Dell EMC PowerEdge XR12

Installation and Service Manual

DELLTechnologies

Notes, cautions, and warnings

(i) **NOTE:** A NOTE indicates important information that helps you make better use of your product.

⚠ **CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.**

⚠ **WARNING: A WARNING indicates a potential for property damage, personal injury, or death.**

Contents

About this document

This document provides an overview about the system, information about installing and replacing components, diagnostic tools, and guidelines to be followed while installing certain components.

PowerEdge XR12 system overview

The PowerEdge XR12 system is a 2U server that supports:
● Rear Accessed configuration or Front Accessed configuration
● One 3rd Generation Intel Xeon Scalable processor with up to 36 cores
● Eight DIMM slots
● Two redundant AC or DC power supply units
● Up to 6 x 2.5-inch SAS/SATA/NVMe Solid State Drives (SSDs)

ⓘ **NOTE:** All instances of SAS, SATA, NVMe drives are referred to as drives in this document, unless specified otherwise.

ⓘ **NOTE:** The Rear Accessed and Front Accessed configurations cannot be modified into the other configuration.

⚠ **CAUTION: Do not install GPUs, network cards, or other PCIe devices on your system that are not validated and tested by Dell. Damage caused by unauthorized and invalidated hardware installation will null and void the system warranty.**

ⓘ **NOTE:** For more information, see the *Dell EMCPowerEdgeXR12 Technical Specifications* on the product documentation page.

Topics:

* Front view of the system
* Rear view of the system
* Status LED control panel
* Power button control panel
* Inside the system
* Locating the Express Service Code and Service Tag
* System information label
* Rail sizing and rack compatibility matrix

Front view of the system

Figure 1. Front view of Rear Accessed 6 x 2.5-inch drive configuration

Table 1. Features available on the front view of Rear Accessed 6 x 2.5-inch drive configuration

Item	Ports, panels, and slots	Icon	Description
1	Status LED control panel	N/A	Contains the system health, system ID, status LED. ● Status LED: Enables you to identify any failed hardware components. There are five status LEDs and an overall system health LED (Chassis health and system ID) bar. For more information, see the Status LED indicators section.
2	Power button control panel	N/A	Contains the power button, USB port, iDRAC Direct micro USB port, and the iDRAC Direct status LED.
3	Information tag	N/A	The Information tag is a slide-out label panel that contains Service Tag, iDRAC MAC address and LOM 1 MAC address.
4	Cooling fan	N/A	Supports 6 high performance cooling fans ⓘ NOTE: All 6 fans need to be installed in the system during operation.

Figure 2. Front view of Front Accessed 6 x 2.5-inch drive configuration

Table 2. Features available on the front view of Front Accessed 6 x 2.5-inch drive configuration

Item	Ports, panels, or slots	Icon	Description
1	Status LED control panel	N/A	Contains the system health, system ID, status LED. ● Status LED: Enables you to identify any failed hardware components. There are five status LEDs and an overall system health LED (Chassis health

Item	Ports, panels, or slots	Icon	Description
			and system ID) bar. For more information, see the Status LED indicators section.
2	PCIe expansion card riser 1 (slot 3)	N/A	Enables you to access the PCIe expansion card installed on riser 1 in the system.
3	PCIe expansion card riser 2 (slot 1 and 2)	N/A	Enables you to access the PCIe expansion card installed on riser 2 in the system.
4	Serial port	IOIOI	Enables you to connect a serial device to the system.
5	iDRAC dedicated port	iDRAC	It is an RJ-45 port.
6	Drive	N/A	Enables you to install up to 6 x 2.5-inch SAS/SATA/NVMe Solid-State Drives (SSDs).
7	Information tag	N/A	The Information tag is a slide-out label panel that contains Service Tag, iDRAC MAC address and LOM 1 MAC address.
8	Power button control panel	N/A	Contains the power button, USB port, iDRAC Direct micro port, and the iDRAC Direct status LED.
9	Power supply unit (PSU 2)	⚡2	Indicates the PSU2 or redundant PSU.
10	Power supply unit (PSU 1)	⚡1	Indicates the PSU1 or primary PSU.
11	PCIe expansion card riser 3 (slot 4 and 5)	N/A	Enables you to access the PCIe expansion card installed on riser 3 in the system.
12	USB 2.0 port	⛛	This port is USB 2.0-compliant.
13	USB 3.0 port	ss⛛	This port is USB 3.0-compliant.
14	VGA port	⌷⌷⌷	Enables you to connect a display device to the system.
15	4 x 25 GB LOM ports	🖧	Provides network connectivity and can also be shared with iDRAC when iDRAC network settings is set to shared mode

ⓘ **NOTE:** For more information, see the Dell EMC PowerEdge XR12 Technical Specifications on the product documentation page.
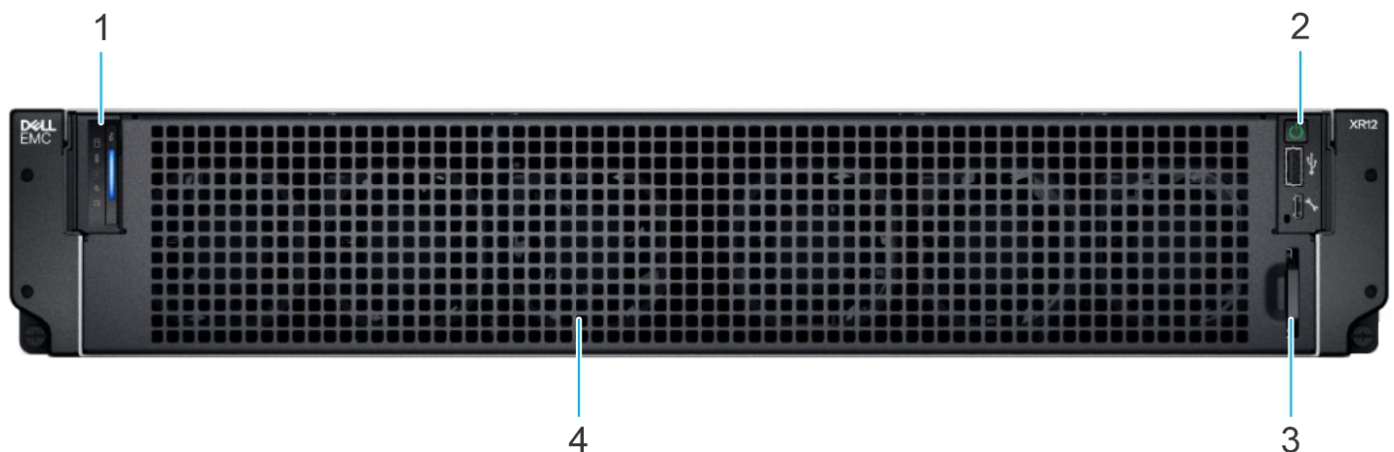
Rear view of the system
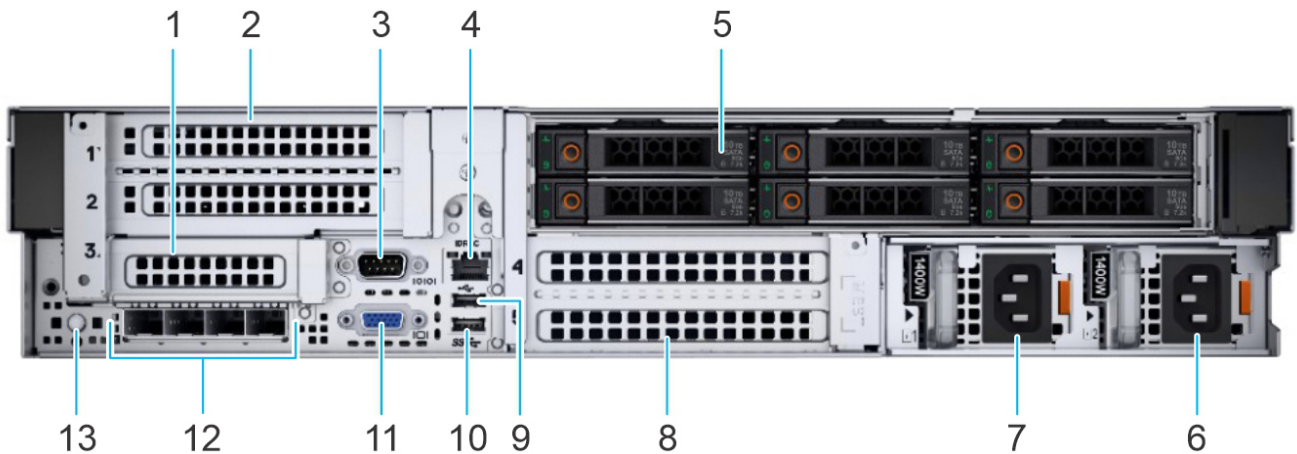
Figure 3. Rear view of Rear Accessed 6 x 2.5-inch drive configuration

Table 3. Features available on the rear view of Rear Accessed 6 x 2.5-inch drive configuration

Item	Ports, panels, or slots	Icon	Description
1	PCIe expansion card riser 1 (slot 3)	N/A	Enables you to connect PCI Express expansion cards.
2	PCIe expansion card riser 2 (slot 1 and 2)	N/A	Enables you to connect PCI Express expansion cards.
3	Serial port	IOIOI	Enables you to connect a serial device to the system.
4	iDRAC dedicated port	iDRAC	It is an RJ-45 port.
5	Drive	N/A	Enables you to install up to 6 x 2.5-inch SAS/SATA/NVMe Solid-State Drives (SSDs).
6	Power supply unit (PSU 2)	⚡2	Indicates the PSU2 or redundant PSU.
7	Power supply unit (PSU 1)	⚡1	Indicates the PSU1 or primary PSU.
8	PCIe expansion card riser 3 (slot 4 and 5)	N/A	Enables you to connect PCI Express expansion cards.
9	USB 2.0 port	⌁	This port is USB 2.0-compliant.
10	USB 3.0 port	SS⌁	This port is USB 3.0-compliant.
11	VGA port	⌸	Enables you to connect a display device to the system.
12	4 x 25 GB LOM ports	⊓⊔	The LOM ports that are integrated on the system board provide network connectivity. These LOM ports can also be shared with iDRAC when iDRAC network settings is set to shared mode.

Table 3. Features available on the rear view of Rear Accessed 6 x 2.5-inch drive configuration (continued)

Item	Ports, panels, or slots	Icon	Description
13	System identification button	ⓘ	Press the system ID button: • To locate a particular system within a rack. • To turn the system ID on or off. To reset iDRAC, press and hold the button for 16 seconds. ⓘ **NOTE:** • To reset iDRAC using system ID, ensure that the system ID button is enabled in the iDRAC setup. • If the system stops responding during POST, press and hold the system ID button (for more than five seconds) to enter the BIOS progress mode.
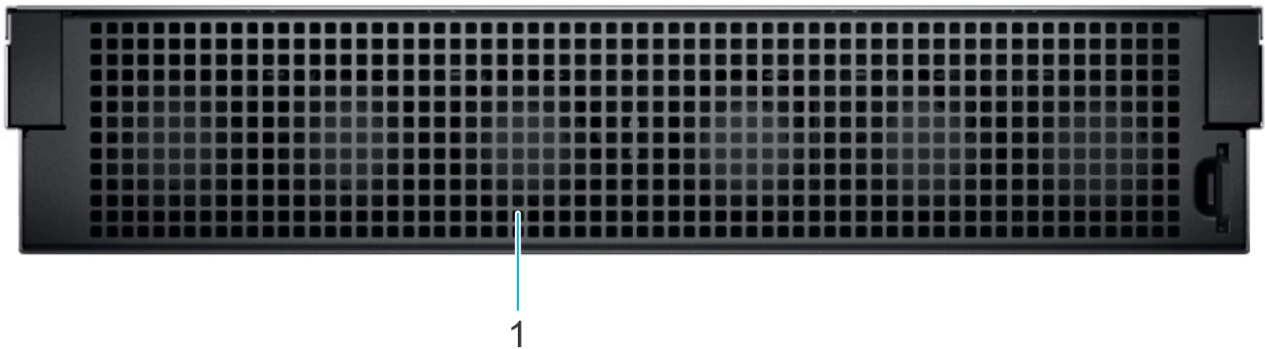
Figure 4. Rear view of Front Accessed 6 x 2.5-inch drive configuration

Table 4. Features available on the rear view of Front Accessed 6 x 2.5-inch drive configuration

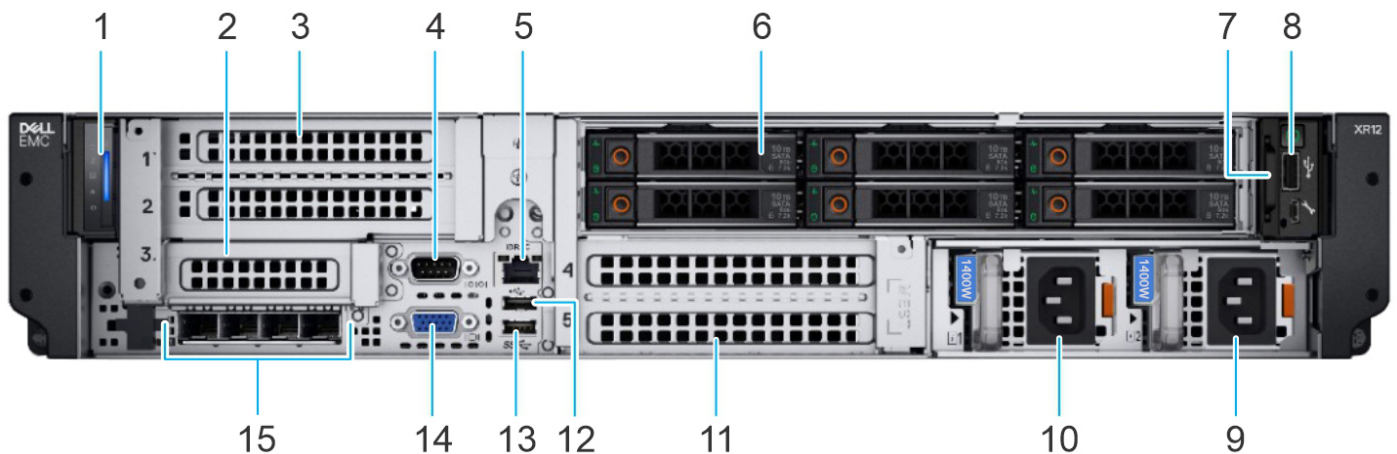| Item	Ports, panels, and slots	Icon	Description
1	Cooling fan	N/A	Supports 6 high performance cooling fans ⓘ **NOTE:** All 6 fans need to be installed in the system during operation. .

ⓘ **NOTE:** For more information, see the Dell EMC PowerEdge XR12 Technical Specifications on the product documentation page.

Status LED control panel
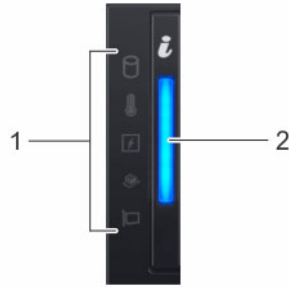
Figure 5. Status LED control panel

Table 5. Status LED control panel

Item	Indicator, button, or connector	Icon	Description
1	Status LED indicators	NA	Indicates the status of the system. For more information, see the Status LED indicators section.
2	System health and system ID indicator	*i*	Indicates system health. For more information, see the System health and system ID indicator codes section.

ⓘ **NOTE:** For more information about the indicator codes, see the System diagnostics and indicator codes section.

Power button control panel
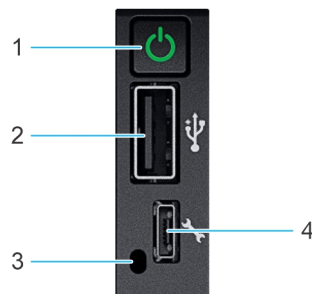
Figure 6. Power button control panel

Table 6. Power button control panel

Item	Indicator or button	Icon	Description
1	Power button	⏻	Indicates if the system is powered on or off. Press the power button to manually power on or off the system. ⓘ **NOTE:** Press the power button to gracefully shut down an ACPI-compliant operating system.
2	USB 2.0-compliant port	⚡	The USB port is a 2.0-compliant. This port enables you to connect USB devices to the system. ⓘ **NOTE:** The USB 2.0 port is not available on Front Accessed configuration.

Table 6. Power button control panel (continued)

Item	Indicator or button	Icon	Description
3	iDRAC Direct LED indicator	N/A	The iDRAC Direct LED indicator lights up to indicate that the iDRAC Direct port is actively connected to a device.
4	iDRAC Direct port (Micro-AB USB)	🔧	The iDRAC Direct port (Micro-AB USB) enables you to access the iDRAC direct features. For more information, see the https://www.dell.com/idracmanuals. ⓘ **NOTE:** You can configure iDRAC Direct by using a USB to micro USB (type AB) cable, which you can connect to your laptop or tablet. Cable length should not exceed 3 feet (0.91 meters). Performance could be affected by cable quality.

ⓘ **NOTE:** For more information, see the *Dell EMCPowerEdgeXR12 Technical Specifications* on the product documentation page.

Inside the system
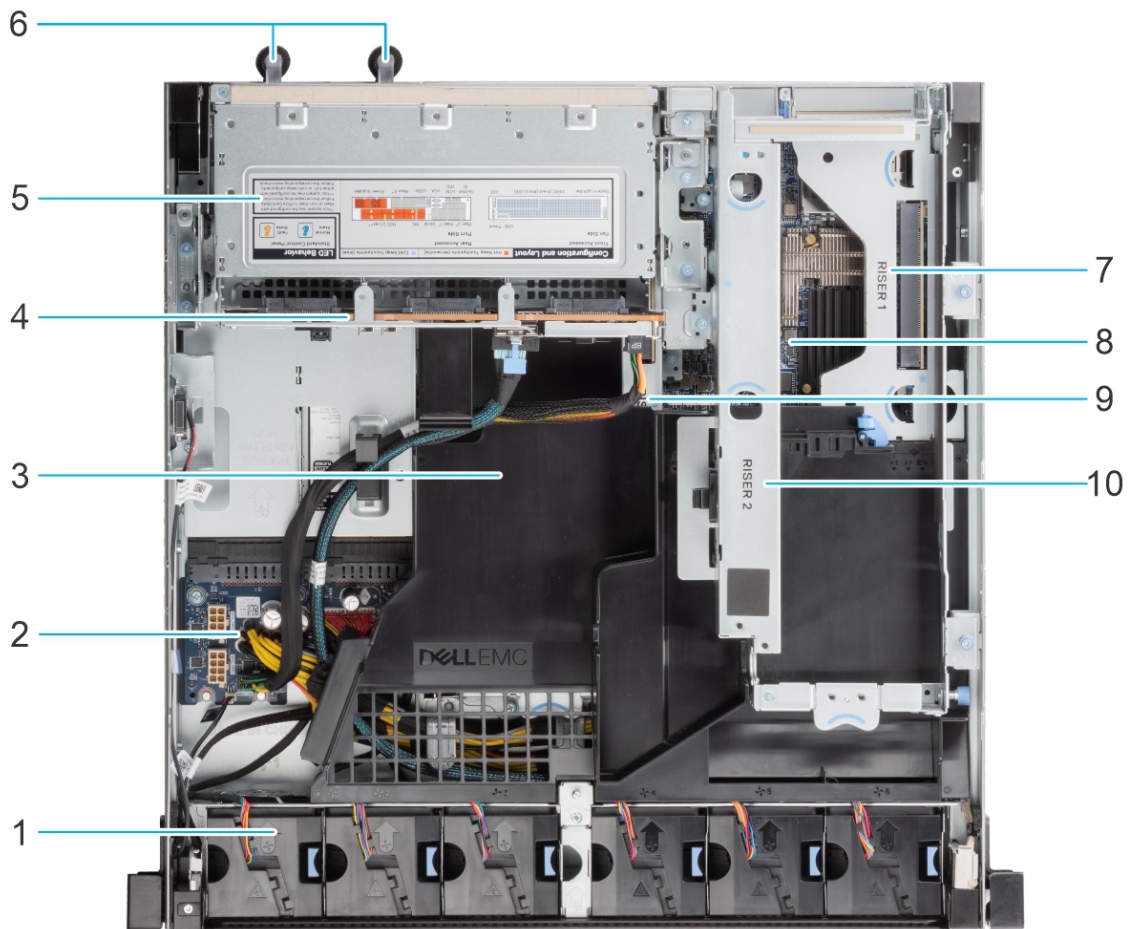
Figure 7. Inside the system - Rear Accessed configuration

1. Cooling fan (6)
2. Power Interposer Board (PIB)
3. Air shroud
4. Backplane
5. Drive cage (2.5-inch SSDs) (6)
6. Power supply units (1 and 2)
7. Riser 1
8. System board
9. Riser 3
10. Riser 2
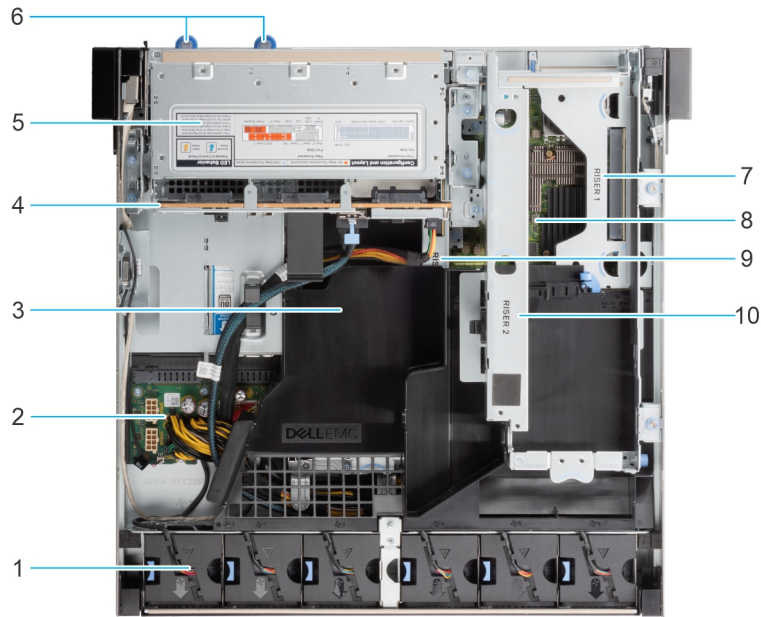
Figure 8. Inside the system - Front Accessed configuration

1. Cooling fan (6)
2. Power Interposer Board (PIB)
3. Air shroud
4. Backplane
5. Drive cage (2.5-inch SSDs) (6)
6. Power supply units (1 and 2)
7. Riser 1
8. System board
9. Riser 3
10. Riser 2

Locating the Express Service Code and Service Tag

The unique Express Service Code and Service Tag are used to identify the system.

The information tag is located on the front of Rear and Front Accessed configurations. The information tag includes system information such as the Service Tag, Express Service Code, Manufacture date, NIC, MAC address, QRL label, and so on.
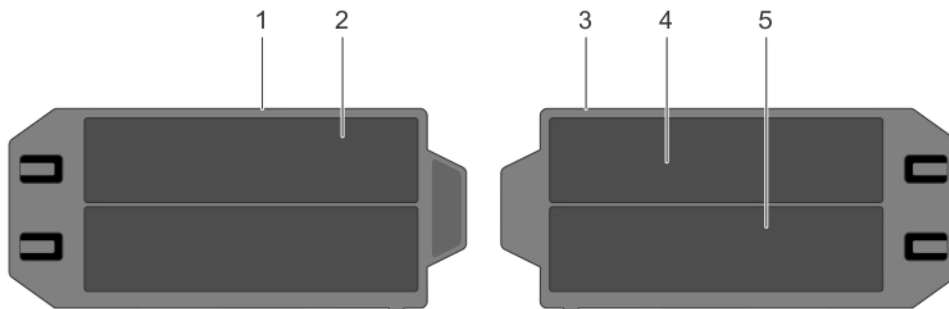
Figure 9. Locating the Service Tag of your system

1. Information tag (front view)
2. Express Service Tag label
3. Information tag (back view)
4. iDRAC MAC address information label
5. Network MAC address information label

The Mini Enterprise Service Tag (MEST) label is located on the rear of the Rear Accessed configuration and on the front of the Front Accessed configurations. The MEST includes the Service Tag (ST), Express Service Code (Exp Svc Code), and Manufacture Date (Mfg. Date). The Exp Svc Code is used by Dell EMC to route support calls to the appropriate personnel.

Alternatively, the Service Tag information is located on a label on the left wall of Rear Accessed configuration and right wall of the Front Accessed configuration.

System information label

The system information label is located on back of the system cover.
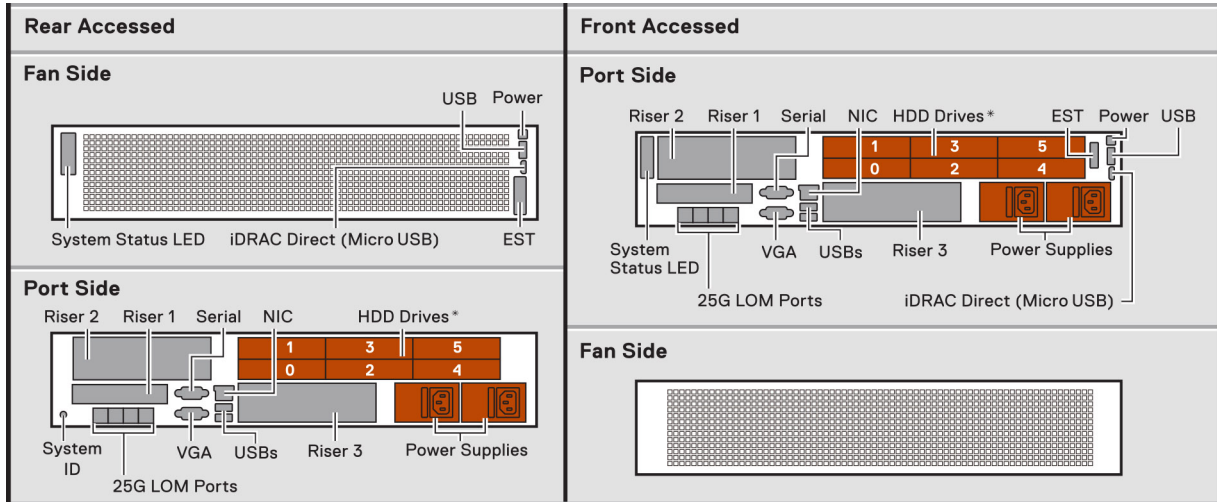
Figure 10. Service information
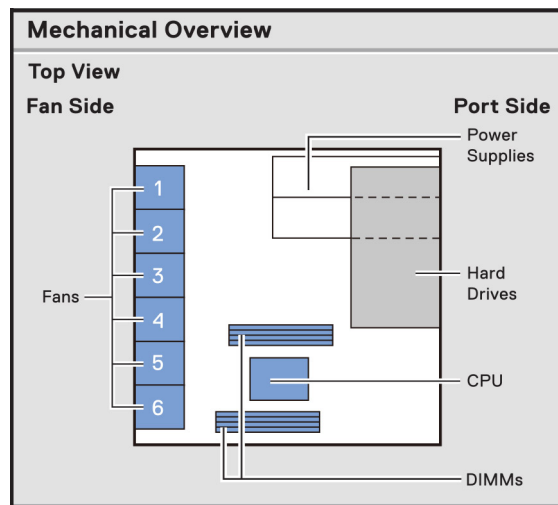
Figure 11. Mechanical overview

Electrical Overview

System Board Connections

5 IO Riser 3		**20** CPU	
6 TPM		**21** Fan 6	
7 BOSS		**22** Fan 5	
8 IO Riser 2		**23** PCIe #2: SL2_CPU_PA1	
9 RJ45 & Dual USB Conn		**24** PCIe #1: SL1_CPU_PB1	
10 COM & VGA Conn		**25** Fan 4	
11 LOM 25G Conn		**26** GPU Power Conn 1	
12 Battery		**27** GPU Power Conn 2	
13 ID Button		**28** PSU Conn 2	
14 PCIe #3: SL3_PCH_SA1		**29** PSU Conn 1	
1 System Power Conn 1	**15** Jumper	**30** Fan 3	
2 System Power Conn 2	**16** Left Control Panel	**31** Fan 2	
3 PIB Signal	**17** IO Riser 1	**32** Fan 1	
4 DIMMs For CPU	**18** Right Control Panel	**33** Backplane Power Conn	
	19 DIMMs for CPU	**34** Intrusion Conn	

Jumper Settings

Figure 12. Electrical overview
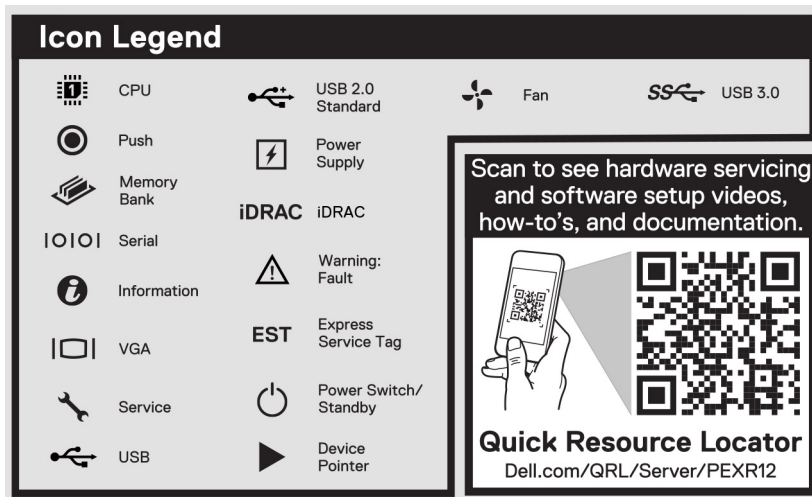
Figure 13. Icon Legend and QRL
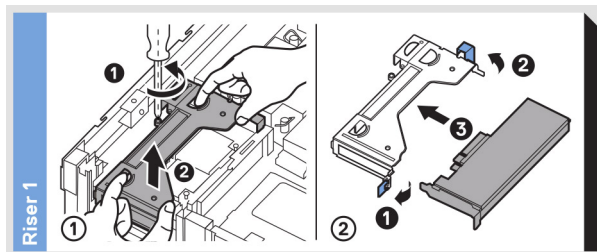
Figure 14. System tasks 1
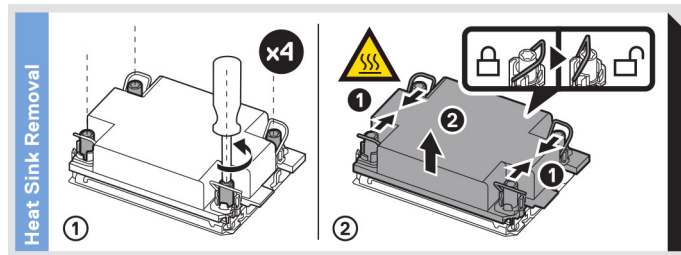
Figure 15. System tasks 2
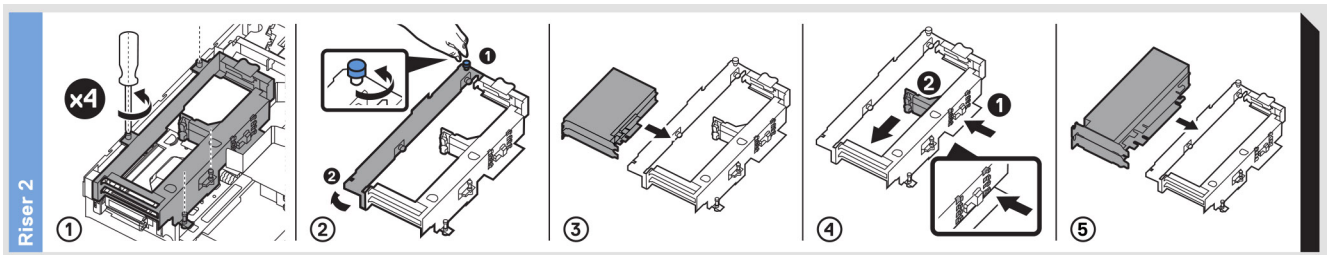
Figure 16. System tasks 3
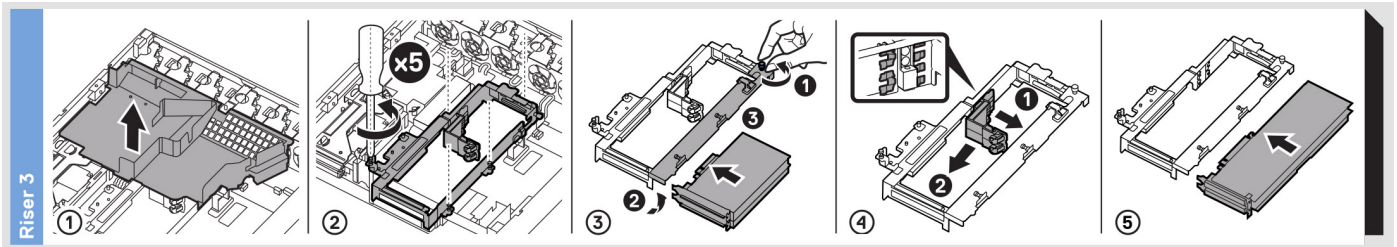
Figure 17. System tasks 4
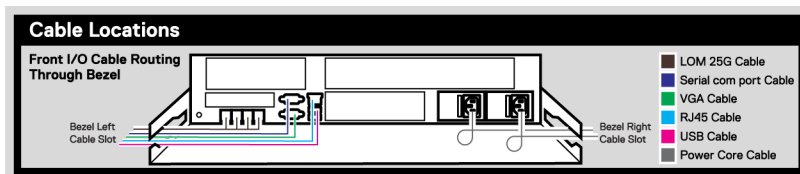
Figure 18. Cabling SIL on optional front bezel

Rail sizing and rack compatibility matrix

For specific information about the rail solutions compatible with your system, see the *Dell EMC Enterprise Systems Rail Sizing and Rack Compatibility Matrix* available at https://i.dell.com/sites/csdocuments/Business_solutions_engineering-Docs_Documents/en/rail-rack-matrix.pdf.

The document provides the information that is listed below:

● Specific details about rail types and their functionalities.
● Rail adjustability range for various types of rack mounting flanges.
● Rail depth with and without cable management accessories.
● Types of racks supported for various types of rack mounting flanges.

Initial system setup and configuration

This section describes the tasks for initial setup and configuration of the Dell EMC system. The section also provides general steps to set up the system and the reference guides for detailed information.

