NF5688M6
User Manual

Document Version: V1.7
Release Date: March 23, 2023

Environmental Protection

Please dispose of product packaging by recycling at a local recycling center for a greener planet.

Trademarks

All the trademarks or registered trademarks mentioned herein may be the property of their respective holders.

Security Statement

We are intensely focused on server product safety and have placed a high priority on this. For a better understanding of our server products, carefully read through the following security risk statements.

- When servers are to be repurposed or retired, it is recommended to restore their firmware factory settings, delete information and clear logs from BIOS and BMC to protect data privacy. Meanwhile, we recommend you to wipe the drive data thoroughly and securely with trusted erasing tools. You can use ISQP. Contact us for specific server models to which ISQP is applicable.
- For server open source software statements, please contact us.
- Some interfaces and commands for production, assembly and return-to-depot, and advanced commands for locating faults, if used improperly, may cause equipment abnormality or business interruption. This is not described herein. Please contact us for such information.
- External ports of our servers do not use private protocols for communication.
- Our products will not initiatively obtain or use your personal data. Only when you consent to use certain functions or services, some personal data such as IP address and email address for alerts may be obtained or used during business operation or fault location. We have implemented necessary measures on product functions to ensure personal data security throughout the data lifecycle, including but not limited to data collection, storage, use, transmission, and destruction. Meanwhile, you are obligated to establish necessary user privacy policies in accordance with applicable national/regional laws and regulations to fully protect user personal data.
- Committed to product data security, we have implemented necessary measures on

product functions to protect system operation and security data throughout its lifecycle in strict accordance with relevant laws, regulations and supervision requirements. As the owner of system operation and security data, you are obligated to establish necessary data security policies and take adequate measures in accordance with applicable national/regional laws and regulations to fully protect system operation and security data.

- We will remain committed to the safety of our products and solutions to achieve better customer satisfaction. We have established emergency response procedures and action plans for security vulnerabilities, so that product safety issues can be dealt with in a timely manner. Please contact us for any safety problems found or necessary support on security vulnerabilities when using our products.

Disclaimer

The purchased products, services and features shall be bound by the contract made between the customer and us. All or part of the products, services and features described herein may not be within your purchase or usage scope. Unless otherwise agreed in the contract, we make no express or implied statement or warranty on the contents herein. Images provided herein are for reference only and may contain information or features that do not apply to your purchased model. This manual is only used as a guide. We shall not be liable for any damage, including but not limited to loss of profits, loss of information, interruption of business, personal injury, or any consequential damage incurred before, during, or after the use of our products. We assumes you have sufficient knowledge of servers and are well trained in protecting yourself from personal injury or preventing product damages during operation and maintenance. The information in this manual is subject to change without notice. We shall not be liable for technical or editorial errors or omissions contained in this manual.

Support

Email	Technical Support	serversupport@aivres.com
	RMA/ARMA Support	serversupportusa@aivres.com
Web	Official Website	www.aivres.com
	Service Portal	service.aivres.com

Preface

Abstract

This manual provides an overview about the system and describes how to administer, maintain and troubleshoot our server systems.

Intended Audience

This manual is intended for:

- Technical support engineers
- Product maintenance engineers

It is recommended that server installation, configuration, or maintenance is performed only by experienced technicians who know our servers inside and out.

Notices

- If your purchases do not include our on-site installation service, make sure that you inspect the shipping cartons before unpacking the equipment. If a shipping carton appears severely damaged, water immersed, or the seal or pressure-sensitive adhesive tape (PSA) is broken, report this based on your purchase channel. If you purchased from a third-party supplier, contact your supplier directly; if you purchased through our direct sales stores, contact us for technical support.
- For your safety, please do not disassemble the server's components, extend the configuration or connect other peripherals arbitrarily. You can contact us for our support and guidance.
- Before disassembling the server's components, please be sure to disconnect all the cables connected to the server.
- Please install a product-compatible operating system and use the drivers coming with the server or provided by us. You can go to our official site and find the correct driver of your product based on the prompt. An incompatible operating system or a driver not validated by us may cause compatibility issues and affect the normal use of the product. We will not assume any responsibility or liability for this.
- BIOS and BMC setup is critical in configuring your server properly. Do not alter default settings unless you are familiar with the options and aware of the affect your changes will have on performance. The first time you log in to the BMC,

please change the user password.

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
 DANGER	A potential for serious injury, or even death if not properly handled
 WARNING	A potential for minor or moderate injury if not properly handled
 CAUTION	A potential loss of data or damage to equipment if not properly handled
 IMPORTANT	Operations or information that requires special attention to ensure successful installation or configuration
 NOTE	Supplementary description of manual information

Revision History

Version	Date	Description of Changes
V1.0	2021/05/13	Initial release
V1.1	2021/7/19	Added table names for some tables
V1.2	2021/11/18	Updated the maximum temperature gradient in Table 8-1
V1.3	2022/05/19	• Deleted relevant contents on expanded operating temperature in 8.5 and 8.6 • Updated DC Power Supply Requirement • Updated Figure 8-1 Fan Blade Safety Protection and Figure 8-2 Multi-power safety protection, deleted Figure 8-3 Leakage current protection • Updated DIMM Population Rules

Version	Date	Description of Changes
		• Updated the gross weight value in Table 2-1 • Updated cable routing for 8 SAS configuration in 4.7 • Added Table 2-3 and Table 2-4
V1.4	2022/07/09	• Updated all figures • Minor modifications to 4.5 Replacing System Components and 4.6 Firmware Update and Configuration • Updated Chapter 7 Troubleshooting
V1.5	2022/08/05	Updated the location of A connector of cable 1 and cable 2 in Table 4-3
V1.6	2022/08/16	Added the removal and installation of the screw securing PCIe card in Section 4.5.8
V1.7	2023/03/23	Added the operation place not suitable for the product in 1.1 Warnings

Table of Contents

1 Safety Instructions

1.1 Warnings

Please follow the instructions below for safety. Failure to do so could result in potential dangers that may cause property loss, personal injury or death.

- The system can be serviced only by trained service technicians because of high voltages and energy hazards. Do not attempt to service the system yourself unless informed by us.
- Use the correct external power source. Operate the product only from the type of power source indicated on the nameplate label of the chassis. To help protect your system/components from sudden, transient increases and decreases in electrical power, please use voltage stabilizers or uninterruptible power supplies.
- Do not lengthen a power cord by connecting two or more power cords. If you need a longer power cord, please contact us.
- Use only the power supply components that come with the server, such as power cords and power strips (if provided). For your safety and safety of the equipment, please do not replace power cords or plugs randomly.
- To help prevent electric shock, plug the system/components and peripheral power cords into properly grounded electrical outlets. Connect the three-prong power plug to the three-prong AC power outlet that is well grounded and within reach. Do not use adapter plugs or remove the grounding prong from a cable. If the grounded conductors are not installed or you are not sure whether there is appropriate grounding protection, do not use or attempt to operate the equipment without consulting an electrician.
- Do not push any objects into the openings of the system. Doing so may cause short circuit of internal components and even fire or electric shock.
- Keep the system far away from radiators and heat sources. Be sure not to block the air vents.
- Do not spill food or liquids on your system components. Do not use the product in wet or dusty environments.
- Using an incompatible battery may cause explosion. Before replacing the battery, consult the manufacturer and choose batteries of the same or equivalent type suggested by them. Do not disassemble, crush or puncture batteries, short-circuit external contacts, dispose of in fire or water, or expose

them to temperatures higher than 60°C (140°F). Do not attempt to open or service batteries. Dispose of batteries properly. Do not dispose of batteries, circuit boards or other components that may contain batteries along with other wastes. For battery recycling, contact the local recycling center.

- Before installing systems in a rack, install front and side stabilizers on stand-alone racks or the front stabilizer on racks joined to other racks. Failure to install stabilizers accordingly before installing systems in a rack could cause the rack to tip over, potentially resulting in bodily injury under certain circumstances. Therefore, always install the stabilizer(s) before installing components in the rack. After installing system/components in a rack, never pull more than one component out of the rack on its slide assemblies at one time. The weight of more than one extended component could cause the rack to tip over and may result in serious injury.
- Do not move racks by yourself. Due to the height and weight of the rack, a minimum of two people should accomplish this task.
- It is prohibited to directly short-circuit the busbar. Please do not touch the busbar when the rack is powered on.
- The product cannot be used in places where children may appear.

1.2 Cautions

The following considerations may help avoid problems, such as component damage or data loss.

- In the event of the following, please unplug the power plug from the outlet and contact us:
  - The power cords or plugs have been damaged.
  - The product has been exposed to water.
  - The product has fallen or has been damaged.
  - Objects have fallen into the product.
  - The product does not operate correctly when you follow the operating instructions.
- If the system gets wet or damp, follow steps below:
  a. Power off the system. Disconnect the power cords, wait 10 to 20 seconds, and then remove the top cover.
  b. Move the system to a well-ventilated area to dry it for at least 24 hours and ensure it is completely dried.

c. Close the top cover, reconnect the system to the electrical outlet, and then power on.

d. In case of operation failure or other abnormal situations, contact us for technical support.

- Position system cables and power cords carefully; route cables so that they cannot be stepped on or tripped over. Be sure that nothing rests on any cables.
- Before removing the top cover or accessing any internal component, shut down the system and wait until the equipment is cooled down. To help avoid possible damage to the motherboard, wait 5 seconds after turning off the system before removing a component from the motherboard or disconnecting a peripheral device from the system.
- If there are modem, telecom or LAN options installed in the system, observe the following guidelines:
  - In case of lightning, do not connect or use a modem. There may be a risk of electrical shock from lightning.
  - Never connect or use a modem in a wet environment.
  - Do not plug a modem or telephone cable into the network interface controller (NIC) receptacle.
  - Disconnect the modem cable before removing the top cover, touching or installing internal components, or touching an uninsulated modem cable or jack.
- To help protect against electrostatic discharge, observe the following guidelines:
  - To prevent static damage, discharge static electricity from your body before you touch any electronic components. You can do so by touching metal grounding objects, such as an unpainted metal chassis surface.
  - To avoid damage, keep static-sensitive devices in their anti-static packages until you are ready to install them.
  - While you work, periodically touch a grounding conductor or an unpainted metal chassis surface to dissipate any static electricity that might harm internal components.
- When removing or installing internal components upon receiving proper authorization from us, observe the following guidelines:

  a. Power off the system and unplug it from its power source. Unplug any and all cables from the system, including peripherals. When disconnecting a cable, pull on its connector, not on the cable itself.

b. Allow the product to cool before removing the top cover or touching internal components.

c. Discharge static electricity from your body by touching metal grounding objects before accessing any electronic component.

d. Avoid applying excessive force to prevent component damage or arm scratches during component installation or removal.

e. Handle components and cards with care. Do not touch the components or connectors on a card. Hold a card or component by its edges or metal brackets.

- Observe the following precautions for rack stability and safety:

  - Before working on the rack, make sure that the stabilizers are secured to the rack, extended to the floor, and that the full weight of the rack rests on the floor.

  - Always load the rack from the bottom up, and load the heaviest item in the rack first.

  - When pulling out a component from the rack, avoid applying excessive force to keep the rack level and stable.

  - Use caution when pressing the component rail release latches and sliding a component into or out of a rack; the rails can pinch your fingers.

  - Do not overload the AC supply branch circuit that provides power to the rack. The total rack load should not exceed 80% of the branch circuit rating.

  - Ensure that proper airflow is provided to components in the rack.

  - Do not step on or stand on any component when servicing other components in a rack.

2 Product Specifications

2.1 Introduction

The NF5688M6 is a high-end 2-socket rack server that features the third generation Intel® Xeon® Scalable processors and is designed for high-end applications such as AI training, reasoning, video encoding and decoding. The server maintains high quality and reliability of our servers and achieves innovation and a breakthrough in compute performance, scalability, configuration elasticity and intelligent management. Hence, it is perfect for customers in telecommunications, finance and Internet industry with the most demanding workloads.

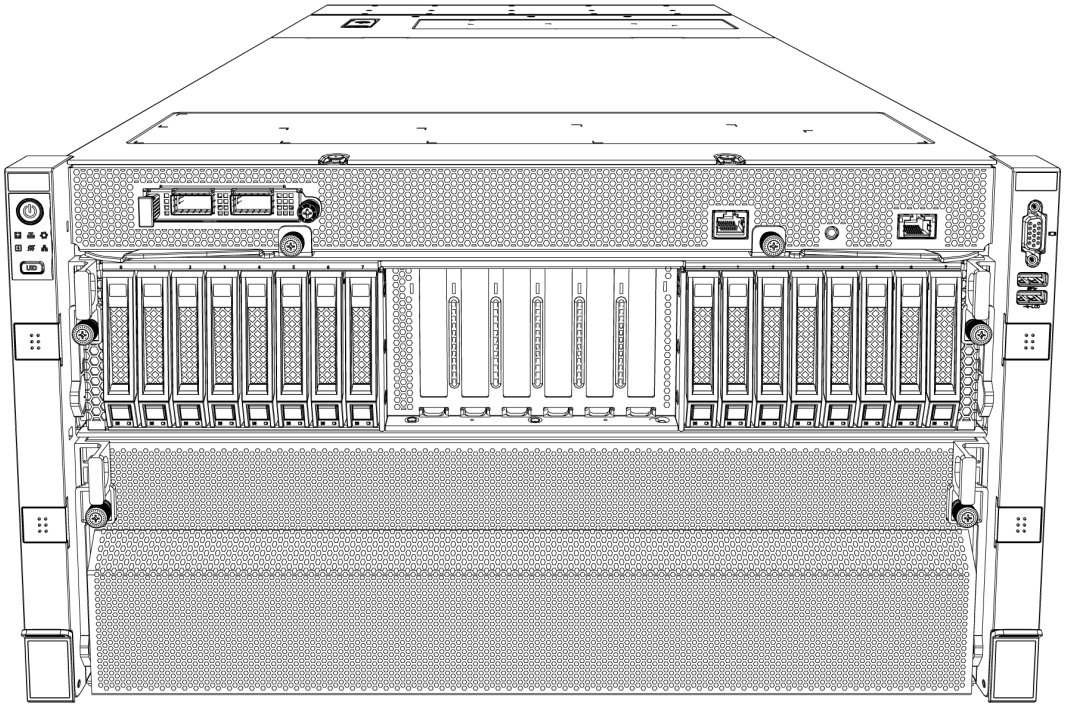
Key Features:

- 2 Intel® Xeon® Scalable processors with TDP up to 270 W
- Up to 3 UPI links at up to 11.2 GT/s
- Up to 32 DDR4 DIMMs (RDIMMs, LRDIMMs and NVDIMMs [Only Barlow Pass]) with memory mirroring and memory sparing supported
- Up to 16 × 2.5-inch SAS/SATA drive at the front
- 1 OCP 3.0 expansion card
- Up to 12 standard HHHL PCIe expansion cards
- NVIDIA Delta GPUs
- Motherboard integrated with an AST2500 BMC chip with KVM functionality as standard
- Hot-swap LCD module and remote monitoring on mobile devices via BMC
- Intel remote BMC debug
- Modular design of drives, PCI expansion cards, PSUs and fans, enabling tool-less maintenance
- Hot-swap and redundant CRPS power supplies of 80 Plus Platinum or higher rank with PMBus and NM 4.0 functionality
- Hot-swap fan/fan cage design; the fan is N+1 redundant and of low noise

2.1.1 16 × 2.5-inch Drive Configuration

Up to 16 front 2.5-inch SAS/SATA drives, as shown in the figure below.

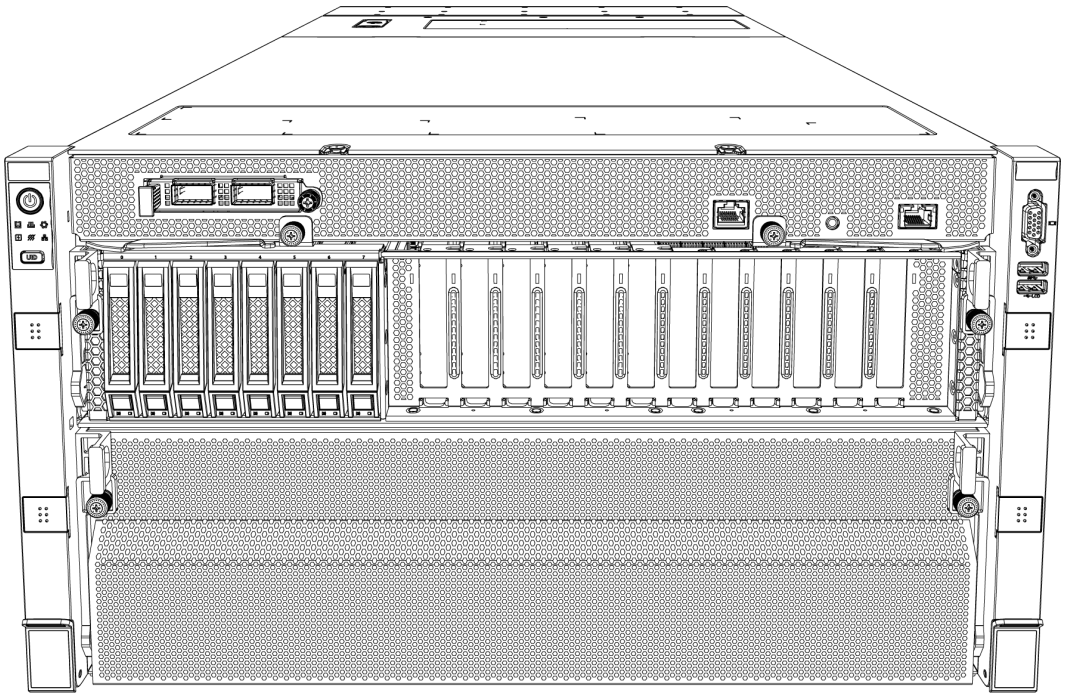
Figure 2-1 16 × 2.5-inch Drive Configuration



2.1.2 8 × 2.5-inch Drive Configuration

Up to 8 front 2.5-inch SAS/SATA/NVMe drives, as shown in the figure below.

