



Inspur Server NF5260FM6 User Manual

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Abstract

This manual describes the server's specifications, features, hardware setup, warranty information and troubleshooting, which will help users to understand how best to utilize the server and all its functionalities.

Target Audience

This manual is intended for:

- Technical support engineers
- Product maintenance engineers

It is recommended that server installation, configuration, or maintenance is performed by experienced technicians with knowledge in servers only.






Safety Precautions

- If your purchases do not include Inspur 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 Inspur direct sales stores, call Inspur service hotline 1-844-860-0011/1-760-769-1847 for technical support.
- For your safety, please do not disassemble the server's components, extend configuration or connect other peripherals arbitrarily. You can contact Inspur 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 the product-compatible operating system and use the driver that comes with the server or provided by Inspur. You can go to our official site, on the Top Navigator, click on **Support > Product Support > Drivers**, and then find the correct driver of your product based on the prompt. An incompatible operating system or a non-Inspur driver may cause compatibility issues and affect the normal use of the product. Inspur will not assume any responsibility or liability for this.

- BIOS and BMC settings are critical to configuring your server. Unless you have specific requirements, always use the factory defaults. Do not make unauthorized modifications. Change the BMC password the first time you log in.

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 important information

Revision History

Version	Date	Description of Changes
V1.0	2021/05/28	Initial release

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1 Safety Instructions

1.1 Warnings

The following warnings indicate potential hazards that may cause property damage, personal injury, or death.

1. The power supply units of this system may generate a high voltage and dangerous energy that can result in personal injury. Without the permission of Inspur, do not remove the chassis cover to install, remove, or replace any components in the system. Such work can only be performed by a qualified technician who has been trained by Inspur.
2. Ensure the system is powered by an external power supply that matches the ratings indicated on the nameplate. Please use a voltage regulator or UPS (uninterruptible power supply) to prevent damage to the system that is caused by voltage sags or surges.
3. If an extension cable is required, always use a three-core cable with a properly grounded plug, and ensure that the total rated current of all the devices connected to the extension cable does not exceed 80% of the cable's rated current.
4. For the safety of the system and user, be sure to use the power cables and sockets (if available) shipped with the product, and do not replace them with other power cables or plugs.
5. To avoid electrical shocks caused by electrical leakage, always connect the power cables of the system and peripheral devices to the properly grounded sockets. Please plug the three-prong plug into a properly grounded and easily accessible three-prong AC power socket. Be sure to use the ground pin of the cable, and do not use an adapter or unplug the ground pin. Do not operate the system without a grounding conductor installed. If you're not sure whether the grounding protection is in place, please contact an electrician.
6. Do not insert any object into the openings of the system to avoid a fire or electrical shock caused by a short circuit of inner components. Otherwise, it may result in a short circuit of inner components and thus cause a fire or electrical shock.
7. Keep the system away from heatsinks and heat sources, and ensure the ventilation openings are not blocked.
8. Avoid contaminating the inside of the system or other components with food debris or liquid. Do not use the product in a humid or dusty environment.

9. Always use the battery type recommended by the manufacturer or a similar battery for replacement. Using an incorrect battery type may cause an explosion. Never attempt to dismantle, squeeze or dismantle a battery or short circuit the battery. Do not throw it into fire or water, or expose it to an environment with a temperature above 60 °C. Ensure the used batteries are properly and safely disposed of. Do not mix a used battery with a circuit board with batteries or with other components and wastes. For information on battery recycling, contact your local recycling agency.
10. Before installing devices on a stand-alone cabinet, install the front and side leveling feet. For a cabinet connected to other cabinets, install the front leveling feet first. Be sure to install the leveling feet before installing devices in the cabinet to prevent the cabinet from tipping over to cause personal injury. After devices and other components are installed in the cabinet, only slide one component out of the cabinet at a time. Pulling out multiple components at a time may cause the cabinet to tip over and result in personal injury.
11. Do not move the cabinet alone. At least two people are required to move the cabinet.
12. Do not touch the copper busbar when the system is powered on. Do not short circuit the copper busbar.
13. This is a "Class A" product, which may cause radio interference. You may need to take adequate measures against its impact.

1.2 Precautions

Before using the product, please carefully read the following precautions to avoid the issues that may cause component damage or data loss.

1. Disconnect the product's power cable from the power socket and contact Inspur Customer Service under any of the following circumstances.
 - a. The power cable, extension cable, or power plug is damaged.
 - b. The product gets wet with water.
 - c. The product falls off or is damaged.
 - d. An object falls into the product.
 - e. The product does not work properly when the operating instructions are followed.
2. If the system is exposed to moisture, follow the steps below.
 - a. Power off the system and devices. Disconnect their power cables, wait 10 to 20 seconds, and then open the chassis cover.

- b. Move the device to a ventilated area to dry the system up. Keep it dry for at least 24 hours.
 - c. Close the cover, connect the system's power cable, and power on the system.
 - d. If it cannot operate normally, contact Inspur for support.
 3. The wiring layout should ensure that the system cables and power cables will not be stepped on or knocked off. Do not place any objects on the cables.
 4. Before removing the chassis cover or touching any inner component, wait until the device is cooled down. After the system is turned off, wait 5 seconds before removing components from the mainboard or disconnecting from peripheral devices to avoid damage to the mainboard.
 5. If a modem, or telecom or LAN component is installed:
 - a. Do not connect or use the modem in the event of lightning to avoid lighting strikes.
 - b. Do not connect or use the modem in a humid environment.
 - c. Do not insert the modem or phone cable into the NIC port.
 - d. Before unpacking the product, touching or installing inner components, or touching an uninsulated modem cable or jack, be sure to disconnect the modem cable.
 6. To prevent static discharge from damaging the electronic components inside the device:
 - a. Discharge static electricity from your body before installing, removing, or touching any electronic components inside the device. You can remove the static electricity from your body by touching a grounded metal object (such as the unpainted metal surface of the chassis) to and prevent damage to ESD-sensitive components caused by static discharge.
 - b. Do not take out ESD-sensitive components from their anti-static packaging materials if they are not intended for use.
 - c. Regularly touch grounded conductors or unpainted metal surface of the chassis during operation to discharge static electricity from your body that could damage inner components.
 7. When installing or removing any components inside the system with the permission of Inspur:
 - a. Power off the system and disconnect its power cable and all the cables connected to the system. Disconnect the cable by holding the cable connector (instead of the cable) and pulling it out.

- b. Allow the product to cool down before removing the chassis cover or touching inner components.
 - c. Discharge static electricity from your body by touching a grounded metal object before installing, removing, or touching any electronic components inside the device.
 - d. Install and remove components gently to avoid damaging the components or scratching your arm.
 - e. Handle all the components and cards with care and do not touch the components or contacts on the cards. Remove a card or component by holding its edge or metal bracket.
8. When installing and using the cabinet:
- a. After installing the cabinet, make sure the leveling legs are secured to the rack and down to the floor, and that weight of the entire rack is transferred to the floor.
 - b. Be sure to load the cabinet from bottom to top and install the heaviest component first.
 - c. Always pull out a component from the cabinet gently to keep the cabinet balanced and stable.
 - d. Be careful not to jam your fingers when pushing in the slide-rail to release the latch and sliding the component in or out.
 - e. Do not overload the AC power supply branch circuit of the cabinet. The total load of the cabinet should not exceed 80% of the rating of a branch circuit.
 - f. Ensure the components in the cabinet are properly ventilated.
 - g. Do not step on other components when repairing a component in the cabinet.

2 Product Specifications

2.1 Introduction

Inspur NF5260FM6 is a 2U2S rack server built on the new generation Intel® Xeon® Scalable processors, which maintains high quality and reliability of Inspur servers. It is designed to maximize the performance, storage capacity, and expansion capability with excellence in computing performance, scalability, flexibility, and intelligent management, fully meeting the needs of various scenarios such as cloud computing and big data.

2.1.1 Features

- Two Intel® Xeon® Scalable processors built on the Ice Lake architecture with a TDP of up to 270 W
- 3 UPI channels at 11.2 GT/s
- Up to 32 DDR4 DIMMs (RDIMM/NVDIMM/Barlow Pass)
- 9 front 3.5" drives (7 × SATA/SAS/SSD + 2 × NVMe SSD) or 16 front 2.5" drives (16 × SATA/SAS/NVMe SSD)
- 1 OCP 3.0 NIC
- 11 onboard Slimline connectors
- Up to 14 onboard drives in Pass-Through mode
- Up to 3 external PCIe cards and 4 internal PCIe cards
- ASP 2500 BMC chips integrated on the mainboard with standard KVM capability
- Hot-swap LCD module and remote monitoring of mobile devices with BMC
- Intel remote BMC debugging
- A modular design of and tool-free maintenance for drive modules, PCIe expansion slots, power supplies, and fans
- Hot-swap redundant 80 Plus Platinum or higher CRPS power supplies with PMBus support and Node Manager 4.0
- Hot-swap fan brackets/fans with N+ N redundancy and low noise

2.1.2 9 × 3.5" Configuration



A 3.5" drive tray can accommodate 3.5"/2.5" drives.

9 front 3.5"/2.5" SAS/SATA drives are supported, as shown below.

Figure 2-1 9 × 3.5" Configuration



2.1.3 16 × 2.5" Configuration

Figure 2-2 16 × 2.5" Configuration



2.2 Features and Specifications

Time to Market	2021	
Processor	Type	Intel® Xeon® Scalable processors (up to two CPUs with a TDP of 270 W)
	Interfaces	2
Chipset	Type	C621-A

DIMM	Type	DDR4 Registered, NVDIMM, and Barlow Pass
	Slots	32
	Total Capacity	Up to 2 T with 64 G per module (excluding BPS)
I/O Port	USB Port	2 USB 3.0 ports
	VGA Port	1 front VGA port
	Serial Port	1 front serial port
	UID LED	1 rear UID button with LED
Display Controller	Controller Type	Integrated in Aspeed 2500 chip, with a maximum resolution of 1280 × 1024
SAS Backplane	SAS 3.0 backplane	Supports hot-swap SAS/SATA/NVMe drives
NIC	NIC Controller	Mainboard supports standard OCP/PCIe cards
Management Chip	Management Chip	Integrated with a separate 1000 Mbps NIC for remote IPMI management
Expansion Slot	PCIe expansion slots	<ul style="list-style-type: none"> • 3 FHHL slots: 1 × PCIe x16 + 2 × PCIe x8 (full-height slots are only available for the configuration of 2.5" drives and PCIe x16) • 4 FHHL slots: 2 × PCIe x16 + 2 × PCIe x8 • Up to 1 OCP 3.0 NIC
Drive	Type	2.5"/3.5" SAS/SATA/NVMe drives. Please refer to the actual server model.
External Drive	USB Drive	External USB drives
	TF Card	None
Power Supply	Specifications	Output power of 800 W/1300 W or above in a single- or dual-power supply configuration; two

		redundant (1+1) PSUs with PMBus support and Node Manager 4.0
	Power Input	See the power input value labeled on the nameplate of the chassis outer surface.
Physical Specifications	Packaging (h x w x d)	780 mm in length: 295 mm x 651 mm x 1031 mm
	Chassis (h x w x d)	780 mm in length: 87 mm x 435 mm x 780 mm
	Weight	<p>At full configuration of 9 x 3.5" bays (9 drives)</p> <ul style="list-style-type: none"> Chassis weight: 25 kg Gross weight: 33 kg (Chassis + Package + Rails + Accessory Box) <p>At full configuration of 16 x 2.5" bays (16 drives)</p> <ul style="list-style-type: none"> Chassis weight: 22 kg Gross weight: 30 kg (Chassis + Package + Rails + Accessory Box)
Environment Parameters	Temperature	<ul style="list-style-type: none"> Operating: 10°C to 35°C (50°F to 95°F) (ASHRAE CLASS A2 compliant) Storage: -40°C to +70°C (-40°F to +159°F) Rate of change: $\leq 20^{\circ}\text{C/h}$ (68°F/h)
	Humidity	<ul style="list-style-type: none"> Operating: 5% - 90% RH Storage: 5% - 95% RH Rate of change: $\leq 40\% \text{ RH/h}$
	Altitude	<ul style="list-style-type: none"> Operating: 0 - 3050 m Storage: 0 - 12,000 m
	Vibration	<ul style="list-style-type: none"> Operating: 5 - 500 Hz, 0.21 Grms (3 axes) Storage: 5 - 500 Hz, 2.20 Grms (3 axes)
	Shock	<ul style="list-style-type: none"> Operating: 2 G half-sine wave on a 11-ms interval along the positive and negative X-/Y-/Z-axis