Topics:

- Setting up the system
- iDRAC configuration
- Resources to install operating system

Setting up the system

Perform the following steps to set up the system:

Steps

1. Unpack the system.
2. Install the system into the rack. For more information, see the rail installation and cable management accessory guides relevant to your rail and cable management solution at www.dell.com/poweredgemanuals.
3. Connect the peripherals to the system and the system to the electrical outlet.
4. Power on the system.

   For more information about setting up the system, see the *Getting Started Guide* that is shipped with your system.

   (i) **NOTE:** For information about managing the basic settings and features of the system, see the *Dell Technologies PowerEdge XR12 BIOS and UEFI Reference Guide* on the product documentation page.

iDRAC configuration

The Integrated Dell Remote Access Controller (iDRAC) is designed to make you more productive as a system administrator and improve the overall availability of Dell EMC servers. iDRAC alerts you to system issues, helps you to perform remote management, and reduces the need for physical access to the system.

(i) **NOTE:** To reset iDRAC, see how to reset iDRAC.

Options to set up iDRAC IP address

To enable communication between your system and iDRAC, you must first configure the network settings based on your network infrastructure. The network settings option is set to **DHCP**, by default.

(i) **NOTE:** For static IP configuration, you must request for the settings at the time of purchase.

You can set up the iDRAC IP address using one of the interfaces in the table below. For information about setting up iDRAC IP address, see the documentation links provided in the table below.

Table 7. Interfaces to set up iDRAC IP address

Interface	Documentation links
iDRAC Settings utility	*Integrated Dell Remote Access Controller User's Guide* at https://www.dell.com/idracmanuals or for system specific *Integrated Dell Remote Access Controller User's Guide*, go to https://www.dell.com/poweredgemanuals > **Product Support** page of your system > **Documentation**.

Table 7. Interfaces to set up iDRAC IP address (continued)

Interface	Documentation links
	(i) **NOTE:** To determine the most recent iDRAC release for your platform and for latest documentation version, see KB article https://www.dell.com/support/article/sln308699.
OpenManage Deployment Toolkit	*Dell OpenManage Deployment Toolkit User's Guide* available at https://www.dell.com/openmanagemanuals > Open Manage Deployment Toolkit.
iDRAC Direct	*Integrated Dell Remote Access Controller User's Guide* at https://www.dell.com/idracmanuals or for system specific *Integrated Dell Remote Access Controller User's Guide*, go to https://www.dell.com/poweredgemanuals > **Product Support** page of your system > **Documentation**. (i) **NOTE:** To determine the most recent iDRAC release for your platform and for latest documentation version, see KB article https://www.dell.com/support/article/sln308699.
Lifecycle Controller	*Dell Lifecycle Controller User's Guide* at https://www.dell.com/idracmanuals or for system specific *Dell Lifecycle Controller User's Guide*, go to https://www.dell.com/poweredgemanuals > **Product Support** page of your system > **Documentation**. (i) **NOTE:** To determine the most recent iDRAC release for your platform and for latest documentation version, see KB article https://www.dell.com/support/article/sln308699.

(i) **NOTE:** To access iDRAC, ensure that you connect the ethernet cable to the iDRAC dedicated network port or use the iDRAC Direct port by using the USB cable. You can also access iDRAC through the shared LOM mode, if you have opted for a system that has the shared LOM mode enabled.

Options to log in to iDRAC

To log in to the iDRAC Web User Interface, open a browser and enter the IP address.

You can log in to iDRAC as:

● iDRAC user
● Microsoft Active Directory user
● Lightweight Directory Access Protocol (LDAP) user

If you opted for legacy password, use the iDRAC legacy username and password - `root` and `calvin`. If you opted for Force Change Password, for the initial log in to iDRAC use the username and password - `root` and `calvin`. Then you will be prompted and required to create a password of your choice before proceeding.

(i) **NOTE:** Ensure that you change the default username and password after setting up the iDRAC IP address.

For more information about logging in to the iDRAC and iDRAC licenses, see the latest *Integrated Dell Remote Access Controller User's Guide* at www.dell.com/idracmanuals.

(i) **NOTE:** To determine the most recent iDRAC release for your platform and for latest documentation version, see KB article https://www.dell.com/support/article/sln308699.

You can also access iDRAC using command-line protocol - RACADM. For more information, see the *Integrated Dell Remote Access Controller RACADM CLI Guide* available at https://www.dell.com/idracmanuals.

You can also access iDRAC using automation tool - Redfish API. For more information, see the *Integrated Dell Remote Access Controller User's Guide Redfish API Guide* available at https://developer.dell.com.

Resources to install operating system

If the system is shipped without an operating system, you can install a supported operating system by using one of the resources provided in the table below. For information about how to install the operating system, see the documentation links provided in the table below.

Table 8. Resources to install the operating system

Resource	Documentation links
iDRAC	*Integrated Dell Remote Access Controller User's Guide* at https://www.dell.com/idracmanuals or for system specific *Integrated Dell Remote Access Controller User's Guide*, go to https://www.dell.com/poweredgemanuals > **Product Support** page of your system > **Documentation**. ⓘ **NOTE:** To determine the most recent iDRAC release for your platform and for latest documentation version, see KB article at https://www.dell.com/support/article/sln308699.
Lifecycle Controller	*Dell Lifecycle Controller User's Guide* at https://www.dell.com/idracmanuals or for system specific *Dell Lifecycle Controller User's Guide*, go to https://www.dell.com/poweredgemanuals > **Product Support** page of your system > **Documentation**. Dell recommends using Lifecycle Controller to install the OS, since all required drivers are installed on the system. ⓘ **NOTE:** To determine the most recent iDRAC release for your platform and for latest documentation version, see KB article at https://www.dell.com/support/article/sln308699.
OpenManage Deployment Toolkit	www.dell.com/openmanagemanuals > OpenManage Deployment Toolkit
Dell certified VMware ESXi	www.dell.com/virtualizationsolutions

ⓘ **NOTE:** For more information about installation and how-to videos for operating systems supported on PowerEdge systems, see Supported Operating Systems for Dell EMC PowerEdge systems.

Options to download firmware

You can download firmware from the Dell support site. For information about downloading firmware, see the Downloading drivers and firmware section.

You can also choose any one of the following options to download the firmware. For information about how to download the firmware, see the documentation links provided in the table below.

Table 9. Options to download firmware

Option	Documentation link
Using Integrated Dell Remote Access Controller Lifecycle Controller (iDRAC with LC)	www.dell.com/idracmanuals
Using Dell Repository Manager (DRM)	www.dell.com/openmanagemanuals > Repository Manager
Using Dell Server Update Utility (SUU)	www.dell.com/openmanagemanuals > Server Update Utility
Using Dell OpenManage Deployment Toolkit (DTK)	www.dell.com/openmanagemanuals > OpenManage Deployment Toolkit
Using iDRAC virtual media	www.dell.com/idracmanuals

Options to download and install OS drivers

You can choose any one of the following options to download and install OS drivers. For information about how to download or install OS drivers, see the documentation links provided in the table below.

Table 10. Options to download and install OS drivers

Option	Documentation
Dell EMC support site	Downloading drivers and firmware section.
iDRAC virtual media	*Integrated Dell Remote Access Controller User's Guide* at https://www.dell.com/idracmanuals or for system specific *Integrated Dell Remote Access Controller User's Guide*, go to https://www.dell.com/poweredgemanuals > **Product Support** page of your system > **Documentation** . (i) **NOTE:** To determine the most recent iDRAC release for your platform and for latest documentation version, see https://www.dell.com/support/article/sln308699.

Downloading drivers and firmware

It is recommended that you download and install the latest BIOS, drivers, and systems management firmware on the system.

Prerequisites

Ensure that you clear the web browser cache before downloading the drivers and firmware.

Steps

1. Go to www.dell.com/support/drivers.
2. Enter the Service Tag of the system in the **Enter a Dell Service Tag, Dell EMC Product ID or Model** field, and then press Enter.

   (i) **NOTE:** If you do not have the Service Tag, click **Browse all products**, and navigate to your product.

3. On the displayed product page, click **Drivers & Downloads**.
   On the **Drivers & Downloads** page, all drivers that are applicable to the system are displayed.
4. Download the drivers to a USB drive, CD, or DVD.

4

Minimum to POST and system management configuration validation

This section describes the minimum to POST system requirement and system management configuration validation of the Dell EMC system.

Topics:

- Minimum configuration to POST
- Configuration validation

Minimum configuration to POST

The components mentioned below are the minimum configuration to POST:

- System board
- Power button control panel and cable
- Power Interposer Board (PIB) and cables
- Processor and heat sink
- One memory module (DIMM) in socket A1
- One power supply unit

Configuration validation

The new generation of PowerEdge systems have added interconnect flexibility and advanced iDRAC management features to collect precise system configuration information and report configuration errors.

When the system is powered on, information about installed cables, risers, backplanes, power supplies and processor is obtained from the CPLD and backplane memory maps is analyzed. This information forms a unique configuration, which is compared with one of the qualified configurations stored in a table maintained by iDRAC.

One or more sensors are assigned to each of the configuration elements. During POST, any configuration validation error is logged in the System Event Log (SEL)/LifeCycle (LC) log. The reported events are categorized in the configuration validation error table.

Table 11. Configuration validation error

Error	Description	Possible cause and recommendations	Example
Config Error	A configuration element within the closest match contains something that is unexpected and does not match any Dell qualified configuration.	Wrong configuration	Config Error: Backplane Cable PLANAR_SL1 and BP_DST_SA1
		The element reported in HWC8010 errors are assembled incorrectly. Verify element (cable, riser, etc) placement in the system.	Config Error : Backplane Cable PLANAR_SL3 and BP_DST_PA1
Config Missing	iDRAC found a configuration element missing within the closest match detected.	Missing element or cable is reported in HWC8010 error logs. Install the missing element (cable, riser, etc).	Config Missing : Backplane Cable PLANAR_SL3 and BP_DST_SA1

Table 11. Configuration validation error (continued)

Error	Description	Possible cause and recommendations	Example
Comm Error	A configuration element is not responding to iDRAC using the management interface while running an inventory check.	System management sideband communication	Comm Error: Backplane 0
		Unplug AC Power, reseat the element and replace the element if the problem persists.	

Error messages

This section describes the error messages displayed on the screen during POST or captured in the system event log (SEL)/ LifeCycle (LC) log.

Table 12. Error message HWC8010

Error code	HWC8010
Message	The System Configuration Check operation resulted in the following issue involving the indicated component type
Arguments	backplane, processor, cable, or other components
Detailed Description	The issue identified in the message is observed in the System Configuration Check operation.
Recommended Response Action	Do the following and retry the operation: 1. Disconnect the input power. 2. Check for proper cable connection and component placement. If the issue persists, contact the service provider.
Category	System Health (HWC = Hardware Config)
Severity	Critical
Trap/EventID	2329

Table 13. Error message HWC8011

Error code	HWC8011
Message	The System Configuration Check operation resulted in multiple issues involving the indicated component type
Arguments	backplane, processor, cable, or other components
Detailed Description	Multiple issues are observed in the System Configuration Check operation.
Recommended Response Action	Do the following and retry the operation: 1. Disconnect the input power. 2. Check for proper cable connection and component placement. If the issue persists, contact the service provider.
Category	System Health (HWC = Hardware Config)
Severity	Critical

Installing and removing system components

Topics:

Safety instructions

ⓘ **NOTE:** Whenever you need to lift the system, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.

⚠ **CAUTION: Ensure that two or more people lift the system horizontally from the box and place it on a flat surface, rack lift, or into the rails.**

⚠ **WARNING: Opening or removing the system cover while the system is powered on may expose you to a risk of electric shock.**

⚠ **WARNING: Do not operate the system without the cover for a duration exceeding five minutes. Operating the system without the system cover can result in component damage.**

⚠ **CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.**

ⓘ **NOTE:** It is recommended that you always use an antistatic mat and antistatic strap while working on components inside the system.

⚠ **CAUTION: To ensure proper operation and cooling, all system bays and fans must always be populated with a component or a blank.**

ⓘ **NOTE:** While replacing the hot swappable PSU, after next server boot; the new PSU automatically updates to the same firmware and configuration of the replaced one. For updating to the latest firmware and changing the configuration, see the *Lifecycle Controller User's Guide* at https://www.dell.com/idracmanuals.

ⓘ **NOTE:** While replacing a faulty storage controller or NIC card with the same type of card, after you power on the system; the new card automatically updates to the same firmware and configuration of the faulty one. For more information about the Part replacement configuration, see the *Dell Lifecycle Controller User's Guide* available at https://www.dell.com/idracmanuals

ⓘ **NOTE:** Only use certified Optical Fiber Transceiver Class I Laser Products.

⚠ **CAUTION: Do not install GPUs, network cards, or other PCIe devices on your system that are not validated and tested by Dell. Damage caused by unauthorized and invalidated hardware installation will null and void the system warranty.**

Before working inside your system

Prerequisites

Follow the safety guidelines listed in the Safety instructions.

Steps

1. Power off the system and all attached peripherals.
2. Disconnect the system from the electrical outlet, and disconnect the peripherals.
3. If applicable, remove the system from the rack.
   For more information, see the *Rail Installation Guide* relevant to your rail solutions at www.dell.com/poweredgemanuals.
4. Remove the system cover.

After working inside your system

Prerequisites

Follow the safety guidelines listed in Safety instructions.

Steps

1. Replace the system cover.
2. If applicable, install the system into the rack.
   For more information, see the *Rail Installation Guide* relevant to your system at www.dell.com/poweredgemanuals.
3. Reconnect the peripherals and connect the system to the electrical outlet, and then power on the system.

Recommended tools

You may need any or combination of the following tools to perform the removal and installation procedures:
- Phillips 1 screwdriver
- Phillips 2 screwdriver
- Torx T8 screwdriver
- Torx T30 screwdriver
- 5 mm hex nut screwdriver
- Plastic scribe
- 1/4-inch flat blade screwdriver

- Wrist grounding strap connected to the ground
- ESD mat
- Needle-nose pliers

You need the following tools to assemble the cables for a DC power supply unit:

- AMP 90871-1 hand-crimping tool or equivalent
- Tyco Electronics 58433-3 or equivalent
- Wire-stripper pliers to remove insulation from size 10 AWG solid or stranded, insulated copper wire
  - (i) **NOTE:** Use alpha wire part number 3080 or equivalent (65/30 stranding).

Optional front bezel

Removing the front bezel

Prerequisites

Follow the safety guidelines listed in the Safety instructions.

Steps

1. Remove the screws that secure the bezel on both sides of the system rack ears.
2. Holding the bezel at its edges, remove the bezel.
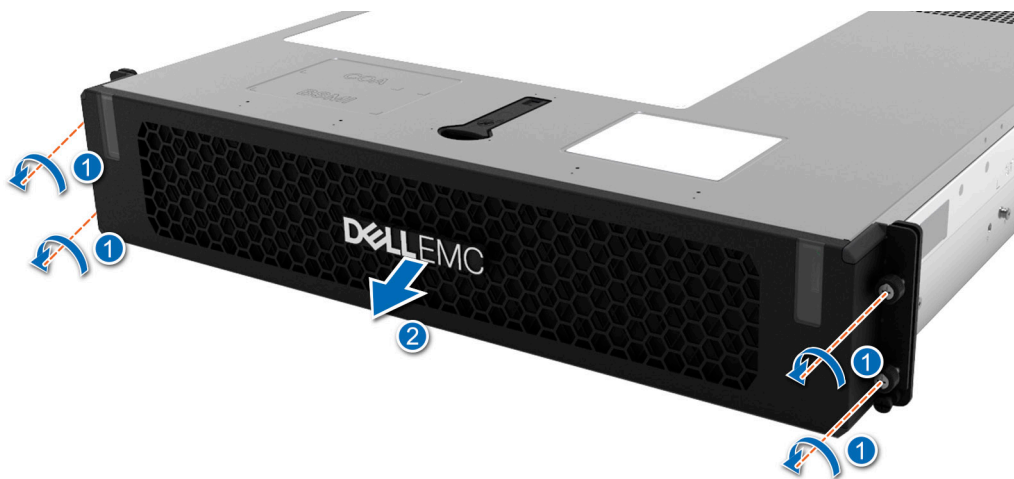
Figure 19. Removing the front bezel for Rear Accessed configuration

Figure 20. Removing the front bezel for Front Accessed configuration

Next steps

Replace the bezel.

Installing the front bezel

Prerequisites

Follow the safety guidelines listed in the Safety instructions.

Steps

1. Align the screws on the sides of the bezel with the holes on the system rack ears.
2. Tighten the screws that secure the bezel on both sides of the system rack ears.

Figure 21. Installing the front bezel for Rear Accessed configuration

Figure 22. Installing the front bezel for Front Accessed configuration

Bezel filter

Removing the bezel filter

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the bezel

Steps

Keep the bezel inside side facing up and slide the latch on one end of the bezel as shown in the figure. After the latch disengages, lift the filter by the pull tab.

(i) **NOTE:** To maintain optimal system health, Dell Technologies recommends checking and changing the filter every three months. Filters can be ordered from Dell Technologies.
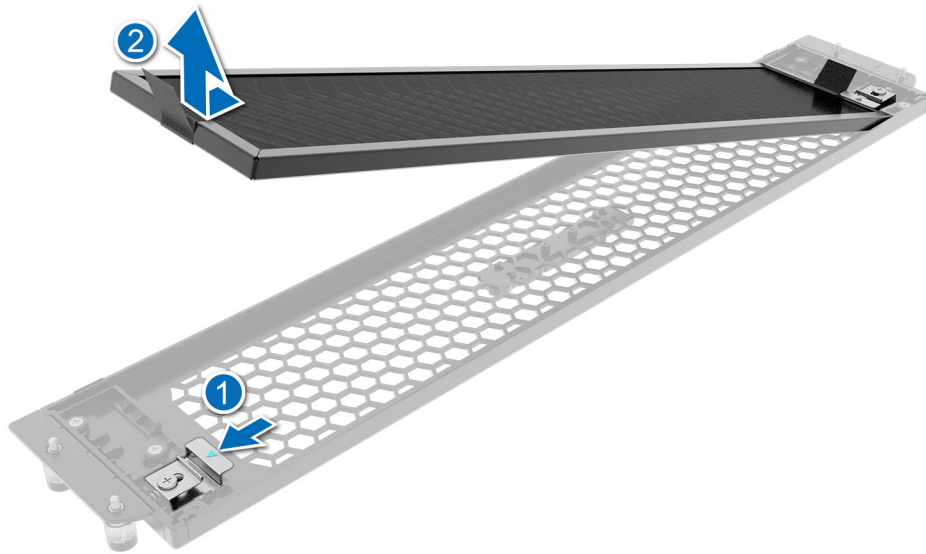
Figure 23. Removing the bezel filter for Rear Accessed configuration
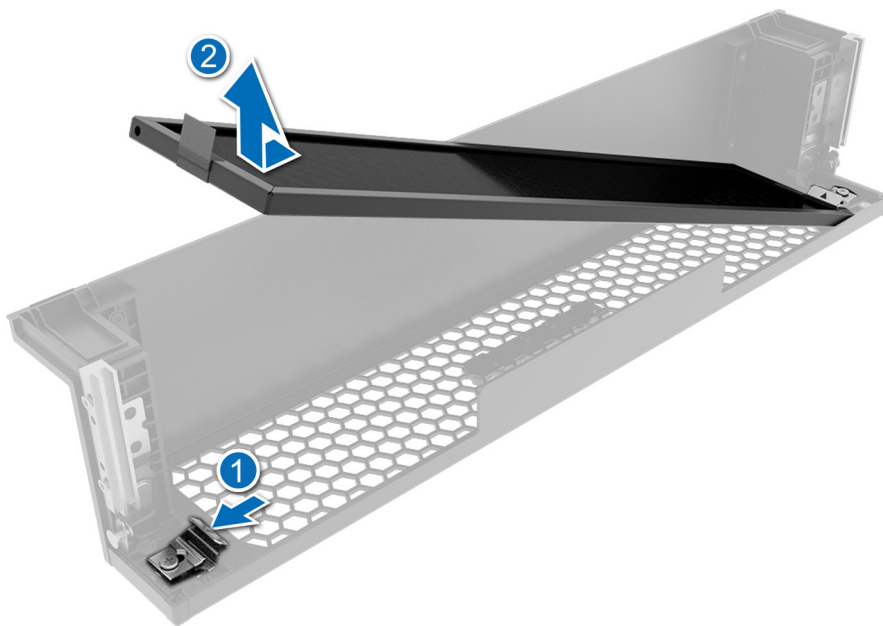
Figure 24. Removing the bezel filter for Front Accessed configuration

Next steps

1. Replace the bezel filter.
2. Install the bezel.

Installing the bezel filter

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the bezel.

Steps

1. Place the new filter in the bezel cavity, sliding it under the filter bracket on one end and opening the latch on the other end of the bezel. Ensure that the filter is sitting smooth and flush in the allowed cavity. Release the latch to engage when the filter is placed squarely in the slot.
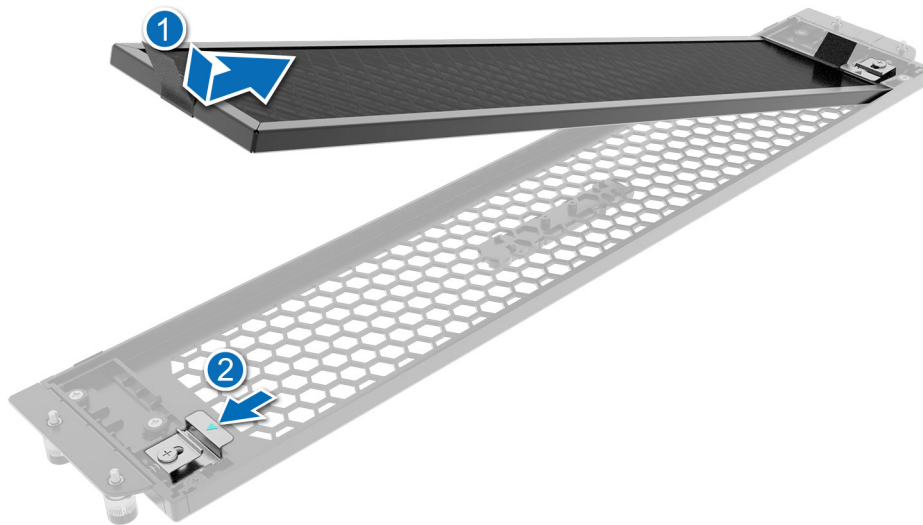
Figure 25. Installing the bezel filter for Rear Accessed configuration
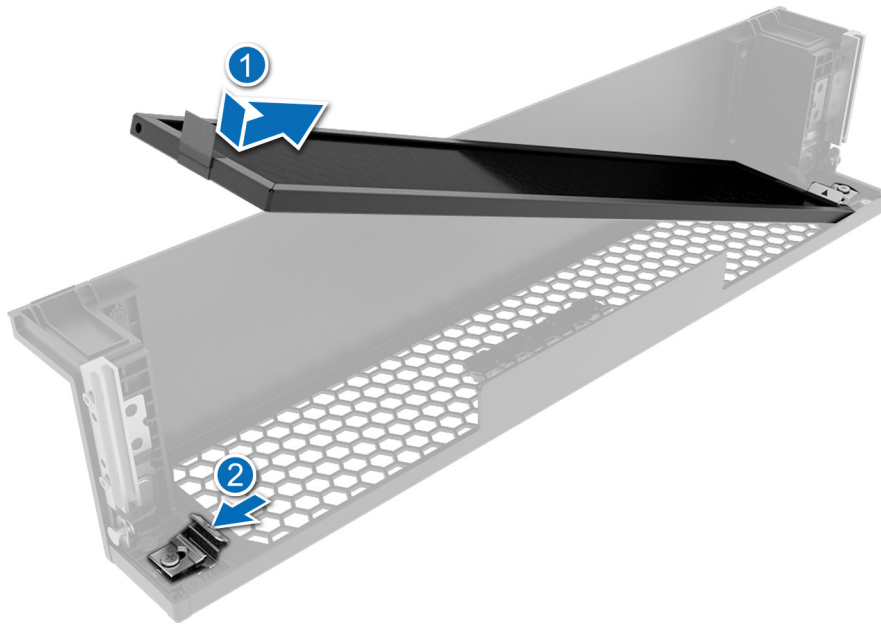
Figure 26. Installing the bezel filter for Front Accessed configuration

2. Install the bezel

System cover

Removing the system cover

Prerequisites
1. Follow the safety guidelines listed in the Safety instructions.
2. Power off the system, and any attached peripherals.
3. Disconnect the system from the electrical outlet and peripherals.

Steps
1. Using a 1/4-inch flat head or Phillips 2 screwdriver, rotate the lock counterclockwise to the unlock position.
2. Lift the release latch until the system cover slides back.
3. Lift the cover from the system.

Figure 27. Removing the system cover for Rear Accessed configuration

Figure 28. Removing the system cover for Front Accessed configuration

Next steps

Replace the system cover.

Installing the system cover

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Ensure that all internal cables are connected and routed properly, and no tools or extra parts are left inside the system.

Steps

1. Align the tabs on the system cover with the guide slots on the system.
2. Close the system cover release latch.
3. Using a 1/4-inch flat head or Phillips 2 screwdriver, rotate the lock clockwise to the lock position.

Figure 29. Installing the system cover for Rear Accessed configuration

Figure 30. Installing the system cover for Front Accessed configuration

Next steps

Follow the procedure listed in After working inside your system.

Air shroud

Removing the air shroud

Prerequisites

⚠️ **CAUTION: Never operate your system with the air shroud removed. The system may get overheated quickly, resulting in shutdown of the system and loss of data.**

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2.

ⓘ **NOTE:** The procedure to remove the air shroud is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Holding the air shroud at both the ends, disengage it from the guide pins on the chassis.
2. Lift the air shroud out of the system.
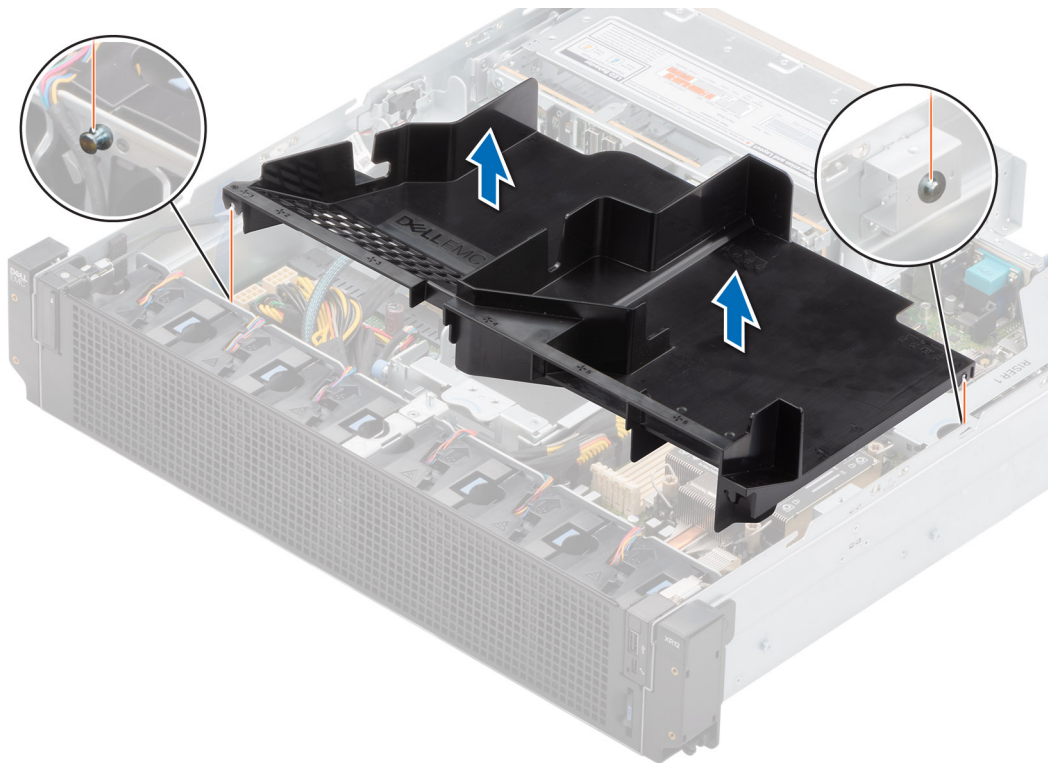
Figure 31. Removing the air shroud

Next steps

Replace the air shroud.

Installing the air shroud

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.

3. Remove the expansion card riser 2.

(i) **NOTE:** The procedure to remove the air shroud is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Align and engage the guide pin on the chassis with the guide on the air shroud.
2. Lower the air shroud into the system until it is firmly seated.
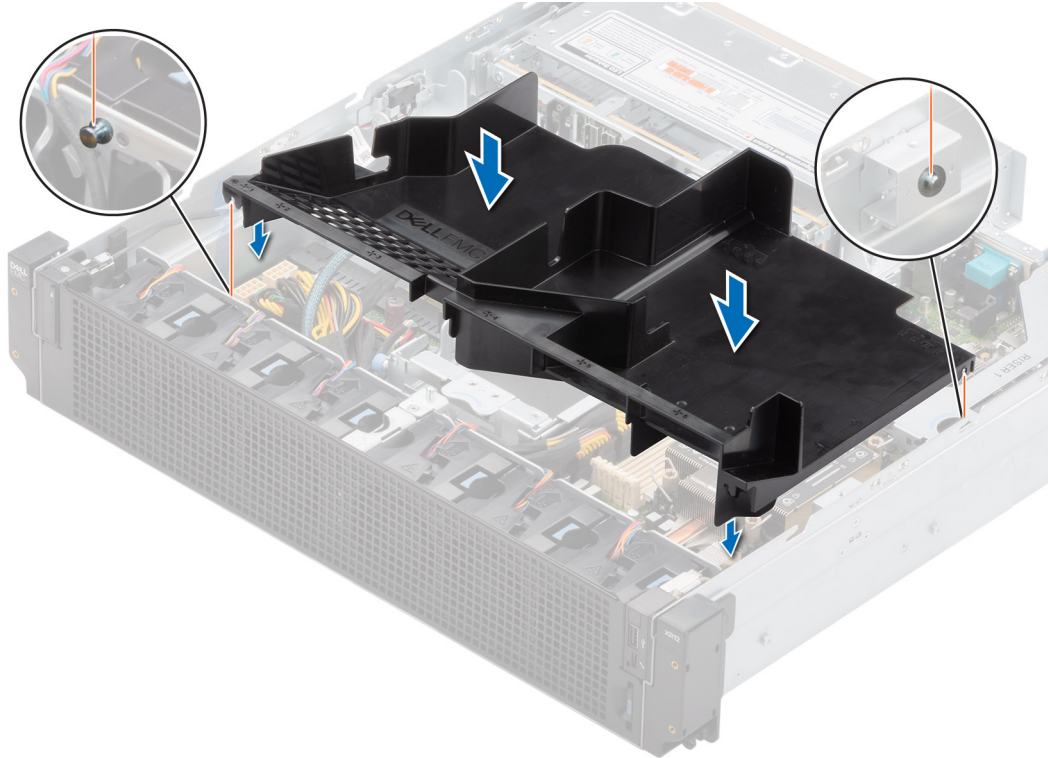
Figure 32. Installing the air shroud

Next steps

1. Install the expansion card riser 2.
2. Follow the procedure listed in After working inside your system.

Expansion cards and expansion card risers

(i) **NOTE:** When an expansion card is not supported or missing, riser the iDRAC and Lifecycle Controller logs an event. This does not prevent your system from booting. However, if a F1/F2 pause occurs with an error message, see *Troubleshooting expansion cards* section in the *Dell EMC PowerEdge Servers Troubleshooting Guide* at www.dell.com/poweredgemanuals.

