



# ThinkSystem SR860 V3 Hardware Maintenance Guide



**Machine Types:** 7D93, 7D94, and 7D95

**Note**

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

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

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

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

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## Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

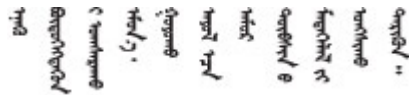
A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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



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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

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

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

مەزكۇر مەھسۇلاتنى ئورنىتىشتىن بۇرۇن بىخەتەرلىك ئۇچۇرلىرىنى ئوقۇپ چىقىڭ.

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canjbinj soengq cungj vahgangj ancien siusik.

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## Safety inspection checklist

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

**Note:** The product is not suitable for use at visual display workplaces according to §2 of the Workplace Regulations.

**Note:** The set-up of the server is made in the server room only.

### CAUTION:

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

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

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

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

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

- a. Go to:

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

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



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# Chapter 1. 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.

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## 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: “Working inside the server with the power on” on page 3 and “Handling static-sensitive devices” on page 4.
- 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>.
  - For the option package contents, see <https://serveroption.lenovo.com/>.
- 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.
- 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 <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/> 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.

- 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 “Update the firmware” in *User Guide* or *System Configuration Guide*.
- It is good practice to make sure that the server is working correctly before you install an optional component.
- Keep the working area clean, and place removed components on a flat and smooth surface that does not shake or tilt.
- Do not attempt to lift an object that might be too heavy for you. If you have to lift a heavy object, read the following precautions carefully:
  - Make sure that you can stand steadily without slipping.
  - Distribute the weight of the object equally between your feet.

- Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
- To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Back up all important data before you make changes related to the disk drives.
- Have a small flat-blade screwdriver, a small Phillips screwdriver, and a T8 torx screwdriver available.
- To view the error LEDs on the system board (system board assembly) 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.
- When replacing power supply units or fans, make sure to refer to redundancy rules for these components.
- 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.
- Orange on a component or an orange 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. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- The Red strip on the drives, adjacent to the release latch, indicates that the drive can be hot-swapped if the server and operating system support hot-swap capability. This means that you can remove or install the drive while the server is still running.

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

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

## Safety inspection checklist

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

**Note:** The product is not suitable for use at visual display workplaces according to §2 of the Workplace Regulations.

**Note:** The set-up of the server is made in the server room only.

### CAUTION:

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

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

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

1. Make sure that the power is off and the power cord is disconnected.



## 2. Check the power cord.

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

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

### a. Go to:

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

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

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

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

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

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

## System reliability guidelines

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

Make sure the following requirements are met:

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

## 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 data loss 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 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.

---

## Memory module installation rules and order

Memory modules must be installed in a specific order based on the memory configuration that you implement and the number of processors and memory modules installed in the server.

### Supported memory types

For information on the types of memory module supported by this server, see “Memory” section in [“Technical specifications” on page 403](#).

Information about optimizing memory performance and configuring memory is available at the Lenovo Press website:

<https://lenovopress.lenovo.com/servers/options/memory>

In addition, you can take advantage of a memory configurator, which is available at the following site:

[https://dcsc.lenovo.com/#/memory\\_configuration](https://dcsc.lenovo.com/#/memory_configuration)

Specific information about the required installation order of memory modules in your server based on the system configuration and memory mode that you are implementing is shown below.

## Memory modules and processors layout

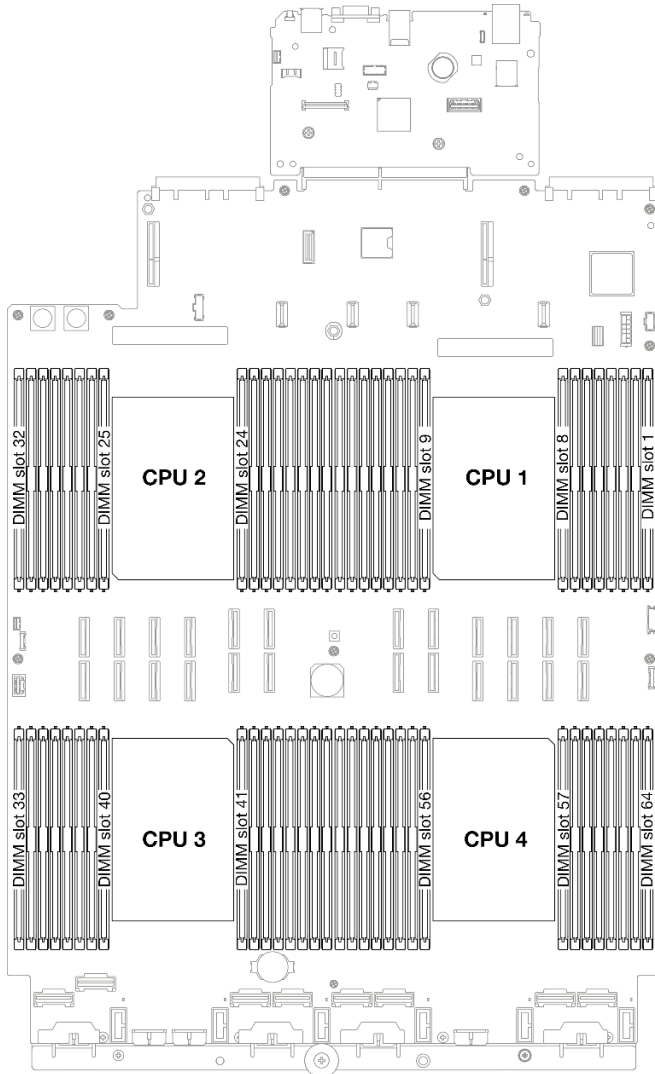


Figure 1. Memory modules and processors layout

The memory-channel configuration table below shows the relationship between the processors, memory controllers, memory channels, and memory module slot numbers.

Table 1. Memory slot and channel identification

Processor	CPU 1															
Controller	iMC1				iMC0				iMC2				iMC3			
Channel	CH1		CH0		CH1		CH0		CH0		CH1		CH0		CH1	
Slot No.	0	1	0	1	0	1	0	1	1	0	1	0	1	0	1	0
DIMM No.	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Processor	CPU 2															
Controller	iMC1				iMC0				iMC2				iMC3			
Channel	CH1		CH0		CH1		CH0		CH0		CH1		CH0		CH1	

Table 1. Memory slot and channel identification (continued)

<b>Slot No.</b>	0	1	0	1	0	1	0	1	1	0	1	0	1	0	1	0
<b>DIMM No.</b>	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
<b>Processor</b>	<b>CPU 3</b>															
<b>Controller</b>	iMC3				iMC2				iMC0				iMC1			
<b>Channel</b>	CH1		CH0		CH1		CH0		CH0		CH1		CH0		CH1	
<b>Slot No.</b>	0	1	0	1	0	1	0	1	1	0	1	0	1	0	1	0
<b>DIMM No.</b>	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
<b>Processor</b>	<b>CPU 4</b>															
<b>Controller</b>	iMC3				iMC2				iMC0				iMC1			
<b>Channel</b>	CH1		CH0		CH1		CH0		CH0		CH1		CH0		CH1	
<b>Slot No.</b>	0	1	0	1	0	1	0	1	1	0	1	0	1	0	1	0
<b>DIMM No.</b>	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64

### Memory module installation guideline

- At least one DIMM is required for each processor. Install at least eight DIMMs per processor for good performance.
- When you replace a DIMM, the server provides automatic DIMM enablement capability without requiring you to use the Setup Utility to enable the new DIMM manually.

### Independent memory mode installation order

Independent memory mode provides the highest level of memory performance, but lacks failover protection. The DIMM installation order for independent memory mode varies based on the number of processors and memory modules installed in the server.

Follow the rules below when installing memory modules in independent mode:

- There should be at least one DDR5 DIMM per processor.
- All DDR5 memory modules must operate at the same speed in the same system.
- Memory population must be identical between processors.
- Memory modules from different vendors are supported.

**Note:** When ThinkSystem 128GB TruDDR5 4800MHz (4Rx4) 3DS RDIMM v1 and/or ThinkSystem 256GB TruDDR5 4800MHz (8Rx4) 3DS RDIMM v1 is installed in a system, no other memory module types can be installed.

- In each memory channel, populate the slot farthest from the processor (slot 0) first.
- All memory modules must be DDR5 memory modules.
- x8 memory modules and x4 memory modules cannot be mixed in a system.
- Mixing 16Gbit (16 GB, 32 GB, 64 GB, 128 GB, 256 GB) and 24Gbit (96 GB) memory module is not allowed in a system.
- 96 GB memory module must be identically populated in the system and only supported on Intel Xeon Platinum processor.
- 96 GB memory module can only support 1DPC (8 DIMMs per processor) and 2DPC (16 DIMMs per processor) configurations.
- All memory modules to be installed must be of the same type.

- Value RDIMM cannot be mixed with non-value RDIMMs in a system.
- 3DS RDIMM cannot be mixed with non-3DS RDIMMs in a system.
- All memory modules in a system must have the same number of ranks.
- When ThinkSystem 256GB TruDDR5 4800MHz (8Rx4) 3DS RDIMM v1 is installed in the system, the maximum number of supported drives is twenty-four drives.
- Before installing 24Gbit (96 GB) memory module to the system, make sure to update the UEFI firmware to the latest version first, then remove all existing 16Gbit (16 GB, 32 GB, 64 GB, 128 GB, 256 GB) memory modules.

### With two processors

The following table shows the sequence of populating memory modules for independent mode when two processors are installed.

Table 2. Independent mode with two processors

Total DIMMs	Processor 1															
	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
2 DIMMs							10									
4 DIMMs*							10							3		
8 DIMMs*			14				10			7				3		
12 DIMMs*	16		14				10			7		5		3		
16 DIMMs*	16		14		12		10			7		5		3		1
24 DIMMs*	16		14	13	12		10	9	8	7		5	4	3		1
32 DIMMs*	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Total DIMMs	Processor 2															
	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
2 DIMMs							26									
4 DIMMs*							26							19		
8 DIMMs*			30				26			23				19		
12 DIMMs*	32		30				26			23		21		19		
16 DIMMs*	32		30		28		26			23		21		19		17
24 DIMMs*	32		30	29	28		26	25	24	23		21	20	19		17
32 DIMMs*	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17

**Note:** DIMM configurations that support the Sub NUMA Clustering (SNC) feature, which can be enabled via UEFI. SNC is not supported if DIMM population does not follow the sequence indicated by the table above.

### With three processors

The following table shows the sequence of populating memory modules for independent mode when three processors are installed.

Table 3. Independent mode with three processors

Total DIMMs	Processor 1															
	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
3 DIMMs							10									

Table 3. Independent mode with three processors (continued)

6 DIMMs*							10							3		
12 DIMMs*			14				10			7				3		
18 DIMMs*	16		14				10			7		5		3		
24 DIMMs*	16		14		12		10			7		5		3		1
36 DIMMs*	16		14	13	12		10	9	8	7		5	4	3		1
48 DIMMs*	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
<b>Total DIMMs</b>	<b>Processor 2</b>															
	<b>32</b>	<b>31</b>	<b>30</b>	<b>29</b>	<b>28</b>	<b>27</b>	<b>26</b>	<b>25</b>	<b>24</b>	<b>23</b>	<b>22</b>	<b>21</b>	<b>20</b>	<b>19</b>	<b>18</b>	<b>17</b>
3 DIMMs							26									
6 DIMMs*							26							19		
12 DIMMs*			30				26			23				19		
18 DIMMs*	32		30				26			23		21		19		
24 DIMMs*	32		30		28		26			23		21		19		17
36 DIMMs*	32		30	29	28		26	25	24	23		21	20	19		17
48 DIMMs*	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
<b>Total DIMMs</b>	<b>Processor 3</b>															
	<b>33</b>	<b>34</b>	<b>35</b>	<b>36</b>	<b>37</b>	<b>38</b>	<b>39</b>	<b>40</b>	<b>41</b>	<b>42</b>	<b>43</b>	<b>44</b>	<b>45</b>	<b>46</b>	<b>47</b>	<b>48</b>
3 DIMMs										42						
6 DIMMs*			35							42						
12 DIMMs*			35				39			42				46		
18 DIMMs*			35		37		39			42				46		48
24 DIMMs*	33		35		37		39			42		44		46		48
36 DIMMs*	33		35	36	37		39	40	41	42		44	45	46		48
48 DIMMs*	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48

**Note:** DIMM configurations that support the Sub NUMA Clustering (SNC) feature, which can be enabled via UEFI. SNC is not supported if DIMM population does not follow the sequence indicated by the table above.

## With four processors

The following table shows the sequence of populating memory modules for independent mode when four processors are installed.

Table 4. Independent mode with four processors

Total DIMMs	Processor 1															
	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
4 DIMMs							10									
8 DIMMs*							10							3		
16 DIMMs*			14				10			7				3		
24 DIMMs*	16		14				10			7		5		3		
32 DIMMs*	16		14		12		10			7		5		3		1
48 DIMMs*	16		14	13	12		10	9	8	7		5	4	3		1
64 DIMMs*	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Total DIMMs	Processor 2															
	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
4 DIMMs							26									
8 DIMMs*							26							19		
16 DIMMs*			30				26			23				19		
24 DIMMs*	32		30				26			23		21		19		
32 DIMMs*	32		30		28		26			23		21		19		17
48 DIMMs*	32		30	29	28		26	25	24	23		21	20	19		17
64 DIMMs*	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Total DIMMs	Processor 3															
	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
4 DIMMs										42						
8 DIMMs*			35							42						
16 DIMMs*			35				39			42				46		
24 DIMMs*			35		37		39			42				46		48
32 DIMMs*	33		35		37		39			42		44		46		48
48 DIMMs*	33		35	36	37		39	40	41	42		44	45	46		48
64 DIMMs*	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
Total DIMMs	Processor 4															
	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
4 DIMMs										58						
8 DIMMs*			51							58						
16 DIMMs*			51				55			58				62		
24 DIMMs*			51		53		55			58				62		64
32 DIMMs*	49		51		53		55			58		60		62		64
48 DIMMs*	49		51	52	53		55	56	57	58		60	61	62		64



Table 4. Independent mode with four processors (continued)

64 DIMMs*	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
-----------	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

**Note:** DIMM configurations that support the Sub NUMA Clustering (SNC) feature, which can be enabled via UEFI. SNC is not supported if DIMM population does not follow the sequence indicated by the table above.

## Memory mirroring mode installation order

Memory-mirroring mode provides full memory redundancy while reducing the total system memory capacity in half. Memory channels are grouped in pairs with each channel receiving the same data. If a failure occurs, the memory controller switches from the DIMMs on the primary channel to the DIMMs on the backup channel. The DIMM installation order for memory mirroring varies based on the number of processors and DIMMs installed in the server.

Memory mirroring guidelines:

- Memory mirroring reduces the maximum available memory by half of the installed memory. For example, if the server has 64 GB of installed memory, only 32 GB of addressable memory is available when memory mirroring is enabled.
- Each DIMM must be identical in size and architecture.
- DIMMs on each memory channel must be of equal density.
- If two memory channels have DIMMs, mirroring occurs across two DIMMs (channels 0/1 will both contain the primary/secondary memory caches).
- If three memory channels have DIMMs, mirroring occurs across all three DIMMs (channels 0/1, channels 1/2, and channels 2/0 will all contain primary/secondary memory caches).
- Partial Memory Mirroring is a sub-function of memory mirroring. It requires following the memory installation order of memory mirroring mode.
- Before installing 24Gbit (96 GB) memory module to the system, make sure to update the UEFI firmware to the latest version first, then remove all existing 16Gbit (16 GB, 32 GB, 64 GB, 128 GB, 256 GB) memory modules.

### With two processors

The following table shows the DIMM population sequence for memory mirroring mode when two processors are installed.

Table 5. Memory mirroring with two processors

Total DIMMs	Processor 1															
	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
16 DIMMs	16		14		12		10			7		5		3		1
32 DIMMs	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Total DIMMs	Processor 2															
	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
16 DIMMs	32		30		28		26			23		21		19		17
32 DIMMs	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17

### With three processors

The following table shows the DIMM population sequence for memory mirroring mode when three processors are installed.

Table 6. Memory mirroring with three processors

Total DIMMs	Processor 1															
	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
24 DIMMs	16		14		12		10			7		5		3		1
48 DIMMs	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

Table 6. Memory mirroring with three processors (continued)

Total DIMMs	Processor 2															
	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
24 DIMMs	32		30		28		26			23		21		19		17
48 DIMMs	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Total DIMMs	Processor 3															
	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
24 DIMMs	33		35		37		39			42		44		46		48
48 DIMMs	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48

### With four processors

The following table shows the DIMM population sequence for memory mirroring mode when four processors are installed.

Table 7. Memory mirroring with four processors

Total DIMMs	Processor 1															
	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
32 DIMMs	16		14		12		10			7		5		3		1
64 DIMMs	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Total DIMMs	Processor 2															
	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
32 DIMMs	32		30		28		26			23		21		19		17
64 DIMMs	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Total DIMMs	Processor 3															
	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
32 DIMMs	33		35		37		39			42		44		46		48
64 DIMMs	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
Total DIMMs	Processor 4															
	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
32 DIMMs	49		51		53		55			58		60		62		64
64 DIMMs	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64

## Drive backplane installation rules and order

This section contains information on the drive backplane installation rules and order.

The server supports up to six drive backplanes with the following corresponding drive bay numbers.

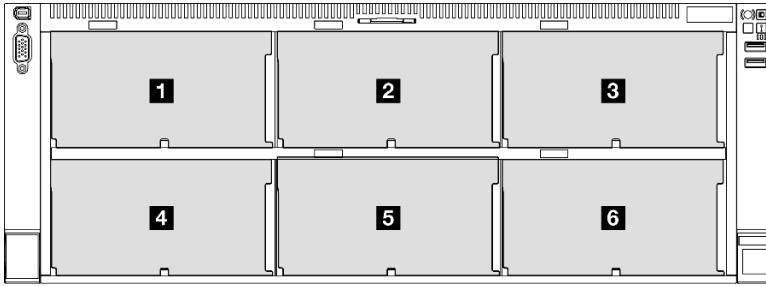


Figure 2. Drive backplane numbering

**Note:** When ThinkSystem 256GB TruDDR5 4800MHz (8Rx4) 3DS RDIMM v1 is installed in the system, the maximum number of supported drives is twenty-four drives.

Table 8. Drive backplanes and corresponding drive bays

Drive backplane	Drive bay	Supported drive backplanes	Supported drives
<b>1</b> Backplane 1	0 to 7	<ul style="list-style-type: none"> <li>2.5-inch AnyBay 8-bay drive backplane</li> <li>2.5-inch SAS/SATA 8-bay drive backplane</li> </ul>	<ul style="list-style-type: none"> <li>2.5-inch SAS/SATA/NVMe drives</li> <li>2.5-inch SAS/SATA drives</li> </ul>
<b>2</b> Backplane 2	8 to 15		
<b>3</b> Backplane 3	16 to 23		
<b>4</b> Backplane 4	24 to 31	<ul style="list-style-type: none"> <li>2.5-inch AnyBay 8-bay drive backplane</li> <li>2.5-inch SAS/SATA 8-bay drive backplane</li> </ul>	<ul style="list-style-type: none"> <li>2.5-inch SAS/SATA drives</li> </ul>
<b>5</b> Backplane 5	32 to 39		
<b>6</b> Backplane 6	40 to 47		

**Note:** 2.5-inch AnyBay 8-bay drive backplanes support 2.5-inch SAS/SATA/NVMe drives.

Table 9. Drive backplanes installation order

Installation priority	Backplane type	Backplane placement priorities
1	2.5-inch AnyBay 8-bay drive backplane	1, 3, 2, 4, 5, 6
2	2.5-inch SAS/SATA 8-bay drive backplane	1, 2, 3, 4, 5, 6

## PCIe riser and adapter installation rules and order

PCIe risers and adapters must be installed in a specific order in your server.

### Notes:

- PCIe Gen 4 risers contain PCIe Gen 4 slots only.
- PCIe Gen 5 risers contain PCIe Gen 4 and PCIe Gen 5 slots.
- Performance may degrade when a x16 PCIe card is installed in a x8 lane PCIe slot.
- Legacy option ROM boot is only supported on PCIe adapters installed in the following PCIe slots.
  - Two slot FH risers: 7, 8, 19, 20
  - Six slot HH risers: 11, 14
  - Six slot FH riser: 3, 6, 8, 15, 18, 20

- The available PCIe slots will depend on the risers and number of processors installed.
  - Two slot FH riser:
    - Two to four processors: 7, 8, 19, 20
  - Six slot FH riser and six slot HH riser:
    - Two processors: 3, 6, 8, 11, 14, 15, 18, 20
    - Three processors: 3, 6, 8, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20
    - Four processors: 3-20
- PCIe slot 20 is unavailable for risers with a 7mm drive bay.
- When a ThinkSystem Intel E810-DA2 10/25GbE SFP28 2-Port PCIe Ethernet Adapter, ThinkSystem Intel E810-DA4 10/25GbE SFP28 4-Port PCIe Ethernet Adapter, ThinkSystem Intel E810-DA2 10/25GbE SFP28 2-Port OCP Ethernet Adapter, or ThinkSystem Intel E810-DA4 10/25GbE SFP28 4-Port OCP Ethernet Adapter is installed, no other Gen 3 RAID/HBA adapters can be installed.

### PCIe riser installation rules and order

Installation priority	PCIe riser type	Riser location priorities
1	7mm/x8/x8 PCIe G4 Riser 3 FHHL	Riser 3
2	3 x16 & 1 x8 + 7mm PCIe G5 Riser 3 FHFL	Riser 3
3	2 x16 & 3 x8 + 7mm PCIe G4 Riser 3 FHFL	Riser 3
4	4 x16 & 1 x8 PCIe G5 Riser 1/3 FHFL	Riser 1, then riser 3
5	3 x16 & 3 x8 PCIe G4 Riser 1/3 FHFL	Riser 1, then riser 3
6	x8/x8 PCIe G4 Riser 1/3 FHHL	Riser 1, then riser 3
7	6 x8 PCIe G5 Riser 2 HHHL	Riser 2
8	6 x8 PCIe G4 Riser 2 HHHL	Riser 2

### PCIe adapter installation rules and order

Installation priority	Component	PCIe slot priorities
1	32i Gen 4 RAID adapter	20, 8, 18, 15, 19
2	1. 16i RAID adapter 2. 16i HBA adapter 3. 8i RAID adapter 4. 8i HBA adapter	20, 8, 14, 11, 12, 18, 6, 15, 19
3	ThinkSystem Nvidia PCIe Gen4 x16 Passive Aux Kit	6
4	ThinkSystem NVIDIA ConnectX-7 NDR400 OSFP 1-Port PCIe Gen5 Adapter	7, 19, 18, 6, 16, 4
5	Double-wide GPU	18, 6, 16, 4
6	Single-wide GPU	18, 6, 16, 4, 3, 15, 5, 17

Installation priority	Component	PCIe slot priorities
7	<ol style="list-style-type: none"> <li>1. ThinkSystem Nvidia ConnectX-7 NDR200/HDR QSFP112 2-Port PCIe Gen5 x16 InfiniBand Adapter</li> <li>2. ThinkSystem Mellanox ConnectX-6 Dx 100GbE QSFP56 2-port PCIe Ethernet Adapter</li> <li>3. ThinkSystem Broadcom 57508 100GbE QSFP56 2-port PCIe 4 Ethernet Adapter</li> <li>4. ThinkSystem Mellanox ConnectX-6 Lx 10/25GbE SFP28 2-Port PCIe Ethernet Adapter</li> </ol>	20, 8, 18, 6, 16, 4, 19, 7
8	10/25GbE SFP28 4-Port PCIe Ethernet Adapter	20, 8, 18, 6, 19, 7, 16, 4, 15, 3, 17, 5
9	<ol style="list-style-type: none"> <li>1. 10/25GbE SFP28 2-port PCIe Ethernet Adapter</li> <li>2. 10GBase-T Ethernet Adapter</li> <li>3. RJ45 Ethernet Adapter</li> <li>4. PCIe Fibre Channel Adapter</li> <li>5. FC HBA adapter</li> <li>6. External RAID/HBA adapter</li> </ol>	20, 8, 14, 11, 18, 6, 19, 12, 13, 7, 9, 10, 16, 4, 15, 3, 17, 5
10	10/25GbE SFP28 4-Port OCP Ethernet Adapter	1
11	Management NIC adapter	1
12	OCP module	1,2

## Power on and power off the server

Follow the instructions in this section to power on and power off the server.

### 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).

Power button location and power LED locations are specified in:

- “Server components” in *User Guide* or *System Configuration Guide*
- [“Troubleshooting by system LEDs and diagnostics display” on page 415](#)

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.

**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/>.

For information about powering off the server, see [“Power off the server” on page 17](#).

## 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.

Power button location and power LED locations are specified in:

- “Server components” in *User Guide* or *System Configuration Guide*
- [“Troubleshooting by system LEDs and diagnostics display” on page 415](#)

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 16](#).

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## Server replacement

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

### Remove the server from rails

#### About this task

##### S036



18 - 32 kg (39 - 70 lb)



32 - 55 kg (70 - 121 lb)

**CAUTION:**  
Use safe practices when lifting.

##### R006



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

##### S037



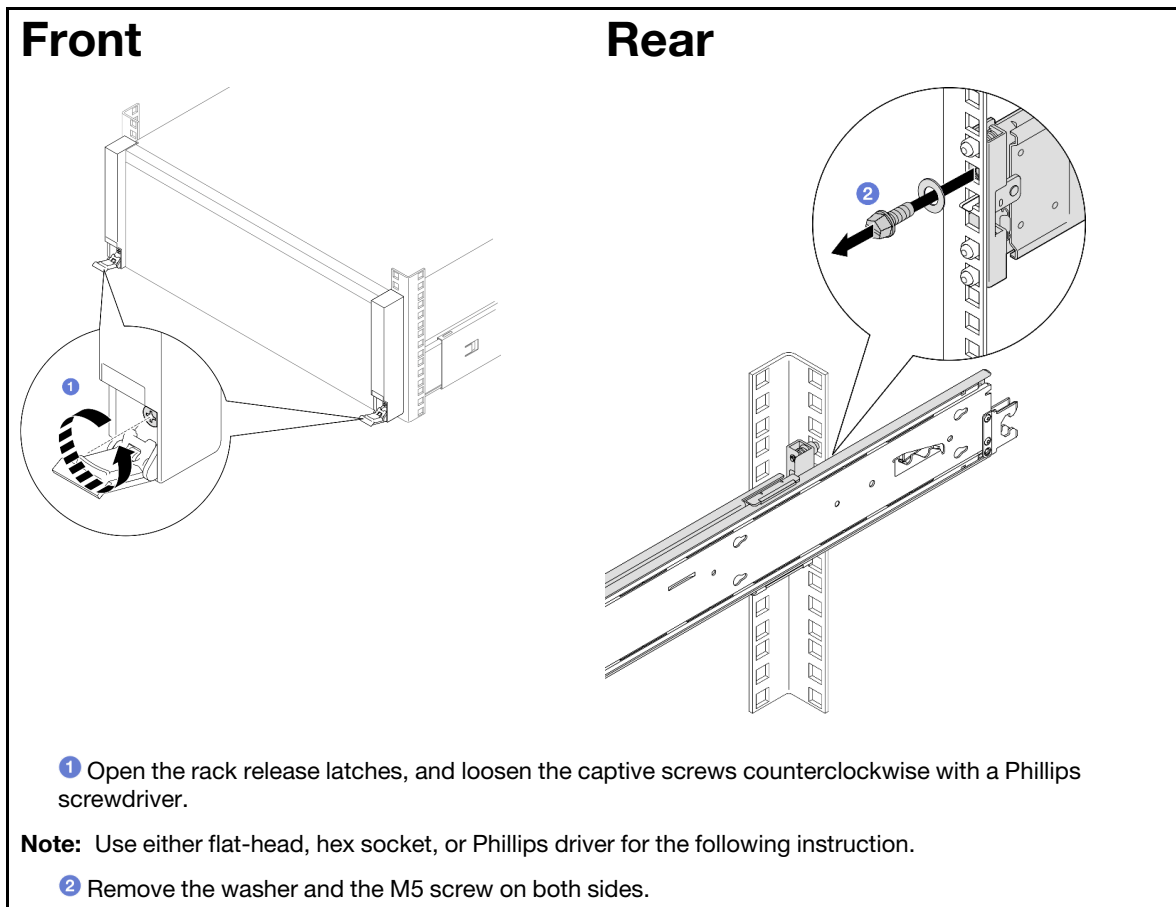
**CAUTION:**  
The weight of this part or unit is more than 55 kg (121.2 lb). It takes specially trained persons, a lifting device, or both to safely lift this part or unit.

**Attention:**

- Read “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “[Power off the server](#)” on page 17.
- 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.








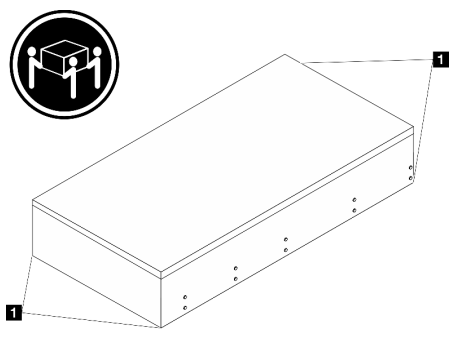
**Procedure**

Step 1. Disengage the server if it has been secured to the rack.

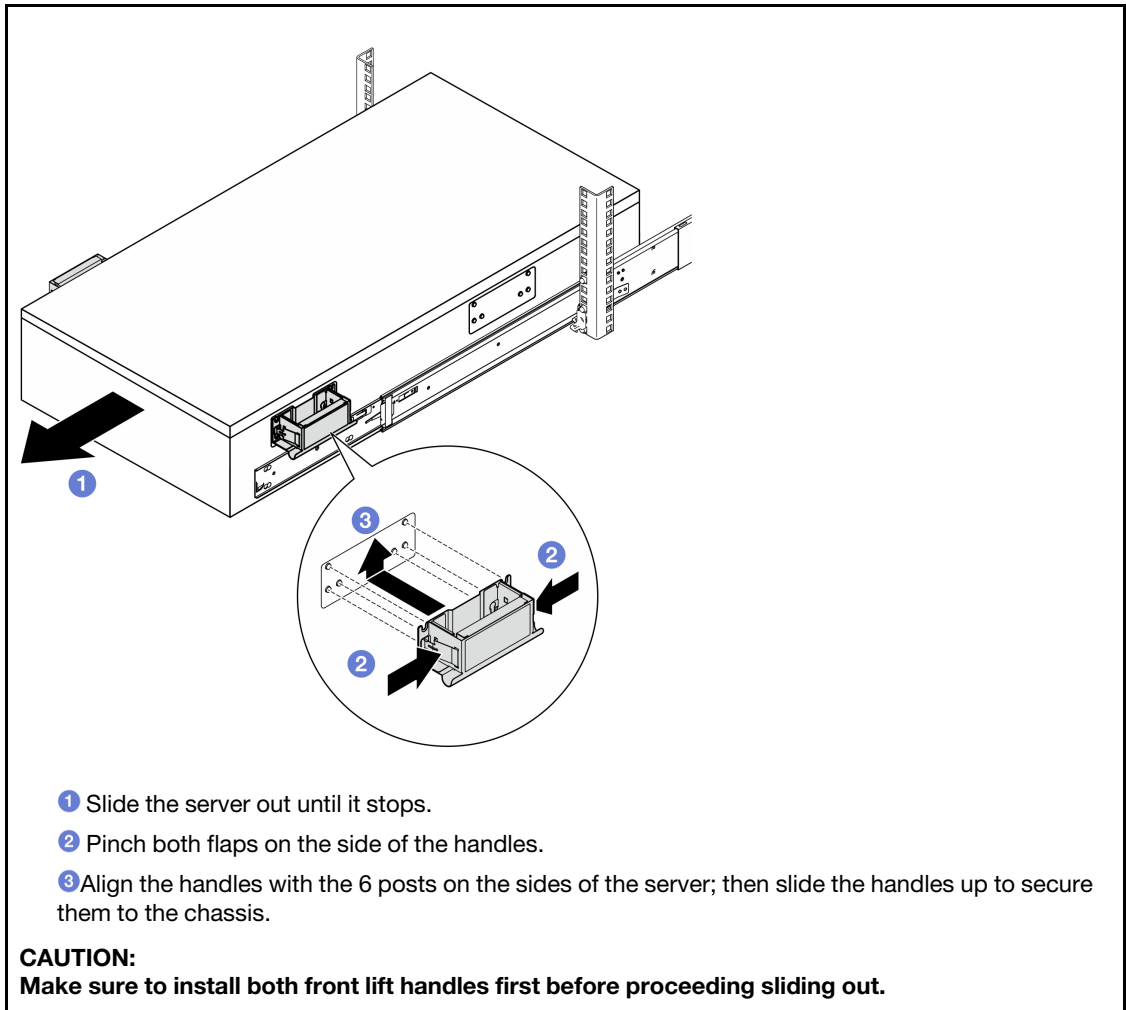


Step 2. Determine the lifting method. Two lifting options are available:

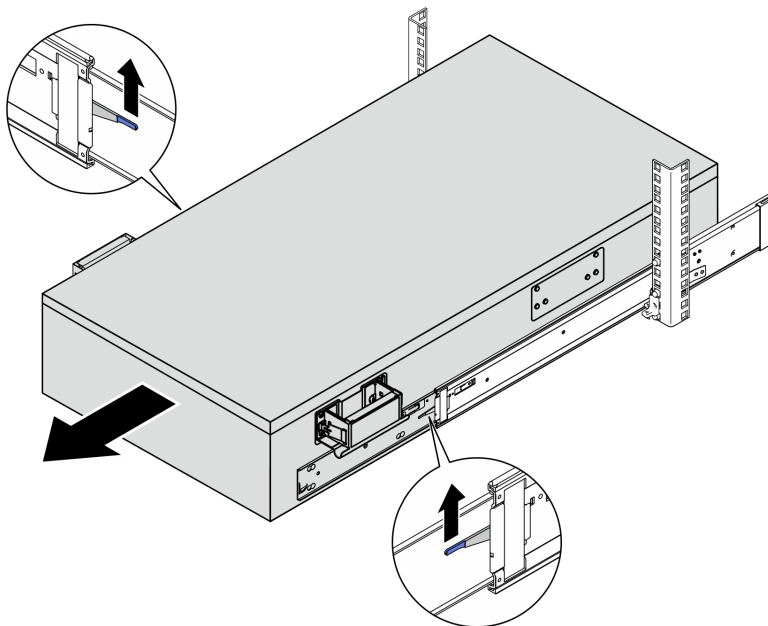


  <p>18-32 kg 39-70 lb</p> <p>For two-person lift, remove the following components beforehand:</p> <ul style="list-style-type: none"> <li>• All the power supply units</li> <li>• All the storage drives</li> <li>• Both front and rear covers</li> </ul>	  <p>32-55 kg 70-121 lb</p>   <p>55-100 kg 121-220 lb</p>  <p>Otherwise, lift the server with three people or a lifting device.</p>
<p><b>CAUTION:</b> Make sure to lift the server by holding the lift points.</p>  <p><b>1</b> Lift point</p>	

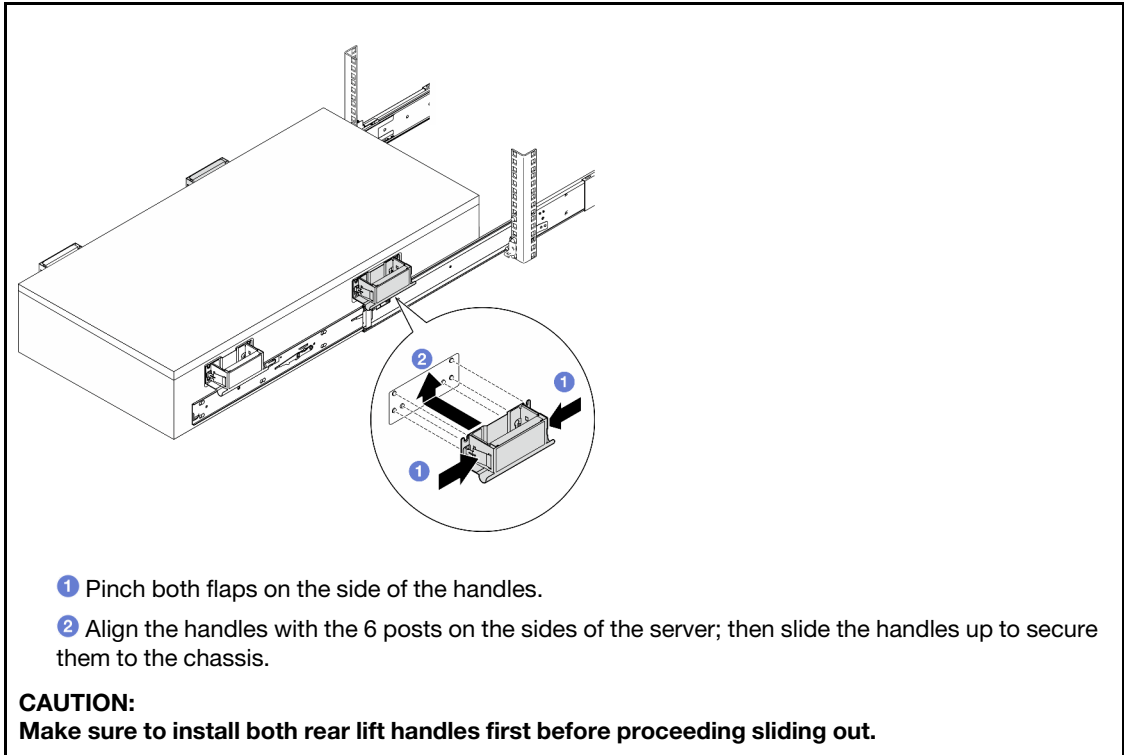
- Step 3. Remove the server along with the inner rails from rack.
- a. Install the front lift handle.



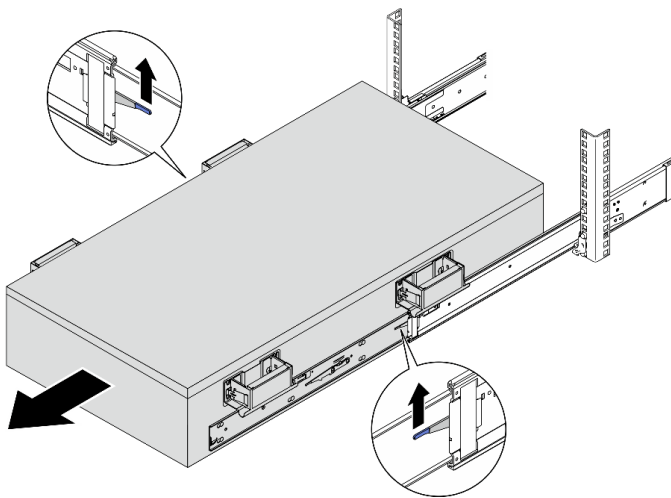
b. Lift the first lock latches up to proceed sliding out.

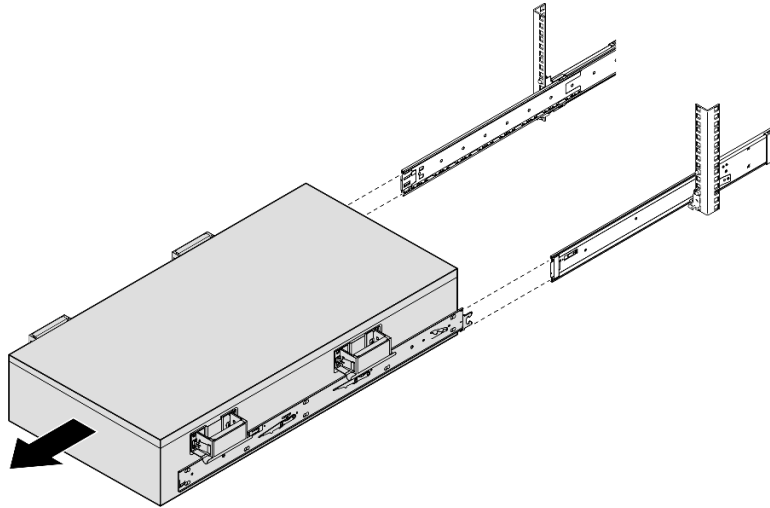


c. Attach the rear handles.

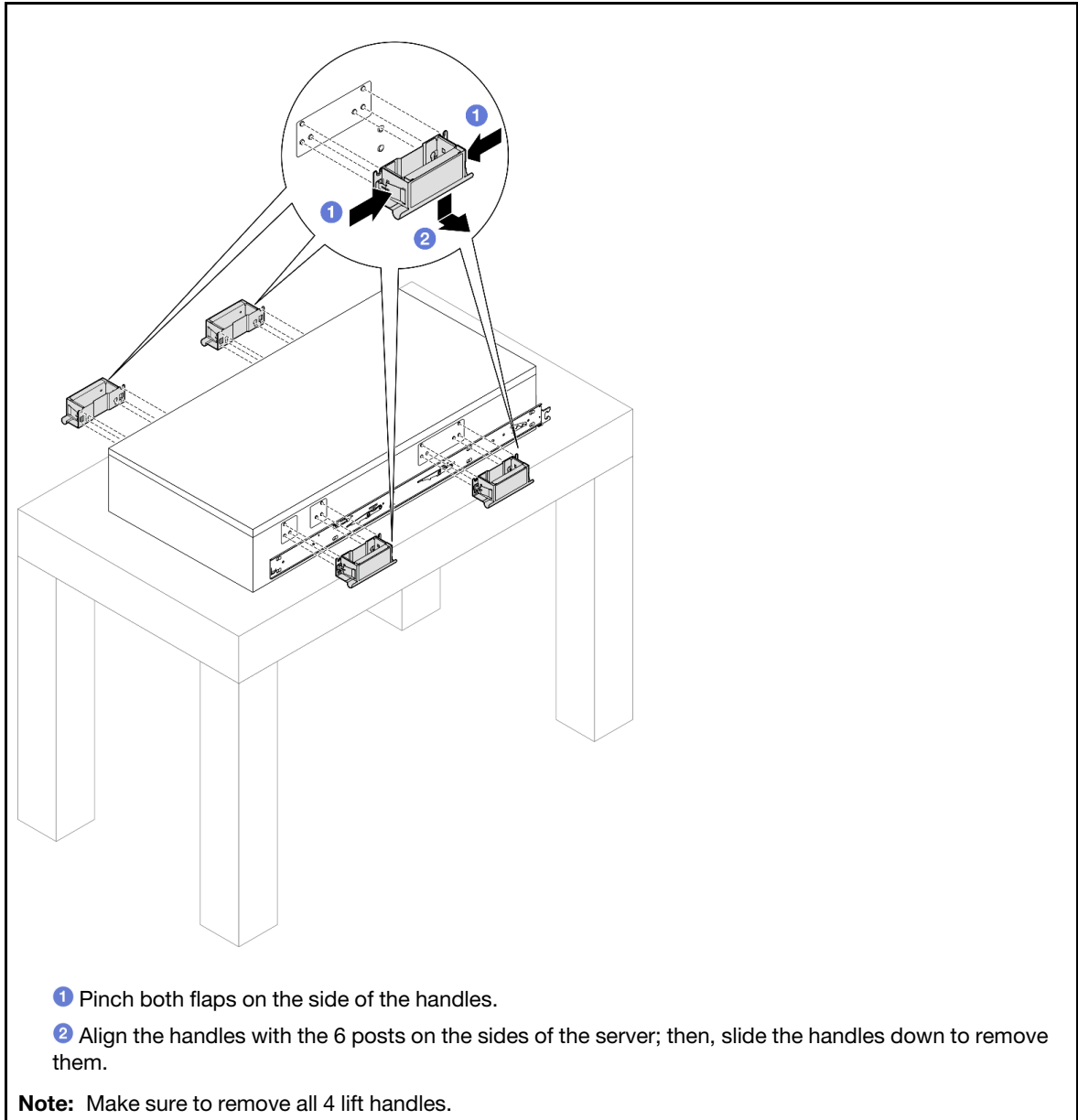


- d. Lift the second lock latches up and remove the server completely from the rack; then place it on a table.

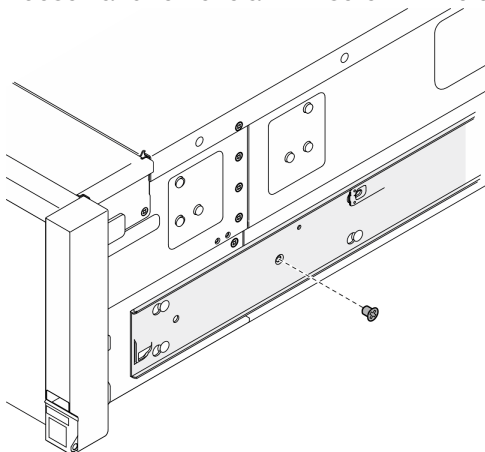




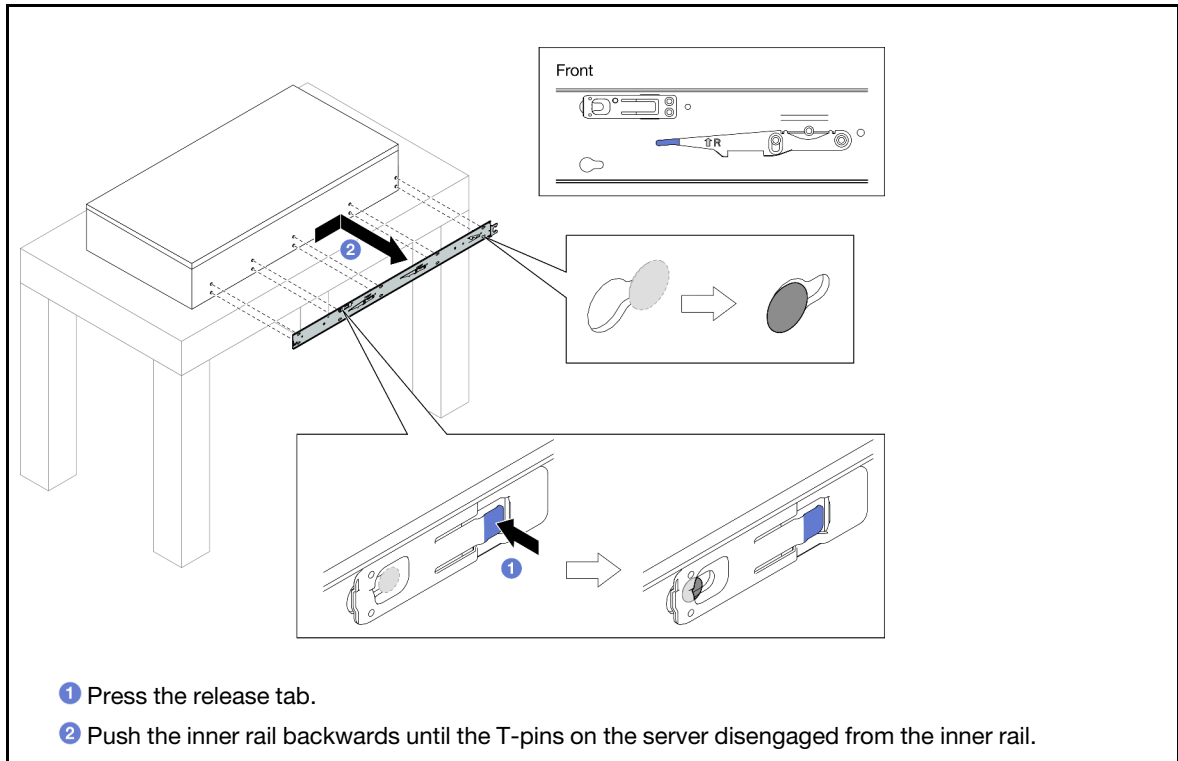
Step 4. Remove the lift handles.



Step 5. Loosen and remove an M4 screw in the corresponding hole on both inner rails as shown.



Step 6. Remove the inner rail from the server.



Step 7. Repeat the previous two steps on the other rail.

## Install the server to rails

### About this task

#### S036



18 - 32 kg (39 - 70 lb)



32 - 55 kg (70 - 121 lb)

**CAUTION:**  
Use safe practices when lifting.

**R006**



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

**S037**






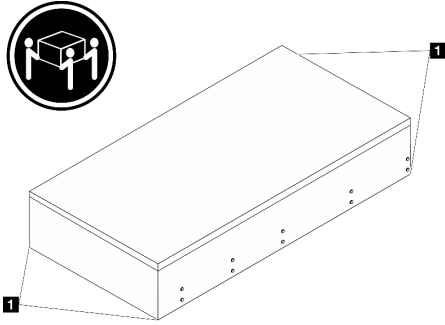
**CAUTION:**  
The weight of this part or unit is more than 55 kg (121.2 lb). It takes specially trained persons, a lifting device, or both to safely lift this part or unit.

**Attention:**

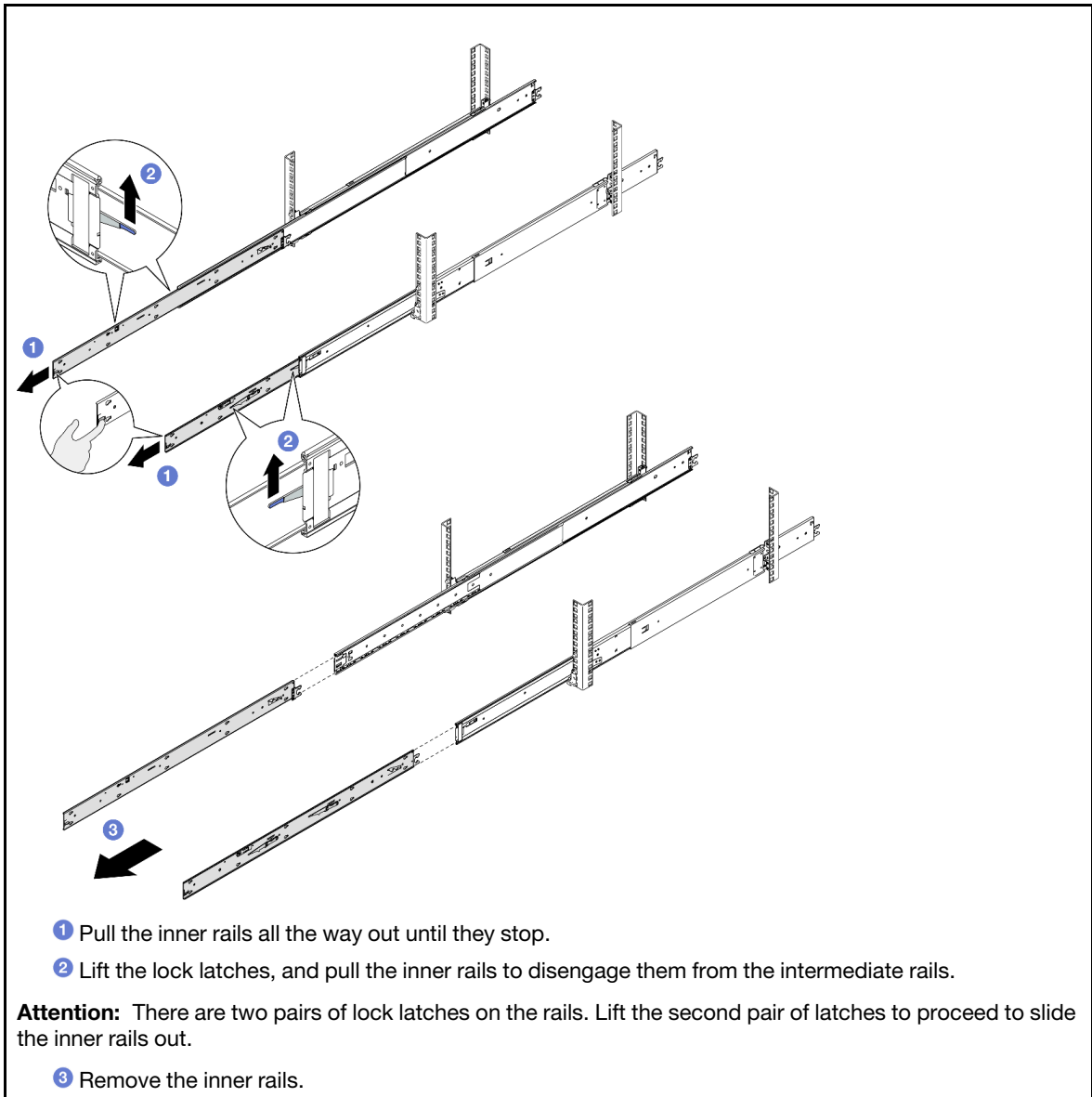
- Read “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “[Power off the server](#)” on page 17.
- Prevent exposure to static 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.

**Procedure**

Step 1. Lift the server and place it on a table. Two lifting options are available:

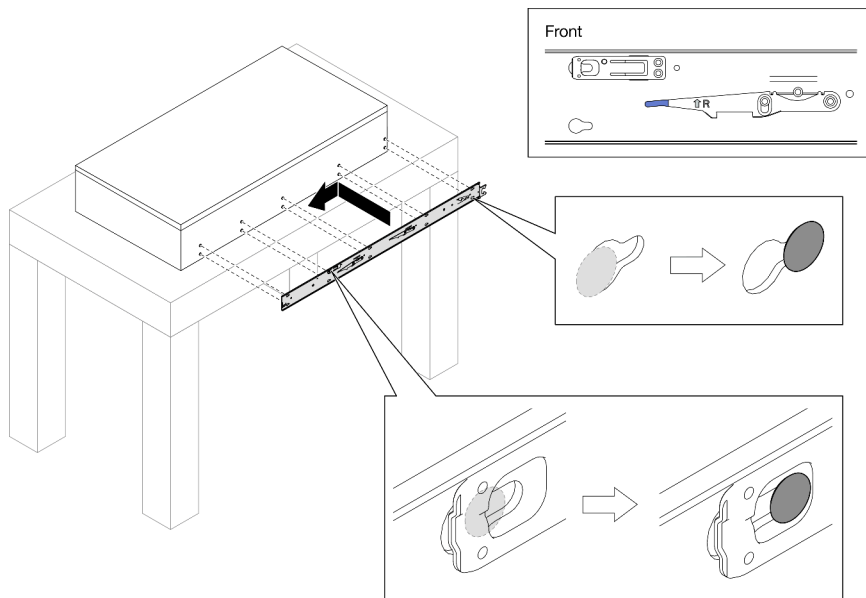
 <p>For two-person lift, remove the following components beforehand:</p> <ul style="list-style-type: none"> <li>• All the power supply units</li> <li>• All the storage drives</li> <li>• Both front and rear covers</li> </ul>	  <p>Otherwise, lift the server with three people or a lifting device.</p>
 <p><b>1</b> Lift point</p> <p><b>CAUTION:</b> Make sure to lift the server by holding the lift points.</p>	

Step 2. Remove the inner rails from the intermediate rails.

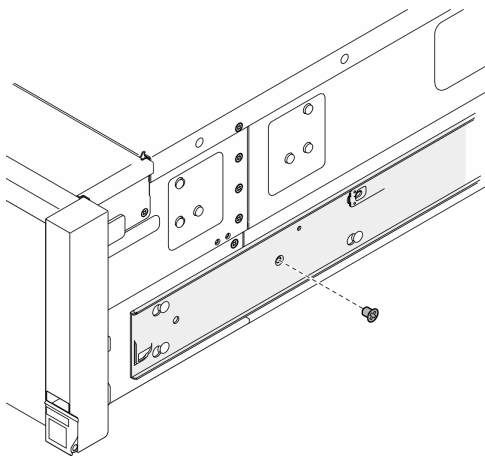


Step 3. Align the slots on the inner rail with the corresponding T-pins on the side of the server; then, slide the inner rail forwards until the T-pins lock into place with the inner rail.



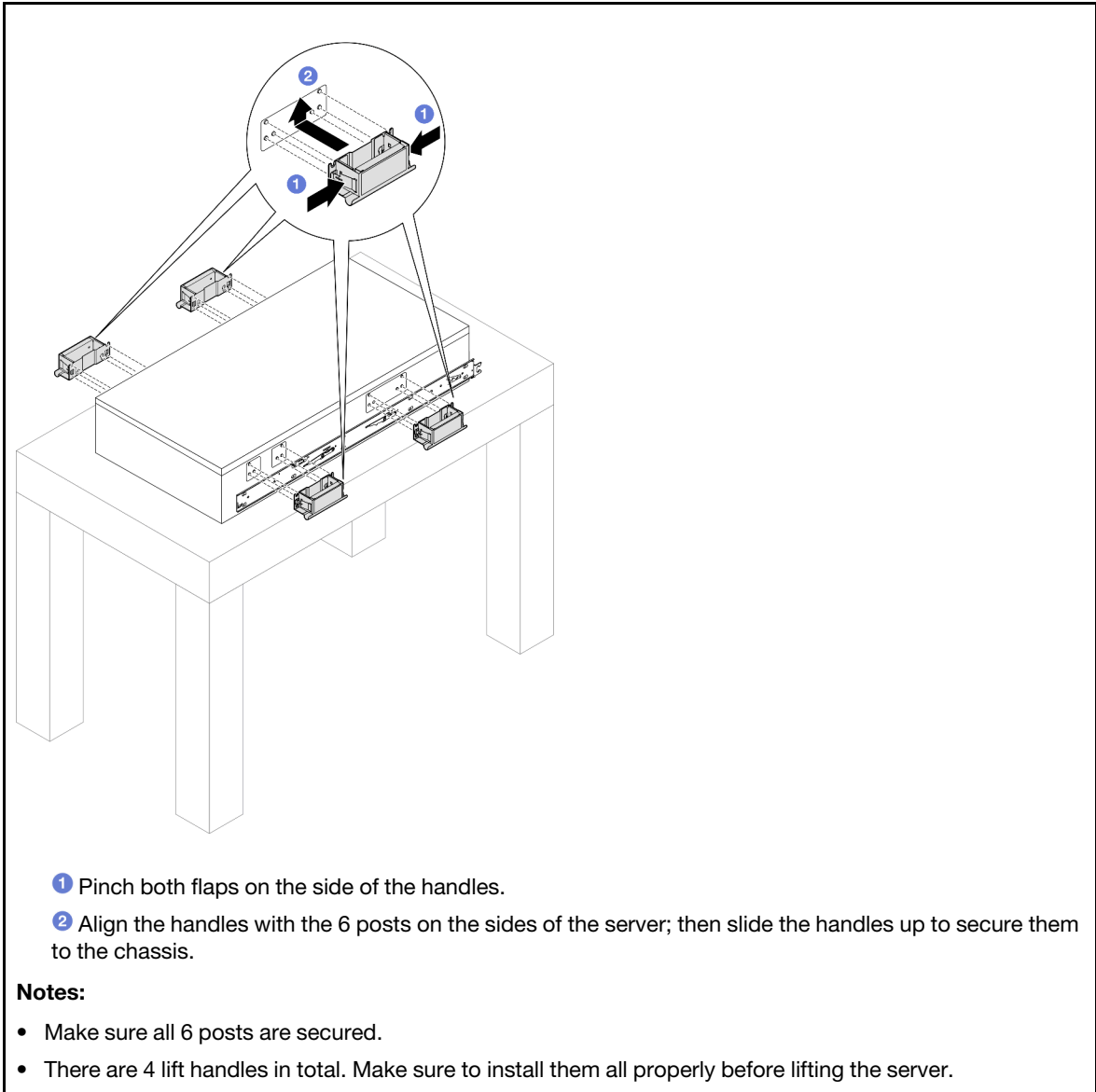


Step 4. Insert and tighten an M4 screw to secure the inner rail as shown.

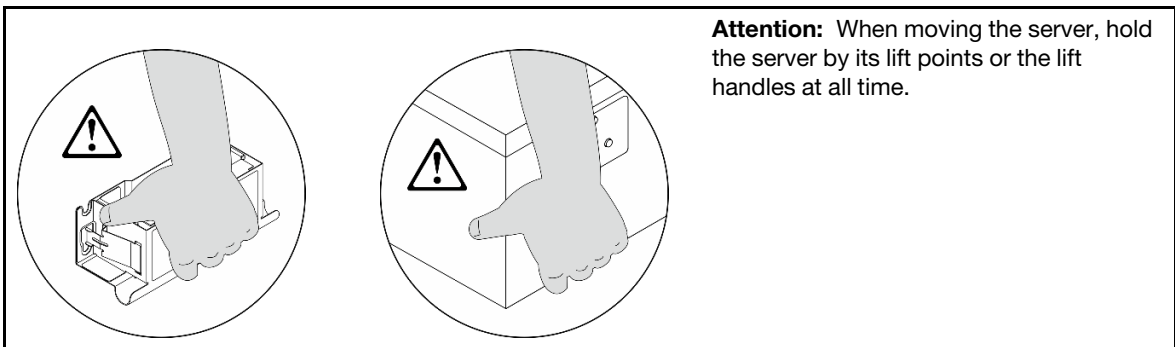


Step 5. Repeat the previous two steps on the other rail.

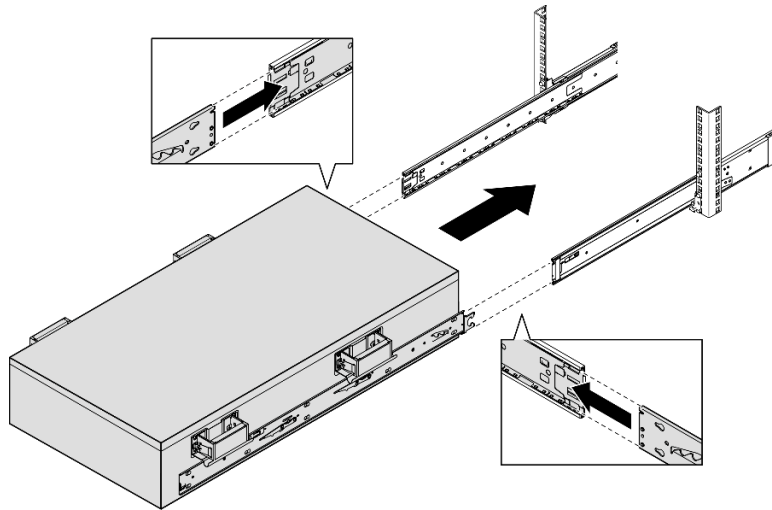
Step 6. Attach the lift handle.



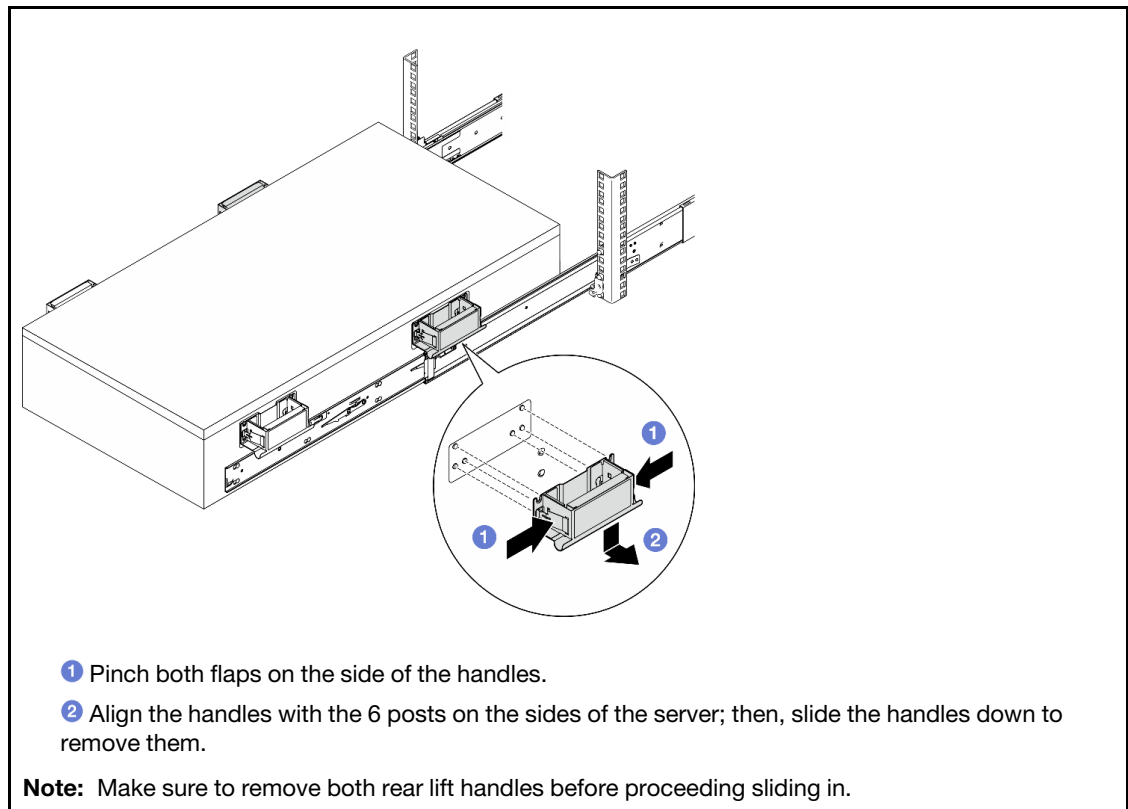
Step 7. Install the server to the rack.



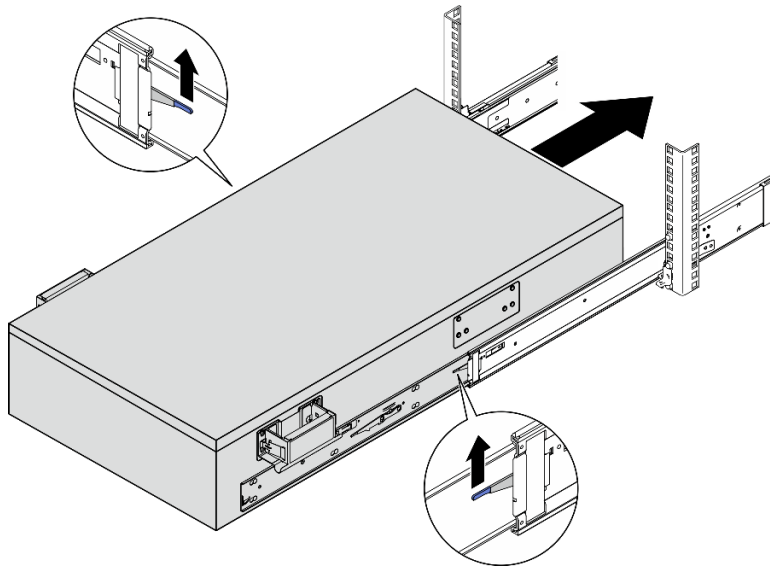
- a. Align both rear ends of the inner rails with the openings in the intermediate rails, and make sure the two pairs of rails mate correctly. Then, carefully slide the server into the rack until the rails snap into place.



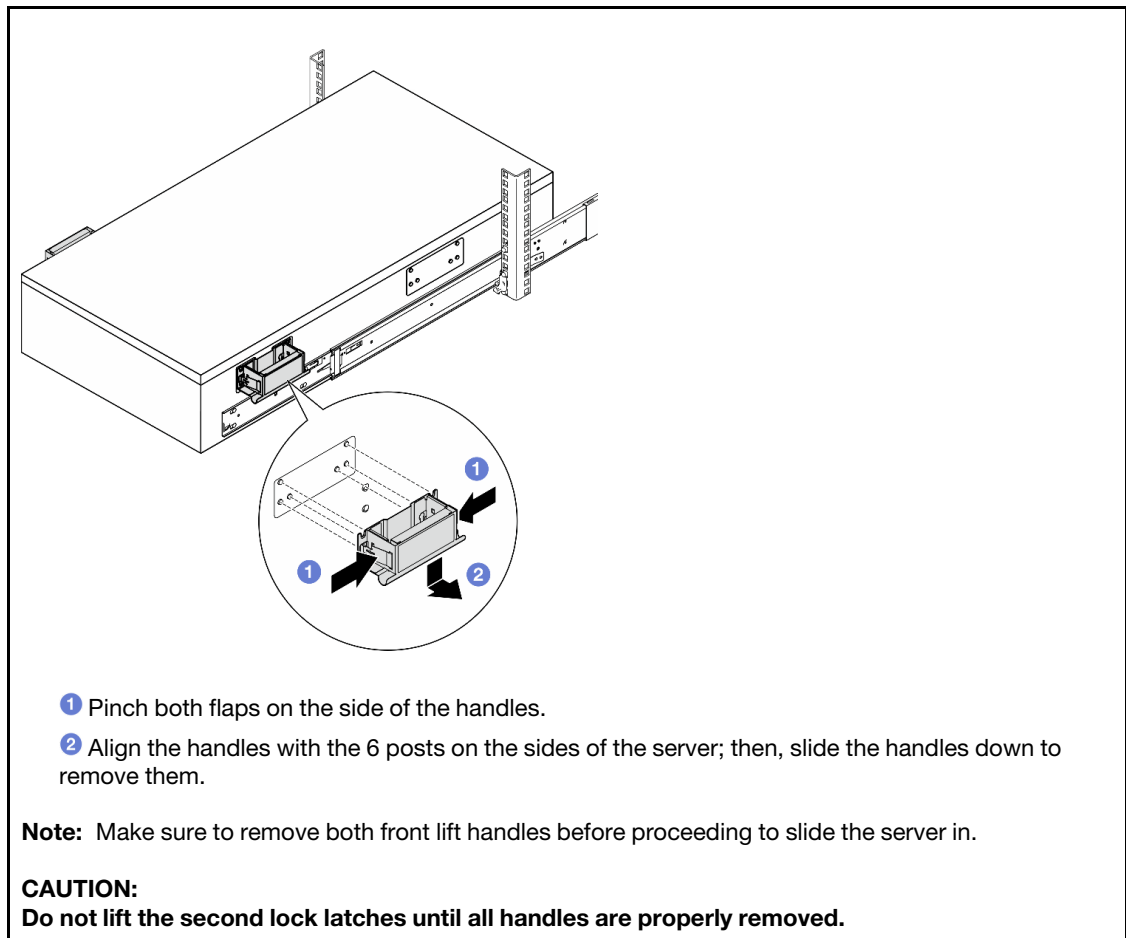
- b. Remove the rear lift handles.



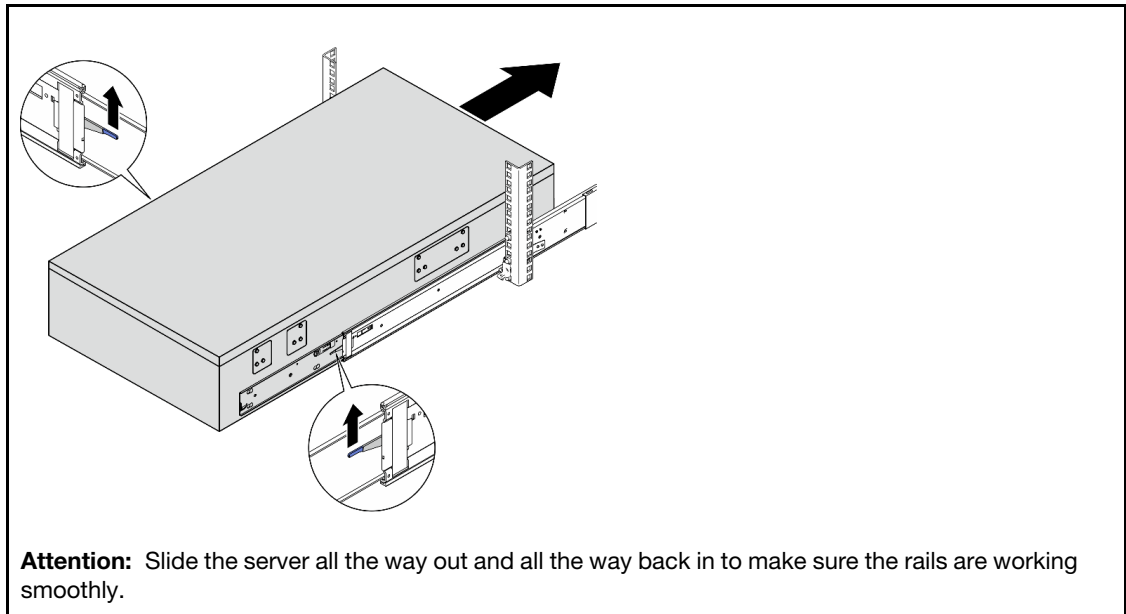
- c. Lift the first pair of lock latches to proceed to slide the server in until the rails snap into place.



d. Remove the front lift handles.



e. Lift the second pair of lock latches to proceed to slide the server in.



- Step 8. Reinstall all the components that were removed previously.
- Step 9. (Optional) Secure the server to the rack.

<b>Rear</b>	<b>Front</b>
<p><b>1</b> Hook latch</p> <p><b>Note:</b> Use either flat-head, hex socket, or Phillips driver for the following instruction.</p> <ul style="list-style-type: none"> <li>1 Insert and tighten an M5 screw along with a washer to the hole below each hook latch.</li> <li>2 Open the rack release latches.</li> <li>3 Tighten the captive screws clockwise with a Phillips screwdriver.</li> </ul>	

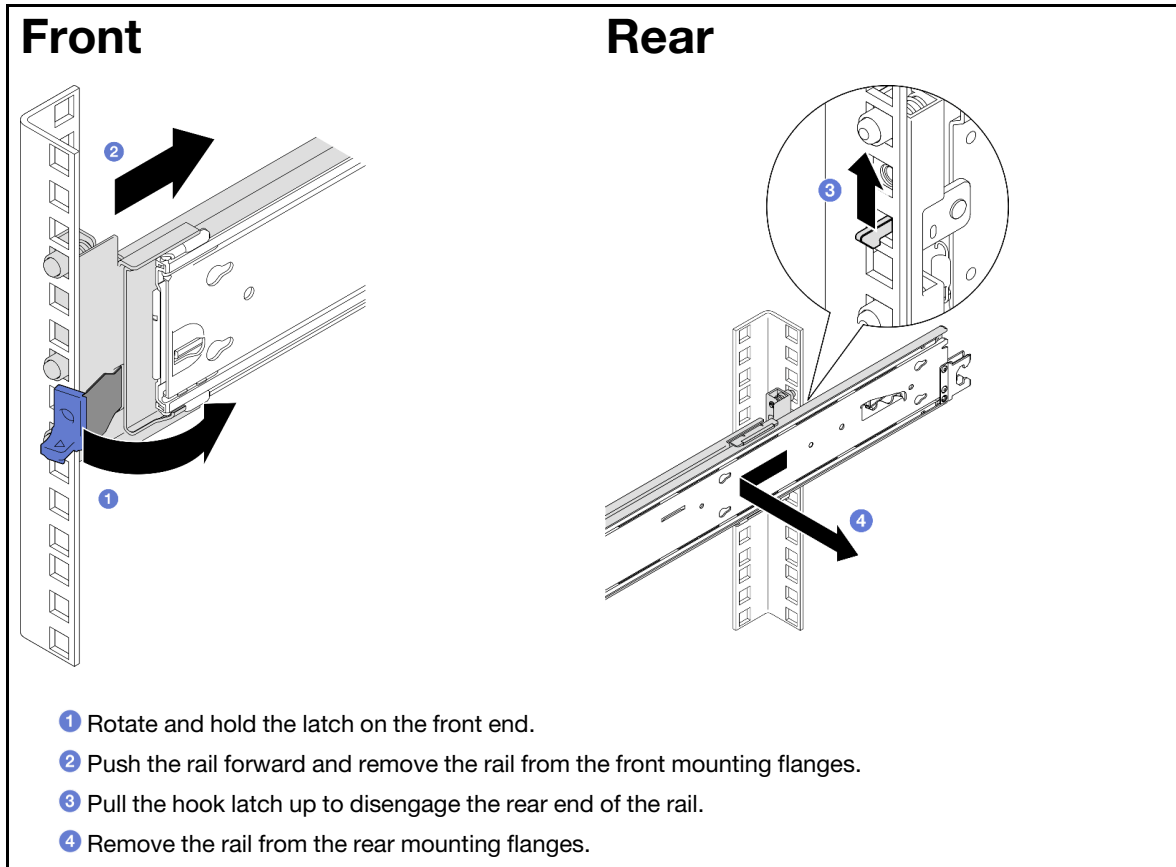
**After you finish**

Complete the parts replacement. See [“Complete the parts replacement”](#) on page 242.

## Remove the rails from the rack

### Procedure

- Step 1. Remove the server from rails. See [“Remove the server from rails”](#) on page 17.
- Step 2. Remove the rails from the rack.



### After you finish

1. Install a replacement unit. See the instructions in *Rail Installation Guide* that comes with the rail kit.
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.

---

## 7mm drive and drive cage replacement

Follow instructions in this section to remove or install the 7mm drive and drive cage.

### Remove a 7mm drive

Follow the instructions in this section to remove a 7mm drive.

### About this task

#### Attention:

- Read [“Installation Guidelines”](#) on page 1 and [“Safety inspection checklist”](#) on page 2 to ensure that you work safely.

- Prevent exposure to static electricity, which might lead to system halt and loss of data, by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.
- To make sure that there is adequate system cooling, do not operate the server for more than two minutes without either a drive or a filler 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 the drives.
- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

**Note:** Make sure you have the drive bay fillers available if some drive bays will be left empty after the removal.

## Procedure

- Step 1. Gently rotate the release latch away to unlock the drive handle; then, grasp and pull the handle to remove the drive from the drive bay.

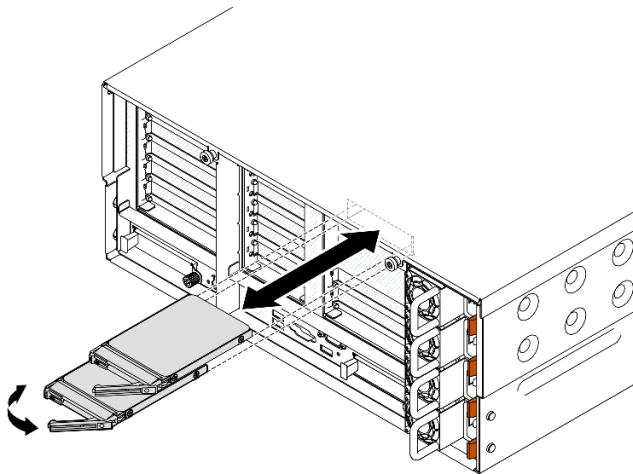


Figure 3. Removing a 7mm drive

## After you finish

1. Install a replacement unit or filler. See [“Install a 7mm drive” on page 44](#).
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](#)

## Remove the 7mm drive cage

Follow the instructions in this section to remove the 7mm drive cage.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

**Note:** For more details on the different types of risers, see “Rear view” in *ThinkSystem SR860 V3 User Guide* or *ThinkSystem SR860 V3 System Configuration Guide*.

Depending on your configuration, follow the corresponding procedures below for proper removal procedure.

- See [“Remove 7mm drive cage from two slot FH riser” on page 34](#) for the following risers:
  - 7mm/x8/x8 PCIe G4 Riser 3 FHHL
- See [“Remove 7mm drive cage from six slot FH riser” on page 37](#) for the following risers:
  - 2 x16 & 3 x8 + 7mm PCIe G4 Riser 3 FHFL
  - 3 x16 & 1 x8 + 7mm PCIe G5 Riser 3 FHFL

## Remove 7mm drive cage from two slot FH riser

### Procedure

Step 1. Make preparation for the task.

- If 7mm drives or fillers have been installed, remove them. See [“Remove a 7mm drive” on page 32](#).
- Remove the front top cover. See [“Remove the front top cover” on page 234](#).
- Remove the rear top cover. See [“Remove the rear top cover” on page 236](#).
- Remove the crossbar. See [“Remove the crossbar” on page 68](#).
- Remove the PCIe riser where the 7mm drive cage is installed. See [“Remove the PCIe riser” on page 134](#).

Step 2. Disconnect the cables from the 7mm drive cage.

Step 3. Remove the 7mm drive cage.



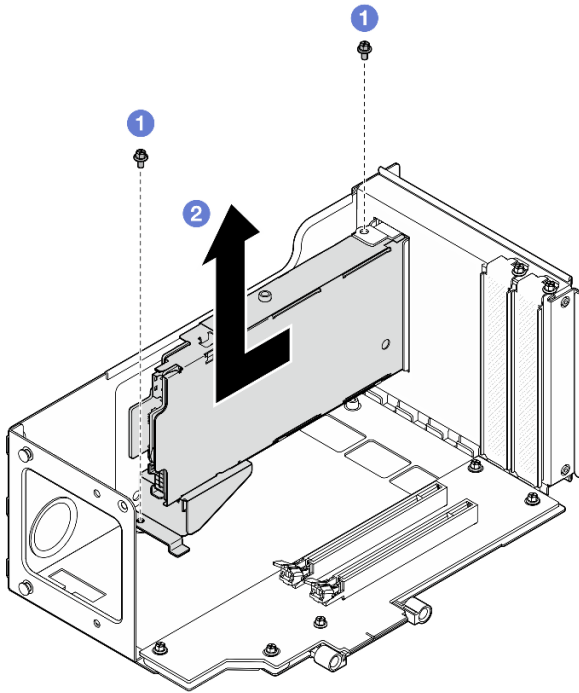


Figure 4. Removing 7mm drive cage from riser

- a. ① Remove the two screws that secure the drive cage to the PCIe riser cage.
- b. ② Remove the drive cage from the PCIe riser cage.

Step 4. Remove the 7mm drive cage bracket.

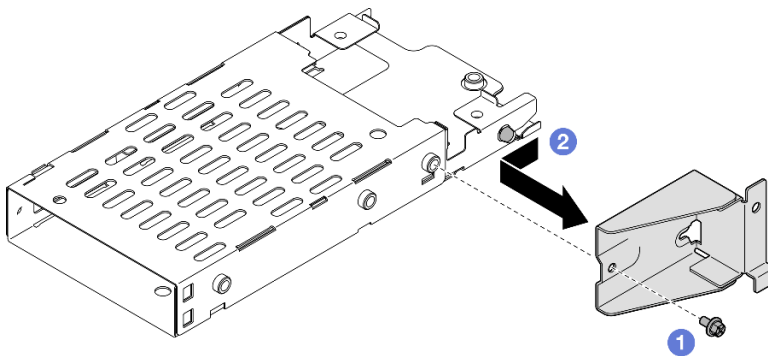


Figure 5. Removing 7mm drive cage bracket

- a. ① Remove the screw that secures the 7mm drive cage bracket.
- b. ② Slide the 7mm drive cage bracket away from the connectors and remove it.

Step 5. Remove the 7mm drive backplanes.

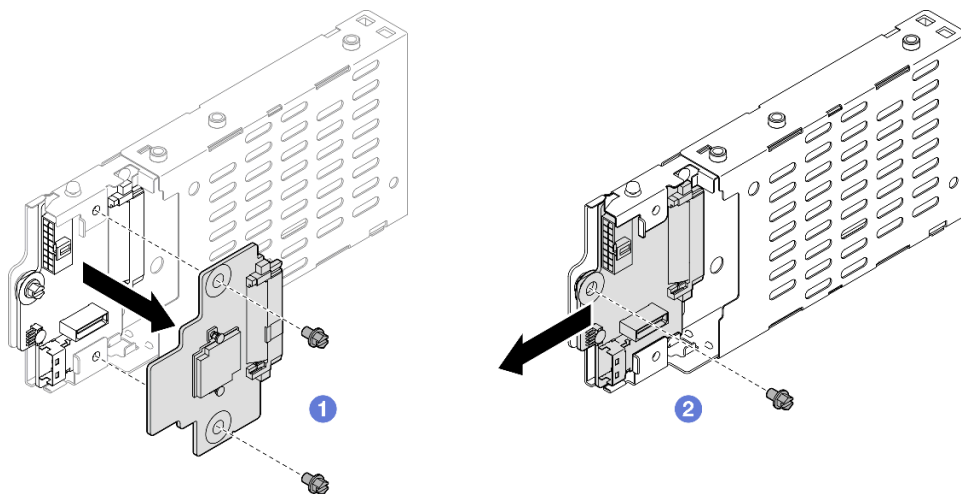


Figure 6. Disassembling 7mm drive cage

- a. ① Unfasten the two screws from the upper backplane; then, remove the upper backplane from the lower backplane.
- b. ② Unfasten the screw from the lower backplane; then, remove the lower backplane from the drive cage.

Step 6. If necessary, install the 7mm drive cage bracket to the filler.

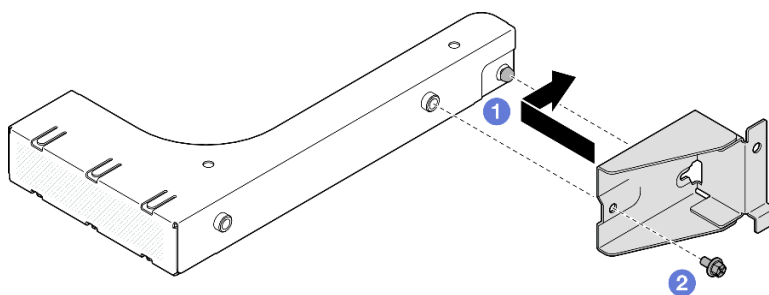


Figure 7. Installing 7mm drive cage bracket

- a. ① Align the 7mm drive cage bracket with the filler and slide it towards the rear of the filler.
- b. ② Secure the 7mm drive cage bracket with a screw.

Step 7. If necessary, install the 7mm drive cage filler.

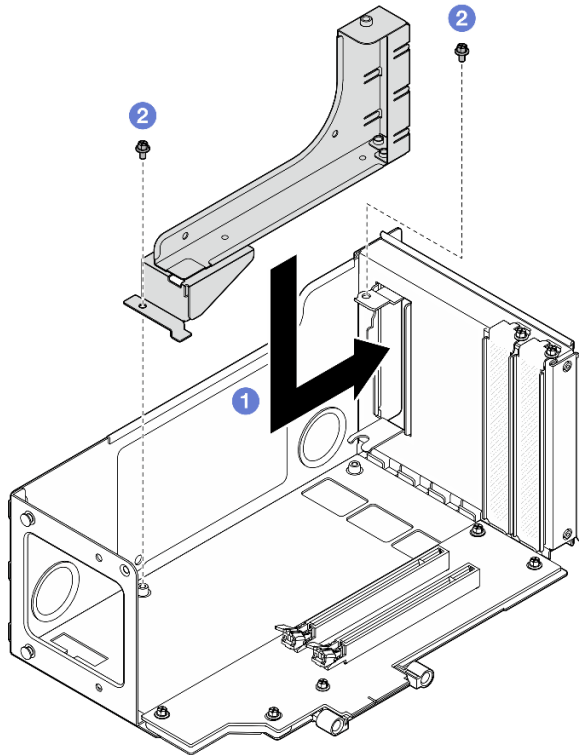


Figure 8. Installing 7mm drive cage filler

- a. ① Install the filler into the PCIe riser cage.
- b. ② Secure the filler with two screws.

### Remove 7mm drive cage from six slot FH riser

**Note:** A Gen 4 riser is used as an example for illustration. The replacement procedure for a Gen 5 riser is similar.

#### Procedure

Step 1. Make preparation for the task.

- a. If 7mm drives or fillers have been installed, remove them. See [“Remove a 7mm drive” on page 32](#).
- b. Remove the front top cover. See [“Remove the front top cover” on page 234](#).
- c. Remove the rear top cover. See [“Remove the rear top cover” on page 236](#).
- d. Remove the crossbar. See [“Remove the crossbar” on page 68](#).
- e. Remove the PCIe riser where the 7mm drive cage is installed. See [“Remove the PCIe riser” on page 134](#).

Step 2. Disconnect the cables from the 7mm drive cage.

Step 3. Remove the 7mm drive cage.

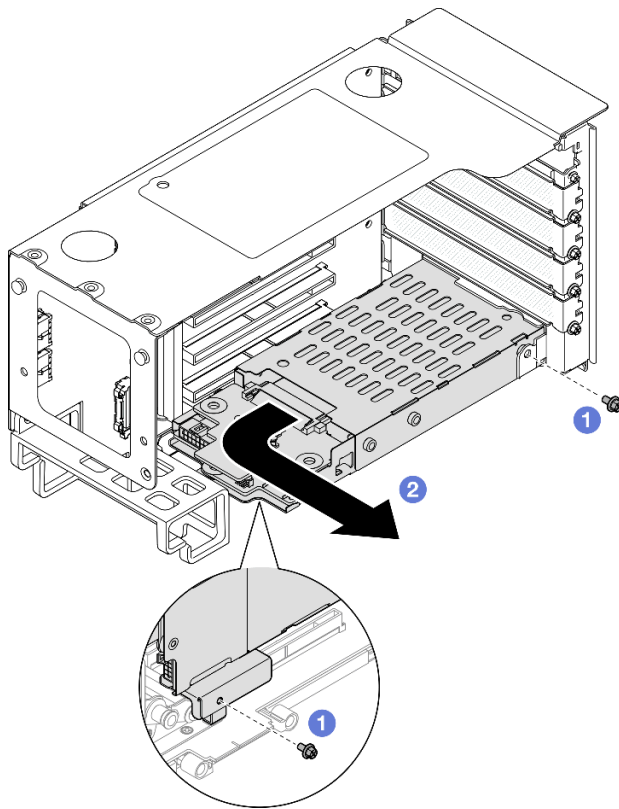


Figure 9. Removing 7mm drive cage from riser

- a. 1 Remove the two screws that secure the drive cage to the PCIe riser.
- b. 2 Rotate the drive cage outwards away from the PCIe riser cage to remove it.

Step 4. Remove the 7mm drive cage bracket.

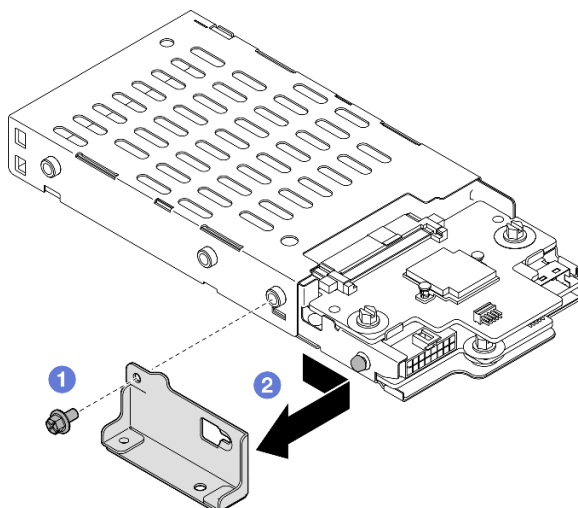


Figure 10. Removing 7mm drive cage bracket

- a. 1 Remove the screw that secures the 7mm drive cage bracket.
- b. 2 Slide the 7mm drive cage bracket towards the connectors and remove it.

Step 5. Remove the 7mm drive backplanes.

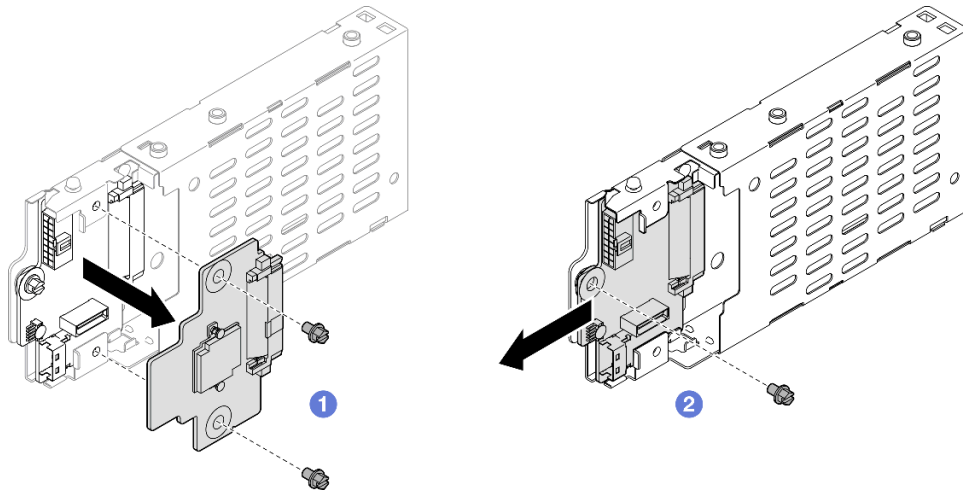


Figure 11. Disassembling 7mm drive cage

- a. ① Unfasten the two screws from the upper backplane; then, remove the upper backplane from the lower backplane.
- b. ② Unfasten the screw from the lower backplane; then, remove the lower backplane from the drive cage.

## After you finish

1. Install a replacement unit or a filler. See [“Install the 7mm drive cage” on page 39](#).
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 7mm drive cage

Follow the instructions in this section to install the 7mm drive.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

**Note:** For more details on the different types of risers, see “Rear view” in *ThinkSystem SR860 V3 User Guide* or *ThinkSystem SR860 V3 System Configuration Guide*.

Depending on your configuration, follow the corresponding procedures below for proper installation procedure.

- See “Install 7mm drive cage to two slot FH riser” on page 40 for the following risers:
  - 7mm/x8/x8 PCIe G4 Riser 3 FHHL
- See “Install 7mm drive cage to six slot FH riser” on page 42 for the following risers:
  - 2 x16 & 3 x8 + 7mm PCIe G4 Riser 3 FHFL
  - 3 x16 & 1 x8 + 7mm PCIe G5 Riser 3 FHFL

**Firmware and driver download:** You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

## Install 7mm drive cage to two slot FH riser

### Procedure

Step 1. Install the 7mm drive backplanes.

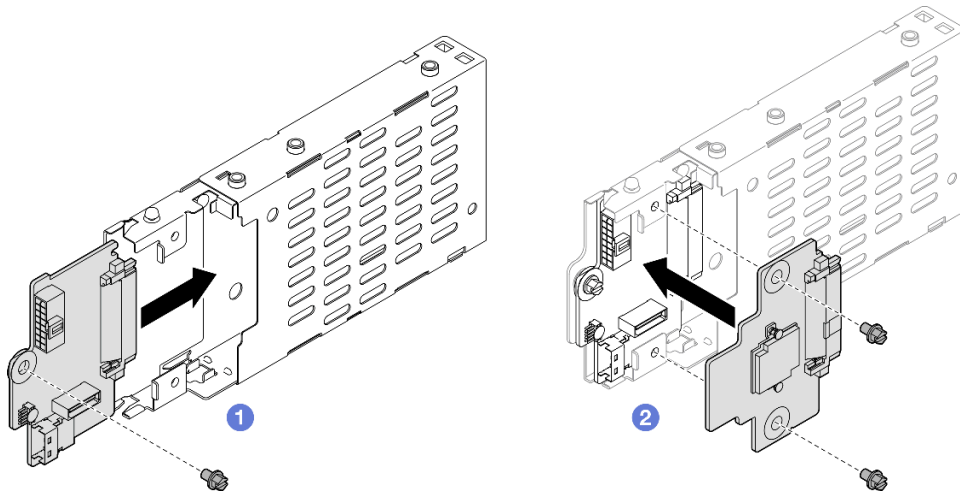


Figure 12. Installing 7mm drive backplane

- a. ① Slide the lower backplane into the drive cage; then, fasten the screw to secure the lower backplane to the drive cage.
- b. ② Align the upper backplane with the lower backplane; then, fasten the two screws to secure the upper backplane to the lower backplane.

Step 2. If a 7mm drive cage filler is installed, remove it.

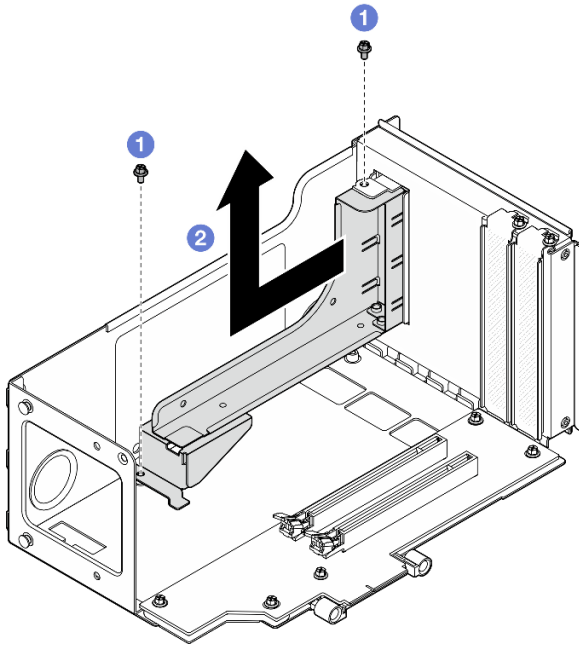


Figure 13. Removing 7mm drive cage filler

- a. ① Remove the two screws that secure the filler to the PCIe riser.
- b. ② Remove the filler from the PCIe riser cage.

Step 3. Remove the 7mm drive cage bracket.

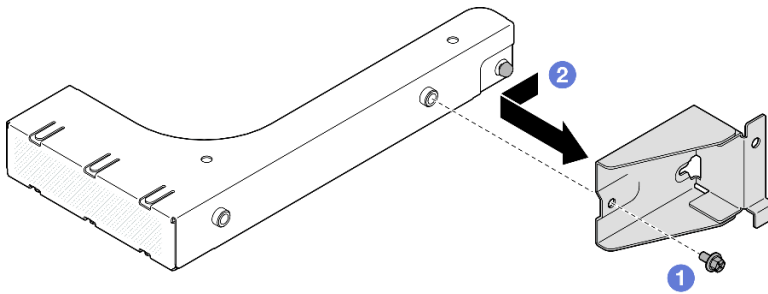


Figure 14. Removing 7mm drive cage bracket

- a. ① Remove the screw that secures the 7mm drive cage bracket.
- b. ② Slide the 7mm drive cage bracket towards the front of the filler and remove it.

Step 4. Install the 7mm drive cage bracket.

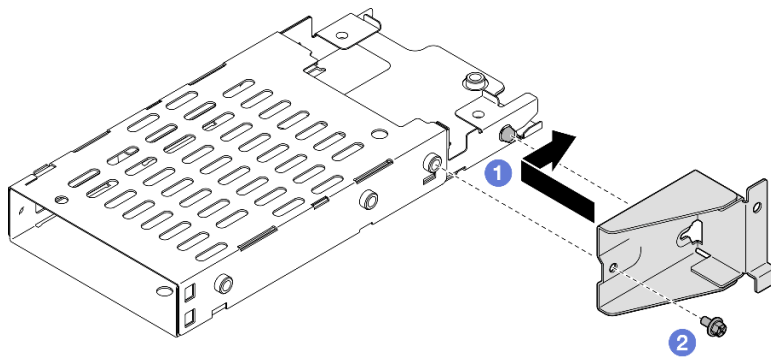


Figure 15. Installing 7mm drive cage bracket

- a. 1 Align the 7mm drive cage bracket with the drive cage and slide it towards the connectors.
- b. 2 Secure the 7mm drive cage bracket with a screw.

Step 5. Install the 7mm drive cage.

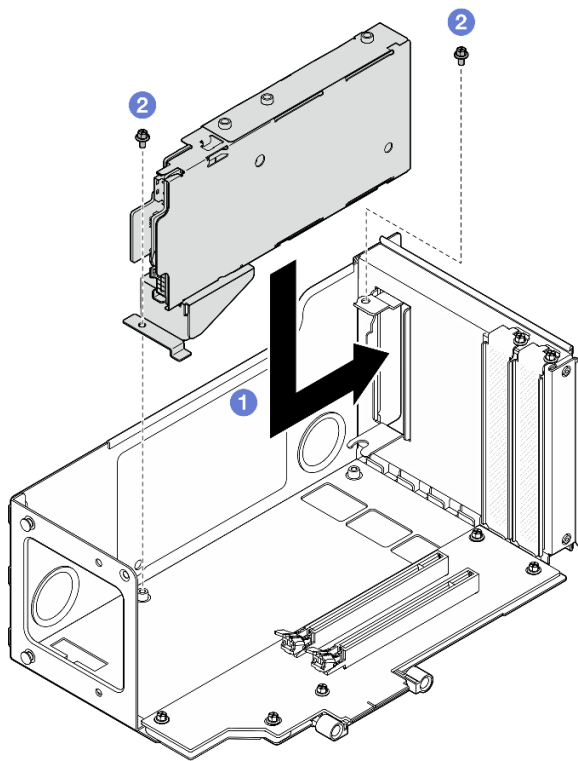


Figure 16. Installing 7mm drive cage to riser

- a. 1 Install the drive cage into the PCIe riser cage.
- b. 2 Secure the drive cage with two screws.

Step 6. Connect the cables to the 7mm drive cage. See [“7mm drive backplane cable routing” on page 383](#) for more information on the internal cable routing.

### Install 7mm drive cage to six slot FH riser

**Note:** A Gen 4 riser is used as an example for illustration. The replacement procedure for a Gen 5 riser is similar.



## Procedure

Step 1. Install the 7mm drive backplanes.

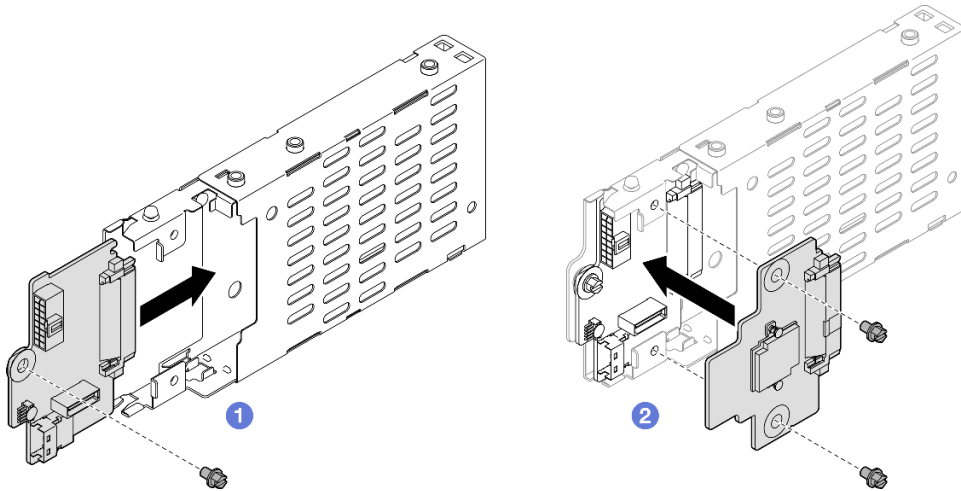


Figure 17. Installing 7mm drive backplane

- a. ① Slide the lower backplane into the drive cage; then, fasten the screw to secure the lower backplane to the drive cage.
- b. ② Align the upper backplane with the lower backplane; then, fasten the two screws to secure the upper backplane to the lower backplane.

Step 2. Install the 7mm drive cage bracket.

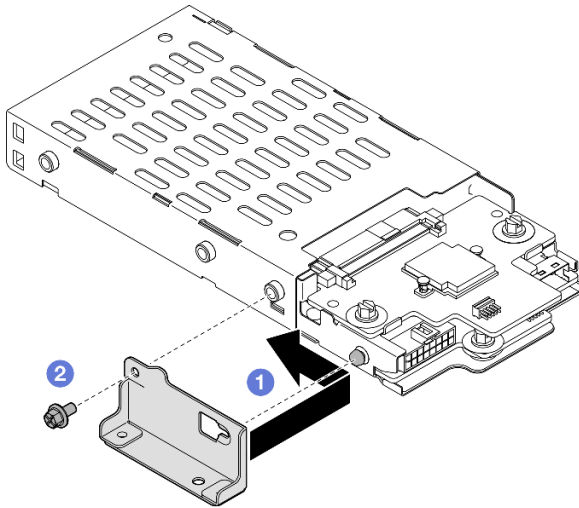


Figure 18. Installing 7mm drive cage bracket

- a. ① Align the 7mm drive cage bracket with the drive cage and slide it away from the connectors.
- b. ② Secure the 7mm drive cage bracket with a screw.

Step 3. Install the 7mm drive cage.

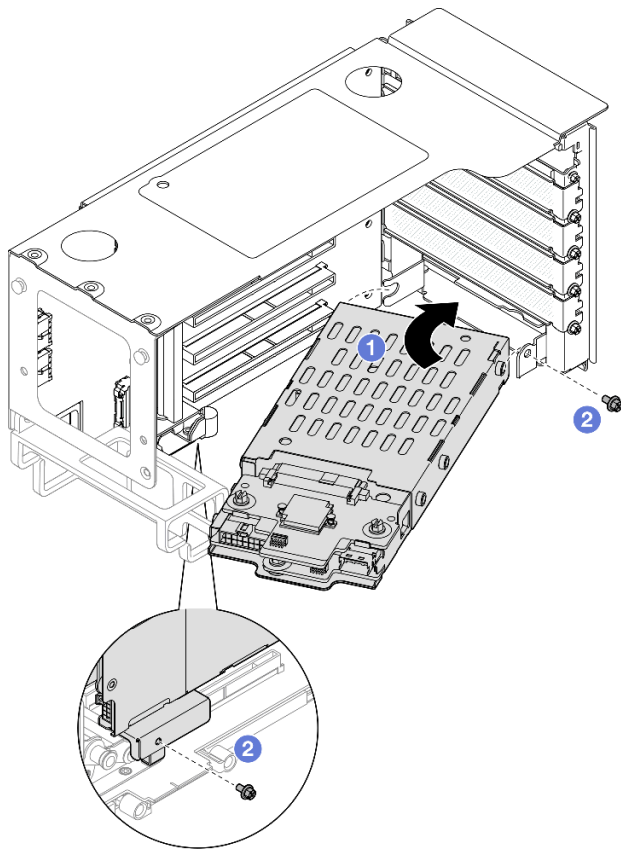


Figure 19. Installing 7mm drive cage to riser

- a. ① Install the drive cage into the PCIe riser cage.
- b. ② Secure the drive cage with two screws.

Step 4. Connect the cables to the 7mm drive cage. See [“7mm drive backplane cable routing” on page 383](#) for more information on the internal cable routing.

## After you finish

1. Reinstall the PCIe riser. See [“Install the PCIe riser” on page 147](#).
2. Reinstall the crossbar. See [“Install the crossbar” on page 71](#).
3. Reinstall the rear top cover. See [“Install the rear top cover” on page 237](#).
4. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
5. Fill the drive bays with 7mm drives or fillers. See [“Install a 7mm drive” on page 44](#).
6. Complete the parts replacement. See [“Complete the parts replacement” on page 242](#).

## Demo video

[Watch the procedure on YouTube](#)

## Install a 7mm drive

Follow the instructions in this section to install a 7mm drive.

## About this task

**Attention:**

- Read “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.
- Prevent exposure to static electricity, which might lead to system halt and loss of data, by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.
- To make sure that there is adequate system cooling, do not operate the server for more than two minutes without either a drive or a drive bay filler installed in each bay.
- Before you make changes to drives, drive controllers (including controllers that are integrated on the system board assembly), drive backplanes, or drive cables, back up all important data that is stored on drives.
- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

**Note:** For a complete list of supported optional device for this server, see <https://serverproven.lenovo.com>.

**Firmware and driver download:** You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

**Procedure**

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

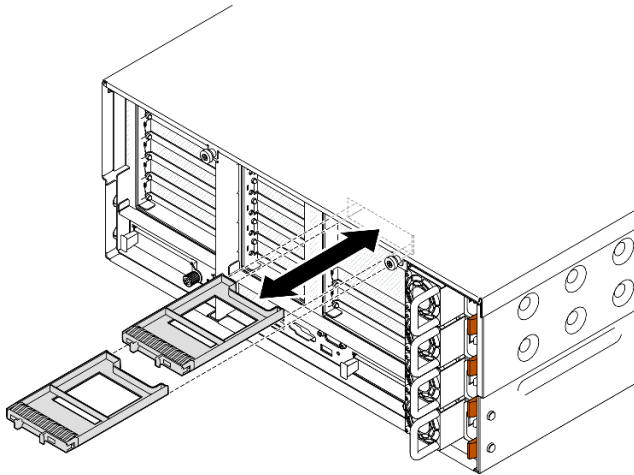


Figure 20. Removing 7mm drive fillers

- Step 2. Gently rotate the release latch away to unlock the drive handle.
- Step 3. Slide the drive into the drive bay, and push it until it stops; then, rotate the handle back to the locked position.

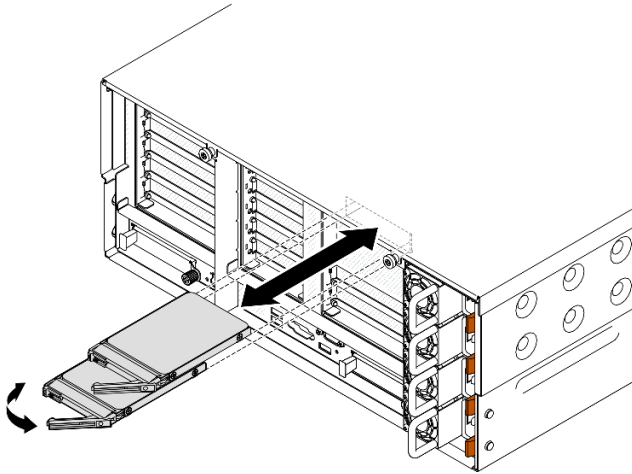


Figure 21. Installing 7mm drives

- a. ① Ensure that the tray handle is in the open position. Slide the drive into the drive bay, and push it until it stops.
- b. ② Rotate the handle back to the locked position.

## After you finish

1. 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.

2. If any of the drive bays are left empty, fill them with drive bay fillers.

## Demo video

[Watch the procedure on YouTube](#)

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## Air baffle replacement

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

### Remove the front air baffle

Follow the instructions in this section to remove the front air baffle.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.

- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).
- If you intend to install memory modules in the server, you must first remove the air baffle from the server.

## Procedure

Step 1. Remove the front top cover. See [“Remove the front top cover” on page 234](#).

Step 2. If a flash power module is installed, disconnect the cable of the RAID flash power module from the extension cable.

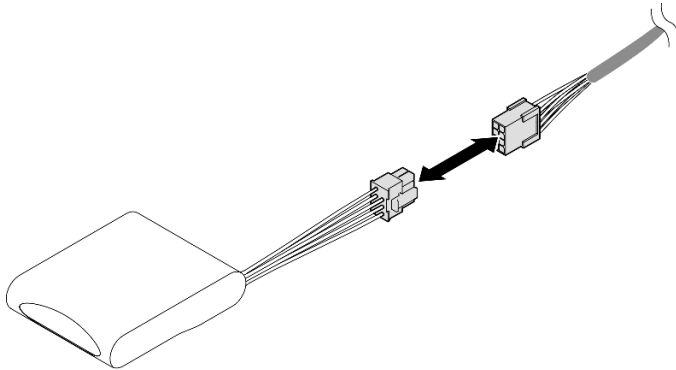


Figure 22. Disconnecting cable from flash power module

Step 3. If an M.2 boot adapter is installed, disconnect the cables from the M.2 boot adapter.

### SATA/x4 NVMe M.2 boot adapter

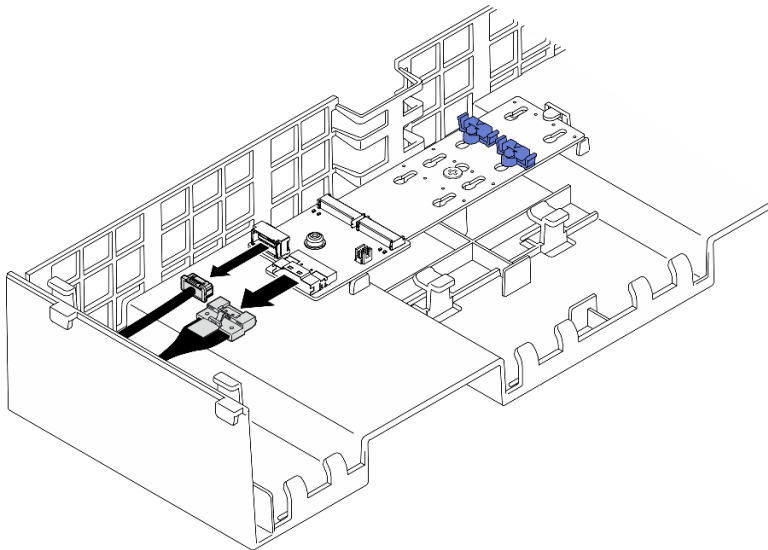


Figure 23. Disconnecting cable from SATA/x4 NVMe M.2 boot adapter

### SATA/NVMe or NVMe M.2 boot adapter

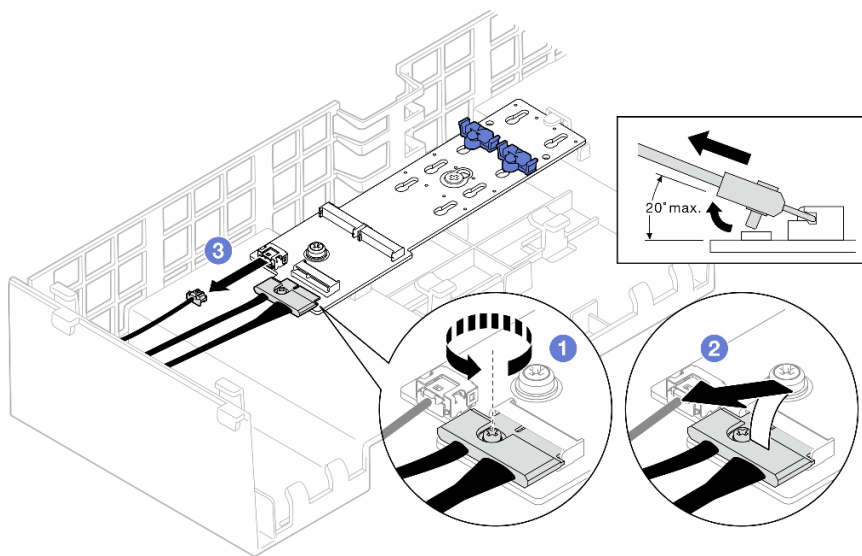


Figure 24. Disconnecting cable from SATA/NVMe or NVMe M.2 boot adapter

1. ① Loosen the screw on the signal cable.
2. ② Tilt the connector and remove it.
3. ③ Remove the power cable.

Step 4. Lift the cables routed through the front air baffle and set them aside.

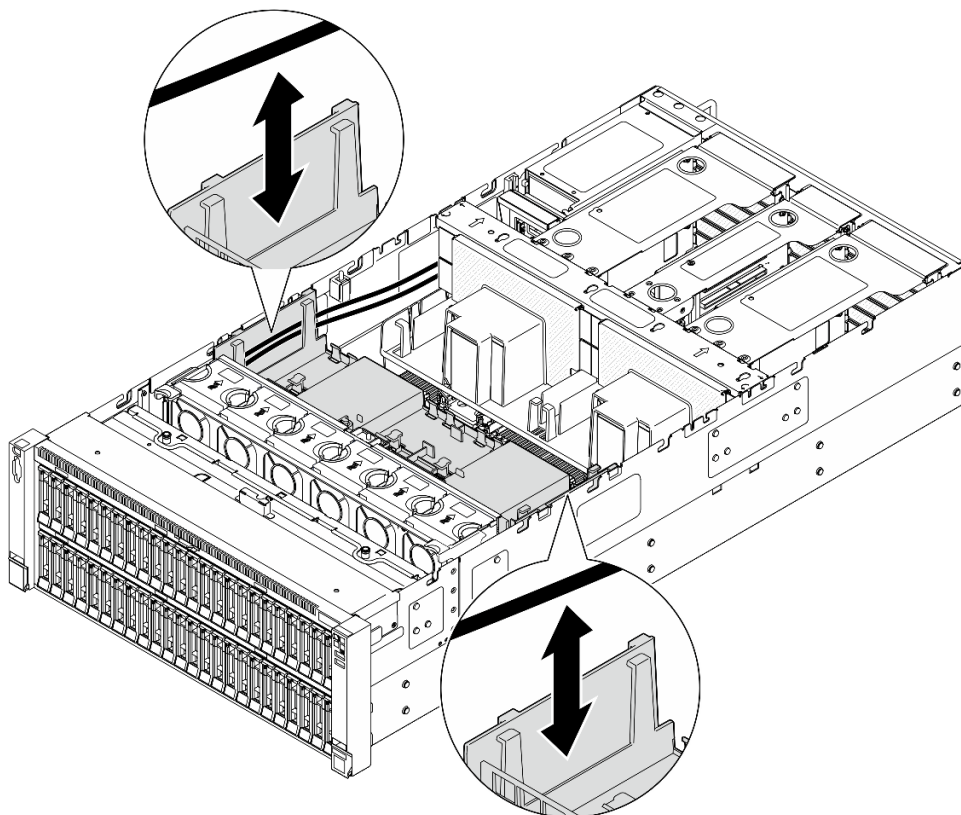


Figure 25. Lifting cable out of front air baffle

Step 5. Grasp the front air baffle and carefully lift it out of the chassis.

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

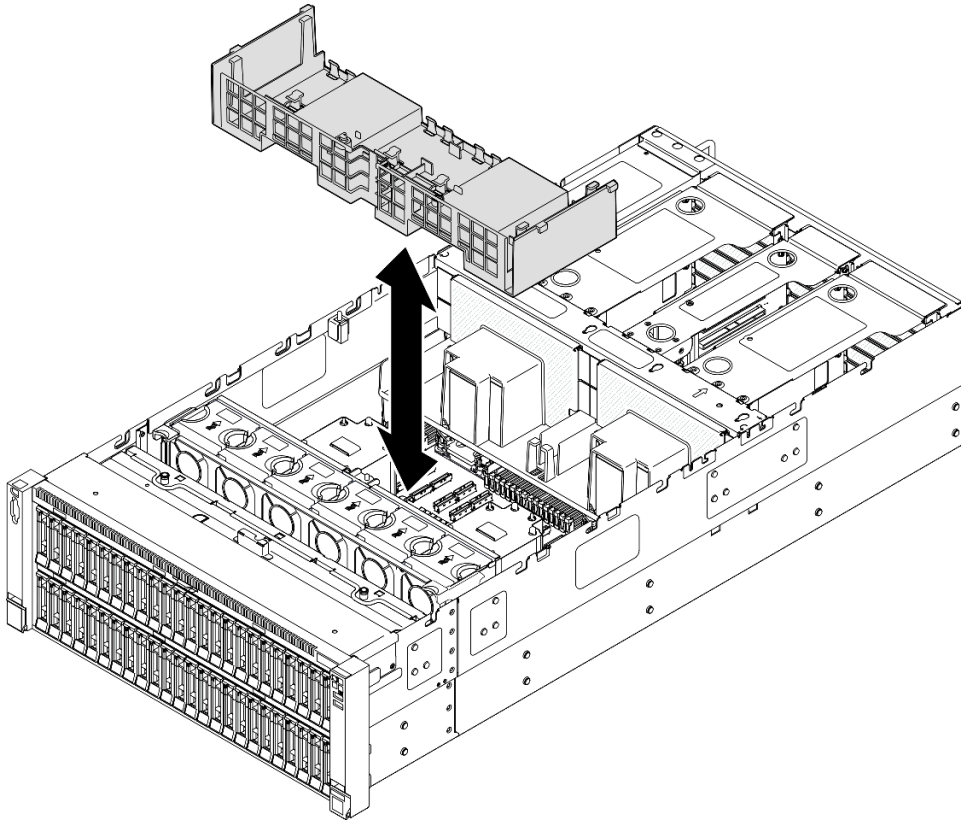


Figure 26. Removing front air baffle

## After you finish

1. If you plan to replace the front air baffle, remove the following.
  - a. Remove all flash power modules. See [“Remove a flash power module” on page 92](#).
  - b. Remove the M.2 boot adapter. See [“Remove the M.2 boot adapter” on page 114](#).
2. Install a replacement unit. See [“Install the front air baffle” on page 49](#).
3. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install the front air baffle

Follow the instructions in this section to install the front air baffle.

