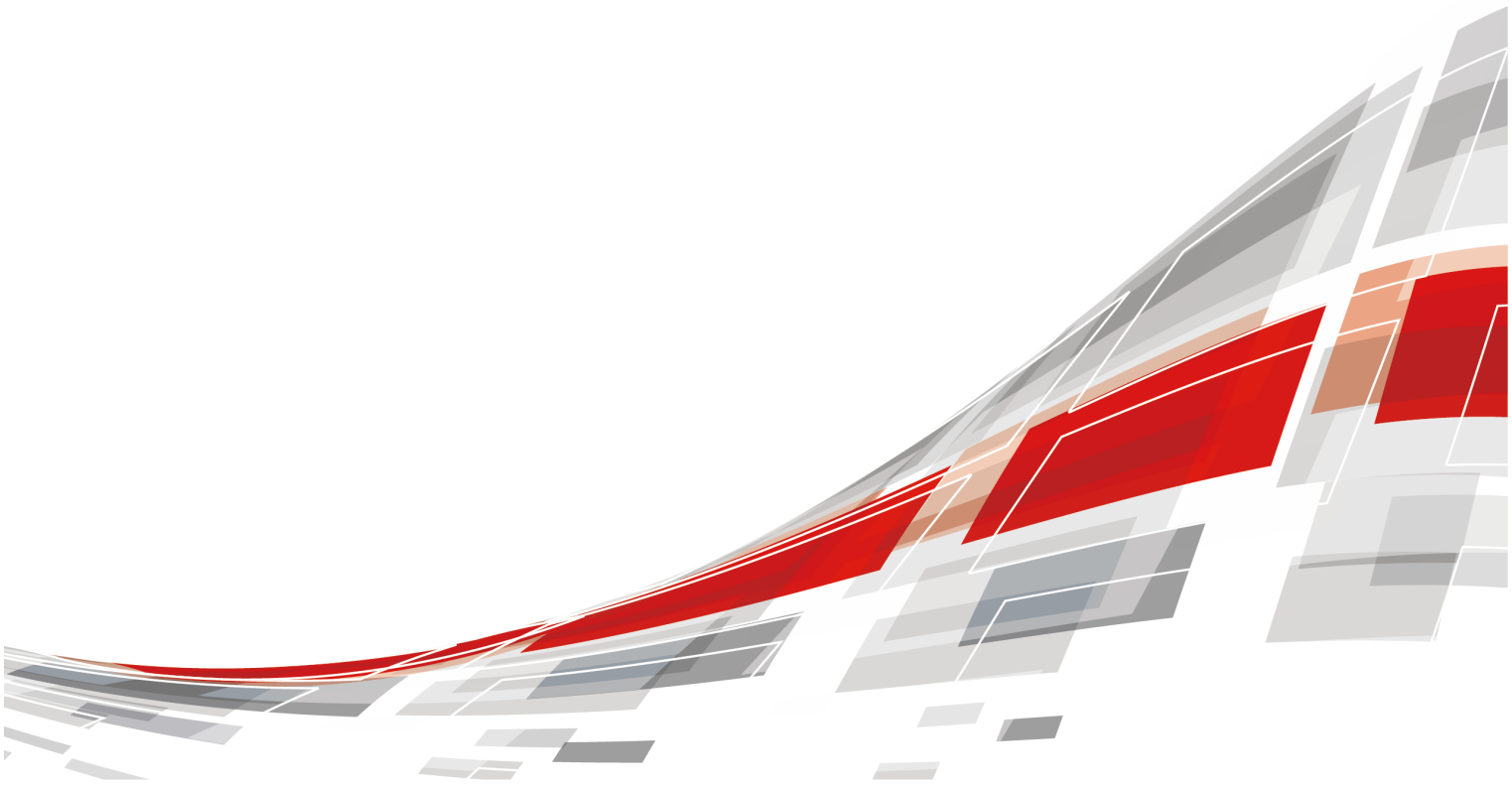
FusionServer 1288H V6 Server

User Guide

Issue 16

Date 2024-05-11



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About This Document

Purpose

This document describes the FusionServer 1288H V6 in terms of its appearance, functions, structure, hardware installation, basic configuration, OS installation methods, and troubleshooting.

Intended Audience

This document is intended for:

- Enterprise administrators
- Enterprise end users

Symbol Conventions

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

Symbol	Description
DANGER	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
NOTE	Supplements the important information in the main text. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

Issue	Release Date	Change Description
16	2024-05-11	Updated **1.1.2 Indicators and Buttons** and **1.10.2 Drive Backplane**.
15	2024-03-29	Updated **6.3.8.1 Connecting the AC PSU Cable** .
14	2023-10-17	• Updated **8.6 Managing VMD**. • Updated **A.4 Nameplate**.
13	2023-04-30	• Updated **2.1 Technical Specifications**. • Added **8.6.3 VMD Affiliation**.
12	2023-03-31	• Optimized **1.5.1 Drive Configurations**. • Updated **6.2.4.1 Installing L-Shaped Guide Rails** and **6.2.4.3 Installing the Ball Bearing Rail Kit**.
11	2023-02-28	Optimized **6.2.5 Installing a Server** .
10	2023-01-18	Optimized **1.10.1 Mainboard**.
09	2022-12-30	• Optimized **8.1 Querying the iBMC IP Address**. • Optimized **A.6 Sensor List** .
08	2022-12-08	Optimized **8.7 Accessing the BIOS**.
07	2022-10-27	• Updated **4.1 Security**. • Optimized **6.6 Initial Configuration**. • Added **A.7 FAQs About Optical Modules**.
06	2022-09-22	• Updated **1.10.2 Drive Backplane**. • Updated **2.3 Physical Specifications**.
05	2022-08-12	Updated **2.3 Physical Specifications**.
04	2022-06-25	• Added a figure that shows how to measure dimensions. • Added **A.1 Chassis Label**. • Updated **A.3 Operating Temperature Limitations**.
03	2022-05-18	Added support for **1.4.2 PMem**.

Issue	Release Date	Change Description
02	2022-05-06	• Added **1.4.1.6 Memory Protection Technologies**. • Updated **2.1 Technical Specifications** and claimed support for U.2 drives.
01	2022-01-27	This issue is the first official release.

Contents

1 Hardware Description

1.1 Front Panel

1.1.1 Appearance

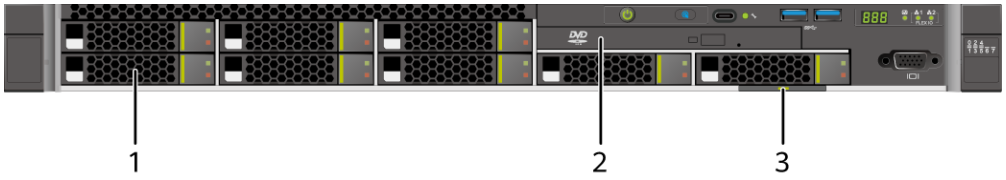
- 4 x 3.5" drive configuration

Figure 1-1 Front view

1	Drive	2	Slide-out label plate (with an SN label)

- 8 x 2.5" Drive Configuration

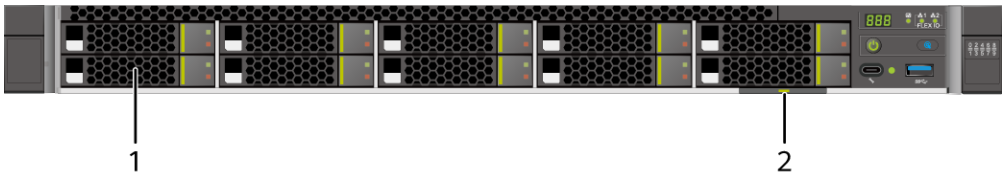
Figure 1-2 Front view



1	Drive	2	(Optional) Built-in DVD drive
3	Label with SN	-	-

- 10 x 2.5" drive configuration

Figure 1-3 Front view



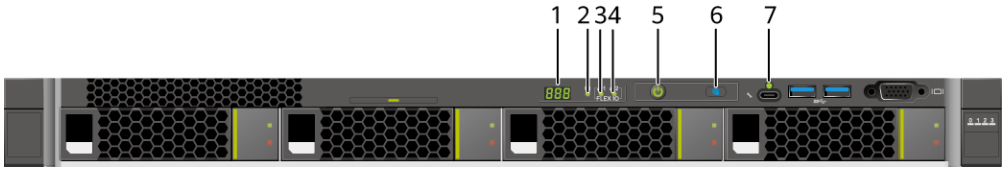
1	Drive	2	Slide-out label plate (with an SN label)

1.1.2 Indicators and Buttons

Indicator and Button Positions

- 4 x 3.5" drive configuration

Figure 1-4 Indicators and buttons on the front panel

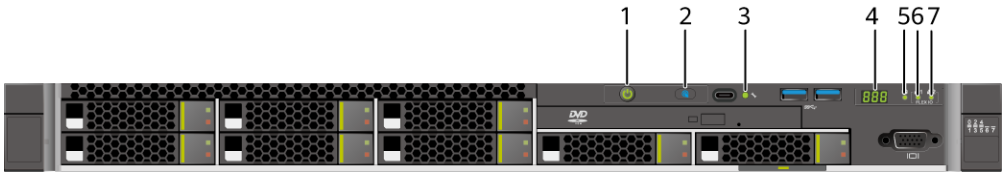


1	Fault diagnosis LED	2	Health status indicator
3	FlexIO card 1 presence indicator	4	FlexIO card 2 presence indicator
5	Power button/indicator	6	UID button/indicator

7	iBMC direct connect management port indicator	-	-

- 8 x 2.5" drive configuration

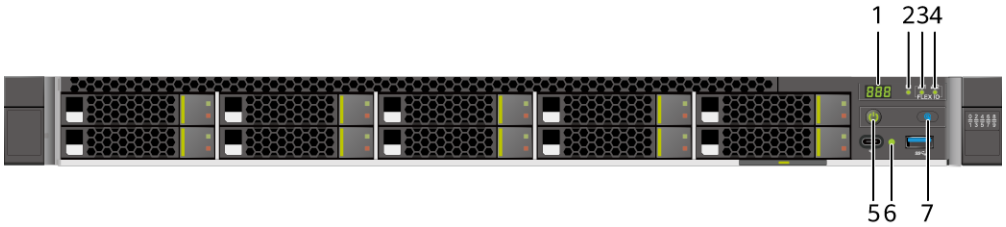
Figure 1-5 Indicators and buttons on the front panel



1	Power button/indicator	2	UID button/indicator
3	iBMC direct connect management port indicator	4	Fault diagnostic LED
5	Health status indicator	6	FlexIO card 1 presence indicator
7	FlexIO card 2 presence indicator	-	-

- 10 x 2.5" drive configuration

Figure 1-6 Indicators and buttons on the front panel



1	Fault diagnosis LED	2	Health status indicator
3	FlexIO card 1 presence indicator	4	FlexIO card 2 presence indicator
5	Power button/indicator	6	iBMC direct connect management port indicator
7	UID button/indicator	-	-

Indicator and Button Descriptions

Table 1-1 Description of indicators and buttons on the front panel

Silkscreen	Indicator and Button	Description
	Fault diagnosis LED	● ---: The device is operating properly. ● Error code: A component is faulty. For details about error codes, see the *iBMC Alarm Handling*. **NOTE** If multiple error codes are generated at the same time, the error codes are displayed in a loop. Each error code is displayed for 5 seconds.
	Health status indicator	● Off: The device is powered off or is faulty. ● Blinking red at 1 Hz: A major alarm has been generated on the system. ● Blinking red at 5 Hz: A critical alarm has been generated on the system. ● Steady green: The device is operating properly.
	FlexIO card presence indicator	Indicates whether the FlexIO card is detected. ● Off: The FlexIO card is not detected. ● Blinking green at 0.5 Hz: The FlexIO card is detected but is not powered on. ● Blinking green at 2 Hz: The FlexIO card is detected and has just been inserted. ● Steady green: The FlexIO card is detected and the power supply is normal.

Silkscreen	Indicator and Button	Description
	Power button/ indicator	Power indicator: ● Off: The device is not powered on. ● Steady green: The device is powered on. ● Blinking yellow: The iBMC is starting. The power button is locked and cannot be pressed. The iBMC is started in about 1 minute, and then the power indicator is steady yellow. ● Steady yellow: The device is standby. Power button: ● When the device is powered on, you can press this button to gracefully shut down the OS. **NOTE** For different OSs, you may need to shut down the OS as prompted. ● When the device is powered on, you can hold down this button for 6 seconds to forcibly power off the device. ● When the power indicator is steady yellow, you can press this button to power on the device.
	UID button/ indicator	The UID button/indicator helps identify and locate a device. UID indicator: ● Off: The device is not being located. ● Blinking or steady blue: The device is being located. UID button: ● You can control the UID indicator status by pressing the UID button or using the iBMC. ● You can press this button to turn on or off the UID indicator. ● You can press and hold down this button for 4 to 6 seconds to reset the iBMC.

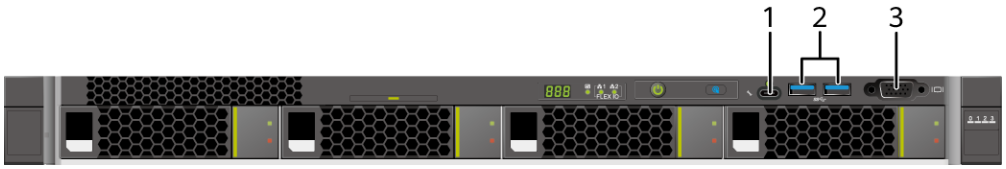
Silkscreen	Indicator and Button	Description
	iBMC direct connect management port indicator	Indicates the status when the iBMC direct connect management port connects to a terminal (local PC or Android mobile phone): ● Off: No terminal is connected. ● Blinking green at short intervals for 3 seconds and then off: The port is disabled. ● Steady green: The terminal is connected. Indicates the status when the iBMC direct connect management port connects to a USB device: ● Blinking red at long intervals: The job fails or an error is reported when the job is complete. ● Blinking green at short intervals: The job is being executed. ● Blinking green at short intervals for 3 seconds and then off: The port is disabled. ● Steady green: The server configuration file is being copied from the USB device or the job is successfully completed.

1.1.3 Ports

Port Positions

- 4 x 3.5" drive configuration

Figure 1-7 Ports on the front panel



1	iBMC direct connect management port	2	USB 3.0 port
3	VGA port	-	-

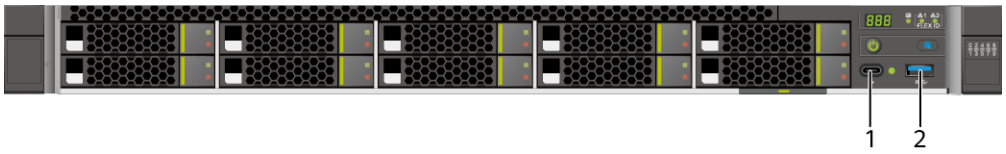
- 8 x 2.5" drive configuration

Figure 1-8 Ports on the front panel

1	iBMC direct connect management port	2	USB 3.0 port
3	VGA port	-	-

- 10 x 2.5" drive configuration

Figure 1-9 Ports on the front panel



1	iBMC direct connect management port	2	USB 3.0 port

Port Description

Table 1-2 Ports on the front panel

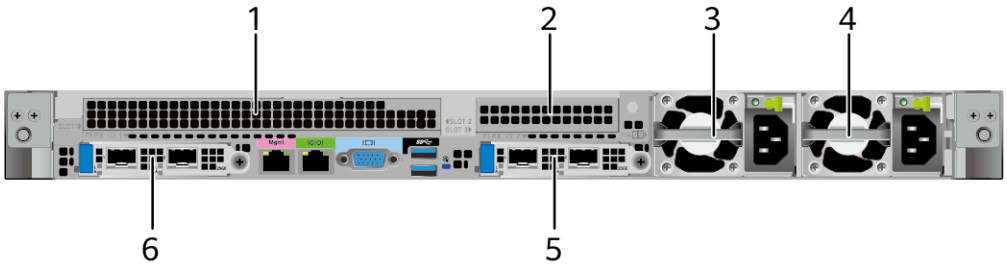
Port	Type	Quantity[Note]	Description
VGA port	DB15	1	Used to connect a display terminal, such as a monitor or KVM.

Port	Type	Quantity[Note]	Description
iBMC direct connect management port	USB Type-C **NOTE** The USB 2.0 protocol is supported.	1	Used to connect to a local PC or mobile phone through a USB Type-C cable to monitor and manage the system. **NOTE** Only local PCs running Windows 10 and mobile phones running Android are supported. ● To log in to the iBMC from the local PC, enter **https:**//*IP address of the iBMC management network port* in the address box of the browser on the local PC. ● When accessing the iBMC through a mobile phone, you need to use the mobile application FusionMobile to access the iBMC. For details, see the *FusionMobile User Guide*.
USB port	USB 3.0	2	Used to connect to a USB 3.0 device. **NOTICE** ● Before connecting an external USB device, ensure that the USB device functions properly. Otherwise, it may adversely impact the server. ● The USB 3.0 port can be used to supply power to low-power peripherals. However, the USB 3.0 port must comply with the USB specifications. To run advanced peripherals, such as external CD/DVD drives, an external power supply is required.
Note: The number of ports varies depending on server configuration. This table lists the maximum number of ports in different configurations.			

1.2 Rear Panel

1.2.1 Appearance

Figure 1-10 Rear view



1	I/O module 1	2	I/O module 2
3	PSU 1	4	Power supply 2
5	(Optional) FlexIO card 2 **NOTE** The FlexIO card slot supports only OCP 3.0 network adapters.	6	(Optional) FlexIO card 1 **NOTE** The FlexIO card slot supports only OCP 3.0 network adapters.

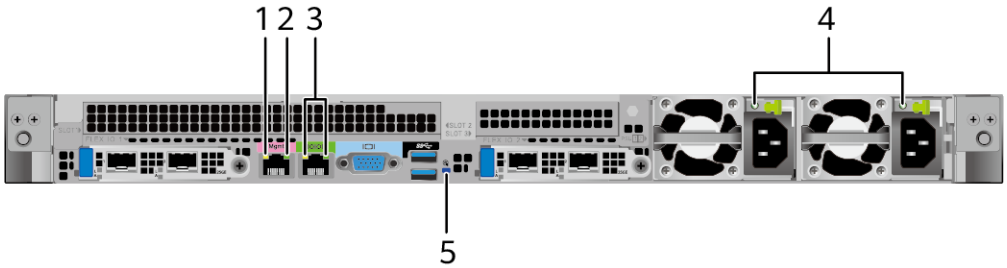
NOTE

- I/O module 1 supports a PCIe riser module or rear drive module.
- I/O module 2 supports only the PCIe riser module.
- For details about the OCP 3.0 network adapter, see **1.6.1 OCP 3.0 Network Adapter** .
- The figure is for reference only. The actual configuration may vary.

1.2.2 Indicators and Buttons

Indicator Positions

Figure 1-11 Indicators on the rear panel



1	Data transmission status indicator for the management network port	2	Connection status indicator for the management network port

3	Serial port indicators **NOTE** Reserved and unavailable currently.	4	PSU indicators
5	UID indicator	-	-

Indicator Description

Table 1-3 Indicators on the rear panel

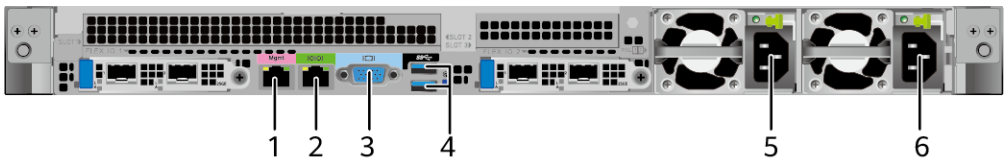
Silkscreen	Indicator	Description
-	Data transmission status indicator for the management network port	● Off: No data is being transmitted. ● Blinking yellow: Data is being transmitted.
-	Connection status indicator for the management network port	● Off: The network port is not connected. ● Steady green: The network port is connected properly.
-	PSU indicator	● Off: No power is supplied. ● Blinking green at 1 Hz: – The input is normal, and the server is standby. – The input is overvoltage or undervoltage. – The PSU is in deep hibernation mode. ● Blinking green at 4 Hz: The firmware is being upgraded online. ● Steady green: The power input and output are normal. ● Steady orange: The input is normal but there is no output. **NOTE** The possible causes of no power output are as follows: ● Power supply overtemperature protection ● Power output overcurrent or short-circuit ● Output overvoltage ● Short-circuit protection ● Device failure (excluding failure of all devices)

Silkscreen	Indicator	Description
	UID indicator	The UID indicator helps identify and locate a device. ● Off: The device is not being located. ● Blinking or steady blue: The device is being located. **NOTE** You can control the UID indicator status by pressing the UID button or using the iBMC.

1.2.3 Ports

Port Positions

Figure 1-12 Ports on the rear panel



1	Management network port	2	Serial port
3	VGA port	4	USB 3.0 ports
5	Socket for PSU 1	6	Socket for PSU 2

Port Description

Table 1-4 Ports on the rear panel

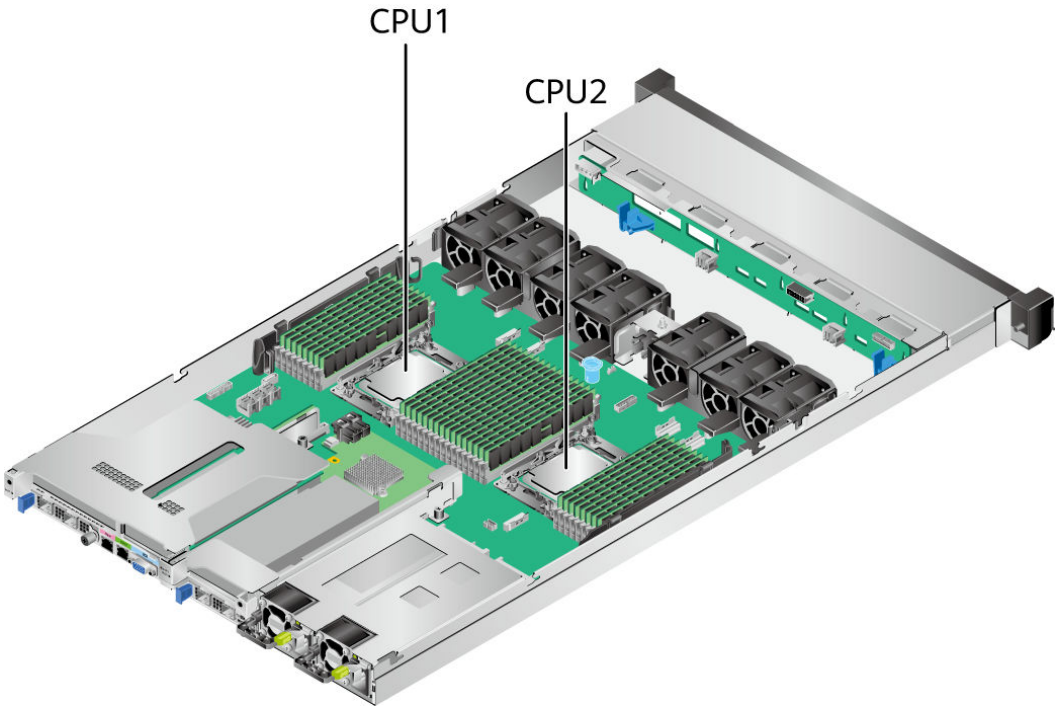
Port	Type	Quantity	Description
Management network port	RJ45	1	iBMC management network port, which is used to manage the server. **NOTE** ● The management network port is a GE port that supports 100 Mbit/s and 1000 Mbit/s auto-negotiation. ● The iBMC management network ports cannot be connected to power over Ethernet (PoE) devices (such as a switch with PoE enabled). Connecting a LOM port to a PoE device may cause link communication failure or even damage the NIC.
Serial port	RJ45	1	Default operating system serial port used for debugging. You can also set it as the iBMC serial port by using the iBMC command. **NOTE** The port uses 3-wire serial communication interface, and the default baud rate is 115,200 bit/s.
VGA port	DB15	1	Used to connect a display terminal, such as a monitor or KVM.

Port	Type	Quantity	Description
USB port	USB 3.0	2	Used to connect to a USB 3.0 device. **NOTICE** ● The maximum current is 1.3 A for an external USB device. ● Before connecting an external USB device, ensure that the USB device functions properly. Otherwise, it may adversely impact the server. ● The USB 3.0 port can be used to supply power to low-power peripherals. However, the USB 3.0 port must comply with the USB specifications. To run advanced peripherals, such as external CD/DVD drives, an external power supply is required.
PSU socket	-	2	Used to connect to a power distribution unit (PDU) through a power cable. You can select the PSUs as required. **NOTE** When determining the PSUs, ensure that the rated power of the PSUs is greater than that of the server.

1.3 Processors

- The server supports one or two processors.
- If only one processor is required, install it in socket CPU1.
- Processors of the same model must be used in a server.
- For details about the optional components, consult the local sales representative or see "Search Parts" in the compatibility list on the technical support website.

Figure 1-13 Processor positions



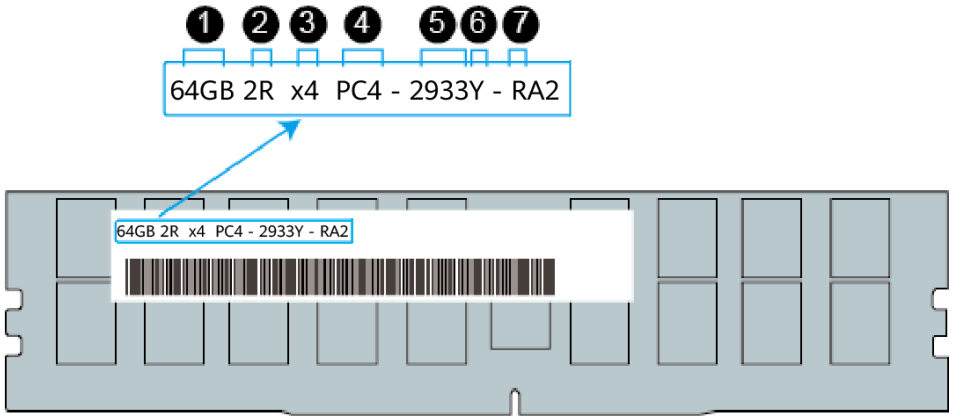
1.4 Memory

1.4.1 DDR4 Memory

1.4.1.1 Memory ID

You can determine the memory module properties based on the label attached to the memory module.

Figure 1-14 Memory identifier



No.	Description	Example
1	Capacity	• 16 GB • 32 GB • 64 GB • 128 GB • 256 GB
2	Number of ranks	• 1R: single-rank • 2R: dual-rank • 4R: quad-rank • 8R: octal-rank
3	Data width on the DRAM	• x4: 4-bit • x8: 8-bit
4	Type of the memory interface	• PC4: DDR4
5	Maximum memory speed	• 2933 MT/s • 3200 MT/s
6	Memory latency parameters (CL-tRCD-tRP)	• W = 20-20-20 • Y = 21-21-21 • AA = 22-22-22
7	DIMM type	• R = RDIMM • L = LRDIMM

1.4.1.2 Memory Subsystem Architecture

A server provides 32 memory slots. Each processor integrates eight memory channels.

Install the memory modules in the primary memory channels first. If the primary memory channel is not populated, the memory modules in secondary memory channels cannot be used.

Table 1-5 Memory channels

CPU	Channel	Memory Slot
CPU 1	A (primary)	DIMM000(A)
	A	DIMM001(I)
	B (primary)	DIMM010(B)
	B	DIMM011(J)
	C (primary)	DIMM020(C)

CPU	Channel	Memory Slot
	C	DIMM021(K)
	D (primary)	DIMM030(D)
	D	DIMM031(L)
	E (primary)	DIMM040(E)
	E	DIMM041(M)
	F (primary)	DIMM050(F)
	F	DIMM051(N)
	G (primary)	DIMM060(G)
	G	DIMM061(O)
	H (primary)	DIMM070(H)
	H	DIMM071(P)
CPU2	A (primary)	DIMM100(A)
	A	DIMM101(I)
	B (primary)	DIMM110(B)
	B	DIMM111(J)
	C (primary)	DIMM120(C)
	C	DIMM121(K)
	D (primary)	DIMM130(D)
	D	DIMM131(L)
	E (primary)	DIMM140(E)
	E	DIMM141(M)
	F (primary)	DIMM150(F)
	F	DIMM151(N)
	G (primary)	DIMM160(G)
	G	DIMM161(O)
	H (primary)	DIMM170(H)
	H	DIMM171(P)

1.4.1.3 Memory Compatibility

Observe the following rules when configuring DDR4 memory modules:

NOTICE

- A server must use DDR4 memory modules of the same part number (P/N code), and the memory speed is the minimum value of the following items:
  - Memory speed supported by a CPU
  - Maximum operating speed of a memory module
- The DDR4 DIMMs of different types (RDIMM and LRDIMM) and specifications (capacity, bit width, rank, and height) cannot be used together.
- For details about the optional components, consult the local sales representative or see "Search Parts" in the compatibility list on the technical support website.

- The memory can be used with the third-generation Intel® Xeon® Scalable Ice Lake processors. The maximum memory capacity supported by all processor models is the same.
- The total memory capacity is the sum of the capacity of all DDR4 DIMMs.

NOTICE

The total memory capacity refers to the capacity when DDR4 memory modules are fully configured. For details about the memory capacity when PMem modules are used together with DDR4 memory modules, see **1.4.2.3 Memory Compatibility**.

- For details about the capacity type of a single memory module, see "Search Parts" in the compatibility list on the technical support website.
- The maximum number of memory modules supported depends on the memory type and rank quantity.

NOTE

Each memory channel supports a maximum of 8 ranks. The number of memory modules supported by each channel varies depending on the number of ranks supported by each channel:

Number of memory modules supported by each channel ≤ Number of ranks supported by each memory channel/Number of ranks supported by each memory module

- A memory channel supports more than eight ranks for LRDIMMs.

NOTE

A quad-rank LRDIMM generates the same electrical load as a single-rank RDIMM on a memory bus.

Table 1-6 DDR4 memory specifications

Parameter	Specifications				
Capacity per DDR4 memory module (GB)	16	32	64	128	256
Type	RDIMM	RDIMM	RDIMM	LRDIMM	RDIMM

Parameter		Specifications				
Rated speed (MT/s)		3200	3200	3200	3200	2933
Operating voltage (V)		1.2	1.2	1.2	1.2	1.2
Maximum number of DDR4 DIMMs in a server[a]		32	32	32	32	32
Maximum DDR4 memory capacity of the server (GB)		512	1024	2048	4096	8192
Actual rate (MT/s)	1DPC[b]	3200	3200	3200	3200	2933
	2DPC	3200	3200	3200	3200	2933

- a: The maximum number of DDR4 memory modules is based on dual-processor configuration. The value is halved for a server with only one processor.
- b: DPC (DIMM per channel) indicates the number of memory modules per channel.
- The information listed in this table is for reference only. For details, consult the local sales representative.

1.4.1.4 DIMM Installation Rules

NOTE

This section applies to a server fully configured with DDR4 memory modules. If PMem modules are used together, see **1.4.2.4 DIMM Installation Rules**.

Observe the following when configuring DDR4 memory modules:

- Install memory modules only when corresponding processors are installed.
- Do not install LRDIMMs and RDIMMs in the same server.
- Install filler memory modules in vacant slots.

Observe the following when configuring DDR4 memory modules in specific operating mode:

- Rank sparing mode
  - Comply with the general installation guidelines.
  - At least two ranks must be configured for each channel.
  - A maximum of two standby ranks can be configured for each channel.
  - The capacity of a standby rank must be greater than or equal to that of other ranks in the same channel.
- Memory mirroring mode
  - Comply with the general installation guidelines.

  - Each processor supports four integrated memory controllers (IMCs), and each IMC has two channels for installing memory modules. The installed memory modules must be identical in size and organization.
  - For a multi-processor configuration, each processor must have a valid memory mirroring configuration.
- Memory scrubbing mode
  - Comply with the general installation guidelines.

1.4.1.5 Memory Installation Positions

A server supports a maximum of 32 DDR4 memory modules. To maximize performance, balance the total memory capacity between the installed processors and to load the channels similarly whenever possible.

Observe the memory module installation rules when configuring memory modules. For details, see the *Memory Configuration Guide* of the server on the technical support website.

NOTICE

At least one DDR4 memory module must be installed in the primary memory channels corresponding to CPU 1.

Figure 1-15 Memory slots

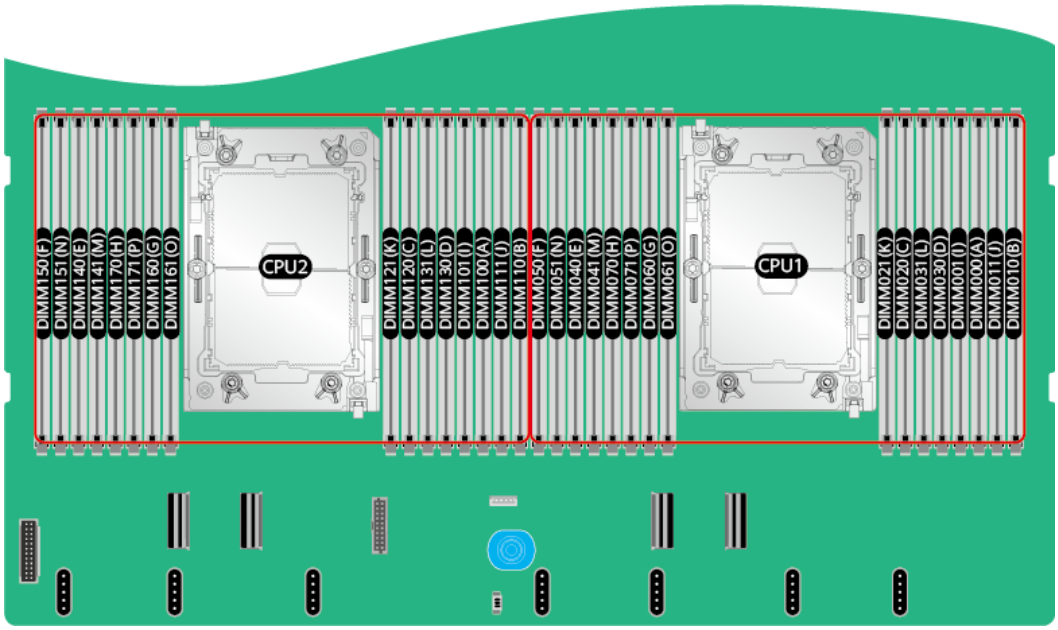


Figure 1-16 DDR4 memory module installation guidelines (1 processor)

CPU	Channel	DIMM Slot	Number of DIMMs (✓: recommended ○: not recommended)							
			✓	✓	✓	✓	✓	✓	○	✓
			1	2	4	6	8	12	12	16
CPU1	A	DIMM000(A)	●	●	●	●	●	●	●	●
		DIMM001(I)						●	●	●
	B	DIMM010(B)				●	●	●	●	●
		DIMM011(J)						●		●
	C	DIMM020(C)			●	●	●	●	●	●
		DIMM021(K)						●	●	●
	D	DIMM030(D)					●		●	●
		DIMM031(L)								●
	E	DIMM040(E)		●	●	●	●	●	●	●
		DIMM041(M)						●	●	●
	F	DIMM050(F)				●	●	●	●	●
		DIMM051(N)						●		●
	G	DIMM060(G)			●	●	●	●	●	●
		DIMM061(O)						●	●	●
	H	DIMM070(H)					●		●	●
		DIMM071(P)								●
Note	When 12 DIMMs are configured, the recommended installation (marked with ✓) achieves better performance than the installation that is not recommended (marked with ○). However, only the installation that is not recommended (marked with ○) supports SNC2, Hemi, SGX, and UMA X-skt.									

Figure 1-17 DDR4 memory module installation guidelines (2 processors)

CPU	Channel	DIMM Slot	Number of DIMMs (✓: recommended ○: not recommended)							
			✓	✓	✓	✓	✓	✓	○	✓
			2	4	8	12	16	24	24	32
CPU1	A	DIMM000(A)	●	●	●	●	●	●	●	●
		DIMM001(I)						●	●	●
	B	DIMM010(B)				●	●	●	●	●
		DIMM011(J)						●		●
	C	DIMM020(C)			●	●	●	●	●	●
		DIMM021(K)						●	●	●
	D	DIMM030(D)					●		●	●
		DIMM031(L)								●
	E	DIMM040(E)		●	●	●	●	●	●	●
		DIMM041(M)						●	●	●
	F	DIMM050(F)				●	●	●	●	●
		DIMM051(N)						●		●
	G	DIMM060(G)			●	●	●	●	●	●
		DIMM061(O)						●	●	●
	H	DIMM070(H)					●		●	●
		DIMM071(P)								●
CPU2	A	DIMM100(A)	●	●	●	●	●	●	●	●
		DIMM101(I)						●	●	●
	B	DIMM110(B)				●	●	●	●	●
		DIMM111(J)						●		●
	C	DIMM120(C)			●	●	●	●	●	●
		DIMM121(K)						●	●	●
	D	DIMM130(D)					●		●	●
		DIMM131(L)								●
	E	DIMM140(E)		●	●	●	●	●	●	●
		DIMM141(M)						●	●	●
	F	DIMM150(F)				●	●	●	●	●
		DIMM151(N)						●		●
	G	DIMM160(G)			●	●	●	●	●	●
		DIMM161(O)						●	●	●
	H	DIMM170(H)					●		●	●
		DIMM171(P)								●
Note	When 24 DIMMs are configured, the recommended installation (marked with ✓) achieves better performance than the installation that is not recommended (marked with ○). However, only the installation that is not recommended (marked with ○) supports SNC2, Hemi, SGX, and UMA X-skt.									

1.4.1.6 Memory Protection Technologies

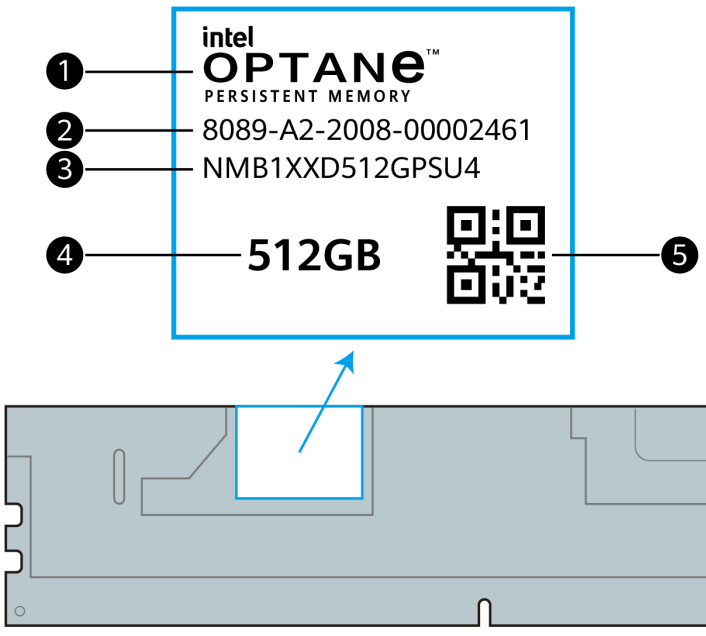
The following memory protection technologies are supported:

- ECC
- Memory Mirroring
- Memory Single Device Data Correction (SDDC)
- Failed DIMM Isolation
- Memory Thermal Throttling
- Command/Address Parity Check and Retry
- Memory Demand/Patrol Scrubbing
- Memory Data Scrambling
- Post Package Repair (PPR)
- Write Data CRC Protection
- Adaptive Data Correction - Single Region (ADC-SR)
- Adaptive Double Device Data Correction - Multiple Region (ADDDC-MR)
- Partial Cache Line Sparing (PCLS)

1.4.2 PMem

1.4.2.1 Memory Identifier

Figure 1-18 Memory identifier



No.	Description	Example
1	Component	Intel Optane™ Persistent Memory

No.	Description	Example
2	SN	8089-A2-2008-00002461
3	Model	NMB1XXD512GPSU4
4	Capacity (GB)	• 128 • 256 • 512
5	SN QR code	8089-A2-2008-00002461

1.4.2.2 Memory Subsystem Architecture

The server provides 32 memory slots. Each processor integrates eight memory channels, and each memory channel supports only one PMem module.

PMem modules must be used with DDR4 memory modules.

Table 1-7 Memory channels

CPU	Channel	Memory Slot
CPU 1	A (primary)	DIMM000(A)
	A	DIMM001(I)
	B (primary)	DIMM010(B)
	B	DIMM011(J)
	C (primary)	DIMM020(C)
	C	DIMM021(K)
	D (primary)	DIMM030(D)
	D	DIMM031(L)
	E (primary)	DIMM040(E)
	E	DIMM041(M)
	F (primary)	DIMM050(F)
	F	DIMM051(N)
	G (primary)	DIMM060(G)
	G	DIMM061(O)
	H (primary)	DIMM070(H)
	H	DIMM071(P)
CPU2	A (primary)	DIMM100(A)

CPU	Channel	Memory Slot
	A	DIMM101(I)
	B (primary)	DIMM110(B)
	B	DIMM111(J)
	C (primary)	DIMM120(C)
	C	DIMM121(K)
	D (primary)	DIMM130(D)
	D	DIMM131(L)
	E (primary)	DIMM140(E)
	E	DIMM141(M)
	F (primary)	DIMM150(F)
	F	DIMM151(N)
	G (primary)	DIMM160(G)
	G	DIMM161(O)
	H (primary)	DIMM170(H)
	H	DIMM171(P)

1.4.2.3 Memory Compatibility

Observe the following rules when configuring PMem modules:

NOTICE

- The PMem modules must be used with the DDR4 memory modules. For details, see *PMem 200-Barlow pass User Guide*.
- For details about the optional components, consult the local sales representative or see "Search Parts" in the compatibility list on the technical support website.

- The memory must be used with the third-generation Intel® Xeon® Scalable Ice Lake processors. The maximum memory capacity supported by all processor models is the same.
- The PMem module can work only in App Direct Mode (AD) and Memory Mode (MM). The total supported memory capacity is calculated as follows:
  - PMem module in AD mode

    Total memory capacity = Total capacity of all PMem modules+ Total capacity of all DDR4 memory modules
  - PMem module in MM mode

Total memory capacity = Total capacity of all PMem modules (The DDR4 memory modules are used as the cache and therefore are not calculated as memory capacity.)

NOTICE

For details about the AD and MM modes, see *PMem 200-Barlow pass User Guide*.

- For details about the capacity type of a single memory module, see "Search Parts" in the compatibility list on the technical support website.
- The maximum number of memory modules supported depends on the memory type and rank quantity.

NOTE

Each memory channel supports a maximum of 8 ranks. The number of memory modules supported by each channel varies depending on the number of ranks supported by each channel:

Number of memory modules supported by each channel ≤ Number of ranks supported by each memory channel/Number of ranks supported by each memory module

Table 1-8 PMem specifications

Parameter	Specifications		
Capacity per PMem module (GB)	128	256	512
Rated speed (MT/s)	3200	3200	3200
Operating voltage (V)	1.2	1.2	1.2
Maximum number of PMem modules in a server[a]	16	16	16
Maximum PMem capacity of the server (GB)[b]	2048	4096	8192
Actual rate (MT/s)	3200	3200	3200
• a: The maximum number of PMem modules is based on dual-processor configuration. The value is halved for a server with only one processor. • b: The maximum PMem capacity varies depending on the PMem working mode. • The information listed in this table is for reference only. For details, consult the local sales representative.			

1.4.2.4 DIMM Installation Rules

- Observe the following when configuring PMem modules:

  - The DDR4 memory modules used with the PMem modules include RDIMMs and LRDIMMs.
  - The PMem modules used in a server must have the same P/N code.
  - The DDR4 memory modules used with the PMem modules in a server must have the same P/N code.
- Observe the following when configuring PMem modules in MM mode:

  On the same server, it is recommended that the ratio of the DDR4 memory capacity to the PMem capacity be 1:4 to 1:16.

1.4.2.5 Memory Installation Positions

A server supports a maximum of 16 PMem modules. The PMem modules must be used with the DDR4 memory modules.

Observe the memory module installation rules when configuring memory modules. For details, see the *Memory Configuration Guide* of the server on the technical support website.

Figure 1-19 Memory slots

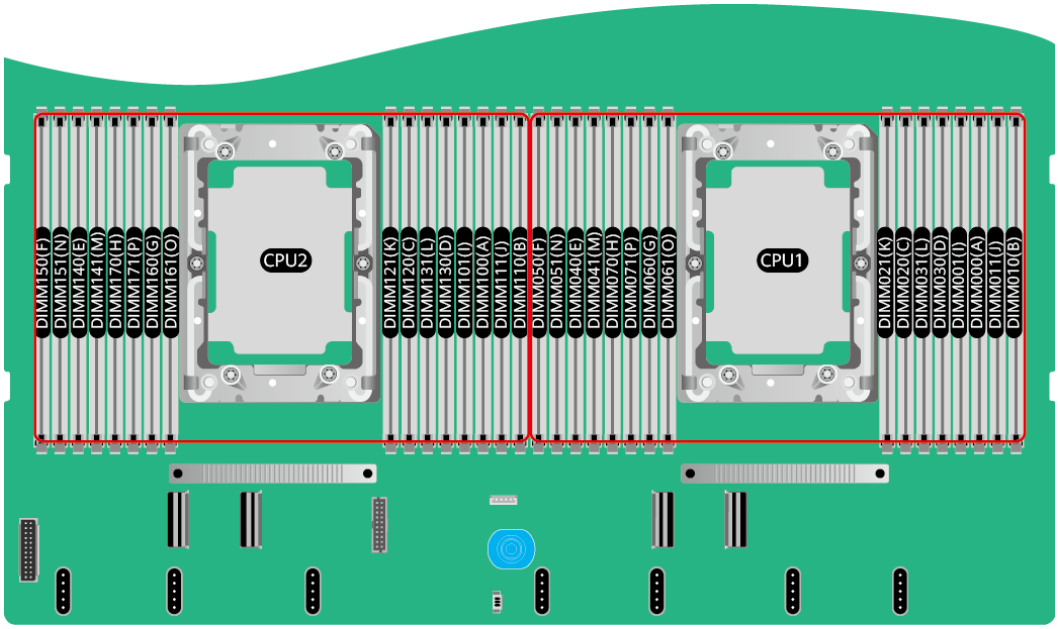


Figure 1-20 PMem module installation guidelines (1 processor)

CPU	Channel		DIMM Slot	Installation Guideline (●: DDR4 ○: PMem)					
				AD MM	AD	AD	AD MM	AD MM	AD
				4+4	6+1	8+1	8+4	8+8	12+2
CPU1	IMC0	A	DIMM000(A)	●	●	●	●	●	●
			DIMM001(I)			○	○	○	●
		B	DIMM010(B)	○	●	●	●	●	○
			DIMM011(J)					○	
	IMC1	C	DIMM020(C)	●	●	●	●	●	●
			DIMM021(K)				○	○	●
		D	DIMM030(D)	○	○	●	●	●	●
			DIMM031(L)					○	●
	IMC2	E	DIMM040(E)	●	●	●	●	●	●
			DIMM041(M)				○	○	●
		F	DIMM050(F)	○	●	●	●	●	○
			DIMM051(N)					○	
	IMC3	G	DIMM060(G)	●	●	●	●	●	●
			DIMM061(O)				○	○	●
		H	DIMM070(H)	○		●	●	●	●
			DIMM071(P)					○	●

Figure 1-21 PMem module installation guidelines (2 processors)

CPU	Channel		DIMM Slot	Installation Guideline (●: DDR4 ○: PMem)					
				AD MM	AD	AD	AD MM	AD MM	AD
				8+8	12+2	16+2	16+8	16+16	24+4
CPU1	IMC0	A	DIMM000(A)	●	●	●	●	●	●
			DIMM001(I)			○	○	○	●
		B	DIMM010(B)	○	●	●	●	●	○
			DIMM011(J)					○	
	IMC1	C	DIMM020(C)	●	●	●	●	●	●
			DIMM021(K)				○	○	●
		D	DIMM030(D)	○	○	●	●	●	●
			DIMM031(L)					○	●
	IMC2	E	DIMM040(E)	●	●	●	●	●	●
			DIMM041(M)				○	○	●
		F	DIMM050(F)	○	●	●	●	●	○
			DIMM051(N)					○	
	IMC3	G	DIMM060(G)	●	●	●	●	●	●
			DIMM061(O)				○	○	●
		H	DIMM070(H)	○		●	●	●	●
			DIMM071(P)					○	●
CPU2	IMC0	A	DIMM000(A)	●	●	●	●	●	●
			DIMM001(I)			○	○	○	●
		B	DIMM010(B)	○	●	●	●	●	○
			DIMM011(J)					○	
	IMC1	C	DIMM020(C)	●	●	●	●	●	●
			DIMM021(K)				○	○	●
		D	DIMM030(D)	○	○	●	●	●	●
			DIMM031(L)					○	●
	IMC2	E	DIMM040(E)	●	●	●	●	●	●
			DIMM041(M)				○	○	●
		F	DIMM050(F)	○	●	●	●	●	○
			DIMM051(N)					○	
	IMC3	G	DIMM060(G)	●	●	●	●	●	●
			DIMM061(O)				○	○	●
		H	DIMM070(H)	○		●	●	●	●
			DIMM071(P)					○	●

1.4.2.6 Memory Protection Technologies

The following memory protection technologies are supported:

- PMem module Error Detection and Correction
- PMem module Device Failure Recovery (SDDC)
- PMem module Package Sparing (DDDC)
- PMem module Patrol Scrubbing
- PMem module Address Error Detection
- PMem module Data Poisoning (Corrupt Data Containment)
- PMem module Viral
- PMem module Address Range Scrub (ARS)
- PMem module Error Injection
- DDR-T Command and Address Parity Check and Retry
- DDR-T Read Write Data ECC Check and Retry
- PMem module Faulty DIMM Isolation
- PMem module Error Reporting

1.5 Storage

1.5.1 Drive Configurations

Table 1-9 Drive configuration

Configuration	Front Drive	Rear Drive	Drive Management Mode
4 x 3.5" drive pass-through configuration 1	● Front drive: 4 x 3.5 – Slots 0 to 3 support only SATA drives.	-	● PCH
4 x 3.5" drive pass-through configuration 2	● Front drive: 4 x 3.5 – Slots 0 to 3 support only SAS/SATA drives.	● I/O module 1: 2 x 2.5" – Slots 12 and 13 support only SAS/SATA drives.	● 1 x screw-in RAID controller card[a]
4 x 3.5" drive pass-through configuration 3	● Front drive: 4 x 3.5 – Slots 0 to 3 support only SAS/SATA drives.	-	● 1 x PCIe RAID controller card[b/c]

Configuration	Front Drive	Rear Drive	Drive Management Mode
8 x 2.5" drive pass-through configuration 1	● Front drive: 8 x 2.5" – Slots 0 to 7 support only SATA drives.	-	● PCH
8 x 2.5" drive pass-through configuration 2	● Front drive: 8 x 2.5" – Slots 0 to 7 support only SAS/SATA drives.	-	● 1 x screw-in RAID controller card[a]
8 x 2.5" drive pass-through configuration 3	● Front drive: 8 x 2.5" – Slots 0 to 7 support only SAS/SATA drives.	-	● 1 x PCIe RAID controller card[c/d]
10 x 2.5" drive pass-through configuration 1	● Front drive: 10 x 2.5" – Slots 0 to 9 support only SAS/SATA drives.	● I/O module 1: 2 x 2.5" – Slots 12 and 13 support only SAS/SATA drives.	● 1 x screw-in RAID controller card[e]
10 x 2.5" drive pass-through configuration 2	● Front drive: 10 x 2.5" – Slots 0 to 9 support only SAS/SATA drives.	-	● 1 x PCIe RAID controller card[f/g]

Configuration	Front Drive	Rear Drive	Drive Management Mode
10 x 2.5" drive pass-through configuration 3	● Front drive: 10 x 2.5" – Slots 0 to 5 support only SATA drives. – Slots 6 and 7 support only SATA/ NVMe drives. – Slots 8 to 9 support only NVMe drives.	-	● SATA drive: PCH ● NVMe drive: CPU
10 x 2.5" drive pass-through configuration 4	● Front drive: 10 x 2.5" – Slots 0 to 5 support only SAS/SATA drives. – Slots 6 and 7 support SAS/SATA/ NVMe drives. – Slots 8 and 9 support only NVMe drives.	-	● SAS/SATA drive: 1 x screw-in RAID controller card[a] ● NVMe drive: CPU
10 x 2.5" drive pass-through configuration 5	● Front drive: 10 x 2.5" – Slots 0 to 5 support only SAS/SATA drives. – Slots 6 and 7 support SAS/SATA/ NVMe drives. – Slots 8 and 9 support only NVMe drives.	-	● SAS/SATA drive: 1 x PCIe RAID controller card[b/c] ● NVMe drive: CPU

Configuration	Front Drive	Rear Drive	Drive Management Mode
10 x 2.5" drive NVMe configuration 1	● Front drive: 10 x 2.5" – Slots 0 to 3 support only SATA/NVMe drives. – Slots 4 to 9 support only NVMe drives.	-	● SATA drive: PCH ● NVMe drive: CPU
10 x 2.5" drive NVMe configuration 2	● Front drive: 10 x 2.5" – Slots 0 to 3 support SAS/SATA/ NVMe drives. – Slots 4 to 9 support only NVMe drives.	● I/O module 1: 2 x 2.5" – Slots 12 and 13 support only SAS/ SATA drives.	● SAS/SATA drive: 1 x screw-in RAID controller card[a] ● NVMe drive: CPU
10 x 2.5" drive NVMe configuration 3	● Front drive: 10 x 2.5" – Slots 0 to 3 support SAS/SATA/ NVMe drives. – Slots 4 to 9 support only NVMe drives.	● I/O module 1: 2 x 2.5" – Slots 12 and 13 support only SAS/ SATA drives.	● SAS/SATA drive: 1 x PCIe RAID controller card[b/g] ● NVMe drive: CPU

Configuration	Front Drive	Rear Drive	Drive Management Mode
• a: For now, this configuration supports only the XR150-M (3408iMR) and XR450C-MX (3508) screw-in RAID controller cards. • b: For now, this configuration supports only the 9460-8i (3508) and 9440-8i (3408iMR) PCIe plug-in RAID controller cards. • c: The PCIe RAID controller card must be installed in slot 1. • d: For now, this configuration supports only the 9460-8i (3508), 9440-8i (3408iMR), 9560-8i (3908) and 9500-8i (3808IT) PCIe plug-in RAID controller cards. • e: For now, this configuration supports only the XR760-M (3416iMR) and XR760IT-M (3416IT) screw-in RAID controller cards. • f: For now, this configuration supports only the 9460-16i (3516) PCIe plug-in RAID controller card. • g: When I/O module 1 is configured with drives, the PCIe RAID controller card must be installed in slot 3. When I/O module 1 is not configured with drives, the PCIe RAID controller card must be installed in slot 1. • Note1: Contact your local sales representative or see "Search Parts" in the compatibility list on the technical support website to determine the components to be used. • Note2: For details about the backplane specifications supported by each drive configuration, see **1.10.2 Drive Backplane**.			

1.5.2 Drive Numbering

NOTE

The drive numbers identified by the RAID controller card vary depending on the cabling of the RAID controller card. The drive numbers identified by the RAID controller card in this section are provided based on the default cabling described in **6.4 Internal Cabling**.

- 4 x 3.5" drive pass-through configuration

  Corresponds to 4 x 3.5" drive pass-through configuration 1 in **1.5.1 Drive Configurations**.

Figure 1-22 Slot Numbers

Table 1-10 Slot numbers

Drive No.	Drive Number Identified by the iBMC
0	0

Drive No.	Drive Number Identified by the iBMC
1	1
2	2
3	3

- 4 x 3.5" drive pass-through configuration

  Corresponds to 4 x 3.5" drive pass-through configuration 2 in **1.5.1 Drive Configurations**.

Figure 1-23 Slot Numbers

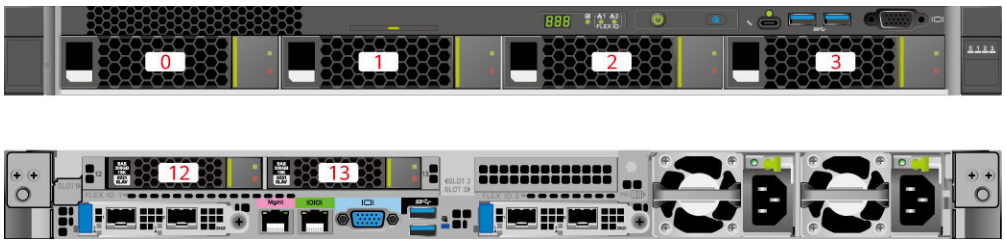


Table 1-11 Slot numbers

Drive No.	Drive Number Identified by the iBMC	Drive Number Identified by the RAID Controller
0	0	0
1	1	1
2	2	2
3	3	3
12	12	4
13	13	5

- 4 x 3.5" drive pass-through configuration

  Corresponds to 4 x 3.5" drive pass-through configuration 3 in **1.5.1 Drive Configurations**.

Figure 1-24 Slot Numbers

Table 1-12 Slot numbers

Drive No.	Drive Number Identified by the iBMC	Drive Number Identified by the RAID Controller
0	0	0
1	1	1
2	2	2
3	3	3

- 8 x 2.5" drive pass-through configuration

  Corresponds to 8 x 2.5" drive pass-through configuration 1 in **1.5.1 Drive Configurations**.

Figure 1-25 Slot numbers

Table 1-13 Slot numbers

Drive No.	Drive Number Identified by the iBMC
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7

- 8 x 2.5" drive pass-through configuration

  Corresponds to 8 x 2.5" drive pass-through configuration 2 and 8 x 2.5" drive pass-through configuration 3 in **1.5.1 Drive Configurations**.

Figure 1-26 Slot Numbers

Table 1-14 Slot numbers

Drive No.	Drive Number Identified by the iBMC	Drive Number Identified by the RAID Controller
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7

- 10 x 2.5" drive pass-through configuration

  Corresponds to 10 x 2.5" drive pass-through configuration 1 in **1.5.1 Drive Configurations**.

Figure 1-27 Slot numbers

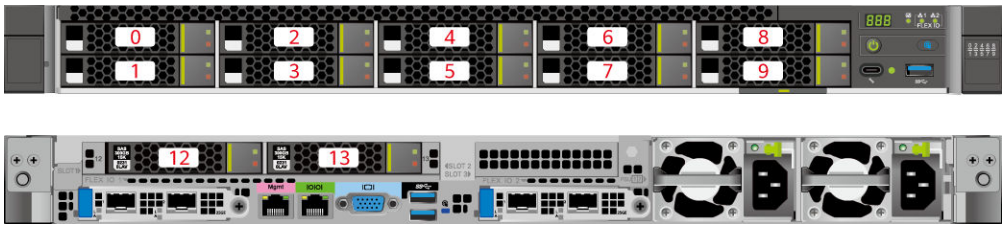


Table 1-15 Slot numbers

Drive No.	Drive Number Identified by the iBMC	Drive Number Identified by the RAID Controller
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7

Drive No.	Drive Number Identified by the iBMC	Drive Number Identified by the RAID Controller
8	8	8
9	9	9
12	12	12
13	13	13

- 10 x 2.5" drive pass-through configuration

  Corresponds to 10 x 2.5" drive pass-through configuration 2 in **1.5.1 Drive Configurations**.

Figure 1-28 Slot numbers

Table 1-16 Slot numbers

Drive No.	Drive Number Identified by the iBMC	Drive Number Identified by the RAID Controller
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9

- 10 x 2.5" drive pass-through configuration

  Corresponds to 10 x 2.5" drive pass-through configuration 3 in **1.5.1 Drive Configurations**.

Figure 1-29 Slot Numbers

Table 1-17 Slot numbers

Drive No.	Drive Number Identified by the iBMC
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

- 10 x 2.5" drive pass-through configuration

  Corresponds to 10 x 2.5" drive pass-through configuration 4 and 10 x 2.5" drive pass-through configuration 5 in **1.5.1 Drive Configurations**.

Figure 1-30 Slot Numbers

Table 1-18 Slot numbers

Drive No.	Drive Number Identified by the iBMC	Drive Number Identified by the RAID Controller
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4

Drive No.	Drive Number Identified by the iBMC	Drive Number Identified by the RAID Controller
5	5	5
6	6	6Note
7	7	7Note
8	8	-
9	9	-
Note: If the slot is configured with a SAS/SATA drive, the RAID controller card can manage the drive and allocate a number to the drive.		

- 10 x 2.5" NVMe drive configuration

  Corresponds to 10 x 2.5" drive NVMe configuration 1 in **1.5.1 Drive Configurations**.

Figure 1-31 Slot Numbers

Table 1-19 Slot numbers

Drive No.	Drive Number Identified by the iBMC
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

- 10 x 2.5" NVMe drive configuration

  Corresponds to 10 x 2.5" NVMe drive configuration 2 and 10 x 2.5" NVMe drive configuration 3 in **1.5.1 Drive Configurations**.

Figure 1-32 Slot Numbers

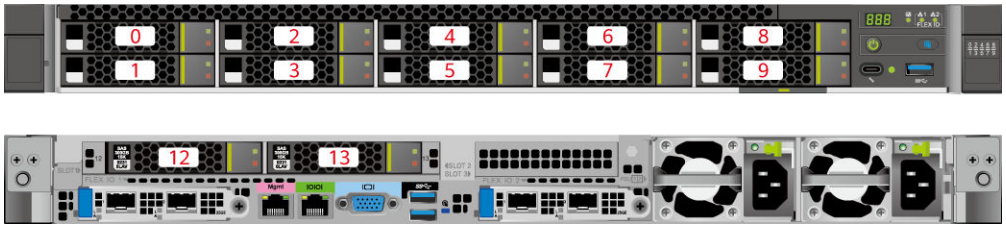


Table 1-20 Slot numbers

Drive No.	Drive Number Identified by the iBMC	Drive Number Identified by the RAID Controller
0	0	0Note
1	1	1Note
2	2	2Note
3	3	3Note
4	4	-
5	5	-
6	6	-
7	7	-
8	8	-
9	9	-
12	12	4
13	13	5
Note: If the slot is configured with a SAS/SATA drive, the RAID controller card can manage the drive and allocate a number to the drive.		

1.5.3 Drive Indicators

SAS/SATA Drive Indicators

Figure 1-33 SAS/SATA drive indicators

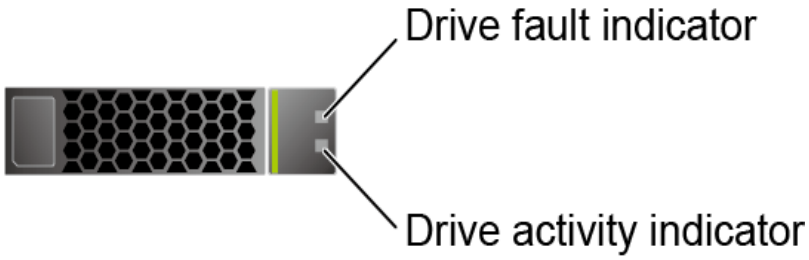
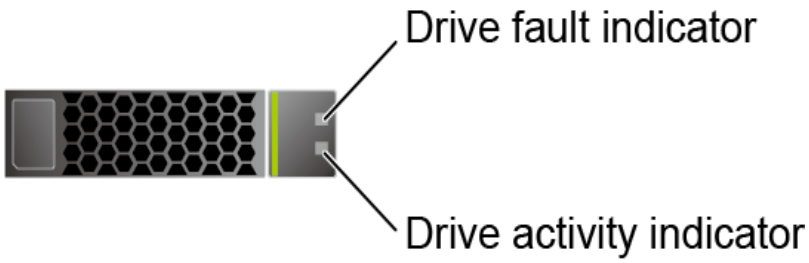


Table 1-21 SAS/SATA drive indicators

Activity Indicator (Green)	Fault Indicator (Yellow)	Description
Off	Off	The drive is not in position.
Steady on	Off	The drive is detected.
Blinking at 4 Hz	Off	Data is being read or written properly, or data on the primary drive is being rebuilt.
Steady on	Blinking at 1 Hz	The drive is being located.
Blinking at 1 Hz	Blinking at 1 Hz	Data on the secondary drive is being rebuilt.
Off	Steady on	A drive in a RAID array is removed.
Steady on	Steady on	The drive is faulty.

NVMe Drive Indicators

Figure 1-34 NVMe drive indicators



- If the VMD function is enabled and the latest VMD driver is installed, the NVMe drives support surprise hot swap.

Table 1-22 NVMe drive indicators (VMD enabled)

Activity Indicator (Green)	Fault Indicator (Yellow)	Description
Off	Off	The NVMe drive is not detected.
Steady on	Off	The NVMe drive is detected and operating properly.
Blinking at 2 Hz	Off	Data is being read from or written to the NVMe drive.
Steady on	Blinking at 2 Hz	The NVMe drive is being located.
Off	Blinking at 8 Hz	The data on the secondary NVMe drive is being rebuilt.
Steady on/Off	Steady on	The NVMe drive is faulty.

- If the VMD function is disabled, NVMe drives support only orderly hot swap.

Table 1-23 NVMe drive indicators (VMD disabled)

Activity Indicator (Green)	Fault Indicator (Yellow)	Description
Off	Off	The NVMe drive is not detected.
Steady on	Off	The NVMe drive is detected and operating properly.
Blinking at 2 Hz	Off	Data is being read from or written to the NVMe drive.
Off	Blinking at 2 Hz	The NVMe drive is being located or hot-swapped.
Off	Blinking at 0.5 Hz	The NVMe drive has completed the hot swap process and is removable.
Steady on/Off	Steady on	The NVMe drive is faulty.

M.2 FRU Indicators

The server supports the Avago SAS3004iMR RAID controller card, which supports two M.2 FRUs.

Figure 1-35 M.2 FRU indicators

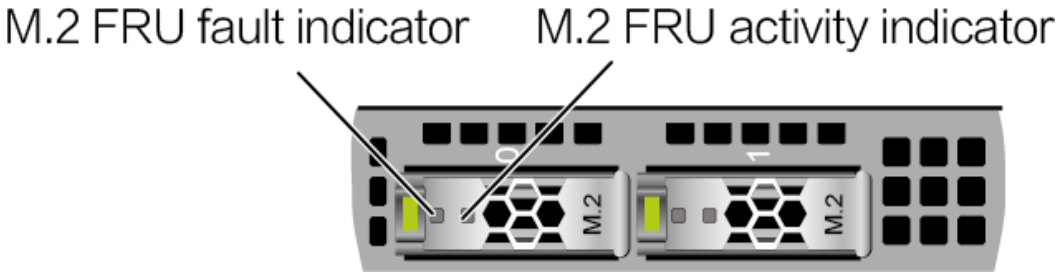


Table 1-24 M.2 FRU indicators

M.2 FRU Active Indicator (Green or Light Green)	M.2 FRU Fault Indicator (Yellow)	Description
Off	Off	The M.2 FRU is not detected.
Steady on	Off	The M.2 FRU is inactive.
Blink	Off	The M.2 FRU is in the read/write or synchronization state.
Steady on	Blink	The M.2 FRU is being located.
Blink	Blink	The RAID array is being rebuilt.
Off	Steady on	The M.2 FRU cannot be detected or is faulty.
Steady on	Steady on	The M.2 FRU RAID status is abnormal.

1.5.4 RAID Controller Card

The RAID controller card supports RAID configuration, RAID level migration, and drive roaming.

- For details about the optional components, consult the local sales representative or see "Search Parts" in the compatibility list on the technical support website.
- For details about the RAID controller card, see server *RAID Controller Card User Guide*.

1.6 Network

1.6.1 OCP 3.0 Network Adapter

OCP 3.0 network adapters provide network expansion capabilities.

- The FlexIO slot supports the OCP 3.0 network adapter, which can be configured as required.

- For details about the optional components, consult the local sales representative or see "Search Parts" in the compatibility list on the technical support website.
- For details about OCP 3.0 NICs, see OCP 3.0 *NIC User Guide*.

1.7 I/O Expansion

1.7.1 PCIe Cards

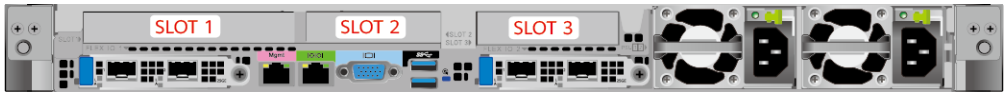
PCIe cards provide ease of expandability and connection.

- A maximum of three PCIe 4.0 slots are supported.
- For details about the optional components, consult the local sales representative or see "Search Parts" in the compatibility list on the technical support website.
- When IB cards are used to build an IB network, ensure that the IPoIB modes of the IB cards at both ends of the network are the same. For details, contact technical support.

1.7.2 PCIe Slots

PCIe Slots

Figure 1-36 PCIe slots



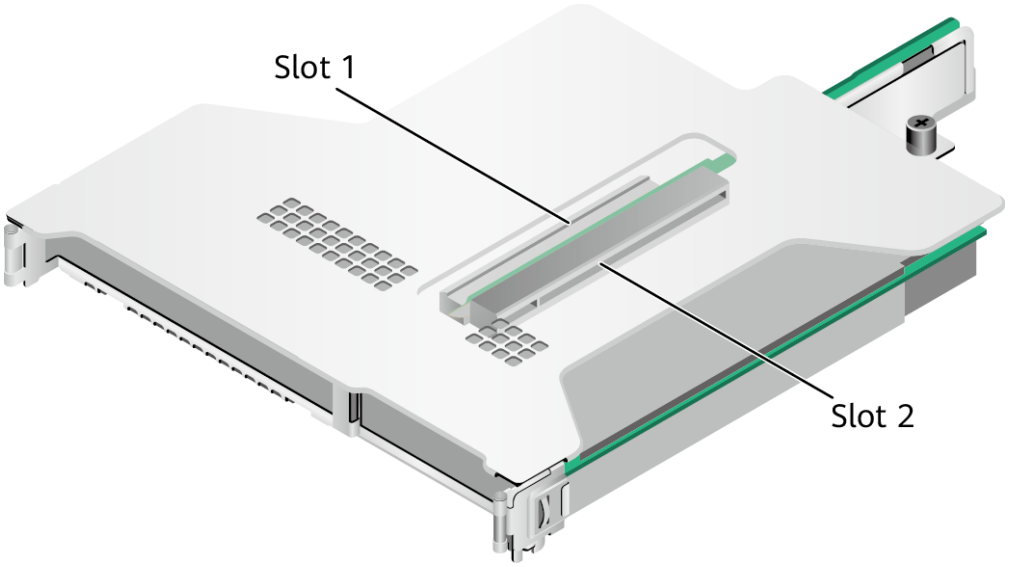
- I/O module 1 provides slots 1 and 2.
- I/O module 2 provides slot 3.

PCIe Riser Modules

- PCIe riser module 1

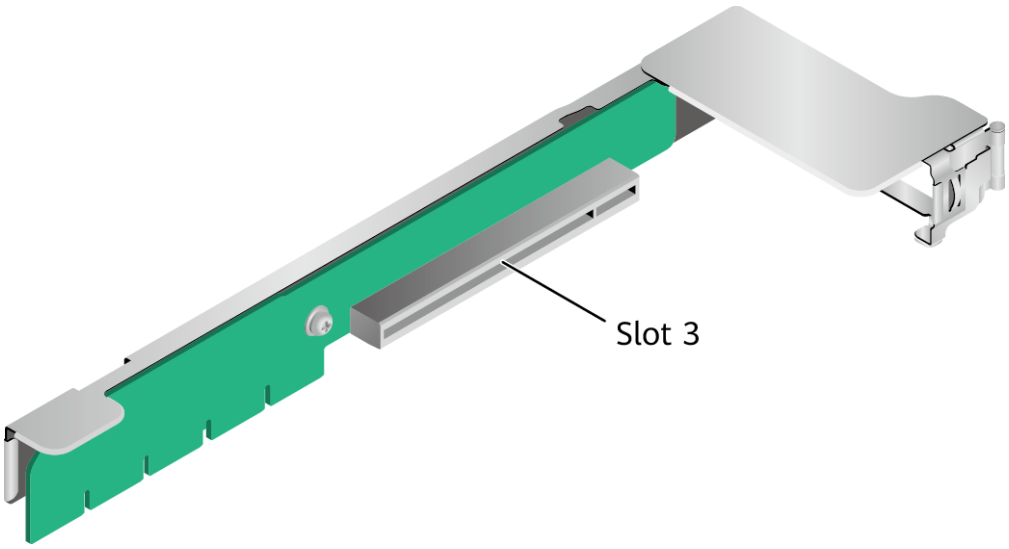
  Provides PCIe slots 1 and 2 in I/O module 1.

Figure 1-37 PCIe riser module



- PCIe riser module 2
  Provides PCIe slot 3 in I/O module 2.

Figure 1-38 PCIe riser module



1.7.3 PCIe Slot Description

NOTE

The PCIe slots mapping to a vacant CPU socket are unavailable.

Table 1-25 PCIe slot description

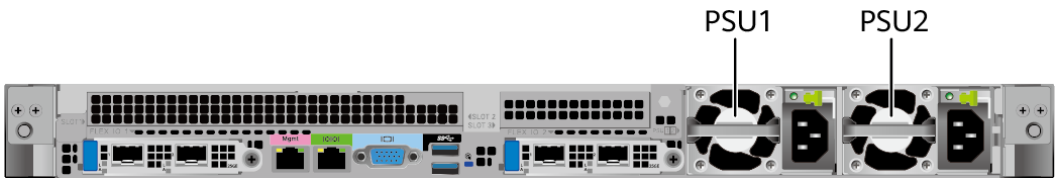
PCIe Slot	CPU	PCIe Standards	Connector Width	Bus Width	Port No.	Root Port (B/D/F)	Device (B/D/F)	Slot Size
Screw-in RAID controller card	CPU1	PCIe 3.0	x8	x8	Port0A	16/02/0	17/00/0	-
FlexIO card 1	CPU1	PCIe 4.0	x16	x8 Expansion cables used by the mainboard: x8 + x8[a]	Port0C	16/04/0	18/00/0	OCP 3.0 specifications
FlexIO card 2	CPU2	PCIe 4.0	x16	x8 Expansion cable used by the mainboard: x16	Port2A	C9/02/0	CA/00/0	OCP 3.0 specifications
Slot1	CPU1	PCIe 4.0	x16	x16	Port1A	30/02/0	31/00/0	FHHL
Slot2	CPU1	PCIe 4.0	x16	x16	Port2A	4A/02/0	4B/00/0	HHHL
Slot3	CPU2	PCIe 4.0	x16	x16	Port0A	97/02/0	98/00/0	HHHL

PCIe Slot	CPU	PCIe Standards	Connector Width	Bus Width	Port No.	Root Port (B/D/F)	Device (B/D/F)	Slot Size
• a: When CPU1 and CPU2 use x8 signals, the socket-direct function is supported. FlexIO cards 1 and 2 are not supported to expand the PCIe bandwidth at the same time. • The B/D/F (Bus/Device/Function Number) is the default value when the server is fully configured with PCIe cards. The value may differ if the server is not fully configured with PCIe cards or if a PCIe card with a PCI bridge is configured. • Root Port (B/D/F) indicates the B/D/F of an internal PCIe root port of the processor. • Device (B/D/F) indicates the B/D/F (bus address displayed on the OS) of an onboard or extended PCIe device. • The PCIe x16 slots are compatible with PCIe x16, PCIe x8, PCIe x4, and PCIe x1 cards. The PCIe cards are not forward compatible. That is, the PCIe slot width cannot be smaller than the PCIe card link width. • The full-height half-length (FHHL) PCIe slots are compatible with FHHL PCIe cards and half-height half-length (HHHL) PCIe cards. • The maximum power supply of each PCIe slot is 75 W.								

1.8 PSUs

- The server supports one or two PSUs.
- The server supports AC or DC PSUs.
- The PSUs are hot-swappable.
- The server supports two PSUs in 1+1 redundancy.
- PSUs of the same P/N code must be used in a server.
- The PSUs are protected against short circuit. Double-pole fuse is provided for the PSUs with dual input live wires.
- If the DC power supply is used, purchase the DC power supply that meets the requirements of the safety standards or the DC power supply that has passed the CCC certification.
- For details about the optional components, consult the local sales representative or see "Search Parts" in the compatibility list on the technical support website.

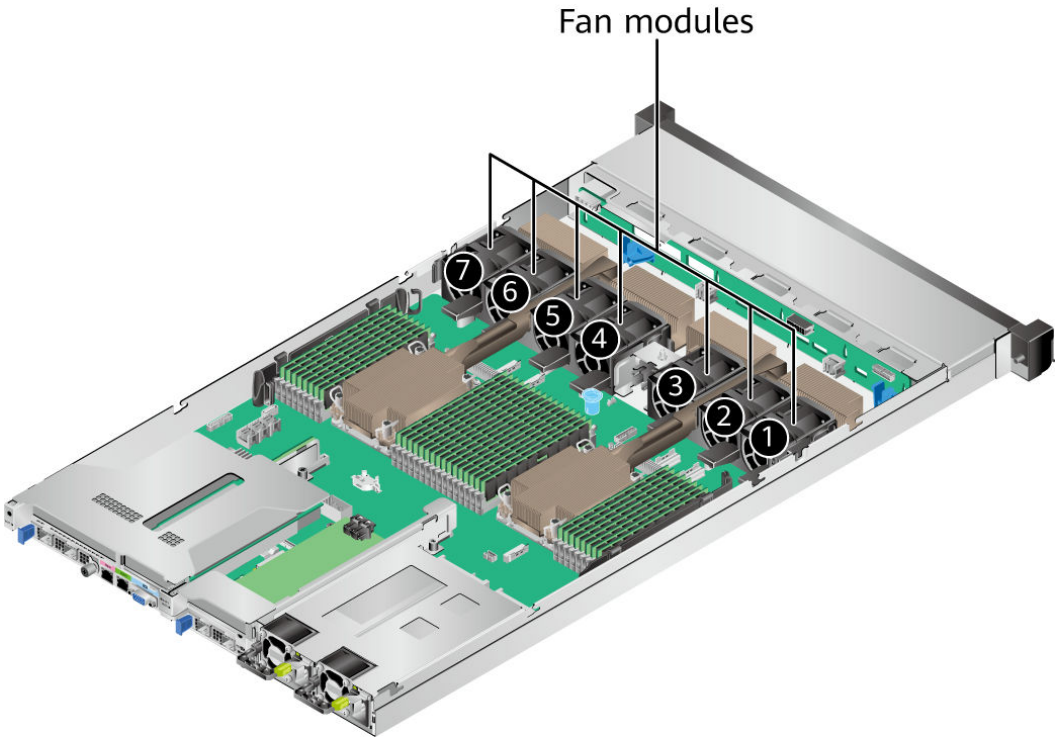
Figure 1-39 Positions of PSUs



1.9 Fan Modules

- The server supports seven fan modules.
- The fan modules are hot-swappable.
- N+1 redundancy is supported. That is, the server can work properly when a single fan fails.
- The fan speed can be adjusted.
- Fan modules of the same P/N code must be used in a server.

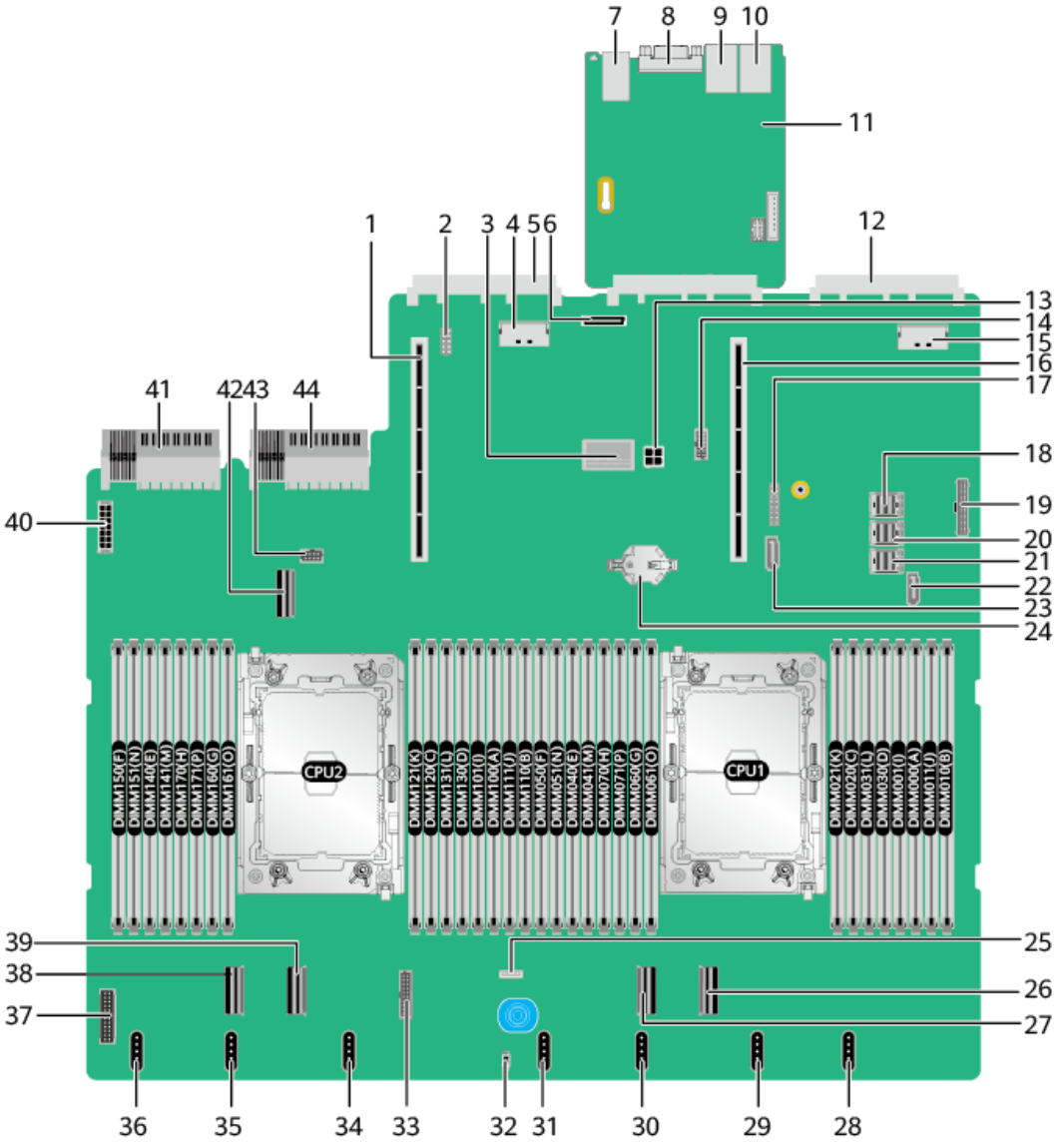
Figure 1-40 Positions of fan modules



1.10 Boards

1.10.1 Mainboard

Figure 1-41 1288H V6 mainboard



1	PCIe riser 2 slot (PCIE RISER2(CPU2)/J51)	2	Debugging pin (J103)
3	Screw-in RAID controller card connector (RAID CARD/J86)	4	LP slimline 7 connector for OCP 3.0 network adapter 2 (SLIMLINE7/J31)
5	OCP 3.0 network adapter 2 connector (OCP2 CONN/ J109)	6	Built-in storage expansion port (SD CARD/J87)
7	2 x USB 3.0 ports (USB3.0 CONN/J88)	8	Rear VGA port (VGA CONN/J60)

9	Serial port (COM/J6020)	10	BMC management network port (BMC_GE /J6019)
11	BMC management board	12	OCP 3.0 network adapter 1 connector (OCP1 CONN/ J108)
13	Rear 4-pin power connector 2 (REAR BP PWR2/J21)	14	NC-SI connector (NCSI CONN/J114)
15	LP slimline 6 connector for OCP 3.0 network adapter 1 (SLIMLINE6/J13)	16	PCIe riser 1 slot (PCIE RISER1(CPU1)/J50)
17	TPM/TCM connector (J10)	18	Mini-SAS HD connector C (MiniHD PORTC/J4)
19	Right mounting ear connector (RCIA BOARD/ J113)	20	Mini-SAS HD connector B (MiniHD PORTB/J5)
21	Mini-SAS HD connector A (MiniHD PORTA/J6)	22	SATA 9-pin connector 1 (SATA1/J1)
23	SATA 9-pin connector 2 (SATA2/J2)	24	Cell battery holder (U9)
25	VROC key connector (Soft RAID KEY/J3)[a]	26	LP slimline 1 connector (SLIMLINE1(CPU1)/J11)
27	LP slimline 2 connector (SLIMLINE2(CPU1)/J84)	28	Fan module 7 connector (1U FAN7/J99)
29	Fan module 6 connector (1U FAN6/J98)	30	Fan module 5 connector (1U FAN5/J96)
31	Fan module 4 connector (1U FAN4/J94)	32	Intrusion sensor connector (INTRUDER CONN/S1)
33	Front low-speed signal connector (FRONT HDD BP/J75)	34	Fan module 3 connector (1U FAN3/J92)
35	Fan module 2 connector (1U FAN2/J101)	36	Fan module 1 connector (1U FAN1/J67)
37	Left mounting ear connector (LCIA BOARD/ J106)	38	LP slimline 4 connector (SLIMLINE4(CPU2)/J12)
39	LP slimline 3 connector (SLIMLINE3(CPU2)/J85)	40	Front 14-pin power connector 1 (HDD BP PWR1/J26)
41	PSU 2 connector (PSU2/ J56)	42	LP slimline 5 connector (SLIMLINE5(CPU2)/J30)

43	Built-in low-speed signal connector (INNER HDD BP/J27)	44	PSU 1 connector (PSU1/J28)
a: Reserved and unavailable currently.			

