



# ThinkSystem SR670 V2 Maintenance Manual



**Machine Types:** 7Z22, 7Z23

**Note**

Before using this information and the product it supports, be sure to read and understand the safety information and the safety instructions, which are available at:

[https://pubs.lenovo.com/safety\\_documentation/](https://pubs.lenovo.com/safety_documentation/)

In addition, be sure that you are familiar with the terms and conditions of the Lenovo warranty for your server, which can be found at:

<http://datacentersupport.lenovo.com/warrantylookup>

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## Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前，请仔细阅读 Safety Information（安全信息）。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας (safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

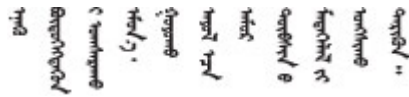
A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.



Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

ཐོན་ཁུངས་འདི་བདེ་སྤྱོད་མ་བྱས་གོང་། སྐྱོར་གྱི་ཡིད་གཟབ་  
བྱ་འདྲ་མིན་ཡིད་པའི་འོད་ཟེར་བལྟ་དགོས།

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

مەزكۇر مەھسۇلاتنى ئورنىتىشتىن بۇرۇن بىخەتەرلىك ئۇچۇرلىرىنى ئوقۇپ چىقىڭ.

Youq mwngz yungh canjbinj neix gaxgonq, itdingh aeu doeg aen  
canjbinj soengq cungj vahgangj ancien siusik.

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## Safety inspection checklist

Use the information in this section to identify potentially unsafe conditions with your server. As each machine was designed and built, required safety items were installed to protect users and service technicians from injury.

### Notes:

1. The product is not suitable for use at visual display workplaces according to §2 of the Workplace Regulations.
2. The set-up of the server is made in the server room only.

### CAUTION:

**This equipment must be installed or serviced by trained personnel, as defined by the NEC, IEC 62368-1 & IEC 60950-1, the standard for Safety of Electronic Equipment within the Field of Audio/Video, Information Technology and Communication Technology. Lenovo assumes you are qualified in the servicing of equipment and trained in recognizing hazards energy levels in products. Access to the equipment is by the use of a tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.**

**Important:** Electrical grounding of the server is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

Use the following checklist to verify that there are no potentially unsafe conditions:

1. Make sure that the power is off and the power cord is disconnected.
2. Check the power cord.
  - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
  - Make sure that the power cord is the correct type.

To view the power cords that are available for the server:

- a. Go to:

<http://dcsc.lenovo.com/#/>

- b. Click **Preconfigured Model** or **Configure to order**.
- c. Enter the machine type and model for your server to display the configurator page.
- d. Click **Power → Power Cables** to see all line cords.
  - Make sure that the insulation is not frayed or worn.
3. Check for any obvious non-Lenovo alterations. Use good judgment as to the safety of any non-Lenovo alterations.
4. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
5. Check for worn, frayed, or pinched cables.
6. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.



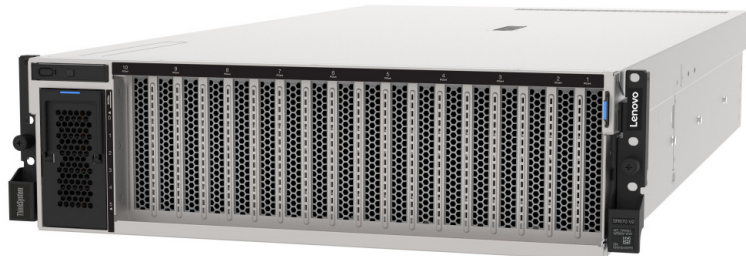


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## Chapter 1. Introduction

The ThinkSystem SR670 V2 server (7Z22, 7Z23) is a 3U rack server designed for high-volume network transaction processing. This high-performance, multi-core server is ideally suited for networking environments that require superior microprocessor performance, input/output (I/O) flexibility, and high manageability.

Figure 1. ThinkSystem SR670 V2 — 8-DW GPU Model



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## Specifications

The following information is a summary of the features and specifications of the server. Depending on the model, some features might not be available, or some specifications might not apply.

The ThinkSystem SR670 V2 models are listed as below:

- The 4-DW GPU Model
- The 8-DW GPU Model
- The SXM GPU Model

Refer to the following tables for server general specification and model unique specifications.

### General specification:

[“General specifications” on page 2](#)

### 4-DW GPU Model and 8-DW GPU Model:

[“4-DW GPU Model / 8-DW GPU Model specification” on page 6](#)

### SXM GPU Model

[“SXM GPU Model specification” on page 8](#)

## General specifications

The following information is a summary of the features and specifications general to the 4-DW GPU Model, the 8-DW GPU Model, and the SXM GPU Model.

Table 1. General specifications

Specification	Description
Dimension	<p>3 U server</p> <ul style="list-style-type: none"> <li>• Height: 131 mm (5.16 inches)</li> <li>• Width (with EIA flange): 482 mm (18.97 inches)</li> <li>• Depth: 953.1 mm (37.52 inches)</li> </ul>
Processor	<p>Supports multi-core Intel Xeon processors, with integrated memory controller and Intel Mesh UPI (Ultra Path Interconnect) topology.</p> <ul style="list-style-type: none"> <li>• Two processor sockets with minimal requirement of two installed on the system board.</li> <li>• Designed for LGA 4189 sockets</li> <li>• Scalable up to 40 cores</li> <li>• Supports 3 UPI links at 11.2 GT/s</li> <li>• Supports TDP up to 270 watts</li> </ul> <p>For a list of supported processors, see: <a href="https://serverproven.lenovo.com/">https://serverproven.lenovo.com/</a>.</p>
Memory	<p>See “Memory module installation order” in <i>Setup Guide</i> for detailed information about memory configuration and setup.</p> <ul style="list-style-type: none"> <li>• Capacity <ul style="list-style-type: none"> <li>– Minimum: 32 GB</li> <li>– Maximum: <ul style="list-style-type: none"> <li>– RDIMM: 2 TB</li> <li>– Persistent Memory (PMEM) + RDIMM: 3TB</li> </ul> </li> </ul> </li> <li>• Memory module types: <ul style="list-style-type: none"> <li>– Double-data-rate 4 (TruDDR4) error correcting code (ECC) 3200 MT/s registered DIMM (RDIMM)</li> <li>– Persistent Memory (PMEM)</li> </ul> </li> <li>• Capacity: <ul style="list-style-type: none"> <li>– RDIMM: 16 GB (2Rx8), 32 GB (2Rx4, 2Rx8), and 64 GB (2Rx4)</li> <li>– 3DS RDIMM: 128 GB (2S2Rx4)</li> <li>– PMEM: 128 GB</li> </ul> </li> <li>• Slots: 32 dual inline memory module (DIMM) connectors that support up to: <ul style="list-style-type: none"> <li>– 32 DRAM DIMMs</li> <li>– 16 DRAM DIMMs and 16 PMEMs</li> </ul> </li> </ul> <p>For a list of supported processors, see: <a href="https://serverproven.lenovo.com/">https://serverproven.lenovo.com/</a>.</p>
M.2 Drive	<p>The server support the following M.2 drive capacity:</p> <ul style="list-style-type: none"> <li>• 128 GB</li> <li>• 240 GB</li> <li>• 480 GB</li> <li>• 960 GB</li> </ul> <p>For a list of supported processors, see: <a href="https://serverproven.lenovo.com/">https://serverproven.lenovo.com/</a>.</p>

Table 1. General specifications (continued)

Specification	Description
Integrated functions	<ul style="list-style-type: none"> <li>• Lenovo XClarity Controller (XCC), which provides service processor control and monitoring functions, video controller, and remote keyboard, video, mouse, and remote drive capabilities.</li> <li>• One system-management RJ-45 connector on the rear to connect to a systems-management network. This connector is dedicated to the Lenovo XClarity Controller functions and runs at 1 GB speed.</li> <li>• A group of two or four Ethernet connectors on OCP 3.0 Ethernet adapter</li> <li>• Up to four USB 3.2 Gen1 ports:               <ul style="list-style-type: none"> <li>– Three on the rear of the server</li> <li>– (Optional) One on the front of the server<sup>1</sup>.</li> </ul> </li> <li>• One internal USB 3.2 Gen1 port</li> <li>• (Optional) One USB 2.0 port on the front of the server<sup>1</sup>.</li> <li>• (Optional) External LCD diagnostics handset connector on the front of the server<sup>1</sup>.</li> <li>• Up to two VGA connectors               <ul style="list-style-type: none"> <li>– One on the rear of the server</li> <li>– (Optional) One on the front of the server<sup>1</sup>.</li> </ul> </li> <li>• (Optional) One serial port connector on the rear of the server<sup>2</sup>.</li> </ul> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. Available when the front I/O module is installed in the server.</li> <li>2. Available when the serial port cable is installed in the server.</li> </ol>
Network	<ul style="list-style-type: none"> <li>• OCP 3.0 Ethernet network adapter</li> </ul>
Rear button	NMI button
RAID adapter	<p>Hardware RAID 0, 1, 10, 5, 50</p> <ul style="list-style-type: none"> <li>• ThinkSystem 530-8i Internal SAS/SATA RAID</li> </ul> <p>RAID 0, 1, 10, 5, 50, 6, 60</p> <ul style="list-style-type: none"> <li>• ThinkSystem 930-8i Internal SAS/SATA RAID w/ 2GB Cache</li> <li>• ThinkSystem 930-8e External SAS/SATA RAID (0, 1, 10, 5, 50, 6, 60) w/ 4GB Cache</li> <li>• ThinkSystem 940-8i Internal SAS/SATA/NVMe RAID (0, 1, 10, 5, 50, 6, 60) w/ 4GB Cache</li> <li>• ThinkSystem 940-8i Internal SAS/SATA/NVMe RAID (0, 1, 10, 5, 50, 6, 60) w/ 8GB Cache</li> </ul>
Host bus adapter	<ul style="list-style-type: none"> <li>• ThinkSystem 430-8i Internal SAS/SATA</li> <li>• ThinkSystem 430-8e External SAS/SATA</li> </ul>
System fan	<ul style="list-style-type: none"> <li>• Five 80 mm x 80 mm x 56 mm dual-rotor fans</li> </ul>
Minimal configuration for debugging	<ul style="list-style-type: none"> <li>• Two processors in socket 1 and 2</li> <li>• Two DRAM memory modules in slots 14 and 30</li> <li>• Two power supplies in bay 1 and 2</li> <li>• One boot drive, M.2, 2.5-inch, 3.5-inch, or EDSFF drive, and RAID adapter if configured. (If OS is needed by debugging)</li> <li>• Five system fans</li> </ul>

Table 1. General specifications (continued)

Specification	Description
Operating systems	<p>Supported and certified operating systems:</p> <ul style="list-style-type: none"> <li>• Microsoft Windows Server</li> <li>• VMware ESXi</li> <li>• Red Hat Enterprise Linux</li> <li>• SUSE Linux Enterprise Server</li> </ul> <p>References:</p> <ul style="list-style-type: none"> <li>• Complete list of available operating systems: <a href="https://lenovopress.lenovo.com/osig">https://lenovopress.lenovo.com/osig</a>.</li> <li>• OS deployment instructions: “Deploy the operating system” in <i>Setup Guide</i>.</li> </ul>
Acoustical noise emissions	<p>The server has the following acoustic noise emissions declaration:</p> <ul style="list-style-type: none"> <li>• Sound power level (<math>L_{WA,d}</math>) <ul style="list-style-type: none"> <li>– Idling: <ul style="list-style-type: none"> <li>– SXM: 7.0 Bel</li> <li>– GPU Typical: 7.0 Bel</li> <li>– GPU Max: 7.8 Bel</li> </ul> </li> <li>– Operating: <ul style="list-style-type: none"> <li>– SXM: 8.3 Bel</li> <li>– GPU Typical: 8.1 Bel</li> <li>– GPU Max: 8.6 Bel</li> </ul> </li> </ul> </li> <li>• Sound pressure level (<math>L_{pA,m}</math>): <ul style="list-style-type: none"> <li>– Idling: <ul style="list-style-type: none"> <li>– SXM: 54 dBA</li> <li>– GPU Typical: 54 dBA</li> <li>– GPU Max: 64 dBA</li> </ul> </li> <li>– Operating: <ul style="list-style-type: none"> <li>– SXM: 69 dBA</li> <li>– GPU Typical: 66 dBA</li> <li>– GPU Max: 72 dBA</li> </ul> </li> </ul> </li> </ul> <p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• These sound levels were measured in controlled acoustical environments according to procedures specified by ISO7779 and are reported in accordance with ISO 9296.</li> <li>• The declared acoustic sound levels are based on the specified configurations, which may change depending on configuration/conditions. <ul style="list-style-type: none"> <li>– SXM configuration: two 270W processors, thirty-two 64 GB DIMMs, eight HDD or SSD, NVIDIA SXM4 400W, two 1P HDR (CX6 card)</li> <li>– GPU Typical configuration: two 205W processors, thirty-two 64 GB DIMMs, Diskless with M.2 or any disk, 4 or 8 NVIDIA A100, INTEL E810-DA2 10/25GbE SFP28 2-port Ethernet Adapter</li> <li>– GPU Max configuration: two 270W processors, thirty-two 64 GB DIMMs, eight NVMe, 4 or 8 NVIDIA A40s, Mellanox ConnectX-6 Lx 10/25GbE SFP28 2-port</li> </ul> </li> <li>• Government regulations (such as those prescribed by OSHA or European Community Directives) may govern noise level exposure in the workplace and may apply to you and your server installation. The actual sound pressure levels in your</li> </ul>

Table 1. General specifications (continued)

Specification	Description
	<p>installation depend upon a variety of factors, including the number of racks in the installation; the size, materials, and configuration of the room; the noise levels from other equipment; the room ambient temperature, and employee's location in relation to the equipment. Further, compliance with such government regulations depends on a variety of additional factors, including the duration of employees' exposure and whether employees wear hearing protection. Lenovo recommends that you consult with qualified experts in this field to determine whether you are in compliance with the applicable regulations.</p>
Environment	<p>ThinkSystem SR670 V2 complies with ASHRAE Class A2 specifications. System performance may be impacted when operating temperature is outside AHSARE A2 specification.</p> <ul style="list-style-type: none"> <li>• Air temperature: <ul style="list-style-type: none"> <li>– Operating <ul style="list-style-type: none"> <li>– ASHARE Class A2: 10°C to 35°C (50°F to 95°F); the maximum ambient temperature decreases by 1°C for every 300 m (984 ft) increase in altitude above 900 m (2,953 ft).</li> <li>– Server off: 5°C to 45°C (41°F to 113°F)</li> <li>– Shipment/storage: -40°C to 60°C (-40°F to 140°F)</li> </ul> </li> </ul> </li> <li>• Adjust ambient temperature when specific components are installed: Keep ambient temperature to 30°C or lower when one or more of the following components are installed. <ul style="list-style-type: none"> <li>– NVIDIA H100 NVL/H100/H800/L40S PCIe GPU adapter</li> <li>– NVIDIA ConnectX-7 dual-port NDR200 or single-port NDR400 with Active Optical Cable installed in the PCIe slot 15, 16, 20, or 21</li> <li>– NVIDIA HGX A100 80GB 500W 4-GPU Board</li> </ul> </li> <li>• Maximum altitude: 3,050 m (10,000 ft)</li> <li>• Relative Humidity (non-condensing): <ul style="list-style-type: none"> <li>– Operating <ul style="list-style-type: none"> <li>– ASHRAE Class A2: 8% to 80%; maximum dew point: 21°C (70°F)</li> <li>– Shipment/storage: 8% to 90%</li> </ul> </li> </ul> </li> <li>• Particulate contamination</li> </ul> <p><b>Attention:</b> Airborne particulates and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server. For information about the limits for particulates and gases, see <a href="#">“Particulate contamination” on page 9</a>.</p> <p><b>Note:</b> The server is designed for standard data center environment and recommended to be placed in industrial data center.</p>

## 4-DW GPU Model / 8-DW GPU Model specification

The following information is a summary of the features and specifications of the 4-DW GPU Model and the 8-DW GPU Model servers. Depending on the model, some features might not be available, or some specifications might not apply.

Table 2. The 4-DW GPU Model / 8-DW GPU Model specification

Specification	Description
Weight	<ul style="list-style-type: none"> <li>4-DW GPU Model weights approximately 36.7 kg ( 81 lbs.), depending on your configuration.</li> <li>8-DW GPU Model weighs approximately 39 kg (86 lbs.), depending on your configuration.</li> </ul>
Storage expansion	<p><b>The 4-DW GPU Model supports one of following storage configuration:</b></p> <ul style="list-style-type: none"> <li>Up to eight hot-swap 2.5-inch SAS/SATA/NVMe drives</li> <li>Up to four hot-swap 3.5-inch SATA drives</li> </ul> <p><b>The 8-DW GPU Model supports the following storage configuration:</b></p> <ul style="list-style-type: none"> <li>Up to six hot-swap EDSFF drives</li> </ul> <p><b>Note:</b> To support Tri-mode with U.3 NVMe drives, <b>U.3 x1 mode</b> must be enabled for the selected drive slots on the backplane through the XCC Web GUI. Otherwise, the U.3 NVMe drives cannot be detected. For more information, see <a href="#">“U.3 NVMe drive can be detected in NVMe connection, but cannot be detected in Tri-mode” on page 386.</a></p>
Expansion slots	<ul style="list-style-type: none"> <li><b>Front I/O expansion board</b> <ul style="list-style-type: none"> <li>Slot 1 to 2 (Front I/O expansion board) <ul style="list-style-type: none"> <li>PCI Express 4.0 x16, FH/FL</li> </ul> </li> </ul> </li> <li><b>Front GPU expansion board</b> <ul style="list-style-type: none"> <li>Slot 3 to 6 (4-DW GPU Model) <ul style="list-style-type: none"> <li>PCI Express 4.0 x16, double-wide, FH/FL</li> </ul> </li> <li>Slot 3 to 10 (8-DW GPU Model) <ul style="list-style-type: none"> <li>PCIe Express 4.0 x16, double-wide / single-wide, FH/FL</li> </ul> </li> </ul> </li> <li><b>Rear PCIe riser 1</b> <ul style="list-style-type: none"> <li>Slot 15 to 16 (Rear PCIe riser 1 with one riser slot cabled) <ul style="list-style-type: none"> <li>Slot 15: PCI Express 4.0 x16, FH/HL</li> <li>Slot 16: PCI Express 4.0 x16 / x8, FH/HL</li> </ul> </li> </ul> </li> <li><b>Rear PCIe riser 2</b> <ul style="list-style-type: none"> <li>Slot 20 to 21 (Rear PCIe riser 2 with one riser slot cabled) <ul style="list-style-type: none"> <li>Slot 20: PCI Express 4.0 x16, FH/HL</li> <li>Slot 21: PCI Express 4.0 x16 / x8, FH/HL</li> </ul> </li> </ul> </li> <li><b>OCP</b> <ul style="list-style-type: none"> <li>Slot 27 (OCP): <ul style="list-style-type: none"> <li>PCI Express 4.0 x16 / x8 OCP 3.0 Ethernet adapter connector</li> </ul> </li> </ul> </li> </ul> <p><b>Note:</b> When Front I/O expansion board is installed, rear PCIe riser 1 and rear PCIe riser 2 are not available.</p>

Table 2. The 4-DW GPU Model / 8-DW GPU Model specification (continued)

Specification	Description
Graphics processing unit (GPU)	<p><b>The 4-DW GPU Model supports one of following GPU configuration:</b></p> <ul style="list-style-type: none"> <li>• Up to four PCIe x16, double-wide, FH/FL GPUs</li> </ul> <p><b>The 8-DW GPU Model supports the following GPU configuration:</b></p> <ul style="list-style-type: none"> <li>• Up to eight PCIe x16, double-wide, FH/FL GPUs</li> <li>• Up to eight PCIe x16, single-wide, FH/FL GPUs</li> </ul> <p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• The DisplayPort ports on the Nvidia A40 GPU are not supported when used in the ThinkSystem SR670 V2.</li> <li>• To prevent potential thermal issues, change the <b>Misc</b> setting in the BIOS from <b>Option3</b> (default value) to <b>Option1</b> if the following two conditions are met: <ul style="list-style-type: none"> <li>– The server is equipped with a GPU adapter.</li> <li>– The UEFI firmware version is U8E128A or later.</li> </ul> </li> </ul> <p>For the method of changing the <b>Misc</b> setting, see <a href="https://support.lenovo.com/us/en/solutions/TT1832">https://support.lenovo.com/us/en/solutions/TT1832</a>.</p> <p><b>Attention:</b> When the H100 80GB double-wide, FH/FL GPU is installed and if the ambient temperature is above 30°C, the GPUs may be instructed by the system to enter an emergency power reduction state whereby GPU performance will be impacted.</p>
Electrical input	<p>This server supports up to four units of CFF V4 power supplies with N+N redundancy. Following is the list of supported types:</p> <ul style="list-style-type: none"> <li>• 2600-watt Titanium, input power 200-240 VAC</li> <li>• 2400-watt Platinum, input power 200-240 VAC</li> <li>• 1800-watt Platinum, input power 200-240 VAC</li> </ul> <p><b>Important:</b> Power supplies and redundant power supplies in the enclosure must be with the same power rating, wattage or level.</p>

## SXM GPU Model specification

The following information is a summary of the features and specifications of the SXM GPU Model servers. Depending on the model, some features might not be available, or some specifications might not apply.

Table 3. The SXM GPU Model specifications

Specification	Description
Weight	SXM GPU Model weights approximately 39.5 kg ( 87 lbs.), depending on your configuration.
Storage expansion	Support the following configurations: <ul style="list-style-type: none"> <li>• Eight hot-swap 2.5-inch NVMe drives</li> <li>• Four hot-swap 2.5-inch NVMe drives</li> </ul> <b>Note:</b> OCP Ethernet adapter is available when only four 2.5-inch NVMe drives are installed in the server.
Expansion slots	<b>The SXM GPU Model supports one of following expansion slot configuration:</b> <ul style="list-style-type: none"> <li>• <b>Front I/O expansion board</b> <ul style="list-style-type: none"> <li>– Slot 1 to 2 (Front I/O expansion board)               <ul style="list-style-type: none"> <li>– PCI Express 4.0 x16, FH/HL</li> </ul> </li> </ul> </li> <li>• <b>OCP</b> <ul style="list-style-type: none"> <li>– Slot 27 (OCP):               <ul style="list-style-type: none"> <li>– PCI Express 4.0 x16 / x8 OCP 3.0 Ethernet adapter connector</li> </ul> </li> </ul> </li> </ul> <b>Note:</b> OCP Ethernet adapter is available when only four 2.5-inch NVMe drives are installed in the server.
Graphics processing unit (GPU)	<ul style="list-style-type: none"> <li>• One set of HGX A100 40GB 400W 4-GPU Board</li> <li>• One set of HGX A100 80GB 500W 4-GPU Board</li> </ul> <p><b>Attention:</b> When the HGX A100 80GB 500W 4-GPU Board is installed and if the ambient temperature is above 30°C, the GPUs may be instructed by the system to enter an emergency power reduction state whereby GPU performance will be impacted.</p> <p><b>Notes:</b> To prevent potential thermal issues, change the <b>Misc</b> setting in the BIOS from <b>Option3</b> (default value) to <b>Option1</b> if the following two conditions are met:</p> <ul style="list-style-type: none"> <li>• The server is equipped with a GPU adapter.</li> <li>• The UEFI firmware version is U8E128A or later.</li> </ul> <p>For the method of changing the <b>Misc</b> setting, see <a href="https://support.lenovo.com/us/en/solutions/TT1832">https://support.lenovo.com/us/en/solutions/TT1832</a>.</p>
Electrical input	This server supports four units of CFF V4 power supplies with N+N redundancy. Following is the list of supported types: <ul style="list-style-type: none"> <li>• 2600-watt Titanium, input power 200-240 VAC</li> <li>• 2400-watt Platinum, input power 200-240 VAC</li> </ul> <b>Important:</b> Power supplies and redundant power supplies in the enclosure must be with the same power rating, wattage or level.



## Particulate contamination

**Attention:** Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the device that is described in this document.

Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the device to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If Lenovo determines that the levels of particulates or gases in your environment have caused damage to the device, Lenovo may condition provision of repair or replacement of devices or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

Table 4. Limits for particulates and gases

Contaminant	Limits
Reactive gases	<p>Severity level G1 as per ANSI/ISA 71.04-1985<sup>1</sup>:</p> <ul style="list-style-type: none"> <li>The copper reactivity level shall be less than 200 Angstroms per month (<math>\text{\AA}/\text{month} \approx 0.0035 \mu\text{g}/\text{cm}^2\text{-hour weight gain}</math>).<sup>2</sup></li> <li>The silver reactivity level shall be less than 200 Angstroms per month (<math>\text{\AA}/\text{month} \approx 0.0035 \mu\text{g}/\text{cm}^2\text{-hour weight gain}</math>).<sup>3</sup></li> <li>The reactive monitoring of gaseous corrosivity must be conducted approximately 5 cm (2 in.) in front of the rack on the air inlet side at one-quarter and three-quarter frame height off the floor or where the air velocity is much higher.</li> </ul>
Airborne particulates	<p>Data centers must meet the cleanliness level of ISO 14644-1 class 8.</p> <p>For data centers without airside economizer, the ISO 14644-1 class 8 cleanliness might be met by choosing one of the following filtration methods:</p> <ul style="list-style-type: none"> <li>The room air might be continuously filtered with MERV 8 filters.</li> <li>Air entering a data center might be filtered with MERV 11 or preferably MERV 13 filters.</li> </ul> <p>For data centers with airside economizers, the choice of filters to achieve ISO class 8 cleanliness depends on the specific conditions present at that data center.</p> <ul style="list-style-type: none"> <li>The deliquescent relative humidity of the particulate contamination should be more than 60% RH.<sup>4</sup></li> <li>Data centers must be free of zinc whiskers.<sup>5</sup></li> </ul>
<p><sup>1</sup> ANSI/ISA-71.04-1985. <i>Environmental conditions for process measurement and control systems: Airborne contaminants</i>. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.</p> <p><sup>2</sup> The derivation of the equivalence between the rate of copper corrosion growth in the thickness of the corrosion product in <math>\text{\AA}/\text{month}</math> and the rate of weight gain assumes that <math>\text{Cu}_2\text{S}</math> and <math>\text{Cu}_2\text{O}</math> grow in equal proportions.</p> <p><sup>3</sup> The derivation of the equivalence between the rate of silver corrosion growth in the thickness of the corrosion product in <math>\text{\AA}/\text{month}</math> and the rate of weight gain assumes that <math>\text{Ag}_2\text{S}</math> is the only corrosion product.</p> <p><sup>4</sup> The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.</p> <p><sup>5</sup> Surface debris is randomly collected from 10 areas of the data center on a 1.5 cm diameter disk of sticky electrically conductive tape on a metal stub. If examination of the sticky tape in a scanning electron microscope reveals no zinc whiskers, the data center is considered free of zinc whiskers.</p>	

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## Firmware updates

Several options are available to update the firmware for the server.

You can use the tools listed here to update the most current firmware for your server and the devices that are installed in the server.

- Best practices related to updating firmware is available at the following site:
  - <http://lenovopress.com/LP0656>
- The latest firmware can be found at the following site:
  - <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr670v2/downloads/driver-list/>
- You can subscribe to product notification to stay up to date on firmware updates:
  - <https://datacentersupport.lenovo.com/tw/en/solutions/ht509500>

### UpdateXpress System Packs (UXSPs)

Lenovo typically releases firmware in bundles called UpdateXpress System Packs (UXSPs). To ensure that all of the firmware updates are compatible, you should update all firmware at the same time. If you are updating firmware for both the Lenovo XClarity Controller and UEFI, update the firmware for Lenovo XClarity Controller first.

### Update method terminology

- **In-band update.** The installation or update is performed using a tool or application within an operating system that is executing on the server's core CPU.
- **Out-of-band update.** The installation or update is performed by the Lenovo XClarity Controller collecting the update and then directing the update to the target subsystem or device. Out-of-band updates have no dependency on an operating system executing on the core CPU. However, most out-of-band operations do require the server to be in the S0 (Working) power state.
- **On-Target update.** The installation or update is initiated from an installed operating system executing on the target server itself.
- **Off-Target update.** The installation or update is initiated from a computing device interacting directly with the server's Lenovo XClarity Controller.
- **UpdateXpress System Packs (UXSPs).** UXSPs are bundled updates designed and tested to provide the interdependent level of functionality, performance, and compatibility. UXSPs are server machine-type specific and are built (with firmware and device driver updates) to support specific Windows Server, Red Hat Enterprise Linux (RHEL) and SUSE Linux Enterprise Server (SLES) operating system distributions. Machine-type-specific firmware-only UXSPs are also available.

### Firmware updating tools

See the following table to determine the best Lenovo tool to use for installing and setting up the firmware:

Tool	Update Methods Supported	Core System Firmware Updates	I/O Devices Firmware Updates	Graphical user interface	Command line interface	Supports UXSPs
<b>Lenovo XClarity Provisioning Manager (LXPM)</b>	In-band <sup>2</sup> On-Target	√		√		
<b>Lenovo XClarity Controller (XCC)</b>	Out-of-band Off-Target	√	Selected I/O devices	√		
<b>Lenovo XClarity Essentials OneCLI (OneCLI)</b>	In-band Out-of-band On-Target Off-Target	√	All I/O devices		√	√
<b>Lenovo XClarity Essentials UpdateXpress (LXCE)</b>	In-band Out-of-band On-Target Off-Target	√	All I/O devices	√		√
<b>Lenovo XClarity Essentials Bootable Media Creator (BoMC)</b>	In-band Out-of-band Off-Target	√	All I/O devices	√ (BoMC application)	√ (BoMC application)	√
<b>Lenovo XClarity Administrator (LXCA)</b>	In-band <sup>1</sup> Out-of-band <sup>2</sup> Off-Target	√	All I/O devices	√		√
<b>Lenovo XClarity Integrator (LXCI) for VMware vCenter</b>	Out-of-band Off-Target	√	Selected I/O devices	√		
<b>Lenovo XClarity Integrator (LXCI) for Microsoft Windows Admin Center</b>	In-band Out-of-band On-Target Off-Target	√	All I/O devices	√		√
<b>Lenovo XClarity Integrator (LXCI) for Microsoft System Center Configuration Manager</b>	In-band On-Target	√	All I/O devices	√		√
<b>Notes:</b>						
1. For I/O firmware updates.						
2. For BMC and UEFI firmware updates.						

- **Lenovo XClarity Provisioning Manager**

From Lenovo XClarity Provisioning Manager, you can update the Lenovo XClarity Controller firmware, the UEFI firmware, and the Lenovo XClarity Provisioning Manager software.

**Note:** By default, the Lenovo XClarity Provisioning Manager Graphical User Interface is displayed when you start the server and press the key specified in the on-screen instructions. If you have changed that default to be the text-based system setup, you can bring up the Graphical User Interface from the text-based system setup interface.

For additional information about using Lenovo XClarity Provisioning Manager to update firmware, see:

“Firmware Update” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>

**Important:** Lenovo XClarity Provisioning Manager (LXPM) supported version varies by product. All versions of Lenovo XClarity Provisioning Manager are referred to as Lenovo XClarity Provisioning Manager and LXPM in this document, unless specified otherwise. To see the LXPM version supported by your server, go to <https://pubs.lenovo.com/lxpm-overview/>.

- **Lenovo XClarity Controller**

If you need to install a specific update, you can use the Lenovo XClarity Controller interface for a specific server.

**Notes:**

- To perform an in-band update through Windows or Linux, the operating system driver must be installed and the Ethernet-over-USB (sometimes called LAN over USB) interface must be enabled.

For additional information about configuring Ethernet over USB, see:

“Configuring Ethernet over USB” section in the XCC documentation version compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>

- If you update firmware through the Lenovo XClarity Controller, make sure that you have downloaded and installed the latest device drivers for the operating system that is running on the server.

For additional information about using Lenovo XClarity Controller to update firmware, see:

“Updating Server Firmware” section in the XCC documentation compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>

**Important:** Lenovo XClarity Controller (XCC) supported version varies by product. All versions of Lenovo XClarity Controller are referred to as Lenovo XClarity Controller and XCC in this document, unless specified otherwise. To see the XCC version supported by your server, go to <https://pubs.lenovo.com/lxcc-overview/>.

- **Lenovo XClarity Essentials OneCLI**

Lenovo XClarity Essentials OneCLI is a collection of command line applications that can be used to manage Lenovo servers. Its update application can be used to update firmware and device drivers for your servers. The update can be performed within the host operating system of the server (in-band) or remotely through the BMC of the server (out-of-band).

For additional information about using Lenovo XClarity Essentials OneCLI to update firmware, see:

[https://pubs.lenovo.com/lxce-onecli/onecli\\_c\\_update](https://pubs.lenovo.com/lxce-onecli/onecli_c_update)

- **Lenovo XClarity Essentials UpdateXpress**

Lenovo XClarity Essentials UpdateXpress provides most of OneCLI update functions through a graphical user interface (GUI). It can be used to acquire and deploy UpdateXpress System Pack (UXSP) update

packages and individual updates. UpdateXpress System Packs contain firmware and device driver updates for Microsoft Windows and for Linux.

You can obtain Lenovo XClarity Essentials UpdateXpress from the following location:

<https://datacentersupport.lenovo.com/solutions/Invo-xpress>

- **Lenovo XClarity Essentials Bootable Media Creator**

You can use Lenovo XClarity Essentials Bootable Media Creator to create bootable media that is suitable for firmware updates, VPD updates, inventory and FFDC collection, advanced system configuration, FoD Keys management, secure erase, RAID configuration, and diagnostics on supported servers.

You can obtain Lenovo XClarity Essentials BoMC from the following location:

<https://datacentersupport.lenovo.com/solutions/Invo-bomc>

- **Lenovo XClarity Administrator**

If you are managing multiple servers using the Lenovo XClarity Administrator, you can update firmware for all managed servers through that interface. Firmware management is simplified by assigning firmware-compliance policies to managed endpoints. When you create and assign a compliance policy to managed endpoints, Lenovo XClarity Administrator monitors changes to the inventory for those endpoints and flags any endpoints that are out of compliance.

For additional information about using Lenovo XClarity Administrator to update firmware, see:

[http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/update\\_fw.html](http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/update_fw.html)

- **Lenovo XClarity Integrator offerings**

Lenovo XClarity Integrator offerings can integrate management features of Lenovo XClarity Administrator and your server with software used in a certain deployment infrastructure, such as VMware vCenter, Microsoft Admin Center, or Microsoft System Center.

For additional information about using Lenovo XClarity Integrator to update firmware, see:

<https://pubs.lenovo.com/lxci-overview/>

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## Tech Tips

Lenovo continually updates the support website with the latest tips and techniques that you can use to solve issues that your server might encounter. These Tech Tips (also called retain tips or service bulletins) provide procedures to work around issues or solve problems related to the operation of your server.

To find the Tech Tips available for your server:

1. Go to <http://datacentersupport.lenovo.com> and navigate to the support page for your server.
2. Click on **How To's** from the navigation pane.
3. Click **Article Type** → **Solution** from the drop-down menu.

Follow the on-screen instructions to choose the category for the problem that you are having.

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## Security advisories

Lenovo is committed to developing products and services that adhere to the highest security standards in order to protect our customers and their data. When potential vulnerabilities are reported, it is the responsibility of the Lenovo Product Security Incident Response Team (PSIRT) to investigate and provide information to our customers so they may put mitigation plans in place as we work toward providing solutions.

The list of current advisories is available at the following site:

## Power on the server

After the server performs a short self-test (power status LED flashes quickly) when connected to input power, it enters a standby state (power status LED flashes once per second).

The server can be turned on (power LED on) in any of the following ways:

- You can press the power button.
- The server can restart automatically after a power interruption.
- The server can respond to remote power-on requests sent to the Lenovo XClarity Controller.

For information about powering off the server, see [“Power off the server” on page 14](#).

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## Power off the server

The server remains in a standby state when it is connected to a power source, allowing the Lenovo XClarity Controller to respond to remote power-on requests. To remove all power from the server (power status LED off), you must disconnect all power cables.

To place the server in a standby state (power status LED flashes once per second):

**Note:** The Lenovo XClarity Controller can place the server in a standby state as an automatic response to a critical system failure.

- Start an orderly shutdown using the operating system (if supported by your operating system).
- Press the power button to start an orderly shutdown (if supported by your operating system).
- Press and hold the power button for more than 4 seconds to force a shutdown.

When in a standby state, the server can respond to remote power-on requests sent to the Lenovo XClarity Controller. For information about powering on the server, see [“Power on the server” on page 14](#).

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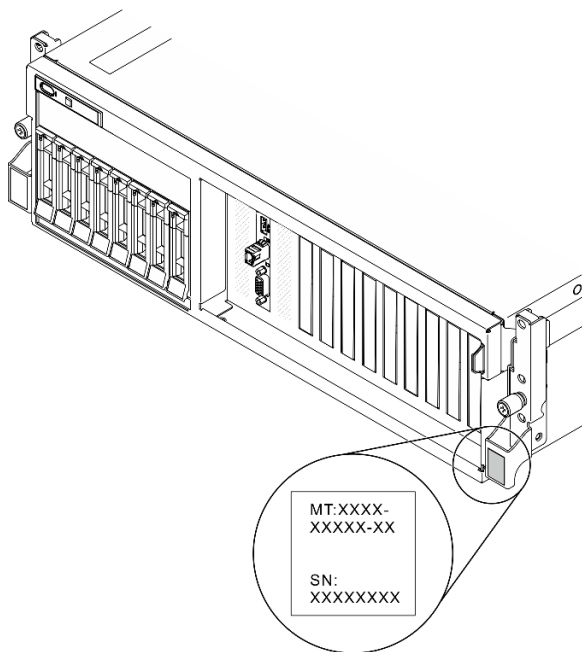
## Chapter 2. Server components

This section contains information about each of the components associated with the server.

### Identifying your server

When you contact Lenovo for help, the machine type, model, and serial number information help support technicians to identify your server and provide faster service.

[Figure 2 “Location of the machine type, model, and serial number” on page 15](#) shows the location of the label containing the machine type, model, and serial number.



*Figure 2. Location of the machine type, model, and serial number*

The model number and serial number are on the ID label on the front of the server, as shown in the following illustrations. You can also add other system information labels to the front of the server in the customer label spaces.

### XClarity Controller network access label

In addition, the XClarity Controller network access label is attached to the pull-out information tab located near the upper right corner in the front of the chassis, with MAC address accessible with a pull.

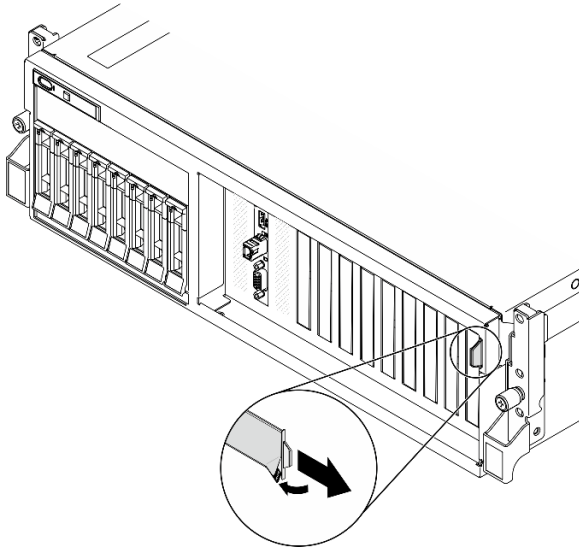


Figure 3. XClarity Controller network access label on the pull-out information tab

## The 4-DW GPU Model Front view

This section contains information about the controls, LEDs, and connectors on the front of the 4-DW GPU Model server.

The 4-DW GPU Model offers two storage configurations, up to eight 2.5-inch drives or up to four 3.5-inch drives. Refer to the following tables for front view identification of each storage configuration:

- [“Front view of 2.5-inch drive configuration” on page 16](#)
- [“Front view of 3.5-inch drive configuration” on page 17](#)

### Front view of 2.5-inch drive configuration

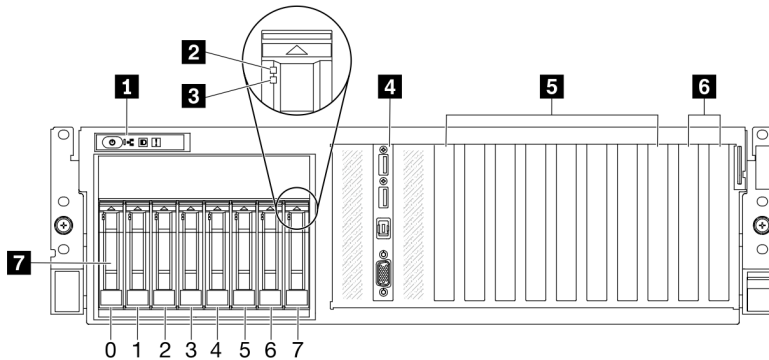


Figure 4. Front view of 2.5-inch drive configuration

Table 5. Components on the front view of 2.5-inch drive configuration

<b>1</b> Front panel	<b>5</b> PCIe slot 3-6
<b>2</b> Drive activity LED (green)	<b>6</b> PCIe slots 1-2 Not available when rear PCIe riser 1 and rear PCIe riser 2 are installed.



Table 5. Components on the front view of 2.5-inch drive configuration (continued)

<b>3</b> Drive status LED (yellow)	<b>7</b> 2.5-inch drive bays (bay 0 to 7)
<b>4</b> Front I/O module	

### **1** Front panel

For more information about the front panel, see [“Front panel” on page 26](#).

### **2** Drive activity LED (green)

Each hot-swap drive comes with an activity LED. When this LED is flashing, it indicates that the drive is in use.

### **3** Drive status LED (yellow)

The drive status LED indicates the following status:

- The LED is lit: the drive has failed.
- The LED is flashing slowly (once per second): the drive is being rebuilt.
- The LED is flashing rapidly (three times per second): the drive is being identified.

### **4** Front I/O module

For more information about the front I/O module, see [“Front I/O module” on page 27](#).

### **5** PCIe slot 3-6

Install PCIe adapters, particularly GPUs to these slots. These PCIe slots support the following configuration:

- PCIe slot 3-6, PCIe x16, double-wide, FH/FL

### **6** PCIe slots 1-2

Not available when rear PCIe riser 1 and rear PCIe riser 2 are installed.

Install PCIe adapters, particularly network adapters to these slots. These PCIe slots support the following configuration:

- PCIe slot 1-2, PCIe x16, FH/FL

### **7** 2.5-inch drive bays (bay 0 to 7)

Install 2.5-inch drives to these bays. See [“Install a 2.5-/3.5-inch hot-swap drive” on page 260](#) for more information.

### Front view of 3.5-inch drive configuration

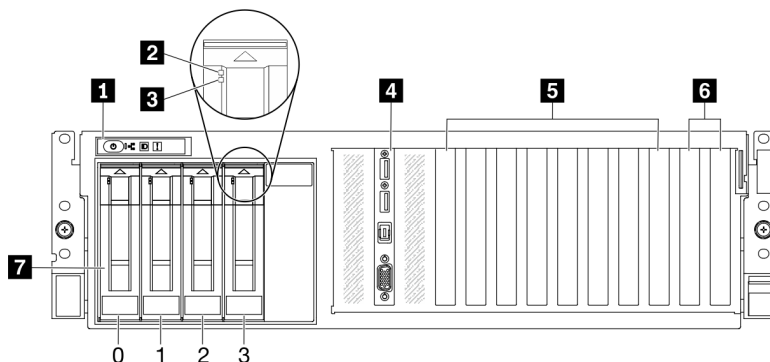


Figure 5. Front view of 3.5-inch drive configuration

Table 6. Components on the front view of 3.5-inch drive configuration

<b>1</b> Front panel	<b>5</b> PCIe slot 3-6
<b>2</b> Drive activity LED (green)	<b>6</b> PCIe slots 1-2 Not available when rear PCIe riser 1 and rear PCIe riser 2 are installed.
<b>3</b> Drive status LED (yellow)	<b>7</b> 3.5-inch drive bays (bay 0 to 3)
<b>4</b> Front I/O module	

#### **1 Front panel**

For more information about the front panel, see [“Front panel” on page 26](#).

#### **2 Drive activity LED (green)**

Each hot-swap drive comes with an activity LED. When this LED is flashing, it indicates that the drive is in use.

#### **3 Drive status LED (yellow)**

The drive status LED indicates the following status:

- The LED is lit: the drive has failed.
- The LED is flashing slowly (once per second): the drive is being rebuilt.
- The LED is flashing rapidly (three times per second): the drive is being identified.

#### **4 Front I/O module**

For more information about the front I/O module, see [“Front I/O module” on page 27](#).

#### **5 PCIe slot 3-6**

Install PCIe adapters, particularly GPUs to these slots. These PCIe slots support the following configuration:

- PCIe slot 3-6, PCIe x16, double-wide, FH/FL

#### **6 PCIe slots 1-2**

Not available when rear PCIe riser 1 and rear PCIe riser 2 are installed.

Install PCIe adapters, particularly network adapters to these slots. These PCIe slots support the following configuration:

- PCIe slot 1-2, PCIe x16, FH/FL

#### **7 3.5-inch drive bays (bay 0 to 3)**

Install 3.5-inch drives to these bays. See [“Install a 2.5-/3.5-inch hot-swap drive” on page 260](#) for more information.

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## The 8-DW GPU Model Front view

This section contains information about the controls, LEDs, and connectors on the front of the 8-DW GPU Model server.

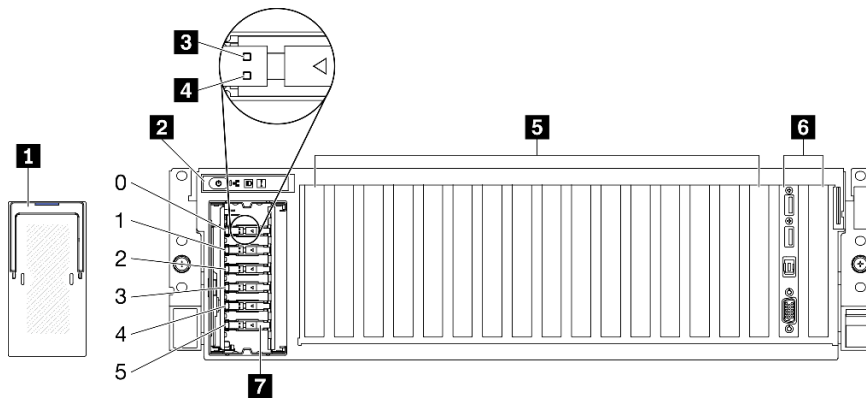


Figure 6. Front view of the 8-DW GPU Model

Table 7. Components on the front view of the 8-DW GPU Model

<b>1</b> EDSFF drive cage cover	<b>5</b> PCIe slot 3-10
<b>2</b> Front panel	<b>6</b> Front I/O module or PCIe Slot 1-2 One of the following is supported: <ul style="list-style-type: none"> <li>• Front I/O module</li> <li>• PCIe Slot 1 and slot 2 (Not available when rear PCIe riser 1 and rear PCIe riser 2 are installed.)</li> </ul>
<b>3</b> Drive activity LED (green)	<b>7</b> EDSFF drive bays (bay 0 to 5)
<b>4</b> Drive status LED (yellow)	

### **1** EDSFF drive cage cover

The 8-DW GPU Model servers should always operate with the EDSFF drive cage cover installed to the chassis.

### **2** Front panel

For more information about the front panel, see [“Front panel” on page 26](#).

### **3** Drive activity LED (green)

Each hot-swap drive comes with an activity LED. When this LED is flashing, it indicates that the drive is in use.

### **4** Drive status LED (yellow)

The drive status LED indicates the following status:

- The LED is lit: the drive has failed.
- The LED is flashing slowly (once per second): the drive is being rebuilt.
- The LED is flashing rapidly (three times per second): the drive is being identified.

### **5** PCIe slot 3-10

Install PCIe adapters, particularly GPUs to these slots. These PCIe slots support one of the following configurations:

- PCIe slot 3-10, PCIe x16, double-wide, FH/FL
- PCIe slot 3-10, PCIe x16, single-wide, FH/FL

## **6 Front I/O module or PCIe Slot 1-2**

One of the following is supported:

- Front I/O module
  - For more information about the front I/O module, see [“Front I/O module” on page 27](#).
- PCIe Slot 1 and slot 2, PCIe x16, FH/FL
  - Install PCIe adapters, particularly network adapters to these slots.

**Note:** Not available when rear PCIe riser 1 and rear PCIe riser 2 are installed.

## **7 EDSFF drive bays (bay 0 to 5)**

Install EDSFF drives to these bays. See [“Install an EDSFF hot-swap drive” on page 271](#) for more information.

## The SXM GPU Model front view

This section contains information about the controls, LEDs, and connectors on the front of the SXM GPU Model server.

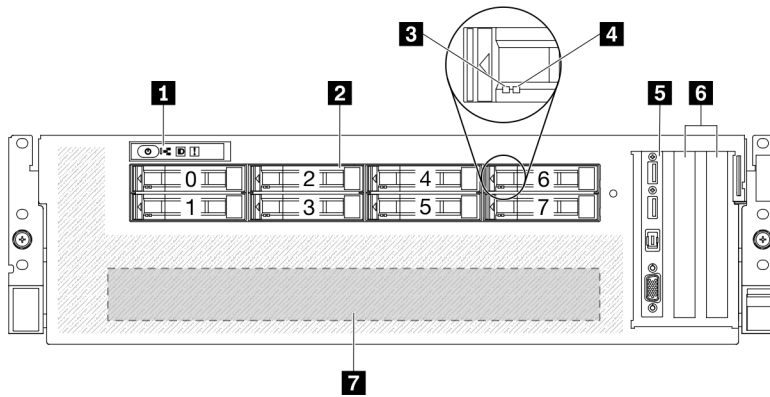


Figure 7. Front view of the SXM GPU Model

Table 8. Components on the front view of the SXM GPU Model

<b>1</b> Front panel	<b>5</b> Front I/O module
<b>2</b> 2.5-inch drive bays (bay 0 to 7)	<b>6</b> PCIe slots 1-2
<b>3</b> Drive activity LED (green)	<b>7</b> GPU-L2A assembly
<b>4</b> Drive status LED (yellow)	

### **1** Front panel

For more information about the front panel, see [“Front panel” on page 26](#).

### **2** 2.5-inch drive bays (bay 0 to 7)

Install 2.5-inch drives to these bays. See [“Install a 2.5-inch hot-swap drive” on page 296](#).

### **3** Drive activity LED (green)

Each hot-swap drive comes with an activity LED. When this LED is flashing, it indicates that the drive is in use.

### **4** Drive status LED (yellow)

The drive status LED indicates the following status:

- The LED is lit: the drive has failed.
- The LED is flashing slowly (once per second): the drive is being rebuilt.
- The LED is flashing rapidly (three times per second): the drive is being identified.

### **5** Front I/O module

For more information about the front I/O module, see [“Front I/O module” on page 27](#).

### **6** PCIe slots 1-2

Install PCIe adapters, particularly network adapters to these slots. These PCIe slots support the following configuration:

- PCIe slot 1-2, PCIe x16, FH/HL

### 7 GPU-L2A assembly

Install the GPU-L2A assembly in this space. A GPU-L2A assembly consists of the Lenovo Neptune™ liquid-to-air (L2A) hybrid cooling module and the SXM GPU board, which contains one of the following:

- One set of HGX A100 40GB 400W 4-GPU Board
- One set of HGX A100 80GB 500W 4-GPU Board

**Attention:** When the HGX A100 80GB 500W 4-GPU Board is installed and if the ambient temperature is above 30°C, the GPUs may be instructed by the system to enter an emergency power reduction state whereby GPU performance will be impacted.

## Rear view

The rear of the server provides access to several components, including the power supplies, PCIe adapters, serial port, and Ethernet port.

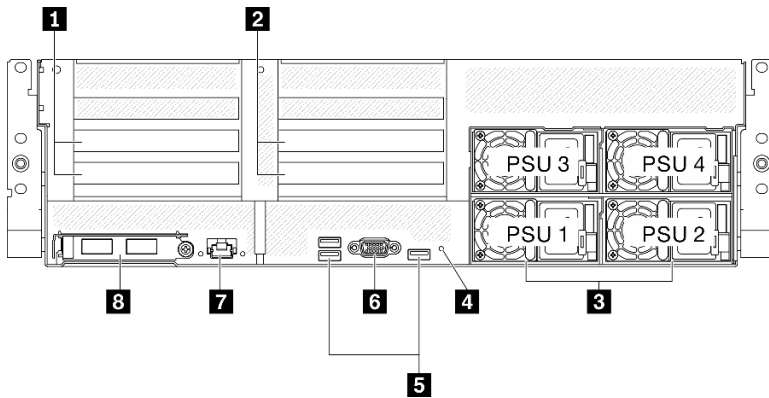


Figure 8. Rear view

Table 9. Components on the rear view

<b>1</b> PCIe riser 1 (PCIe slot 15-16)	<b>5</b> USB 3.2 Gen 1 connectors (total of three connectors)
<b>2</b> PCIe riser 2 (PCIe slot 20-21)	<b>6</b> VGA connector
<b>3</b> Power supply units	<b>7</b> System management 1 GB RJ-45 connector dedicated to Lenovo XClarity Controller functions.
<b>4</b> NMI button	<b>8</b> OCP 3.0 Ethernet adapter

**Note:** PCIe riser 1 and PCIe riser 2 are not supported in the SXM GPU Model.

### 1 / 2 PCIe riser

Install PCIe adapters into these risers. See the following table for PCIe slots corresponding to the risers.

Table 10. PCIe riser and corresponding slots

PCIe riser	PCIe slot (PCI Express 4.0 x16, FH/FL)
<b>1</b> PCIe riser 1	Slot 15: PCI Express 4.0 x16, FH/HL
	Slot 16: PCI Express 4.0 x16 / x8, FH/HL

Table 10. PCIe riser and corresponding slots (continued)

PCIe riser	PCIe slot (PCI Express 4.0 x16, FH/FL)
2 PCIe riser 2	Slot 20: PCI Express 4.0 x16, FH/HL
	Slot 21: PCI Express 4.0 x16 / x8, FH/HL

### 3 Power supply units

Install power supply units to these bays, connect them to power cords. Make sure the power cords are connected properly. Following are the power supplies supported by this system:

- 2600-watt Titanium, input power 200-240 VAC
- 2400-watt Platinum, input power 200-240 VAC
- 1800-watt Platinum, input power 200-240 VAC

Each hot-swap power supply has three status LEDs:

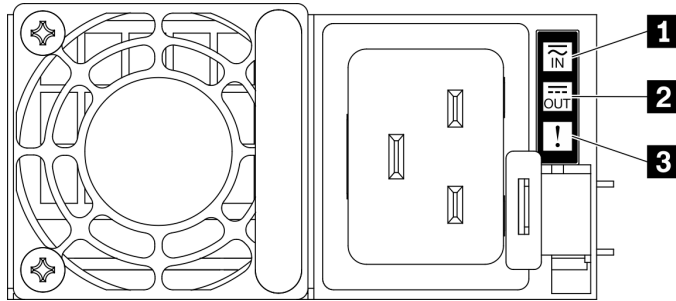


Figure 9. 2400W/2600W power supply LEDs

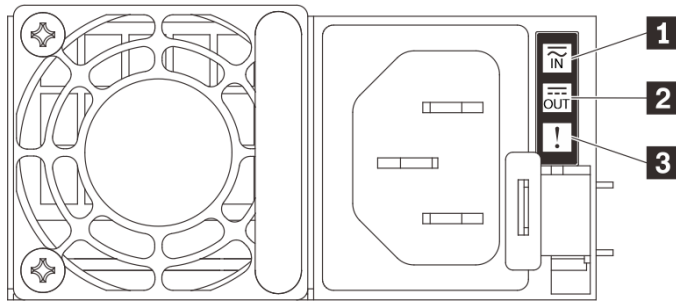


Figure 10. 1800W power supply LEDs

LED	Description
<b>1</b> Input status	The input status LED can be in one of the following states: <ul style="list-style-type: none"> <li>• Off: The power supply is disconnected from the ac power source.</li> <li>• Green: The power supply is connected to the ac power source.</li> </ul>
<b>2</b> Output status	The output status LED can be in one of the following states: <ul style="list-style-type: none"> <li>• Off: The server is powered off, or the power supply is not working properly. If the server is powered on but the output status LED is off, replace the power supply.</li> <li>• Slow blinking green (about one flash every two seconds): The power supply is in cold redundancy active mode.</li> <li>• Fast blinking green (about 2 flashes each second): The power supply is in cold redundancy sleep mode.</li> <li>• Green: The server is on and the power supply is working normally.</li> </ul>
<b>3</b> Fault LED	<ul style="list-style-type: none"> <li>• Off: The power supply is working normally</li> <li>• Amber: The power supply has failed. To resolve the issue, replace the power supply.</li> </ul>

#### **4** NMI button

Press this button to force a nonmaskable interrupt to the processor. You might have to use a pen or the end of a straightened paper clip to press the button. You can also use it to force a blue-screen memory dump. Use this button only when you are directed to do so by Lenovo Support.

#### **5** USB 3.2 Gen 1 connector

There are three USB 3.2 Gen 1 connectors on the rear of the server. Connect a USB device, such as a mouse, keyboard, or other devices, to either of these connectors.

#### **6** VGA connector

Connect a monitor to this connector.

#### **7** System management port

The server has a 1 GB RJ-45 connector dedicated to Lenovo XClarity Controller functions. Through the management port, you can access the Lenovo XClarity Controller directly by connecting your laptop to the management port using an Ethernet cable. Make sure that you modify the IP settings on the laptop so that it is on the same network as the server default settings. A dedicated management network provides additional security by physically separating the management network traffic from the production network.

The system management port has two status LEDs to help you identify the Ethernet connectivity and activity:

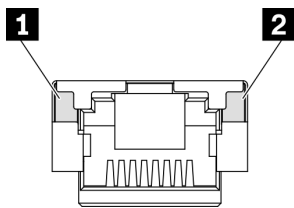


Figure 11. System management port LEDs

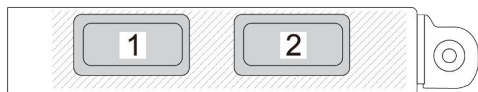


LED	Description
<b>1</b> 1 GB RJ-45 Ethernet port link LED	Use this green LED to distinguish the network connectivity status: <ul style="list-style-type: none"> <li>• Off: The network link is disconnected.</li> <li>• Green: The network link is established.</li> </ul>
<b>2</b> 1 GB RJ-45 Ethernet port activity LED	Use this green LED to distinguish the network activity status: <ul style="list-style-type: none"> <li>• Off: The server is disconnected from a LAN.</li> <li>• Green: The network is connected and active.</li> </ul>

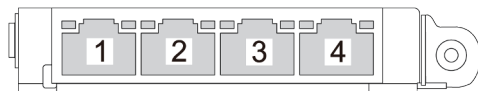
### **8 OCP 3.0 Ethernet adapter**

The OCP 3.0 Ethernet adapter provides a group of two or four Ethernet connectors on OCP 3.0 Ethernet adapter for network connections.

The system may support a 2-port or a 4-port OCP module for network connections. Port numbering are shown in the illustrations below.



*Figure 12. Port numbering – 2-port OCP module*



*Figure 13. Port numbering – 4-port OCP 3.0 module*

## Front panel

The front panel of the server provides controls, connectors, and LEDs.

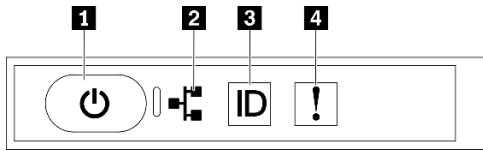


Figure 14. Front panel

Table 11. Components on the front panel

<b>1</b> “Power button with power status LED (green)” on page 26	<b>3</b> “System ID button with system ID LED (blue)” on page 26
<b>2</b> “Network activity LED (green)” on page 26	<b>4</b> “System Error LED (yellow)” on page 26

### **1** Power button with power status LED (green)

You can press the power button to power on the server when you finish setting up the server. You also can hold the power button for several seconds to power off the server if you cannot shut down the server from the operating system. The states of the power LED are as follows:

Status	Color	Description
Off	None	No power supply is properly installed, or the LED itself has failed.
Flashing rapidly (four times per second)	Green	The server is turned off and is not ready to be turned on. The power button is disabled. This will last approximately 5 to 10 seconds.
Flashing slowly (once per second)	Green	The server is turned off and is ready to be turned on. You can press the power button to turn on the server.
Lit	Green	The server is turned on.

### **2** Network activity LED (green)

The network activity LED on the front panel helps you identify the network connectivity and activity.

Status	Color	Description
On	Green	The server is connected to a network.
Blinking	Green	The network is connected and active.
Off	None	The server is disconnected from the network.

### **3** System ID button with system ID LED (blue)

Use this system ID button and the blue system ID LED to visually locate the server. Each time you press the system ID button, the state of the system ID LEDs changes. The LEDs can be changed to on, blinking, or off. You can also use the Lenovo XClarity Controller or a remote management program to change the state of the system ID LEDs to assist in visually locating the server among other servers.

### **4** System Error LED (yellow)

The system error LED helps you to determine if there are any system errors.

Status	Color	Description	Action
On	Yellow	<p>An error has been detected on the server. Causes might include one or more of the following errors:</p> <ul style="list-style-type: none"> <li>The temperature of the server reached the non-critical temperature threshold.</li> <li>The voltage of the server reached the non-critical voltage threshold.</li> <li>A fan has been detected to be running at low speed.</li> <li>The power supply has a critical error.</li> <li>The power supply is not connected to the power.</li> </ul>	Check the Event log to determine the exact cause of the error.
Off	None	The server is off or the server is on and is working correctly.	None.

## Front I/O module

The front I/O module of the server provides controls, connectors, and LEDs. The front I/O module varies by model.

The following illustrations show the front I/O module for different server models. To locate the front I/O module, see [Chapter 2 “Server components” on page 15](#).

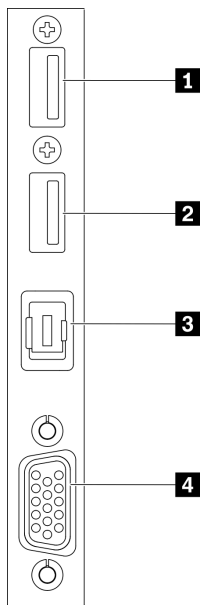


Figure 15. Front I/O module

Table 12. Components on the front I/O module

<b>1</b> USB 2.0 connector with Lenovo XClarity Controller management	<b>3</b> External LCD diagnostics handset connector
<b>2</b> USB 3.2 Gen 1	<b>4</b> VGA connector

## **1 USB 2.0 connector with Lenovo XClarity Controller management**

Connect a USB 2.0 device, such as a mouse, keyboard, or other devices, to this connector.

Connection to Lenovo XClarity Controller is primarily intended for users with a mobile device running the Lenovo XClarity Controller mobile application. When a mobile device is connected to this USB port, an Ethernet over USB connection is established between the mobile application running on the device and the Lenovo XClarity Controller.

Select **Network** in **BMC Configuration** to view or modify settings.

Four types of settings are available:

- **Host only mode**

In this mode, the USB port is always solely connected to the server.

- **BMC only mode**

In this mode, the USB port is always solely connected to Lenovo XClarity Controller.

- **Shared mode: owned by BMC**

In this mode, connection to the USB port is shared by the server and Lenovo XClarity Controller, while the port is switched to Lenovo XClarity Controller.

- **Shared mode: owned by host**

In this mode, connection to the USB port is shared by the server and Lenovo XClarity Controller, while the port is switched to the server.

## **2 USB 3.2 Gen 1**

Connect a USB 3.2 Gen 1 device, such as a mouse, keyboard, or other devices, to this connector.

## **3 External LCD diagnostics handset connector**

Connect the external LCD diagnostics handset here. See [“External LCD diagnostics handset” on page 28](#) for more details.

## **4 VGA connector**

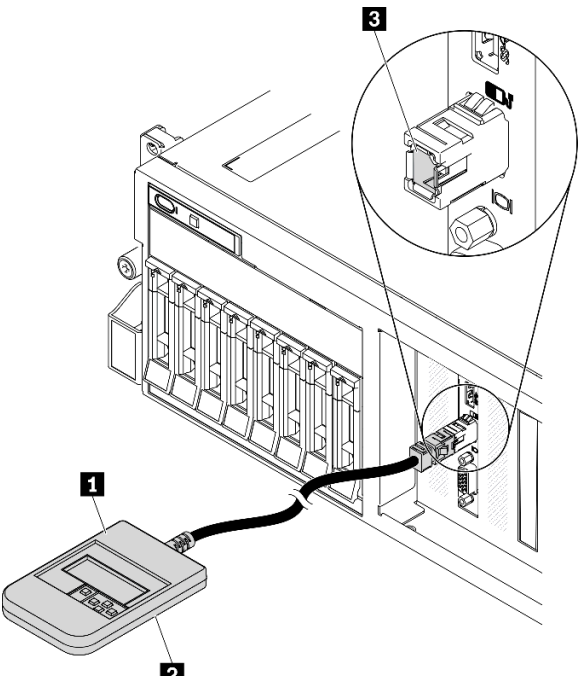
Connect a monitor to this connector.

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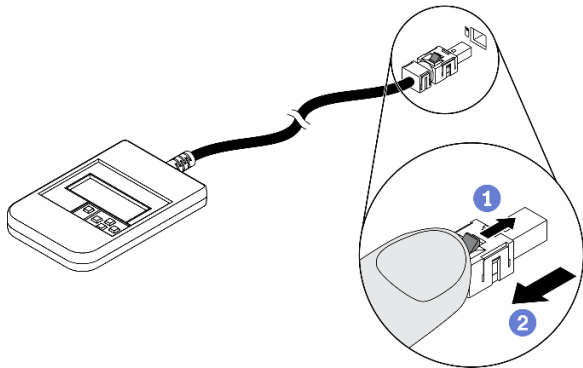
## **External LCD diagnostics handset**

The external LCD diagnostics handset is an external device that is connected to the server with a cable, and it allows quick access to system information such as errors, system status, firmware, network, and health information.

## Location of the external LCD diagnostics handset

Location	Callouts
<p>The external LCD diagnostics handset is connected to the server with an external cable.</p> 	<p><b>1</b> External LCD diagnostics handset</p> <p><b>2</b> Magnetic bottom With this component, the diagnostic handset can be attached to the top or side of the rack with hands spared for service tasks.</p> <p><b>3</b> External diagnostics connector This connector is located on the front of the server, and is used to connect an external LCD diagnostics handset.</p>

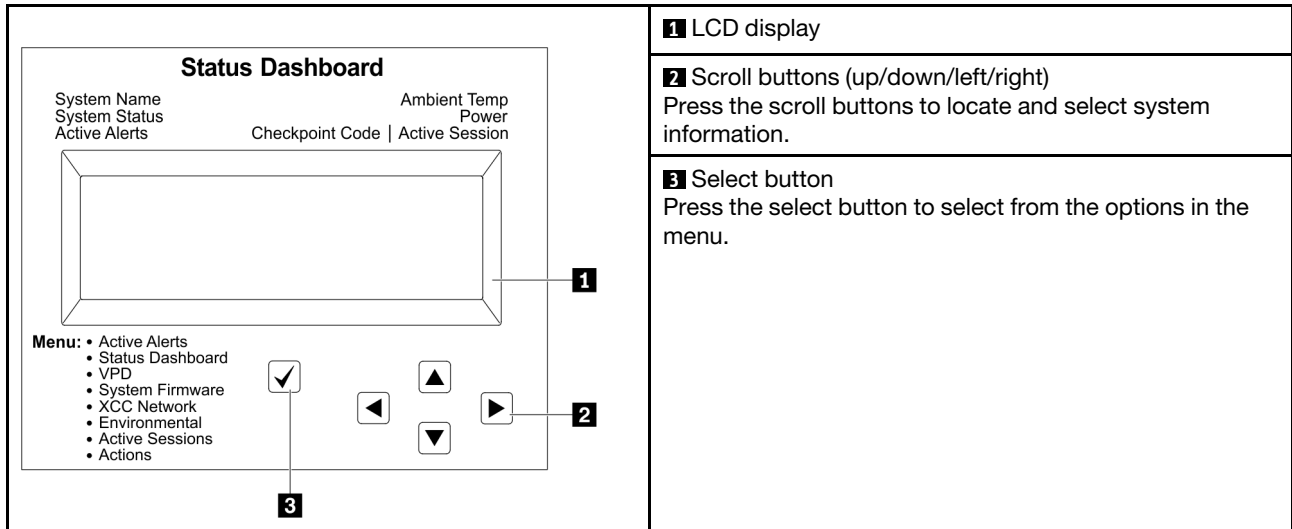
**Note:** When unplugging the external handset, see the following instructions:



- 1** Press the plastic clip on the plug forward.
- 2** Hold the clip and remove the cable from the connector.

## Display panel overview

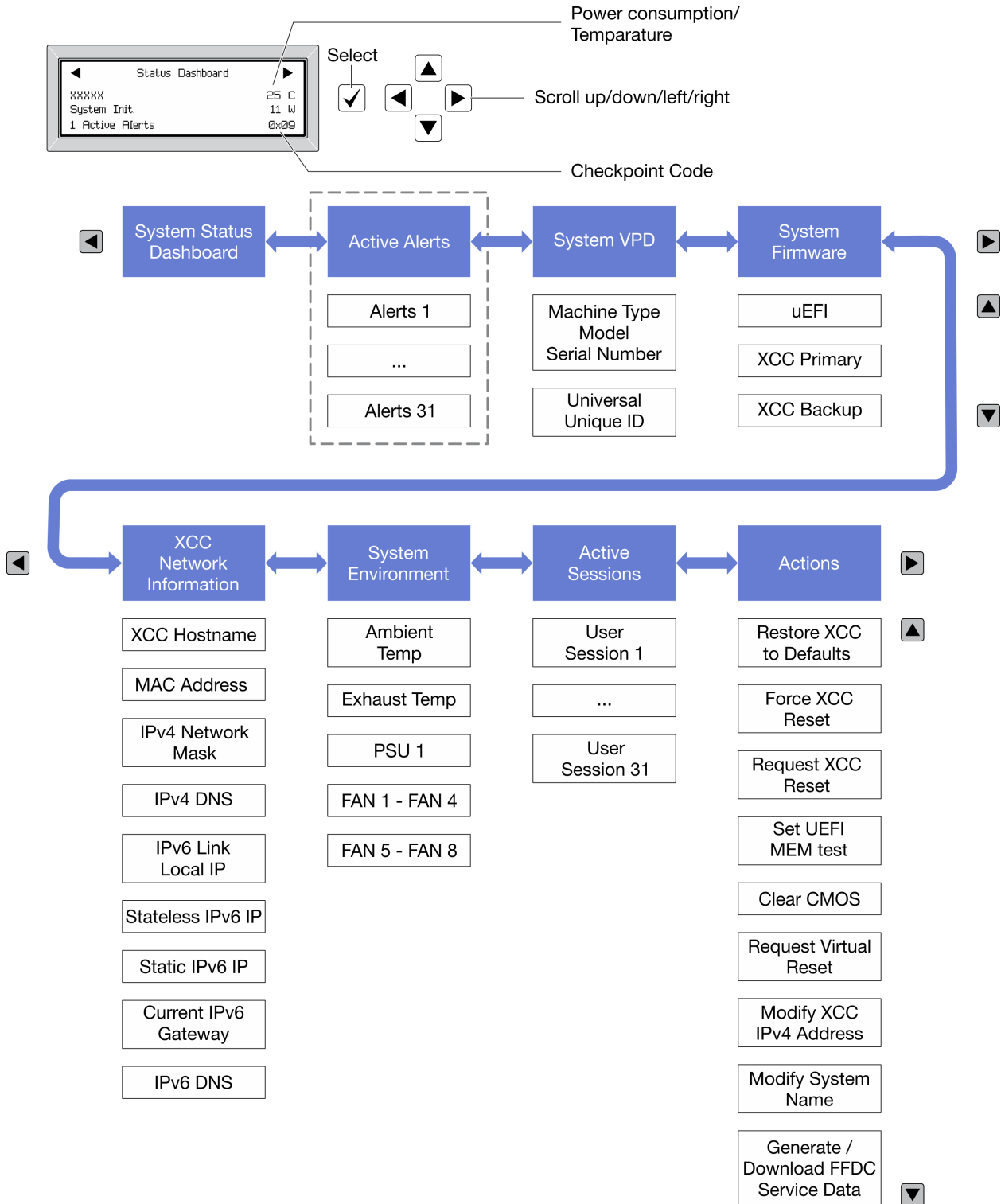
The diagnostics device consists of an LCD display and 5 navigation buttons.



## Option flow diagram

The LCD panel displays various system information. Navigate through the options with the scroll keys.

Depending on the model, the options and entries on the LCD display might be different.



## Full menu list

Following is the list of available options. Switch between an option and the subordinate information entries with the select button, and switch among options or information entries with the scroll buttons.

Depending on the model, the options and entries on the LCD display might be different.

## Home Menu (System Status Dashboard)

Home Menu	Example
<ul style="list-style-type: none"> <li><b>1</b> System name</li> <li><b>2</b> System status</li> <li><b>3</b> Active alert quantity</li> <li><b>4</b> Temperature</li> <li><b>5</b> Power consumption</li> <li><b>6</b> Checkpoint code</li> </ul>	<p>The screenshot shows a 'Status Dashboard' screen with the following elements:         <ul style="list-style-type: none"> <li><b>1</b>: Points to the system name 'xxxxxx'.</li> <li><b>2</b>: Points to the system status 'System Init.'.</li> <li><b>3</b>: Points to the active alert quantity '1 Active Alerts'.</li> <li><b>4</b>: Points to the temperature '25 C'.</li> <li><b>5</b>: Points to the power consumption '11 W'.</li> <li><b>6</b>: Points to the checkpoint code '0x09'.</li> </ul> </p>

## Active Alerts

Sub Menu	Example
Home screen: Active error quantity <b>Note:</b> The “Active Alerts” menu displays only the quantity of active errors. If no errors occur, the “Active Alerts” menu will not be available during navigation.	1 Active Alerts
Details screen: <ul style="list-style-type: none"> <li>• Error message ID (Type: Error/Warning/Information)</li> <li>• Occurrence time</li> <li>• Possible sources of the error</li> </ul>	Active Alerts: 1 Press ▼ to view alert details FQXSPPU009N(Error) 04/07/2020 02:37:39 PM CPU 1 Status: Configuration Error

## System VPD Information

Sub Menu	Example
<ul style="list-style-type: none"> <li>• Machine type and serial number</li> <li>• Universal Unique ID (UUID)</li> </ul>	Machine Type: xxxx Serial Num: xxxxxx Universal Unique ID: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx



## System Firmware

Sub Menu	Example
UEFI <ul style="list-style-type: none"> <li>Firmware level (status)</li> <li>Build ID</li> <li>Version number</li> <li>Release date</li> </ul>	UEFI (Inactive) Build: DOE101P Version: 1.00 Date: 2019-12-26
XCC Primary <ul style="list-style-type: none"> <li>Firmware level (status)</li> <li>Build ID</li> <li>Version number</li> <li>Release date</li> </ul>	XCC Primary (Active) Build: DVI399T Version: 4.07 Date: 2020-04-07
XCC Backup <ul style="list-style-type: none"> <li>Firmware level (status)</li> <li>Build ID</li> <li>Version number</li> <li>Release date</li> </ul>	XCC Backup (Active) Build: D8BT05I Version: 1.00 Date: 2019-12-30

## XCC Network Information

Sub Menu	Example
<ul style="list-style-type: none"> <li>XCC hostname</li> <li>MAC address</li> <li>IPv4 Network Mask</li> <li>IPv4 DNS</li> <li>IPv6 Link Local IP</li> <li>Stateless IPv6 IP</li> <li>Static IPv6 IP</li> <li>Current IPv6 Gateway</li> <li>IPv6 DNS</li> </ul> <p><b>Note:</b> Only the MAC address that is currently in use is displayed (extension or shared).</p>	XCC Network Information XCC Hostname: XCC-xxxx-SN MAC Address: xx:xx:xx:xx:xx:xx IPv4 IP: xx.xx.xx.xx IPv4 Network Mask: x.x.x.x IPv4 Default Gateway: x.x.x.x

## System Environmental Information

Sub Menu	Example
<ul style="list-style-type: none"><li>• Ambient temperature</li><li>• Exhaust temperature</li><li>• PSU status</li><li>• Spinning speed of fans by RPM</li></ul>	Ambient Temp: 24 C Exhaust Temp: 30 C PSU1: Vin= 213 w Inlet= 26 C FAN1 Front: 21000 RPM FAN2 Front: 21000 RPM FAN3 Front: 21000 RPM FAN4 Front: 21000 RPM

## Active Sessions

Sub Menu	Example
Quantity of active sessions	Active User Sessions: 1

## Actions

Sub Menu	Example
Several quick actions are available: <ul style="list-style-type: none"><li>• Restore XCC to Defaults</li><li>• Force XCC Reset</li><li>• Request XCC Reset</li><li>• Set UEFI Memory Test</li><li>• Clear CMOS</li><li>• Request Virtual Reseat</li><li>• Modify XCC Static IPv4 Address/Net mask/Gateway</li><li>• Modify System Name</li><li>• Generate/Download FFDC Service Data</li></ul>	Request XCC Reset? This will request the BMC to reboot itself. Hold $\sqrt{\quad}$ for 3 seconds

---

## System-board layout

The illustrations in this section provide information about the connectors and switches that are available on the system board.

For more information about the LEDs that are available on the system board, see [“System-board LEDs” on page 373](#).

## System-board connectors

The following illustrations show the internal connectors on the system board.

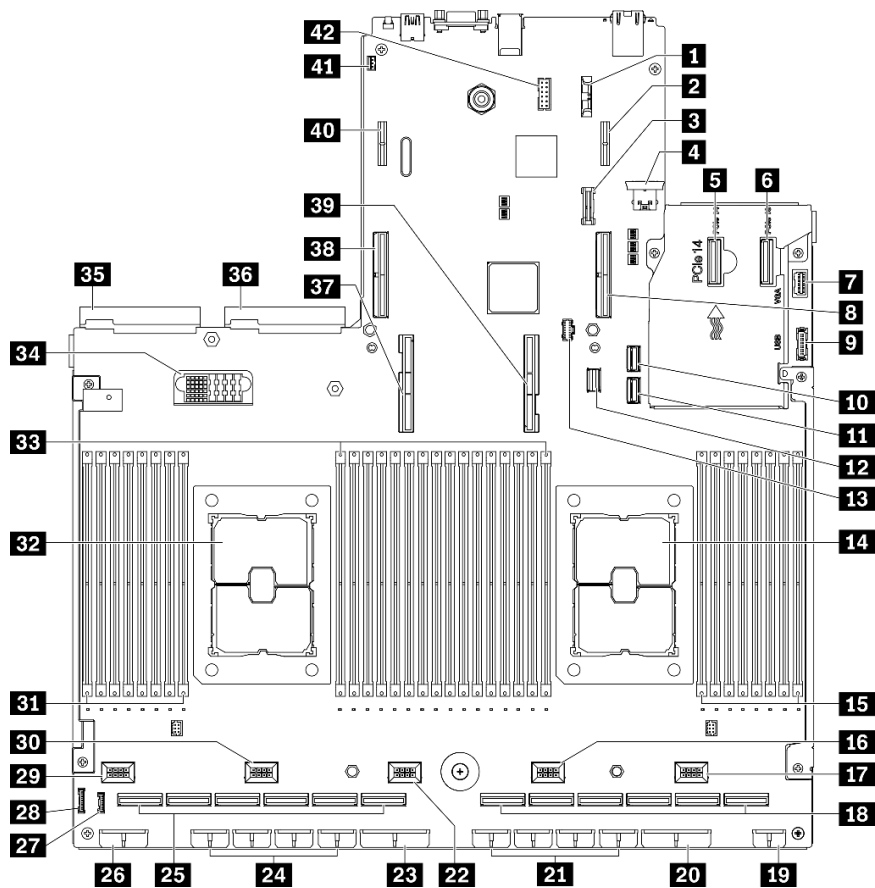


Figure 16. System-board connectors

Table 13. System-board connectors

<b>1</b> 3V battery (CR2032)	<b>22</b> Fan 3 connector
<b>2</b> Rear PCIe riser power 1 connector	<b>23</b> PCIe adapter distribution board power 2 connector
<b>3</b> TPM connector	<b>24</b> GPU power connector 8, 7, 6, 5 (left to right)
<b>4</b> Internal USB connector	<b>25</b> PCIe connector 12, 11, 10, 9, 8, 7 (left to right)
<b>5</b> PCIe connector 14	<b>26</b> Backplane power 1 connector
<b>6</b> PCIe connector 13	<b>27</b> LCD connector <sup>1</sup>
<b>7</b> Front VGA connector <sup>1</sup>	<b>28</b> Front panel connector
<b>8</b> PCIe connector 15 (rear PCIe riser 1)	<b>29</b> Fan 5 connector
<b>9</b> Front USB connector <sup>1</sup>	<b>30</b> Fan 4 connector
<b>10</b> SATA 1 connector	<b>31</b> Memory module 32 - 25 (left to right)
<b>11</b> SATA 2 connector	<b>32</b> Processor 2
<b>12</b> M.2 signal connector	<b>33</b> Memory module slots 24 - 9 (left to right)
<b>13</b> M.2 power connector	<b>34</b> Power distribution board connector
<b>14</b> Processor 1	<b>35</b> Power supply unit 2 connector
<b>15</b> Memory module slots 8 - 1 (left to right)	<b>36</b> Power supply unit 1 connector

Table 13. System-board connectors (continued)

<b>16</b> Fan 2 connector	<b>37</b> Processor 2 UPI connector
<b>17</b> Fan 1 connector	<b>38</b> PCIe connector 16 (rear PCIe riser 2)
<b>18</b> PCIe connector 6, 5, 4, 3, 2, 1 (left to right)	<b>39</b> Processor 1 UPI connector
<b>19</b> Front I/O expansion board power connector	<b>40</b> Rear PCIe riser power 2 connector
<b>20</b> PCIe adapter distribution board power 1 connector	<b>41</b> Intrusion switch connector
<b>21</b> GPU power connector 4, 3, 2, 1 (left to right)	<b>42</b> Serial port cable connector

**Note:** <sup>1</sup> Front I/O module cables connect to these connectors.

## System-board switches

The following illustrations show the location of the switches, jumpers, and buttons on the server.

**Note:** If there is a clear protective sticker on the top of the switch blocks, you must remove and discard it to access the switches.

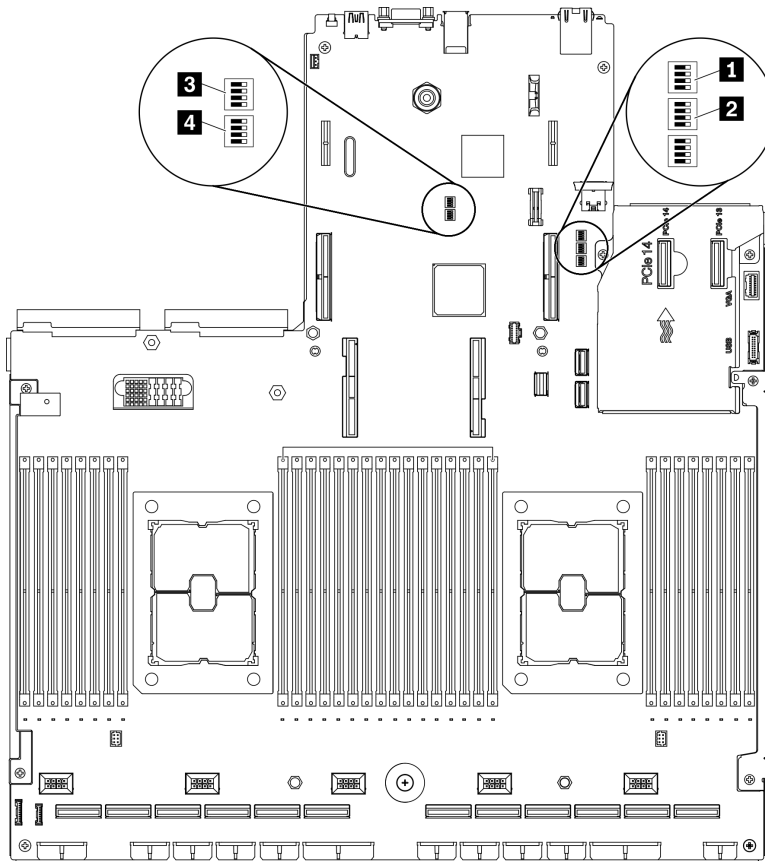


Figure 17. System-board switches

### Important:

1. Before you change any switch settings or move any jumpers, turn off the server; then, disconnect all power cords and external cables. Review the information in [https://pubs.lenovo.com/safety\\_](https://pubs.lenovo.com/safety_)

documentation/, “Installation Guidelines” on page 149, “Handling static-sensitive devices” on page 151, and “Power off the server” on page 14.

- Any system-board switch or jumper block that is not shown in the illustrations in this document are reserved.

### SW1 switch block

The following table describes the functions of the SW1 switch block on the system board.

Table 14. System board SW1 switch block description

Switch number	Default position	Description
1	Off	Reserved
2	Off	Changing this switch to the On position overrides the power-on password. Changing the position of this switch does not affect the administrator password check if an administrator password is set.
3	Off	Changing this switch to the On position to bypass the operational firmware image and performs a BMC firmware update, if the normal firmware update procedure results in an inoperative BMC. <b>Note:</b> Use this switch only if the normal firmware update procedure fails and the operational firmware image is corrupted. Use of this switch disables normal baseboard management controller operation.
4	Off	Reserved

### SW2 switch block

The following table describes the functions of the SW2 switch block on the system board.

Table 15. System board SW2 switch block description

Switch number	Default position	Description
1	Off	Changing the switch to the On position to enable ME boots to recovery.
2	Off	Reserved
3	Off	Changing this switch to the On position to enable Power On.
4	Off	Reserved

### SW3 switch block

The following table describes the functions of the SW3 switch block on the system board.

Table 16. System board SW3 switch block description

Switch number	Default position	Description
1	Off	Reserved
2	Off	Reserved
3	Off	Reserved
4	Off	When the switch is in the default Off position, the server will boot by using the primary XClarity Controller firmware. Change this switch to the On position, to enable the server to boot by using a backup of the XClarity Controller firmware.

## SW10 switch block

The following table describes the functions of the SW10 switch block on the system board.

Table 17. System board SW10 switch block description

Switch number	Default position	Description
1	Off	Changing this switch to the On position to resets the RTC. A momentary toggle is all that is required. To avoid excessive CMOS battery drain, do not leave this switch in the On position.
3	Off	Reserved

---

## Parts list

Use the parts list to identify each of the components that are available for your server.

The ThinkSystem SR670 V2 parts list varies by model. Refer to the parts list specific to each model to identify the components.

- [“The 4-DW GPU Model \(2.5-inch drive configuration\) parts list” on page 39](#)
- [“The 4-DW GPU Model \(3.5-inch drive configuration\) parts list” on page 43](#)
- [“The 8-DW GPU Model parts list” on page 47](#)
- [“The SXM GPU Model parts list” on page 51](#)

## The 4-DW GPU Model (2.5-inch drive configuration) parts list

Use the parts list to identify each of the components that are available for your server.

For more information about ordering the parts shown in [Figure 18 “Server components of the 4-DW GPU Model \(2.5-inch drive configuration\) parts list”](#) on page 40:

1. Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr670v2/7z22/parts/display/compatible> and navigate to the support page for your server.
2. Enter either the serial number or the machine type model for your server to see the parts for your server.

It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.

**Note:** Depending on the model, your server might look slightly different from the illustration.

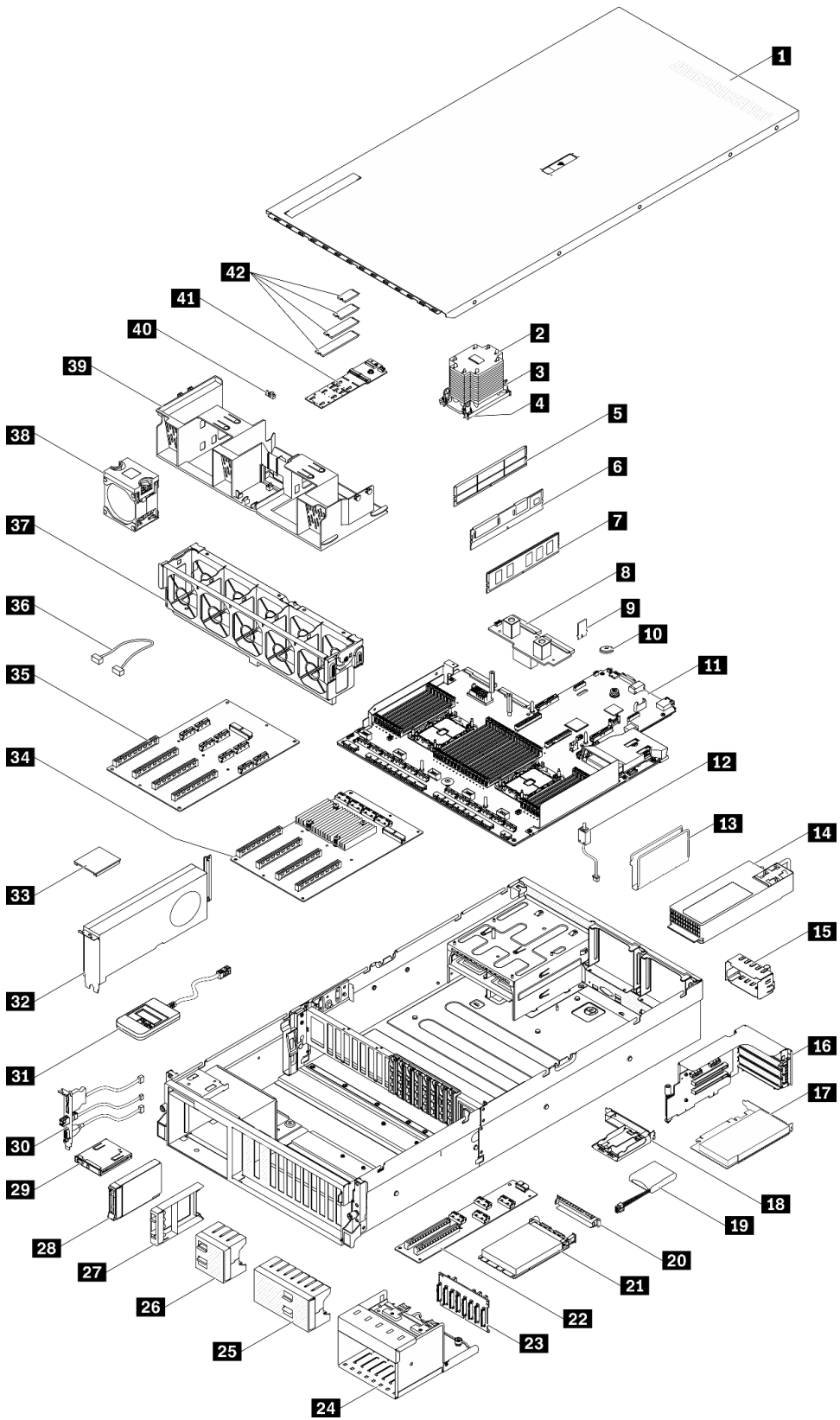


Figure 18. Server components of the 4-DW GPU Model (2.5-inch drive configuration) parts list



The parts listed in the following table are identified as one of the following:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request with no service agreement, you will be charged for the installation.
- **Tier 2 customer replaceable unit (CRU):** You may install a Tier 2 CRU yourself or request Lenovo to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.
- **Consumable and Structural parts:** Purchase and replacement of consumable and structural parts (components, such as a cover or bezel) is your responsibility. If Lenovo acquires or installs a structural component at your request, you will be charged for the service.

Table 18. Parts list of the 4-DW GPU Model (2.5-inch drive configuration)

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
<p>For more information about ordering the parts shown in Figure 18 “Server components of the 4-DW GPU Model (2.5-inch drive configuration) parts list” on page 40:</p> <ol style="list-style-type: none"> <li>1. Go to <a href="https://datacentersupport.lenovo.com/products/servers/thinksystem/sr670v2/7z22/parts/display/compatible">https://datacentersupport.lenovo.com/products/servers/thinksystem/sr670v2/7z22/parts/display/compatible</a> and navigate to the support page for your server.</li> <li>2. Enter either the serial number or the machine type model for your server to see the parts for your server.</li> </ol> <p>It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.</p>					
<b>1</b>	Top cover				√
<b>2</b>	Processor heat sink			√	
<b>3</b>	Heat sink Torx T30	√			
<b>4</b>	Processor			√	
<b>5</b>	DIMM filler				√
<b>6</b>	Persistent Memory (PMEM)	√			
<b>7</b>	DRAM DIMM	√			
<b>8</b>	Power distribution board		√		
<b>9</b>	TPM card (Chinese Mainland only)	√			
<b>10</b>	CMOS battery (CR2032)				√
<b>11</b>	System board			√	
<b>12</b>	Intrusion switch	√			
<b>13</b>	Cable guide				√
<b>14</b>	Power supply unit	√			
<b>15</b>	Power supply unit filler				√
<b>16</b>	PCIe riser cage with riser	√			
<b>17</b>	PCIe adapter	√			
<b>18</b>	Flash power module holder				√
<b>19</b>	Flash power module	√			

Table 18. Parts list of the 4-DW GPU Model (2.5-inch drive configuration) (continued)

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
20	OCP Ethernet adapter filler				√
21	OCP Ethernet adapter	√			
22	Front I/O expansion board		√		
23	2.5-inch drive backplane	√			
24	2.5-inch drive cage				√
25	2.5-inch drive filler (8-bay)				√
26	2.5-inch drive filler (4-bay)				√
27	2.5-inch drive filler (1-bay)				√
28	2.5-inch hot-swap drive	√			
29	Front panel	√			
30	Front I/O module	√			
31	External LCD diagnostics handset	√			
32	Double-wide GPU	√			
33	GPU adapter link bridge		√		
34	Four PCIe x16 slot switched PCIe distribution board			√	
35	Four PCIe x16 slot PCIe distribution board			√	
36	Cable	√			
37	Fan cage	√			
38	Fan	√			
39	Air baffle	√			
40	M.2 drive retainer				√
41	M.2 drive backplane	√			
42	M.2 drive	√			

## The 4-DW GPU Model (3.5-inch drive configuration) parts list

Use the parts list to identify each of the components that are available for your server.

For more information about ordering the parts shown in [Figure 19 “Server components of the 4-DW GPU Model \(3.5-inch drive configuration\)”](#) on page 44:

1. Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr670v2/7z22/parts/display/compatible> and navigate to the support page for your server.
2. Enter either the serial number or the machine type model for your server to see the parts for your server.

It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.

**Note:** Depending on the model, your server might look slightly different from the illustration.

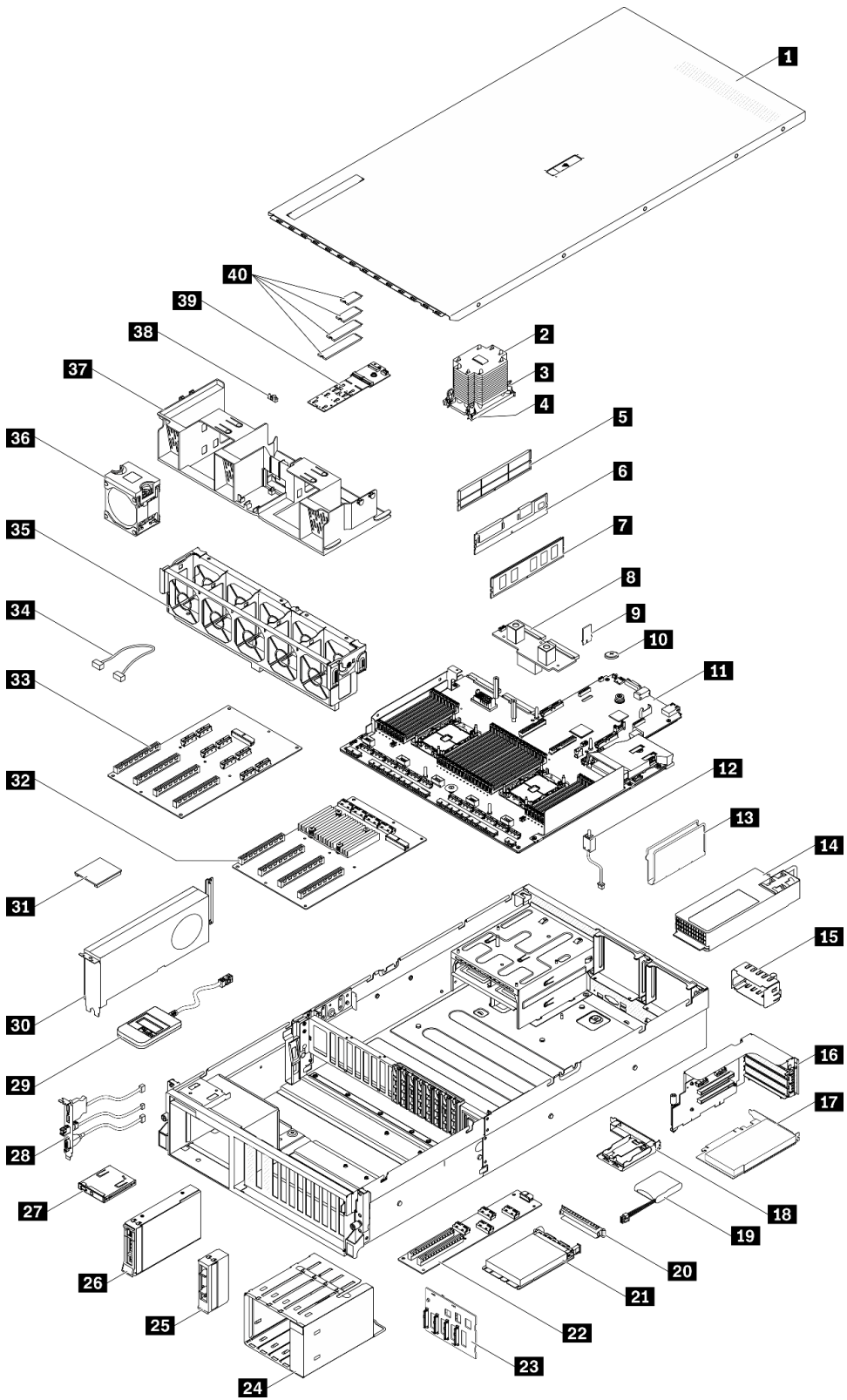


Figure 19. Server components of the 4-DW GPU Model (3.5-inch drive configuration)

The parts listed in the following table are identified as one of the following:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request with no service agreement, you will be charged for the installation.
- **Tier 2 customer replaceable unit (CRU):** You may install a Tier 2 CRU yourself or request Lenovo to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.
- **Consumable and Structural parts:** Purchase and replacement of consumable and structural parts (components, such as a cover or bezel) is your responsibility. If Lenovo acquires or installs a structural component at your request, you will be charged for the service.

Table 19. Parts list of the 4-DW GPU Model (3.5-inch drive configuration)

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
<p>For more information about ordering the parts shown in Figure 19 “Server components of the 4-DW GPU Model (3.5-inch drive configuration)” on page 44:</p> <ol style="list-style-type: none"> <li>1. Go to <a href="https://datacentersupport.lenovo.com/products/servers/thinksystem/sr670v2/7z22/parts/display/compatible">https://datacentersupport.lenovo.com/products/servers/thinksystem/sr670v2/7z22/parts/display/compatible</a> and navigate to the support page for your server.</li> <li>2. Enter either the serial number or the machine type model for your server to see the parts for your server.</li> </ol> <p>It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.</p>					
1	Top cover				√
2	Processor heat sink			√	
3	Heat sink Torx T30	√			
4	Processor			√	
5	DIMM filler				√
6	Persistent Memory (PMEM)	√			
7	DRAM DIMM	√			
8	Power distribution board		√		
9	TPM card (Chinese Mainland only)	√			
10	CMOS battery (CR2032)				√
11	System board			√	
12	Intrusion switch	√			
13	Cable guide				√
14	Power supply unit	√			
15	Power supply unit filler				√
16	PCIe riser cage with riser	√			
17	PCIe adapter	√			
18	Flash power module holder				√
19	Flash power module	√			

Table 19. Parts list of the 4-DW GPU Model (3.5-inch drive configuration) (continued)

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
20	OCP Ethernet adapter filler				√
21	OCP Ethernet adapter	√			
22	Front I/O expansion board		√		
23	3.5-inch drive backplane	√			
24	3.5-inch drive cage				√
25	3.5-inch drive filler (1-bay)				√
26	3.5-inch hot-swap drive	√			
27	Front panel	√			
28	Front I/O module	√			
29	External LCD diagnostics handset	√			
30	Double-wide GPU	√			
31	GPU adapter link bridge		√		
32	Four PCIe x16 slot switched PCIe distribution board			√	
33	Four PCIe x16 slot PCIe distribution board			√	
34	Cable	√			
35	Fan cage	√			
36	Fan	√			
37	Air baffle	√			
38	M.2 drive retainer				√
39	M.2 drive backplane	√			
40	M.2 drive	√			

## The 8-DW GPU Model parts list

Use the parts list to identify each of the components that are available for your server.

For more information about ordering the parts shown in [Figure 20 “Server components of the 8-DW GPU Model” on page 48](#):

1. Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr670v2/7z22/parts/display/compatible> and navigate to the support page for your server.
2. Enter either the serial number or the machine type model for your server to see the parts for your server.

It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.

**Note:** Depending on the model, your server might look slightly different from the illustration.

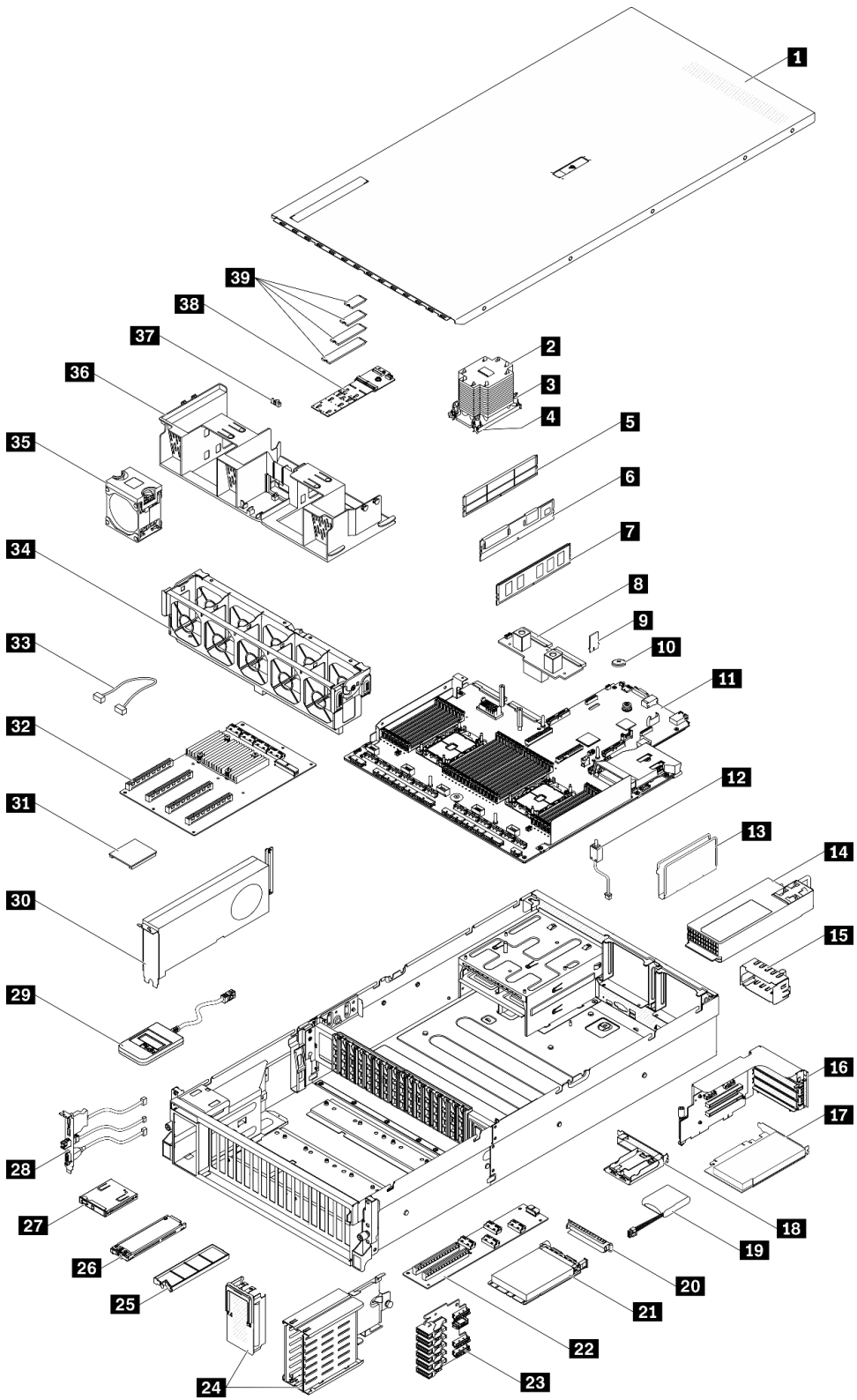


Figure 20. Server components of the 8-DW GPU Model



The parts listed in the following table are identified as one of the following:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request with no service agreement, you will be charged for the installation.
- **Tier 2 customer replaceable unit (CRU):** You may install a Tier 2 CRU yourself or request Lenovo to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.
- **Consumable and Structural parts:** Purchase and replacement of consumable and structural parts (components, such as a cover or bezel) is your responsibility. If Lenovo acquires or installs a structural component at your request, you will be charged for the service.