Figure 2-2 8 × 2.5-inch Drive Configuration



2.2 Features and Specifications

Table 2-1 Features and Specifications

Launch Time	2021/5	
Processor	Processor Type	Intel® Xeon® Scalable processors (Up to 2 CPUs with TDP up to 270 W)
	Socket	Two
Chipset	Chipset Type	Intel C621A
Memory	Memory Type	RDIMM, LRDIMM and NVDIMM (Only Barlow Pass)
	Memory Slot Qty	32 (For detailed population rules, see DIMM Population Rules)
I/O Port and UID LED	USB Port	• 1 rear USB 3.0 port • 1 front USB 3.0 port • 1 front USB 2.0 port
	Video	1 front and 1 rear VGA ports
	Serial Port	1 front serial port
	UID Button and LED	1 UID LED & button
Display Controller	Controller Type	Integrated in the Aspeed AST2500 chip, up to 1920 × 1200 resolution
SAS Backplane	SAS 3.0 Backplane	Hot-swap SAS/SATA/NVMe drives supported
NIC	NIC Controller	OCP NIC 3.0 module supported
Management Chip	Management Chip	Integrated with 1 independent 1000 Mbps network port, dedicated for IPMI remote management
Expansion Slot	PCIe Expansion Slot	• Riser card supports HHHL cards • Riser1 (12-card SKU) supports 10 PCIe 4.0 x16 and 2 PCIe 4.0 x8 cards • Riser2 (6-card SKU) supports 6 PCIe 4.0 x16 cards
Drive	Drive Type	2.5-inch SAS/SATA/NVMe drives (Actual configuration may vary depending on the model you purchased)
External Storage Drive	Optical Drive	External USB optical drives

	T-flash Card	Internal TF card
Power Supply	Specification	• 3000 W output power • 3+3 redundant • 6 PSUs • PMBus and Node Manager 4.0 functionality
	Power Input	Please refer to the power input on the nameplate label of the chassis
Physical	Outer Packaging Dimensions (H × W × D)	570 × 800 × 1200 mm (22.44 × 31.50 × 47.24 in.)
	Chassis Dimensions (H × W × D)	263.9 × 447 × 850 mm (10.39 × 17.60 × 33.46 in.)
	Product Weight	The weight of 16 × 2.5-inch configuration (with 16 drives) is the same as that of 8 × 2.5-inch configuration (with 8 drives) • Net weight: 88 kg (194 lbs) • Gross weight: 126 kg (277.78 lbs) (including chassis, shipping carton, rails and accessory box)

2.3 PSU Efficiency

Table 2-2 Platinum PSU Efficiency

Rated Power	@20% Load	@50% Load	@100% Load	PF@50% Load
3000 W	90%	94%	91%	0.98

Table 2-3 Relevant Information Required by Erp Lot9

EU Regulation 2019/424 **Server configurations**	**High-end performance configuration (W)**	**Low-end performance configuration (W)**
(h) idle state power	200.8	196
(i) list of all components for additional idle power allowances, if any (additional PSU, HDDs or SSDs, additional memory, additional buffered DDR channels, additional I/O devices);	265.32	167.79
(j) maximum power, expressed in Watts and rounded to the first decimal place;	523.4	485.1
(k) declared operating condition class;	A2	A2
(l) idle state power (Watts) at the higher boundary temperature of the declared operating condition class;	201	197
(m) the active state efficiency and the performance in active state of the server;	42.4	28.4

Table 2-4 Additional Idle Power Allowances for Extra Components

(i) List of components for additional power allowance		**High-end performance configuration (W)**	**Low-end performance configuration (W)**
CPU Performance	1 socket: 10 × $Perf_{CPU}$ W 2 socket: 7 × $Perf_{CPU}$ W	131.88	80.43
Additional PSU	10 W per PSU	0	0
HDD or SSD	5,0 W per HDD or SSD	10	10
Additional memory	0,18 W per GB	91.44	45.36

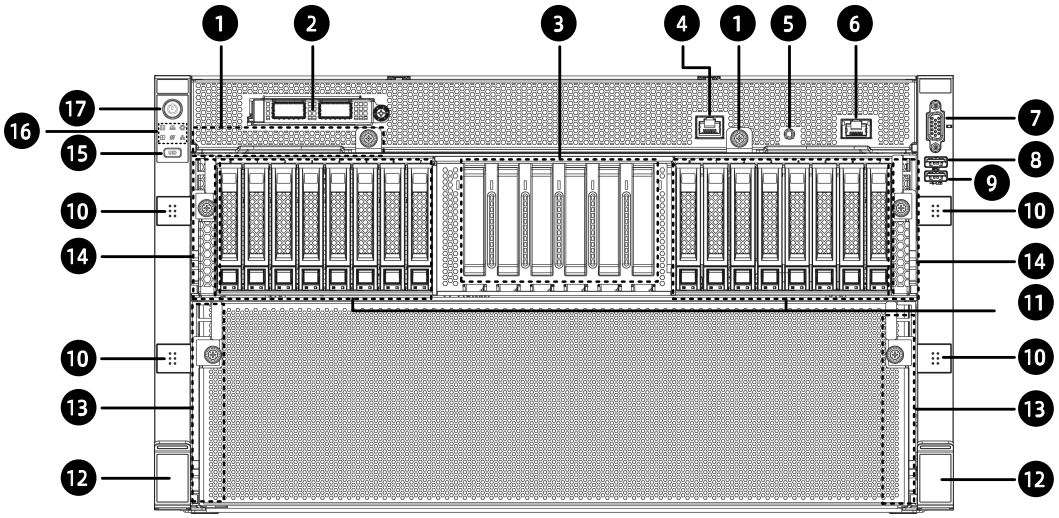
(i) List of components for additional power allowance		High-end performance configuration (W)	Low-end performance configuration (W)
Additional buffered DDR channel	4,0 W per buffered DDR channel	32	32
Additional I/O devices	< 1 Gb/s: No Allowance = 1 Gb/s: 2,0 W/Active Port > 1 Gb/s and < 10 Gb/s: 4,0 W/Active Port ≥ 10 Gb/s and < 25Gb/s: 15,0 W/Active Port ≥ 25 Gb/s and < 50Gb/s: 20,0 W/Active Port ≥ 50 Gb/s 26,0 W/Active Port	0	0
Total power		265.32	167.79

3 Product Overview

3.1 Front Panel

3.1.1 16 × 2.5-inch Drive Configuration

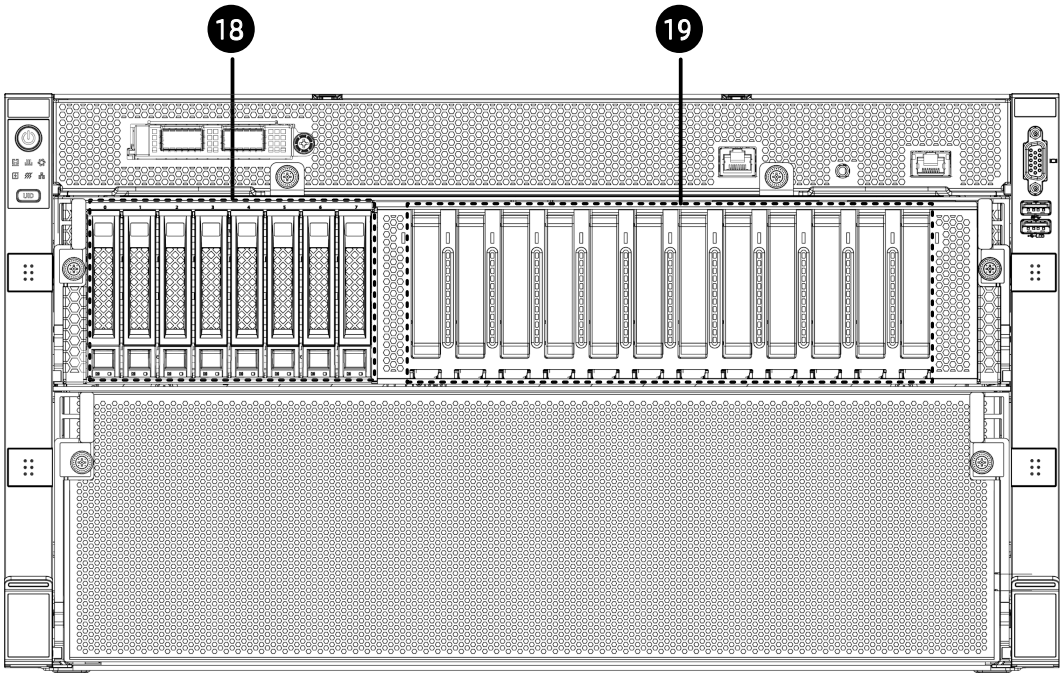
Figure 3-1 Front View of 16 × 2.5-inch Drive Configuration



Item	Feature	Item	Feature
1	MB Drawer Handle × 2	10	Screw Cover × 4
2	OCP NIC 3.0 Module	11	Drive Bay × 16
3	PCIe Cards (Up to 6)	12	Ear Latch × 2
4	System Serial Port	13	GPU Drawer Handle × 2
5	BMC Serial Port	14	Switch Drawer Handle × 2
6	BMC Management Network Port	15	UID/BMC RST Button and LED
7	VGA Port	16	LEDs
8	USB 3.0 Port	17	Power Button and LED
9	USB 2.0/LCD Port		

3.1.2 8 × 2.5-inch Drive Configuration

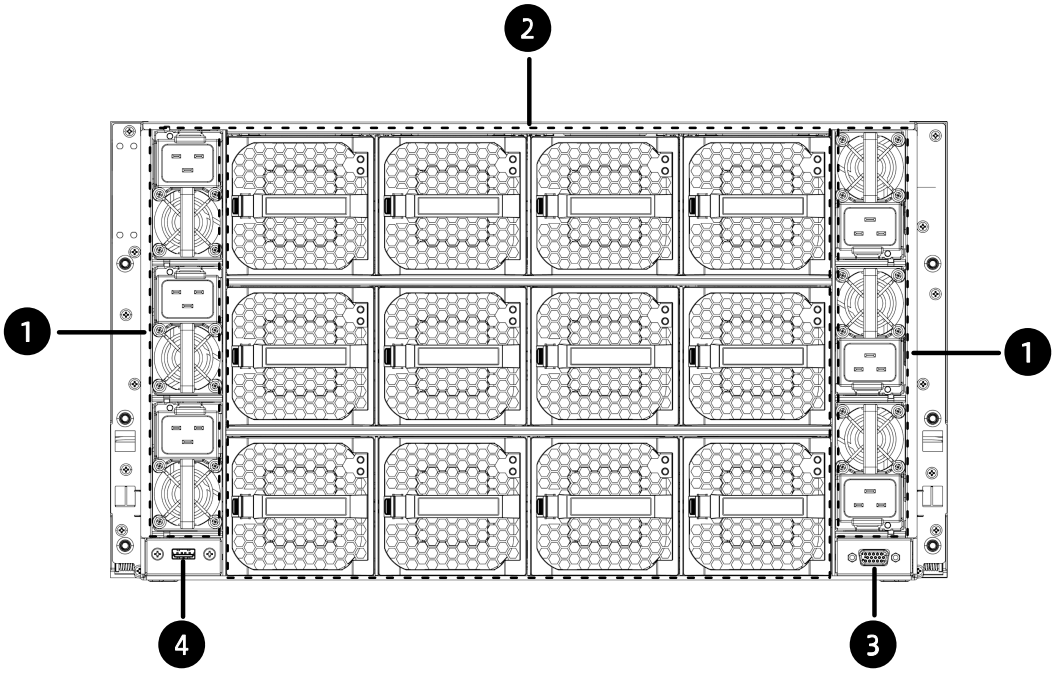
Figure 3-2 Front View of 8 × 2.5-inch Drive Configuration



Item	Feature
18	Drive Bay × 8
19	PCIe Cards (Up to 12)

3.2 Rear Panel

Figure 3-3 Rear View



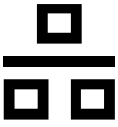
Item	Feature
1	PSU × 6
2	Fan Module × 12
3	VGA Port
4	USB 3.0 Port

3.3 Buttons and LEDs

3.3.1 Front Panel Buttons and LEDs

Table 3-1 Front Panel Buttons and LEDs

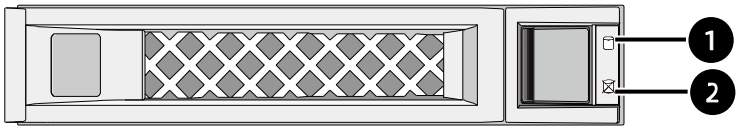
Item	Icon	Item	Description
1		Power Button and LED	• Off = No power • Solid green = Power on state • Solid orange = Standby state • Long press 4 seconds to force a shutdown

Item	Icon	Item	Description
			Note: Follow the prompt under different OS to shut down the OS. Short press the power button to power on the system in standby state.
2		System Status LED	• Off = Normal • Flashing red (1 Hz) = A non-critical warning occurs • Solid red = A critical warning occurs
3		Memory Status LED	• Off = Normal • Flashing red (1 Hz) = A non-critical warning occurs • Solid red = A critical warning occurs
4		Fan Status LED	• Off = Normal • Flashing red (1 Hz) = A non-critical warning occurs • Solid red = A critical warning occurs
5		Power Status LED	• Off = Normal • Flashing red (1 Hz) = A non-critical warning occurs • Solid red = A critical warning occurs
6		System Overheat LED	• Off = Normal • Flashing red (1 Hz) = A non-critical warning occurs • Solid red = A critical warning occurs
7		Network Status LED	• NA (No LOM)
8		UID/RST Button and LED	• Off = System unit not identified • Solid blue = System unit identified

Item	Icon	Item	Description
			• Flashing blue = System being operated remotely Note: The UID LED turns on when activated by the UID button or via ISBMC. Long press the UID button 6s to reset BMC.

3.3.2 Drive Tray LEDs

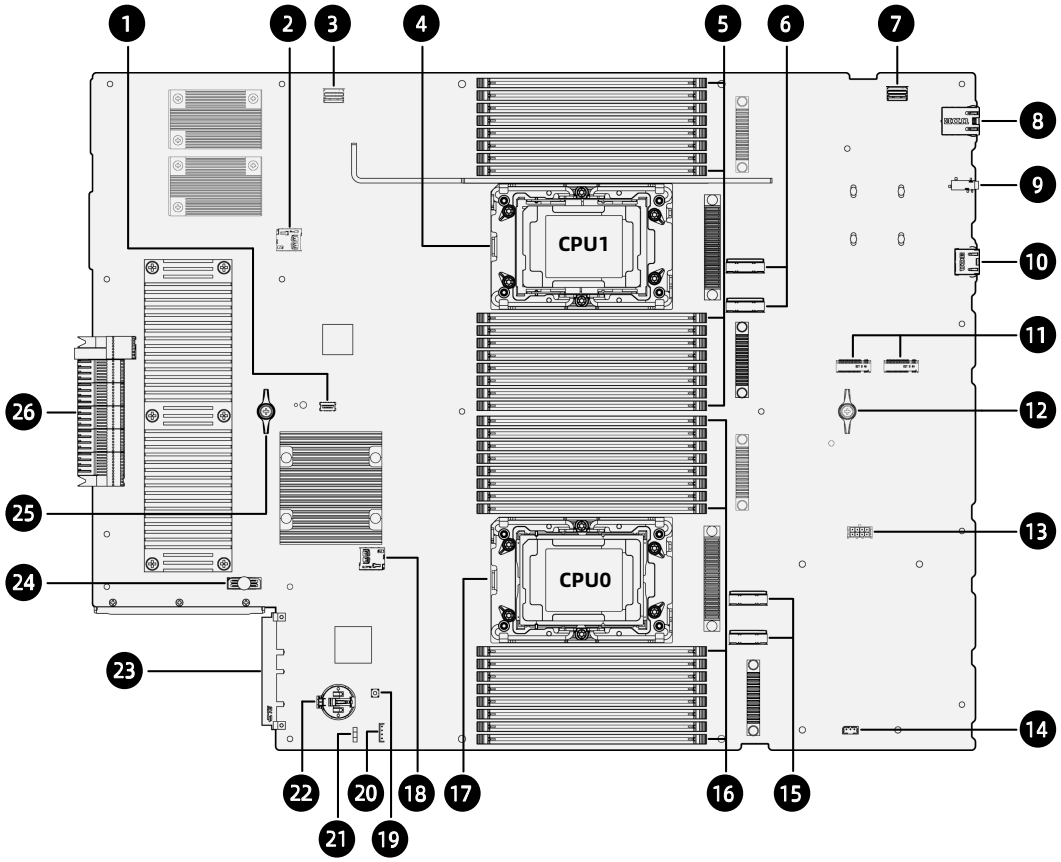
Figure 3-4 Drive Tray LEDs



Item	Feature	Description
1	Activity LED	• Solid green = Drive is present but not in use • Flashing green = Drive is present and in use
2	Error LED	• Solid red = Drive error or failed • Solid blue = Drive is being located • Solid pink = RAID rebuilding

3.4 Motherboard Layout

Figure 3-5 Motherboard Connectors



Item	Feature	Item	Feature
1	TPM Connector	14	Intrusion Switch Connector
2	BMC_TF Card Slot	15	Slimline x8 Connector × 2
3	BMC Management Network Port Connector	16	DIMM Slots (CPU0)
4	CPU1	17	CPU0
5	DIMM Slots (CPU1)	18	SYS_TF Card Slot
6	Slimline x8 Connector × 2	19	Power Button
7	BMC Management Network Port Connector	20	RAID Key Connector
8	BMC Management Network Port	21	CLR_CMOS Jumper
9	BMC Serial Port	22	Battery Socket
10	System Serial Port	23	OCP Retimer Card Connector
11	M.2 SSD Connector × 2	24	XDP Connector
12	MB Handle	25	MB Handle

Item	Feature	Item	Feature
13	OCP 3.0 Power Connector	26	Bridge Module Connector

3.5 Motherboard Jumper Introduction

CAUTION

For your personal safety and protection of the equipment, it is necessary to shut down the system and disconnect the power cables.

For the location of CLR_CMOS jumper, see Motherboard Layout.

Table 3-2 CMOS Jumper Cap

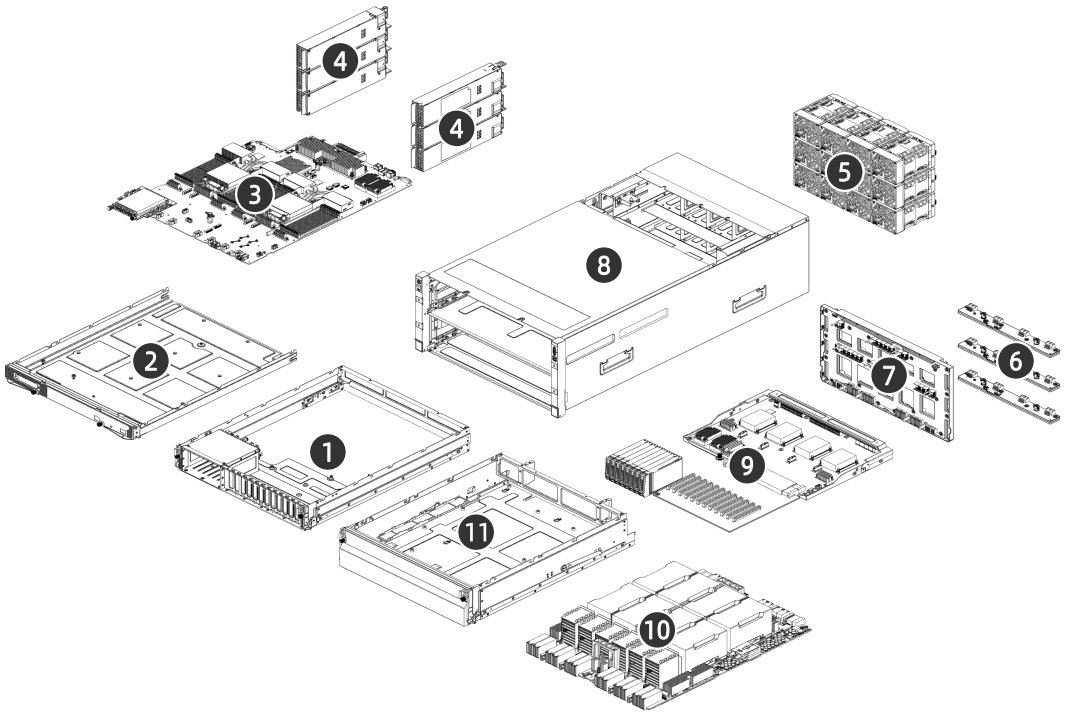
Item	Description	Function
J122 (CLR_CMOS)	CMOS clear jumper	• Short-circuit pins 1-2 to restore to normal status. • Short-circuit pins 2-3 to clear CMOS.

To clear the CMOS setting via a jumper:

1. Power down the server and unplug the power cords from the electrical outlet.
2. Wait for 5 seconds.
3. Locate the CLR_CMOS jumper cap on the motherboard.
4. Move the jumper cap from the default pins 1-2 to pins 2-3.
5. Plug in the power cords and power on the server, and then wait for 10 seconds for the CMOS to clear.
6. Power down the server, unplug the power cords, and then wait for 5 seconds again.
7. Move the jumper cap back to the default pins 1-2.
8. Reconnect the power cords and power on the server.

3.6 System Parts Breakdown

Figure 3-6 Exploded View (Demonstrated with 8 × 2.5-inch Drive Configuration)



Item	Feature	Item	Feature
1	Switch Drawer	7	Mid-plane Board
2	Motherboard Drawer	8	6U Chassis
3	Motherboard + OCP Module	9	Switch Board + Riser + Drive Modules (8-bay)
4	PSU × 6	10	NVIDIA HGX GPU Module
5	Fan Module × 12	11	GPU Drawer
6	Fan Board × 3		

4 Maintenance and Component Replacement

4.1 Installing the Server into the Rack

For detailed information on installing the server into the rack with rails supplied by us, see the rack server installation guide.

CAUTION

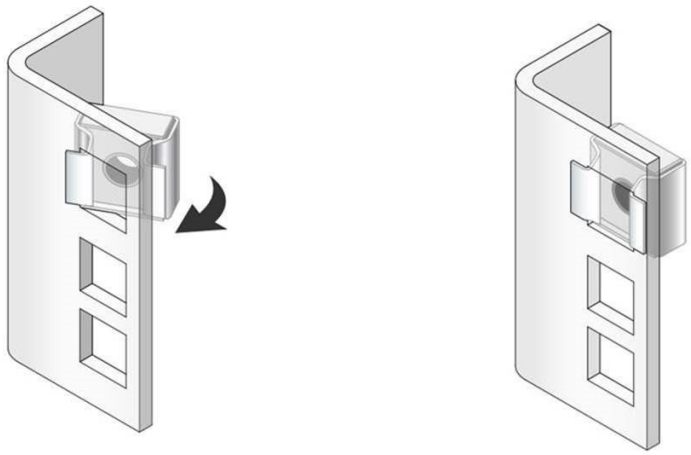
We recommend using rails supplied by us as 6U servers are very heavy. If you would like to use rails not provided by us, please contact us first to ensure the server can be installed to the rack safely and properly. The loading-bearing capacity of self-prepared rails must be higher than 95 kg. If not, you MUST use our rails as using these rails not provided by us may cause such risks as installation failure. We will not assume any responsibility or liability for any damage or injury caused by this.

WARNING

To reduce the risk of personal injury or damage to the equipment, DO secure the mounting ears to the mounting flanges firmly to prevent server from moving or sliding out from the cabinet.