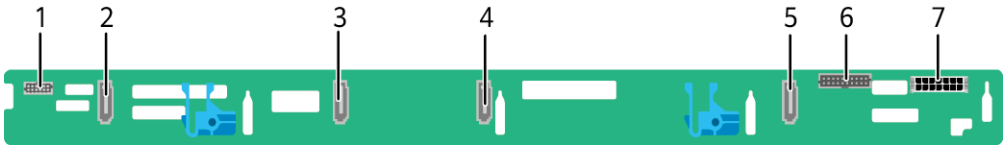
1.10.2 Drive Backplane

Front Drive Backplane

- 4 x 3.5" drive pass-through backplane

  Configure this backplane in 4 x 3.5" drive pass-through configuration 1, 4 x 3.5" drive pass-through configuration 2, and 4 x 3.5" drive pass-through configuration 3 in **1.5.1 Drive Configurations**.

  Figure 1-42 4 x 3.5" drive pass-through backplane

No.	Connector	The managed drive slots
1	Backplane indicator signal cable connector (SGPIO/J6)	-
2	SAS3 signal connector (PORT3/J5)	Slot 3
3	SAS2 signal connector (PORT2/J4)	Slot 2
4	SAS1 signal connector (PORT1/J3)	Slot 1
5	SAS0 signal connector (PORT0/J2)	Slot 0
6	Backplane signal cable connector (HDD_BP/J1)	-
7	Backplane power connector (HDD POWER/J24)	-

- 8 x 2.5" drive pass-through backplane

Configure this backplane in 8 x 2.5" drive pass-through configuration 1, 8 x 2.5" drive pass-through configuration 2, and 8 x 2.5" drive pass-through configuration 3 in **1.5.1 Drive Configurations**.

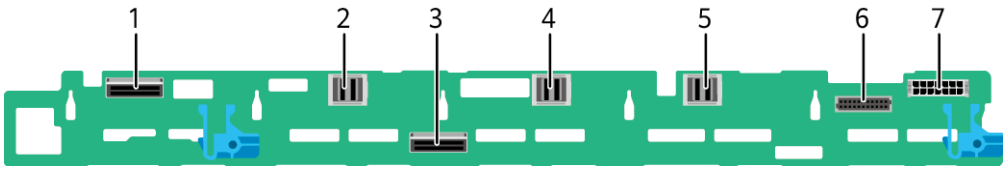
Figure 1-43 8 x 2.5" drive pass-through backplane

No.	Connector	The managed drive slots
1	Built-in DVD drive connector (DVD_POWER/J11)	-
2	Mini-SAS HD connector (PORT B/J29)	Slot 4-Slot 7
3	Backplane power connector (HDD POWER/J24)	-
4	Mini-SAS HD connector (PORT A/J28)	Slot 0-Slot 3
5	Backplane signal cable connector (HDD_BP/J1)	-

- 10 x 2.5" drive pass-through backplane

  Configure this backplane in 10 x 2.5" drive pass-through configuration 1, 10 x 2.5" drive pass-through configuration 2, 10 x 2.5" drive pass-through configuration 3, 10 x 2.5" drive pass-through configuration 4, and 10 x 2.5" drive pass-through configuration 5 in **1.5.1 Drive Configurations**.

Figure 1-44 10 x 2.5" drive pass-through backplane



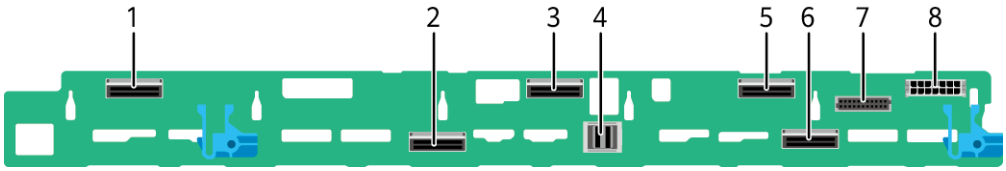
No.	Connector	The managed drive slots
1	LP slimline 2 connector (SLIM A/SLIM2/J12)	Slot 8-Slot 9

No.	Connector	The managed drive slots
2	Mini-SAS HD connector (PORT C/J15)	Slot 8-Slot 9
3	LP slimline 1 connector (SLIM B/SLIM1/J11)	Slot 6-Slot 7
4	Mini-SAS HD connector (PORT B/J14)	Slot 4-Slot 7
5	Mini-SAS HD connector (PORT A/J13)	Slot 0-Slot 3
6	Backplane signal cable connector (HDD BP/J1)	-
7	Backplane power connector (HDD POWER/J24)	-

- 10 x 2.5" drive NVMe backplane

  Configure this backplane in 10 x 2.5" NVMe drive configuration 1, 10 x 2.5" NVMe drive configuration 2, and 10 x 2.5" NVMe drive configuration 3 in **1.5.1 Drive Configurations**.

  Figure 1-45 10 x 2.5" drive NVMe backplane

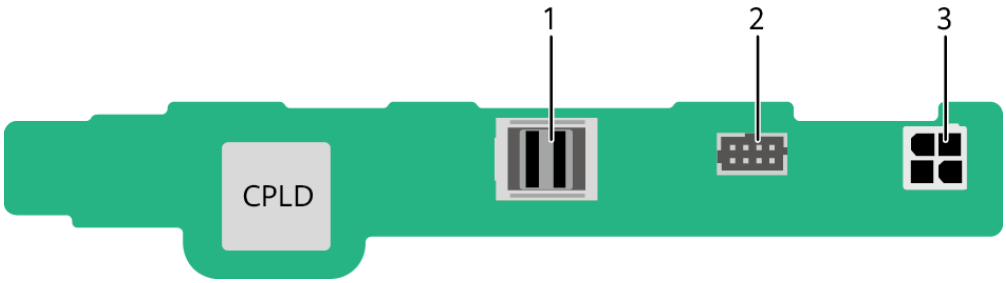
No.	Connector	The managed drive slots
1	LP slimline 2 connector (SLIM A/ SLIM_2/ SLIM_5/J3)	Slot 8-Slot 9
2	LP slimline 1 connector (SLIM B/ SLIM_1/ PORT_2B/J2)	Slot 6-Slot 7
3	LP slimline 4 connector (SLIM C/ SLIM_4/ PORT_2A/J5)	Slot 4-Slot 5
4	Mini-SAS HD connector (PORT A/J6)	Slot 0-Slot 3

No.	Connector	The managed drive slots
5	LP slimline 3 connector (SLIM D/ SLIM_3/ PORT_1B/J4)	Slot 2-Slot 3
6	LP slimline 5 connector (SLIM E/ SLIM_5/ PORT_1A/J17)	Slot 0-Slot 1
7	Backplane low-speed signal connector (HDD BP/J1)	-
8	Backplane power connector (HDD POWER/J30)	-

Rear-drive backplane

- 2 x 2.5" drive backplane

Figure 1-46 2 x 2.5" drive backplane



No.	Connector	The managed drive slots
1	Mini-SAS HD connector (PORT/J3)	Slot 12-Slot 13
2	Low-speed signal connector (HDD_BP/J1)	-
3	Power connector (HDD_POWER/J2)	-

2 Product Specifications

2.1 Technical Specifications

Table 2-1 Technical specifications

Component	Specifications
Form factor	1U rack server
Chipset	Intel® C621A
Processor	Supports one or two processors. ● Third-generation Intel® Xeon® Scalable Ice Lake processors ● Built-in memory controller and eight memory channels per processor ● Built-in PCIe controller, supporting PCIe 4.0 and 64 lanes per processor ● Three UPI buses between processors, providing up to 11.2 GT/s transmission per channel ● Up to 40 cores ● Max. 3.6 GHz ● Min. 1.5 MB L3 cache per core ● Max. 270 W TDP **NOTE** The preceding information is for reference only. For details, see "Search Parts" in the compatibility list on the technical support website.

Component	Specifications
DIMM	Supports 32 memory module slots. ● Up to 32 DDR4 memory modules – RDIMM and LRDIMM support – Max. 3200 MT/s memory speed – The DDR4 memory modules of different types (RDIMM and LRDIMM) and specifications (capacity, bit width, rank, and height) cannot be used together. – A server must use DDR4 memory modules of the same P/N code. ● Up to 16 PMem modules – The PMem modules must be used with the DDR4 memory modules, and only one PMem module can be installed in each memory channel. – The PMem modules support the AD or MM mode. – Max. 3200 MT/s memory speed – The PMem modules of different specifications (capacity and rank) cannot be used together. – For details about the PMem modules, see *PMem 200-Barlow pass User Guide*. **NOTE** The preceding information is for reference only. For details, see "Search Parts" in the compatibility list on the technical support website.

Component	Specifications
Storage	Supports a variety of drive configurations. For details, see **1.5.1 Drive Configurations**. ● Supports two M.2 SSDs. – M.2 SSDs are supported for RAID 0/1 and hot swap without opening the chassis cover is supported when the server is configured with an Avago SAS3004iMR RAID controller card. **NOTE** ● The M.2 SSD is used only as a boot device for installing the OS. Small-capacity (32 GB or 64 GB) M.2 SSDs do not support logging due to poor endurance. If a small-capacity M.2 SSD is used as the boot device, a dedicated log drive or log server is required for logging. For example, you can dump VMware logs in either of the following ways: ● Redirect **/scratch**. For details, see **https://kb.vmware.com/s/article/1033696**. ● Configure syslog. For details, see **https://kb.vmware.com/s/article/2003322**. ● The M.2 SSD cannot be used to store data due to poor endurance. In write-intensive applications, the M.2 SSD will wear out in a short time. If you want to use SSDs or HDDs as data storage devices, use enterprise-level SSDs or HDDs with high DWPD. ● The M.2 SSD is not recommended for write-intensive service software due to poor endurance. ● Do not use M.2 SSDs for cache. ● Supports hot swap of SAS/SATA/NVMe U.2 drives. **NOTE** The NVMe drives support: ● Before using the VMD function, contact technical support engineers of the OS vendor to check whether the OS supports the VMD function. If yes, check whether the VMD driver needs to be manually installed and check the installation method. ● Surprise hot swap if the VMD function is enabled and the latest Intel VMD driver is installed. ● Orderly hot swap if the VMD function is disabled. ● Supports a variety of RAID controller cards. For details, see "Search Parts" in the compatibility list on the technical support website. – The RAID controller card supports RAID configuration, RAID level migration, and drive roaming. – The RAID controller card supports a supercapacitor for power-off protection to ensure user data security.

Component	Specifications
	– The PCIe RAID controller card occupies one PCIe slot. For details about the RAID controller card, see server *RAID Controller Card User Guide*. **NOTE** If the BIOS is in legacy mode, the 4K drive cannot be used as the boot drive.
Network	Supports expansion capability of multiple types of networks. ● OCP 3.0 network adapter – The two FlexIO card slots support two OCP 3.0 network adapter respectively, which can be configured as required. – Supports orderly hot swap. **NOTE** The OCP 3.0 network adapter supports orderly hot swap only when the VMD function is disabled. – Supports a variety of OCP 3.0 network adapters. For details, see "Search Parts" in the compatibility list on the technical support website
I/O expansion	Supports 6 PCIe slots. ● One PCIe slot dedicated for a screw-in RAID controller card, two FlexIO slots dedicated for OCP 3.0 network adapters, and three PCIe slots for standard PCIe cards. For details, see **1.7.2 PCIe Slots** and **1.7.3 PCIe Slot Description**. ● Support GPU cards. **NOTE** The preceding information is for reference only. For details, see "Search Parts" in the compatibility list on the technical support website.

Component	Specifications
Port	Supports a variety of ports. ● Ports on the front panel: – One USB Type-C iBMC direct connect management port – Two USB 3.0 ports – One DB15 VGA port **NOTE** The front panel of a server with 10 x 2.5" drives provides only one USB Type-C iBMC direct connect management port and one USB 3.0 port. ● Ports on the rear panel: – Two USB 3.0 ports – One DB15 VGA port – One RJ45 serial port – One RJ45 management network port ● Built-in ports: – Two SATA ports **NOTE** You are not advised to install the operating system on the USB storage media.
Video card	An SM750 video chip with 32 MB display memory is integrated on the mainboard. The maximum display resolution is 1920 x 1200 at 60 Hz with 16 M colors. **NOTE** ● The integrated video card can provide the maximum display resolution (1920 x 1200) only after the video card driver matching the operating system version is installed. Otherwise, only the default resolution supported by the operating system is provided. ● If both the front and rear VGA ports are connected to monitors, only the monitor connected to the front VGA port displays information.
System management	● UEFI ● iBMC ● NC-SI ● Integration with third-party management systems
Security feature	● Power-on password ● Administrator password ● TCM (only in China)/TPM ● Secure boot ● Front bezel (optional) ● Chassis cover opening detection

2.2 Environmental Specifications

Table 2-2 Environmental specifications

Category	Specifications
Temperature	• Operating temperature: 5°C to 45°C (41°F to 113°F) (ASHRAE Classes A1 to A4 compliant) • Storage temperature (within three months): –30°C to +60°C (–22°F to 140°F) • Storage temperature (within six months): –15°C to +45°C (5°F to 113°F) • Storage temperature (within one year): –10°C to +35°C (14°F to 95°F) • Maximum rate of temperature change: 20°C (36°F) per hour, 5°C (9°F) per 15 minutes **NOTE** The highest operating temperature varies depending on the server configuration. For details, see **A.3 Operating Temperature Limitations**.
Relative humidity (RH, non-condensing)	• Operating humidity: 8% to 90% • Storage humidity (within three months): 8% to 85% • Storage humidity (within six months): 8% to 80% • Storage humidity (within one year): 20% to 75% • Maximum humidity change rate: 20%/h
Air volume	≥ 96 cubic feet per minute (CFM)
Operating altitude	≤ 3050 m (10006.56 ft) • When the server configuration complies with ASHRAE Classes A1 and A2 and the altitude is above 900 m (2952.76 ft), the highest operating temperature decreases by 1°C (1.8°F) for every increase of 300 m (984.24 ft). • When the server configuration complies with ASHRAE Class A3 and the altitude is above 900 m (2952.76 ft), the highest operating temperature decreases by 1°C (1.8°F) for every increase of 175 m (574.14 ft). • When the server configuration complies with ASHRAE Class A4 and the altitude is above 900 m (2952.76 ft), the highest operating temperature decreases by 1°C (1.8°F) for every increase of 125 m (410.1 ft). • HDDs cannot be used at an altitude of over 3050 m (10006.44 ft).

Category	Specifications
Corrosive gaseous contaminant	Maximum corrosion product thickness growth rate: ● Copper corrosion rate test: 300 Å/month (meeting level G1 requirements of the ANSI/ISA-71.04-2013 standard on gaseous corrosion) ● Silver corrosion rate test: 200 Å/month
Particle contaminant	● The equipment room environment meets the requirements of ISO 14664-1 Class 8. ● There is no explosive, conductive, magnetic, or corrosive dust in the equipment room. **NOTE** It is recommended that the particulate pollutants in the equipment room be monitored by a professional organization.
Acoustic noise	The declared A-weighted sound power levels (LWAd) and declared average bystander position A-weighted sound pressure levels (LpAm) listed are measured at 23°C (73.4°F) in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109). ● Idle: – LWAd: 6.2 Bels – LpAm: 45.3 dBA ● Operating: – LWAd: 6.97 Bels – LpAm: 52.6 dBA **NOTE** Actual sound levels generated during server operation vary depending on server configuration, load, and ambient temperature.

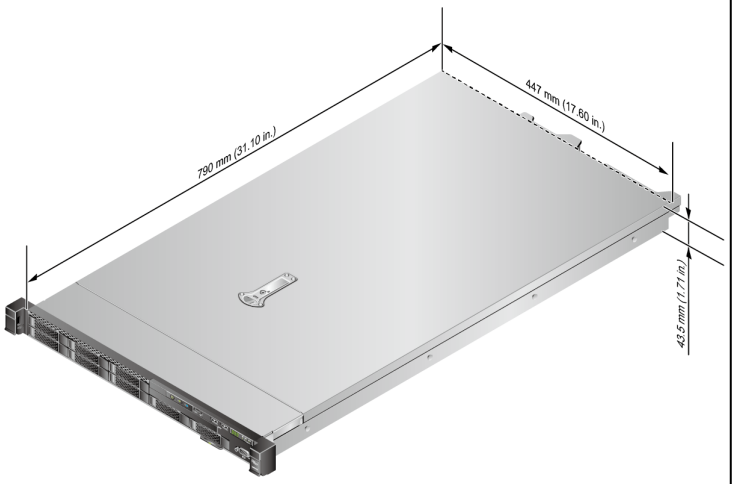
NOTE

SSDs and HDDs (including NL-SAS, SAS, and SATA) cannot be preserved for a long time in the power-off state. Data may be lost or faults may occur if the preservation duration exceeds the specified maximum duration. When drives are preserved under the storage temperature and humidity specified in the preceding table, the following preservation time is recommended:

- Maximum preservation duration of SSDs:
  - 12 months in power-off state without data stored
  - 3 months in power-off state with data stored
- Maximum preservation duration of HDDs:
  - 6 months in unpacked/packed and powered-off state
- The maximum preservation duration is determined according to the preservation specifications provided by drive vendors. For details, see the manuals provided by drive vendors.

2.3 Physical Specifications

Table 2-3 Physical specifications

Item	Description
Dimensions (H x W x D)	• 3.5" drive chassis: 43.5 mm x 447 mm x 790 mm (1.71 in. x 17.60 in. x 31.10 in.) • 2.5" drive chassis: 43.5 mm x 447 mm x 790 mm (1.71 in. x 17.60 in. x 31.10 in.) **Figure 2-1** Physical dimensions (example: 2.5" drive chassis)  **NOTE** • See **Figure 2-1** for methods in measuring physical dimensions of the chassis. • Methods measuring 3.5" and 2.5" drive chassis are the same. The 2.5" drive chassis is used as an example.

Item	Description
Installation dimension requirements	● Requirements for cabinet installation: 19-inch standard cabinet compliant with the International Electrotechnical Commission (IEC) 297 standard – Cabinet width: 482.6 mm (19.00 in.) – Cabinet depth ≥ 1000 mm (39.37 in.) ● Requirements for guide rail installation: – L-shaped guide rails: apply only to xFusion cabinets. – Adjustable L-shaped guide rail: apply to cabinets with a distance of 610 mm to 950 mm (24.02 in. to 37.40 in.) between the front and rear mounting bars. – Ball bearing rail kit: applies to cabinets with a distance of 609 mm to 950 mm (23.98 in. to 37.40 in.) between the front and rear mounting bars.
Fully equipped weight	● Net weight – Maximum weight for server with 4 x 3.5" drives: 20.5 kg (45.19 lb) – Maximum weight for server with 8 x 2.5" drives: 18.0 kg (39.68 lb) – Maximum weight for server with 10 x 2.5" drives: 18.5 kg (40.79 lb) ● Packaging materials: 5 kg (11.03 lb)
Energy consumption	The power consumption parameters vary with hardware configurations (including the configurations complying with EU ErP). For details, see Power Calculator on the technical support website.

3 Software and Hardware Compatibility

See the compatibility list on the technical support website to obtain information about the operating systems and hardware supported.

NOTICE

- If incompatible components are used, the device may be abnormal. This fault is beyond the scope of technical support and warranty.
- The performance of servers is closely related to application software, basic middleware software, and hardware. The slight differences of the application software, middleware basic software, and hardware may cause performance inconsistency between the application layer and test software layer.
  - If the customer has requirements on the performance of specific application software, contact technical support to apply for POC tests in the pre-sales phase to determine detailed software and hardware configurations.
  - If the customer has requirements on hardware performance consistency, specify the specific configuration requirements (for example, specific drive models, RAID controller cards, or firmware versions) in the pre-sales phase.

4 Safety Instructions

4.1 Security

General Statement

- Comply with local laws and regulations when installing devices. These Safety Instructions are only a supplement.
- The "DANGER", "WARNING", and "CAUTION" information in this document does not represent all the safety instructions, but supplements to the safety instructions.
- Observe all safety instructions provided on the device labels when installing hardware. Follow them in conjunction with these Safety Instructions.
- Only qualified personnel are allowed to perform special tasks, such as performing high-voltage operations and driving a forklift.

⚠ WARNING

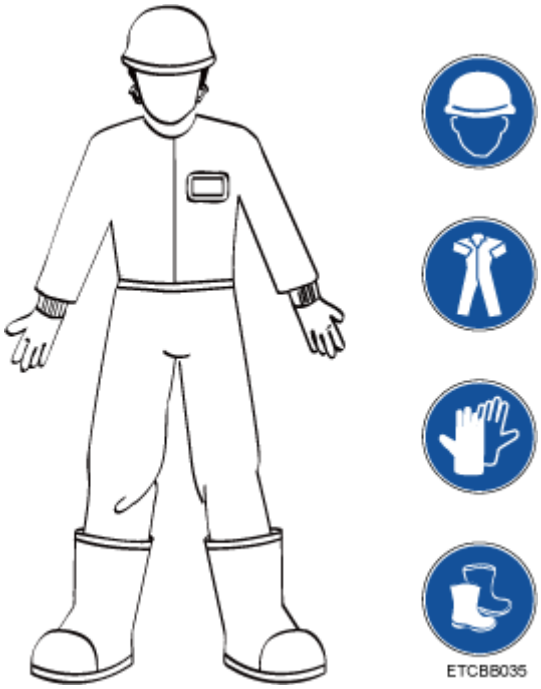
If this device works in a residential environment, the wireless interference may be generated.

Personal Safety

- This equipment is not suitable for use in places where children may be present.
- Only personnel certified or authorized are allowed to install equipment.
- Discontinue any dangerous operations and take protective measures. Report anything that could cause personal injury or device damage to a project supervisor.
- Do not move devices or install racks and power cables in hazardous weather conditions.

- Do not carry the weight that is over the maximum load per person allowed by local laws or regulations. Before moving or installing equipment, check the maximum equipment weight and arrange required personnel.
- Wear clean protective gloves, ESD clothing, a protective hat, and protective shoes, as shown in **Figure 4-1**.

Figure 4-1 Safety work wear



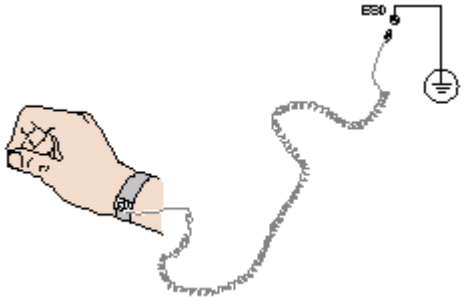
- Before touching a device, wear ESD clothing and gloves (or wrist strap), and remove any conductive objects (such as watches and jewelry). **Figure 4-2** shows conductive objects that must be removed before you touch a device.

Figure 4-2 Removing conductive objects

Figure 4-3 shows how to wear an ESD wrist strap.

a. Put your hands into the ESD wrist strap.
b. Tighten the strap buckle and ensure that the ESD wrist strap is in contact with your skin.
c. Insert the ground terminal attached to the ESD wrist strap into the jack on the grounded rack or chassis.

Figure 4-3 Wearing an ESD wrist strap



- Exercise caution when using tools.
- If the installation position of a device is higher than the shoulders of the installation personnel, use a vehicle such as a lift to facilitate installation. Prevent the device from falling down and causing personal injury or damage to the device.
- The equipment is powered by high-voltage power sources. Direct or indirect contact (especially through damp objects) with high-voltage power sources may result in serious injury or death.
- Ground the equipment before powering it on. Otherwise, personal injury may be caused by high electricity leakage.
- When a ladder is used, ensure that another person holds the ladder steady to prevent accidents.
- Do not look into optical ports without eye protection.

Device Security

- Use the recommended power cables at all times.
- Use power cables only for dedicated servers. Do not use them for other devices.
- Before operating equipment, wear ESD clothes and gloves to prevent electrostatic-sensitive devices from being damaged by ESD.
- When moving a device, hold the bottom of the device. Do not hold the handles of the installed modules, such as the PSUs, fan modules, drives, and the mainboard. Handle the equipment with care.
- Exercise caution when using tools.
- Connect the primary and secondary power cables to different power distribution units (PDUs) to ensure reliable system operation.
- Ground a device before powering it on. Otherwise, high leakage current may cause device damage.

Transportation Precautions

Improper transportation may damage equipment. Contact the manufacturer for precautions before attempting transportation.

Transportation precautions include but are not limited to:

- The logistics company engaged to transport the device must be reliable and comply with international standards for transporting electronics. Ensure that the equipment being transported is always kept upright. Take necessary precautions to prevent collisions, corrosion, package damage, damp conditions and pollution.

- Transport each device in its original packaging.
- If the original packaging is unavailable, package heavy, bulky parts (such as chassis and blades) and fragile parts (such as PCIe cards and optical modules) separately.

  NOTE

  For details about the components supported by the server, see "Search Parts" in the compatibility list on the technical support website
- Power off all devices before transportation.

Maximum Weight Carried by a Person

CAUTION

Comply with local regulations for the maximum load per person.

Table 4-1 lists the maximum weight one person is permitted to carry as stipulated by a number of organizations.

Table 4-1 Maximum weight carried per person

Organization	Weight (kg/lb)
European Committee for Standardization (CEN)	25/55.13
International Organization for Standardization (ISO)	25/55.13
National Institute for Occupational Safety and Health (NIOSH)	23/50.72
Health and Safety Executive (HSE)	25/55.13

For more information about safety instructions, see server *Safety Information*.

4.2 Maintenance and Warranty

For details about the maintenance policy, visit the **technical support website** > **service support** > **Customer Support Service**.

For details about the warranty policy, visit the **technical support website** > **service support** > **warranty**.

5 ESD

5.1 ESD Prevention

The static electricity released by the human body or conductors may damage the mainboard or other electrostatic-sensitive devices. The damage caused by static electricity will shorten the service time of the devices.

To prevent electrostatic damage, observe the following:

- Use the ESD floor (or ESD mat) and ESD chairs in the equipment room. Use ESD materials for partition boards, screens, and curtains in the equipment room.
- All floor-standing electric devices, metal frames, and metal rack shells in the equipment room must be directly grounded. All electric meters or tools on a workbench must be connected to the common ground point of the workbench.
- Monitor the temperature and humidity in the equipment room. The heating system may reduce the humidity and increases static electricity indoors.
- Place the product in an ESD bag to avoid direct contact during transportation and storage.
- Before transporting electrostatic-sensitive components to a work area that is not affected by static electricity, store them in their original packages.
- Place the component on a grounded surface and then take it out of the package.
- Before installing or removing a server component, wear an ESD wrist strap that is properly grounded.
- During parts replacement, keep new components in ESD bags before installation, and place removed components on conductive mats for temporary storage.
- Do not touch pins, wires, or circuits.

5.2 Grounding Methods for ESD Prevention

Use one or more of the following grounding methods when handling or installing electrostatic-sensitive devices:

- Use an ESD wrist strap that connects to a grounded work area or computer chassis through a ground cable. The wrist strap must be scalable, and the resistance of the ground cable must be at least 1 megohm (±10%). Wear the wrist strap tightly against your skin.
- Use a heel-grounded, toe-grounded, or shoe-grounded ESD strap when working in a standing position. When standing on a conductive floor or electrostatic dissipative floor mat, tie a strap on your feet.
- Use conductive maintenance tools.
- Use a folding tool mat that dissipates static electricity and a portable field service kit.

6 Installation and Configuration

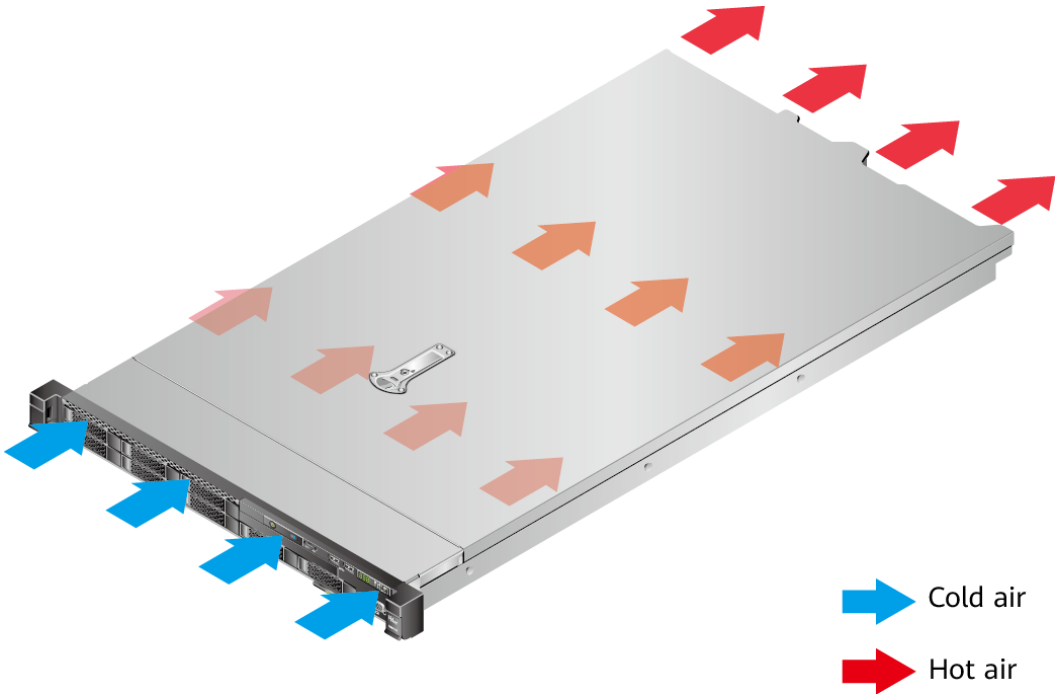
6.1 Installation Environment Requirements

6.1.1 Space and Airflow Requirements

To allow for servicing and adequate airflow, observe the following space and airflow requirements:

- Install the server in an access-restricted area.
- Keep the area in which the server is located clean and tidy.
- To facilitate heat dissipation and device maintenance, leave a clearance of 1000 mm in front of the cabinet and a clearance of 800 mm at the rear of the cabinet.
- Do not block the air intake vents. Otherwise, air intake and heat dissipation will be affected.
- The air conditioning system in the equipment room provides enough wind to ensure proper heat dissipation of all components.

Figure 6-1 Direction of heat dissipation



6.1.2 Temperature and Humidity Requirements

To ensure continued safe and reliable device operation, install or position the device in a well-ventilated, climate-controlled environment.

- Use temperature control devices all year long in any climates.
- Use humidifiers and dehumidifiers in dry or humid areas to maintain ambient humidity within range.

Table 6-1 Temperature and humidity requirements in the equipment room

Item	Description
Temperature	5ºC to 35ºC (41ºF to 95ºF)
Humidity (non-condensing)	8% RH to 90% RH

6.1.3 Cabinet Requirements

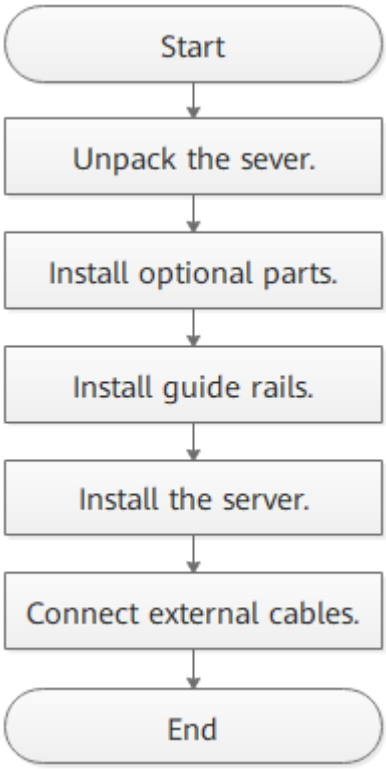
- Use a 19-inch standard cabinet that is equal to or more than 1000 mm (39.37 in.) deep and complies with the International Electrotechnical Commission 297 (IEC 297) standard.
- Install air filters on cabinet doors.

6.2 Hardware Installation

6.2.1 Installation Overview

Installation process

Figure 6-2 Installation process



Precautions

- Properly ground the server before installation to avoid damage to electronic components from electrostatic discharge. Improper grounding may cause ESD.

  For details about how to prevent electrostatic discharge, see **5 ESD**.
- Before installing multiple components, read the installation instructions for all the components and identify similar actions to simplify the installation process.

  For details about component compatibility, see "Search Parts" in the **Compatibility List**.

CAUTION

Wait until overheating devices have cooled down before touching them to avoid injury.

6.2.2 Unpacking the Server

Procedure

Step 1 Check whether the packing case and seals are in good conditions.

NOTE

If the packing case is soaked or deformed, or the seals or pressure-sensitive adhesive tapes are not intact, contact technical support to obtain the *Cargo Problem Feedback Form*.

Step 2 Use a box cutter to open the packing case.

CAUTION

Exercise caution with the box cutter to avoid injury to your hands or damage to devices.

Step 3 Unpack the packing case.

Step 4 Ensure that the components are complete and in good condition without defects such as oxidation, chemical corrosion, missing components, or other damage incurred during transport.

Table 6-2 Packing list

No.	Description
1	(Optional) Documentation bag containing a warranty card and quick start guide
2	(Optional) Server guide rails
3	One rack server

----End

6.2.3 Installing Optional Parts

Before installing and configuring a server, you need to install all optional parts required, such as purchased CPUs, drives, and PCIe cards.

Procedure

Step 1 Install the optional parts for the 1288H V6.

For details, see the **FusionServer 1288H V6 Server Maintenance and Service Guide**.

----End

6.2.4 Installing Server Guide Rails

6.2.4.1 Installing L-Shaped Guide Rails

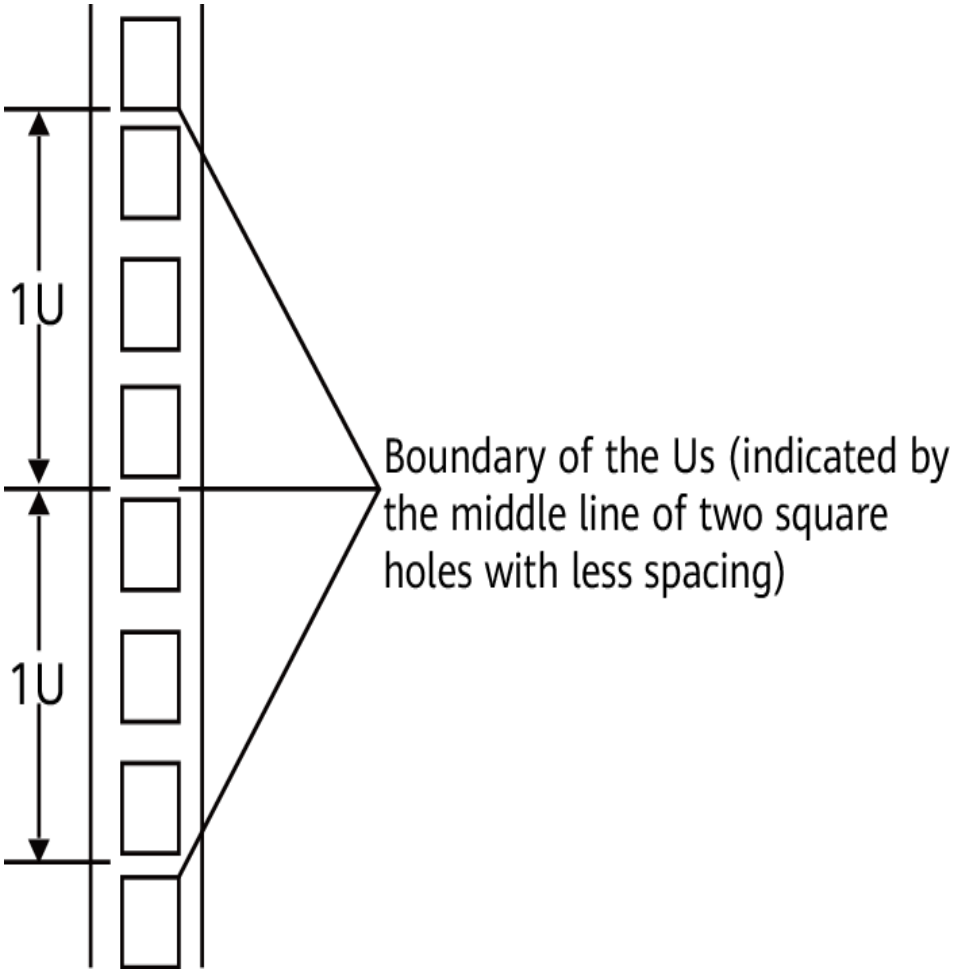
L-shaped guide rails apply only to our company's cabinets only.

Procedure

Step 1 Install floating nuts.

1. Determine the installation positions of the floating nuts according to the cabinet device installation plan.

   Figure 6-3 Spacing of 1U on a mounting bar of a cabinet

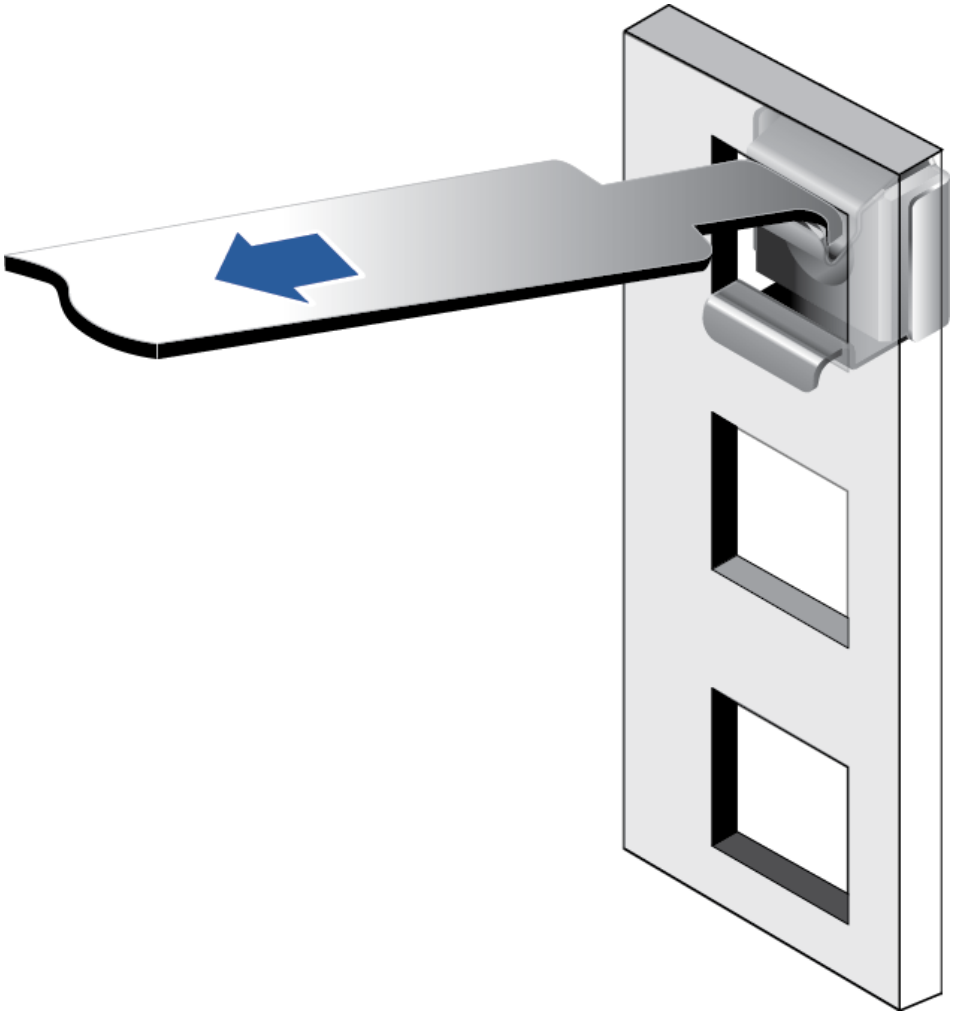


   NOTE

   – Floating nuts are used to tighten screws.
   – The boundary between Us is used as the reference for calculating device installation space.

2. Fasten the lower end of a floating nut to the target square hole in a mounting bar at the front of the cabinet.
3. Use a floating nut hook to pull the upper end of the floating nut, and fasten it to the upper edge of the square hole.

Figure 6-4 Installing a floating nut

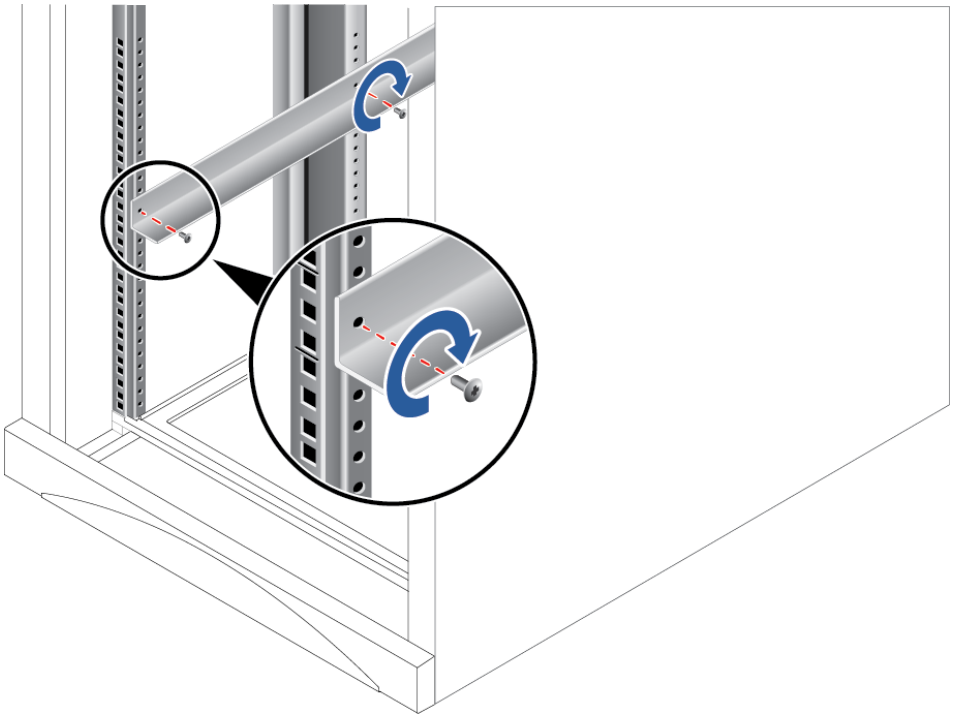


4. Install the other floating nut in the same way.

Step 2 Install the L-shaped guide rails.

1. Position a guide rail horizontally in contact with the mounting bars in the cabinet.
2. Tighten the screws to secure the guide rail.

Figure 6-5 Installing an L-shaped guide rail



3. Install the other guide rail in the same way.

----End

6.2.4.2 Installing the Static Rail Kit

This section applies to the adjustable L-shaped guide rail whose P/N code is 21244082.

The adjustable L-shaped guide rail apply to cabinets with a distance of 610 mm to 950 mm (24.02 in. to 37.40 in.) between the front and rear mounting bars.

Procedure

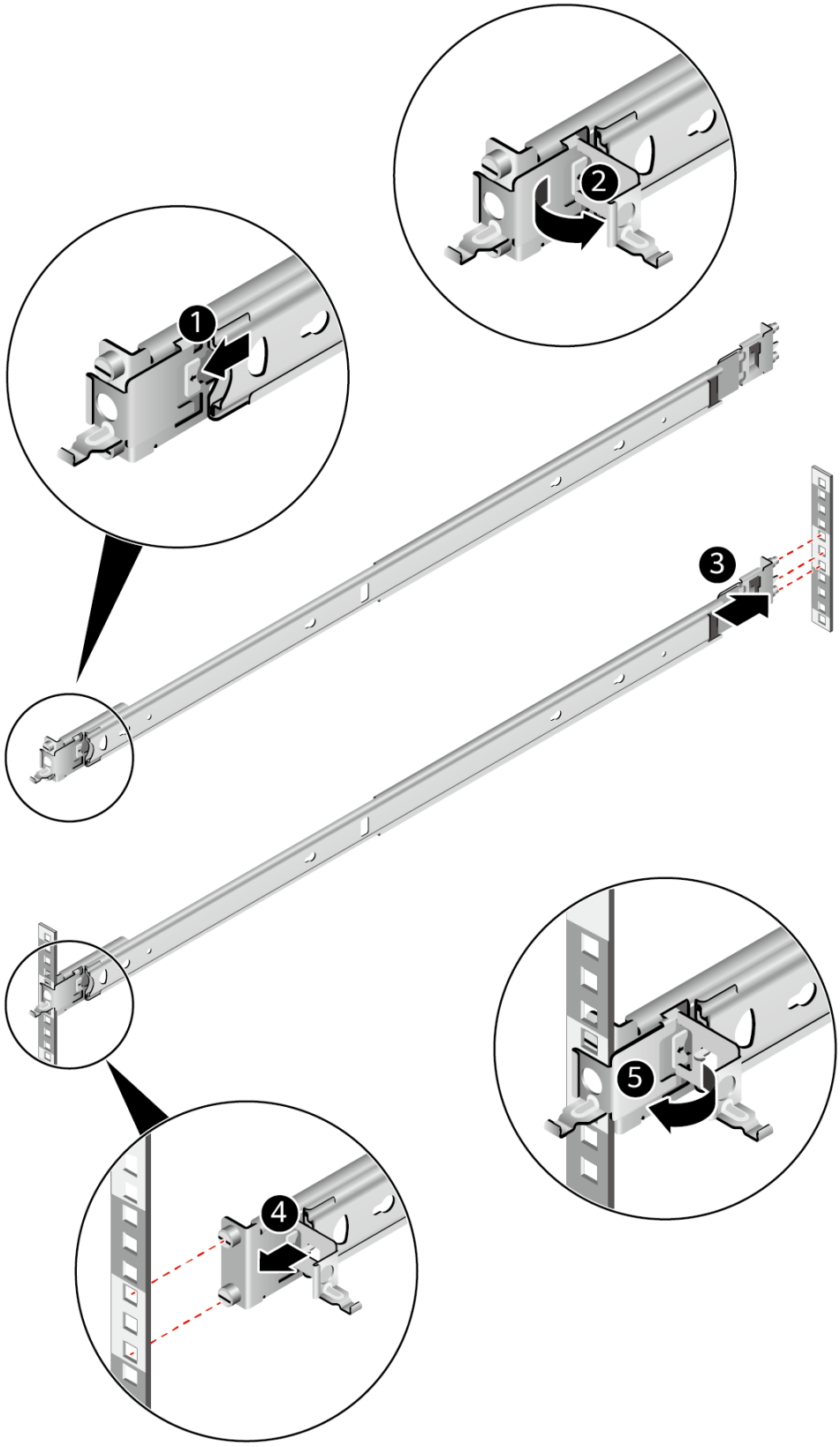
Step 1 Push the release latch on the front of the rail and pull out the hook. See (1) and (2) in **Figure 6-6**.

Step 2 Insert the positioning pin at the rear of the rail into the hole on the rear column of the cabinet. See (3) in **Figure 6-6**.

Step 3 Keep the rail horizontal, and push the front end of the rail until it is inserted into the hole on the front column of the cabinet. See (4) in **Figure 6-6**.

Step 4 Hook the rail. See (5) in **Figure 6-6**.

Figure 6-6 Installing a friction guide rail



Step 5 Install the other guide rail in the same way.

----End

6.2.4.3 Installing the Ball Bearing Rail Kit

This section applies to the ball bearing rail kit whose P/N code is 21243789.

The ball bearing rail kit applies to cabinets with a distance of 609 mm to 950 mm (23.98 in. to 37.40 in.) between the front and rear mounting bars.

Procedure

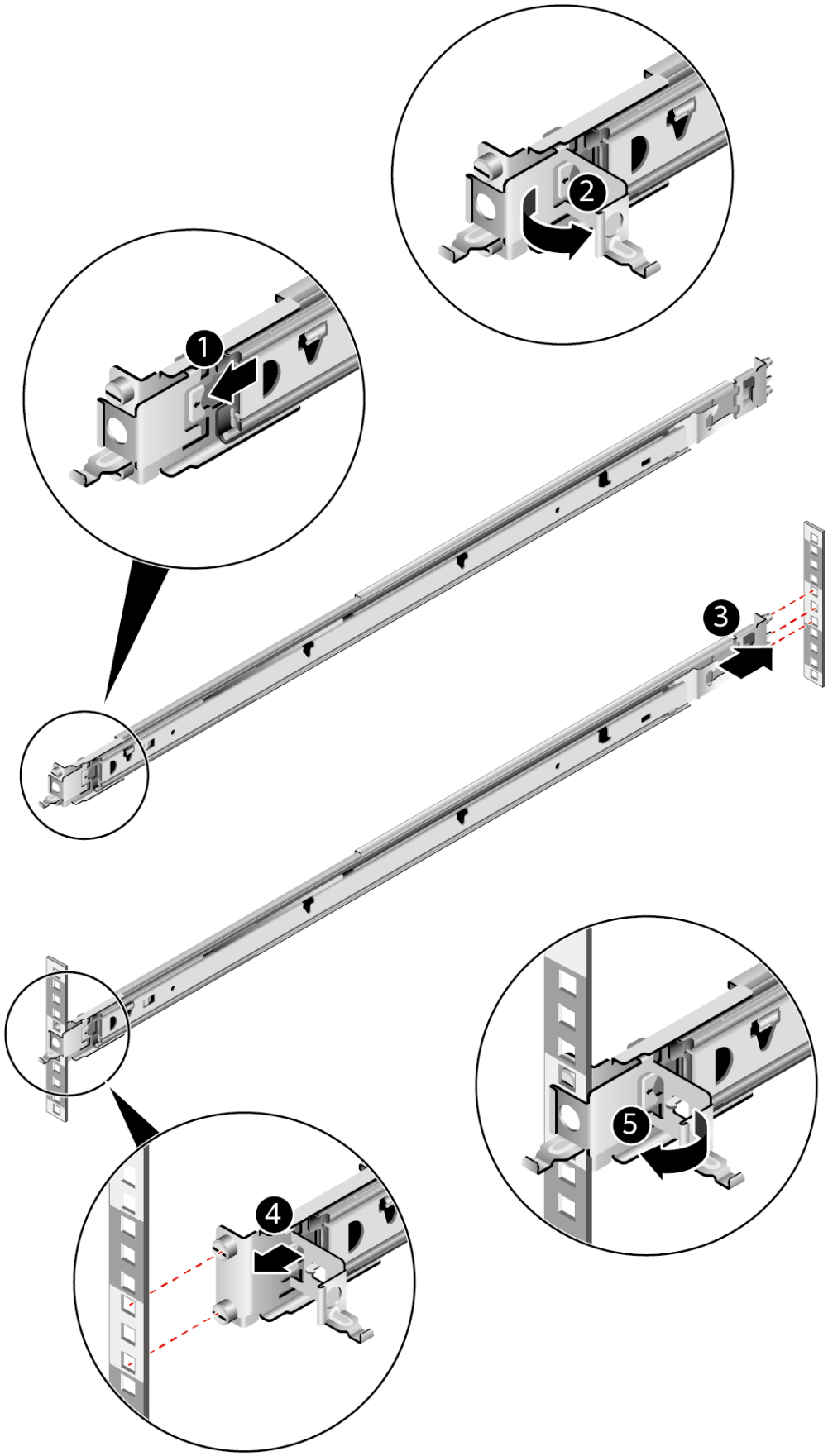
Step 1 Push the release latch on the front of the rail and pull out the hook. See (1) and (2) in **Figure 6-7**.

Step 2 Insert the positioning pin at the rear of the rail into the hole on the rear column of the cabinet. See (3) in **Figure 6-7**.

Step 3 Keep the rail horizontal, and push the front end of the rail until it is inserted into the hole on the front column of the cabinet. See (4) in **Figure 6-7**.

Step 4 Hook the rail. See (5) in **Figure 6-7**.

Figure 6-7 Installing a ball bearing rail



Step 5 Install the other guide rail in the same way.

----End

6.2.5 Installing a Server

6.2.5.1 Installing the Server on L-Shaped Guide Rails

- Before installing the server, ensure that the L-shaped guide rails are properly installed. For details, see **6.2.4.1 Installing L-Shaped Guide Rails**.
- The servers are not stackable onto L-shaped guide rails.

Procedure

Step 1 Install the server.

CAUTION

At least two people are required to move the device. Otherwise, personal injury or device damage may occur.

1. At least two people are required to lift the server vertically from both sides and place it on the guide rails, see **Figure 6-8**. Then push it into the cabinet, see (1) in **Figure 6-9**.

   NOTE

   If you touch the drive unlock button by mistake, do not remove the drive and immediately close the drive ejector lever to install the drive in place.

2. Align both sides of the server with the mounting bars and tighten the captive screws on the panel. See (2) in the **Figure 6-9**.

Figure 6-8 Moving the server

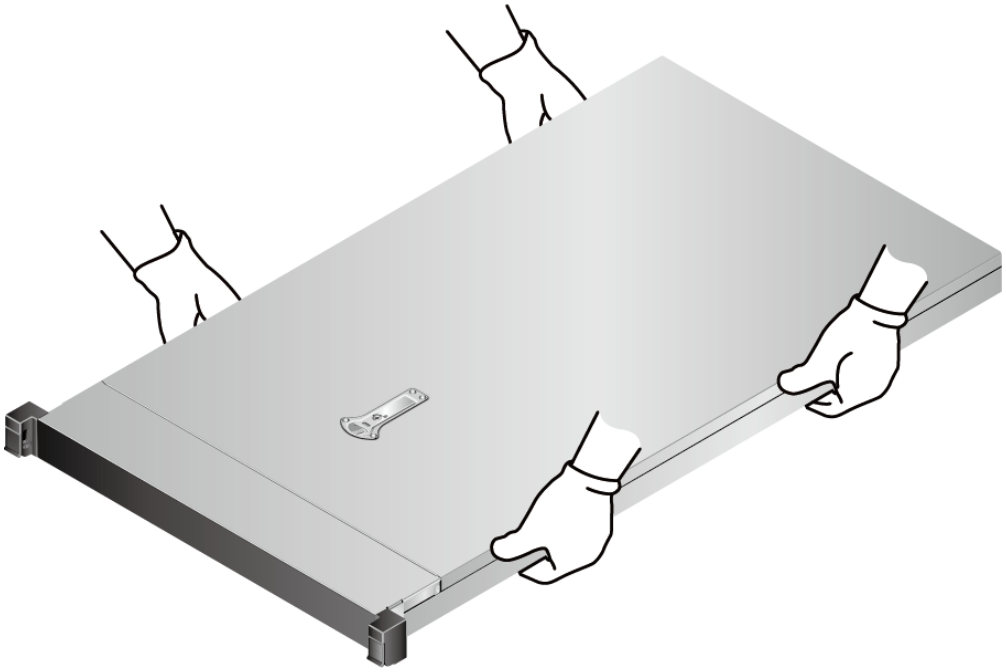
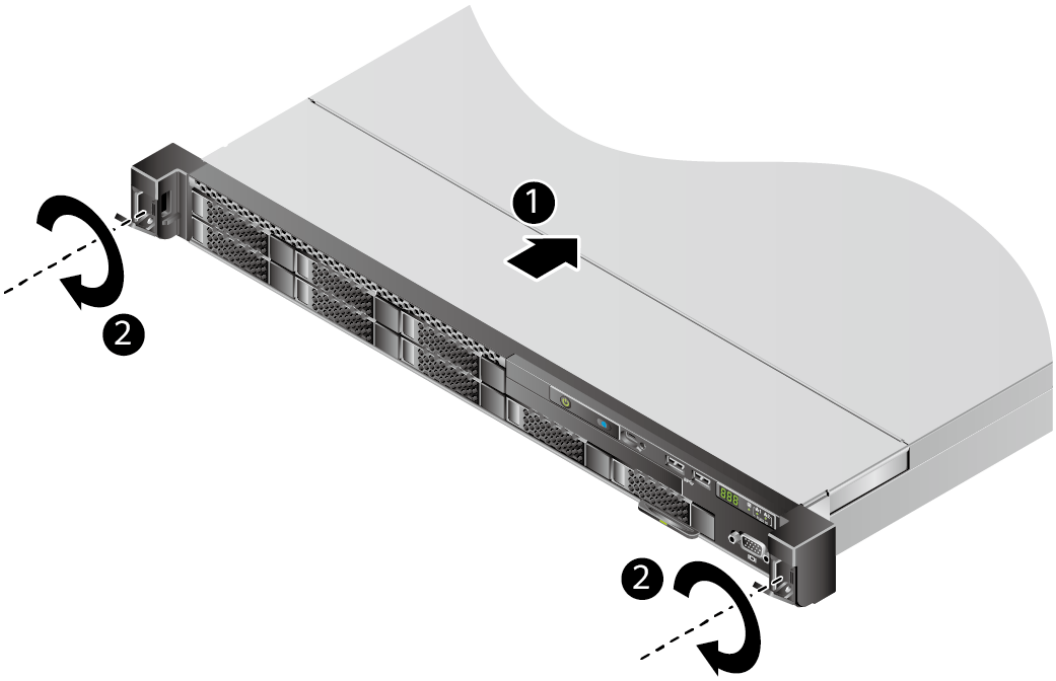


Figure 6-9 Installing a server



Step 2 Connect external cables as required, such as network cables, VGA cables, and USB devices.

Step 3 Connect the cables to the PSU.

For details, see **6.3.8 Connecting PSU Cables**.

Step 4 Power on the server.

For details, see **6.5.1 Powering On** .

Step 5 Check indicator status.

For details, see **1.1.2 Indicators and Buttons** .

----End

6.2.5.2 Installing the Server on the Static Rail Kit

- Before installing the server, ensure that the adjustable L-shaped guide rail is properly installed. For details, see **6.2.4.2 Installing the Static Rail Kit**.
- The servers are stackable onto the adjustable L-shaped guide rail.

Procedure

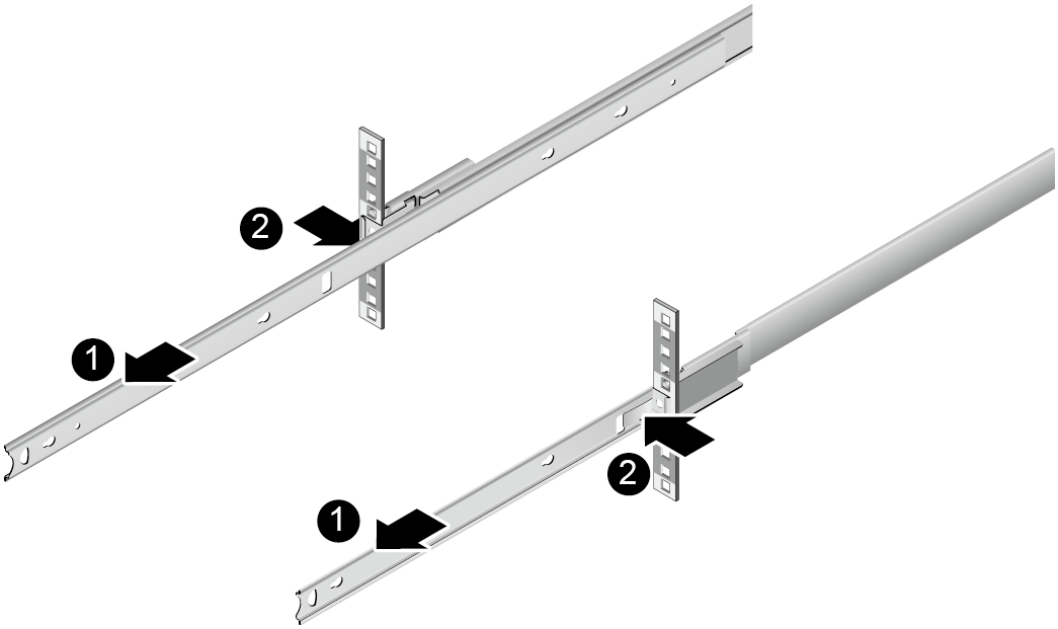
Step 1 Install the server.

CAUTION

At least two people are required to move the device. Otherwise, personal injury or device damage may occur.

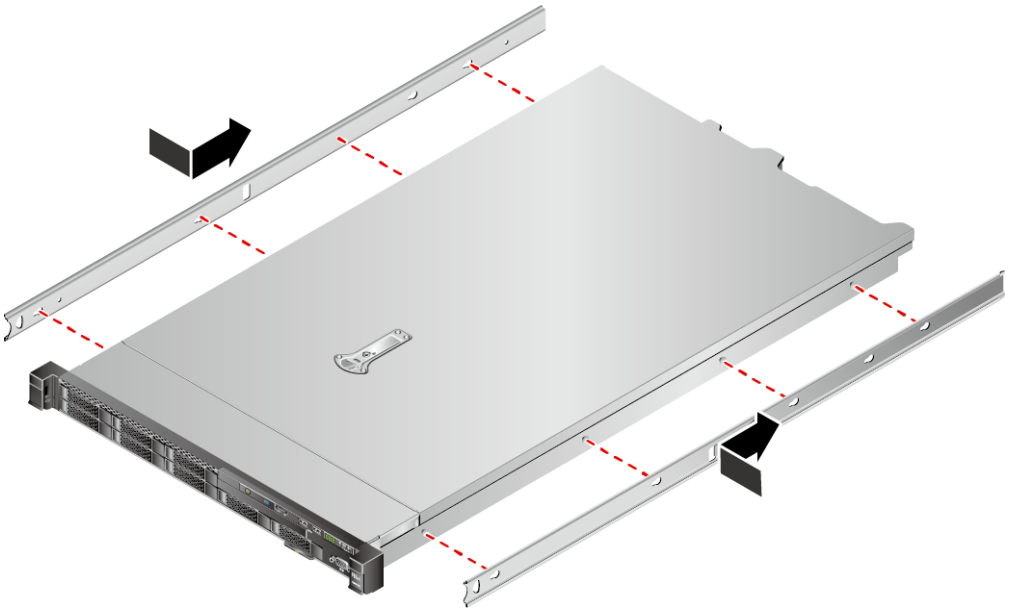
1. Pull the inner rail out of the rail until it does not move. See (1) in **Figure 6-10**.
2. Press the buckles on both sides of the inner rails and remove the inner rails See (2) in **Figure 6-10**.

Figure 6-10 Removing inner rails



3. Align the holes on the inner rails with the nail heads on both sides of the server, and install the inner rails in the arrow direction.

Figure 6-11 Installing a server on inner rails



4. At least two people are required to lift the server vertically from both sides and install it on the guide rails. See **Figure 6-12** and **Figure 6-13**.

Figure 6-12 Moving the server

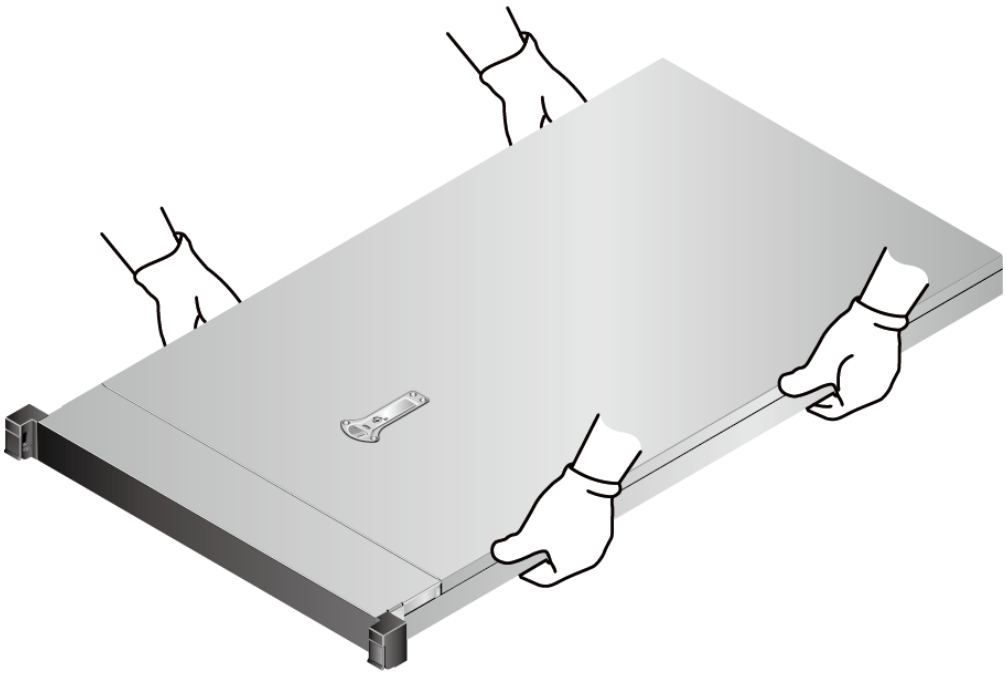
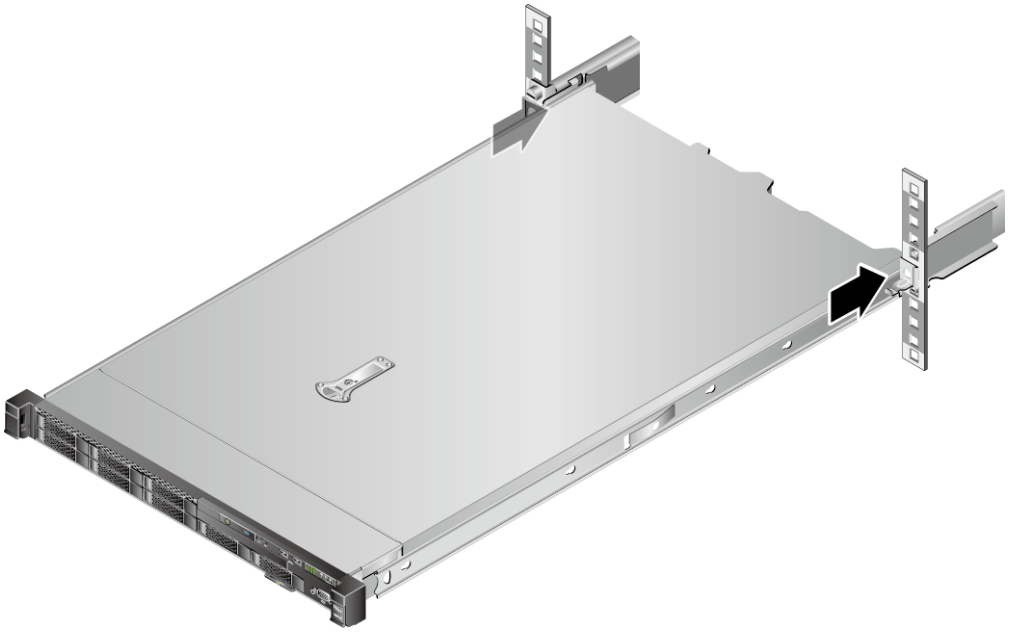


Figure 6-13 Installing a server

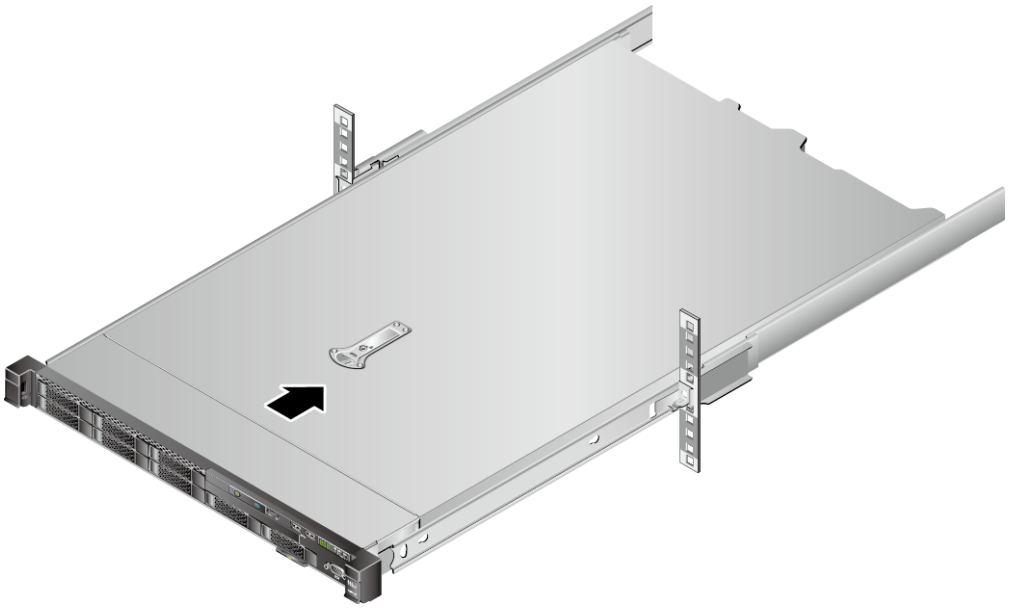


5. Push the server on the inner rails until it cannot move.

NOTE

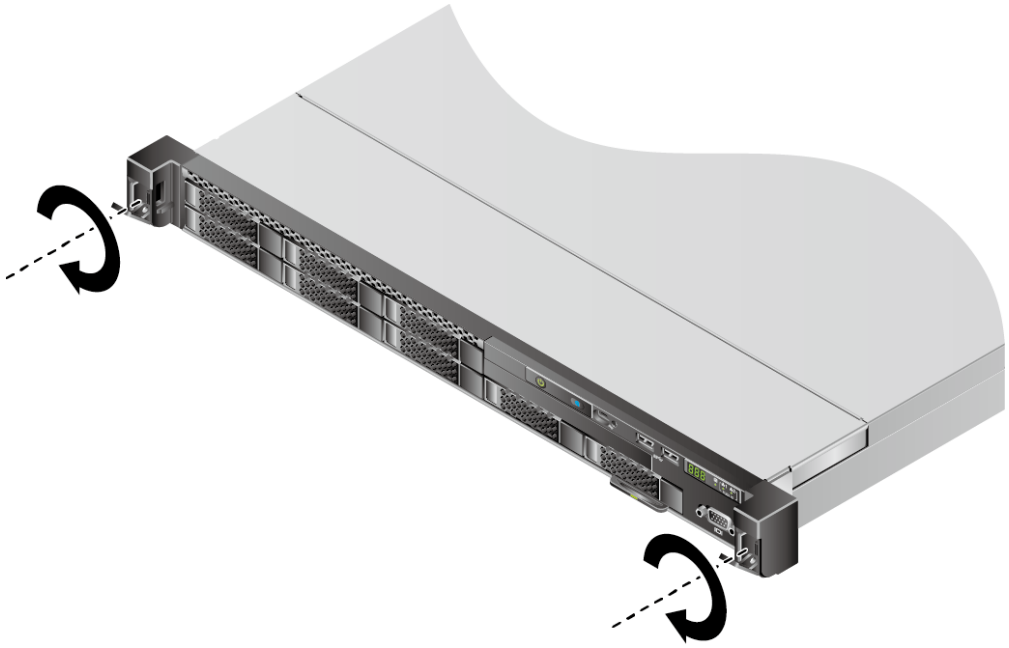
If you touch the drive unlock button by mistake, do not remove the drive and immediately close the drive ejector lever to install the drive in place.

Figure 6-14 Pushing the server into the adjustable L-shaped guide rail



6. Open the baffle plate of the captive screws on the panel and tighten the captive screws.

Figure 6-15 Securing a server



Step 2 Connect external cables as required, such as network cables, VGA cables, and USB devices.

Step 3 Connect the cables to the PSU.

For details, see **6.3.8 Connecting PSU Cables**.

Step 4 Power on the server.

For details, see **6.5.1 Powering On** .

Step 5 Check indicator status.

For details, see **1.1.2 Indicators and Buttons**

----End

6.2.5.3 Installing a Server on the Ball Bearing Rail Kit

- Before installing the server, ensure that the ball bearing rail kit is properly installed. For details, see **6.2.4.3 Installing the Ball Bearing Rail Kit**.
- The servers are stackable onto the ball bearing rail kit.

Procedure

Step 1 Install the server.

⚠ CAUTION

At least two people are required to move the device. Otherwise, personal injury or device damage may occur.

---

1. Pull out the inner rails as far as they will go.

Figure 6-16 Pulling out an inner rail

2. At least two people are required to lift the server vertically from both sides, align the two mounting screws at the rear of the server with the fixing holes on the inner rails, and place the server vertically at the rear of the server. Then push the server horizontally as far as it will go. See **Figure 6-17** and **Figure 6-18**.

Figure 6-17 Moving the server

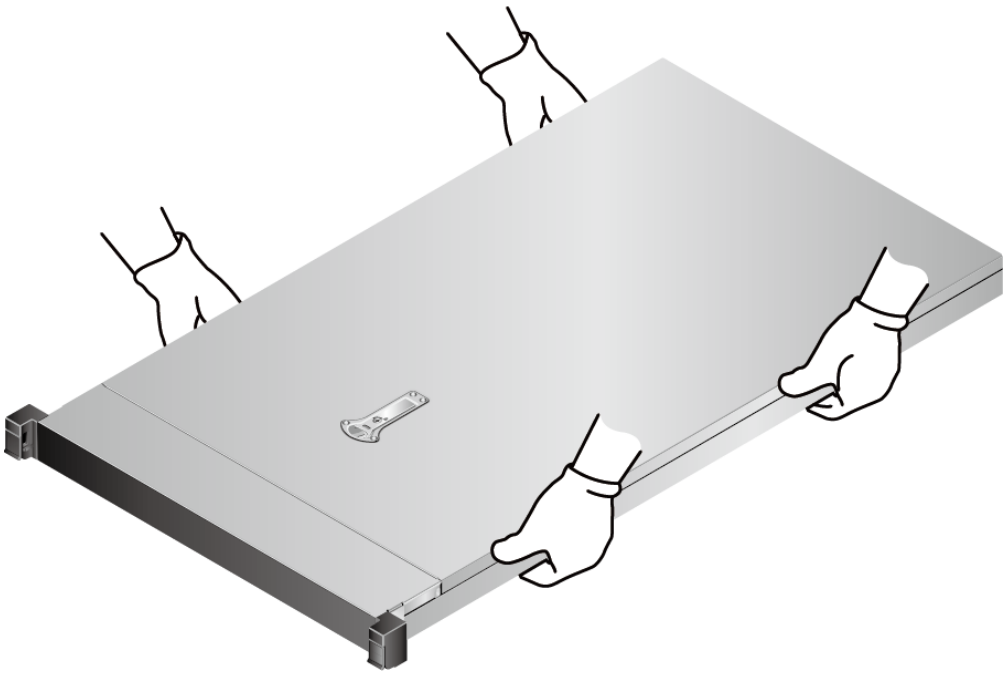
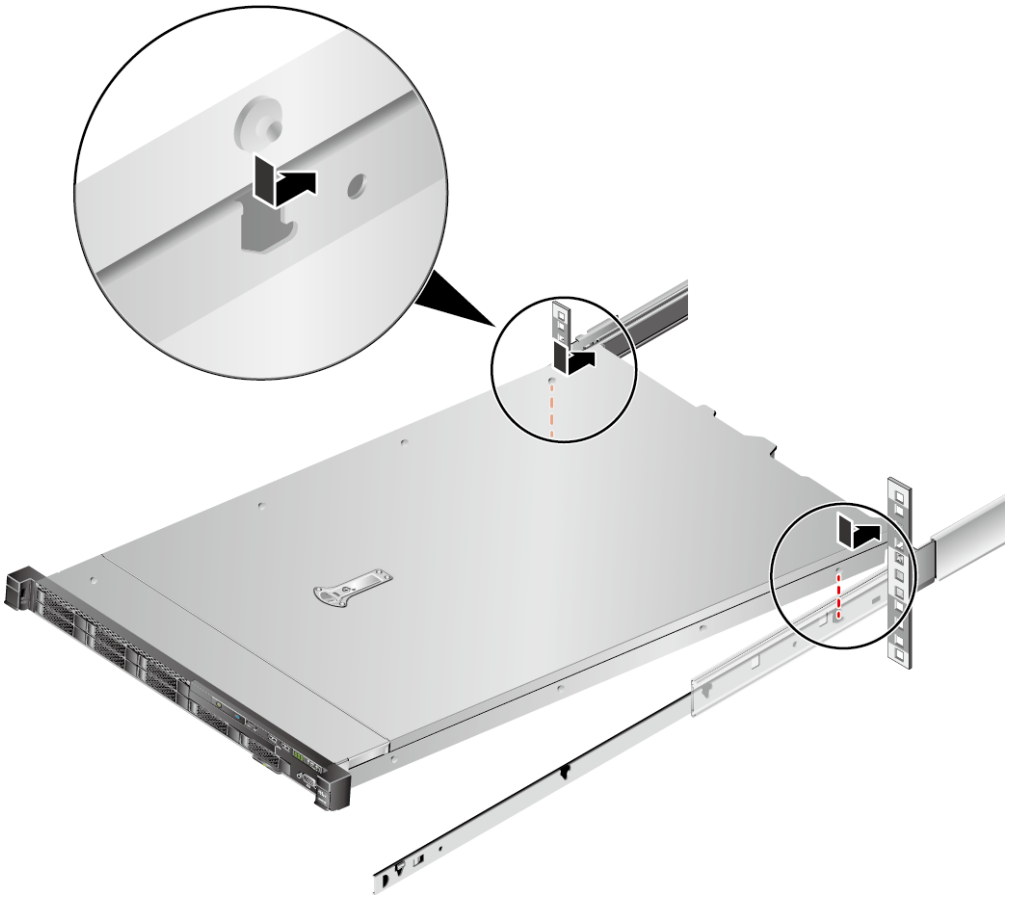
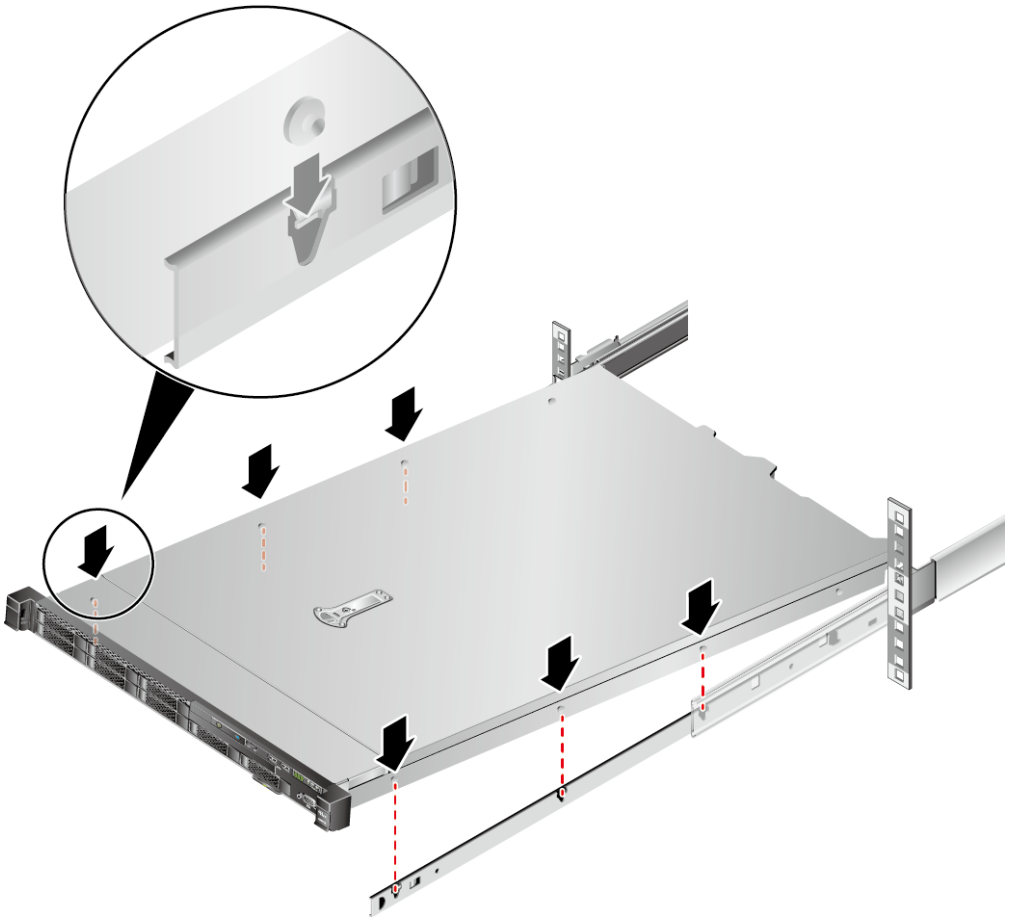


Figure 6-18 Securing the server to inner rails (1)



3. Aligning the six mounting screws at the front of the server with the fixing holes on the inner rails, place the server vertically to ensure that the server is secured to the inner rails. See **Figure 6-19**.