## About this task

### Attention:



- Read “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “[Power off the server](#)” on page 17.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See “[Remove the server from rails](#)” on page 17.
- If you intend to install memory modules in the server, you must first remove the air baffle from the server.
- For proper cooling and airflow, reinstall the front and rear air baffles before you turn on the server. Operating the server with the air baffle removed might damage server components.

## Procedure

Step 1. Align the front air baffle tabs with the front air baffle slots on both sides of the chassis; then, lower the front air baffle into the server.

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

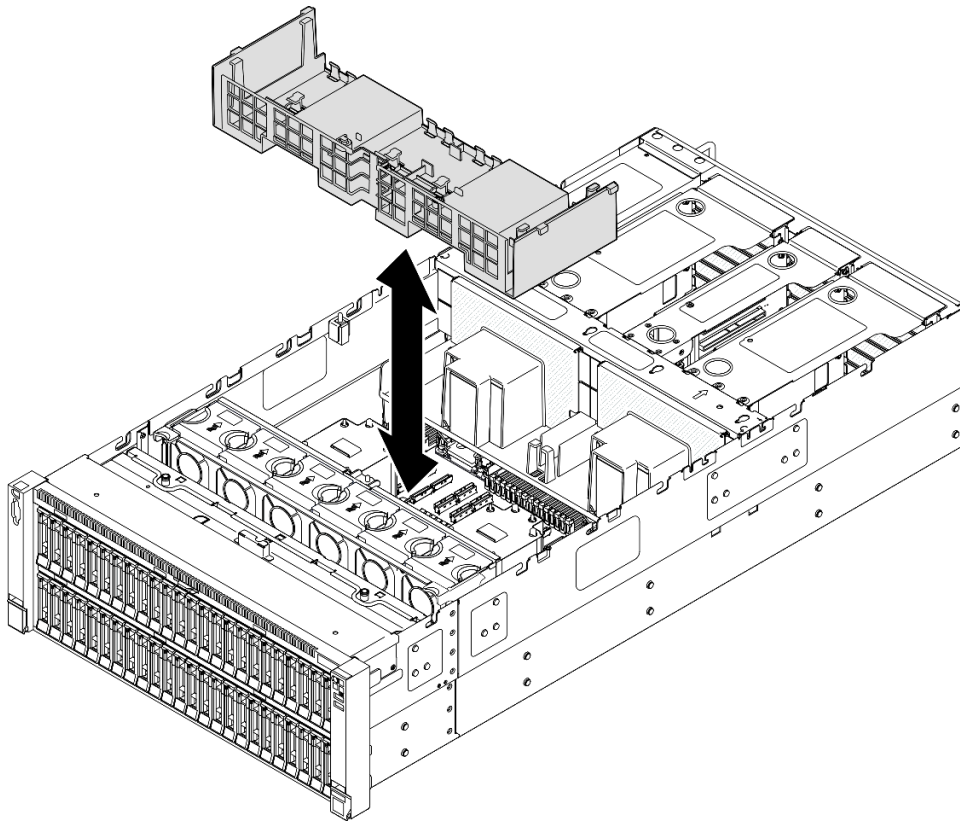


Figure 27. Installing front air baffle

- Step 2. Slightly press the front air baffle down until it is securely seated.
- Step 3. Route the cables through the front air baffle.



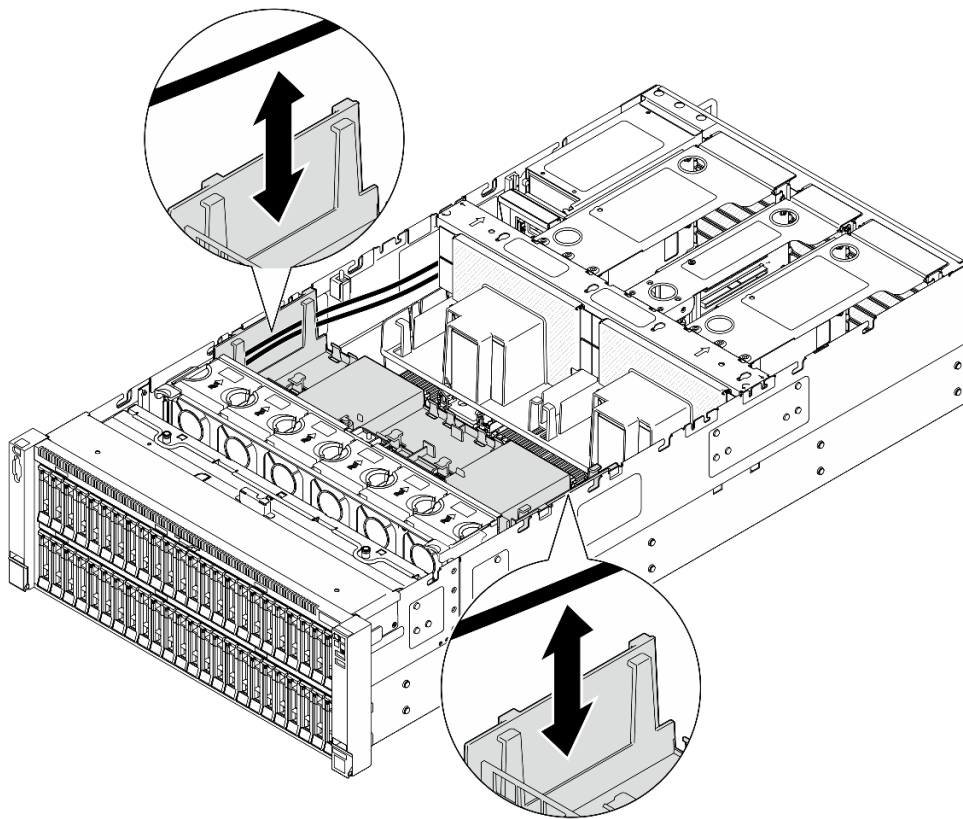


Figure 28. Routing cable through front air baffle

Step 4. If applicable, connect the cables to the M.2 boot adapter.

**SATA/x4 NVMe M.2 boot adapter**

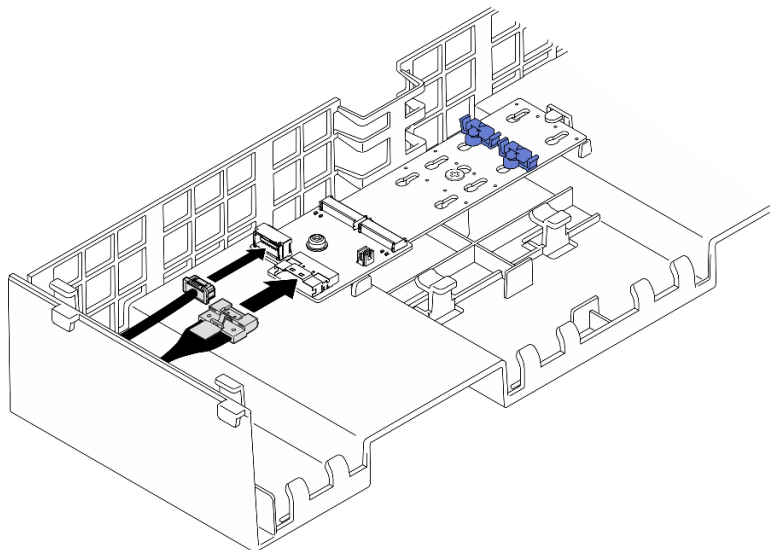


Figure 29. Connecting cable to SATA/x4 NVMe M.2 boot adapter

**SATA/NVMe or NVMe M.2 boot adapter**

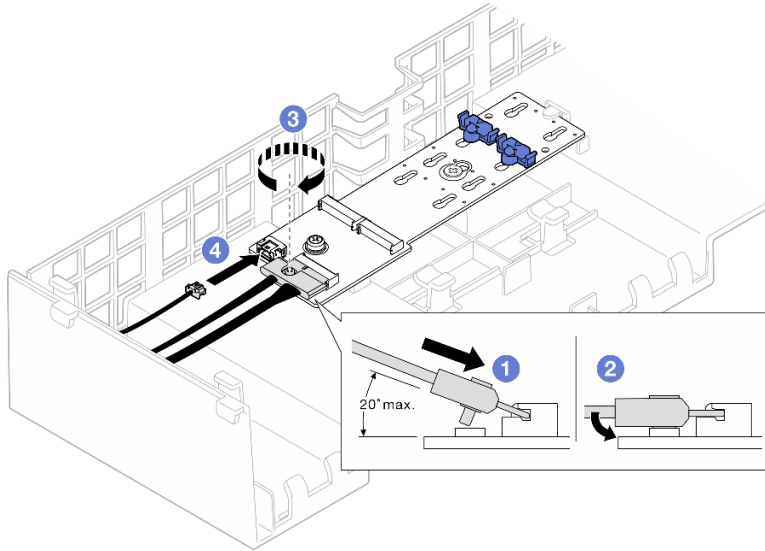


Figure 30. Connecting cable to SATA/NVMe or NVMe M.2 boot adapter

1. ① Tilt the connector at an angle of 20 degrees or lower, and insert it until its bottom surface reaches the ramp.
2. ② Press the connector down flat.
3. ③ Tighten the screw on the signal cable.
4. ④ Connect the power cable.

Step 5. If applicable, connect the flash power module to an adapter with the extension cable that comes with the flash power module. See [“Flash power module cable routing”](#) on page 384 for more information on the internal cable routing.

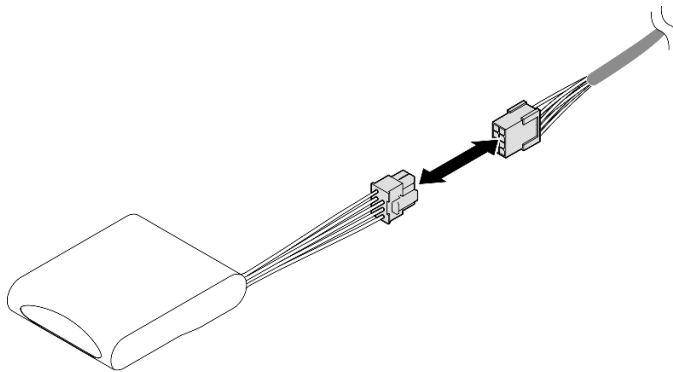


Figure 31. Connecting cable to flash power module

## After you finish

1. If you replaced the front air baffle, reinstall the following.
  - a. Reinstall the M.2 boot adapter. See [“Install the M.2 boot adapter”](#) on page 116.
  - b. Reinstall all flash power modules. See [“Install a flash power module”](#) on page 93.
2. Reinstall the front top cover. See [“Install the front top cover”](#) on page 239.
3. Complete the parts replacement. See [“Complete the parts replacement”](#) on page 242.

## Demo video

[Watch the procedure on YouTube](#)

## Remove the rear air baffle

Follow the instructions in this section to remove the rear air baffle.

### About this task

#### Attention:

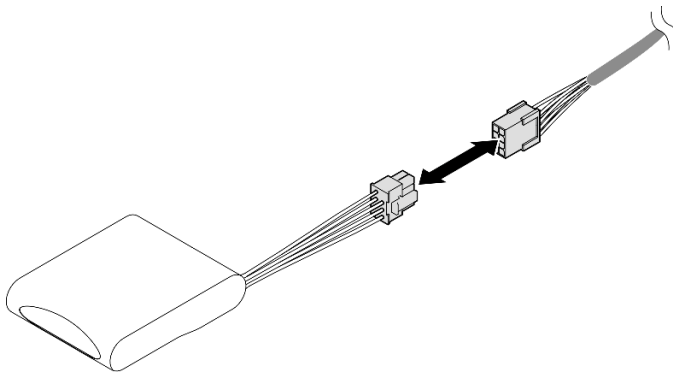
- Read “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “[Power off the server](#)” on page 17.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See “[Remove the server from rails](#)” on page 17.
- If you intend to install memory modules in the server, you must first remove the air baffle from the server.

### Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See “[Remove the front top cover](#)” on page 234.
- b. Remove the rear top cover. See “[Remove the rear top cover](#)” on page 236.
- c. Remove the crossbar. See “[Remove the crossbar](#)” on page 68.
- d. Remove all the PCIe risers. See “[Remove the PCIe riser](#)” on page 134.

Step 2. If a flash power module is installed, disconnect the cable of the RAID flash power module from the extension cable.



*Figure 32. Disconnecting cable from flash power module*

Step 3. If an M.2 boot adapter is installed, disconnect the cables from the M.2 boot adapter on the front air baffle.

#### SATA/x4 NVMe M.2 boot adapter

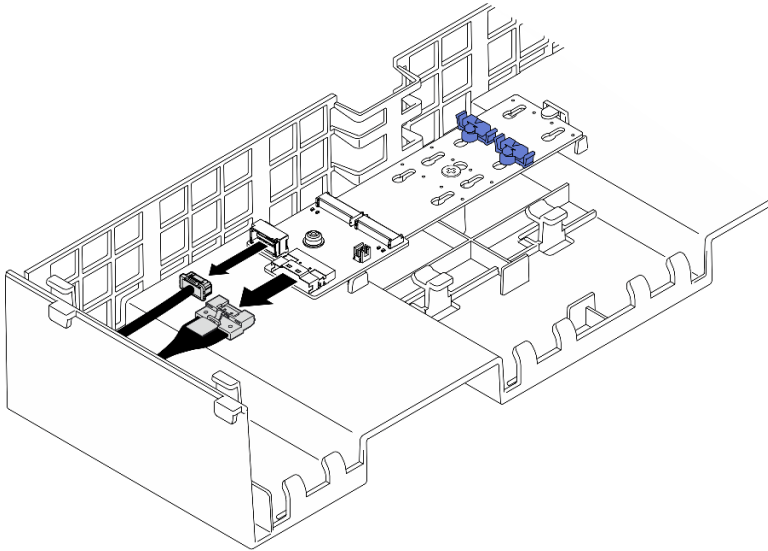


Figure 33. Disconnecting cable from SATA/x4 NVMe M.2 boot adapter

### SATA/NVMe or NVMe M.2 boot adapter

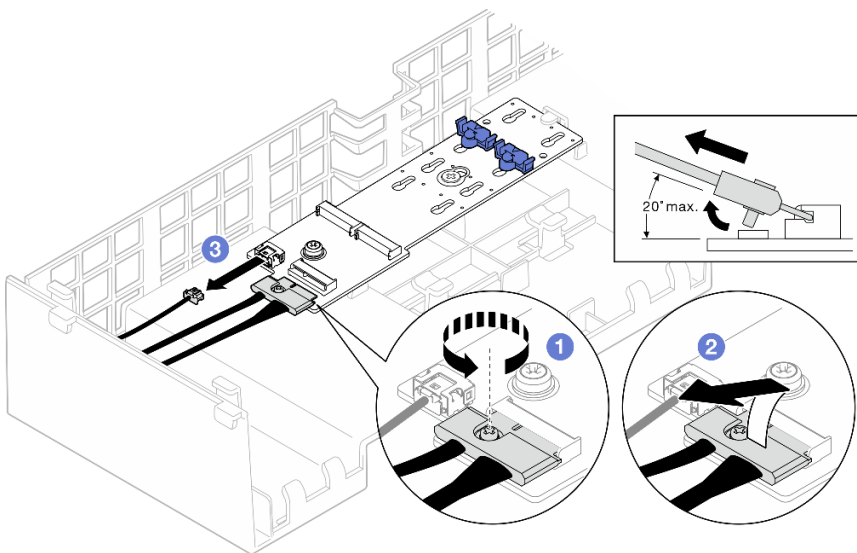


Figure 34. Disconnecting cable from SATA/NVMe or NVMe M.2 boot adapter

1. ① Loosen the screw on the signal cable.
2. ② Tilt the connector and remove it.
3. ③ Remove the power cable.

Step 4. Remove the power cable routed through the rear air baffle and set it aside. See [“Power distribution board cable routing” on page 397](#) for more information on the internal cable routing.

Step 5. Lift the cables routed through the rear air baffle and set them aside.

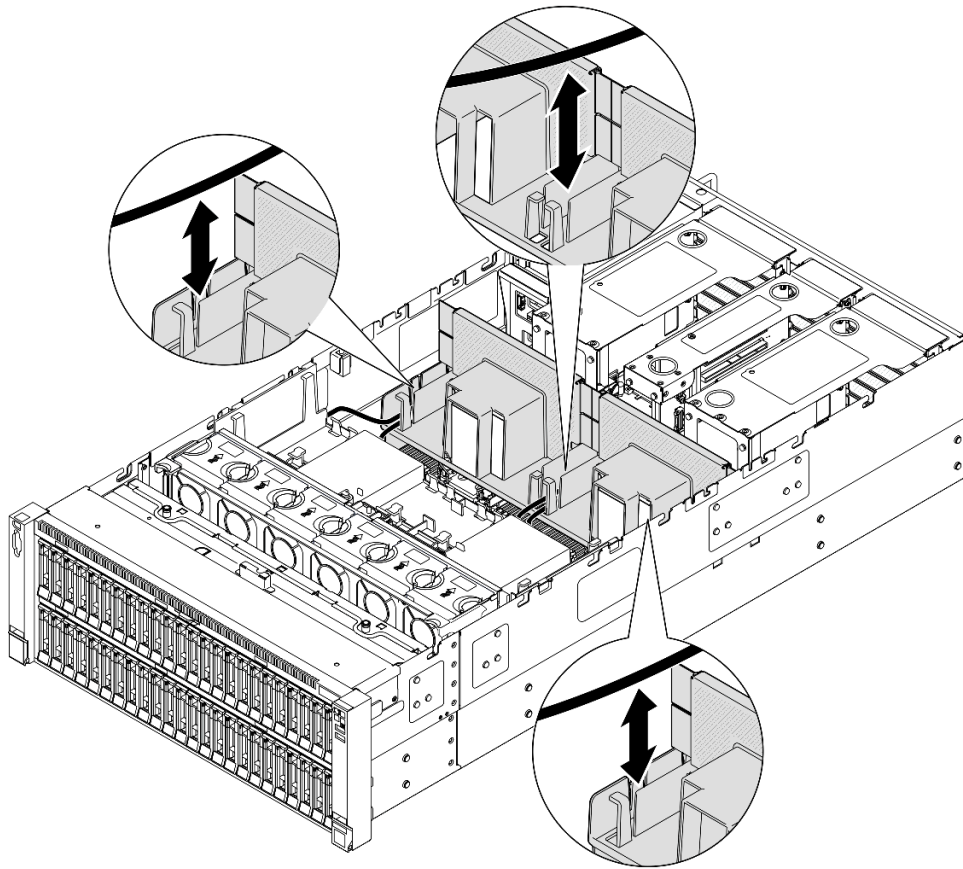
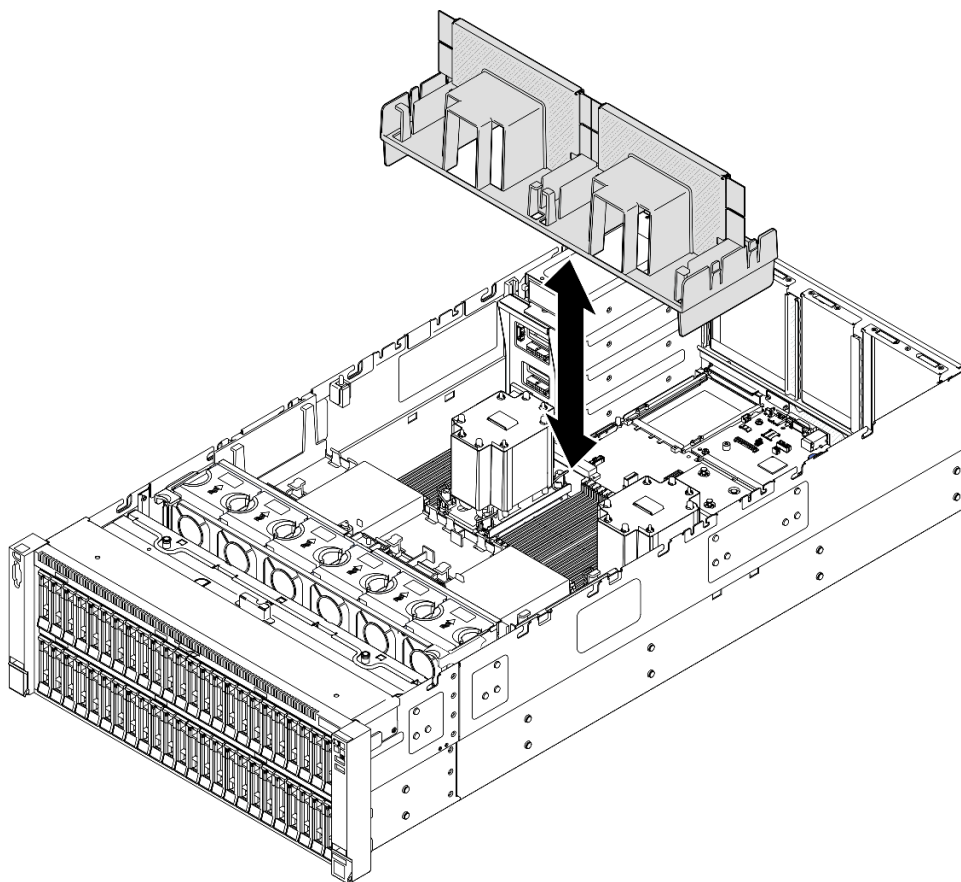


Figure 35. Lifting cable out of rear air baffle

Step 6. Grasp the rear air baffle and carefully lift it out of the chassis.

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



*Figure 36. Removing rear air baffle for 3U standard PHM*

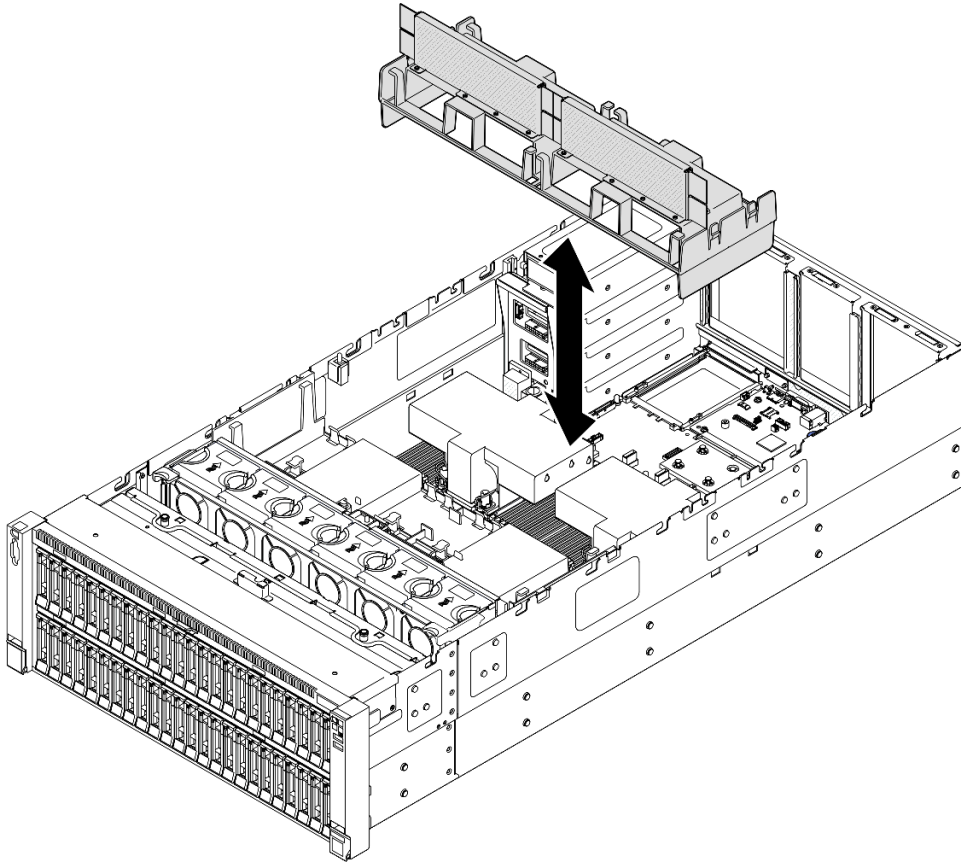


Figure 37. Removing rear air baffle for 2U performance PHM

## After you finish

1. Install a replacement unit. See [“Install the rear air baffle” on page 57](#).
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 rear air baffle

Follow the instructions in this section to install the rear air baffle.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).



- If you intend to install memory modules in the server, you must first remove the air baffle from the server.
- For proper cooling and airflow, reinstall the front and rear air baffles before you turn on the server. Operating the server with the air baffle removed might damage server components.

## Procedure

Step 1. Align the rear air baffle tabs with the rear air baffle slots on both sides of the chassis; then, lower the rear air baffle into the server.

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

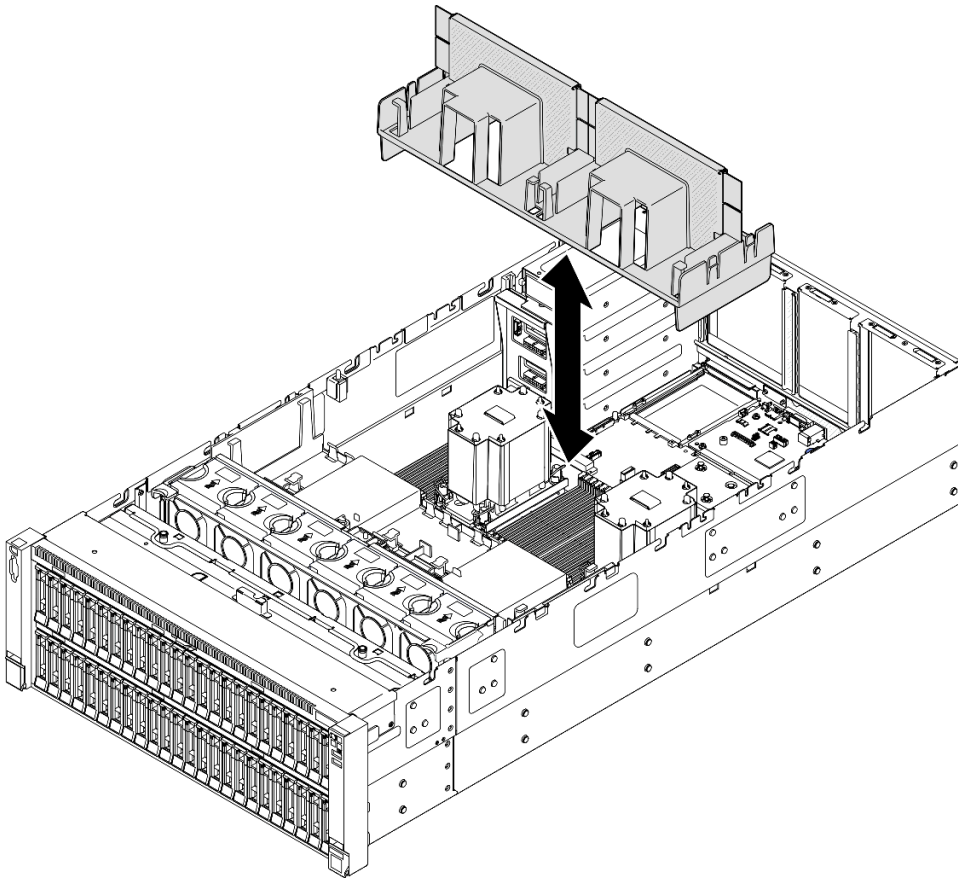
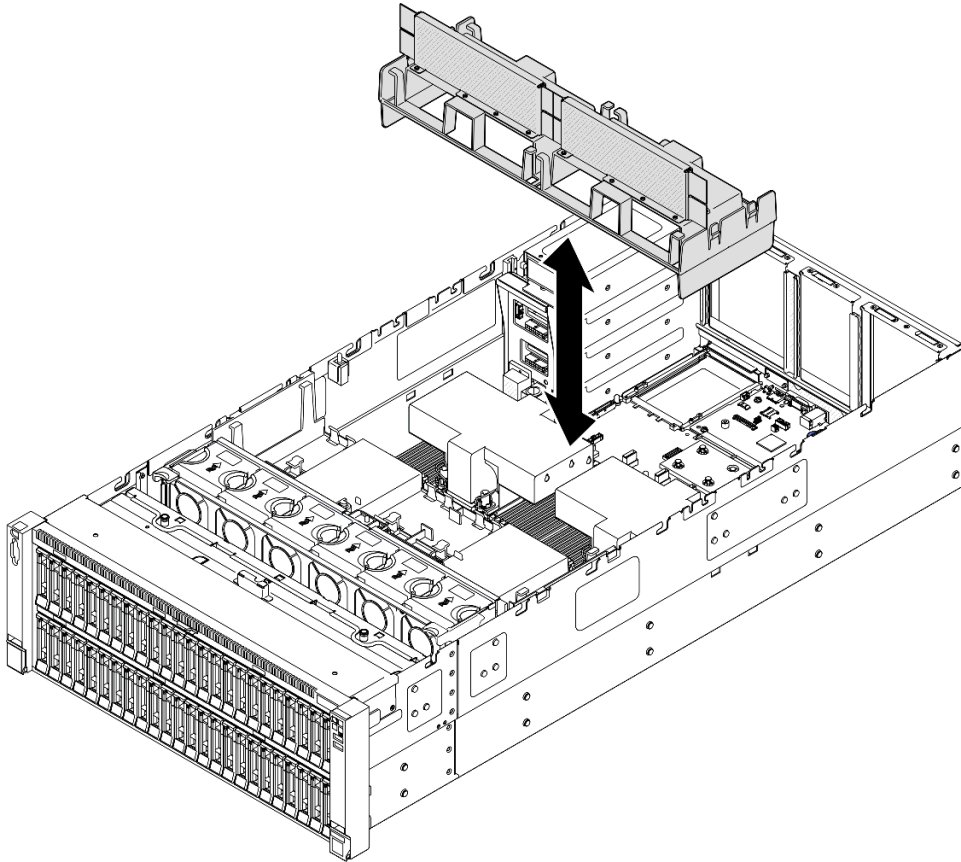


Figure 38. Installing rear air baffle for 3U standard PHM





*Figure 39. Installing rear air baffle for 2U performance PHM*

- Step 2. Slightly press the rear air baffle down until it is securely seated.
- Step 3. Route the cables through the rear air baffle.

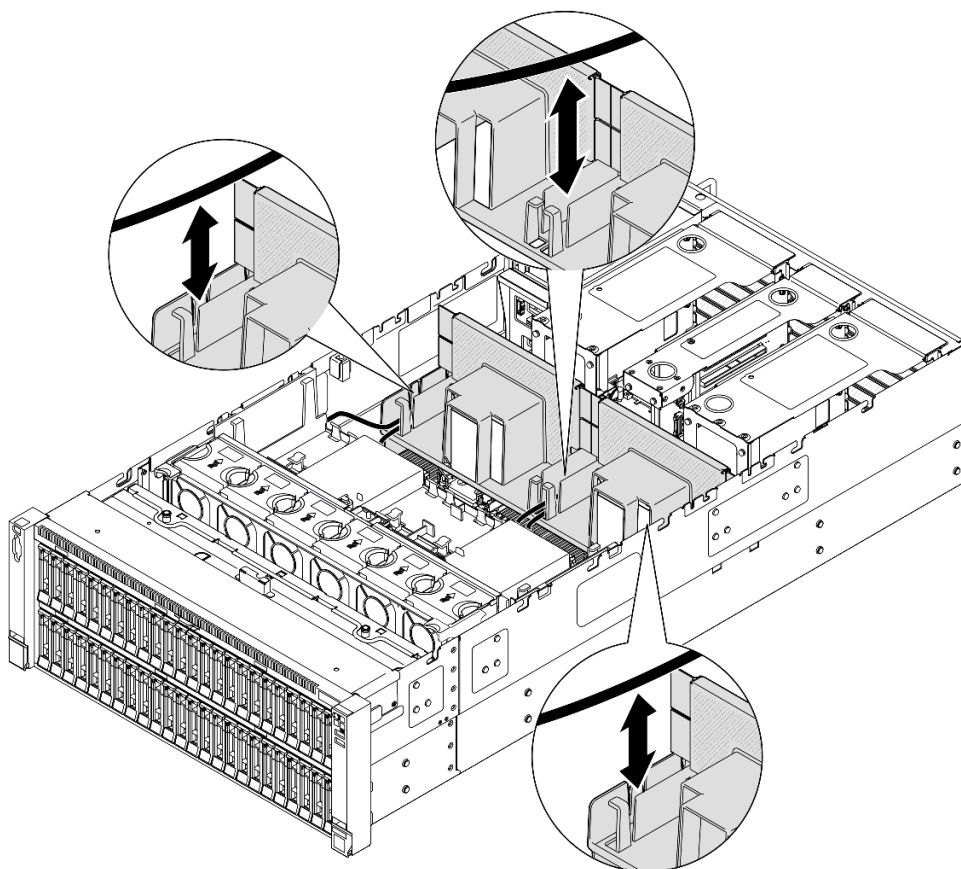


Figure 40. Routing cable through rear air baffle

- Step 4. Route the power cable through the rear air baffle. See [“Power distribution board cable routing”](#) on [page 397](#) for more information on the internal cable routing.
- Step 5. If applicable, connect the cables to the M.2 boot adapter.

**SATA/x4 NVMe M.2 boot adapter**

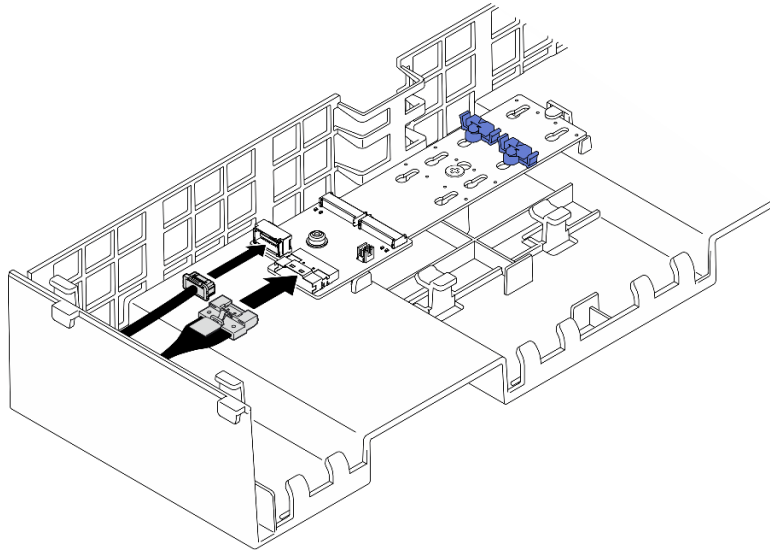


Figure 41. Connecting cable to SATA/x4 NVMe M.2 boot adapter

### SATA/NVMe or NVMe M.2 boot adapter

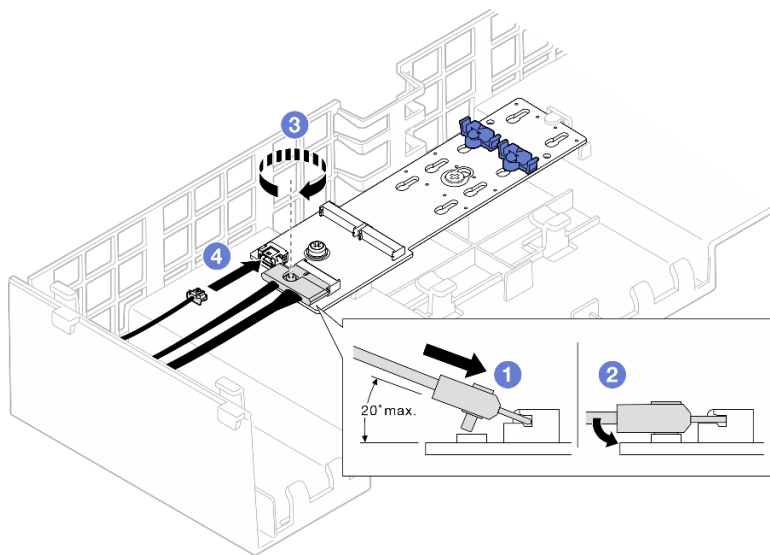


Figure 42. Connecting cable to SATA/NVMe or NVMe M.2 boot adapter

1. ① Tilt the connector at an angle of 20 degrees or lower, and insert it until its bottom surface reaches the ramp.
  2. ② Press the connector down flat.
  3. ③ Tighten the screw on the signal cable.
  4. ④ Connect the power cable.
- Step 6. If applicable, connect the flash power module to an adapter with the extension cable that comes with the flash power module. See [“Flash power module cable routing”](#) on page 384 for more information on the internal cable routing.

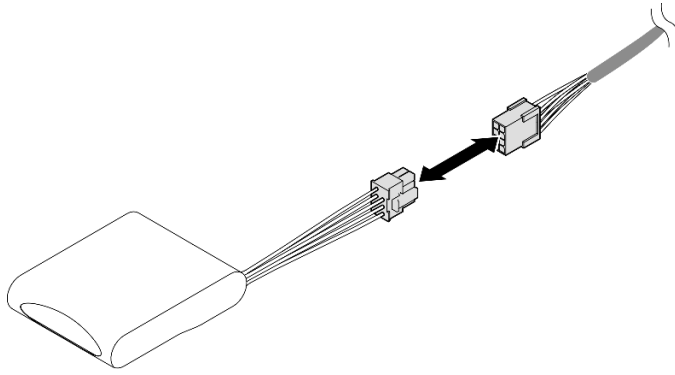


Figure 43. Connecting cable to flash power module

## After you finish

1. Reinstall all the PCIe risers. See “[Install the PCIe riser](#)” on page 147.
2. Reinstall the crossbar. See “[Install the crossbar](#)” on page 71.
3. Reinstall the rear top cover. See “[Install the rear top cover](#)” on page 237.
4. Reinstall the front top cover. See “[Install the front top cover](#)” on page 239.
5. Complete the parts replacement. See “[Complete the parts replacement](#)” on page 242.

## Demo video

[Watch the procedure on YouTube](#)

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## CMOS battery (CR2032) replacement

Follow the instructions in this section to remove or install the CMOS battery.

### Remove the CMOS battery (CR2032)

Follow the instructions in this section to remove the CMOS battery.

### About this task

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 CMOS battery must be handled correctly to avoid possible danger. If you replace the CMOS battery, you must adhere to local ordinances or regulations for battery disposal.
- 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 CMOS battery, you must reconfigure the server and reset the system date and time.

## 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 of 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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

## Procedure

- Step 1. Remove the front top cover. See [“Remove the front top cover”](#) on page 234.
- Step 2. Locate the CMOS battery on the system board assembly.

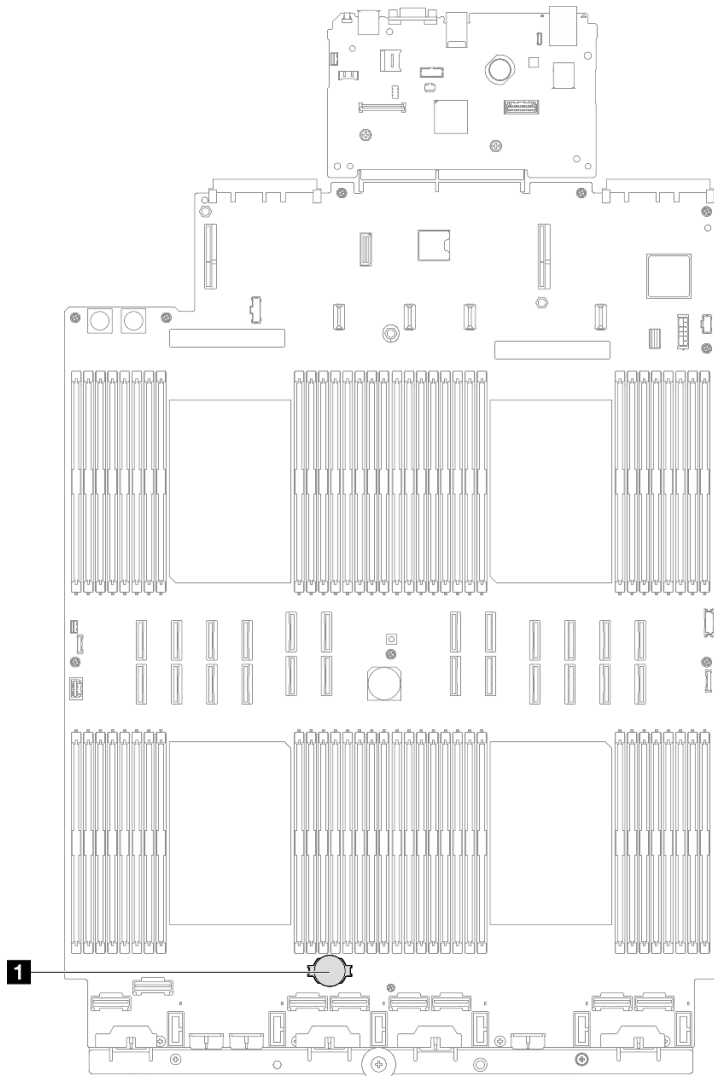


Figure 44. CMOS battery location

- Step 3. Open the battery clip as shown and carefully take the CMOS battery out of the socket.

### Attention:

- Failing to remove the CMOS battery properly might damage the socket on the system board assembly. Any damage to the socket might require replacing the system board assembly.
- Do not tilt or push the CMOS battery by using excessive force.

**Note:** Before you remove or install the CMOS battery from or into the socket, differentiate between the positive and negative ends.

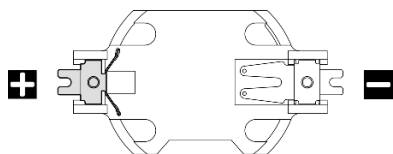


Figure 45. CMOS battery positive and negative ends

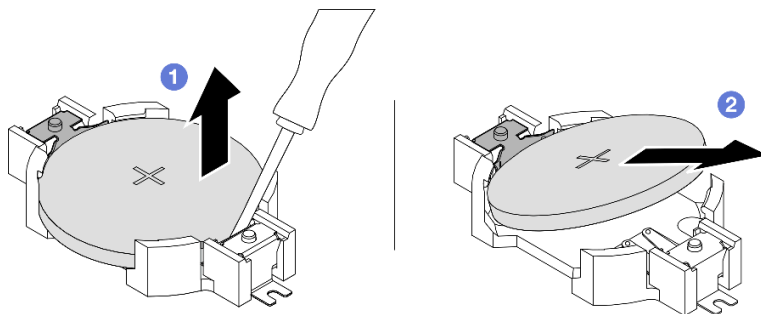


Figure 46. CMOS battery removal

- a. 1 From the negative end, lever the CMOS battery from the socket with a slotted screwdriver.
- b. 2 Remove the CMOS battery.

## After you finish

1. Install a replacement unit. See [“Install the CMOS battery \(CR2032\)”](#) on page 65.
2. Dispose of the CMOS battery as required by local ordinances or regulations.

## Demo video

[Watch the procedure on YouTube](#)

## Install the CMOS battery (CR2032)

Follow the instructions in this section to install the CMOS battery.

### 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 you replace the CMOS battery, you must reconfigure the server and reset the system date and time.
- To avoid possible danger, read and follow the following safety statement.

### 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 of 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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

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

#### **Procedure**

Step 1. Locate the CMOS battery on the system board assembly.



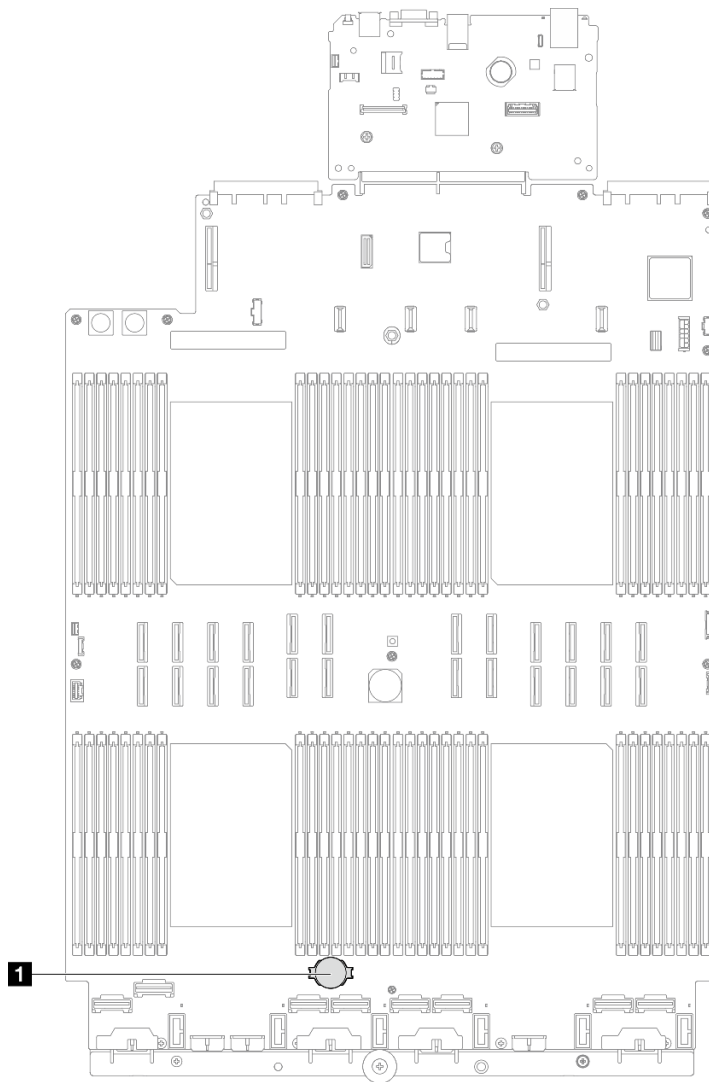


Figure 47. CMOS battery location

- Step 2. Touch the static-protective package that contains the new part to any unpainted surface on the outside of the server; then, take the new part out of the package and place it on a static-protective surface.
- Step 3. Install the CMOS battery. Ensure that the CMOS battery is seated in place.

**Note:** Before you install the battery into the socket, make sure that the positive side faces upward.

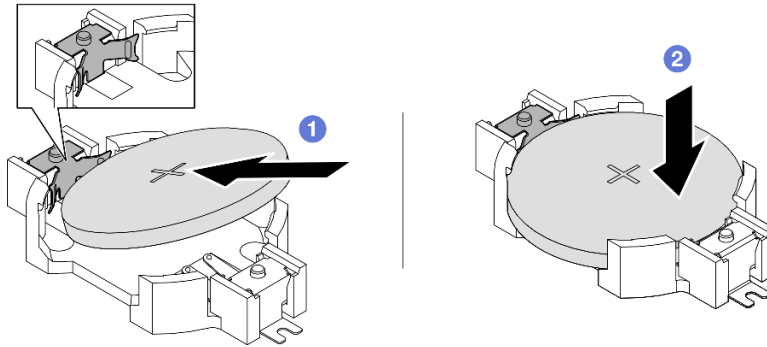


Figure 48. CMOS battery installation

- a. ❶ Tilt the battery and insert it to the positive end on the socket, and make sure that the battery goes tight to the metal clip.
- b. ❷ Press the battery down until it clicks into the socket.

## After you finish

1. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 242](#).
3. Use the Setup utility to set the date, time, and any passwords.

**Note:** After you install the CMOS battery, you must reconfigure the server and reset the system date and time.

## Demo video

[Watch the procedure on YouTube](#)

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## Crossbar replacement

Follow the instructions in this section to remove and install a crossbar.

### Remove the crossbar

Follow the instructions in this section to remove the crossbar.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

**Note:** The illustrations show how to remove a crossbar from a chassis with half-length PCIe risers. The removal procedure is similar for full-length PCIe risers.

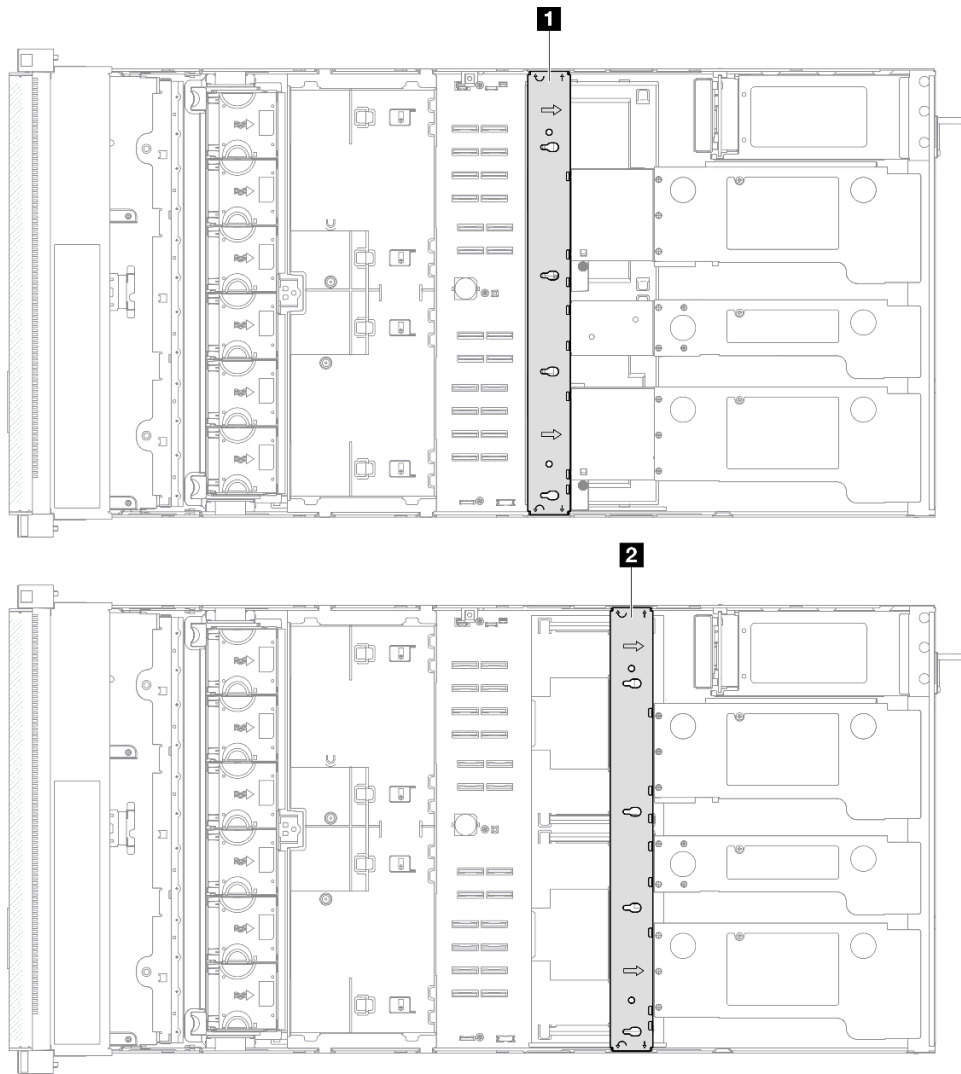


Figure 49. Crossbar location

<b>1</b> Crossbar location for full-length PCIe risers	<b>2</b> Crossbar location for half-length PCIe risers
--	--

## Procedure

- Step 1. Make preparation for the task.
  - a. Remove the front top cover. See [“Remove the front top cover”](#) on page 234.
  - b. Remove the rear top cover. See [“Remove the rear top cover”](#) on page 236.
- Step 2. Disconnect all external cables from the PCIe adapters.
- Step 3. Disengage PCIe riser 1 from the crossbar.

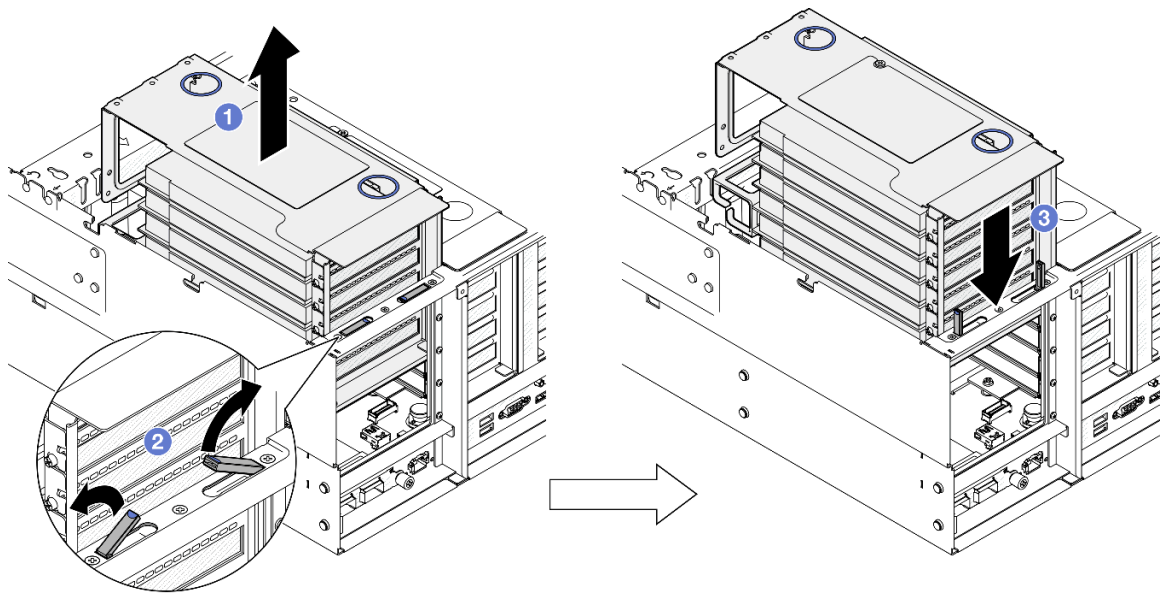


Figure 50. Disengaging PCIe riser

- a. ① Slightly lift the PCIe riser out of the chassis.
- b. ② Lift the kickstand(s) outward.
- c. ③ Place the PCIe riser on top of the kickstand(s).

Step 4. Repeat [Step 3 on page 69](#) to disengage the other two PCIe risers.

Step 5. Remove the crossbar.

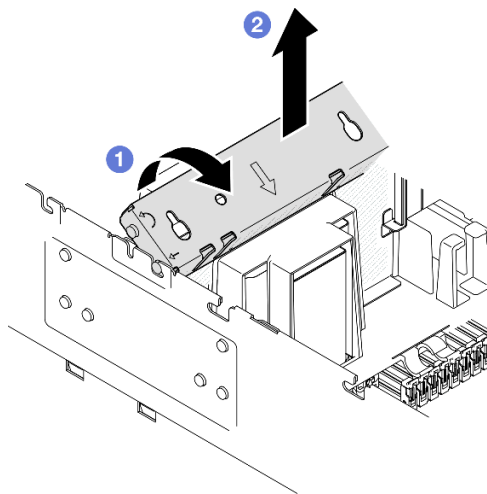


Figure 51. Removing crossbar

- a. ① Rotate the crossbar towards the rear of the server.
- b. ② Grasp and lift the crossbar to remove it from the chassis.

## After you finish

1. Install a replacement unit. See [“Install the crossbar” on page 71](#).

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 crossbar

Follow the instructions in this section to install the crossbar.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

**Note:** The illustrations show how to install a crossbar into a chassis with half-length PCIe risers. The installation procedure is similar for full-length PCIe risers.

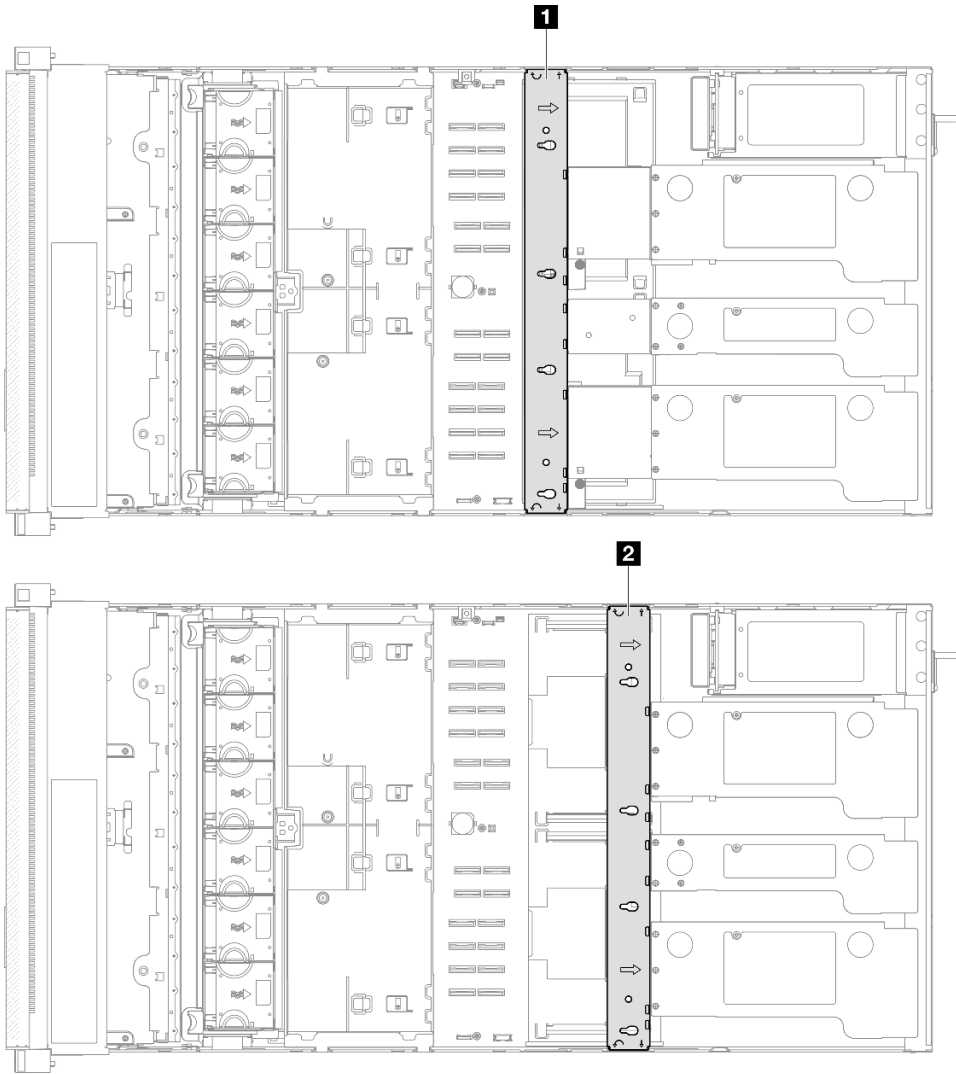


Figure 52. Crossbar location

<b>1</b> Crossbar location for full-length PCIe risers	<b>2</b> Crossbar location for half-length PCIe risers
--	--

## Procedure

Step 1. Install the crossbar.

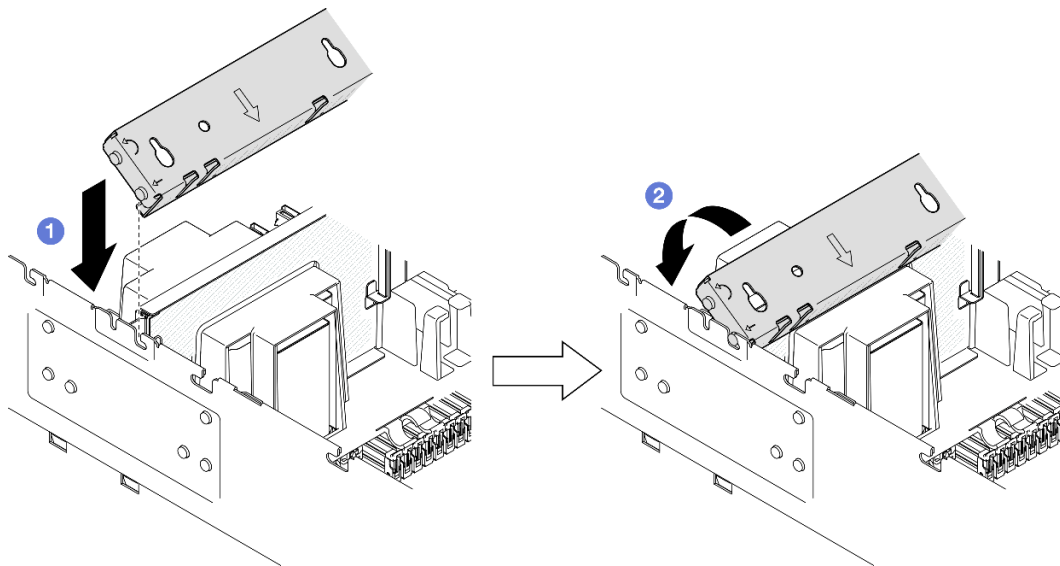


Figure 53. Installing crossbar

- a. ① Align the rear guide pins on the crossbar and install it into the openings on the sides of the chassis.
- b. ② Rotate the crossbar towards the front of the server to secure it in place.

Step 2. Secure PCIe riser 1 to the crossbar.

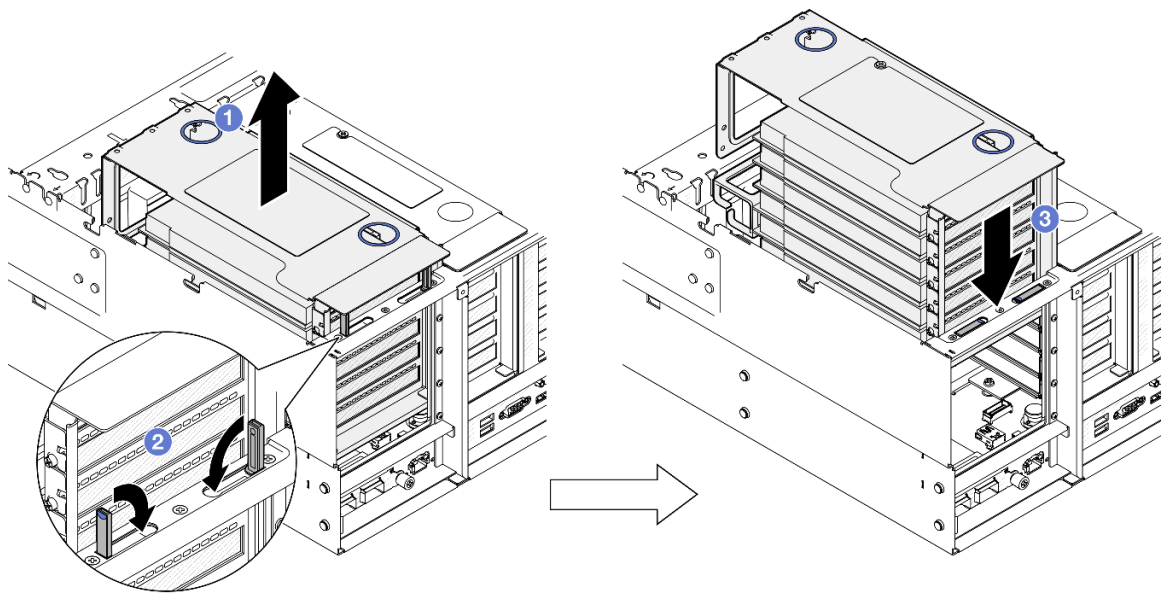


Figure 54. Securing PCIe riser

- a. ① Slightly lift the PCIe riser.
- b. ② Close the kickstand(s).
- c. ③ Push the PCIe riser into the chassis until it is fully seated.

Step 3. Repeat [Step 2 on page 73](#) to secure the other two PCIe risers.

Step 4. Connect all external cables to the PCIe adapters.

## After you finish

1. Reinstall the rear top cover. See [“Install the rear top cover” on page 237](#).
2. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 242](#).

### Demo video

[Watch the procedure on YouTube](#)

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## Drive replacement

Follow the instructions in this section to install or remove drives.

### Remove a 2.5-inch hot-swap drive

Follow the instructions in this section to remove a 2.5-inch hot-swap drive.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Prevent exposure to static electricity, which might lead to system halt and loss of data, by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.
- To make sure that there is adequate system cooling, do not operate the server for more than two minutes without either a drive or a filler installed in each bay.
- If one or more NVMe solid-state drives are to be removed, it is recommended to disable them beforehand via the operating system.
- Before you remove or make changes to drives, drive controllers (including controllers that are integrated on the system board), drive backplanes or drive cables, back up all important data that is stored on the drives.
- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

**Note:** Make sure you have the drive bay fillers available if some drive bays will be left empty after the removal.

### Procedure

Step 1. Remove the 2.5-inch drive.



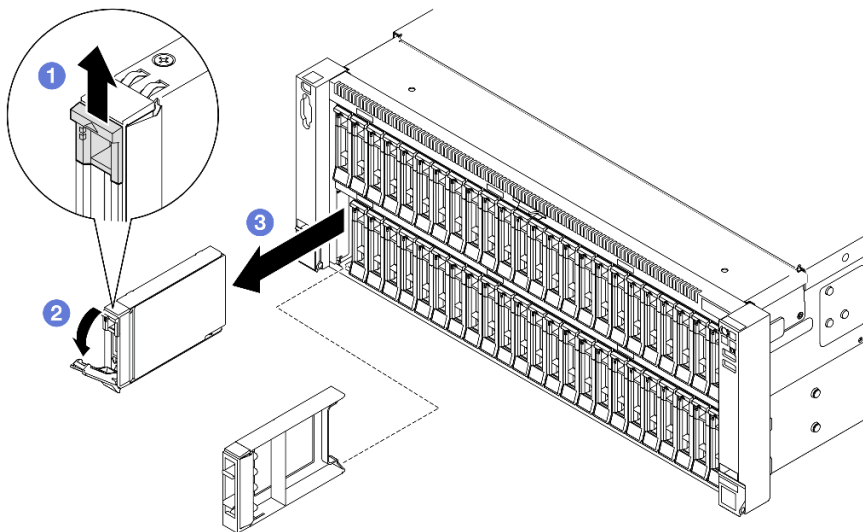


Figure 55. Removing a 2.5-inch drive

- a. ① Slide the release latch to open the tray handle.
- b. ② The tray handle opens automatically.
- c. ③ Grasp and pull the handle to remove the drive from the drive bay.

## After you finish

1. Install a replacement unit or filler. See [“Install a 2.5-inch hot-swap drive” on page 75](#).
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 2.5-inch hot-swap drive

Follow the instructions in this section to install a 2.5-inch hot-swap drive.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Prevent exposure to static electricity, which might lead to system halt and loss of data, by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.
- To make sure that there is adequate system cooling, do not operate the server for more than two minutes without either a drive or a drive bay filler installed in each bay.
- Before you make changes to drives, drive controllers (including controllers that are integrated on the system board assembly), drive backplanes, or drive cables, back up all important data that is stored on drives.

- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

**Note:** For a complete list of supported optional device for this server, see <https://serverproven.lenovo.com>.

**Firmware and driver download:** You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

## Procedure

- Step 1. Touch the static-protective package that contains the new part to any unpainted surface on the outside of the server; then, take the new part out of the package and place it on a static-protective surface.
- Step 2. If a drive filler has been installed in the drive bay, remove it.
- Step 3. Install the 2.5-inch drive.

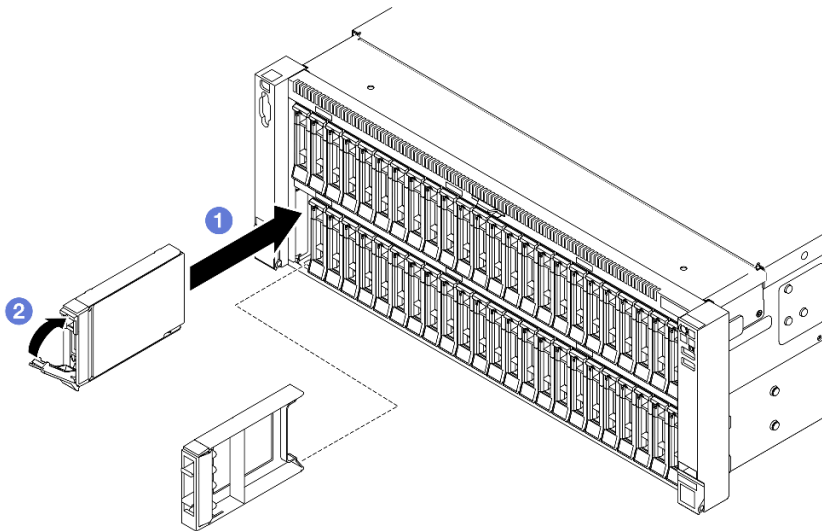


Figure 56. Installing a 2.5-inch drive

- a. ① Ensure that the tray handle is in the open position. Slide the drive into the drive bay, and push it until it stops.
- b. ② Rotate the handle back to the locked position.

## After you finish

1. 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.

2. If any of the drive bays are left empty, fill them with drive bay fillers.
3. If you have installed 2.5-inch drive backplane with U.3 NVMe drives for Trimode. Enable U.3 x1 mode for the selected drive slots on the backplane through the XCC web GUI. See [“U.3 NVMe drive can be detected in NVMe connection, but cannot be detected in Tri-mode” on page 449](#).

## Demo video

[Watch the procedure on YouTube](#)

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## Drive backplane carrier assembly and drive backplane replacement

Follow the instructions in this section to install or remove the drive backplane carrier assembly and the drive backplanes.

### Remove the drive backplane carrier assembly

Follow the instructions in this section to remove the drive backplane carrier assembly.

#### About this task

##### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

#### Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover” on page 234](#).
- b. Remove the front air baffle. See [“Remove the front air baffle” on page 46](#).
- c. Remove all fan modules. See [“Remove a fan module” on page 84](#).
- d. Remove the fan cage. See [“Remove the fan cage” on page 86](#).
- e. Remove all the 2.5-inch hot-swap drives and drive fillers. See [“Remove a 2.5-inch hot-swap drive” on page 74](#).
- f. Record the cable connections first; then, disconnect the power and signal cables from all the backplanes. See [“2.5-inch drive backplane cable routing” on page 254](#) for more information on the internal cable routing.

Step 2. Remove the drive backplane carrier assembly.

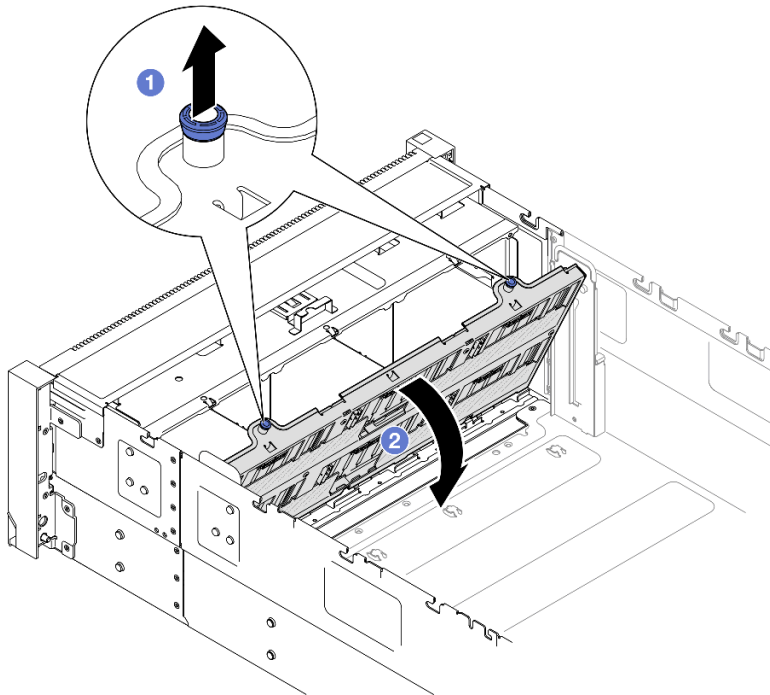


Figure 57. Removing drive backplane carrier assembly

- a. ① Pull the plunger up to disengage the backplane carrier.
- b. ② Pivot the top of the backplane carrier away to remove it from the server.

## After you finish

1. Install a replacement unit. See [“Install the drive backplane carrier assembly” on page 83](#).
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](#)

## Remove a 2.5-inch drive backplane

Follow the instructions in this section to remove a 2.5-inch drive backplane.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.

- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

## Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover” on page 234](#).
- b. Remove the front air baffle. See [“Remove the front air baffle” on page 46](#).
- c. Remove all fan modules. See [“Remove a fan module” on page 84](#).
- d. Remove the fan cage. See [“Remove the fan cage” on page 86](#).
- e. Remove all the 2.5-inch hot-swap drives and drive fillers. See [“Remove a 2.5-inch hot-swap drive” on page 74](#).
- f. Record the cable connections first; then, disconnect the power and signal cables from all the backplanes. See [“2.5-inch drive backplane cable routing” on page 254](#) for more information on the internal cable routing.
- g. Remove the drive backplane carrier. See [“Remove the drive backplane carrier assembly” on page 77](#).

Step 2. Remove the two screws that secure the backplane; then, remove the backplane from the drive backplane carrier.

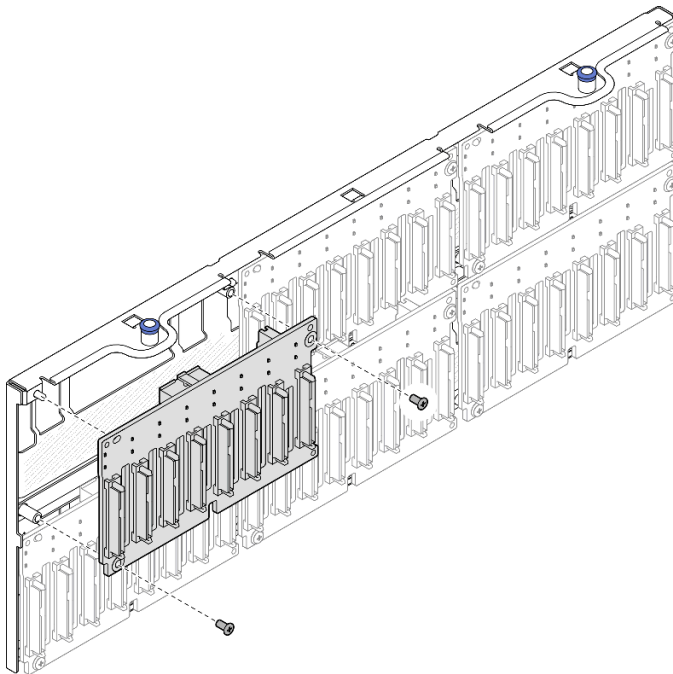


Figure 58. Removing backplane from carrier

Step 3. If necessary, store the two screws back in the backplane carrier.

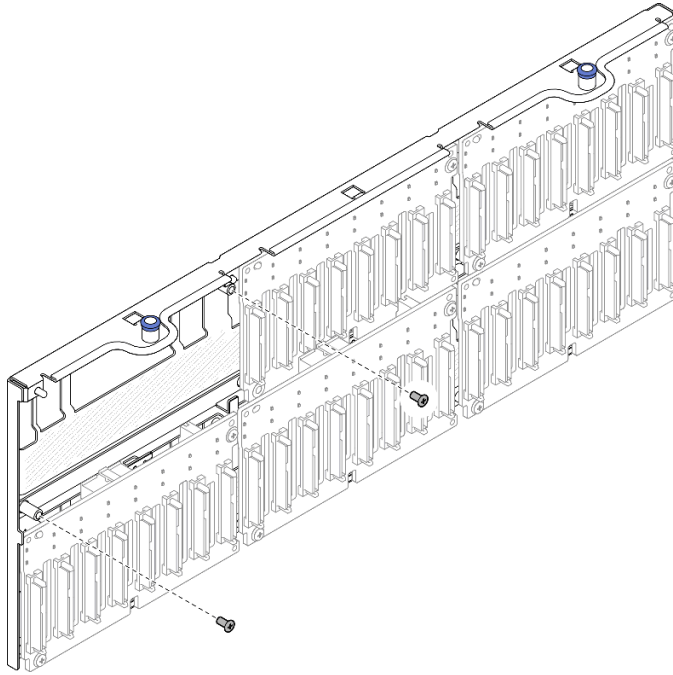


Figure 59. Spare screws on backplane carrier

## After you finish

1. Install a replacement unit or fill the corresponding drive bays with drive fillers. See [“Install a 2.5-inch drive backplane” 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 a 2.5-inch drive backplane

Follow instruction in this section to install a 2.5-inch drive backplane.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

The server supports up to six drive backplanes with the following corresponding drive bay numbers.

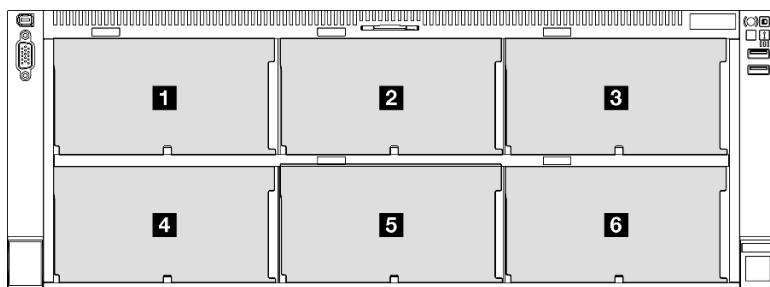


Figure 60. Drive backplane numbering

**Note:** When ThinkSystem 256GB TruDDR5 4800MHz (8Rx4) 3DS RDIMM v1 is installed in the system, the maximum number of supported drives is twenty-four drives.

Table 10. Drive backplanes and corresponding drive bays

Drive backplane	Drive bay	Supported drive backplanes	Supported drives
<b>1</b> Backplane 1	0 to 7	<ul style="list-style-type: none"> <li>2.5-inch AnyBay 8-bay drive backplane</li> <li>2.5-inch SAS/SATA 8-bay drive backplane</li> </ul>	<ul style="list-style-type: none"> <li>2.5-inch SAS/SATA/NVMe drives</li> <li>2.5-inch SAS/SATA drives</li> </ul>
<b>2</b> Backplane 2	8 to 15		
<b>3</b> Backplane 3	16 to 23		
<b>4</b> Backplane 4	24 to 31	<ul style="list-style-type: none"> <li>2.5-inch AnyBay 8-bay drive backplane</li> <li>2.5-inch SAS/SATA 8-bay drive backplane</li> </ul>	<ul style="list-style-type: none"> <li>2.5-inch SAS/SATA drives</li> </ul>
<b>5</b> Backplane 5	32 to 39		
<b>6</b> Backplane 6	40 to 47		

**Note:** 2.5-inch AnyBay 8-bay drive backplanes support 2.5-inch SAS/SATA/NVMe drives.

Table 11. Drive backplanes installation order

Installation priority	Backplane type	Backplane placement priorities
1	2.5-inch AnyBay 8-bay drive backplane	1, 3, 2, 4, 5, 6
2	2.5-inch SAS/SATA 8-bay drive backplane	1, 2, 3, 4, 5, 6

**Firmware and driver download:** You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

## Procedure

Step 1. If necessary, remove the two screws from the backplane carrier.

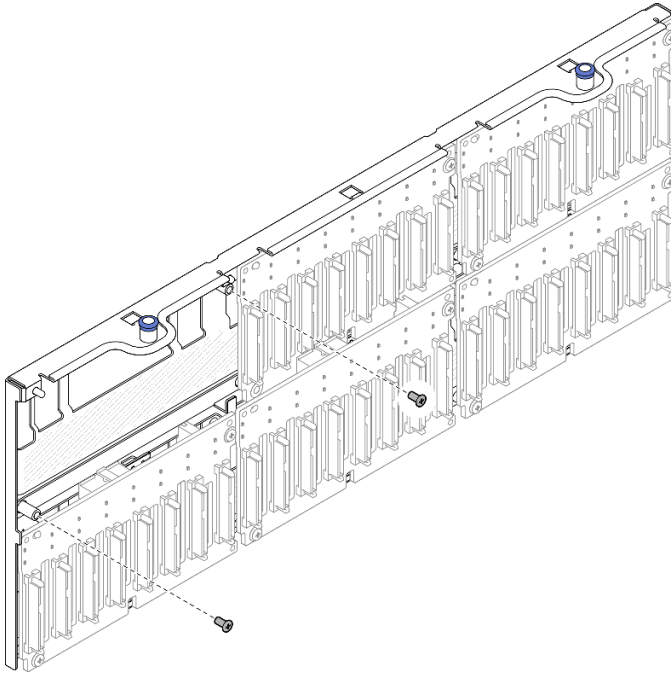


Figure 61. Spare screws on backplane carrier

Step 2. Install backplane to carrier and secure with two screws.

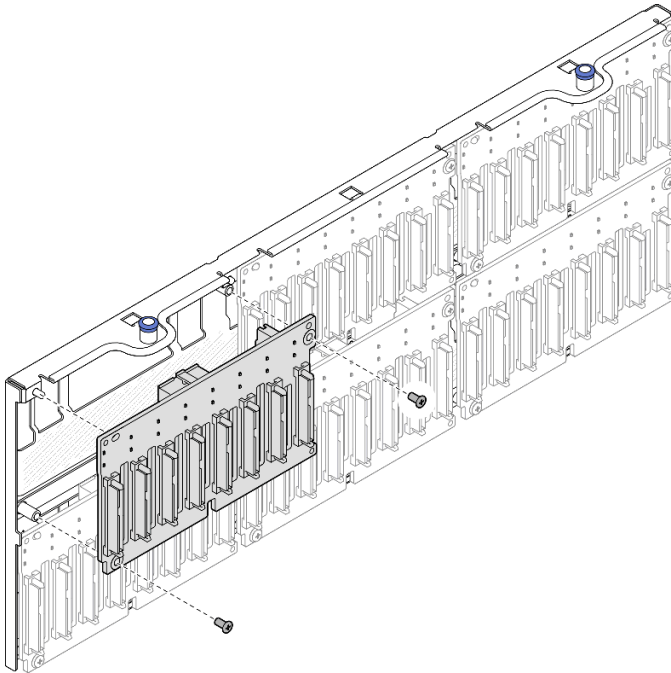


Figure 62. Installing backplane to carrier

## After you finish

1. Reinstall the drive backplane carrier. See [“Install the drive backplane carrier assembly”](#) on page 83.



2. Connect the power and signal cables to all the backplanes. See [“2.5-inch drive backplane cable routing” on page 254](#) for more information on the internal cable routing.
3. Reinstall all the 2.5-inch hot-swap drive and drive fillers. See [“Install a 2.5-inch hot-swap drive” on page 75](#).
4. Reinstall the fan cage. See [“Install the fan cage” on page 88](#).
5. Reinstall all fan modules. See [“Install a fan module” on page 90](#).
6. Reinstall the front air baffle. See [“Install the front air baffle” on page 49](#).
7. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
8. Complete the parts replacement. See [“Complete the parts replacement” on page 242](#).
9. If you have installed 2.5-inch drive backplane with U.3 NVMe drives for Trimode. Enable U.3 x1 mode for the selected drive slots on the backplane through the XCC web GUI. See [“U.3 NVMe drive can be detected in NVMe connection, but cannot be detected in Tri-mode” on page 449](#).

## Demo video

[Watch the procedure on YouTube](#)

## Install the drive backplane carrier assembly

Follow instruction in this section to install the drive backplane carrier assembly.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

### Procedure

Step 1. Install the drive backplane carrier assembly.

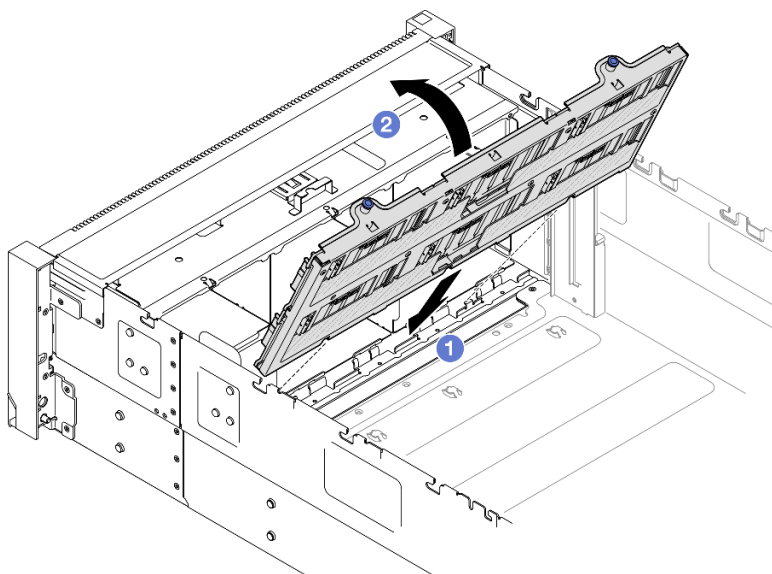


Figure 63. Installing drive backplane carrier assembly

- a. ① Align the bottom of the carrier to the slots in the server.
- b. ② Pivot the top of the carrier until it clicks into place.

## After you finish

1. Connect the power and signal cables to all the backplanes. See [“2.5-inch drive backplane cable routing” on page 254](#) for more information on the internal cable routing.
2. Reinstall all the 2.5-inch hot-swap drive and drive fillers. See [“Install a 2.5-inch hot-swap drive” on page 75](#).
3. Reinstall the fan cage. See [“Install the fan cage” on page 88](#).
4. Reinstall all fan modules. See [“Install a fan module” on page 90](#).
5. Reinstall the front air baffle. See [“Install the front air baffle” on page 49](#).
6. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
7. Complete the parts replacement. See [“Complete the parts replacement” on page 242](#).

## Demo video

[Watch the procedure on YouTube](#)

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## Fan and fan cage replacement

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

### Remove a fan module

Follow the instructions in this section to remove a fan module.

### 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.

**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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

**Procedure**

- Step 1. Remove the front top cover. See [“Remove the front top cover” on page 234](#).
- Step 2. Remove the fan module.

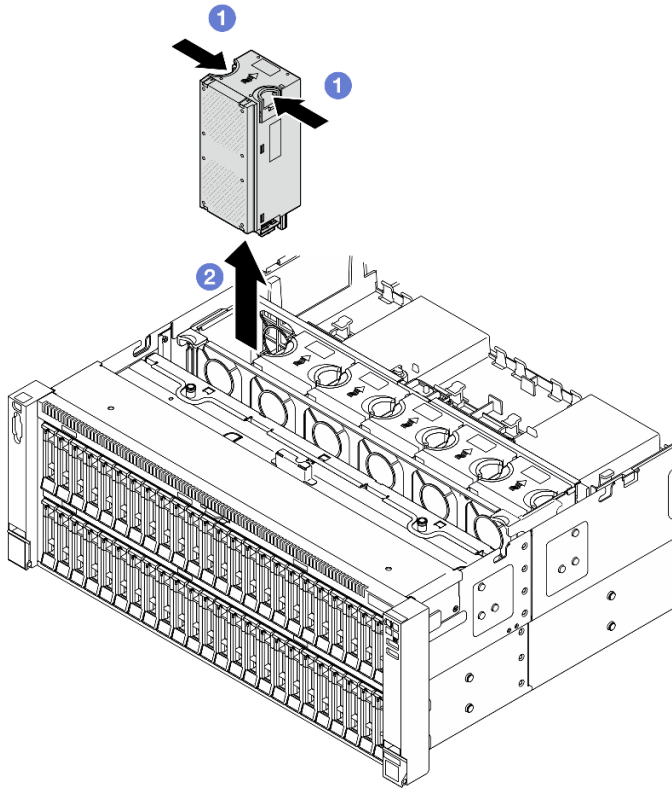


Figure 64. Removing a fan module

- a. ① Pinch and hold on the orange touch points on the top of the fan module.
- b. ② Lift the fan module to remove it.

## After you finish

1. Install a replacement unit. See [“Install a fan module” on page 90](#). Make sure the replacement unit is of the exact same type as the removed one.

**Attention:** With power on, complete the replacement within 30 seconds to ensure proper operation.

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](#)

## Remove the fan cage

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

## 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.

**S017**



**CAUTION:**

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

**Attention:**

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

**Procedure**

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover” on page 234](#).
- b. Remove all fan modules. See [“Remove a fan module” on page 84](#).

Step 2. Remove the fan cage.

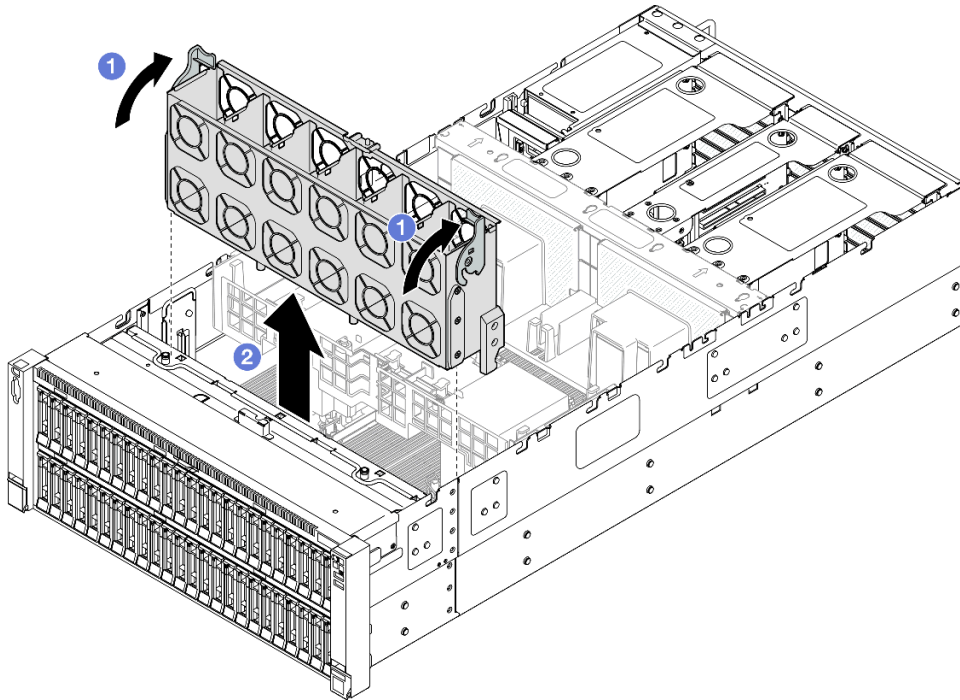


Figure 65. Removing the fan cage

- a. ① Lift and rotate the fan cage release latches to disengage the fan cage from the server.
- b. ② Lift the fan cage to remove it.

## After you finish

1. Install a replacement unit. See [“Install the fan cage” on page 88](#).
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 fan cage

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

## 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.

### S017



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

#### Attention:

- Read [“Installation Guidelines”](#) on page 1 and [“Safety inspection checklist”](#) on page 2 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server”](#) on page 17.
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails”](#) on page 17.

Step 1. Install the fan cage.

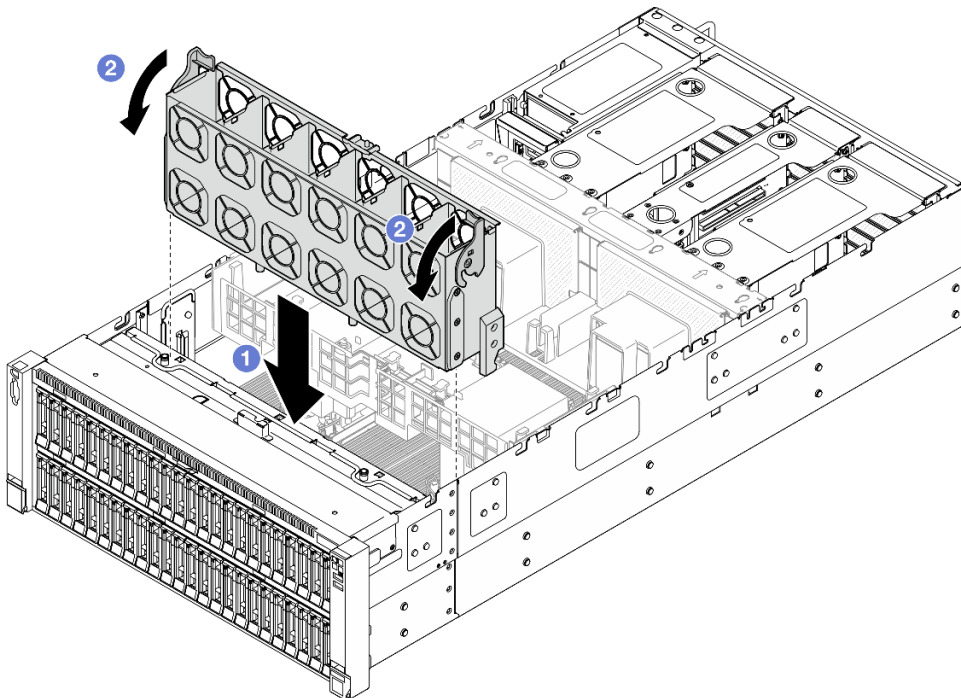


Figure 66. Installing the fan cage

- 1 Align the fan cage to the guides on both sides of the server; then, lower it into the server.
- 2 Rotate the fan cage release latches down until they stop.

## After you finish

1. Reinstall all fan modules. See [“Install a fan module”](#) on page 90.
2. Reinstall the front top cover. See [“Install the front top cover”](#) on page 239.
3. Complete the parts replacement. See [“Complete the parts replacement”](#) on page 242.

### Demo video

[Watch the procedure on YouTube](#)

## Install a fan module

Follow the instructions in this section to install a hot-swap fan.

### 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.

#### 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 [“Installation Guidelines”](#) on page 1 and [“Safety inspection checklist”](#) on page 2 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server”](#) on page 17.



- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

## Procedure

- Step 1. Align the fan module over the fan slot in the fan cage assembly, and insert the fan module into the fan cage assembly until it clicks into place.

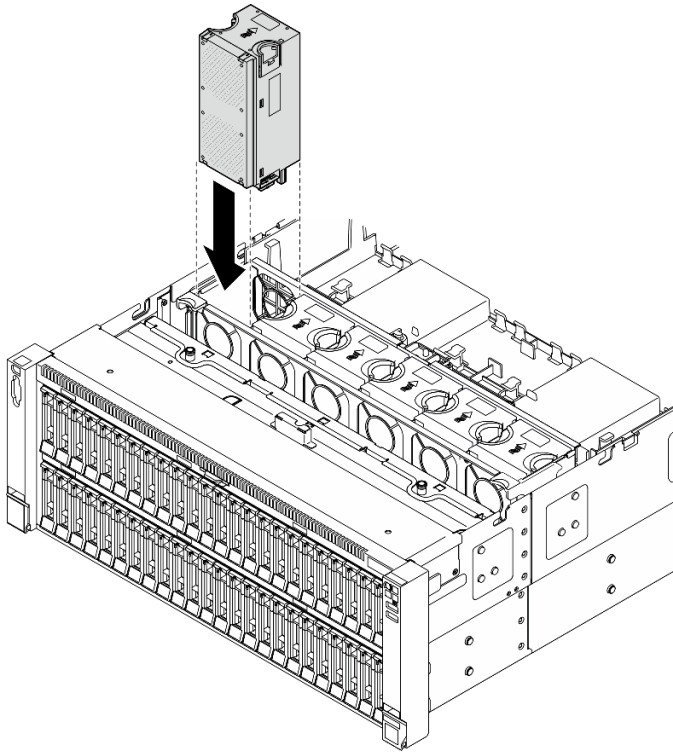


Figure 67. Installing a fan module

### Notes:

- Make sure to replace a defective fan module with another unit of the exact same type.
- Do not mix single and dual rotor fan modules in the same unit of server.

**Attention:** With power on, complete the replacement within 30 seconds to ensure proper operation.

## After you finish

1. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 242](#).

## Demo video

[Watch the procedure on YouTube](#)

---

## Flash power module replacement

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

### Remove a flash power module

Follow the instructions in this section to remove a 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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

#### Procedure

Step 1. Remove the front top cover. See [“Remove the front top cover” on page 234](#).

Step 2. Disconnect the cable of the RAID flash power module from the extension cable.

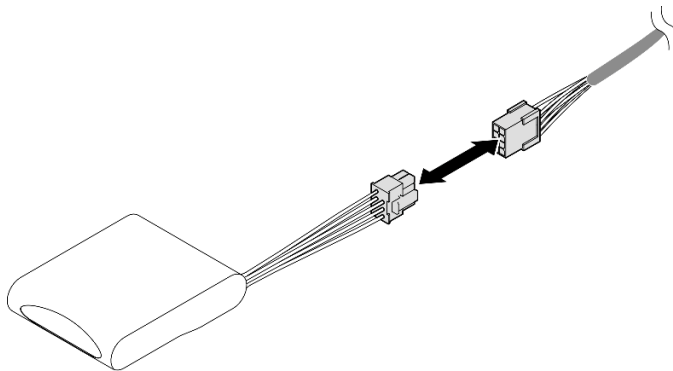


Figure 68. Disconnecting cable from flash power module

Step 3. Remove the flash power module.

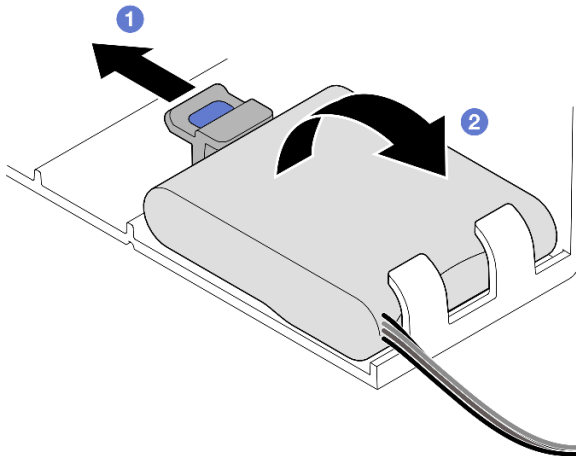


Figure 69. Flash power module removal

- a. ① Gently pivot the retaining clip as shown.
- b. ② Lift the flash power module up and remove it from the holder.

## After you finish

1. Install a replacement unit. See [“Install a flash power module” on page 93](#).
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 flash power module

Follow the instructions in this section to install a 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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.

- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

## Procedure

Step 1. Touch the static-protective package that contains the new part to any unpainted surface on the outside of the server; then, take the new part out of the package and place it on a static-protective surface.

Step 2. Install the flash power module.

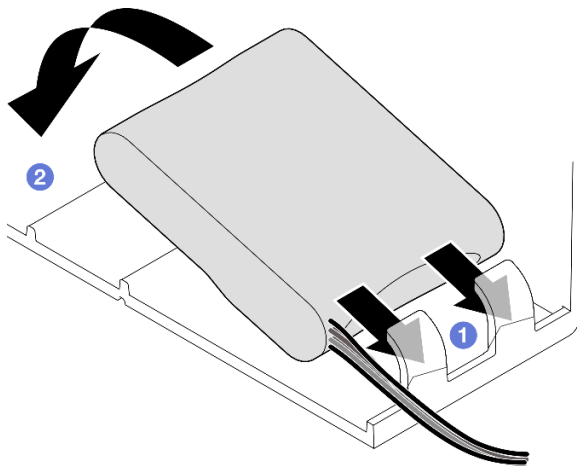


Figure 70. Flash power module installation

- 1 Note the orientation of the flash power module; then, gently insert the flash power module into the retaining clip at one side as shown.
- 2 Press the flash power module down on the other side until it snaps into place.

Step 3. Connect the cable of the RAID flash power module to the extension cable.

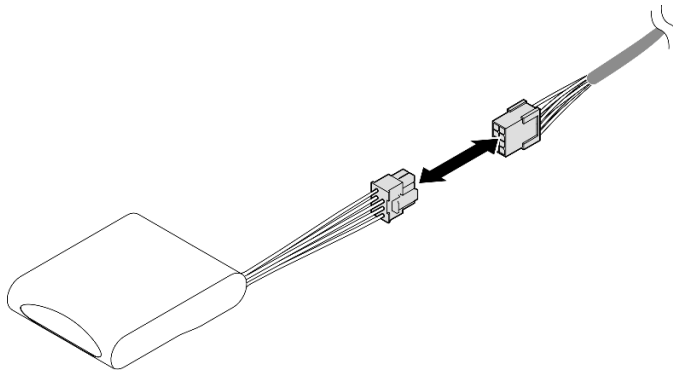


Figure 71. Connecting cable to flash power module

Step 4. Connect the flash power module to a RAID adapter with the extension cable. See [“Flash power module cable routing” on page 384](#) for more information on the internal cable routing.

## After you finish

1. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 242](#).

## Demo video

[Watch the procedure on YouTube](#)

---

## GPU adapter link bridge and double-wide GPU adapter replacement

Follow the instructions in this section to remove and install a GPU adapter link bridge and double-wide GPU adapter.

### Remove a GPU adapter link bridge

Follow the instructions in this section to remove a GPU adapter link bridge.

### 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.

**Important:** Make sure you have a suction cup available for properly removing the GPU adapter link bridge.

#### **Attention:**

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).
- Depending on the specific type, your GPU adapter might look slightly different from the illustrations in this section.
- Follow the additional instructions in any documentation that comes with your GPU adapter.

## Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover”](#) on page 234.
- b. Remove the rear top cover. See [“Remove the rear top cover”](#) on page 236.
- c. Remove the crossbar. See [“Remove the crossbar”](#) on page 68.
- d. Remove the PCIe riser where the GPU is installed. See [“Remove the PCIe riser”](#) on page 134.

Step 2. Remove the GPU adapter link bridge from the GPUs with a suction cup.

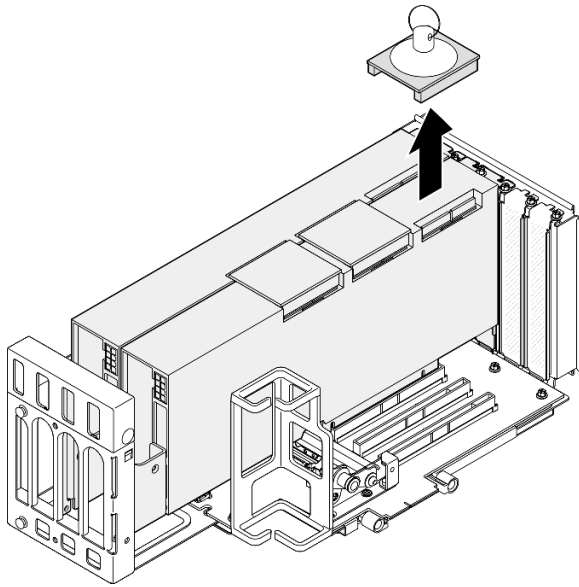


Figure 72. Removing the GPU adapter link bridge

- a. ① Press the suction cup against the GPU adapter link bridge until it adheres to the GPU adapter link bridge.
- b. ② Pull up the suction cup and remove the GPU adapter link bridge together with the suction cup from the GPUs.

Step 3. Repeat [Step 2 on page 96](#) to remove the other GPU adapter link bridges.

**Note:** Remove all GPU adapter link bridges from the GPUs.

## After you finish

1. If you are not installing a replacement unit, install a link connector cover onto the GPUs.

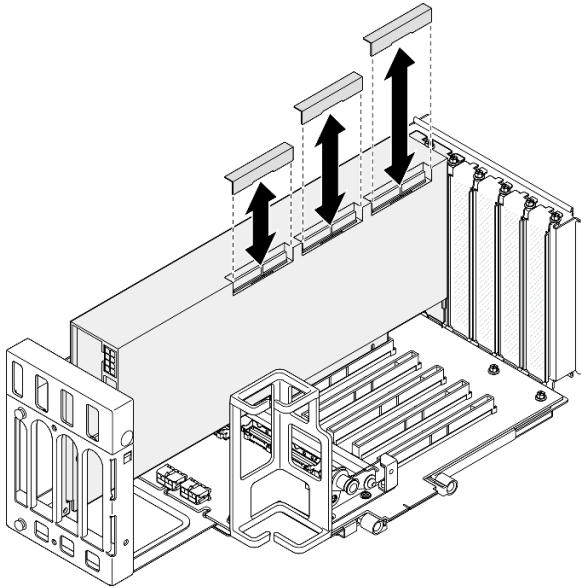


Figure 73. Installing the link connector cover to GPU

2. Install a replacement unit. See [“Install a GPU adapter link bridge” on page 106](#).
3. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

#### Demo video

[Watch the procedure on YouTube](#)

## Remove a double-wide GPU adapter

Follow the instructions in this section to remove a double-wide GPU 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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).

- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See “[Remove the server from rails](#)” on page 17.
- Depending on the specific type, your GPU adapter might look slightly different from the illustrations in this section.
- Follow the additional instructions in any documentation that comes with your GPU adapter.

#### Notes:

- For a list of the supported GPU adapters, see <https://serverproven.lenovo.com>.
- Ensure that you observe the installation rules and sequence order in “[PCIe riser and adapter installation rules and order](#)” on page 14.
- For instructions on how to remove and install a PCIe adapter or single-wide GPU, see “[PCIe riser and adapter replacement](#)” on page 134.
- To prevent potential thermal issues, change the **Misc** setting in the BIOS from **Option3** (default value) to **Option1** if the following two conditions are met:
  - The server is equipped with a GPU adapter.
  - The UEFI firmware version is RSE110I or later.

For the method of changing the **Misc** setting, see <https://support.lenovo.com/us/en/solutions/TT1832>.

#### Procedure

Step 1. Make preparation for the task.

- Remove the front top cover. See “[Remove the front top cover](#)” on page 234.
- Remove the rear top cover. See “[Remove the rear top cover](#)” on page 236.
- Remove the crossbar. See “[Remove the crossbar](#)” on page 68.
- Remove the PCIe riser where the GPU is installed. See “[Remove the PCIe riser](#)” on page 134.
- If a GPU adapter link bridge is installed, remove it. See “[Remove a GPU adapter link bridge](#)” on page 95.

Step 2. Remove the riser extender cover.

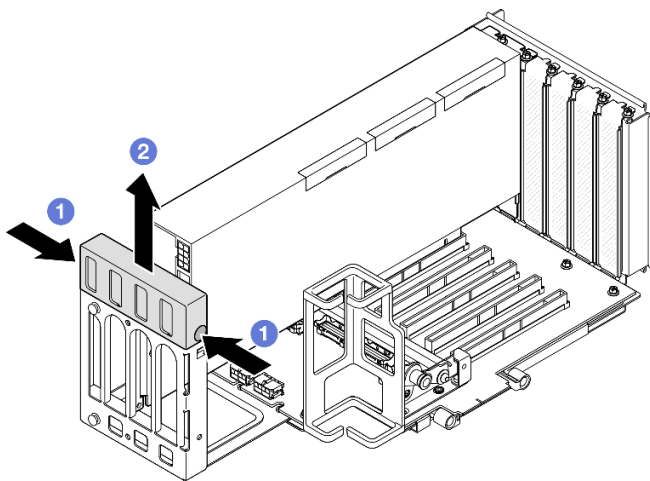


Figure 74. Removing riser extender cover



- a. ① Press both ends of the riser extender cover.
- b. ② Lift the riser extender cover out from the PCIe riser.

Step 3. Disconnect the power cable from the GPU adapter and PCIe riser.

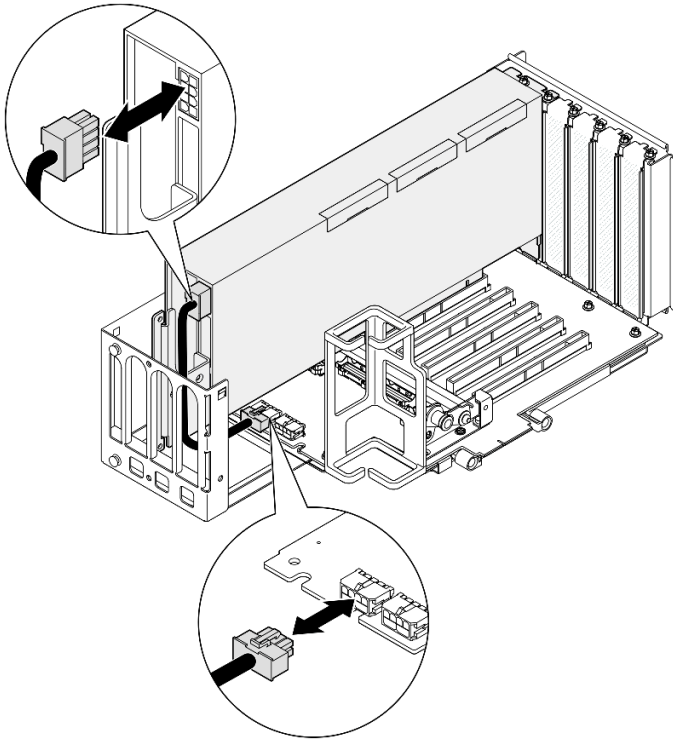


Figure 75. Disconnecting power cable from GPU adapter

Step 4. Remove the GPU adapter.

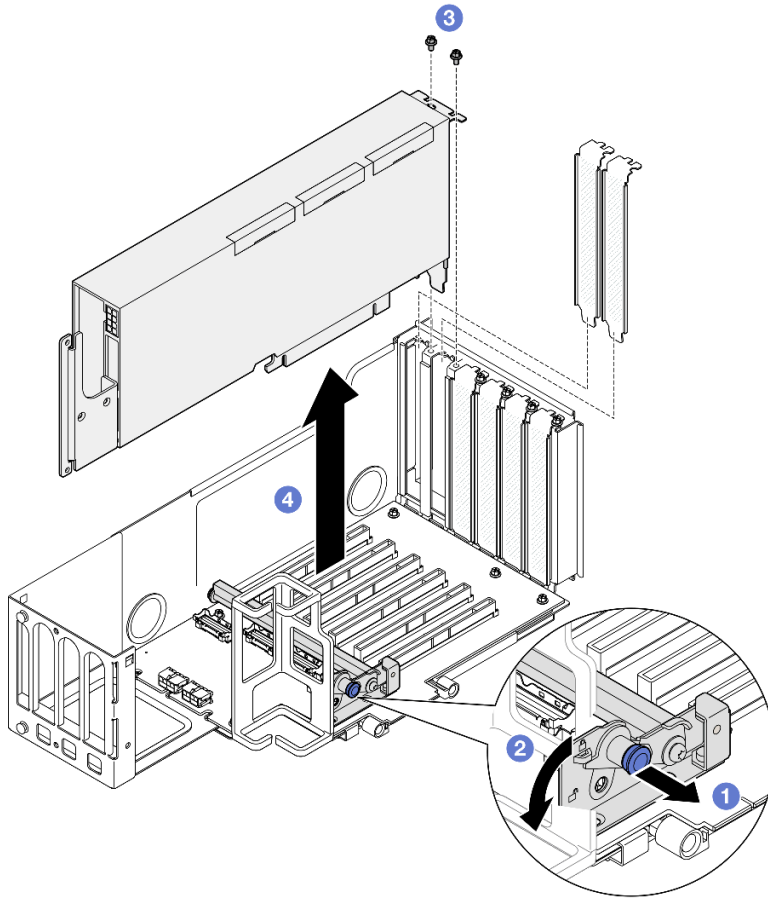


Figure 76. Removing GPU adapter from PCIe riser

- a. ① Pull the plunger that secures the PCIe adapter retainer.
- b. ② Open the PCIe adapter retainer to the unlocked position.
- c. ③ Remove the screws that secure the GPU adapter to the PCIe riser.
- d. ④ Grasp the GPU adapter by its edges and carefully pull it out of the PCIe slot.

Step 5. If necessary, install the riser extender cover.

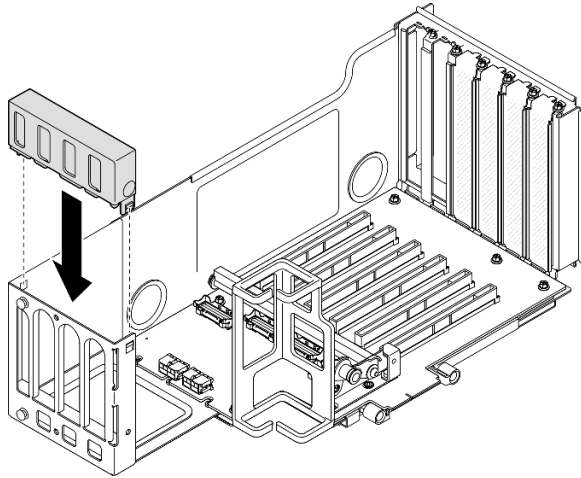


Figure 77. Installing riser extender cover

## After you finish

1. Install a replacement unit. See [“Install a double-wide GPU adapter” on page 101](#).
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 double-wide GPU adapter

Follow the instructions in this section to install a double-wide GPU 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.

## About this task

### **Attention:**

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).

- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See “[Remove the server from rails](#)” on page 17.
- Depending on the specific type, your GPU adapter might look slightly different from the illustrations in this section.
- Follow the additional instructions in any documentation that comes with your GPU adapter.

#### Notes:

- For a list of the supported GPU adapters, see <https://serverproven.lenovo.com>.
- Ensure that you observe the installation rules and sequence order in “[PCIe riser and adapter installation rules and order](#)” on page 14.
- For instructions on how to remove and install a PCIe adapter or single-wide GPU, see “[PCIe riser and adapter replacement](#)” on page 134.
- To prevent potential thermal issues, change the **Misc** setting in the BIOS from **Option3** (default value) to **Option1** if the following two conditions are met:
  - The server is equipped with a GPU adapter.
  - The UEFI firmware version is RSE110I or later.

For the method of changing the **Misc** setting, see <https://support.lenovo.com/us/en/solutions/TT1832>.

**Firmware and driver download:** You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

#### Procedure

- Step 1. If a filler has been installed to the slot on the PCIe riser, remove the screw that secures it and remove the filler.
- Step 2. If a riser extender cover is installed, remove it.

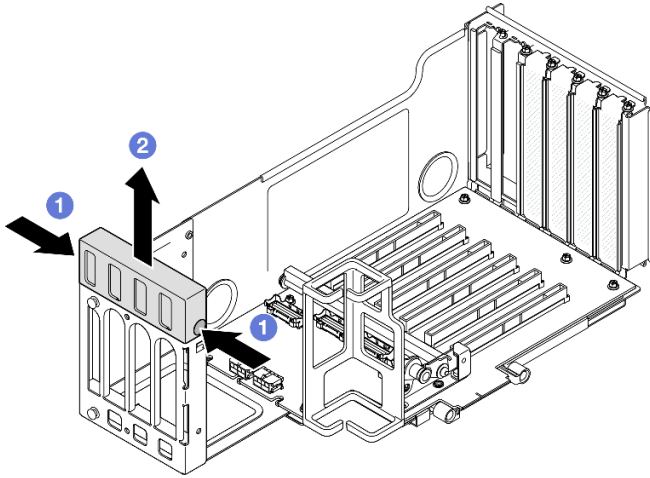


Figure 78. Removing riser extender cover

- a. ① Press both ends of the riser extender cover.
- b. ② Lift the riser extender cover out from the PCIe riser.

Step 3. Install the GPU adapter.

**Note:** Ensure that you observe the installation rules and sequence order in [“PCIe riser and adapter installation rules and order”](#) on page 14.

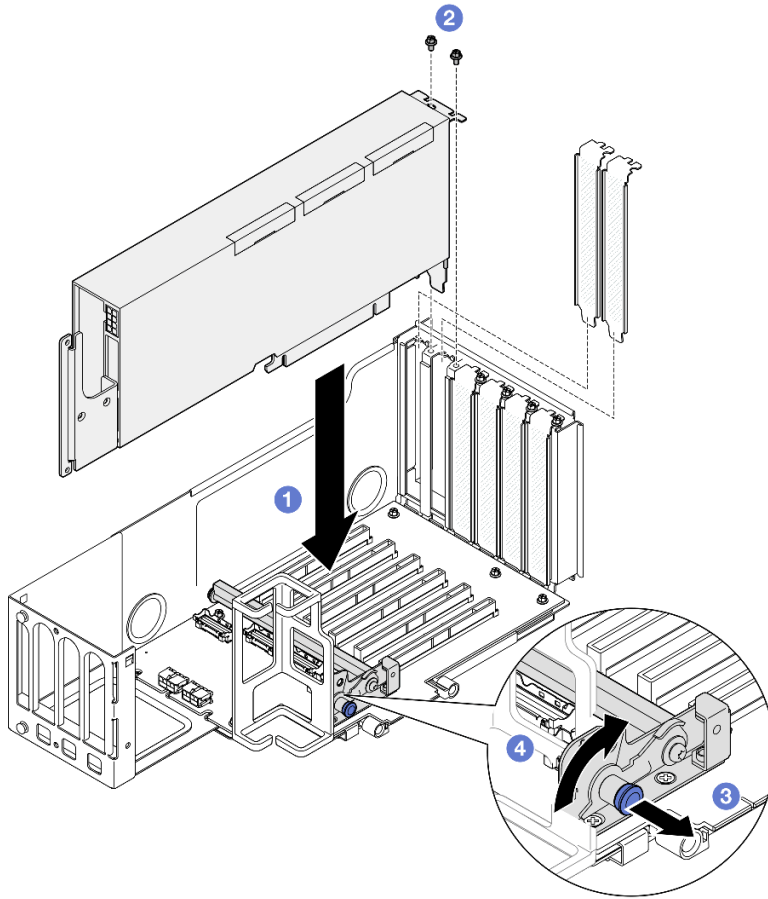


Figure 79. Installing GPU adapter to PCIe riser

- a. ① Align the GPU adapter with the connector on the PCIe riser; then, carefully press the GPU adapter straight into the slot until it is securely seated and its bracket also is secured.
- b. ② Secure the GPU adapter with two screws.
- c. ③ Pull the plunger that secures the PCIe adapter retainer.
- d. ④ Close the PCIe adapter retainer to the locked position.

Step 4. Connect the power cable to the GPU adapter and PCIe riser.

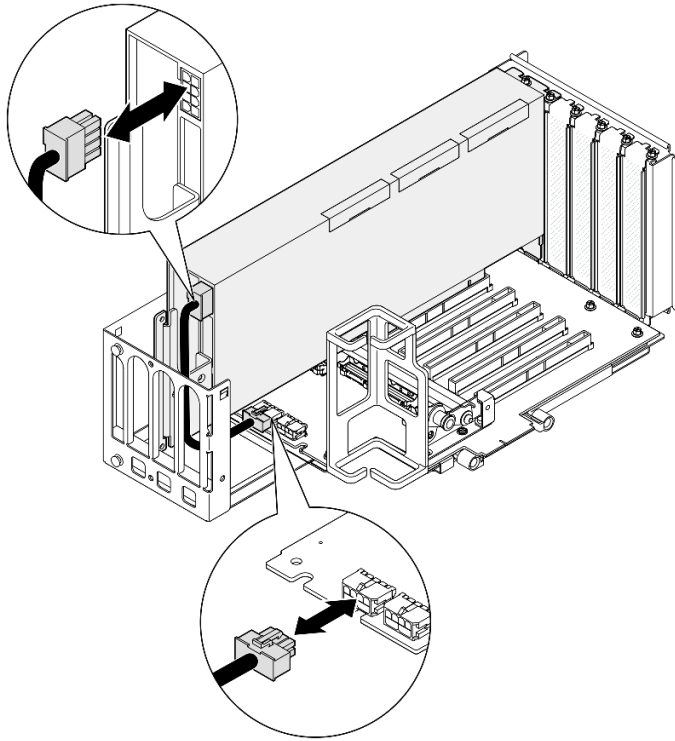


Figure 80. Connecting power cable to GPU adapter

Step 5. Install the riser extender cover.

