



# ThinkSystem SR250 V2 Maintenance Manual



**Machine Types:** 7D7Q and 7D7R

**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>

**Fifth Edition (March 2023)**

**© Copyright Lenovo 2023.**

LIMITED AND RESTRICTED RIGHTS NOTICE: If data or software is delivered pursuant to a General Services Administration (GSA) contract, use, reproduction, or disclosure is subject to restrictions set forth in Contract No. GS-35F-05925.

---

# Contents

## Contents . . . . . i

## Safety . . . . . iii

Safety inspection checklist . . . . . iv

## Chapter 1. Introduction . . . . . 1

Specifications . . . . . 1

Particulate contamination . . . . . 5

Firmware updates . . . . . 6

Tech Tips . . . . . 10

Security advisories . . . . . 10

Power on the server . . . . . 10

Power off the server . . . . . 11

## Chapter 2. Server components . . . . 13

Front view . . . . . 14

Front operator panel . . . . . 16

Rear view . . . . . 17

System-board switches, jumpers, and buttons. . . 19

System-board LEDs . . . . . 19

System-board connectors . . . . . 19

System-board jumpers and buttons . . . . . 21

Backplates and backplanes . . . . . 22

PCIe riser assembly . . . . . 24

Parts list. . . . . 25

Power cords . . . . . 32

## Chapter 3. Internal cable routing . . . 33

Front panel cable routing . . . . . 33

Fan cable routing . . . . . 35

Fixed power supply unit cable routing . . . . . 36

Hot-swap power supply unit cable routing . . . . 37

Flash power module cable routing . . . . . 38

M.2 boot adapter cable routing. . . . . 39

Backplane and backplate cable routing . . . . 40

Four 3.5-inch simple-swap drive cable routing . . . . . 40

Four 3.5-inch hot-swap drive cable routing . . . 43

Eight 2.5-inch hot-swap drive cable routing . . 45

Ten 2.5-inch hot-swap drive cable routing. . . 47

## Chapter 4. Hardware replacement procedures. . . . . 51

Installation Guidelines . . . . . 51

System reliability guidelines . . . . . 52

Working inside the server with the power on. . 53

Handling static-sensitive devices . . . . . 53

2.5-inch backplane replacement . . . . . 53

Remove the 2.5-inch backplane. . . . . 53

Install the 2.5-inch backplane . . . . . 54

2.5-inch drive replacement from 3.5-inch drive bay. . . . . 55

Remove a 2.5-inch drive from a 3.5-inch drive bay . . . . . 56

Install a 2.5-inch drive into a 3.5-inch drive bay . . . . . 57

3.5-inch backplane replacement . . . . . 59

Remove the 3.5-inch backplane. . . . . 59

Install the 3.5-inch backplane . . . . . 60

3.5-inch backplate replacement . . . . . 61

Remove the 3.5-inch backplate . . . . . 61

Install the 3.5-inch backplate . . . . . 62

Air baffle replacement . . . . . 63

Remove the air baffle . . . . . 63

Install the air baffle . . . . . 64

CMOS battery (CR2032) replacement . . . . . 65

Remove the CMOS battery (CR2032) . . . . . 65

Install the CMOS battery (CR2032) . . . . . 67

Drive replacement . . . . . 69

Remove a simple-swap drive . . . . . 69

Install a simple-swap drive. . . . . 70

Remove a hot-swap drive . . . . . 71

Install a hot-swap drive . . . . . 73

Fan replacement . . . . . 74

Remove a fan . . . . . 74

Install a fan . . . . . 76

Flash power module replacement. . . . . 78

Remove the flash power module . . . . . 78

Install the flash power module . . . . . 80

Front operator panel replacement. . . . . 81

Remove the front operator panel (2.5-inch drive model) . . . . . 81

Install the front operator panel (2.5-inch drive model) . . . . . 82

Remove the front operator panel (3.5-inch drive model) . . . . . 83

Install the front operator panel (3.5-inch drive model) . . . . . 85

Heat sink replacement . . . . . 86

Remove the heat sink. . . . . 86

Install the heat sink. . . . . 87

M.2 boot adapter replacement . . . . . 88

Remove the M.2 boot adapter . . . . . 89

Install the M.2 boot adapter . . . . . 90

M.2 drive replacement . . . . .	92
Remove an M.2 drive . . . . .	92
Install an M.2 drive . . . . .	93
Memory module replacement . . . . .	95
Remove a memory module . . . . .	95
Install a memory module . . . . .	97
PCIe adapter replacement. . . . .	100
Remove a PCIe adapter (Riser) . . . . .	100
Install a PCIe adapter (Riser) . . . . .	101
Remove the PCIe adapter (Slot 3) . . . . .	103
Install the PCIe adapter (Slot 3) . . . . .	104
PCIe riser assembly replacement . . . . .	105
Remove the PCIe riser assembly . . . . .	105
Install the PCIe riser assembly . . . . .	107
Power supply unit replacement. . . . .	108
Remove the fixed power supply unit . . . . .	108
Install the fixed power supply unit . . . . .	110
Remove a hot-swap power supply unit . . . . .	112
Install a hot-swap power supply unit . . . . .	114
Power distribution board replacement . . . . .	116
Remove the power distribution board . . . . .	116
Install the power distribution board . . . . .	118
Processor replacement . . . . .	122
Remove the processor . . . . .	122
Install the processor . . . . .	123
Rack latches replacement. . . . .	125
Remove the rack latches . . . . .	125
Install the rack latches . . . . .	127
Security bezel replacement . . . . .	129
Remove the security bezel . . . . .	129
Install the security bezel . . . . .	130
System board replacement (trained technician only) . . . . .	131
Remove the system board . . . . .	131
Install the system board . . . . .	133
Update the machine type and serial number . . . . .	136
Enable TPM . . . . .	138
Enable UEFI Secure Boot . . . . .	140
Top cover replacement . . . . .	140
Remove the top cover . . . . .	140
Install the top cover . . . . .	142
VGA cable replacement. . . . .	143
Remove the VGA cable (2.5-inch drive model) . . . . .	143
Install the VGA cable (2.5-inch drive model) . . . . .	144
Remove the VGA cable (3.5-inch drive model) . . . . .	145

Install the VGA cable (3.5-inch drive model) . . . . .	147
Complete the parts replacement . . . . .	148

## **Chapter 5. Problem determination . . . . .149**

Event logs . . . . .	149
The front operator panel and error LEDs . . . . .	151
Power supply LEDs . . . . .	152
System-board LEDs . . . . .	153
General problem determination procedures . . . . .	154
Resolving suspected power problems . . . . .	154
Resolving suspected Ethernet controller problems . . . . .	155
Troubleshooting by symptom . . . . .	155
Power on and power off problems. . . . .	156
Memory problems . . . . .	157
Hard disk drive problems . . . . .	158
Monitor and video problems . . . . .	161
Keyboard, mouse, KVM switch or USB-device problems . . . . .	162
Optional-device problems . . . . .	163
Serial-device problems . . . . .	165
Intermittent problems. . . . .	165
Power problems. . . . .	166
Network problems . . . . .	167
Observable problems. . . . .	167
Software problems. . . . .	170

## **Appendix A. Hardware disassembling for recycle . . . . .171**

Disassemble the server for chassis recycle . . . . .	171
--	-----

## **Appendix B. Getting help and technical assistance . . . . .173**

Before you call . . . . .	173
Collecting service data . . . . .	174
Contacting Support . . . . .	175

## **Appendix C. Notices. . . . .177**

Trademarks . . . . .	178
Important notes. . . . .	178
Telecommunication regulatory statement. . . . .	178
Electronic emission notices . . . . .	179
Taiwan Region BSMI RoHS declaration. . . . .	179
Taiwan Region import and export contact information . . . . .	179

## **Index . . . . .181**



---

## 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.

在安裝本产品之前，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.

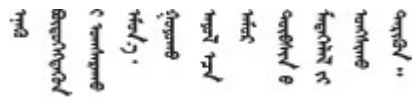
A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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་སྤྱད་མ་བྱས་གོང་། སྐྱོར་གྱི་ཡིད་གཟབ་  
བྱ་འདྲ་མིན་ཡིད་པའི་འོད་མེར་བཟང་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.

---

## 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.

**Attention:** This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

### 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.



---

## Chapter 1. Introduction

The ThinkSystem SR250 V2 server is a 1U rack server designed for high-volume network transaction processing. This high-performance, multi-core server is ideally suited for networking environments that require superior processor performance, input/output (I/O) flexibility, and high manageability.



Figure 1. SR250 V2

The server comes with a limited warranty. For details about the warranty, see:  
<https://support.lenovo.com/us/en/solutions/ht503310>

For details about your specific warranty, see:  
<http://datacentersupport.lenovo.com/warrantylookup>

---

## 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.

Table 1. Server Specifications

Specification	Description
Dimensions	<p>1U rack</p> <ul style="list-style-type: none"><li>• Height: 43 mm (1.7 inches)</li><li>• Width: 435 mm (17.1 inches)<ul style="list-style-type: none"><li>– With rack handles: 482 mm (18.98 inches)</li><li>– Without rack handles: 435 mm (17.1 inches)</li></ul></li><li>• Depth: 545 mm (21.5 inches)</li></ul> <p><b>Note:</b> The depth is measured from the front mounting flange of the rack to the rear of the server.</p>
Weight	Maximum: 12.3 kg (27.1 lbs)
Processor (depending on the model)	<p>This server supports one of the following Intel® processors:</p> <ul style="list-style-type: none"><li>• Xeon® E</li><li>• Pentium®</li></ul> <p><b>Notes:</b></p> <ol style="list-style-type: none"><li>1. For a list of supported processors, see <a href="https://serverproven.lenovo.com/">https://serverproven.lenovo.com/</a>.</li><li>2. Energy Star Certification is with limited configurations.</li></ol>

Table 1. Server Specifications (continued)

Specification	Description
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>• Slots: 4 memory module slots</li> <li>• Minimum: 8 GB (1 x 8GB DIMM)</li> <li>• Maximum: 128 GB (4 x 32 GB DIMM)</li> <li>• Type: <ul style="list-style-type: none"> <li>– ThinkSystem 8GB TruDDR4 3200 MHz (1Rx8, 1.2V) ECC UDIMM</li> <li>– ThinkSystem 16GB TruDDR4 3200 MHz (2Rx8, 1.2V) ECC UDIMM</li> <li>– ThinkSystem 32GB TruDDR4 3200 MHz (2Rx8, 1.2V) ECC UDIMM</li> </ul> </li> </ul>
Drive bays (depending on the model)	<ul style="list-style-type: none"> <li>• 2.5-inch models: <ul style="list-style-type: none"> <li>– Supports up to eight hot-swap SAS/SATA drive bays.</li> <li>– Supports up to ten hot-swap SAS/SATA drive bays.</li> </ul> </li> <li>• 3.5-inch models: <ul style="list-style-type: none"> <li>– Supports up to four simple-swap SATA drive bays.</li> <li>– Supports up to three simple-swap SATA drive bays and one NVMe drive bay.</li> <li>– Supports up to four hot-swap SAS/SATA drive bays.</li> </ul> </li> </ul> <p><b>Note:</b> When all eight storage drives have been installed, and the system has been set to software RAID mode in the UEFI settings, regardless if the disks are configured as an array or as separate disks, drives 6 and 7 cannot be used to install the Windows operating system.</p>
M.2 drive	<p>Supports up to two SATA M.2 drives of the following drive form factors:</p> <ul style="list-style-type: none"> <li>• 42 mm (2242)</li> <li>• 60 mm (2260)</li> <li>• 80 mm (2280)</li> <li>• 110 mm (22110)</li> </ul> <p>Supports the following M.2 drive capacity:</p> <ul style="list-style-type: none"> <li>• 128 GB</li> <li>• 240 GB</li> <li>• 480 GB (supported when ambient temperature is below 30°C)</li> <li>• 960 GB (supported when ambient temperature is below 30°C)</li> </ul> <p><b>Note:</b> When an M.2 adapter is installed, eight SATA/SAS drives configured with software RAID is not supported.</p>

Table 1. Server Specifications (continued)

Specification	Description
PCIe riser cards and expansion slots	<p>Up to two expansion slots (depending on the server configuration):</p> <ul style="list-style-type: none"> <li>Slot 1-2: PCIe Gen4 x16 lane in x16 slot for Riser, the following slots are available depending on the riser card installed: <ul style="list-style-type: none"> <li>1. X16 PCIe Riser card PCIe Gen4: <ul style="list-style-type: none"> <li>Slot 1: Not available</li> <li>Slot 2, PCIe Gen4 x16 in x16 slot, full height</li> </ul> </li> <li>2. X16/X8 PCIe Riser card PCIe Gen4: <ul style="list-style-type: none"> <li>Slot 1, PCIe Gen4 x8 in x8 slot, half-length (open-end)</li> <li>Slot 2, PCIe Gen4 x8 in x16 slot, full-height</li> </ul> </li> </ul> </li> <li>Slot 3 (on-board): PCIe Gen3 x4 lane in x8 slot</li> </ul> <p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>GPU adapters are only supported on servers with redundant power supply.</li> <li>When a ThinkSystem Intel E810-DA2 Ethernet Adapter is installed, the following adapters are not supported: <ul style="list-style-type: none"> <li>ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Adapter</li> <li>ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Adapter</li> <li>ThinkSystem RAID 5350-8i PCIe 12Gb Adapter</li> <li>ThinkSystem 4350-8i SAS/SATA 12Gb HBA</li> </ul> </li> </ul>
Integrated functions	<ul style="list-style-type: none"> <li>Lenovo XClarity Controller, which provides service processor control and monitoring functions, video controller, and remote keyboard, video, mouse, and remote drive capabilities.</li> <li>Light Path Diagnostics</li> <li>Front standard connectors (front of server): <ul style="list-style-type: none"> <li>One USB 2.0 connector with XCC mobile support</li> <li>One USB 3.2 Gen 1 connector</li> <li>One front operator panel</li> <li>One VGA connector (optional)</li> </ul> </li> <li>Rear standard connectors (rear of server): <ul style="list-style-type: none"> <li>Two USB 3.2 Gen 2 connectors</li> <li>Two Ethernet connectors</li> <li>One Lenovo XClarity Controller network connector</li> <li>One VGA connector</li> <li>One serial connector</li> <li>One NMI button</li> </ul> </li> </ul>
RAID controllers (depending on the model)	<ul style="list-style-type: none"> <li>Hardware RAID: Additional RAID levels supported when an optional RAID controller is installed. The hardware RAID controller supports RAID levels 0, 1, 5, and 10.</li> <li>Intel VROC SATA RAID (Software RAID): A software RAID controller is integrated on the system board. The software RAID controller supports RAID levels 0, 1, 5, and 10.</li> <li>ThinkSystem M.2 SATA/NVMe 2-Bay Enablement Kit (SATA only)</li> </ul>

Table 1. Server Specifications (continued)

Specification	Description
Video controller (integrated into Lenovo XClarity Controller)	<p>Matrox G200</p> <ul style="list-style-type: none"> <li>• ASPEED</li> <li>• SVGA compatible video controller</li> <li>• Avocent Digital Video Compression</li> <li>• 16 MB of video memory (not expandable)</li> </ul> <p><b>Note:</b> Maximum video resolution is 1600 x 1200 at 75 Hz.</p>
Fans	Four internal system fans (40mm x 28mm)
Power supplies	<ul style="list-style-type: none"> <li>• Supports one fixed power supply: 300W Gold Power Supply</li> <li>• Supports up to two power supplies for redundancy support: 450W Platinum Power Supply</li> </ul>
Operating System	<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 (base configuration)	<p>The server has the following acoustic noise emissions declaration:</p> <ul style="list-style-type: none"> <li>• Sound power level (<math>L_{WAd}</math>): <ul style="list-style-type: none"> <li>– Idling: 4.7 Bel (Typical), 5.7 Bel (Max)</li> <li>– Operating: 6.6 Bel (Typical), 6.8 Bel (Max)</li> </ul> </li> <li>• Sound pressure level (<math>L_{pAm}</math>): <ul style="list-style-type: none"> <li>– Idling: 33.1 dBA (Typical), 43.3 dBA (Max)</li> <li>– Operating: 52.6 dBA (Typical), 53.6 dBA (Max)</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, SPL is measured by bystander position (1m).</li> <li>• The declared acoustic sound levels are based on the following configurations, which may change depending on the configuration or conditions, for example M.2 drive, Broadcom 57414 25Gb NIC, Broadcom 57416 10Gb NIC, T1000 etc. <ul style="list-style-type: none"> <li>– Typical: 1x 80W CPU, 4x 32GB DIMM, 2x HDD or SSD, RAID 5350-8i, 1x 300W PSU</li> <li>– Max: 1x 95W CPU, 4x 32GB DIMM, 2x HDD or SSD, 2x 450W PSU</li> </ul> </li> </ul>
Heat output	<p>Approximate heat output:</p> <ul style="list-style-type: none"> <li>• Minimum configuration: 379.08 BTU per hour (111 watts)</li> <li>• Maximum configuration : 802.5 BTU per hour (235 watts)</li> </ul>



Table 1. Server Specifications (continued)

Specification	Description
Electrical input	<p>Sine-wave input (50–60 Hz) required</p> <ul style="list-style-type: none"> <li>300-Watt power supply: 100-127 V ac /200-240 V ac, 4/2A</li> <li>450-Watt power supply: 100-127 V ac /200-240 V ac, 5.8/2.9A</li> </ul>
Environment	<p>The ThinkSystem SR250 V2 complies with ASHRAE class A2 specifications. System performance may be impacted when operating temperature is outside ASHRAE A2 specification or fan failed condition. The ThinkSystem SR250 V2 is supported in the following environment:</p> <ul style="list-style-type: none"> <li>Air temperature: <ul style="list-style-type: none"> <li>Server on: <ul style="list-style-type: none"> <li>ASHRAE Class A2: 10°C to 35°C (50°F to 95°F); decrease the maximum ambient temperature by 1°C for every 300 m (984 ft) increase in altitude above 900 m (2,953 ft).</li> <li>ASHRAE Class A3: 5°C to 40°C (41°F to 104°F); decrease the maximum ambient temperature by 1°C for every 175 m (574 ft) increase in altitude above 900 m (2,953 ft).</li> <li>ASHRAE Class A4: 5°C to 45°C (41°F to 113°F); decrease the maximum ambient temperature by 1°C for every 125 m (410 ft) increase in altitude above 900 m (2,953 ft).</li> </ul> </li> <li>Sever off: 5°C to 45°C (41°F to 113°F)</li> <li>Shipping/storage: -40 to 60°C (-40 to 140°F)</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>ASHRAE Class A3: 8% to 85%, maximum dew point : 24°C (75°F)</li> <li>ASHRAE Class A4: 8% to 90%, maximum dew point : 24°C (75°F)</li> </ul> </li> <li>Shipment/storage: 8% to 90%</li> </ul> </li> <li>Particulate contamination: <p>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 solution. For information about the limits for particulates and gases, see <a href="#">“Particulate contamination” on page 5.</a></p> </li> </ul>

## 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 2. 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>	

## 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/sr250v2/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		✓	✓

Tool	Update Methods Supported	Core System Firmware Updates	I/O Devices Firmware Updates	Graphical user interface	Command line interface	Supports UXSPs
<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/>

---

## 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.

---

## 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:

[https://datacentersupport.lenovo.com/product\\_security/home](https://datacentersupport.lenovo.com/product_security/home)

---

## 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 11](#).

---

## 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 10](#).





---

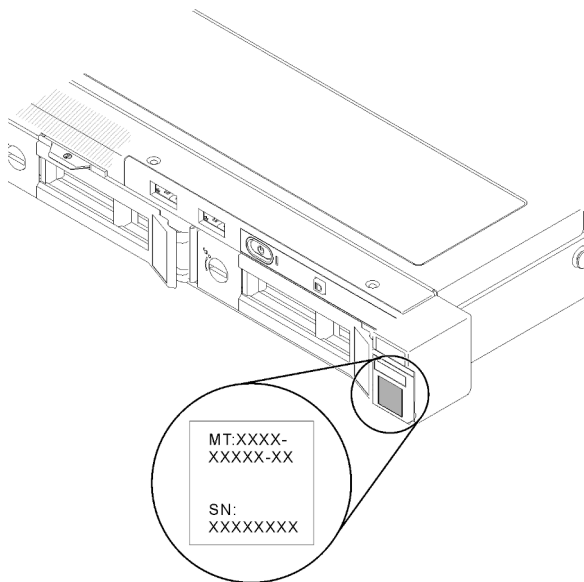
## Chapter 2. Server components

Use the information in this section to learn about each of the components associated with your 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.

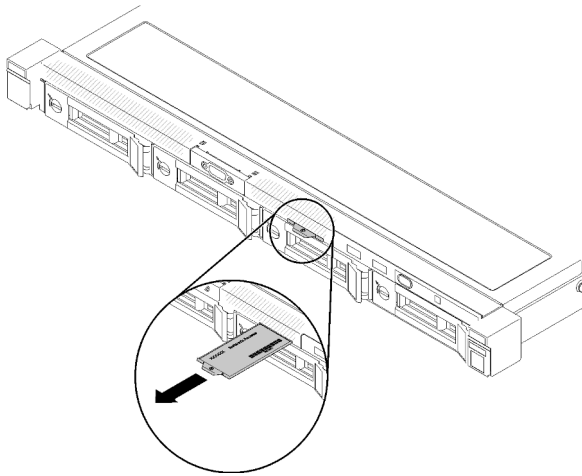
The model number and serial number are on the ID label on the front of the server. The following illustration shows the location of the ID label containing the machine type, model, and serial number.



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

### Network access tag

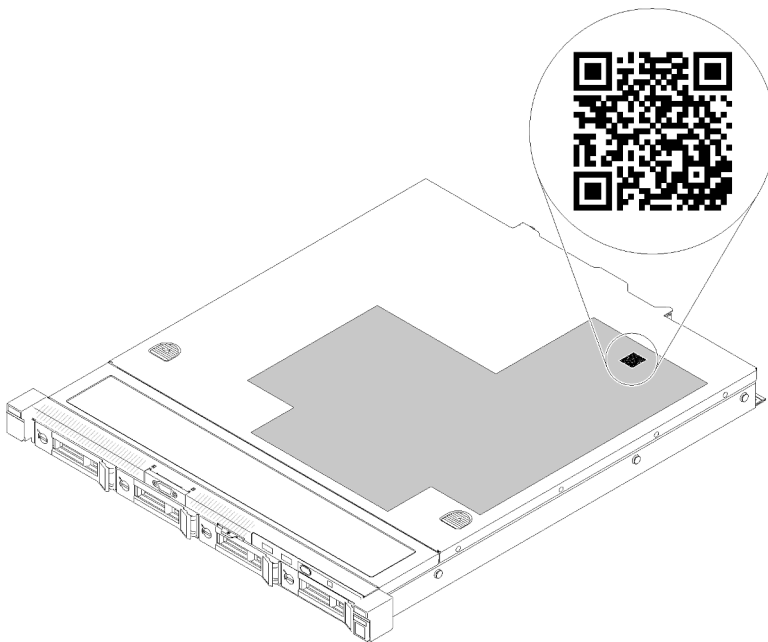
The network access tag can be found on the front of the server. You can pull away the network access tag to paste your own label for recording some information such as the hostname, the system name and the inventory bar code. Please keep the network access tag for future reference.



*Figure 3. Network access tag*

### **QR code**

In addition, the system Service Card that is located on the top cover of the server, provides a quick response (QR) code for mobile access to service information. You can scan the QR code with a mobile device using a QR code reader application and get quick access to the Service Information web page. The Service Information web page provides additional information for parts installation and replacement videos, and error codes for server support.



*Figure 4. SR250 V2 QR code*

---

## **Front view**

The front view of the server varies by the model.

## Front view of the server

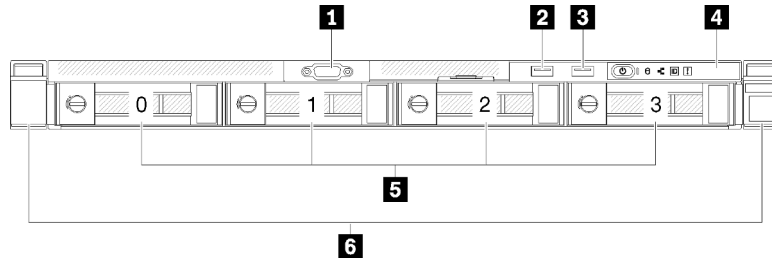


Figure 5. Four 3.5-inch simple-swap drives model front view

<b>1</b> VGA connector (optional)	<b>4</b> Front operator panel
<b>2</b> USB 2.0 connector with Lenovo XClarity Controller management	<b>5</b> Four 3.5-inch simple-swap drive bays (0-3)
<b>3</b> USB 3.2 Gen 1 connector	<b>6</b> Rack release latches

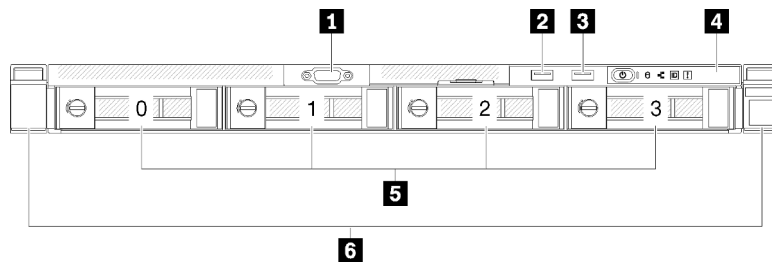


Figure 6. Three 3.5-inch simple-swap drives and one 3.5-inch NVMe drive model front view

<b>1</b> VGA connector (optional)	<b>4</b> Front operator panel
<b>2</b> USB 2.0 connector with Lenovo XClarity Controller management	<b>5</b> Three 3.5-inch simple-swap drive bays (0-2) and one 3.5-inch NVMe drive bay (3)
<b>3</b> USB 3.2 Gen 1 connector	<b>6</b> Rack release latches

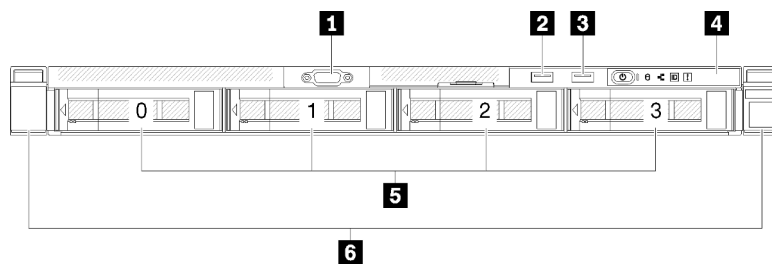


Figure 7. Four 3.5-inch hot-swap drives model front view

<b>1</b> VGA connector (optional)	<b>4</b> Front operator panel
<b>2</b> USB 2.0 connector with Lenovo XClarity Controller management	<b>5</b> Four 3.5-inch hot-swap drive bays (0-3)
<b>3</b> USB 3.2 Gen 1 connector	<b>6</b> Rack release latches

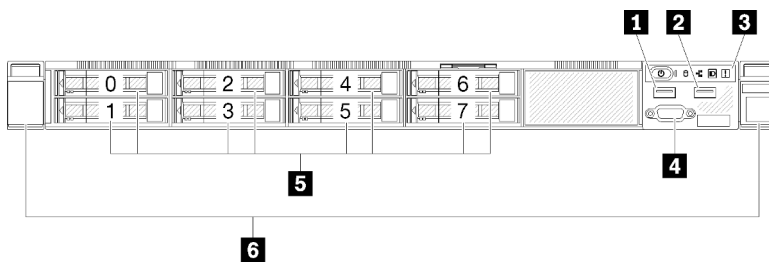


Figure 8. Eight 2.5-inch hot-swap drives model front view

<b>1</b> USB 2.0 connector with Lenovo XClarity Controller management	<b>4</b> VGA connector (optional)
<b>2</b> USB 3.2 Gen 1 connector	<b>5</b> Eight 2.5-inch hot-swap drive bays (0-7)
<b>3</b> Front operator panel	<b>6</b> Rack release latches

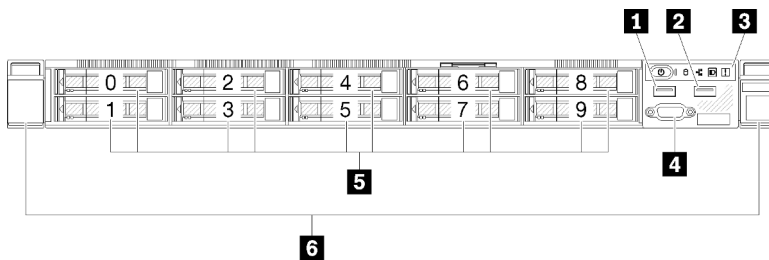


Figure 9. Ten 2.5-inch hot-swap drives model front view

**Note:** The last two drive bays may not be supported if only the eight-bay backplane is installed.

<b>1</b> USB 2.0 connector with Lenovo XClarity Controller management	<b>4</b> VGA connector (optional)
<b>2</b> USB 3.2 Gen 1 connector	<b>5</b> Ten 2.5-inch hot-swap drive bays (0-9)
<b>3</b> Front operator panel	<b>6</b> Rack release latches

## Front operator panel

The front operator information panel of the server provides controls, connectors, and LEDs. The front operator panel varies by model.

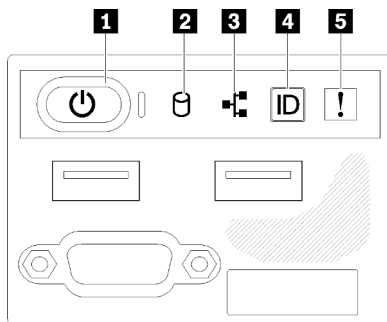


Figure 10. 2.5-inch drive chassis front I/O assembly

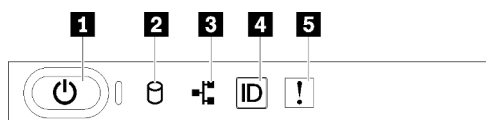


Figure 11. 3.5-inch drive chassis front operator panel

Table 3. Front operator panel controls and indicators

<b>1</b> Power button and power LED (green)	<b>4</b> System ID button/LED (blue)
<b>2</b> Drive activity LED (green)	<b>5</b> System error LED (yellow)
<b>3</b> Network activity LED (green)	

**1 Power button and power LED (green):** Press this button to turn the server on and off manually. The states of the power LED are as follows:

**Off:** Power is not present, or the power supply / the LED itself is failed.

**Flashing rapidly (4 times per second):** 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):** The server is turned off and is ready to be turned on. You can press the power button to turn on the server.

**On:** The server is turned on.

**2 Drive activity LED (green):** Each hot-swap drive comes with an activity LED. If the LED is lit, it indicates that the drive is powered, but not actively reading or writing data. If the LED is flashing, the drive is being accessed.

**3 Network activity LED (green):** When this LED flickers, it indicates that the server is transmitting to or receiving signals from the Ethernet LAN.

**4 System ID button/LED (blue):** Use this blue LED to visually locate the server among other servers. This LED is also used as a presence detection button. You can use Lenovo XClarity Administrator to light this LED remotely.

If the XClarity Controller USB connector is set to have both the USB 2.0 function and XClarity Controller management function, you can press the system ID button for three seconds to switch between the two functions.

**5 System error LED (yellow):** When this yellow LED is lit, it indicates that a system error has occurred.

## Rear view

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

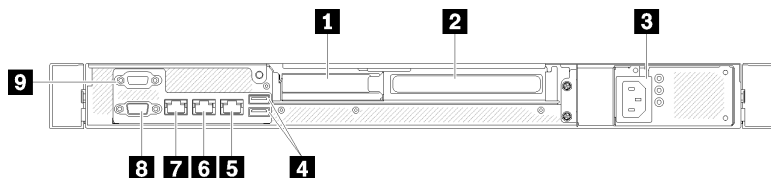


Figure 12. Rear view - Non-redundant power supply model

Table 4. Rear view - Non-redundant power supply model

<b>1</b> PCIe slot 1	<b>6</b> Ethernet connector 1 (shared with XCC network port)
<b>2</b> PCIe slot 2	<b>7</b> Dedicated Lenovo XClarity Controller (XCC) network connector
<b>3</b> Power connector	<b>8</b> VGA connector
<b>4</b> USB 3.2 Gen 2 connectors	<b>9</b> Serial connector
<b>5</b> Ethernet connector 2	

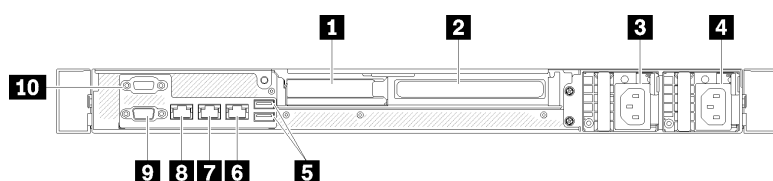


Figure 13. Rear view - Redundant power supply model

Table 5. Rear view - Redundant power supply model

<b>1</b> PCIe slot 1	<b>6</b> Ethernet connector 2
<b>2</b> PCIe slot 2	<b>7</b> Ethernet connector 1 (shared with XCC network port)
<b>3</b> Power connector 1	<b>8</b> Dedicated Lenovo XClarity Controller (XCC) network connector
<b>4</b> Power connector 2	<b>9</b> VGA connector
<b>5</b> USB 3.2 Gen 2 connectors	<b>10</b> Serial connector

**PCIe slot 1 and 2:** Your server has PCIe slots on the system board for you to install appropriate PCIe adapters. For information about the PCIe slots, see [“PCIe riser assembly” on page 24](#).