Table 20. Parts list of the 8-DW GPU Model

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
<p>For more information about ordering the parts shown in <a href="#">Figure 20 “Server components of the 8-DW GPU Model” on page 48</a>:</p> <ol style="list-style-type: none"> <li>1. Go to <a href="https://datacentersupport.lenovo.com/products/servers/thinksystem/sr670v2/7z22/parts/display/compatible">https://datacentersupport.lenovo.com/products/servers/thinksystem/sr670v2/7z22/parts/display/compatible</a> and navigate to the support page for your server.</li> <li>2. Enter either the serial number or the machine type model for your server to see the parts for your server.</li> </ol> <p>It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.</p>					
<b>1</b>	Top cover				√
<b>2</b>	Processor heat sink			√	
<b>3</b>	Heat sink Torx T30	√			
<b>4</b>	Processor			√	
<b>5</b>	DIMM filler				√
<b>6</b>	Persistent Memory (PMEM)	√			
<b>7</b>	DRAM DIMM	√			
<b>8</b>	Power distribution board		√		
<b>9</b>	TPM card (Chinese Mainland only)	√			
<b>10</b>	CMOS battery (CR2032)				√
<b>11</b>	System board			√	
<b>12</b>	Intrusion switch	√			
<b>13</b>	Cable guide				√
<b>14</b>	Power supply unit	√			
<b>15</b>	Power supply unit filler				√
<b>16</b>	PCIe riser cage with riser	√			
<b>17</b>	PCIe adapter	√			
<b>18</b>	Flash power module holder				√
<b>19</b>	Flash power module	√			

Table 20. Parts list of the 8-DW GPU Model (continued)

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
20	OCP Ethernet adapter filler				√
21	OCP Ethernet adapter	√			
22	Front I/O expansion board		√		
23	EDSFF drive backplane	√			
24	EDSFF drive cage (with cage cover)				√
25	EDSFF drive filler (1-bay)				√
26	EDSFF hot-swap drive	√			
27	Front panel	√			
28	Front I/O module	√			
29	External LCD diagnostics handset	√			
30	Double-wide GPU	√			
31	GPU adapter link bridge		√		
32	Four PCIe x16 slot switched PCIe distribution board			√	
33	Cable	√			
34	Fan cage	√			
35	Fan	√			
36	Air baffle	√			
37	M.2 drive retainer				√
38	M.2 drive backplane	√			
39	M.2 drive	√			

## The SXM GPU Model parts list

Use the parts list to identify each of the components that are available for your server.

For more information about ordering the parts shown in [Figure 21 “Server components” on page 52](#):

1. Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr670v2/7z22/parts/display/compatible> and navigate to the support page for your server.
2. Enter either the serial number or the machine type model for your server to see the parts for your server.

It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.

**Note:** Depending on the model, your server might look slightly different from the illustration.

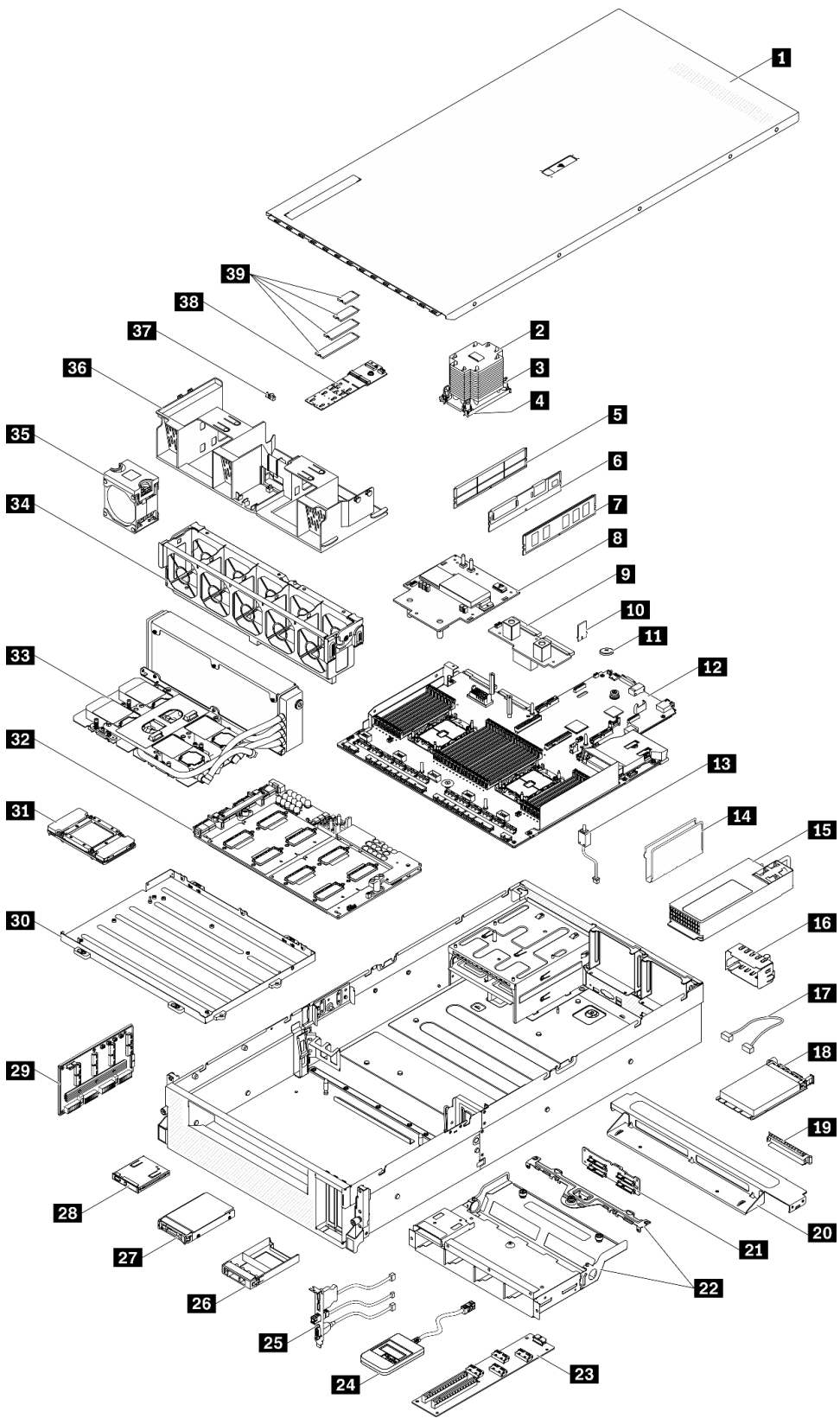


Figure 21. Server components

The parts listed in the following table are identified as one of the following:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request with no service agreement, you will be charged for the installation.
- **Tier 2 customer replaceable unit (CRU):** You may install a Tier 2 CRU yourself or request Lenovo to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.
- **Consumable and Structural parts:** Purchase and replacement of consumable and structural parts (components, such as a cover or bezel) is your responsibility. If Lenovo acquires or installs a structural component at your request, you will be charged for the service.

Table 21. Parts list of the SXM GPU Model

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
<p>For more information about ordering the parts shown in Figure 21 “Server components” on page 52:</p> <ol style="list-style-type: none"> <li>1. Go to <a href="https://datacentersupport.lenovo.com/products/servers/thinksystem/sr670v2/7z22/parts/display/compatible">https://datacentersupport.lenovo.com/products/servers/thinksystem/sr670v2/7z22/parts/display/compatible</a> and navigate to the support page for your server.</li> <li>2. Enter either the serial number or the machine type model for your server to see the parts for your server.</li> </ol> <p>It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.</p>					
<b>1</b>	Top cover				√
<b>2</b>	Processor heat sink			√	
<b>3</b>	Heat sink Torx T30	√			
<b>4</b>	Processor			√	
<b>5</b>	DIMM filler				√
<b>6</b>	Persistent Memory (PMEM)	√			
<b>7</b>	DRAM DIMM	√			
<b>8</b>	SXM GPU power distribution board		√		
<b>9</b>	Power distribution board		√		
<b>10</b>	TPM card (Chinese Mainland only)	√			
<b>11</b>	CMOS battery (CR2032)				√
<b>12</b>	System board			√	
<b>13</b>	Intrusion switch	√			
<b>14</b>	Cable guide				√
<b>15</b>	Power supply unit	√			
<b>16</b>	Power supply unit filler				√
<b>17</b>	Cable	√			
<b>18</b>	OCP Ethernet adapter	√			
<b>19</b>	OCP Ethernet adapter filler				√

Table 21. Parts list of the SXM GPU Model (continued)

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
<b>20</b>	Cross bar				√
<b>21</b>	2.5-inch drive backplane	√			
<b>22</b>	2.5-inch drive cage assembly				√
<b>23</b>	Front I/O expansion board		√		
<b>24</b>	External LCD diagnostics handset	√			
<b>25</b>	Front I/O module	√			
<b>26</b>	2.5-inch drive filler (1-bay)				√
<b>27</b>	2.5-inch drive	√			
<b>28</b>	Front panel	√			
<b>29</b>	Retimer assembly			√	
<b>30</b>	GPU tray			√	
<b>31</b>	GPU			√	
<b>32</b>	SXM GPU board			√	
<b>33</b>	Lenovo Neptune™ liquid-to-air (L2A) hybrid cooling module			√	
<b>34</b>	Fan cage	√			
<b>35</b>	Fan	√			
<b>36</b>	Air baffle	√			
<b>37</b>	M.2 drive retainer				√
<b>38</b>	M.2 drive backplane	√			
<b>39</b>	M.2 drive	√			

---

## Power cords

Several power cords are available, depending on the country and region where the server is installed.

To view the power cords that are available for the server:

1. Go to:

<http://dcsc.lenovo.com/#/>

2. Click **Preconfigured Model** or **Configure to order**.

3. Enter the machine type and model for your server to display the configurator page.

4. Click **Power** → **Power Cables** to see all line cords.

### Notes:

- For your safety, a power cord with a grounded attachment plug is provided to use with this product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.
- Power cords for this product that are used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).
- For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.
- For units intended to be operated at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.
- For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.
- Power cords for a specific country or region are usually available only in that country or region.





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## Chapter 3. Internal cable routing

See this section to do cable routing for specific components.

**Note:** Disengage all latches, release tabs, or locks on cable connectors when you disconnect cables from the system board. Failing to release them before removing the cables will damage the cable sockets on the system board, which are fragile. Any damage to the cable sockets might require replacing the system board.

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## Identifying connectors

See this section to locate and identify the connectors on the electric boards.

**Note:** For the connectors on system board, see [“System-board connectors” on page 34.](#)

## Drive backplane connectors

See this section to locate the connectors in the drive backplanes.

Four types of drive backplanes are supported in this server:

4-DW GPU Model supports:

- 8x2.5-inch SAS/SATA/NVMe backplane
- 4x3.5-inch SAS/SATA/NVMe backplane

8-DW GPU Model supports:

- 6x EDSFF NVMe backplane

SXM GPU Model supports:

- 4x2.5-inch NVMe backplane

### 8x2.5-inch SAS/SATA/NVMe backplane

See this section to locate the connectors on the drive backplane.

- 1 NVMe 6-7
- 2 NVMe 4-5
- 3 SAS / SATA
- 4 Power connector
- 5 NVMe 2-3
- 6 NVMe 0-1

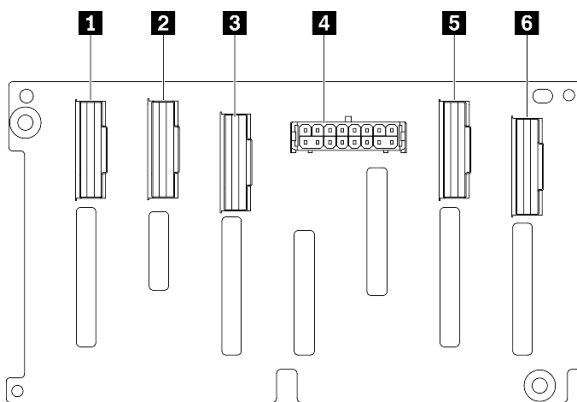


Figure 22. 8x2.5-inch SAS/SATA/NVMe backplane connectors

### 4x3.5-inch SAS/SATA/NVMe backplane

See this section to locate the connectors on the drive backplane.

- 1** NVMe 2-3
- 2** Power connector
- 3** NVMe 0-1
- 4** SAS / SATA

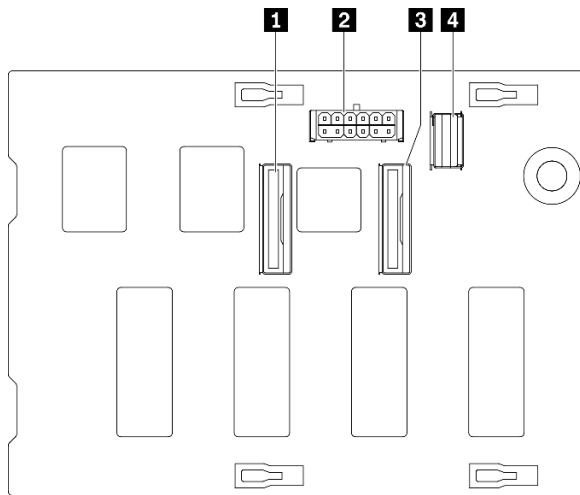


Figure 23. 4x3.5-inch SAS/SATA/NVMe backplane

### 6x EDSFF NVMe backplane

See this section to locate the connectors on the drive backplane.

- 1** EDSFF 0-1
- 2** Power connector
- 3** EDSFF 2-3
- 4** EDSFF 4-5

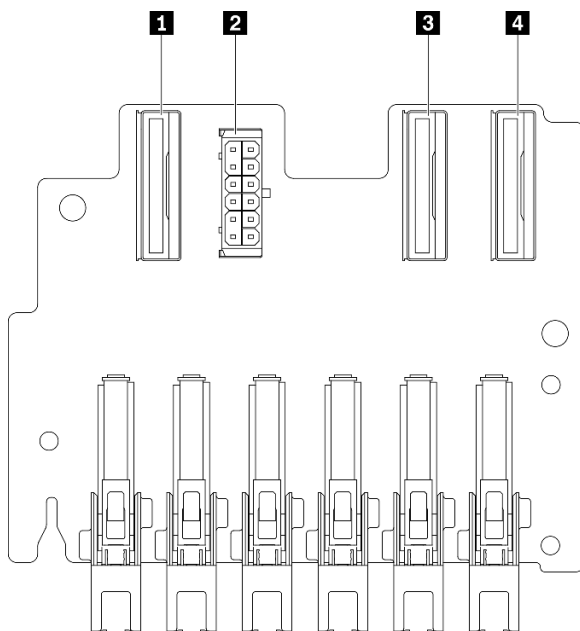


Figure 24. 6x EDSFF NVMe backplane

## 4x2.5-inch NVMe backplane

See this section to locate the connectors on the drive backplane.

- ❶ NVMe 2-3
- ❷ NVMe 0-1
- ❸ Power connector

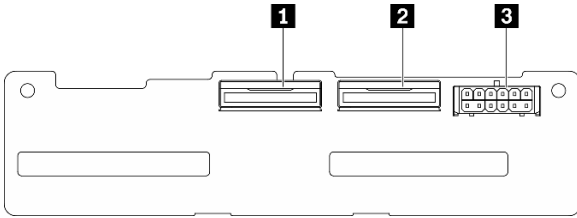


Figure 25. 4x2.5-inch NVMe backplane

## GPU distribution board connectors

See this section to locate the connectors in the GPU distribution board.

Two types of GPU distribution board are supported in this server.

4-DW GPU Model supports:

- Four PCIe x16 slot PCIe distribution board
- Four PCIe x16 slot switched PCIe distribution board

8-DW GPU Model supports:

- Four PCIe x16 slot switched PCIe distribution board

### Four PCIe x16 slot PCIe distribution board

See this section to locate the connectors on the GPU distribution board.

- 1 PCIe slots for GPU
- 2 MCIO connectors A to H
- A B GPU #3 / #7
- C D GPU #4 / #8
- E F GPU #5 / #9
- G H GPU #6 / #10
- 3 Power connector

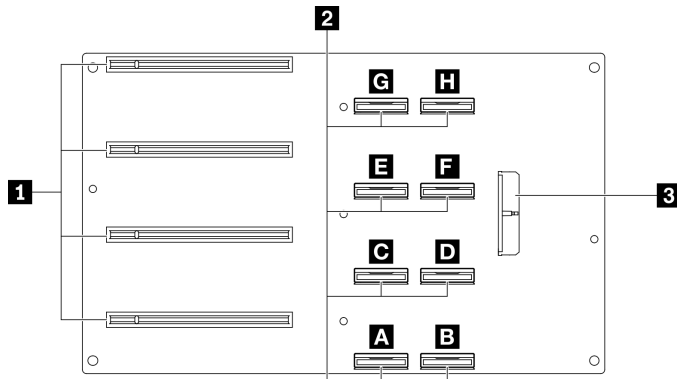


Figure 26. Four PCIe x16 slot PCIe distribution board

### Four PCIe x16 slot switched PCIe distribution board

See this section to locate the connectors on the GPU distribution board.

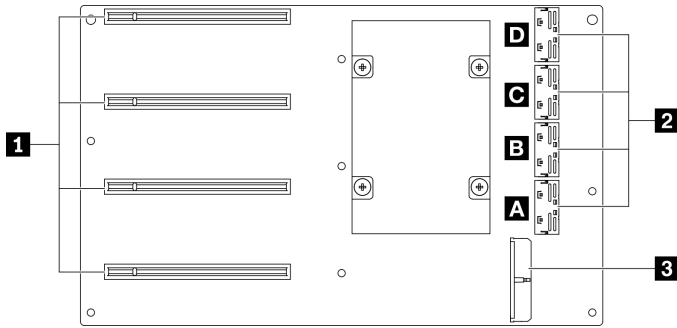


Figure 27. Four PCIe x16 slot switched PCIe distribution board

- 1** PCIe slots for GPU
- 2** MCI/O connectors A to D
- A B** Uplink 2
- C D** Uplink 1
- 3** Power connector

## Rear riser board connectors

See this section to locate the connectors in the rear riser board.

### Rear riser board connectors

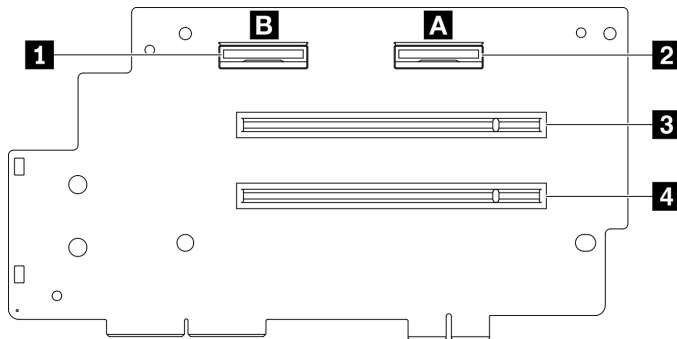


Figure 28. Four PCIe x16 slot PCIe distribution board

- 1 MCIO connectors B
- 2 MCIO connectors A
- 3 PCIe slot 2
- 4 PCIe slot 1

## Front I/O expansion board connectors

See this section to locate the connectors in the front I/O expansion board.

### Front I/O expansion board connectors

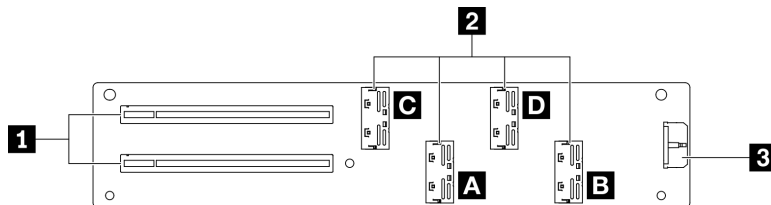


Figure 29. Front I/O expansion board connectors

- 1 PCIe slots
- 2 MCIO connectors A to D
- A B PCIe Slot 1
- C D PCIe Slot 2
- 3 Power connector

## Retimer assembly connectors

See this section to locate the connectors in the retimer assembly.

### Retimer assembly connectors

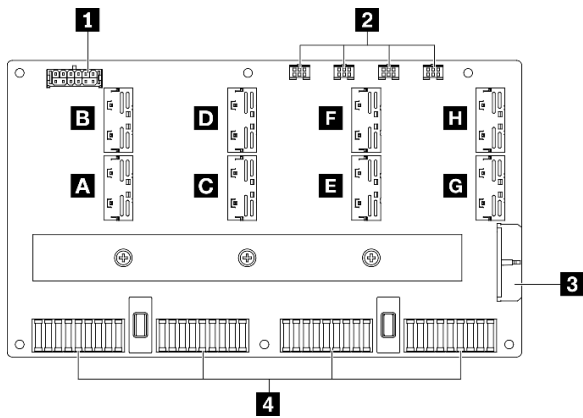


Figure 30. Retimer assembly connectors

- 1 Backplane power connector
- 2 Cold plate assembly pump cable connectors 1 to 4 (left to right)
- 3 Power connector
- 4 SXM GPU board connectors
- A B C D E F G H MCIO connector



---

## 4-DW GPU Model with 8x 2.5-inch drives cable routing

Follow the instructions in this section to learn how to do cable routing for 4-DW GPU Model with 8x 2.5-inch drives.

### Identifying connectors

Go through the following sections to acquire necessary information before starting cable routing.

- For the connectors on system board, see [“System-board connectors” on page 34](#).
- For the connectors on the drive backplane, GPU distribution board, rear riser, and front I/O expansion board, see [“Identifying connectors” on page 58](#).

### 4-DW GPU Model with 8x 2.5-inch drives configurations

Cable routing is different by configuration. See the table below for the configuration that matches your server, and refer to the corresponding cable routing guide.

Rear riser 1	Rear riser 2	Rear riser 2 installed with HBA/RAID adapter	OCP Ethernet adapter	Front I/O expansion board	Configurations
V			V		Configuration A
V		V			Configuration A with HBA/RAID adapter
				V	Configuration C
V	V		V		Configuration H
V		V	V		Configuration H with HBA/RAID adapter
			V	V	Configuration I

Refer to the corresponding cable routing guide:

- For Configuration A, see [“Configuration A cable routing” on page 67](#)
- For Configuration A with HBA/RAID adapter, see [“Configuration A with HBA/RAID adapter cable routing” on page 72](#)
- For Configuration C, see [“Configuration C cable routing” on page 77](#)
- For Configuration H, see [“Configuration H cable routing” on page 81](#)
- For Configuration H with HBA/RAID adapter, see [“Configuration H with HBA/RAID adapter cable routing” on page 86](#)
- For Configuration I, see [“Configuration I cable routing” on page 91](#)

Make sure to route the cables through cable guide and cable clip as instructed in the cable routing guides. See the illustration below for the cable guide and cable clip locations.

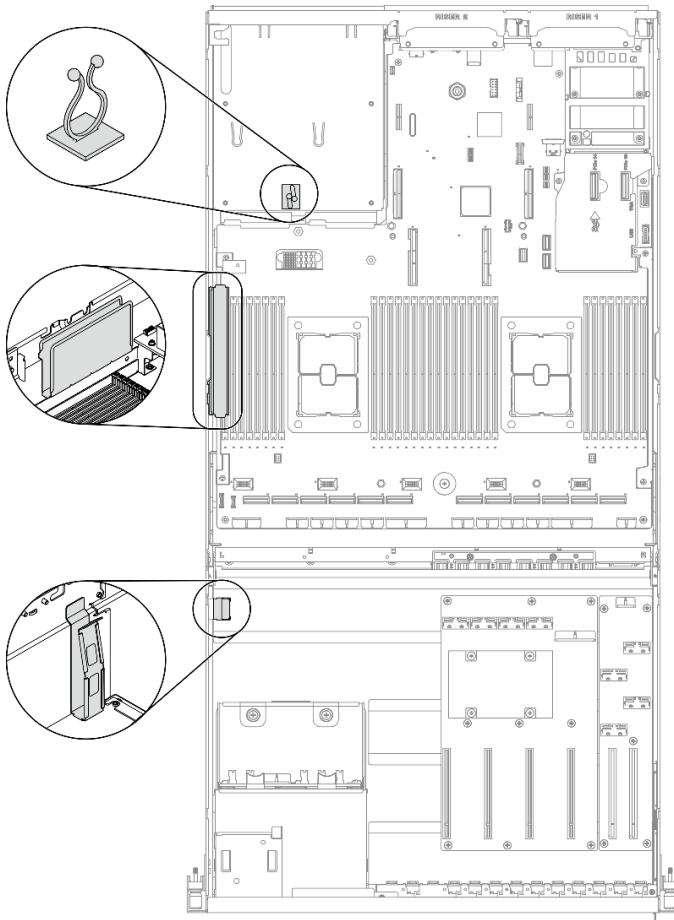


Figure 31. Cable guide and cable clip locations in the chassis

## Configuration A cable routing

Follow the instructions in this section to learn how to do cable routing for Configuration A.

### **Configuration A cable routing includes the following items:**

1. Drive backplane cable routing
2. GPU distribution board cable routing
3. Rear riser 1 cable routing
4. OCP Ethernet adapter routing

Cabling for these components are illustrated below.

## Drive backplane cable routing

Connect the drive backplane signal cables and power cable as illustrated.

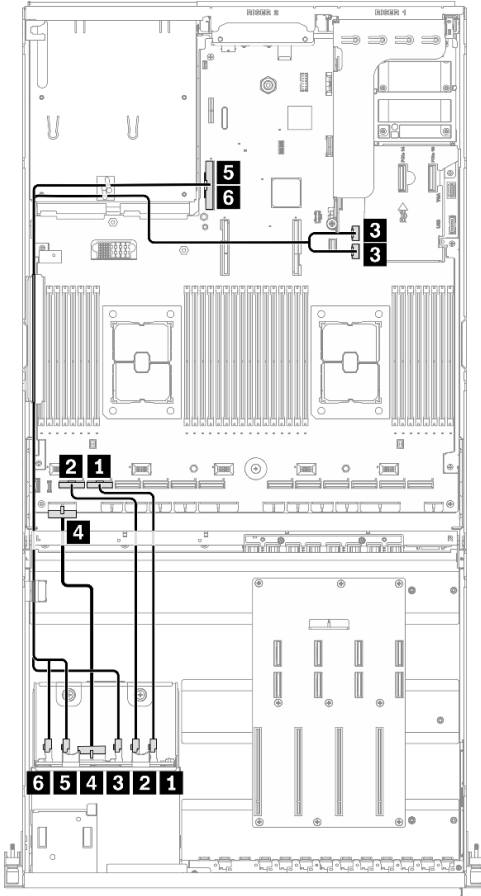


Figure 32. Drive backplane cable routing – Configuration A

From		To	
Drive backplane	<b>1</b> NVMe 6-7	System board	<b>1</b> PCIe connector 11
	<b>2</b> NVMe 4-5		<b>2</b> PCIe connector 12
	<b>3</b> SAS		<b>3</b> SATA 1 connector and SATA 2 connector
	<b>4</b> Power connector		<b>4</b> Backplane power 1 connector
	<b>5</b> NVMe 2-3		<b>5</b> PCIe connector 16
	<b>6</b> NVMe 0-1		<b>6</b> PCIe connector 16

## GPU distribution board cable routing

Connect the GPU distribution board signal cables and power cable as illustrated.

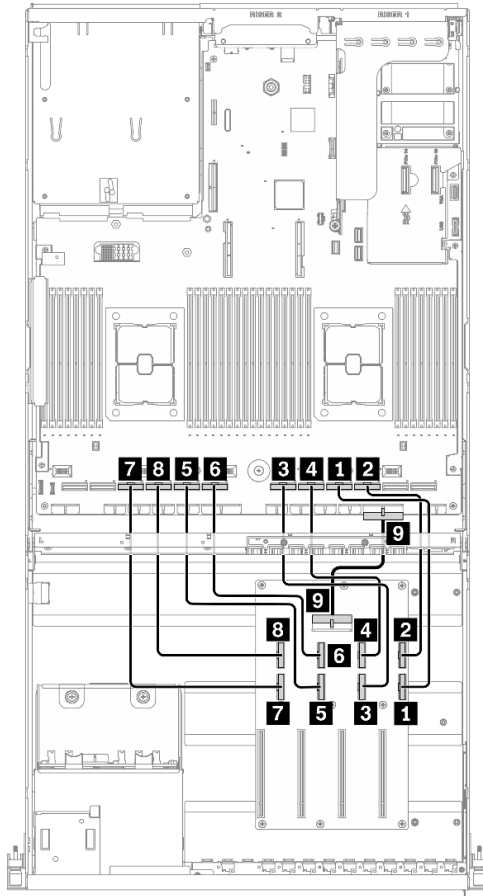


Figure 33. GPU distribution board cable routing – Configuration A

From		To	
GPU distribution board	<b>1</b> MCIO connector A	GPU #3	<b>1</b> PCIe connector 4
	<b>2</b> MCIO connector B		<b>2</b> PCIe connector 3
	<b>3</b> MCIO connector C	GPU #4	<b>3</b> PCIe connector 6
	<b>4</b> MCIO connector D		<b>4</b> PCIe connector 5
	<b>5</b> MCIO connector E	GPU #5	<b>5</b> PCIe connector 8
	<b>6</b> MCIO connector F		<b>6</b> PCIe connector 7
	<b>7</b> MCIO connector G	GPU #6	<b>7</b> PCIe connector 10
	<b>8</b> MCIO connector H		<b>8</b> PCIe connector 9
	<b>9</b> Power connector		<b>9</b> PCIe adapter distribution board power 1 connector

## Rear riser 1 cable routing

Connect the rear riser 1 signal cable as illustrated.

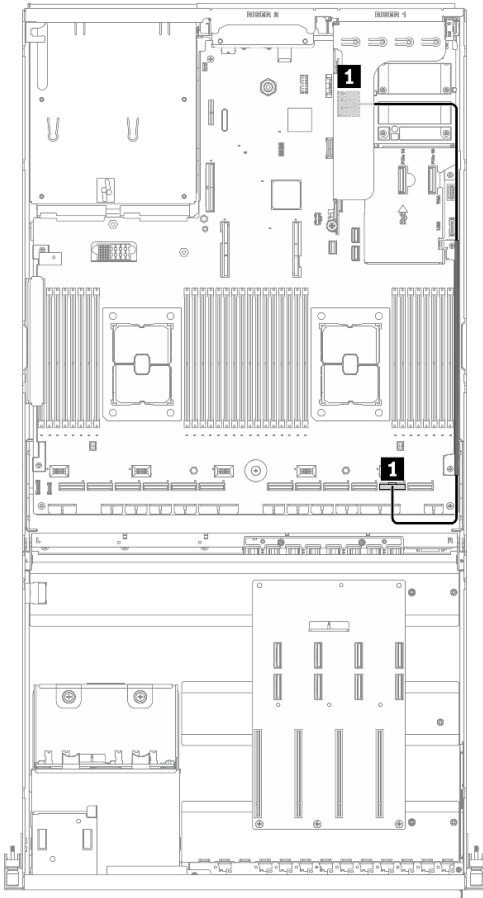


Figure 34. Rear riser 1 cable routing – Configuration A

From		To	
Rear riser 1	<b>1</b> MCIO connector A	System board	<b>1</b> PCIe connector 2

## OCP Ethernet adapter cable routing

Connect the OCP Ethernet adapter signal cable as illustrated.

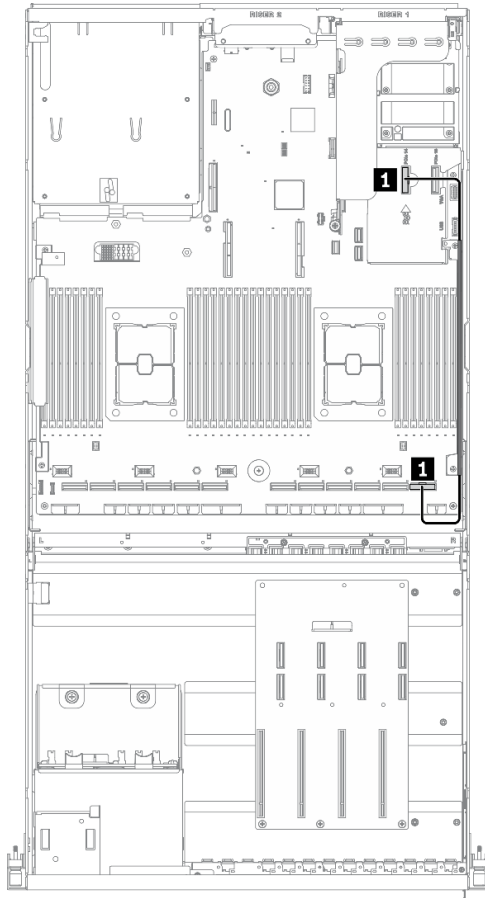


Figure 35. OCP Ethernet adapter cable routing – Configuration A

From		To	
System board	<b>1</b> PCIe connector 14	System board	<b>1</b> PCIe connector 1

## Configuration A with HBA/RAID adapter cable routing

Follow the instructions in this section to learn how to do cable routing for Configuration A with HBA/RAID adapter.

**Configuration A with HBA/RAID adapter cable routing includes the following items:**

1. Drive backplane cable routing
2. GPU distribution board cable routing
3. Rear riser 1, rear riser 2, and HBA/RAID adapter cable routing
4. OCP Ethernet adapter routing

Cabling for these components are illustrated below.



## Drive backplane cable routing

Connect the drive backplane signal cable and power cable as illustrated.

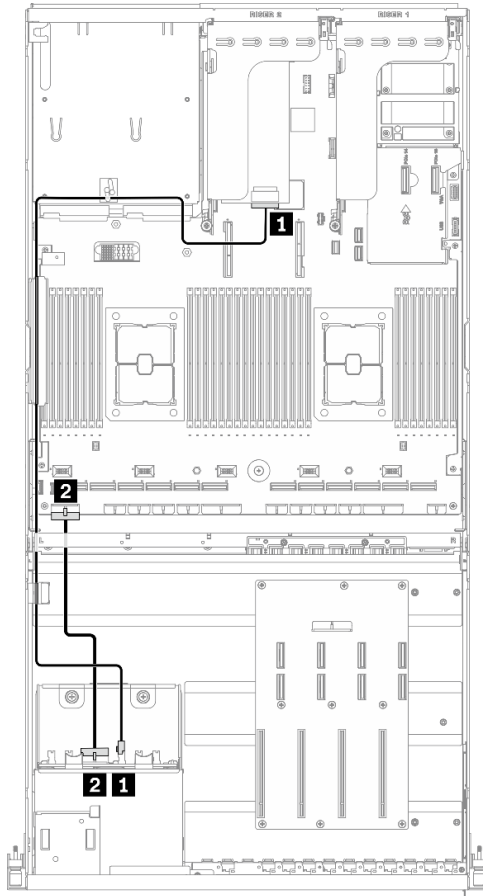


Figure 36. Drive backplane cable routing – Configuration A with HBA/RAID adapter

From		To	
Drive backplane	1 SAS	System board	1 HBA/RAID adapter installed on rear riser 2
	2 Power connector		2 Backplane power 1 connector

## GPU distribution board cable routing

Connect the GPU distribution board signal cables and power cable as illustrated.

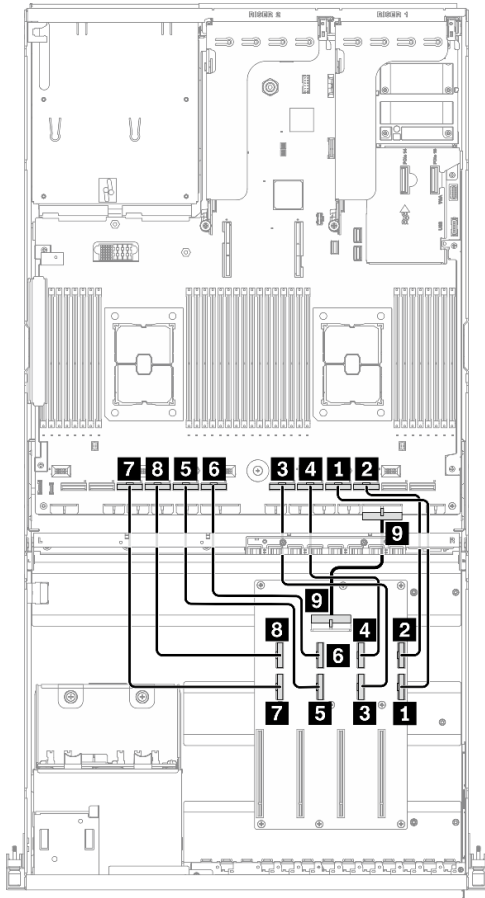


Figure 37. GPU distribution board cable routing – Configuration A with HBA/RAID adapter

From			To	
GPU distribution board	1 MCIO connector A	GPU #3	System board	1 PCIe connector 4
	2 MCIO connector B			2 PCIe connector 3
	3 MCIO connector C	GPU #4		3 PCIe connector 6
	4 MCIO connector D			4 PCIe connector 5
	5 MCIO connector E	GPU #5		5 PCIe connector 8
	6 MCIO connector F			6 PCIe connector 7
	7 MCIO connector G	GPU #6		7 PCIe connector 10
	8 MCIO connector H			8 PCIe connector 9
	9 Power connector			9 PCIe adapter distribution board power 1 connector

### Rear riser 1, rear riser 2, and HBA/RAID adapter cable routing

Connect the rear riser 1, rear riser 2, and HBA/RAID adapter signal cables as illustrated.

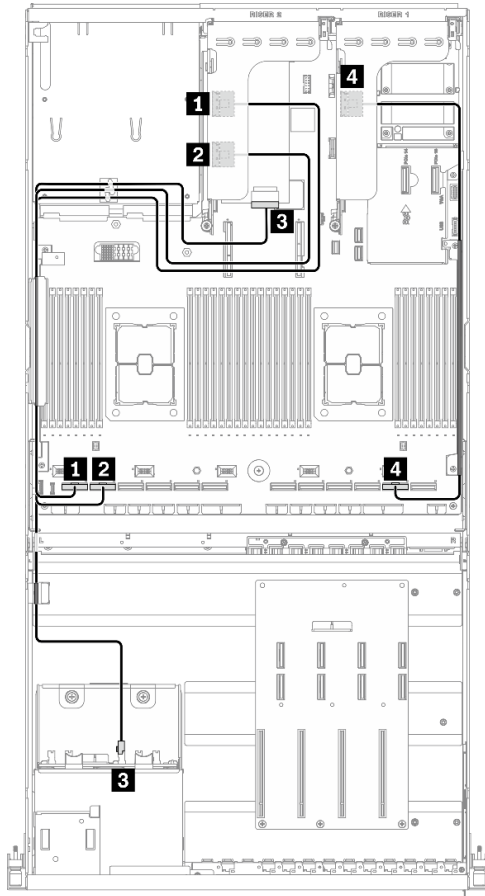


Figure 38. Rear riser 1, rear riser 2, and HBA/RAID adapter cable routing – Configuration A with HBA/RAID adapter

From		To	
Rear riser 2	<b>1</b> MCIO connector A	System board	<b>1</b> PCIe connector 12
	<b>2</b> MCIO connector B		<b>2</b> PCIe connector 11
	<b>3</b> HBA/RAID adapter installed on rear riser 2	Drive backplane	<b>3</b> SAS
Rear riser 1	<b>4</b> MCIO connector A	System board	<b>4</b> PCIe connector 2

## OCP Ethernet adapter cable routing

Connect the OCP Ethernet adapter signal cable as illustrated.

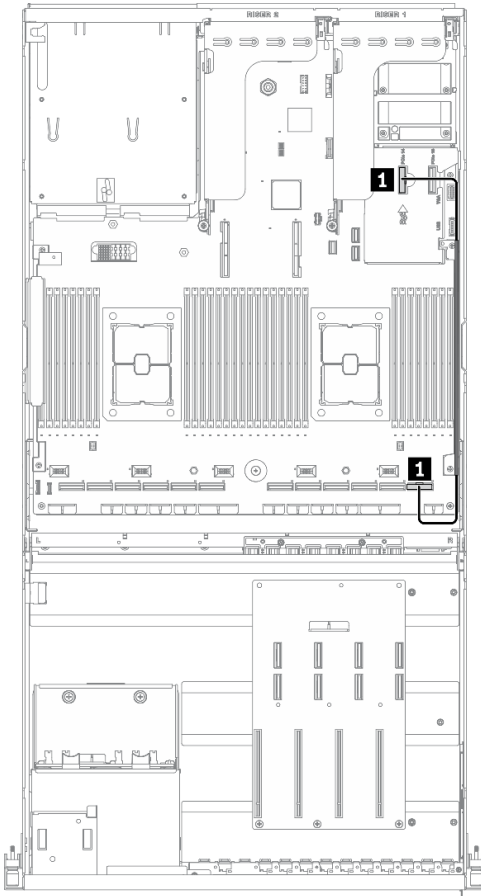


Figure 39. OCP Ethernet adapter cable routing – Configuration A with HBA/RAID adapter

From		To	
System board	<b>1</b> PCIe connector 14	System board	<b>1</b> PCIe connector 1

## **Configuration C cable routing**

Follow the instructions in this section to learn how to do cable routing for Configuration C.

**Configuration C cable routing includes the following items:**

1. Drive backplane cable routing
2. GPU distribution board cable routing
3. Front I/O expansion board cable routing

Cabling for these components are illustrated below.

## Drive backplane cable routing

Connect the drive backplane signal cables and power cable as illustrated.

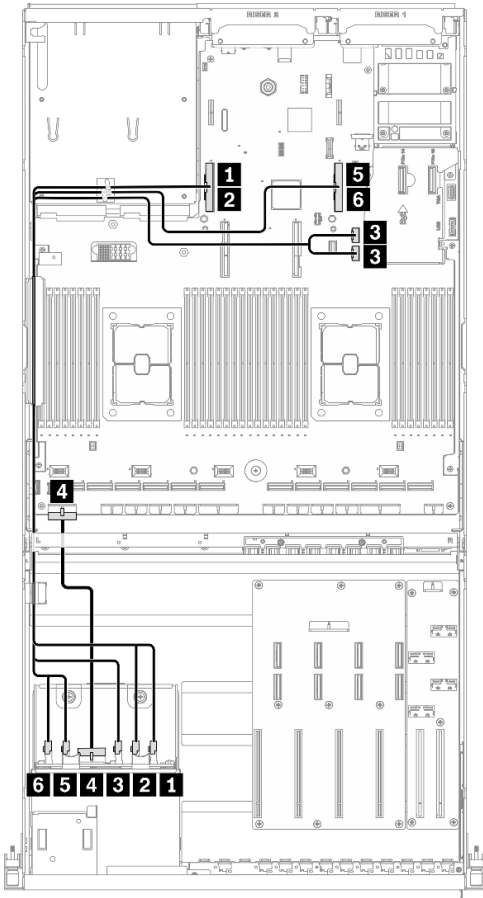


Figure 40. Drive backplane cable routing – Configuration C

From		To	
Drive backplane	<b>1</b> NVMe 6-7	System board	<b>1</b> PCIe connector 16
	<b>2</b> NVMe 4-5		<b>2</b> PCIe connector 16
	<b>3</b> SAS		<b>3</b> SATA 1 connector and SATA 2 connector
	<b>4</b> Power connector		<b>4</b> Backplane power 1 connector
	<b>5</b> NVMe 2-3		<b>5</b> PCIe connector 15
	<b>6</b> NVMe 0-1		<b>6</b> PCIe connector 15

## GPU distribution board cable routing

Connect the GPU distribution board signal cables and power cable as illustrated.

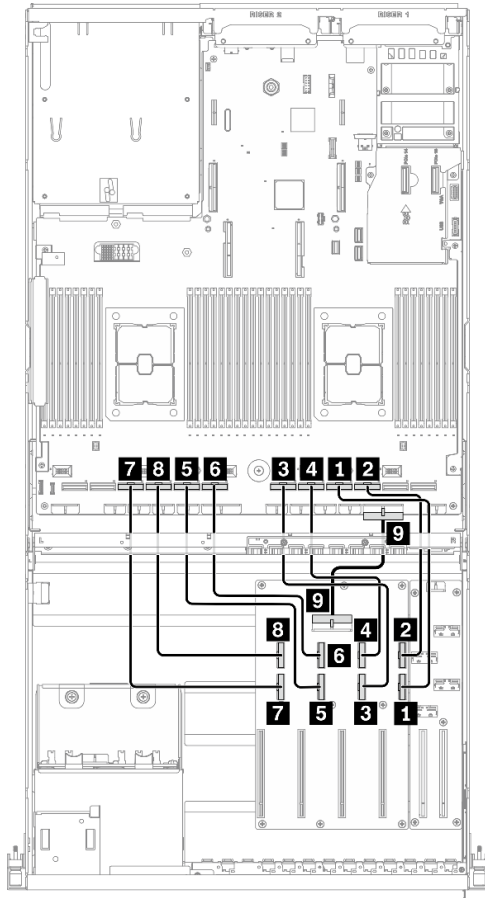


Figure 41. GPU distribution board cable routing – Configuration C

From		To	
GPU distribution board	<b>1</b> MCIO connector A	GPU #3	<b>1</b> PCIe connector 4
	<b>2</b> MCIO connector B		<b>2</b> PCIe connector 3
	<b>3</b> MCIO connector C	GPU #4	<b>3</b> PCIe connector 6
	<b>4</b> MCIO connector D		<b>4</b> PCIe connector 5
	<b>5</b> MCIO connector E	GPU #5	<b>5</b> PCIe connector 8
	<b>6</b> MCIO connector F		<b>6</b> PCIe connector 7
	<b>7</b> MCIO connector G	GPU #6	<b>7</b> PCIe connector 10
	<b>8</b> MCIO connector H		<b>8</b> PCIe connector 9
		<b>9</b> Power connector	

## Front I/O expansion board cable routing

Connect the front I/O expansion board signal cables and power cable as illustrated.

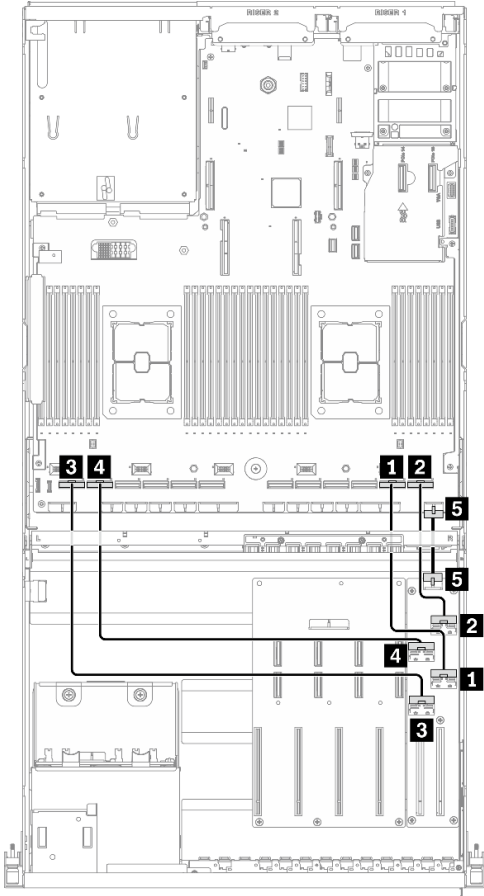


Figure 42. Front I/O expansion board cable routing – Configuration C

From		To	
Front I/O expansion board	<b>1</b> MCIO connector A	Slot #1	<b>1</b> PCIe connector 2
	<b>2</b> MCIO connector B		<b>2</b> PCIe connector 1
	<b>3</b> MCIO connector C	Slot #2	<b>3</b> PCIe connector 12
	<b>4</b> MCIO connector D		<b>4</b> PCIe connector 11
	<b>5</b> Power connector		<b>5</b> Front I/O expansion board power connector



## Configuration H cable routing

Follow the instructions in this section to learn how to do cable routing for Configuration H.

**Configuration H cable routing includes the following items:**

1. Drive backplane cable routing
2. GPU distribution board cable routing
3. Rear riser 1 and rear riser 2 cable routing
4. OCP Ethernet adapter cable routing

Cabling for these components are illustrated below.

## Drive backplane cable routing

Connect the drive backplane signal cables and power cable as illustrated.

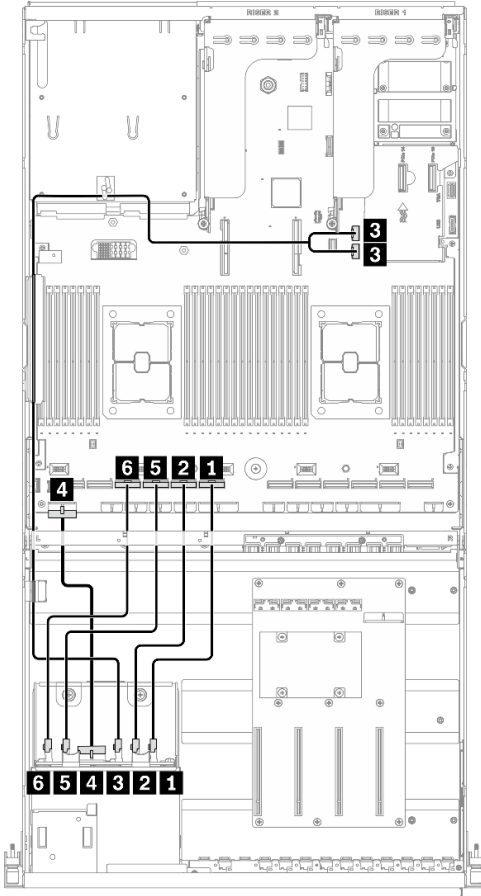


Figure 43. Drive backplane cable routing – Configuration H

From		To	
Drive backplane	<b>1</b> NVMe 6-7	System board	<b>1</b> PCIe connector 7
	<b>2</b> NVMe 4-5		<b>2</b> PCIe connector 8
	<b>3</b> SAS		<b>3</b> SATA 1 connector and SATA 2 connector
	<b>4</b> Power connector		<b>4</b> Backplane power 1 connector
	<b>5</b> NVMe 2-3		<b>5</b> PCIe connector 9
	<b>6</b> NVMe 0-1		<b>6</b> PCIe connector 10

## GPU distribution board cable routing

Connect the GPU distribution board signal cables and power cable as illustrated.

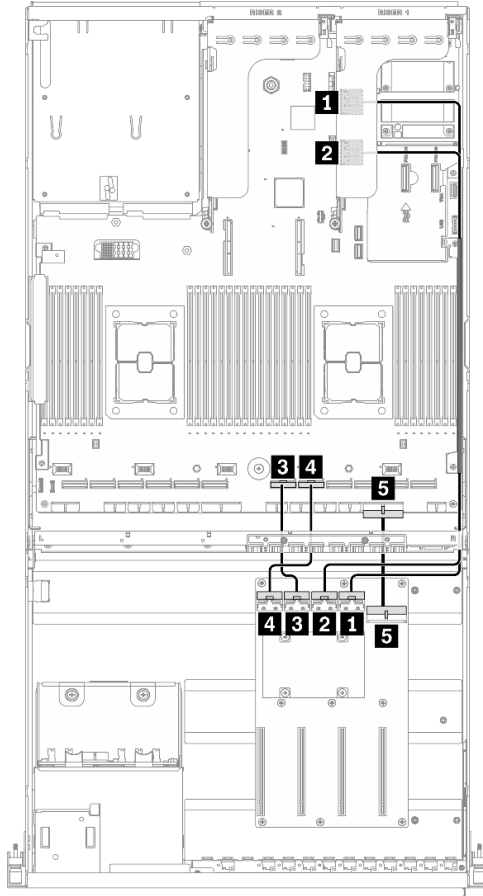


Figure 44. GPU distribution board cable routing – Configuration H

From		To	
GPU distribution board	1 MCIO connector A	GPU #3	Rear riser 1
	2 MCIO connector B	GPU #4	
	3 MCIO connector C	GPU #5	System board
	4 MCIO connector D	GPU #6	
	5 Power connector		
			1 MCIO connector A
			2 MCIO connector B
			3 PCIe connector 6
			4 PCIe connector 5
			5 PCIe adapter distribution board power 1 connector

## Rear riser 1 and rear riser 2 cable routing

Connect the rear riser 1 and rear riser 2 signal cables as illustrated.

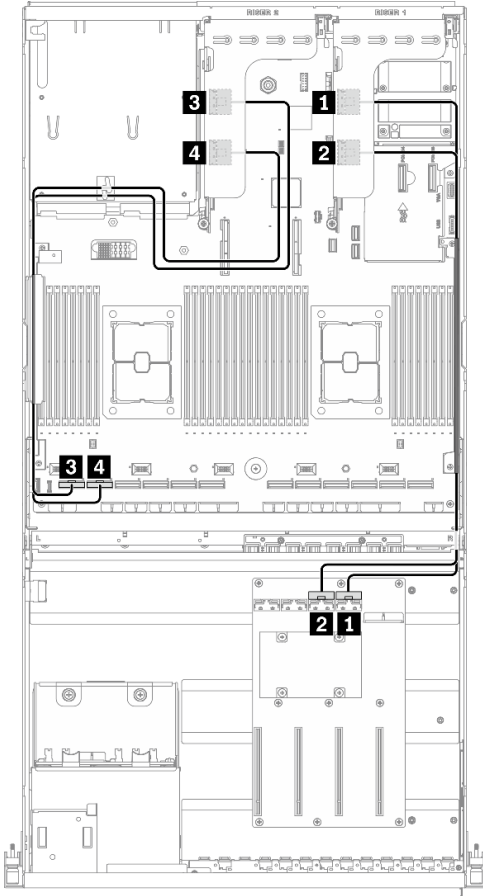


Figure 45. Rear riser 1 and rear riser 2 cable routing – Configuration H

From		To	
Rear riser 1	<b>1</b> MCIO connector A	GPU distribution board	<b>1</b> MCIO connector A
	<b>2</b> MCIO connector B		<b>2</b> MCIO connector B
Rear riser 2	<b>3</b> MCIO connector A	System board	<b>3</b> PCIe connector 12
	<b>4</b> MCIO connector B		<b>4</b> PCIe connector 11

## OCP Ethernet adapter cable routing

Connect the OCP Ethernet adapter signal cable as illustrated.

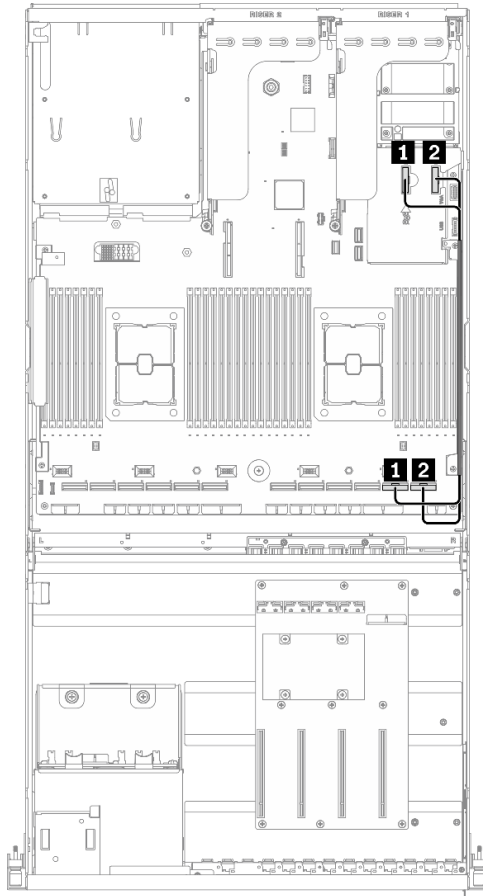


Figure 46. OCP Ethernet adapter cable routing – Configuration H

From		To	
System board	<b>1</b> PCIe connector 14	System board	<b>1</b> PCIe connector 2
	<b>2</b> PCIe connector 13		<b>2</b> PCIe connector 1

## Configuration H with HBA/RAID adapter cable routing

Follow the instructions in this section to learn how to do cable routing for Configuration H with HBA/RAID adapter.

**Configuration H with HBA/RAID adapter cable routing includes the following items:**

1. Drive backplane cable routing
2. GPU distribution board cable routing
3. Rear riser 1, rear riser 2, and HBA/RAID adapter cable routing
4. OCP Ethernet adapter cable routing

Cabling for these components are illustrated below.

## Drive backplane cable routing

Connect the drive backplane signal cables and power cable as illustrated.

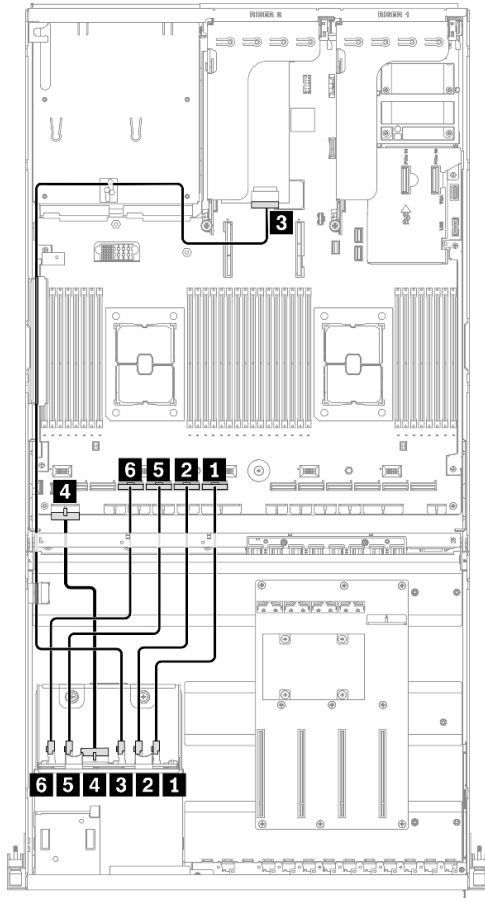


Figure 47. Drive backplane cable routing – Configuration H with HBA/RAID adapter

From		To	
Drive backplane	1 NVMe 6-7	System board	1 PCIe connector 7
	2 NVMe 4-5		2 PCIe connector 8
	3 SAS		3 HBA/RAID adapter installed on rear riser 2
	4 Power connector		4 Backplane power 1 connector
	5 NVMe 2-3		5 PCIe connector 9
	6 NVMe 0-1		6 PCIe connector 10

## GPU distribution board cable routing

Connect the GPU distribution board signal cables and power cable as illustrated.

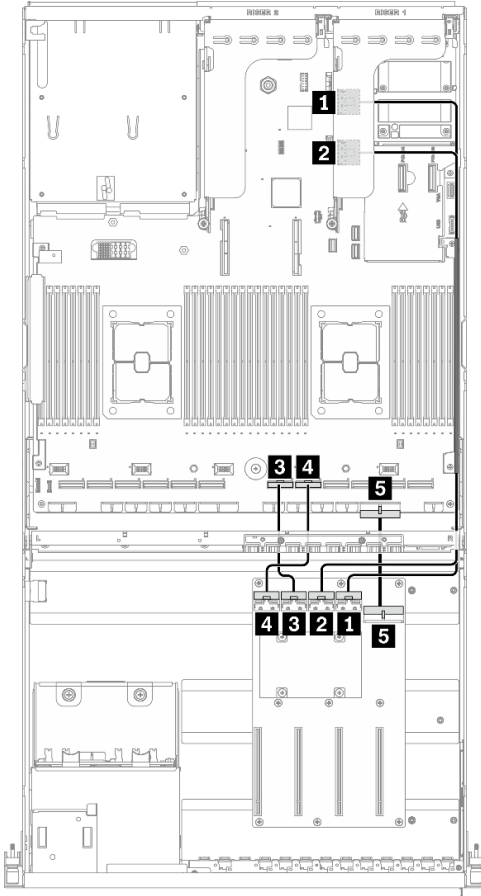


Figure 48. GPU distribution board cable routing – Configuration H with HBA/RAID adapter

From		To	
GPU distribution board	1 MCIO connector A	GPU #3	Rear riser 1
	2 MCIO connector B	GPU #4	
	3 MCIO connector C	GPU #5	System board
	4 MCIO connector D	GPU #6	
	5 Power connector		
			1 MCIO connector A
			2 MCIO connector B
			3 PCIe connector 6
			4 PCIe connector 5
			5 PCIe adapter distribution board power 1 connector



### Rear riser 1, rear riser 2, and HBA/RAID adapter cable routing

Connect the rear riser 1, rear riser 2, and HBA/RAID adapter signal cables as illustrated.

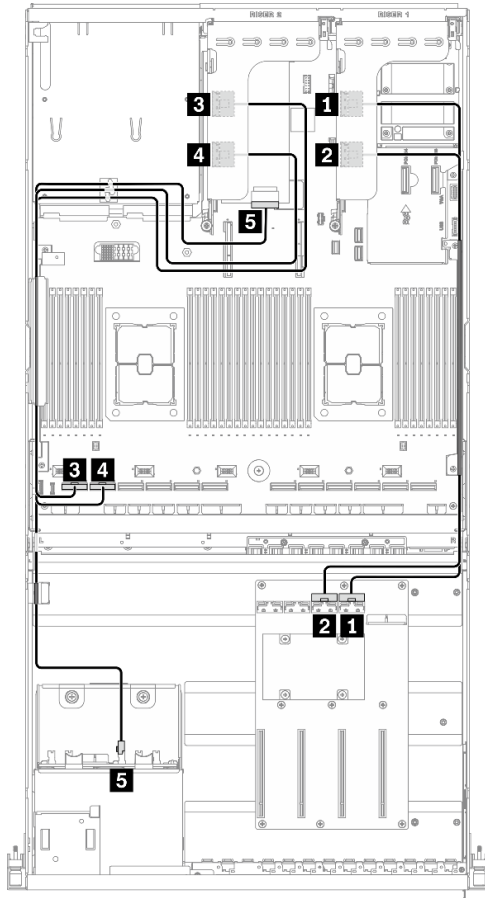


Figure 49. Rear riser 1, rear riser 2, and HBA/RAID adapter cable routing – Configuration H with HBA/RAID adapter

From		To	
Rear riser 1	1 MCIO connector A	GPU distribution board	1 MCIO connector A
	2 MCIO connector B		2 MCIO connector B
Rear riser 2	3 MCIO connector A	System board	3 PCIe connector 12
	4 MCIO connector B		4 PCIe connector 11
	5 HBA/RAID adapter installed on rear riser 2	Drive backplane	5 SAS

## OCP Ethernet adapter cable routing

Connect the OCP Ethernet adapter signal cable as illustrated.

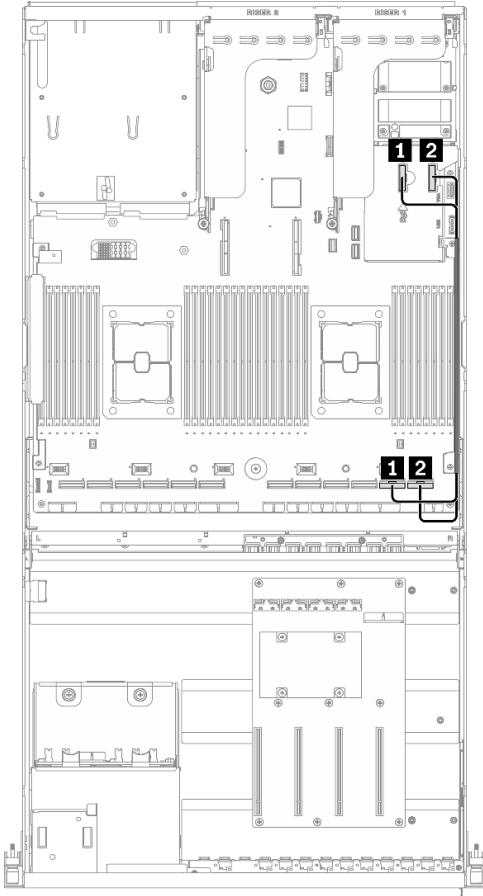


Figure 50. OCP Ethernet adapter cable routing – Configuration H with HBA/RAID adapter

From		To	
System board	<b>1</b> PCIe connector 14	System board	<b>1</b> PCIe connector 2
	<b>2</b> PCIe connector 13		<b>2</b> PCIe connector 1

## Configuration I cable routing

Follow the instructions in this section to learn how to do cable routing for Configuration I.

**Configuration I cable routing includes the following items:**

1. Drive backplane cable routing
2. GPU distribution board cable routing
3. Front I/O expansion board cable routing
4. OCP Ethernet adapter cable routing

Cabling for these components are illustrated below.

## Drive backplane cable routing

Connect the drive backplane signal cables and power cable as illustrated.

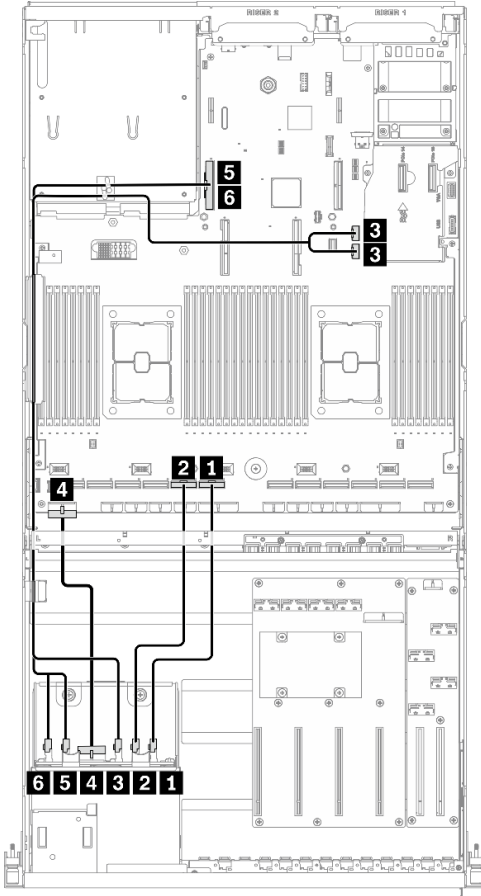


Figure 51. Drive backplane cable routing – Configuration I

From		To	
Drive backplane	<b>1</b> NVMe 6-7	System board	<b>1</b> PCIe connector 7
	<b>2</b> NVMe 4-5		<b>2</b> PCIe connector 8
	<b>3</b> SAS		<b>3</b> SATA 1 connector and SATA 2 connector
	<b>4</b> Power connector		<b>4</b> Backplane power 1 connector
	<b>5</b> NVMe 2-3		<b>5</b> PCIe connector 16
	<b>6</b> NVMe 0-1		<b>6</b> PCIe connector 16

## GPU distribution board cable routing

Connect the GPU distribution board signal cables and power cable as illustrated.

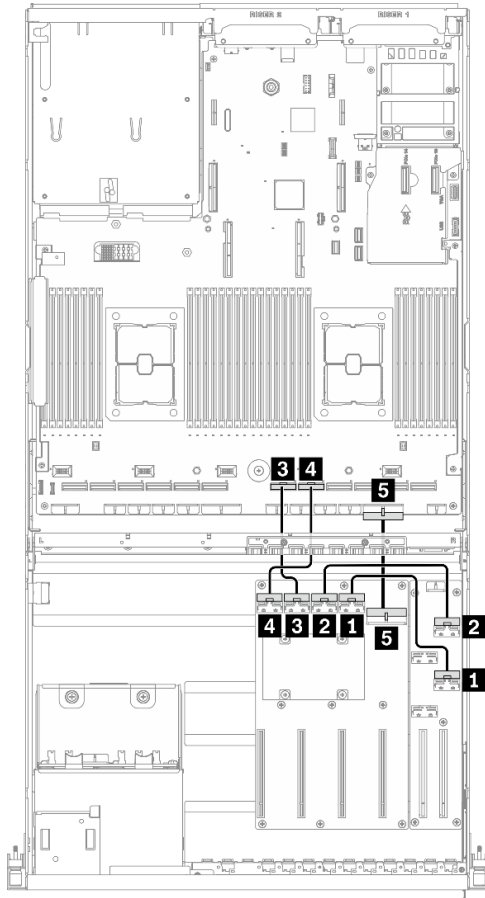


Figure 52. GPU distribution board cable routing – Configuration I

From		To	
GPU distribution board	<b>1</b> MCIO connector A	GPU #3	Front I/O expansion board
	<b>2</b> MCIO connector B	GPU #4	Front I/O expansion board
	<b>3</b> MCIO connector C	GPU #5	System board
	<b>4</b> MCIO connector D	GPU #6	
	<b>5</b> Power connector		
			<b>1</b> MCIO connector A <b>2</b> MCIO connector B <b>3</b> PCIe connector 6 <b>4</b> PCIe connector 5 <b>5</b> PCIe adapter distribution board power 1 connector

## Front I/O expansion board cable routing

Connect the front I/O expansion board signal cables and power cable as illustrated.

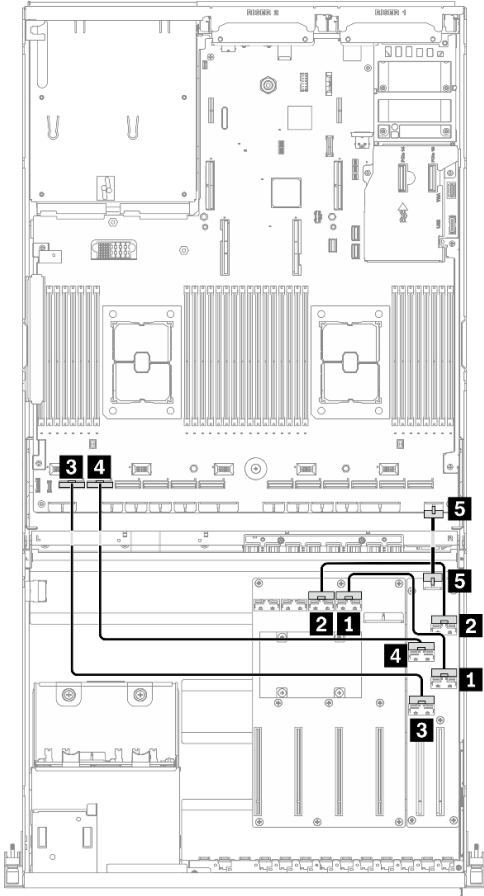


Figure 53. Front I/O expansion board cable routing – Configuration I

From		To	
Front I/O expansion board	<b>1</b> MCIO connector A	Slot #1	GPU distribution board
	<b>2</b> MCIO connector B		GPU distribution board
	<b>3</b> MCIO connector C	Slot #2	System board
	<b>4</b> MCIO connector D		System board
	<b>5</b> Power connector		System board
			GPU distribution board
			System board

## OCP Ethernet adapter cable routing

Connect the OCP Ethernet adapter signal cable as illustrated.

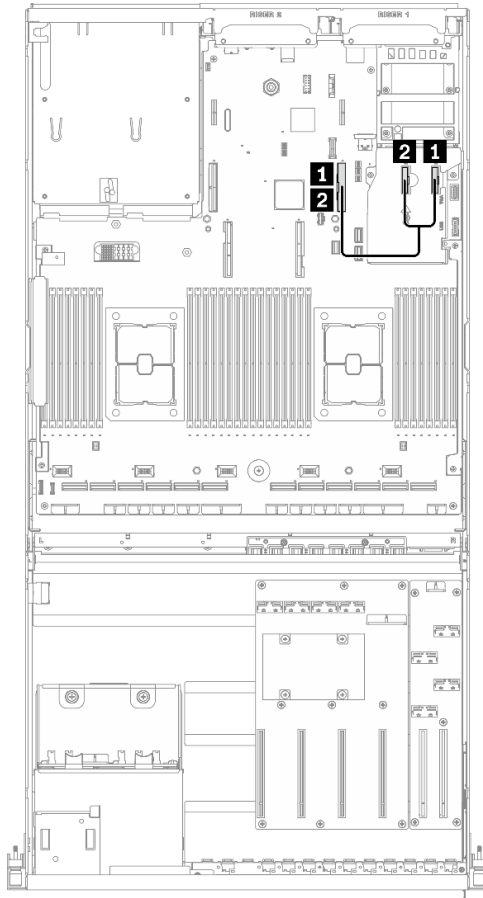


Figure 54. OCP Ethernet adapter cable routing – Configuration I

From		To	
System board	1 PCIe connector 13	System board	1 PCIe connector 15
	2 PCIe connector 14		2 PCIe connector 15

---

## 4-DW GPU Model with 4x 3.5-inch drives cable routing

Follow the instructions in this section to learn how to do cable routing for 4-DW GPU Model with 4x 3.5-inch drives.

### Identifying connectors

Go through the following sections to acquire necessary information before starting cable routing.

- For the connectors on system board, see [“System-board connectors” on page 34](#).
- For the connectors on the drive backplane, GPU distribution board, rear riser, and front I/O expansion board, see [“Identifying connectors” on page 58](#).

### 4-DW GPU Model with 4x 3.5-inch drives configurations

Cable routing is different by configuration. See the table below for the configuration that matches your server, and refer to the corresponding cable routing guide.

Rear riser 1	Rear riser 2	Rear riser 2 installed with HBA/RAID adapter	OCP Ethernet adapter	Configuration
V	V		V	Configuration B
V		V	V	Configuration B with HBA/RAID adapter

Refer to the corresponding cable routing guide:

- For Configuration B, see [“Configuration B cable routing” on page 98](#)
- For Configuration B with HBA/RAID adapter, see [“Configuration B with HBA/RAID adapter cable routing” on page 103](#)



Make sure to route the cables through cable guide and cable clip as instructed in the cable routing guides. See the illustration below for the cable guide and cable clip locations.

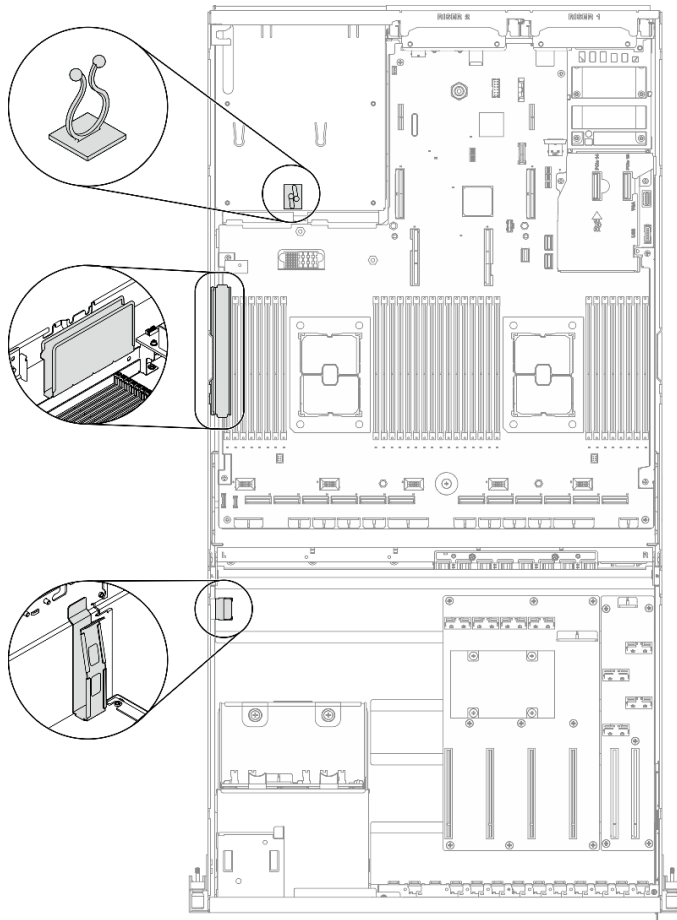


Figure 55. Cable guide and cable clip locations in the chassis

## Configuration B cable routing

Follow the instructions in this section to learn how to do cable routing for Configuration B.

### Configuration B cable routing includes the following items:

1. Drive backplane cable routing
2. GPU distribution board cable routing
3. Rear riser 1 and rear riser 2 cable routing
4. OCP Ethernet adapter routing

Cabling for these components are illustrated below.

## Drive backplane cable routing

Connect the drive backplane signal cable and power cable as illustrated.

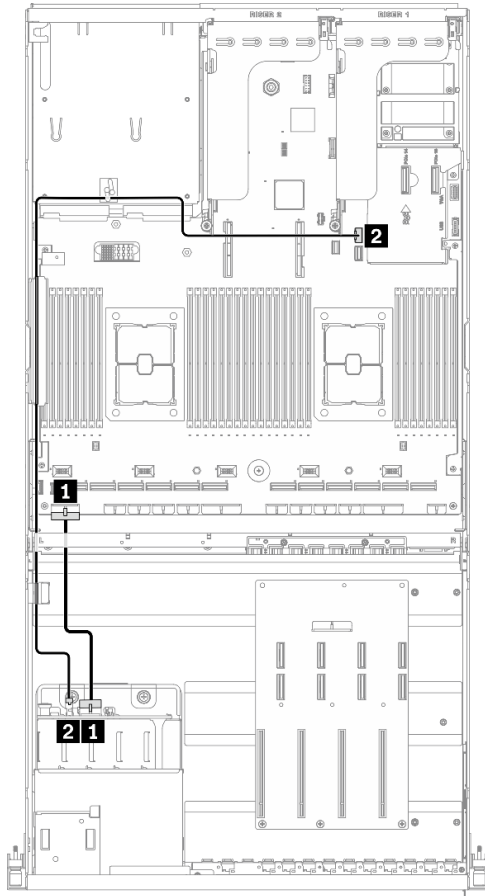


Figure 56. Drive backplane cable routing – Configuration B

From		To	
Drive backplane	<b>1</b> Power connector	System board	<b>1</b> Backplane power 1 connector
	<b>2</b> SAS		<b>2</b> SATA 1 connector

## GPU distribution board cable routing

Connect the GPU distribution board signal cables and power cable as illustrated.

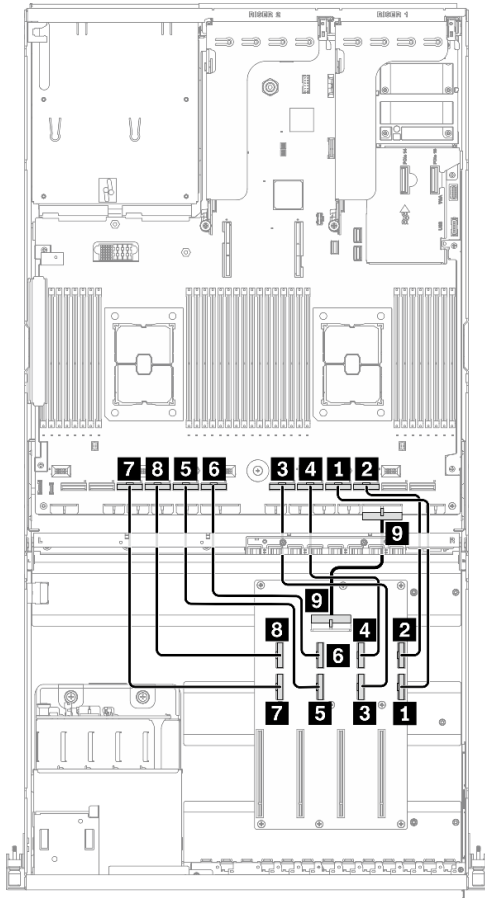


Figure 57. GPU distribution board cable routing – Configuration B

From		To	
GPU distribution board	1 MCIO connector A	GPU #3	1 PCIe connector 4
	2 MCIO connector B		2 PCIe connector 3
	3 MCIO connector C	GPU #4	3 PCIe connector 6
	4 MCIO connector D		4 PCIe connector 5
	5 MCIO connector E	GPU #5	5 PCIe connector 8
	6 MCIO connector F		6 PCIe connector 7
	7 MCIO connector G	GPU #6	7 PCIe connector 10
	8 MCIO connector H		8 PCIe connector 9
	9 Power connector		9 PCIe adapter distribution board power 1 connector

## Rear riser 1 and rear riser 2 cable routing

Connect the rear riser 1 and rear riser 2 cables as illustrated.

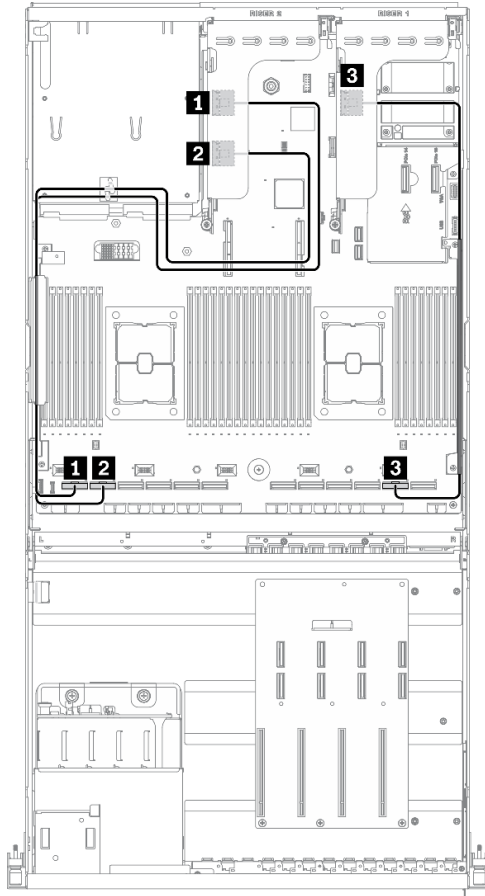


Figure 58. Rear riser 1 and rear riser 2 cable routing – Configuration B

From		To	
Rear riser 2	<b>1</b> MCIO connector A	System board	<b>1</b> PCIe connector 12
	<b>2</b> MCIO connector B		<b>2</b> PCIe connector 11
Rear riser 1	<b>3</b> MCIO connector A		<b>3</b> PCIe connector 2

## OCP Ethernet adapter cable routing

Connect the OCP Ethernet adapter signal cable as illustrated.

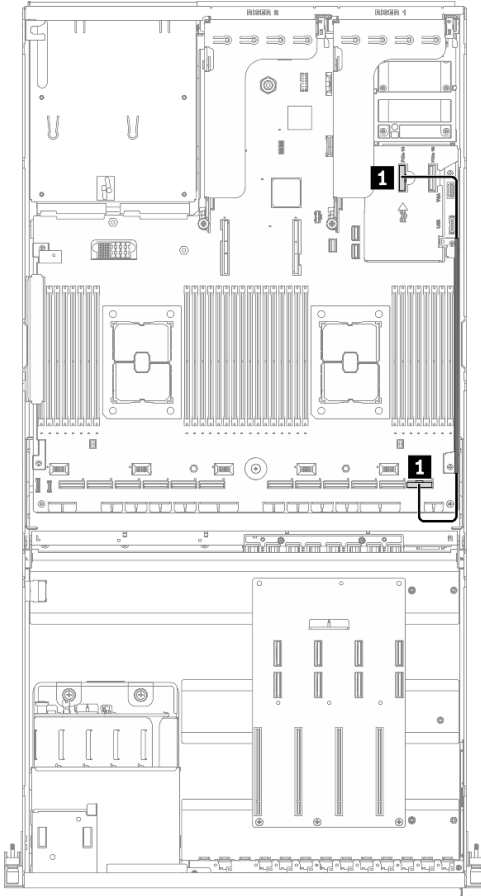


Figure 59. OCP Ethernet adapter cable routing – Configuration B

From		To	
System board	<b>1</b> PCIe connector 14	System board	<b>1</b> PCIe connector 1

## **Configuration B with HBA/RAID adapter cable routing**

Follow the instructions in this section to learn how to do cable routing for Configuration B with HBA/RAID adapter.

**Configuration B with HBA/RAID adapter cable routing includes the following items:**

1. Drive backplane cable routing
2. GPU distribution board cable routing
3. Rear riser 1, rear riser 2, and HBA/RAID adapter cable routing
4. OCP Ethernet adapter routing

Cabling for these components are illustrated below.

## Drive backplane cable routing

Connect the drive backplane signal cable and power cable as illustrated.

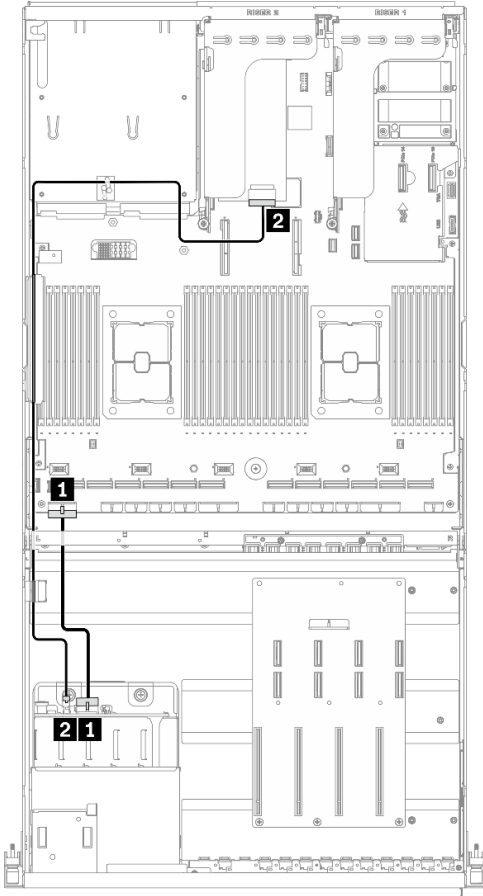


Figure 60. Drive backplane cable routing – Configuration B with HBA/RAID adapter

From		To	
Drive backplane	<b>1</b> Power connector	System board	<b>1</b> Backplane power 1 connector
	<b>2</b> SAS		<b>2</b> HBA/RAID adapter installed on rear riser 2



## GPU distribution board cable routing

Connect the GPU distribution board signal cables and power cable as illustrated.

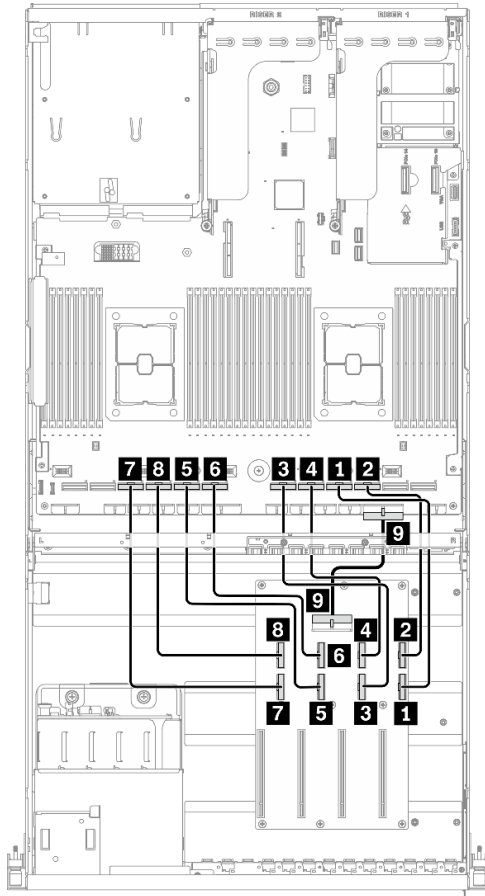


Figure 61. GPU distribution board cable routing – Configuration B with HBA/RAID adapter

From		To	
GPU distribution board	1 MCIO connector A	GPU #3	1 PCIe connector 4
	2 MCIO connector B		2 PCIe connector 3
	3 MCIO connector C	GPU #4	3 PCIe connector 6
	4 MCIO connector D		4 PCIe connector 5
	5 MCIO connector E	GPU #5	5 PCIe connector 8
	6 MCIO connector F		6 PCIe connector 7
	7 MCIO connector G	GPU #6	7 PCIe connector 10
	8 MCIO connector H		8 PCIe connector 9
	9 Power connector		9 PCIe adapter distribution board power 1 connector

### Rear riser 1, rear riser 2, and HBA/RAID adapter cable routing

Connect the rear riser 1, rear riser 2, and HBA/RAID adapter cables as illustrated.

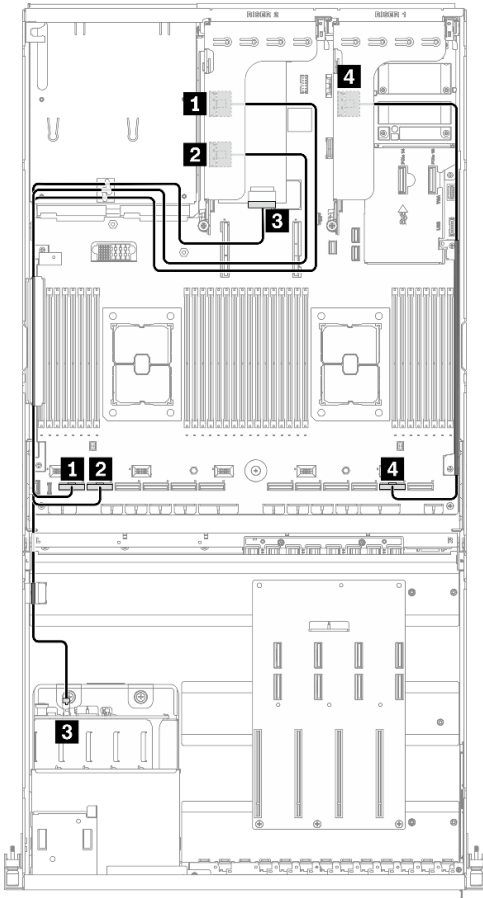


Figure 62. Riser 1, rear riser 2, and HBA/RAID adapter cable routing – Configuration B with HBA/RAID adapter

From		To	
Rear riser 2	1 MCIO connector A	System board	1 PCIe connector 12
	2 MCIO connector B		2 PCIe connector 11
	3 HBA/RAID adapter installed on rear riser 2	Drive backplane	3 SAS
Rear riser 1	4 MCIO connector A	System board	4 PCIe connector 2

## OCP Ethernet adapter cable routing

Connect the OCP Ethernet adapter signal cable as illustrated.

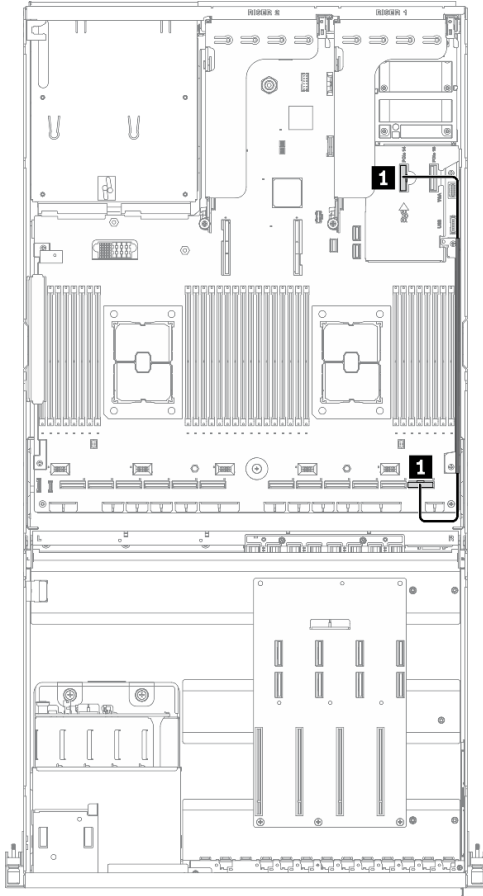


Figure 63. OCP Ethernet adapter cable routing – Configuration B with HBA/RAID adapter

From		To	
System board	<b>1</b> PCIe connector 14	System board	<b>1</b> PCIe connector 1

---

## 8-DW GPU Model cable routing

Follow the instructions in this section to learn how to do cable routing for 8-DW GPU Model.

### Identifying connectors

Go through the following sections to acquire necessary information before starting cable routing.

- For the connectors on system board, see [“System-board connectors” on page 34](#).
- For the connectors on the drive backplane, GPU distribution board, rear riser, and front I/O expansion board, see [“Identifying connectors” on page 58](#).

### 8-DW GPU Model configurations

Cable routing is different by configuration. See the table below for the configuration that matches your server, and refer to the corresponding cable routing guide.

Rear riser 1	Rear riser 2	OCP Ethernet adapter	Front I/O expansion board	Configurations
	V	V		Configuration D
			V	Configuration E
V	V	V		Configuration J
		V	V	Configuration K

Refer to the corresponding cable routing guide:

- For Configuration D, see [“Configuration D cable routing” on page 110](#)
- For Configuration E, see [“Configuration E cable routing” on page 116](#)
- For Configuration J, see [“Configuration J cable routing” on page 121](#)
- For Configuration K, see [“Configuration K cable routing” on page 127](#)

Make sure to route the cables through cable guide and cable clip as instructed in the cable routing guides. See the illustration below for the cable guide and cable clip locations.

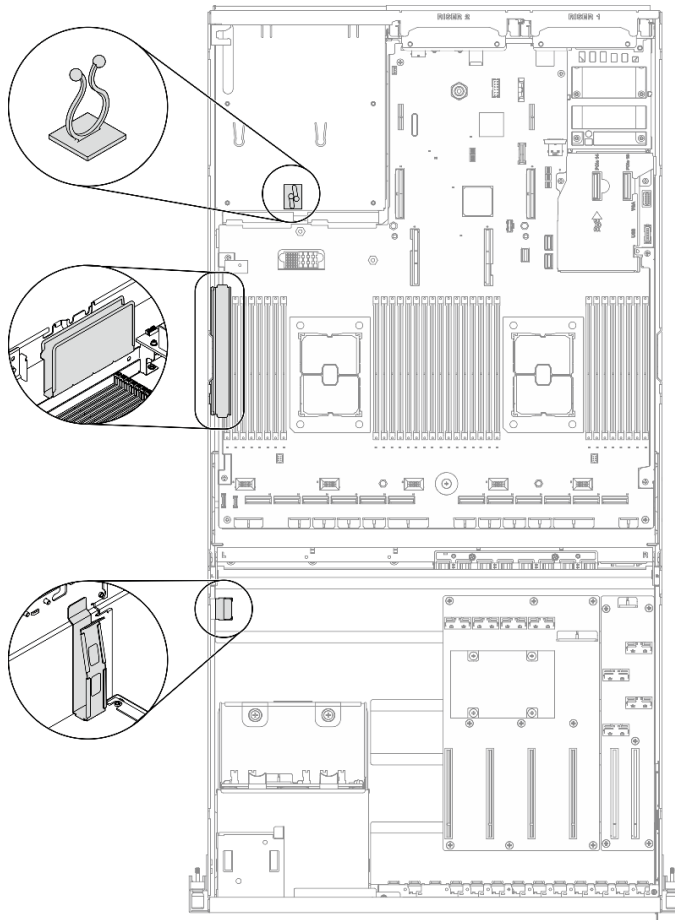


Figure 64. Cable guide and cable clip locations in the chassis

## Configuration D cable routing

Follow the instructions in this section to learn how to do cable routing for Configuration D.

### **Configuration D cable routing includes the following items:**

1. Drive backplane cable routing
2. GPU distribution board cable routing
3. Rear riser 2 cable routing
4. OCP Ethernet adapter cable routing

Cabling for these components are illustrated below.

## Drive backplane cable routing

Connect the drive backplane signal cables and power cable as illustrated.

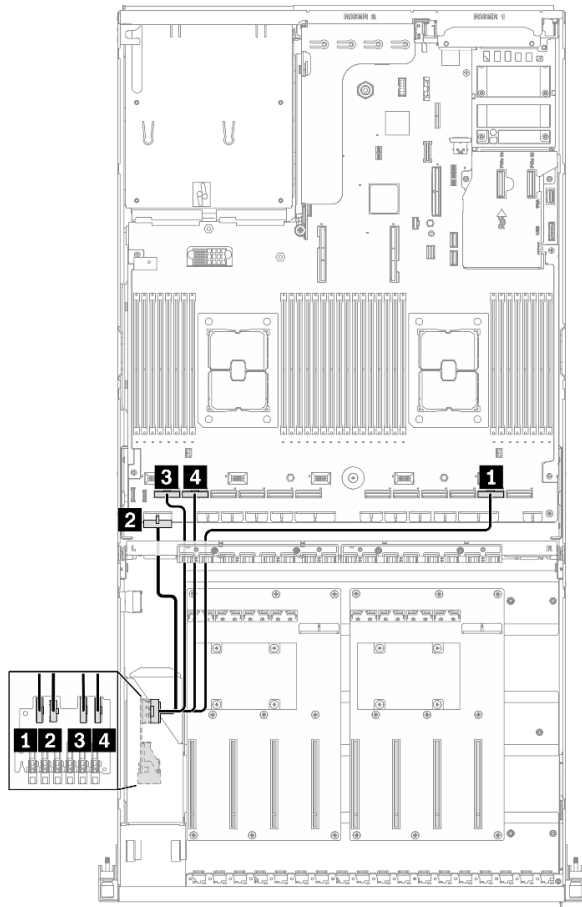


Figure 65. Drive backplane cable routing – Configuration D

From		To	
Drive backplane	<b>1</b> EDSFF 0-1	System board	<b>1</b> PCIe connector 2
	<b>2</b> Power connector		<b>2</b> Backplane power 1 connector
	<b>3</b> EDSFF 2-3		<b>3</b> PCIe connector 12
	<b>4</b> EDSFF 4-5		<b>4</b> PCIe connector 11

## GPU distribution board cable routing

Connect the GPU distribution board signal cables and power cable as illustrated.

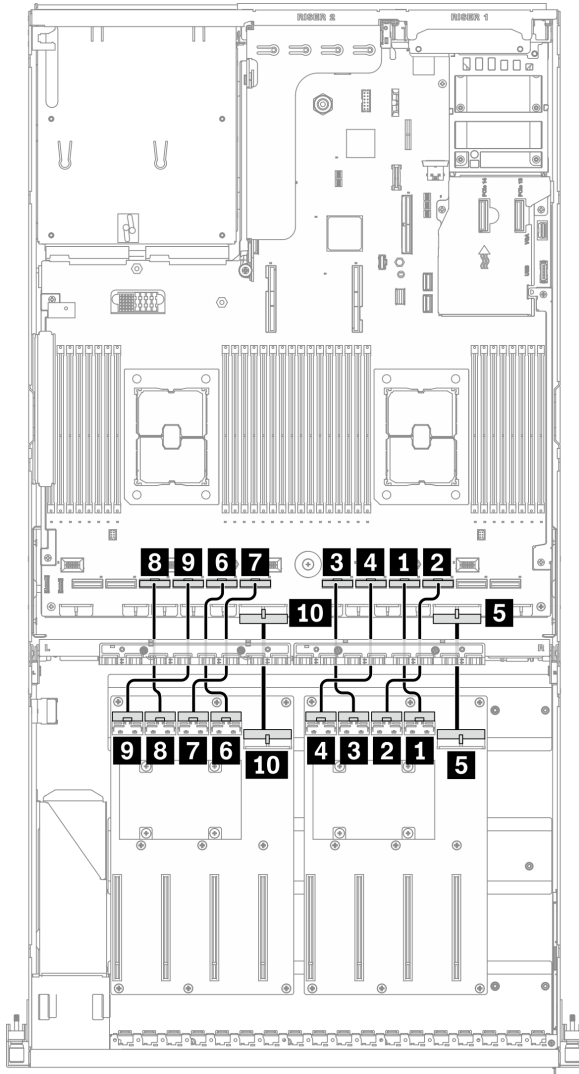


Figure 66. GPU distribution board cable routing – Configuration D

From		To	
GPU distribution board (Right side)	<b>1</b> MCIO connector A	System board	<b>1</b> PCIe connector 4
	<b>2</b> MCIO connector B		<b>2</b> PCIe connector 3
	<b>3</b> MCIO connector C		<b>3</b> PCIe connector 6
	<b>4</b> MCIO connector D		<b>4</b> PCIe connector 5
	<b>5</b> Power connector		<b>5</b> PCIe adapter distribution board power 1 connector
GPU distribution board (Left side)	<b>6</b> MCIO connector A		<b>6</b> PCIe connector 8
	<b>7</b> MCIO connector B		<b>7</b> PCIe connector 7
	<b>8</b> MCIO connector C		<b>8</b> PCIe connector 10



From		To	
	<b>9</b> MCIO connector D		<b>9</b> PCIe connector 9
	<b>10</b> Power connector		<b>10</b> PCIe adapter distribution board power 2 connector

## Rear riser 2 cable routing

Connect the rear riser 2 signal cable as illustrated.

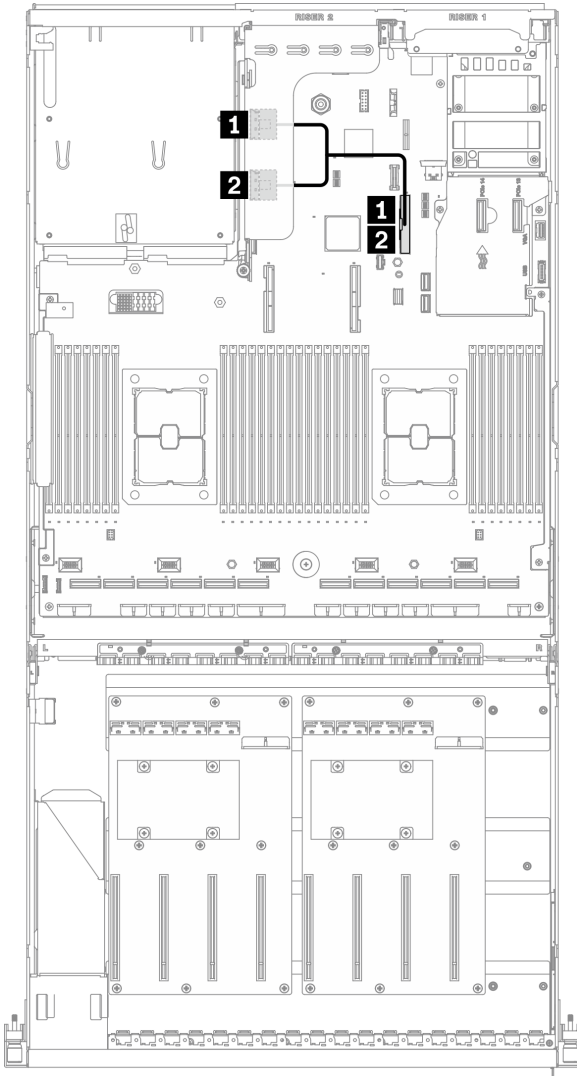


Figure 67. Rear riser 2 cable routing – Configuration D

From		To	
Rear riser 2	<b>1</b> MCIO connector A	System board	<b>1</b> PCIe connector 15
	<b>2</b> MCIO connector B		<b>2</b> PCIe connector 15

### OCP Ethernet adapter cable routing

Connect the OCP Ethernet adapter signal cable as illustrated.