Expansion card installation guidelines
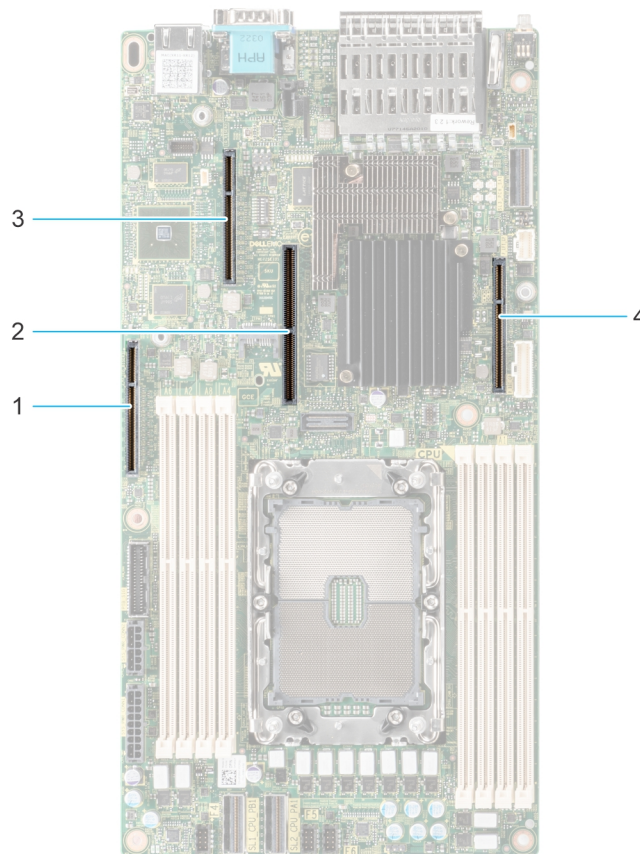
Figure 33. Expansion card slot connectors

1. IO_Riser3 (Riser 3 connector)
2. BOSS (M.2) card connector
3. IO_Riser2 (Riser 2 connector)
4. IO_Riser1 (Riser 1 connector)

The following table describes the expansion card riser configurations:

Table 14. Expansion card riser configurations

Configurations	Expansion card risers	PCIe Slots	Controlling processor	Height	Length	Slot width
Config0.	R1B+R2A+R3A	3	Processor 1	Low profile	Half length	x8
	Rear / Front Accessed configurations	2		Full Height	Full length	x16
		4		Full Height	Full length	x16
Config1.	R1B+R2B+R3B	3	Processor 1	Low profile	Half length	x8
	Rear / Front Accessed configurations	1, 2		Full Height	Full length	x8+x8
		4, 5		Full Height	Full length	x8+x8
Config2.	R1B+R2B+R3A	3	Processor 1	Low profile	Half length	x8
	Rear / Front Accessed configurations	1, 2		Full Height	Full length	x8+x8
		4		Full Height	Full length	x16
Config3.	R1A+R2A+R3A	3	Processor 1	Low profile	Half length	x16
		2		Full Height	Full length	x16

Table 14. Expansion card riser configurations (continued)

Configurations	Expansion card risers	PCIe Slots	Controlling processor	Height	Length	Slot width
	Front Accessed configurations	4		Full Height	Full length	x16
Config4.	R1A+R2B+R3A	3	Processor 1	Low profile	Half length	x16
	Front Accessed configurations	1,2		Full Height	Full length	x8+x8
		4		Full Height	Full length	x16
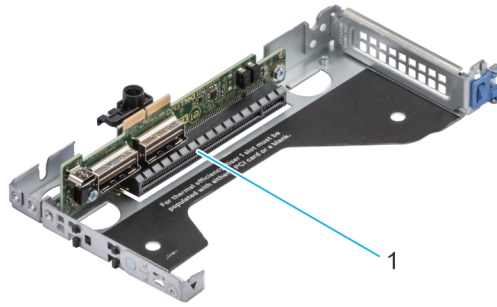
Figure 34. Riser 1A

1. Riser 1A, slot 3, x16, LP-HL (Low Profile - Half Length)
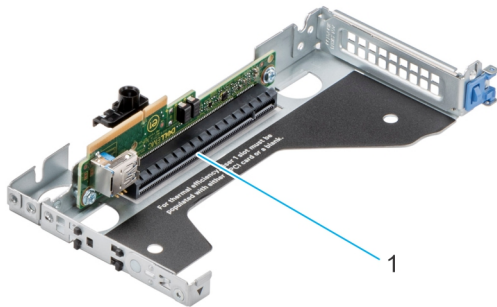
Figure 35. Riser 1B

1. Riser 1B, slot 3, x8, LP-HL (Low Profile - Half Length)
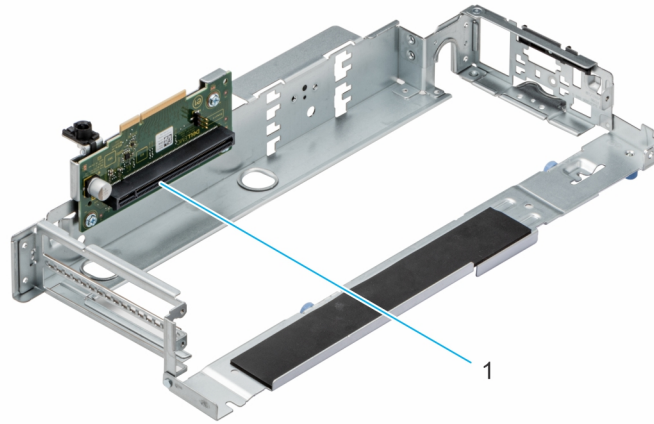
Figure 36. Riser 2A

1. Riser 2A, slot 2, x16, FH-FL (Full height - Full Length)
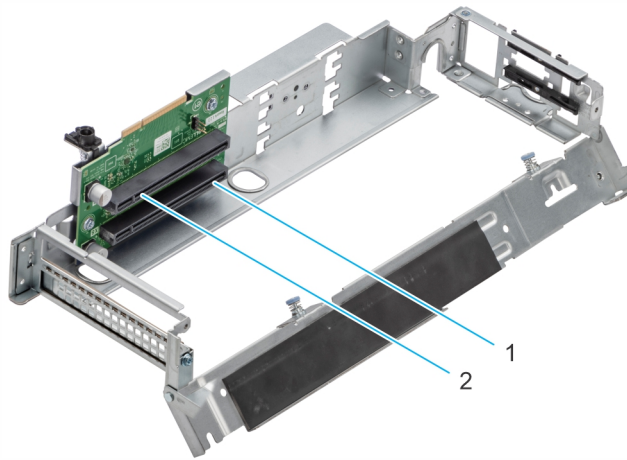
Figure 37. Riser 2B

1. Riser 2B, slot 1, x8, FH-FL (Full height - Full Length)
2. Riser 2B, slot 2, x8, FH-FL (Full height - Full Length)
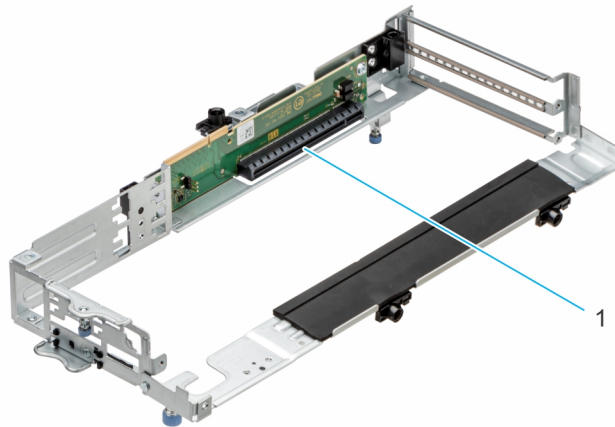
Figure 38. Riser 3A

1. Riser 3A, slot 4, x16, FH-FL (Full height - Full Length)
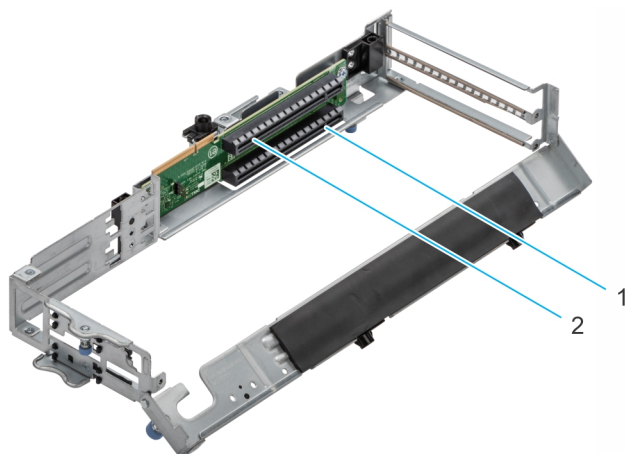
Figure 39. Riser 3B

1. Riser 3B, slot 4, x8, FH-FL (Full height - Full Length)
2. Riser 3B, slot 5, x8, FH-FL (Full height - Full Length)

(i) **NOTE:** The expansion-card slots are not hot-swappable.

The following table provides guidelines for installing expansion cards to ensure proper cooling and mechanical fit. The expansion cards with the highest priority should be installed first using the slot priority indicated. All the other expansion cards should be installed in the card priority and slot priority order.

Table 15. Configuration 0: R1B+R2A+R3A for Rear / Front Accessed configurations

Card type	Slot priority	Maximum number of cards
Internal PERC adapter (LP)	3	1
Dell External Adapter (FH)	2, 4	2
GPU (FH)	4, 2	2
Mellanox (NIC: 100Gb) (FH)	4, 2	2
Mellanox (NIC: 25Gb) (FH)	4, 2	2
Mellanox (NIC:25Gb) (LP)	3	1
Broadcom (NIC: 100Gb) (FH)	4,2	2
Broadcom (NIC: 25Gb) (FH)	4, 2	2
Broadcom (NIC: 25Gb) (LP)	3	1
Broadcom (NIC: 10Gb) (FH)	4, 2	2
Broadcom (NIC: 10Gb) (LP)	3	1
Broadcom (NIC: 1Gb) (FH)	4, 2	2
Broadcom (NIC: 1Gb) (LP)	3	1
Intel (NIC: 100Gb) (FH)	4, 2	2
Intel (NIC: 25Gb) (FH)	4, 2	2
Intel (NIC: 25Gb) (LP)	3	1
Intel (NIC: 2x10Gb SFP+) (FH)	2	1
Intel (NIC: 4x10Gb SFP+) (FH)	2	1
Intel (NIC: 10Gb) (FH) (all others including V2 of 4x10 and 2x10 SFP+ cards)	4, 2	2
Intel (NIC: 10Gb) (LP)	3	1

Table 15. Configuration 0: R1B+R2A+R3A for Rear / Front Accessed configurations (continued)

Card type	Slot priority	Maximum number of cards
Intel (NIC: 1Gb) (FH)	4, 2	2
Intel (NIC: 1Gb) (LP)	3	1
Intel (FPGA Accelerator card FH)	4, 2	1
Dell BOSS S1 card Module	Integrated slot	1

Table 16. Configuration 1: R1B+R2B+R3B Rear / Front Accessed configurations

Card type	Slot priority	Maximum number of cards
Internal PERC adapter (LP)	3	1
Dell External Adapter (FH)	1, 2, 4, 5	2
Mellanox (NIC: 25Gb) (FH)	4, 5, 1, 2	4
Mellanox (NIC: 25Gb) (LP)	3	1
Broadcom (NIC: 25Gb) (FH)	4, 5, 2, 1	4
Broadcom (NIC: 25Gb) (LP)	3	1
Broadcom (NIC: 10Gb) (FH)	4, 5, 2, 1	4
Broadcom (NIC: 10Gb) (LP)	3	1
Broadcom (NIC: 1Gb) (FH)	4, 5, 2, 1	4
Broadcom (NIC: 1Gb) (LP)	3	1
Intel (NIC: 25Gb) (FH)	4, 5, 1, 2	4
Intel (NIC: 25Gb) (LP)	3	1
Intel (NIC: 4x10Gb SFP+) (FH)	1, 2	2
Intel (NIC: 2x10Gb SFP+) (FH)	1, 2	2
Intel (NIC: 10Gb) (FH) (all others including V2 of 4x10 and 2x10 SFP+ cards)	4, 5, 1, 2	4
Intel (NIC: 10Gb) (LP)	3	1
Intel (NIC: 1Gb) (FH)	4, 5, 1, 2	4
Intel (NIC: 1Gb) (LP)	3	1
Dell BOSS S1 card Module	Integrated slot	1

Table 17. Configuration 2: R1B+R2B+R3A for Rear / Front Accessed configuration

Card type	Slot priority	Maximum number of cards
Internal PERC adapter (LP)	3	1
Dell External Adapter (FH)	2, 1, 4	2
GPU (FH)	4	1
Mellanox (NIC: 100Gb) (FH)	4	1
Mellanox (NIC: 25Gb) (FH)	4	1
Mellanox CX5 (NIC: 25Gb) (FH)	4	1
Mellanox (NIC: 25Gb) (FH)	4,1,2	3
Mellanox (NIC: 25Gb) (LP)	3	1

Table 17. Configuration 2: R1B+R2B+R3A for Rear / Front Accessed configuration (continued)

Card type	Slot priority	Maximum number of cards
Broadcom (NIC: 100Gb) (FH)	4	1
Broadcom (NIC: 25Gb QP) (FH) (x16)	4	1
Broadcom (NIC: 25Gb DP) (FH)	4, 1, 2	3
Broadcom (NIC: 25Gb) (LP)	3	1
Broadcom (NIC: 10Gb) (FH)	4, 1, 2	3
Broadcom (NIC: 10Gb) (LP)	3	1
Broadcom (NIC: 1Gb) (FH)	4, 1, 2	3
Broadcom (NIC: 1Gb) (LP)	3	1
Intel (NIC: 100Gb) (FH)	4	1
Intel (NIC: 25Gb QP) (FH) (x16)	4	1
Intel (NIC: 25Gb DP) (FH)	4, 1, 2	3
Intel (NIC: 25Gb 4P) (FH)	4	1
Intel (NIC: 25Gb) (LP)	3	1
Intel (NIC: 2x10Gb SFP+) (FH)	1, 2	2
Intel (NIC: 4x10Gb SFP+) (FH)	1, 2	2
Intel (NIC: 10Gb) (FH) (all others including V2 of 4x10 and 2x10 SFP+ cards)	4, 1, 2	3
Intel (NIC: 10Gb) (LP)	3	1
Intel (NIC: 1Gb) (FH)	4, 1, 2	3
Intel (NIC: 1Gb) (LP)	3	1
Intel (FPGA Accelerator card) (FH)	4	1
Dell BOSS S1 card Module	Integrated slot	1

Table 18. Configuration 3: R1A+R2A+R3A for Front Accessed configuration

Card type	Slot priority	Maximum number of cards
Dell External PERC Adapter (FH)	2,4	2
GPU (FH)	4,2	2
Mellanox (NIC: 100Gb) (FH)	4,2	2
Mellanox (NIC: 100Gb) (LP)	3	1
Mellanox (NIC:25Gb) (FH)	4,2	2
Broadcom (NIC: 100Gb) (FH)	4,2	2
Broadcom (NIC: 25Gb) (FH)	4,2	2
Broadcom (NIC: 10Gb) (FH)	4,2	2
Broadcom (NIC: 1Gb) (FH)	4,2	2
Intel (NIC:100Gb) (FH)	4,2	2
Intel (NIC:25Gb) (FH)	4,2	2
Intel (NIC: 2x10Gb SFP+) (FH)	2	1
Intel (NIC: 4x10Gb SFP+) (FH)	2	1

Table 18. Configuration 3: R1A+R2A+R3A for Front Accessed configuration (continued)

Card type	Slot priority	Maximum number of cards
Intel (NIC: 10Gb) (FH) (all others including V2 of 4x10Gb and 2x10Gb SFP+ cards)	4,2	2
Intel (NIC: 1Gb) (FH)	4,2	2
Intel (FPGA Accelerator) (LP)	3	1
Dell BOSS S1 card Module	Integrated slot	1

Table 19. Configuration 4: R1A+R2B+R3A for Front Accessed configuration

Card type	Slot priority	Maximum number of cards
Dell External PERC Adapter (FH)	2,1,4	2
GPU (FH)	4	1
Mellanox (NIC: 100Gb) (FH)	4	1
Mellanox (NIC: 100Gb) (LP)	3	1
Mellanox CX5 (NIC:25Gb) (FH) x16	4	1
Mellanox (NIC:25Gb) (FH)	4,1,2	3
Intel (FPGA Accelerator) (LP)	3	1
Broadcom (NIC: 100Gb) (FH)	4	1
Broadcom (NIC: 25Gb QP) (FH) x16	4	1
Broadcom (NIC: 25Gb DP) (FH)	4,1,2	3
Broadcom (NIC: 10Gb) (FH)	4,1,2	3
Broadcom (NIC: 1Gb) (FH)	4,1,2	3
Intel (NIC:100Gb) (FH)	4	1
Intel (NIC:25Gb QP) (FH) x16	4	1
Intel (NIC:25Gb DP) (FH)	4,1,2	3
Intel (NIC: 25Gb 4P) (FH)	4	1
Intel (NIC: 2x10Gb SFP+) (FH)	1,2	2
Intel (NIC: 4x10Gb SFP+) (FH)	1,2	2
Intel (NIC: 10Gb) (FH) (all others including V2 of 4x10Gb and 2x10Gb SFP+ cards)	4,1,2	3
Intel (NIC: 1Gb) (FH)	4,1,2	3
Dell BOSS S1 card Module	Integrated slot	1

⚠ **CAUTION: Do not install GPUs, network cards, or other PCIe devices on your system that are not validated and tested by Dell. Damage caused by unauthorized and invalidated hardware installation will null and void the system warranty.**

⚠ **WARNING: Consumer-Grade GPU should not be installed or used in the Enterprise Server products.**

Removing the expansion card riser 1

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2.
4. Remove the air shroud.

(i) **NOTE:** The procedure to remove the expansion card riser 1 is the same for Rear Accessed and Front Accessed configurations.

Steps

1. For Riser 1A, first disconnect the cables from the system board. Using the Phillips 2 screwdriver, loosen the blue thumbscrew. Hold the blue touch points and lift the expansion card riser from the riser connector on the system board.

Figure 40. Removing the expansion card riser 1A

2. For Riser 1B, using the Phillips 2 screwdriver, loosen the blue thumbscrew. Hold the blue touch points and lift the expansion card riser from the riser connector on the system board.

Figure 41. Removing the expansion card riser 1B

Next steps

Replace the expansion card riser 1.

Installing the expansion card riser 1

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2.
4. Remove the air shroud.

ⓘ **NOTE:** The procedure to remove the expansion card riser 1 is the same for Rear Accessed and Front Accessed configurations.

Steps

1. For Riser 1A, holding the blue touch points, align the expansion card riser with the guide pins on the side wall of the chassis and with the connector on the system board. Lower the expansion card riser into place until the expansion card riser connector is fully seated in the connector on the system board. Route the cables along the chassis wall, behind the memory modules. Using Phillips 2 screwdriver, tighten the blue thumbscrew.
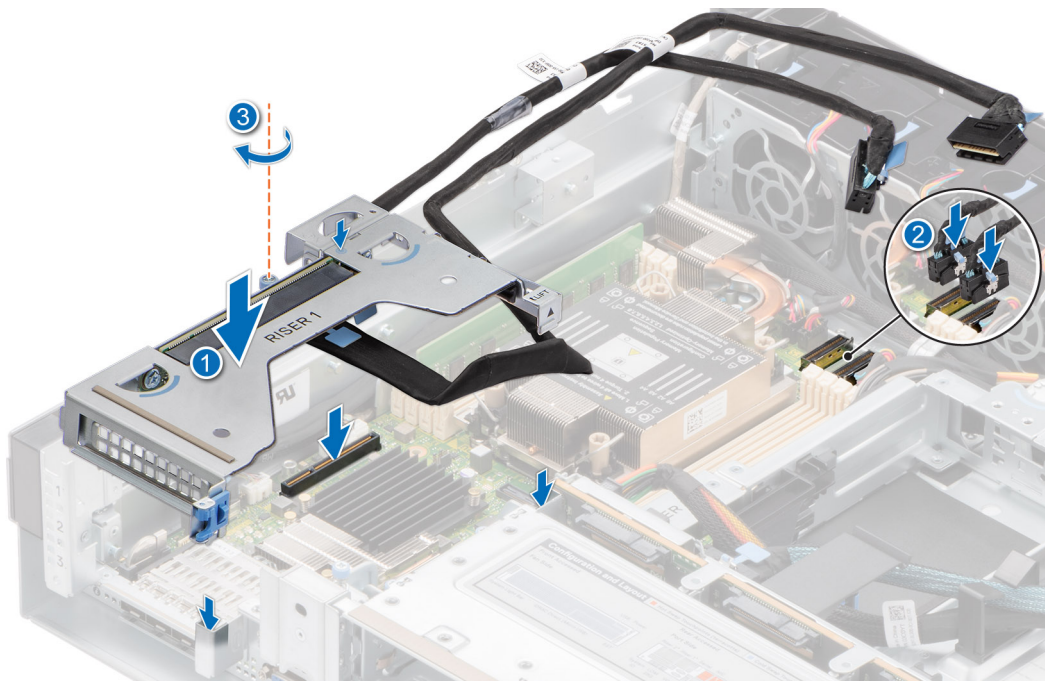
Figure 42. Installing the expansion card riser 1A

2. For Riser 1B, holding the blue touch points, align the expansion card riser with the guide pins on the side wall of the chassis and with the connector on the system board. Lower the expansion card riser into place until the expansion card riser connector is fully seated in the connector on the system board. Using Phillips 2 screwdriver, tighten the blue thumbscrew.
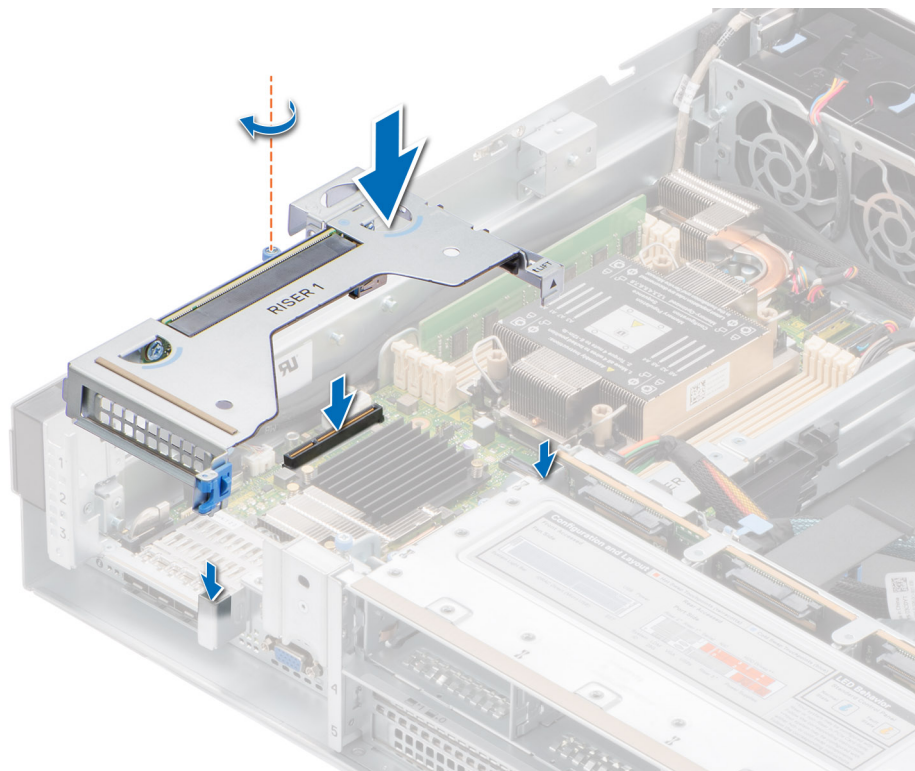
Figure 43. Installing the expansion card riser 1B

Next steps

1. Install the air shroud.

2. Install the expansion card riser 2.
3. Follow the procedure listed in After working inside your system.
4. Install any device drivers required for the card as described in the documentation for the card.

Removing the expansion card riser 2

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.

   ⓘ **NOTE:** The procedure to remove the expansion card riser 2 is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Using the Phillips 2 screwdriver, loosen the blue thumbscrews.
2. Hold the blue touch points and lift the expansion card riser from the riser connector on the system board.

   ⓘ **NOTE:** The procedure to remove the expansion card riser 2A and 2B is the same.

Figure 44. Removing the expansion card riser 2

Next steps

Replace the expansion card riser 2.

Installing the expansion card riser 2

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.

NOTE: The procedure to install the expansion card riser 2 is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Holding the blue touch points, align the expansion card riser with the connector and the riser guide pins on the system board.
2. Lower the expansion card riser into place until the expansion card riser connector is fully seated in the connector on the system board.
3. Using Phillips 2 screwdriver, tighten the blue thumbscrew.

NOTE: The procedure to install the expansion card riser 2A and 2B is the same.
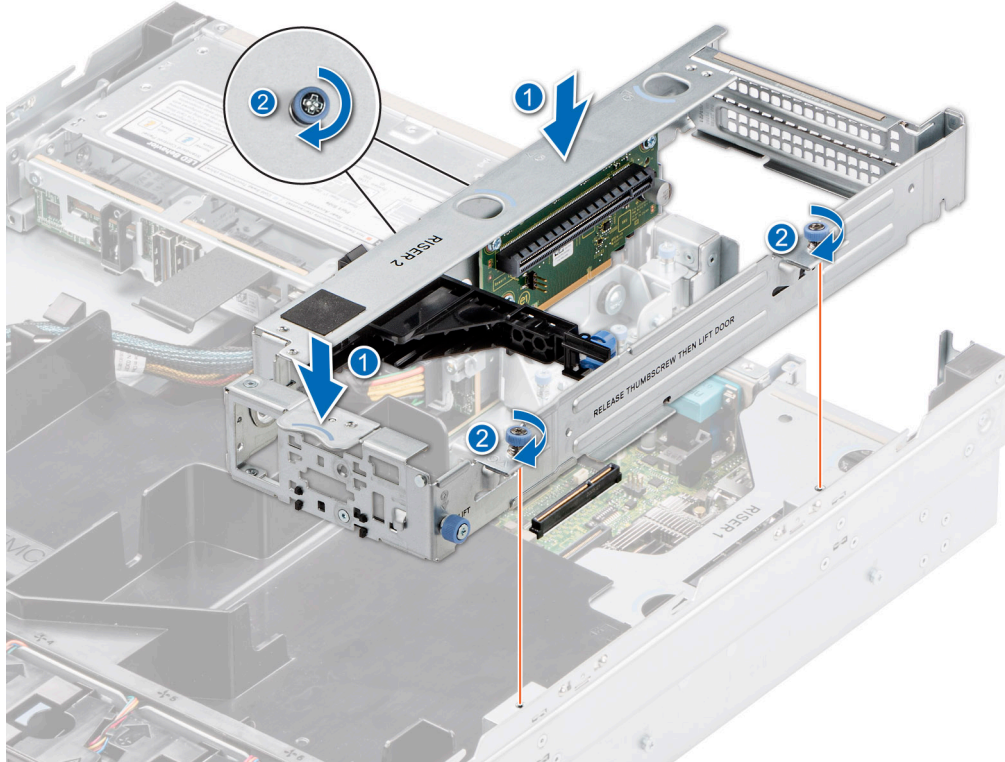
Figure 45. Installing the expansion card riser 2

Next steps

1. Follow the procedure listed in After working inside your system.
2. Install any device drivers required for the card as described in the documentation for the card.

Removing the expansion card riser 3

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2.
4. Remove the air shroud.
5. Remove the drives.
6. Remove the backplane.
7. Remove the drive cage.

NOTE: The procedure to remove the expansion card riser 3 is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Using Phillips 2 screwdriver, loosen the blue thumbscrews.
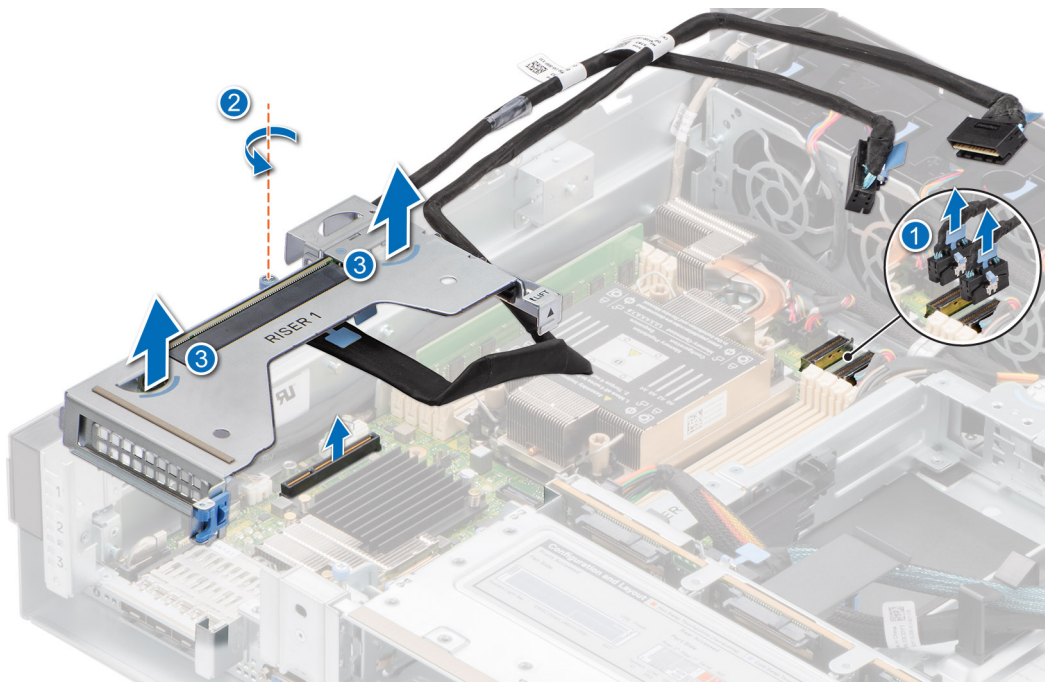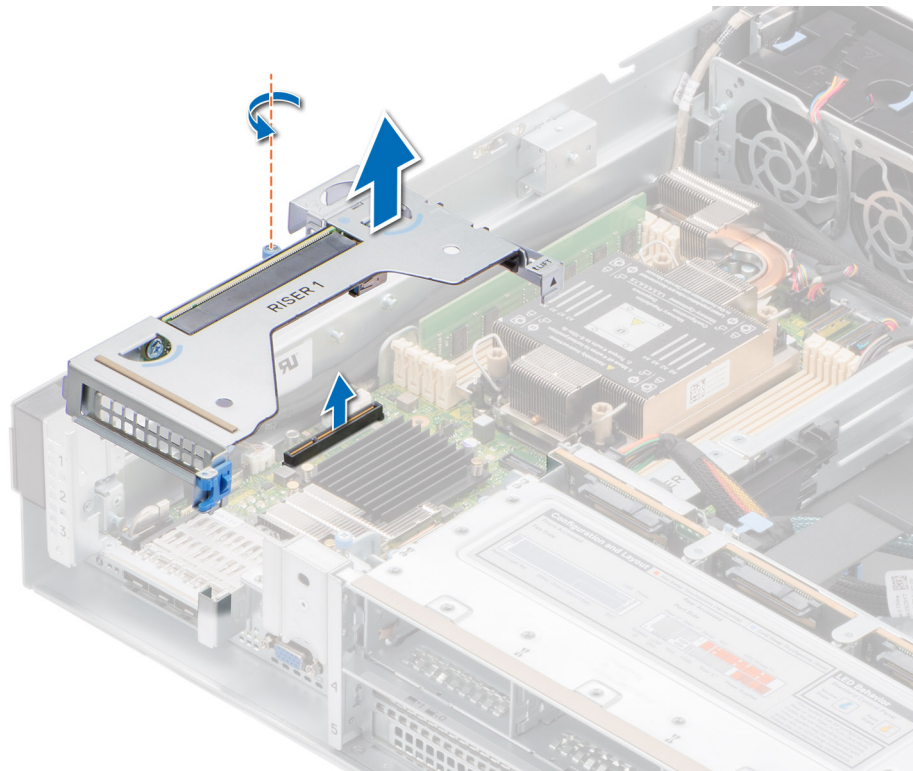2. Hold the blue touch points and lift the expansion card riser from the riser connector on the system board.

   (i) **NOTE:** The procedure to remove the expansion card riser 3A and 3B is the same.
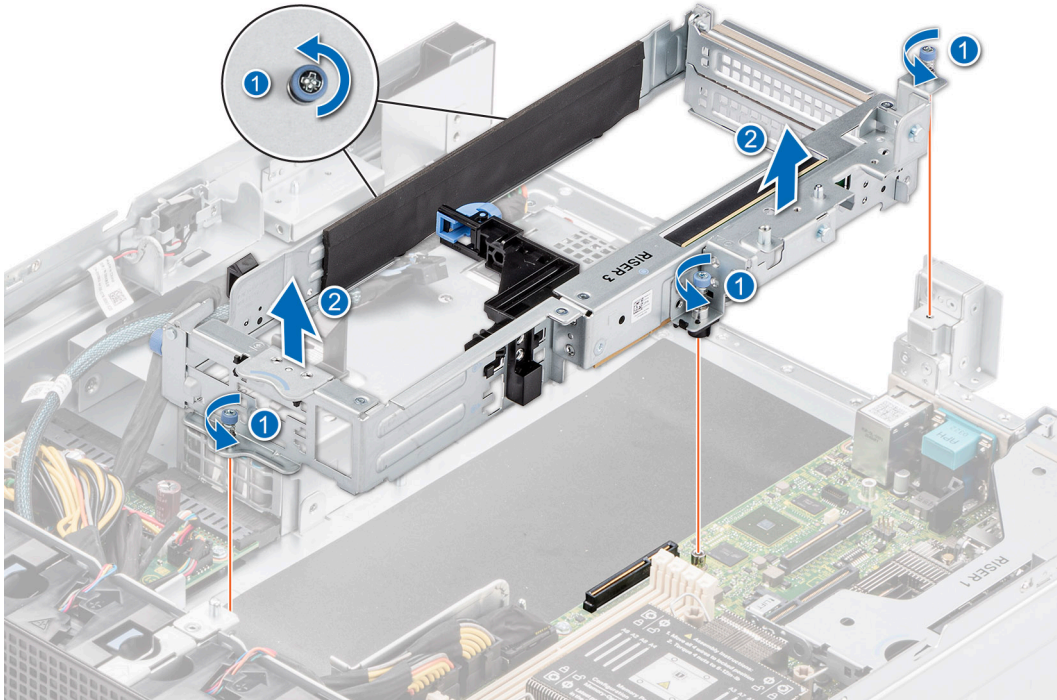
Figure 46. Removing the expansion card riser 3

Next steps

Replacing the expansion card riser 3.

Installing the expansion card riser 3

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2.
4. Remove the air shroud.
5. Remove the drives.
6. Remove the backplane.
7. Remove the drive cage.

(i) **NOTE:** The procedure to remove the expansion card riser 3 is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Holding the blue touch points, align the expansion card riser with the connector and the riser guide pins on the system board.
2. Lower the expansion card riser into place until the expansion card riser connector is fully seated in the connector on the system board.
3. Using Phillips 2 screwdriver, tighten the blue thumbscrews.

ⓘ **NOTE:** The procedure to install the expansion card riser 3A and 3B is the same.
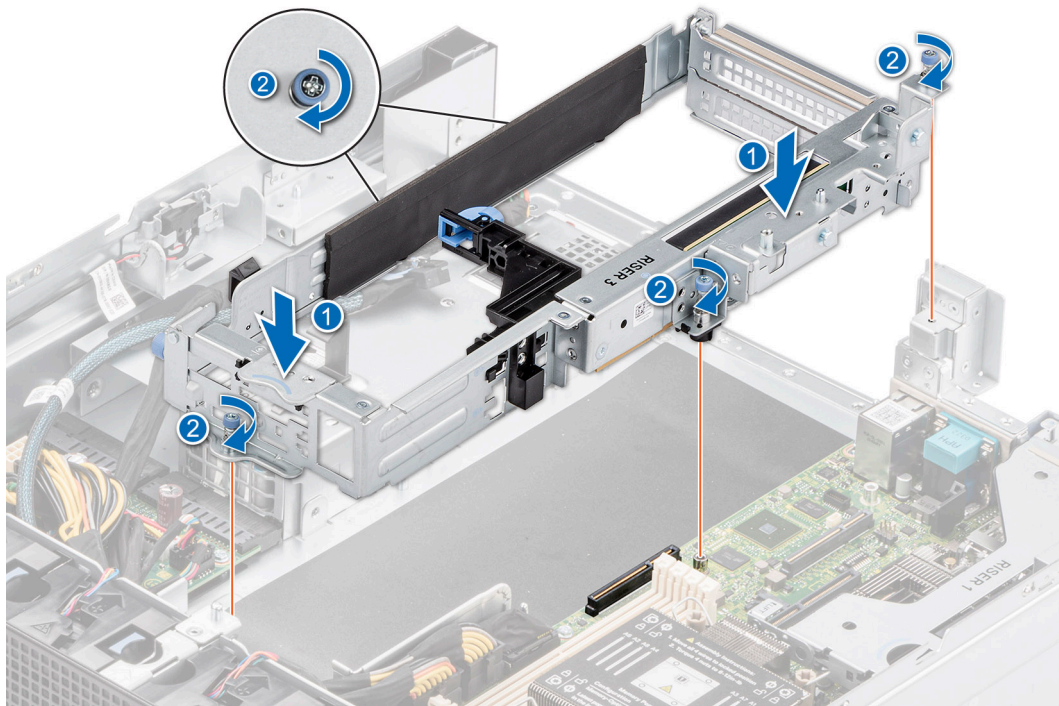
Figure 47. Installing the expansion card riser 3

Next steps

1. Install the drive cage.
2. Install the backplane.
3. Install the drives.
4. Install the air shroud.
5. Install the expansion card riser 2.
6. Follow the procedure listed in After working inside your system.
7. Install any device drivers required for the card as described in the documentation for the card.