**Power connector 1 and 2:** Connect the power cord to this component.

**USB 3.2 Gen 2 connectors:** Used to attach a device that requires a USB 3.2 connection, such as a keyboard, a mouse, or a USB flash drive.

**Ethernet connector 1 and 2:** Used to attach an Ethernet cable for a LAN. Each Ethernet connector has two status LEDs to help you identify the Ethernet connectivity and activity. If the LOM adapter is not installed, Ethernet connector 1 can be set as Lenovo XClarity Controller Network connector. To set Ethernet connector 1 as Lenovo XClarity Controller Network connector, start Setup Utility and select **BMC Settings → Network Settings → Network Settings Network Interface Port : Shared**. Then, click **Shared NIC on** and select **Onboard Port 1**.

**Dedicated Lenovo XClarity Controller (XCC) network connector :** Used to attach an Ethernet cable to manage the system using Lenovo XClarity Controller.

**VGA connector :** Used to attach a VGA-compatible video device, such as a VGA monitor.

**Serial connector:** Connect a 9-pin serial device to this connector. The serial port is shared with the XCC. The XCC can take control of the shared serial port to redirect serial traffic, using Serial over LAN (SOL).

# System-board switches, jumpers, and buttons

The illustrations in this section provide information about the switches, jumpers, and buttons 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 19](#).

## System-board LEDs

The following illustration indicates the light-emitting diodes (LEDs) on the system board.

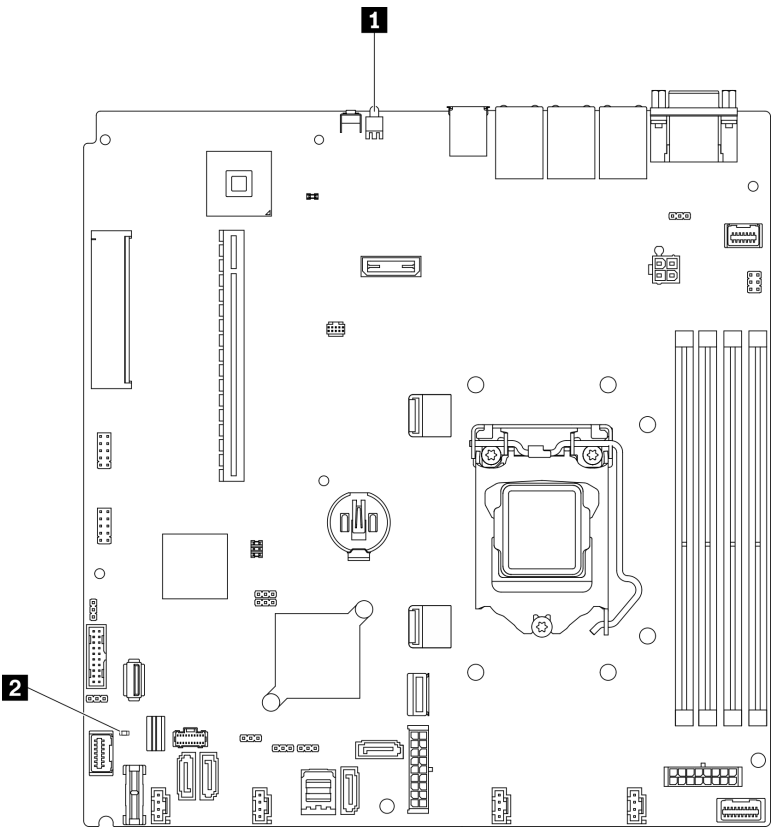


Figure 14. System-board LEDs

Table 6. System-board LEDs

<b>1</b> Rear identification LED (blue)	<b>2</b> System error LED (amber)
---	-----------------------------------

## System-board connectors

The following illustrations show the connectors on the system board.

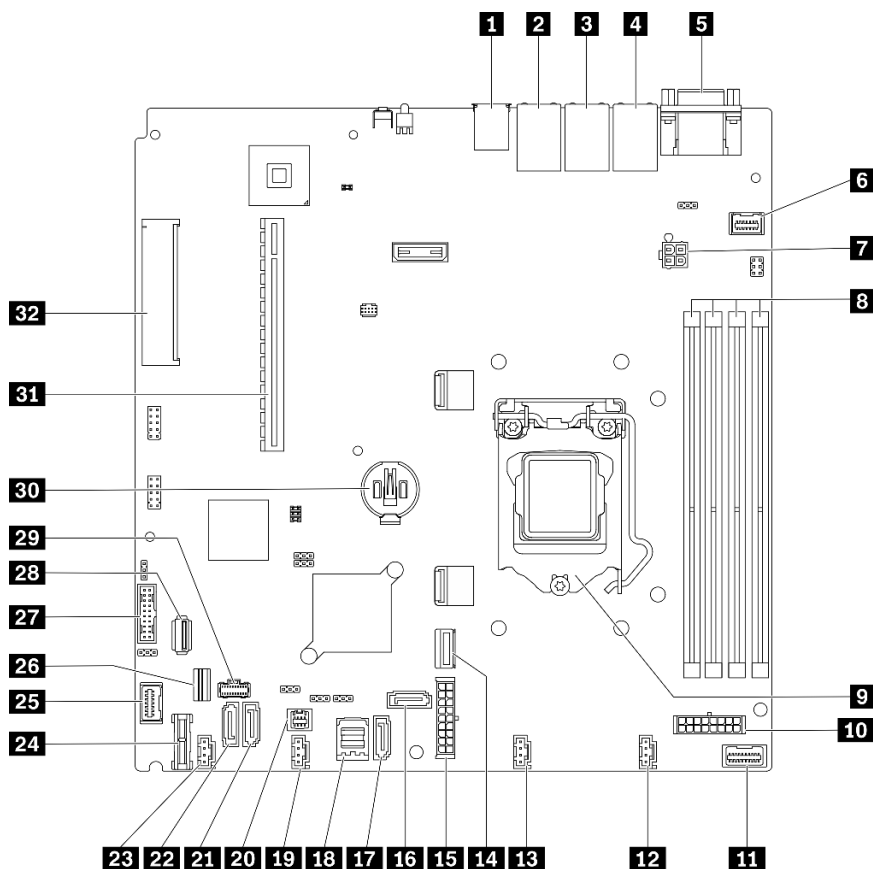


Figure 15. System-board connectors

Table 7. System-board connectors

<b>1</b> USB 3.2 Gen 2 connector	<b>17</b> SATA connector 7
<b>2</b> Ethernet connector 2	<b>18</b> SATA connector 0-3
<b>3</b> Ethernet connector 1 (shared with XCC network port)	<b>19</b> Fan 3 connector
<b>4</b> Lenovo XClarity Controller (XCC) management port	<b>20</b> SGPIO1 connector
<b>5</b> VGA and serial port connector	<b>21</b> SATA connector 5
<b>6</b> Front VGA connector	<b>22</b> SATA connector 4
<b>7</b> Processor power connector	<b>23</b> Fan 4 connector
<b>8</b> Memory module slot 1 to 4	<b>24</b> TPM/TCM card connector
<b>9</b> Processor	<b>25</b> Front panel connector
<b>10</b> Backplane power connector	<b>26</b> M.2 signal connector
<b>11</b> Power distribution board signal connector	<b>27</b> Front USB 3.0/2.0 header (DCI support)
<b>12</b> Fan 1 connector	<b>28</b> Internal USB 3.2 Gen 1 connector
<b>13</b> Fan 2 connector	<b>29</b> M.2 power connector
<b>14</b> MCIO x4 connector for NVMe	<b>30</b> CMOS battery - CR2032



Table 7. System-board connectors (continued)

<b>15</b> System power connector	<b>31</b> PCIe 4.0 x16 slot 1 to 2
<b>16</b> SATA connector 6	<b>32</b> PCIe 3.0 x8 slot 3

## System-board jumpers and buttons

The following illustration indicates the location of the 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.

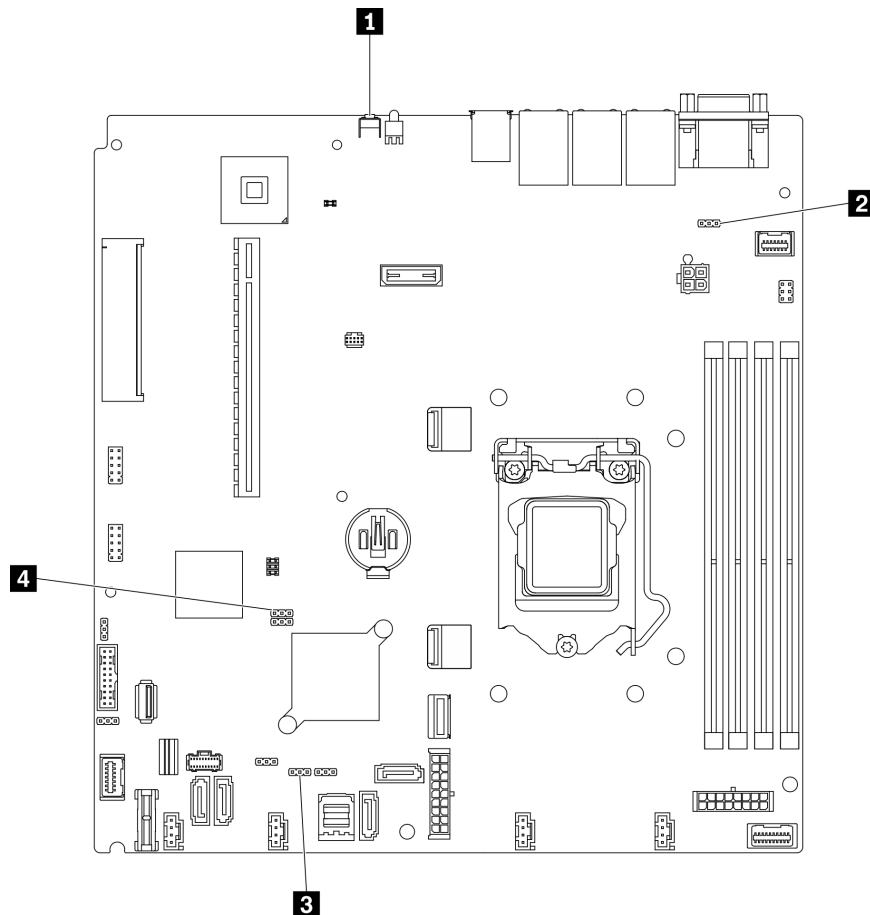


Figure 16. System-board jumpers and buttons

The following table describes the jumpers and buttons on the system board.

Table 8. System-board jumpers and buttons

Jumper and button name	Jumper setting / Button function
<b>1</b> Force NMI button	This button is on the rear of the server. 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).
<b>2</b> Power permission override jumper	<ul style="list-style-type: none"> <li>Pins 1 and 2: Normal (default).</li> <li>Pins 2 and 3: Override the power-on permission.</li> </ul>
<b>3</b> Force XCC update jumper	<ul style="list-style-type: none"> <li>Pins 1 and 2: Normal (default).</li> <li>Pins 2 and 3: Force the Lenovo XClarity Controller to update to the latest version.</li> </ul>
<b>4</b> Clear CMOS jumper	<ul style="list-style-type: none"> <li>Pins 1 and 2: Normal (default).</li> <li>Pins 2 and 3: Clear the real-time clock (RTC) registry.</li> </ul>

**Important:**

- 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\\_documentation/](https://pubs.lenovo.com/safety_documentation/), “Installation Guidelines” on page 51, “Handling static-sensitive devices” on page 53, and “Power off the server” on page 11.
- Any system-board switch or jumper block that is not shown in the illustrations in this document are reserved.

## Backplates and backplanes

Use this information to identify the backplate or the backplane you use.

### Backplate, four 3.5-inch simple-swap drives (connects to onboard connectors)

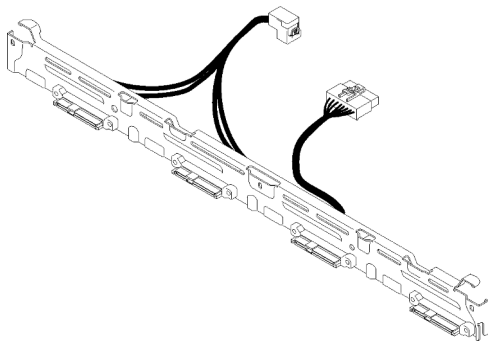
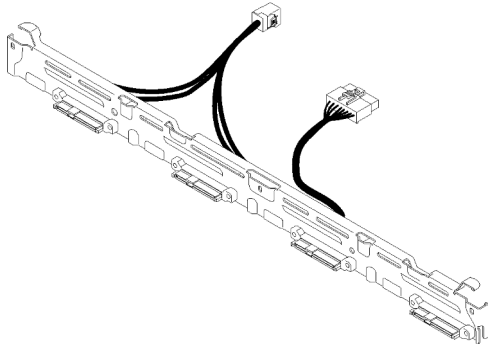


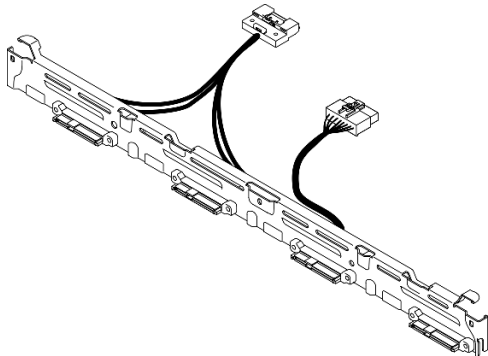
Figure 17. Backplate, four 3.5-inch simple-swap drives (connects to onboard connectors)

**Backplate, four 3.5-inch simple-swap drives (connects to Gen 3 RAID adapter)**



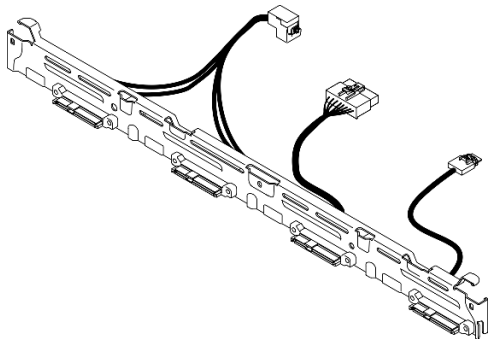
*Figure 18. Backplate, four 3.5-inch simple-swap drives (connects to Gen 3 RAID adapter)*

**Backplate, four 3.5-inch simple-swap drives (connects to Gen 4 RAID adapter)**



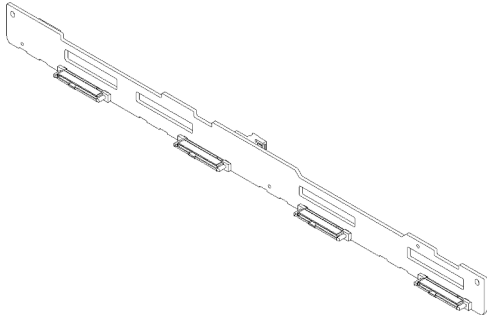
*Figure 19. Backplate, four 3.5-inch simple-swap drives (connects to Gen 4 RAID adapter)*

**Backplate, three 3.5-inch simple-swap drives and one NVMe drive (connects to onboard connectors)**



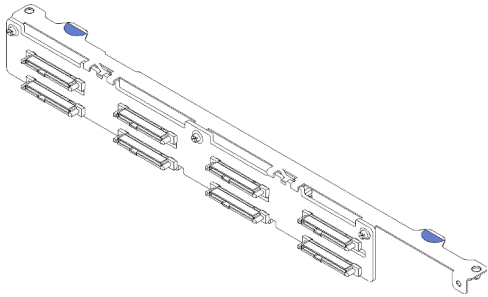
*Figure 20. Backplate, three 3.5-inch simple-swap drives and one NVMe drive (connects to onboard connectors)*

### **Backplane, four 3.5-inch hot-swap drives**



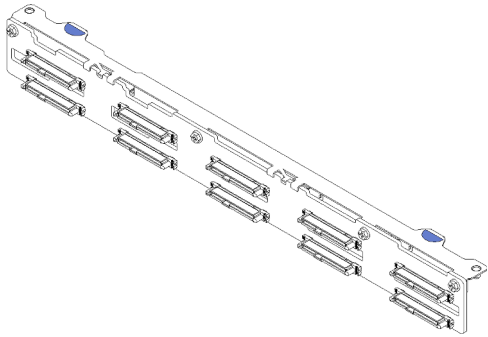
*Figure 21. Backplane, four 3.5-inch hot-swap drives*

### **Backplane, eight 2.5-inch hot-swap drives**



*Figure 22. Backplane, eight 2.5-inch hot-swap drives*

### **Backplane, ten 2.5-inch hot-swap drives**



*Figure 23. Backplane, ten 2.5-inch hot-swap drives*

---

## **PCIe riser assembly**

Use this information to locate the connectors on the PCIe riser assembly.

**x16 PCIe riser assembly**

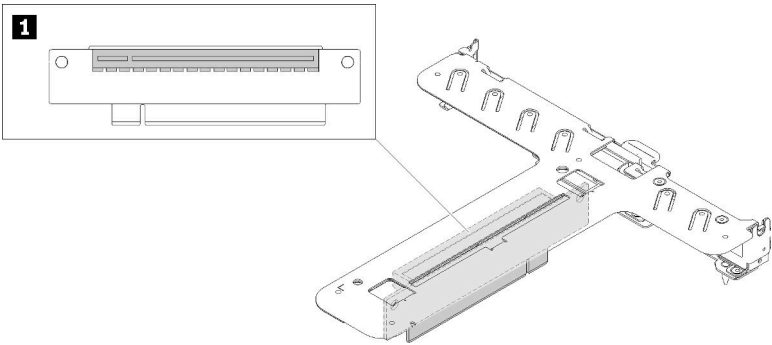


Figure 24. x16 PCIe riser assembly

Table 9. x16 PCIe riser assembly

<b>1</b> Slot 2, PCIe Gen4 x16 in x16 slot, full height
---

**x8/x8 Butterfly riser assembly**

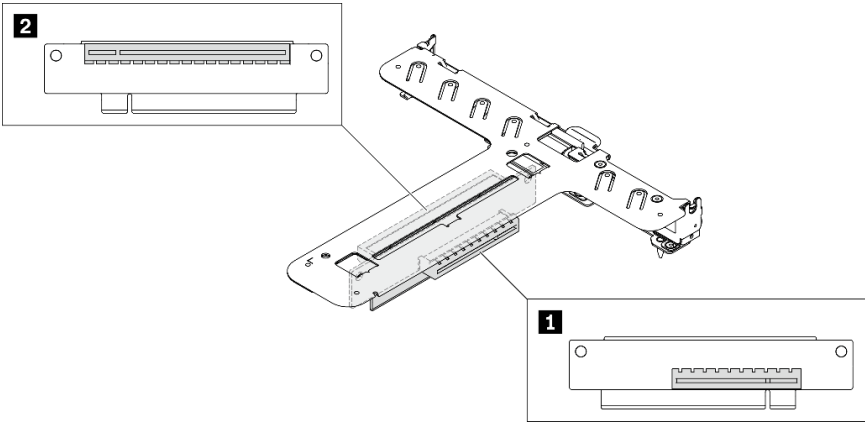


Figure 25. x8/x8 Butterfly riser assembly

Table 10. x8/x8 Butterfly riser assembly

<b>1</b> Slot 1, PCIe Gen4 x8 in x8 slot, half-length (open-end)	<b>2</b> Slot 2, PCIe Gen4 x8 in x16 slot, full-height
--	--

**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 the [Figure 26 “Server components - 2.5-inch drive model” on page 26](#) or [Figure 27 “Server components - 3.5-inch drive model” on page 29](#):

<http://datacentersupport.lenovo.com/products/servers/thinksystem/sr250v2/parts>

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

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.

## 2.5-inch drive model

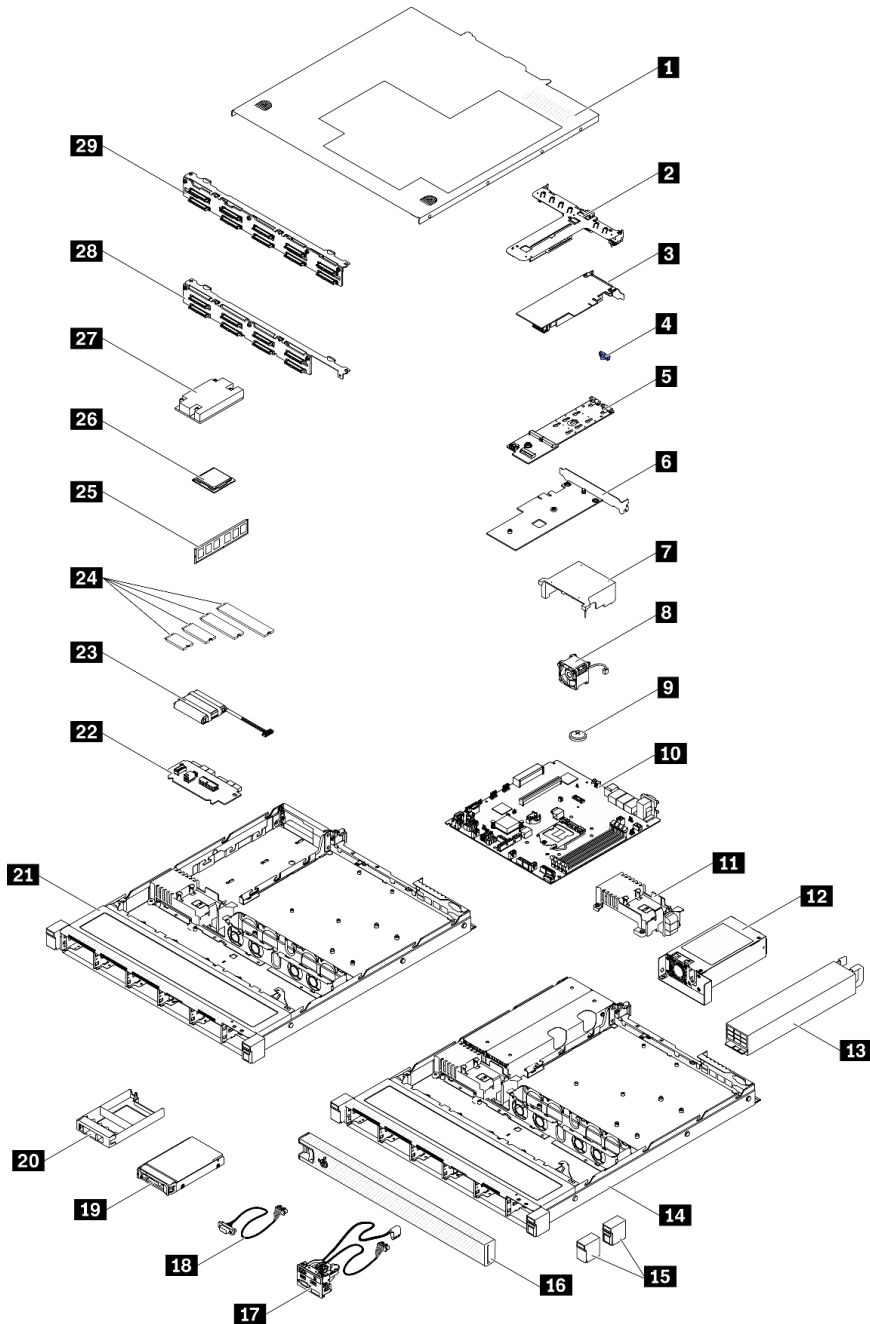


Figure 26. Server components - 2.5-inch drive model

Table 11. Parts list - 2.5-inch drive 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 26 “Server components - 2.5-inch drive model” on page 26:</p> <p><a href="http://datacentersupport.lenovo.com/products/servers/thinksystem/sr250v2/parts">http://datacentersupport.lenovo.com/products/servers/thinksystem/sr250v2/parts</a></p> <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	PCIe riser assembly	√			
3	RAID adapter	√			
4	M.2 retainer clip	√			
5	M.2 boot adapter	√			
6	PCIe adapter for M.2 boot adapter	√			
7	Air baffle	√			
8	Fan	√			
9	CMOS battery (CR2032)				√
10	System board			√	
11	Power distribution board cover	√			
12	Fixed power supply unit		√		
13	Redundant power supply unit	√			
14	Chassis for redundant power supply			√	
15	Rack latches	√			
16	Security bezel	√			
17	Front I/O assembly	√			
18	VGA cable	√			
19	2.5-inch hot-swap drive	√			
20	Drive filler				√
21	Chassis for fixed power supply			√	
22	Power distribution board		√		
23	Flash power module	√			
24	M.2 drive	√			
25	Memory module	√			
26	Processor			√	
27	Heat sink			√	

Table 11. Parts list - 2.5-inch drive model (continued)

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
<b>28</b>	Backplane, eight 2.5-inch hot-swap drives	√			
<b>29</b>	Backplane, ten 2.5-inch hot-swap drives	√			



### 3.5-inch drive model

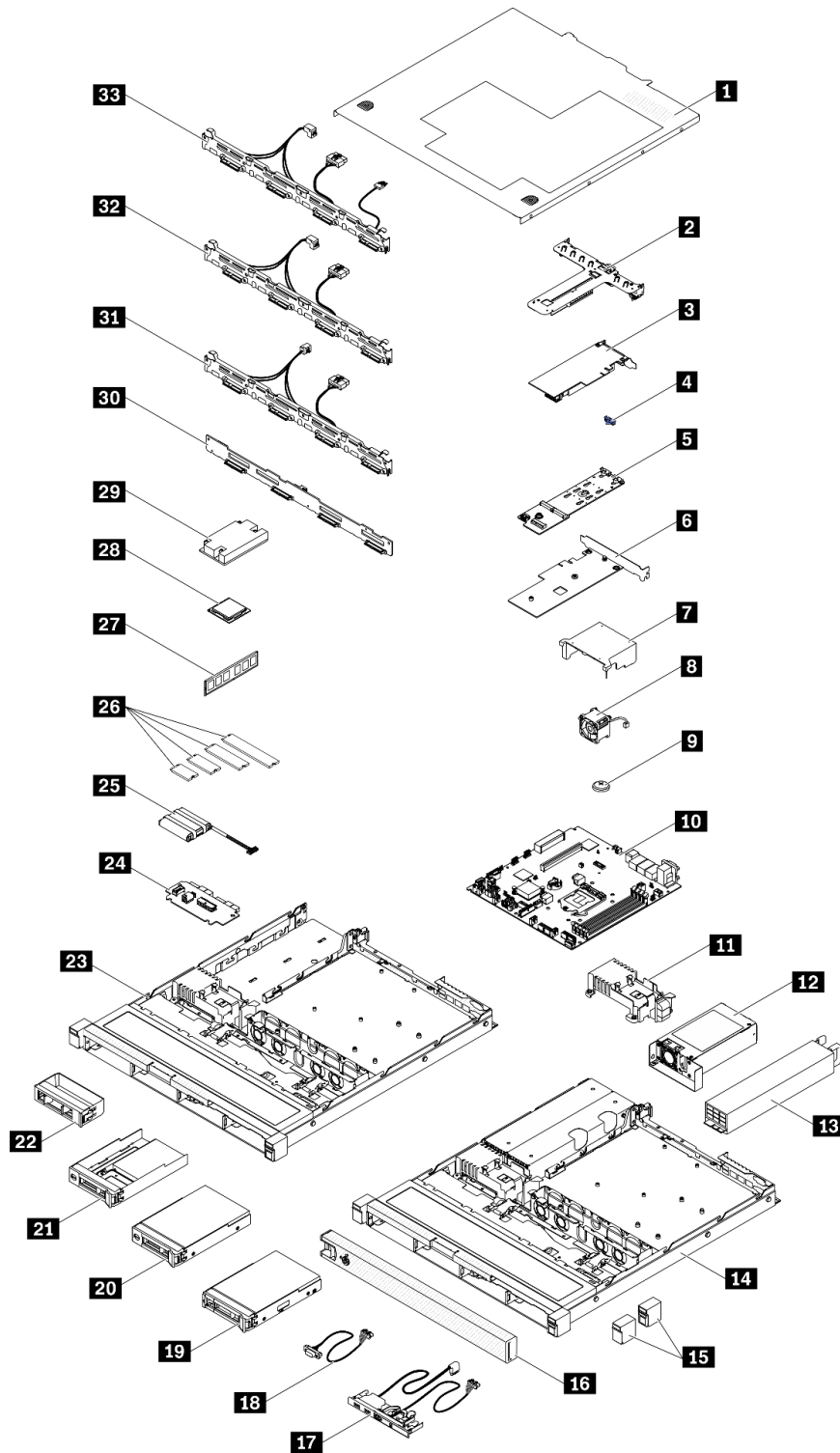


Figure 27. Server components - 3.5-inch drive model

Table 12. Parts listing - 3.5-inch drive 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 27 “Server components - 3.5-inch drive model” on page 29</a>:</p> <p><a href="http://datacentersupport.lenovo.com/products/servers/thinksystem/sr250v2/parts">http://datacentersupport.lenovo.com/products/servers/thinksystem/sr250v2/parts</a></p> <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>	PCIe riser assembly	√			
<b>3</b>	RAID adapter	√			
<b>4</b>	M.2 retainer clip	√			
<b>5</b>	M.2 boot adapter	√			
<b>6</b>	PCIe adapter for M.2 boot adapter	√			
<b>7</b>	Air baffle	√			
<b>8</b>	Fan	√			
<b>9</b>	CMOS battery (CR2032)				√
<b>10</b>	System board			√	
<b>11</b>	Power distribution board cover	√			
<b>12</b>	Fixed power supply unit		√		
<b>13</b>	Redundant power supply unit	√			
<b>14</b>	Chassis for redundant power supply			√	
<b>15</b>	Rack latches	√			
<b>16</b>	Security bezel	√			
<b>17</b>	Front operator panel	√			
<b>18</b>	VGA cable	√			
<b>19</b>	3.5-inch hot-swap drive	√			
<b>20</b>	3.5-inch simple-swap drive	√			
<b>21</b>	2.5-inch simple-swap drive with 3.5-inch drive tray	√			
<b>22</b>	Drive filler				√
<b>23</b>	Chassis for fixed power supply			√	
<b>24</b>	Power distribution board		√		
<b>25</b>	Flash power module	√			
<b>26</b>	M.2 drive	√			
<b>27</b>	Memory module	√			

Table 12. Parts listing - 3.5-inch drive model (continued)

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
<b>28</b>	Processor			√	
<b>29</b>	Heat sink			√	
<b>30</b>	Backplane, four 3.5-inch hot-swap drives	√			
<b>31</b>	Backplane, four 3.5-inch simple-swap drives (connects to RAID card)	√			
<b>32</b>	Backplane, four 3.5-inch simple-swap drives (connects to onboard connectors)	√			
<b>33</b>	Backplane, three 3.5-inch simple-swap drives and one NVMe drive (connects to onboard connectors)	√			

## 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.

---

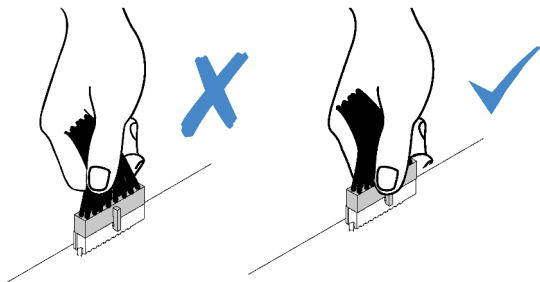
## Chapter 3. Internal cable routing

Some of the components in the server have internal cables and cable connectors.

To connect cables, observe the following guidelines:

- Turn off the server before you connect or disconnect any internal cables.
- See the documentation that comes with any external devices for additional cabling instructions. It might be easier for you to route cables before you connect the devices to the server.
- Cable identifiers of some cables are printed on the cables that come with the server and optional devices. Use these identifiers to connect the cables to the correct connectors.
- Ensure that the cable is not pinched and does not cover any connectors or obstruct any components on the system board.
- Ensure that the relevant cables pass through the cable clips and guides.

**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.



---

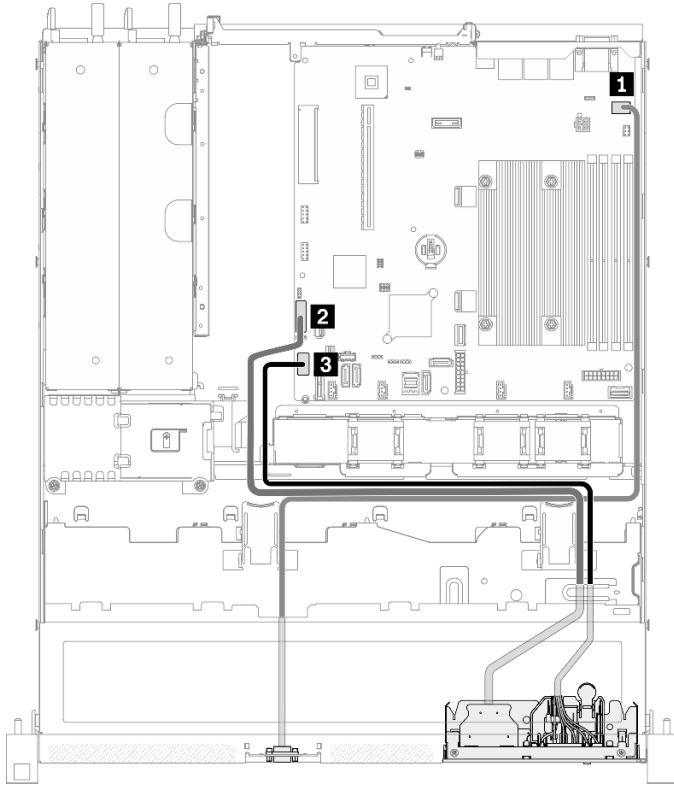
### Front panel cable routing

Use the section to understand the cable routing for the front panel.