4.1.1 Installing Floating Nuts

Figure 4-1 Installing a Floating Nut



1. Determine the mounting flange hole for the floating nut based on the position of the mounting ear.
2. Insert one side of the floating nut into the mounting flange hole.
3. Press the other side with a screwdriver until the floating nut is fully seated into the mounting flange hole.
4. Follow the preceding steps for the other floating nut on the other mounting flange. Make sure the two floating nuts are installed at the same height.

4.1.2 Securing Floating Nuts

Secure the mounting ears to the floating nuts with captive screws.

4.2 Powering On/Off the Server

To power on or off the server, press the power button.

To completely shut down the server, press the power button and disconnect the power cords from the server.

DANGER

To reduce the risk of personal injury, electric shock, or damage to the equipment, remove the power cords to disconnect power from the server. The power button does not shut off the system power completely. Portions of the power supply and internal circuitry remain active until AC power is removed.

4.3 Preparing for Component Replacement

Read the installation instructions for all the hardware operations before removing or re-installing the components. All prerequisites must be completed prior to installation or maintenance.


WARNING

To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching.


CAUTION

To prevent damage to electrical components, properly ground the server before installation. Improper grounding can cause electrostatic discharge.

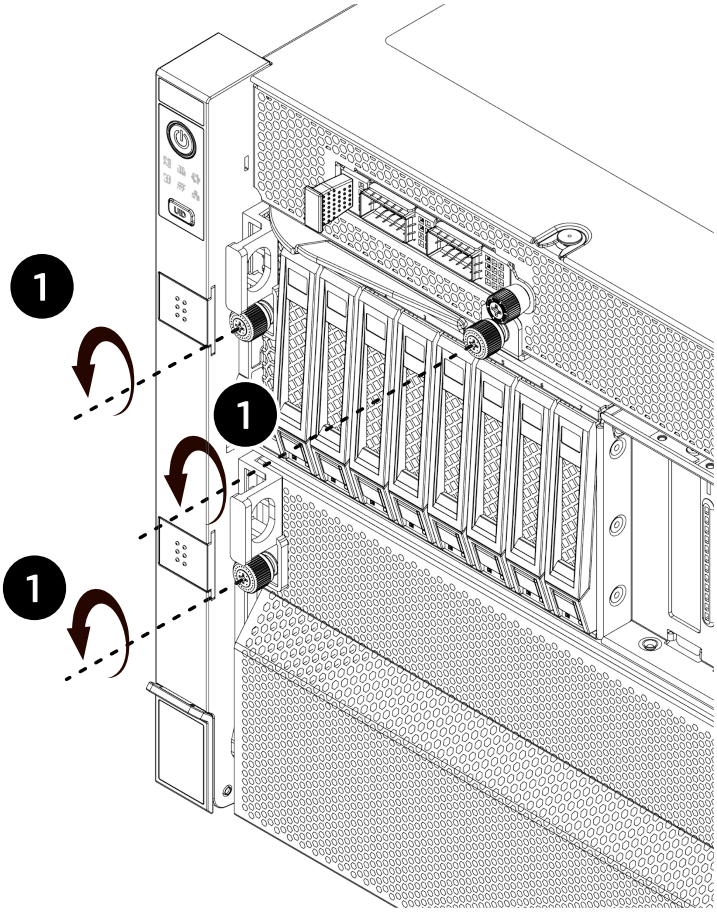
4.4 Pulling Out the Motherboard Drawer/Switch Drawer/GPU Drawer from the Server


WARNING

To reduce the risk of personal injury or equipment damage, be sure that the server is adequately stabilized before you extend a drawer out of it.

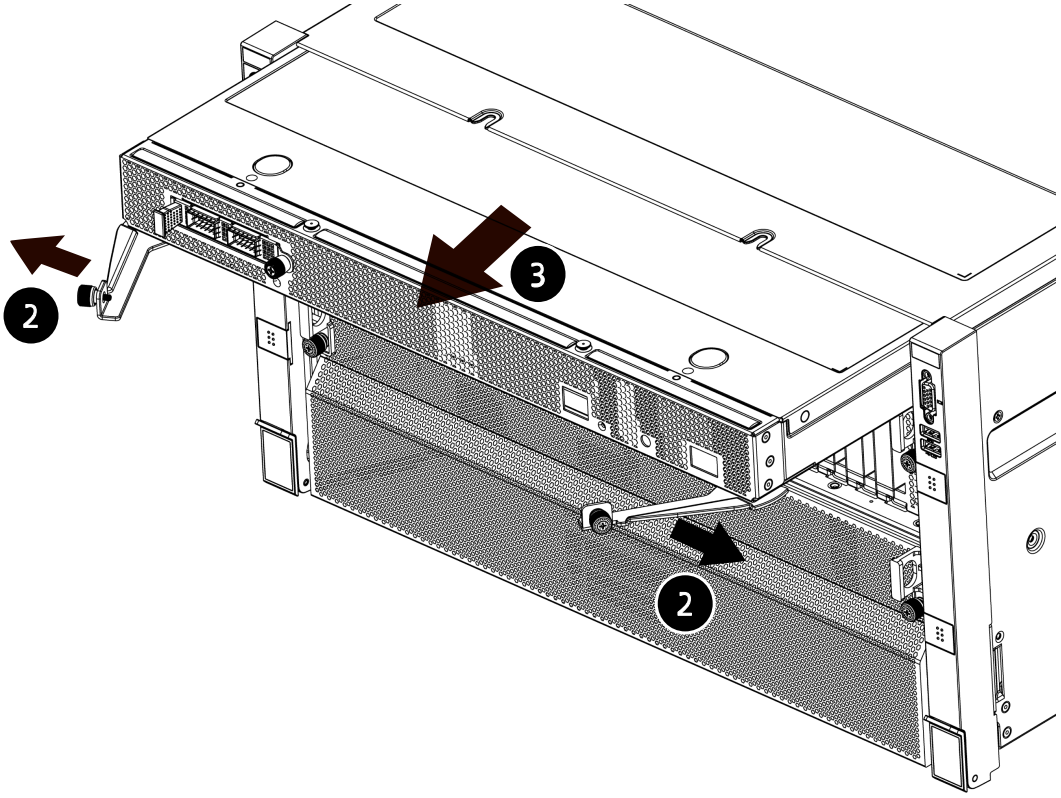
1. Loosen the screws securing the motherboard drawer/switch drawer/GPU drawer to the server.

Figure 4-2 Loosening the Screws Securing the Drawers



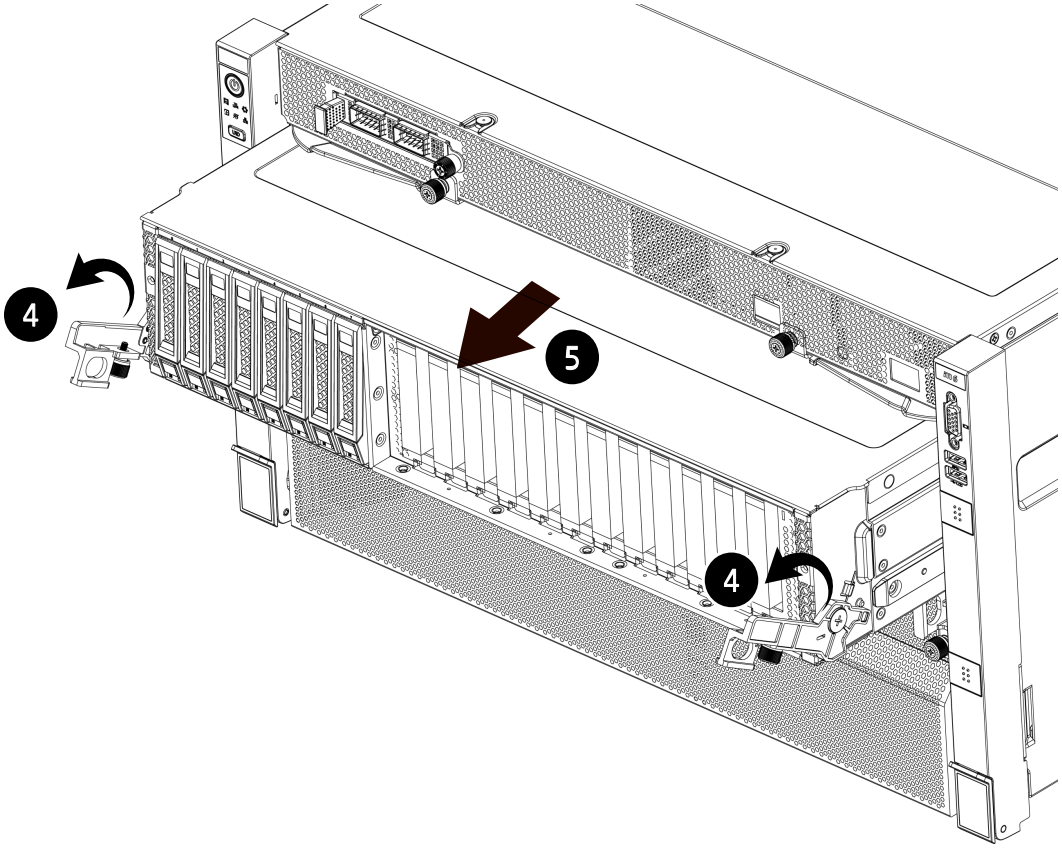
2. Fully open the motherboard drawer handle as indicated by arrow 2, and then grasp and pull out the handle as indicated by arrow 3 to slide the motherboard drawer out.

Figure 4-3 Pulling Out the Motherboard Drawer



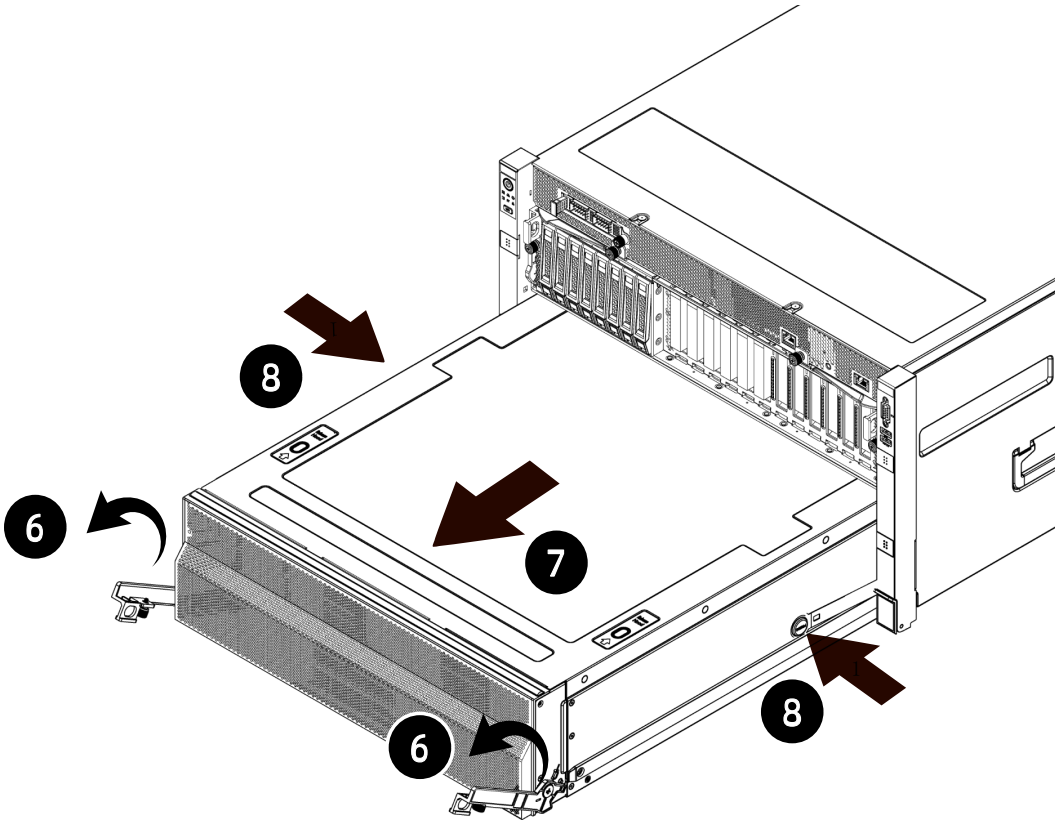
3. Fully open the switch drawer handle as indicated by arrow 4, and then grasp and pull out the handle as indicated by arrow 5 to slide the switch drawer out.

Figure 4-4 Pulling Out the Switch Drawer



4. Fully open the GPU drawer handle as indicated by arrow 6, and then grasp and pull out the handle as indicated by arrow 7 to slide the switch drawer out a little until the two buttons appear. Press and hold the two buttons as indicated by arrow 8 to slide the drawer out.

Figure 4-5 Pulling Out the GPU Drawer



5. After installation or maintenance, slide the corresponding drawer all the way back into the server. Close the two handles until they are in place. Then secure each handle with a screw.

4.5 Replacing System Components

NOTE

- When installing or removing system components, always wear anti-static gloves or an anti-static wrist strap.
- During installation or removal of any hardware, always ensure all data is backed up properly.
- Disconnect the server and all attached devices from their electrical outlets.
- There is no need to remove power from the server when replacing hot-swap components.
- If more than one option is to be installed, read the installation instructions for all the hardware options and identify similar steps to streamline the installation process.

Component appearance may be different on actual models.

4.5.1 Replacing the Top Cover of the Motherboard Drawer

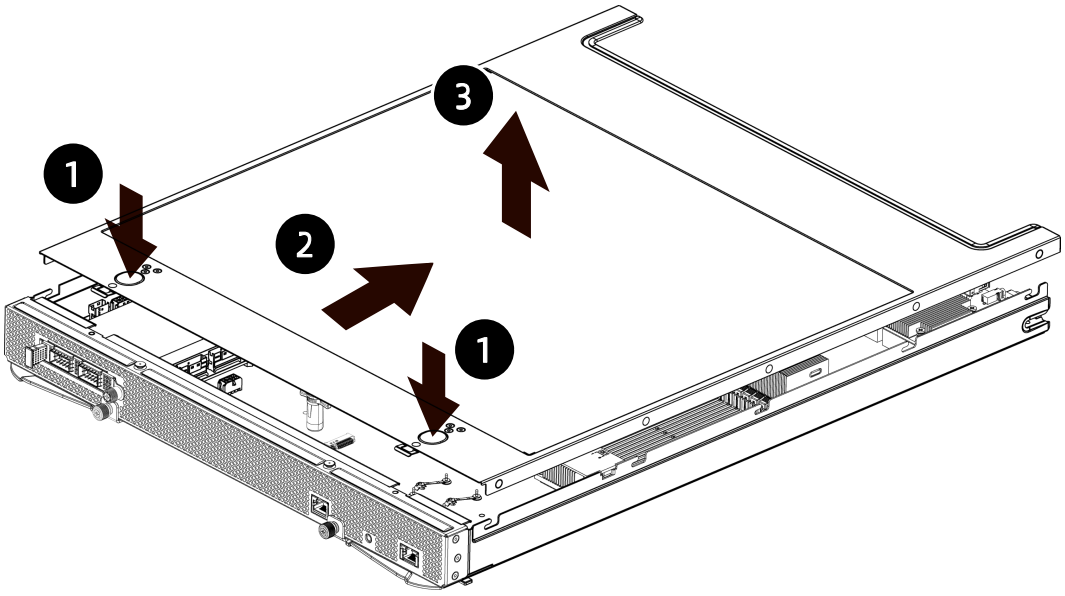
CAUTION

For proper cooling, do not operate the server without the top cover, air ducts, dummies, or blanks installed. If the server supports hot-swap components, minimize the amount of time the top cover is open.

To remove the top cover of the motherboard drawer:

1. Power down the server.
2. Pull out the motherboard drawer of the server. (See 4.4 Pulling Out the Motherboard Drawer/Switch Drawer/GPU Drawer from the Server for detailed steps).
3. Press the two buttons on the top cover in the direction of arrow 1 in the figure below.
4. Push the top cover toward the rear of the chassis as indicated by arrow 2 and lift it straight up as indicated by arrow 3.

Figure 4-6 Removing the Top Cover of the Motherboard Drawer



To install the top cover of the motherboard drawer:

1. Lower down the top cover vertically onto the chassis, with its standoffs aligned with the J-slots on the chassis.

2. Slide the top cover toward the front of the chassis until it stops. Ensure the top cover is in the closed position.
3. Push the motherboard drawer back into the server. Close the two handles until they are in place. Then secure each handle with a screw.

4.5.2 Replacing the Air Duct

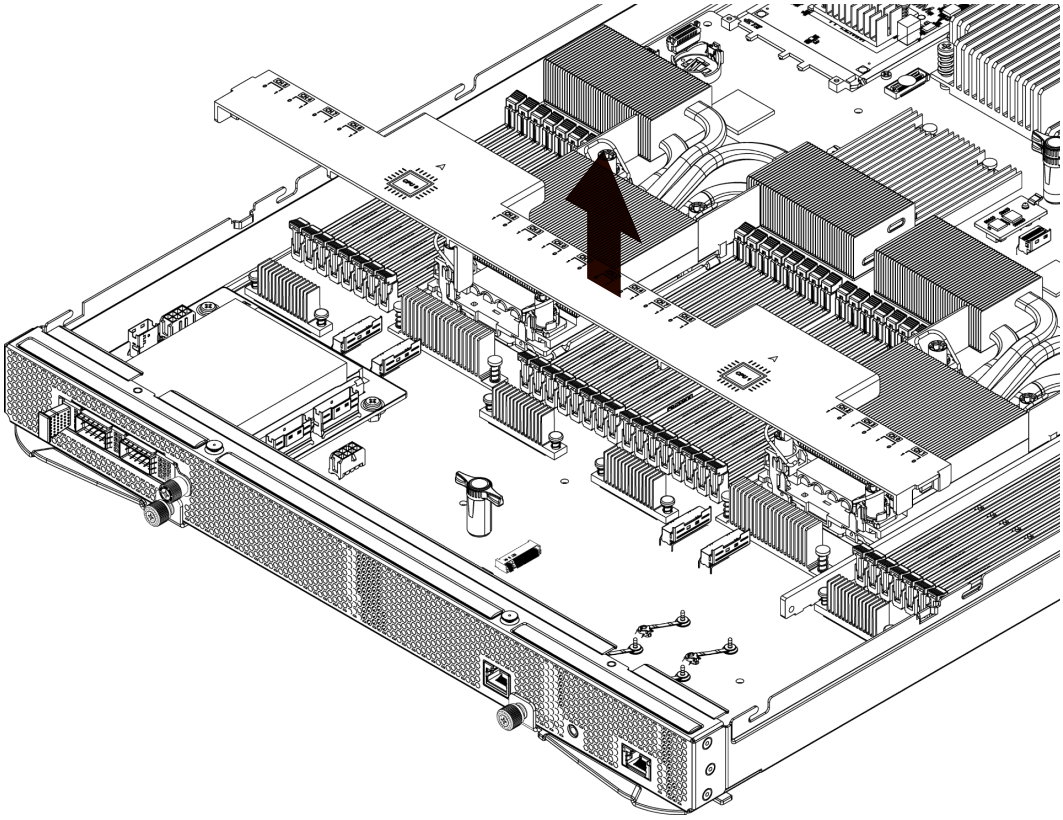
CAUTION

For proper cooling, do not operate the server without the top cover, air ducts, dummies, or blanks installed. If the server supports hot-swap components, minimize the amount of time the top cover is open.

To remove the air duct:

1. Power down the server.
2. Pull out the motherboard drawer of the server.
3. Remove the top cover of the motherboard drawer.
4. Lift up the air duct to remove it.

Figure 4-7 Removing the Air Duct



To install the air duct:

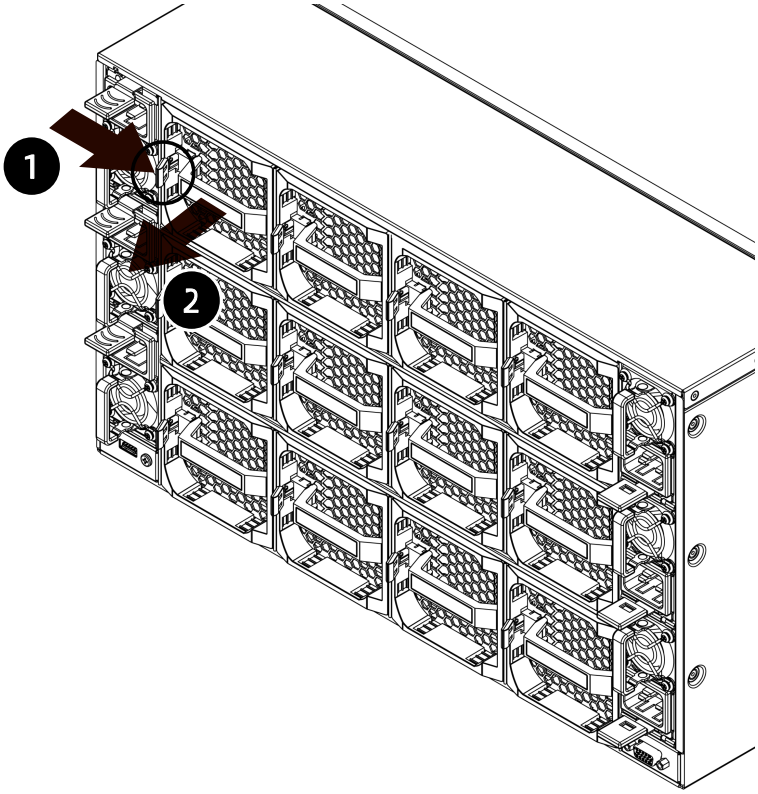
1. Lower down the air duct vertically into the chassis.
2. Install the top cover of the motherboard drawer.
3. Push the motherboard drawer back into the server. Close the two handles until they are in place. Then secure each handle with a screw.