		<ul style="list-style-type: none"> Storage: 40 G square wave at 156"/sec along the positive and negative X-/Y-/Z-axis
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2.3 Power Efficiency

Table 2-1 Platinum Power Supply

Vendor	Module	@10% Load	@20% Load	@50% Load	@100% Load	PF@50% Load	Rated Power
Delta	DELTA_M_DPS-800AB-58A_800W_1U_P	88%	94%	94%	91%	98%	800 W
	DELTA_M_DPS-1300AB-27A_1300W_1U_P	88%	94%	94%	91%	98%	1300 W
	DELTA_M_DPS-1600AB-45A_1600W_1U_P	88%	94%	94%	91%	98%	1600 W
	DELTA_M_DPST-2030AB F_2000W_1U_P	88%	94%	94%	91%	98%	2000 W
Great Wall	G_M_GW-CRPS800N2W_800W_1U_P_S	88%	94%	94%	91%	98%	800 W
	G_M_GW-CRPS1300D2W_1300W_1U_P	88%	94%	94%	91%	98%	1300 W
	G_M_GW-CRPS1600D2W_1600W_1U_P	88%	94%	94%	91%	98%	1600 W
	G_M_GW-CRPS2000DW_2000W_1U_P	88%	94%	94%	91%	98%	2000 W
Liteon	LO_M_PS-2801-22L1_1U_P	88%	94%	94%	91%	98%	800 W
	LO_M_PS-2132-11L1_800W_1U_P	88%	94%	94%	91%	98%	1300 W
	LO_M_PS-2162-15L1_1300W_1U_P	88%	94%	94%	91%	98%	1600 W

Note: Efficiency was tested under the AC input voltage of 230 VAC/50 Hz (according to the 80 PLUS[®] Standard)

Table 2-2 EU Regulation 2019/424 Server configurations

EU Regulation 2019/424 Server configurations	High-end performance configuration	Low-end performance configuration
(h)idle state power	218.3	183.1
(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);	393.68	184.53
(j)maximum power, expressed in Watts and rounded to the first decimal place;	612.1	493.7
(k)declared operating condition class, as detailed in Table 6;	A2	A2
(l)idle state power (Watts) at the higher boundary temperature of the declared operating condition class;	219	185
(m)the active state efficiency and the performance in active state of the server;	43.1	27.4

Table 2-3 List of components for additional power allowance

(i) List of components for additional power allowance		High-end performance configuration	Low-end performance configuration
CPU Performance	1 socket: 10 × Perf CPU W 2 socket: 7 × Perf CPU W	150.08	79.17
Additional PSU	10 W per PSU	10	10
HDD or SSD	5,0 W per HDD or SSD	10	10
Additional memory	0,18 W per GB	183.6	45.36
Additional buffered DDR channel	4,0 W per buffered DDR channel	32	32

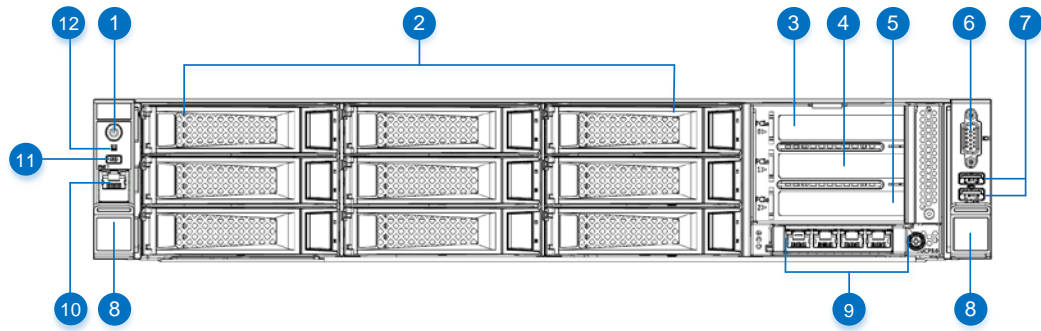
(i) List of components for additional power allowance		High-end performance configuration	Low-end performance configuration
Additional I/O devices	< 1 Gb/s: No Allowance = 1 Gb/s: 2,0 W/Active Port > 1 Gb/s and < 10 Gb/s: 4,0 W/Active Port ≥ 10 Gb/s and < 25Gb/s: 15,0 W/Active Port ≥ 25 Gb/s and < 50Gb/s: 20,0 W/Active Port ≥ 50 Gb/s 26,0 W/Active Port	8	8
Total additional idle state power allowed		393.68	184.53

3 Component Description

3.1 Front Panel Components

3.1.1 9 × 3.5" Bays

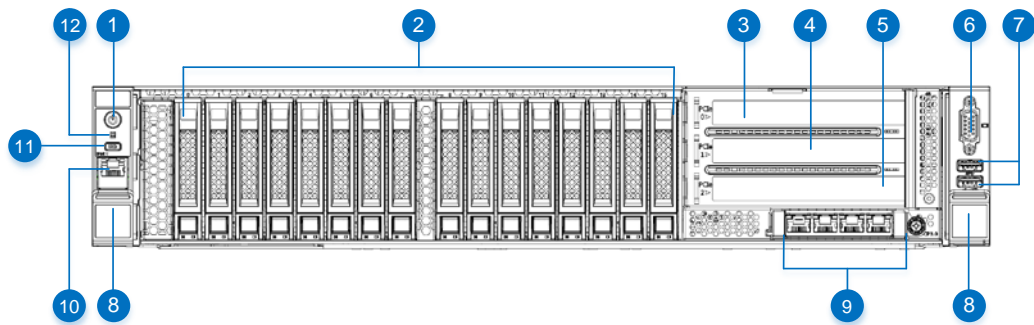
Figure 3-1 9 × 3.5" Configuration at Front Panel



#	Item
1	Power Button
2	Drive Bay × 9
3	PCIe0 Slot
4	PCIe1 Slot
5	PCIe2 Slot
6	VGA Port
7	USB 3.0 Port × 2
8	Mounting Ear Handle
9	OCP 3.0 NIC
10	RJ45 Network Interface
11	UID Button
12	System Status LED

3.1.2 16 × 2.5" Bays



Figure 3-2 16 × 2.5" Configuration at Front Panel




#	Item
1	Power Button
2	Drive Bay × 16
3	PCIe0 Slot
4	PCIe1 Slot
5	PCIe2 Slot
6	VGA Port
7	USB 3.0 Port × 2
8	Mounting Ear Handle
9	OCP 3.0 NIC
10	RJ45 Network Interface
11	UID Button
12	System Status LED

3.1.3 Front Control Panel Button with LED

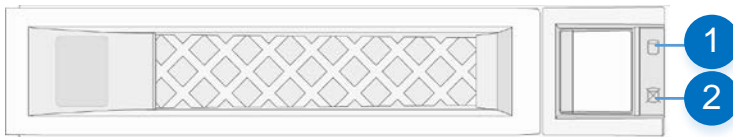
Figure 3-3 Front Control Panel Buttons with LEDs

Symbol and Convention	Item	Description
	Power Button	<ul style="list-style-type: none"> Green = Power-on Orange = Standby Long press 4 sec to force a shutdown
	UID Button	<ul style="list-style-type: none"> Blue = UID on/off Hold for 6 s = Force reboot the system

Symbol and Convention	Item	Description
	System Status LED	<ul style="list-style-type: none"> • Off = Normal • Solid red = Error • Flashing red = Warning

3.1.4 Drive Tray LEDs

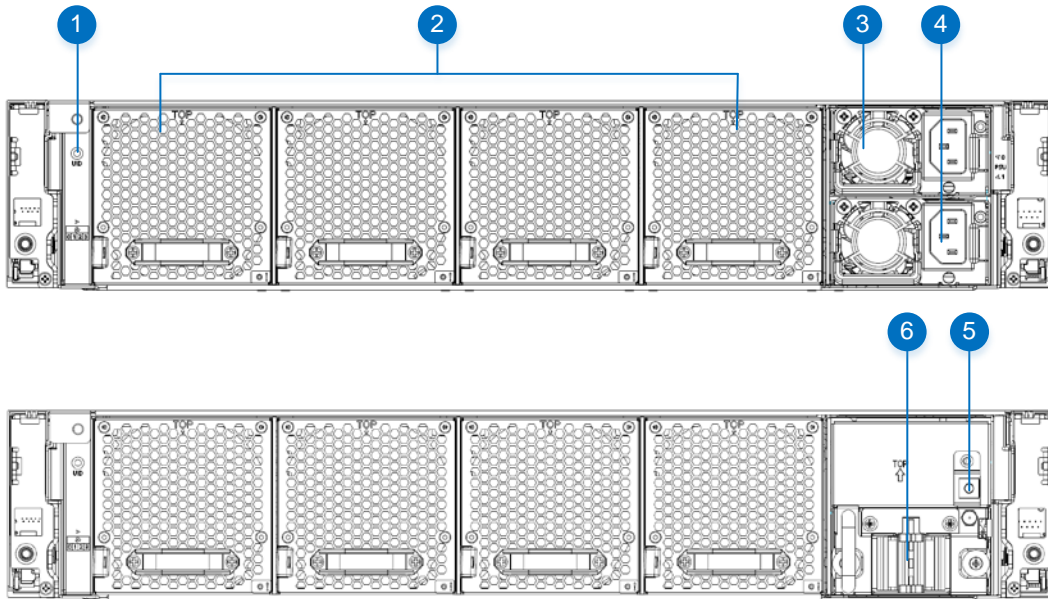
Figure 3-4 Drive Tray LEDs



#	Item	Description
1	Drive Fault LED	<ul style="list-style-type: none"> • Solid red = Drive error or failed • Solid blue = Drive is being located • Solid blue = RAID rebuilding
2	Activity Status LED	<ul style="list-style-type: none"> • Solid green = Normal • Flashing green = Read/write activities

3.2 Rear Panel

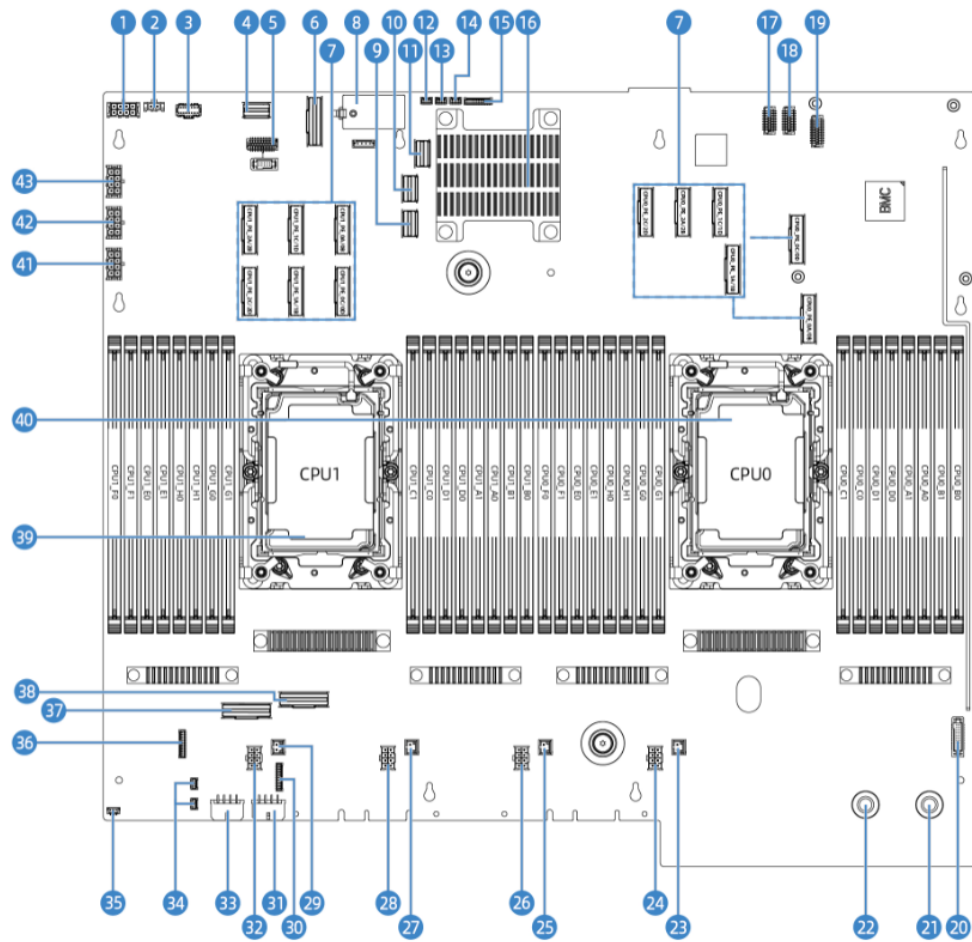
Figure 3-5 Rear Panel



#	Item
1	UID
2	Fan Slot × 4
3	PSU0
4	PSU1
5	In-depth Detection Switch
6	PSUs

3.3 Mainboard Layout

Figure 3-6 Mainboard



#	Item	#	Item
1	Riser Power Connector	23	FAN3 LED Connector
2	OCP Power Connector	24	FAN3 Connector
3	OCP 3.0 Connector	25	FAN2 LED Connector
4	USB1/2 Port	26	FAN2 Connector
5	NSCI Connector (Smart NIC/OCP3.0)	27	FAN1 LED Connector
6	M.2_Riser Slot	28	FAN1 Connector