**Notes:**

- Connections between connectors; **1↔1, 2↔2, 3↔3, ... n↔n**
- When routing the cables, ensure that all cables are routed appropriately through the cable guides and cable clips.

### 3.5-inch model



*Figure 28. Front panel cable routing for 3.5-inch model*

2.5-inch model

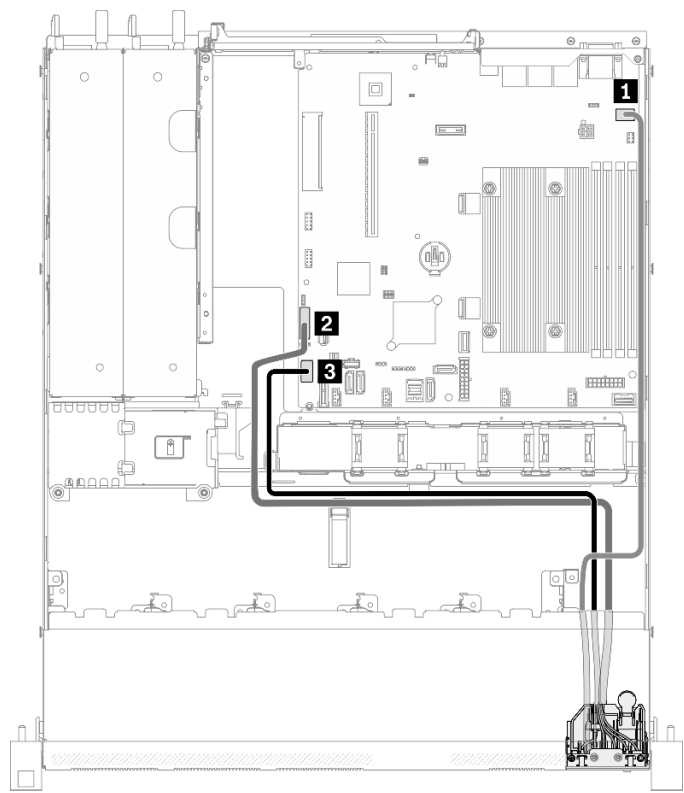


Figure 29. Front panel cable routing for 2.5-inch model

<b>1</b> Front VGA connector	<b>3</b> Front panel connector
<b>2</b> Front USB 3.0/2.0 header (DCI support)	

Fan cable routing

Use the section to understand the internal routing and connectors for fan cables.

Notes:

- Connections between connectors; **1↔1**, **2↔2**, **3↔3**, ... **n↔n**
- When routing the cables, ensure that all cables are routed appropriately through the cable guides and cable clips.

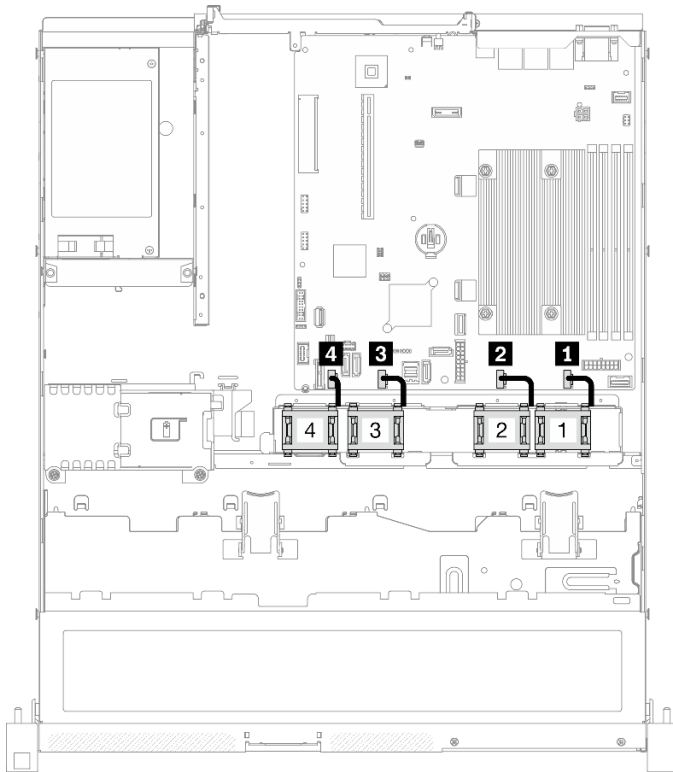


Figure 30. Fan cable routing

<b>1</b> Fan 1 connector	<b>3</b> Fan 3 connector
<b>2</b> Fan 2 connector	<b>4</b> Fan 4 connector

## Fixed power supply unit cable routing

Use the section to understand the internal routing and connectors for the fixed power supply unit.

### Notes:

- Connections between connectors; **1** ↔ **1**, **2** ↔ **2**, **3** ↔ **3**, ... **n** ↔ **n**
- When routing the cables, ensure that all cables are routed appropriately through the cable guides and cable clips.



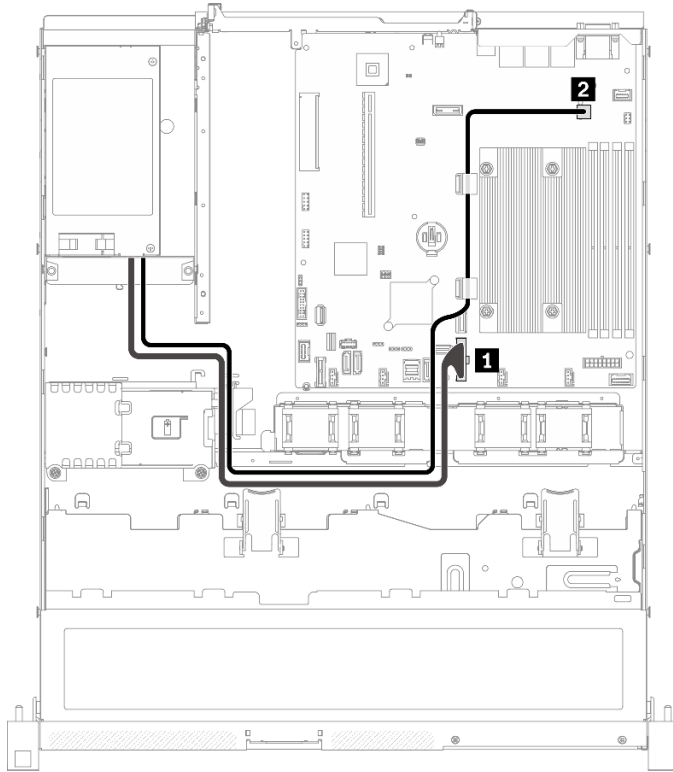


Figure 31. Fixed power supply unit cable routing

<b>1</b> System power connector	<b>2</b> Processor power connector
---------------------------------	------------------------------------

## Hot-swap power supply unit cable routing

Use the section to understand the internal routing and connectors for the hot-swap power supply units.

### Notes:

- Connections between connectors: **1 ↔ 1**, **2 ↔ 2**, **3 ↔ 3**, ... **n ↔ n**
- When routing the cables, ensure that all cables are routed appropriately through the cable guides and cable clips.

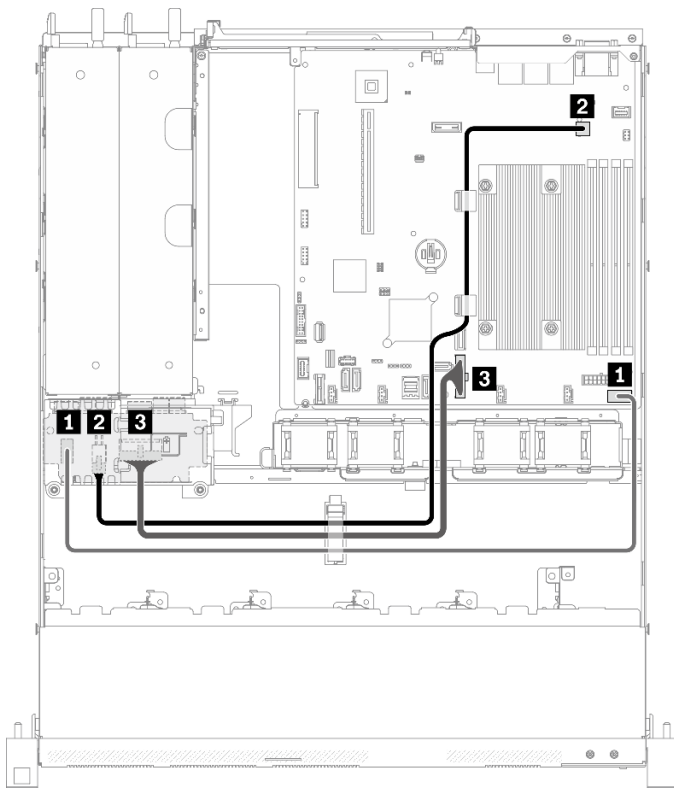


Figure 32. Hot-swap power supply unit cable routing

From	To
<b>1</b> PDB: Power distribution board signal connector	System board: Power distribution board signal connector
<b>2</b> PDB: Processor power connector	System board: Processor power connector
<b>3</b> PDB: System power connector	System board: System power connector

## Flash power module cable routing

Use the section to understand the internal routing and connectors for the flash power module.

### Notes:

- Connections between connectors; **1 ↔ 1**, **2 ↔ 2**, **3 ↔ 3**, ... **n ↔ n**
- When routing the cables, ensure that all cables are routed appropriately through the cable guides and cable clips.

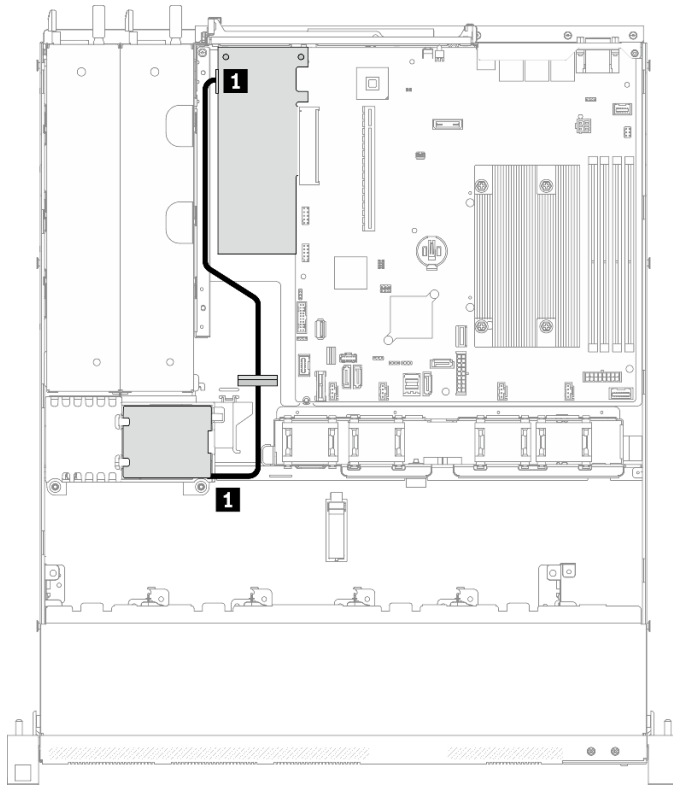


Figure 33. Flash power module cable routing

**1** Flash power module

## M.2 boot adapter cable routing

Use the section to understand the internal routing and connectors for the M.2 boot adapter.

### Notes:

- Connections between connectors; **1 ↔ 1**, **2 ↔ 2**, **3 ↔ 3**, ... **n ↔ n**
- When routing the cables, ensure that all cables are routed appropriately through the cable guides and cable clips.
- When an M.2 adapter is installed, eight SATA/SAS drives configured with software RAID is not supported.

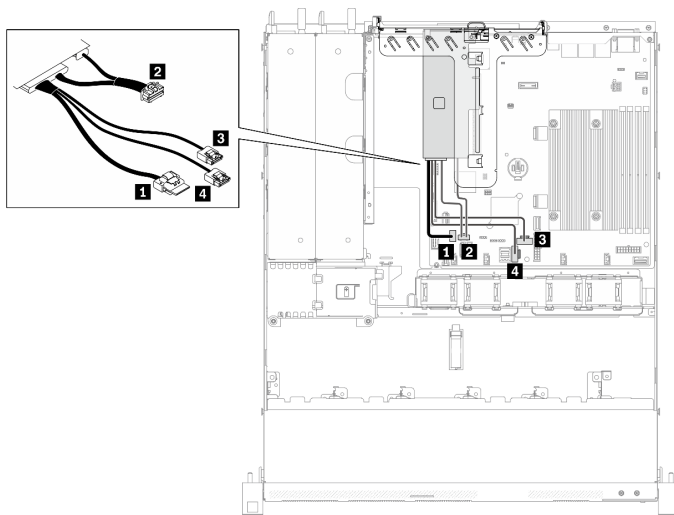


Figure 34. M.2 boot adapter cable routing

From	To
<b>1</b> M.2 signal connector on the M.2 boot adapter	System board: M.2 signal connector
<b>2</b> M.2 power connector on the M.2 boot adapter	System board: M.2 power connector
<b>3</b> M.2 signal connector on the M.2 boot adapter	System board: SATA connector 6
<b>4</b> M.2 signal connector on the M.2 boot adapter	System board: SATA connector 7

## Backplane and backplate cable routing

Use the information in this section to route the cables for the backplates and backplanes.

### Four 3.5-inch simple-swap drive cable routing

Use this section to understand how to route cables for four 3.5-inch simple-swap drive model.

#### Notes:

- Connections between connectors; **1**↔**1**, **2**↔**2**, **3**↔**3**, ... **n**↔**n**
- When routing the cables, ensure that all cables are routed appropriately through the cable guides and cable clips.

## Four SATA drives (Software RAID)

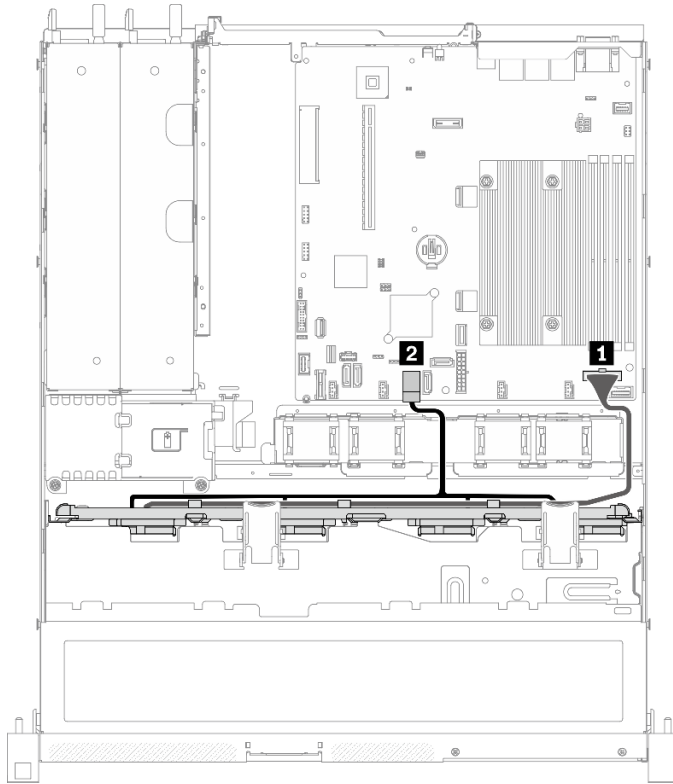


Figure 35. Four SATA drives (Software RAID)

From	To
<b>1</b> Backplate: Power cable	System board: Backplane power connector
<b>2</b> Backplate: SATA cable	System board: SATA connector 0-3

### Three SATA drives and one NVMe drive (Software RAID)

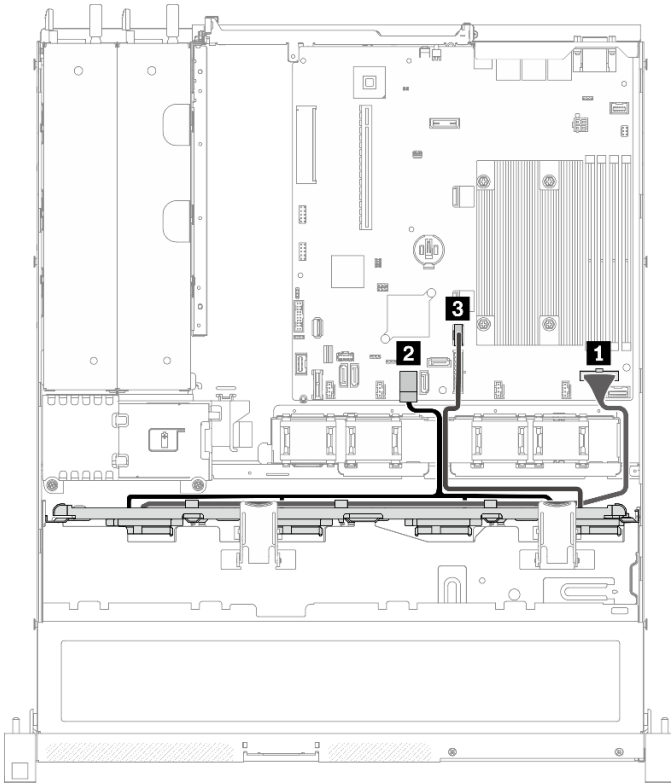


Figure 36. Three SATA drives and one NVMe drive (Software RAID)

From	To
<b>1</b> Backplane: Power cable	System board: Backplane power connector
<b>2</b> Backplane: SATA cable	System board: SATA connector 0-3
<b>3</b> Backplane: NVMe cable	System board: MCIO x4 connector for NVMe

## Four SATA drives (Hardware RAID/HBA)

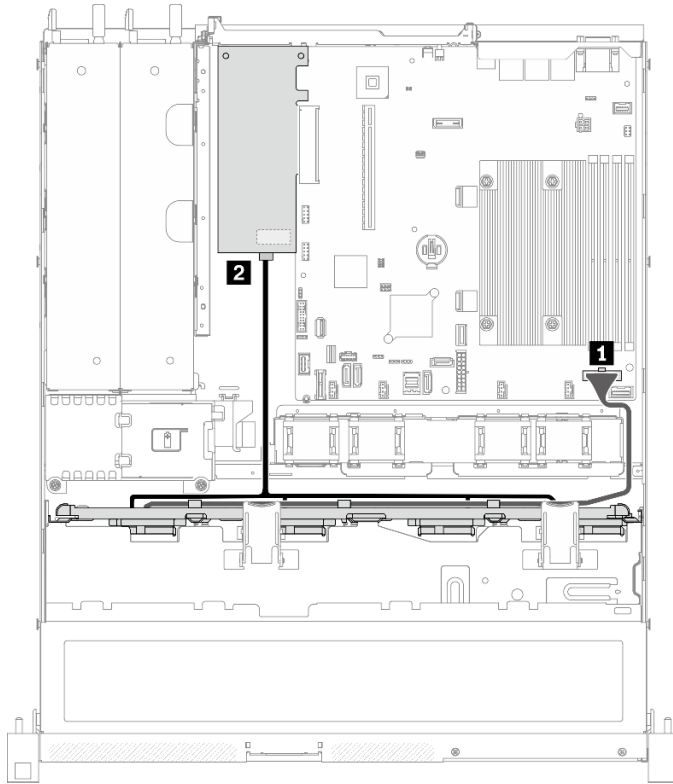


Figure 37. Four SATA drives (Hardware RAID/HBA)

From	To
<b>1</b> Backplate: Power cable	System board: Backplane power connector
<b>2</b> Backplate: SATA cable	<ul style="list-style-type: none"><li>• 8i G4: C0</li><li>• 8i G3: C0</li></ul>

## Four 3.5-inch hot-swap drive cable routing

Use this section to understand how to route cables for four 3.5-inch hot-swap drive model.

### Notes:

- Connections between connectors; **1** ↔ **1**, **2** ↔ **2**, **3** ↔ **3**, ... **n** ↔ **n**
- When routing the cables, ensure that all cables are routed appropriately through the cable guides and cable clips.

## Four SATA/SAS drives (Software RAID)

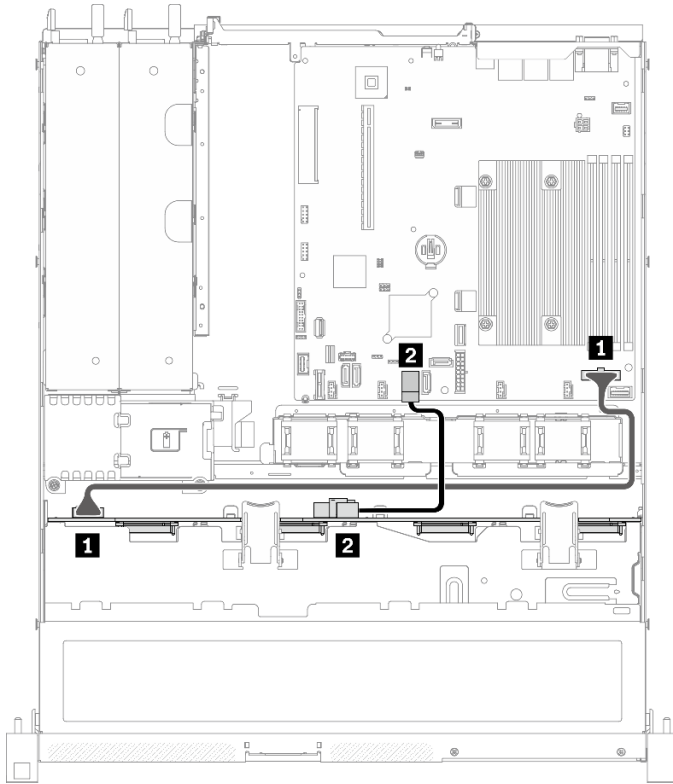
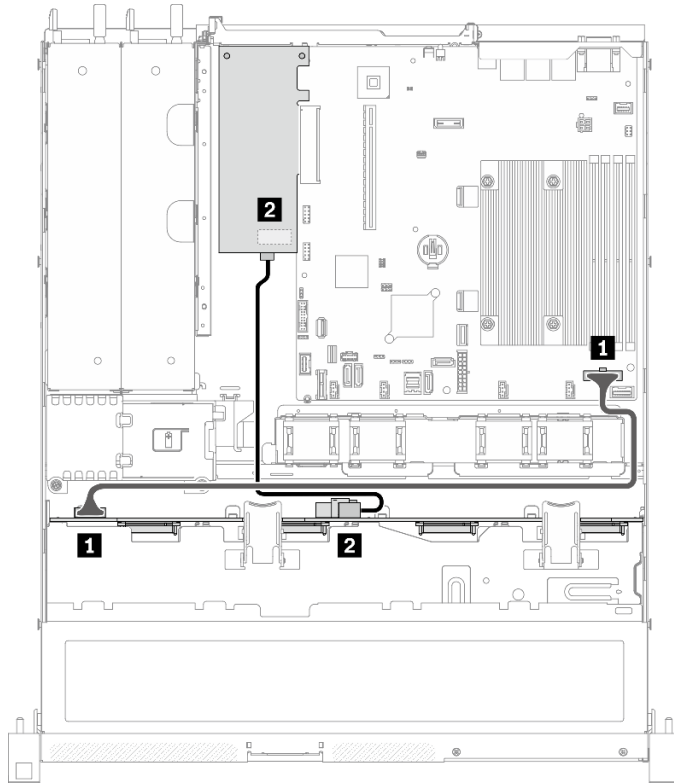


Figure 38. Four SATA/SAS drives (Software RAID)

From	To
<b>1</b> Backplane: Power connector	System board: Backplane power connector
<b>2</b> Backplane: SATA signal connector	System board: SATA connector 0-3



### Four SATA/SAS drives (Hardware RAID/HBA)



From	To
<b>1</b> Backplane: Power connector	System board: Backplane power connector
<b>2</b> Backplane: SATA signal connector	<ul style="list-style-type: none"><li>• 8i G4: C0</li><li>• 8i G3: C0</li></ul>

Figure 39. Four SATA/SAS drives (Hardware RAID/HBA)

### Eight 2.5-inch hot-swap drive cable routing

Use this section to understand how to route cables for eight 2.5-inch hot-swap drive model.

#### Notes:

- Connections between connectors: **1↔1, 2↔2, 3↔3, ... n↔n**
- When routing the cables, ensure that all cables are routed appropriately through the cable guides and cable clips.

### Eight SATA/SAS drives (Software RAID)

**Note:** When an M.2 adapter is installed, eight SATA/SAS drives configured with software RAID is not supported.

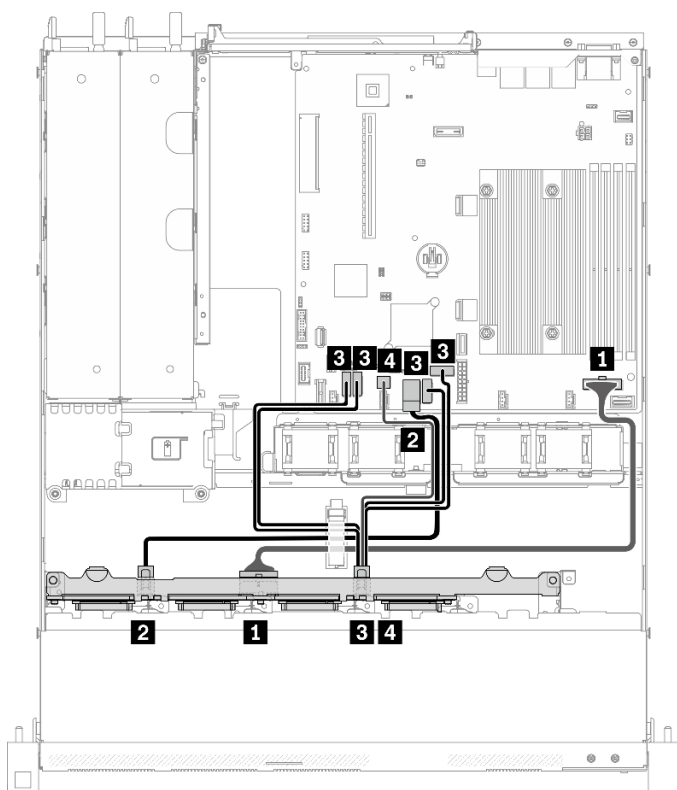


Figure 40. Eight SATA/SAS drives (Software RAID)

From	To
<b>1</b> Backplane: Power connector	System board: Backplane power connector
<b>2</b> Backplane: SATA signal connector 1	System board: SATA connector 0-3
<b>3</b> Backplane: SATA signal connector 2 (Signal)	System board: SATA connector 4/5/6/7
<b>4</b> Backplane: SATA signal connector 2 (SGPIO)	System board: SGPIO1 connector

## Eight SATA/SAS drives (Hardware RAID/HBA)

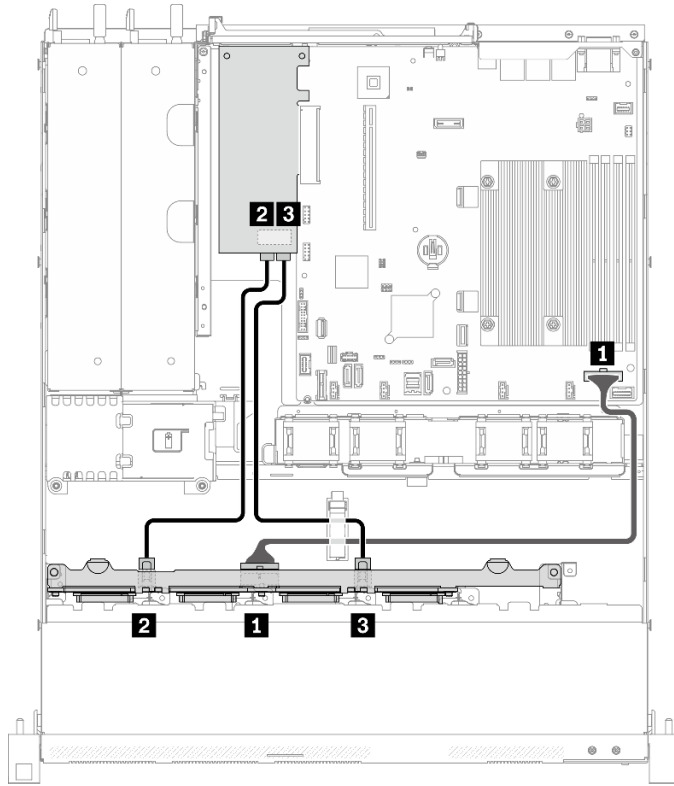


Figure 41. Eight SATA/SAS drives (Hardware RAID/HBA)

From	To
<b>1</b> Backplane: Power connector	System board: Backplane power connector
<b>2</b> Backplane: SATA signal connector 1	<ul style="list-style-type: none"><li>• 8i G4: C0</li><li>• 8i G3: C0</li></ul>
<b>3</b> Backplane: SATA signal connector 2	<ul style="list-style-type: none"><li>• 8i G4: C0</li><li>• 8i G3: C1</li></ul>

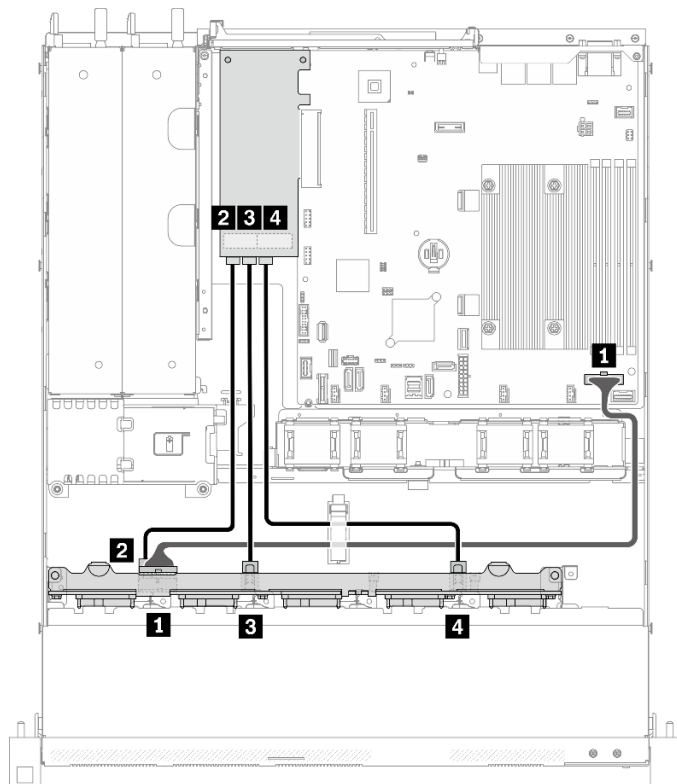
## Ten 2.5-inch hot-swap drive cable routing

Use this section to understand how to route cables for ten 2.5-inch hot-swap drive model.

### Notes:

- Connections between connectors: **1↔1**, **2↔2**, **3↔3**, ... **n↔n**
- When routing the cables, ensure that all cables are routed appropriately through the cable guides and cable clips.

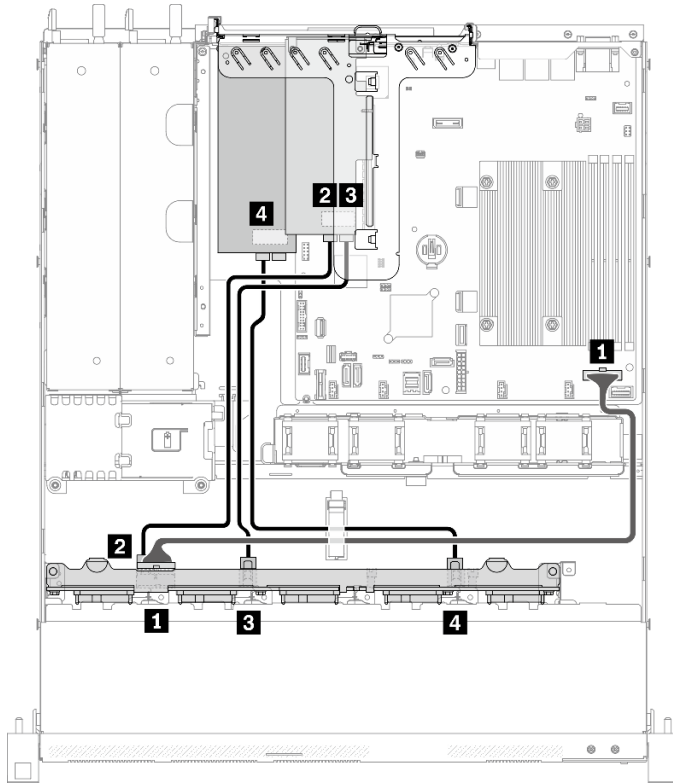
## Ten SATA/SAS drives with one 16i (Hardware RAID/HBA)



From	To
<b>1</b> Backplane: Power connector	System board: Backplane power connector
<b>2</b> Backplane: SATA signal connector 1	16i: C0
<b>3</b> Backplane: SATA signal connector 2	16i: C1
<b>4</b> Backplane: SATA signal connector 3	16i: C2

Figure 42. Ten SATA/SAS drives with one 16i (Hardware RAID/HBA)

### Ten SATA/SAS drives with two 8i (Hardware RAID/HBA)



From	To
<b>1</b> Backplane: Power connector	System board: Backplane power connector
<b>2</b> Backplane: SATA signal connector 1	8i: C0
<b>3</b> Backplane: SATA signal connector 2	8i: C1
<b>4</b> Backplane: SATA signal connector 3	8i: C0

Figure 43. Ten SATA/SAS drives with two 8i (Hardware RAID/HBA)



---

## 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 6](#).

---

### 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 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 53](#) and [“Working inside the server with the power on” on page 53](#).
- 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 SR250 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.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- 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, hot-swap fans, 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.