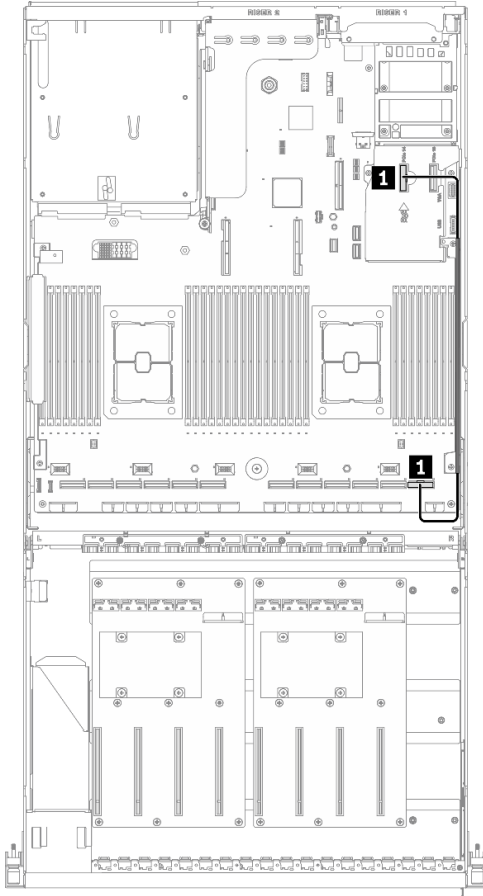


Figure 68. OCP Ethernet adapter cable routing – Configuration D

From		To	
System board	<b>1</b> PCIe connector 14	System board	<b>1</b> PCIe connector 1

## **Configuration E cable routing**

Follow the instructions in this section to learn how to do cable routing for Configuration E.

**Configuration E cable routing includes the following items:**

1. Drive backplane cable routing
2. GPU distribution board cable routing
3. Front I/O expansion board cable routing

Cabling for these components are illustrated below.

## Drive backplane cable routing

Connect the drive backplane signal cables and power cable as illustrated.

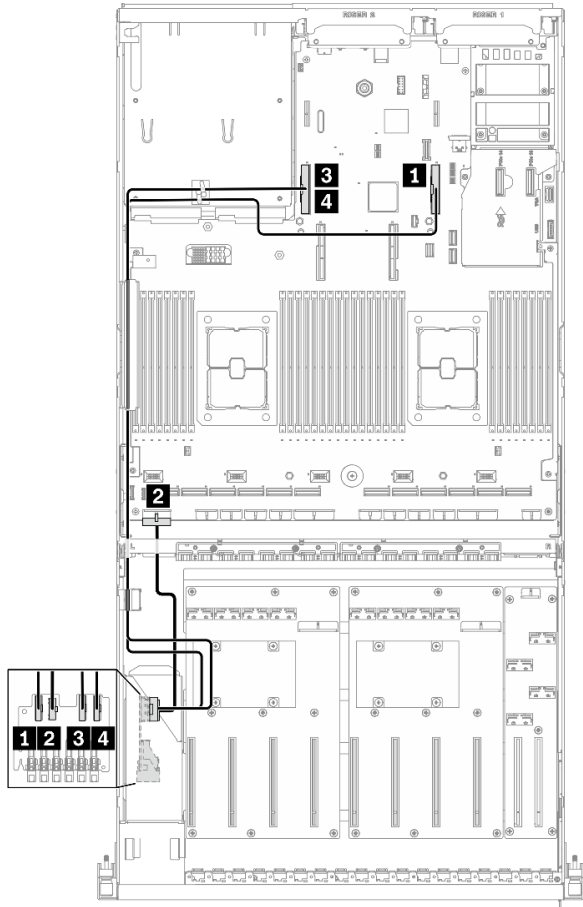


Figure 69. Drive backplane cable routing – Configuration E

From		To	
Drive backplane	<b>1</b> EDSFF 0-1	System board	<b>1</b> PCIe connector 15
	<b>2</b> Power connector		<b>2</b> Backplane power 1 connector
	<b>3</b> EDSFF 2-3		<b>3</b> PCIe connector 16
	<b>4</b> EDSFF 4-5		<b>4</b> PCIe connector 16
System board	<b>5</b> PCIe connector 14		<b>5</b> PCIe connector 15

## GPU distribution board cable routing

Connect the GPU distribution board signal cables and power cable as illustrated.

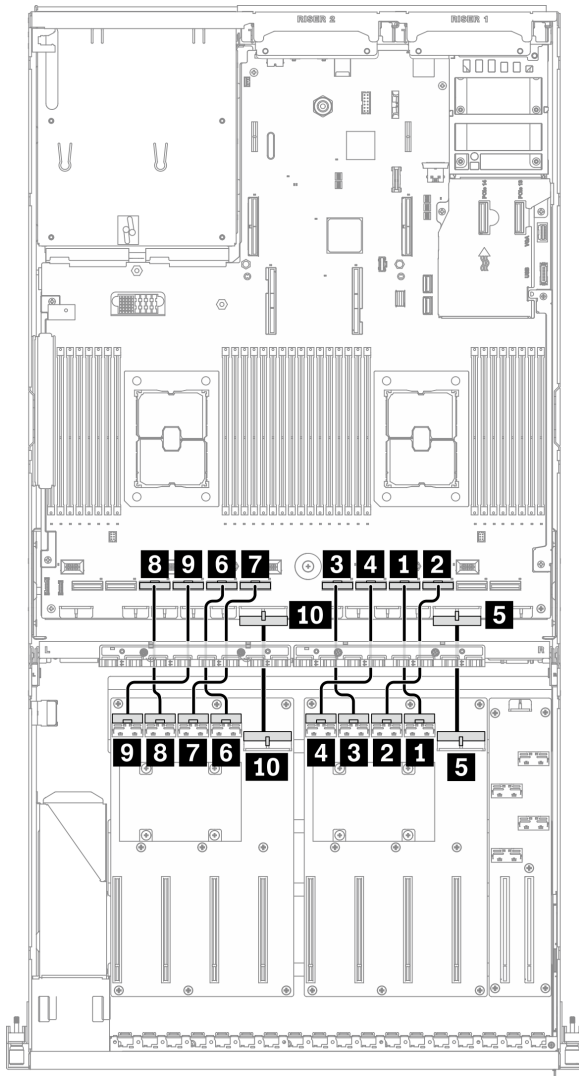


Figure 70. GPU distribution board cable routing – Configuration E

From		To	
GPU distribution board (Right side)	<b>1</b> MCIO connector A	System board	<b>1</b> PCIe connector 4
	<b>2</b> MCIO connector B		<b>2</b> PCIe connector 3
	<b>3</b> MCIO connector C		<b>3</b> PCIe connector 6
	<b>4</b> MCIO connector D		<b>4</b> PCIe connector 5
	<b>5</b> Power connector		<b>5</b> PCIe adapter distribution board power 1 connector
GPU distribution board (Left side)	<b>6</b> MCIO connector A		<b>6</b> PCIe connector 8
	<b>7</b> MCIO connector B		<b>7</b> PCIe connector 7
	<b>8</b> MCIO connector C		<b>8</b> PCIe connector 10

From		To	
	<b>9</b> MCIO connector D		<b>9</b> PCIe connector 9
	<b>10</b> Power connector		<b>10</b> PCIe adapter distribution board power 2 connector

## Front I/O expansion board cable routing

Connect the front I/O expansion board signal cables and power cable as illustrated.

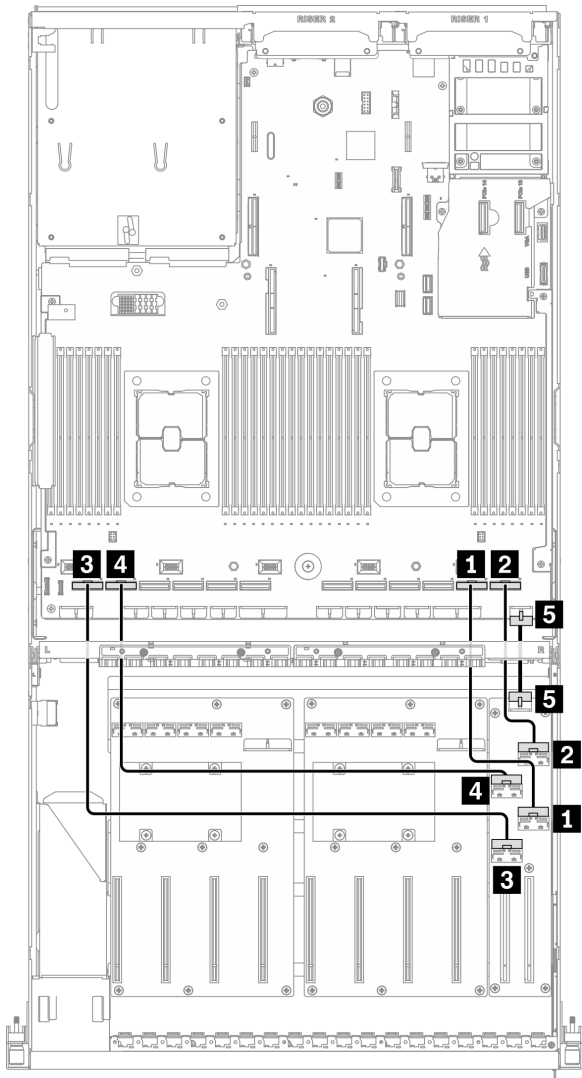


Figure 71. Front I/O expansion board cable routing – Configuration E

From			To	
Front I/O expansion board	<b>1</b> MCIO connector A	Slot #1	System board	<b>1</b> PCIe connector 2
	<b>2</b> MCIO connector B			<b>2</b> PCIe connector 1
	<b>3</b> MCIO connector C	Slot #2		<b>3</b> PCIe connector 12
	<b>4</b> MCIO connector D			<b>4</b> PCIe connector 11
	<b>5</b> Power connector			<b>5</b> Front I/O expansion board power connector



## Configuration J cable routing

Follow the instructions in this section to learn how to do cable routing for Configuration J.

### **Configuration J cable routing includes the following items:**

1. Drive backplane cable routing
2. GPU distribution board cable routing
3. Rear riser 1 and rear riser 2 cable routing
4. OCP Ethernet adapter cable routing

Cabling for these components are illustrated below.

## Drive backplane cable routing

Connect the drive backplane signal cables and power cable as illustrated.

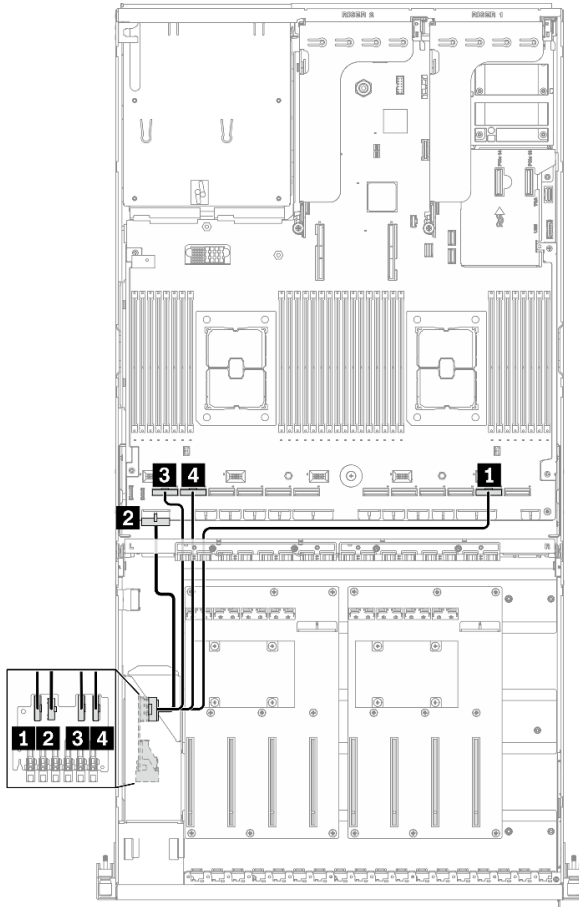


Figure 72. Drive backplane cable routing – Configuration J

From		To	
Drive backplane	<b>1</b> EDSFF 0-1	System board	<b>1</b> PCIe connector 2
	<b>2</b> Power connector		<b>2</b> Backplane power 1 connector
	<b>3</b> EDSFF 2-3		<b>3</b> PCIe connector 12
	<b>4</b> EDSFF 4-5		<b>4</b> PCIe connector 11

## GPU distribution board cable routing

Connect the GPU distribution board signal cables and power cable as illustrated.

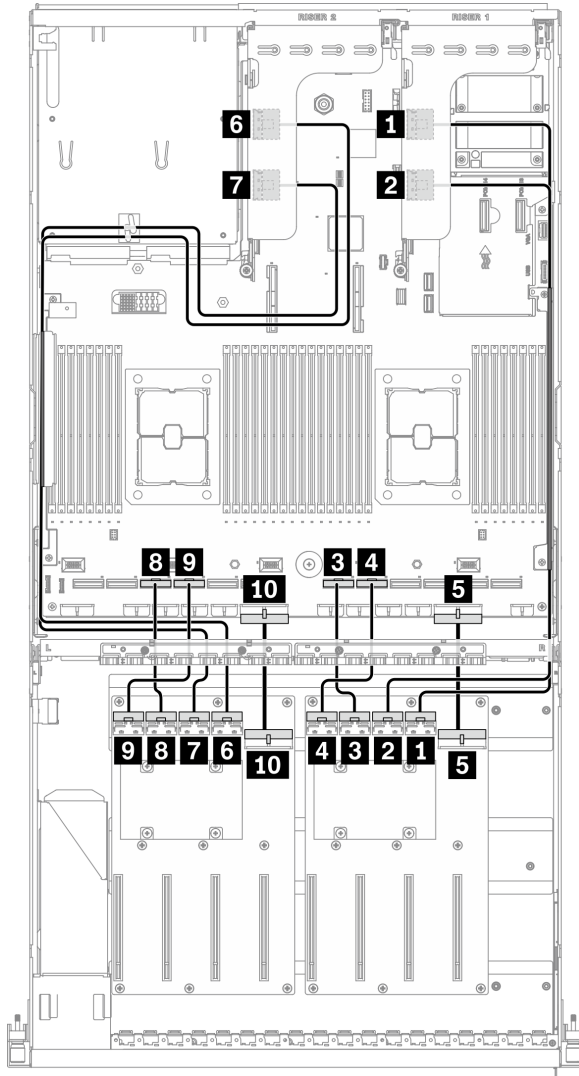


Figure 73. GPU distribution board cable routing – Configuration J

From		To	
GPU distribution board (Right side)	<b>1</b> MCIO connector A	GPU #3	Rear riser 1
	<b>2</b> MCIO connector B	GPU #4	<b>1</b> MCIO connector A
	<b>3</b> MCIO connector C	GPU #5	<b>2</b> MCIO connector B
	<b>4</b> MCIO connector D	GPU #6	System board
	<b>5</b> Power connector		<b>3</b> PCIe connector 6
GPU distribution board (Left side)	<b>6</b> MCIO connector A	GPU #7	<b>4</b> PCIe connector 5
	<b>7</b> MCIO connector B	GPU #8	<b>5</b> PCIe adapter distribution board power 1 connector
	<b>8</b> MCIO connector C	GPU #9	Rear riser 2
			<b>6</b> MCIO connector A
			<b>7</b> MCIO connector B
		System board	<b>8</b> PCIe connector 10

From		To	
	9 MCIO connector D	GPU #10	9 PCIe connector 9
	10 Power connector		10 PCIe adapter distribution board power 2 connector

## Rear riser 1 and rear riser 2 cable routing

Connect the rear riser 1 and rear riser 2 signal cables as illustrated.

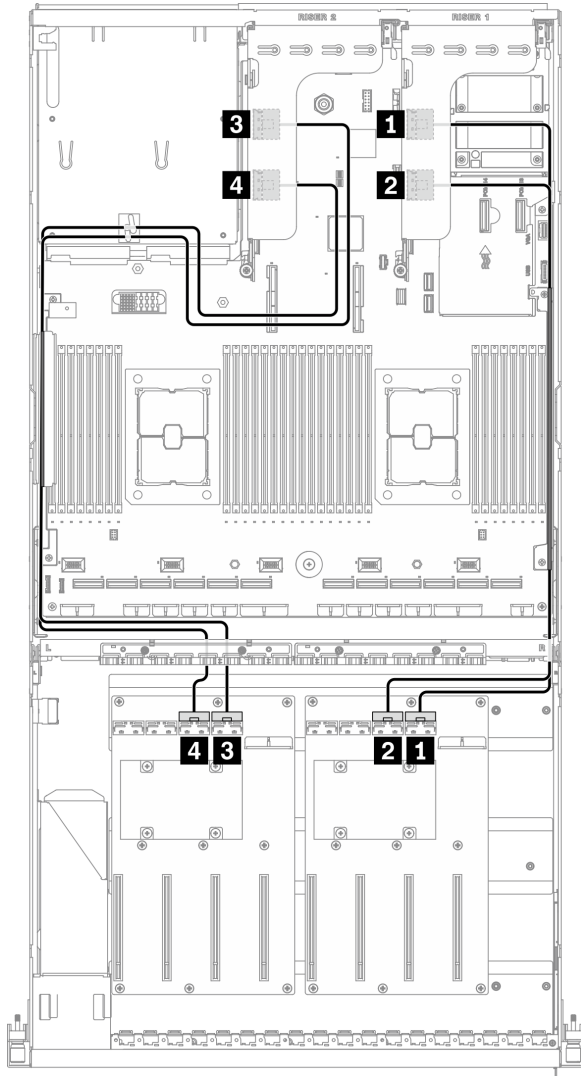


Figure 74. Rear riser 1 and rear riser 2 cable routing – Configuration J

From		To	
Rear riser 1	<b>1</b> MCIO connector A	GPU distribution board (Right side)	<b>1</b> MCIO connector A
	<b>2</b> MCIO connector B		<b>2</b> MCIO connector B
Rear riser 2	<b>3</b> MCIO connector A	GPU distribution board (Left side)	<b>3</b> MCIO connector A
	<b>4</b> MCIO connector B		<b>4</b> MCIO connector B

## OCP Ethernet adapter cable routing

Connect the OCP Ethernet adapter signal cable as illustrated.

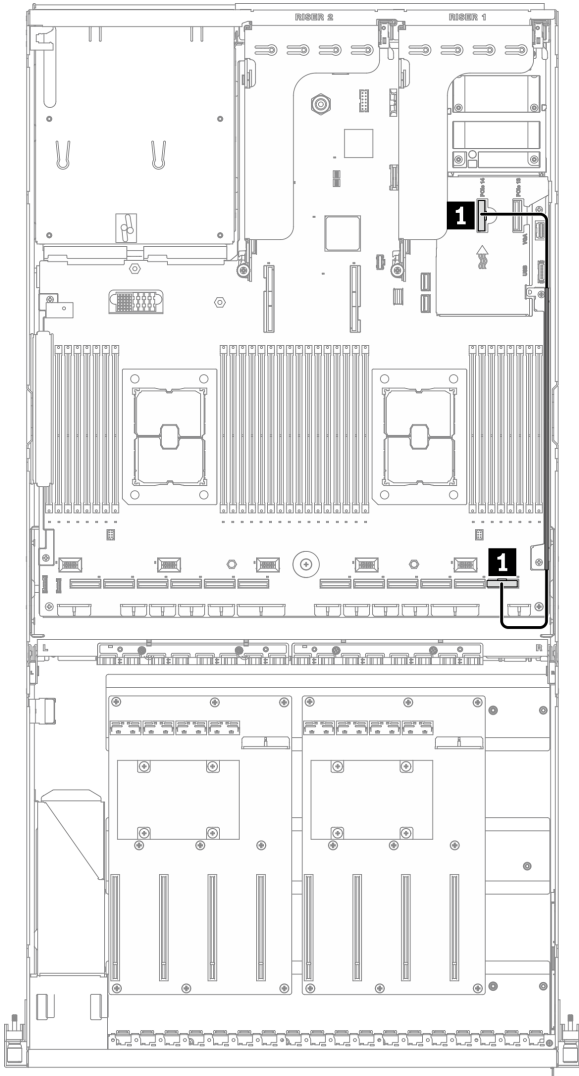


Figure 75. OCP Ethernet adapter cable routing – Configuration J

From		To	
System board	<b>1</b> PCIe connector 14	System board	<b>1</b> PCIe connector 1

## Configuration K cable routing

Follow the instructions in this section to learn how to do cable routing for Configuration K.

### **Configuration K cable routing includes the following items:**

1. Drive backplane cable routing
2. GPU distribution board cable routing
3. Front I/O expansion board cable routing
4. OCP Ethernet adapter cable routing

Cabling for these components are illustrated below.

## Drive backplane cable routing

Connect the drive backplane signal cables and power cable as illustrated.

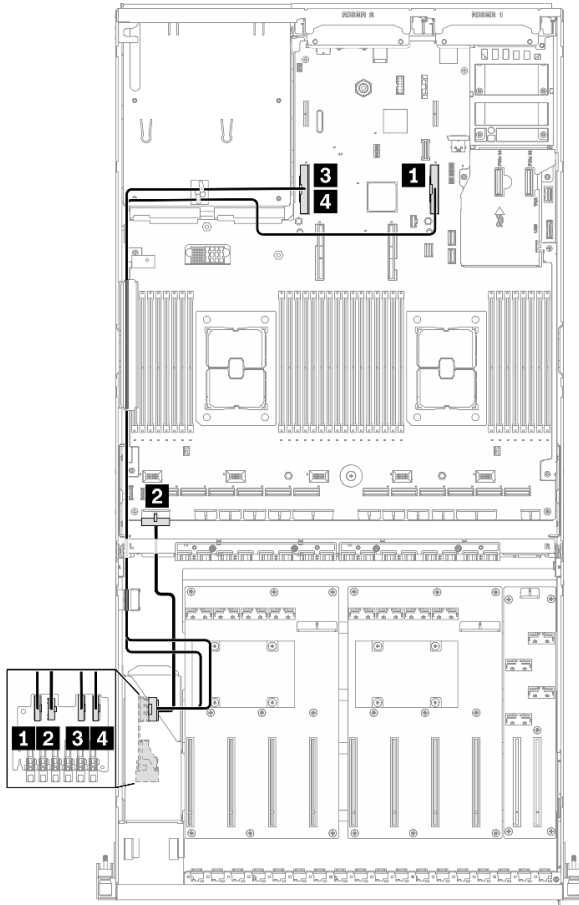


Figure 76. Drive backplane cable routing – Configuration K

From		To	
Drive backplane	<b>1</b> EDSFF 0-1	System board	<b>1</b> PCIe connector 15
	<b>2</b> Power connector		<b>2</b> Backplane power 1 connector
	<b>3</b> EDSFF 2-3		<b>3</b> PCIe connector 16
	<b>4</b> EDSFF 4-5		<b>4</b> PCIe connector 16



## GPU distribution board cable routing

Connect the GPU distribution board signal cables and power cable as illustrated.

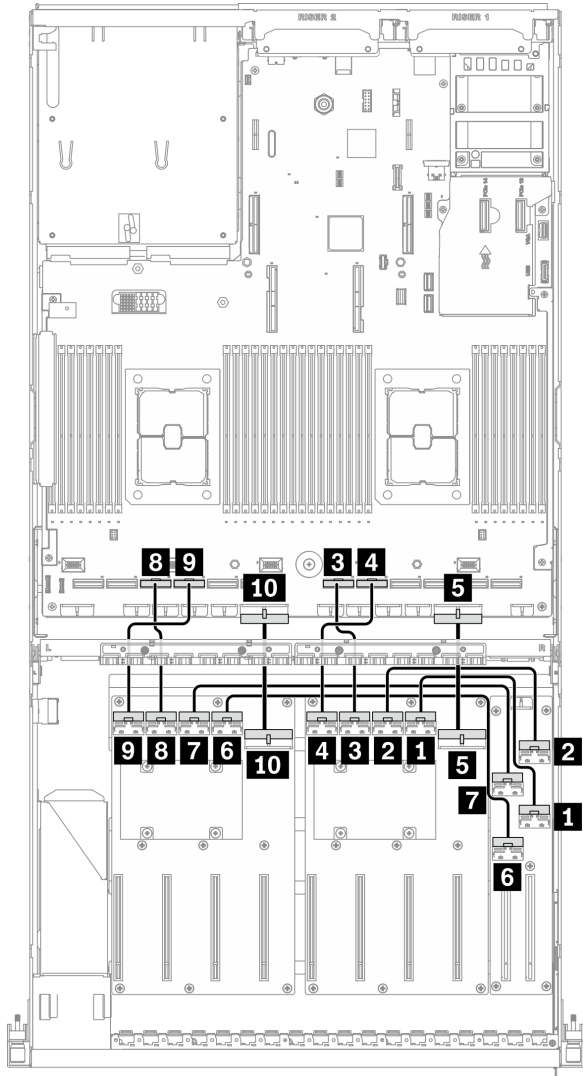


Figure 77. GPU distribution board cable routing – Configuration K

From			To		
GPU distribution board (Right side)	<b>1</b> MCIO connector A	GPU #3	Front I/O expansion board	<b>1</b> MCIO connector A	
	<b>2</b> MCIO connector B	GPU #4		<b>2</b> MCIO connector B	
	<b>3</b> MCIO connector C	GPU #5	System board	<b>3</b> PCIe connector 6	
	<b>4</b> MCIO connector D	GPU #6		<b>4</b> PCIe connector 5	
	<b>5</b> Power connector			<b>5</b> PCIe adapter distribution board power 1 connector	
GPU distribution board (Left side)	<b>6</b> MCIO connector A	GPU #7	Front I/O expansion board	<b>6</b> MCIO connector C	
	<b>7</b> MCIO connector B	GPU #8	Front I/O expansion board	<b>7</b> MCIO connector D	
	<b>8</b> MCIO connector C	GPU #9	System board	<b>8</b> PCIe connector 10	

From		To	
	9 MCIO connector D	GPU #10	9 PCIe connector 9
	10 Power connector		10 PCIe adapter distribution board power 2 connector

## Front I/O expansion board cable routing

Connect the front I/O expansion board signal cables and power cable as illustrated.

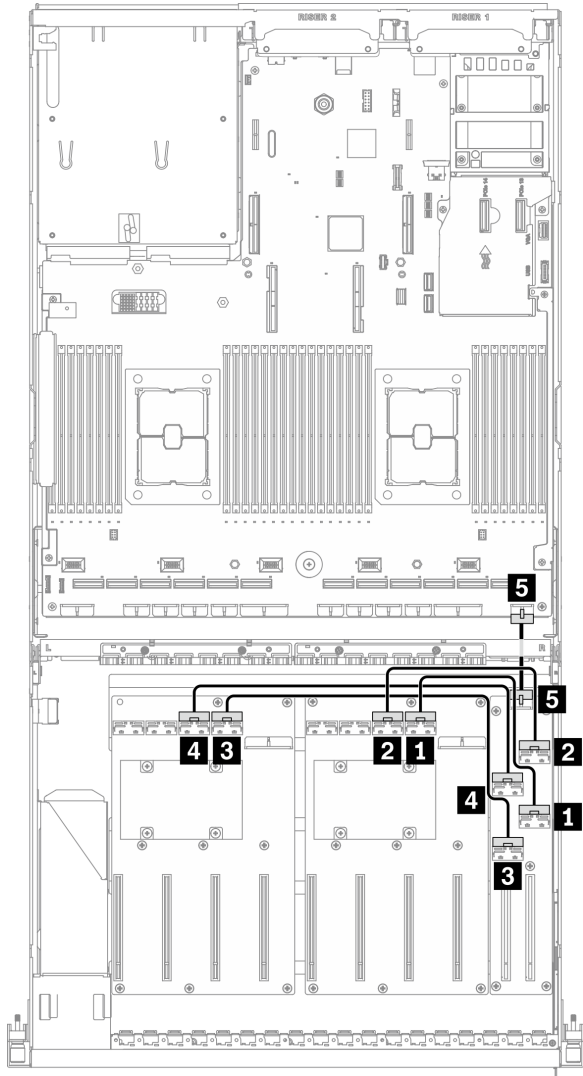


Figure 78. Front I/O expansion board cable routing – Configuration K

From			To		
Front I/O expansion board	<b>1</b> MCIO connector A	Slot #1	GPU distribution board (Right side)	<b>1</b> MCIO connector A	
	<b>2</b> MCIO connector B			<b>2</b> MCIO connector B	
	<b>3</b> MCIO connector C	Slot #2	GPU distribution board (Left side)	<b>3</b> MCIO connector A	
	<b>4</b> MCIO connector D			<b>4</b> MCIO connector B	
	<b>5</b> Power connector		System board	<b>5</b> Front I/O expansion board power connector	

## OCP Ethernet adapter cable routing

Connect the OCP Ethernet adapter signal cable as illustrated.

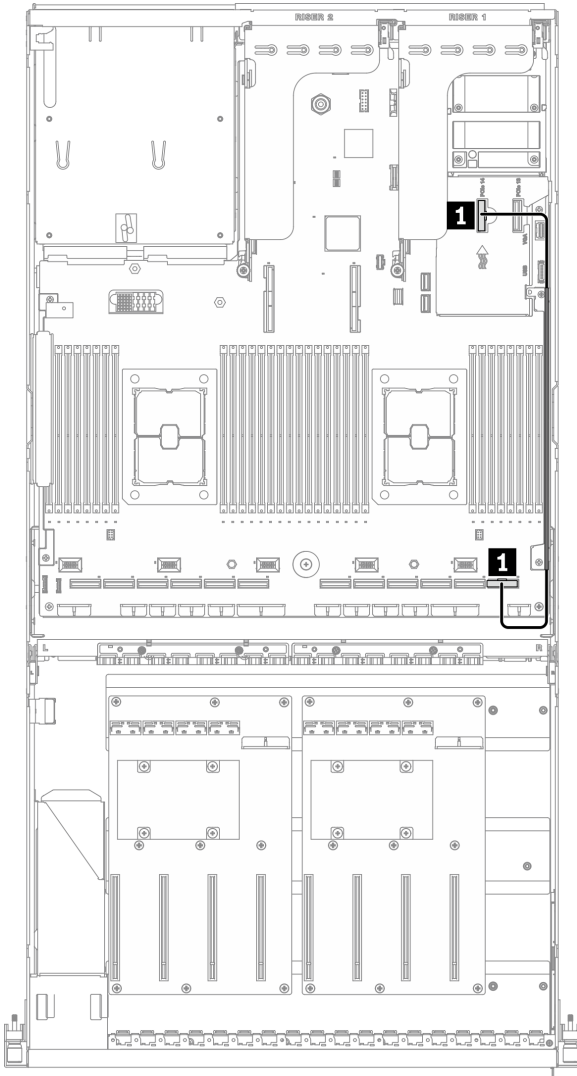


Figure 79. OCP Ethernet adapter cable routing – Configuration K

From		To	
System board	<b>1</b> PCIe connector 1	System board	<b>1</b> PCIe connector 14

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## SXM GPU Model cable routing

Follow the instructions in this section to learn how to do cable routing for SXM GPU Model.

### Identifying connectors

Go through the following sections to acquire necessary information before starting cable routing.

- For the connectors on system board, see [“System-board connectors” on page 34](#).
- For the connectors on the drive backplane, front I/O expansion board, and retimer assembly, see [“Identifying connectors” on page 58](#).

### SXM GPU Model configurations

Cable routing is different by configuration. See the table below for the configuration that matches your server, and refer to the corresponding cable routing guide.

Drive quantity	OCP Ethernet adapter	Configurations
Eight drives		Configuration F
Four drives	V	Configuration G

Refer to the corresponding cable routing guide:

- For Configuration F, see [“Configuration F cable routing” on page 135](#)
- For Configuration G, see [“Configuration G cable routing” on page 141](#)

Make sure to route the cables through cable guide and cable clip as instructed in the cable routing guides. See the illustration below for the cable guide and cable clip locations.

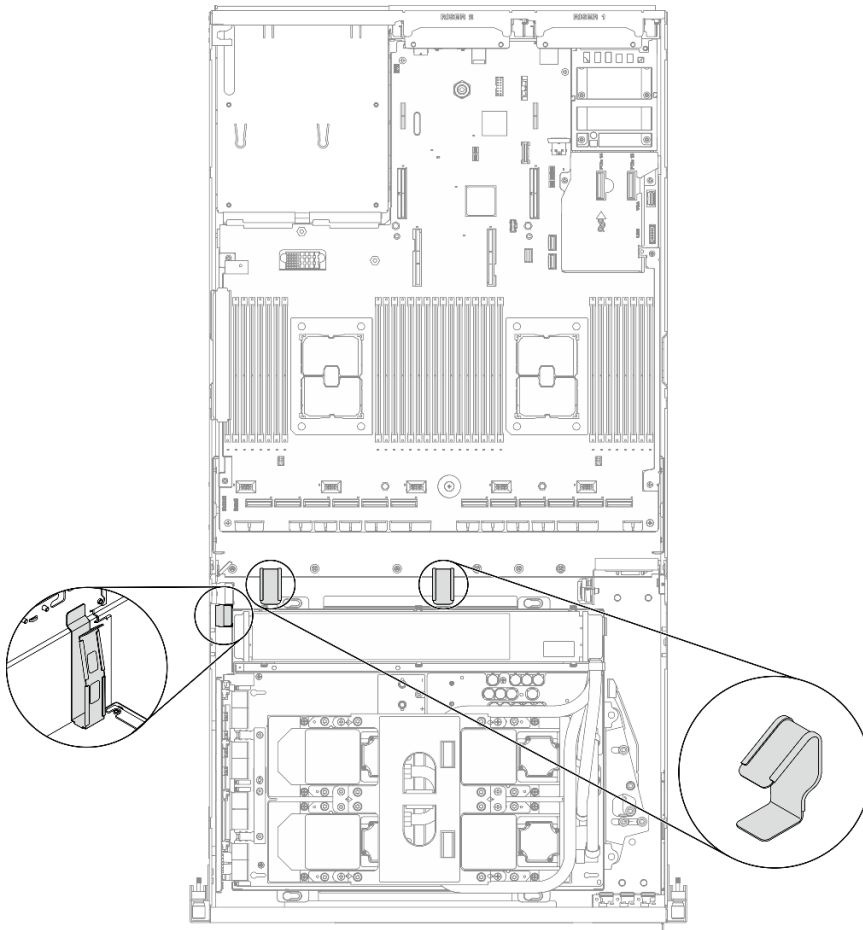


Figure 80. Cable guide and cable clip locations in the chassis

## **Configuration F cable routing**

Follow the instructions in this section to learn how to do cable routing for Configuration F.

**Configuration F cable routing includes the following components:**

1. Drive backplane cable routing
2. Front I/O expansion board cable routing
3. Retimer assembly cable routing
4. Cold plate assembly cable routing

Cabling for these components are illustrated below.

## Drive backplane cable routing

Connect the drive backplane signal cables and power cables as illustrated.

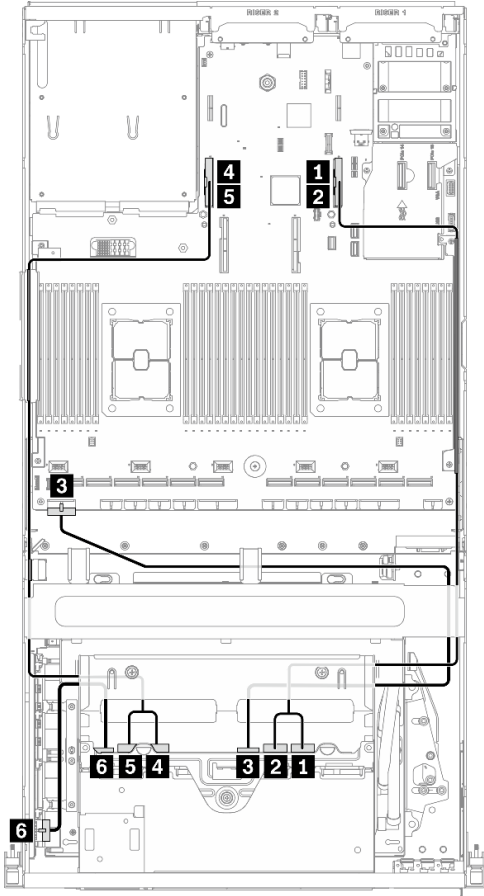


Figure 81. Drive backplane cable routing – Configuration F

From		To	
Drive backplane (right side)	<b>1</b> NVMe 2-3	System board	<b>1</b> PCIe connector 16
	<b>2</b> NVMe 0-1		<b>2</b> PCIe connector 16
	<b>3</b> Power connector		<b>3</b> Backplane power 1 connector
Drive backplane (left side)	<b>4</b> NVMe 2-3		<b>4</b> PCIe connector 15
	<b>5</b> NVMe 0-1		<b>5</b> PCIe connector 15
	<b>6</b> Power connector		Retimer assembly



## Front I/O expansion board cable routing

Connect the front I/O expansion board signal cables and power cable as illustrated.

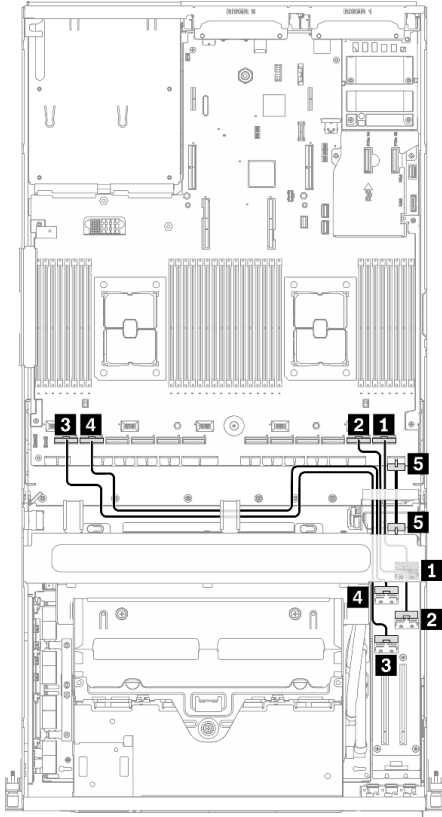


Figure 82. Front I/O expansion board cable routing – Configuration F

From			To	
Front I/O expansion board	<b>1</b> MCI0 connector B	Slot #1	System board	<b>1</b> PCIe connector 1
	<b>2</b> MCI0 connector A			<b>2</b> PCIe connector 2
	<b>3</b> MCI0 connector C	Slot #2		<b>3</b> PCIe connector 12
	<b>4</b> MCI0 connector D			<b>4</b> PCIe connector 11
	<b>5</b> Power connector			<b>5</b> Front I/O expansion board power connector

### Retimer assembly cable routing

Retimer assembly cable routing includes the following items:

1. Retimer assembly power cable
2. Retimer assembly signal cables

### Retimer assembly power cable

Connect the retimer assembly power cable as illustrated.

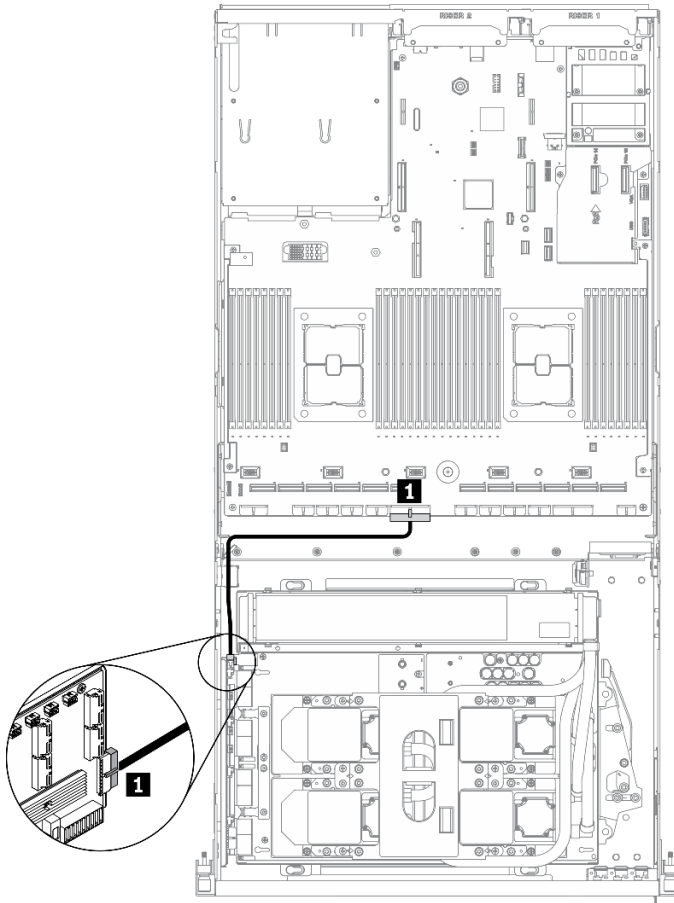


Figure 83. Retimer assembly cable routing (power cable) – Configuration F

From		To	
Retimer assembly	<b>1</b> Power connector	System board	<b>1</b> PCIe adapter distribution board power 2 connector

## Retimer assembly signal cables

Connect the retimer assembly signal cables as illustrated.

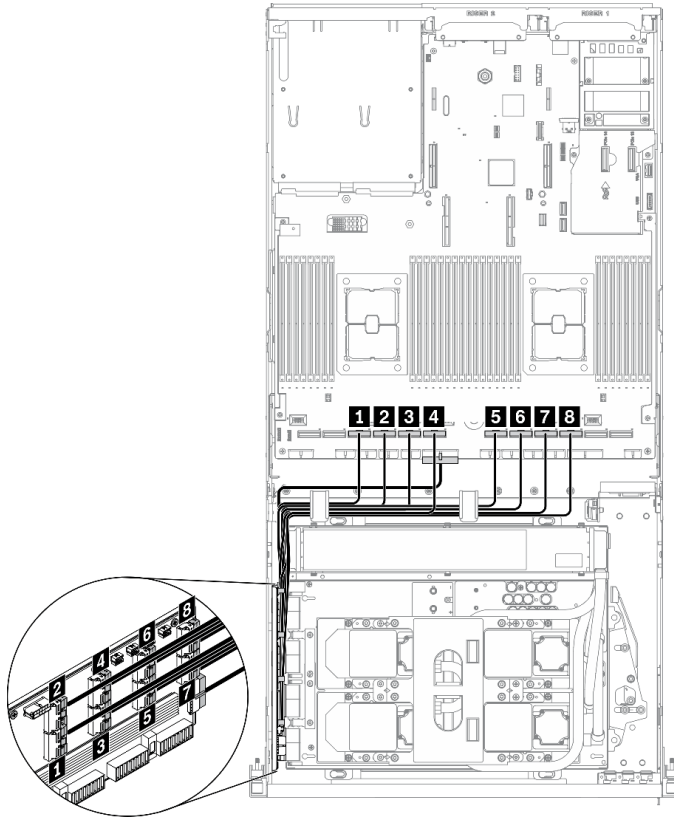


Figure 84. Retimer assembly cable routing (signal cables) – Configuration F

From		To	
Retimer assembly	<b>1</b> MCIO connector A	System board	<b>1</b> PCIe connector 10
	<b>2</b> MCIO connector B		<b>2</b> PCIe connector 9
	<b>3</b> MCIO connector C		<b>3</b> PCIe connector 8
	<b>4</b> MCIO connector D		<b>4</b> PCIe connector 7
	<b>5</b> MCIO connector E		<b>5</b> PCIe connector 6
	<b>6</b> MCIO connector F		<b>6</b> PCIe connector 5
	<b>7</b> MCIO connector G		<b>7</b> PCIe connector 4
	<b>8</b> MCIO connector H		<b>8</b> PCIe connector 3

### Cold plate assembly cable routing

Connect the cold plate assembly pump cables to the retimer assembly as illustrated.

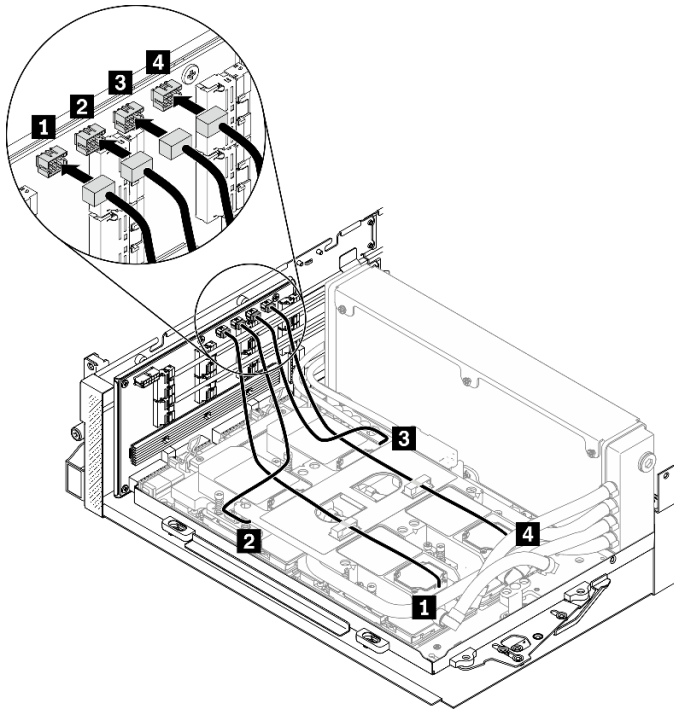


Figure 85. Cold plate assembly pump cables to the retimer assembly cable routing – Configuration F

From		To	
Retimer assembly	<b>1</b> Cold plate assembly pump cable connector 1	Cold plate assembly	<b>1</b> Cold plate 1
	<b>2</b> Cold plate assembly pump cable connector 2		<b>2</b> Cold plate 2
	<b>3</b> Cold plate assembly pump cable connector 3		<b>3</b> Cold plate 3
	<b>4</b> Cold plate assembly pump cable connector 4		<b>4</b> Cold plate 4

## **Configuration G cable routing**

Follow the instructions in this section to learn how to do cable routing for Configuration G.

**Configuration G cable routing includes the following components:**

1. Drive backplane cable routing
2. OCP Ethernet adapter cable routing
3. Front I/O expansion board cable routing
4. Retimer assembly cable routing
5. Cold plate assembly cable routing

Cabling for these components are illustrated below.

## Drive backplane cable routing

Connect the drive backplane signal cables and power cable as illustrated.

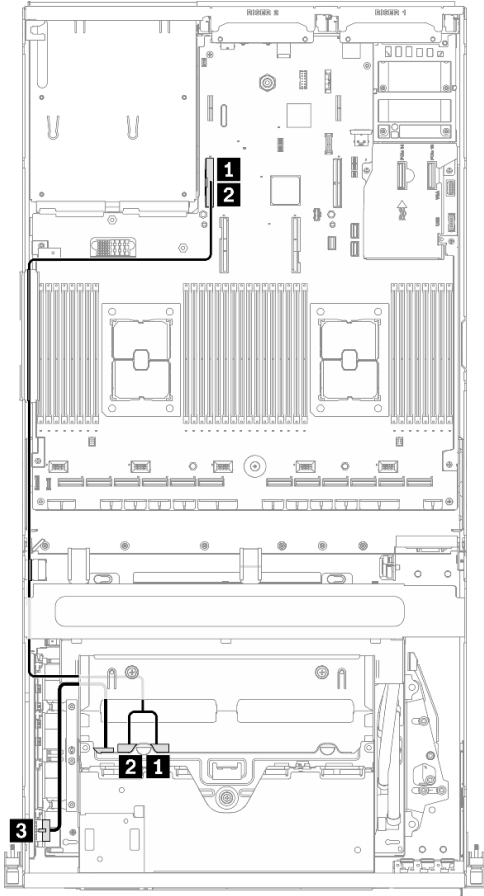


Figure 86. Drive backplane cable routing – Configuration G

From		To	
Drive backplane	<b>1</b> NVMe 2-3	System board	<b>4</b> PCIe connector 15
	<b>2</b> NVMe 0-1		<b>5</b> PCIe connector 15
	<b>3</b> Power connector	Retimer assembly	<b>6</b> Backplane power connector

## OCP Ethernet adapter cable routing

Connect the OCP Ethernet adapter signal cables as illustrated.

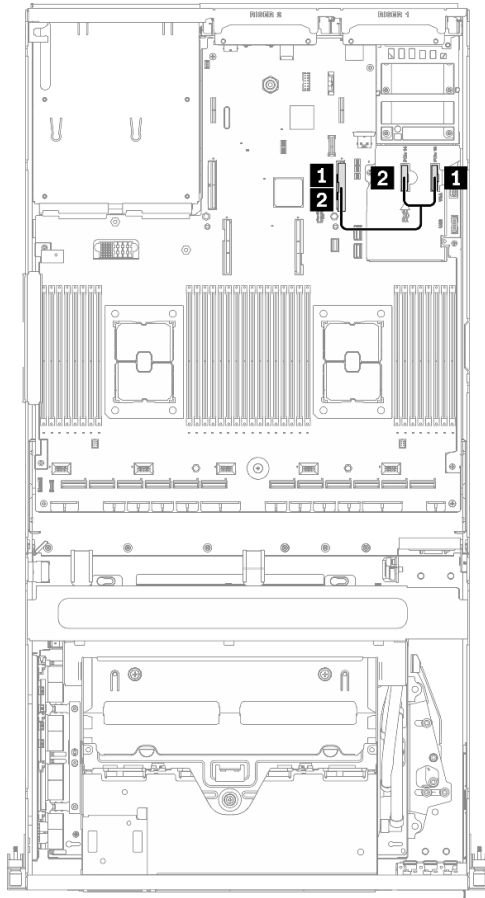


Figure 87. OCP Ethernet adapter cable routing – Configuration G

From		To	
System board	1 PCIe connector 13	System board	1 PCIe connector 15
	2 PCIe connector 14		2 PCIe connector 15

## Front I/O expansion board cable routing

Connect the front I/O expansion board signal cables and power cable as illustrated.

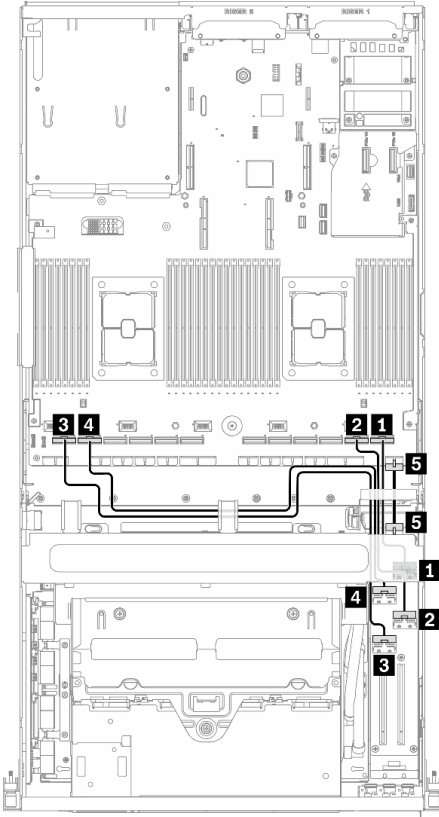


Figure 88. Front I/O expansion board cable routing – Configuration G

From			To	
Front I/O expansion board	<b>1</b> MCI/O connector B	Slot #1	System board	<b>1</b> PCIe connector 1
	<b>2</b> MCI/O connector A			<b>2</b> PCIe connector 2
	<b>3</b> MCI/O connector C	Slot #2		<b>3</b> PCIe connector 12
	<b>4</b> MCI/O connector D			<b>4</b> PCIe connector 11
	<b>5</b> Power connector			<b>5</b> Front I/O expansion board power connector



### Retimer assembly cable routing

Retimer assembly cable routing includes the following items:

1. Retimer assembly power cable
2. Retimer assembly signal cables

### Retimer assembly power cable

Connect the retimer assembly power cable as illustrated.

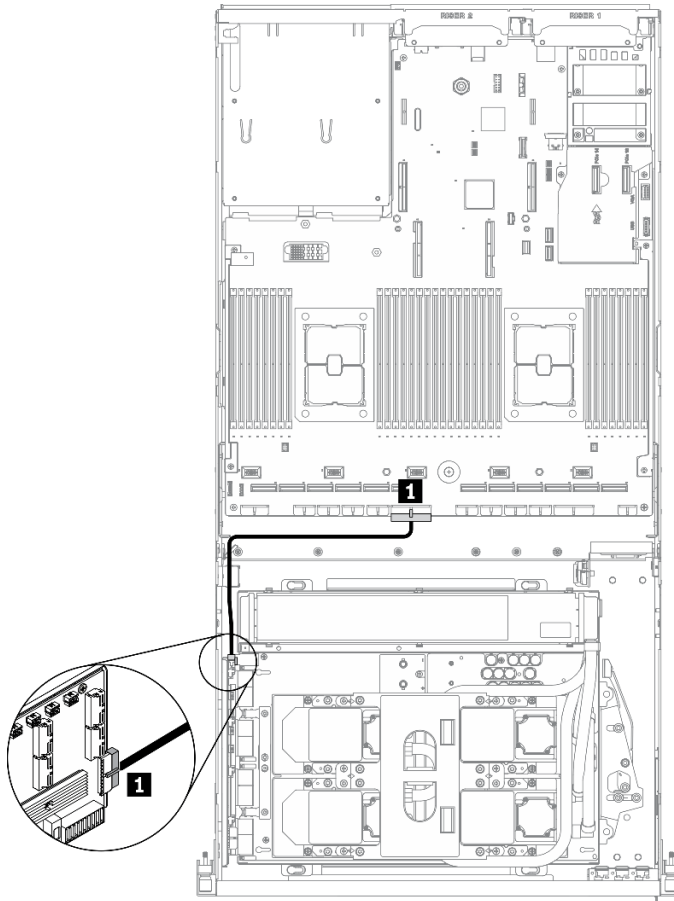


Figure 89. Retimer assembly cable routing (power cable) – Configuration G

From		To	
Retimer assembly	<b>1</b> Power connector	System board	<b>1</b> PCIe adapter distribution board power 2 connector

## Retimer assembly signal cables

Connect the retimer assembly signal cables as illustrated.

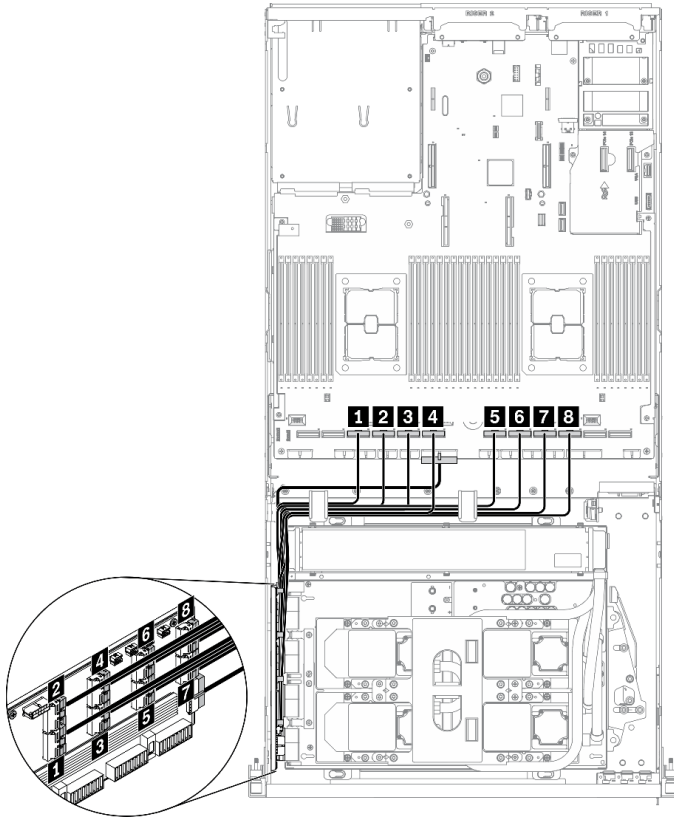


Figure 90. Retimer assembly cable routing (signal cables) – Configuration G

From		To	
Retimer assembly	1 MCIO connector A	System board	1 PCIe connector 10
	2 MCIO connector B		2 PCIe connector 9
	3 MCIO connector C		3 PCIe connector 8
	4 MCIO connector D		4 PCIe connector 7
	5 MCIO connector E		5 PCIe connector 6
	6 MCIO connector F		6 PCIe connector 5
	7 MCIO connector G		7 PCIe connector 4
	8 MCIO connector H		8 PCIe connector 3

### Cold plate assembly cable routing

Connect the cold plate assembly pump cables to the retimer assembly as illustrated.

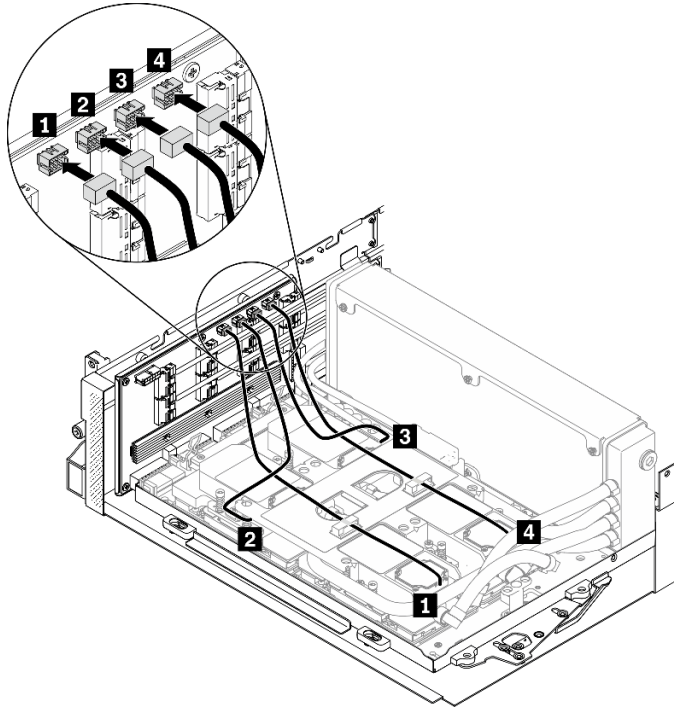


Figure 91. Cold plate assembly pump cables to the retimer assembly cable routing – Configuration G

From		To	
Retimer assembly	<b>1</b> Cold plate assembly pump cable connector 1	Cold plate assembly	<b>1</b> Cold plate 1
	<b>2</b> Cold plate assembly pump cable connector 2		<b>2</b> Cold plate 2
	<b>3</b> Cold plate assembly pump cable connector 3		<b>3</b> Cold plate 3
	<b>4</b> Cold plate assembly pump cable connector 4		<b>4</b> Cold plate 4



---

## Chapter 4. Hardware replacement procedures

This section provides installation and removal procedures for all serviceable system components. Each component replacement procedure references any tasks that need to be performed to gain access to the component being replaced.

For more information about ordering parts:

1. Go to <http://datacentersupport.lenovo.com> and navigate to the support page for your server.
2. Click **Parts**.
3. Enter the serial number to view a listing of parts for your server.

**Note:** If you replace a part, such as an adapter, that contains firmware, you might also need to update the firmware for that part. For more information about updating firmware, see [“Firmware updates” on page 10](#).

---

### Installation Guidelines

Before installing components in your server, read the installation guidelines.

Before installing optional devices, read the following notices carefully:

**Attention:** Prevent exposure to static electricity, which might lead to system halt and loss of data, by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.

- Read the safety information and guidelines to ensure to ensure your safety at work:
  - A complete list of safety information for all products is available at:  
[https://pubs.lenovo.com/safety\\_documentation/](https://pubs.lenovo.com/safety_documentation/)
  - The following guidelines are available as well: [“Handling static-sensitive devices” on page 151](#).
- Make sure the components you are installing are supported by your server. For a list of supported optional components for the server, see <https://serverproven.lenovo.com/>.
- When you install a new server, download and apply the latest firmware. This will help ensure that any known issues are addressed, and that your server is ready to work with optimal performance. Go to [ThinkSystem SR670 V2 Drivers and Software](#) to download firmware updates for your server.

**Important:** Some cluster solutions require specific code levels or coordinated code updates. If the component is part of a cluster solution, verify the latest Best Recipe code level menu for cluster supported firmware and driver before you update the code.

- It is good practice to make sure that the server is working correctly before you install an optional component.
- Keep the working area clean, and place removed components on a flat and smooth surface that does not shake or tilt.
- Do not attempt to lift an object that might be too heavy for you. If you have to lift a heavy object, read the following precautions carefully:
  - Make sure that you can stand steadily without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.

- Back up all important data before you make changes related to the disk drives.
- Have a small flat-blade screwdriver, a small Phillips screwdriver, and a T8 torx screwdriver available.
- To view the error LEDs on the system board and internal components, leave the power on.
- You do not have to turn off the server to remove or install hot-swap power supplies or hot-plug USB devices. However, you must turn off the server before you perform any steps that involve removing or installing adapter cables, and you must disconnect the power source from the server before you perform any steps that involve removing or installing a riser card.
- Blue on a component indicates touch points, where you can grip to remove a component from or install it in the server, open or close a latch, and so on.
- Terra-cotta on a component or a Terra-cotta label on or near a component indicates that the component can be hot-swapped if the server and operating system support hot-swap capability, which means that you can remove or install the component while the server is still running. (Terra-cotta can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- The Red strip on the drives, adjacent to the release latch, indicates that the drive can be hot-swapped if the server and operating system support hot-swap capability. This means that you can remove or install the drive while the server is still running.

**Note:** See the system specific instructions for removing or installing a hot-swap drive for any additional procedures that you might need to perform before you remove or install the drive.

- After finishing working on the server, make sure you reinstall all safety shields, guards, labels, and ground wires.

## Safety inspection checklist

Use the information in this section to identify potentially unsafe conditions with your server. As each machine was designed and built, required safety items were installed to protect users and service technicians from injury.

### Notes:

1. The product is not suitable for use at visual display workplaces according to §2 of the Workplace Regulations.
2. The set-up of the server is made in the server room only.

### CAUTION:

**This equipment must be installed or serviced by trained personnel, as defined by the NEC, IEC 62368-1 & IEC 60950-1, the standard for Safety of Electronic Equipment within the Field of Audio/Video, Information Technology and Communication Technology. Lenovo assumes you are qualified in the servicing of equipment and trained in recognizing hazards energy levels in products. Access to the equipment is by the use of a tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.**

**Important:** Electrical grounding of the server is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

Use the following checklist to verify that there are no potentially unsafe conditions:

1. Make sure that the power is off and the power cord is disconnected.
2. Check the power cord.
  - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.

- Make sure that the power cord is the correct type.

To view the power cords that are available for the server:

- a. Go to:

<http://dcsc.lenovo.com/#/>

- b. Click **Preconfigured Model** or **Configure to order**.

- c. Enter the machine type and model for your server to display the configurator page.

- d. Click **Power → Power Cables** to see all line cords.

- Make sure that the insulation is not frayed or worn.

3. Check for any obvious non-Lenovo alterations. Use good judgment as to the safety of any non-Lenovo alterations.
4. Check inside the server for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
5. Check for worn, frayed, or pinched cables.
6. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

## System reliability guidelines

Review the system reliability guidelines to ensure proper system cooling and reliability.

Make sure the following requirements are met:

- When the server comes with redundant power, a power supply must be installed in each power-supply bay.
- Adequate space around the server must be spared to allow server cooling system to work properly. Leave approximately 50 mm (2.0 in.) of open space around the front and rear of the server. Do not place any object in front of the fans.
- For proper cooling and airflow, refit the server cover before you turn the power on. Do not operate the server for more than 30 minutes with the server cover removed, for it might damage server components.
- Cabling instructions that come with optional components must be followed.
- A failed fan must be replaced within 48 hours after malfunction.
- A removed hot-swap fan must be replaced within 30 seconds after removal.
- A removed hot-swap drive must be replaced within two minutes after removal.
- A removed hot-swap power supply must be replaced within two minutes after removal.
- Every air baffle that comes with the server must be installed when the server starts (some servers might come with more than one air baffle). Operating the server with a missing air baffle might damage the processor.
- All processor sockets must contain either a socket cover or a processor with heat sink.
- When more than one processor is installed, fan population rules for each server must be strictly followed.

## Handling static-sensitive devices

Review these guidelines before you handle static-sensitive devices to reduce the possibility of damage from electrostatic discharge.

**Attention:** Prevent exposure to static electricity, which might lead to system halt and loss of data, by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.

- Limit your movement to prevent building up static electricity around you.
- Take additional care when handling devices during cold weather, for heating would reduce indoor humidity and increase static electricity.
- Always use an electrostatic-discharge wrist strap or other grounding system, particularly when working inside the server with the power on.
- While the device is still in its static-protective package, touch it to an unpainted metal surface on the outside of the server for at least two seconds. This drains static electricity from the package and from your body.
- Remove the device from the package and install it directly into the server without putting it down. If it is necessary to put the device down, put it back into the static-protective package. Never place the device on the server or on any metal surface.
- When handling a device, carefully hold it by the edges or the frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Keep the device from others' reach to prevent possible damages.

---

## Server replacement

Follow instructions in this section to remove and install the server.

### Remove the server from rack

Follow instructions in this section to remove the server from the rack.

#### S036



18 - 32 kg (39 - 70 lb)



32 - 55 kg (70 - 121 lb)

#### R006



#### **CAUTION:**

**Do not place any object on top of a rack-mounted device unless that rack-mounted device is intended for use as a shelf.**

### About this task

#### **Attention:**

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).



**CAUTION:**

**Make sure to have three people operate the server removal procedures to prevent injury.**

**Procedure**

Step 1. Loosen the two thumbscrews located on the front of the server to disengage it from the rack.

## Rack front

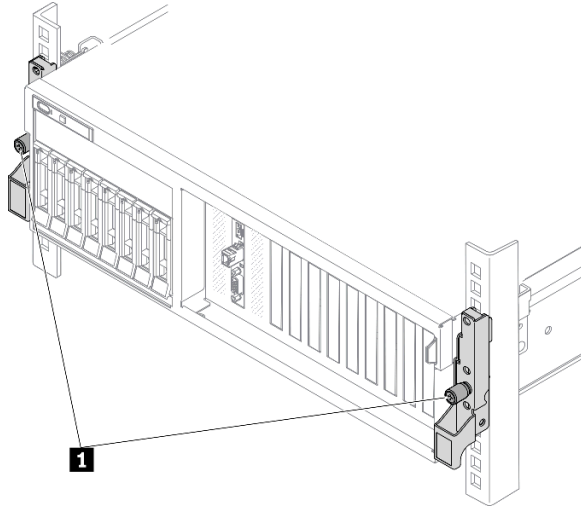


Figure 92. Disengaging server from the rack

1	Thumbscrew
---	------------

Step 2. Hold the mounting ears on the front of the server; then, slide the server all the way out until it stops.

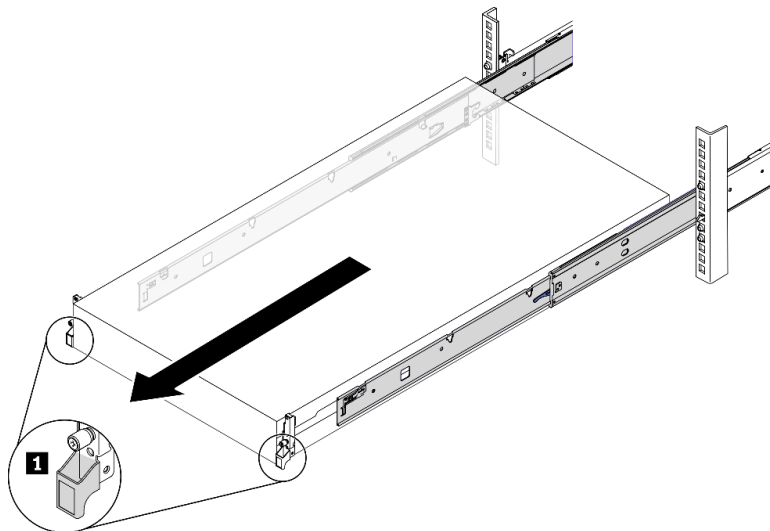


Figure 93. Pulling out the server

1	Mounting ear
---	--------------

Step 3. Remove the server from the rack.

**CAUTION:**

**Make sure three people are lifting the sever by holding the lift points**

## Rack front

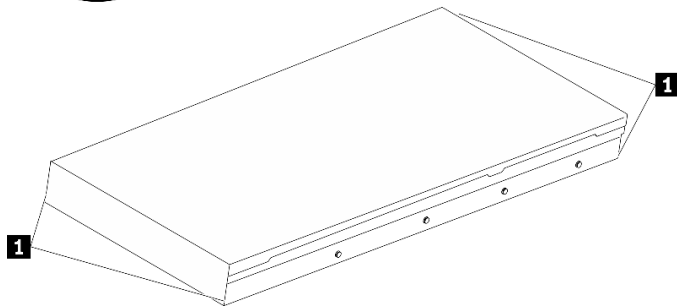


Figure 94. Lifting up the server

<b>1</b>	Lift point
----------	------------

- a. ① Press the release tabs to disengage the rails from the server.
- b. ② Carefully lift up the front end of the server slightly to detach the nailheads from the slots on the rails.
- c. ③ With three people, lift up the serve to remove it from the rails completely. Place the server on a flat and sturdy surface.

## Rack Front

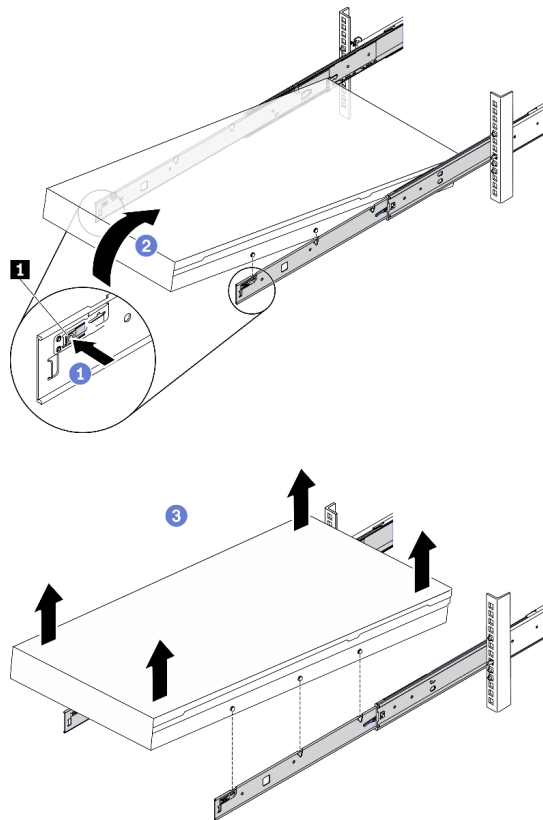


Figure 95. Removing the server from the rack.

<b>1</b>	Release tab
----------	-------------

### After you finish

Carefully lay the server on a flat, static-protective surface.

### Install the server to rack

Follow instructions in this section to install the server to the rack.

#### S036



18 - 32 kg (39 - 70 lb)



32 - 55 kg (70 - 121 lb)

#### R006



**CAUTION:**

Do not place any object on top of a rack-mounted device unless that rack-mounted device is intended for use as a shelf.

**About this task**

**Attention:**

- Read “[Installation Guidelines](#)” on page 149 and “[Safety inspection checklist](#)” on page 150 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “[Power off the server](#)” on page 14.

**CAUTION:**

Make sure to have three people operate the server installation procedures to prevent injury.

**Procedure**

Step 1. From the front of the rack, pull the rails all the way out until they stop

**Attention:** You can only install the server successfully when the rails are fully extended.

**Rack front**

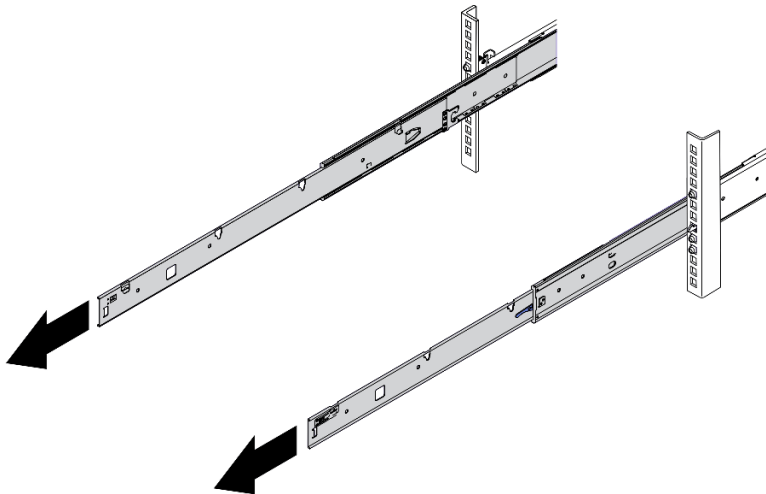


Figure 96. Pulling out the rails

Step 2. Carefully lift up the server with three people.

**CAUTION:**

**Make sure three people are lifting the sever by holding the lift points**

## Rack front

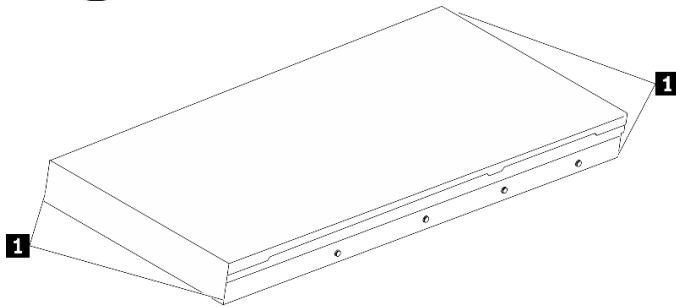


Figure 97. Lifting up the server

<b>1</b>	Lift point
----------	------------

Step 3. From the front of the rack, install server into the rails.

- a. ① Tilt the server and slowly lower the rear end; then, push the rails toward the server and make sure the farthest nailheads on server's left and right side go into the slots on the rail.
- b. ② Slowly lower the server down and make sure the other 3 nailheads on server's left and right side slip into corresponding slots.

**Note:** Inspect the sides of the rails to make sure the nailheads are placed in the slots.

**Attention:** You can only install the server successfully when the rails are fully extended.

## Rack front

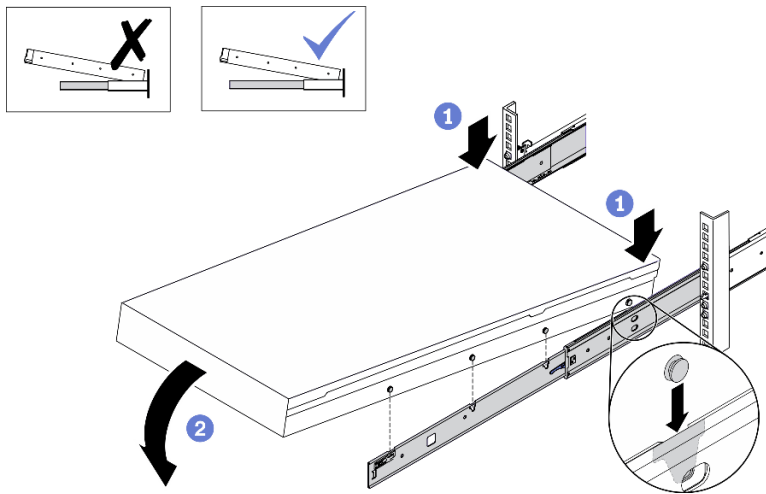


Figure 98. Installing the server into the rails

Step 4. Slide the server into rack.

- a. ① Push up the latches on the rails.
- b. ② Push the server all the way into the rack.

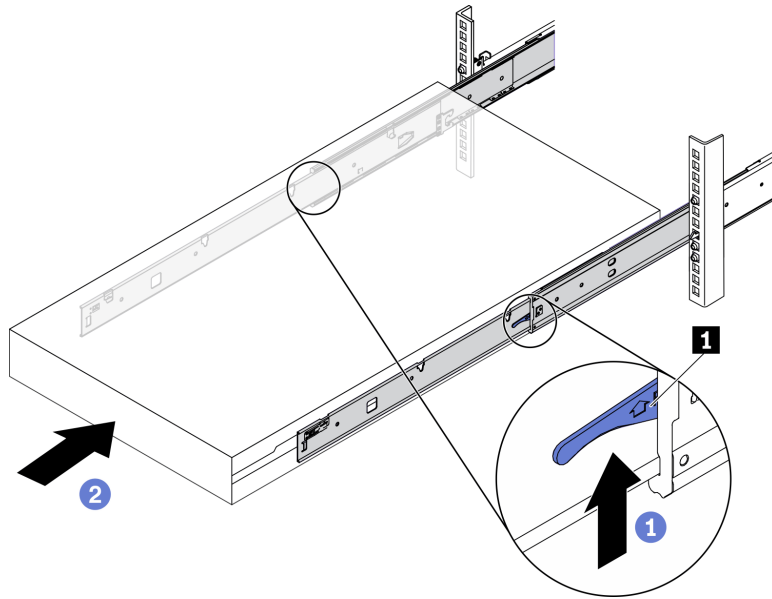


Figure 99. Installing the server into the rack

<b>1</b>	Latch
----------	-------

Step 5. (Optional) Secure the server to the rack.

- a. Secure the server to the rear of the rack. Select the first rail you want to secure. Insert a washer and M5 screw; then, fasten the M5 screw. Repeat to secure the other rail.

## Rack rear

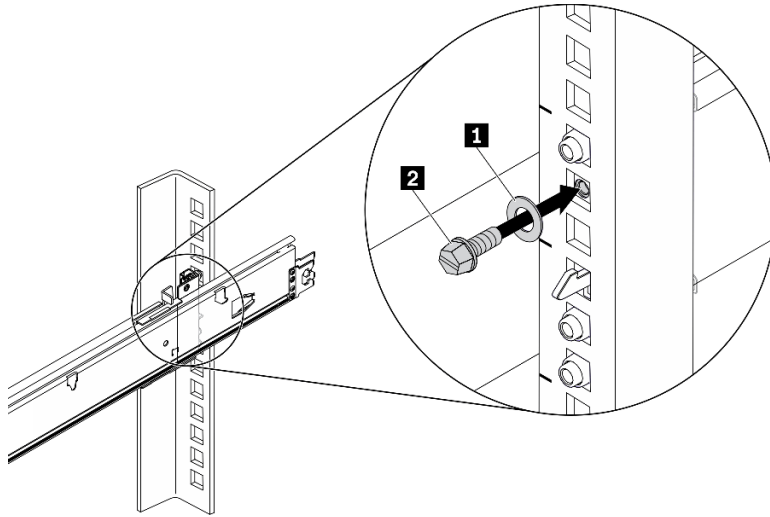


Figure 100. Securing the server to the rear of the rack

<b>1</b>	Washer
<b>2</b>	M5 screw

- b. Secure the server to the front of the rack. Fasten the two thumbscrews located on the front of the server.

## Rack front

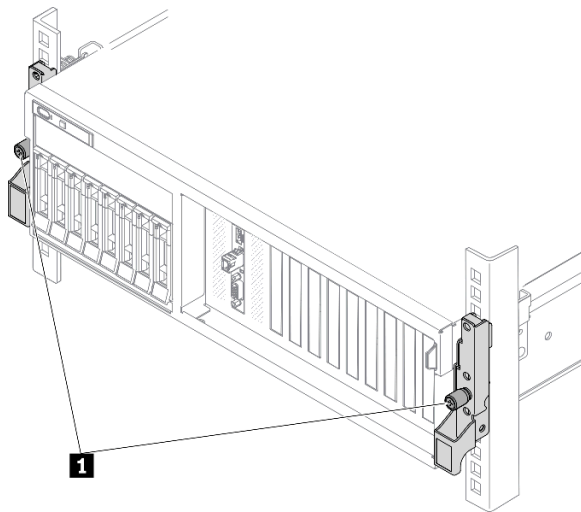


Figure 101. Securing the server to the front of the rack



<b>1</b>	Thumbscrew
----------	------------

## After you finish

1. Reconnect the power cords and any cables that you removed.
2. Power on the server and any peripheral devices. See [“Power on the server” on page 14](#).
3. Update the server configuration. See [“Complete the parts replacement” on page 360](#).

---

## Common components

Follow instructions in this section to remove and install common components in chassis.

### Air baffle replacement

Follow instructions in this section to remove and install the air baffle.

#### Remove the air baffle

Follow instructions in this section to remove the air baffle.

#### About this task

##### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).
- If you intend to install memory modules in the server, you must first remove the air baffle from the server.

#### Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).

Step 2. Disconnect the M.2 backplane cables from the system board.

- a. **1** Press and hold the latches on the M.2 cables.
- b. **2** Disconnect the cables from system board.

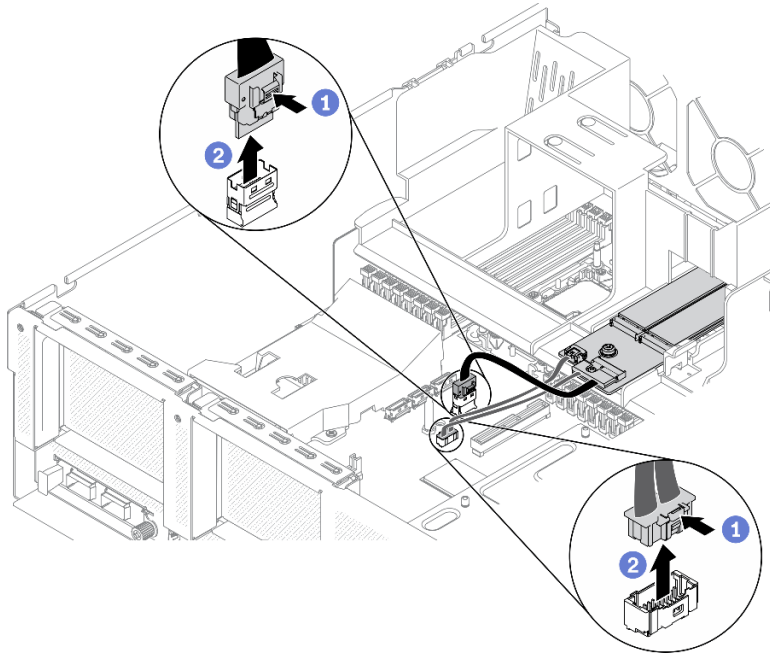


Figure 102. Disconnecting the M.2 backplane cables from system board

Step 3. Grasp the air baffle and carefully lift it out of the chassis.

**Attention:** For proper cooling and airflow, reinstall the air baffle before you turn on the server. Operating the server with the air baffle removed might damage server components.

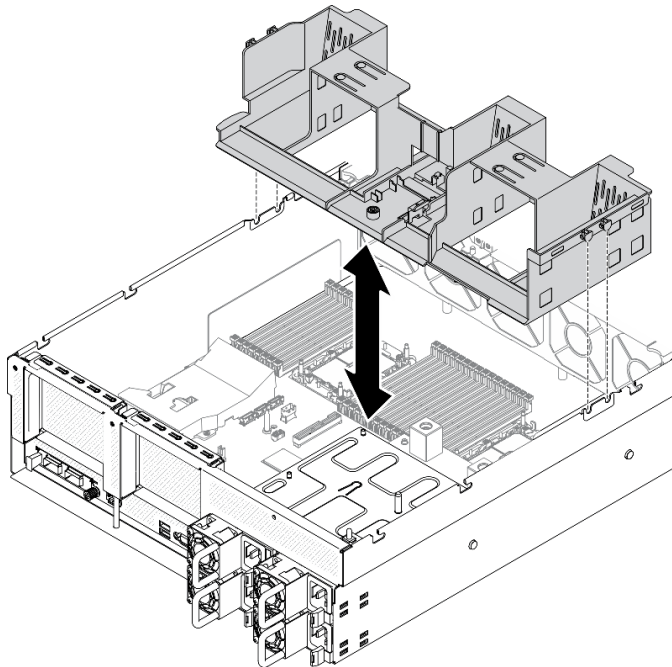


Figure 103. Removing the air baffle

Step 4. Remove the M.2 backplane from the air baffle. See [“Remove the M.2 backplane”](#) on page 196.

## After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

### Demo video

[Watch the procedure on YouTube](#)

## Install the air baffle

Follow instructions in this section to install the air baffle.

### About this task

#### Attention:

- Read “[Installation Guidelines](#)” on page 149 and “[Safety inspection checklist](#)” on page 150 to ensure that you work safely.

**Attention:** For proper cooling and airflow, reinstall the air baffle before you turn on the server. Operating the server with the air baffle removed might damage server components.

### Procedure

**Note:** Close the retaining clip on each end of the memory module connector before installing the air baffle for proper cooling.

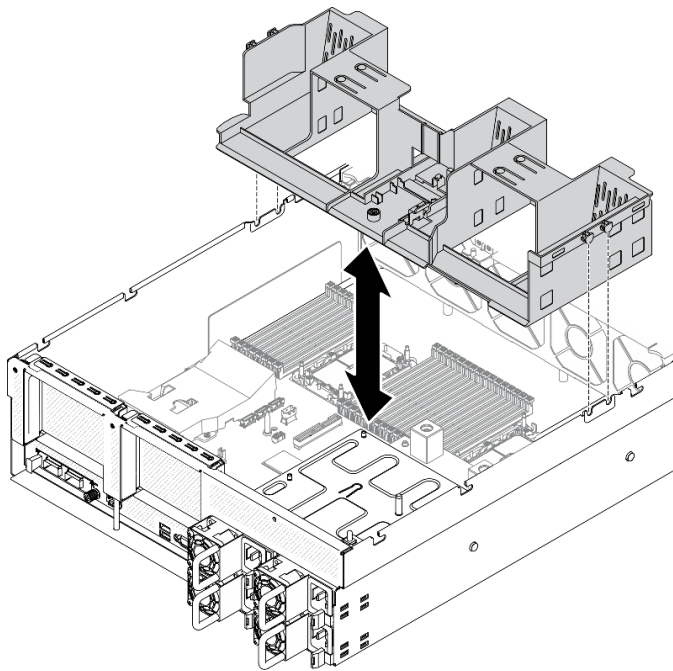


Figure 104. Installing air baffle

- Step 1. Align the air baffle tabs with the air baffle slots on both sides of the chassis; then, lower the air baffle into the server.
- Step 2. Slightly press the air baffle down until it is securely seated.

## After you finish

1. Reinstall the M.2 backplane if needed. See [“Install an M.2 drive” on page 199](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

### Demo video

[Watch the procedure on YouTube](#)

## CMOS battery (CR2032) replacement

Use the following information to remove and install the CMOS battery - CR2032.

### Remove a CMOS battery (CR2032)

Follow instructions in this section to remove a CMOS battery (CR2032).

- Lenovo has designed this product with your safety in mind. The lithium battery must be handled correctly to avoid possible danger. If you replace the battery, you must adhere to the following instructions.
- If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner.
- After you replace the battery, you must reconfigure the server and reset the system date and time.

### S004



#### **CAUTION:**

When replacing the lithium battery, use only Lenovo specified part number or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of. *Do not:*

- Throw or immerse into water
- Heat to more than 100°C (212°F)
- Repair or disassemble

Dispose of the battery as required by local ordinances or regulations.

### S005



#### **CAUTION:**

The battery is a lithium ion battery. To avoid possible explosion, do not burn the battery. Exchange it only with the approved part. Recycle or discard the battery as instructed by local regulations.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

### Procedure

- Step 1. Prepare your server.
  - a. Remove the top cover. See [“Remove the top cover” on page 255](#).
  - b. Remove the PCIe riser 1. See [“Remove a PCIe riser” on page 213](#).
- Step 2. Locate the CMOS battery (CR2032) on the system board. See [“System-board connectors” on page 34](#)
- Step 3. Pivot the CMOS battery (CR2032) toward the PSU bays, and lift the CMOS battery (CR2032) out of the battery socket.

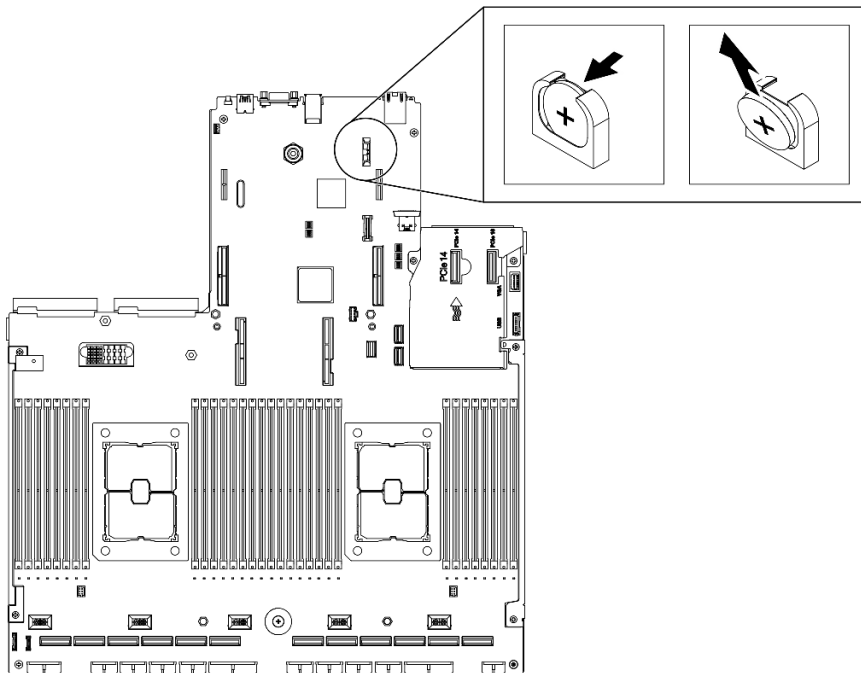


Figure 105. Removing the CMOS battery (CR2032)

### After you finish

- Install a replacement unit. See [“Install the CMOS battery \(CR2032\)” on page 166](#).
- Dispose the component with compliance to local regulations.

### Demo video

[Watch the procedure on YouTube](#)

## Install the CMOS battery (CR2032)

Follow instructions in this section to install the CMOS battery (CR2032).

### S005



#### **CAUTION:**

The battery is a lithium ion battery. To avoid possible explosion, do not burn the battery. Exchange it only with the approved part. Recycle or discard the battery as instructed by local regulations.

### **About this task**

#### **Attention:**

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.

**Important:** The following notes describe information that you must consider when you are replacing the CMOS battery (CR2032) in the server:

- You must replace the CMOS battery (CR2032) with a lithium CMOS battery (CR2032) of the same type from the same manufacturer..
- After you replace the CMOS battery (CR2032), you must reconfigure the server and reset the system date and time.

### **Procedure**

**Note:** Follow any special handling and installation instructions that come with the replacement battery.

Step 1. Follow any special handling and installation instructions that come with the CMOS battery (CR2032).

**Attention:** Touching the CMOS battery (CR2032) on a metal surface, such as the side of the server, when you replace the CMOS battery (CR2032) can cause it to fail.

Step 2. Locate the battery socket on the system board. See [“System-board connectors” on page 34](#).

Step 3. Orient the CMOS battery (CR2032) so that the positive (+) side faces toward the PSU bays.

Step 4. Tilt the CMOS battery (CR2032) at an angle and insert it into the battery socket.

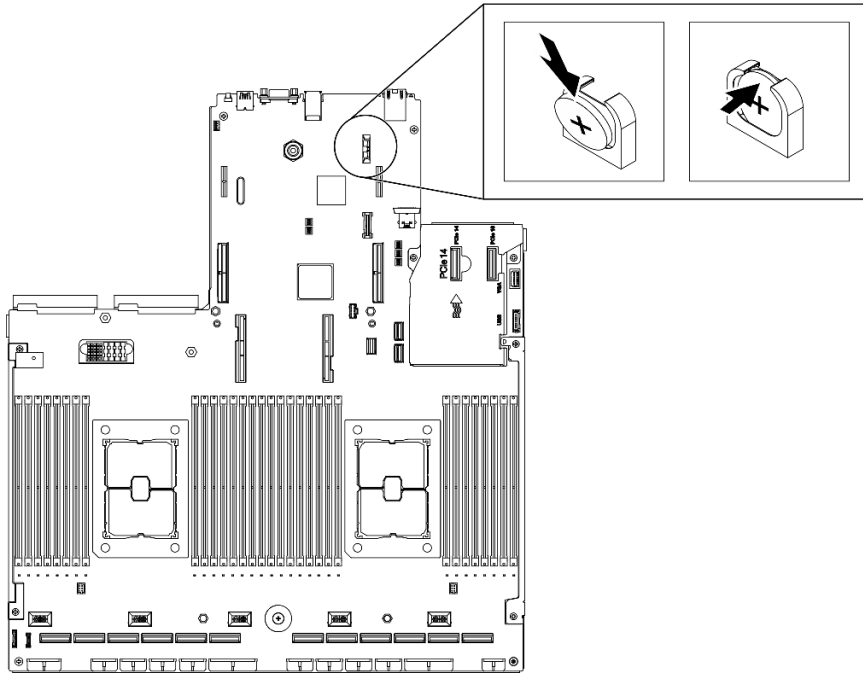


Figure 106. Installing the CMOS battery (CR2032)

### After you finish

1. Reconfigure the server and reset the system date and time.
2. Reinstall the PCIe riser 1 if needed. See [“Install a PCIe riser”](#) on page 219.
3. Complete the parts replacement. See [“Complete the parts replacement”](#) on page 360.

### Demo video

[Watch the procedure on YouTube](#)

## External LCD diagnostics handset replacement

Follow instructions in this section to remove or install the external LCD diagnostics handset.

### Remove the external LCD diagnostics handset

Follow instructions in this section to remove the external LCD diagnostics handset.

### About this task

To avoid possible danger, read and follow the following safety statement.

- **S014**



#### CAUTION:

Hazardous voltage, current, and energy levels might be present. Only a qualified service technician is authorized to remove the covers where the label is attached.

- **S017**



**CAUTION:**  
Hazardous moving fan blades nearby.

- **S033**



**CAUTION:**  
Hazardous energy present. Voltages with hazardous energy might cause heating when shorted with metal, which might result in spattered metal, burns, or both.

**Attention:**

- Read “Installation Guidelines” on page 149 and “Safety inspection checklist” on page 150 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “Power off the server” on page 14.

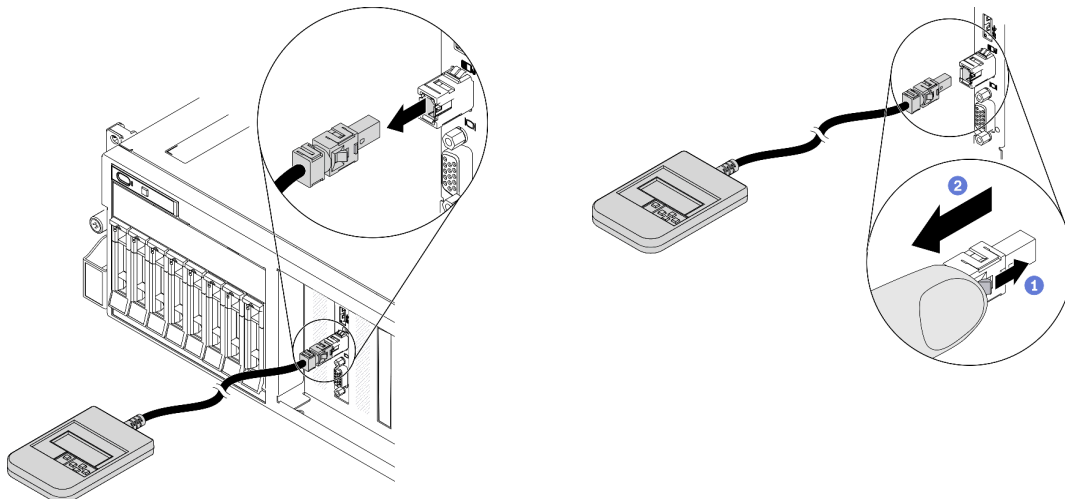
**Procedure**

Step 1. Disconnect the external LCD diagnostics handset cable.

- a. ① Press and hold on the latch on the side of the connector.
- b. ② Pull to disconnect the cable from the server.

**Note:** Depending on your configuration, the server and the location of the connector might look different from those shown in the illustrations.

*Figure 107. Disconnecting the external LCD diagnostics handset cable*





## After you finish

- Install a replacement unit. See [“Install the external LCD diagnostics handset” on page 169](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

### Demo video

[Watch the procedure on YouTube](#)

## Install the external LCD diagnostics handset

Follow instructions in this section to install the external LCD diagnostics handset.

### About this task

To avoid possible danger, read and follow the following safety statement.

- S014



**CAUTION:**

**Hazardous voltage, current, and energy levels might be present. Only a qualified service technician is authorized to remove the covers where the label is attached.**

- S017



**CAUTION:**

**Hazardous moving fan blades nearby.**

- S033



**CAUTION:**

**Hazardous energy present. Voltages with hazardous energy might cause heating when shorted with metal, which might result in spattered metal, burns, or both.**

**Attention:**

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

## Procedure

Step 1. Align the connector on the cable with that on the server and push it in.

**Note:** Depending on your configuration, the server and the location of the connector might look different from those shown in the illustrations.

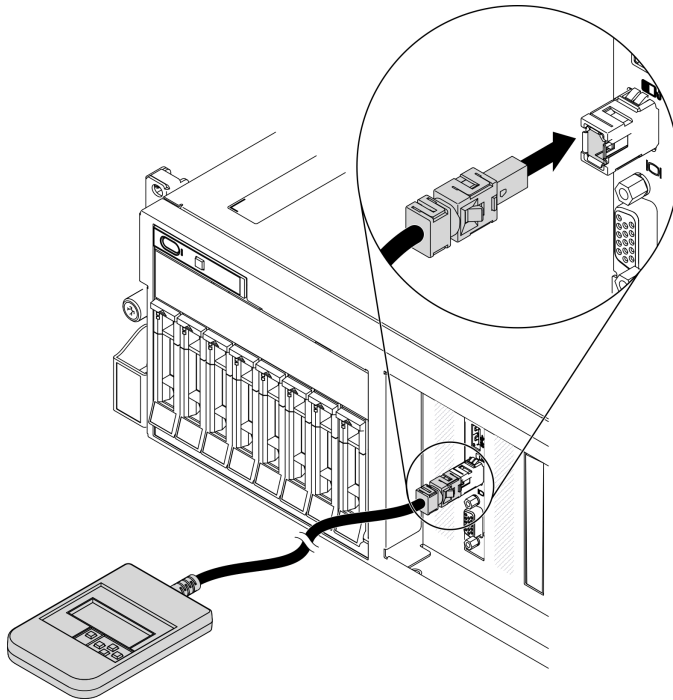


Figure 108. Connecting the external LCD diagnostics handset cable

Step 2. Attach the external LCD diagnostics handset to a metal surface with the magnetic bottom.

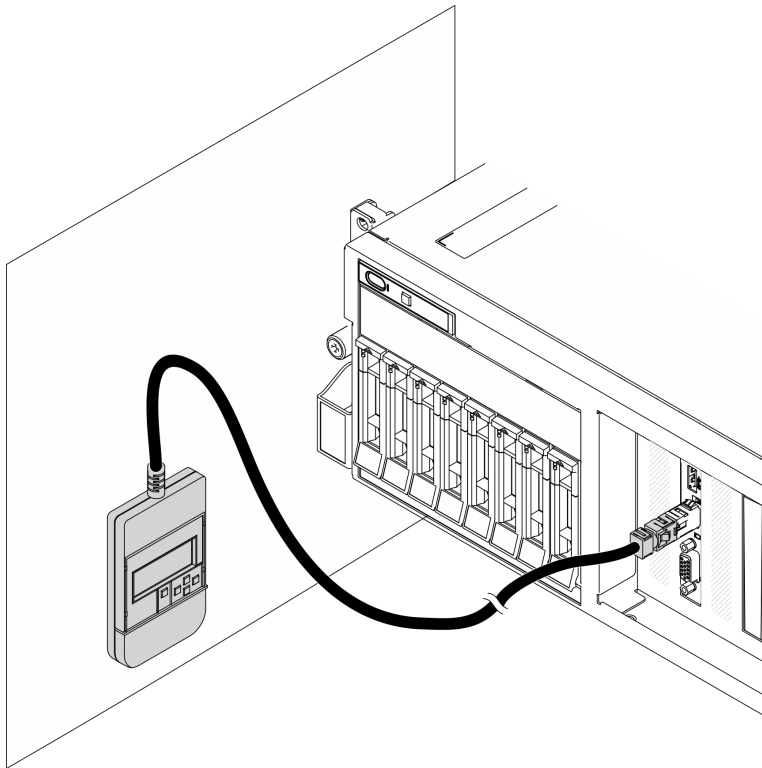


Figure 109. Attaching the external LCD diagnostics handset to a metal surface

## After you finish

Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

## Demo video

[Watch the procedure on YouTube](#)

## Fan cage replacement

Follow instructions in this section to remove and install the fan cage.

### Remove the fan cage

Follow instructions in this section to remove the fan cage.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

## Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).

Step 2. Remove the fan cage.

- a. ① Rotate the release latches on the fan cage up to disengage it from the chassis.
- b. ② Hold the handles, and lift the fan cage out of the chassis.

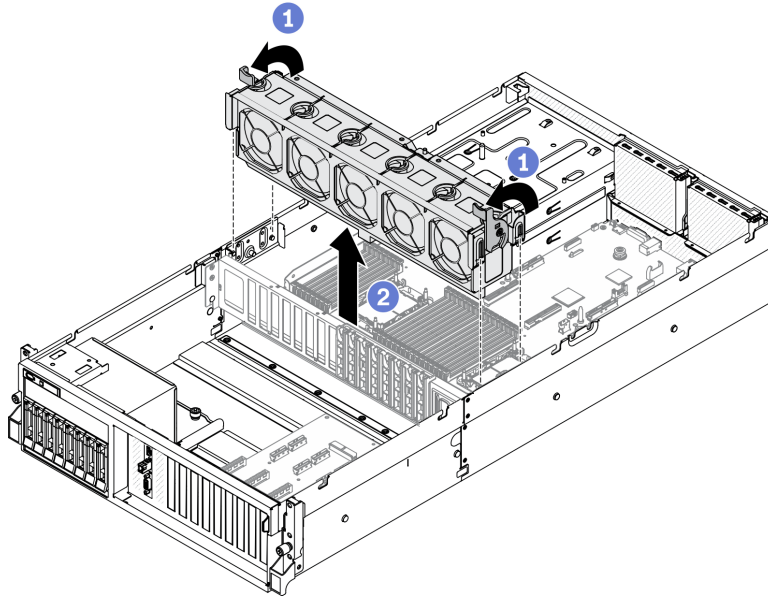


Figure 110. Removing the fan cage

## After you finish

- Install a replacement unit. See [“Install the fan cage” on page 172](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install the fan cage

Follow instructions in this section to install the fan cage.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.

## Procedure

Step 1. Install the fan cage.

- a. ① Align the guide slots on the fan cage with the guide pins on the chassis, and lower the fan cage into the chassis.

- b. 2 Rotate the release latches down until they stop.

**Note:** Press the fan modules to make sure they are seated correctly on the system board.

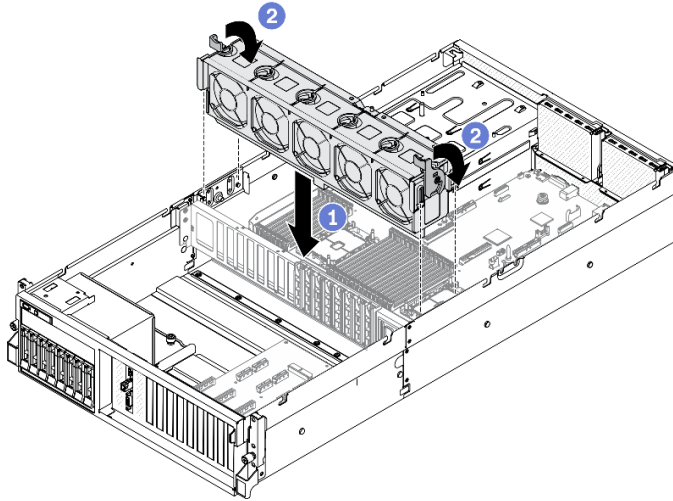


Figure 111. Installing the fan cage

## After you finish

1. Reinstall the fans if needed. See [“Install a fan” on page 174](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

## Demo video

[Watch the procedure on YouTube](#)

## Fan replacement

Follow instructions in this section to remove and install a fan.