Removing expansion card from the expansion card riser 1

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2.
4. Remove the air shroud.
5. Remove the expansion card riser 1.
6. If applicable, disconnect the internal cables that are connected to expansion card.

ⓘ **NOTE:** The procedure to remove the expansion card is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Pull and lift up the expansion card retention latch locks to open.
2. Hold the expansion card by its edges and pull the card until the card edge connector disengages from the expansion card connector on the riser.
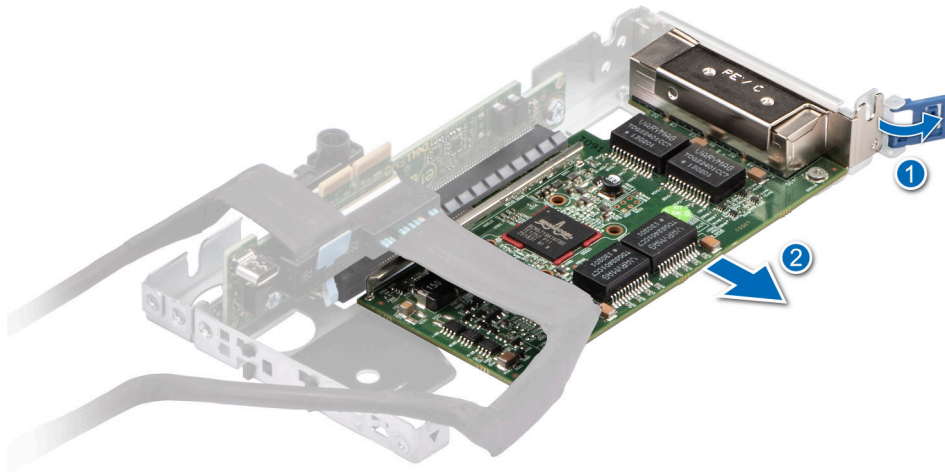
Figure 48. Removing a half-length expansion card from Riser 1A
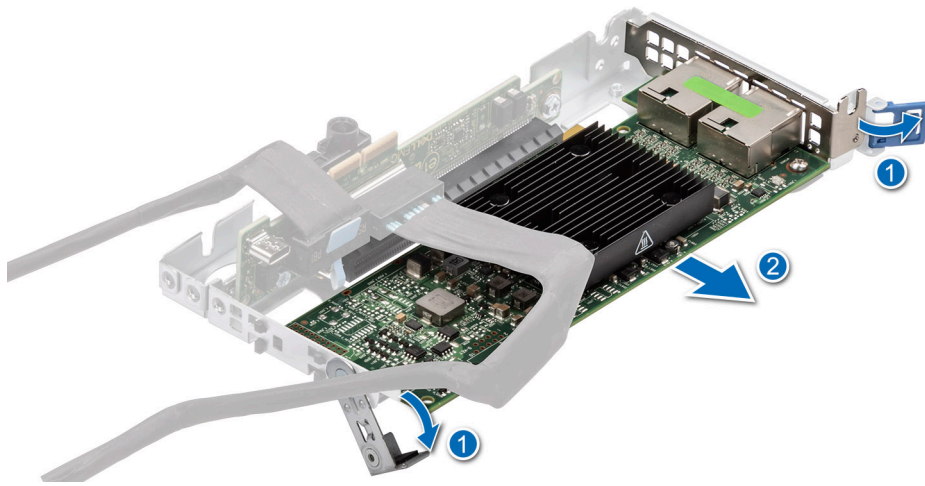
Figure 49. Removing a full-height expansion card from Riser 1A
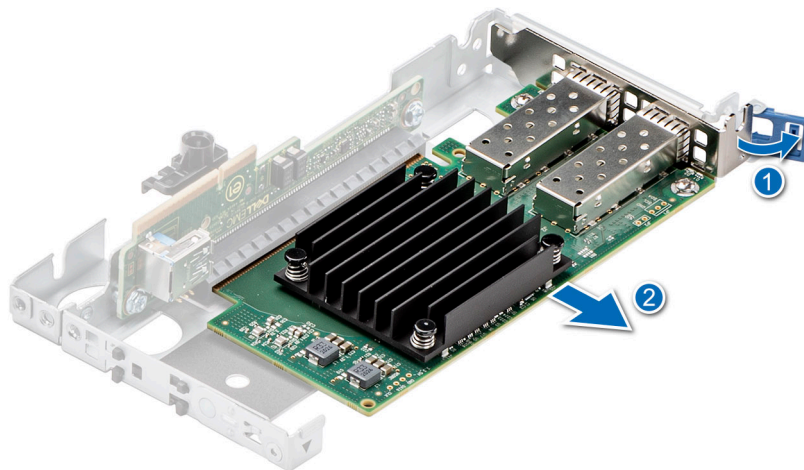
Figure 50. Removing a half-length expansion card from Riser 1B
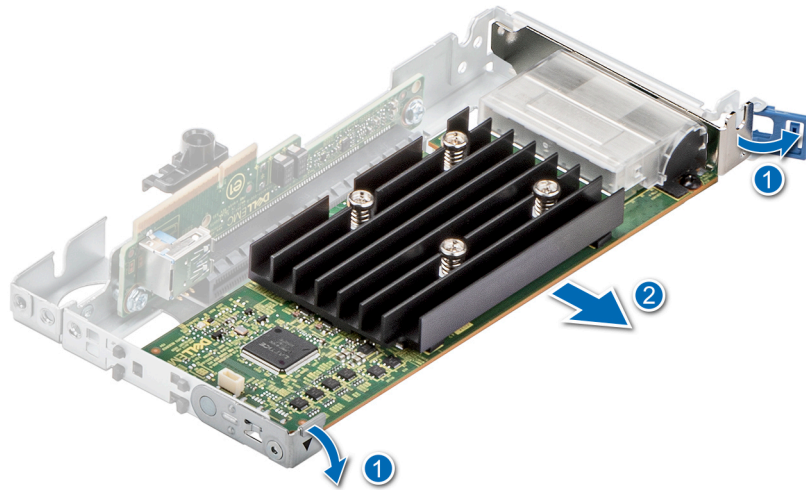
Figure 51. Removing a full-height expansion card from Riser 1B

3. If the expansion card is not going to be replaced, install a filler bracket and close the card retention latch.

ⓘ **NOTE:** You must install a filler bracket over an empty expansion card slot to maintain Federal Communications Commission (FCC) certification of the system. The brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.

ⓘ **NOTE:** The numbers on the image do not depict the exact steps. The numbers are for representation of sequence.
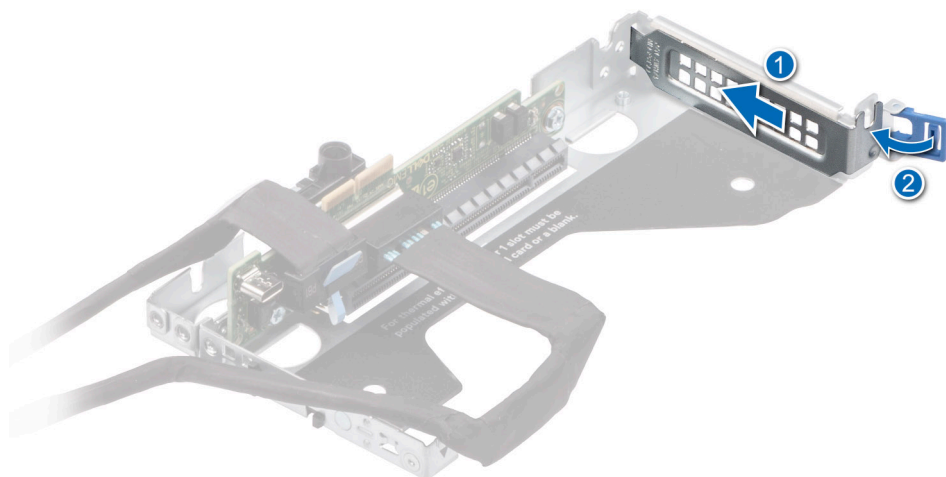
Figure 52. Installing filler bracket in Riser 1A
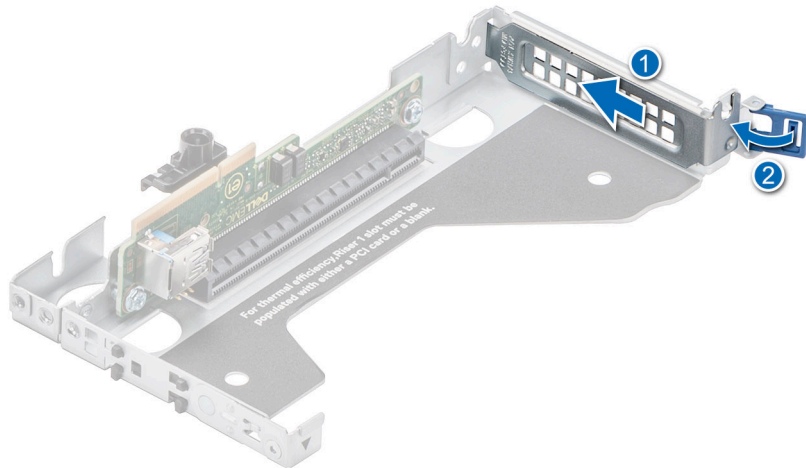
Figure 53. Installing filler bracket in Riser 1B

Next steps

If applicable, Install an expansion card into the expansion card riser 1 or Install the expansion card Riser 1.

Installing an expansion card into the expansion card riser 1

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. If installing a new expansion card, unpack it and prepare the card for installation.
   (i) **NOTE:** For instructions, see the documentation accompanying the card.
4. Remove the expansion card riser 2.
5. Remove the air shroud.
6. Remove the expansion card riser 1.

(i) **NOTE:** The procedure to install the expansion card is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Pull and lift up the expansion card retention latch locks to open.
2. If installed, remove the filler bracket.
   (i) **NOTE:** Store the filler bracket for future use. Filler brackets must be installed in empty expansion card slots to maintain Federal Communications Commission (FCC) certification of the system. The filler brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.

Figure 54. Removing a filler bracket from Riser 1A
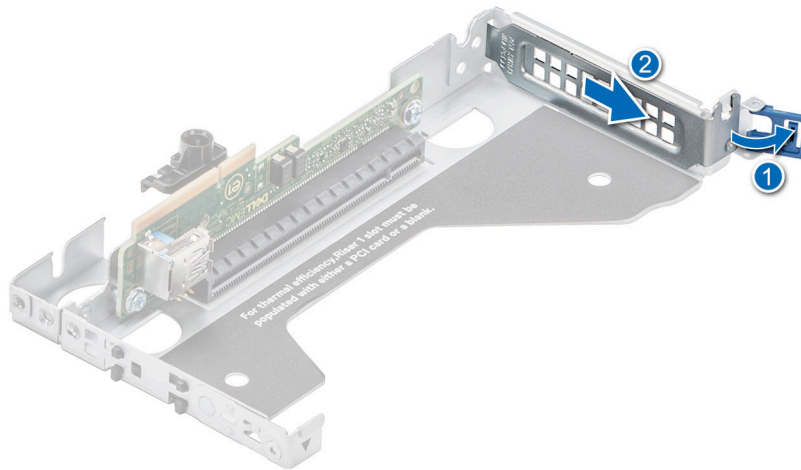
Figure 55. Removing a filler bracket from Riser 1B

3. Hold the expansion card by the edges, and align the card edge connector with the expansion card connector on the riser.
4. Insert the card edge connector firmly into the expansion card connector until the card is fully seated.
5. Close the expansion card retention latch.

(i) **NOTE:** The numbers on the image do not depict the exact steps. The numbers are for representation of sequence.
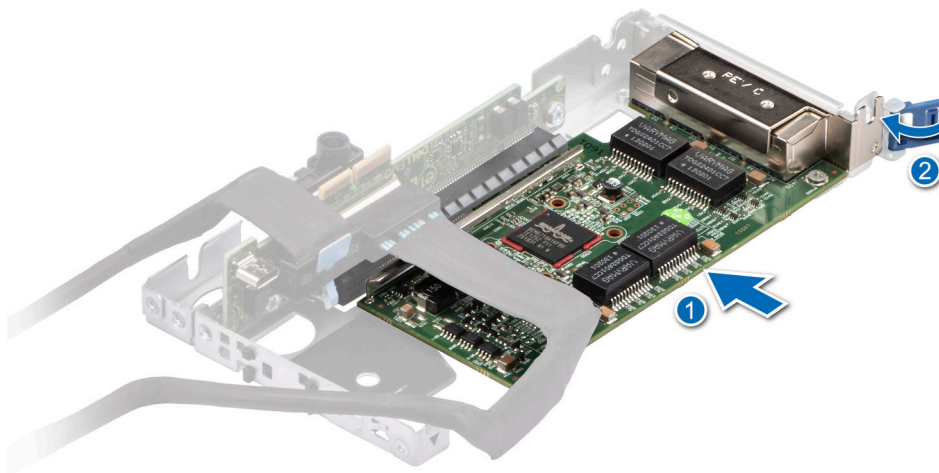
Figure 56. Installing a half-length expansion card into Riser 1A
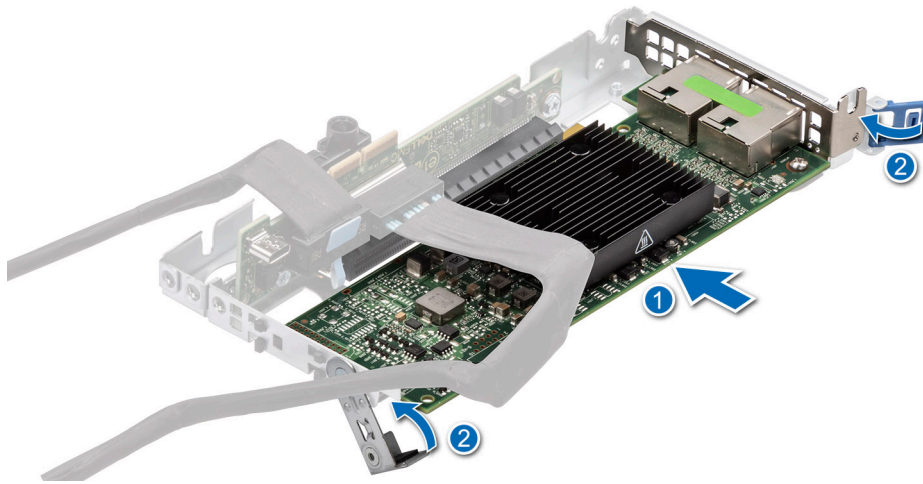
Figure 57. Installing a full-height expansion card into Riser 1A
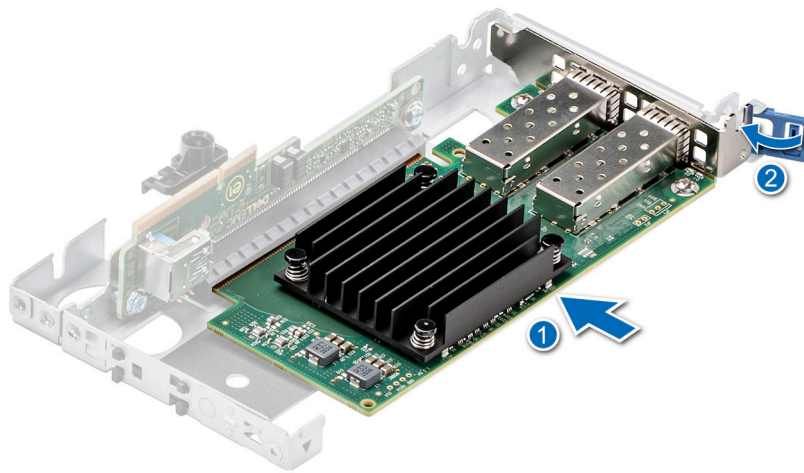
Figure 58. Installing a half-length expansion card into Riser 1B
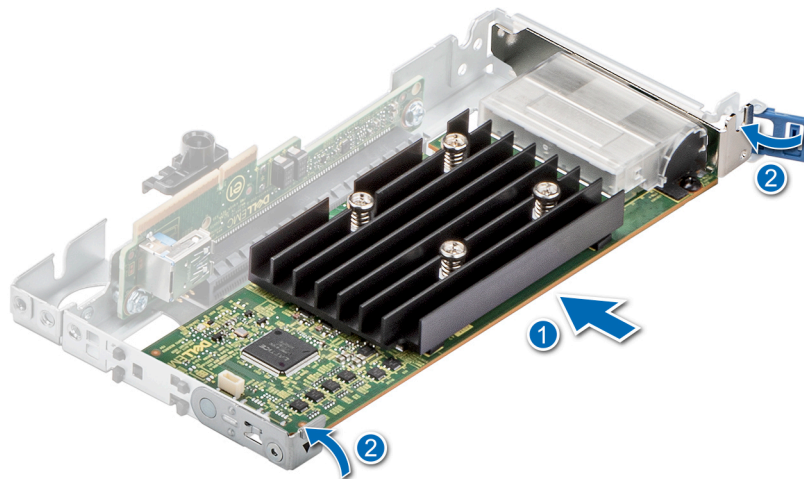
Figure 59. Installing a full-height expansion card into Riser 1B

Next steps

1. If applicable, connect the internal cables to the expansion card.

2. Install the expansion card riser 1.
3. Install the air shroud.
4. Install the expansion card riser 2.
5. Follow the procedure listed in After working inside your system.
6. Install any device drivers required for the card as described in the documentation for the card.

ⓘ **NOTE:** While replacing a faulty storage controller or NIC card or GPU with the same type of card, after you power on the system; the new card automatically updates to the same firmware and configuration of the faulty one. For more information about the Part replacement configuration, see the *Dell Lifecycle Controller User's Guide* available at https://www.dell.com/idracmanuals

⚠ **CAUTION: Do not install GPUs, network cards, or other PCIe devices on your system that are not validated and tested by Dell. Damage caused by unauthorized and invalidated hardware installation will null and void the system warranty.**

Removing expansion card from the expansion card riser 2

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2.
4. If applicable, disconnect the internal cables that are connected to the expansion card.

ⓘ **NOTE:** The procedure to remove the expansion card or GPU card is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Using the Phillips 1 screwdriver, loosen the blue thumbscrew.
2. Lift the L-shaped bracket from the expansion card riser, and remove the screw.
3. Release the blue latch half-length, full height expansion card.
4. Hold the expansion card by its edges and pull the card until the card edge connector disengages from the expansion card connector on the riser.

ⓘ **NOTE:** The procedure to remove the cards from the expansion card riser 2A and 2B is the same.
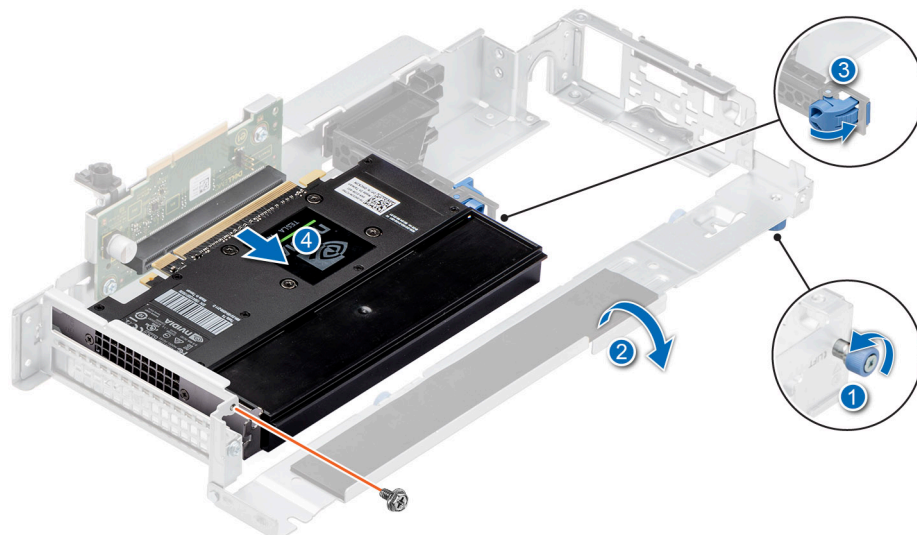
Figure 60. Removing a half-length, full height expansion GPU card from Riser 2A
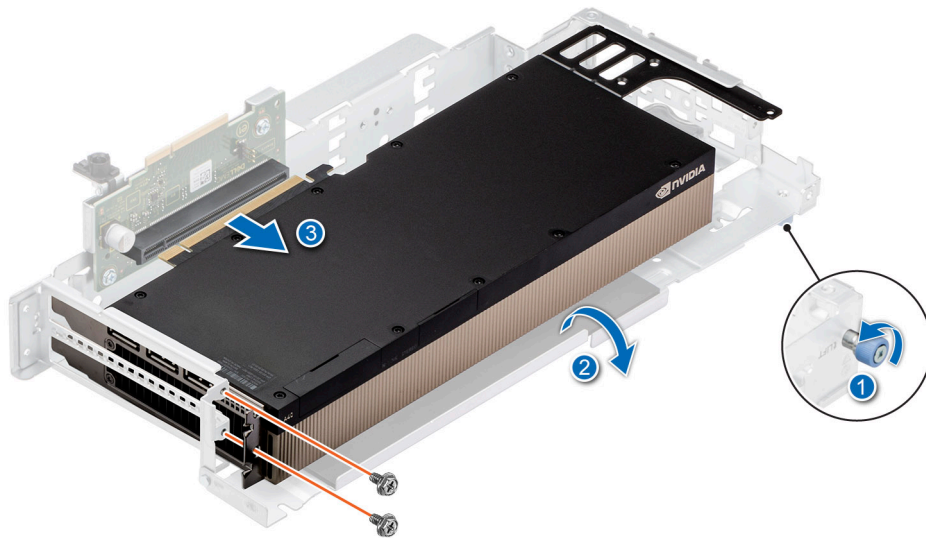
Figure 61. Removing a double-width, full-length GPU card from Riser 2A
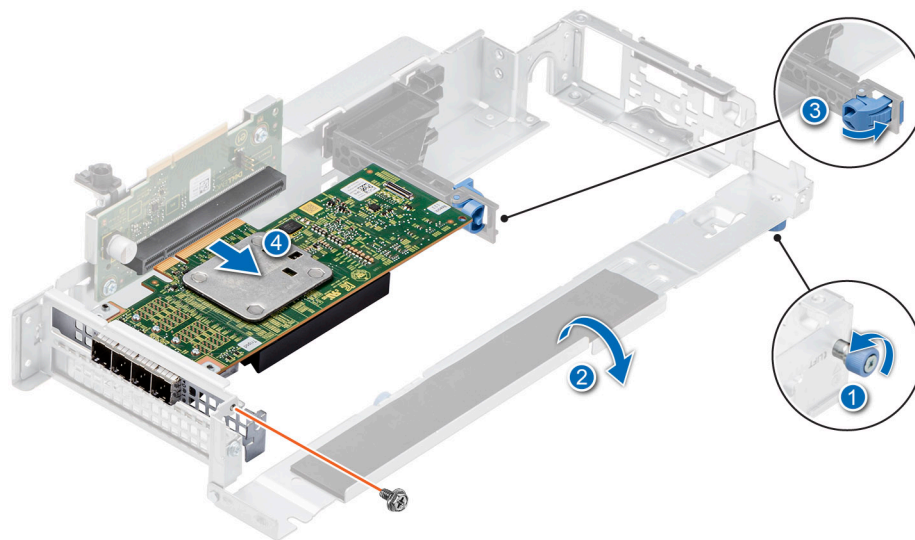
Figure 62. Removing a half-length, low-profile expansion card from Riser 2A
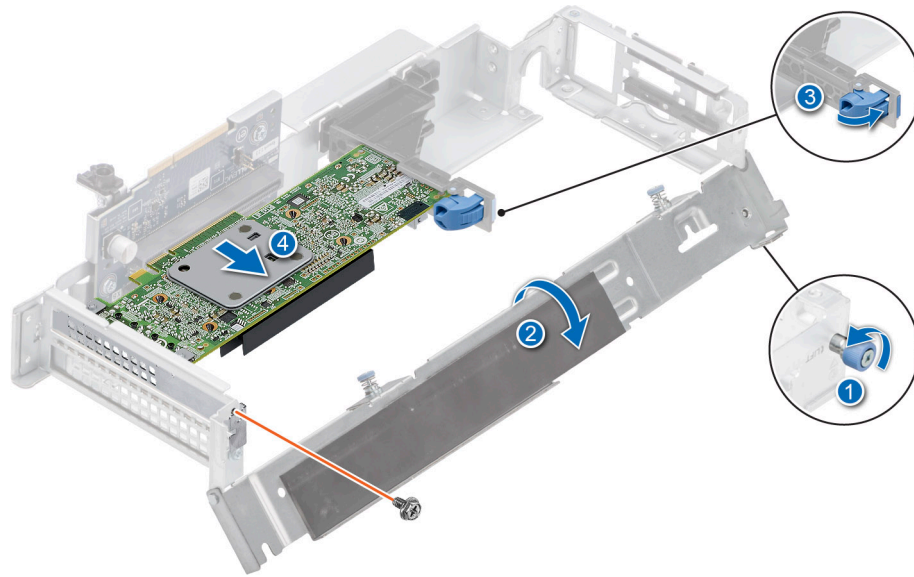
Figure 63. Removing a half-length, low-profile expansion card from Riser 2B

5. If the expansion card or GPU card is not going to be replaced, install a filler bracket.

ⓘ **NOTE:** You must install a filler bracket over an empty expansion card slot to maintain Federal Communications Commission (FCC) certification of the system. The filler brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.
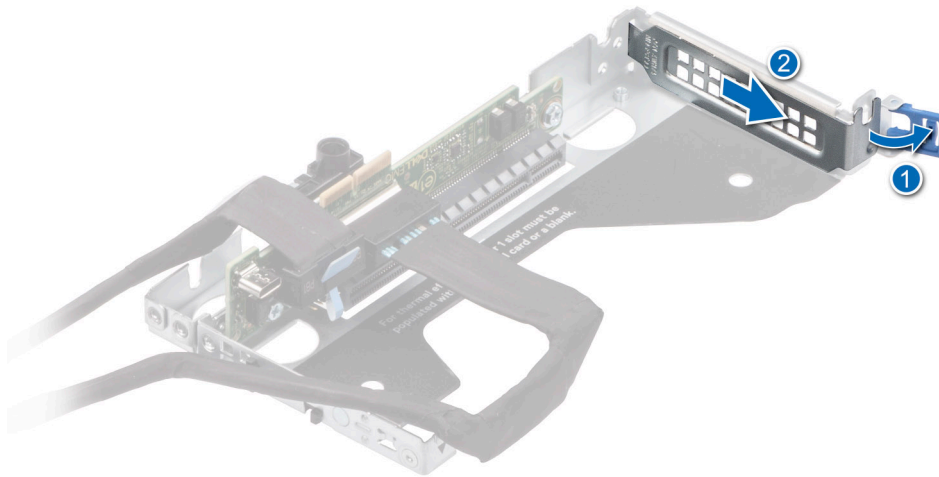
ⓘ **NOTE:** The numbers on the image do not depict the exact steps. The numbers are for representation of sequence.
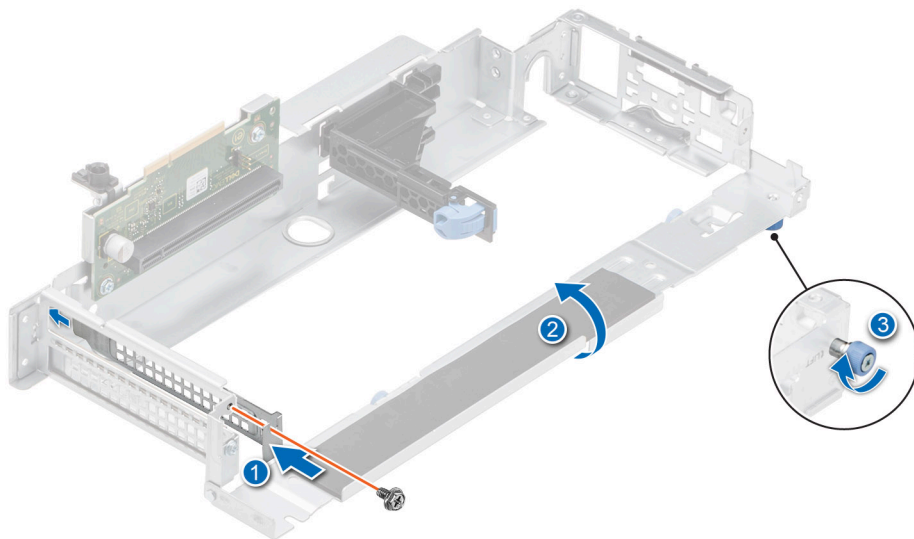
Figure 64. Installing the filler bracket in Riser 2A
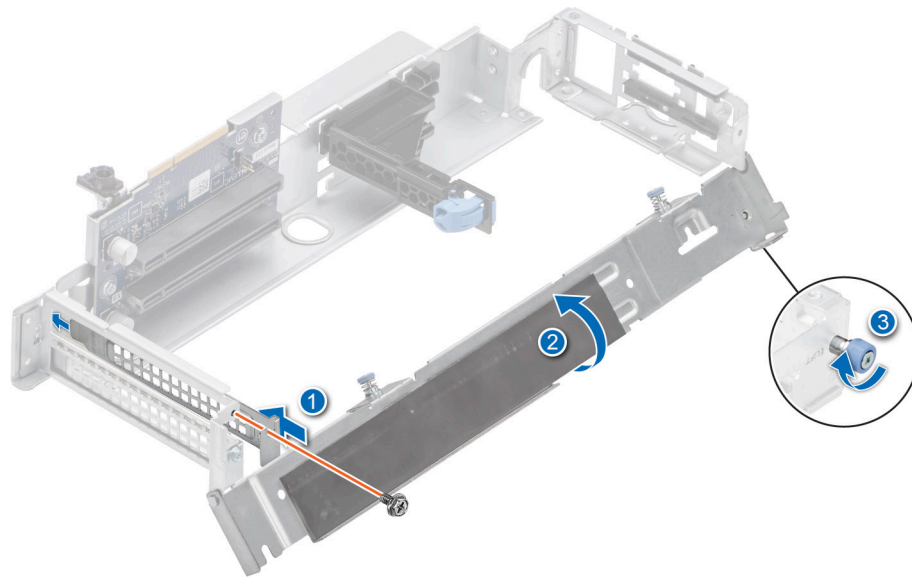
Figure 65. Installing the filler bracket in Riser 2B

6. Close the L-shaped bracket, and using the Phillips 1 screwdriver, tighten the thumbscrew.

Next steps

If applicable, Install an expansion card into the expansion card riser 2 or Install the expansion card riser 2.

Installing an expansion card into the expansion card riser 2

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. If installing a new expansion card, unpack it and prepare the card for installation.

   (i) **NOTE:** For instructions, see the documentation accompanying the card.

4. Remove the expansion card riser 2.

(i) **NOTE:** The procedure to install the expansion card or GPU card is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Using the Phillips 1 screwdriver, loosen the blue thumbscrew.
2. Lift the L-shaped bracket from the expansion card riser, and remove the screws.
3. If installed, remove the filler bracket.

   (i) **NOTE:** Store the filler bracket for future use. Filler brackets must be installed in empty expansion card slots to maintain Federal Communications Commission (FCC) certification of the system. The filler brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.

   (i) **NOTE:** The numbers on the image do not depict the exact steps. The numbers are for representation of sequence.

**Figure 66. Removing a filler bracket from Riser 2A**

Figure 67. Removing a filler bracket from Riser 2B

4. Remove the plastic card guide from the riser if the expansion card to be installed is longer than half-length.
5. Hold the card by the edges, and align the card edge connector with the expansion card connector on the riser.
6. Insert the card edge connector firmly into the expansion card connector until the card is fully seated.
7. Using the Phillips 1 screwdriver, tighten the screw.

(i) **NOTE:** The numbers on the image do not depict the exact steps. The numbers are for representation of sequence.