4.5.3 Replacing a Hot-Swap Fan Module

To remove a fan module:

1. Press the latch securing the fan module as indicated by arrow 1.
2. Pull out the fan module as indicated by arrow 2. Put it into an anti-static bag.

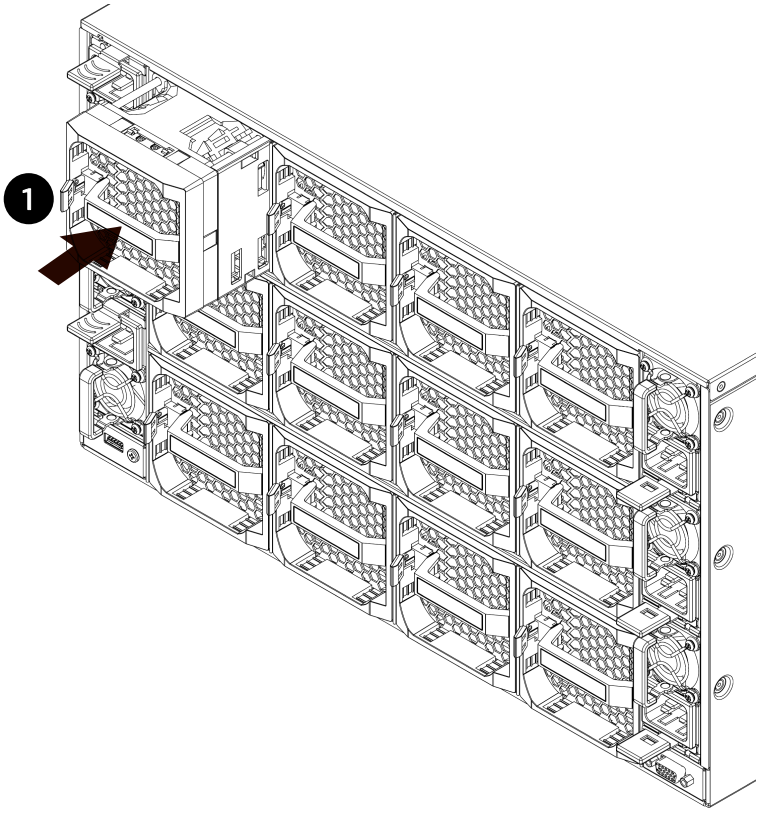
Figure 4-8 Removing the Fan Module



To install the fan module:

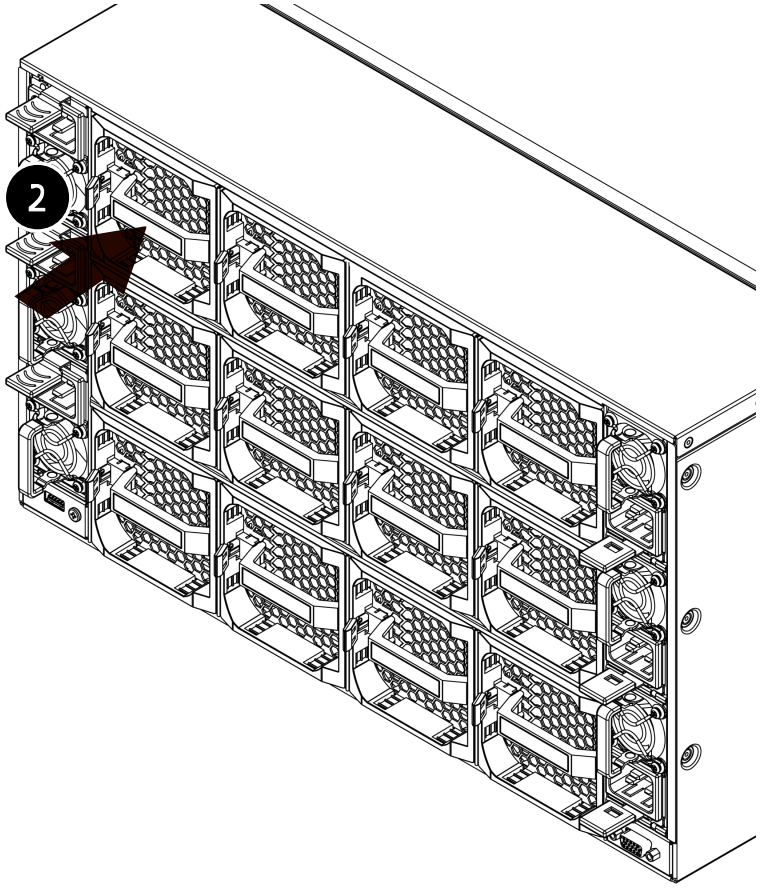
1. Take a new fan module out from the anti-static bag.
2. Insert the fan module into the fan bay as indicated by arrow 1.

Figure 4-9 Installing the Fan Module



3. Make sure the fan module is secured in place.

Figure 4-10 When the Fan Module is Secured

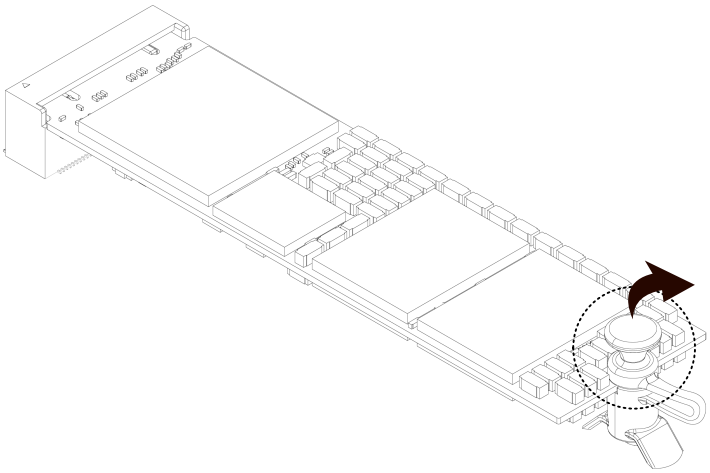


4.5.4 Replacing an M.2 SSD

To remove an M.2 SSD:

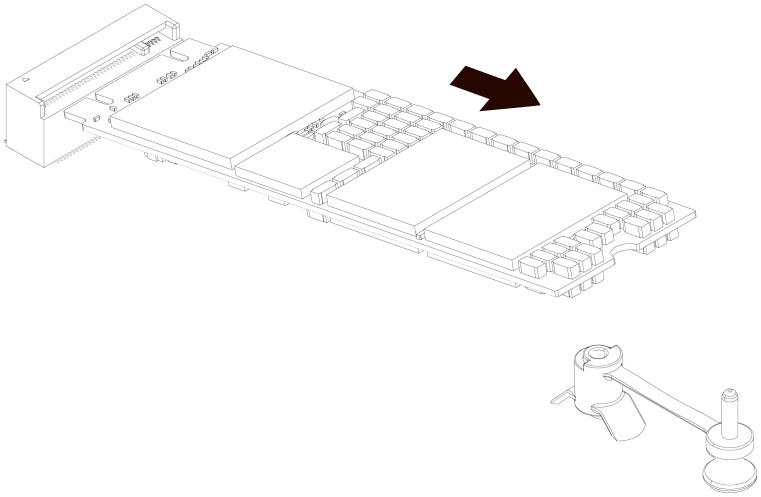
1. Pull out the motherboard drawer of the server.
2. Remove the top cover of the motherboard drawer.
3. Open the snap clip securing the M.2 SSD as indicated by the arrow. One end of the M.2 SSD pops up.

Figure 4-11 Opening the Snap Clip Securing M.2



4. Pull out the M.2 SSD. Put it into an anti-static bag.

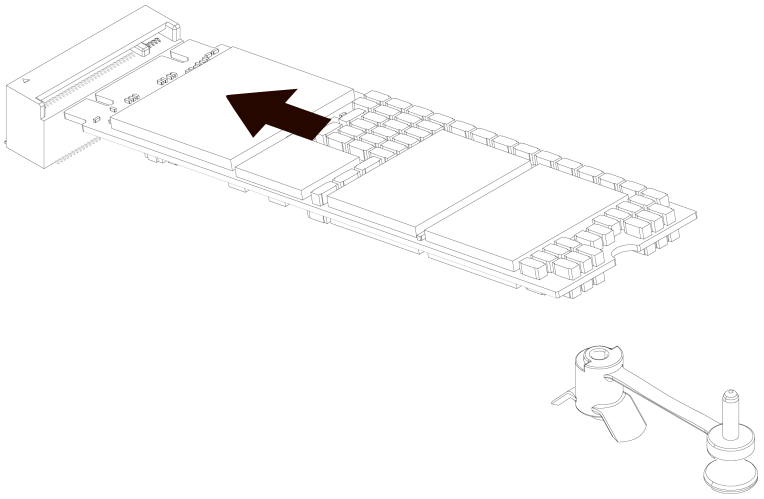
Figure 4-12 Pulling out the M.2 SSD



To install the M.2 SSD:

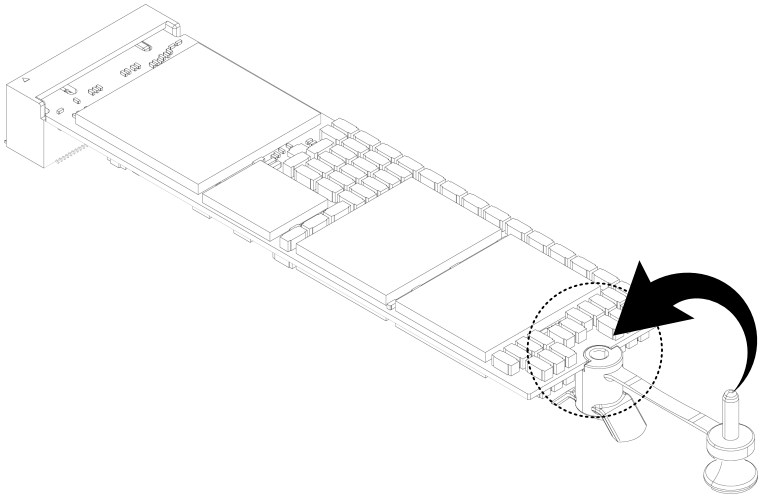
1. Take a new M.2 SSD out from the anti-static bag.
2. Insert the gold finger of the M.2 SSD into the connector as indicated by the arrow.

Figure 4-13 Inserting the Gold Finger of the M.2 SSD into the Connector



3. Lay the M.2 SSD flat. Align the notch of the SSD with the M.2 snap clip as indicated in the dotted circle. Then close the snap clip as indicated by the arrow.

Figure 4-14 Securing M.2 SSD



4. Make sure the snap clip is installed in place.
5. Install the top cover of the motherboard drawer.
6. Push the motherboard drawer back into the server. Close the two handles until they are in place. Then secure each handle with a screw.

4.5.5 Replacing a DIMM

IMPORTANT

- Mixing of RDIMMs and LRDIMMs is not supported.
- Using BPS DIMMs alone is not supported.
- Mixing of BPS with RDIMMs or LRDIMMs is supported.

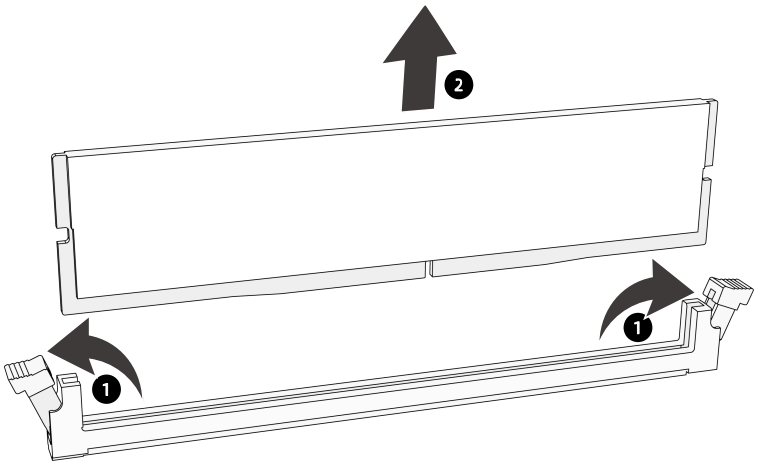
To remove a DIMM:

1. Pull out the motherboard drawer from the server.
2. Remove the top cover of the motherboard drawer.
3. Locate the DIMM you want to replace.
4. Remove the DIMM:
   a. Push the ejectors on both ends of the DIMM slot outward to unlock it.
   b. Gently lift and remove the DIMM from the slot.

NOTE

Make sure the ejectors on both ends of the DIMM slot are fully opened.

Figure 4-15 Removing the DIMM

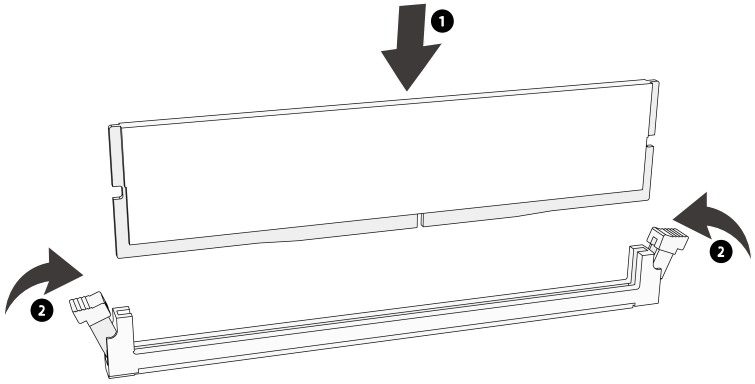


   c. Put it into the memory box.

To install the DIMM:

1. Take a new DIMM out from the memory box.
2. Align the alignment keys on the DIMM and on the slot. Use two thumbs together to press both ends of the module straight down into the slot until the module snaps into place.

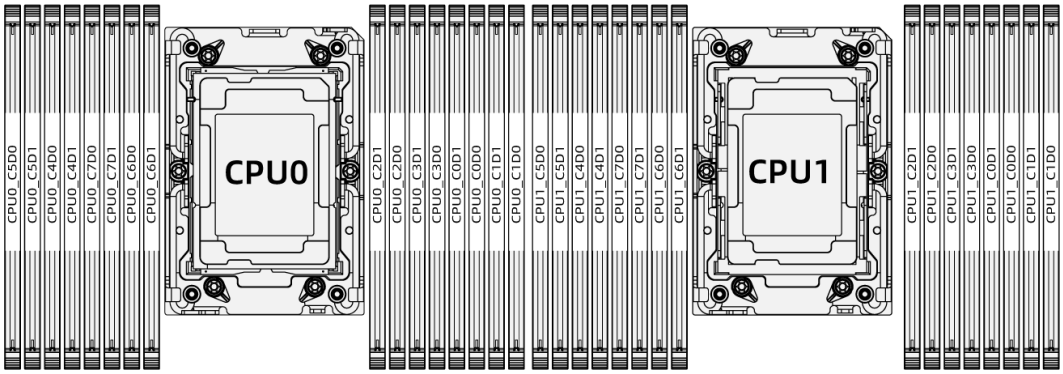
Figure 4-16 Installing a DIMM



3. Install the top cover of the motherboard drawer.
4. Push the motherboard drawer back into the server. Close the two handles until they are in place. Then secure each handle with a screw.

DIMM Slot Layout:

Figure 4-17 DIMM Slot Layout



1. DIMM Population Rules

Only DIMMs of the same type could be used in the same machine. Detailed DIMM population rules are as follows:

1. Only DDR4 DIMMs are populated:

Table 4-1 DIMM Population Rules under Dual-CPU Configuration

DDR4 DIMM Qty	CPU0																CPU1													
	C0		C1		C2		C3		C4		C5		C6		C7		C0		C1		C2		C3		C4		C5		C6		C7	
	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1
2	v																v															
4	v								v								v								v							
8	v				v				v				v				v				v				v				v			
12	v		v		v				v		v		v				v		v		v				v		v		v			
16	v		v		v		v		v		v		v		v		v		v		v		v		v		v		v		v	
24	v	v	v	v	v	v			v	v	v	v	v	v			v	v	v	v	v	v			v	v	v	v	v	v		
32	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v

2. DDR4 DIMMs and BPS are mixed:

NOTE

BPS need to be used with DDR4. In the following table, “D” stands for DDR4, and “B” for BPS.

Table 4-2 Mixing Population Sequence of DDR4s and BPS under Dual-CPU Configuration

DDR4 DIMM Qty	BPS DIMM Qty	CPU0																CPU1													
		C0		C1		C2		C3		C4		C5		C6		C7		C0		C1		C2		C3		C4		C5		C6		C7	
		D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1
8	8	D		B		D		B		D		B		D		B		D		B		D		B		D		B		D	
12	2	D		D		D		B		D		D		D				D		D		D		B		D		D			
16	2	D	B	D		D		D		D		D		D		D		D	B	D		D		D		D		D		D	
16	8	D	B	D		D	B	D		D	B	D		D	B	D		D	B	D		D	B	D		D	B	D		D	
16	16	D	B	D	B	D	B	D	B	D	B	D	B	D	B	D	B	D	B	D	B	D	B	D	B	D	B	D	B	D	B
24	4	D	D	B		D	D	D	D	D	D	B		D	D	D	D	D	D	B		D	D	D	D	D	D	B		D	D	D	D

4.5.6 Replacing a Processor and Heatsink Module (PHM)

CAUTION

- To help avoid damage to the processor and motherboard, do not install the processor without using the processor installation tool.
- To prevent possible server malfunction and damage to the equipment, multi-processor configurations must contain processors with the same part number.

To remove a PHM:

WARNING

The heatsink may be hot after the system has been powered down. Allow the heatsink to cool down for a few minutes before removing it.

1. Power down the server.
2. Pull out the motherboard drawer from the server.
3. Remove the top cover of the motherboard drawer.

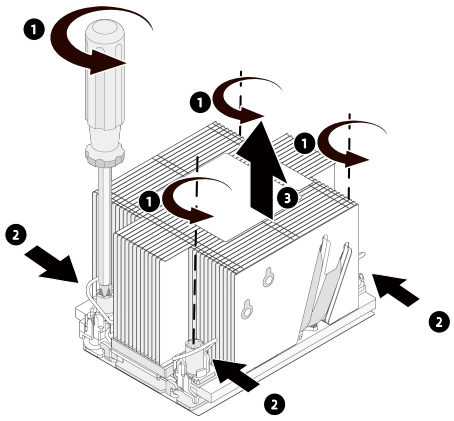
4. To remove a PHM:

   a. Loosen the four nuts securing the PHM to the CPU socket anticlockwise in the sequence as shown on the heatsink label with a T30 Torx screwdriver.

   b. Press the four lock-in wires inward with both hands simultaneously.

   c. Gently lift the PHM off the CPU socket.

Figure 4-18 Removing the PHM



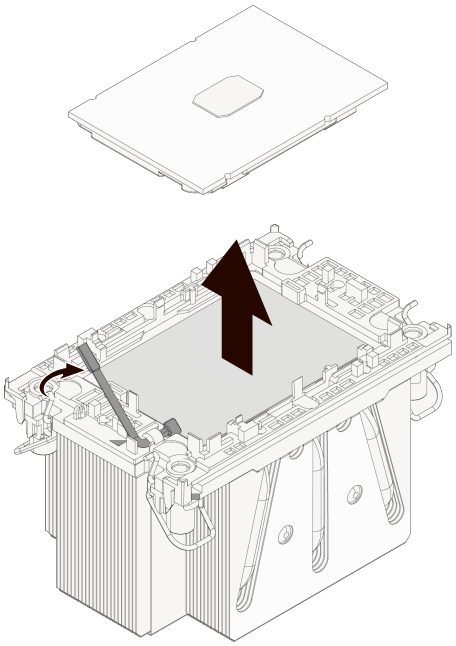
CAUTION

- Use a protective cover to protect the CPU socket to avoid damaging socket pins after the PHM has been removed.
- CPU contacts are fragile and can be easily damaged if touched. During removal and installation, always keep the CPU contacts side up when the processor dedicated insertion/removal tool (CPU tray) is unavailable.
- DO NOT touch the CPU contacts.