### Remove a fan

Follow instructions in this section to remove a fan.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

### Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).

Step 2. Remove a fan.

- a. ① Pinch and hold the blue touch points on top of the fan module.
- b. ② Lift the fan module out of the chassis.

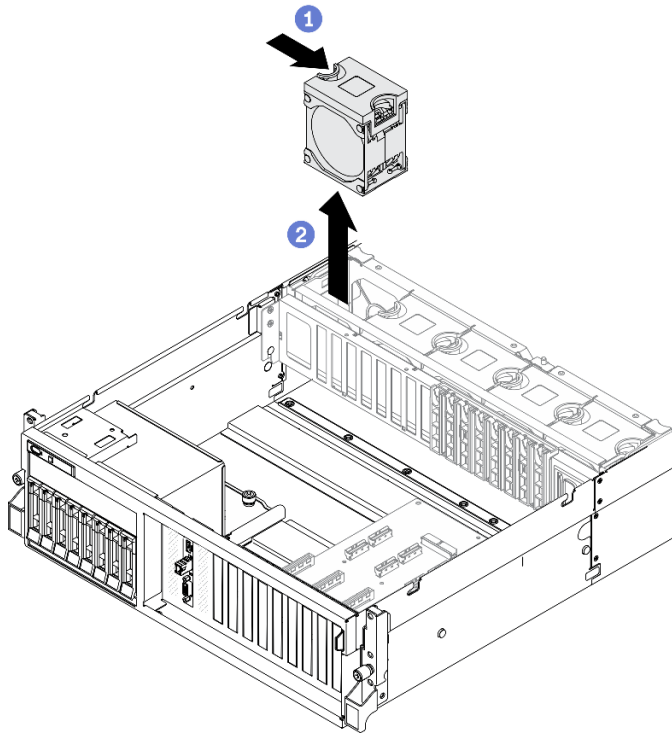


Figure 112. Removing a fan

## After you finish

- Install a replacement unit. See [“Install a fan” on page 174](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install a fan

Follow instructions in this section to install a fan.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Make sure to replace a defective fan with another unit of the exact same type.
- Do not mix single rotor fan and dual rotor fan in the same unit of server.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

## Procedure

- Step 1. Make sure the fan cage is installed in the chassis. See [“Install the fan cage” on page 172](#).
- Step 2. Align the fan to the fan slot in the fan cage; then, insert the fan into the fan cage and press it until it clicks into place.

**Note:** Press the fan to make sure they are seated correctly on the system board.

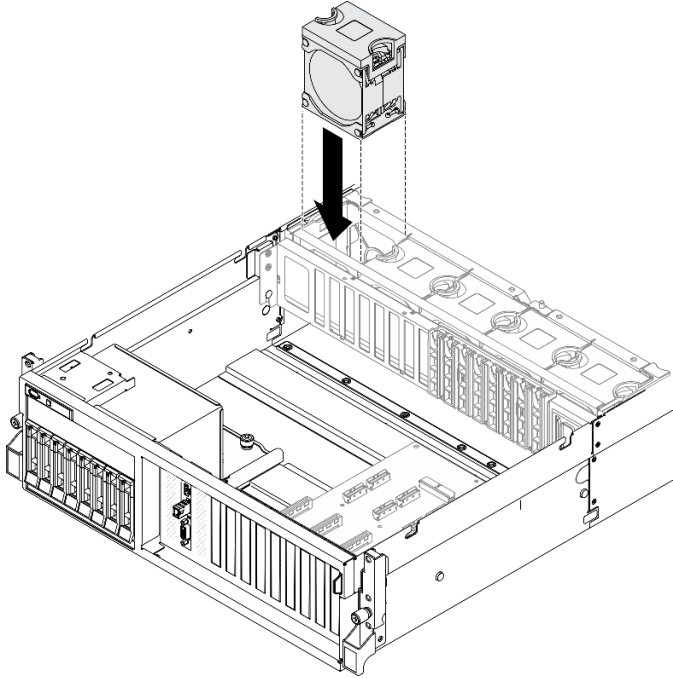


Figure 113. Installing a fan

## After you finish

Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

## Demo video

[Watch the procedure on YouTube](#)

## Flash power module replacement

Follow instructions in this section to remove or install the flash power module.

### Remove the flash power module

Follow instructions in this section to remove the flash power module.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).

- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152.](#)

## Procedure

Step 1. Prepare your server.

- Remove the top cover. See [“Remove the top cover” on page 255.](#)
- Remove the PCIe riser where the flash power module is located. See [“Remove a PCIe riser” on page 213.](#)

Step 2. Disconnect the cable from the flash power module.

Step 3. Remove the flash power module.

- 1 Open the retention latch on the PCIe riser.
- 2 Unfasten the screw that secures the flash power module holder bracket to the PCIe riser.
- 3 Remove the holder bracket from the PCIe riser.
- 4 Press and release the retaining latch.
- 5 Remove the flash power module from the holder.

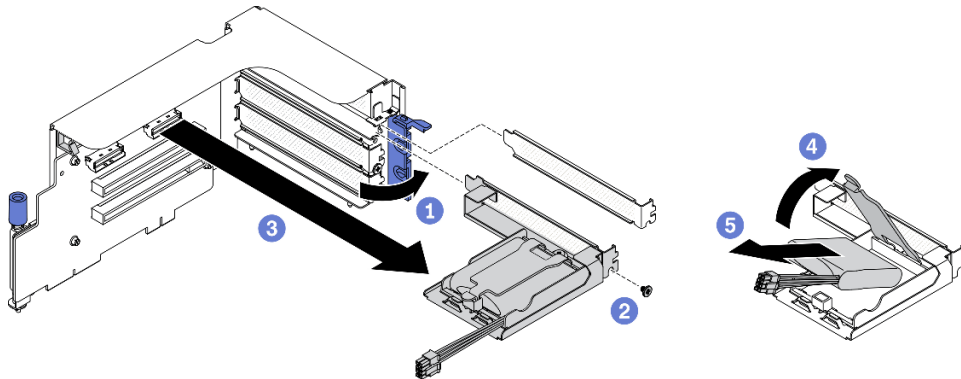


Figure 114. Removing the flash power module

## After you finish

1. Install a replacement unit. See [“Install the flash power module” on page 177.](#)
2. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.
3. If you plan to remove or recycle the flash power module holder:
  - a. Remove the holder from the bracket.
    - 1) 1 Remove the screw that secures the holder to the bracket.
    - 2) 2 Slide the holder forward slightly to disengage it from the bracket, and remove the holder.



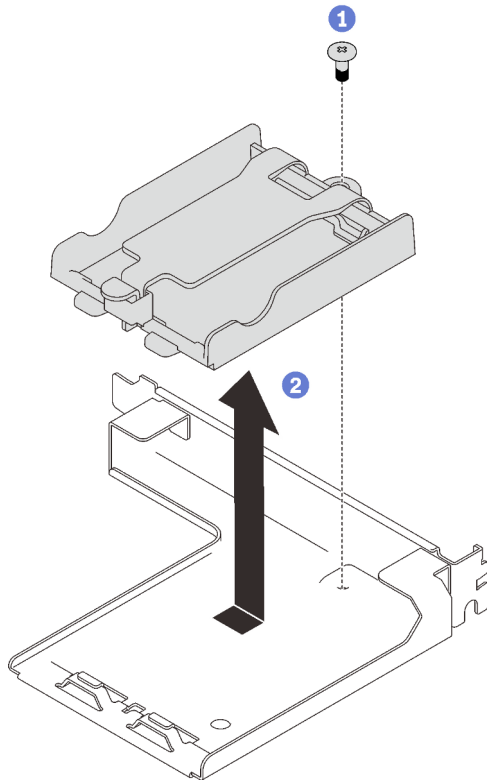


Figure 115. Removing the holder from the bracket

- b. Recycle the component in compliance with local regulations.

### Demo video

[Watch the procedure on YouTube](#)

### Install the flash power module

Follow instructions in this section to install the flash power module.

### About this task

#### Attention:

- Read “[Installation Guidelines](#)” on page 149 and “[Safety inspection checklist](#)” on page 150 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

### Procedure

- Step 1. Install the flash power module.

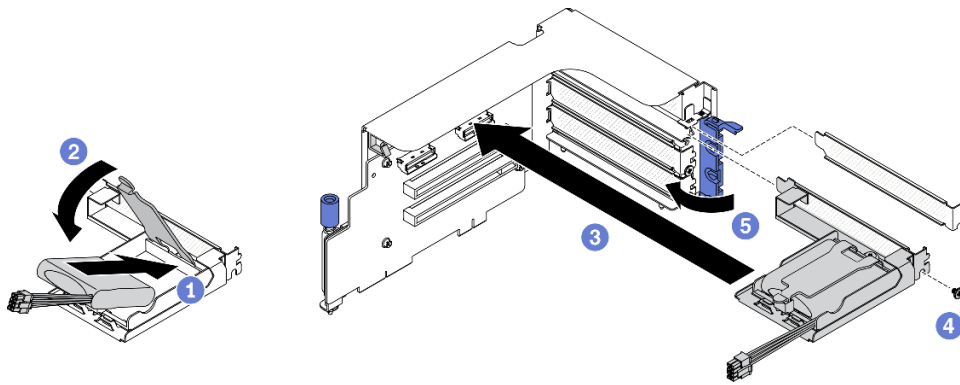


Figure 116. Installing the flash power module

- a. ① Align the flash power module with the holder hinge; then, rotate the other end of the module inward until it is secured in the holder.
- b. ② Close the retaining latch.
- c. ③ Insert the holder bracket into the PCIe riser.
- d. ④ Fasten the screw to secure the holder bracket to the PCIe riser.
- e. ⑤ Close the retention latch.

Step 2. Connect the cable to the corresponding RAID adapter.

### After you finish

1. Reinstall the PCIe riser. See [“Install a PCIe riser” on page 219](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

### Demo video

[Watch the procedure on YouTube](#)

## Front I/O module replacement

Follow instructions in this section to remove or install the front I/O module.

### Remove the front I/O module

Follow instructions in this section to remove the front I/O module.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

### Procedure

Step 1. Prepare your server.

a. Remove the top cover. See [“Remove the top cover” on page 255](#).

Step 2. Disconnect all three cables of the front I/O module from their respective connectors on the system board—VGA cable connector is **7**, USB cable connector is **9**, and LCD diagnostic handset cable connector is **27** specified in [“System-board connectors” on page 34](#).

a. **1** Press release tab(s) to release the connector.

b. **2** Disengage the connector from the cable socket.

**Notes:**

- If there is insufficient space to press both tabs, use the provided loop to pull up and disengage the tabs on both sides.
- Failing to release the tab before removing the cables will damage the cable sockets on the system board. Any damage to the cable sockets **will** require replacing the system board.

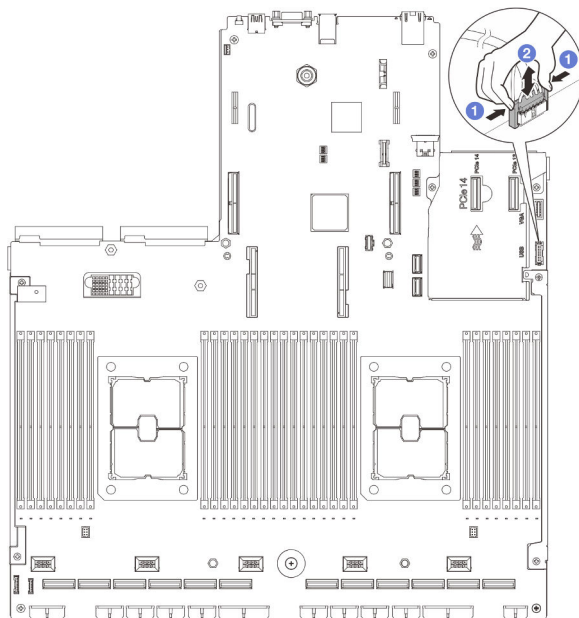


Figure 117. Disconnecting Front USB cable

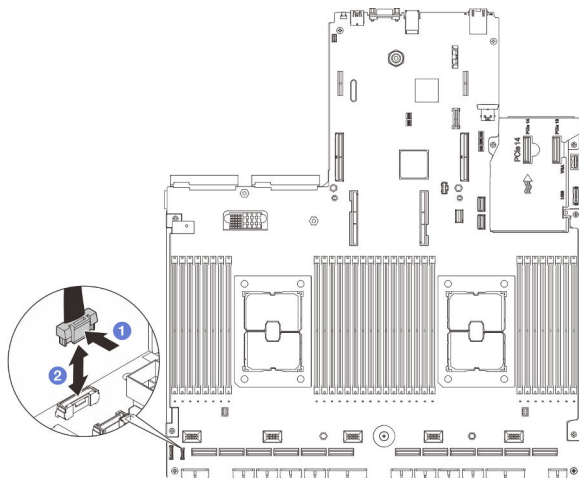
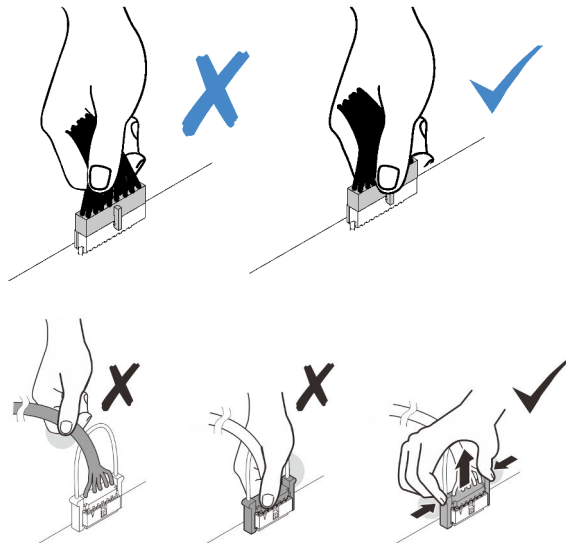


Figure 118. Disconnecting LCD diagnostic handset cable



Step 3. Remove the front I/O module.

- a. 1 Remove the front I/O module retention screw.
- b. 2 Lift the front I/O module out of the chassis.

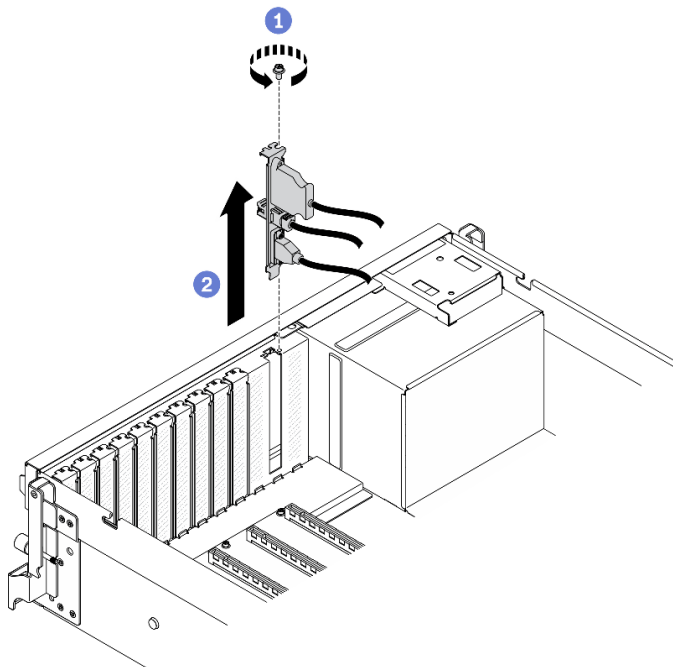


Figure 119. Removing the front I/O module

## After you finish

1. Install a replacement unit or a slot bracket. See [“Install the front I/O module”](#) on page 181.
2. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install the front I/O module

Follow instructions in this section to install the front I/O module.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

### Procedure

Step 1. Locate the front I/O module slot based on the server front view of your configuration. See below for more details:

- [“The 4-DW GPU Model Front view” on page 16](#)
- [“The 8-DW GPU Model Front view” on page 18](#)
- [“The SXM GPU Model front view” on page 21](#)

Step 2. Install the front I/O module.

**Note:** If the front I/O module slot is covered with a slot bracket, remove the bracket from the chassis first.

- 1 Insert the front I/O module into the front I/O module slot. Ensure that the module is fully seated.
- 2 Fasten the front I/O module retention screw.

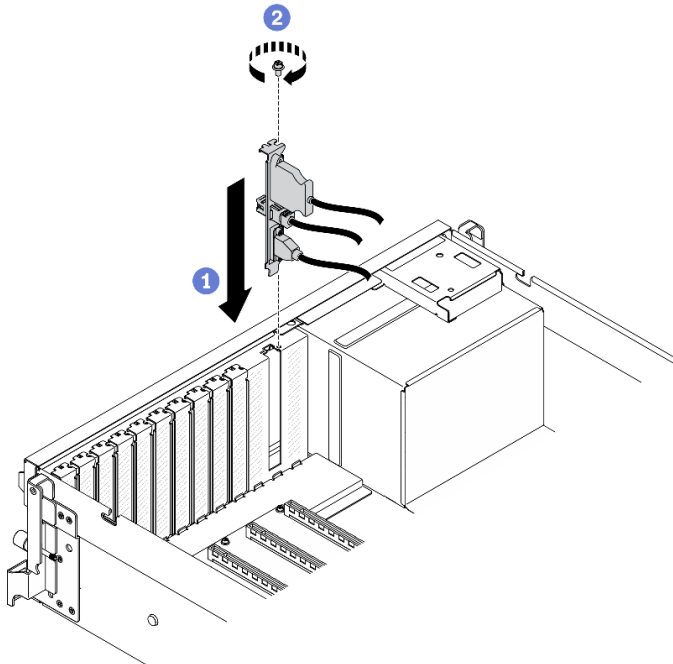


Figure 120. Installing the front I/O module

Step 3. Connect the front USB, video and external LCD diagnostics handset cables from the front I/O module to their respective connectors on the system board.

**Note:** The front I/O module cabling is different by server model. Refer to the front I/O module cable routing guide for each server model below. See [“System-board connectors” on page 34](#) for more details.

From		To	
Front I/O module	<b>1</b> Video cable	System board	<b>1</b> Front VGA connector
	<b>2</b> External LCD diagnostics handset cables		<b>2</b> LCD connector
	<b>3</b> USB cable		<b>3</b> Front USB connector

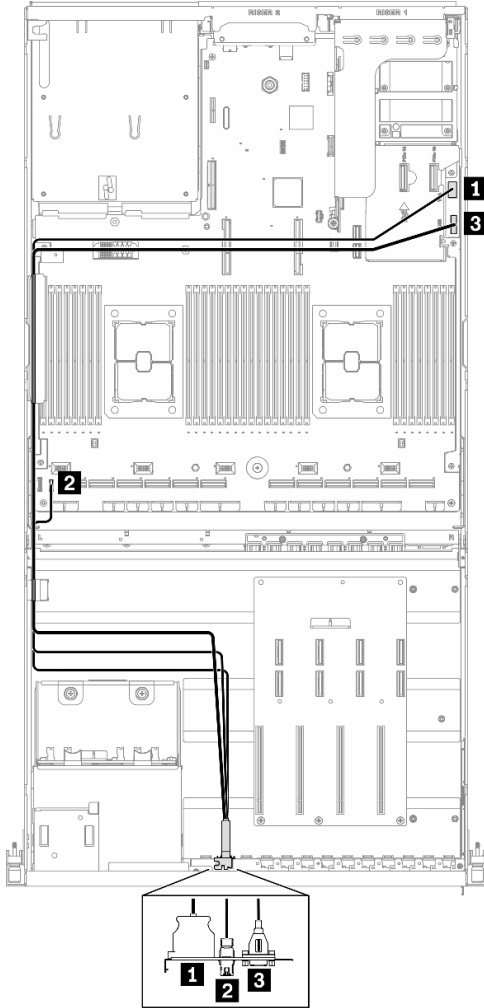


Figure 121. 4-DW GPU Model front I/O module cable routing

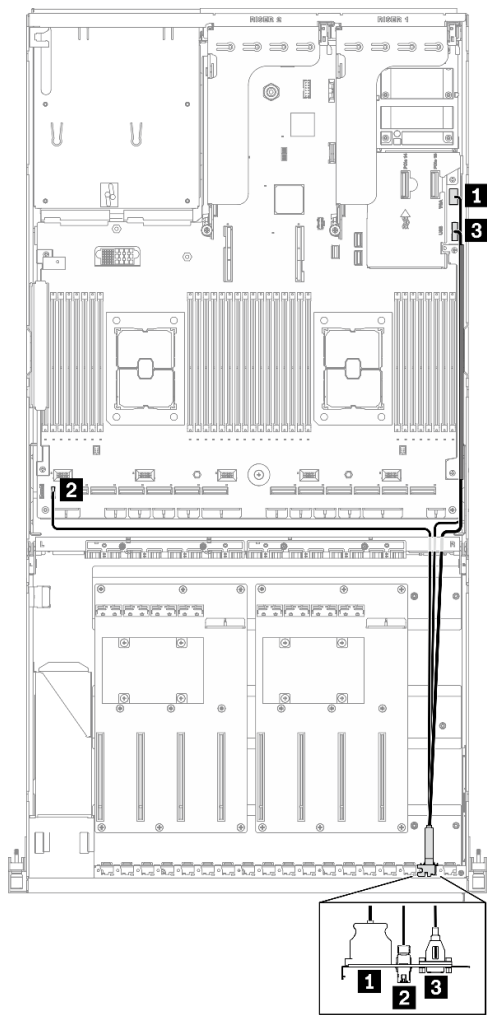


Figure 122. 8-DW GPU Model front I/O module cable routing



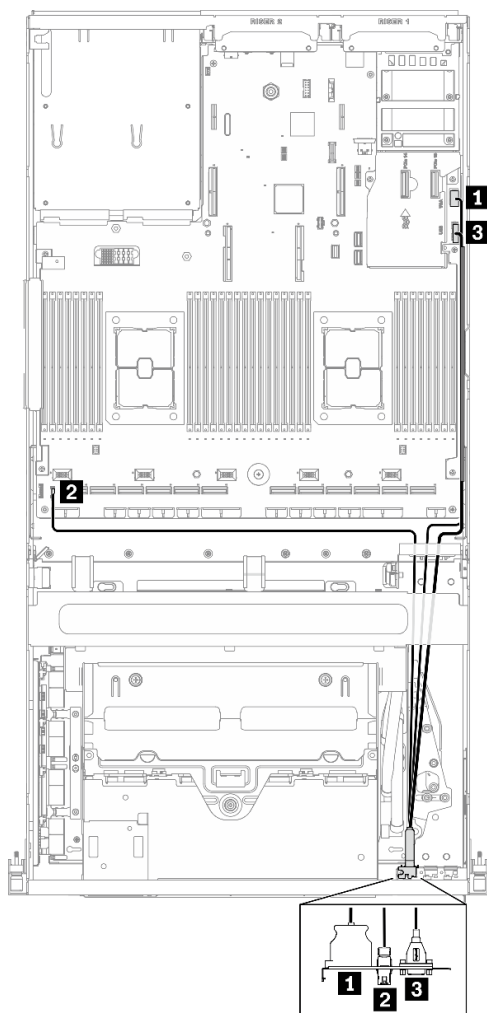


Figure 123. SXM GPU Model front I/O module cable routing

## After you finish

Complete the parts replacement. See [“Complete the parts replacement”](#) on page 360.

## Demo video

[Watch the procedure on YouTube](#)

## Front panel replacement

Follow instructions in this section to remove or install the front panel.

### Remove the front panel

Follow instructions in this section to remove the front panel.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

## Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).

Step 2. Disconnect the front panel cable from the system board by pressing on the release tab as illustrated below. The front panel cable connector on system board is **28** specified in [“System-board connectors” on page 34](#).

- a. ① Press the release tab to release the connector.
- b. ② Disengage the connector from the cable socket.

**Note:** Failing to release the tab before removing the cables will damage the cable sockets on the system board. Any damage to the cable sockets might require replacing the system board.

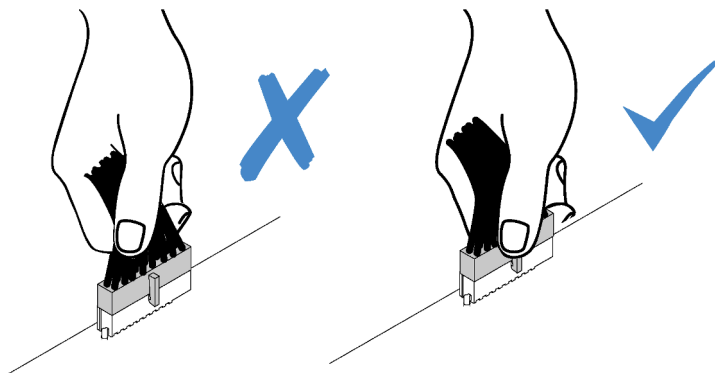
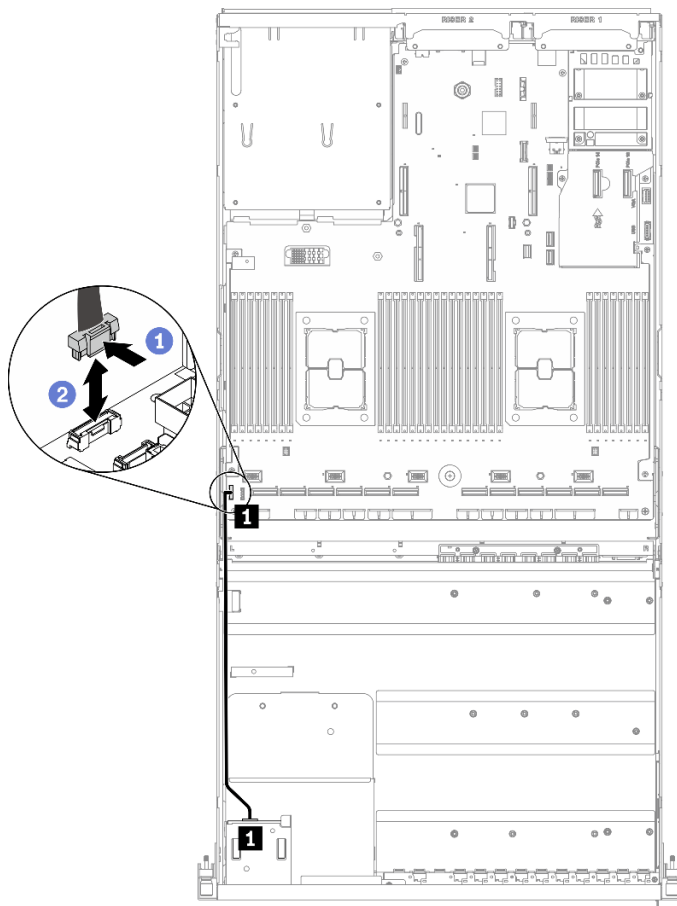


Figure 124. Disconnecting the front panel cable

Step 3. Remove the front panel.

- a. ① Press and hold on the two release tabs on the top of the drive bays.
- b. ② Grasp and pull the front panel to remove it from the server.

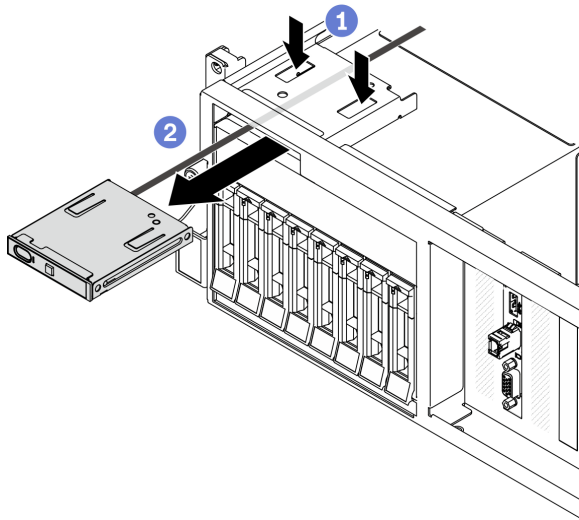


Figure 125. Removing the front panel

## After you finish

1. Install a replacement unit. See [“Install the front panel” on page 188](#).
2. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install the front panel

Follow instructions in this section to install the front panel.

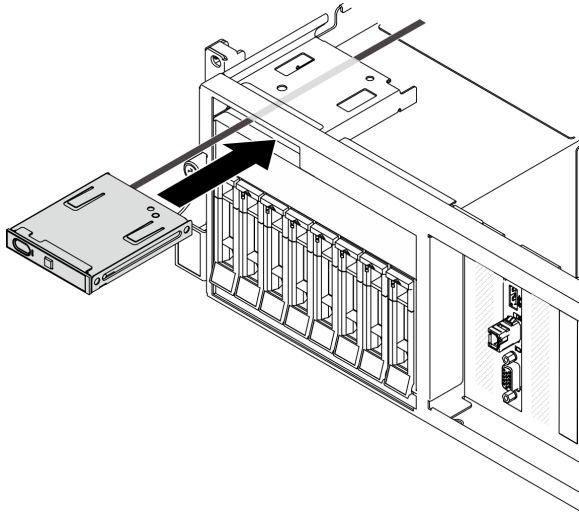
## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

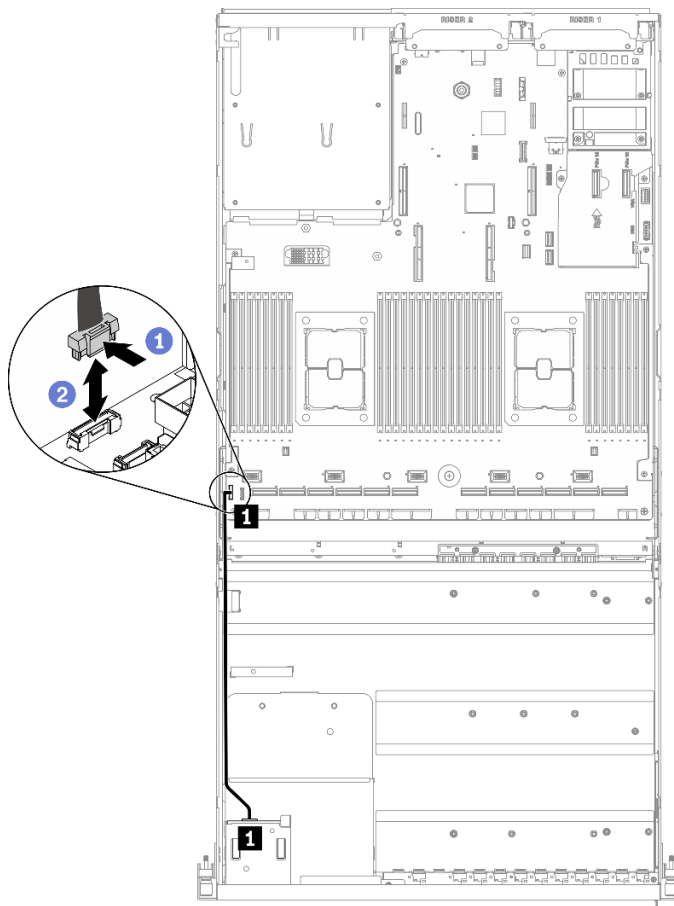
## Procedure

- Step 1. Locate the front panel slot based on the server front view of your configuration. See below for more details:
  - [“The 4-DW GPU Model Front view” on page 16](#)
  - [“The 8-DW GPU Model Front view” on page 18](#)
  - [“The SXM GPU Model front view” on page 21](#)
- Step 2. Align the front panel with the slot on top of the drive bays and slide it in.



*Figure 126. Installing the front panel*

Step 3. Reconnect the front panel cable to system board as illustrated. See [“System-board connectors”](#) on [page 34](#) for more details.





From		To	
Front panel	 Front panel cable	System board	 Front panel connector

Figure 127. Connecting the front panel cable

## After you finish

Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

## Demo video

[Watch the procedure on YouTube](#)

## Heat sink Torx T30 nut replacement

Use this information to remove and install a heat sink Torx T30 nut.

### Remove a heat sink Torx T30 nut

This task has instructions for removing a PEEK (Polyether ether ketone) Torx T30 nut on the heat sink.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).
- Prevent exposure to static electricity, which might lead to system halt and loss of data, by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.
- Do not touch the processor contacts. Contaminants on the processor contacts, such as oil from your skin, can cause connection failures.

**Note:** The heat sink, processor, and processor carrier for your system might be different from those shown in the illustrations.

## Procedure

Step 1. Prepare your server.

- Remove the top cover. See [“Remove the top cover” on page 255](#).
- Remove the air baffle. See [“Remove the air baffle” on page 161](#).
- Remove the PHM. See [“Remove a processor and heat sink” on page 230](#).

Step 2. Remove the Torx T30 nut.

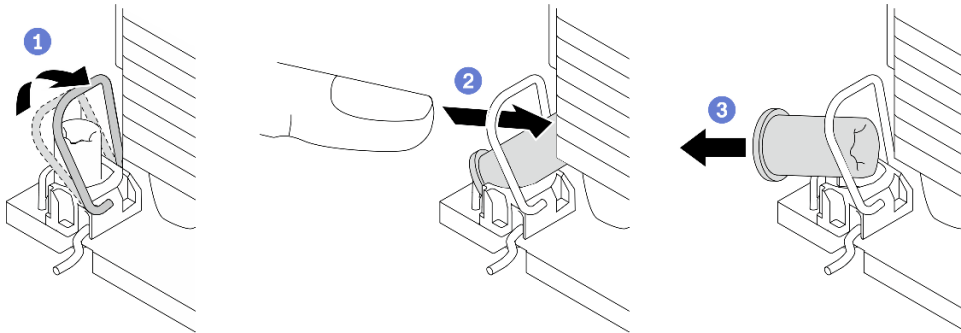


Figure 128. Removing a Torx T30 nut from the heat sink

**Note:** Do not touch the gold contacts on the bottom of the processor.

- ① Rotate the anti-tilt wire bail inwards.
- ② Push the upper edge of the Torx T30 nut towards the center of the heat sink until it disengages.
- ③ Remove the Torx T30 nut.

**Attention:** Visually inspect the removed Torx T30 nut, if the nut is cracked or damaged, make sure no debris or broken pieces are left inside your server.

## After you finish

1. Install a new Torx T30 nut. See [“Install a heat sink Torx T30 nut” on page 192](#).
2. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install a heat sink Torx T30 nut

This task has instructions for installing a PEEK (Polyether ether ketone) Torx T30 nut on the heat sink.

## About this task

### Attention:

- Read “[Installation Guidelines](#)” on page 149 and “[Safety inspection checklist](#)” on page 150 to ensure that you work safely.
- Prevent exposure to static electricity, which might lead to system halt and loss of data, by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.
- Do not touch the processor contacts. Contaminants on the processor contacts, such as oil from your skin, can cause connection failures.

**Note:** The heat sink, processor, and processor carrier for your system might be different from those shown in the illustrations.

## Procedure

Step 1. Install the Torx T30 nut.

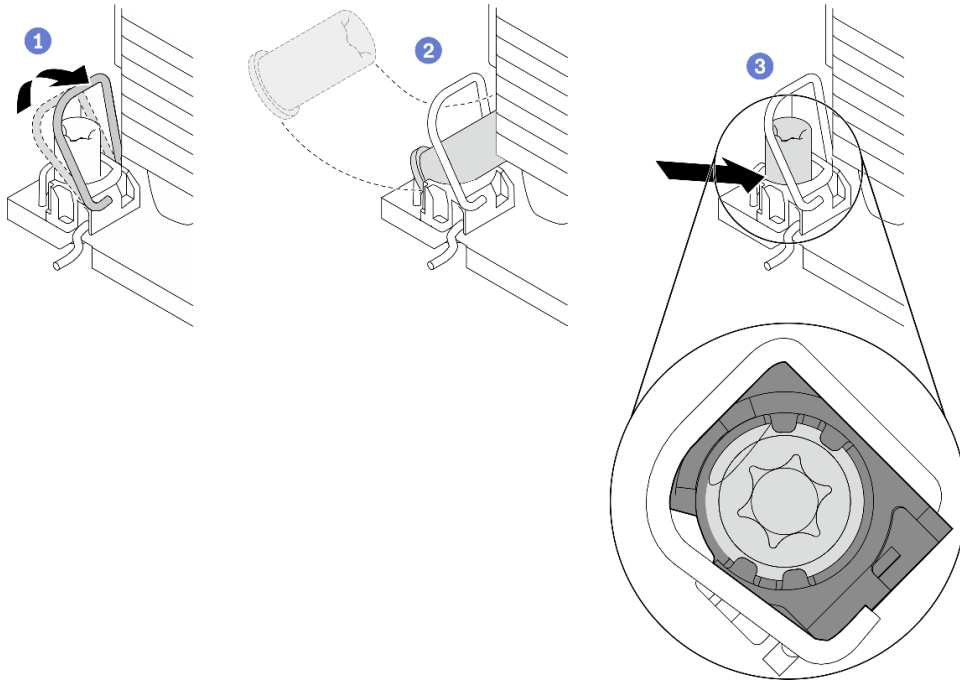


Figure 129. Installing a Torx T30 nut into the heat sink

**Note:** Do not touch the gold contacts on the bottom of the processor.

- a. ① Rotate the anti-tilt wire bail inwards.
- b. ② Orient the Torx T30 nut under the anti-tilt wire bail; then, align the Torx T30 nut with the socket at an angle as shown.



- c. ③ Push the lower edge of the Torx T30 nut into the socket until it clicks into place. Make sure the Torx T30 nut is secured under the four clips in the socket.

## After you finish

1. Reinstall the PHM. See [“Install a processor and heat sink” on page 236](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

## Demo video

[Watch the procedure on YouTube](#)

## Intrusion switch replacement

Follow instructions in this section to remove and install the intrusion switch.

### Remove the intrusion switch

Follow instructions in this section to remove the intrusion switch.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

## Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. Remove the rear PCIe riser 2 if applicable. See [“Remove a PCIe riser” on page 213](#).

Step 2. Remove the intrusion switch.

- a. ① Disconnect the intrusion switch cable from the system board.
- b. ② Remove the intrusion switch cable from the three cable clips on the outside of the PSU bays.
- c. ③ Pull the intrusion switch out of the intrusion switch bracket.

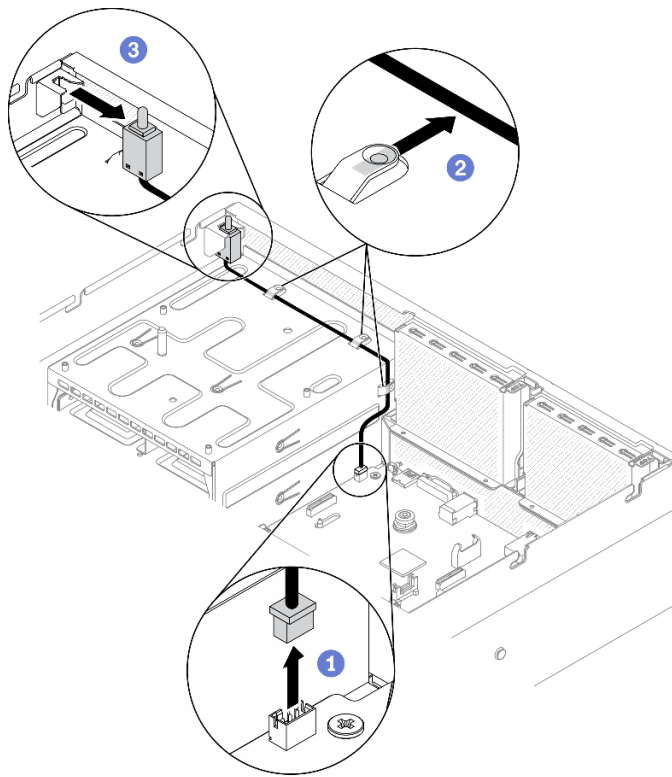


Figure 130. Removing the intrusion switch

## After you finish

- Install a replacement unit. See [“Install the intrusion switch” on page 194](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install the intrusion switch

Follow instructions in this section to install the intrusion switch.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

## Procedure

Step 1. Install the intrusion switch.

- a. 1 Push the intrusion switch into the intrusion switch bracket on top of the PSU bays. Make sure the intrusion switch is fully seated in the bracket.

- b. 2 Route the intrusion switch cable through the three cable clips on the outside of the PSU bays.
- c. 3 Connect the intrusion switch cable to the system board. See [“System-board connectors”](#) on page 34 for intrusion switch connector location on system board.

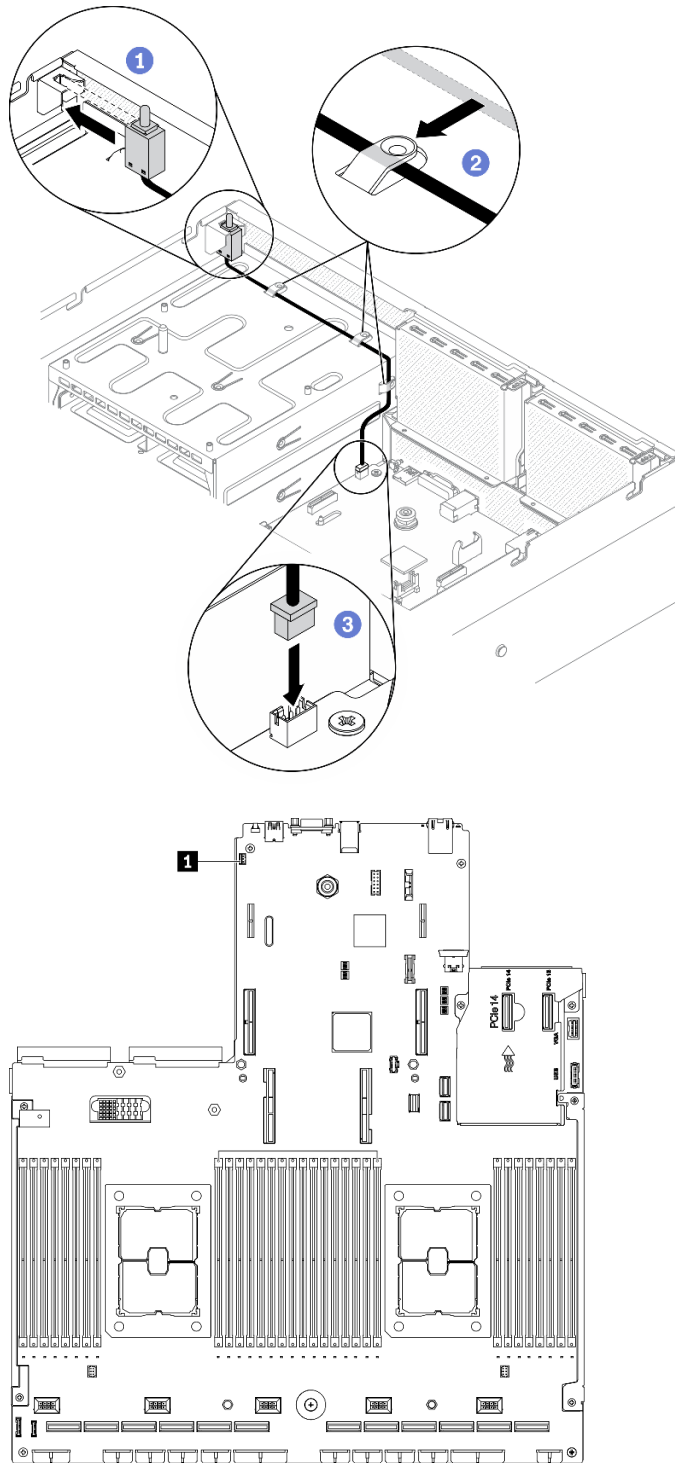


Figure 131. Installing the intrusion switch

## After you finish

1. Reinstall the PCIe riser 2 if needed. See [“Install a PCIe riser” on page 219](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

## Demo video

[Watch the procedure on YouTube](#)

## M.2 backplane and M.2 drive replacement

Follow instructions in this section to remove and install the M.2 backplane and the M.2 drive.

### Remove the M.2 backplane

Follow instructions in this section to remove the M.2 backplane.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).
- If one or more NVMe solid-state drives are to be removed, it is recommended to disable them beforehand via the operating system.
- Before you remove or make changes to drives, drive controllers (including controllers that are integrated on the system board), drive backplanes or drive cables, back up all important data that is stored on drives.
- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

## Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).

Step 2. Disconnect the M.2 cable from system board

- a. ① Press and hold the latches on the M.2 cables.
- b. ② Disconnect the cables from system board.

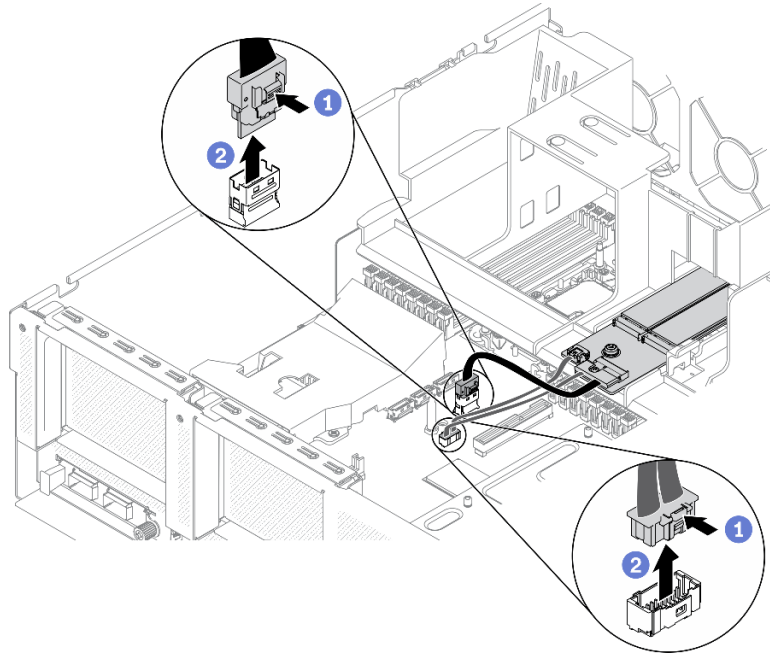


Figure 132. Disconnecting M.2 cables

Step 3. Remove the M.2 backplane.

- a. 1 Unfasten the screw that secures the M.2 backplane to the air baffle.
- b. 2 Slide and release the M.2 backplane retention latch on the air baffle.
- c. 3 Slide and lift the M.2 backplane out of the air baffle.

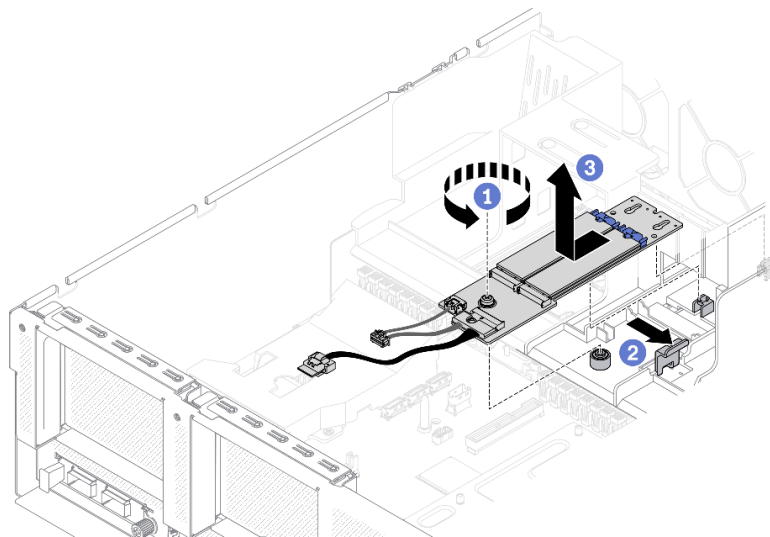


Figure 133. Removing the M.2 backplane

Step 4. (Optional) Remove the M.2 backplane cables from the M.2 backplane.

- a. 1 Unfasten the screw on the signal cable.
- b. 2 Remove the M.2 cables from the M.2 backplane.

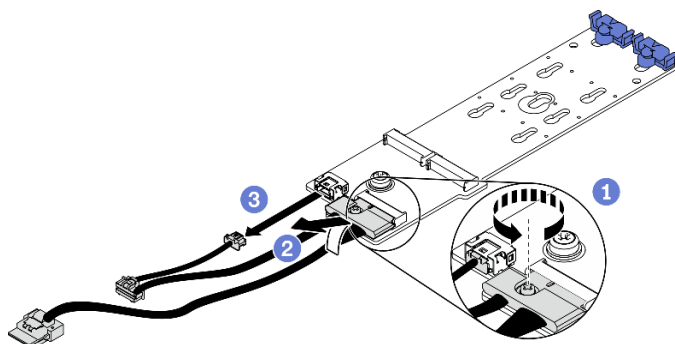


Figure 134. Removing M.2 cables from the M.2 backplane

## After you finish

- Install a replacement unit. See [“Install the M.2 backplane” on page 200](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Remove an M.2 drive

Follow instructions in this section to remove the M.2 drive.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).
- If one or more NVMe solid-state drives are to be removed, it is recommended to disable them beforehand via the operating system.
- Before you remove or make changes to drives, drive controllers (including controllers that are integrated on the system board), drive backplanes or drive cables, back up all important data that is stored on drives.
- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

## Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. Remove the M.2 backplane. See [“Remove the M.2 backplane” on page 196](#).

Step 2. Remove the M.2 drive.

- a. ① Press the retainer from the both sides.
- b. ② Slide the retainer away from the M.2 drive

- c. ③ Rotate the rear end of M.2 drive to an angle.
- d. ④ Remove the M.2 drive from the M.2 backplane.

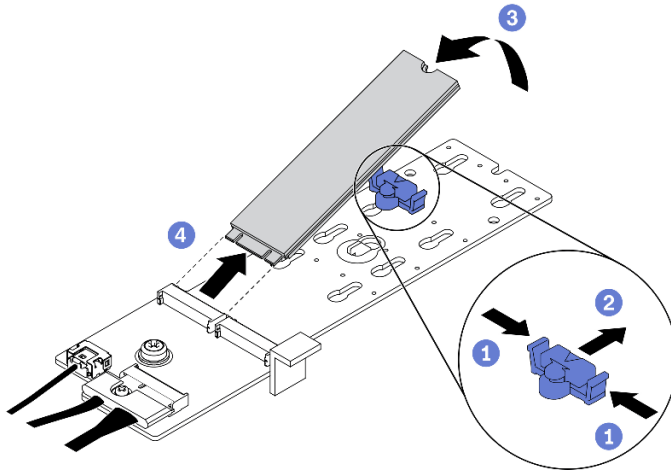


Figure 135. Removing M.2 drive

### After you finish

- Install a replacement unit. See [“Install an M.2 drive” on page 199](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

### Demo video

[Watch the procedure on YouTube](#)

### Install an M.2 drive

Follow instructions in this section to install an M.2 drive.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

### Procedure

- Step 1. Locate the connector you want to install the M.2 drive on the M.2 backplane.
- Step 2. If needed, adjust the position of the M.2 drive retainer so that it is compatible with the size of the M.2 drive you are installing.
- Step 3. Slide the M.2 retainer backward to ensure enough space for the M.2 drive installation.
- Step 4. Install the M.2 drive.
  - a. ① Hold the M.2 drive at an angle, and insert it into the M.2 slot.
  - b. ② Lower the M.2 drive.
  - c. ② Slide the retainer toward the M.2 drive to secure it in place.

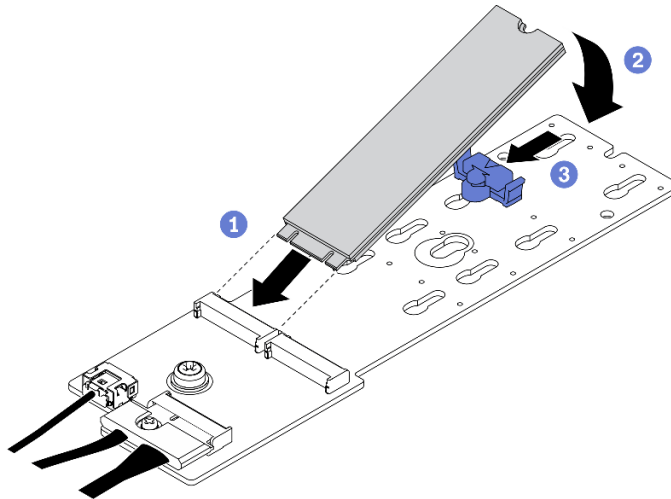


Figure 136. Installing an M.2 drive

## After you finish

1. Reinstall the M.2 backplane. See [“Install the M.2 backplane” on page 200](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

## Demo video

[Watch the procedure on YouTube](#)

## Install the M.2 backplane

Follow instructions in this section to install the M.2 backplane.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

## Procedure

- Step 1. Make sure the air baffle is installed in chassis. See [“Install the air baffle” on page 163](#).
- Step 2. (Optional) Connect the M.2 backplane cables to M.2 backplane.
  - a. ① Connect the M.2 backplane cables to the M.2 backplane.
  - b. ② Fasten the screw on the signal cable.



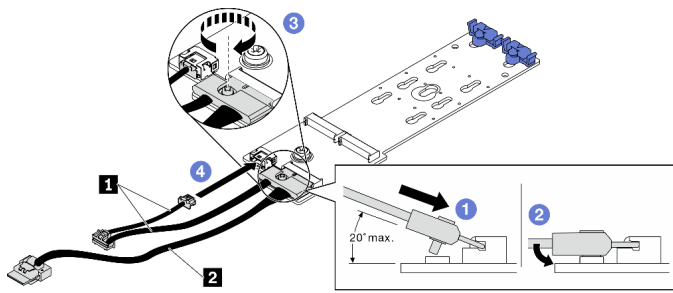


Figure 137. Connecting M.2 backplane cables to M.2 backplane

1 Power cable	2 Signal cable
---------------	----------------

Step 3. Install the M.2 backplane.

- a. 1 Open the M.2 backplane retention latch on the air baffle.
- b. 2 Align the guide holes on the M.2 backplane with the guide pins on the air baffle; then, lower the M.2 backplane, and insert it into the air baffle.
- c. 3 Fasten the screw that secures the M.2 backplane to the air baffle.

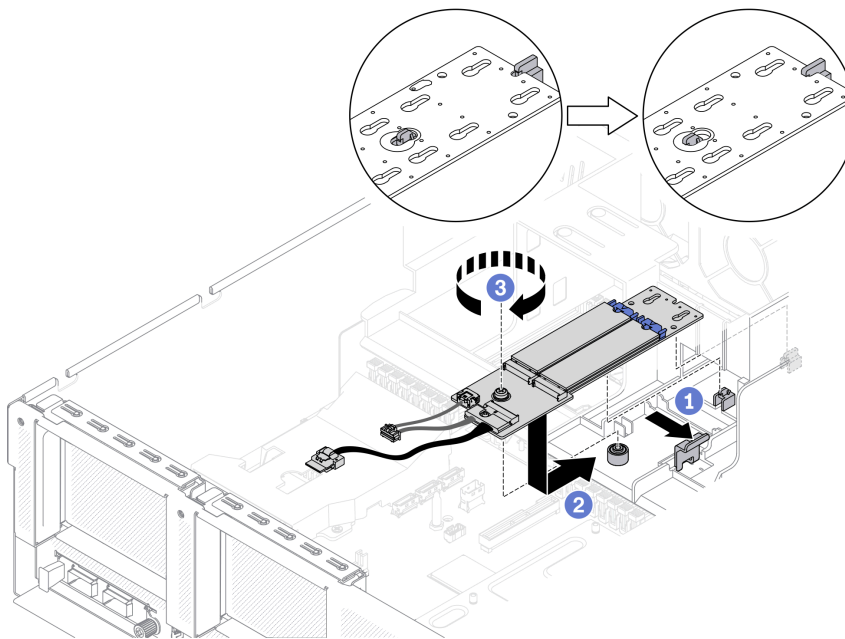


Figure 138. Installing M.2 backplane to the air baffle

Step 4. Connect M.2 cables to the M.2 power connector and signal connector on system board. See [“System-board connectors” on page 34](#) for more details.

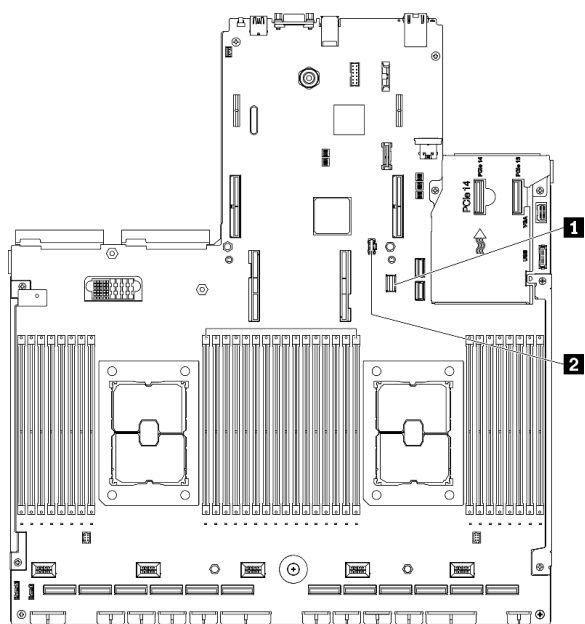
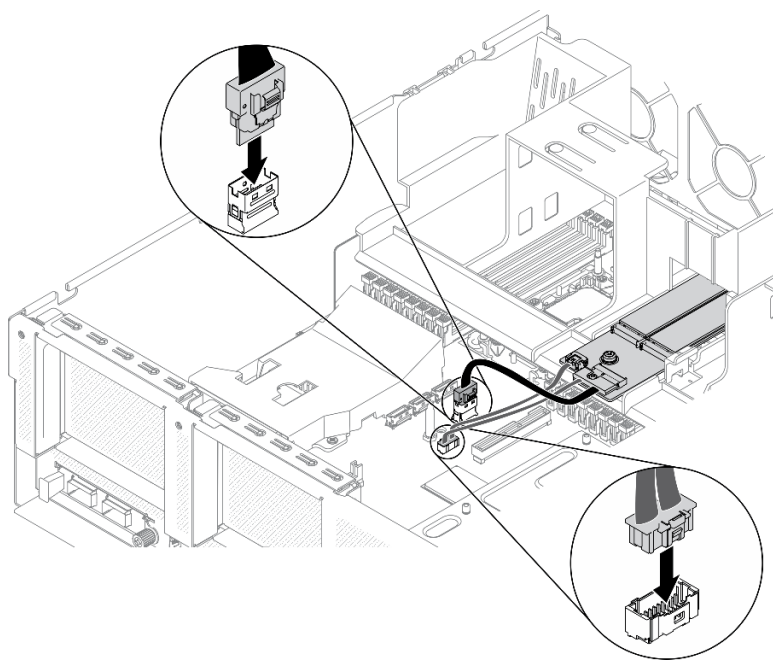


Figure 139. Connecting M.2 backplane cables to system board

<b>1</b> M.2 signal connector
<b>2</b> M.2 power connector

## After you finish

Complete the parts replacement. See [“Complete the parts replacement”](#) on page 360.

## Demo video

[Watch the procedure on YouTube](#)

## Memory module replacement

Use the following procedures to remove and install a memory module.

### Remove a memory module

Use this information to remove a memory module.

#### About this task

##### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).
- If you are not installing a replacement memory module to the same slot, make sure you have memory module filler available.
- Memory modules are sensitive to static discharge and require special handling. Refer to the standard guidelines for [“Handling static-sensitive devices” on page 151](#).
  - Always wear an electrostatic-discharge strap when removing or installing memory modules. Electrostatic-discharge gloves can also be used.
  - Never hold two or more memory modules together so that they do not touch each other. Do not stack memory modules directly on top of each other during storage.
  - Never touch the gold memory module connector contacts or allow these contacts to touch the outside of the memory module connector housing.
  - Handle memory modules with care: never bend, twist, or drop a memory module.
  - Do not use any metal tools (such as jigs or clamps) to handle the memory modules, because the rigid metals may damage the memory modules.
  - Do not insert memory modules while holding packages or passive components, which can cause package cracks or detachment of passive components by the high insertion force.
- After you install or remove a memory module, you must change and save the new configuration information by using the Setup utility. When you turn on the server, a message indicates that the memory configuration has changed. Start the Setup utility and select **Save Settings** to save changes. (see the *ThinkSystem SR670 V2 Setup Guide* for more information.)

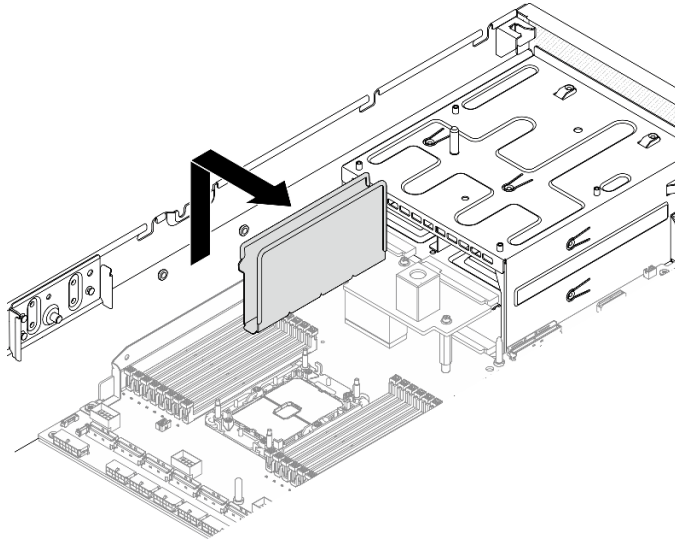
**Important:** Remove or install memory modules for one processor at a time.

#### Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. Remove the air baffle. See [“Remove the air baffle” on page 161](#).
- c. Locate the memory module slots and determine which memory module you want to remove from the server. See [“System-board connectors” on page 34](#).

Step 2. Remove the cable guide from the chassis to access the memory module slots.



*Figure 140. Removing the cable guide from chassis*

Step 3. Remove the memory module from the slot.

- a. ① Carefully use a common tool to press the retaining clips.
- b. ② Push the retaining clips outward on each end of the memory module slot.
- c. ③ Grasp the memory module at both ends and carefully lift it out of the slot.

**Attention:**

- Remove or install memory modules for one processor at a time.
- To avoid breaking the retaining clips or damaging the memory module slots, handle the clips gently.

**Notes:**

- The retaining clips for adjacent memory module slots of processor 1 and processor 2 can not be open at the same time. Remove or install the memory module for each processor one at a time and close the retaining clips after removing a memory module.
- If necessary, due to space constraints, you can use a pointed tool to open the retaining clips. Place the tip of the tool in the recess on the top of the retaining clip; then, carefully rotate the retaining clip away from the memory module slot. Make sure you use firm and solid pointed tool to open the latch. Do not use pencils or other fragile tools.

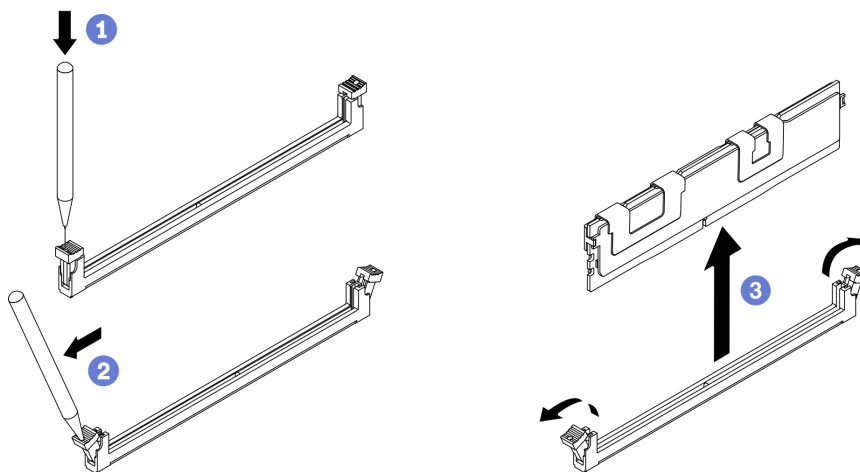


Figure 141. Memory module removal

**After you finish**

1. A memory module slot must be installed with a memory module or a memory module filler. See [“Install a memory module” on page 206](#).
2. Change and save the new configuration information by using the Setup utility. When you turn on the server, a message indicates that the memory configuration has changed. Start the Setup utility and select **Save Setting** to save changes. (see the *ThinkSystem SR670 V2 Setup Guide* for more information)
3. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

**Demo video**

[Watch the procedure on YouTube](#)

## Install a memory module

Follow instructions in this section to install a memory module.

### About this task

See “Memory module installation order” in *Setup Guide* for detailed information about memory configuration and setup.

#### Attention:

- Read “[Installation Guidelines](#)” on page 149 and “[Safety inspection checklist](#)” on page 150 to ensure that you work safely.
- Make sure to adopt one of the supported configurations listed in “Memory module installation rules and order” in the *ThinkSystem SR670 V2 Setup Guide*.
- Memory modules are sensitive to static discharge and require special handling. Refer to the standard guidelines at “[Handling static-sensitive devices](#)” on page 151:
  - Always wear an electrostatic-discharge strap when removing or installing memory modules. Electrostatic-discharge gloves can also be used.
  - Never hold two or more memory modules together so that they do not touch each other. Do not stack memory modules directly on top of each other during storage.
  - Never touch the gold memory module connector contacts or allow these contacts to touch the outside of the memory module connector housing.
  - Handle memory modules with care: never bend, twist, or drop a memory module.
  - Do not use any metal tools (such as jigs or clamps) to handle the memory modules, because the rigid metals may damage the memory modules.
  - Do not insert memory modules while holding packages or passive components, which can cause package cracks or detachment of passive components by the high insertion force.

**Important:** Remove or install memory modules for one processor at a time.

### Procedure

Step 1. If any of the modules to be installed is PMEM, make sure to complete the following procedure before physically installing the module:

1. Back up stored data in PMEM namespaces.
2. Disable PMEM security with one of the following options:
  - **LXPM**  
Go to **UEFI Setup → System Settings → Intel Optane PMEMs → Security → Press to Disable Security**, and input passphrase to disable security.
  - **Setup Utility**  
Go to **System Configuration and Boot Management → System Settings → Intel Optane PMEMs → Security → Press to Disable Security**, and input passphrase to disable security.
3. Delete namespaces with command corresponding to the operating system that is installed:
  - **Linux** command:  
`ndctl destroy-namespace all -f`
  - **Windows** Powershell command:  
`Get-PmemDisk | Remove-PmemDisk`

4. Clear Platform Configuration Data (PCD) and Namespace Label Storage Area (LSA) with the following ipmctl command (for both Linux and Windows).

```
ipmctl delete -pcd
```

**Notes:** See the following links to learn how to download and use ipmctl in different operating systems:

- Windows: <https://datacentersupport.lenovo.com/us/en/videos/YTV101407>
- Linux: <https://datacentersupport.lenovo.com/us/en/solutions/HT508642>

5. Reboot the system.

Step 2. Prepare your server.

- a. Remove the top cover. See “Remove the top cover” on page 255.
- b. Remove the air baffle. See “Remove the air baffle” on page 161.

Step 3. Touch the static-protective package that contains the memory module to any unpainted surface on the outside of the server. Then, take the memory module out of the package and place it on a static-protective surface.

Step 4. Locate the required memory module slot on the system board.

**Note:**

- Remove or install memory modules for one processor at a time.
- Ensure that you observe the installation rules and sequence order in “Memory module installation rules and order” in the *ThinkSystem SR670 V2 Setup Guide*.

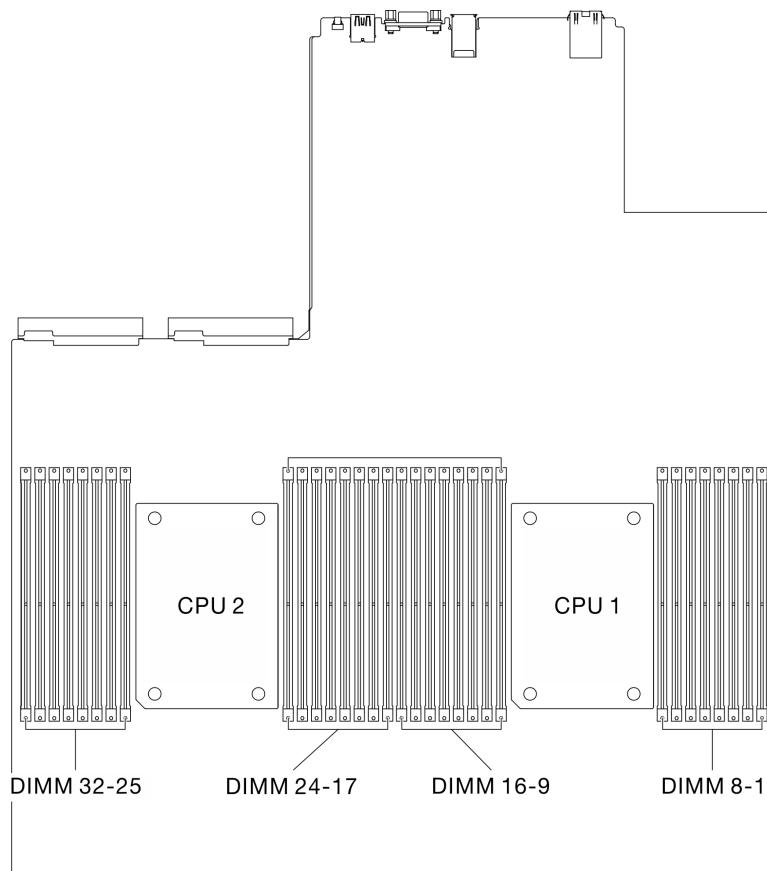


Figure 142. Location of memory module slots and processor sockets

Step 5. Install the memory module into the slot.

- a. ① Carefully use a common tool to press the retaining clips.
- b. ② Push the retaining clips outward on each end of the memory module slot.
- c. ③ Align the memory module with the slot, and gently place the memory module on the slot with both hands. Firmly press both ends of the memory module straight down into the slot until the retaining clips snap into the locked position.

**Attention:**

- To avoid breaking the retaining clips or damaging the memory module slots, open and close the clips gently.
- If there is a gap between the memory module and the retaining clips, the memory module has not been correctly inserted. In this case, open the retaining clips, remove the memory module, and then reinsert it.

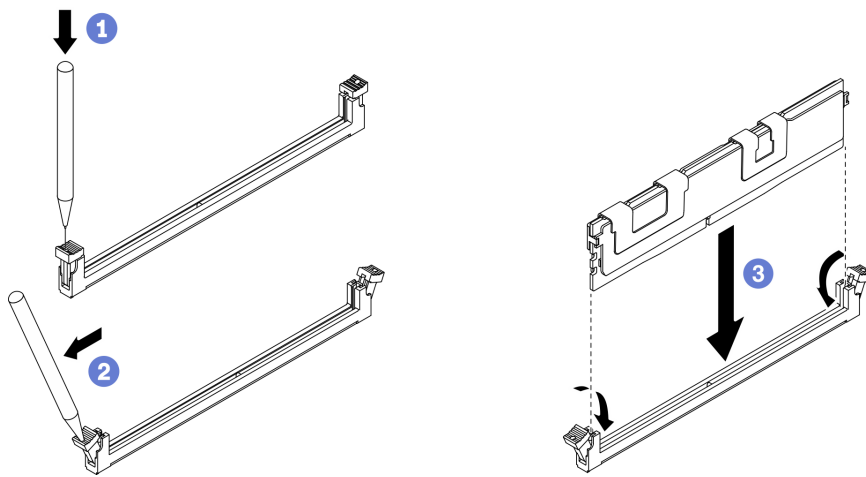


Figure 143. Memory module installation

Step 6. Align the cable guide with the guide pins; then, attach the cable guide to the chassis, and slide it down to secure it in place.



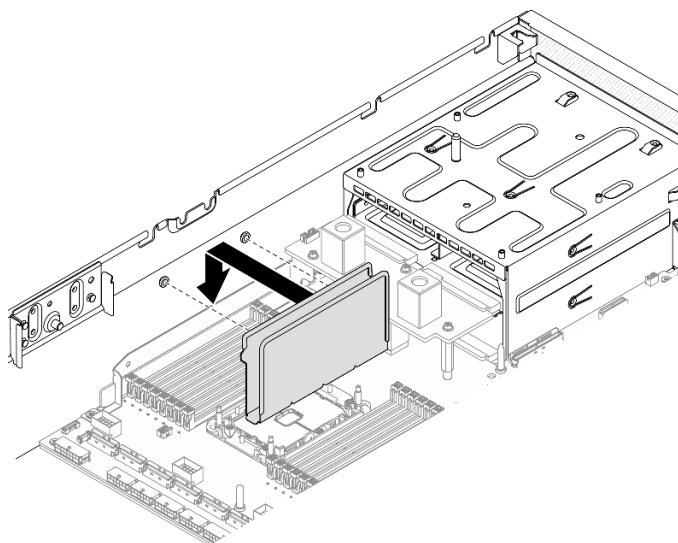


Figure 144. Installing the cable guide to the chassis

## After you finish

**Note:** Change and save the new configuration information by using the Setup utility. When you turn on the server, a message indicates that the memory configuration has changed. Start the Setup utility and select **Save Settings** to save changes. See the *ThinkSystem SR670 V2 Setup Guide* for more information.

- Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

## Demo video

[Watch the procedure on YouTube](#)

## Network adapter replacement

Follow instructions in this section to remove and install a network adapter from or to the front I/O expansion board or the front I/O expansion board module.

### Remove a network adapter

Follow instructions in this section to remove a network adapter from the front I/O expansion board or the front I/O expansion board module.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

## Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).

Step 2. Unfasten the screw that secures the network adapter to the chassis; then, lift it out of the chassis.

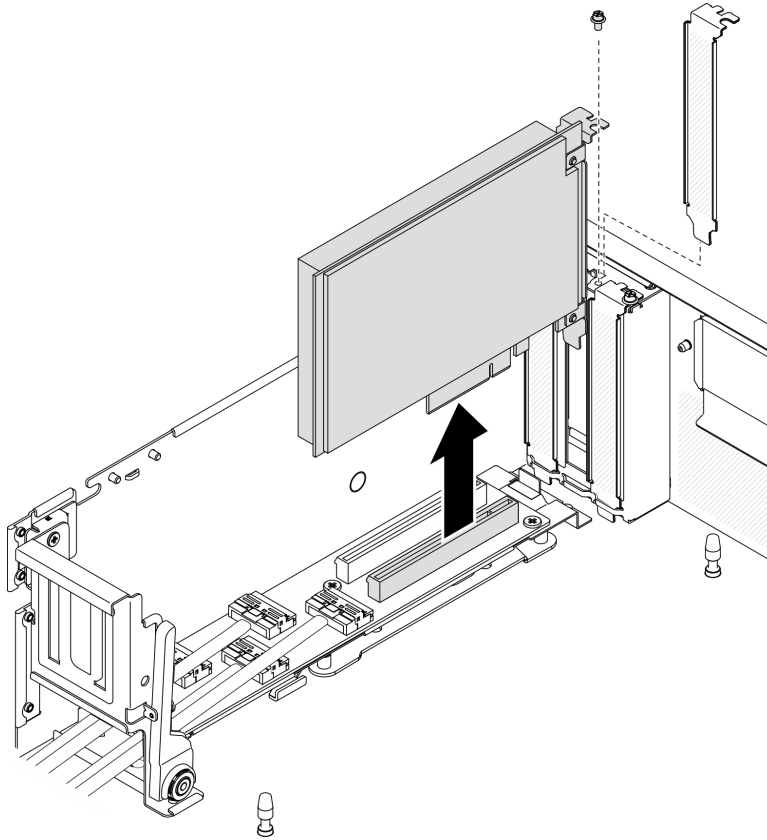


Figure 145. Removing the network adapter

### After you finish

- Install a replacement unit. See [“Install a network adapter” on page 210](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

### Demo video

[Watch the procedure on YouTube](#)

### Install a network adapter

Follow instructions in this section to install a network adapter to the front I/O expansion board or the front I/O expansion board module.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

## Procedure

- Step 1. Align the network adapter to the PCIe slot on the front I/O expansion board; then, press the network adapter into the slot until it is fully seated.
- Step 2. Fasten the screw that secures the network adapter to the chassis.

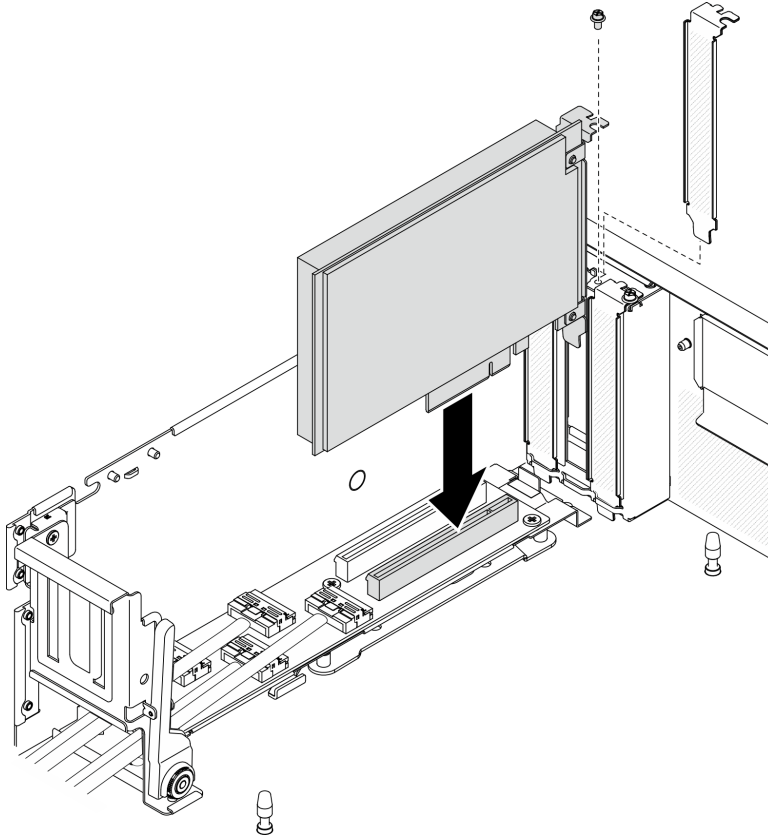


Figure 146. Installing a network adapter

## After you finish

Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

## Demo video

[Watch the procedure on YouTube](#)

## OCP Ethernet adapter replacement

Follow instructions in this section to remove or install the OCP Ethernet adapter.

### Remove the OCP Ethernet adapter

Follow instructions in this section to remove the OCP Ethernet adapter.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

## Procedure

Step 1. Remove the OCP Ethernet adapter.

- 1 Loosen the captive screw.
- 2 Grasp the handle and slide the adapter out.

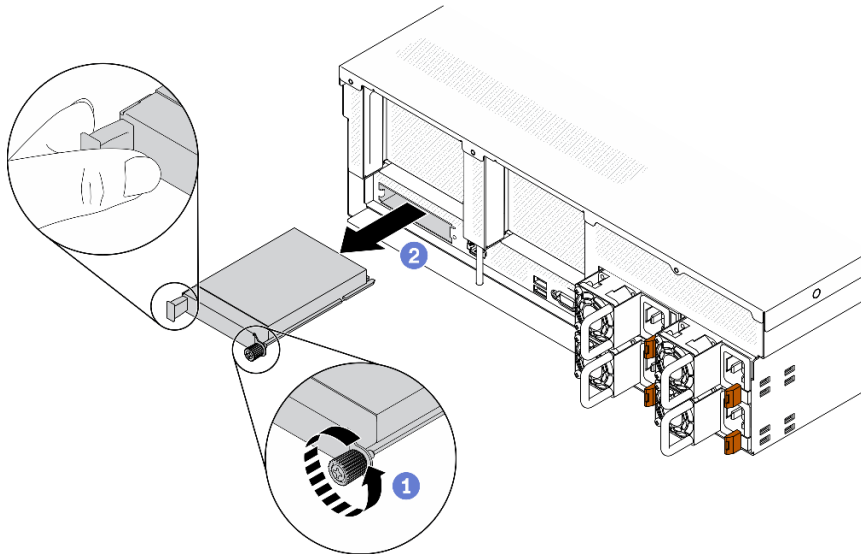


Figure 147. Removing the OCP Ethernet adapter

## After you finish

1. Install a replacement unit or a filler. See [“Install the OCP Ethernet adapter” on page 212](#).
2. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install the OCP Ethernet adapter

Follow instructions in this section to install the OCP Ethernet adapter.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.

- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

## Procedure

Step 1. Install the OCP Ethernet adapter.

**Note:** If the OCP is covered with a OCP filler, remove the filler from the chassis first.

- 1 Slide the adapter into the PCIe slot.
- 2 Tighten the captive screw to secure the adapter.

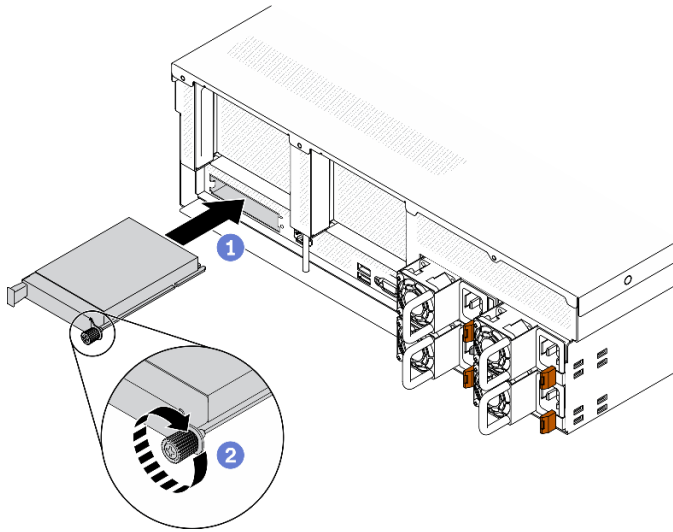


Figure 148. Installing the OCP Ethernet adapter

## After you finish

1. Connect the required cables.
2. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

## Demo video

[Watch the procedure on YouTube](#)

## PCIe riser and PCIe adapter replacement

Follow instructions in this section to remove and install the PCIe riser and PCIe adapter installed on it.

### Remove a PCIe riser

Follow instructions in this section to remove a PCIe riser.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.

- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

**Note:** To maintain proper system cooling, do not operate the server without a PCIe riser or a rise filler installed in the chassis.

### Select the PCIe riser removal scenario

There are three PCIe riser removal scenarios differentiated by PCIe riser location and serial port installation. See corresponding instructions below for proper removal procedure.

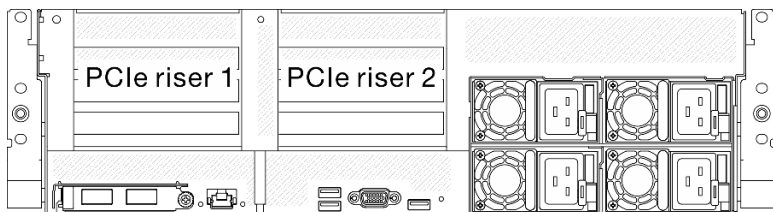


Figure 149. PCIe riser locations

1. Removing PCIe riser 1 or PCIe riser 2 without serial port module installed. See [“Remove a PCIe riser without serial port” on page 214](#).
2. Removing PCIe riser 1 installed with serial port module. See [“Remove PCIe riser 1 installed with serial port” on page 215](#).
3. Removing PCIe riser 2 installed with serial port module. See [“Remove PCIe riser 2 installed with serial port” on page 216](#).

### Remove a PCIe riser without serial port

#### Procedure

- Step 1. Prepare your server.
  - a. Remove the top cover. See [“Remove the top cover” on page 255](#).
  - b. Disconnect cables that are connected to the PCIe riser and the PCIe adapter.
- Step 2. Remove the PCIe riser.
  - a. ① Unfasten the thumbscrew on the PCIe riser.
  - b. ② Lift the PCIe riser out of the chassis.

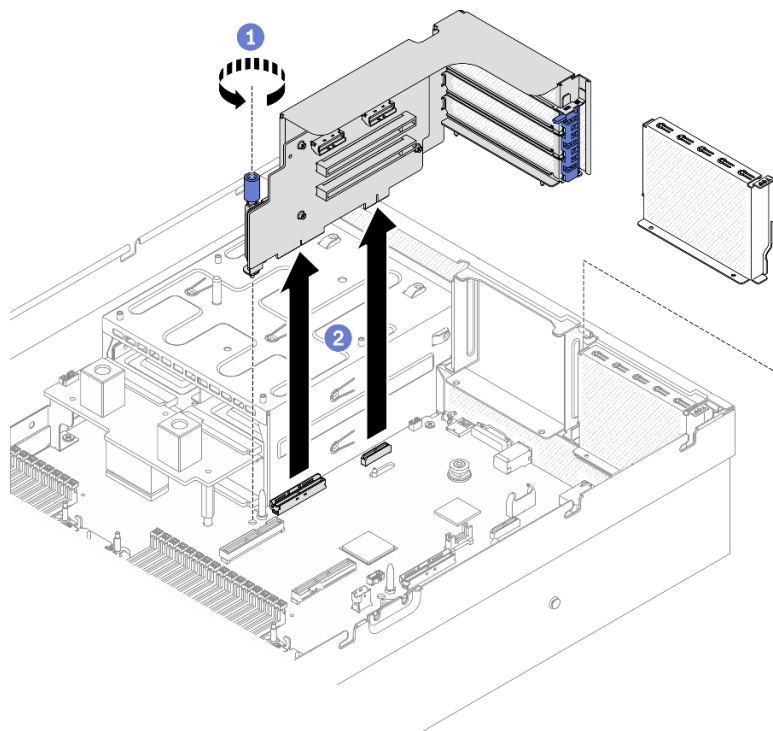


Figure 150. Removing the PCIe riser

### Remove PCIe riser 1 installed with serial port

#### Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. Disconnect cables that are connected to the PCIe riser and the PCIe adapter.

Step 2. If PCIe riser 2 is installed, remove it from chassis. See [“Remove a PCIe riser without serial port” on page 214](#).

Step 3. Remove the PCIe riser 1 installed with serial port.

- a. ① Disconnect serial port cable from system board.
- b. ② Unfasten the thumbscrew on the PCIe riser.
- c. ③ Lift the PCIe riser out of the chassis.

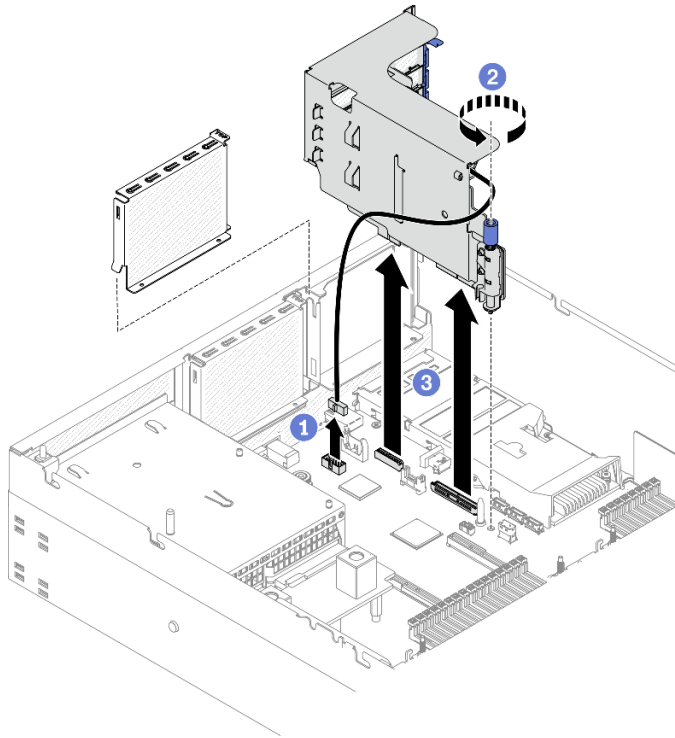


Figure 151. Removing PCIe riser 1 installed with serial port

## Remove PCIe riser 2 installed with serial port

### Procedure

Step 1. Prepare your server.

- Remove the top cover. See [“Remove the top cover” on page 255](#).
- Disconnect cables that are connected to the PCIe riser and the PCIe adapter.

Step 2. Remove the PCIe riser.

- ① Unfasten the thumbscrew on the PCIe riser.
- ② Slightly lift up the PCIe riser, and disconnect the serial port cable from the system board.
- ③ Lift the PCIe riser out of the chassis.



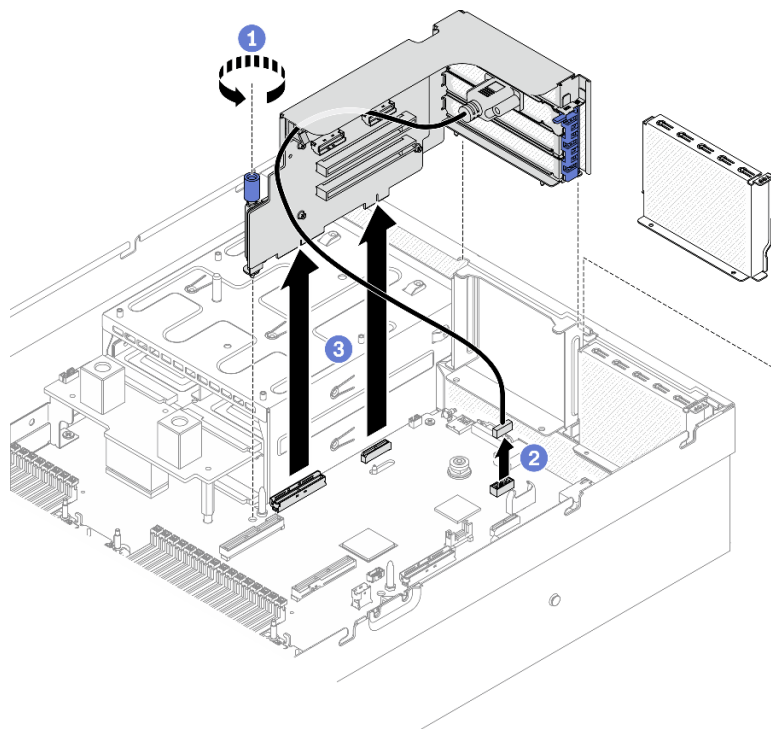


Figure 152. Removing the PCIe riser 2 installed with serial port

## After you finish

1. If no PCIe riser is going to be installed to the chassis, install a riser filler into the chassis. See [“Install a PCIe riser” on page 219](#).
2. Reinstall the PCIe riser 2 if needed. See [“Install a PCIe riser” on page 219](#).
3. To replace the PCIe adapter, see [“Remove a PCIe adapter” on page 217](#).
4. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Remove a PCIe adapter

Follow instructions in this section to remove a PCIe adapter from the rear PCIe riser.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

## Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255.](#)
- b. Remove the PCIe riser. See [“Remove a PCIe riser” on page 213.](#)

Step 2. Remove the PCIe adapter.

- a. ① Open the retention latch on the PCIe riser.
- b. ② Unfasten the screw that secures the PCIe adapter to the PCIe riser.
- c. ③ Remove the PCIe adapter from the PCIe riser.

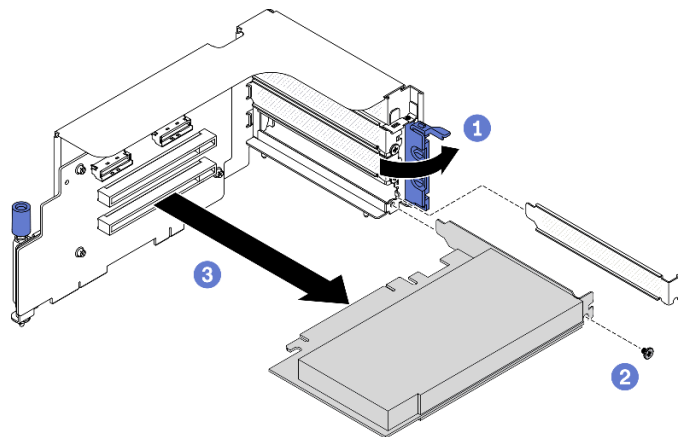


Figure 153. Removing a PCIe adapter

## After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install a PCIe adapter

Follow instructions in this section to install a PCIe adapter.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

## Procedure

Step 1. Open the retention latch on the PCIe riser.

Step 2. Install the PCIe adapter.

- a. ① Insert the PCIe adapter into the PCIe riser.
- b. ② Fasten the screw to secure the PCIe adapter to the PCIe riser.

- c. 3 Close the retention latch.

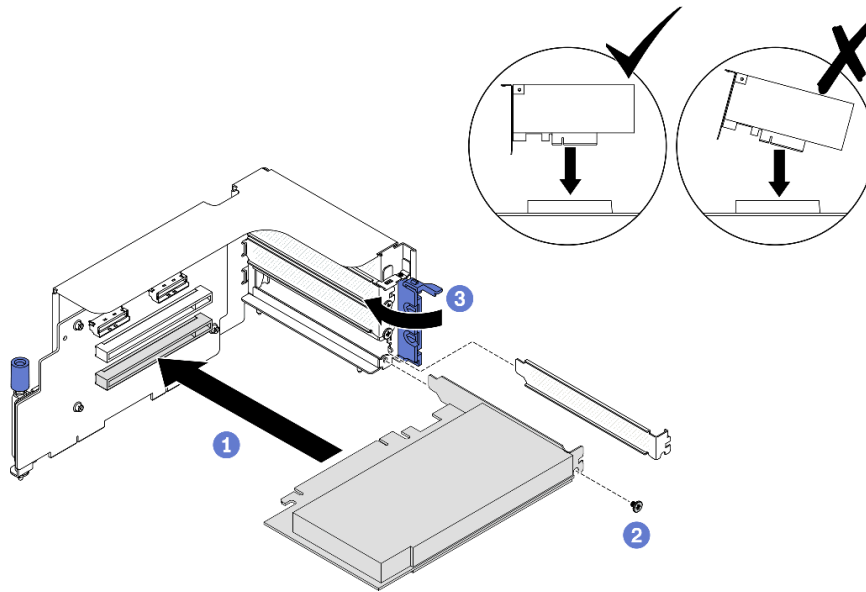


Figure 154. Installing a PCIe adapter

### After you finish

1. Reinstall the PCIe riser. See “[Install a PCIe riser](#)” on page 219.
2. Complete the parts replacement. See “[Complete the parts replacement](#)” on page 360.

### Demo video

[Watch the procedure on YouTube](#)

### Install a PCIe riser

Follow instructions in this section to install a PCIe riser.

### About this task

#### Attention:

- Read “[Installation Guidelines](#)” on page 149 and “[Safety inspection checklist](#)” on page 150 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

**Note:** To maintain proper system cooling, do not operate the server without a PCIe riser or a rise filler installed in the chassis.

### Select the PCIe riser installation scenario

There are three PCIe riser installation scenarios differentiated by PCIe riser location and serial port installation. See corresponding instructions below for proper installation procedure.

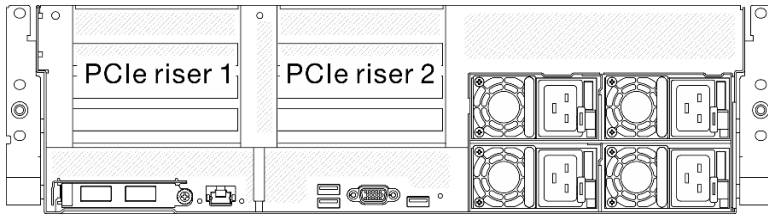


Figure 155. PCIe riser locations

1. Installing PCIe riser 1 or PCIe riser 2 without serial port module installed. See [“Install a PCIe riser without serial port” on page 220](#).
2. Installing PCIe riser 1 installed with serial port module. See [“Install PCIe riser 1 installed with serial port” on page 220](#).
3. Installing PCIe riser 2 installed with serial port module. See [“Install PCIe riser 2 installed with serial port” on page 221](#).

### Install a PCIe riser without serial port

#### Procedure

Step 1. Install the PCIe riser.

- a. 1 Align the guide hole on the PCIe riser to the guide post on system board, and insert the PCIe riser into the PCIe slots on system board.
- b. 2 Fasten the thumbscrew to secure the PCIe riser.

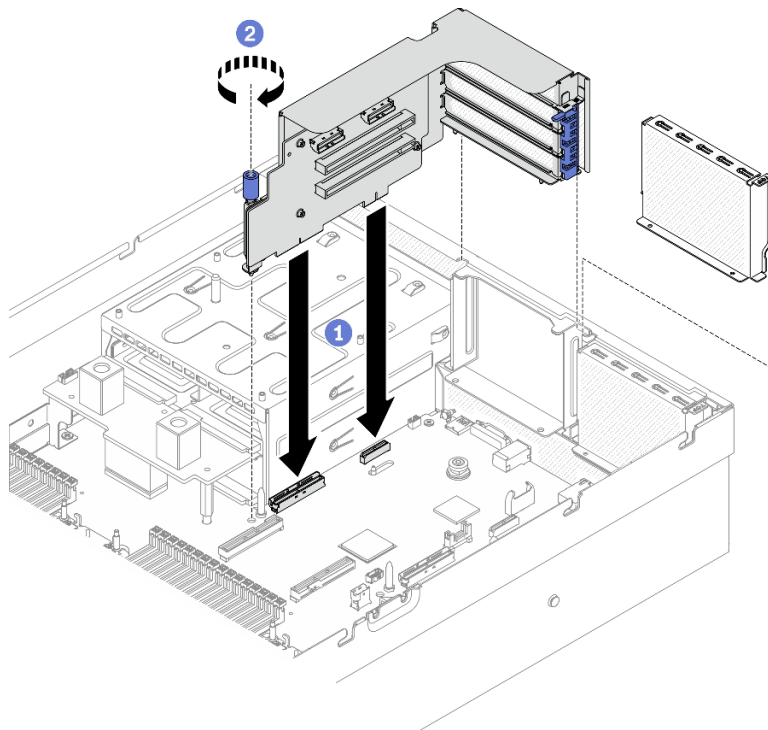


Figure 156. Installing a PCIe riser without serial port

### Install PCIe riser 1 installed with serial port

#### Procedure

Step 1. If PCIe riser 2 is installed, remove it. See [“Remove a PCIe riser” on page 213](#).

Step 2. Install the PCIe riser.

**Attention:** Make sure the serial port cable is routed through the cable clip inside the PCIe riser.

- a. ① Align the guide hole on the PCIe riser to the guide post on system board, and insert the PCIe riser into the PCIe slots on system board.
- b. ② Fasten the thumbscrew to secure the PCIe riser.
- c. ③ Connect serial port cable to serial port connector on system board.

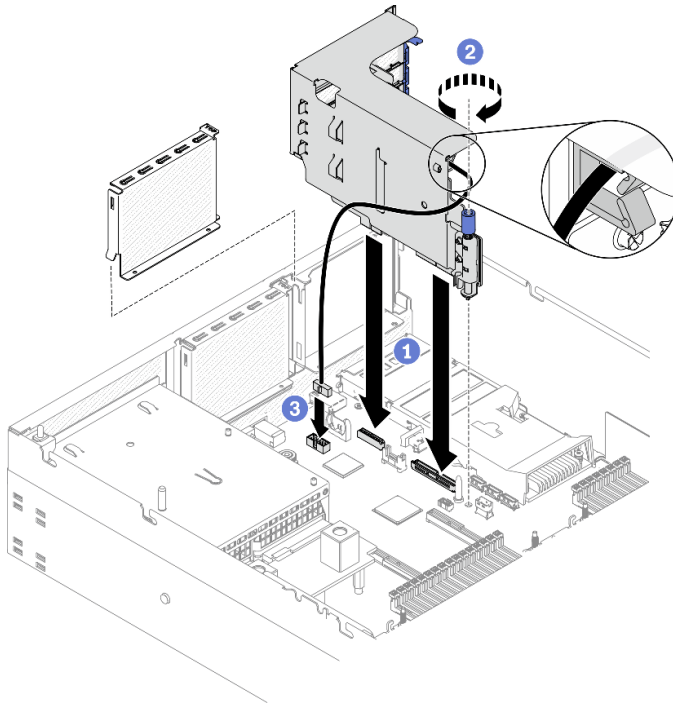


Figure 157. Installing PCIe riser 1 installed with serial port

### Install PCIe riser 2 installed with serial port

#### Procedure

Step 1. 1. Install the PCIe riser.

**Attention:** Make sure the serial port cable is routed through the cable clip inside the PCIe riser.

- a. ① Connect serial port cable to serial port connector on system board.
- b. ② Align the guide hole on the PCIe riser to the guide post on system board, and insert the PCIe riser into the PCIe slots on system board.
- c. ③ Fasten the thumbscrew to secure the PCIe riser.

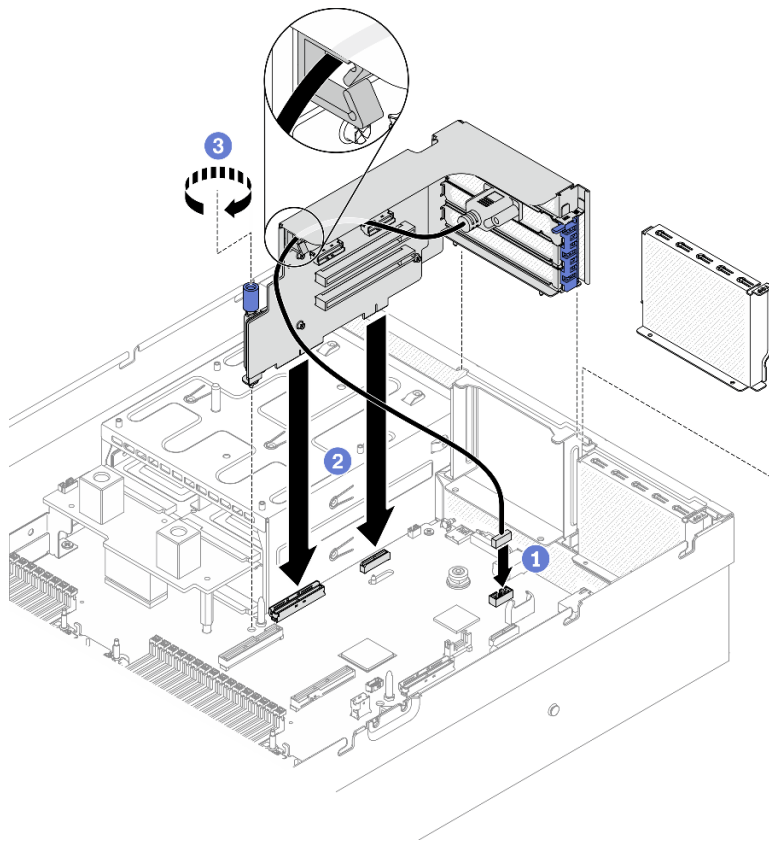


Figure 158. Installing PCIe riser 2 installed with serial port

## After you finish

1. Reconnect the required cables.
2. Reinstall the PCIe riser 2 if needed. See [“Install a PCIe riser” on page 219](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

## Demo video

[Watch the procedure on YouTube](#)

## PCIe riser board replacement

Follow instructions in this section to remove and install the PCIe riser board.

### Remove a PCIe riser board

Follow instructions in this section to remove a PCIe riser board from the rear PCIe riser.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).

- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

**Note:** To maintain proper system cooling, do not operate the server without a PCIe riser or a rise filler installed in the chassis.

## Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. Remove the PCIe riser. See [“Remove a PCIe riser” on page 213](#).
- c. Remove the PCIe adapter or serial port module. See [“Remove a PCIe adapter” on page 217](#) or [“Remove the serial port module” on page 242](#).

Step 2. Unfasten the four screws to remove the PCIe riser board from the PCIe riser cage.