#	Item	#	Item
7	Slimline Slot × 8	29	FAN0 LED Connector
8	TPM	30	Rear Riser0 Slot
9	Slimline Slot × 4 (SATA4 - 7)	31	Rear Riser0 Power Connector
10	Slimline Slot × 4 (SATA0 - 3)	32	FAN0 Connector
11	Slimline Slot × 4 (sSATA2 - 5)	33	Rear Riser1 Power Connector
12	HDD BP2 Connector	34	Liquid Connector × 2
13	HDD BP1 Connector	35	RP UID Connector
14	HDD BP0 Connector	36	Rear Riser1 Slot
15	Riser Card Slot	37	Slimline Slot × 8 (CPU1_PE_3C/3D)
16	PCH	38	Slimline Slot × 8 (CPU1_PE_3A/3B)
17	mLan Interface	39	CPU1
18	VGA Port	40	CPU0
19	LED/BUTTON Connector	41	HDD BP2 Power Connector
20	PSU_CONTROL Interface	42	HDD BP1 Power Connector
21	PSU_12V Connector	43	HDD BP0 Power Connector
22	PSU_GND Connector		

3.3.1 CMOS Clear Jumper



CAUTION

Turn off the server and disconnect the power source before clearing the CMOS. Wait for 5 seconds after shorting the Pin2 and Pin3. Then short the Pin1 and Pin2 of the CLR_CMOS jumper via the jumper cap to restore to the default setting.

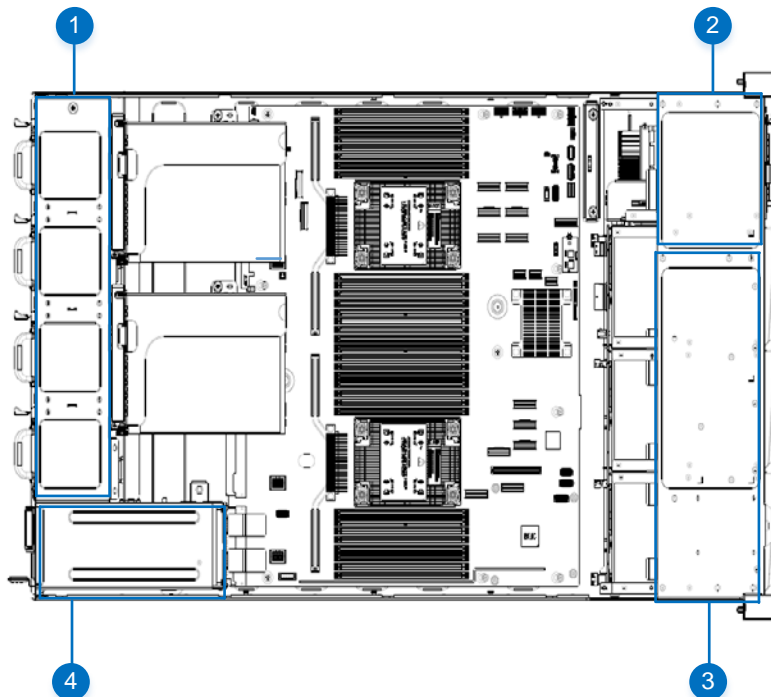
For details about the location of the jumper, see 3.3 Mainboard Layout.

Table 3-1 Jumper

#	Description	Jumper Position
CLR_CMOS	CMOS clear jumper	Position 1 - 2 = Normal state; Position 2 - 3 = Clears the CMOS

3.4 Structure

1. Top View



#	Item
1	Fan Slot × 4

#	Item
2	Top: PCIe0/1/2 Slot Bottom: OCP 3.0 NIC
3	Drive Bay × 9
4	PSU

4 Operation

4.1 Powering the Server On

Plug in the power plug and press the power button.

4.2 Powering the Server Off



To reduce the risk of personal injury, electric shock, or server damage, unplug the power plug to disconnect the server from the power supply. Pressing the power button on the front panel does not fully turn off the server. Before the AC power is cut off, some power sources and internal circuits still have electric charges.



It is unnecessary to power off the server for hot-swap devices.

1. Back up the server data.
2. Turn the server off.
3. Unplug the power plug to disconnect the server from the power supply.

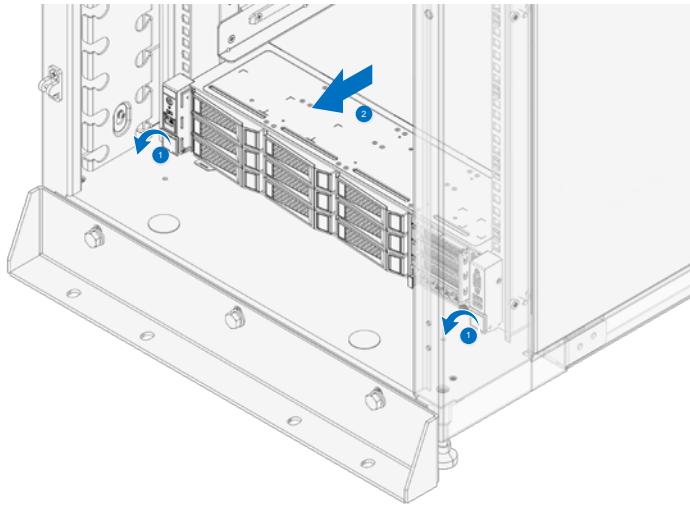
4.3 Extending the server from the rack



To reduce the risk of personal injury or server damage, make sure that the rack is firmly fixed before you pull a component out of the rack.

1. Unscrew the captive screws on both mounting ears.
2. Pull the server out of the rack.

Figure 4-1 Pulling the Server Out



3. After installation or maintenance, push the server into the rack until it is seated in place.

4.4 Removing the Server Top Cover

WARNING

Do not touch the drive and internal system components before they cool down to prevent injuries caused by overheating on the server surface.

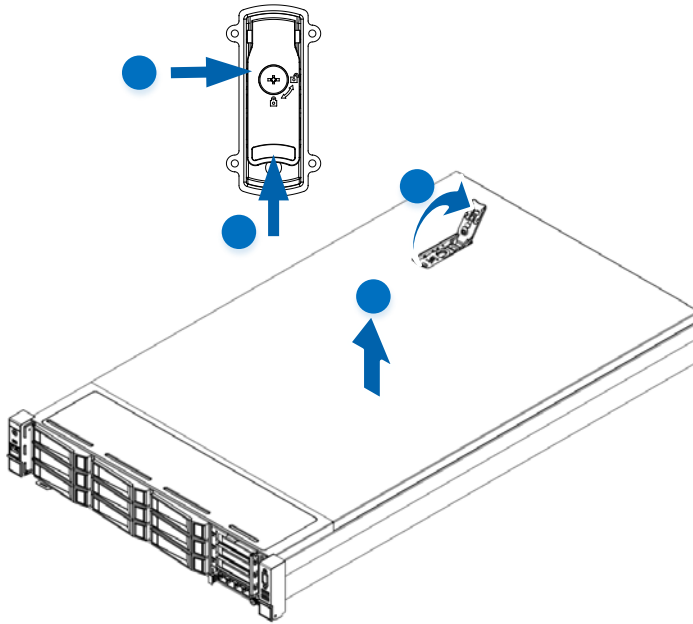
CAUTION

For proper cooling, do not run the server without the top cover, air directors, or fans installed. If the server supports hot-swap of components, avoid frequently opening the top cover of the server.

To remove the component:

1. If you want to perform non-hot-swap installation or maintenance, power off the server.
2. Pull the server out of the rack.
3. Use a screwdriver to loosen the safety screws on the cover locker.
4. Lift the cover locker handle, as shown by the arrow below, and remove the server top cover.

Figure 4-2 Removing the server top cover



4.5 Installing the Server Top Cover

1. Open the cover locker, align the server top cover with the server installation slot and lower it vertically.
2. Slide the server top cover into the closed position and snap the cover locker downward.
3. Use a screwdriver to tighten the safety screws on the cover locker.

4.6 Removing the PCIe Riser Assembly

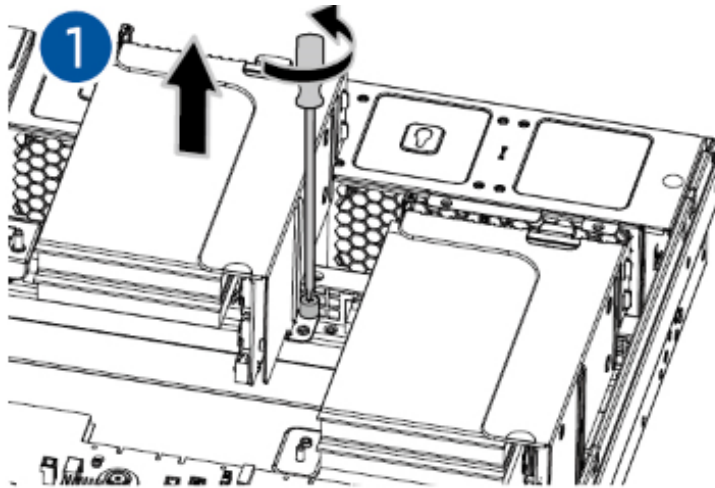


CAUTION

To avoid damage to the server or expansion card, power off the server and remove all AC power plugs before removing or installing the PCIe riser assembly.

1. Power off the server.
2. Pull the server out of the rack.
3. Remove the server top cover.
4. Remove the PCIe riser assembly.

Figure 4-3 Removing the PCIe riser assembly



4.7 Installing the PCIe Riser Assembly

1. Power off the server.
2. Pull the server out of the rack.
3. Remove the server top cover.
4. Install the PCIe riser assembly.
5. Install the server top cover.
6. Install the server into the rack.
7. Power on the server.

4.8 Removing the Air Director

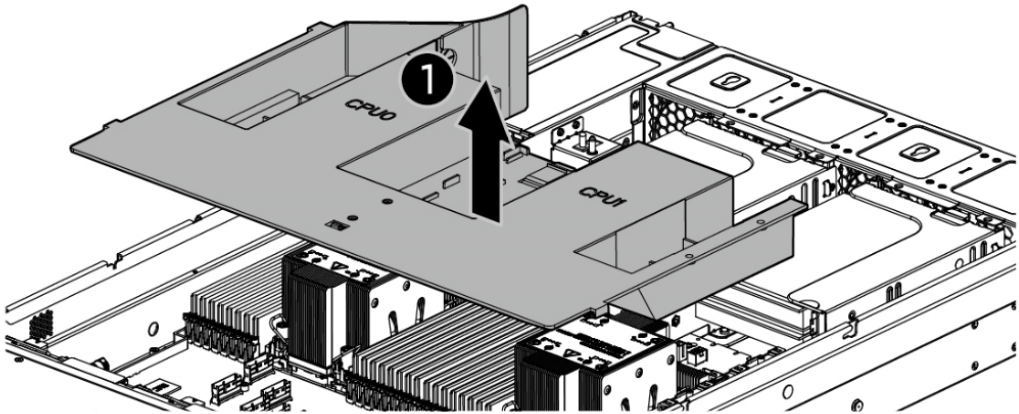


CAUTION

For proper cooling, do not run the server without the top cover, air directors, or fans installed. If the server supports hot-swap of components, avoid frequently opening the top cover of the server.

1. Power off the server.
2. Remove the server from the rack.
3. Remove the server top cover.
4. Remove the air director.

Figure 4-4 Removing the air director



5 Hardware Components

5.1 Introduction



WARNING

Do not touch the drive and internal system components before they cool down to prevent injuries caused by overheating on the server surface.