(i) **NOTE:** The procedure to install the cards into the expansion card riser 2A and 2B is the same.
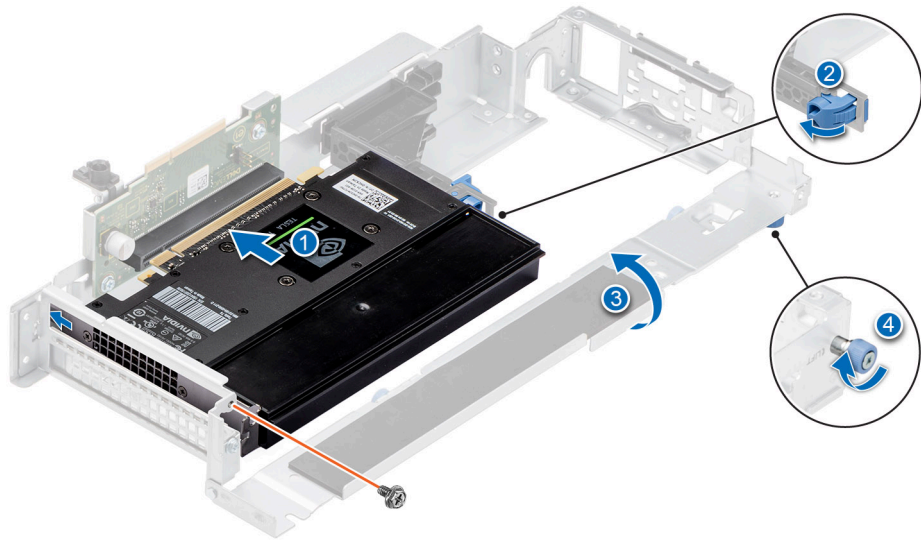
Figure 68. Installing a half-length, full height GPU card into Riser 2A

ⓘ **NOTE:** For full-length GPU card, remove the plastic card guide from Riser.
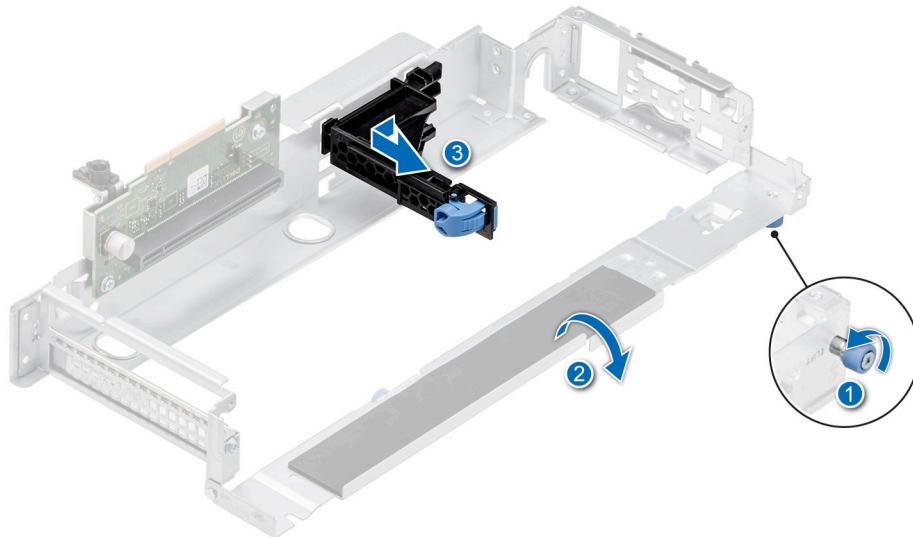
Figure 69. Removing the plastic card guide from Riser

Figure 70. Installing a double-width, full-length GPU card into Riser 2A

Figure 71. Installing a half-length, low-profile expansion card into Riser 2A

Figure 72. Installing a half-length, low-profile expansion card into Riser 2B

8. Close the L-shaped bracket, and using the Phillips 1 screwdriver, tighten the blue thumbscrew.

Next steps

1. If applicable, connect the internal cables to the expansion card.
2. Install the expansion card riser 2.
3. Follow the procedure listed in After working inside your system.
4. Install any device drivers required for the card as described in the documentation for the card.

ⓘ **NOTE:** While replacing a faulty storage controller or NIC card or GPU card with the same type of card, after you power on the system; the new card automatically updates to the same firmware and configuration of the faulty one. For more information about the Part replacement configuration, see the *Dell Lifecycle Controller User's Guide* available at https://www.dell.com/idracmanuals

⚠️ **CAUTION: Do not install GPUs, network cards, or other PCIe devices on your system that are not validated and tested by Dell. Damage caused by unauthorized and invalidated hardware installation will null and void the system warranty.**

Removing expansion card from the expansion card riser 3

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2.
4. Remove the air shroud.
5. Remove the drive cage.
6. Remove the expansion card riser 3.
7. If applicable, disconnect the internal cables that are connected to expansion card.

ⓘ **NOTE:** The procedure to install the expansion card or GPU card is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Using the Phillips 1 screwdriver, loosen the blue thumbscrew.
2. Lift the L-shaped bracket from the expansion card riser, and remove the screw.
3. Release the blue latch for half-length, low-profile expansion card.

4. Hold the expansion card by its edges and pull the card until the card edge connector disengages from the expansion card connector on the riser.

ⓘ **NOTE:** The numbers on the image do not depict the exact steps. The numbers are for representation of sequence.

ⓘ **NOTE:** The procedure to remove the cards from the expansion card riser 3A and 3B is the same.
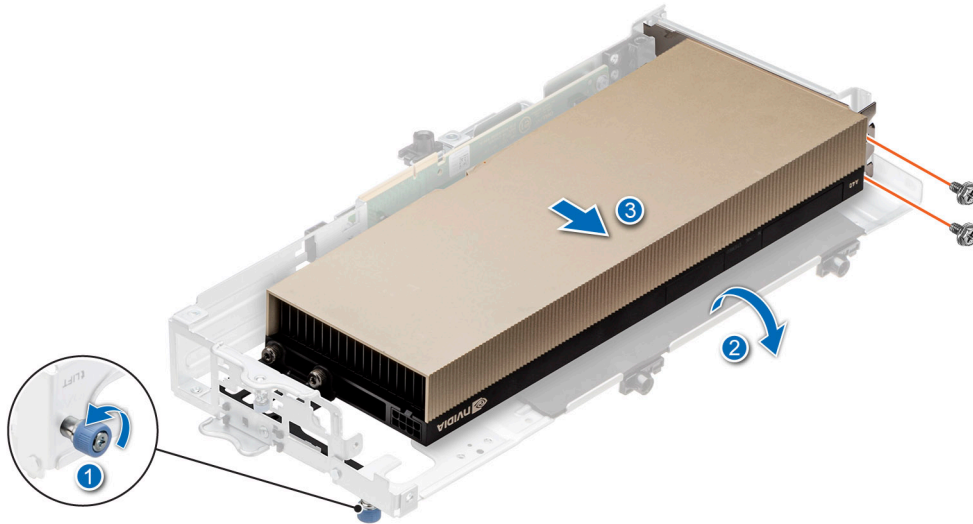
**Figure 73. Removing a double-width, full-length GPU card from Riser 3A**
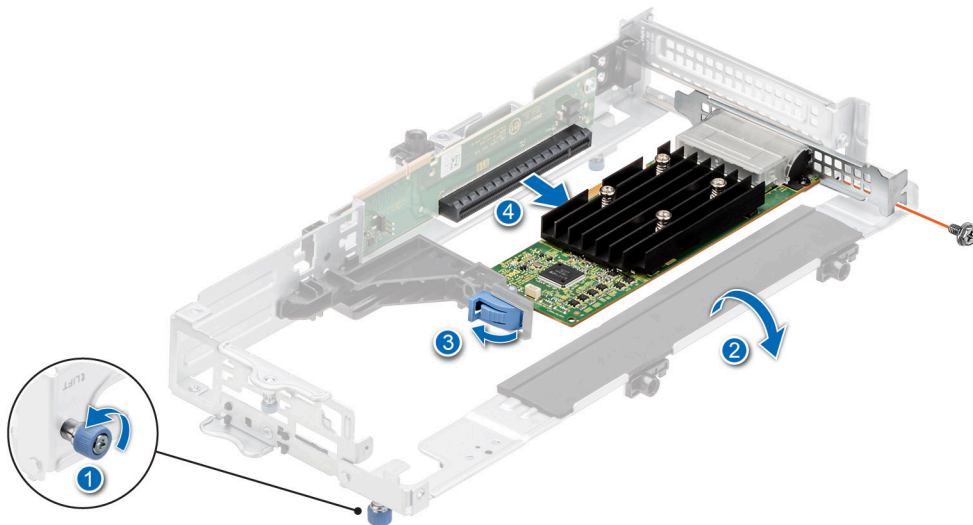
Figure 74. Removing a half-length, low-profile expansion card from Riser 3A
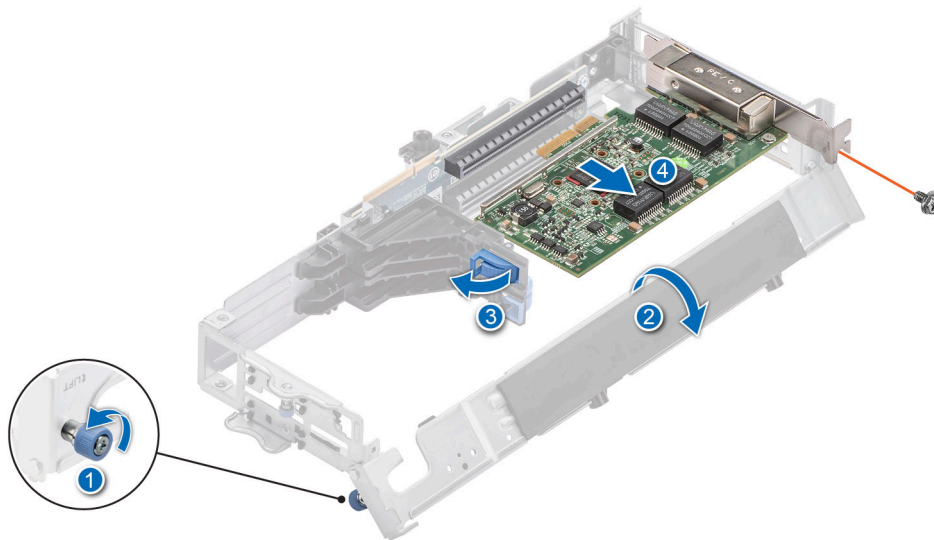
Figure 75. Removing a half-length, low-profile expansion card from Riser 3B

5. If the expansion card is not going to be replaced, install a filler bracket and close the card retention latch.

   (i) **NOTE:** You must install a filler bracket over an empty expansion card slot to maintain Federal Communications Commission (FCC) certification of the system. The filler brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.

   (i) **NOTE:** The numbers on the image do not depict the exact steps. The numbers are for representation of sequence.
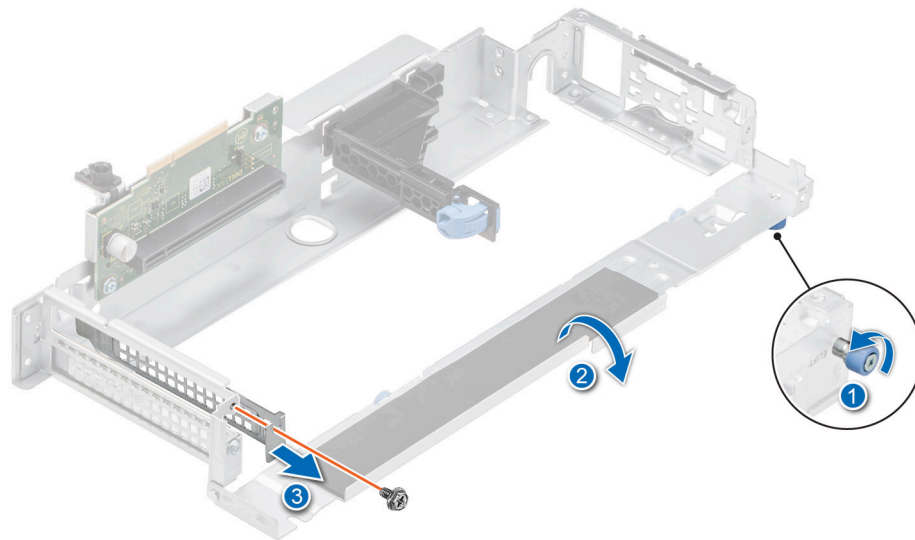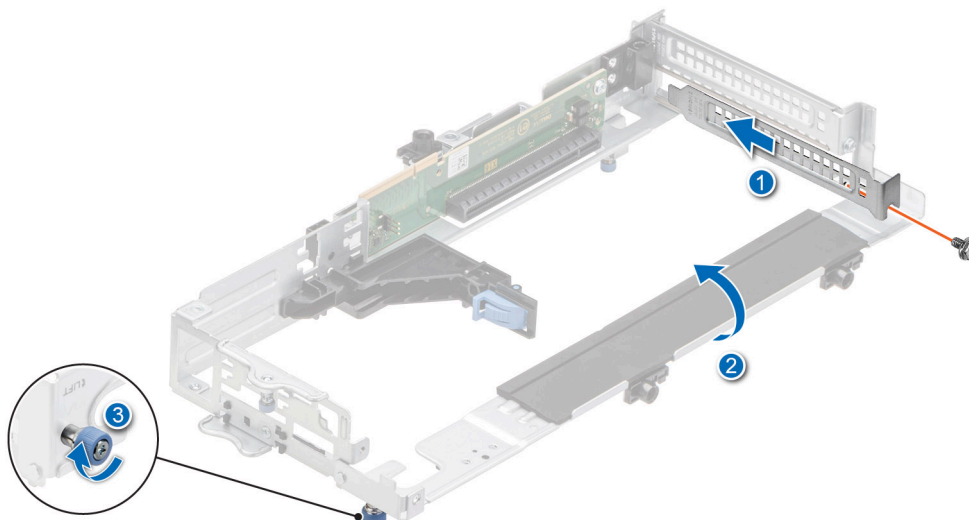

Figure 76. Installing filler bracket in Riser 3A
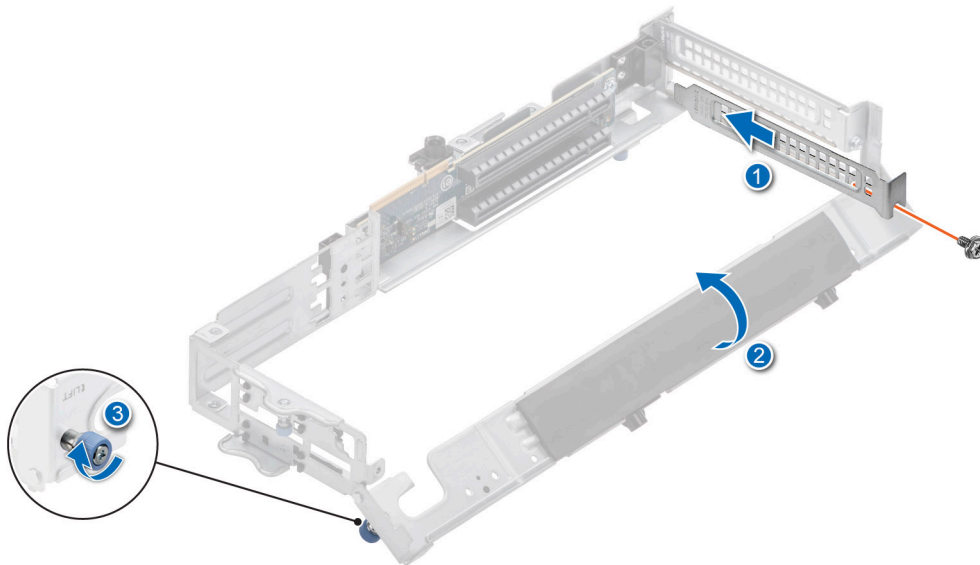
Figure 77. Installing filler bracket in Riser 3B

6. Close the L-shaped bracket, and using the Phillips 1 screwdriver, tighten the thumbscrew.

Next steps

If applicable, install an expansion card into the expansion card riser 3 or install the expansion card riser 3.

Installing an expansion card into the expansion card riser 3

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. If installing a new expansion card, unpack it and prepare the card for installation.

   ⓘ **NOTE:** For instructions, see the documentation accompanying the card.
4. Remove the expansion card riser 2.
5. Remove the air shroud.
6. Remove the drive cage.
7. Remove the expansion card riser 3.

ⓘ **NOTE:** The procedure to install the expansion card or GPU card is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Using the Phillips 1 screwdriver, loosen the blue thumbscrew.
2. Lift the L-shaped bracket from the expansion card riser, and remove the screws.
3. If installed, remove the filler bracket.

   ⓘ **NOTE:** Store the filler bracket for future use. Filler brackets must be installed in empty expansion card slots to maintain Federal Communications Commission (FCC) certification of the system. The filler brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.

   ⓘ **NOTE:** The numbers on the image do not depict the exact steps. The numbers are for representation of sequence.
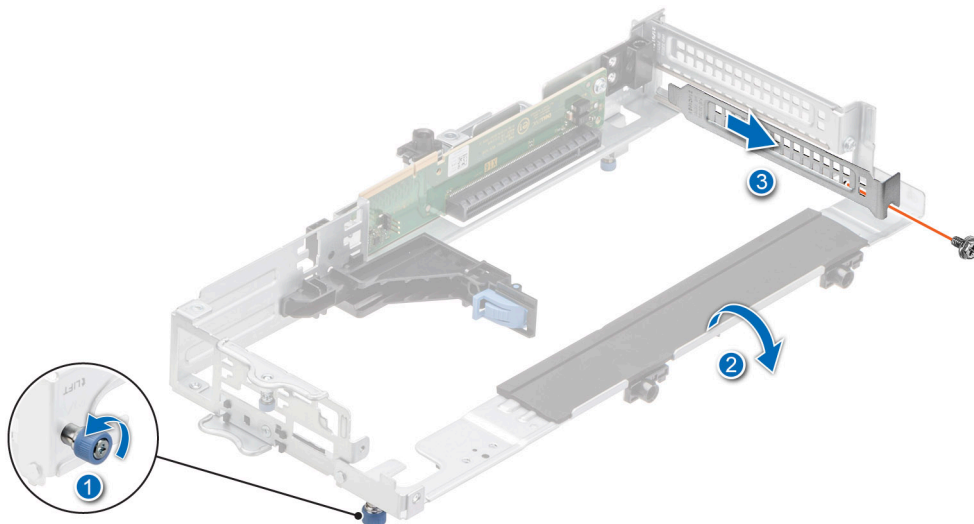
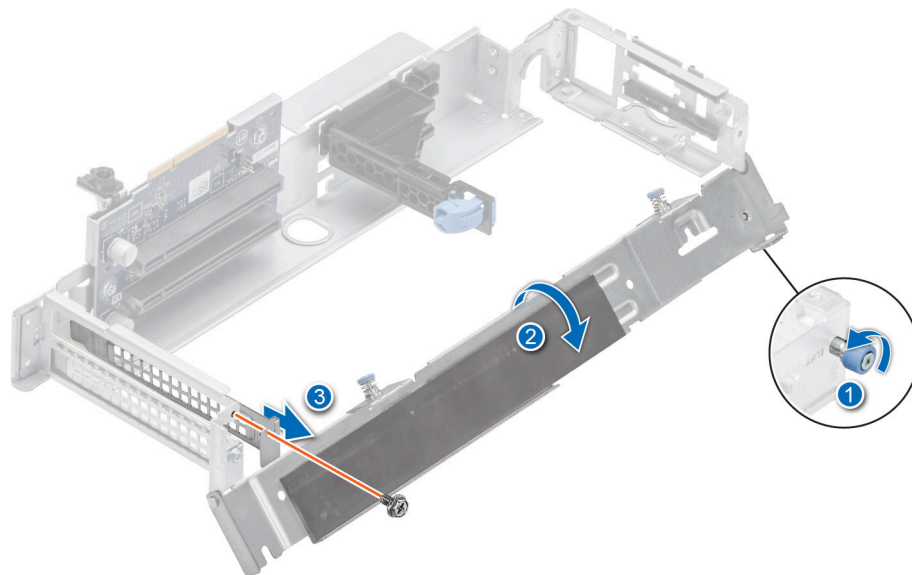**Figure 78. Removing a filler bracket from Riser 3A**
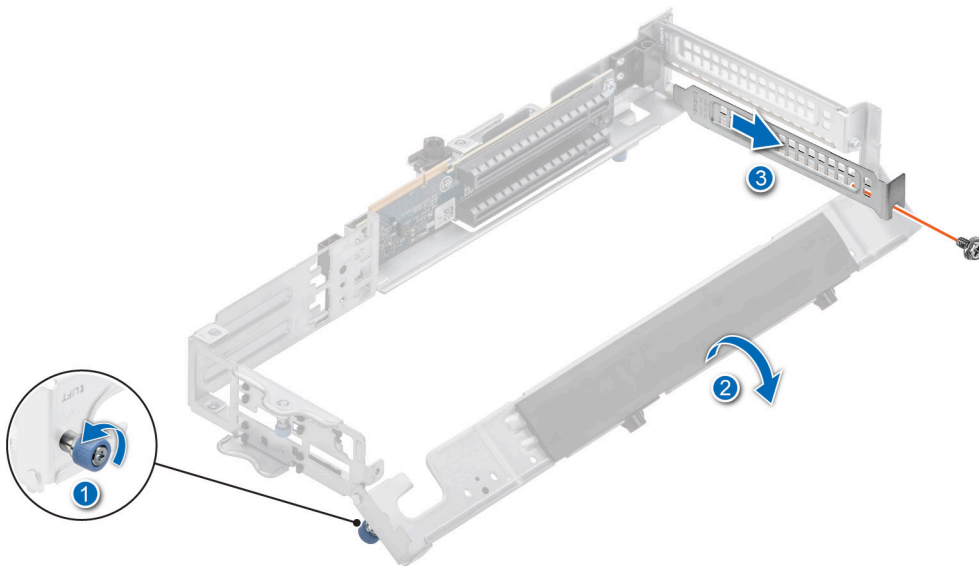
Figure 79. Removing a filler bracket from Riser 3B

4. Remove the plastic card guide from the riser if the expansion card to be installed is longer than half-length.
5. Hold the card by the edges, and align the card edge connector with the expansion card connector on the riser.
6. Insert the card edge connector firmly into the expansion card connector until the card is fully seated.
7. Using the Phillips 1 screwdriver, tighten the screw.

> (i) **NOTE:** The numbers on the image do not depict the exact steps. The numbers are for representation of sequence.

> (i) **NOTE:** For a double-width, full-length GPU card, remove the plastic card guide from the riser.

> (i) **NOTE:** The procedure to install the cards into the expansion card riser 3A and 3B is the same.
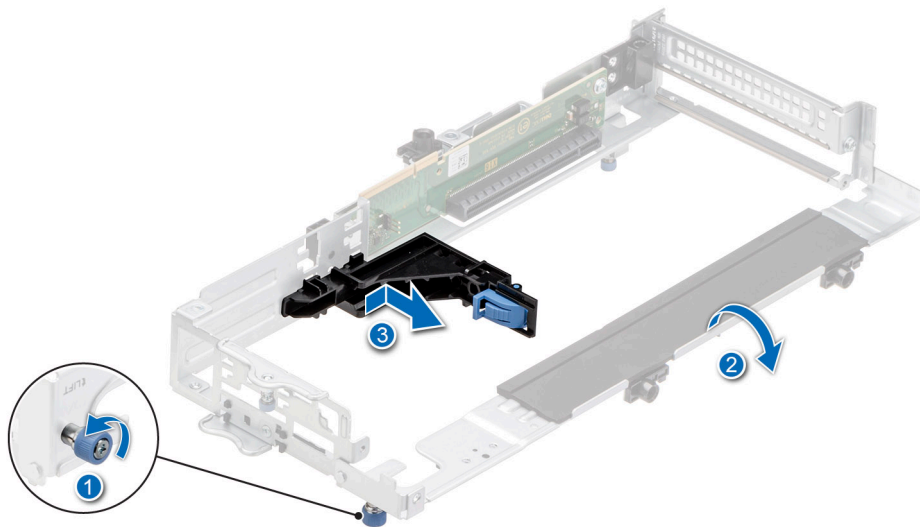
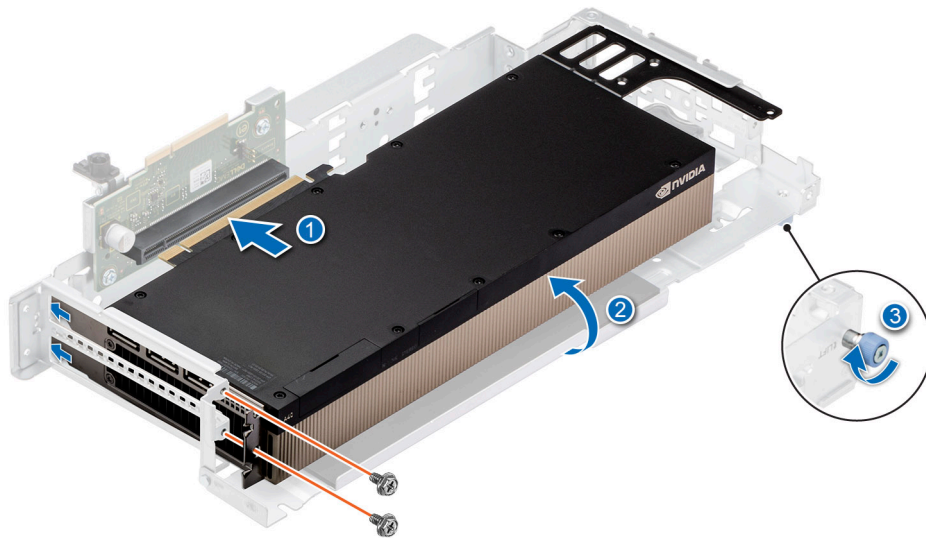**Figure 80. Removing the plastic card guide from Riser 3**

Figure 81. Installing a double-width, full-length GPU card into Riser 3A
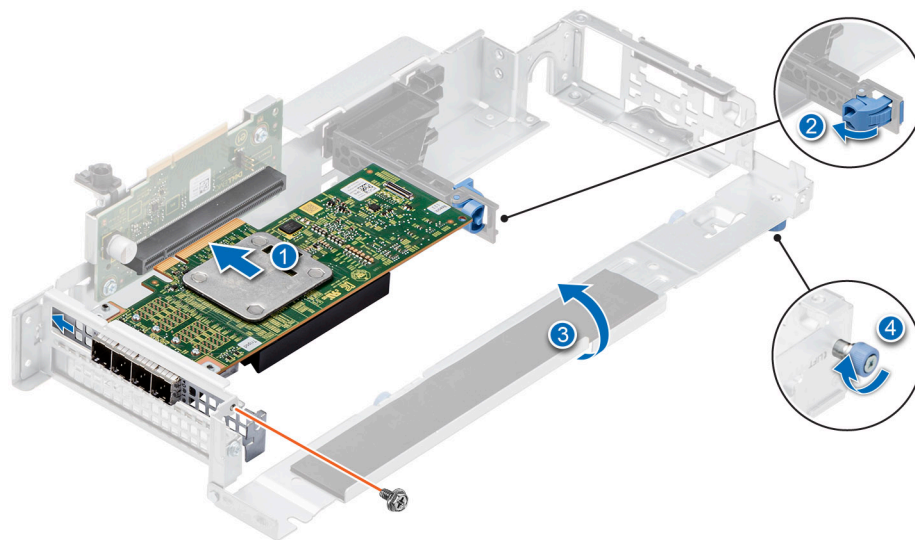

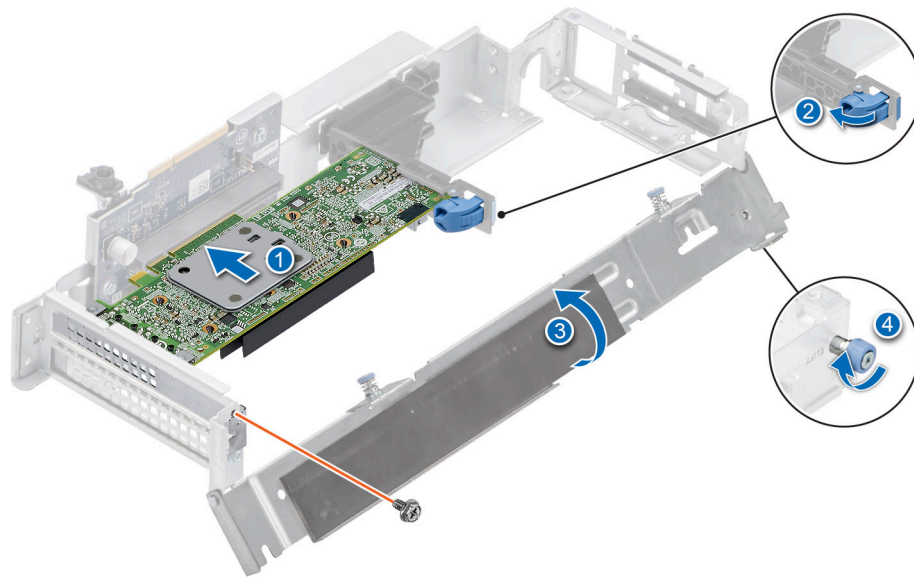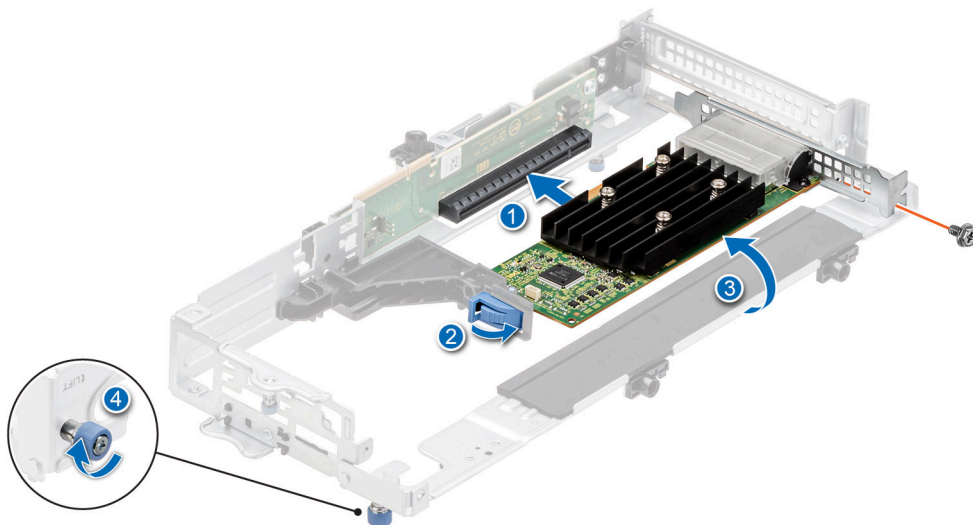**Figure 82. Installing a half-length, low-profile expansion card into Riser 3A**
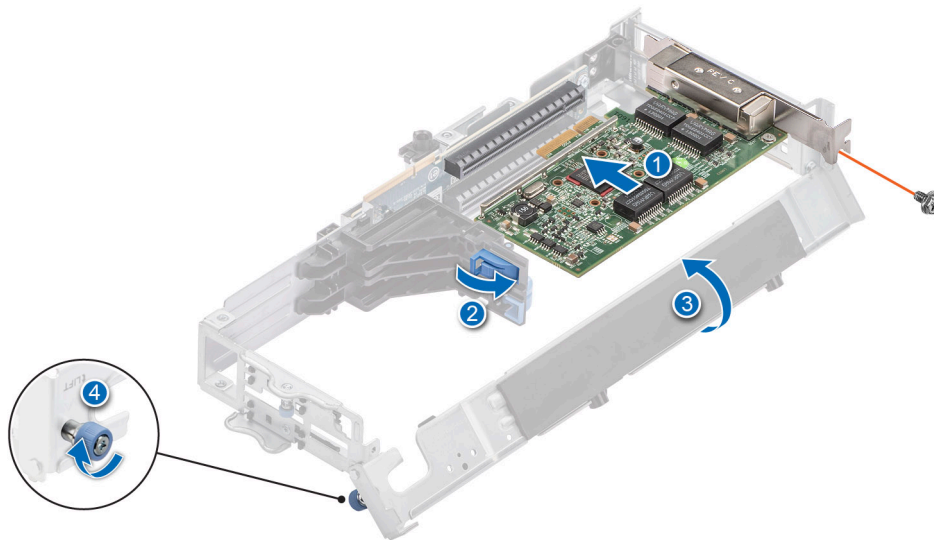
Figure 83. Installing a half-length, low-profile expansion card into Riser 3B

8. Close the L-shaped bracket, and using the Phillips 1 screwdriver, tighten the thumbscrew.

Next steps

1. If applicable, connect the internal cables to the expansion card.
2. Install the expansion card riser 3.
3. Follow the procedure listed in After working inside your system.
4. Install any device drivers required for the card as described in the documentation for the card.

(i) **NOTE:** While replacing a faulty storage controller or NIC card or GPU card with the same type of card, after you power on the system; the new card automatically updates to the same firmware and configuration of the faulty one. For more information about the Part replacement configuration, see the *Dell Lifecycle Controller User's Guide* available at https://www.dell.com/idracmanuals

⚠ **CAUTION: Do not install GPUs, network cards, or other PCIe devices on your system that are not validated and tested by Dell. Damage caused by unauthorized and invalidated hardware installation will null and void the system warranty.**

Drives

Removing a drive blank

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. If installed, remove the front bezel.

⚠ **CAUTION: To maintain proper system cooling, drive blanks must be installed in all empty drive slots.**

(i) **NOTE:** Store the drive blank for future use. Drive blanks must be installed in empty drive slots to maintain Federal Communications Commission (FCC) certification of the system. The blanks also keep dust and dirt out of the system.

Steps

Press the release button, and slide the drive blank out of the drive slot.
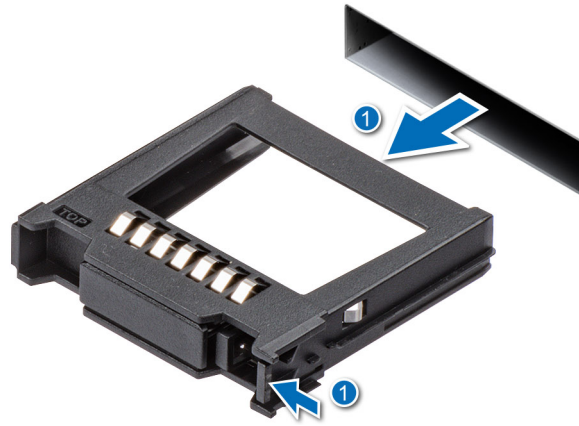
Figure 84. Removing a drive blank

Next steps

Installing a hard drive or Installing a drive blank.

Installing a drive blank

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. If installed, Remove the front bezel.

Steps

Insert the drive blank into the drive slot until the release button clicks into place.
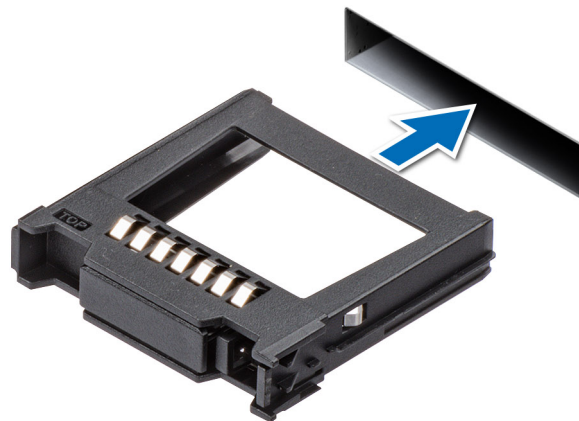
Figure 85. Installing a drive blank

Next steps

If applicable, Install the front bezel.

Removing the drive carrier

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. If installed, Remove the front bezel for Front Accessed configuration.

3. Using the management software, prepare the drive for removal.

If the drive is online, the green activity or fault indicator blinks while the drive is powered off. When the drive indicators are off, the drive is ready for removal. For more information, see the documentation for the storage controller at www.dell.com/support/home.