Figure 6-19 Securing a server to inner rails (2)

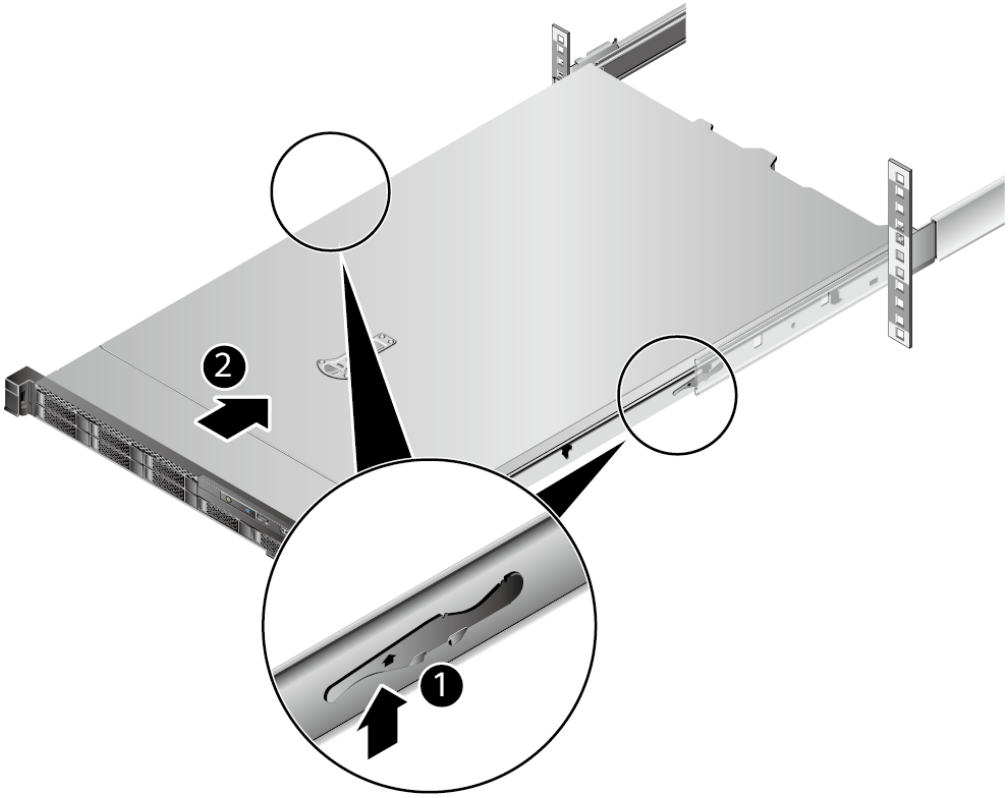


4. Unlock the release latches on both sides of the inner rails and push the server as far as it will go. See (1) and (2) in **Figure 6-20**.

NOTE

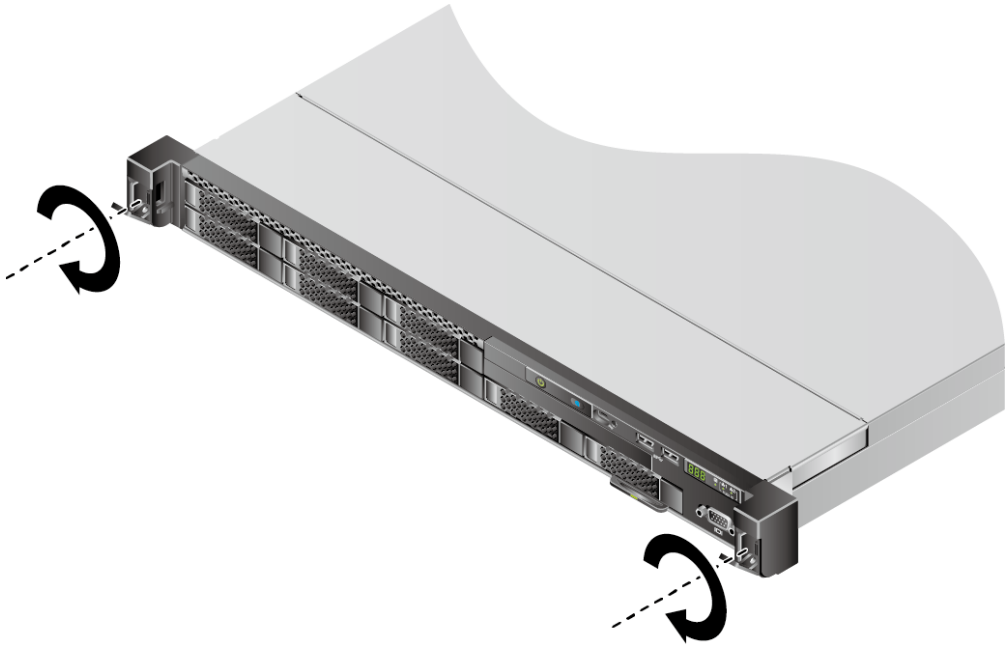
If you touch the drive unlock button by mistake, do not remove the drive and immediately close the drive ejector lever to install the drive in place.

Figure 6-20 Pushing the server into the ball bearing rail kit



5. Open the baffle plate of the captive screws on the panel and tighten the captive screws.

Figure 6-21 Securing a server

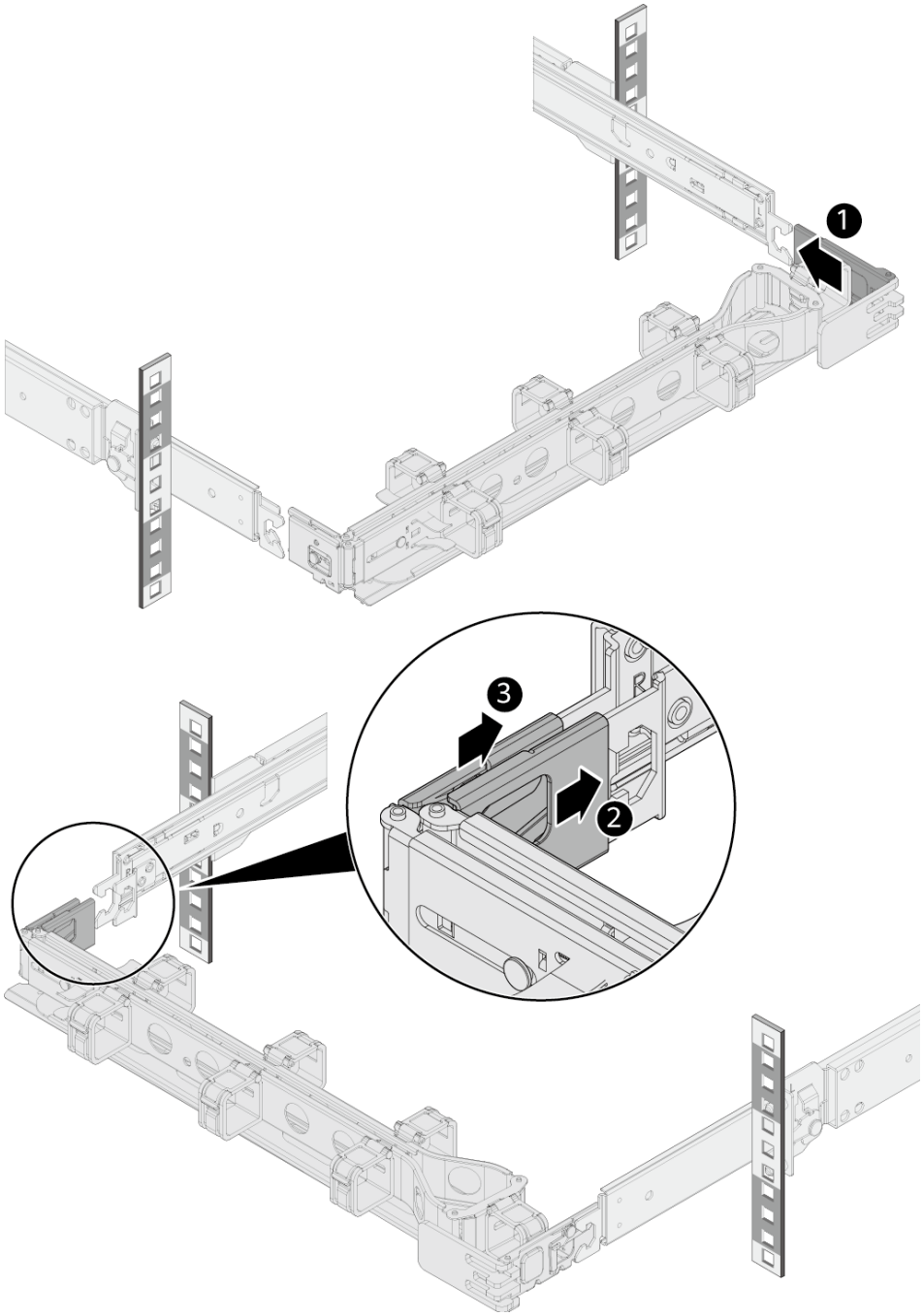


Step 2 Install a cable management arm (CMA).

1. Insert the bracket on the right of the CMA into the right guide rail. See (1) in **Figure 6-22**.

2. Insert the internal bracket on the left of the CMA into the left guide rail. See (2) in **Figure 6-22**.
3. Insert the external bracket on the left of the CMA into the left guide rail. See (3) in **Figure 6-22**.

Figure 6-22 Installing a CMA



Step 3 Connect external cables as required, such as network cables, VGA cables, and USB devices.

Step 4 Connect the cables to the PSU.

For details, see **6.3.8 Connecting PSU Cables**.

Step 5 Power on the server.

For details, see **6.5.1 Powering On** .

Step 6 Check indicator status.

For details, see **1.1.2 Indicators and Buttons**

----End

6.3 Connecting External Cables

6.3.1 Connecting Mouse, Keyboard, and VGA Cables

The front and rear panels of the server provide DB15 VGA ports but no standard PS/2 port for a keyboard or mouse.

Users can connect a keyboard and mouse to the USB port on the front or rear panel based on site installation conditions. There are two connection methods:

- Connect the keyboard and mouse to the USB ports.
- Connect the keyboard and mouse using a USB-to-PS/2 cable.

This section describes how to connect a keyboard and mouse using a USB-to-PS/2 cable and connect a monitor using a VGA cable.

Procedure

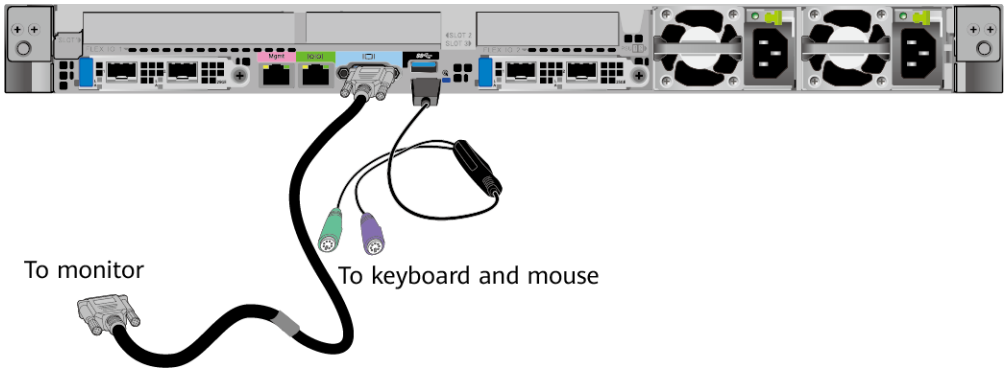
Step 1 Connect the USB connector of the USB-to-PS/2 cable to a USB port on the front or rear panel of the server.

Step 2 Connect the PS/2 connectors of the USB-to-PS/2 cable to the keyboard and mouse.

Step 3 Connect the DB15 connector of the VGA cable to the VGA port on the front or rear panel of the server and tighten the two screws.

Step 4 Connect the other connector of the VGA cable to the VGA port on the monitor and tighten the two screws.

Figure 6-23 Connecting a USB-to-PS/2 cable and VGA cable



----End

6.3.2 Connecting Network Cables

Before connecting or replacing a network cable, use a network cable tester to ensure that the new network cable is functional.

Procedure

Step 1 Determine the model of the new network cable.

- Shielded cables are recommended.

  NOTE

  If a non-shielded cable is used, the system cannot respond to ESD. As a result, the server may work abnormally.

- The new and old cables must be of the same model or be compatible.

Step 2 Number the new network cable.

- The number of the new network cable must be the same as that of the old one.
- Use the same type of labels for the network cable.
  - Record the name and number of the local device to be connected on one side of the label, and those of the peer device on the other side.
  - Attach the label 2 cm (0.79 in.) away from the end of the network cable.

Step 3 Lay out the new network cable.

- Lay out the new cable in the same way as the old one. Underfloor cabling is recommended because it is tidy and easy.
- Lay out network cables in the cabinet based on installation requirements. You are advised to arrange cables in the same way as existing cables. Ensure that cables are routed neatly and undamaged.
- Separate network cables from power cables and signal cables when laying out the cables.
- The minimum bend radius of a network cable is 4 cm (1.57 in.). Ensure that the cable insulation layer is intact.
- Ensure that cables are laid out for easy maintenance and capacity expansion.
- Network cables must be bound using cable ties. Ensure that network cables are bound closely, neatly, and straight, and cable ties are in even distance and fastened properly.

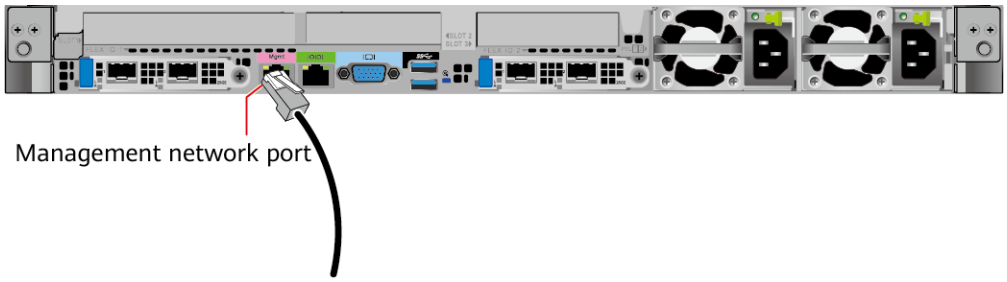
Step 4 Remove the network cable to be replaced.

Remove the network cable from the network interface card (NIC) or board in the cabinet.

Step 5 Connect the new network cable to the NIC or board.

- Connect the new network cable to the same network port as the removed one.
- Before installing a network cable to a network port, ensure that the network cable connector is intact and the pins have no sundries or deformation.
- Connect the network cable to the network port securely.

Figure 6-24 Connecting a network cable



Step 6 Connect the new network cable to the peer network port.

- Connect the other cable connector to the peer device based on the network plan.
- Connect the new network cable to the same port as the removed one.
- Connect the network cable to the network port securely.

Step 7 Check whether the new network cable is functioning properly.

Power on the device. Check whether the communication with the peer device is normal by running the **ping** command.

- If yes, bind the new network cable with other cables.

  Bind the new network cable in the same way as the existing network cables. You can also remove all existing cable ties and bind all network cables again if necessary.
- If no, check whether the network cable is damaged or whether the connector of the network cable is not securely inserted.

----End

6.3.3 Connecting a Cable to an Optical Port

Procedure

Step 1 Determine the model of the new cable.

You can use an optical cable or an SFP+ cable to connect to the optical port.

Step 2 Number the new cable.

- The number of the new cable must be the same as that of the old one.
- Use the same type of labels for the optical cable.
  - Record the name and number of the local device to be connected on one side of the label, and those of the peer device on the other side.
  - Attach the label 2 cm (0.79 in.) away from the end of the optical cable.

Step 3 Lay out the new cable.

- Lay out the new cable in the same way as the old one.

  For example, if the old cable is laid out in underfloor cabling mode, so is the new cable.
- Lay out optical cables or SFP+ cables in the cabinet based on installation requirements.

You are advised to arrange cables in the same way as existing cables. Ensure that cables are routed neatly and undamaged.

- Separate optical cables or SFP+ cables from power cables and signal cables when laying out the cables.
- The minimum bend radius of an optical cable or SFP+ cables is 4 cm (1.57 in.).
- Ensure that optical cables or SFP+ cables are laid out for easy maintenance and capacity expansion.
- Optical cables must be bound using cable ties. Ensure that:
  – Optical cables are bound closely, neatly, and straight.
  – Cable ties are in even distance and fastened properly.

Step 4 Connect the cable to an optical port.

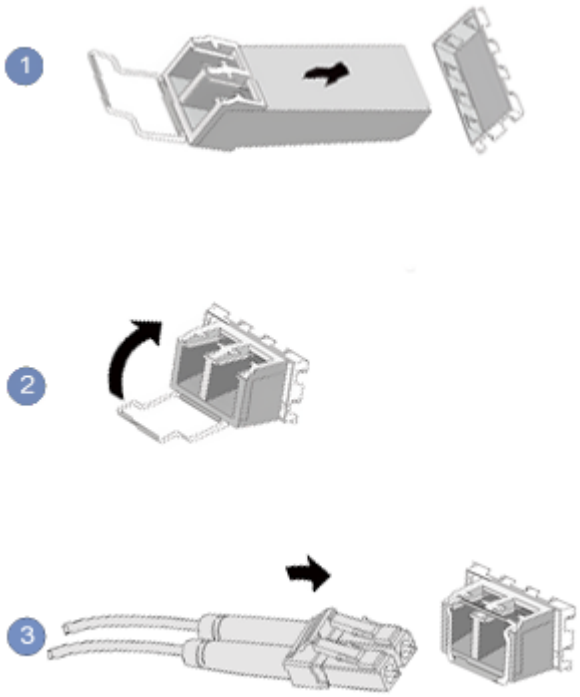
- When you use an optical cable:
  a. Remove the optical cable to be replaced.
  b. Connect the new optical cable.

  NOTE

  - Connect the new optical cable to the same port as the removed one.
  - Connect the optical cable to the optical module securely.

  i. Insert the optical module into the optical port. See (1) in **Figure 6-25**.
  ii. Close the latch on the optical module to secure it. See (2) in **Figure 6-25**.
  iii. Insert the optical cable into the optical module. See (3) in **Figure 6-25**.

Figure 6-25 Connecting an optical cable



- When you use an SFP+ cable:

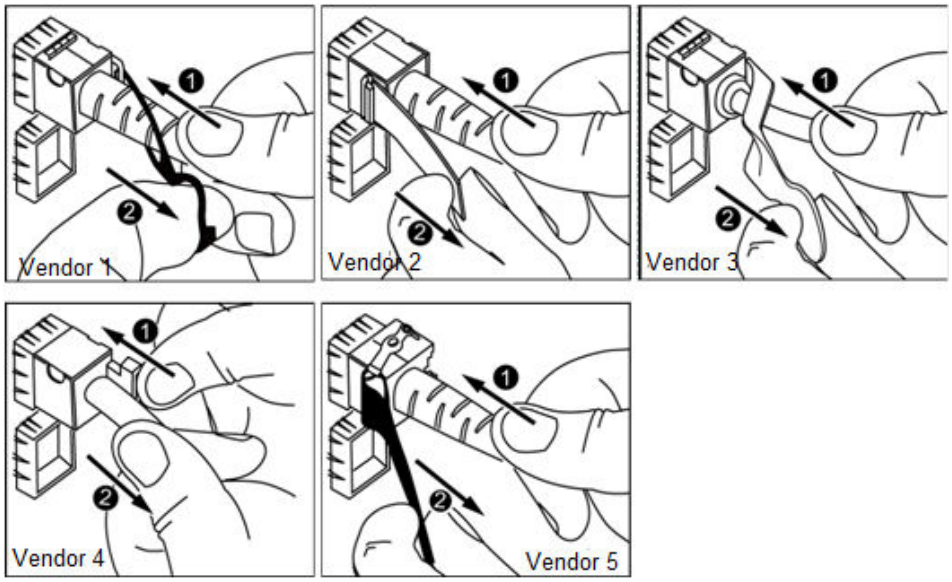
1. Remove the SFP+ cable to be replaced.

   Gently push the power connector inwards and pull the latch out to remove the SFP+ cable.

NOTICE

Do not directly pull out the latch.

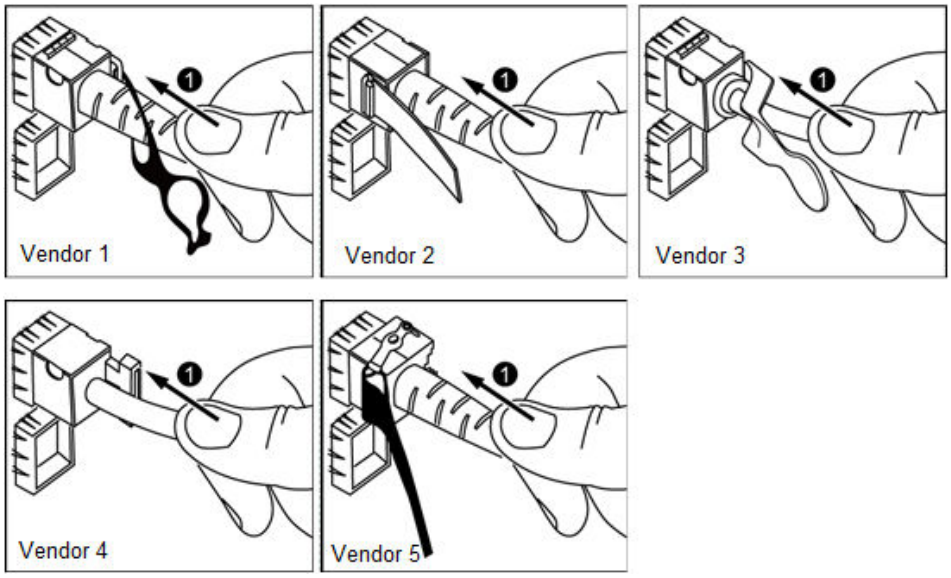
Figure 6-26 Removing an SFP+ cable



2. Connect the new SFP+ cable.

   Remove the dust-proof cap on the port, and insert the cable connector into the port. When you hear a "click" and the cable cannot be pulled out, the connector is secured.

Figure 6-27 Connecting an SFP+ cable



Step 5 Check whether the new cable is properly connected.

Power on the device. Check whether the port indicator is normal.

- If yes, go to **Step 7**.
- If no, go to **Step 6**.

Step 6 If the peer device cannot be pinged, check whether the cable is intact or the connector is securely connected.

- If yes, contact technical support.
- If no, replace the cable or insert the connector securely, and go to **Step 5**.

Step 7 Bind the new optical cable.

Bind the new optical cable in the same way as the existing optical cables. You can also remove all existing cable ties and bind all optical cables again if necessary.

----End

6.3.4 Connecting an IB Cable

Procedure

Step 1 Check the model of the new cable.

You can use QSFP+ cables to connect IB cables.

Step 2 Number the new cable.

The number of the new cable must be the same as that of the old one.

Step 3 Route the new cable.

- Route the new cable in the same way (underfloor or overhead) as the old one.

  For example, if the old cable is routed in underfloor cabling mode, so is the new cable; if the old cable is routed in overhead mode, so is the new cable.

- Route QSFP+ cables in the cabinet based on installation requirements.

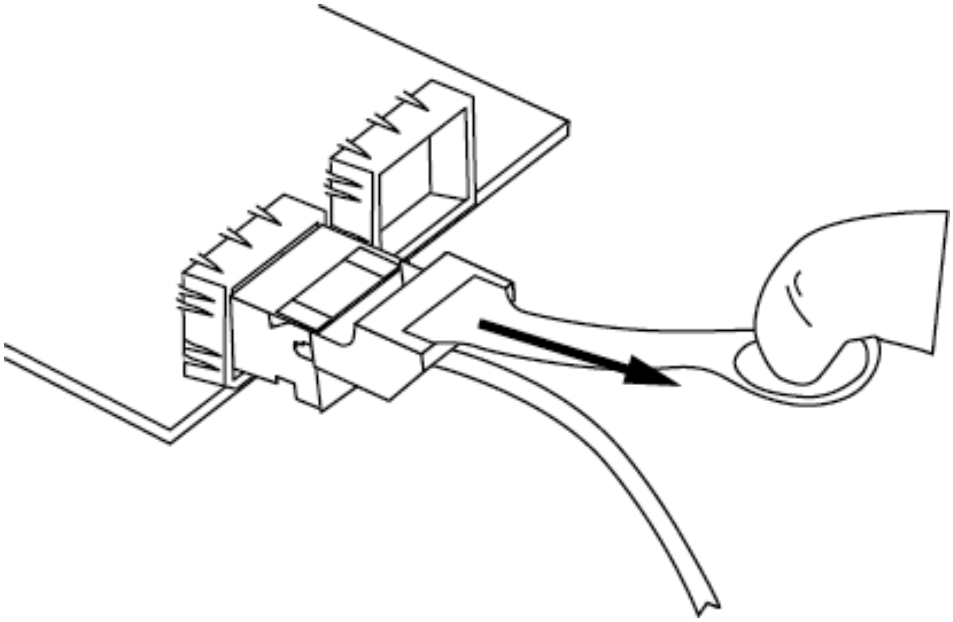
  You are advised to arrange new cables in the same way as existing cables. Ensure that cables are routed neatly without damage to the cable sheath.
- Separate QSFP+ cables from power cables and signal cables when routing the cables.
- Bend the QSFP+ cables with a bending radius of at least 4 cm (1.57 in.) to prevent damage to core wires. Ensure that the cable sheath is intact.
- Ensure that QSFP+ cables are routed for easy maintenance and capacity expansion.

Step 4 Replace the cable.

1. Remove the old cable to be replaced.

   Release the latch and remove the cable.

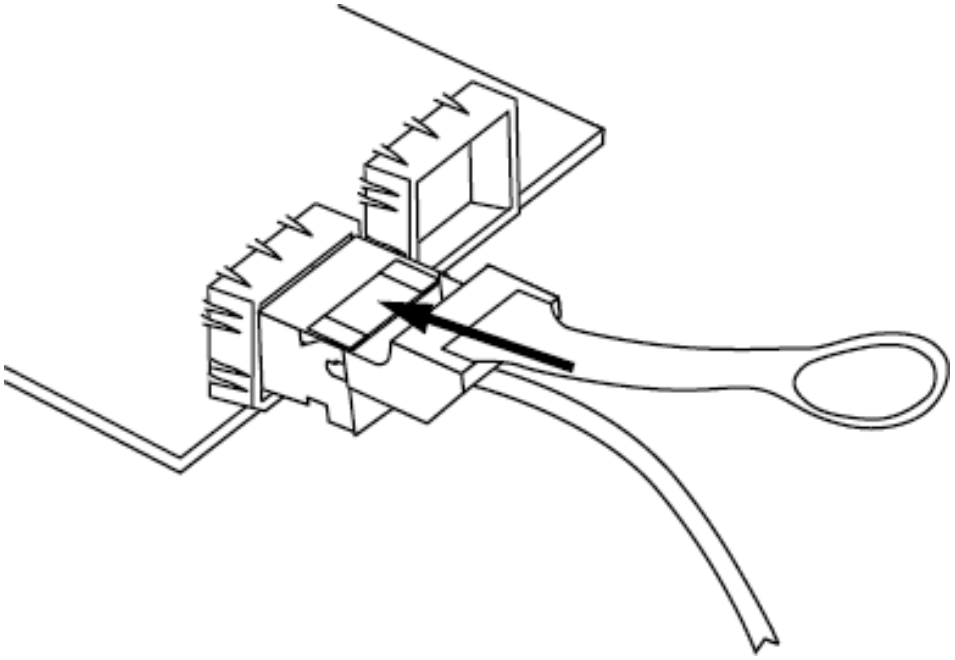
   Figure 6-28 Removing a cable (IB NIC with two 56 Gbit/s ports as an example)

2. Connect the new cable.

   Remove the dust-proof cap on the port, and insert the cable connector into the port. When you hear a "click" and the cable cannot be pulled out, the connector is secured.

Figure 6-29 Connecting a cable (IB NIC with two 56 Gbit/s ports as an example)



Step 5 Check whether the new cable is properly connected.

Power on the device. If the LOM indicator is green, the cable is properly connected.

----End

6.3.5 Connecting a USB Type-C Cable

The server panel provides an iBMC management port, which is connected to a PC or mobile phone through a USB Type-C cable to monitor and manage the system.

There are two types of USB Type-C cables:

- Both ends of the cable are USB Type-C connectors.
- One end of the cable is a USB Type-C connector, and the other end is a USB connector.

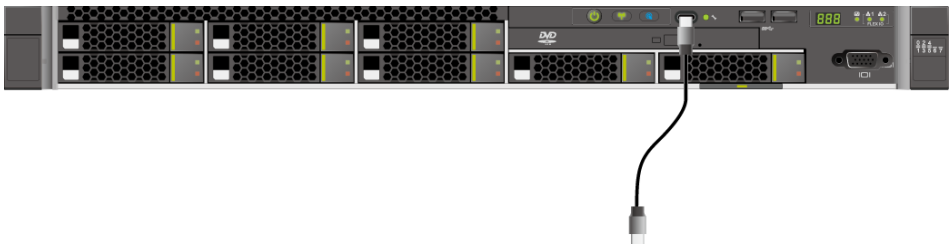
Procedure

Step 1 Connect the USB Type-C connector of the cable to the USB Type-C port on the server panel.

Step 2 Connect the other end of the adapter cable to a PC or mobile phone.

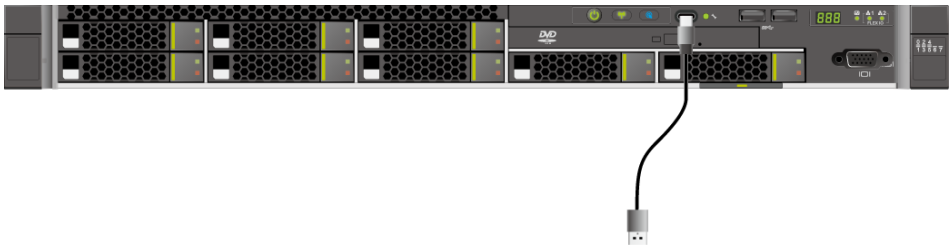
- Connect the other end of the adapter cable to the USB Type-C port on the laptop or mobile phone.

Figure 6-30 Connecting a cable to the USB Type-C port



- Connect the other end of the adapter cable to the USB port on the PC.

Figure 6-31 Connecting a USB Type-C to USB cable



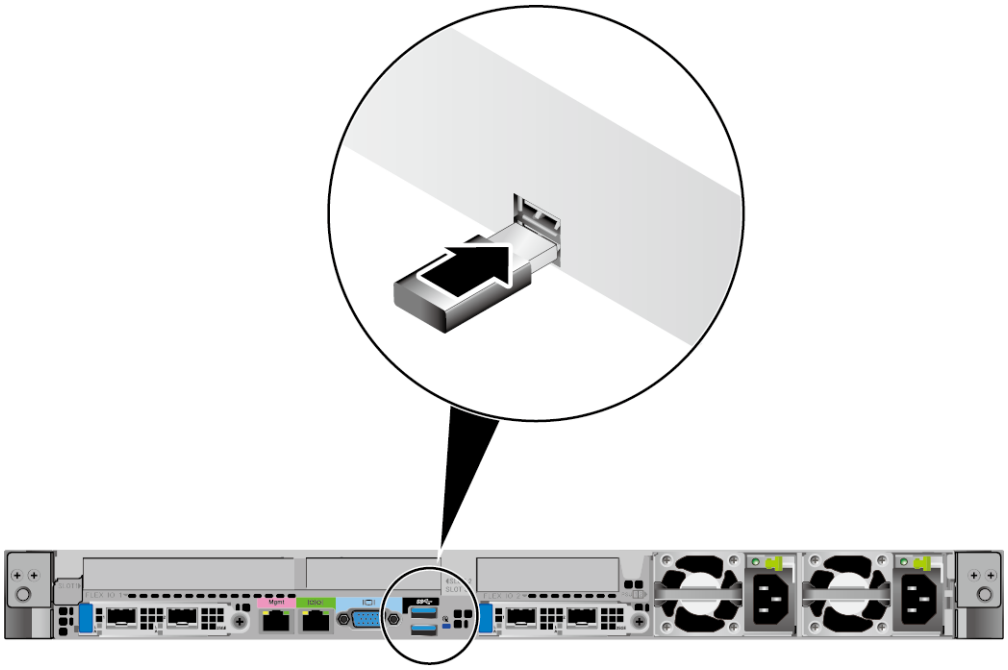
----End

6.3.6 Connecting a USB Device

Procedure

Step 1 Connect the USB device to a USB port of the server.

Figure 6-32 Connecting a USB device



----End

6.3.7 Connecting a Serial Cable

The rear panel of the server provides a standard RJ45 serial port (3-wire), which works as the OS serial port by default. You can configure it as the iBMC serial port by using the iBMC CLI.

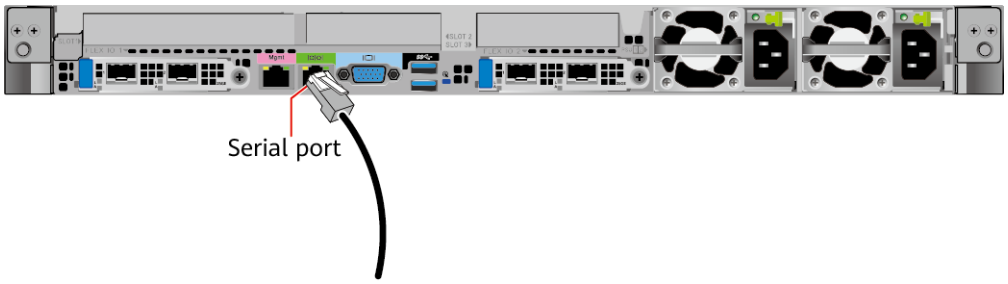
The serial port can be used as:

- OS serial port to monitor the OS status
- iBMC serial port for debugging and fault locating

Procedure

Step 1 Connect the serial cable.

Figure 6-33 Connecting a serial cable



----End

6.3.8 Connecting PSU Cables

6.3.8.1 Connecting the AC PSU Cable

Before connecting power cables, ensure that the server has been correctly installed. For details, see **6.2.5 Installing a Server** .

NOTICE

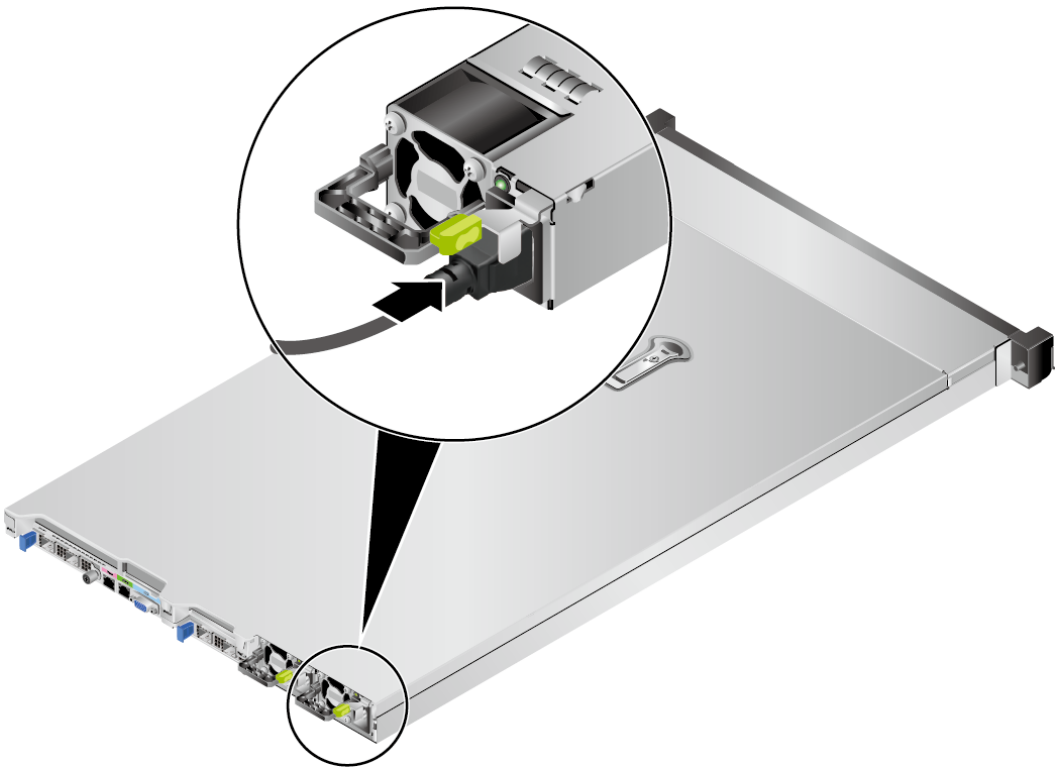
- Use dedicated power cables to ensure equipment and personal safety.
- Use power cables only for dedicated servers. Do not use them for other devices.
- Connect the power cables of the active and standby PSUs to different PDUs to ensure reliable system operation.
- Ground the equipment before powering it on. In AC or HVDC environment, the power cables of AC PSUs are grounded. Ensure that the power cables are in good contact.

Procedure

Step 1 Take the component out of its ESD bag.

Step 2 Connect one end of the power cable to the power socket on the PSU of the server.

Figure 6-34 Connecting the cable

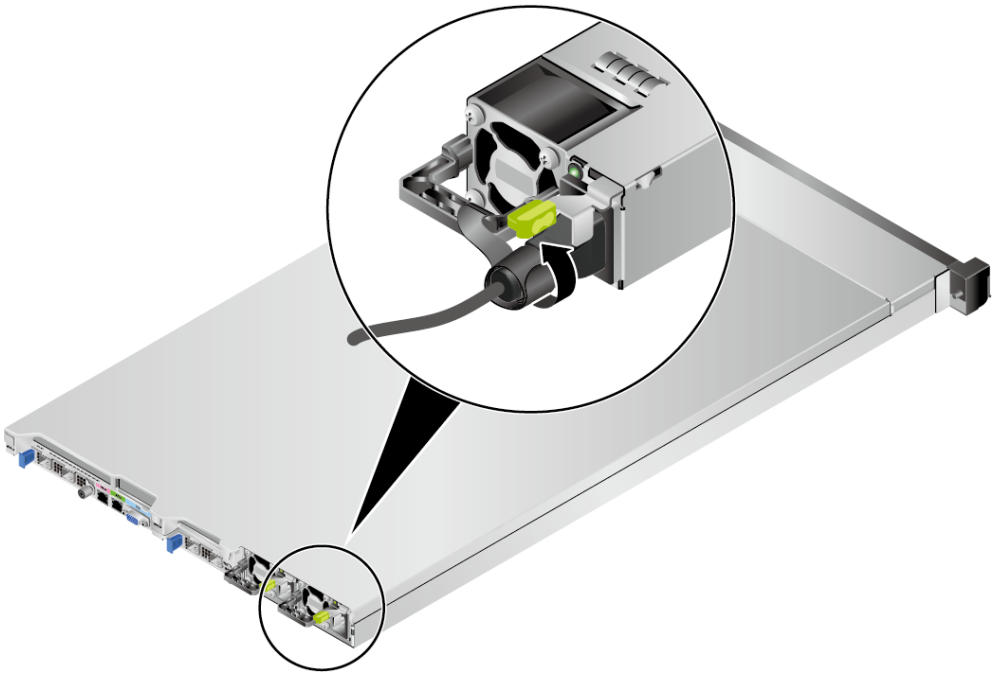


Step 3 Secure the power cable using a velcro strap.

NOTE

After the power module cables are connected to the server, adjust the velcro on the power module to the right corner of the handle, and then wrap the velcro tape around the lower part of the power cable plug, as shown in **Figure 6-35**.

Figure 6-35 Securing the cable



Step 4 Connect the other end of the power cable to the AC PDU in the cabinet.

The AC PDU is fastened in the rear of the cabinet. Connect the power cable to the nearest jack on the AC PDU.

Step 5 Bind the power cables to the cable guide using cable ties.

----End

6.3.8.2 Connecting a DC Power Cable

Before connecting power cables, ensure that the server has been correctly installed. For details, see **6.2.5 Installing a Server** .

NOTICE

- Use dedicated power cables to ensure equipment and personal safety.
- Use power cables only for dedicated servers. Do not use them for other devices.
- Connect the power cables of the active and standby PSUs to different PDUs to ensure reliable system operation.
- Ground the equipment before powering it on. In DC environment, the ground terminals of DC PSUs are grounded. Ensure that the ground cables are in good contact.

Procedure

Step 1 Take the component out of its ESD bag.

Step 2 Connect the cables to the PSU.

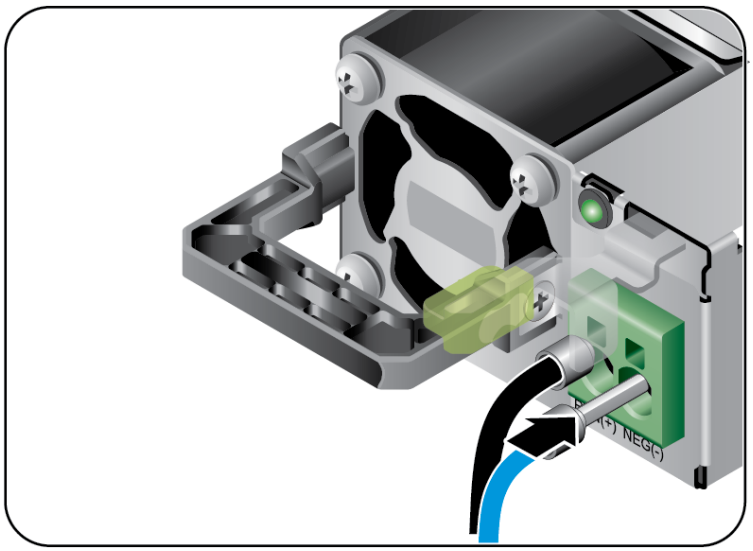
- 1200 W (power cable P/N code: 02232SVN)

  a. Insert the power cable to the wiring terminals on the PSU until the cable click into position, as shown in **Figure 6-36**.

     i. Connect the cord end terminal of the negative power cable (blue) to the NEG(–) wiring terminal on the PSU.

     ii. Connect the cord end terminal of the positive power cable (black) to the RTN(+) wiring terminal on the PSU.

  Figure 6-36 Connecting the power cable

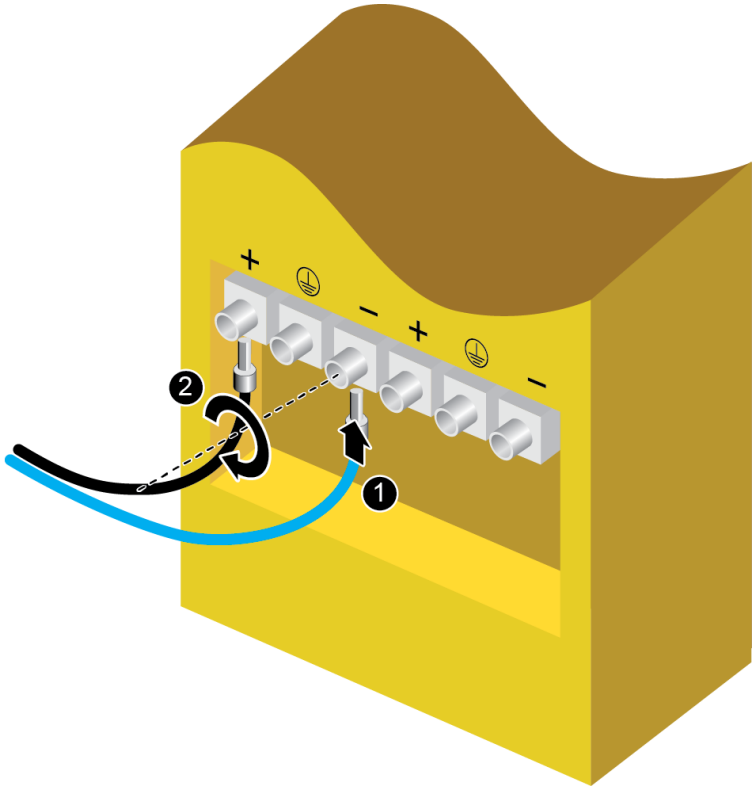
  

  b. Insert the other end of the power cable to the wiring terminals on the PDU, and tighten the screws. See (1) and (2) in **Figure 6-37**.

     i. Connect the cord end terminal of the negative power cable (blue) to the PDU(–) wiring terminal.

     ii. Connect the cord end terminal of the positive power cable (black) to the PDU(+) wiring terminal.

Figure 6-37 Connecting the power cable to the PDU



- 1500 W (power cable P/N codes: 04151188/04151188-002 for the HVDC cable and 04152747 for the AC cable)

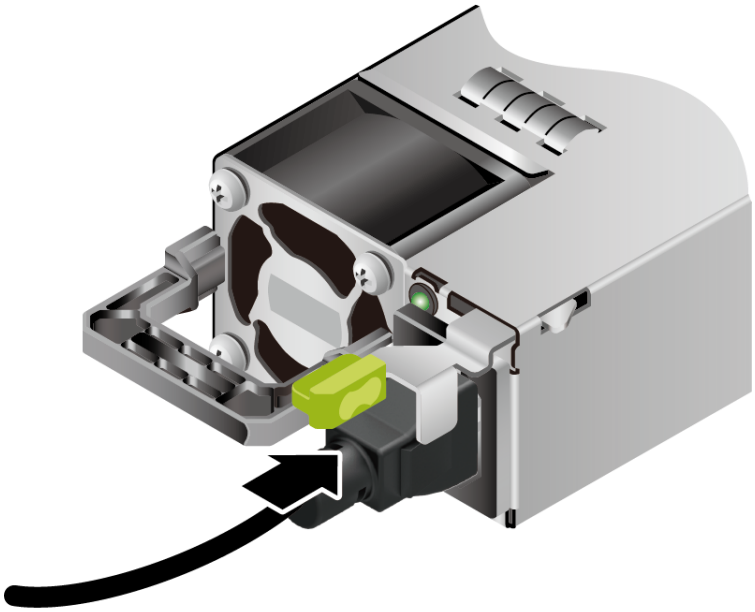
  NOTE

  The 1500 W HVDC PSU supports AC and DC input. Cables 04152747 and 04151188/04151188-002 can be used for AC input. Cable 04151188/04151188-002 can only be used for DC input.

  – 04151188/04151188-002

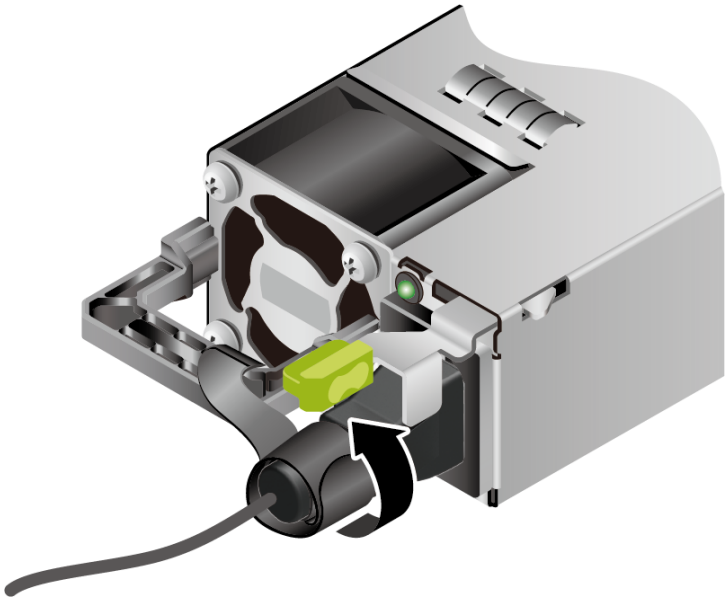
    i. Connect one end of the power cable to the power socket on the PSU of the server.

Figure 6-38 Connecting the power cable



ii. Secure the power cable using a velcro strap.

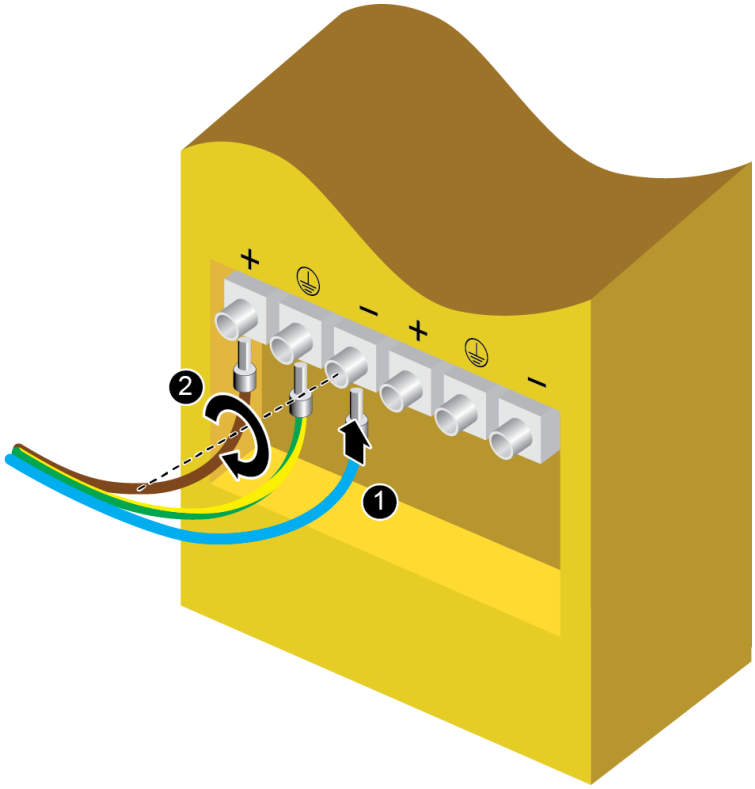
Figure 6-39 Securing the cable



iii. Insert the other end of the power cable to the wiring terminals on the PDU, and tighten the screws. See (1) and (2) in **Figure 6-40**.

1) Connect the cord end terminal of the live wire (brown) to the PDU(+) wiring terminal.
2) Connect the cord end terminal of the neutral wire (blue) to the PDU(–) wiring terminal.
3) Connect the cord end terminal of the ground cable (yellow and green) to the ground terminal of the PDU.

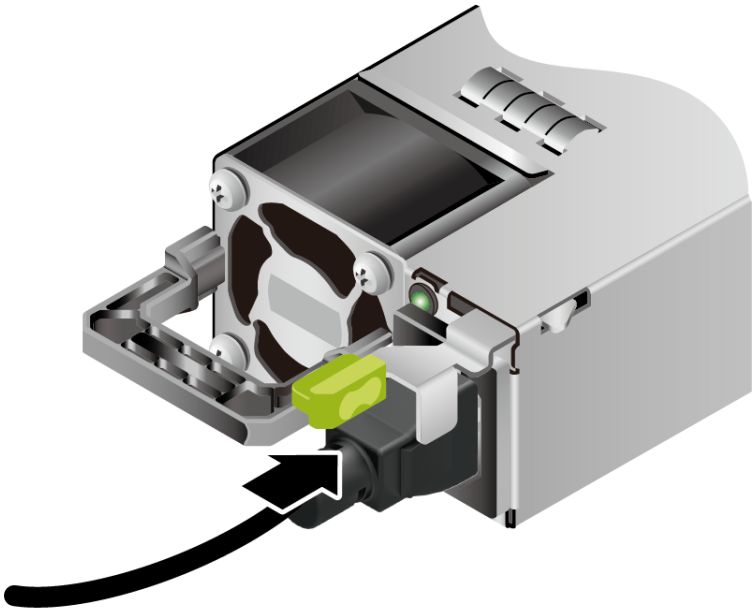
Figure 6-40 Connecting the power cable to the PDU



– 04152747

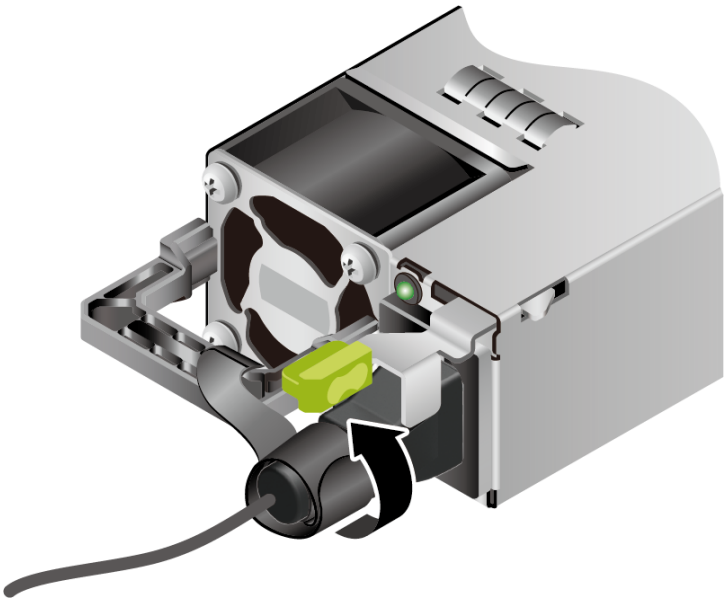
i. Connect one end of the power cable to the power socket on the PSU of the server.

Figure 6-41 Connecting the power cable



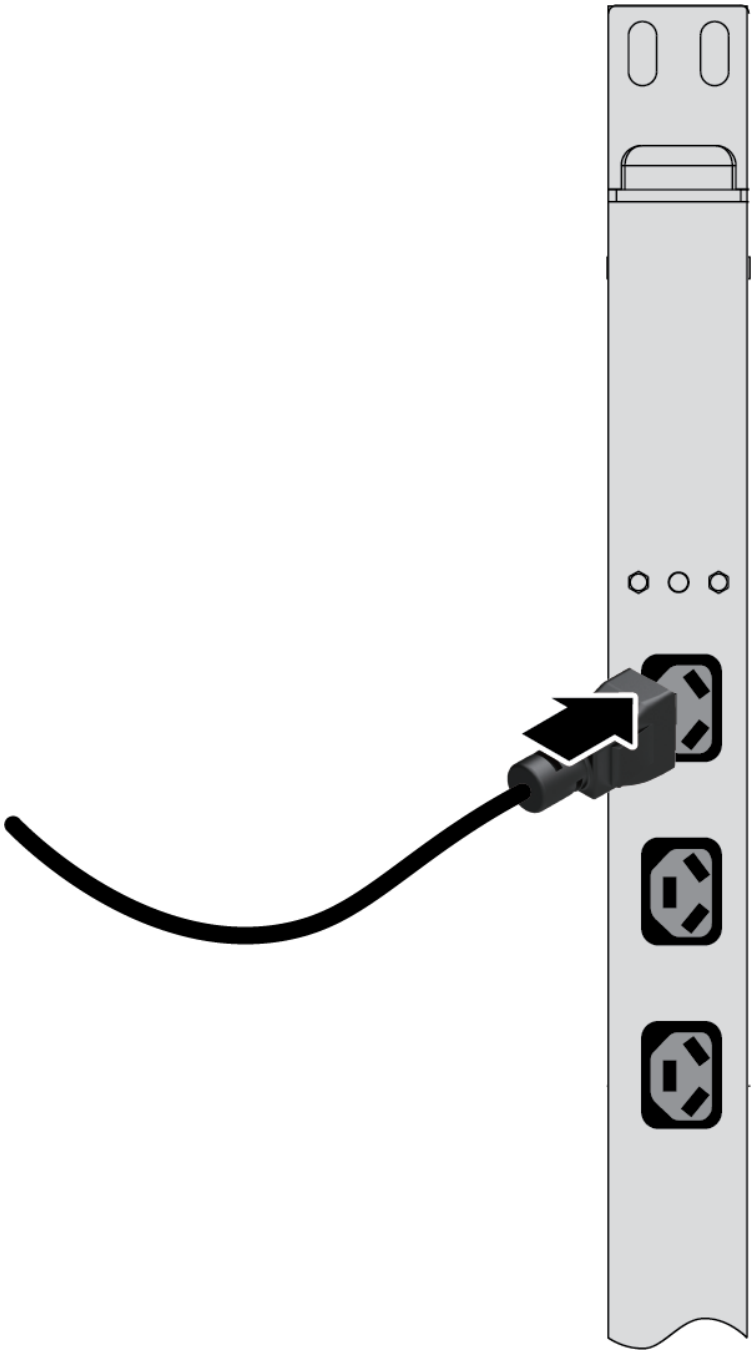
ii. Secure the power cable using a velcro strap.

Figure 6-42 Securing the cable



iii. Connect the other end of the power cable to the PDU in the cabinet.

Figure 6-43 Connecting the power cable to the PDU



Step 3 Bind the power cables to the cable guide using cable ties.

----End

6.3.9 Checking Cable Connections

⚠ CAUTION

Before checking cable connections, ensure that the power is cut off. Otherwise, any incorrect connection or loose connection may cause human injury or device damage.

Table 6-3 Cable connection checklist

Check Item	Description
Power cable	Power cables are correctly connected to the rear of the chassis.
Network cable	Network cables are connected correctly to the management ports or data ports on the rear panel of the chassis.
Ground cable	The server does not provide a separate ground port. ● In AC or HVDC environment, the power cables of AC PSUs are grounded. Ensure that the power cables are in good contact. ● In DC environment, the ground terminals of DC PSUs must be grounded. Ensure that the ground cables are in good contact.

6.4 Internal Cabling

A P/N code uniquely identifies a server component. You can find the number on a component or component package.

NOTE

For details about the drive slots managed by the drive backplane connectors, see **1.10.2 Drive Backplane**.

6.4.1 Cabling Overview

- Before connecting cables:
  - Check the connection ports of the cables to ensure that the ports are not rusty or damaged.
  - Do not forcibly unfold the pre-bent part of a cable to prevent damage to the cable.
  - Do not touch the ports at both ends of a cable to protect the cable from being contaminated by the oil on your hands or damaged.
- When connecting cables:
  - Check whether the cable codes are correct. Incorrect cables may cause the connector to be damaged or the device to work abnormally.
  - Properly route and secure cables to protect the cables from being squeezed and reduce interference in signal and transmission errors.
  - Avoid bending or stretching a cable excessively to prevent damage to the cable.
- When disconnecting cables:
  - Disconnect cables carefully and orderly to ensure that the normal operation of devices is not affected.

- Hold the main body of a cable connector to avoid pulling the cable itself and damaging the internal wires of the cable or the pins on the connector.
- If a cable cannot be disconnected easily, do not pull the cable forcibly. Check whether there is a guide pin that can be pressed to release the cable.
- If a cable of the server is no longer required, remove and store it properly to prevent airflow inside the server from being blocked and heat dissipation being affected.

6.4.2 4 x 3.5" Drive Pass-through Configuration 1

6.4.2.1 Indicator Board and VGA Board Cabling

Indicator Board and VGA Board Cabling

Figure 6-44 Indicator board and VGA board cabling

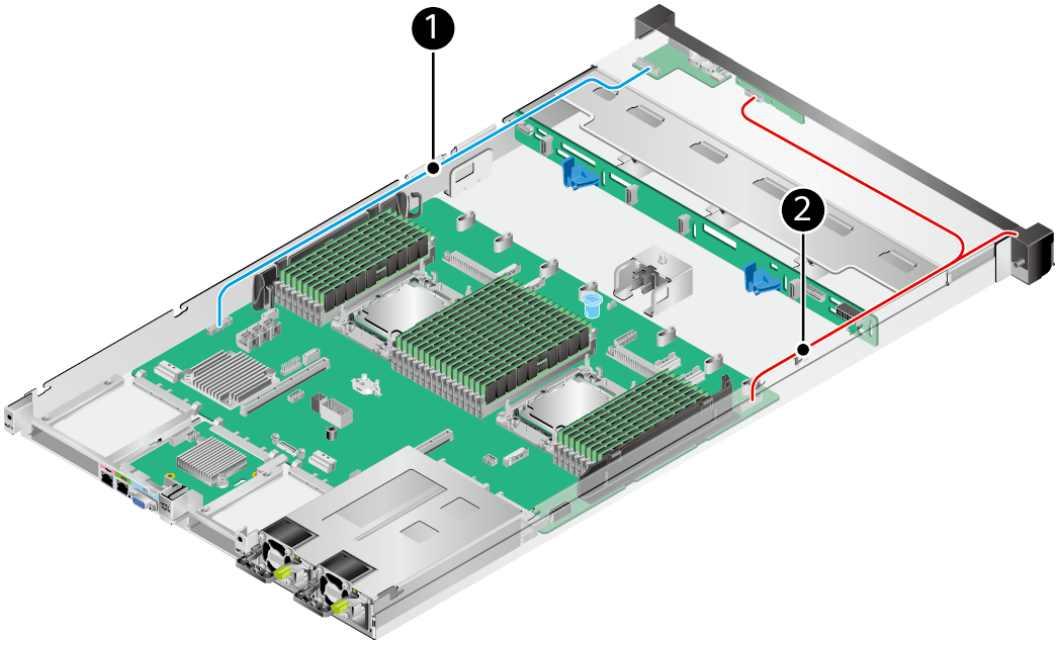


Table 6-4 Indicator board and VGA board cabling

No.	P/N Code	Description
1	04052666	Low-speed signal cable for connecting the VGA board to the mainboard (J113)
2	04080684-001	Low-speed signal cable for connecting the indicator board to the mainboard (J106)

6.4.2.2 OCP 3.0 Expansion Cable

OCP 3.0 Expansion Cable

NOTE

- When configured with a single CPU, the OCP 3.0 network card can only be installed in the 1 slot of the FlexIO card, and it does not support the expansion of bandwidth through the OCP 3.0 expansion cable.
- When configuring with dual CPUs, FlexIO card 1 and FlexIO card 2 slots can be configured with OCP 3.0 network cards, but only one OCP 3.0 network cards is supported to expand bandwidth at the same time.
  - FlexIO card has 1 slot, and the default operating bandwidth is x8. If you need to expand to x8+x8, you need to use 04052322-001 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 1 LP Slimline 6 connector (J13).
  - The FlexIO card has 2 slots, and the default operating bandwidth is x8. If you need to expand to x16, you need to use a 04052322 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 2 LP Slimline 7 connector (J31).
- The 10NVMe model does not support bandwidth expansion via OCP 3.0 expansion cable.

Figure 6-45 OCP 3.0 expansion cable 1

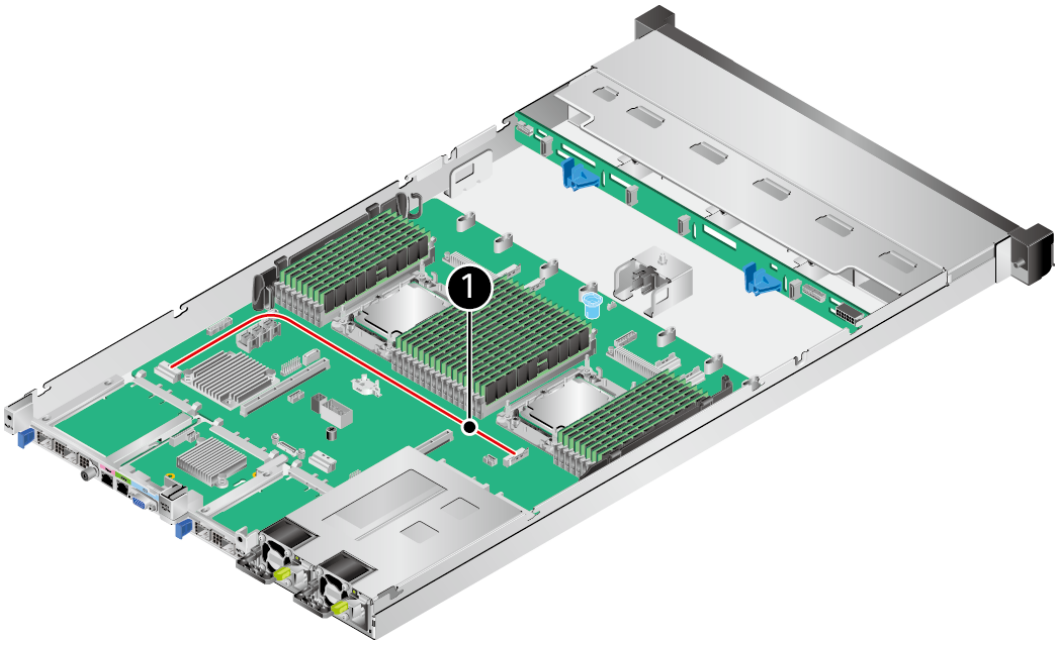


Table 6-5 OCP 3.0 expansion cable 1

No.	P/N Code	Description
1	04052322-001	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 6 connector (J13) of OCP 3.0 network adapter 1

Figure 6-46 OCP 3.0 expansion cable 2

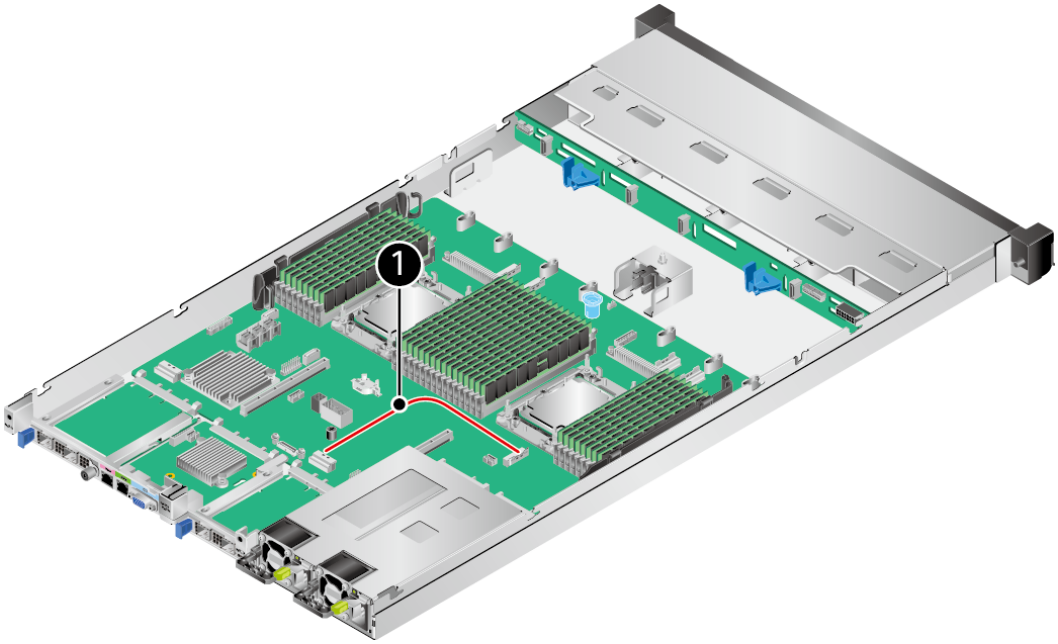


Table 6-6 OCP 3.0 expansion cable 2

No.	P/N Code	Description
1	04052322	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 7 connector (J31) of OCP 3.0 network adapter 2

6.4.2.3 Intrusion Sensor Cabling

Intrusion Sensor Cabling

Figure 6-47 Intrusion sensor cabling

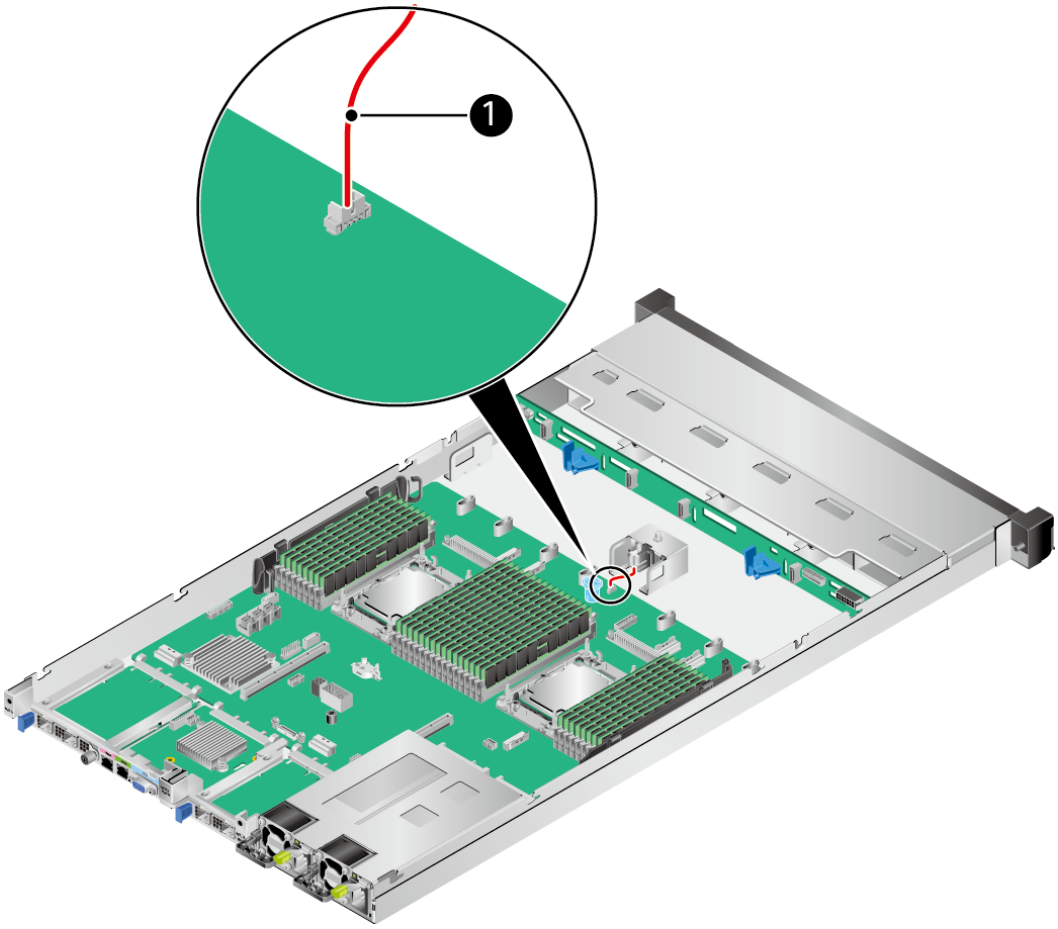


Table 6-7 Intrusion sensor cabling

No.	P/N Code	Description
1	04080771	Low-speed signal cable for connecting the intrusion sensor to the mainboard (S1)

6.4.2.4 Front-Drive Backplane Power and Indicator Signal Cabling

Front-Drive Backplane Power and Low-speed Signal Cables

Figure 6-48 Front-drive backplane power and low-speed signal cables

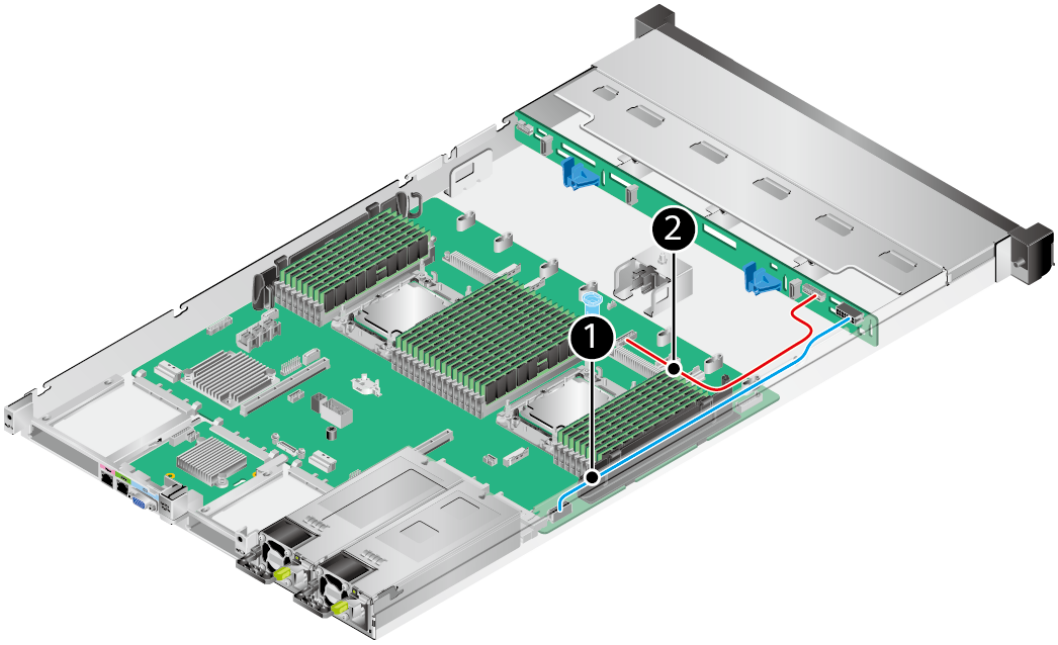


Table 6-8 Front-drive backplane power and low-speed signal cables

No.	P/N Code	Description
1	04152145-009	Power cable for connecting the front-drive backplane (J24) to the mainboard (J26)
2	04080651-007	Low-speed signal cable for connecting the front-drive backplane (J1) to the mainboard (J75) **NOTICE** If the server is configured with remote heat sinks, remove the remote heat sinks before removing or installing the cable.

6.4.2.5 Front-Drive Backplane SAS Cabling (PCH Pass-through)

Front-Drive Backplane SAS High-speed Cabling

Figure 6-49 Front-drive backplane SAS high-speed cabling

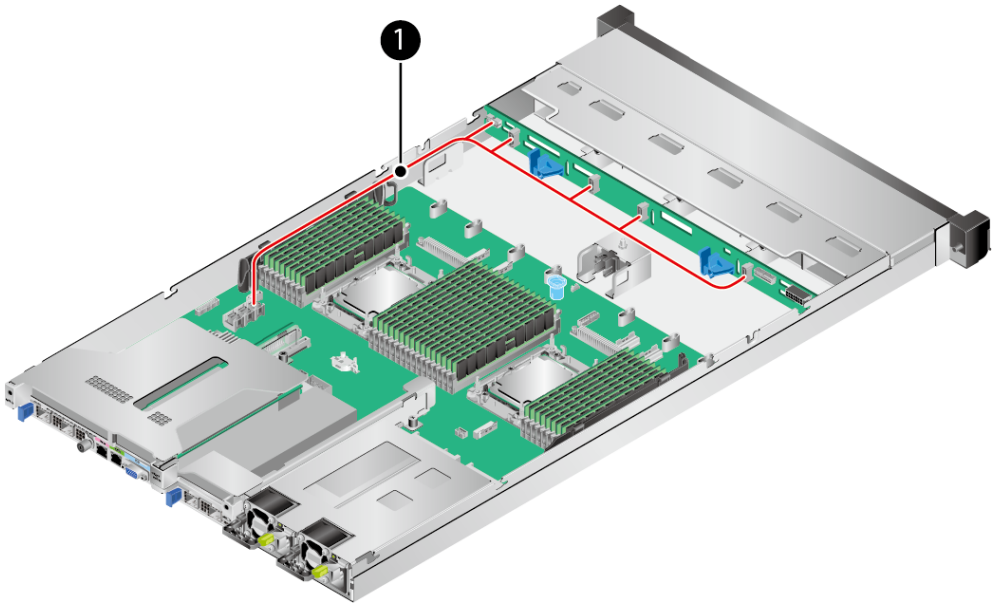


Table 6-9 Front-drive backplane SAS high-speed cabling

No.	P/N Code	Description
1	04051938	SAS high-speed cable for connecting the SAS0 signal connector, SAS1 signal connector, SAS2 signal connector, SAS3 signal connector, and Backplane indicator signal cable connector (J2, J3, J4, J5, and J6) of the front-drive backplane to the mainboard (J6)

6.4.3 4 x 3.5" Drive Pass-through Configuration 2

6.4.3.1 Indicator Board and VGA Board Cabling

Indicator Board and VGA Board Cabling

Figure 6-50 Indicator board and VGA board cabling

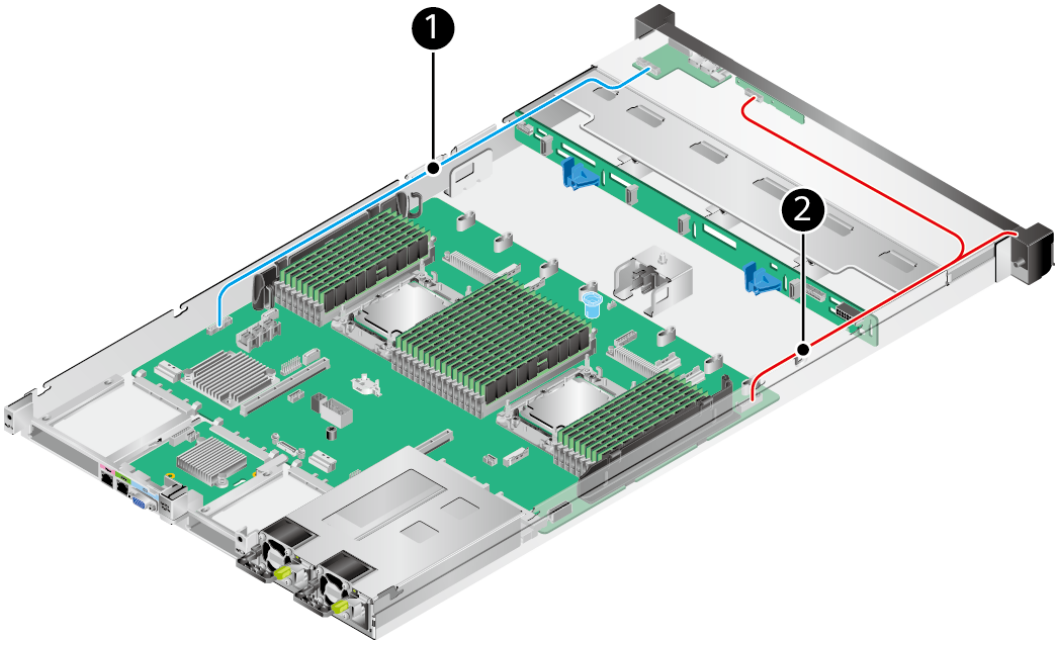


Table 6-10 Indicator board and VGA board cabling

No.	P/N Code	Description
1	04052666	Low-speed signal cable for connecting the VGA board to the mainboard (J113)
2	04080684-001	Low-speed signal cable for connecting the indicator board to the mainboard (J106)

6.4.3.2 OCP 3.0 Expansion Cable

OCP 3.0 Expansion Cable

NOTE

- When configured with a single CPU, the OCP 3.0 network card can only be installed in the 1 slot of the FlexIO card, and it does not support the expansion of bandwidth through the OCP 3.0 expansion cable.
- When configuring with dual CPUs, FlexIO card 1 and FlexIO card 2 slots can be configured with OCP 3.0 network cards, but only one OCP 3.0 network cards is supported to expand bandwidth at the same time.
  - FlexIO card has 1 slot, and the default operating bandwidth is x8. If you need to expand to x8+x8, you need to use 04052322-001 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 1 LP Slimline 6 connector (J13).
  - The FlexIO card has 2 slots, and the default operating bandwidth is x8. If you need to expand to x16, you need to use a 04052322 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 2 LP Slimline 7 connector (J31).
- The 10NVMe model does not support bandwidth expansion via OCP 3.0 expansion cable.