5. Lift up the lever to release one side of the CPU off the Carrier Clip.

6. Open the tabs securing the CPU to the Carrier Clip. Gently remove the CPU and put it into an anti-static bag.

Figure 4-19 Removing the CPU



7. To remove the CPU Carrier Clip:

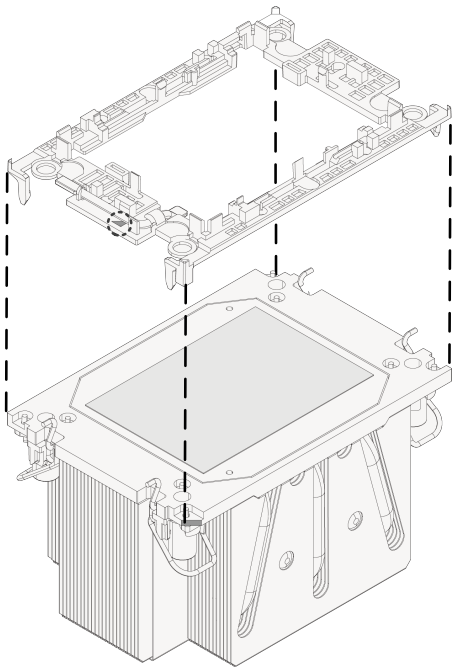
   a. Close the CPU lever.

   b. Push to release the tab near the triangle.

   c. Release the rest three tabs.

   d. Gently lift the CPU Carrier Clip off the heatsink.

Figure 4-20 Removing CPU Carrier Clip



CAUTION

- Use a clean and lint-free cloth to wipe off the old thermal grease first if the heatsink is to be reused.
- Coat thermal grease evenly onto the heatsink before reusing the heatsink.

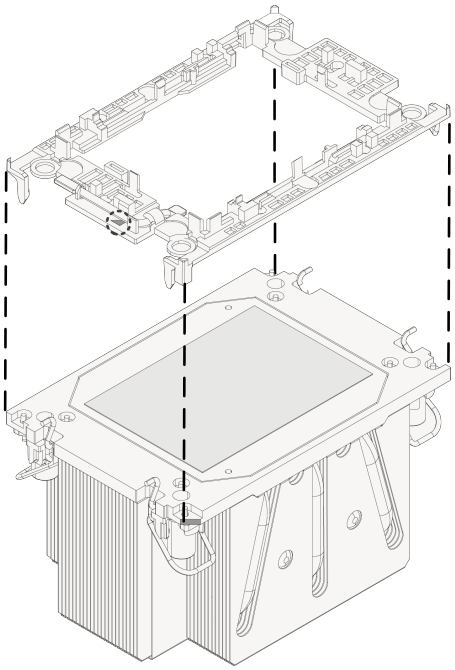
To install a PHM:

1. To install the CPU Carrier Clip:

    a. With the heatsink thermal grease side up, align the triangle mark on the Carrier Clip with that on the heatsink label.

    b. Install the Carrier Clip onto the heatsink until the four retaining tabs of the Carrier Clip snap into place.

Figure 4-21 Installing CPU Carrier Clip

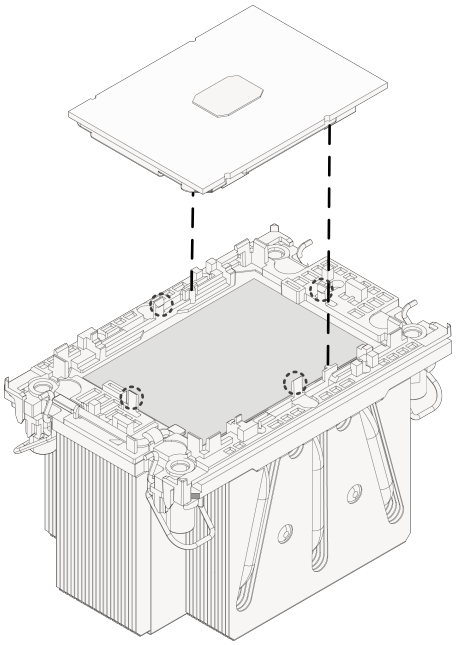


2. Apply the thermal grease evenly across the heatsink in the size of the CPU.
3. To install the CPU:

    a. With the CPU contacts side up, align the triangle mark on the CPU with that on the Carrier Clip.

    b. Grasp CPU by its two edges, and install it into the Carrier Clip. Make sure the notches of the CPU are aligned with the tabs if the Carrier Clip and the CPU is secured in place by the tabs on the four sides of the Carrier Clip.

Figure 4-22 Installing CPU



4. Grasp the protective cover (if available) by its short edges to remove it from the CPU socket.
5. With the CPU contacts side down, align the triangle mark on the CPU with that on the heatsink to attach the PHM onto the CPU socket.
6. Press the four lock-in wires outward with both hands simultaneously.
7. Tighten the four screws securing the PHM to the CPU socket clockwise in the sequence as shown on the heatsink label with a T30 Torx screwdriver.
8. Install the top cover of the motherboard drawer.
9. Push the motherboard drawer back into the server. Close the two handles until they are in place. Then secure each handle with a screw.

4.5.7 Replacing the Top Cover of the Switch Drawer

CAUTION

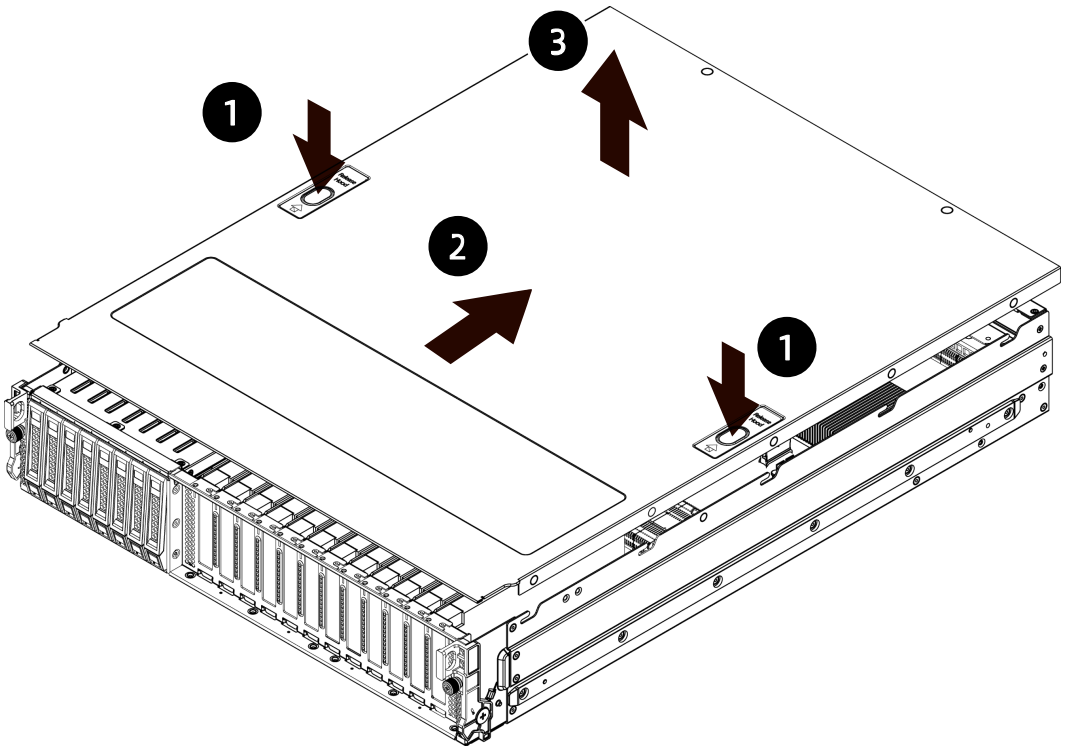
For proper cooling, do not operate the server without the top cover, air ducts, dummies, or blanks installed. If the server supports hot-swap components, minimize the amount of time the top cover is open.

To remove the top cover of the switch drawer:

1. Power down the server.

2. Pull out the switch drawer from the server. (See 4.4 Pulling Out the Motherboard Drawer/Switch Drawer/GPU Drawer from the Server for detailed steps).
3. Press the two buttons on the top cover in the direction of arrow 1 in the figure below.
4. Push the top cover toward the rear of the chassis as indicated by arrow 2 and lift it straight up off the chassis as indicated by arrow 3.

Figure 4-23 Removing the Top Cover of the Switch Drawer



To install the top cover of the switch drawer:

1. Lower down the top cover vertically onto the chassis, with its standoffs aligned with the J-slots on the chassis.
2. Push the top cover toward the front of the chassis until it stops. Ensure the top cover is in the closed position.
3. Push the switch drawer back into the server. Close the two handles until they are in place. Then secure each handle with a screw.

4.5.8 Replacing a PCIe Expansion Card

CAUTION

- To prevent damage to the server or expansion cards, power down the server

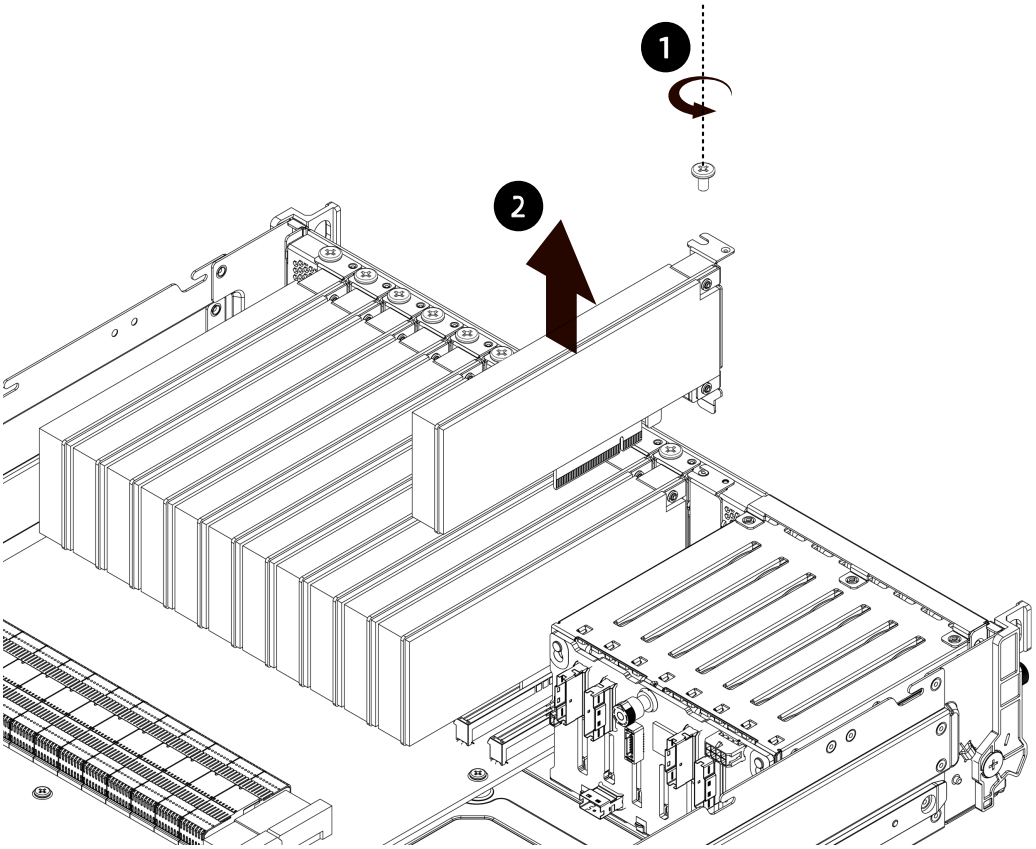
and remove all power cords before removing or installing the PCIe card.

- To prevent damage to the PCIe slot pins, be sure to apply even force.

To remove the PCIe expansion card:

1. Power down the server.
2. Pull out the switch drawer from the server.
3. Remove the top cover of the switch drawer.
4. Disconnect the cables of the PCIe card. Take a record of the cables to avoid wrong cable routing when installing.
5. Remove the screw securing the PCIe card counterclockwise.
6. Lift up and put the PCIe card into an anti-static bag.

Figure 4-24 Removing the PCIe Card



To install the PCIe expansion card:

1. Take a new PCIe card out from the anti-static bag.
2. Align and insert the PCIe card to the PCIe slot.

3. Insert and tighten the screw securing the PCIe card.
4. Connect the cables of the PCIe card.
5. Install the top cover of the switch drawer.
6. Push the switch drawer back into the server. Close the two handles until they are in place. Then secure each handle with a screw.

4.5.9 Replacing a Hot-Swap Storage Drive

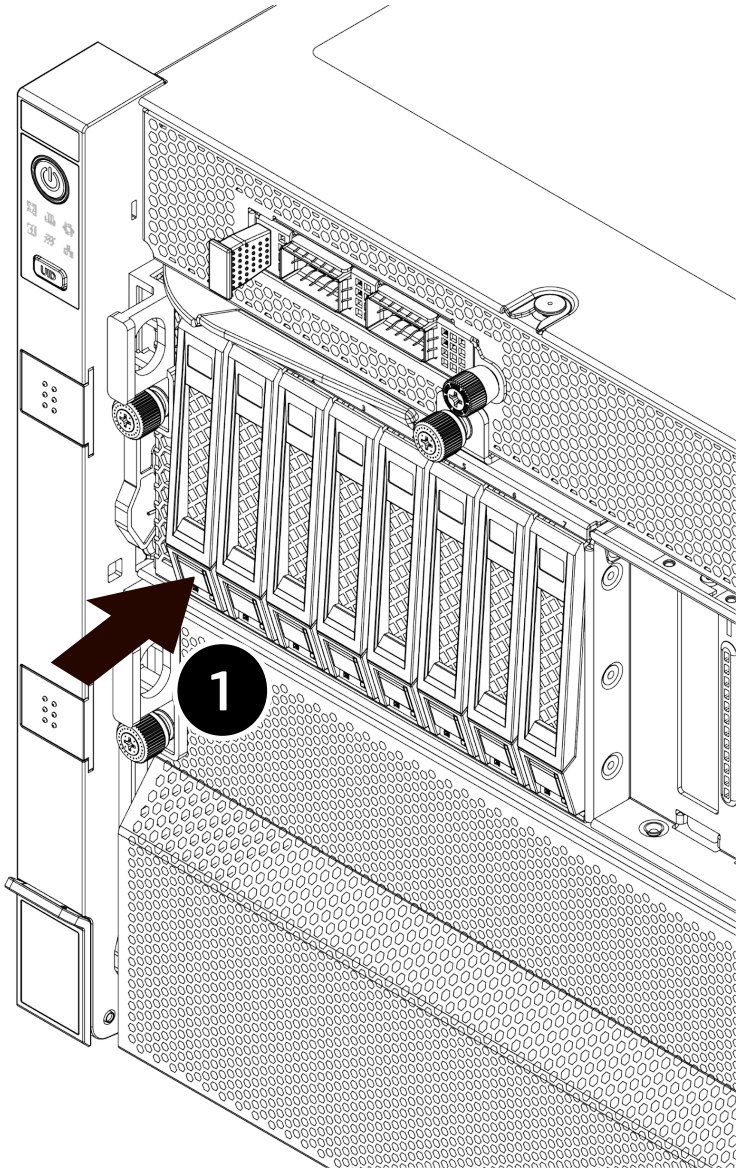
CAUTION

For proper cooling, do not operate the server without the top cover, air ducts, dummies, or blanks installed. If the server supports hot-swap components, minimize the amount of time the top cover is open.

To remove the drive:

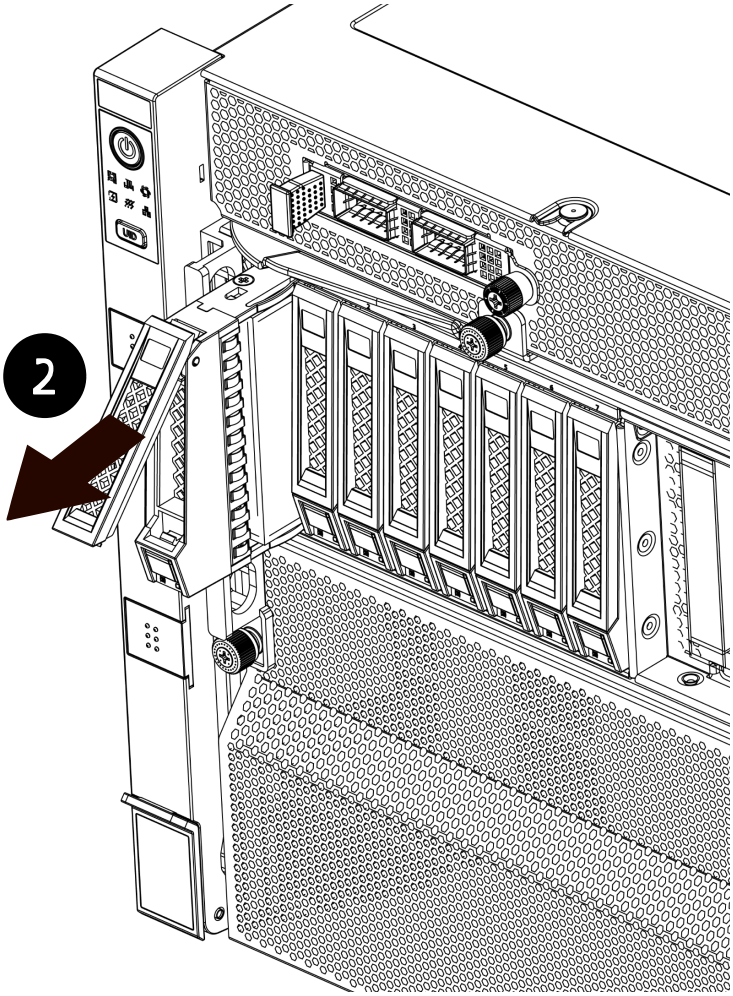
1. Remove the hot-swap drive.
    a. Press the release button to release the lever. The drive tray handle will pop up automatically.

Figure 4-25 Pressing the Release Button



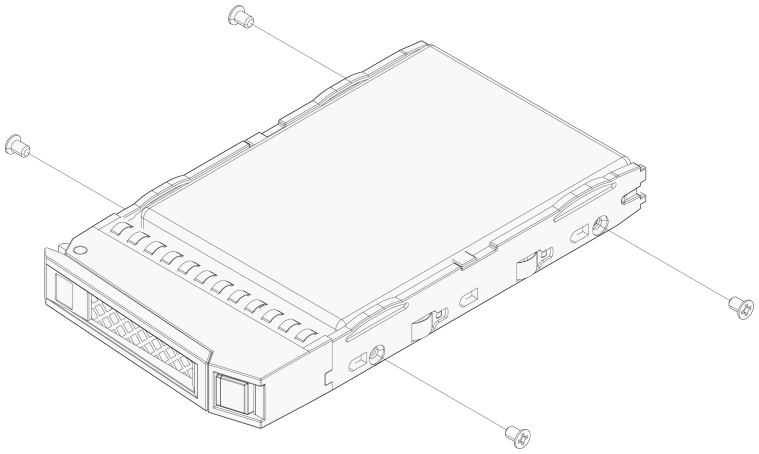
b. Hold the handle and pull the drive module out of the drive bay.

Figure 4-26 Pulling out the Drive Module



c. To separate the drive tray and the drive: Remove the four screws securing the drive to the drive tray counterclockwise with a Phillips screwdriver.

Figure 4-27 Removing Screws Securing the Drive to the Drive Tray



To install the drive:

1. Install the drive to the drive tray:
    a. Orient the drive to the drive tray with the drive connector facing the rear end of the tray.
    b. Tighten the four screws securing the drive to the drive tray clockwise with a Phillips screwdriver.
2. Insert the drive module into the drive bay with the drive tray handle in the open position.
3. Close the drive tray handle to lock the drive module in place.
4. Verify that the drive activity LED is green.

4.5.10 Replacing a Hot-Swap PSU


WARNING

To reduce the risk of personal injury from hot surfaces, allow the power supply or power supply blank to cool before touching.