## 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 since 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.

## Working inside the server with the power on

You might need to keep the power on with the server cover removed to look at system information on the display panel or to replace hot-swap components. Review these guidelines before doing so.

**Attention:** The server might stop and loss of data might occur when internal server components are exposed to static electricity. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding systems when working inside the server with the power on.

- Avoid loose-fitting clothing, particularly around your forearms. Button or roll up long sleeves before working inside the server.
- Prevent your necktie, scarf, badge rope, or long hair from dangling into the server.
- Remove jewelry, such as bracelets, necklaces, rings, cuff links, and wrist watches.
- Remove items from your shirt pocket, such as pens and pencils, in case they fall into the server as you lean over it.
- Avoid dropping any metallic objects, such as paper clips, hairpins, and screws, into the server.

## 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.

---

## 2.5-inch backplane replacement

Use the following information to remove and install the 2.5-inch backplane.

### Remove the 2.5-inch backplane

Use this information to remove the 2.5-inch drive backplane.

#### About this task

**Attention:**

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

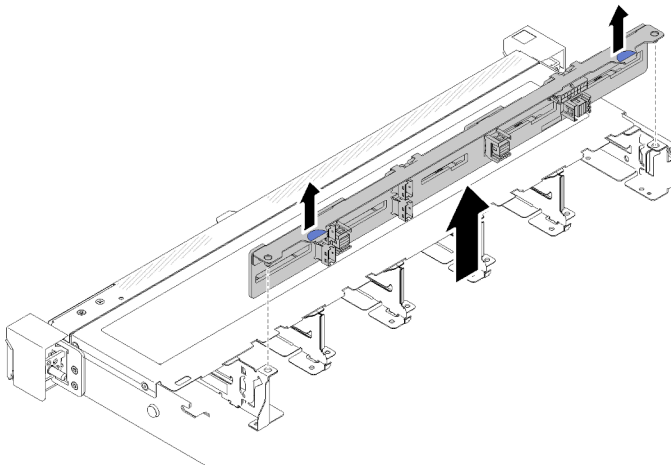
**Note:** Depending on the configuration, the following illustration might differ slightly from your backplane.

**Procedure**

Step 1. Make preparations for this task.

- a. Remove all drives and drive fillers from the drive bays. See [“Remove a hot-swap drive” on page 71](#).
- b. Remove the top cover. See [“Remove the top cover” on page 140](#).
- c. Disconnect the cables from the backplane. See [“Backplane and backplate cable routing” on page 40](#).

Step 2. Grasp the backplane and carefully lift it out of the chassis.



*Figure 44. 2.5-inch backplane removal*

**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 2.5-inch backplane**

Use this information to install the 2.5-inch backplane.

**About this task**

**Attention:**

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)

**Note:** Depending on the configuration, the following illustration might differ slightly from your backplane.

**Procedure**

- Step 1. Align the two pins on the backplane with the corresponding holes in the chassis.
- Step 2. Lower the backplane into the chassis. Ensure that the pins pass through the holes and the backplane is fully seated in place.

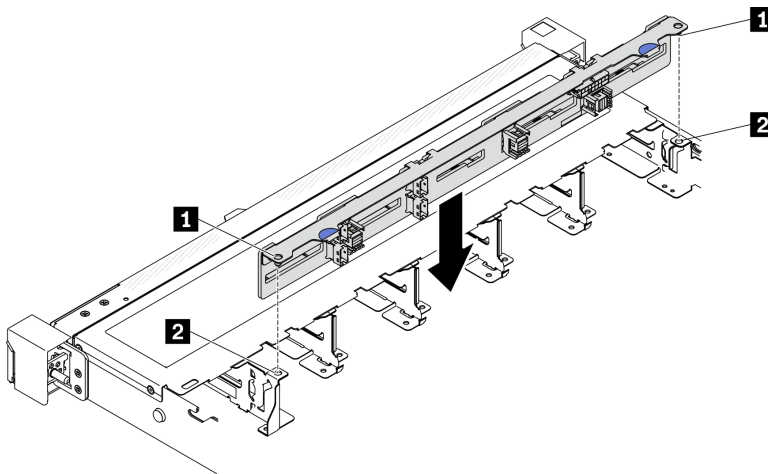


Figure 45. 2.5-inch backplane installation

<b>1</b> Pins	<b>2</b> Corresponding holes
---------------	------------------------------

**After you finish**

1. Connect the cables to the backplane. See [“Backplane and backplate cable routing” on page 40](#).
2. Install the top cover. See [“Install the top cover” on page 142](#).
3. Install all drives and drive fillers into the drive bays. See [“Install a hot-swap drive” on page 73](#).
4. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

**Demo video**

[Watch the procedure on YouTube](#)

---

## 2.5-inch drive replacement from 3.5-inch drive bay

Use this information to remove and install a 2.5-inch drive from a 3.5-inch drive bay.

The EMI integrity and cooling of the server are protected by having all drive bays covered or occupied. The number of the installed drives in your server varies depending on the server model. The vacant bays are occupied by dummy trays. When you install a drive, save the removed dummy tray from the drive bay in case you later remove the drive and need the dummy tray to cover the place.

**Attention:** An unoccupied drive bay without any other protection might impact the EMI integrity and cooling of the server, which might result in overheating or component damage. To maintain the EMI integrity and cooling of the server, install a new drive as soon as you remove the failing one or the dummy tray.

## Remove a 2.5-inch drive from a 3.5-inch drive bay

Use this information to remove 2.5-inch drive from a 3.5-inch drive bay.

### About this task

#### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Turn off the server. Disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- 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 simple-swap drive.
- For proper system cooling, do not operate the server for more than 2 minutes without either a drive or a filler panel installed in each bay.
- 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.
- If an NVMe drive is to be removed, it is recommended to disable it beforehand via the operating system.
- Before you remove any component of a RAID array, 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 the simple-swap drive. See [“Remove a simple-swap drive” on page 69](#).
- Step 2. Remove the five screws that secure the 2.5-inch drive and the drive adapter; then, remove the 2.5-inch drive and the drive adapter from the tray.

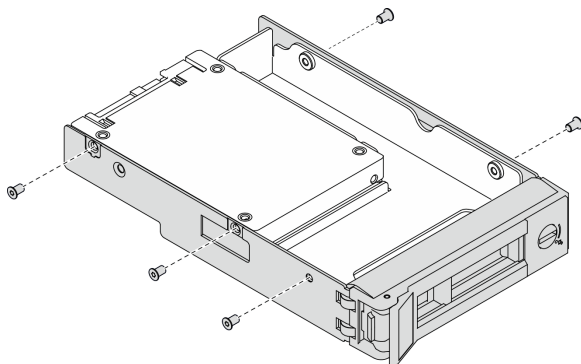


Figure 46. Removing the screws that secure the 2.5-inch drive and the drive adapter

- Step 3. Remove the two screws that secure the 2.5-inch drive; then, lift the drive up to remove it from the drive adapter.

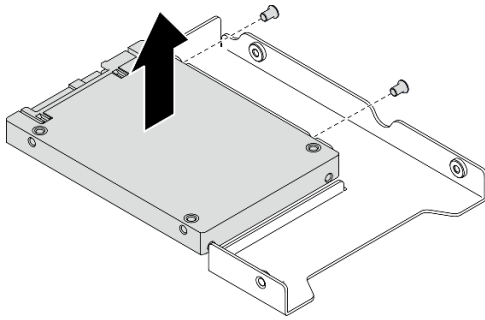


Figure 47. 2.5-inch drive removal from the drive adapter

### 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.

## Install a 2.5-inch drive into a 3.5-inch drive bay

Use this information to install a 2.5-inch drive into a 3.5-inch drive bay.

### About this task

#### Attention:

- Read the following section(s) to ensure that you work safely.
  - “Safety” on page iii
  - “Installation Guidelines” on page 51
- Turn off the server. Disconnect the power cords and all external cables. See “Power off the server” on page 11.
- 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.
- 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.
- Make sure you save the data on your drive, especially if it is part of a RAID array.
- Before you remove or make changes to drives, drive controllers (including controllers that are integrated on the system board), drive backplates or drive cables, back up all important data that is stored on drives.
- For proper system cooling, do not operate the server for more than 2 minutes without either a drive or a filler panel installed in each bay.

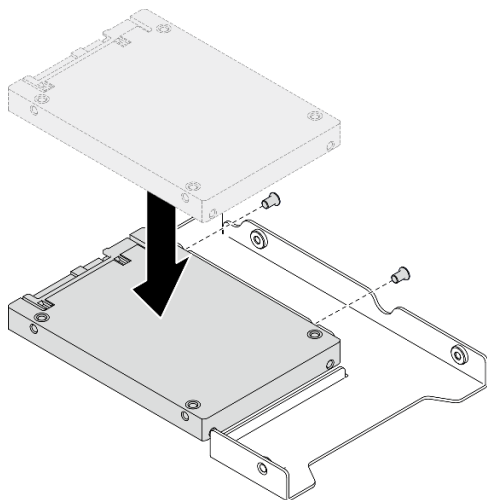
#### Notes:

- Locate the documentation that comes with the drive and follow those instructions in addition to the instructions in this chapter.
- The drive bays are numbered to indicate the installation order (starting from number “0”). Follow the installation order when you install a drive. See “Front view” on page 14.
- The drives in a single RAID array must be the same type, same size, and same capacity.
- For a complete list of supported optional devices for the server, see <https://serverproven.lenovo.com/>.

### Procedure

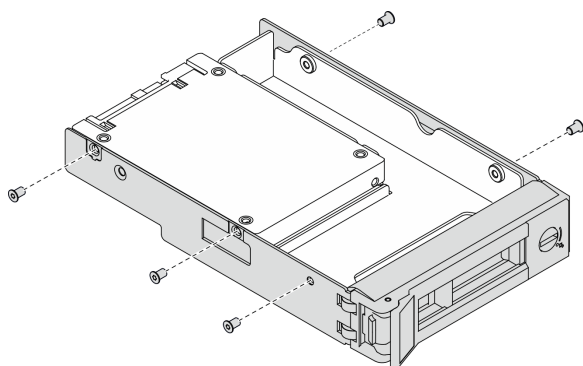
Step 1. Position the 2.5-inch drive into the 2.5-inch to 3.5-inch drive adapter.

- Step 2. Align the two screw holes in the drive with the corresponding holes in the drive adapter; then, install the two screws to secure the drive to the drive adapter.



*Figure 48. 2.5-inch drive installation to drive adapter*

- Step 3. Position the drive adapter with the drive into the 3.5-inch drive tray. Align the screw holes in the drive adapter and the drive with the corresponding holes in the tray; then, install the five screws to secure the drive adapter and the drive into the tray.



*Figure 49. Installing the screws that secure the 2.5-inch drive and the drive adapter*

- Step 4. Slide the tray with the drive into the drive bay from the front until it snaps into position and then completely close the handle. See [“Install a simple-swap drive” on page 70](#).

#### **After you finish**

1. Install other drives or drive fillers if necessary.
2. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).
3. Check the drive activity LED on the front operator panel to verify if the drives are operating correctly. See [“Front operator panel” on page 16](#)
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.

---

## 3.5-inch backplane replacement

Use the following information to remove and install the 3.5-inch backplane.

### Remove the 3.5-inch backplane

Use this information to remove the 3.5-inch drive backplane.

#### About this task

##### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

**Note:** Depending on the configuration, the following illustration might differ slightly from your backplane.

#### Procedure

Step 1. Make preparations for this task.

- a. Remove all drives and drive fillers from the drive bays. See [“Remove a hot-swap drive” on page 71](#).
- b. Remove the top cover. See [“Remove the top cover” on page 140](#).
- c. Disconnect the cables from the backplane. See [“Backplane and backplate cable routing” on page 40](#).

Step 2. Remove the backplane.

- a. ① Open the retaining clips by rotating them up.
- b. ② Rotate the backplane down towards the center of the server.
- c. ③ Lift the backplane out of the server.

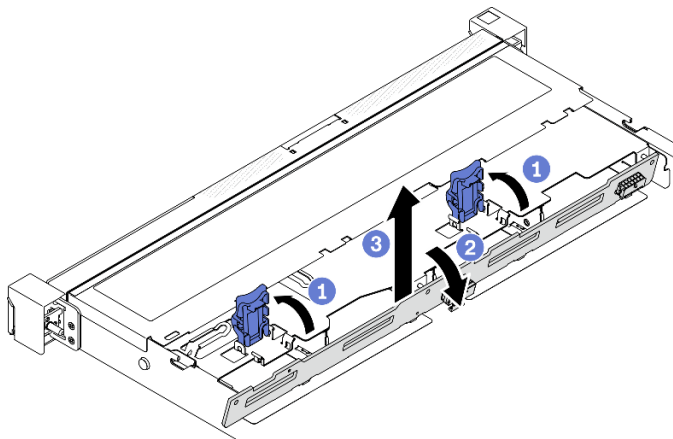


Figure 50. 3.5-inch backplane removal

#### 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.

## Install the 3.5-inch backplane

Use this information to install the 3.5-inch backplane.

### About this task

#### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)

**Note:** Depending on the configuration, the following illustration might differ slightly from your backplane.

### Procedure

Step 1. Install the backplane.

- a. ① Insert the backplane into the chassis at an angle. Make sure the pins are against the backplane on the backside.
- b. ② Rotate the backplane up towards the front of the server.
- c. ③ Close the retaining clips to secure the backplane in place.

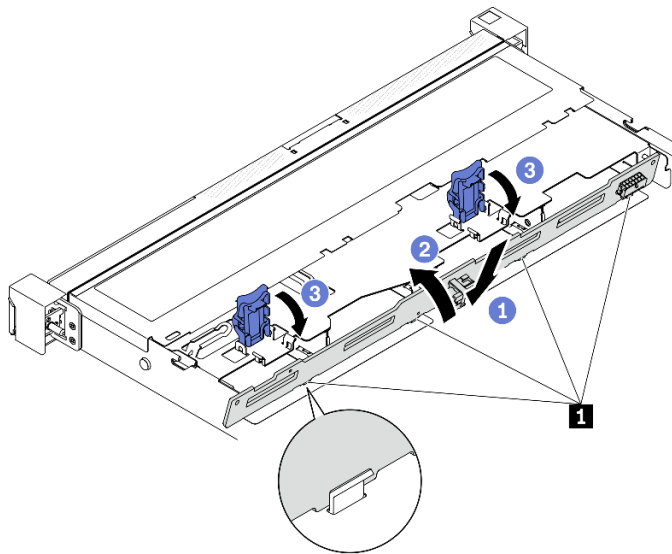


Figure 51. 3.5-inch backplane installation

① Pin

### After you finish

1. Connect the cables to the backplane. See [“Backplane and backplate cable routing” on page 40](#).
2. Install the top cover. See [“Install the top cover” on page 142](#).
3. Install all drives and drive fillers into the drive bays. See [“Install a hot-swap drive” on page 73](#).
4. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).



---

## 3.5-inch backplate replacement

Use the following information to remove and install the 3.5-inch backplate.

### Remove the 3.5-inch backplate

Use this information to remove the 3.5-inch backplate.

#### About this task

##### Notes:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

#### Procedure

Step 1. Make preparations for this task.

- a. Remove all drives and drive fillers from the drive bays. See [“Remove a hot-swap drive” on page 71](#).
- b. Remove the top cover. See [“Remove the top cover” on page 140](#).
- c. Disconnect the cables from the system board or the RAID adapter. See [“Backplane and backplane cable routing” on page 40](#).

Step 2. Remove the backplate.

- a. ① Open the retaining clips by rotating them up.
- b. ② Rotate the backplate down towards the center of the server.
- c. ③ Lift the backplate out of the server.

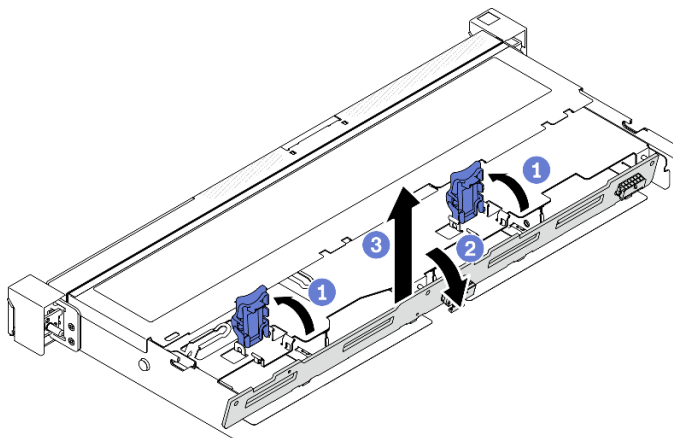


Figure 52. Backplate removal

**Note:** Depending on the configuration, the following illustration might differ slightly from your backplate.

## 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 3.5-inch backplate

Use this information to install the 3.5-inch backplate.

## About this task

### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Depending on the configuration, the following illustration might differ slightly from your backplate.

## Procedure

Step 1. Install the backplate.

- a. **1** Insert the backplate into the chassis at an angle. Make sure the pins are against the backplate on the backside.
- b. **2** Rotate the backplate up towards the front of the server.
- c. **3** Close the retaining clips to secure the backplate in place.

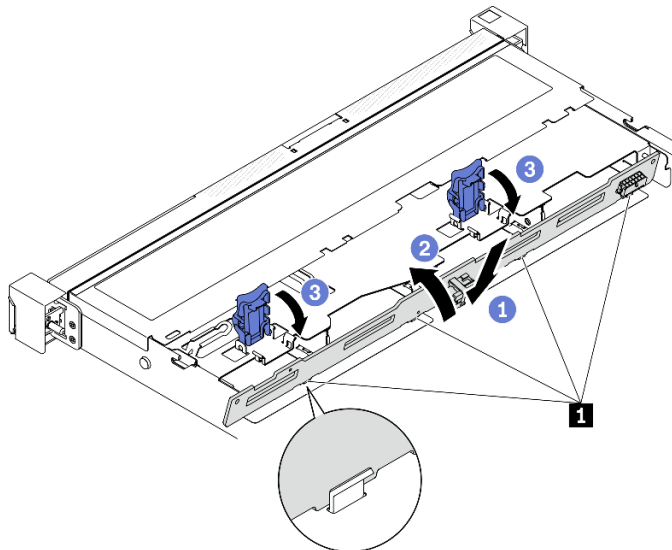


Figure 53. Backplate installation

**1** Pin

## After you finish

1. Connect the backplate cables to the system board or RAID adapter. See [“Backplane and backplate cable routing” on page 40](#).
2. Install the top cover. See [“Install the top cover” on page 142](#).
3. Install all drives and drive fillers into the drive bays. See [“Install a hot-swap drive” on page 73](#).
4. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

### Demo video

[Watch the procedure on YouTube](#)

---

## Air baffle replacement

Use the following information to remove and install the air baffle.

### Remove the air baffle

Use this information to remove the air baffle.

#### About this task

##### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

#### Procedure

- Step 1. Remove the top cover. See [“Remove the top cover” on page 140](#).
- Step 2. Lift the air baffle up and set it aside.

**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.

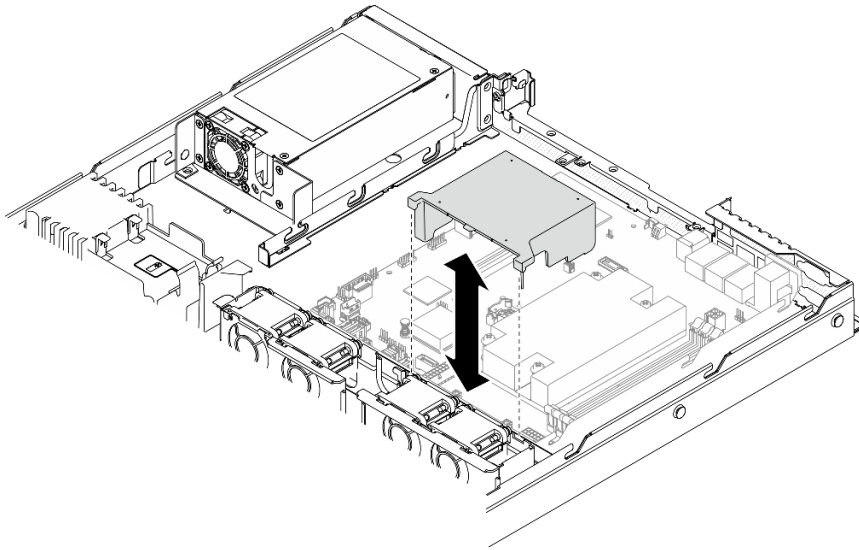


Figure 54. Air baffle removal

### 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

Use this information to install the air baffle.

### About this task

#### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- 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

Step 1. Align the air baffle hooks with the slots on the top of the fan cage; then, hook the air baffle onto the slots.

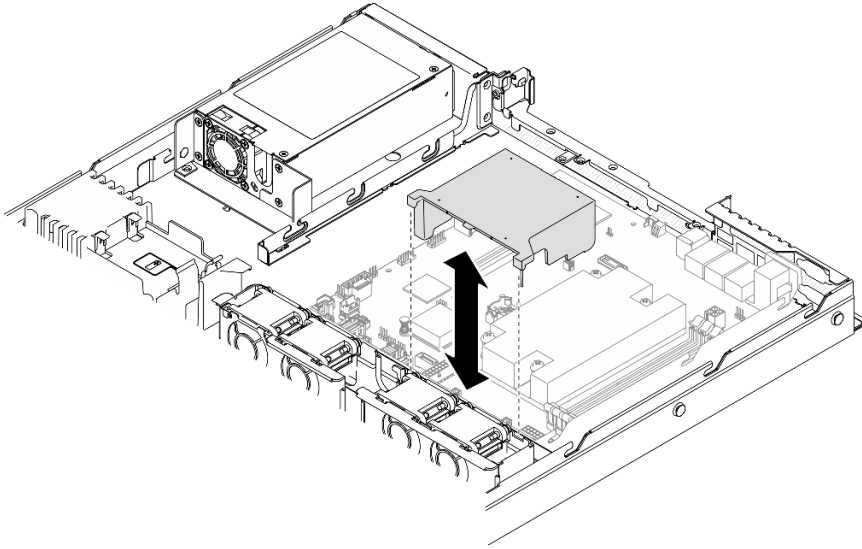


Figure 55. Air baffle installation

#### After you finish

1. Install the top cover. See [“Install the top cover” on page 142.](#)
2. Complete the parts replacement. See [“Complete the parts replacement” on page 148.](#)

#### Demo video

[Watch the procedure on YouTube](#)

---

## CMOS battery (CR2032) replacement

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

### Remove the CMOS battery (CR2032)

Use this information to remove the CMOS battery.

#### About this task

##### S002



#### CAUTION:

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

##### 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.

**Attention:**

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

The following notes describe information that you must consider when replacing the battery.

- 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 solution and reset the system date and time.

**Procedure**

Step 1. Remove the top cover. See [“Remove the top cover” on page 140](#).

Step 2. Locate the CMOS battery on the system board. See [“System-board connectors” on page 19](#).

Step 3. Remove the CMOS battery.

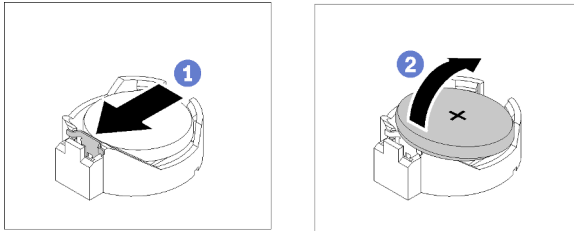


Figure 56. CMOS battery removal

**Attention:** Do not use excessive force to tilt or push the battery, it might damage the socket.

- a. ① Press the battery clip in the direction as shown.
- b. ② Carefully tilt and lift CMOS battery out of the socket.

#### After you finish

1. Install a replacement of CMOS battery. See [“Install the CMOS battery \(CR2032\)” on page 67](#).
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 CMOS battery (CR2032)

Use this information to install the CMOS battery (CR2032).

#### About this task

- When replacing the CMOS battery, you must replace it with another CMOS battery of the same type from the same manufacturer.
- After replacing the CMOS battery, make sure to reconfigure the server and reset system date and time.
- To avoid possible danger, read and follow the following safety information.

#### S002



#### CAUTION:

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

#### 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.

**Attention:**

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- 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.
- Do not make CMOS battery in contact with a metal surface when replace it. The contact with metal surface, such as server side, can cause damage to the battery.
- Make sure that all server power cords are disconnected from their power sources before performing this procedure.

**Procedure**

Step 1. Install the CMOS battery.



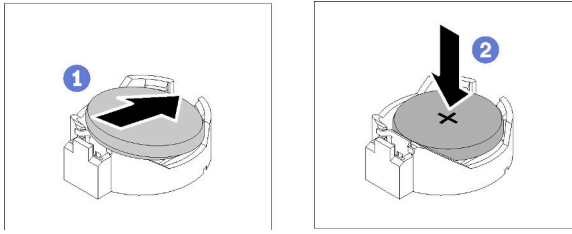


Figure 57. CMOS battery installation

- a. ❶ Pivot the CMOS battery to insert it into the socket, with positive (+) side faces up.
- b. ❷ Press the battery straight down until it clicks in place.

#### After you finish

1. Install the top cover. See [“Install the top cover” on page 142](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).
3. Reset date, time, and all the passwords.

#### Demo video

[Watch the procedure on YouTube](#)

---

## Drive replacement

Use the following information to remove and install drives.

The EMI integrity and cooling of the server are protected by having all drive bays covered or occupied. The number of the installed drives in your server varies depending on the server model. The vacant bays are occupied by dummy trays. When you install a drive, save the removed dummy tray from the drive bay in case you later remove the drive and need the dummy tray to cover the place.

### Remove a simple-swap drive

Use this information to remove a simple-swap drive.

#### About this task

##### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Turn off the server. Disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- 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 simple-swap drive.
- For proper system cooling, do not operate the server for more than 2 minutes without either a drive or a filler panel installed in each bay.
- 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.
- If an NVMe drive is to be removed, it is recommended to disable it beforehand via the operating system.

- Before you remove any component of a RAID array, 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 the simple-swap drive.

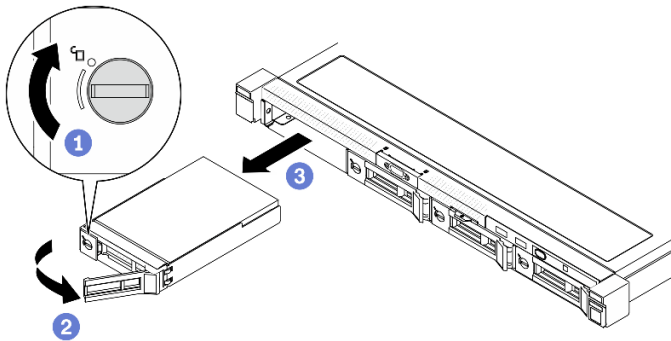


Figure 58. Simple-swap drive removal

- 1 Use a flat-blade screwdriver to rotate the drive lock clockwise.
- 2 Make sure the drive handle is released after unlocking.
- 3 Carefully grab the handle and slide the drive out of the drive bay.

## 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 simple-swap drive

Use this information to install a simple-swap drive.

## About this task

### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Turn off the server. Disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- 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.
- 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.
- Make sure you save the data on your drive, especially if it is part of a RAID array.

- Before you remove or make changes to drives, drive controllers (including controllers that are integrated on the system board), drive backplates or drive cables, back up all important data that is stored on drives.
- For proper system cooling, do not operate the server for more than 2 minutes without either a drive or a filler panel installed in each bay.

#### Notes:

- Locate the documentation that comes with the drive and follow those instructions in addition to the instructions in this chapter.
- The drive bays are numbered to indicate the installation order (starting from number “0”). Follow the installation order when you install a drive. See [“Front view” on page 14](#).
- The drives in a single RAID array must be the same type, same size, and same capacity.
- For a complete list of supported optional devices for the server, see <https://serverproven.lenovo.com/>.

#### Procedure

Step 1. If the drive bay has a drive filler installed, remove it.

Step 2. Install the simple-swap drive.

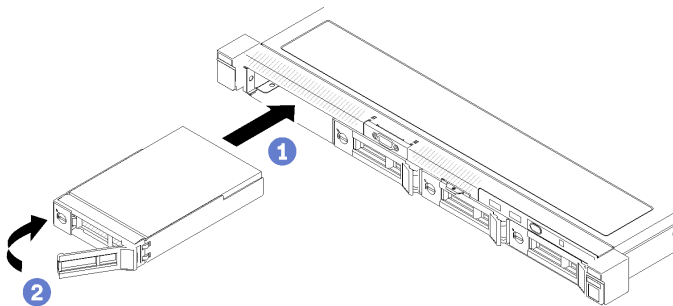


Figure 59. Simple-swap drive installation

- 1 Make sure the drive handle is in the open position. Slide the drive into the drive bay, and push it until it stops.
- 2 Rotate the drive handle inwards until it clicks and lock the drive in place.

#### After you finish

1. Install other drives or drive fillers if necessary.
2. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).
3. Check the drive activity LED on the front operator panel to verify if the drives are operating correctly. See [“Front operator panel” on page 16](#)
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 hot-swap drive

Use this information to remove a hot-swap drive.

#### About this task

**Attention:**

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- 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 simple-swap drive.
- For proper system cooling, do not operate the server for more than 2 minutes without either a drive or a filler panel installed in each bay.
- 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, 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 the hot-swap drive.

**Note:** Install a drive bay filler or replacement drive as soon as possible. See [“Install a hot-swap drive” on page 73](#).

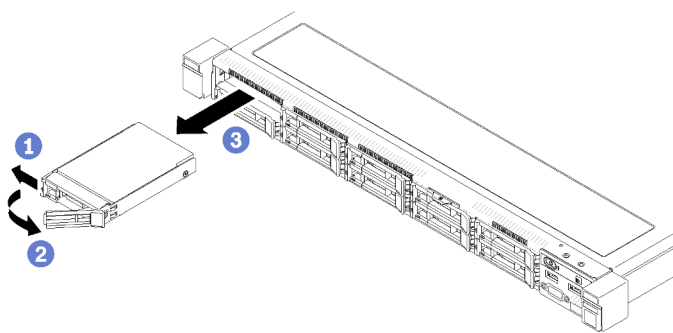


Figure 60. 2.5-inch hot-swap drive removal

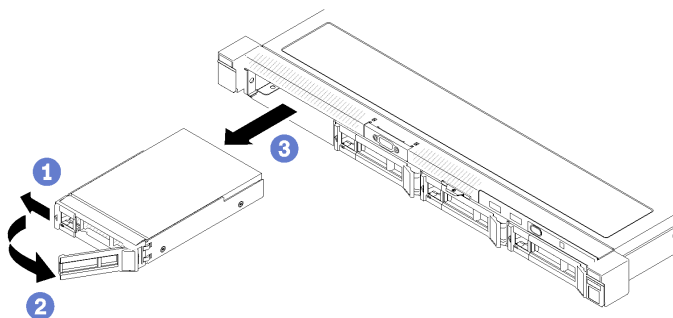


Figure 61. 3.5-inch hot-swap drive removal

- a. ① Slide the release latch to unlock the drive handle.
- b. ② Make sure the drive handle is released after unlocking.
- c. ③ Carefully grasp the handle and slide the drive out of the drive bay.

## 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 hot-swap drive

Use this information to install a hot-swap drive.

### About this task

#### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- 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.
- 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.
- Make sure you save the data on your drive, especially if it is part of a RAID array.
- 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.
- For proper system cooling, do not operate the server for more than 2 minutes without either a drive or a filler panel installed in each bay.

#### Notes:

- Locate the documentation that comes with the drive and follow those instructions in addition to the instructions in this chapter.
- The drive bays are numbered to indicate the installation order (starting from number “0”). Follow the installation order when you install a drive. See [“Front view” on page 14](#).
- The drives in a single RAID array must be the same type, same size, and same capacity.
- For a complete list of supported optional devices for the server, see <https://serverproven.lenovo.com/>.

### Procedure

Step 1. If the drive bay has a drive filler installed, remove it.

Step 2. Install the hot-swap drive.