CAUTION

To prevent damage to electronic components, properly ground the server before starting any installation steps. Improper grounding may cause electrostatic discharge.

To install multiple components, read the installation instructions for all hardware components and identify similar steps to simplify the installation process.

5.2 Processor Components



CAUTION

- To avoid damage to processors and mainboard, only authorized operators can replace and install the processors on the server. Do not install the processor without using the processor installation tool.
 - To prevent server failure or damage, make sure that the processors used in a multi-processor configuration must have the same component ID.
 - To install a processor with a high speed, update the system ROM before installing the processor.
-

To install the component:

1. Power off the server.
2. Pull the server out of the rack.
3. Remove the server top cover.
4. Remove the air director.

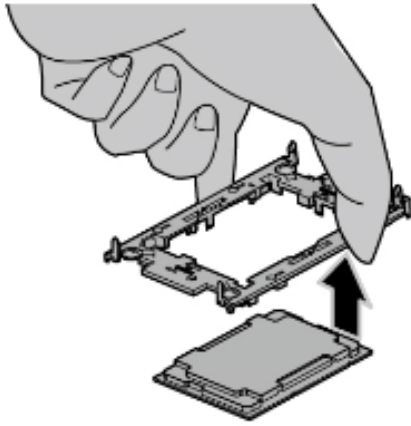
5. Remove the heatsink.
6. Install the processor as follows:

 CAUTION

- Be sure to evenly coat the contacts with thermal grease between the CPU and the heatsink.
 - When securing the heatsink, tighten the screws sequentially.
-

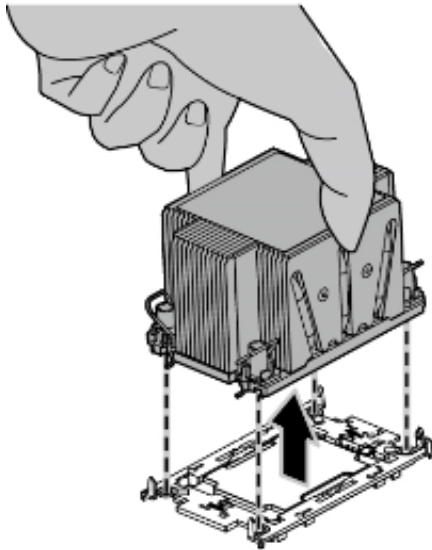
- a. Align the clip triangle mark with the corner mark on the CPU, and assemble the clip and the CPU together.

Figure 5-1 Assembling the clip and CPU



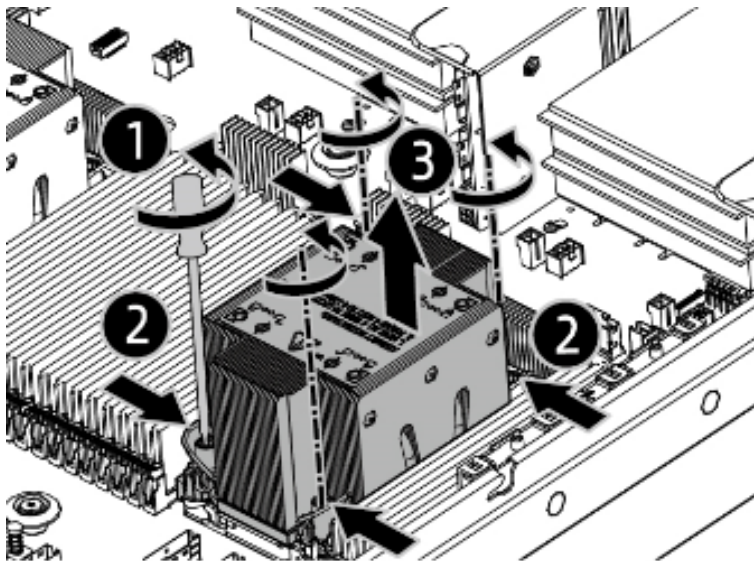
- b. Make sure that the position of "1" on the heatsink label corresponds to the triangular mark on the clip, align the positioning hole on the heat dissipation module vertically with the clip, and press to assemble them.

Figure 5-2 Installing the heat dissipation module



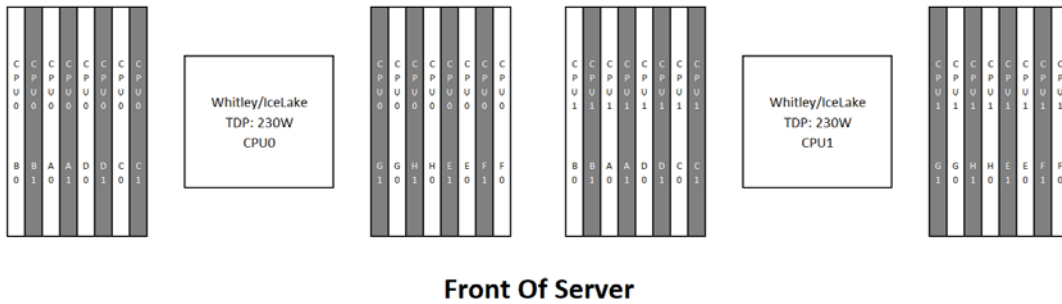
- c. Install the assembled heat dissipation module vertically on the CPU base, and make sure that the position of the numeral 1 on the heat dissipation module label corresponds to the triangle mark on the CPU base of the mainboard. Then tighten the screws in a sequence of labels 1, 2, 3 and 4.

Figure 5-3 Tightening the screws



5.3 DIMM Components

Figure 5-4 DIMM slot layout



5.3.1 How to Populate DIMMs

i IMPORTANT

- RDIMMs cannot be inserted together with LRDIMMs.
- Mixed insertion of BPSs is not supported.
- BPSs cannot be inserted together with RDIMMs or LRDIMMs.

NOTE

BPSs need to be used together with normal DIMMs. In the following table, "D" represents DDR4 DIMMs, and "B" represents BPSs.

DIMM installation sequence for single-CPU configuration

Table 5-1 DIMM installation sequence for single-CPU configuration

DDR4 Qty	CPU0																
	C0		C1		C2		C3		C4		C5		C6		C7		
	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	
1	v																
2	v							v									
4	v				v			v					v				
6	v		v		v			v		v			v				
8	v		v		v		v		v		v		v		v		
12	v		v		v		v		v		v		v		v		v
16	v		v		v		v		v		v		v		v		v

DIMM installation sequence for dual-CPU configuration

Table 5-2 DIMM installation sequence for dual-CPU configuration

DDR4 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	
1	v																																
2	v																v																
3	v									v							v																
4	v									v							v																
8	v				v					v							v																
12	v		v		v					v			v				v																
16	v		v		v			v		v			v				v																
24	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																		

Mixed DIMM and BPS installation sequence for single-CPU configuration

Table 5-3 Mixed DIMM and BPS installation sequence for single-CPU configuration

DDR4 Qty	BPS Qty	CPU0															
		C0		C1		C2		C3		C4		C5		C6		C7	
		D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1	D0	D1
4	4	D		B		D		B		D		B		D		B	
6	1	D		D		D		B		D		D		D		B	
8	1	D	B	D		D		D		D		D		D		D	
8	4	D	B	D		D	B	D		D	B	D		D	B	D	
8	8	D	B	D	B	D	B	D	B	D	B	D	B	D	B	D	
12	2	D	D	B		D	D	D		D	D	B		D	D	D	

Mixed DIMM and BPS installation sequence for dual-CPU configuration

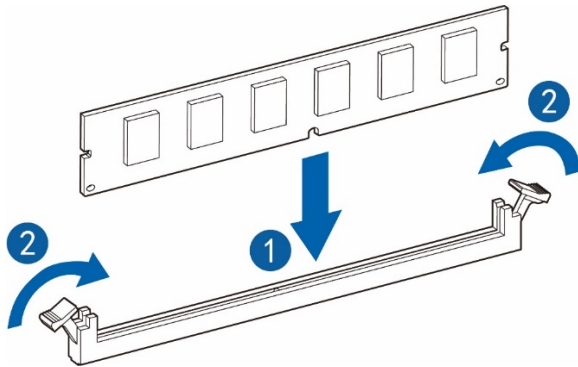
Table 5-4 Mixed DIMM and BPS installation sequence for dual-CPU configuration

DDR4 Qty	BPS 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
8	8	D		B		D		B		D		B		D		B		D		B		D		B		D		B		D		B	
12	2	D		D		D		B		D		D		D		D		D		D		B		D		D		D		D		D	
16	2	D	B	D		D		D		D		D		D		D		D		D		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	B	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	D	
24	4	D	D	B		D	D	D		D	D	B		D	D	D		D	D	D		D	D	B		D	D	D		D	D	D	

5.3.2 DIMM Installation Procedure

1. Open the clasps on both ends of the DIMM slot.
2. Align the notch on the bottom of the DIMM with the key positions of the slot, and press both ends of the DIMM with your thumbs to fully seat it into the slot. Then, close the clasps on both sides of the slot.

Figure 5-5 Installing a DIMM



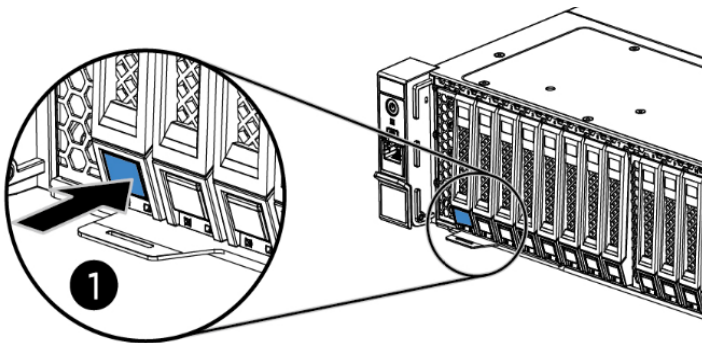
5.4 Hot-swap Drive Components



For proper cooling, do not run the server without the server top cover, air directors, expansion slot covers, or blanks installed. If the server supports hot-swap of components, avoid frequently opening the top cover of the server.

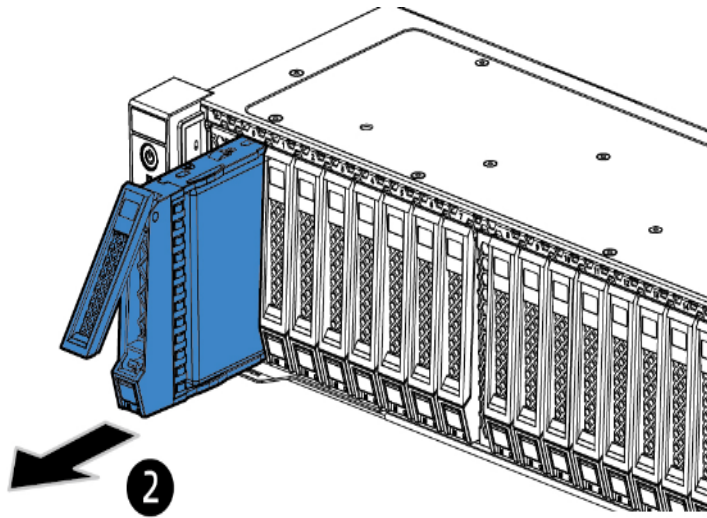
1. Determine the drive operating status by hot-swap drive tray LEDs.
2. Back up all server data on the drive.
3. Remove a hot-swap drive.
 - a. Press the drive panel button.

Figure 5-6 Pressing the button



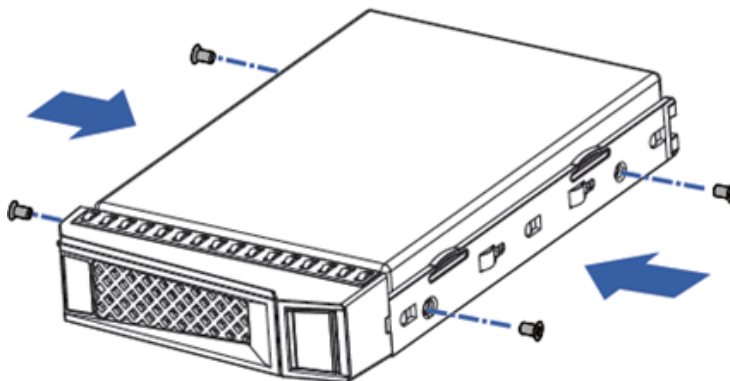
- b. Automatically eject the wrench on the drive tray and remove the drive tray horizontally outward.

Figure 5-7 Pulling out the drive tray



- c. Secure the drive to the tray with four drive screws.