Figure 6-51 OCP 3.0 expansion cable 1

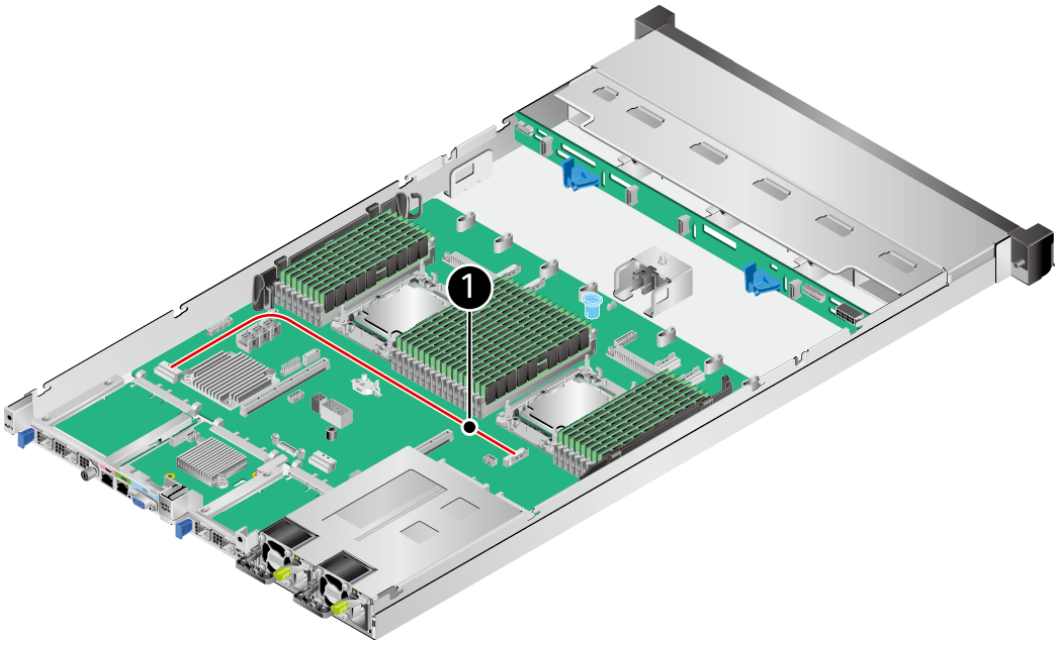


Table 6-11 OCP 3.0 expansion cable 1

No.	P/N Code	Description
1	04052322-001	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 6 connector (J13) of OCP 3.0 network adapter 1

Figure 6-52 OCP 3.0 expansion cable 2

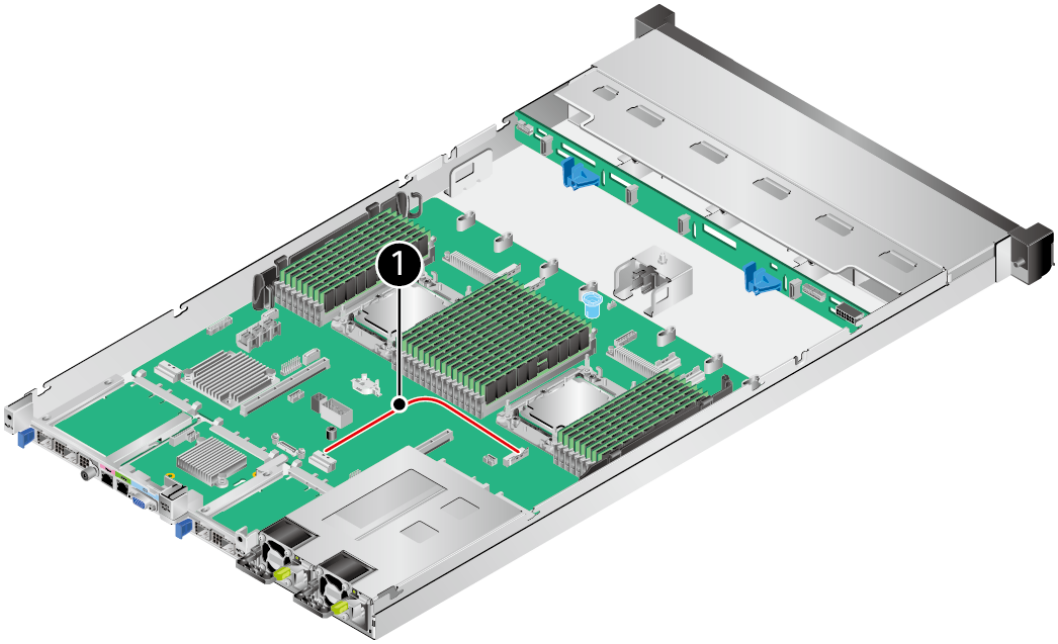


Table 6-12 OCP 3.0 expansion cable 2

No.	P/N Code	Description
1	04052322	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 7 connector (J31) of OCP 3.0 network adapter 2

6.4.3.3 Intrusion Sensor Cabling

Intrusion Sensor Cabling

Figure 6-53 Intrusion sensor cabling

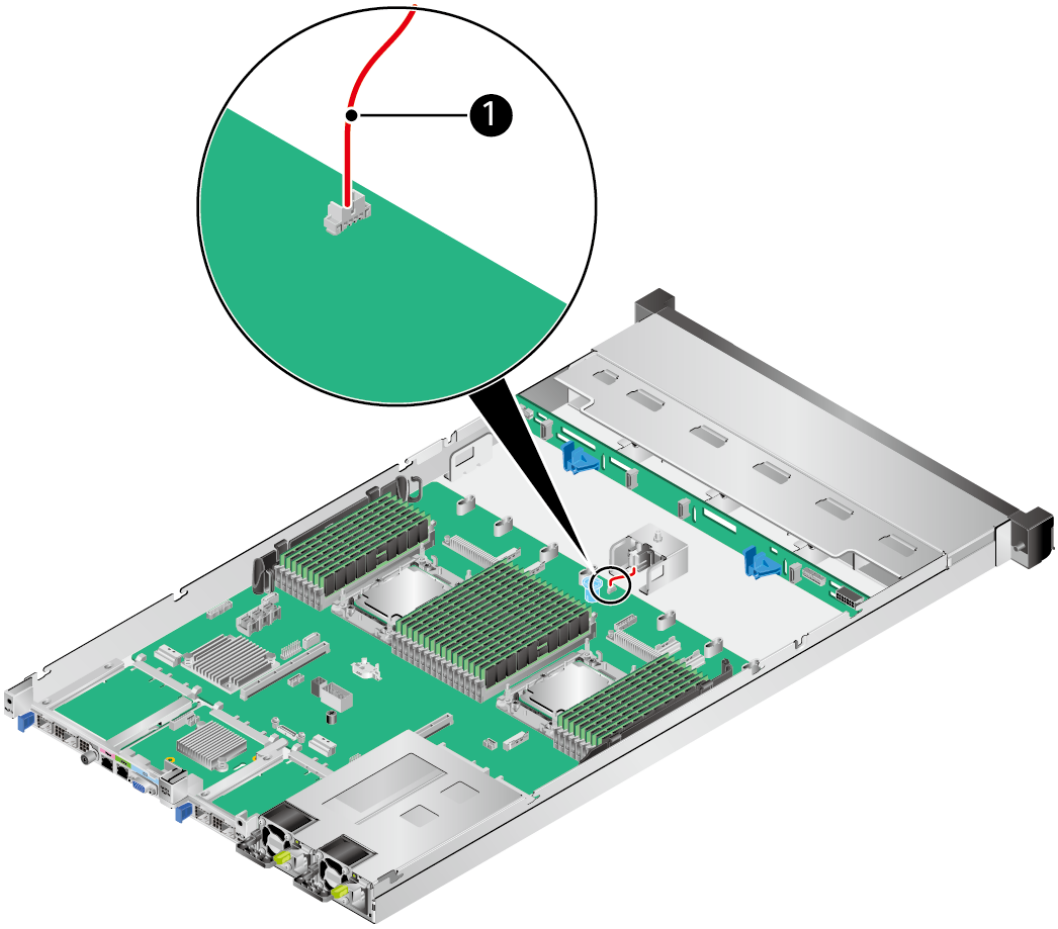


Table 6-13 Intrusion sensor cabling

No.	P/N Code	Description
1	04080771	Low-speed signal cable for connecting the intrusion sensor to the mainboard (S1)

6.4.3.4 Front-Drive Backplane Power and Indicator Signal Cabling

Front-Drive Backplane Power and Low-speed Signal Cables

Figure 6-54 Front-drive backplane power and low-speed signal cables

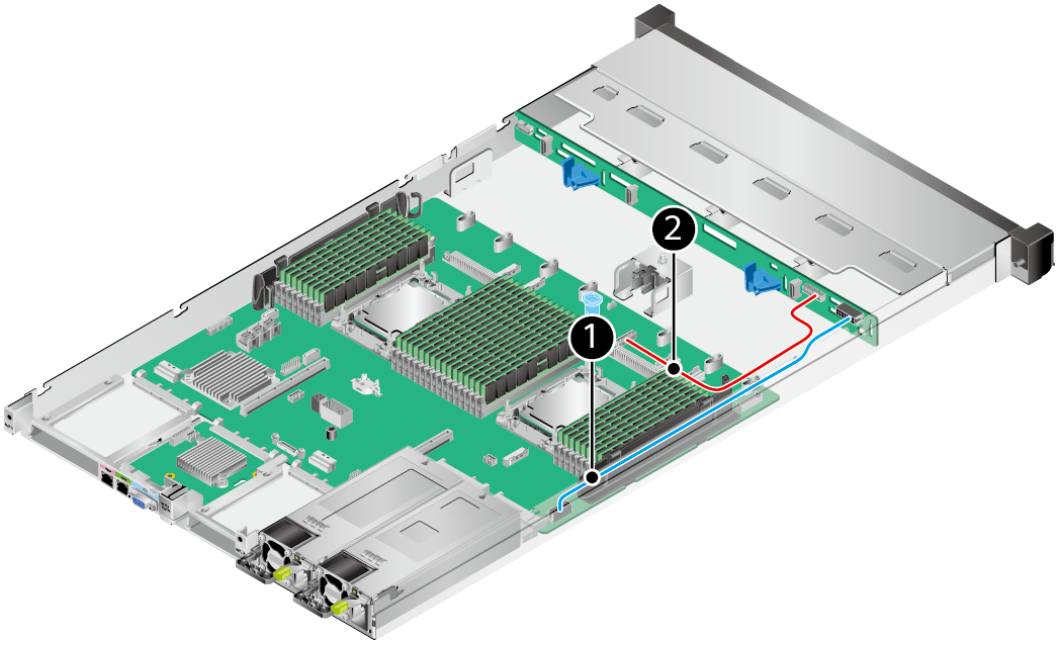


Table 6-14 Front-drive backplane power and low-speed signal cables

No.	P/N Code	Description
1	04152145-009	Power cable for connecting the front-drive backplane (J24) to the mainboard (J26)
2	04080651-007	Low-speed signal cable for connecting the front-drive backplane (J1) to the mainboard (J75) **NOTICE** If the server is configured with remote heat sinks, remove the remote heat sinks before removing or installing the cable.

6.4.3.5 Front-Drive Backplane SAS Signal Cabling (Server with a Screw-in RAID Controller Card)

Front-Drive Backplane SAS High-speed Cabling

Figure 6-55 Front-drive backplane SAS high-speed cabling

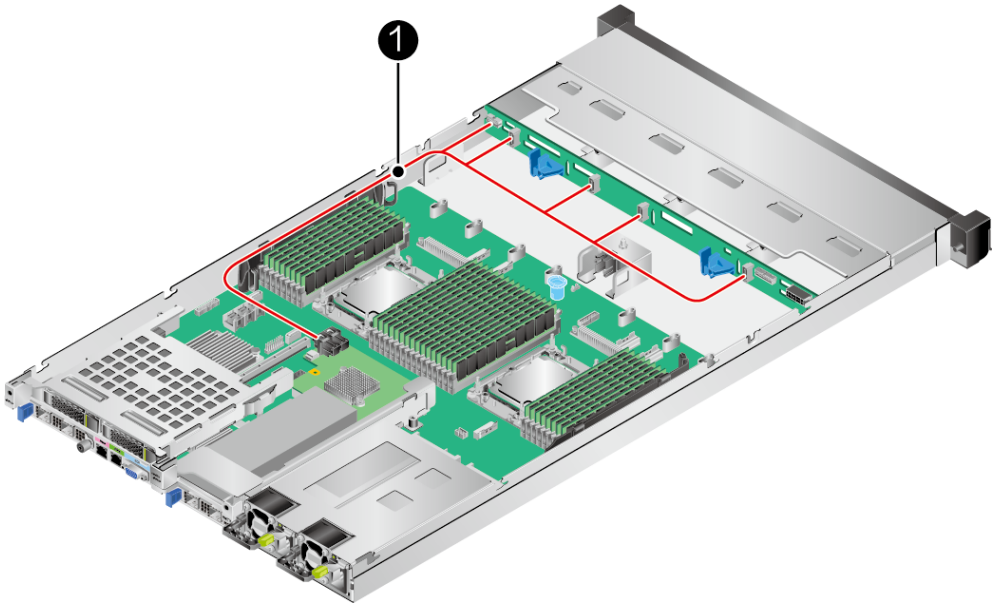


Table 6-15 Front-drive backplane SAS high-speed cabling

No.	P/N Code	Description
1	04051057	SAS high-speed cable for connecting the SAS0 signal connector, SAS1 signal connector, SAS2 signal connector, SAS3 signal connector, and Backplane indicator signal cable connector (J2, J3, J4, J5, and J6) of the front-drive backplane to PORT A of the screw-in RAID controller card

6.4.3.6 I/O Module 1 Cabling

I/O Module 1 Cabling

Figure 6-56 I/O module 1 cabling

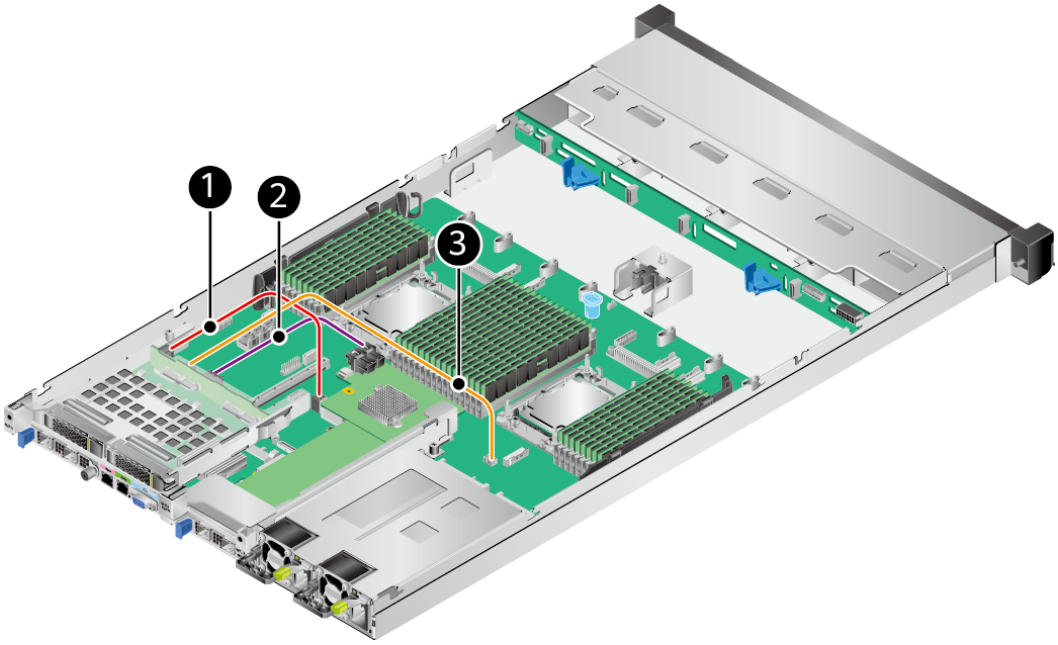


Table 6-16 I/O module 1 cabling

No.	P/N Code	Description	Remarks
1	04150448 -001	Power cable for connecting the rear-drive backplane (J2) to the mainboard (J21)	-
2	04052363 -001	SAS high-speed cable for connecting the rear-drive backplane (J3) to PORT B of the screw-in RAID controller card	The cable is not an independent spare part in this configuration. It is packed with the 2 x 2.5" drive module as a spare part.
3	04080551 -005	Low-speed signal cable for connecting the rear-drive backplane (J1) to the mainboard (J27)	The cable is not an independent spare part. It is packed with the 2 x 2.5" drive module as a spare part.

6.4.4 4 x 3.5" Drive Pass-through Configuration 3

6.4.4.1 Indicator Board and VGA Board Cabling

Indicator Board and VGA Board Cabling

Figure 6-57 Indicator board and VGA board cabling

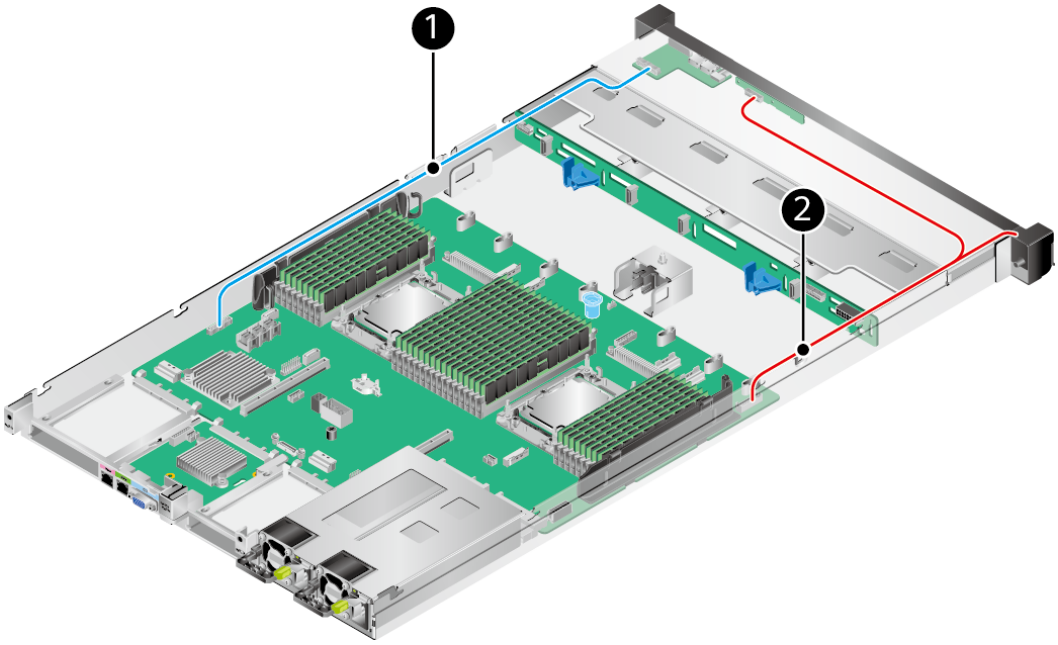


Table 6-17 Indicator board and VGA board cabling

No.	P/N Code	Description
1	04052666	Low-speed signal cable for connecting the VGA board to the mainboard (J113)
2	04080684-001	Low-speed signal cable for connecting the indicator board to the mainboard (J106)

6.4.4.2 OCP 3.0 Expansion Cable

OCP 3.0 Expansion Cable

NOTE

- When configured with a single CPU, the OCP 3.0 network card can only be installed in the 1 slot of the FlexIO card, and it does not support the expansion of bandwidth through the OCP 3.0 expansion cable.
- When configuring with dual CPUs, FlexIO card 1 and FlexIO card 2 slots can be configured with OCP 3.0 network cards, but only one OCP 3.0 network cards is supported to expand bandwidth at the same time.
  - FlexIO card has 1 slot, and the default operating bandwidth is x8. If you need to expand to x8+x8, you need to use 04052322-001 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 1 LP Slimline 6 connector (J13).
  - The FlexIO card has 2 slots, and the default operating bandwidth is x8. If you need to expand to x16, you need to use a 04052322 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 2 LP Slimline 7 connector (J31).
- The 10NVMe model does not support bandwidth expansion via OCP 3.0 expansion cable.

Figure 6-58 OCP 3.0 expansion cable 1

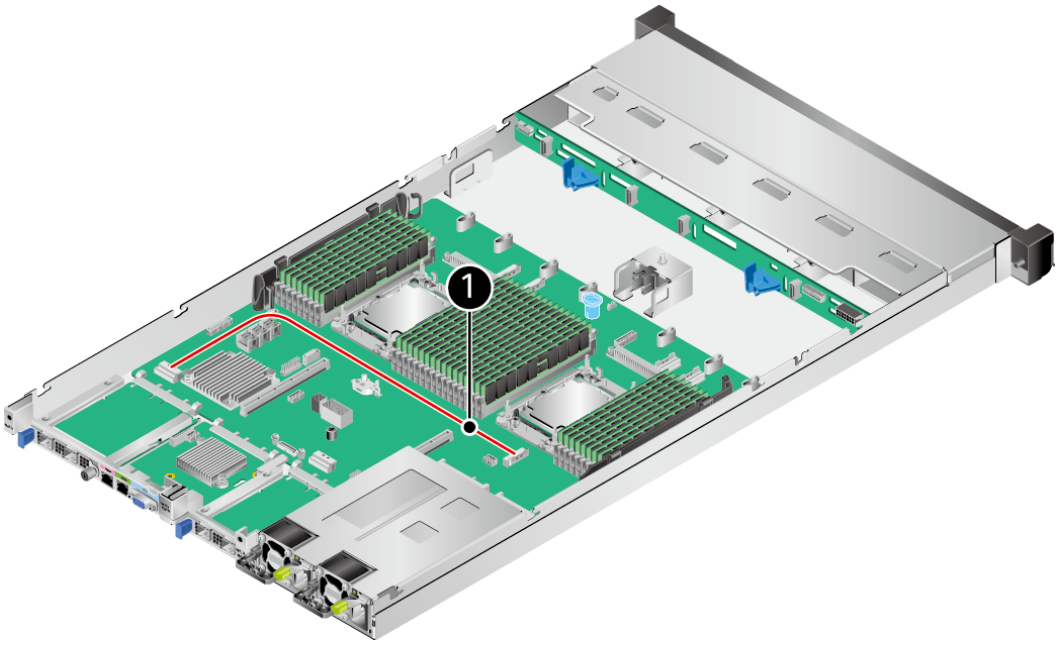


Table 6-18 OCP 3.0 expansion cable 1

No.	P/N Code	Description
1	04052322-001	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 6 connector (J13) of OCP 3.0 network adapter 1

Figure 6-59 OCP 3.0 expansion cable 2

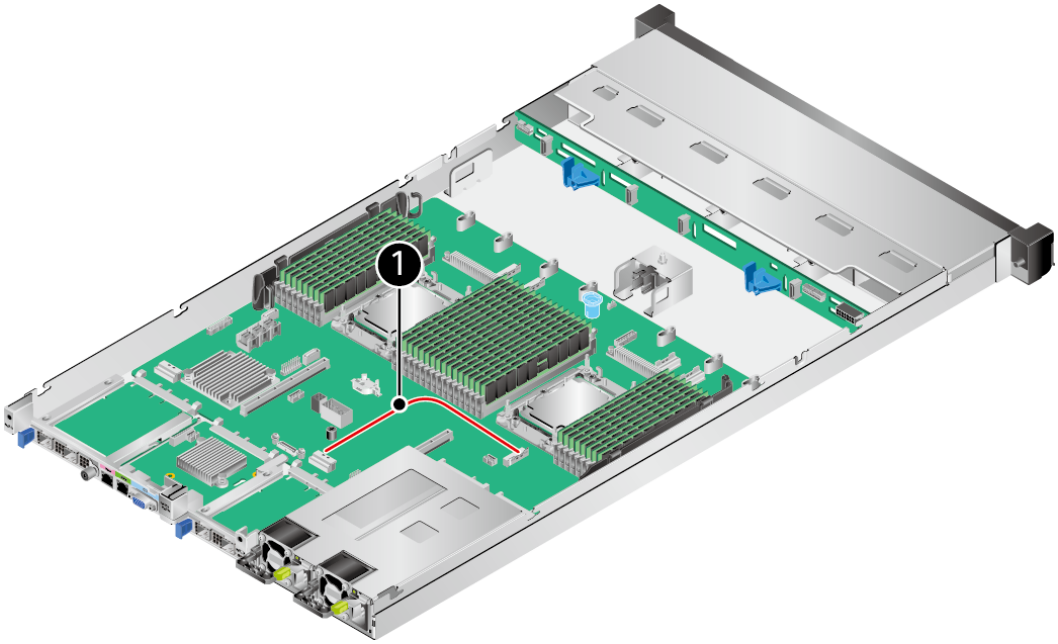


Table 6-19 OCP 3.0 expansion cable 2

No.	P/N Code	Description
1	04052322	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 7 connector (J31) of OCP 3.0 network adapter 2

6.4.4.3 Intrusion Sensor Cabling

Intrusion Sensor Cabling

Figure 6-60 Intrusion sensor cabling

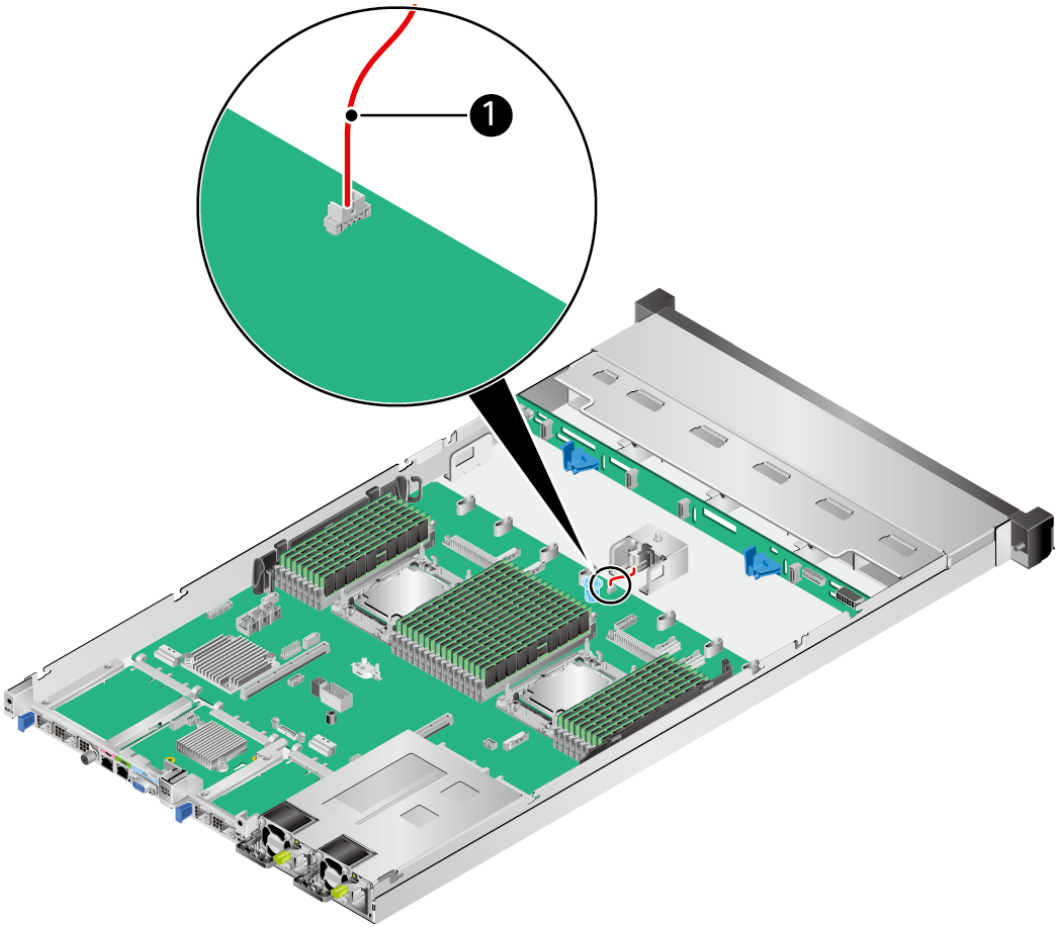


Table 6-20 Intrusion sensor cabling

No.	P/N Code	Description
1	04080771	Low-speed signal cable for connecting the intrusion sensor to the mainboard (S1)

6.4.4.4 Front-Drive Backplane Power and Indicator Signal Cabling

Front-Drive Backplane Power and Low-speed Signal Cables

Figure 6-61 Front-drive backplane power and low-speed signal cables

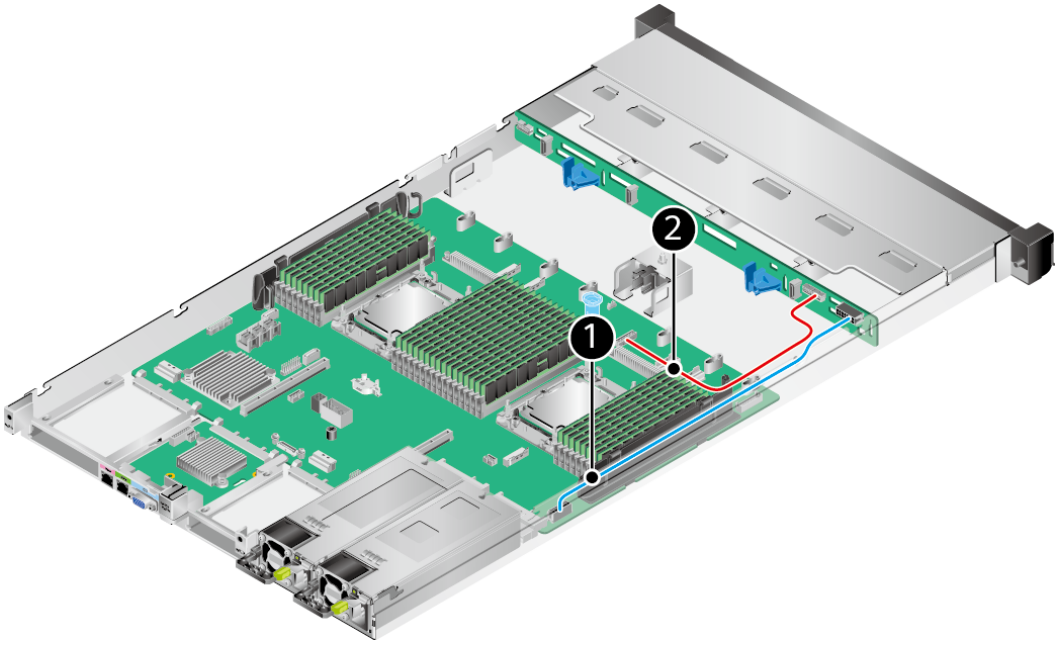


Table 6-21 Front-drive backplane power and low-speed signal cables

No.	P/N Code	Description
1	04152145-009	Power cable for connecting the front-drive backplane (J24) to the mainboard (J26)
2	04080651-007	Low-speed signal cable for connecting the front-drive backplane (J1) to the mainboard (J75) **NOTICE** If the server is configured with remote heat sinks, remove the remote heat sinks before removing or installing the cable.

6.4.4.5 Front-Drive Backplane SAS Signal Cabling (Server with a PCIe RAID Controller Card)

NOTICE

The PCIe RAID controller card must be installed in slot 1.

Front-Drive Backplane SAS high-speed cabling

Figure 6-62 Front-drive backplane SAS high-speed cabling

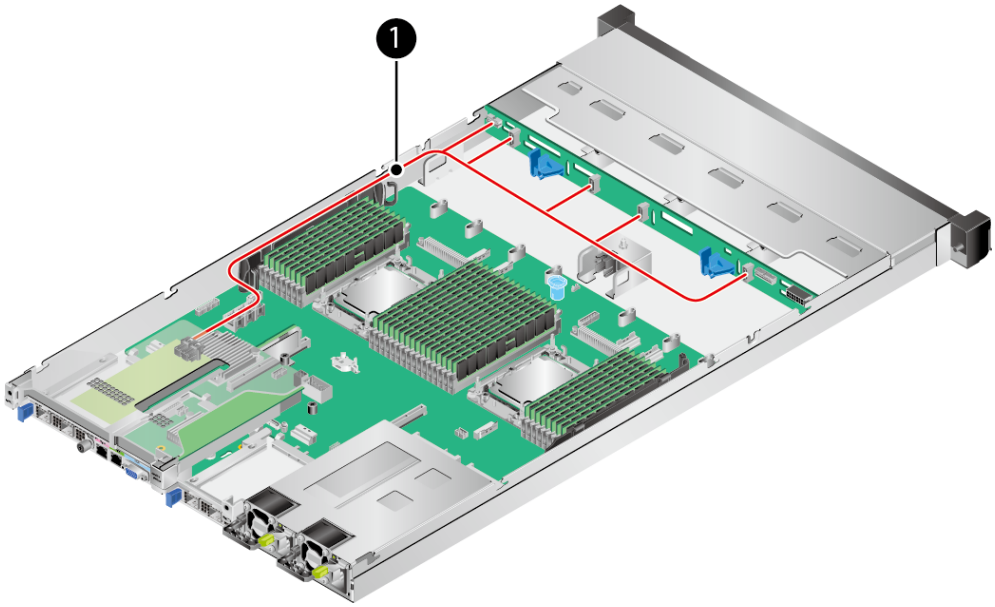


Table 6-22 Front-drive backplane SAS high-speed cabling

No.	P/N Code	Description
1	04051057	SAS high-speed cable for connecting the SAS0 signal connector, SAS1 signal connector, SAS2 signal connector, SAS3 signal connector, and Backplane indicator signal cable connector (J2, J3, J4, J5, and J6) of the front-drive backplane to PORT A of the PCIe RAID controller card

NOTE

The port numbers vary with the PCIe RAID controller cards. The port number of the PCIe RAID controller card connected to the SAS0 signal connector, SAS1 signal connector, SAS2 signal connector, and SAS3 signal connector (J2, J3, J4, and J5) of the front-drive backplane may be C0, PORT A, 0, or CN0.

6.4.5 8 x 2.5" Drive Pass-through Configuration 1

6.4.5.1 Indicator Board and USB Cabling

Indicator Board and USB Cabling

Figure 6-63 Indicator board and USB cabling

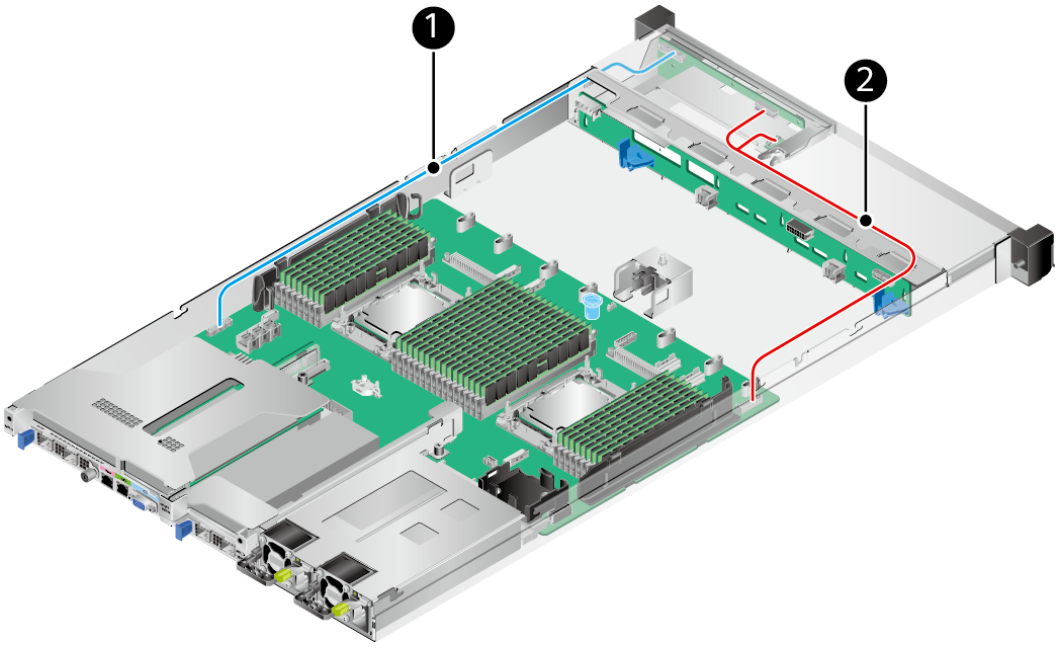


Table 6-23 VGA board cabling

No.	P/N Code	Description
1	04052666	Low-speed signal cable for connecting a USB device to the mainboard (J113)
2	04080684-001	Low-speed signal cable for connecting the indicator board to the mainboard (J106)

6.4.5.2 DVD Drive Cabling

DVD Drive Cabling

Figure 6-64 DVD drive cabling

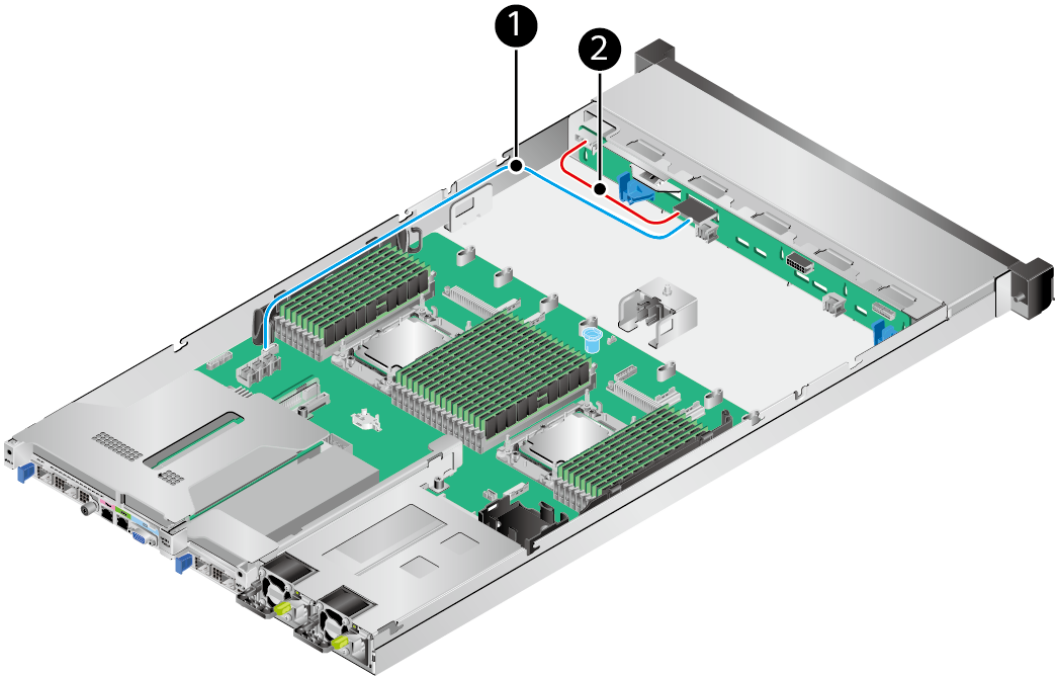


Table 6-24 DVD drive cabling

No.	P/N Code	Description
1	04050689	High-speed cable for connecting the DVD drive to the mainboard (J1)
2	04050689	Power cable for connecting the DVD drive to the front-drive backplane (J11)

6.4.5.3 OCP 3.0 Expansion Cable

OCP 3.0 Expansion Cable

NOTE

- When configured with a single CPU, the OCP 3.0 network card can only be installed in the 1 slot of the FlexIO card, and it does not support the expansion of bandwidth through the OCP 3.0 expansion cable.
- When configuring with dual CPUs, FlexIO card 1 and FlexIO card 2 slots can be configured with OCP 3.0 network cards, but only one OCP 3.0 network cards is supported to expand bandwidth at the same time.
  - FlexIO card has 1 slot, and the default operating bandwidth is x8. If you need to expand to x8+x8, you need to use 04052322-001 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 1 LP Slimline 6 connector (J13).
  - The FlexIO card has 2 slots, and the default operating bandwidth is x8. If you need to expand to x16, you need to use a 04052322 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 2 LP Slimline 7 connector (J31).
- The 10NVMe model does not support bandwidth expansion via OCP 3.0 expansion cable.

Figure 6-65 OCP 3.0 expansion cable 1

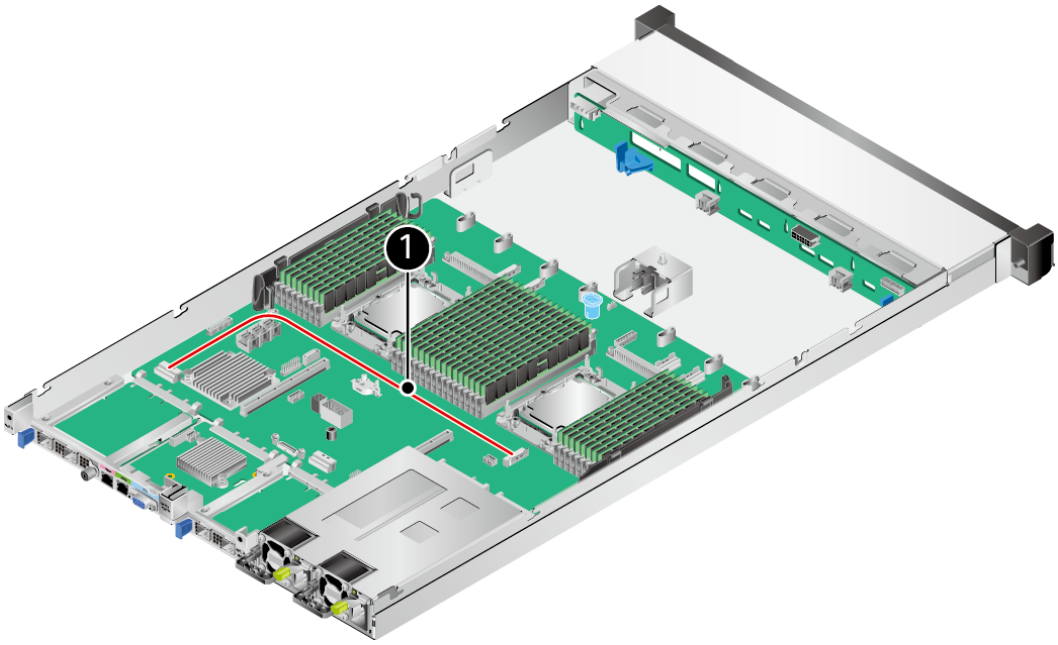


Table 6-25 OCP 3.0 expansion cable 1

No.	P/N Code	Description
1	04052322-001	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 6 connector (J13) of OCP 3.0 network adapter 1

Figure 6-66 OCP 3.0 expansion cable 2

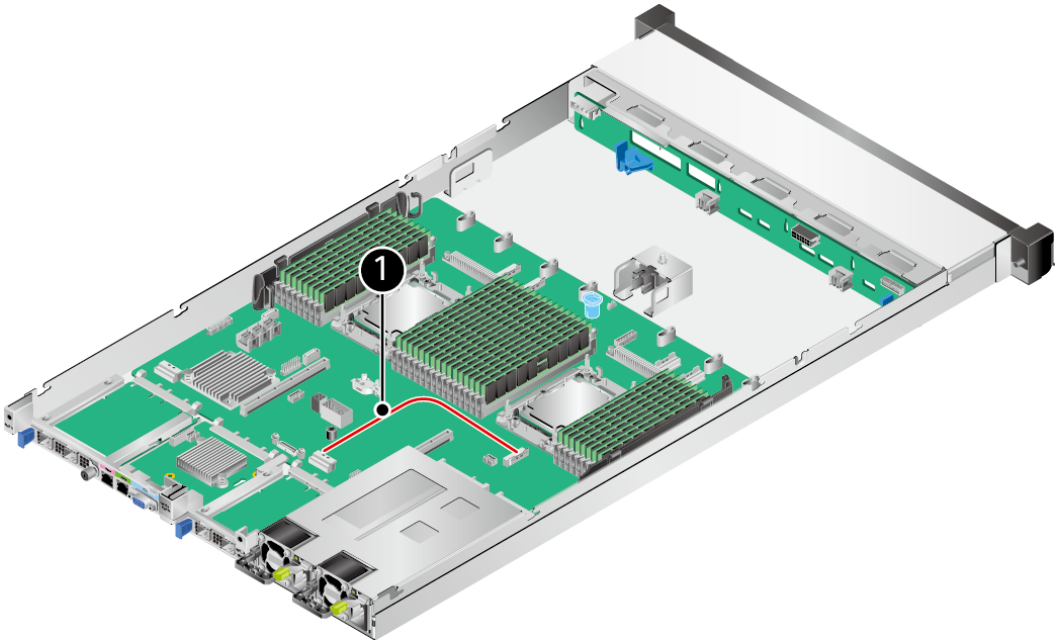


Table 6-26 OCP 3.0 expansion cable 2

No.	P/N Code	Description
1	04052322	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 7 connector (J31) of OCP 3.0 network adapter 2

6.4.5.4 Intrusion Sensor Cabling

Intrusion Sensor Cabling

Figure 6-67 Intrusion sensor cabling

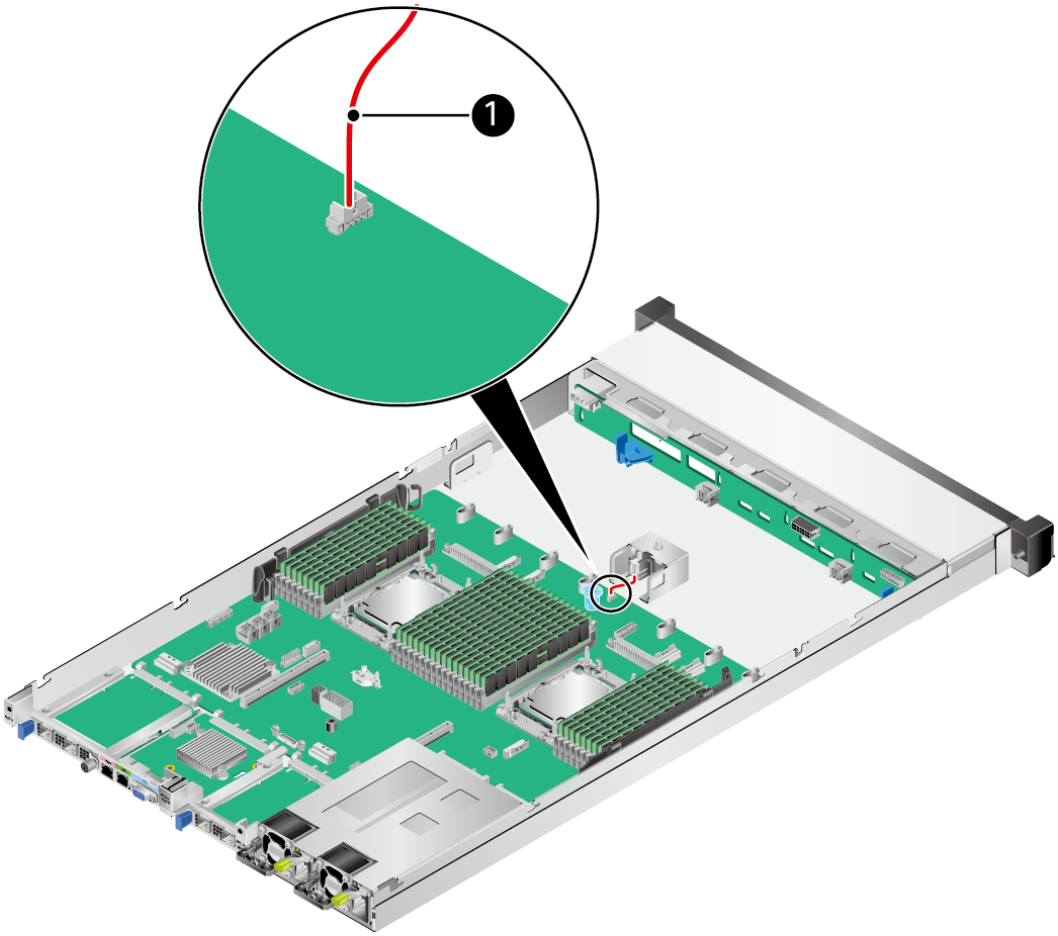


Table 6-27 Intrusion sensor cabling

No.	P/N Code	Description
1	04080771	Low-speed signal cable for connecting the intrusion sensor to the mainboard (S1)

6.4.5.5 Front-Drive Backplane Power and Indicator Signal Cabling

Front-Drive Backplane Power and Low-speed Signal Cables

Figure 6-68 Front-drive backplane power and low-speed signal cables

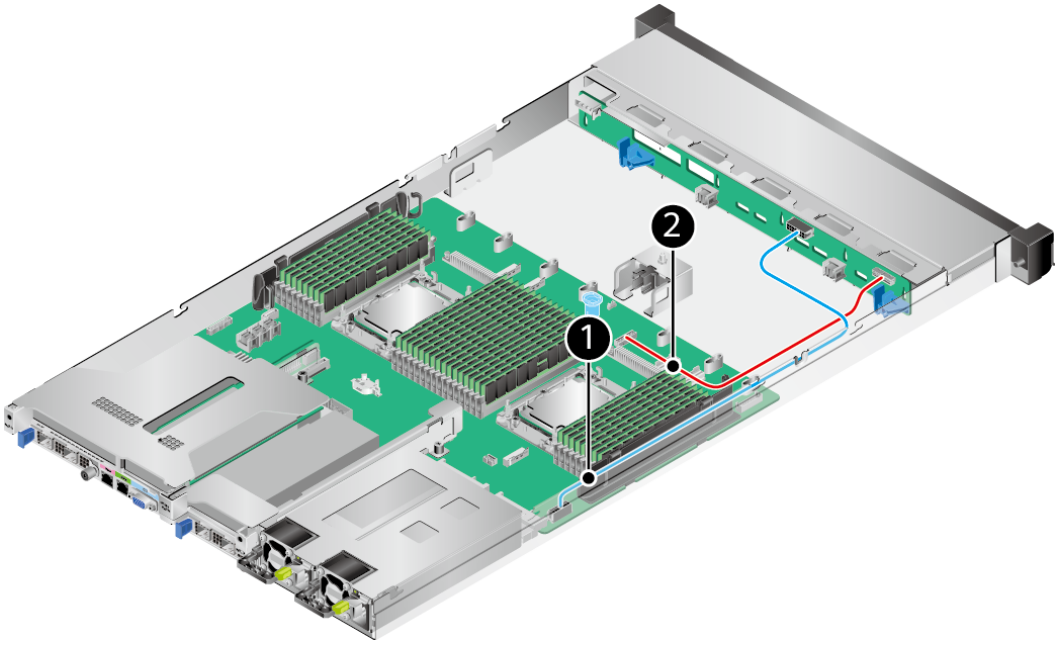


Table 6-28 Front-drive backplane power and low-speed signal cables

No.	P/N Code	Description
1	04152145	Power cable for connecting the front-drive backplane (J24) to the mainboard (J26)
2	04080651-007	Low-speed signal cable for connecting the front-drive backplane (J1) to the mainboard (J75) **NOTICE** If the server is configured with remote heat sinks, remove the remote heat sinks before removing or installing the cable.

6.4.5.6 Front-Drive Backplane SAS Cabling (PCH Pass-through)

Front-Drive Backplane SAS High-speed Cabling

Figure 6-69 Front-drive backplane SAS high-speed cabling

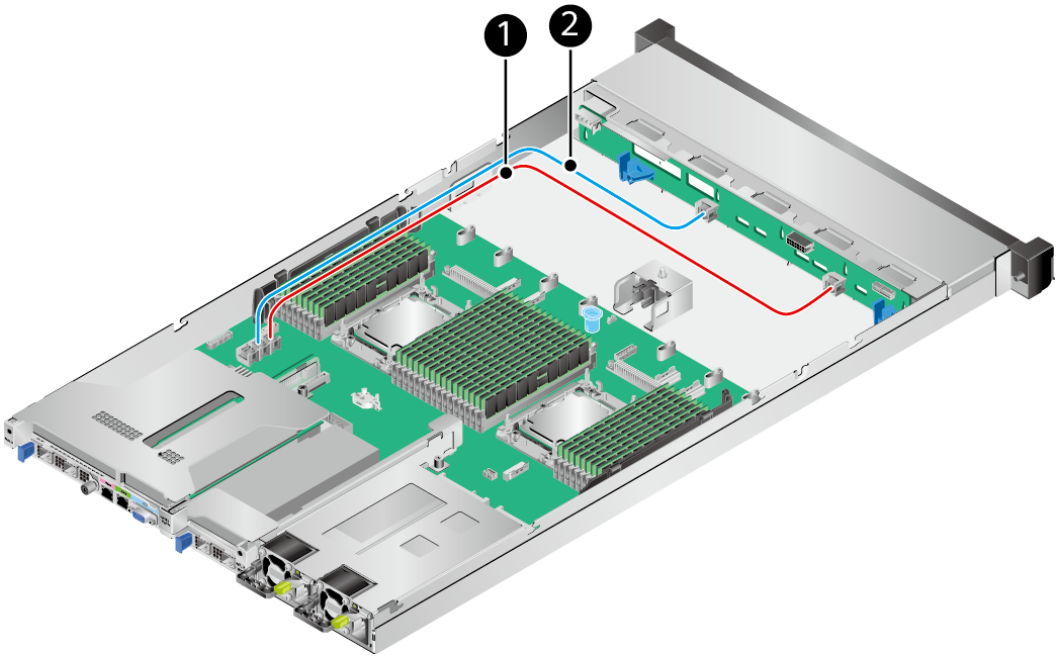


Table 6-29 Front-drive backplane SAS high-speed cabling

No.	P/N Code	Description
1	04051939-001	SAS high-speed cable for connecting the front-drive backplane (J28) to the mainboard (J6)
2	04051939-001	SAS high-speed cable for connecting the front-drive backplane (J29) to the mainboard (J5)

6.4.6 8 x 2.5" Drive Pass-through Configuration 2

6.4.6.1 Indicator Board and USB Cabling

Indicator Board and USB Cabling

Figure 6-70 Indicator board and USB cabling

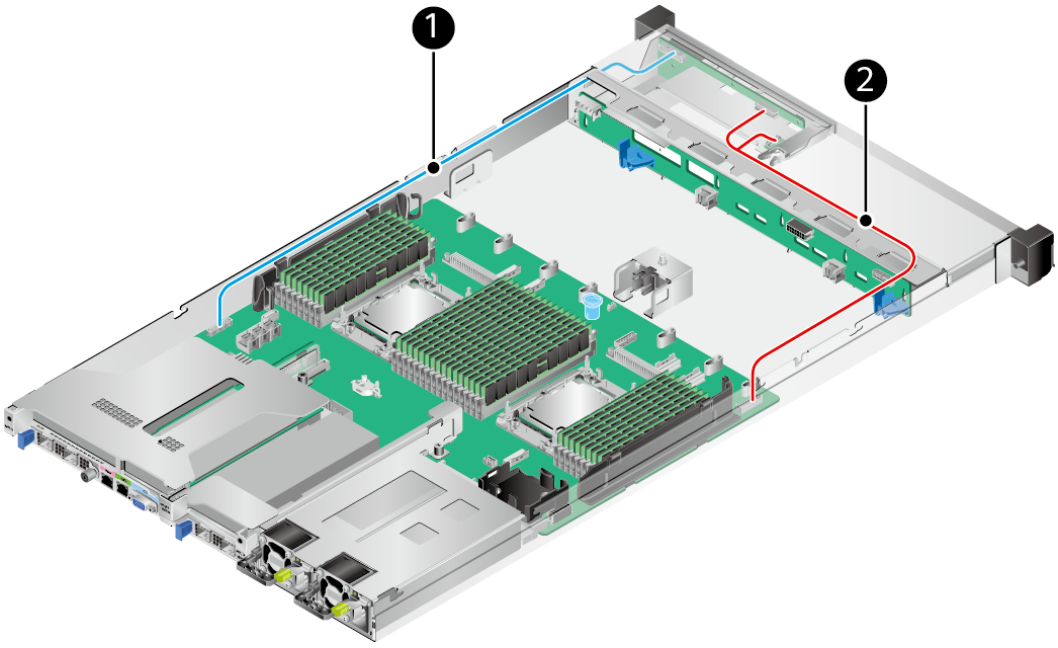


Table 6-30 VGA board cabling

No.	P/N Code	Description
1	04052666	Low-speed signal cable for connecting a USB device to the mainboard (J113)
2	04080684-001	Low-speed signal cable for connecting the indicator board to the mainboard (J106)

6.4.6.2 DVD Drive Cabling

DVD Drive Cabling

Figure 6-71 DVD drive cabling

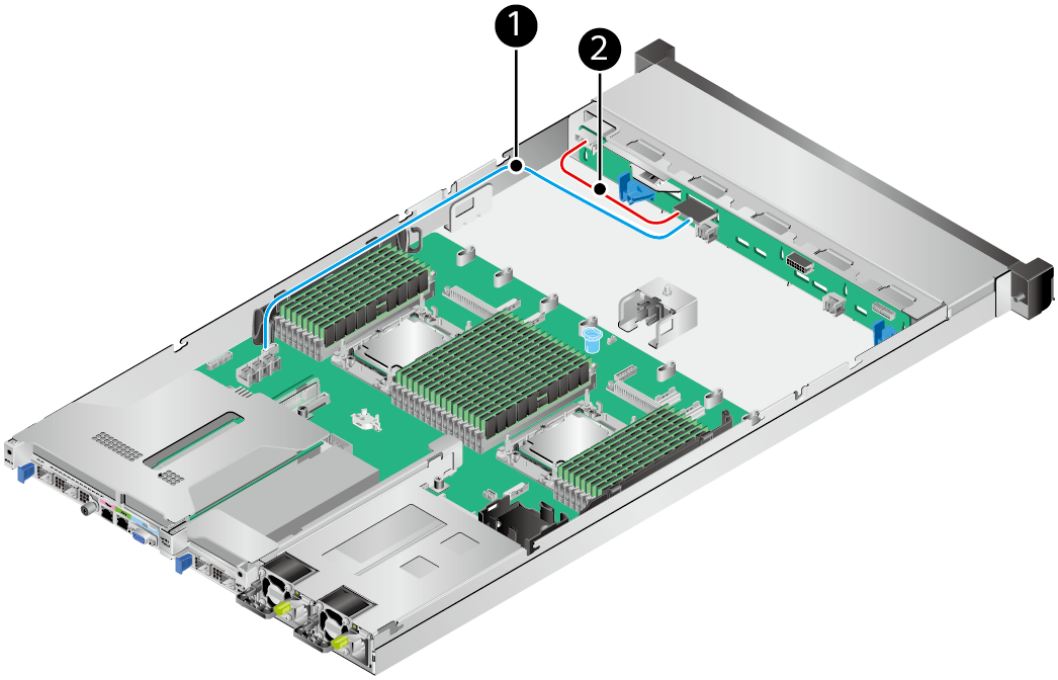


Table 6-31 DVD drive cabling

No.	P/N Code	Description
1	04050689	High-speed cable for connecting the DVD drive to the mainboard (J1)
2	04050689	Power cable for connecting the DVD drive to the front-drive backplane (J11)

6.4.6.3 OCP 3.0 Expansion Cable

OCP 3.0 Expansion Cable

NOTE

- When configured with a single CPU, the OCP 3.0 network card can only be installed in the 1 slot of the FlexIO card, and it does not support the expansion of bandwidth through the OCP 3.0 expansion cable.
- When configuring with dual CPUs, FlexIO card 1 and FlexIO card 2 slots can be configured with OCP 3.0 network cards, but only one OCP 3.0 network cards is supported to expand bandwidth at the same time.
  - FlexIO card has 1 slot, and the default operating bandwidth is x8. If you need to expand to x8+x8, you need to use 04052322-001 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 1 LP Slimline 6 connector (J13).
  - The FlexIO card has 2 slots, and the default operating bandwidth is x8. If you need to expand to x16, you need to use a 04052322 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 2 LP Slimline 7 connector (J31).
- The 10NVMe model does not support bandwidth expansion via OCP 3.0 expansion cable.

Figure 6-72 OCP 3.0 expansion cable 1

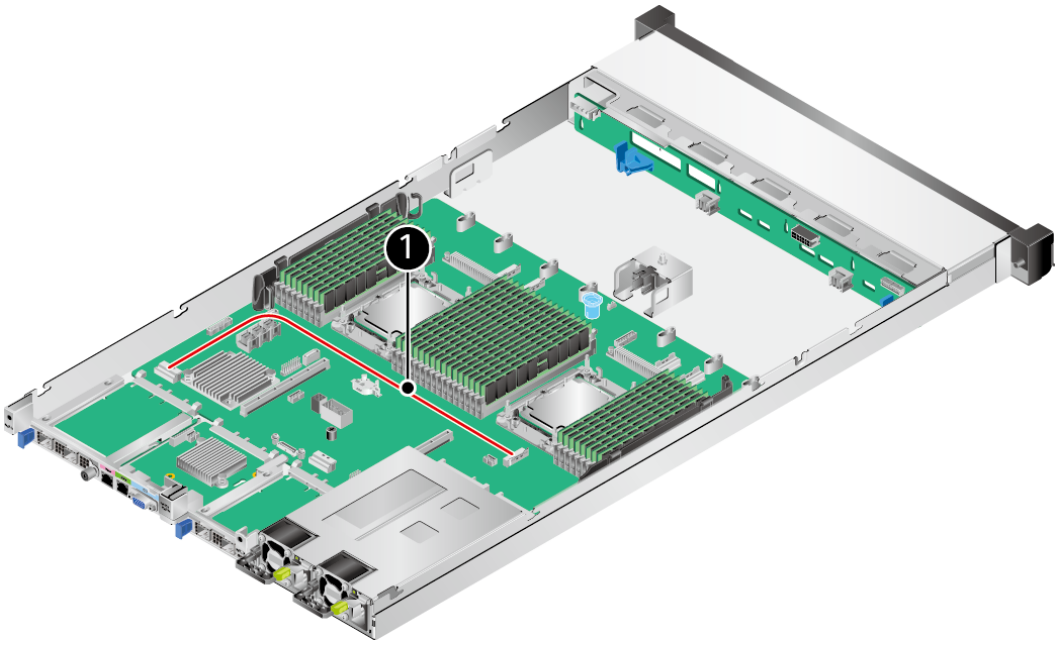


Table 6-32 OCP 3.0 expansion cable 1

No.	P/N Code	Description
1	04052322-001	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 6 connector (J13) of OCP 3.0 network adapter 1

Figure 6-73 OCP 3.0 expansion cable 2

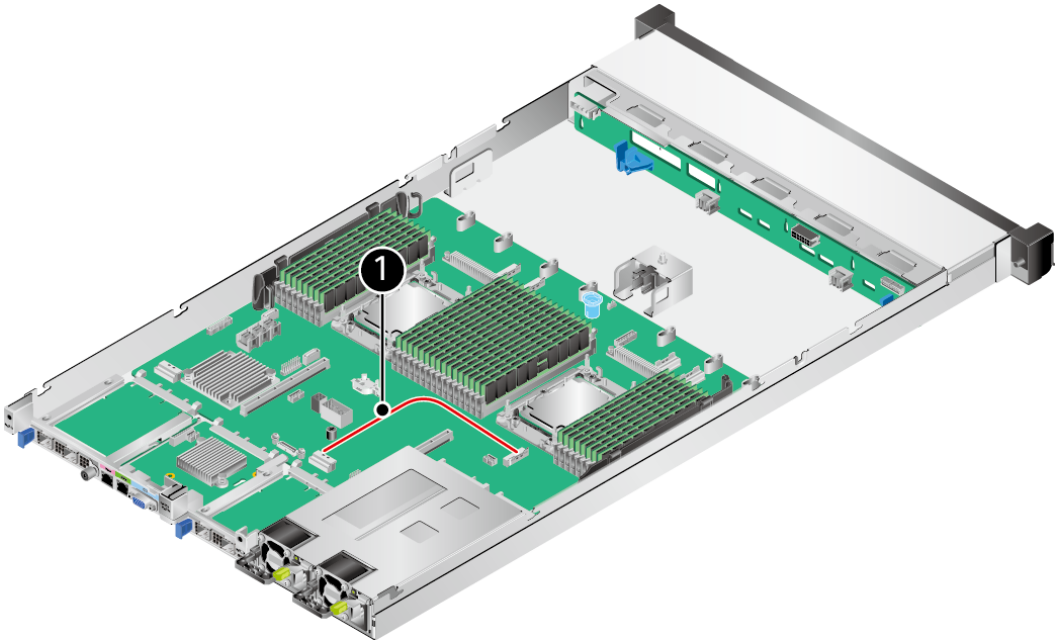


Table 6-33 OCP 3.0 expansion cable 2

No.	P/N Code	Description
1	04052322	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 7 connector (J31) of OCP 3.0 network adapter 2

6.4.6.4 Intrusion Sensor Cabling

Intrusion Sensor Cabling

Figure 6-74 Intrusion sensor cabling

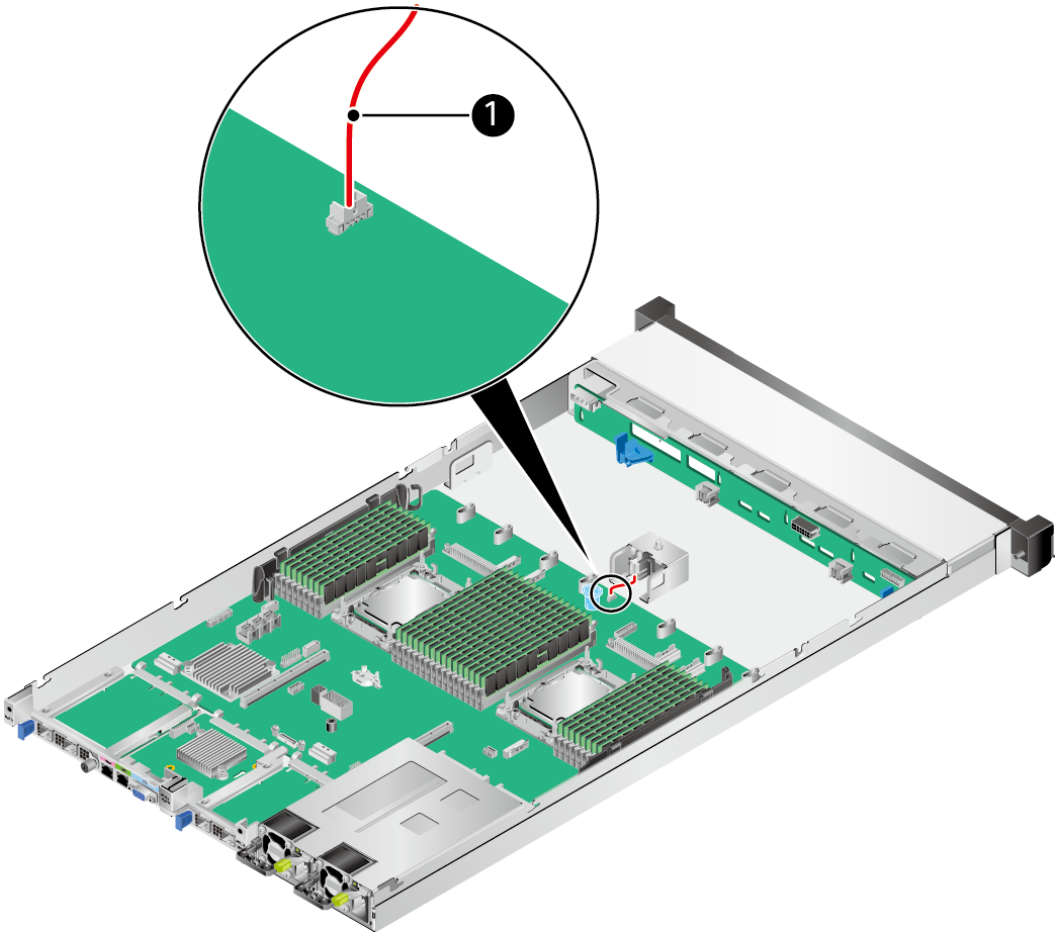


Table 6-34 Intrusion sensor cabling

No.	P/N Code	Description
1	04080771	Low-speed signal cable for connecting the intrusion sensor to the mainboard (S1)

6.4.6.5 Front-Drive Backplane Power and Indicator Signal Cabling

Front-Drive Backplane Power and Low-speed Signal Cables

Figure 6-75 Front-drive backplane power and low-speed signal cables

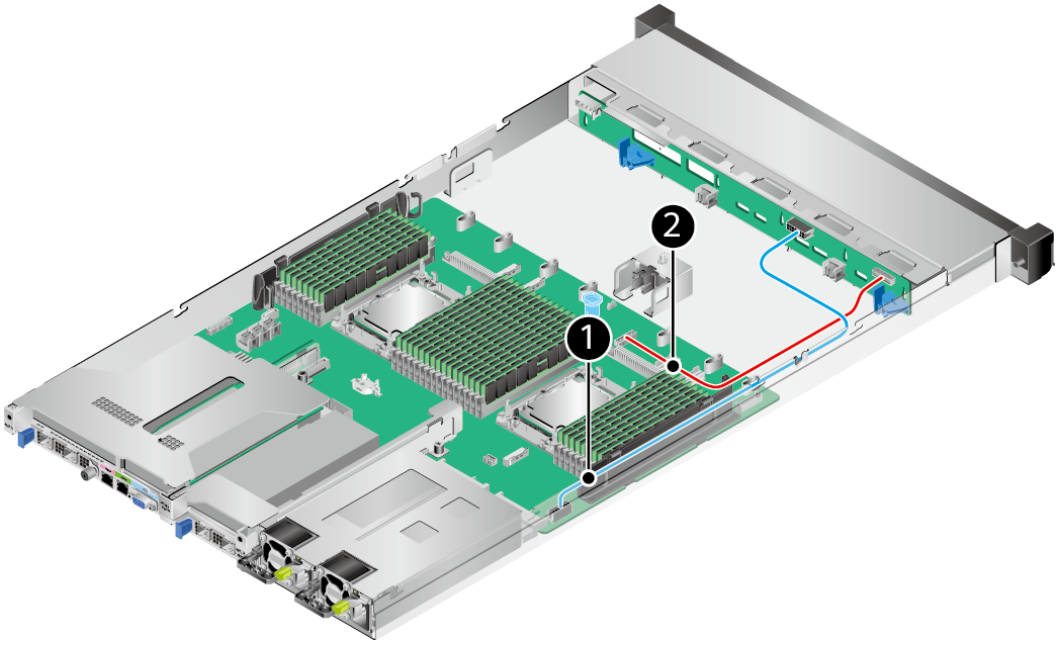


Table 6-35 Front-drive backplane power and low-speed signal cables

No.	P/N Code	Description
1	04152145	Power cable for connecting the front-drive backplane (J24) to the mainboard (J26)
2	04080651-007	Low-speed signal cable for connecting the front-drive backplane (J1) to the mainboard (J75) **NOTICE** If the server is configured with remote heat sinks, remove the remote heat sinks before removing or installing the cable.

6.4.6.6 Front-Drive Backplane SAS Signal Cabling (Server with a Screw-in RAID Controller Card)

Front-Drive Backplane SAS High-speed Cabling

Figure 6-76 Front-drive backplane SAS high-speed cabling

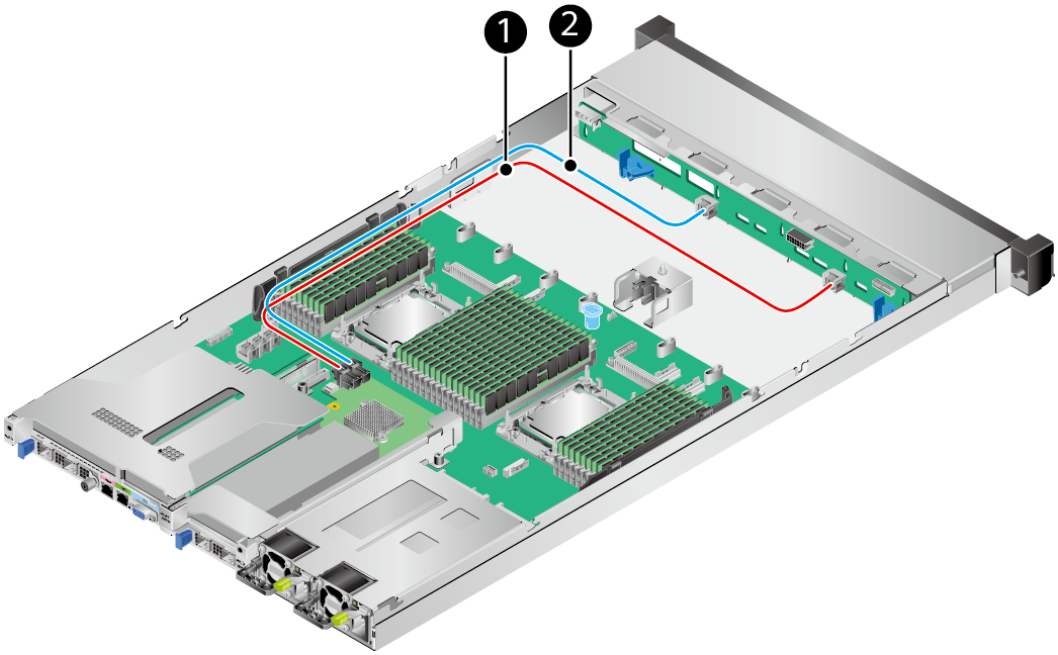


Table 6-36 Front-drive backplane SAS high-speed cabling

No.	P/N Code	Description
1	04051916-015	SAS high-speed cable for connecting the front-drive backplane (J28) to PORT A of the screw-in RAID controller card
2	04051916-015	SAS high-speed cable for connecting the front-drive backplane (J29) to PORT B of the screw-in RAID controller card

6.4.7 8 x 2.5" Drive Pass-through Configuration 3

6.4.7.1 Indicator Board and USB Cabling

Indicator Board and USB Cabling

Figure 6-77 Indicator board and USB cabling

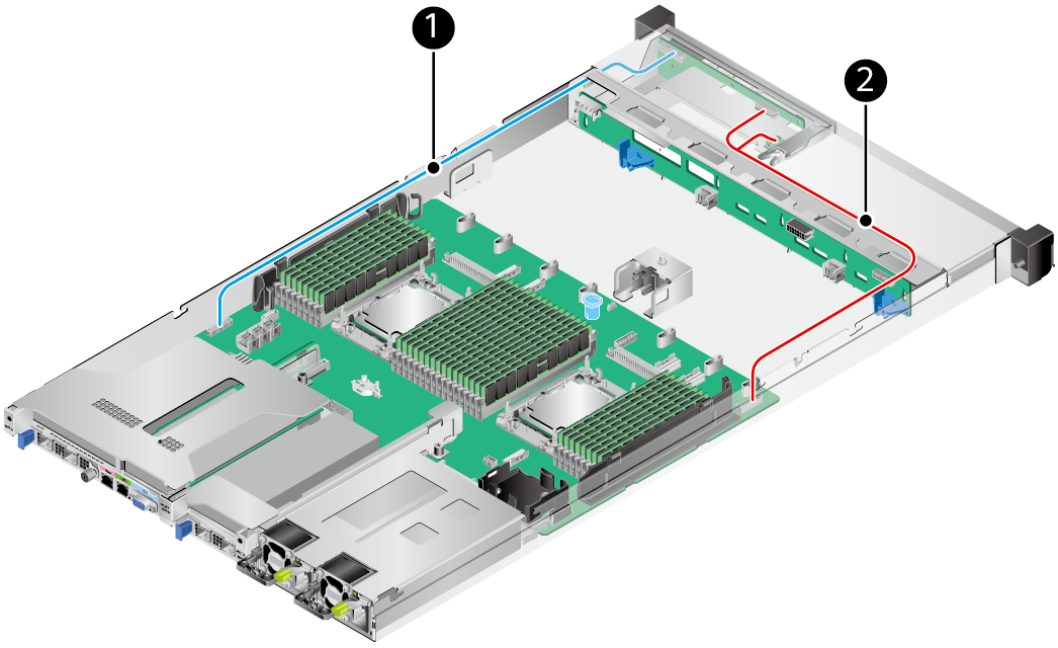


Table 6-37 VGA board cabling

No.	P/N Code	Description
1	04052666	Low-speed signal cable for connecting a USB device to the mainboard (J113)
2	04080684-001	Low-speed signal cable for connecting the indicator board to the mainboard (J106)

6.4.7.2 DVD Drive Cabling

DVD Drive Cabling

Figure 6-78 DVD drive cabling

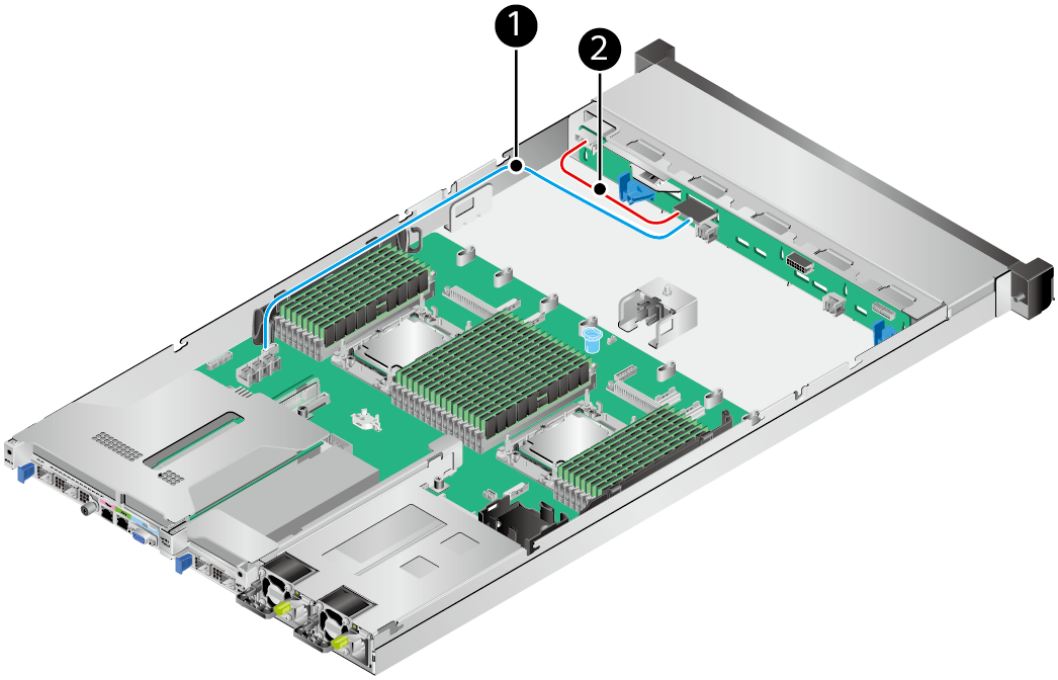


Table 6-38 DVD drive cabling

No.	P/N Code	Description
1	04050689	High-speed cable for connecting the DVD drive to the mainboard (J1)
2	04050689	Power cable for connecting the DVD drive to the front-drive backplane (J11)

6.4.7.3 OCP 3.0 Expansion Cable

OCP 3.0 Expansion Cable

NOTE

- When configured with a single CPU, the OCP 3.0 network card can only be installed in the 1 slot of the FlexIO card, and it does not support the expansion of bandwidth through the OCP 3.0 expansion cable.
- When configuring with dual CPUs, FlexIO card 1 and FlexIO card 2 slots can be configured with OCP 3.0 network cards, but only one OCP 3.0 network cards is supported to expand bandwidth at the same time.
  - FlexIO card has 1 slot, and the default operating bandwidth is x8. If you need to expand to x8+x8, you need to use 04052322-001 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 1 LP Slimline 6 connector (J13).
  - The FlexIO card has 2 slots, and the default operating bandwidth is x8. If you need to expand to x16, you need to use a 04052322 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 2 LP Slimline 7 connector (J31).
- The 10NVMe model does not support bandwidth expansion via OCP 3.0 expansion cable.

Figure 6-79 OCP 3.0 expansion cable 1

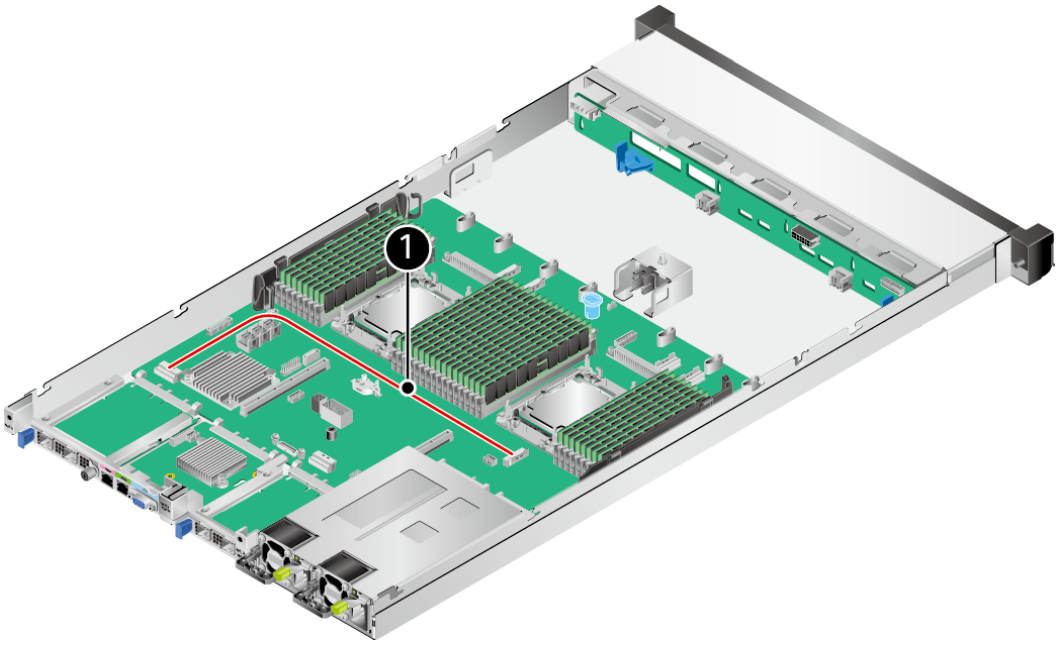


Table 6-39 OCP 3.0 expansion cable 1

No.	P/N Code	Description
1	04052322-001	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 6 connector (J13) of OCP 3.0 network adapter 1

Figure 6-80 OCP 3.0 expansion cable 2

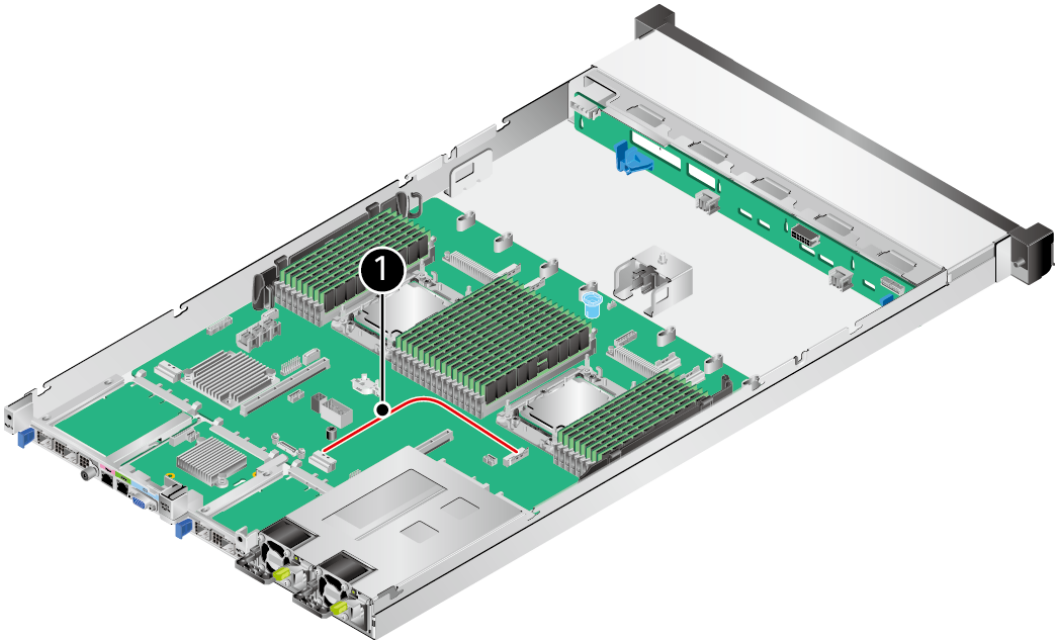


Table 6-40 OCP 3.0 expansion cable 2

No.	P/N Code	Description
1	04052322	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 7 connector (J31) of OCP 3.0 network adapter 2

6.4.7.4 Intrusion Sensor Cabling

Intrusion Sensor Cabling

Figure 6-81 Intrusion sensor cabling

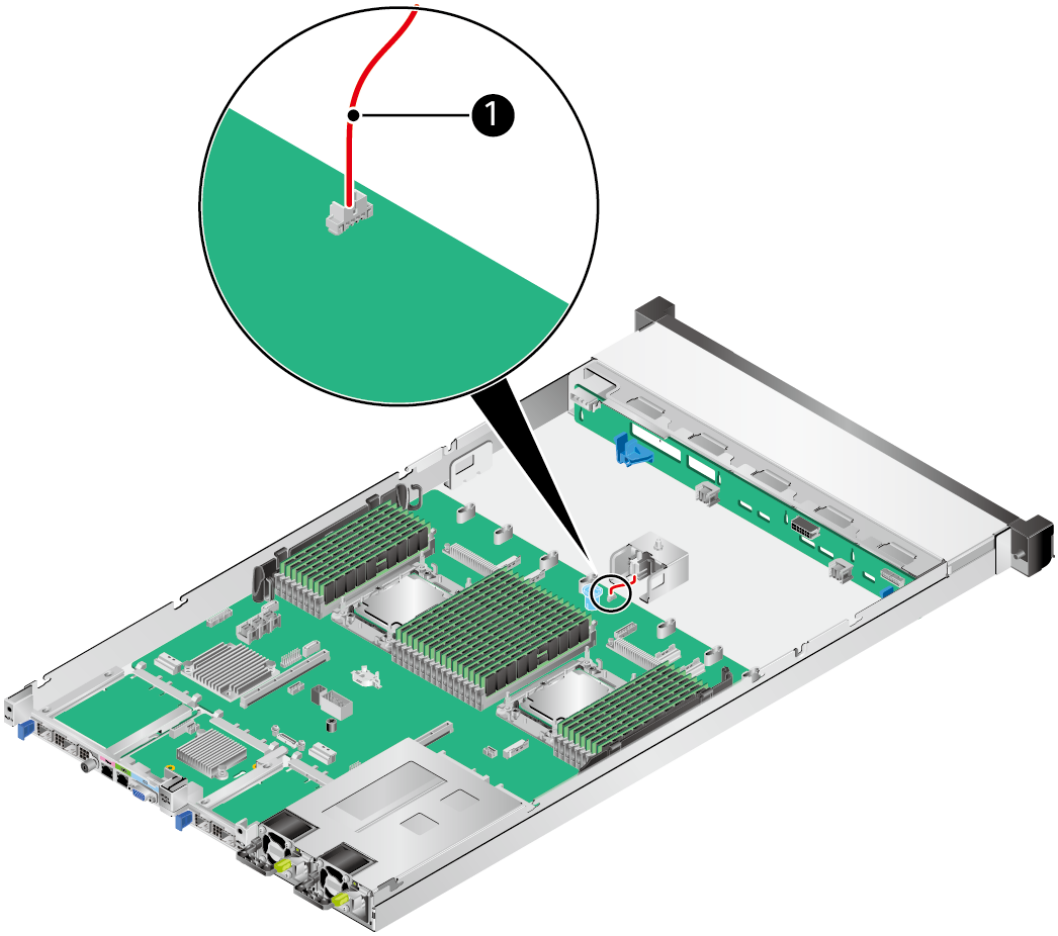


Table 6-41 Intrusion sensor cabling

No.	P/N Code	Description
1	04080771	Low-speed signal cable for connecting the intrusion sensor to the mainboard (S1)

6.4.7.5 Front-Drive Backplane Power and Indicator Signal Cabling

Front-Drive Backplane Power and Low-speed Signal Cables

Figure 6-82 Front-drive backplane power and low-speed signal cables

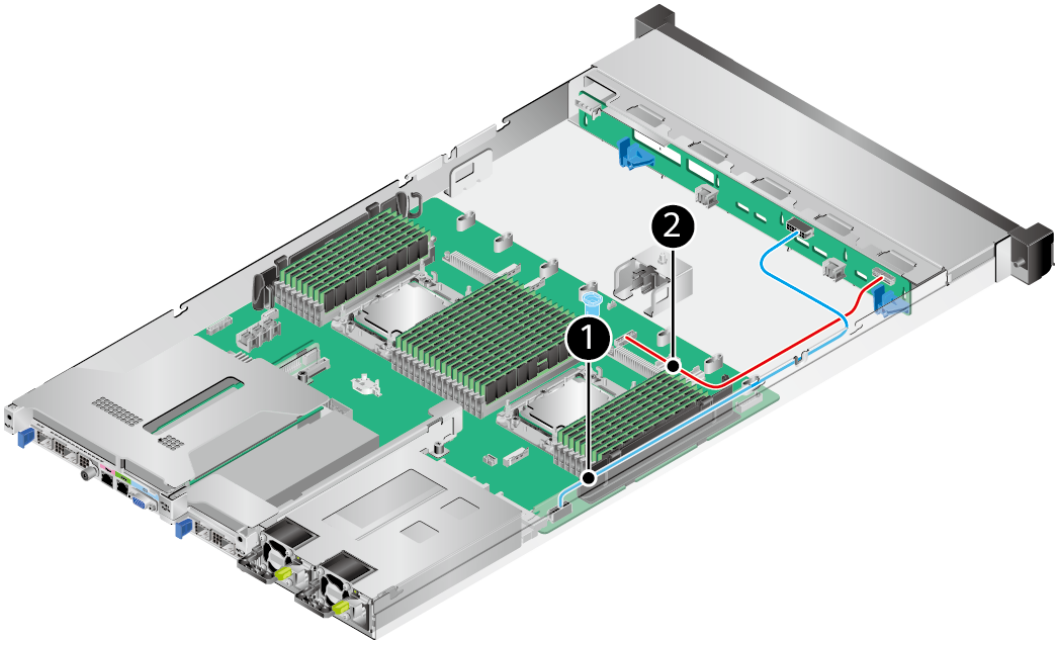


Table 6-42 Front-drive backplane power and low-speed signal cables

No.	P/N Code	Description
1	04152145	Power cable for connecting the front-drive backplane (J24) to the mainboard (J26)
2	04080651-007	Low-speed signal cable for connecting the front-drive backplane (J1) to the mainboard (J75) **NOTICE** If the server is configured with remote heat sinks, remove the remote heat sinks before removing or installing the cable.