⚠️ **CAUTION: Before attempting to remove or install a drive while the system is running, see the documentation for the storage controller card to ensure that the host adapter is configured correctly to support drive removal and insertion.**

⚠️ **CAUTION: To prevent data loss, ensure that your operating system supports drive installation. See the documentation supplied with your operating system.**

Steps

1. Press the release button to open the drive carrier release handle.
2. Holding the drive carrier release handle, slide the drive carrier out of the drive slot.
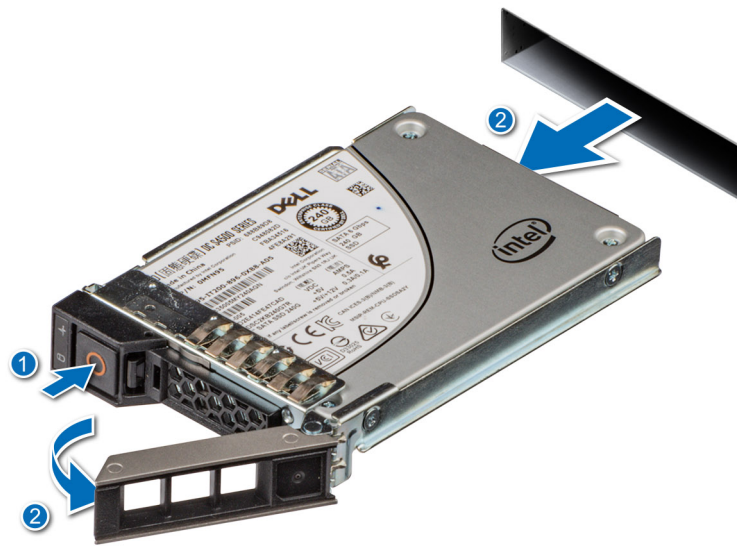
Figure 86. Removing a drive carrier

Next steps

Install a drive carrier or Install a hard drive blank.

Installing the drive carrier

Prerequisites

⚠️ **CAUTION: Before removing or installing a drive while the system is running, see the documentation for the storage controller card to ensure that the host adapter is configured correctly to support drive removal and insertion.**

⚠️ **CAUTION: Combining SAS and SATA drives in the same RAID volume is not supported.**

⚠️ **CAUTION: When installing a drive, ensure that the adjacent drives are fully installed. Inserting a drive carrier and attempting to lock its handle next to a partially installed carrier can damage the partially installed carrier's shield spring and make it unusable.**

⚠️ **CAUTION: To prevent data loss, ensure that your operating system supports hot-swap drive installation. See the documentation supplied with your operating system.**

⚠ **CAUTION: When a replacement hot swappable drive is installed and the system is powered on, the drive automatically begins to rebuild. Ensure that the replacement drive is blank or contains data that you wish to overwrite. Any data on the replacement drive is immediately lost after the drive is installed.**

ⓘ **NOTE:** Ensure that the drive carrier's release handle is in the open position before inserting the carrier into the slot.

1. Follow the safety guidelines listed in the Safety instructions.
2. If installed, remove the front bezel.
3. Remove the drive carrier or remove the drive blank when you want to assemble the drives in to the system.

Steps

1. Slide the drive carrier into the drive slot.
2. Close the drive carrier release handle to lock the drive in place.
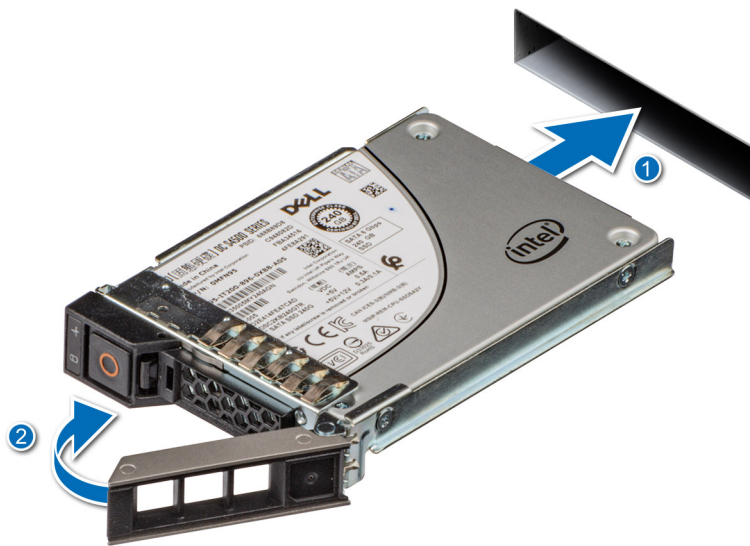
Figure 87. Installing a drive carrier

Next steps

If removed, install the front bezel.

Removing the drive from the drive carrier

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.

Steps

1. Using a Phillips 1 screwdriver, release the screws from the slide rails on the drive carrier.

    ⓘ **NOTE:** If the drive carrier has Torx screw, use Torx 6 (for 2.5-inch drive) screwdriver to remove the drive. ✷

2. Lift the drive out of the drive carrier.
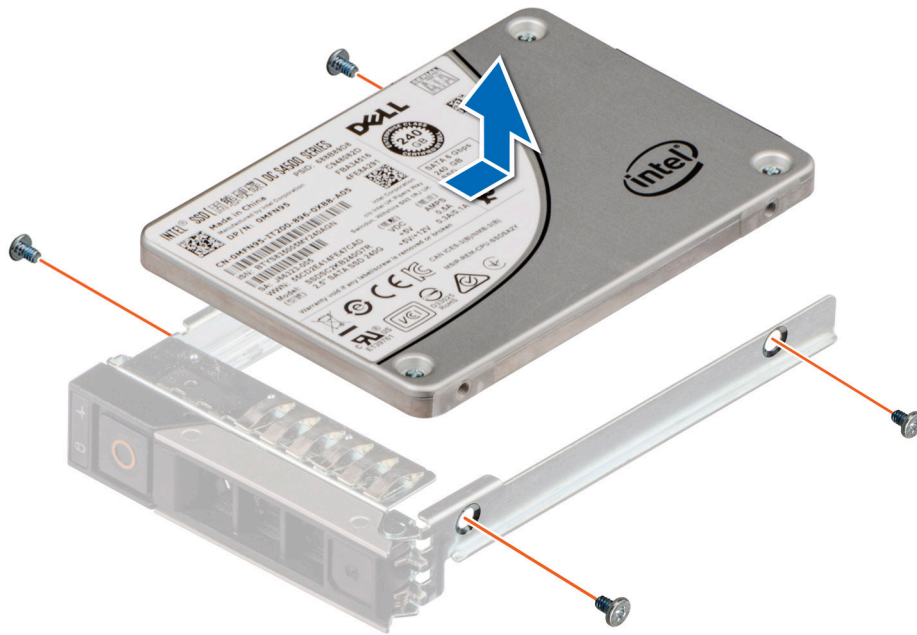
Figure 88. Removing the drive from the drive carrier

Next steps

Install the drive into a drive carrier.

Installing the drive into the drive carrier

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.

ⓘ **NOTE:** When installing a drive into the drive carrier, ensure that the screws are torqued to 4 in-lbs.

Steps

1. Insert the drive into the drive carrier with the drive connector facing towards the rear of the carrier.
2. Align the screw holes on the drive with the screws holes on the drive carrier.
3. Using a Phillips 1 screwdriver, secure the drive to the drive carrier with the screws.

   ⓘ **NOTE:** If the drive carrier has Torx screw, use Torx 6 (for 2.5-inch drive) screwdriver to install the drive. ✲
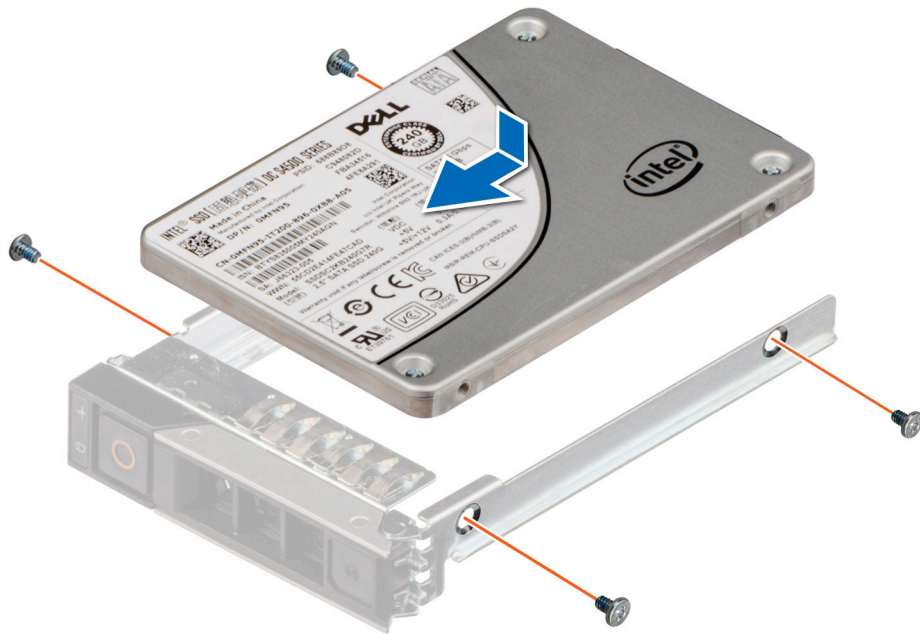
Figure 89. Installing a drive into the drive carrier

Next steps

1. Install the drive carrier.

Drive backplane

This is a service technician replaceable part only.

Drive backplane details

The system supports 2.5-inch (x6) backplane.
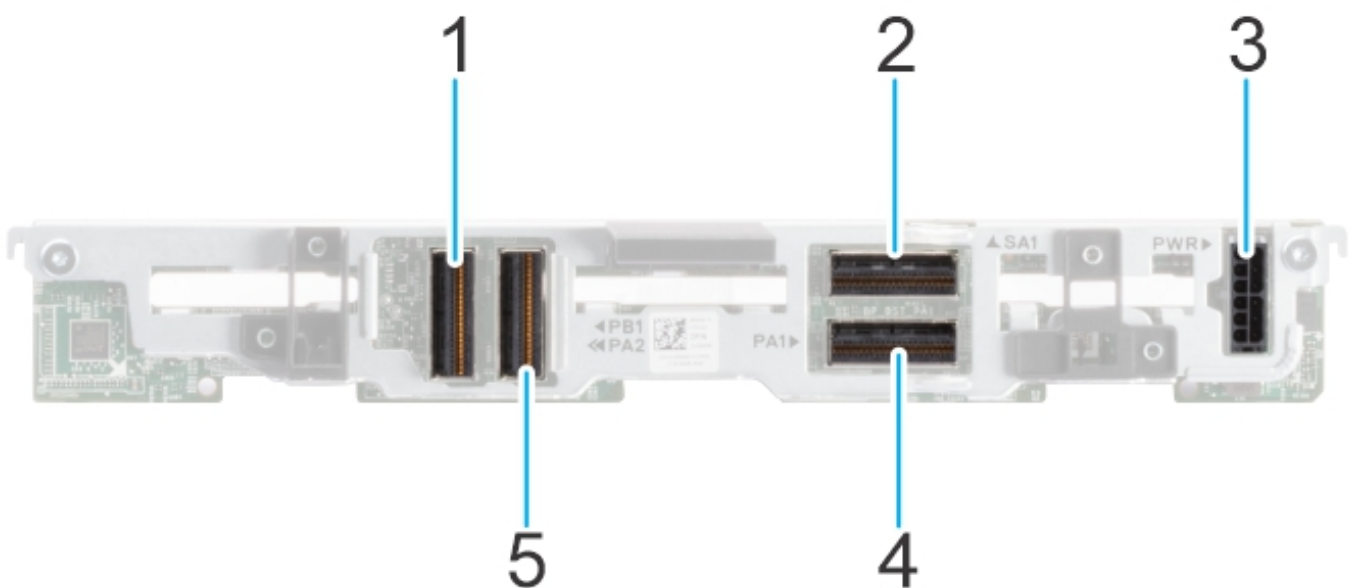
Figure 90. 6 x 2.5-inch backplane

1. PA2 (NVMe signal connector)
2. SA1 (SAS/SATA signal connector)
3. PWR (backplane power cable connector)
4. PA1 (NVMe signal connector)
5. PB1 (NVMe signal connector)

Removing the drive backplane

Prerequisites

⚠ **CAUTION: To prevent damage to the drives and backplane, remove the drives from the system before removing the backplane.**

⚠ **CAUTION: Note the number of each drive and temporarily label them before you remove the drive so that you can reinstall them in the same location. The drive slot numbers are printed next to each drive slot respectively.**

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove all the drives.
4. Disconnect the drive backplane cables from the connectors on the system board and PIB.

   ⓘ **NOTE:** The procedure to remove the drive backplane is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Hold the drive backplane by the edges and lift it upwards to disengage the backplane from the guide pins.
2. Lift the drive backplane out of the system.
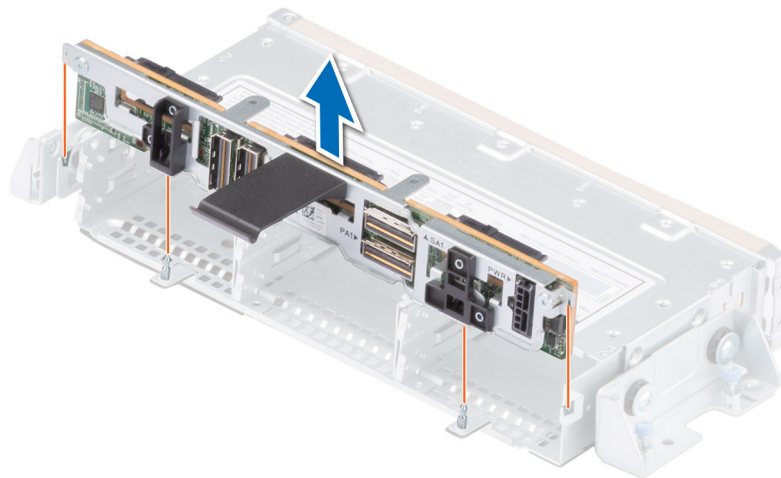
Figure 91. Removing the drive backplane

Next steps

Replace the drive backplane.

Installing the drive backplane

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove all the drives.

(i) **NOTE:** Route the cables properly when you replace them to prevent the cable from being pinched or crimped.

(i) **NOTE:** The procedure to install the drive backplane is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Align the guide pins on the backplane with the guides on the system.
2. Insert the backplane into the guides and lower the backplane firmly until it is fully seated.
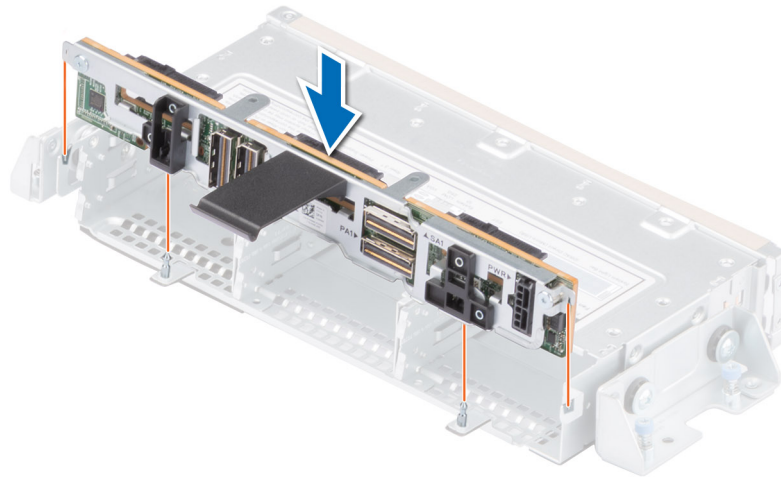
Figure 92. Installing the drive backplane

Next steps

1. Reconnect all the disconnected cables to the backplane.
2. Install all the drives.
3. Follow the procedure listed in After working inside your system.

Internal storage configuration matrix for XR12

Table 20. Internal storage configuration matrix

Configu ration	Chassis Orientatio n	Base Configuration Description	Backplane Description	Storage Controller(s)	Controller Form Factor	BOSS Enable d	Riser Configuration
1	Front Accessed	ASSY, CHAS, RAF, 6HD, 3PCI, 2U, XR12	x6 2.5 SATA (only)	Onboard SATA	Onboard SATA	Y	C0: R1B+R2A+R3A C1: R1B+R2B+R3B C2: R1B+R2B+R3A C3: R1A+R2A+R3A C4: R1A+R2B+R3A
2	Front Accessed	ASSY, CHAS, RAF, 6HD, 3PCI, 2U, XR12	x6 2.5 SAS/ SATA	HBA355i	Adapter	Y	C0: R1B+R2A+R3A C1: R1B+R2B+R3B C2: R1B+R2B+R3A
3	Front Accessed	ASSY, CHAS, RAF, 6HD, 3PCI, 2U, XR12	x6 2.5 SAS/ SATA	H755	Adapter	Y	C0: R1B+R2A+R3A C1: R1B+R2B+R3B C2: R1B+R2B+R3A

Table 20. Internal storage configuration matrix (continued)

Configu ration	Chassis Orientatio n	Base Configuration Description	Backplane Description	Storage Controller(s)	Controller Form Factor	BOSS Enable d	Riser Configuration
4	Front Accessed	ASSY, CHAS, RAF, 6HD, 3PCI, 2U, XR12	x6 2.5 SAS/ SATA	H345	Adapter	Y	C0: R1B+R2A+R3A C1: R1B+R2B+R3B C2: R1B+R2B+R3A
5	Front Accessed	ASSY, CHAS, RAF, 6HD, 3PCI, 2U, XR12	x4 2.5 NVME + 2.5 SATA	S150 + Onboard SATA	Direct Attach (SL) + Onboard SATA	Y	C0: R1B+R2A+R3A C1: R1B+R2B+R3B C2: R1B+R2B+R3A
6	Front Accessed	ASSY, CHAS, RAF, 6HD, 3PCI, 2U, XR12	x6 2.5 NVME (only)	H755	Adapter	Y	C0: R1B+R2A+R3A C1: R1B+R2B+R3B
7	Rear Accessed	ASSY, CHAS, NAF, 6HD, 3PCI, 2U, XR12	x6 2.5 SATA (only)	Onboard SATA	Onboard SATA	Y	C0: R1B+R2A+R3A C1: R1B+R2B+R3B C2: R1B+R2B+R3A
8	Rear Accessed	ASSY, CHAS, NAF, 6HD, 3PCI, 2U, XR12	x6 2.5 SAS/ SATA	HBA355i	Adapter	Y	C0: R1B+R2A+R3A C1: R1B+R2B+R3B C2: R1B+R2B+R3A
9	Rear Accessed	ASSY, CHAS, NAF, 6HD, 3PCI, 2U, XR12	x6 2.5 SAS/ SATA	H755	Adapter	Y	C0: R1B+R2A+R3A C1: R1B+R2B+R3B C2: R1B+R2B+R3A
10	Rear Accessed	ASSY, CHAS, NAF, 6HD, 3PCI, 2U, XR12	x6 2.5 SAS/ SATA	H345	Adapter	Y	C0: R1B+R2A+R3A C1: R1B+R2B+R3B C2: R1B+R2B+R3A
11	Rear Accessed	ASSY, CHAS, NAF, 6HD, 3PCI, 2U, XR12	x4 2.5 NVME + 2.5 SATA	S150 + Onboard SATA	Direct Attach (SL) + Onboard SATA	Y	C0: R1B+R2A+R3A C1: R1B+R2B+R3B C2: R1B+R2B+R3A
12	Rear Accessed	ASSY, CHAS, NAF, 6HD, 3PCI, 2U, XR12	x6 2.5 NVME (only)	H755	Adapter	Y	C0: R1B+R2A+R3A C1: R1B+R2B+R3B C2: R1B+R2B+R3A

Cable routing
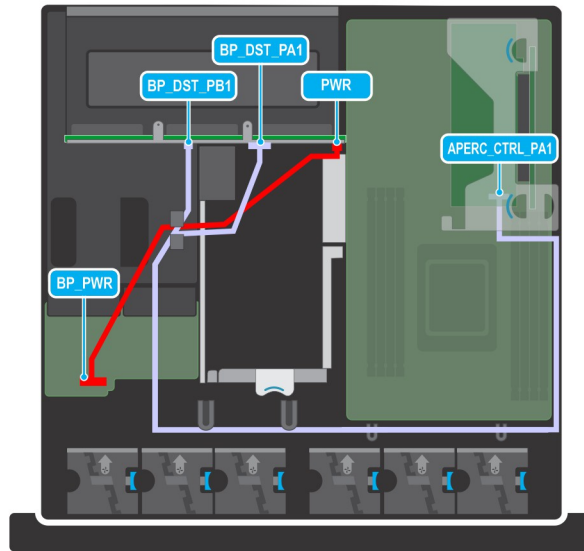
Figure 93. PERC PA NVMe cable with 6 x 2.5-inch backplane

Table 21. Connector descriptions for PERC PA NVMe cable with 6 x 2.5-inch backplane

From	To
PWR (PIB power connector)	BP_PWR (backplane power connector)
BP_DST_PA1 (backplane NVMe connector, cable marking BP PA1) and BP_DST_PB1 (backplane NVMe connector, cable marking BP PB1)	APERC_CTRL_PA1 (signal connector on the system board, cable marking CTRL_PA1)
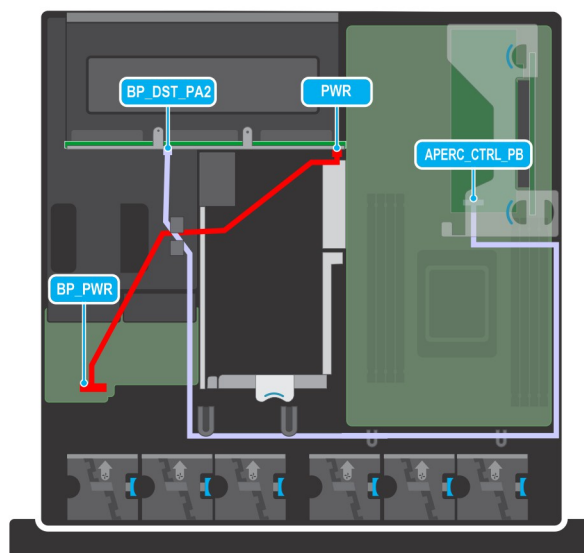
Figure 94. PERC PB NVMe cable with 6 x 2.5-inch backplane

Table 22. Connector descriptions for PERC PB NVMe cable with 6 x 2.5-inch backplane

From	To
PWR (PIB power connector)	BP_PWR (backplane power connector)
BP_DST_PA2 (backplane NVMe connector, cable marking BP PA2)	APERC_CTRL_PB (signal connector on the system board, cable marking CTRL_PB1)
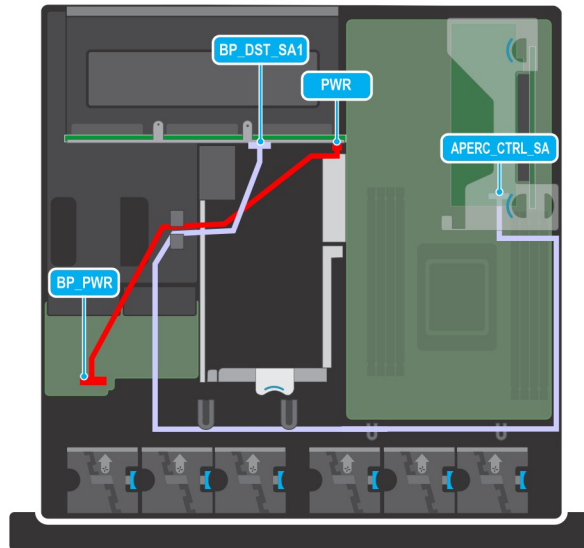
Figure 95. PERC SA SAS cable with 6 x 2.5-inch backplane

Table 23. Connector descriptions for PERC SA SAS cable with 6 x 2.5-inch backplane

From	To
PWR (PIB power connector)	BP_PWR (backplane power connector)
BP_DST_SA1 (backplane SAS connector, cable marking BP SA1)	APERC_CTRL_SA (signal connector on the system board, cable marking CTRL_SA1)
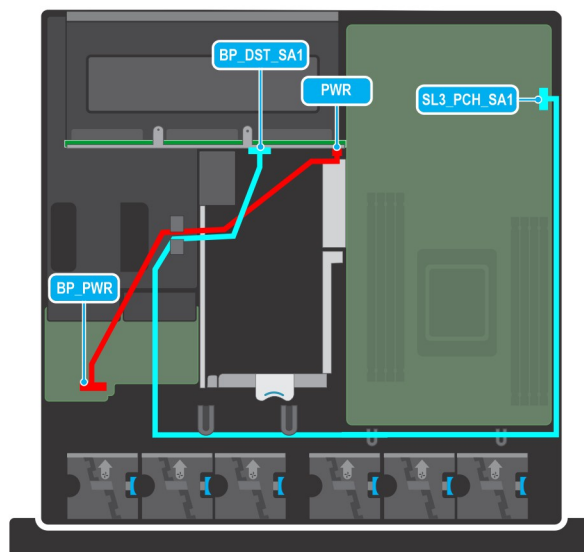
Figure 96. SATA cable connector with 6 x 2.5-inch backplane

Table 24. Connector descriptions for SATA cable connector with 6 x 2.5-inch backplane

From	To
PWR (PIB power connector)	BP_PWR (backplane power connector)
BP_DST_SA1 (backplane SATA connector, cable marking BP SA1)	SL3_PCH_SA1 (signal connector on the system board, cable marking MB SA1)
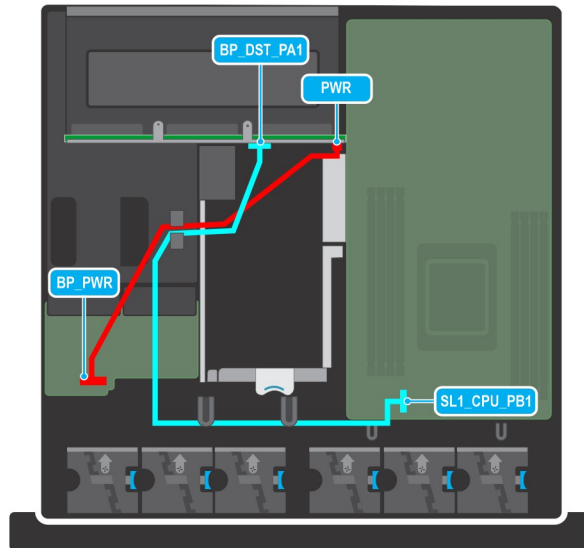
Figure 97. NVMe cable connector with 6 x 2.5-inch backplane

Table 25. Connector descriptions for NVMe cable connector with 6 x 2.5-inch backplane

From	To
PWR (PIB power connector)	BP_PWR (backplane power connector)
BP_DST_PA1 (backplane NVMe connector, cable marking BP PA1)	SL2_CPU_PB1 (signal connector on the system board, cable marking MB PB1)
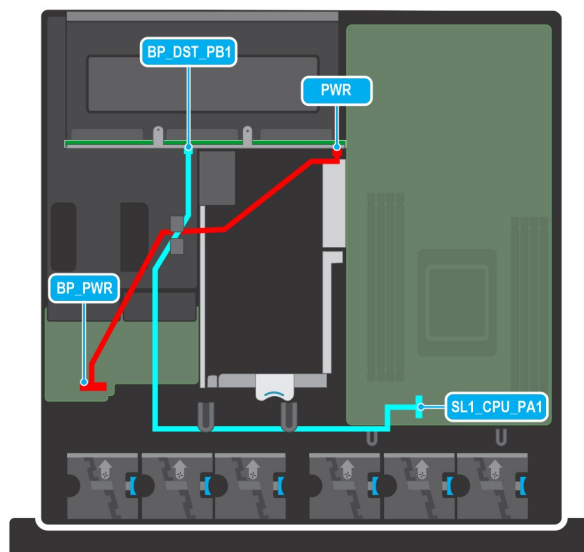
Figure 98. NVMe cable connector with 6 x 2.5-inch backplane

Table 26. Connector descriptions for NVMe cable connector with 6 x 2.5-inch backplane

From	To
PWR (PIB power connector)	BP_PWR (backplane power connector)
BP_DST_PB1 (backplane NVMe connector, cable marking BP PB1)	SL2_CPU_PA1 (signal connector on the system board, cable marking MB PA1)

Figure 99. Riser 1A connecting on system board

Table 27. Connector descriptions for Riser 1A connecting on system board

From	To
Riser_DST_PA1 (cable marking RSR_PA1)	SL2-CPU-PA1 (signal connector, cable marking MB_PA1)
Riser_DST_PB1 (cable marking RSR_PB1)	SL1-CPU-PB1 (signal connector, cable marking MB_PB1)
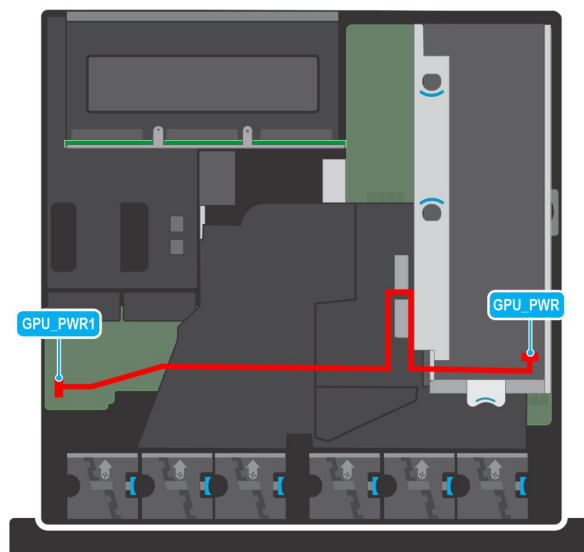
Figure 100. PIB to Riser 2 with one single-width, full-length GPU

Table 28. Connector descriptions for PIB to Riser 2 with one single-width, full-length GPU

From	To
GPU_PWR1 (PIB power cable connector)	GPU_PWR (GPU power cable connector)
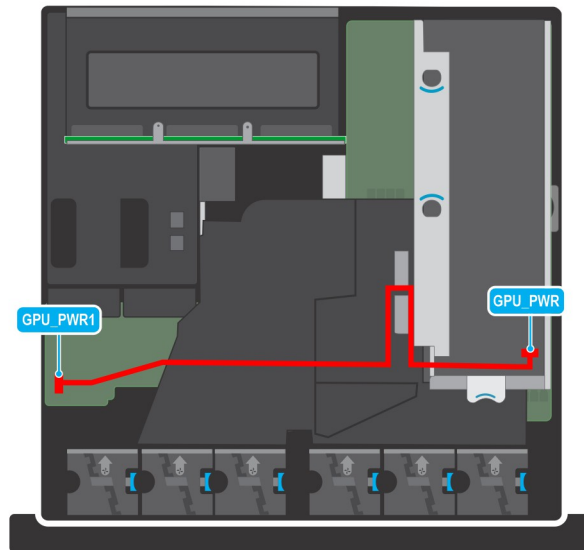
Figure 101. PIB to Riser 2 with double-width, full-length GPU

Table 29. Connector descriptions for PIB to Riser 2 with double-width, full-length GPU

From	To
GPU_PWR1 (PIB power cable connector)	GPU_PWR (GPU power cable connector)
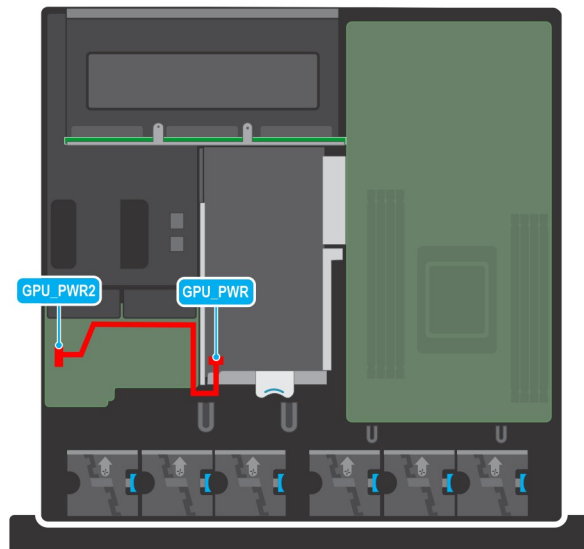
Figure 102. PIB to Riser 3 with double-width, full-length GPU

Table 30. Connector descriptions for PIB to Riser 3 with double-width, full-length GPU

From	To
GPU_PWR2 (PIB power cable connector)	GPU_PWR (GPU power cable connector)

Drive cage

This is a service technician replaceable part only.

Removing the drive cage

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the drives.
4. Remove the backplane.

(i) **NOTE:** The procedure to remove the drive cage is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Using the Phillips 2 screwdriver, loosen the blue thumbscrews.
2. Hold and lift the drive cage out of the system.
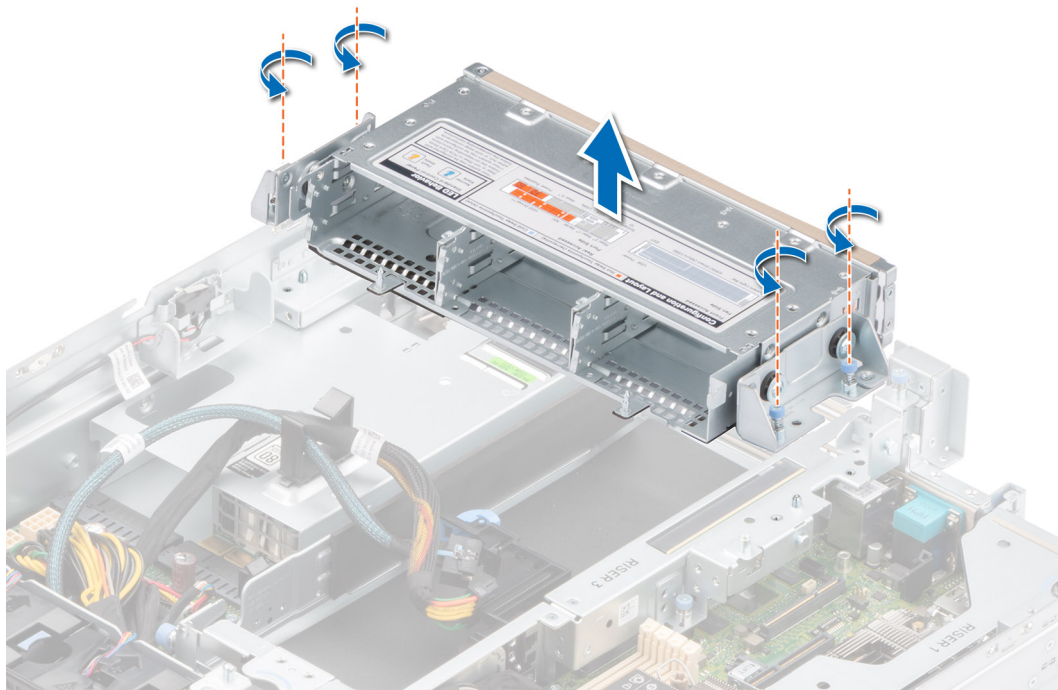
Figure 103. Removing the drive cage

Next steps

Replace the drive cage.