Figure 5-8 Securing the drive



- d. Install the drive into the server and secure the drive wrench.

5.5 Redundant Hot-Swap Power Supply Components

 **WARNING**

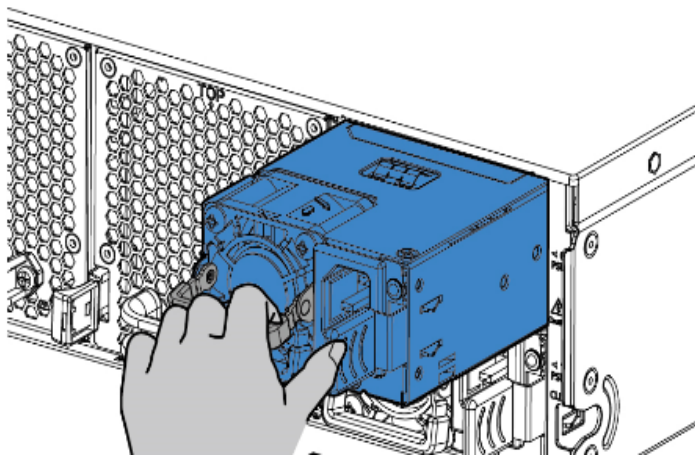
Do not touch the server before the power source or the blank filler of the power source cools down to prevent injuries caused by hot surfaces.

 CAUTION

To avoid damage caused by insufficient heat dissipation and high temperature, make sure that all the trays are equipped with components or blank fillers before you run the server.

1. Remove the blank fillers.
2. Install the power module in the power connector.

Figure 5-9 Installing the power module



3. Connect the power cable to the power supply.
4. Pass the power cable through the power cable anchor hole or the cable management arm.
5. Reposition the cable management arm to the work position.
6. Connect the power cable to the power supply.
7. Check whether the power LED is displayed normally.

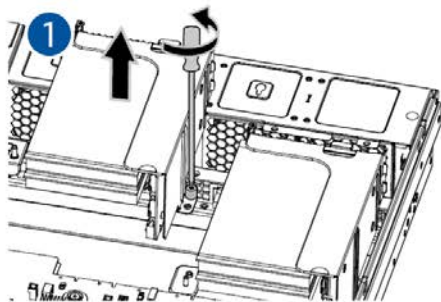
5.6 Expansion Card Components

 CAUTION

- To avoid damage to the server or expansion card, power off the server and remove all AC power plugs before removing or installing the PCIe riser assembly.
 - For proper cooling, do not run the server without the server top cover, air directors, expansion slot covers, or blanks installed. If the server supports hot-swap of components, avoid frequently opening the top cover of the server.
-

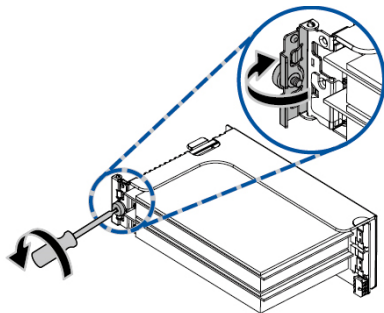
1. Power off the server.
2. Pull the server out of the rack.
3. Remove the server top cover.
4. Remove the PCIe riser assembly as shown in the figure below.

Figure 5-10 Removing the PCIe riser assembly



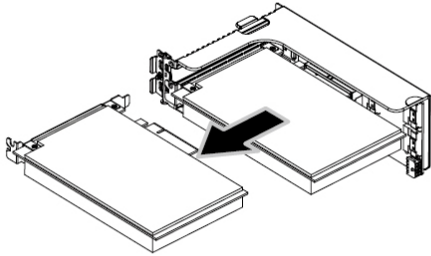
5. Loosen the fastening screws and open the PCIe card latch.

Figure 5-11 Opening the latch



6. Pull out the expansion card in the direction of the arrow and replace it with a new one.

Figure 5-12 Pulling out the expansion card



5.7 Air Director Components

WARNING

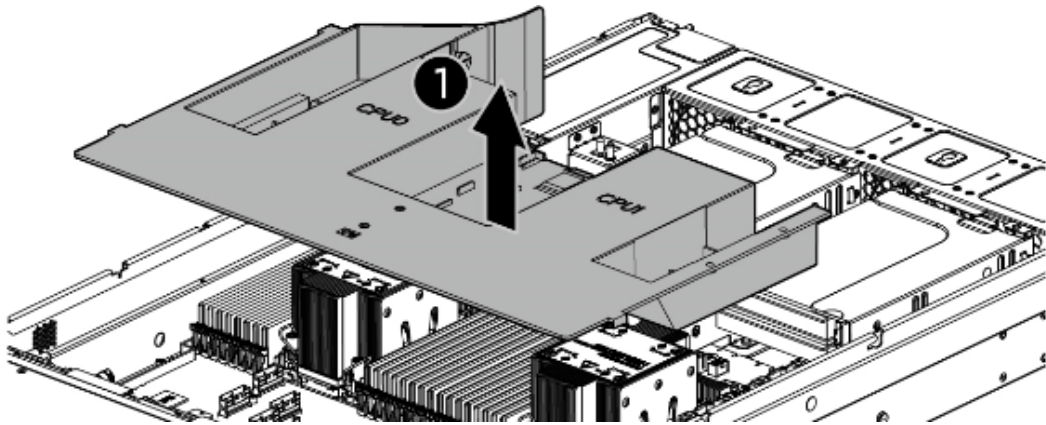
Do not touch the server before the server surface cools down to prevent injuries caused by hot surfaces.

CAUTION

For proper cooling, do not run the server without the server top cover, air directors, expansion slot covers, or blanks installed. If the server supports hot-swap of components, avoid frequently opening the top cover of the server.

1. Power off the server.
2. Pull the server out of the rack.
3. Remove the server top cover.
4. Remove the air director vertically upward and replace it with a new one.

Figure 5-13 Removing the air director



5.8 Fan Module Components

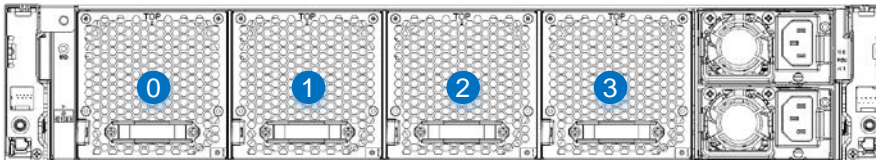


CAUTION

Be sure to wear work gloves during operation to avoid scratches by sharp parts on the device.

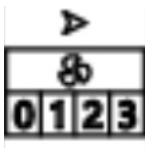
1. Determine the installation slot of the fan module. You can install up to four fan modules.

Figure 5-14 Fan locations



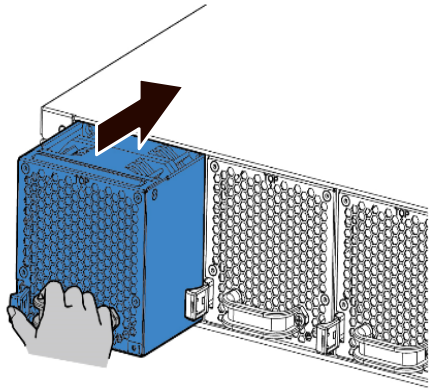
2. Determine the installation direction of the fan.

Figure 5-15 Fan directions



3. Insert the fan module horizontally into the chassis until the chassis fastens the fan module.

Figure 5-16 Installing the fan module



4. Repeat steps 2-3 to install the remaining fan modules.

6 Cabling



CAUTION

Route cables based on the configuration of the server you purchased.

- Route the SATA/PCIe cables of the 9HDD backplane as shown by the blue lines below to connect to the SATA/PCIe interfaces on the mainboard.
- Route the power cable of the 9HDD backplane as shown by the red lines below to connect to the power connector on the mainboard.

Figure 6-1 Backplane cabling (taking the 9HDD backplane as an example)



7 Firmware Upgrade and Configuration

For more information about how to upgrade and configure the firmware, see the following manuals:

- BIOS User Manual
- BIOS Upgrade Manual
- BMC User Manual
- BMC Configuration Manual
- BMC Upgrade Manual
- BMC Log Collection and Analysis Guide

8 Fault Diagnosis and Troubleshooting

This section describes common server problems and their handling suggestions.

8.1 FAQ About Hardware

8.1.1 No Power on Boot

Description:

After the power button was pressed, the power LED was orange instead of green and the drive status LEDs were off. In addition, the monitor had no display output, and the fans of the server did not rotate.

Handling suggestion:

Check the PSU LED on the rear panel of the server.

1. PSU LED is off or red
 - a. This problem indicates a power failure. Check whether the power socket works properly, the power cable is plugged in place, and the PSU cables supply power normally.
 - b. After everything is checked without any problems, if the PSU LED is still off or red, then the PSU is probably faulty. Replace the PSU with a new one of the same model and configuration to check whether the original PSU is faulty. If the PSU LED turns green but the power LED remains orange, please contact Inspur at 1-844-860-0011 (toll-free)/1-760-769-1847 (DID) or email us at serversupport@inspur.com.
2. All PSU LEDs are green
 - a. In this case, unplug the power cable, re-plug it to the PSU, and power on the server again.
 - b. If the problem persists, replace each PSU with a new one of the same model and configuration to check whether the original PSUs are faulty.
 - c. If none of the preceding operations can resolve the problem, call Global Service Hotline 1-844-860-0011 (toll-free)/1-760-769-1847 (DID) or email us at serversupport@inspur.com.

8.1.2 No Display after Powering-on

Description:

After the power button on the front panel of the server was pressed, the power LED on the front panel of the server lighted up. The chassis fan keeps rotating, but the monitor had no display output.

Handling suggestion:

- a. Check whether the display is powered on properly.
- b. If the power-on is normal, but the display still has no display output, check whether the display is properly connected to the server VGA port.
- c. If the VGA port is connected properly but the display still has no display output, replace the display.
- d. If this still does not work, the VGA port may be abnormal. Log in to the BMC Web GUI, and open the BMC remote KVM (for details, refer to *Firmware Upgrade and Configuration*) to check whether the display is normal. If the KVM can be displayed normally, the VGA port of the mainboard may be abnormal. Please contact the customer service of Inspur. If the KVM cannot be displayed normally, record the specific alarm information.
- e. If none of the preceding operations can resolve the problem, call Global Service Hotline 1-844-860-0011 (toll-free)/1-760-769-1847 (DID) or email us at serversupport@inspur.com to inform the specific alarm and problem.

8.1.3 Status LED Alarm of the Front Panel

Description:

An LED on the front panel turned red to send an alarm.

Handling suggestion:

Determine which LED is abnormal according to the section Front Control Board Buttons and LEDs.

- a. If the system fault LED is red, check whether the server is running normally. If the server is running normally, log in to the BMC Web GUI to check the BMC logs (for details, refer to *Firmware Upgrade and Configuration*) to check whether there is an alarm. If yes, record the specific alarm information.
- b. If the power fault LED is abnormal, check whether the power module LED on the rear window of the server is abnormal (red or off). If the power module LED is normal, log in to the BMC Web GUI to check the BMC logs (for details, refer to *Firmware Upgrade and Configuration*) to check whether there is an alarm. If there is an alarm, record the specific alarm

information. If the power module LED is abnormal, see Situation 1: Power Module LED Not Lit or Turning Red in the No Power Upon Boot section for reference.

- c. If other LEDs are abnormal, log in to the BMC Web GUI to check whether there is an alarm. If yes, record the specific alarm information.
- d. If none of the preceding operations can resolve the problem, call Global Service Hotline 1-844-860-0011 (toll-free)/1-760-769-1847 (DID) or email us at serversupport@inspur.com to inform the specific alarm and problem.

8.1.4 Stuck on Self-test or Other Screens Upon Boot

Description:

After the power button was pressed, the server failed to boot properly but was stuck on the self-test or other screens.

Handling suggestion:

- a. If the server is stuck on the Media Test Failure screen, check if the server has installed OS successfully and set the OS boot option to the first in order.
- b. If the screen that the server is stuck on contains hardware error message such as memory and RAID controller card self-test error, take note of the error message.
- c. If the server is stuck on the self-test screen, which reports an error, take note of the error message.
- d. If none of the preceding operations can resolve the problem, call Global Service Hotline 1-844-860-0011 (toll-free)/1-760-769-1847 (DID) or email us at serversupport@inspur.com to inform the error message.

8.1.5 Power Module LED Not Lit or Turning Red

Description:

When the server was powered up using the power module, the device was running properly, but a power module LED on the rear window was not lit or turned red.