6.4.7.6 Front-Drive Backplane SAS Signal Cabling (Server with a PCIe RAID Controller Card)

NOTICE

The PCIe RAID controller card must be installed in slot 1.

Front-Drive Backplane SAS High-speed Cabling

Figure 6-83 Front-drive backplane SAS high-speed cabling

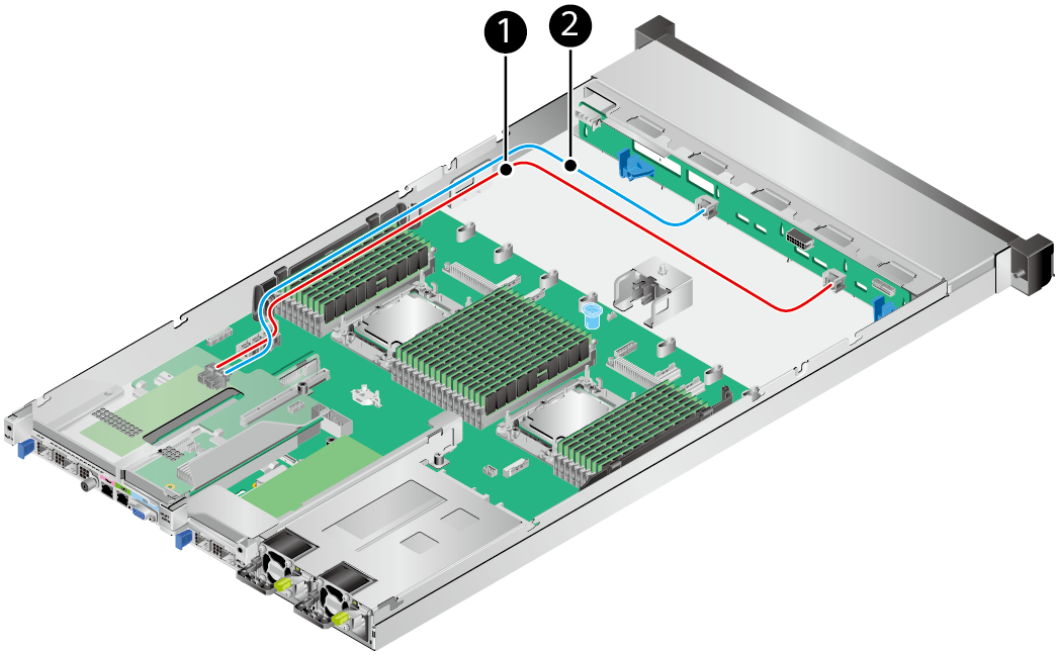


Table 6-43 Front-drive backplane SAS high-speed cabling

No.	P/N Code	Description
1	04051021	SAS high-speed cable for connecting the front-drive backplane (J28) to PORT A of the PCIe RAID controller card
2	04051021	SAS high-speed cable for connecting the front-drive backplane (J29) to PORT B of the PCIe RAID controller card

NOTE

The port numbers vary with the PCIe RAID controller cards. The port number of the PCIe RAID controller card connected to front-drive backplane (J28) may be C0, PORT A, 0, or CN0, and the port number of the PCIe RAID controller card connected to front-drive backplane (J29) may be C1, PORT B, 1, or CN1.

6.4.8 10 x 2.5" Drive Pass-through Configuration 1

6.4.8.1 Indicator Board and USB Cabling

Indicator Board and USB Cabling

Figure 6-84 VGA board cabling

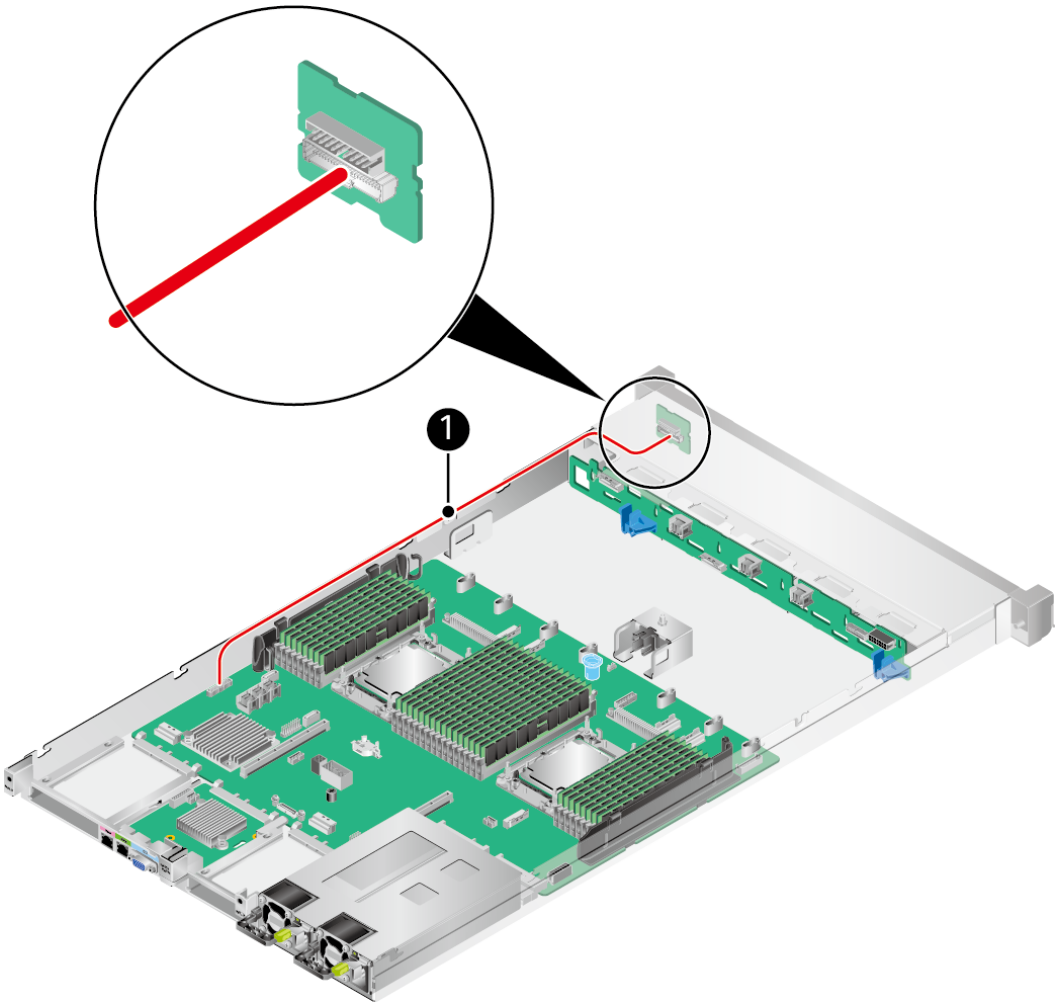


Table 6-44 VGA board cabling

No.	P/N Code	Description
1	04052666	Low-speed signal cable for connecting the indicator board to the mainboard (J106)

Figure 6-85 USB cabling

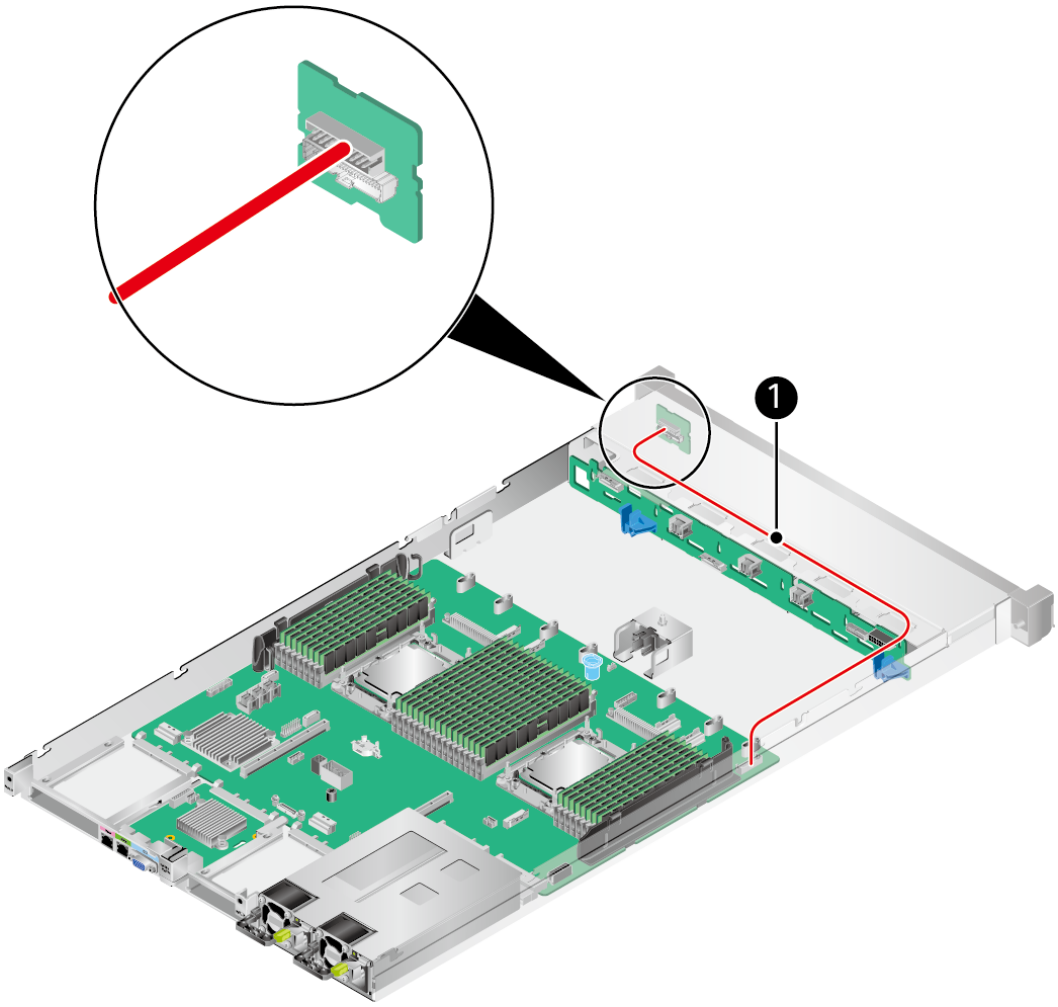


Table 6-45 USB cabling

No.	P/N Code	Description
1	04080684-001	Low-speed signal cable for connecting a USB device to the mainboard (J113)

6.4.8.2 OCP 3.0 Expansion Cable

OCP 3.0 Expansion Cable

NOTE

- When configured with a single CPU, the OCP 3.0 network card can only be installed in the 1 slot of the FlexIO card, and it does not support the expansion of bandwidth through the OCP 3.0 expansion cable.
- When configuring with dual CPUs, FlexIO card 1 and FlexIO card 2 slots can be configured with OCP 3.0 network cards, but only one OCP 3.0 network cards is supported to expand bandwidth at the same time.
  - FlexIO card has 1 slot, and the default operating bandwidth is x8. If you need to expand to x8+x8, you need to use 04052322-001 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 1 LP Slimline 6 connector (J13).
  - The FlexIO card has 2 slots, and the default operating bandwidth is x8. If you need to expand to x16, you need to use a 04052322 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 2 LP Slimline 7 connector (J31).
- The 10NVMe model does not support bandwidth expansion via OCP 3.0 expansion cable.

Figure 6-86 OCP 3.0 expansion cable 1

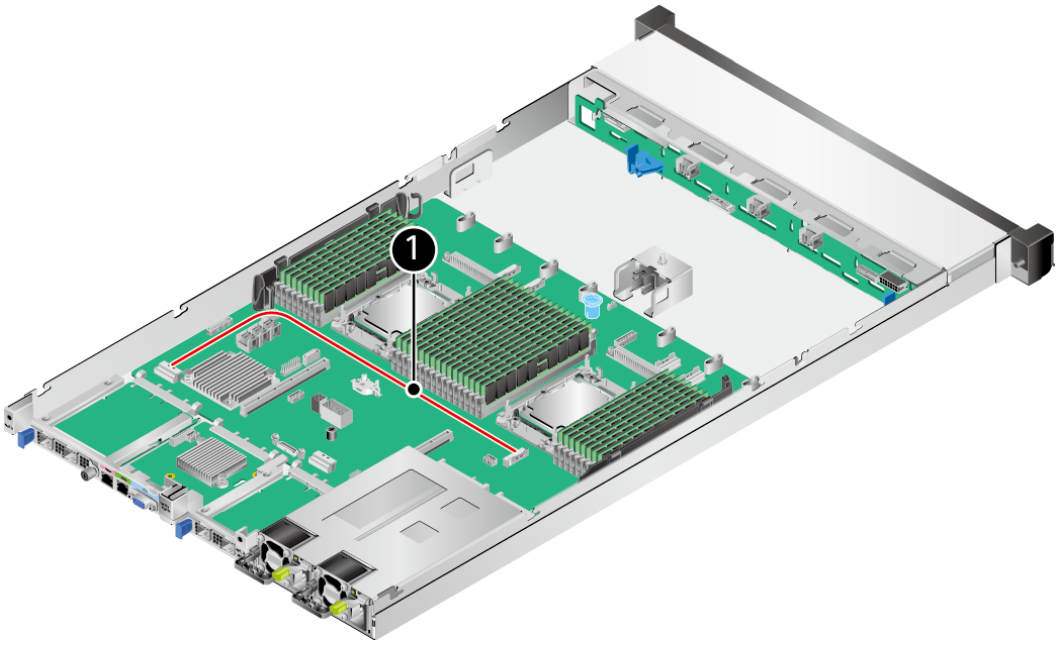


Table 6-46 OCP 3.0 expansion cable 1

No.	P/N Code	Description
1	04052322-001	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 6 connector (J13) of OCP 3.0 network adapter 1

Figure 6-87 OCP 3.0 expansion cable 2

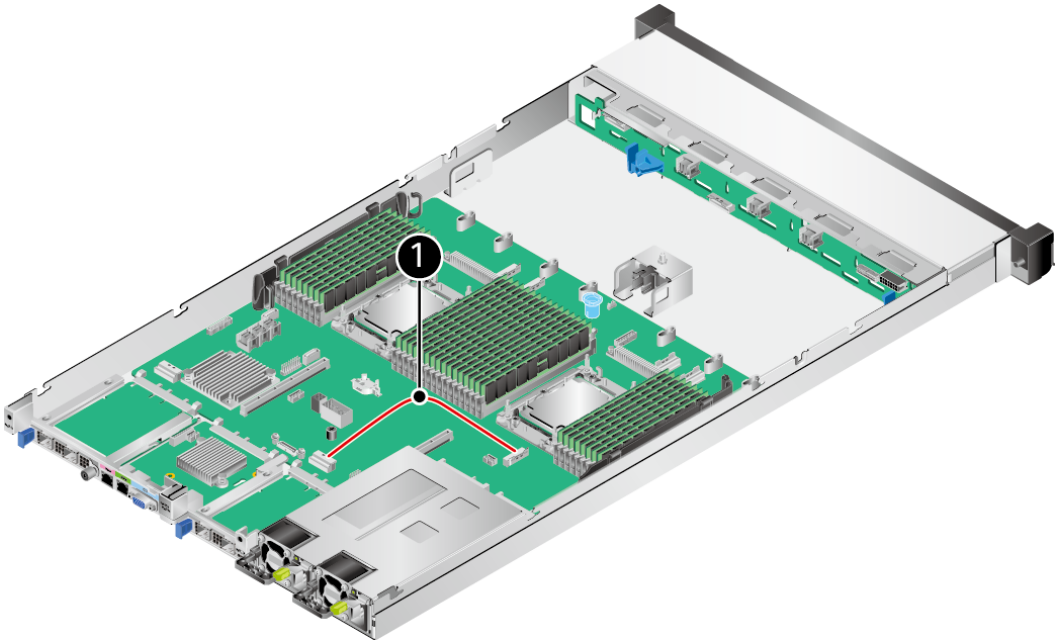


Table 6-47 OCP 3.0 expansion cable 2

No.	P/N Code	Description
1	04052322	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 7 connector (J31) of OCP 3.0 network adapter 2

6.4.8.3 Intrusion Sensor Cabling

Intrusion Sensor Cabling

Figure 6-88 Intrusion sensor cabling

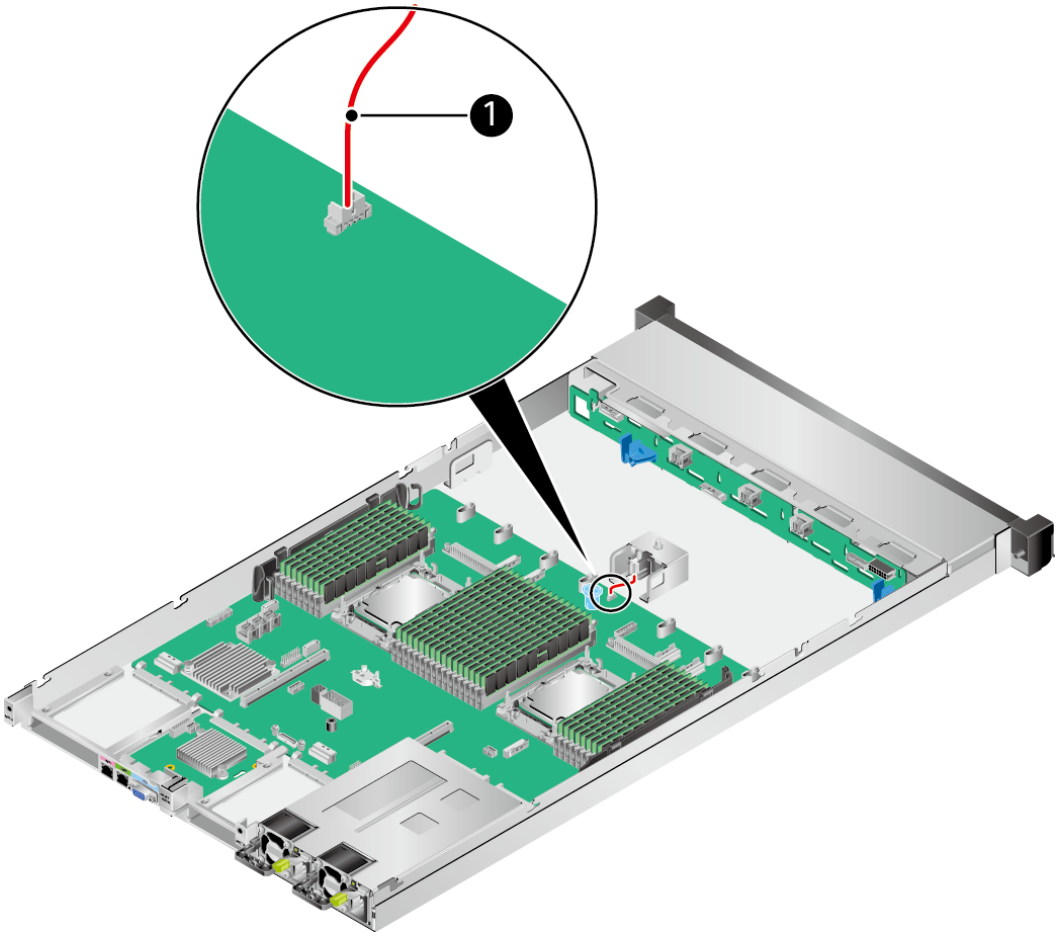


Table 6-48 Intrusion sensor cabling

No.	P/N Code	Description
1	04080771	Low-speed signal cable for connecting the intrusion sensor to the mainboard (S1)

6.4.8.4 Front-Drive Backplane Power and Indicator Signal Cabling

Front-Drive Backplane Power and Low-speed Signal Cables

Figure 6-89 Front-drive backplane power and low-speed signal cables

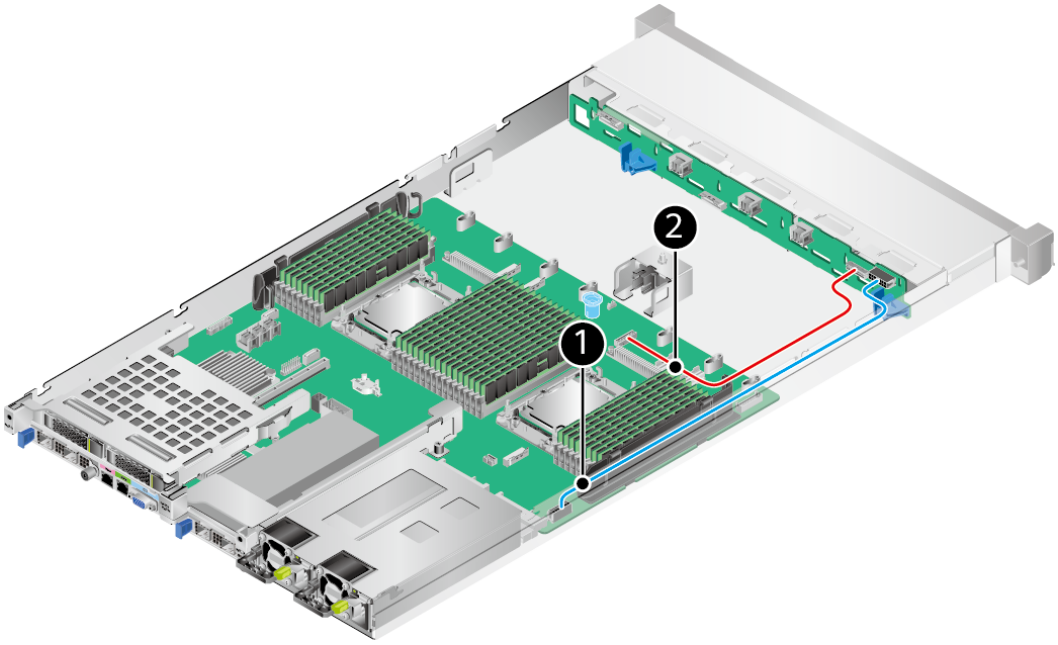


Table 6-49 Front-drive backplane power and low-speed signal cables

No.	P/N Code	Description
1	04152145-009	Power cable for connecting the front-drive backplane (J24) to the mainboard (J26)
2	04080651-007	Low-speed signal cable for connecting the front-drive backplane (J1) to the mainboard (J75) **NOTICE** If the server is configured with remote heat sinks, remove the remote heat sinks before removing or installing the cable.

6.4.8.5 Front-Drive Backplane SAS Signal Cabling (Server with a Screw-in RAID Controller Card)

Front-Drive Backplane SAS High-speed Cabling

Figure 6-90 Front-drive backplane SAS high-speed cabling

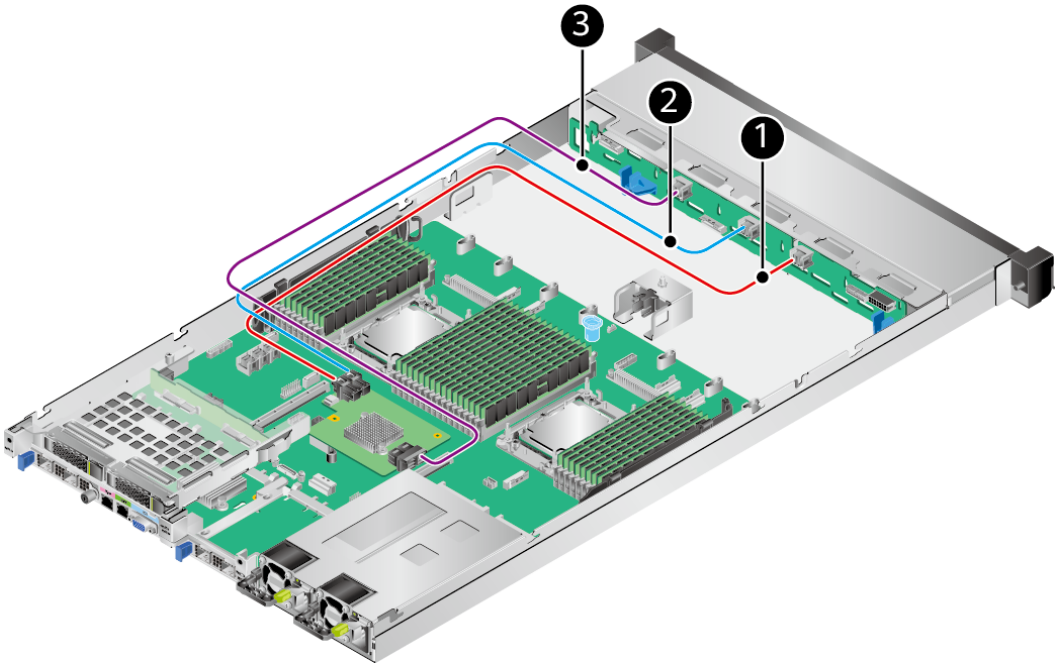


Table 6-50 Front-drive backplane SAS high-speed cabling

No.	P/N Code	Description
1	04051916-015	SAS high-speed cable for connecting the front-drive backplane (J13) to PORT A of the screw-in RAID controller card
2	04051916-015	SAS high-speed cable for connecting the front-drive backplane (J14) to PORT B of the screw-in RAID controller card
3	04051916-015	SAS high-speed cable for connecting the front-drive backplane (J15) to PORT C of the screw-in RAID controller card

6.4.8.6 I/O Module 1 Cabling

I/O Module 1 Cabling

Figure 6-91 I/O module 1 cabling

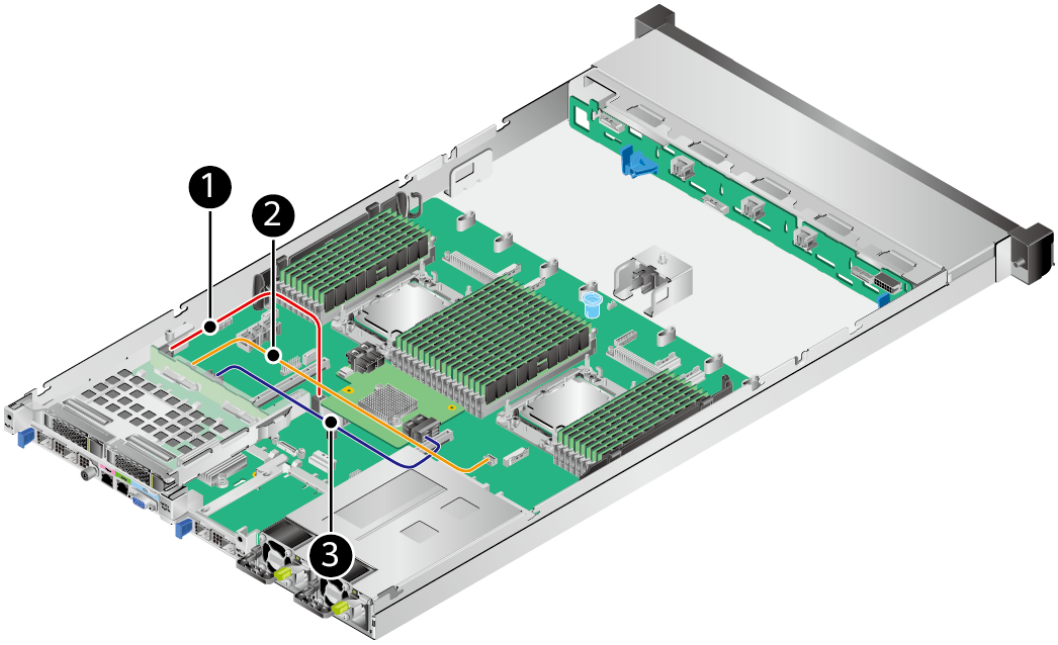


Table 6-51 I/O module 1 cabling

No.	P/N Code	Description	Remarks
1	04150448 -001	Power cable for connecting the rear-drive backplane (J2) to the mainboard (J21)	-
2	04080551 -005	Low-speed signal cable for connecting the rear-drive backplane (J1) to the mainboard (J27)	The cable is not an independent spare part. It is packed with the 2 x 2.5" drive module as a spare part.
3	04052363 -001	SAS high-speed cable for connecting the rear-drive backplane (J3) to PORT D of the screw-in RAID controller card	The cable is not an independent spare part in this configuration. It is packed with the 2 x 2.5" drive module as a spare part.

6.4.9 10 x 2.5" Drive Pass-through Configuration 2

6.4.9.1 Indicator Board and USB Cabling

Indicator Board and USB Cabling

Figure 6-92 VGA board cabling

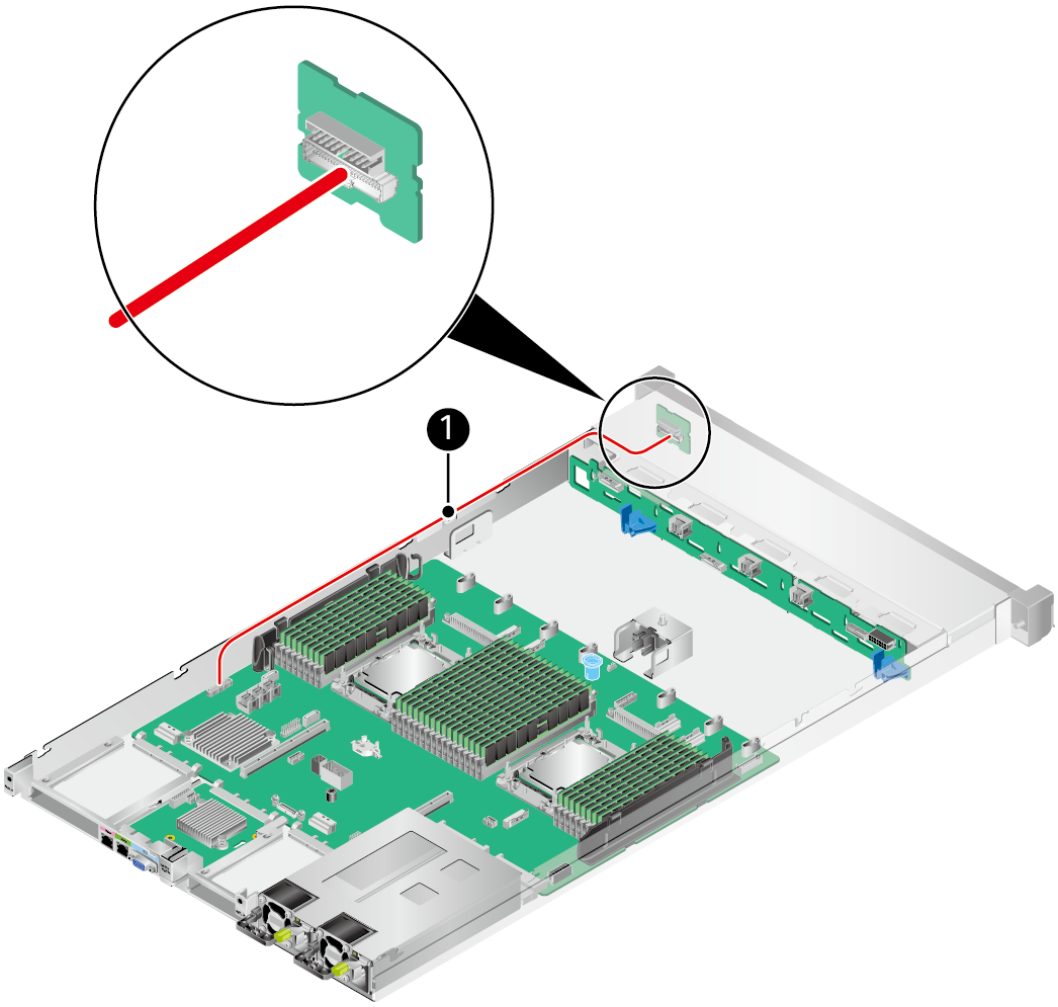


Table 6-52 VGA board cabling

No.	P/N Code	Description
1	04052666	Low-speed signal cable for connecting the indicator board to the mainboard (J106)

Figure 6-93 USB cabling

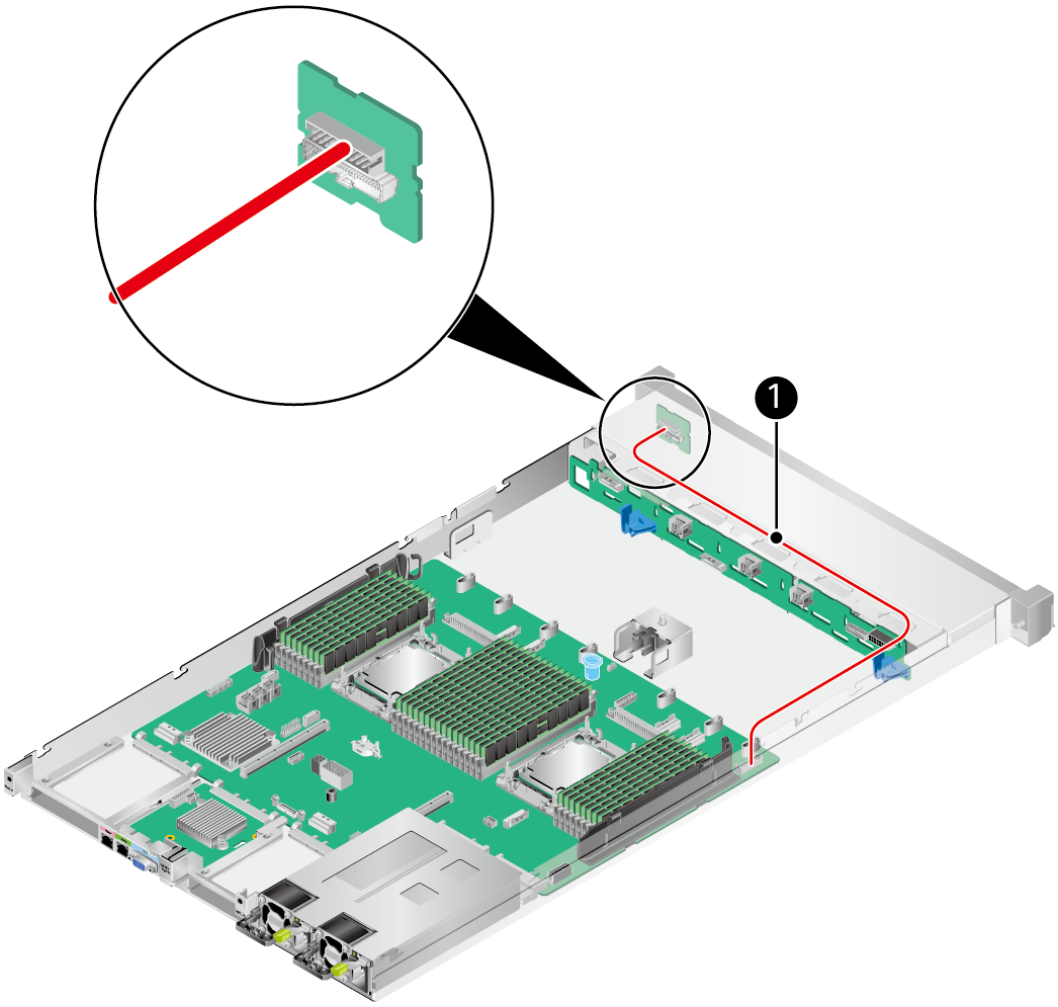


Table 6-53 USB cabling

No.	P/N Code	Description
1	04080684-001	Low-speed signal cable for connecting a USB device to the mainboard (J113)

6.4.9.2 OCP 3.0 Expansion Cable

OCP 3.0 Expansion Cable

NOTE

- When configured with a single CPU, the OCP 3.0 network card can only be installed in the 1 slot of the FlexIO card, and it does not support the expansion of bandwidth through the OCP 3.0 expansion cable.
- When configuring with dual CPUs, FlexIO card 1 and FlexIO card 2 slots can be configured with OCP 3.0 network cards, but only one OCP 3.0 network cards is supported to expand bandwidth at the same time.
  - FlexIO card has 1 slot, and the default operating bandwidth is x8. If you need to expand to x8+x8, you need to use 04052322-001 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 1 LP Slimline 6 connector (J13).
  - The FlexIO card has 2 slots, and the default operating bandwidth is x8. If you need to expand to x16, you need to use a 04052322 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 2 LP Slimline 7 connector (J31).
- The 10NVMe model does not support bandwidth expansion via OCP 3.0 expansion cable.

Figure 6-94 OCP 3.0 expansion cable 1

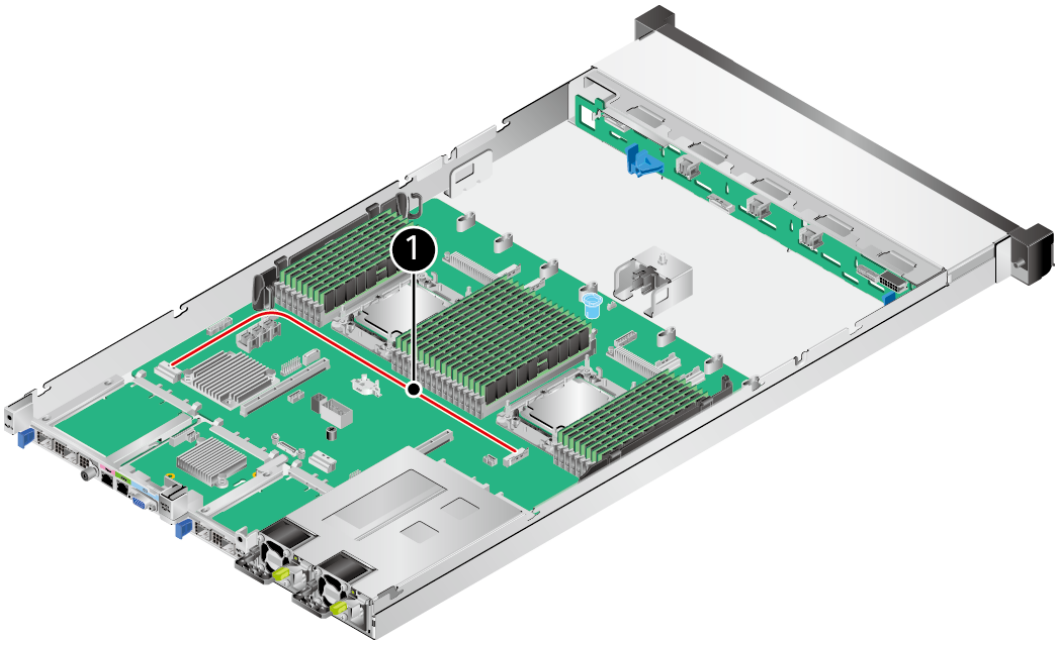


Table 6-54 OCP 3.0 expansion cable 1

No.	P/N Code	Description
1	04052322-001	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 6 connector (J13) of OCP 3.0 network adapter 1

Figure 6-95 OCP 3.0 expansion cable 2

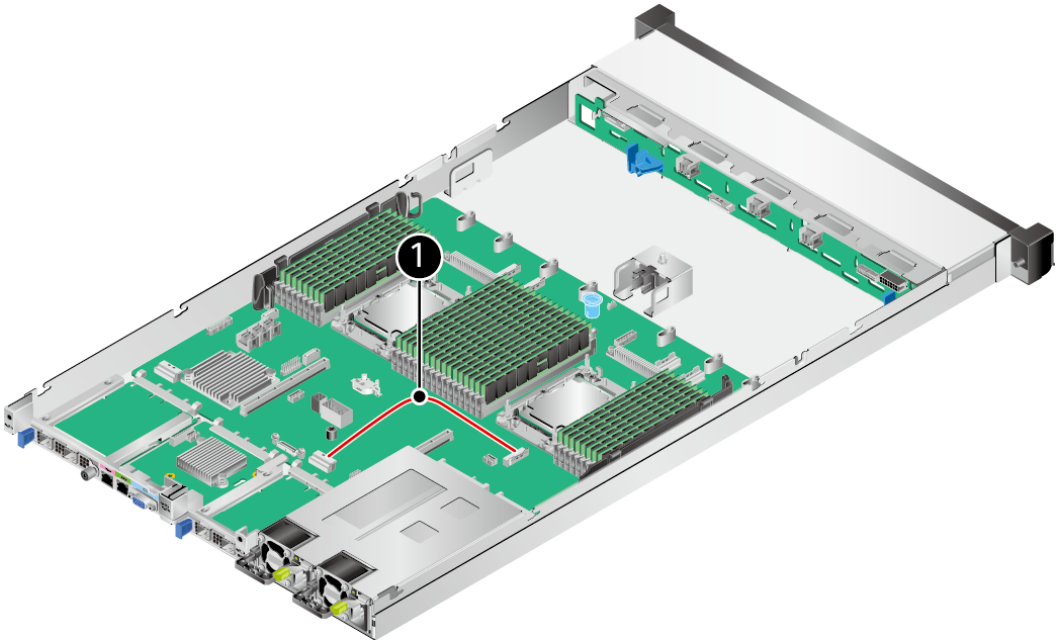


Table 6-55 OCP 3.0 expansion cable 2

No.	P/N Code	Description
1	04052322	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 7 connector (J31) of OCP 3.0 network adapter 2

6.4.9.3 Intrusion Sensor Cabling

Intrusion Sensor Cabling

Figure 6-96 Intrusion sensor cabling

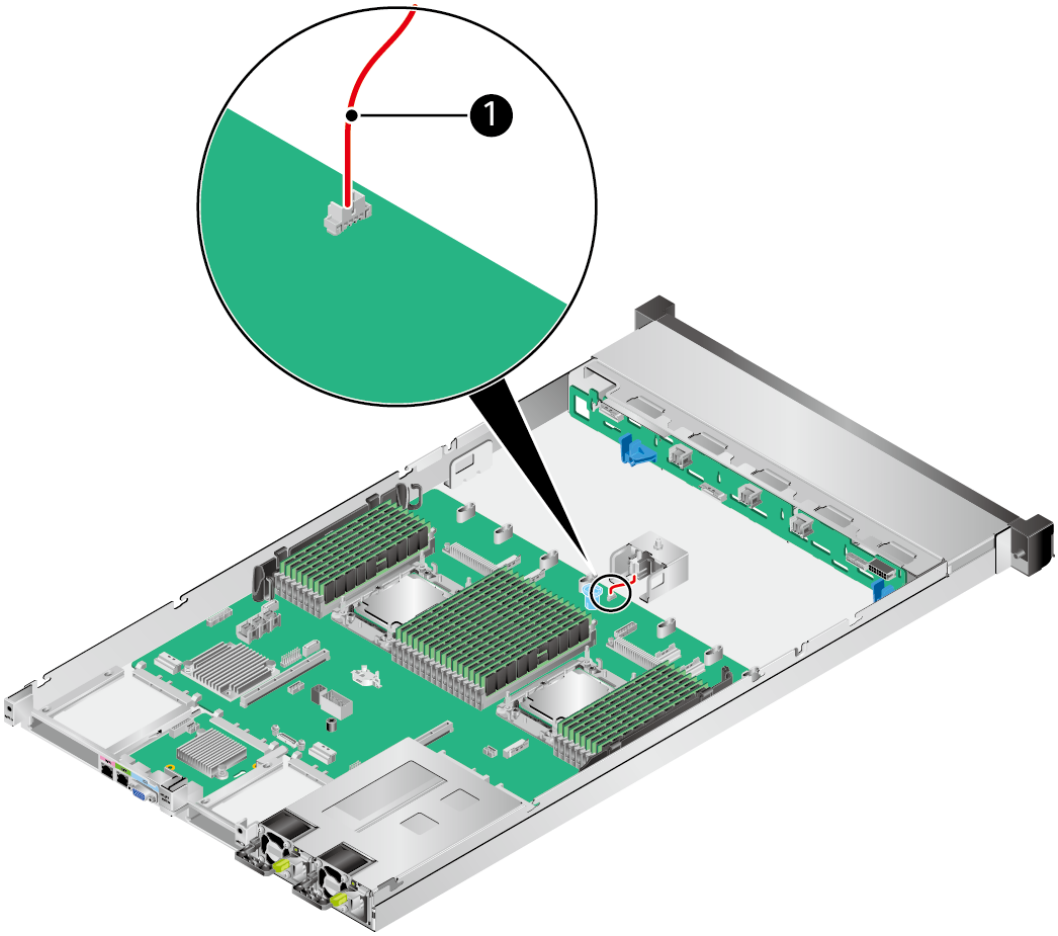


Table 6-56 Intrusion sensor cabling

No.	P/N Code	Description
1	04080771	Low-speed signal cable for connecting the intrusion sensor to the mainboard (S1)

6.4.9.4 Front-Drive Backplane Power and Indicator Signal Cabling

Front-Drive Backplane Power and Low-speed Signal Cables

Figure 6-97 Front-drive backplane power and low-speed signal cables

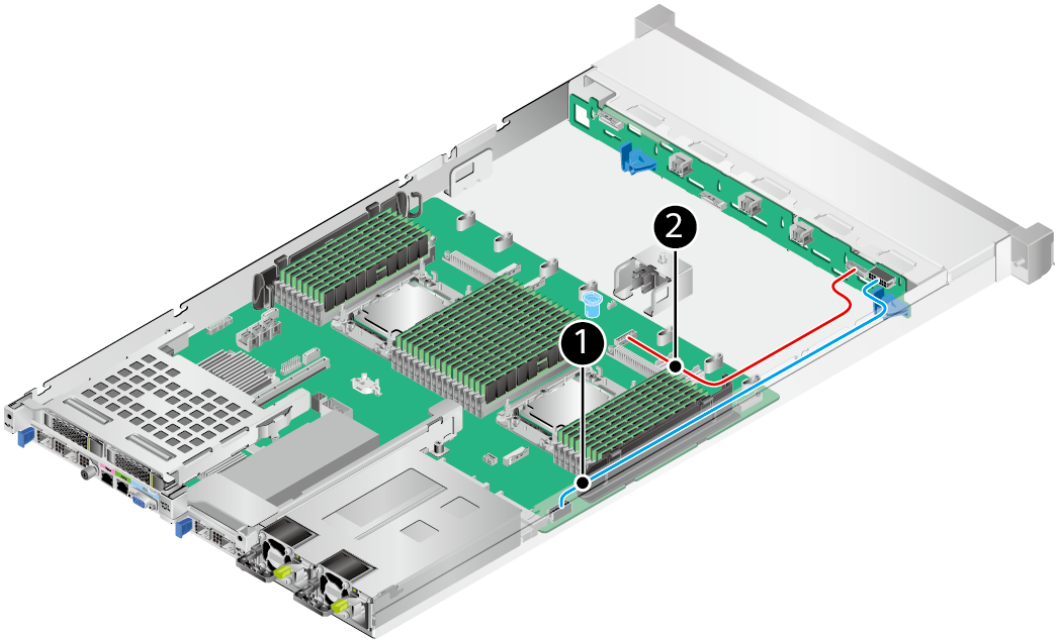


Table 6-57 Front-drive backplane power and low-speed signal cables

No.	P/N Code	Description
1	04152145-009	Power cable for connecting the front-drive backplane (J24) to the mainboard (J26)
2	04080651-007	Low-speed signal cable for connecting the front-drive backplane (J1) to the mainboard (J75) **NOTICE** If the server is configured with remote heat sinks, remove the remote heat sinks before removing or installing the cable.

6.4.9.5 Front-Drive Backplane SAS Signal Cabling (Server with a PCIe RAID Controller Card)

NOTICE

- When I/O module 1 is configured with drives, the PCIe RAID controller card must be installed in slot 3.
- When I/O module 1 is not configured with drives, the PCIe RAID controller card must be installed in slot 1.

Front-Drive Backplane SAS High-speed Cabling (Server with a PCIe RAID Controller Card in Slot 1)

Figure 6-98 Front-drive backplane SAS high-speed cabling

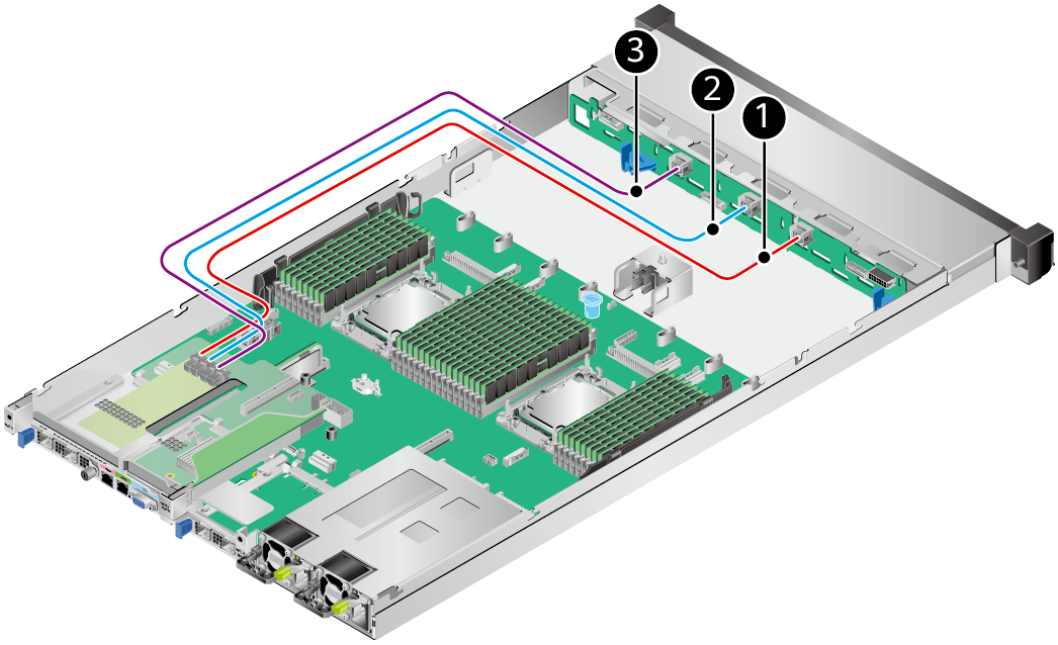


Table 6-58 Front-drive backplane SAS high-speed cabling

No.	P/N Code	Description
1	04051021	SAS high-speed cable for connecting the front-drive backplane (J13) to PORT A of the PCIe RAID controller card
2	04051916-014	SAS high-speed cable for connecting the front-drive backplane (J14) to PORT B of the PCIe RAID controller card
3	04051020	SAS high-speed cable for connecting the front-drive backplane (J15) to PORT C of the PCIe RAID controller card

Front-Drive Backplane SAS High-speed Cabling (Server with a PCIe RAID Controller Card in Slot 3)

Figure 6-99 Front-drive backplane SAS high-speed cabling

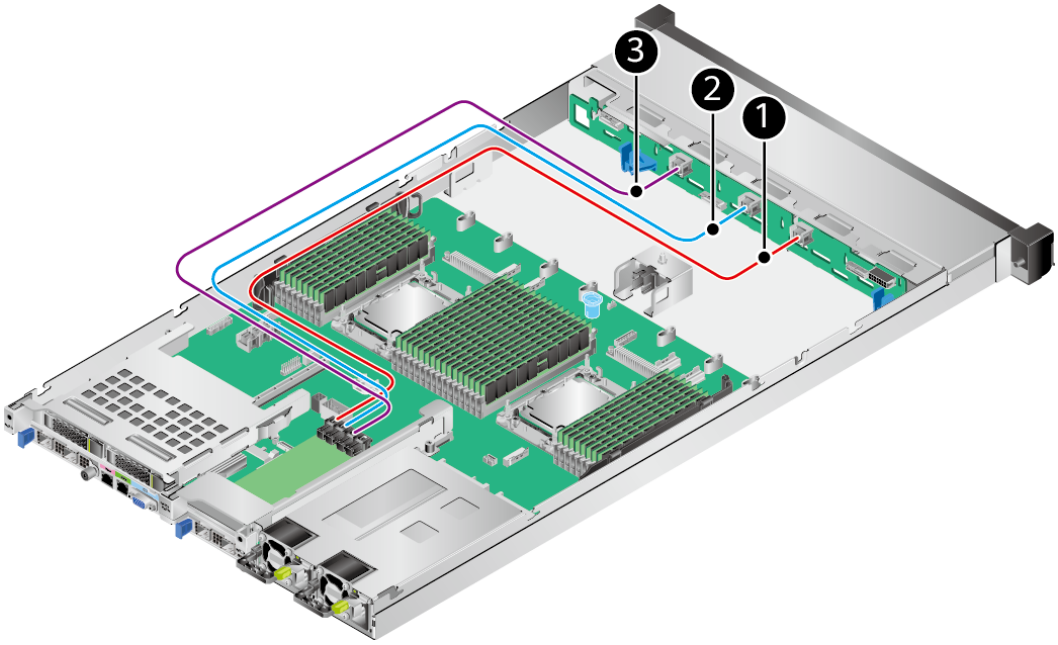


Table 6-59 Front-drive backplane SAS high-speed cabling

No.	P/N Code	Description
1	04051390	SAS high-speed cable for connecting the front-drive backplane (J13) to PORT A of the PCIe RAID controller card
2	04051916-015	SAS high-speed cable for connecting the front-drive backplane (J14) to PORT B of the PCIe RAID controller card
3	04051021	SAS high-speed cable for connecting the front-drive backplane (J15) to PORT C of the PCIe RAID controller card

NOTE

The port numbers vary with the PCIe RAID controller cards. The port number of the PCIe RAID controller card connected to front-drive backplane (J13) may be C0, PORT A, 0, or CN0. The port number of the PCIe RAID controller card connected to front-drive backplane (J14) may be C1, PORT B, 1, or CN1, and the port number of the PCIe RAID controller card connected to front-drive backplane (J15) may be C2, PORT C, 2, or CN2.

6.4.9.6 I/O Module 1 Cabling

I/O Module 1 Cabling

Figure 6-100 I/O module 1 cabling

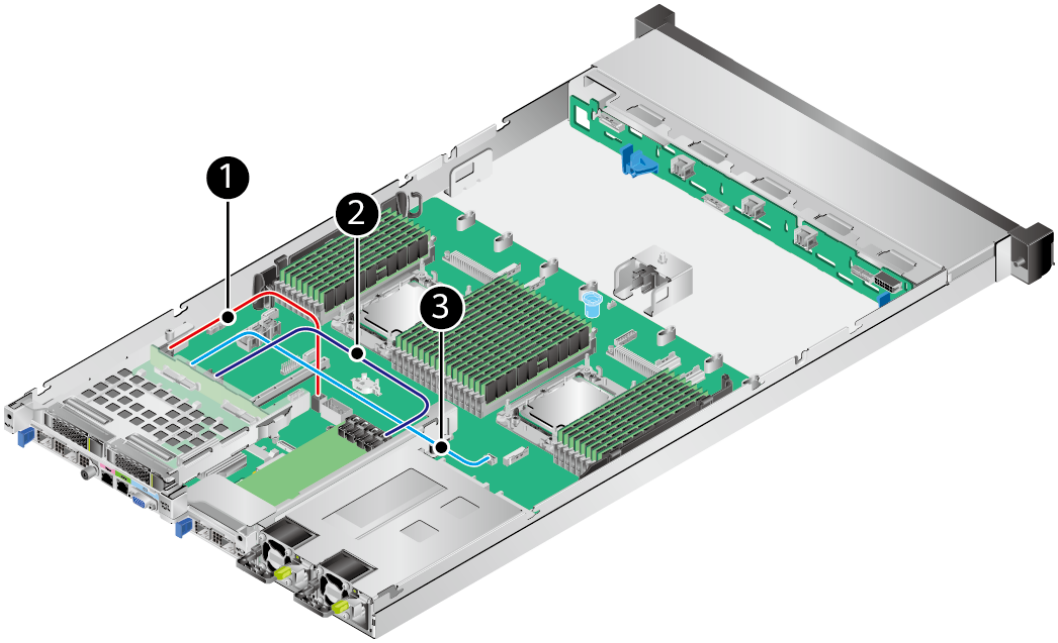


Table 6-60 I/O module 1 cabling

No.	P/N Code	Description	Remarks
1	04150448 -001	Power cable for connecting the rear-drive backplane (J2) to the mainboard (J21)	-
2	04052363 -001	SAS high-speed cable for connecting the rear-drive backplane (J3) to PORT D of the PCIe RAID controller card	The cable is not an independent spare part in this configuration. It is packed with the 2 x 2.5" drive module as a spare part.
3	04080551 -005	Low-speed signal cable for connecting the rear-drive backplane (J1) to the mainboard (J27)	The cable is not an independent spare part. It is packed with the 2 x 2.5" drive module as a spare part.

NOTE

The port numbers vary with the PCIe RAID controller cards. The port number of the PCIe RAID controller card connected to rear-drive backplane (J3) may be C3, PORT D, 3, or CN3.

6.4.10 10 x 2.5" Drive Pass-through Configuration 3

6.4.10.1 Indicator Board and USB Cabling

Indicator Board and USB Cabling

Figure 6-101 VGA board cabling

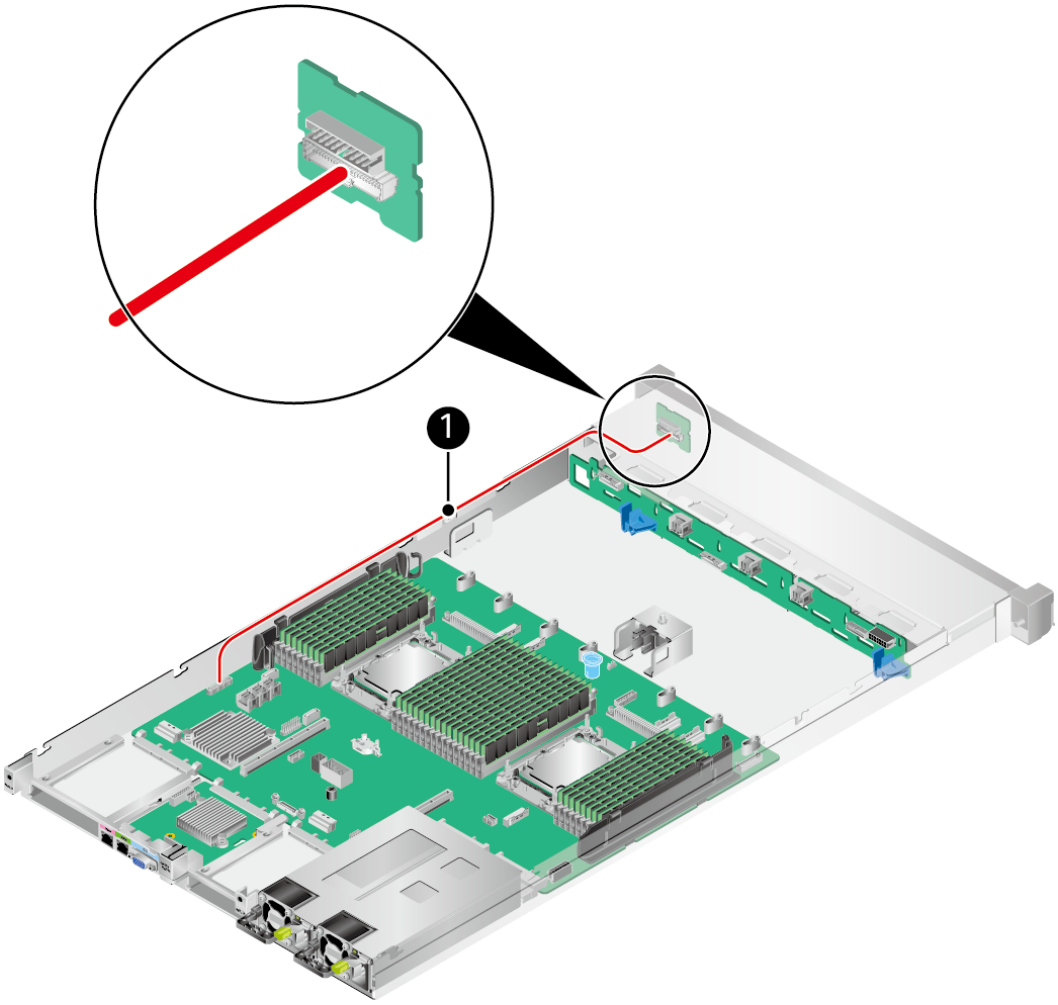


Table 6-61 VGA board cabling

No.	P/N Code	Description
1	04052666	Low-speed signal cable for connecting the indicator board to the mainboard (J106)

Figure 6-102 USB cabling

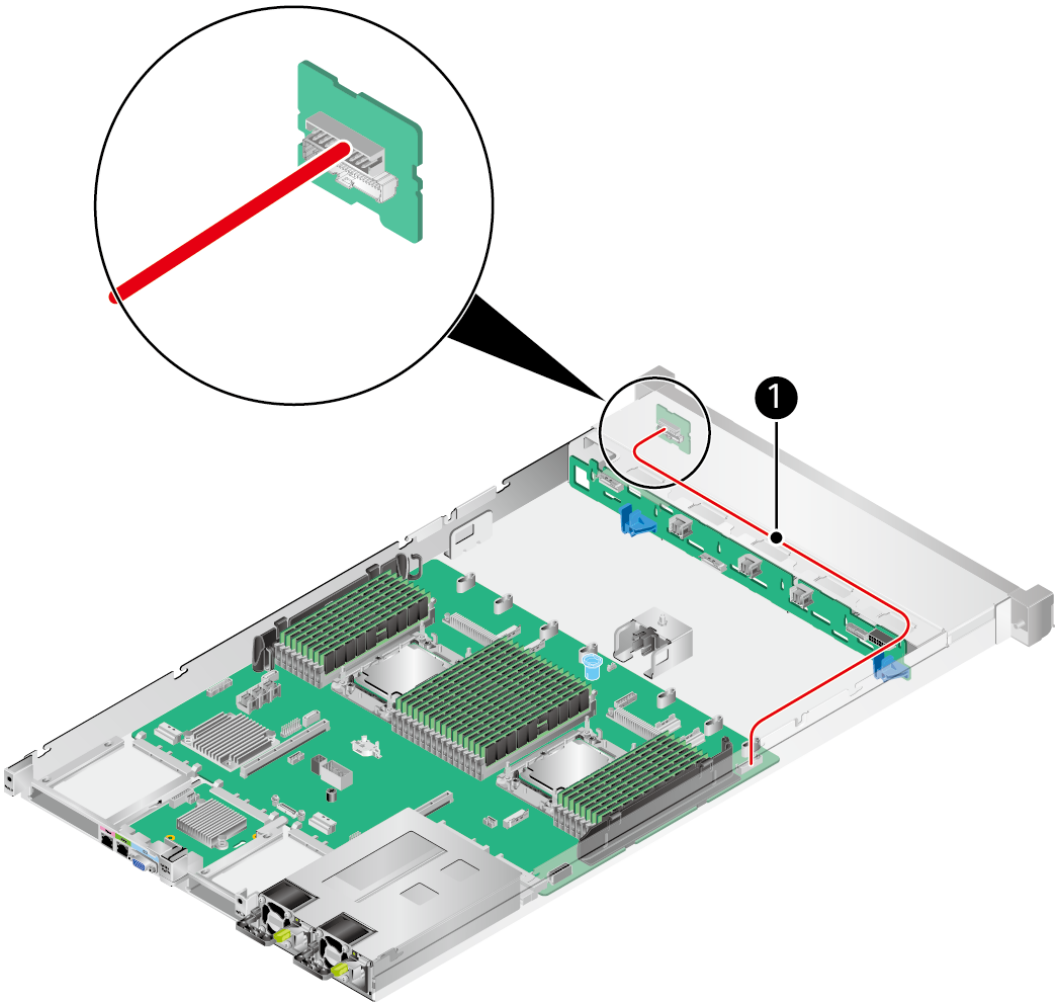


Table 6-62 USB cabling

No.	P/N Code	Description
1	04080684-001	Low-speed signal cable for connecting a USB device to the mainboard (J113)

6.4.10.2 OCP 3.0 Expansion Cable

OCP 3.0 Expansion Cable

NOTE

- When configured with a single CPU, the OCP 3.0 network card can only be installed in the 1 slot of the FlexIO card, and it does not support the expansion of bandwidth through the OCP 3.0 expansion cable.
- When configuring with dual CPUs, FlexIO card 1 and FlexIO card 2 slots can be configured with OCP 3.0 network cards, but only one OCP 3.0 network cards is supported to expand bandwidth at the same time.
  - FlexIO card has 1 slot, and the default operating bandwidth is x8. If you need to expand to x8+x8, you need to use 04052322-001 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 1 LP Slimline 6 connector (J13).
  - The FlexIO card has 2 slots, and the default operating bandwidth is x8. If you need to expand to x16, you need to use a 04052322 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 2 LP Slimline 7 connector (J31).
- The 10NVMe model does not support bandwidth expansion via OCP 3.0 expansion cable.

Figure 6-103 OCP 3.0 expansion cable 1

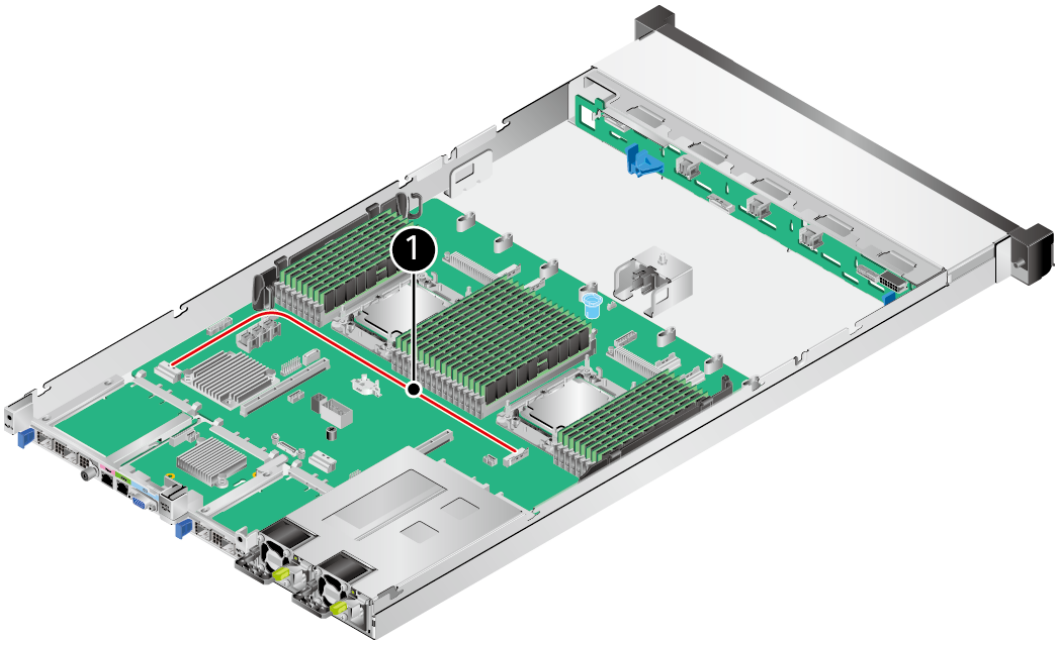


Table 6-63 OCP 3.0 expansion cable 1

No.	P/N Code	Description
1	04052322-001	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 6 connector (J13) of OCP 3.0 network adapter 1

Figure 6-104 OCP 3.0 expansion cable 2

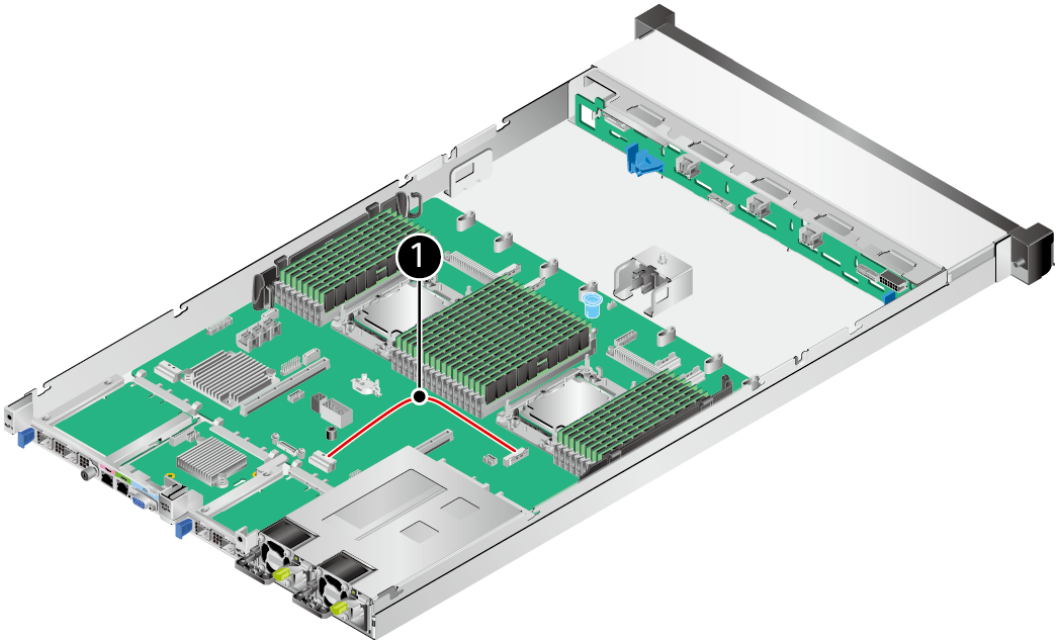


Table 6-64 OCP 3.0 expansion cable 2

No.	P/N Code	Description
1	04052322	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 7 connector (J31) of OCP 3.0 network adapter 2

6.4.10.3 Intrusion Sensor Cabling

Intrusion Sensor Cabling

Figure 6-105 Intrusion sensor cabling

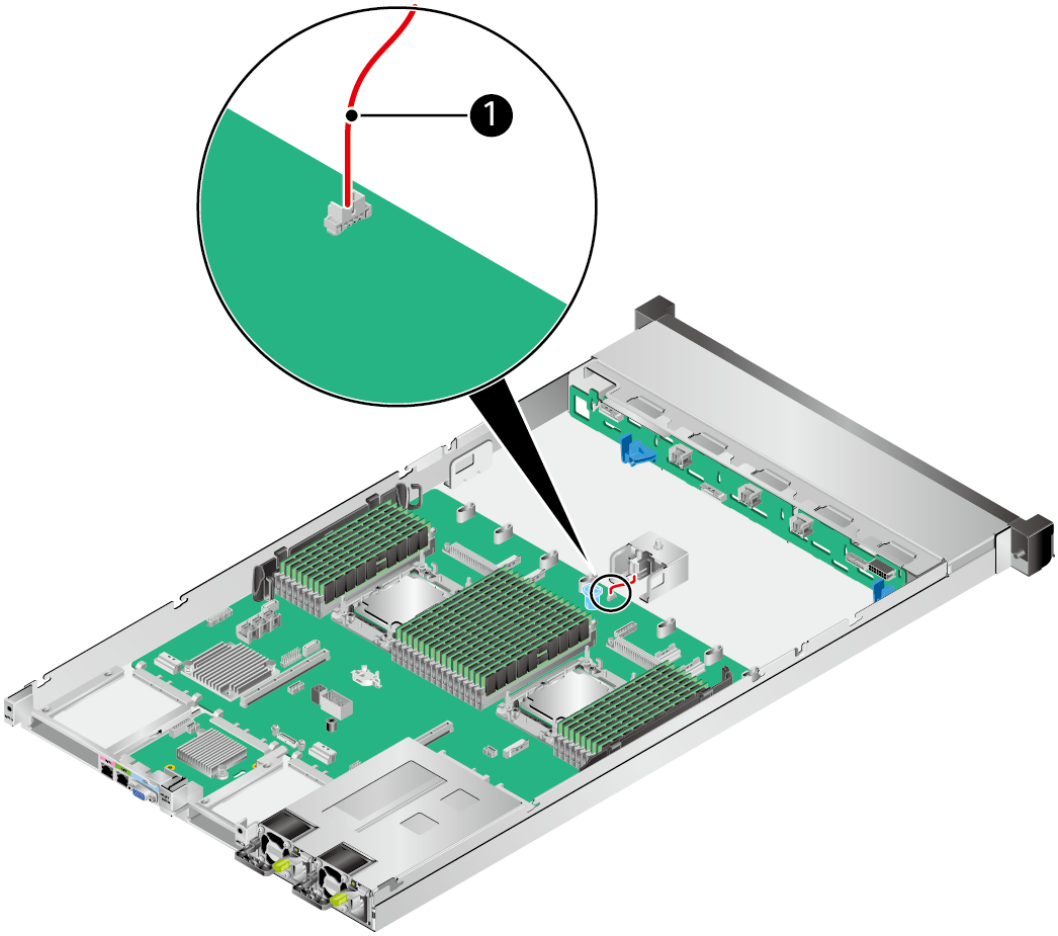


Table 6-65 Intrusion sensor cabling

No.	P/N Code	Description
1	04080771	Low-speed signal cable for connecting the intrusion sensor to the mainboard (S1)

6.4.10.4 Front-Drive Backplane Power and Indicator Signal Cabling

Front-Drive Backplane Power and Low-speed Signal Cables

Figure 6-106 Front-drive backplane power and low-speed signal cables

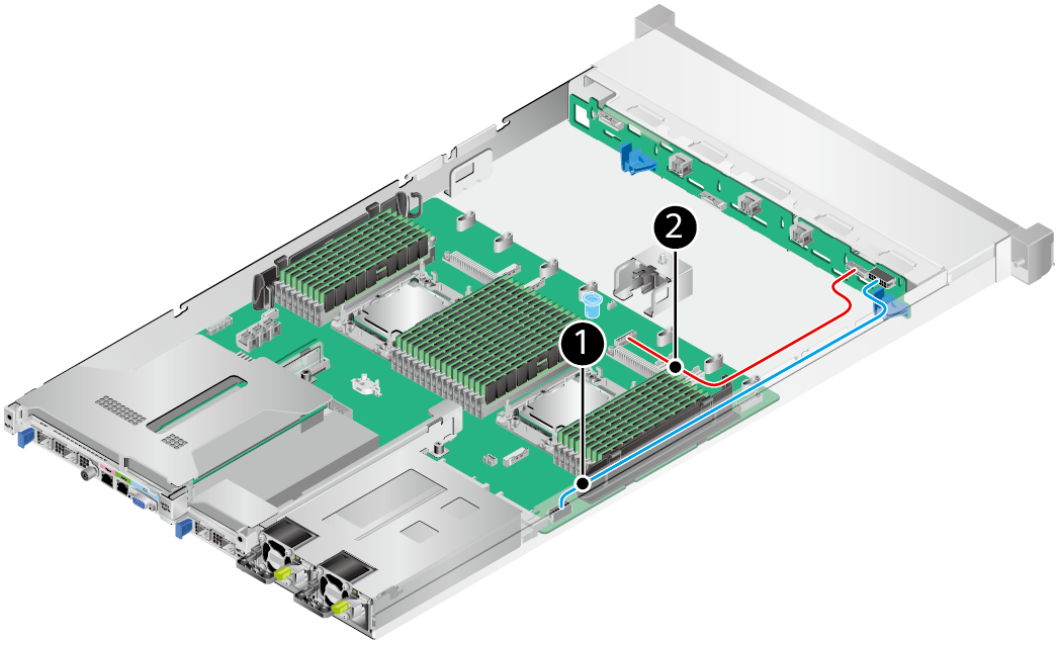


Table 6-66 Front-drive backplane power and low-speed signal cables

No.	P/N Code	Description
1	04152145-009	Power cable for connecting the front-drive backplane (J24) to the mainboard (J26)
2	04080783-001	Low-speed signal cable for connecting the front-drive backplane (J1) to the mainboard (J75) **NOTICE** If the server is configured with remote heat sinks, remove the remote heat sinks before removing or installing the cable.

6.4.10.5 Front-Drive Backplane SAS Cabling (PCH Pass-through)

NOTICE

Remove the LP slimline high-speed cables from the front-drive backplane before removing the SAS high-speed cables from the front-drive backplane.

Front-Drive Backplane SAS High-speed Cabling

Figure 6-107 Front-drive backplane SAS high-speed cabling

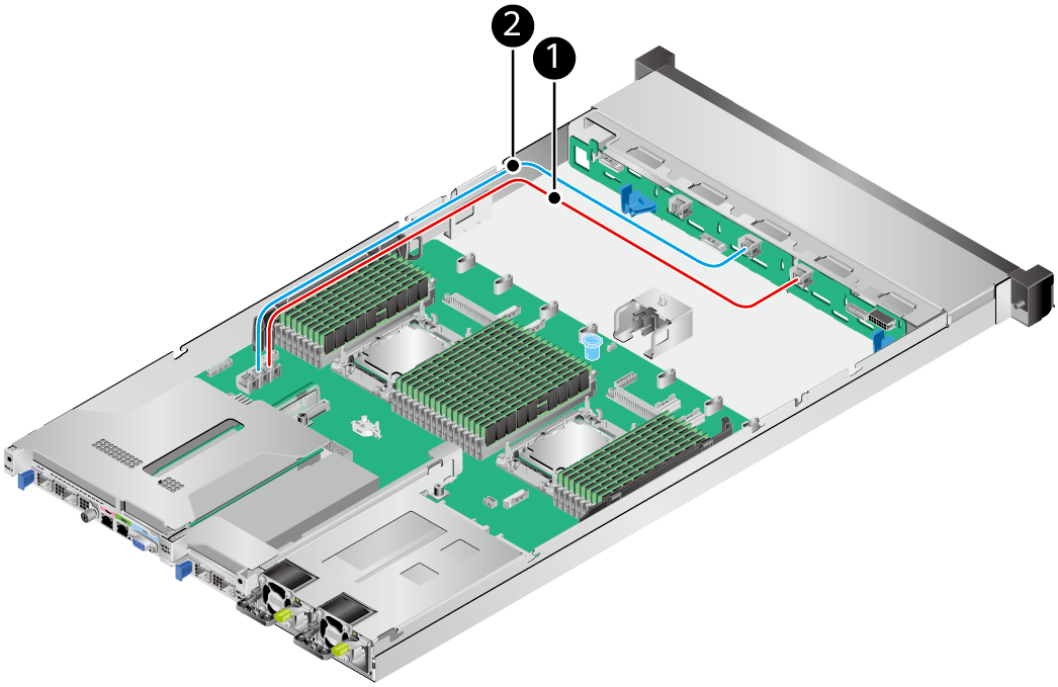


Table 6-67 Front-drive backplane SAS high-speed cabling

No.	P/N Code	Description
1	04051939-001	SAS high-speed cable for connecting the front-drive backplane (J13) to the mainboard (J6)
2	04051939-001	SAS high-speed cable for connecting the front-drive backplane (J14) to the mainboard (J5)

6.4.10.6 Front-Drive Backplane LP Slimline Signal Cable

NOTICE

If the server is configured with remote heat sinks, remove the remote heat sinks before removing or installing the LP slimline high-speed cables of the front-drive backplane. Connect SAS high-speed cables to the front-drive backplane before connecting LP slimline high-speed cables to the front-drive backplane.