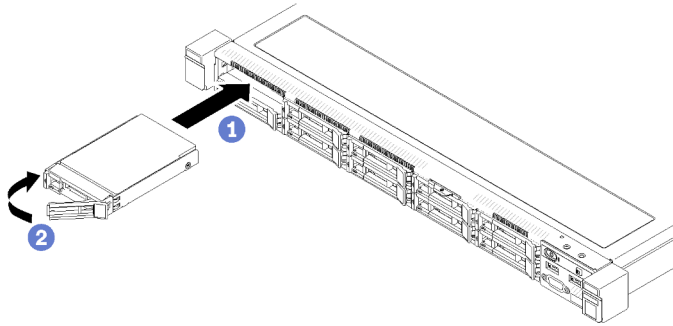


Figure 62. 2.5-inch hot-swap drive installation

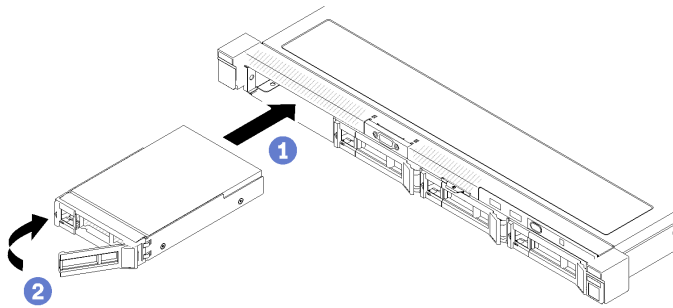


Figure 63. 3.5-inch hot-swap drive installation

- a. ① Make sure the drive handle is in the open position. Slide the drive into the drive bay, and push it until it stops.
- b. ② Rotate the drive handle inwards until it clicks and lock the drive in place.

#### After you finish

1. Install other drives or drive fillers if necessary.
2. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).
3. Check the drive status LED to verify if the drive is operating correctly.
  - If the yellow LED is lit continuously, it is malfunctioning and must be replaced.
  - If the green LED is flashing, the drive is functioning.

**Note:** 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](#)

---

## Fan replacement

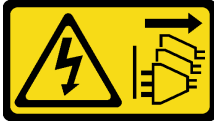
Use the following information to remove and install the fan.

### Remove a fan

Use this information to remove a fan.

## About this task

### S002



#### **CAUTION:**

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

### S009



#### **CAUTION:**

To avoid personal injury, disconnect the fan cables before removing the fan from the device.

### S017



#### **CAUTION:**

Hazardous moving fan blades nearby. Keep fingers and other body parts away.

### 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.

#### **Notes:**

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

## Procedure

Step 1. Make preparations for this task.

- a. Remove the top cover. See [“Remove the top cover” on page 140.](#)
- b. Remove the air baffle. See [“Remove the air baffle” on page 63.](#)

Step 2. Remove the fan.

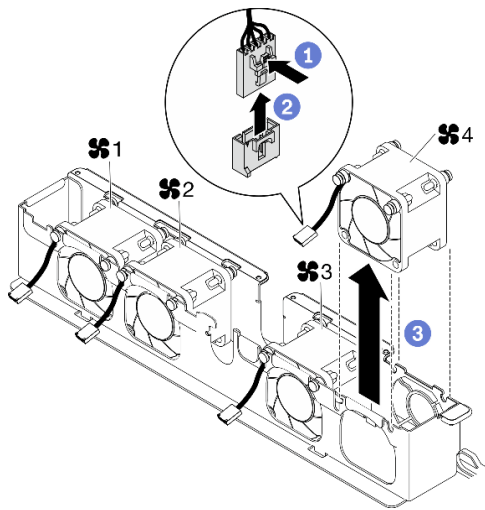


Figure 64. Fan removal

- a. ① Press and hold the fan cable latch.
- b. ② Disconnect the cable from the connector.
- c. ③ Lift the fan out from the fan cage.

## After you finish

1. Install a replacement unit. See [“Install a fan” on page 76.](#)
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 fan

Use this information to install a fan.

## About this task

### S002



**CAUTION:**



The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

#### S009



#### **CAUTION:**

To avoid personal injury, disconnect the fan cables before removing the fan from the device.

#### S017



#### **CAUTION:**

Hazardous moving fan blades nearby. Keep fingers and other body parts away.

#### 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 the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- 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.
- Make sure to replace a defective fan with another unit of the exact same type.

#### **Procedure**

Step 1. Install the fan.

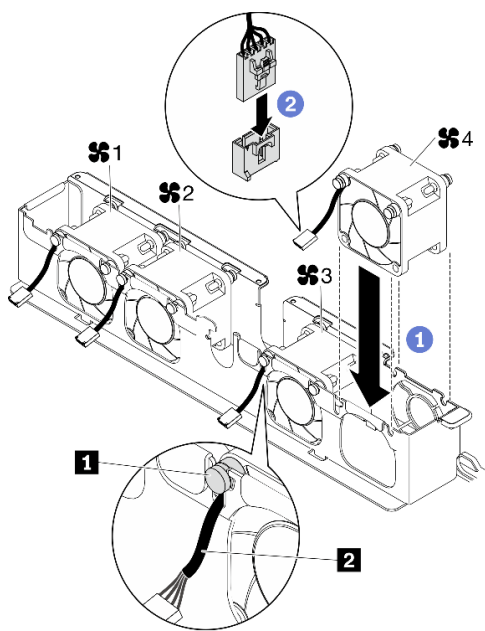


Figure 65. Fan installation

<b>1</b> Rubber pad	<b>2</b> Fan cable
---------------------	--------------------

- a. **1** Align the fan with the slot in the fan cage; then, place the fan into the slot.

**Attention:** Make sure the fan cable is under the rubber pad and are inserted into the cable slot as shown.

- b. **2** Connect the fan cable to the connector by pressing it down until it clicks.

#### After you finish

1. Install the air baffle. See [“Install the air baffle” on page 64](#).
2. Install the top cover. See [“Install the top cover” on page 142](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

#### Demo video

[Watch the procedure on YouTube](#)

## Flash power module replacement

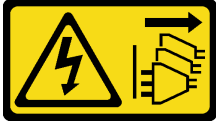
Use the following information to remove and install the flash power module

### Remove the flash power module

Use this information to remove the flash power module.

#### About this task

#### S002

**CAUTION:**

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

**Attention:**

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.
- To avoid possible danger, read and follow the following safety information.

**Procedure**

Step 1. Make preparations for this task.

- a. Remove the top cover. See [“Remove the top cover” on page 140](#).
- b. Disconnect the flash power module cable from the RAID adapter. See [“Flash power module cable routing” on page 38](#).

Step 2. Remove the flash power module.

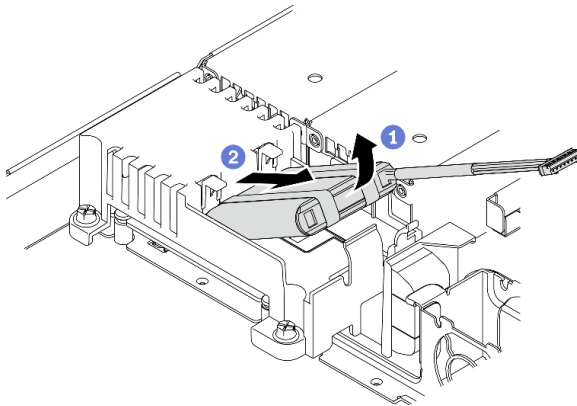


Figure 66. Flash power module removal

- a. ① Use your finger to lift the flash power module slightly.
- b. ② Slide the flash power module out of the server.

**After you finish**

1. Install a replacement of the flash power module if necessary. See [“Install the flash power module” on page 80](#).

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 flash power module

Use this information to install the flash power module.

### About this task

#### S002



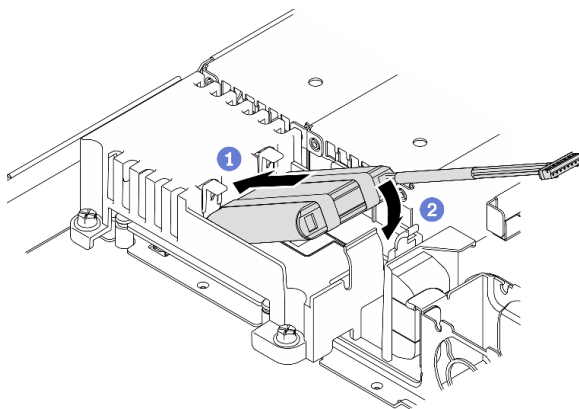
#### **CAUTION:**

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

#### **Attention:**

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.
- To avoid possible danger, read and follow the following safety information.

Step 1. Install the flash power module.



*Figure 67. Flash power module installation*

- a. ❶ Insert the end of the flash power module into its carrier.
- b. ❷ Rotate the flash power module down into the carrier until the tab clicks in place to secure it.

#### After you finish

1. Connect the flash power module cable to the RAID adapter. See [“Flash power module cable routing” on page 38](#).
2. Install the top cover. See [“Install the top cover” on page 142](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

#### Demo video

[Watch the procedure on YouTube](#)

---

## Front operator panel replacement

Use this procedure to remove or install the front operator panel.

### Remove the front operator panel (2.5-inch drive model)

Use this information to remove the front operator panel (2.5-inch drive model).

#### About this task

##### Attention:

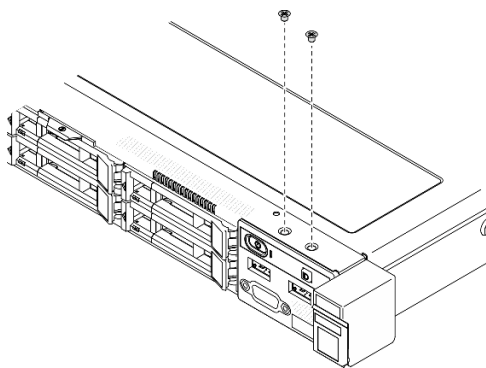
- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

#### Procedure

Step 1. Make preparations for this task.

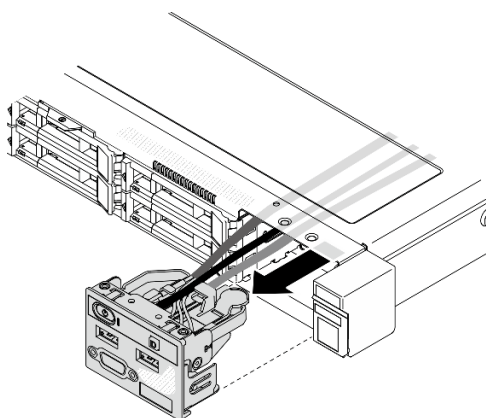
- a. Remove the top cover. See [“Remove the top cover” on page 140](#).
- b. Disconnect the front operator panel cables from the system board. See [“Front panel cable routing” on page 33](#).

Step 2. Remove two screws that secure the front operator panel.



*Figure 68. Front operator panel screws removal*

Step 3. Slide the front operator panel out of the server.



*Figure 69. Front operator panel removal*

### 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 front operator panel (2.5-inch drive model)

Use this information to install the front operator panel (2.5-inch drive model).

### About this task

**Attention:** Read the following section(s) to ensure that you work safely.

- [“Safety” on page iii](#)
- [“Installation Guidelines” on page 51](#)

### Procedure

Step 1. Slide the front operator panel into the assembly bay.

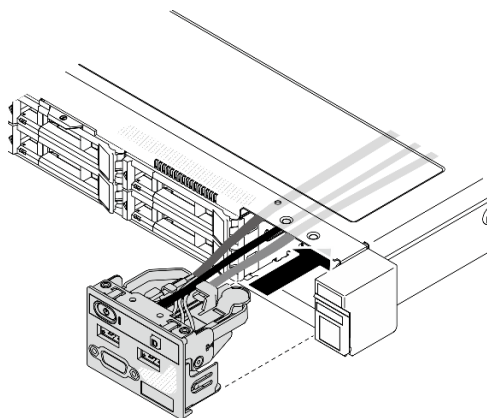


Figure 70. Front operator panel (2.5-inch drive model) installation

Step 2. Install the two screws to secure the front operator panel.

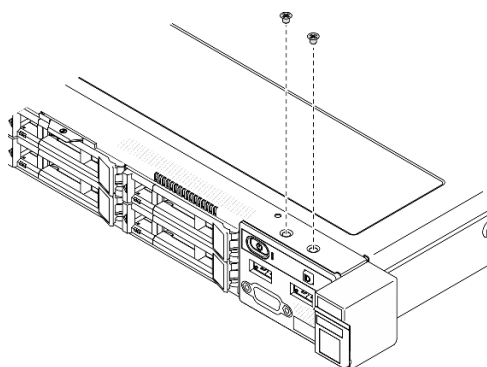


Figure 71. Screws installation

#### After you finish

1. Connect the front operator panel cables to the system board. See [“Front panel cable routing” on page 33](#).
2. Install the top cover. See [“Install the top cover” on page 142](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

#### Demo video

[Watch the procedure on YouTube](#)

## Remove the front operator panel (3.5-inch drive model)

Use this information to remove the front operator panel (3.5-inch drive model).

#### About this task

##### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)

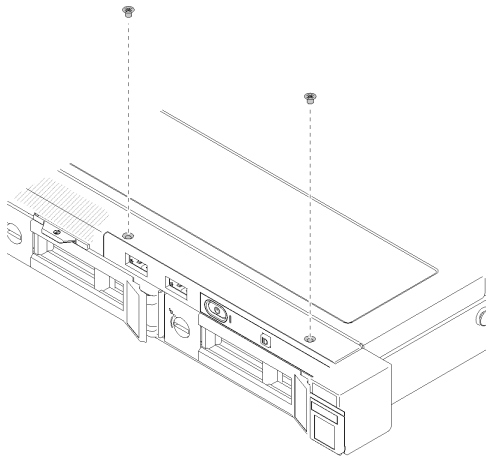
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

## Procedure

Step 1. Make preparations for this task.

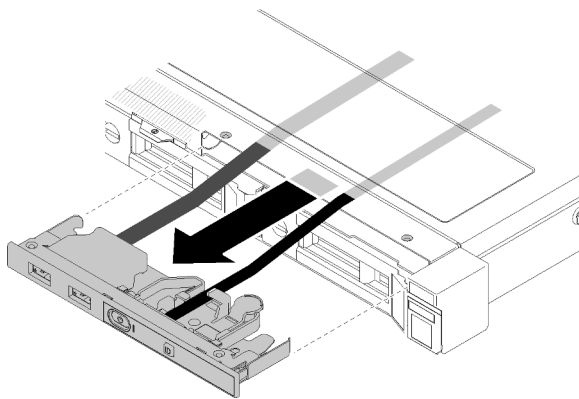
- a. Remove the top cover. See [“Remove the top cover” on page 140](#).
- b. Disconnect the front operator panel cables from the system board. See [“Front panel cable routing” on page 33](#).

Step 2. Remove the two screws that secure the front operator panel.



*Figure 72. Front operator panel removal*

Step 3. Pull out the front operator panel from the server.



*Figure 73. Front operator panel removal*

## 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 front operator panel (3.5-inch drive model)

Use this information to install the front operator panel (3.5-inch drive model).

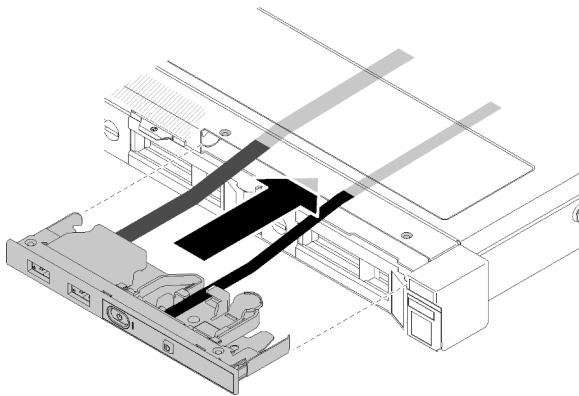
### About this task

**Attention:** Read the following section(s) to ensure that you work safely.

- [“Safety” on page iii](#)
- [“Installation Guidelines” on page 51](#)

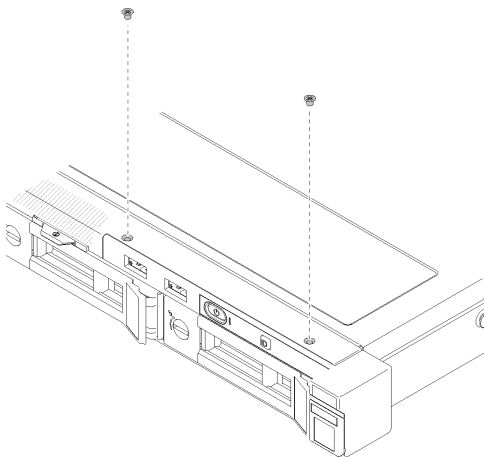
### Procedure

Step 1. Slide the front operator panel and cables into the slot on the front server.



*Figure 74. Front operator panel (3.5-inch drive model) installation*

Step 2. Install the two screws that secure the front operator panel.



*Figure 75. Front operator panel (3.5-inch drive model) installation*

### After you finish

1. Connect the front operator panel cables to the system board. See [“Front panel cable routing” on page 33](#).
2. Install the top cover. See [“Install the top cover” on page 142](#).

3. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

### Demo video

[Watch the procedure on YouTube](#)

---

## Heat sink replacement

Follow this procedure to remove and install the heat sink.

### Remove the heat sink

Use this information to remove the heat sink. This procedure must be executed by a trained technician.

#### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

#### Procedure

Step 1. Remove the top cover. See [“Remove the top cover” on page 140](#).

Step 2. Loosen screw 1 and 2:

- a. Partially loosen screw 1.
- b. Fully loosen screw 2.
- c. Fully loosen screw 1.

#### Notes:

1. Gently remove the four screws to avoid any possible damage to the system board.
2. Always keep the four screws attached to the heat sink.
3. Do not touch the thermal grease while handling the heat sink.

Step 3. Loosen screw 3 and 4:

- a. Partially loosen screw 3.
- b. Fully loosen screw 4.
- c. Fully loosen screw 3.

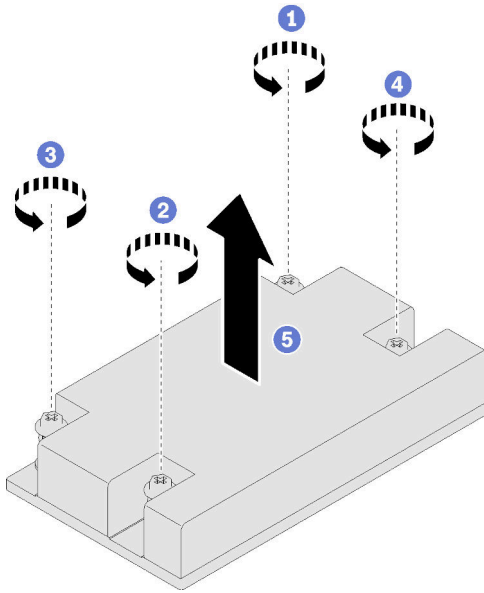


Figure 76. Heat sink removal

Step 4. Lift evenly and remove the heat sink from the server.

#### 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 heat sink

Use this information to install the heat sink. This procedure must be executed by a trained technician.

#### About this task

##### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- 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.
- 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 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.

#### Procedure

Step 1. Align the four screws on the heat sink with the corresponding screw holes on the system board.

Step 2. Tighten screw 1 and 2:

- a. Partially tighten screw 1.
- b. Fully tighten screw 2.
- c. Fully tighten screw 1.

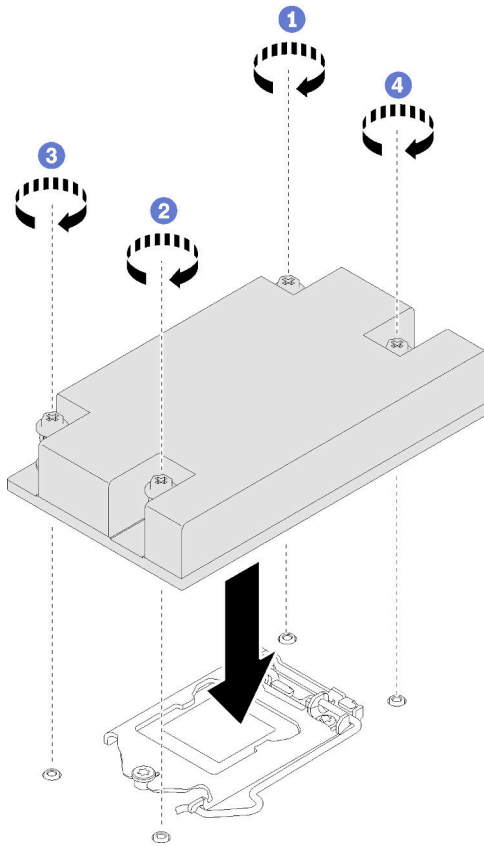


Figure 77. Heat sink installation

Step 3. Tighten screw 3 and 4:

- a. Partially tighten screw 3.
- b. Fully tighten screw 4.
- c. Fully tighten screw 3.

#### After you finish

1. Install the top cover. See [“Install the top cover” on page 142](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

#### Demo video

[Watch the procedure on YouTube](#)

---

## M.2 boot adapter replacement

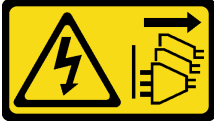
Use the following information to remove and install the M.2 boot adapter.

## Remove the M.2 boot adapter

Follow instructions in this section to remove the M.2 boot adapter.

### About this task

- **S002**



#### CAUTION:

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

#### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

**Note:** The following illustration might differ slightly from your hardware, but the removal method is the same

### Procedure

Step 1. Make preparations for this task.

- Remove the top cover. See [“Remove the top cover” on page 140](#).
- Disconnect the M.2 boot adapter cables from the system board. See [“M.2 boot adapter cable routing” on page 39](#).
- Remove the M.2 boot adapter assembly from the PCIe riser assembly or PCIe slot 3. See [“Remove a PCIe adapter \(Riser\)” on page 100](#) or [“Remove the PCIe adapter \(Slot 3\)” on page 103](#).
- Remove the M.2 drives from the M.2 boot adapter. See [“Remove an M.2 drive” on page 92](#).

Step 2. Disconnect the power and signal cables from the M.2 boot adapter.

- 1** Loosen the screw that secures the power and signal cables to the M.2 boot adapter.
- 2** Disconnect all the cables.

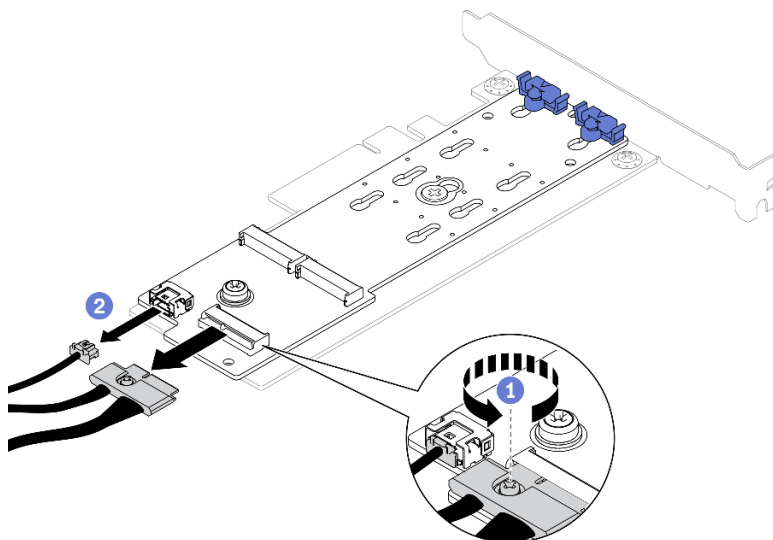


Figure 78. Disconnecting the power and signal cables

Step 3. Remove the M.2 boot adapter from the PCIe adapter.

- a. ❶ Remove the screw that secures the M.2 boot adapter to the PCIe adapter.
- b. ❷ Loosen the captive screw on the M.2 boot adapter.
- c. ❸ Slightly slide the M.2 boot adapter and carefully separate it from the PCIe adapter as shown.

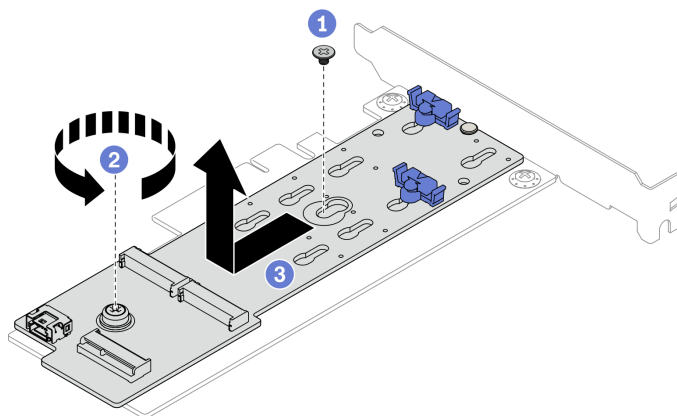


Figure 79. Removing the M.2 boot adapter

### 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 the M.2 boot adapter

Use this information to install the M.2 boot adapter.

## About this task

### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- 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:** The following illustration might differ slightly from your hardware, but the installation method is the same

### Procedure

Step 1. Install the M.2 boot adapter to the PCIe adapter.

- a. ① Align the M.2 boot adapter with the T-head pin on the PCIe adapter and slide it in place as shown.
- b. ② Tighten the captive screw on the M.2 boot adapter.
- c. ③ Tighten the screw to secure the M.2 boot adapter to the PCIe adapter.

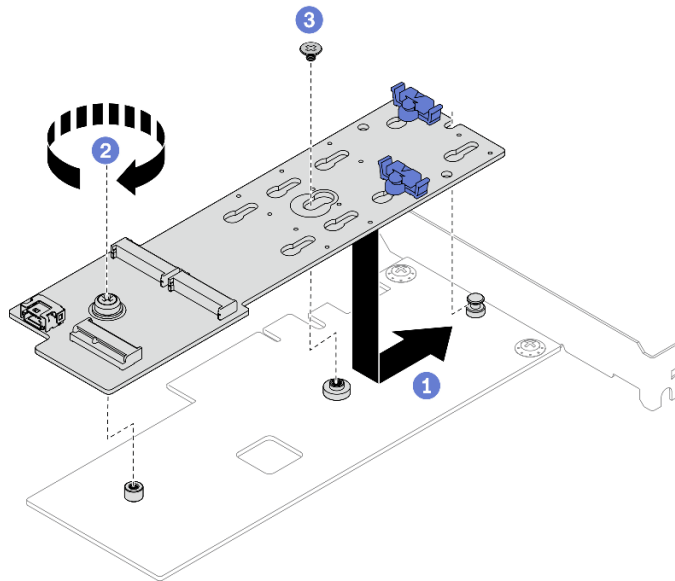


Figure 80. Installing the M.2 boot adapter

Step 2. Install the power and signal cables to the M.2 boot adapter.

- a. ① Connect both cables.
- b. ② Fasten the screw that secures the signal cable to the M.2 boot adapter.

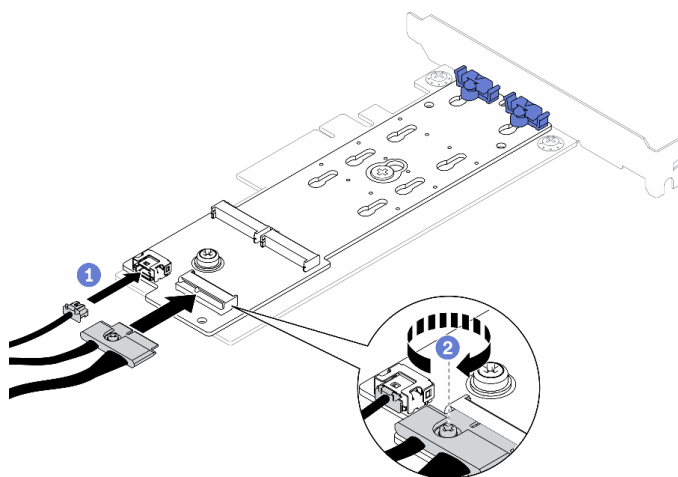


Figure 81. Connecting the power and signal cables

#### After you finish

1. Install the M.2 drives to the M.2 boot adapter. See [“Install an M.2 drive” on page 93](#).
2. Install the M.2 boot adapter assembly to the PCIe riser assembly or PCIe slot 3. See [“Install a PCIe adapter \(Riser\)” on page 101](#) or [“Install the PCIe adapter \(Slot 3\)” on page 104](#).
3. Connect the M.2 boot adapter cables to the system board. See [“M.2 boot adapter cable routing” on page 39](#).
4. Install the top cover. See [“Install the top cover” on page 142](#).
5. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

#### Demo video

[Watch the procedure on YouTube](#)

---

## M.2 drive replacement

Use the following information to remove and install the M.2 drive.

### Remove an M.2 drive

Use this information to remove the M.2 drive.

#### About this task

##### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

**Note:** There are two dimensions of M.2 drive supported by the server: 42 mm and 80 mm. Both are removed and installed in a similar method.



## Procedure

Step 1. Make preparations for this task.

- a. Remove the top cover. See [“Remove the top cover” on page 140](#).
- b. Disconnect the M.2 boot adapter cables from the system board. See [“M.2 boot adapter cable routing” on page 39](#).
- c. Remove the M.2 boot adapter assembly from the PCIe riser assembly or PCIe slot 3. See [“Remove a PCIe adapter \(Riser\)” on page 100](#) or [“Remove the PCIe adapter \(Slot 3\)” on page 103](#).

Step 2. Remove the M.2 drive.

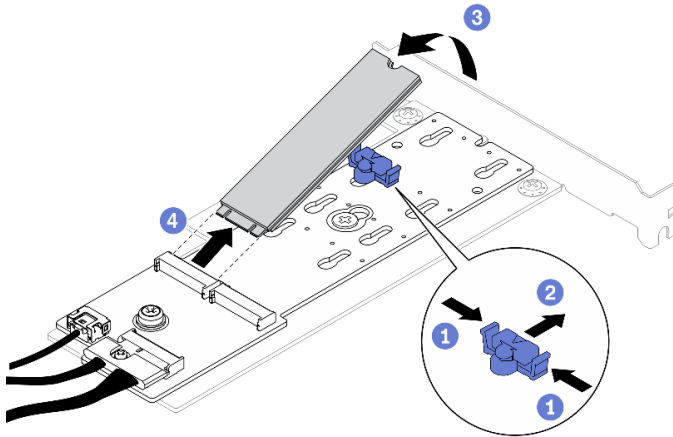


Figure 82. M.2 drive removal

- a. ① Press both sides of the retainer.
- b. ② Slide the retainer backwards to loosen the M.2 drive from the M.2 boot adapter.
- c. ③ Pivot the M.2 drive away from the M.2 boot adapter.
- d. ④ Pull the M.2 drive away from the connector at an angle.

## 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 M.2 drive

Use this information to install an M.2 drive.

### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- 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.

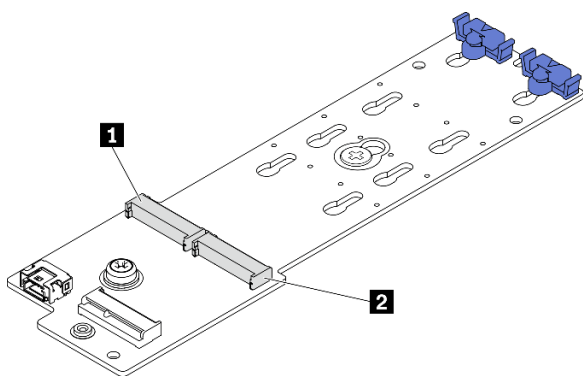


Figure 83. M.2 drive slot

Table 13. M.2 drive slot locations on M.2 boot adapter

<b>1</b> M.2 boot adapter slot 1	<b>2</b> M.2 boot adapter slot 0
----------------------------------	----------------------------------

## Procedure

Step 1. 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. **3** Slide the retainer towards the M.2 drive to secure it in place.

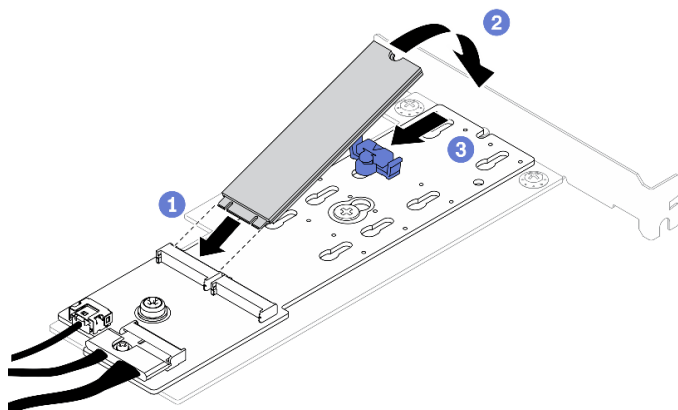


Figure 84. M.2 drive installation

## After you finish

1. Install the M.2 boot adapter assembly to the PCIe riser assembly or PCIe slot 3. See [“Install a PCIe adapter \(Riser\)” on page 101](#) or [“Install the PCIe adapter \(Slot 3\)” on page 104](#).
2. Connect the M.2 boot adapter cables to the system board. See [“M.2 boot adapter cable routing” on page 39](#).
3. Install the top cover. See [“Install the top cover” on page 142](#).
4. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

## Demo video

[Watch the procedure on YouTube](#)

---

## Memory module replacement

Use the following information to remove and install a memory module.

### Remove a memory module

Use this information to remove a memory module.