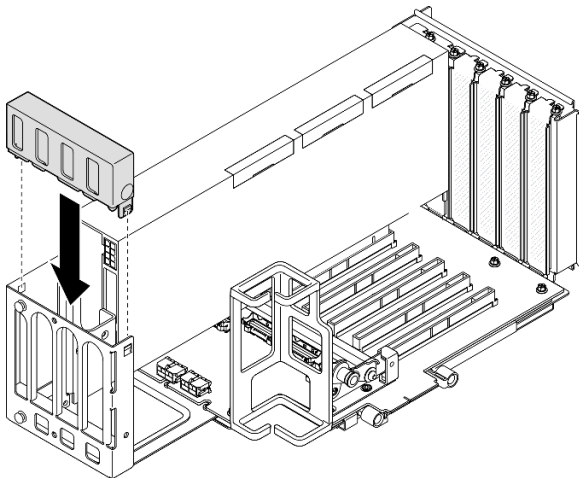


Figure 81. Installing riser extender cover

## After you finish

1. If necessary, install a GPU adapter link bridge. See [“Install a GPU adapter link bridge” on page 106](#).
2. Reinstall the PCIe riser. See [“Install the PCIe riser” on page 147](#).
3. Reinstall the crossbar. See [“Install the crossbar” on page 71](#).
4. Reinstall the rear top cover. See [“Install the rear top cover” on page 237](#).
5. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).

6. Complete the parts replacement. See [“Complete the parts replacement” on page 242](#).

### Demo video

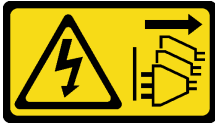
[Watch the procedure on YouTube](#)

## Install a GPU adapter link bridge

Follow the instructions in this section to install a GPU adapter link bridge.

### 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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).
- Depending on the specific type, your GPU adapter might look slightly different from the illustrations in this section.
- Follow the additional instructions in any documentation that comes with your GPU adapter.

**Firmware and driver download:** You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

### Procedure

Step 1. If a link connector cover is installed on the GPU, remove it.



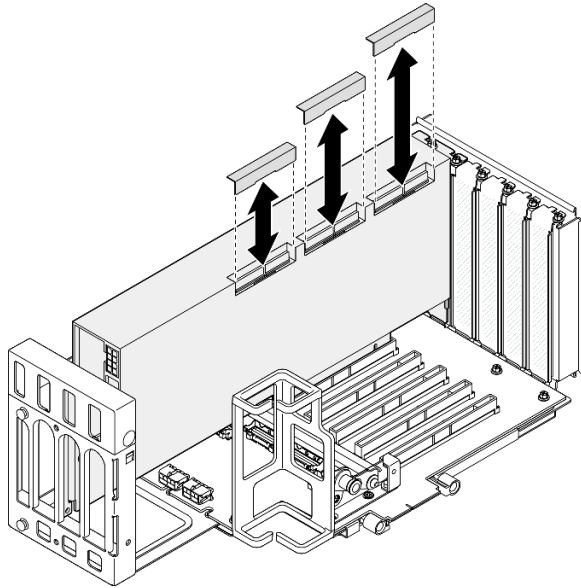


Figure 82. Removing the link connector cover from GPU

- Step 2. Align the GPU adapter link bridge to the link connectors on the GPUs; then, install the GPU adapter link bridge to the GPUs until it clicks into place.

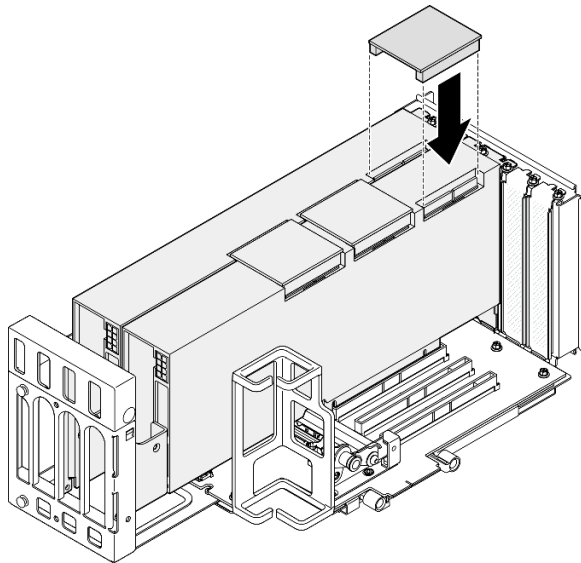


Figure 83. Installing the GPU adapter link bridge

- Step 3. Repeat [Step 2 on page 107](#) to install the other GPU adapter link bridges.

**Note:** When linking a GPU pair, all link connectors on the GPUs must be linked.

### After you finish

1. Reinstall the PCIe riser. See [“Install the PCIe riser” on page 147](#).
2. Reinstall the crossbar. See [“Install the crossbar” on page 71](#).
3. Reinstall the rear top cover. See [“Install the rear top cover” on page 237](#).

4. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
5. Complete the parts replacement. See [“Complete the parts replacement” on page 242](#).

### Demo video

[Watch the procedure on YouTube](#)

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## Intrusion switch replacement

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

### Remove the intrusion switch

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

### 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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

### Procedure

- Step 1. Remove the front top cover. See [“Remove the front top cover” on page 234](#).
- Step 2. Disconnect the cable from the system board assembly.

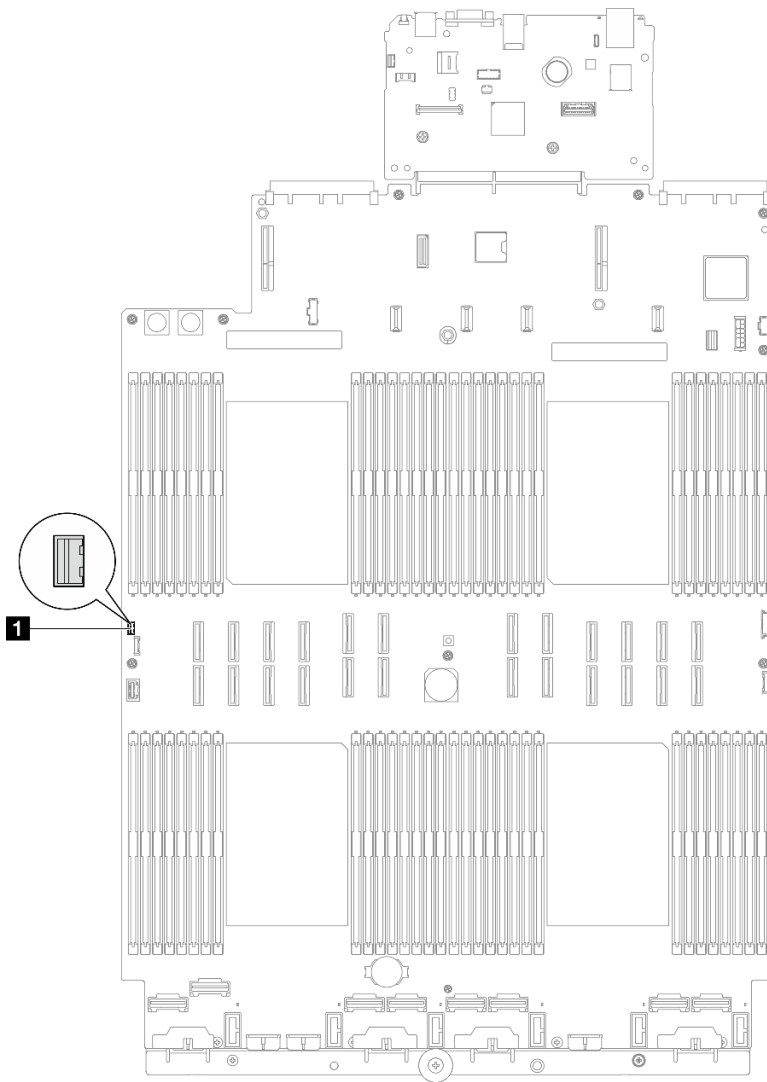


Figure 84. Disconnecting the intrusion switch

Step 3. Grasp the switch, and pull to remove it from the slot.

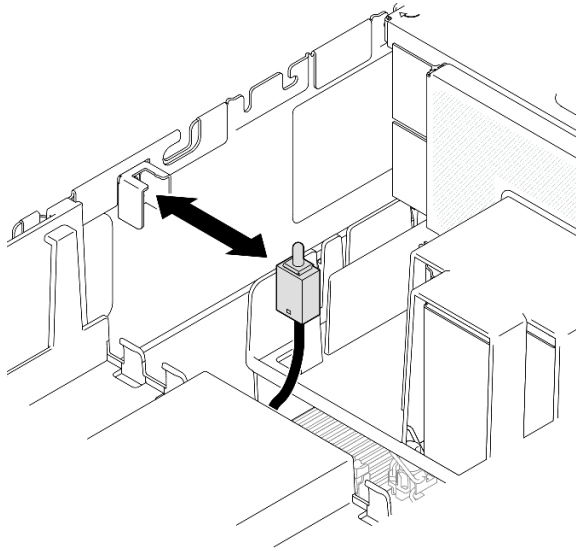


Figure 85. Removing the intrusion switch

## After you finish

1. Install a replacement unit. See [“Install the intrusion switch” on page 110](#).
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 intrusion switch

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

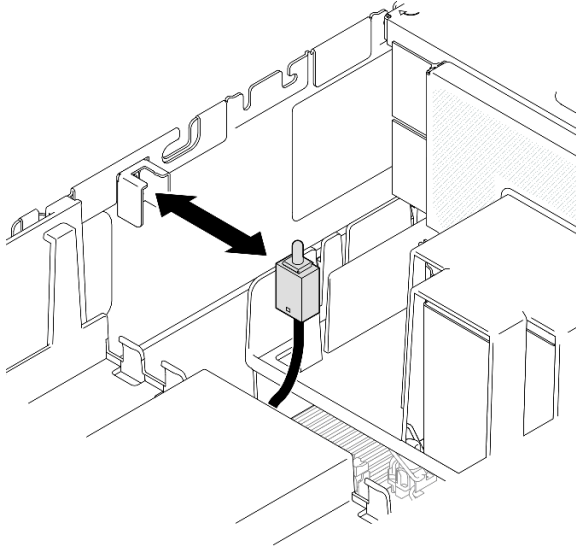
## About this task

### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

## Procedure

Step 1. Align the intrusion switch with the slot and push it in.



*Figure 86. Installing the intrusion switch*

Step 2. Connect the cable to the system board assembly.

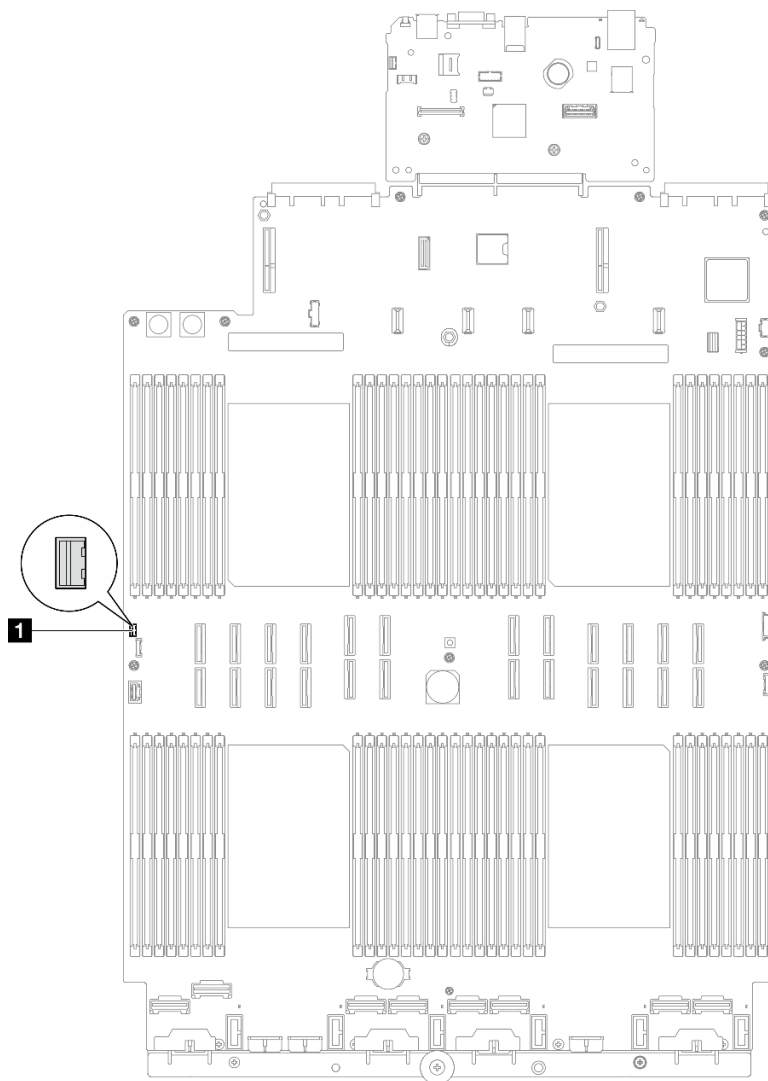


Figure 87. Connecting the intrusion switch

## After you finish

1. Reinstall the front top cover. See [“Install the front top cover”](#) on page 239.
2. Complete the parts replacement. See [“Complete the parts replacement”](#) on page 242.

## Demo video

[Watch the procedure on YouTube](#)

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## M.2 drive and M.2 boot adapter replacement

Follow the instructions in this section to remove or install an M.2 drive and the M.2 boot adapter.

### Remove an M.2 drive

Follow the instructions in this section to remove an M.2 drive.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

### Procedure

Step 1. Remove the front top cover. See [“Remove the front top cover” on page 234](#).

Step 2. Remove the M.2 drive.

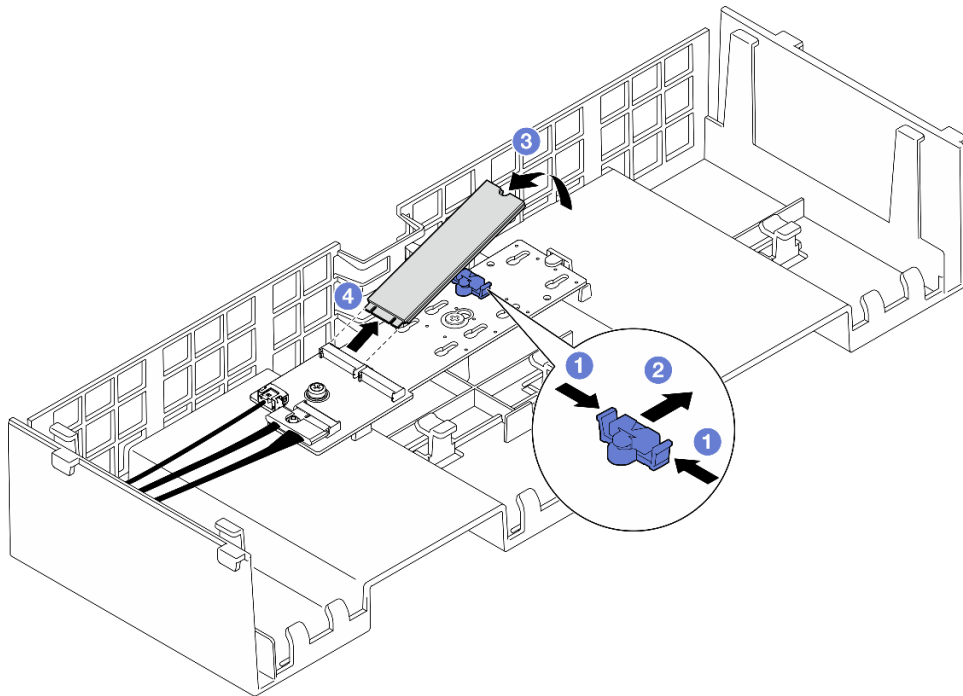


Figure 88. Removing M.2 drive

- a. ① Pinch and hold on the retainer clip.
- b. ② Slide the retainer backward to loosen the M.2 drive from the M.2 boot adapter.
- c. ③ Pivot the rear side of the M.2 drive away from the M.2 boot adapter.
- d. ④ Pull the M.2 drive away from the slot at an angle of approximately 30 degrees.

### After you finish

1. Adjust the retainer on the M.2 boot adapter to accommodate the particular size of the M.2 drive you wish to install. See [“Adjust the retainer on the M.2 boot adapter” on page 119](#).

2. Install a replacement unit. See [“Install an M.2 drive” on page 120](#).
3. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Remove the M.2 boot adapter

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

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.

### Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover” on page 234](#).
- b. Remove the rear top cover. See [“Remove the rear top cover” on page 236](#).
- c. Remove all the M.2 drives from the M.2 boot adapter. See [“Remove an M.2 drive” on page 112](#).
- d. Remove the crossbar. See [“Remove the crossbar” on page 68](#).
- e. Remove PCIe riser 1 and PCIe riser 2. See [“Remove the PCIe riser” on page 134](#).

Step 2. Disconnect the M.2 boot adapter cables from the system board assembly. See [“M.2 boot adapter cable routing” on page 387](#) for more information on the internal cable routing.

Step 3. Remove the M.2 boot adapter.



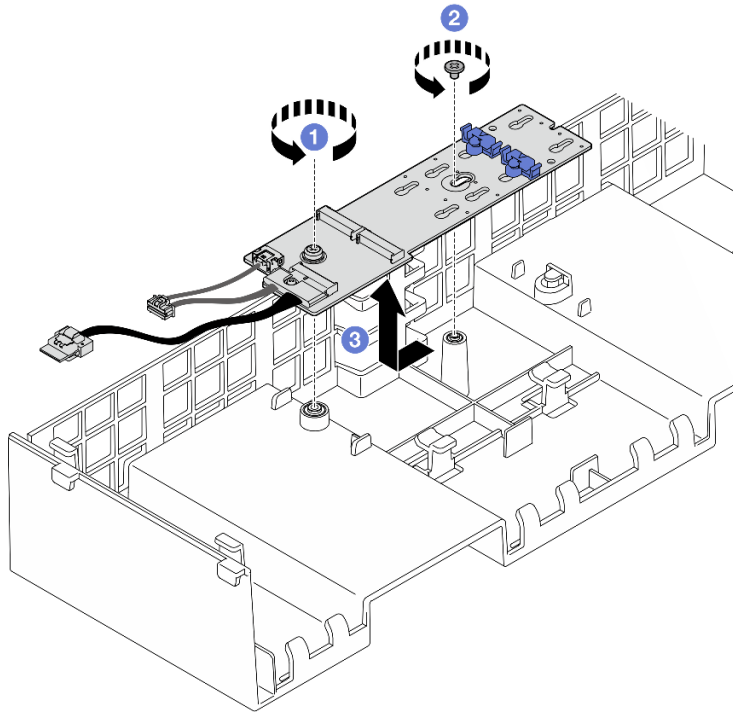


Figure 89. Removing M.2 boot adapter

- a. ① Unfasten the screw that secures the end of the M.2 boot adapter to the front air baffle.
- b. ② Unfasten the screw that secures the middle of the M.2 boot adapter to the front air baffle.
- c. ③ Slide the M.2 boot adapter backward and lift it out of the front air baffle.

Step 4. Disconnect the cables from the M.2 boot adapter.

#### **SATA/x4 NVMe M.2 boot adapter**

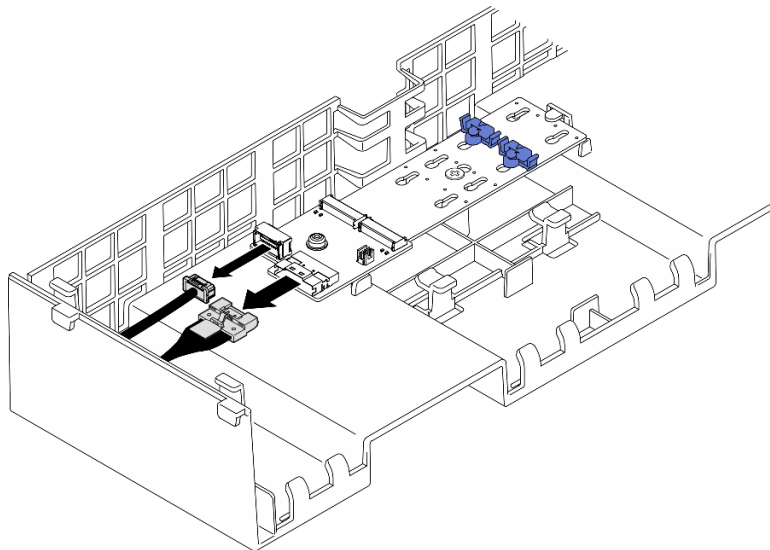


Figure 90. Disconnecting cable from SATA/x4 NVMe M.2 boot adapter

#### **SATA/NVMe or NVMe M.2 boot adapter**

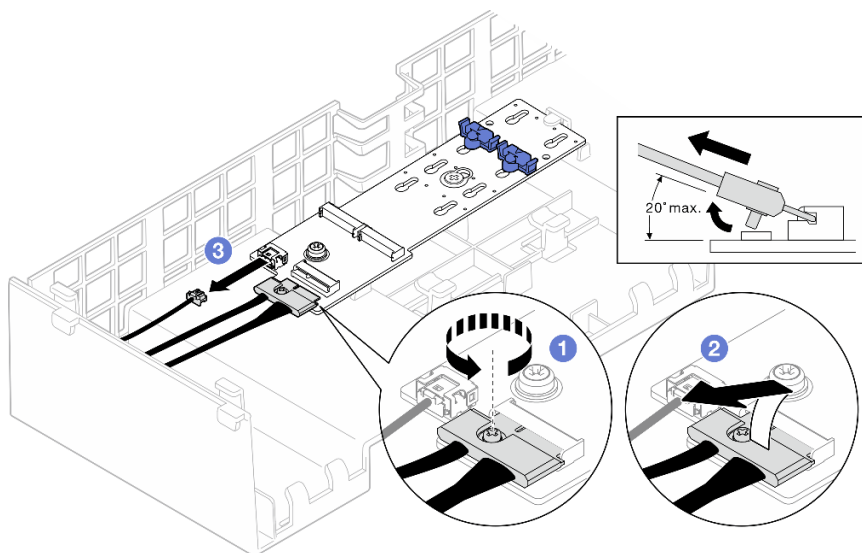


Figure 91. Disconnecting cable from SATA/NVMe or NVMe M.2 boot adapter

1. ① Loosen the screw on the signal cable.
2. ② Tilt the connector and remove it.
3. ③ Remove the power cable.

## After you finish

1. Install a replacement unit. See [“Install the M.2 boot adapter” on page 116](#).
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 M.2 boot adapter

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

## About this task

### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.

**Firmware and driver download:** You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

## Procedure

Step 1. If applicable, connect the cables to the M.2 boot adapter.

### SATA/x4 NVMe M.2 boot adapter

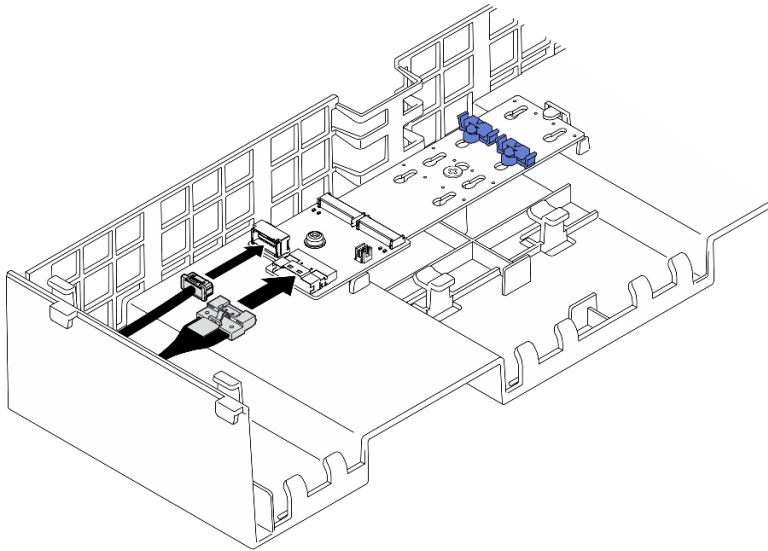


Figure 92. Connecting cable to SATA/x4 NVMe M.2 boot adapter

### SATA/NVMe or NVMe M.2 boot adapter

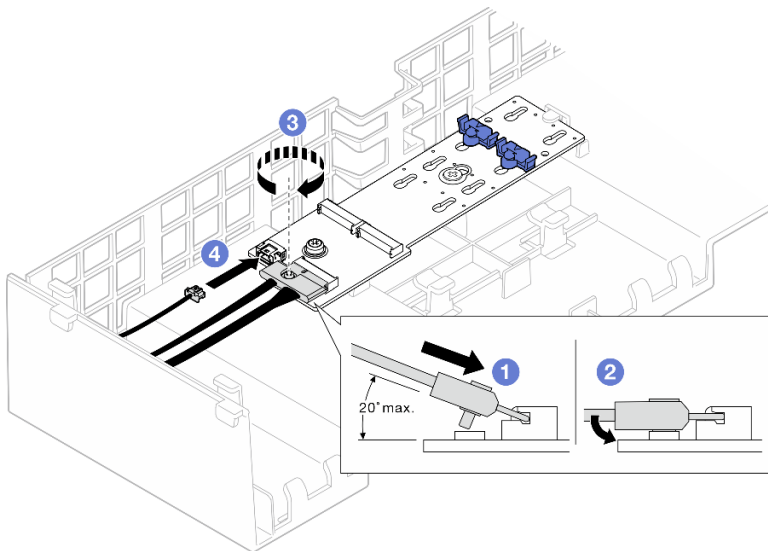


Figure 93. Connecting cable to SATA/NVMe or NVMe M.2 boot adapter

1. **1** Tilt the connector at an angle of 20 degrees or lower, and insert it until its bottom surface reaches the ramp.

2. ② Press the connector down flat.
3. ③ Tighten the screw on the signal cable.
4. ④ Connect the power cable.

Step 2. Install M.2 boot adapter.

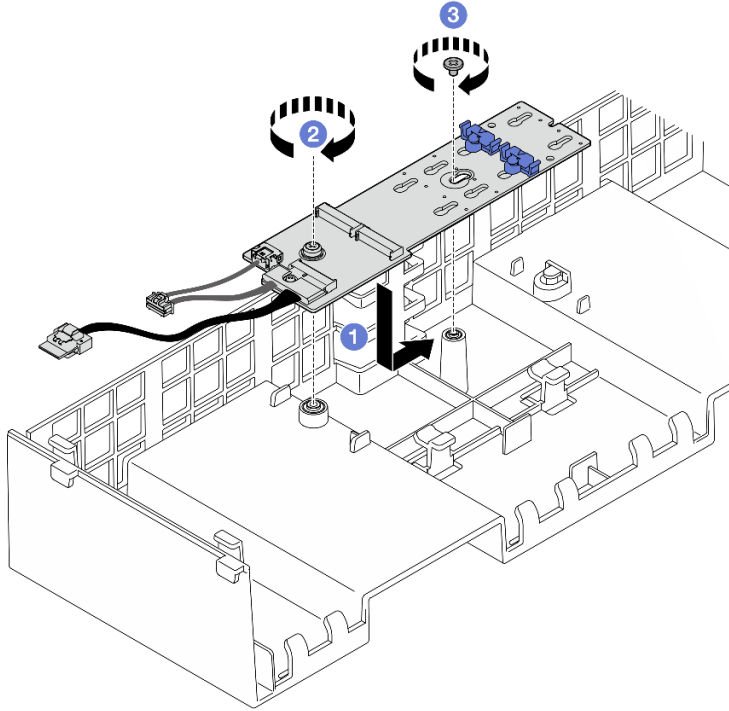


Figure 94. Installing M.2 boot adapter

- a. ① Lower the M.2 boot adapter into the front air baffle; then, slide the M.2 boot adapter forward until it is seated in place.
- b. ② Fasten the screw that secures the end of the M.2 boot adapter to the front air baffle.
- c. ③ Fasten the screw that secures the middle of the M.2 boot adapter to the front air baffle.

Step 3. Connect the M.2 boot adapter cables to the system board assembly. See [“M.2 boot adapter cable routing” on page 387](#) for more information on the internal cable routing.

## After you finish

1. Reinstall all the PCIe risers. See [“Install the PCIe riser” on page 147](#).
2. Reinstall the crossbar. See [“Install the crossbar” on page 71](#).
3. Reinstall the M.2 drives to the M.2 boot adapter. See [“Install an M.2 drive” on page 120](#).
4. Reinstall the rear top cover. See [“Install the rear top cover” on page 237](#).
5. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
6. Complete the parts replacement. See [“Complete the parts replacement” on page 242](#).

## Demo video

[Watch the procedure on YouTube](#)

## Adjust the retainer on the M.2 boot adapter

Use this information to adjust the retainer on the M.2 boot adapter.

### About this task

Sometimes you need to adjust the M.2 drive retainer to a correct keyhole that can accommodate the particular size of the M.2 drive you wish to install.

### Procedure

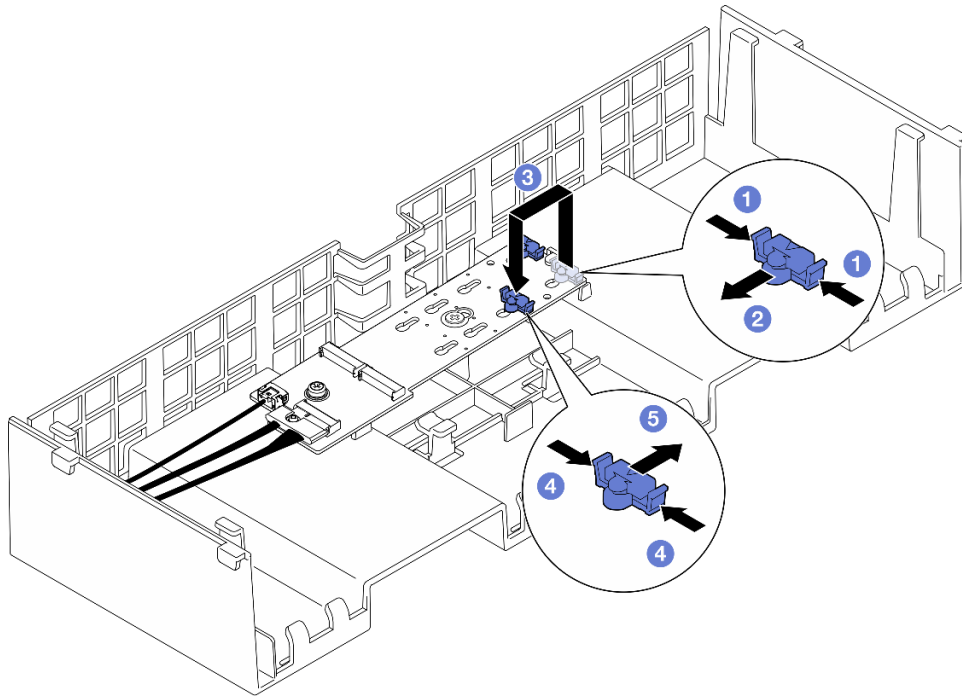


Figure 95. M.2 retainer adjustment

Step 1. Adjust the M.2 retainer.

- a. ① Press both sides of the retainer.
- b. ② Move the retainer forward until it is in the large opening of the keyhole.
- c. ③ Take the retainer out of the keyhole; then, insert the retainer into the correct keyhole.
- d. ④ Press both sides of the retainer.
- e. ⑤ Slide the retainer backwards (toward the small opening of the keyhole) until it is seated in place.

### After you finish

1. Install an M.2 drive. See [“Install an M.2 drive” on page 120](#).
2. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

### Demo video

[Watch the procedure on YouTube](#)

## Install an M.2 drive

Follow the instructions in this section to install an M.2 drive.

### About this task

#### Attention:

- Read “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “[Power off the server](#)” on page 17.
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See “[Remove the server from rails](#)” on page 17.

**Firmware and driver download:** You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

### Procedure

- Step 1. Touch the static-protective package that contains the new part to any unpainted surface on the outside of the server; then, take the new part out of the package and place it on a static-protective surface.
- Step 2. (Optional) Adjust the retainer on the M.2 boot adapter to accommodate the particular size of the M.2 drive you wish to install. See “[Adjust the retainer on the M.2 boot adapter](#)” on page 119.
- Step 3. Locate the connector on the M.2 boot adapter.

#### Notes:

- Your M.2 boot adapter might look different from the following illustrations, but the installation method is the same.
- Some M.2 boot adapters support two identical M.2 drives. Install the M.2 drive in slot 0 first.

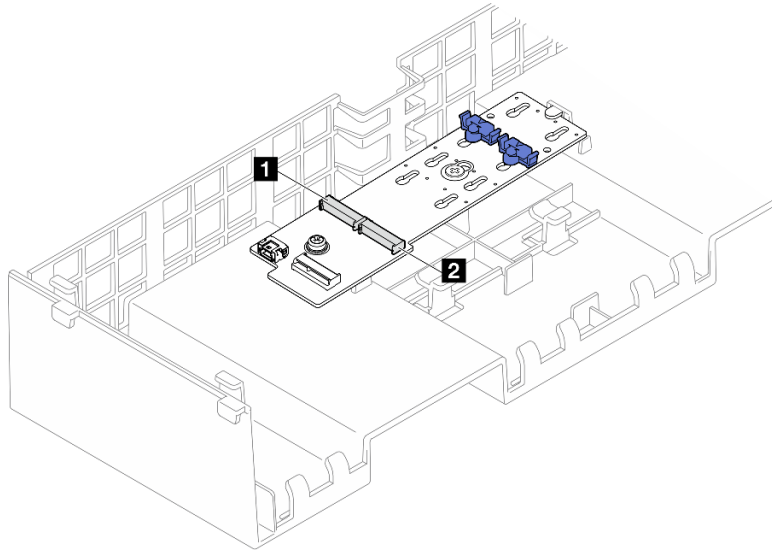


Figure 96. M.2 drive slots

1 Slot 1	2 Slot 0
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Step 4. Install M.2 drive into M.2 boot adapter.

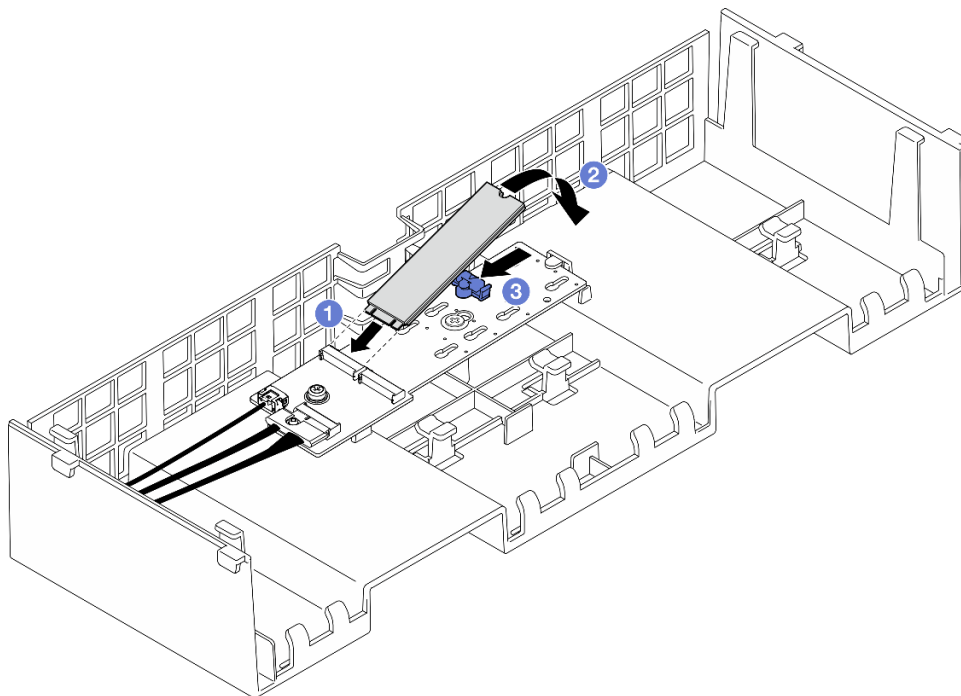


Figure 97. Installing M.2 drive

- a. 1 Insert the M.2 drive into the slot at an angle of approximately 30 degrees.
- b. 2 Pivot the M.2 drive down until the notch at the end of the M.2 drive catches on the lip of the retainer.
- c. 3 Slide the retaining clip forward to secure the M.2 drive to the M.2 boot adapter.

## After you finish

1. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
2. Complete the parts replacement. See [“Complete the parts replacement” on page 242](#).

### Demo video

[Watch the procedure on YouTube](#)

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## Management NIC adapter replacement

Follow the instructions in this section to install or remove the management NIC adapter.

### Remove the management NIC adapter

Follow the instructions in this section to remove the management NIC adapter.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.

### Procedure

Step 1. Make preparation for the task.

- a. Access the Lenovo XClarity Controller; then, select **Network** in **BMC Configuration** and disable **Ethernet Port 2**.
- b. Remove the front top cover. See [“Remove the front top cover” on page 234](#).
- c. Remove the rear top cover. See [“Remove the rear top cover” on page 236](#).
- d. Remove the crossbar. See [“Remove the crossbar” on page 68](#).
- e. Remove PCIe riser 1 and PCIe riser 2. See [“Remove the PCIe riser” on page 134](#).

Step 2. Disconnect the cable on the management NIC adapter.

Step 3. Remove the management NIC adapter.



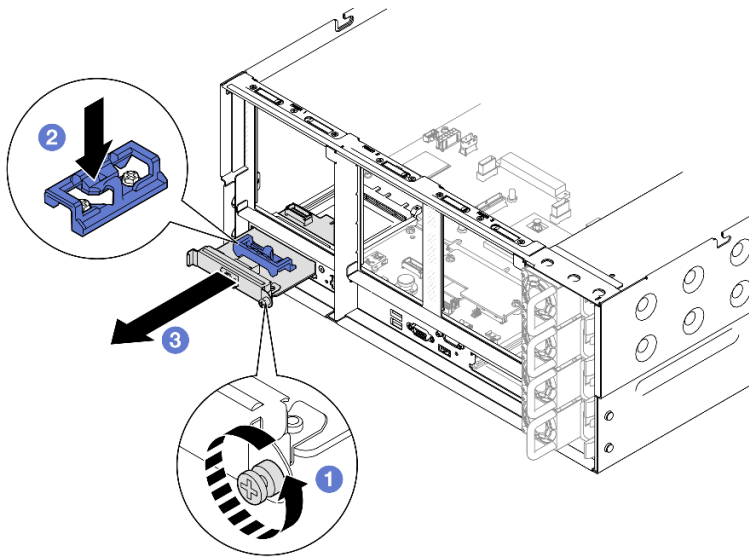


Figure 98. Removing management NIC adapter

- a. 1 Loosen the screw that secures the management NIC adapter.
- b. 2 Press and hold the blue latch.
- c. 2 Push the management NIC adapter by the latch out from the chassis.

## After you finish

1. Install a replacement unit or a filler. See [“Install the management NIC adapter” 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 management NIC adapter

Follow the instructions in this section to install the management NIC adapter.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.

**Firmware and driver download:** You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

## Procedure

Step 1. If a filler is installed, remove it.

Step 2. Install the management NIC adapter.

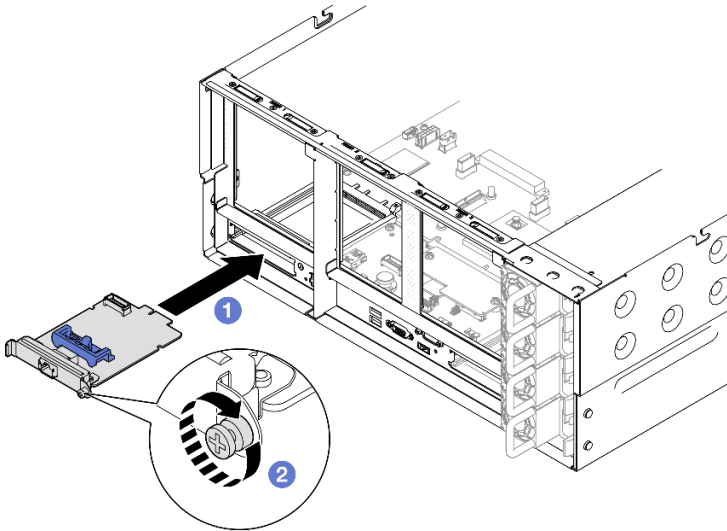


Figure 99. Installing management NIC adapter

- 1 Slide the management NIC adapter into the slot until it is fully seated.
- 2 Tighten the screw to secure the management NIC adapter.

Step 3. Connect the cable to the management NIC adapter.

## After you finish

1. Reinstall all the PCIe risers. See “Install the PCIe riser” on page 147.
2. Reinstall the crossbar. See “Install the crossbar” on page 71.
3. Reinstall the rear top cover. See “Install the rear top cover” on page 237.
4. Reinstall the front top cover. See “Install the front top cover” on page 239.
5. Complete the parts replacement. See “Complete the parts replacement” on page 242.
6. Access the Lenovo XClarity Controller; then, select **Network** in **BMC Configuration** and enable **Ethernet Port 2**.

## Demo video

[Watch the procedure on YouTube](#)

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## Memory module replacement

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

## Remove a memory module

Use this information to remove a memory module.

### About this task

#### 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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- Make sure to remove or install memory module 20 seconds after disconnecting power cords from the system. It allows the system to be completely discharged of electricity and safe for handling memory module.
- If you are not installing a replacement memory module to the same slot, make sure you have memory module filler available.
- Memory modules are sensitive to static discharge and require special handling. Refer to the standard guidelines for [“Handling static-sensitive devices” on page 4](#).
  - Always wear an electrostatic-discharge strap when removing or installing memory modules. Electrostatic-discharge gloves can also be used.
  - Never hold two or more memory modules together so that they do not touch each other. Do not stack memory modules directly on top of each other during storage.
  - Never touch the gold memory module connector contacts or allow these contacts to touch the outside of the memory module connector housing.
  - Handle memory modules with care: never bend, twist, or drop a memory module.
  - Do not use any metal tools (such as jigs or clamps) to handle the memory modules, because the rigid metals may damage the memory modules.
  - Do not insert memory modules while holding packages or passive components, which can cause package cracks or detachment of passive components by the high insertion force.
- In the case of processor board replacement, keep records of the slots in which the modules are installed, and make sure to install them back to the exact same slots after processor board replacement.

**Important:** Remove or install memory modules for one processor at a time.

### Procedure

**Attention:** Make sure to remove or install memory module 20 seconds after disconnecting power cords from the system. It allows the system to be completely discharged of electricity and safe for handling memory module.

Step 1. Make preparation for the task.

- a. To replace a front memory module (memory module 33-64), remove the following:
  1. Remove the front top cover. See [“Remove the front top cover” on page 234.](#)
  2. Remove the front air baffle. See [“Remove the front air baffle” on page 46.](#)
- b. To replace a rear memory module (memory module 1-32), remove the following:
  1. Remove the front top cover. See [“Remove the front top cover” on page 234.](#)
  2. Remove the rear top cover. See [“Remove the rear top cover” on page 236.](#)
  3. Remove the crossbar. See [“Remove the crossbar” on page 68.](#)
  4. Remove all the PCIe risers. See [“Remove the PCIe riser” on page 134.](#)
  5. Remove the rear air baffle. See [“Remove the rear air baffle” on page 53.](#)
  6. If 2U performance PHMs are installed, remove them to access the memory module slots. See [“Remove a processor and heat sink” on page 199.](#)

**Note:** This procedure must be executed by a trained technician.

Step 2. Remove the memory module from the slot.

**Attention:** To avoid breaking the retaining clips or damaging the memory module slots, handle the clips gently.

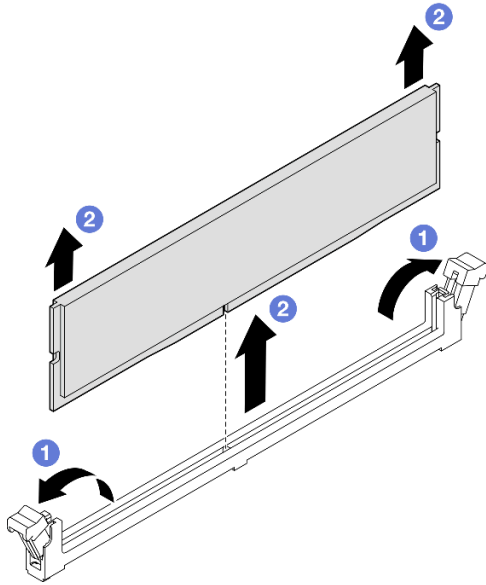


Figure 100. Memory module removal

- a. ① Gently open the retaining clip on each end of the memory module slot.
- b. ② Grasp the memory module at both ends and carefully lift it out of the slot.

## After you finish

1. Install a memory module or a memory module filler. See [“Install a memory module” on page 127.](#)

**Note:** A memory module slot must be installed with a memory module or a memory module filler.

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

Follow the instructions in this section to install a memory 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.**

See for detailed information about memory configuration and setup.

#### **Attention:**

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- Make sure to remove or install memory module 20 seconds after disconnecting power cords from the system. It allows the system to be completely discharged of electricity and safe for handling memory module.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).
- Make sure to adopt one of the supported configurations listed in [“Memory module installation rules and order” on page 4](#).
- Memory modules are sensitive to static discharge and require special handling. Refer to the standard guidelines at [“Handling static-sensitive devices” on page 4](#):
  - Always wear an electrostatic-discharge strap when removing or installing memory modules. Electrostatic-discharge gloves can also be used.
  - Never hold two or more memory modules together so that they do not touch each other. Do not stack memory modules directly on top of each other during storage.
  - Never touch the gold memory module connector contacts or allow these contacts to touch the outside of the memory module connector housing.
  - Handle memory modules with care: never bend, twist, or drop a memory module.

- Do not use any metal tools (such as jigs or clamps) to handle the memory modules, because the rigid metals may damage the memory modules.
- Do not insert memory modules while holding packages or passive components, which can cause package cracks or detachment of passive components by the high insertion force.

**Important:**

- Remove or install memory modules for one processor at a time.
- Before installing 24 Gb DRAM RDIMMs, make sure to update the UEFI firmware to the latest version first, then remove all existing 16 Gb DRAM RDIMMs.

**Firmware and driver download:** You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

**Procedure**

**Attention:** Make sure to remove or install memory module 20 seconds after disconnecting power cords from the system. It allows the system to be completely discharged of electricity and safe for handling memory module.

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

**Notes:**

- Remove or install memory modules for one processor at a time.
- Ensure that you observe the installation rules and sequence order in “[Memory module installation rules and order](#)” on page 4.

Step 2. Touch the static-protective package that contains the memory module to any unpainted surface on the outside of the server. Then, take the memory module out of the package and place it on a static-protective surface.

Step 3. Install the memory module into the slot.

**Attention:**

- To avoid breaking the retaining clips or damaging the memory module slots, open and close the clips gently.
- If there is a gap between the memory module and the retaining clips, the memory module has not been correctly inserted. In this case, open the retaining clips, remove the memory module, and then reinsert it.

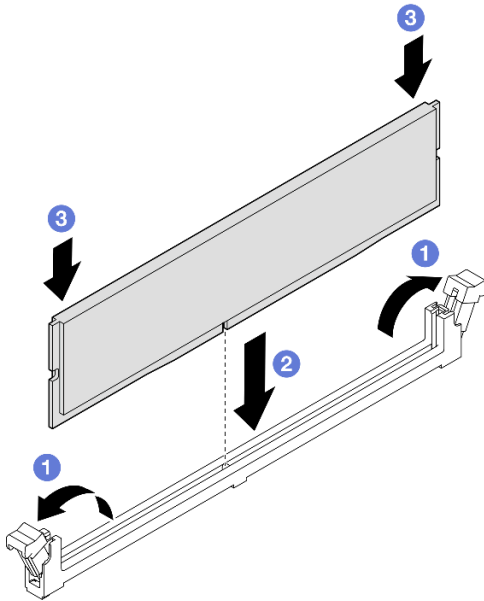


Figure 101. Memory module installation

- a. ① Gently open the retaining clip on each end of the memory module slot.
- b. ② Align the memory module with the slot, and gently place the memory module on the slot with both hands.
- c. ③ Firmly press both ends of the memory module straight down into the slot until the retaining clips snap into the locked position.

## After you finish

1. If you replaced a front memory module, reinstall the following:
  - a. Reinstall the front air baffle. See [“Install the front air baffle” on page 49](#).
  - b. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
2. If you replaced a rear memory module, reinstall the following:
  - a. If 2U performance PHMs were removed to access the memory modules, reinstall them. See [“Install a processor and heat sink” on page 204](#).
  - b. Reinstall the rear air baffle. See [“Install the rear air baffle” on page 57](#).
  - c. Reinstall all the PCIe risers. See [“Install the PCIe riser” on page 147](#).
  - d. Reinstall the crossbar. See [“Install the crossbar” on page 71](#).
  - e. Reinstall the rear top cover. See [“Install the rear top cover” on page 237](#).
  - f. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 242](#).

## Demo video

[Watch the procedure on YouTube](#)

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## MicroSD card replacement (trained technician only)

Follow the instructions in this section to remove and install the MicroSD card.

## Remove the MicroSD card

Follow the instructions in this section to remove the MicroSD card.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

### Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover” on page 234](#).
- b. Remove the rear top cover. See [“Remove the rear top cover” on page 236](#).
- c. Remove the crossbar. See [“Remove the crossbar” on page 68](#).
- d. Remove all the PCIe risers. See [“Remove the PCIe riser” on page 134](#).

Step 2. Remove the MicroSD card.

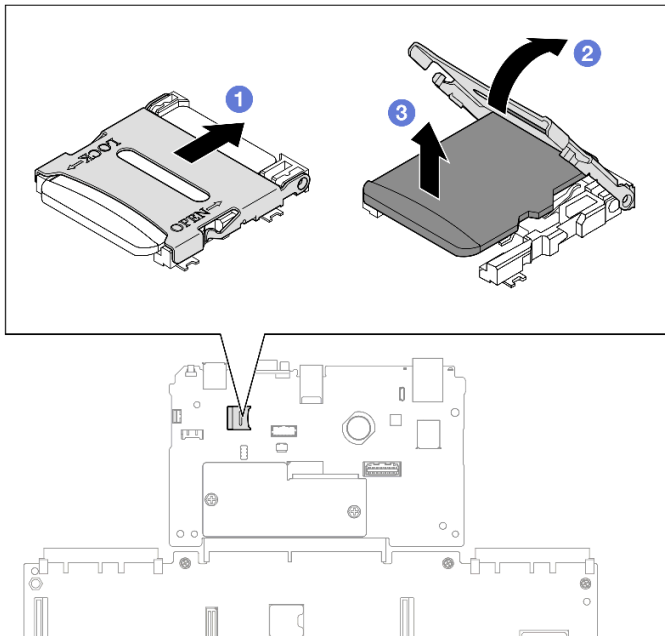


Figure 102. Removing MicroSD card

- a. ① Slide the socket lid to the open position.
- b. ② Lift open the socket lid.
- c. ③ Remove the MicroSD card from the socket.



## After you finish

1. Install a replacement unit. See [“Install the MicroSD card” on page 131](#).
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 MicroSD card

Follow the instructions in this section to install the MicroSD card.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

### Procedure

Step 1. Install the MicroSD card.

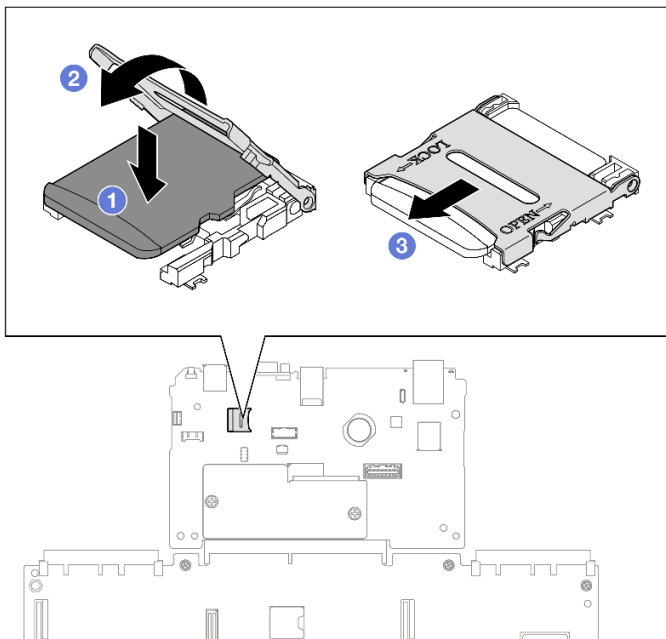


Figure 103. Installing MicroSD card

- a. ① Place the MicroSD card into the socket.
- b. ② Close the socket lid.
- c. ③ Slide the socket lid to the lock position.

## After you finish

1. Reinstall all the PCIe risers. See [“Install the PCIe riser” on page 147](#).
2. Reinstall the crossbar. See [“Install the crossbar” on page 71](#).
3. Reinstall the rear top cover. See [“Install the rear top cover” on page 237](#).
4. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
5. Complete the parts replacement. See [“Complete the parts replacement” on page 242](#).

## Demo video

[Watch the procedure on YouTube](#)

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## OCP module replacement

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

### Remove the OCP module

Follow the instructions in this section to remove the OCP module.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.

### Procedure

Step 1. Remove the OCP module.

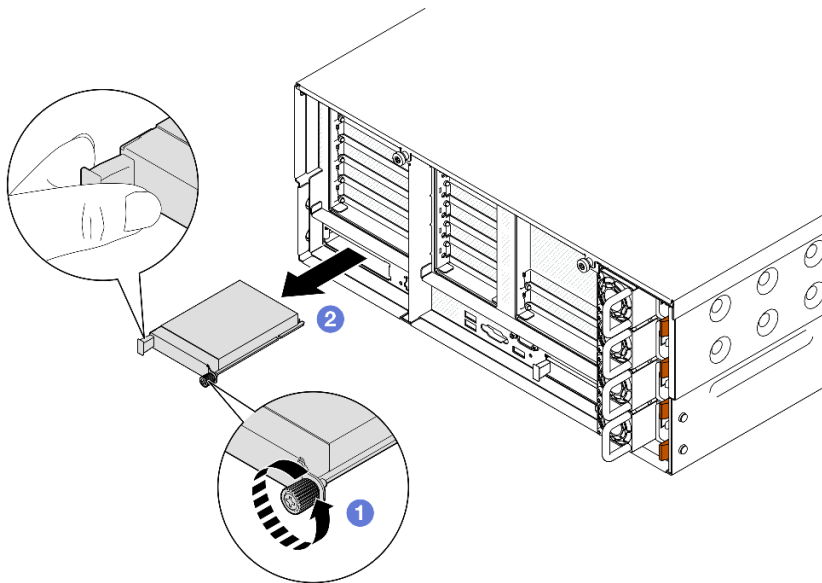


Figure 104. Removing OCP module

- a. ① Loosen the thumbscrew that secures the OCP module. Use a screwdriver if necessary.
- b. ② Grasp the handle, and slide the OCP module out.

## After you finish

1. Install a replacement unit or a filler. See [“Install the OCP module” on page 133](#).
2. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install the OCP module

Follow the instructions in this section to install the OCP module.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.

**Firmware and driver download:** You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

## Procedure

Step 1. If a filler is installed, remove it.

Step 2. Install the OCP module.

**Note:** Ensure that the module is fully seated and the thumbscrew is securely tightened. Otherwise, the OCP module will not get full connection and may not function.

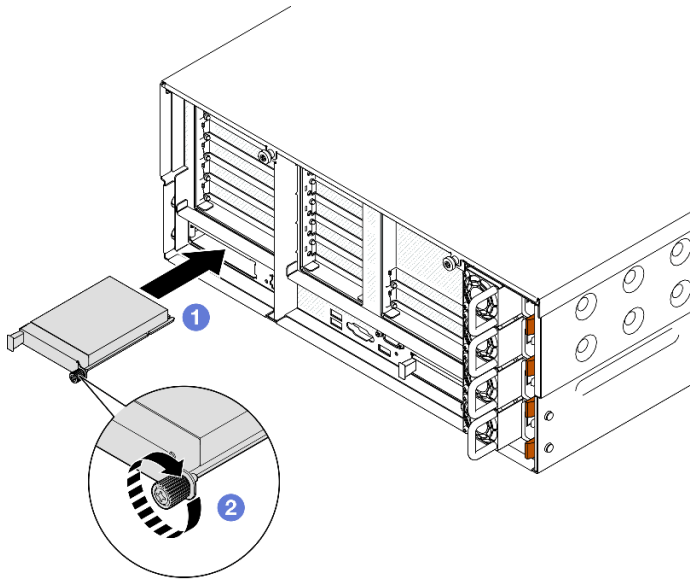


Figure 105. Installing OCP module

- 1 Slide the OCP module into the slot until it is fully seated.
- 2 Tighten the thumbscrew to secure the OCP module. Use a screwdriver if necessary.

## After you finish

Complete the parts replacement. See “[Complete the parts replacement](#)” on page 242.

## Demo video

[Watch the procedure on YouTube](#)

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## PCIe riser and adapter replacement

Follow the instructions in this section to remove and install the PCIe risers and adapters.

### Remove the PCIe riser

Follow the instructions in this section to remove the PCIe riser.

### About this task

**Attention:**

- Read “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “[Power off the server](#)” on page 17.
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See “[Remove the server from rails](#)” on page 17.

**Note:** For more details on the different types of risers, see “Rear view” in *ThinkSystem SR860 V3 User Guide* or *ThinkSystem SR860 V3 System Configuration Guide*.

Depending on your configuration, follow the corresponding procedures below for proper removal procedure.

- “[Remove PCIe riser 2](#)” on page 135
- “[Remove PCIe riser 1](#)” on page 136
- “[Remove PCIe riser 3](#)” on page 137

**Remove PCIe riser 2****Procedure**

Step 1. Make preparation for the task.

- a. Remove the front top cover. See “[Remove the front top cover](#)” on page 234.
- b. Remove the rear top cover. See “[Remove the rear top cover](#)” on page 236.
- c. Remove the crossbar. See “[Remove the crossbar](#)” on page 68.

Step 2. Remove PCIe riser 2.

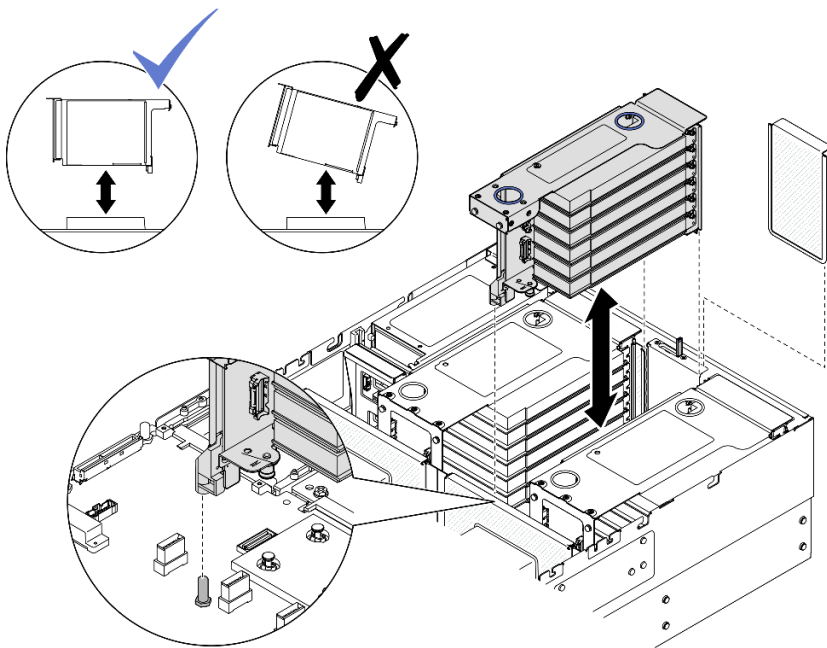


Figure 106. Removing PCIe riser 2

- a. Disconnect the PCIe riser 2 assembly cables from the system board assembly. See [“PCIe riser 2 cable routing” on page 393](#) for more information on the internal cable routing.
- b. Grasp and lift the PCIe riser to remove it from the chassis.
- c. Record the cable connections and disconnect all internal cables from the PCIe adapters.

## Remove PCIe riser 1

### Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover” on page 234](#).
- b. Remove the rear top cover. See [“Remove the rear top cover” on page 236](#).
- c. Remove the crossbar. See [“Remove the crossbar” on page 68](#).

Step 2. Remove PCIe riser 2.

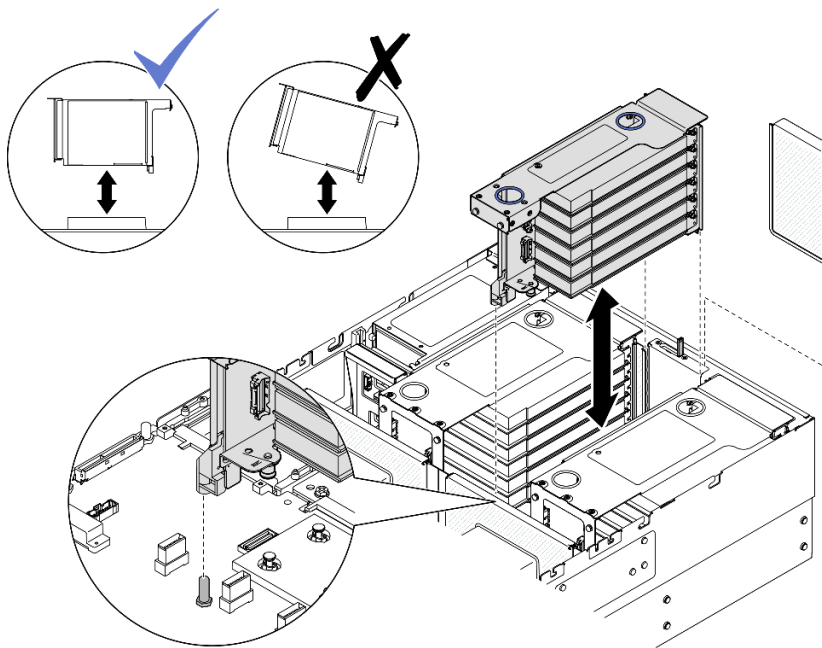


Figure 107. Removing PCIe riser 2

- a. Disconnect the PCIe riser 2 assembly cables from the system board assembly. See [“PCIe riser 2 cable routing” on page 393](#) for more information on the internal cable routing.
- b. Grasp and lift the PCIe riser to remove it from the chassis.
- c. Record the cable connections and disconnect all internal cables from the PCIe adapters.

Step 3. Remove PCIe riser 1.

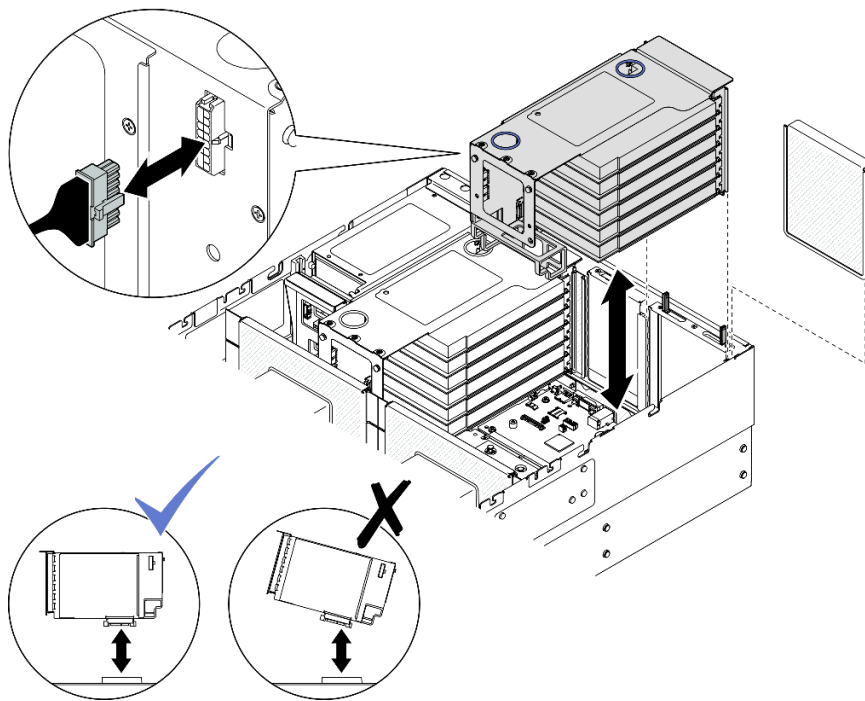


Figure 108. Removing PCIe riser 1

- a. Disconnect the PCIe riser 1 cables from the system board assembly. See [“PCIe riser 1 cable routing” on page 391](#) for more information on the internal cable routing.
- b. Disconnect the power cable from the PCIe riser; then, grasp and lift the PCIe riser to remove it from the chassis.
- c. Record the cable connections and disconnect all internal cables from the PCIe adapters.

## Remove PCIe riser 3

### Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover” on page 234](#).
- b. Remove the rear top cover. See [“Remove the rear top cover” on page 236](#).
- c. Remove the crossbar. See [“Remove the crossbar” on page 68](#).

Step 2. Remove PCIe riser 2.

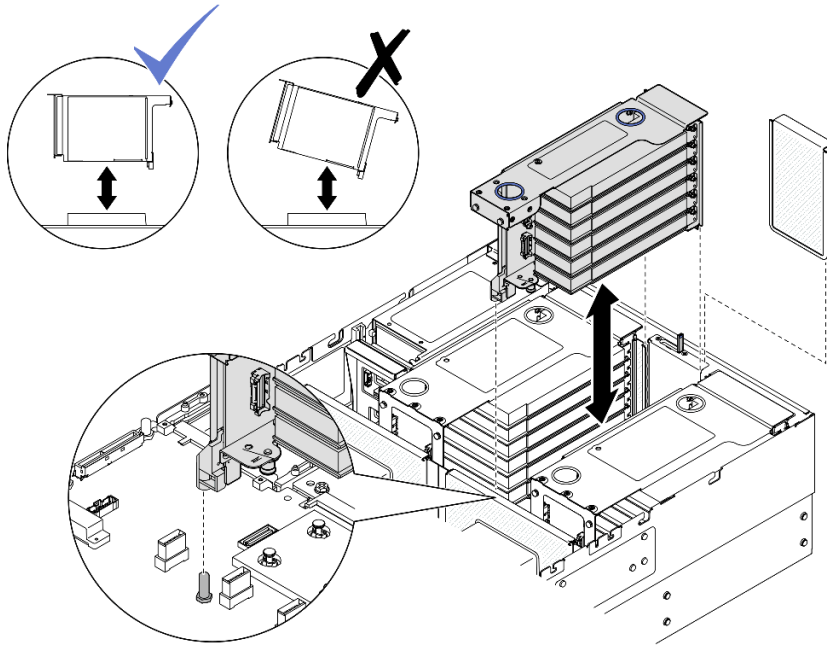


Figure 109. Removing PCIe riser 2

- a. Disconnect the PCIe riser 2 assembly cables from the system board assembly. See [“PCIe riser 2 cable routing” on page 393](#) for more information on the internal cable routing.
- b. Grasp and lift the PCIe riser to remove it from the chassis.
- c. Record the cable connections and disconnect all internal cables from the PCIe adapters.

Step 3. If a 7mm drive cage is installed in PCIe riser 3, remove PCIe riser 1 and disconnect the 7mm drive cables.

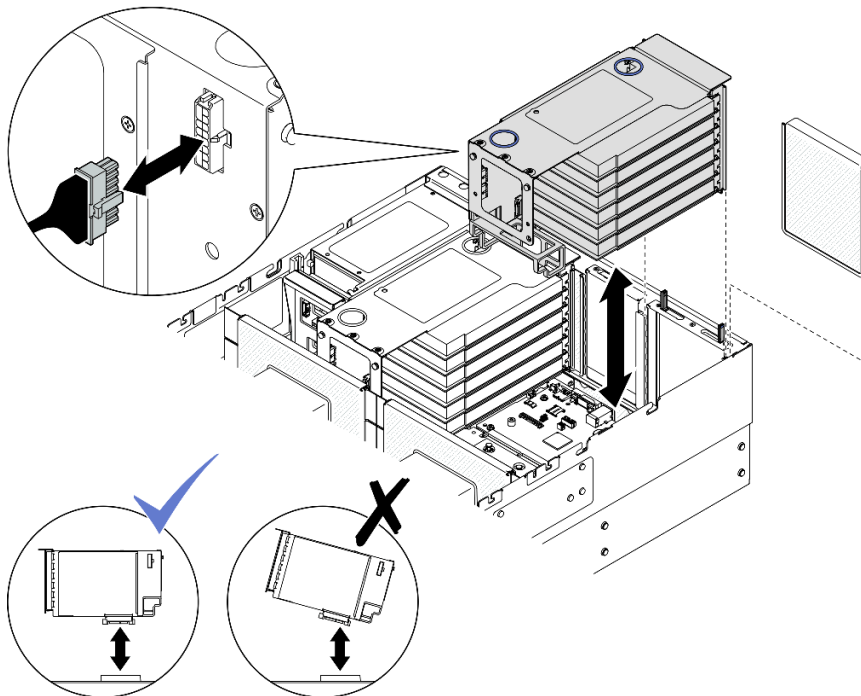


Figure 110. Removing PCIe riser 1



- a. Disconnect the PCIe riser 1 cables from the system board assembly. See [“PCIe riser 1 cable routing” on page 391](#) for more information on the internal cable routing.
- b. Disconnect the power cable from the PCIe riser; then, grasp and lift the PCIe riser to remove it from the chassis.
- c. Record the cable connections and disconnect all internal cables from the PCIe adapters.
- d. Disconnect the 7mm drive cables from the system board assembly. See [“7mm drive backplane cable routing” on page 383](#).

Step 4. Remove PCIe riser 3.

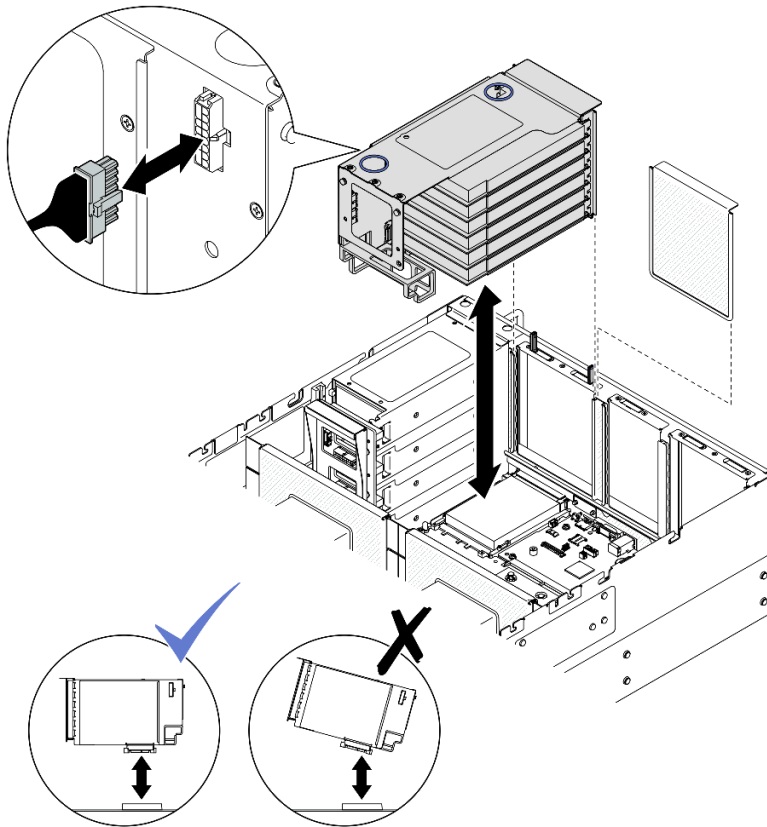


Figure 111. Removing PCIe riser 3

- a. Disconnect the PCIe riser 3 assembly cables from the system board assembly. See [“PCIe riser 3 cable routing” on page 395](#) for more information on the internal cable routing.
- b. Disconnect the power cable from the PCIe riser; then, grasp and lift the PCIe riser to remove it from the chassis.
- c. Record the cable connections and disconnect all internal cables from the PCIe adapters.

## After you finish

1. If you plan to replace the PCIe riser, remove the PCIe adapters. See [“Remove a PCIe adapter” on page 140](#).
2. Install a replacement unit or filler. See [“Install the PCIe riser” on page 147](#).
3. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

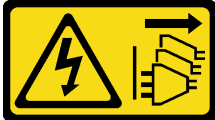
[Watch the procedure on YouTube](#)

## Remove a PCIe adapter

Follow the instructions in this section to remove a PCIe 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 “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “[Power off the server](#)” on page 17.
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See “[Remove the server from rails](#)” on page 17.

#### Notes:

- For a list of the supported PCIe adapters, see <https://serverproven.lenovo.com>.
- Ensure that you observe the installation rules and sequence order in “[PCIe riser and adapter installation rules and order](#)” on page 14.
- For instructions on how to remove and install a double-wide GPU adapter, see “[GPU adapter link bridge and double-wide GPU adapter replacement](#)” on page 95.
- For more details on the different types of risers, see “Rear view” in *ThinkSystem SR860 V3 User Guide* or *ThinkSystem SR860 V3 System Configuration Guide*.
- To prevent potential thermal issues, change the **Misc** setting in the BIOS from **Option3** (default value) to **Option1** if the following two conditions are met:
  - The server is equipped with a GPU adapter.
  - The UEFI firmware version is RSE110I or later.

For the method of changing the **Misc** setting, see <https://support.lenovo.com/us/en/solutions/TT1832>.

Depending on your configuration, follow the corresponding procedures below for proper removal procedure.

- See “[Remove PCIe adapter from two slot FH riser](#)” on page 141 for the following risers:

- x8/x8 PCIe G4 Riser 1/3 FHHL
- 7mm/x8/x8 PCIe G4 Riser 3 FHHL
- See [“Remove PCIe adapter from six slot FH riser”](#) on page 142 for the following risers:
  - 3 x16 & 3 x8 PCIe G4 Riser 1/3 FHFL
  - 2 x16 & 3 x8 + 7mm PCIe G4 Riser 3 FHFL
  - 4 x16 & 1 x8 PCIe G5 Riser 1/3 FHFL
  - 3 x16 & 1 x8 + 7mm PCIe G5 Riser 3 FHFL
- See [“Remove PCIe adapter from six slot HH riser”](#) on page 143 for the following risers:
  - 6 x8 PCIe G4 Riser 2 HHHL
  - 6 x8 PCIe G5 Riser 2 HHHL

## Remove PCIe adapter from two slot FH riser

### Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover”](#) on page 234.
- b. Remove the rear top cover. See [“Remove the rear top cover”](#) on page 236.
- c. Remove the crossbar. See [“Remove the crossbar”](#) on page 68.
- d. Remove the PCIe riser where the PCIe adapter is installed. See [“Remove the PCIe riser”](#) on page 134.

Step 2. Remove the PCIe adapter.

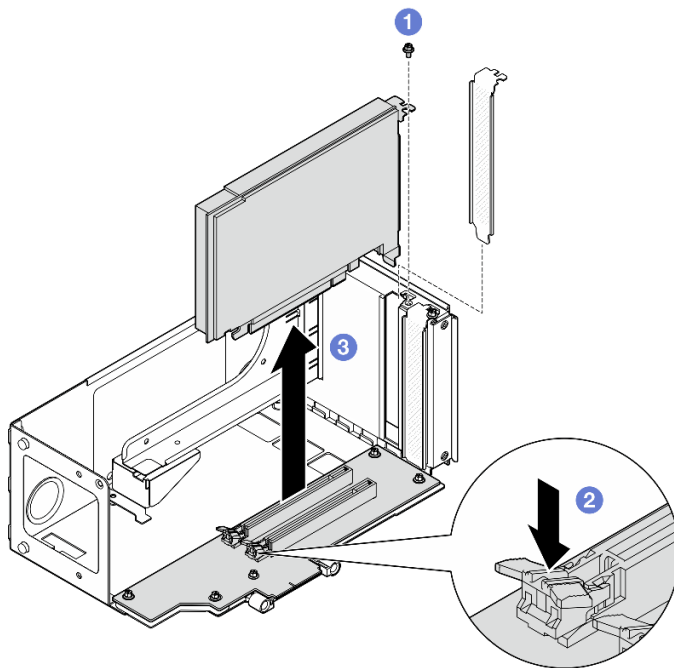


Figure 112. Removing PCIe adapter from riser

- a. ① Remove the screw that secures the adapter to the PCIe riser.
- b. ② Press on the latch to disengage the adapter from the PCIe riser.
- c. ③ Grasp the PCIe adapter by its edges and carefully pull it out of the PCIe slot.

## Remove PCIe adapter from six slot FH riser

**Note:** A Gen 4 riser is used as an example for illustration. The replacement procedure for a Gen 5 riser is similar.

### Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover” on page 234](#).
- b. Remove the rear top cover. See [“Remove the rear top cover” on page 236](#).
- c. Remove the crossbar. See [“Remove the crossbar” on page 68](#).
- d. Remove the PCIe riser where the PCIe adapter is installed. See [“Remove the PCIe riser” on page 134](#).

Step 2. Remove the PCIe adapter.

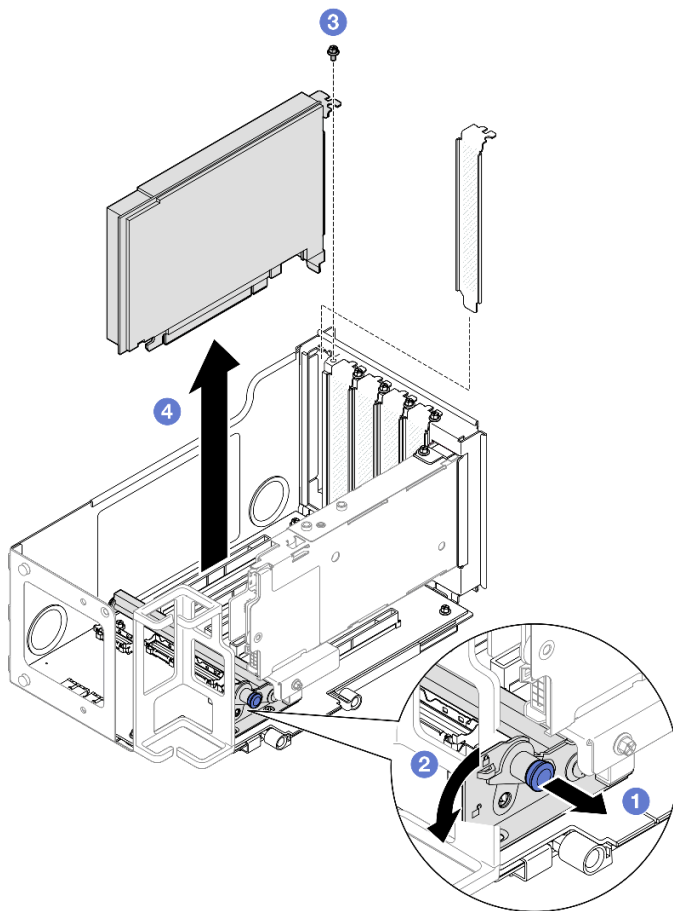


Figure 113. Removing PCIe adapter from riser

- a. ① Pull the plunger that secures the PCIe adapter retainer.
- b. ② Open the PCIe adapter retainer to the unlocked position.
- c. ③ Remove the screw that secures the adapter to the PCIe riser.
- d. ④ Grasp the PCIe adapter by its edges and carefully pull it out of the PCIe slot.

## Remove PCIe adapter from six slot HH riser

**Note:** A Gen 4 riser is used as an example for illustration. The replacement procedure for a Gen 5 riser is similar.

### Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover” on page 234](#).
- b. Remove the rear top cover. See [“Remove the rear top cover” on page 236](#).
- c. Remove the crossbar. See [“Remove the crossbar” on page 68](#).
- d. Remove the PCIe riser where the PCIe adapter is installed. See [“Remove the PCIe riser” on page 134](#).

Step 2. Remove the PCIe adapter.

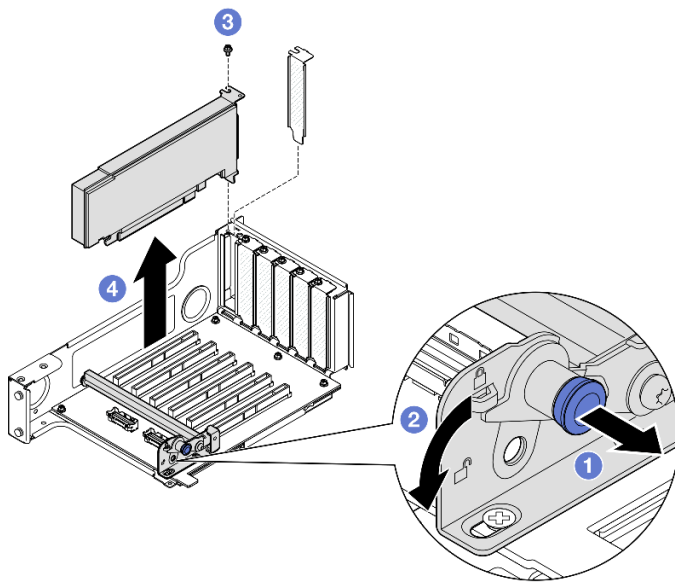


Figure 114. Removing PCIe adapter from riser

- a. ① Pull the plunger that secures the PCIe adapter retainer.
- b. ② Open the PCIe adapter retainer to the unlocked position.
- c. ③ Remove the screw that secures the adapter to the PCIe riser.
- d. ④ Grasp the PCIe adapter by its edges and carefully pull it out of the PCIe slot.

### After you finish

1. Install a replacement unit or filler. See [“Install a PCIe adapter” on page 144](#).
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 PCIe adapter

Follow the instructions in this section to install a PCIe 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 “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “[Power off the server](#)” on page 17.
- 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.

#### **Notes:**

- For a list of the supported PCIe adapters, see <https://serverproven.lenovo.com>.
- Ensure that you observe the installation rules and sequence order in “[PCIe riser and adapter installation rules and order](#)” on page 14.
- For instructions on how to remove and install a double-wide GPU adapter, see “[GPU adapter link bridge and double-wide GPU adapter replacement](#)” on page 95.
- For more details on the different types of risers, see “Rear view” in *ThinkSystem SR860 V3 User Guide* or *ThinkSystem SR860 V3 System Configuration Guide*.
- To prevent potential thermal issues, change the **Misc** setting in the BIOS from **Option3** (default value) to **Option1** if the following two conditions are met:
  - The server is equipped with a GPU adapter.
  - The UEFI firmware version is RSE110I or later.

For the method of changing the **Misc** setting, see <https://support.lenovo.com/us/en/solutions/TT1832>.

Depending on your configuration, follow the corresponding procedures below for proper installation procedure.

- See “[Install PCIe adapter to two slot FH riser](#)” on page 145 for the following risers:
  - x8/x8 PCIe G4 Riser 1/3 FHHL
  - 7mm/x8/x8 PCIe G4 Riser 3 FHHL
- See “[Install PCIe adapter to six slot FH riser](#)” on page 146 for the following risers:
  - 3 x16 & 3 x8 PCIe G4 Riser 1/3 FHFL

- 2 x16 & 3 x8 + 7mm PCIe G4 Riser 3 FHFL
- 4 x16 & 1 x8 PCIe G5 Riser 1/3 FHFL
- 3 x16 & 1 x8 + 7mm PCIe G5 Riser 3 FHFL
- See “Install PCIe adapter to six slot HH riser” on page 146 for the following risers:
  - 6 x8 PCIe G4 Riser 2 HHHH
  - 6 x8 PCIe G5 Riser 2 HHHH

**Firmware and driver download:** You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

## Install PCIe adapter to two slot FH riser

### Procedure

- Step 1. If a filler has been installed to the slot on the PCIe riser, remove the screw that secures it and remove the filler.
- Step 2. Install the PCIe adapter.

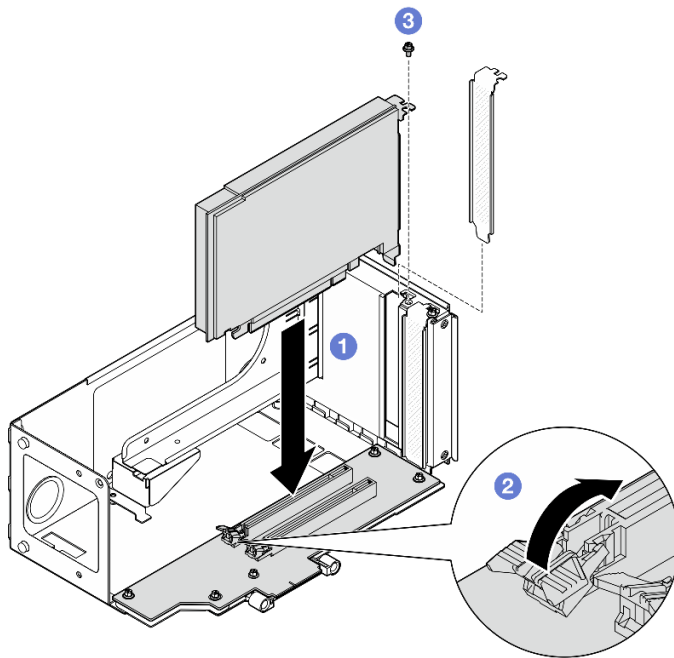


Figure 115. Installing PCIe adapter to riser

- a. ① Align the adapter with the connector on the PCIe riser; then, carefully press the PCIe adapter straight into the slot until it is securely seated and its bracket also is secured.
- b. ② Make sure the latch clicks in the locked position.
- c. ③ Secure the adapter with a screw.

## Install PCIe adapter to six slot FH riser

**Note:** A Gen 4 riser is used as an example for illustration. The replacement procedure for a Gen 5 riser is similar.

### Procedure

- Step 1. If a filler has been installed to the slot on the PCIe riser, remove the screw that secures it and remove the filler.
- Step 2. Install the PCIe adapter.

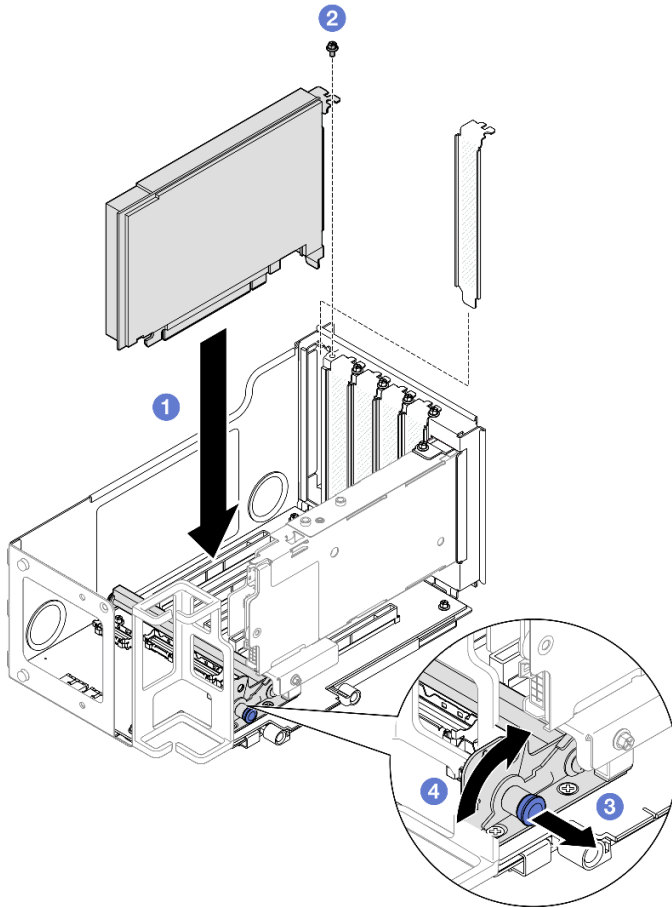


Figure 116. Installing PCIe adapter to riser

- a. ① Align the adapter with the connector on the PCIe riser; then, carefully press the PCIe adapter straight into the slot until it is securely seated and its bracket also is secured.
- b. ② Secure the adapter with a screw.
- c. ③ Pull the plunger that secures the PCIe adapter retainer.
- d. ④ Close the PCIe adapter retainer to the locked position.

## Install PCIe adapter to six slot HH riser

**Note:** A Gen 4 riser is used as an example for illustration. The replacement procedure for a Gen 5 riser is similar.

### Procedure



- Step 1. If a filler has been installed to the slot on the PCIe riser, remove the screw that secures it and remove the filler.
- Step 2. Install the PCIe adapter.

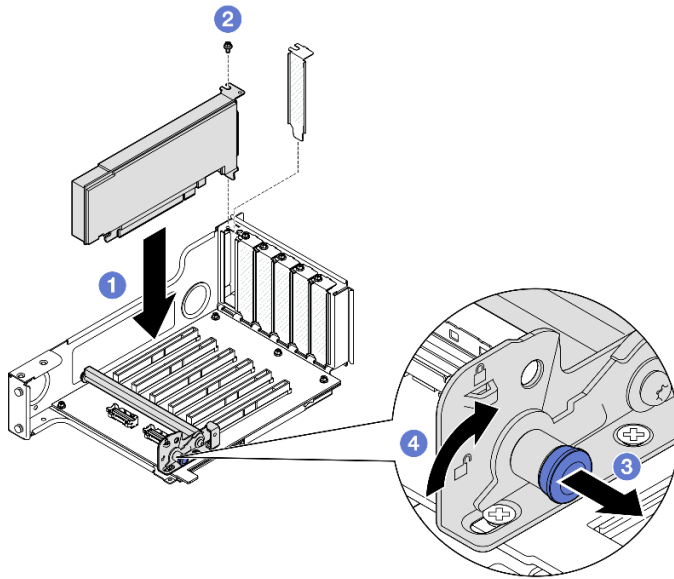


Figure 117. Installing PCIe adapter to riser

- a. ① Align the adapter with the connector on the PCIe riser; then, carefully press the PCIe adapter straight into the slot until it is securely seated and its bracket also is secured.
- b. ② Secure the adapter with a screw.
- c. ③ Pull the plunger that secures the PCIe adapter retainer.
- d. ④ Close the PCIe adapter retainer to the locked position.

## After you finish

1. Reinstall the PCIe riser. See [“Install the PCIe riser”](#) on page 147.
2. Reinstall the crossbar. See [“Install the crossbar”](#) on page 71.
3. Reinstall the rear top cover. See [“Install the rear top cover”](#) on page 237.
4. Reinstall the front top cover. See [“Install the front top cover”](#) on page 239.
5. Complete the parts replacement. See [“Complete the parts replacement”](#) on page 242.

## Demo video

[Watch the procedure on YouTube](#)

## Install the PCIe riser

Follow the instructions in this section to install the PCIe riser.

## About this task

### Attention:

- Read “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “[Power off the server](#)” on page 17.
- 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.

**Note:** For more details on the different types of risers, see “Rear view” in *ThinkSystem SR860 V3 User Guide* or *ThinkSystem SR860 V3 System Configuration Guide*.

Depending on your configuration, follow the corresponding procedures below for proper installation procedure.

- “[Install PCIe riser 3](#)” on page 148
- “[Install PCIe riser 1](#)” on page 151
- “[Install PCIe riser 2](#)” on page 153

**Firmware and driver download:** You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

## Install PCIe riser 3

### Procedure

- Step 1. If necessary, install the PCIe adapters. See “[Install a PCIe adapter](#)” on page 144.
- Step 2. If a PCIe riser filler has been installed, remove it.
- Step 3. Install PCIe riser 3.

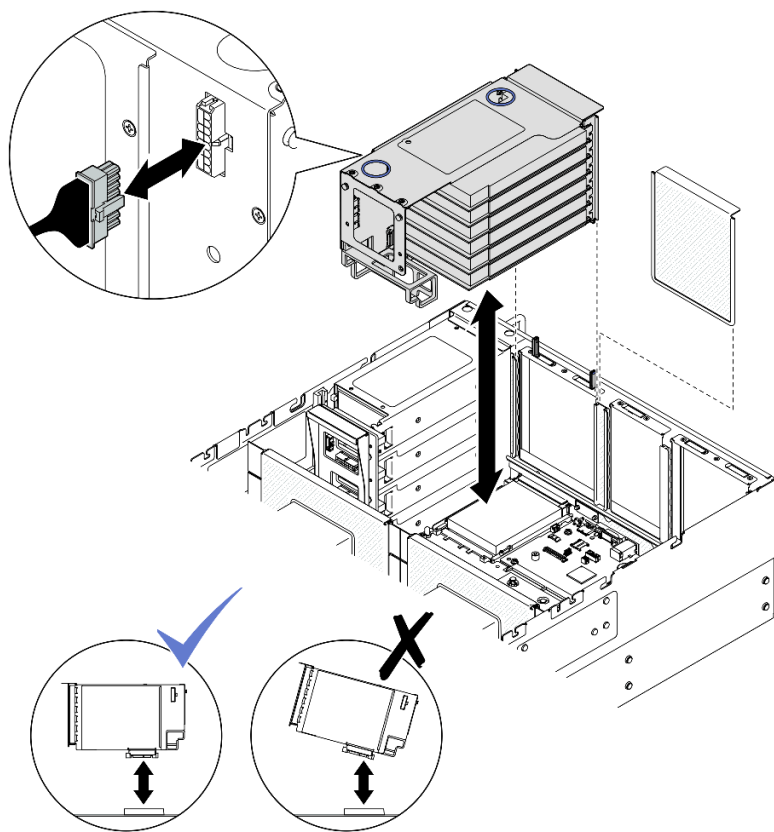
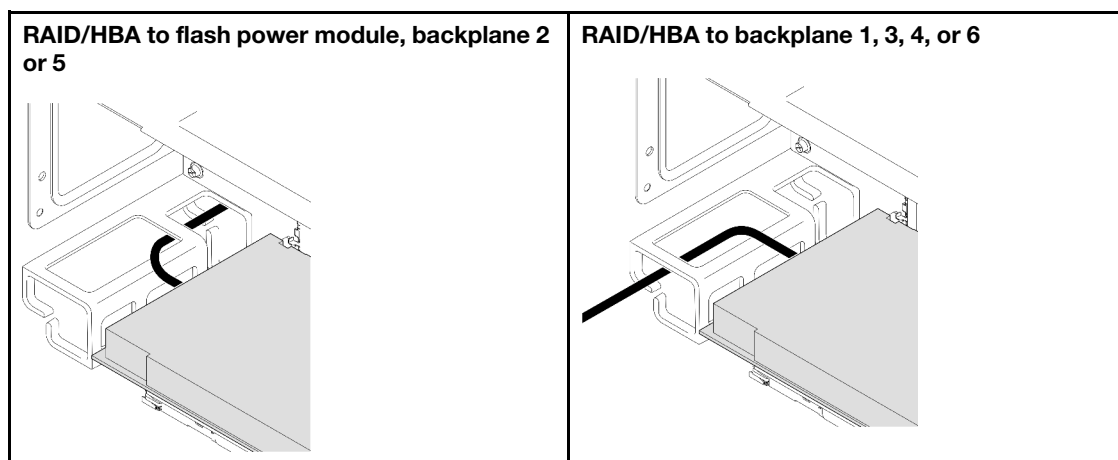


Figure 118. Installing PCIe riser 3

- a. Connect all internal cables to the PCIe adapters.
- b. For six slot FH risers, route all internal cables through the cable retainer as shown below.



- c. Align and install the PCIe riser until it rests firmly on top of the kickstands; then, connect the power cable to the PCIe riser.
  - Six slot FH riser: Power 2x8 to power 2x8 (100 mm)
  - Two slot FH riser: Power 2x8 to power 2x4 (100 mm)
- d. Connect the PCIe riser 3 assembly cables to the system board assembly. See [“PCIe riser 3 cable routing”](#) on page 395 for more information on the internal cable routing.

Step 4. If a 7mm drive cage is installed in PCIe riser 3, connect the 7mm drive cables and reinstall PCIe riser 1.

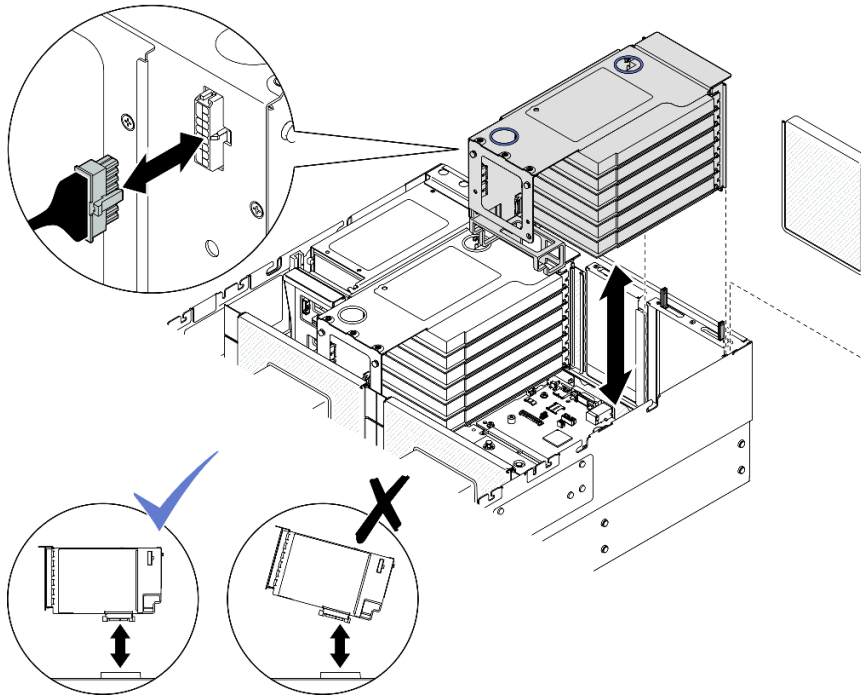
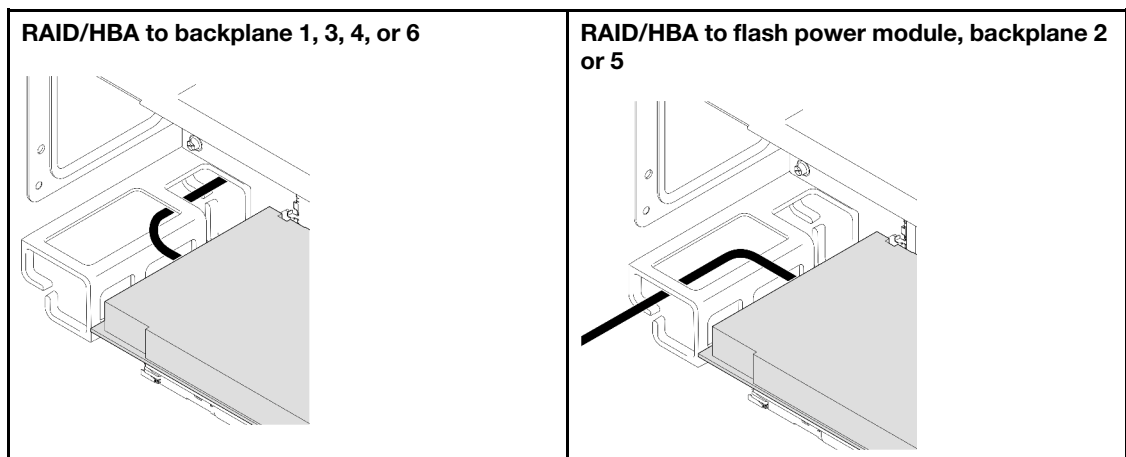


Figure 119. Installing PCIe riser 1

- Connect the 7mm drive cables to the system board assembly. See [“7mm drive backplane cable routing” on page 383](#).
- Connect all internal cables to the PCIe adapters.
- For six slot FH risers, route all internal cables through the cable retainer as shown below.



- Align and install the PCIe riser until it rests firmly on top of the kickstands; then, connect the power cable to the PCIe riser.
  - Six slot FH riser: Power 2x8 to power 2x8 (400 mm)
  - Two slot FH riser: Power 2x8 to power 2x4 (330 mm)
- Connect the PCIe riser 1 cables to the system board assembly. See [“PCIe riser 1 cable routing” on page 391](#) for more information on the internal cable routing.

Step 5. Install PCIe riser 2.

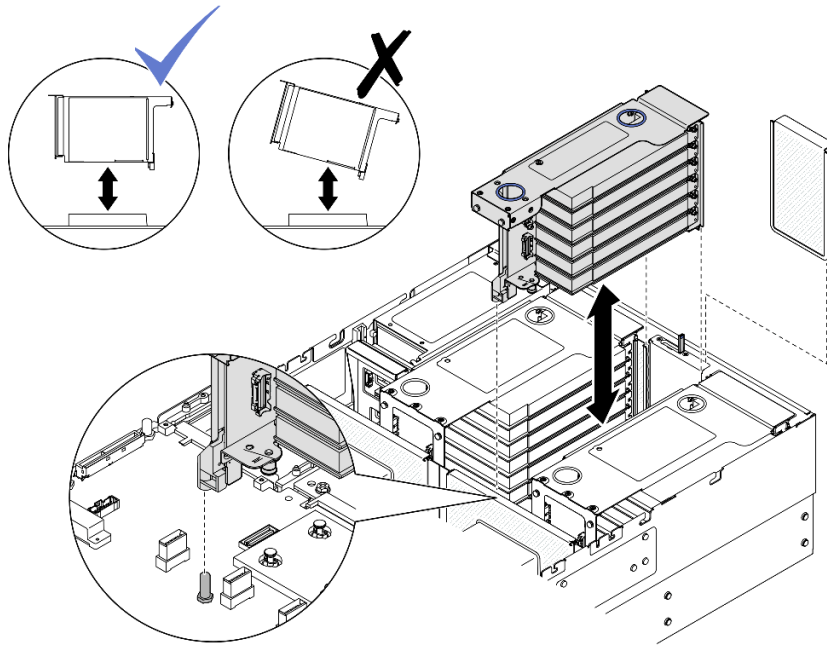


Figure 120. Installing PCIe riser 2

- a. Connect all internal cables to the PCIe adapters.
- b. Align and install the PCIe riser until it rests firmly on top of the kickstand.
- c. Connect the PCIe riser 2 assembly cables to the system board assembly. See [“PCIe riser 2 cable routing” on page 393](#) for more information on the internal cable routing.

Step 6. Connect and route all internal cables to the backplanes and flash power modules. See [“2.5-inch drive backplane cable routing” on page 254](#) and [“Flash power module cable routing” on page 384](#) for more information on the internal cable routing.

## Install PCIe riser 1

### Procedure

Step 1. If necessary, install the PCIe adapters. See [“Install a PCIe adapter” on page 144](#).

Step 2. If a PCIe riser filler has been installed, remove it.

Step 3. Install PCIe riser 1.

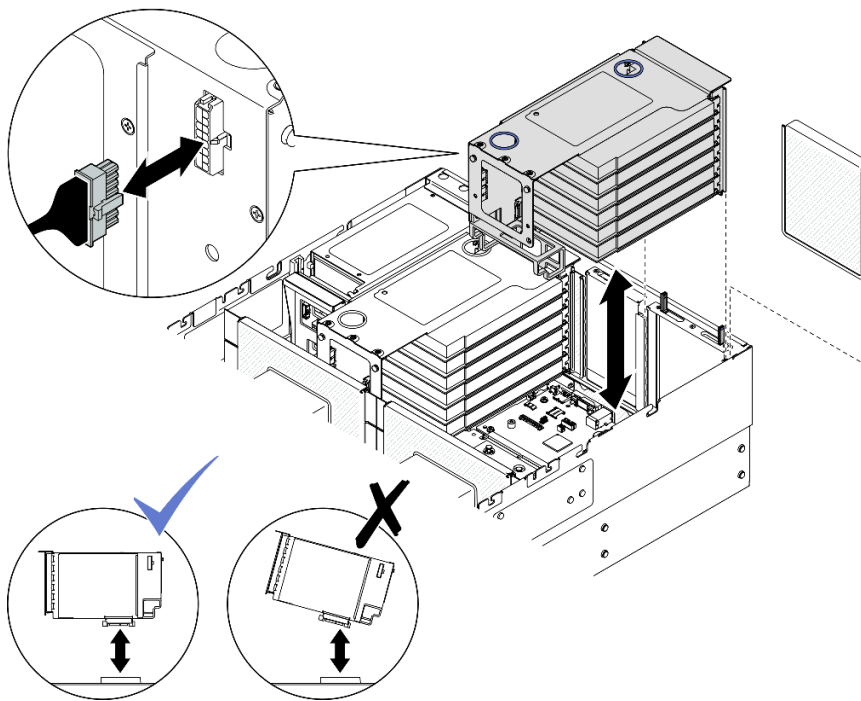
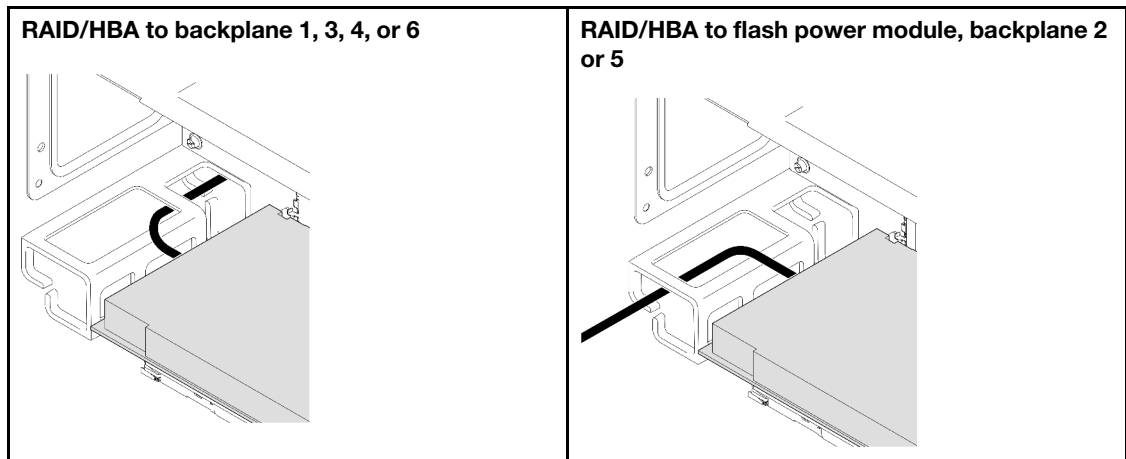


Figure 121. Installing PCIe riser 1

- a. Connect all internal cables to the PCIe adapters.
- b. For six slot FH risers, route all internal cables through the cable retainer as shown below.



- c. Align and install the PCIe riser until it rests firmly on top of the kickstands; then, connect the power cable to the PCIe riser.
  - Six slot FH riser: Power 2x8 to power 2x8 (400 mm)
  - Two slot FH riser: Power 2x8 to power 2x4 (330 mm)
- d. Connect the PCIe riser 1 cables to the system board assembly. See [“PCIe riser 1 cable routing” on page 391](#) for more information on the internal cable routing.

Step 4. Install PCIe riser 2.

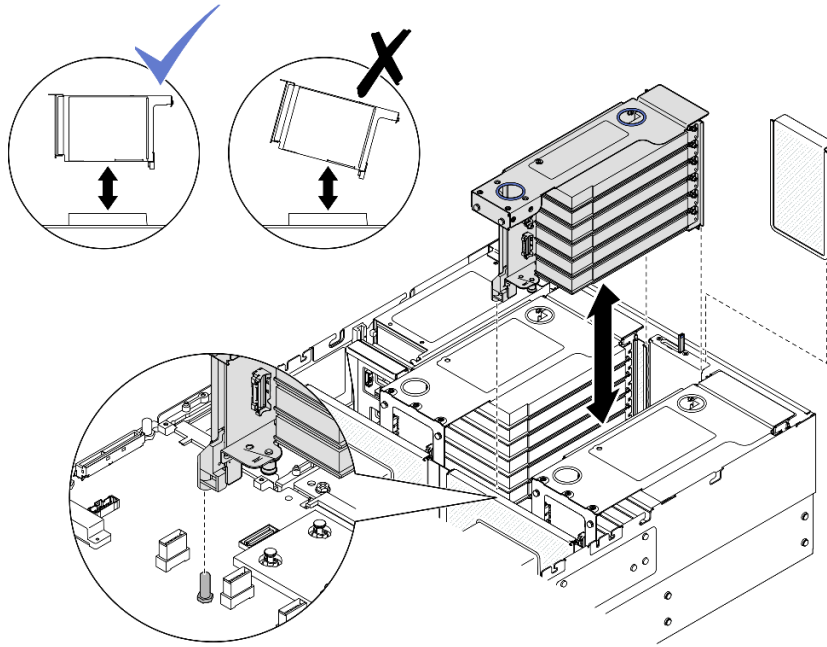


Figure 122. Installing PCIe riser 2

- a. Connect all internal cables to the PCIe adapters.
- b. Align and install the PCIe riser until it rests firmly on top of the kickstand.
- c. Connect the PCIe riser 2 assembly cables to the system board assembly. See [“PCIe riser 2 cable routing” on page 393](#) for more information on the internal cable routing.

Step 5. Connect and route all internal cables to the backplanes and flash power modules. See [“2.5-inch drive backplane cable routing” on page 254](#) and [“Flash power module cable routing” on page 384](#) for more information on the internal cable routing.

## Install PCIe riser 2

### Procedure

- Step 1. If necessary, install the PCIe adapters. See [“Install a PCIe adapter” on page 144](#).
- Step 2. If a PCIe riser filler has been installed, remove it.
- Step 3. Install PCIe riser 2.

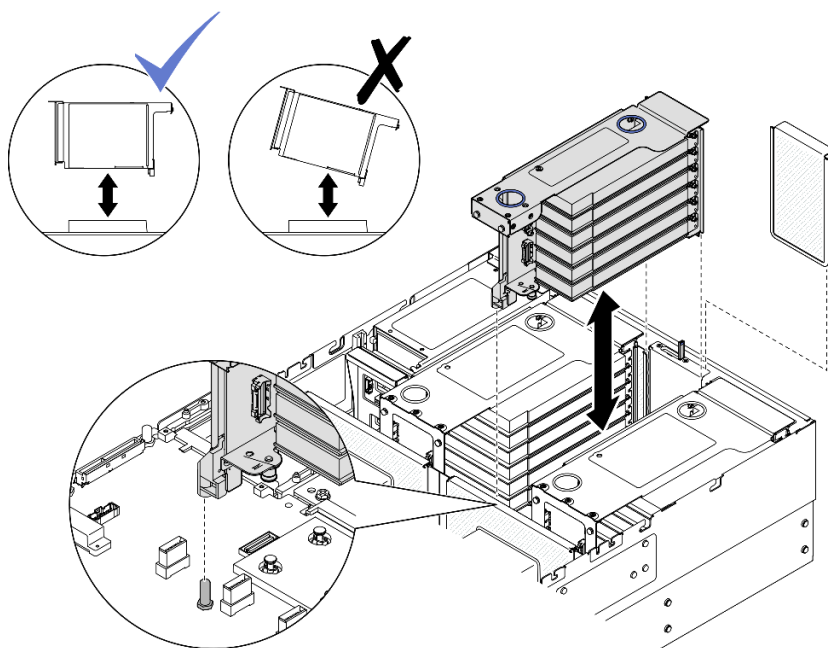


Figure 123. Installing PCIe riser 2

- a. Connect all internal cables to the PCIe adapters.
- b. Align and install the PCIe riser until it rests firmly on top of the kickstand.
- c. Connect the PCIe riser 2 assembly cables to the system board assembly. See [“PCIe riser 2 cable routing” on page 393](#) for more information on the internal cable routing.

Step 4. Connect and route all internal cables to the backplanes and flash power modules. See [“2.5-inch drive backplane cable routing” on page 254](#) and [“Flash power module cable routing” on page 384](#) for more information on the internal cable routing.

## After you finish

1. Reinstall the crossbar. See [“Install the crossbar” on page 71](#).
2. Reinstall the rear top cover. See [“Install the rear top cover” on page 237](#).
3. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
4. Complete the parts replacement. See [“Complete the parts replacement” on page 242](#).

## Demo video

[Watch the procedure on YouTube](#)

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## PCIe riser card and cage replacement

Follow the instructions in this section to remove and install a PCIe riser card and cage.

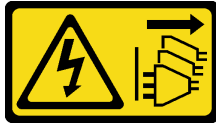
### Remove a PCIe riser card and cage

Follow the instructions in this section to remove a PCIe riser card and cage.

### About this task



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### 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 [“Installation Guidelines”](#) on page 1 and [“Safety inspection checklist”](#) on page 2 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server”](#) on page 17.
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails”](#) on page 17.

**Note:** For more details on the different types of risers, see “Rear view” in *ThinkSystem SR860 V3 User Guide* or *ThinkSystem SR860 V3 System Configuration Guide*.

Depending on your configuration, follow the corresponding procedures below for proper removal procedure.

- See [“Remove a PCIe riser card and cage from two slot FH riser”](#) on page 155 for the following risers:
  - x8/x8 PCIe G4 Riser 1/3 FHHL
  - 7mm/x8/x8 PCIe G4 Riser 3 FHHL
- See [“Remove a PCIe riser card and cage from six slot FH riser”](#) on page 156 for the following risers:
  - 3 x16 & 3 x8 PCIe G4 Riser 1/3 FHFL
  - 2 x16 & 3 x8 + 7mm PCIe G4 Riser 3 FHFL
  - 4 x16 & 1 x8 PCIe G5 Riser 1/3 FHFL
  - 3 x16 & 1 x8 + 7mm PCIe G5 Riser 3 FHFL
- See [“Remove a PCIe riser card and cage from six slot HH riser”](#) on page 159 for the following risers:
  - 6 x8 PCIe G4 Riser 2 HHHL
  - 6 x8 PCIe G5 Riser 2 HHHL

## Remove a PCIe riser card and cage from two slot FH riser

### Procedure

- Step 1. Make preparation for the task.
  - a. Remove the front top cover. See [“Remove the front top cover”](#) on page 234.
  - b. Remove the rear top cover. See [“Remove the rear top cover”](#) on page 236.
  - c. Remove the crossbar. See [“Remove the crossbar”](#) on page 68.
  - d. Remove the PCIe riser. See [“Remove the PCIe riser”](#) on page 134.

e. Remove all the PCIe adapters. See [“Remove a PCIe adapter”](#) on page 140.

Step 2. Remove the five screws that secure the PCIe riser card; then, remove the PCIe riser card from the PCIe riser cage.

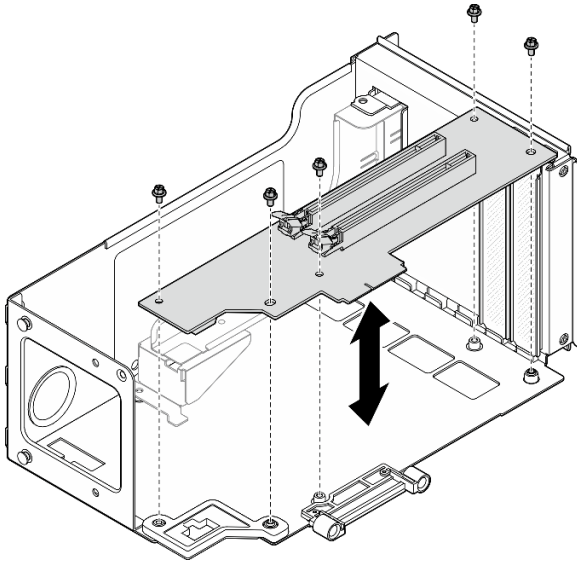


Figure 124. Removing PCIe riser card from riser

Step 3. If necessary, remove the connector guide from the PCIe riser cage.

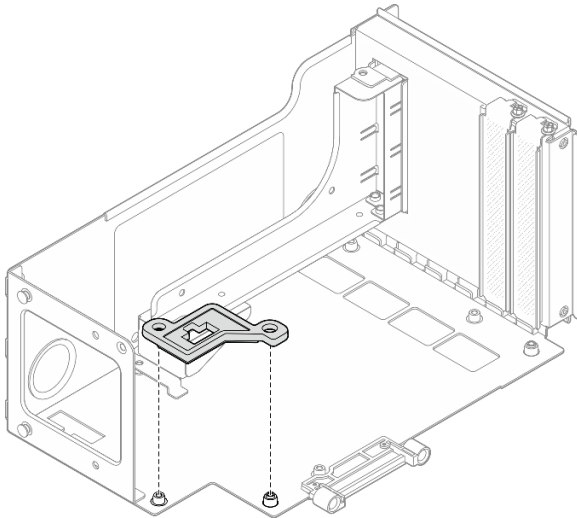


Figure 125. Removing connector guide from riser

## Remove a PCIe riser card and cage from six slot FH riser

**Note:** A Gen 4 riser is used as an example for illustration. The replacement procedure for a Gen 5 riser is similar.

### Procedure

Step 1. Make preparation for the task.

a. Remove the front top cover. See [“Remove the front top cover”](#) on page 234.

- b. Remove the rear top cover. See [“Remove the rear top cover”](#) on page 236.
- c. Remove the crossbar. See [“Remove the crossbar”](#) on page 68.
- d. Remove the PCIe riser. See [“Remove the PCIe riser”](#) on page 134.
- e. Remove the 7mm drive cage. See [“Remove the 7mm drive cage”](#) on page 33.
- f. Remove all the PCIe adapters. See [“Remove a PCIe adapter”](#) on page 140.

Step 2. Remove the two screws and the cover.

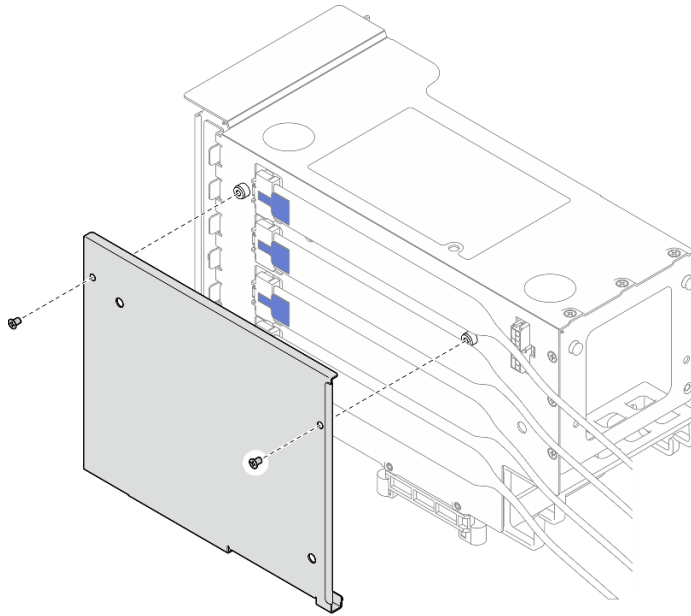


Figure 126. Removing cover from riser

Step 3. Disconnect all the PCIe cables from the outside of the PCIe riser.

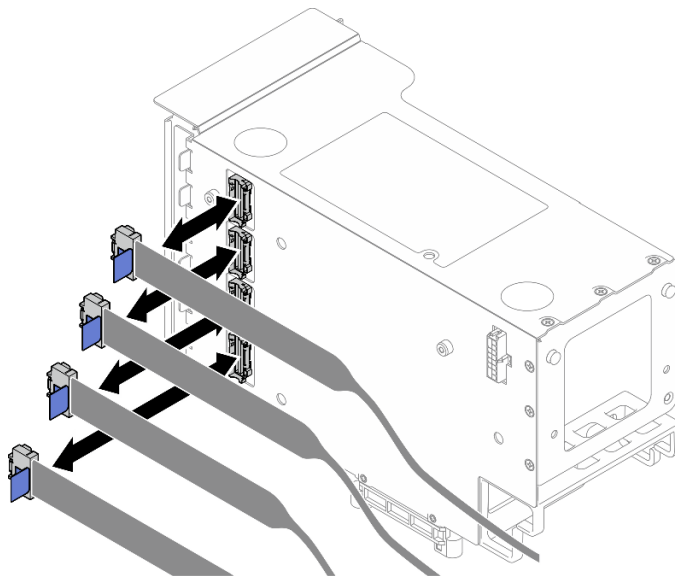


Figure 127. Disconnecting PCIe cables from outside of riser

Step 4. Disconnect all the PCIe cables from the inside of the PCIe riser.