Front-Drive Backplane LP Slimline High-speed Cables

Figure 6-108 Front-drive backplane LP slimline high-speed cables

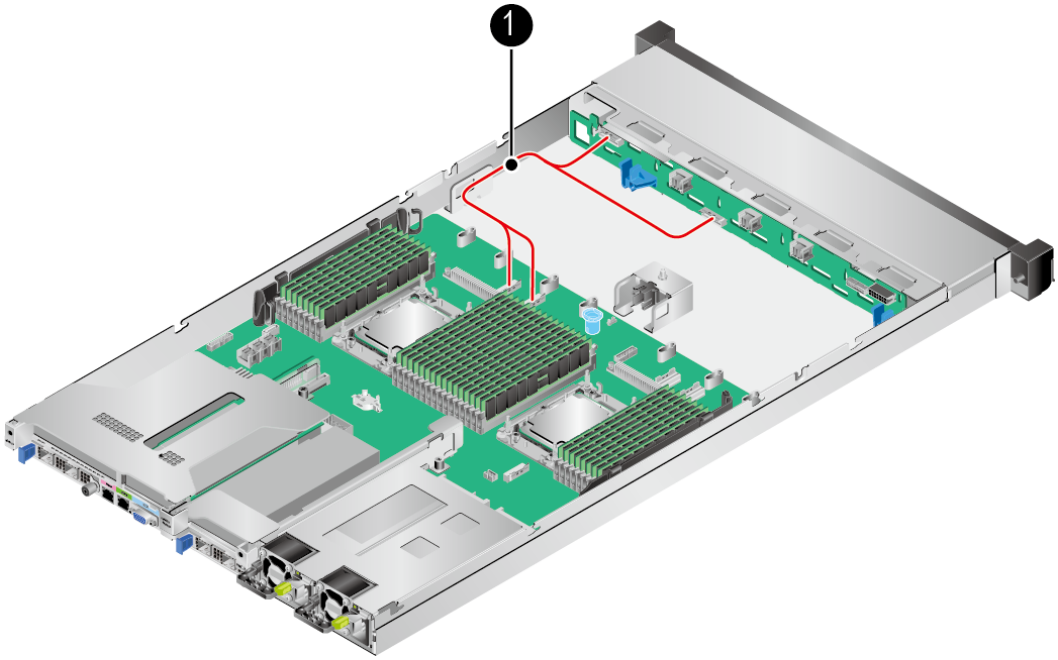


Table 6-68 Front-drive backplane LP slimline high-speed cables

No.	P/N Code	Description
1	04052323	High-speed cable for connecting LP Slimline 1 (J11) and LP Slimline 2 (J12) on the front-drive backplane to LP Slimline 1 (J11) and LP Slimline 2 (J84) on the mainboard

6.4.11 10 x 2.5" Drive Pass-through Configuration 4

6.4.11.1 Indicator Board and USB Cabling

Indicator Board and USB Cabling

Figure 6-109 VGA board cabling

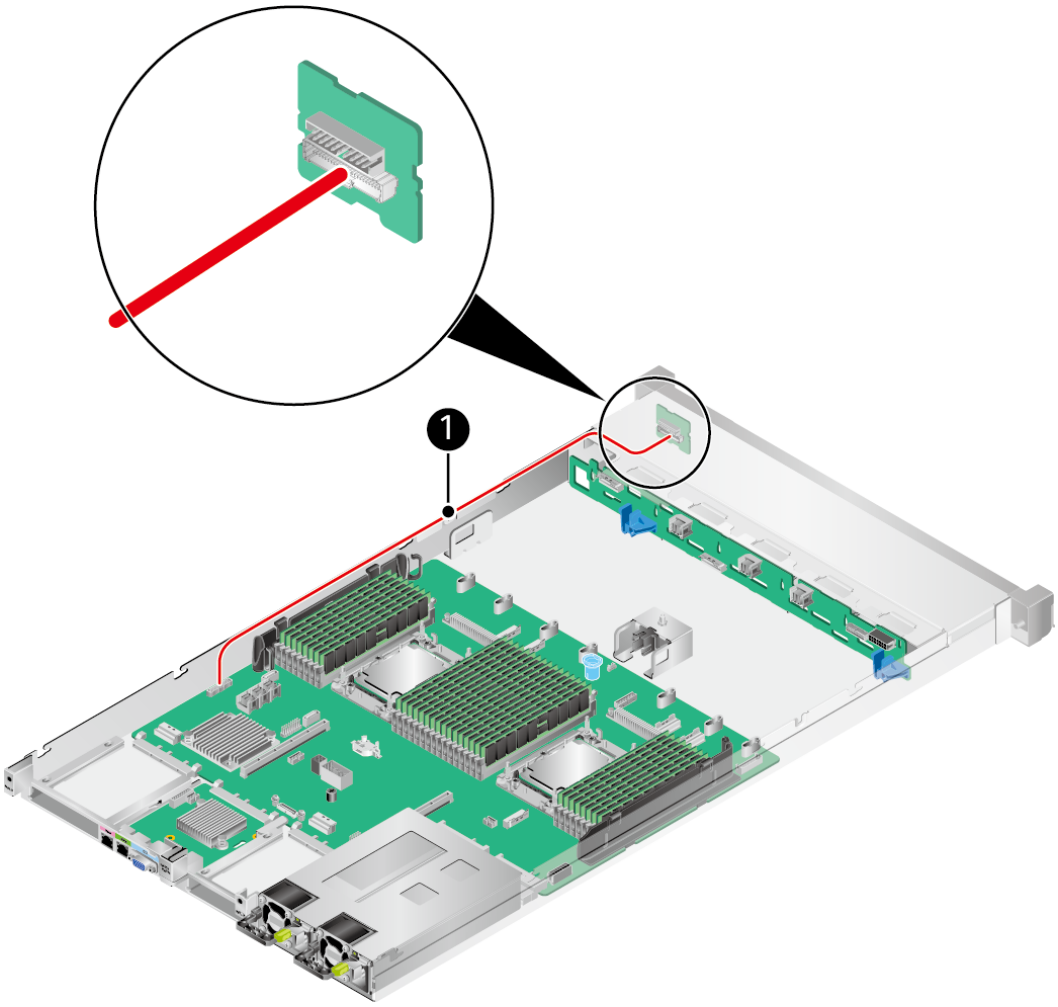


Table 6-69 VGA board cabling

No.	P/N Code	Description
1	04052666	Low-speed signal cable for connecting the indicator board to the mainboard (J106)

Figure 6-110 USB cabling

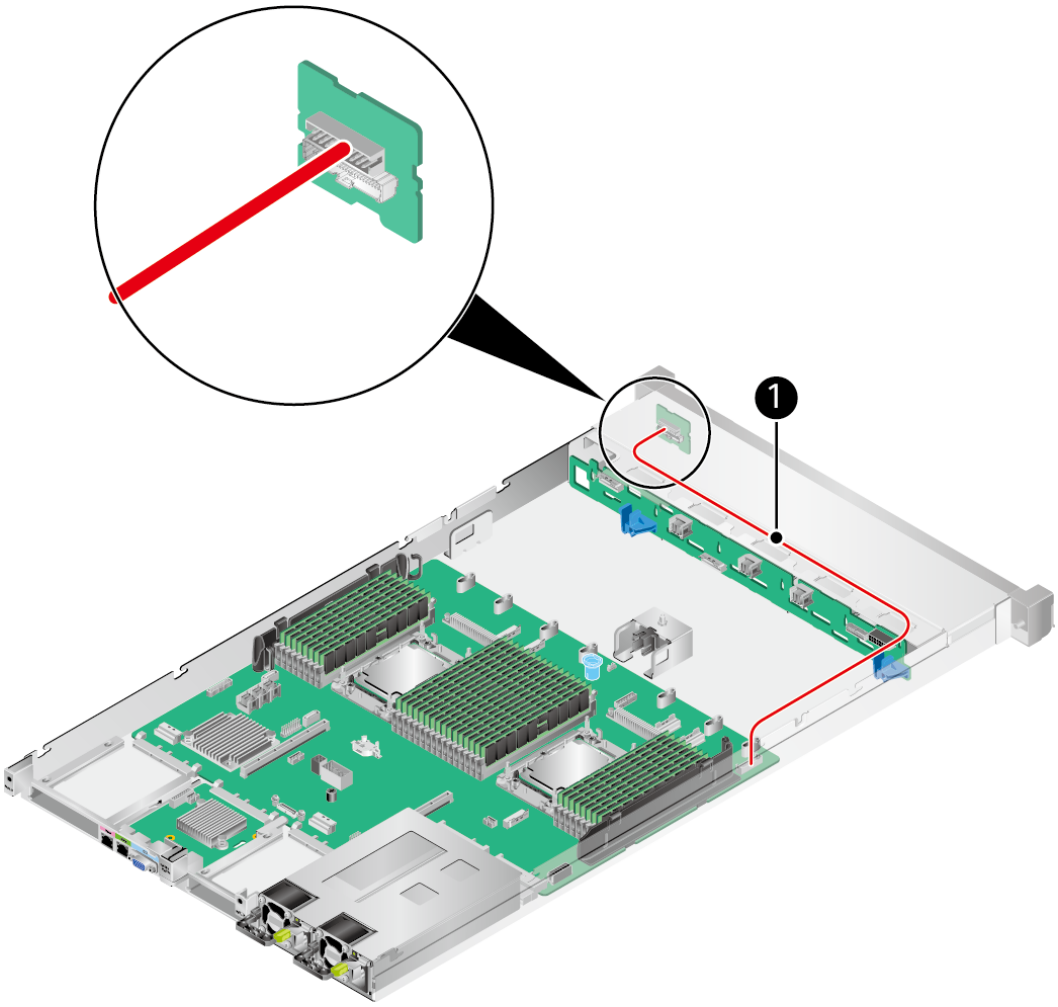


Table 6-70 USB cabling

No.	P/N Code	Description
1	04080684-001	Low-speed signal cable for connecting a USB device to the mainboard (J113)

6.4.11.2 OCP 3.0 Expansion Cable

OCP 3.0 Expansion Cable

NOTE

- When configured with a single CPU, the OCP 3.0 network card can only be installed in the 1 slot of the FlexIO card, and it does not support the expansion of bandwidth through the OCP 3.0 expansion cable.
- When configuring with dual CPUs, FlexIO card 1 and FlexIO card 2 slots can be configured with OCP 3.0 network cards, but only one OCP 3.0 network cards is supported to expand bandwidth at the same time.
  - FlexIO card has 1 slot, and the default operating bandwidth is x8. If you need to expand to x8+x8, you need to use 04052322-001 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 1 LP Slimline 6 connector (J13).
  - The FlexIO card has 2 slots, and the default operating bandwidth is x8. If you need to expand to x16, you need to use a 04052322 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 2 LP Slimline 7 connector (J31).
- The 10NVMe model does not support bandwidth expansion via OCP 3.0 expansion cable.

Figure 6-111 OCP 3.0 expansion cable 1

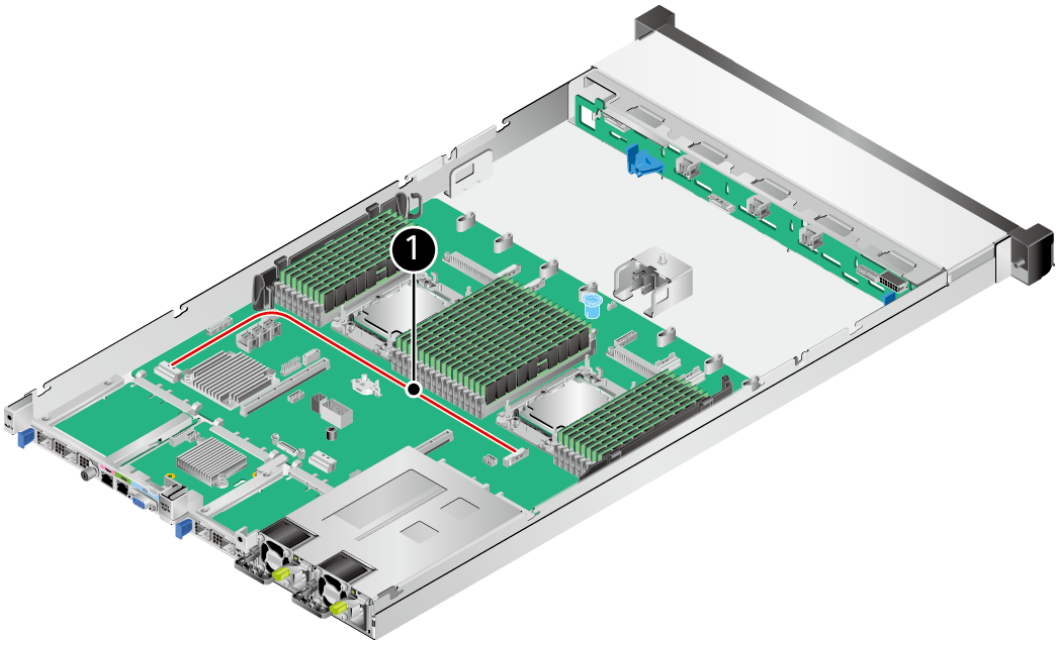


Table 6-71 OCP 3.0 expansion cable 1

No.	P/N Code	Description
1	04052322-001	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 6 connector (J13) of OCP 3.0 network adapter 1

Figure 6-112 OCP 3.0 expansion cable 2

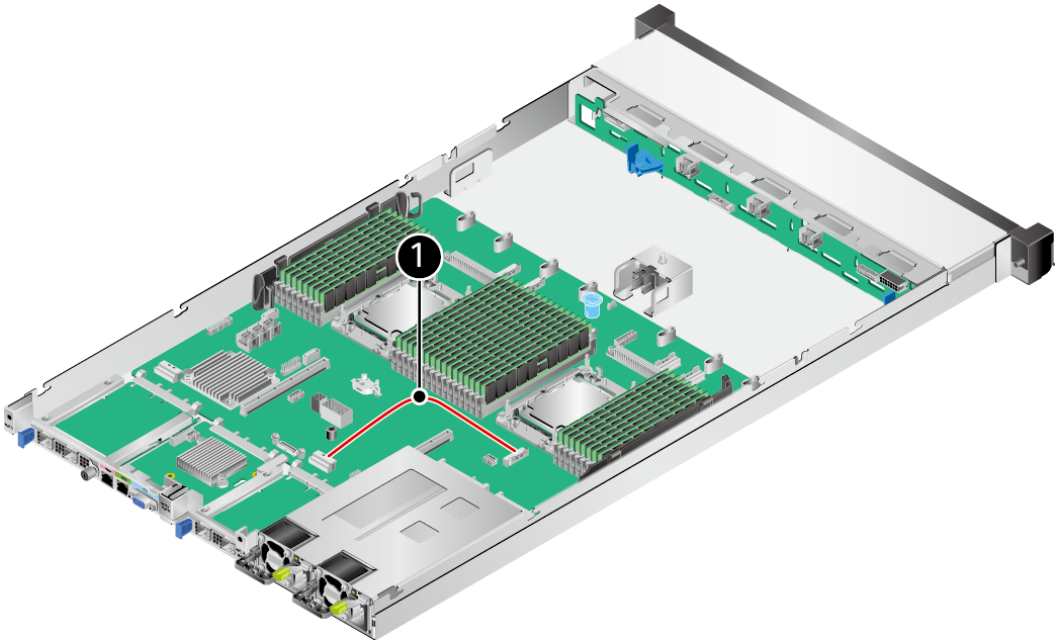


Table 6-72 OCP 3.0 expansion cable 2

No.	P/N Code	Description
1	04052322	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 7 connector (J31) of OCP 3.0 network adapter 2

6.4.11.3 Intrusion Sensor Cabling

Intrusion Sensor Cabling

Figure 6-113 Intrusion sensor cabling

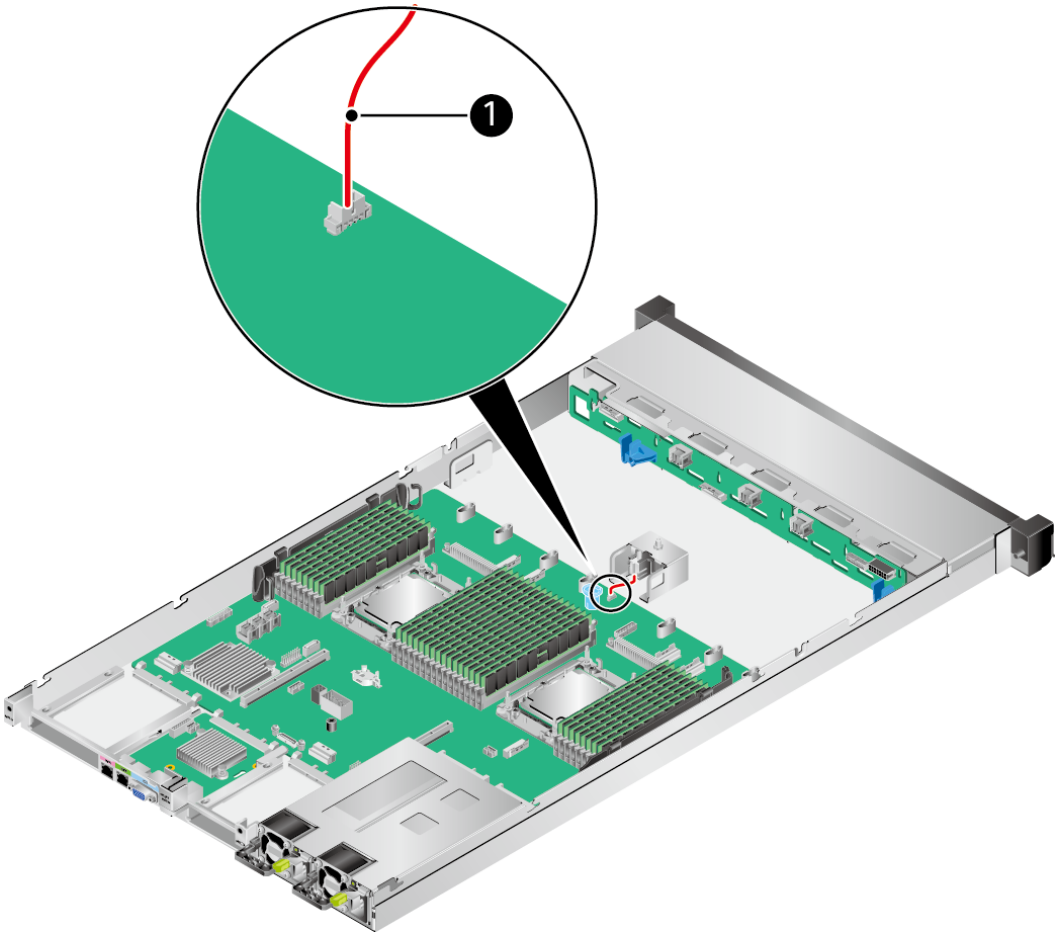


Table 6-73 Intrusion sensor cabling

No.	P/N Code	Description
1	04080771	Low-speed signal cable for connecting the intrusion sensor to the mainboard (S1)

6.4.11.4 Front-Drive Backplane Power and Indicator Signal Cabling

Front-Drive Backplane Power and Low-speed Signal Cables

Figure 6-114 Front-drive backplane power and low-speed signal cables

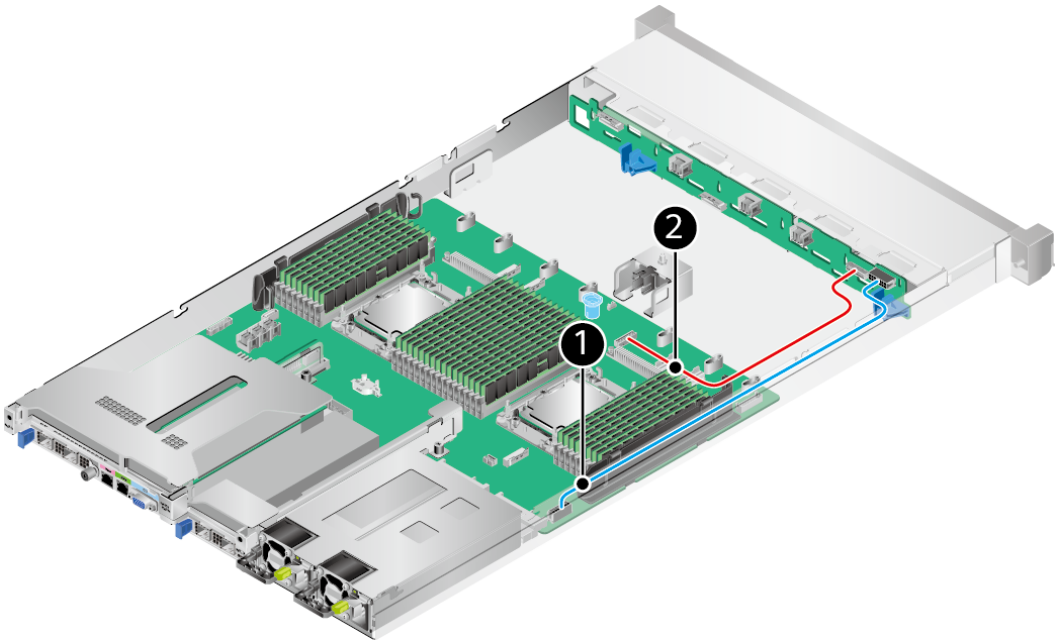


Table 6-74 Front-drive backplane power and low-speed signal cables

No.	P/N Code	Description
1	04152145-009	Power cable for connecting the front-drive backplane (J24) to the mainboard (J26)
2	04080783-001	Low-speed signal cable for connecting the front-drive backplane (J1) to the mainboard (J75) **NOTICE** If the server is configured with remote heat sinks, remove the remote heat sinks before removing or installing the cable.

6.4.11.5 Front-Drive Backplane SAS Signal Cabling (Server with a Screw-in RAID Controller Card)

NOTICE

Remove the LP slimline high-speed cables from the front-drive backplane before removing the SAS high-speed cables from the front-drive backplane.

Front-Drive Backplane SAS High-speed Cabling

Figure 6-115 Front-drive backplane SAS high-speed cabling

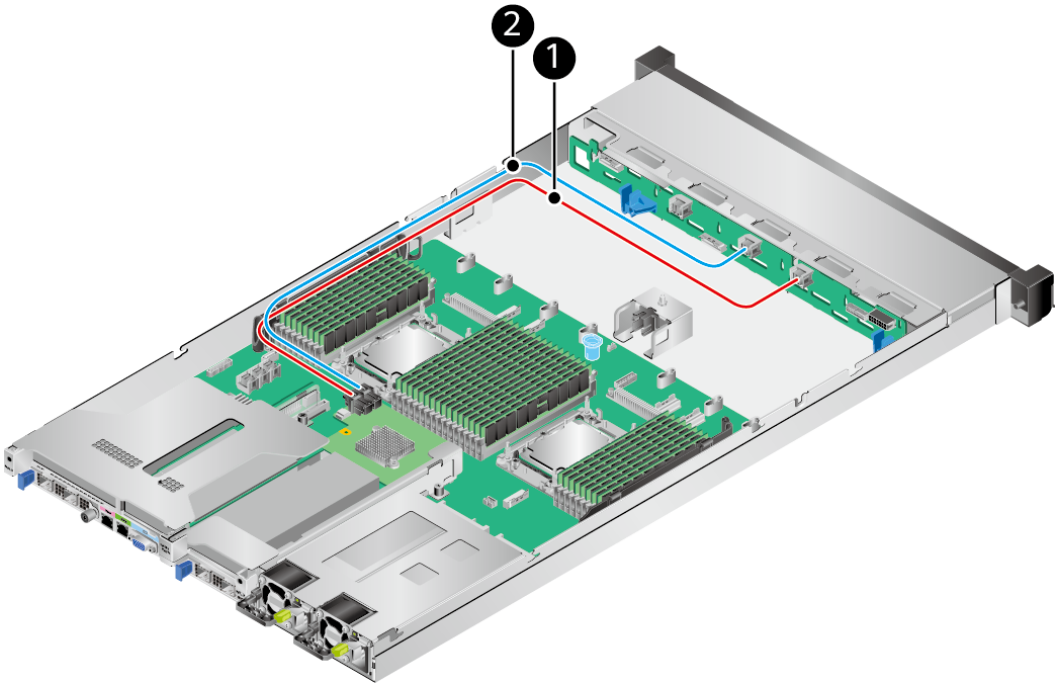


Table 6-75 Front-drive backplane SAS high-speed cabling

No.	P/N Code	Description
1	04051916-015	SAS high-speed cable for connecting the front-drive backplane (J13) to PORT A of the screw-in RAID controller card
2	04051916-015	SAS high-speed cable for connecting the front-drive backplane (J14) to PORT B of the screw-in RAID controller card

6.4.11.6 Front-Drive Backplane LP Slimline Signal Cable

NOTICE

If the server is configured with remote heat sinks, remove the remote heat sinks before removing or installing the LP slimline high-speed cables of the front-drive backplane. Connect SAS high-speed cables to the front-drive backplane before connecting LP slimline high-speed cables to the front-drive backplane.

Front-Drive Backplane LP Slimline High-speed Cables

Figure 6-116 Front-drive backplane LP slimline high-speed cables

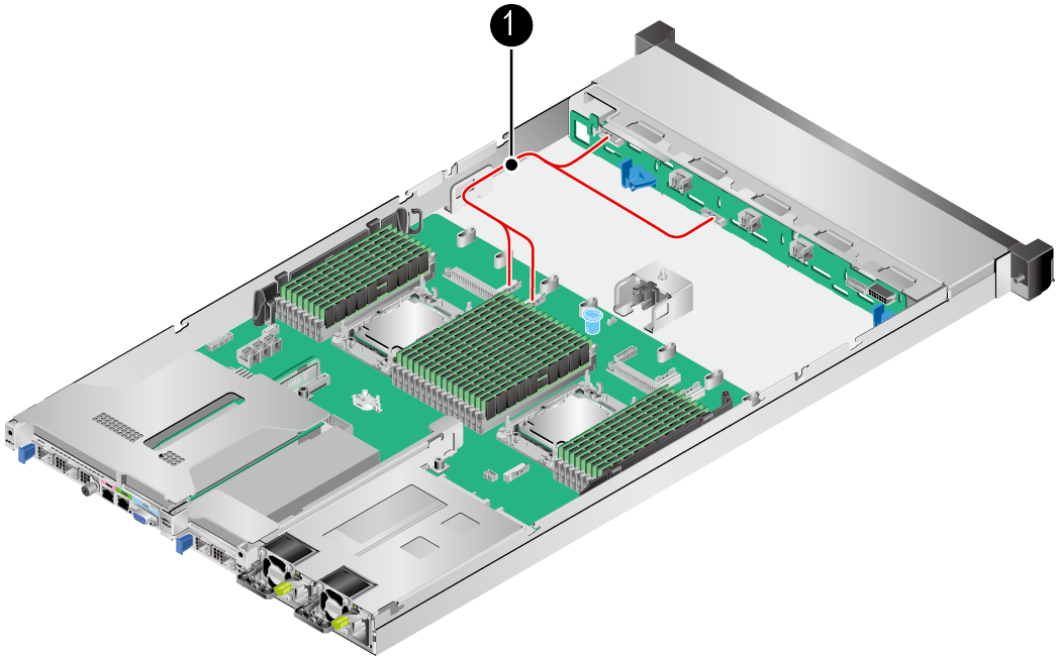


Table 6-76 Front-drive backplane LP slimline high-speed cables

No.	P/N Code	Description
1	04052323	High-speed cable for connecting LP Slimline 1 (J11) and LP Slimline 2 (J12) on the front-drive backplane to LP Slimline 1 (J11) and LP Slimline 2 (J84) on the mainboard

6.4.12 10 x 2.5" Drive Pass-through Configuration 5

6.4.12.1 Indicator Board and USB Cabling

Indicator Board and USB Cabling

Figure 6-117 VGA board cabling

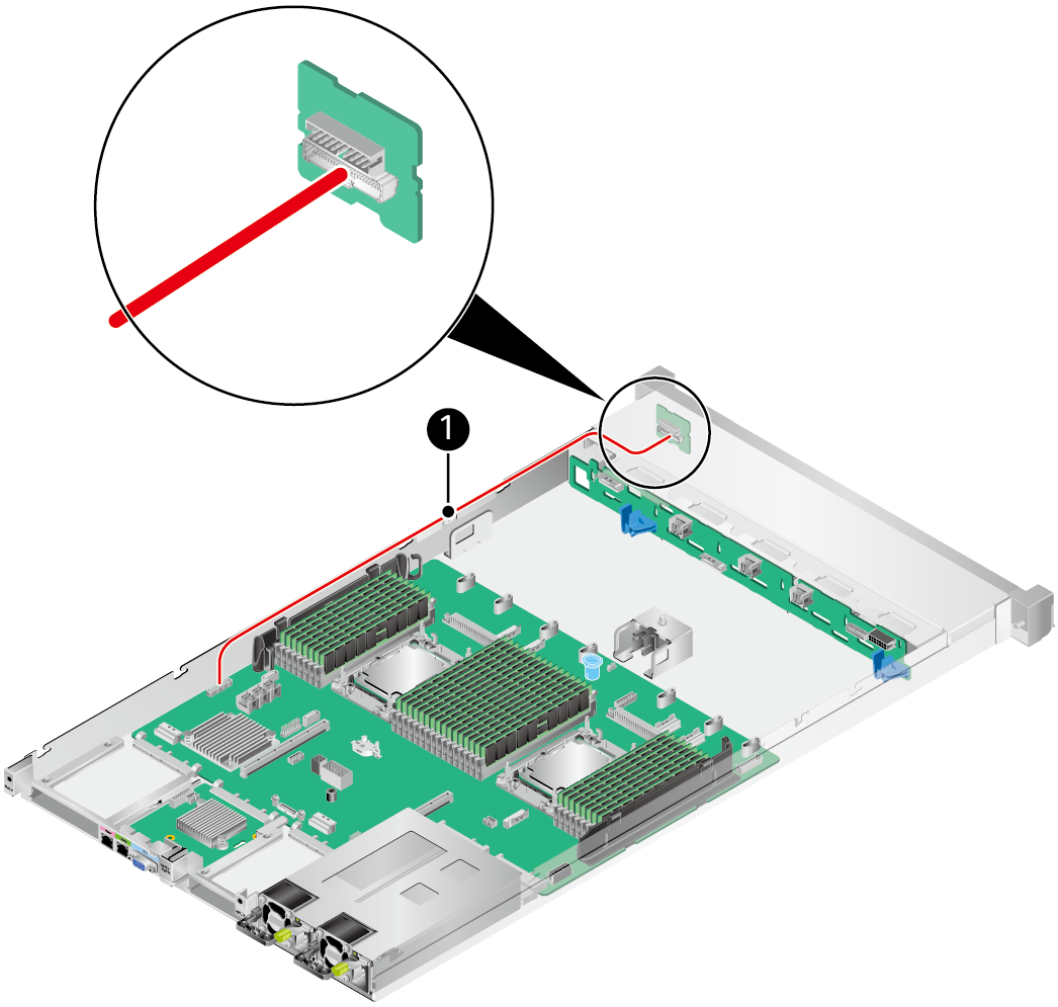


Table 6-77 VGA board cabling

No.	P/N Code	Description
1	04052666	Low-speed signal cable for connecting the indicator board to the mainboard (J106)

Figure 6-118 USB cabling

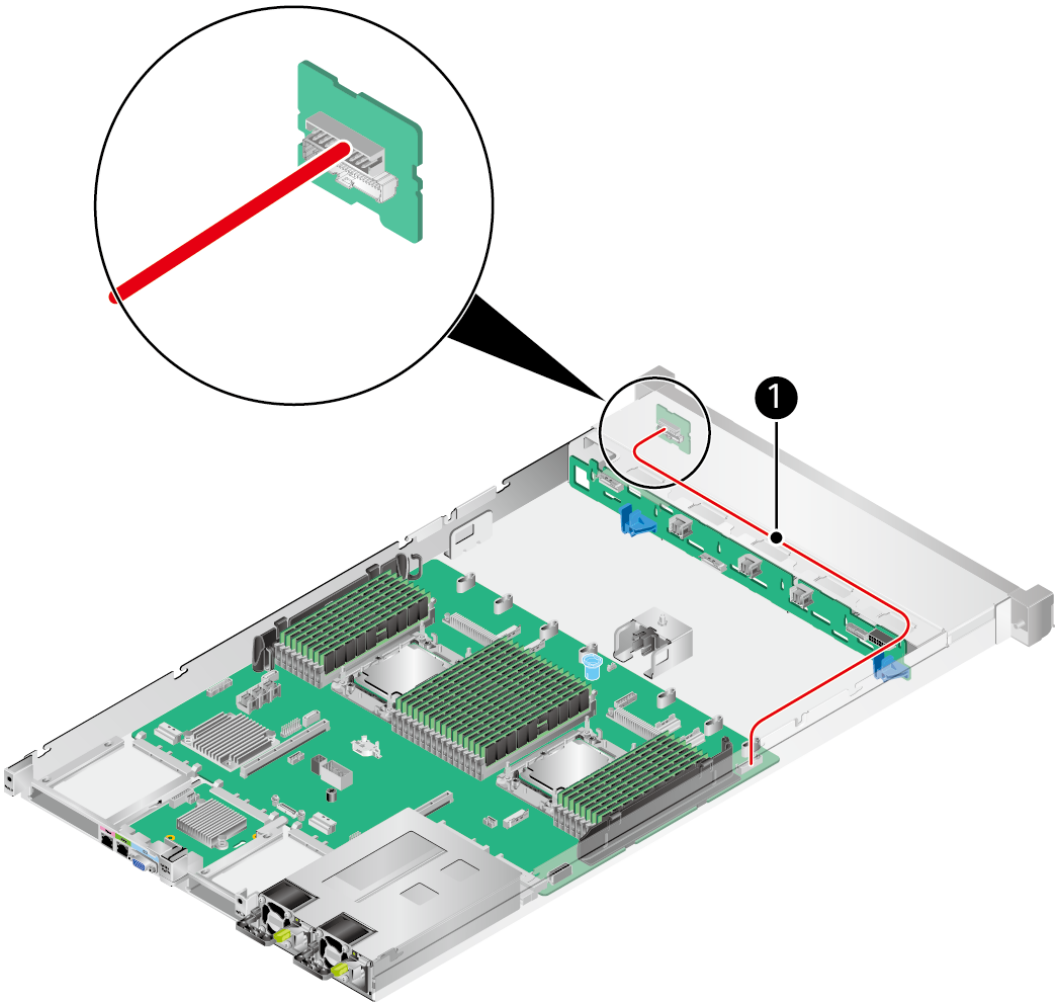


Table 6-78 USB cabling

No.	P/N Code	Description
1	04080684-001	Low-speed signal cable for connecting a USB device to the mainboard (J113)

6.4.12.2 OCP 3.0 Expansion Cable

OCP 3.0 Expansion Cable

NOTE

- When configured with a single CPU, the OCP 3.0 network card can only be installed in the 1 slot of the FlexIO card, and it does not support the expansion of bandwidth through the OCP 3.0 expansion cable.
- When configuring with dual CPUs, FlexIO card 1 and FlexIO card 2 slots can be configured with OCP 3.0 network cards, but only one OCP 3.0 network cards is supported to expand bandwidth at the same time.
  - FlexIO card has 1 slot, and the default operating bandwidth is x8. If you need to expand to x8+x8, you need to use 04052322-001 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 1 LP Slimline 6 connector (J13).
  - The FlexIO card has 2 slots, and the default operating bandwidth is x8. If you need to expand to x16, you need to use a 04052322 cable to connect the mainboard LP Slimline 5 connector (J30) and OCP 3.0 network card 2 LP Slimline 7 connector (J31).
- The 10NVMe model does not support bandwidth expansion via OCP 3.0 expansion cable.

Figure 6-119 OCP 3.0 expansion cable 1

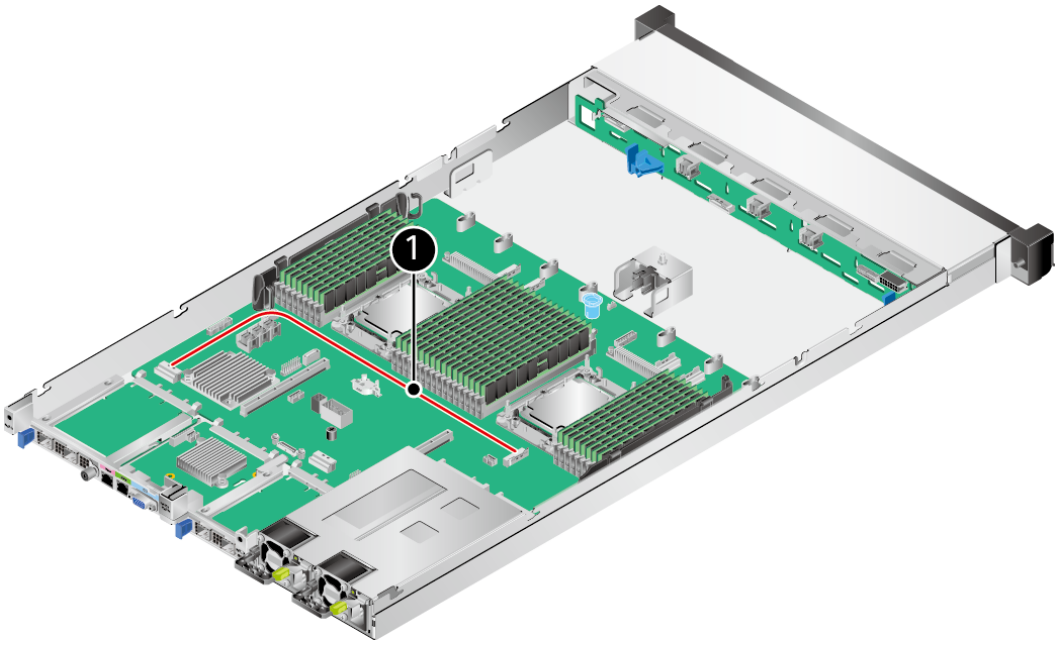


Table 6-79 OCP 3.0 expansion cable 1

No.	P/N Code	Description
1	04052322-001	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 6 connector (J13) of OCP 3.0 network adapter 1

Figure 6-120 OCP 3.0 expansion cable 2

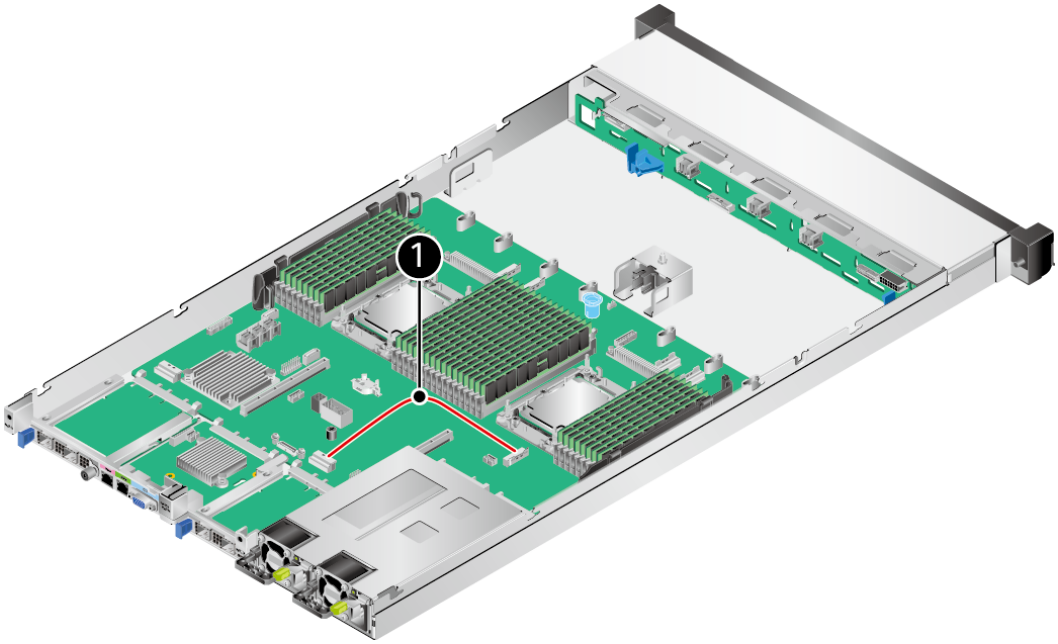


Table 6-80 OCP 3.0 expansion cable 2

No.	P/N Code	Description
1	04052322	OCP 3.0 expansion cable for connecting LP Slimline 5 (J30) to the LP Slimline 7 connector (J31) of OCP 3.0 network adapter 2

6.4.12.3 Intrusion Sensor Cabling

Intrusion Sensor Cabling

Figure 6-121 Intrusion sensor cabling

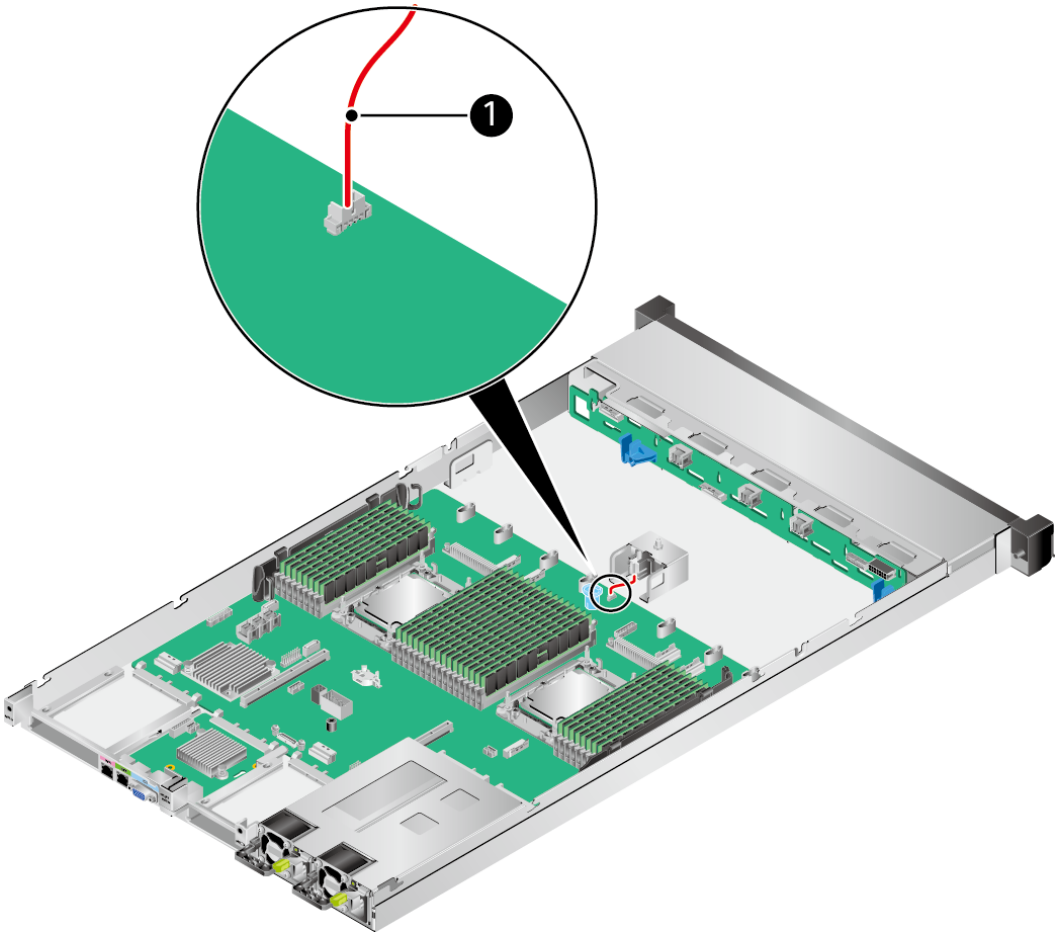


Table 6-81 Intrusion sensor cabling

No.	P/N Code	Description
1	04080771	Low-speed signal cable for connecting the intrusion sensor to the mainboard (S1)

6.4.12.4 Front-Drive Backplane Power and Indicator Signal Cabling

Front-Drive Backplane Power and Low-speed Signal Cables

Figure 6-122 Front-drive backplane power and low-speed signal cables

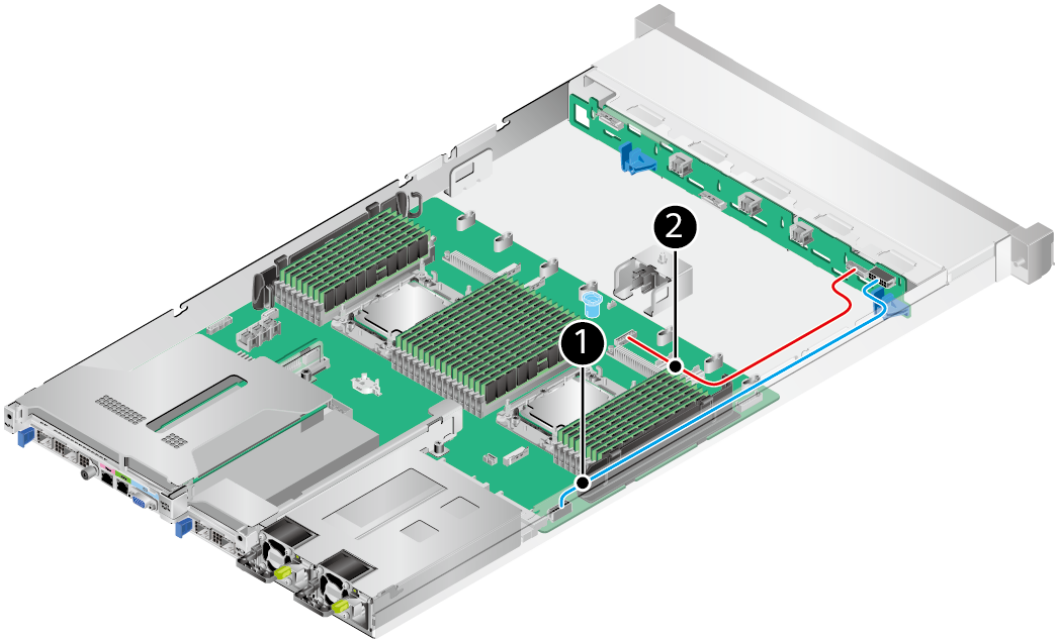


Table 6-82 Front-drive backplane power and low-speed signal cables

No.	P/N Code	Description
1	04152145-009	Power cable for connecting the front-drive backplane (J24) to the mainboard (J26)
2	04080783-001	Low-speed signal cable for connecting the front-drive backplane (J1) to the mainboard (J75) **NOTICE** If the server is configured with remote heat sinks, remove the remote heat sinks before removing or installing the cable.

6.4.12.5 Front-Drive Backplane SAS Signal Cabling (Server with a PCIe RAID Controller Card)

NOTICE

- Remove the LP slimline high-speed cables from the front-drive backplane before removing the SAS high-speed cables from the front-drive backplane.
- The PCIe RAID controller card must be installed in slot 1.

Front-Drive Backplane SAS High-speed Cabling

Figure 6-123 Front-drive backplane SAS high-speed cabling

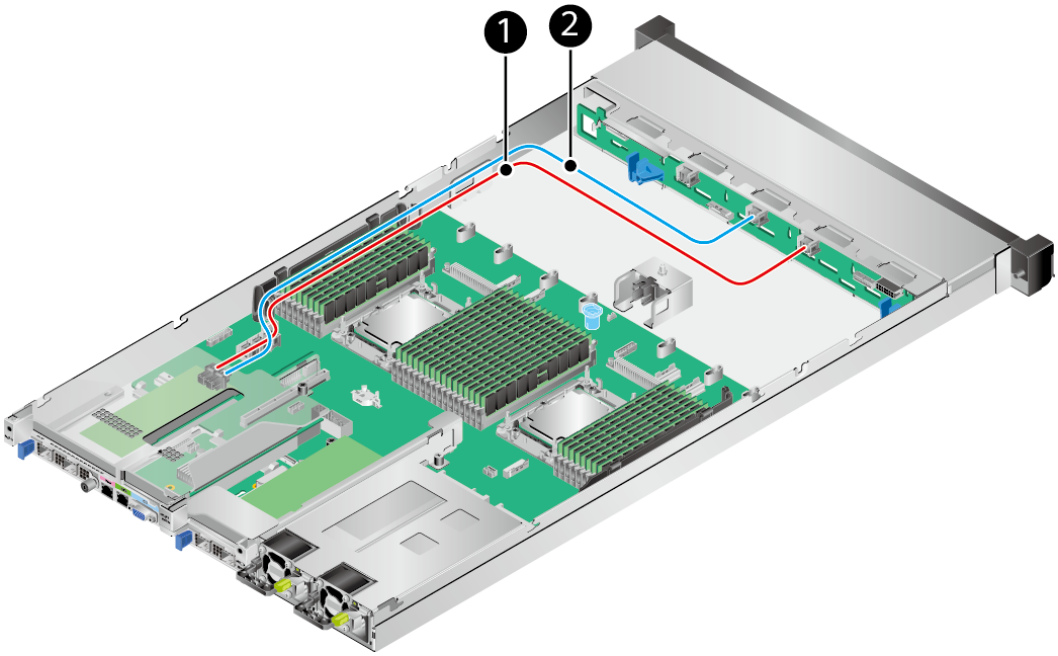


Table 6-83 Front-drive backplane SAS high-speed cabling

No.	P/N Code	Description
1	04051021	SAS high-speed cable for connecting the front-drive backplane (J13) to PORT A of the PCIe RAID controller card
2	04051916-014	SAS high-speed cable for connecting the front-drive backplane (J14) to PORT B of the PCIe RAID controller card

NOTE

The port numbers vary with the PCIe RAID controller cards. The port number of the PCIe RAID controller card connected to front-drive backplane (J13) may be C0, PORT A, 0, or CN0, and the port number of the PCIe RAID controller card connected to front-drive backplane (J14) may be C1, PORT B, 1, or CN1.

6.4.12.6 Front-Drive Backplane LP Slimline Signal Cable

NOTICE

If the server is configured with remote heat sinks, remove the remote heat sinks before removing or installing the LP slimline high-speed cables of the front-drive backplane. Connect SAS high-speed cables to the front-drive backplane before connecting LP slimline high-speed cables to the front-drive backplane.

Front-Drive Backplane LP Slimline High-speed Cables

Figure 6-124 Front-drive backplane LP slimline high-speed cables

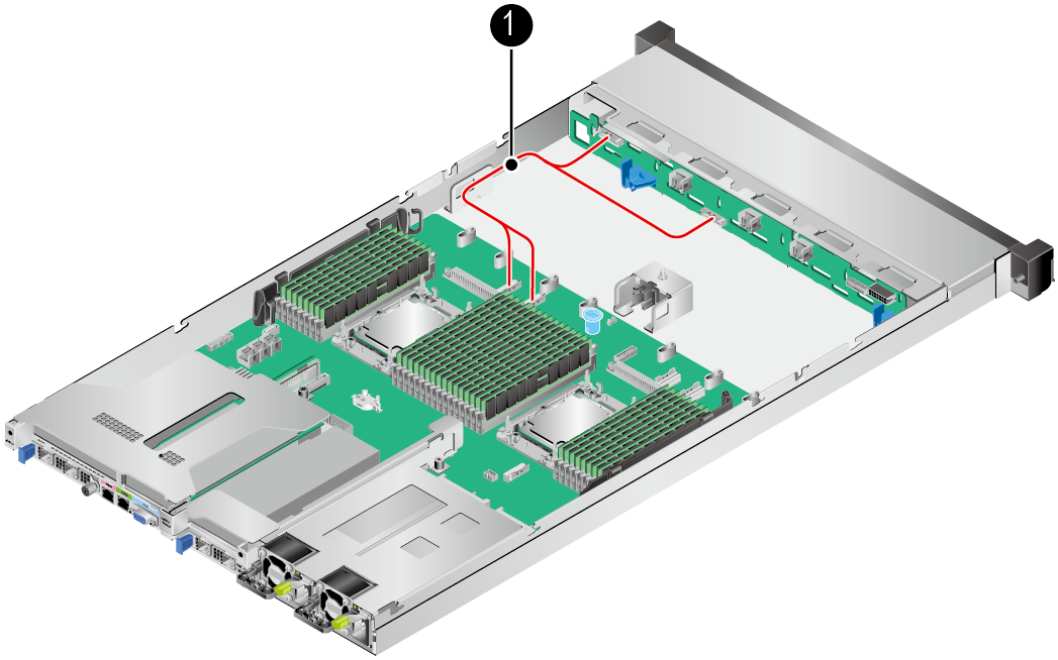


Table 6-84 Front-drive backplane LP slimline high-speed cables

No.	P/N Code	Description
1	04052323	High-speed cable for connecting LP Slimline 1 (J11) and LP Slimline 2 (J12) on the front-drive backplane to LP Slimline 1 (J11) and LP Slimline 2 (J84) on the mainboard

6.4.13 10 x 2.5" Drive NVMe Configuration 1

6.4.13.1 Indicator Board and USB Cabling

Indicator Board and USB Cabling

Figure 6-125 VGA board cabling

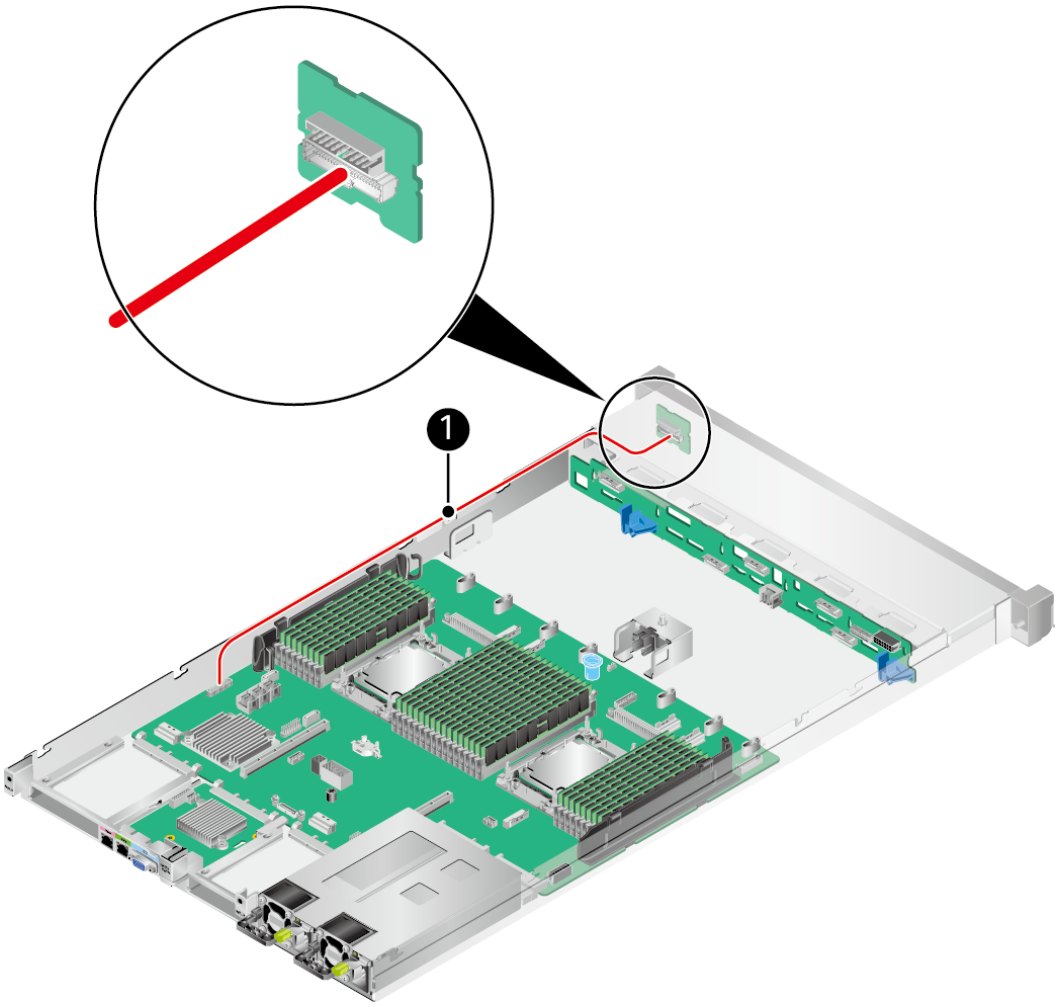


Table 6-85 VGA board cabling

No.	P/N Code	Description
1	04052666	Low-speed signal cable for connecting the indicator board to the mainboard (J106)

Figure 6-126 USB cabling

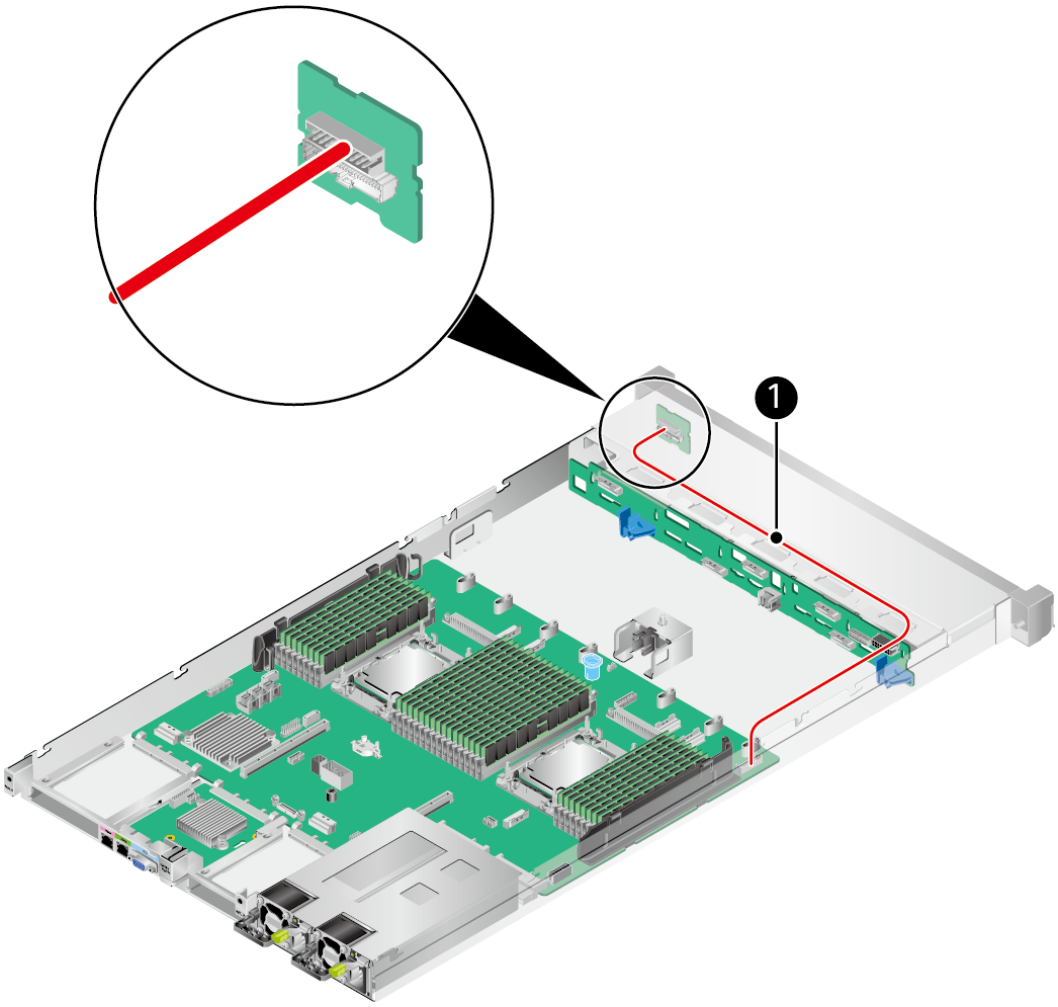


Table 6-86 USB cabling

No.	P/N Code	Description
1	04080684-001	Low-speed signal cable for connecting a USB device to the mainboard (J113)

6.4.13.2 Intrusion Sensor Cabling

Intrusion Sensor Cabling

Figure 6-127 Intrusion sensor cabling

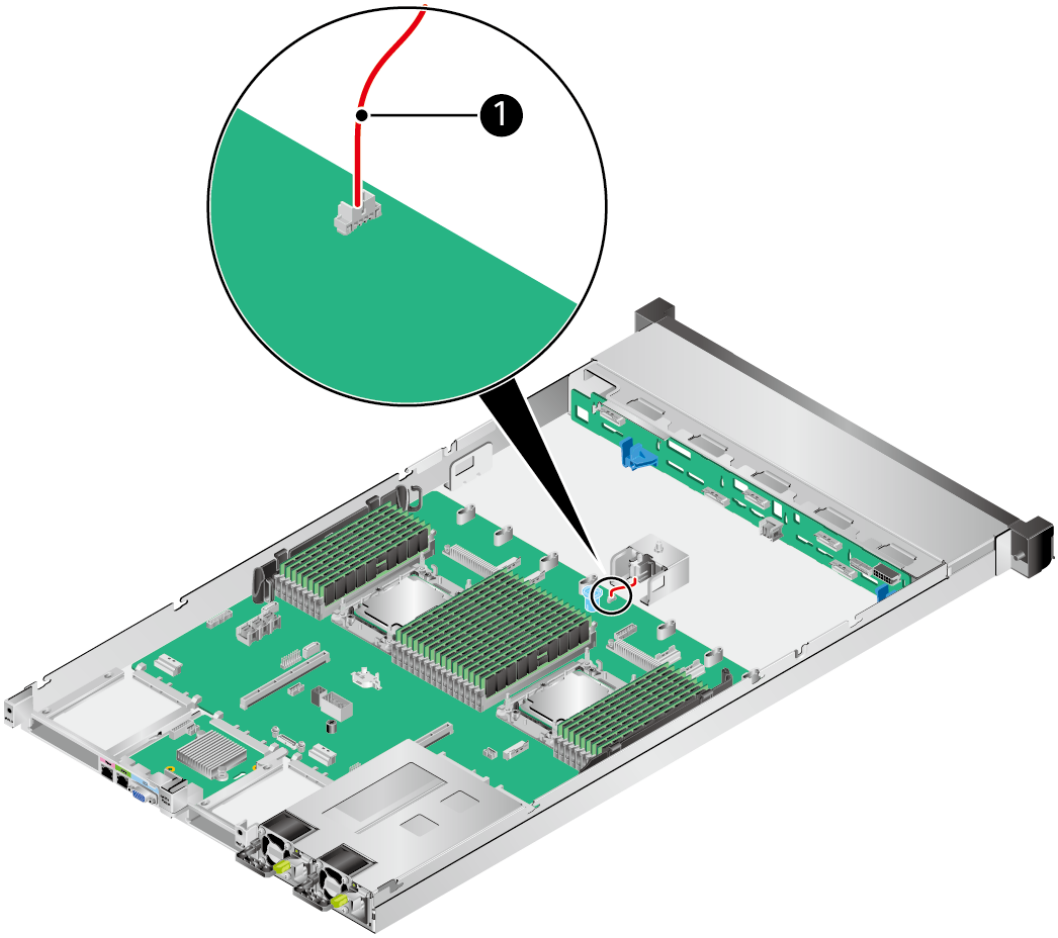


Table 6-87 Intrusion sensor cabling

No.	P/N Code	Description
1	04080771	Low-speed signal cable for connecting the intrusion sensor to the mainboard (S1)

6.4.13.3 Front-Drive Backplane Power and Indicator Signal Cabling

Front-Drive Backplane Power and Low-speed Signal Cables

Figure 6-128 Front-drive backplane power and low-speed signal cables

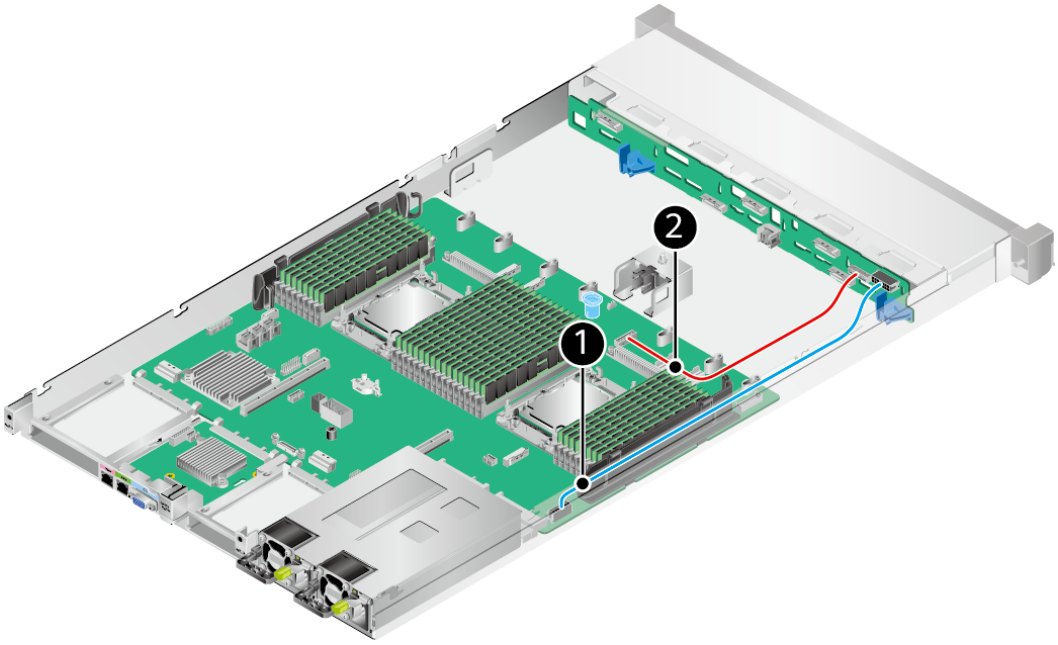


Table 6-88 Front-drive backplane power and low-speed signal cables

No.	P/N Code	Description
1	04152145-009	Power cable for connecting the front-drive backplane (J24) to the mainboard (J26)
2	04080783-001	Low-speed signal cable for connecting the front-drive backplane (J1) to the mainboard (J75) **NOTICE** If the server is configured with remote heat sinks, remove the remote heat sinks before removing or installing the cable.

6.4.13.4 Front-Drive Backplane SAS Cabling (PCH Pass-through)

NOTICE

Remove the LP slimline high-speed cables from the front-drive backplane before removing the SAS high-speed cables from the front-drive backplane.

Front-Drive Backplane SAS High-speed Cabling

Figure 6-129 Front-drive backplane SAS high-speed cabling

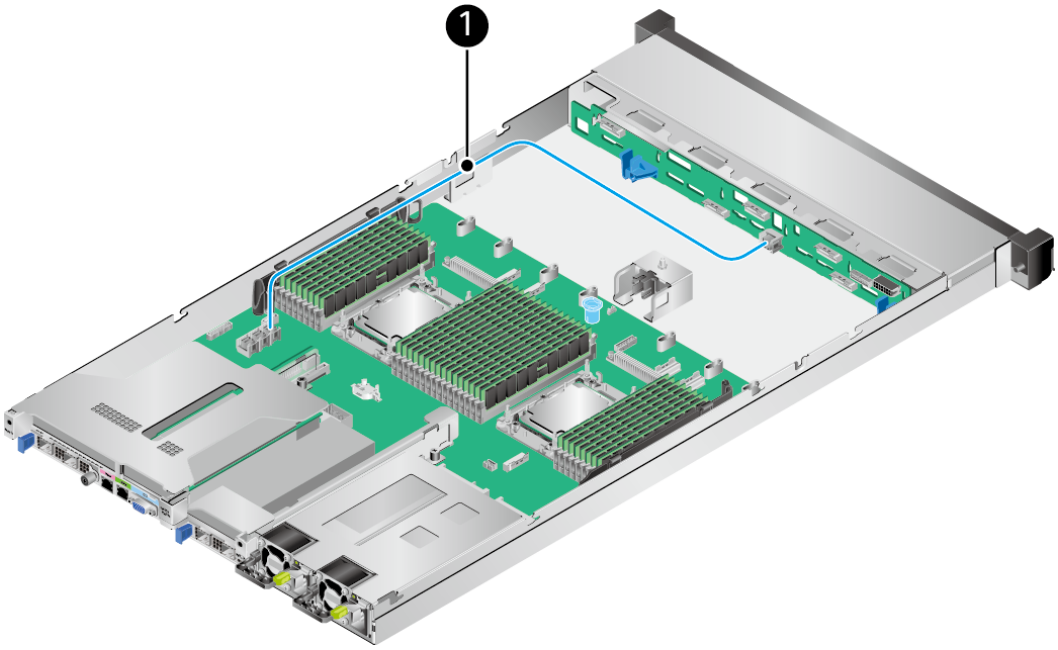


Table 6-89 Front-drive backplane SAS high-speed cabling

No.	P/N Code	Description
1	04051939-001	SAS high-speed cable for connecting the front-drive backplane (J6) to the mainboard (J6)

6.4.13.5 Front-Drive Backplane LP Slimline Signal Cable

NOTICE

If the server is configured with remote heat sinks, remove the remote heat sinks before removing or installing the LP slimline high-speed cables of the front-drive backplane. Connect SAS high-speed cables to the front-drive backplane before connecting LP slimline high-speed cables to the front-drive backplane.

Front-Drive Backplane LP Slimline High-speed Cables

Figure 6-130 Front-drive backplane LP slimline high-speed cables

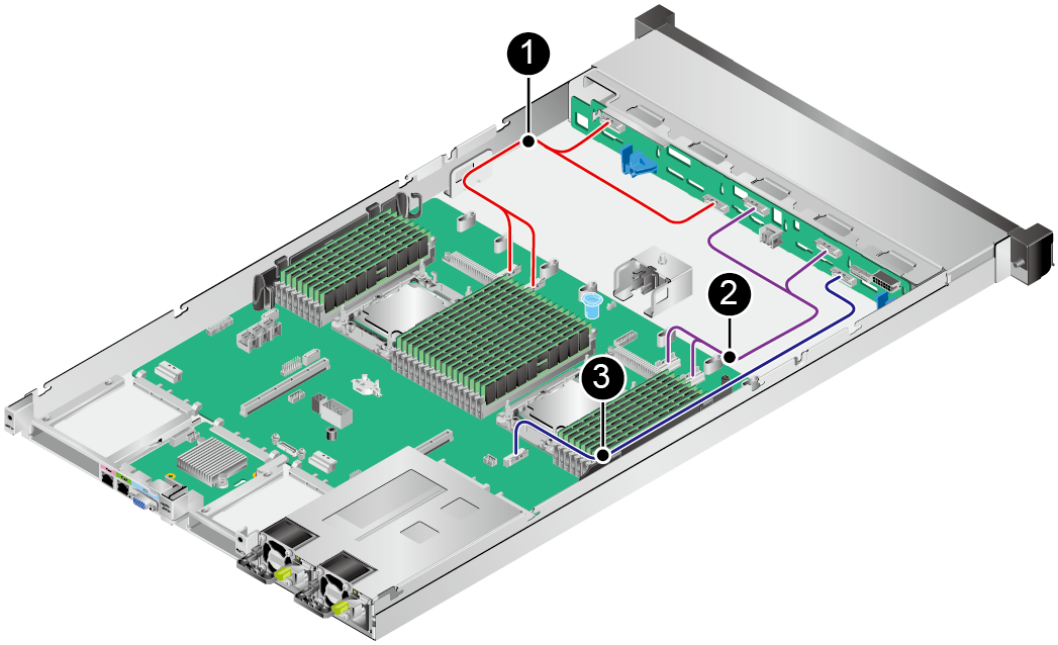


Table 6-90 Front-drive backplane LP slimline high-speed cables

No.	P/N Code	Description
1	04052323	High-speed cable for connecting LP Slimline 1 (J2) and LP Slimline 2 (J3) on the front-drive backplane to LP Slimline 1 (J11) and LP Slimline 2 (J84) on the mainboard
2	04052324	High-speed cable for connecting LP Slimline 3 (J4) and LP Slimline 4 (J5) on the front-drive backplane to LP Slimline 3 (J85) and LP Slimline 4 (J12) on the mainboard
3	04052346	LP slimline high-speed cable for connecting the front-drive backplane (J17) to the mainboard (J30)

6.4.14 10 x 2.5" Drive NVMe Configuration 2

6.4.14.1 Indicator Board and USB Cabling

Indicator Board and USB Cabling

Figure 6-131 VGA board cabling

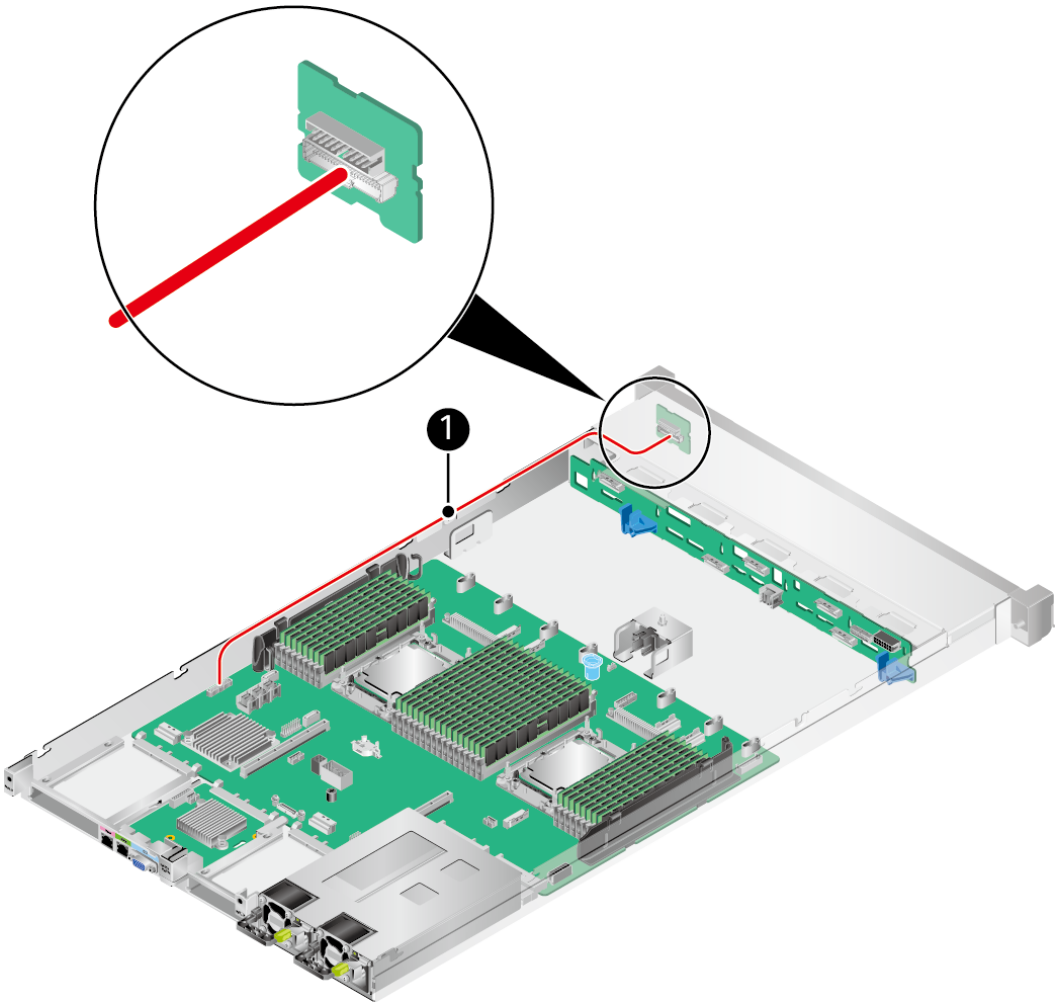


Table 6-91 VGA board cabling

No.	P/N Code	Description
1	04052666	Low-speed signal cable for connecting the indicator board to the mainboard (J106)

Figure 6-132 USB cabling

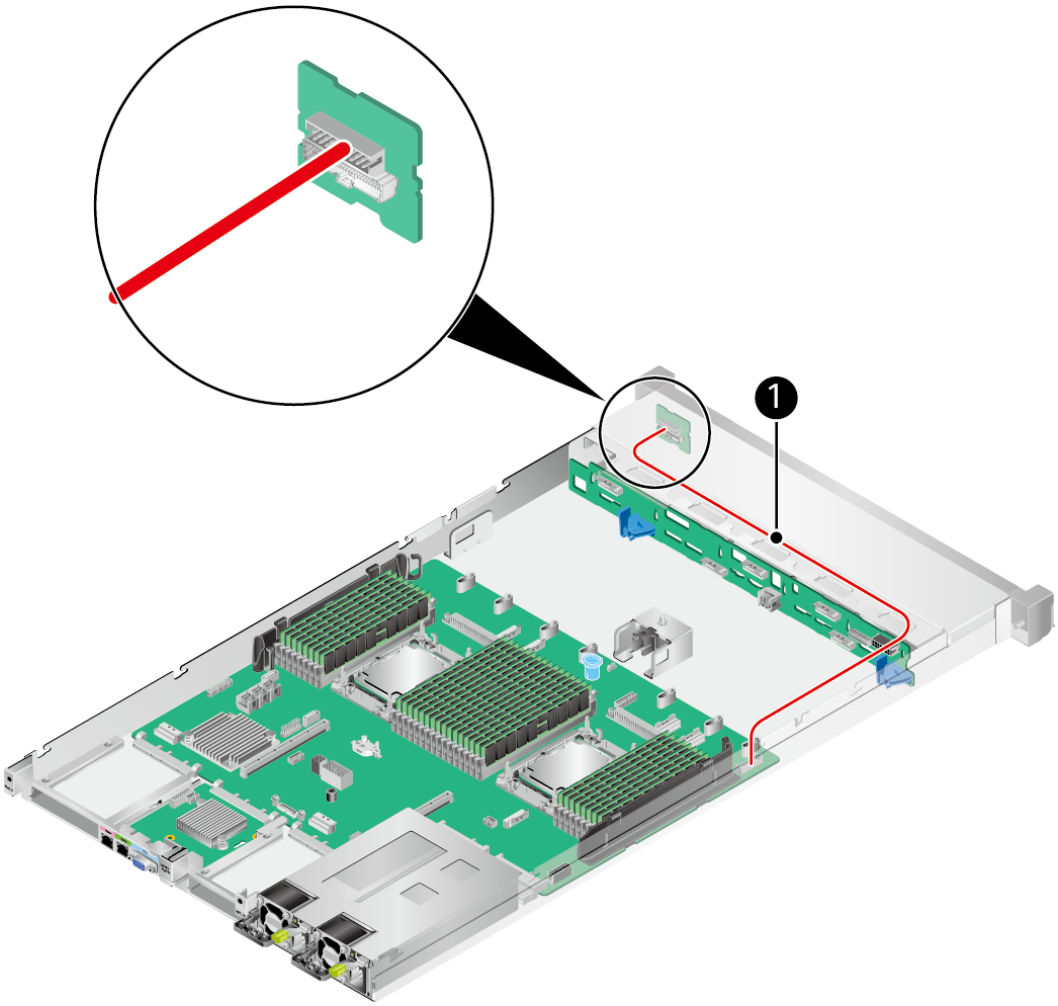


Table 6-92 USB cabling

No.	P/N Code	Description
1	04080684-001	Low-speed signal cable for connecting a USB device to the mainboard (J113)

6.4.14.2 Intrusion Sensor Cabling

Intrusion Sensor Cabling

Figure 6-133 Intrusion sensor cabling

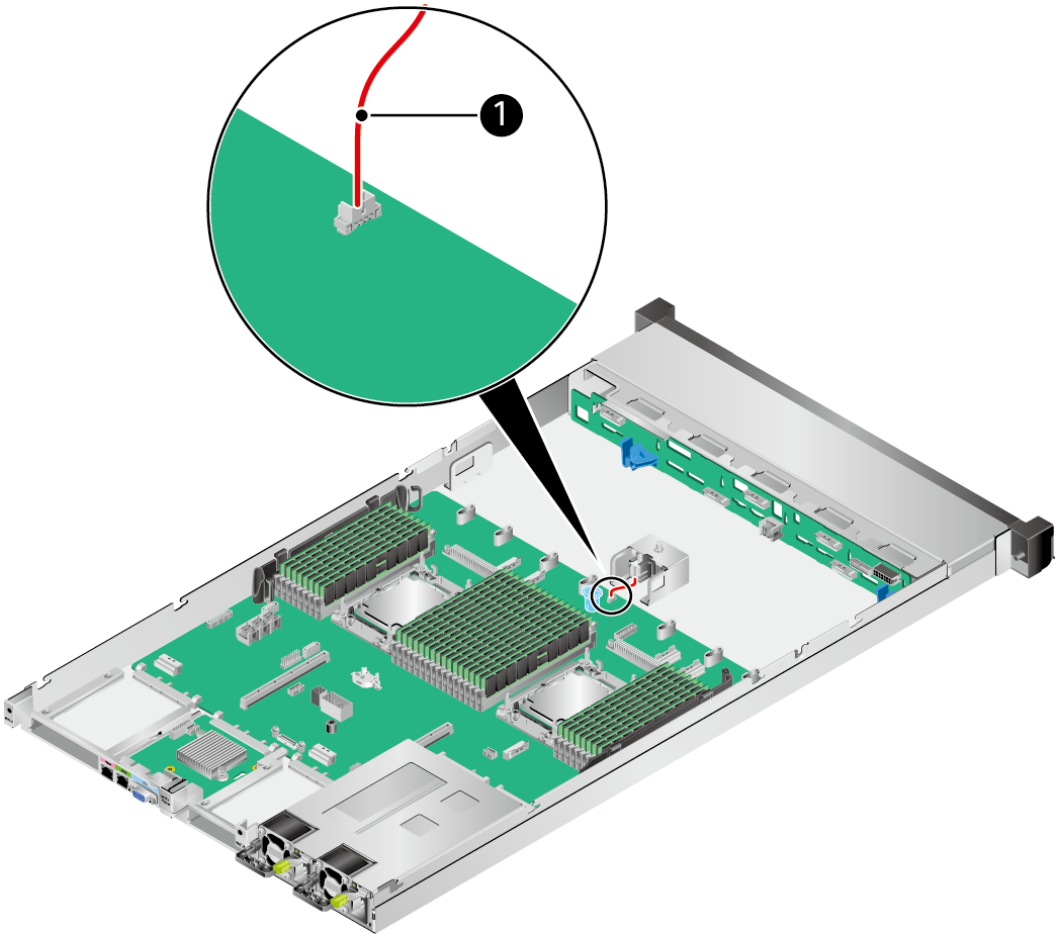


Table 6-93 Intrusion sensor cabling

No.	P/N Code	Description
1	04080771	Low-speed signal cable for connecting the intrusion sensor to the mainboard (S1)

6.4.14.3 Front-Drive Backplane Power and Indicator Signal Cabling

Front-Drive Backplane Power and Low-speed Signal Cables

Figure 6-134 Front-drive backplane power and low-speed signal cables

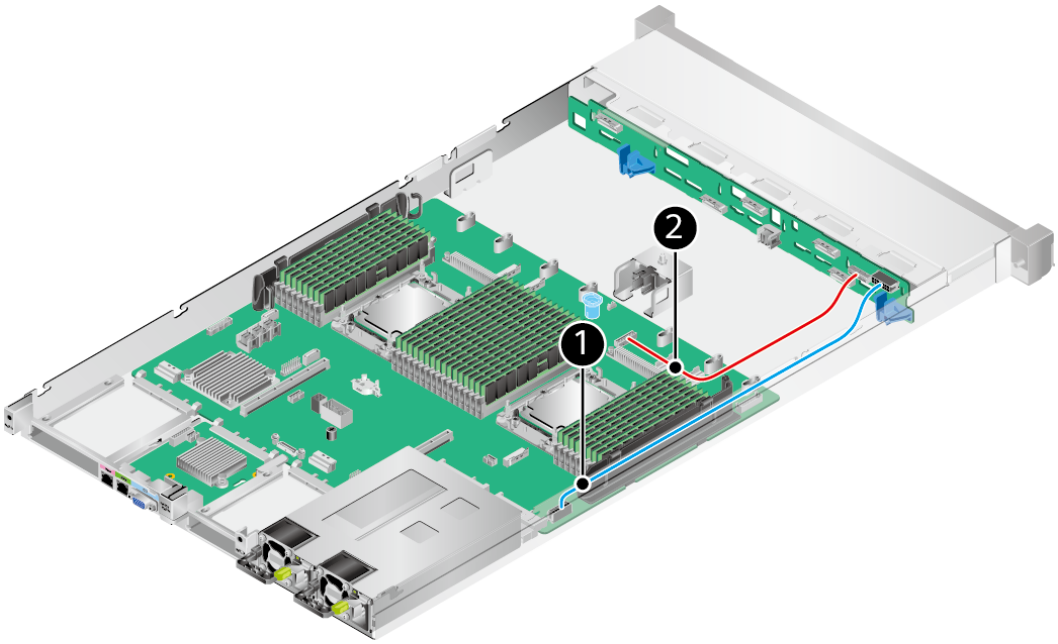


Table 6-94 Front-drive backplane power and low-speed signal cables

No.	P/N Code	Description
1	04152145-009	Power cable for connecting the front-drive backplane (J24) to the mainboard (J26)
2	04080783-001	Low-speed signal cable for connecting the front-drive backplane (J1) to the mainboard (J75) **NOTICE** If the server is configured with remote heat sinks, remove the remote heat sinks before removing or installing the cable.