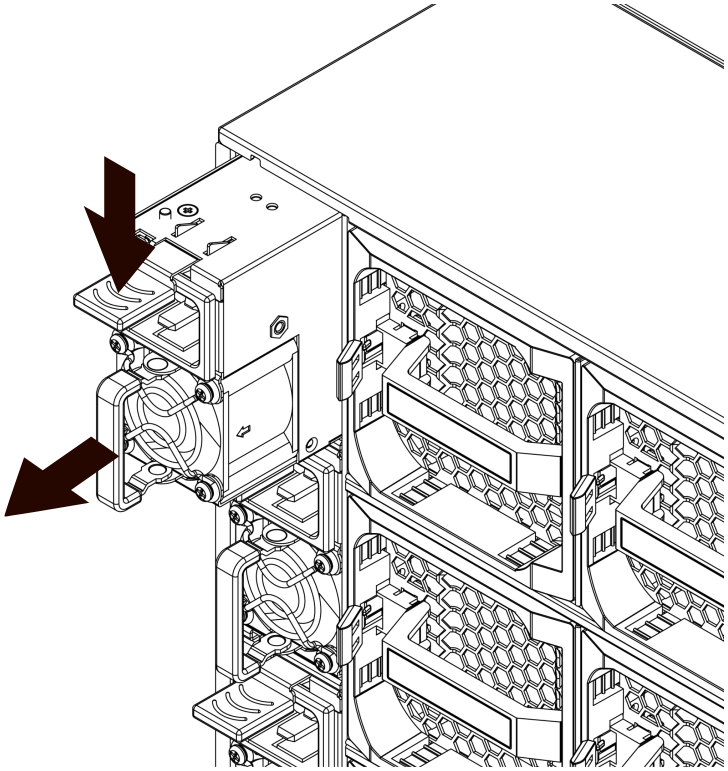

CAUTION

To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

To remove the PSU:

1. Grasp the handle and press down on the blue lever to release the PSU. Pull the PSU out of the power supply bay.

Figure 4-28 Removing the PSU



2. Put it into an anti-static bag.

To install the PSU:

1. Take a new PSU out from the anti-static bag.
2. Insert the PSU into the power supply bay until it snaps into a locked position.
3. Verify that the PSU LED is green.

4.5.11 Replacing the OCP NIC 3.0 Module

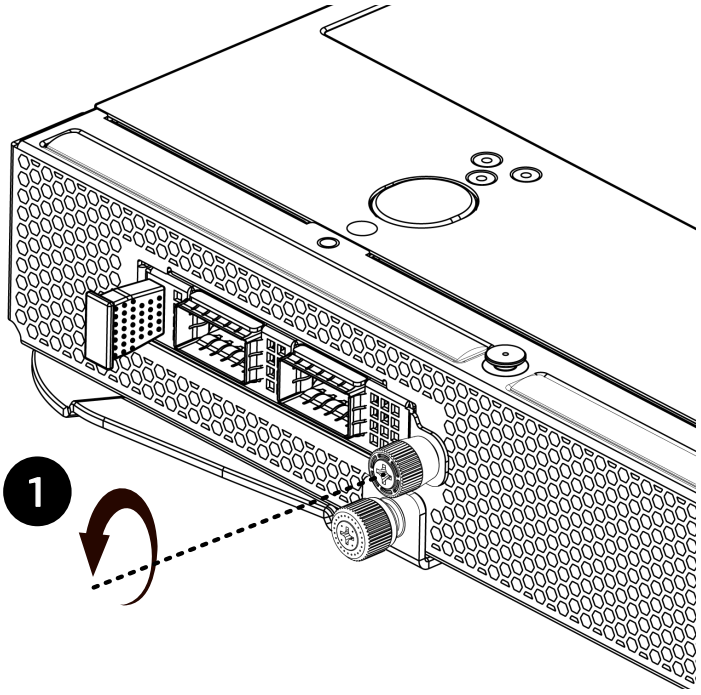
CAUTION

To prevent damage to the server or expansion cards, power down the server and remove all power cords before removing or installing the OCP card.

To remove the OCP NIC 3.0 module:

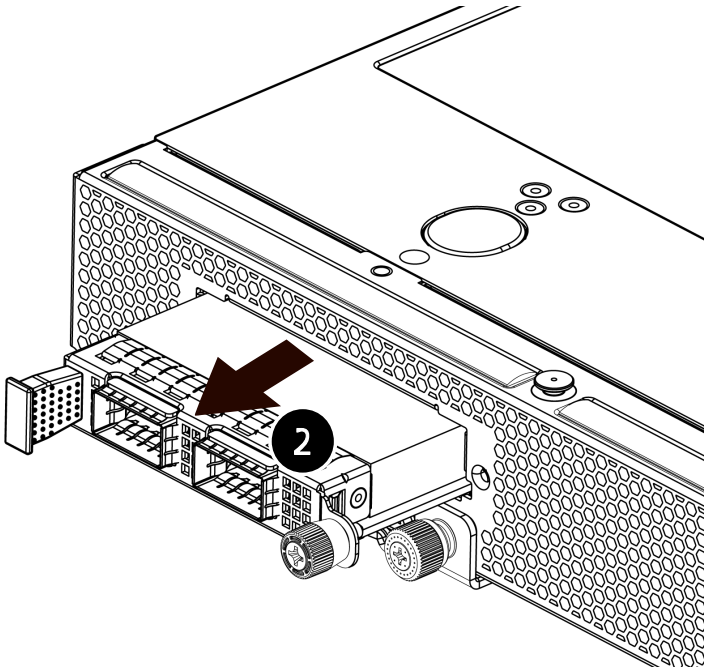
1. Loosen the thumbscrew securing the OCP NIC 3.0 module to the server as indicated by arrow 1.

Figure 4-29 Loosening the Thumbscrew of the OCP NIC 3.0 Module



2. Pull out the OCP NIC 3.0 module as indicated by arrow 2.

Figure 4-30 Pulling out the OCP 3.0 Module



3. Put the OCP NIC 3.0 module into an anti-static bag.

To install the OCP NIC 3.0 module:

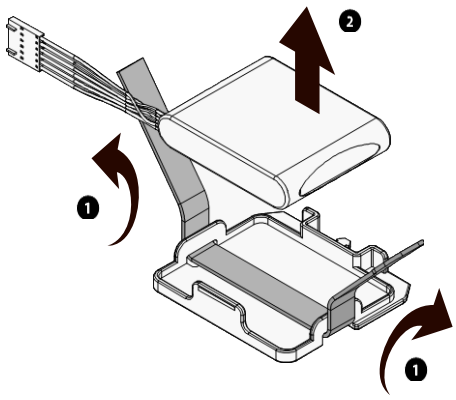
1. Take a new OCP NIC 3.0 module out from the anti-static bag.
2. Insert the module into the card slot until it snaps into place.
3. Tighten the thumbscrew securing the OCP NIC 3.0 module in place.

4.5.12 Replacing the Super-Capacitor

To remove the super-capacitor:

1. Power down the server.
2. Pull out the switch drawer from the server.
3. Remove the top cover of the switch drawer.
4. Disconnect the cable from the super-capacitor.
5. Open the Velcro that secures the super-capacitor.
6. Remove the super-capacitor and put it in an anti-static bag.

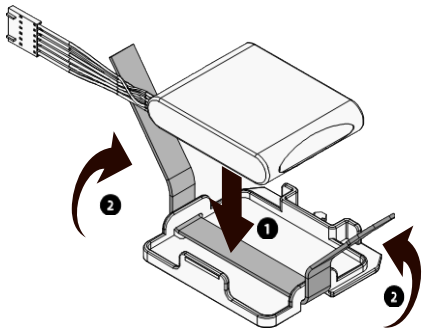
Figure 4-31 Removing the Super-Capacitor



To install a super-capacitor:

1. Take out a new super-capacitor from the anti-static bag and position it in place.
2. Secure the super-capacitor with the Velcro.

Figure 4-32 Installing the Super-Capacitor



3. Connect the cable to it.
4. Install the top cover of the switch drawer.
5. Push the switch drawer back into the server. Close the two handles until they are in place. Then secure each handle with a screw.

4.5.13 Replacing the Top Cover of the 6U Chassis

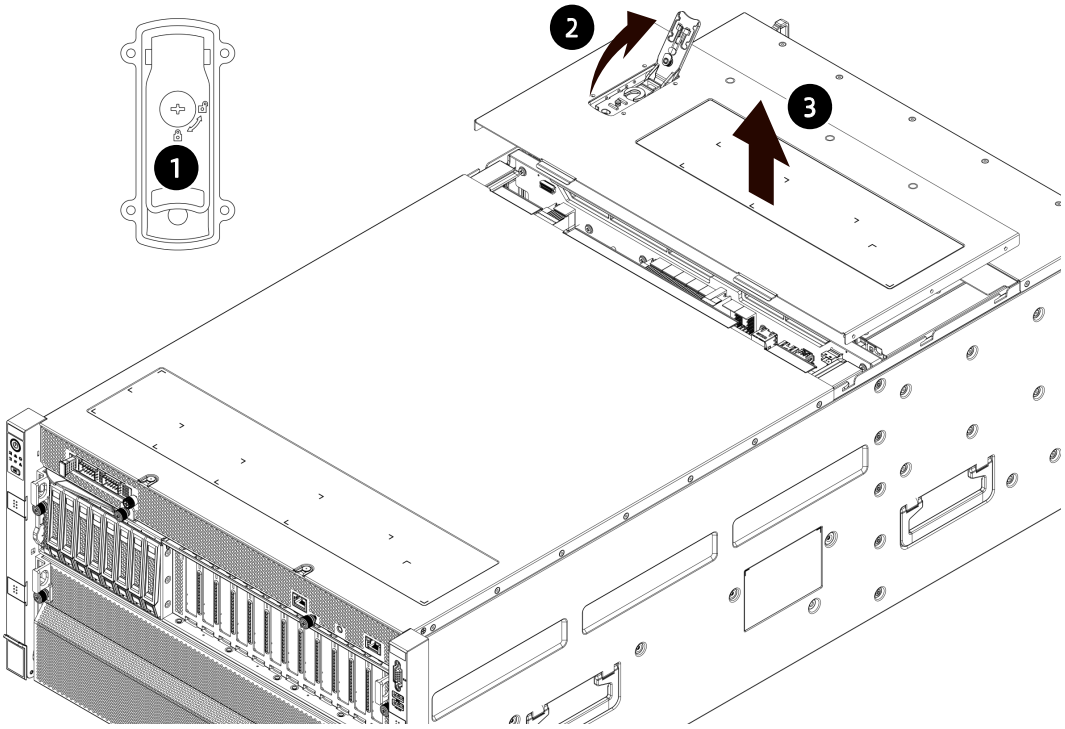
CAUTION

For proper cooling, do not operate the server without the top cover, air ducts, dummies, or blanks installed. If the server supports hot-swap components, minimize the amount of time the top cover is open.

To remove the top cover of the 6U chassis:

1. Loosen the security screw on the hood latch counterclockwise with a Phillips screwdriver.
2. Lift up the hood latch handle and remove the top cover.

Figure 4-33 Removing the Top Cover



To install the top cover:

1. Lower down the top cover vertically onto the chassis, with its standoffs aligned with the J-slots on the chassis.
2. Close the hood latch handle and the top cover will slide to the closed position.
3. Tighten the security screw on the hood latch clockwise with a Phillips screwdriver.

4.6 Firmware Update and Configuration

For update and configuration of firmware, refer to:

- BIOS update manual
- BMC update manual
- BIOS user manual
- BMC configuration manual

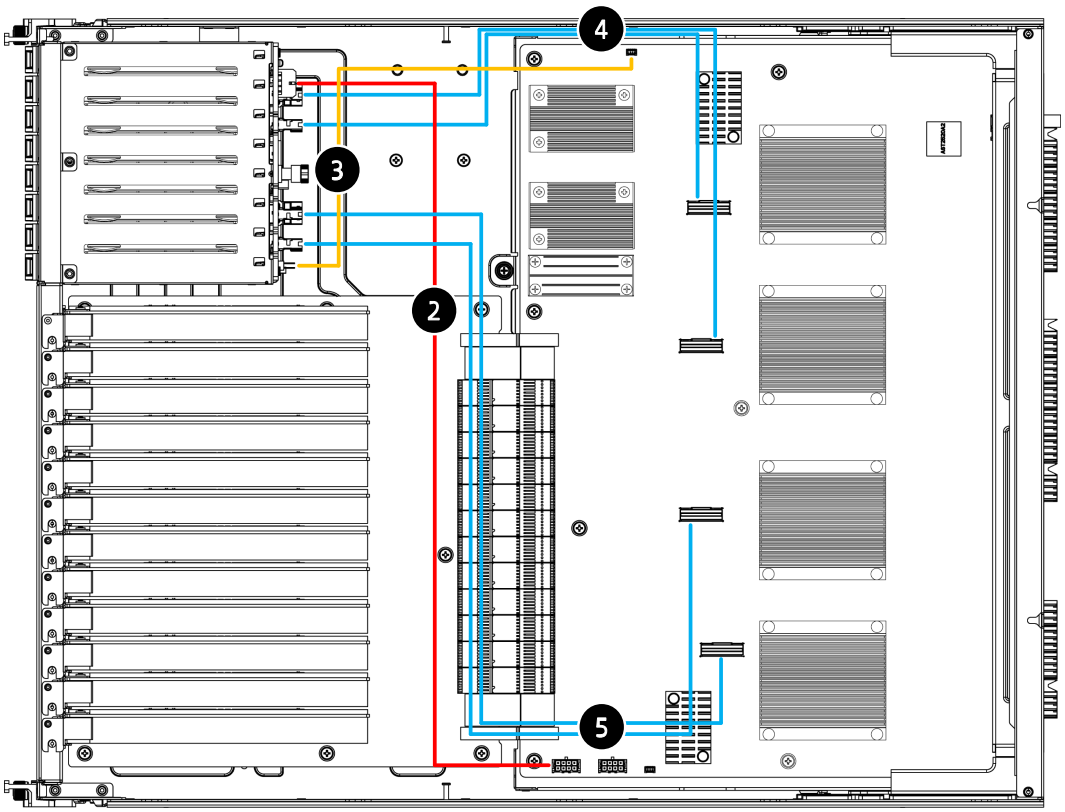
4.7 Cable Routing

CAUTION

Please route cables based on the configuration of your purchased machine.

The following describes backplane cable routing for 8-drive and 16-drive configurations (full configurations). For other configurations with less drives (less than 8 or 16 drives), reduce the cables by referring to the cable routing for full configurations.

Figure 4-34 Backplane Cable Routing: 8-NVMe Drive Configuration



The following figures describe cable routing for 16-SAS/8-SAS configurations. For 8-SAS configuration, there are two routings: One is the shown in the top part in Figure 4-35 (cables are marked 3, 2, 7, 6 in the dotted box), the other is shown in the bottom part in Figure 4-35 (cables are marked 6, 7, 1, 3 in the dotted box).

Figure 4-35 Backplane Cable Routing: 16-SAS Drive (2 8i RAID Controller Cards) Configuration/8-SAS (1 8i RAID Controller Card) Configuration

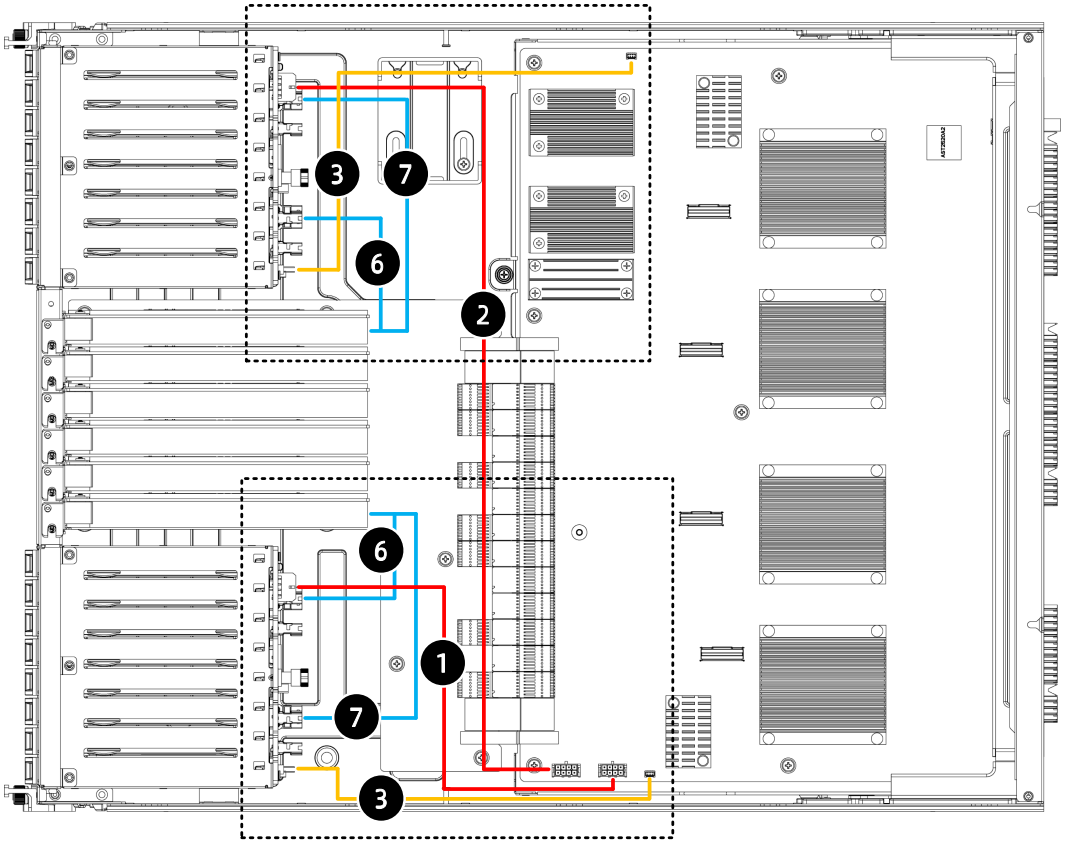


Figure 4-36 Backplane Cable Routing: 16-SAS Drive (1 16i RAID Controller Card) Configuration

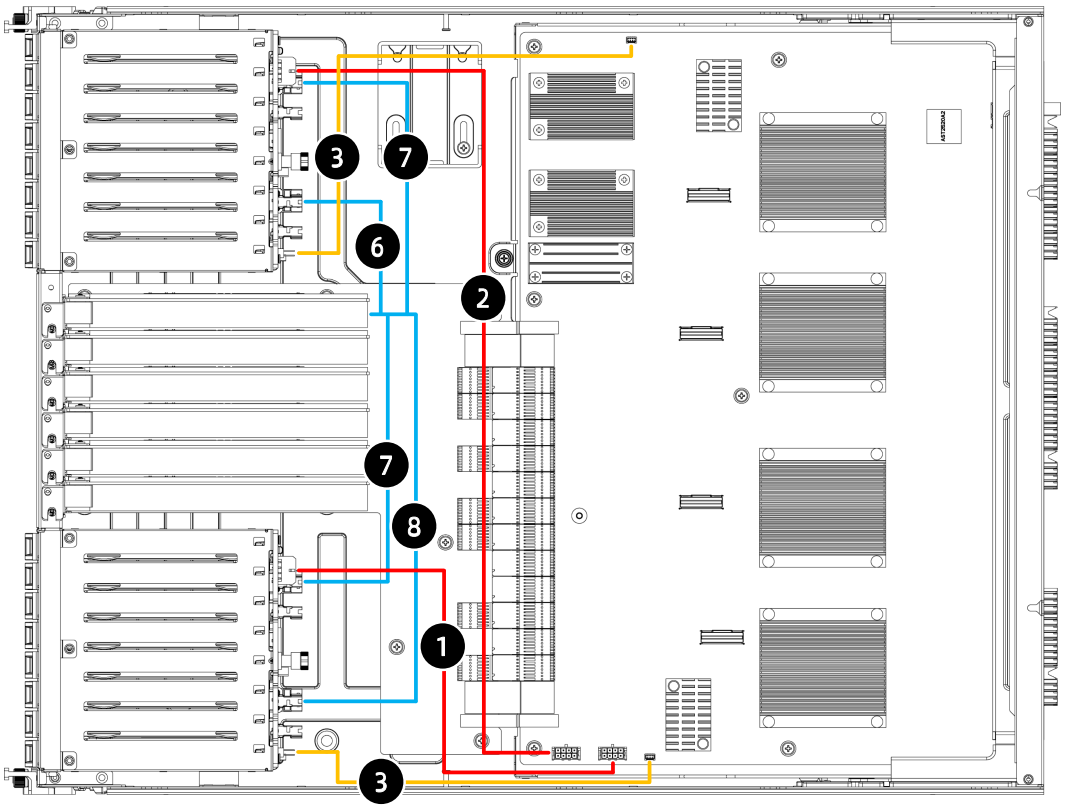


Table 4-3 Cable Details

#	Cable Name	Connected From	A Connector		B Connector		Qty
			Board	Location	Board	Location	
1	Switch to HDBP Power Cable	Switch board to backplane 1	Switch Board	J53	Backplane 1	J11	1
2		Switch board to backplane 0	Switch Board	J28	Backplane 0	J11	1
3	Switch to HDBP I²C Cable	Switch board to backplane	Switch Board	J26 J51	Backplane 1 Backplane 0	J9	2
4	Switch to HDBP Slimline Cable	Switch board to backplane (0-3)	Switch Board	J5 J9	Backplane	101 100	1

#	Cable Name	Connected From	A Connector		B Connector		Qty
			Board	Location	Board	Location	
5		Switch board to backplane (4-7)	Switch Board	J13 J15	Backplane	103 102	1
6	miniSAS to Slimline x4 cable 2 8i RAID controller cards: nearby connection, two cables for No. 6/No. 7 (8-SAS configuration uses only 1 8i RAID controller card, 1 No.6 and 1 No.7); 1 16i RAID controller card: 1 No.6, 2 No.7 and 1 No.8	Standard RAID controller card to backplane	RAID controller card	/	Backplane	J12 J14	2
7		Standard RAID controller card to backplane	RAID controller card	/	Backplane	J12 J14	2
8		Standard RAID controller card to backplane	RAID controller card	/	The Backplane Far Away	J12	1

5 Replacing the CMOS Battery

WARNING

The CMOS battery contains lithium. A risk of fire and burns exists if the battery is not properly handled. To reduce the risk of personal injury:

- Do not recharge the battery.
- Do not expose the battery to temperatures higher than 60°C (140°F).
- Do not disassemble, crush or puncture the battery, short-circuit external contacts, or dispose of in fire or water.
- Replace batteries only with batteries designated for the product.
- To avoid damage to the components due to ESD, use anti-static gloves or wrist straps.