Installing the drive cage

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.

3. Remove the drives.
4. Remove the backplane.

ⓘ **NOTE:** The procedure to install the drive cage is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Align the drive cage with the guide pins on the system and lower it until fully seated.
2. Using Phillips 2 screwdriver, tighten the blue thumbscrews.
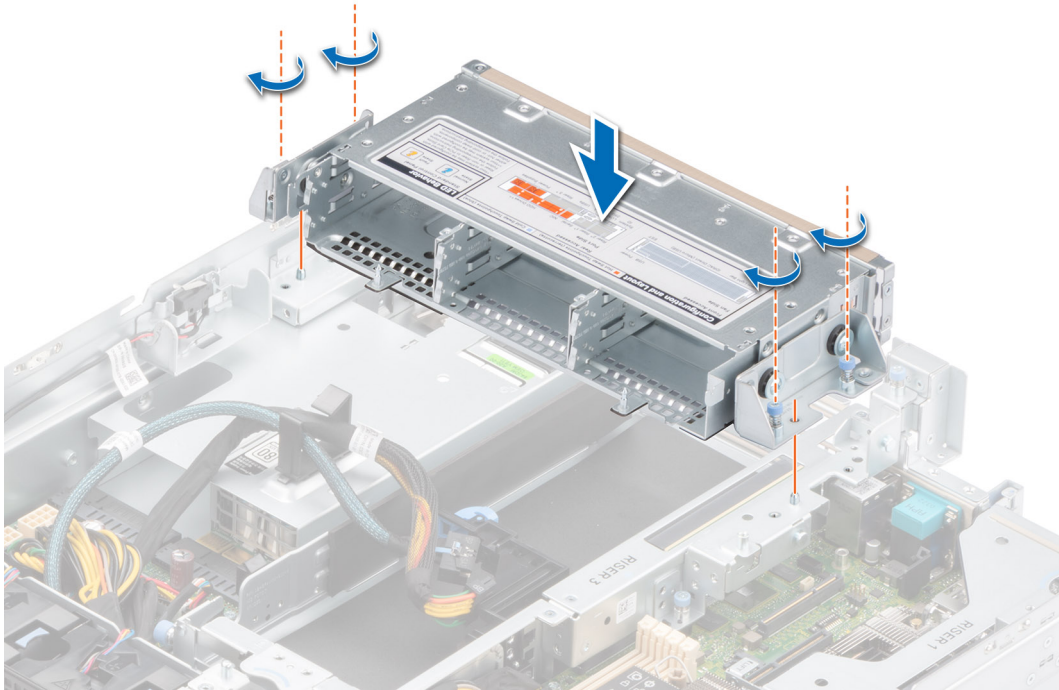
Figure 104. Installing the drive cage

Next steps

1. Install the backplane.
2. Install the drives.
3. Follow the procedure listed in After working inside your system.

Cooling fans

Removing a cooling fan

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2.
4. Remove the air shroud.
5. Move the cables out of way to access the fan cable connector on the system board or the PIB.

ⓘ **NOTE:** Observe the fan cable routing or make a note on the fan cable routing.

ⓘ **NOTE:** The procedure to remove the cooling fan is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Disconnect the cooling fan cable that is connected on the system board connector or the power interposer board (PIB).

   (i) **NOTE:** Fans 1, 2, and 3 are connected on the PIB and fans 4, 5, and 6 are connected on the system board.

2. Holding the blue touch point, lift the cooling fan out of the fan cage.
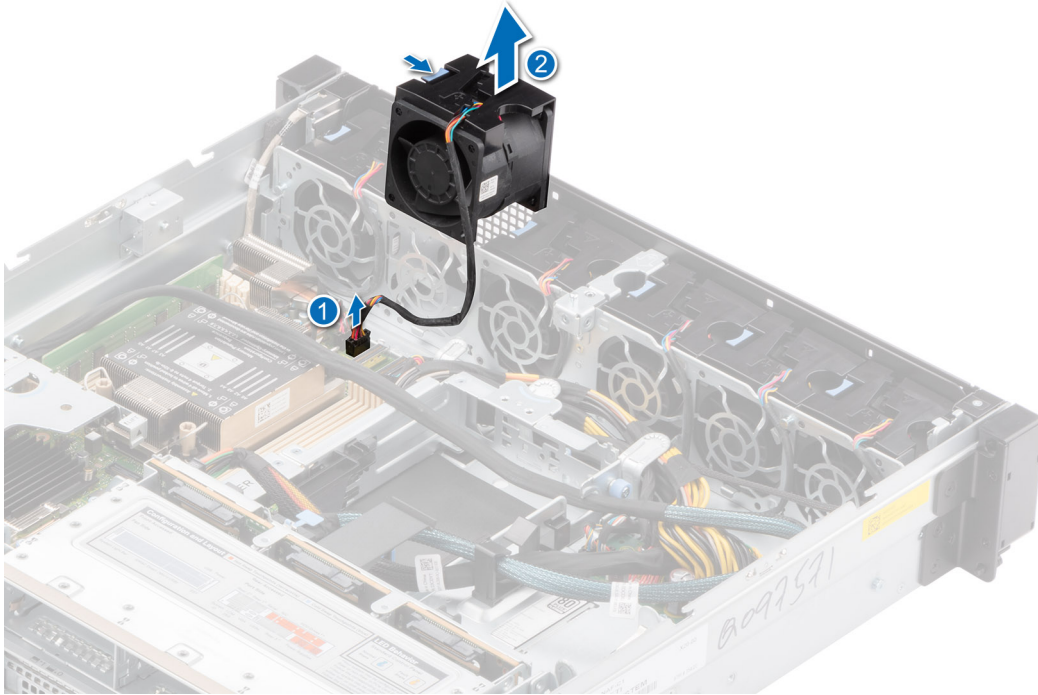
Figure 105. Removing a cooling fan

Next steps

Replace a fan.

Installing a cooling fan

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2.
4. Remove the air shroud.

   (i) **NOTE:** The procedure to install the cooling fan is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Ensure to match the airflow directional arrows on the fan assembly to the arrows on the chassis. Lower the cooling fan into the cage until it is seated firmly.
2. Route the fan cables properly to prevent the cables from being pinched or crimped.
3. Press the release tabs on the fan cable connector and connect the cable to the system board or to the PIB.

   (i) **NOTE:** Fans 1, 2, and 3 are connected on the PIB and fans 4, 5, and 6 are connected on the system board.
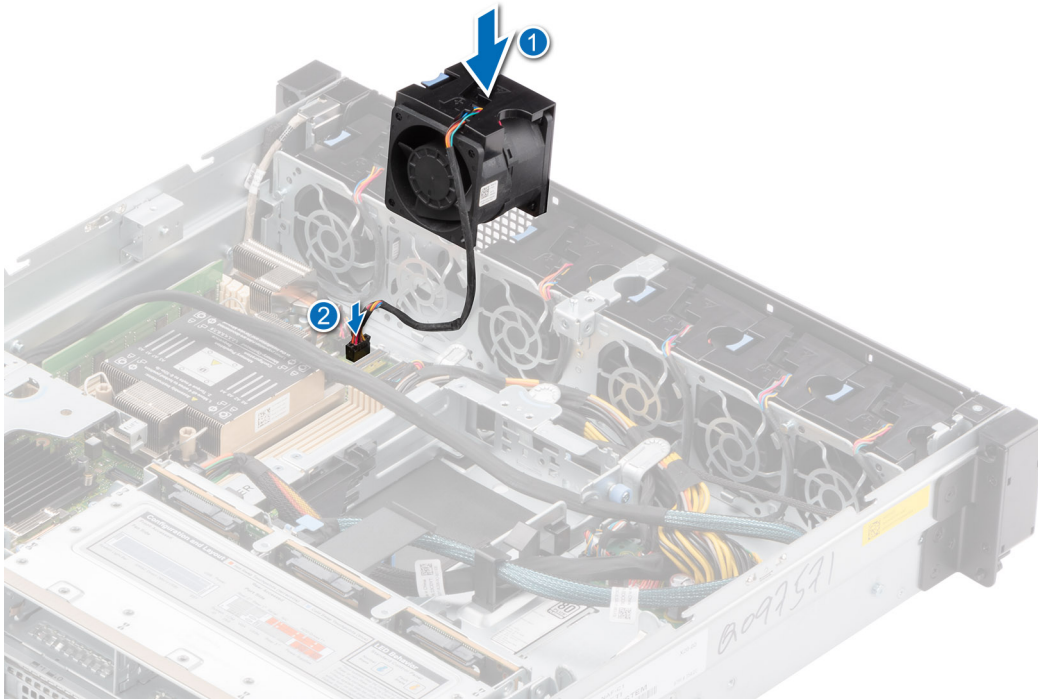
Figure 106. Installing a cooling fan

Next steps

1. Install the air shroud.
2. Install the expansion card riser 2.
3. Follow the procedure listed in After working inside your system.

Intrusion switch module

This is a service technician replaceable part only.

Removing the intrusion switch module

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.

   ⓘ **NOTE:** The procedure to remove the intrusion switch module is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Disconnect and remove the intrusion switch cable from the connector on the power interposer board (PIB).

   ⓘ **NOTE:** Observe the routing of the cable as you remove them from the system.

2. Using the Phillips 1 screwdriver, remove the screw securing the intrusion switch module.
3. Lift the intrusion switch module out of the system.
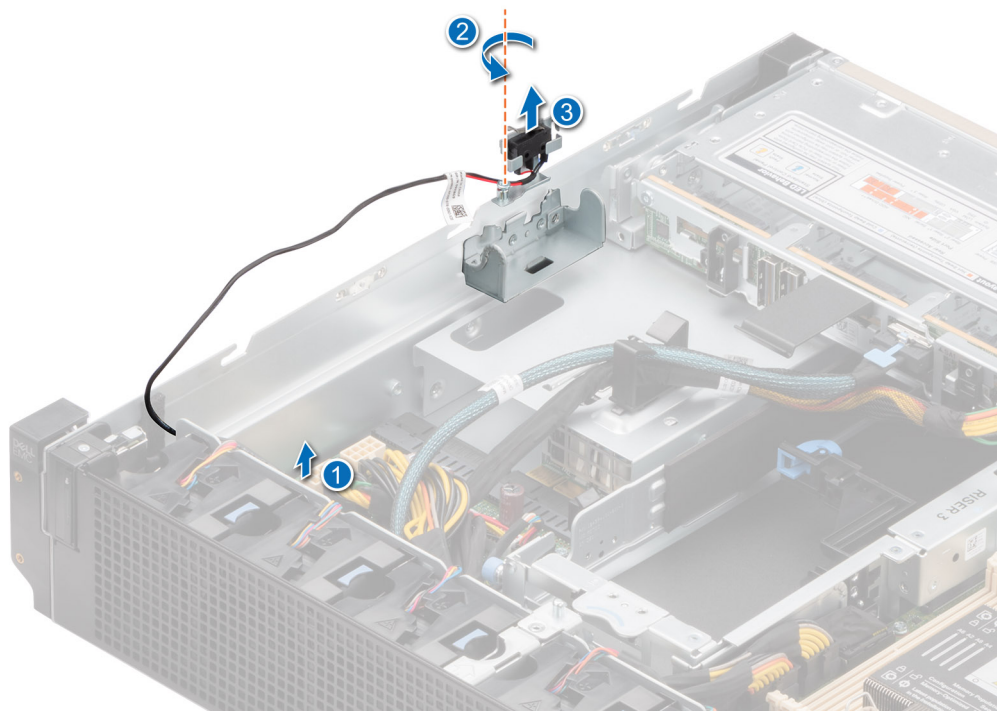
Figure 107. Removing the intrusion switch module

Next steps

Replace the intrusion switch module.

Installing the intrusion switch

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.

   (i) **NOTE:** The procedure to install the intrusion switch module is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Align and insert the intrusion switch module until it is firmly seated in the slot on the system.
2. Using the Phillips 1 screwdriver, tighten the screw securing the intrusion switch module.
3. Connect the intrusion switch cable to the connector on the power interposer board (PIB).

   (i) **NOTE:** Route the cable properly when you replace them to prevent the cable from being pinched or crimped.
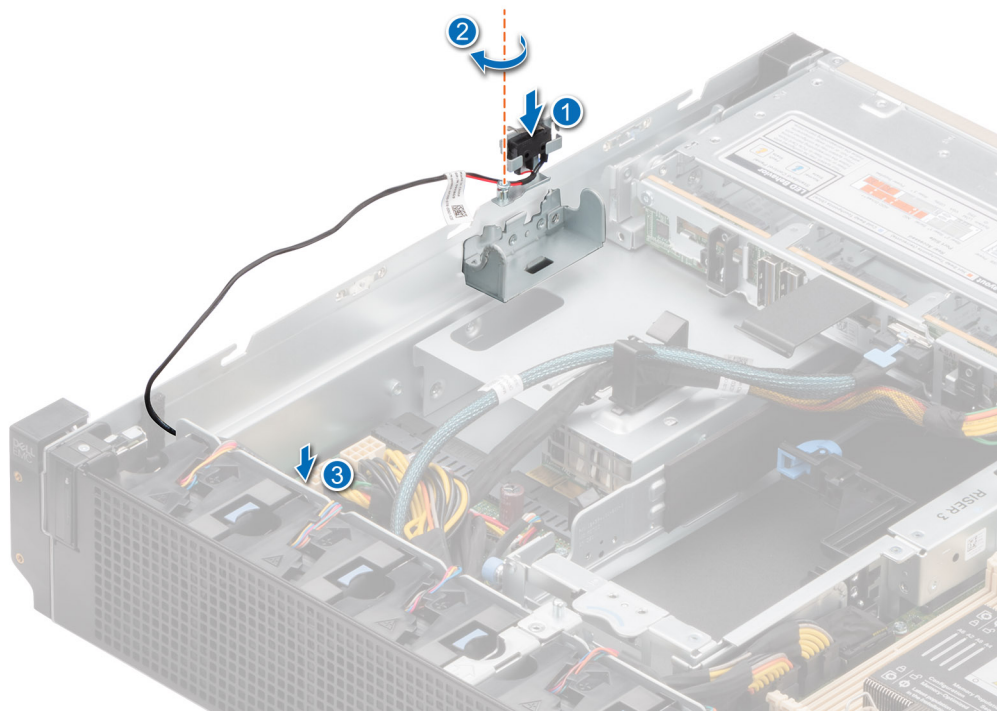
Figure 108. Installing the intrusion switch module

Next steps

Follow the procedure listed in After working inside your system.

System memory

System memory guidelines

The PowerEdge XR12 system supports DDR4 registered DIMMs (RDIMMs), load reduced DIMMs (LRDIMMs) and Intel Optane PMem 200 Series. System memory holds the instructions that are executed by the processor.

Your system contains 8 memory sockets organized into 8 channels to the processor.

Memory channels are organized as follows:

Table 31. Memory channels

Channel A	Channel B	Channel C	Channel D	Channel E	Channel F	Channel G	Channel H
Slots A1	Slots A5	Slots A3	Slots A7	Slots A2	Slots A6	Slots A4	Slots A8
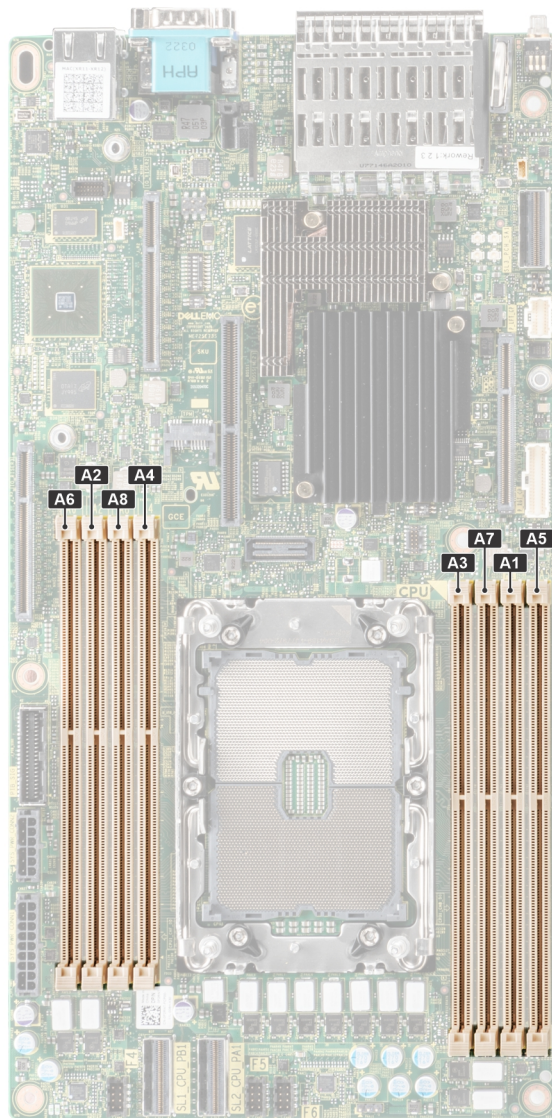
Figure 109. Memory sockets on the system board

The following table shows the memory populations and operating frequencies for the supported configurations:

Table 32. Memory population

DIMM Type	DIMM Ranking	Capacity	DIMM rated voltage and speed	Operating speed for DIMMs per Channel (DPC)
RDIMM	1R	8 GB	DDR4 (1.2V), 3200 MT/s, 2933 MT/s or 2666 MT/s	3200 MT/s
RDIMM	2R	16 GB, 32 GB, 64 GB	DDR4 (1.2V), 3200 MT/s, 2933 MT/s or 2666 MT/s	3200 MT/s
LRDIMM	4R	128 GB, 256 GB	DDR4 (1.2V), 3200 MT/s, 2933 MT/s or 2666 MT/s	3200 MT/s
Intel Optane PMem 200 Series	1R	128 GB, 256 GB	DDR4 (1.2V), 3200 MT/s, 2933 MT/s or 2666 MT/s	3200 MT/s

General memory module installation guidelines

To ensure optimal performance of your system, observe the following general guidelines when configuring your system memory. If your system's memory configurations fail to observe these guidelines, your system might not boot, stop responding during memory configuration, or operate with reduced memory.

The memory bus may operate at speeds of 3200 MT/s, 2933 MT/s , or 2666 MT/s depending on the following factors:

- System profile selected (for example, Performance Optimized, or Custom [can be run at high speed or lower])
- Maximum supported DIMM speed of the processor
- Maximum supported speed of the DIMMs

(i) **NOTE:** MT/s indicates DIMM speed in MegaTransfers per second.

The system supports Flexible Memory Configuration, enabling the system to be configured and run in any valid chipset architectural configuration. The following are the recommended guidelines for installing memory modules:

- All DIMMs must be DDR4.
- x4 and x8 DRAM based memory modules can be mixed.
- If memory modules with different speeds are installed, they operate at the speed of the slowest installed memory module(s).
- Populate memory module sockets only if a processor is installed.
- In **Optimizer Mode**, the DRAM controllers operate independently in the 64-bit mode and provide optimized memory performance.

Table 33. Memory population rules

Processor	Configuration	Memory population	Memory population information
Single processor	Optimizer (Independent channel) population order	A{1}, A{2}, A{3}, A{4}, A{5}, A{6}, A{7}, A{8}	1, 2, 4, 6, 8 DIMMs are allowed.

- Memory modules of different capacities can be mixed provided other memory population rules are followed.
- Mixing of more than two memory module capacities in a system is not supported.
- Unbalanced or odd memory configuration results in a performance loss and system may not identify the memory modules being installed, so always populate memory channels identically with equal DIMMs for best performance.
- Odd memory configuration with 3, 5 or 7 RDIMMs/LRDIMMs is not supported.
- Supported RDIMM / LRDIMM configurations are 1, 2, 4, 6, 8 DIMMs.
- Mixing RDIMM and LRDIMM is not supported.

Intel Optane PMem 200 Series installation guidelines

The following are the recommended guidelines for installing Intel Optane PMem 200 Series memory modules:
- Each system supports maximum of one Intel Optane PMem 200 Series memory module per channel.
- Intel Optane PMem 200 Series can be mixed with RDIMM or LRDIMM.
- Mixing of Intel Optane PMem 200 Series operating modes (App Direct, Memory Mode) is not supported.
- Intel Optane PMem 200 Series cannot be mixed with other Intel Optane PMem 200 Series capacities or NVDIMMs.
- VMware ESXi boot takes a longer time when Intel Intel Optane PMem 200 Series are configured in AppDirect mode. This is expected as background ARS is going on the interleave sets and needs to be completed before the pMem datastore is mounted on ESXi.
- Intel Optane PMem 200 Series in App Direct mode can be populated symmetrically or asymmetrically across sockets.
- In Memory mode symmetry across sockets is required.

For more information about the supported Intel Optane PMem 200 Series configurations, see the *Dell EMC Intel Optane PMem 200 Series User 's Guide* at https://www.dell.com/support/home/products/server_int/server_int_poweredge.

Table 34. Intel Optane PMem 200 Series Configuration 1 - 4 x RDIMMs/ LRDIMMs, 4 x Intel Optane PMem 200 Series

Total No of RDIMMs/ LRDIMMs	Total No of Intel Optane PMem 200 Series DIMMs	1 R/LRDIMM capacity (GB)	1 Intel Optane PMem 200 Series capacity (GB)	Total Standard Memory Capacity	Total PM Capacity	Supported Modes
4	4	16	128	64	512	MM or AD

Total No of RDIMMs/ LRDIMMs	Total No of Intel Optane PMem 200 Series DIMMs	1 R/LRDIMM capacity (GB)	1 Intel Optane PMem 200 Series capacity (GB)	Total Standard Memory Capacity	Total PM Capacity	Supported Modes
4	4	32	128	128	512	MM or AD
4	4	64	128	256	512	AD
4	4	128	128	512	512	AD
4	4	256	128	1024	512	AD
4	4	16	256	64	1024	MM or AD
4	4	32	256	128	1024	MM or AD
4	4	64	256	256	1024	MM or AD
4	4	128	256	512	1024	AD
4	4	256	256	1024	1024	AD

Table 35. Intel Optane PMem 200 Series Configuration 2 - 6 x RDIMMs/ LRDIMMs, 1 x Intel Optane PMem 200 Series

Total No of RDIMMs/ LRDIMMs	Total No of Intel Optane PMem 200 Series DIMMs	1 R/LRDIMM capacity (GB)	1 Intel Optane PMem 200 Series capacity (GB)	Total Standard Memory Capacity	Total PM Capacity	Supported Modes
6	1	16	128	96	128	AD
6	1	32	128	192	128	AD
6	1	64	128	384	128	AD
6	1	128	128	768	128	AD
6	1	256	128	1536	128	AD
6	1	16	256	96	256	AD
6	1	32	256	192	256	AD
6	1	64	256	384	256	AD
6	1	128	256	768	256	AD
6	1	256	256	1536	256	AD

Removing a memory module

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2.
4. Remove the air shroud.

(i) **NOTE:** The procedure to remove the memory module is the same for Rear Accessed and Front Accessed configurations.

⚠ **WARNING: The memory modules are hot to touch for some time after the system has been powered off. Allow the memory modules to cool down before handling them.**

⚠ **CAUTION: To ensure proper system cooling, memory module blanks must be installed in any memory socket that is not occupied. Remove memory module blanks only if you intend to install memory modules in those sockets.**

Steps

1. Locate the appropriate memory module socket.
2. To release the memory module from the socket, simultaneously press the ejectors on both ends of the memory module socket to fully open.

   ⚠ **CAUTION: Handle each memory module only by the card's edges, ensuring not to touch the middle of the memory module or the metallic contacts.**

3. Lift the memory module away from the system.
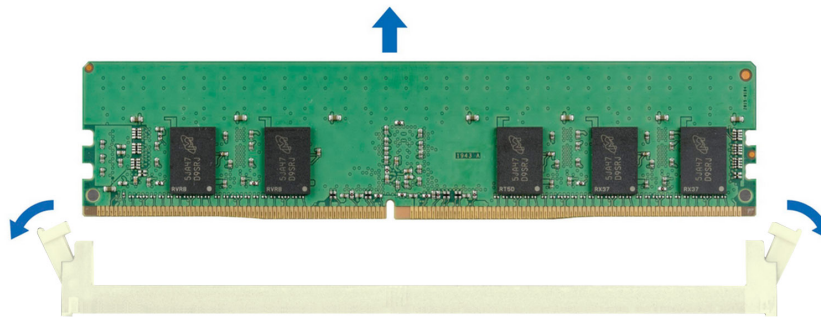
Figure 110. Removing a memory module

Next steps

Replace the memory module.

Installing a memory module

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2.
4. Remove the air shroud.

ⓘ **NOTE:** The procedure to install the memory module is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Locate the appropriate memory module socket.

   ⚠ **CAUTION: Handle each memory module only by the card's edges, ensuring not to touch the middle of the memory module or the metallic contacts.**

2. If a memory module blank is installed in the socket, remove it.

   ⓘ **NOTE:** Ensure the socket ejector latches are fully open, before installing the memory module.

3. Align the edge connector of the memory module with the alignment key of the memory module socket, and insert the memory module in the socket.

⚠ **CAUTION: To prevent damage to the memory module or the memory module socket during installation, do not bend or flex the memory module; insert both ends of the memory module simultaneously.**

ⓘ **NOTE:** The memory module socket has an alignment key that enables you to install the memory module in the socket in only one orientation.

⚠ **CAUTION: Do not apply pressure at the center of the memory module; apply pressure at both ends of the memory module evenly.**

4. Press the memory module with your thumbs until the ejectors firmly click into place. When the memory module is properly seated in the socket, the levers on the memory module socket align with the levers on the other sockets that have memory modules installed.
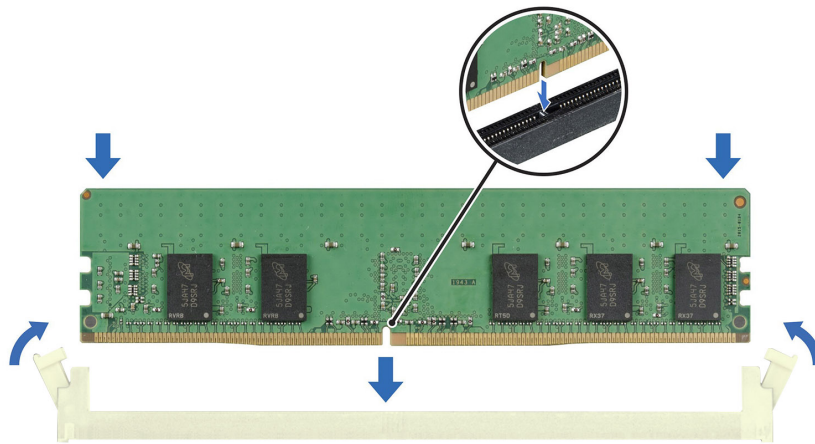
Figure 111. Installing a memory module

Next steps

1. Install the air shroud.
2. Install the expansion card riser 2.
3. Follow the procedure listed in After working inside your system.
4. To verify if the memory module has been installed properly, press F2 and navigate to **System Setup Main Menu > System BIOS > Memory Settings**. In the **Memory Settings** screen, the System Memory Size must reflect the updated capacity of the installed memory.
5. If the System Memory Size is incorrect, one or more of the memory modules may not be installed properly. Ensure that the memory modules are firmly seated in their sockets.
6. Run the system memory test in system diagnostics.

Processor and heat sink module

This is a service technician replaceable part only.

Removing a processor and heat sink module

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.

2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2.
4. Remove the air shroud.

> (i) **NOTE:** The heat sink and processor are hot to touch for some time after the system has been powered down. Allow the heat sink and processor to cool down before handling them.

> (i) **NOTE:** The procedure to remove the processor and heat sink module is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Ensure all four anti-tilt wires are in the locked position (outward position), and then using a Torx T30 tool, loosen the captive nuts on the heat sink in the order that is mentioned below:
   a. Loosen the first nut three turns.
   b. Loosen the nut diagonally opposite to the nut you loosened first.
   c. Repeat the procedure for the remaining two nuts.
   d. Return to the first nut to loosen it completely.
2. Set the Anti-Tilt wires to the unlocked position (inward position).
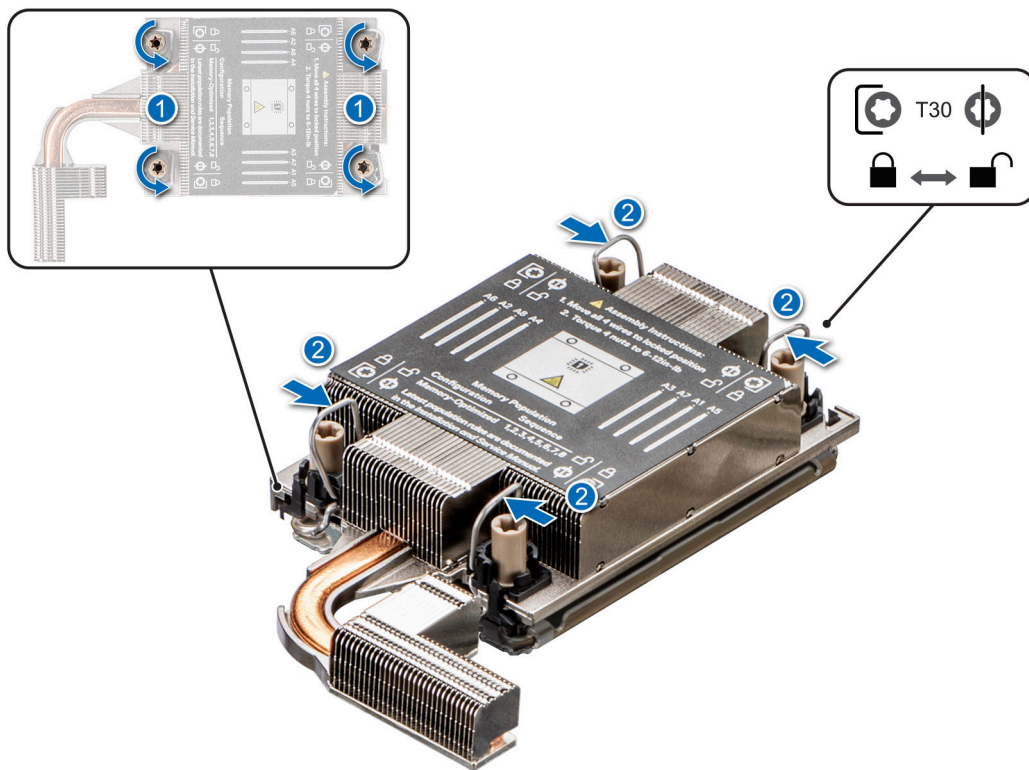
Figure 112. Loosening the nuts and set the Anti-Tilt wires to the unlocked position

3. Lift the processor and heat sink module (PHM) from the system and set the PHM aside with the processor side facing up.
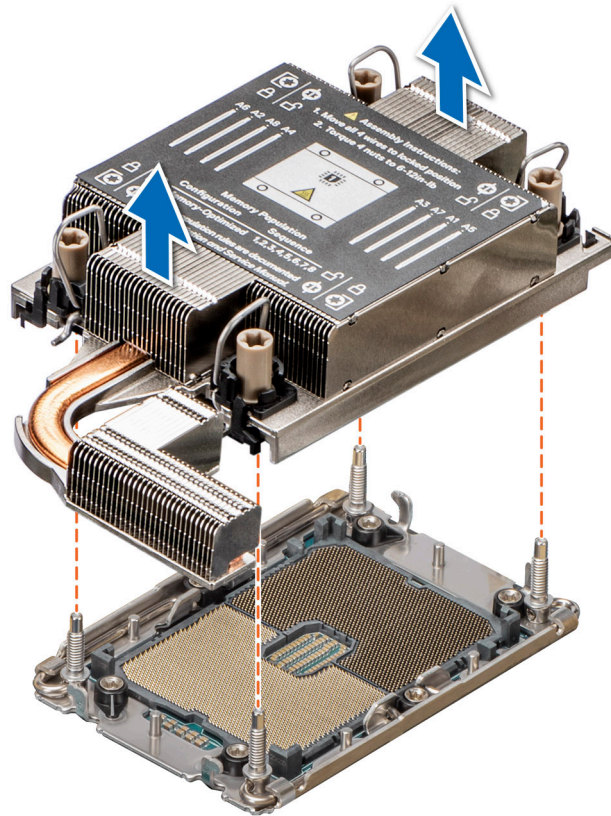
Figure 113. Removing a processor and heat sink module

Next steps

If you are removing a faulty heat sink, replace the heat sink, if not, remove the processor.

Removing the processor from the processor and heat sink module

Prerequisites

⚠️ **WARNING: Remove the processor from the processor and heat sink module (PHM) only if you are replacing the processor or heat sink.**

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2.
4. Remove the air shroud.
5. Remove the processor and heat sink module.

ⓘ **NOTE:** The procedure to remove the processor from the processor and heat sink module is the same for Rear Accessed and Front Accessed configurations.

⚠️ **CAUTION: An expected CMOS battery loss or CMOS checksum error message may be displayed during the first instance of powering on the system after replacing the processor or system board. To resolve this issue, go to setup option to configure the system settings.**

Steps

1. Place the heat sink with the processor side facing up.
2. Using your thumb lift up the Thermal Interface Material (TIM) break lever to release the processor from the TIM and carrier.

   ⓘ **NOTE:** Ensure to hold the carrier to the heat sink as you lift the TIM break lever.