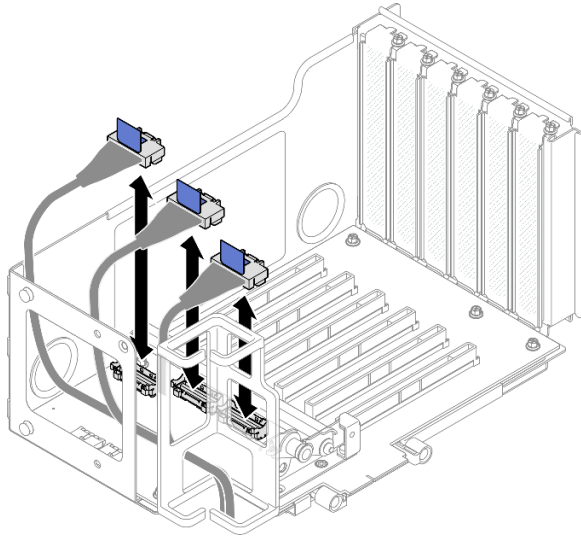


Figure 128. Disconnecting PCIe cables from inside of riser

Step 5. Remove the three screws that secure the PCIe retainer; then remove the PCIe retainer.

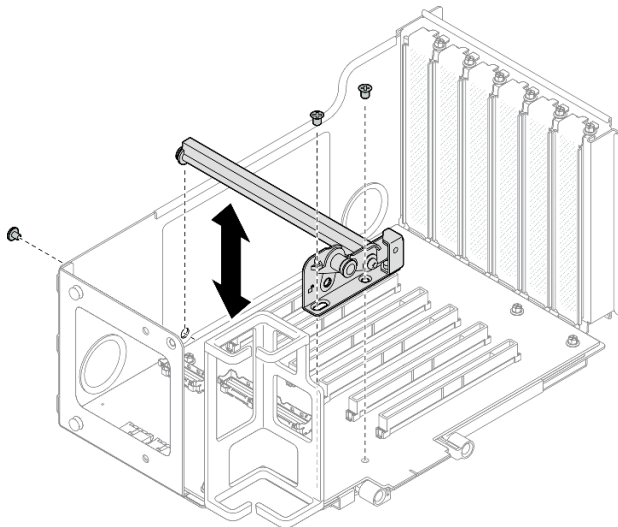


Figure 129. Removing PCIe retainer from riser

Step 6. Remove the six screws that secure the PCIe riser card; then, remove the PCIe riser card from the PCIe riser cage.

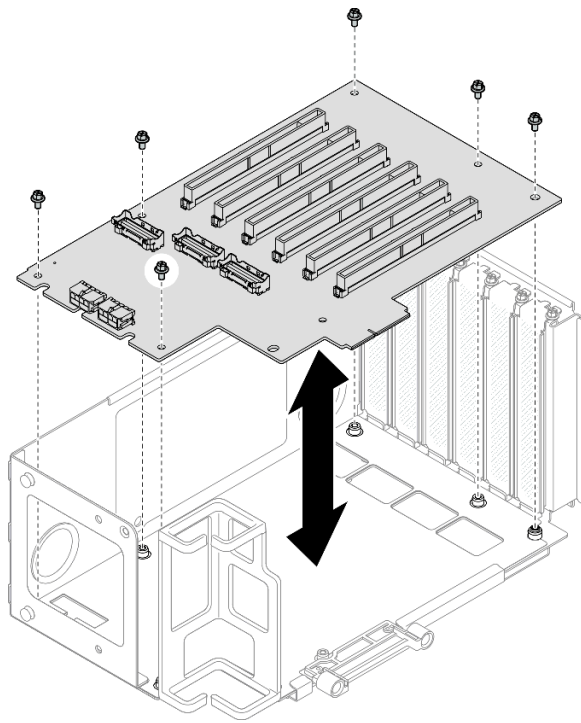


Figure 130. Removing PCIe riser card from riser

Step 7. If necessary, remove the PCIe riser cable retainer from the PCIe riser cage.

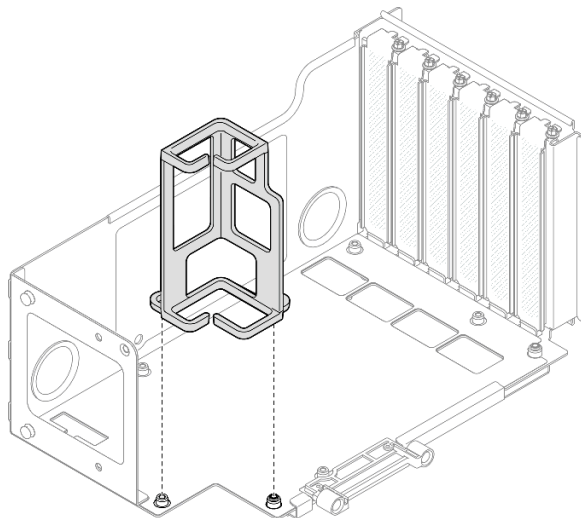


Figure 131. Removing cable retainer from riser

### Remove a PCIe riser card and cage from six slot HH riser

**Note:** A Gen 4 riser is used as an example for illustration. The replacement procedure for a Gen 5 riser is similar.

#### Procedure

Step 1. Make preparation for the task.

- a. Remove the front top cover. See [“Remove the front top cover”](#) on page 234.

- b. Remove the rear top cover. See [“Remove the rear top cover”](#) on page 236.
- c. Remove the crossbar. See [“Remove the crossbar”](#) on page 68.
- d. Remove the PCIe riser. See [“Remove the PCIe riser”](#) on page 134.
- e. Remove all the PCIe adapters. See [“Remove a PCIe adapter”](#) on page 140.

Step 2. Remove the two screws and the cover.

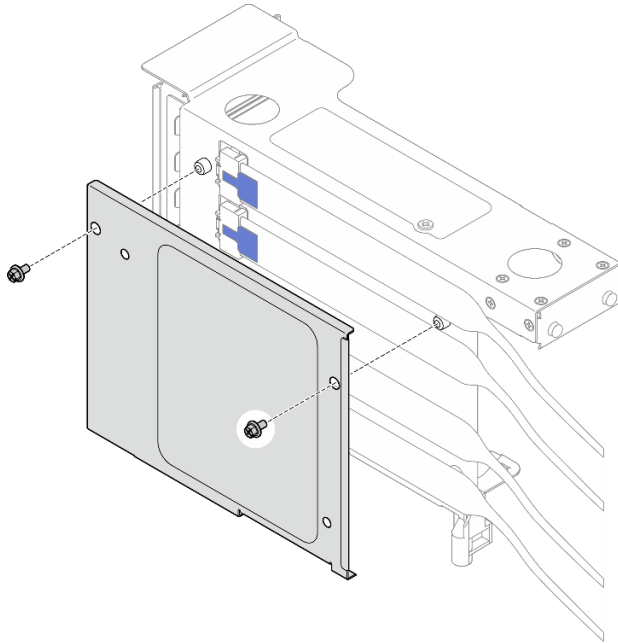


Figure 132. Removing cover from riser

Step 3. Disconnect all the PCIe cables from the outside of the PCIe riser.

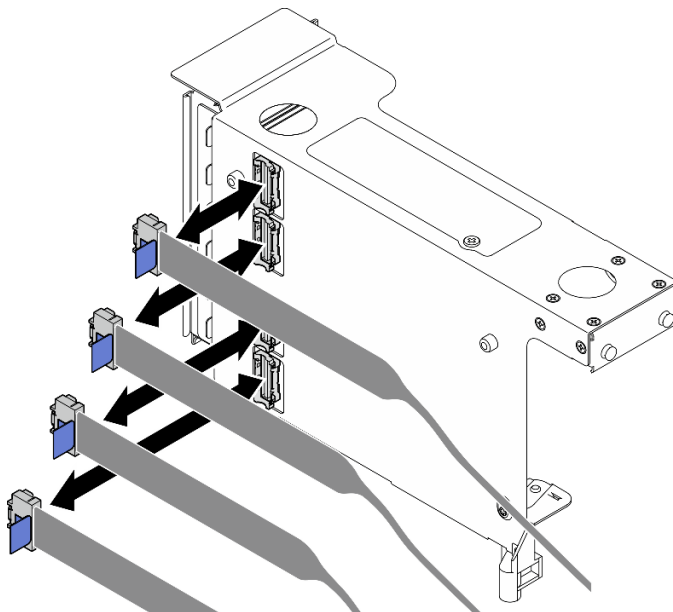


Figure 133. Disconnecting PCIe cables from outside of riser

Step 4. Disconnect all the PCIe cables from the inside of the PCIe riser.

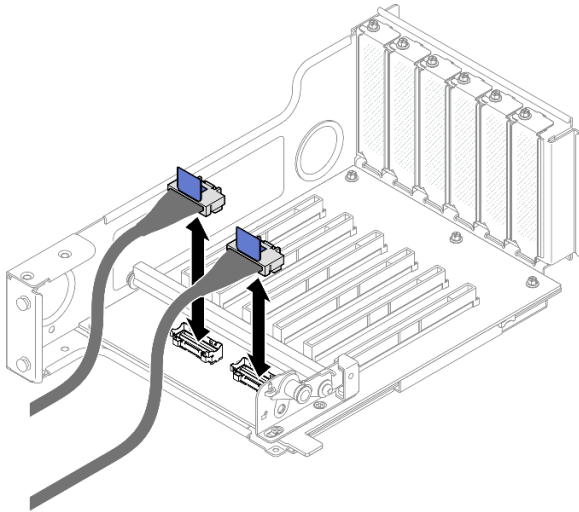


Figure 134. Disconnecting PCIe cables from inside of riser

Step 5. Remove the three screws that secure the PCIe retainer; then remove the PCIe retainer.

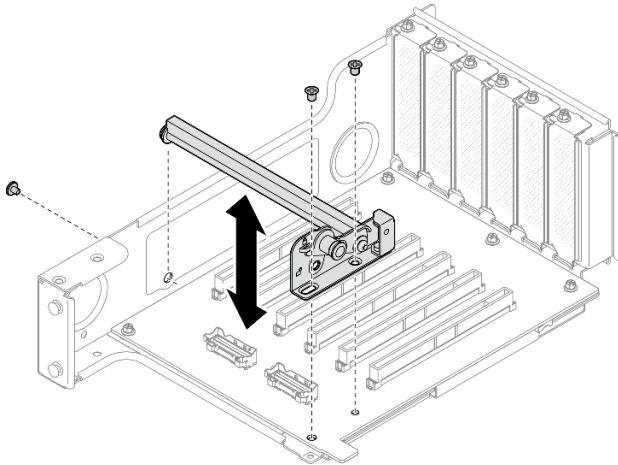


Figure 135. Removing PCIe retainer from riser

Step 6. Remove the five screws that secure the PCIe riser card; then, remove the PCIe riser card from the PCIe riser cage.

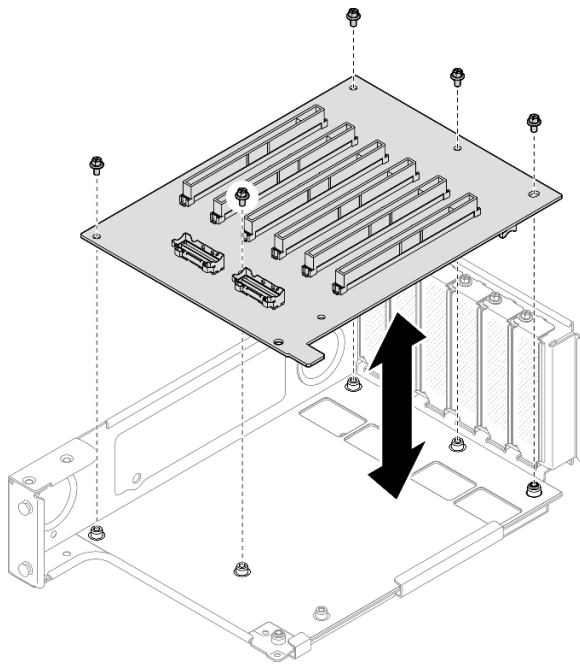


Figure 136. Removing PCIe riser card from riser

## After you finish

1. If you are replacing a FHFL or HHFL PCIe riser cage and reusing the PCIe riser board, remove the PCIe riser extenders. See [“Remove a PCIe riser extender” on page 174](#).
2. Install a replacement unit. See [“Install a PCIe riser card and cage” on page 162](#).
3. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

## Demo video

[Watch the procedure on YouTube](#)

## Install a PCIe riser card and cage

Follow the instructions in this section to install a PCIe riser card and cage.

## 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 “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “[Power off the server](#)” on page 17.
- 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.

**Notes:**

- For more details on the different types of risers, see “Rear view” in *ThinkSystem SR860 V3 User Guide* or *ThinkSystem SR860 V3 System Configuration Guide*.
- If you are installing a new riser cage, attach the riser cage label to the rear of the new riser cage if necessary.

Depending on your configuration, follow the corresponding procedures below for proper removal procedure.

- See “[Install a PCIe riser card and cage to two slot FH riser](#)” on page 163 for the following risers:
  - x8/x8 PCIe G4 Riser 1/3 FHHL
  - 7mm/x8/x8 PCIe G4 Riser 3 FHHL
- See “[Install a PCIe riser card and cage to six slot FH riser](#)” on page 164 for the following risers:
  - 3 x16 & 3 x8 PCIe G4 Riser 1/3 FHFL
  - 2 x16 & 3 x8 + 7mm PCIe G4 Riser 3 FHFL
  - 4 x16 & 1 x8 PCIe G5 Riser 1/3 FHFL
  - 3 x16 & 1 x8 + 7mm PCIe G5 Riser 3 FHFL
- See “[Install a PCIe riser card and cage to six slot HH riser](#)” on page 169 for the following risers:
  - 6 x8 PCIe G4 Riser 2 HHHL
  - 6 x8 PCIe G5 Riser 2 HHHL

**Firmware and driver download:** You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

**Install a PCIe riser card and cage to two slot FH riser****Procedure**

- Step 1. If necessary, install the PCIe riser extenders. See “[Install a PCIe riser extender](#)” on page 176.
- Step 2. If necessary, align and install the connector guide into the PCIe riser cage.

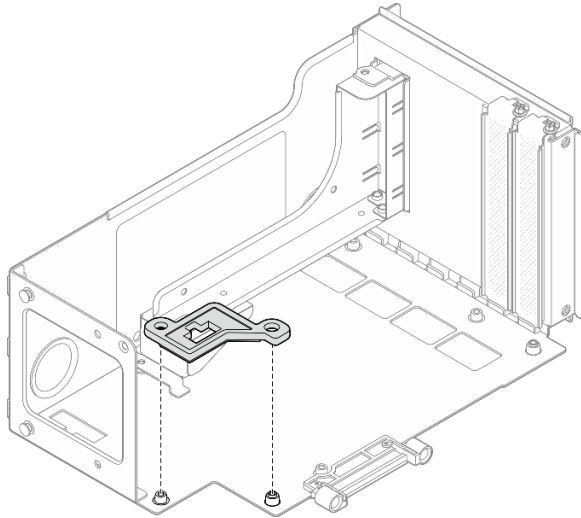


Figure 137. Installing connector guide to riser

- Step 3. Align the screw holes in the PCIe riser card with the screw holes in the PCIe riser cage; then, install five screws to secure the PCIe riser card.

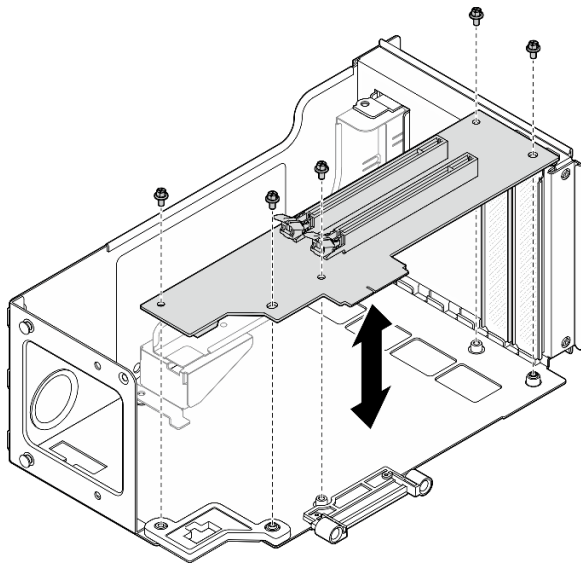


Figure 138. Installing PCIe riser card to riser

## Install a PCIe riser card and cage to six slot FH riser

**Note:** A Gen 4 riser is used as an example for illustration. The replacement procedure for a Gen 5 riser is similar.

### Procedure

- Step 1. If necessary, attach the labels onto the straight-end of the PCIe riser cables.

**Note:** See [“PCIe riser 1 cable routing” on page 391](#) or [“PCIe riser 3 cable routing” on page 395](#) to identify the corresponding labels for the cables.

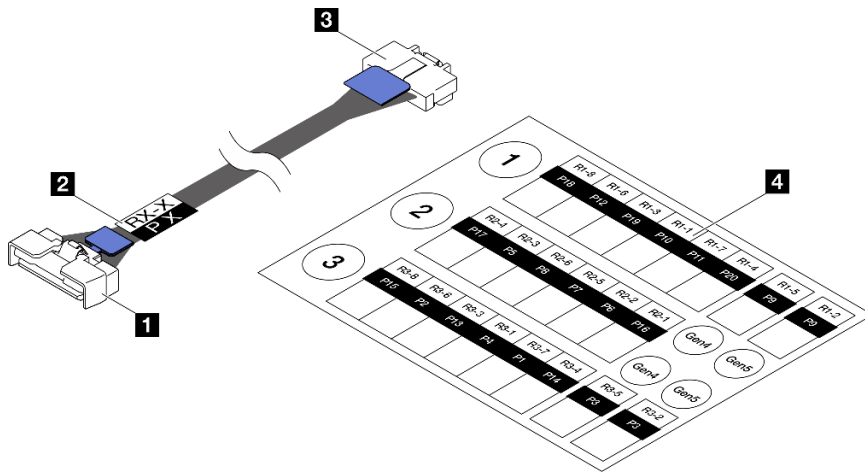


Figure 139. PCIe riser cable

<b>1</b> Straight-end of cable (connects to system board assembly)	<b>3</b> Right-angle end of cable (connects to riser card)
<b>2</b> Label (located near straight-end of cable)	<b>4</b> Label sheet for PCIe riser cable (from labels kit)

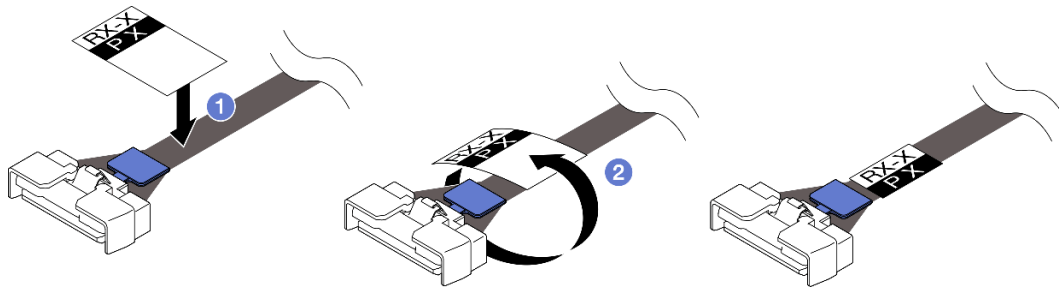


Figure 140. Attaching label onto cable

- a. **1** Attach the white space portion of the label near the straight-end of the PCIe riser cable.
- b. **2** Wrap the label around the cable and attach it onto the white space portion.

Step 2. If necessary, install the PCIe riser extenders. See [“Install a PCIe riser extender”](#) on page 176.

Step 3. If necessary, align and install the cable retainer into the PCIe riser cage.

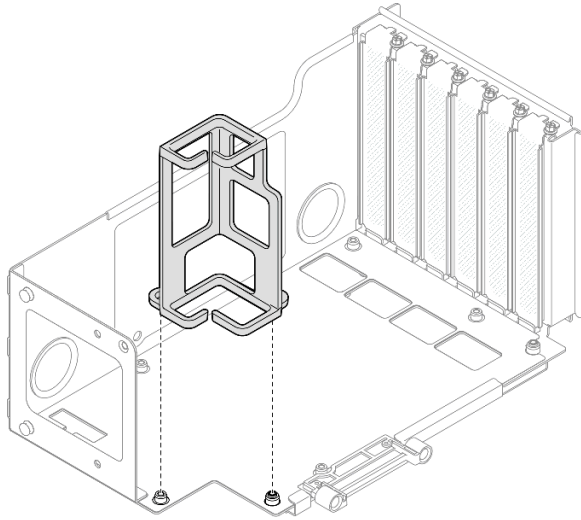


Figure 141. Installing cable retainer to riser

- Step 4. Align the screw holes in the PCIe riser card with the screw holes in the PCIe riser cage; then, install six screws to secure the PCIe riser card.

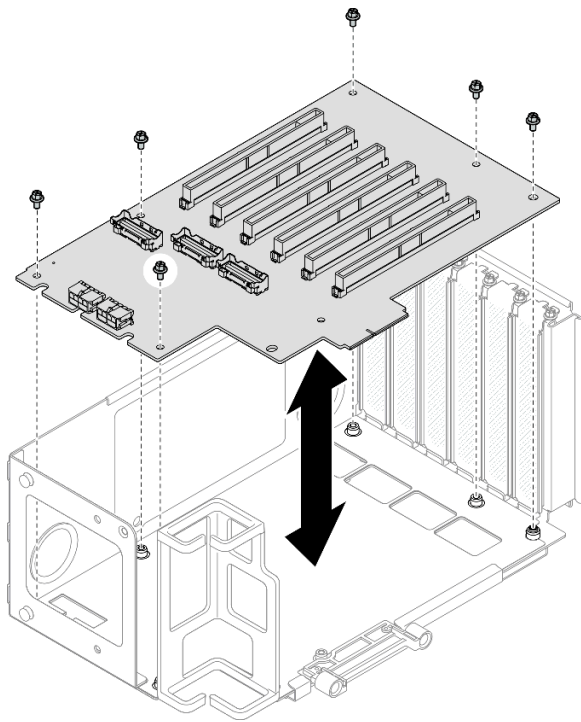


Figure 142. Installing PCIe riser card to riser

- Step 5. Install the PCIe retainer into the PCIe riser cage; then, install three screws to secure the PCIe retainer.

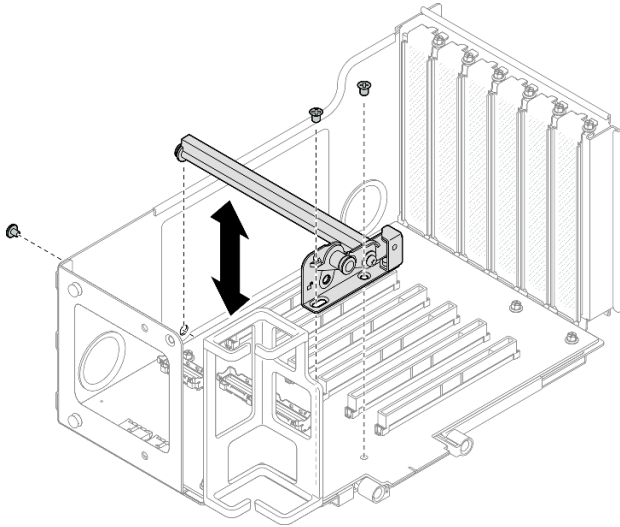


Figure 143. Installing PCIe retainer to riser

Step 6. Connect the right-angle end of the PCIe riser cables labeled **R1-4**, **R1-5**, and **R1-7** (**R3-4**, **R3-5**, and **R3-7**) to the corresponding connectors on the inside of the PCIe riser.

**Note:** For a Gen 5 riser card, connect the PCIe riser cables labeled **R1-2**, **R1-4**, and **R1-7** (**R3-2**, **R3-4**, and **R3-7**) to the corresponding connectors.

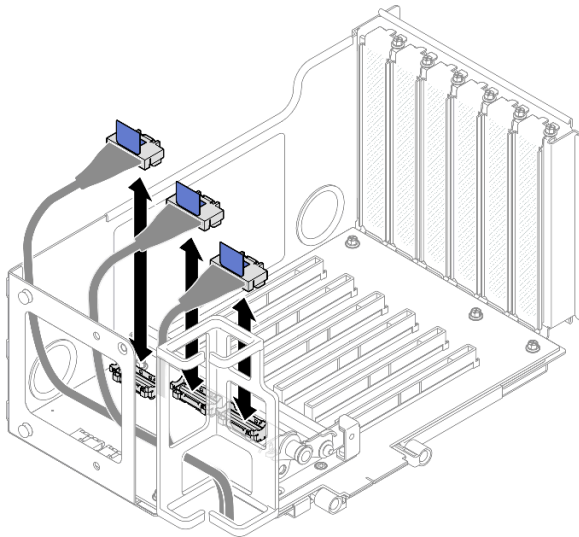
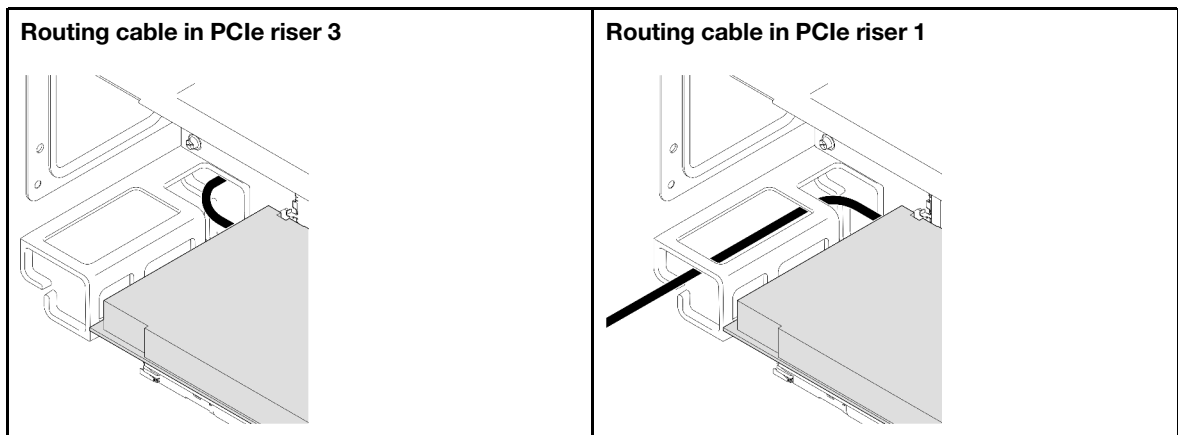


Figure 144. Connecting PCIe riser cables to inside of riser

Step 7. Route the PCIe riser cables through the cable retainer as shown below.



Step 8. If necessary, remove the two screws and the cover.

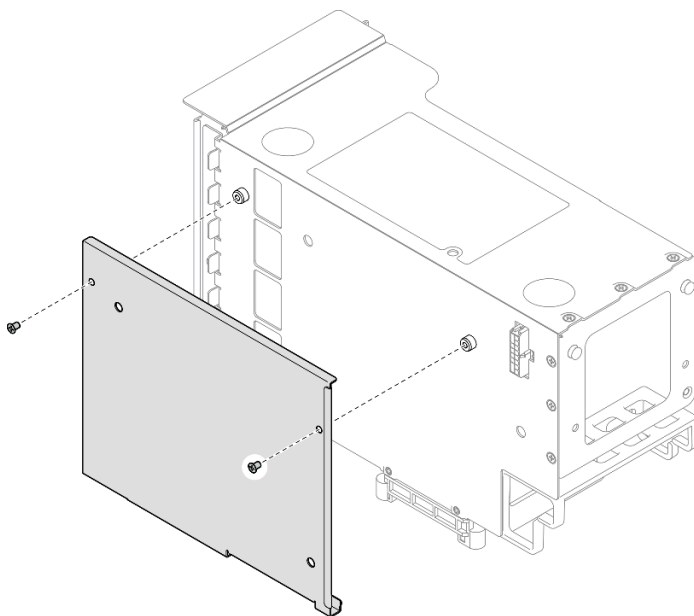


Figure 145. Removing cover from riser

Step 9. Connect the right-angle end of the PCIe riser cables labeled **R1-1, R1-3, R1-6, and R1-8 (R3-1, R3-3, R3-6, and R3-8)** to the corresponding connectors on the outside of the PCIe riser.

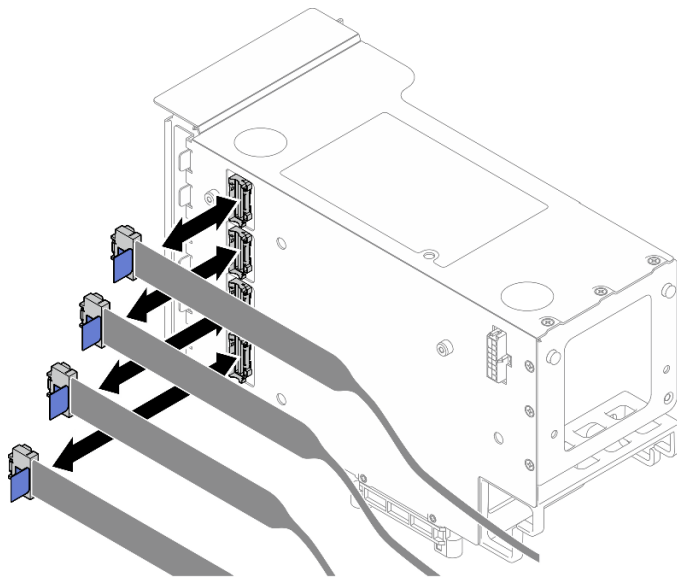


Figure 146. Connecting PCIe riser cables to outside of riser

Step 10. Install the cover onto the PCIe riser cage; then, install two screws to secure the cover.

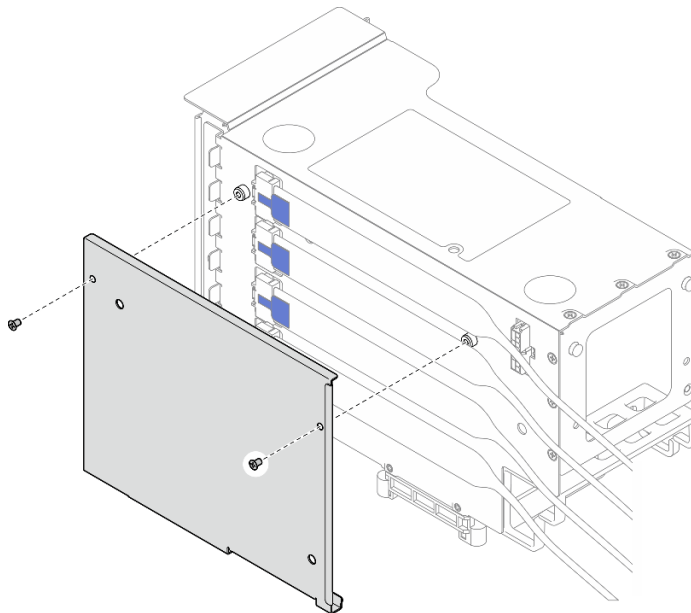


Figure 147. Installing cover to riser

## Install a PCIe riser card and cage to six slot HH riser

**Note:** A Gen 4 riser is used as an example for illustration. The replacement procedure for a Gen 5 riser is similar.

### Procedure

Step 1. If necessary, attach the labels onto the straight-end of the PCIe riser cables.

**Note:** See [“PCIe riser 2 cable routing” on page 393](#) to identify the corresponding labels for the cables.

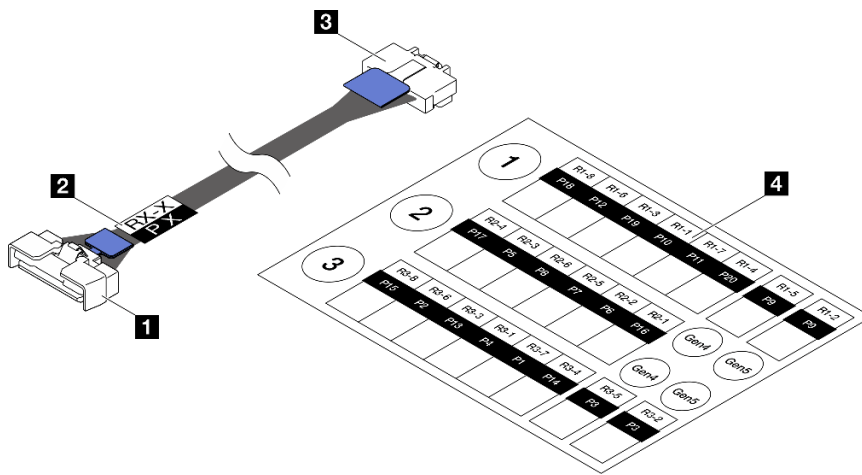


Figure 148. PCIe riser cable

<b>1</b> Straight-end of cable (connects to system board assembly)	<b>3</b> Right-angle end of cable (connects to riser card)
<b>2</b> Label (located near straight-end of cable)	<b>4</b> Label sheet for PCIe riser cable (from labels kit)

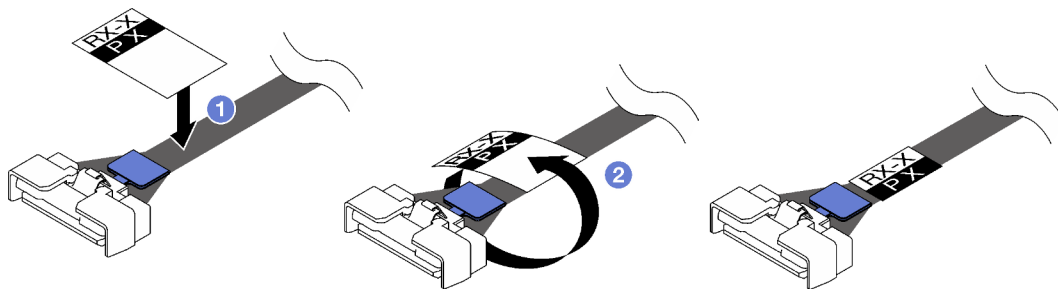


Figure 149. Attaching label onto cable

- a. **1** Attach the white space portion of the label near the straight-end of the PCIe riser cable.
- b. **2** Wrap the label around the cable and attach it onto the white space portion.

Step 2. If necessary, install the PCIe riser extenders. See [“Install a PCIe riser extender” on page 176](#).

Step 3. Align the screw holes in the PCIe riser card with the screw holes in the PCIe riser cage; then, install five screws to secure the PCIe riser card.



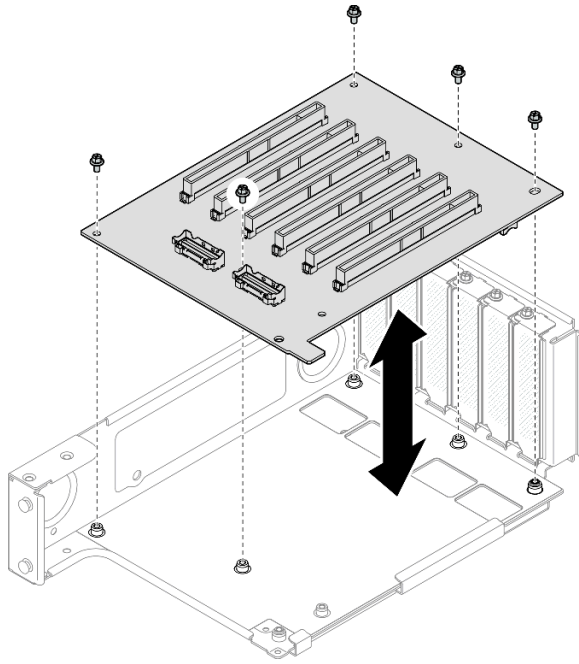


Figure 150. Installing PCIe riser card to riser

- Step 4. Install the PCIe retainer into the PCIe riser cage; then, install three screws to secure the PCIe retainer.

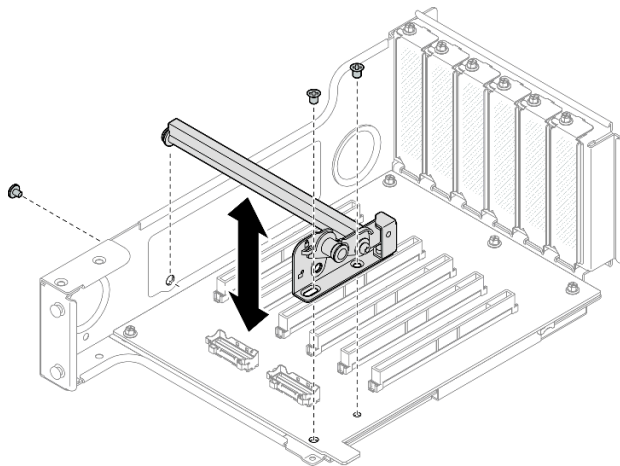


Figure 151. Installing PCIe retainer to riser

- Step 5. Connect the right-angle end of the PCIe riser cables labeled **R2-3** and **R2-4** to the corresponding connectors on the inside of the PCIe riser.

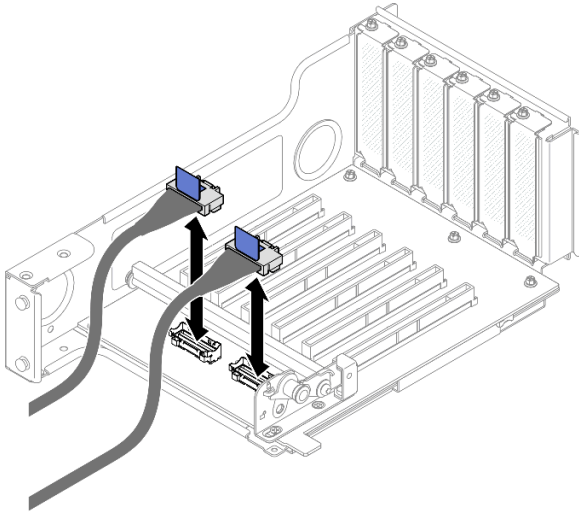


Figure 152. Connecting PCIe riser cables to inside of riser

Step 6. If necessary, remove the two screws and the cover.

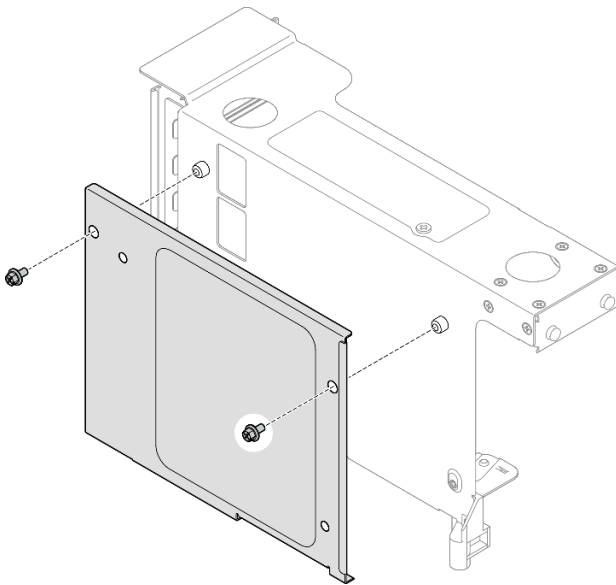


Figure 153. Removing cover from riser

Step 7. Connect the right-angle end of the PCIe riser cables labeled **R2-1**, **R2-2**, **R2-5**, and **R2-6** to the corresponding connectors on the outside of the PCIe riser.

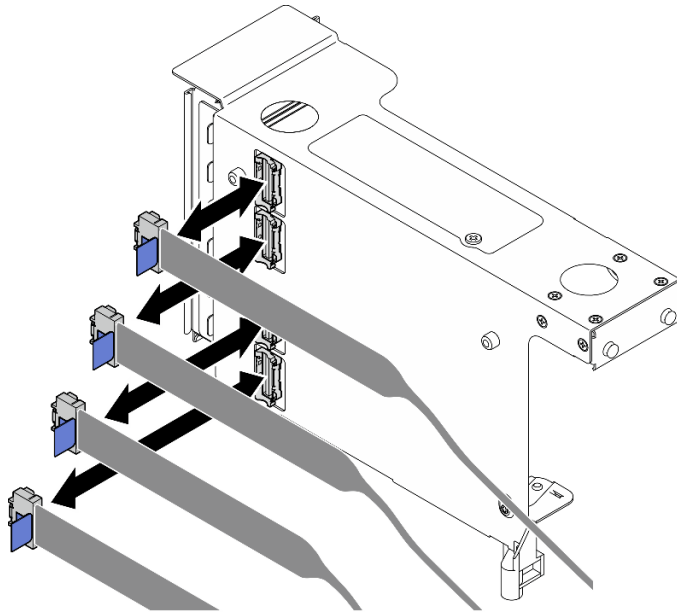


Figure 154. Connecting PCIe riser cables to outside of riser

Step 8. Install the cover onto the PCIe riser cage; then, install two screws to secure the cover.

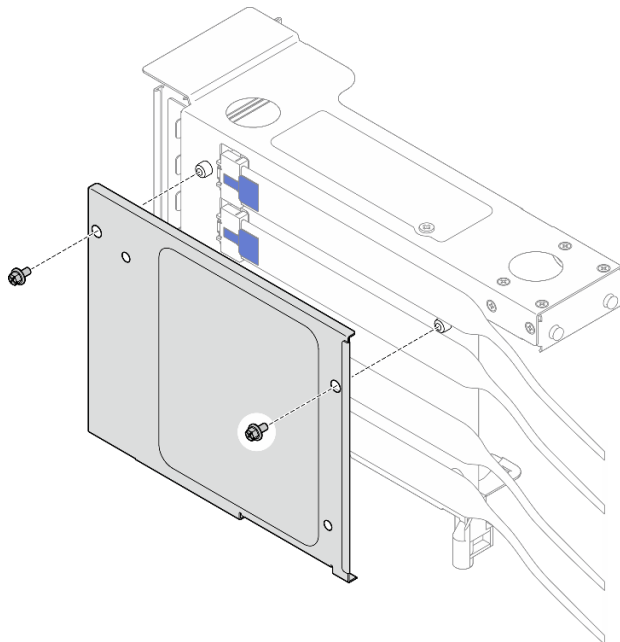


Figure 155. Installing cover to riser

## After you finish

1. Reinstall all the PCIe adapters. See [“Install a PCIe adapter”](#) on page 144.
2. Reinstall the 7mm drive cage. See [“Install the 7mm drive cage”](#) on page 39.
3. Reinstall the PCIe riser. See [“Install the PCIe riser”](#) on page 147.
4. Reinstall the crossbar. See [“Install the crossbar”](#) on page 71.

5. Reinstall the rear top cover. See [“Install the rear top cover” on page 237](#).
6. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
7. Complete the parts replacement. See [“Complete the parts replacement” on page 242](#).

### Demo video

[Watch the procedure on YouTube](#)

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## PCIe riser extender replacement

Follow the instructions in this section to remove and install a PCIe riser extender.

### Remove a PCIe riser extender

Follow the instructions in this section to remove a PCIe riser extender.

#### 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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

**Note:** For more details on the different types of risers, see “Rear view” in *ThinkSystem SR860 V3 User Guide* or *ThinkSystem SR860 V3 System Configuration Guide*.

Depending on your configuration, follow the corresponding procedures below for proper removal procedure.

- See [“Remove a PCIe riser extender from six slot FH riser” on page 175](#) for the following risers:
  - 3 x16 & 3 x8 PCIe G4 Riser 1/3 FHFL
  - 2 x16 & 3 x8 + 7mm PCIe G4 Riser 3 FHFL
  - 4 x16 & 1 x8 PCIe G5 Riser 1/3 FHFL
  - 3 x16 & 1 x8 + 7mm PCIe G5 Riser 3 FHFL

- See [“Remove a PCIe riser extender from six slot HH riser”](#) on page 175 for the following risers:
  - 6 x8 PCIe G4 Riser 2 HHHL
  - 6 x8 PCIe G5 Riser 2 HHHL

## Remove a PCIe riser extender from six slot FH riser

**Note:** A Gen 4 riser is used as an example for illustration. The replacement procedure for a Gen 5 riser is similar.

### Procedure

Step 1. Make preparation for the task.

- Remove the front top cover. See [“Remove the front top cover”](#) on page 234.
- Remove the rear top cover. See [“Remove the rear top cover”](#) on page 236.
- Remove the crossbar. See [“Remove the crossbar”](#) on page 68.
- Remove the PCIe riser. See [“Remove the PCIe riser”](#) on page 134.
- Remove all the PCIe adapters. See [“Remove a PCIe adapter”](#) on page 140.

Step 2. Remove the PCIe riser extender.

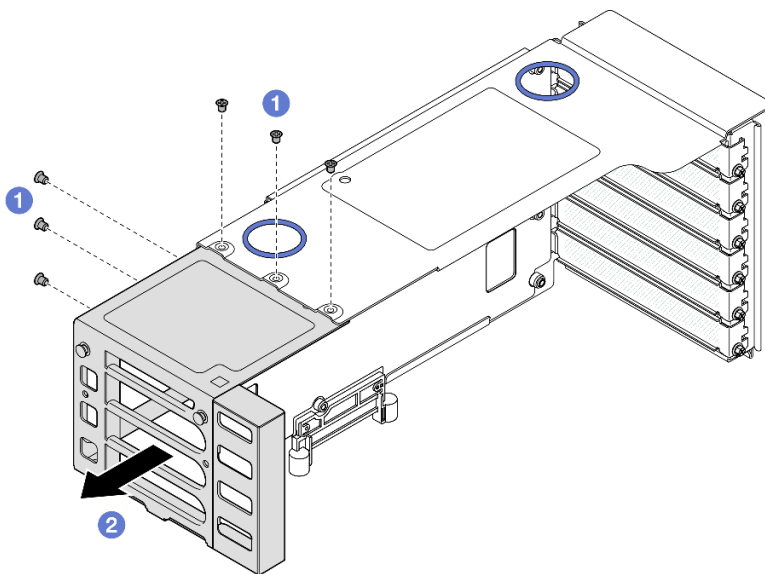


Figure 156. Removing PCIe riser extender from FH PCIe riser

- ① Remove the six screws that secure the PCIe riser extender.
- ② Remove the PCIe riser extender from the PCIe riser cage.

## Remove a PCIe riser extender from six slot HH riser

**Note:** A Gen 4 riser is used as an example for illustration. The replacement procedure for a Gen 5 riser is similar.

### Procedure

Step 1. Make preparation for the task.

- Remove the front top cover. See [“Remove the front top cover”](#) on page 234.
- Remove the rear top cover. See [“Remove the rear top cover”](#) on page 236.

- c. Remove the crossbar. See [“Remove the crossbar”](#) on page 68.
- d. Remove the PCIe riser. See [“Remove the PCIe riser”](#) on page 134.
- e. Remove all the PCIe adapters. See [“Remove a PCIe adapter”](#) on page 140.

Step 2. Remove the PCIe riser extender.

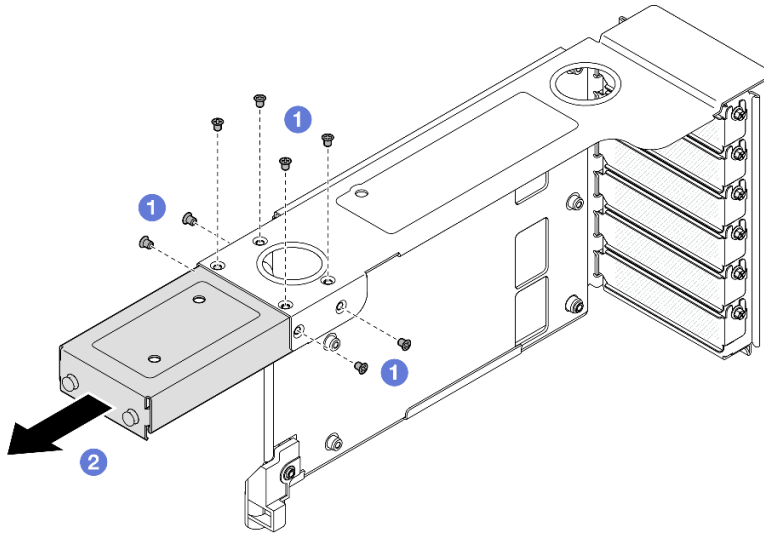


Figure 157. Removing PCIe riser extender from HH PCIe riser

- a. ① Remove the eight screws that secure the PCIe riser extender.
- b. ② Remove the PCIe riser extender from the PCIe riser cage.

## After you finish

1. Install a replacement unit. See [“Install a PCIe riser extender”](#) on page 176.
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 PCIe riser extender

Follow the instructions in this section to install a PCIe riser extender.

## 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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.

**Note:** For more details on the different types of risers, see “Rear view” in *ThinkSystem SR860 V3 User Guide* or *ThinkSystem SR860 V3 System Configuration Guide*.

Depending on your configuration, follow the corresponding procedures below for proper removal procedure.

- See [“Install a PCIe riser extender to six slot FH riser” on page 177](#) for the following risers:
  - 3 x16 & 3 x8 PCIe G4 Riser 1/3 FHFL
  - 2 x16 & 3 x8 + 7mm PCIe G4 Riser 3 FHFL
  - 4 x16 & 1 x8 PCIe G5 Riser 1/3 FHFL
  - 3 x16 & 1 x8 + 7mm PCIe G5 Riser 3 FHFL
- See [“Install a PCIe riser extender to six slot HH riser” on page 178](#) for the following risers:
  - 6 x8 PCIe G4 Riser 2 HHHL
  - 6 x8 PCIe G5 Riser 2 HHHL

### **Install a PCIe riser extender to six slot FH riser**

**Note:** A Gen 4 riser is used as an example for illustration. The replacement procedure for a Gen 5 riser is similar.

#### **Procedure**

Step 1. If a filler is installed, remove it.

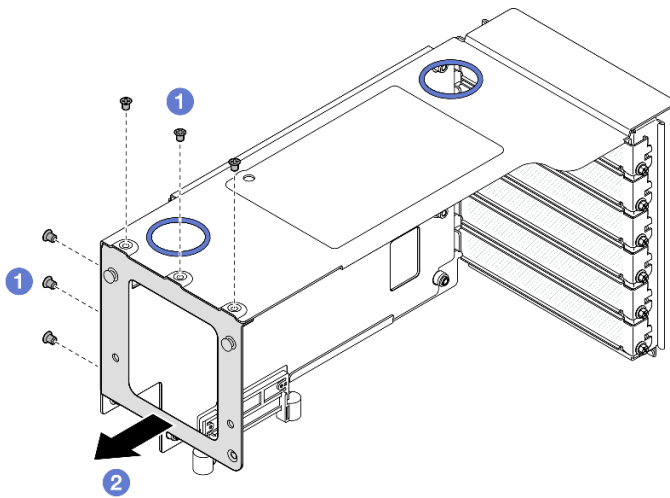


Figure 158. Removing filler from FH PCIe riser

- a. ① Remove the six screws that secure the filler.
- b. ② Remove the filler from the PCIe riser cage.

Step 2. Install the PCIe riser extender.

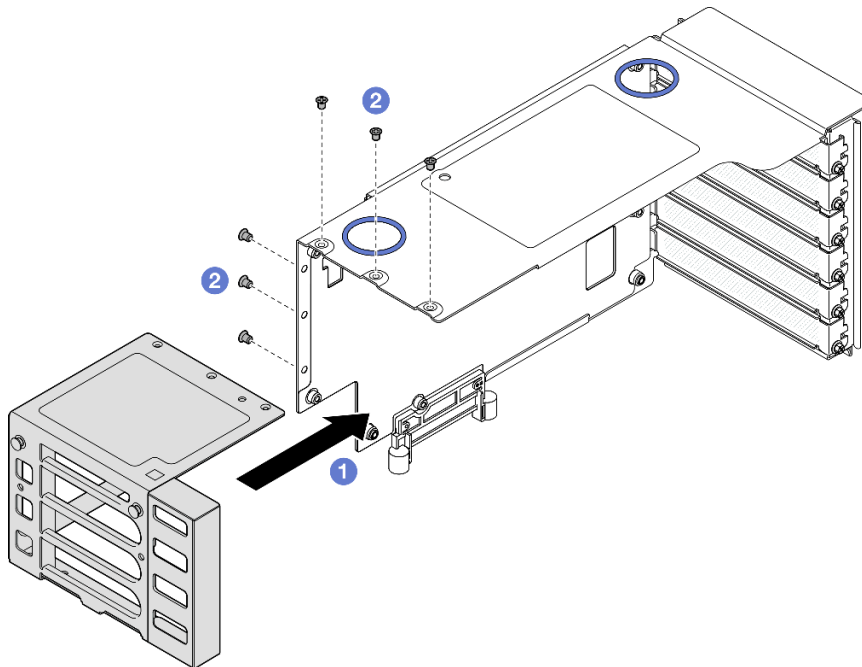


Figure 159. Installing PCIe riser extender to FH PCIe riser

- a. ① Align the screw holes on the PCIe riser extender with the screw holes in the PCIe riser cage.
- b. ② Install six screws to secure the PCIe riser extender.

### Install a PCIe riser extender to six slot HH riser

**Note:** A Gen 4 riser is used as an example for illustration. The replacement procedure for a Gen 5 riser is similar.



## Procedure

Step 1. If a filler is installed, remove it.

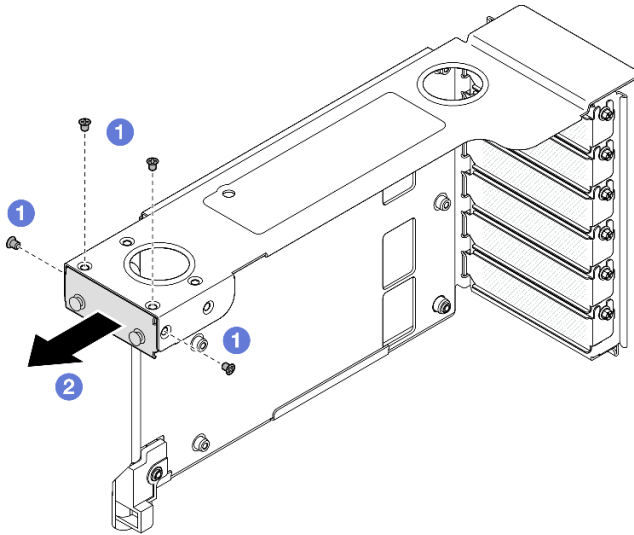


Figure 160. Removing filler from FH PCIe riser

- a. ① Remove the four screws that secure the filler.
- b. ② Remove the filler from the PCIe riser cage.

Step 2. Install the PCIe riser extender.

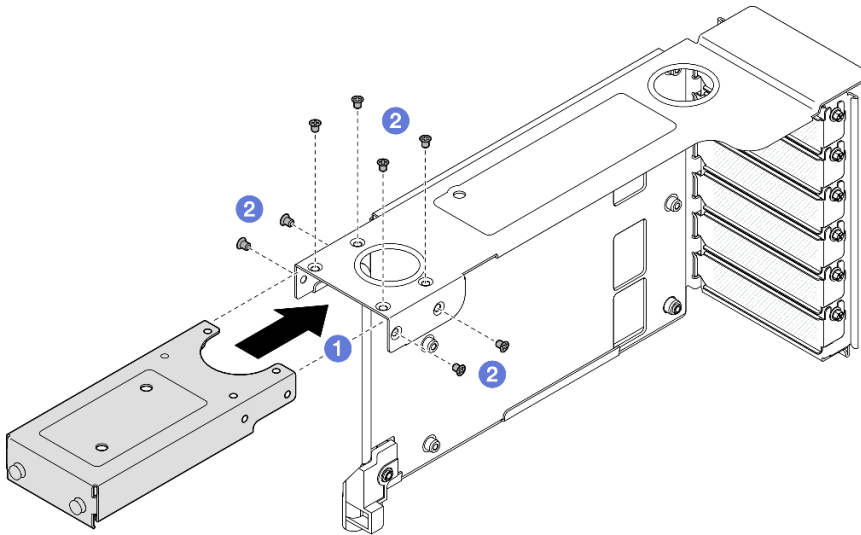


Figure 161. Installing PCIe riser extender to FH PCIe riser

- a. ① Align the screw holes on the PCIe riser extender with the screw holes in the PCIe riser cage.
- b. ② Install eight screws to secure the PCIe riser extender.

## After you finish

1. Reinstall all the PCIe adapters. See [“Install a PCIe adapter”](#) on page 144.

2. Reinstall the PCIe riser. See [“Install the PCIe riser”](#) on page 147.
3. Reinstall the crossbar. See [“Install the crossbar”](#) on page 71.
4. Reinstall the rear top cover. See [“Install the rear top cover”](#) on page 237.
5. Reinstall the front top cover. See [“Install the front top cover”](#) on page 239.
6. Complete the parts replacement. See [“Complete the parts replacement”](#) on page 242.

### Demo video

[Watch the procedure on YouTube](#)

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## Power distribution board replacement

Follow the instructions in this section to remove or install the power distribution board.

### Remove the power distribution board

Follow the instructions in this section to remove the power distribution board.

#### 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.

##### S029



**DANGER**

For -48V dc power supply, electrical current from power cords is hazardous.  
To avoid a shock hazard:

- To connect or disconnect -48V dc power cords when you need to remove/install redundancy power supply unit(s).

**To Connect:**

1. Turn OFF subject dc power source(s) and equipment (s) that are attached to this product.
2. Install the power supply unit(s) into the system housing.
3. Attach dc power cord(s) to the product.
  - Ensure correct polarity of -48 V dc connections: RTN is + and -Vin (typical -48 V) dc is -. Earth ground should be connected very well.
4. Connect dc power cord(s) to subject power source (s).
5. Turn ON all the power source(s).

**To Disconnect:**

1. Disconnect or turn off the subject dc power source(s) (at the breaker panel) before removing the power supply unit(s).
2. Remove the subject dc cord(s) and make sure the wire terminal of power cord(s) is insulated.
3. Unplug the subject power supply unit(s) from the system housing.

**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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

**Procedure**

Step 1. Make preparation for the task.

- a. Gently pull and disengage every installed power supply unit. See [“Remove a hot-swap power supply unit” on page 194](#).
- b. Remove the front top cover. See [“Remove the front top cover” on page 234](#).
- c. Remove the rear top cover. See [“Remove the rear top cover” on page 236](#).

Step 2. Disconnect the sideband and power cables from the power distribution board.

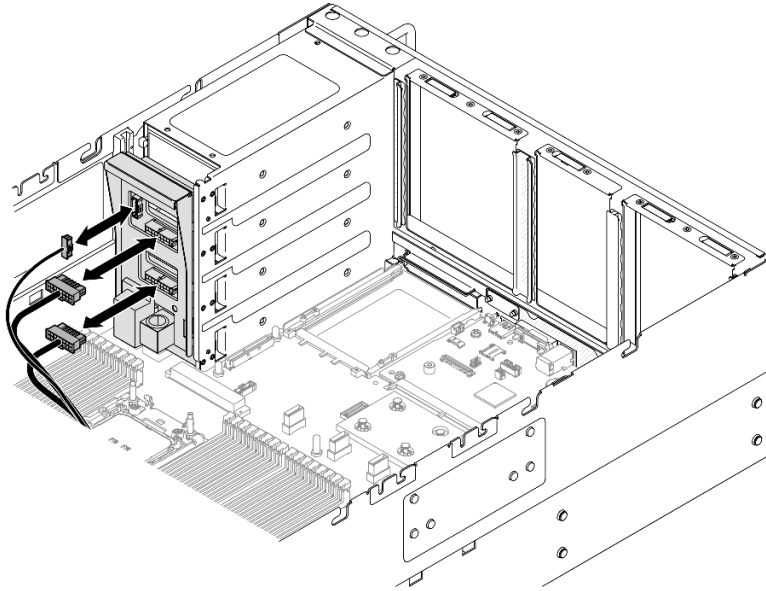


Figure 162. Disconnecting power distribution board cables

Step 3. Grasp and lift the power distribution board to remove it.

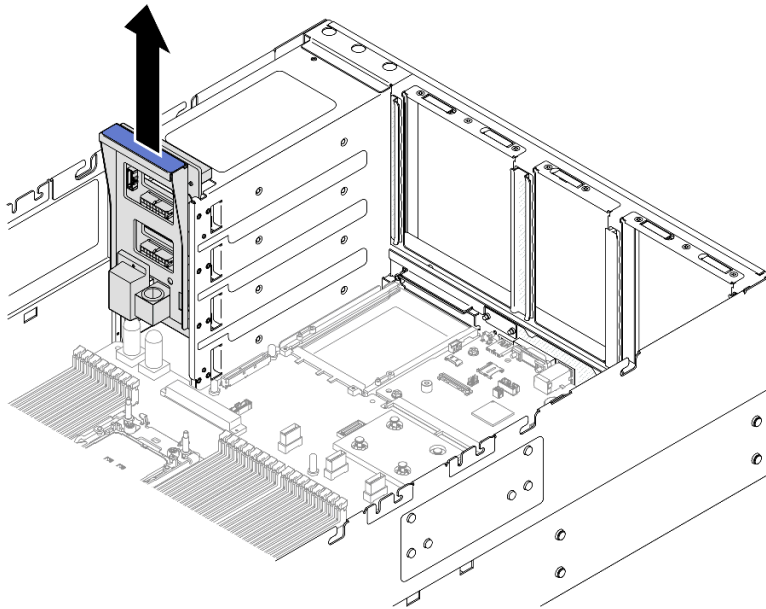


Figure 163. Removing power distribution board

## After you finish

1. Install a replacement unit. See [“Install the power distribution board” on page 183](#).
2. If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.
3. If you plan to recycle the component.
  - a. Remove the six screws, and separate the backplane from the bracket.

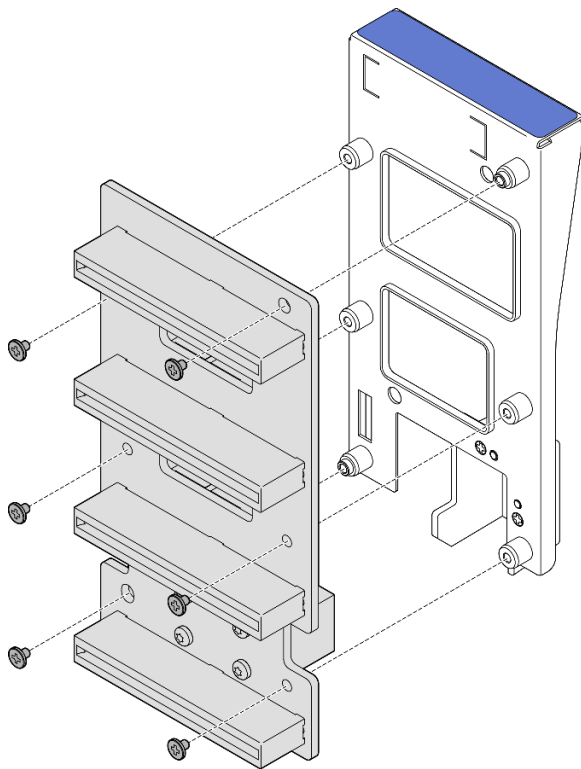


Figure 164. Disassembling the power distribution board

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

#### Demo video

[Watch the procedure on YouTube](#)

## Install the power distribution board

Follow the instructions in this section to install the power distribution board.

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

**Firmware and driver download:** You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

## Procedure

- Step 1. Align the bottom connector on the power distribution board to the corresponding connector on the system board assembly; then, push the power distribution board in until it is firmly seated.

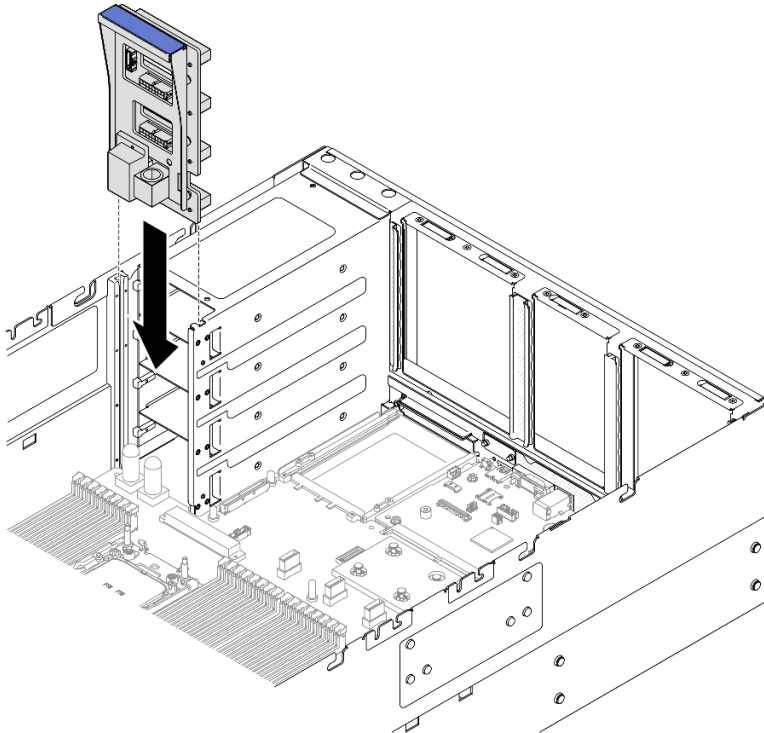


Figure 165. Installing power distribution board

- Step 2. Connect the sideband and power cables to the power distribution board.

**Note:** See “[Power distribution board cable routing](#)” on page 397 for more information on the internal cable routing.

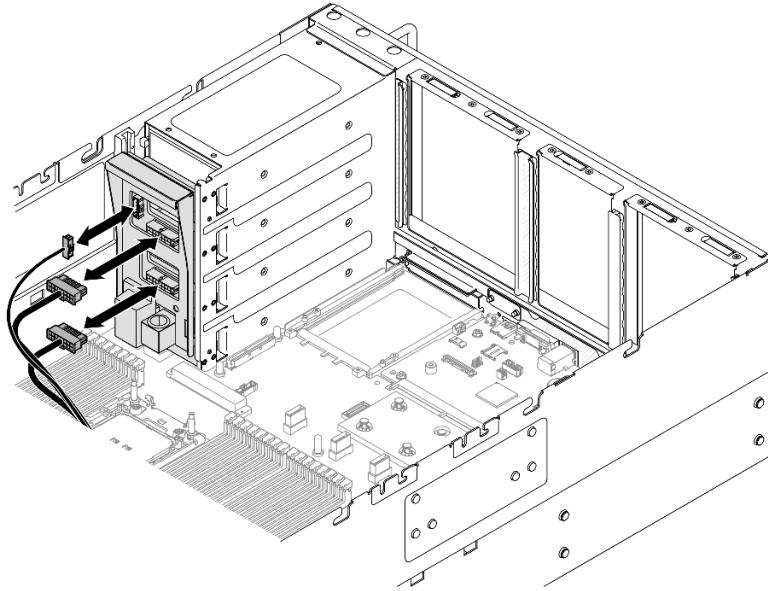


Figure 166. Connecting power distribution board cables

## After you finish

1. Reinstall the rear top cover. See [“Install the rear top cover” on page 237](#).
2. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
3. Reinstall all the power supply units. See [“Install a hot-swap power supply unit” on page 196](#).
4. Complete the parts replacement. See [“Complete the parts replacement” on page 242](#).

## Demo video

[Watch the procedure on YouTube](#)

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## Power supply bracket (CRPS) replacement

Follow the instructions in this section to remove or install a power supply bracket (CRPS).

### Remove a power supply bracket (CRPS)

Follow the instructions in this section to remove a power supply bracket (CRPS).

## 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.

#### **S029**



 **DANGER**

**For -48V dc power supply, electrical current from power cords is hazardous.**

**To avoid a shock hazard:**

- **To connect or disconnect -48V dc power cords when you need to remove/install redundancy power supply unit(s).**

#### **To Connect:**

1. Turn OFF subject dc power source(s) and equipment (s) that are attached to this product.
2. Install the power supply unit(s) into the system housing.
3. Attach dc power cord(s) to the product.
  - Ensure correct polarity of -48 V dc connections: RTN is + and -Vin (typical -48 V) dc is -. Earth ground should be connected very well.
4. Connect dc power cord(s) to subject power source (s).
5. Turn ON all the power source(s).

#### **To Disconnect:**

1. Disconnect or turn off the subject dc power source(s) (at the breaker panel) before removing the power supply unit(s).
2. Remove the subject dc cord(s) and make sure the wire terminal of power cord(s) is insulated.
3. Unplug the subject power supply unit(s) from the system housing.

#### **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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).



- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

**Note:** A power supply bracket is only available on models configured with CRPS power supplies.

## Procedure

Step 1. Make preparation for the task.

- Remove the power supply unit. See [“Remove a hot-swap power supply unit” on page 194](#).
- Remove the front top cover. See [“Remove the front top cover” on page 234](#).
- Remove the rear top cover. See [“Remove the rear top cover” on page 236](#).
- Remove the PCIe riser. See [“Remove the PCIe riser” on page 134](#).

Step 2. Remove the power supply bracket screw

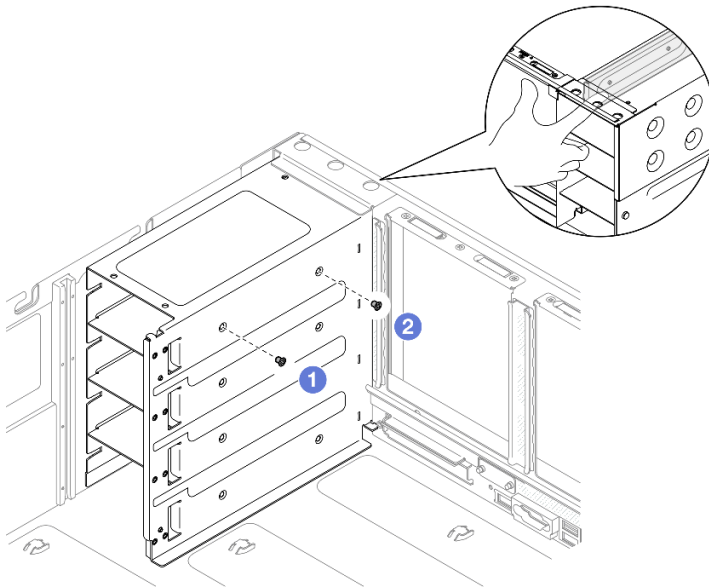


Figure 167. Removing power supply bracket screw

**Note:** Hold the power supply bracket in place while installing or removing the screws.

- 1 Remove the inner screw.
- 2 Remove the outer screw.

Step 3. Remove the power supply bracket out of the PSU bay.

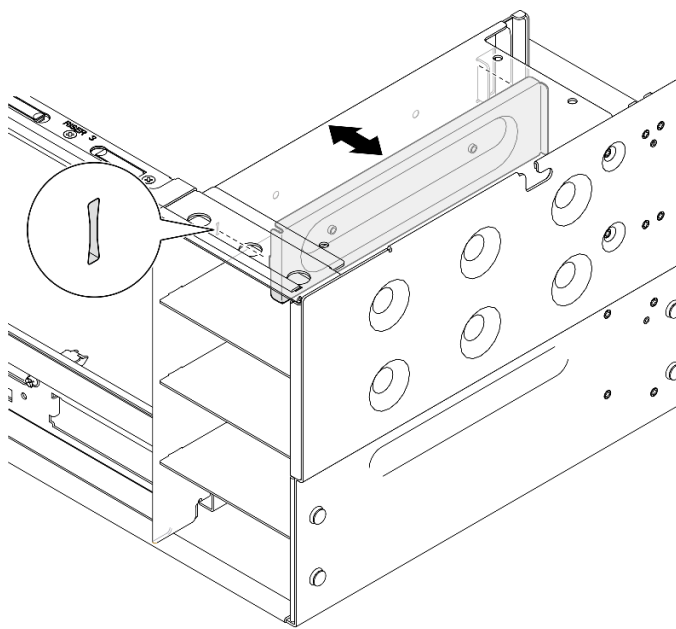


Figure 168. Removing power supply bracket

## After you finish

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

## Demo video

[Watch the procedure on YouTube](#)

## Install a power supply bracket (CRPS)

Follow the instructions in this section to install a power supply bracket (CRPS).

## About this task

### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

**Note:** A power supply bracket is only available on models configured with CRPS power supplies.

## Procedure

Step 1. Align and install the power supply bracket into the power supply bay.

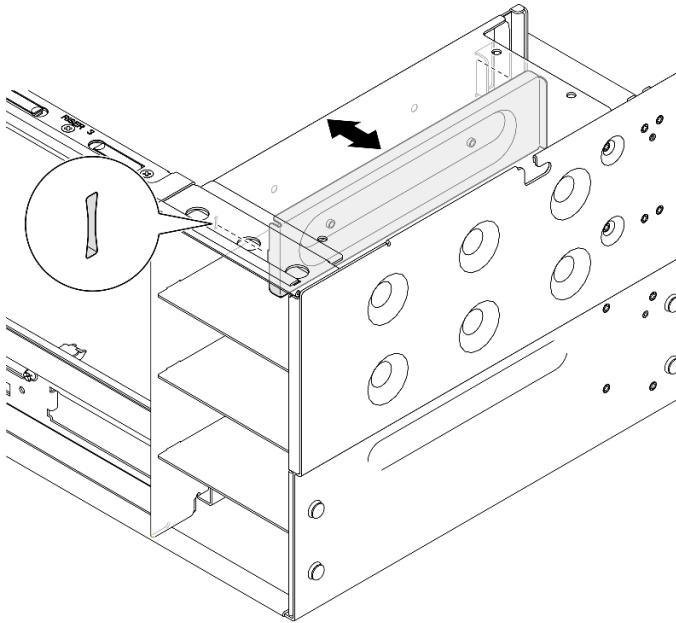


Figure 169. Installing power supply bracket

Step 2. Secure the power supply bracket.

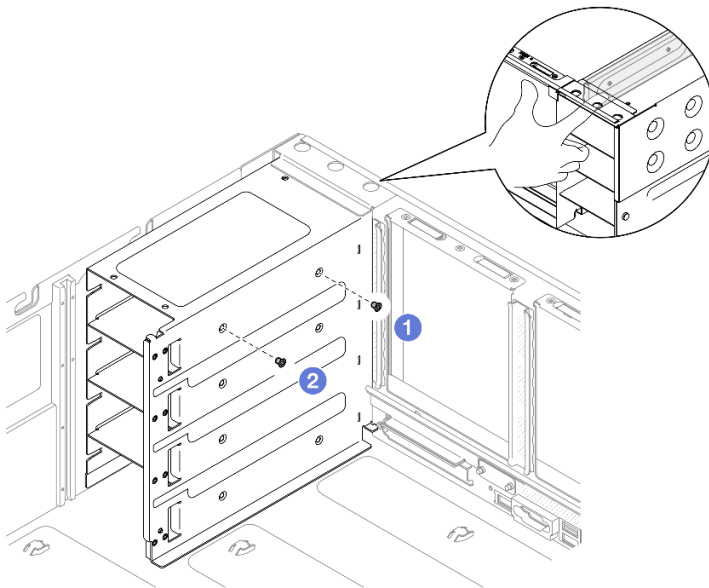


Figure 170. Securing power supply bracket

**Note:** Hold the power supply bracket in place while installing or removing the screws.

- a. ① Install the outer screw.
- b. ② Install the inner screw.

## After you finish

1. Reinstall the PCIe riser. See [“Install the PCIe riser”](#) on page 147.
2. Reinstall the rear top cover. See [“Install the rear top cover”](#) on page 237.
3. Reinstall the front top cover. See [“Install the front top cover”](#) on page 239.
4. Reinstall the power supply unit. See [“Install a hot-swap power supply unit”](#) on page 196.
5. Complete the parts replacement. See [“Complete the parts replacement”](#) on page 242.

## Demo video

[Watch the procedure on YouTube](#)

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## Power supply key (CFFv4) replacement

Follow the instructions in this section to remove or install a power supply key (CFFv4).

### Remove a power supply key (CFFv4)

Follow the instructions in this section to remove a power supply key (CFFv4).

#### 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.

##### S029



**DANGER**

**For -48V dc power supply, electrical current from power cords is hazardous.  
To avoid a shock hazard:**

- **To connect or disconnect -48V dc power cords when you need to remove/install redundancy power supply unit(s).**

**To Connect:**

1. Turn OFF subject dc power source(s) and equipment (s) that are attached to this product.
2. Install the power supply unit(s) into the system housing.
3. Attach dc power cord(s) to the product.
  - Ensure correct polarity of -48 V dc connections: RTN is + and -Vin (typical -48 V) dc is -. Earth ground should be connected very well.
4. Connect dc power cord(s) to subject power source (s).
5. Turn ON all the power source(s).

**To Disconnect:**

1. Disconnect or turn off the subject dc power source(s) (at the breaker panel) before removing the power supply unit(s).
2. Remove the subject dc cord(s) and make sure the wire terminal of power cord(s) is insulated.
3. Unplug the subject power supply unit(s) from the system housing.

**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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

**Note:** A power supply key is only available on models configured with CFFv4 power supplies.

**Procedure**

Step 1. Make preparation for the task.

- a. Remove the power supply unit. See [“Remove a hot-swap power supply unit” on page 194](#).
- b. Remove the front top cover. See [“Remove the front top cover” on page 234](#).
- c. Remove the rear top cover. See [“Remove the rear top cover” on page 236](#).
- d. Remove the power distribution board. See [“Remove the power distribution board” on page 180](#).

Step 2. Remove the screw that secures the power supply key.

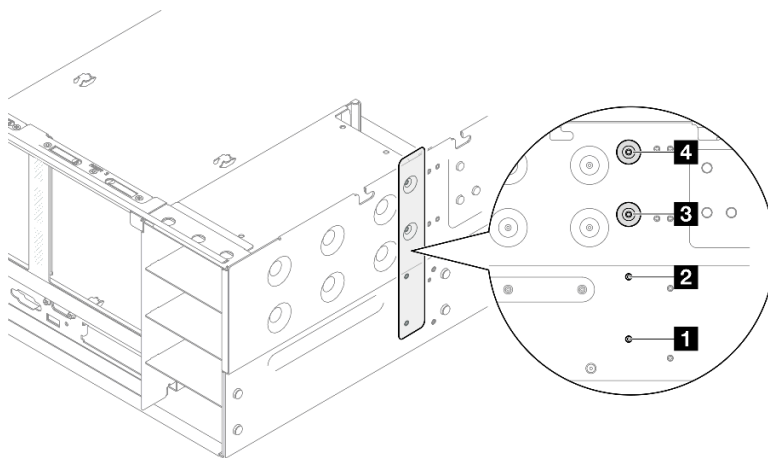


Figure 171. Removing power supply key screw

<b>1</b> Power supply key screw for PSU bay 1	<b>3</b> Power supply key screw for PSU bay 3
<b>2</b> Power supply key screw for PSU bay 2	<b>4</b> Power supply key screw for PSU bay 4

Step 3. Grasp the power supply key and slide it out of the power supply bay.

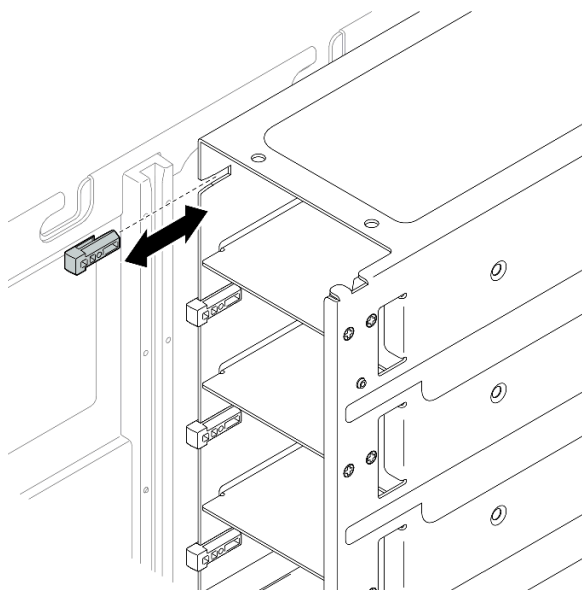


Figure 172. Removing power supply key

## After you finish

1. Install a replacement unit. See [“Install a power supply key \(CFFv4\)” on page 193](#).
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 power supply key (CFFv4)

Follow the instructions in this section to install a power supply key (CFFv4).

### About this task

#### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

**Note:** A power supply key is only available on models configured with CFFv4 power supplies.

#### Procedure

Step 1. Align the power supply key and slide it into the power supply bay.

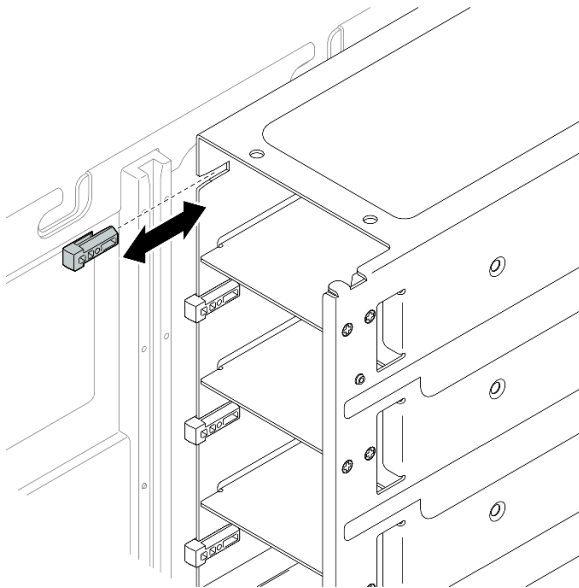


Figure 173. Installing power supply key

Step 2. Secure the power supply key with a screw.

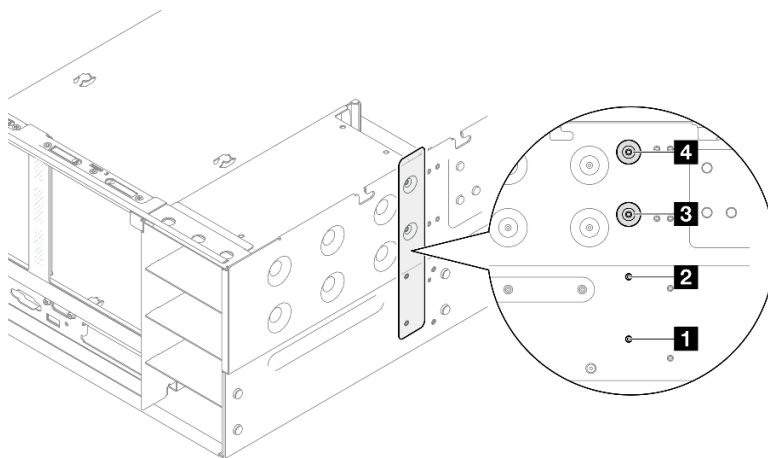


Figure 174. Securing power supply key

<b>1</b> Power supply key screw for PSU bay 1	<b>3</b> Power supply key screw for PSU bay 3
<b>2</b> Power supply key screw for PSU bay 2	<b>4</b> Power supply key screw for PSU bay 4

## After you finish

1. Reinstall the power distribution board. See [“Install the power distribution board” on page 183.](#)
2. Reinstall the rear top cover. See [“Install the rear top cover” on page 237.](#)
3. Reinstall the front top cover. See [“Install the front top cover” on page 239.](#)
4. Reinstall the power supply unit. See [“Install a hot-swap power supply unit” on page 196.](#)
5. Complete the parts replacement. See [“Complete the parts replacement” on page 242.](#)

## Demo video

[Watch the procedure on YouTube](#)

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## Power supply unit replacement

Follow the instructions in this section to install or remove power supply units.

### Remove a hot-swap power supply unit

Follow the instructions in this section to remove a hot-swap power supply unit.

## 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.

### S029



**For -48V dc power supply, electrical current from power cords is hazardous.  
To avoid a shock hazard:**

- **To connect or disconnect -48V dc power cords when you need to remove/install redundancy power supply unit(s).**

#### **To Connect:**

1. Turn OFF subject dc power source(s) and equipment (s) that are attached to this product.
2. Install the power supply unit(s) into the system housing.
3. Attach dc power cord(s) to the product.
  - Ensure correct polarity of -48 V dc connections: RTN is + and -Vin (typical -48 V) dc is -. Earth ground should be connected very well.
4. Connect dc power cord(s) to subject power source (s).
5. Turn ON all the power source(s).

#### **To Disconnect:**

1. Disconnect or turn off the subject dc power source(s) (at the breaker panel) before removing the power supply unit(s).
2. Remove the subject dc cord(s) and make sure the wire terminal of power cord(s) is insulated.
3. Unplug the subject power supply unit(s) from the system housing.

### 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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.

#### **Procedure**

- Step 1. Disconnect both ends of the power cord and keep it in an ESD-safe place.
- Step 2. Remove the power supply.

**Notes:**

- A CFFv4 power supply is used as an example for illustration. The replacement procedure for CRPS power supply is similar.
- The color of the CRPS release tab might be different from the image.

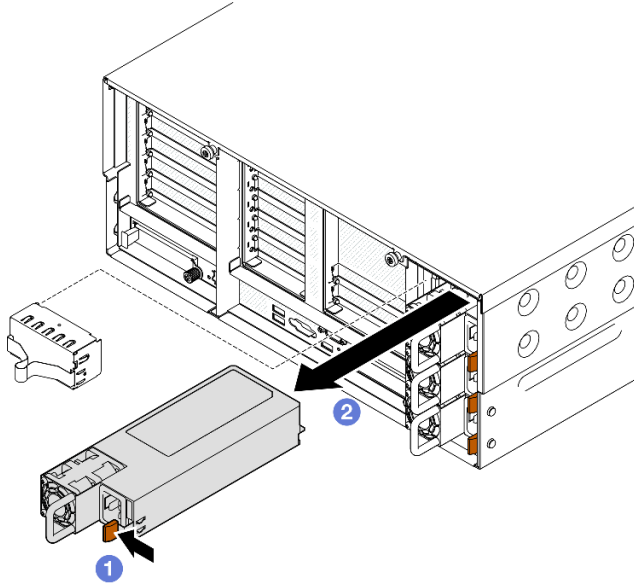


Figure 175. Removing the power supply

- a. ① Press and hold on the orange release tab.
- b. ② Grasp the handle and slide the power supply unit out from the server.

**After you finish**

1. Install a replacement unit or filler. See “[Install a hot-swap power supply unit](#)” on page 196.
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 hot-swap power supply unit**

Follow the instructions in this section to install a hot-swap power supply unit.

**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.

#### S029



**For -48V dc power supply, electrical current from power cords is hazardous.  
To avoid a shock hazard:**

- **To connect or disconnect -48V dc power cords when you need to remove/install redundancy power supply unit(s).**

#### **To Connect:**

1. Turn OFF subject dc power source(s) and equipment (s) that are attached to this product.
2. Install the power supply unit(s) into the system housing.
3. Attach dc power cord(s) to the product.
  - Ensure correct polarity of -48 V dc connections: RTN is + and -Vin (typical -48 V) dc is -. Earth ground should be connected very well.
4. Connect dc power cord(s) to subject power source (s).
5. Turn ON all the power source(s).

#### **To Disconnect:**

1. Disconnect or turn off the subject dc power source(s) (at the breaker panel) before removing the power supply unit(s).
2. Remove the subject dc cord(s) and make sure the wire terminal of power cord(s) is insulated.
3. Unplug the subject power supply unit(s) from the system housing.

#### 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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.

#### **Procedure**

Step 1. Make preparation for the task.

- a. Make sure the power supply unit to be installed is of the same wattage as the installed ones. Otherwise, complete the following steps:
  1. Turn off the server and peripheral devices.
  2. Disconnect the power cords and all external cables.
  3. Remove all the installed power supply units.
  4. Make sure all the power supply units to be installed are of the same wattage. Do not mix power supply units of different wattages in the same unit of server.
- b. If installing a power supply into an empty bay, remove the power supply filler panel from the power supply bay.
- c. If more than one units are to be installed, start with the lowest available power supply bay.

Step 2. Make sure the label on the power supply is facing up; then, grasp the handle and slide it into the power supply bay until it clicks into place.

**Notes:**

- A CFFv4 power supply is used as an example for illustration. The replacement procedure for CRPS power supply is similar.
- The color of the CRPS release tab might be different from the image.

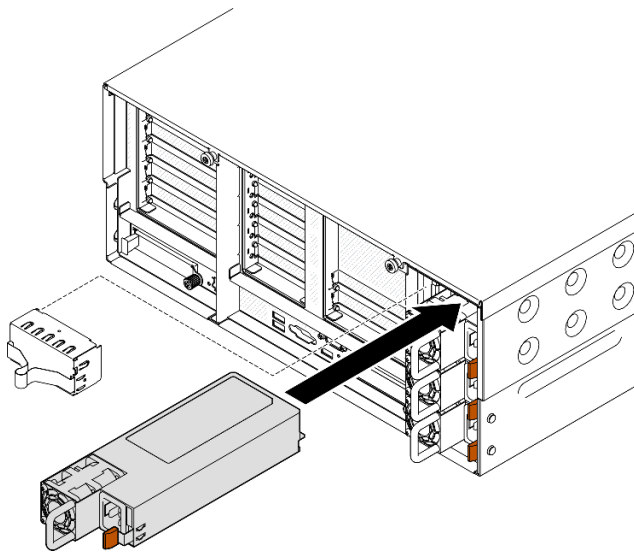


Figure 176. Installing power supply unit

**After you finish**

1. Connect the power cord to the power supply unit, and make sure it's properly connected to the power.
2. Pull the handle to see if the power supply unit is properly installed. If it slides out, reinstall it.
3. If the server is turned off, turn on the server. Ensure that both the power input LED and the power output LED on the power supply are lit, indicating that the power supply is operating properly.

**Demo video**

[Watch the procedure on YouTube](#)

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## Processor and heat sink replacement (trained technician only)

Follow the instruction in this section to replace an assembled processor and heat sink, known as a processor-heat-sink module (PHM), a processor, or a heat sink.

**Attention:** Before reusing a processor or heat sink, make sure you use Lenovo proven alcohol cleaning pad and thermal grease.

### Remove a processor and heat sink

This task has instructions for removing an assembled processor and heat sink, known as a processor-heat-sink module (PHM). This task requires a Torx T30 driver. This procedure must be executed by a trained technician.

#### 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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- Prevent exposure to static electricity, which might lead to system halt and loss of data, by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.
- Each processor socket must always contain a cover or a PHM. When removing or installing a PHM, protect empty processor sockets with a cover.
- Do not touch the processor socket or processor contacts. Processor-socket contacts are very fragile and easily damaged. Contaminants on the processor contacts, such as oil from your skin, can cause connection failures.
- Do not allow the thermal grease on the processor or heat sink to come in contact with anything. Contact with any surface can compromise the thermal grease, rendering it ineffective. Thermal grease can damage components, such as the electrical connectors in the processor socket.
- Remove and install only one PHM at a time. If the system supports multiple processors, install the PHMs starting with the first processor socket.

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

The following illustration shows the components of the PHM.

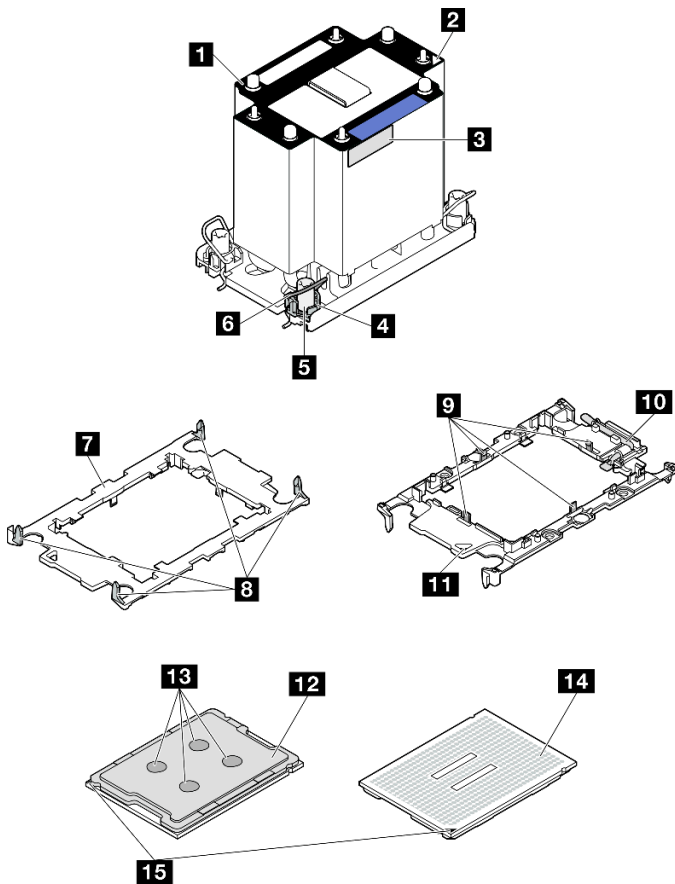


Figure 177. PHM components

<b>1</b> Heat sink	<b>9</b> Clips to secure processor in carrier
<b>2</b> Heat sink triangular mark	<b>10</b> Processor ejector handle
<b>3</b> Processor identification label	<b>11</b> Carrier triangular mark
<b>4</b> Nut and wire bail retainer	<b>12</b> Processor heat spreader
<b>5</b> Torx T30 nut	<b>13</b> Thermal grease
<b>6</b> Anti-tilt wire bail	<b>14</b> Processor contacts
<b>7</b> Processor carrier	<b>15</b> Processor triangular mark
<b>8</b> Clips to secure carrier to heat sink	

## Procedure

Step 1. Make preparation for the task.

- a. To replace a front PHM (processor 3 or 4), remove the following:
  1. Remove the front top cover. See [“Remove the front top cover”](#) on page 234.
  2. Remove the front air baffle. See [“Remove the front air baffle”](#) on page 46.
- b. To replace a rear PHM (processor 1 or 2), remove the following:
  1. Remove the front top cover. See [“Remove the front top cover”](#) on page 234.
  2. Remove the rear top cover. See [“Remove the rear top cover”](#) on page 236.

3. Remove the crossbar. See [“Remove the crossbar”](#) on page 68.
4. Remove all the PCIe risers. See [“Remove the PCIe riser”](#) on page 134.
5. Remove the rear air baffle. See [“Remove the rear air baffle”](#) on page 53.

Step 2. Remove the PHM from the system board assembly.

**Notes:**

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

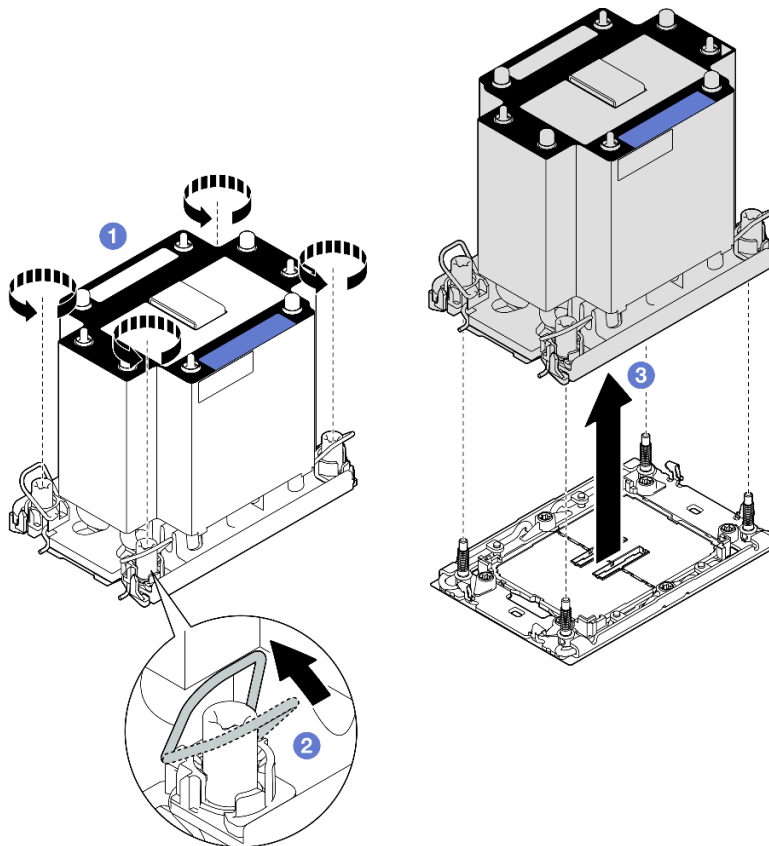


Figure 178. Removing a 3U standard PHM

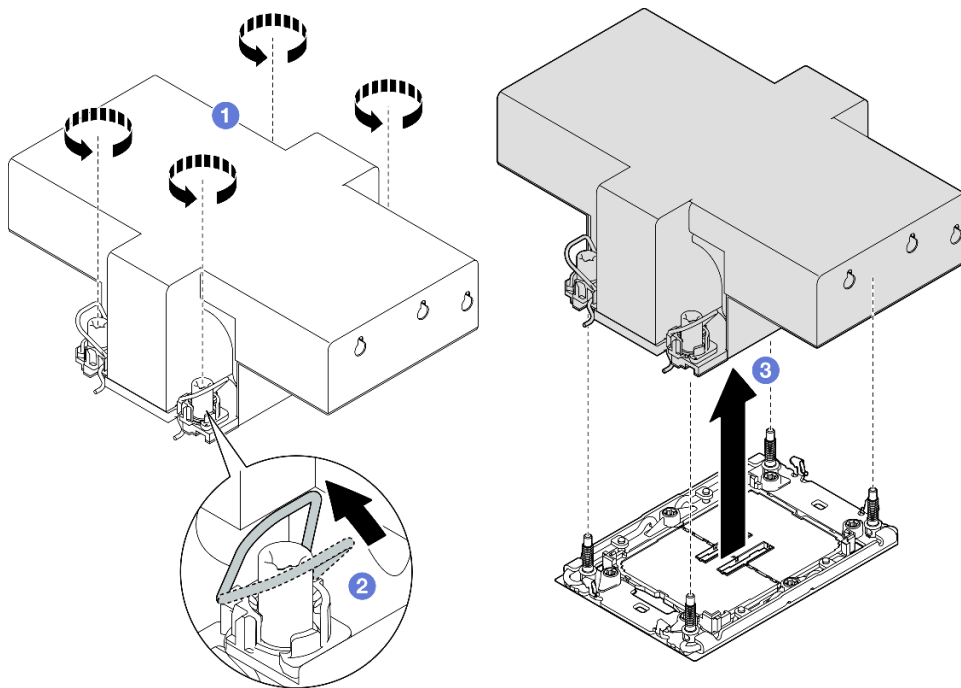


Figure 179. Removing a 2U performance PHM

- a. ① Fully loosen the Torx T30 nuts on the PHM **in the removal sequence shown** on the heat-sink label.
- b. ② Rotate the anti-tilt wire bails inward.
- c. ③ Carefully lift the PHM from the processor socket. If the PHM cannot be fully lifted out of the socket, further loosen the Torx T30 nuts and try lifting the PHM again.

## After you finish

1. Each processor socket must always contain a cover or a PHM. Protect empty processor sockets with a cover or install a new PHM.
2. If you are removing the PHM as part of a system board assembly replacement, set the PHM aside.
3. If you are reusing the processor or heat sink, separate the processor from its retainer. See [“Separate the processor from carrier and heat sink” on page 202](#).
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](#)

## Separate the processor from carrier and heat sink

This task has instructions for separating a processor and its carrier from an assembled processor and heat sink, known as a processor-heat-sink module (PHM). This procedure must be executed by a trained technician.

## About this task

### Attention:



- Read “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “[Power off the server](#)” on page 17.
- Prevent exposure to static electricity, which might lead to system halt and loss of data, by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.
- Do not touch the processor contacts. Contaminants on the processor contacts, such as oil from your skin, can cause connection failures.
- Do not allow the thermal grease on the processor or heat sink to come in contact with anything. Contact with any surface can compromise the thermal grease, rendering it ineffective. Thermal grease can damage components, such as the electrical connectors in the processor socket.

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

## Procedure

Step 1. Separate the processor from the heat sink and carrier.

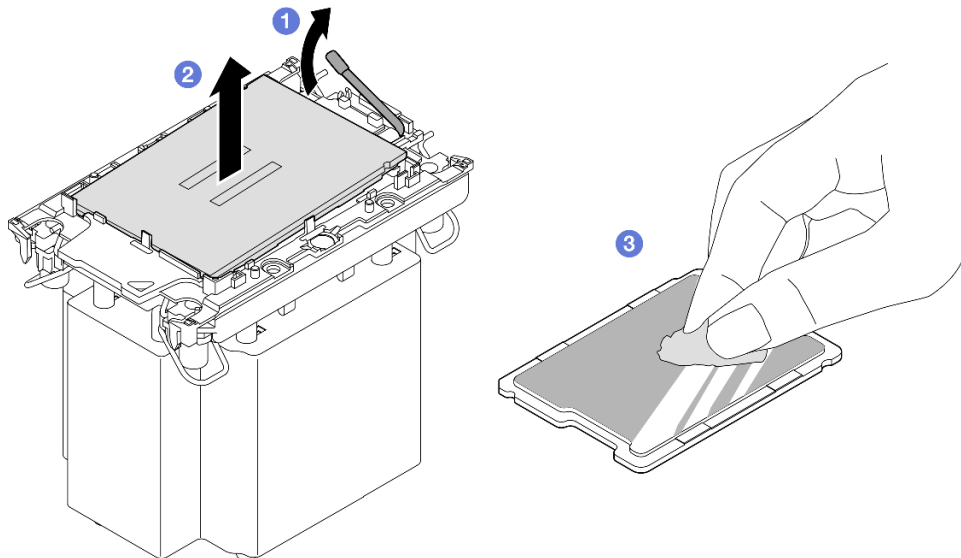


Figure 180. Separating a processor from the heat sink and carrier

**Note:** Do not touch the contacts on the processor.

- 1 Lift the handle to release the processor from the carrier.
- 2 Hold the processor by its edges; then, lift the processor from the heat sink and carrier.
- 3 Without putting the processor down, wipe the thermal grease from the top of the processor with an alcohol cleaning pad; then, place the processor on a static protective surface with the processor-contact side up.

Step 2. Separate the processor carrier from the heat sink.

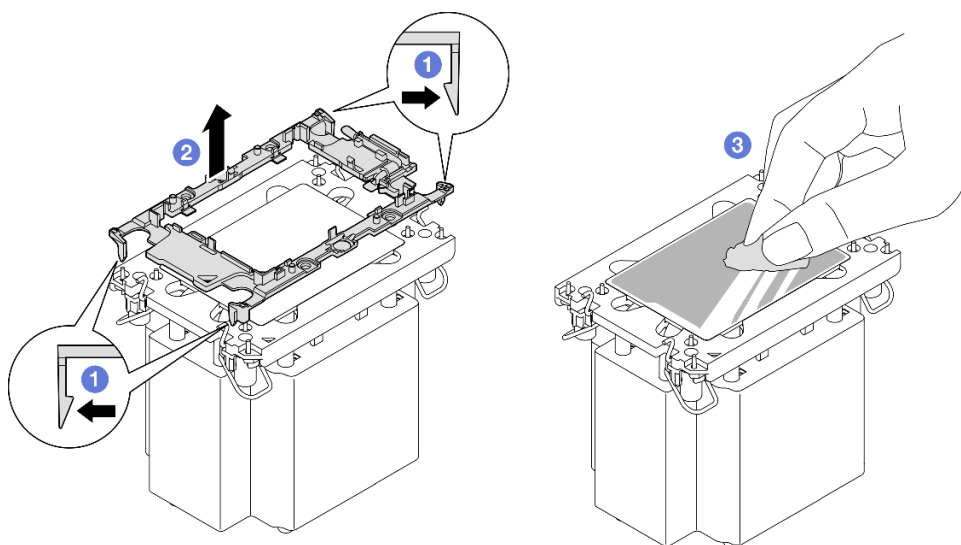


Figure 181. Separating a processor carrier the from heat sink

**Note:** The processor carrier will be discarded and replaced with a new one.

- a. ① Release the retaining clips from the heat sink.
- b. ② Lift the carrier from the heat sink.
- c. ③ Wipe the thermal grease from the bottom of the heat sink with an alcohol cleaning pad.

## After you finish

1. Install the PHM. See [“Install a processor and heat sink” on page 204](#).
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 processor and heat sink

This task has instructions for installing an assembled processor and heat sink, known as a processor-heat-sink module (PHM). This task requires a Torx T30 driver. This procedure must be executed by a trained technician.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- Prevent exposure to static electricity, which might lead to system halt and loss of data, by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.

- Each processor socket must always contain a cover or a PHM. When removing or installing a PHM, protect empty processor sockets with a cover.
- Do not touch the processor socket or processor contacts. Processor-socket contacts are very fragile and easily damaged. Contaminants on the processor contacts, such as oil from your skin, can cause connection failures.
- Do not allow the thermal grease on the processor or heat sink to come in contact with anything. Contact with any surface can compromise the thermal grease, rendering it ineffective. Thermal grease can damage components, such as the electrical connectors in the processor socket.
- Remove and install only one PHM at a time. If the system supports multiple processors, install the PHMs starting with the first processor socket.

**Notes:**

- The heat sink, processor, and processor carrier for your system might be different from those shown in the illustrations.
- PHMs are keyed for the socket where they can be installed and for their orientation in the socket.
- See <https://serverproven.lenovo.com> for a list of processors supported for your server. All processors must have the same speed, number of cores, and frequency.
- Before you install a new PHM or replacement processor, update your system firmware to the latest level. See “Update the firmware” in *User Guide* and *System Configuration Guide*.

The following illustration shows the components of the PHM.

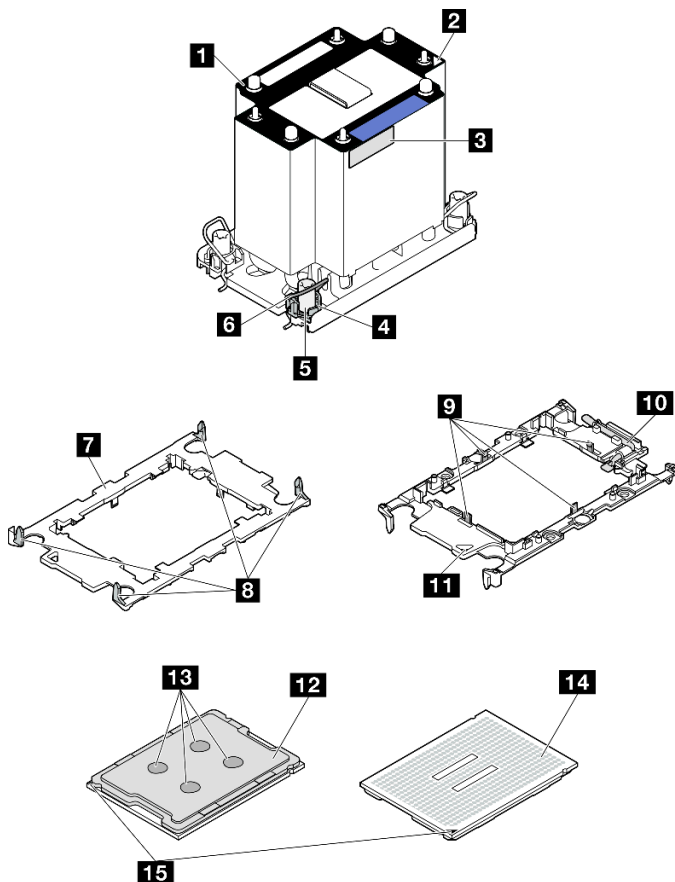


Figure 182. PHM components

<b>1</b> Heat sink	<b>9</b> Clips to secure processor in carrier
<b>2</b> Heat sink triangular mark	<b>10</b> Processor ejector handle
<b>3</b> Processor identification label	<b>11</b> Carrier triangular mark
<b>4</b> Nut and wire bail retainer	<b>12</b> Processor heat spreader
<b>5</b> Torx T30 nut	<b>13</b> Thermal grease
<b>6</b> Anti-tilt wire bail	<b>14</b> Processor contacts
<b>7</b> Processor carrier	<b>15</b> Processor triangular mark
<b>8</b> Clips to secure carrier to heat sink	

**Firmware and driver download:** You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

## Procedure

Step 1. Record the processor identification label.

- If you are replacing a processor and reusing the heat sink, remove the processor identification label from the heat sink and replace it with the new label that comes with the replacement processor.
- If you are replacing a heat sink and reusing the processor, remove the processor identification label from the old heat sink and place it on the new heat sink in the same location.

**Note:** If you are unable to remove the label and place it on the new heat sink, or if the label is damaged during transfer, write the processor serial number from the processor identification label on the new heat sink in the same location as the label would be placed using a permanent marker.

Step 2. Install the processor in the new carrier.

### Notes:

- If you are replacing the processor and reusing the heat sink, use the new carrier that comes with the new processor.
- If you are replacing the heat sink and reusing the processor, and if the new heat sink comes with two processor carriers, make sure to use the same type of carrier as the one you discarded.

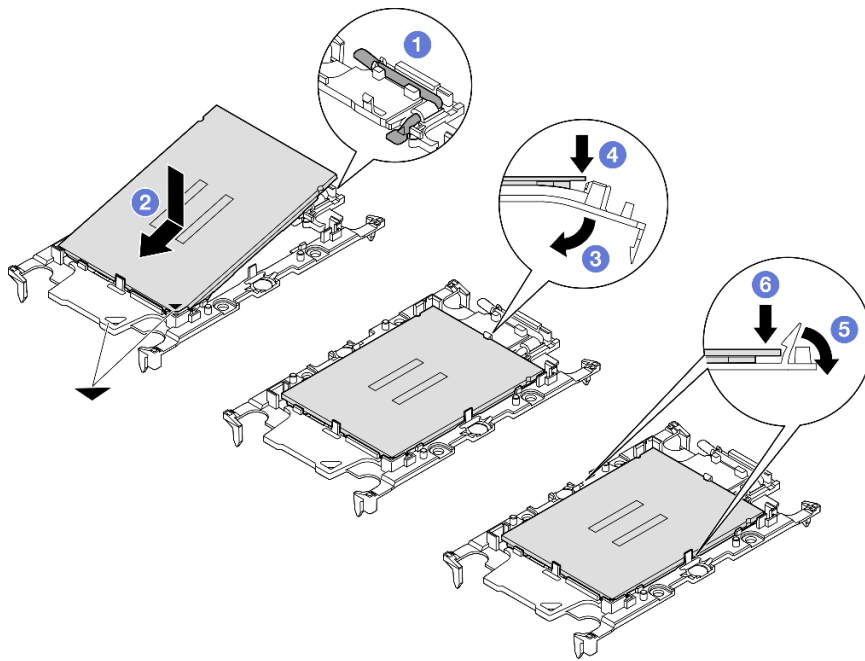


Figure 183. Installing a processor carrier

1. ① Make sure the handle on the carrier is in the closed position.
2. ② Align the processor on the new carrier so that the triangular marks align; then, insert the marked end of the processor into the carrier.
3. ③ Hold the inserted end of the processor in place; then, pivot the unmarked end of the carrier down and away from the processor.
4. ④ Press the processor and secure the unmarked end under the clip on the carrier.
5. ⑤ Carefully pivot the sides of the carrier down and away from the processor.
6. ⑥ Press the processor and secure the sides under the clips on the carrier.

**Note:** To prevent the processor from falling out of the carrier, keep the processor-contact side up and hold the processor-carrier assembly by the sides of the carrier.

### Step 3. Apply thermal grease.

- If you are replacing the heat sink and reusing the processor, a new heat sink comes with thermal grease and you do not need to apply new thermal grease.

**Note:** To ensure the best performance, check the manufacturing date on the new heat sink and make sure it does not exceed two years. Otherwise, wipe off the existing thermal grease and apply new thermal grease.

- If you are replacing the processor and reusing the heat sink, do the following steps to apply thermal grease:
  1. If there is any old thermal grease on the heat sink, wipe off the thermal grease with an alcohol cleaning pad.
  2. Carefully place the processor and carrier in the shipping tray with the processor-contact side down. Make sure the triangular mark on the carrier is oriented in the shipping tray as shown below.
  3. 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.

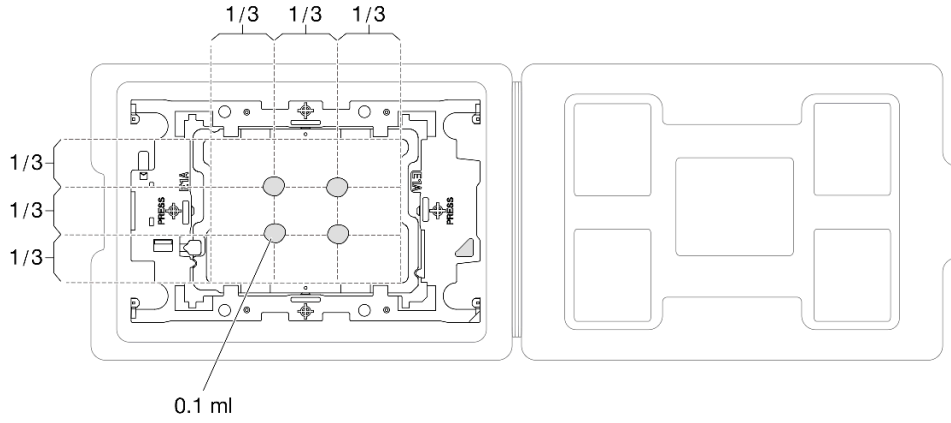


Figure 184. Thermal grease application with processor in shipping tray

Step 4. Assemble the processor and heat sink.

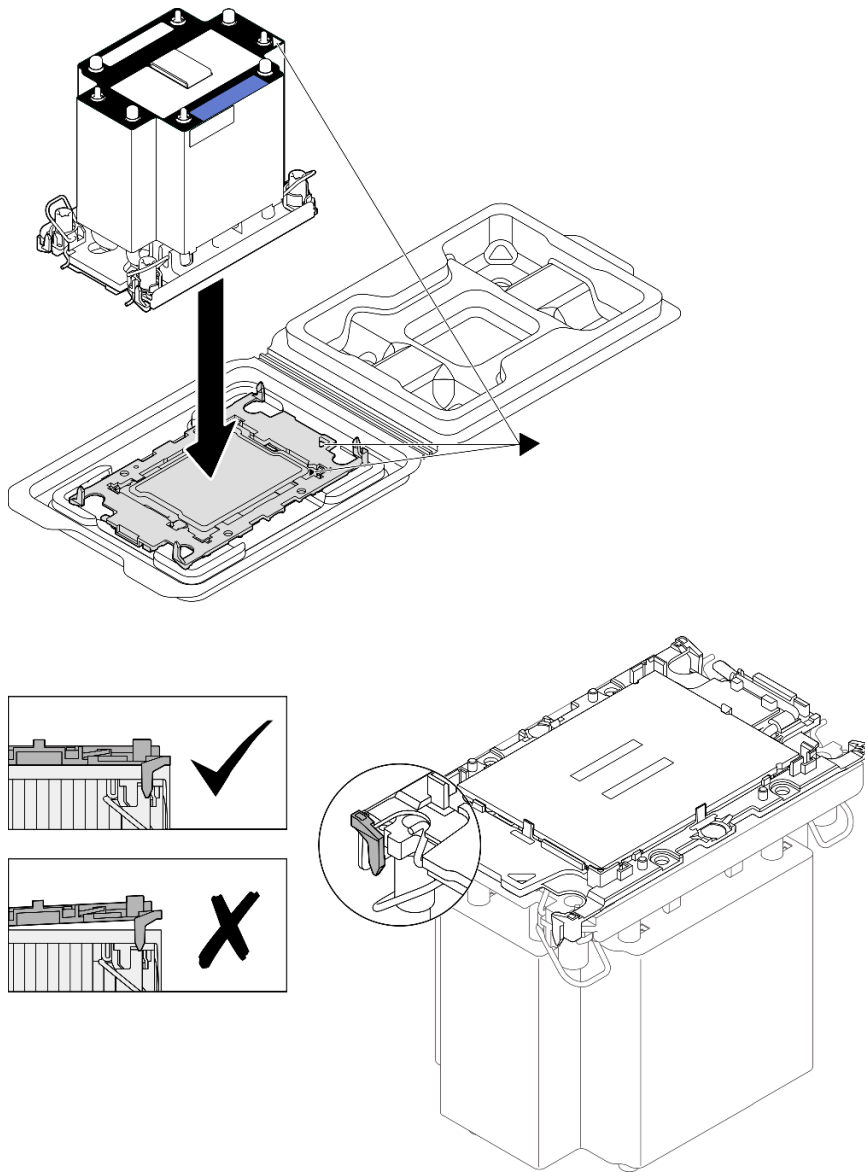


Figure 185. Assembling the PHM with processor in shipping tray

- a. Align the triangular mark on the heat sink label with the triangular mark on the processor carrier and processor.
- b. Install the heat sink onto the processor-carrier.
- c. Press the carrier into place until the clips at all four corners engage. Visually inspect to make sure that there is no gap between the processor carrier and the heat sink.

Step 5. Install the processor-heat-sink module into the processor socket.

**Notes:**

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

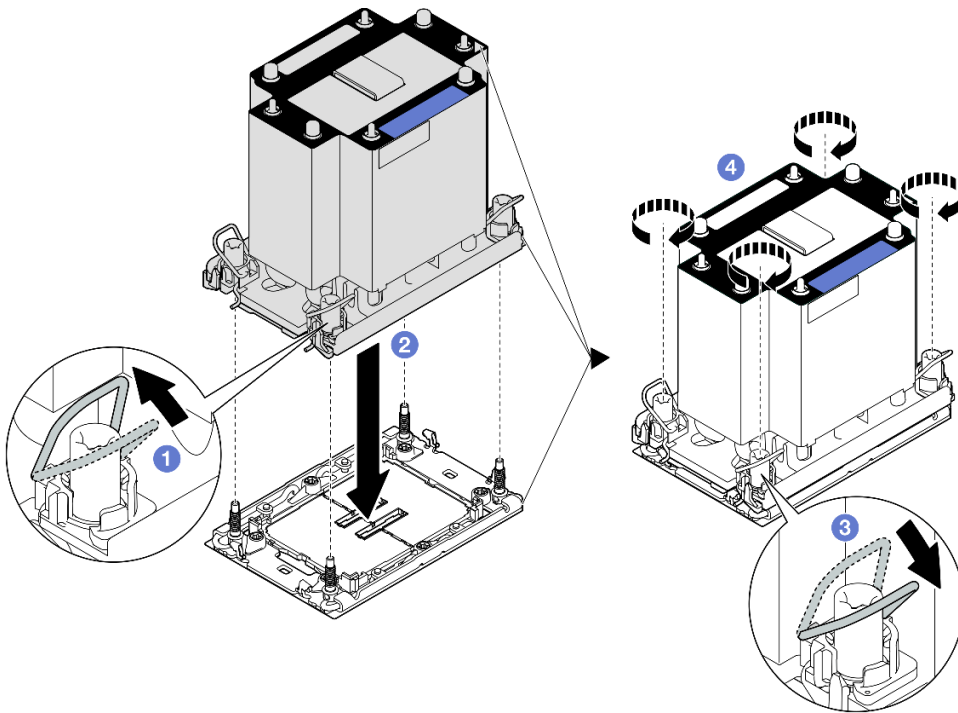


Figure 186. Installing a 3U standard PHM

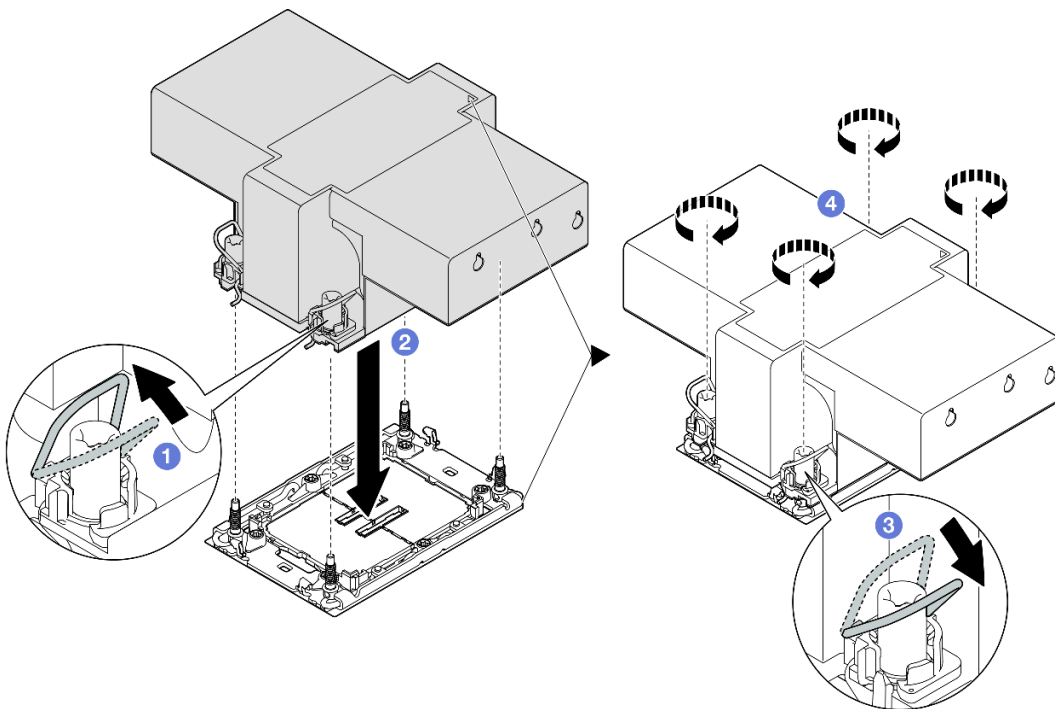


Figure 187. Installing a 2U performance PHM

- a. ① Rotate the anti-tilt wire bails inward.
- b. ② Align the triangular mark and four Torx T30 nuts on the PHM with the triangular mark and threaded posts of the processor socket; then, insert the PHM into the processor socket.
- c. ③ Rotate the anti-tilt wire bails outward until they engage with the hooks in the socket.