Handling suggestion:

- a. Check if the external power supply environment is powered on and if the server appearance is burnt or vulcanized.
- b. Check whether the power cable of the server is properly plugged, and re-plug the power cable.
- c. If the problem still exists, power off and reseal the power module.

- d. If the server can be turned off, cut off the power, and then change the positions of power modules to cross-validate if any power module is faulty.
- e. If none of the preceding operations can resolve the problem, call Global Service Hotline 1-844-860-0011 (toll-free)/1-760-769-1847 (DID) or email us at serversupport@inspur.com.

8.1.6 Abnormal Drive Status LEDs

Description:

When the server was running properly, the drive status LEDs were not lit or the fault alarm LED turned red to send an alarm.

Handling suggestion:

- a. Check whether the drive is installed in place.
- b. Check if the drives were removed or subject to other manual operations. If drives turn red due to manual removal, you need to restore the array by configuring RAID, ensuring the drives to be properly configured in the array.
- c. If the drives were not subject to manual operations, you can check if the drives are identified properly by running commands in the OS. If the server is configured with the RAID controller card, you can also log in to the RAID card management screen to check if the drives are offline.
- d. If the drives are found offline or none of the preceding operations can resolve the problem, call Global Service Hotline 1-844-860-0011 (toll-free)/1-760-769-1847 (DID) or email us at serversupport@inspur.com.



NOTE

- Hot-swap drives allow users to remove or replace drives without shutting down the system and cutting off power, making the system better in timely recovery from disaster, more extensible and more flexible. It means hot-swap drives allow hot plugging without causing any drive damage.
 - If drives are configured with an array, hot plugging will lead to array degradation or disconnection according to different array levels. After the drives are plugged back, response strategies vary with different RAID cards. You may have to log in to the RAID card management screen for recovery.
 - When you hot plug the drives, stop the drive motors from rotating before you remove the drives completely, avoiding any damage to the drive motors.
-

8.1.7 Excessive Noise from Chassis Fans

Description:

The chassis fans made excessive noise when the server was running properly.

Handling suggestion:

- a. Check if there is any alarm from the fan fault LEDs or other status LEDs on the front panel of the server. Besides, check if the top chassis cover is closed and the air director has not been used.
- b. Learn about the sensor temperature through physical contact or the BMC Web GUI. Check if the noise is caused by overly high fan speed due to overheated server chassis.
- c. If the server chassis is overheating, check if the computer room is in high temperature. If the temperature in the computer room is too high, you need to lower it by adjusting the air-conditioning until the server returns to the normal operating temperature.
- d. If the computer room is in proper temperature, check if the front baffle or chassis interior is clogged with dust and the air inlets are blocked, leading to chassis overheating. If so, clear the dust with a piece of dry and soft cloth or a dedicated brush, and improve the environment in the computer room, avoiding overheated operation of the server due to too much dust.
- e. Check if the server is running with a high load. And log in to the BMC Web GUI to view if all the fans are identified properly and in automatic control.
- f. If none of the preceding operations can resolve the problem, call Global Service Hotline 1-844-860-0011 (toll-free)/1-760-769-1847 (DID) or email us at serversupport@inspur.com.

8.1.8 Server Alarm Ringing

Description:

The alarm rang when the server booted or was running.

Handling suggestion:

You need to determine the source of alarm sounds:

- a. If the alarm sounds come from the power module, check if the power module LED on the rear window of the server is abnormal. If it is, see Situation 1: Power Module LED Not Lit or Turning Red in the No Power Upon Boot section for reference.
- b. If the alarm sounds come from the inside of the chassis, you need to identify the source by opening the chassis.

- c. If the alarm sounds come from the RAID controller card, you need to check if the drive LEDs turn red, or log in to the RAID card management screen to check if the drives are abnormal and take note of the alarm message.
- d. If none of the preceding operations can resolve the problem, call Global Service Hotline 1-844-860-0011 (toll-free)/1-760-769-1847 (DID) or email us at serversupport@inspur.com to inform the alarm source and message.

8.1.9 Keyboard and Mouse Not Work

Description:

The keyboard and mouse do not work.

Handling suggestion:

- a. Check if the cable port of the keyboard or mouse is connected correctly and firmly to the server.
- b. Check if the keyboard and mouse work properly by connecting them to a laptop or other servers.
- c. Power off the server and then power it on for test purpose.
- d. Restart the server and enter the BIOS or RAID configuration screen to test if the keyboard and mouse are normal in a non-OS environment. If the keyboard and mouse work normally, the USB drivers for the OS may be abnormal; if not, the mainboard ports may be faulty. Please call Global Service Hotline 1-844-860-0011 (toll-free)/1-760-769-1847 (DID) or email us at serversupport@inspur.com.

8.1.10 USB Port Problem

Description:

Devices with USB ports are unavailable.

Handling suggestion:

- a. Make sure that the OS of the server supports USB devices.
- b. Make sure that the compatible USB driver has been installed on the server and then reinstall the USB driver.
- c. Connect the USB device to other servers to verify that the USB device is normal.
- d. If the USB device is abnormal when it is connected to another server, replace it with a USB device that works properly.
- e. Power off the server and then power on the server again to test the USB device.

- f. If none of the preceding operations can resolve the problem, call Global Service Hotline 1-844-860-0011 (toll-free)/1-760-769-1847 (DID) or email us at serversupport@inspur.com.

8.2 FAQ About System Software

8.2.1 FAQ About OS Installation

Description:

During OS installation, the RAID driver cannot be loaded and partitions larger than 2 TB cannot be created. OS takes up too much space on the C drive.

Handling suggestion:

- a. If you cannot load the RAID driver when you install the OS, please make sure that you use the correct RAID driver. To download the RAID driver that is configured for the server, go to the official website of Inspur: <https://en.inspur.com>. You may need to load some RAID drivers multiple times.
- b. If you cannot create a 2 TB partition when you install the OS, please go to the BIOS screen and select **Advanced > CSM Configuration > Boot option filter > UEFI only**. Save the settings and then exit the BIOS screen. (For more information, see *Firmware Upgrade and Configuration*.) Then, select the UEFI mode to install the OS. The server will automatically restart. During OS installation, you need to go to the CMD window to convert the drive format to GPT. This allows you to create a partition larger than 2 TB.
- c. If the installed Windows system takes up too much space on the C drive, you need to reduce the virtual memory or host the virtual memory to other partitions. For example, in the Windows Server 2012 system, right-click **My Computer** and choose **Properties**. In the **System** dialog box, click **Advanced System Settings**, and then click the **Advanced** tab. Click **Settings** in the **Performance** section. In the **Performance Options** dialog box, select the **Advanced** tab, and click **Change** in the **Virtual memory** section.
- d. If none of the preceding operations can resolve the problem, call Global Service Hotline 1-844-860-0011 (toll-free)/1-760-769-1847 (DID) or email us at serversupport@inspur.com.

8.2.2 Error while Installing Operating System via PXE

Description:

Failed to install an operating system via PXE.

Handling suggestion:

- a. Make sure that the PXE server can properly install the system for other servers.
- b. Check whether the network is connected based on the network interface LED. Make sure that the external network is normal.
- c. Make sure that the NIC can be recognized in the BMC Web GUI, BIOS or Shell.
- d. Make sure that the PXE function is enabled in the BIOS, and the PXE boot option is located at the top.
- e. Make sure that the destination drive or RAID array can be recognized and has sufficient free space.
- f. If none of the preceding operations can resolve the problem, call Global Service Hotline 1-844-860-0011 (toll-free)/1-760-769-1847 (DID) or email us at serversupport@inspur.com.

8.2.3 Memory Capacity Error

Description:

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

Handling suggestion:

- a. Check the OS version. The memory size may vary depending on the Windows system versions. Enter the **BIOS Setup** screen to view the memory capacity. If the memory is fully recognized on the **BIOS Setup** screen, the OS may support a limited memory capacity. For example, Windows Server 2008 x86 supports a maximum of 4 GB of memory capacity.
- b. If the memory is not fully recognized on the **BIOS Setup** screen, make sure that a correct type of memories is installed in the sockets of the BIOS.
- c. If none of the preceding operations can resolve the problem, call Global Service Hotline 1-844-860-0011 (toll-free)/1-760-769-1847 (DID) or email us at serversupport@inspur.com.

8.2.4 System Network Error

Description:

The network in the OS that runs on the server is abnormal or disconnected, or the network rate is lower than the actual rate of the network interface.

Handling suggestion:

- a. Make sure that a network cable is connected to the network interface. Check whether the network interface LED flashes and the network configuration is correct.
- b. Unplug and plug in the network cable to test whether the network is normal. If the network is still abnormal, use a tested good network cable to directly connect your computer to the server. If the network is normal, check whether the network cable or switch port is normal. If the network error persists in the direct connection, go to the official website of Inspur <https://en.inspur.com> to download the latest NIC driver.
- c. Make sure that the NIC can be recognized in the BMC Web GUI, BIOS or Shell and the MAC address is configured.
- d. If none of the preceding operations can resolve the problem, call Global Service Hotline 1-844-860-0011 (toll-free)/1-760-769-1847 (DID) or email us at serversupport@inspur.com to inform the specific alarm and problem.

9 Battery Replacement

If the server clock displays wrong date and time, you may need to replace the battery with one that supplies power for a real-time clock.



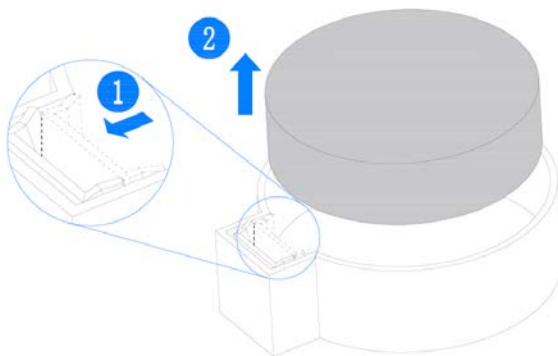
Improper use of the battery pack may cause fire and burns. To reduce the risk of personal injury:

- Do not try to recharge the battery.
 - Do not expose the battery to an environment where the temperature is higher than 60°C (140°F).
 - Do not disassemble, crush, or puncture the battery, short-circuit the external contacts of the battery, or expose the battery to fire or water.
 - Replace with the spare parts designed for this product only.
-

To remove the component:

1. Power off the server.
2. Pull the server out of the rack.
3. Remove the server top cover.
4. Remove the air director.
5. Remove the battery.

Figure 9-1 Removing the Battery



10 Electrostatic Discharge (ESD)

10.1 ESD Prevention

To avoid damage to the system, take necessary preventive measures when you install the system or pick up and place components. The static electricity that flows from fingers or other conductors may damage the mainboard or other ESD-sensitive devices. The damage caused by static electricity will shorten the expected service life of the preceding device.

To avoid damage from ESD:

- Pack the product in an anti-static package to prevent the product from direct contact with fingers during transportation and storage.
- Pack ESD-sensitive components in their respective packages for storage before you expose them to a work area that is not affected by ESD.
- Put a component on a grounded surface before you take it out of the package.
- Do not touch the pins, wires, or circuits.
- Take grounding measures when you touch ESD-sensitive components or devices.

10.2 Anti-ESD Grounding Methods

Multiple grounding methods are available. When you pick up, place, or install an ESD-sensitive component, you can ground the component in one or more of the following methods:

- Use a wrist strap that is connected to a grounded work area or computer chassis by using a ground wire. The wrist strap must be scalable. The resistance of the ground wire must be at least 1 megohm $\pm 10\%$. For anti-ESD grounding, make sure that the wrist strap is in close contact with your skin when you wear the wrist strap.
- In a standing work area, use heel straps, toe straps, or boot straps. Before you stand on a conductive floor or a static dissipative mat, wear a strap on your feet.
- Use conductive onsite maintenance tools.
- Use a static dissipative folding tool pad and a portable onsite maintenance toolkit.

If none of the preceding recommended grounding devices are available, contact an authorized dealer to install a grounding device.

To learn more information about ESD or product installation, contact an authorized dealer.