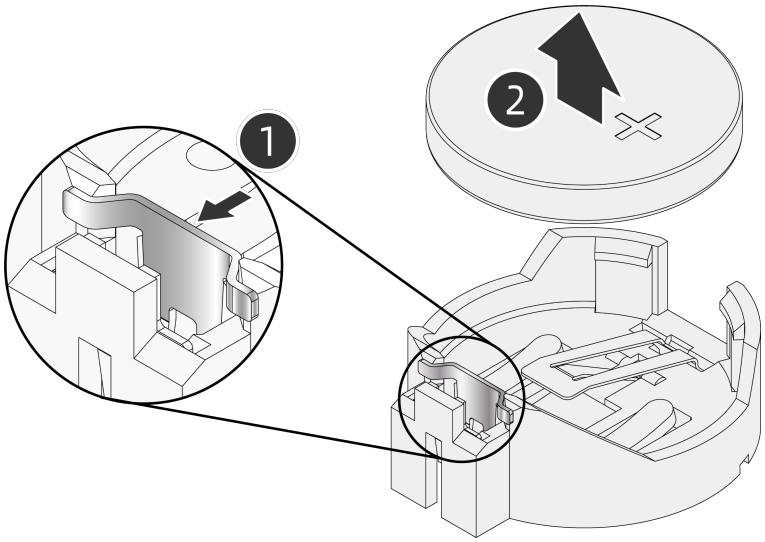
To replace the battery:

1. Power down the server and disconnect the power cords from the server to remove power completely.
2. Gently slide the motherboard drawer out of the server.
3. Locate the battery on the motherboard.
4. Gently press the release tab away from the battery until the battery pops up from the socket.
5. Remove the battery.

NOTE

The figure shown below is for reference only. The location and orientation of the battery may differ depending on the model you purchased.

Figure 5-1 Removing the Battery



CAUTION

- DO NOT pry or press the battery with excessive force.
- Failing to remove the battery properly might damage the socket on the motherboard. Any damage to the socket might require replacing the motherboard.

6. Dispose of the battery as required by local ordinances or regulations.
7. Take a new battery out from the anti-static bag.
8. Place the new battery into the socket, being careful to observe the correct polarity.
9. Snap the battery into place. Make sure the battery is secured by the clip within the socket.
10. Push the motherboard drawer back into the server. Close the two handles until they are in place. Then secure each handle with a screw.

NOTE

After replacing the battery, you must reconfigure the server and reset the system date and time.

6 Electrostatic Discharge (ESD)

6.1 ESD Prevention

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling components. A discharge of static electricity from a finger or other conductors may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive components in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching an electrostatic-sensitive component or assembly.

6.2 ESD Grounding Methods

Several methods are used for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Wear a wrist strap connected by a ground cord to a grounded workstation or the chassis. Wrist straps are flexible straps with a minimum of 1 megohm ±10% resistance in the ground cords. To be grounded properly, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an authorized reseller install the part.

For more information on static electricity or assistance with product installation, contact an authorized reseller.

7 Troubleshooting

7.1 Hardware Issues

7.1.1 Power-On Issue

Symptom:

After pressing the power button, the power button LED is orange and does not turn green. The drive activity LEDs are off, the monitor screen is blank or shows “No input signal”, and the system fans do not spin.

Solution:

1. Be sure that the power cords are plugged into functioning outlets.
2. Be sure that no loose connections exist.
3. Be sure that the power cords work.
4. Be sure that all PSUs are firmly seated.
5. Check the status of the PSU LEDs on the rear panel.
    a. If the PSU LEDs are off or amber, further action is needed to determine whether the PSUs are faulty. Replace with a known working PSU. If the problem persists, contact us for assistance; if the PSU LED flashes green, then the PSU in question is faulty. Replace the faulty PSU or contact us instead.
    b. If the PSU LEDs are green, contact and inform us of the detailed error information and problems.

7.1.2 No Display Issue

Symptom:

After pressing the power button, the power button LED is green, the system fans work properly, but the monitor screen is blank or shows “No input signal”.

Solution:

1. Be sure that the monitor power cord is plugged into a working grounded outlet.
2. Be sure that no loose connections exist.
3. Power up the monitor and be sure that the monitor light is on.

4. Be sure that the monitor is cabled to the intended server.
5. Replace the monitor with a known functional monitor to be sure it is not faulty.
6. Log into the BMC Web GUI and launch the BMC remote control. (For more information on BMC Web GUI, refer to the BMC user manual.)
    a. If the KVM works normally and there is display output, the server VGA port is faulty, contact us.
    b. If the KVM does not work and there is no display output, review and export the system event logs related to the KVM status.
7. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

7.1.3 Front Panel LED Illuminates Red

Symptom:

The LED on the front panel illuminates red.

Solution:

Identify the abnormal LED based on Front Panel Buttons and LEDs.

1. If the system status LED illuminates red, check whether the server is working properly. If it is working normally, log into the BMC Web GUI to review the BMC logs and record the detailed error information. (For more information on BMC Web GUI, refer to the BMC user manual.)
2. If the power status LED illuminates red, check the PSU LEDs on the rear panel for any abnormality (amber or off).
    a. If the PSU LEDs are normal, log into the BMC Web GUI to review the BMC logs and record the detailed error information. (For more information on BMC Web GUI, refer to the BMC user manual.)
    b. If the PSU LEDs are abnormal, see PSU LED Off or Amber for handling suggestions.
3. If the system overheat LED is abnormal, be sure that the server room temperature is within the normal range (see Chapter 8 for temperature specifications); be sure that the air vents and chassis interior are dust-free; be sure that the top cover and air ducts are in place; be sure that the thermal grease between the CPU and the heatsink is not dry or caked.
4. If other LEDs are abnormal, log into the BMC Web GUI to review the BMC logs and record the detailed error information.
5. If the instructions above do not locate or resolve the problem, contact and inform us of the detailed error information and problems.

7.1.4 Stuck in POST Interface or Other Interfaces after Powering on

Symptom:

After pressing the power button, the server does not power up normally and is stuck in the POST interface or other interfaces.

Solution:

1. If the interface the server is stuck in contains hardware-related error information, such as memory or RAID controller card errors, record the detailed error information.
2. If the server is stuck in the POST interface, record the detailed error information if any.
3. If the server is stuck in the media test failure interface, be sure that the OS has been installed successfully and the hard drive has been set as Boot Option #1.
4. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

7.1.5 PSU LED Off or Amber

Symptom:

A certain PSU LED is off or amber when the server is working properly.

Solution:

1. Be sure that there is no surface damage on the server such as burning or vulcanization.
2. Be sure that the power cord is plugged into a functioning outlet.
3. Be sure that no loose connections exist and the power cord works.
4. Disconnect the power cord of the PSU in question. Reseat the PSU and connect the power cord.
5. If shutdown is allowed, power off the server, remove the power, and swap the PSU in question with another PSU to test.
6. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

7.1.6 Drive LED Abnormal

Symptom:

The drive LED is abnormal (activity LED off or error LED red) when the server is

working properly.

Solution:

1. Be sure that the drive is firmly seated in place.
2. Check whether the drive has been plugged or other manual operations have occurred. If above situations have occurred, and the server is configured with RAID controller cards, be sure that the drive is configured properly in the RAID array.
3. Be sure that the drive can be identified in OS. Log into the RAID management interface to check whether the drive is offline.
4. If the drive is offline or if the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

NOTE

- A hot-swap drive allows users to remove or replace the drive without shutting down or powering off the system, which improves the system disaster recovery capability, scalability and flexibility. It only means that the hot-swap drive can be plugged in and out during server operation without damaging the drive.
- Depending on the RAID level, hot-plugging out and in a drive in a RAID array may cause RAID degradation or failure. Different RAID controller cards have different policies. When re-inserting a drive, you may need to log into the RAID management interface for recovery.
- Do not remove the drive until the drive motor stops completely in order to prevent damage to the motor.

7.1.7 Excessive Noise from System Fans

Symptom:

The system fans make excessive noise when the server is working properly.

Solution:

1. Be sure that the top cover is closed properly and the air ducts are seated in place.
2. Check the fan status LED and other status LEDs for any alarm. If the fan status LED is red, contact us for repair; if other status LEDs are red, refer to Front Panel LED Illuminates Red.

3. Check the server temperature by touching the chassis or viewing sensor temperatures in BMC Web GUI.
4. Be sure that the server room temperature is within the proper range (see Chapter 8 for temperature specifications). Adjust the air conditioner temperature if necessary.
5. Be sure that the front bezel and chassis interior are dust-free. If necessary, clean with a soft and dry cloth or a specialized brush with the server powered off. Improve the server room environment so that the server is not exposed to dirt and dust to avoid over-temperature.
6. Be sure that the server is not running with high loads. Log into the BMC Web GUI and be sure that all fans are identified and the fan mode is auto. If a fan is not identified, swap test the fan to check whether the issue is with the fan bay or the fan itself.
7. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

7.1.8 Alarm Sound from the Server

Symptom:

An alarm goes off during server startup or operation.

Solution:

Identify the source of the alarm:

1. If the alarm sound comes from the PSU, check the PSU LEDs on the rear panel for any abnormality. If any, refer to PSU LED Off or Amber to handle this.
2. If the alarm sound comes from the chassis interior, remove the top cover to check further.
3. If the alarm sound comes from the RAID controller card, check the drive error LEDs or log into the RAID management interface to see whether the drives are normal. Record the error information if any.
4. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

7.1.9 Keyboard and Mouse Not Functioning

Symptom:

The keyboard and/or mouse are not operating normally.

Solution:

1. Be sure that all cables are securely and properly connected.

2. Connect the keyboard and mouse to a notebook or another server to test.
3. Power cycle the server and retest the devices.
4. Restart the server and enter BIOS or RAID configuration interface to test whether the keyboard and mouse can work: If the two devices work properly, then the USB driver has a problem; if the problem persists, then maybe the motherboard or I/O board connectors are defective.
5. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

7.1.10 USB Port Issue

Symptom:

Unable to use USB devices.

Solution:

1. Be sure that the OS on the server supports USB devices.
2. Be sure that the server has been installed with the correct USB driver. Reinstall the USB driver if necessary.
3. Connect the USB device to another server to test.
    a. If the USB device does not work normally, replace with a known working USB device.
    b. If the USB device works normally, a system fault has occurred. Contact us for repair.
4. Power cycle the server and retest the USB device.
5. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

7.2 Software Issues

7.2.1 OS Installation Issues

1. Unable to load the RAID driver

Symptom:

Unable to load the RAID driver during OS installation.

Solution:

1. Be sure that the server has been installed with the correct RAID driver.

2. Go to our official website to download the correct RAID driver. Some RAID drivers need to be loaded several times.
3. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

2. Unable to create partitions larger than 2 TB

Symptom:

Unable to create partitions larger than 2 TB during OS installation.

Solution:

1. Click **Advanced** > **CSM Configuration** > **Boot option filter** > **UEFI only** in BIOS to set the compatibility mode to UEFI only. (For more information, refer to the BIOS user manual.) Then save and exit BIOS.
2. Press <F11> on the BIOS boot screen, and then select the needed boot option to install the OS. The server will restart automatically after OS installation.
3. Be sure that the disk format is GPT during OS installation. Then you can create partitions larger than 2 TB.
4. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

3. Low disk space on C drive

Symptom:

After OS installation, the C drive is almost full and out of space.

Solution:

1. Turn down the virtual memory or allocate the virtual memory to other partitions by clicking **This PC** > **Properties** > **Advanced system settings** > **Advanced** > **Performance** > **Settings** > **Virtual Memory** > **Change** (demonstrated with Windows Server 2012).
2. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

7.2.2 PXE Boot Failure

Symptom:

Fail to install an OS via PXE.

Solution:

1. Be sure that the PXE server can be used to install an OS for another server.

2. Be sure that there is network link by checking the network port LED.
3. Be sure that the NIC can be identified in BMC Web GUI, BIOS or Shell.
4. Be sure that PXE function is enabled in BIOS.
5. Be sure that the target drive and RAID array can be identified and are large enough for OS installation.
6. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

7.2.3 Displayed Memory Capacity Abnormal

Symptom:

The memory capacity displayed in OS is inconsistent with the physical memory capacity.

Solution:

1. Be sure that all DIMMs are properly seated.
2. Be sure that the DIMMs are installed as per the DIMM population rules of the server.
3. Be sure that the identified total memory capacity in BIOS matches the physical memory capacity.
4. Be sure that the memory capacity supported by the Windows version installed on the server is equal or larger than the total physical memory capacity. The OS may be unable to access all the installed memories. For example, Windows server 2008 x86 supports up to 4 GB memory.
5. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

7.2.4 Network Performance Issue

Symptom:

The network connection is lost or slow.

Solution:

1. Be sure that the network cable is connected properly, the network port LED flashes normally and the network port is configured properly.
2. Reseat the network cable. If the problem persists, connect the server with a notebook via a known working network cable: If the network is normal, check

the network cable or the switch port; if the network is faulty, go to our official website to download the latest NIC driver.

3. Be sure that the NIC can be identified in BMC Web GUI, BIOS or Shell and the MAC address is correct.
4. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

8 Environmental Specifications

8.1 Ambient Temperature

Table 8-1 Ambient Temperature and Humidity

Item	Condition	Specifications
Temperature	Continuous Operation	10°C to 35°C (50°F to 95°F)
	Shipping (Storage)	-40°C to 70°C (-40°F to 158 °F)
	Maximum temperature gradient (Operating and storage)	20°C/h (36°F/h)
Humidity	Operating	5% to 90% RH
	Shipping (Storage)	5% to 95% RH
	Maximum humidity gradient (Operation and storage)	≤40%RH/h

8.2 Vibration and Shock Specifications

Table 8-2 Vibration and Shock

Item	Condition	Specifications
Maximum vibration	Operating	0.21 Grms at 5 to 500 Hz (x, y and z axes and every direction for 15 minutes)
	Shipping (Storage)	0.54 Grms at 1 - 200 Hz: (z axis for 4 hours)
Maximum shock	Operating	Half sine wave shock lasting for 11 ms with an acceleration of 2g (100

Item	Condition	Specifications
		shocks in every direction of the negative and positive x, y and z axes respectively with an interval of 3 s)

8.3 Altitude Specifications

Table 8-3 Altitude

Item	Condition	Specifications
Altitude	Operating	0 to 3,048 m (0 to 10,000 ft)
	Shipping (Storage)	0 to 12,192 m (0 to 40,000 ft)

8.4 Alternating Temperature and Humidity

Table 8-4 Alternating Temperature and Humidity

Item	Condition	Specifications
Humidity	Operating	10% to 90% RH with 38℃ (100.4℉) maximum dew point
	Shipping (Storage)	10% to 93% RH with 39℃ (102.2℉) maximum dew point. Atmosphere must be noncondensing always.

8.5 Thermal Restrictions

Table 8-5 Thermal Restrictions

Configuration	Front Drive	Internal Drive	Rear Drive	CPU	GPU	Max Temperature
GPU Storage Configuration	8 × 2.5-inch or 16 × 2.5-inch	Not supported	Not supported	No higher than 270 W	SXM4 × 8 (400 W)	35℃ (95℉)

8.6 Operational Requirements

This section specifies the requirements for temperature, humidity, organisms, chemical substances and mechanically active substances in the server room when the server is operating.

1. Temperature and Humidity

The temperature, dew point and relative humidity in the server room should meet the requirements for operating the server. For specific requirements, see the detailed descriptions in the product documentation.

2. Organisms

Plants and animals are strictly prohibited in the server room. Take strict precautions against damage by rats and ants.

To meet these requirements, take the following measures in the server room:

- Ensure safety if there are humidification devices in the server room.
- All the structures and construction gaps and cracks of doors, windows, walls, ground (floors) must be sealed.
- Take anti-leakage and anti-condensation measures if there are water supply and drainage pipes in the server room.
- Take measures to prevent water overflow and leakage if there is water equipment in the main server room.
- Block cable holes and antenna holes.
- Clean and sterilize the server room periodically. Regular disinfection is recommended.

3. Corrosive Gaseous Contaminants

Generally, a small quantity of common corrosive gaseous contaminants exist in indoor and outdoor atmospheric environments. Chemical reactions may occur due to long-term contact between these mixed corrosive gaseous contaminants or contaminants of one single corrosive gas and other environmental factors (such as temperature or relative humidity), which may pose a risk of IT equipment failure from corrosion and damage circuit boards of IT equipment and system component units with weak oxidation resistance. This section specifies the limits for corrosive gaseous contaminants with an aim to avoid such risks.

The concentration level of corrosive gaseous contaminants in a data center shall meet the requirements listed in the white paper entitled *2011 Gaseous and Particulate Contamination Guidelines for Data Centers* published by American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE) Technical Committee (TC) 9.9. According to the Guidelines, corrosive gaseous contaminants in a data center shall meet the following requirements:

- Copper coupon corrosion rate less than 300 Å/month per ANSI/ISA-71.04-2013 severity level G1
- Silver corrosion rate less than 200 Å/month per ANSI/ISA-71.04-2013 severity level G1
- ANSI/ISA-71.04-2013 *Environmental Conditions for Process Measurement and Control Systems: Airborne Contaminants* classifies severity levels into G1 (mild), G2 (moderate), G3 (harsh), and GX (severe), as described in the table below.

Table 8-6 Gaseous Corrosivity Levels per ANSI/ISA-71.04-2013

Severity Level	**Copper Reactivity Level**	**Silver Reactivity Level**	**Description**
G1 (mild)	<300 Å/month	< 200 Å/month	An environment sufficiently well-controlled such that corrosion is not a factor in determining equipment reliability.
G2 (moderate)	<1000 Å/month	<1000 Å/month	An environment in which the effects of corrosion are measurable and may be a factor in determining equipment reliability.
G3 (harsh)	<2000 Å/month	<2000 Å/month	An environment in which there is high probability that corrosive attack will occur.
GX (severe)	≥2000 Å/month	≥2000 Å/month	An environment in which only specially designed and

Severity Level	Copper Reactivity Level	Silver Reactivity Level	Description
			packaged equipment would be expected to survive.

See corrosive gas groups and concentration limits provided in the table below and make sure the copper and silver coupon corrosion rates meet the requirements of the corrosion concentration levels specified in the Gaseous Corrosivity Levels per ANSI/ISA-71.04-2013 table.

Table 8-7 Concentration Limits on Corrosive Gaseous Contaminants in a Data Center

Group	Corrosive Gas	Unit	Concentration
Group A	H_2S	ppb[a]	<3
	SO_2	ppb	<10
	Cl_2	ppb	<1
	NO_2	ppb	<50
Group B	HF	ppb	<1
	NH_3	ppb	<500
	O_3	ppb	<2
a: Parts per billion (ppb) is a unit of concentration, and 1 ppb represents 1 part per billion.			

Group A and group B are common gas groups in a data center. Group A's or group B's concentration limits correspond to copper and silver reactivity level G1.

Corrosion is not determined by a single factor, but by comprehensive environmental factors such as temperature, relative humidity and corrosive airborne contaminants. Any change of the environmental factors may affect the gaseous corrosivity level. Therefore, the concentration limits specified in the previous table are for reference only. If the actual mixed gas concentration is not listed in the table, refer to the chemically active substance level in IEC-60721-3-3 or GB/T 4798.3-2007 to choose the concentration range.

4. Mechanically Active Substances

The server room should be free from explosive, conductive, magnetic, and corrosive dust. The table below lists the requirements for the concentration of mechanically active substances.