6.4.14.4 Front-Drive Backplane SAS Signal Cabling (Server with a Screw-in RAID Controller Card)

NOTICE

Remove the LP slimline high-speed cables from the front-drive backplane before removing the SAS high-speed cables from the front-drive backplane.

Front-Drive Backplane SAS High-speed Cabling

Figure 6-135 Front-drive backplane SAS high-speed cabling

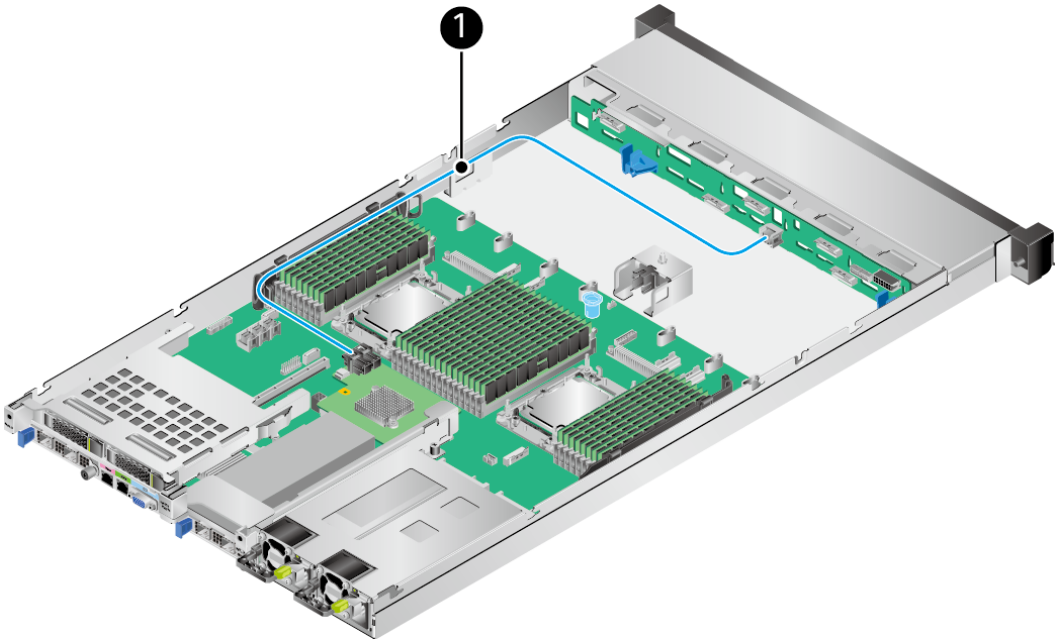


Table 6-95 Front-drive backplane SAS high-speed cabling

No.	P/N Code	Description
1	04051021	SAS high-speed cable for connecting the front-drive backplane (J6) to PORT A of the screw-in RAID controller card

6.4.14.5 Front-Drive Backplane LP Slimline Signal Cable

NOTICE

If the server is configured with remote heat sinks, remove the remote heat sinks before removing or installing the LP slimline high-speed cables of the front-drive backplane. Connect SAS high-speed cables to the front-drive backplane before connecting LP slimline high-speed cables to the front-drive backplane.

Front-Drive Backplane LP Slimline High-speed Cables

Figure 6-136 Front-drive backplane LP slimline high-speed cables

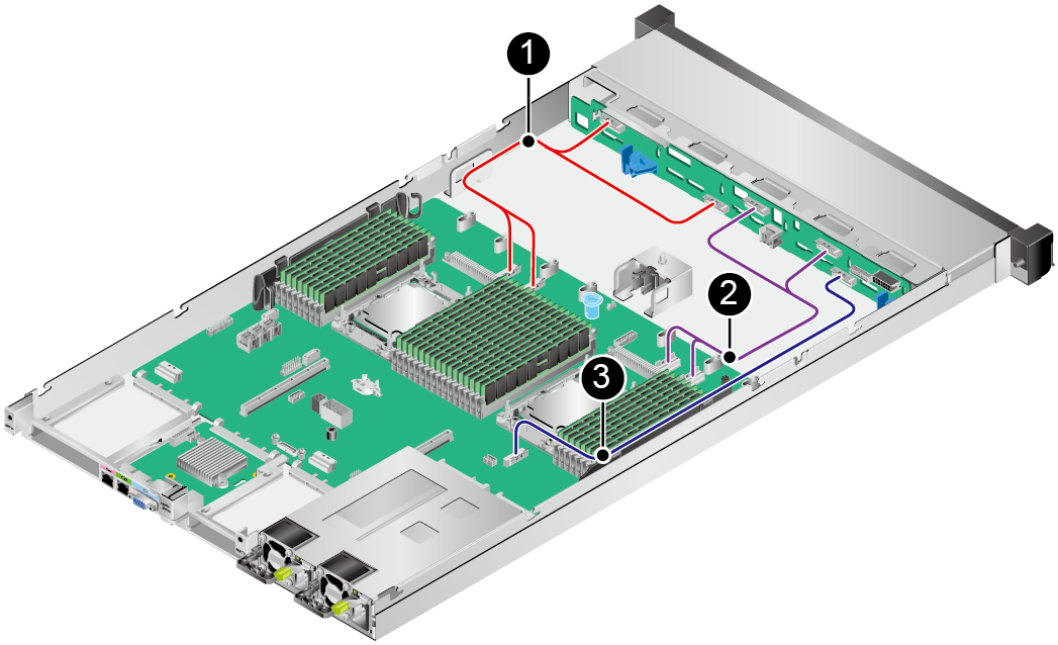


Table 6-96 Front-drive backplane LP slimline high-speed cables

No.	P/N Code	Description
1	04052323	High-speed cable for connecting LP Slimline 1 (J2) and LP Slimline 2 (J3) on the front-drive backplane to LP Slimline 1 (J11) and LP Slimline 2 (J84) on the mainboard
2	04052324	High-speed cable for connecting LP Slimline 3 (J4) and LP Slimline 4 (J5) on the front-drive backplane to LP Slimline 3 (J85) and LP Slimline 4 (J12) on the mainboard
3	04052346	LP slimline high-speed cable for connecting the front-drive backplane (J17) to the mainboard (J30)

6.4.14.6 I/O Module 1 Cabling

I/O Module 1 Cabling

Figure 6-137 I/O module 1 cabling

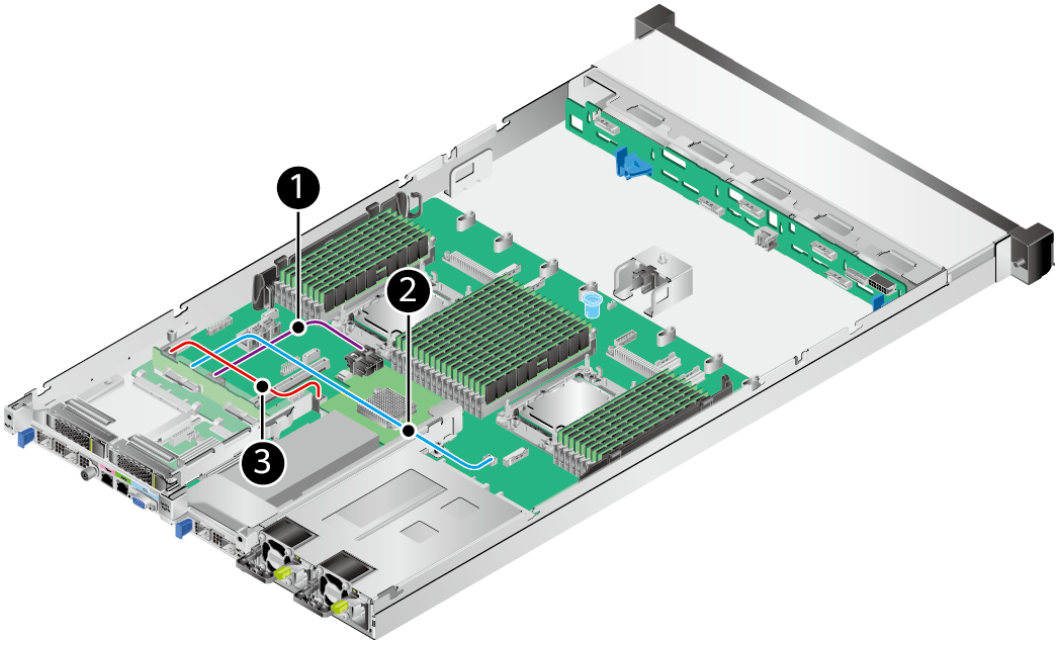


Table 6-97 I/O module 1 cabling

No.	P/N Code	Description	Remarks
1	04052363 -001	SAS high-speed cable for connecting the rear-drive backplane (J3) to PORT B of the screw-in RAID controller card	The cable is not an independent spare part in this configuration. It is packed with the 2 x 2.5" drive module as a spare part.
2	04080551 -005	Low-speed signal cable for connecting the rear-drive backplane (J1) to the mainboard (J27)	The cable is not an independent spare part. It is packed with the 2 x 2.5" drive module as a spare part.
3	04150448 -001	Power cable for connecting the rear-drive backplane (J2) to the mainboard (J21)	-

6.4.15 10 x 2.5" Drive NVMe Configuration 3

6.4.15.1 Indicator Board and USB Cabling

Indicator Board and USB Cabling

Figure 6-138 VGA board cabling

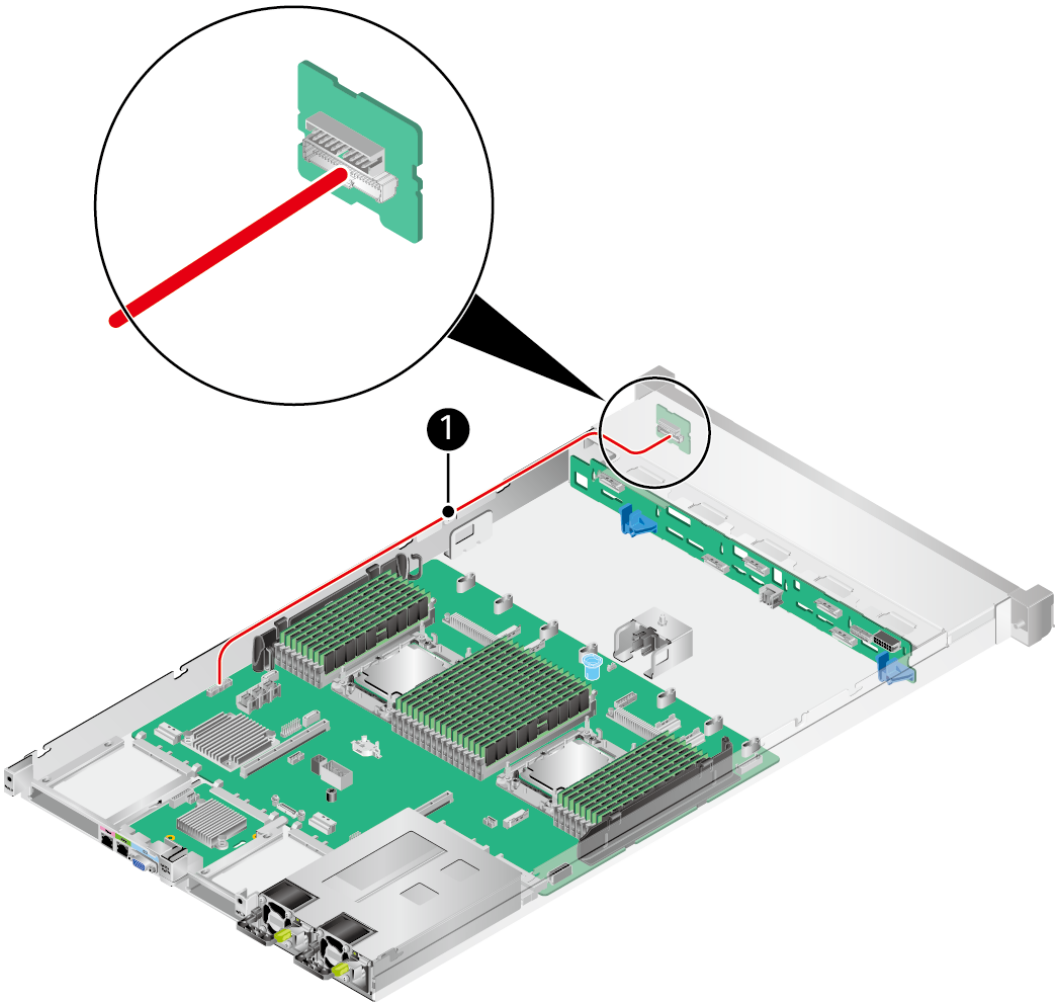


Table 6-98 VGA board cabling

No.	P/N Code	Description
1	04052666	Low-speed signal cable for connecting the indicator board to the mainboard (J106)

Figure 6-139 USB cabling

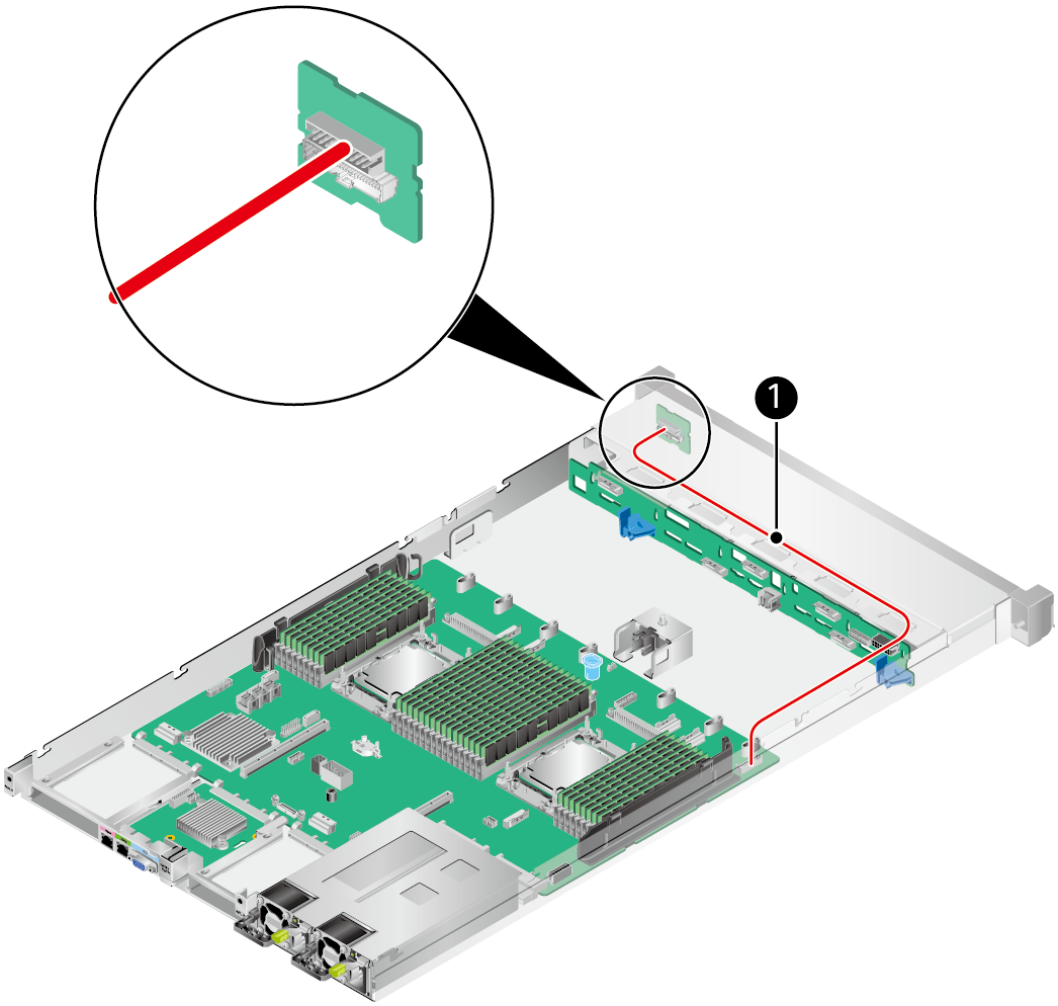


Table 6-99 USB cabling

No.	P/N Code	Description
1	04080684-001	Low-speed signal cable for connecting a USB device to the mainboard (J113)

6.4.15.2 Intrusion Sensor Cabling

Intrusion Sensor Cabling

Figure 6-140 Intrusion sensor cabling

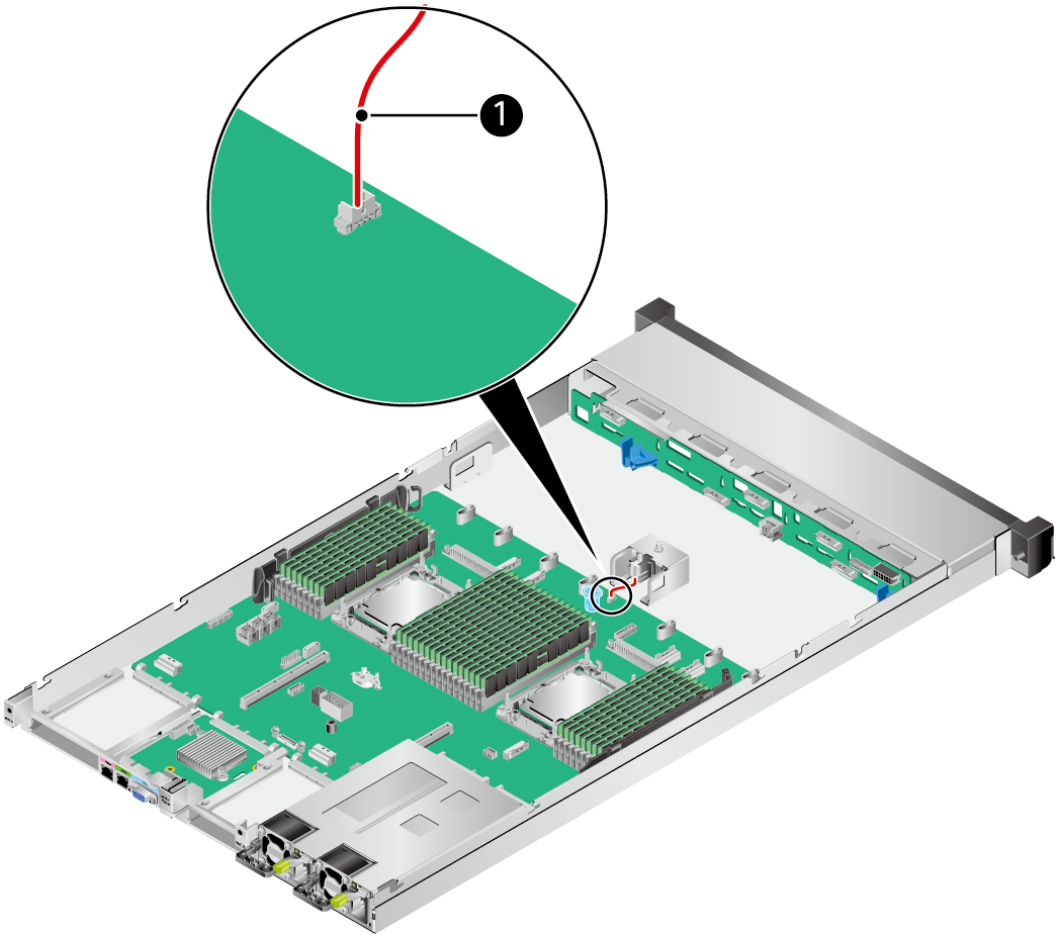


Table 6-100 Intrusion sensor cabling

No.	P/N Code	Description
1	04080771	Low-speed signal cable for connecting the intrusion sensor to the mainboard (S1)

6.4.15.3 Front-Drive Backplane Power and Indicator Signal Cabling

Front-Drive Backplane Power and Low-speed Signal Cables

Figure 6-141 Front-drive backplane power and low-speed signal cables

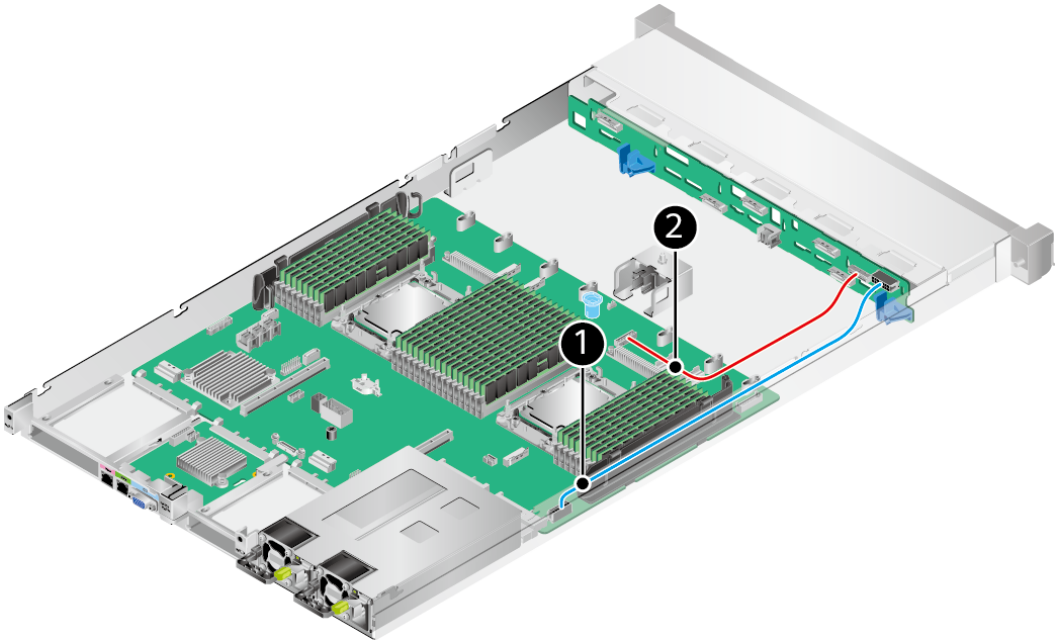


Table 6-101 Front-drive backplane power and low-speed signal cables

No.	P/N Code	Description
1	04152145-009	Power cable for connecting the front-drive backplane (J24) to the mainboard (J26)
2	04080783-001	Low-speed signal cable for connecting the front-drive backplane (J1) to the mainboard (J75) **NOTICE** If the server is configured with remote heat sinks, remove the remote heat sinks before removing or installing the cable.

6.4.15.4 Front-Drive Backplane SAS Signal Cabling (Server with a PCIe RAID Controller Card)

NOTICE

- Remove the LP slimline high-speed cables from the front-drive backplane before removing the SAS high-speed cables from the front-drive backplane.
- When I/O module 1 is configured with drives, the PCIe RAID controller card must be installed in slot 3.
- When I/O module 1 is not configured with drives, the PCIe RAID controller card must be installed in slot 1.

Front-Drive Backplane SAS High-speed Cabling (Server with a PCIe RAID Controller Card in Slot 1)

Figure 6-142 Front-drive backplane SAS high-speed cabling

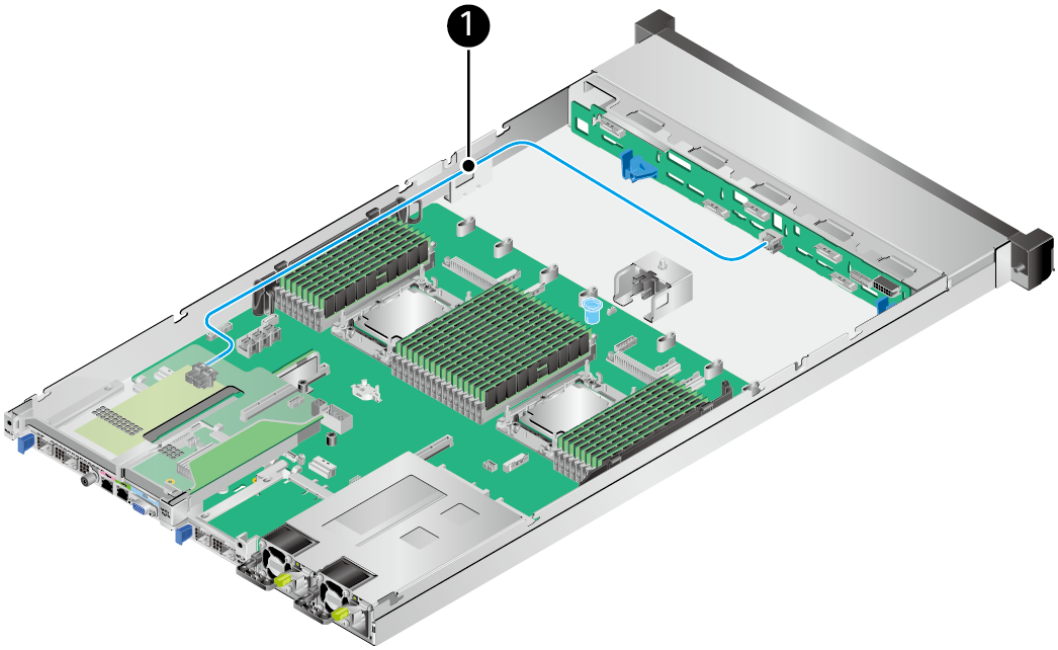


Table 6-102 Front-drive backplane SAS high-speed cabling

No.	P/N Code	Description
1	04051201	SAS high-speed cable for connecting the front-drive backplane (J6) to PORT A of the PCIe RAID controller card

Front-Drive Backplane SAS High-speed Cabling (Server with a PCIe RAID Controller Card in Slot 3)

Figure 6-143 Front-drive backplane SAS high-speed cabling

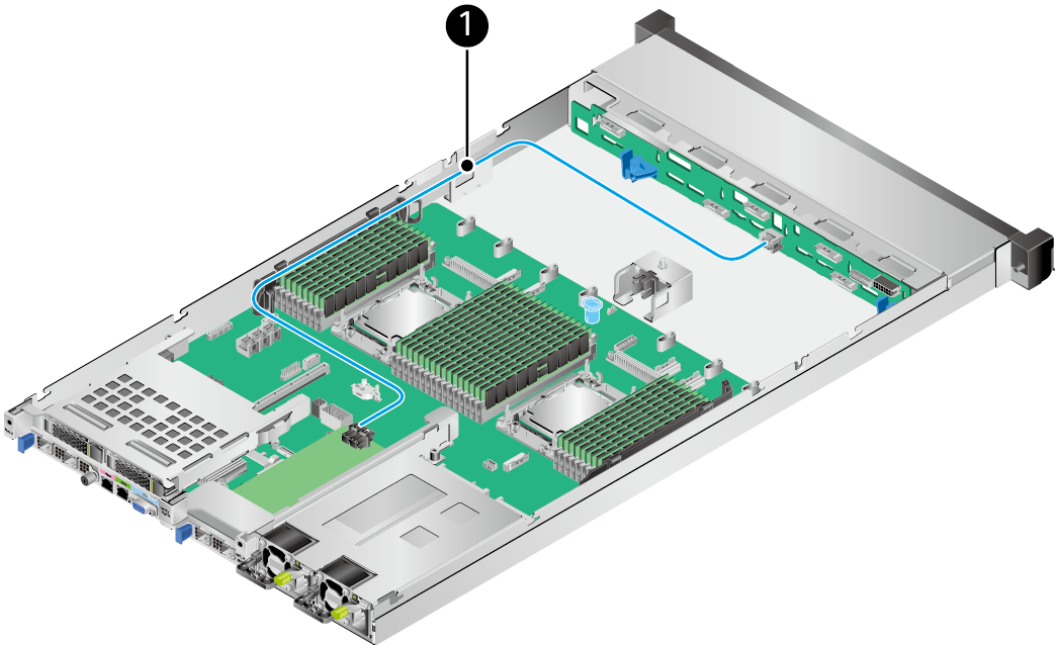


Table 6-103 Front-drive backplane SAS high-speed cabling

No.	P/N Code	Description
1	04051390	SAS high-speed cable for connecting the front-drive backplane (J6) to PORT A of the PCIe RAID controller card

NOTE

The port numbers vary with the PCIe RAID controller cards. The port number of the PCIe RAID controller card connected to front-drive backplane (J6) may be C0, PORT A, 0, or CN0.

6.4.15.5 Front-Drive Backplane LP Slimline Signal Cable

NOTICE

If the server is configured with remote heat sinks, remove the remote heat sinks before removing or installing the LP slimline high-speed cables of the front-drive backplane. Connect SAS high-speed cables to the front-drive backplane before connecting LP slimline high-speed cables to the front-drive backplane.

Front-Drive Backplane LP Slimline High-speed Cables

Figure 6-144 Front-drive backplane LP slimline high-speed cables

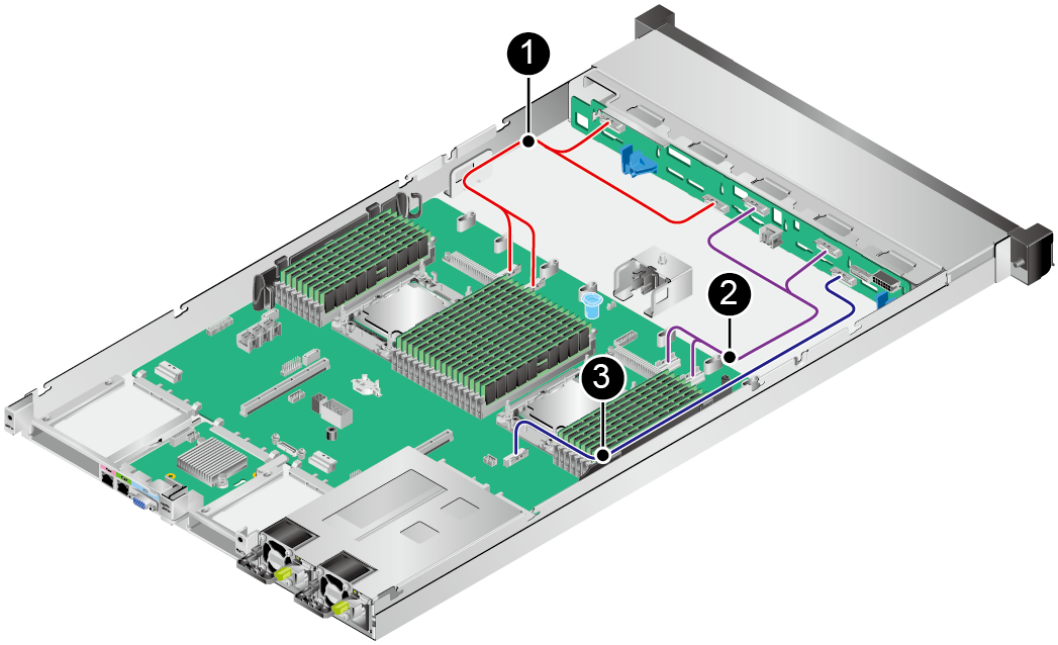


Table 6-104 Front-drive backplane LP slimline high-speed cables

No.	P/N Code	Description
1	04052323	High-speed cable for connecting LP Slimline 1 (J2) and LP Slimline 2 (J3) on the front-drive backplane to LP Slimline 1 (J11) and LP Slimline 2 (J84) on the mainboard
2	04052324	High-speed cable for connecting LP Slimline 3 (J4) and LP Slimline 4 (J5) on the front-drive backplane to LP Slimline 3 (J85) and LP Slimline 4 (J12) on the mainboard
3	04052346	LP slimline high-speed cable for connecting the front-drive backplane (J17) to the mainboard (J30)

6.4.15.6 I/O Module 1 Cabling

I/O Module 1 Cabling

Figure 6-145 I/O module 1 cabling

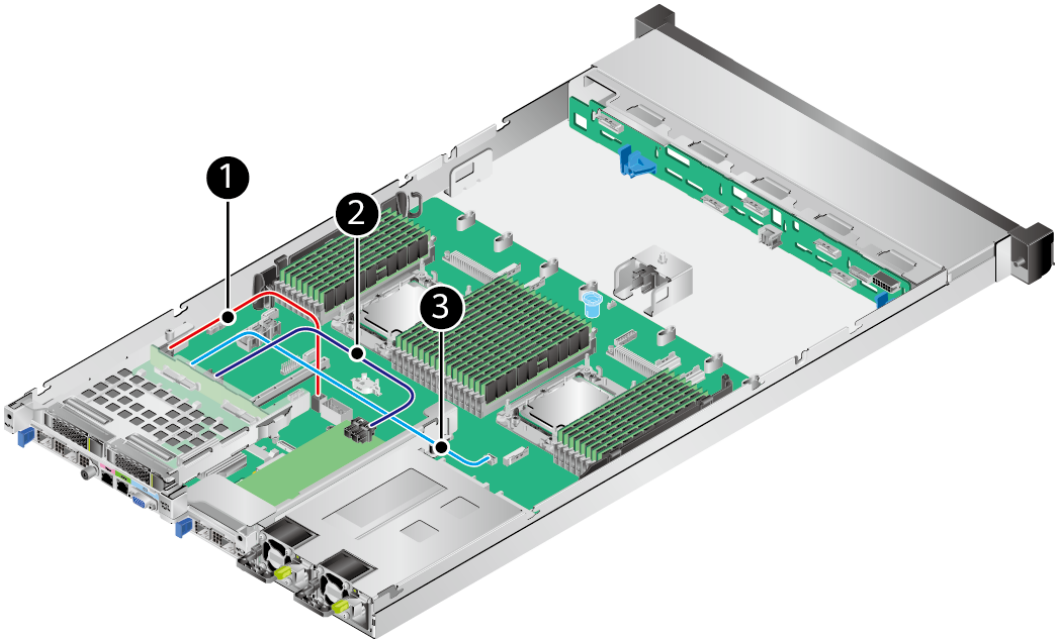


Table 6-105 I/O module 1 cabling

No.	P/N Code	Description	Remarks
1	04150448 -001	Power cable for connecting the rear-drive backplane (J2) to the mainboard (J21)	-
2	04052363 -001	SAS high-speed cable for connecting the rear-drive backplane (J3) to PORT B of the PCIe RAID controller card	The cable is not an independent spare part in this configuration. It is packed with the 2 x 2.5" drive module as a spare part.
3	04080551 -005	Low-speed signal cable for connecting the rear-drive backplane (J1) to the mainboard (J27)	The cable is not an independent spare part. It is packed with the 2 x 2.5" drive module as a spare part.

NOTE

The port numbers vary with the PCIe RAID controller cards. The port number of the PCIe RAID controller card connected to rear-drive backplane (J3) may be C1, PORT B, 1, or CN1.

6.4.16 M.2 SSD Cabling

M.2 SSD Cabling

Figure 6-146 M.2 SSD cabling

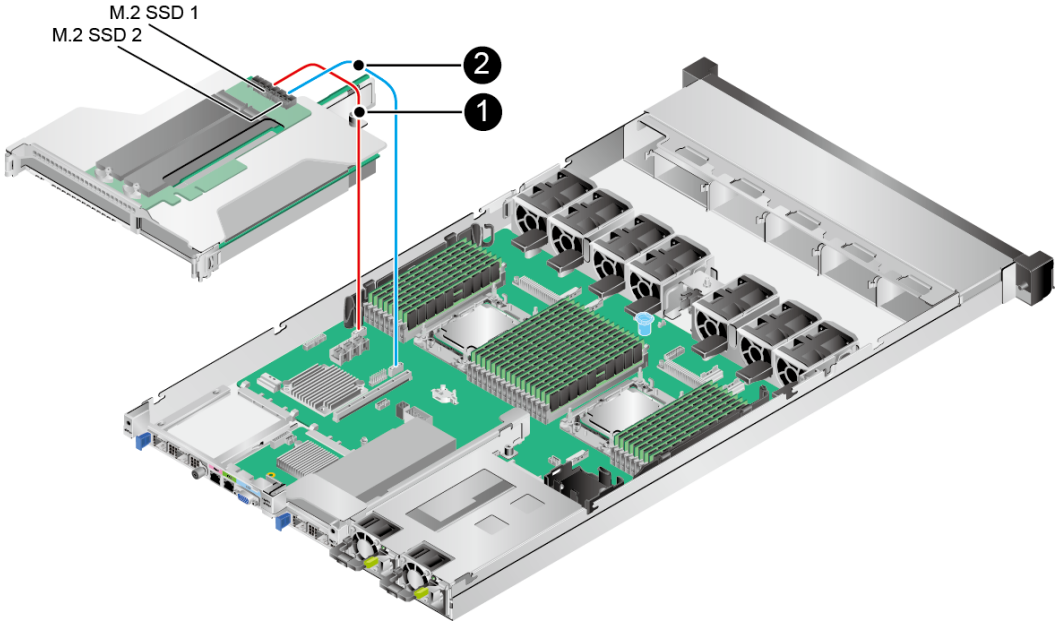


Table 6-106 M.2 SSD cabling

No.	P/N Code	Description
1	04051409	High-speed cable for connecting M.2 SSD 1 to the mainboard (J1)
2	04051409	High-speed cable for connecting M.2 SSD 2 to the mainboard (J2)

6.5 Power-On and Power-Off

6.5.1 Powering On

NOTICE

- Before powering on a server, ensure that the server is powered off, all cables are connected correctly, and the power supply voltage meets service requirements.
- During power-on, do not remove or insert server components or cables, such as drive modules, network cables, and console cables.
- If the power supply to a server is disconnected, wait for at least one minute before powering it on again.

The server can be powered on in any of the following ways:

- If PSUs are properly installed but are not connected to an external power supply, the server is powered off.

  Connect the external power supply to the PSUs. Then the server will be powered on with the PSUs.

  NOTE

  System State Upon Power Supply is set to **Power On** by default, which indicates that the server automatically powers on after power is supplied to PSUs. You can log in to the iBMC WebUI, choose **System** > **Power** > **Power Control**, to view and change the setting,

- If the PSUs are powered on and the server is in standby state (the power indicator is steady yellow), use any of the following methods to power on the server:
  - Press the power button on the front panel.

    For details, see **1.1.2 Indicators and Buttons** .
  - Use the iBMC WebUI.
    i. Log in to the iBMC WebUI.

       For details, see **8.2 Logging In to the iBMC WebUI**.
    ii. Choose **System** > **Power** > **Power Control**.

       The **Power Control** page is displayed.
    iii. Click **Power On**.

       A confirmation message is displayed.
    iv. Click **OK**.

       The server starts to be powered on.
  - Use the iBMC CLI.
    i. Log in to the iBMC CLI.

       For details, see **8.5 Logging In to the Server CLI**.
    ii. Run the following command:

       ipmcset -d powerstate -v 1
    iii. Type **y** or **Y** and press **Enter**.

       The server starts to be powered on.
  - Use the Remote Virtual Console.
    i. Log in to the Remote Virtual Console.

       For details, see **8.4 Logging In to the Desktop of a Server**.
    ii. On the KVM screen, click  or  on the toolbar.
    iii. Select **Power On**.

       A dialog box is displayed.
    iv. Click **OK**.

       The server starts to be powered on.

6.5.2 Powering Off

NOTE

- The "power-off" mentioned here is an operation performed to change the server to the standby state (the power indicator is steady yellow).
- Powering off a server will interrupt all services and programs running on it. Therefore, before powering off a server, ensure that all services and programs have been stopped or migrated to other servers.
- After a server is powered off forcibly, wait for more than 10 seconds for the server to power off completely. Do not power on the server again before it is completely powered off.
- A forced power-off may cause data loss or program damage. Select an appropriate operation based on your actual situation.

The server can be powered off in any of the following ways:

- Connect a keyboard, video, and mouse (KVM) to the server and shut down the operating system of the server using the KVM.
- When the server is in power-on state, pressing the power button on the server front panel can power off the server gracefully.

  NOTE

  If the server OS is running, shut down the OS according to the onscreen instructions.

  For details, see **1.1.2 Indicators and Buttons** .
- When the server is in power-on state, holding down the power button on the server front panel for six seconds can power off the server forcibly.

  For details, see **1.1.2 Indicators and Buttons** .
- Use the iBMC WebUI.
  a. Log in to the iBMC WebUI.

     For details, see **8.2 Logging In to the iBMC WebUI**.
  b. Choose **System** > **Power** > **Power Control**.

     The **Power Control** page is displayed.
  c. Click **Power Off** or **Forced Power Off**.

     A confirmation message is displayed.
  d. Click **OK**.

     The server starts to be powered off.
- Use the iBMC CLI.
  a. Log in to the iBMC CLI.

     For details, see **8.5 Logging In to the Server CLI**.
  b. Run the following command:

     - To power off the compute node gracefully, run the **ipmcset -d powerstate -v 0** command.
     - To power off the compute node forcibly, run the **ipmcset -d powerstate -v 2** command.
  c. Type **y** or **Y** and press **Enter**.

     The server starts to be powered off.

- Use the Remote Virtual Console.
  a. Log in to the Remote Virtual Console.
     For details, see **8.4 Logging In to the Desktop of a Server**.
  b. On the KVM screen, click  or  on the toolbar.
  c. Choose **Power Off** or **Forced Power Off**.
     A dialog box is displayed.
  d. Click **OK**.
     The server starts to be powered off.

6.6 Initial Configuration

6.6.1 Default Information

Table 6-107 Default information

Category	Item	Default Value
iBMC management network port data	IP address and subnet mask of the management network port	• Default IP address: **192.168.2.100** **NOTE** If the local PC is connected to the iBMC using a USB Type-C cable, the IP address of the iBMC management port is **169.254.1.5**. • Default subnet mask: 255.255.255.0
iBMC login data	User name and password	• Default user name: **Administrator** • Default password: **Admin@9000**
BIOS data	Password	• Default password: **Admin@9000**

6.6.2 Configuration Process and Description

Configuration Process

Figure 6-147 Initial configuration process

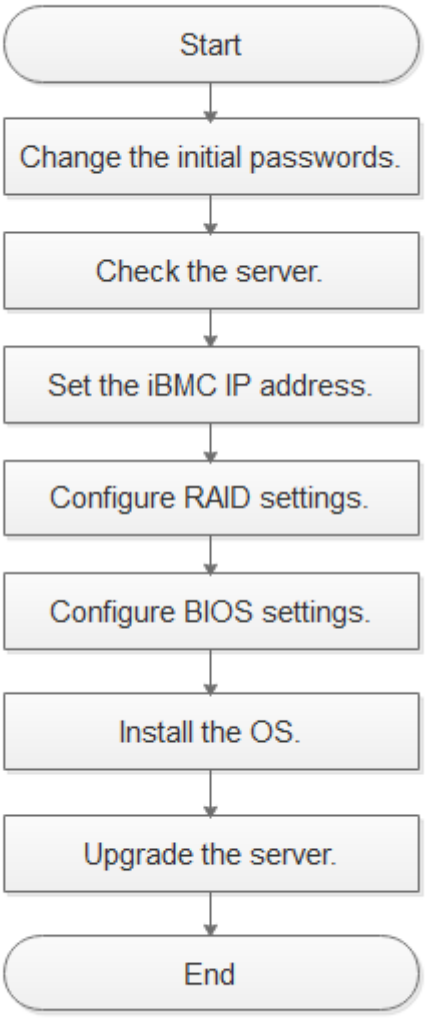


Table 6-108 Process description

Step	Description	Documents
Change the initial password.	Change the initial password of the iBMC default user. ● Use the iBMC WebUI. ● Use the iBMC CLI. ● Use the BIOS.	● Use the iBMC WebUI or iBMC CLI to change the password. The method for changing the password varies depending on iBMC versions. For details, see the *iBMC User Guide* of the corresponding version. ● Use the BIOS. For details, see the *Whitley Platform BIOS Parameter Reference*.
Check the server.	1. Check the indicators on the panel to ensure that the server is running properly. 2. Check the iBMC or BIOS version of the server to ensure that the version is the same as the target version. The query methods are as follows: ● Use the iBMC WebUI. ● Use the iBMC CLI. 3. Query the health status and alarm information of the server to ensure that the server is running properly. The query methods are as follows: ● Use the iBMC WebUI. ● Use the iBMC CLI.	● Check the status of indicators on the panel. For details, see section "Indicators and Buttons." ● The methods for querying the server version, health status, and alarm information vary depending on the iBMC version. For details, see the *iBMC User Guide* of the corresponding version. ● Upgrade the firmware to the target version. For details, see the *Upgrade Guide*. ● Handle the alarms. For details, see the *iBMC Alarm Handling*.
Configure the iBMC network information.	To configure the iBMC network information, perform the following steps: ● Use the iBMC WebUI. ● Use the iBMC CLI. ● Use the BIOS.	● Use the iBMC WebUI and iBMC CLI to configure the iBMC network information. The configuration mode varies depending on the iBMC version. For details, see the *iBMC User Guide* of the corresponding version. ● Use the BIOS. For details, see the *Whitley Platform BIOS Parameter Reference*.

Step	Description	Documents
Configure RAID.	Configure the RAID group based on service requirements. **NOTE** When the management mode of common drives is PCH, RAID groups cannot be configured.	Different RAID controller cards have different configuration methods. For details, see the server *RAID Controller Card User Guide*. **NOTE** For details about the compatible RAID controller cards, see the compatibility list on the technical support websit.
Configuring the BIOS.	Configure the BIOS based on the actual service scenario.	For details, see the *Whitley Platform BIOS Parameter Reference*. **NOTE** The common BIOS settings are as follows: ● Set the system boot sequence. ● Set PXE of NIC. ● Set the BIOS password. ● Set the BIOS system language.
Install the OS.	Install an OS for the server.	For details about how to install different OSs, see the *OS Installation Guide*. **NOTE** For details about the compatible OS, see the compatibility list on the technical support websit.

Step	Description	Documents
Upgrade the system to the latest version.	Upgrade firmware, and install or update drivers to keep the server system up to date.	● Upgrade the iBMC, BIOS, CPLD, and other firmware. For details, see the*Upgrade Guide*. ● For details about how to install or update the driver, see the *OS Installation Guide*. **NOTICE** ● If the driver versions on the server are inconsistent with the driver list, install the drivers of the required versions. Otherwise, the server may operate abnormally. ● Back up the drivers before installing or updating them. ● For details about how to obtain the driver installation package, see the compatibility list on the technical support websit. Take the CentOS 7.8 OS driver package as an example. The driver package name is **FusionServer iDriver-CentOS7.8-Driver-V111.zip**. ● The driver installation package and procedure vary depending on the OS.

7 Troubleshooting Guide

For details about how to troubleshoot servers, see the *Troubleshooting*. It covers the following content:

- Troubleshooting process

  Use appropriate methods to find the cause of a fault and rectify the fault. Analyze possible causes for a fault and narrow down the scope to reduce troubleshooting complexity, identify the root cause, and rectify the fault.
- Fault information collection

  Collect logs for fault diagnosis when a fault occurs on a server.
- Fault diagnosis

  Fault diagnosis rules and tools help technical support engineers and maintenance engineers to analyze and rectify faults according to alarms and hardware fault symptoms.
- Software and firmware upgrade

  Obtain and install the software and firmware upgrade packages based on the server model.
- Preventive maintenance

  Check for, diagnoses, and rectifies server faults through routine preventive maintenance inspection.

8 Common Operations

8.1 Querying the iBMC IP Address

Scenario

This section describes how to query the IP address of the iBMC management network port on the BIOS.

You can query the IP address of the iBMC management network port on:

- BIOS
- iBMC WebUI
- iBMC CLI

  Run the **ipmcget -d ipinfo** command.

For details about iBMC, see the *iBMC User Guide*.

Procedure

Step 1 Access the BIOS.

For details, see **8.7 Accessing the BIOS**.

Step 2 Choose **Advanced** > **BMC Configuration** and press **Enter**.

The **BMC Configuration** screen is displayed.

Step 3 Select **BMC IPv4/IPv6 Configuration** and press **Enter**.

The **BMC IPv4/IPv6 Configuration** screen is displayed.

Step 4 Check the IP address of the iBMC management network port.

----End

8.2 Logging In to the iBMC WebUI

Scenario

Log in to the iBMC WebUI. The following uses Internet Explorer 11.0 as an example.

- A maximum of four users can log in to the WebUI at the same time.
- By default, the system timeout period is 5 minutes. If no operation is performed on the WebUI within 5 minutes, the user will be automatically logged out of the WebUI.
- The system locks a user account if the number of consecutive incorrect password attempts reaches the maximum for the user account. The user account is automatically unlocked after the locking duration reaches the value specified.
- For security purposes, change the initial password upon the first login and change the password periodically.
- If resources fail to be obtained due to unstable network connection, the iBMC WebUI may be displayed abnormally. If this occurs, refresh the browser and log in to the iBMC WebUI again.

NOTE

- If TLS version is set to **Only TLS 1.3** on the **User & Security** > **Security Management** page, the following browser versions are not supported:
  - All Internet Explorer versions
  - Safari 11.0 to 12.0
  - Microsoft Edge 12 to 18
- Before using Internet Explorer to log in to the iBMC WebUI, enable the compatibility view and select "Use TLS 1.2".
  - Enable the compatibility view:
    1. Click  in the upper right corner of the browser.
    2. On the shortcut menu displayed, click **Compatibility View Settings**.
    3. In the **Compatibility View Settings** dialog box displayed, enter the iBMC IP address in the **Add this website** text box and click **Add**.
    4. Deselect **Use Microsoft compatibility lists**.

       After the iBMC IP address is added to the compatibility view, improper display on the iBMC WebUI will be rectified.
  - Select "Use TLS 1.2" as follows:
    1. Choose **Internet Options** > **Advanced**.
    2. In the **Security** area, select **Use TLS 1.2**.

Procedure

Step 1 Check that the client (for example, a local PC) used to access the iBMC meets the operating environment requirements.

If you want to use the Java Integrated Remote Console, ensure that the Java Runtime Environment (JRE) meets requirements.

Table 8-1 Operating environment

OS	Web Browser	Java Runtime Environment (JRE)
Windows 7 (32-bit) Windows 7 (64-bit)	Internet Explorer 11.0 or later Mozilla Firefox 63.0 or later Google Chrome 70.0 or later	AdoptOpenJDK 8u222 JRE AdoptOpenJDK 11.0.6 JRE
Windows 8 (32-bit) Windows 8 (64-bit)		
Windows Server 2008 R2 (64-bit)		
Windows Server 2012 (64-bit)		
Windows Server 2012 R2 (64-bit)		
Windows Server 2016 (64-bit)		

OS	Web Browser	Java Runtime Environment (JRE)
Windows 10 (64-bit)	Internet Explorer 11.0 or later	
	Microsoft Edge	
	Mozilla Firefox 63.0 or later	
	Google Chrome 70.0 or later	
CentOS 7	Mozilla Firefox 63.0 or later	
MAC OS X v10.7	Safari 11.0 and later	
	Mozilla Firefox 63.0 or later	

Step 2 Configure an IP address and subnet mask or route information for the local PC to enable communication with the iBMC management network port.

Step 3 Connect the local PC to the iBMC using any of the following methods:

- Connect the local PC to the iBMC management network port using a network cable.
- Connect the local PC to the iBMC management network port over a LAN.
- Connect the local PC to the iBMC direct connect management port using a USB Type-C cable.

  NOTE

  – Only servers configured with the iBMC direct management port support this operation.
  – If you use a USB Type-C cable to connect the local PC to the iBMC direct connect management port, the local PC can run only Windows 10.

Step 4 Choose **Control Panel** > **Network and Internet** > **Network Connections**, and check whether the local PC is connected to the iBMC network.

NOTE

- If the local PC is connected to the iBMC using a USB Type-C cable, the iBMC network name is **Remote NDS Compatible Device**.
- If the local PC is connected to the iBMC using a network cable or over a LAN, the iBMC network name varies depending on the NIC used on the local PC.

- If yes, go to **Step 5**.
- If no, contact technical support for assistance.

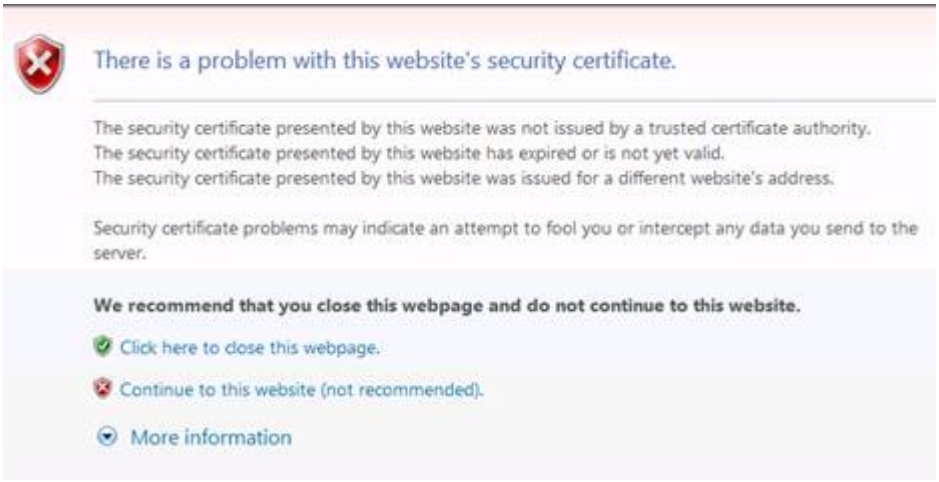
Step 5 Open Internet Explorer, enter **https://***iBMC management network port IP address* in the address box, and press **Enter**.

NOTE

- If the local PC is connected to the iBMC direct connect management port using a USB Type-C cable, the IP address of the iBMC management network port is **169.254.1.5**.
- If the local PC is connected to the iBMC management network port using a network cable or over a LAN, the default IP address of the iBMC management network port is **192.168.2.100**.
- Enter the IP address of the iBMC management network port based on actual situation:
  - If an IPv6 address is used, use [] to enclose the IPv6 address, for example, **[fc00::64]**.
  - If an IPv4 address is used, enter the IPv4 address, for example, **192.168.100.1**.

A security alert dialog box is displayed.

Figure 8-1 Security warning



NOTE

- If a security alert is displayed, you can ignore this message or perform any of the following to shield this alert:
  - Import a trust certificate and a root certificate to the iBMC.

    For details, see "Importing the iBMC Trust Certificate and Root Certificate" in the iBMC user guide of the server you use.
  - If no trust certificate is available and network security can be ensured, add the iBMC to the **Exception Site List on Java Control Panel** or reduce the Java security level.

    This operation poses security risks. Exercise caution when performing this operation.

Step 6 Click **Continue to this website (not recommended)**.

The iBMC login page is displayed.

Figure 8-2 iBMC login page

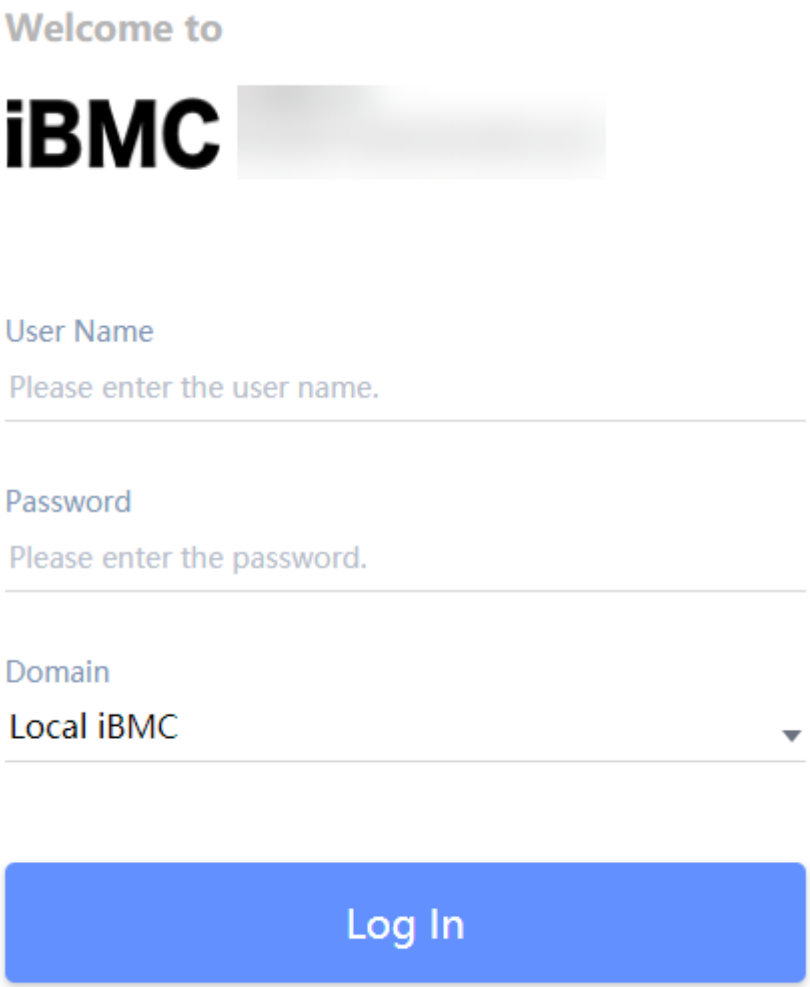


Table 8-2 User login

Parameter	Description
Username	Username for logging in to the iBMC WebUI. ● When **Domain** is **Local iBMC**, the maximum length of the user name is 20 characters. ● When **Domain** is not **Local iBMC**, the maximum length of the user name is 255 characters. Pay attention to the following points when logging in to the system: ● When you log in to the iBMC as a local user, you can set **Domain** to **Local iBMC** or **Automatic matching**. ● To log in as an LDAP user, the user name can be in either of the following formats: – LDAP user name (In this case, **Domain** can be **Automatic matching** or a specified domain.) – LDAP user name@Domain name (In this case, **Domain** can be **Automatic matching** or a specified domain.) ● To log in as a Kerberos user, the user name can be in either of the following formats: – Kerberos user name (in this case, **Domain** can be **Automatic matching** or a specified domain) – Kerberos user name@domain name (in this case, **Domain** can be **Automatic matching** or a specified domain, and uppercase letters must be used in the domain name) ● Both Kerberos user name and Kerberos user name@Domain name formats support single sign-on (SSO).
Password	Password of the login user. For security purposes, periodically change your login password. **NOTE** When you log in to the iBMC WebUI as an LDAP or Kerberos user, the password can contain a maximum of 255 characters.

Step 7 Log in to the iBMC WebUI.

- **Log in to the WebUI as a local user.**
- **Logging in as a Lightweight Directory Access Protocol (LDAP) User**
- **To log in to the iBMC WebUI as a Kerberos user, perform the following steps:**

----End

Log in to the WebUI as a local user.

Step 1 (Optional) On the login page, switch to the target language.

Step 2 Enter the user name and password for logging in to the iBMC WebUI. For details, see **Table 8-2**.

NOTE

The default user name for logging in to the iBMC system is **Administrator**, and the default password is **Admin@9000**.

Step 3 Select **Local iBMC** or **Automatic matching** from the **Domain** drop-down list.

Step 4 Click **Log In**.

After the login is successful, the **Home** page is displayed.

NOTE

- If you use Internet Explorer to log in to the iBMC WebUI for the first time after an upgrade, the system may display a message indicating that the login fails due to incorrect user name or password. If this occurs, press **Ctrl+Shift+Delete**, and click **Delete** in the dialog box displayed to clear the cache of Internet Explorer. Then, attempt to log in again.
- If you cannot log in to the iBMC WebUI using Internet Explorer, choose **Tools** > **Internet Options** > **Advanced** and click **Reset**. Then you can log in to the iBMC WebUI.

----End

Logging in as a Lightweight Directory Access Protocol (LDAP) User

Before login, ensure that the following settings meet the requirements:

- A domain controller exists on the network, and a user domain and LDAP users have been created on the domain controller.

  NOTE

  For details about how to create a domain controller, a user domain, and LDAP users who belong to the user domain, see related documents about the domain controller. The iBMC provides only the access function for LDAP users.
- On the **User & Security** > **LDAP** page of the iBMC WebUI, the LDAP function is enabled, and the user domain and the LDAP user who belong to the user domain are set.

Step 1 (Optional) On the iBMC login page, switch to the target language.

Step 2 Enter the LDAP user name and password for logging in to the iBMC WebUI. For details, see **Table 8-2**.

NOTE

- To log in as an LDAP user, the user name can be in either of the following formats:
  - LDAP user name (In this case, **Domain** can be **Automatic matching** or a specified domain.)
  - LDAP user name@Domain name (In this case, **Domain** can be **Automatic matching** or a specified domain.)
- When you log in to the iBMC WebUI over LDAP, the password can contain a maximum of 255 characters.

Step 3 Select the LDAP user domain from the Domain drop-down list.

NOTE

The Domain drop-down list contains the following options:

- **This iBMC**: Select this option to log in as a local user. The system automatically locates the user from the local user list.
- Configured domain servers: Select a domain server to log in as an LDAP user. The system automatically locates the user from the domain server.
- **Automatic matching**: If this option is selected, the system searches for the user from the local user list first. If no match is found, the system searches from the domain servers in the sequence displayed in the **Domain** drop-down list.

Step 4 Click **Log In**.

After the login is successful, the **Home** page is displayed.

----End

To log in to the iBMC WebUI as a Kerberos user, perform the following steps:

Kerberos environment:

- The client supports the Windows 10 64-bit operating system and the Internet Explorer 11 browser.
- The Kerberos server supports the Windows Server 2012 R2 64-bit and Windows Server 2016 64-bit OSs.

Before login, ensure that the following settings meet the requirements:

- Kerberos is enabled and Kerberos function and user group are configured on the **User & Security** > **Kerberos** page of the iBMC WebUI.
- The Kerberos user group and user have been created on the Kerberos server, and the user has been added to the Kerberos user group. This user is a user of the client OS.

Kerberos users can log in to the WebUI in either of the following modes:

- Logging in as a Kerberos domain user
  a. On the iBMC login page, switch to the target language.
  b. Enter the Kerberos user name and password for logging in to the iBMC WebUI. For details, see **Table 8-2**.
  c. In the **Domain** drop-down list, select a Kerberos user domain (for example, **ADMIN.COM(KRB)**) or **Automatic matching**.
  d. Click **Log In**.
     After the login is successful, the **Home** page is displayed.
- Logging in over SSO
  a. Use the Kerberos user name and password configured on the Kerberos server to log in to the client OS.
  b. Enter the FQDN of the iBMC in the address box of the browser, for example, **https://***host name.domain name*.
     The iBMC login page is displayed.

c. Click **SSO**.

After the login is successful, the **Home** page is displayed.

8.3 Log in to the FusionMobile

For details about FusionMobile, see the *FusionMobile User Guide*.

8.4 Logging In to the Desktop of a Server

8.4.1 Using the Remote Virtual Console

8.4.1.1 iBMC

Scenario

Log in to the desktop of a server using the iBMC Remote Virtual Console.

Procedure

Step 1 Log in to the iBMC WebUI.

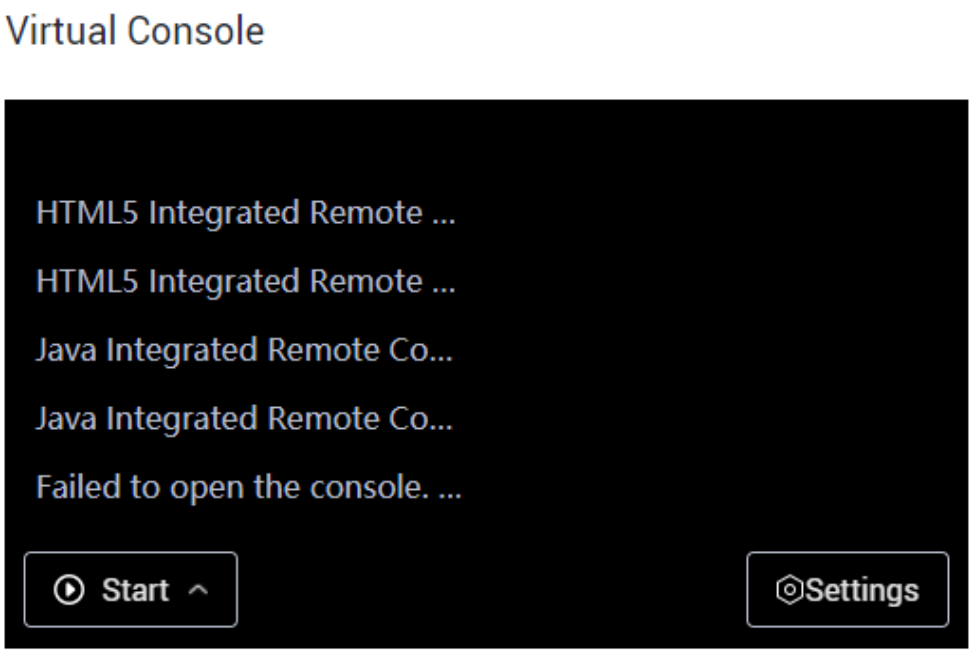
For details, see **8.2 Logging In to the iBMC WebUI**.

Step 2 Choose **Home** from the menu.

The home page is displayed.

Step 3 In the **Virtual Console** area, click **Start** and select **Java Integrated Remote Console** or **HTML5 Integrated Remote Console** from the drop-down list box.

Figure 8-3 Virtual console



NOTE

- **Java Integrated Remote Console (Private)**: allows only one local user or VNC user to access and manage the server at a time.
- **Java Integrated Remote Console (Shared)**: allows two local users or five VNC users to access and manage the server at a time. The users can see each other's operations.
- **HTML5 Integrated Remote Console (Private)**: allows only one local user or VNC user to access and manage the server at a time.
- **HTML5 Integrated Remote Console (Shared)**: allows two local users or five VNC users to access and manage the server at a time. The users can see each other's operations.
- If you want to use the Java Integrated Remote Console, ensure that the Java Runtime Environment (JRE) meets requirements listed in **Table 8-1**. If the JRE is not installed, click **Failed to open the console ...** and click **here** to download the JRE from the official AdoptOpenJDK website. If you still cannot use the console after installing the JRE, click the links under **Troubleshooting Remote Virtual Console Problems** to obtain more information.
- For details about the virtual console, see "Virtual Console" in the iBMC user guide of the server you use.

Figure 8-4 Java Integrated Remote Console

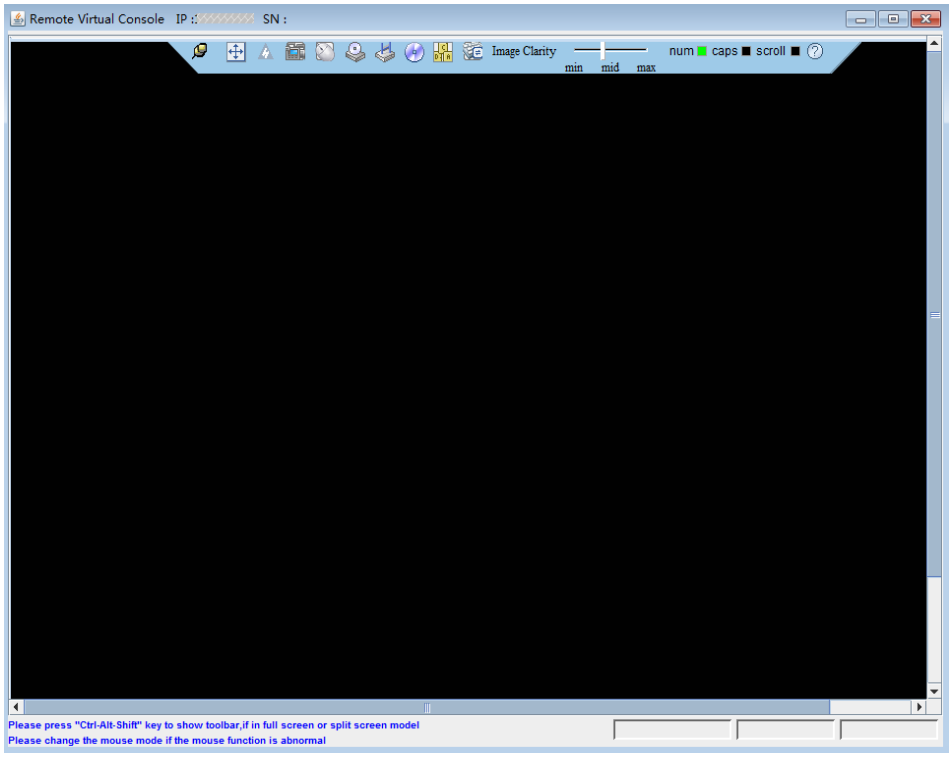
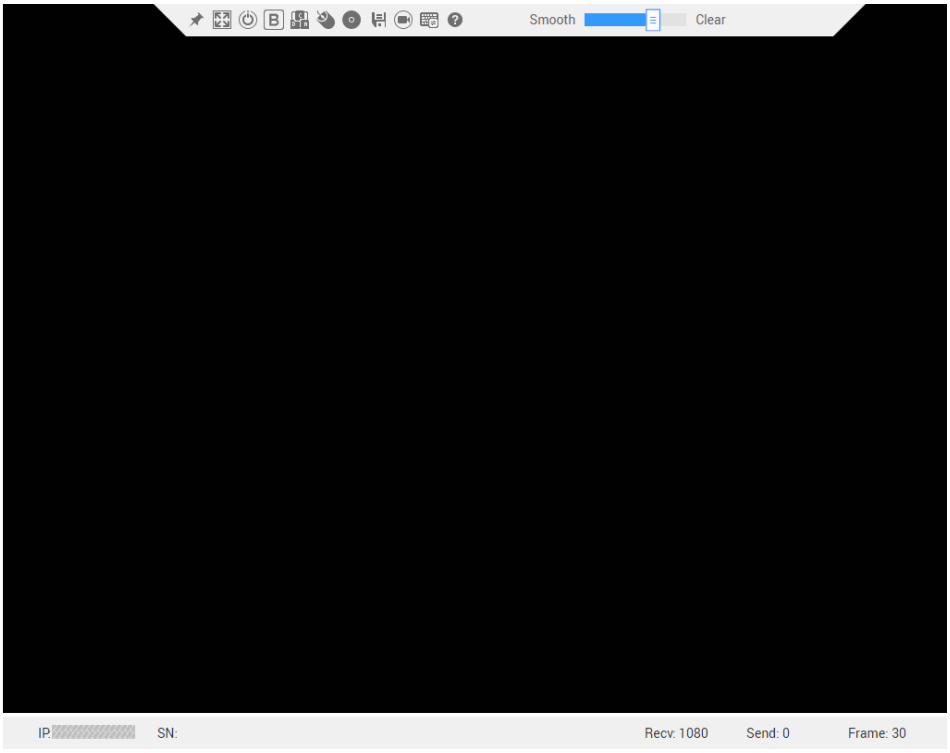


Figure 8-5 HTML5 Integrated Remote Console



----End

8.4.2 Logging In to the System Using a Standalone Remote Console

Log in to the desktop of a server using the Independent Remote Console.

NOTE

The independent remote console is a remote control tool developed based on the server management software iBMC. It plays the same functions as **Virtual Console** provided by the iBMC WebUI. This tool allows you to remotely access and manage a server, without worrying about the compatibility between the client's browser and the JRE.

8.4.2.1 Windows

The following Windows OS versions are supported:

- Windows 7 (32-bit/64-bit)
- Windows 8 (32-bit/64-bit)
- Windows 10 (32-bit/64-bit)
- Windows Server 2008 R2 (32-bit/64-bit)
- Windows Server 2012 (64-bit)

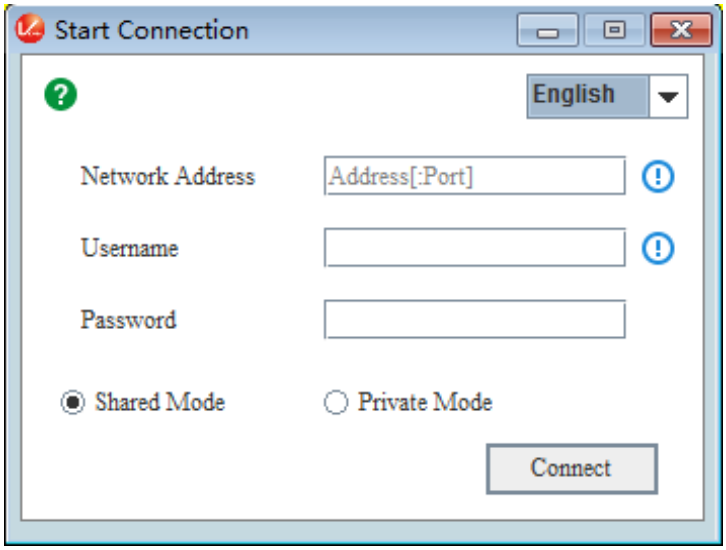
Procedure

Step 1 Configure an IP address for the client (local PC) to enable communication with the iBMC management network port.

Step 2 Double-click **KVM.exe**.

The Independent Remote Console login page is displayed.

Figure 8-6 Independent Remote Console login page



Step 3 Enter the network address, user name, and password.

NOTE

- Local and LDAP domain users are supported.
- The network address can be in either of the following formats:
  - *iBMC management network port IPv4 or IPv6 address*:*Port number*

    Enter an IPv6 address in brackets or an IPv4 address directly. for example, **[fc00::64]:444** or **192.168.100.1:444**.
  - *iBMC domain name address*:*Port number*
- When the port number is the default port number, the port number can be left blank.
- The preferred port number is the HTTPS service port number, and then the RMCP+ service port number.

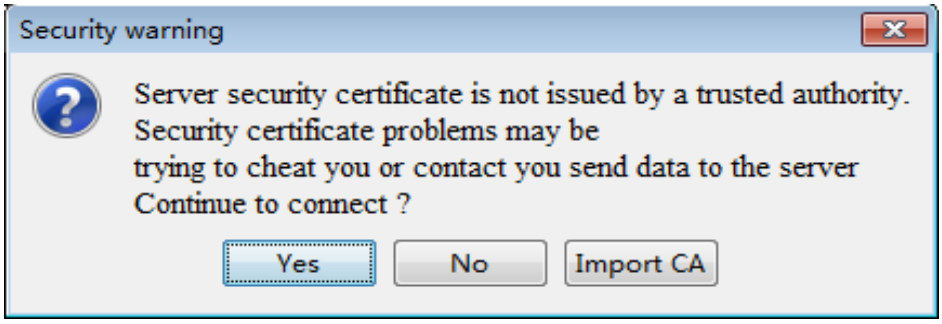
Step 4 Select a login mode.

- **Shared Mode**: allows two users to access and manage a server at the same time. The users can see each other's operations.
- **Private Mode**: allows only one user to access and manage a server at a time.

Step 5 Click **Connect**.

A security warning is displayed.

Figure 8-7 Security warning



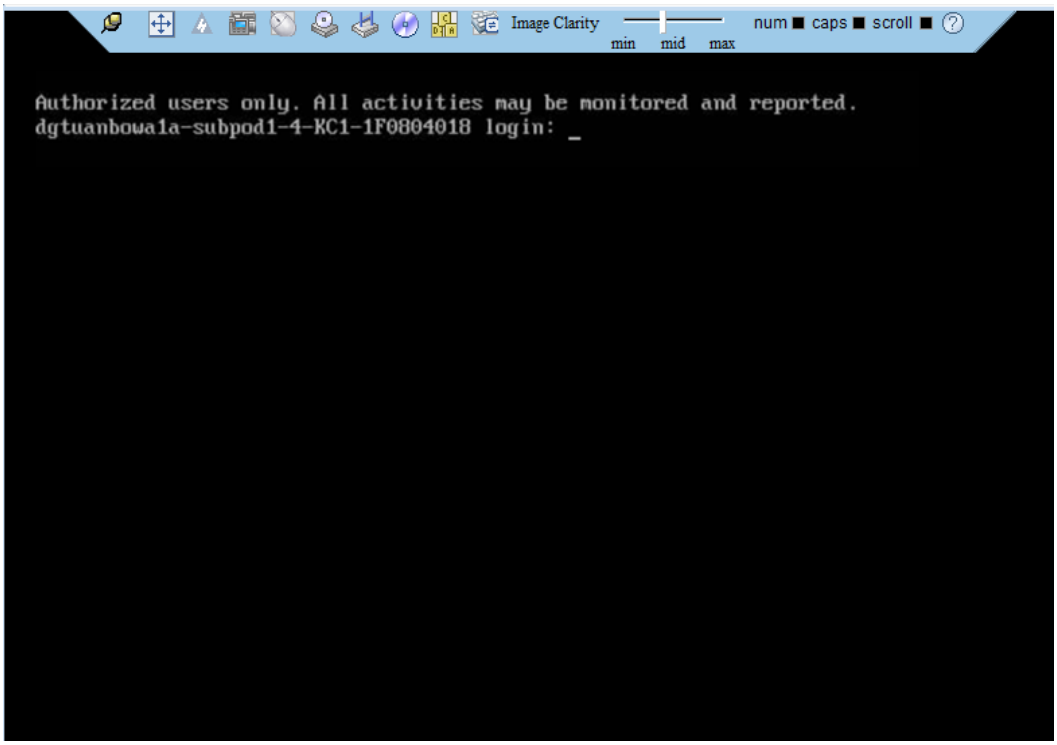
Step 6 Click **Yes**.

Ignore the certificate authentication error and go to the real-time desktop.

NOTE

- Click **No** to return to the login interface.
- Click **Import CA** to import a CA certificate (*.cer, *.crt, or *.pem). After the CA certificate is imported, the security warning dialog box will no longer be displayed.
- You are advised to periodically update the certificate for security purposes.

Figure 8-8 Server desktop



----End

8.4.2.2 Ubuntu

The following Ubuntu OS versions are supported:

- Ubuntu 14.04 LTS
- Ubuntu 16.04 LTS

Before the operation, ensure that the IPMItool version later than 1.8.14 has been installed.

Procedure

Step 1 Configure an IP address for the client (local PC) to enable communication with the iBMC management network port.

Step 2 Open the console and set the folder where the Independent Remote Console is stored as the working folder.

Step 3 Set the permissions on the Independent Remote Console.

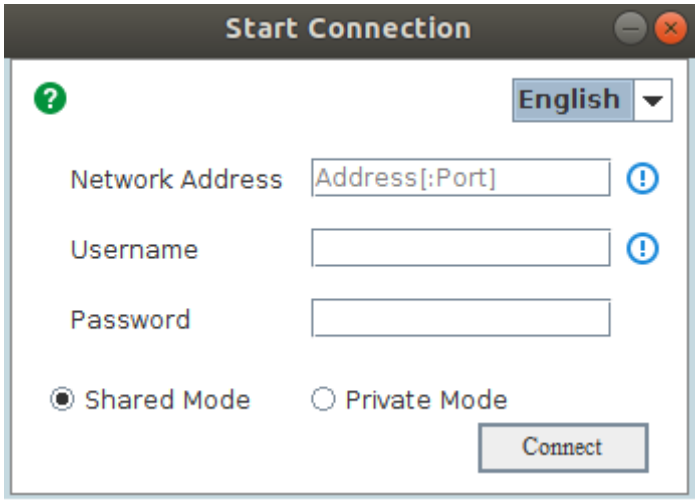
chmod 777 KVM.sh

Step 4 Open the Independent Remote Console.

./KVM.sh

The Independent Remote Console login page is displayed.

Figure 8-9 Independent Remote Console login page



Step 5 Enter the network address, user name, and password.

NOTE

- Local and LDAP domain users are supported.
- The network address can be in either of the following formats:
  - *iBMC management network port IPv4 or IPv6 address*:*Port number*

    Enter an IPv6 address in brackets or an IPv4 address directly. for example, **[fc00::64]:444** or **192.168.100.1:444**.
  - *iBMC domain name address*:*Port number*
- When the port number is the default port number, the port number can be left blank.
- The preferred port number is the HTTPS service port number, and then the RMCP+ service port number.

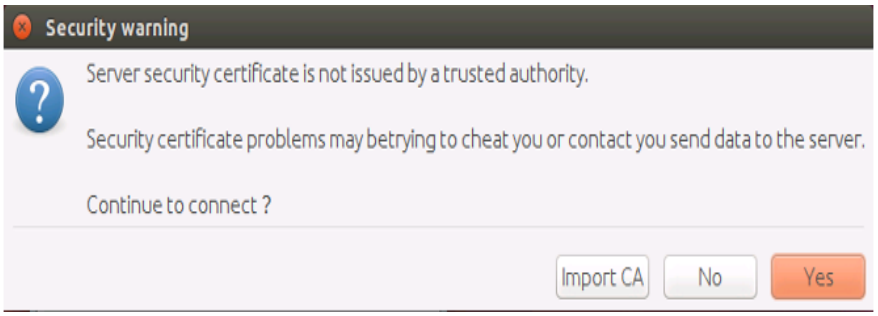
Step 6 Select a login mode.

- **Shared Mode**: allows two users to access and manage a server at the same time. The users can see each other's operations.
- **Private Mode**: allows only one user to access and manage a server at a time.

Step 7 Click **Connect**.

A security warning is displayed.

Figure 8-10 Security warning



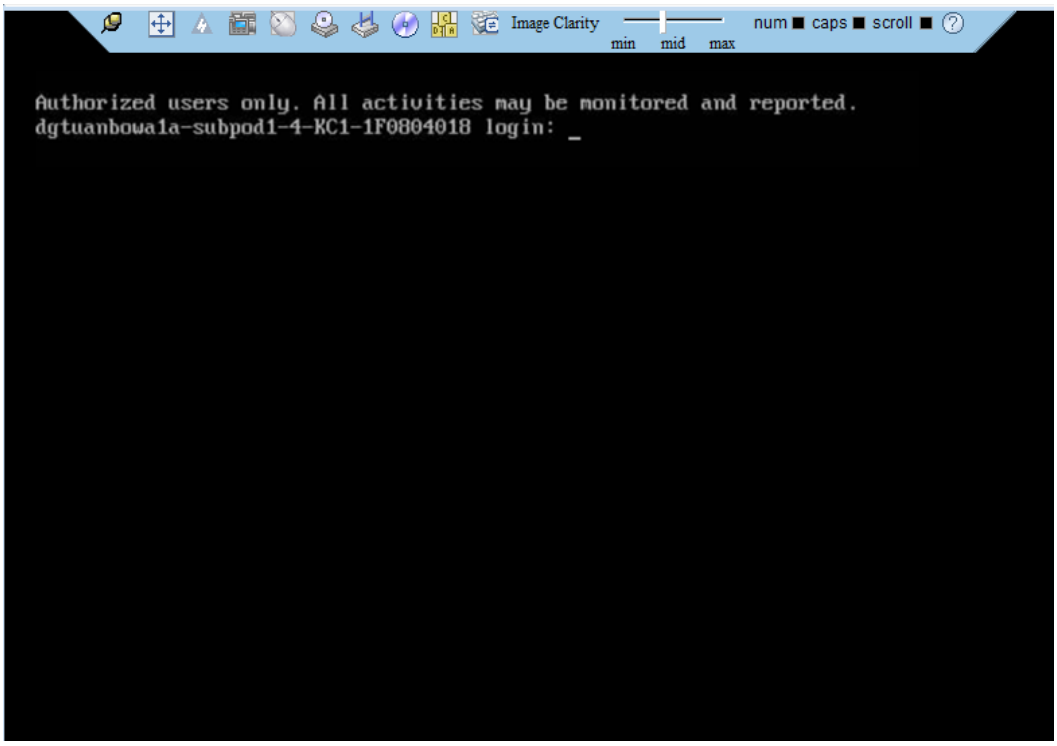
Step 8 Click **Yes**.