- d. ④ Fully tighten the Torx T30 nuts **in the installation sequence shown** on the heat-sink label. Tighten the screws until they stop; then, visually inspect to make sure that there is no gap between the screw shoulder beneath the heat sink and the processor socket. (For reference, the torque required for the fasteners to fully tighten is 0.9 newton-meters, 8 inch-pounds).

## After you finish

1. If you replaced a front PHM, reinstall the following:
  - a. Reinstall the front air baffle. See [“Install the front air baffle” on page 49](#).
  - b. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
2. If you replaced a rear PHM, reinstall the following:
  - a. Reinstall the rear air baffle. See [“Install the rear air baffle” on page 57](#).
  - b. Reinstall all the PCIe risers. See [“Install the PCIe riser” on page 147](#).
  - c. Reinstall the crossbar. See [“Install the crossbar” on page 71](#).
  - d. Reinstall the rear top cover. See [“Install the rear top cover” on page 237](#).
  - e. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
3. Complete the parts replacement. See [“Complete the parts replacement” on page 242](#).

## Demo video

[Watch the procedure on YouTube](#)

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## Serial port module replacement

Follow the instructions in this section to remove and install a serial port module.

### Remove the serial port module

Follow the instructions in this section to remove the serial port module.

### About this task

#### Attention:

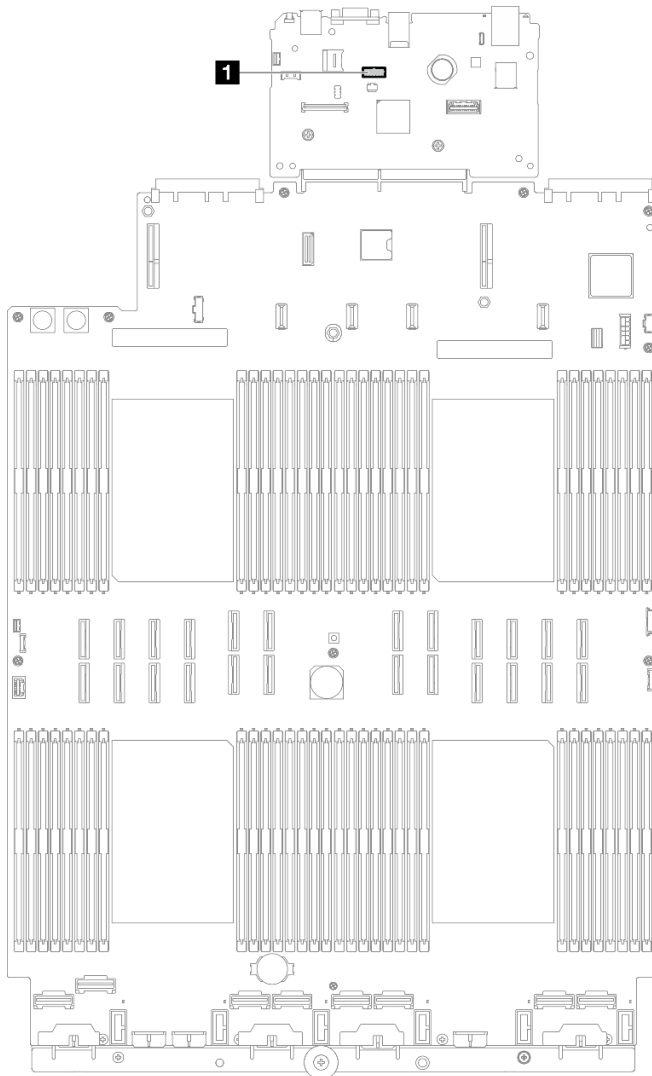
- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- Prevent exposure to static 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

### Procedure

- Step 1. Make preparation for the task.
  - a. Remove the front top cover. See [“Remove the front top cover” on page 234](#).
  - b. Remove the rear top cover. See [“Remove the rear top cover” on page 236](#).
  - c. Remove the crossbar. See [“Remove the crossbar” on page 68](#).

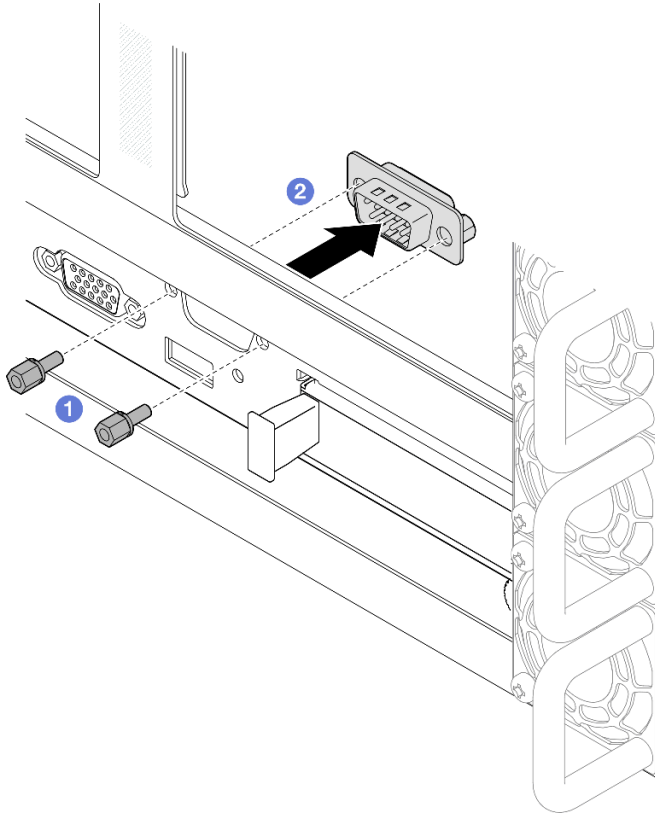
d. Remove all the PCIe risers. See [“Remove the PCIe riser” on page 134](#).

Step 2. Disconnect the serial port module from the system board assembly.



*Figure 188. Disconnecting serial port module*

Step 3. Remove the serial port module.



*Figure 189. Removing serial port module*

- a. ① Remove the retention screws on the rear of the chassis.
- b. ② Push the serial port module out of the serial port hole and remove it from the chassis.

Step 4. If necessary, install the serial port filler.

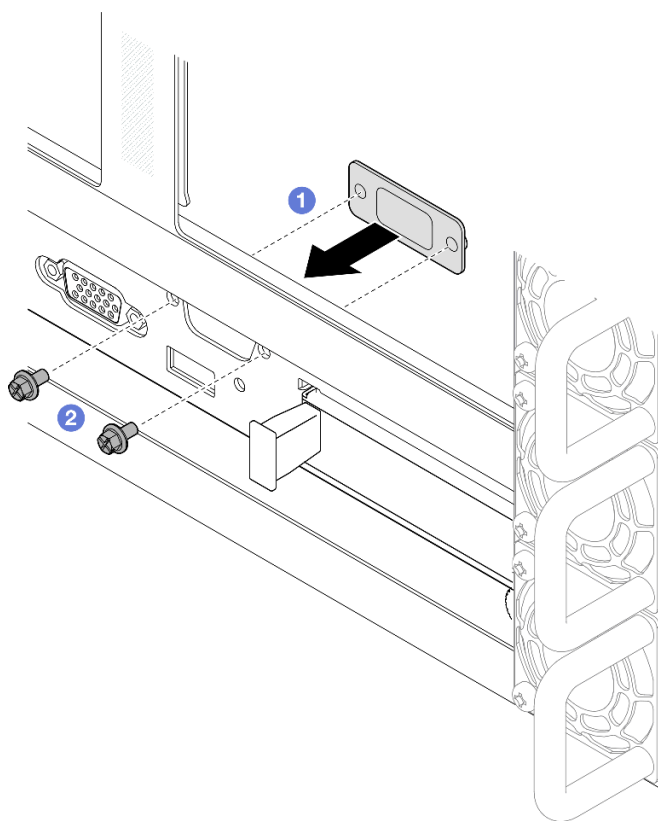


Figure 190. Installing serial port filler

- a. ① Align and install the serial port filler into the serial port hole from inside of the server chassis.
- b. ② Secure the serial port filler with the retention screws.

## After you finish

1. Install a replacement unit or filler. See [“Install the serial port module” on page 214](#).
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 serial port module

Follow the instructions in this section to install the serial port module.

## About this task

### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).

- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See “Remove the server from rails” on page 17.

**Firmware and driver download:** You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

## Procedure

Step 1. If a serial port filler is installed, remove it.

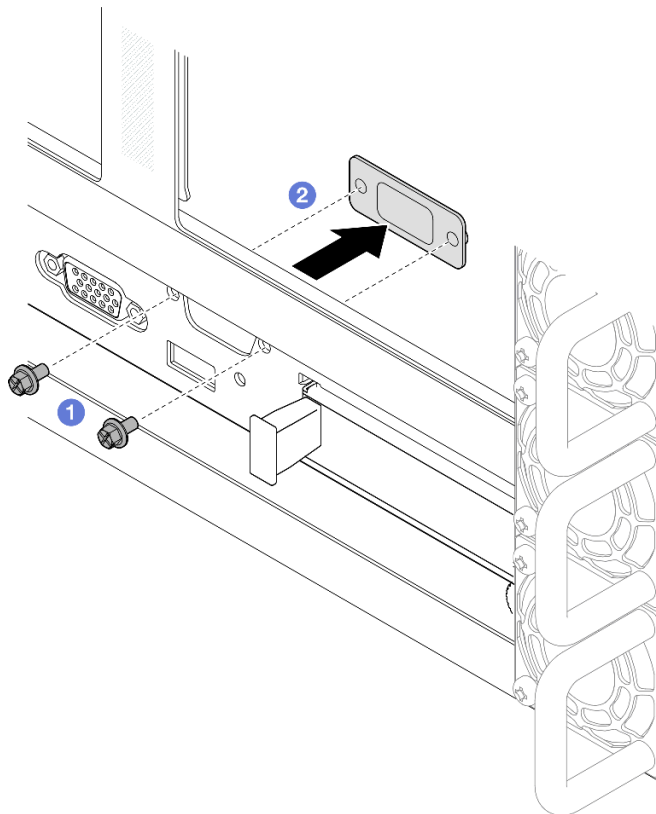


Figure 191. Removing serial port filler

- a. ① Remove the retention screws on the rear of the chassis.
- b. ② Push the serial port filler out of the serial port hole and remove it from the chassis.

Step 2. Install the serial port module.

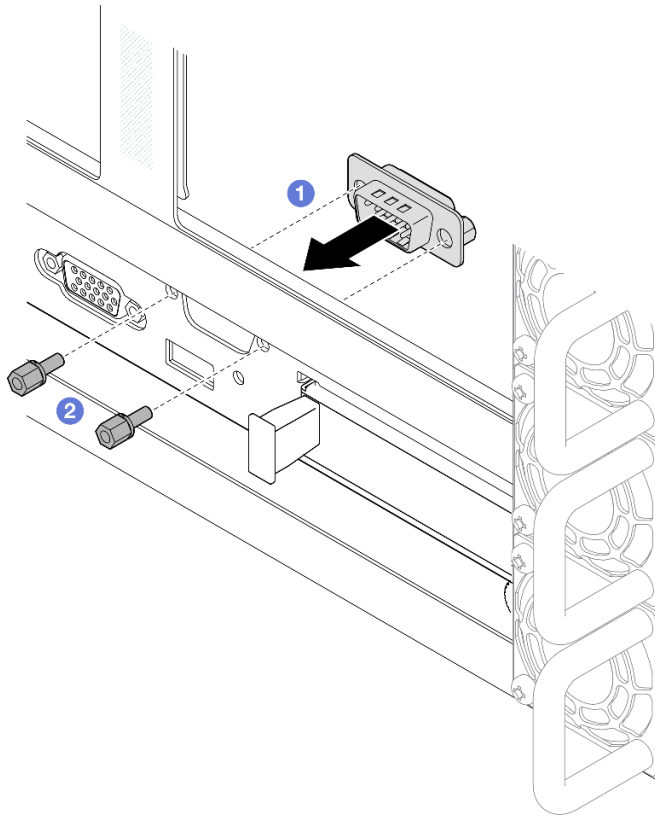


Figure 192. Installing serial port module

- a. ① Align and install the serial port module into the serial port hole from inside of the server chassis.
- b. ② Secure the serial port module with the retention screws.

Step 3. Connect the serial port module to the system board assembly.

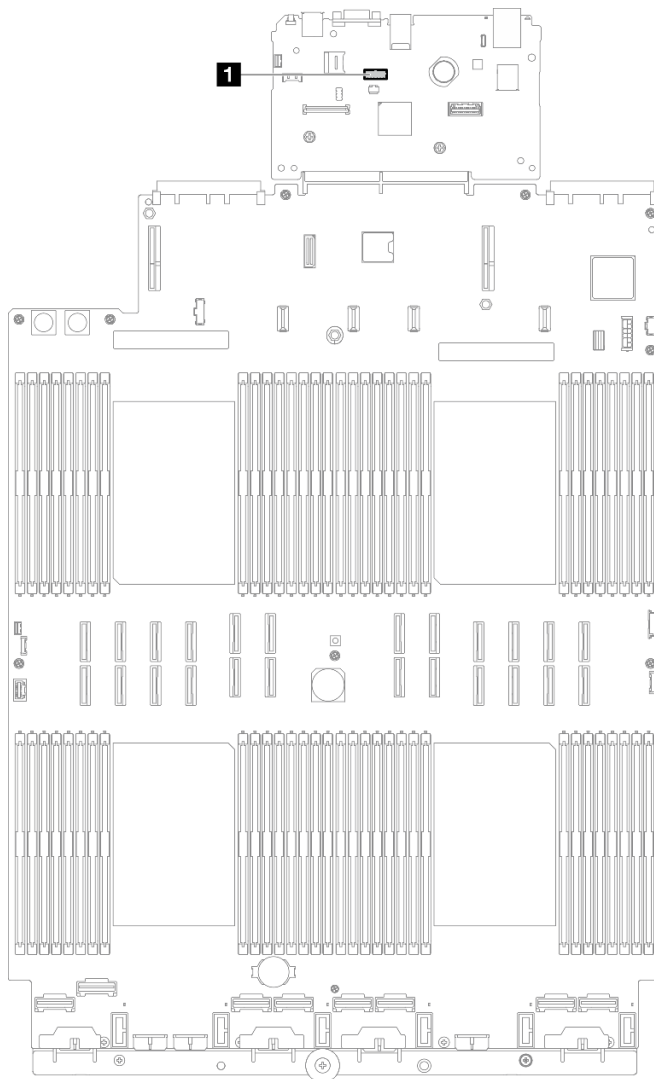


Figure 193. Connecting serial port module

## After you finish

1. Reinstall all the PCIe risers. See [“Install the PCIe riser”](#) on page 147.
2. Reinstall the crossbar. See [“Install the crossbar”](#) on page 71.
3. Reinstall the rear top cover. See [“Install the rear top cover”](#) on page 237.
4. Reinstall the front top cover. See [“Install the front top cover”](#) on page 239.
5. Complete the parts replacement. See [“Complete the parts replacement”](#) on page 242.
6. To enable the serial port module on Linux or Microsoft Windows, do one of the followings according to the installed operating system:

**Note:** If the Serial over LAN (SOL) or Emergency Management Services (EMS) feature is enabled, the serial port will be hidden on Linux and Microsoft Windows. Therefore, it is required to disable SOL and EMS to use the serial port on operating systems for serial devices.

- For Linux:

Open the ipmitool and enter the following command to disable the Serial over LAN (SOL) feature:

```
-I lanplus -H IP -U USERID -P PASSWORD sol deactivate
```

- For Microsoft Windows:
  - a. Open the ipmitool and enter the following command to disable the SOL feature:

```
-I lanplus -H IP -U USERID -P PASSWORD sol deactivate
```
  - b. Open Windows PowerShell and enter the following command to disable the Emergency Management Services (EMS) feature:

```
Bcdedit /ems off
```
  - c. Restart the server to ensure that the EMS setting takes effect.

### Demo video

[Watch the procedure on YouTube](#)

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## System board assembly replacement (trained technician only)

Follow the instructions in this section to remove and install the system I/O board and processor board, which assembled as a system board assembly.

**Important:** This task must be operated by trained technicians that are certified by Lenovo Service. Do not attempt to remove or install the part without proper training and qualification.

The following illustration shows the layout of the system board assembly which contains the system I/O board and processor board.



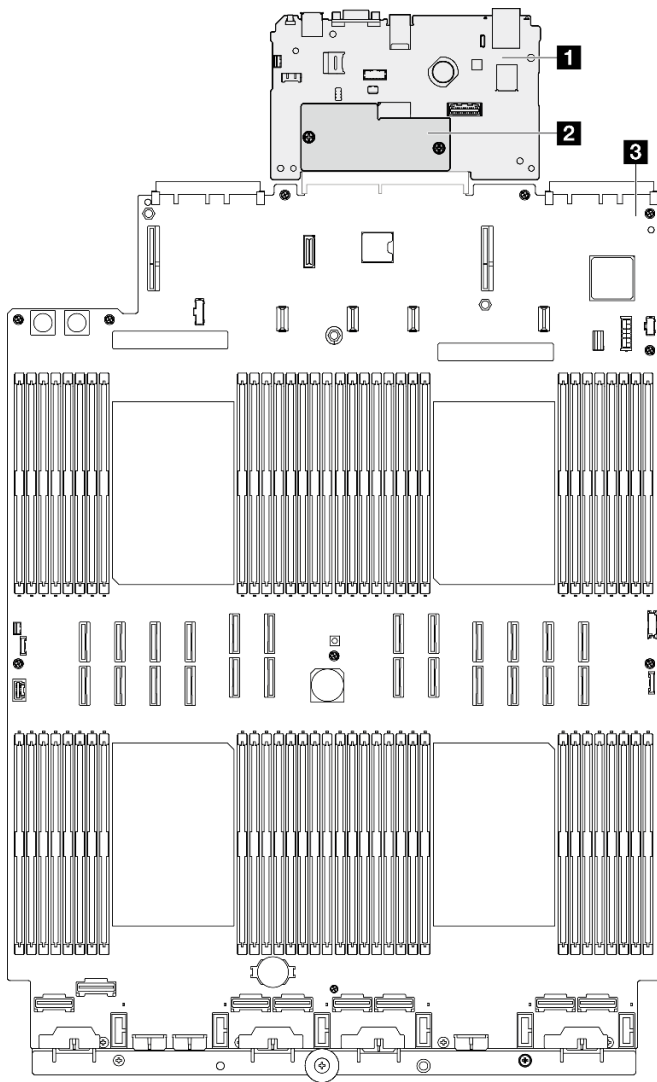


Figure 194. System board assembly layout

<b>1</b> System I/O board	<b>3</b> Processor board
<b>2</b> Firmware and RoT security module	

- [“Remove the firmware and RoT security module” on page 219](#)
- [“Install the firmware and RoT security module” on page 221](#)
- [“Remove the system I/O board or processor board” on page 223](#)
- [“Install the system I/O board or processor board” on page 226](#)

## Remove the firmware and RoT security module

Follow instructions in this section to remove the ThinkSystem V3 Firmware and Root of Trust Security Module (firmware and RoT security 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.

**Important:** This task must be operated by trained technicians that are certified by Lenovo Service. Do not attempt to remove or install the part without proper training and qualification.

**Attention:**

- Read “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “[Power off the server](#)” on page 17.
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See “[Remove the server from rails](#)” on page 17.

**Procedure**

Step 1. Make preparation for the task.

- a. Perform OneCLI commands to back up the UEFI settings. See [https://pubs.lenovo.com/lxce-onecli/onecli\\_r\\_save\\_command](https://pubs.lenovo.com/lxce-onecli/onecli_r_save_command).
- b. Perform both OneCLI commands and XCC actions to back up the XCC settings. See [https://pubs.lenovo.com/lxce-onecli/onecli\\_r\\_save\\_command](https://pubs.lenovo.com/lxce-onecli/onecli_r_save_command) and [https://pubs.lenovo.com/xcc2/NN1ia\\_c\\_backupthexcc.html](https://pubs.lenovo.com/xcc2/NN1ia_c_backupthexcc.html).
- c. Remove the front top cover. See “[Remove the front top cover](#)” on page 234.
- d. Remove the rear top cover. See “[Remove the rear top cover](#)” on page 236.
- e. Remove the crossbar. See “[Remove the crossbar](#)” on page 68.
- f. Remove all the PCIe risers. See “[Remove the PCIe riser](#)” on page 134.

Step 2. Remove the firmware and RoT security module.

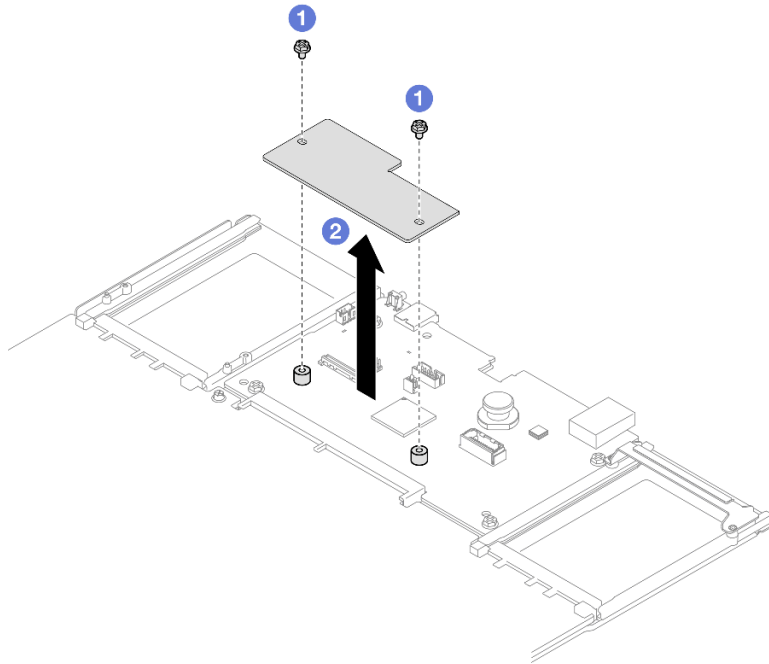


Figure 195. Firmware and RoT security module removal

- a. ① Loosen the two screws on the firmware and RoT security module.
- b. ② Lift the firmware and RoT security module out of the chassis.

## After you finish

1. Install a replacement unit. See [“Install the firmware and RoT security module” on page 221](#).
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 firmware and RoT security module

Follow instructions in this section to install the ThinkSystem V3 Firmware and Root of Trust Security Module (firmware and RoT security module).

## About this task

**Important:** This task must be operated by trained technicians that are certified by Lenovo Service. Do not attempt to remove or install the part without proper training and qualification.

(Lenovo trained technician only) After replacing the Firmware and RoT Security Module, update the UEFI, XCC, and LXPM firmware to the specific version supported by the server. For detailed information on how to update the firmware, see <https://glosse4lenovo.lenovo.com/wiki/glosse4lenovo/view/How%20To/System%20related/How%20to%20do%20RoT%20Module%20FW%20update%20on%20ThinkSystem%20V3%20machines/>.

## Attention:

- Read “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “[Power off the server](#)” on page 17.
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See “[Remove the server from rails](#)” on page 17.

**Firmware and driver download:** You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

## Procedure

Step 1. Touch the static-protective package that contains the new part to any unpainted surface on the outside of the server; then, take the new part out of the package and place it on a static-protective surface.

Step 2. Install the firmware and RoT security module to the server.

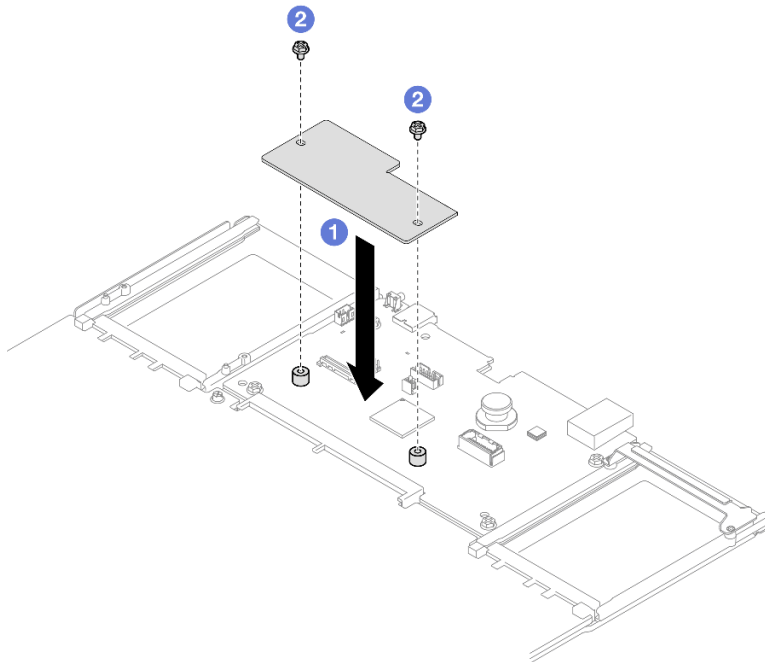


Figure 196. Firmware and RoT security module installation

- 1 Lower the firmware and RoT security module onto the system I/O board and ensure that the connector on the module is correctly inserted into the slot on the system I/O board.
- 2 Tighten the two screws to secure the firmware and RoT security module in place.

## After you finish

1. Reinstall all the PCIe risers. See “[Install the PCIe riser](#)” on page 147.
2. Reinstall the crossbar. See “[Install the crossbar](#)” on page 71.
3. Reinstall the rear top cover. See “[Install the rear top cover](#)” on page 237.
4. Reinstall the front top cover. See “[Install the front top cover](#)” on page 239.
5. Complete the parts replacement. See “[Complete the parts replacement](#)” on page 242.
6. Update the UEFI, XCC, and LXPM firmware to the specific version supported by the server. See <https://glosse4lenovo.lenovo.com/wiki/glosse4lenovo/view/How%20To/System%20related/How%20to%20do%20RoT%20Module%20FW%20update%20on%20ThinkSystem%20V3%20machines/>.
7. Perform OneCLI commands to restore the UEFI settings. See [https://pubs.lenovo.com/lxce-onecli/onecli\\_r\\_restore\\_command](https://pubs.lenovo.com/lxce-onecli/onecli_r_restore_command).
8. Perform both OneCLI commands and XCC actions to restore the XCC settings. See [https://pubs.lenovo.com/lxce-onecli/onecli\\_r\\_restore\\_command](https://pubs.lenovo.com/lxce-onecli/onecli_r_restore_command) and [https://pubs.lenovo.com/xcc2/NN1ia\\_c\\_restorethexcc.html](https://pubs.lenovo.com/xcc2/NN1ia_c_restorethexcc.html).
9. If there is a software (SW) key, for example, XCC FoD key, installed in the system, inject the key again to ensure that the key functions properly. See <https://lenovopress.lenovo.com/redp4895.pdf>.

**Note:** If you need to replace the processor board together with the Firmware and RoT Security Module, update the VPD before injecting the key. See [Update the Vital Product Data \(VPD\)](#).

10. Optionally, do the following if needed:
  - Hide TPM. See “[Hide/observe TPM](#)” on page 231.
  - Update the TPM firmware. See “[Update the TPM firmware](#)” on page 232.
  - Enable UEFI Secure Boot. See “[Enable UEFI Secure Boot](#)” on page 233.

## Demo video

[Watch the procedure on YouTube](#)

## Remove the system I/O board or processor board

Follow instructions in this section to remove the system I/O board or processor board.

### 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.

#### **Important:**

- This task must be operated by trained technicians that are certified by Lenovo Service. Do not attempt to remove or install the part without proper training and qualification.

- When removing the memory modules, label the slot number on each memory module, remove all the memory modules from the system board assembly, and set them aside on a static-protective surface for reinstallation.
- **When disconnecting cables, make a list of each cable and record the connectors the cable is connected to, and use the record as a cabling checklist after installing the new system board assembly.**

#### Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

## Procedure

Step 1. Make preparation for the task.

- 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.
- Save the system configuration to an external device with Lenovo XClarity Essentials.
- Save the system event log to external media.
- Gently pull and disengage every installed power supply unit. See [“Remove a hot-swap power supply unit” on page 194](#).
- Remove the OCP module. See [“Remove the OCP module” on page 132](#).
- Remove the front top cover. See [“Remove the front top cover” on page 234](#).
- Remove the rear top cover. See [“Remove the rear top cover” on page 236](#).
- Remove all fan modules. See [“Remove a fan module” on page 84](#).
- Remove the fan cage. See [“Remove the fan cage” on page 86](#).
- Remove the front air baffle. See [“Remove the front air baffle” on page 46](#).
- Remove the crossbar. See [“Remove the crossbar” on page 68](#).
- Remove all the PCIe risers. See [“Remove the PCIe riser” on page 134](#).
- Remove the rear air baffle. See [“Remove the rear air baffle” on page 53](#).
- Remove the power distribution board. See [“Remove the power distribution board” on page 180](#).
- Remove the PHMs. See [“Remove a processor and heat sink” on page 199](#).
- Remove the memory modules. See [“Remove a memory module” on page 125](#).
- Remove the serial port module. See [“Remove the serial port module” on page 211](#).
- Remove the management NIC adapter. See [“Remove the management NIC adapter” on page 122](#).
- Remove the MicroSD card. See [“Remove the MicroSD card” on page 130](#).

- t. Disconnect all cables connected to the system board assembly. See [Chapter 2 “Internal cable routing” on page 245](#).

Step 2. Disengage the system board assembly.

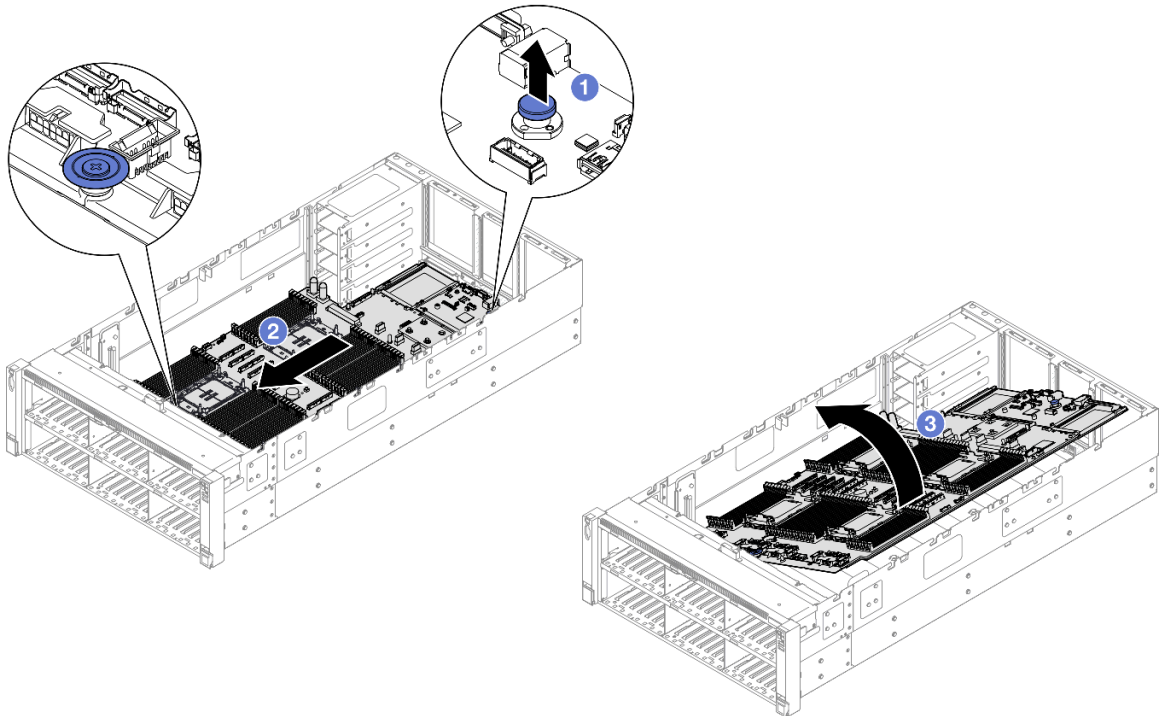


Figure 197. System board assembly removal

**Note:** This handle only serves the purpose of removing the system board assembly. Do not attempt to lift the whole server with it.

- a. ① Pull the plunger up to release the system board assembly.
- b. ② Grasp the plunger and blue handle; then, slide the system board assembly slightly towards the front of the server to disengage it from the chassis.
- c. ③ Rotate the longer side of the system board assembly up; then, remove the system board assembly from the chassis.

Step 3. If you are going to replace the system I/O board, remove the firmware and RoT security module and MicroSD card from the system I/O board. See [“Remove the firmware and RoT security module” on page 219](#) and [“Remove the MicroSD card” on page 130](#).

Step 4. Separate the system I/O board from the processor board.

**Note:** To prevent the contact of the system I/O board from damage, pinch and lift the plunger on the system I/O board upward a little and pull out the system I/O board outward. During the entire pulling action, ensure that the system I/O board remains as horizontal as possible.

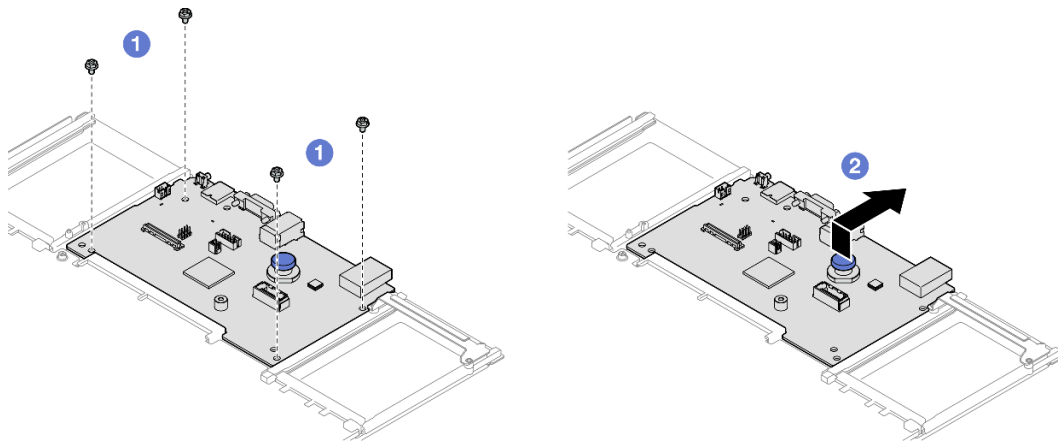


Figure 198. Separating the system I/O board from the processor board

- a. ❶ Remove the four screws that secure the system I/O board.
- b. ❷ Lift and hold the plunger; then, slide the system I/O board towards the rear end of the chassis to disengage it from the processor board.

## After you finish

1. Install a replacement unit. See [“Install the system I/O board or processor board”](#) on page 226.
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.

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

- a. Take a socket cover from the processor socket assembly on the new processor board and orient it correctly above the processor socket assembly on the removed processor board.
  - b. 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 when it is securely attached.
  - c. **Make sure** that the socket cover is securely attached to the processor socket assembly.
3. If you plan to recycle the component, see [“Disassemble the system board assembly for recycle”](#) in *User Guide*.

## Demo video

[Watch the procedure on YouTube](#)

## Install the system I/O board or processor board

Follow instructions in this section to install the system I/O board or processor board.

## About this task

**Important:** This task must be operated by trained technicians that are certified by Lenovo Service. Do not attempt to remove or install the part without proper training and qualification.

## Attention:



- Read “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See “[Power off the server](#)” on page 17.
- 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.

**Firmware and driver download:** You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

## Procedure

- Step 1. Touch the static-protective package that contains the new part to any unpainted surface on the outside of the server; then, take the new part out of the package and place it on a static-protective surface.
- Step 2. Depending on your need, do one of the following:
- If you are going to replace the system I/O board and reuse the processor board, install a new system I/O board onto the processor board.
  - If you are going to replace the processor board and reuse the system I/O board, install the existing system I/O board onto a new processor board.

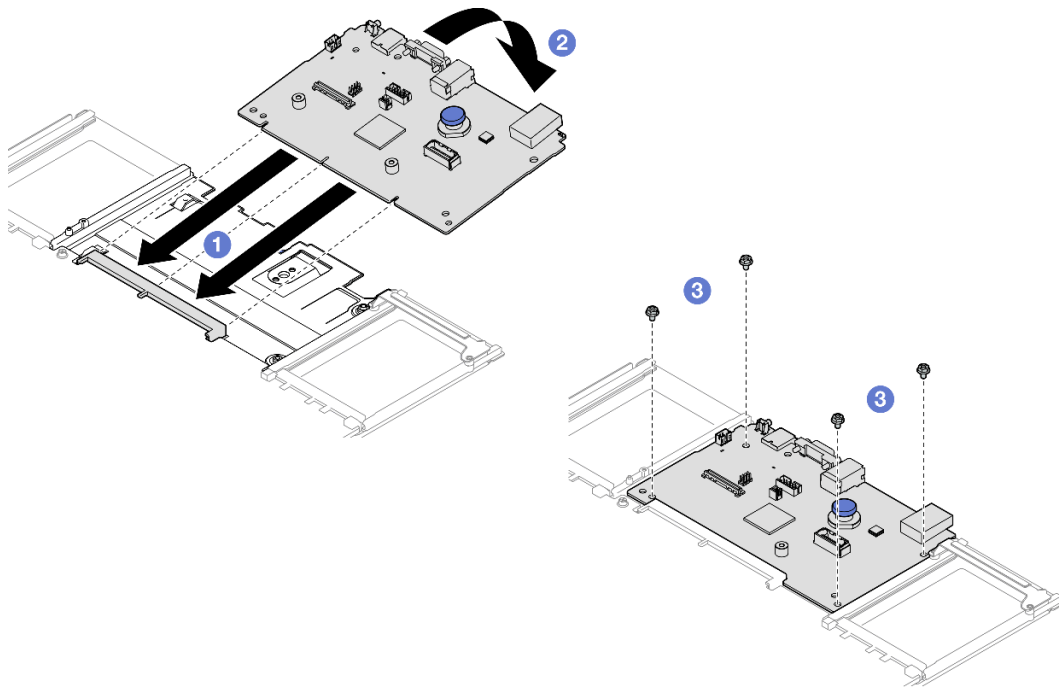
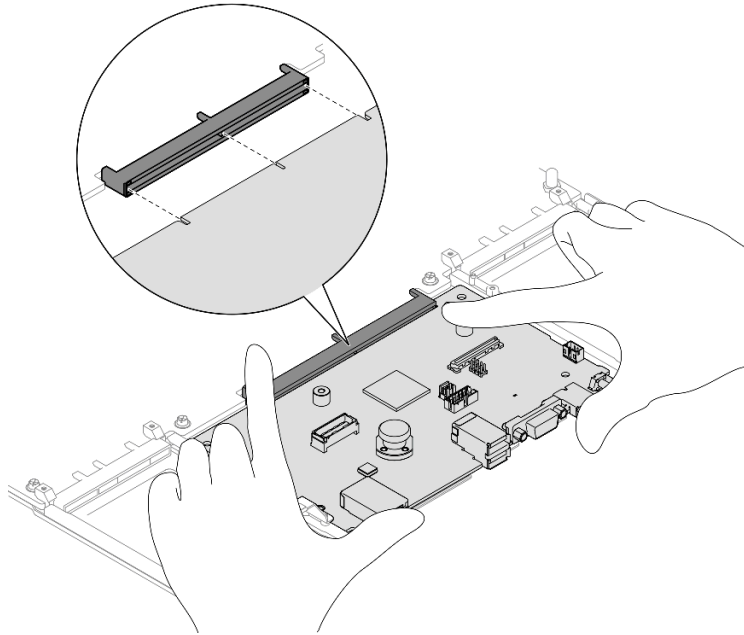


Figure 199. Installing the system I/O board onto the processor board

- 1 Align the system I/O board with the connector on the processor board, and use both hands to push the system I/O board and slightly insert it into the connector.

**Note:** To prevent the contacts of the system I/O board from damage, ensure that the system I/O board is aligned correctly with the connector on the processor board, and remains as horizontal as possible during the insertion.



- b. ② Lower the system I/O board onto the supporting sheet metal. Make sure the plunger engages with the supporting sheet metal.
- c. ③ Install the screws to fix the system I/O board into place.

Step 3. If you installed a new system I/O board onto the processor board, install the firmware and RoT security module and MicroSD card that was removed from the old system I/O board onto the new system I/O board. See [“Install the firmware and RoT security module” on page 221](#) and [“Install the MicroSD card” on page 131](#).

Step 4. Place the system board assembly in the chassis.

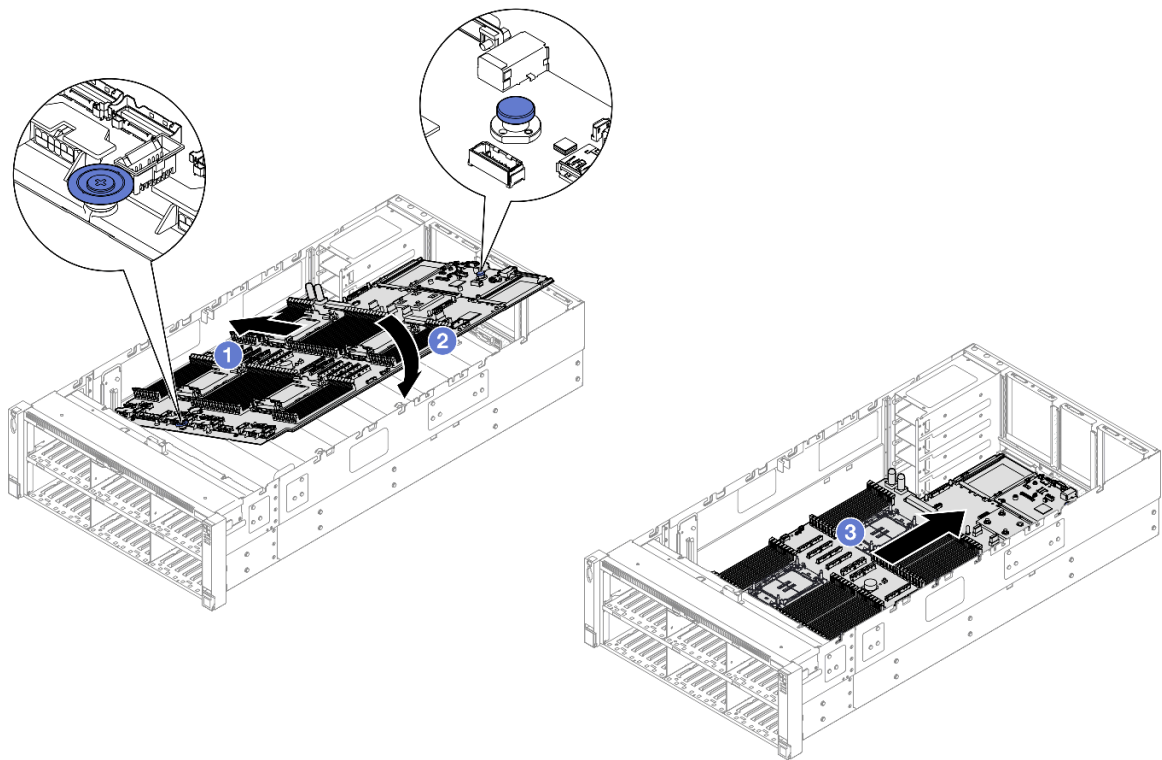


Figure 200. System board assembly installation

- a. ① Grasp the plunger and blue handle; then, insert the shorter side of the system board assembly into the chassis.
- b. ② Lower the longer side of the system board assembly down into the chassis.
- c. ③ Slide the system board assembly towards the rear of the chassis until the plunger clicks into place. Ensure that rear connectors on the system I/O board are inserted into the corresponding holes in the rear panel.

## After you finish

1. Reconnect all the cables to the system board assembly. See [Chapter 2 “Internal cable routing” on page 245](#).
2. Reinstall the MicroSD card. See [“Install the MicroSD card” on page 131](#).
3. Reinstall the management NIC adapter. See [“Install the management NIC adapter” on page 123](#).
4. Reinstall the serial port module. See [“Install the serial port module” on page 214](#).
5. Reinstall the memory modules. See [“Install a memory module” on page 127](#).
6. Reinstall the PHMs. See [“Install a processor and heat sink” on page 204](#).
7. Reinstall the power distribution board. See [“Install the power distribution board” on page 183](#).
8. Reinstall the rear air baffle. See [“Install the rear air baffle” on page 57](#).
9. Reinstall all the PCIe risers. See [“Install the PCIe riser” on page 147](#).
10. Reinstall the crossbar. See [“Install the crossbar” on page 71](#).
11. Reinstall the front air baffle. See [“Install the front air baffle” on page 49](#).
12. Reinstall the fan cage. See [“Install the fan cage” on page 88](#).
13. Reinstall all fan modules. See [“Install a fan module” on page 90](#).

14. Reinstall the rear top cover. See [“Install the rear top cover” on page 237](#).
15. Reinstall the front top cover. See [“Install the front top cover” on page 239](#).
16. Reinstall the OCP module. See [“Install the OCP module” on page 133](#).
17. Reinstall all the power supply units. See [“Install a hot-swap power supply unit” on page 196](#).
18. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside the server.
19. Reconnect the power cords and any cables that you removed.
20. Power on the server and any peripheral devices. See [“Power on the server” on page 16](#).
21. Update the vital product data (VPD). See [“Update the Vital Product Data \(VPD\)” on page 230](#).

Machine type number and serial number can be found on the ID label, see [“Identify the server and access to the Lenovo XClarity Controller” in \*User Guide\* or \*System Configuration Guide\*](#).

22. Optionally, enable UEFI Secure Boot. See [“Enable UEFI Secure Boot” on page 233](#).

## Demo video

[Watch the procedure on YouTube](#)

## Update the Vital Product Data (VPD)

Use this topic to update the Vital Product Data (VPD).


- **(Required)** Machine type
- **(Required)** Serial number
- **(Required)** System model
- (Optional) Asset tag
- (Optional) UUID

### Recommended tools:

- Lenovo XClarity Provisioning Manager
- Lenovo XClarity Essentials OneCLI commands

### Using Lenovo XClarity Provisioning Manager

#### Steps:

1. Start the server and press the key according to the on-screen instructions. The Lenovo XClarity Provisioning Manager interface is displayed by default.
2. Click  on the top right corner of the Lenovo XClarity Provisioning Manager main interface.
3. Click **Update VPD**; then, follow on-screen instructions to update the VPD.

### Using Lenovo XClarity Essentials OneCLI commands

- Updating **machine type**  
`onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> [access_method]`
- Updating **serial number**  
`onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> [access_method]`
- Updating **system model**  
`onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> [access_method]`  
`onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx <system model> --override [access_method]`
- Updating **asset tag**

```
onecli config set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> [access_method]
```

- Updating **UUID**

```
onecli config createuuid SYSTEM_PROD_DATA.SysInfoUUID [access_method]
```

Variable	Description
<m/t_model>	The server machine type and model number. Type xxxxyyy, where xxxx is the machine type and yy 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 on the server. Type system yyyyyyyy, where yyyyyyyy is the product identifier.
<asset_tag>	The server asset tag number. Type aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa, where aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa is the asset tag number.
[access_method]	<p>The access method that you select to access the target server.</p> <ul style="list-style-type: none"> <li>• Online KCS (unauthenticated and user restricted): You can directly delete [access_method] from the command.</li> <li>• Online authenticated LAN: In this case, specify below LAN account information at the end of the OneCLI command: --bmc -username &lt;user_id&gt; --bmc -password &lt;password&gt;</li> <li>• Remote WAN/LAN: In this case, specify below XCC account information and IP address at the end of the OneCLI command: --bmc &lt;bmc_user_id&gt;:&lt;bmc_password&gt;@&lt;bmc_external_IP&gt;</li> </ul> <p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>– &lt;bmc_user_id&gt; The BMC account name (1 of 12 accounts). The default value is USERID.</li> <li>– &lt;bmc_password&gt; The BMC account password (1 of 12 accounts).</li> </ul>

## Hide/observe TPM

TPM is enabled by default to encrypt data transfer for system operation. Optionally, you can disable TPM using Lenovo XClarity Essentials OneCLI.

To disable TPM, do the following:

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:

```
OneCli.exe config set TrustedComputingGroup.HideTPMfromOS "Yes" --imm <userid>:<password>@<ip_address> --override
```

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.

Example:

```
D:\onecli>OneCli.exe config set TrustedComputingGroup.HideTPMfromOS "Yes" --imm USERID:PASSWORD=1@10.245.39.79 --override

Lenovo XClarity Essentials OneCLI 1xce_onecli01p-2.3.0
Licensed Materials - Property of Lenovo
(C) Copyright Lenovo Corp. 2013-2018 All Rights Reserved
If the parameters you input includes password, please Note that:
* The password must consist of a sequence of characters from `0-9a-zA-Z_+.$%!'&*()=` set
* Use `"'` to quote when password parameters include special characters
* Do not use reserved characters in path name when parameter contains path
Invoking SET command ...
Connected to BMC at IP address 10.245.39.79 by IPMI
TrustedComputingGroup.HideTPMfromOS=Yes
Success.
```

### 3. Reboot the system.

If you want to enable TPM again, run the following command and reboot the system:

```
OneCli.exe config set TrustedComputingGroup.HideTPMfromOS "No" --imm <userid>:<password>@<ip_address> --override
```

Example:

```
D:\onecli3>OneCli.exe config set TrustedComputingGroup.HideTPMfromOS "No" --imm USERID:PASSWORD=1@10.245.39.79 --override

Lenovo XClarity Essentials OneCLI 1xce_onecli01h-3.0.1
(C) Lenovo 2013-2020 All Rights Reserved

OneCLI License Agreement and OneCLI Legal Information can be found at the following location:
"D:\onecli3\Lic"

[Is]Certificate check finished [100%][=====]
Invoking SET command ...
Connected to BMC at IP address 10.245.39.79 by IPMI
TrustedComputingGroup.HideTPMfromOS=No
Configure successfully, please reboot system.
Succeed.
```

## Update the TPM firmware

Optionally, you can update the TPM firmware using Lenovo XClarity Essentials OneCLI.

**Note:** TPM firmware update is irreversible. After update, the TPM firmware cannot be downgraded to earlier versions.

### TPM firmware version

Follow the procedure below to see the TPM firmware version:

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** → **Trusted Platform Module** → **TPM 2.0** → **TPM Firmware Version**.

### Update the TPM firmware

To update the TPM firmware, do the following:

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:

```
OneCli.exe config set TrustedComputingGroup.DeviceOperation "Update to TPM 2.0 firmware version <x.x.x.x>" --bmc <userid>:<password>@<ip_address>
```

where:

- <x.x.x.x> is the target TPM version.  
e.g. TPM 2.0 (7.2.1.0) -> TPM 2.0 (7.2.2.0):

```
OneCli.exe config set TrustedComputingGroup.DeviceOperation "Update to TPM 2.0 firmware version 7.2.2.0" --bmc <userid>:<password>@<ip_address>
```

- <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.

## 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.

**Note:** If disabling UEFI secure boot is needed, select Disable in step 4.

- 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

Follow the instructions in this section to remove and install the top cover.

### Remove the front top cover

Follow the instructions in this section to remove the front 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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- 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.
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

## Procedure

Step 1. If the front top cover is locked, unlock it with a screwdriver (direction **1**).



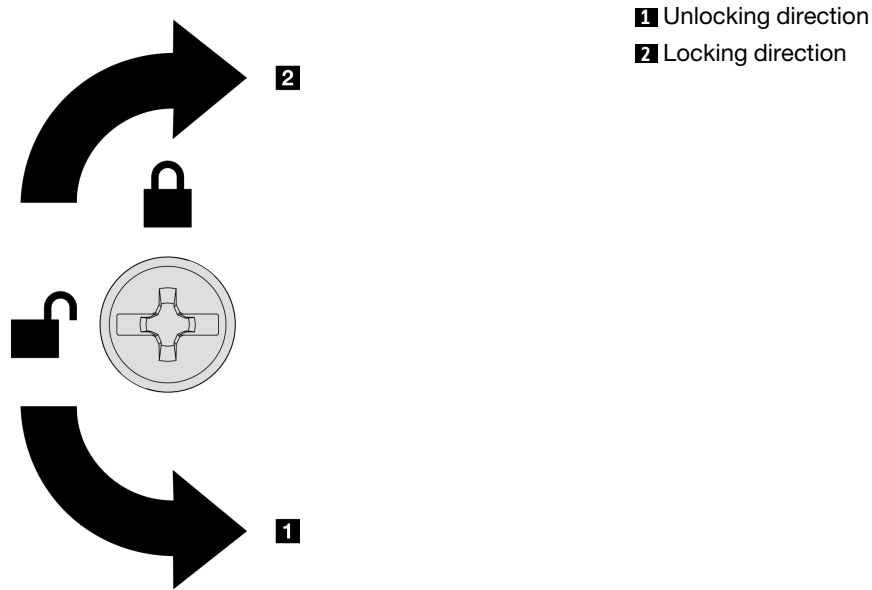


Figure 201. Front top cover locking/unlocking direction

Step 2. Remove the front top cover from the server.

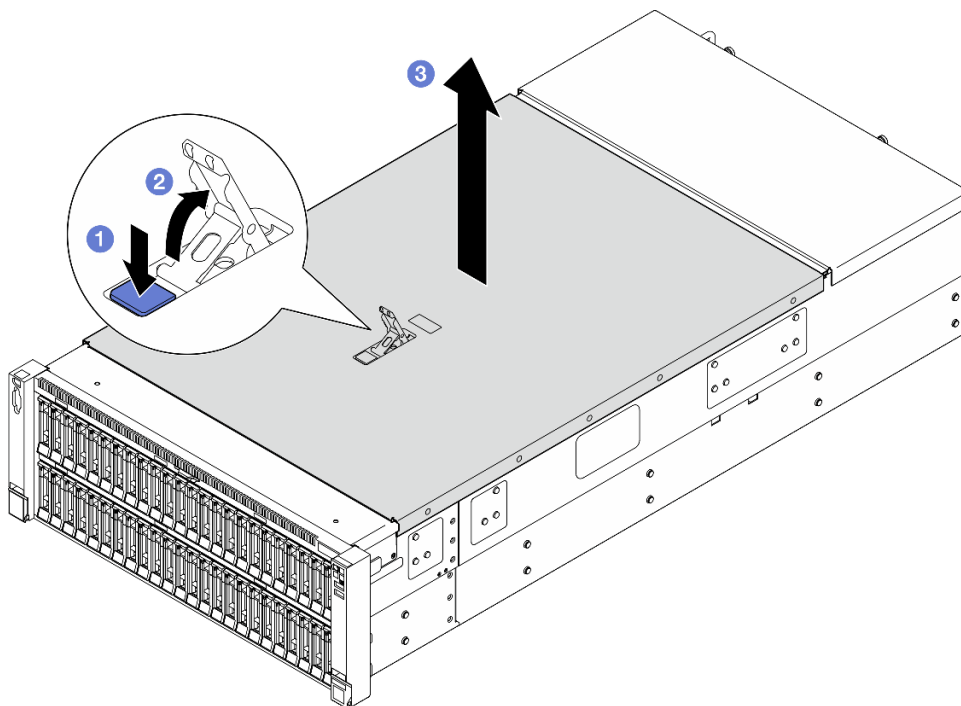


Figure 202. Removing front top cover

**Attention:**

- Service label is located on the inside of the front top cover.
- For proper cooling and air flow, install the front and rear top covers before you power on the server. Operating the server with the top covers removed might damage server components.

- a. ① Press the blue button on the front top cover release latch.
- b. ② Rotate the end of the latch up until it is in vertical position.
- c. ③ Lift the front top cover to remove it.

## After you finish

1. Install a replacement unit. See [“Install the front top cover” on page 239](#).
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](#)

## Remove the rear top cover

Follow the instructions in this section to remove the rear 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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Power off the server and peripheral devices and disconnect the power cords and all external cables. See [“Power off the server” on page 17](#).
- If the server is installed in a rack, slide the server out on its rack slide rails to gain access to the top covers, or remove the server from the rack. See [“Remove the server from rails” on page 17](#).

## Procedure

Step 1. Remove the front top cover. See [“Remove the front top cover” on page 234](#).

Step 2. Remove the rear top cover from the server.

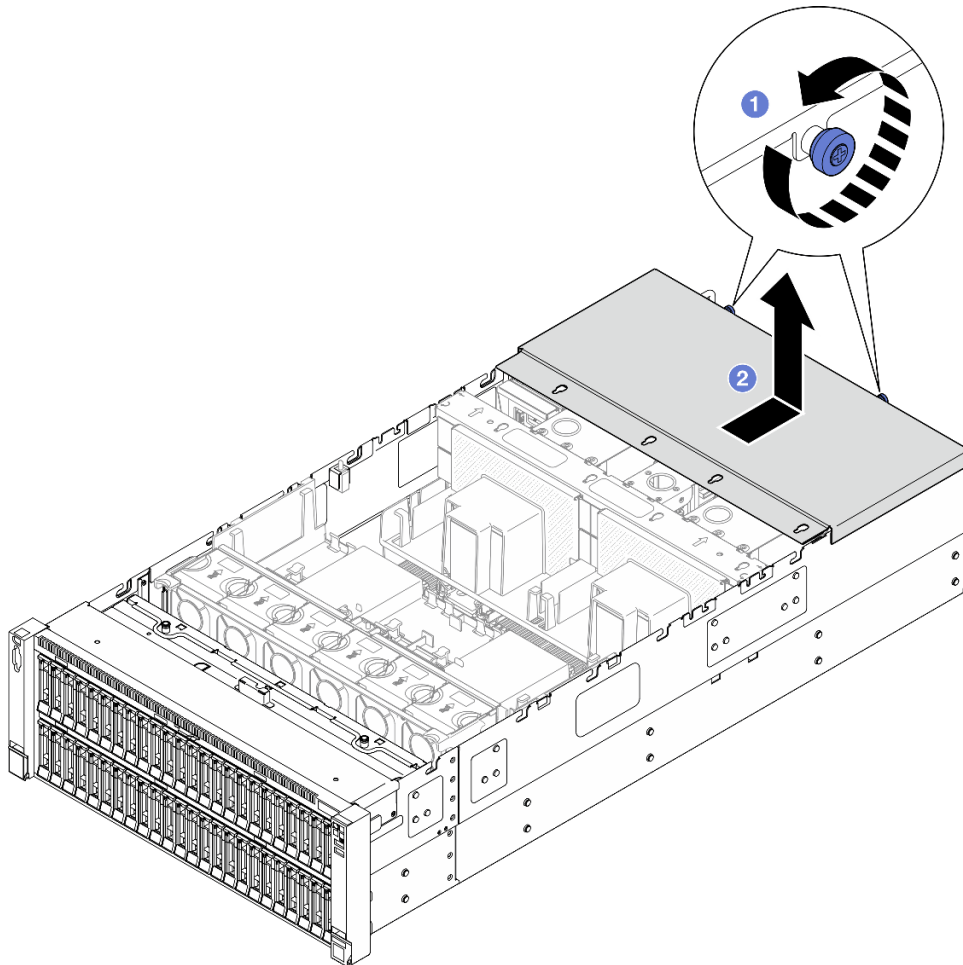


Figure 203. Removing rear top cover

- a. ① Loosen the two thumbscrews on the rear of the server.
- b. ② Slide the rear top cover towards the rear of the server and lift to remove it.

## After you finish

1. Install a replacement unit. See [“Install the rear top cover” on page 237](#).
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 rear top cover

Follow the instructions in this section to install the rear 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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Prevent exposure to static electricity, which might lead to system halt and loss of data, by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.
- 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 2 “Internal cable routing” on page 245](#).

## **Procedure**

Step 1. Install the rear top cover.

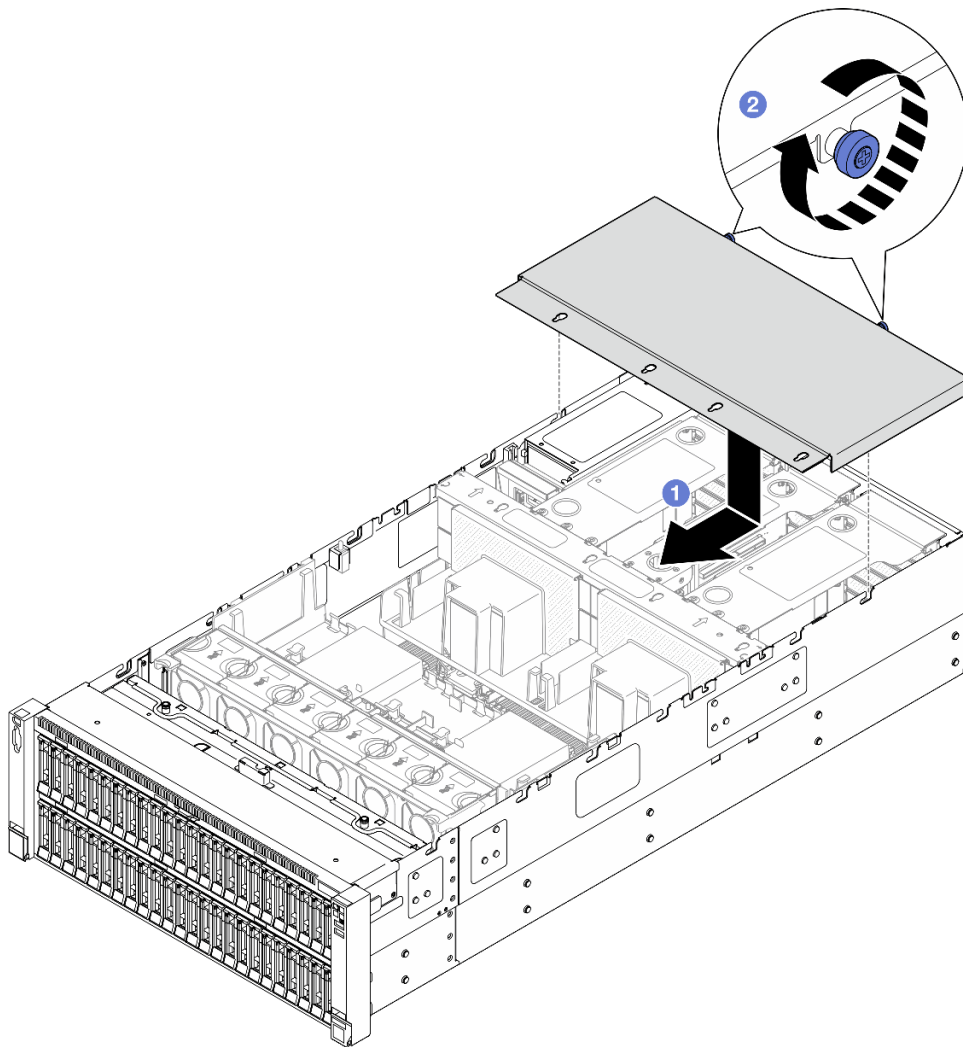


Figure 204. Installing rear top cover

- a. **1** Align the rear top cover guide pins with the guide holes on chassis; then place the rear top cover on top of the server and slide it towards the front of the server until it engages with the chassis.
- b. **2** Secure the two thumbscrews on the rear of the server.

## After you finish

1. Reinstall the front top cover. See [“Install the front top cover”](#) on page 239.
2. Complete the parts replacement. See [“Complete the parts replacement”](#) on page 242.

## Demo video

[Watch the procedure on YouTube](#)

## Install the front top cover

Follow the instructions in this section to install the front 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 [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Prevent exposure to static electricity, which might lead to system halt and loss of data, by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.
- 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 2 “Internal cable routing” on page 245](#).

**Note:** If you are installing a new top cover, attach the service label to the inside of the new top cover if necessary.

## Procedure

Step 1. Install the front top cover.

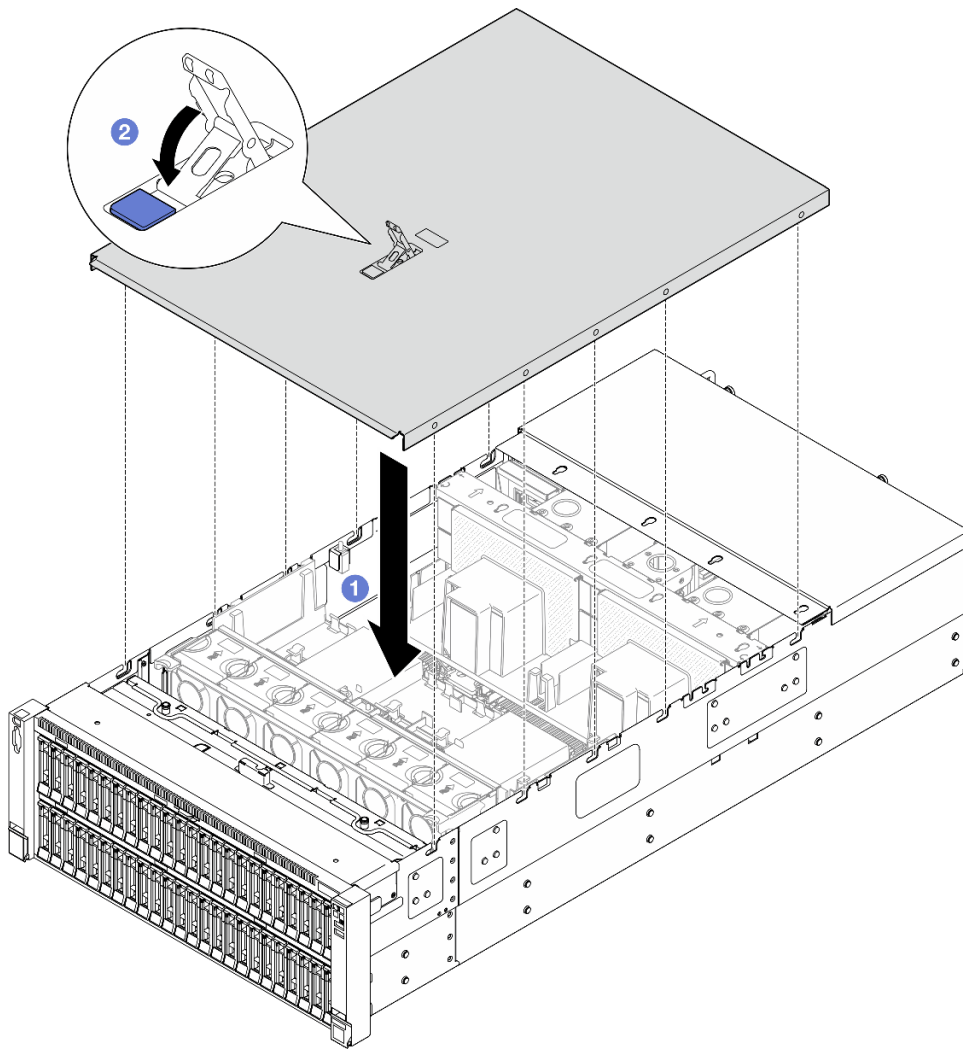


Figure 205. Installing front top cover

- a. ① Align the front top cover guide pins with the guide holes on chassis; then place the front top cover on top of the server with both sides aligned.
- b. ② Rotate the latch down until it stops.

Step 2. (Optional) Lock the front top cover with a screw driver (direction ②).

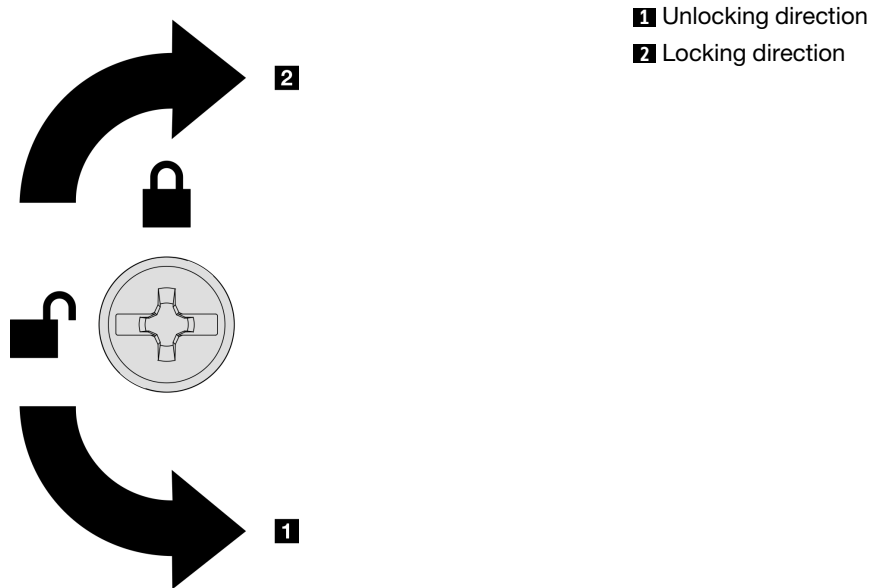


Figure 206. Front top cover locking/unlocking direction

## After you finish

Complete the parts replacement. See [“Complete the parts replacement” on page 242](#).

### Demo video

[Watch the procedure on YouTube](#)

---

## Complete the parts replacement

Go through the checklist to complete parts replacement

To complete the parts replacement, do the following:

1. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside your server.
2. Properly route and secure the cables in the server. Refer to the cable connecting and routing information for each component.
3. Reinstall the air baffles. See [“Install the front air baffle” on page 49](#) and [“Install the rear air baffle” on page 57](#).

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

4. Reinstall the top cover. See [“Install the front top cover” on page 239](#) and [“Install the rear top cover” on page 237](#).
5. If the server was installed in a rack, reinstall the server into the rack. See [“Install the server to rails” on page 24](#).
6. Reconnect the power cords and any cables that you removed.
7. Power on the server and any peripheral devices. See [“Power on the server” on page 16](#).



8. Update the server configuration.

- Download and install the latest device drivers: <http://datacentersupport.lenovo.com>.
- Update the system firmware. See “Update the firmware” in *User Guide* or *System Configuration Guide*.
- Update the UEFI configuration. See <https://pubs.lenovo.com/uefi-overview/>.
- Reconfigure the disk arrays if you have installed or removed a hot-swap drive or a RAID adapter. See <https://pubs.lenovo.com/lxpm-overview/> for the LXPM documentation compatible with your server.



---

## Chapter 2. Internal cable routing

See this section to do cable routing for specific components.

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

---

### Identifying connectors

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

### Drive backplane connectors

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

#### 2.5-inch AnyBay 8-bay drive backplane

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

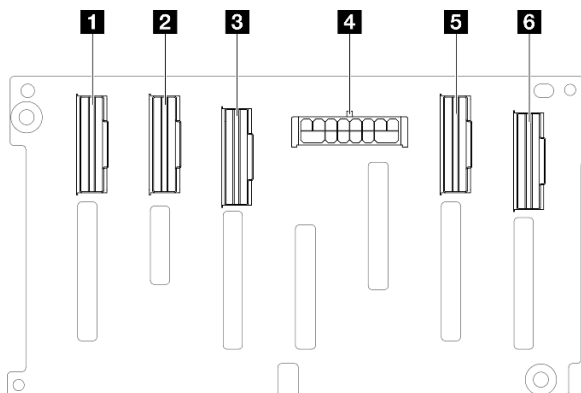


Figure 207. 2.5-inch AnyBay 8-bay drive backplane connectors

Table 12. 2.5-inch AnyBay 8-bay drive backplane connectors

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

**Note:** 2.5-inch AnyBay 8-bay drive backplanes support 2.5-inch SAS/SATA/NVMe drives.

#### 2.5-inch SAS/SATA 8-bay drive backplane

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

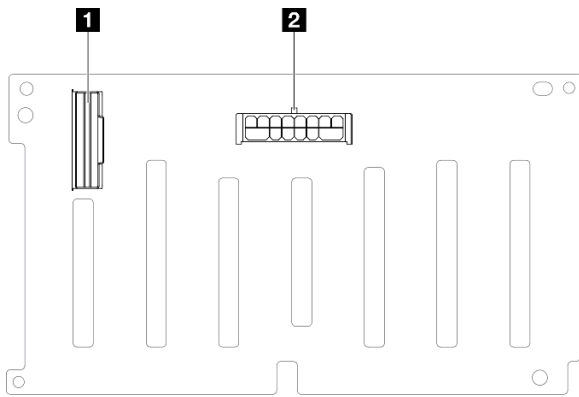


Figure 208. 2.5-inch SAS/SATA 8-bay drive backplane connectors

Table 13. 2.5-inch SAS/SATA 8-bay drive backplane connectors

1 SAS / SATA	2 Power connector
--------------	-------------------

## PCIe riser connectors

See this section to locate the connectors in the PCIe riser.

The server supports the following riser cards.

- See [“Two slot Gen 4 FH riser card” on page 247](#) for the following risers:
  - x8/x8 PCIe G4 Riser 1/3 FHHL
  - 7mm/x8/x8 PCIe G4 Riser 3 FHHL
- See [“Six slot Gen 4 HH riser card” on page 248](#) for the following riser:
  - 6 x8 PCIe G4 Riser 2 HHHL
- See [“Six slot Gen 5 HH riser card” on page 249](#) for the following riser:
  - 6 x8 PCIe G5 Riser 2 HHHL
- See [“Six slot Gen 4 FH riser card” on page 250](#) for the following risers:
  - 3 x16 & 3 x8 PCIe G4 Riser 1/3 FHFL
  - 2 x16 & 3 x8 + 7mm PCIe G4 Riser 3 FHFL
- See [“Six slot Gen 5 FH riser card” on page 251](#) for the following risers:
  - 4 x16 & 1 x8 PCIe G5 Riser 1/3 FHFL
  - 3 x16 & 1 x8 + 7mm PCIe G5 Riser 3 FHFL

### Two slot Gen 4 FH riser card

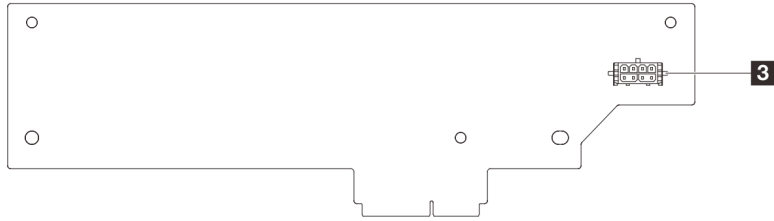
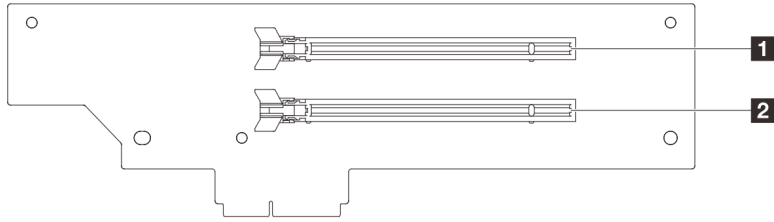


Table 14. Two slot Gen 4 FH riser card connectors

<b>1</b> PCIe x16 (Gen4 x8) slot	<b>3</b> Riser power connector
<b>2</b> PCIe x16 (Gen4 x8) slot	

### Six slot Gen 4 HH riser card

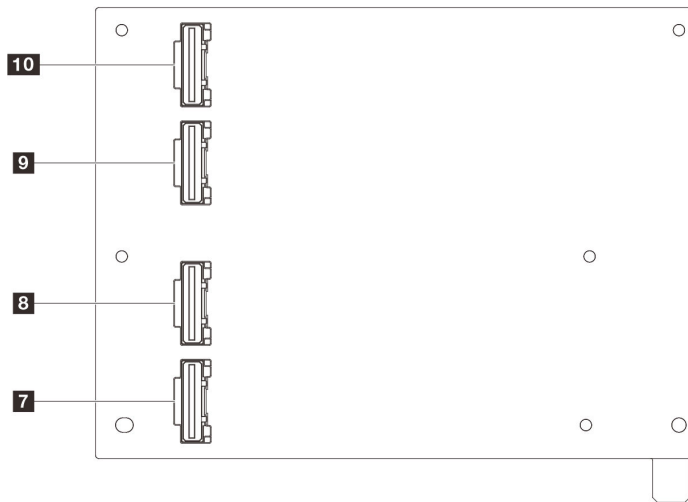
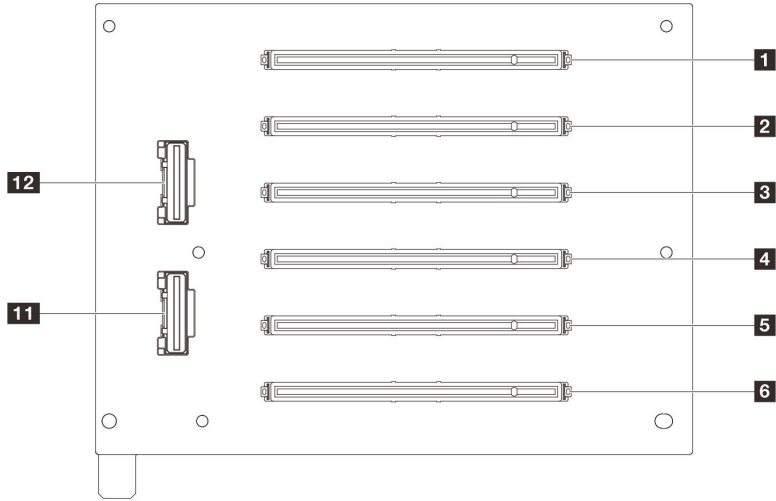


Table 15. Six slot Gen 4 HH riser card connectors

<b>1</b> PCIe x16 (Gen4 x8) slot	<b>7</b> R1 connector
<b>2</b> PCIe x16 (Gen4 x8) slot	<b>8</b> R2 connector
<b>3</b> PCIe x16 (Gen4 x8) slot	<b>9</b> R5 connector
<b>4</b> PCIe x16 (Gen4 x8) slot	<b>10</b> R6 connector
<b>5</b> PCIe x16 (Gen4 x8) slot	<b>11</b> R3 connector
<b>6</b> PCIe x16 (Gen4 x8) slot	<b>12</b> R4 connector

### Six slot Gen 5 HH riser card

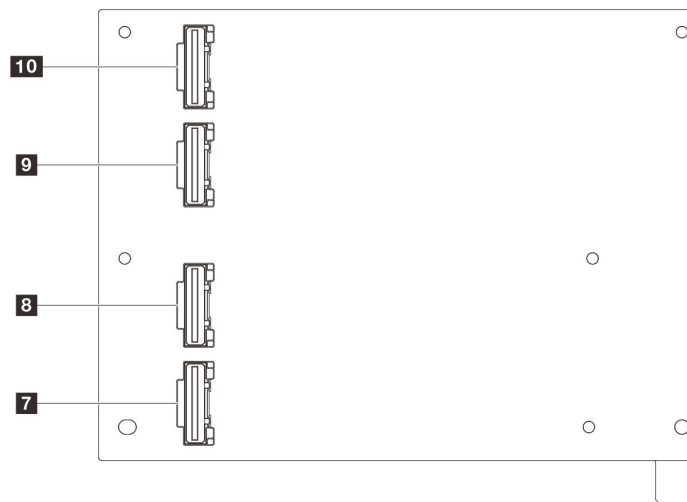
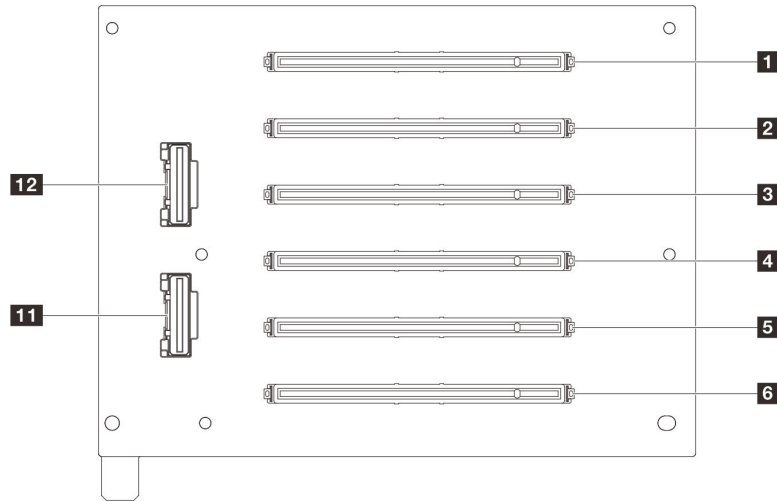


Table 16. Six slot Gen 5 HH riser card connectors

<b>1</b> PCIe x16 (Gen5 x8) slot	<b>7</b> R1 connector
<b>2</b> PCIe x16 (Gen5 x8) slot	<b>8</b> R2 connector
<b>3</b> PCIe x16 (Gen4 x8) slot	<b>9</b> R5 connector
<b>4</b> PCIe x16 (Gen4 x8) slot	<b>10</b> R6 connector
<b>5</b> PCIe x16 (Gen5 x8) slot	<b>11</b> R3 connector
<b>6</b> PCIe x16 (Gen5 x8) slot	<b>12</b> R4 connector

### Six slot Gen 4 FH riser card

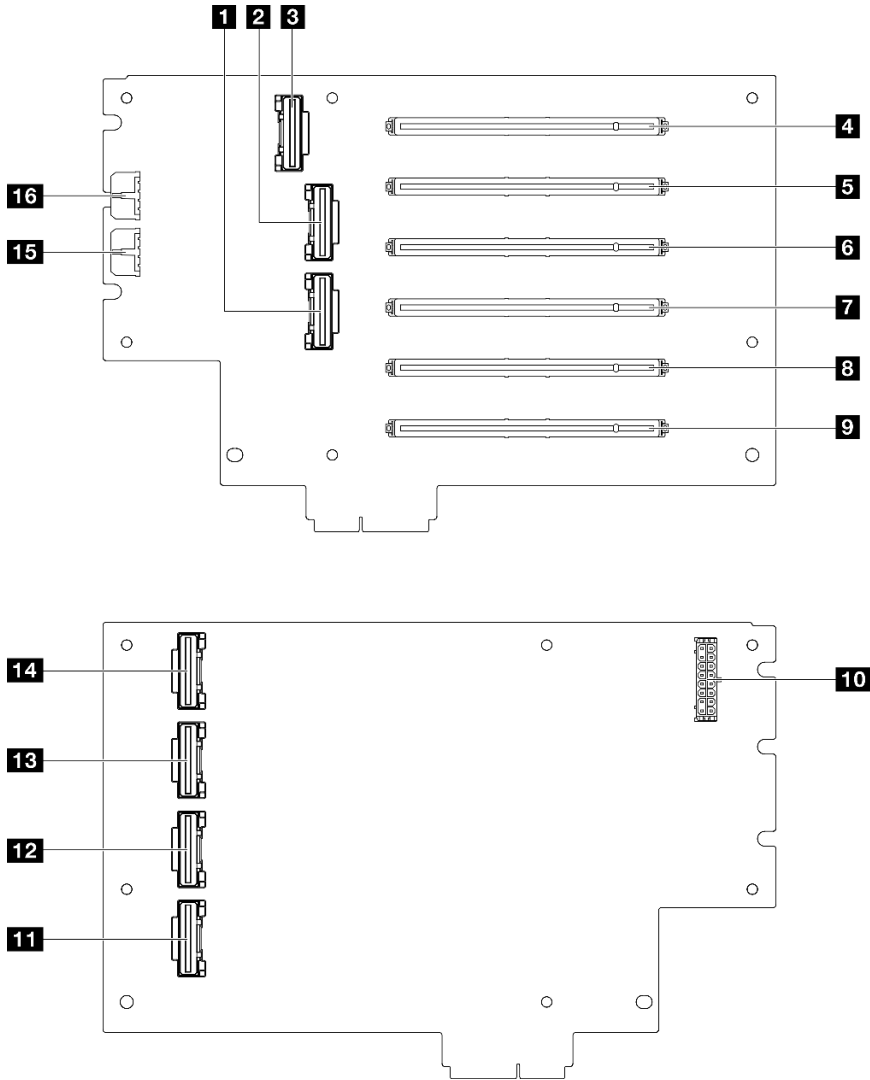


Table 17. Six slot Gen 4 FH riser card connectors

<b>1</b> R4 connector	<b>9</b> PCIe x16 (Gen4 x16) slot
<b>2</b> R5 connector	<b>10</b> Riser power connector
<b>3</b> R7 connector	<b>11</b> R1 connector
<b>4</b> PCIe x16 (Gen4 x8) slot	<b>12</b> R3 connector
<b>5</b> PCIe x16 (Gen4 x16) slot	<b>13</b> R6 connector
<b>6</b> PCIe x16 (Gen4 x8) slot	<b>14</b> R8 connector
<b>7</b> PCIe x16 (Gen4 x16) slot	<b>15</b> GPU power 2 connector
<b>8</b> PCIe x16 (Gen4 x8) slot	<b>16</b> GPU power 1 connector



### Six slot Gen 5 FH riser card

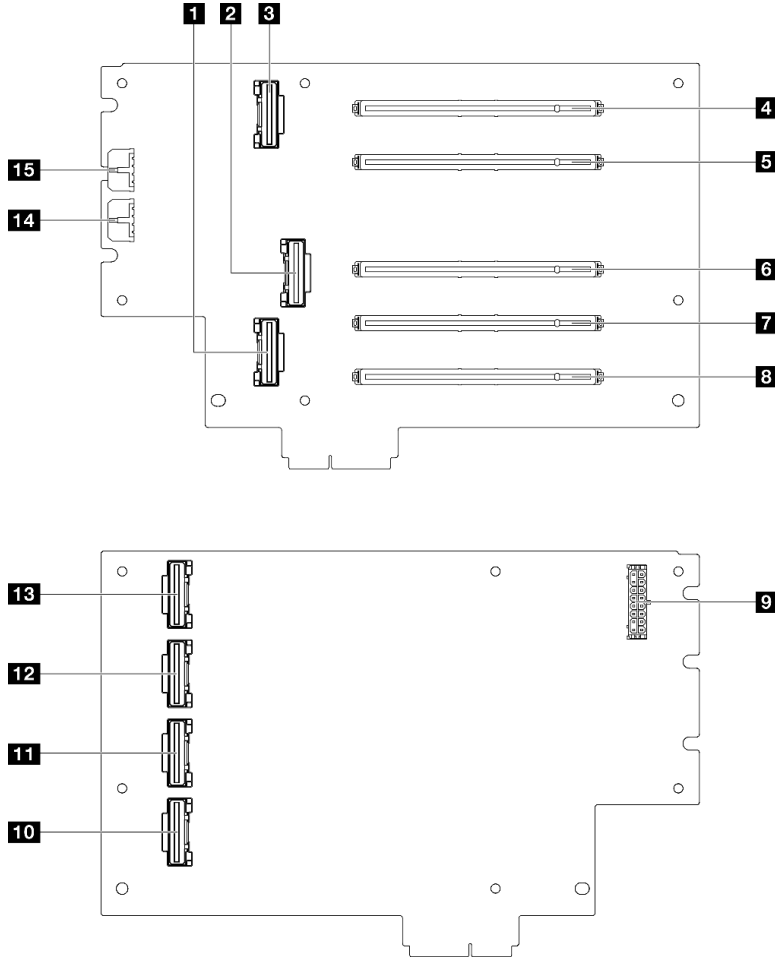


Table 18. Six slot Gen 5 FH riser card connectors

<b>1</b> R2 connector	<b>9</b> Riser power connector
<b>2</b> R4 connector	<b>10</b> R1 connector
<b>3</b> R7 connector	<b>11</b> R3 connector
<b>4</b> PCIe x16 (Gen5 x8) slot	<b>12</b> R6 connector
<b>5</b> PCIe x16 (Gen5 x16) slot	<b>13</b> R8 connector
<b>6</b> PCIe x16 (Gen5 x16) slot	<b>14</b> GPU power 2 connector
<b>7</b> PCIe x16 (Gen5 x16) slot	<b>15</b> GPU power 1 connector
<b>8</b> PCIe x16 (Gen4 x16) slot	

### Power distribution board connectors

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

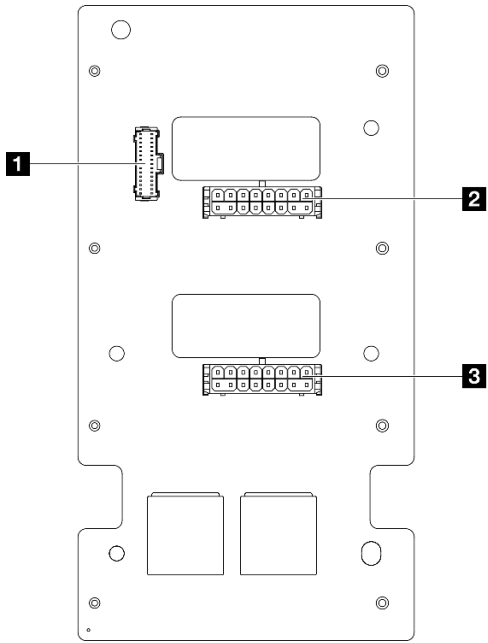


Figure 209. Power distribution board connectors

<b>1</b> Power distribution board sideband connector	<b>3</b> PCIe riser 1 power connector
<b>2</b> PCIe riser 3 power connector	

## System-board-assembly connectors for cable routing

The following illustrations show the internal connectors on the system board assembly that are used for internal cable routing.

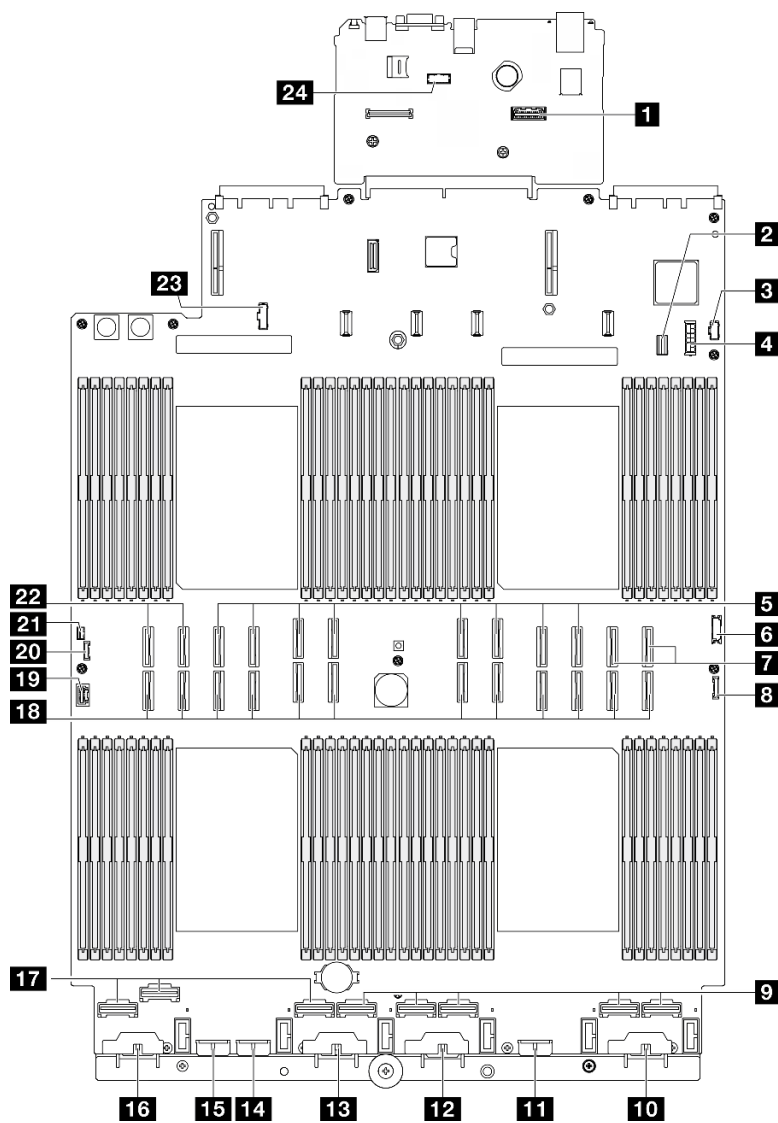


Figure 210. System-board-assembly connectors

Table 19. System-board-assembly connectors

<b>1</b> Second management Ethernet connector	<b>13</b> Backplane 3 power connector
<b>2</b> 7mm drive/M.2 signal connector	<b>14</b> Backplane 7 power connector
<b>3</b> M.2 power connector	<b>15</b> Backplane 2 power connector
<b>4</b> 7mm drive power connector	<b>16</b> Backplane 1 power connector
<b>5</b> P 13-20 connector (left to right)	<b>17</b> NVMe 1-3 connector (left to right)
<b>6</b> Front USB connector	<b>18</b> P 1-12 connector (left to right)
<b>7</b> NVMe 11-12 connector (left to right)	<b>19</b> VGA connector
<b>8</b> Front I/O connector	<b>20</b> External diagnostic connector
<b>9</b> NVMe 4-8 connector (left to right)	<b>21</b> Intrusion switch connector
<b>10</b> Backplane 6 power connector	<b>22</b> NVMe 9-10 connector (left to right)

Table 19. System-board-assembly connectors (continued)

<b>11</b> Backplane 5 power connector	<b>23</b> Power distribution board sideband connector
<b>12</b> Backplane 4 power connector	<b>24</b> Serial port module connector

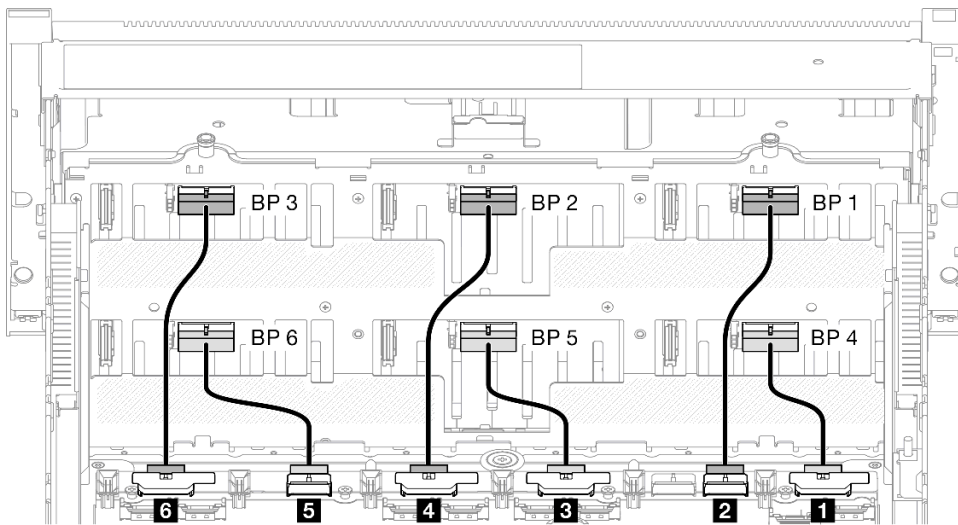
## 2.5-inch drive backplane cable routing

Use the section to understand the cable routing for the 2.5-inch drive backplanes.

**Note:** Remove the fan and fan cage first to access the connectors on the drive backplane and system board assembly. See [“Remove a fan module” on page 84](#) and [“Remove the fan cage” on page 86](#).

### 2.5-inch drive backplane power cable routing

Connect power cables to drive backplanes as illustrated.



From	To	Cable
<b>1</b> System board assembly: BP1 PWR connector	Drive backplane 4: Power connector	Power 2x8 to power 2x6 (110 mm)
<b>2</b> System board assembly: BP2 PWR connector	Drive backplane 1: Power connector	Power 2x8 to power 2x6 (190 mm)
<b>3</b> System board assembly: BP3 PWR connector	Drive backplane 5: Power connector	Power 2x8 to power 2x6 (110 mm)
<b>4</b> System board assembly: BP4 PWR connector	Drive backplane 2: Power connector	Power 2x8 to power 2x6 (190 mm)
<b>5</b> System board assembly: BP5 PWR connector	Drive backplane 6: Power connector	Power 2x8 to power 2x6 (110 mm)
<b>6</b> System board assembly: BP6 PWR connector	Drive backplane 3: Power connector	Power 2x8 to power 2x6 (190 mm)

### SAS/SATA cables for RAID/HBA adapters

When picking cables for RAID/HBA adapters from SAS/SATA cable kits, make sure to choose the cables based on the generation of RAID adapters that you plan to install.

- **Gen 3 RAID/HBA adapters** (9350-16i, 4350-16i, 9350-8i, 5350-8i, 4350-8i): Mini-SAS HD x4\*2 to SlimSAS x8 cable
- **Gen 4 RAID/HBA adapters** (940-32i, 940-16i, 540-16i, 440-16i, 940-8i, 540-8i, 440-8i): SlimSAS x8 to SlimSAS x8 cable

## SAS/SATA backplane combinations

Use this section to understand the signal cable routing for combinations with SAS/SATA backplanes.

This configuration contains the following combinations:

- [“1 x SAS/SATA backplane” on page 255](#)
- [“2 x SAS/SATA backplanes” on page 258](#)
- [“3 x SAS/SATA backplanes” on page 260](#)
- [“4 x SAS/SATA backplanes” on page 263](#)
- [“5 x SAS/SATA backplanes” on page 267](#)
- [“6 x SAS/SATA backplanes” on page 272](#)

### 1 x SAS/SATA backplane

Use this section to understand the signal cable routing for one SAS/SATA backplane.

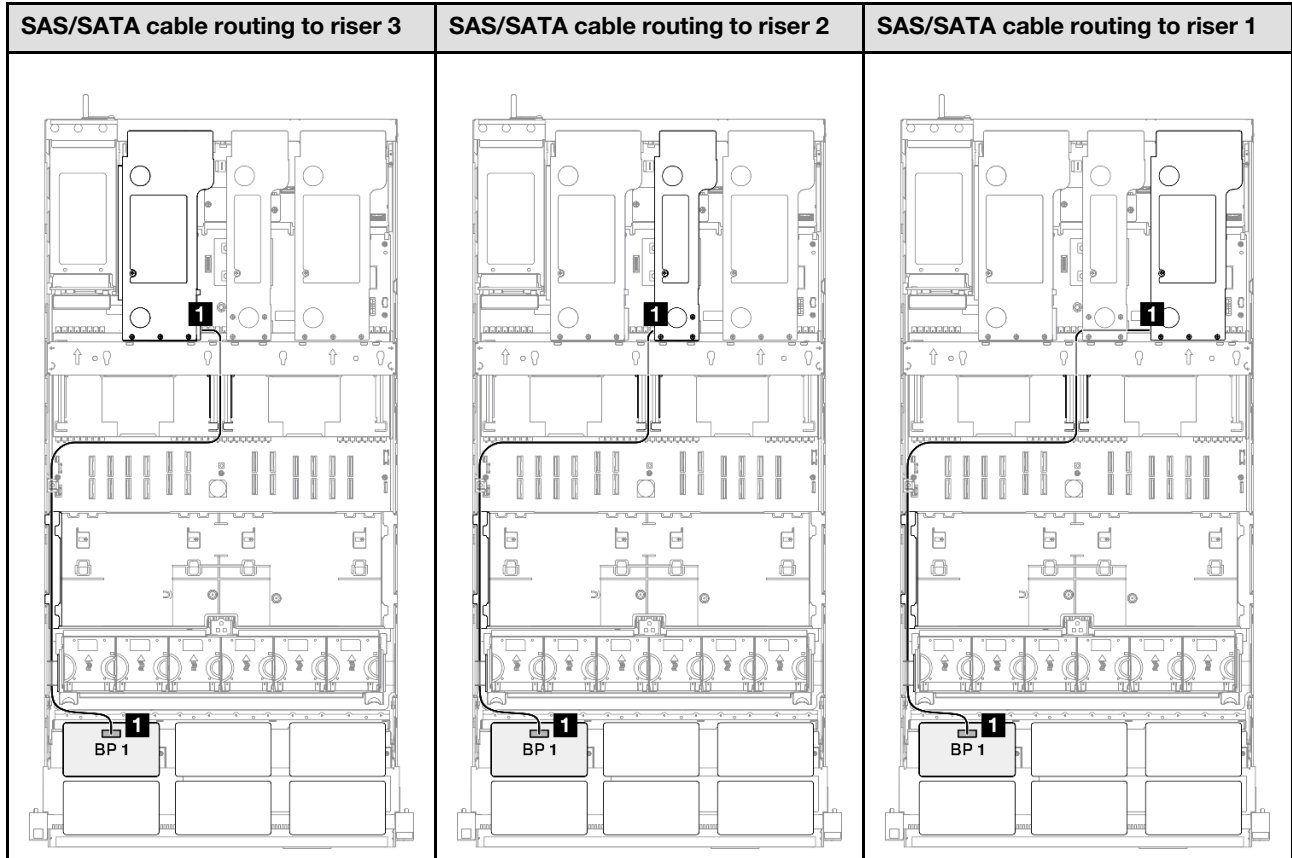
#### Notes:

- Ensure that you observe the installation rules and sequence order in [“PCIe riser and adapter installation rules and order” on page 14](#) and [“Drive backplane installation rules and order” on page 13](#).
- For more information on the power cable routing, see [“2.5-inch drive backplane power cable routing” on page 254](#).
- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.
- 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.

This configuration contains the following storage controller combinations:

- [“8i RAID/HBA adapter” on page 256](#)
- [“16i RAID/HBA adapter” on page 257](#)
- [“32i RAID adapter” on page 258](#)

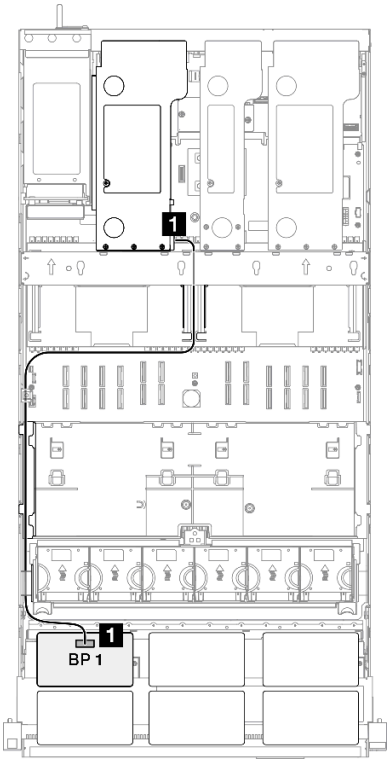
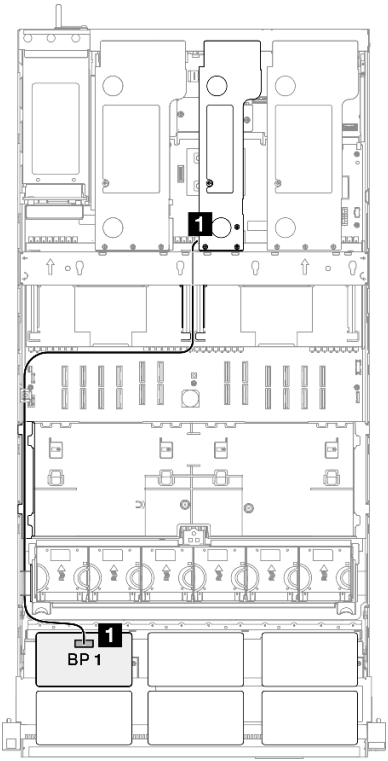
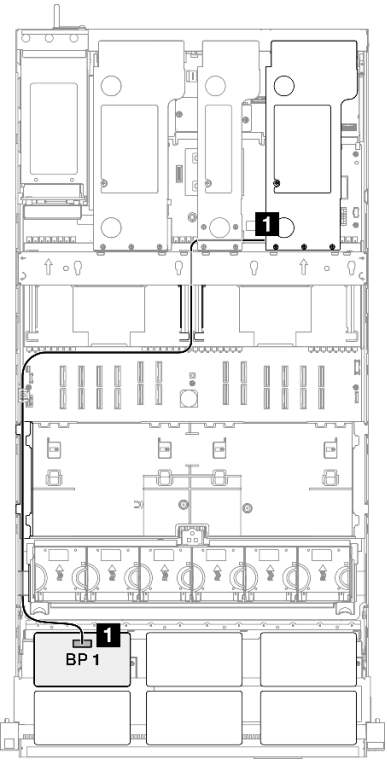
## 8i RAID/HBA adapter



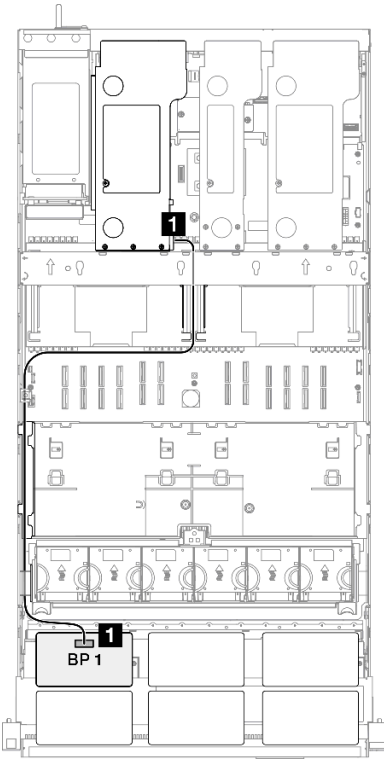
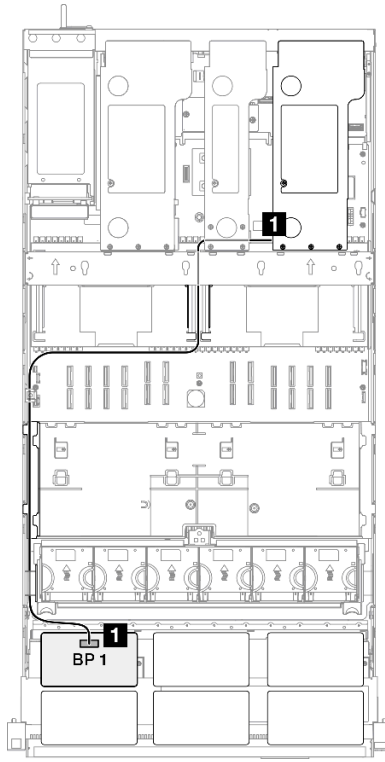
**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 8i Gen 4: C0</li> <li>• 8i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

## 16i RAID/HBA adapter

SAS/SATA cable routing to riser 3	SAS/SATA cable routing to riser 2	SAS/SATA cable routing to riser 1
		
<p><b>Note:</b> Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.</p>		
From	To	Cable
<p>1 BP1: SAS/SATA</p>	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

## 32i RAID adapter

SAS/SATA cable routing to riser 3		SAS/SATA cable routing to riser 1
		
<p><b>Note:</b> Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.</p>		
From	To	Cable
1 BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

## 2 x SAS/SATA backplanes

Use this section to understand the signal cable routing for two SAS/SATA backplanes.

### Notes:

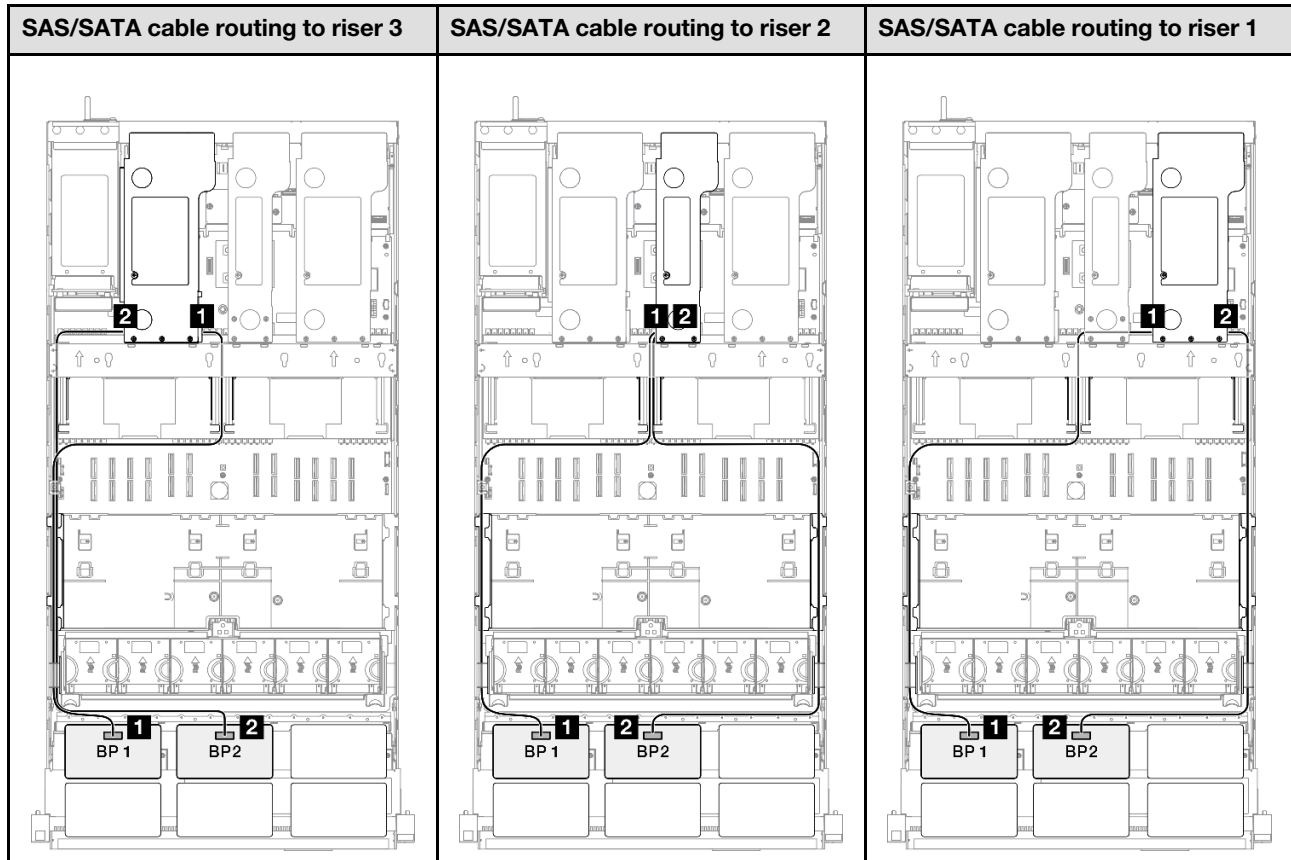
- Ensure that you observe the installation rules and sequence order in [“PCIe riser and adapter installation rules and order”](#) on page 14 and [“Drive backplane installation rules and order”](#) on page 13.
- For more information on the power cable routing, see [“2.5-inch drive backplane power cable routing”](#) on page 254.
- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.
- 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.

This configuration contains the following storage controller combinations:

- [“16i RAID/HBA adapter”](#) on page 259
- [“32i RAID adapter”](#) on page 260



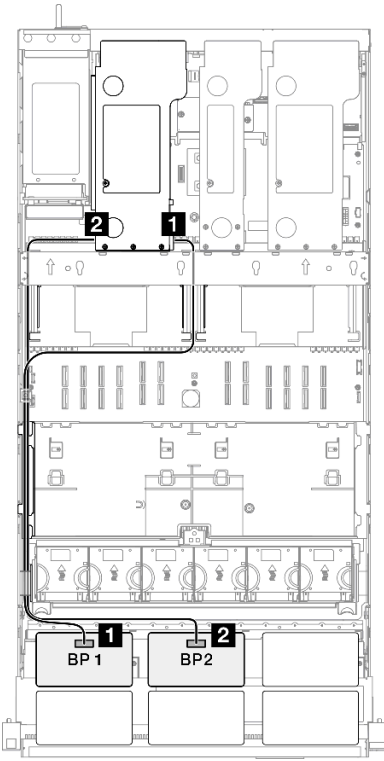
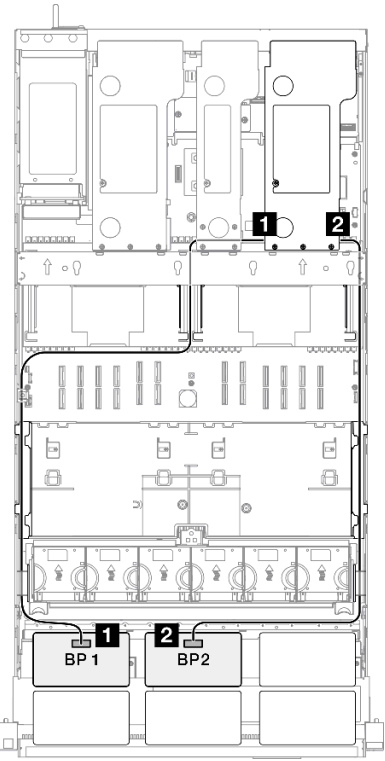
## 16i RAID/HBA adapter



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

### 32i RAID adapter

SAS/SATA cable routing to riser 3		SAS/SATA cable routing to riser 1	
			
<p><b>Note:</b> Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.</p>			
From	To	Cable	
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)	
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)	

### 3 x SAS/SATA backplanes

Use this section to understand the signal cable routing for three SAS/SATA backplanes.

#### Notes:

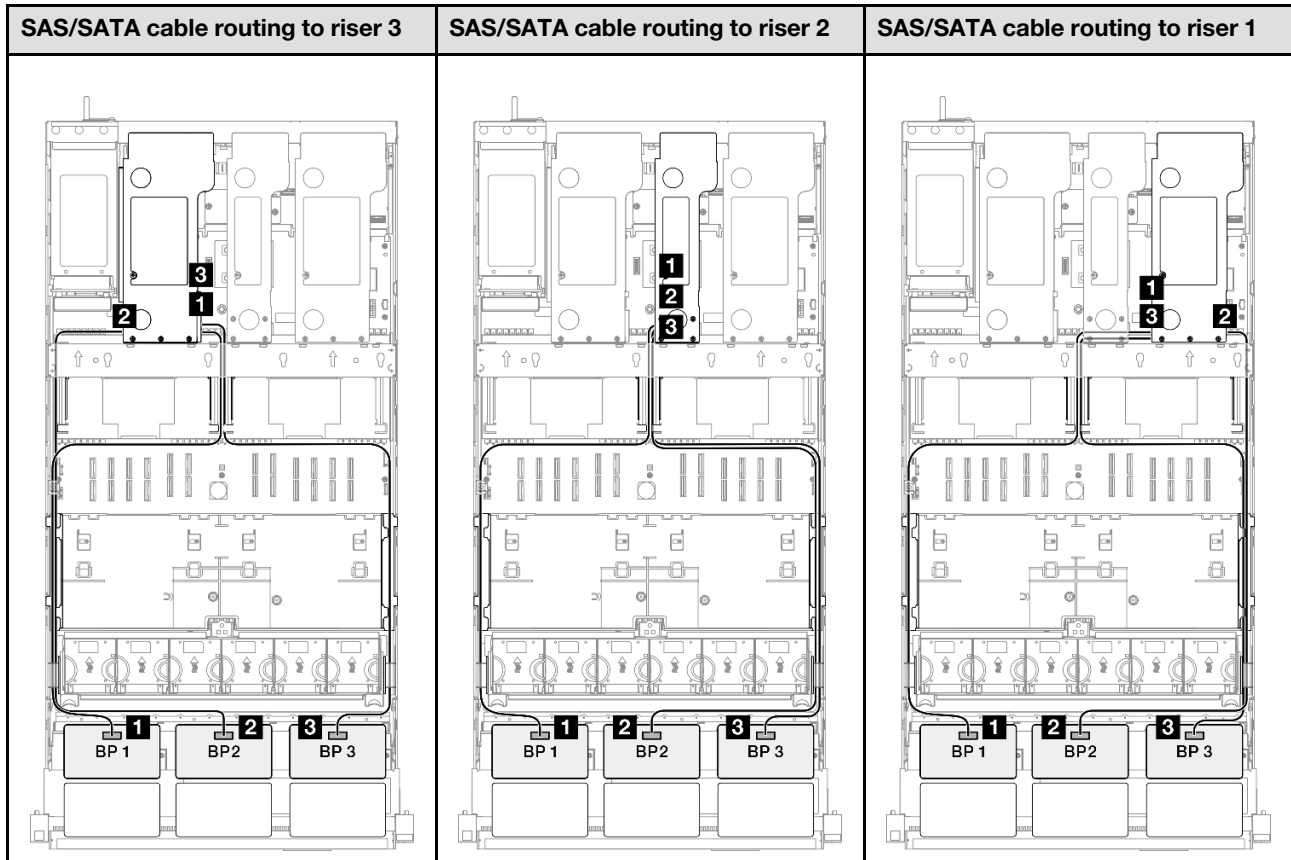
- Ensure that you observe the installation rules and sequence order in [“PCIe riser and adapter installation rules and order”](#) on page 14 and [“Drive backplane installation rules and order”](#) on page 13.
- For more information on the power cable routing, see [“2.5-inch drive backplane power cable routing”](#) on page 254.
- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.
- 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.