Table 8-8 Requirements for Concentration of Mechanically Active Substances

Mechanically Active Substances	Unit	Concentration
Sand	mg/m^3	≤30
Dust (suspension)	mg/m^3	≤0.2
Dust (sedimentation)	$mg/(m^2h)$	≤1.5

To meet these requirements, take the following measures in the server room:

- Use dustproof materials on the ground, wall, and ceiling of the server room.
- Adopt few or no windows design in the server room, and use dustproof materials for outer windows.
- Clean the server room periodically, especially the air filters.
- Wear shoe covers and ESD clothing before entering the server room.

8.7 Electromagnetic and Safety Standard Requirements

As per GB/T 17626.3 (IEC 61000-4-3), GB/T 17626.6(IEC 61000-4-6) and GB/T 17626.8 (IEC 61000-4-8), the recommended electromagnetic environment is as follows:

Table 8-9 Electromagnetic Specifications

Electromagnetic Phenomenon		Specifications
Power Frequency Magnetic Field	Frequency (Hz)	50
	A/m (rms)	≤1
Amplitude Modulation RF Electromagnetic Field	Frequency (MHz)	80 - 1000
	V/m (rms, unmodulated)	≤3
	%AM (1 kHz)	80
	Frequency (MHz)	0.15 - 80
	V (rms, unmodulated)	≤3

Electromagnetic Phenomenon		Specifications
Continuous Induced RF Conduction	%AM (1 kHz)	80

Meanwhile, we recommend you to take the following measures to suppress interference signals:

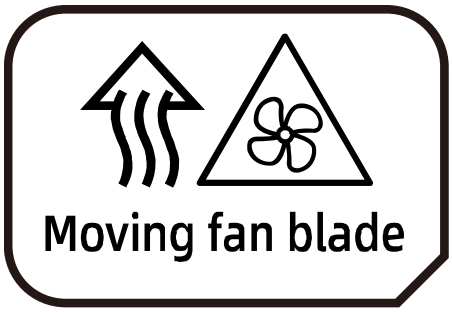
- Take effective measures against power grid interference to the power supply system.
- Keep away from electrical equipment such as magnetic resonance devices, heliarc welding machines, and radio frequency electric heaters.
- Try to avoid the impact of surrounding electrical railways, industrial radiation devices, substations, high-voltage transmission lines and other facilities that emit high levels of EMI or RFI, such as broadcasting equipment, radars and mobile communication transmitters.
- The interference level of other equipment in the server room must comply with relevant standards and regulations.
- Take measures to shield and isolate natural noise such as atmospheric noise and solar radio noise when necessary.

To avoid damage to the system, take ESD protection measures. (See 6 Electrostatic Discharge section.)

As per the requirements of Appendix F.5 of IEC 62368, the server is pasted with safety protection logos. The logos and interpretations are as follows:

- Fan blade safety protection:

Figure 8-1 Fan Blade Safety Protection



Caution: Keep body parts away from fan blades

- Multi-power safety protection:

Figure 8-2 Multi-Power Safety Protection

Caution: Shock Hazard! Disconnect all power supply cords before servicing.

8.8 Power Supply Requirements

8.8.1 AC Power Supply Requirements

An AC power supply that consists of mains supply, uninterruptible power supply (UPS), and self-supplied electric generator set can be used as an integrated power supply. The AC power supply must feature simple wiring, safe operation, flexible scheduling, and easy maintenance, in addition to meeting the requirements of site load. The low voltage power supply should adopt three-phase five-wire mode or monophase three-wire mode.

The AC power supply system should work under nominal voltage and rated frequency.

Table 8-10 Nominal Voltage and Rated Frequency

Nominal Voltage	Rated Frequency
110 V, 208 V	60 Hz
220 V, 380 V	50 Hz

A UPS is typically used as an AC backup power of network products. A UPS should be in the same phase as the mains supply. The time used for switching between the UPS and the mains supply should be less than 8 ms. Otherwise, the server will reboot or reset.

8.8.2 DC Power Supply Requirements

The DC power supply system should work under nominal voltage of 270 V.

The upstream DC power supply equipment should meet the following requirements:

- *YD/T 731 48 V rectifier for telecommunications*
- *YD/T 2378 240 V DC power supply system for telecommunications*
- *YD/T 3089 336 V DC power supply system for telecommunications*

8.8.3 Recommendations on AC Power Supply

Recommendations on the AC power supply are as follows:

- Use a voltage stabilizer or voltage-regulator to respond to unstable voltages. Use a voltage-regulator in the following situations:
- The server is directly powered by the mains supply, and the power supply voltage is not within -10% to +10% of the rated voltage or the voltage range allowed for the server.
- The server is not directly powered by the mains supply, and the mains voltage is not within -10% to +10% of the rated voltage or the AC input voltage range allowed for the DC power equipment.
- To prevent interruption or transient increases and decreases of AC power supply, use the UPS or inverter.
- The data center should be equipped with self-supplied generator set in case of mains failure to ensure proper function of important load and important power load. All electrical equipment such as IT equipment and refrigeration equipment should be considered. Check the start-up shock to ensure that the generator can start reliably. The generator performance should meet the requirements of Code for Design of Data Centers (GB50174).
- Connect two storage battery strings in parallel. A second UPS is needed as redundant backup.

8.8.4 HVDC Power Supply

The high-voltage direct current (HVDC) system can eliminate the problems existing in conventional AC and low-voltage DC power supplies. At present, 240 V HVDC standards and 336 V HVDC standards are the mainstream HVDC standards used in China.

8.8.5 HVDC Power Supply Requirements

- Temperature:
  - Operating: -5℃ to 45℃ (23℉ to 113℉)

  - Storage: -40℃ to 85℃ (-40℉ to 185℉)

- Relative humidity:
  - Operating: ≤ 90% RH (40 ± 2℃) (104 ± 3.6℉)
  - Storage: ≤ 95% RH (40 ± 2℃) (104 ± 3.6℉)
- Vibration performance: Ability to withstand sinusoidal frequencies between 10 Hz to 55 Hz and amplitude of 0.35 mm.
- Storage battery pack configuration: Ensure continuous operation of servers at full loads when the power supplies are unavailable. The storage battery backup time should be 15 minutes when a diesel generator is available as the backup power source.
- Determination of cell voltage and pack number: Depending on the system capacity and backup time, the cell voltage can be selected from 2 V, 6 V or 12 V.
- The insulation monitoring device acts properly if a ground fault occurs or the insulation resistance is lower than the set value 28 kΩ. The HVDC system is protected against overcurrent and short circuits and can be manually or automatically restored after overcurrent or short circuits are rectified.
- Over- and under-voltage protection for AC power supplies: The power supply system can monitor the input voltage changes. When detecting that the AC input voltage is higher or lower than the specified threshold, which may pose a safety risk on the operation of the power supply system, the system automatically shuts down. The system automatically restores when the input voltage is normal.
- The site must be free from mold, explosive materials, conductive media and hazardous gases that erode metals and affect insulation.
- Overtemperature protection: When the temperature in the power supply system reaches the specified threshold, the power supply system automatically reduces the power or shuts down the power amplifier. When the temperature falls below the threshold, the power supply system restores the normal power output.
- The system provides alarm records and query, and the alarm can be displayed in real time. The alarm information is protected against loss when the system is out of power.

8.8.6 Recommendations on HVDC Power Supply

- Terminal devices can be connected to electrical outlets or wiring terminals. Wiring terminals are recommended.

- Do not use a branch circuit breaker to connect to or control multiple power modules through a multi-purpose electrical outlet.
- Choose DC circuit breakers based on the rated current of the equipment. The 10 A or 16 A DC breakers are recommended.
- Recommended standards for equipment power wiring: Connect the DC output positive pole to terminal L of the equipment input power cord. Connect the DC output negative pole to terminal N of the equipment input power cord. DC system is strictly forbidden from being grounded.
- The upstream input terminal of the power supply system is equipped with a surge protection device to protect the system against a minimum voltage pulse of 10/700 us, 5 kV and a minimum current pulse of 8/20 us, 20 kA.
- All cables in the power distribution frame (PDF) comply with YD/T 1173 specifications, and the diameters of all power cables meet the requirements for wire ampacity.

9 Limited Warranty

This limited warranty applies only to the original purchasers of our products who are direct customers or distributors of us (“Customer”).

We warrant all our hardware products, if properly used and installed, to be free from defects in material and workmanship within the warranty period. The term “Hardware Product” is limited to the hardware components and required firmware. The term “Hardware Product” DOES NOT include software applications or programs, and DOES NOT include products or peripherals that are not supplied by us. We may, at our discretion, repair or replace the defective parts. Repair or replacement parts may be new, used, or equivalent to new in performance and reliability. Repair or replacement parts are warranted to be free of defects in material or workmanship for ninety (90) calendar days or for the remainder of the warranty period of the product, whichever is longer.

Service offerings may vary by geographic region. Please contact your representative to identify service levels and needs for your region.

9.1 Warranty Service

Our warranty service includes 24 × 7 remote technical support, RMA (Return Material Authorization) Service, ARMA (Advanced Return Material Authorization) Service, 9 × 5 × NBD (Next Business Day) Onsite Service and 24 × 7 × 4 Onsite Service.

9.1.1 Remote Technical Support

The 24 × 7 remote technical support can be obtained through hotline, e-mail, and Service Portal*[1]. Through hotline and e-mail support, our engineers help customers diagnose the causes of malfunctions and provide solutions. Service Portal*[1] provides access to firmware, customized update files, and related manuals for Hardware Products. Customer may also access the Service Portal*[1] to submit an RMA request or an ARMA request for parts replacement or repair.

Information needed when requesting support:

- Contact name, phone number, e-mail address
- System serial number, part number, model and location (address) of the product needing service
- Detailed description of problem, logs (SELs and blackbox logs, and any other related logs from OS), screenshot of issue, pictures of damaged/faulty parts, etc.

Table 9-1 Support Contact Information

Type	Description	Support Window
Email	• Technical Support: serversupport@aivres.com • RMA/ARMA Support: serversupportusa@aivres.com	24 × 7 × 365
Web	Service Portal: service.aivres.com	24 × 7 × 365

9.1.2 RMA Service

Standard Replacement: When a hardware failure occurs, Customer may submit an RMA request to us via e-mail or Service Portal*[1]. We will review and approve the RMA submission at its own discretion, and provide an RMA number and return information that Customer may use to return the defective part(s) for the RMA service. We will ship out replacement part(s) within one (1) business day after receiving the defective part(s) and cover one-way shipment.

NOTE

- Customer should return the defective parts in proper packaging to our designated service center at their own expense.
- After our further diagnosing and testing, if the defective parts conform to our repair policy, we will ship out the repair or replacement parts at our own expense; otherwise, we will return the defective parts at Customer's expense.
- If Customer needs to designate a logistics company, allocation of the shipping cost to us/Customer will be redefined.

9.1.3 ARMA Service

Advanced Replacement: If a problem with our hardware products cannot be resolved via hotline or e-mail support and replacement part(s) are required, we will ship out replacement part(s) in advance within one (1) business day. Customer should return defective part(s) within five (5) business days after receiving the replacement(s). We will cover one-way shipment.

NOTE

- Customer should return the defective parts in proper packaging to our designated service center.
- We will ship out the replacement parts at our own expense after completing remote diagnosis.
- If Customer needs to designate a logistics company, allocation of the shipping cost to us/Customer will be redefined.

9.1.4 9 × 5 × NBD Onsite Service

When we ultimately determine that an onsite service call is required to repair or replace a defect, the call will be scheduled in accordance with the Response Time Commitment. The response time is measured from the time when the remote troubleshooting is completed and logged to the arrival of a service engineer and parts to Customer location for repair.

NOTE

9 × 5 × NBD: Our service engineer typically arrives at the customer's data center on the next business day. Service engineers are available on local business day from 9:00 am to 6:00 pm local time. Calls received/dispatches after 5:00 pm local time will require an additional day for the service engineer to arrive.

9.1.5 24 × 7 × 4 Onsite Service

When we ultimately determine that an onsite service call is required to repair or replace a defect, the call will be scheduled in accordance with the Response Time Commitment. The response time is measured from the time when the remote troubleshooting is completed and logged to the arrival of a service engineer and parts to Customer location for repair.

NOTE

24 × 7 × 4: Our service engineer typically arrives at the customer site within 4 hours. Service engineers are available at anytime, including weekends and local national holidays.

9.2 Our Service SLA

We offer a variety of Service Level Agreements (SLA)*[2] to meet customer requirements.

- RMA Service
- ARMA Service
- 9 × 5 × NBD Onsite Service
- 24 × 7 × 4 Onsite Service

9.3 Warranty Exclusions

We do not guarantee that there will be no interruptions or mistakes during the use of the products. We will not undertake any responsibility for the losses arising from any operation not conducted according to instructions intended for Hardware Products.

The Limited Warranty does do not apply to

- expendable or consumable parts, such as, but not limited to, batteries or protective coatings that are designed to diminish over time, unless failure has occurred during DOA period due to a defect in material or workmanship;
- any cosmetic damage, such as, but not limited to, scratches, dents, broken plastics, metal corrosion, or mechanical damage, unless failure has occurred during DOA period due to a defect in material or workmanship;
- damage or defects caused by accident, misuse, abuse, contamination, improper or inadequate maintenance or calibration or other external causes;
- damage or defects caused by operation beyond the parameters as stipulated in the user documentation;
- damage or defects by software, interfacing, parts or supplies not provided by us;
- damage or defects by improper storage, usage, or maintenance;
- damage or defects by virus infection;

- loss or damage in transit which is not arranged by us;
- Hardware Products that have been modified or serviced by non-authorized personnel;
- any damage to or loss of any personal data, programs, or removable storage media;
- the restoration or reinstallation of any data or programs except the software installed by us when the product is manufactured;
- any engineering sample, evaluation unit, or non-mass production product that is not covered under warranty service;
- any solid-state drive (SSD) which has reached its write endurance limit.

In no event will we be liable for any direct loss of use, interruption of business, lost profits, lost data, or indirect, special, incidental or consequential damages of any kind regardless of the form of action, whether in contract, tort (including negligence), strict liability or otherwise, even if we have been advised of the possibility of such damage, and whether or not any remedy provided should fail of its essential purpose.

*1 Service Portal availability is subject to customer type and customer location. Please contact your representative to learn more.

*2 Not all SLA offerings are available at all customer locations. Some SLA offerings may be limited to geolocation and/or customer type. Please contact your representative to learn more.

Appendix

A.1 Drive Neodymium Content Reference Table

Table A-1 Seagate Drive Neodymium Content Reference

Product Series Name	Neodymium Content Range		
	< 5 g	5 g - 25 g	> 25 g
Cimarron (2T/4T)	√		
Cimarron (6T/8T)		√	
Evans		√	
Kestrel	√		
MakaraBP		√	
MakaraPLUS		√	
Mobula		√	
MobulaBP		√	
Skybolt	√		
Tatsu		√	

Table A-2 WD Drive Neodymium Content Reference

Product Series Name	Neodymium Content Range		
	< 5 g	5 g - 25 g	> 25 g
Rainier	√		
Libra He10		√	
Leo A		√	
Vela-A		√	
Vela-AP		√	
Hs14		√	
Leo-B		√	

Table A-3 Toshiba Drive Neodymium Content Reference

Product Series Name	Neodymium Content Range		
	< 5 g	5 g - 25 g	> 25 g
AL14SE-Lite	√		
AL15SE	√		
AL14SX	√		
MG04 Tomcat-R SAS		√	
MG04 Tomcat-R SATA		√	
MG04 Tomcat SATA		√	
MG06 SAS		√	
MG06 SATA		√	
MG07 SAS		√	
MG07 SATA		√	

A.2 Acronyms and Abbreviations

A

AC	Alternating Current
ACPI	Advanced Configuration and Power Management Interface
AEP	Apache Pass
AES	Advanced Encryption Standard New Instruction Set
AI	Artificial Intelligence
ANSI	American National Standards Institute
AOC	Active Optical Cables
API	Application Programming Interface
ASHRAE	The American Society of Heating, Refrigerating and Air-Conditioning Engineers

ARP	Address Resolution Protocol
AVL	Approved Vendor List

B

BIOS	Basic Input Output System
BMC	Baseboard Management Controller
BPS	Barlow Pass

C

CE	Conformite Europeenne
CLI	Command-Line Interface
CMOS	Complementary Metal-Oxide-Semiconductor Transistor
CPLD	Complex Programmable Logic Device
CPU	Central Processing Unit
CRPS	Common Redundant Power Supply
CRM	Customer Relationship Management
CRU	Customer-Replaceable Unit
CSA	Canadian Standards Association
CSM	Compatibility Support Module

D

DC	Direct Current

DDR4	Double Date Rate 4
DHCP	Dynamic Host Configuration Protocol
DIMM	Dual In-Line Memory Module
DMTF	Distributed Management Task Force
DOA	Dead on Arrival
DPC	DIMMs Per Channel
DNS	Domain Name System
DVD	Digital Video Disc

E

ECC	Error Checking and Correcting
EMC	Electromagnetic Compatibility
EN	European Standard
ERP	Enterprise Resources Planning
ESD	Electrostatic Discharge
EVAC	Extended Volume Air Cooling
E1.L	Enterprise & Data Center SSD Form Factor 1 Unit Long
E1.S	Enterprise & Data Center SSD Form Factor 1 Unit Short

F

FCoE	Fibre Channel over Ethernet
FMA	Failure Mode Analysis

FPGA	Field Programmable Gate Array
FRU	Field-Replaceable Unit
FTP	File Transfer Protocol
FW	Firmware

G

GE	Gigabit Ethernet
GPU	Graphics Processing Unit
GUI	Graphical User Interface

H

HBA	Host Bus Adapter
HCA	Host Channel Adapter
HDD	Hard Disk Drive
HTML	Hyper Text Markup Language
HWRAID	Hardware Redundant Arrays of Independent Disks

I

I/O	Input/Output
IB	InfiniBand
IEC	International Electrotechnical Commission
IGMP	Internet Group Management Protocol

IOPS	Input/Output Operations Per Second
IP	Internet Protocol
IPMB	Intelligent Platform Management Bus
IPMI	Intelligent Platform Management Interface
IRQ	Interrupt ReQuest
iSCSI	Internet Small Computer System Interface

J

JBOD	Just a Bunch of Disks
JTAG	Joint Test Action Group

K

KVM	Keyboard Video Mouse

L

LAN	Local Area Network
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LOM	LAN On Motherboard
LRDIMM	Load Reduced Dual In-Line Memory Module

M

MAC	Media Access Control

MLAN	Management Local Area Network

N

NCSI	Network Controller Sideband Interface
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NIC	Network Interface Controller
NPU	Network Processing Unit
NTP	Network Time Protocol
NVDIMM	Non-Volatile Dual In-Line Memory Module
NVMe	Non-Volatile Memory Express

O

OCP	Open Compute Project
OAM	OCP Accelerator Module
O-RAN	Open Radio Access Network
OS	Operating System
OTII	Open Telecom IT Infrastructure

P

PCH	Platform Controller Hub
PCI	Peripheral Component Interconnect

PCIe	Peripheral Component Interconnect express
PDU	Power Distribution Unit
PF	Power Factor
PFR	Platform Firmware Resilience
PHM	Processor Heatsink Module
PHY	Physical
PMBus	Power Management Bus
POST	Power On Self Test
PSU	Power Supply Unit
PXE	Pre-boot Execution Environment

R

RAM	Random-Access Memory
RAID	Redundant Arrays of Independent Disks
RDIMM	Registered Dual In-line Memory Module
RH	Relative Humidity
RJ45	Registered Jack 45
RoHS	Restriction of Hazardous Substances
ROM	Read-Only Memory
RTC	Real Time Clock

S

SAS	Serial Attached SCSI
SATA	Serial Advanced Technology Attachment
SCSI	Small Computer System Interface
SEL	System Event Log
SFP	Small Form-factor Pluggable
SIC	Smart Interface Card
SKU	Stock Keeping Unit
SMTP	Simple Mail Transfer Protocol
SNMP	Simple Network Management Protocol
SOL	Serial Over LAN
SSD	Solid State Drive
SSE	Streaming SIMD Extensions
SSH	Secure Shell
SUV	Serial, USB, VGA
SWRAID	Software Redundant Arrays of Independent Disks

T

TCG	Trusted Computing Group
TCM	Trusted Cryptography Module
TCO	Total Cost of Ownership
TDP	Thermal Design Power

TPCM	Trusted Platform Control Module
TPM	Trusted Platform Module

U

UEFI	Unified Extensible Firmware Interface
UID	Unit Identification
UPI	Ultra Path Interconnect
UPS	Uninterruptible Power Supply
USB	Universal Serial Bus

V

VGA	Video Graphics Array
VLAN	Virtual Local Area Network
VPP	Vector Packet Processing

X

XDP	eXtend Debug Port