#### About this task

##### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.
- Memory modules are sensitive to static discharge and require special handling. In addition to referring to the standard guidelines for [“Handling static-sensitive devices” on page 53](#):
  - 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 touch. 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.

#### Procedure

Step 1. Prepare the server:

- a. Remove the top cover. See [“Remove the top cover” on page 140](#).
- b. Remove the air baffle when removing the memory module from slot 4. This provides more space for the removal. See [“Remove the air baffle” on page 63](#).

Step 2. Locate the memory module slot. Determine which memory module you want to remove from the server.

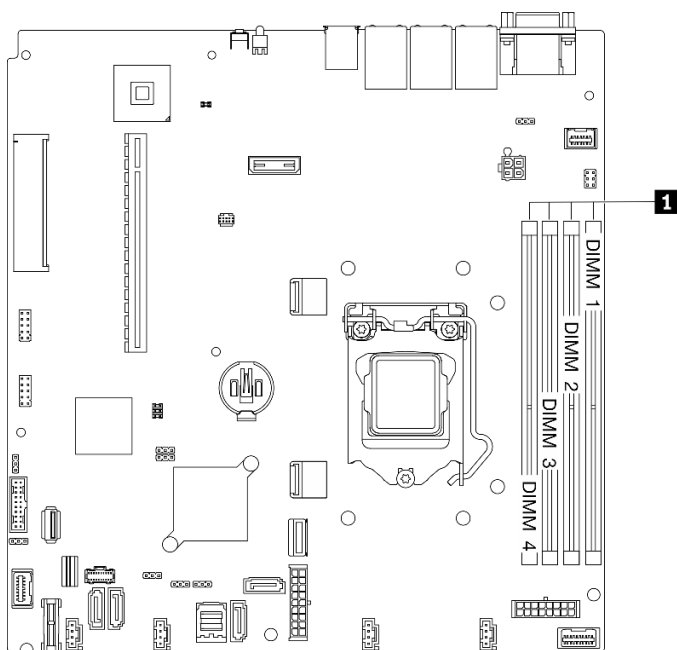


Figure 85. Memory module slots location

Step 3. Open the retaining clips on each end of the memory module slot.

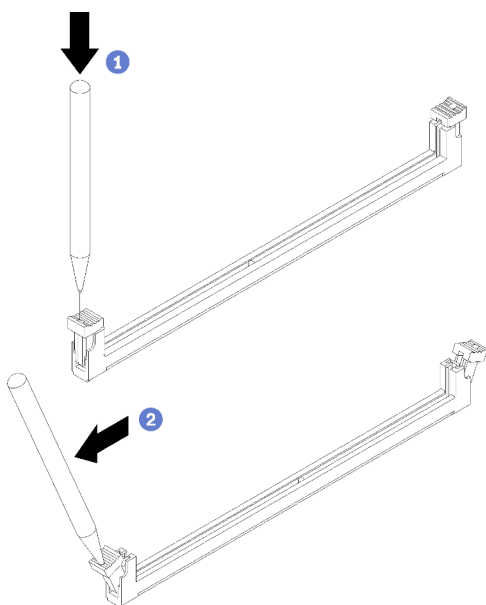


Figure 86. Opening retaining clips

**Attention:**

- To avoid breaking the retaining clips or damaging the memory module slots, handle the clips gently.
- If necessary, you can use a pointed tool to open the retaining clips due to space constraints. Pencils are not recommended as a tool as they may not be strong enough.
  - a. ① Place the tip of the tool in the recess on the top of the retaining clip.

- b. ② Carefully rotate the retaining clip away from the memory module slot.

Step 4. Remove the memory module.

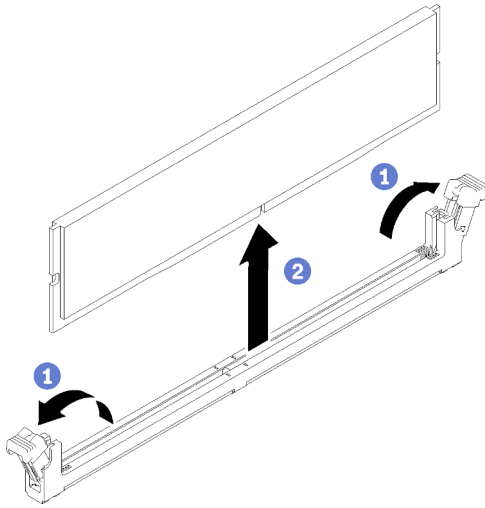


Figure 87. Memory module removal

- a. ① Make sure that both retaining clips are in the fully-open position.
- b. ② Grasp the memory module at both ends and carefully lift it out of the slot.

#### After you finish

1. Install a replacement of memory module if it is needed. See [“Install a memory module” on page 97](#).
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 memory module

Use this information to install a memory module.

#### About this task

See “Memory module installation order” in *Setup Guide* for detailed information about memory configuration and setup.

To avoid potential danger, read and follow the following safety statements.

- **S002**



**CAUTION:**

**The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.**

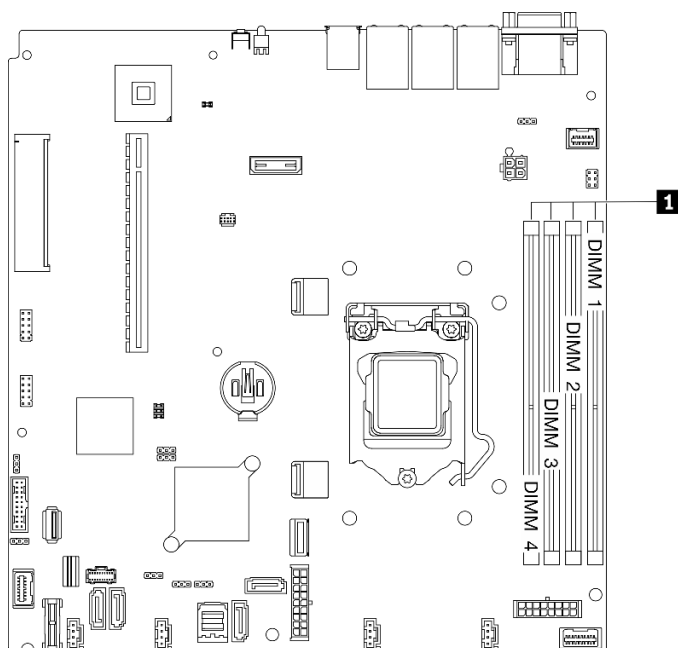
**Attention:**

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- 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.
- Memory modules are sensitive to static discharge and require special handling. In addition to the standard guidelines for [“Handling static-sensitive devices” on page 53](#):
  - 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 touch. 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.

**Procedure**

Step 1. Locate the memory module slot on the system board.

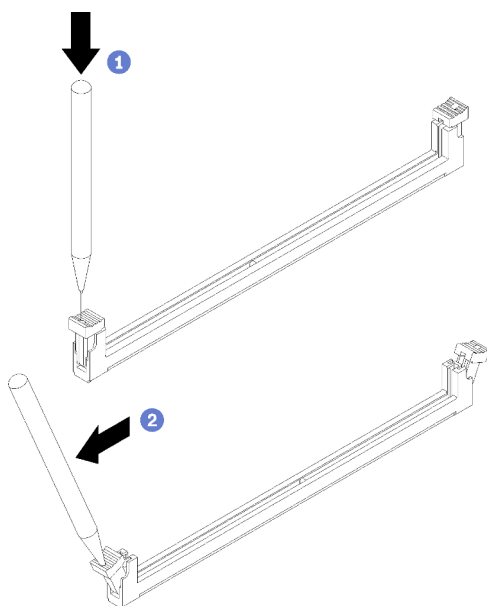
**Note:** Ensure that you observe the installation rules and sequence in “Technical rules for memory modules” in the *ThinkSystem SR250 V2 Setup Guide*.



**1** Memory module slots

*Figure 88. Memory module slots location*

Step 2. Open the retaining clips outward on each end of the memory module slot.



*Figure 89. Opening retaining clips*

**Attention:**

- To avoid breaking the retaining clips or damaging the memory module slots, handle the clips gently.
- If necessary, you can use a pointed tool to open the retaining clips due to space constraints. Pencils are not recommended as a tool as they may not be strong enough.

- a. ① Place the tip of the tool in the recess on the top of the retaining clip.
- b. ② Carefully rotate the retaining clip away from the memory module slot.

Step 3. Install the memory module.

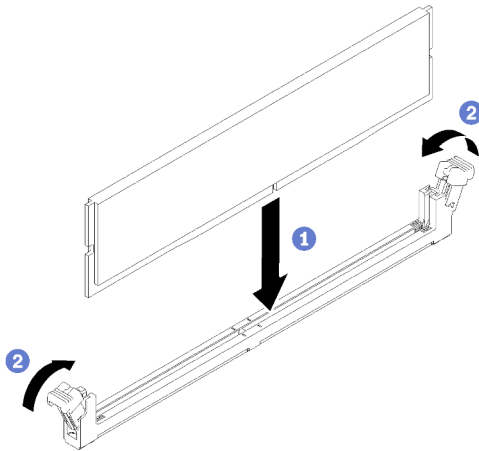


Figure 90. Memory module installation

- a. ① Make sure they are in the fully-open position. Align the keys on the memory module with the connector.
- b. ② Firmly press both ends of the memory module straight down into the connector until the retaining clips snap into the locked position.

#### After you finish

1. Reinstall the air baffle if it is removed. See [“Install the air baffle” on page 64](#).
2. Install the top cover. See [“Install the top cover” on page 142](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

#### Demo video

[Watch the procedure on YouTube](#)

---

## PCIe adapter replacement

Use the following information to remove and install a PCIe adapter.

### Remove a PCIe adapter (Riser)

Use this information to remove a PCIe adapter from the riser.

#### About this task

##### Attention:

- Replacing the adapter might impact your RAID configurations. Back up your data before the replacement to avoid any data loss due to a RAID configuration change.
- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)



- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

## Procedure

Step 1. Make preparations for this task.

- Remove the top cover. See [“Remove the top cover” on page 140](#).
- Remove the PCIe riser assembly. See [“Remove the PCIe riser assembly” on page 105](#).

Step 2. Remove the PCIe adapter.

- ① Disengage the adapter by pulling it straight out of the riser cage.
- ② If necessary, install the fillers.

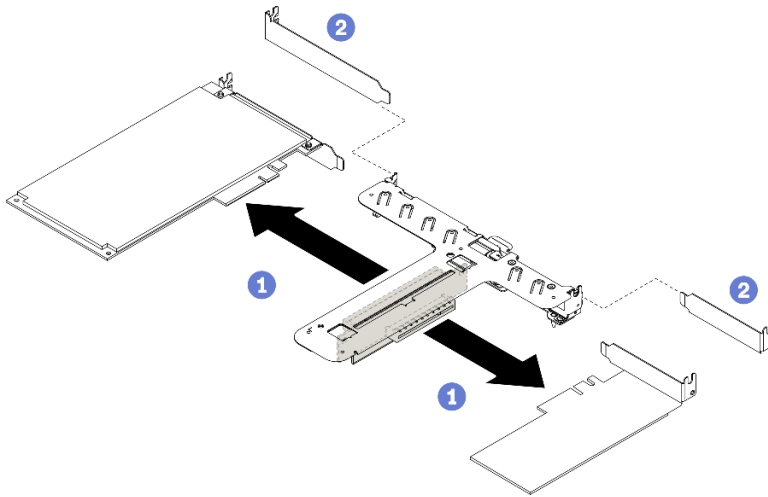


Figure 91. PCIe adapter removal

**Note:** Remove one adapter at a time, do not pull out two adapters at the same time.

Step 3. Record the cable connections on the adapter; then, disconnect all cables from the 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 (Riser)

Use this information to install a PCIe adapter to the riser.

## About this task

### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)

- [“Installation Guidelines” on page 51](#)
- 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:

- GPU adapters are only supported on servers with redundant power supply.
- When a ThinkSystem Intel E810-DA2 Ethernet Adapter is installed, the following adapters are not supported:
  - ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Adapter
  - ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Adapter
  - ThinkSystem RAID 5350-8i PCIe 12Gb Adapter
  - ThinkSystem 4350-8i SAS/SATA 12Gb HBA

#### Procedure

- Step 1. Connect all cables to the adapter.
- Step 2. Install the bracket to the PCIe adapter.
- Step 3. Install the PCIe adapter.

**Note:** Ensure that you observe the installation rules and sequence in “Technical rules for PCIe adapters” in the *ThinkSystem SR250 V2 Setup Guide*.

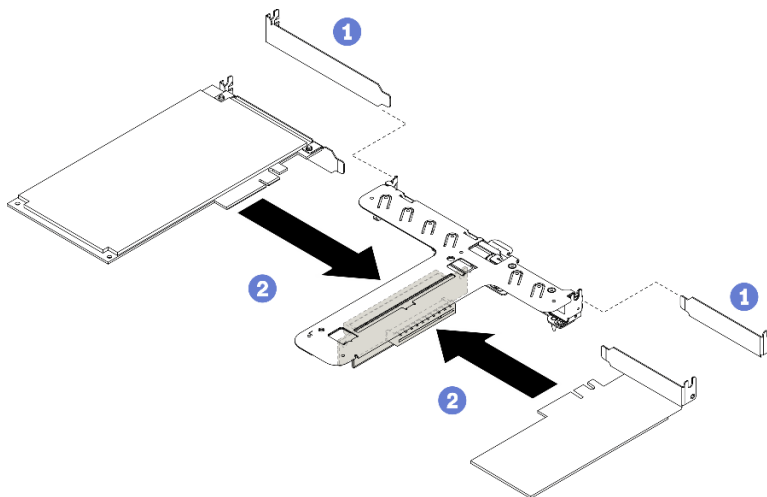


Figure 92. PCIe adapter installation

#### Notes:

- For the detail connectors on the PCIe riser card, see [“PCIe riser assembly” on page 24](#).
- Install one adapter at a time, do not insert two adapters to the riser card at the same time.
  - 1 If fillers are installed on the rear side of the riser cage, remove them.
  - 2 Align and insert the PCIe adapter assembly into the slot on the PCIe riser. Make sure you install the PCIe adapter into the correct slot.

#### After you finish

1. Install the PCIe riser assembly. See [“Install the PCIe riser assembly” on page 107](#).

2. Install the top cover. See [“Install the top cover” on page 142](#).
3. If necessary, configure the RAID array using the Setup utility configuration.
4. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

### Demo video

[Watch the procedure on YouTube](#)

## Remove the PCIe adapter (Slot 3)

Use this information to remove the PCIe adapter from PCIe slot 3.

### About this task

#### Attention:

- Replacing the RAID adapter might impact your RAID configurations. Back up your data before the replacement to avoid any data loss due to a RAID configuration change.
- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

**Note:** The following illustration might differ slightly from your hardware, but the removal method is the same

### Procedure

- Step 1. Remove the top cover. See [“Remove the top cover” on page 140](#).
- Step 2. Remove the PCIe adapter.

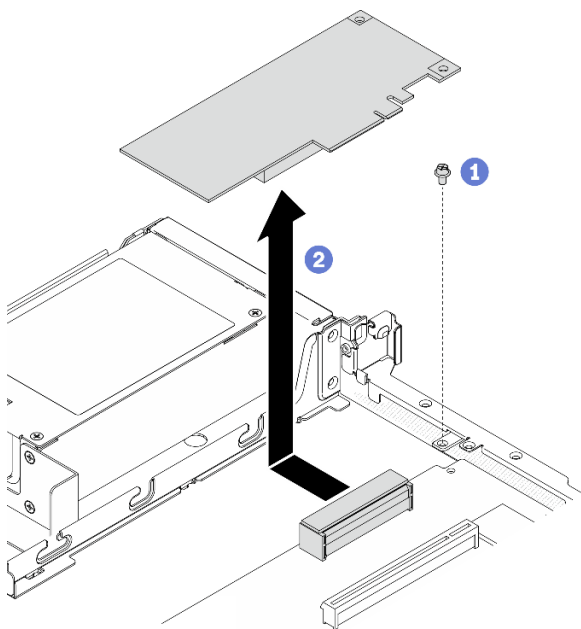


Figure 93. PCIe adapter removal

- a. ❶ Remove the screw that secures the PCIe adapter.
- b. ❷ Slide the PCIe adapter aside to disengage the adapter from the connector.

Step 3. Record the cable connections on the adapter; then, disconnect all cables from the 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 the PCIe adapter (Slot 3)

Use this information to install the PCIe adapter to PCIe slot 3.

#### About this task

##### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- 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:

- Locate the PCIe 3.0 x8 slot 3 connector. See [“System-board connectors” on page 19](#).

- PCIe 3.0 x8 slot 3 connector is dedicated for a RAID adapter or M.2 boot adapter. Depending on your configuration, you can also install a RAID adapter or M.2 boot adapter in the PCIe riser assembly.
- The following illustration might differ slightly from your hardware, but the installation method is the same

Step 1. If a bracket is installed on the PCIe adapter, remove the two screws and remove the bracket.

Step 2. Connect all cables to the adapter.

Step 3. Install the PCIe adapter.

**Note:** Ensure that you observe the installation rules and sequence in “Technical rules for PCIe adapters” in the *ThinkSystem SR250 V2 Setup Guide*.

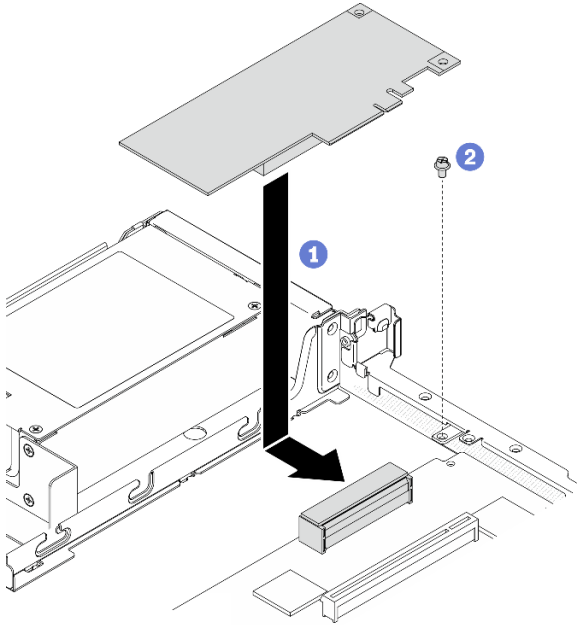


Figure 94. PCIe adapter installation

- 1 Lower the PCIe adapter into the server; then, firmly press it into the connector.
- 2 Install the screw to secure the PCIe adapter.

#### After you finish

1. Install the top cover. See [“Install the top cover” on page 142](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).
3. Configure the RAID array using the Setup utility configuration.

#### Demo video

[Watch the procedure on YouTube](#)

---

## PCIe riser assembly replacement

Use this procedure to remove or install the PCIe riser assembly.

### Remove the PCIe riser assembly

Use this information to remove the PCIe riser assembly.

## About this task

### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

### Procedure

Step 1. Remove the top cover. See [“Remove the top cover” on page 140](#).

Step 2. Grasp the PCIe riser assembly by its edges and carefully lift it out of the server.

### Notes:

1. The following illustration might differ slightly from your hardware.
2. Carefully lift the PCIe riser assembly straight up. Avoid tilting the PCIe riser assembly at a large angle, tilting might cause damage to the connector.

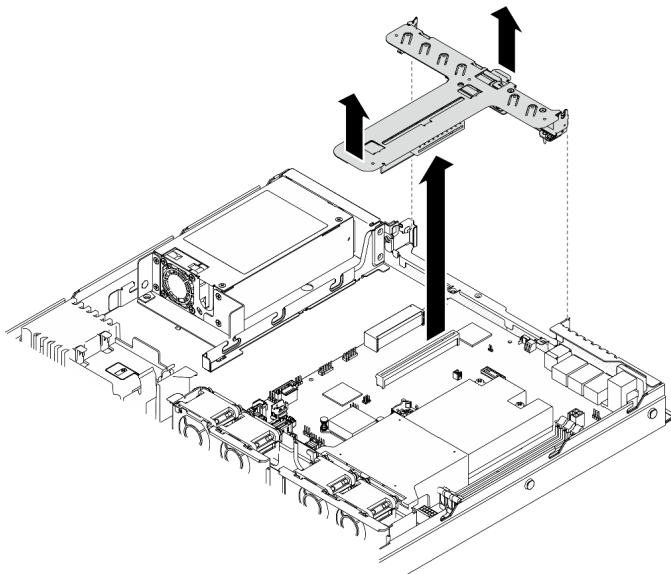


Figure 95. PCIe riser assembly removal

### 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.

If you need to disassemble the PCIe riser assembly for recycle, remove the two screws and carefully pull the PCIe riser card out of the riser cage.

**Attention:** You can only disassemble the PCIe riser assembly for recycle. Do not disassemble it for any other purposes.

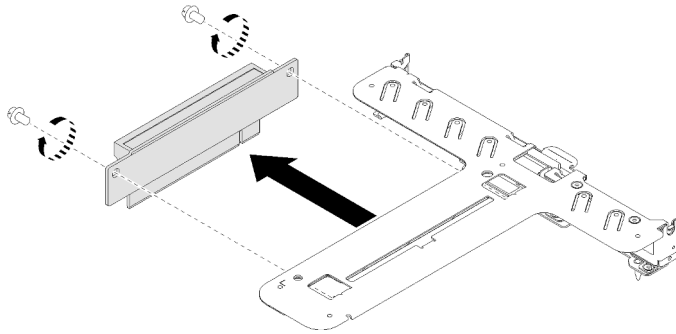


Figure 96. PCIe riser card removal

### Demo video

[Watch the procedure on YouTube](#)

## Install the PCIe riser assembly

Use this information to install the PCIe riser assembly.

### About this task

**Attention:** Read the following section(s) to ensure that you work safely.

- [“Safety” on page iii](#)
- [“Installation Guidelines” on page 51](#)

### Procedure

Step 1. If necessary, align the screw holes of the PCIe riser card with the corresponding holes on the riser cage; then, insert the PCIe riser card and tighten it with two screws.

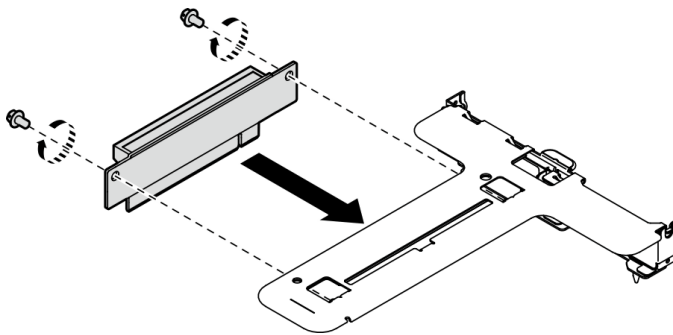


Figure 97. PCIe riser card installation

Step 2. Align the two tabs on PCIe riser assembly with the slots on the rear chassis; then, insert the PCIe riser assembly into the connector on the system board.

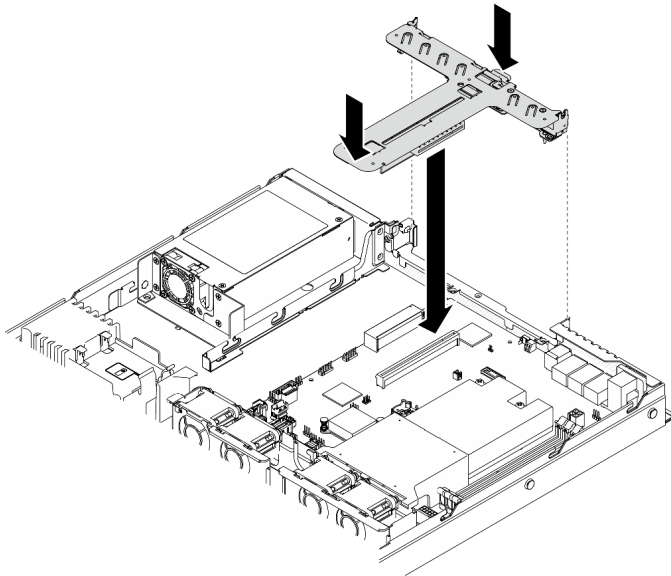


Figure 98. PCIe riser assembly installation

Step 3. Carefully press the riser assembly straight down into the slot until it is fully seated.

#### After you finish

1. Install the top cover. See [“Install the top cover” on page 142](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

#### Demo video

[Watch the procedure on YouTube](#)

---

## Power supply unit replacement

Use this procedure to install or remove the fixed power supply unit.

### Remove the fixed power supply unit

Use this information to remove the fixed power supply unit.

#### About this task

##### S001







Electrical current from power, telephone, and communication cables is hazardous.  
To avoid a shock hazard:

- Connect all power cords to a properly wired and grounded electrical outlet/source.
- Connect any equipment that will be attached to this product to properly wired outlets/sources.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

#### S002



#### **CAUTION:**

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

#### S035



#### **CAUTION:**

Never remove the cover on a power supply or any part that has this label attached. Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

#### **Attention:**

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

#### **Procedure**

Step 1. Remove the top cover. See [“Remove the top cover” on page 140](#).

Step 2. Disconnect the power cables from the system board. See [“Fixed power supply unit cable routing” on page 36](#).

Step 3. Remove the fixed power supply unit.

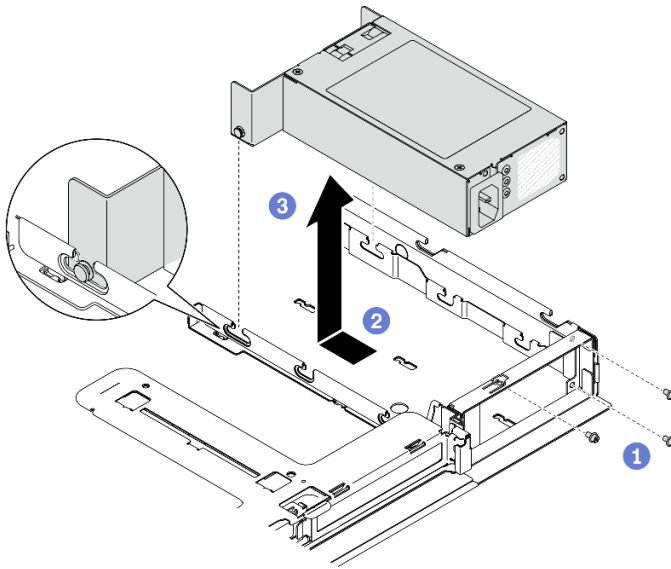


Figure 99. Power supply unit removal

- a. ① Remove the screws on the rear side of the server.
- b. ② Slide the power supply unit forward until the pins align with the opening of the slots.
- c. ③ Lift the power supply unit out of the server.

#### 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 fixed power supply unit

Use this information to install the fixed power supply unit.

#### About this task

##### S001





**DANGER**

Electrical current from power, telephone, and communication cables is hazardous.  
To avoid a shock hazard:

- Connect all power cords to a properly wired and grounded electrical outlet/source.
- Connect any equipment that will be attached to this product to properly wired outlets/sources.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

#### S002



##### **CAUTION:**

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

#### S035



##### **CAUTION:**

Never remove the cover on a power supply or any part that has this label attached. Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

##### **Attention:**

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- 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 fixed power supply unit.

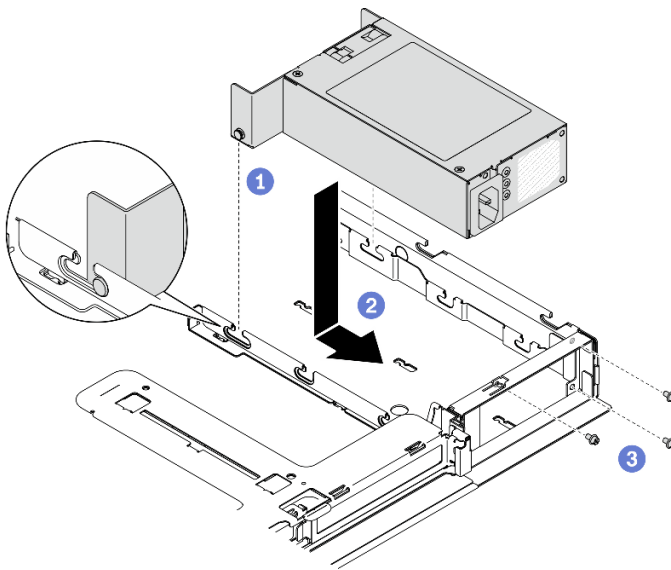


Figure 100. Power supply unit installation

- a. ① Align the pins with the slots on the chassis; then, lower the power supply unit into the chassis.
- b. ② Slide the power supply unit backwards to lock the pins into the slots.
- c. ③ Install the screws that secure the power supply unit.

#### After you finish

1. Connect the power cables to the system board. See [“Fixed power supply unit cable routing” on page 36](#).
2. Install the top cover. See [“Install the top cover” on page 142](#).
3. Connect the power cable to the power supply and a properly grounded electrical outlet.
4. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

#### Demo video

[Watch the procedure on YouTube](#)

## Remove a hot-swap power supply unit

Use this information to remove a hot-swap power supply unit.

#### About this task

##### S001





**DANGER**

Electrical current from power, telephone, and communication cables is hazardous.  
To avoid a shock hazard:

- Connect all power cords to a properly wired and grounded electrical outlet/source.
- Connect any equipment that will be attached to this product to properly wired outlets/sources.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

#### S002



#### **CAUTION:**

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

#### S035



#### **CAUTION:**

Never remove the cover on a power supply or any part that has this label attached. Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

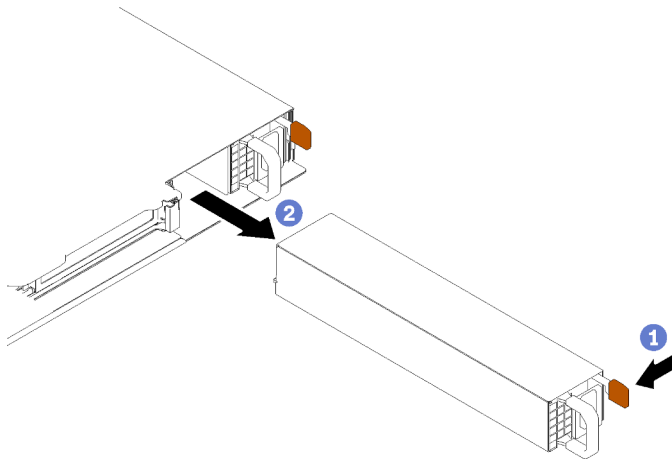
**Attention:** Read the following section(s) to ensure that you work safely.

- [“Safety” on page iii](#)
- [“Installation Guidelines” on page 51](#)

#### **Procedure**

- Step 1. Locate the hot-swap power supply in the rear of your server and disconnect the power cord from the power supply.
- Step 2. Remove the hot-swap power supply unit.

Figure 101. Hot-swap power supply unit



- a. ① Press the release tab towards the handle.
- b. ② Carefully pull the handle to slide the hot-swap power supply unit out of the chassis.

#### 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 hot-swap power supply unit

Use this information to install a hot-swap power supply unit.

#### About this task

##### S001





**DANGER**

Electrical current from power, telephone, and communication cables is hazardous.  
To avoid a shock hazard:

- Connect all power cords to a properly wired and grounded electrical outlet/source.
- Connect any equipment that will be attached to this product to properly wired outlets/sources.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

#### S002



#### **CAUTION:**

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

#### S035



#### **CAUTION:**

Never remove the cover on a power supply or any part that has this label attached. Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

#### **Attention:**

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- 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. Remove the power supply filler if necessary.

Step 2. Align the power supply unit with the bay; then, slide the power supply unit into the bay until it snaps into position.

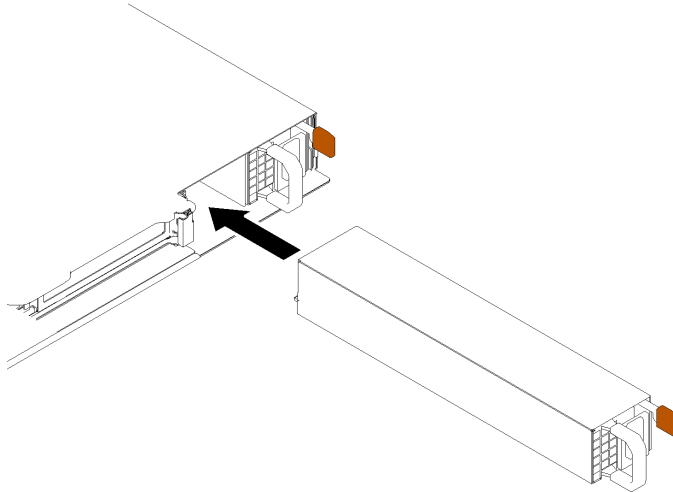


Figure 102. Hot-swap power supply unit installation

#### After you finish

1. Connect the power cable to the power supply and a properly grounded electrical outlet.
2. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

#### Demo video

[Watch the procedure on YouTube](#)

---

## Power distribution board replacement

Use the following information to remove and install the power distribution board.

### Remove the power distribution board

Use this information to remove the power distribution board.