This configuration contains the following storage controller combinations:

- [“8i + 16i RAID/HBA adapter”](#) on page 261
- [“16i + 16i RAID/HBA adapter”](#) on page 262

- “32i RAID adapter” on page 263

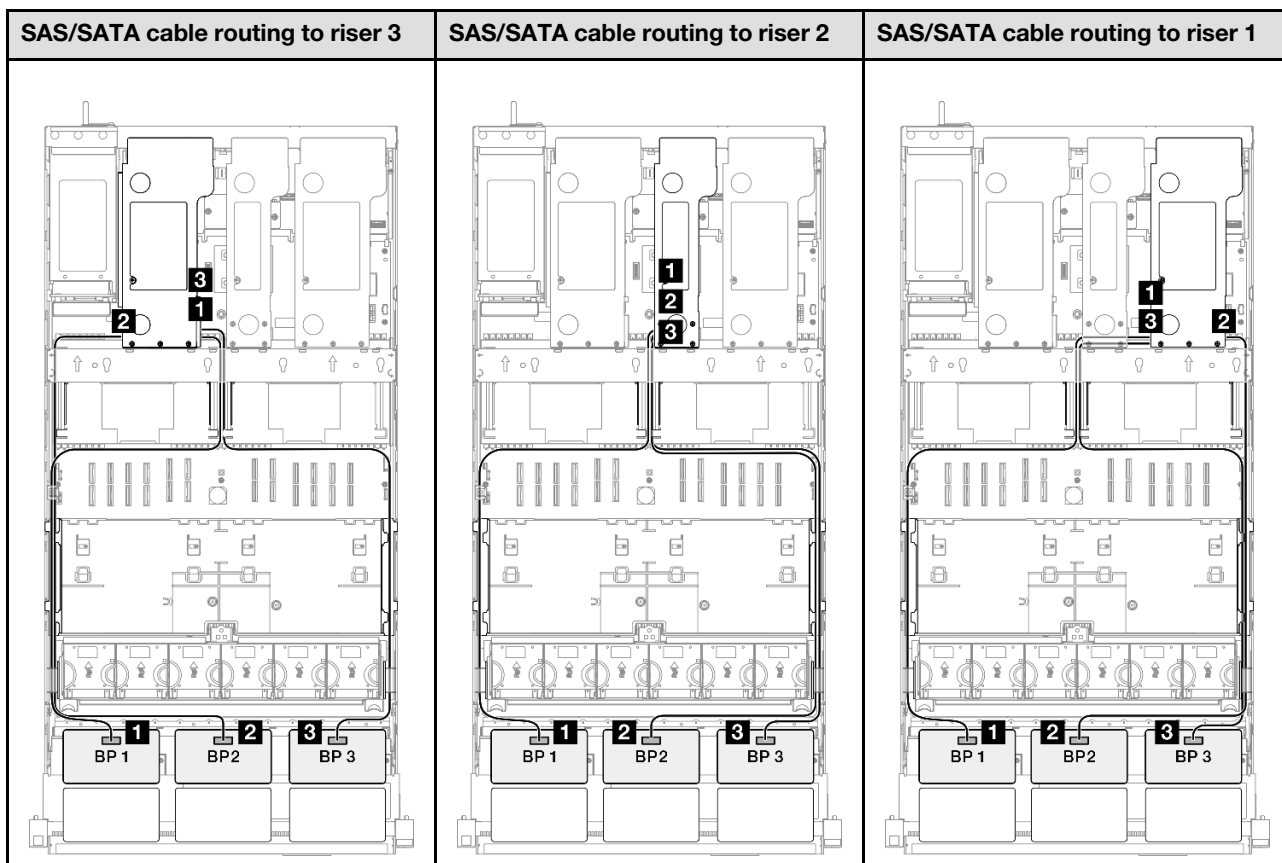
### 8i + 16i RAID/HBA adapter



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 8i Gen 4: C0</li> <li>• 8i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

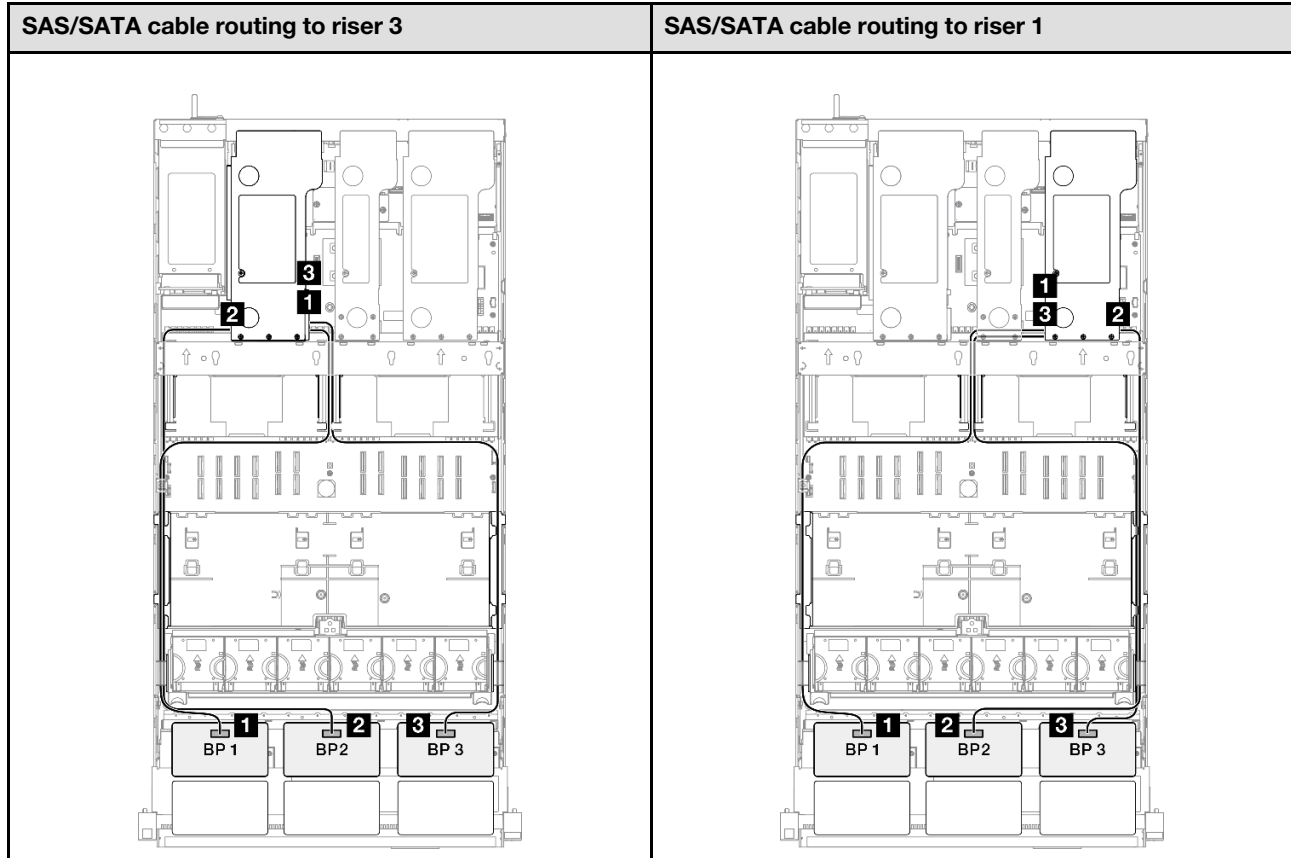
## 16i + 16i RAID/HBA adapter



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C0</li> <li>16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C1</li> <li>16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C0</li> <li>16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

## 32i RAID adapter



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

## 4 x SAS/SATA backplanes

Use this section to understand the signal cable routing for four SAS/SATA backplanes.

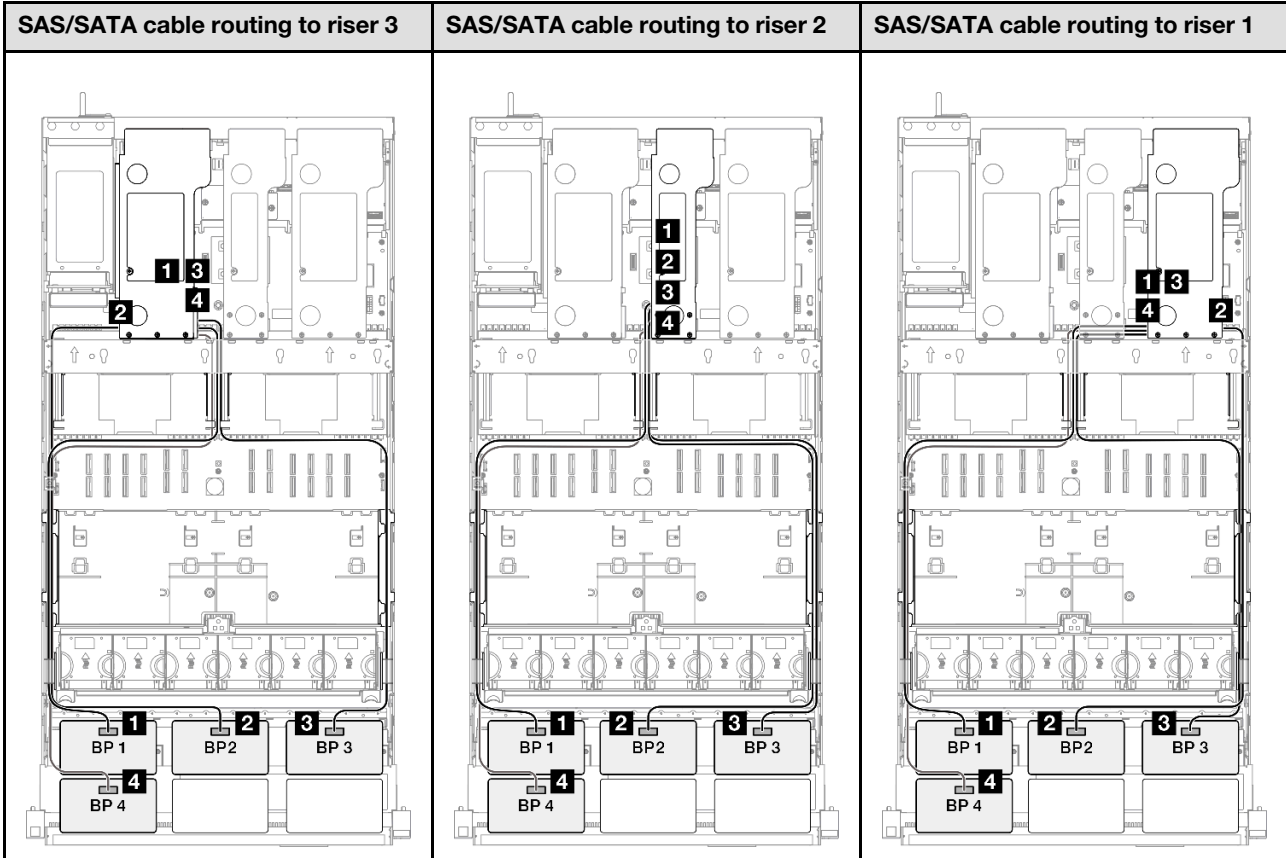
### Notes:

- Ensure that you observe the installation rules and sequence order in [“PCIe riser and adapter installation rules and order”](#) on page 14 and [“Drive backplane installation rules and order”](#) on page 13.
- For more information on the power cable routing, see [“2.5-inch drive backplane power cable routing”](#) on page 254.
- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.
- 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.

This configuration contains the following storage controller combinations:

- “16i + 16i RAID/HBA adapter” on page 264
- “8i + 32i RAID/HBA adapter” on page 265
- “16i + 32i RAID/HBA adapter” on page 266
- “32i + 32i RAID adapter” on page 267

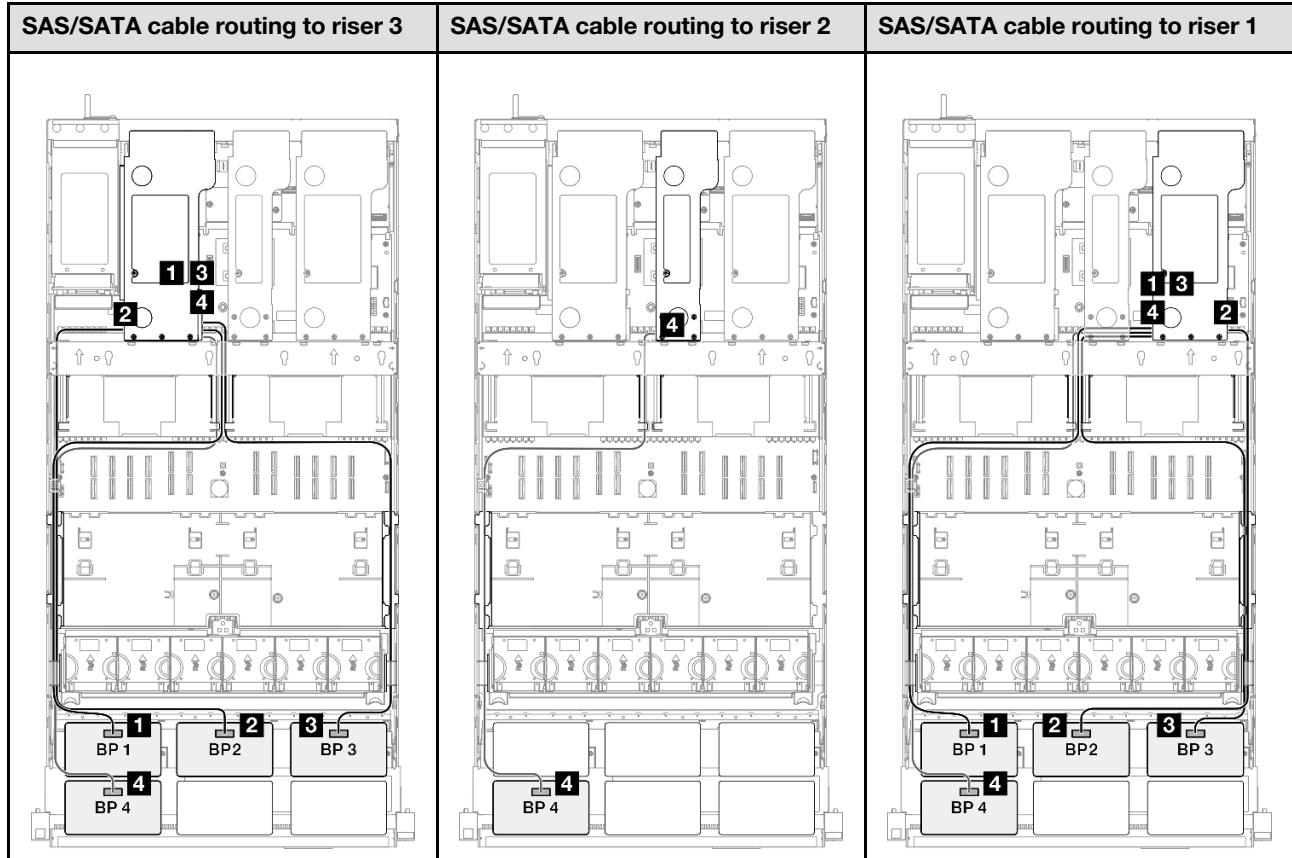
### 16i + 16i RAID/HBA adapter



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

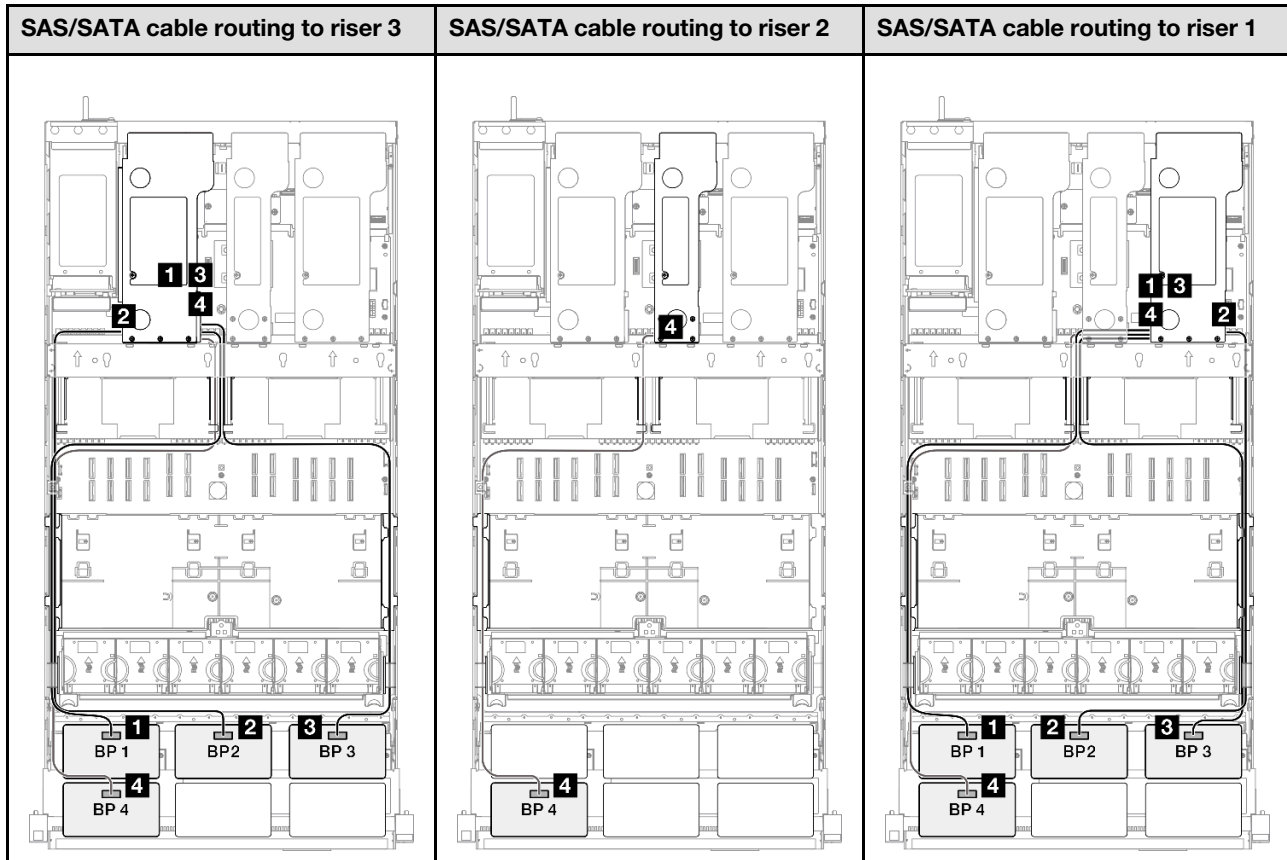
## 8i + 32i RAID/HBA adapter



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>8i Gen 4: C0</li> <li>8i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

## 16i + 32i RAID/HBA adapter

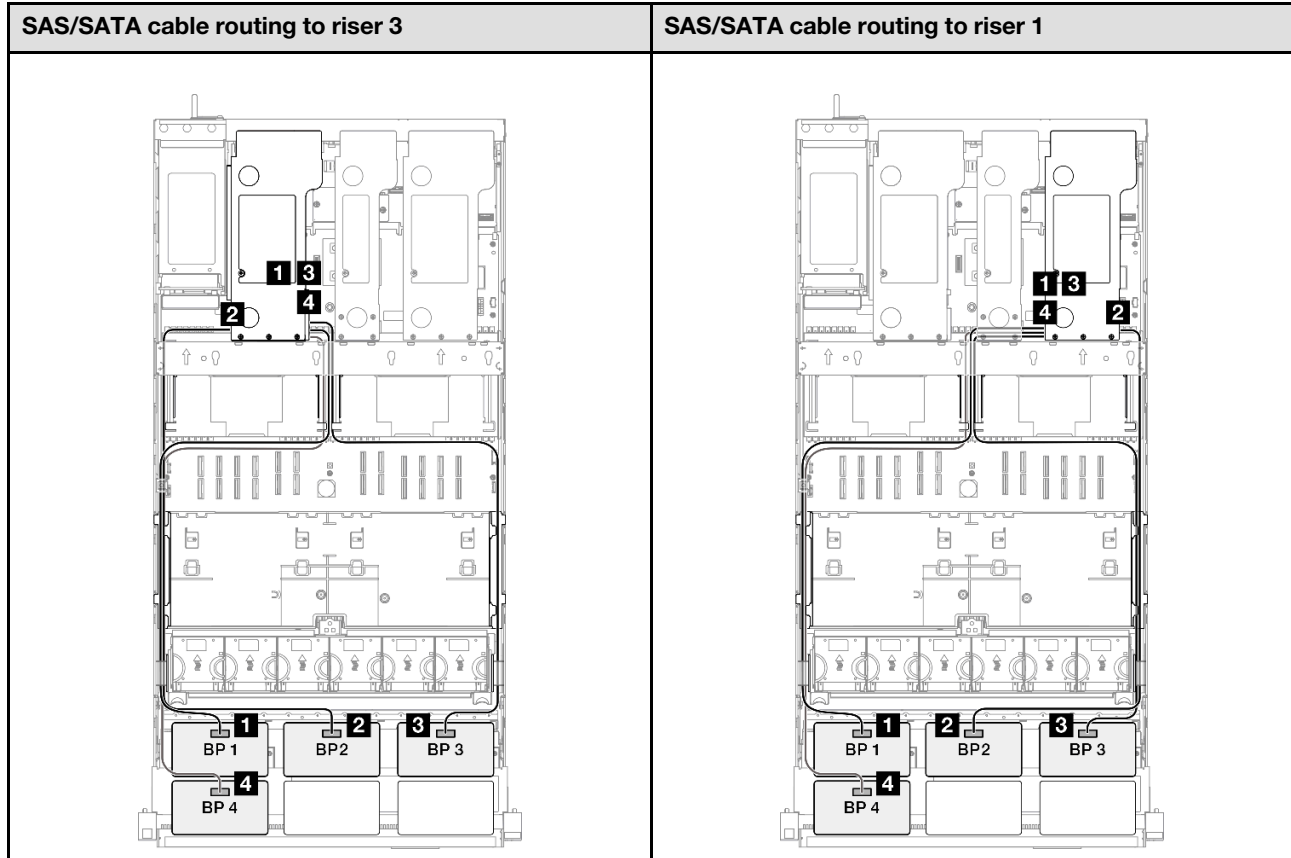


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>



## 32i + 32i RAID adapter



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

## 5 x SAS/SATA backplanes

Use this section to understand the signal cable routing for five SAS/SATA backplanes.

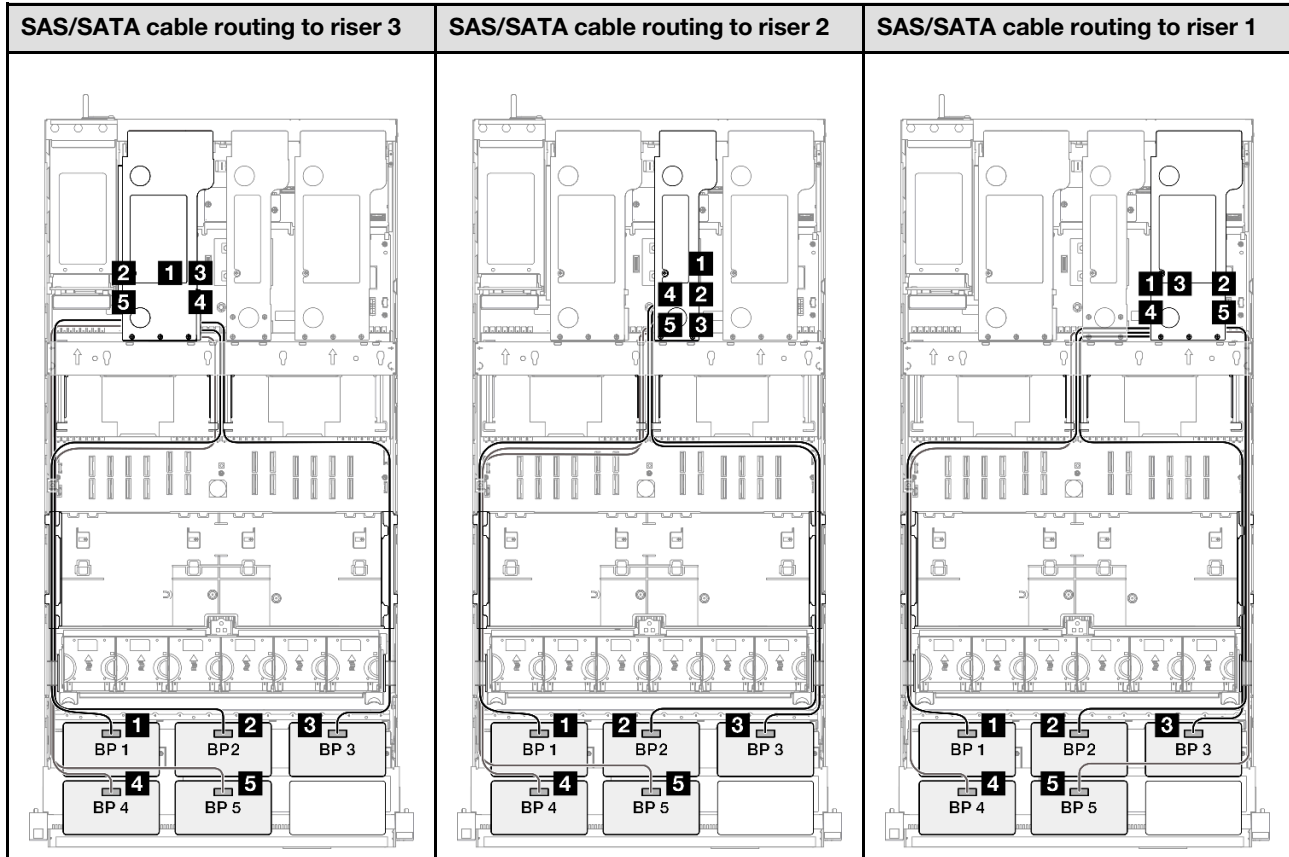
### Notes:

- Ensure that you observe the installation rules and sequence order in [“PCIe riser and adapter installation rules and order”](#) on page 14 and [“Drive backplane installation rules and order”](#) on page 13.
- For more information on the power cable routing, see [“2.5-inch drive backplane power cable routing”](#) on page 254.
- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.
- 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.

This configuration contains the following storage controller combinations:

- “8i + 16i + 16i RAID/HBA adapter” on page 268
- “16i + 16i + 16i RAID/HBA adapter” on page 269
- “16i + 32i RAID/HBA adapter” on page 270
- “32i + 32i RAID adapter” on page 271

### 8i + 16i + 16i RAID/HBA adapter

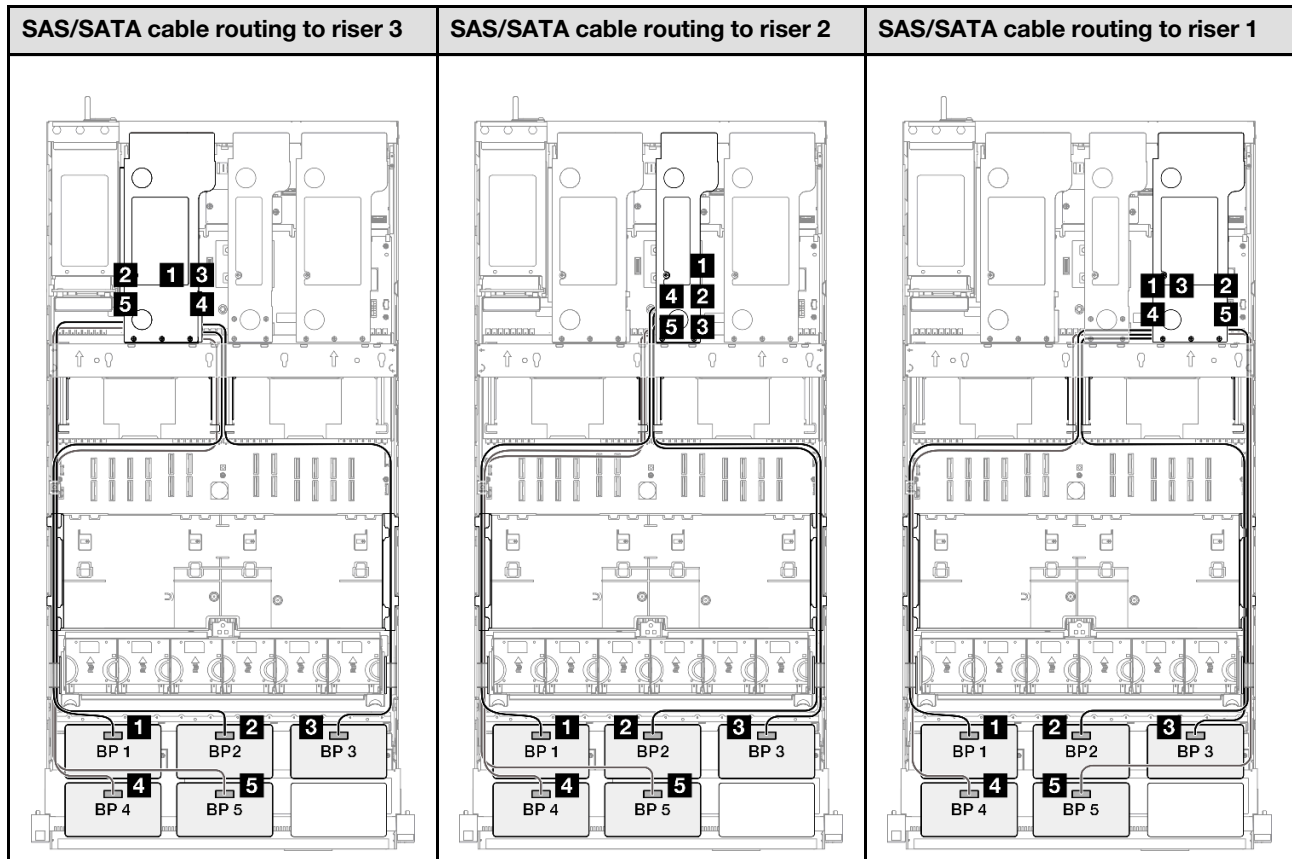


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

From	To	Cable
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>5</b> BP5: SAS/SATA	<ul style="list-style-type: none"> <li>• 8i Gen 4: C0</li> <li>• 8i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

### 16i + 16i + 16i RAID/HBA adapter

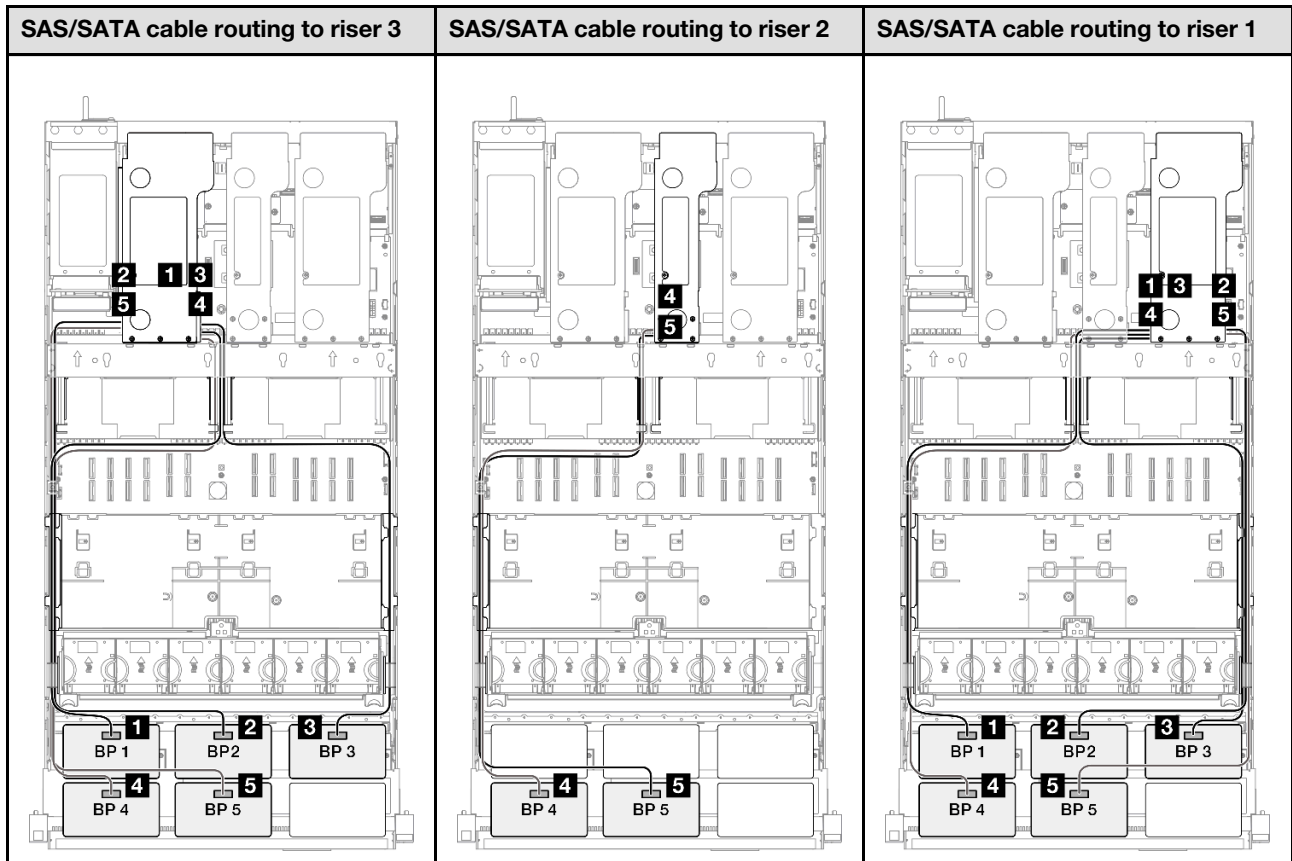


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

From	To	Cable
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>5</b> BP5: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

### 16i + 32i RAID/HBA adapter

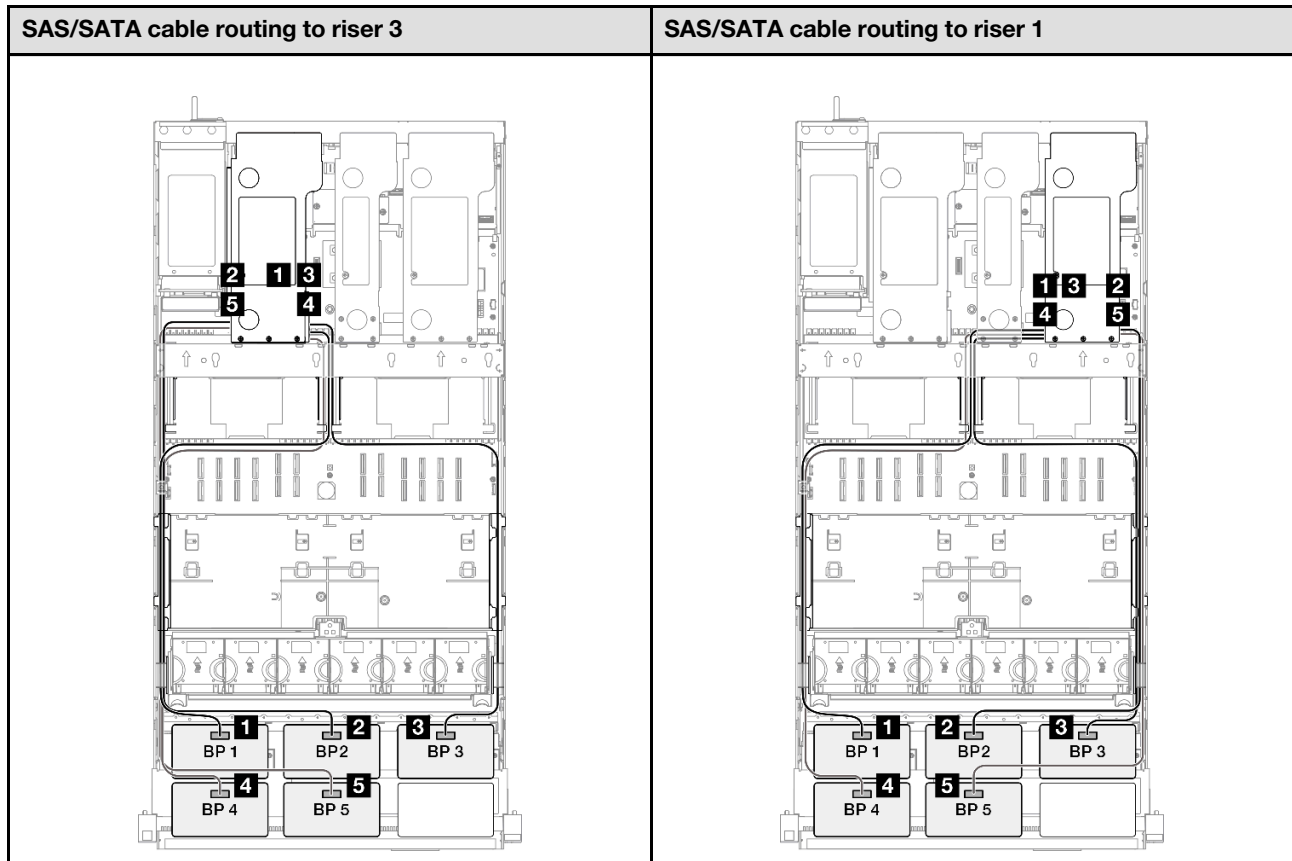


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

From	To	Cable
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>5</b> BP5: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

### 32i + 32i RAID adapter



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>5</b> BP5: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

## 6 x SAS/SATA backplanes

Use this section to understand the signal cable routing for six SAS/SATA backplanes.

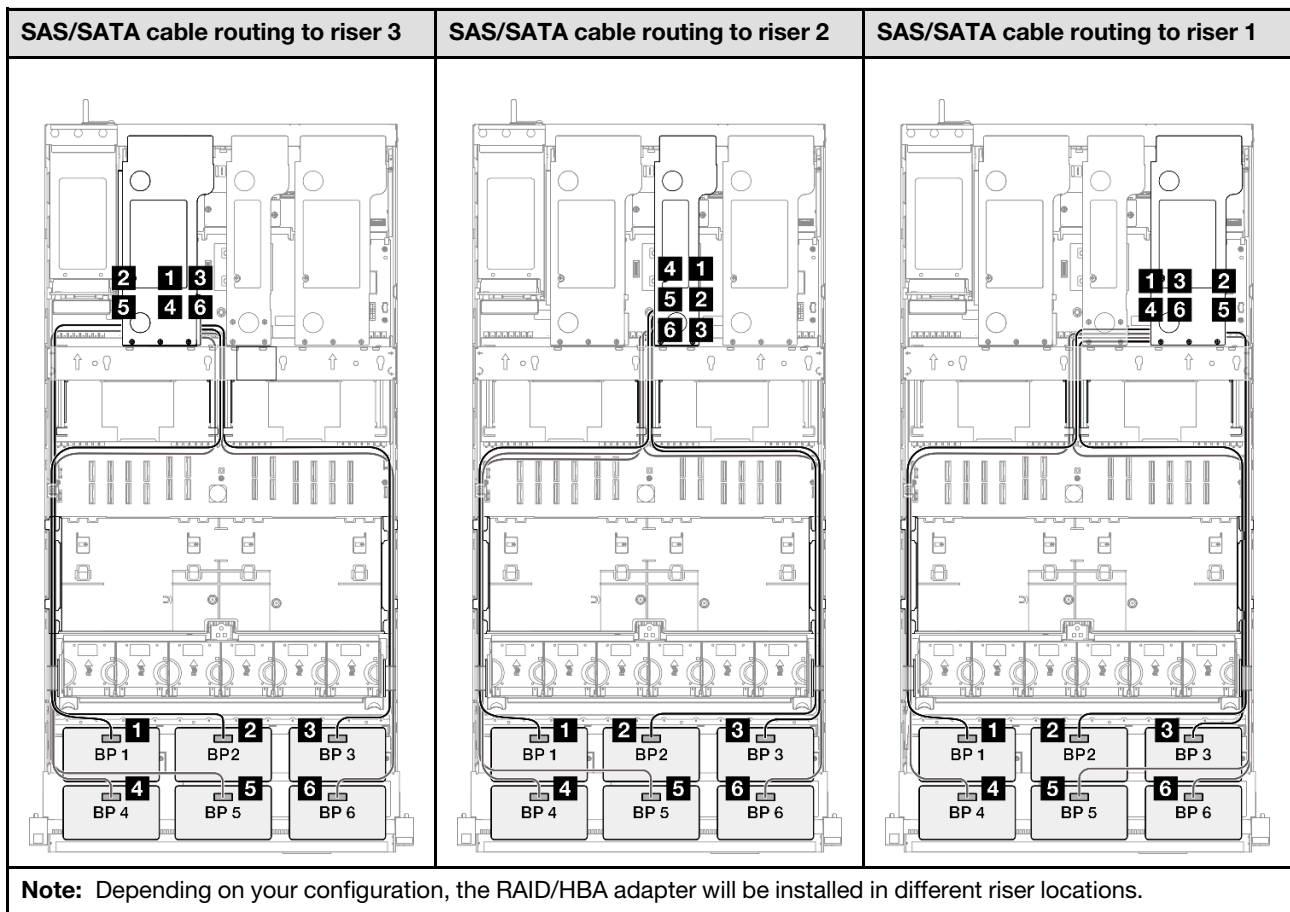
### Notes:

- Ensure that you observe the installation rules and sequence order in [“PCIe riser and adapter installation rules and order”](#) on page 14 and [“Drive backplane installation rules and order”](#) on page 13.
- For more information on the power cable routing, see [“2.5-inch drive backplane power cable routing”](#) on page 254.
- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.
- Connections between connectors; **1↔1, 2↔2, 3↔3, ... m↔m**
- When routing the cables, ensure that all cables are routed appropriately through the cable guides.

This configuration contains the following storage controller combinations:

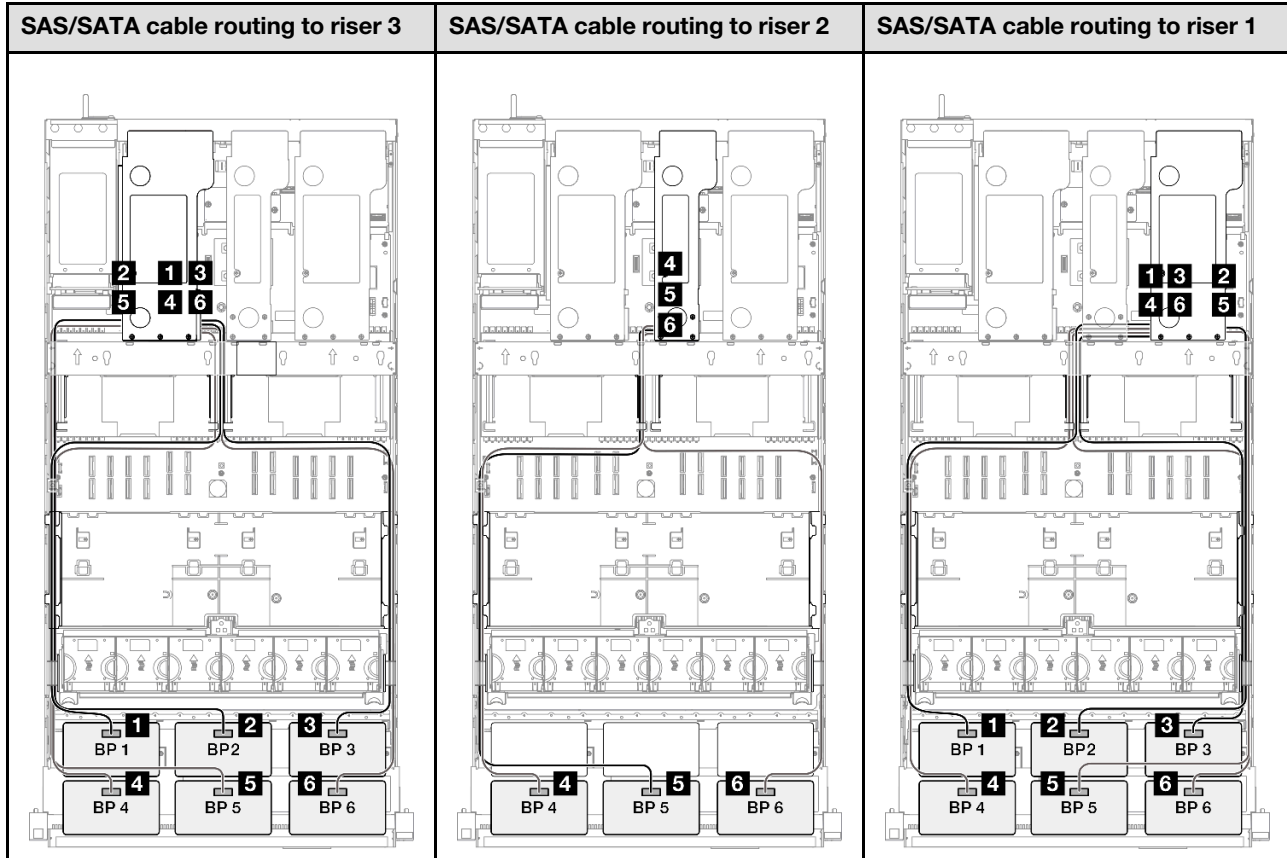
- [“16i + 16i + 16i RAID/HBA adapter”](#) on page 272
- [“8i + 16i + 32i RAID/HBA adapter”](#) on page 274
- [“32i + 32i RAID adapter”](#) on page 275

### 16i + 16i + 16i RAID/HBA adapter



From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>5</b> BP5: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>6</b> BP6: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

## 8i + 16i + 32i RAID/HBA adapter

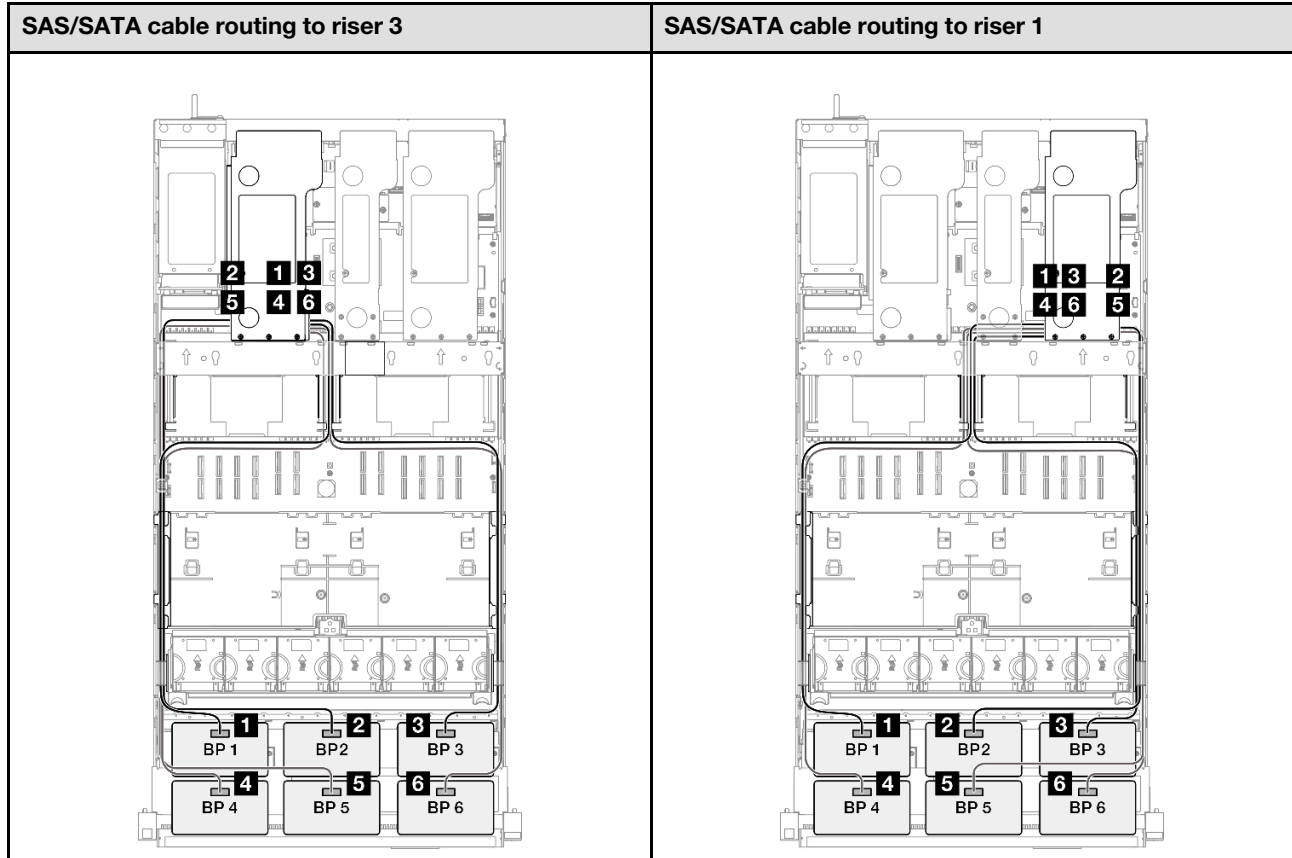


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C0</li> <li>16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>5</b> BP5: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C1</li> <li>16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>6</b> BP6: SAS/SATA	<ul style="list-style-type: none"> <li>8i Gen 4: C0</li> <li>8i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>



### 32i + 32i RAID adapter



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>5</b> BP5: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>6</b> BP6: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

### AnyBay backplane combinations

Use this section to understand the signal cable routing for combinations with AnyBay backplanes.

This configuration contains the following combinations:

### One AnyBay backplane combinations

- “1 x AnyBay backplane” on page 276
- “1 x AnyBay and 1 x SAS/SATA backplane” on page 285
- “1 x AnyBay + 2 x SAS/SATA backplanes” on page 289
- “1 x AnyBay + 3 x SAS/SATA backplanes” on page 295
- “1 x AnyBay + 4 x SAS/SATA backplanes” on page 303
- “1 x AnyBay + 5 x SAS/SATA backplanes” on page 311

### Two AnyBay backplane combinations

- “2 x AnyBay backplanes” on page 317
- “2 x AnyBay + 1 x SAS/SATA backplane” on page 323
- “2 x AnyBay + 2 x SAS/SATA backplanes” on page 329
- “2 x AnyBay + 3 x SAS/SATA backplanes” on page 337
- “2 x AnyBay + 4 x SAS/SATA backplanes” on page 345

### Three AnyBay backplane combinations

- “3 x AnyBay backplanes” on page 351
- “3 x AnyBay + 1 x SAS/SATA backplane” on page 360
- “3 x AnyBay + 2 x SAS/SATA backplanes” on page 368
- “3 x AnyBay + 3 x SAS/SATA backplanes” on page 376

## 1 x AnyBay backplane

Use this section to understand the signal cable routing for one AnyBay backplane.

### Notes:

- Ensure that you observe the installation rules and sequence order in “PCIe riser and adapter installation rules and order” on page 14 and “Drive backplane installation rules and order” on page 13.
- For more information on the power cable routing, see “2.5-inch drive backplane power cable routing” on page 254.
- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.
- 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.

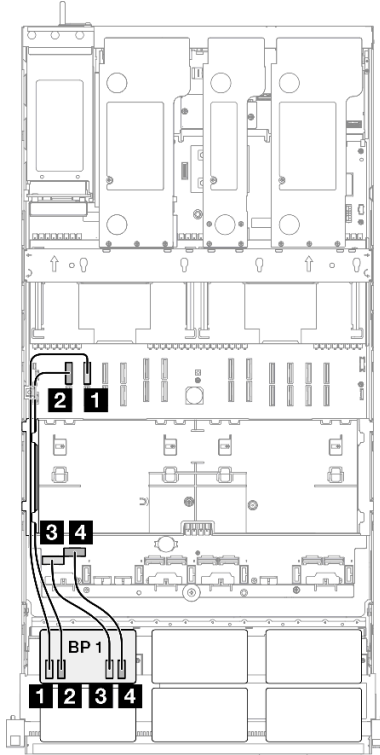
This configuration contains the following storage controller combinations:

- “No RAID/HBA adapters” on page 276
- “8i RAID/HBA adapter” on page 278
- “8i RAID adapter (Tri-mode)” on page 280
- “16i RAID/HBA adapter” on page 281
- “16i RAID/HBA adapter (Tri-mode)” on page 283
- “32i RAID adapter” on page 284

### No RAID/HBA adapters

**Note:** The AnyBay backplanes are used as pure NVMe backplanes when no RAID/HBA adapters are installed.

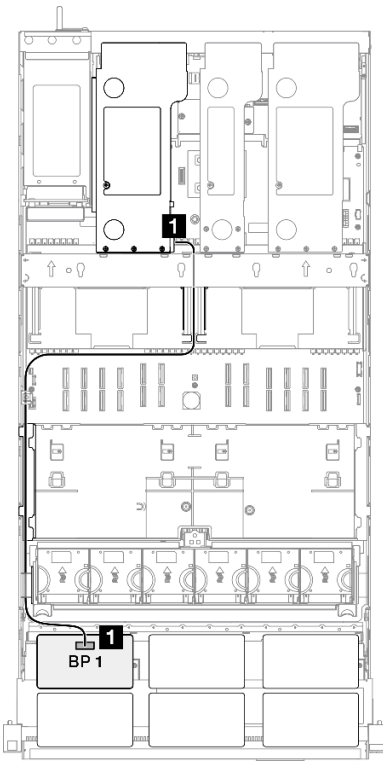
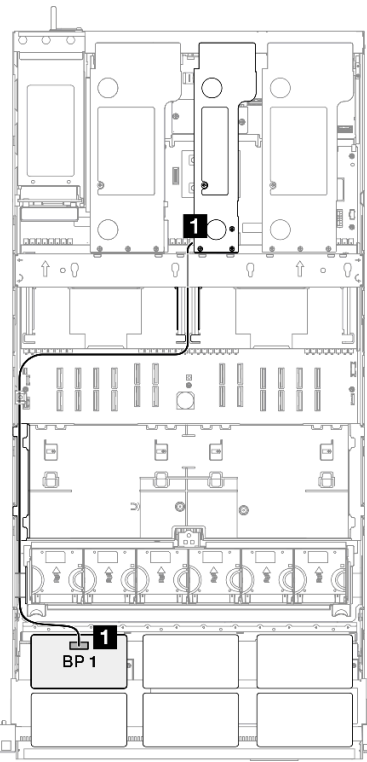
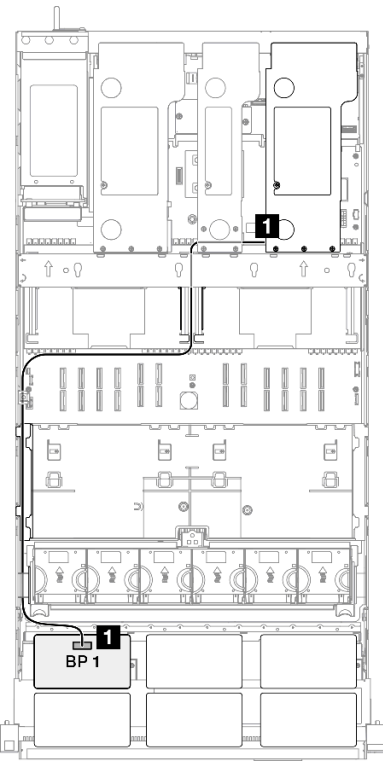
## NVMe cable routing



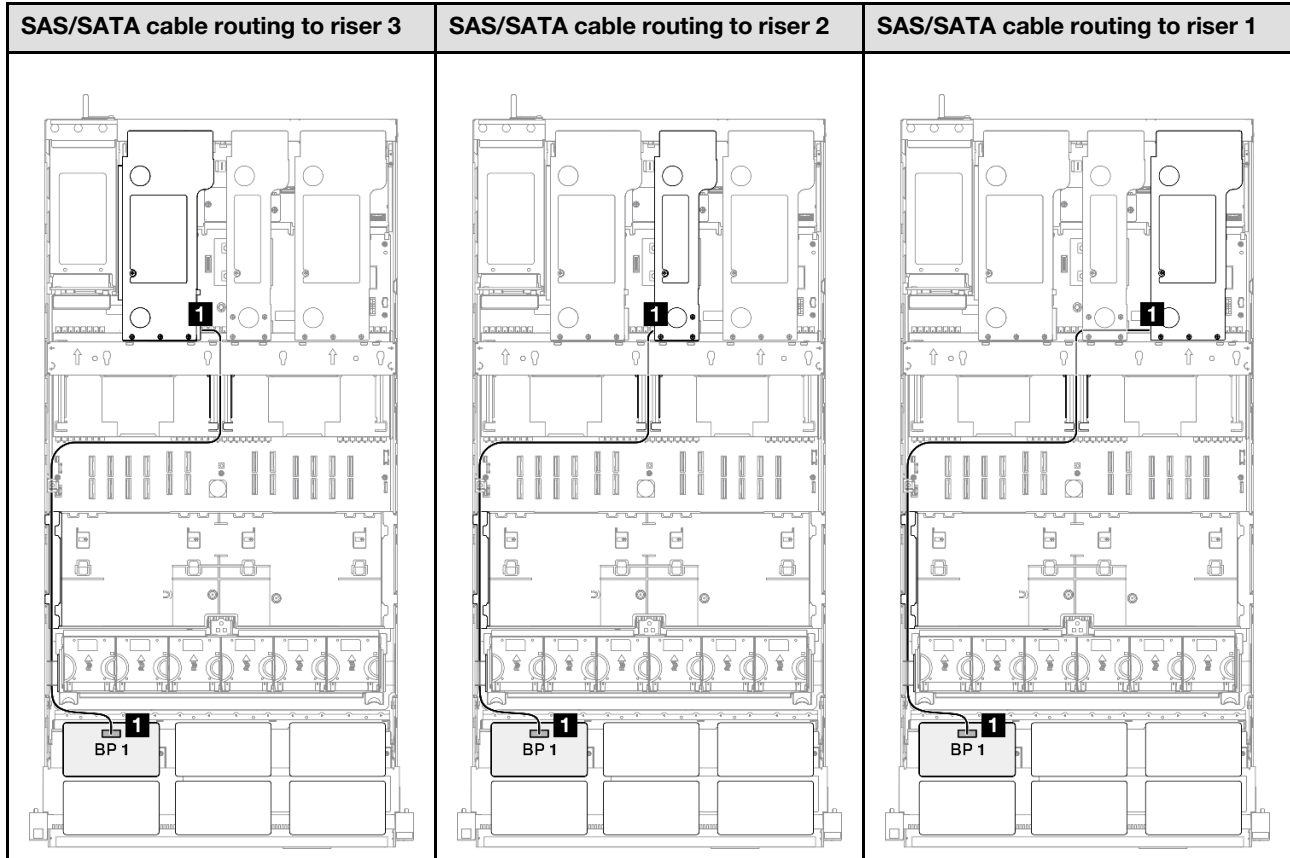
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)

## 8i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)

SAS/SATA cable routing to riser 3	SAS/SATA cable routing to riser 2	SAS/SATA cable routing to riser 1
		
<p><b>Note:</b> Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.</p>		
From	To	Cable
<p>1 BP1: SAS/SATA</p>	<ul style="list-style-type: none"> <li>• 8i Gen 4: C0</li> <li>• 8i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

## 8i RAID adapter (Tri-mode)

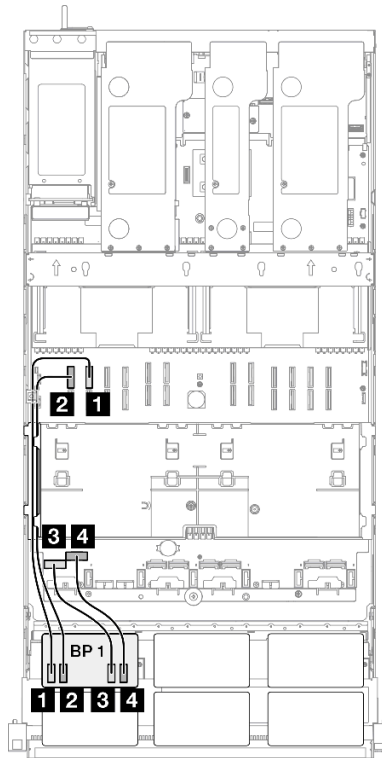


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

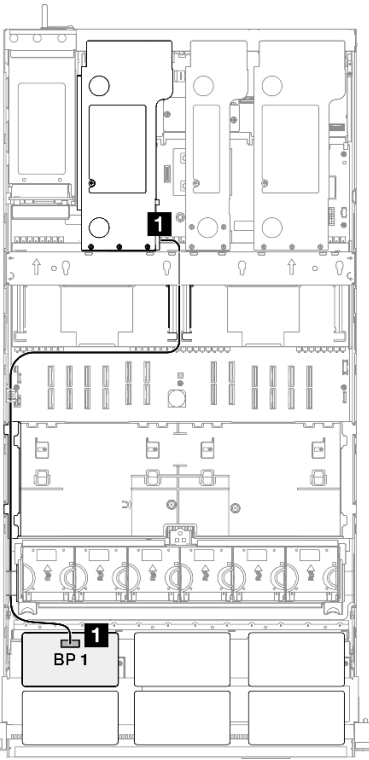
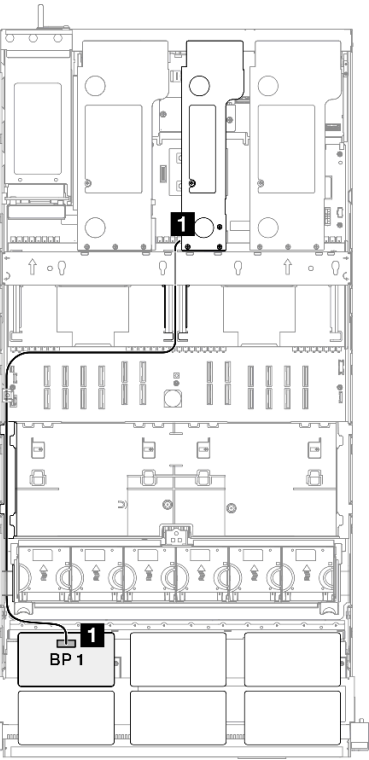
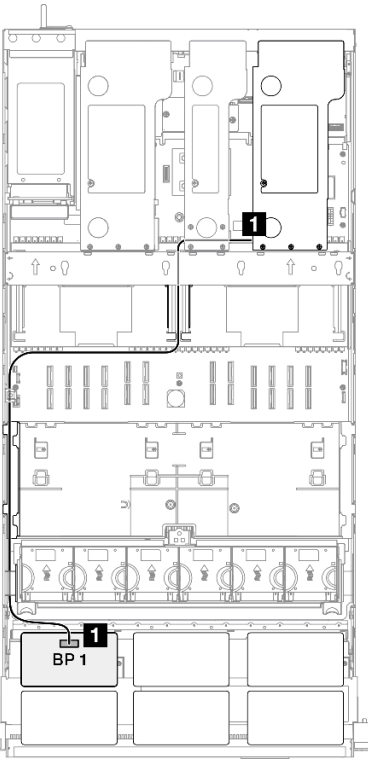
From	To	Cable
<b>1</b> BP1: SAS/SATA	8i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

## 16i RAID/HBA adapter

### NVMe cable routing

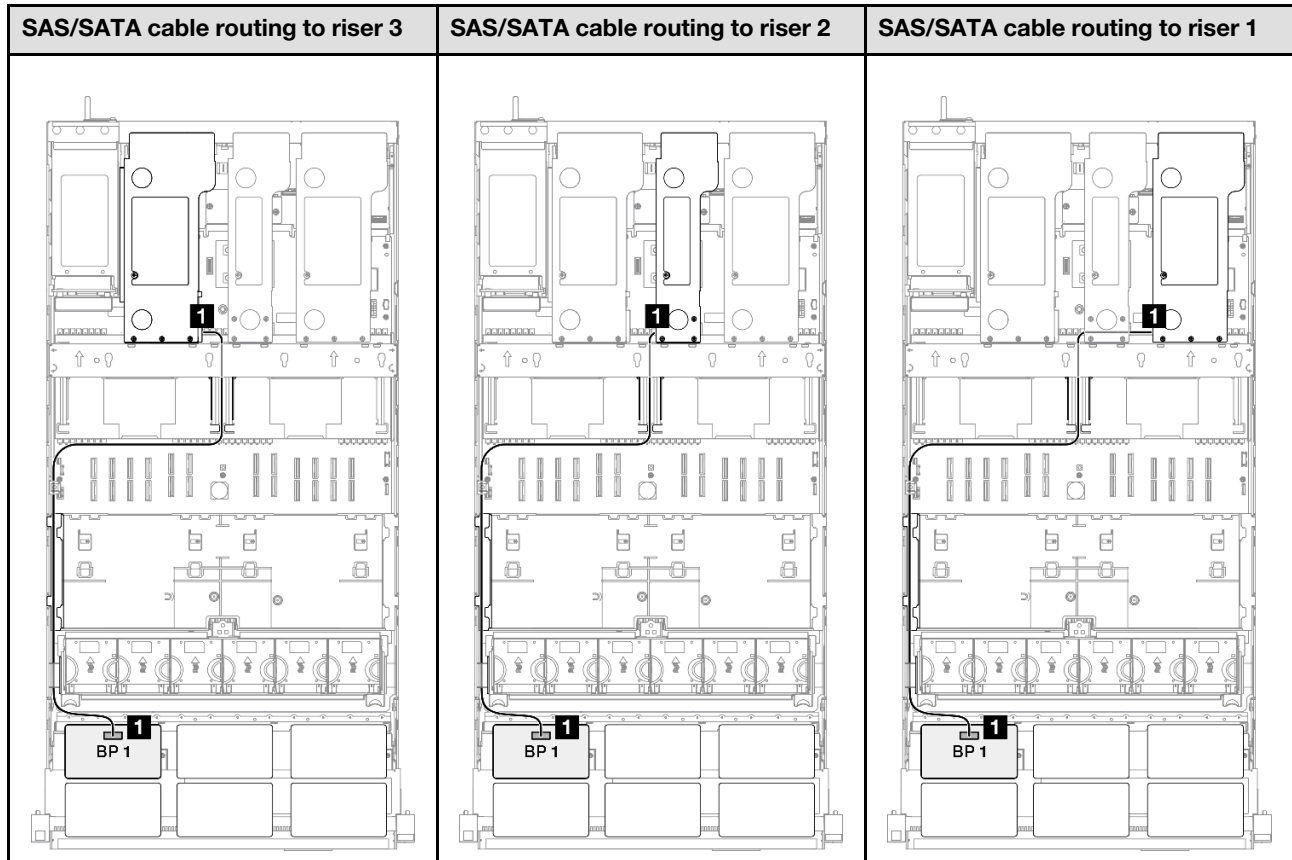


From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)

SAS/SATA cable routing to riser 3	SAS/SATA cable routing to riser 2	SAS/SATA cable routing to riser 1
		
<p><b>Note:</b> Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.</p>		
From	To	Cable
<p>1 BP1: SAS/SATA</p>	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>



## 16i RAID/HBA adapter (Tri-mode)

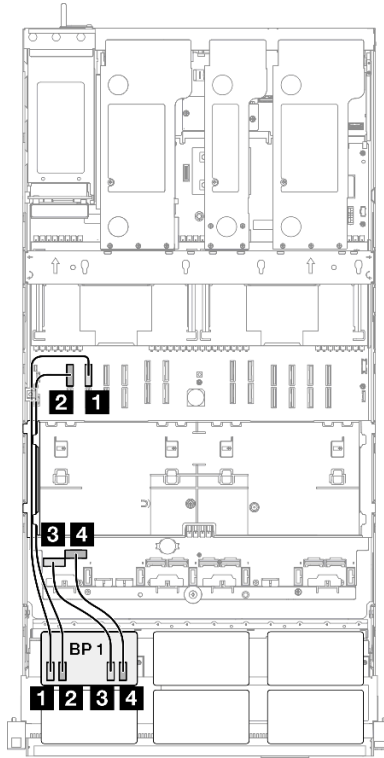


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	16i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

## 32i RAID adapter

### NVMe cable routing



From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)

SAS/SATA cable routing to riser 3		SAS/SATA cable routing to riser 1	
<p><b>Note:</b> Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.</p>			
From	To	Cable	
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)	

## 1 x AnyBay and 1 x SAS/SATA backplane

Use this section to understand the signal cable routing for one AnyBay backplane and one SAS/SATA backplane.

### Notes:

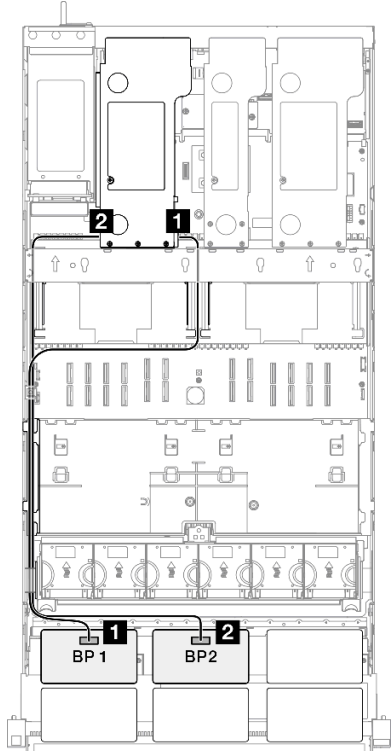
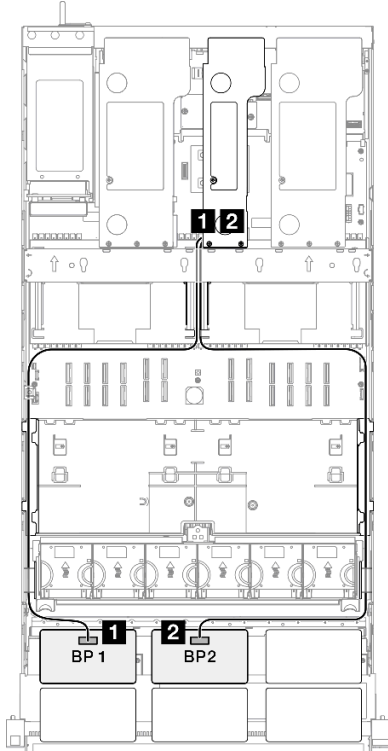
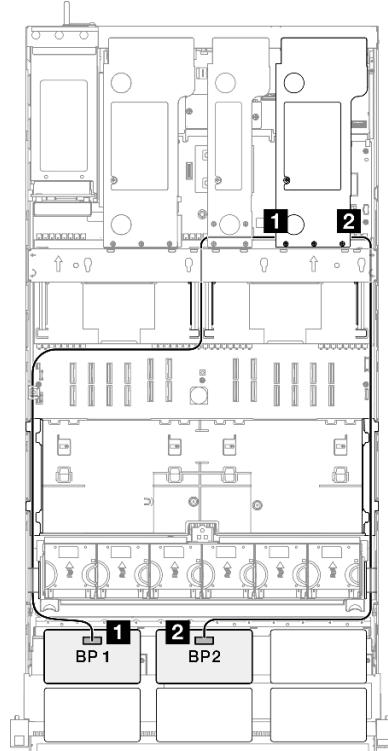
- Ensure that you observe the installation rules and sequence order in [“PCIe riser and adapter installation rules and order” on page 14](#) and [“Drive backplane installation rules and order” on page 13](#).
- For more information on the power cable routing, see [“2.5-inch drive backplane power cable routing” on page 254](#).
- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.
- 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.

This configuration contains the following storage controller combinations:

- [“16i RAID/HBA adapter” on page 286](#)
- [“32i RAID adapter” on page 288](#)

## 16i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)

SAS/SATA cable routing to riser 3	SAS/SATA cable routing to riser 2	SAS/SATA cable routing to riser 1
		
<p><b>Note:</b> Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.</p>		
From	To	Cable
<p><b>1</b> BP1: SAS/SATA</p>	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<p><b>2</b> BP2: SAS/SATA</p>	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

### 32i RAID adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)

SAS/SATA cable routing to riser 3		SAS/SATA cable routing to riser 1	
<p><b>Note:</b> Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.</p>			
From	To	Cable	
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)	
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)	

### 1 x AnyBay + 2 x SAS/SATA backplanes

Use this section to understand the signal cable routing for one AnyBay backplane and two SAS/SATA backplanes.

#### Notes:

- Ensure that you observe the installation rules and sequence order in “[PCIe riser and adapter installation rules and order](#)” on page 14 and “[Drive backplane installation rules and order](#)” on page 13.
- For more information on the power cable routing, see “[2.5-inch drive backplane power cable routing](#)” on page 254.
- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.
- 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.

This configuration contains the following storage controller combinations:

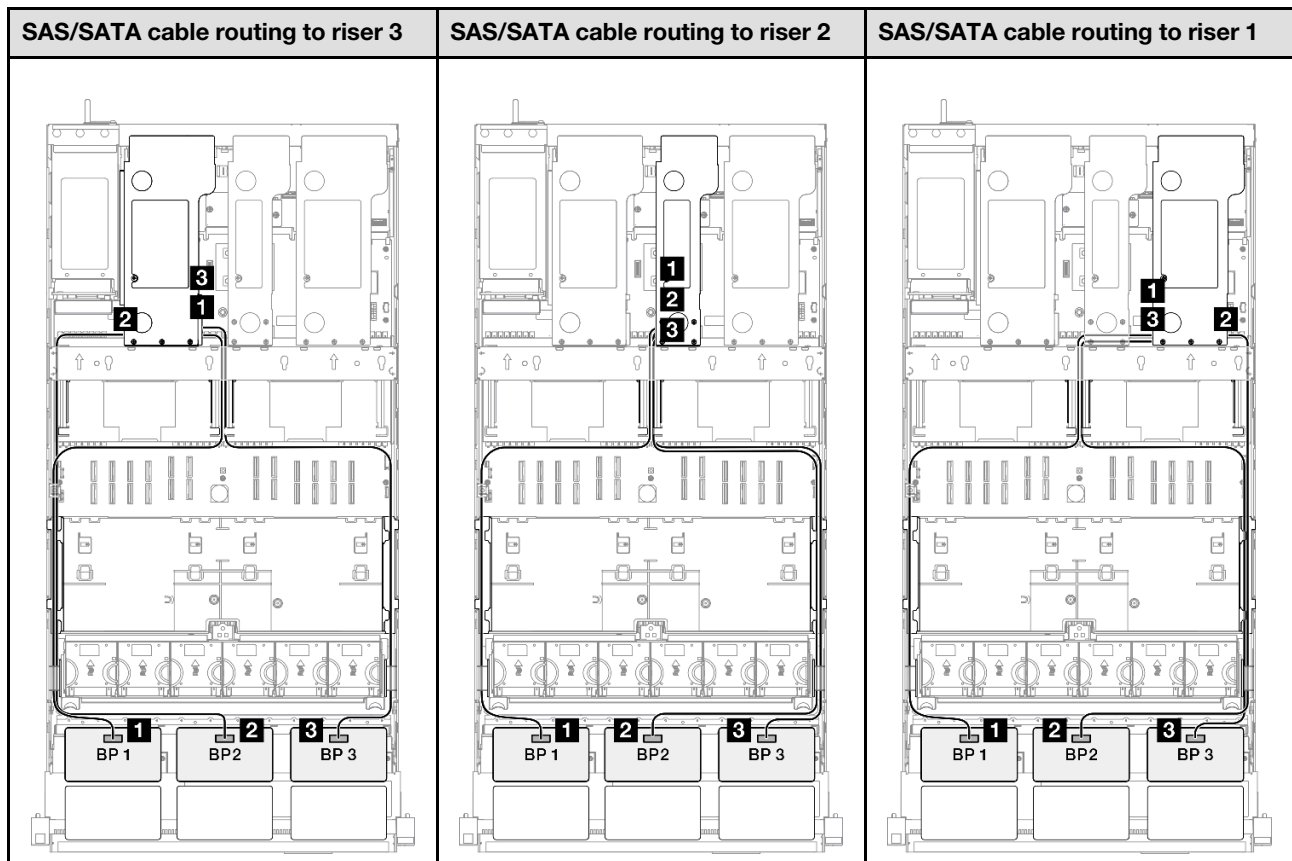
- “[8i + 16i RAID/HBA adapter](#)” on page 290
- “[16i + 16i RAID/HBA adapter](#)” on page 292

- “32i RAID adapter” on page 294

### 8i + 16i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)

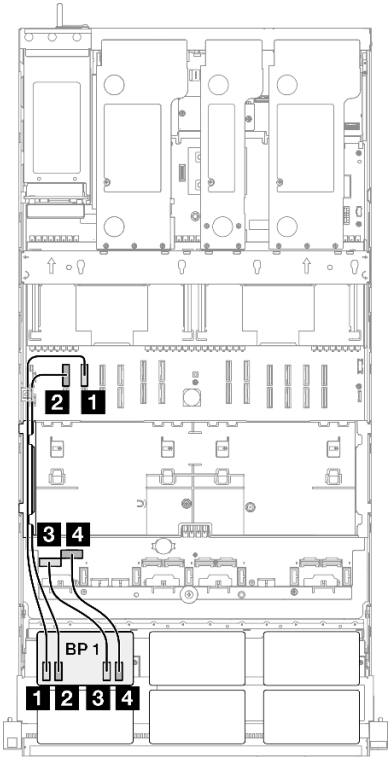


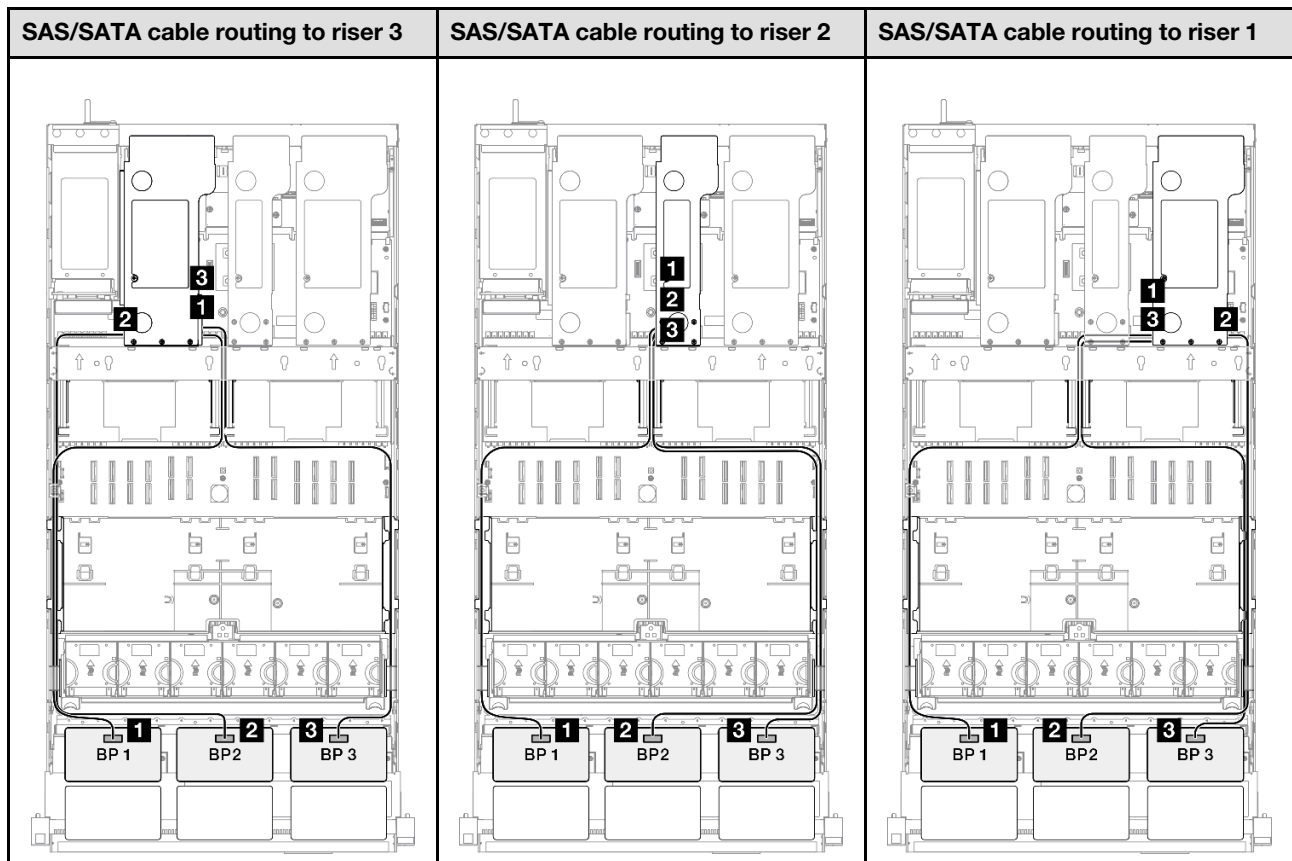


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 8i Gen 4: C0</li> <li>• 8i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

## 16i + 16i RAID/HBA adapter

NVMe cable routing		
		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)

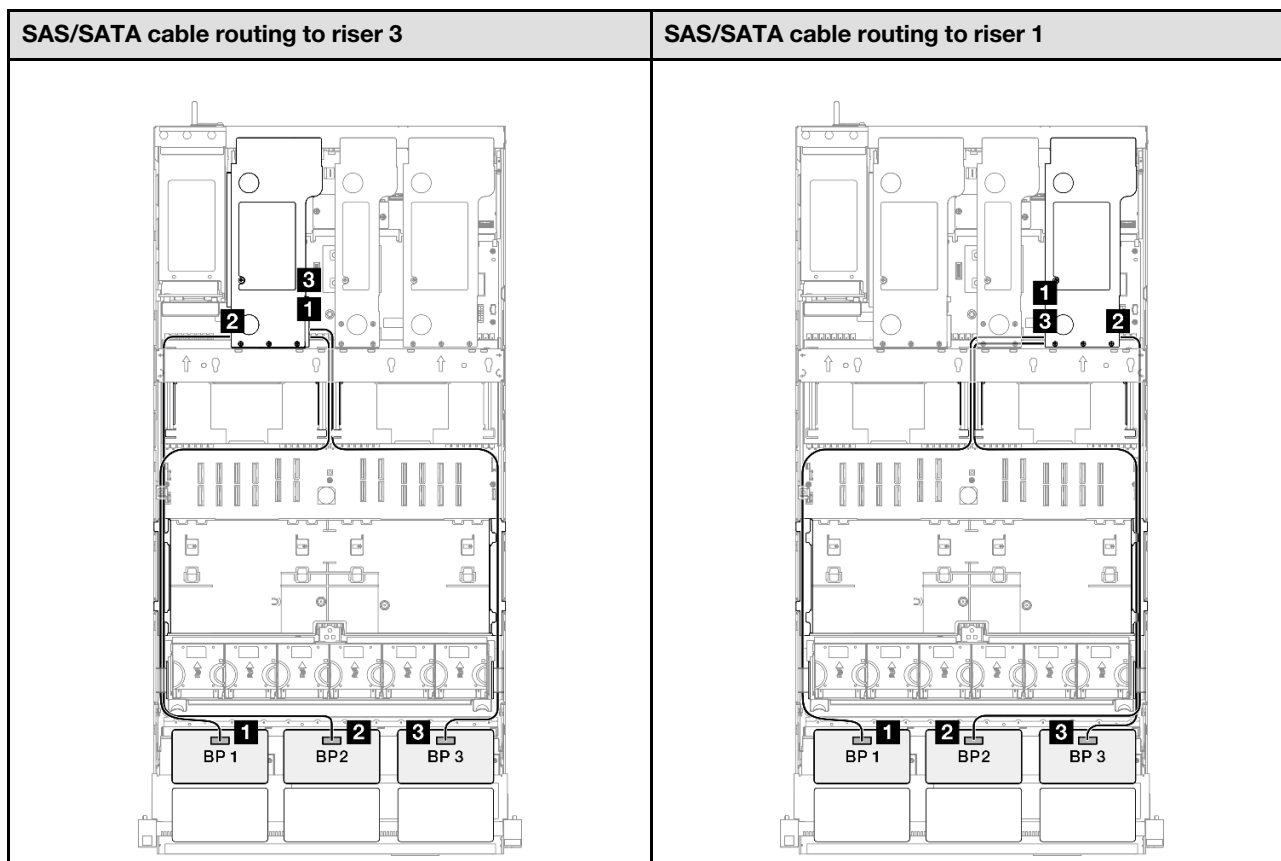


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

### 32i RAID adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

### 1 x AnyBay + 3 x SAS/SATA backplanes

Use this section to understand the signal cable routing for one AnyBay backplane and three SAS/SATA backplanes.

#### Notes:

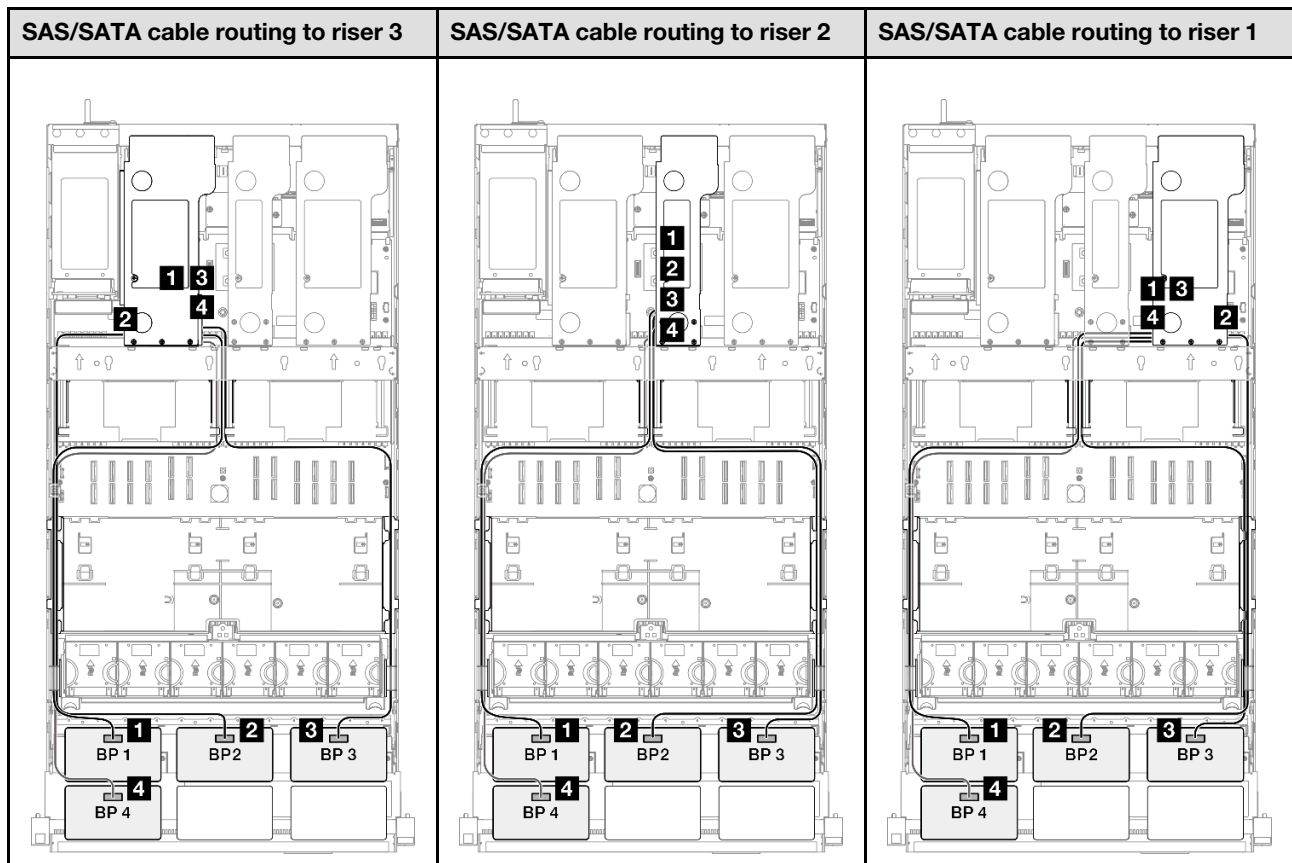
- Ensure that you observe the installation rules and sequence order in [“PCIe riser and adapter installation rules and order” on page 14](#) and [“Drive backplane installation rules and order” on page 13](#).
- For more information on the power cable routing, see [“2.5-inch drive backplane power cable routing” on page 254](#).
- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.
- 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.

This configuration contains the following storage controller combinations:

- “16i + 16i RAID/HBA adapter” on page 296
- “8i + 32i RAID/HBA adapter” on page 298
- “16i + 32i RAID/HBA adapter” on page 300
- “32i + 32i RAID adapter” on page 302

### 16i + 16i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)

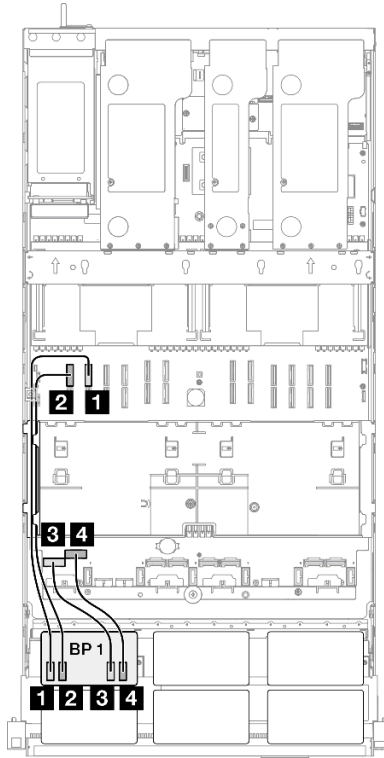


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

## 8i + 32i RAID/HBA adapter

### NVMe cable routing



From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)



SAS/SATA cable routing to riser 3	SAS/SATA cable routing to riser 2	SAS/SATA cable routing to riser 1
<p><b>Note:</b> Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.</p>		
From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 8i Gen 4: C0</li> <li>• 8i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

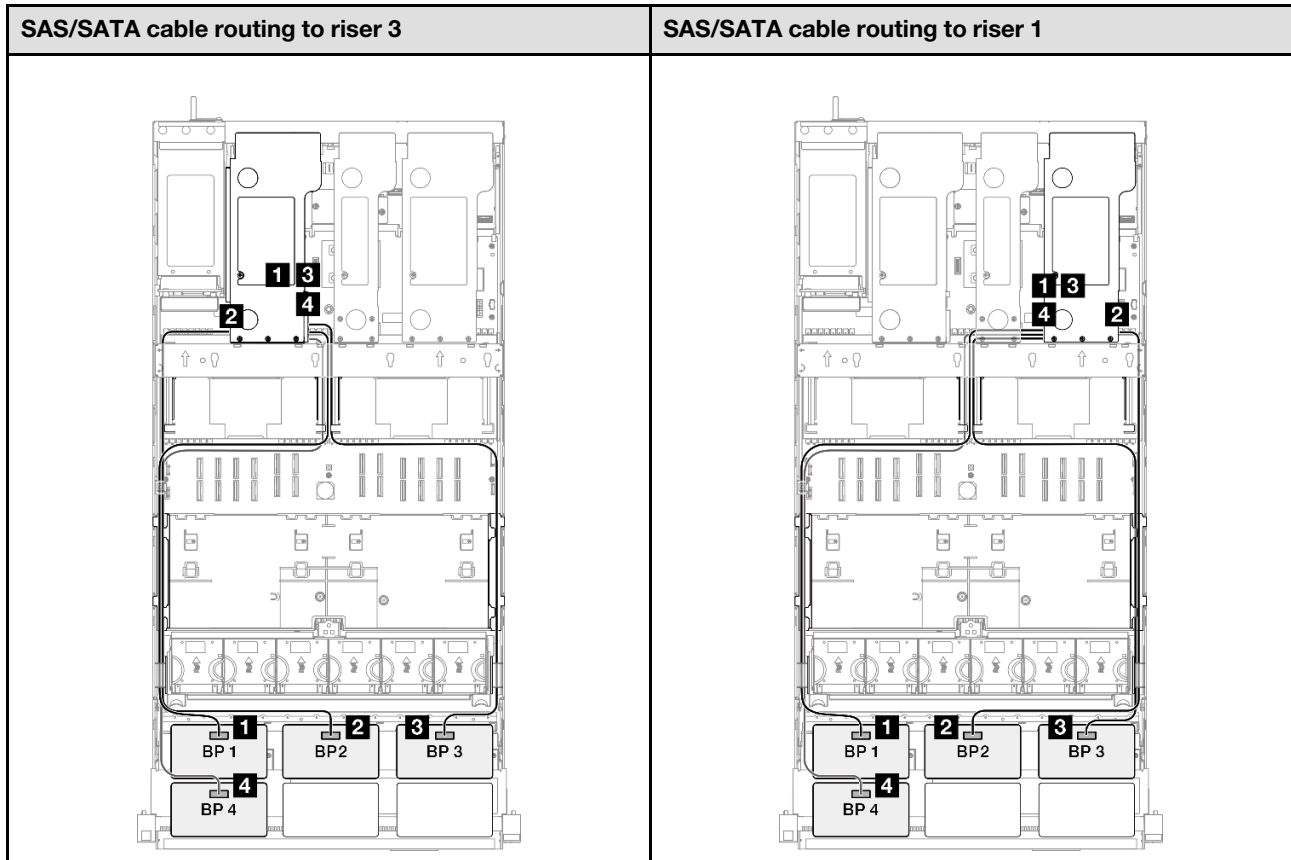
## 16i + 32i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)

SAS/SATA cable routing to riser 3	SAS/SATA cable routing to riser 2	SAS/SATA cable routing to riser 1
<b>Note:</b> Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.		
From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

### 32i + 32i RAID adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

### 1 x AnyBay + 4 x SAS/SATA backplanes

Use this section to understand the signal cable routing for one AnyBay backplane and four SAS/SATA backplanes.

#### Notes:

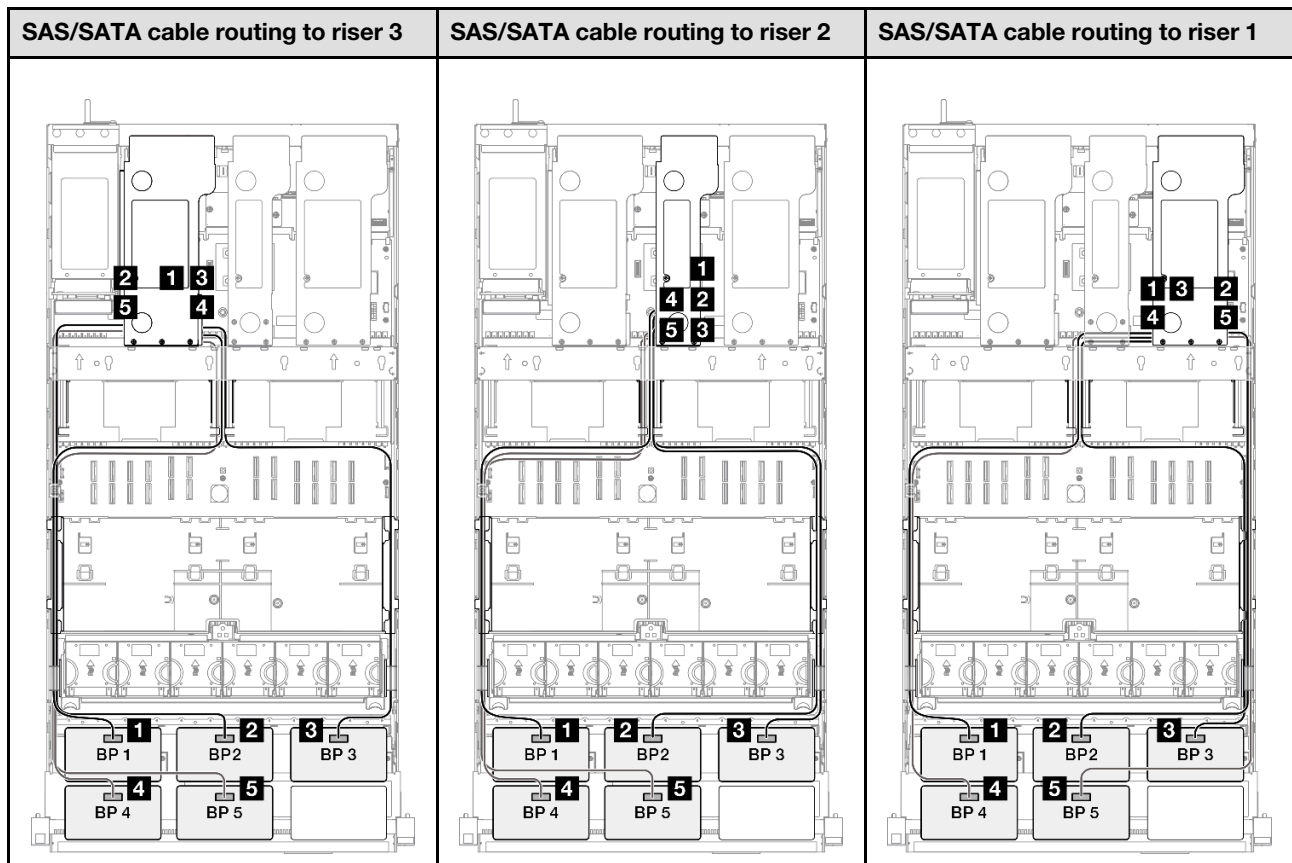
- Ensure that you observe the installation rules and sequence order in [“PCIe riser and adapter installation rules and order”](#) on page 14 and [“Drive backplane installation rules and order”](#) on page 13.
- For more information on the power cable routing, see [“2.5-inch drive backplane power cable routing”](#) on page 254.
- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.
- 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.

This configuration contains the following storage controller combinations:

- “8i + 16i + 16i RAID/HBA adapter” on page 304
- “16i + 16i + 16i RAID/HBA adapter” on page 306
- “16i + 32i RAID/HBA adapter” on page 308
- “32i + 32i RAID adapter” on page 310

### 8i + 16i + 16i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)



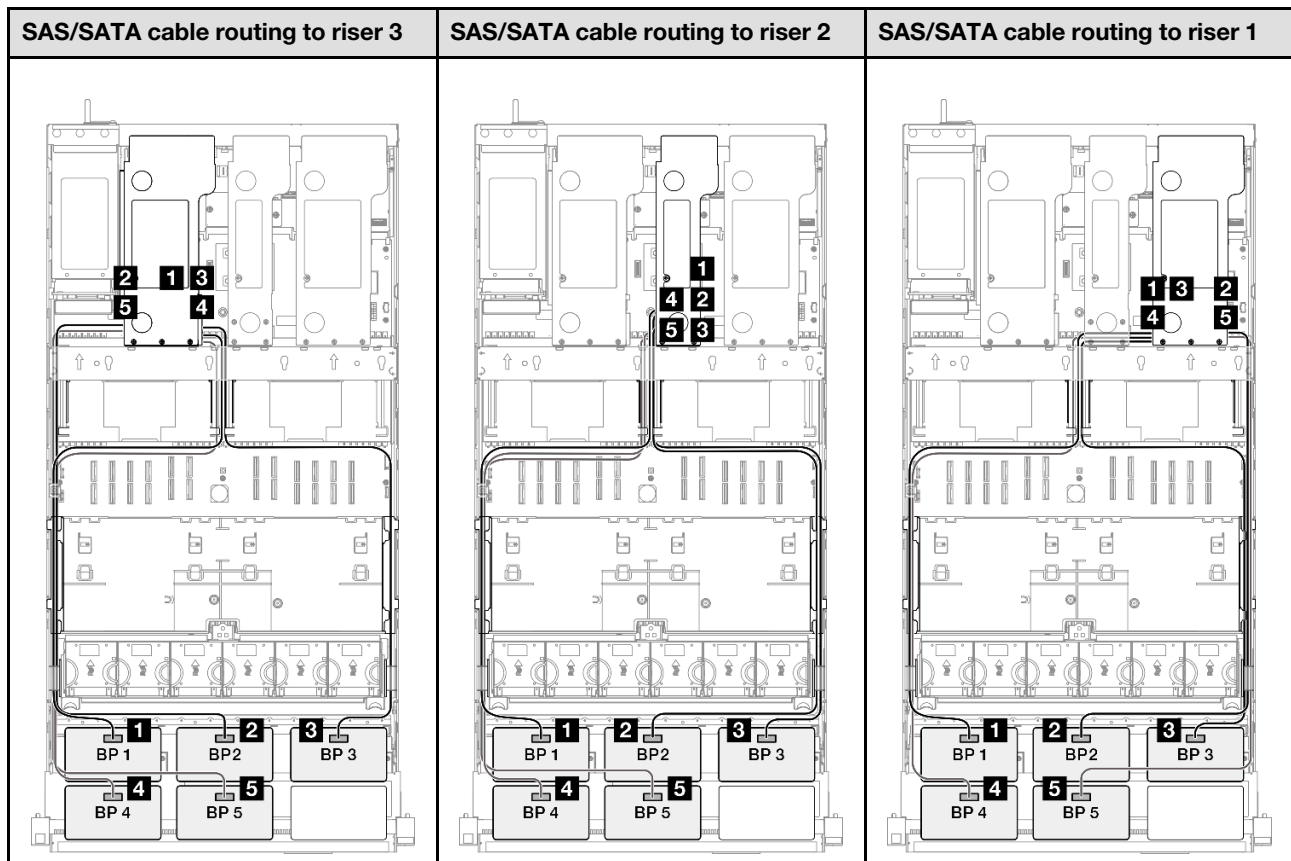
**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>5</b> BP5: SAS/SATA	<ul style="list-style-type: none"> <li>• 8i Gen 4: C0</li> <li>• 8i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

## 16i + 16i + 16i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)



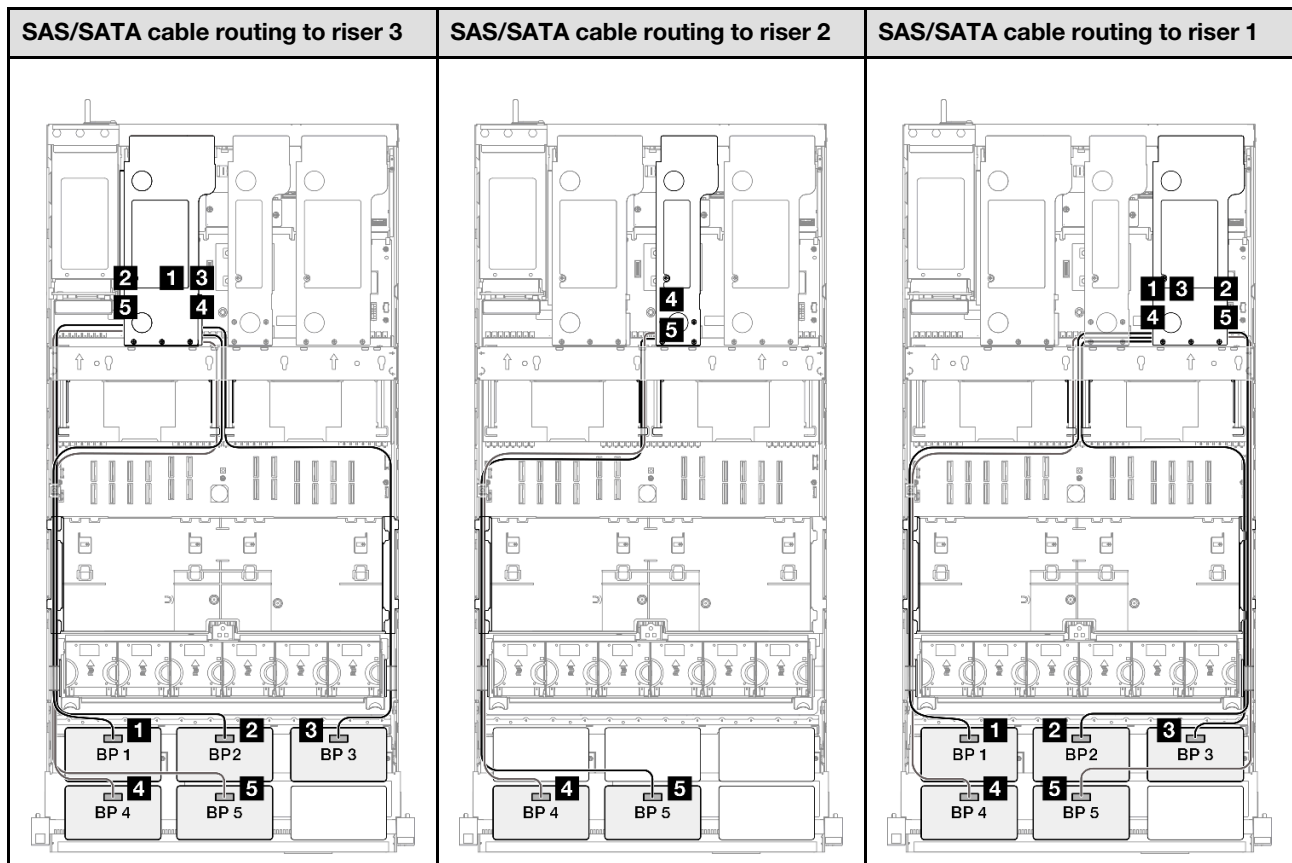


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>5</b> BP5: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

## 16i + 32i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)

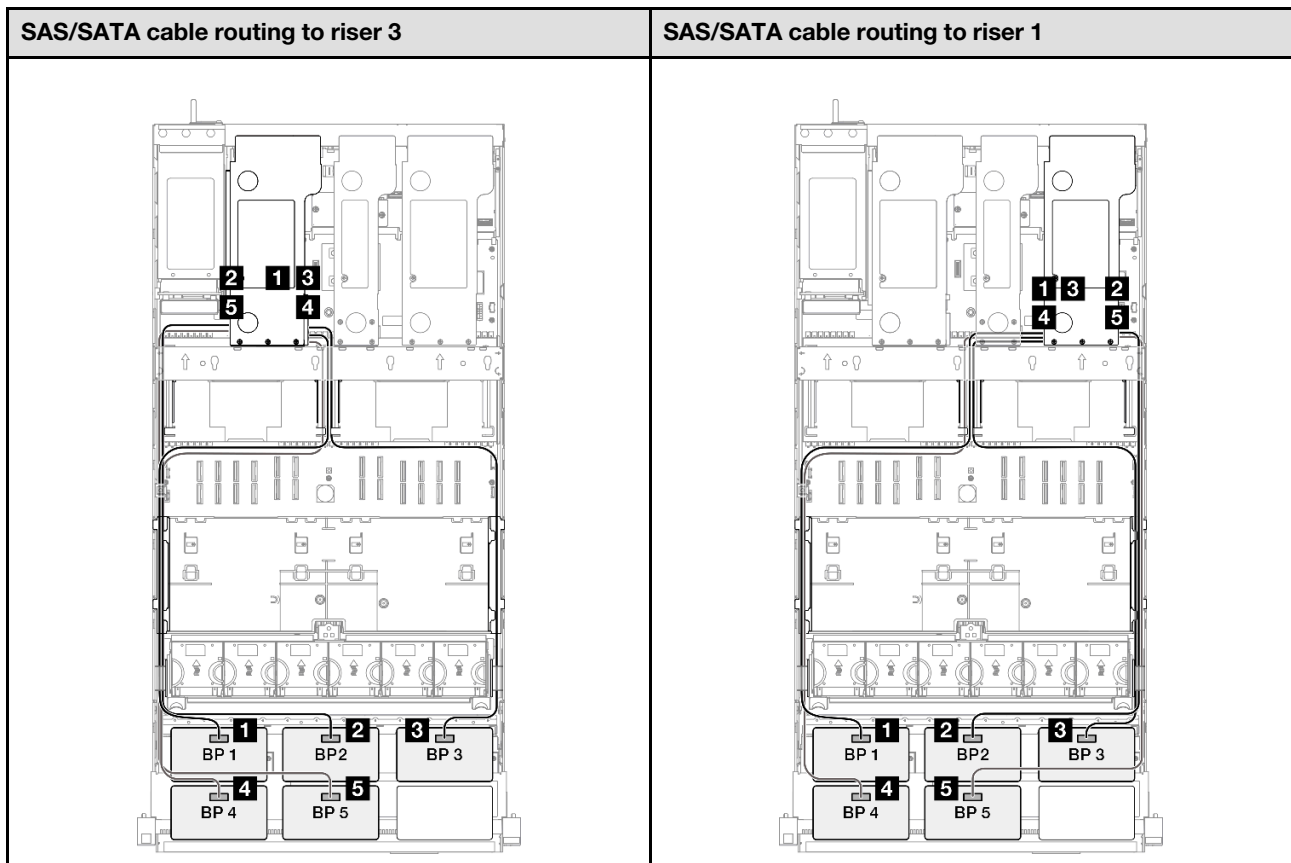


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C0</li> <li>16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>5</b> BP5: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C1</li> <li>16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

### 32i + 32i RAID adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>5</b> BP5: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

### 1 x AnyBay + 5 x SAS/SATA backplanes

Use this section to understand the signal cable routing for one AnyBay backplane and five SAS/SATA backplanes.

#### Notes:

- Ensure that you observe the installation rules and sequence order in [“PCIe riser and adapter installation rules and order”](#) on page 14 and [“Drive backplane installation rules and order”](#) on page 13.
- For more information on the power cable routing, see [“2.5-inch drive backplane power cable routing”](#) on page 254.
- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

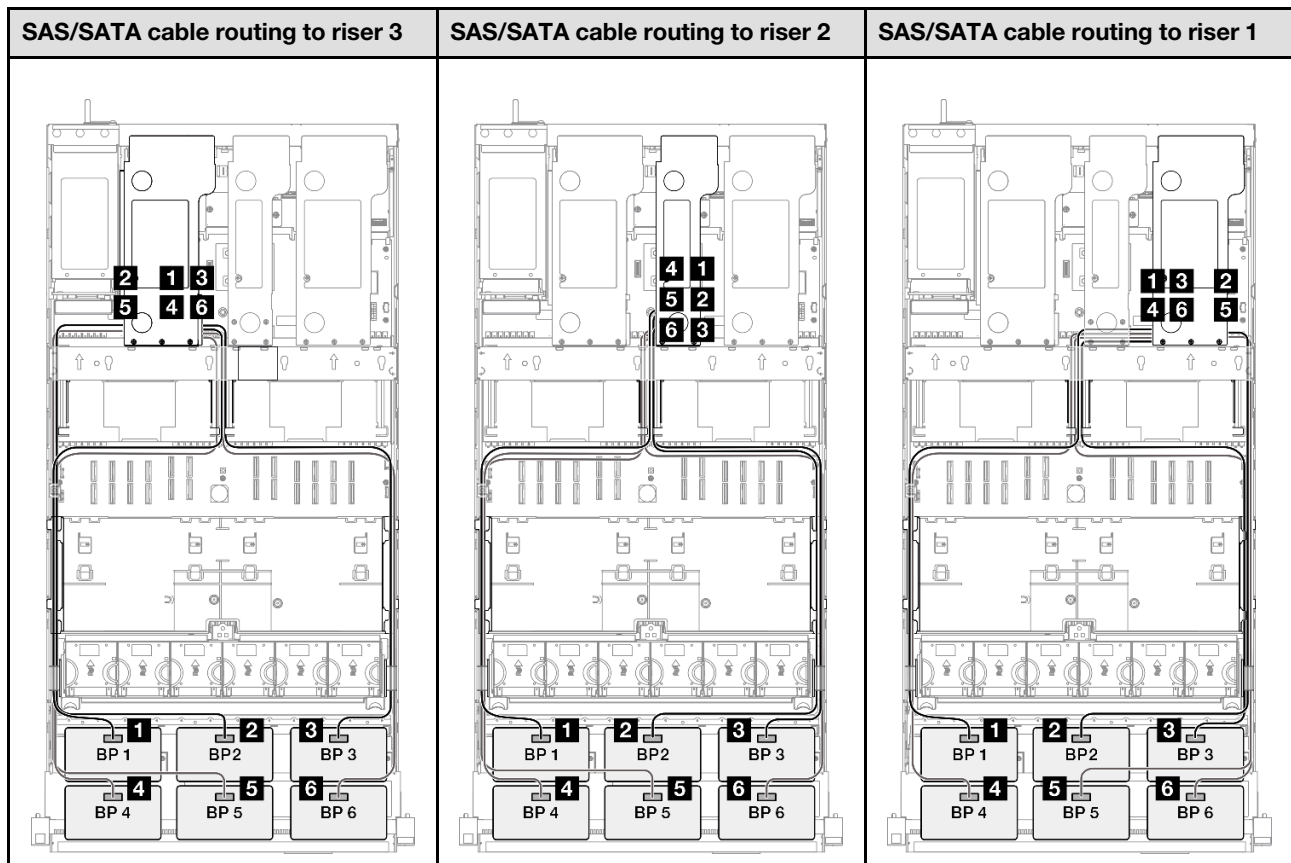
- Connections between connectors; **1**↔**1**, **2**↔**2**, **3**↔**3**, ... **n**↔**n**
- When routing the cables, ensure that all cables are routed appropriately through the cable guides.

This configuration contains the following storage controller combinations:

- “16i + 16i + 16i RAID/HBA adapter” on page 312
- “8i + 16i + 32i RAID/HBA adapter” on page 314
- “32i + 32i RAID adapter” on page 316

### 16i + 16i + 16i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)

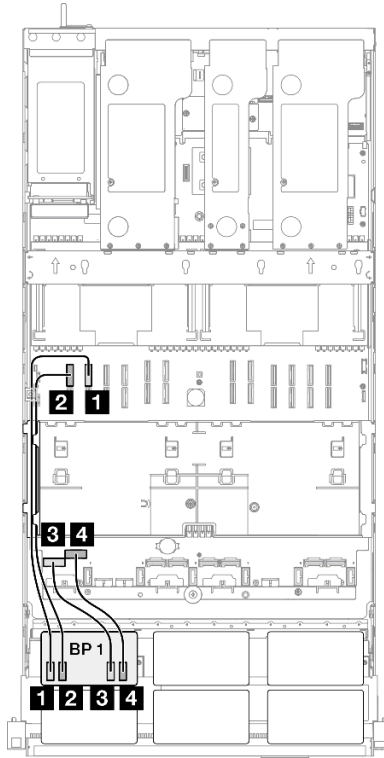


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C0</li> <li>16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C1</li> <li>16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C0</li> <li>16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C1</li> <li>16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>5</b> BP5: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C0</li> <li>16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>6</b> BP6: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C1</li> <li>16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

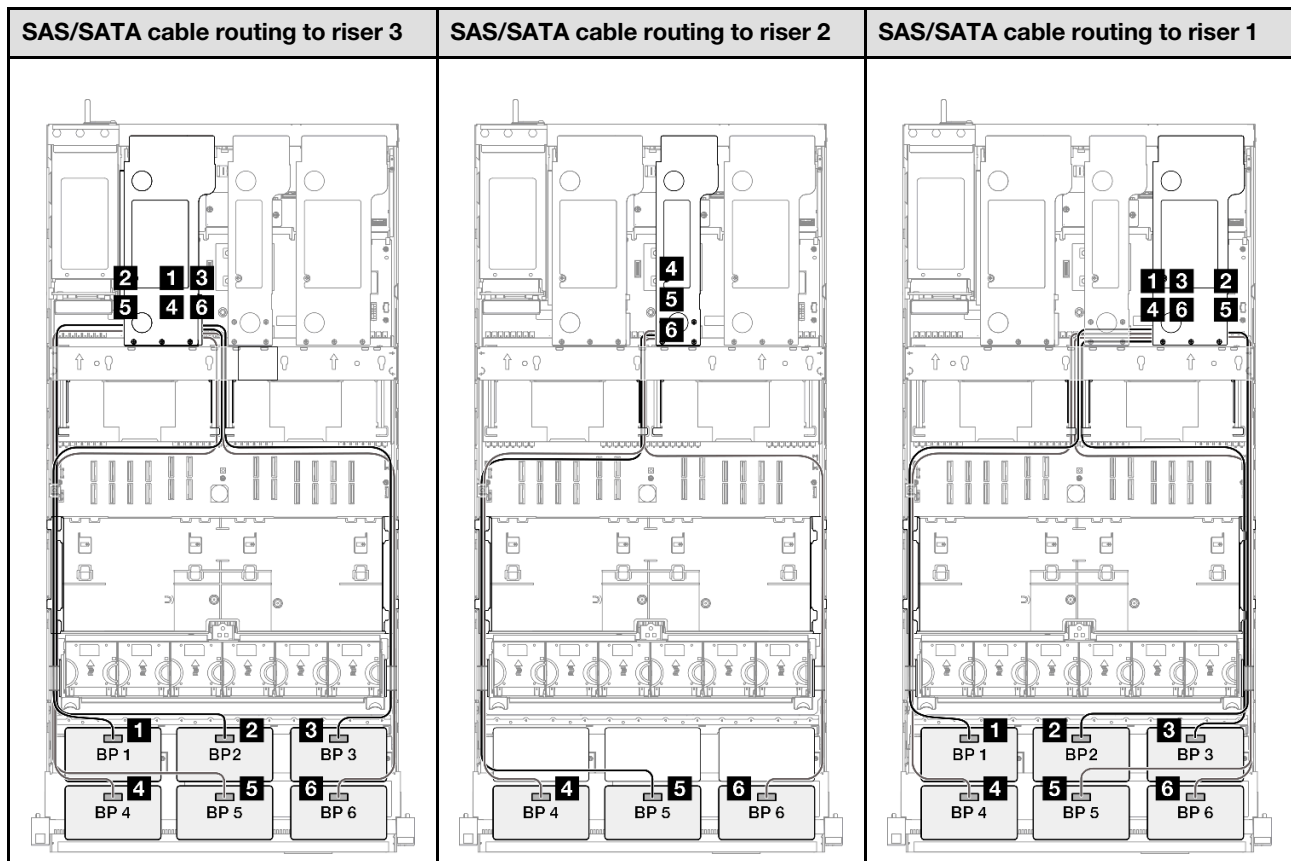
## 8i + 16i + 32i RAID/HBA adapter

### NVMe cable routing



From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)



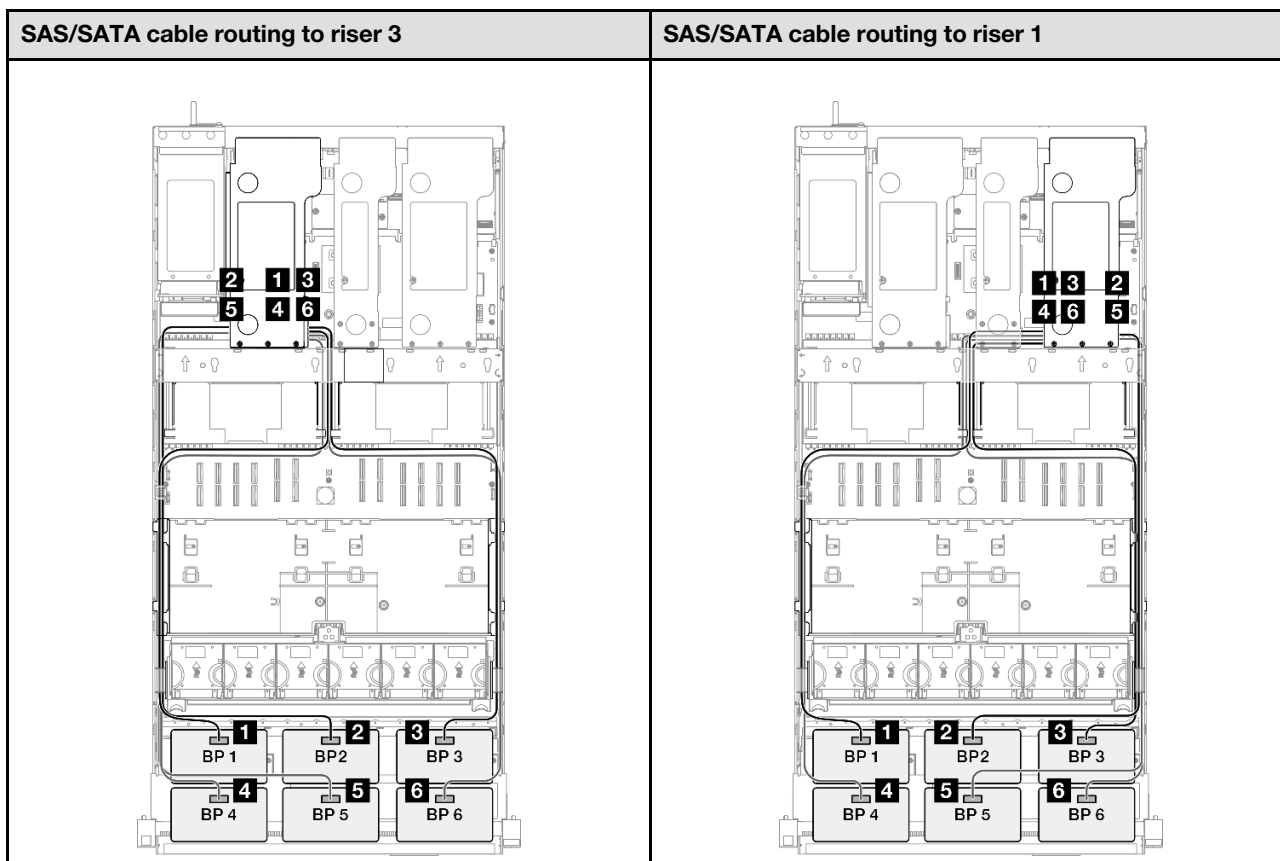


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>5</b> BP5: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>6</b> BP6: SAS/SATA	<ul style="list-style-type: none"> <li>• 8i Gen 4: C0</li> <li>• 8i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

### 32i + 32i RAID adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>5</b> BP5: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>6</b> BP6: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

## 2 x AnyBay backplanes

Use this section to understand the signal cable routing for two AnyBay backplanes.