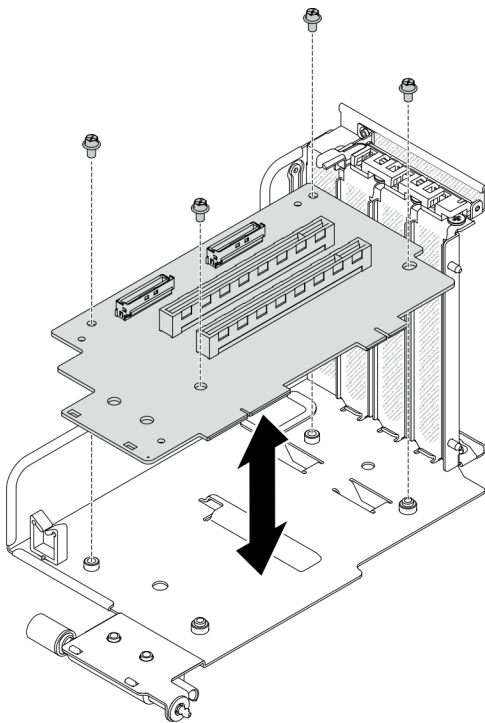


Figure 159. Removing the riser board

## After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install a PCIe riser board

Follow instructions in this section to install a PCIe riser board to the rear PCIe riser.

## About this task

**Attention:**

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.

**Procedure**

Step 1. Fasten the four screws to secure the PCIe riser board to the PCIe riser cage.

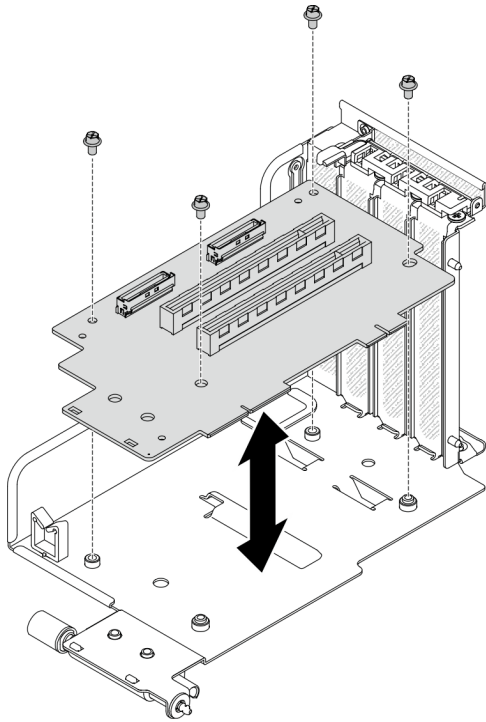


Figure 160. Installing the riser board

**After you finish**

1. Reinstall the PCIe adapter or serial port module. See [“Install a PCIe adapter” on page 218](#) or [“Install the serial port module” on page 243](#).
2. Reinstall the PCIe riser. See [“Install a PCIe riser” on page 219](#).
3. Reconnect the required cables.
4. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

**Demo video**

[Watch the procedure on YouTube](#)

**Power distribution board replacement**

Follow instructions in this section to remove and install the power distribution board.

**Remove the power distribution board**

Follow instructions in this section to remove the power distribution board.



## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

## Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. Remove all of the power supply units. See [“Remove a power supply unit” on page 227](#).
- c. **SXM GPU Model only:** Disconnect the sideband cable between the power distribution board and the SXM GPU power distribution board. Then, remove the GPU power distribution board. See [“Remove the SXM GPU power distribution board” on page 344](#).

Step 2. Remove the power distribution board from the server.

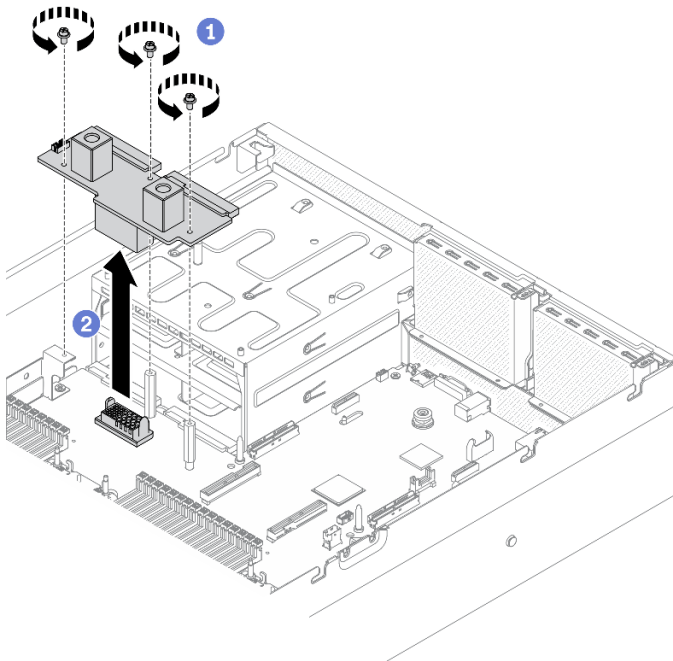


Figure 161. Removing the power distribution board

- a. ① Remove the three screws from the power distribution board.
- b. ② Lift the power distribution board out of its connector.

## After you finish

- Install a replacement unit. See [“Install the power distribution board” on page 226](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install the power distribution board

Follow instructions in this section to install the power distribution board.

### About this task

**Attention:** Read [“Installation Guidelines”](#) on page 149 and [“Safety inspection checklist”](#) on page 150 to ensure that you work safely.

### Procedure

- Step 1. Install the power distribution board into the server.
- 1 Align the connector on the power distribution board with that on the system board with the two power supply connectors facing the power supply bays; then, press the power distribution board into the connector until it is fully seated.
  - 2 Fasten the three screws to secure the power distribution board to the system board.

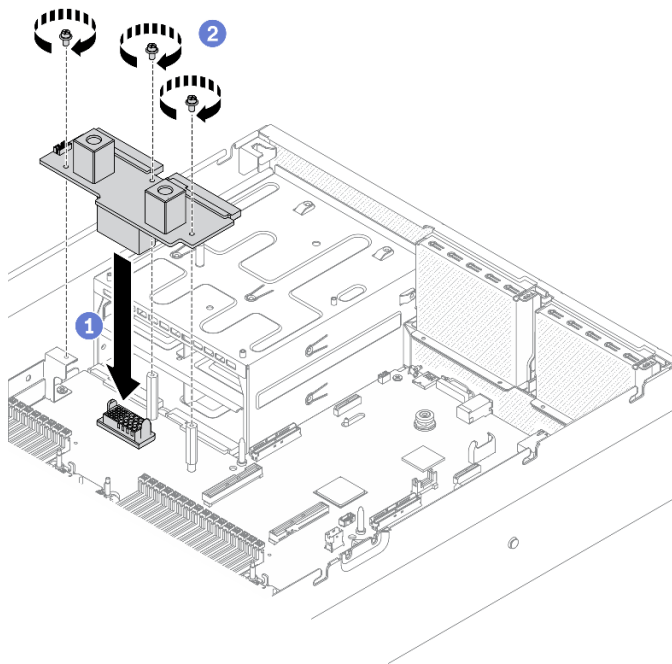


Figure 162. Installing the power distribution board

### After you finish

1. **SXM GPU Model only:** Reinstall the SXM GPU power distribution board and connect the sideband cable between the power distribution board and the SXM GPU power distribution board. See [“Install the SXM GPU power distribution board”](#) on page 347.
2. Reinstall the power supply units. See [“Install a power supply unit”](#) on page 228.
3. Complete the parts replacement. See [“Complete the parts replacement”](#) on page 360.

## Demo video

[Watch the procedure on YouTube](#)

## Power supply unit replacement

Follow instructions in this section to remove and install the power supply unit.

### Remove a power supply unit

Use instructions in this section to remove a power supply unit.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).
- Make sure you have a power supply unit filler available if some PSU bays will be left empty after the removal.

### Procedure

Step 1. Remove the power supply unit.

- a. ① Press and hold the orange release tab.
- b. ② Grasp the handle, and pull the power supply unit out of the server.

**Important:** During normal operation, each power supply bay must contain either a power supply unit or a power supply filler for proper cooling.

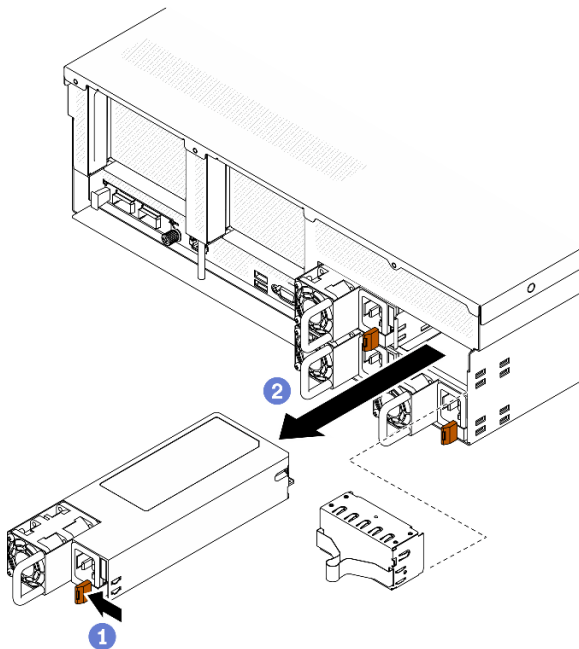


Figure 163. Removing power supply unit

## After you finish

- Install a replacement unit or filler. See [“Install a power supply unit” on page 228](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install a power supply unit

Use instructions in this section to install a power supply unit.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

### Notes:

- 4-DW GPU Model and 8-DW GPU Model server should be installed with two power supply units in bay 1 and bay 2 or four power supply units in all four bays.
- SXM GPU Model server should be installed with four power supply units in all four bays.
- During normal operation, each power supply bay must contain either a power supply unit or a power supply filler for proper cooling.

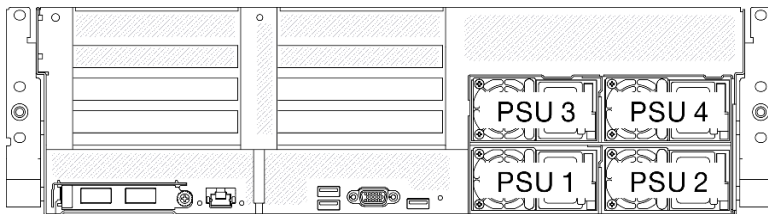


Figure 164. Power supply bay numbering

## Procedure

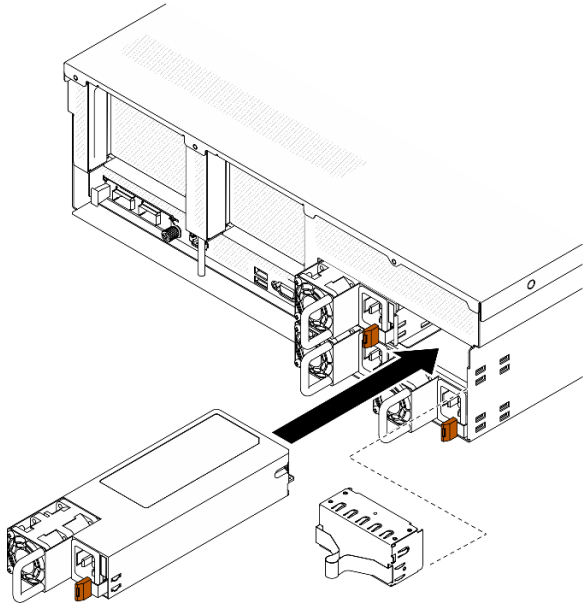


Figure 165. Installing power supply unit

- Step 1. If a power supply filler is installed in the bay, pull the filler out of the bay.
- Step 2. Align the power supply unit with the bay; then, slide the power supply unit into the bay until the release tab locks into place.
- Step 3. Connect the power supply unit to a properly grounded electrical socket with a power cord.
- Step 4. Make sure that the ac power LED on the power supply unit is lit, indicating that the power supply unit is operating correctly.

**Important:** During normal operation, each power supply bay must contain either a power supply unit or a power supply filler for proper cooling.

## After you finish

Check the PSU LEDs to verify that the PSU is operating correctly. See [Figure 9 “2400W/2600W power supply LEDs” on page 23](#).

## Demo video

[Watch the procedure on YouTube](#)

## Processor and heat sink replacement

Follow the instruction in this section to replace an assembled processor and heat sink, known as a processor-heat-sink module (PHM), a processor, or a heat sink.

**Attention:** Before reusing a processor or heat sink, make sure you use Lenovo proven alcohol cleaning pad and thermal grease.

**Important:** The processor in your server can throttle in response to thermal conditions, temporarily lowering its speed to reduce heat output. In instances where a few processor cores are throttled for an extremely short time period (100 ms or less), the only indication might be an entry in the operating system event log with no corresponding entry in the system XCC event log. If this situation occurs, the event can be ignored and processor replacement is not required.

### Remove a processor and heat sink

This task has instructions for removing an assembled processor and heat sink, known as a processor-heat-sink module (PHM), a processor, and a heat sink. All of these tasks require a Torx T30 driver.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).
- Prevent exposure to static electricity, which might lead to system halt and loss of data, by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.
- Each processor socket must always contain a cover or a PHM. When removing or installing a PHM, protect empty processor sockets with a cover.
- Do not touch the processor socket or processor contacts. Processor-socket contacts are very fragile and easily damaged. Contaminants on the processor contacts, such as oil from your skin, can cause connection failures.
- Do not allow the thermal grease on the processor or heat sink to come in contact with anything. Contact with any surface can compromise the thermal grease, rendering it ineffective. Thermal grease can damage components, such as the electrical connectors in the processor socket.
- Remove and install only one PHM at a time.
- Install the PHM starting from processor socket 1.

The following illustration shows the PHM locations on system board.

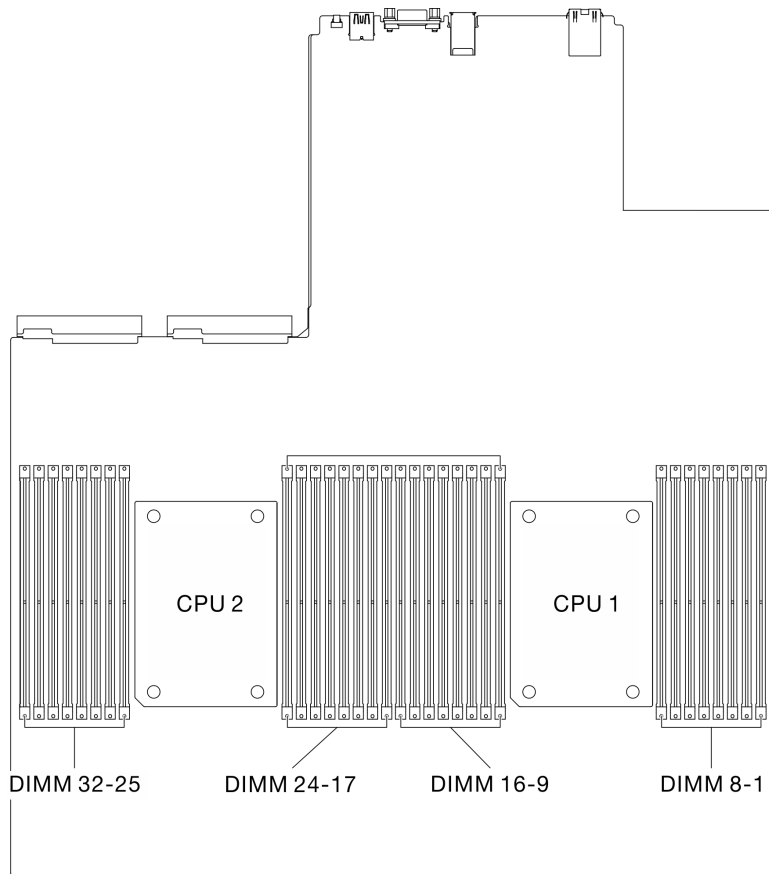


Figure 166. Location of memory modules and processor sockets

The following illustration shows the components of the PHM.

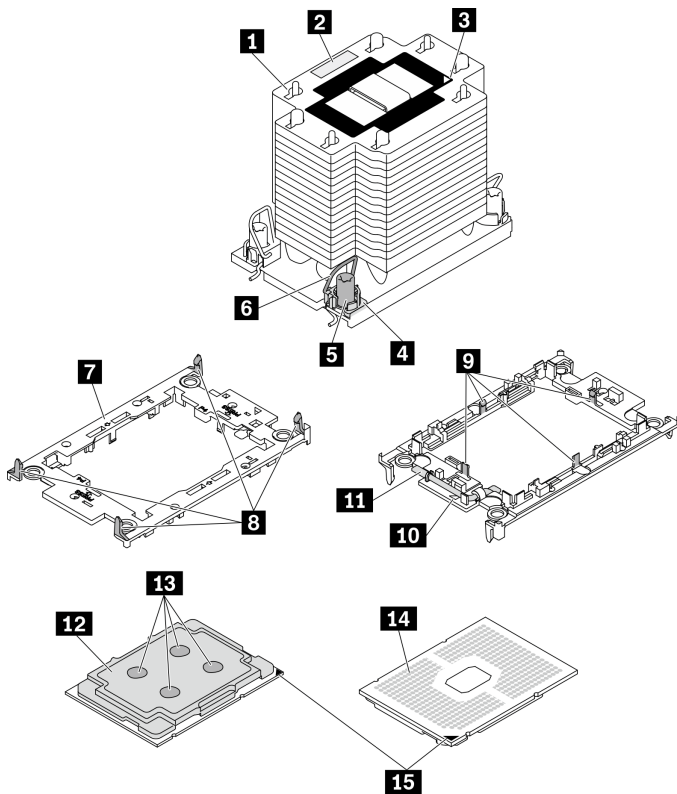


Figure 167. PHM components

<b>1</b> Heat sink	<b>9</b> Clips to secure processor in carrier
<b>2</b> Processor identification label	<b>10</b> Carrier triangular mark
<b>3</b> Heat sink triangular mark	<b>11</b> Processor ejector handle
<b>4</b> Nut and wire bail retainer	<b>12</b> Processor heat spreader
<b>5</b> Torx T30 nut	<b>13</b> Thermal grease
<b>6</b> Anti-tilt wire bail	<b>14</b> Processor contacts
<b>7</b> Processor carrier	<b>15</b> Processor triangular mark
<b>8</b> Clips to secure carrier to heat sink	

**Note:** The heat sink, processor, and processor carrier for your system might be different from those shown in the illustrations.

## Procedure

Step 1. Prepare your sever.

- a. Remove the top cover. See [“Remove the top cover” on page 255.](#)
- b. Remove the air baffle. See [“Remove the air baffle” on page 161.](#)



Step 2. Remove the PHM from the system board.

- a. ① Fully loosen the Torx T30 nuts on the PHM *in the removal sequence shown* on the heat sink label.
- b. ② Rotate the anti-tilt wire bails on the heat sink inward.
- c. ③ Carefully lift the PHM from the processor socket. If the PHM cannot be fully lifted out of the socket, further loosen the Torx T30 nuts and try lifting the PHM again.
- d. Place the PHM upside down with the processor-contact side up.

**Notes:**

- Do not touch the contacts on the processor.
- Keep the processor socket clean from any object to prevent possible damages.

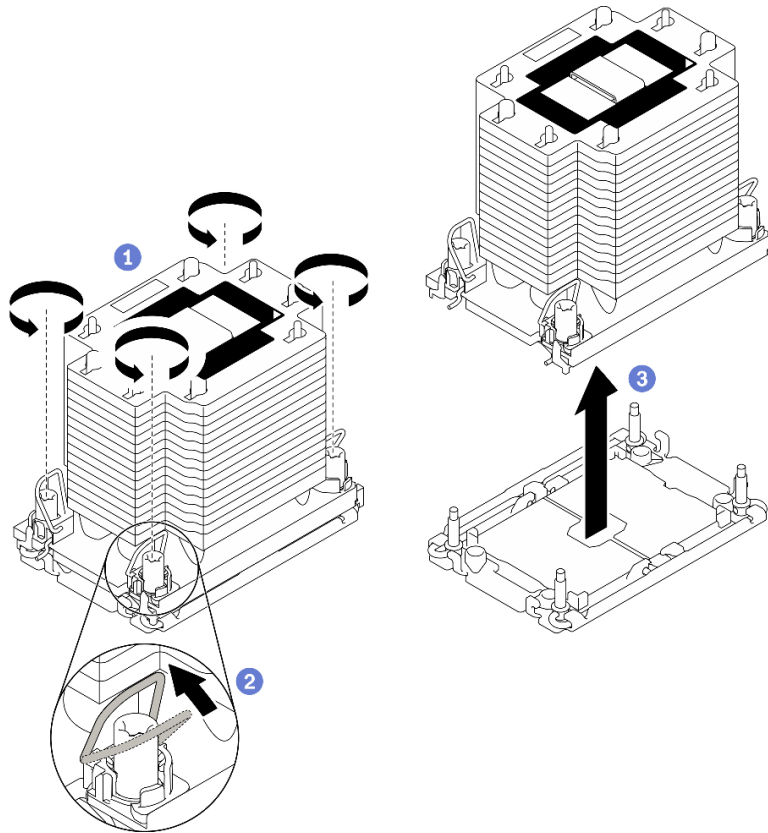


Figure 168. PHM removal

**After you finish**

- Empty processor socket must always contain a socket cover and a filler before the server is powered on.
- If you are removing the PHM as part of a system board replacement, set the PHM aside.
- If you are reusing the processor or heat sink, separate the processor from its carrier. See [“Separate the processor from carrier and heat sink” on page 234](#)
- If you are instructed to return the defective component, package the part to prevent any shipping damage. Reuse the packaging the new part arrived in and follow all packaging instructions.

**Demo video**

[Watch the procedure on YouTube](#)

## Separate the processor from carrier and heat sink

This task has instructions for separating a processor and its carrier from an assembled processor and heat sink, known as a processor-heat-sink module (PHM). This procedure must be executed by a trained technician.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Prevent exposure to static electricity, which might lead to system halt and loss of data, by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.
- Do not touch the processor contacts. Contaminants on the processor contacts, such as oil from your skin, can cause connection failures.
- Do not allow the thermal grease on the processor or heat sink to come in contact with anything. Contact with any surface can compromise the thermal grease, rendering it ineffective. Thermal grease can damage components, such as the electrical connectors in the processor socket.

**Important:** Make sure you have the alcohol cleaning pad (part number 00MP352) available.

**Note:** The heat sink, processor, and processor carrier for your system might be different from those shown in the illustrations.

### Procedure

Step 1. Remove the processor heat sink module, if one is installed. See [“Remove a processor and heat sink” on page 230](#).

Step 2. Separate the processor from the heat sink and carrier.

- a. ① Lift the handle to release the processor from the carrier.
- b. ② Hold the processor by its edges; then, lift the processor from the heat sink and carrier.
- c. ③ Without putting the processor down, wipe the thermal grease from the top of the processor with an alcohol cleaning pad; then, place the processor on a static protective surface with the processor-contact side up.

**Note:** Do not touch the contacts on the processor.

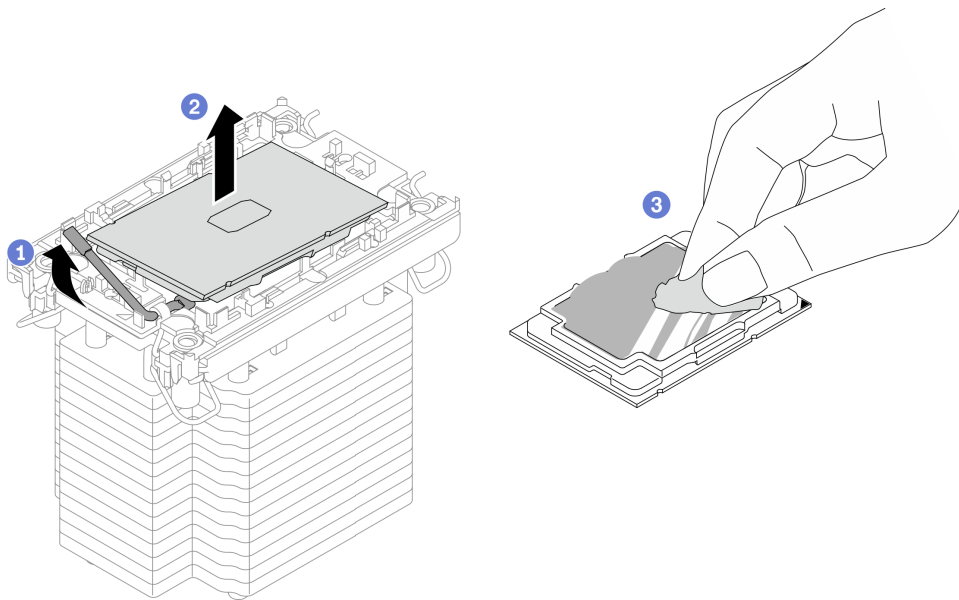


Figure 169. Separating a processor from the heat sink and carrier

Step 3. Separate the processor carrier from the heat sink.

- a. ① Release the retaining clips from the heat sink.
- b. ② Lift the carrier from the heat sink.
- c. ③ Wipe the thermal grease from the bottom of the heat sink with an alcohol cleaning pad.

**Note:** The processor carrier will be discarded and replaced with a new one. Make note of the color of the discarded carrier since replacement carrier needs to be of the same color.

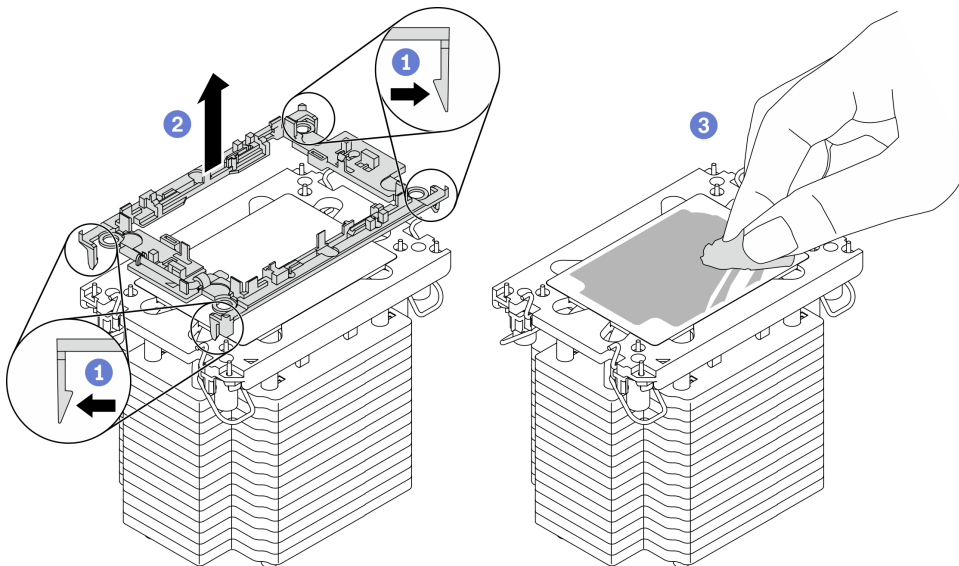


Figure 170. Separating a processor carrier from the heat sink

### After you finish

- Install a replacement processor or heat sink. See [“Install a processor and heat sink”](#) on page 236.

- If you are instructed to return the defective component, package the part to prevent any shipping damage. Reuse the packaging the new part arrived in and follow all packaging instructions.

### Demo video

[Watch the procedure on YouTube](#)

## Install a processor and heat sink

This task has instructions for installing an assembled processor and heat sink, known as a processor-heat-sink module (PHM). This task requires a Torx T30 driver. This procedure must be executed by a trained technician.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Prevent exposure to static electricity, which might lead to system halt and loss of data, by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.
- Each processor socket must always contain a cover or a PHM. When removing or installing a PHM, protect empty processor sockets with a cover.
- Do not touch the processor socket or processor contacts. Processor-socket contacts are very fragile and easily damaged. Contaminants on the processor contacts, such as oil from your skin, can cause connection failures.
- Do not allow the thermal grease on the processor or heat sink to come in contact with anything. Contact with any surface can compromise the thermal grease, rendering it ineffective. Thermal grease can damage components, such as the electrical connectors in the processor socket.
- Remove and install only one PHM at a time.
- Install the PHM starting from processor socket 1.

**Important:** Make sure you have an alcohol cleaning pad (part number 00MP352), thermal grease, and Torx T30 screwdriver available.

The following illustration shows the PHM locations on system board.

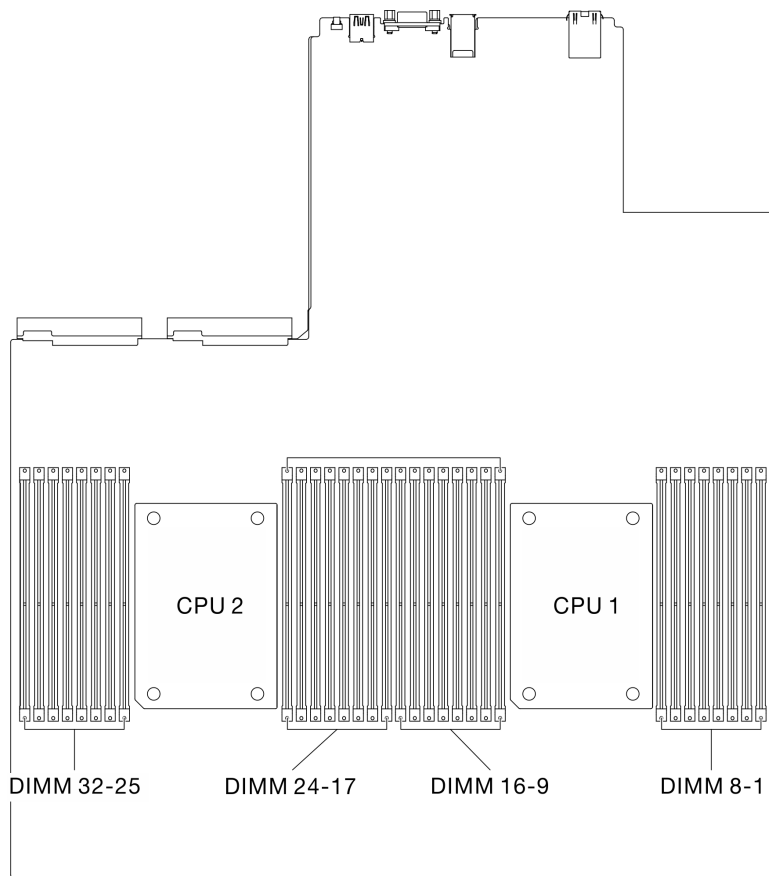


Figure 171. Location of memory modules and processor sockets

The following illustration shows the components of the PHM.

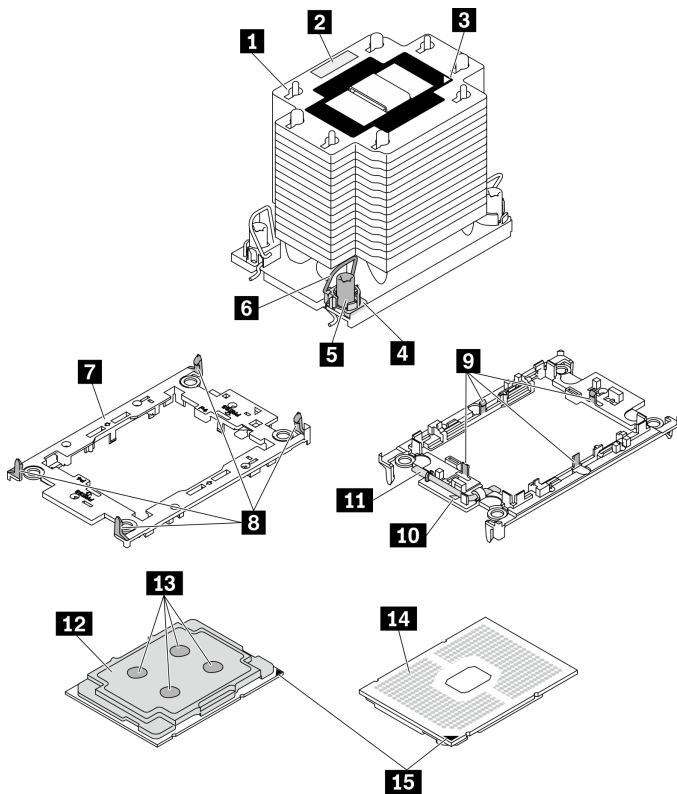


Figure 172. PHM components

<b>1</b> Heat sink	<b>9</b> Clips to secure processor in carrier
<b>2</b> Processor identification label	<b>10</b> Carrier triangular mark
<b>3</b> Heat sink triangular mark	<b>11</b> Processor ejector handle
<b>4</b> Nut and wire bail retainer	<b>12</b> Processor heat spreader
<b>5</b> Torx T30 nut	<b>13</b> Thermal grease
<b>6</b> Anti-tilt wire bail	<b>14</b> Processor contacts
<b>7</b> Processor carrier	<b>15</b> Processor triangular mark
<b>8</b> Clips to secure carrier to heat sink	

**Notes:**

- The heat sink, processor, and processor carrier for your system might be different from those shown in the illustrations.
- PHMs are keyed for the socket where they can be installed and for their orientation in the socket.
- See <https://serverproven.lenovo.com/> for a list of processors supported for your server. All processors on the system board must have the same speed, number of cores, and frequency.
- Before you install a new PHM or replacement processor, update your system firmware to the latest level. See “Update the firmware” in the *ThinkSystem SR670 V2 Setup Guide*.

**Procedure**

Step 1. Prepare your your server.

- Remove the top cover. See “Remove the top cover” on page 255.

- b. Remove the air baffle. See [“Remove the air baffle” on page 161](#).

Step 2. If you are replacing a processor and reusing the heat sink,

- a. Remove the processor identification label from the heat sink and replace it with the new label that comes with the replacement processor.
- b. If there is any old thermal grease on the heat sink, wipe the thermal grease from the bottom of the heat sink with an alcohol cleaning pad.

**Note:** Afterwards, proceed to Step 3.

Step 3. If you are replacing a heat sink and reusing the processor.

- a. Remove the processor identification label from the old heat sink and place it on the new heat sink in the same location. The label is on the side of the heat sink closest to the triangular alignment mark.

**Note:** If you are unable to remove the label and place it on the new heat sink, or if the label is damaged during transfer, write the processor serial number from the processor identification label on the new heat sink in the same location as the label would be placed using a permanent marker.

- b. Install processor in new carrier.

**Note:** Replacement heat sinks come with both gray and black processor carriers. Make sure to use the carrier with the same color as the one you discarded earlier.

1. ① Make sure the handle on the carrier is in the closed position.
2. ② Align the processor on the new carrier so that the triangular marks align; then, insert the marked end of the processor into the carrier.
3. ③ Hold the inserted end of the processor in place; then, pivot the unmarked end of the carrier down and away from the processor.
4. ④ Press the processor and secure the unmarked end under the clip on the carrier.
5. ⑤ Carefully pivot the sides of the carrier down and away from the processor.
6. ⑥ Press the processor and secure the sides under the clips on the carrier.

**Note:** To prevent the processor from falling out of the carrier, keep the processor-contact side up and hold the processor-carrier assembly by the sides of the carrier.

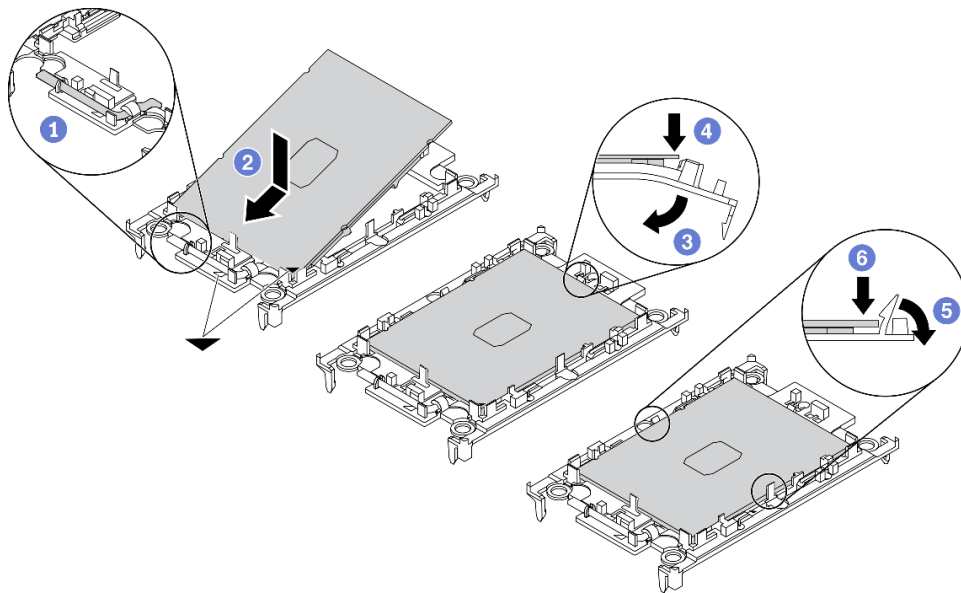


Figure 173. Processor carrier installation

Step 4. Apply thermal grease.

- a. Carefully place the processor and carrier in the shipping tray with the processor-contact side down. Make sure the triangular mark on the carrier is aligned with the triangular mark in the shipping tray.
- b. If there is any old thermal grease on the processor, gently wipe the top of the processor with an alcohol cleaning pad.

**Note:** Make sure the alcohol has fully evaporated before applying new thermal grease.

- c. Apply the thermal grease on the top of the processor with syringe by forming four uniformly spaced dots, while each dot consists of about 0.1 ml of thermal grease.

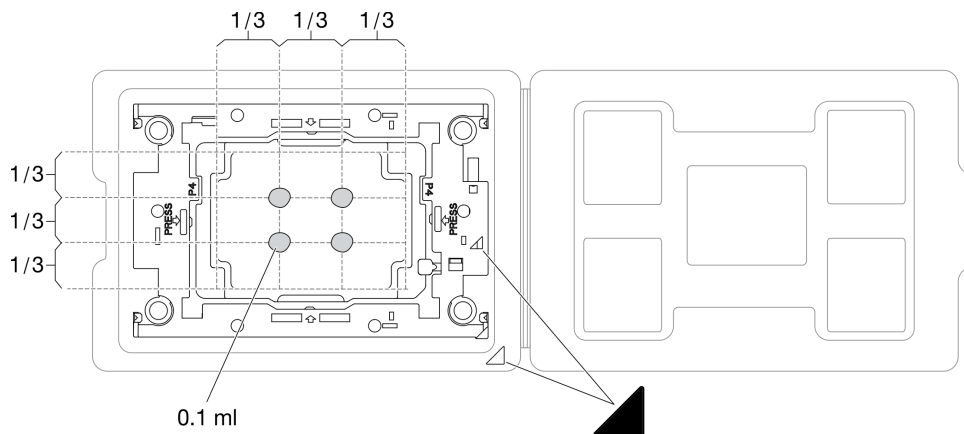


Figure 174. Thermal grease application with processor in shipping tray

Step 5. Assemble the processor and heat sink.

- a. Align the triangular mark on the processor carrier and processor with the triangular mark or notched corner on the heat sink.
- b. Install the heat sink onto the processor carrier.



- c. Press the carrier into place until the clips at all four corners engage.

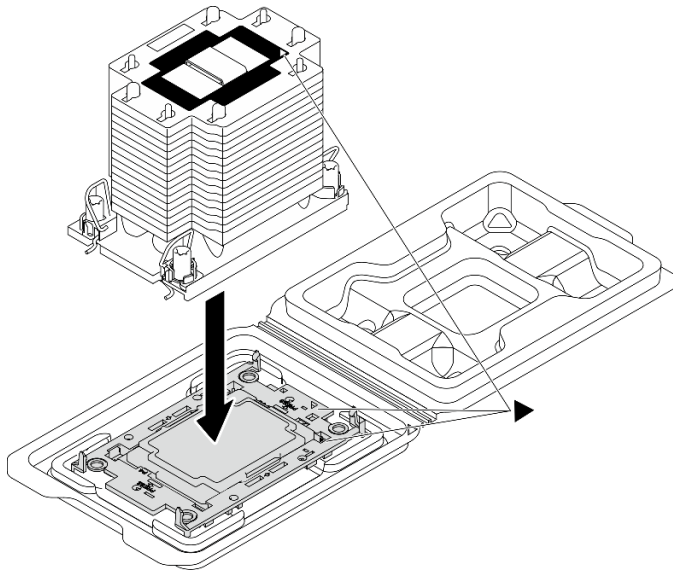


Figure 175. Assembling the PHM with processor in shipping tray

- Step 6. Install the processor-heat-sink module into the system board socket.
- a. ① Rotate the anti-tilt wire bails inward.
  - b. ② Align the triangular mark and four Torx T30 nuts on the PHM with the triangular mark and threaded posts of the processor socket; then, insert the PHM into the processor socket.
  - c. ③ Rotate the anti-tilt wire bails outward until they engage with the hooks in the socket.
  - d. ④ Fully tighten the Torx T30 nuts *in the installation sequence shown* on the heat-sink label. Tighten the screws until they stop; then, visually inspect to make sure that there is no gap between the screw shoulder beneath the heat sink and the processor socket

**Note:** For reference, the torque required for the fasteners to fully tighten is 1.1 newton-meters, 10 inch-pounds.

**Attention:** To prevent damage to components, make sure that you follow the indicated installation sequence.

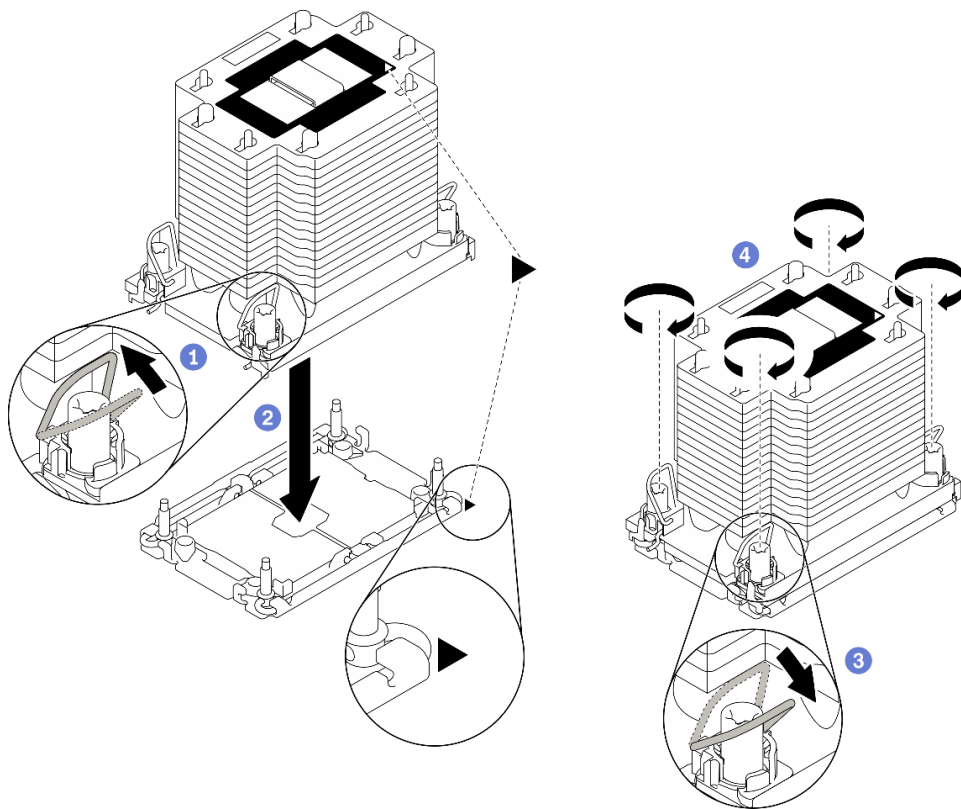


Figure 176. PHM installation

## After you finish

1. Empty processor socket must always contain a socket cover and a filler before the server is powered on.
2. Complete the parts replacement. See [“Complete the parts replacement”](#) on page 360.

## Demo video

[Watch the procedure on YouTube](#)

## Serial port module replacement

Follow instructions in this section to remove and install the serial port module.

### Remove the serial port module

Follow instructions in this section to remove the serial port module from the rear PCIe riser.

## About this task

### Attention:

- Read [“Installation Guidelines”](#) on page 149 and [“Safety inspection checklist”](#) on page 150 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server”](#) on page 14.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack”](#) on page 152.

## Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. Remove the PCIe riser. See [“Remove a PCIe riser” on page 213](#).

Step 2. Remove the serial port module.

- a. ① Remove the serial port cable from the cable clip.
- b. ② Open the retention latch on the PCIe riser.
- c. ③ Unfasten the screw that secures the serial port module to the PCIe riser.
- d. ④ Remove the serial port module from the PCIe riser.

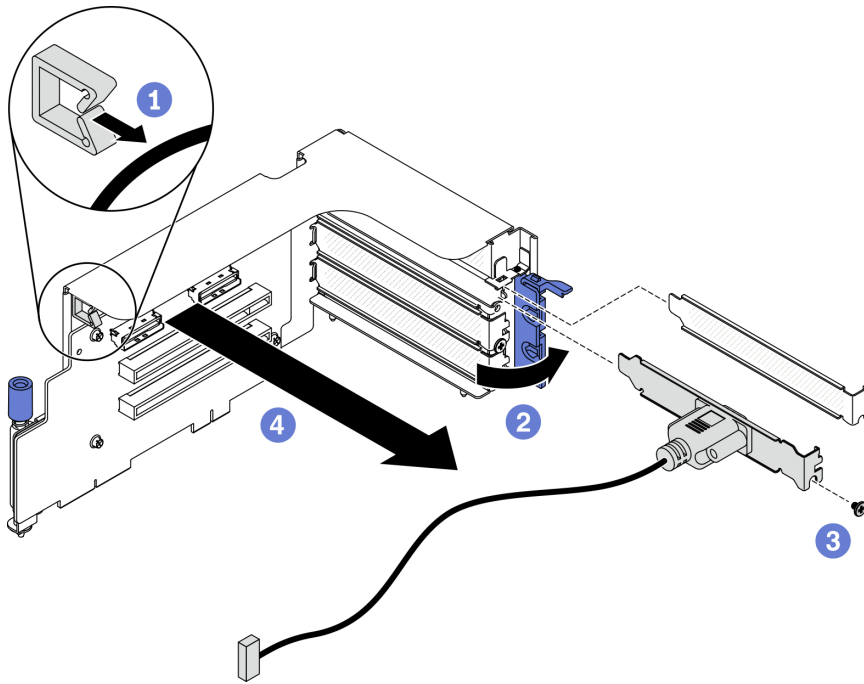


Figure 177. Removing the serial port module

## After you finish

- Install a replacement unit. See [“Install the serial port module” on page 243](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install the serial port module

Follow instructions in this section to install the serial port module.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.

## Procedure

Step 1. Open the retention latch on the PCIe riser.

Step 2. Install the serial port module.

- 1 Insert the serial port module into the PCIe riser.
- 2 Fasten the screw to secure the serial port module to the PCIe riser.
- 3 Close the retention latch.
- 4 Route the serial port cable through the cable clip.

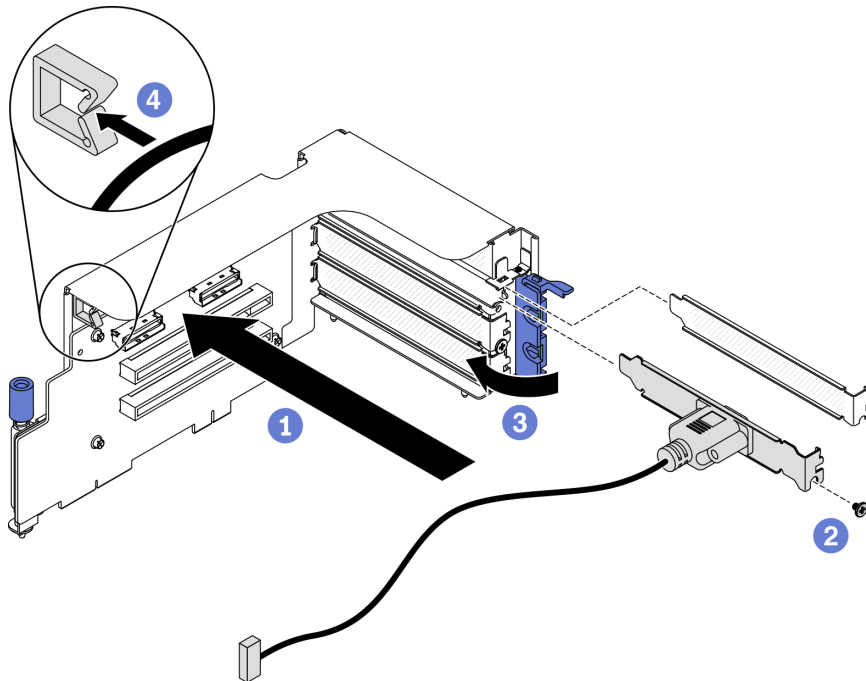


Figure 178. Installing the serial port module

## After you finish

1. Connect the serial port cable to the serial port cable connector on the system board. See [“System-board connectors” on page 34](#) for more details.
2. Reinstall the PCIe riser. See [“Install a PCIe riser” on page 219](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

## Demo video

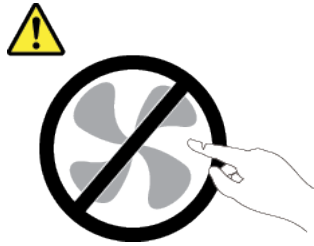
[Watch the procedure on YouTube](#)

## System board replacement (trained technician only)

Follow instructions in this section to remove and install the system board.

**Important:** This task must be operated by trained technicians.

**CAUTION:**  
Hazardous moving parts. Keep fingers and other body parts away.



**CAUTION:**



The heat sinks and processors might be very hot. Turn off the server and wait several minutes to let the server cool before removing the server cover.

## Remove the system board

Follow instructions in this section to remove the system board.

### About this task

#### Important:

- Removing and installing this component requires trained technicians. **Do not** attempt to remove or install it without proper training.
- When replacing the system board, always update the server with the latest firmware or restore the pre-existing firmware. Make sure that you have the latest firmware or a copy of the pre-existing firmware before you proceed.
- When removing the memory modules, label the slot number on each memory module, remove all the memory modules from the system board, and set them aside on a static-protective surface for reinstallation.
- **When disconnecting cables**, make a list of each cable and record the connectors the cable is connected to, and use the record as a cabling checklist after installing the new system board.

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

## Procedure

Step 1. Prepare your server.

- a. Record all system configuration information, such as Lenovo XClarity Controller IP addresses, vital product data, and the machine type, model number, serial number, Universally Unique Identifier, and asset tag of the server.
- b. Save the system configuration to an external device with Lenovo XClarity Essentials.

- c. Save the system event log to external media.

Step 2. Remove the following components in the sequence below.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. Remove the air baffle. See [“Remove the air baffle” on page 161](#).
- c. Remove the fan cage and the fans. See [“Remove the fan cage” on page 171](#) and [“Remove a fan” on page 173](#).
- d. Remove the PHMs. See [“Remove a processor and heat sink” on page 230](#).
- e. Make sure to label the slot number on each memory module, remove all the memory modules from the system board, and set them aside on a static-protective surface for reinstallation. See [“Remove a memory module” on page 203](#).

**Important:** It is advised to print out the layout of memory module slots for reference.

- f. Remove the intrusion switch. See [“Remove the intrusion switch” on page 193](#).
- g. If applicable, remove the PCIe riser. See [“Remove a PCIe riser” on page 213](#).
- h. If applicable, remove the OCP Ethernet adapter. See [“Remove the OCP Ethernet adapter” on page 211](#).
- i. Remove the power supply units. See [“Remove a power supply unit” on page 227](#).
- j. (SXM GPU Model only) Remove the SXM GPU power distribution board. See [“Remove the SXM GPU power distribution board” on page 344](#).
- k. Remove the power distribution board. See [“Remove the power distribution board” on page 224](#).

Step 3. Disconnect all the cables from the system board. As you disconnect the cable, make a list of each cable and record the connectors the cable is connected to, and use the record as a cabling checklist after installing the new system board.

Step 4. Disengage the system board.

- a. ① Pull up the rear lifting handle to release the system board.
- b. ② Grasp both lifting handles, and slide the system board toward the front of the chassis. Make sure that the guide pin is at the rear end of the guide slot.

**Note:** This handle only serves the purpose of removing system board. Do not attempt to lift the whole server with it.

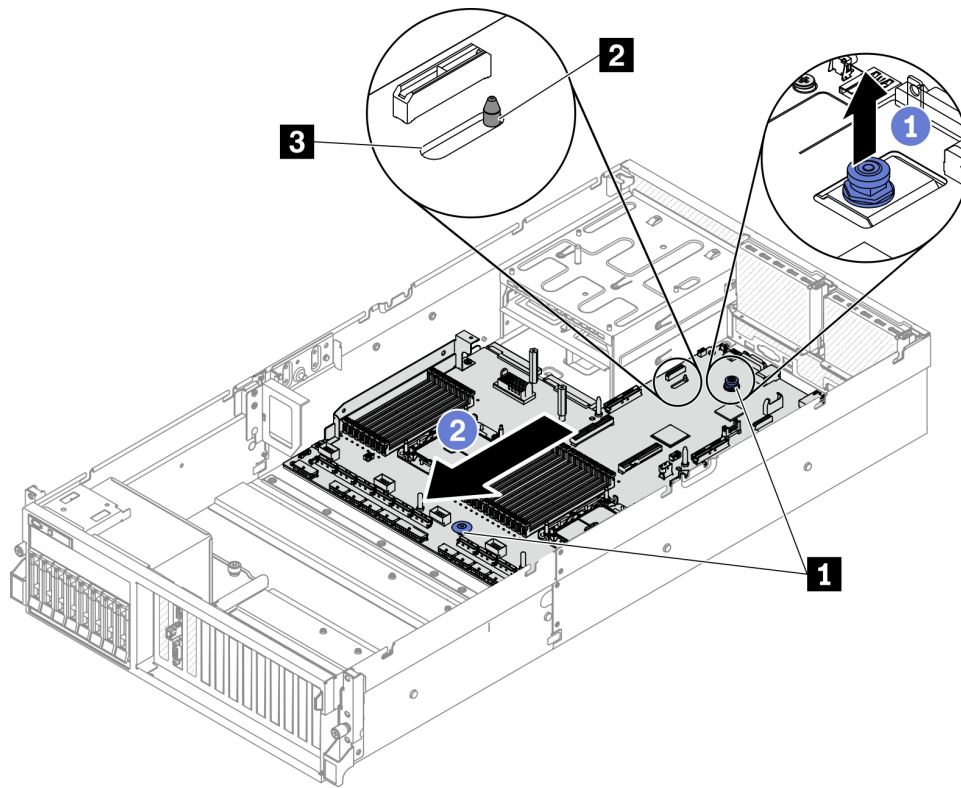


Figure 179. Disengaging the system board

<b>1</b> Lifting handles
<b>2</b> Guide pin
<b>3</b> Guide slot

- Step 5. Remove the system board.
- a. **1** Tilt the system board so that its rear end is up.
  - b. **2** Hold both lifting handles, and lift the system board out of the chassis.

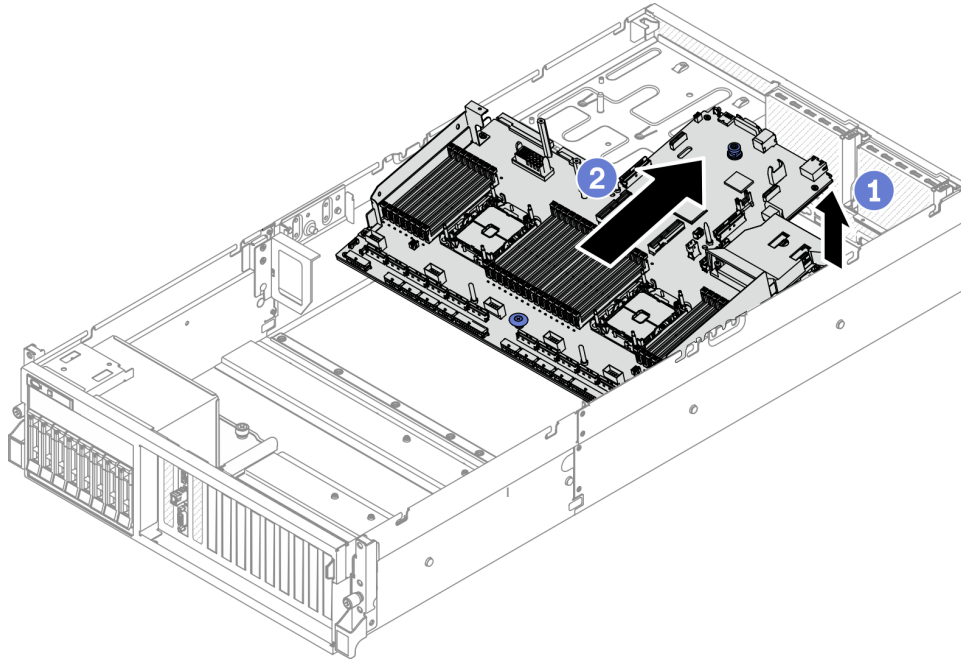


Figure 180. Removing the system board

## After you finish

- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

**Important:** Before you return the system board, make sure that you install the CPU socket covers from the new system board. To replace a CPU socket cover:

1. Take a socket cover from the CPU socket assembly on the new system board and orient it correctly above the CPU socket assembly on the removed system board.
  2. Gently press down the socket cover legs to the CPU socket assembly, pressing on the edges to avoid damage to the socket pins. You might hear a click on the socket cover is securely attached.
  3. **Make sure** that the socket cover is securely attached to the CPU socket assembly.
- If you plan to recycle the component, see [“Disassemble the system board for recycle” on page 397](#).

## Demo video

[Watch the procedure on YouTube](#)

## Install the system board

Follow instructions in this section to install the system board.

## About this task

**Important:** Removing and installing this component requires trained technicians. **Do not** attempt to remove or install it without proper training.

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.

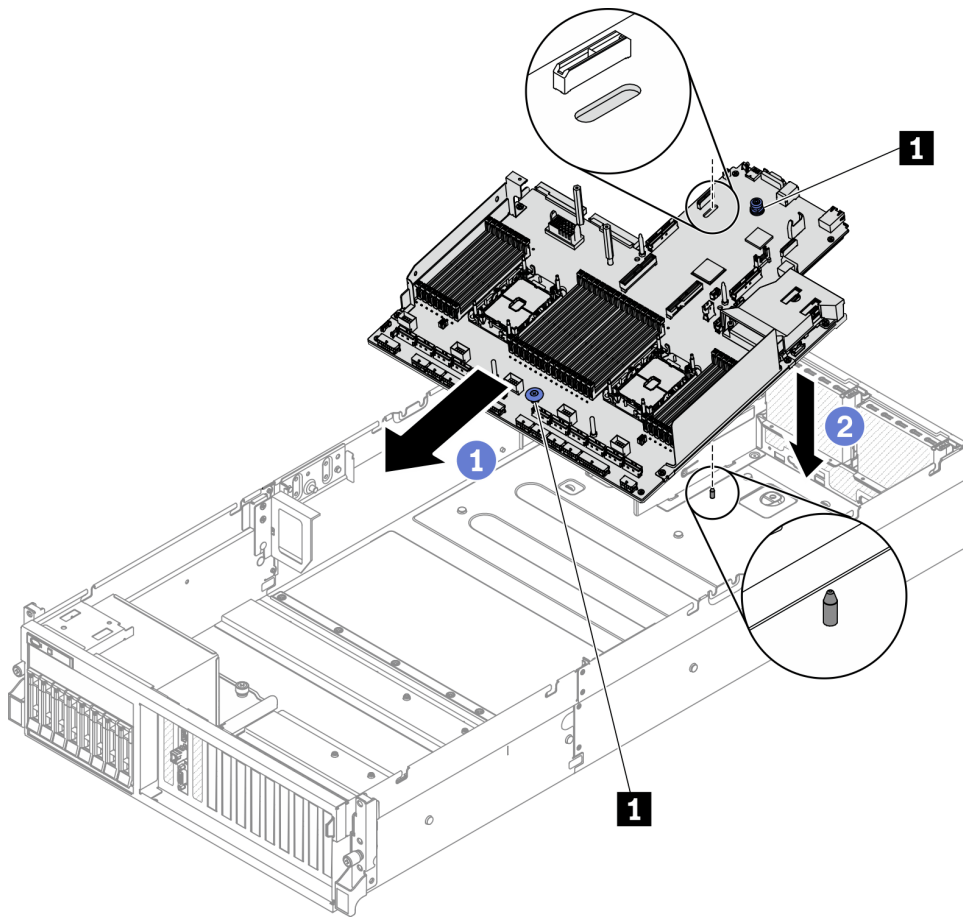


- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

## Procedure

Step 1. Placing the system board inside the chassis.

- a. ① Grasp the lifting handles on system board, and tilt the system board so that its rear end is up.
- b. ② Align the guide slot on system board with the guide pin on chassis; then, lower the system board into the chassis.



① Lifting handle

Step 2. Grasp the lifting handles, and slide the system board toward the rear of the chassis. Make sure that:

1. The guide pin is at the front end of the guide slot.
2. The rear connectors on the new system board are inserted into the corresponding holes in the rear panel.

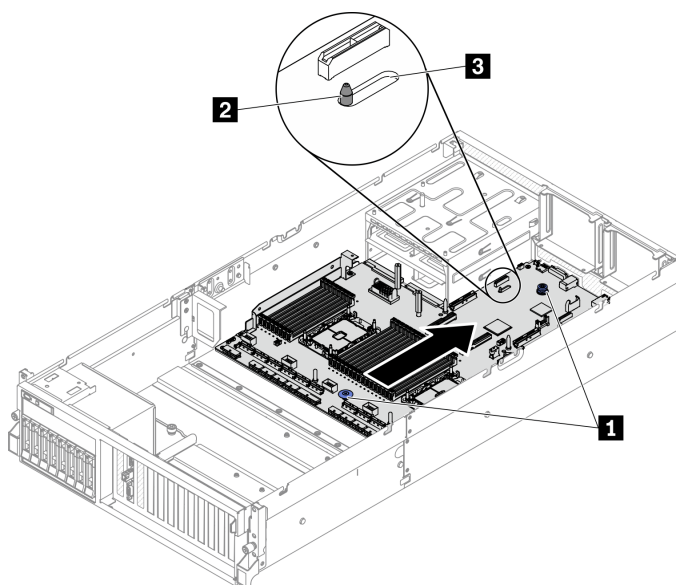


Figure 181. Installing the system board

<b>1</b> Lifting handles
<b>2</b> Guide pin
<b>3</b> Guide slot

## After you finish

1. Install the following components in the sequence below.
  - a. Install the power distribution board. See [“Install the power distribution board” on page 226](#).
  - b. (SXM GPU Model only) Install the SXM GPU power distribution board. See [“Install the SXM GPU power distribution board” on page 347](#).
  - c. Install the power supply units. See [“Install a power supply unit” on page 228](#).
  - d. If applicable, install the OCP Ethernet adapter. See [“Install the OCP Ethernet adapter” on page 212](#).
  - e. If applicable, install the PCIe riser. See [“Install a PCIe riser” on page 219](#).
  - f. Install the intrusion switch. See [“Install the intrusion switch” on page 194](#).
  - g. Install each memory module to the same slot on the new system board as on the defective system board until all the memory modules are installed. See [“Install a memory module” on page 206](#).
  - h. Install the PHMs. See [“Install a processor and heat sink” on page 236](#).
  - i. Install the air baffle. See [“Install the air baffle” on page 163](#).
2. Reconnect all the required cables to the same connectors on the system board as the defective system board.
3. Install the fan cage and the fans. See [“Install the fan cage” on page 172](#) and [“Install a fan” on page 174](#).
4. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside the server.
5. Reinstall the top cover. See [“Install the top cover” on page 257](#).
6. If the sever was installed in a rack, reinstall the server into the rack. See [“Install the server to rack” on page 155](#).
7. Reconnect the power cords and any cables that you removed.

8. Power on the server and any peripheral devices. See “Power on the server” on page 14.
9. Update the machine type and serial number with new vital product data (VPD). Use the Lenovo XClarity Provisioning Manager to update the machine type and serial number. See “Update the machine type and serial number” on page 251.
10. Enable TPM. See “Enable TPM” on page 253.
11. Optionally, enable UEFI Secure Boot. See “Enable UEFI Secure Boot” on page 255.

## Demo video

[Watch the procedure on YouTube](#)

## Update the machine type and serial number

After the system board is replaced by trained service technicians, the machine type and serial number must be updated.

There are two methods available to update the machine type and serial number:

- From Lenovo XClarity Provisioning Manager

To update the machine type and serial number from Lenovo XClarity Provisioning Manager:

1. Start the server and press the key according to the on-screen instructions to display the Lenovo XClarity Provisioning Manager interface.
2. If the power-on Administrator password is required, enter the password.
3. From the System Summary page, click **Update VPD**.
4. Update the machine type and serial number.

- From Lenovo XClarity Essentials OneCLI

Lenovo XClarity Essentials OneCLI sets the machine type and serial number in the Lenovo XClarity Controller. Select one of the following methods to access the Lenovo XClarity Controller and set the machine type and serial number:

- Operate from the target system, such as LAN or keyboard console style (KCS) access
- Remote access to the target system (TCP/IP based)

To update the machine type and serial number from Lenovo XClarity Essentials OneCLI:

1. Download and install Lenovo XClarity Essentials OneCLI.

To download Lenovo XClarity Essentials OneCLI, go to the following site:

<https://datacentersupport.lenovo.com/solutions/HT116433>

2. Copy and unpack the OneCLI package, which also includes other required files, to the server. Make sure that you unpack the OneCLI and the required files to the same directory.
3. After you have Lenovo XClarity Essentials OneCLI in place, type the following commands to set the machine type and serial number:

```
onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> [access_method]
onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> [access_method]
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> [access_method]
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx <system model> --override [access_method]
```

Where:

*<m/t\_model>*

The server machine type and model number. Type *xxxxxyyy*, where *xxxx* is the machine type and *yyy* is the server model number.

<s/n>

The serial number on the server. Type zzzzzzz, where zzzzzzz is the serial number.

<system model>

The system model. Type system yyyyyyyy, where yyyyyyyy is the product identifier.

[access\_method]

The access method that you select to use from the following methods:

- Online authenticated LAN access, type the command:  
[--bmc-username <xcc\_user\_id> --bmc-password <xcc\_password>]

Where:

*xcc\_user\_id*

The BMC/IMM/XCC account name (1 of 12 accounts). The default value is USERID.

*xcc\_password*

The BMC/IMM/XCC account password (1 of 12 accounts).

Example commands are as follows:

```
onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> --bmc-username <xcc_user_id>
--bmc-password <xcc_password>
```

```
onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> --bmc-username <xcc_user_id> --bmc-
password <xcc_password>
```

```
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> --bmc-username xcc_user_
id --bmc-password xcc_password
```

```
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx <system model> --override --bmc-
username xcc_user_id --bmc-password xcc_password
```

- Online KCS access (unauthenticated and user restricted):

You do not need to specify a value for *access\_method* when you use this access method.

Example commands are as follows:

```
onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model>
```

```
onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n>
```

```
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model>
```

```
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx <system model> --override
```

**Note:** The KCS access method uses the IPMI/KCS interface, which requires that the IPMI driver be installed.

- Remote LAN access, type the command:  
[--bmc <xcc\_user\_id>:<xcc\_password>@<xcc\_external\_ip>]

Where:

*xcc\_external\_ip*

The BMC/IMM/XCC IP address. There is no default value. This parameter is required.

*xcc\_user\_id*

The BMC/IMM/XCC account (1 of 12 accounts). The default value is USERID.

*xcc\_password*

The BMC/IMM/XCC account password (1 of 12 accounts).

**Note:** BMC, IMM, or XCC internal LAN/USB IP address, account name, and password are all valid for this command.

Example commands are as follows:

```
onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> --bmc <xcc_user_id>:<xcc_
password>@<xcc_external_ip>
```

```
onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> --bmc <xcc_user_id>:<xcc_
password>@<xcc_external_ip>
```

```
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> --bmc xcc_user_id:xcc_
password@xcc_external_ip
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx <system model> --override --bmc xcc_
user_id:xcc_password@xcc_external_ip
```

4. Reset the Lenovo XClarity Controller to the factory defaults. See “Resetting the BMC to Factory Default” section in the XCC documentation compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>.

## Enable TPM

The server supports Trusted Platform Module (TPM), Version 1.2 or Version 2.0

**Note:** For customers in Chinese Mainland, integrated TPM is not supported. However, customers in Chinese Mainland can install a Trusted Cryptographic Module (TCM) adapter or a TPM adapter (sometimes called a daughter card).

When a system board is replaced, you must make sure that the TPM policy is set correctly.

### CAUTION:

**Take special care when setting the TPM policy. If it is not set correctly, the system board can become unusable.**

### Set the TPM policy

By default, a replacement system board is shipped with the TPM policy set to **undefined**. You must modify this setting to match the setting that was in place for the system board that is being replaced.

There are two methods available to set the TPM policy:

- From Lenovo XClarity Provisioning Manager

To set the TPM policy from Lenovo XClarity Provisioning Manager:

1. Start the server and press the key according to the on-screen instructions to display the Lenovo XClarity Provisioning Manager interface.
2. If the power-on Administrator password is required, enter the password.
3. From the System Summary page, click **Update VPD**.
4. Set the policy to one of the following settings.
  - **NationZ TPM 2.0 enabled - China only**. Customers in the Chinese Mainland should choose this setting if a NationZ TPM 2.0 adapter is installed.
  - **TPM enabled - ROW**. Customers outside of the Chinese Mainland should choose this setting.
  - **Permanently disabled**. Customers in the Chinese Mainland should use this setting if no TPM adapter is installed.

**Note:** Although the setting **undefined** is available as a policy setting, it should not be used.

- From Lenovo XClarity Essentials OneCLI

**Note:** Please note that a Local IPMI user and password must be setup in Lenovo XClarity Controller for remote accessing to the target system.

To set the TPM policy from Lenovo XClarity Essentials OneCLI:

1. Read TpmTcmPolicyLock to check whether the TPM\_TCM\_POLICY has been locked:  
`OneCli.exe config show imm.TpmTcmPolicyLock --override --imm <userid>:<password>@<ip_address>`

**Note:** The imm.TpmTcmPolicyLock value must be 'Disabled', which means TPM\_TCM\_POLICY is NOT locked and changes to the TPM\_TCM\_POLICY are permitted. If the return code is 'Enabled' then no changes to the policy are permitted. The planar may still be used if the desired setting is correct for the system being replaced.

2. Configure the TPM\_TCM\_POLICY into XCC:

- For customers in Chinese Mainland with no TPM, or customers that require to disable TPM:  
`OneCli.exe config set imm.TpmTcmPolicy "NeitherTpmNorTcm" --override --imm <userid>:<password>@<ip_address>`
- For customers in Chinese Mainland that require to enable TPM:  
`OneCli.exe config set imm.TpmTcmPolicy "NationZTPM20Only" --override --imm <userid>:<password>@<ip_address>`
- For customers outside Chinese Mainland that require to enable TPM:  
`OneCli.exe config set imm.TpmTcmPolicy "TpmOnly" --override --imm <userid>:<password>@<ip_address>`

3. Issue reset command to reset system:

`OneCli.exe misc ospower reboot --imm <userid>:<password>@<ip_address>`

4. Read back the value to check whether the change has been accepted:

`OneCli.exe config show imm.TpmTcmPolicy --override --imm <userid>:<password>@<ip_address>`

**Notes:**

- If the read back value is matched it means the TPM\_TCM\_POLICY has been set correctly.

imm.TpmTcmPolicy is defined as below:

- Value 0 use string "Undefined", which means UNDEFINED policy.
- Value 1 use string "NeitherTpmNorTcm", which means TPM\_PERM\_DISABLED.
- Value 2 use string "TpmOnly", which means TPM\_ALLOWED.
- Value 4 use string "NationZTPM20Only", which means NationZ\_TPM20\_ALLOWED.
- Below 4 steps must also be used to 'lock' the TPM\_TCM\_POLICY when using OneCli/ASU commands:

5. Read TpmTcmPolicyLock to check whether the TPM\_TCM\_POLICY has been locked, command as below:

`OneCli.exe config show imm.TpmTcmPolicyLock --override --imm <userid>:<password>@<ip_address>`

The value must be 'Disabled', it means TPM\_TCM\_POLICY is NOT locked and must be set.

6. Lock the TPM\_TCM\_POLICY:

`OneCli.exe config set imm.TpmTcmPolicyLock "Enabled" --override --imm <userid>:<password>@<ip_address>`

7. Issue reset command to reset system, command as below:

`OneCli.exe misc ospower reboot --imm <userid>:<password>@<ip_address>`

During the reset, UEFI will read the value from imm.TpmTcmPolicyLock, if the value is 'Enabled' and the imm.TpmTcmPolicy value is valid, UEFI will lock the TPM\_TCM\_POLICY setting.

**Note:** The valid values for imm.TpmTcmPolicy include 'NeitherTpmNorTcm', 'TpmOnly', and 'NationZTPM20Only'.

If the imm.TpmTcmPolicyLock is set as 'Enabled' but imm.TpmTcmPolicy value is invalid, UEFI will reject the 'lock' request and change imm.TpmTcmPolicyLock back to 'Disabled'.

8. Read back the value to check whether the 'Lock' is accepted or rejected. Command as below:

`OneCli.exe config show imm.TpmTcmPolicy --override --imm <userid>:<password>@<ip_address>`

**Note:** If the read back value is changed from 'Disabled' to 'Enabled' that means the TPM\_TCM\_POLICY has been locked successfully. There is no method to unlock a policy once it has been set other than replacing system board.

imm.TpmTcmPolicyLock is defined as below:

Value 1 uses string "Enabled" , which means lock the policy. Other values are not accepted.

## Enable UEFI Secure Boot

Optionally, you can enable UEFI Secure Boot.

There are two methods available to enable UEFI Secure Boot:

- From Lenovo XClarity Provisioning Manager

To enable UEFI Secure Boot from Lenovo XClarity Provisioning Manager:

1. Start the server and press the key specified in the on-screen instructions to display the Lenovo XClarity Provisioning Manager interface. (For more information, see the "Startup" section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/> )
2. If the power-on Administrator password is required, enter the password.
3. From the UEFI Setup page, click **System Settings** → **Security** → **Secure Boot**.
4. Enable Secure Boot and save the settings.

- From Lenovo XClarity Essentials OneCLI

To enable UEFI Secure Boot from Lenovo XClarity Essentials OneCLI:

1. Download and install Lenovo XClarity Essentials OneCLI.

To download Lenovo XClarity Essentials OneCLI, go to the following site:

<https://datacentersupport.lenovo.com/solutions/HT116433>

2. Run the following command to enable Secure Boot:

```
OneCli.exe config set SecureBootConfiguration.SecureBootSetting Enabled --bmc <userid>:<password>@<ip_<br>address>
```

where:

- <userid>:<password> are the credentials used to access the BMC (Lenovo XClarity Controller interface) of your server. The default user ID is USERID, and the default password is PASSWORD (zero, not an uppercase o)
- <ip\_address> is the IP address of the BMC.

For more information about the Lenovo XClarity Essentials OneCLI `set` command, see:

[https://pubs.lenovo.com/lxce-onecli/onecli\\_r\\_set\\_command](https://pubs.lenovo.com/lxce-onecli/onecli_r_set_command)

**Note:** If disabling UEFI secure boot is needed, run the following command:

```
OneCli.exe config set SecureBootConfiguration.SecureBootSetting Disabled --bmc <userid>:<password>@<ip_<br>address>
```

## Top cover replacement

Follow instructions in this section to remove and install the top cover.

### Remove the top cover

Follow instructions in this section to remove the top cover.

#### S014



**CAUTION:**

Hazardous voltage, current, and energy levels might be present. Only a qualified service technician is authorized to remove the covers where the label is attached.

**S033**



**CAUTION:**

Hazardous energy present. Voltages with hazardous energy might cause heating when shorted with metal, which might result in spattered metal, burns, or both.

## About this task

**Attention:**

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

## Procedure

Step 1. Remove the top cover.

- a. ① Press the release button on the top cover latch.
- b. ② Rotate the latch until the latch is fully open and the top cover is disengaged from the chassis.
- c. ③ Lift up the top cover from the chassis, and place it on a flat clean surface.

**Attention:**

- Service label is located on the inside of the top cover.
- For proper cooling and air flow, install the top cover before you power on the server. Operating the server with the top cover removed might damage server components.



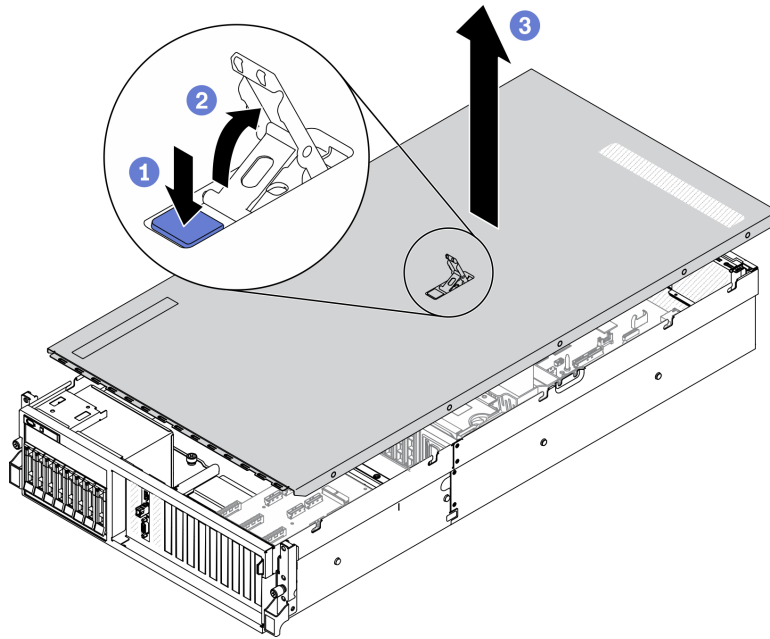


Figure 182. Removing top cover

## After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

### Demo video

[Watch the procedure on YouTube](#)

## Install the top cover

Follow instructions in this section to install the top cover.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Make sure that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server.
- Make sure that all internal cables are correctly routed. See [Chapter 3 “Internal cable routing” on page 57](#).

## Procedure

Step 1. Install the top cover.

- a. **1** Align the top cover guide holes with the guide pins on chassis; then place the top cover on top of the server.
- b. **2** Press down the top cover latch to lock the top cover in place.

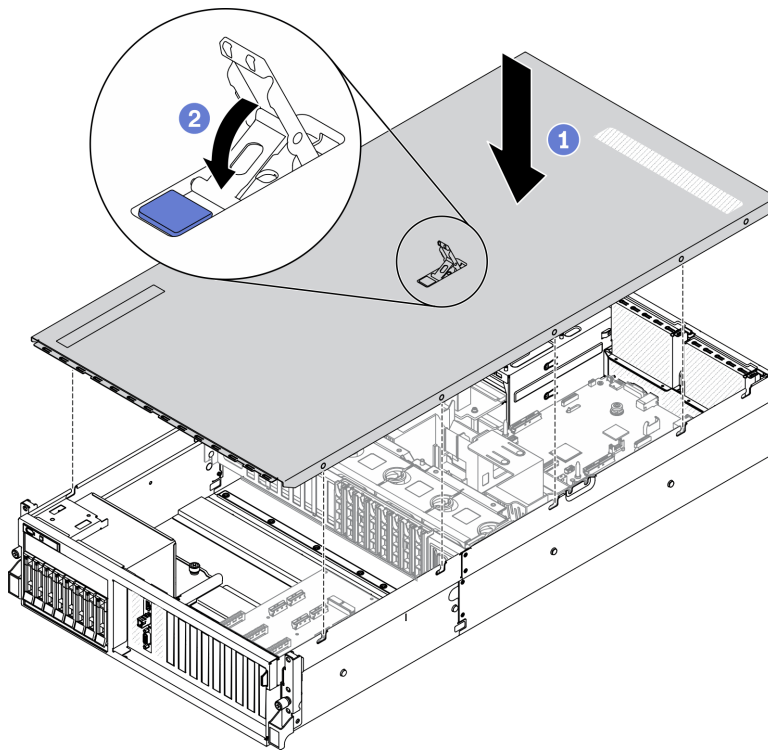


Figure 183. Installing top cover

## After you finish

Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

## Demo video

[Watch the procedure on YouTube](#)

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## 4-DW GPU Model / 8-DW GPU Model components

Follow instructions in this section to remove and install the 4-DW GPU Model and 8-DW GPU Model components.

### 2.5-/3.5-inch hot-swap drive replacement

Follow instructions in this section to remove and install a 2.5-inch or 3.5-inch hot-swap drive.

#### Remove a 2.5-/3.5-inch hot-swap drive

Follow instructions in this section to remove a 2.5-inch or 3.5-inch hot-swap drive.

#### About this task

##### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- To make sure that there is adequate system cooling, do not operate the solution for more than two minutes without either a drive or a filler installed in each bay.

- If one or more NVMe solid-state drives are to be removed, it is recommended to disable them beforehand via the operating system.
- Before you remove or make changes to drives, drive controllers (including controllers that are integrated on the system board), drive backplanes or drive cables, back up all important data that is stored on drives.
- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

**Note:** Make sure you have the drive bay fillers available if some drive bays will be left empty after the removal.

## Procedure

Step 1. Based on your configuration, follow the corresponding procedures to remove a 2.5-inch or 3.5-inch hot-swap drive.

### Remove a 2.5-inch hot-swap drive:

- 1 Slide the release latch to unlock the drive handle.
- 2 Rotate the drive handle to the open position.
- 3 Grasp the handle and slide the drive out of the drive bay.

**Note:** Install a drive bay filler or replacement drive as soon as possible. See [“Install a 2.5-/3.5-inch hot-swap drive” on page 260](#).

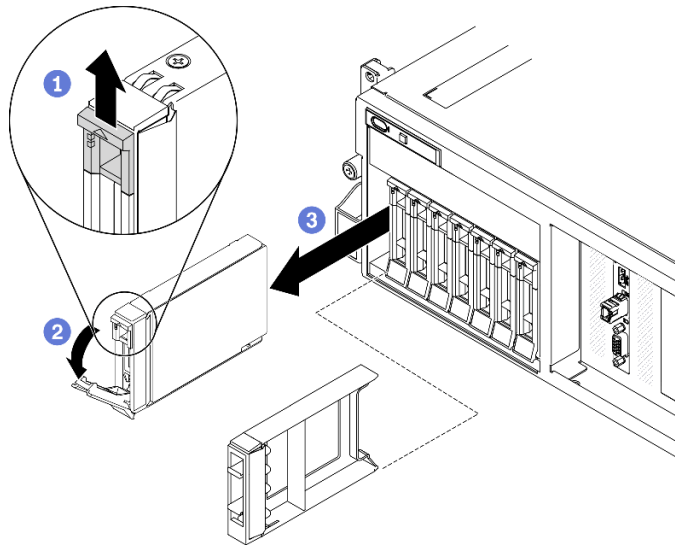


Figure 184. Removing a 2.5-inch hot-swap drive

### Remove a 3.5-inch hot-swap drive:

- 1 Slide the release latch to unlock the drive handle.
- 2 Rotate the drive handle to the open position.
- 3 Grasp the handle and slide the drive out of the drive bay.

**Note:** Install a drive bay filler or replacement drive as soon as possible. See [“Install a 2.5-/3.5-inch hot-swap drive” on page 260](#).

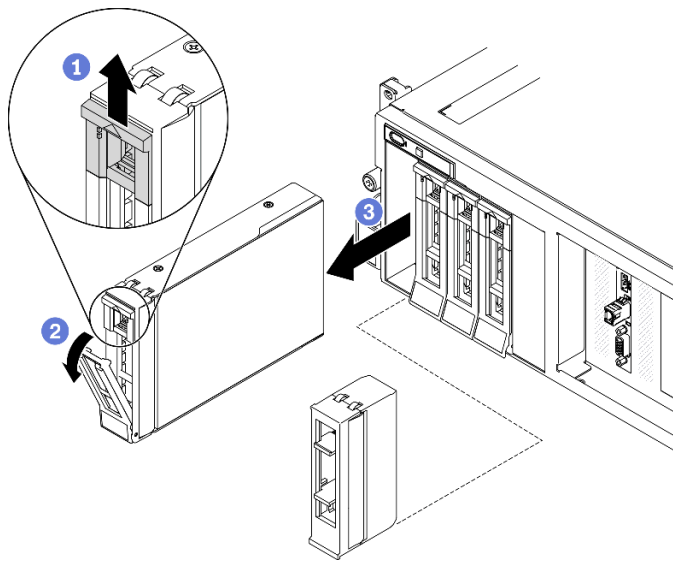


Figure 185. Removing a 3.5-inch hot-swap drive

## After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

### Demo video

[Watch the procedure on YouTube](#)

## Install a 2.5-/3.5-inch hot-swap drive

Follow instructions in this section to install a 2.5-inch or 3.5-inch hot-swap drive.

## About this task

### Attention:

- Read “[Installation Guidelines](#)” on page 149 and “[Safety inspection checklist](#)” on page 150 to ensure that you work safely.
- Touch the static-protective package that contains the drive to any unpainted metal surface on the solution; then, remove the drive from the package and place it on a static-protective surface.
- Make sure you save the data on your drive, especially if it is part of a RAID array, before you remove it from the server.
- To avoid damage to the drive connectors, make sure that the server top cover is in place and fully closed whenever you install or remove a drive.
- To make sure that there is adequate system cooling, do not operate the server for more than two minutes without either a drive or a drive bay filler installed in each bay.
- Before you make changes to drives, drive controllers (including controllers that are integrated on the system board), drive backplanes, or drive cables, back up all important data that is stored on drives.
- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

The following notes describe the type of drives that the server supports and other information that you must consider when you install a drive. For a list of supported drives, see <https://serverproven.lenovo.com/>.

- Locate the documentation that comes with the drive and follow those instructions in addition to the instructions in this chapter.
- The electromagnetic interference (EMI) integrity and cooling of the solution are protected by having all bays and PCI and PCIe slots covered or occupied. When you install a drive, PCI, or PCIe adapter, save the EMC shield and filler panel from the bay or PCI or PCIe adapter slot cover in the event that you later remove the device.
- For a complete list of supported optional devices for the server, see <https://serverproven.lenovo.com/>.
- Depending on your server configuration for 4-DW GPU Model, the following drive types can be installed into each drive cage with their corresponding drive bay numbers:
  - Up to eight 2.5-inch SAS/SATA/NVMe drives

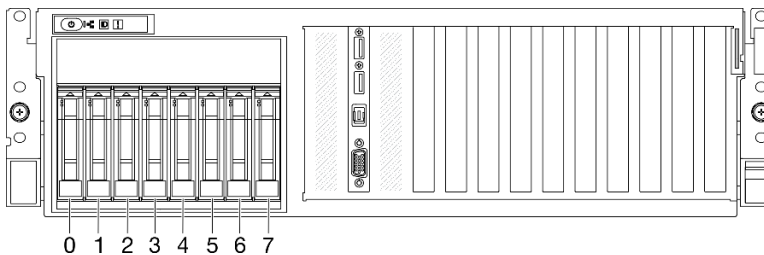


Figure 186. 2.5-inch drive bay numbering

- Up to four 3.5-inch SATA drives

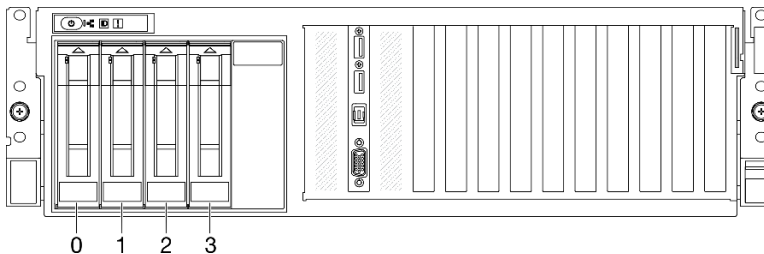


Figure 187. 3.5-inch drive bay numbering

## Procedure

Step 1. Based on your configuration, follow the corresponding procedures to install a 2.5-inch or 3.5-inch hot-swap drive.

### Install a 2.5-inch hot-swap drive:

**Note:** If a drive bay filler is installed in the drive bay, pull the release lever on the filler and slide it out of the server.

- 1 Make sure that the drive handle is in the open position. Then, align the drive with the guide rails in the bay and gently push the drive into the bay until the drive stops.
- 2 Rotate the drive handle to the fully closed position until the handle latch clicks.

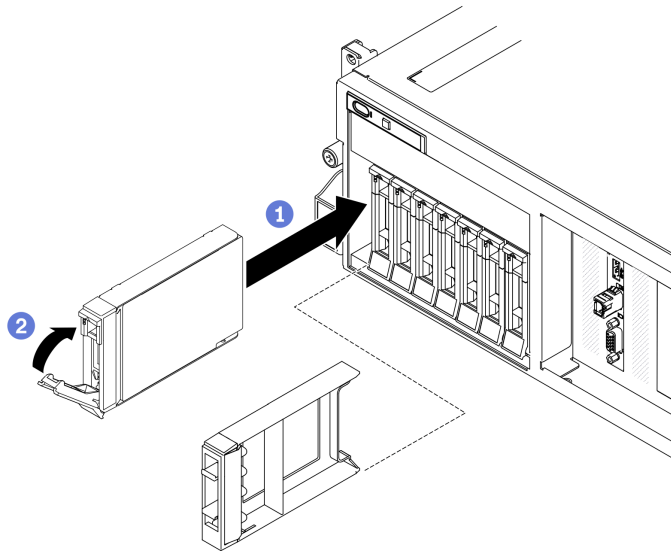


Figure 188. Installing a 2.5-inch hot-swap drive

### Install a 3.5-inch hot-swap drive:

**Note:** If a drive bay filler is installed in the drive bay, pull the release lever on the filler and slide it out of the server.

- a. ① Make sure that the drive handle is in the open position. Then, align the drive with the guide rails in the bay and gently push the drive into the bay until the drive stops.
- b. ② Rotate the drive handle to the fully closed position until the handle latch clicks.

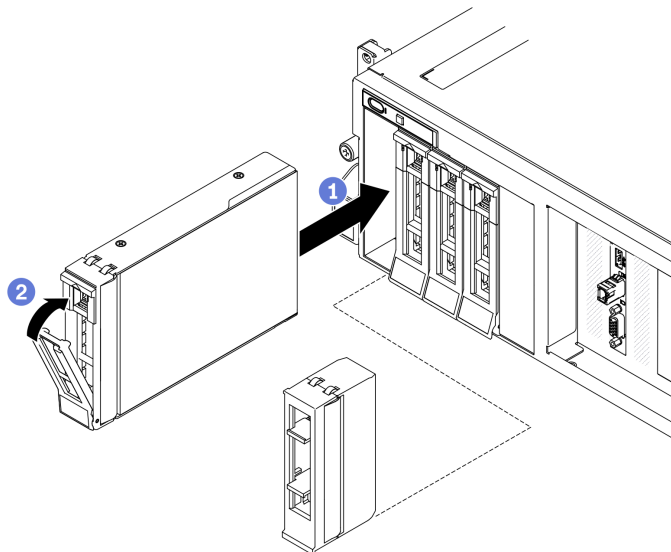


Figure 189. Installing a 3.5-inch hot-swap drive

Step 2. If you have additional drives to install, do so now; if any of the drive bays is left empty, fill it with a drive bay filler.

### After you finish

1. Check the drive status LED to verify that the drive is operating correctly.
  - If the yellow drive status LED of a drive is lit continuously, that drive is faulty and must be replaced.
  - If the green drive activity LED is flashing, the drive is being accessed.
2. If the server is configured for RAID operation through a ThinkSystem RAID adapter, you might have to reconfigure your disk arrays after you install drives. See the ThinkSystem RAID adapter documentation for additional information about RAID operation and complete instructions for using ThinkSystem RAID adapter.
3. If you have installed 2.5-inch drive backplane with U.3 NVMe drives for Trimode. Enable U.3 x1 mode for the selected drive slots on the backplane through the XCC web GUI. See [“U.3 NVMe drive can be detected in NVMe connection, but cannot be detected in Tri-mode” on page 386](#).

## Demo video

[Watch the procedure on YouTube](#)

## 2.5-/3.5-inch drive backplane replacement

Follow instructions in this section to remove and install a 2.5-inch or 3.5-inch drive backplane.

### Remove the 2.5-/3.5-inch drive backplane

Follow instructions in this section to remove the 2.5-inch or 3.5-inch drive backplane.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

### Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. Remove all hot-swap drives and drive bay fillers (if any) from the drive bays. See [“Remove a 2.5-/3.5-inch hot-swap drive” on page 258](#). Place the drives on a static protective surface.
- c. Disconnect the power and signal cables from the 2.5-inch or 3.5-inch drive backplane.
- d. Remove the 2.5-inch or 3.5-inch drive cage assembly. See [“Remove the 2.5-/3.5-inch drive cage assembly” on page 266](#).

Step 2. Based on your configuration, follow the corresponding procedures to remove the 2.5-inch or 3.5-inch drive backplane.

#### Remove the 2.5-inch drive backplane:

- a. ① Lift and hold the retention latches on top of the 2.5-inch drive cage.
- b. ② Rotate the 2.5-inch drive backplane away to disengage it from the retention latches as illustrated.
- c. ③ Remove the backplane from the drive cage.

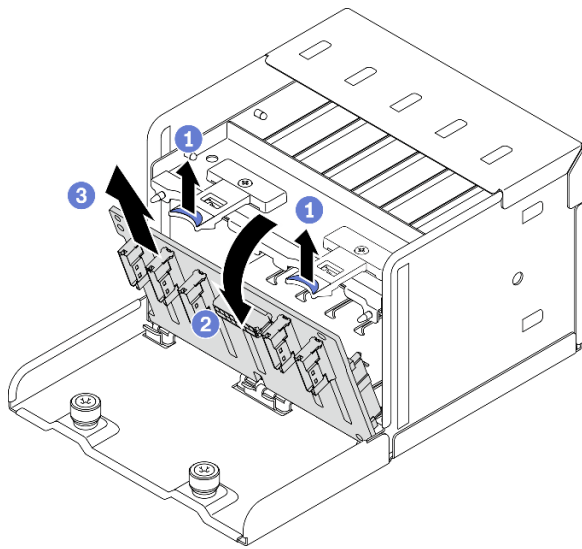


Figure 190. Removing the 2.5-inch drive backplane

**Remove the 3.5-inch drive backplane:**

- a. ① Pull out the blue plunger that secures the 3.5-inch drive backplane.
- b. ② Slide the 3.5-inch drive backplane as illustrated to disengage it from the drive cage; then, remove the backplane from the drive cage.

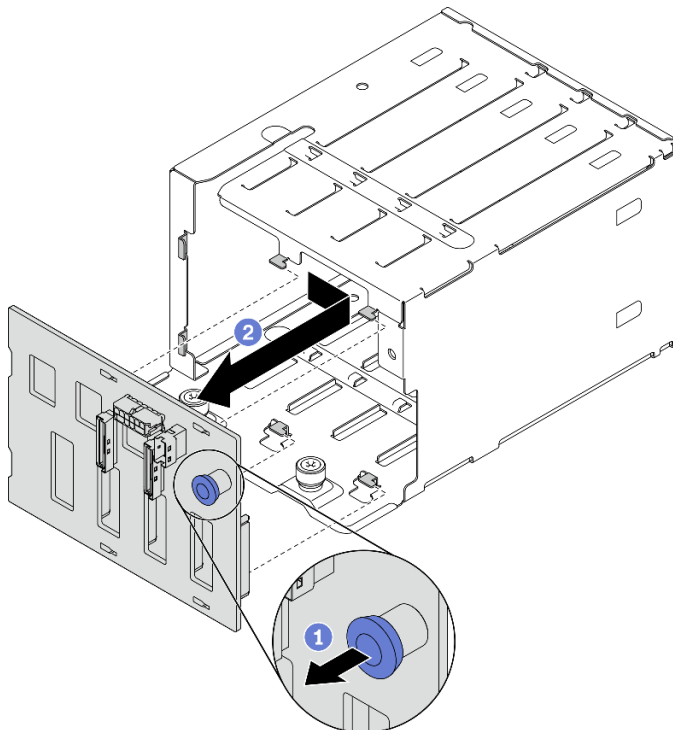


Figure 191. Removing the 3.5-inch drive backplane

**After you finish**

- Install a replacement unit. See [“Install the 2.5-/3.5-inch drive backplane”](#) on page 265.



- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

### Demo video

[Watch the procedure on YouTube](#)

## Install the 2.5-/3.5-inch drive backplane

Follow instructions in this section to install the 2.5-inch or 3.5-inch drive backplane.

### About this task

#### Attention:

- Read “[Installation Guidelines](#)” on page 149 and “[Safety inspection checklist](#)” on page 150 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

### Procedure

Step 1. Based on your configuration, follow the corresponding procedures to install the 2.5-inch or 3.5-inch drive backplane.

#### Install the 2.5-inch drive backplane:

- 1 Align the tabs on the bottom of the 2.5-inch drive backplane with the slots on the drive cage, and insert them into the slots.
- 2 Push the top of the backplane toward the drive cage until it clicks in place.

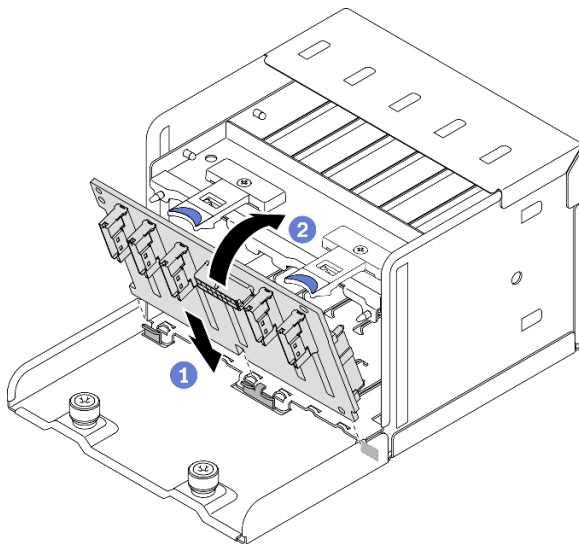


Figure 192. Installing the 2.5-inch drive backplane

#### Install the 3.5-inch drive backplane:

- 1 Align the four tabs on the drive cage with the slots on the 3.5-inch drive backplane; then, insert the tabs into the corresponding slots.
- 2 Slide the backplane toward the left as illustrated until it is seated in the drive cage.

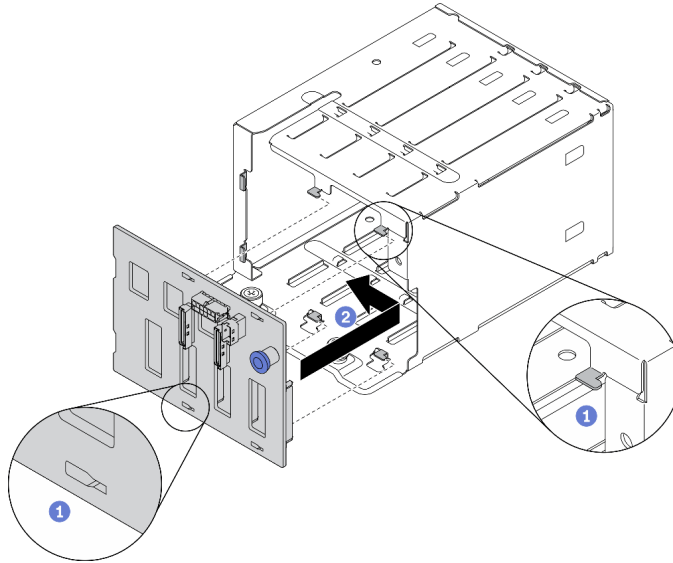


Figure 193. Installing the 3.5-inch drive backplane

## After you finish

1. Reinstall the 2.5-inch or 3.5-inch drive cage assembly. See [“Install the 2.5-/3.5-inch drive cage assembly” on page 268.](#)
2. Reconnect the power and signal cables to the 2.5-inch or 3.5-inch drive backplane.
3. Reinstall the drives and drive bay fillers (if any) into the drive bays. See [“Install a 2.5-/3.5-inch hot-swap drive” on page 260.](#)
4. Complete the parts replacement. See [“Complete the parts replacement” on page 360.](#)
5. If you have installed 2.5-inch drive backplane with U.3 NVMe drives for Trimode. Enable U.3 x1 mode for the selected drive slots on the backplane through the XCC web GUI. See [“U.3 NVMe drive can be detected in NVMe connection, but cannot be detected in Tri-mode” on page 386.](#)

## Demo video

[Watch the procedure on YouTube](#)

## 2.5-/3.5-inch drive cage assembly replacement

Follow instructions in this section to remove and install the 2.5-inch or 3.5-inch drive cage assembly.

### Remove the 2.5-/3.5-inch drive cage assembly

Follow instructions in this section to remove the 2.5-inch or 3.5-inch drive cage assembly.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14.](#)

- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

## Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. Remove all hot-swap drives and drive bay fillers (if any) from the drive bays. See [“Remove a 2.5-/3.5-inch hot-swap drive” on page 258](#). Place the drives on a static protective surface.
- c. Disconnect the power and signal cables from the 2.5-inch or 3.5-inch drive backplane.

Step 2. Based on your configuration, follow the corresponding procedures to remove the 2.5-inch or 3.5-inch drive cage assembly.

### Remove the 2.5-inch drive cage assembly:

- a. ① Loosen the two thumbscrews that secure the 2.5-inch drive cage assembly to the chassis.
- b. ② Slide the drive cage assembly out of the chassis.

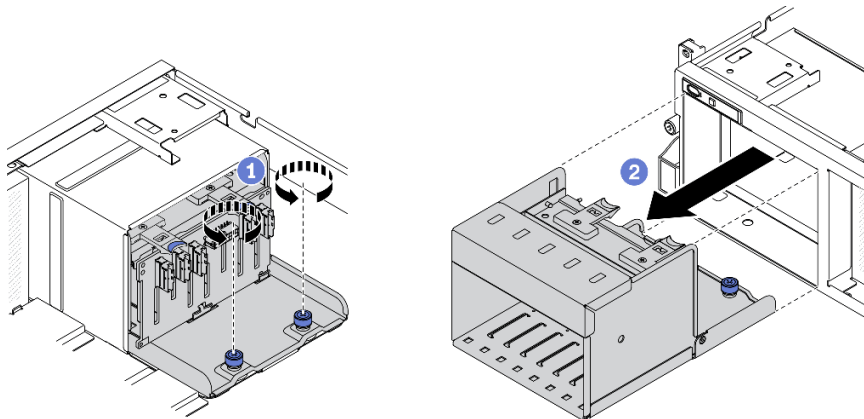


Figure 194. Removing the 2.5-inch drive cage assembly

### Remove the 3.5-inch drive cage assembly:

- a. ① Loosen the two thumbscrews that secure the 3.5-inch drive cage assembly to the chassis.
- b. ② Slide the drive cage assembly out of the chassis.

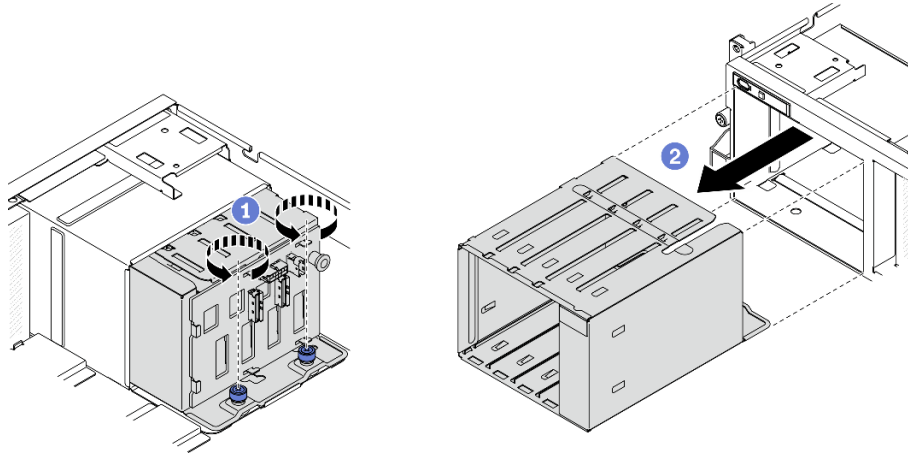


Figure 195. Removing the 3.5-inch drive cage assembly

## After you finish

- Install a replacement unit. See [“Install the 2.5-/3.5-inch drive cage assembly” on page 268](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install the 2.5-/3.5-inch drive cage assembly

Follow instructions in this section to install the 2.5-inch or 3.5-inch drive cage assembly.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the drive to any unpainted metal surface on the solution; then, remove the drive from the package and place it on a static-protective surface.