#### About this task

##### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

#### Procedure

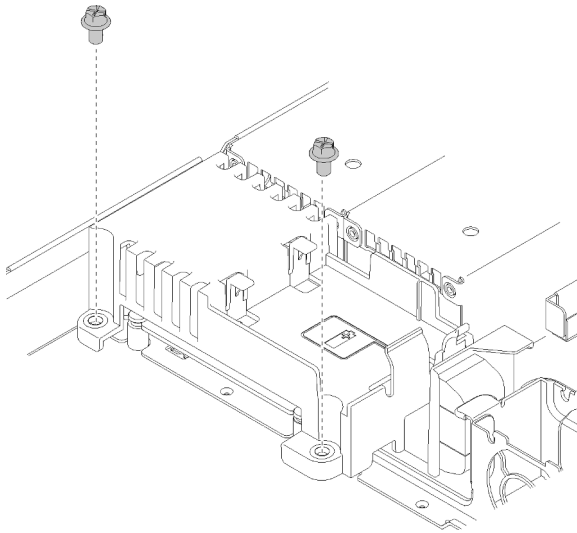
Step 1. Make preparations for this task.

- a. Remove the top cover. See [“Remove the top cover” on page 140](#).
- b. Remove the power supply unit. See [“Remove a hot-swap power supply unit” on page 112](#).
- c. Disconnect the flash power module cable from the RAID adapter. See [“Flash power module cable routing” on page 38](#).



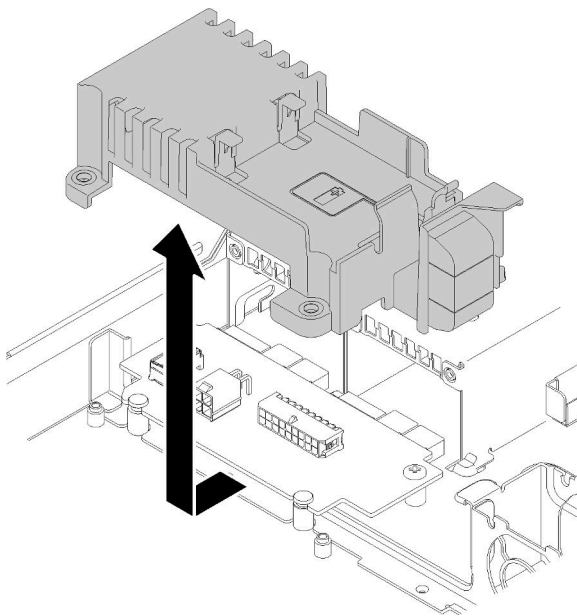
- d. Remove the flash power module. See [“Remove the flash power module” on page 78](#).

Step 2. Remove the two screws.



*Figure 103. Cover screw removal*

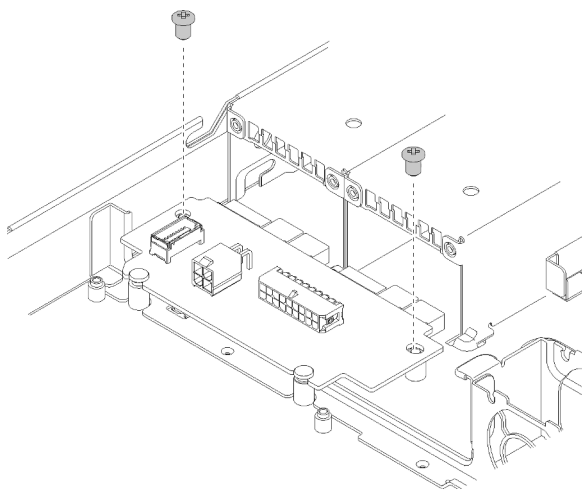
Step 3. Carefully slide the power distribution board cover forward and lift it out of the server.



*Figure 104. Power distribution board cover removal*

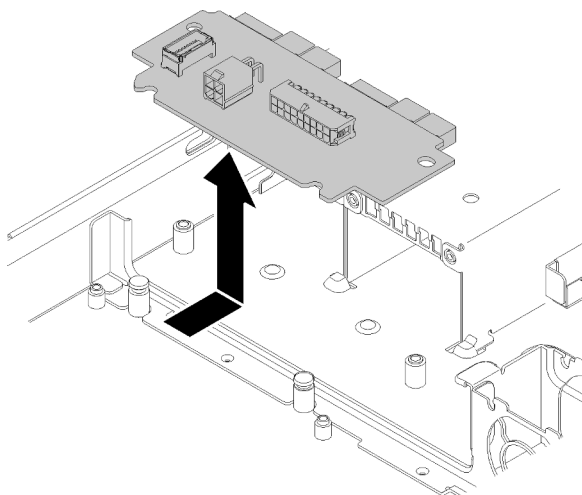
Step 4. Disconnect the cables from the power distribution board. See [“Hot-swap power supply unit cable routing” on page 37](#).

Step 5. Remove the two screws on the power distribution board.



*Figure 105. Power distribution board screw removal*

Step 6. Carefully slide the power distribution board backwards and remove it out of the server.



*Figure 106. Power distribution board removal*

### **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 power distribution board**

Use this information to install the power distribution board.

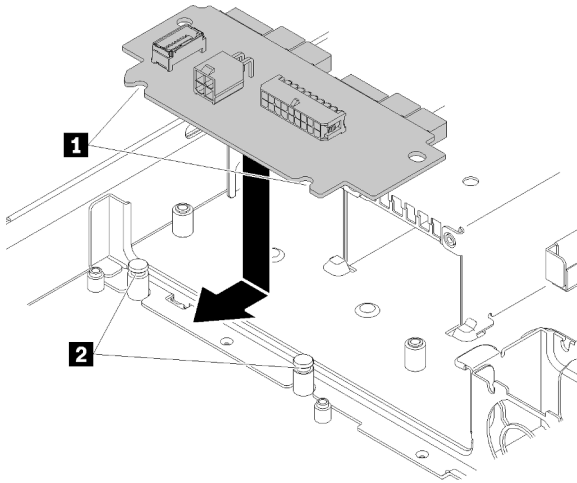
### **About this task**

**Attention:** Read the following section(s) to ensure that you work safely.

- [“Safety” on page iii](#)
- [“Installation Guidelines” on page 51](#)

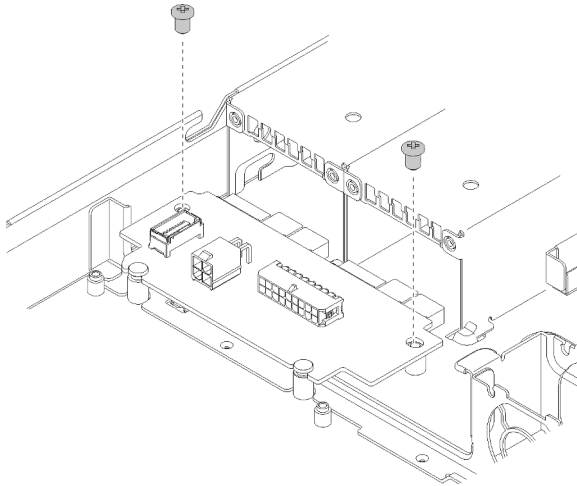
## Procedure

Step 1. Align the power distribution board slots **1** with the alignment pins **2** and lower it into the server; then, slightly slide the power distribution board forward to insert it.



*Figure 107. Power distribution board installation*

Step 2. Fasten the two screws to secure the power distribution board.



*Figure 108. Screw installation*

- Step 3. Connect the cables to the power distribution board. See [“Hot-swap power supply unit cable routing” on page 37](#).
- Step 4. Align the power distribution board cover pin **1** with the hook **2** and lower it into the server; then, slightly slide the power distribution board cover backwards to insert it.

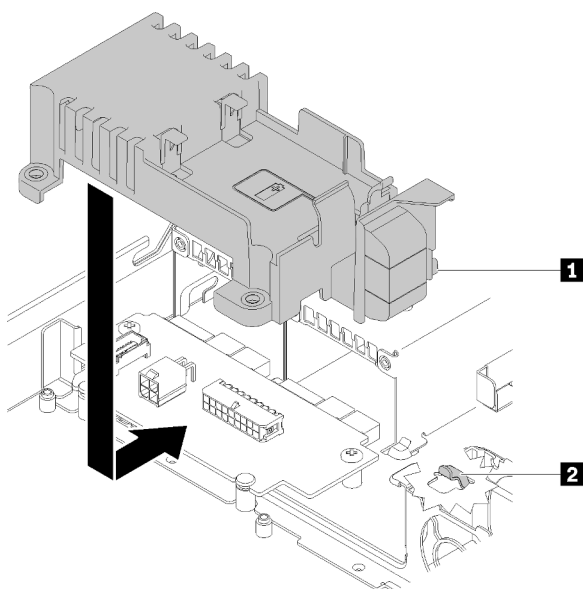


Figure 109. Power distribution board cover installation

Step 5. Fasten the two screws to secure the power distribution board cover.

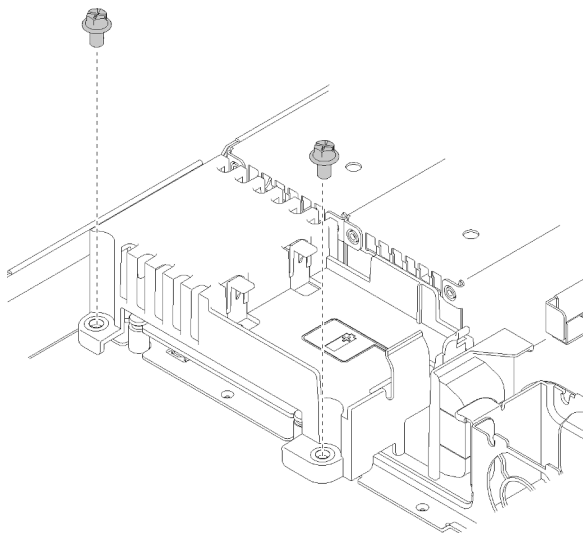


Figure 110. Cover screw installation

#### After you finish

1. Install the flash power module. See [“Install the flash power module” on page 80](#).
2. Connect the flash power module cable to the RAID adapter. See [“Flash power module cable routing” on page 38](#).
3. Install the power supply unit. See [“Install a hot-swap power supply unit” on page 114](#).
4. Install the top cover. See [“Install the top cover” on page 142](#).
5. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

#### Demo video

[Watch the procedure on YouTube](#)

---

## Processor replacement

Use the following procedures to remove and install a processor.

**Attention:** Before you begin replacing a processor, make sure that you have an alcohol cleaning pad (part number 00MP352) and gray 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 the processor

Use this information to remove the processor. This procedure must be executed by a trained technician.

### About this task

#### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

#### Procedure

Step 1. Make preparations for this task.

- a. Remove the top cover. See [“Remove the top cover” on page 140](#).
- b. Remove the air baffle. See [“Remove the air baffle” on page 63](#).
- c. Remove the heat sink. See [“Remove the heat sink” on page 86](#).

Step 2. Remove the processor.

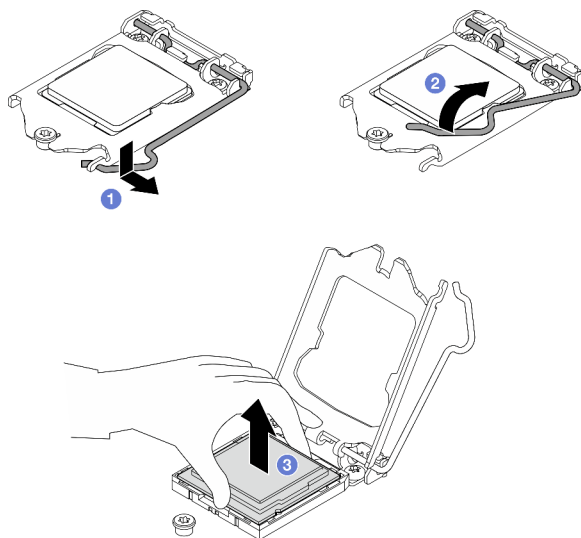


Figure 111. Opening the processor retainer

- a. ① Gently pull the handle away from the processor retainer.
- b. ② Lift the handle along with the retainer to the fully open position.
- c. ③ Hold the processor by both sides and gently lift it away from the processor socket.

**Notes:**

1. Do not touch the gold contacts on the bottom of the processor.
2. Keep the processor socket clean from any object to prevent possible damages.

**After you finish**

1. Install a new processor. See [“Install the processor” on page 123](#).
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 processor

Use this information to install the processor. This procedure must be executed by a trained technician.

**About this task**

**Attention:**

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- 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.
- 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.

- Before reusing a processor that was removed from another system board, wipe the thermal grease from the processor with an alcohol cleaning pad, and dispose of the cleaning pad after all of the thermal grease is removed.

**Note:** If you are applying new thermal grease on the top of the processor, make sure to do it after the alcohol has fully evaporated.

## Procedure

- Step 1. 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.

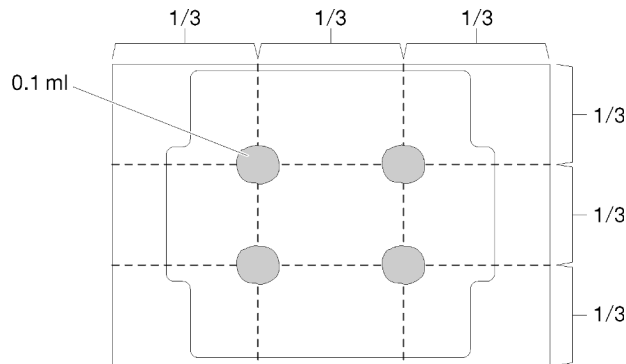


Figure 112. Proper shape of the thermal grease

- Step 2. Hold the processor by both sides, and align the following:
1. Align **1** the small notches on the processor to **2** the tabs on the socket.
  2. Align **3** the small triangle of the processor to **4** the beveled corner on the socket.

Then, gently lower the processor evenly into the socket.



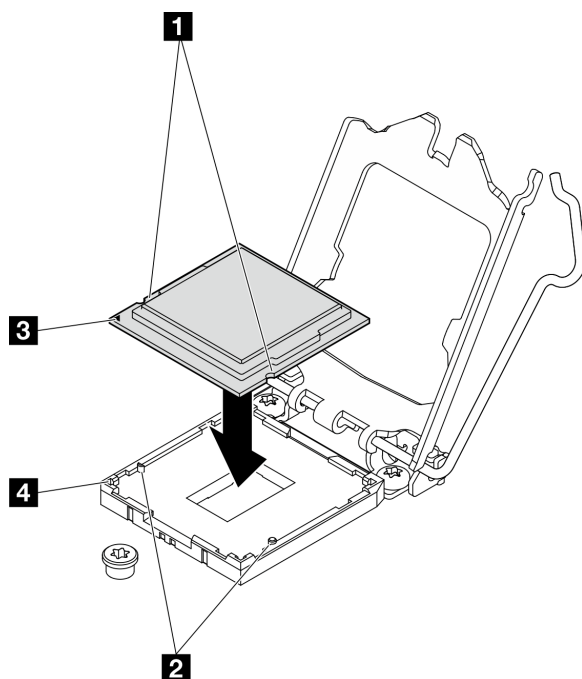


Figure 113. Installing the processor

Step 3. Close the processor retainer, and push the handle to the locked position.

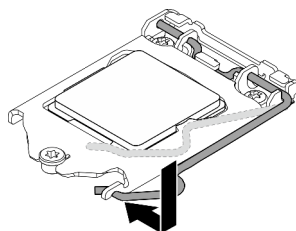


Figure 114. Closing the processor retainer

#### After you finish

1. Reinstall the heat sink. See [“Install the heat sink” on page 87](#).
2. Install the air baffle. See [“Install the air baffle” on page 64](#).
3. Install the top cover. See [“Install the top cover” on page 142](#).
4. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

#### Demo video

[Watch the procedure on YouTube](#)

---

## Rack latches replacement

Use the following information to remove and install the rack latches.

### Remove the rack latches

Use this information to remove the rack latches.

## About this task

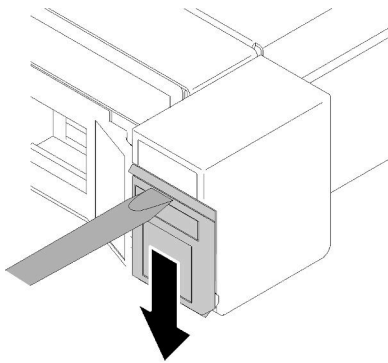
### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

**Note:** Both rack latches are removed and installed in a similar method.

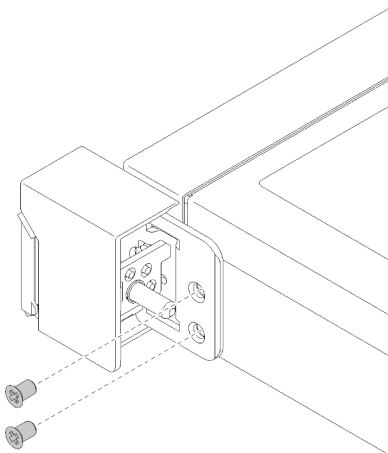
### Procedure

- Step 1. Remove the security bezel if it is installed. See [“Remove the security bezel” on page 129](#).
- Step 2. Use a flat-blade screwdriver to remove the ID label plate on the right rack latch and place it in a safe place.



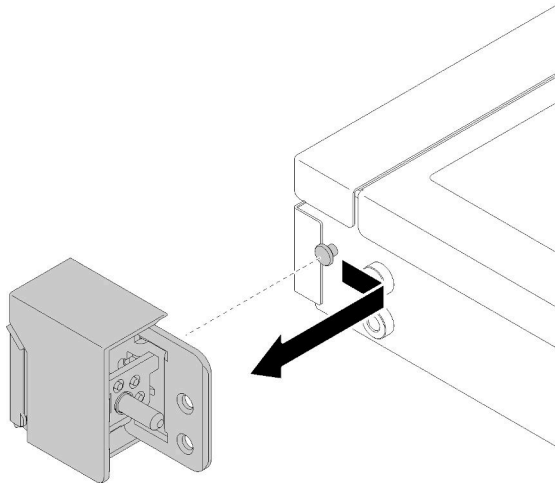
*Figure 115. ID label removal*

- Step 3. Remove the two screws on the side of the server that secure the rack latch.



*Figure 116. Rack latches removal*

- Step 4. Slide the latch backwards and remove it from the server.



*Figure 117. Rack latches removal*

Step 5. Remove the other rack latch if necessary.

#### **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 rack latches**

Use this information to install the rack latches.

#### **About this task**

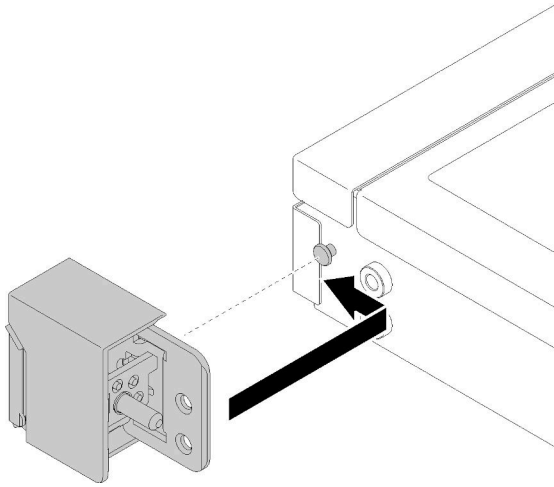
**Attention:** Read the following section(s) to ensure that you work safely.

- [“Safety” on page iii](#)
- [“Installation Guidelines” on page 51](#)

**Note:** Both rack latches are removed and installed in a similar method.

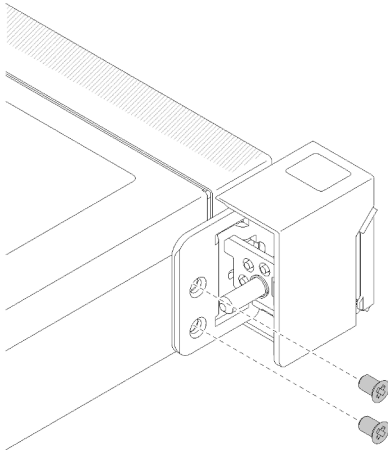
#### **Procedure**

Step 1. Align the pin hole with the pin on the chassis; then, press the rack latch onto the chassis and slightly slide it forward.



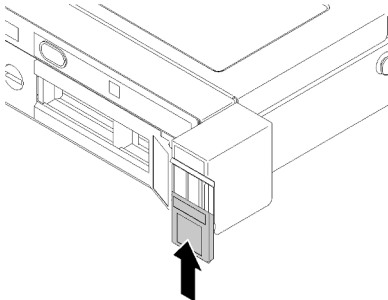
*Figure 118. Rack latches installation*

Step 2. Install the two screws to secure the rack latch on the side of the server.



*Figure 119. Rack latches installation*

Step 3. Install the ID label to the right rack latch by inserting the label onto the right rack latch.



*Figure 120. ID label installation*

Step 4. If you are installing the other rack latch, do so now.

**After you finish**

1. Install the security bezel. See [“Install the security bezel” on page 130](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

### Demo video

[Watch the procedure on YouTube](#)

---

## Security bezel replacement

Use this procedure to remove or install the security bezel.

### Remove the security bezel

Use this information to remove the security bezel.

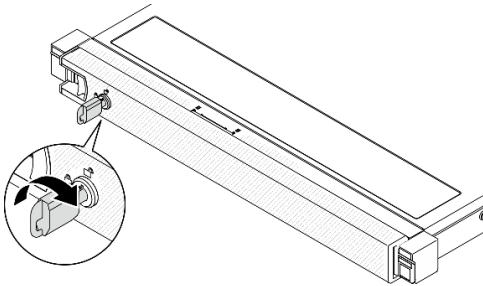
#### About this task

##### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- If the server is installed in a rack, extend or remove the server from the rack.

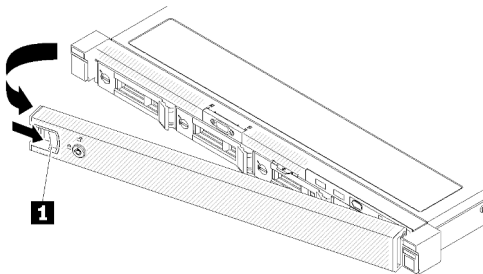
#### Procedure

Step 1. Use the key to unlock the security bezel to the open position.



*Figure 121. Unlocking the security bezel*

Step 2. Press the release latch and rotate the security bezel outwards to remove it from the chassis.



*Figure 122. Security bezel removal*

Table 14. Security bezel removal

**1** Release latch

### 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 security bezel

Use this information to install the security bezel.

### About this task

**Attention:** Read the following section(s) to ensure that you work safely.

- [“Safety” on page iii](#)
- [“Installation Guidelines” on page 51](#)

### Procedure

Step 1. Carefully insert the tabs on the security bezel into the slots on the right rack handle. Press and hold the release latch; then, pivot the security bezel inwards until it clicks in place.

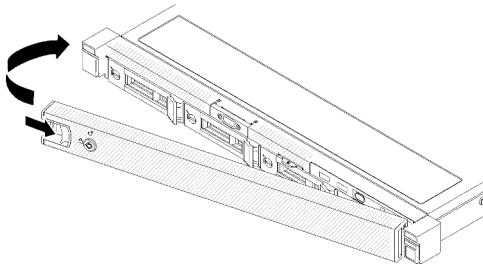


Figure 123. Security bezel installation

Step 2. Use the key to lock the security bezel to the closed position.

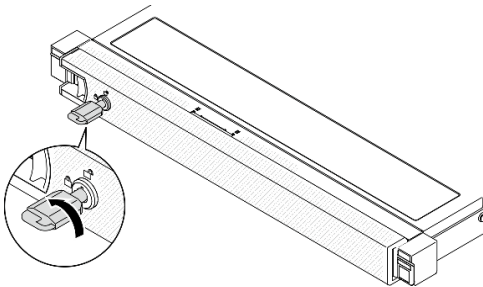


Figure 124. Locking the security bezel

### After you finish

Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

### Demo video

[Watch the procedure on YouTube](#)

---

## System board replacement (trained technician only)

Use this procedure to remove or install the system board.

**Important:** Before you return the system board, make sure that you install the processor socket covers from the new system board. To replace a processor socket cover:

1. Take a socket cover from the processor socket assembly on the new system board and orient it correctly above the processor socket assembly on the removed system board.
2. Gently press down the socket cover legs to the processor 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 processor socket assembly.

## Remove the system board

Use this information to remove the system board.

### About this task

#### Attention:

- Removing and installing this component requires trained technicians. Do not attempt to remove or install it without proper training.
- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- 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.
- Use the Lenovo XClarity Essentials OneCLI to save the system configuration to external media.
- Save the system-event log to external media.
- 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.
- Turn off the server. Disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

### Procedure

Step 1. Make preparations for this task.

- a. Remove the top cover. See [“Remove the top cover” on page 140](#).
- b. Remove the air baffle. See [“Remove the air baffle” on page 63](#).
- c. Remove the PCIe riser assembly. See [“Remove the PCIe riser assembly” on page 105](#).

- d. Remove the PCIe adapter from PCIe slot 3. See [“Remove the PCIe adapter \(Slot 3\)” on page 103](#).
- e. Disconnect the backplate or the backplane cables from the system board. See [“Backplane and backplane cable routing” on page 40](#).
- f. Disconnect the M.2 boot adapter cables from the system board. See [“M.2 boot adapter cable routing” on page 39](#).
- g. Disconnect the fan cables from the system board. See [“Fan cable routing” on page 35](#).
- h. Disconnect the front operator panel cables from the system board. See [“Front panel cable routing” on page 33](#).
- i. Remove the memory modules. See [“Remove a memory module” on page 95](#).
- j. Remove the heat sink. See [“Remove the heat sink” on page 86](#).
- k. Remove the processor. See [“Remove the processor” on page 122](#).

Step 2. Remove all eight screws that secure the system board to the chassis.

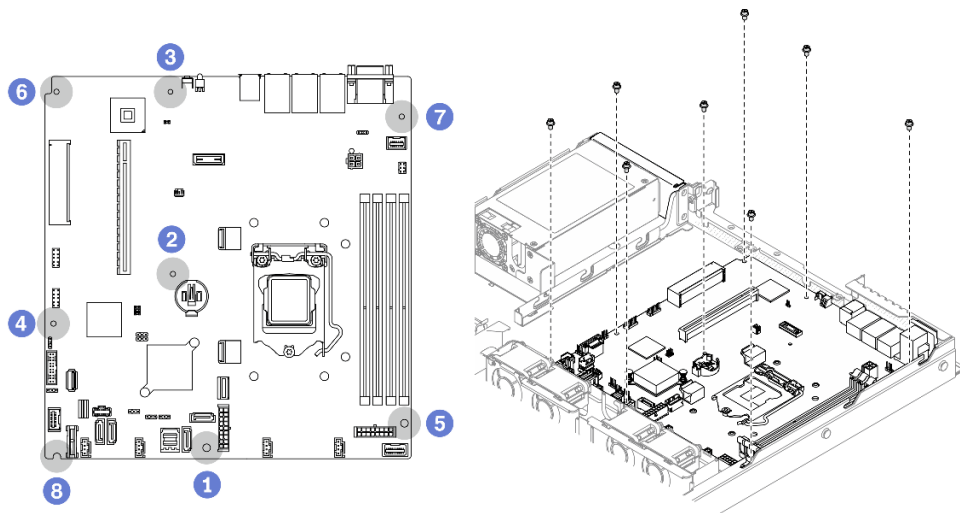


Figure 125. System-board screws location

**Notes:**

- The order and locations of screws removal:

<b>1</b> between the SATA connectors and the system power connector	<b>5</b> the lower right side
<b>2</b> near the CMOS battery	<b>6</b> the upper left side
<b>3</b> near NMI button	<b>7</b> the upper right side
<b>4</b> near front USB 3.0 / 2.0 header	<b>8</b> the lower left side

- For reference, the torque which is required for the screws to be fully tightened or removed is 5.0 +/- 0.5 lb-in.

Step 3. Slightly lift up the front side of the system board; then, slide the system board towards the front of the server and lift it out of the server.



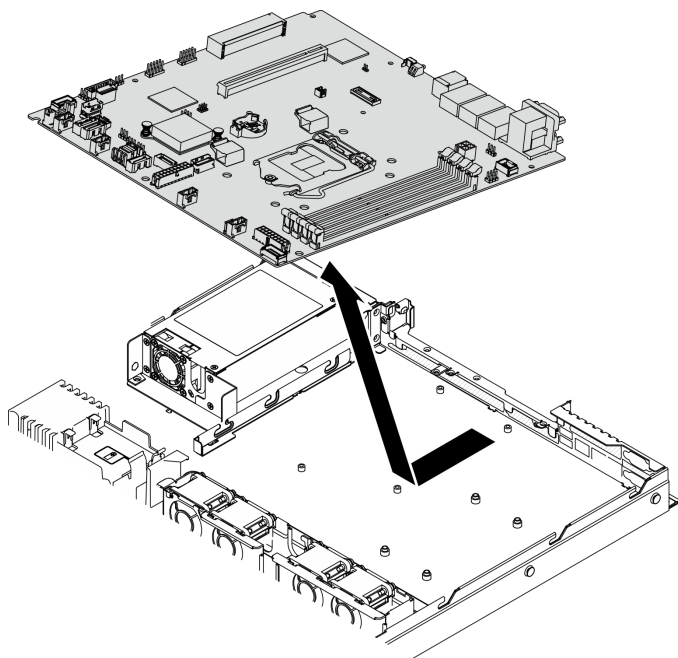


Figure 126. System board removal

### After you finish

**Important:** Before you return the system board, make sure that you install the processor socket covers from the new system board. To replace a processor socket cover:

1. Insert the new system board into the chassis. See [“Install the system board” on page 133](#).
2. Take a socket cover from the processor socket assembly on the new system board and orient it correctly above the processor socket assembly on the removed system board.
3. Gently press down the socket cover legs to the processor 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.
4. **Make sure** that the socket cover is securely attached to the processor socket assembly.

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 system board

Use this information to install the system board.

### About this task

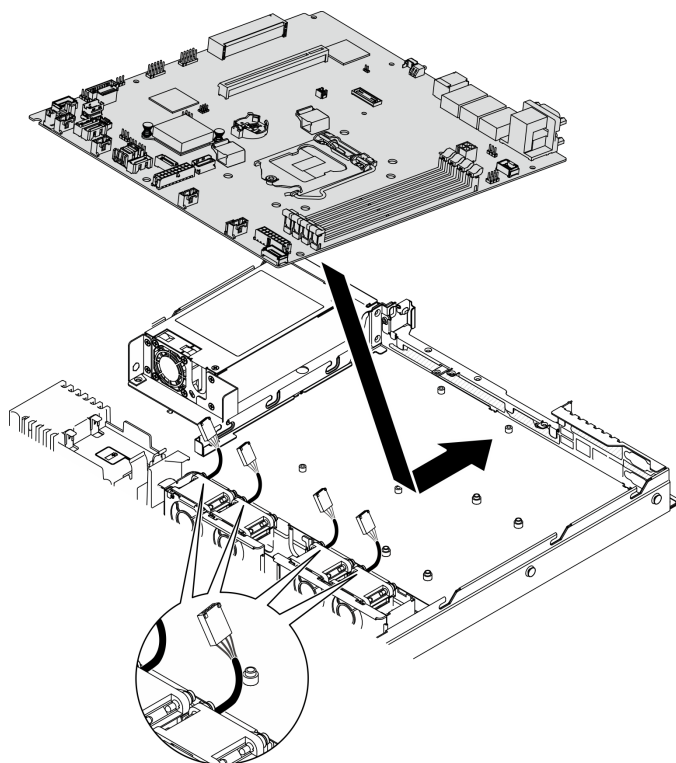
#### Attention:

- Removing and installing this component requires trained technicians. Do not attempt to remove or install it without proper training.
- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)

- “Installation Guidelines” on page 51
- 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 system board with serial and VGA ports on the rear side of the chassis. Carefully lower the system board into the chassis.
- a. Move the fan cables aside and make sure these cables will not interfere the installation of the system board.
  - b. Place the system board flat into the chassis. Match screw slots on the system board to the corresponding slots on the chassis.



*Figure 127. System board installation*

- Step 2. Install all eight screws to secure the system board to the chassis according to the installation orders as shown.

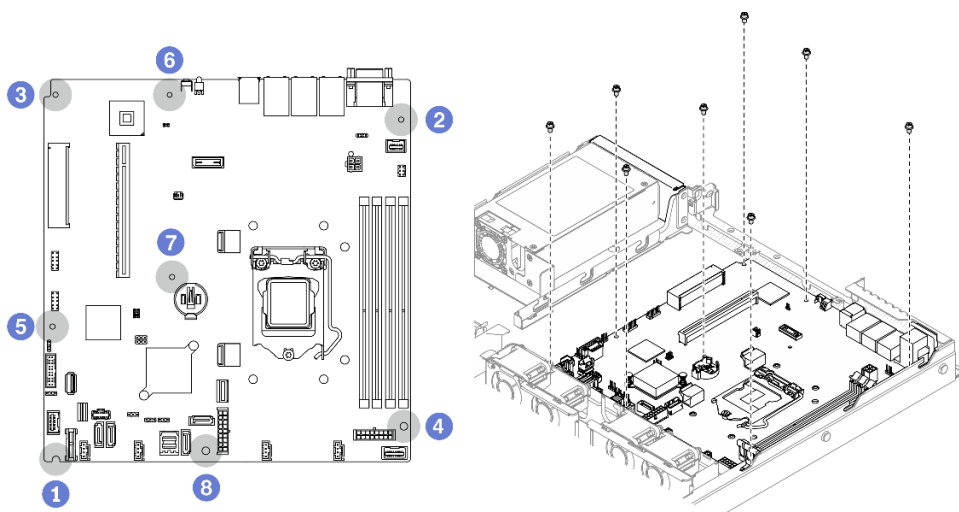


Figure 128. System-board screws location

#### Notes:

- The order and locations of screws installation :

<b>1</b> the lower left side	<b>5</b> near front USB 3.0 / 2.0 header
<b>2</b> the upper right side	<b>6</b> near NMI button
<b>3</b> the upper left side	<b>7</b> near the CMOS battery
<b>4</b> the lower right side	<b>8</b> between the SATA connectors and the system power connector

- For reference, the torque which is required for the screws to be fully tightened or removed is 5.0 +/- 0.5 lb-in.