### Notes:

- Ensure that you observe the installation rules and sequence order in [“PCIe riser and adapter installation rules and order” on page 14](#) and [“Drive backplane installation rules and order” on page 13](#).
- For more information on the power cable routing, see [“2.5-inch drive backplane power cable routing” on page 254](#).

- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.
- 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.

This configuration contains the following storage controller combinations:

- [“No RAID/HBA adapters” on page 318](#)
- [“16i RAID/HBA adapter” on page 319](#)
- [“16i RAID adapter \(Tri-mode\)” on page 321](#)
- [“32i RAID adapter” on page 322](#)

### No RAID/HBA adapters

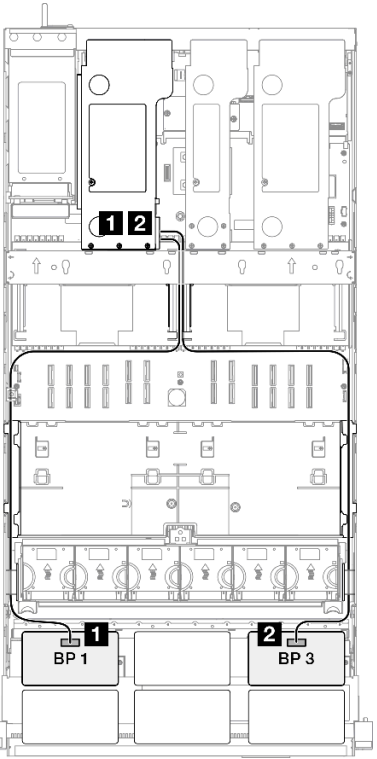
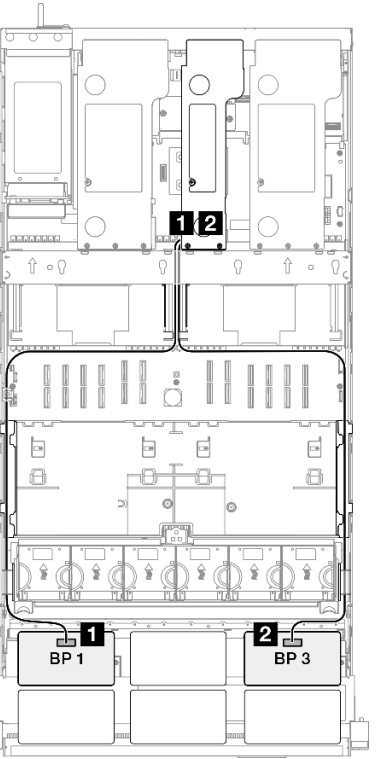
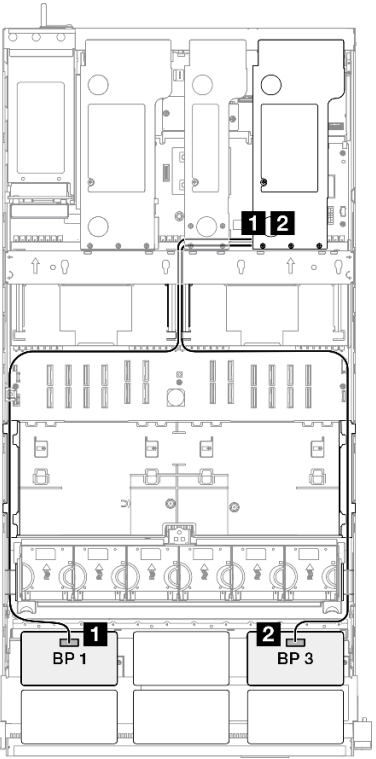
**Note:** The AnyBay backplanes are used as pure NVMe backplanes when no RAID/HBA adapters are installed.

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)

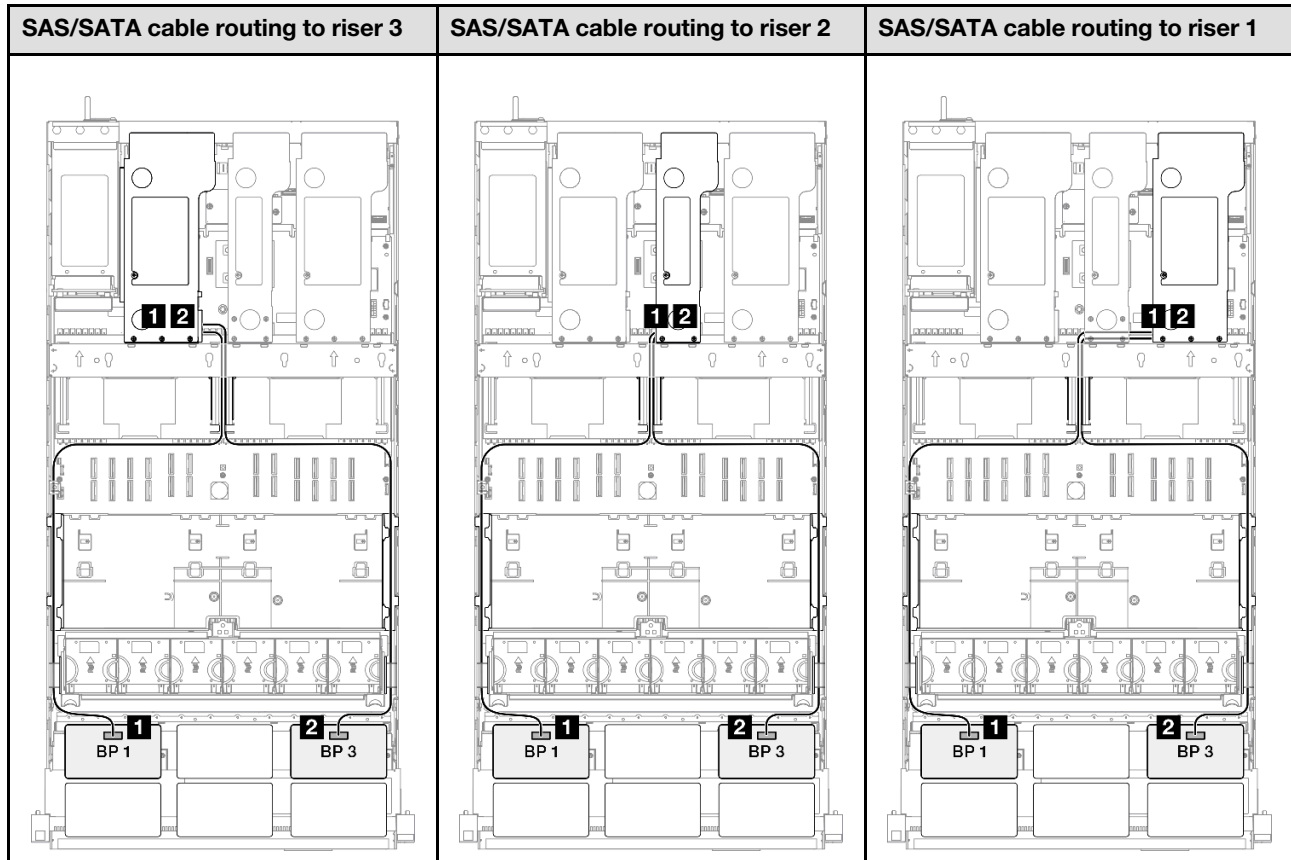
From	To	Cable
<b>7</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>8</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)

## 16i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>8</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)

SAS/SATA cable routing to riser 3	SAS/SATA cable routing to riser 2	SAS/SATA cable routing to riser 1
		
<p><b>Note:</b> Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.</p>		
From	To	Cable
<p><b>1</b> BP1: SAS/SATA</p>	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<p><b>2</b> BP3: SAS/SATA</p>	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

## 16i RAID adapter (Tri-mode)



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

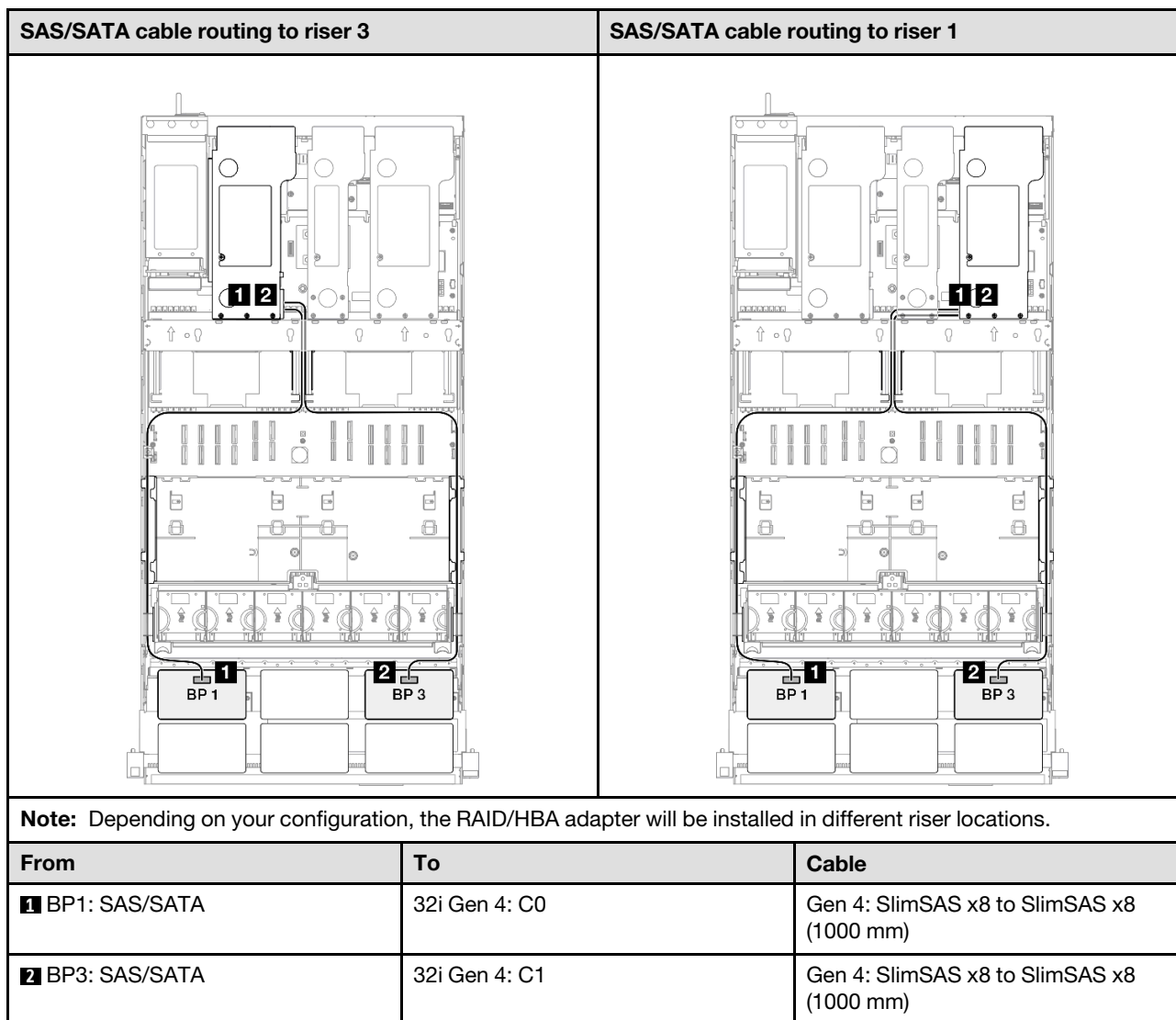
From	To	Cable
<b>1</b> BP1: SAS/SATA	16i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP3: SAS/SATA	16i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

### 32i RAID adapter

**NVMe cable routing**

From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>8</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)





## 2 x AnyBay + 1 x SAS/SATA backplane

Use this section to understand the signal cable routing for two AnyBay backplanes and one SAS/SATA backplane.

### Notes:

- Ensure that you observe the installation rules and sequence order in “[PCIe riser and adapter installation rules and order](#)” on page 14 and “[Drive backplane installation rules and order](#)” on page 13.
- For more information on the power cable routing, see “[2.5-inch drive backplane power cable routing](#)” on page 254.
- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.
- 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.

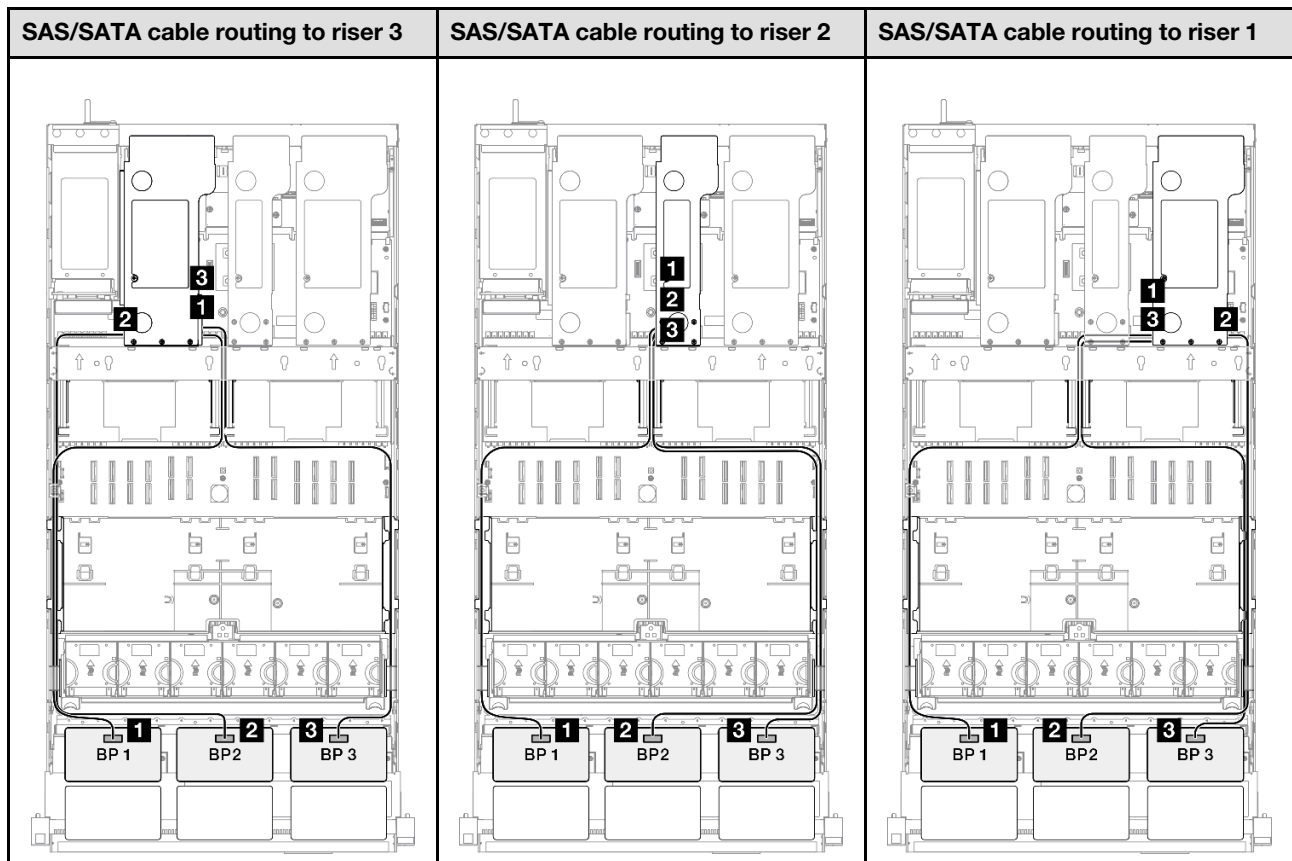
This configuration contains the following storage controller combinations:

- “[8i + 16i RAID/HBA adapter](#)” on page 324
- “[16i + 16i RAID/HBA adapter](#)” on page 326

- “32i RAID adapter” on page 328

## 8i + 16i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>8</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)

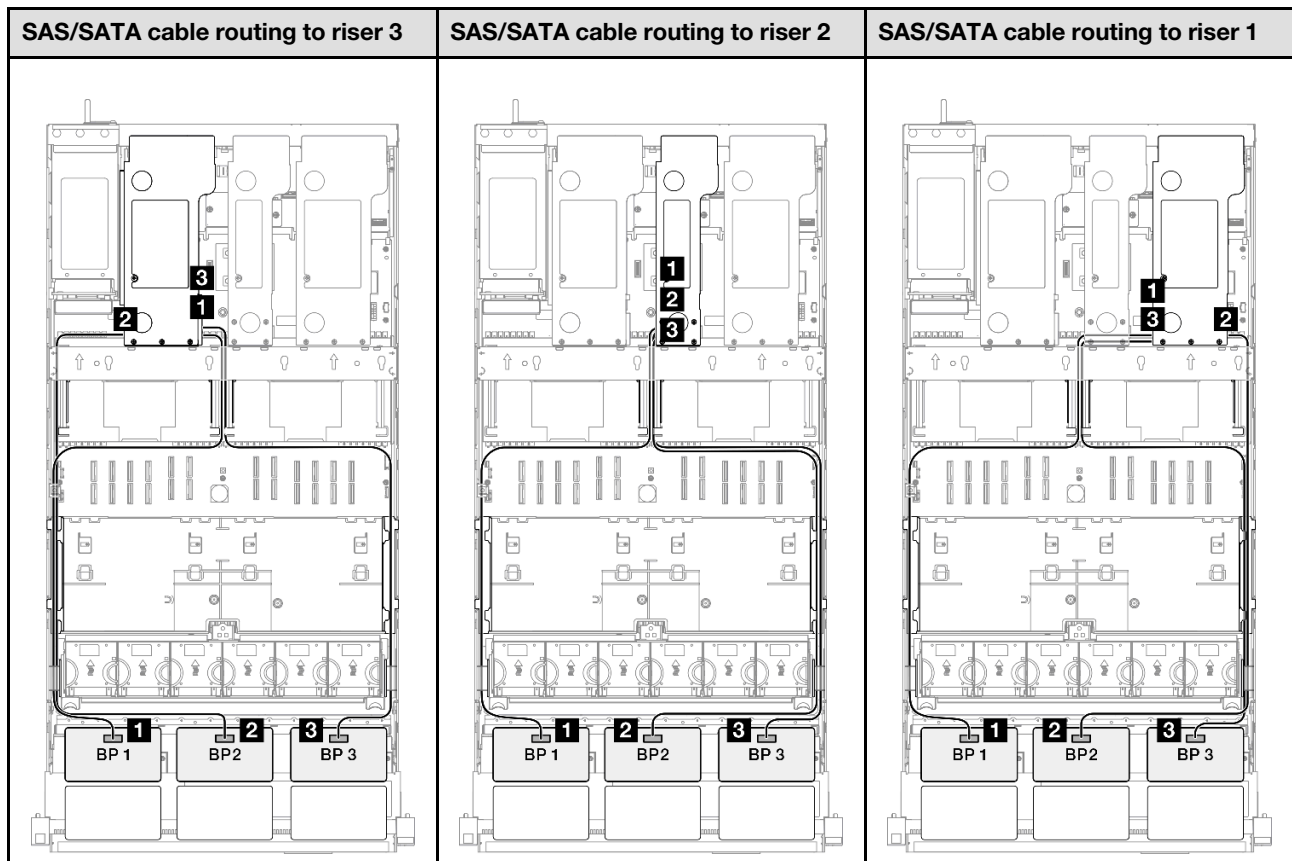


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 8i Gen 4: C0</li> <li>• 8i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

## 16i + 16i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>8</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)



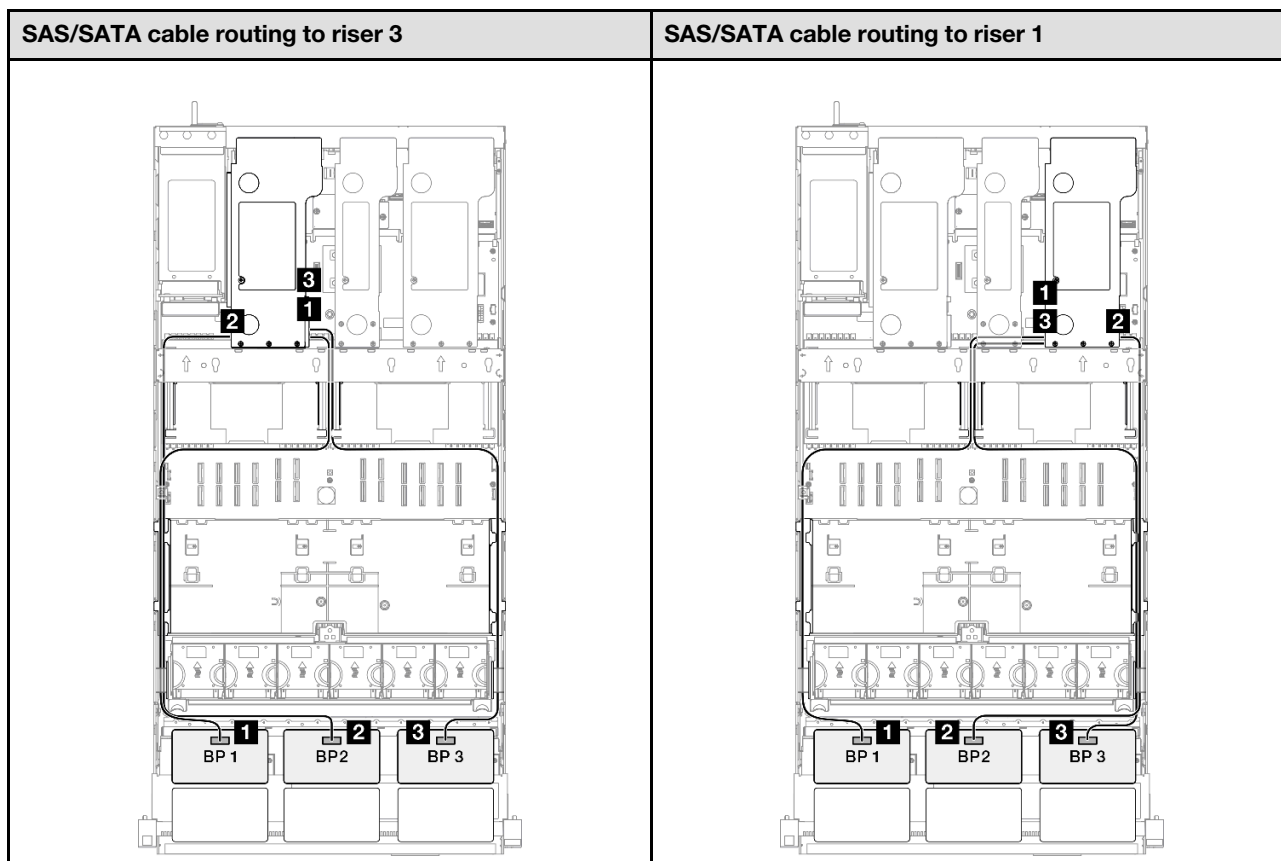
**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

### 32i RAID adapter

**NVMe cable routing**

From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>8</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

## 2 x AnyBay + 2 x SAS/SATA backplanes

Use this section to understand the signal cable routing for two AnyBay backplanes and two SAS/SATA backplanes.

### Notes:

- Ensure that you observe the installation rules and sequence order in [“PCIe riser and adapter installation rules and order” on page 14](#) and [“Drive backplane installation rules and order” on page 13](#).
- For more information on the power cable routing, see [“2.5-inch drive backplane power cable routing” on page 254](#).
- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.
- 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.

This configuration contains the following storage controller combinations:

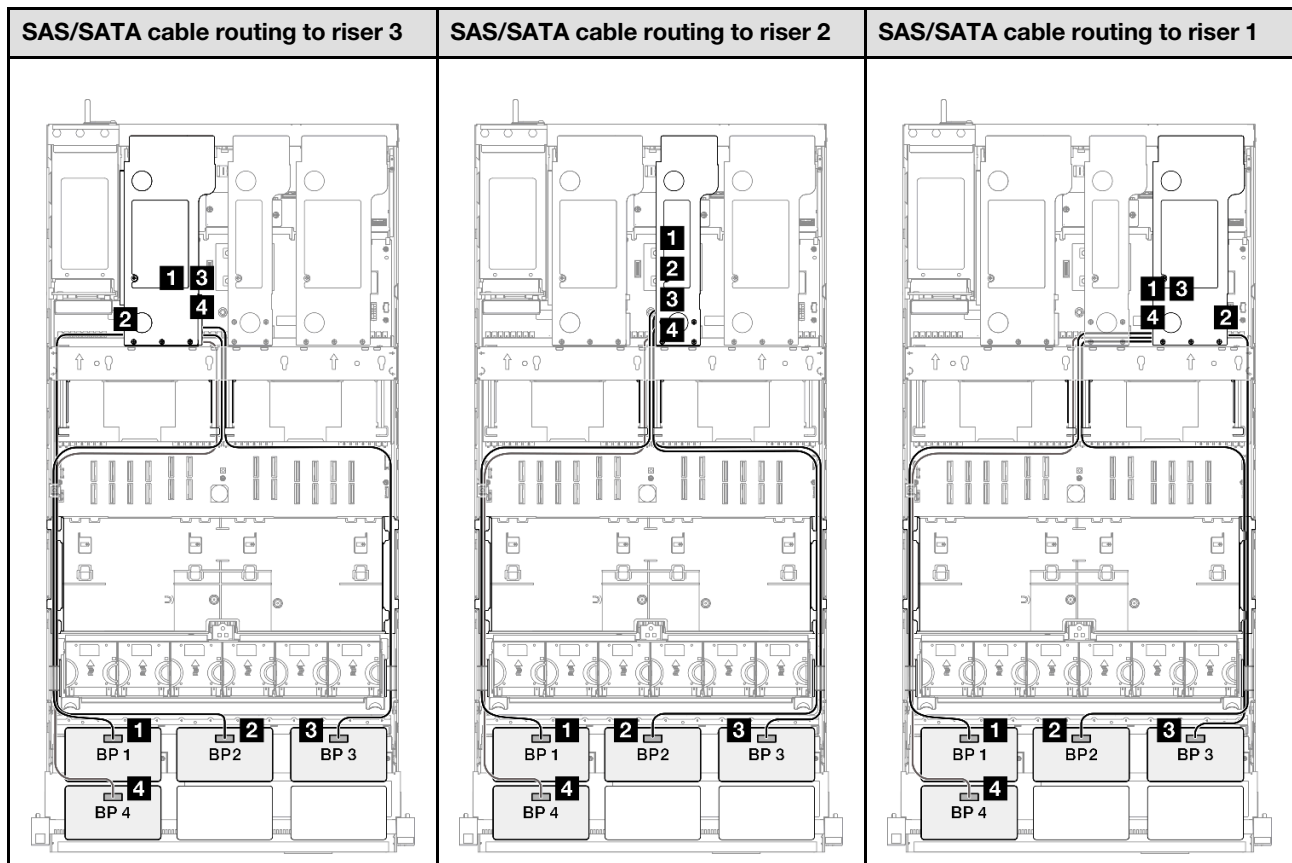
- “16i + 16i RAID/HBA adapter” on page 330
- “8i + 32i RAID/HBA adapter” on page 332
- “16i + 32i RAID/HBA adapter” on page 334
- “32i + 32i RAID adapter” on page 336

### 16i + 16i RAID/HBA adapter

**NVMe cable routing**

From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>8</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)



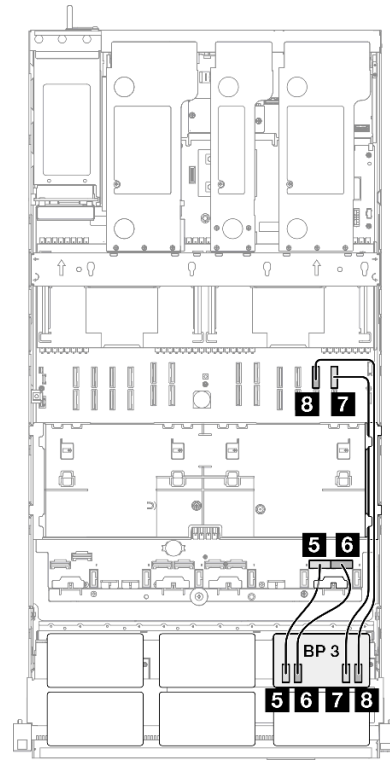
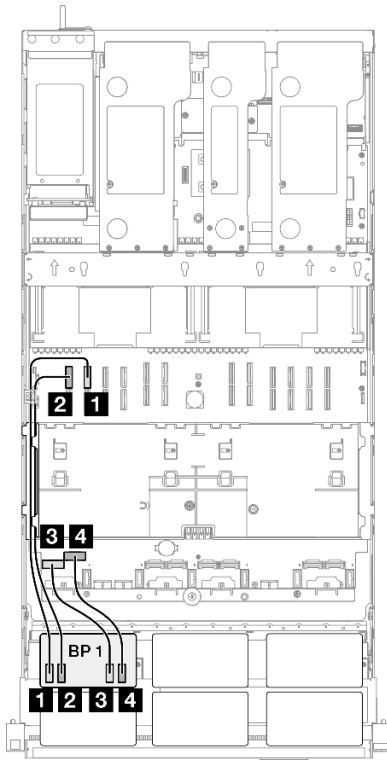


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

## 8i + 32i RAID/HBA adapter

### NVMe cable routing



From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>8</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)

SAS/SATA cable routing to riser 3	SAS/SATA cable routing to riser 2	SAS/SATA cable routing to riser 1
<p><b>Note:</b> Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.</p>		
From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 8i Gen 4: C0</li> <li>• 8i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

## 16i + 32i RAID/HBA adapter

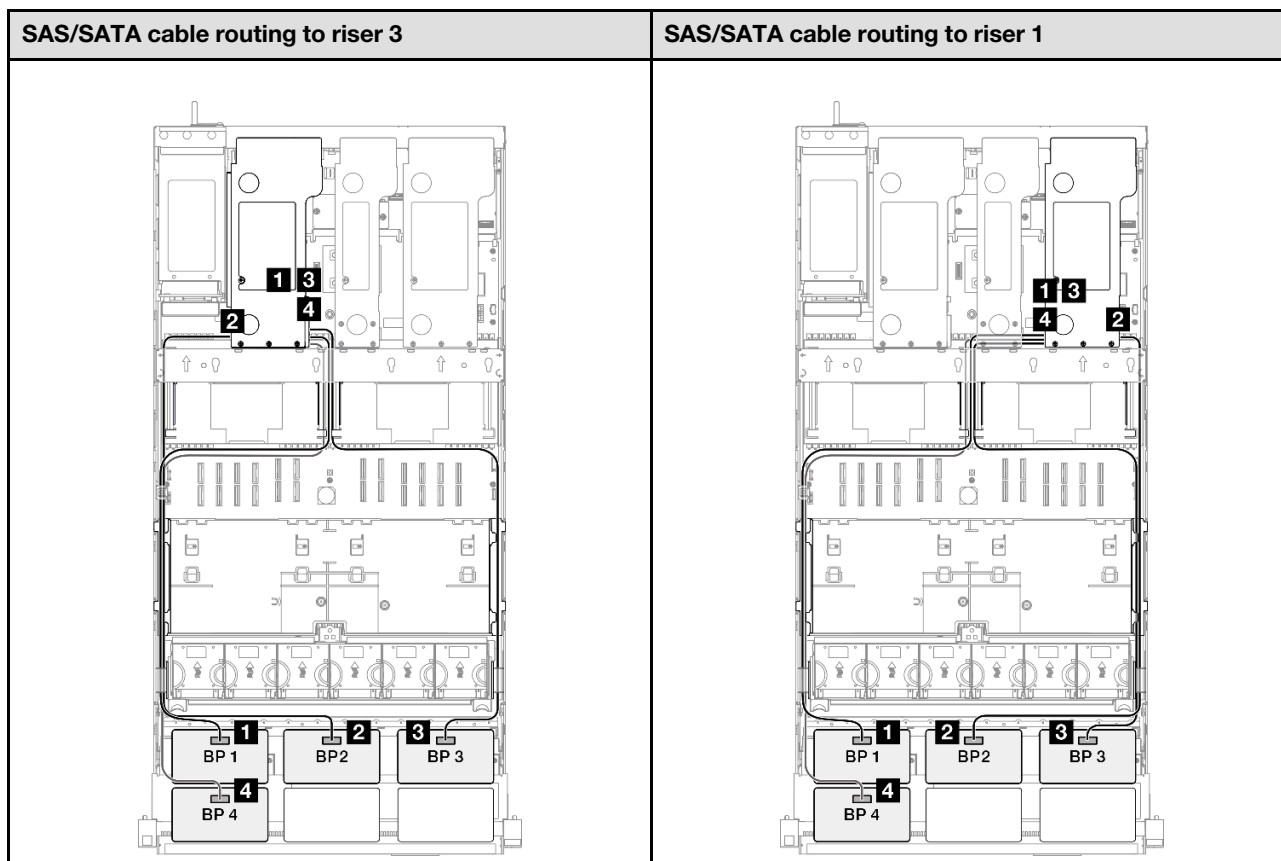
NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>8</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)

SAS/SATA cable routing to riser 3	SAS/SATA cable routing to riser 2	SAS/SATA cable routing to riser 1
<p><b>Note:</b> Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.</p>		
From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

### 32i + 32i RAID adapter

**NVMe cable routing**

From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>8</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

## 2 x AnyBay + 3 x SAS/SATA backplanes

Use this section to understand the signal cable routing for two AnyBay backplanes and three SAS/SATA backplanes.

### Notes:

- Ensure that you observe the installation rules and sequence order in [“PCIe riser and adapter installation rules and order”](#) on page 14 and [“Drive backplane installation rules and order”](#) on page 13.
- For more information on the power cable routing, see [“2.5-inch drive backplane power cable routing”](#) on page 254.
- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.
- 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.

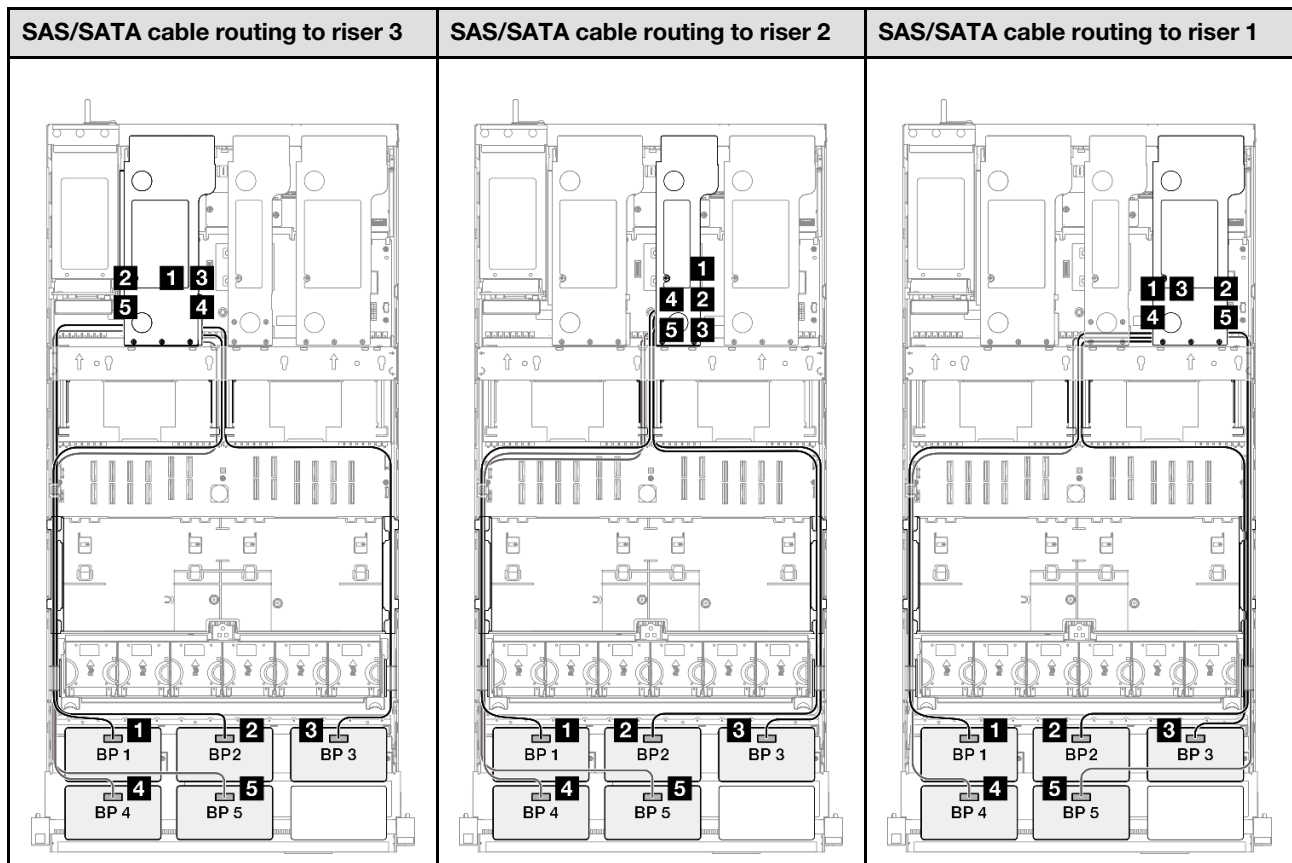
This configuration contains the following storage controller combinations:

- “8i + 16i + 16i RAID/HBA adapter” on page 338
- “16i + 16i + 16i RAID/HBA adapter” on page 340
- “16i + 32i RAID/HBA adapter” on page 342
- “32i + 32i RAID adapter” on page 344

### 8i + 16i + 16i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>8</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)



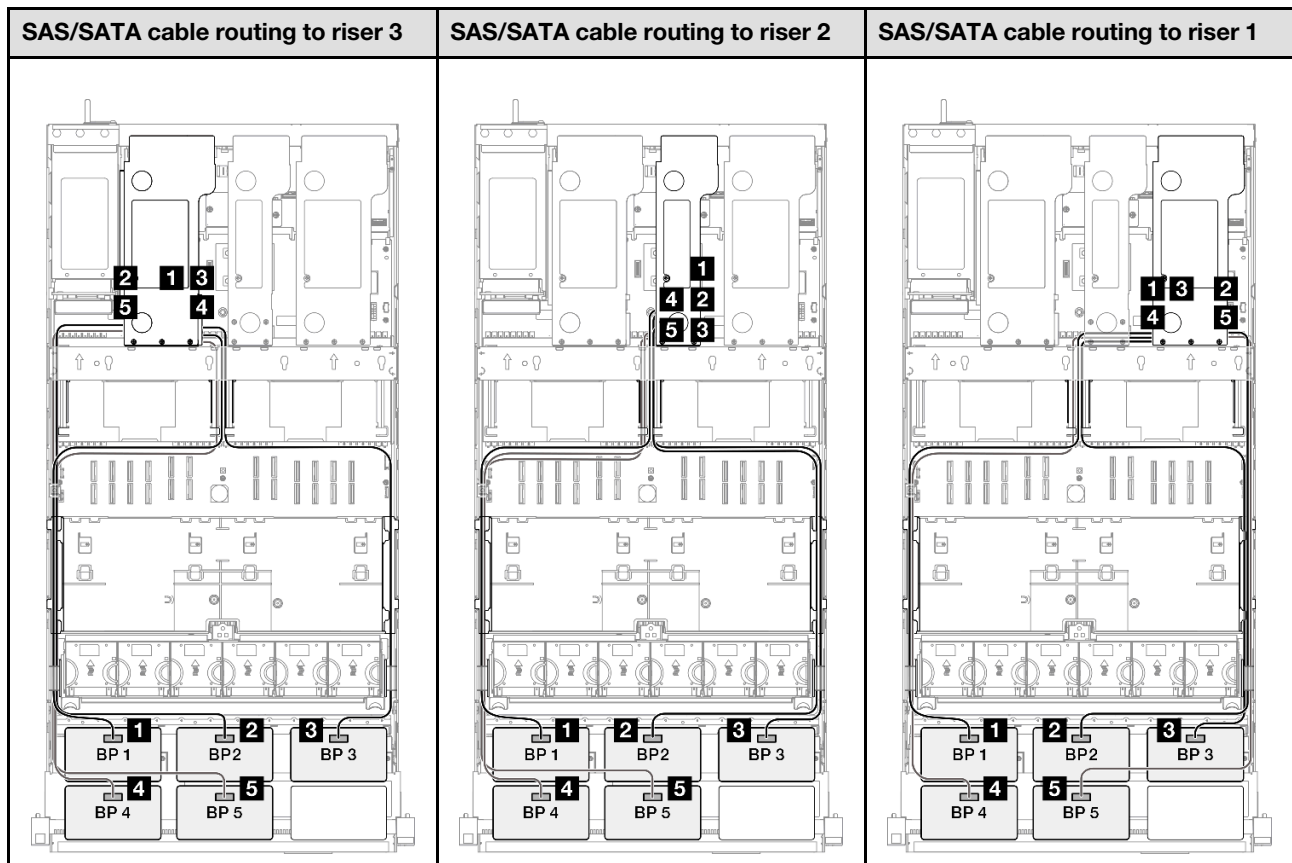


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>5</b> BP5: SAS/SATA	<ul style="list-style-type: none"> <li>• 8i Gen 4: C0</li> <li>• 8i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

## 16i + 16i + 16i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>8</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)

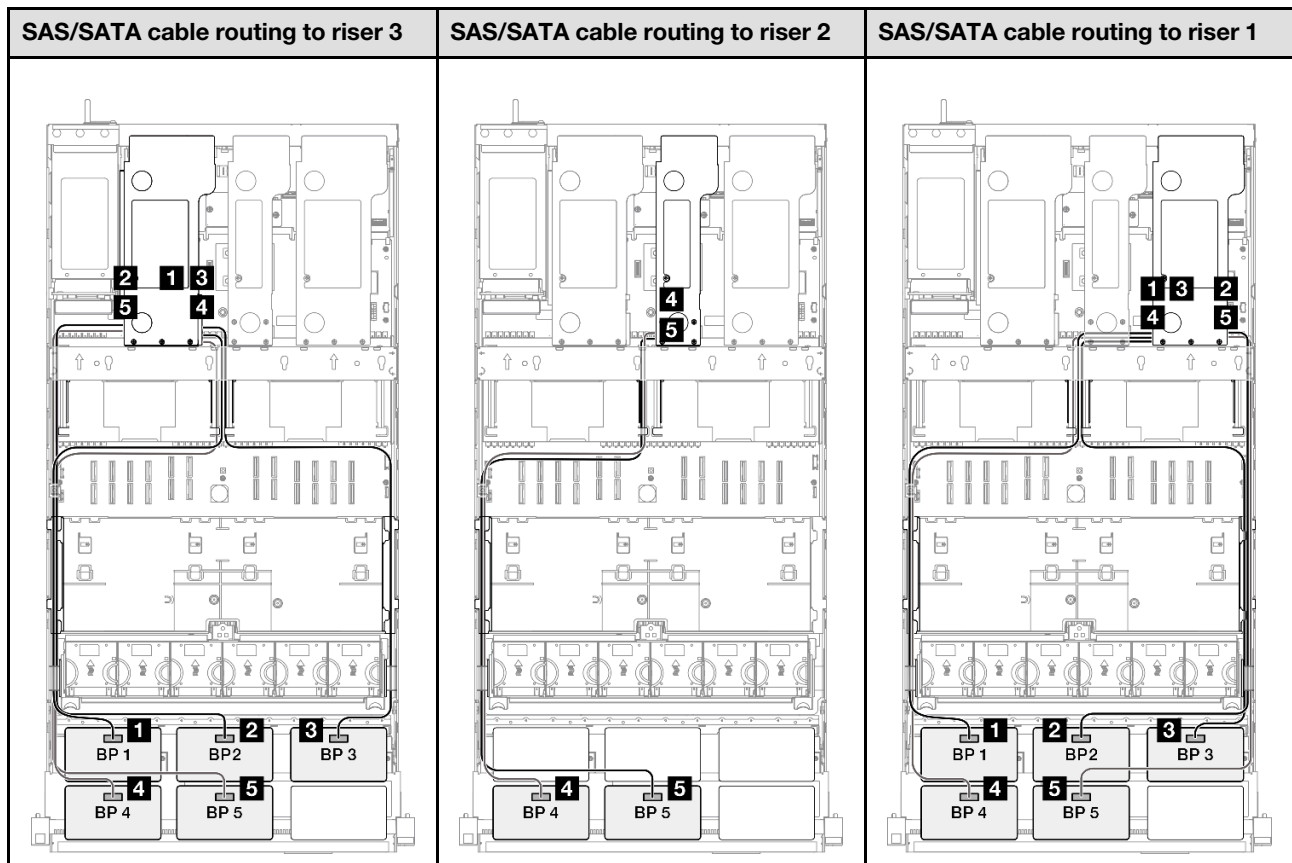


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>5</b> BP5: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

## 16i + 32i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>8</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)



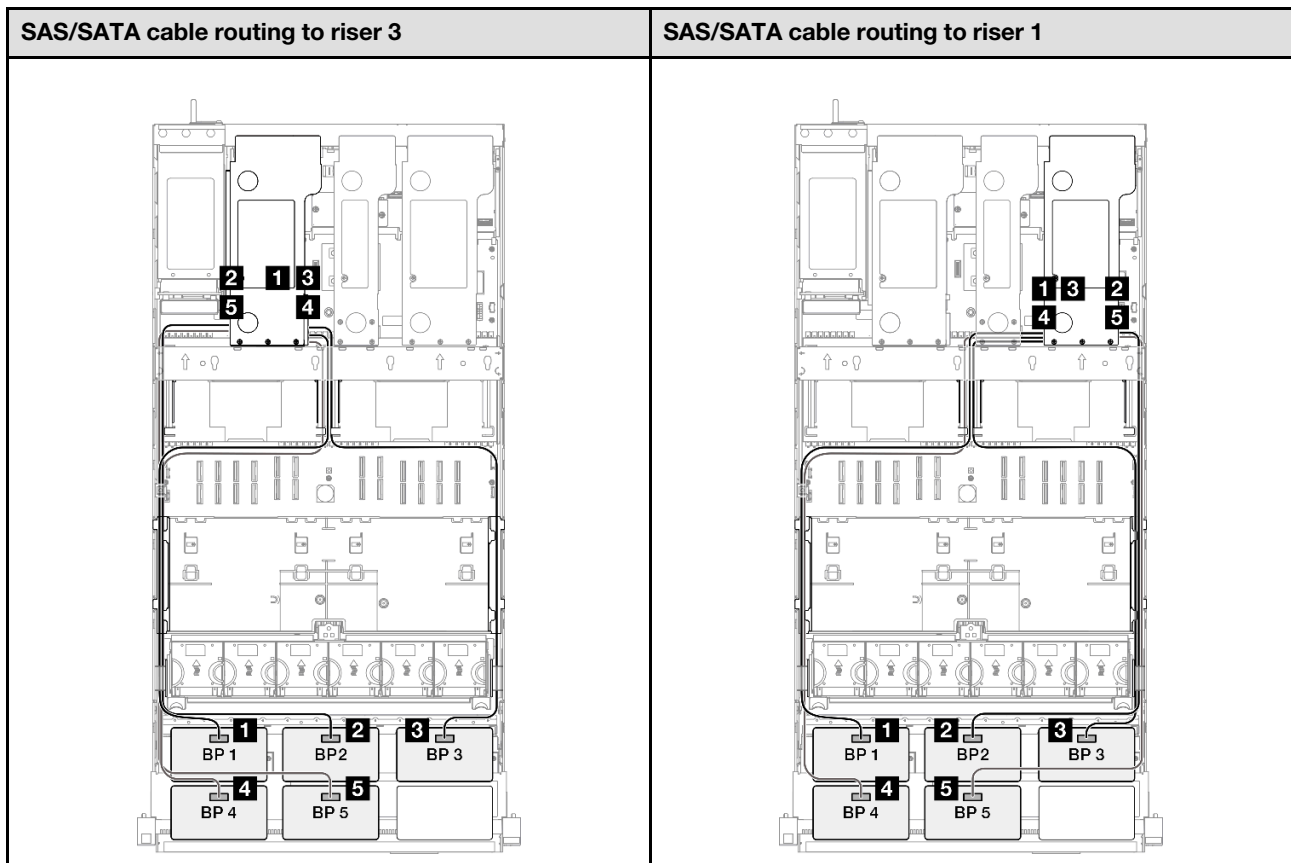
**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C0</li> <li>16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>5</b> BP5: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C1</li> <li>16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

### 32i + 32i RAID adapter

**NVMe cable routing**

From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>8</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>5</b> BP5: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

## 2 x AnyBay + 4 x SAS/SATA backplanes

Use this section to understand the signal cable routing for two AnyBay backplanes and four SAS/SATA backplanes.

### Notes:

- Ensure that you observe the installation rules and sequence order in [“PCIe riser and adapter installation rules and order”](#) on page 14 and [“Drive backplane installation rules and order”](#) on page 13.
- For more information on the power cable routing, see [“2.5-inch drive backplane power cable routing”](#) on page 254.
- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

- 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.

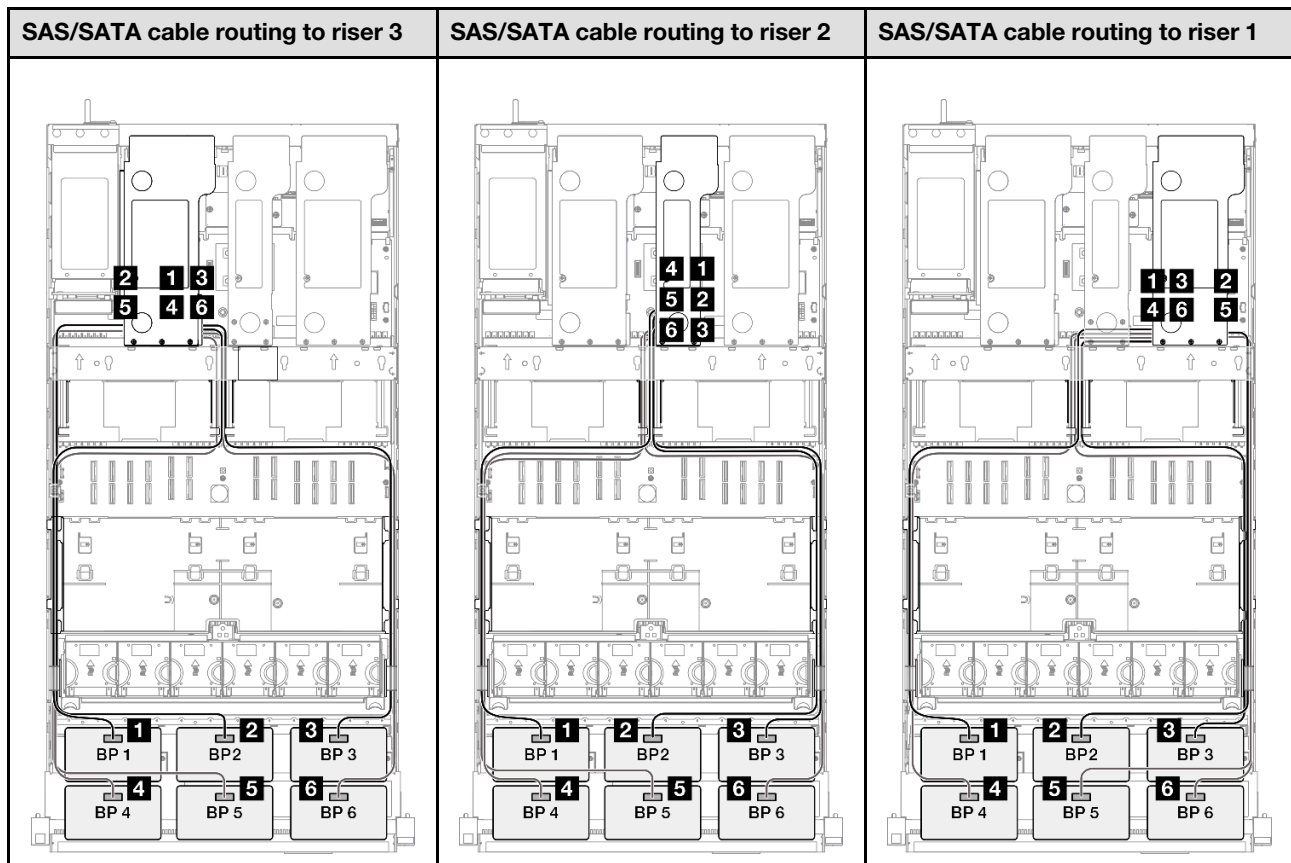
This configuration contains the following storage controller combinations:

- “16i + 16i + 16i RAID/HBA adapter” on page 346
- “8i + 16i + 32i RAID/HBA adapter” on page 348
- “32i + 32i RAID adapter” on page 350

### 16i + 16i + 16i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>8</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)



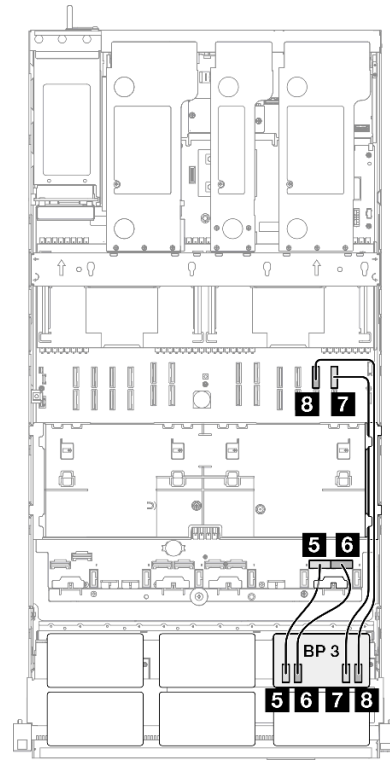
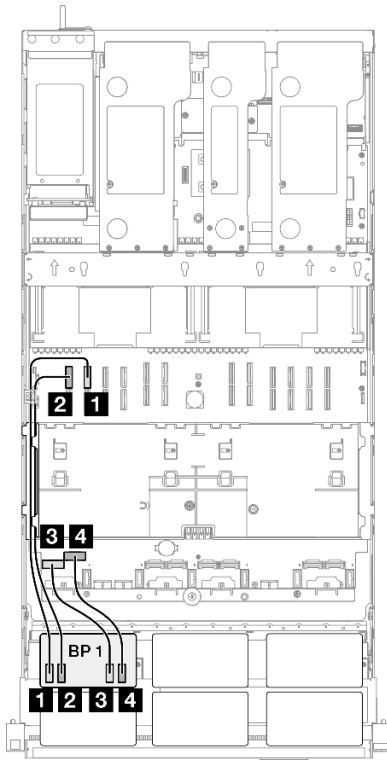


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

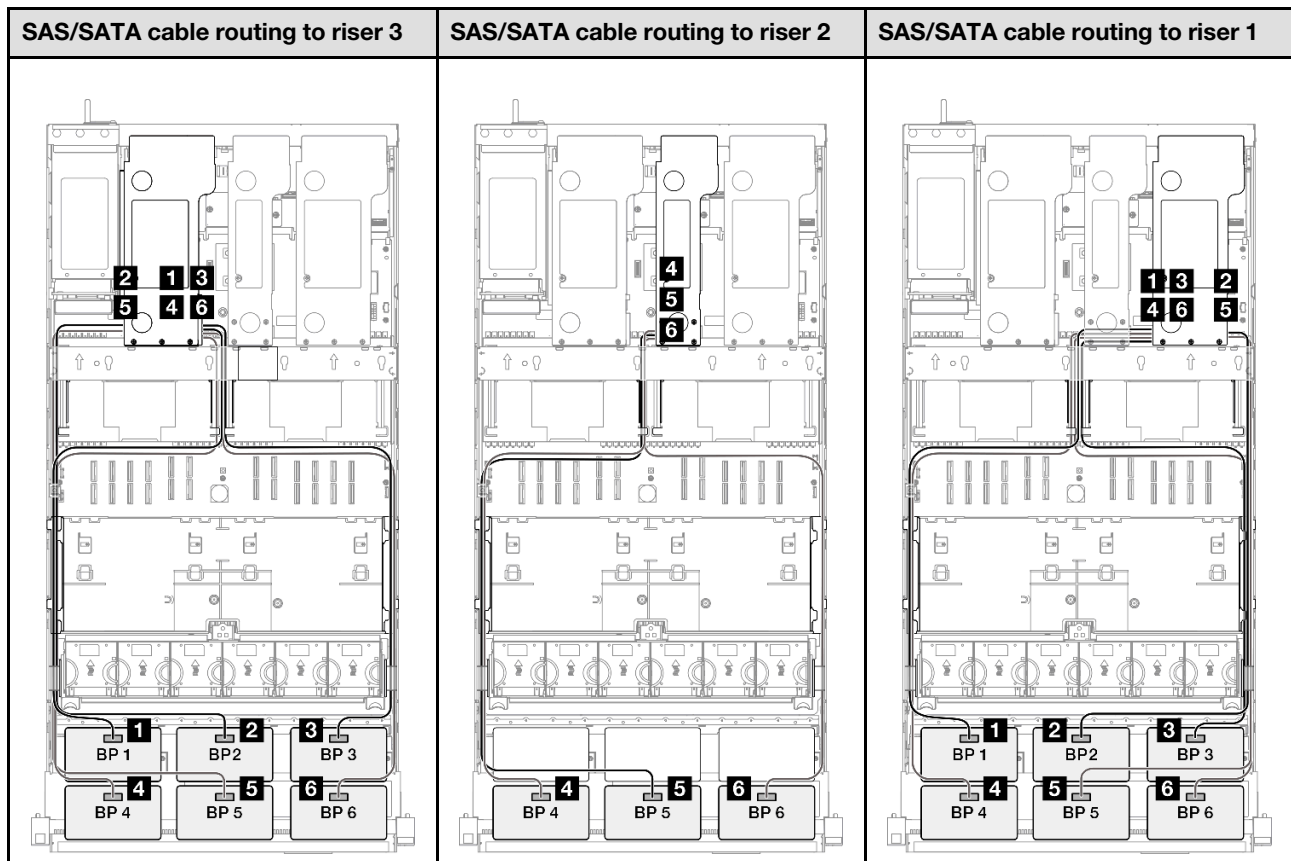
From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C0</li> <li>16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C1</li> <li>16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C0</li> <li>16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C1</li> <li>16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>5</b> BP5: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C0</li> <li>16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>6</b> BP6: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C1</li> <li>16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

## 8i + 16i + 32i RAID/HBA adapter

### NVMe cable routing



From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>8</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)



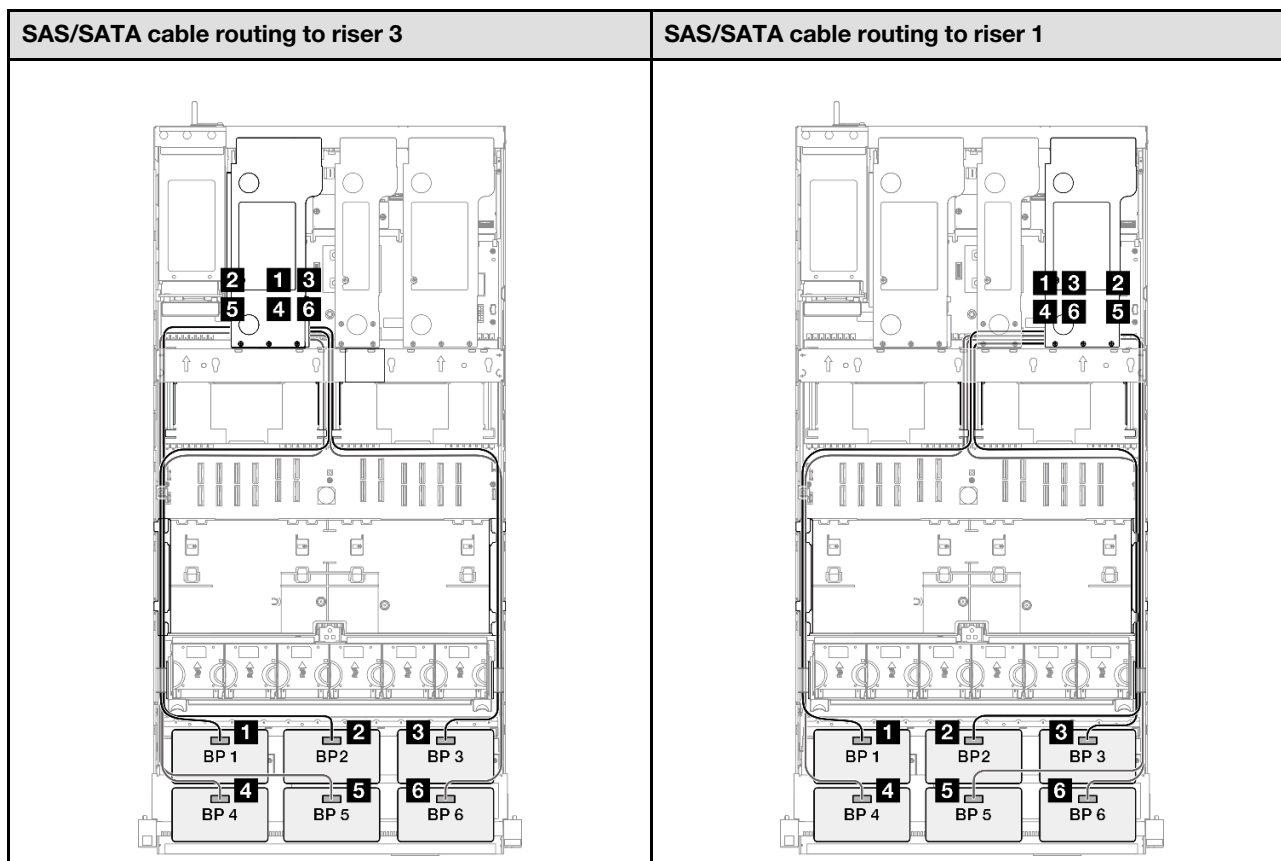
**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C0</li> <li>16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>5</b> BP5: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C1</li> <li>16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>6</b> BP6: SAS/SATA	<ul style="list-style-type: none"> <li>8i Gen 4: C0</li> <li>8i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

### 32i + 32i RAID adapter

**NVMe cable routing**

From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>8</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>5</b> BP5: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>6</b> BP6: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

### 3 x AnyBay backplanes

Use this section to understand the signal cable routing for three AnyBay backplanes.

#### Notes:

- Ensure that you observe the installation rules and sequence order in [“PCIe riser and adapter installation rules and order” on page 14](#) and [“Drive backplane installation rules and order” on page 13](#).
- For more information on the power cable routing, see [“2.5-inch drive backplane power cable routing” on page 254](#).

- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.
- 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.

This configuration contains the following storage controller combinations:

- “No RAID/HBA adapters” on page 352
- “8i + 16i RAID/HBA adapter” on page 353
- “8i + 16i RAID adapter (Tri-mode)” on page 355
- “16i + 16i RAID/HBA adapter” on page 356
- “16i + 16i RAID adapter (Tri-mode)” on page 358
- “32i RAID adapter” on page 359

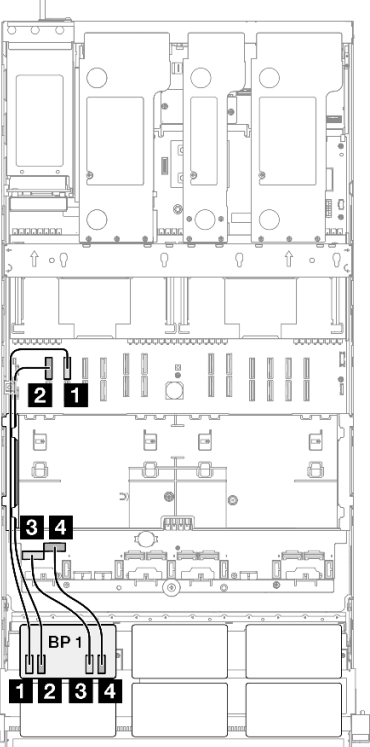
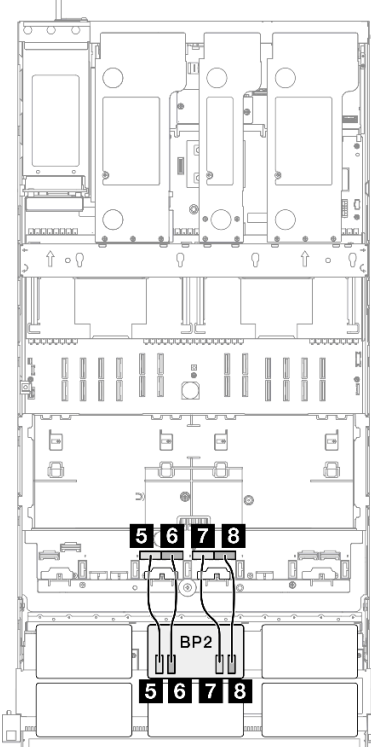
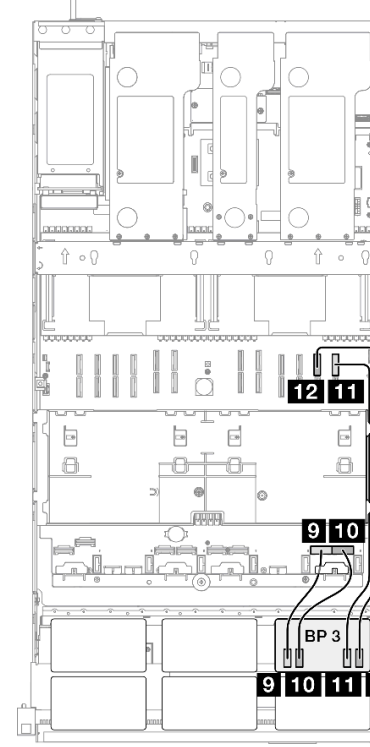
### No RAID/HBA adapters

**Note:** The AnyBay backplanes are used as pure NVMe backplanes when no RAID/HBA adapters are installed.

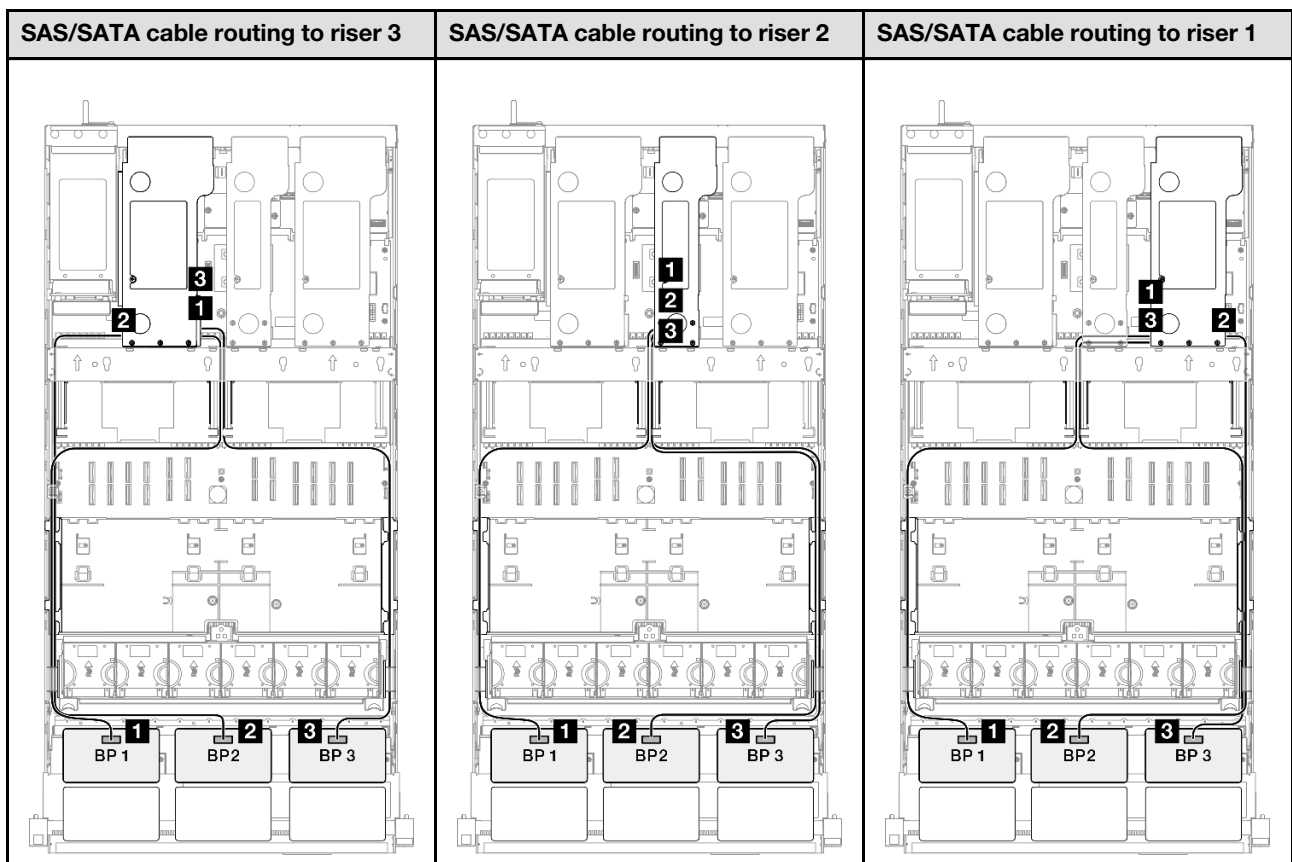
NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP2: NVMe 0-1	System board: NVMe 3	MCIO x8 to Swift x8 (190 mm)

From	To	Cable
<b>6</b> BP2: NVMe 2-3	System board: NVMe 4	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP2: NVMe 4-5	System board: NVMe 5	MCIO x8 to Swift x8 (190 mm)
<b>8</b> BP2: NVMe 6-7	System board: NVMe 6	MCIO x8 to Swift x8 (190 mm)
<b>9</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>10</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>11</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>12</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)

### 8i + 16i RAID/HBA adapter

NVMe cable routing		
		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP2: NVMe 0-1	System board: NVMe 3	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP2: NVMe 2-3	System board: NVMe 4	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP2: NVMe 4-5	System board: NVMe 5	MCIO x8 to Swift x8 (190 mm)

From	To	Cable
<b>8</b> BP2: NVMe 6-7	System board: NVMe 6	MCIO x8 to Swift x8 (190 mm)
<b>9</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>10</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>11</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>12</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)

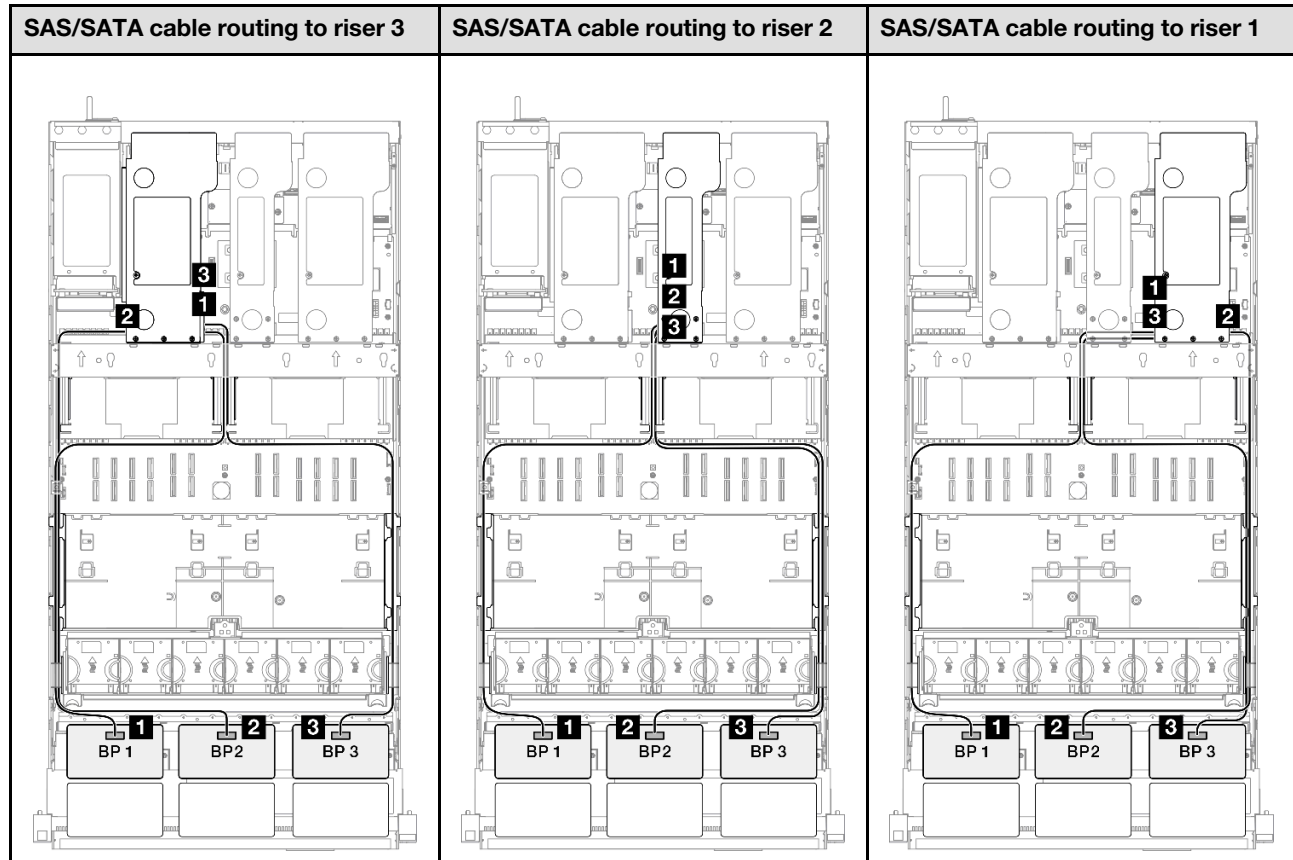


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 8i Gen 4: C0</li> <li>• 8i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>



### 8i + 16i RAID adapter (Tri-mode)

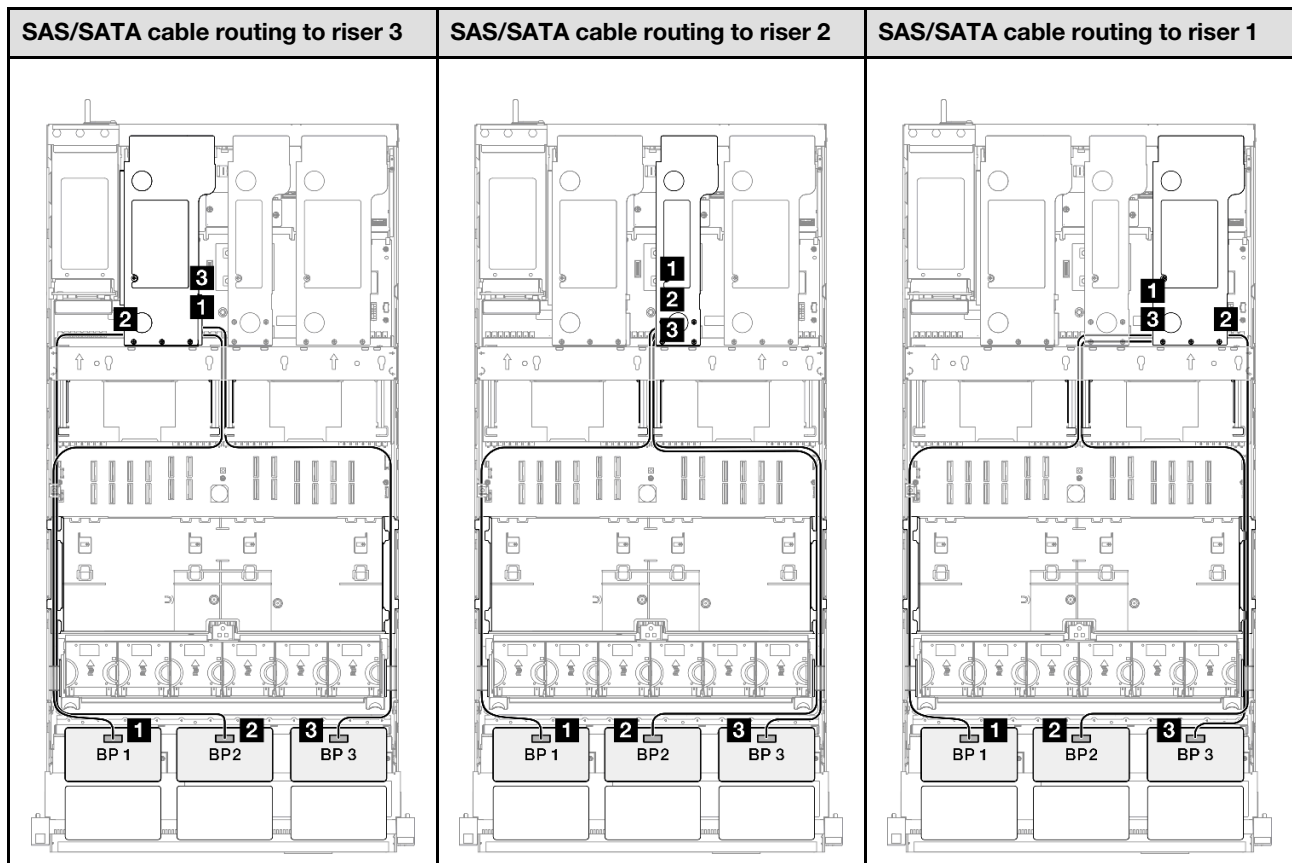


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	16i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	16i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	8i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

## 16i + 16i RAID/HBA adapter

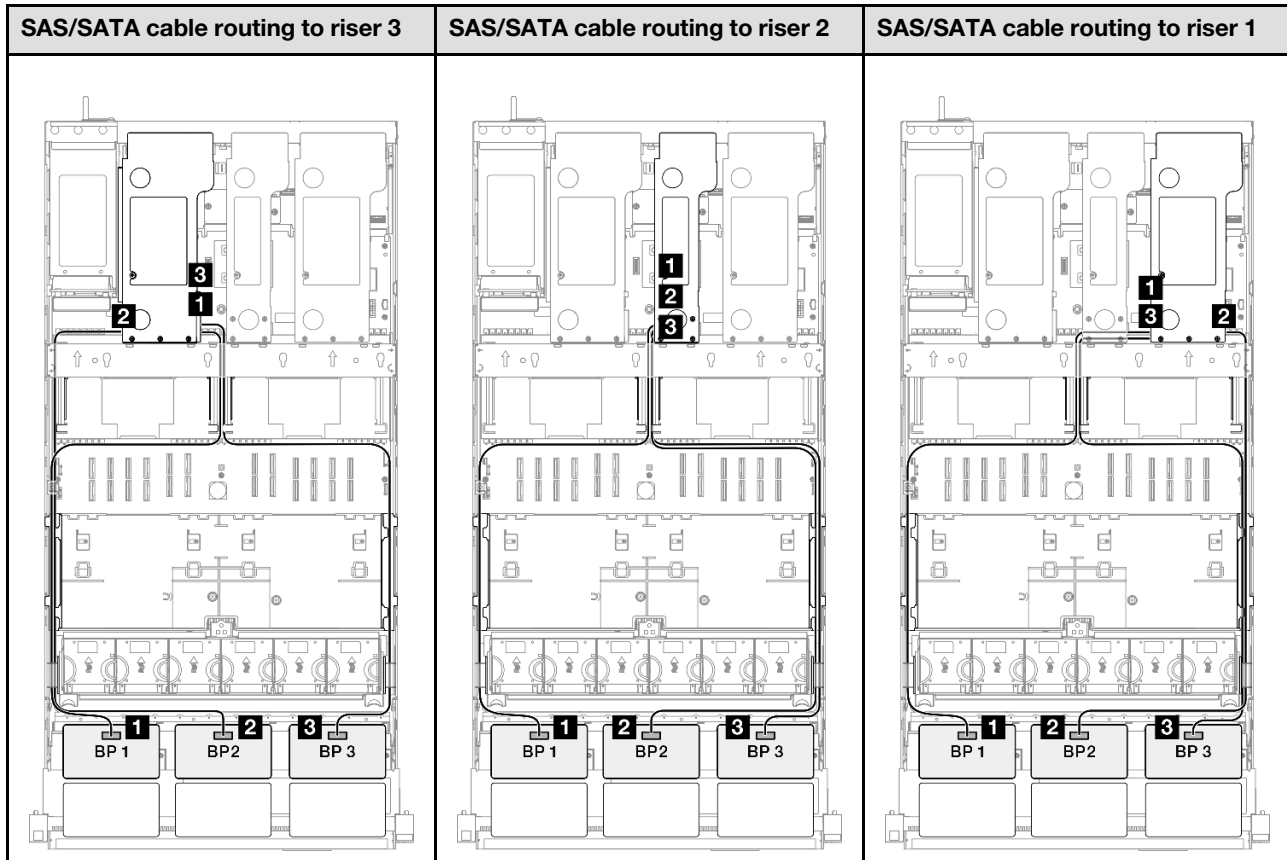
NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP2: NVMe 0-1	System board: NVMe 3	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP2: NVMe 2-3	System board: NVMe 4	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP2: NVMe 4-5	System board: NVMe 5	MCIO x8 to Swift x8 (190 mm)
<b>8</b> BP2: NVMe 6-7	System board: NVMe 6	MCIO x8 to Swift x8 (190 mm)
<b>9</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>10</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>11</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>12</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

## 16i + 16i RAID adapter (Tri-mode)

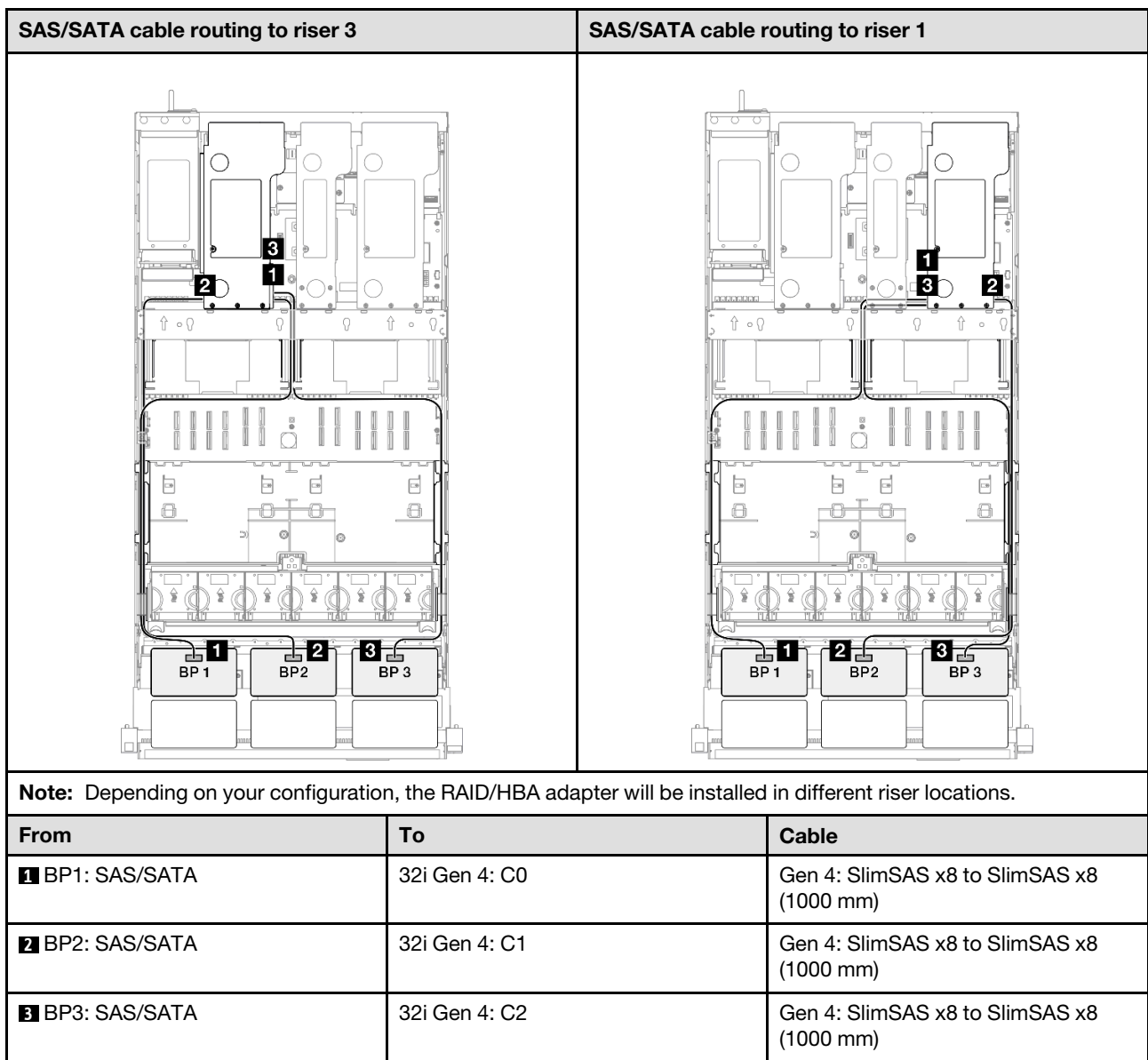


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	16i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	16i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	16i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

### 32i RAID adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP2: NVMe 0-1	System board: NVMe 3	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP2: NVMe 2-3	System board: NVMe 4	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP2: NVMe 4-5	System board: NVMe 5	MCIO x8 to Swift x8 (190 mm)
<b>8</b> BP2: NVMe 6-7	System board: NVMe 6	MCIO x8 to Swift x8 (190 mm)
<b>9</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>10</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>11</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>12</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)



### 3 x AnyBay + 1 x SAS/SATA backplane

Use this section to understand the signal cable routing for three AnyBay backplanes and one SAS/SATA backplane.

#### Notes:

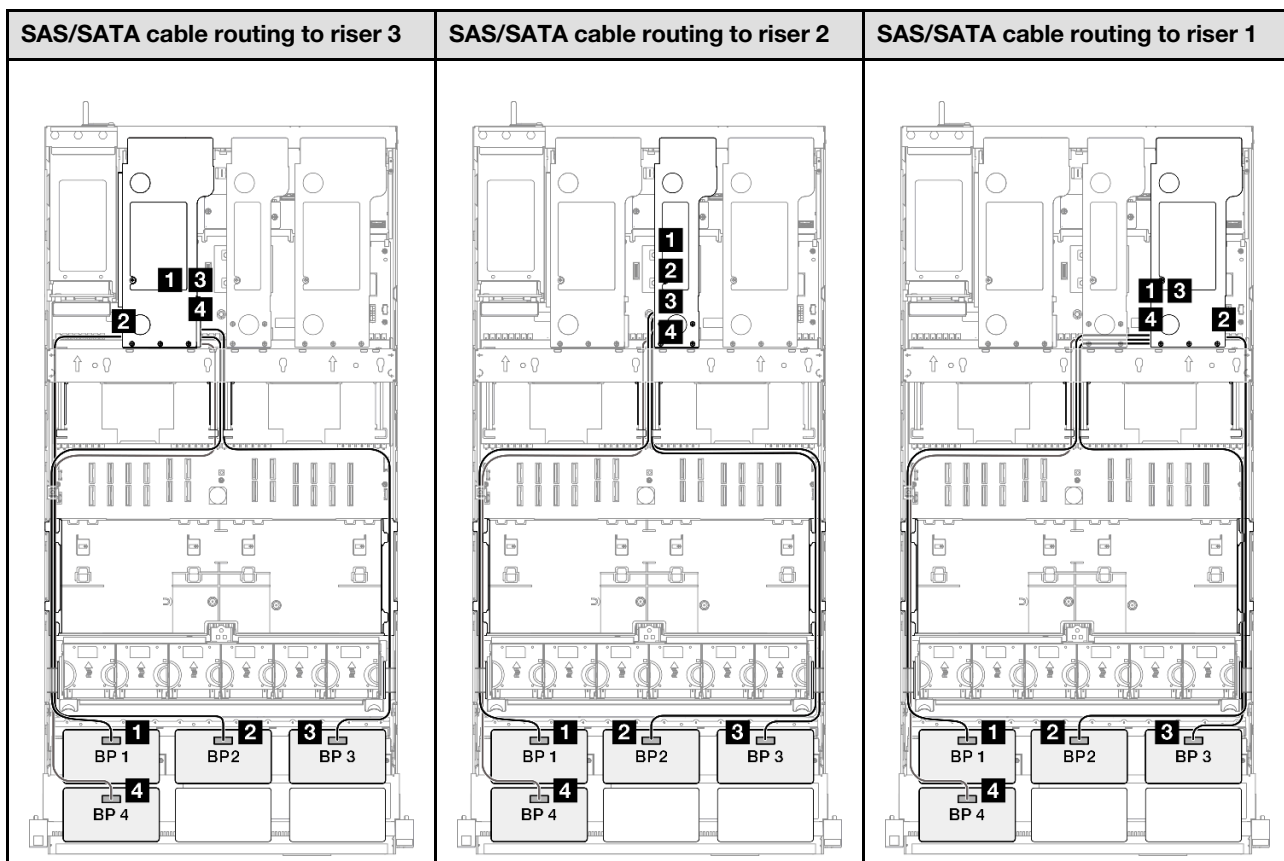
- Ensure that you observe the installation rules and sequence order in [“PCIe riser and adapter installation rules and order”](#) on page 14 and [“Drive backplane installation rules and order”](#) on page 13.
- For more information on the power cable routing, see [“2.5-inch drive backplane power cable routing”](#) on page 254.
- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.
- 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.

This configuration contains the following storage controller combinations:

- “16i + 16i RAID/HBA adapter” on page 361
- “8i + 32i RAID/HBA adapter” on page 363
- “16i + 32i RAID/HBA adapter” on page 365
- “32i + 32i RAID adapter” on page 367

### 16i + 16i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP2: NVMe 0-1	System board: NVMe 3	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP2: NVMe 2-3	System board: NVMe 4	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP2: NVMe 4-5	System board: NVMe 5	MCIO x8 to Swift x8 (190 mm)
<b>8</b> BP2: NVMe 6-7	System board: NVMe 6	MCIO x8 to Swift x8 (190 mm)
<b>9</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>10</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>11</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>12</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

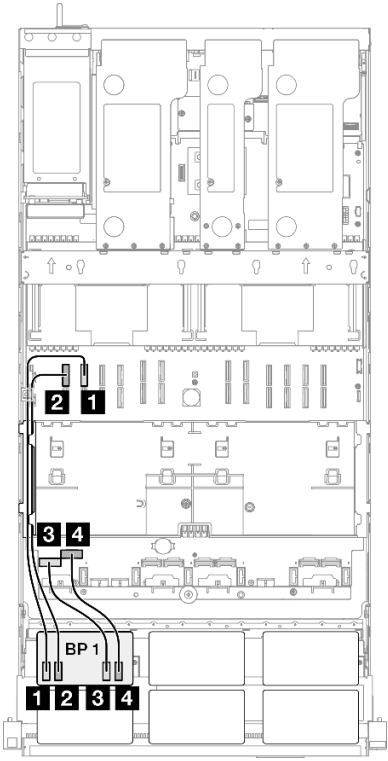
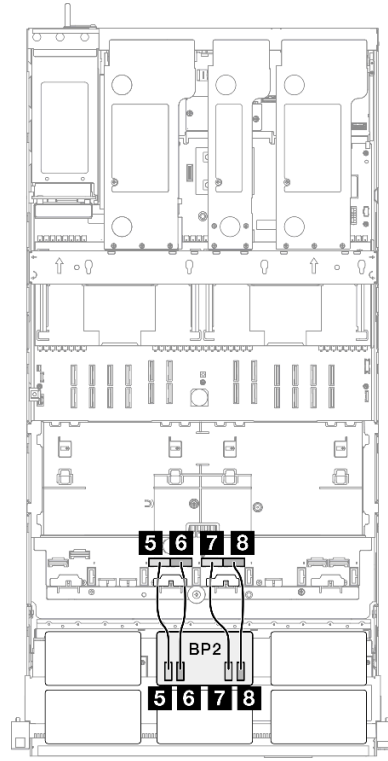
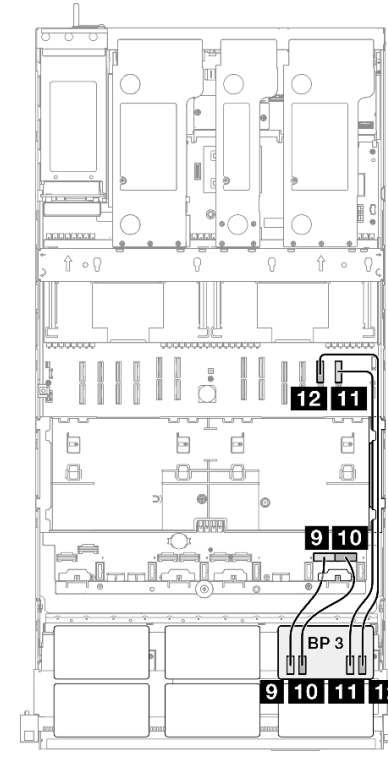


## 8i + 32i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP2: NVMe 0-1	System board: NVMe 3	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP2: NVMe 2-3	System board: NVMe 4	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP2: NVMe 4-5	System board: NVMe 5	MCIO x8 to Swift x8 (190 mm)
<b>8</b> BP2: NVMe 6-7	System board: NVMe 6	MCIO x8 to Swift x8 (190 mm)
<b>9</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>10</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>11</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>12</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)

SAS/SATA cable routing to riser 3	SAS/SATA cable routing to riser 2	SAS/SATA cable routing to riser 1
<p><b>Note:</b> Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.</p>		
From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 8i Gen 4: C0</li> <li>• 8i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

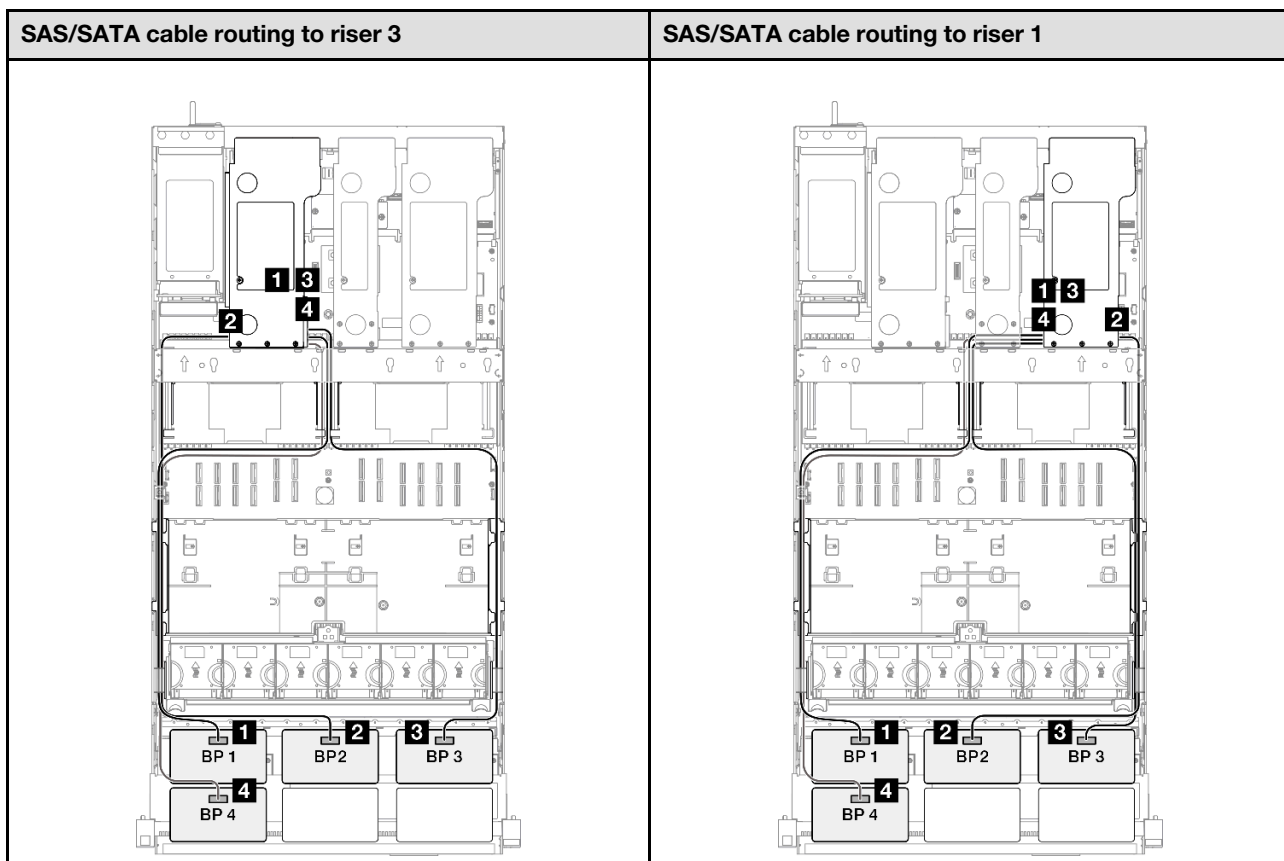
## 16i + 32i RAID/HBA adapter

NVMe cable routing		
		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP2: NVMe 0-1	System board: NVMe 3	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP2: NVMe 2-3	System board: NVMe 4	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP2: NVMe 4-5	System board: NVMe 5	MCIO x8 to Swift x8 (190 mm)
<b>8</b> BP2: NVMe 6-7	System board: NVMe 6	MCIO x8 to Swift x8 (190 mm)
<b>9</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>10</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>11</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>12</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)

SAS/SATA cable routing to riser 3	SAS/SATA cable routing to riser 2	SAS/SATA cable routing to riser 1
<p><b>Note:</b> Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.</p>		
From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C0</li> <li>16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

### 32i + 32i RAID adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP2: NVMe 0-1	System board: NVMe 3	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP2: NVMe 2-3	System board: NVMe 4	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP2: NVMe 4-5	System board: NVMe 5	MCIO x8 to Swift x8 (190 mm)
<b>8</b> BP2: NVMe 6-7	System board: NVMe 6	MCIO x8 to Swift x8 (190 mm)
<b>9</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>10</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>11</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>12</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

### 3 x AnyBay + 2 x SAS/SATA backplanes

Use this section to understand the signal cable routing for three AnyBay backplanes and two SAS/SATA backplanes.

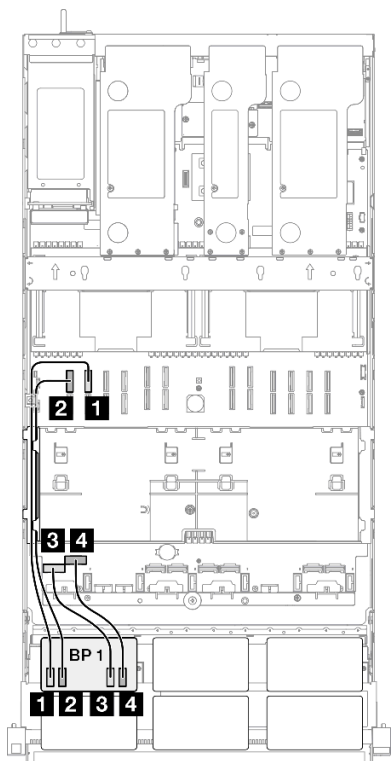
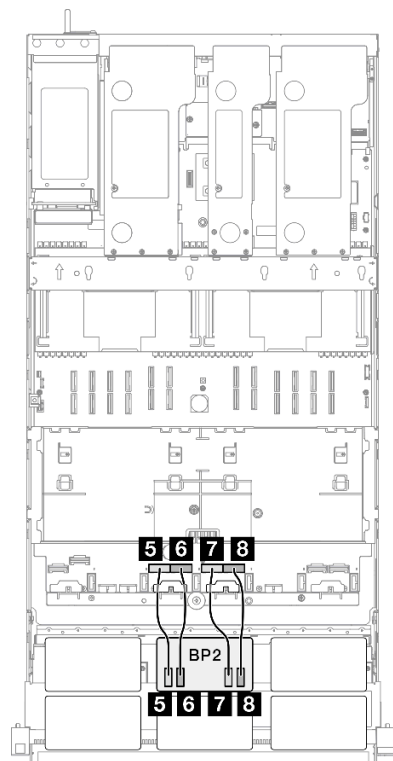
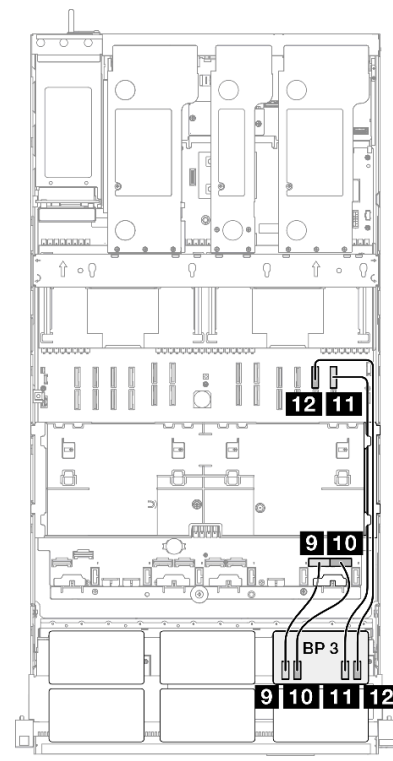
#### Notes:

- Ensure that you observe the installation rules and sequence order in [“PCIe riser and adapter installation rules and order” on page 14](#) and [“Drive backplane installation rules and order” on page 13](#).
- For more information on the power cable routing, see [“2.5-inch drive backplane power cable routing” on page 254](#).
- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.
- 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.

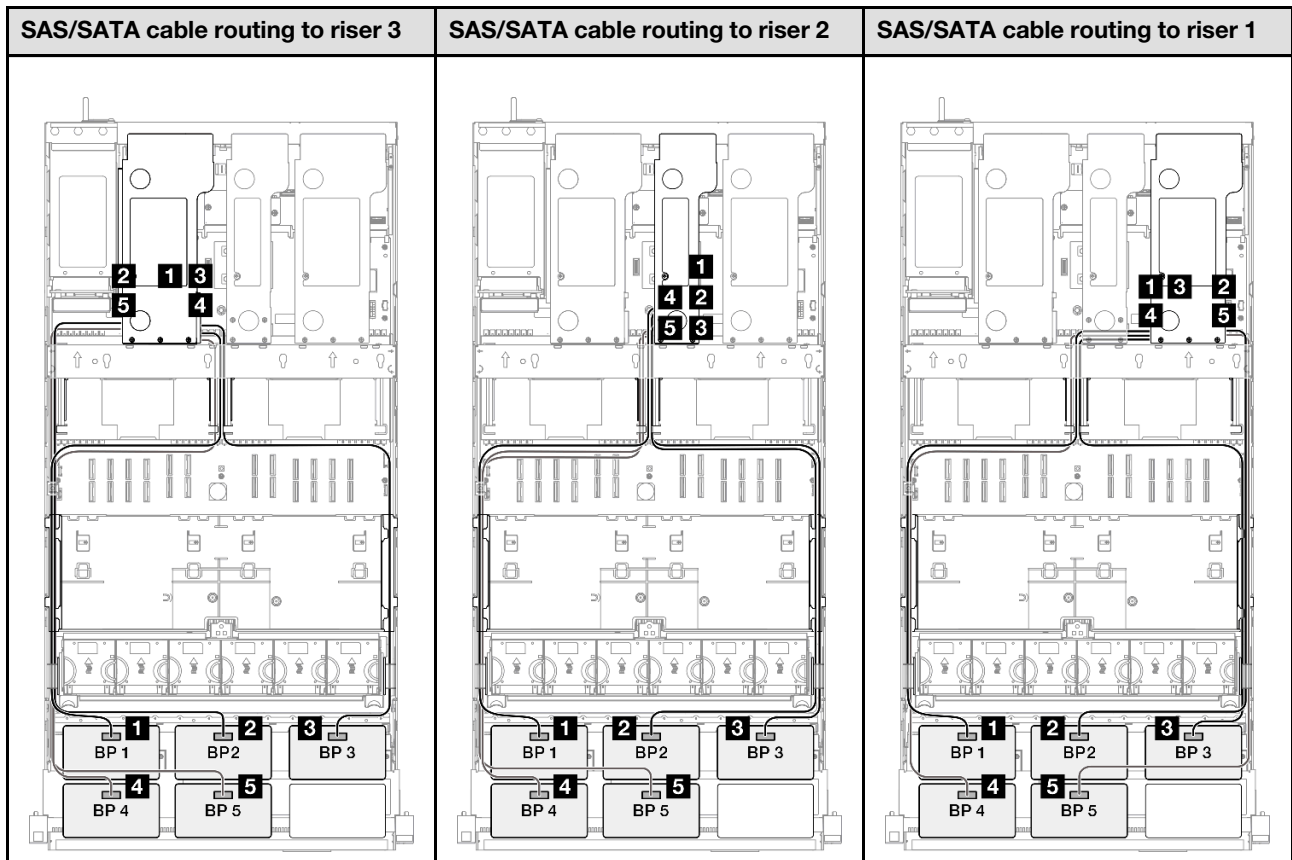
This configuration contains the following storage controller combinations:

- “8i + 16i + 16i RAID/HBA adapter” on page 369
- “16i + 16i + 16i RAID/HBA adapter” on page 371
- “16i + 32i RAID/HBA adapter” on page 373
- “32i + 32i RAID adapter” on page 375

### 8i + 16i + 16i RAID/HBA adapter

NVMe cable routing		
		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP2: NVMe 0-1	System board: NVMe 3	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP2: NVMe 2-3	System board: NVMe 4	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP2: NVMe 4-5	System board: NVMe 5	MCIO x8 to Swift x8 (190 mm)
<b>8</b> BP2: NVMe 6-7	System board: NVMe 6	MCIO x8 to Swift x8 (190 mm)
<b>9</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>10</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)

From	To	Cable
<b>11</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>12</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

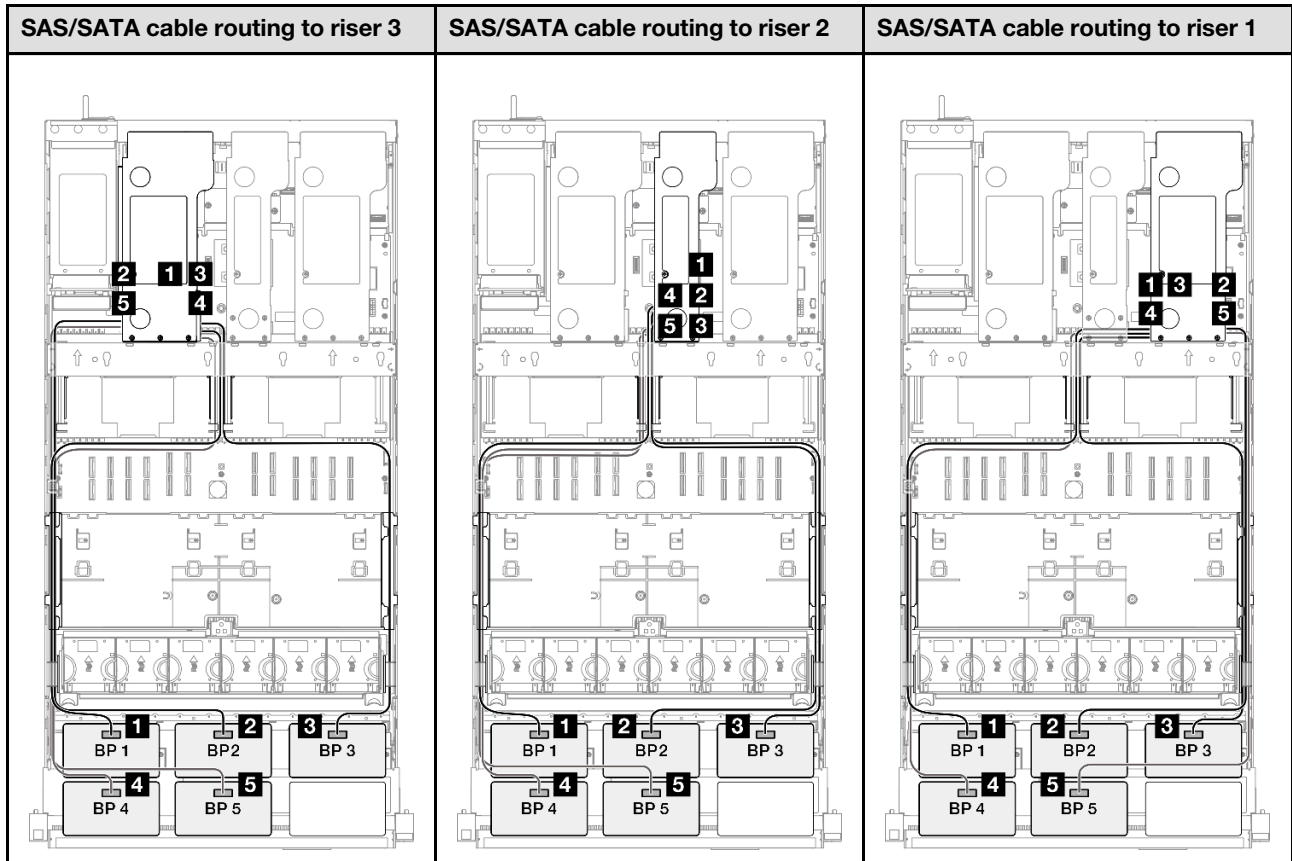


From	To	Cable
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>5</b> BP5: SAS/SATA	<ul style="list-style-type: none"> <li>• 8i Gen 4: C0</li> <li>• 8i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

### 16i + 16i + 16i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP2: NVMe 0-1	System board: NVMe 3	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP2: NVMe 2-3	System board: NVMe 4	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP2: NVMe 4-5	System board: NVMe 5	MCIO x8 to Swift x8 (190 mm)
<b>8</b> BP2: NVMe 6-7	System board: NVMe 6	MCIO x8 to Swift x8 (190 mm)
<b>9</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)

From	To	Cable
<b>10</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>11</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>12</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

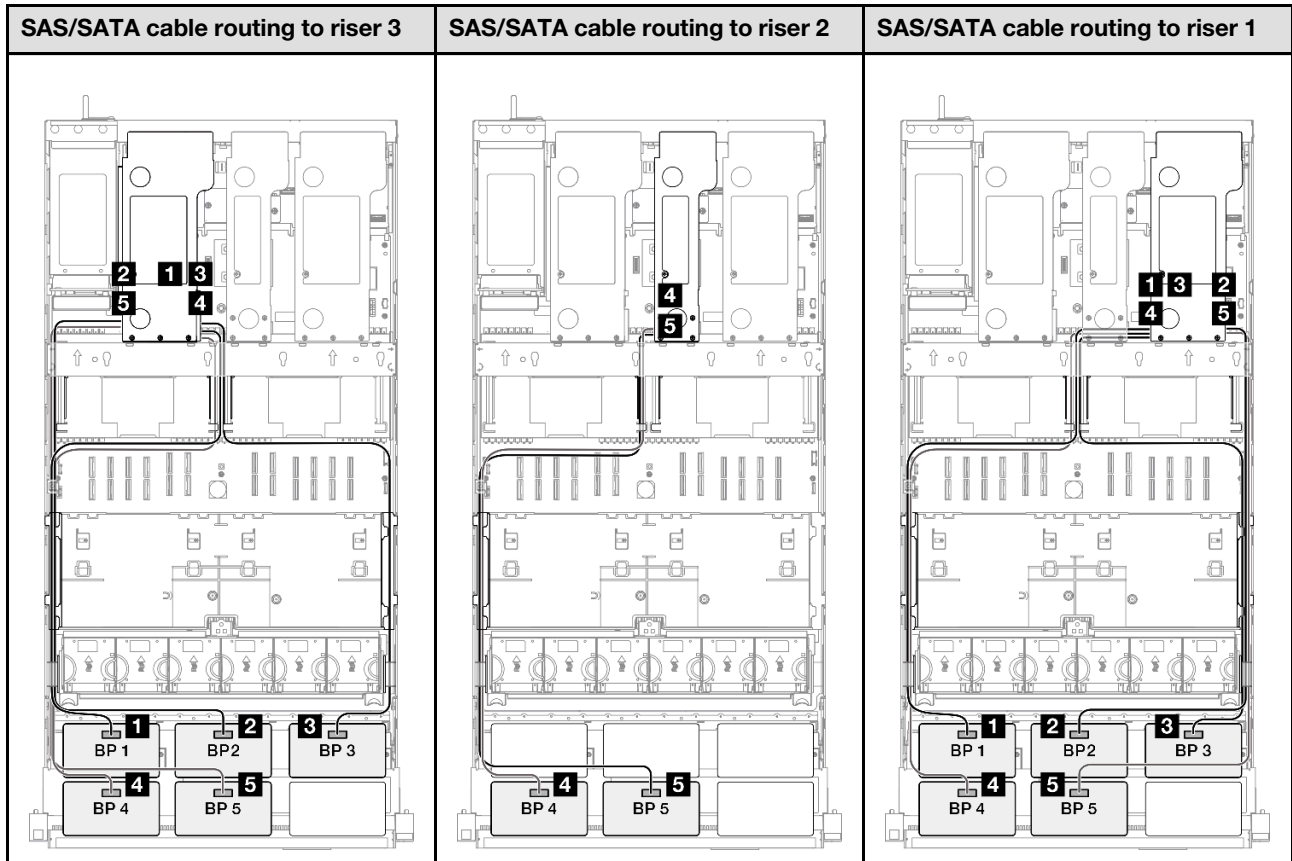
From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

From	To	Cable
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>5</b> BP5: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

### 16i + 32i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP2: NVMe 0-1	System board: NVMe 3	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP2: NVMe 2-3	System board: NVMe 4	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP2: NVMe 4-5	System board: NVMe 5	MCIO x8 to Swift x8 (190 mm)
<b>8</b> BP2: NVMe 6-7	System board: NVMe 6	MCIO x8 to Swift x8 (190 mm)
<b>9</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)

From	To	Cable
<b>10</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>11</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>12</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)

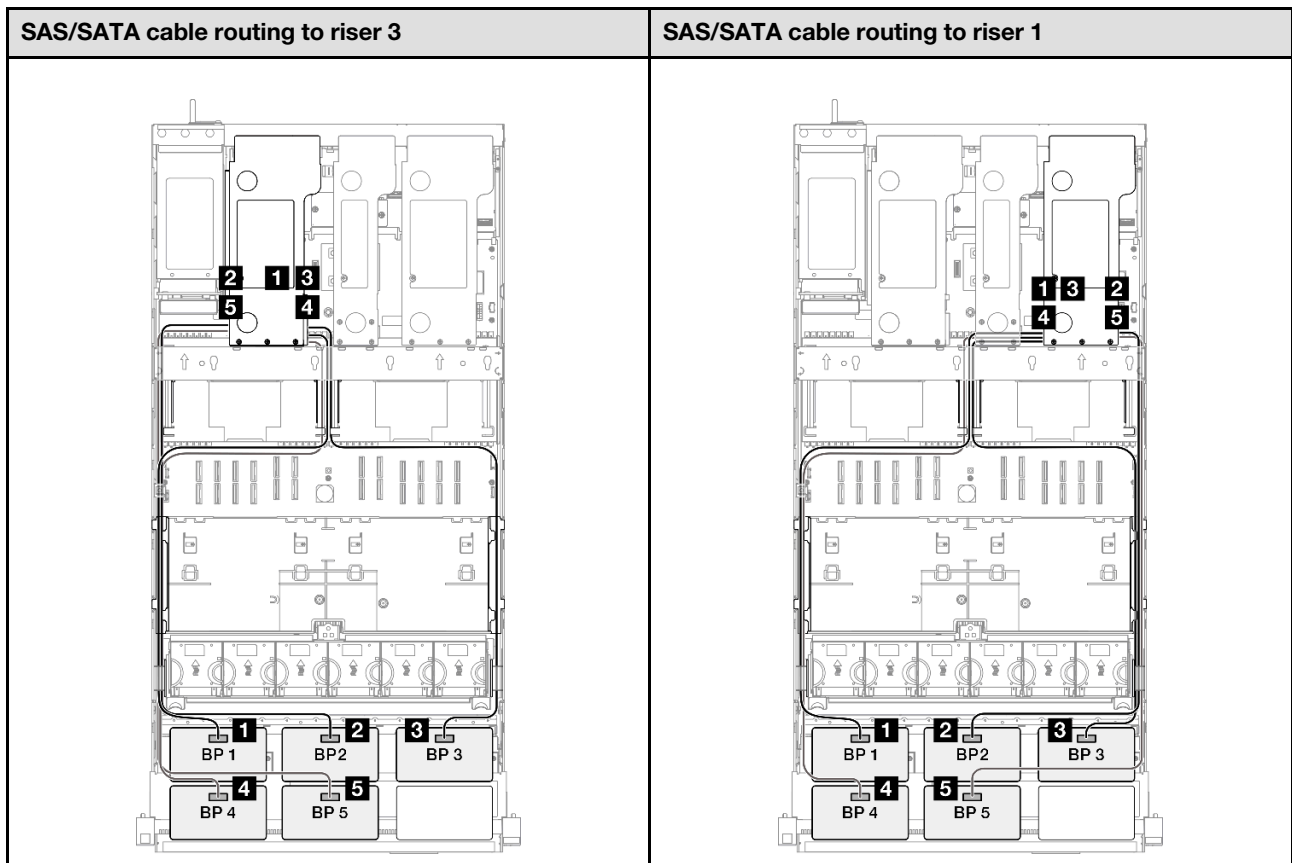


**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C0</li> <li>16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>5</b> BP5: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C1</li> <li>16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

### 32i + 32i RAID adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP2: NVMe 0-1	System board: NVMe 3	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP2: NVMe 2-3	System board: NVMe 4	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP2: NVMe 4-5	System board: NVMe 5	MCIO x8 to Swift x8 (190 mm)
<b>8</b> BP2: NVMe 6-7	System board: NVMe 6	MCIO x8 to Swift x8 (190 mm)
<b>9</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>10</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>11</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>12</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>5</b> BP5: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

### 3 x AnyBay + 3 x SAS/SATA backplanes

Use this section to understand the signal cable routing for three AnyBay backplanes and three SAS/SATA backplanes.

#### Notes:

- Ensure that you observe the installation rules and sequence order in [“PCIe riser and adapter installation rules and order”](#) on page 14 and [“Drive backplane installation rules and order”](#) on page 13.
- For more information on the power cable routing, see [“2.5-inch drive backplane power cable routing”](#) on page 254.
- Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

- 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.