11 Server Entrance and Runtime Environment Requirements

11.1 Ambient Temperature

Table 11-1 Ambient Temperature

Item	Status	Specifications
Temperature	Continuous operation	10°C to 35°C (50°F to 95°F)
	Transportation (Storage)	-40°C to +70°C (-40°F to +158°F)
	Maximum temperature gradient (operation and storage)	20°C/h (68°F/h)
Humidity	Operation	Relative humidity: 5% to 90%. Maximum dew-point temperature: 32°C (89.6°F)
	Transportation (Storage)	Maximum dew-point temperature: 39°C (102.2°F). Relative humidity: 5% to 95%, non-condensing

11.2 Reliability

Table 11-2 Reliability

Item	Status	Specifications
Vibration	Operating	0.21 Grms at 5 to 500 Hz (15 min per axis, including X, Y, and Z axes)
	Transportation (Storage)	2.2 Grms at 5 to 500 Hz (10 min per axis, including X, Y, and Z axes)
Shock	Operating	In the positive and negative directions of the x, y, and z axes, each axis can withstand 100 continuous 2 G shock pulses with a maximum duration of 11 ms.
	Transportation (Storage)	In the directions x, y, and z axes, each axis can withstand 1,000 continuous 40 G shock pulses with a maximum duration of 6 ms.

11.3 Altitude and Atmospheric Pressure

Table 11-3 Altitude and Atmospheric Pressure

Item	Status	Specifications
Altitude	Operating	0 to 3,048 m (10,000 feet)
	Transportation (Storage)	0 to 12,192 m (40,000 feet)

11.4 Alternating Temperature and Humidity

Table 11-4 Alternating Temperature and Humidity

Item	Status	Specifications
Humidity	Operating	Relative humidity: 5% to 90%. Maximum dew-point temperature: 38°C (100.4°F)
	Transportation (Storage)	Maximum dew-point temperature: 39°C (102.2°F). Relative humidity: 5% to 95%, non-condensing

11.5 Extended Operating Temperature

Table 11-5 Extended Operating Temperature

Temperature Specifications (Example)	Description
5°C to 40°C (5% to 85% RH) ^{Note 1}	Continuous operation
-5°C to +45°C (5% to 90% RH) ^{Note 2}	≤ 1% of the runtime per year

Note 1: When the server operates beyond the defined temperature specifications, system performance will be affected.

Note 2: When the server operates beyond the defined temperature specifications, ignore monitoring alarms for the ambient temperature.

11.6 Limits of the Extended Operating Temperature

- The system cannot be started in an environment where the ambient temperature is lower than 5°C.
- The server cannot be used at an altitude higher than 3,000 meters.
- CPUs with a power higher than 165 W are not supported.
- Redundant power supplies are not supported.

- Only specified types of PCIe cards are supported.
- PCIe SSDs are not supported.
- NVDIMMs are not supported.
- Middle drives are not supported.
- Rear drives are not supported.
- GPU configuration is not supported.

11.7 Cooling Limits

Table 11-6 Cooling Limits

Configuration Name	Front Drive	Middle Drive	Rear Drive	CPU	GPU
Storage configuration 1	9 × 3.5"	Not supported	Not supported	≤ 250 W	Not supported
GPU1	9 × 3.5"	Not supported	Not supported	≤ 250 W	Fan redundancy is not supported.

Table 11-7 Cooling Limits

Configuration Name	Front Drive	Middle Drive	Rear Drive	CPU	GPU	Max. Ambient Temperature
Storage configuration 1	9 × 3.5"	Not supported	Not supported	≤ 320 W	Not supported	< 30°C
GPU configuration 1	9 × 3.5"	Not supported	Not supported	≤ 250 W	Fan redundancy is supported.	< 25°C

11.8 Runtime Environment Requirements

This section specifies the requirements for temperature and humidity, biological conditions, chemical substances, and mechanically reactive substances. The device in the server room must meet these requirements during runtime.

1. Temperature and Humidity

The temperature, dew-point temperature, and relative humidity in the server room must meet the requirements of the server. For the specific requirements of different servers, see the detailed description of the product documentation.

2. Biological Conditions

Animals and plants are strictly prohibited in the server room. This prevents rats and ants from causing damage to the device.

To meet the requirements, you must take the following measures for the server room:

- Make sure that the humidification system (if any) in the server room is safe.
- Measures must be taken to ensure that the structures and construction cracks of doors, windows, walls, and ground (floor) surfaces are airtight.
- If water supply and drainage pipes are provided in the server room, anti-leakage and anti-condensation measures are required.
- If water equipment is provided in the server room, measures must be taken to prevent water overflow and leakage.
- The cable holes and antenna holes in the server room must be blocked and protected.
- Make sure that the sanitation in the server room is good. Regular disinfection is recommended.

3. Corrosive Gaseous Pollutants

Generally, indoor and outdoor environments contain a small amount of common corrosive gaseous pollutants. These mixed corrosive gaseous pollutants or a single corrosive gaseous pollutant may cause a long-term chemical action based on other environmental factors such as temperature or relative humidity. As a result, the IT equipment is prone to failure caused by corrosion. The circuit boards of the IT equipment and the system components with weak anti-oxidation capability may be damaged. This clause stipulates the restrictions on corrosive gaseous pollutants to prevent such risks.

The corrosive gaseous pollutants in the data center must meet the requirements of the *2011 Gaseous and Particulate Contamination Guidelines for Data Centers*. This white paper is widely used by IT equipment manufacturers. It is prepared by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Technical Committee (TC) 9.9. According to this white paper, corrosive gaseous pollutants in data centers must meet the following requirements:

- The corrosion rate of the tested copper samples must meet the gas corrosivity level G1 defined per American National Standards Institute/Instrument Society of America (ANSI/ISA)-71.04-2013. The thickness growth rate of the corrosion product of the tested copper samples must be less than 300 Å/month.
- The corrosion rate of the tested silver samples must meet the gas corrosivity level G1 defined per ANSI/ISA-71.04-2013. The thickness growth rate of the corrosion product of the tested silver samples must be less than 200 Å/month.

- ANSI/ISA-71.04-2013 Environmental Conditions for Process Measurement and Control Systems: Airborne Contaminants classifies gaseous corrosivity levels into G1 (mild), G2 (moderate), G3 (harsh), and GX (severe). Table 11-8 shows the Gaseous Corrosivity Levels per ANSI/ISA-71.04-2013.

Table 11-8 Gaseous Corrosivity Levels per ANSI/ISA-71.04-2013

Gaseous Corrosivity Level	Copper Reactivity Level	Silver Reactivity Level	Description
G1 (Mild)	< 300 Å/month	< 200 Å/month	An environment sufficiently well-controlled so 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 a corrosive attack will occur.
GX (Severe)	≥ 2000 Å/month	≥ 2000 Å/month	An environment in which only specially designed and packaged equipment would be expected to survive.

Make sure that the corrosion rates of the tested copper and silver samples meet the requirements of the corrosion concentration levels specified in "Gaseous Corrosivity Levels per ANSI/ISA-71.04-2013." To do so, see the selected types of corrosive gases and their concentration limits provided in the table "Concentration Limits of Corrosive Gases in Data Centers."

Table 11-9 Concentration Limits of Corrosive Gases in Data Centers

Group	Corrosive Gas	Unit	Concentration
Group A	Hydrogen sulfide (H ₂ S)	ppba	< 3
	Sulfur dioxide (SO ₂)	ppb	< 10
	Chlorine (Cl ₂)	ppb	< 1
	Nitrogen dioxide (NO ₂)	ppb	< 50

Group	Corrosive Gas	Unit	Concentration
Group B	Hydrogen fluoride (HF)	ppb	< 1
	Ammonia (NH ₃)	ppb	< 500
	Ozone (O ₃)	ppb	< 2
a: Parts per billion (ppb) is a unit of concentration, and 1 ppb represents 1 part per billion.			

The corrosive gases in Group A or Group B in Table 11-9 are common in data centers. The copper and silver corrosion rates that correspond to the concentration limits of corrosive gases in group A or group B must meet the severity level G1.

Gaseous corrosivity is not determined by a single factor, but by comprehensive environmental factors such as temperature, relative humidity, and corrosive gases. Any changes in environmental factors may affect the gaseous corrosivity level. Therefore, the concentration limits of corrosive gases for data centers provided in Table 11-9 are for reference only. If the concentration of mixed gases is not listed, see the concentration range of the gases in the table for condition levels of chemically reactive substances per IEC-60721-3-3 or GB/T 4798.3-2007.

4. Mechanically Reactive Substances

The server room must be free of explosive, conductive, magnetic, and corrosive dust. Table 11-10 lists the requirements for mechanically reactive substances.

Table 11-10 Requirements for Mechanically Reactive Substances

Mechanically Reactive Substances	Unit	Requirement
Sand	mg/m ³	≤ 30
Floating dust	mg/m ³	≤ 0.2
Dust deposits	mg/(m ² h)	≤ 1.5

To meet the requirements, you must take the following measures for the server room:

- Make sure that no dust exists on the floors, walls, and ceiling surfaces.
- Make sure that few or no windows are designed for the server room. Windows in the server room must be dustproof.
- Regularly clean the server room, the dust screens, or dust guards.
- Make sure that visitors wear shoe covers and anti-static clothing before entering the server room.

11.9 Electromagnetic Requirements

1. Table 11-11 lists the electromagnetic requirements 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).

Table 11-11 Electromagnetic Requirements

Electromagnetic Phenomenon		Specification
Power frequency magnetic field	Frequency (Hz)	50
	A/m (root-mean-square value)	1
Amplitude-modulated RF electromagnetic fields	Frequency (MHz)	80 to 1000
	V/m (root-mean-square value, unmodulated)	3
	%AM (1 kHz)	80
Continuous RF wave conduction	Frequency (MHz)	0.15 to 80
	V (root-mean-square value, unmodulated)	3
	%AM (1 kHz)	80

It is recommended to take the following measures to suppress interference signals:

- Take measures to prevent grid interference on the power supply system.
- Keep away from electrical equipment such as medical magnetic resonance equipment, helium arc welding machines, and RF electric heaters.
- Avoid nearby high-power transmitters such as broadcasting, radars, and mobile communication transmitters, electrified railways, industrial radiation, transformer substations, and high-voltage transmission lines.
- In the same operating environment, the interference level of other equipment must meet the requirements of standards and regulations.
- When necessary, take shielding and isolation measures to prevent natural noise such as atmospheric noise and solar radio noise.

Protect the system from damage caused by ESD. For ESD protection methods, see "Chapter 10 Electrostatic Discharge (ESD)".

2. According to the requirements of IEC6268 Annex F.5, the safety symbols on the server and their meanings are defined as follows:
 - a. Safety protection from fan blades

Figure 11-1 Safety protection from fan blades



Caution: Keep your body away from fan blades.

b. Safety protection from multiple power supplies

Figure 11-2 Safety protection from multiple power supplies



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

11.10 Power Supply Requirements

The following describes the power supply requirements for running the system.

11.10.1 Requirements for AC Power Supply

An AC power supply system consisting of a utility AC power supply, UPS, and a generator set should work in a centralized power supply mode. With the load of server room satisfied, it should allow simple wiring, safe operation, flexible distribution, and easy maintenance. The low-voltage power supply system should be a three-phase five-wire or single-phase three-wire system.

The AC power supply should operate at nominal voltage and rated frequency.

Table 11-12 AC Power Supply

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

If an uninterruptible power supply (UPS) is used as the AC backup power supply, it should have the same phase as the AC utility power supply, and the switching time between the UPS and the utility power should be less than 12ms to avoid the

restart or resetting of devices.

11.10.2 Requirements for DC Power Supply

DC power supply should operate at the nominal voltage of 240 V DC.

11.10.3 Considerations on AC Power Supply

During the use of AC power supplies:

- Use a voltage stabilizer or voltage regulator to respond to voltage fluctuations. Use a voltage regulator in any of the following situations:
 - If the device is directly powered by an AC utility power supply: the power supply voltage is outside the tolerance range (-10% - +5%) of the rated voltage or the fluctuation tolerance range allowed for the device.
 - If the device is not directly powered by an AC utility power supply: the utility power supply voltage is outside the tolerance range (-15% - +10%) of the rated voltage or the fluctuation tolerance range allowed for a DC power supply unit.
- To ensure a continuous and transient-free AC power supply, please use a UPS or inverter.
- The data center should have a backup generator set to power critical static and dynamic load in case of utility power failure. Make sure the generator set can accommodate the total power load of all the IT and cooling devices. Test the switch-on surge to ensure the generator is turned on reliably. The performance of the generator should comply with the GB50174 standard.
- Generally, two batteries are joined in parallel. Redundant UPSs are required.

11.10.4 HVDC Power Supply

An HVDC (high-voltage direct current) system can solve the existing problems in conventional AC and low-voltage DC power supplies. At present, the mainstream HVDC standards applied in China include 240 V HVDC and 336 V HVDC standards.