## Procedure

Step 1. Based on your configuration, follow the corresponding procedures to install the 2.5-inch or 3.5-inch drive cage assembly.

### Install the 2.5-inch drive cage assembly:

- a. ① Align the 2.5-inch drive cage assembly with the opening on the front of the server; then, slide it into the chassis until it is seated in place.
- b. ② Fasten the two thumbscrews to secure the drive cage assembly to the chassis.

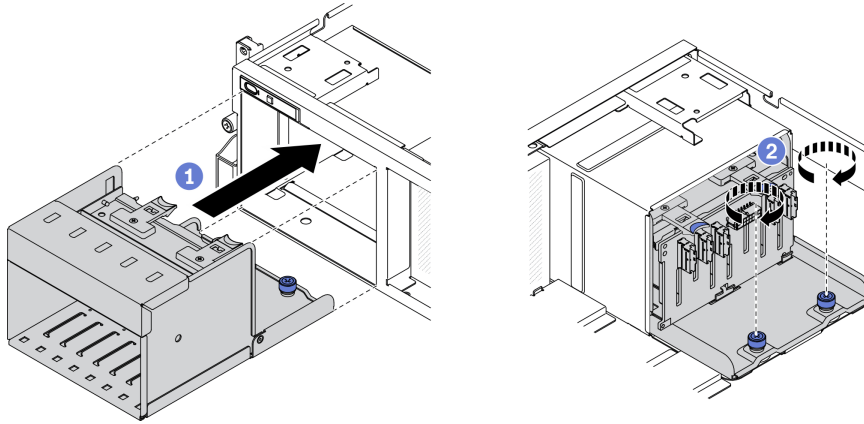


Figure 196. Installing the 2.5-inch drive cage assembly

**Install the 3.5-inch drive cage assembly:**

- a. 1 Align the 3.5-inch drive cage assembly with the opening on the front of the server; then, slide it into the chassis until it is seated in place.
- b. 2 Fasten the two thumbscrews to secure the drive cage assembly to the chassis.

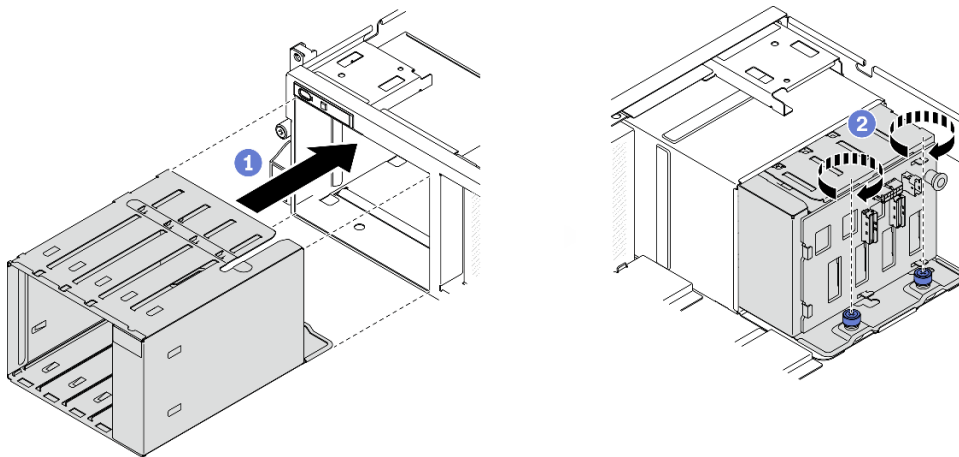


Figure 197. Installing the 3.5-inch drive cage assembly

**After you finish**

1. Reconnect the power and signal cables to the 2.5-inch or 3.5-inch drive backplane.
2. Reinstall the drives and drive bay fillers (if any) into the drive bays. See [“Install a 2.5-/3.5-inch hot-swap drive” on page 260](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

**Demo video**

[Watch the procedure on YouTube](#)

**EDSFF hot-swap drive replacement**

Follow instructions in this section to remove and install an EDSFF hot-swap drive.

## Remove an EDSFF hot-swap drive

Follow instructions in this section to remove an EDSFF hot-swap drive.

### About this task

#### Attention:

- Read “[Installation Guidelines](#)” on page 149 and “[Safety inspection checklist](#)” on page 150 to ensure that you work safely.
- To make sure that there is adequate system cooling, do not operate the solution for more than two minutes without either a drive or a filler installed in each bay.
- If one or more EDSFF drives are to be removed, it is recommended to disable them beforehand via the operating system.
- Before you remove or make changes to drives, drive controllers (including controllers that are integrated on the system board), drive backplanes or drive cables, back up all important data that is stored on drives.
- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

**Note:** Make sure you have the drive bay fillers available if some drive bays will be left empty after the removal.

### Procedure

Step 1. Hold the handle of the EDSFF drive cage cover and pull it out of the server.

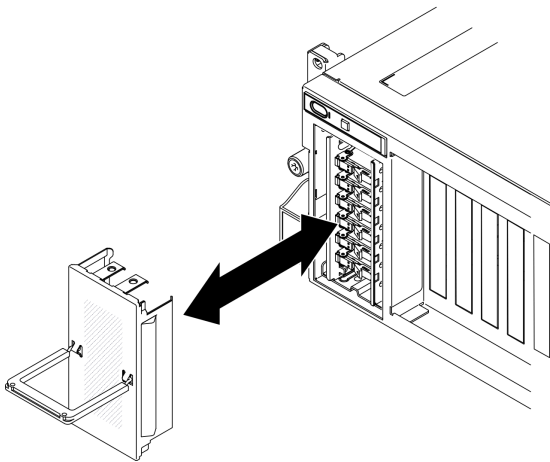


Figure 198. Removing the EDSFF drive cage cover

Step 2. Remove the EDSFF hot-swap drive.

- a. ① Slide the release latch to unlock the drive handle.
- b. ② Rotate the drive handle to the open position.
- c. ③ Grasp the handle and slide the drive out of the drive bay.

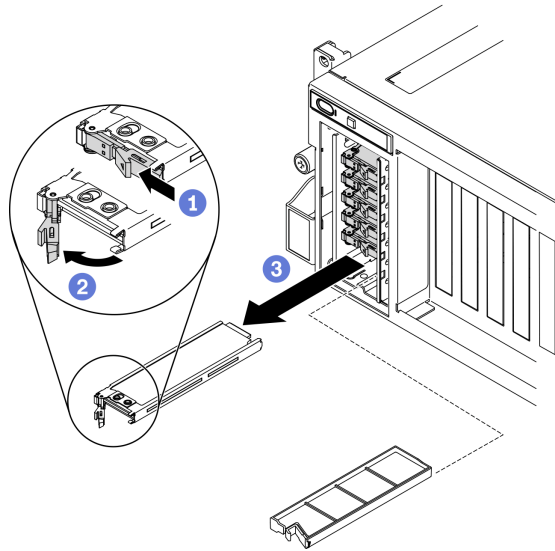


Figure 199. Removing an EDSFF hot-swap drive

- Step 3. Install a drive bay filler or replacement drive as soon as possible. See [“Install an EDSFF hot-swap drive” on page 271](#).
- Step 4. Reinstall the EDSFF drive cage cover back to the server.

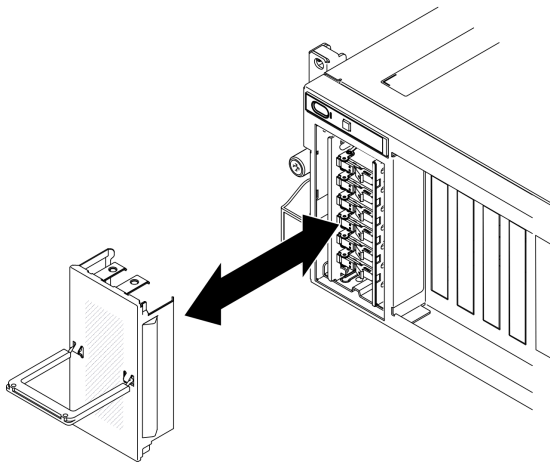


Figure 200. Reinstalling EDSFF drive cage cover

## After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install an EDSFF hot-swap drive

Use this information to install an EDSFF hot-swap drive.

## About this task

### Attention:

- Read “Installation Guidelines” on page 149 and “Safety inspection checklist” on page 150 to ensure that you work safely.
- Touch the static-protective package that contains the drive to any unpainted metal surface on the solution; then, remove the drive from the package and place it on a static-protective surface.
- Make sure you save the data on your drive, especially if it is part of a RAID array, before you remove it from the server.
- To avoid damage to the drive connectors, make sure that the server top cover is in place and fully closed whenever you install or remove a drive.
- To make sure that there is adequate system cooling, do not operate the server for more than two minutes without either a drive or a drive bay filler installed in each bay.
- Before you make changes to drives, drive controllers (including controllers that are integrated on the system board), drive backplanes, or drive cables, back up all important data that is stored on drives.
- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

The following notes describe the type of drives that the server supports and other information that you must consider when you install a drive. For a list of supported drives, see <https://serverproven.lenovo.com/>.

- Locate the documentation that comes with the drive and follow those instructions in addition to the instructions in this chapter.
- The electromagnetic interference (EMI) integrity and cooling of the solution are protected by having all bays and PCI and PCIe slots covered or occupied. When you install a drive, PCI, or PCIe adapter, save the EMC shield and filler panel from the bay or PCI or PCIe adapter slot cover in the event that you later remove the device.
- For a complete list of supported optional devices for the server, see <https://serverproven.lenovo.com/>.
- Depending on your server configuration for 8-DW GPU Model, the following drive types can be installed into each drive cage with their corresponding drive bay numbers:
  - Up to six EDSFF drives

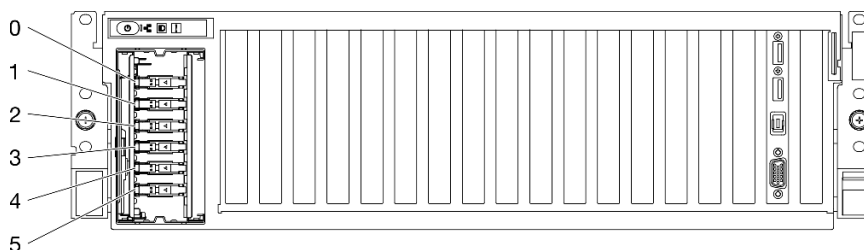


Figure 201. EDSFF drive bay numbering

## Procedure

Step 1. Hold the handle of the EDSFF drive cage cover and pull it out of the server.



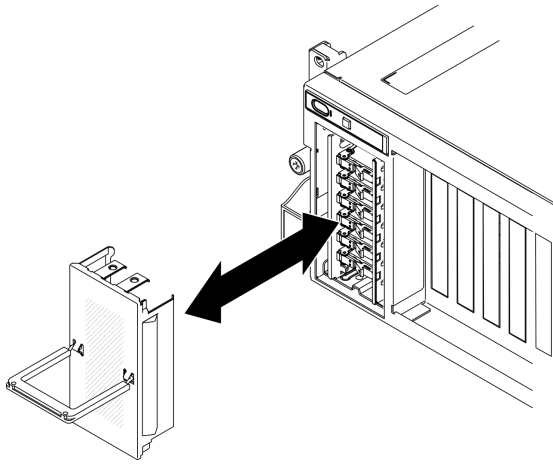


Figure 202. Removing the EDSFF drive cage cover

- Step 2. If a drive bay filler is installed in the drive bay, pull the release lever on the filler and slide it out of the server.
- Step 3. Install the EDSFF drive.
- a. ① Make sure that the drive handle is in the open position. Then, align the drive with the guide rails in the bay and gently push the drive into the bay until the drive stops.
  - b. ② Rotate the drive handle to the fully closed position until the latch clicks.

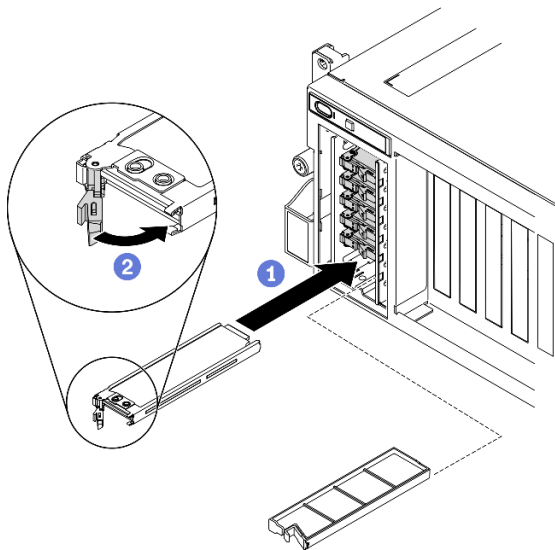


Figure 203. Installing an EDSFF hot-swap drive

- Step 4. If you have additional drives to install, do so now; if any of the drive bays is left empty, fill it with a drive bay filler.
- Step 5. Check the drive status LED to verify that the drive is operating correctly.
- If the yellow drive status LED is lit continuously, the drive is malfunctioning and must be replaced.
  - If the green drive activity LED is flashing, the drive is functioning.
- Step 6. Reinstall the EDSFF drive cage cover back to the server.

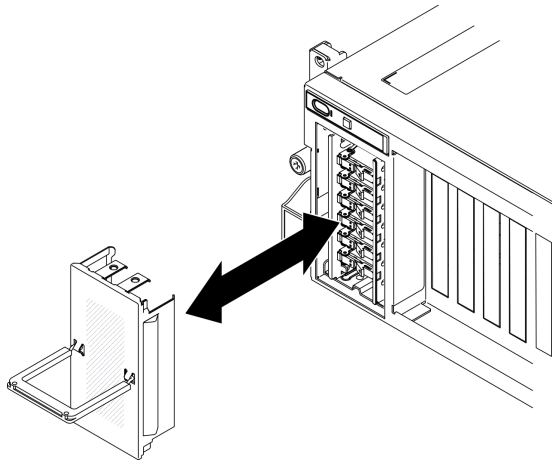


Figure 204. Reinstalling the EDSFF drive cage cover

## After you finish

If the server is configured for RAID operation through a ThinkSystem RAID adapter, you might have to reconfigure your disk arrays after you install drives. See the ThinkSystem RAID adapter documentation for additional information about RAID operation and complete instructions for using ThinkSystem RAID adapter.

## Demo video

[Watch the procedure on YouTube](#)

## EDSFF drive backplane replacement

Follow instructions in this section to remove and install the EDSFF drive backplane.

### Remove the EDSFF drive backplane

Follow instructions in this section to remove the EDSFF drive backplane.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

## Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. Remove all EDSFF hot-swap drives and drive bay fillers (if any) from the drive bays. See [“Remove an EDSFF hot-swap drive” on page 270](#). Place the drives on a static protective surface.
- c. Disconnect the power and signal cables from the EDSFF drive backplane.

- d. Remove the EDSFF drive cage assembly. See [“Remove the EDSFF drive cage assembly” on page 276](#).

Step 2. Unfasten the two screws to remove the drive backplane from the drive cage.

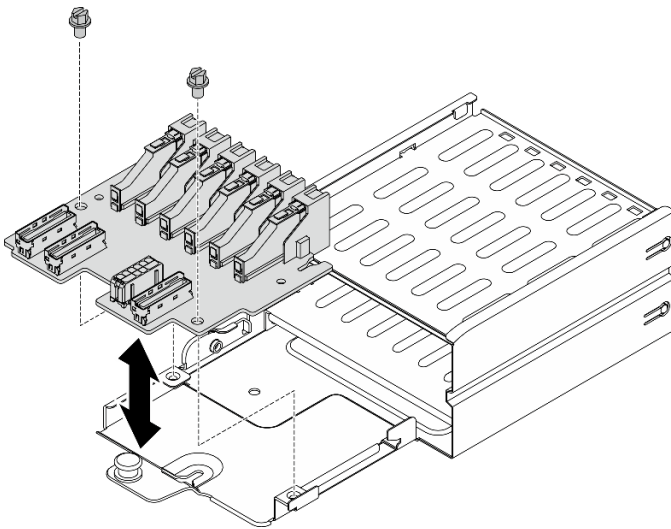


Figure 205. Removing the EDSFF drive backplane

## After you finish

- Install a replacement unit. See [“Install the EDSFF drive backplane” on page 275](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install the EDSFF drive backplane

Follow instructions in this section to install the EDSFF drive backplane.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

## Procedure

Step 1. Fasten the two screws to secure the drive backplane to the drive cage.

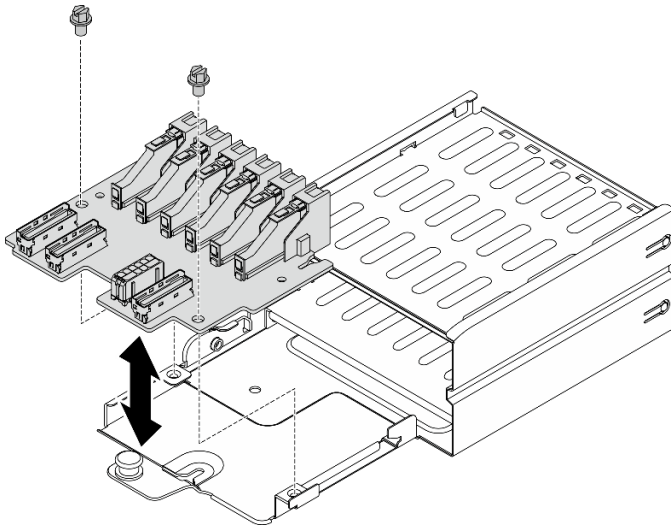


Figure 206. Installing the EDSFF drive backplane

## After you finish

1. Reinstall the EDSFF drive cage assembly. See [“Install the EDSFF drive cage assembly” on page 278](#).
2. Reconnect the power and signal cables to the EDSFF drive backplane.
3. Reinstall the EDSFF hot-swap drive or drive bay filler (if any). See [“Install an EDSFF hot-swap drive” on page 271](#).
4. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

## Demo video

[Watch the procedure on YouTube](#)

## EDSFF drive cage assembly replacement

Follow instructions in this section to remove and install the EDSFF drive cage assembly.

### Remove the EDSFF drive cage assembly

Follow instructions in this section to remove the EDSFF drive cage assembly.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).
- To make sure that there is adequate system cooling, do not operate the solution for more than two minutes without either a drive or a filler installed in each bay.
- If one or more EDSFF drives are to be removed, it is recommended to disable them beforehand via the operating system.

- Before you remove or make changes to drives, drive controllers (including controllers that are integrated on the system board), drive backplanes or drive cables, back up all important data that is stored on drives.
- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

## Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. Remove all EDSFF hot-swap drives and drive bay fillers (if any) from the chassis. See [“Remove an EDSFF hot-swap drive” on page 270](#). Place the drives on a static protective surface.

Step 2. Disconnect the power and signal cables from the EDSFF drive backplane.

Step 3. Remove the EDSFF drive cage assembly.

- a. ① Pull out the plunger on the drive cage assembly.
- b. ② Slide the drive cage assembly out of the chassis.

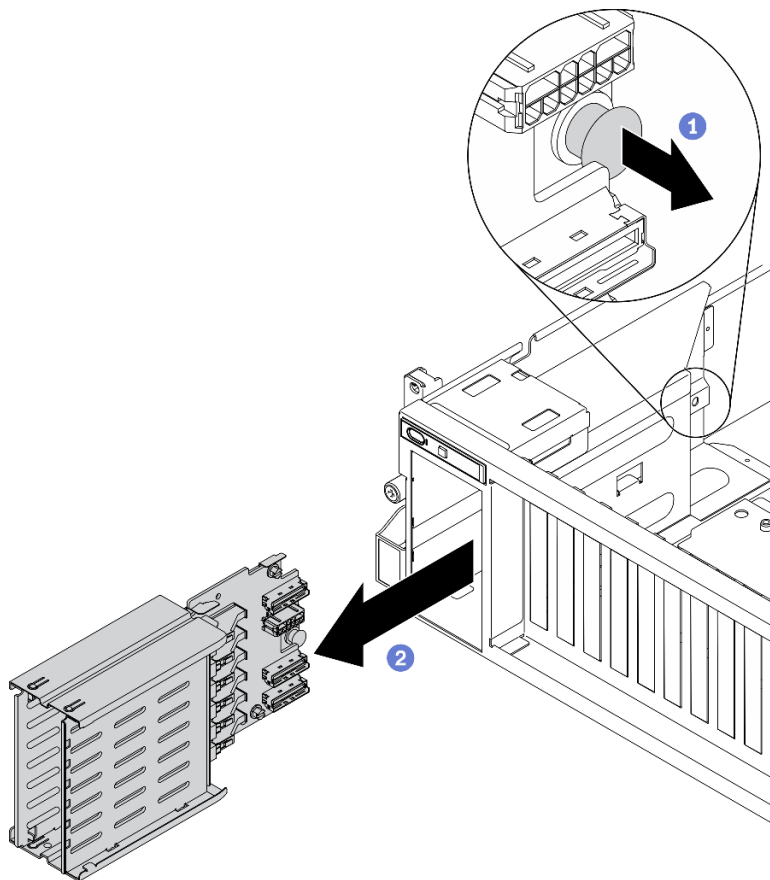


Figure 207. Removing the EDSFF drive cage assembly

## After you finish

- Install a replacement unit. See [“Install the EDSFF drive cage assembly” on page 278](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install the EDSFF drive cage assembly

Follow instructions in this section to install the EDSFF drive cage assembly.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the drive to any unpainted metal surface on the solution; then, remove the drive from the package and place it on a static-protective surface.

### Procedure

Step 1. Insert the EDSFF drive cage assembly into the drive cage slot until the plunger clicks into place.

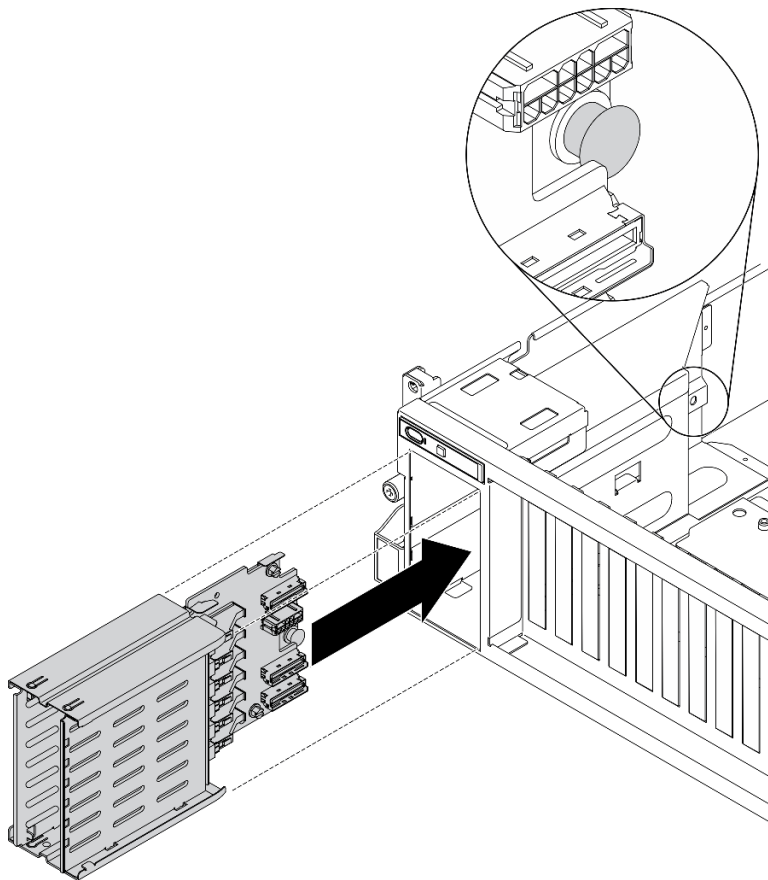


Figure 208. Install the EDSFF drive cage assembly

### After you finish

1. Reconnect the power and signal cables to the EDSFF drive backplane.

2. Reinstall the EDSFF hot-swap drive or drive bay filler (if any). See [“Install an EDSFF hot-swap drive” on page 271](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

### Demo video

[Watch the procedure on YouTube](#)

## Front I/O expansion board replacement

Follow instructions in this section to remove and install the front I/O expansion board.

### Remove the front I/O expansion board

Follow instructions in this section to remove the front I/O expansion board.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

### Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. If a network adapter is installed on the front I/O expansion board, remove it. See [“Remove a network adapter” on page 209](#).

Step 2. Disconnect cables that are connected to the front I/O expansion board.

Step 3. Unfasten the five screws from the front I/O expansion board, and remove it from the chassis.

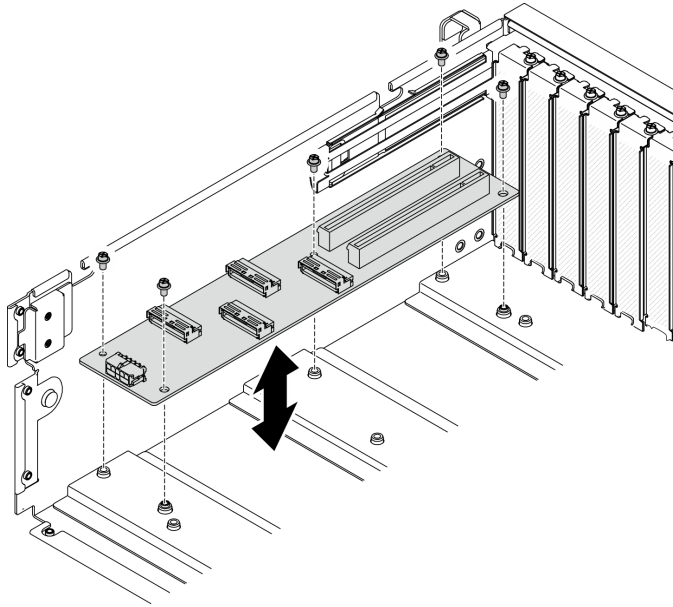


Figure 209. Removing the front I/O expansion board

## After you finish

- Install a replacement unit. See [“Install the front I/O expansion board” on page 280](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install the front I/O expansion board

Follow instructions in this section to install the front I/O expansion board.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.

## Procedure

- Step 1. Align the front I/O expansion board with the five screw holes on the rear of the system-board; then, lower the front I/O expansion board into the chassis.
- Step 2. Fasten the five screws to secure it to the chassis.



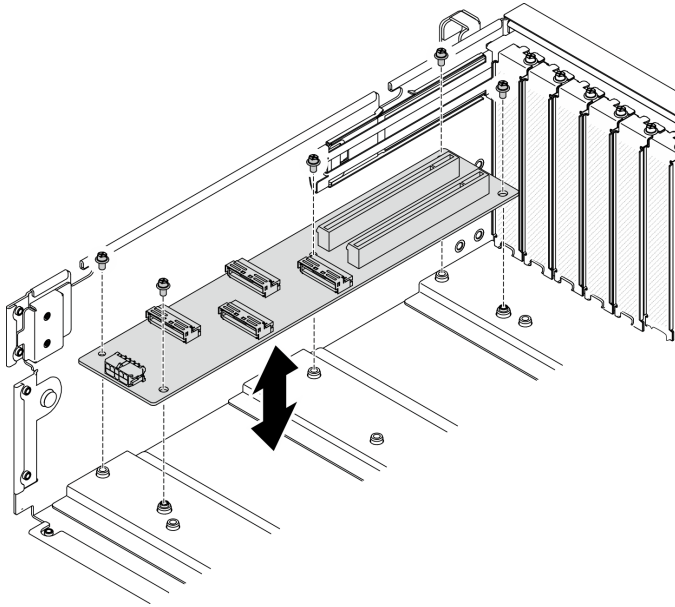


Figure 210. Installing the front I/O expansion board

## After you finish

1. Reconnect the required cables.
2. Reinstall the network adapter to the front I/O expansion board. See [“Install a network adapter” on page 210](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

## Demo video

[Watch the procedure on YouTube](#)

## GPU adapter replacement

Follow instructions in this section to remove and install a GPU adapter.

**Note:** For a list of the supported GPU adapters, see: <https://serverproven.lenovo.com/>

### Remove a GPU adapter

Follow instructions in this section to remove a GPU adapter.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).
- Depending on the specific type, your GPU adapter might look slightly different from the illustrations in this section.

- Follow the additional instructions in any documentation that comes with your GPU adapter.

## Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. Remove the GPU adapter link bridge(s) if installed. See [“Remove a GPU adapter link bridge” on page 291](#).

**Note:** Depending on the configuration, there may be one or three GPU adapter link bridges on the GPU.

Step 2. Remove the GPU adapter.

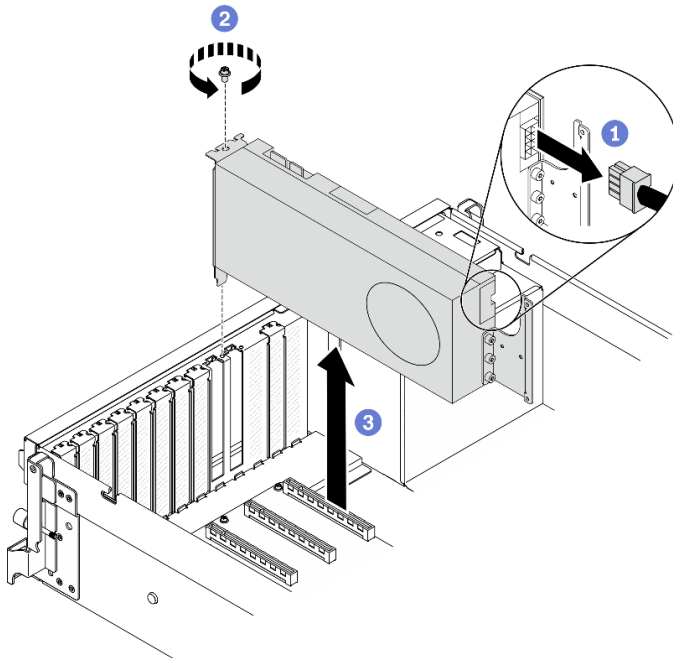
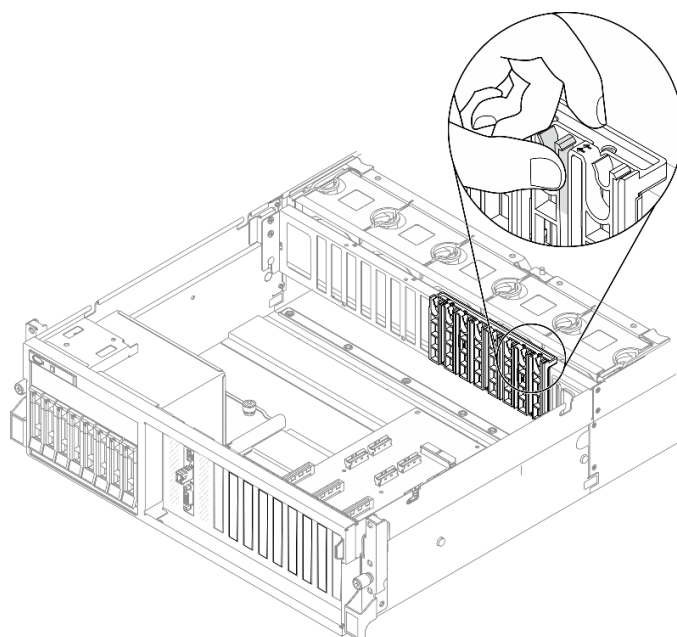


Figure 211. Removing a GPU adapter

- a. ① Locate the GPU adapter that you want to remove and disconnect the power cable from the GPU adapter.
- b. ② Remove the GPU adapter retention screw.
- c. ③ Grasp the GPU adapter by its edges and carefully pull it out of the PCIe slot.

**Note:** Press on the plastic latch on the rear end to ensure that the GPU adapter can be removed from the chassis smoothly.



### After you finish

1. Install a replacement unit or a slot bracket. See [“Install a GPU adapter” on page 284](#).
2. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.
3. If the GPU adapter link bridge was removed, reinstall the link connector cover back to the GPU. If you do not have the original link connector cover on hand, use the one on the new GPU adapter.

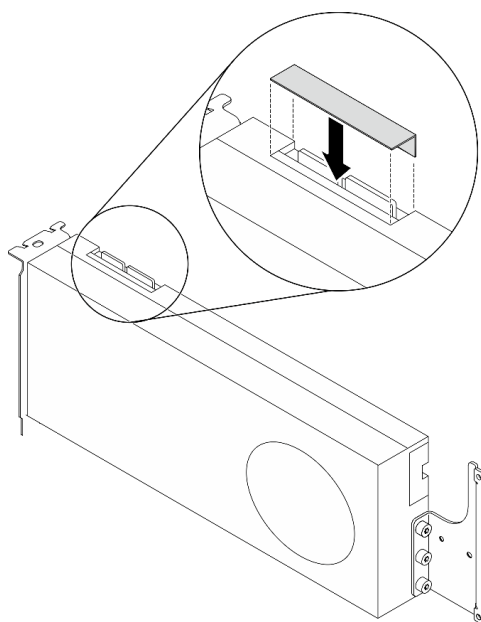


Figure 212. Installing the link connector cover to the GPUs

### Demo video

[Watch the procedure on YouTube](#)

## Install a GPU adapter

Follow instructions in this section to install a GPU adapter.

### About this task

#### Attention:

- Read “Installation Guidelines” on page 149 and “Safety inspection checklist” on page 150 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- Depending on the specific type, your GPU adapter might look slightly different from the illustrations in this section.
- Follow the additional instructions in any documentation that comes with your GPU adapter.

**Notes:** To prevent potential thermal issues, change the **Misc** setting in the BIOS from **Option3** (default value) to **Option1** if the following two conditions are met:

- The server is equipped with a GPU adapter.
- The UEFI firmware version is U8E128A or later.

For the method of changing the **Misc** setting, see <https://support.lenovo.com/us/en/solutions/TT1832>.

**Important:** The DisplayPort ports on the Nvidia A40 GPU are not supported when used in the ThinkSystem SR670 V2.

### Procedure

Step 1. Locate the PCIe slot based on the server front view of your configuration. Refer to the following sections for the PCIe slot numbering and supported GPU configurations:

- “The 4-DW GPU Model Front view” on page 16
- “The 8-DW GPU Model Front view” on page 18

Step 2. (Optional) If a GPU adapter link bridge is to be installed, remove the link connector cover from the GPU. Keep the link connector cover in case it is needed in the future.

**Note:** Depending on the configuration, there may be one or three GPU adapter link bridges on the GPU. When linking a GPU pair, all link connectors on the GPUs must be linked.

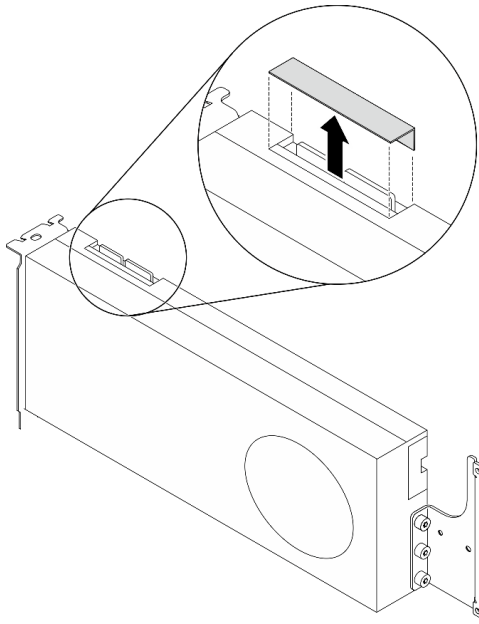


Figure 213. Removing the link connector cover from the GPU

Step 3. Install the GPU adapter.

**Note:** If the PCIe slot is covered with a slot bracket, remove the bracket from the chassis first.

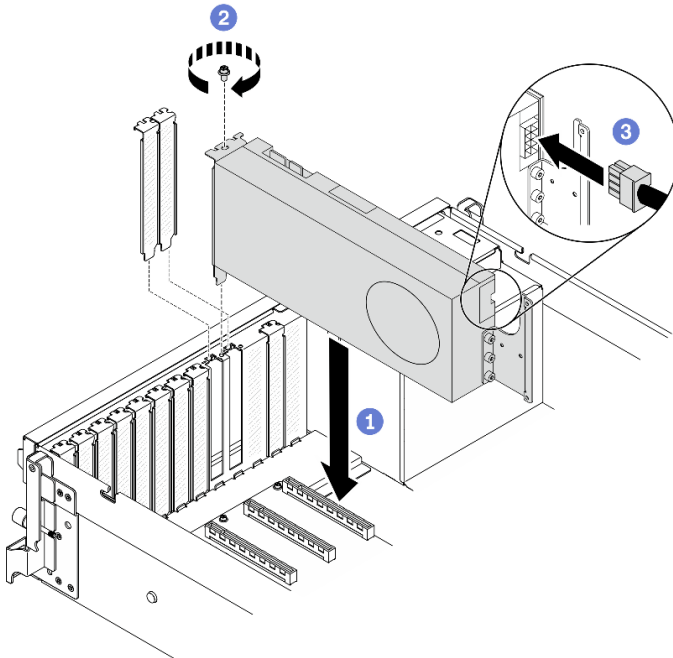
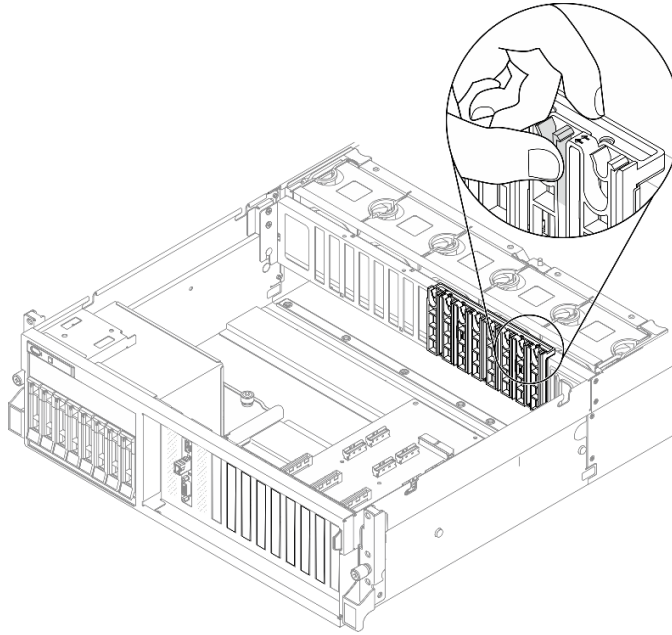


Figure 214. Installing a GPU adapter

- a. ① Align the GPU adapter with the PCIe slot on the chassis. Then, carefully press both ends of the GPU adapter straight into the slot until it is securely seated.

**Note:** Make sure that the rear end of each adapter is inserted into the slot next to the two imprinted arrows on the chassis.



- b. 2 Fasten the GPU adapter retention screw.
- c. 3 Connect the GPU adapter power cable to the GPU adapter. Refer to the GPU adapter and system board GPU power connector mapping table. For more details on GPU power connectors on system board, see [“System-board connectors” on page 34.](#)

Table 22. GPU adapter and system board GPU power connector mapping table

Item	Numbering							
	GPU adapter (PCIe slot)	1 (Slot 3)	2 (Slot 4)	3 (Slot 5)	4 (Slot 6)	5 (Slot 7)	6 (Slot 8)	7 (Slot 9)
System board GPU power connector	1	2	3	4	5	6	7	8

### After you finish

- To install the GPU adapter link bridge, see [“Install a GPU adapter link bridge” on page 293.](#)
- Complete the parts replacement. See [“Complete the parts replacement” on page 360.](#)

### Demo video

[Watch the procedure on YouTube](#)

## GPU distribution board replacement

Follow instructions in this section to remove and install a GPU distribution board.

### Remove a GPU distribution board

Follow instructions in this section to remove a GPU distribution board.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

### Procedure

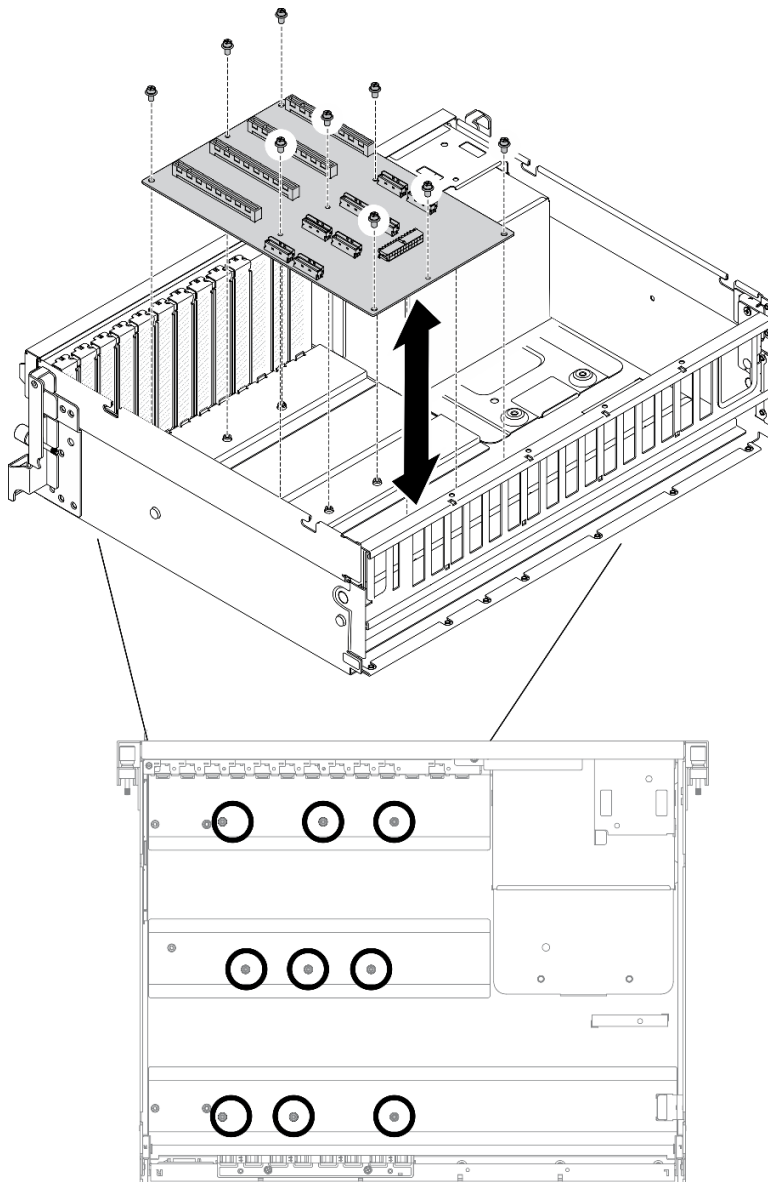
Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. Remove all of the GPU adapters. See [“Remove a GPU adapter” on page 281](#).

Step 2. Disconnect the power and signal cables from the GPU distribution board.

Step 3. Remove the GPU distribution board.

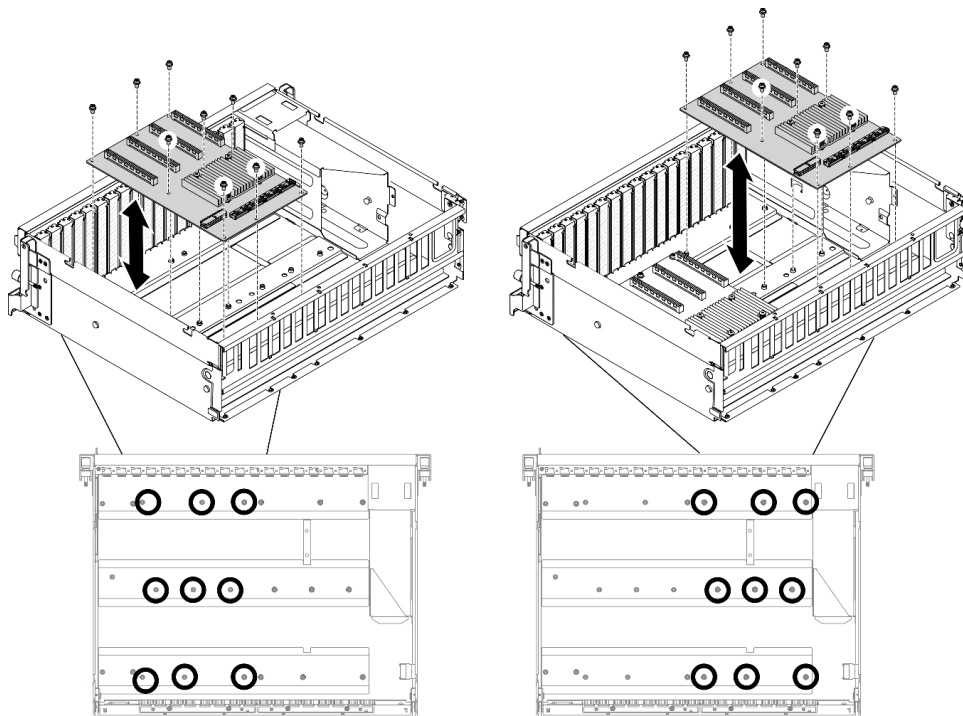
- a. ① Remove the nine screws that secure the GPU distribution board to the chassis.
- b. ② Grasp the GPU distribution board by its edges and carefully lift it out of the chassis.



**Note:** The illustration shows the Four PCIe x16 slot PCIe distribution board.

*Figure 215. Removing a GPU distribution board – 4-DW GPU Model*





**Note:** The illustration shows the Four PCIe x16 slot switched PCIe distribution board.

Figure 216. Removing a GPU distribution board — 8-DW GPU Model

## After you finish

- Install a replacement unit. See [“Install a GPU distribution board” on page 289](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install a GPU distribution board

Follow instructions in this section to install a GPU distribution board.

## About this task

### Attention:

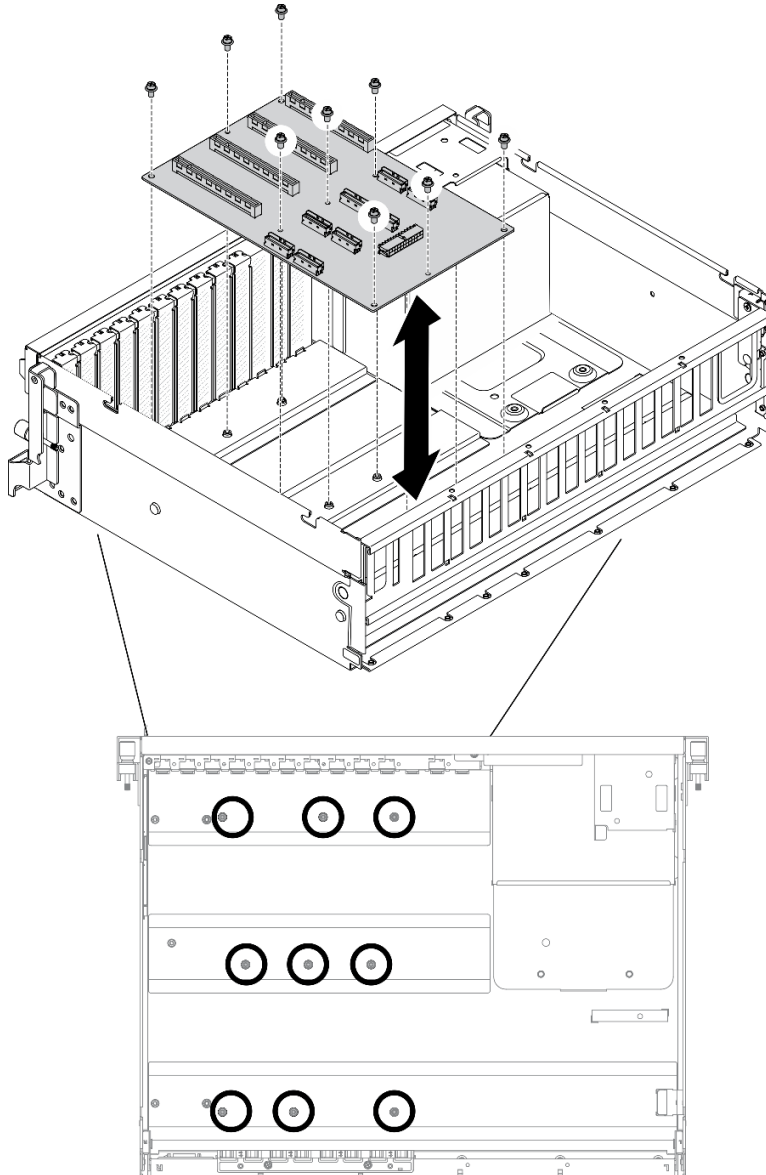
- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- Based on your configuration, the following GPU distribution boards are supported in the 4-DW GPU Model and the 8-DW GPU Model:
  - The 4-DW GPU Model supports one of the followings:
    - 1 x Four PCIe x16 slot PCIe distribution board
    - 1 x Four PCIe x16 slot switched PCIe distribution board

- The 8-DW GPU Model supports one of the followings:
  - 2 x Four PCIe x16 slot PCIe distribution board
  - 2 x Four PCIe x16 slot switched PCIe distribution board

## Procedure

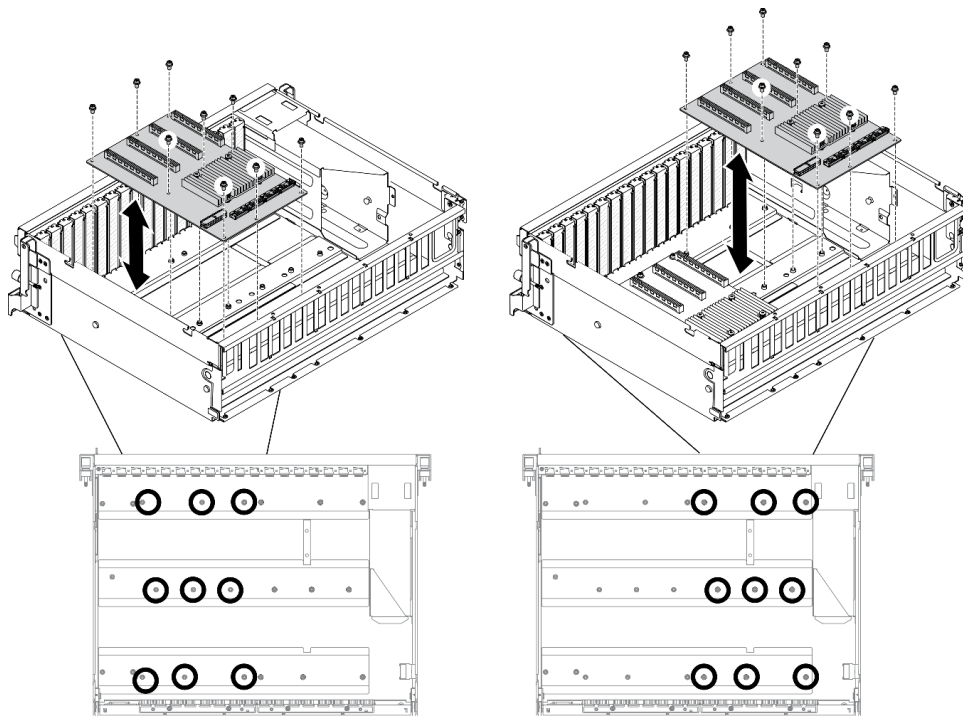
Step 1. Install the GPU distribution board.

- 1 Align the nine screw holes on the GPU distribution board with the standoffs on the chassis.
- 2 Fasten the nine screws to secure the GPU distribution board to the chassis.



**Note:** The illustration shows the Four PCIe x16 slot PCIe distribution board.

*Figure 217. Installing a GPU distribution board — 4-DW GPU Model*



**Note:** The illustration shows the Four PCIe x16 slot switched PCIe distribution board.

Figure 218. Installing a GPU distribution board — 8-DW GPU Model

Step 2. Connect the power and signal cables to the GPU distribution board.

## After you finish

1. Reinstall the GPU adapters. See [“Install a GPU adapter” on page 284](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

## Demo video

[Watch the procedure on YouTube](#)

## GPU adapter link bridge replacement

Follow instructions in this section to remove and install a GPU adapter link bridge.

### Remove a GPU adapter link bridge

Follow instructions in this section to remove a GPU adapter link bridge.

## About this task

**Important:** Make sure you have a suction cup available for properly removing the GPU adapter link bridge.

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).

- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152.](#)
- Depending on the specific type, your GPU adapter might look slightly different from the illustrations in this section.
- Follow the additional instructions in any documentation that comes with your GPU adapter.

## Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255.](#)

Step 2. Remove the GPU adapter link bridge from the GPUs with a suction cup.

- a. ① Press the suction cup against the GPU adapter link bridge until it adheres to the GPU adapter link bridge.
- b. ② Pull up the suction cup and remove the GPU adapter link bridge together with the suction cup from the GPUs.

**Note:** Depending on the configuration, there may be one or three GPU adapter link bridges on the GPU. Remove all GPU adapter link bridge from the GPUs.

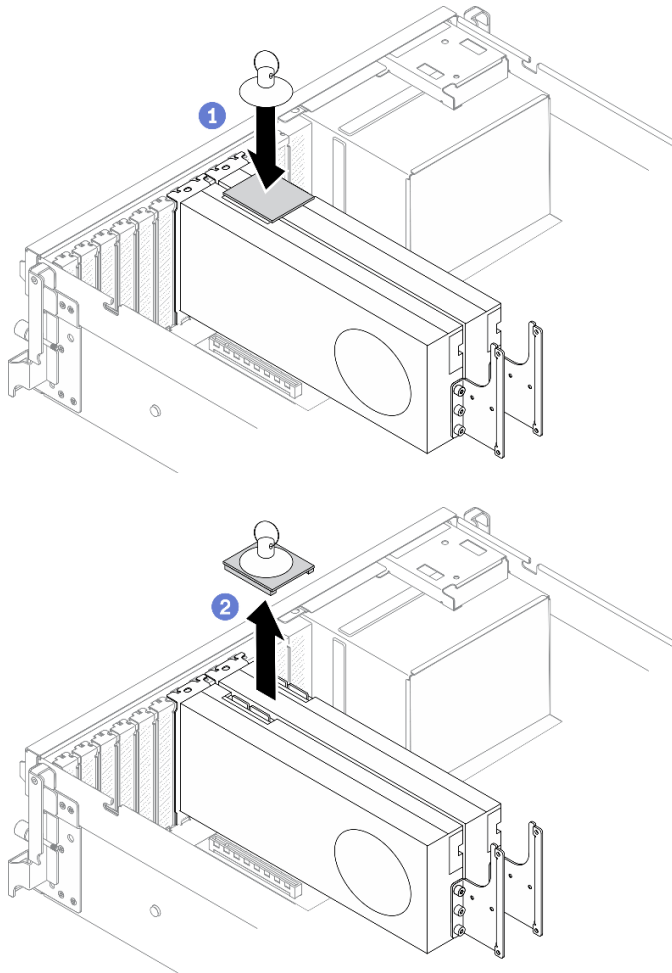


Figure 219. Removing the GPU adapter link bridge

## After you finish

1. Install a replacement unit or a slot bracket. See [“Install a GPU adapter link bridge” on page 293](#).
2. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

### Demo video

[Watch the procedure on YouTube](#)

## Install a GPU adapter link bridge

Follow instructions in this section to install a GPU adapter link bridge.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- Depending on the specific type, your GPU adapter might look slightly different from the illustrations in this section.
- Follow the additional instructions in any documentation that comes with your GPU adapter.

### Procedure

**Notes:** Install the GPU adapter link bridge to connect the GPU pairs listed below:

- GPU 1 and GPU 2
- GPU 3 and GPU 4
- GPU 5 and GPU 6
- GPU 7 and GPU 8

Step 1. If the GPU is installed in the chassis, remove it from the chassis. See [“Remove a GPU adapter” on page 281](#).

Step 2. Remove the link connector cover from the GPU.

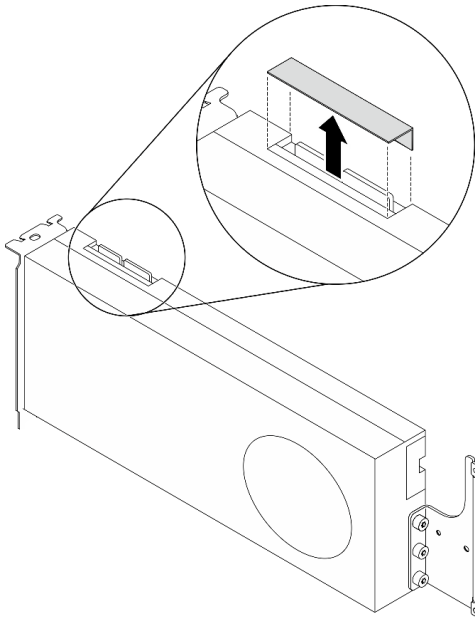


Figure 220. Removing the link connector cover from the GPU

- Step 3. Install the GPU to the chassis. See [“Install a GPU adapter” on page 284](#).
- Step 4. Align the GPU adapter link bridge to the link connectors on the GPUs; then, install the GPU adapter link bridge to the GPUs until it clicks into place.

**Note:** Depending on the configuration, there may be one or three GPU adapter link bridges on the GPU. When linking a GPU pair, all link connectors on the GPUs must be linked.

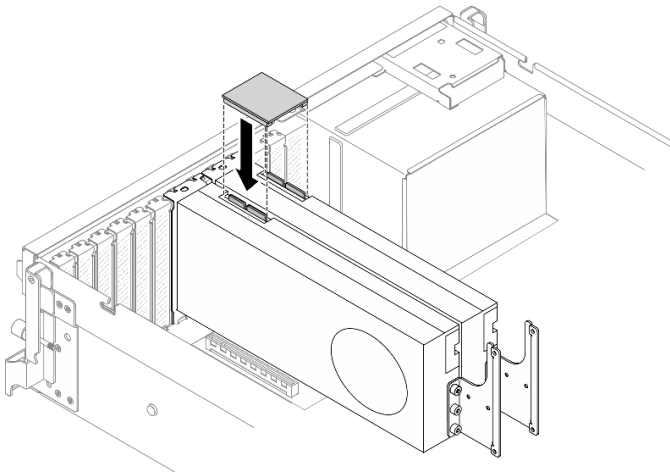


Figure 221. Installing the GPU adapter link bridge

## After you finish

Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

## Demo video

[Watch the procedure on YouTube](#)

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## SXM GPU Model components

Use information in this section to remove and install SXM GPU Model components.

### 2.5-inch hot-swap drive replacement

Follow instructions in this section to remove and install a 2.5-inch hot-swap drive.

#### Remove a 2.5-inch hot-swap drive

Follow instructions in this section to remove a 2.5-inch hot-swap drive.

#### About this task

##### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- To make sure that there is adequate system cooling, do not operate the solution for more than two minutes without either a drive or a filler installed in each bay.
- If one or more NVMe solid-state drives are to be removed, it is recommended to disable them beforehand via the operating system.
- Before you remove or make changes to drives, drive controllers (including controllers that are integrated on the system board), drive backplanes or drive cables, back up all important data that is stored on drives.
- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

**Note:** Make sure you have the drive bay fillers available if some drive bays will be left empty after the removal.

#### Procedure

Step 1. Remove a 2.5-inch hot-swap drive.

- a. ① Slide the release latch to open the drive tray handle.
- b. ② Rotate the drive handle to the open position.
- c. ③ Grasp the handle and the slide the drive out of the drive bay.

**Note:** Install a drive bay filler or replacement drive as soon as possible. See [“Install a 2.5-inch hot-swap drive” on page 296](#).

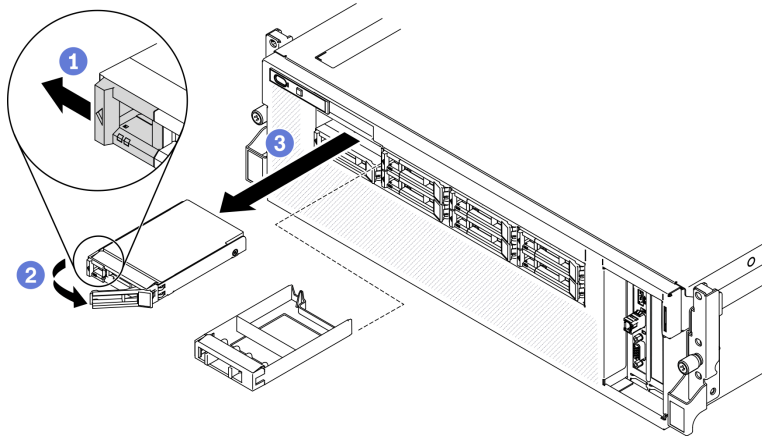


Figure 222. Removing a 2.5-inch drive in the SXM GPU Model

## After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install a 2.5-inch hot-swap drive

Follow instructions in this section to install a 2.5-inch hot-swap drive.

## About this task

### Attention:

- Read “[Installation Guidelines](#)” on page 149 and “[Safety inspection checklist](#)” on page 150 to ensure that you work safely.
- Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.
- Make sure you save the data on your drive, especially if it is part of a RAID array, before you remove it from the server.
- To avoid damage to the drive connectors, make sure that the server top cover is in place and fully closed whenever you install or remove a drive.
- To make sure that there is adequate system cooling, do not operate the server for more than two minutes without either a drive or a drive bay filler installed in each bay.
- Before you make changes to drives, drive controllers (including controllers that are integrated on the system board), drive backplanes, or drive cables, back up all important data that is stored on drives.
- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

The following notes describe the type of drives that the server supports and other information that you must consider when you install a drive. For a list of supported drives, see <https://serverproven.lenovo.com/>.

- Locate the documentation that comes with the drive and follow those instructions in addition to the instructions in this chapter.



- The electromagnetic interference (EMI) integrity and cooling of the solution are protected by having all bays and PCI and PCIe slots covered or occupied. When you install a drive, PCI, or PCIe adapter, save the EMC shield and filler panel from the bay or PCI or PCIe adapter slot cover in the event that you later remove the device.
- For a complete list of supported optional devices for the server, see <https://serverproven.lenovo.com/>.
- Depending on your server configuration for SXM GPU Model, the following drive types can be installed into each drive cage with their corresponding drive bay numbers:
  - Supports four or eight 2.5-inch NVMe drives

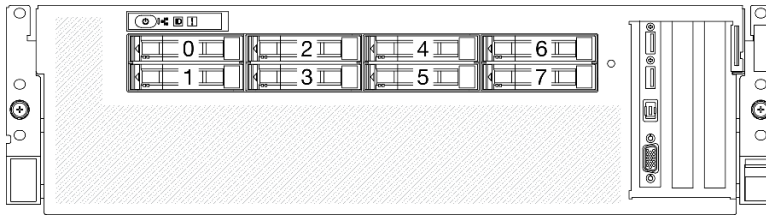
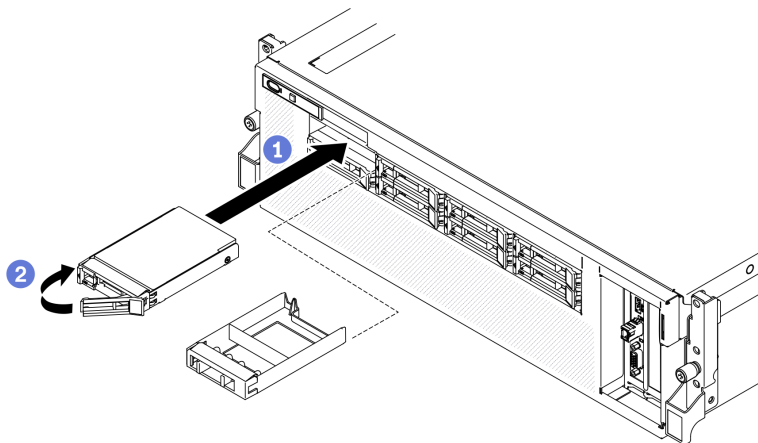


Figure 223. 2.5-inch drive bay numbering in SXM GPU Model

## Procedure

- Step 1. If a drive bay filler is installed in the drive bay, pull the release lever on the filler and slide it out of the server.
- Step 2. Install a 2.5-inch drive.
  - 1 Make sure that the drive handle is in the open position. Then, align the drive with the guide rails in the bay and gently push the drive into the bay until the drive stops.
  - 2 Rotate the drive handle to the fully closed position until the latch clicks.

Figure 224. Installing a 2.5-inch hot-swap drive in SXM GPU Model



- Step 3. If you have additional drives to install, do so now; if any of the drive bays is left empty, fill it with a drive bay filler.

## After you finish

1. Check the drive status LED to verify that the drive is operating correctly.
  - If the yellow drive status LED of a drive is lit continuously, that drive is faulty and must be replaced.
  - If the green drive activity LED is flashing, the drive is being accessed.

2. If the server is configured for RAID operation through a ThinkSystem RAID adapter, you might have to reconfigure your disk arrays after you install drives. See the ThinkSystem RAID adapter documentation for additional information about RAID operation and complete instructions for using ThinkSystem RAID adapter.

### Demo video

[Watch the procedure on YouTube](#)

## 2.5-inch drive cage assembly replacement

Follow instructions in this section to remove and install the 2.5-inch drive cage assembly.

### Remove the 2.5-inch drive cage assembly

Follow instructions in this section to remove the 2.5-inch drive cage assembly.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

### Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. Remove all 2.5-inch hot-swap drives from the chassis. See [“Remove a 2.5-inch hot-swap drive” on page 295](#).
- c. Remove the front panel. See [“Remove the front panel” on page 185](#).

Step 2. Disconnect the power and signal cables from the 2.5-inch drive backplane.

Step 3. Remove the 2.5-inch drive cage assembly.

- a. ① Unfasten the two thumb screws on the assembly to disengage it from the cross bar.
- b. ② Slide the assembly inward to disengage it from the chassis.

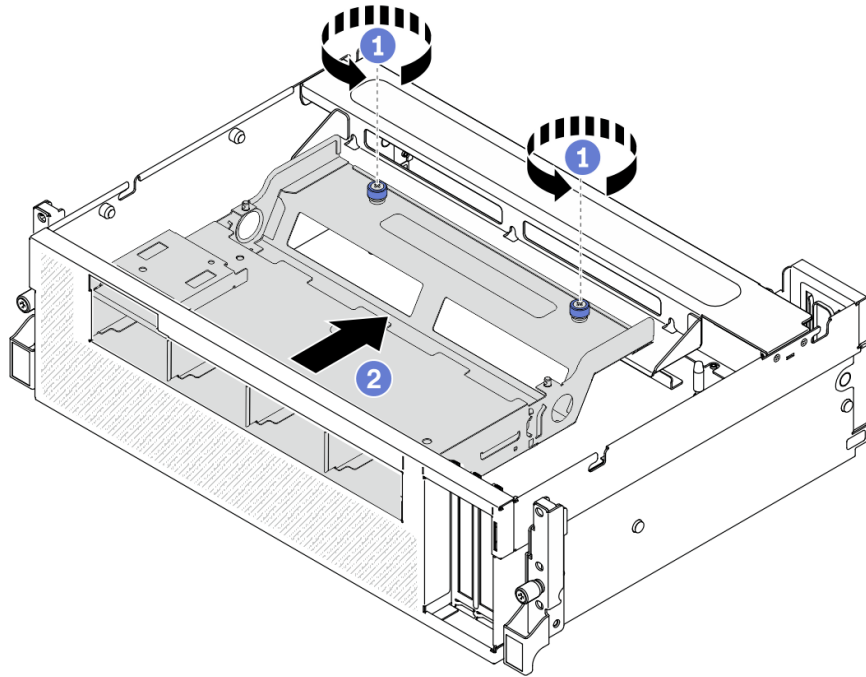


Figure 225. Disengaging the 2.5-inch drive cage assembly

- Step 4. Remove the 2.5-inch drive cage assembly.
- a. 1 Tilt the assembly so that its rear end is up.
  - b. 2 Lift the assembly out of the chassis.

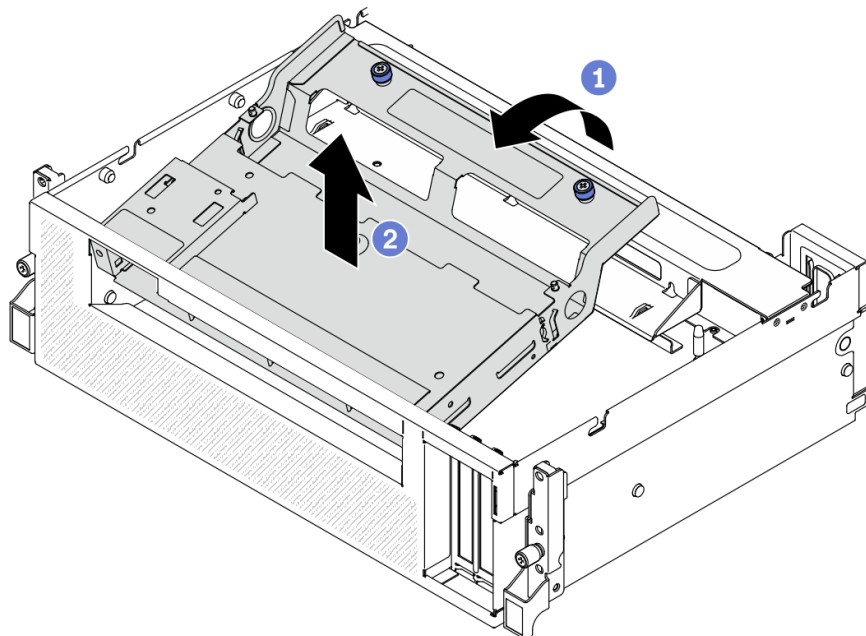


Figure 226. Removing the 2.5-inch drive cage assembly

## After you finish

1. To remove the 2.5-inch drive backplane module. See [“Remove the 2.5-inch drive backplane module” on page 301](#).
2. Install a replacement unit. See [“Install the 2.5-inch drive cage assembly” on page 300](#).
3. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

### Demo video

[Watch the procedure on YouTube](#)

## Install the 2.5-inch drive cage assembly

Follow instructions in this section to install the 2.5-inch drive cage assembly.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.

### Procedure

- Step 1. Make sure the 2.5-inch drive backplane module is installed on the assembly. See [“Install the 2.5-inch drive backplane module” on page 303](#).
- Step 2. Place the 2.5-inch drive cage assembly in the chassis.
  - a. 1 Tilt the assembly so that its rear end is up; then, align the assembly with the upper inner edge of the chassis, and lower it into the chassis.
  - b. 2 Place the rear end of the assembly onto the cross bar.

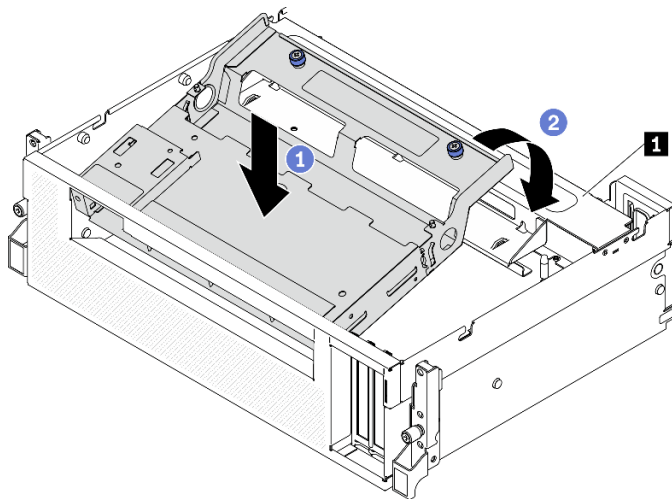


Figure 227. Placing the 2.5-inch drive cage assembly in the chassis

1 Cross bar

- Step 3. Installing the 2.5-inch drive cage assembly.

- a. ① Align the assembly with the four guide pins on the inside of the chassis; then, slide the assembly into the assembly slot on the chassis.
- b. ② Fasten the two thumb screws to secure the assembly to the cross bar.

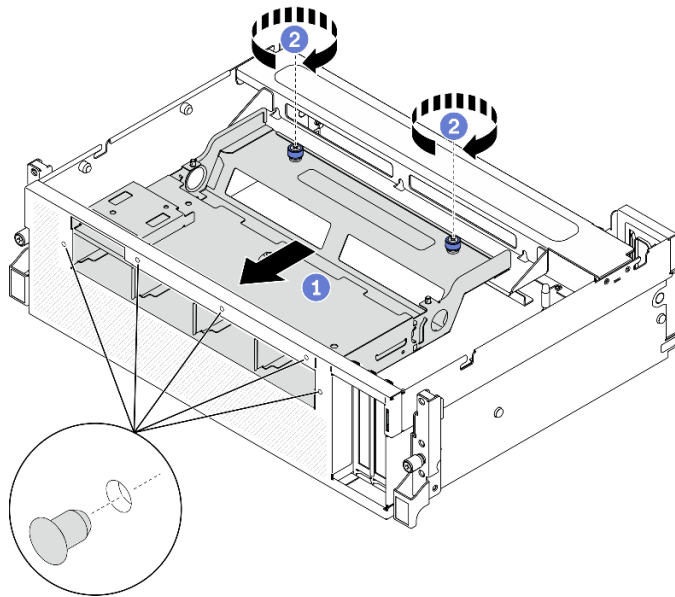


Figure 228. Installing the 2.5-inch drive cage assembly

### After you finish

1. Reinstall the 2.5-inch drive backplane module if needed. See [“Install the 2.5-inch drive backplane module” on page 303](#).
2. Reconnect the power and signal cables to the 2.5-inch drive backplane.
3. Reinstall the front panel. See [“Install the front panel” on page 188](#).
4. Reinstall the 2.5-inch hot-swap drive or drive bay filler (if any). See [“Install a 2.5-inch hot-swap drive” on page 296](#).
5. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

### Demo video

[Watch the procedure on YouTube](#)

## 2.5-inch drive backplane module replacement

Follow instructions in this section to remove and install the 2.5-inch drive backplane module.

### Remove the 2.5-inch drive backplane module

Follow instructions in this section to remove the 2.5-inch drive backplane module.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.

- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

### Watch the procedure

A video of this procedure is available at YouTube: <https://www.youtube.com/playlist?list=PLYV5R7hVcs-BXei6L6c05osQVLt4w5XYx>.

### Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. Remove all 2.5-inch hot-swap drives from the chassis. See [“Remove a 2.5-inch hot-swap drive” on page 295](#). Place the drives on a static protective surface.

Step 2. Disconnect the power and signal cables from 2.5-inch drive backplane.

Step 3. Remove the 2.5-inch drive backplane module.

- a. ① Unfasten the thumbscrew on the drive backplane module.
- b. ② Lift the drive backplane module out of the chassis.

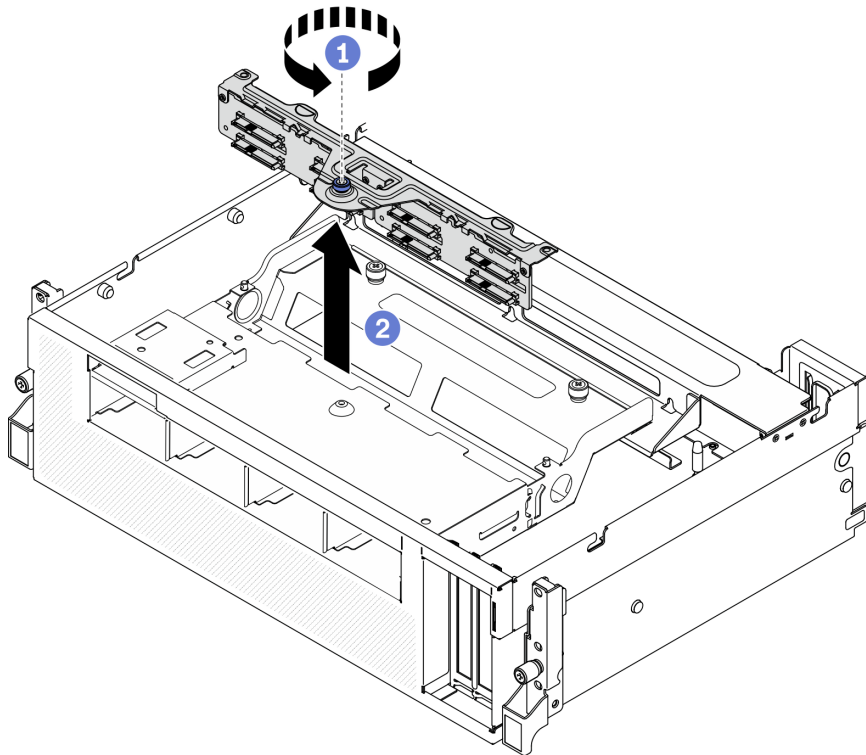


Figure 229. Removing the 2.5-inch drive backplane module

### After you finish

- Install a replacement unit. See [“Install the 2.5-inch drive backplane module” on page 303](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install the 2.5-inch drive backplane module

Follow instructions in this section to install the 2.5-inch drive backplane module.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.

### Procedure

Step 1. Installing the 2.5-inch drive backplane module.

- 1 Align the guide holes on the drive backplane module with the guide pins on the 2.5-inch drive assembly; then, place the drive backplane module onto the assembly.
- 2 Fasten the thumbscrew to secure the drive backplane module to the assembly.

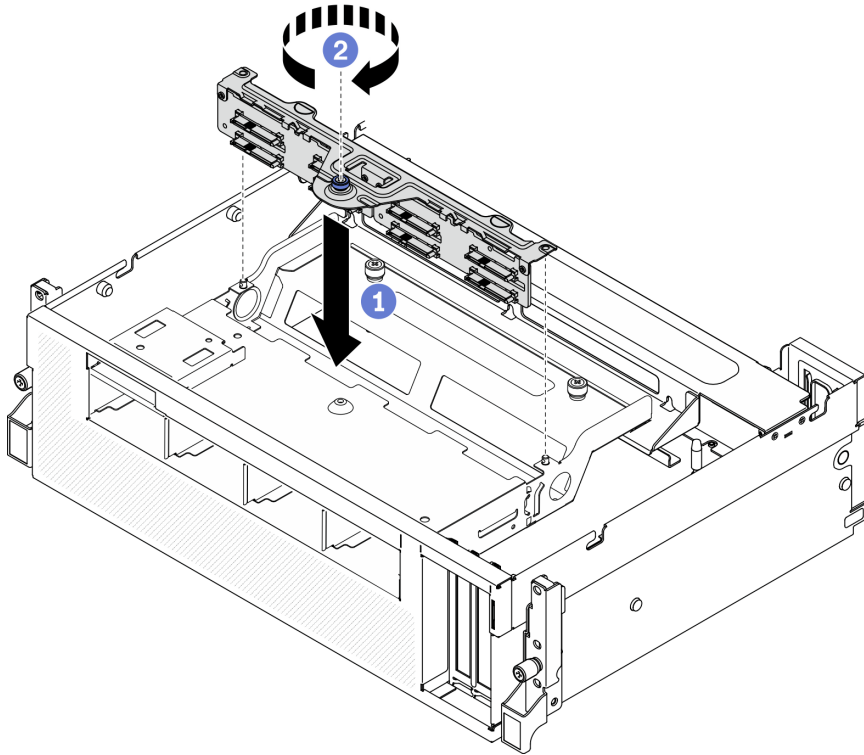


Figure 230. Installing the 2.5-inch drive backplane module

### After you finish

1. Reconnect the power and signal cables to the 2.5-inch drive backplane.
2. Reinstall the 2.5-inch hot-swap drive or drive bay filler (if any). See [“Install a 2.5-inch hot-swap drive” on page 296](#).

3. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

### Demo video

[Watch the procedure on YouTube](#)

## 2.5-inch drive backplane replacement

Follow instructions in this section to remove and install the 2.5-inch drive backplane.

### Remove the 2.5-inch drive backplane

Follow instructions in this section to remove the 2.5-inch drive backplane.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

### Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. Remove all 2.5-inch and drive bay fillers (if any) from the drive bays. See [“Remove a 2.5-inch hot-swap drive” on page 295](#). Place the drives on a static protective surface.
- c. Remove the 2.5-inch drive backplane module. See [“Remove the 2.5-inch drive backplane module” on page 301](#).

Step 2. Remove the 2.5-inch drive backplane.

- a. ① Unfasten the two screws on the backplane.
- b. ② Remove the backplane from the backplane module.



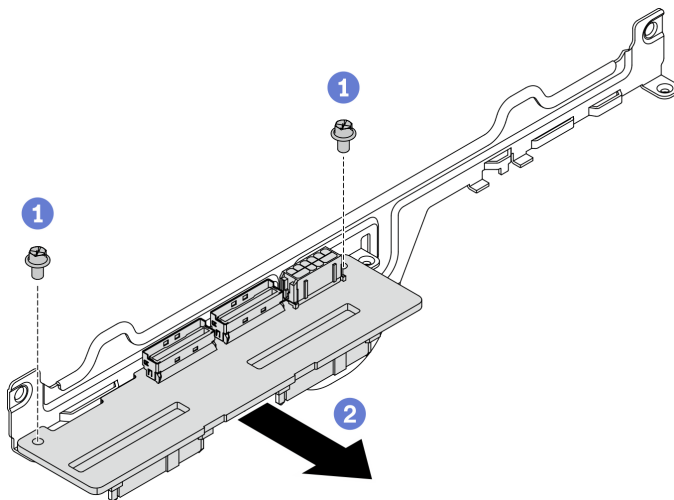


Figure 231. Removing the 2.5-inch drive backplane

### After you finish

- Install a replacement unit. See [“Install the 2.5-inch drive backplane” on page 305](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

### Demo video

[Watch the procedure on YouTube](#)

### Install the 2.5-inch drive backplane

Follow instructions in this section to install the 2.5-inch drive backplane.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

### Procedure

Step 1. Position the 2.5-inch drive backplane and the backplane module as illustrated below. Align the square-shape guide slot on the drive backplane to the square-shape guide pin on backplane module, and align the screw holes on backplane and the backplane module. Then, insert the backplane into the backplane module.

**Note:** Make sure the backplane and backplane module position is arranged as illustrated below.

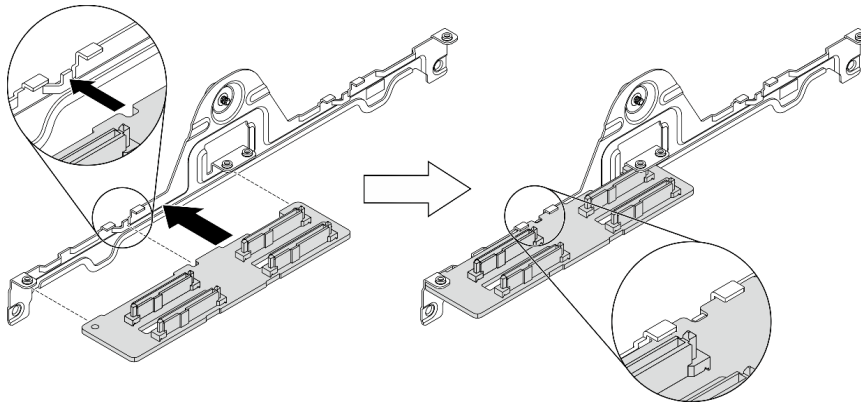


Figure 232. Inserting the 2.5-inch drive backplane into the module

- Step 2. Hold the backplane and the backplane module together; then, turn them over as illustrated below. Fasten the two screws to secure the backplane to the backplane module.

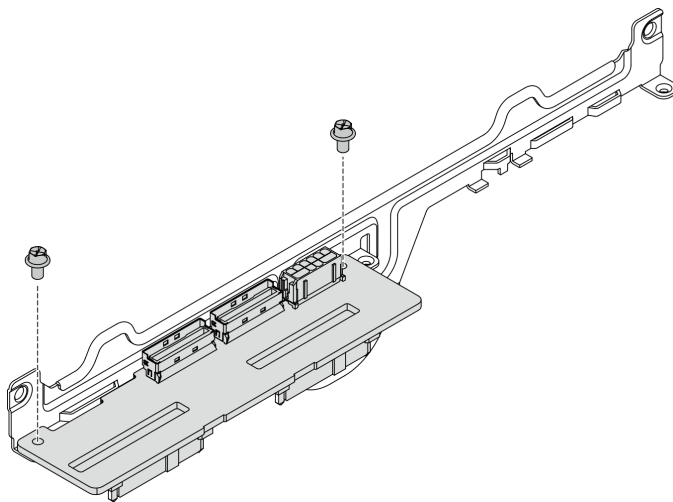


Figure 233. Installing the 2.5-inch drive backplane to the module

### After you finish

1. Reinstall the 2.5-inch drive backplane module. See [“Install the 2.5-inch drive backplane module” on page 303](#).
2. Reconnect the power and signal cables to the 2.5-inch drive backplane.
3. Reinstall the 2.5-inch hot-swap drive or drive bay filler (if any). See [“Install a 2.5-inch hot-swap drive” on page 296](#).
4. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

### Demo video

[Watch the procedure on YouTube](#)

## Front I/O expansion board module replacement

Follow instructions in this section to remove and install the front I/O expansion board module.

## Remove the front I/O expansion board module

Follow instructions in this section to remove the front I/O expansion board module.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

### Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. If a network adapter is installed on the front I/O expansion board module, remove it. See [“Remove a network adapter” on page 209](#).

Step 2. Disconnect all cables from the front I/O expansion board module.

Step 3. Disengage the front I/O expansion board module from chassis.

- a. ① Press the release latch on the cross bar.
- b. ② Slide the front I/O expansion board module toward the rear of the chassis to disengage the module from guide pins.

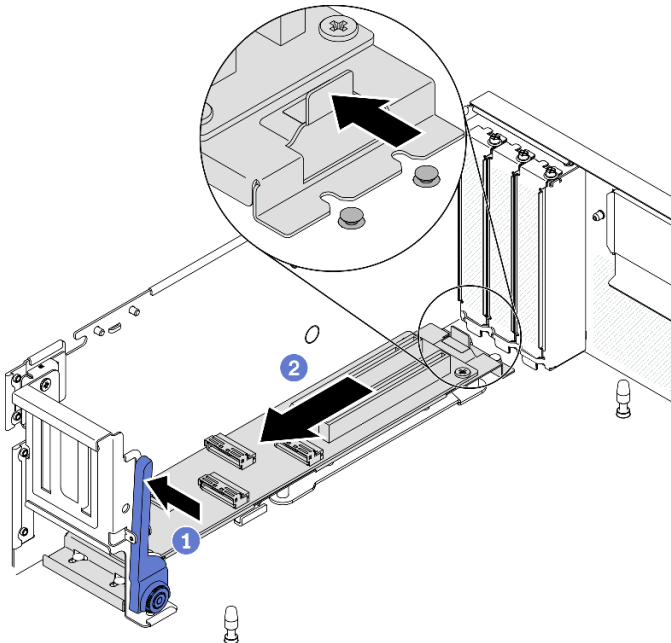


Figure 234. Disengaging the front I/O expansion board module

Step 4. Removing the front I/O expansion board module.

- a. ① Lift up the front end of the front I/O expansion board module to tilt the module.
- b. ② Remove the module from the chassis.

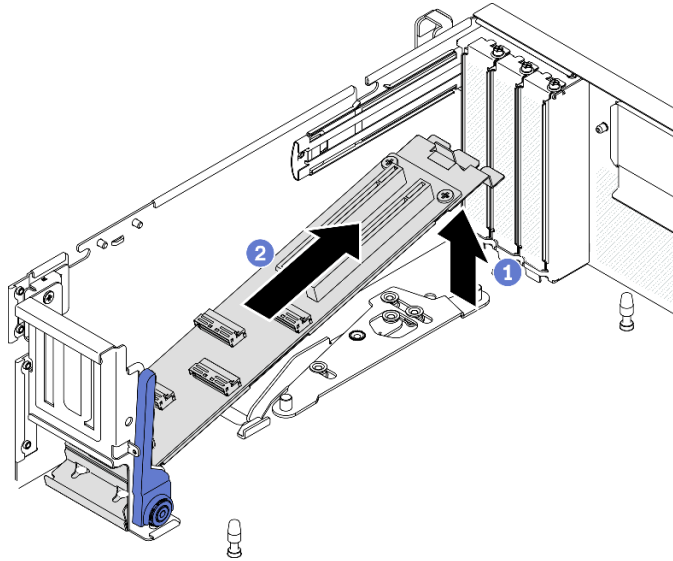


Figure 235. Removing the front I/O expansion board module

### After you finish

- Install a replacement unit. See [“Install the front I/O expansion board module” on page 308](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

### Demo video

[Watch the procedure on YouTube](#)

### Install the front I/O expansion board module

Follow instructions in this section to install the front I/O expansion board module.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.

### Procedure

Step 1. Install the front I/O expansion board module.

- 1 Push the release latch on the cross bar.
- 2 Hold the module at an angle, and insert the two guide pins on system board into the guide holes on the module.
- 3 Lower the module into the chassis.

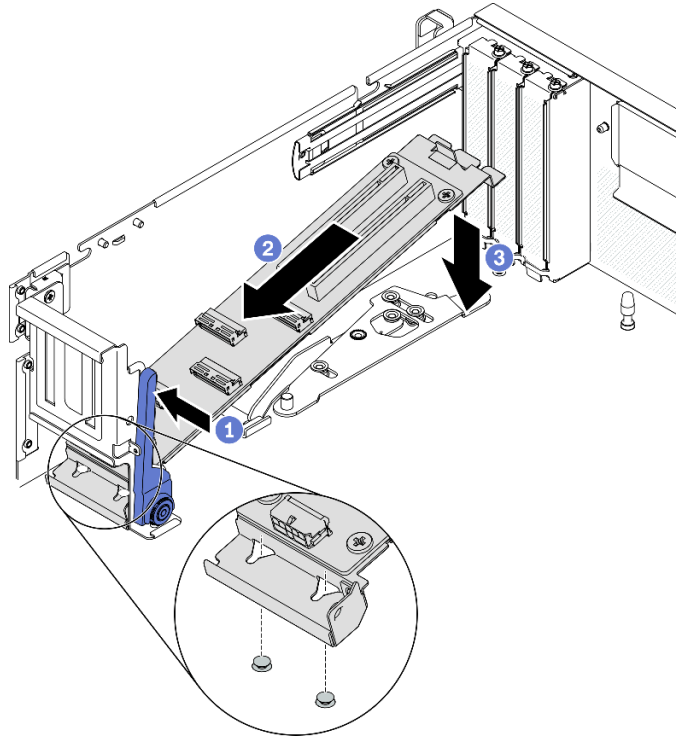


Figure 236. Placing the front I/O expansion board module into the chassis

- Step 2. Slide the front I/O expansion board module toward the front of the chassis until the guide pins on system board are fully seated in the guide holes on the module.

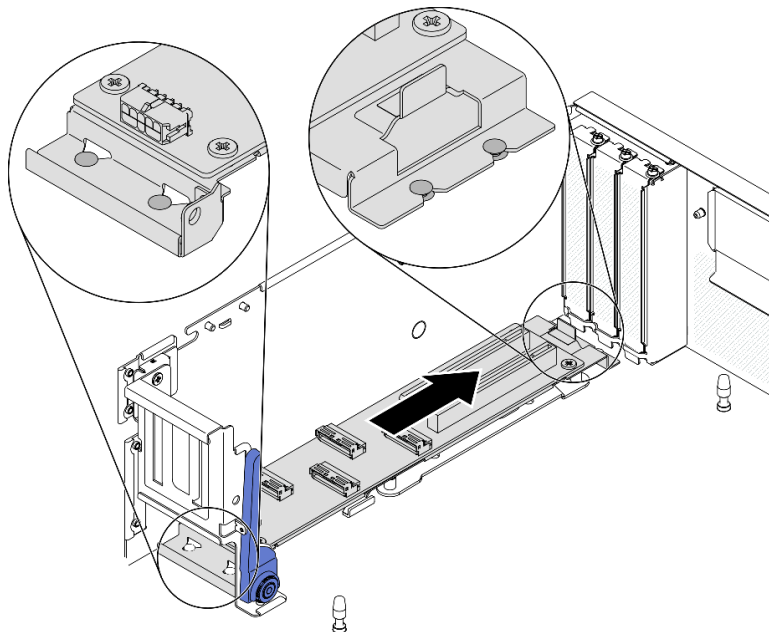


Figure 237. Installing the front I/O expansion board module

### After you finish

1. Reconnect the required cables.

2. Reinstall the network adapter to the front I/O expansion board module. See [“Install a network adapter” on page 210](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

### Demo video

[Watch the procedure on YouTube](#)

## Front I/O expansion board replacement

Follow instructions in this section to remove and install the front I/O expansion board.

### Remove the front I/O expansion board

Follow instructions in this section to remove the front I/O expansion board.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

### Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. If a network adapter is installed on the front I/O expansion board module, remove it.
- c. Remove the front I/O expansion board module. See [“Remove the front I/O expansion board module” on page 307](#).

Step 2. Unfasten the five screws to remove the front I/O expansion board from the carrier.

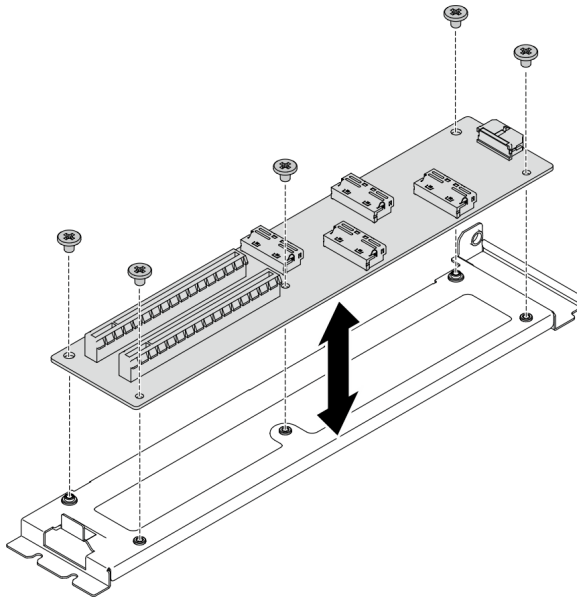


Figure 238. Removing the front I/O expansion board

### After you finish

- Install a replacement unit. See [“Install the front I/O expansion board” on page 311](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

### Demo video

[Watch the procedure on YouTube](#)

### Install the front I/O expansion board

Follow instructions in this section to install the front I/O expansion board.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the drive to any unpainted metal surface on the server; then, remove the drive from the package and place it on a static-protective surface.

### Procedure

- Step 1. Align the front I/O expansion board to the screw holes on the carrier; then, fasten the five screws to secure front I/O expansion board to the carrier.

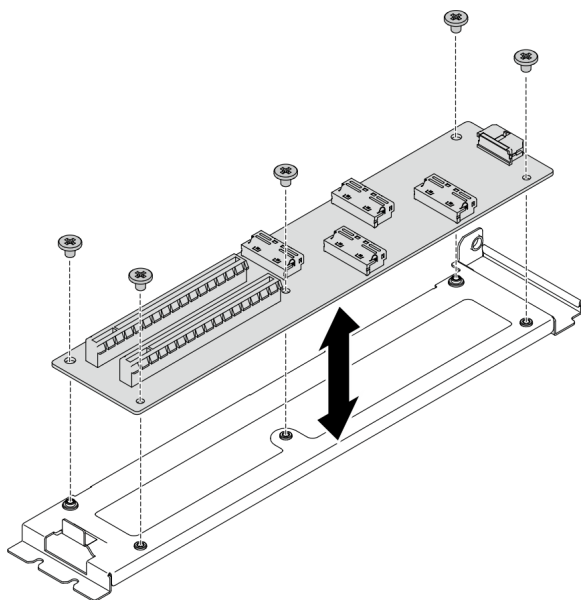


Figure 239. Installing the front I/O expansion board

### After you finish

1. Reinstall the front I/O expansion board module. See [“Install the front I/O expansion board module” on page 308](#).
2. Reconnect the required cables.
3. Reinstall the network adapter to the front I/O expansion board module. See [“Install a network adapter” on page 210](#).
4. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

### Demo video

[Watch the procedure on YouTube](#)

## Lenovo Neptune(TM) liquid-to-air (L2A) hybrid cooling module replacement (trained technician only)

Follow instructions in this section to remove and install the Lenovo Neptune™ liquid-to-air (L2A) hybrid cooling module.

**Important:** This task must be operated by trained technicians.

### Remove the Lenovo Neptune(TM) liquid-to-air (L2A) hybrid cooling module

Follow instructions in this section to remove the Lenovo Neptune™ liquid-to-air (L2A) hybrid cooling module.

### About this task

**Important:** Removing and installing this component requires trained technicians. **Do not** attempt to remove or install it without proper training.

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.



- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

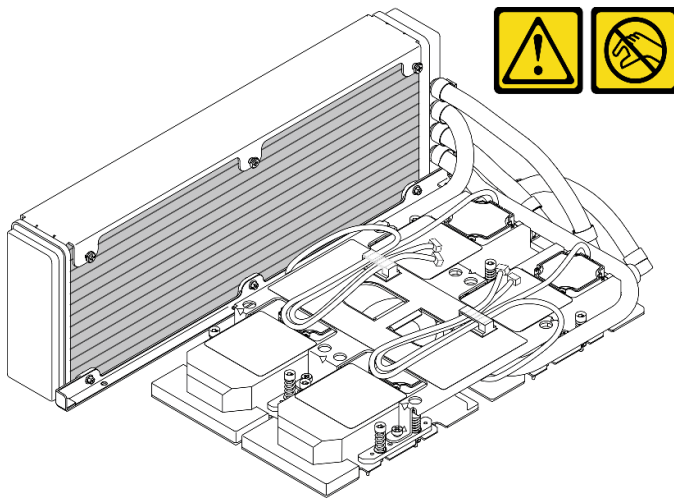
Prepare the following screwdrivers to ensure you can install and remove the corresponding screws properly.

Torque screwdriver type list	Screw Type
Phillips #1 head screwdriver	Phillips #1
Torx T10 head screwdriver	Torx T10 screw

**Note:** Make sure you have an alcohol cleaning pad available.

**CAUTION:**

**Do not touch the radiator fins. Touching the radiator fins might damage the L2A.**



**Procedure**

Step 1. Prepare your server.

- Remove the top cover. See [“Remove the top cover” on page 255](#).
- Remove the 2.5-inch drive assembly. See [“Remove the 2.5-inch drive cage assembly” on page 298](#).
- Remove the network adapters. See [“Remove a network adapter” on page 209](#).
- Remove the front I/O expansion board module. See [“Remove the front I/O expansion board module” on page 307](#).

Step 2. Remove the retimer assembly. See [“Remove the retimer assembly” on page 350](#).

Step 3. Route the cold plate assembly pump cables through the cable clips on the cold plate assembly.

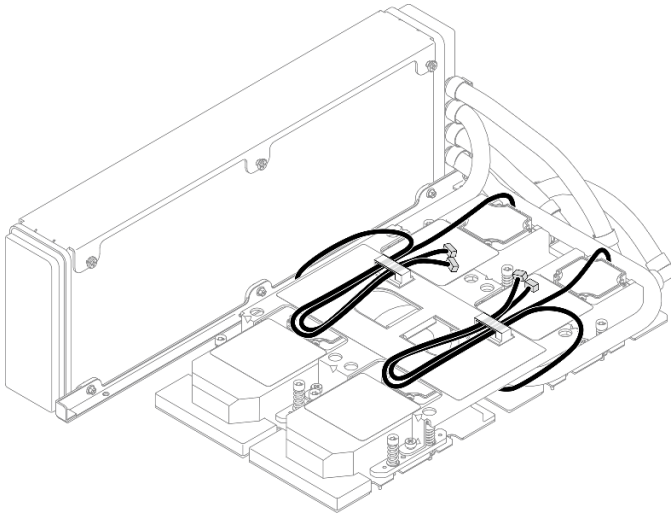
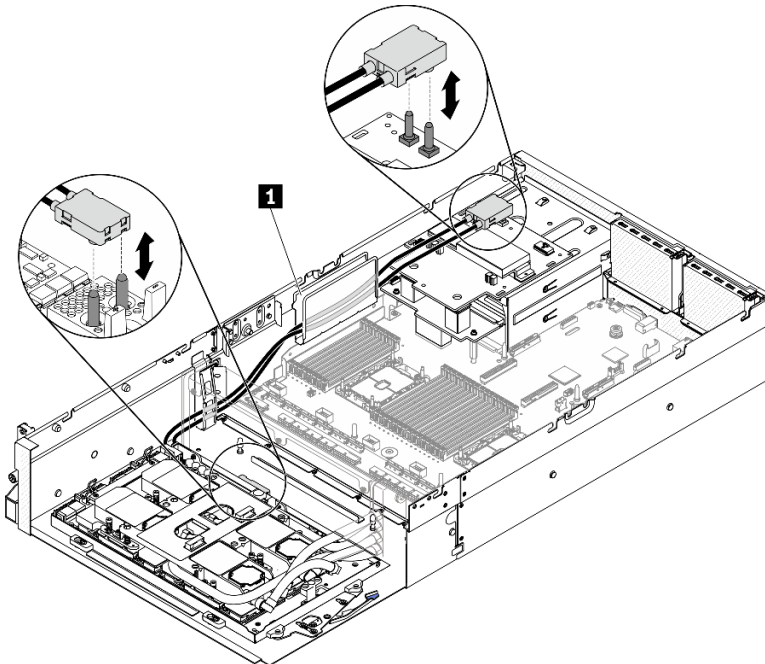


Figure 240. Routing the pump cables through the cable clips

Step 4. Disconnect the SXM GPU board power cable from the SXM GPU board and the SXM GPU power distribution board.

Figure 241. Disconnecting the SXM GPU board power cable

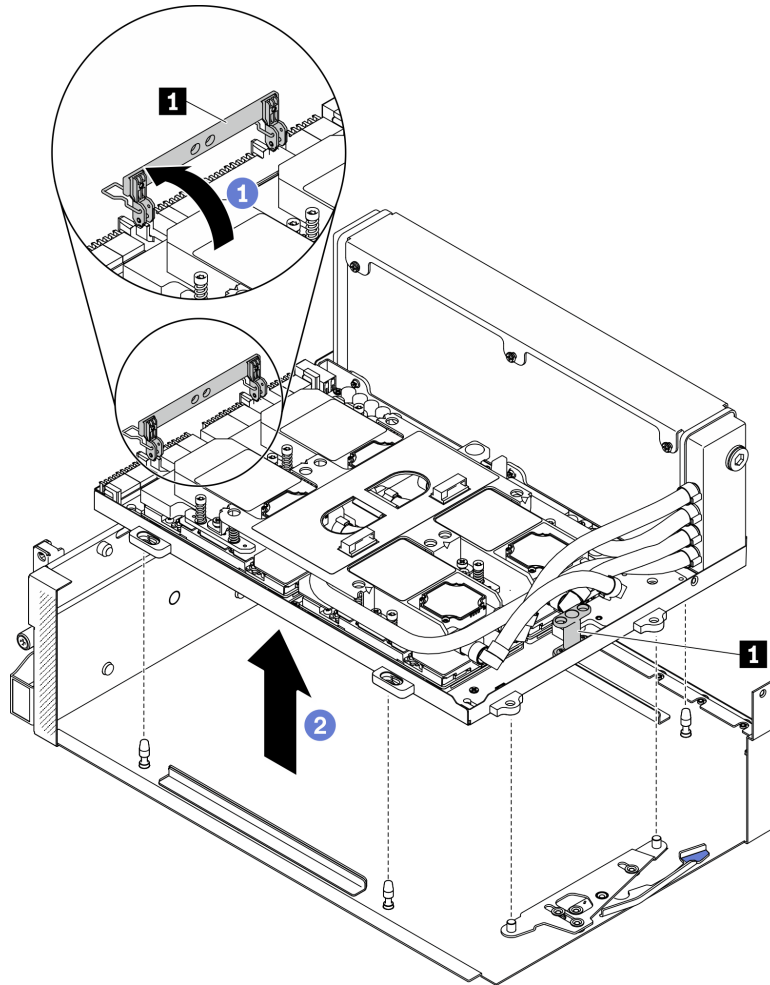


**1** Cable guide

Step 5. Remove the GPU-L2A assembly.