#### After you finish

1. Install the processor. See [“Install the processor” on page 123](#).
2. Install the heat sink. See [“Install the heat sink” on page 87](#).
3. Install the memory modules. See [“Install a memory module” on page 97](#).
4. Connect the front operator panel cables to the system board. See [“Front panel cable routing” on page 33](#).
5. Connect the fan cables to the system board by pressing it down until it clicks. See [“Fan cable routing” on page 35](#).
6. Connect the M.2 boot adapter cables to the system board. See [“M.2 boot adapter cable routing” on page 39](#).
7. Connect the backplane or the backplane cables to the system board. See [“Backplane and backplane cable routing” on page 40](#).
8. Install the PCIe riser assembly. See [“Install the PCIe riser assembly” on page 107](#).
9. Install the PCIe adapter to PCIe slot 3. See [“Install the PCIe adapter \(Slot 3\)” on page 104](#).
10. Install the air baffle. See [“Install the air baffle” on page 64](#).
11. Install the top cover. See [“Install the top cover” on page 142](#).
12. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

13. Reconnect power cords and all external cables.
14. 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 136](#).
15. Enable TPM. See [“Enable TPM” on page 138](#).
16. Optionally, enable UEFI Secure Boot. See [“Enable UEFI Secure Boot” on page 140](#).

## 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 xxxxyyy, 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 TPM card.

When a system board is replaced, you must make sure that the TPM card policy is set correctly.

### CAUTION:

**Take special care when setting the TPM card 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>`

**Note:** Make sure the latest version of BIOS/UEFI firmware is installed before locking the TPM\_TCM\_POLICY.

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_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_address>
```

---

## Top cover replacement

Use the following information to remove and install the top cover.

### Remove the top cover

Use this information to remove the top cover.



## About this task

### 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:**

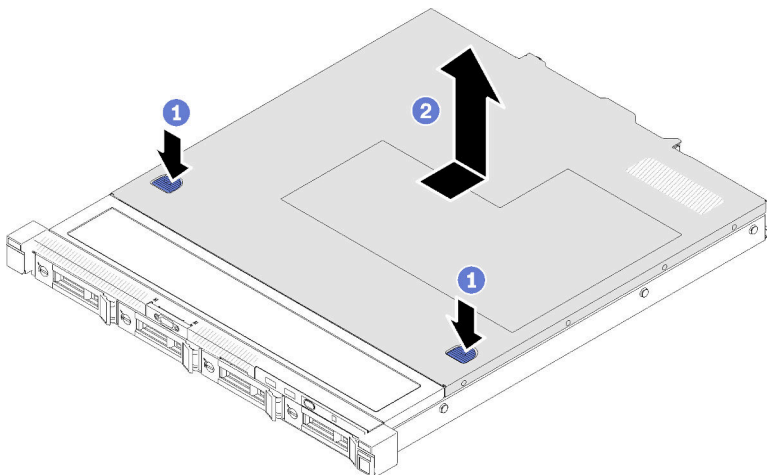
Hazardous energy present. Voltages with hazardous energy might cause heating when shorted with metal, which might result in spattered metal, burns, or both.

#### **Attention:**

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

#### **Procedure**

Step 1. Remove the top cover



*Figure 129. Top cover removal*

- a. ① Press the release button and the push point at the same time; then, slide the cover toward the rear of the server.
- b. ② Lift the top cover away from the server.

### 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

Use this information to install the top cover.

### About this task

#### 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.**

#### **Attention:**

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- 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 33](#).

### Procedure

Step 1. Align the posts inside the top cover with the slots on the chassis.

Step 2. Hold the front of the server and slide the top cover towards the front of the server until it clicks into place.

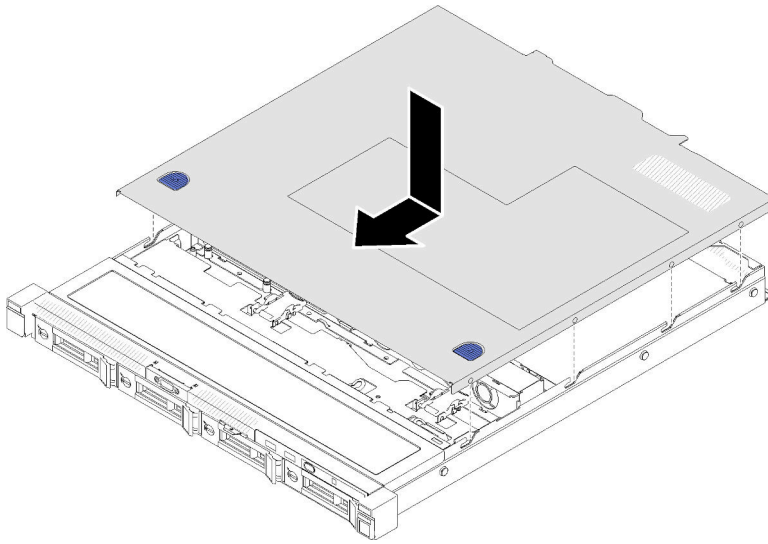


Figure 130. Top cover installation

#### After you finish

Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

#### Demo video

[Watch the procedure on YouTube](#)

---

## VGA cable replacement

Use the following information to remove and install the VGA cable.

### Remove the VGA cable (2.5-inch drive model)

Use this information to remove the VGA cable for the 2.5-inch drive model.

#### About this task

##### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Turn off the server. Disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

Step 1. Make preparations for this task.

- a. Remove the top cover. See [“Remove the top cover” on page 140](#).

- b. Remove the front operator panel (2.5-inch drive model). See [“Remove the front operator panel \(2.5-inch drive model\)” on page 81](#).

Step 2. Remove the VGA cable.

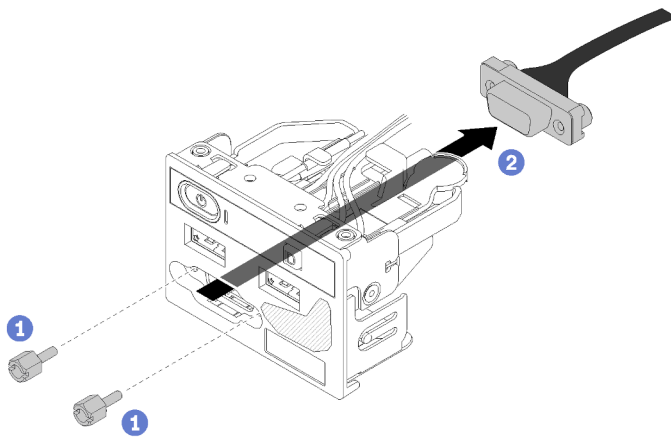


Figure 131. VGA cable removal - 2.5-inch drive model

- a. ① Remove the two screws that secure the VGA connector.
- b. ② Push the VGA connector out of the front I/O assembly.

### 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 VGA cable (2.5-inch drive model)

Use this information to install the VGA cable for the 2.5-inch drive model.

### About this task

#### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Turn off the server. Disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

### Procedure

Step 1. Install the VGA cable.

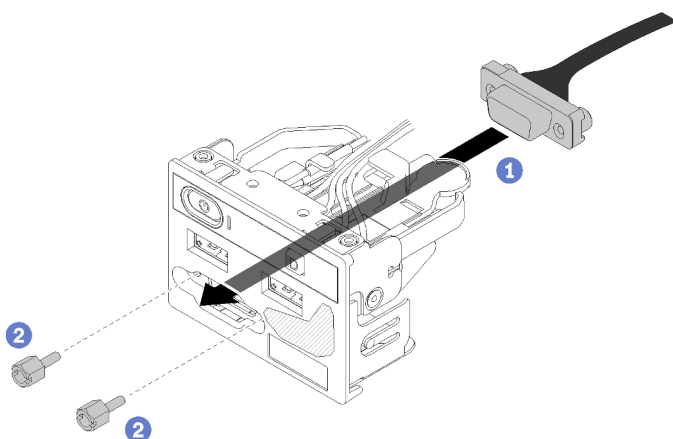


Figure 132. VGA cable installation

- a. ① Insert the VGA cable into the front I/O assembly.
- b. ② Install and fasten two screws to secure the VGA cable.

#### After you finish

1. Install the front operator panel (2.5-inch drive model). See [“Install the front operator panel \(2.5-inch drive model\)” on page 82](#).
2. Install the top cover onto the server. See [“Install the top cover” on page 142](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

#### Demo video

[Watch the procedure on YouTube](#)

## Remove the VGA cable (3.5-inch drive model)

Use this information to remove the VGA cable for the 3.5-inch drive model.

#### About this task

##### Attention:

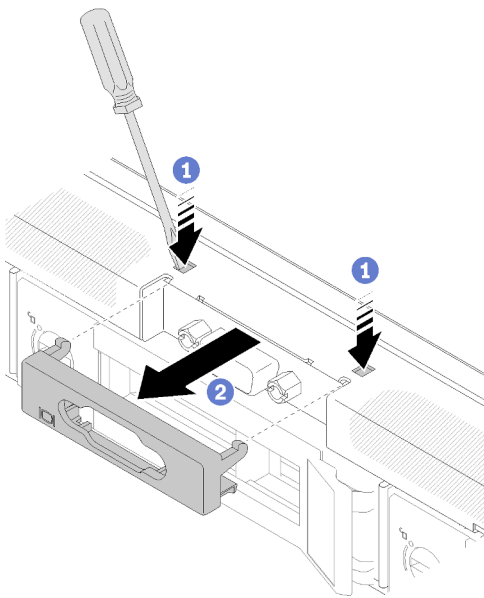
- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Turn off the server. Disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

#### Procedure

Step 1. Make preparations for this task.

- a. Remove the top cover. See [“Remove the top cover” on page 140](#).
- b. Disconnect the VGA cable. See [“Front panel cable routing” on page 33](#).

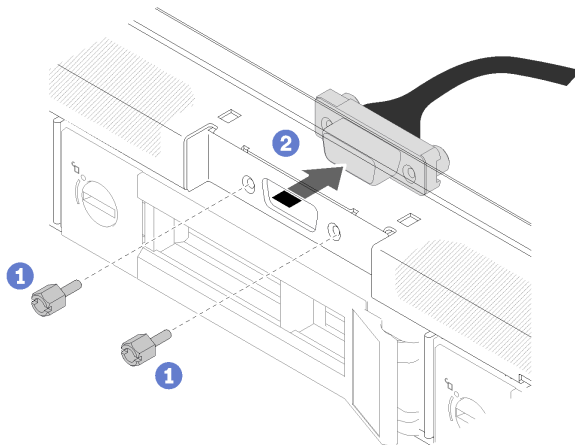
Step 2. Remove the VGA cover.



*Figure 133. VGA cover removal*

- a. ① Use a tool to press both clips.
- b. ② Pull the cover of the VGA cable out.

Step 3. Remove the VGA cable.



*Figure 134. VGA cable removal*

- a. ① Remove the screws that secure the VGA cable.
- b. ② Pull out the VGA cable out of the server.

### **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 VGA cable (3.5-inch drive model)

Use this information to install the VGA cable for the 3.5-inch drive model.

### About this task

#### Attention:

- Read the following section(s) to ensure that you work safely.
  - “Safety” on page iii
  - “Installation Guidelines” on page 51
- Turn off the server. Disconnect the power cords and all external cables. See “Power off the server” on page 11.
- If the server is installed in a rack, remove the server from the rack.

#### Procedure

Step 1. Install the VGA cable.

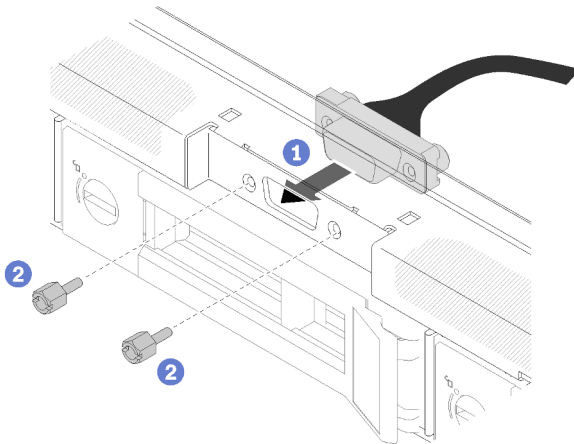


Figure 135. VGA cable installation

- a. ① Insert the VGA cable into the slot on the front chassis.
- b. ② Install the screws to secure the VGA cable.

Step 2. Push the VGA cable cover into the slot until the clips are locked.

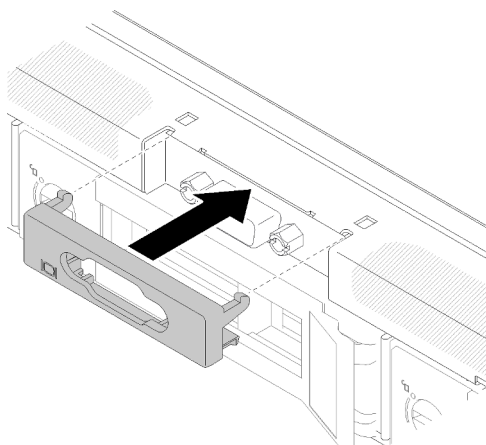


Figure 136. VGA cover installation

### After you finish

1. Connect the VGA cable. See [“Front panel cable routing” on page 33](#).
2. Install the top cover onto the server. See [“Install the top cover” on page 142](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 148](#).

### Demo video

[Watch the procedure on YouTube](#)

---

## Complete the parts replacement

Use this information to complete the 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. If you have removed the server cover, reinstall it. See [“Install the top cover” on page 142](#).
4. Reconnect external cables and power cords to the server.

**Attention:** To avoid component damage, connect the power cords last.

5. Update the server configuration.
  - Download and install the latest device drivers: <http://datacentersupport.lenovo.com>
  - Update the system firmware. See [“Firmware updates” on page 6](#).
  - Update the UEFI configuration.
  - Reconfigure the disk arrays if you have installed or removed a hot-swap drive or a RAID adapter. See the Lenovo XClarity Provisioning Manager User Guide, which is available for download at: <http://datacentersupport.lenovo.com>



---

## 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.

### Notes:

- For your server, the Lenovo XClarity Controller web page or command-line interface does not support the display of system utilization information for the following:
  - Processor
  - memory module
  - I/O

---

## 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: [http://ralfss28.labs.lenovo.com:8787/help/topic/royce/pdf\\_files.html](http://ralfss28.labs.lenovo.com:8787/help/topic/royce/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:

All Event Sources

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 137. Lenovo XClarity Administrator event log

For more information about working with events from XClarity Administrator, see:

[http://sysmgmt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/events\\_vieweventlog.html](http://sysmgmt.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.

ThinkSystem System name: XCC0023579PK

Event Log Audit Log Maintenance History

Customize Table Clear Logs Refresh

Type: All Source All Date

Severity	Source	Event ID	Message	Date
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
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
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
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

Figure 138. 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/>

## The front operator panel and error LEDs

The front operator panel 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.

The following illustration shows the error LEDs for the server, which are located on the front operator panel.

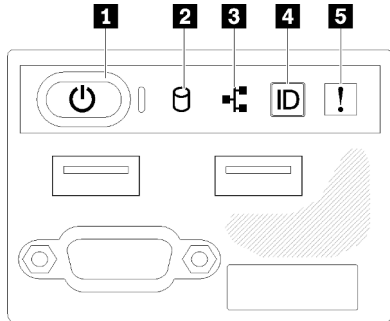


Figure 139. 2.5-inch drive chassis front operator panel

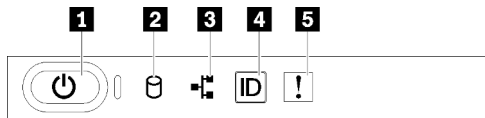


Figure 140. 3.5-inch drive chassis front operator panel

Table 15. Front operator panel controls and indicators

<b>1</b> Power button and power LED (green)	<b>4</b> System ID button/LED (blue)
<b>2</b> Drive activity LED (green)	<b>5</b> System-error LED (yellow)
<b>3</b> Network activity LED (green)	

**1 Power button and power LED (green):** Press this button to turn the server on and off manually. The states of the power LED are as follows:

**Off:** Power is not present or the power supply, or the LED itself has failed.

**Flashing rapidly (4 times per second):** 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):** The server is turned off and is ready to be turned on. You can press the power button to turn on the server.

**On:** The server is turned on.

**2 Drive activity LED (green):** Each hot-swap drive comes with an activity LED. If the LED is lit, it indicates that the drive is powered, but not actively reading or writing data. If the LED is flashing, the drive is being accessed.

**3 Network activity LED (green):** When this LED flickers, it indicates that the server is transmitting to or receiving signals from the Ethernet LAN.

**4 System ID button/LED (blue):** Use this blue LED to visually locate the server among other servers. This LED is also used as a presence detection button. You can use Lenovo XClarity Administrator to light this LED remotely.

**5 System-error LED (yellow):** When this yellow LED is lit, it indicates that a system error has occurred. A system-error LED is also on the rear of the server. Messages on the LCD system information display panel and LEDs on other server components might also be lit to help isolate the error. This LED is controlled by the Lenovo XClarity Controller.

## Power supply LEDs

The illustration in this section shows the LEDs on the power supply.

### 300 watts Power supply LEDs

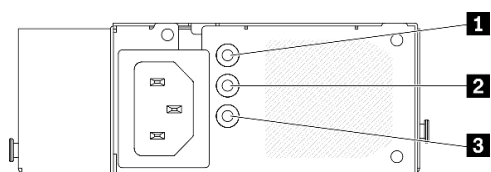


Figure 141. 300 watts Power supply LEDs

Each hot-swap power supply has three status LEDs.

Table 16. 300 watts Power supply LEDs

LED	Description
<b>1</b> Power input LED (green)	<ul style="list-style-type: none"> <li>Off: The power supply is disconnected from the ac power source or a power problem occurs.</li> <li>Green: The power supply is connected to the ac power source.</li> </ul>
<b>2</b> Power output LED (green)	<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 power output LED is off, replace the power supply.</li> <li>Green: The server is on and the power supply is working normally.</li> </ul>
<b>3</b> Power supply error LED (yellow)	<ul style="list-style-type: none"> <li>Off: The power supply is working normally.</li> <li>Yellow: The power supply has failed. To resolve the issue, replace the power supply.</li> </ul>

### 450 watts Power supply LED

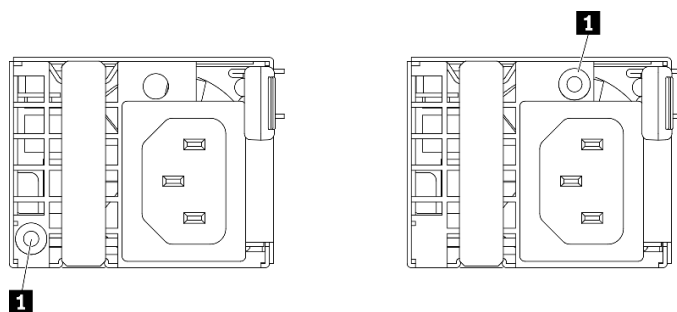


Figure 142. 450 watts Power supply LED

**Note:** The location of the power supply LED will vary depending on model.

Each hot-swap power supply has one status LED.

Table 17. 450 watts Power supply LED

LED	Description
<b>1</b> Power output LED (green)	<ul style="list-style-type: none"> <li>Green: The server is on and the power supply is working normally.</li> <li>Blinking green: The power supply is in zero-output mode (standby). When the server power load is low, one of the installed power supplies enters into the standby state while the other one delivers entire load. When the power load increases, the standby power supply will switch to active state to provide sufficient power to the server.</li> </ul> <p>To disable zero-output mode, start the Setup utility, go to <b>System Settings → Power → Zero Output</b> and select <b>Disable</b>. If you disable zero-output mode, both power supplies will be in the active state.</p> <ul style="list-style-type: none"> <li>Off: The power supply has failed or not connected from the ac power source or a power problem occurs. To resolve the issue, check the power cord and the input voltage. If the problem still recurs, replace the power supply.</li> </ul>

## System-board LEDs

The following illustration indicates the light-emitting diodes (LEDs) on the system board.

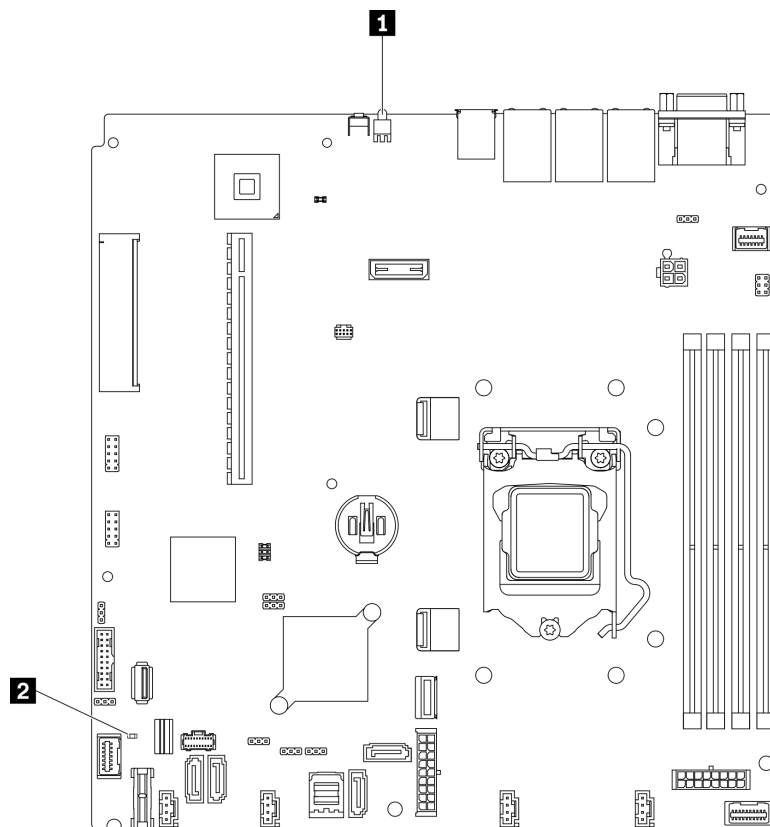


Figure 143. System-board LEDs

Table 18. System-board LEDs

<b>1</b> Rear identification LED (blue)	<b>2</b> System error LED (amber)
---	-----------------------------------

---

## 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 149](#)

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 [“Specifications” on page 1](#) 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, reseal 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 152](#) 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.

---

## 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 149](#)

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 175](#)).

## 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 156
- “The power button does not work (server does not start)” on page 156
- “Server does not power on” on page 157

### 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 memory module 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 157](#)
- [“Displayed system memory is less than installed physical memory” on page 158](#)
- [“Invalid memory population detected” on page 158](#)

### **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.
  - 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.
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. Re-enable all memory modules using the Setup Utility, and then restart the server.
5. (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.
6. (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 *Setup Guide* 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.

## **Hard disk drive problems**

Use this information to resolve issues related to the hard disk drives.

- “Server cannot recognize a hard drive” on page 159
- “Multiple hard drives fail” on page 160
- “Multiple hard drives are offline” on page 160
- “A replacement hard disk drive does not rebuild” on page 160
- “Green hard disk drive activity LED does not represent actual state of associated drive” on page 160
- “Yellow hard disk drive status LED does not represent actual state of associated drive” on page 160

### 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**.

## Monitor and video problems

Use this information to solve problems related to a monitor or video.

- [“Incorrect characters are displayed” on page 161](#)
- [“Screen is blank” on page 161](#)
- [“Screen goes blank when you start some application programs” on page 161](#)
- [“The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted” on page 161](#)
- [“The wrong characters appear on the screen” on page 162](#)

### 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 6](#).

### 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 6](#).
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 6](#).

## **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 162](#)
- [“Mouse does not work” on page 162](#)
- [“KVM switch problems” on page 163](#)
- [“USB-device does not work” on page 163](#)

### **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 163
- “PCIe adapter is not recognized or is not functioning” on page 163
- “Insufficient PCIe resources are detected.” on page 164
- “A Lenovo optional device that was just installed does not work.” on page 164
- “A Lenovo optional device that worked previously does not work now” on page 164

### 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 165](#)
- [“Serial device does not work” on page 165](#)

### 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 165](#)
- [“Intermittent KVM problems” on page 166](#)
- [“Intermittent unexpected reboots” on page 166](#)

### 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 149](#) 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 167](#)
- [“Could not log in using LDAP account with SSL enabled” on page 167](#)

### **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 149](#)), 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 168](#)
- [“The server immediately displays the POST Event Viewer when it is turned on” on page 168](#)
- [“Server is unresponsive \(POST is complete and operating system is running\)” on page 168](#)
- [“Server is unresponsive \(POST failed and cannot start System Setup\)” on page 169](#)
- [“Voltage planar fault is displayed in the event log” on page 169](#)
- [“Unusual smell” on page 169](#)

- “Server seems to be running hot” on page 169
- “Cannot enter legacy mode after installing a new adapter” on page 170
- “Cracked parts or cracked chassis” on page 170

### 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 memory modules.
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.

---

### Disassemble the server for chassis recycle

Follow the instructions in this section to disassemble the server before recycling the chassis.

#### About this task

##### Attention:

- Read the following section(s) to ensure that you work safely.
  - [“Safety” on page iii](#)
  - [“Installation Guidelines” on page 51](#)
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 11](#).
- If the server is installed in a rack, remove the server from the rack.

- Step 1. Remove the power supply unit. See [“Remove a hot-swap power supply unit” on page 112](#).
- Step 2. Remove the security bezel. See [“Remove the security bezel” on page 129](#).
- Step 3. Remove the rack latches. See [“Remove the rack latches” on page 125](#).
- Step 4. Remove all the drives. See [“Remove a simple-swap drive” on page 69](#) or [“Remove a hot-swap drive” on page 71](#).
- Step 5. Remove the top cover. See [“Remove the top cover” on page 140](#).
- Step 6. Remove the air baffle. See [“Remove the air baffle” on page 63](#).
- Step 7. Remove the PCIe riser assembly. See [“Remove the PCIe riser assembly” on page 105](#).
- Step 8. Remove the M.2 boot adapter assembly or PCIe adapter from PCIe slot 3. See [“Remove the PCIe adapter \(Slot 3\)” on page 103](#).
- Step 9. Remove the flash power module. See [“Remove the flash power module” on page 78](#).
- Step 10. Remove the fixed power supply unit. See [“Remove the fixed power supply unit” on page 108](#).
- Step 11. Remove the power distribution board. See [“Remove the power distribution board” on page 116](#).
- Step 12. Remove all the fans. See [“Remove a fan” on page 74](#).
- Step 13. Remove all the backplanes and backplates. See [“Remove the 2.5-inch backplane” on page 53](#), [“Remove the 3.5-inch backplane” on page 59](#), or [“Remove the 3.5-inch backplate” on page 61](#).
- Step 14. Remove the front operator panel. See [“Remove the front operator panel \(2.5-inch drive model\)” on page 81](#) or [“Remove the front operator panel \(3.5-inch drive model\)” on page 83](#).
- Step 15. Remove the VGA cable. See [“Remove the VGA cable \(2.5-inch drive model\)” on page 143](#) or [“Remove the VGA cable \(3.5-inch drive model\)” on page 145](#).
- Step 16. Remove the CMOS battery (CR2032). See [“Remove the CMOS battery \(CR2032\)” on page 65](#).
- Step 17. Remove the memory modules. See [“Remove a memory module” on page 95](#).
- Step 18. Remove the heat sink. See [“Remove the heat sink” on page 86](#).
- Step 19. Remove the processor. See [“Remove the processor” on page 122](#).
- Step 20. Remove the system board. See [“Remove the system board” on page 131](#).

After disassembling the server, 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:** This section includes references to IBM web sites and information about obtaining service. IBM is Lenovo's preferred service provider for ThinkSystem.

---

### 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).

---

## 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.



---

## Appendix C. Notices

Lenovo may not offer the products, services, or features discussed in this document in all countries. Consult your local Lenovo representative for information on the products and services currently available in your area.

Any reference to a Lenovo product, program, or service is not intended to state or imply that only that Lenovo product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any Lenovo intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any other product, program, or service.

Lenovo may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document is not an offer and does not provide a license under any patents or patent applications. You can send inquiries in writing to the following:

*Lenovo (United States), Inc.  
1009 Think Place  
Morrisville, NC 27560  
U.S.A.  
Attention: Lenovo VP of Intellectual Property*

LENOVO PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. Lenovo may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

The products described in this document are not intended for use in implantation or other life support applications where malfunction may result in injury or death to persons. The information contained in this document does not affect or change Lenovo product specifications or warranties. Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of Lenovo or third parties. All information contained in this document was obtained in specific environments and is presented as an illustration. The result obtained in other operating environments may vary.

Lenovo may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Any references in this publication to non-Lenovo Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this Lenovo product, and use of those Web sites is at your own risk.

Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

---

## Trademarks

LENOVO, THINKSYSTEM, Flex System, System x, NeXtScale System, and x Architecture are trademarks of Lenovo.

Intel and Intel Xeon are trademarks of Intel Corporation in the United States, other countries, or both.

Internet Explorer, Microsoft, and Windows are trademarks of the Microsoft group of companies.

Linux is a registered trademark of Linus Torvalds.

All other trademarks are the property of their respective owners. © 2018 Lenovo.

---

## 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.

---

## 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	—	○	○	○	○	○
電路卡	—	○	○	○	○	○
光碟機	—	○	○	○	○	○
<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。</p> <p>Note1 : “exceeding 0.1wt%” 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。</p> <p>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。</p> <p>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.

委製商/進口商名稱: 台灣聯想環球科技股份有限公司  
進口商地址: 台北市南港區三重路 66 號 8 樓  
進口商電話: 0800-000-702



---

# Index

2.5-inch drive from 3.5-inch drive bay  
    replacing 55  
2.5-inch drive into a 3.5-inch drive bay  
    installing 57

## B

backplate  
    replacing 61

## C

chassis 171  
collecting service data 174  
completing  
    parts replacement 148  
contamination, particulate and gaseous 5  
creating a personalized support web page 173  
custom support web page 173

## D

devices, static-sensitive  
    handling 53  
disassembling 171

## E

enable  
    TPM 138

## G

gaseous contamination 5  
Getting help 173  
guidelines  
    options installation 51  
    system reliability 52

## H

handling static-sensitive devices 53  
hard disk drive problems 158  
hardware service and support telephone numbers 175  
help 173

## I

important notices 178  
installation  
    guidelines 51  
installation guidelines 51  
installing  
    2.5-inch drive into a 3.5-inch drive bay 57  
insufficient PCIe resource  
    solving 163  
intermittent problems 165

## K

keyboard problems 162

## M

monitor problems 161  
mouse problems 162

## N

network  
    problems 167  
notes, important 178  
notices 177

## O

observable problems 167  
optional-device problems 163

## P

particulate contamination 5  
parts replacement, completing 148  
PCIe  
    troubleshooting 163  
power  
    problems 166  
power problems 154  
problems  
    hard disk drive 158  
    intermittent 165  
    keyboard 162  
    monitor 161  
    mouse 162  
    network 167  
    observable 167  
    optional devices 163  
    PCIe 163  
    power 154, 166  
    power on and power off 156  
    serial-device 165  
    software 170  
    USB device 162  
    video 161

## R

recycle 171  
recycling 171  
replacing  
    2.5-inch drive from 3.5-inch drive bay 55  
    backplate 61

## S

safety iii  
safety inspection checklist iv  
Secure Boot 140

- serial number 136
- serial-device problems 165
- server power on or power off problems 156
- service and support
  - before you call 173
  - hardware 175
  - software 175
- service data 174
- software problems 170
- software service and support telephone numbers 175
- solving
  - insufficient PCIe resource 163
- solving power problems 154
- static-sensitive devices
  - handling 53
- support web page, custom 173
- system reliability guidelines 52

## T

- Taiwan Region BSMI RoHS declaration 179
- Taiwan Region import and export contact information 179
- Tech Tips 10
- telecommunication regulatory statement 178
- telephone numbers 175
- TPM 138
- TPM card 138
- TPM policy 138
- trademarks 178

- troubleshooting 161, 163, 170
  - by symptom 155
  - hard disk drive problems 158
  - intermittent problems 165
  - keyboard problems 162
  - mouse problems 162
  - network problems 167
  - observable problems 167
  - power on and power off problems 156
  - power problems 166
  - serial-device problems 165
  - symptoms-based troubleshooting 155
  - USB-device problems 162
  - video 161
- Trusted Cryptographic Module 138
- Trusted Platform Module 138

## U

- UEFI Secure Boot 140
- updating,
  - machine type 136
- USB-device problems 162

## V

- video problems 161



**Lenovo**