11.10.5 Requirements for HVDC Power Supply

- Temperature:
 - Operating temperature: -5 °C - 45 °C
 - Storage temperature: -40 °C - 85 °C
- Relative humidity:
 - Operating humidity: $\leq 90\%$ RH (40 ± 2 °C)
 - Storage humidity: $\leq 95\%$ RH (40 ± 2 °C)

- Vibration resistance: withstands a sinusoidal vibration with a frequency between 10 Hz to 55 Hz and amplitude of 0.35 mm.
- Battery capacity: ensures the UPS backup time supports the power supply to servers when the cabinet is fully loaded. The battery backup time should be 15 minutes if a diesel generator is used as the source of power supply.
- Battery voltage: 2 V, 6V, or 12 V depending on the system capacity and backup time.
- The insulation monitoring device should act properly if a ground fault occurs or the insulation resistance is lower than the set value of 28 kΩ. The HVDC system should have automatic protection against overcurrent and short circuit, and be restored to normal automatically or manually after the overcurrent or short circuit is fixed.
- Over- and under-voltage protection for AC power supplies: The power supply system can monitor the input voltage changes. When the AC input voltage is higher or lower than the specified threshold, the system automatically shuts down. The system automatically restores when the input voltage returns to normal.
- The site must be free from explosives, mold, and conductive media and hazardous gases that erode metals and affect insulation.
- Overtemperature protection: When the PSU is operating at a temperature exceeding the specified threshold, it should automatically reduce the power or shut down. When the temperature falls below the threshold, the PSU should restore to the normal power output.
- The system should record and display alarms and allow users to query and update them in real time. The alarm information should be retained after the system is disconnected from the power supply.

11.10.6 Considerations on HVDC Power Supply

- Terminal devices can be connected to power sockets or wiring terminals (recommended).
- Do not use a shunt circuit breaker to connect or control multiple PSUs through a multi-purpose power socket.
- Select a DC circuit breaker depending on the rated current of the device. 10 A or 16 A DC circuit breaker is recommended.
- Wiring: Connect the DC output positive pole to terminal L of the device input power cable. Connect the DC output negative pole to terminal N of the device input power cable. The DC system must not be grounded.

- A front-end surge protector should be installed in the power supply system to protect the system against a voltage surge of 10/700 us, 5 kV and a current surge of 8/20 us, 20 kA.
- All cables in the power distribution frame (PDF) should comply with YD/T 1173-2001 specifications, and the diameters of all power cables should meet the requirements for wire ampacity.

11.10.7 DC Power Supply

The DC power supply should be stable and reliable, with the power supply unit being arranged close to the device. The standard DC voltage is -48 VDC, and the fluctuation range of server power supply voltage is -38.4 V to -57.6 V.

12 Service Terms

Please visit Inspur official website at <https://en.inspur.com/> and navigate to **Support > Support Center > Warranty & Configuration**, and enter the product model, part model, serial number or keywords to learn relevant information and check the warranty status and configuration of related product. You can also call our global service hotline 1-844-860-0011 (toll-free)/1-760-769-1847 (DID) to consult about relevant server by model or serial number.

13 Appendices

13.1 Reference Tables of Neodymium Content in HDDs

Table 13-1 Reference Range of Neodymium Content in Seagate HDDs

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

Table 13-2 Reference Range of Neodymium Content in WD HDDs

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 13-3 Reference Range of Neodymium Content in Toshiba HDDs

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		√	

13.2 Glossary

A

AEP	Apache Pass Persistent memory based on 3D XPoint.
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B

BIOS	Basic Input Output System BIOS is a set of programs that are solidified to the ROM chip of a computer's mainboard. It is where the most basic yet important input and output programs of a computer, Power On Self Test program, and self-triggered programs are saved. It can read/write system settings from the CMOS.
BMC	Baseboard Management Controller As the core of the IPMI, BMC collects, processes, and stores sensor signals, and monitors the running status of components. BMC enables the chassis management module (MM) to manage various objects by providing such information as hardware status and alarm of the managed objects for the MM.

BPS	<p>Barlow Pass</p> <p>This Intel's next generation persistent memory module offers an unprecedented memory capacity and allows access to persistent data at the fastest rate.</p>
BTU/hr	British Thermal Unit Per Hour, which is a unit of heat input.

C

CPLD	<p>Complex Programmable Logic Device</p> <p>A digital integrated circuit that can build logic functions as needed.</p>
CRM	<p>Customer Relationship Management</p> <p>A method and process to acquire, retain and increase profitable customers. It is not only a brand-new, world-leading, customer-centric enterprise management theory, business concept and business operating mode, but also specific software and an implementation method to effectively improve enterprise income, customer satisfaction and employee productivity by means of information technology.</p>

E

ECC	<p>Error Checking and Correcting</p> <p>A technology that enables "error checking and correcting". ECC memory uses this technology to improve the stability and reliability of computer operation. ECC can detect 2-bit errors and correct 1-bit errors.</p>
ERP	<p>Enterprise Resources Planning</p> <p>It refers to a management platform based on information technology that uses systematic management ideas to provide decision-making means for enterprise employees and decision-makers.</p>
Ethernet	<p>Ethernet is a baseband LAN specification created by Xerox and jointly developed by Xerox, Intel and DEC. It uses CSMA/CD to transmit data on various cables at 10 Mbit/s. It is similar to IEEE 802.3 series standards.</p>

G

GE	<p>Gigabit Ethernet</p> <p>It is an extension and enhancement of traditional shared media Ethernet standards. It is compatible with 10 M and 100 M Ethernet and complies with IEEE 802.3z standards.</p>
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I

Intel ME	<p>Intel Management Engine</p> <p>It is a microprocessor that runs independently of CPU and operating system in Intel chips. ME provides remote management to manage enterprise computers autonomously without user intervention in case of serious vulnerabilities.</p>
Intel Optane DC PMeM	<p>Intel® Optane™ DC Persistent Memory Module</p> <p>It is a memory product of Intel, which disrupts the traditional memory-storage hierarchy by creating a new tier to fill the memory-storage gap, providing greater overall performance, efficiency, and affordability.</p>
iSCSI	<p>Internet Small Computer System Interface</p> <p>iSCSI, also known as IP-SAN, is a storage technology based on Internet and SCSI-3 protocol. It was proposed by IETF and became an official standard on February 11, 2003.</p>

L

LOM	<p>LAN On Motherboard</p> <p>A network interface card.</p>
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M

M.2 Connector	<p>It is a new host interface solution that is compatible with a variety of communication protocols.</p>
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MAC Address	<p>Media Access Control Address</p> <p>MAC address, also known as LAN address, MAC bit address, Ethernet address or physical address, is used to locate each device on a given network. MAC address is used to uniquely identify a NIC in the network. If a device has one or more NICs, each NIC requires and has a unique MAC address.</p>
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N

NCSI	<p>Network Controller Sideband Interface</p> <p>An industry standard defined by the Distributed Management Task Force (DMTF) to support server sideband interface network controllers. It consists of a management controller and multiple network controllers.</p>
NTP	<p>Network Time Protocol</p> <p>A protocol that is used to synchronize a computer clock with a server or other clock sources, and provides accurate and robust time synchronization service in an unordered Internet environment.</p>
NVDIMM	<p>Non-Volatile Dual In-line Memory Module</p> <p>A non-volatile random access memory that can retain data in case of power failure and normal shutdown. It uses a DIMM package, compatible with a standard DIMM slot and communicates through a standard DDR bus. According to JEDEC Standards Organization, there are three types of NVDIMM implementations: NVDIMM-N, NVDIMM-F and NVDIMM-P. AEP and BPS can be seen instances of an NVDIMM-P implementation.</p>

O

OCulink	<p>A new internal and external optical cabling solution originally proposed by the PCIe Standards Organization. Molex's connector solution has been used as PCIe Oculink (supporting PCIe Gen3 and Gen4) and internal cabling solution (supporting SAS 4.0 speed) for SAS protocols in the SAS 4.0 specification.</p>
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P

PCIe	<p>Peripheral Component Interconnect express</p> <p>A type of PCI computer bus that uses existing PCI programming concepts and communication standards, but is based on a faster serial communication system. The high-speed PCIe can replace almost all existing internal buses, including AGP and PCI.</p>
PMBus	<p>Power Management Bus</p> <p>An open-standard digital power-management protocol with a defined command language and transport and physical interface to facilitate communication with the power converter and other devices.</p>
POST	<p>Power On Self Test</p> <p>A set of routines that the BIOS program runs after a computer system is powered on, including tests on CPU, system mainboard, base memory, expanded memory, system ROM BIOS and other components. If any error is found, the BIOS will send a prompt or warning message to the operator.</p>

R

RAID	<p>Redundant Arrays of Independent Drives</p> <p>A technology that combines multiple independent physical drives into one logical drive group in different ways to improve the read/write performance and security of drives.</p>
RJ45	<p>Registered Jack 45</p> <p>A connector of information socket (telecommunications outlet) in the cabling system. According to Federal Communications Commission (FCC) standards and regulations, RJ refers to an interface describing public telecommunication networks and RJ45 for computer networks is the common name for standard 8-bit modular interface.</p>

S

SEL	<p>System Event Log</p> <p>Immutable storage regions and interfaces that are used to store system event information for fault diagnosis and system recovery.</p>
Server	<p>A special computer that provides various services for clients in the network environment.</p>
Slimline	<p>Slimline Connector</p> <p>To provide higher-speed and smaller-size solution on networking equipment and server, Amphenol developed a SlimSAS low-profile connector that conforms to the SFF-8654 specification, which is mainly used in application of UPI1.0, 11.2 GT/s, 24 Gb/s SAS 4.0 signal or 16 GT/s PCIe 4.0 signal. The SlimSAS connector that saves space in devices has become the mainstream connector for high-speed internal signal transmission in the market.</p>
SOL	<p>Serial Over Lan</p> <p>A mechanism that redirects the serial port I/O in system through IP-based IPMI sessions.</p>

U

U	<p>1 U = 44.45 mm</p> <p>A unit of measure to describe the height of cabinet, chassis and sub-rack in IEC 60297-1.</p>
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V

VPP	<p>Vector Packet Processing</p> <p>A commercial code developed by Cisco in 2002.</p>
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13.3 Abbreviations

A

AC	Alternating Current
ACPI	Advanced Configuration and Power Management Interface
AES	Advanced Encryption Standard New Instruction Set
AI	Artificial Intelligence
ANSI	American National Standards Institute
AOC	Active Optical Cables
API	Application Program Interface
ARP	Address Resolution Protocol
AVL	Approved Vendor List

B

BIOS	Basic Input Output System
BMC	Baseboard Management Controller

C

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

D

DC	Direct Current
DDR4	Double Data Rate 4
Dhcp	Dynamic Host Configuration Protocol
DIMM	Dual-Inline-Memory-Modules
DNS	Domain Name System
DVD	Digital Video Disc

F

FMA	Failure Mode Analysis
FRU	Field-Replaceable Unit
FTP	File Transfer Protocol
FW	Firmware

G

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 Drives

I

I/O	Input/Output
IB	InfiniBand
IEC	International Electrotechnical Commission
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

JTAG	Joint Test Action Group
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K

KVM	Keyboard Video Mouse
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L

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

M

MLAN	Music Local Area Network
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N

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
OS	Operating System

P

PCH	Platform Controller Hub
PCI	Peripheral Component Interconnect
PCIe	Peripheral Component Interconnect express
PDU	Power Distribution Unit
PFR	Platform Firmware Resilience
PHM	Processor Heatsink Module
PHY	Physical
POST	Power On Self Test
PSU	Power Supply Unit
PXE	Pre-boot Execution Environment

R

RAM	Random-Access Memory
RAID	Redundant Arrays of Independent Drives
RDIMM	Registered Dual In-line Memory Module
RH	Relative Humidity
ROM	Read-Only Memory
RTA	Real Time Clock

S

SAS	Serial Attached SCSI
SATA	Serial Advanced Technology Attachment
SCSI	Small Computer System Interface
SFP	Small Form-factor Pluggable
SIC	Smart Interface Card
SKU	Stock Keeping Unit
SMTP	Simple Mail Transfer Protocol
SNMP	Simple Network Management Protocol
SSD	Solid State Disk
SSH	Secure Shell
SWRAID	Software Redundant Arrays of Independent Drives

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	User Identification
UPI	Ultra Path Interconnect
UPS	Uninterruptible Power Supply
USB	Universal Serial Bus

V

VGA	Video Graphics Array
VLAN	Virtual Local Area Network

X

XDP	eXtend Debug Port
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