- a. ① Rotate up the clips and handle on the SXM GPU board.
- b. ② Hold the handles on both sides of the SXM GPU board, and lift the GPU-L2A assembly out of the chassis.

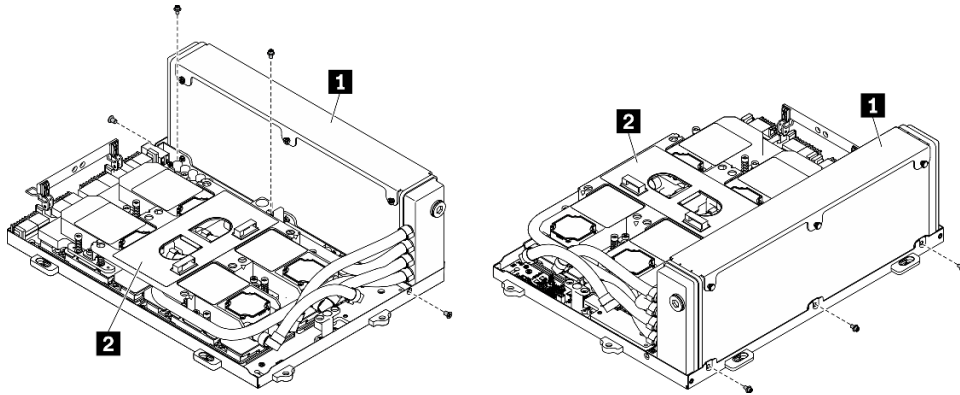
Figure 242. Removing the GPU-L2A assembly



1 SXM GPU board handle

Step 6. With a PH 1 head screwdriver, unfasten the seven Philip #1 screws that secure the radiator to the GPU tray. Remove the screws with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to fully tighten is  $0.3\pm 0.03$  newton-meter,  $2.7\pm 0.27$  pound-inch.

Figure 243. Unfastening the screws on the radiator



<b>1</b> Radiator
<b>2</b> Cold plate assembly

Step 7. With a Torx T10 screwdriver, unfasten the captive screws that secure the cold plates to the SXM GPU board in the removal sequence shown on the cold plate label. Remove the screws with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to fully tighten is  $0.4 \pm 0.06$  newton-meter,  $3.5 \pm 0.5$  pound-inch.

**Attention:** To prevent damage to components, make sure to follow the indicated screw unfastening sequence shown on the cold plate label.

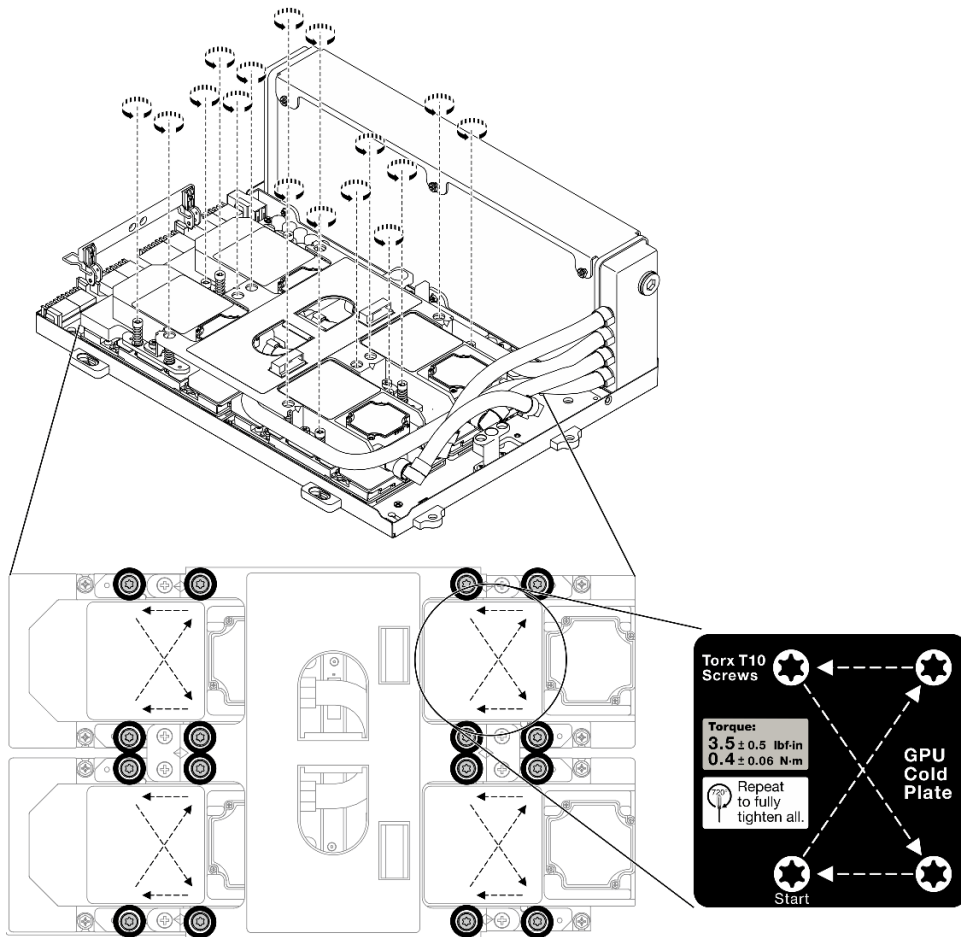


Figure 244. Unfastening the screws on the cold plates

Step 8. Hold the radiator by its upper edge and hold the cold plate assembly by its lifting handle; then, lift them up from the SXM GPU board.

**Note:** A flat tool may be needed to carefully disengage the cold plates from the GPUs. Make sure not to damage the GPUs while disengaging the cold plates.

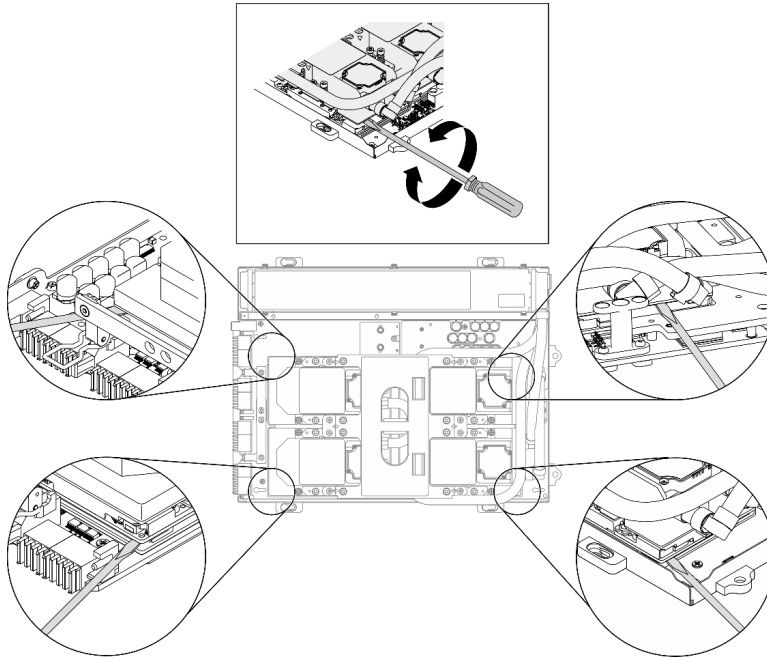
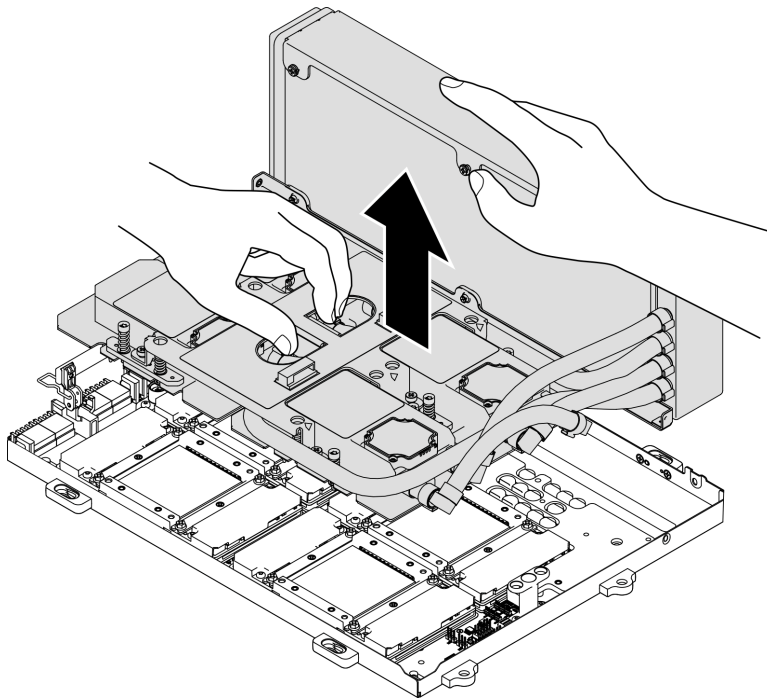


Figure 245. Disengaging the cold plates from the SXM GPU board

Figure 246. Removing the L2A



Step 9. Rotate the L2A counterclockwise.

- a. ① Hold the right end of the radiator which is attached with the tubes, and hold the cold plate assembly lifting handle.
- b. ② Rotate the L2A counterclockwise so that the left end of the radiator is standing on a flat surface, and the cold plate assembly lifting handle is facing your left side.

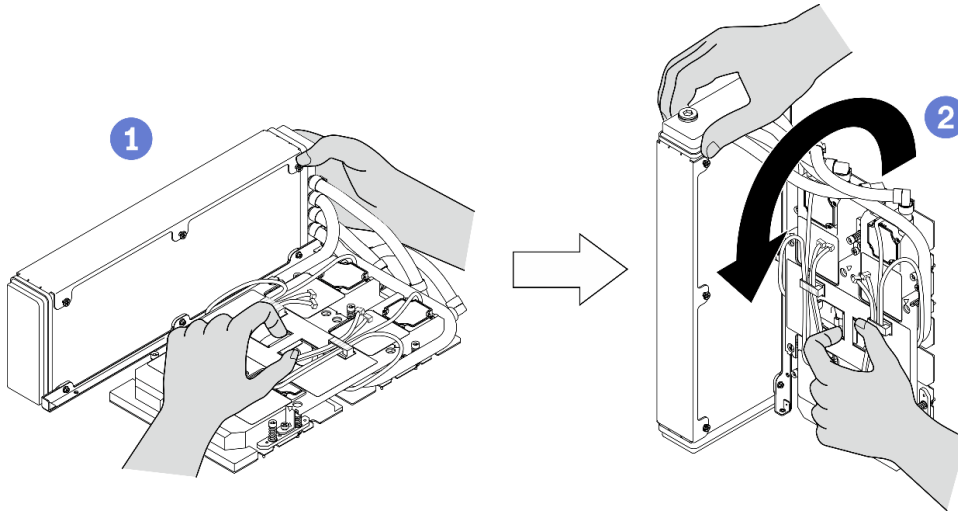


Figure 247. Rotating the L2A counterclockwise

Step 10. Turn the L2A upside down.

- a. ① Keep the left end of the radiator standing on the flat surface, and hold the cold plate assembly lifting handle.
- b. ② Move your hand to hold the bottom edge of the radiator, then turn the L2A upside down so that the upper side of the radiator and cold plate assembly lifting handle are facing down.

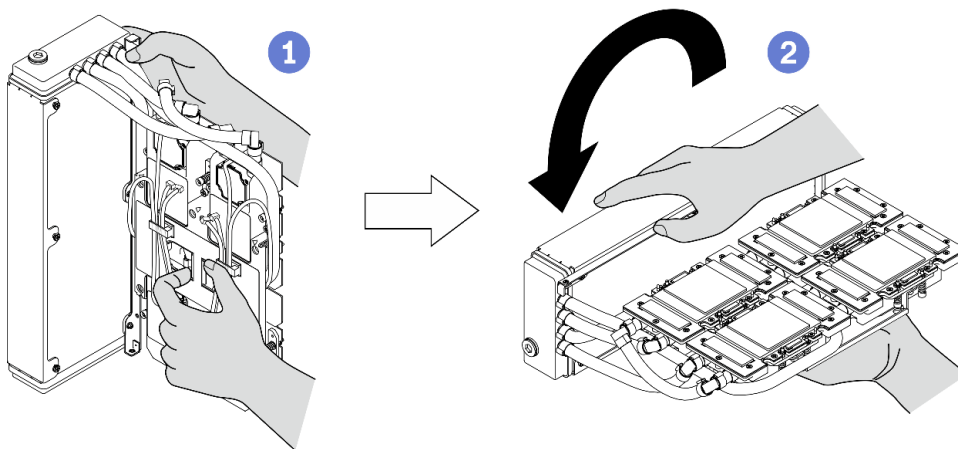


Figure 248. Turning the L2A upside down

Step 11. Place the L2A on a clean flat surface.

Step 12. If there is any old thermal grease on the four GPUs, gently clean the top of the four GPUs with an alcohol cleaning pad.

## After you finish

1. Install a replacement unit or proceed to replace the SXM GPU board. See:
  - [“Install the Lenovo Neptune\(TM\) liquid-to-air \(L2A\) hybrid cooling module” on page 320](#)
  - [“SXM GPU board replacement \(trained technician only\)” on page 334](#)
2. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install the Lenovo Neptune(TM) liquid-to-air (L2A) hybrid cooling module

Follow instructions in this section to install the Lenovo Neptune™ liquid-to-air (L2A) hybrid cooling module.

### About this task

**Important:** Removing and installing this component requires trained technicians. **Do not** attempt to remove or install it without proper training.

#### Attention:

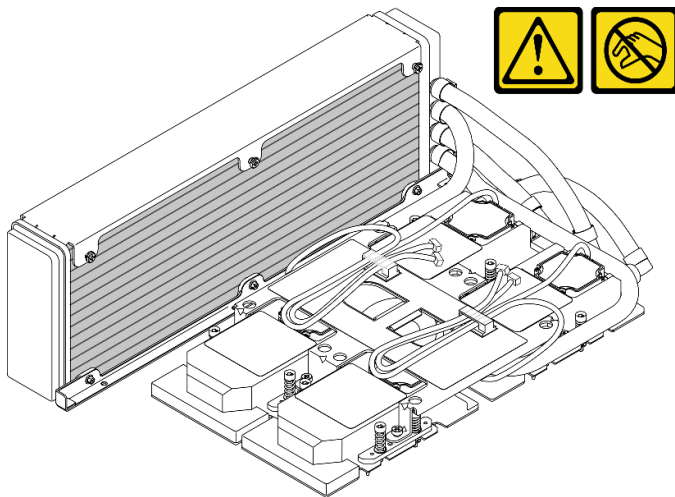
- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.

#### CAUTION:

When removing a new L2A from the shipping box, lift out the cold plate assembly with the plastic tray attached to prevent thermal grease on the cold plate assembly from damages. Only remove the masking tape from the plastic tray and cold plate assembly when you are about to install the L2A to the SXM GPU board.

#### CAUTION:

Do not touch the radiator fins. Touching the radiator fins might damage the L2A.



Prepare the following screwdrivers to ensure you can install and remove the corresponding screws properly.



Torque screwdriver type list	Screw Type
Phillips #1 head screwdriver	Phillips #1
Torx T10 head screwdriver	Torx T10 screw

**Note:** Make sure you have an alcohol cleaning pad available.

## Procedure

Step 1. Make sure the SXM GPU board is installed in the GPU tray.

**Attention:** If there is any old thermal grease on the four GPUs, gently clean the top of the four GPUs with an alcohol cleaning pad.

Step 2. Hold the radiator by its upper edge and hold the cold plate assembly by its lifting handle to remove the L2A out of the shipping box.

**Attention:** To avoid damaging the thermal grease on the cold plate assembly, make sure the plastic tray is secured to the cold plate assembly with masking tapes when removing the L2A out of the shipping box.

Step 3. Remove the masking tapes from the plastic tray and the cold plate assembly, and remove the protective cardboard packing from the radiator.

Step 4. Hold the radiator by its upper edge and hold the cold plate assembly by its lifting handle to lift up the L2A.

Step 5. Align the L2A with the upper left corner of the GPU tray and the screw holes on the SXM GPU board; then, gently place the L2A down onto the SXM GPU board.

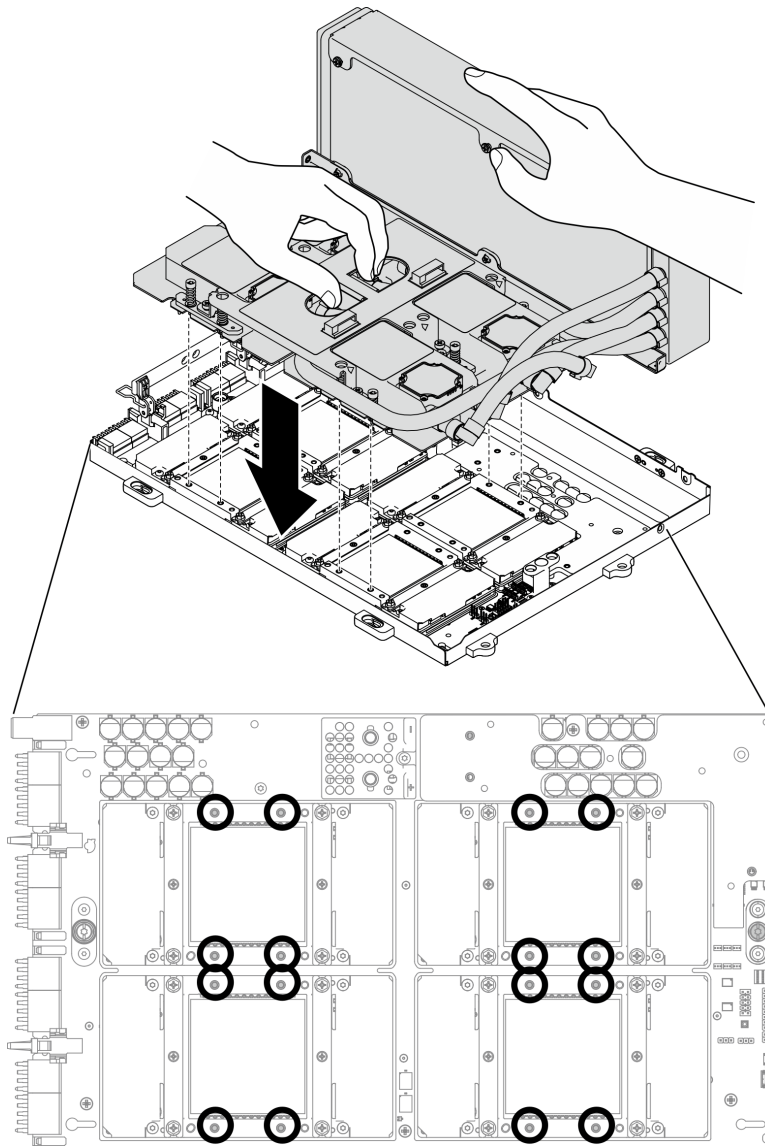


Figure 249. Placing the L2A onto the SXM GPU board

Step 6. With a PH 1 head screwdriver, fasten the seven Philip #1 screws that secure the radiator to the GPU tray. Install the screws with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to fully tighten is  $0.3\pm 0.03$  newton-meter,  $2.7\pm 0.27$  pound-inch.

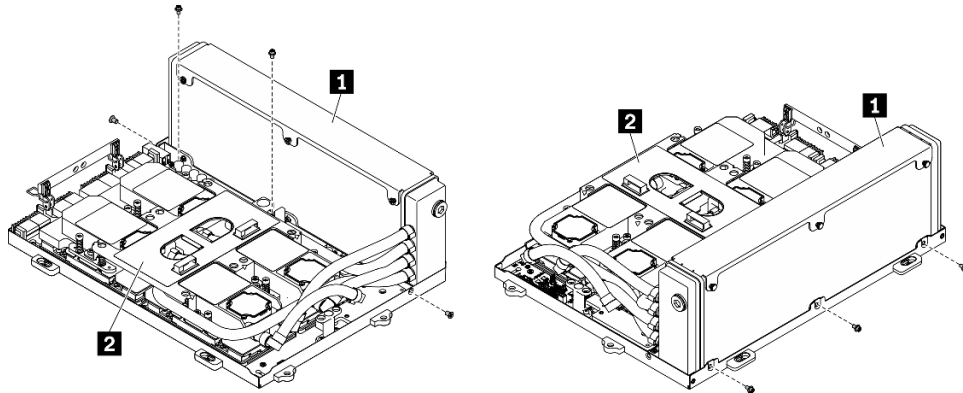


Figure 250. Fastening screws to the radiator

**1** Radiator

**2** Cold plate assembly

Step 7. With a Torx T10 screwdriver, fasten the captive screws that secure the cold plates to the SXM GPU board in the installation sequence shown on the cold plate label. Install the screws with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to fully tighten is  $0.4 \pm 0.06$  newton-meter,  $3.5 \pm 0.5$  pound-inch.

**Attention:** To prevent damage to components, make sure to follow the indicated screw fastening sequence shown on the cold plate label.

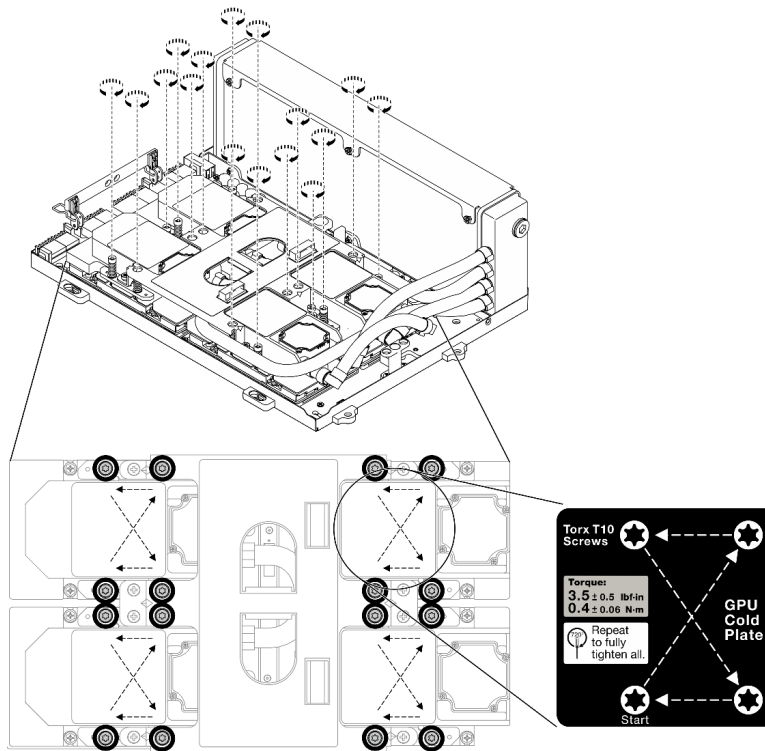


Figure 251. Fastening screws on the cold plates

Step 8. Remove the retimer assembly from the chassis. See [“Remove the retimer assembly” on page 350](#)

Step 9. Install the GPU-L2A assembly.

- a. ① Pull the GPU-L2A assembly latch outward until it stops.
- b. ② Rotate up the clips and handle of the SXM GPU board, and hold the handles on both sides of the SXM GPU board.
- c. ③ Align the GPU-L2A assembly with the six guide pins in the chassis, and gently place the GPU-L2A assembly into the chassis.

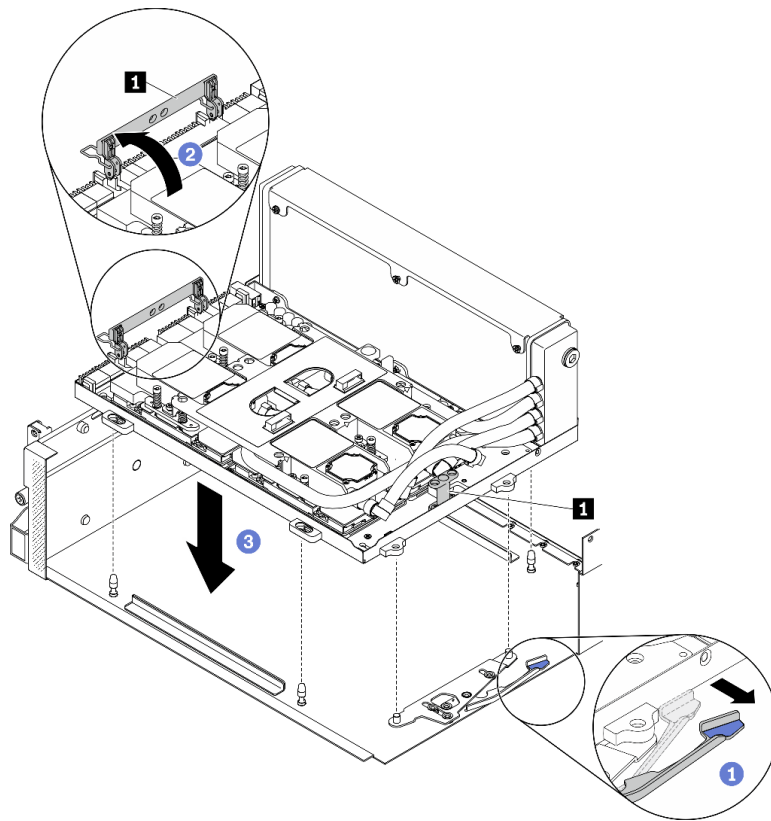


Figure 252. Install the GPU-L2A assembly

**1** SXM GPU board handle

Step 10. Route the SXM GPU board power cable through the cable clip and cable guide, and connect it to the SXM GPU board and the SXM GPU power distribution board in the rear of the chassis.

**Attention:** Make sure to route the cables through the cable clip and cable guide.

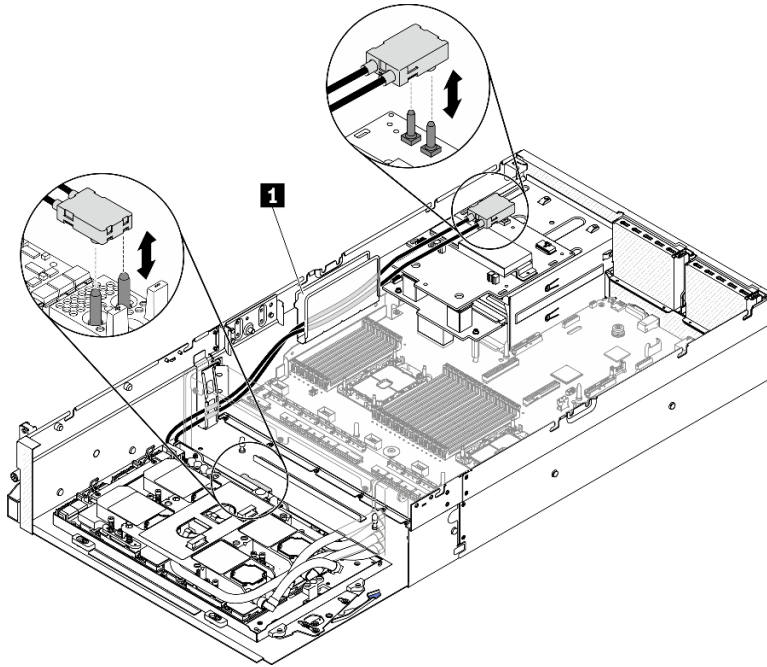


Figure 253. Connecting SXM GPU board power cable

Step 11. Rotate down the clips and handle of the SXM GPU board.

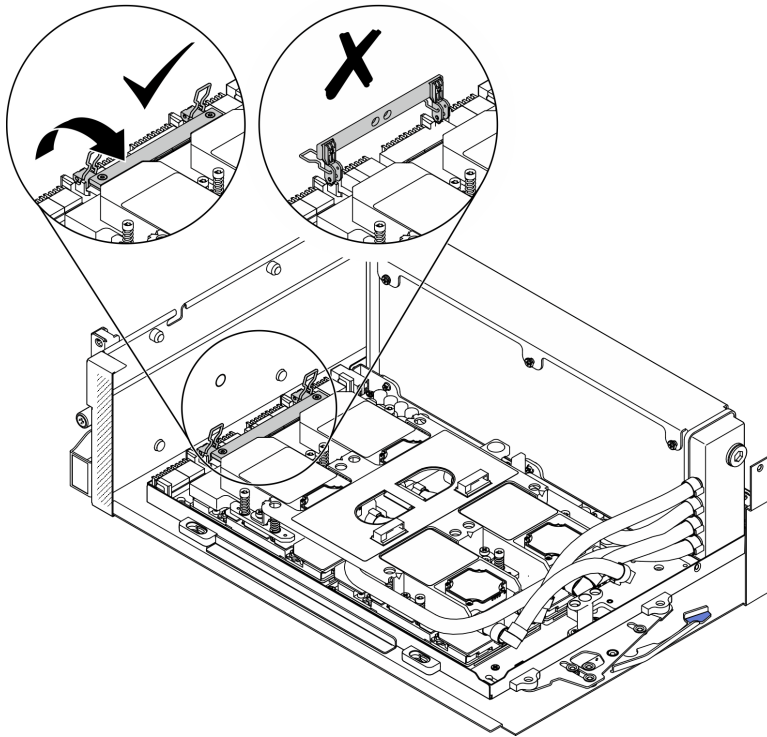


Figure 254. Rotate down the clips and handle of the SXM GPU board

### After you finish

1. Reinstall the retimer assembly. See [“Install the retimer assembly” on page 354](#).
2. Reinstall the front I/O expansion board module. See [“Install the front I/O expansion board module” on page 308](#).
3. Reinstall the network adapter. [“Install a network adapter” on page 210](#).
4. Reinstall the 2.5-inch drive cage assembly. See [“Install the 2.5-inch drive cage assembly” on page 300](#).
5. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

### Demo video

[Watch the procedure on YouTube](#)

## SXM GPU replacement (trained technician only)

Follow instructions in this section to remove and install the SXM GPU.

**Important:** This task must be operated by trained technicians.

### Remove an SXM GPU

Follow instructions in this section to remove a GPU.

### About this task

**Attention:** When the HGX A100 80GB 500W 4-GPU Board is installed and if the ambient temperature is above 30°C, the GPUs may be instructed by the system to enter an emergency power reduction state whereby GPU performance will be impacted.

**Important:** Removing and installing this component requires trained technicians. **Do not** attempt to remove or install it without proper training.

**Note:** Make sure you have an alcohol cleaning pad available.

**Attention:**

- Read “[Installation Guidelines](#)” on page 149 and “[Safety inspection checklist](#)” on page 150 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “[Power off the server](#)” on page 14.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See “[Remove the server from rack](#)” on page 152.
- A torque screwdriver is available for request if you do not have one at hand.

Prepare the following screwdrivers to ensure you can install and remove the corresponding screws properly

Table 23. Torque screwdriver type list

Torque screwdriver type list	Screw type
PH 2 head screwdriver	Philips #2
Torx 10 screwdriver	Torx T10 screw

The following illustration shows the GPU numbering.

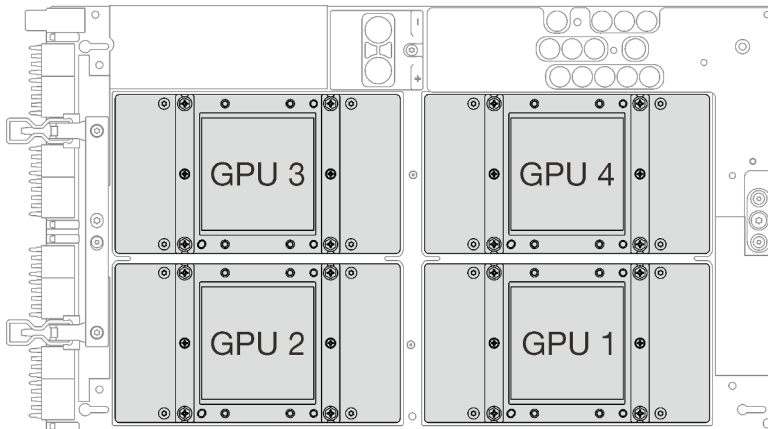


Figure 255. SXM GPU Numbering

## Procedure

Step 1. Prepare your server.

- Remove the top cover. See “[Remove the top cover](#)” on page 255.
- Remove the 2.5-inch drive assembly. See “[Remove the 2.5-inch drive cage assembly](#)” on page 298.
- Remove the network adapters. See “[Remove a network adapter](#)” on page 209.



- d. Remove the front I/O expansion board module. See [“Remove the front I/O expansion board module” on page 307.](#)
- e. Remove the retimer assembly. See [“Remove the retimer assembly” on page 350.](#)
- f. Remove the Lenovo Neptune™ liquid-to-air (L2A) hybrid cooling module. See [“Remove the Lenovo Neptune\(TM\) liquid-to-air \(L2A\) hybrid cooling module” on page 312.](#)
- g. Remove the SXM GPU board. See [“Remove the SXM GPU board” on page 334.](#)

Step 2. If there is any old thermal grease on the four GPUs and the cold plates, gently clean the top of the four GPUs and the cold plates with an alcohol cleaning pad.

Step 3. Locate the GPU to be removed. Unfasten the four Philips #2 screws on the GPU, and carefully remove the GPU out of the GPU board.

**Attention:** Tighten and remove the screws with a torque screwdriver sets to the proper torque. For reference, the torque required for the screws to fully tighten/removal is  $0.5 \pm 0.05$  newton-meter,  $4.5 \pm 0.5$  pound-inch.

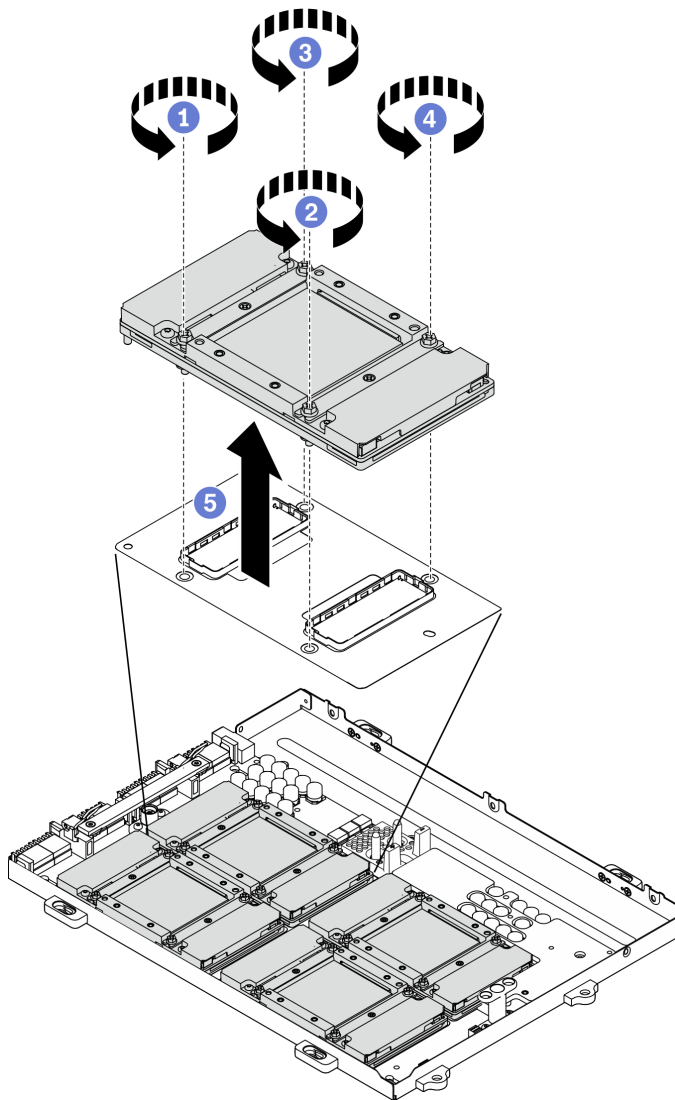


Figure 256. Removing a GPU from the SXM GPU board

Step 4. Install protective covers to the SXM GPU board.

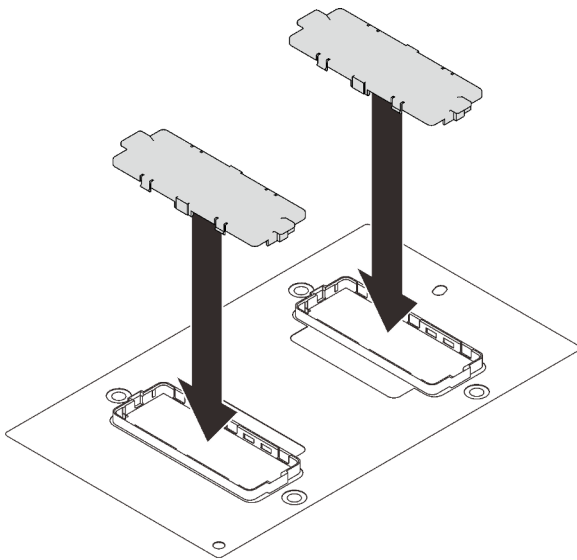


Figure 257. Installing the protective covers

## After you finish

1. Install a replacement unit. See [“Install an SXM GPU” on page 330](#).
2. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install an SXM GPU

Follow instructions in this section to install a GPU.

## About this task

**Attention:** When the HGX A100 80GB 500W 4-GPU Board is installed and if the ambient temperature is above 30°C, the GPUs may be instructed by the system to enter an emergency power reduction state whereby GPU performance will be impacted.

**Important:** Removing and installing this component requires trained technicians. **Do not** attempt to remove or install it without proper training.

**Note:** Make sure you have an alcohol cleaning pad available.

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.
- A torque screwdriver is available for request if you do not have one at hand.

**Notes:** To prevent potential thermal issues, change the **Misc** setting in the BIOS from **Option3** (default value) to **Option1** if the following two conditions are met:

- The server is equipped with a GPU adapter.
- The UEFI firmware version is U8E128A or later.

For the method of changing the **Misc** setting, see <https://support.lenovo.com/us/en/solutions/TT1832>.

Prepare the following screwdrivers to ensure you can install and remove the corresponding screws properly

Table 24. Torque screwdriver type list

Torque screwdriver type list	Screw type
PH 2 head screwdriver	Philips #2
Torx 10 screwdriver	Torx T10 screw

The following illustration shows the GPU numbering.

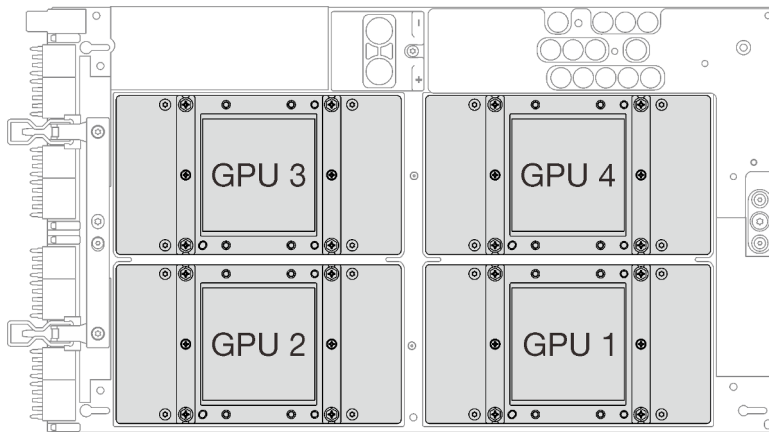


Figure 258. SXM GPU Numbering

## Procedure

**Attention:** If there is any old thermal grease on the four GPUs and the cold plates, gently clean the top of the four GPUs and the cold plates with an alcohol cleaning pad.

Step 1. Remove protective covers from the GPU if they are installed.

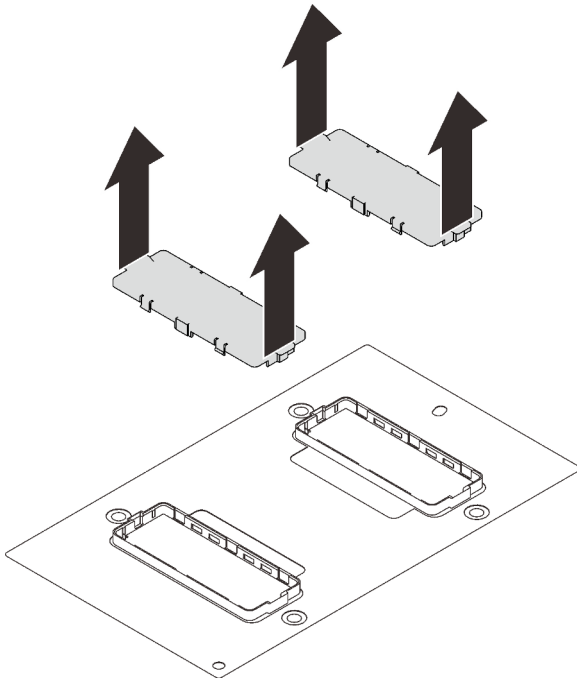


Figure 259. Removing the protective covers

Step 2. Gently place the GPU down on the SXM GPU board; then fasten the four Philips #2 screw to secure the GPU to the SXM GPU board.

**Attention:** Tighten and remove the screws with a torque screwdriver sets to the proper torque. For reference, the torque required for the screws to fully tighten/removal is  $0.5 \pm 0.05$  newton-meter,  $4.5 \pm 0.5$  pound-inch.

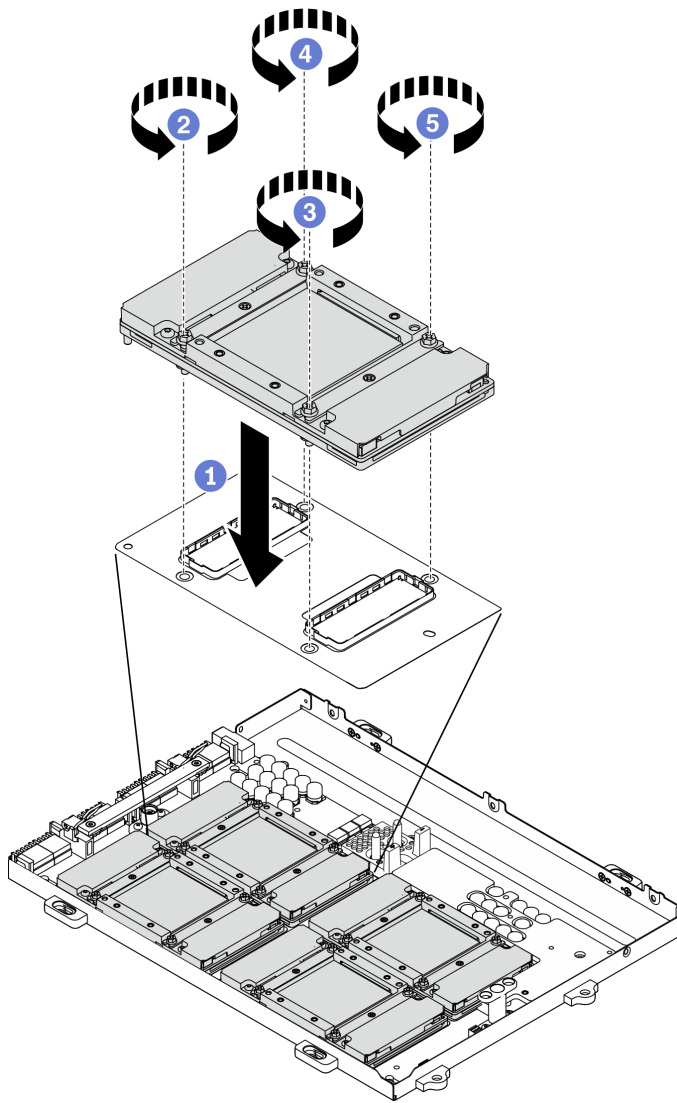


Figure 260. Installing a GPU to the SXM GPU board

Step 3. Proceed to install the SXM GPU board.

**Attention:** Apply thermal grease only when the SXM GPU board is installed in GPU tray

### After you finish

1. Reinstall the SXM GPU board. See [“Install the SXM GPU board” on page 337](#).
2. Reinstall the Lenovo Neptune™ liquid-to-air (L2A) hybrid cooling module. See [“Install the Lenovo Neptune\(TM\) liquid-to-air \(L2A\) hybrid cooling module” on page 320](#).
3. Reinstall the retimer assembly. See [“Install the retimer assembly” on page 354](#).
4. Reinstall the front I/O expansion board module. See [“Install the front I/O expansion board module” on page 308](#).
5. Reinstall the network adapter. See [“Install a network adapter” on page 210](#).
6. Reinstall the 2.5-inch drive assembly. See [“Install the 2.5-inch drive cage assembly” on page 300](#).
7. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

## Demo video

[Watch the procedure on YouTube](#)

## SXM GPU board replacement (trained technician only)

Follow instructions in this section to remove and install the SXM GPU board.

**Important:** This task must be operated by trained technicians.

### Remove the SXM GPU board

Follow instructions in this section to remove the SXM GPU board.

### About this task

**Attention:** When the HGX A100 80GB 500W 4-GPU Board is installed and if the ambient temperature is above 30°C, the GPUs may be instructed by the system to enter an emergency power reduction state whereby GPU performance will be impacted.

**Important:** Removing and installing this component requires trained technicians. **Do not** attempt to remove or install it without proper training.

**Note:** Make sure you have an alcohol cleaning pad available.

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).
- A torque screwdriver is available for request if you do not have one at hand.

**Prepare the following screwdriver to ensure you can install and remove the corresponding screws properly**

Table 25. Torque screwdriver type list

Torque screwdriver type list	Screw type
PH 2 head screwdriver	Four Philips #2 One Phillips #2 screw (18mm)
Torx 10 screwdriver	Torx T10 screw (captive screw)

The following illustration shows the GPU numbering.

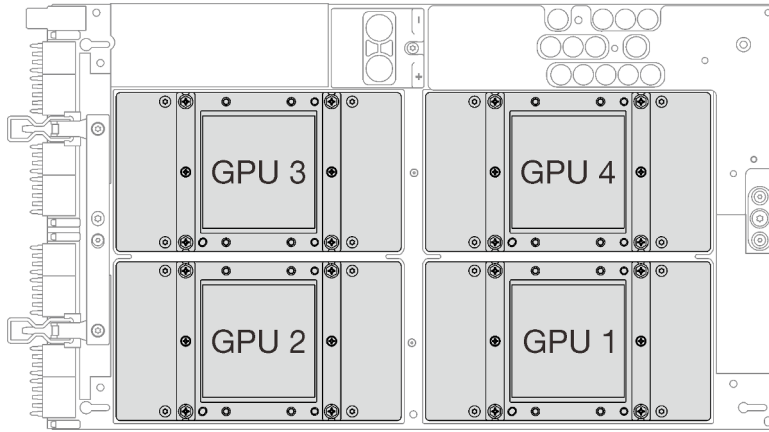


Figure 261. SXM GPU Numbering

## Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. Remove the 2.5-inch drive cage assembly. See [“Remove the 2.5-inch drive cage assembly” on page 298](#).
- c. Remove the network adapters. See [“Remove a network adapter” on page 209](#).
- d. Remove the front I/O expansion board module. See [“Remove the front I/O expansion board module” on page 307](#).
- e. Remove the retimer assembly. See [“Remove the retimer assembly” on page 350](#).
- f. Remove the Lenovo Neptune™ liquid-to-air (L2A) hybrid cooling module. See [“Remove the Lenovo Neptune\(TM\) liquid-to-air \(L2A\) hybrid cooling module” on page 312](#).

Step 2. If there is any old thermal grease on the four GPUs and the cold plates, gently clean the top of the four GPUs and the cold plates with an alcohol cleaning pad.

Step 3. With a PH 2 head screwdriver, unfasten the five screws that secure the SXM GPU board to the GPU tray. Then, with a Torx T10 screwdriver, unfasten the two captive screws on the SXM GPU board handles. Remove the screws with a torque screwdriver sets to the proper torque. For reference, the torque required for the screws to fully tighten/removal is  $0.6 \pm 0.06$  newton-meter,  $5 \pm 0.5$  pound-inch.

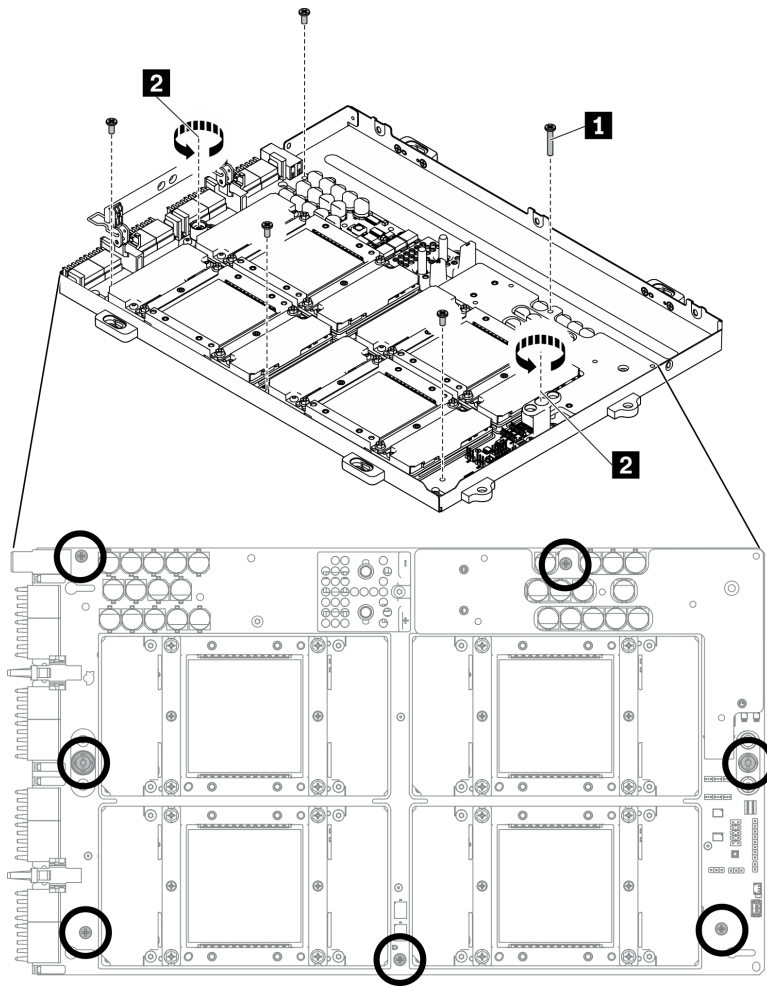


Figure 262. Unfastening the screws on the SXM GPU board

<b>1</b>	Phillips #2 screw (18mm)
<b>2</b>	Torx T10 screw (captive screw)

- Step 4. Remove the SXM GPU board from the GPU tray.
- a. ① Rotate up the clips and handle on the SXM GPU board.
  - b. ② Hold the handles on both sides of the SXM GPU board, and lift it up from the GPU tray.



**1** SXM GPU board handle

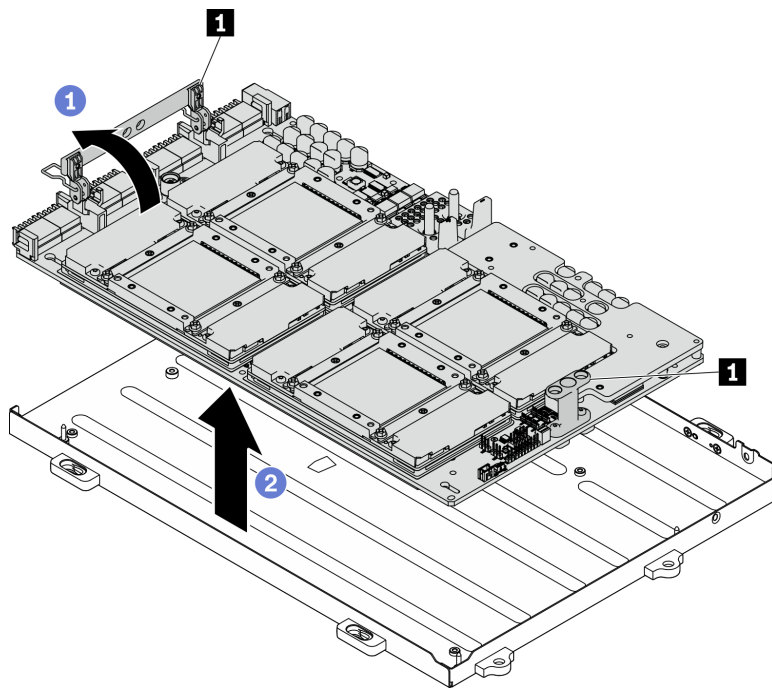


Figure 263. Removing the SXM GPU board

### After you finish

- Install a replacement unit. See [“Install the SXM GPU board” on page 337](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

### Demo video

[Watch the procedure on YouTube](#)

### Install the SXM GPU board

Follow instructions in this section to install the SXM GPU board.

### About this task

**Attention:** When the HGX A100 80GB 500W 4-GPU Board is installed and if the ambient temperature is above 30°C, the GPUs may be instructed by the system to enter an emergency power reduction state whereby GPU performance will be impacted.

**Important:** Removing and installing this component requires trained technicians. **Do not** attempt to remove or install it without proper training.

**Note:** Make sure you have an alcohol cleaning pad available.

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.

- A torque screwdriver is available for request if you do not have one at hand.
- Hold the long sides of the SXM GPU board with two hands while removing the new GPU board from the package box.

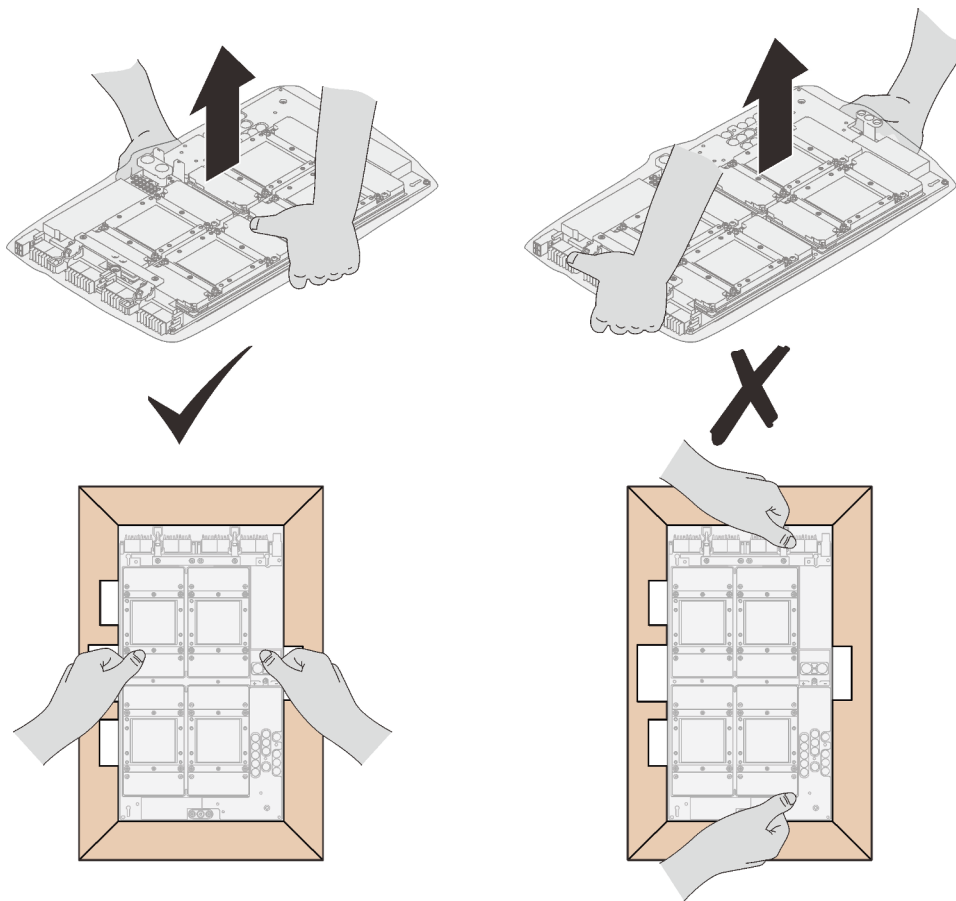


Figure 264. Removing SXM GPU board from the package box

- Once the SXM GPU board is removed from the plastic protective bag, hold two handles with both hands to move the GPU board.

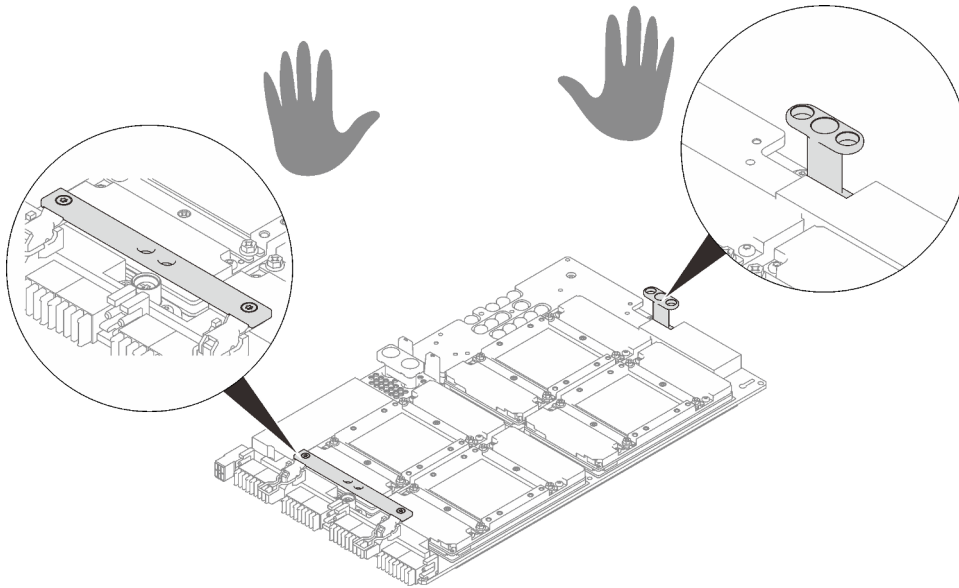


Figure 265. Removing SXM GPU board from the package box

**Prepare the following screwdriver to ensure you can install and remove the corresponding screws properly**

Table 26. Torque screwdriver type list

Torque screwdriver type list	Screw type
PH 2 head screwdriver	Four Phillips #2 One Phillips #2 screw (18mm)
Torx 10 screwdriver	Torx T10 screw (captive screw)

**The following illustration shows the GPU numbering.**

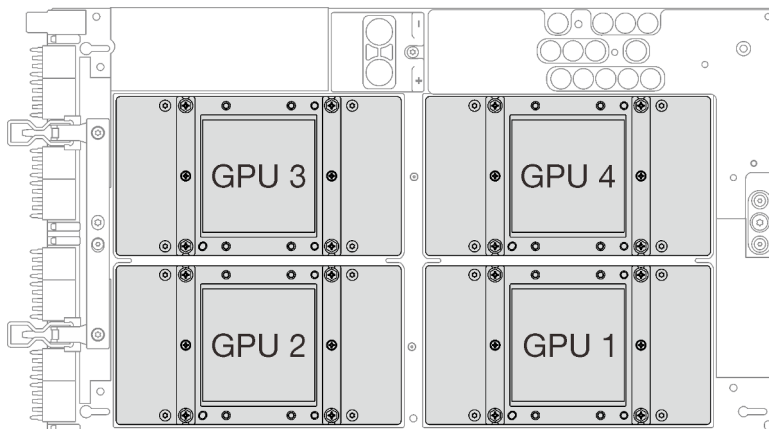


Figure 266. SXM GPU Numbering

## Procedure

**Attention:** If there is any old thermal grease on the cold plates, gently clean the top of the cold plates with an alcohol cleaning pad.

Step 1. Hold the SXM GPU board handles and align the SXM GPU board with the four guide pins on the GPU tray; then, gently place the SXM GPU board down into the tray.

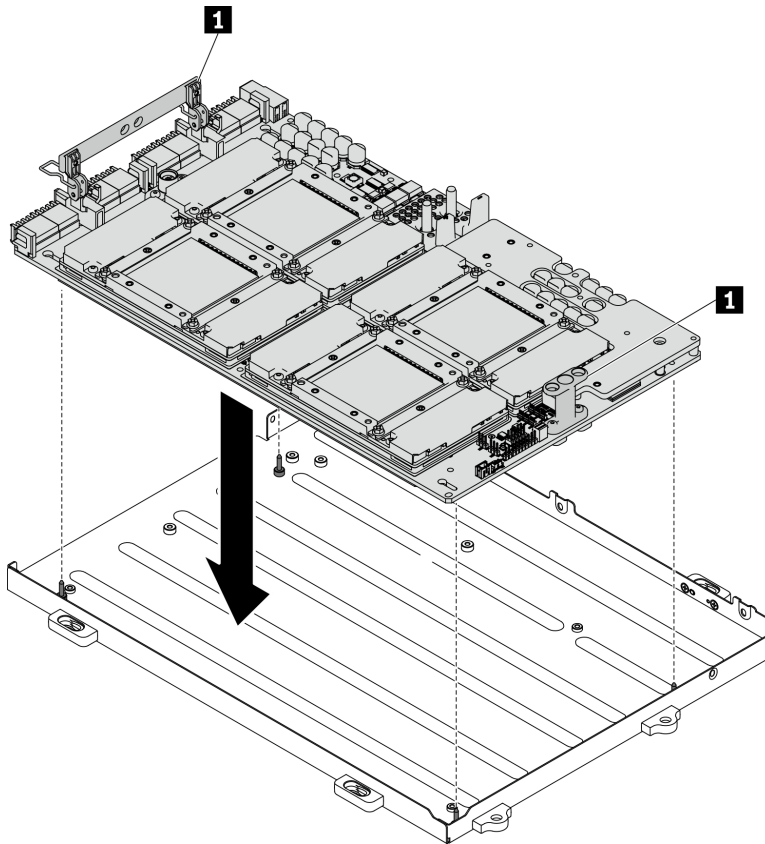
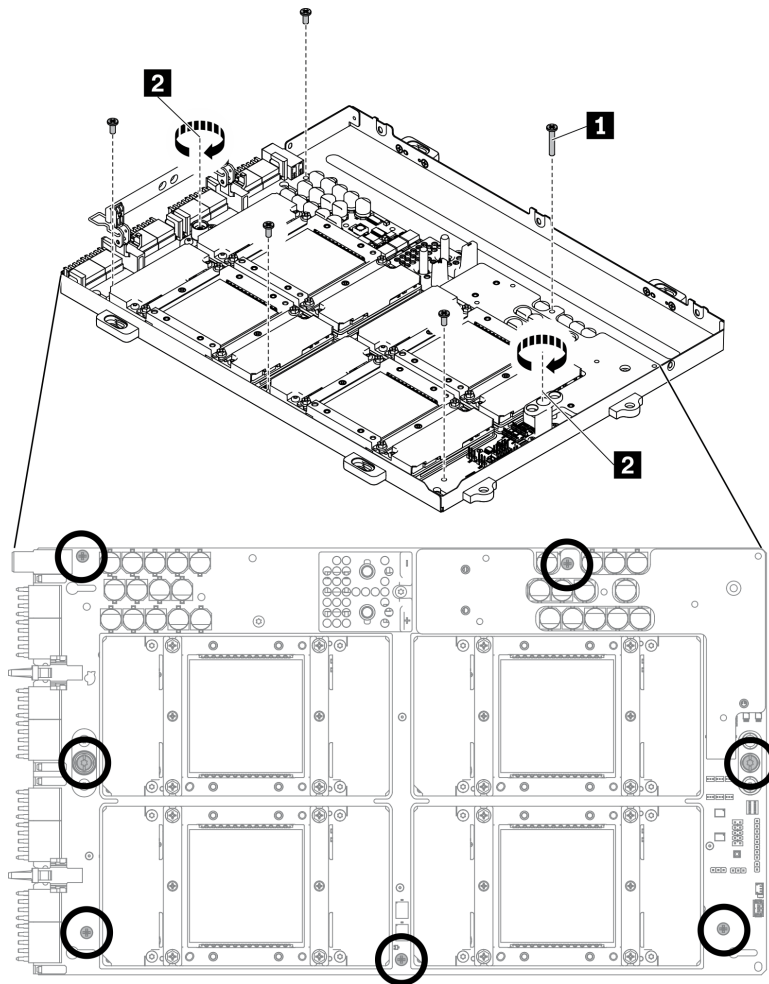


Figure 267. Placing the SXM GPU board into the GPU tray

<b>1</b>	SXM GPU board handle
----------	----------------------

Step 2. With a PH 2 head screwdriver, fasten the five screws that secure the SXM GPU board to the GPU tray. Then, with a Torx T10 screwdriver, fasten the two captive screws on the SXM GPU board handles. Remove the screws with a torque screwdriver sets to the proper torque. For reference, the torque required for the screws to fully tighten/removal is  $0.6\pm 0.06$  newton-meter,  $5\pm 0.5$  pound-inch.

**Attention:** Make sure to install the Phillips #2 screw (18mm) to the designated screw hole. See the following illustration for the screw hole location.



<b>1</b>	Phillips #2 screw (18mm)
<b>2</b>	Torx T10 screw (captive screw)

Figure 268. Installing the SXM GPU board

Step 3. Apply new thermal grease to the SXM GPU board.

- a. If there is any old thermal grease on the cold plates, gently clean the top of the cold plates with an alcohol cleaning pad.
- b. If you have cleaned the top of the GPUs with an alcohol cleaning pad, make sure to apply the new thermal grease after the alcohol has fully evaporated. Apply new thermal grease (1.5 g) to the top of each of the four GPUs.

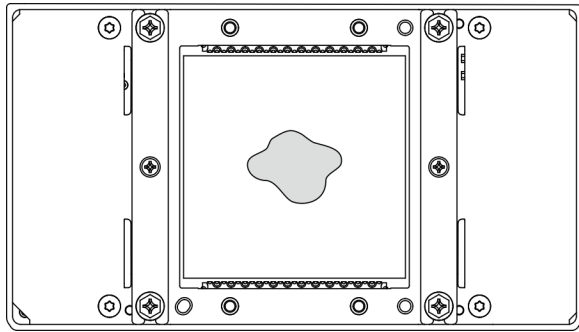


Figure 269. Thermal grease application

## After you finish

1. Follow the instructions below to install the L2A.

a. Lift up the cold plate.

- 1 Slightly lift up the cold plate with your right hand, and hold the cold plate assembly lifting handle with your left hand from underneath the cold plate.
- 2 Remove your right hand from the cold plate while holding the cold plate assembly lifting handle with your left hand.

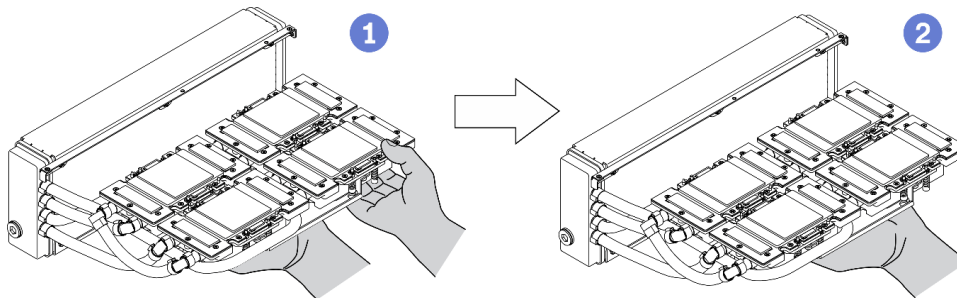


Figure 270. Lifting up the cold plate

b. Rotate the L2A clockwise.

- 1 Hold the bottom edge of the radiator, and hold the cold plate assembly lifting handle from underneath.
- 2 Rotate the L2A clockwise so that the left end of the radiator is standing on the flat surface, and the cold plate assembly lifting handle is facing your left side. Move your right hand to hold the right end of the radiator which is attached with the tubes.

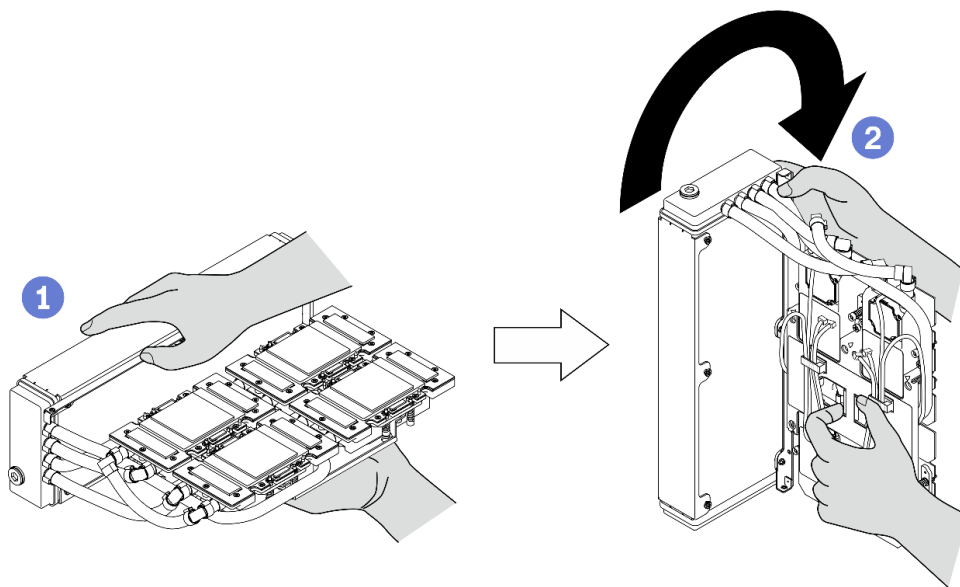


Figure 271. Rotate the L2A clockwise

c. Turn the L2A upside up.

① Hold the right end of the radiator which is attached with the tubes, and hold the cold plate assembly lifting handle.

② Rotate the L2A clockwise so that the upper side of the radiator and cold plate assembly lifting handle are facing up.

**Attention:** To prevent cold plate assembly thermal grease from contacting the flat surface below, lift up the cold plate assembly before installing it onto the SXM GPU board.

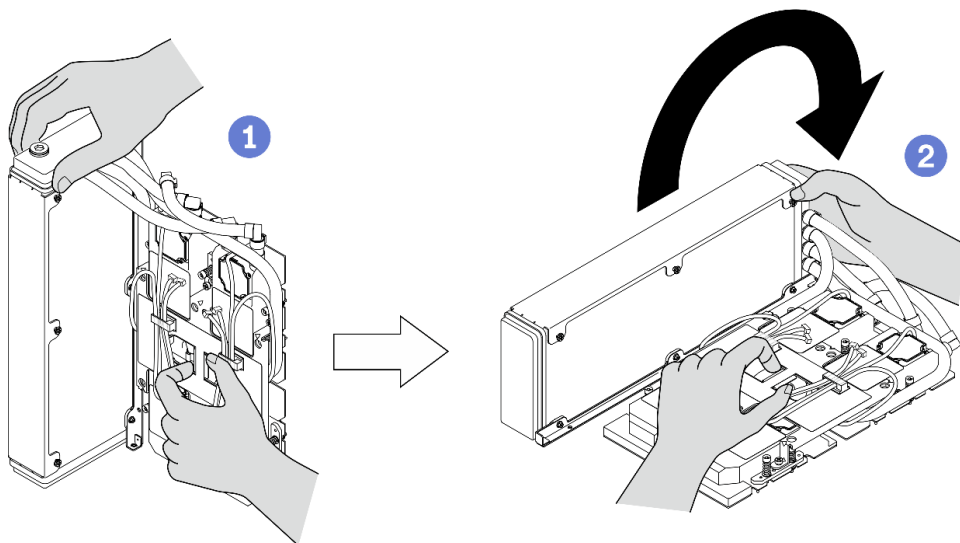


Figure 272. Turning the L2A upside up

d. Reinstall the L2A. See [“Install the Lenovo Neptune\(TM\) liquid-to-air \(L2A\) hybrid cooling module” on page 320.](#)

2. Reinstall the retimer assembly. See [“Install the retimer assembly” on page 354.](#)

3. Reinstall the front I/O expansion board module. See [“Install the front I/O expansion board module” on page 308](#).
4. Reinstall the network adapter. See [“Install a network adapter” on page 210](#).
5. Reinstall the 2.5-inch drive cage assembly. See [“Install the 2.5-inch drive cage assembly” on page 300](#).
6. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

### Demo video

[Watch the procedure on YouTube](#)

## SXM GPU power distribution board replacement

Following instructions in this section to remove and install the SXM GPU power distribution board.

### Remove the SXM GPU power distribution board

Follow instructions in this section to remove the SXM GPU power distribution board.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

**Note:** Prepare Phillips #1 head screwdriver for this task.

### Procedure

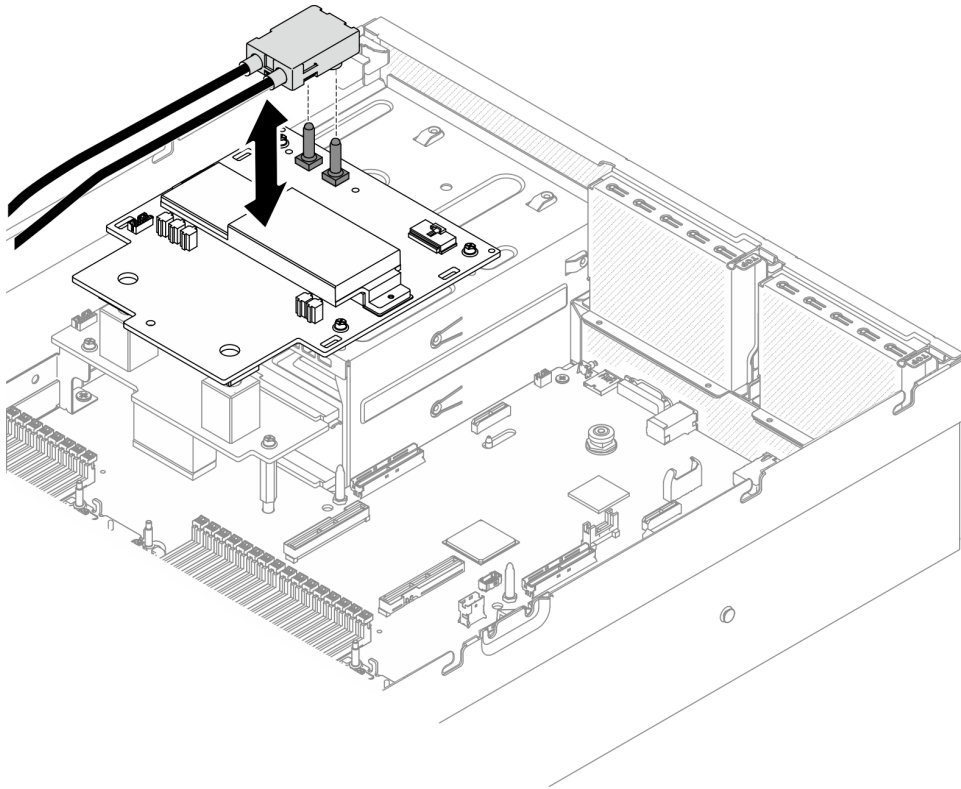
Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. Remove the 2.5-inch drive cage assembly. See [“Remove the 2.5-inch drive cage assembly” on page 298](#).

Step 2. Disconnect the SXM GPU board power cable from the SXM GPU power distribution board.

*Figure 273. Disconnecting the SXM GPU board power cable*





Step 3. Disconnect the sideband cable from both power distribution boards.

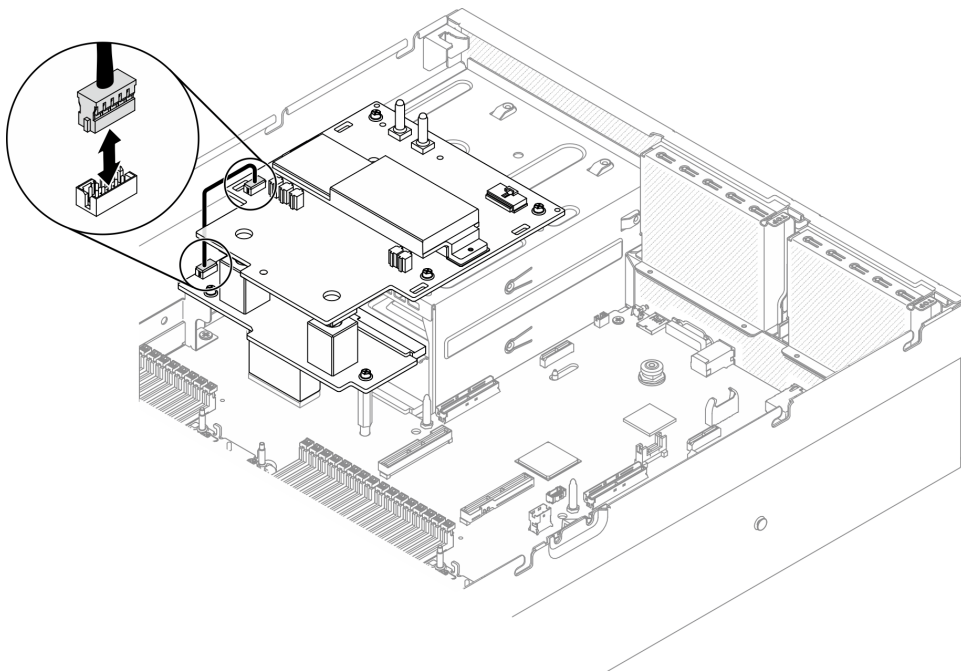



Figure 274. Disconnecting the sideband cable

Step 4. Remove the SXM GPU power distribution board.

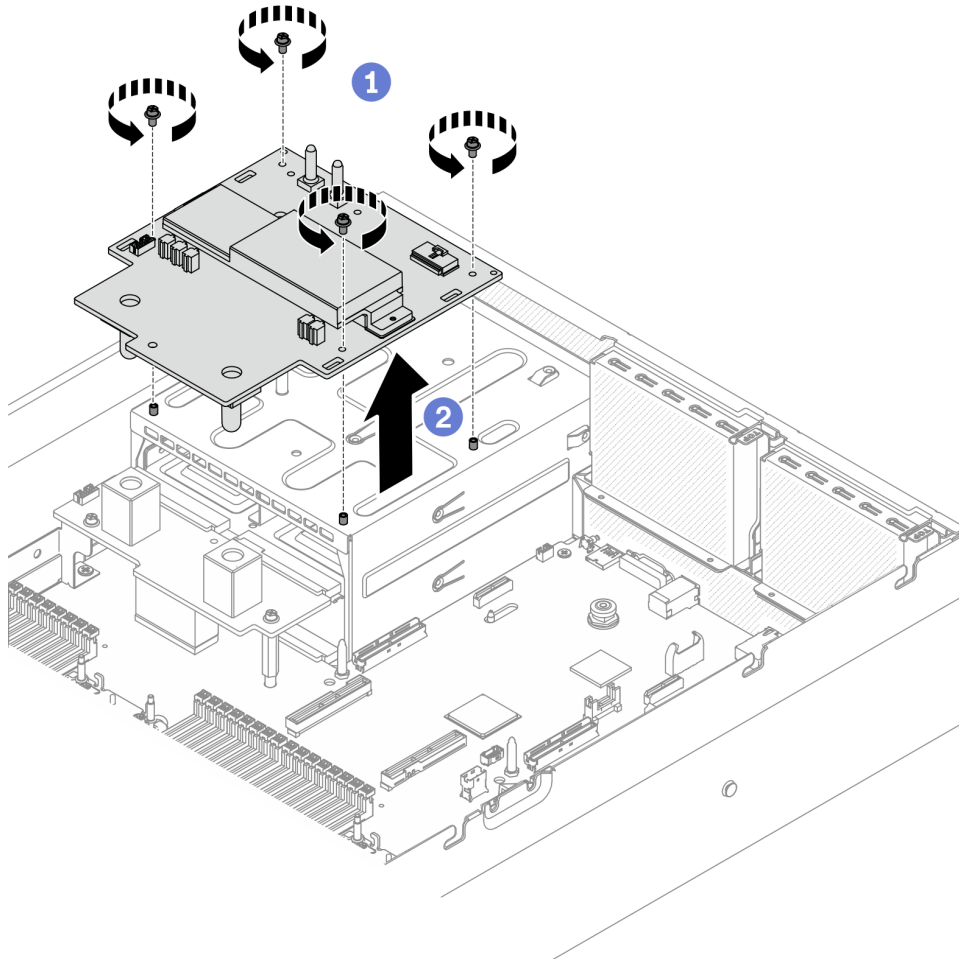
- a.  Unfasten the four screws that secure the SXM GPU power distribution board to the PSU bays.

- b. ② Lift up the SXM GPU power distribution board out of the chassis.

**Note:** Remove the screws with a torque screwdriver sets to the proper torque. For reference, the torque required for the screws to fully tighten/removal is  $0.6\pm 0.06$  newton-meter,  $5\pm 0.5$  pound-inch.

Torque screwdriver type list	Screw Type
PH 1 head screwdriver	Phillips #1 head screw

Figure 275. Removing the SXM GPU power distribution board



### After you finish

- Install a replacement unit. See [“Install the SXM GPU power distribution board”](#) on page 347.
- To replace the power distribution board, see [“Power distribution board replacement”](#) on page 224.
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

### Demo video

[Watch the procedure on YouTube](#)

## Install the SXM GPU power distribution board

Follow instructions in this section to install the SXM GPU power distribution board.

### About this task

#### Attention:

- Read “[Installation Guidelines](#)” on page 149 and “[Safety inspection checklist](#)” on page 150 to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

**Note:** Prepare Phillips #1 head screwdriver for this task.

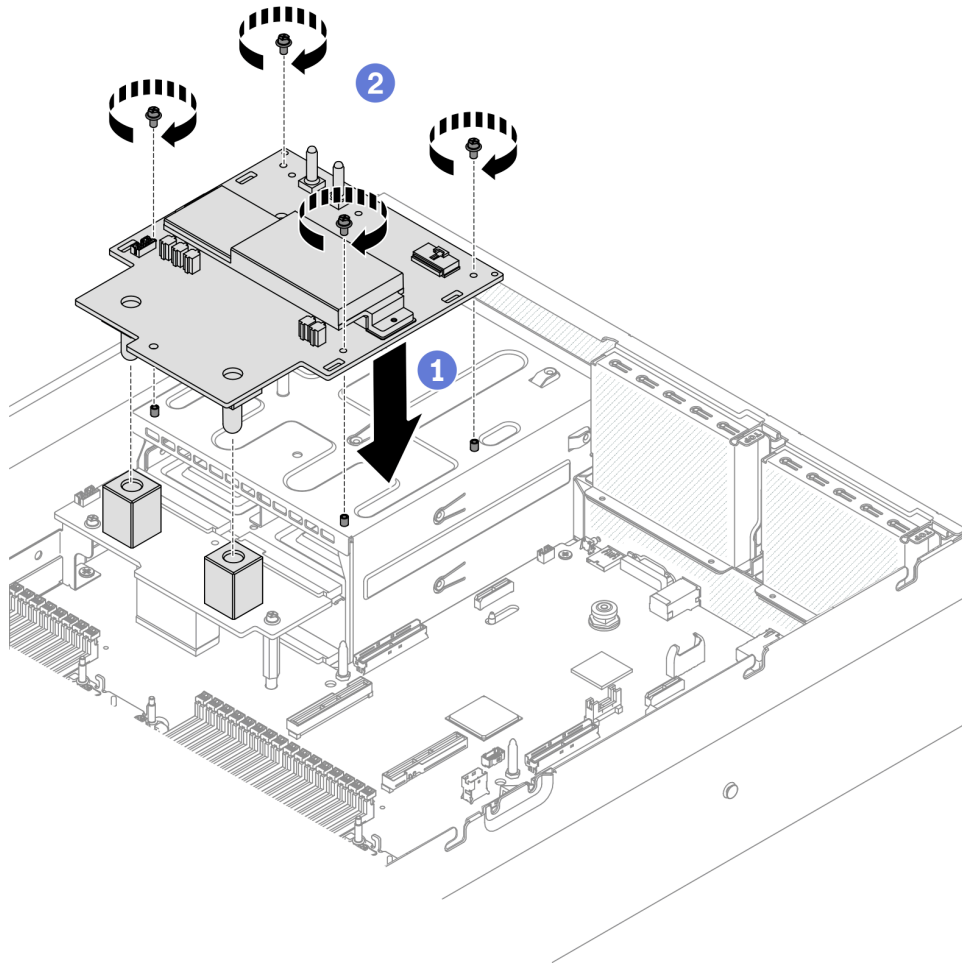
### Procedure

- Step 1. Make sure the power distribution board is installed in the chassis. See “[Install the power distribution board](#)” on page 226.
- Step 2. Install the SXM GPU power distribution board.
  - a. Align the SXM GPU power distribution board with guide slots in the two standoffs on the power distribution board; then, place the SXM GPU power distribution board on the PSU cage.
  - b. Fasten the four screws to secure the SXM GPU power distribution board to the PSU bays.

**Note:** Remove the screws with a torque screwdriver sets to the proper torque. For reference, the torque required for the screws to fully tighten/removal is  $0.6\pm 0.06$  newton-meter,  $5\pm 0.5$  pound-inch.

Torque screwdriver type list	Screw Type
PH 1 head screwdriver	Phillips #1 head screw

Figure 276. Installing the SXM GPU power distribution board



Step 3. Connect the side band cable to SXM GPU power distribution board and power distribution board.

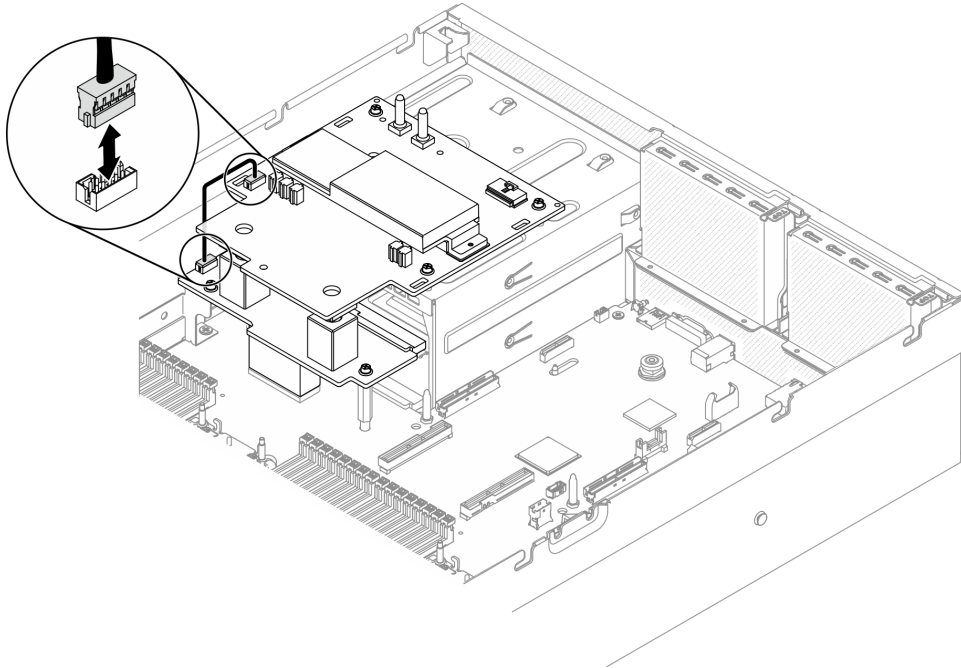
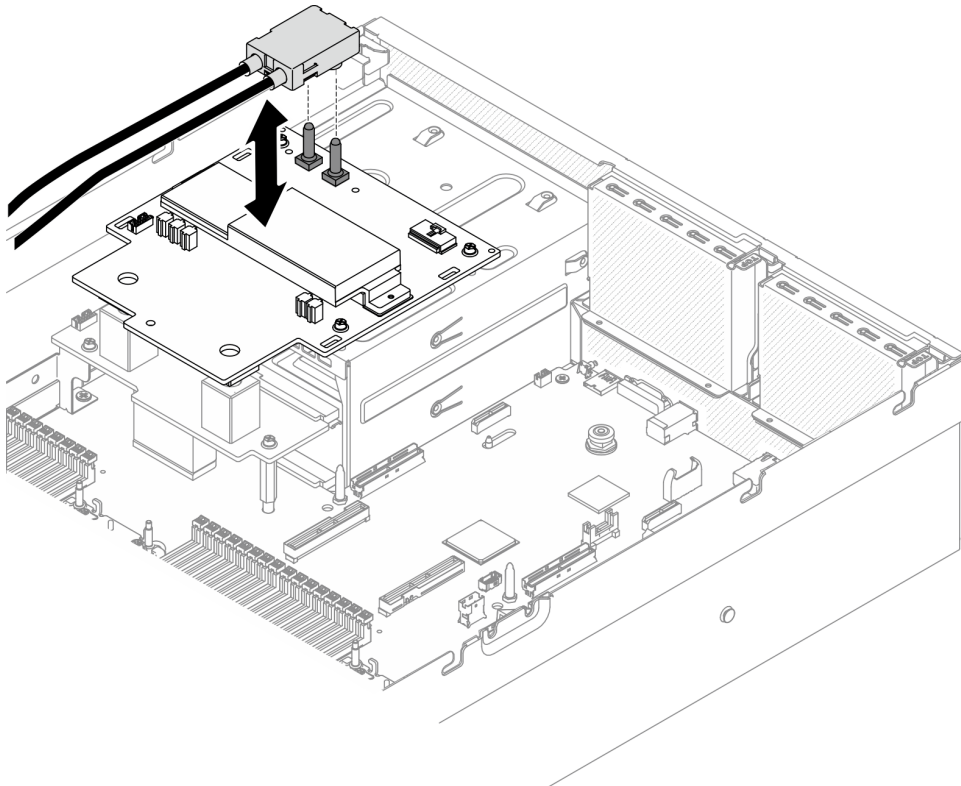


Figure 277. Connecting sideband cable

Step 4. Connect the SXM GPU board power cable to the SXM GPU power distribution board.

Figure 278. Connecting the SXM GPU board power cable



**After you finish**

1. Reinstall the 2.5-inch drive cage assembly. See [“Install the 2.5-inch drive cage assembly” on page 300](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 360](#).

## Demo video

[Watch the procedure on YouTube](#)

## Retimer assembly replacement

Follow instructions in this section to remove and install the retimer assembly.

### Remove the retimer assembly

Follow instructions in this section to remove the retimer assembly.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 14](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top cover, or remove the server from the rack. See [“Remove the server from rack” on page 152](#).

### Procedure

Step 1. Prepare your server.

- a. Remove the top cover. See [“Remove the top cover” on page 255](#).
- b. Remove the 2.5-inch drive cage assembly. See [“Remove the 2.5-inch drive cage assembly” on page 298](#).
- c. Remove the network adapters. See [“Remove a network adapter” on page 209](#).
- d. Remove the front I/O expansion board module. See [“Remove the front I/O expansion board module” on page 307](#).

Step 2. Remove the fan cage. See [“Remove the fan cage” on page 171](#).

Step 3. Remove the cross bar.

- a. ① Unfasten the four screws that secures the cross bar to the chassis.
- b. ② Lift the cross bar out of the chassis.

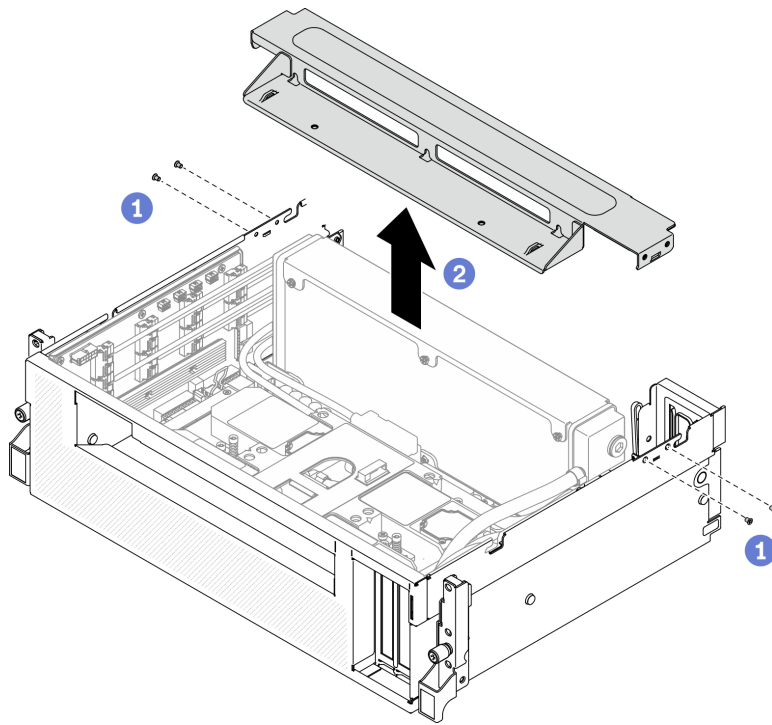
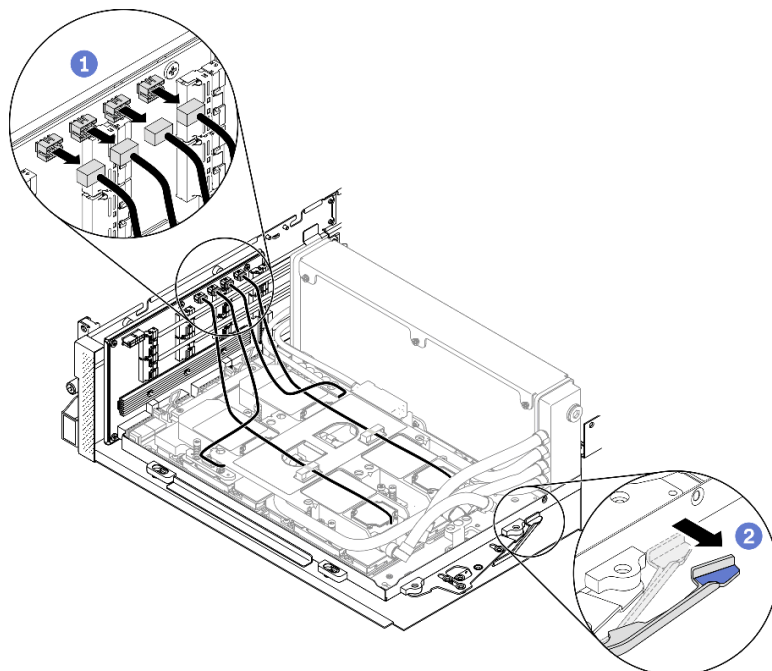


Figure 279. Removing the cross bar

- Step 4. Disengage the SXM GPU board from the retimer assembly.
- a. ① Disconnect the four cold plate assembly pump cables from the retimer assembly.
  - b. ② Pull the SXM GPU board latch outward until it stops to disconnect it from the retimer assembly.

Figure 280. Disengaging the SXM GPU board from the retimer assembly



Step 5. Disconnect the retimer cables from system board.

- a. ① Disconnect the eight retimer signal cables from the system board, and remove them from the cable clips.
- b. ② Disconnect the retimer power cable from the system board, and remove it from the cable clips.

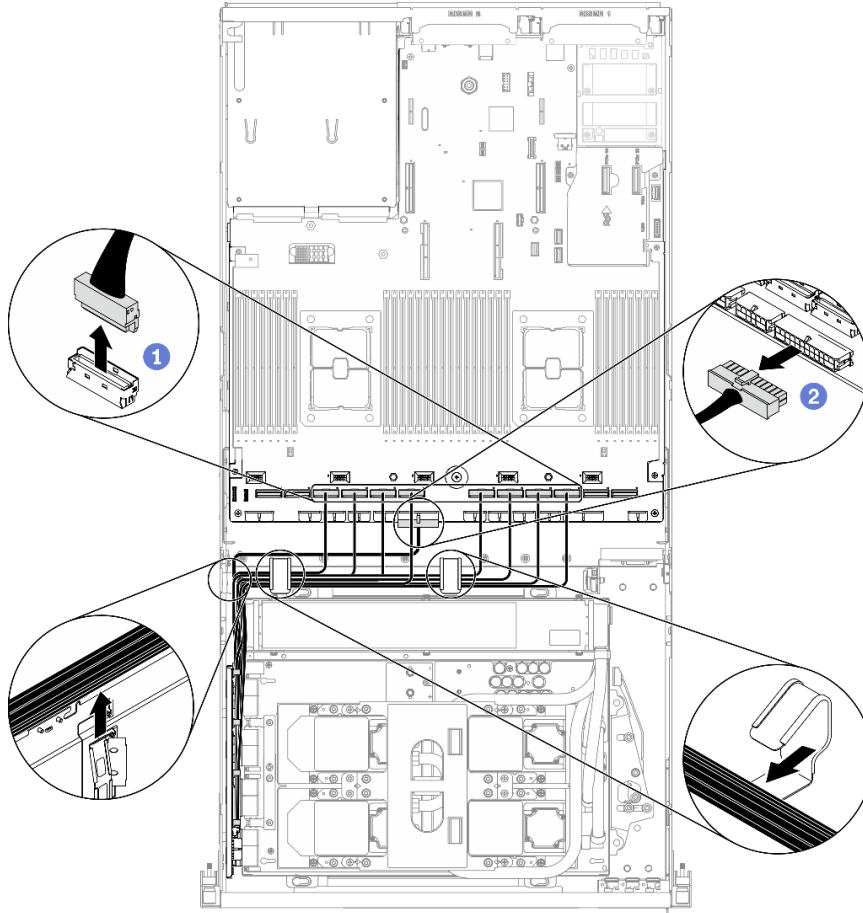
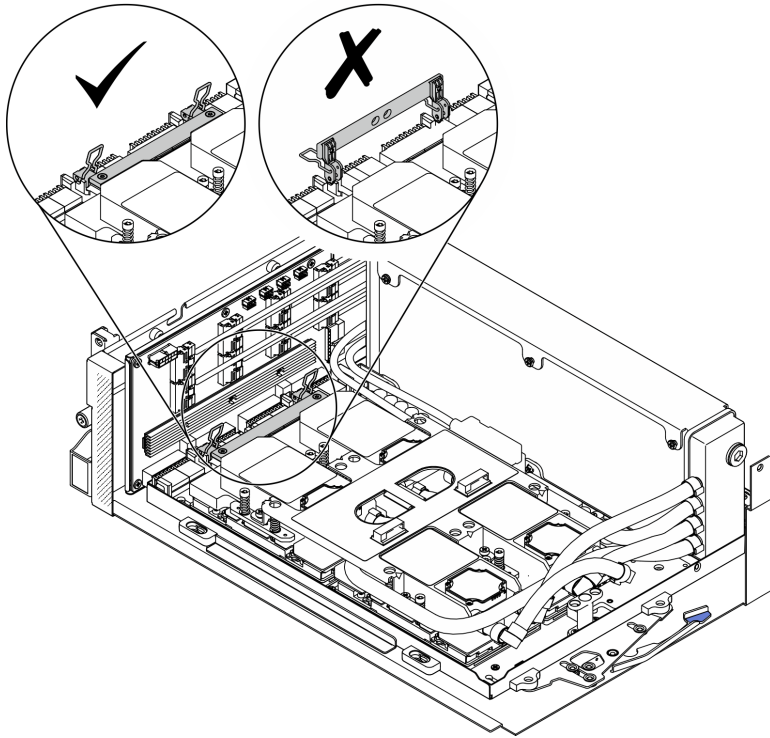


Figure 281. Disconnecting the retimer cables

Step 6. Rotate down the SXM GPU board handle and clips so that they are away from the retimer assembly.

Figure 282. Closing the GPU-L2A assembly clips and handle

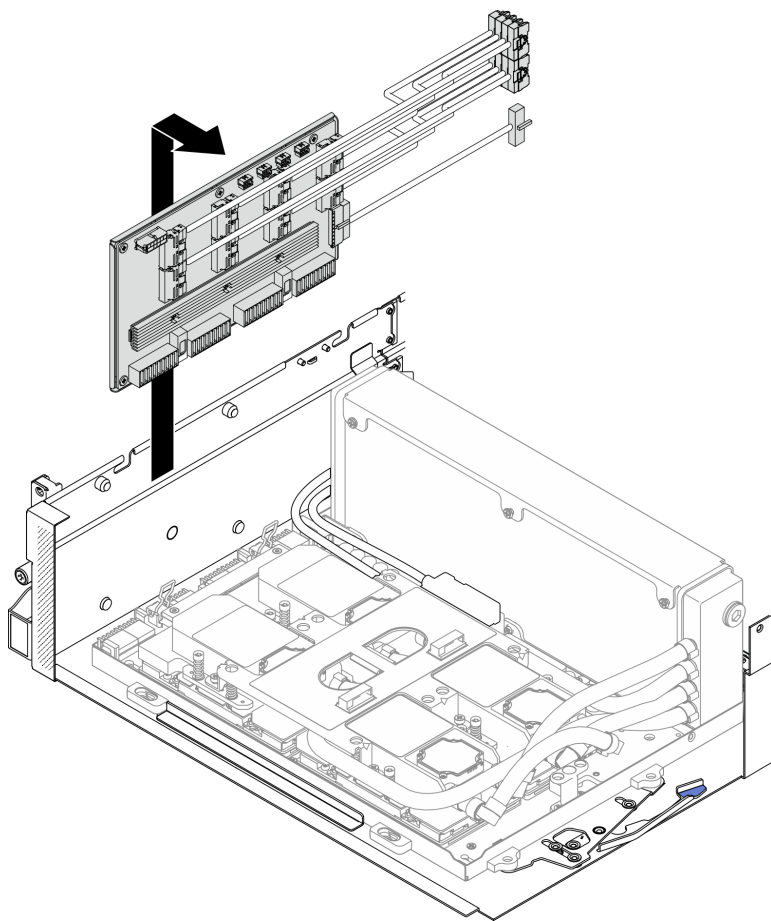




Step 7. Slide up the retimer assembly and remove it out of the chassis.

**Attention:** Keep the SXM GPU board clips and handle away from the retimer assembly to prevent damages to the retimer assembly.

*Figure 283. Removing the retimer assembly*



## After you finish

- Install a replacement unit. See [“Install the retimer assembly” on page 354](#).
- If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.
- If you plan to recycle the component, see [“Disassemble the retimer assembly for recycle” on page 399](#).

## Demo video

[Watch the procedure on YouTube](#)

## Install the retimer assembly

Follow instructions in this section to install the retimer assembly.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 149](#) and [“Safety inspection checklist” on page 150](#) to ensure that you work safely.
- Touch the static-protective package that contains the component to any unpainted metal surface on the server; then, remove it from the package and place it on a static-protective surface.

## Procedure

Step 1. Make sure the following components are installed in the chassis:

- SXM GPU board, see [“Install the SXM GPU board” on page 337](#).
- Lenovo Neptune™ liquid-to-air (L2A) hybrid cooling module, see [“Install the Lenovo Neptune \(TM\) liquid-to-air \(L2A\) hybrid cooling module” on page 320](#).

Step 2. Adjust the SXM GPU board.

- a. ① Pull out the SXM GPU board latch outward until it stops.
- b. ② Rotate down the clips and handle so that they are away from the retimer assembly guide pins.