Ignore the certificate authentication error and go to the real-time desktop.

NOTE

- Click **No** to return to the login interface.
- Click **Import CA** to import a CA certificate (*.cer, *.crt, or *.pem). After the CA certificate is imported, the security warning dialog box will no longer be displayed.
- You are advised to periodically update the certificate for security purposes.

Figure 8-11 Server desktop



----End

8.4.2.3 Mac

The following macOS version is supported:

- Mac OS X El Capitan

Before the operation, ensure that the IPMItool version later than 1.8.14 has been installed.

Procedure

Step 1 Configure an IP address for the client (local PC) to enable communication with the iBMC management network port.

Step 2 Open the console and set the folder where the Independent Remote Console is stored as the working folder.

Step 3 Set the permissions on the Independent Remote Console.

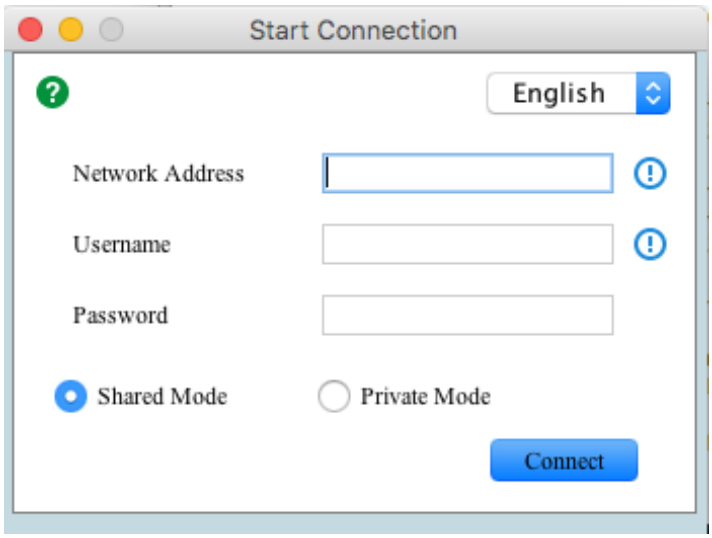
chmod 777 KVM.sh

Step 4 Open the Independent Remote Console.

./KVM.sh

The Independent Remote Console login page is displayed.

Figure 8-12 Independent Remote Console login page



Step 5 Enter the network address, user name, and password.

NOTE

- Local and LDAP domain users are supported.
- The network address can be in either of the following formats:
  - *iBMC management network port IPv4 or IPv6 address*:*Port number*

    Enter an IPv6 address in brackets or an IPv4 address directly. for example, **[fc00::64]:444** or **192.168.100.1:444**.
  - *iBMC domain name address*:*Port number*
- When the port number is the default port number, the port number can be left blank.
- The preferred port number is the HTTPS service port number, and then the RMCP+ service port number.

Step 6 Select a login mode.

- **Shared Mode**: allows two users to access and manage a server at the same time. The users can see each other's operations.
- **Private Mode**: allows only one user to access and manage a server at a time.

Step 7 Click **Connect**.

A security warning is displayed.

Figure 8-13 Security warning

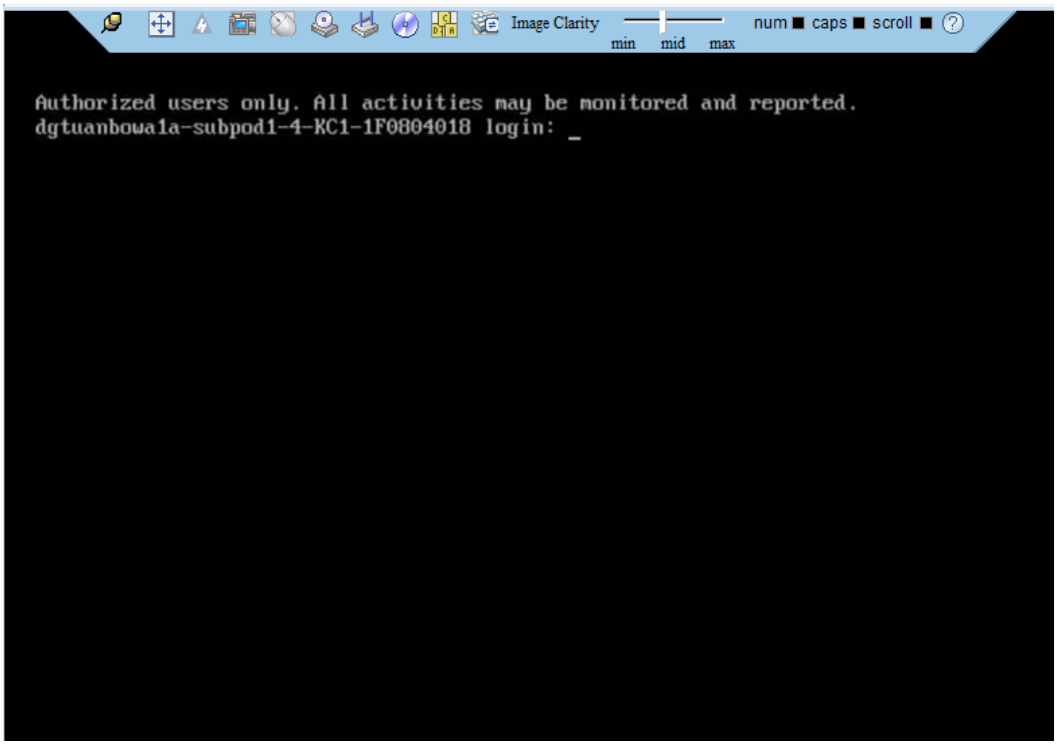
Step 8 Click **Yes**.

Ignore the certificate authentication error and go to the real-time desktop.

NOTE

- Click **No** to return to the login interface.
- Click **Import CA** to import a CA certificate (*.cer, *.crt, or *.pem). After the CA certificate is imported, the security warning dialog box will no longer be displayed.
- You are advised to periodically update the certificate for security purposes.

Figure 8-14 Server desktop



----End

8.4.2.4 Red Hat

The following Red Hat OS versions are supported:

- Red Hat 6.9

- Red Hat 7.3

Before the operation, ensure that the IPMItool version later than 1.8.14 has been installed.

Procedure

Step 1 Configure an IP address for the client (local PC) to enable communication with the iBMC management network port.

Step 2 Open the console and set the folder where the Independent Remote Console is stored as the working folder.

Step 3 Set the permissions on the Independent Remote Console.

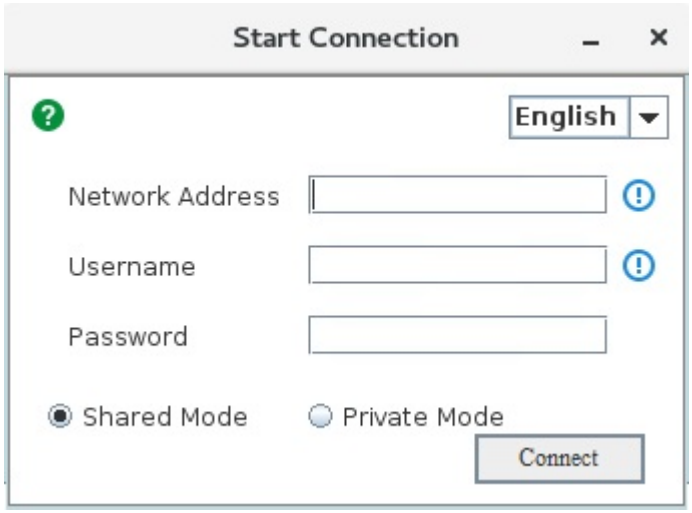
chmod 777 KVM.sh

Step 4 Open the Independent Remote Console.

./KVM.sh

The Independent Remote Console login page is displayed.

Figure 8-15 Independent Remote Console login page



Step 5 Enter the network address, user name, and password.

NOTE

- Local and LDAP domain users are supported.
- The network address can be in either of the following formats:
  - *iBMC management network port IPv4 or IPv6 address*:*Port number*

    Enter an IPv6 address in brackets or an IPv4 address directly. for example, **[fc00::64]:444** or **192.168.100.1:444**.
  - *iBMC domain name address*:*Port number*
- When the port number is the default port number, the port number can be left blank.
- The preferred port number is the HTTPS service port number, and then the RMCP+ service port number.

Step 6 Select a login mode.

- **Shared Mode**: allows two users to access and manage a server at the same time. The users can see each other's operations.
- **Private Mode**: allows only one user to access and manage a server at a time.

Step 7 Click **Connect**.

A security warning is displayed.

Figure 8-16 Security warning

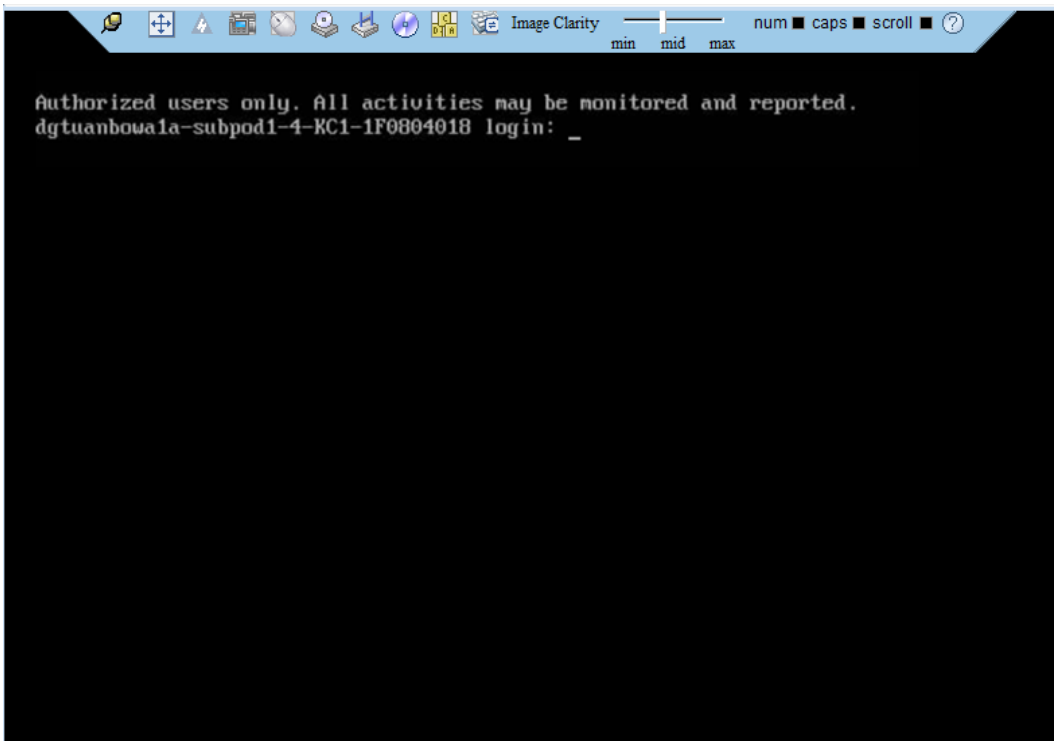
Step 8 Click **Yes**.

Ignore the certificate authentication error and go to the real-time desktop.

NOTE

- Click **No** to return to the login interface.
- Click **Import CA** to import a CA certificate (*.cer, *.crt, or *.pem). After the CA certificate is imported, the security warning dialog box will no longer be displayed.
- You are advised to periodically update the certificate for security purposes.

Figure 8-17 Server desktop



----End

8.5 Logging In to the Server CLI

8.5.1 Logging In to the CLI Using PuTTY over a Network Port

Scenario

Use PuTTY to access a server over a local area network (LAN).

NOTE

- PuTTY is free software. You need to obtain it by yourself.
- You are advised to use PuTTY of the latest version. PuTTY of an earlier version may cause login failures.

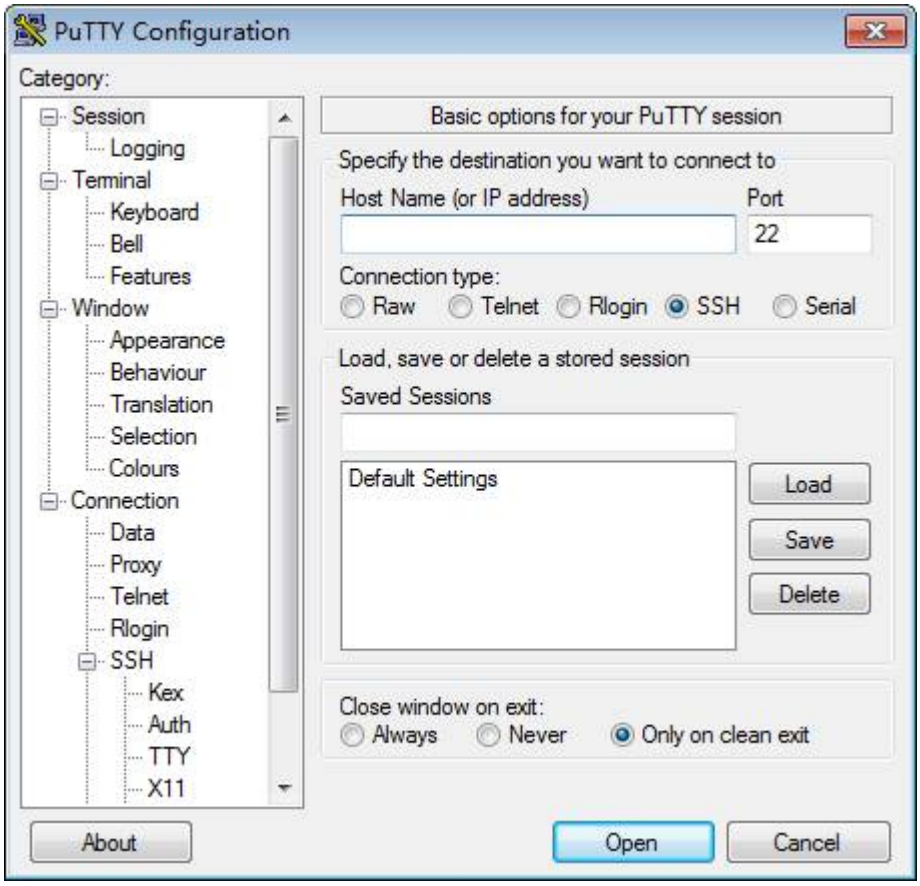
Procedure

Step 1 Set an IP address and subnet mask or add route information for the PC to communicate with the server.

Step 2 On the PC, double-click **PuTTY.exe**.

The **PuTTY Configuration** window is displayed.

Figure 8-18 PuTTY Configuration



Step 3 In the navigation pane, choose **Session**.

Step 4 Set login parameters.

The parameters are described as follows:

- **Host Name (or IP address)**: Enter the IP address of the server to be accessed, for example, **192.168.34.32**.
- **Port**: Retain the default value **22**.
- **Connection type**: Retain the default value **SSH**.
- **Close window on exit**: Retain the default value **Only on clean exit**.

NOTE

Configure **Host Name** and **Saved Sessions**, and click **Save**. You can double-click the saved record in **Saved Sessions** to log in to the server next time.

Step 5 Click **Open**.

The **PuTTY** window is displayed.

NOTE

- If this is your first login to the server, the **PuTTY Security Alert** dialog box is displayed. Click **Yes** to proceed.
- If an incorrect user name or password is entered, you must set up a new PuTTY session.

Step 6 Enter the user name and password.

If the login is successful, the server host name is displayed on the left of the prompt.

----End

8.5.2 Logging In to the CLI Using PuTTY over a Serial Port

Scenario

Use PuTTY to log in to a server over a serial port when:

- You want to perform initial configuration of the server.
- The server is inaccessible over a network port.

NOTE

- PuTTY is free software. You need to obtain it by yourself.
- You are advised to use PuTTY of the latest version. PuTTY of an earlier version may cause login failures.

Procedure

Step 1 On the PC, double-click **PuTTY.exe**.

The **PuTTY Configuration** window is displayed.

Step 2 In the navigation tree, choose **Connection** > **Serial**.

Step 3 Set login parameters.

The parameters are described as follows:

- Serial Line to connect to: COM*n*
- Speed (baud): 115200
- Data bits: 8
- Stop bits: 1
- Parity: None
- Flow control: None

NOTE

n indicates the serial port number, which is an integer.

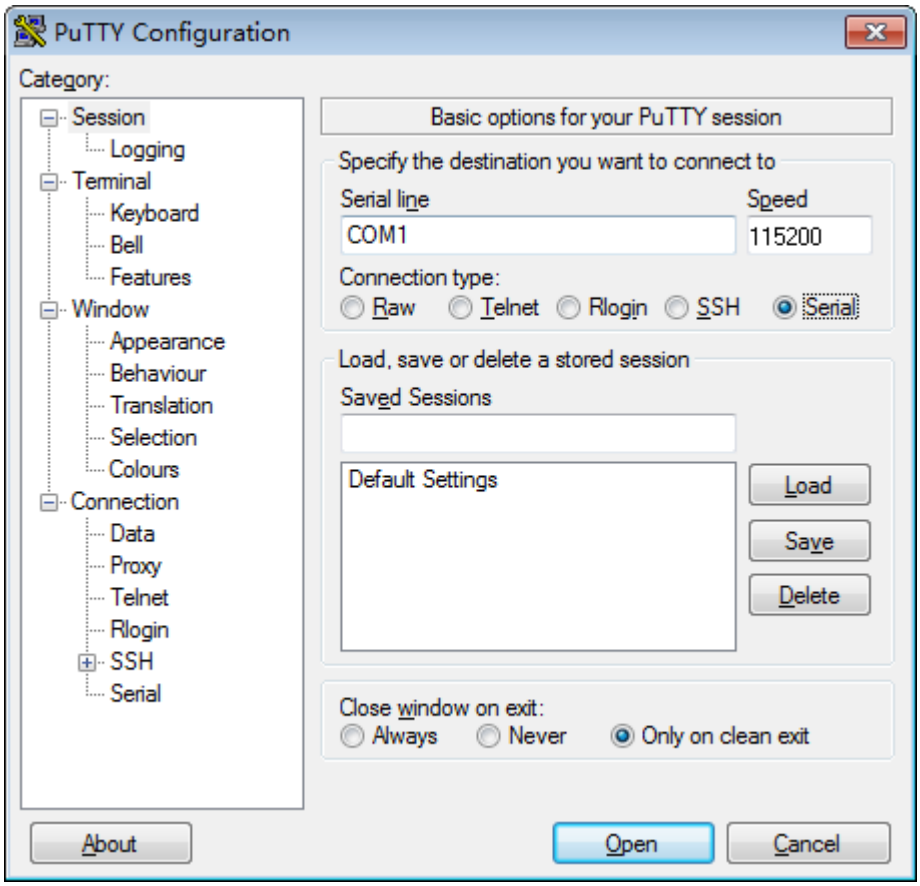
Step 4 In the navigation pane, choose **Session**.

Step 5 Set **Connection type** to **Serial** and **Close window on exit** to **Only on clean exit**.

NOTE

Set **Saved Sessions** and click **Save**. You can double-click the saved record in **Saved Sessions** to log in to the server next time.

Figure 8-19 PuTTY Configuration



Step 6 Click **Open**.

The **PuTTY** window is displayed.

NOTE

If this is your first login to the server, the **PuTTY Security Alert** dialog box is displayed. Click **Yes** to proceed.

Step 7 Enter the user name and password.

If the login is successful, the server host name is displayed on the left of the prompt.

----End

8.6 Managing VMD

The Intel Volume Management Device (VMD) is a module integrated in the processor on the Whitley platform. It is used for surprise hot plug, management, and error processing of NVMe drives.

- Before using the VMD function, contact technical support engineers of the OS vendor to check whether the OS supports the VMD function. If yes, check whether the VMD driver needs to be manually installed and check the installation method.

- The VMD function must be enabled in the BIOS. The function can be enabled only in UEFI mode.
- If the VMD function is enabled and the latest VMD driver is installed, the NVMe drives support surprise hot swap.

8.6.1 Enabling VMD

Procedure

Step 1 Access the BIOS.

For details, see **8.7 Accessing the BIOS**.

Step 2 Choose **Advanced**.

Step 3 Select **Socket Configuration** and press **Enter**.

Step 4 Select **IIO Configuration** and press **Enter**.

Step 5 Select **Intel(R) VMD Technology** and press **Enter**.

Step 6 Select **Intel(R) VMD Config** and press **Enter**.

Step 7 Select **Enable** and press **Enter**.

NOTE

The VMD function of PCIe devices is disabled by default.

Step 8 Press **F10**.

"Exit Saving Changes?" is displayed.

Step 9 Select **Yes** and press **Enter**.

The server automatically restarts for the settings to take effect.

----End

8.6.2 Disabling VMD

Procedure

Step 1 Access the BIOS.

For details, see **8.7 Accessing the BIOS**.

Step 2 Choose **Advanced**.

Step 3 Select **Socket Configuration** and press **Enter**.

Step 4 Select **IIO Configuration** and press **Enter**.

Step 5 Select **Intel(R) VMD Technology** and press **Enter**.

Step 6 Select **Intel(R) VMD Config** and press **Enter**.

Step 7 Select **Disabled** and press **Enter**.

Step 8 Press **F10**.

"Exit Saving Changes?" is displayed.

Step 9 Select **Yes** and press **Enter**.

The server automatically restarts for the settings to take effect.

----End

8.6.3 VMD Affiliation

- VMD of 10 x 2.5" drive pass-through configuration 3, 10 x 2.5" drive pass-through configuration 4, and 10 x 2.5" drive pass-through configuration 5 in **1.5.1 Drive Configurations**.

Figure 8-20 Drive slot numbers

Table 8-3 VMD of NVMe drives

Physical No. of the NVMe Drive	Physical No. of NVMe Drives with the Same VMD	VMD
6-9	6-9	CPU1

- VMD of 10 x 2.5" drive NVMe configuration 1 in **1.5.1 Drive Configurations**.

Figure 8-21 Drive slot numbers

Table 8-4 VMD of NVMe drives

Physical No. of the NVMe Drive	Physical No. of NVMe Drives with the Same VMD	VMD
0-9	0-3	CPU2
	4-5	
	6-9	CPU1

- VMD of 10 x 2.5" drive NVMe configuration 2 and 10 x 2.5" drive NVMe configuration 3 in **1.5.1 Drive Configurations**.

Figure 8-22 Drive slot numbers

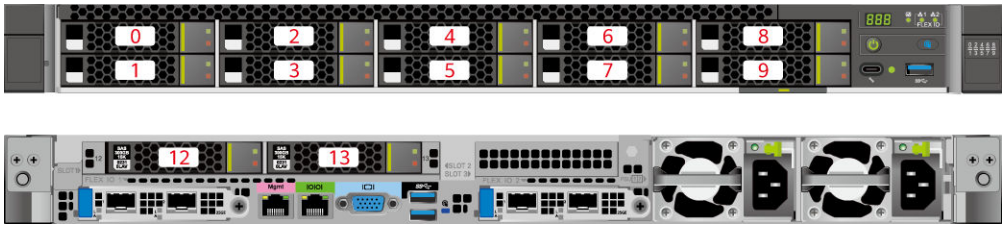


Table 8-5 VMD of NVMe drives

Physical No. of the NVMe Drive	Physical No. of NVMe Drives with the Same VMD	VMD
0-9	0-3	CPU2
	4-5	
	6-9	CPU1

8.7 Accessing the BIOS

Procedure

Step 1 Connect a local PC with the KVM to the server, or access the **Remote Control** page on the iBMC WebUI.

NOTE

For details about how to access the **Remote Control** page on the iBMC WebUI, see *iBMC User Guide* of corresponding server.

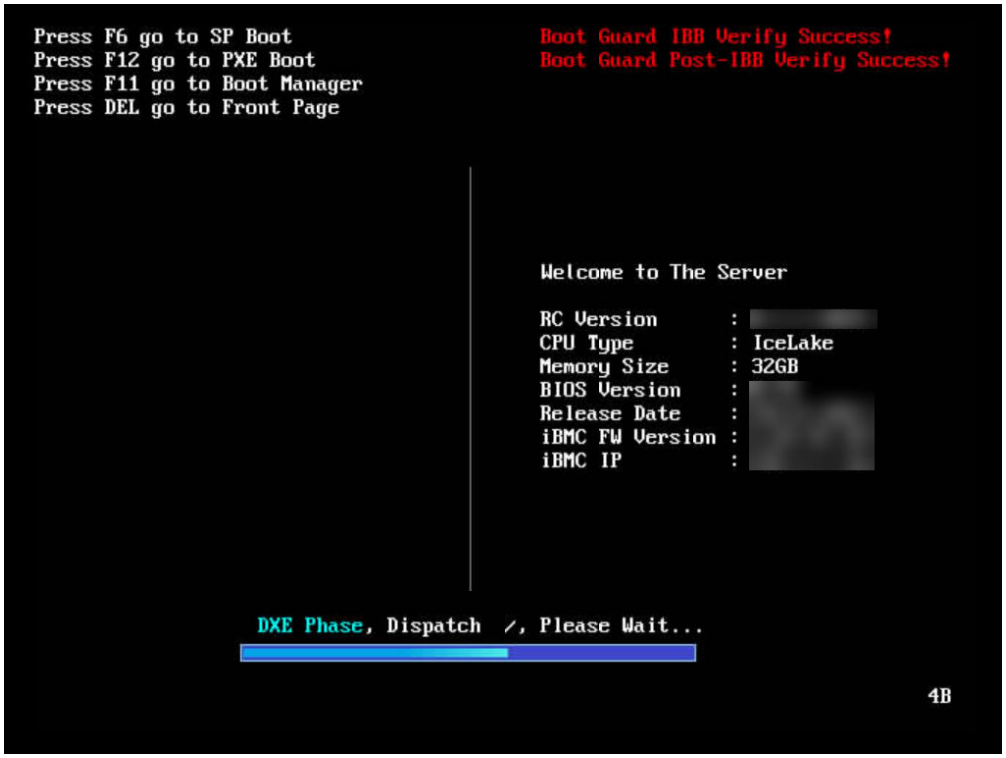
Step 2 Power on or restart the server.

NOTE

Restarting the server will interrupt services. Exercise caution when performing this operation.

Step 3 When the screen shown in **Figure 8-23** is displayed, press **Del** or **Delete**.

Figure 8-23 BIOS boot screen



NOTE

- To access the Smart Provisioning GUI, press **F6**.
- To switch to the **Boot Manager** screen, press **F11**.
- To boot from the network, press **F12**.

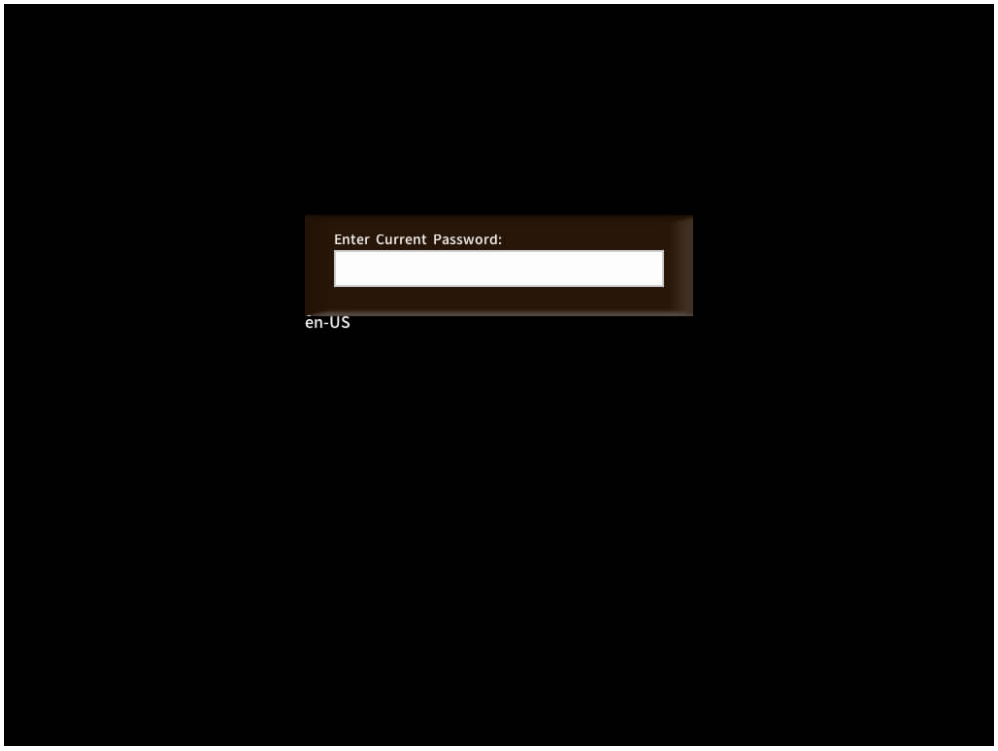
Step 4 Enter the current password.

If you are prompted to enter the current password during the startup, enter the password in the displayed dialog box.

NOTE

- The default BIOS password is **Admin@9000** (administrator password). After the first login, you are advised to set an administrator password immediately. For details, see "Common Operations > Common Operations > Setting the BIOS Password" in the *Whitley Platform BIOS Parameter Reference.*
- Press **F2** to alternate between the English (US), French, and Japanese keyboards.
- Use the mouse to open the on-screen keyboard and enter the password.
- For security purposes, change the administrator password periodically.
- The system will be locked if an incorrect password is entered three consecutive times. Restart the server to unlock it.

Figure 8-24 Dialog box for entering the current password



Step 5 After the password is entered, press **Enter**.

The front page is displayed.

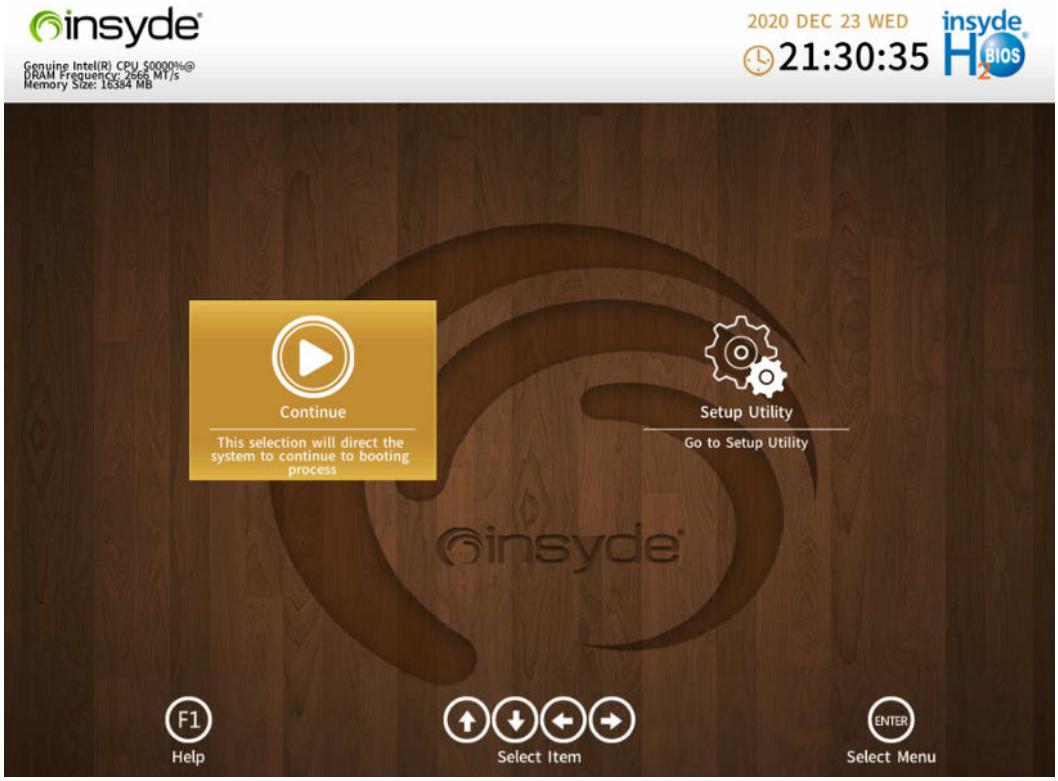
NOTE

- **Figure 8-25** and **Figure 8-26** show the **Front Page** screen displayed when you log in to the system as the administrator.
- **Figure 8-27** shows the **Front Page** screen displayed when you log in to the system as a common user. In this case, only the **Continue** and **Setup Utility** menus are displayed. On the **Setup Utility** page, a common user can only view menu options, set or change the password of the common user (that is, editing the **Set User Password** option on the **Security** page), set parameters (except **Load Defaults**) on the **Exit** page, press **F10** to save and exit. Other options are all dimmed and cannot be edited. **F9** used to restore the default settings is unavailable.

Figure 8-25 Front Page screen (UEFI mode)

Figure 8-26 Front Page screen (legacy mode)

Figure 8-27 Front Page screen (login using a common user password)



Step 6 Use arrow keys to select **Setup Utility** and press **Enter**.

The **Main** screen is displayed.

Figure 8-28 Main screen 1

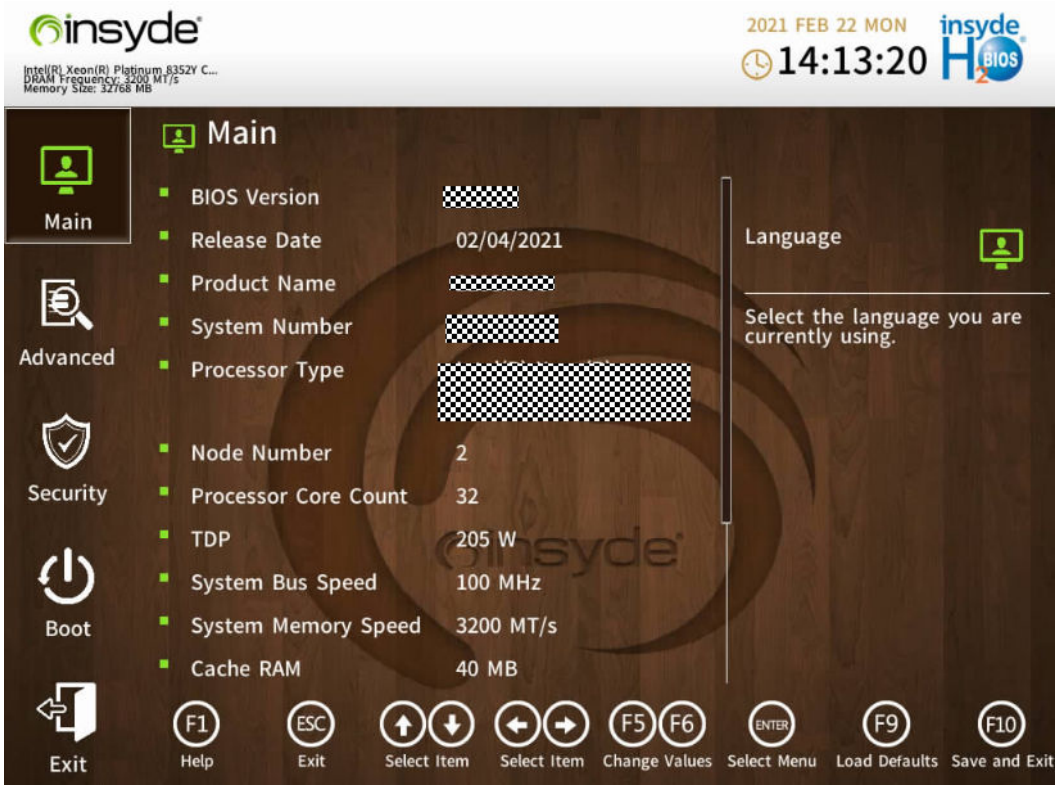


Figure 8-29 Main screen 2

----End

8.8 Clearing Data from a Storage Device

Scenario

Use the Linux **badblocks** command to clear data on a storage device. When running the **badblocks** command, you need to specify parameters to overwrite data on the storage device.

The following describes how to clear the data on one HDD/SSD as an example. This operation is for reference only. You can also use the disk erasing function of Smart Provisioning to erase data from storage media. This function is not applicable to encrypted drives.

For details, see section "Erasing Hard Disks" in the *Smart Provisioning User Guide*.

NOTICE

The cleared data cannot be restored. Exercise caution when performing this operation.

Procedure

NOTE

Before performing this operation, check that:

- The storage device is not in a RAID array with redundancy, and the server operating system is running properly.
- You have obtained the server No. and the slot No. and location of the storage device to be cleared.

Step 1 You have accessed the desktop of the server where the target drive is located.

For details, see **8.4 Logging In to the Desktop of a Server**.

Step 2 Open the CLI.

Step 3 Query information about drive letters.

lsscsi

Figure 8-30 Querying drive letters

```
linux-hm54:~ # lsscsi
[0:0:0:0]    disk    SEAGATE  ST900MM0006      B001  /dev/sda
[0:0:1:0]    disk    SEAGATE  ST900MM0006      B001  /dev/sdb
```

Step 4 Query drive information.

fdisk -l

NOTE

- The drive with the * symbol in the **Boot** column is the system drive. As shown in **Figure 8-31**, **sda** is the system drive.
- Do not directly clear system drive data. Before clearing system drive data, clear data from other storage media.

Figure 8-31 Querying drive information

```
linux-hm54:~ # fdisk -l

Disk /dev/sda: 900.2 GB, 900185481216 bytes
255 heads, 63 sectors/track, 109441 cylinders, total 1758174768 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x000181d2

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1            2048     8386559     4192256   82  Linux swap / Solaris
/dev/sda2   *     8386560  1758173183   874893312   83  Linux

Disk /dev/sdb: 900.2 GB, 900185481216 bytes
255 heads, 63 sectors/track, 109441 cylinders, total 1758174768 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000

Disk /dev/sdb doesn't contain a valid partition table
```

Step 5 Write 0s to the drive to be cleared.

Command: **badblocks -swft 0** ***Drive letter***

Example: **badblocks -swft 0 /dev/sdb**

Figure 8-32 Clearing data (example)

```
linux-hm54:~ # badblocks -swft 0 /dev/sdb
Testing with pattern 0x00:  26.38% done, 19:40 elapsed
```

NOTE

- The drive letters vary with the storage media (HDD, SSD, and USB flash drive). Ensure that the drive letter that you entered is correct.
- This operation takes time.
- If the command fails to execute, contact technical support.

Step 6 Remove the drive.

NOTE

After the data is cleared, do not restart or reinstall the server. Otherwise, the system will reload data to the drives during the startup of the server.

----End

9 More Information

9.1 Obtaining Technical Support

xFusion Digital Technologies Co., Ltd. provides timely and effective support for users through local branch offices, secondary technical support system, telephone technical support, remote and on-site technical services.

Technical Support Website

Technical documents are available at **xFusion website**.

Knowledge Base

To obtain case study about servers, visit **Knowledge Base**.

Obtaining Technical Support

xFusion provides comprehensive technical support and services. To obtain assistance, contact xFusion technical support as follows:

- Contact Global Technical Assistance Center by phone or email. For the phone number and email address, see **Global Service Hotline**.
- Contact technical support personnel at your local xFusion branch office.

9.2 Product Information Resources

Table 9-1 Product information resources

Item	Description	How to Obtain
Server Product Documentation	Documents that provide information about the structure, specifications, installation and removal of components, installation of software, and server configuration.	Visit **Technical Support > Documentation**, select the product model, and download the product documentation.
Compatibility List	A tool used to query the OSs, components, and peripherals compatible with a server.	Visit **Compatibility List**.
Warranty Query System	A system used to query service information about servers.	Visit **Maintenance Search**.
Power Calculator	A tool used to calculate server power consumption based on the server configuration.	Visit **Power Calculator**.

9.3 Product Configuration Resources

Table 9-2 Product configuration resources

Tool	Description	How to Obtain
Server removal and installation videos	Show how to remove and install server hardware.	Visit **Multimedia Portal**.
Memory Configuration	An online application that helps you specify the information, such as the product model, CPU quantity, and DIMM quantity. Then, the application displays the DIMM installation sequence in a graphical manner.	Visit **Server Assembly Guide**.

9.4 Maintenance Tool

Table 9-3 Software tools for routine maintenance

Tool	Server Model and Software Version	Description
FusionServer Tools	**FusionServer Tools**	FusionServer Tools contain tools used for batch deployment, maintenance, and upgrade of servers. Download link: **FusionServer Tools**
Smart Provisioning	For details, see the ***Smart Provisioning User Guide***.	Smart Provisioning is used to install OSs, configure RAID, and upgrade firmware. Download link: **Smart Provisioning**

10 Software and Configuration Utilities

10.1 iBMC

The intelligent Baseboard Management Controller (iBMC) complies with DCMI 1.5/IPMI 1.5/IPMI 2.0 and SNMP standards and supports various functions, including KVM redirection, text console redirection, remote virtual media, and hardware monitoring and management.

The iBMC offers the following features:

- Various management interfaces

  The iBMC provides IPMI, CLI, Data Center Manageability Interface (DCMI), Redfish interfaces, Hypertext Transfer Protocol Secure (HTTPS), and SNMP.
- Fault detection and alarm management

  The iBMC implements fault detection and alarm management, ensuring stable, uninterrupted 24/7 system operation.
- Virtual KVM and virtual media

  The iBMC provides virtual KVM and virtual media, facilitating remote maintenance.
- WebUI

  The iBMC provides a web-based UI for setting and querying device information.
- System breakdown screenshots and video playback

  The iBMC allows screenshots and videos to be created when the system breaks down. The screenshots and videos help to identify the cause of system breakdown.
- Screen snapshots and videos

  The iBMC offers screen snapshots and videos, which simplify routine preventive maintenance, recording, and auditing.
- Support for DNS and LDAP

The iBMC supports domain name system (DNS) and Lightweight Directory Application Protocol (LDAP) to implement domain management and directory service.

- Image backup

  The iBMC works in active/standby mode to ensure system reliability. If the active iBMC is faulty, the standby iBMC takes over services immediately.

- Intelligent power management

  The iBMC uses power capping to increase deployment density, and uses dynamic energy saving to reduce operating expenditure.

For details about iBMC, see the *iBMC User Guide.*

10.2 BIOS

The basic input/output system (BIOS) is the most basic software loaded on a computer hardware system. The BIOS provides an abstraction layer for the operating system (OS) and the hardware to interact with the keyboard, display, and other input/output (I/O) devices.

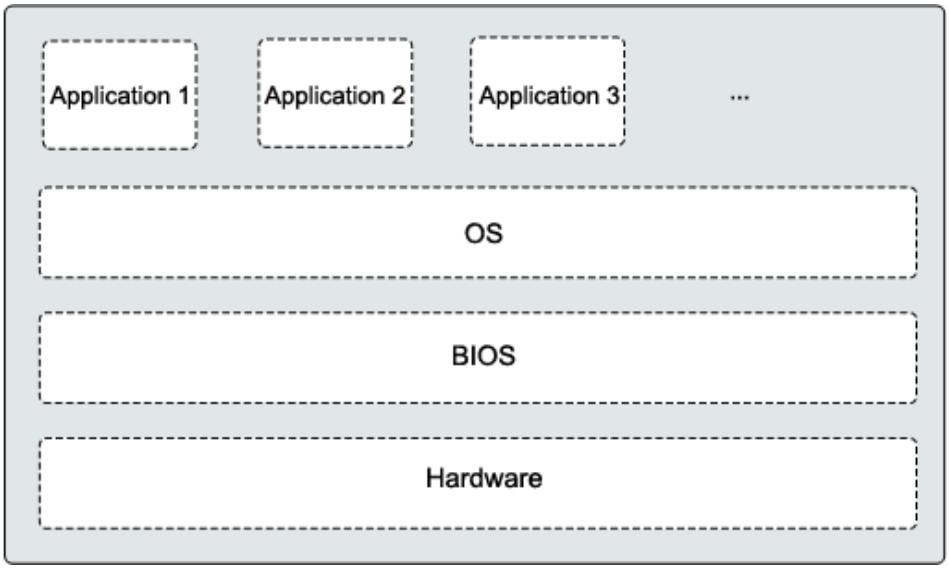
The BIOS data is stored on the Serial Peripheral Interface (SPI) flash memory. The BIOS performs a power-on self-test (POST), initializes CPUs and memory, checks the I/O and boot devices, and finally boots the OS. The BIOS also provides the advanced configuration and power interface (ACPI), hot swap setting, and a management interface in Chinese, English, and Japanese.

The Whitley platform BIOS complies with UEFI 2.7 and ACPI 6.2 specifications.

The BIOS on Whitley-based servers is developed based on the code base of independent BIOS vendors (IBVs). It provides a variety of in-band and out-of-band configuration functions as well as high scalability and supports customization.

For more information about the BIOS, see the *Whitley Platform BIOS Parameter Reference*.

Figure 10-1 BIOS in the system



A Appendix

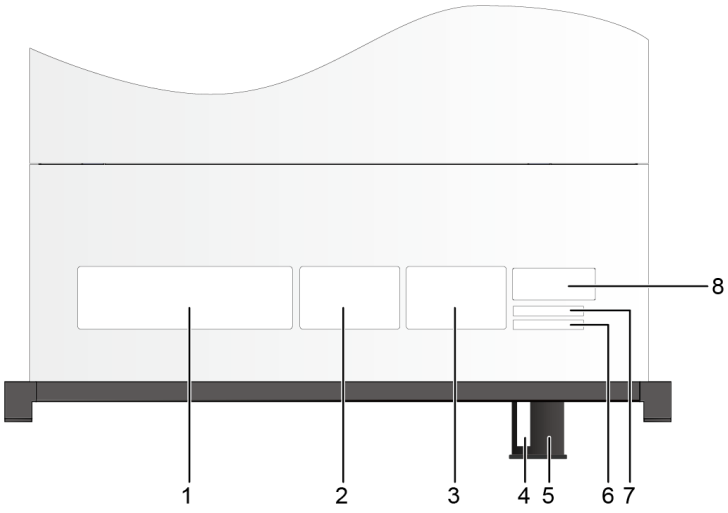
A.1 Chassis Label

NOTE

The label information and location are for reference only. For details, see the actual product.

A.1.1 On the Front Top

Figure A-1 Chassis head label



1	Nameplate	2	Certificate
3	Quick access tag	4	SN **NOTE** For details, see **A.2 Product SN**.

5	Slide-out label plate **NOTE** The label locations vary with server models or configurations. For details, see **1.1.1 Appearance** .	6	SN **NOTE** For details, see **A.2 Product SN**.
7	Reserved space for custom label	8	Pressure-proof label **NOTE** This label indicates that do not place any objects on top of a rack-mounted device.

A.1.1.1 Nameplate

Figure A-2 Nameplate example

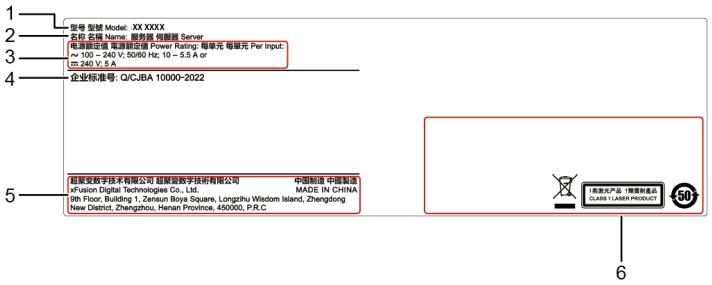


Table A-1 Nameplate description

No.	Description
1	Server Model For details, see**A.1.1.1 Nameplate** .
2	Device names
3	Power Supply Requirements
4	Enterprise Standard No.
5	Vendor Information
6	Authentication ID

A.1.1.2 Certificate

Figure A-3 Sample certificate of conformity

Table A-2 Certificate of conformity description

No.	Description
1	Order
2	No. **NOTE** For details, see **Figure A-4** and **Table A-3**.
3	QC inspector
4	Production date
5	No. Barcode

Figure A-4 Sample certificate number

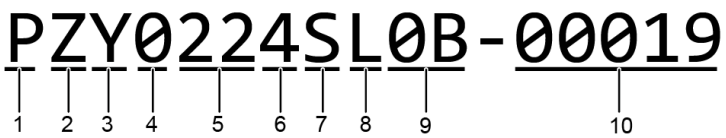


Table A-3 Certificate No. Description

No.	Description
1	"P", fixed
2	"Z", fixed
3	• Y: Server • B: Semi-finished product of the whole machine. • N: Loose spare parts

No.	Description
4	"0", Reserved bit.
5	Year (2 digits).
6	Month (1 digit). ● Digits 1 to 9 indicate January to September, respectively. ● Letters A to C indicate October to December, respectively.
7	Day (1 digit). ● Digits 1 to 9 indicate the 1st to 9th ● Letters A to H indicate the 10th to 17th. ● Letters J to N indicate the 18th to 22nd. ● Letters P to Y indicate the 23rd to 31st
8	Hour (1 digit). ● Digits 0 to 9 indicate 0 to 9:00. ● Letters A to H indicate 10 to 17:00. ● Letters J to N indicate 18 to 22:00. ● Letters P to Q indicate 23 to 24:00.
9	Serial number (2 digits)
10	Manufacturing serial number (5 digits).

A.1.1.3 Sample Quick Access Tags

Figure A-5 Sample quick access tags

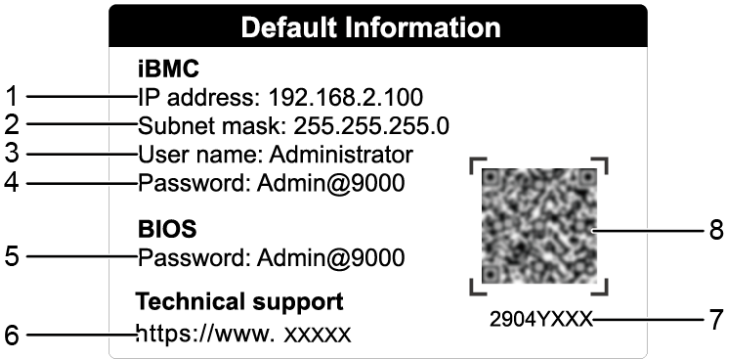


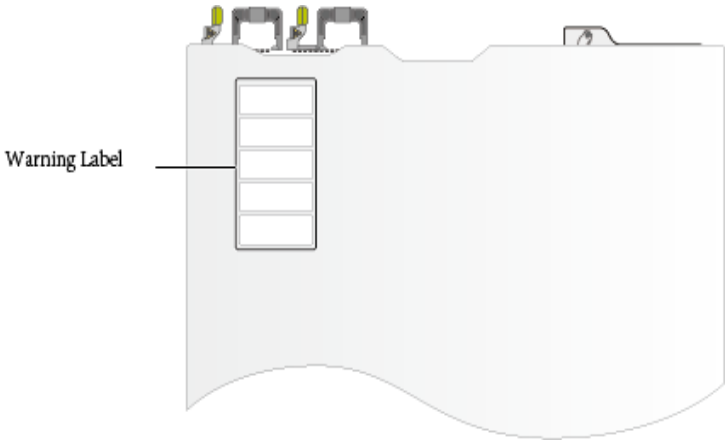
Table A-4 Quick access tab description

No.	Description
1	IP address of the iBMC management network port
2	Subnet mask of the iBMC management network port

No.	Description
3	Default iBMC user name
4	Default iBMC password
5	Default BIOS password
6	Technical support website
7	P/N Code
8	QR Code **NOTE** Scan the QR code to obtain technical support resources.

A.1.2 Chassis Tail Label

Figure A-6 Chassis tail label

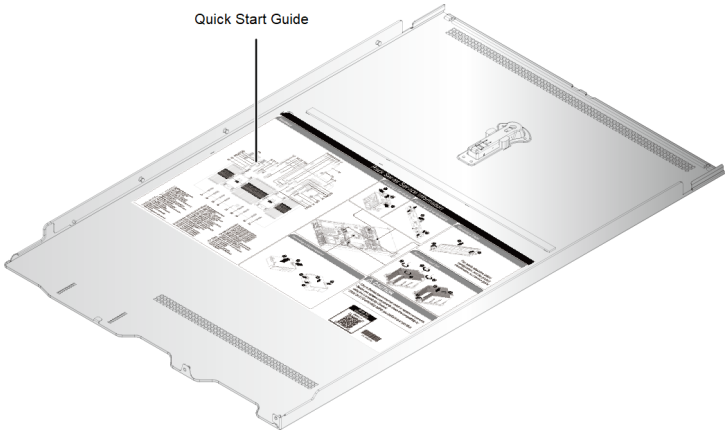


NOTE

For details about the warning label, see server *Safety Information*.

A.1.3 Chassis Internal Label

Figure A-7 Chassis internal label



NOTE

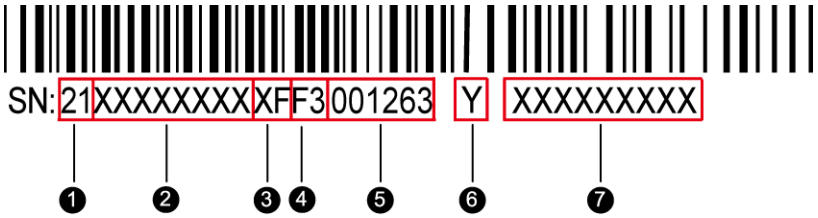
- The quick guide is located on the inside of the chassis cover. It describes how to remove the mainboard components, important components of the chassis, precautions, and QR codes of technical resources. The pictures are for reference only. For details, see the actual product.
- The quick guide is optional. For details, see the actual product.

A.2 Product SN

The serial number (SN) on the slide-out label plate uniquely identifies a device. The SN is required when you contact technical support. **Figure A-8** and **Figure A-9** show the SN formats.

- SN example 1

Figure A-8 SN example 1



- SN example 2

Figure A-9 SN example 2

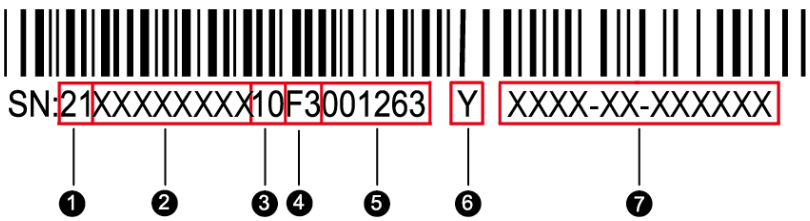


Table A-5 SN example description

No.	Description
1	ESN ID (two characters), which can only be **21**.
2	Material ID (eight characters), that is, the processing code.
3	Vendor code (two characters), that is, the code of the processing place.
4	Year and month (two characters). ● The first character indicates the year. – Digits 1 to 9 indicate years 2001 to 2009, respectively. – Letters A to H indicate years 2010 to 2017, respectively. – Letters J to N indicate years 2018 to 2022, respectively. – Letters P to Y indicate years 2023 to 2032, respectively. **NOTE** The years from 2010 are represented by upper-case letters excluding I, O, and Z because the three letters are similar to the digits 1, 0, and 2. ● The second character indicates the month. – Digits 1 to 9 indicate January to September, respectively. – Letters A to C indicate October to December, respectively.
5	Serial number (six digits).
6	RoHS compliance (one character). **Y** indicates RoHS compliant.
7	Internal model, that is, product name. The model format varies according to the actual situation.

- SN example 3

Figure A-10 Label example

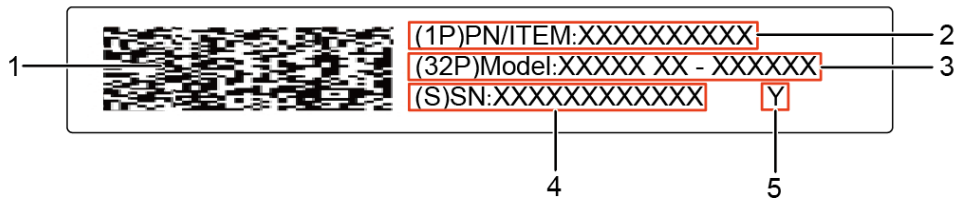


Table A-6 Label example description

No.	Description
1	QR code. For details, see **Figure A-12**.
2	BOM code (10 digits).

No.	Description
3	Product model (13 characters).
4	Product SN (12 characters). For details, see **Table A-7**.
5	RoHS compliance code (one character).

Figure A-11 SN example

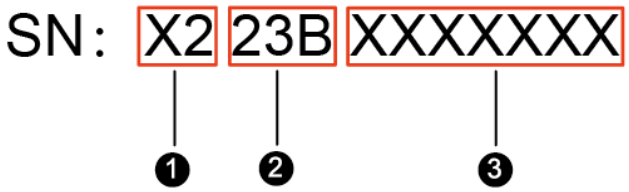


Table A-7 SN example description

No.	Description
1	Manufacturer code (two characters).
2	Year and month (three characters). • The first and second characters indicate the year. **NOTE** A four-digit year is indicated by the last two digits of the year. For example, 23 indicates the year 2023. • The third character indicates the month. – Digits 1 to 9 indicate January to September, respectively. – Letters A to C indicate October to December, respectively.
3	Serial number (seven characters).

Figure A-12 QR code scanning result example

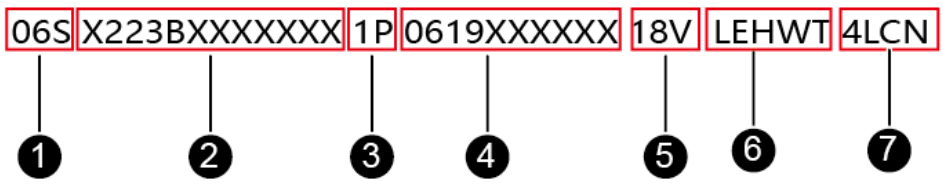


Table A-8 QR code scanning result example description

No.	Description
1	Fixed representation symbol (three characters).
2	Product SN (12 characters). For details, see **Table A-7**.
3	Data identifier for the material code (two characters).
4	BOM code (10 digits).
5	Data identifier of manufacturer (three characters).
6	Code of device manufacturer (five characters).
7	Data identifier of origin (four characters).

A.3 Operating Temperature Limitations

Table A-9 Operating temperature limitations

Configuration	Maximum Operating Temperature 30°C (86°F)	Maximum Operating Temperature 35°C (95°F)	Maximum Operating Temperature 40°C (104°F)	Maximum Operating Temperature 45°C (113°F)
4 x 3.5-inch drive pass-through configuration	• Processor models not supported include 6334, 6342, 6346, 6348, 6354, 8358P, 8351N, 8358, 8360Y, 8362, 8368, and 8380.	• Rear drives (including HDD/SSD/M.2) are not supported. • Processor models not supported include 6334, 6342, 6346, 6348, 6354, 8358P, 8351N, 8358, 8360Y, 8362, 8368, and 8380. • PMem modules whose capacity per module is 512 GB are not supported.	• Processor models not supported include 5320, 6312U, 6326, 6334, 6336Y, 6342, 6314U, 6330, 6330N, 6338, 6338N, 6346, 6348, 6354, 8351N, 8352V, 8352S, 8352Y, 8358, 8358P, 8360Y, 8362, 8368, and 8380. • DDR4 memory modules/ PMem modules whose capacity per module is 256 GB or larger are not supported.	• Only 4309Y/ 4310/4310T/4314 processors are supported. • DDR4 memory modules/ PMem modules whose capacity per module is 128 GB or larger are not supported. • Rear drives (including HDD/SSD/M.2) are not supported. • GPU cards are not supported. • IB cards are not supported. • CX5/CX6 NICs are not supported. • OCP 3.0 network adapters are not supported.

Configuration	Maximum Operating Temperature 30°C (86°F)	Maximum Operating Temperature 35°C (95°F)	Maximum Operating Temperature 40°C (104°F)	Maximum Operating Temperature 45°C (113°F)
			• Rear drives (including HDD/SSD/M.2) are not supported. • GPU cards are not supported. • IB cards are not supported. • CX5/CX6 NICs are not supported. • OCP 3.0 network adapters with 25GE ports or ports of higher rate are not supported.	• NICs with rate higher than 25 Gbit/s are not supported. • 9460-16i RAID controller cards are not supported.

Configuration	Maximum Operating Temperature 30°C (86°F)	Maximum Operating Temperature 35°C (95°F)	Maximum Operating Temperature 40°C (104°F)	Maximum Operating Temperature 45°C (113°F)
8 x 2.5-inch drive pass-through configuration	• All options supported.	• Rear drives (including HDD/SSD/M.2) are not supported. • PMem modules whose capacity per module is 512 GB are not supported.	• Processor models not supported include 5320, 6312U, 6326, 6334, 6336Y, 6342, 6314U, 6330, 6330N, 6338, 6338N, 6346, 6348, 6354, 8351N, 8352V, 8352S, 8352Y, 8358, 8358P, 8360Y, 8362, 8368, and 8380. • DDR4 memory modules/ PMem modules whose capacity per module is 256 GB or larger are not supported. • Rear drives (including HDD/SSD/M.2) are not supported.	• Only 4309Y, 4310, 4310T, and 4314 processors are supported. • DDR4 memory modules/ PMem modules whose capacity per module is 128 GB or larger are not supported. • Rear drives (including HDD/SSD/M.2) are not supported. • GPU cards are not supported. • IB cards are not supported. • CX5/CX6 NICs are not supported. • OCP 3.0 network adapters are not supported. • NICs with rate higher than 25 Gbit/s are

Configuration	Maximum Operating Temperature 30°C (86°F)	Maximum Operating Temperature 35°C (95°F)	Maximum Operating Temperature 40°C (104°F)	Maximum Operating Temperature 45°C (113°F)
			• GPU cards are not supported. • IB cards are not supported. • CX5/CX6 NICs are not supported. • OCP 3.0 network adapters with 25GE ports or ports of higher rate are not supported.	not supported. • 9460-16i RAID controller cards are not supported.

Configuration	Maximum Operating Temperature 30°C (86°F)	Maximum Operating Temperature 35°C (95°F)	Maximum Operating Temperature 40°C (104°F)	Maximum Operating Temperature 45°C (113°F)
10 x 2.5-inch drive pass-through configuration	• All options supported.	• Rear drives (including HDD/SSD/M.2) are not supported. • PMem modules whose capacity per module is 512 GB are not supported.	• Processor models not supported include 5320, 6312U, 6326, 6334, 6336Y, 6342, 6314U, 6330, 6330N, 6338, 6338N, 6346, 6348, 6354, 8351N, 8352V, 8352S, 8352Y, 8358, 8358P, 8360Y, 8362, 8368, and 8380. • DDR4 memory modules/ PMem modules whose capacity per module is 256 GB or larger are not supported. • Rear drives (including HDD/SSD/M.2) are not supported.	• Only 4309Y, 4310, 4310T, and 4314 processors are supported. • DDR4 memory modules/ PMem modules whose capacity per module is 128 GB or larger are not supported. • Rear drives (including HDD/SSD/M.2) are not supported. • GPU cards are not supported. • IB cards are not supported. • CX5/CX6 NICs are not supported. • OCP 3.0 network adapters are not supported. • NICs with rate higher than 25 Gbit/s are

Configuration	Maximum Operating Temperature 30°C (86°F)	Maximum Operating Temperature 35°C (95°F)	Maximum Operating Temperature 40°C (104°F)	Maximum Operating Temperature 45°C (113°F)
			• GPU cards are not supported. • IB cards are not supported. • CX5/CX6 NICs are not supported. • OCP 3.0 network adapters with 25GE ports or ports of higher rate are not supported.	not supported. • 9460-16i RAID controller cards are not supported.

Configuration	Maximum Operating Temperature 30°C (86°F)	Maximum Operating Temperature 35°C (95°F)	Maximum Operating Temperature 40°C (104°F)	Maximum Operating Temperature 45°C (113°F)
10 x 2.5-inch NVMe drive configuration	● All options supported.	● Processor models not supported include 6334, 6342, 6348, 6346, 6354, 8358P, 8351N, 8358, 8360Y, 8362, 8368, and 8380. ● DDR4 memory modules/ PMem modules whose capacity per module is 256 GB or larger are not supported. ● Rear drives (including HDD/SSD/ M.2) are not supported. ● GPU cards are not supported. ● IB cards are not supported. ● CX5/CX6 NICs are not supported. ● OCP 3.0 NICs with	● Not supported.	● Not supported.

Configuration	Maximum Operating Temperature 30°C (86°F)	Maximum Operating Temperature 35°C (95°F)	Maximum Operating Temperature 40°C (104°F)	Maximum Operating Temperature 45°C (113°F)
		25GE ports or ports of higher rate are not supported.		

NOTE

- When a single fan is faulty, the highest operating temperature is 5°C (9°F) lower than the rated value.
- When a single fan is faulty, the system performance may be affected.
- When memory modules whose capacity module is 256 GB or larger or when 6342, 6348, 6346, 6354, 8352V, 8352S, 8352Y, 8358P, 8351N, 8358, 8360Y, 8362, 8368, or 8380 processors are configured, rear GPU cards, rear drives (including HDDs, SSDs, and M.2), IB cards, or OCP 3.0 network adapters with 25GE ports or ports of higher rate are not supported.
- It is recommended that servers be deployed at an interval of 1 U to reduce server noise and improve server energy efficiency.
- 8368Q 38c 270 W 2.6 GHz liquid-cooled processors are not supported.

A.4 Nameplate

Certified Model	Usage Restrictions
H12H-06	Global
1288H V6	Global
Note: The nameplate depends on the actual product.	

A.5 RAS Features

The server supports a variety of Reliability, Availability, and Serviceability (RAS) features. You can configure these features for better performance.

For details about the RAS features, see *Ice Lake Platform RAS Technical White Paper*.

A.6 Sensor List

Sensor	Description	Component
Inlet Temp	Air inlet temperature	Indicator board
Outlet Temp	Air outlet temperature	BMC card
PCH Temp	PCH bridge temperature	Mainboard
CPU*N* Core Rem	CPU core temperature	CPU*N* *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* DTS	Difference between the real-time CPU temperature and the core CPU temperature threshold	CPU*N* *N* indicates the CPU number. The value is **1** or **2**.
Cpu*N* Margin	Difference between the real-time CPU temperature and the CPU Tcontrol threshold	CPU*N* *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* VDDQ Temp	CPU VDDQ temperature	Mainboard *N* indicates the CPU number. The value ranges from **1** to **2**.
CPU*N* VRD Temp	CPU VRD temperature	Mainboard *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* MEM Temp	CPU memory module temperature	Memory module corresponding to CPU *N* *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* 12V	12 V voltage supplied by the mainboard to the CPU	Mainboard *N* indicates the CPU number. The value is **1** or **2**.
Riser 12V	12 V voltage supplied by the mainboard to the riser card	Mainboard

Sensor	Description	Component
Disk BP 12V	12 V voltage supplied by the mainboard to the drive backplane	Mainboard
CPU*N* DDR VDDQ	1.2 V memory module voltage	Mainboard *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* DDR VDDQ2	1.2 V memory module voltage	Mainboard *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* VCCIN	CPU VCCIN voltage	Mainboard *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* VSA	CPU VSA voltage	Mainboard *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* P1V8	CPU P1V8 voltage	Mainboard *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* VCCIO	CPU VCCIO voltage	Mainboard *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* VCCANA	CPU VCCANA voltage	Mainboard *N* indicates the CPU number. The value is **1** or **2**.
FAN*N* F Speed	Fan speed	Fan module *N* *N* indicates the fan module number. The value ranges from **1** to **7**.
FAN*N* R Speed		
Power	Server input power	Power supply unit (PSU)
PS*N* VIN	PSU *N* input voltage	PSU *N* *N* indicates the PSU number. The value is **1** or **2**.

Sensor	Description	Component
Disks Temp	Maximum drive temperature	Drive
RAID Temp	Temperature of the RAID controller card	RAID controller card
Power*N*	PSU input power	PSU *N* *N* indicates the PSU number. The value is **1** or **2**.
PCH Status	PCH chip fault diagnosis health status	Mainboard
CPU*N* UPI Link	CPU UPI link fault diagnosis health status	Mainboard or CPU *N* *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* Prochot	CPU Prochot	CPU*N* *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* Status	CPU status	CPU*N* *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* Memory	Status of the memory corresponding to the CPU	Memory module corresponding to CPU *N* *N* indicates the CPU number. The value is **1** or **2**.
FAN*N* F Status	Fan fault status	Fan module *N* *N* indicates the fan module number. The value ranges from **1** to **7**.
FAN*N* R Status		
DIMM*N*	DIMM status	DIMM *N* *N* indicates the DIMM slot number.
RTC Battery	RTC battery status. An alarm is generated when the voltage is lower than 1 V.	RTC battery on the mainboard
PCIE Status	PCIe status error	PCIe card

Sensor	Description	Component
Power Button	Power button pressed	Mainboard and power button
Watchdog2	Watchdog	Mainboard
Mngmnt Health	Management subsystem health status	Management modules
UID Button	UID button status	Mainboard
PwrOk Sig. Drop	Voltage dip status	Mainboard
PwrOn TimeOut	Power-on timeout	Mainboard
PwrCap Status	Power capping status	Mainboard
HDD Backplane	Hardware presence	Drive backplane
HDD BP Status	Drive backplane health status	Drive Backplane
Riser*N* Card	Hardware presence	Riser card *N* *N* indicates the riser card slot number. The value is **1** or **2**.
FAN*N* Presence	Fan presence	Fan module *N* *N* indicates the fan module number. The value ranges from **1** to **7**.
RAID Presence	RAID presence	RAID Controller Card
PS Redundancy	Redundancy failure due to PSU removal	Power supply unit (PSU)
RAID Status	RAID controller card health status	RAID Controller Card
RAID PCIE ERR	Health status of the RAID controller card in fault diagnosis	RAID Controller Card
RAID Card BBU	LSI SAS3106 RAID controller card BBU	RAID Controller Card
PS*N* Status	PSU status	PSU *N* *N* indicates the PSU number. The value is **1** or **2**.

Sensor	Description	Component
PS*N* Fan Status	PSU fan fault status	PSU*N* *N* indicates the PSU number. The value is **1** or **2**.
PS*N* Temp Status	PSU presence	PSU*N* *N* indicates the PSU number. The value is **1** or **2**.
DISK*N*	Disk status	Drive*N* *N* indicates the drive slot number. The value ranges from **0** to **9**.
PCIe RAID$ Temp	Temperature of the PCIe RAID controller card	PCIe RAID controller card
M2 Temp(PCIe$)	Maximum temperature of all M.2 drives of the RAID controller card	PCIe RAID controller card
PCIe$ OP Temp	PCIe card optical module temperature	PCIe card
PCIe NIC$ Temp	PCIe card chip temperature	PCIe card
PCIe FC$ Temp	PCIe card chip temperature	PCIe card
1711 Core Temp	Core temperature of the BMC management chip	BMC card
PS$ IIn	PSU input current	Power supply unit (PSU)
PS$ IOut	PSU output current	Power supply unit (PSU)
PS$ Pout	PSU output power	Power supply unit (PSU)
PS$ Temp	Maximum internal temperature of the PSU	Power supply unit (PSU)
PS$ Inlet Temp	PSU air inlet temperature	Power supply unit (PSU)
AreaIntrusion	Listening to the unpacking action	Mainboard
OCP$ OP Temp	OCP card optical module temperature	OCP 3.0 Network Adapters
OCP$ Temp	OCP card chip temperature	OCP 3.0 Network Adapters

Sensor	Description	Component
CPU*N* PMem Temp	CPU PMem module temperature	PMem module corresponding to CPU *N* *N* indicates the CPU number. The value is **1** or **2**.
Riser$ Temp	Riser card temperature	Riser cards
Disk BP$ Temp	Drive backplane temperature	Drive Backplanes
SSD Max Temp	Maximum SSD temperature	SSD
RAID BBU Temp	RAID controller card capacitor temperature	Supercapacitor of the RAID controller card
IB$ Temp	IB NIC temperature	IB card
SAS Cable	Entity presence	SAS high-speed cable on the mainboard
LCD Status	LCD health status	LCD
LCD Presence	LCD presence	LCD
PCIe$ Temp	PCIe card chip temperature	PCIe card
PCIe$ Card BBU	BBU status of the PCIe RAID controller card	PCIe RAID controller card
GPU$ Power	GPU card power	GPU cards
GPU$ Temp	GPU temperature	GPU cards
GPU$ MINI Temp	Mini chip temperature of the GPU card	GPU cards
GPU$ DDR Temp	DDR chip temperature of the GPU card	GPU cards
GPU$ HBM Temp	HBM chip temperature of the GPU card	GPU cards
CPU Usage	CPU usage.	N/A
Memory Usage	Memory usage.	
ACPI State	ACPI status	
SysFWProgress	Software process and system startup errors	

Sensor	Description	Component
System Notice	Hot restart reminder and fault diagnosis program information collection	
System Error	System suspension or restart. Check the background logs.	
SysRestart	Cause of system restart	
Boot Error	Boot error	
BMC Boot Up	BMC startup events	
BMC Time Hopping	Time hopping	
NTP Sync Failed	NTP synchronization failure and recovery events	
SEL Status	SEL full or clearing events	
Op. Log Full	Operation log full or clearing events	
Sec. Log Full	Security log full or clearing events	
Host Loss	System monitoring software (BMA) link loss detection	
OAMPort1_$ Link	Network port OAM link status	
OAMPort2_$ Link	Network port OAM link status	

A.7 FAQs About Optical Modules

The server NIC must be used with optical modules that have passed the compatibility test of xFusion. With uncertain transmission reliability, optical modules that have not been tested for compatibility may affect service stability. xFusion is not liable for any problems caused by the use of optical modules that have not been tested for compatibility by xFusion and will not fix such problems in principle.

When performing the compatibility tests on the optical modules used by servers, xFusion comprehensively verifies their functions to ensure their quality. The verified items include optical module plugging/unplugging, transmit and receive optical power, signal transmission quality, basic data reading, error tolerance, compatibility, electromagnetic compatibility (EMC), and environmental parameters.

Table A-10 Problems of using optical modules that have not been tested for compatibility and corresponding causes

Symptom	Cause
Due to non-standard structure and size, an optical module fails to be installed/removed smoothly on/from the optical interface.	Structures or sizes of some optical modules that have not been tested for compatibility do not comply with the Multi-Source Agreement (MSA). When such an optical module is installed on an optical interface, the size of this optical module hinders optical module installation on adjacent optical interfaces. In addition, optical modules can be unlocked through self-unlocking, press-unlocking, push-unlocking, or tilt-unlocking. For optical modules that have not been tested for compatibility, the server may not be able to have the optical modules removed that are not unlocked through press-unlocking.
Data bus defects cause the data bus suspension of a device.	Some optical modules that have not been tested for compatibility have defects in data bus designs. Using such an optical module causes suspension of the connected data bus on the device. As a result, data on the suspended bus cannot be read.
An optical module with improper edge connector size damages electronic components of the optical interface.	If an optical module that has not been tested for compatibility with improper edge connector size is used on an optical interface, electronic components of the optical interface will be damaged by short circuits.
Unnormalized temperature monitoring causes incorrect alarms.	The temperature monitoring systems of some optical modules that have not been tested for compatibility do not comply with industry standards and report temperature values higher than the real temperature. When such optical modules are used, the system will report incorrect temperature alarms.
Improper register settings cause errors or failures in reading parameters or diagnostic information.	Some optical modules that have not been tested for compatibility have improper register values on page A0, which can cause errors or failures when the data bus attempts to read parameters or diagnostic information.
Optical modules bring electromagnetic interference to nearby devices.	Some optical modules that have not been tested for compatibility are not designed in compliance with EMC standards and have low anti-interference capability. Additionally, they bring electromagnetic interference to nearby devices.
Services are interrupted when an optical module is operating under overtemperature.	The operating temperature ranges of optical modules that have not been tested for compatibility cannot meet service requirements. When they are used under a relatively high temperature, the optical power decreases, resulting in service interruption.

Symptom	Cause
Optical modules cannot work properly when the temperature change rate exceeds the normal range without adapting to the heat dissipation policy of the server.	Some optical modules that are not tested for compatibility have poor heat dissipation. Since they are not adapted to the heat dissipation policy of the server, abnormally high temperatures may occur continuously after they are running for a period of time. As a result, the optical modules cannot work properly.

B Glossary

B.1 A-E

B

BMC	The baseboard management controller (BMC) complies with the Intelligent Platform Management Interface (IPMI). It collects, processes, and stores sensor signals, and monitors the operating status of components. The BMC provides the hardware status and alarm information about the managed objects to the upper-level management system, so that the management system can manage the objects.

E

ejector lever	A part on the panel of a device used to facilitate installation or removal of the device.
Ethernet	A baseband local area network (LAN) architecture developed by Xerox Corporation by partnering with Intel and DEC. Ethernet uses the Carrier Sense Multiple Access/Collision Detection (CSMA/CD) access method and allows data transfer over various cables at 10 Mbit/s. The Ethernet specification is the basis for the IEEE 802.3 standard.

B.2 F-J

G

Gigabit Ethernet (GE)	An extension and enhancement of traditional shared media Ethernet standards. It is compatible with 10 Mbit/s and 100 Mbit/s Ethernet and complies with IEEE 802.3z standards.

H

hot swap	Replacing or adding components without stopping or shutting down the system.

B.3 K-O

K

KVM	A hardware device that provides public video, keyboard and mouse (KVM).

B.4 P-T

P

panel	An external component (including but not limited to ejector levers, indicators, and ports) on the front or rear of the server. It seals the front and rear of the chassis to ensure optimal ventilation and electromagnetic compatibility (EMC).
Peripheral Component Interconnect Express (PCIe)	A computer bus PCI, which uses the existing PCI programming concepts and communication standards, but builds a faster serial communication system. Intel is the main sponsor for PCIe. PCIe is used only for internal interconnection. A PCI system can be transformed to a PCIe system by modifying the physical layer instead of software. PCIe delivers a faster speed and can replace almost all AGP and PCI buses.

R

redundancy	A mechanism that allows a backup device to automatically take over services from a faulty device to ensure uninterrupted running of the system.
redundant array of independent disks (RAID)	A storage technology that combines multiple physical drives into a logical unit for the purposes of data redundancy and performance improvement.

S

server	A special computer that provides services for clients over a network.
system event log (SEL)	Event records stored in the system used for subsequent fault diagnosis and system recovery.

B.5 U-Z

U

U	A unit defined in International Electrotechnical Commission (IEC) 60297-1 to measure the height of a cabinet, chassis, or subrack. 1 U = 44.45 mm
UltraPath Interconnect (UPI)	A point-to-point processor interconnect developed by Intel.

C Acronyms and Abbreviations

C.1 A-E

A

AC	alternating current
AES	Advanced Encryption Standard New Instruction Set
ARP	Address Resolution Protocol
AVX	Advanced Vector Extensions

B

BBU	backup battery unit
BIOS	Basic Input/Output System
BMC	baseboard management controller

C

CCC	China Compulsory Certification
CD	calendar day
CE	Conformite Europeenne
CIM	Common Information Model
CLI	command-line interface

D

DC	direct current
DDR4	Double Data Rate 4
DDDC	double device data correction
DEMT	Dynamic Energy Management Technology
DIMM	dual in-line memory module
DRAM	dynamic random-access memory
DVD	digital video disc

E

ECC	error checking and correcting
ECMA	European Computer Manufacturer Association
EDB	Execute Disable Bit
EID	Enclosure ID
EN	European Efficiency
ERP	enterprise resource planning
ETS	European Telecommunication Standards

C.2 F-J

F

FB-DIMM	Fully Buffered DIMM
FC	Fiber Channel
FCC	Federal Communications Commission
FCoE	Fibre Channel over Ethernet
FTP	File Transfer Protocol

G

GE	Gigabit Ethernet

GPIO	General Purpose Input/Output
GPU	graphics processing unit

H

HA	high availability
HDD	hard disk drive
HPC	high-performance computing
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure

I

iBMC	intelligent baseboard management controller
IC	Industry Canada
ICMP	Internet Control Message Protocol
IDC	Internet Data Center
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IGMP	Internet Group Message Protocol
IOPS	input/output operations per second
IP	Internet Protocol
IPC	Intelligent Power Capability
IPMB	Intelligent Platform Management Bus
IPMI	Intelligent Platform Management Interface

C.3 K-O

K

KVM	keyboard, video, and mouse

L

LC	Lucent Connector
LRDIMM	load-reduced dual in-line memory module
LED	light emitting diode
LOM	LAN on motherboard

M

MAC	media access control
MMC	module management controller

N

NBD	next business day
NC-SI	Network Controller Sideband Interface

O

OCP	Open Compute Project

C.4 P-T

P

PCIe	Peripheral Component Interconnect Express
PDU	power distribution unit
PHY	physical layer
PMBUS	power management bus
POK	Power OK
PWM	pulse-width modulation
PXE	Preboot Execution Environment

R

RAID	redundant array of independent disks
RAS	reliability, availability and serviceability
RDIMM	registered dual in-line memory module
REACH	Registration Evaluation and Authorization of Chemicals
RJ45	registered jack 45
RoHS	Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment

S

SAS	Serial Attached Small Computer System Interface
SATA	Serial Advanced Technology Attachment
SCM	supply chain management
SDDC	single device data correction
SERDES	serializer/deserializer
SGMII	serial gigabit media independent interface
SMI	serial management interface
SMTP	Simple Mail Transfer Protocol
SNMP	Simple Network Management Protocol
SOL	serial over LAN
SONCAP	Standards Organization of Nigeria-Conformity Assessment Program
SSD	solid-state drive
SSE	Streaming SIMD Extension

T

TACH	tachometer signal
TBT	Turbo Boost Technology
TCG	Trusted Computing Group
TCM	trusted cryptography module
TCO	total cost of ownership

TDP	thermal design power
TELNET	Telecommunication Network Protocol
TET	Trusted Execution Technology
TFM	TransFlash module
TFTP	Trivial File Transfer Protocol
TOE	TCP offload engine
TPM	trusted platform module

C.5 U-Z

U

UDIMM	unbuffered dual in-line memory module
UEFI	Unified Extensible Firmware Interface
UID	unit identification light
UL	Underwriter Laboratories Inc.
UPI	UltraPath Interconnect
USB	Universal Serial Bus

V

VCCI	Voluntary Control Council for Interference by Information Technology Equipment
VGA	Video Graphics Array
VLAN	virtual local area network
VRD	voltage regulator-down

W

WEEE	waste electrical and electronic equipment
WSMAN	Web Service Management