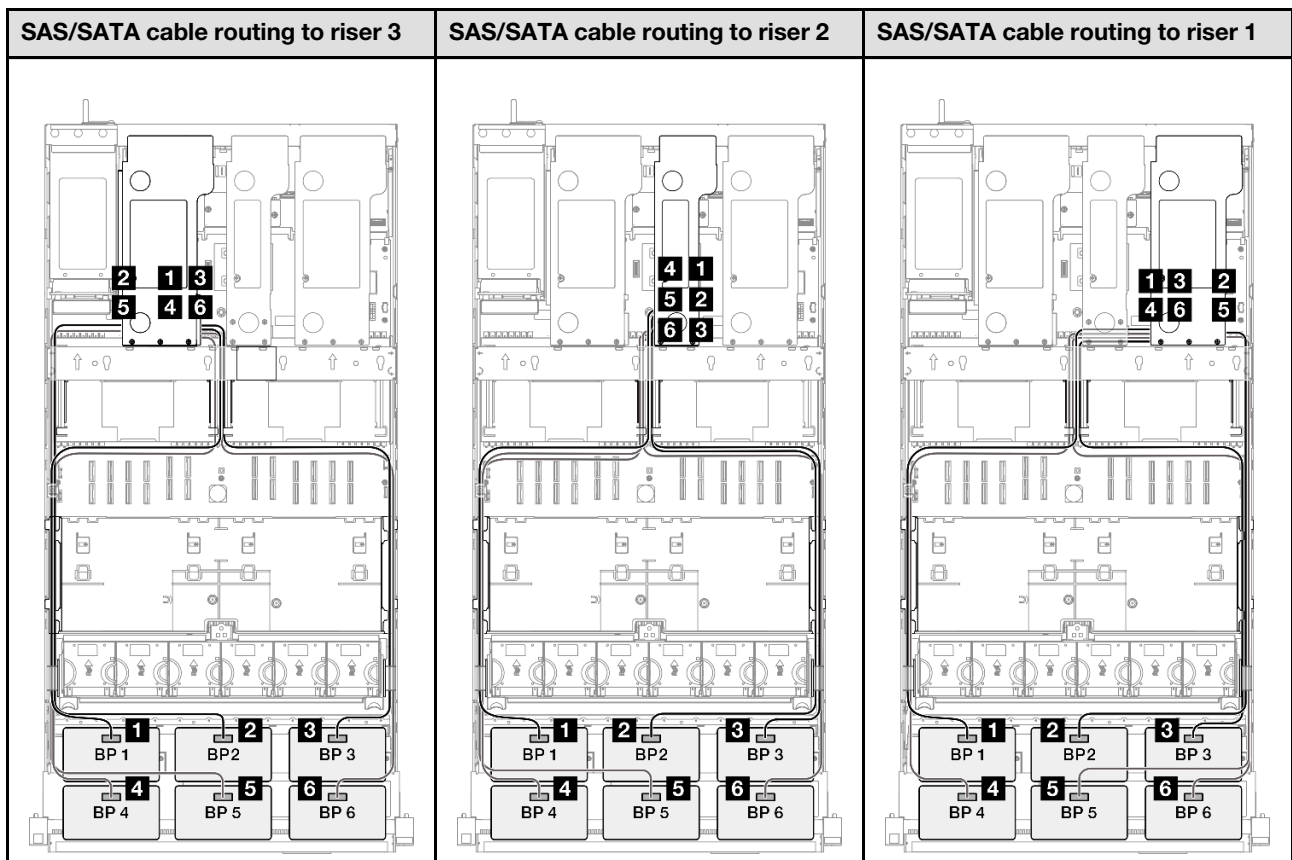
This configuration contains the following storage controller combinations:

- “16i + 16i + 16i RAID/HBA adapter” on page 377
- “8i + 16i + 32i RAID/HBA adapter” on page 379
- “32i + 32i RAID adapter” on page 381

### 16i + 16i + 16i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP2: NVMe 0-1	System board: NVMe 3	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP2: NVMe 2-3	System board: NVMe 4	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP2: NVMe 4-5	System board: NVMe 5	MCIO x8 to Swift x8 (190 mm)
<b>8</b> BP2: NVMe 6-7	System board: NVMe 6	MCIO x8 to Swift x8 (190 mm)
<b>9</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)
<b>10</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)

From	To	Cable
<b>11</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>12</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>2</b> BP2: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>3</b> BP3: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

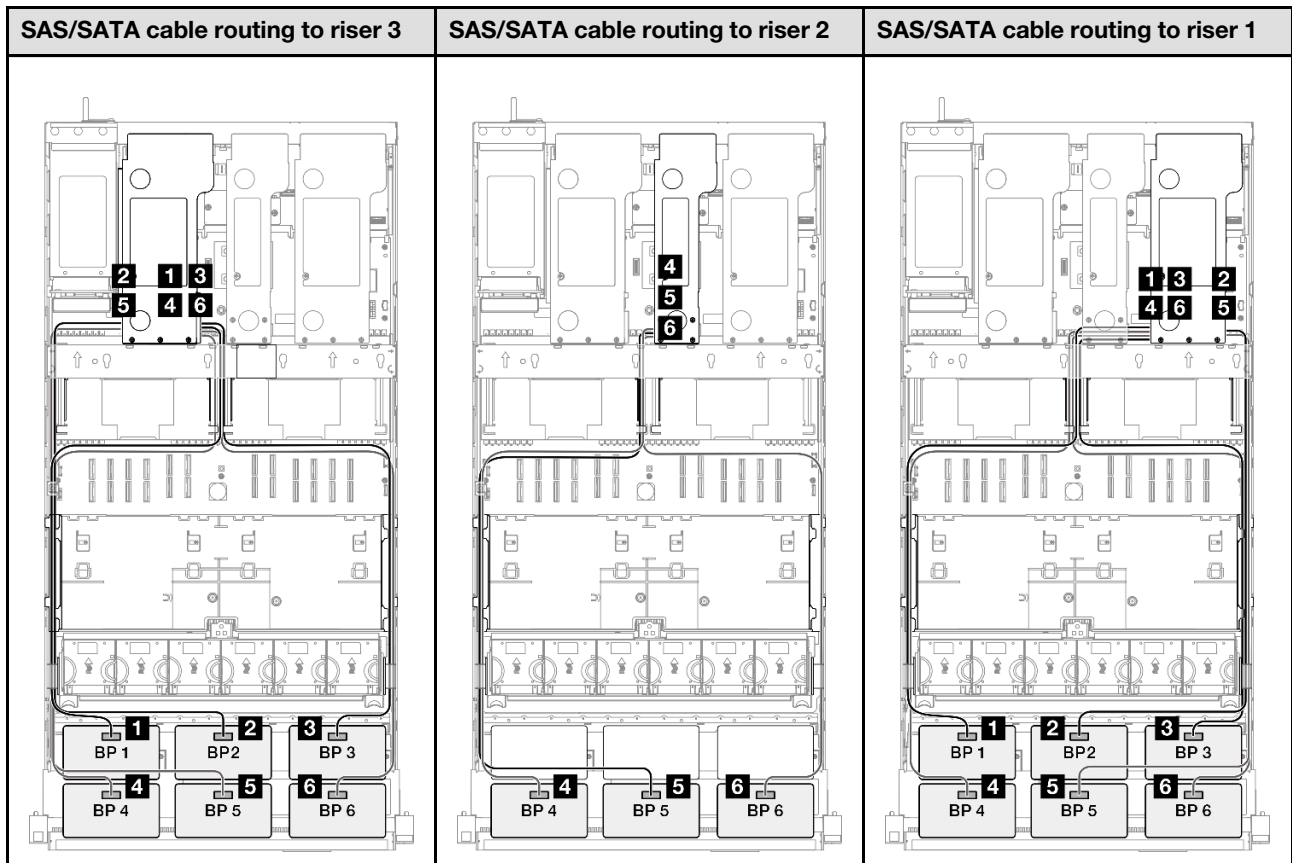


From	To	Cable
<b>5</b> BP5: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C0</li> <li>• 16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>6</b> BP6: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

### 8i + 16i + 32i RAID/HBA adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP2: NVMe 0-1	System board: NVMe 3	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP2: NVMe 2-3	System board: NVMe 4	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP2: NVMe 4-5	System board: NVMe 5	MCIO x8 to Swift x8 (190 mm)
<b>8</b> BP2: NVMe 6-7	System board: NVMe 6	MCIO x8 to Swift x8 (190 mm)
<b>9</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)

From	To	Cable
<b>10</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>11</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>12</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

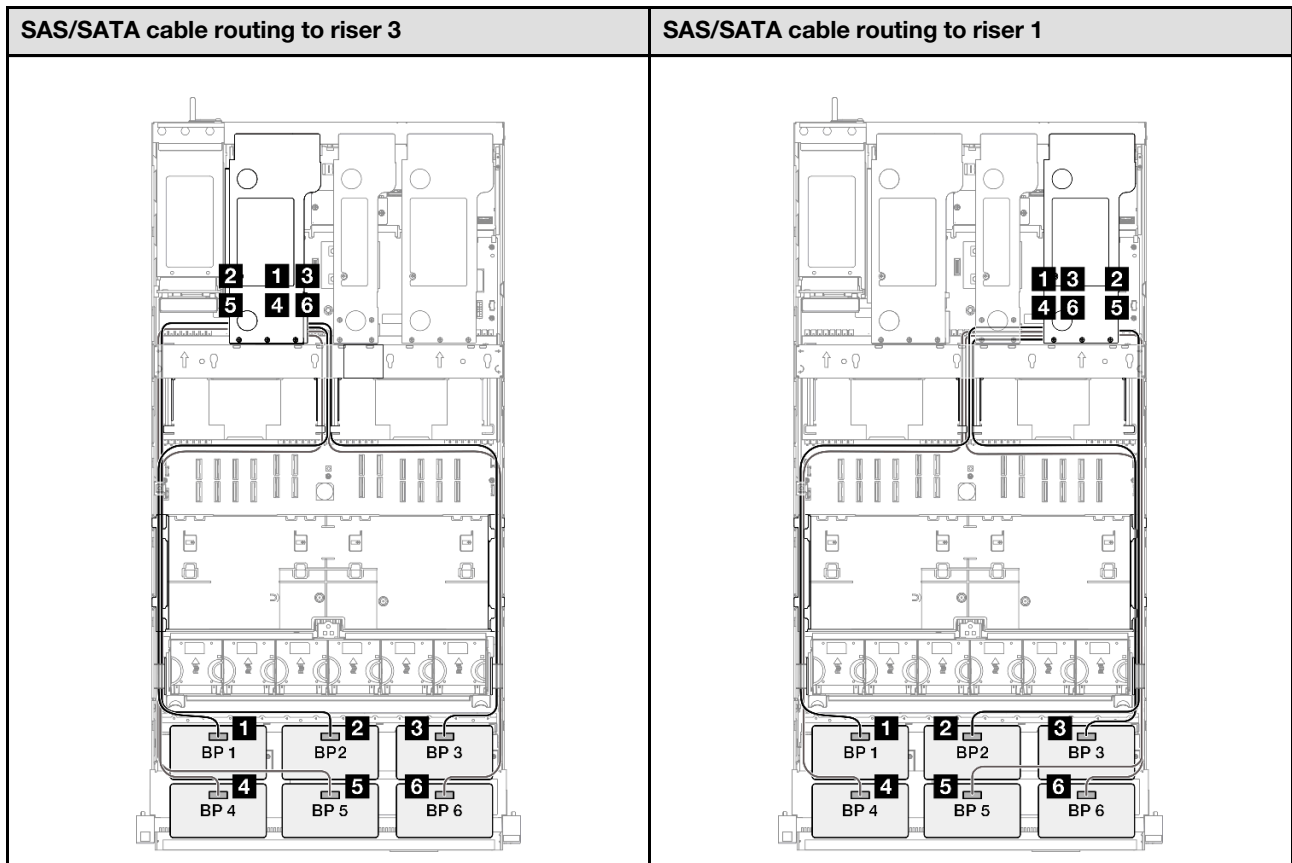
From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	<ul style="list-style-type: none"> <li>16i Gen 4: C0</li> <li>16i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

From	To	Cable
<b>5</b> BP5: SAS/SATA	<ul style="list-style-type: none"> <li>• 16i Gen 4: C1</li> <li>• 16i Gen 3: C2, C3</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>
<b>6</b> BP6: SAS/SATA	<ul style="list-style-type: none"> <li>• 8i Gen 4: C0</li> <li>• 8i Gen 3: C0, C1</li> </ul>	<ul style="list-style-type: none"> <li>• Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)</li> <li>• Gen 3: Mini-SAS HD x4*2 to SlimSAS x8 (1000 mm)</li> </ul>

### 32i + 32i RAID adapter

NVMe cable routing		
From	To	Cable
<b>1</b> BP1: NVMe 0-1	System board: NVMe 10	MCIO x8 to MCIO x8 (440 mm)
<b>2</b> BP1: NVMe 2-3	System board: NVMe 9	MCIO x8 to MCIO x8 (440 mm)
<b>3</b> BP1: NVMe 4-5	System board: NVMe 1	MCIO x8 to Swift x8 (190 mm)
<b>4</b> BP1: NVMe 6-7	System board: NVMe 2	MCIO x8 to Swift x8 (190 mm)
<b>5</b> BP2: NVMe 0-1	System board: NVMe 3	MCIO x8 to Swift x8 (190 mm)
<b>6</b> BP2: NVMe 2-3	System board: NVMe 4	MCIO x8 to Swift x8 (190 mm)
<b>7</b> BP2: NVMe 4-5	System board: NVMe 5	MCIO x8 to Swift x8 (190 mm)
<b>8</b> BP2: NVMe 6-7	System board: NVMe 6	MCIO x8 to Swift x8 (190 mm)
<b>9</b> BP3: NVMe 0-1	System board: NVMe 7	MCIO x8 to Swift x8 (190 mm)

From	To	Cable
<b>10</b> BP3: NVMe 2-3	System board: NVMe 8	MCIO x8 to Swift x8 (190 mm)
<b>11</b> BP3: NVMe 4-5	System board: NVMe 12	MCIO x8 to MCIO x8 (440 mm)
<b>12</b> BP3: NVMe 6-7	System board: NVMe 11	MCIO x8 to MCIO x8 (440 mm)



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> BP1: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>2</b> BP2: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>3</b> BP3: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>4</b> BP4: SAS/SATA	32i Gen 4: C0	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>5</b> BP5: SAS/SATA	32i Gen 4: C1	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)
<b>6</b> BP6: SAS/SATA	32i Gen 4: C2	Gen 4: SlimSAS x8 to SlimSAS x8 (1000 mm)

## 7mm drive backplane cable routing

Use the section to understand the cable routing for the 7mm drive backplane.

### 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.

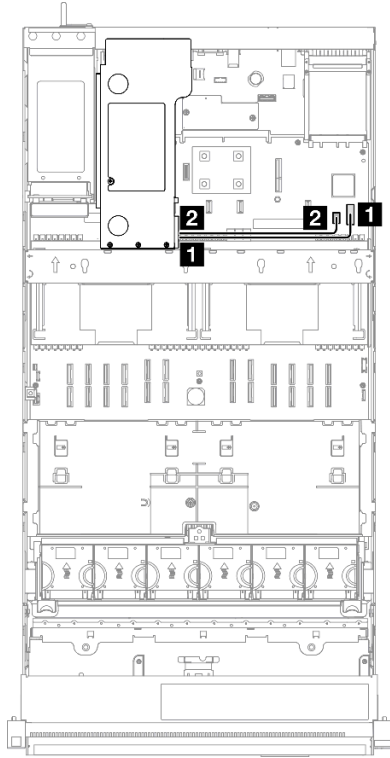


Figure 211. Cable routing for 7mm drive backplane

From	To	Cable
<b>1</b> 7mm drive backplane: power connector	System board assembly: 7mm drive power connector	SlimSAS x4 to SlimSAS x4 (340 mm)
<b>2</b> 7mm drive backplane: signal connector	System board assembly: 7mm drive/ M.2 signal connector	Power 2x8 to power 2x6 (340 mm)

## External diagnostic handset connector cable routing

Use the section to understand the cable routing for the external diagnostic handset connector.

### 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.

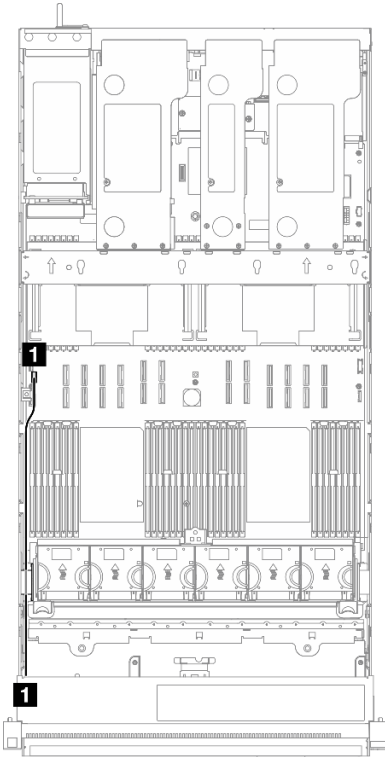


Figure 212. Cable routing for External diagnostic handset connector

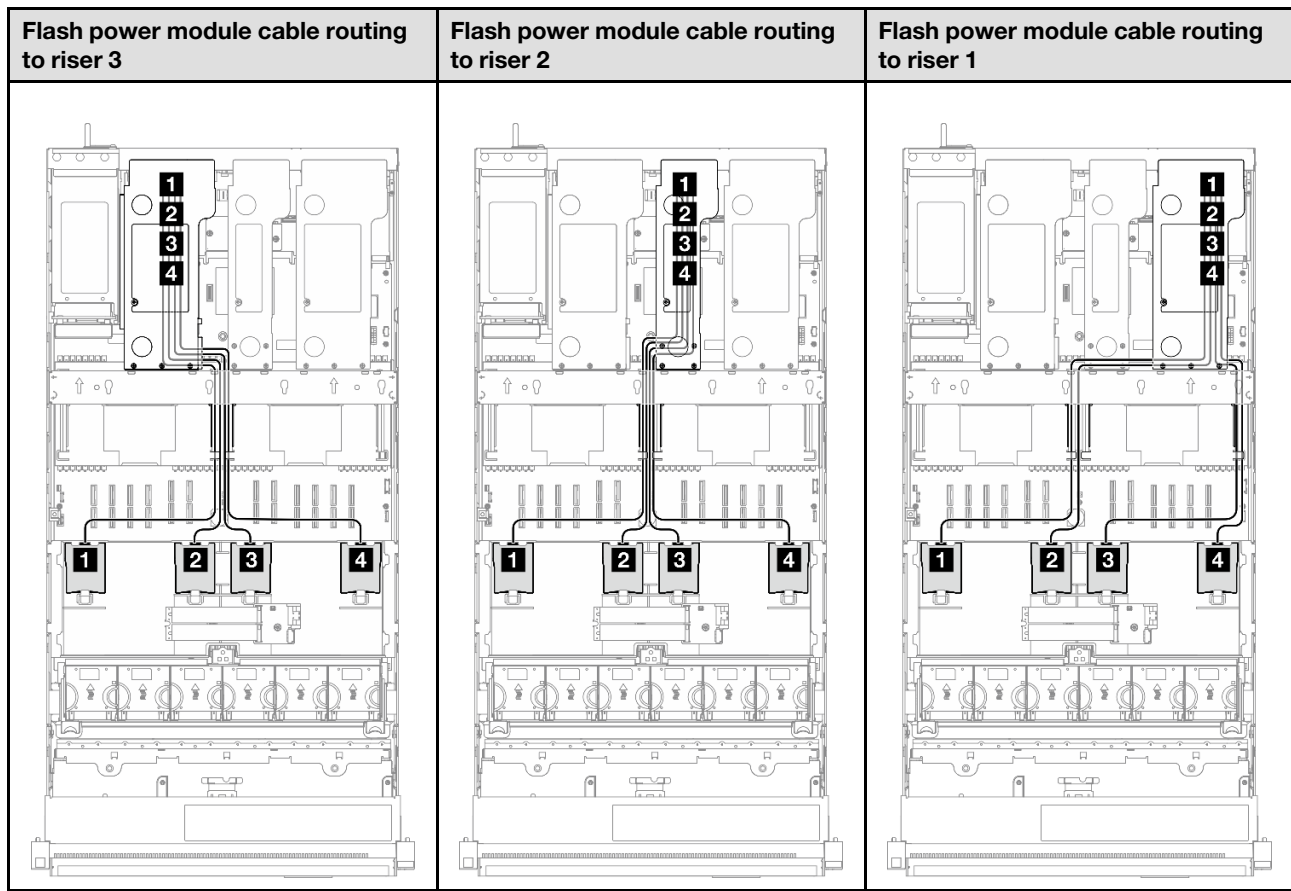
From	To	Cable
<b>1</b> External diagnostic handset connector	System board assembly: External diagnostic handset connector	Internal external diagnostic handset connector (570 mm)

## Flash power module cable routing

Use the section to understand the cable routing for the flash power modules.

### 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.



**Note:** Depending on your configuration, the RAID/HBA adapter will be installed in different riser locations.

From	To	Cable
<b>1</b> Flash power module	<b>1</b> RAID adapter in PCIe riser	<ul style="list-style-type: none"> <li>• Gen 4: Power 1x9 to power 2x4 (680 mm)</li> <li>• Gen 3: Power 1x8 to power 1x8 (680 mm)</li> </ul>
<b>2</b> Flash power module	<b>2</b> RAID adapter in PCIe riser	<ul style="list-style-type: none"> <li>• Gen 4: Power 1x9 to power 2x4 (680 mm)</li> <li>• Gen 3: Power 1x8 to power 1x8 (680 mm)</li> </ul>
<b>3</b> Flash power module	<b>3</b> RAID adapter in PCIe riser	<ul style="list-style-type: none"> <li>• Gen 4: Power 1x9 to power 2x4 (680 mm)</li> <li>• Gen 3: Power 1x8 to power 1x8 (680 mm)</li> </ul>
<b>4</b> Flash power module	<b>4</b> RAID adapter in PCIe riser	<ul style="list-style-type: none"> <li>• Gen 4: Power 1x9 to power 2x4 (680 mm)</li> <li>• Gen 3: Power 1x8 to power 1x8 (680 mm)</li> </ul>

## Front I/O module cable routing

Use the section to understand the cable routing for the front I/O 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.

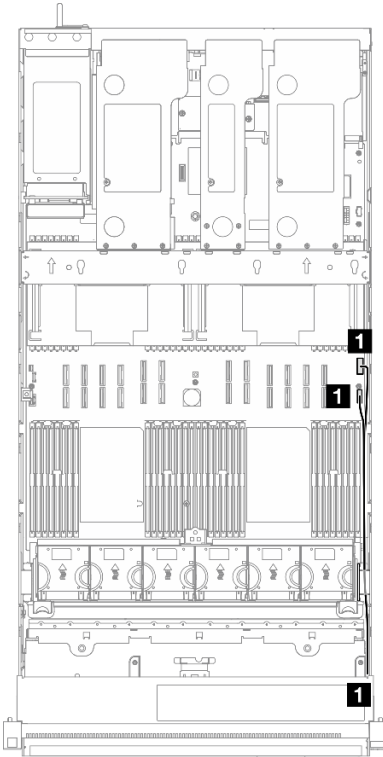


Figure 213. Cable routing for front I/O module

From	To	Cable
<b>1</b> Front I/O module	System board assembly: Front I/O connector	Internal front I/O module (570/590 mm)
	System board assembly: Front USB connector	

## Front VGA assembly cable routing

Use the section to understand the cable routing for the front VGA assembly.

### 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.



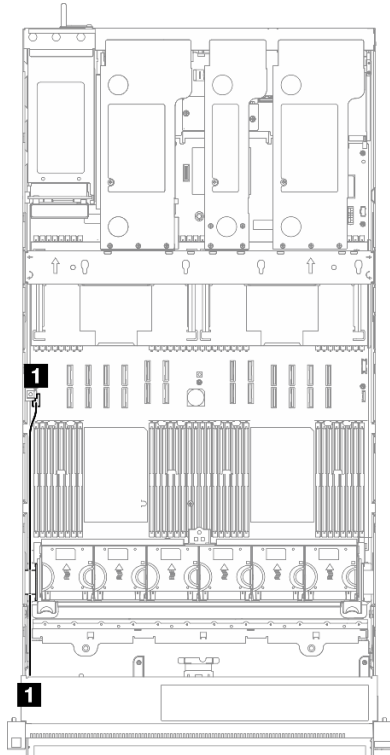


Figure 214. Cable routing for front VGA assembly

From	To	Cable
<b>1</b> Front VGA assembly	System board assembly: VGA connector	Internal VGA (560 mm)

## M.2 boot adapter cable routing

Use the section to understand the cable routing 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.

## SATA/NVMe or NVMe M.2 boot adapter

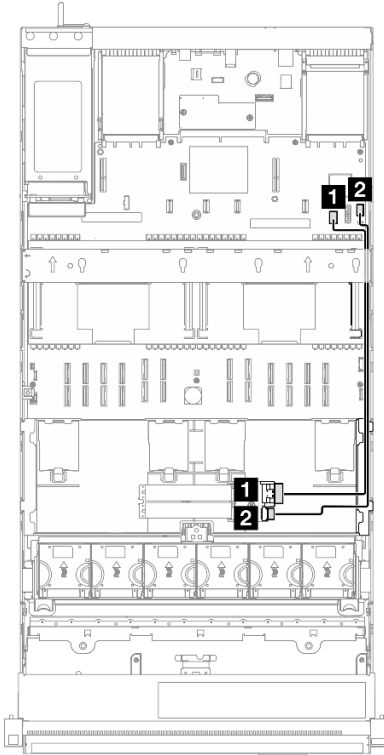


Figure 215. Cable routing for SATA/NVMe or NVMe M.2 boot adapter

**Note:** This configuration supports non-RAID SATA, SATA RAID (VROC), non-RAID NVMe, and NVMe RAID (VROC standard).

From	To	Cable
<b>1</b> M.2 boot adapter: signal connector	System board assembly: 7mm drive/M.2 signal connector	M.2 signal and power (530/550/550 mm)
<b>2</b> M.2 boot adapter: power connector	System board assembly: M.2 power connector	

## SATA/x4 NVMe M.2 boot adapter

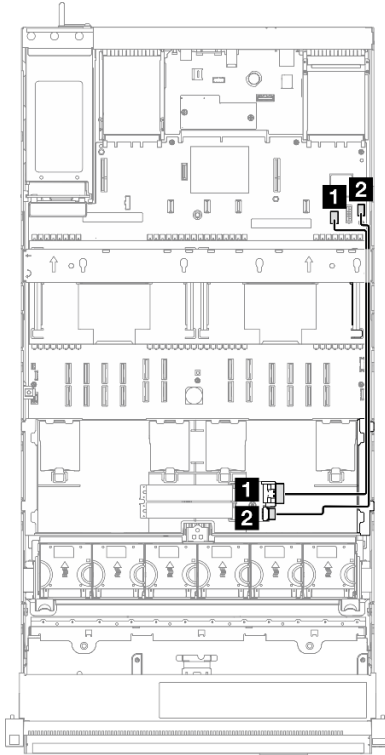


Figure 216. Cable routing for SATA/x4 NVMe M.2 boot adapter to PCH

**Note:** This configuration supports non-RAID SATA and SATA RAID (VROC).

From	To	Cable
<b>1</b> M.2 boot adapter: signal connector	System board assembly: 7mm drive/M.2 signal connector	SlimSAS x4 to SlimSAS x8 (530 mm)
<b>2</b> M.2 boot adapter: power connector	System board assembly: M.2 power connector	Power 2x10 to power 2x10 (500 mm)

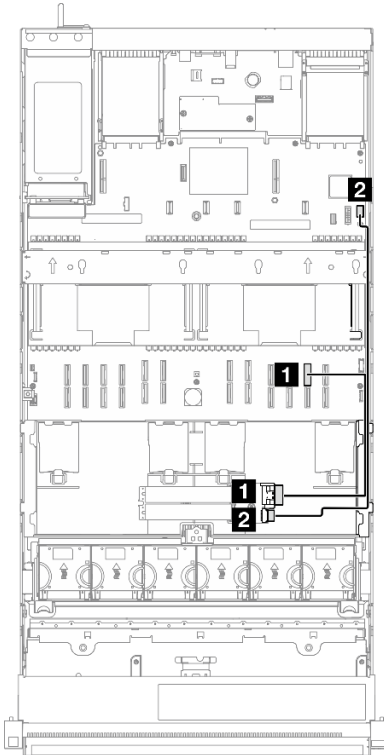


Figure 217. Cable routing for SATA/x4 NVMe M.2 boot adapter to CPU

**Note:** This configuration supports non-RAID NVMe and NVMe RAID (VROC standard).

From	To	Cable
<b>1</b> M.2 boot adapter: signal connector	System board assembly: NVMe 11 connector	MCIO x8 to SlimSAS x8 (365 mm)
<b>2</b> M.2 boot adapter: power connector	System board assembly: M.2 power connector	Power 2x10 to power 2x10 (500 mm)

## Management NIC adapter cable routing

Use the section to understand the cable routing for the management NIC 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.

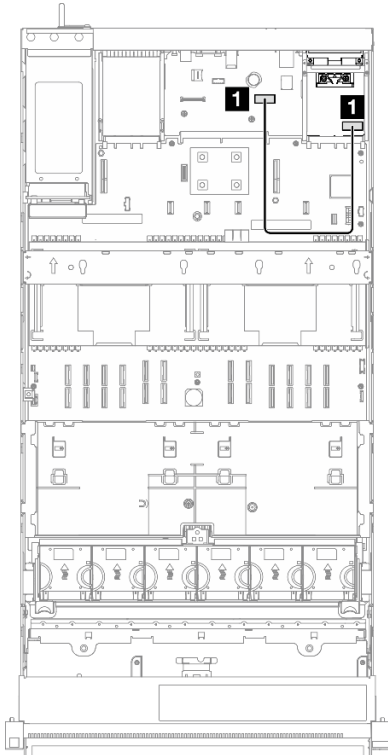


Figure 218. Cable routing for management NIC adapter

From	To	Cable
<b>1</b> Management NIC adapter	System board assembly: Second management Ethernet connector	Internal management NIC adapter (160 mm)

## PCIe riser 1 cable routing

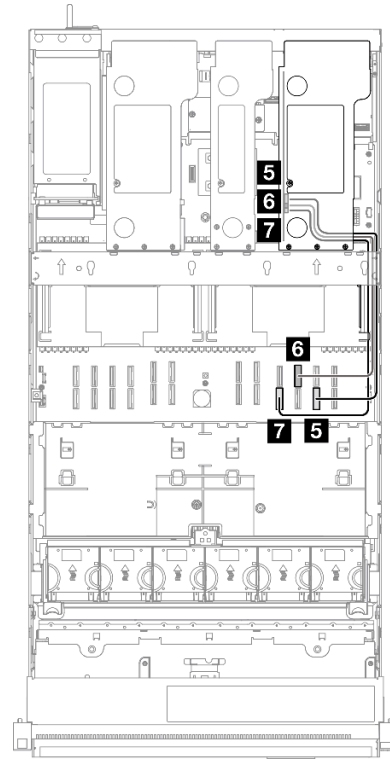
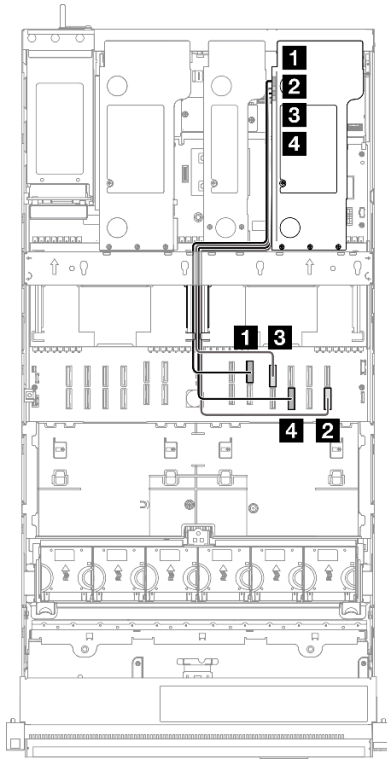
Use the section to understand the cable routing for the PCIe riser 1.

### 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.
- A label on each cable indicates the connection source and destination. This information is in the format **RY-X** and **PZ**. Where **Y** indicates the PCIe riser number, **X** indicates the connector on the riser card, and **Z** indicates the connector on the system board assembly.

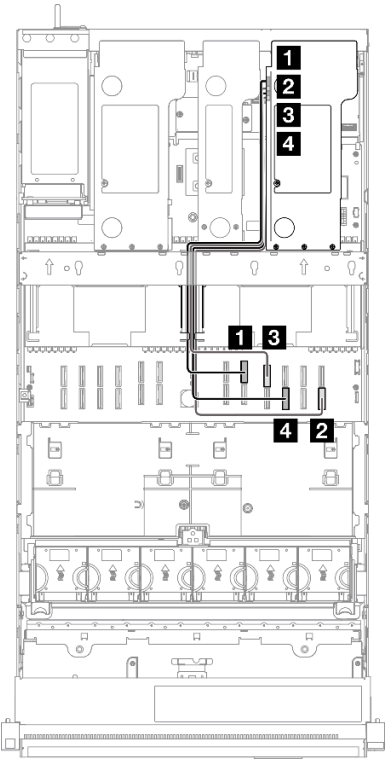
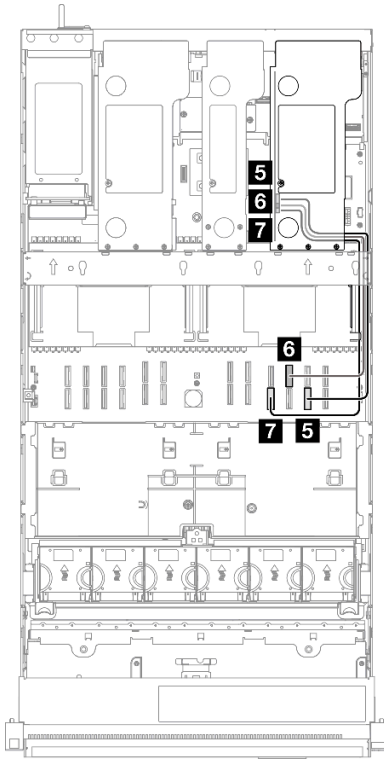
## Six slot Gen 4 FH riser (PCIe riser 1)

### Cable routing for six slot Gen 4 FH riser (PCIe riser 1)



From	To	Cable	Label
<b>1</b> PCIe riser: R8	System board assembly: P 18	MCIO x8 to Swift x8 (500 mm, flat 140 mm)	R1-8 P 18
<b>2</b> PCIe riser: R6	System board assembly: P 12	MCIO x8 to Swift x8 (600 mm, flat 140 mm)	R1-6 P 12
<b>3</b> PCIe riser: R3	System board assembly: P 19	MCIO x8 to Swift x8 (600 mm, flat 140 mm)	R1-3 P 19
<b>4</b> PCIe riser: R1	System board assembly: P 10	MCIO x8 to Swift x8 (600 mm, flat 140 mm)	R1-1 P 10
<b>5</b> PCIe riser: R7	System board assembly: P 11	MCIO x8 to Swift x8 (500 mm)	R1-7 P 11
<b>6</b> PCIe riser: R4	System board assembly: P 20	MCIO x8 to Swift x8 (500 mm)	R1-4 P 20
<b>7</b> PCIe riser: R5	System board assembly: P 9	MCIO x8 to Swift x8 (500 mm)	R1-5 P 9

## Six slot Gen 5 FH riser (PCIe riser 1)

Cable routing for six slot Gen 5 FH riser (PCIe riser 1)			
			
From	To	Cable	Label
<b>1</b> PCIe riser: R8	System board assembly: P 18	MCIO x8 to Swift x8 (500 mm, flat 140 mm)	R1-8 P 18
<b>2</b> PCIe riser: R6	System board assembly: P 12	MCIO x8 to Swift x8 (600 mm, flat 140 mm)	R1-6 P 12
<b>3</b> PCIe riser: R3	System board assembly: P 19	MCIO x8 to Swift x8 (600 mm, flat 140 mm)	R1-3 P 19
<b>4</b> PCIe riser: R1	System board assembly: P 10	MCIO x8 to Swift x8 (600 mm, flat 140 mm)	R1-1 P 10
<b>5</b> PCIe riser: R7	System board assembly: P 11	MCIO x8 to Swift x8 (500 mm)	R1-7 P 11
<b>6</b> PCIe riser: R4	System board assembly: P 20	MCIO x8 to Swift x8 (500 mm)	R1-4 P 20
<b>7</b> PCIe riser: R2	System board assembly: P 9	MCIO x8 to Swift x8 (500 mm)	R1-2 P 9

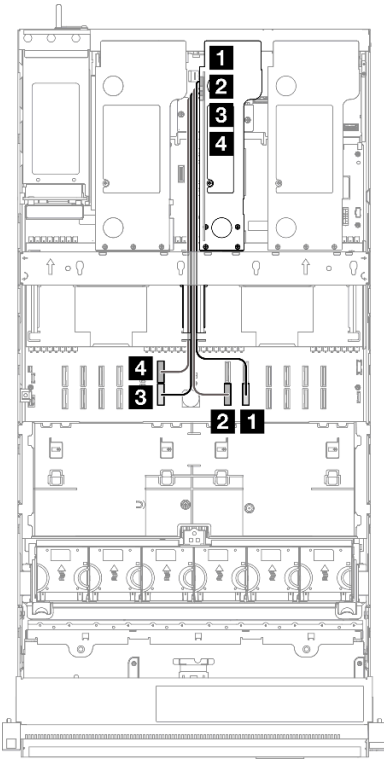
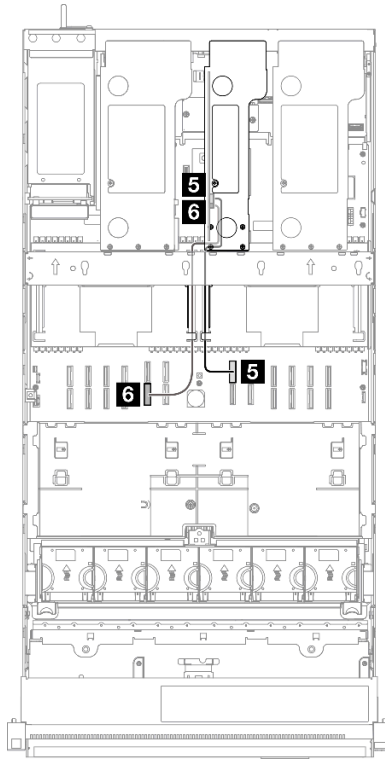
## PCIe riser 2 cable routing

Use the section to understand the cable routing for the PCIe riser 2.

### Notes:

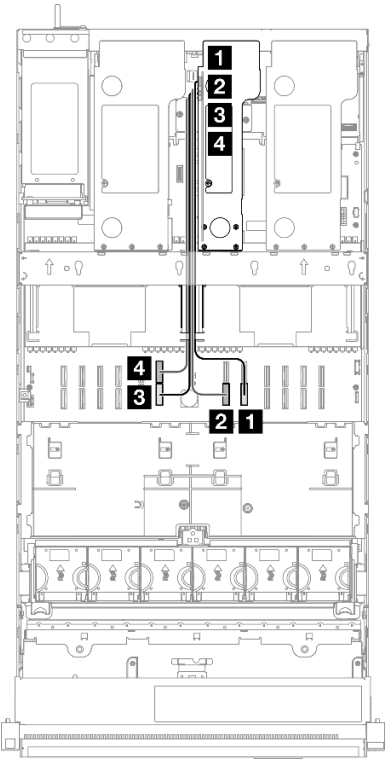
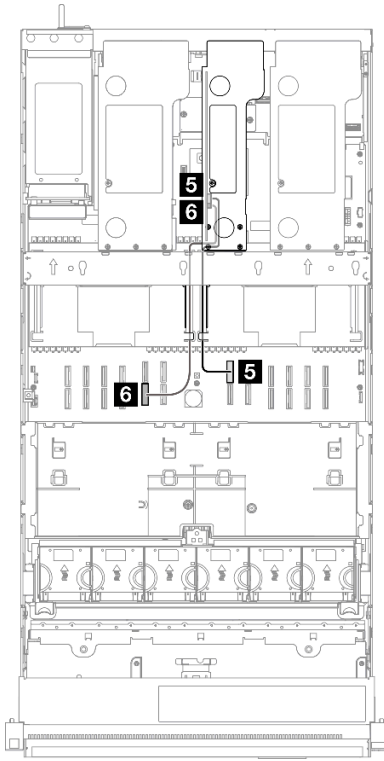
- Connections between connectors; **1**↔**1**, **2**↔**2**, **3**↔**3**, ... **n**↔**n**
- When routing the cables, ensure that all cables are routed appropriately through the cable guides.
- A label on each cable indicates the connection source and destination. This information is in the format **RY-X** and **P Z**. Where **Y** indicates the PCIe riser number, **X** indicates the connector on the riser card, and **Z** indicates the connector on the system board assembly.

### Six slot Gen 4 HH riser (PCIe riser 2)

Cable routing for six slot Gen 4 HH riser (PCIe riser 2)			
			
From	To	Cable	Label
<b>1</b> PCIe riser: R6	System board assembly: P 8	MCIO x8 to Swift x8 (500 mm)	R2-6 P 8
<b>2</b> PCIe riser: R5	System board assembly: P 7	MCIO x8 to Swift x8 (500 mm)	R2-5 P 7
<b>3</b> PCIe riser: R2	System board assembly: P 6	MCIO x8 to Swift x8 (440 mm, flat 140 mm)	R2-2 P 6
<b>4</b> PCIe riser: R1	System board assembly: P 16	MCIO x8 to Swift x8 (440 mm, flat 140 mm)	R2-1 P 16
<b>5</b> PCIe riser: R4	System board assembly: P 17	MCIO x8 to Swift x8 (320 mm)	R2-4 P 17
<b>6</b> PCIe riser: R3	System board assembly: P 5	MCIO x8 to Swift x8 (320 mm)	R2-3 P 5



## Six slot Gen 5 HH riser (PCIe riser 2)

Cable routing for six slot Gen 4 HH riser (PCIe riser 2)			
			
From	To	Cable	Label
<b>1</b> PCIe riser: R6	System board assembly: P 8	MCIO x8 to Swift x8 (500 mm)	R2-6 P 8
<b>2</b> PCIe riser: R5	System board assembly: P 7	MCIO x8 to Swift x8 (500 mm)	R2-5 P 7
<b>3</b> PCIe riser: R2	System board assembly: P 6	MCIO x8 to Swift x8 (440 mm, flat 140 mm)	R2-2 P 6
<b>4</b> PCIe riser: R1	System board assembly: P 16	MCIO x8 to Swift x8 (440 mm, flat 140 mm)	R2-1 P 16
<b>5</b> PCIe riser: R4	System board assembly: P 17	MCIO x8 to Swift x8 (320 mm)	R2-4 P 17
<b>6</b> PCIe riser: R3	System board assembly: P 5	MCIO x8 to Swift x8 (320 mm)	R2-3 P 5

## PCIe riser 3 cable routing

Use the section to understand the cable routing for the PCIe riser 3.

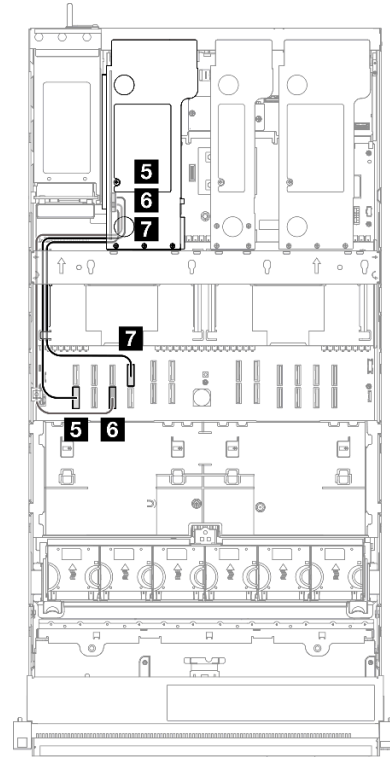
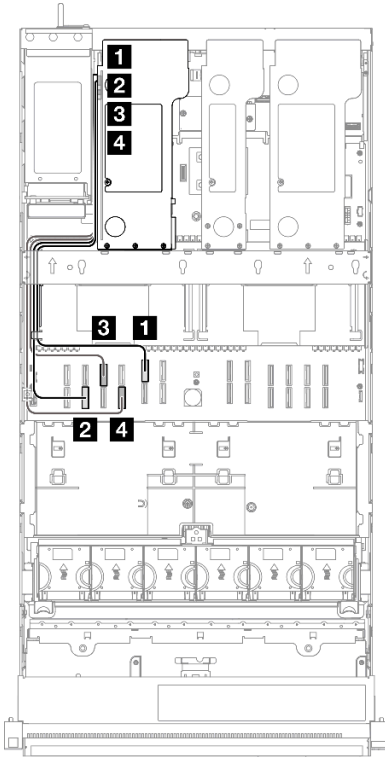
### Notes:

- 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.
- A label on each cable indicates the connection source and destination. This information is in the format **RY-X** and **P Z**. Where **Y** indicates the PCIe riser number, **X** indicates the connector on the riser card, and **Z** indicates the connector on the system board assembly.

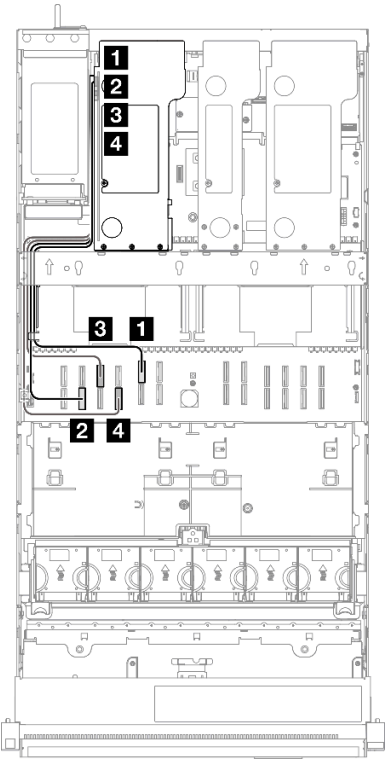
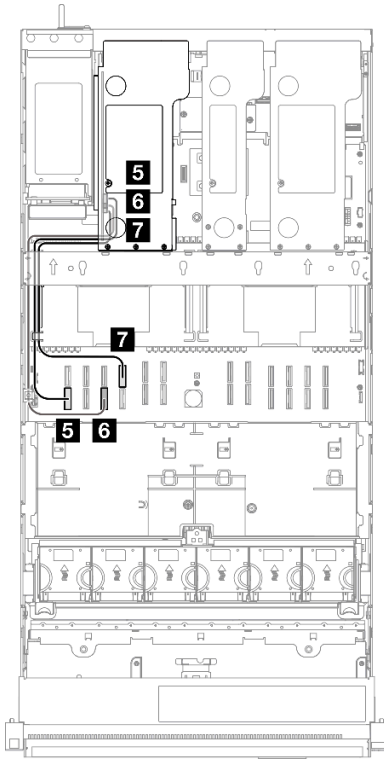
### Six slot Gen 4 FH riser (PCIe riser 3)

**Cable routing for six slot Gen 4 FH riser (PCIe riser 3)**



From	To	Cable	Label
<b>1</b> PCIe riser: R8	System board assembly: P 15	MCIO x8 to Swift x8 (600 mm, flat 140 mm)	R3-8
			P 15
<b>2</b> PCIe riser: R6	System board assembly: P 2	MCIO x8 to Swift x8 (500 mm, flat 140 mm)	R3-6
			P 2
<b>3</b> PCIe riser: R3	System board assembly: P 13	MCIO x8 to Swift x8 (500 mm, flat 140 mm)	R3-3
			P 13
<b>4</b> PCIe riser: R1	System board assembly: P 4	MCIO x8 to Swift x8 (540 mm, flat 140 mm)	R3-1
			P 4
<b>5</b> PCIe riser: R7	System board assembly: P 1	MCIO x8 to Swift x8 (440 mm)	R3-7
			P 1
<b>6</b> PCIe riser: R5	System board assembly: P 3	MCIO x8 to Swift x8 (440 mm)	R3-5
			P 3
<b>7</b> PCIe riser: R4	System board assembly: P 14	MCIO x8 to Swift x8 (440 mm)	R3-4
			P 14

## Six slot Gen 5 FH riser (PCIe riser 3)

Cable routing for six slot Gen 5 FH riser (PCIe riser 3)			
			
From	To	Cable	Label
<b>1</b> PCIe riser: R8	System board assembly: P 15	MCIO x8 to Swift x8 (600 mm, flat 140 mm)	R3-8 P 15
<b>2</b> PCIe riser: R6	System board assembly: P 2	MCIO x8 to Swift x8 (500 mm, flat 140 mm)	R3-6 P 2
<b>3</b> PCIe riser: R3	System board assembly: P 13	MCIO x8 to Swift x8 (500 mm, flat 140 mm)	R3-3 P 13
<b>4</b> PCIe riser: R1	System board assembly: P 4	MCIO x8 to Swift x8 (540 mm, flat 140 mm)	R3-1 P 4
<b>5</b> PCIe riser: R7	System board assembly: P 1	MCIO x8 to Swift x8 (440 mm)	R3-7 P 1
<b>6</b> PCIe riser: R2	System board assembly: P 3	MCIO x8 to Swift x8 (440 mm)	R3-2 P 3
<b>7</b> PCIe riser: R4	System board assembly: P 14	MCIO x8 to Swift x8 (440 mm)	R3-4 P 14

## Power distribution board cable routing

Use the section to understand the cable routing for the power distribution board.

### 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.

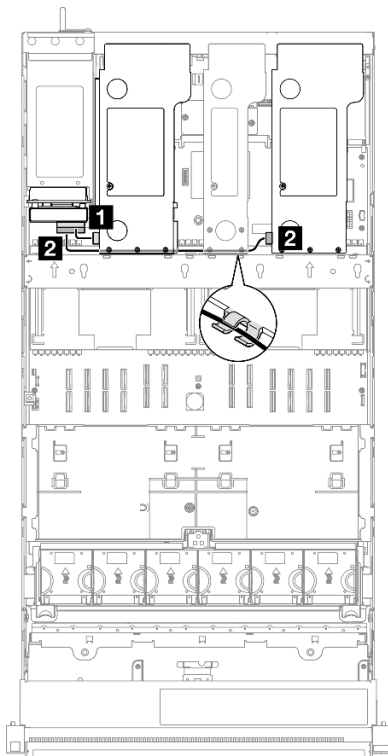


Figure 219. Power cable routing for power distribution board

From	To	Cable
<b>1</b> Power distribution board: PCIe riser 1 power connector (upper connector)	PCIe riser 1: Power connector	<ul style="list-style-type: none"> <li>• Six slot FH riser: Power 2x8 to power 2x8 (100 mm)</li> <li>• Two slot FH riser: Power 2x8 to power 2x4 (100 mm)</li> </ul>
<b>2</b> Power distribution board: PCIe riser 3 power connector (lower connector)	PCIe riser 3: Power connector	<ul style="list-style-type: none"> <li>• Six slot FH riser: Power 2x8 to power 2x8 (400 mm)</li> <li>• Two slot FH riser: Power 2x8 to power 2x4 (330 mm)</li> </ul>

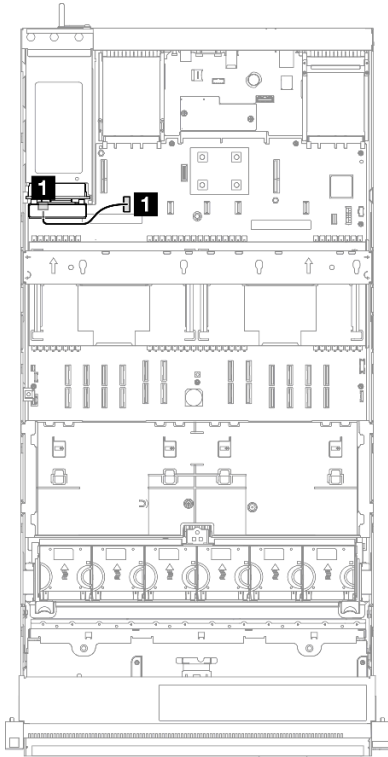


Figure 220. Sideband cable routing for power distribution board

From	To	Cable
<b>1</b> Power distribution board: Sideband connector	System board assembly: Power distribution board sideband connector	Sideband 2x15 to sideband 2x15 (210 mm)



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## Chapter 3. 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.

### Web resources

- **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.

- **Lenovo Data Center Forum**

- Check [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.

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## Event logs

An *alert* is a message or other indication that signals an event or an impending event. Alerts are generated by the Lenovo XClarity Controller or by UEFI in the servers. These alerts are stored in the Lenovo XClarity Controller Event Log. If the server is managed by the Chassis Management Module 2 or by the Lenovo XClarity Administrator, alerts are automatically forwarded to those management applications.

**Note:** For a listing of events, including user actions that might need to be performed to recover from an event, see the *Messages and Codes Reference*, which is available at [https://pubs.lenovo.com/sr860-v3/pdf\\_files.html](https://pubs.lenovo.com/sr860-v3/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

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 221. Lenovo XClarity Administrator event log

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

[https://pubs.lenovo.com/lxca/events\\_vieweventlog](https://pubs.lenovo.com/lxca/events_vieweventlog)

### 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.

Severity	Source	Event ID	Message	Date
Error	System	0X4000000E00000000	Remote login successful. Login ID: userid from webguis at IP address: 10.104.194.180.	27 Jul 2015, 08:11:04 AM
Warning	System	0X4000000E00000000	Remote login successful. Login ID: userid from webguis at IP address: 10.104.194.180.	27 Jul 2015, 08:11:04 AM
Info	System	0X4000000E00000000	Remote login successful. Login ID: userid from webguis at IP address: 10.104.194.180.	27 Jul 2015, 08:11:04 AM
Info	System	0X4000000E00000000	Remote login successful. Login ID: userid from webguis at IP address: 10.104.194.180.	27 Jul 2015, 08:11:04 AM

Figure 222. 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/>

## Specifications

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.

Refer to the below table for specifications categories and the content of each category.

Specification category	Technical specifications	Mechanical specifications	Environmental specifications
<b>Content</b>	<ul style="list-style-type: none"> <li>• Processor</li> <li>• Memory</li> <li>• Internal drives</li> <li>• Storage expansion</li> <li>• Expansion slots</li> <li>• Graphics processing units (GPU)</li> <li>• Integrated functions and I/O connectors</li> <li>• Network</li> <li>• Rear button</li> <li>• RAID adapter</li> <li>• Host bus adapter</li> <li>• System fan</li> <li>• Electrical input</li> <li>• Minimal configuration for debugging</li> <li>• Operating systems</li> </ul>	<ul style="list-style-type: none"> <li>• Dimension</li> <li>• Weight</li> </ul>	<ul style="list-style-type: none"> <li>• Acoustical noise emissions</li> <li>• Ambient temperature management</li> <li>• Environmental</li> </ul>

## Technical specifications

Summary of the technical specifications of server. Depending on the model, some features might not be available, or some specifications might not apply.

<b>Processor</b>
<p>Supports multi-core Intel Xeon processors, with integrated memory controller and Intel Mesh UPI (Ultra Path Interconnect) topology.</p> <ul style="list-style-type: none"> <li>• Up to four 4th Gen Intel Xeon scalable processors with minimal requirement of two installed on the system board assembly</li> <li>• Designed for LGA 4677 sockets</li> <li>• Scalable up to 60 cores</li> <li>• Supports 4 UPI links per processor supporting 12.8 GT/s, 14.4 GT/s and 16 GT/s speeds</li> </ul> <p>For a list of supported processors, see: <a href="https://serverproven.lenovo.com">https://serverproven.lenovo.com</a>.</p>

## Memory

See for detailed information about memory configuration and setup.

- 64 dual inline memory module (DIMM) slots that support up to 64 DRAM DIMMs
- Memory module type:
  - TruDDR5 4800MHz RDIMM: 16 GB (1Rx8), 32 GB (1Rx4, 2Rx8), 64 GB (2Rx4), 96 GB (2Rx4)
  - TruDDR5 4800MHz Value RDIMM: 32 GB (1Rx4), 64 GB (2Rx4)
  - TruDDR5 4800MHz 3DS RDIMM: 128 GB (4Rx4), 256 GB (8Rx4)

- Speed:

**Note:** Operating speed depends on processor model and UEFI settings.

- 4800 MT/s for 1 DIMM per channel
- 4400 MT/s for 2 DIMMs per channel
- Minimum memory: 32 GB
- Maximum memory: 16 TB

For a list of supported memory modules, see <https://serverproven.lenovo.com>.

## Internal drives

The server supports up to two internal M.2 drives with the following capacity:

- SATA M.2 drive:
  - 128 GB
  - 240 GB
  - 480 GB
  - 960 GB
- NVMe M.2 drive:
  - 480 GB
  - 960 GB

The following form factors are supported:

- 42 mm (2242)
- 60 mm (2260)
- 80 mm (2280)
- 110 mm (22110)

For a list of supported M.2 drives, see: <https://serverproven.lenovo.com>.

## Storage expansion

### 2.5-inch drive configuration:

- Forty-eight 2.5-inch drive bays:
  - Bay 0 to 23 support SAS/SATA/NVMe drives.
  - Bay 24 to 47 support SAS/SATA drives.
- Two 7mm drive bays support SATA/NVMe drives.

### Notes:

- When ThinkSystem 256GB TruDDR5 4800MHz (8Rx4) 3DS RDIMM v1 is installed in the system, the maximum number of supported drives is twenty-four drives.
- When an M.2 boot adapter is installed and connected to the NVMe 11 connector, the maximum number of supported NVMe drives is twenty-two drives.
- VROC supported.
- Tri-mode adapters can support RAID with U.3 drives.

For a list of supported drives, see: <https://serverproven.lenovo.com>.

## Expansion slots

- Up to eighteen rear PCIe slots
- Two OCP slots

### Notes:

- PCIe slot availability is based on CPU configuration, riser selection, and 7mm drive bay selection.
- When a ThinkSystem Intel E810-DA2 10/25GbE SFP28 2-Port PCIe Ethernet Adapter, ThinkSystem Intel E810-DA4 10/25GbE SFP28 4-Port PCIe Ethernet Adapter, ThinkSystem Intel E810-DA2 10/25GbE SFP28 2-Port OCP Ethernet Adapter, or ThinkSystem Intel E810-DA4 10/25GbE SFP28 4-Port OCP Ethernet Adapter is installed, no other Gen 3 RAID/HBA adapters can be installed.
- For more details on the different types of risers, see “Rear view” in *ThinkSystem SR860 V3 User Guide* or *ThinkSystem SR860 V3 System Configuration Guide*.

## Graphics processing unit (GPU)

- Up to eight 75-watt low profile GPUs
- Up to four 350-watt double wide FHFL GPUs with Nvlink support

**Note:** Nvlink is only supported between GPUs installed in the same riser.

For a list of supported GPUs, see: <https://serverproven.lenovo.com>.

## Integrated functions and I/O connectors

- Lenovo XClarity Controller (XCC), which provides service processor control and monitoring functions, video controller, and remote keyboard, video, mouse, and remote drive capabilities.
  - The server supports Lenovo XClarity Controller 2 (XCC2). For additional information about Lenovo XClarity Controller 2 (XCC2), refer to <https://pubs.lenovo.com/lxcc-overview/>.
- Front connectors:
  - One USB 3.2 Gen 1 (5 Gbps) connector
  - One USB 2.0 connector with XCC system management function
  - One VGA connector
  - One external diagnostics connector
  - Front I/O module
    - System ID button/LED
    - System error LED
    - Network Activity LED
    - Power button/LED
- Rear connectors:
  - One VGA connector
  - Three USB 3.2 Gen 1 (5 Gbps) connectors
  - One XCC system management port
  - Two OCP slots
  - One serial port

## Network

Two or four Ethernet connectors on each OCP module (optional)

## Rear button

NMI button

### RAID adapter

Onboard NVMe ports with software RAID support (Intel VROC NVMe RAID)

- Intel VROC Standard: requires an activation key and supports RAID levels 0, 1, and 10
- Intel VROC Premium: requires an activation key and supports RAID levels 0, 1, 5, and 10

Hardware RAID 0, 1, 10

- ThinkSystem RAID 540-16i PCIe Gen4 12Gb Adapter
- ThinkSystem RAID 540-8i PCIe Gen4 12Gb Adapter

Hardware RAID 0, 1, 10, 5

- ThinkSystem RAID 5350-8i PCIe 12Gb Adapter

Hardware RAID 0, 1, 10, 5, 50, 6, 60

- ThinkSystem RAID 940-32i 8GB Flash PCIe Gen4 12Gb Adapter
- ThinkSystem RAID 940-16i 4GB Flash PCIe Gen4 12Gb Adapter
- ThinkSystem RAID 940-16i 8GB Flash PCIe Gen4 12Gb Adapter
- ThinkSystem RAID 940-8i 4GB Flash PCIe Gen4 12Gb Adapter
- ThinkSystem RAID 940-8e 4GB Flash PCIe Gen4 12Gb Adapter

Hardware RAID 0, 1, 10, 5, 50, 6, 60, 1 Triple, 10 Triple

- ThinkSystem RAID 9350-16i 4GB Flash PCIe 12Gb Adapter
- ThinkSystem RAID 9350-8i 2GB Flash PCIe 12Gb Adapter

For more information about the RAID/HBA adapters, see [Lenovo ThinkSystem RAID Adapter and HBA Reference](#).

### Host bus adapter

- ThinkSystem 4350-16i SAS/SATA 12Gb HBA
- ThinkSystem 4350-8i SAS/SATA 12Gb HBA
- ThinkSystem 440-16i SAS/SATA PCIe Gen4 12Gb HBA
- ThinkSystem 440-8i SAS/SATA PCIe Gen4 12Gb HBA
- ThinkSystem 440-8e SAS/SATA PCIe Gen4 12Gb HBA
- ThinkSystem 440-16e SAS/SATA PCIe Gen4 12Gb HBA

For more information about the RAID/HBA adapters, see [Lenovo ThinkSystem RAID Adapter and HBA Reference](#).

### System fan

Six (60 mm x 56 mm) dual-fan single-rotor or dual-fan dual-rotor fan modules

## Electrical input

The server supports up to four power supplies with N+N redundancy with oversubscription.

- Platinum:
  - CFFv4S 1100-watt, input power 115 Vac / 230 Vac / 240 Vdc
  - CFFv4S 1800-watt, input power 230 Vac / 240 Vdc
  - CFFv4L 2400-watt, input power 230 Vac / 240 Vdc
  - CRPS 1300-watt, input power 115 Vac / 230 Vac / 240 Vdc (Chinese Mainland Only)
  - CRPS 2700-watt, input power 230 Vac / 240 Vdc (Chinese Mainland Only)
- Titanium:
  - CFFv4S 1100-watt, input power 115 Vac / 230 Vac / 240 Vdc
  - CFFv4S 1800-watt, input power 230 Vac / 240 Vdc
  - CFFv4L 2600-watt, input power 230 Vac / 240 Vdc
- DC:
  - CRPS 1600-watt, input power 336 Vdc (Chinese Mainland Only)
  - CRPS 1600-watt, input power -48 Vdc (Chinese Mainland Only)

### CAUTION:

- **240 Vdc input (input range: 180-300 Vdc) is supported in Chinese Mainland ONLY.**
- **Power supply with 240 Vdc input cannot support hot plugging power cord function. Before removing the power supply with dc input, please turn off server or disconnect dc power sources at the breaker panel or by turning off the power source. Then, remove the power cord.**

**Note:** The actual power efficiency depends on system configuration.

## Minimal configuration for debugging

- Two processors in processor socket 1 and 2
- Two DRAM DIMMs in slot 10 and 26
- Two power supplies
- One 2.5-inch drive, one M.2 drive, or one 7mm drive (if OS is needed for debugging)
- Six system fan modules

## Operating systems

Supported and certified operating systems:

- Microsoft Windows Server
- VMware ESXi
- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server

References:

- Complete list of available operating systems: <https://lenovopress.lenovo.com/osig>.
- OS deployment instructions, see “Deploy the operating system” in *User Guide* or *System Configuration Guide*.

## Mechanical specifications

Summary of the mechanical specifications of server. Depending on the model, some features might not be available, or some specifications might not apply.

Dimension
4U server <ul style="list-style-type: none"><li>• Height: 175 mm (6.9 inches)</li><li>• Width:<ul style="list-style-type: none"><li>– With rack handles: 482 mm (19.0 inches)</li><li>– Without rack handles: 434.4 mm (17.1 inches)</li></ul></li><li>• Depth: 869 mm (34.21 inches)</li></ul>
Weight
<ul style="list-style-type: none"><li>• <b>2.5-inch drive configuration:</b><ul style="list-style-type: none"><li>– 59 kg (130.1 lb) maximum</li></ul></li></ul>

## Environmental specifications

Summary of the environmental specifications of server. Depending on the model, some features might not be available, or some specifications might not apply.

## Acoustical noise emissions

The server has the following acoustic noise emissions declaration:

- Sound power level ( $L_{WAd}$ )
  - Idling:
    - Typical: 7.1 Bel
    - Storage rich: 7.1 Bel
    - GPU: 8.0 Bel
  - Operating:
    - Typical: 8.0 Bel
    - Storage rich: 8.0 Bel
    - GPU: 9.2 Bel
- Sound pressure level ( $L_{pAm}$ ):
  - Idling:
    - Typical: 52 dBA
    - Storage rich: 52.5 dBA
    - GPU: 63.6 dBA
  - Operating:
    - Typical: 63.6 dBA
    - Storage: 63.6 dBA
    - GPU: 75 dBA

### Notes:

- These sound levels were measured in controlled acoustical environments according to procedures specified by ISO7779 and are reported in accordance with ISO 9296.
- The declared acoustic sound levels are based on the specified configurations, which may change depending on configuration/conditions.
  - Typical configuration: four 250W CPUs, thirty-two 64GB RDIMMs, eight SAS HDDs, RAID 940-8i, Intel X710-T2L 10GBASE-T 2-port OCP, two 1100W PSUs.
  - GPU configuration: four 205W CPUs, four H100 GPUs, thirty-two 64GB RDIMMs, twenty-four SAS HDDs, RAID 940-16i, Intel X710-T2L 10GBASE-T 2-port OCP, two 1800W PSUs.
  - Storage rich configuration: four 205W CPUs, thirty-two 64GB RDIMMs, twenty-four SAS HDDs, RAID 940-8i, Intel X710-T2L 10GBASE-T 2-port OCP, two 2600W PSUs.
- Government regulations (such as those prescribed by OSHA or European Community Directives) may govern noise level exposure in the workplace and may apply to you and your server installation. The actual sound pressure levels in your installation depend upon a variety of factors, including the number of racks in the installation; the size, materials, and configuration of the room; the noise levels from other equipment; the room ambient temperature, and employee's location in relation to the equipment. Further, compliance with such government regulations depends on a variety of additional factors, including the duration of employees' exposure and whether employees wear hearing protection. Lenovo recommends that you consult with qualified experts in this field to determine whether you are in compliance with the applicable regulations.



## Ambient temperature management

Adjust ambient temperature when specific components are installed:

- The ambient temperature must be limited to 45°C or lower if the server has 48 drives and any of the following components:
  - CPU with 270W or lower TDP (except 6434H)
  - Memory module with 64 GB or lower capacity
- The ambient temperature must be limited to 35°C or lower if the server has 48 drives and any of the following components:
  - CPU with 350W or lower TDP with standard heat sink
  - Memory module with 256 GB or lower capacity
  - ConnectX-6 Dx 100GbE QSFP56 2-port with Active Optic Cable
  - ConnectX-6 HDR 200GbE QSFP56 2-port with Active Optic Cable
  - ConnectX-7 NDR200 QSFP 2-port without Active Optic Cable
  - ConnectX-7 NDR400 OSFP 1-port without Active Optic Cable
  - ConnectX-7 NDR200 QSFP 2-port with Active Optic Cable, and CPU with 270W or lower TDP is installed.
  - ConnectX-7 NDR400 OSFP 1-port with Active Optic Cable, and CPU with 270W or lower TDP is installed.
- The ambient temperature must be limited to 30°C or lower if the server has 48 drives and any of the following components:
  - CPU with 350W or lower TDP with performance heat sink
  - GPU adapter
  - ConnectX-7 NDR200 QSFP 2-port with Active Optic Cable
  - ConnectX-7 NDR400 OSFP 1-port with Active Optic Cable

## Environment

ThinkSystem SR860 V3 complies with ASHRAE Class A2 specifications with most configurations, and depending on the hardware configuration, also complies with ASHRAE Class A3, and Class A4 specifications. System performance may be impacted when operating temperature is outside ASHRAE A2 specification.

Depending on the hardware configuration, ThinkSystem SR860 V3 server also complies with ASHRAE Class H1 specification. System performance may be impacted when operating temperature is outside ASHRAE H1 specification.

- Air temperature:
  - Operating
    - ASHRAE Class H1: 5°C to 25°C (41°F to 77°F); the maximum ambient temperature decreases by 1°C for every 500 m (1640 ft) increase in altitude above 900 m (2,953 ft).
    - ASHRAE Class A2: 10°C to 35°C (50°F to 95°F); the maximum ambient temperature decreases by 1°C for every 300 m (984 ft) increase in altitude above 900 m (2,953 ft).
    - ASHRAE Class A3: 5°C to 40°C (41°F to 104°F); the maximum ambient temperature decreases by 1°C for every 175 m (574 ft) increase in altitude above 900 m (2,953 ft).
    - ASHRAE Class A4: 5°C to 45°C (41°F to 113°F); the maximum ambient temperature decreases by 1°C for every 125 m (410 ft) increase in altitude above 900 m (2,953 ft).
  - Server off: 5°C to 45°C (41°F to 113°F)
  - Shipment/storage: -40°C to 60°C (-40°F to 140°F)
- Maximum altitude: 3,050 m (10,000 ft)
- Relative Humidity (non-condensing):
  - Operating
    - ASHRAE Class H1: 8% to 80%; maximum dew point: 17°C (62.6°F)
    - ASHRAE Class A2: 8% to 80%; maximum dew point: 21°C (70°F)
    - ASHRAE Class A3: 8% to 85%; maximum dew point: 24°C (75°F)
    - ASHRAE Class A4: 8% to 90%; maximum dew point: 24°C (75°F)
  - Shipment/storage: 8% to 90%
- Particulate contamination

**Attention:** Airborne particulates and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server. For information about the limits for particulates and gases, see [“Particulate contamination” on page 412](#).

**Note:** The server is designed for standard data center environment and recommended to be placed in industrial data center.

## 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 20. Limits for particulates and gases

Contaminant	Limits
Reactive gases	Severity level G1 as per ANSI/ISA 71.04-1985 <sup>1</sup> : <ul style="list-style-type: none"> <li>• The copper reactivity level shall be less than 200 Å/month (Å/month <math>\approx</math> 0.0035 µg/cm<sup>2</sup>-hour weight gain).<sup>2</sup></li> <li>• The silver reactivity level shall be less than 200 Å/month (Å/month <math>\approx</math> 0.0035 µg/cm<sup>2</sup>-hour weight gain).<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	Data centers must meet the cleanliness level of ISO 14644-1 class 8.  For data centers without airside economizer, the ISO 14644-1 class 8 cleanliness might be met by choosing one of the following filtration methods: <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> 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. <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 Å/month and the rate of weight gain assumes that Cu<sub>2</sub>S and Cu<sub>2</sub>O 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 Å/month and the rate of weight gain assumes that Ag<sub>2</sub>S 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>	

## System-board-assembly connectors

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

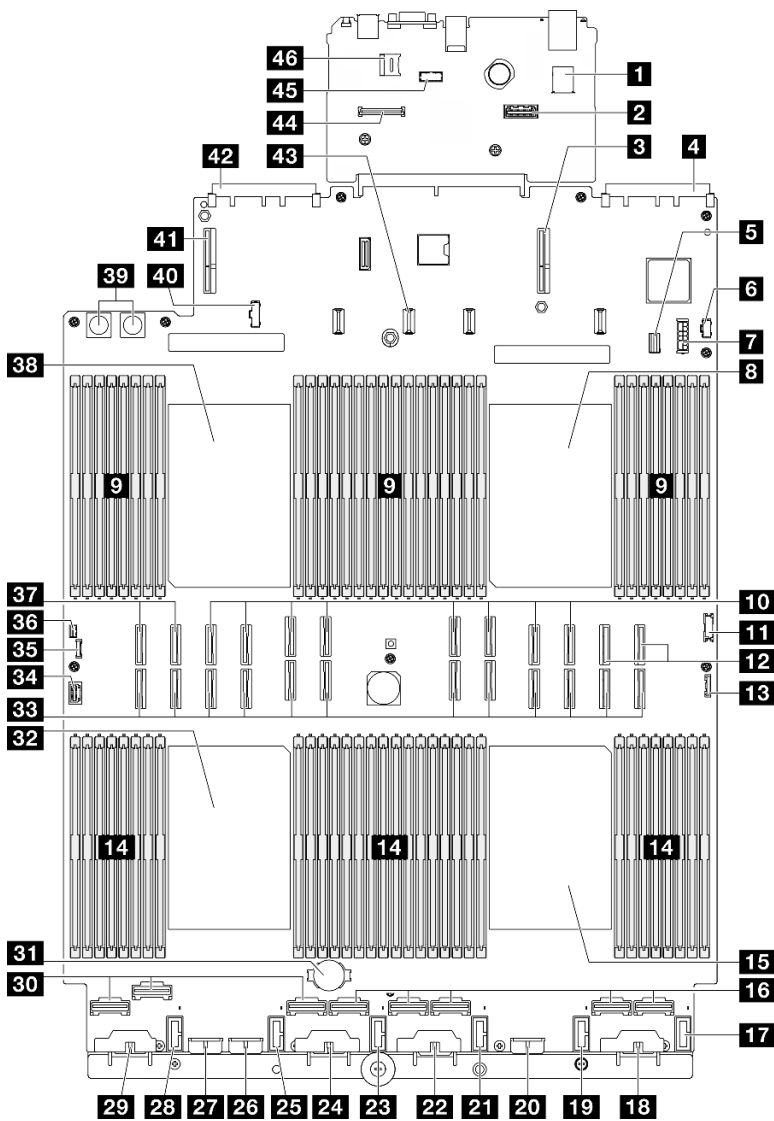


Figure 223. System-board-assembly connectors

Table 21. System-board-assembly connectors

<b>1</b> Internal USB connector	<b>24</b> Backplane 3 power connector
<b>2</b> Second management Ethernet connector	<b>25</b> Fan 2 connector
<b>3</b> PCIe riser 1 connector	<b>26</b> Backplane 7 power connector
<b>4</b> OCP slot 1 connector	<b>27</b> Backplane 2 power connector
<b>5</b> 7mm drive/M.2 signal connector	<b>28</b> Fan 1 connector
<b>6</b> M.2 power connector	<b>29</b> Backplane 1 power connector
<b>7</b> 7mm drive power connector	<b>30</b> NVMe 1-3 connector (left to right)
<b>8</b> Processor 1	<b>31</b> 3V battery (CR2032)
<b>9</b> Memory module slot 1-32 (right to left)	<b>32</b> Processor 3
<b>10</b> P 13-20 connector (left to right)	<b>33</b> P 1-12 connector (left to right)

Table 21. System-board-assembly connectors (continued)

<b>11</b> Front USB connector	<b>34</b> VGA connector
<b>12</b> NVMe 11-12 connector (left to right)	<b>35</b> External diagnostic connector
<b>13</b> Front I/O connector	<b>36</b> Intrusion switch connector
<b>14</b> Memory module slot 33-64 (left to right)	<b>37</b> NVMe 9-10 connector (left to right)
<b>15</b> Processor 4	<b>38</b> Processor 2
<b>16</b> NVMe 4-8 connector (left to right)	<b>39</b> Power distribution board connector
<b>17</b> Fan 6 connector	<b>40</b> Power distribution board sideband connector
<b>18</b> Backplane 6 power connector	<b>41</b> PCIe riser 3 connector
<b>19</b> Fan 5 connector	<b>42</b> OCP slot 2 connector
<b>20</b> Backplane 5 power connector	<b>43</b> PCIe riser 2 power connector
<b>21</b> Fan 4 connector	<b>44</b> Firmware and RoT security module connector
<b>22</b> Backplane 4 power connector	<b>45</b> Serial port module connector
<b>23</b> Fan 3 connector	<b>46</b> MicroSD socket

## Troubleshooting by system LEDs and diagnostics display

See the following section for information on available system LEDs and diagnostics display.

### Drive LEDs

This topic provides information on drive LEDs.

The following table describes the problems that are indicated by drive activity LED and drive status LED.

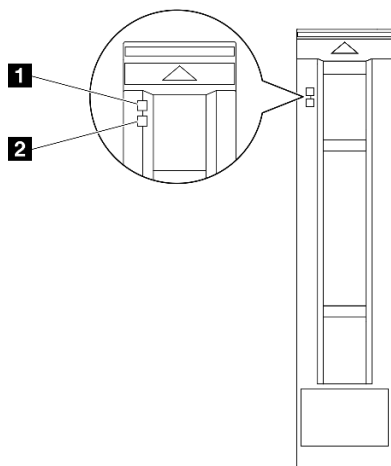


Figure 224. Drive LEDs

LED	Description
<b>1</b> Drive activity LED (green)	Each hot-swap drive comes with an activity LED. When this LED is flashing, it indicates that the drive is in use.
<b>2</b> Drive status LED (yellow)	The drive status LED indicates the following status: <ul style="list-style-type: none"> <li>The LED is lit: the drive has failed.</li> <li>The LED is flashing slowly (once per second): the drive is being rebuilt.</li> <li>The LED is flashing rapidly (three times per second): the drive is being identified.</li> </ul>

## Front I/O module LEDs

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

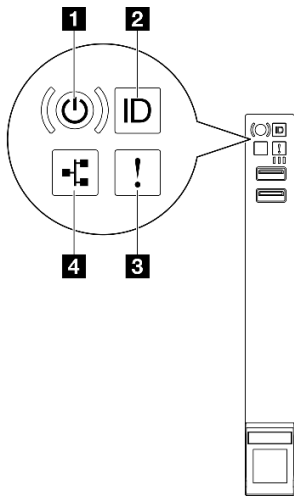


Figure 225. Front I/O module LEDs

Table 22. Front I/O module LEDs

<b>1</b> Power button/LED (green)	<b>3</b> System error LED (yellow)
<b>2</b> System ID button/LED (blue)	<b>4</b> Network Activity LED (green)

### **1** Power button/LED (green)

Press this button to turn the server on and off manually. The states of the power LED are as follows:

Status	Color	Description
Off	None	Power is not present, or the power supply has failed.
Fast blinking (about four flashes per second)	Green	<ul style="list-style-type: none"> <li>The server is off, but the XClarity Controller is initializing, and the server is not ready to be powered on.</li> <li>System-board-assembly power has failed.</li> </ul>
Slow blinking (about one flash per second)	Green	The server is off and is ready to be powered on (standby state).
Solid on	Green	The server is on and running.

### 2 System ID button/LED (blue)

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

### 3 System error LED (yellow)

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

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

### 4 Network Activity LED (green)

The network activity LED helps you identify the network connectivity and activity.

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

## Rear system LEDs

This topic provides information on the system LEDs on the rear of the server.

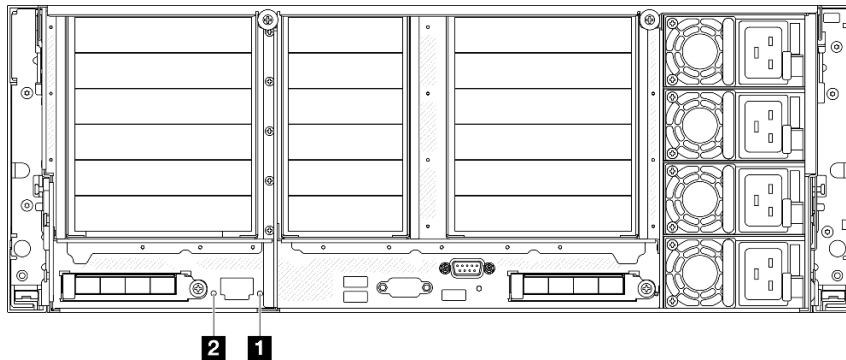


Figure 226. Rear system LEDs

Table 23. Rear system LEDs

LED	Description	Action
<b>1</b> System error LED (yellow)	<p>LED on: an error has been detected on the server. Causes might include one or more of the following errors:</p> <ul style="list-style-type: none"> <li>• The temperature of the server reached the non-critical temperature threshold.</li> <li>• The voltage of the server reached the non-critical voltage threshold.</li> <li>• A fan has been detected to be running at low speed.</li> <li>• The power supply has a critical error.</li> <li>• The power supply is not connected to the power.</li> </ul>	Check system logs or internal error LEDs to identify the failed part.
<b>2</b> System ID LED (blue)	This LED helps you to visually locate the server.	A system ID button with LED is also located on the front of the server. You can press the system ID button to turn on/off or blink the front and rear ID LEDs.

## Power supply LEDs

This topic provides information about various power supply LED status and corresponding action suggestions.

The following minimal configuration is required for the server to start:

- Two processors in processor socket 1 and 2
- Two DRAM DIMMs in slot 10 and 26
- Two power supplies
- One 2.5-inch drive, one M.2 drive, or one 7mm drive (if OS is needed for debugging)
- Six system fan modules

**Note:** Depending on the power supply type, your power supply might look slightly different from the following illustration.



### CFFv4 power supply LEDs

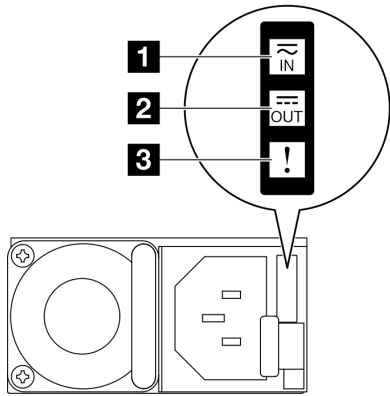


Figure 227. Power supply LEDs

LED	Description
<b>1</b> Input status	<p>The input status LED can be in one of the following states:</p> <ul style="list-style-type: none"> <li>Off: The power supply is disconnected from the AC power source.</li> <li>Green: The power supply is connected to the AC power source.</li> </ul>
<b>2</b> Output status	<p>The output status LED can be in one of the following states:</p> <ul style="list-style-type: none"> <li>Off: The server is powered off, or the power supply is not working properly. If the server is powered on but the output status LED is off, replace the power supply.</li> <li>Slow blinking green (about one flash every two seconds): The power supply is in cold redundancy active mode.</li> <li>Fast blinking green (about 2 flashes each second): The power supply is in cold redundancy sleep mode.</li> <li>Green: The server is on and the power supply is working normally.</li> </ul>
<b>3</b> Fault LED	<ul style="list-style-type: none"> <li>Off: The power supply is working normally</li> <li>Amber: The power supply may have failed. Dump the FFDC log from the system and contact Lenovo back end support team for PSU data log reviewing.</li> </ul>

### CRPS power supply LED

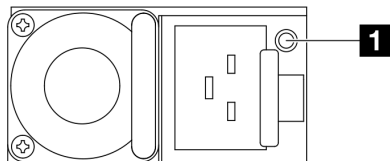


Figure 228. CRPS power supply LED

LED	Description
<b>1</b> Power supply status	<p>The power supply status LED can be in one of the following states:</p> <ul style="list-style-type: none"> <li>• Green: The power supply is connected to the AC power source and working normally.</li> <li>• Off: The power supply is disconnected from the AC power source.</li> <li>• Slow blinking green (about one flash every second): The power supply is in PSU standby state with AC present, cold standby state, or always standby state.</li> <li>• Amber: The AC power cord is unplugged, AC power lost (with a second power supply in parallel still in AC power input power), or power supply has failed. To resolve the issue, replace the power supply.</li> <li>• Slow blinking amber (about one flash every second): Power supply warning events where the power supply continues to operate.</li> <li>• Fast blinking green (about 2 flashes each second): Power supply firmware updating.</li> </ul>

## System-board-assembly LEDs

The following illustrations show the light-emitting diodes (LEDs) on the system board assembly.

Press the power button to light the LEDs on the system board assembly when the power source has been removed from the server.

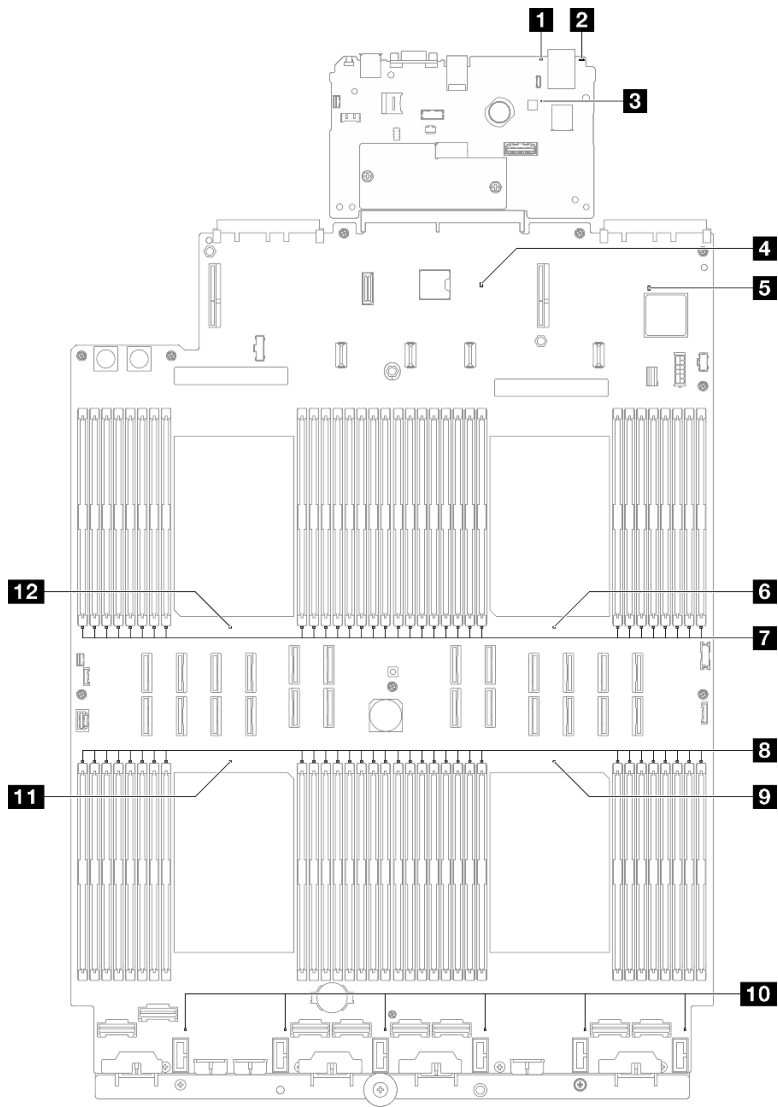


Figure 229. System-board-assembly LEDs

Table 24. System-board-assembly LEDs

LED	Description	Action
<p><b>1</b> System error LED (yellow)</p>	<p>LED on: an error has been detected on the server. Causes might include one or more of the following errors:</p> <ul style="list-style-type: none"> <li>• The temperature of the server reached the non-critical temperature threshold.</li> <li>• The voltage of the server reached the non-critical voltage threshold.</li> <li>• A fan has been detected to be running at low speed.</li> <li>• The power supply has a critical error.</li> <li>• The power supply is not connected to the power.</li> </ul>	<p>Check system logs or internal error LEDs to identify the failed part.</p>
<p><b>2</b> System ID LED (blue)</p>	<p>This LED helps you to visually locate the server.</p>	<p>A system ID button with LED is also located on the front of the server. You can press the system ID button to turn on/off or blink the front and rear ID LEDs.</p>

Table 24. System-board-assembly LEDs (continued)

LED	Description	Action
<p><b>3</b> XCC heartbeat LED (green)</p>	<p>The XCC heartbeat LED helps you identify the XCC status.</p> <ul style="list-style-type: none"> <li>• Blinking (about one flash per second) : XCC is working normally.</li> <li>• Blinking at other speeds or always on: XCC is at the initial phase or is working abnormally.</li> <li>• Off: XCC is not working.</li> </ul>	<ul style="list-style-type: none"> <li>• If the XCC heartbeat LED is always off or always on, do the following:               <ul style="list-style-type: none"> <li>– If XCC cannot be accessed:                   <ol style="list-style-type: none"> <li>1. Re-plug the power cord.</li> <li>2. Check and ensure that the system I/O board and the firmware and RoT security module are installed correctly. (Trained technician only) Reinstall them if needed.</li> <li>3. (Trained technician only) Replace the firmware and RoT security module.</li> <li>4. (Trained technician only) Replace the system I/O board.</li> </ol> </li> <li>– If XCC can be accessed, replace the system I/O board.</li> </ul> </li> <li>• If the XCC heartbeat LED is always blinking fast over 5 minutes, do the following:               <ol style="list-style-type: none"> <li>1. Re-plug the power cord.</li> <li>2. Check and ensure that the system I/O board and the firmware and RoT security module are installed correctly. (Trained technician only) Reinstall them if needed.</li> <li>3. (Trained technician only) Replace the firmware and RoT security module.</li> <li>4. (Trained technician only) Replace the system I/O board.</li> </ol> </li> <li>• If the XCC heartbeat LED is always blinking slow for over 5 minutes, do the following:               <ol style="list-style-type: none"> <li>1. Re-plug the power cord.</li> <li>2. Check and ensure that the system I/O board and the firmware and RoT security module are installed correctly. (Trained technician only) Reinstall them if needed.</li> <li>3. If the problem remains, contact Lenovo Support.</li> </ol> </li> </ul>
<p><b>4</b> PCH heartbeat LED (green)</p>	<p>The PCH heartbeat LED helps you identify the PCH status.</p> <ul style="list-style-type: none"> <li>• Blinking (about one flash per second): system ME is working normally.</li> <li>• Off: system ME is not working.</li> </ul>	<p>If the PCH heartbeat LED is always off or always on, do the following:</p> <ol style="list-style-type: none"> <li>1. Check and ensure that the system I/O board and the firmware and RoT security module are installed correctly. (Trained technician only) Reinstall them if needed.</li> <li>2. Make sure the UEFI firmware has been flashed to the corresponding platform version.</li> <li>3. Update UEFI and XCC firmware to latest version.</li> <li>4. Check if there is ME error event triggered in system event log. If yes, and the above actions are done, replace the firmware and RoT security module.</li> <li>5. (Trained technician only) If it is still not working, replace the processor board.</li> </ol>

Table 24. System-board-assembly LEDs (continued)

LED	Description	Action
<b>5</b> FPGA heartbeat LED (green)	The FPGA heartbeat LED helps you identify the FPGA status. <ul style="list-style-type: none"> <li>Blinking (about one flash per second): FPGA is working normally.</li> <li>On or off: FPGA is not working.</li> </ul>	If FPGA heartbeat LED is always off or always on, do the following: <ol style="list-style-type: none"> <li>Replace the processor board.</li> <li>If the problem remains, contact Lenovo Support.</li> </ol>
<b>6</b> Processor 1 error LED (Amber)	LED on: an error has occurred to the processor the LED represents.	Replace the processor.
<b>7</b> DIMM 1-32 error LEDs (Amber)	LED on: an error has occurred to the DIMM the LED represents.	For more information, see <a href="#">“Memory problems” on page 436</a> .
<b>8</b> DIMM 33-64 error LEDs (Amber)	LED on: an error has occurred to the DIMM the LED represents.	For more information, see <a href="#">“Memory problems” on page 436</a> .
<b>9</b> Processor 4 error LED (Amber)	LED on: an error has occurred to the processor the LED represents.	Replace the processor.
<b>10</b> Fan 1-6 error LED (Amber)	LED on: an error has occurred to the fan the LED represents.	Replace the fan.
<b>11</b> Processor 3 error LED (Amber)	LED on: an error has occurred to the processor the LED represents.	Replace the processor.
<b>12</b> Processor 2 error LED (Amber)	LED on: an error has occurred to the processor the LED represents.	Replace the processor.

## Firmware and RoT security module LEDs

The following illustrations show the light-emitting diodes (LEDs) on the ThinkSystem V3 Firmware and Root of Trust Security Module (Firmware and RoT Security Module).

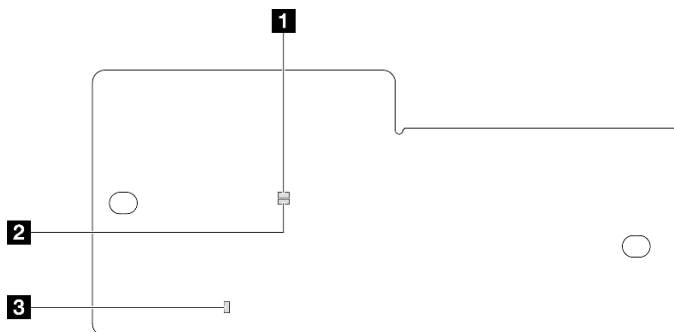


Figure 230. LEDs on the firmware and RoT security module

<b>1</b> AP0 LED (Green)	<b>2</b> AP1 LED (Green)	<b>3</b> Fatal Error LED (Amber)
--------------------------	--------------------------	----------------------------------

Table 25. LEDs description

Scenario	AP0 LED	AP1 LED	Fatal Error LED	FPGA heart-beat LED <sup>note</sup>	XCC heart-beat LED <sup>note</sup>	Actions
RoT security module fatal firmware failure	Off	Off	On	N/A	N/A	Replace the firmware and RoT security module.
	Blink	N/A	On	N/A	N/A	Replace the firmware and RoT security module.
	Blink	N/A	On	On	N/A	Replace the firmware and RoT security module.
No system power (FPGA heartbeat LED off)	Off	Off	Off	Off	Off	If the AC power is on, but the system board assembly does not have power, then: <ol style="list-style-type: none"> <li>1. Check the power supply unit (PSU) or power distribution board. If the PSU or power distribution board has any error, replace it.</li> <li>2. If the PSU or power distribution board is good, do the following:               <ol style="list-style-type: none"> <li>a. Replace the system I/O board.</li> <li>b. Replace the processor board.</li> </ol> </li> </ol>
XCC firmware recoverable error	Blink	N/A	Off	N/A	N/A	Information only. No action is required.
XCC firmware is recovered from error	On	N/A	Off	N/A	N/A	Information only. No action is required.
UEFI firmware authentication failure	N/A	Blink	Off	N/A	N/A	Information only. No action is required.
UEFI firmware is recovered from authentication failure	N/A	On	Off	N/A	N/A	Information only. No action is required.
System is OK (FPGA heartbeat LED is On)	On	On	Off	On	On	Information only. No action is required.

**Note:** For locations of the FPGA LED and XCC heartbeat LED, see [“System-board-assembly LEDs” on page 420](#).

## XCC system management port LEDs

This topic provides information on LEDs of XCC system management port.

The following table describes the problems that are indicated by LEDs on XCC system management port.

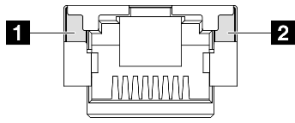


Figure 231. XCC system management port LEDs

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

## External Diagnostics Handset

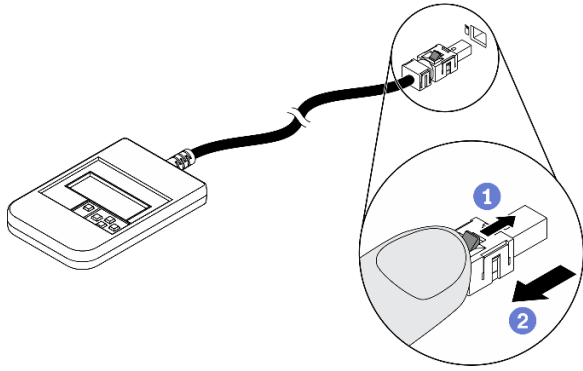
The External Diagnostics Handset is an external device that is connected to the server with a cable, and it allows quick access to system information such as errors, system status, firmware, network, and health information.

### Location of the External Diagnostics Handset

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

**Note:** When unplugging the External Diagnostics Handset, see the following instructions:

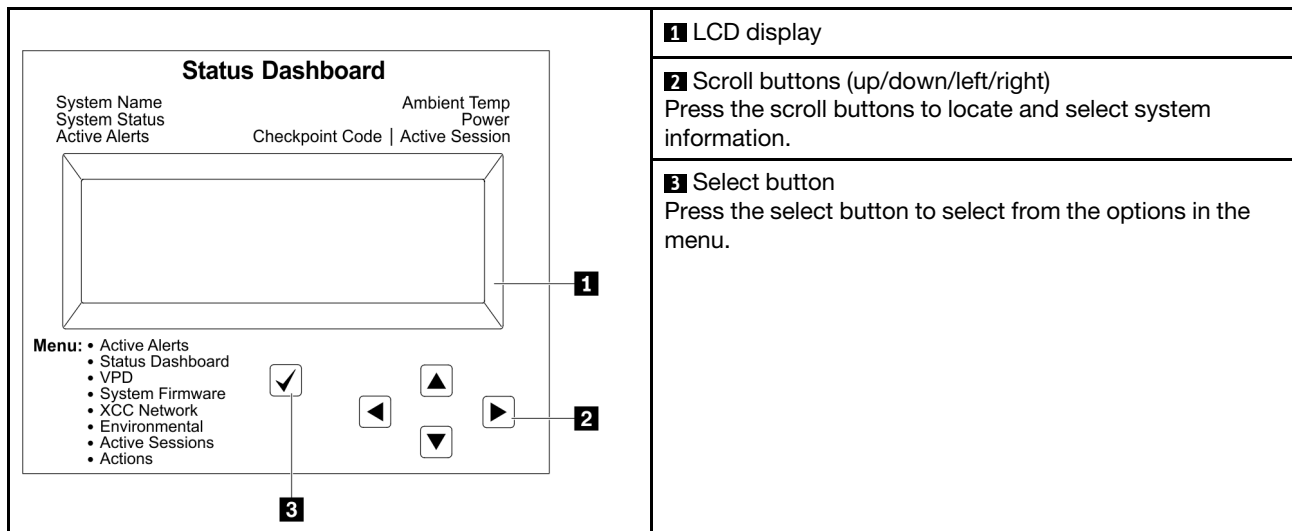




- 1 Press the plastic clip on the plug forward.
- 2 Hold the clip and remove the cable from the connector.

### Display panel overview

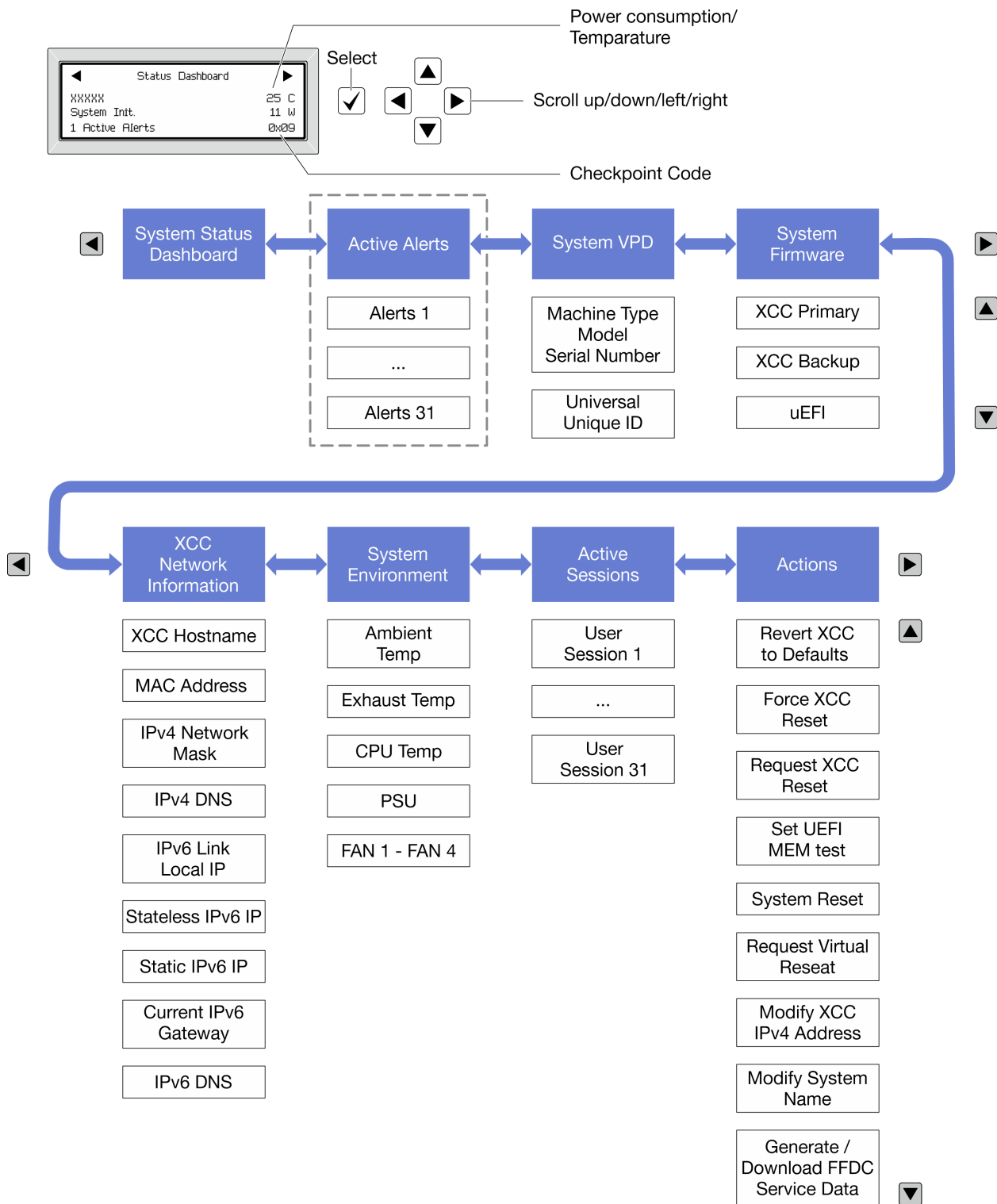
The diagnostics device consists of an LCD display and 5 navigation buttons.



### Option flow diagram

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

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



### Full menu list

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

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

## Home Menu (System Status Dashboard)

Home Menu	Example
<ul style="list-style-type: none"> <li>1 System name</li> <li>2 System status</li> <li>3 Active alert quantity</li> <li>4 Temperature</li> <li>5 Power consumption</li> <li>6 Checkpoint code</li> </ul>	<p>The screenshot shows a 'Status Dashboard' window with the following content:         <ul style="list-style-type: none"> <li>1: A left-pointing arrow.</li> <li>2: The text 'xxxxxx'.</li> <li>3: The text 'System Init.'.</li> <li>4: The text '25 C'.</li> <li>5: The text '11 W'.</li> <li>6: The text '0x09'.</li> </ul>         The text '1 Active Alerts' is also visible in the center of the dashboard.       </p>

## Active Alerts

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

## System VPD Information

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

## System Firmware

Sub Menu	Example
XCC Primary <ul style="list-style-type: none"> <li>Firmware level (status)</li> <li>Build ID</li> <li>Version number</li> <li>Release date</li> </ul>	XCC Primary (Active) Build: DVI399T Version: 4.07 Date: 2020-04-07
XCC Backup <ul style="list-style-type: none"> <li>Firmware level (status)</li> <li>Build ID</li> <li>Version number</li> <li>Release date</li> </ul>	XCC Backup (Active) Build: D8BT05I Version: 1.00 Date: 2019-12-30
UEFI <ul style="list-style-type: none"> <li>Firmware level (status)</li> <li>Build ID</li> <li>Version number</li> <li>Release date</li> </ul>	UEFI (Inactive) Build: D0E101P Version: 1.00 Date: 2019-12-26

## XCC Network Information

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

## System Environmental Information

Sub Menu	Example
<ul style="list-style-type: none"> <li>• Ambient temperature</li> <li>• Exhaust temperature</li> <li>• CPU temperature</li> <li>• PSU status</li> <li>• Spinning speed of fans by RPM</li> </ul>	Ambient Temp: 24 C Exhaust Temp: 30 C CPU1 Temp: 50 C PSU1: Vin= 213 w Inlet= 26 C FAN1 Front: 21000 RPM FAN2 Front: 21000 RPM FAN3 Front: 21000 RPM FAN4 Front: 21000 RPM

## Active Sessions

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

## Actions

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

---

## 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 minimal configuration for debugging that is supported for the server.

To determine the minimal configuration for your server, see “Minimal configuration for debugging” in [“Technical specifications” on page 403](#).

#### 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 401](#).

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 minimal configuration for debugging that is required for the server to start. To determine the minimal configuration for your server, see “Minimal configuration for debugging” in [“Technical specifications” on page 403](#).

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 minimal configuration, replace the components in the minimal 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 server. These LEDs indicate whether there is a problem with the connector, cable, or hub.

Ethernet controller LED locations are specified in [“Troubleshooting by system LEDs and diagnostics display” on page 415](#).

- 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 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.

Network activity LED location is specified in [“Troubleshooting by system LEDs and diagnostics display” on page 415](#).

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 401](#)).

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 453](#)).

## Intermittent problems

Use this information to solve intermittent problems.

- [“Intermittent external device problems” on page 434](#)
- [“Intermittent KVM problems” on page 434](#)

- [“Intermittent unexpected reboots” on page 434](#)

### 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 401](#) 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.

## 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 435](#)
- [“Mouse does not work” on page 435](#)
- [“KVM switch problems” on page 435](#)
- [“USB-device does not work” on page 435](#)

### 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.

## 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 436](#)
- [“Displayed system memory is less than installed physical memory” on page 436](#)
- [“Invalid memory population detected” on page 437](#)

### 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 (system board assembly).

### 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. See [“Troubleshooting by system LEDs and diagnostics display” on page 415](#).
  - No memory module error LEDs are lit on the system board (system board assembly).
  - Memory mirrored channel does not account for the discrepancy.
  - The memory modules are seated correctly.

- You have installed the correct type of memory module (see [“Memory module installation rules and order” on page 4](#) for requirements).
  - After changing or replacing a memory module, memory configuration is updated accordingly in the Setup Utility.
  - All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled.
  - There is no memory mismatch when the server is at the minimum memory configuration.
2. Reseat the memory modules, and then restart the server.
  3. Check the POST error log:
    - If a memory module was disabled by a systems-management interrupt (SMI), replace the memory module.
    - If a memory module was disabled by the user or by POST, reseat the memory module; then, run the Setup Utility and enable the memory module.
  4. Run memory diagnostics. When you start a server and press the key according to the on-screen instructions, the LXPM interface is displayed by default. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) You can perform memory diagnostics with this interface. From the Diagnostic page, go to **Run Diagnostic → Memory test → Advanced Memory Test**.
  5. Reverse the modules between the channels (of the same processor), and then restart the server. If the problem is related to a memory module, replace the failing memory module.
  6. Re-enable all memory modules using the Setup Utility, and then restart the server.
  7. (Trained technician only) Install the failing memory module into a memory module connector for processor 2 (if installed) to verify that the problem is not the processor or the memory module connector.
  8. (Trained technician only) Replace the system board (system board assembly).

### 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” on page 4](#) 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.

## Monitor and video problems

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

- [“Incorrect characters are displayed” on page 437](#)
- [“Screen is blank” on page 438](#)
- [“Screen goes blank when you start some application programs” on page 438](#)
- [“The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted” on page 438](#)
- [“The wrong characters appear on the screen” on page 439](#)

### 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 “Update the firmware” in *User Guide* or *System Configuration Guide*.

### 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 “Update the firmware” in *User Guide* or *System Configuration Guide*.
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 (system board assembly)

### **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 “Update the firmware” in *User Guide* or *System Configuration Guide*.

## **Network problems**

Use this information to resolve issues related to networking.

- [“Cannot wake server using Wake on LAN” on page 439](#)
- [“Could not log in using LDAP account with SSL enabled” on page 439](#)

### **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 401](#)), 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 403](#)).
  - 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 440](#)
- [“The server immediately displays the POST Event Viewer when it is turned on” on page 440](#)
- [“Server is unresponsive \(POST is complete and operating system is running\)” on page 440](#)
- [“Server is unresponsive \(POST failed and cannot start System Setup\)” on page 441](#)
- [“Voltage planar fault is displayed in the event log” on page 441](#)
- [“Unusual smell” on page 441](#)
- [“Server seems to be running hot” on page 441](#)
- [“Cannot enter legacy mode after installing a new adapter” on page 442](#)
- [“Cracked parts or cracked chassis” on page 442](#)

## 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/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 system LEDs and diagnostics display.
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 (system board assembly)

## 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 (system board assembly).

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 403 for the minimally required number of processors and DIMMs.
2. Restart the system.
  - If the system restarts, add each of the removed items one at a time and restart the system each time until the error occurs. Replace the item for which the error occurs.
  - If the system does not restart, suspect the system board (system board assembly).

### **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 403).
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 [Chapter 1 “Hardware replacement procedures” on page 1](#) 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.

## **Optional-device problems**

Use this information to solve problems related to optional devices.

- [“External USB device is not recognized” on page 442](#)
- [“PCIe adapter is not recognized or is not functioning” on page 442](#)
- [“Insufficient PCIe resources are detected.” on page 443](#)
- [“A Lenovo optional device that was just installed does not work.” on page 443](#)
- [“A Lenovo optional device that worked previously does not work now” on page 444](#)

### **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.

## **Performance problems**

Use this information to solve performance problems.

- [“Network performance” on page 444](#)
- [“Operating system performance” on page 444](#)

### **Network performance**

Complete the following steps until the problem is solved:

1. Isolate which network is operating slowly (such as storage, data, and management). You might find it helpful to use ping tools or operating-system tools such as task manager or resource manager.
2. Check for traffic congestion on the network.
3. Update the NIC device driver, or the storage device controller device driver.
4. Use the traffic-diagnostic tools that are provided by the IO-module manufacturer.

### **Operating system performance**

Complete the following steps until the problem is solved:

1. If you have recently made changes to the compute node (for example updated device drivers or installed software applications) remove the changes.
2. Check for any networking issues.
3. Check the operating system logs for performance related errors.
4. Check for events related to high temperatures and power issues as the compute node might be throttled to help with cooling. If it is throttled, reduce the workload on the compute node to help improve performance.
5. Check for events related to disabled DIMMs. If you do not have enough memory for the application workload, your operating system will have poor performance.
6. Ensure that the workload is not too high for the configuration.

## **Power on and power off problems**

Use this information to resolve issues when powering on or powering off the server.

- [“The power button does not work \(server does not start\)” on page 444](#)
- [“Server does not power on” on page 445](#)

### **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 front I/O module cable, and then repeat steps 1a and 2b.
    - If the server starts, reseat the front I/O module.
    - If the problem remains, replace the front I/O module.
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 is flashing slowly.
  - The push force is enough and with button force response.
3. If the power button LED is not lit on or is not flashing 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 (system board assembly).
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 (see [“Technical specifications” on page 403](#)).
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 (system board assembly) replacement is necessary.

## **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.

## 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 446](#)
- [“Serial device does not work” on page 446](#)

### 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 (see [“System-board-assembly connectors” on page 413](#)).
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 (system board assembly).

## 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.

## Storage drive problems

Use this information to resolve issues related to the storage drives.

- “Server cannot recognize a drive” on page 447
- “Multiple drives fail” on page 448
- “Multiple drives are offline” on page 448
- “A replacement drive does not rebuild” on page 448
- “Green drive activity LED does not represent actual state of associated drive” on page 448
- “Yellow drive status LED does not represent actual state of associated drive” on page 448
- “U.3 NVMe drive can be detected in NVMe connection, but cannot be detected in Tri-mode” on page 449

### Server cannot recognize a drive

Complete the following steps until the problem is solved.

1. Observe the associated yellow 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 drive backplane.
3. Observe the associated green 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 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 drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → 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 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.
4. Make sure that the 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 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 drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → 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 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 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 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 drive does not rebuild**

Complete the following steps until the problem is solved:

1. Make sure that the drive is recognized by the adapter (the green drive activity LED is flashing).
2. Review the SAS/SATA RAID adapter documentation to determine the correct configuration parameters and settings.

### **Green drive activity LED does not represent actual state of associated drive**

Complete the following steps until the problem is solved:

1. If the green drive activity LED does not flash when the drive is in use, run the diagnostics tests for the 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 drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → Disk Drive Test**
2. If the drive passes the test, replace the backplane.
3. If the drive fails the test, replace the drive.

### **Yellow 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 drive.

5. Power on the server and observe the activity of the drive LEDs.

### **U.3 NVMe drive can be detected in NVMe connection, but cannot be detected in Tri-mode**

In Tri-mode, NVMe drives are connected via a PCIe x1 link to the controller. To support Tri-mode with U.3 NVMe drives, **U.3 x1 mode** must be enabled for the selected drive slots on the backplane through the XCC Web GUI. By default, the backplane setting is **U.2 x4 mode**.

Complete the following steps to enable **U.3 x1 mode**:

1. Log into the XCC Web GUI, and choose **Storage → Detail** from the navigation tree on the left.
2. In the window that is displayed, click the icon  next to **Backplane**.
3. In the dialog box that is displayed, select the target drive slots and click **Apply**.
4. Do a DC power cycle to make the setting take effect.





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## Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about Lenovo products, you will find a wide variety of sources available from Lenovo to assist you.

On the World Wide Web, up-to-date information about Lenovo systems, optional devices, services, and support are available at:

<http://datacentersupport.lenovo.com>

**Note:** IBM is Lenovo's preferred service provider for ThinkSystem.

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### Before you call

Before you call, there are several steps that you can take to try and solve the problem yourself. If you decide that you do need to call for assistance, gather the information that will be needed by the service technician to more quickly resolve your problem.

#### Attempt to resolve the problem yourself

You can solve many problems without outside assistance by following the troubleshooting procedures that Lenovo provides in the online help or in the Lenovo product documentation. The online help 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 the following location:

<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. (See the following links) 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.
  - Drivers and software downloads
    - <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/>
  - Operating system support center
    - <https://datacentersupport.lenovo.com/solutions/server-os>
  - Operating system installing instructions
    - <https://pubs.lenovo.com/thinksystem#os-installation>
- 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.
- Refer to [Chapter 3 “Problem determination” on page 401](#) for instructions on isolating and solving issues.

- Go to <http://datacentersupport.lenovo.com> and check for information to help you solve the problem.

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.

- Check Lenovo Data Center Forum 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). Machine type number can be found on the ID label, see “Identifying the server and access the Lenovo XClarity Controller” in *User Guide* or *System Configuration Guide*.
- 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.

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## 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 “Backing up the BMC configuration” section in the XCC documentation compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>.
- For more information about using the CLI to collect service data, see the “XCC `ffdc` command” section in the XCC documentation 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.

You can find more information about setting up automatic problem notification within the Lenovo XClarity Administrator at [https://pubs.lenovo.com/lxca/admin\\_setupcallhome](https://pubs.lenovo.com/lxca/admin_setupcallhome).

- **Lenovo XClarity Essentials OneCLI**

Lenovo XClarity Essentials OneCLI has inventory application to collect service data. It can run both in-band and out-of-band. When running in-band within the host operating system on the server, OneCLI can collect information about the operating system, such as the operating system event log, in addition to the hardware service data.

To obtain service data, you can run the `getinfor` command. For more information about running the `getinfor`, see [https://pubs.lenovo.com/lxce-onecli/onecli\\_r\\_getinfor\\_command](https://pubs.lenovo.com/lxce-onecli/onecli_r_getinfor_command).

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## Contacting Support

You can contact Support to obtain help for your issue.

You can receive hardware service through a Lenovo Authorized Service Provider. To locate a service provider authorized by Lenovo to provide warranty service, go to <https://datacentersupport.lenovo.com/serviceprovider> and use filter searching for different countries. For Lenovo support telephone numbers, see <https://datacentersupport.lenovo.com/supportphonenumber> for your region support details.



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## Appendix B. Documents and supports

This section provides handy documents, driver and firmware downloads, and support resources.

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### Documents download

This section provides introduction and download link for handy documents.

#### Documents

Download the following product documentations at:

[https://pubs.lenovo.com/sr860-v3/pdf\\_files.html](https://pubs.lenovo.com/sr860-v3/pdf_files.html)

- **Rail Installation Guides**
  - Rail installation in a rack
- **CMA Installation Guide**
  - CMA installation in a rack
- **User Guide**
  - Complete overview, system configuration, hardware components replacing, and troubleshooting.  
Selected chapters from *User Guide*:
    - **System Configuration Guide** : Server overview, components identification, system LEDs and diagnostics display, product unboxing, setting up and configuring the server.
    - **Hardware Maintenance Guide** : Installing hardware components, cable routing, and troubleshooting.
- **Messages and Codes Reference**
  - XClarity Controller, LXPM, and uEFI events
- **UEFI Manual**
  - UEFI setting introduction

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### Support websites

This section provides driver and firmware downloads and support resources.

#### Support and downloads

- Drivers and Software download website for ThinkSystem SR860 V3
  - <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93/downloads/driver-list/>
- Lenovo Data Center Forum
  - [https://forums.lenovo.com/t5/Datacenter-Systems/ct-p/sv\\_eg](https://forums.lenovo.com/t5/Datacenter-Systems/ct-p/sv_eg)
- Lenovo Data Center Support for ThinkSystem SR860 V3
  - <https://datacentersupport.lenovo.com/products/servers/thinksystem/sr860v3/7d93>
- Lenovo License Information Documents
  - <https://datacentersupport.lenovo.com/documents/Invo-eula>
- Lenovo Press website (Product Guides/Datasheets/White papers)

- <https://lenovopress.lenovo.com/>
- Lenovo Privacy Statement
  - <https://www.lenovo.com/privacy>
- Lenovo Product Security Advisories
  - [https://datacentersupport.lenovo.com/product\\_security/home](https://datacentersupport.lenovo.com/product_security/home)
- Lenovo Product Warranty Plans
  - <http://datacentersupport.lenovo.com/warrantylookup>
- Lenovo Server Operating Systems Support Center website
  - <https://datacentersupport.lenovo.com/solutions/server-os>
- Lenovo ServerProven website (Options compatibility lookup)
  - <https://serverproven.lenovo.com>
- Operating System Installation Instructions
  - <https://pubs.lenovo.com/thinksystem#os-installation>
- Submit an eTicket (service request)
  - <https://support.lenovo.com/servicerequest>
- Subscribe to Lenovo Data Center Group product notifications (Stay up to date on firmware updates)
  - <https://datacentersupport.lenovo.com/solutions/ht509500>

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## 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.

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## Trademarks

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## Important notes

Processor speed indicates the internal clock speed of the processor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1 024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard-disk-drive bays with the largest currently supported drives that are available from Lenovo.

Maximum memory might require replacement of the standard memory with an optional memory module.

Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write cycles that it can be subjected to, expressed as total bytes written (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. Lenovo is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.

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Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

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## Electronic emission notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

Additional electronic emissions notices are available at:

[https://pubs.lenovo.com/important\\_notices/](https://pubs.lenovo.com/important_notices/)



## Taiwan Region BSMI RoHS declaration

單元 Unit	限用物質及其化學符號 Restricted substances and its chemical symbols					
	鉛Lead (Pb)	汞Mercury (Hg)	鎘Cadmium (Cd)	六價鉻 Hexavalent chromium (Cr <sup>6+</sup> )	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
機架	○	○	○	○	○	○
外部蓋板	○	○	○	○	○	○
機械組零件	-	○	○	○	○	○
空氣傳動設備	-	○	○	○	○	○
冷卻組零件	-	○	○	○	○	○
內存模組	-	○	○	○	○	○
處理器模組	-	○	○	○	○	○
電纜組零件	-	○	○	○	○	○
電源供應器	-	○	○	○	○	○
儲備設備	-	○	○	○	○	○
印刷電路板	-	○	○	○	○	○

備考1. “超出0.1 wt %”及“超出0.01 wt %”係指限用物質之百分比含量超出百分比含量基準值。  
 Note1: “exceeding 0.1wt%” and “exceeding 0.01 wt%” indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.

備考2. “○”係指該項限用物質之百分比含量未超出百分比含量基準值。  
 Note2: “○”indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.

備考3. “-”係指該項限用物質為排除項目。  
 Note3: The “-” indicates that the restricted substance corresponds to the exemption.

## 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





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