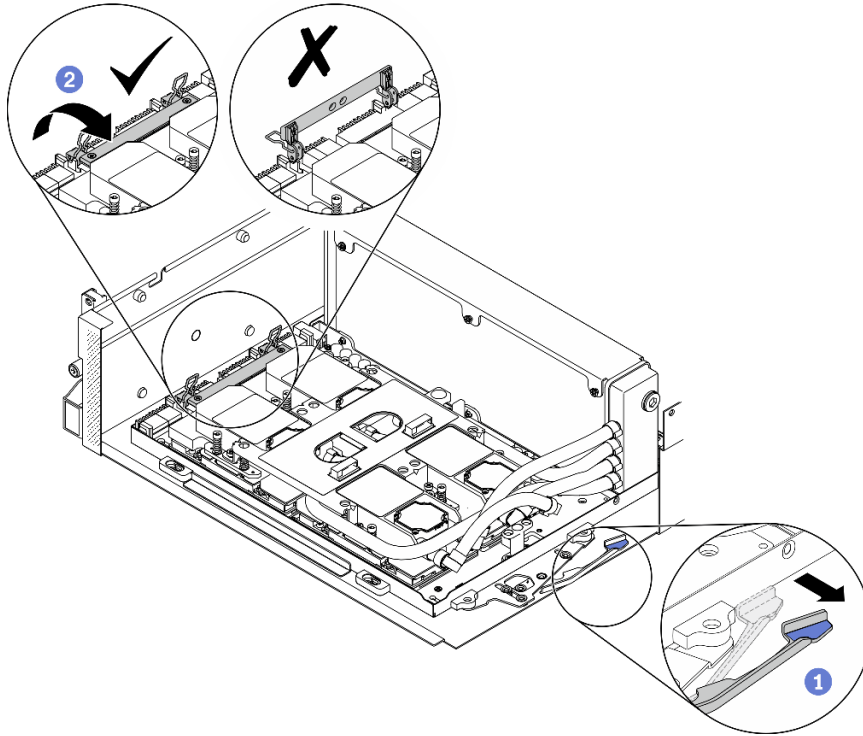


Figure 284. Adjusting the SXM GPU board

Step 3. Align the retimer assembly with the four guide pins; then, attach the retimer assembly to the chassis, and slide it down to secure it in place.

**Attention:** Keep the SXM GPU board clips and handle away from the retimer assembly to prevent damages to the retimer assembly.

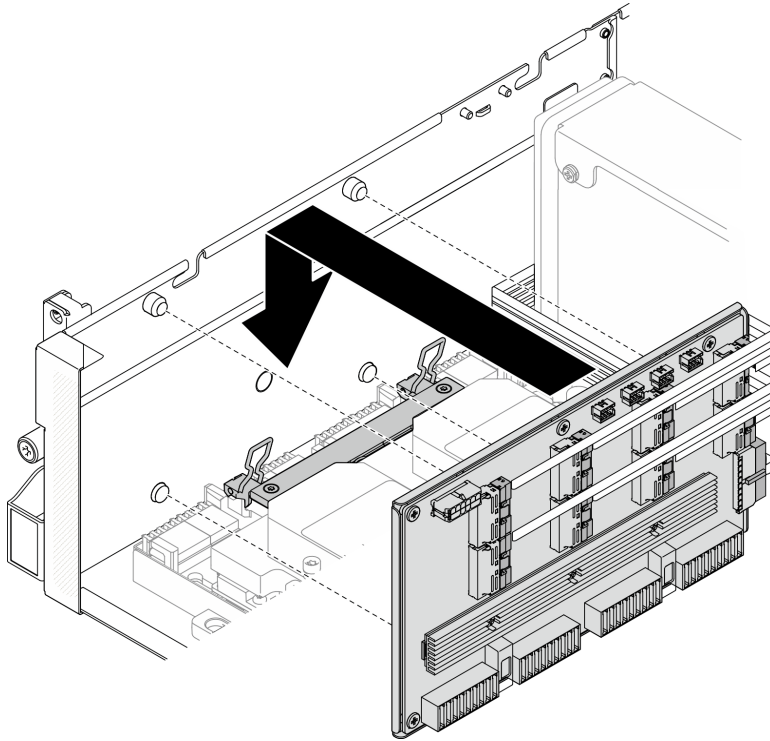


Figure 285. Installing the retimer assembly

Step 4. Pull the SXM GPU board latch inward to connect the SXM GPU board to the retimer assembly.

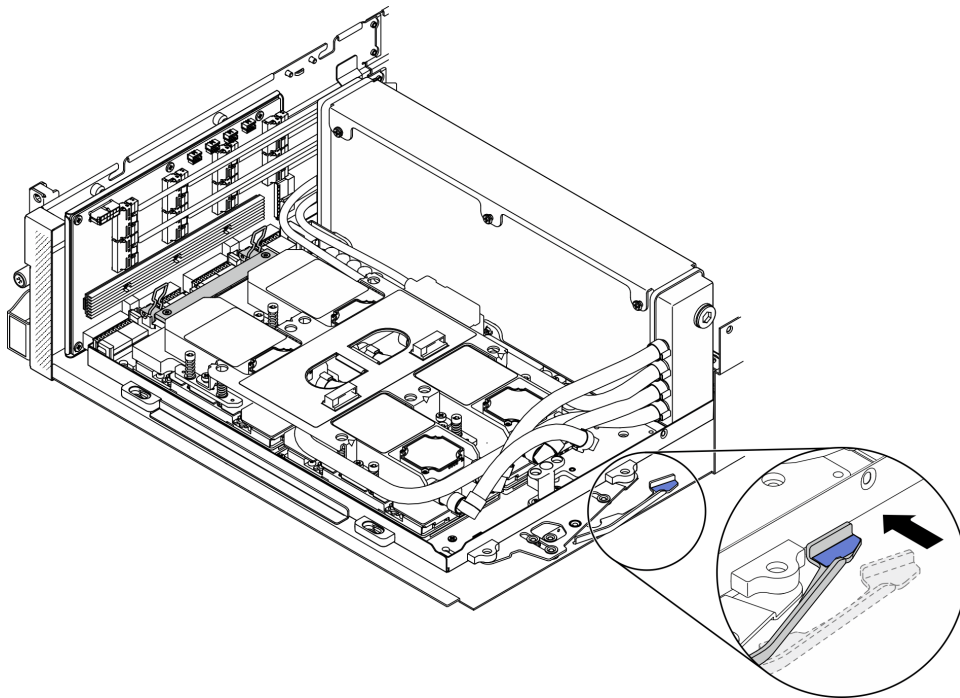


Figure 286. Connecting SXM GPU board to the retimer assembly

Step 5. Connect the four cold plate assembly pump cables to the retimer assembly.

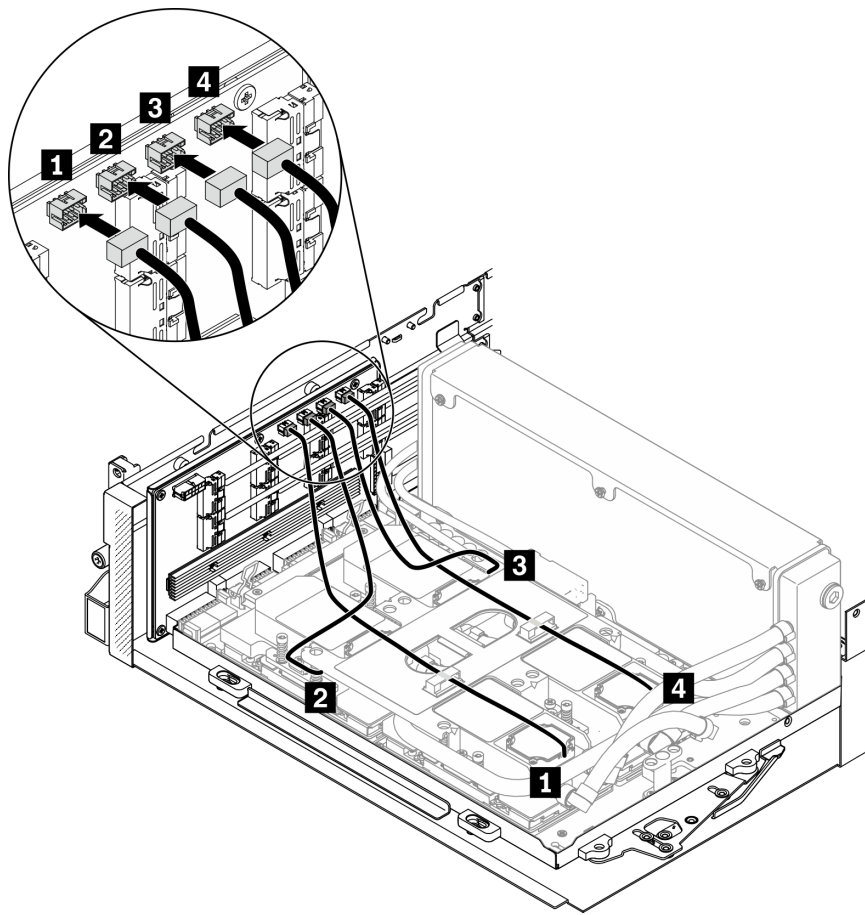


Figure 287. Connecting cold plate assembly pump cables to the retimer assembly

- Step 6. Route the retimer assembly power cable through the cable clips, and connect the power cable to the retimer assembly and the system board.

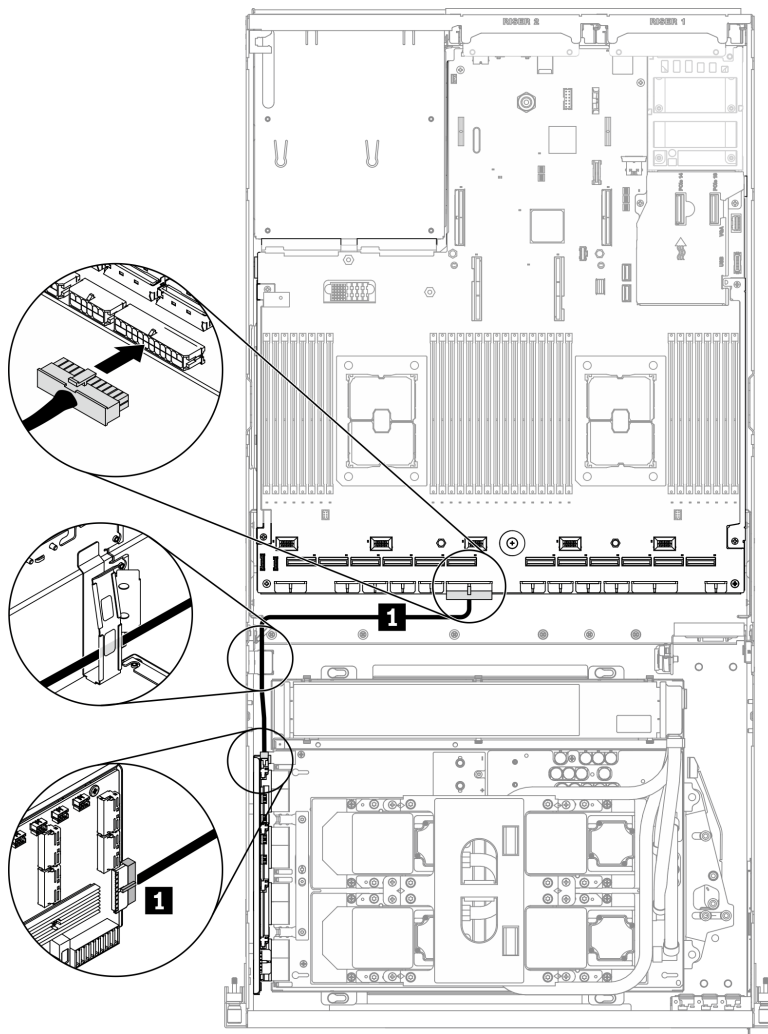


Figure 288. Connecting the retimer assembly power cable

<b>1</b> Retimer power cable			
From		To	
<b>Retimer</b>	Power connector	<b>System board</b>	PCIe adapter distribution board power 2 connector

For detailed information, see [“System-board connectors” on page 34](#).

- Step 7. Route the eight retimer assembly signal cables through the cable clips, and connect the signal cables to the retimer assembly and the system board.

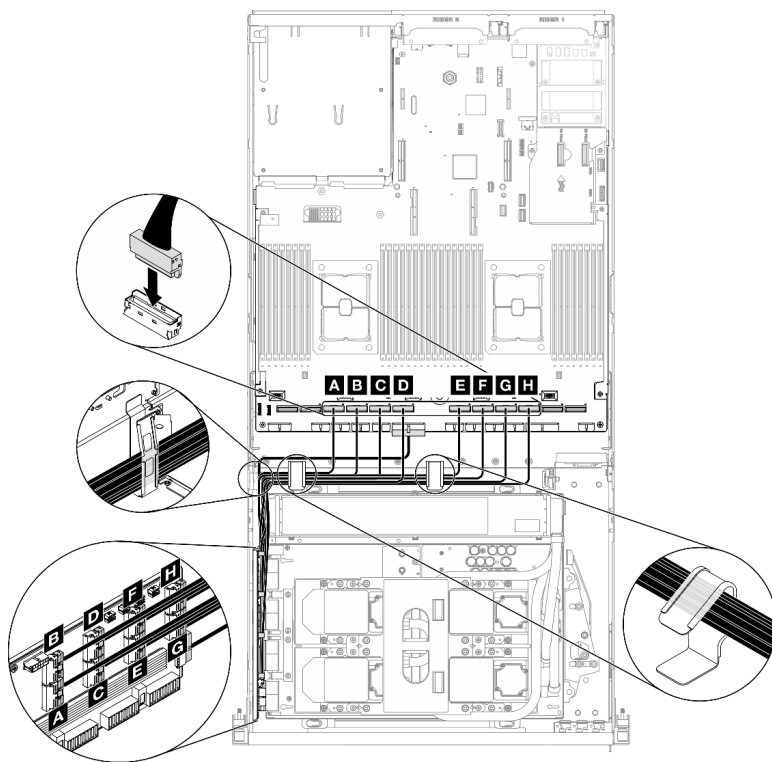


Figure 289. Connecting retimer assembly signal cables

From		To	
Retimer	MCIO connector <b>A</b>	System board	PCIe connector 10
	MCIO connector <b>B</b>		PCIe connector 9
	MCIO connector <b>C</b>		PCIe connector 8
	MCIO connector <b>D</b>		PCIe connector 7
	MCIO connector <b>E</b>		PCIe connector 6
	MCIO connector <b>F</b>		PCIe connector 5
	MCIO connector <b>G</b>		PCIe connector 4
	MCIO connector <b>H</b>		PCIe connector 3

For detailed information, see [“System-board connectors”](#) on page 34.

Step 8. Install the cross bar.

- a. ① Place the cross bar on top of the radiator.
- b. ② Fasten the four screws to secure the cross bar to the chassis.

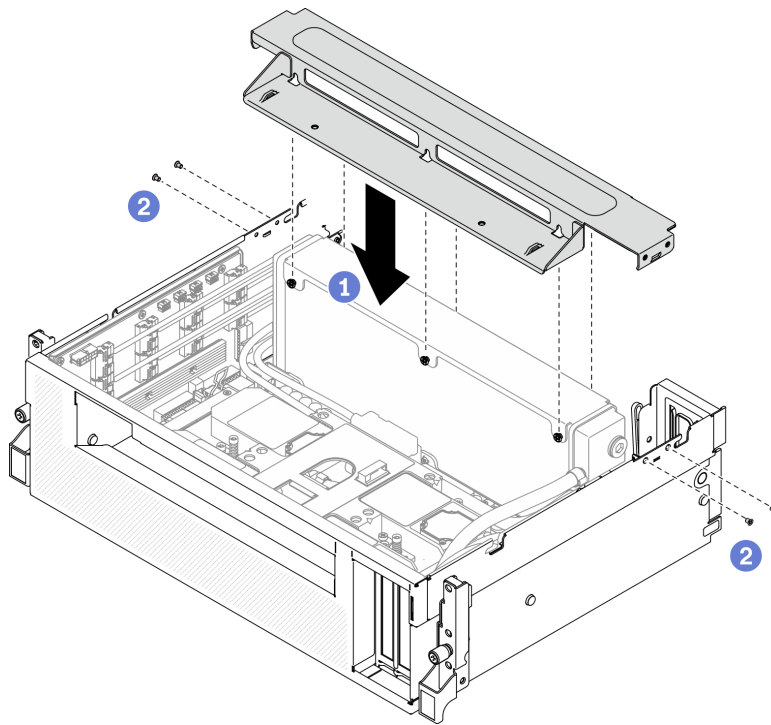


Figure 290. Installing the cross bar

## After you finish

1. Reinstall the fan cage. See [“Install the fan cage” on page 172.](#)
2. Reinstall the front I/O expansion board module. See [“Install the front I/O expansion board module” on page 308.](#)
3. Reinstall the network adapter. See [“Install a network adapter” on page 210.](#)
4. Reinstall the 2.5-inch drive cage assembly. See [“Install the 2.5-inch drive cage assembly” on page 300.](#)
5. Complete the parts replacement. See [“Complete the parts replacement” on page 360.](#)

## Demo video

[Watch the procedure on YouTube](#)

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## Complete the parts replacement

Go through the checklist to complete parts replacement

To complete the parts replacement, do the following:

1. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside your server.
2. Properly route and secure the cables in the server. Refer to the cable connecting and routing information for each component.
3. Reinstall the air baffle. See [“Install the air baffle” on page 163.](#)

**Attention:** For proper cooling and airflow, reinstall the air baffle before you turn on the server. Operating the server with the air baffle removed might damage server components.

4. Reinstall the top cover. See [“Install the top cover” on page 257.](#)



5. If the sever was installed in a rack, reinstall the server into the rack. See “[Install the server to rack](#)” on [page 155](#).
6. Reconnect the power cords and any cables that you removed.
7. Power on the server and any peripheral devices. See “[Power on the server](#)” on [page 14](#).
8. Update the server configuration.
  - Download and install the latest device drivers: <http://datacentersupport.lenovo.com>.
  - Update the system firmware. See “[Firmware updates](#)” on [page 10](#).
  - Update the UEFI configuration. See <https://pubs.lenovo.com/uefi-overview/>.
  - Reconfigure the disk arrays if you have installed or removed a hot-swap drive or a RAID adapter. See the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.



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## Chapter 5. Problem determination

Use the information in this section to isolate and resolve issues that you might encounter while using your server.

Lenovo servers can be configured to automatically notify Lenovo Support if certain events are generated. You can configure automatic notification, also known as Call Home, from management applications, such as the Lenovo XClarity Administrator. If you configure automatic problem notification, Lenovo Support is automatically alerted whenever a server encounters a potentially significant event.

To isolate a problem, you should typically begin with the event log of the application that is managing the server:

- If you are managing the server from the Lenovo XClarity Administrator, begin with the Lenovo XClarity Administrator event log.
- If you are using some other management application, begin with the Lenovo XClarity Controller event log.

---

### Event logs

An *alert* is a message or other indication that signals an event or an impending event. Alerts are generated by the Lenovo XClarity Controller or by UEFI in the servers. These alerts are stored in the Lenovo XClarity Controller Event Log. If the server is managed by the Chassis Management Module 2 or by the Lenovo XClarity Administrator, alerts are automatically forwarded to those management applications.

**Note:** For a listing of events, including user actions that might need to be performed to recover from an event, see the *Messages and Codes Reference*, which is available at:[https://thinksystem.lenovofiles.com/help/SR670V2/pdf\\_files.html](https://thinksystem.lenovofiles.com/help/SR670V2/pdf_files.html)

#### Lenovo XClarity Administrator event log

If you are using Lenovo XClarity Administrator to manage server, network, and storage hardware, you can view the events from all managed devices through the XClarity Administrator.

## Logs

The Event log provides a history of hardware and management conditions that have been detected.

Show: [Error] [Warning] [Info]

All Event Sources [Filter]

All Dates

Severity	Serviceability	Date and Time	System	Event	System Type	Source ID
Warning	Support	Jan 30, 2017, 7:48:07 AM	Chassis114:...	Node Node 08 device	Chassis	Jan 30, 20
Warning	Support	Jan 30, 2017, 7:48:07 AM	Chassis114:...	Node Node 02 device	Chassis	Jan 30, 20
Warning	User	Jan 30, 2017, 7:48:07 AM	Chassis114:...	I/O module IO Module	Chassis	Jan 30, 20
Warning	User	Jan 30, 2017, 7:48:07 AM	Chassis114:...	Node Node 08 incom	Chassis	Jan 30, 20

Figure 291. Lenovo XClarity Administrator event log

For more information about working with events from XClarity Administrator, see:

[http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/events\\_vieweventlog.html](http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/events_vieweventlog.html)

### Lenovo XClarity Controller event log

The Lenovo XClarity Controller monitors the physical state of the server and its components using sensors that measure internal physical variables such as temperature, power-supply voltages, fan speeds, and component status. The Lenovo XClarity Controller provides various interfaces to systems management software and to system administrators and users to enable remote management and control of a server.

The Lenovo XClarity Controller monitors all components of the server and posts events in the Lenovo XClarity Controller event log.

The Event log provides a history of hardware and management conditions that have been detected.

Type: [Error] [Warning] [Info]

All Source All Date

Severity	Source	Event ID	Message	Date
Error	System	0X4000000E00000000	Remote login successful. Login ID: userid from webguis at IP address: 10.104.194.180.	27 Jul 2015, 08:11:04 AM
Warning	System	0X4000000E00000000	Remote login successful. Login ID: userid from webguis at IP address: 10.104.194.180.	27 Jul 2015, 08:11:04 AM
Info	System	0X4000000E00000000	Remote login successful. Login ID: userid from webguis at IP address: 10.104.194.180.	27 Jul 2015, 08:11:04 AM
Info	System	0X4000000E00000000	Remote login successful. Login ID: userid from webguis at IP address: 10.104.194.180.	27 Jul 2015, 08:11:04 AM

Figure 292. Lenovo XClarity Controller event log

For more information about accessing the Lenovo XClarity Controller event log, see:

“Viewing Event Logs” section in the XCC documentation compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>

## Light Path Diagnostics

Light Path Diagnostics is a system of LEDs on various external and internal components of the server that leads you to the failed component. When an error occurs, LEDs are lit on the front operator panel on the front of the server, then on the failed component. By viewing the LEDs in a particular order, you can often identify the source of the error.

### Front panel

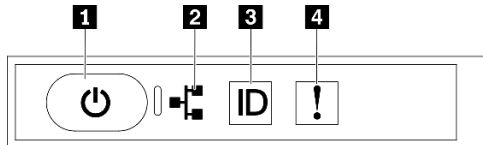


Figure 293. Front panel

Table 27. Components on the front panel

<b>1</b> Power button with power status LED (green)	<b>3</b> System ID button with system ID LED (blue)
<b>2</b> Network activity LED (green)	<b>4</b> System Error LED (yellow)

#### **1** Power button with power status LED (green)

You can press the power button to power on the server when you finish setting up the server. You also can hold the power button for several seconds to power off the server if you cannot shut down the server from the operating system. The states of the power LED are as follows:

Status	Color	Description
Off	None	No power supply is properly installed, or the LED itself has failed.
Flashing rapidly (four times per second)	Green	The server is turned off and is not ready to be turned on. The power button is disabled. This will last approximately 5 to 10 seconds.
Flashing slowly (once per second)	Green	The server is turned off and is ready to be turned on. You can press the power button to turn on the server.
Lit	Green	The server is turned on.

#### **2** Network activity LED (green)

The network activity LED on the front panel helps you identify the network connectivity and activity.

Status	Color	Description
On	Green	The server is connected to a network.
Blinking	Green	The network is connected and active.
Off	None	The server is disconnected from the network.

#### **3** System ID button with system ID LED (blue)

Use this system ID button and the blue system ID LED to visually locate the server. Each time you press the system ID button, the state of the system ID LEDs changes. The LEDs can be changed to on, blinking, or off.

You can also use the Lenovo XClarity Controller or a remote management program to change the state of the system ID LEDs to assist in visually locating the server among other servers.

#### **4 System Error LED (yellow)**

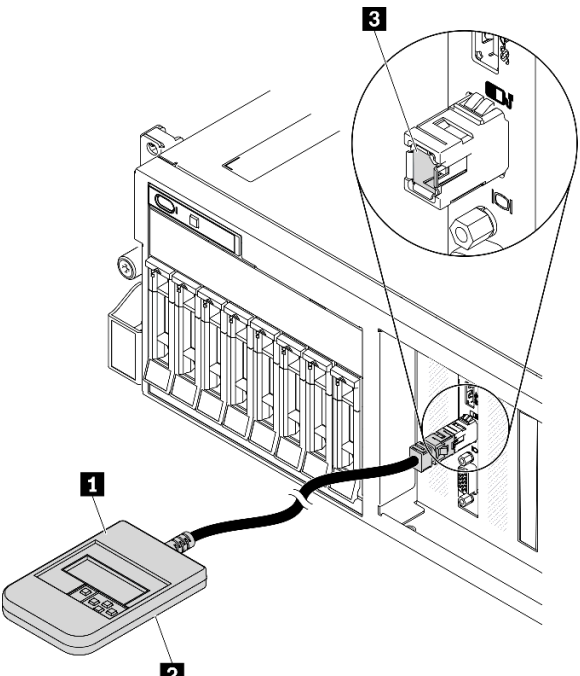
The system error LED helps you to determine if there are any system errors.

<b>Status</b>	<b>Color</b>	<b>Description</b>	<b>Action</b>
On	Yellow	An error has been detected on the server. Causes might include one or more of the following errors: <ul style="list-style-type: none"><li>• The temperature of the server reached the non-critical temperature threshold.</li><li>• The voltage of the server reached the non-critical voltage threshold.</li><li>• A fan has been detected to be running at low speed.</li><li>• The power supply has a critical error.</li><li>• The power supply is not connected to the power.</li></ul>	Check the Event log to determine the exact cause of the error.
Off	None	The server is off or the server is on and is working correctly.	None.

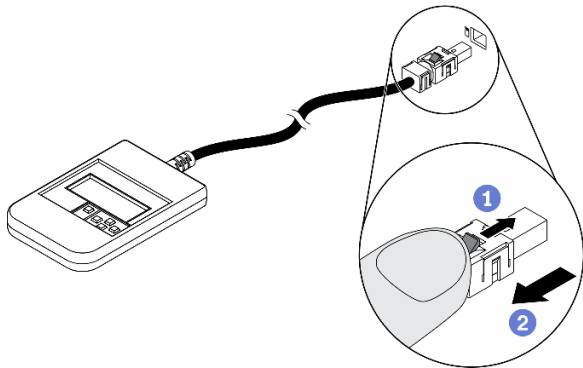
### **External LCD diagnostics handset**

The external LCD diagnostics handset is an external device that is connected to the server with a cable, and it allows quick access to system information such as errors, system status, firmware, network, and health information.

## Location of the external LCD diagnostics handset

Location	Callouts
<p>The external LCD diagnostics handset is connected to the server with an external cable.</p> 	<p><b>1</b> External LCD diagnostics handset</p> <p><b>2</b> Magnetic bottom With this component, the diagnostic handset can be attached to the top or side of the rack with hands spared for service tasks.</p> <p><b>3</b> External diagnostics connector This connector is located on the front of the server, and is used to connect an external LCD diagnostics handset.</p>

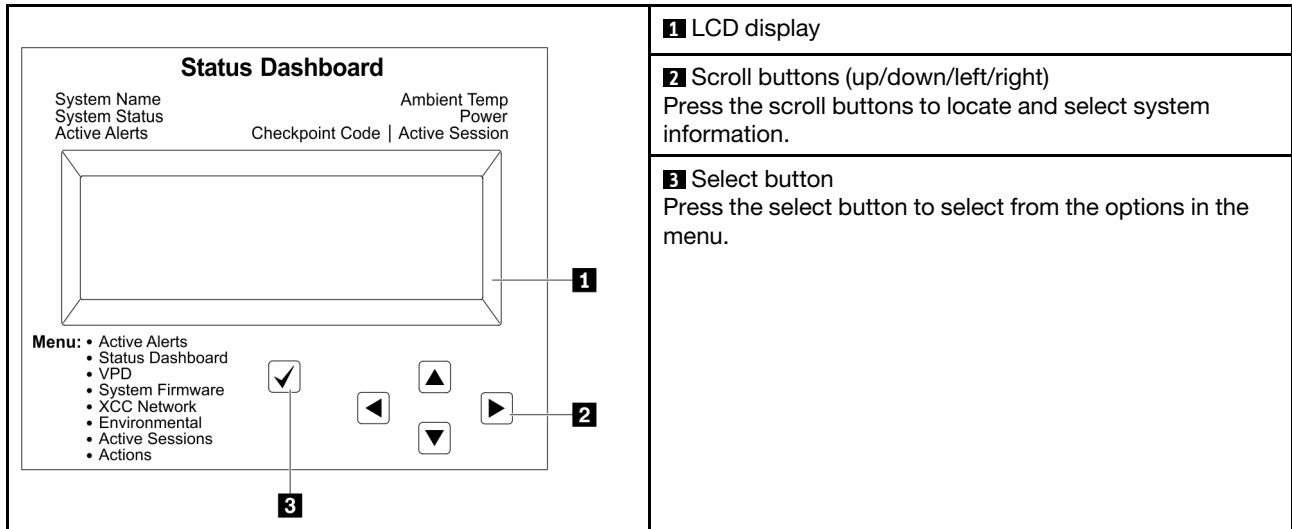
**Note:** When unplugging the external handset, see the following instructions:



- 1** Press the plastic clip on the plug forward.
- 2** Hold the clip and remove the cable from the connector.

## Display panel overview

The diagnostics device consists of an LCD display and 5 navigation buttons.

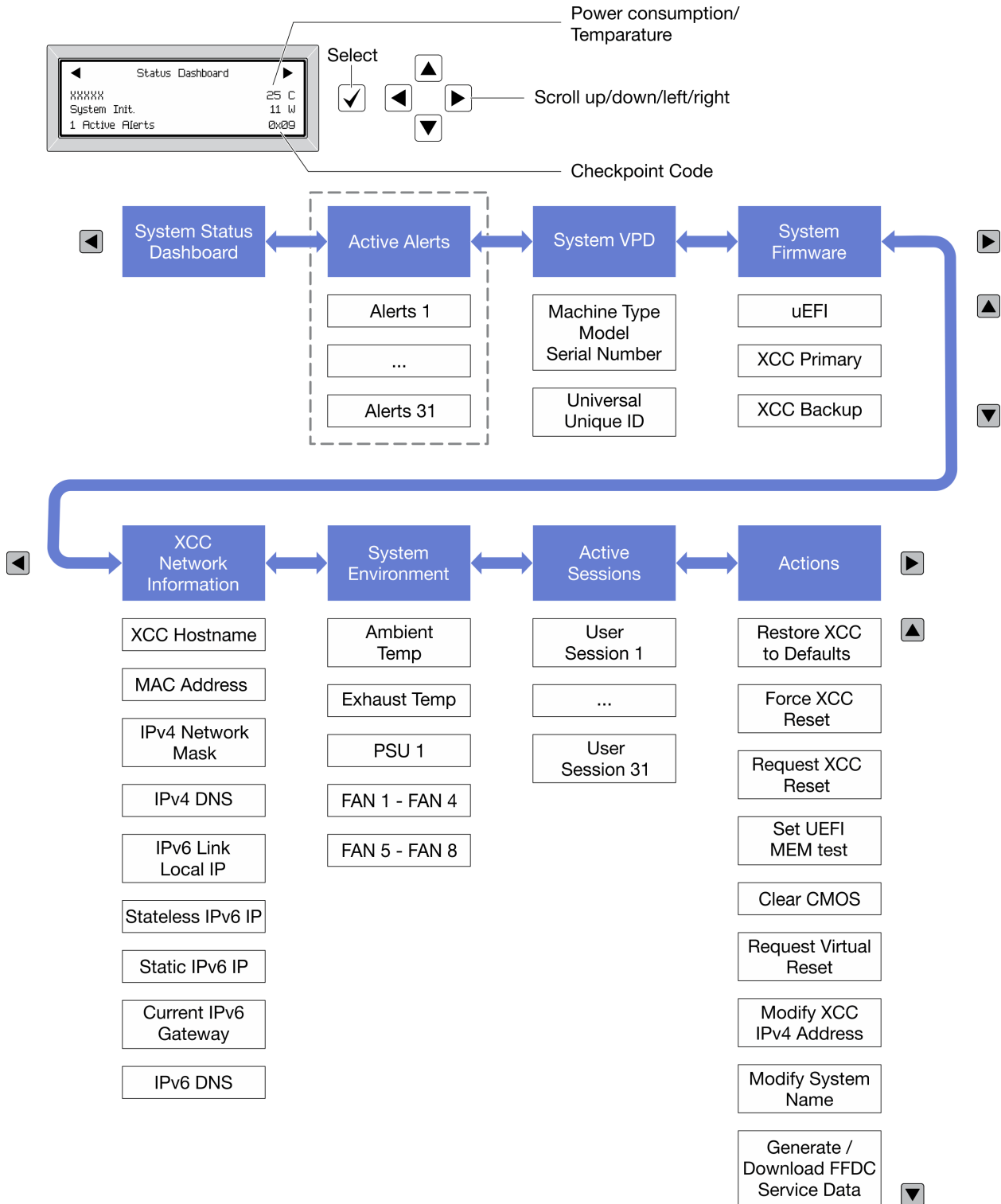




## Option flow diagram

The LCD panel displays various system information. Navigate through the options with the scroll keys.

Depending on the model, the options and entries on the LCD display might be different.



## Full menu list

Following is the list of available options. Switch between an option and the subordinate information entries with the select button, and switch among options or information entries with the scroll buttons.

Depending on the model, the options and entries on the LCD display might be different.

## Home Menu (System Status Dashboard)

Home Menu	Example
<ul style="list-style-type: none"> <li>1 System name</li> <li>2 System status</li> <li>3 Active alert quantity</li> <li>4 Temperature</li> <li>5 Power consumption</li> <li>6 Checkpoint code</li> </ul>	<p>The screenshot shows a 'Status Dashboard' screen with the following items: 'xxxxxx' (1), 'System Init.' (2), '1 Active Alerts' (3), '25 C' (4), '11 W' (5), and '0x09' (6). Navigation arrows are visible at the top.</p>

## Active Alerts

Sub Menu	Example
Home screen: Active error quantity <b>Note:</b> The “Active Alerts” menu displays only the quantity of active errors. If no errors occur, the “Active Alerts” menu will not be available during navigation.	1 Active Alerts
Details screen: <ul style="list-style-type: none"> <li>• Error message ID (Type: Error/Warning/Information)</li> <li>• Occurrence time</li> <li>• Possible sources of the error</li> </ul>	Active Alerts: 1 Press ▼ to view alert details FQXSPPU009N(Error) 04/07/2020 02:37:39 PM CPU 1 Status: Configuration Error

## System VPD Information

Sub Menu	Example
<ul style="list-style-type: none"> <li>• Machine type and serial number</li> <li>• Universal Unique ID (UUID)</li> </ul>	Machine Type: xxxx Serial Num: xxxxxx Universal Unique ID: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

## System Firmware

Sub Menu	Example
UEFI <ul style="list-style-type: none"> <li>Firmware level (status)</li> <li>Build ID</li> <li>Version number</li> <li>Release date</li> </ul>	UEFI (Inactive) Build: DOE101P Version: 1.00 Date: 2019-12-26
XCC Primary <ul style="list-style-type: none"> <li>Firmware level (status)</li> <li>Build ID</li> <li>Version number</li> <li>Release date</li> </ul>	XCC Primary (Active) Build: DVI399T Version: 4.07 Date: 2020-04-07
XCC Backup <ul style="list-style-type: none"> <li>Firmware level (status)</li> <li>Build ID</li> <li>Version number</li> <li>Release date</li> </ul>	XCC Backup (Active) Build: D8BT05I Version: 1.00 Date: 2019-12-30

## XCC Network Information

Sub Menu	Example
<ul style="list-style-type: none"> <li>XCC hostname</li> <li>MAC address</li> <li>IPv4 Network Mask</li> <li>IPv4 DNS</li> <li>IPv6 Link Local IP</li> <li>Stateless IPv6 IP</li> <li>Static IPv6 IP</li> <li>Current IPv6 Gateway</li> <li>IPv6 DNS</li> </ul> <p><b>Note:</b> Only the MAC address that is currently in use is displayed (extension or shared).</p>	XCC Network Information XCC Hostname: XCC-xxxx-SN MAC Address: xx:xx:xx:xx:xx:xx IPv4 IP: xx.xx.xx.xx IPv4 Network Mask: x.x.x.x IPv4 Default Gateway: x.x.x.x

## System Environmental Information

Sub Menu	Example
<ul style="list-style-type: none"><li>• Ambient temperature</li><li>• Exhaust temperature</li><li>• PSU status</li><li>• Spinning speed of fans by RPM</li></ul>	Ambient Temp: 24 C Exhaust Temp: 30 C PSU1: Vin= 213 w Inlet= 26 C FAN1 Front: 21000 RPM FAN2 Front: 21000 RPM FAN3 Front: 21000 RPM FAN4 Front: 21000 RPM

## Active Sessions

Sub Menu	Example
Quantity of active sessions	Active User Sessions: 1

## Actions

Sub Menu	Example
Several quick actions are available: <ul style="list-style-type: none"><li>• Restore XCC to Defaults</li><li>• Force XCC Reset</li><li>• Request XCC Reset</li><li>• Set UEFI Memory Test</li><li>• Clear CMOS</li><li>• Request Virtual Reseat</li><li>• Modify XCC Static IPv4 Address/Net mask/Gateway</li><li>• Modify System Name</li><li>• Generate/Download FFDC Service Data</li></ul>	Request XCC Reset? This will request the BMC to reboot itself. Hold $\checkmark$ for 3 seconds

## Power supply LEDs

This topic provides information about various power supply LED status and corresponding action suggestions.

The following minimum configuration is required for the server to start:

- Two processors in socket 1 and 2
- Two DRAM memory modules in slots 14 and 30
- Two power supplies in bay 1 and 2
- One boot drive, M.2, 2.5-inch, 3.5-inch, or EDSFF drive, and RAID adapter if configured. (If OS is needed by debugging)
- Five system fans

The following table describes the problems that are indicated by various combinations of the power-supply LEDs and the power-on LED on the front operator panel and suggested actions to correct the detected problems.

Each hot-swap power supply has three status LEDs:

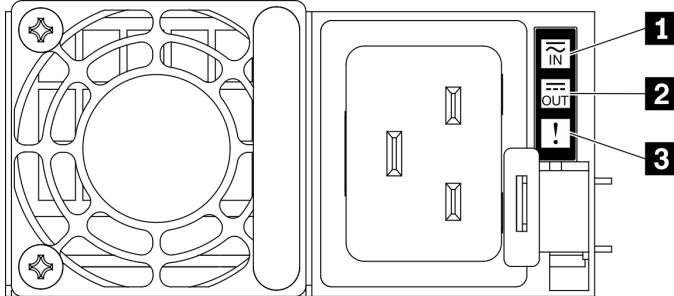


Figure 294. 2400W/2600W power supply LEDs

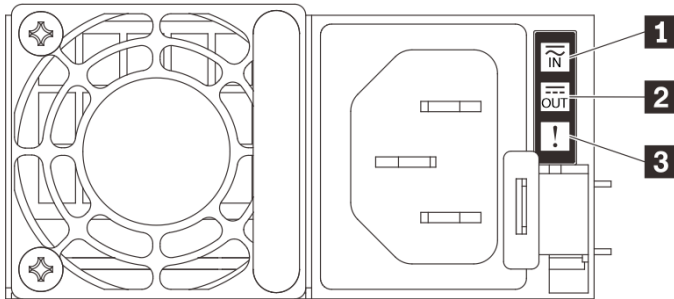


Figure 295. 1800W power supply LEDs

LED	Description
<b>1</b> Input status	The input status LED can be in one of the following states: <ul style="list-style-type: none"> <li>Off: The power supply is disconnected from the ac power source.</li> <li>Green: The power supply is connected to the ac power source.</li> </ul>
<b>2</b> Output status	The output status LED can be in one of the following states: <ul style="list-style-type: none"> <li>Off: The server is powered off, or the power supply is not working properly. If the server is powered on but the output status LED is off, replace the power supply.</li> <li>Slow blinking green (about one flash every two seconds): The power supply is in cold redundancy active mode.</li> <li>Fast blinking green (about 2 flashes each second): The power supply is in cold redundancy sleep mode.</li> <li>Green: The server is on and the power supply is working normally.</li> </ul>
<b>3</b> Fault LED	<ul style="list-style-type: none"> <li>Off: The power supply is working normally</li> <li>Amber: The power supply has failed. To resolve the issue, replace the power supply.</li> </ul>

## System-board LEDs

The following illustrations show the light-emitting diodes (LEDs) on the system board.

Press the power button to light the LEDs on the system board when the power source has been removed from the server.

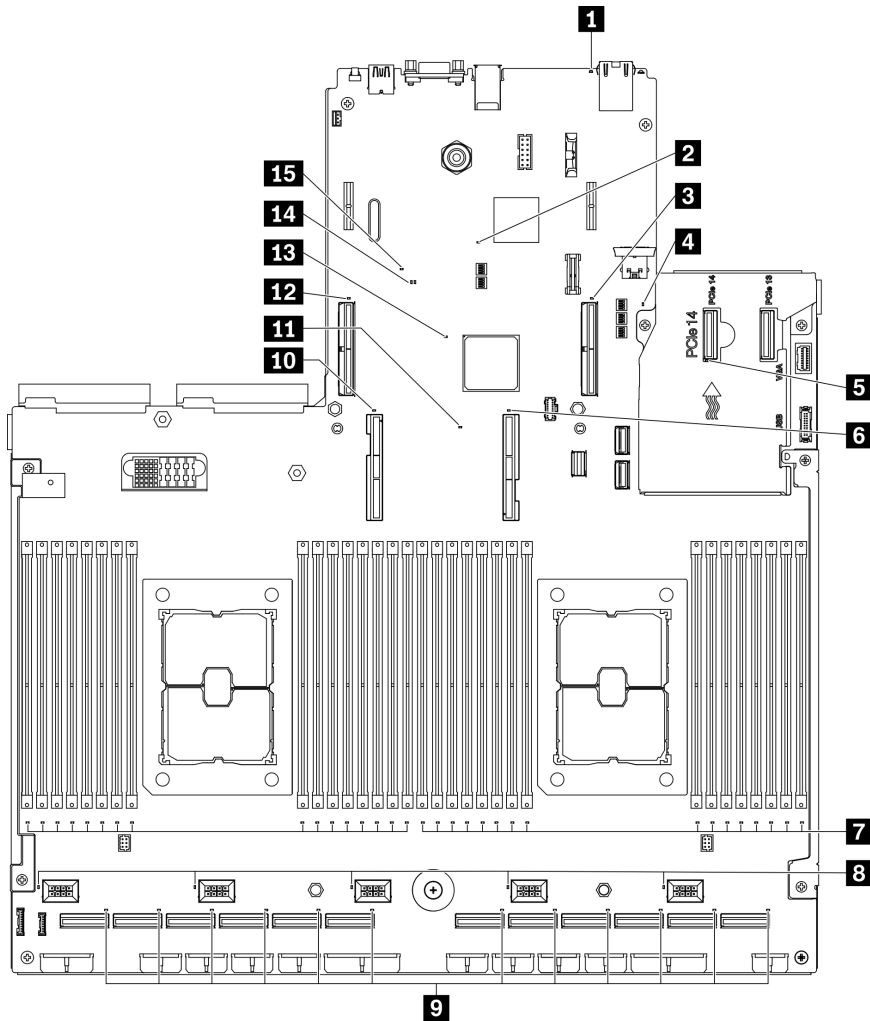


Figure 296. System-board LEDs

Table 28. System board LEDs description and actions

LED	Description and actions
<p><b>1</b> System error LED (yellow)</p>	<p>LED on: an error has occurred. Complete the following steps:</p> <ul style="list-style-type: none"> <li>• Check the identification LED and check log LED and follow the instructions.</li> <li>• Check the Lenovo XClarity Controller event log and the system error log for information about the error.</li> <li>• Save the log if necessary, and clear the log afterwards.</li> </ul>
<p><b>2</b> XCC heartbeat LED (green)</p>	<p>This LED indicates XCC heartbeat and boot process:</p> <ul style="list-style-type: none"> <li>• LED blinking fast: XCC code is in the loading process.</li> <li>• LED going off momentarily: XCC code has loaded completely.</li> <li>• LED going off momentarily and then starts blinking slowing: XCC is fully operational. You can now press the power-control button to power on the server.</li> </ul>

Table 28. System board LEDs description and actions (continued)

LED	Description and actions
<b>3</b> PCIe slot 15 error LED	<p>LED on: an error has occurred to the PCIe slot the LED represents. Complete the following steps:</p> <ol style="list-style-type: none"> <li>1. Make sure the cable is connected to the appropriate downstream PCIe riser, drive backplane, or OCP adapter.</li> <li>2. Make sure both ends of the cable are securely seated in the PCIe slots.</li> <li>3. Replace the cable.</li> <li>4. (Trained technician only) replace the system board. See <a href="#">“System board replacement (trained technician only)”</a> on page 244.</li> </ol>
<b>4</b> UEFI ROM heartbeat LED (green)	<p>This LED indicated the UEFI ROM status:</p> <ul style="list-style-type: none"> <li>• LED blinking: the UEFI ROM is in normal operation.</li> <li>• LED off: the UEFI ROM is not loaded or in recovery.</li> </ul>
<b>5</b> OCP error LED	<p>LED on: an error has occurred to the OCP slot the LED represents. Complete the following steps:</p> <ul style="list-style-type: none"> <li>• Make sure the PCIe cable is connected to the appropriate downstream PCIe slot 15-16 or PCIe connector 1-12.</li> <li>• Make sure both ends of the cable are securely seated in the PCIe slots.</li> <li>• Replace the cable.</li> <li>• (Trained technician only) replace the system board. See <a href="#">“System board replacement (trained technician only)”</a> on page 244.</li> </ul>
<b>6</b> Processor 1 error LED	LED on: an error has occurred to the processor the LED represents.
<b>7</b> DIMM 1-32 error LED (amber)	LED on: an error has occurred to the DIMM the LED represents.
<b>8</b> Fan 1-5 error LED	LED on: an error has occurred to the fan the LED represents.
<b>9</b> PCIe connector 1-12 error LED	<p>LED on: an error has occurred to the PCIe connector the LED represents. Complete the following steps:</p> <ol style="list-style-type: none"> <li>1. Make sure the cable is connected to the appropriate downstream PCIe riser, drive backplane, or OCP adapter.</li> <li>2. Make sure both ends of the cable are securely seated in the PCIe slots.</li> <li>3. Replace the cable.</li> <li>4. (Trained technician only) replace the system board. See <a href="#">“System board replacement (trained technician only)”</a> on page 244.</li> </ol>
<b>10</b> Processor 2 error LED	LED on: An error has occurred to the processor the LED represents.
<b>11</b> Lightpath power LED	This LED indicates if there is sufficient power to lit the LEDs when light path button is pressed while the system is not connected to the power.

Table 28. System board LEDs description and actions (continued)

LED	Description and actions
<b>12</b> PCIe slot 16 error LED	LED on: an error has occurred to the PCIe slot the LED represents. Complete the following steps: <ol style="list-style-type: none"> <li>1. Make sure the cable is connected to the appropriate downstream PCIe riser, drive backplane, or OCP adapter.</li> <li>2. Make sure both ends of the cable are securely seated in the PCIe slots.</li> <li>3. Replace the cable.</li> <li>4. (Trained technician only) replace the system board. See <a href="#">“System board replacement (trained technician only)”</a> on page 244.</li> </ol>
<b>13</b> FPGA heartbeat error LED (green)	This LED indicates power-on and power-off sequencing. <ul style="list-style-type: none"> <li>• LED blinking: the system is functioning properly, and no action is necessary.</li> <li>• LED not blinking: (trained technician only) replace the system board. See <a href="#">“System board replacement (trained technician only)”</a> on page 244.</li> </ul>
<b>14</b> UEFI valid LED	The LED indicates the UEFI flash content verification result. <ul style="list-style-type: none"> <li>• LED on: UEFI flash contents verification passed.</li> <li>• LED off: UEFI flash contents verification failed.</li> </ul>
<b>15</b> PFR error LED	The LED indicated the PFR (Platform Firmware Resilience) error. <ul style="list-style-type: none"> <li>• LED off: PFR/XCC/UEFI verification passed.</li> <li>• LED on: one or more PFR/XCC/UEFI content verification failed, and is unable to recover. (Trained technician only) replace the system board. See <a href="#">“System board replacement (trained technician only)”</a> on page 244.</li> </ul>

## General problem determination procedures

Use the information in this section to resolve problems if the event log does not contain specific errors or the server is inoperative.

If you are not sure about the cause of a problem and the power supplies are working correctly, complete the following steps to attempt to resolve the problem:

1. Power off the server.
2. Make sure that the server is cabled correctly.
3. Remove or disconnect the following devices if applicable, one at a time, until you find the failure. Power on and configure the server each time you remove or disconnect a device.
  - Any external devices.
  - Surge-suppressor device (on the server).
  - Printer, mouse, and non-Lenovo devices.
  - Each adapter.
  - Hard disk drives.
  - Memory modules until you reach the minimum configuration that is supported for the server.

See [“Specifications”](#) on page 1 to determine the minimum configuration for your server.

4. Power on the server.



If the problem is solved when you remove an adapter from the server, but the problem recurs when you install the same adapter again, suspect the adapter. If the problem recurs when you replace the adapter with a different one, try a different PCIe slot.

If the problem appears to be a networking problem and the server passes all system tests, suspect a network cabling problem that is external to the server.

## Resolving suspected power problems

Power problems can be difficult to solve. For example, a short circuit can exist anywhere on any of the power distribution buses. Usually, a short circuit will cause the power subsystem to shut down because of an overcurrent condition.

Complete the following steps to diagnose and resolve a suspected power problem.

Step 1. Check the event log and resolve any errors related to the power.

**Note:** Start with the event log of the application that is managing the server. For more information about event logs, see [“Event logs” on page 363](#)

Step 2. Check for short circuits, for example, if a loose screw is causing a short circuit on a circuit board.

Step 3. Remove the adapters and disconnect the cables and power cords to all internal and external devices until the server is at the minimum configuration that is required for the server to start. See [“General specifications” on page 2](#) to determine the minimum configuration for your server.

Step 4. Reconnect all ac power cords and turn on the server. If the server starts successfully, reseat the adapters and devices one at a time until the problem is isolated.

If the server does not start from the minimum configuration, see [“Power supply LEDs” on page 372](#) to replace the components in the minimum configuration one at a time until the problem is isolated.

## Resolving suspected Ethernet controller problems

The method that you use to test the Ethernet controller depends on which operating system you are using. See the operating-system documentation for information about Ethernet controllers, and see the Ethernet controller device-driver readme file.

Complete the following steps to attempt to resolve suspected problems with the Ethernet controller.

Step 1. Make sure that the correct device drivers, which come with the server are installed and that they are at the latest level.

Step 2. Make sure that the Ethernet cable is installed correctly.

- The cable must be securely attached at all connections. If the cable is attached but the problem remains, try a different cable.
- If you set the Ethernet controller to operate at 100 Mbps or 1000 Mbps, you must use Category 5 cabling.

Step 3. Determine whether the hub supports auto-negotiation. If it does not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.

Step 4. Check the Ethernet controller LEDs on the rear panel of the server. These LEDs indicate whether there is a problem with the connector, cable, or hub.

- The Ethernet link status LED is lit when the Ethernet controller receives a link pulse from the hub. If the LED is off, there might be a defective connector or cable or a problem with the hub.
- The Ethernet transmit/receive activity LED is lit when the Ethernet controller sends or receives data over the Ethernet network. If the Ethernet transmit/receive activity is off, make sure that the hub and network are operating and that the correct device drivers are installed.

- Step 5. Check the Network activity LED on the rear of the server. The Network activity LED is lit when data is active on the Ethernet network. If the Network activity LED is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Step 6. Check for operating-system-specific causes of the problem, and also make sure that the operating system drivers are installed correctly.
- Step 7. Make sure that the device drivers on the client and server are using the same protocol.

If the Ethernet controller still cannot connect to the network but the hardware appears to be working, the network administrator must investigate other possible causes of the error.

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## Troubleshooting by symptom

Use this information to find solutions to problems that have identifiable symptoms.

To use the symptom-based troubleshooting information in this section, complete the following steps:

1. Check the event log of the application that is managing the server and follow the suggested actions to resolve any event codes.
  - If you are managing the server from the Lenovo XClarity Administrator, begin with the Lenovo XClarity Administrator event log.
  - If you are using some other management application, begin with the Lenovo XClarity Controller event log.

For more information about event logs, see [“Event logs” on page 363](#)

2. Review this section to find the symptoms that you are experiencing and follow the suggested actions to resolve the issue.
3. If the problem persists, contact support (see [“Contacting Support” on page 403](#)).

## Power on and power off problems

Use this information to resolve issues when powering on or powering off the server.

- [“Embedded hypervisor is not in the boot list” on page 378](#)
- [“The power button does not work \(server does not start\)” on page 379](#)
- [“Server does not power on” on page 379](#)

### Embedded hypervisor is not in the boot list

Complete the following steps until the problem is solved.

1. If the server has been installed, moved, or serviced recently, or if this is the first time the embedded hypervisor is being used, make sure that the device is connected properly and that there is no physical damage to the connectors.
2. See the documentation that comes with the optional embedded hypervisor flash device for setup and configuration information.
3. Check <https://serverproven.lenovo.com/> to validate that the embedded hypervisor device is supported for the server.
4. Make sure that the embedded hypervisor device is listed in the list of available boot options. From the management controller user interface, click **Server Configuration → Boot Options**.

For information about accessing the management controller user interface, see “Opening and Using the XClarity Controller Web Interface” section in the XCC documentation compatible with your server at:

<https://pubs.lenovo.com/lxcc-overview/>

5. Check <http://datacentersupport.lenovo.com> for any tech tips (service bulletins) related to the embedded hypervisor and the server.
6. Make sure that other software works on the server to ensure that it is working properly.

### **The power button does not work (server does not start)**

**Note:** The power button will not function until approximately 1 to 3 minutes after the server has been connected to ac power to allow time for BMC to initialize.

Complete the following steps until the problem is resolved:

1. Make sure that the power button on the server is working correctly:
  - a. Disconnect the server power cords.
  - b. Reconnect the server power cords.
  - c. Reseat the operator information panel cable, and then repeat steps 1a and 1b.
    - If the server starts, reseat the operator information panel.
    - If the problem remains, replace the operator information panel.
2. Make sure that:
  - The power cords are correctly connected to the server and to a working electrical outlet.
  - The LEDs on the power supply do not indicate a problem.
  - The Power button LED is lit on and flash slowly.
  - The push force is enough and with button force response.
3. If the power button LED didn't lit on or flash correctly, reseat all the power supplies and make sure AC LED on PSU rear side are lit on.
4. If you have just installed an optional device, remove it, and restart the server.
5. If the issue is still observed or without power button LED lit on, implement the minimum configuration to check whether any specific components lock the power permission. Replace the each power supply and check the power button function after installing the each one.
6. If everything is still done and the issue cannot be resolved, collect the failure information with system logs captured to Lenovo support.

### **Server does not power on**

Complete the following steps until the problem is resolved:

1. Check the event log for any events related to the server not powering on.
2. Check for any LEDs that are flashing amber.
3. Check the power LED on the system board.
4. Check if AC power LED is lit on or the amber LED is lit on at the PSU rear side.
5. AC cycle the system.
6. Remove the CMOS battery for at least ten seconds, then, reinstall the CMOS battery.
7. Try to power on the system by IPMI command through XCC or by the power button.
8. Implement the minimum configuration (one processor, one DIMM and one PSU without any adapter and any drive installed).
9. Reseat all power supplies and make sure that AC LEDs on the PSU rear side are lit.
10. Replace the each power supply and check the power button function after installing the each one.
11. If the issue cannot be resolved by above actions, call service to review the issue symptom and see whether the system board replacement is necessary.

## Memory problems

See this section to resolve issues related to memory.

### Common memory problems

- [“Multiple memory modules in a channel identified as failing” on page 380](#)
- [“Displayed system memory is less than installed physical memory” on page 380](#)
- [“Invalid memory population detected” on page 382](#)

### PMEM specific problems

- [“Attempt to change to another PMEM mode fails” on page 382](#)
- [“Extra namespace appears in an interleaved region” on page 382](#)
- [“Migrated PMEMs are not supported” on page 382](#)
- [“PMEMs installed in wrong slots after system board replacement” on page 383](#)
- [“After PMEMs are reconfigured, error messages and LEDs persist to indicate PMEMs are installed in wrong slots” on page 383](#)
- [“Cannot create goal successfully when installing PMEMs to the system for the first time” on page 383](#)

### Multiple memory modules in a channel identified as failing

**Note:** Each time you install or remove a memory module, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server.

Complete the following procedure to solve the problem.

1. Reseat the memory modules; then, restart the server.
2. Remove the highest-numbered memory module of those that are identified and replace it with an identical known good memory module; then, restart the server. Repeat as necessary. If the failures continue after all identified memory modules are replaced, go to step 4.
3. Return the removed memory modules, one at a time, to their original connectors, restarting the server after each memory module, until a memory module fails. Replace each failing memory module with an identical known good memory module, restarting the server after each memory module replacement. Repeat step 3 until you have tested all removed memory modules.
4. Replace the highest-numbered memory module of those identified; then, restart the server. Repeat as necessary.
5. Reverse the memory modules between the channels (of the same processor), and then restart the server. If the problem is related to a memory module, replace the failing memory module.
6. (Trained technician only) Install the failing memory module into a memory module connector for processor 2 (if installed) to verify that the problem is not the processor or the memory module connector.
7. (Trained technician only) Replace the system board.

### Displayed system memory is less than installed physical memory

Complete the following procedure to solve the problem.

**Note:** Each time you install or remove a memory module, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server.

1. Make sure that:
  - No error LEDs are lit on the operator information panel.
  - No memory module error LEDs are lit on the system board.

- Memory mirrored channel does not account for the discrepancy.
  - The memory modules are seated correctly.
  - You have installed the correct type of memory module (see “PMEM and DRAM DIMM installation order” in the server *Setup Guide* for requirements for requirements).
  - After changing or replacing a memory module, memory configuration is updated accordingly in the Setup Utility.
  - All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled.
  - There is no memory mismatch when the server is at the minimum memory configuration.
  - When PMEMs are installed:
    - a. If the memory is set in App Direct Mode, all the saved data have been backed up, and created namespaces are deleted before any PMEM is replaced or added.
    - b. Refer to “PMEM and DRAM DIMM installation order” in the server *Setup Guide* for requirements and see if the displayed memory fits the mode description.
    - c. If PMEMs are recently set in Memory Mode, turn it back to App Direct Mode and examine if there is namespace that has not been deleted.
    - d. Go to the Setup Utility, select **System Configuration and Boot Management → Intel Optane PMEMs → Security**, and make sure security of all the PMEM units is disabled.
2. Reseat the memory modules, and then restart the server.
  3. Check the POST error log:
    - If a memory module was disabled by a systems-management interrupt (SMI), replace the memory module.
    - If a memory module was disabled by the user or by POST, reseat the memory module; then, run the Setup Utility and enable the memory module.
  4. Run memory diagnostics. When you start a solution and press the key according to the on-screen instructions, the LXPM interface is displayed by default. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) You can perform memory diagnostics with this interface. From the Diagnostic page, go to **Run Diagnostic → Memory test** or **PMEM test**.

**Notes:** When PMEMs are installed, run diagnostics based on the mode that is set presently:

- App Direct Mode:
    - Run Memory Test for DRAM memory modules.
    - Run PMEM Test for PMEMs.
  - Memory Mode:
    - Run both Memory Test and PMEM Test for PMEMs.
5. Reverse the modules between the channels (of the same processor), and then restart the server. If the problem is related to a memory module, replace the failing memory module.
 

**Note:** When PMEMs are installed, only adopt this method in Memory Mode.
  6. Re-enable all memory modules using the Setup Utility, and then restart the server.
  7. (Trained technician only) Install the failing memory module into a memory module connector for processor 2 (if installed) to verify that the problem is not the processor or the memory module connector.
  8. (Trained technician only) Replace the system board.

## Invalid memory population detected

If this warning message appears, complete the following steps:

Invalid memory population (unsupported DIMM population) detected. Please verify memory configuration is valid.

1. See “Memory module installation rules and order” in the server *Setup Guide* for requirements to make sure the present memory module population sequence is supported.
2. If the present sequence is indeed supported, see if any of the modules is displayed as “disabled” in Setup Utility.
3. Reseat the module that is displayed as “disabled,” and reboot the system.
4. If the problem persists, replace the memory module.

## Attempt to change to another PMEM mode fails

After the PMEM mode is changed and the system is successfully restarted, if the PMEM mode stays the same instead of being changed, check the DRAM DIMMs and PMEM capacity to see if it meets the requirement of the new mode (see “Memory module installation rules and order” in the server *Setup Guide* for requirements).

## Extra namespace appears in an interleaved region

If there are two created namespaces in one interleaved region, VMware ESXi ignores the created namespaces and creates an extra new namespace during system booting. Delete the created namespaces in either the Setup Utility or the operating system before the first booting with ESXi.

## Migrated PMEMs are not supported

If this warning message appears, complete the following steps:

Intel Optane PMEM interleave set (DIMM X) is migrated from another system (Platform ID: 0x00), these migrated PMEMs are not supported nor warranted in this system.

1. Move the modules back to the original system with the exact same configuration as the previous one.
2. Back up stored data in PMEM namespaces.
3. Disable PMEM security with one of the following options:

- **LXPM**

Go to **UEFI Setup → System Settings → Intel Optane PMEMs → Security → Press to Disable Security**, and input passphrase to disable security.

- **Setup Utility**

Go to **System Configuration and Boot Management → System Settings → Intel Optane PMEMs → Security → Press to Disable Security**, and input passphrase to disable security.

4. Delete namespaces with command corresponding to the operating system that is installed:

- **Linux** command:

```
ndctl destroy-namespace all -f
```

- **Windows** Powershell command:

```
Get-PmemDisk | Remove-PmemDisk
```

5. Clear Platform Configuration Data (PCD) and Namespace Label Storage Area (LSA) with the following ipmctl command (for both Linux and Windows).

```
ipmctl delete -pcd
```

**Notes:** See the following links to learn how to download and use ipmctl in different operating systems:

- Windows: <https://datacentersupport.lenovo.com/us/en/videos/YTV101407>
- Linux: <https://datacentersupport.lenovo.com/us/en/solutions/HT508642>

6. Reboot the system, and press the key according to the on-screen instructions to enter Setup Utility. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.)
7. Power off the system.
8. Remove the modules to be reused for a new system or configuration.

### **PMEMs installed in wrong slots after system board replacement**

If this warning message appears, complete the following steps:

DIMM X of Intel Optane PMEM persistent interleave set should be moved to DIMM Y.

1. Record each of the instructions of changing PMEM slot from XCC events.
2. Power off the system, and remove the PMEMs that are mentioned in the warning messages. It is suggested to label these PMEMs to avoid confusion.
3. Install the PMEMs in the correct slot number indicated in the warning messages. Remove the labels to avoid blocking airflow and cooling.
4. Complete replacement and power on the system. Make sure there is no similar warning messages in XCC.

**Note:** Do not perform any provisioning on PMEM to avoid data lost when the messages are still present in XCC events.

### **After PMEMs are reconfigured, error messages and LEDs persist to indicate PMEMs are installed in wrong slots**

AC the system or restart XCC to solve this problem.

### **Cannot create goal successfully when installing PMEMs to the system for the first time**

When seeing ones of the following messages:

- ERROR: Cannot retrieve memory resources info
- ERROR: One or more PMEM modules do not have PCD data. A platform reboot is recommended to restore valid PCD data.

Complete the following steps to solve the problem.

1. If the PMEMs have been installed in another system with stored data, perform the following steps to erase the data.
  - a. Based on the original population order, install the PMEMs to the original system where they were installed previously, and back up the data from the PMEMs to other storage devices.
  - b. Disable PMEM security with one of the following options:
    - **LXPM**  
Go to **UEFI Setup → System Settings → Intel Optane PMEMs → Security → Press to Disable Security**, and input passphrase to disable security.
    - **Setup Utility**  
Go to **System Configuration and Boot Management → System Settings → Intel Optane PMEMs → Security → Press to Disable Security**, and input passphrase to disable security.
  - c. Delete namespaces with command corresponding to the operating system that is installed:
    - **Linux** command:  
`ndctl destroy-namespace all -f`
    - **Windows** Powershell command:  
`Get-PmemDisk | Remove-PmemDisk`

- d. Clear Platform Configuration Data (PCD) and Namespace Label Storage Area (LSA) with the following ipmctl command (for both Linux and Windows).  
`ipmctl delete -pcd`

**Notes:** See the following links to learn how to download and use ipmctl in different operating systems:

- Windows: <https://datacentersupport.lenovo.com/us/en/videos/YTV101407>
  - Linux: <https://datacentersupport.lenovo.com/us/en/solutions/HT508642>
2. Install the PMEMs back to the target system, and upgrade system firmware to the latest version without entering Setup Utility.
  3. If the problem persists, overwrite PMEMs with the following ndctl command.  
`ndctl sanitize-dimm --overwrite all`
  4. Monitor the overwrite status with the following command.  
`watch -n 1 "ipmctl show -d OverwriteStatus -dimm"`
  5. When seeing all PMEM OverwriteStatus=Completed, reboot the system and see if the problem persists.

## Hard disk drive problems

Use this information to resolve issues related to the hard disk drives.

- [“Server cannot recognize a hard drive” on page 384](#)
- [“Multiple hard drives fail” on page 385](#)
- [“Multiple hard drives are offline” on page 385](#)
- [“A replacement hard disk drive does not rebuild” on page 385](#)
- [“Green hard disk drive activity LED does not represent actual state of associated drive” on page 385](#)
- [“Yellow hard disk drive status LED does not represent actual state of associated drive” on page 386](#)
- [“U.3 NVMe drive can be detected in NVMe connection, but cannot be detected in Tri-mode” on page 386](#)

### Server cannot recognize a hard drive

Complete the following steps until the problem is solved.

1. Observe the associated yellow hard disk drive status LED. If the LED is lit, it indicates a drive fault.
2. If the status LED is lit, remove the drive from the bay, wait 45 seconds, and reinsert the drive, making sure that the drive assembly connects to the hard disk drive backplane.
3. Observe the associated green hard disk drive activity LED and the yellow status LED and perform corresponding operations in different situations:
  - If the green activity LED is flashing and the yellow status LED is not lit, the drive is recognized by the controller and is working correctly. Run the diagnostics tests for the hard disk drives. When you start a server and press the key according to the on-screen instructions, the LXPM is displayed by default. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) You can perform hard drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → HDD test/Disk Drive Test.**
  - If the green activity LED is flashing and the yellow status LED is flashing slowly, the drive is recognized by the controller and is rebuilding.
  - If neither LED is lit or flashing, check whether the hard disk drive backplane is correctly seated. For details, go to step 4.
  - If the green activity LED is flashing and the yellow status LED is lit, replace the drive. If the activity of the LEDs remains the same, go to step Hard disk drive problems. If the activity of the LEDs changes, return to step 1.



4. Make sure that the hard disk drive backplane is correctly seated. When it is correctly seated, the drive assemblies correctly connect to the backplane without bowing or causing movement of the backplane.
5. Reseat the backplane power cable and repeat steps 1 through 3.
6. Reseat the backplane signal cable and repeat steps 1 through 3.
7. Suspect the backplane signal cable or the backplane:
  - Replace the affected backplane signal cable.
  - Replace the affected backplane.
8. Run the diagnostics tests for the hard disk drives. When you start a server and press the key according to the on-screen instructions, the LXPM is displayed by default. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) You can perform hard drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → HDD test/Disk Drive Test.**

Based on those tests:

- If the backplane passes the test but the drives are not recognized, replace the backplane signal cable and run the tests again.
- Replace the backplane.
- If the adapter fails the test, disconnect the backplane signal cable from the adapter and run the tests again.
- If the adapter fails the test, replace the adapter.

### **Multiple hard drives fail**

Complete the following steps until the problem is solved:

- View the Lenovo XClarity Controller event log for events related to power supplies or vibration issues and resolve those events.
- Make sure that the device drivers and firmware for the hard disk drive and server are at the latest level

**Important:** Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

### **Multiple hard drives are offline**

Complete the following steps until the problem is solved:

- View the Lenovo XClarity Controller event log for events related to power supplies or vibration issues and resolve those events.
- View the storage subsystem log for events related to the storage subsystem and resolve those events.

### **A replacement hard disk drive does not rebuild**

Complete the following steps until the problem is solved:

1. Make sure that the hard disk drive is recognized by the adapter (the green hard disk drive activity LED is flashing).
2. Review the SAS/SATA RAID adapter documentation to determine the correct configuration parameters and settings.

### **Green hard disk drive activity LED does not represent actual state of associated drive**

Complete the following steps until the problem is solved:

1. If the green hard disk drive activity LED does not flash when the drive is in use, run the diagnostics tests for the hard disk drives. When you start a server and press the key according to the on-screen instructions, the LXPM is displayed by default. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) You can perform hard drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic** → **HDD test/Disk Drive Test**.\*
2. If the drive passes the test, replace the backplane.
3. If the drive fails the test, replace the drive.

### **Yellow hard disk drive status LED does not represent actual state of associated drive**

Complete the following steps until the problem is solved:


1. Turn off the server.
2. Reseat the SAS/SATA adapter.
3. Reseat the backplane signal cable and backplane power cable.
4. Reseat the hard disk drive.
5. Power on the server and observe the activity of the hard disk drive LEDs.

**Note:** \*Depending on the LXPM version, you may see **HDD test** or **Disk Drive Test**.

### **U.3 NVMe drive can be detected in NVMe connection, but cannot be detected in Tri-mode**

In Tri-mode, NVMe drives are connected via a PCIe x1 link to the controller. To support Tri-mode with U.3 NVMe drives, **U.3 x1 mode** must be enabled for the selected drive slots on the backplane through the XCC Web GUI. By default, the backplane setting is **U.2 x4 mode**.

Complete the following steps to enable **U.3 x1 mode**:

1. Log into the XCC Web GUI, and choose **Storage** → **Detail** from the navigation tree on the left.
2. In the window that is displayed, click the icon  next to **Backplane**.
3. In the dialog box that is displayed, select the target drive slots and click **Apply**.
4. Do a DC power cycle to make the setting take effect.

## **Monitor and video problems**

Use this information to solve problems related to a monitor or video.

- [“Incorrect characters are displayed” on page 386](#)
- [“Screen is blank” on page 387](#)
- [“Screen goes blank when you start some application programs” on page 387](#)
- [“The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted” on page 387](#)
- [“The wrong characters appear on the screen” on page 387](#)

### **Incorrect characters are displayed**

Complete the following steps:

1. Verify that the language and locality settings are correct for the keyboard and operating system.
2. If the wrong language is displayed, update the server firmware to the latest level. See [“Firmware updates” on page 10](#).

## Screen is blank

**Note:** Make sure that the expected boot mode has not been changed from the UEFI to Legacy or vice versa.

1. If the server is attached to a KVM switch, bypass the KVM switch to eliminate it as a possible cause of the problem: connect the monitor cable directly to the correct connector on the rear of the server.
2. The management controller remote presence function is disabled if you install an optional video adapter. To use the management controller remote presence function, remove the optional video adapter.
3. If the server is installed with the graphical adapters while turning on the server, the Lenovo logo is displayed on the screen after approximately 3 minutes. This is normal operation while the system loads.
4. Make sure that:
  - The server is turned on and there is power supplied to the server.
  - The monitor cables are connected correctly.
  - The monitor is turned on and the brightness and contrast controls are adjusted correctly.
5. Make sure that the correct server is controlling the monitor, if applicable.
6. Make sure that the video output is not affected by corrupted server firmware; see [“Firmware updates” on page 10](#).
7. If the problem remains, contact Lenovo Support.

## Screen goes blank when you start some application programs

1. Make sure that:
  - The application program is not setting a display mode that is higher than the capability of the monitor.
  - You installed the necessary device drivers for the application.

## The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted

1. If the monitor self-tests show that the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescents, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor.

**Attention:** Moving a color monitor while it is turned on might cause screen discoloration.

Move the device and the monitor at least 305 mm (12 in.) apart, and turn on the monitor.

### Notes:

- a. To prevent diskette drive read/write errors, make sure that the distance between the monitor and any external diskette drive is at least 76 mm (3 in.).
- b. Non-Lenovo monitor cables might cause unpredictable problems.
2. Reseat the monitor cable.
3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time:
  - a. Monitor cable
  - b. Video adapter (if one is installed)
  - c. Monitor
  - d. (Trained technician only) System board.

## The wrong characters appear on the screen

Complete the following steps until the problem is solved:

1. Verify that the language and locality settings are correct for the keyboard and operating system.

2. If the wrong language is displayed, update the server firmware to the latest level. See [“Firmware updates” on page 10](#).

## Keyboard, mouse, KVM switch or USB-device problems

Use this information to solve problems related to a keyboard, mouse, KVM switch or USB-device problems.

- [“All or some keys on the keyboard do not work” on page 388](#)
- [“Mouse does not work” on page 388](#)
- [“KVM switch problems” on page 388](#)
- [“USB-device does not work” on page 388](#)

### All or some keys on the keyboard do not work

1. Make sure that:
  - The keyboard cable is securely connected.
  - The server and the monitor are turned on.
2. If you are using a USB keyboard, run the Setup utility and enable keyboardless operation.
3. If you are using a USB keyboard and it is connected to a USB hub, disconnect the keyboard from the hub and connect it directly to the server.
4. Replace the keyboard.

### Mouse does not work

1. Make sure that:
  - The mouse cable is securely connected to the server.
  - The mouse device drivers are installed correctly.
  - The server and the monitor are turned on.
  - The mouse option is enabled in the Setup utility.
2. If you are using a USB mouse and it is connected to a USB hub, disconnect the mouse from the hub and connect it directly to the server.
3. Replace the mouse.

### KVM switch problems

1. Make sure that the KVM switch is supported by your server.
2. Make sure that the KVM switch is powered on correctly.
3. If the keyboard, mouse or monitor can be operated normally with direct connection to the server, then replace the KVM switch.

### USB-device does not work

1. Make sure that:
  - The correct USB device driver is installed.
  - The operating system supports USB devices.
2. Make sure that the USB configuration options are set correctly in system setup.

Restart the server and press the key according to the on-screen instructions to display the LXPM system setup interface. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) Then, click **System Settings → Devices and I/O Ports → USB Configuration**.

3. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server.

## Optional-device problems

Use this information to solve problems related to optional devices.

- “External USB device is not recognized” on page 389
- “PCIe adapter is not recognized or is not functioning” on page 389
- “Insufficient PCIe resources are detected.” on page 389
- “A Lenovo optional device that was just installed does not work.” on page 390
- “A Lenovo optional device that worked previously does not work now” on page 390

### External USB device is not recognized

Complete the following steps until the problem is resolved:

1. Update the UEFI firmware to the latest version.
2. Make sure that the proper drivers are installed on the compute node. See the product documentation for the USB device for information about device drivers.
3. Use the Setup utility to make sure that the device is configured correctly.
4. If the USB device is plugged into a hub or the console breakout cable, unplug the device and plug it directly into the USB port on the front of the compute node.

### PCIe adapter is not recognized or is not functioning

Complete the following steps until the problem is resolved:

1. Update the UEFI firmware to the latest version.
2. Check the event log and resolve any issues related to the device.
3. Validate that the device is supported for the server (see <https://serverproven.lenovo.com/>). Make sure that the firmware level on the device is at the latest supported level and update the firmware if applicable.
4. Make sure that the adapter is installed in a correct slot.
5. Make sure that the proper device drivers are installed for the device.
6. Resolve any resource conflicts if running legacy mode (UEFI). Check legacy ROM boot orders and modify the UEFI setting for MM config base.

**Note:** Ensure that you modify the ROM boot order associated with the PCIe adapter to the first execution order.

7. Check <http://datacentersupport.lenovo.com> for any tech tips (also known as retain tips or service bulletins) that might be related to the adapter.
8. Ensure any adapter external connections are correct and that the connectors are not physically damaged.
9. Make sure that the PCIe adapter is installed with the supported operating system.

### Insufficient PCIe resources are detected.

If you see an error message stating “Insufficient PCI Resources Detected,” complete the following steps until the problem is resolved:

1. Press Enter to access System Setup Utility.
2. Select **System Settings → Devices and I/O Ports → MM Config Base**; then, modify the setting to increase the device resources. For example, modify 3 GB to 2 GB or modify 2 GB to 1 GB.

3. Save the settings and restart the system.
4. If the error recurs with the highest device resource setting (1GB), shutdown the system and remove some PCIe devices; then, power on the system.
5. If the reboot failed, repeat step 1 to step 4.
6. If the error recurs, press Enter to access System Setup Utility.
7. Select **System Settings** → **Devices and I/O Ports** → **PCI 64-Bit Resource Allocation**, then; modify the setting from **Auto** to **Enable**.
8. If the Boot Device does not support MMIO above 4GB for Legacy Boot, use UEFI Boot Mode or remove/disable some PCIe devices.
9. DC cycle the system and ensure the system is enter UEFI boot menu or the operating system; then, capture the FFDC log.
10. Contact Lenovo technical support.

#### **A Lenovo optional device that was just installed does not work.**

1. Make sure that:
  - The device is supported for the server (see <https://serverproven.lenovo.com/>).
  - You followed the installation instructions that came with the device and the device is installed correctly.
  - You have not loosened any other installed devices or cables.
  - You updated the configuration information in system setup. When you start a server and press the key according to the on-screen instructions to display the Setup Utility. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) Whenever memory or any other device is changed, you must update the configuration.
2. Reseat the device that you have just installed.
3. Replace the device that you have just installed.
4. Reseat the cable connection and check there is no physical damage to the cable.
5. If there is any cable damages, then replace the cable.

#### **A Lenovo optional device that worked previously does not work now**

1. Make sure that all of the cable connections for the device are secure.
2. If the device comes with test instructions, use those instructions to test the device.
3. Reseat the cable connection and check if any physical parts have been damaged, .
4. Replace the cable.
5. Reseat the failing device.
6. Replace the failing device.

## **Serial-device problems**

Use this information to solve problems with serial ports or devices.

- [“Number of displayed serial ports is less than the number of installed serial ports” on page 390](#)
- [“Serial device does not work” on page 391](#)

#### **Number of displayed serial ports is less than the number of installed serial ports**

Complete the following steps until the problem is solved.

1. Make sure that:

- Each port is assigned a unique address in the Setup utility and none of the serial ports is disabled.
  - The serial-port adapter (if one is present) is seated correctly.
2. Reseat the serial port adapter.
  3. Replace the serial port adapter.

### **Serial device does not work**

1. Make sure that:
  - The device is compatible with the server.
  - The serial port is enabled and is assigned a unique address.
  - The device is connected to the correct connector.
2. Reseat the following components:
  - a. Failing serial device.
  - b. Serial cable.
3. Replace the following components:
  - a. Failing serial device.
  - b. Serial cable.
4. (Trained technician only) Replace the system board.

## **Intermittent problems**

Use this information to solve intermittent problems.

- [“Intermittent external device problems” on page 391](#)
- [“Intermittent KVM problems” on page 391](#)
- [“Intermittent unexpected reboots” on page 392](#)

### **Intermittent external device problems**

Complete the following steps until the problem is solved.

1. Update the UEFI and XCC firmware to the latest versions.
2. Make sure that the correct device drivers are installed. See the manufacturer's website for documentation.
3. For a USB device:
  - a. Make sure that the device is configured correctly.

Restart the server and press the key according to the on-screen instructions to display the LXPM system setup interface. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) Then, click **System Settings** → **Devices and I/O Ports** → **USB Configuration**.
  - b. Connect the device to another port. If using a USB hub, remove the hub and connect the device directly to the server. Make sure that the device is configured correctly for the port.

### **Intermittent KVM problems**

Complete the following steps until the problem is solved.

#### **Video problems:**

1. Make sure that all cables and the console breakout cable are properly connected and secure.

2. Make sure that the monitor is working properly by testing it on another server.
3. Test the console breakout cable on a working server to ensure that it is operating properly. Replace the console breakout cable if it is defective.

### Keyboard problems:

Make sure that all cables and the console breakout cable are properly connected and secure.

### Mouse problems:

Make sure that all cables and the console breakout cable are properly connected and secure.

### Intermittent unexpected reboots

**Note:** Some uncorrectable errors require that the server reboot so that it can disable a device, such as a memory DIMM or a processor to allow the machine to boot up properly.

1. If the reset occurs during POST and the POST watchdog timer is enabled, make sure that sufficient time is allowed in the watchdog timeout value (POST Watchdog Timer).

To check the POST watchdog time, restart the server and press the key according to the on-screen instructions to display the LXPM system setup interface. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) Then, click **BMC Settings → POST Watchdog Timer**.

2. If the reset occurs after the operating system starts, do one of the followings:
  - Enter the operating system when the system operates normally and set up operating system kernel dump process (Windows and Linux base operating systems will be using different method). Enter the UEFI setup menus and disable the feature, or disable it with the following OneCli command.  
`OneCli.exe config set SystemRecovery.RebootSystemOnNMI Disable --bmc XCC_USER:XCC_PASSWORD@XCC_IPAddress`
  - Disable any automatic server restart (ASR) utilities, such as the Automatic Server Restart IPMI Application for Windows, or any ASR devices that are installed.
3. See the management controller event log to check for an event code that indicates a reboot. See “[Event logs](#)” on page 363 for information about viewing the event log. If you are using Linux base operating system, then capture all logs back to Lenovo support for further investigation.

## Power problems

Use this information to resolve issues related to power.

### System error LED is on and event log "Power supply has lost input" is displayed

To resolve the problem, ensure that:

1. The power supply is properly connected to a power cord.
2. The power cord is connected to a properly grounded electrical outlet for the server.
3. Make sure that the power supply AC source is stable within the supported range.
4. Swap the power supply to see if the issue follows the power supply, if it follows the power supply, then replace the failing one.
5. Review the event log and see how the problem it is to follow the event log actions to resolved the problems.

## Network problems

Use this information to resolve issues related to networking.



- [“Cannot wake server using Wake on LAN” on page 393](#)
- [“Could not log in using LDAP account with SSL enabled” on page 393](#)

### Cannot wake server using Wake on LAN

Complete the following steps until the problem is resolved:

1. If you are using the dual-port network adapter and the server is connected to the network using Ethernet 5 connector, check the system-error log or IMM2 system event log (see [“Event logs” on page 363](#)), make sure:
  - a. Fan 3 is running in standby mode, if Emulex dual port 10GBase-T embedded adapter is installed.
  - b. The room temperature is not too high (see [“Specifications” on page 1](#)).
  - c. The air vents are not blocked.
  - d. The air baffle is installed securely.
2. Reseat the dual-port network adapter.
3. Turn off the server and disconnect it from the power source; then, wait 10 seconds before restarting the server.
4. If the problem still remains, replace the dual-port network adapter.

### Could not log in using LDAP account with SSL enabled

Complete the following steps until the problem is resolved:

1. Make sure that the license key is valid.
2. Generate a new license key and log in again.

## Observable problems

Use this information to solve observable problems.

- [“Server hangs during the UEFI boot process” on page 393](#)
- [“The server immediately displays the POST Event Viewer when it is turned on” on page 394](#)
- [“Server is unresponsive \(POST is complete and operating system is running\)” on page 394](#)
- [“Server is unresponsive \(POST failed and cannot start System Setup\)” on page 394](#)
- [“Voltage planar fault is displayed in the event log” on page 395](#)
- [“Unusual smell” on page 395](#)
- [“Server seems to be running hot” on page 395](#)
- [“Cannot enter legacy mode after installing a new adapter” on page 396](#)
- [“Cracked parts or cracked chassis” on page 396](#)

### Server hangs during the UEFI boot process

If the system hangs during the UEFI boot process with the message UEFI: DXE INIT on the display, make sure that Option ROMs were not configured with a setting of **Legacy**. You can remotely view the current settings for Option ROMs by running the following command using the Lenovo XClarity Essentials OneCLI:

```
onecli config show EnableDisableAdapterOptionROMSupport --bmc xcc_userid:xcc_password@xcc_ipaddress
```

To recover a system that hangs during the boot process with Legacy Option ROM settings, see the following Tech Tip:

<https://datacentersupport.lenovo.com/us/en/solutions/ht506118>

If legacy Option ROMs must be used, do not set slot Option ROMs to **Legacy** on the Devices and I/O Ports menu. Instead, set slot Option ROMs to **Auto** (the default setting), and set the System Boot Mode to **Legacy Mode**. Legacy option ROMs will be invoked shortly before the system boots.

### **The server immediately displays the POST Event Viewer when it is turned on**

Complete the following steps until the problem is solved.

1. Correct any errors that are indicated by the light path diagnostics LEDs.
2. Make sure that the server supports all the processors and that the processors match in speed and cache size.

You can view processor details from system setup.

To determine if the processor is supported for the server, see <https://serverproven.lenovo.com/>.

3. (Trained technician only) Make sure that processor 1 is seated correctly
4. (Trained technician only) Remove processor 2 and restart the server.
5. Replace the following components one at a time, in the order shown, restarting the server each time:
  - a. (Trained technician only) Processor
  - b. (Trained technician only) System board

### **Server is unresponsive (POST is complete and operating system is running)**

Complete the following steps until the problem is solved.

- If you are in the same location as the compute node, complete the following steps:
  1. If you are using a KVM connection, make sure that the connection is operating correctly. Otherwise, make sure that the keyboard and mouse are operating correctly.
  2. If possible, log in to the compute node and verify that all applications are running (no applications are hung).
  3. Restart the compute node.
  4. If the problem remains, make sure that any new software has been installed and configured correctly.
  5. Contact your place of purchase of the software or your software provider.
- If you are accessing the compute node from a remote location, complete the following steps:
  1. Make sure that all applications are running (no applications are hung).
  2. Attempt to log out of the system and log back in.
  3. Validate the network access by pinging or running a trace route to the compute node from a command line.
    - a. If you are unable to get a response during a ping test, attempt to ping another compute node in the enclosure to determine whether it is a connection problem or compute node problem.
    - b. Run a trace route to determine where the connection breaks down. Attempt to resolve a connection issue with either the VPN or the point at which the connection breaks down.
  4. Restart the compute node remotely through the management interface.
  5. If the problem remains, verify that any new software has been installed and configured correctly.
  6. Contact your place of purchase of the software or your software provider.

### **Server is unresponsive (POST failed and cannot start System Setup)**

Configuration changes, such as added devices or adapter firmware updates, and firmware or application code problems can cause the server to fail POST (the power-on self-test).

If this occurs, the server responds in either of the following ways:

- The server restarts automatically and attempts POST again.
- The server hangs, and you must manually restart the server for the server to attempt POST again.

After a specified number of consecutive attempts (automatic or manual), the server reverts to the default UEFI configuration and starts System Setup so that you can make the necessary corrections to the configuration and restart the server. If the server is unable to successfully complete POST with the default configuration, there might be a problem with the system board.

You can specify the number of consecutive restart attempts in System Setup. Restart the server and press the key according to the on-screen instructions to display the LXPM system setup interface. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) Then, click **System Settings** → **Recovery and RAS** → **POST Attempts** → **POST Attempts Limit**. Available options are 3, 6, 9, and disable.

### **Voltage planar fault is displayed in the event log**

Complete the following steps until the problem is solved.

1. Revert the system to the minimum configuration. See “[Specifications](#)” on page 1 for the minimally required number of processors and DIMMs.
2. Restart the system.
  - If the system restarts, add each of the removed items one at a time and restart the system each time until the error occurs. Replace the item for which the error occurs.
  - If the system does not restart, suspect the system board.

### **Unusual smell**

Complete the following steps until the problem is solved.

1. An unusual smell might be coming from newly installed equipment.
2. If the problem remains, contact Lenovo Support.

### **Server seems to be running hot**

Complete the following steps until the problem is solved.

Multiple compute nodes or chassis:

1. Make sure that the room temperature is within the specified range (see “[Specifications](#)” on page 1).
2. Make sure that the fans are installed correctly.
3. Update the UEFI and XCC to the latest versions.
4. Make sure that the fillers in the server are installed correctly (see *Maintenance Manual* for detailed installation procedures).
5. Use the IPMI command to ramp up the fan speed to the full fan speed to see whether the issue can be resolved.

**Note:** The IPMI raw command should only be used by trained technician and the each system has its own specific PMI raw command.

6. Check the management processor event log for rising temperature events. If there are no events, the compute node is running within normal operating temperatures. Note that you can expect some variation in temperature.

### **Cannot enter legacy mode after installing a new adapter**

Complete the following procedure to solve the problem.

1. Go to **UEFI Setup → Devices and I/O Ports → Set Option ROM Execution Order**.
2. Move the RAID adapter with operation system installed to the top of the list.
3. Select **Save**.
4. Reboot the system and auto boot to operation system.

### **Cracked parts or cracked chassis**

Contact Lenovo Support.

## **Software problems**

Use this information to solve software problems.

1. To determine whether the problem is caused by the software, make sure that:
  - The server has the minimum memory that is needed to use the software. For memory requirements, see the information that comes with the software.  
  
**Note:** If you have just installed an adapter or memory, the server might have a memory-address conflict.
  - The software is designed to operate on the server.
  - Other software works on the server.
  - The software works on another server.
2. If you receive any error messages while you use the software, see the information that comes with the software for a description of the messages and suggested solutions to the problem.
3. Contact your place of purchase of the software.

---

## Appendix A. Hardware disassembling for recycle

Follow the instructions in this section to recycle components with compliance with local laws or regulations.

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### Disassemble the system board for recycle

Follow the instructions in this section to disassemble the system board before recycling.

#### About this task

Before disassembling the system board:

1. Remove the system board from the server. See [“Remove the system board” on page 245](#).
2. Refer to local environmental, waste or disposal regulations to ensure compliance.

#### Procedure

Step 1. Remove the following components as illustrated:

- Two spacers (8 mm wrench)
- Four guide pins (7 mm wrench)
- One plunger (5/8” wrench for top side; 7/16” wrench for bottom side)
- Two hex nuts (5 mm wrench)
- One lifting handle (PH 2 screwdriver)

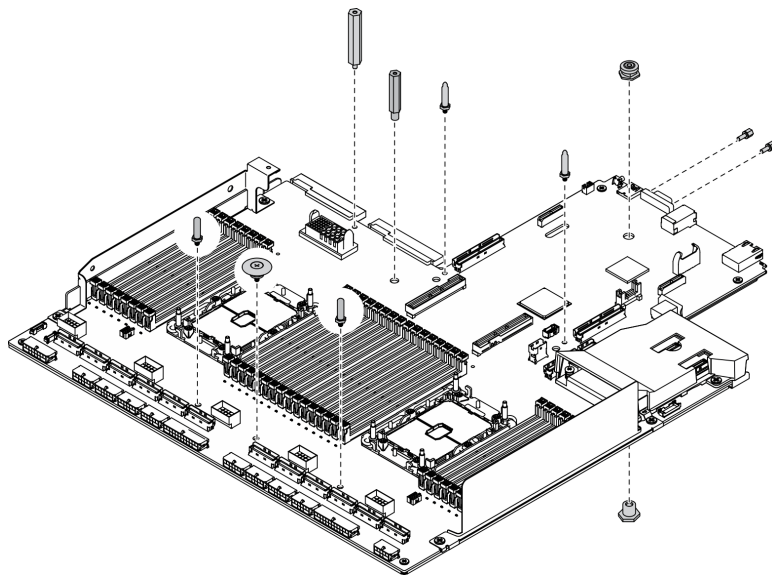


Figure 297. Disassembling the system board

Step 2. Remove the following components as illustrated:

- Ten screws (PH 2 screwdriver)

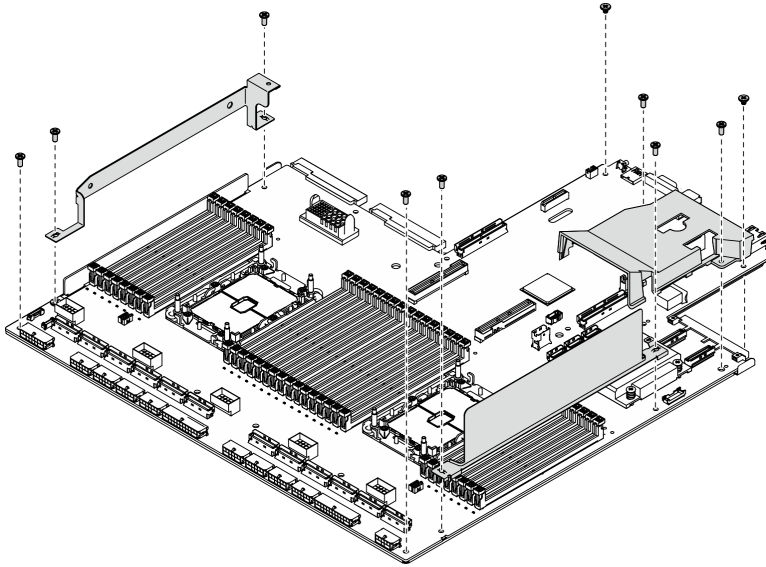


Figure 298. Disassembling the system board

Step 3. Remove the following components as illustrated:

- Four screws (PH 2 screwdriver)

Step 4. Separate the system board from the supporting sheet metal.

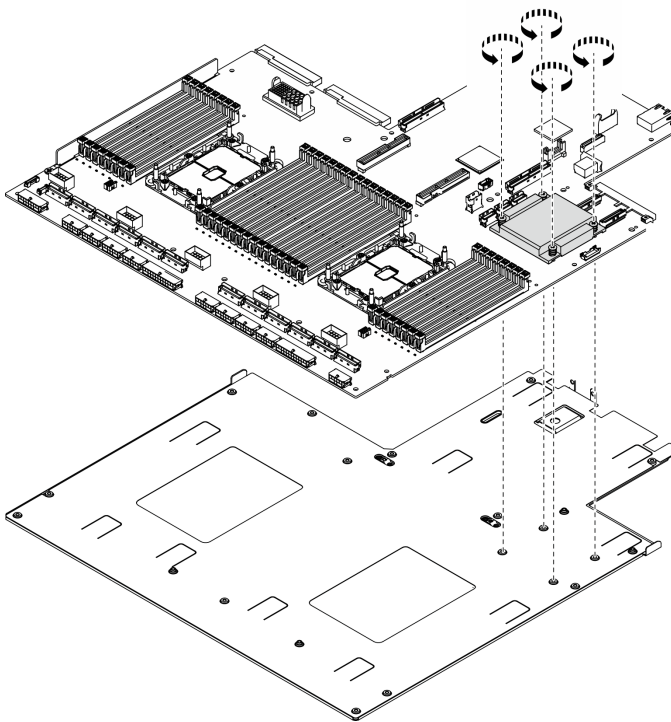


Figure 299. Disassembling the system board

## After you finish

After disassembling the system board, recycle the unit in compliance with local regulations.

---

## Disassemble the retimer assembly for recycle

Follow the instructions in this section to disassemble the retimer assembly before recycling.

### About this task

Before disassembling the retimer assembly:

1. Remove the retimer assembly from the server. See [“Remove the retimer assembly” on page 350](#).
2. Refer to local environmental, waste or disposal regulations to ensure compliance.

## Procedure

Step 1. Remove the following components as illustrated:

- Nine screws (PH2 screwdriver)

Step 2. Separate the retimer assembly from the supporting sheet metal.

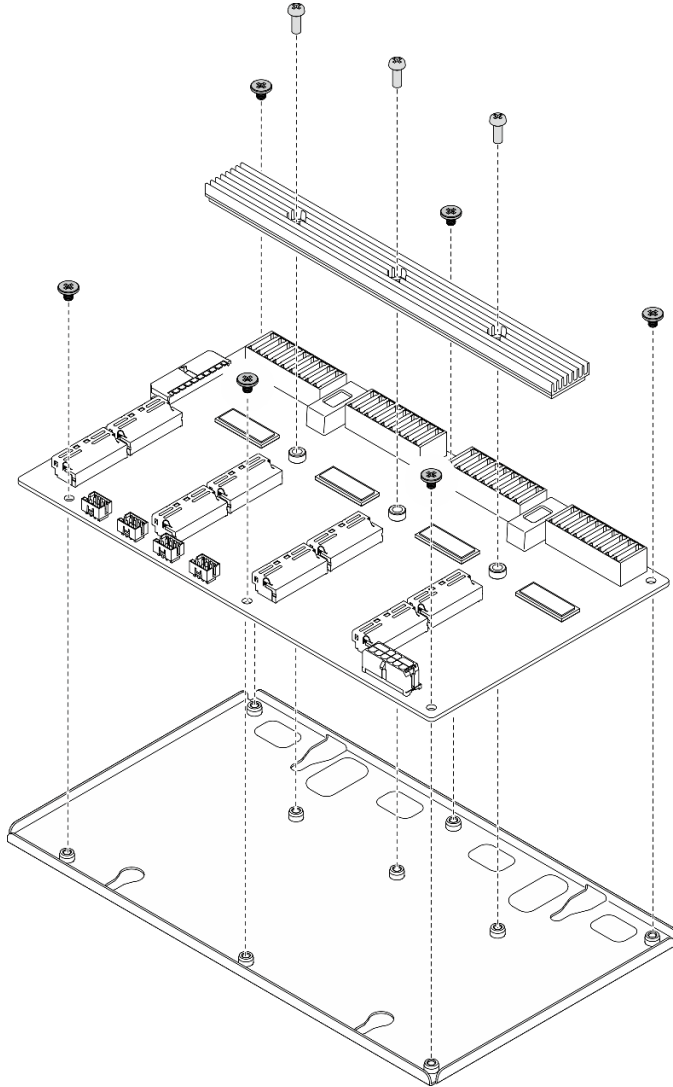


Figure 300. Disassembling the retimer assembly

## After you finish

After disassembling the system board, recycle the unit in compliance with local regulations.



---

## Appendix B. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about Lenovo products, you will find a wide variety of sources available from Lenovo to assist you.

On the World Wide Web, up-to-date information about Lenovo systems, optional devices, services, and support are available at:

<http://datacentersupport.lenovo.com>

**Note:** IBM is Lenovo's preferred service provider for ThinkSystem.

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### Before you call

Before you call, there are several steps that you can take to try and solve the problem yourself. If you decide that you do need to call for assistance, gather the information that will be needed by the service technician to more quickly resolve your problem.

#### Attempt to resolve the problem yourself

You can solve many problems without outside assistance by following the troubleshooting procedures that Lenovo provides in the online help or in the Lenovo product documentation. The Lenovo product documentation also describes the diagnostic tests that you can perform. The documentation for most systems, operating systems, and programs contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

You can find the product documentation for your ThinkSystem products at <https://pubs.lenovo.com/>

You can take these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Check for updated software, firmware, and operating-system device drivers for your Lenovo product. The Lenovo Warranty terms and conditions state that you, the owner of the Lenovo product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.
- If you have installed new hardware or software in your environment, check <https://serverproven.lenovo.com/> to make sure that the hardware and software are supported by your product.
- Go to <http://datacentersupport.lenovo.com> and check for information to help you solve the problem.
  - Check the Lenovo forums at [https://forums.lenovo.com/t5/Datacenter-Systems/ct-p/sv\\_eg](https://forums.lenovo.com/t5/Datacenter-Systems/ct-p/sv_eg) to see if someone else has encountered a similar problem.

#### Gathering information needed to call Support

If you require warranty service for your Lenovo product, the service technicians will be able to assist you more efficiently if you prepare the appropriate information before you call. You can also go to <http://datacentersupport.lenovo.com/warrantylookup> for more information about your product warranty.

Gather the following information to provide to the service technician. This data will help the service technician quickly provide a solution to your problem and ensure that you receive the level of service for which you might have contracted.

- Hardware and Software Maintenance agreement contract numbers, if applicable
- Machine type number (Lenovo 4-digit machine identifier)
- Model number
- Serial number
- Current system UEFI and firmware levels
- Other pertinent information such as error messages and logs

As an alternative to calling Lenovo Support, you can go to <https://support.lenovo.com/servicerequest> to submit an Electronic Service Request. Submitting an Electronic Service Request will start the process of determining a solution to your problem by making the pertinent information available to the service technicians. The Lenovo service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

---

## Collecting service data

To clearly identify the root cause of a server issue or at the request of Lenovo Support, you might need collect service data that can be used for further analysis. Service data includes information such as event logs and hardware inventory.

Service data can be collected through the following tools:

- **Lenovo XClarity Provisioning Manager**

Use the Collect Service Data function of Lenovo XClarity Provisioning Manager to collect system service data. You can collect existing system log data or run a new diagnostic to collect new data.

- **Lenovo XClarity Controller**

You can use the Lenovo XClarity Controller web interface or the CLI to collect service data for the server. The file can be saved and sent to Lenovo Support.

- For more information about using the web interface to collect service data, see the “Downloading service data” section in the XCC documentation version compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>.
- For more information about using the CLI to collect service data, see the “ffdc command” section in the XCC documentation version compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>.

- **Lenovo XClarity Administrator**

Lenovo XClarity Administrator can be set up to collect and send diagnostic files automatically to Lenovo Support when certain serviceable events occur in Lenovo XClarity Administrator and the managed endpoints. You can choose to send diagnostic files to Lenovo Support using Call Home or to another service provider using SFTP. You can also manually collect diagnostic files, open a problem record, and send diagnostic files to the Lenovo Support Center.

You can find more information about setting up automatic problem notification within the Lenovo XClarity Administrator at [http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/admin\\_setupcallhome.html](http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/admin_setupcallhome.html).

- **Lenovo XClarity Essentials OneCLI**

Lenovo XClarity Essentials OneCLI has inventory application to collect service data. It can run both in-band and out-of-band. When running in-band within the host operating system on the server, OneCLI can collect information about the operating system, such as the operating system event log, in addition to the hardware service data.

To obtain service data, you can run the `getinfor` command. For more information about running the `getinfor`, see [https://pubs.lenovo.com/lxce-onecli/onecli\\_r\\_getinfor\\_command](https://pubs.lenovo.com/lxce-onecli/onecli_r_getinfor_command).

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## Contacting Support

You can contact Support to obtain help for your issue.

You can receive hardware service through a Lenovo Authorized Service Provider. To locate a service provider authorized by Lenovo to provide warranty service, go to <https://datacentersupport.lenovo.com/serviceprovider> and use filter searching for different countries. For Lenovo support telephone numbers, see <https://datacentersupport.lenovo.com/supportphonenumberlist> for your region support details.



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## Appendix C. Notices

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## Important notes

Processor speed indicates the internal clock speed of the processor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1 024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard-disk-drive bays with the largest currently supported drives that are available from Lenovo.

Maximum memory might require replacement of the standard memory with an optional memory module.

Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write cycles that it can be subjected to, expressed as total bytes written (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. Lenovo is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.

Lenovo makes no representations or warranties with respect to non-Lenovo products. Support (if any) for the non-Lenovo products is provided by the third party, not Lenovo.

Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

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## Telecommunication regulatory statement

This product may not be certified in your country for connection by any means whatsoever to interfaces of public telecommunications networks. Further certification may be required by law prior to making any such connection. Contact a Lenovo representative or reseller for any questions.

## Electronic emission notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

Additional electronic emissions notices are available at:

[https://pubs.lenovo.com/important\\_notices/](https://pubs.lenovo.com/important_notices/)

## Taiwan Region BSMI RoHS declaration

單元 Unit	限用物質及其化學符號 Restricted substances and its chemical symbols					
	鉛Lead (Pb)	汞Mercury (Hg)	鎘Cadmium (Cd)	六價鉻 Hexavalent chromium (Cr <sup>6+</sup> )	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
機架	○	○	○	○	○	○
外部蓋板	○	○	○	○	○	○
機械組零件	-	○	○	○	○	○
空氣傳動設備	-	○	○	○	○	○
冷卻組零件	-	○	○	○	○	○
內存模組	-	○	○	○	○	○
處理器模組	-	○	○	○	○	○
電纜組零件	-	○	○	○	○	○
電源供應器	-	○	○	○	○	○
儲備設備	-	○	○	○	○	○
印刷電路板	-	○	○	○	○	○
<p>備考1. “超出0.1 wt%”及“超出0.01 wt%”係指限用物質之百分比含量超出百分比含量基準值。            Note1: “exceeding 0.1 wt%” and “exceeding 0.01 wt%” indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.</p> <p>備考2. “○”係指該項限用物質之百分比含量未超出百分比含量基準值。            Note2: “○”indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.</p> <p>備考3. “-”係指該項限用物質為排除項目。            Note3: The “-” indicates that the restricted substance corresponds to the exemption.</p>						

## Taiwan Region import and export contact information

Contacts are available for Taiwan region import and export information.

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