3. Holding the processor by its edges, lift the processor away from the carrier, and then place the processor connector side down on the processor tray. Ensure pin 1 marks are aligned.
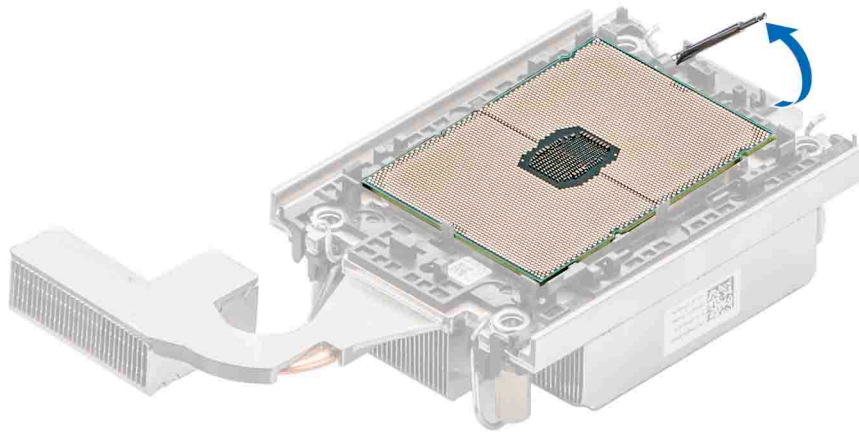
Figure 114. Lift up the TIM break lever
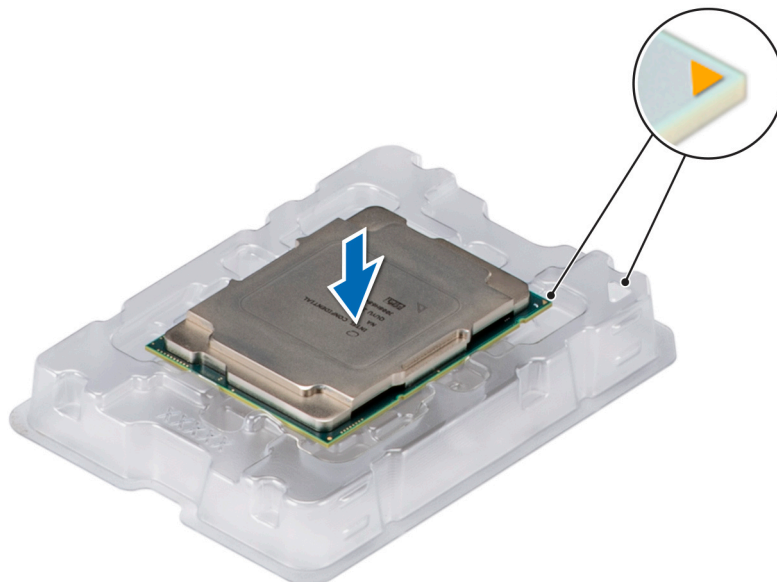
Figure 115. Aligning pin 1 marks of processor with tray

(i) **NOTE:** Ensure that you return the TIM break lever back to its original position.

4. Using your thumb and index finger, first hold the carrier release tab at the pin 1 connector, pull out the tip of the carrier release tab, and then lift the carrier partially from the heat sink.
5. Repeat the procedure at the remaining three corners of the carrier.
6. After all the corners are released from the heat sink, lift the carrier from the pin 1 corner of the heat sink.
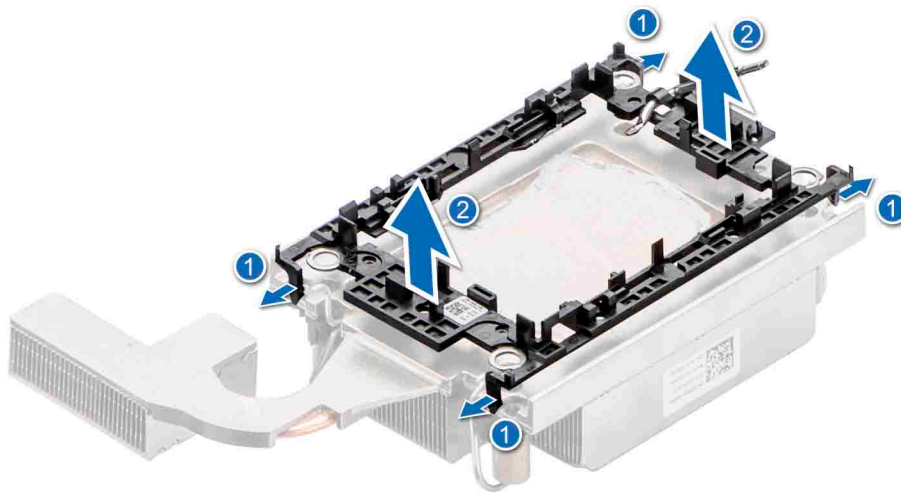
Figure 116. Removing the processor carrier

Next steps

Replace the processor into a processor and heat sink module.

Installing the processor into a processor and heat sink module

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Remove the expansion card riser 2.
4. Remove the air shroud.
5. Remove the processor and heat sink module.

ⓘ **NOTE:** The procedure to install the processor into the processor and heat sink module is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Place the processor in the processor tray.

   ⓘ **NOTE:** Ensure that the pin 1 indicator on the processor tray is aligned with the pin 1 indicator on the processor.

2. Place the processor carrier on top of the processor that is in the processor tray aligning pin 1 indicator on the processor.

   ⓘ **NOTE:** Ensure that the pin 1 indicator on the carrier is aligned with the pin 1 indicator on the processor before placing the carrier on the processor.

   ⓘ **NOTE:** Ensure that the processor and the carrier are placed in the tray before you install the heat sink.
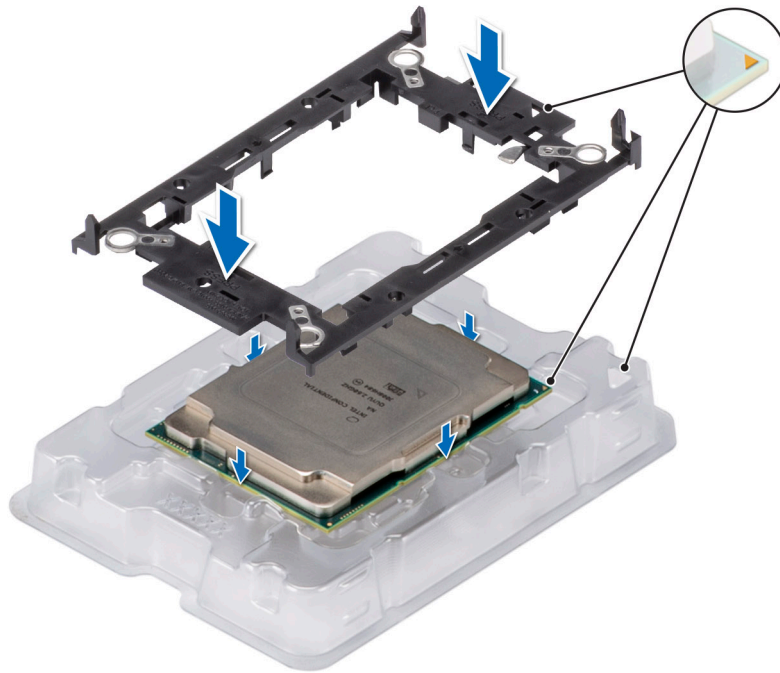
Figure 117. Installing the processor carrier

3. To align the processor tray with the bracket, press down on the bracket with your fingers on all four sides until it clicks into place.

ⓘ **NOTE:** Ensure that the processor is securely latched to the processor carrier.
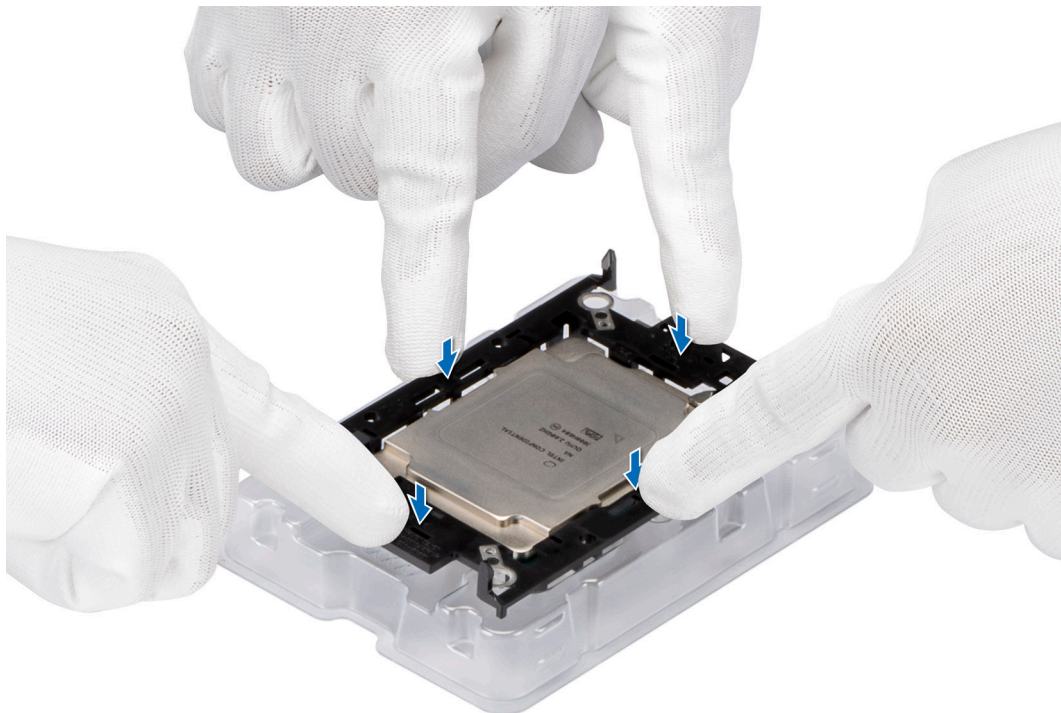
Figure 118. Press the carrier on the four sides

4. If you are using an existing heat sink, remove the thermal grease on the heat sink by using a clean lint-free cloth or the cleaning pad that came with the processor kit.
5. Use the thermal grease syringe included with your processor kit to apply the grease in a thin spiral on the bottom of the heat sink.
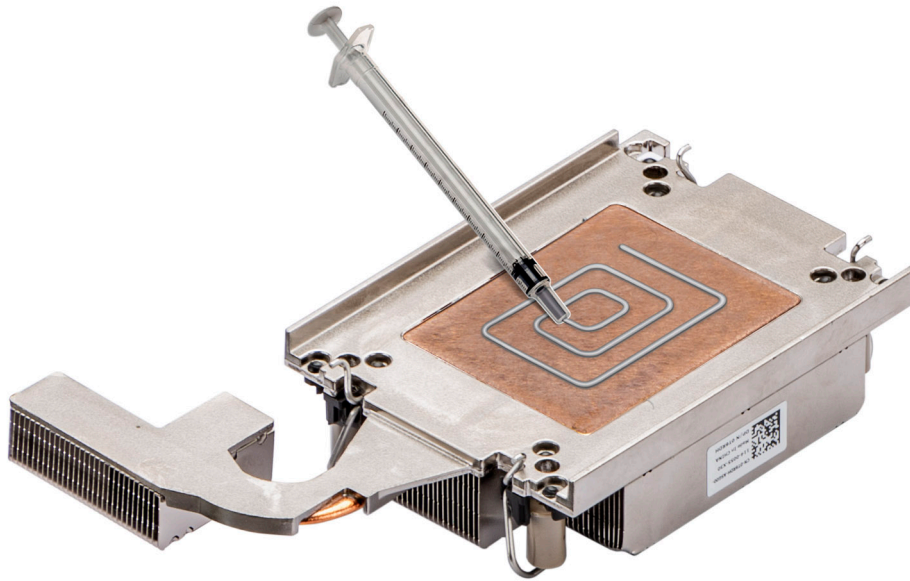
Figure 119. Applying thermal grease

⚠ **CAUTION: Applying too much thermal grease can result in excess grease coming in contact with and contaminating the processor socket.**

ⓘ **NOTE:** The thermal grease syringe is intended for single use only. Dispose of the syringe after you use it.

6. For new heat sink. remove the Thermal Interface Material (TIM) protective film from the base of heat sink.
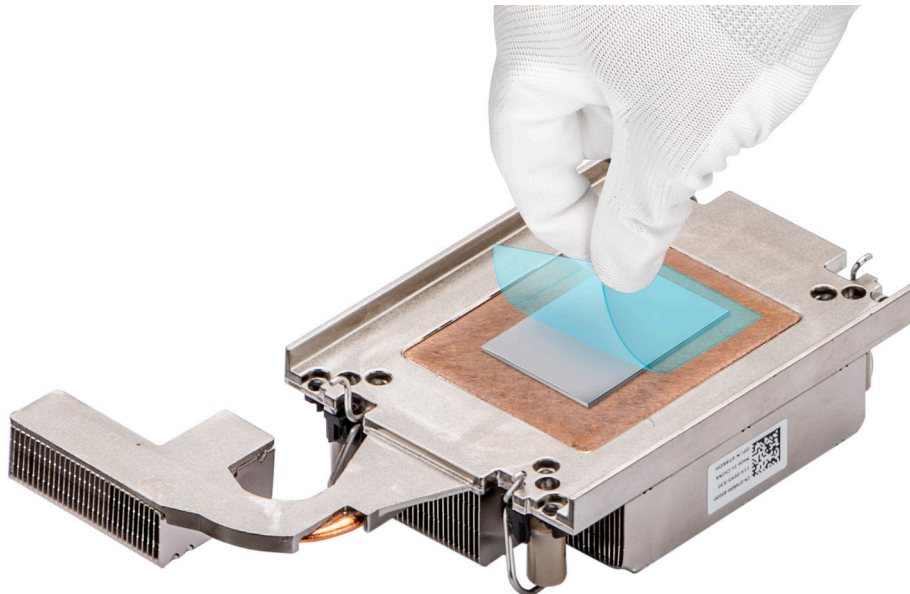
Figure 120. Remove the Thermal Interface Material (TIM) protective film

7. Place the heat sink on the processor and press the heat sink until the carrier locks onto the heat sink at all the four corners.

⚠ **CAUTION: To avoid damaging the fins on the heat sink, do not press down on the heat sink fins.**

ⓘ **NOTE:** Ensure that the pin 1 indicator on the heat sink is aligned with the pin 1 indicator on the carrier before placing the heat sink onto the processor carrier.

ⓘ **NOTE:** Ensure latching features on processor carrier and heat sink are aligned during assembly.
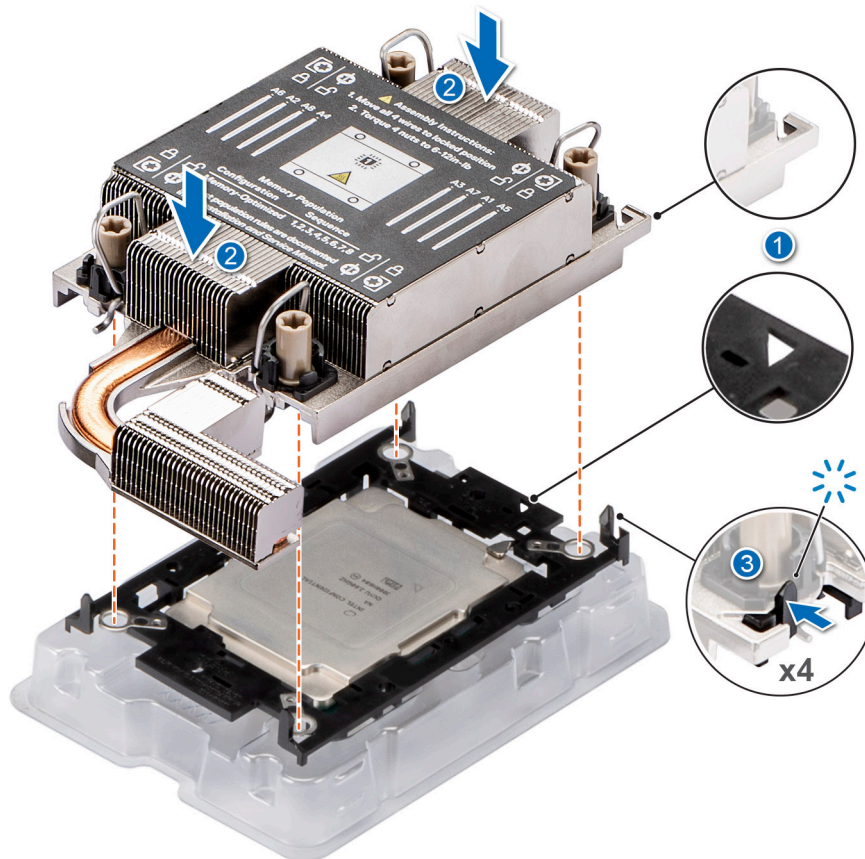
Figure 121. Installing the heat sink onto the processor

Next steps

1. Install the processor and heat sink module.
2. Install the air shroud.
3. Install the expansion card riser 2.
4. Follow the procedure listed in After working inside your system.

Installing the processor and heat sink module

Prerequisites

⚠ **CAUTION: Never remove the heat sink from a processor unless you intend to replace the processor. The heat sink is necessary to maintain proper thermal conditions.**

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2.
4. Remove the air shroud.
5. If installed, remove the processor socket cover.

ⓘ **NOTE:** The procedure to install the processor and heat sink module is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Set the Anti-Tilt wires to the unlocked position on the heat sink (inward position).
2. Align the pin 1 indicator of the heat sink to the system board, and then place the processor and heat sink on the processor socket.

⚠ **CAUTION: To avoid damaging the fins on the heat sink, do not press down on the heat sink fins.**

ⓘ **NOTE:** Ensure that the processor and heat sink is held parallel to the system board to prevent damaging the components.

Figure 122. Installing the processor and heat sink module (PHM)

3. Set the anti-tilt wires to the locked position (outward position), and then using the Torx T30 tool, tighten the captive nuts (8 in-lbf) on the heat sink in the order below:
   a. In a random order, tighten the first nut three turns.
   b. Tighten the nut diagonally opposite to the nut you tighten first.
   c. Repeat the procedure for the remaining two nuts.
   d. Return to the first nut to tighten it completely.
   e. Check all the nuts to ensure they are firmly secured.

Figure 123. Set the anti-tilt wires to the locked position and tightening the captive nuts

Next steps

1. Install the air shroud.
2. Install the expansion card riser 2.
3. Follow the procedure listed in After working inside your system.

Internal USB memory key

Removing the internal USB memory key

Prerequisites

⚠️ **CAUTION: To avoid interference with other components in the server, the maximum permissible dimensions of the USB memory key are 15.9 mm width x 57.15 mm length x 7.9 mm height.**

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2.
4. Remove the air shroud.
5. Remove the expansion card riser 1B.

   ⓘ **NOTE:** The procedure to remove the USB memory key is the same for Rear Accessed and Front Accessed configurations.

Steps

Remove the USB memory key from the USB port on the riser 1B.
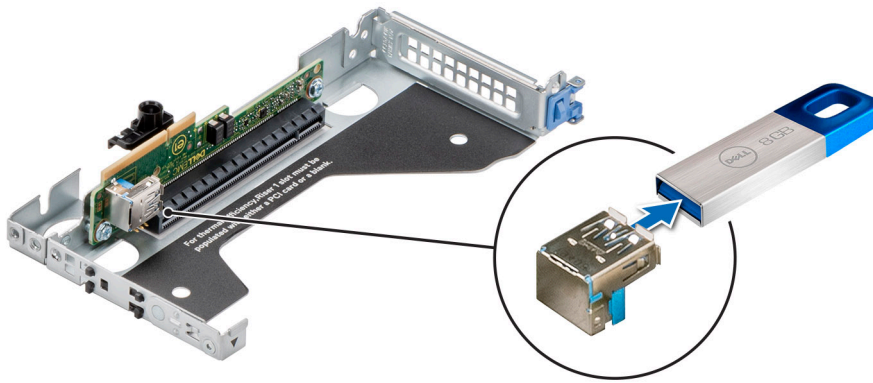
Figure 124. Removing the internal USB memory key

Next steps

Replace the internal USB memory key.

Installing the internal USB memory key

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2.
4. Remove the air shroud.
5. Remove the expansion card riser 1B.

   (i) **NOTE:** The procedure to install the USB memory key is the same for Rear Accessed and Front Accessed configurations.

Steps

Connect the USB memory key into the USB port on riser 1B.
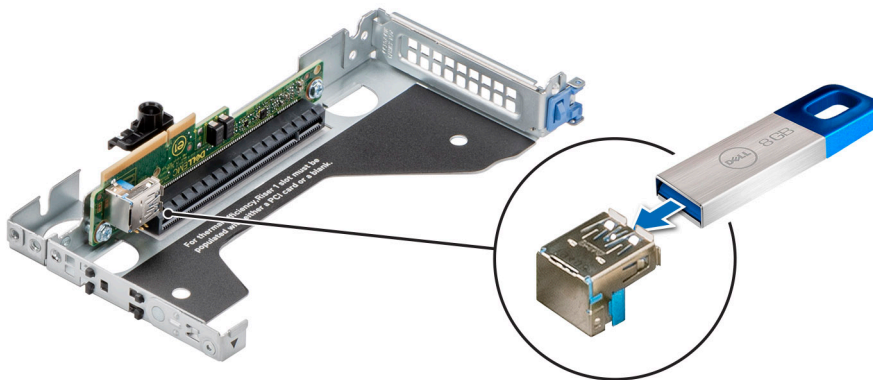
Figure 125. Installing the internal USB memory key

Next steps

1. Install the expansion card riser 1B.
2. Follow the procedure listed in After working inside your system.
3. While booting, press F2 to enter **System Setup** and verify that the system detects the USB memory key.

Optional BOSS S1 card

Removing the M.2 BOSS card

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2.
4. Remove the air shroud.

ⓘ **NOTE:** The procedure to remove the M.2 BOSS card is the same for Rear Accessed and Front Accessed configurations.

About this task

Holding the blue tag, pull the M.2 BOSS card away from the system board connector.
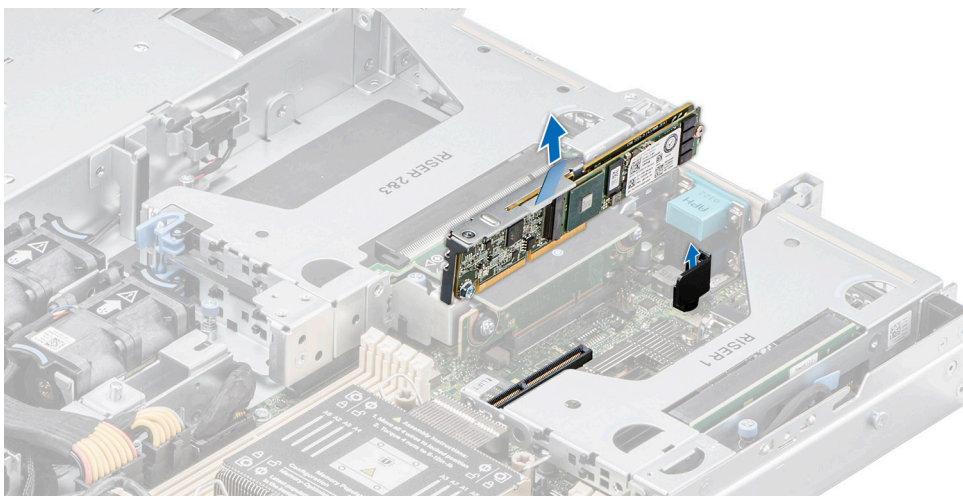
Figure 126. Removing the M.2 BOSS card from the system board

Next steps

Replace the M.2 BOSS card.

Installing the M.2 BOSS card

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Remove the expansion card riser 2.
4. Remove the air shroud.

ⓘ **NOTE:** The procedure to install the M.2 BOSS card is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Align and insert the M.2 BOSS card connector with the connector on the system board.
2. Press the blue touch point on the M.2 BOSS card firmly until it is fully seated.
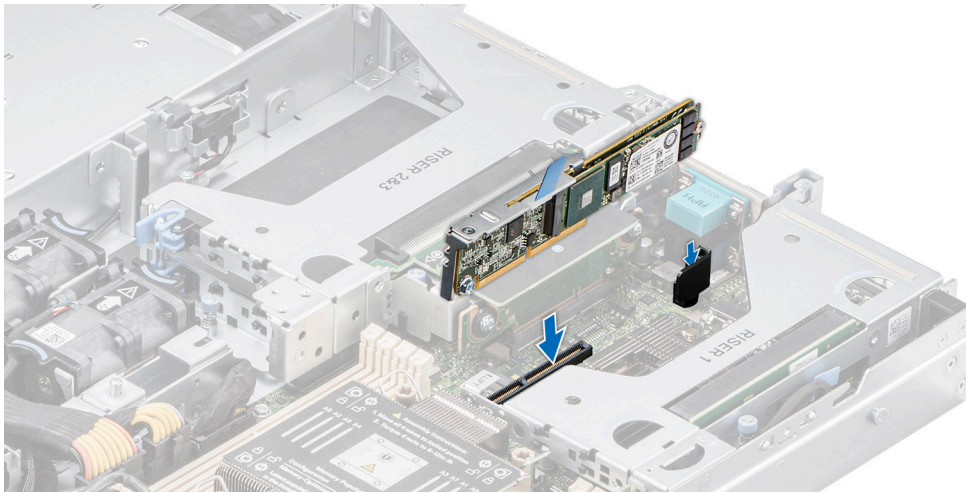
Figure 127. Installing the M.2 BOSS card into the system board

Next steps

1. Install the air shroud.
2. Install the expansion card riser 2.
3. Follow the procedure listed in After working inside your system.

Removing the M.2 SSD module

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Removing the M.2 BOSS card.

(i) **NOTE:** The procedure to remove the M.2 SSD module is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Using the Phillips 1 screwdriver, remove the screw securing the M.2 SSD module to the BOSS card.
2. Pull the M.2 SSD module to disconnect from the connector on the M.2 BOSS card.
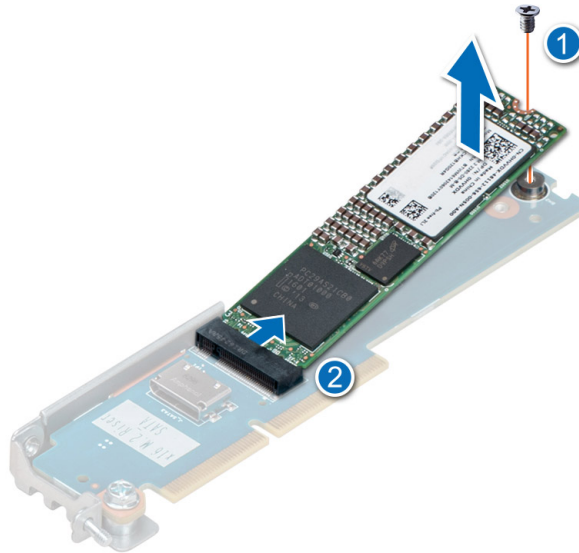
Figure 128. Removing the M.2 SSD module

Next steps

If applicable, Install the M.2 BOSS card.

Installing the M.2 SSD module

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Removing the M.2 BOSS card.

ⓘ **NOTE:** The procedure to install the M.2 SSD module is the same for Rear Accessed and Front Accessed configurations.

Steps

1. Align the M.2 SSD module at angle with the connector on the M.2 BOSS card.
2. Insert the M.2 SSD module until it is firmly seated in M.2 BOSS card connector.
3. Using the Phillips 1 screwdriver, secure the M.2 SSD module on the M.2 BOSS card with the screw.

ⓘ **NOTE:** The numbers on the image do not depict the exact steps. The numbers are for representation of sequence.
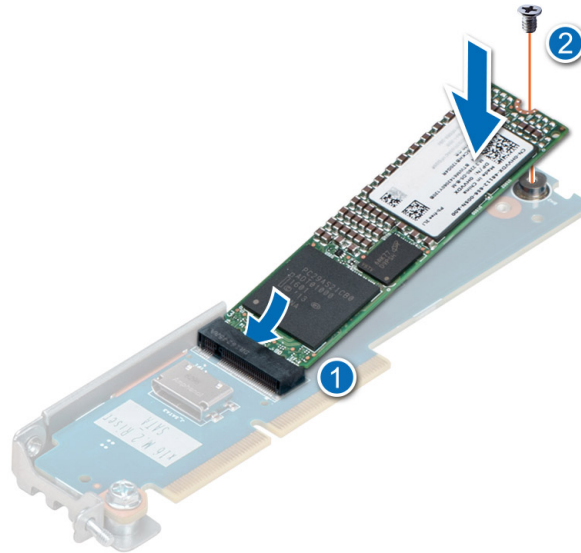
Figure 129. Installing the M.2 SSD module

Next steps

1. If applicable, Install the M.2 BOSS card.
2. Follow the procedure listed in the After working inside your system.

Power supply unit

ⓘ **NOTE:** While replacing the hot swappable PSU, after next server boot; the new PSU automatically updates to the same firmware and configuration of the replaced one. For updating to the latest firmware and changing the configuration, see the *Lifecycle Controller User's Guide* at https://www.dell.com/idracmanuals.

ⓘ **NOTE:** For information about DC PSU cabling instructions, see the *Cabling instructions for − (48 − 60) V DC power supply* Tech sheet that is shipped with your DC PSU or go to https://www.dell.com/poweredgemanuals > **XR Servers** > **PowerEdge XR12** > **Select This Product** > **Documentation** > **Manuals and Documents** > *Cabling instructions for − 48 − 60 V DC power supply*

Hot spare feature

Your system supports the hot spare feature that significantly reduces the power overhead associated with the power supply unit (PSU) redundancy.

When the hot spare feature is enabled, one of the redundant PSUs is switched to the sleep state. The active PSU supports 100 percent of the system load, thus operating at higher efficiency. The PSU in the sleep state monitors output voltage of the active PSU. If the output voltage of the active PSU drops, the PSU in the sleep state returns to an active output state.

If having both PSUs active is more efficient than having one PSU in the sleep state, the active PSU can also activate the sleeping PSU.

The default PSU settings are as follows:

● If the load on the active PSU is more than 50 percent of PSU rated power wattage, then the redundant PSU is switched to the active state.
● If the load on the active PSU falls below 20 percent of PSU rated power wattage, then the redundant PSU is switched to the sleep state.

You can configure the hot spare feature by using the iDRAC settings. For more information, see the *iDRAC User's Guide* available at www.dell.com/poweredgemanuals.

Removing a power supply unit blank

Prerequisites

Follow the safety guidelines listed in the Safety instructions.

ⓘ **NOTE:** The procedure to remove the power supply unit blank is the same for Rear Accessed and Front Accessed configurations.

Steps

Pull the blank out of the system.

⚠ **CAUTION: To ensure proper system cooling, the PSU blank must be installed in the second PSU bay in a non-redundant configuration. Remove the PSU blank only if you are installing a second PSU.**

ⓘ **NOTE:** You must install a power supply blank in a unused slot to maintain Federal Communications Commission (FCC) certification of the system. The blank also keeps dust and dirt out of the system and aids in proper cooling and airflow inside the system.
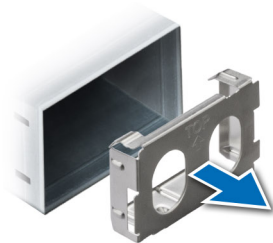
Figure 130. Removing a power supply unit blank

Next steps

Replace the PSU or PSU blank.

Installing a power supply unit blank

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
   ⓘ **NOTE:** Install the power supply unit (PSU) blank only in the second PSU bay.
2. Remove the PSU.

ⓘ **NOTE:** The procedure to install the power supply unit blank is the same for Rear Accessed and Front Accessed configurations.

Steps

Align the PSU blank with the PSU bay and push it into the PSU bay until it clicks into place.
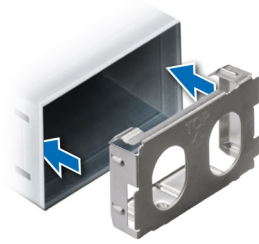
Figure 131. Installing a power supply unit blank

Removing a power supply unit

Prerequisites

⚠ **CAUTION: The system requires one power supply unit (PSU) for normal operation. On power-redundant systems, remove and replace only one PSU at a time in a system that is powered on.**

1. Follow the safety guidelines listed in the Safety instructions.
2. Disconnect the power cable from the power outlet and from the PSU you intend to remove.
3. Remove the cable from the strap on the PSU handle.
4. Unlatch and lift the optional cable management arm if it interferes with the PSU removal.

   For information about the cable management arm, see the system's rack documentation at https://www.dell.com/poweredgemanuals.

ⓘ **NOTE:** The procedure to remove the power supply unit is same for Rear Accessed and Front Accessed configurations.

Steps

Press the release latch, and holding the PSU handle slide the PSU out of the PSU bay.

Figure 132. Removing a power supply unit

Next steps

Replace the PSU or install the PSU blank.

Installing a power supply unit

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. For systems that support redundant PSU, ensure that both the PSUs are of the same type and have the same maximum output power.

   (i) **NOTE:** The maximum output power (shown in watts) is listed on the PSU label.

3. Remove the PSU blank.

(i) **NOTE:** The procedure to install the power supply unit is same for Rear Accessed and Front Accessed configurations.

Steps

Slide the PSU into the PSU bay until the release latch snaps into place.

Figure 133. Installing a power supply unit

Next steps

1. If you have unlatched the cable management arm, relatch it. For information about the cable management arm, see the system's rack documentation at https://www.dell.com/poweredgemanuals.
2. Connect the power cable to the PSU, and plug the cable into a power outlet.

   ⚠️ **CAUTION: When connecting the power cable to the PSU, secure the cable to the PSU with the strap.**

   (i) **NOTE:** When installing, hot swapping, or hot adding a new PSU, wait for 15 seconds for the system to recognize the PSU and determine its status. The PSU redundancy may not occur until discovery is complete. The PSU status indicator turns green to indicate that the PSU is functioning properly.

(i) **NOTE:** For certain premium configurations with high power consumption, system PSU might stay with 2+0 mode only, 1+1 redundant mode is not available.

(i) **NOTE:** While replacing the hot swappable PSU, after next server boot; the new PSU automatically updates to the same firmware and configuration of the replaced one. For updating to the latest firmware and changing the configuration, see the *Lifecycle Controller User's Guide* at https://www.dell.com/idracmanuals.

Power interposer board

This is a service technician replaceable part only.

Removing the power interposer board

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card risers 2.
4. Remove the air shroud.
5. Remove a power supply unit or Remove a power supply unit blank.
6. Disconnect the cables that are connected to power interposer board (PIB) including intrusion switch module cable and from the system board.

ⓘ **NOTE:** The procedure to remove the PIB is same for Rear Accessed and Front Accessed configurations.

Steps

1. Using a Phillips 2 screwdriver, remove the screws securing the power interposer board to the system.

   ⓘ **NOTE:** Observe the routing of the cables as you remove it from the system.

2. Lift the PIB away from the system.
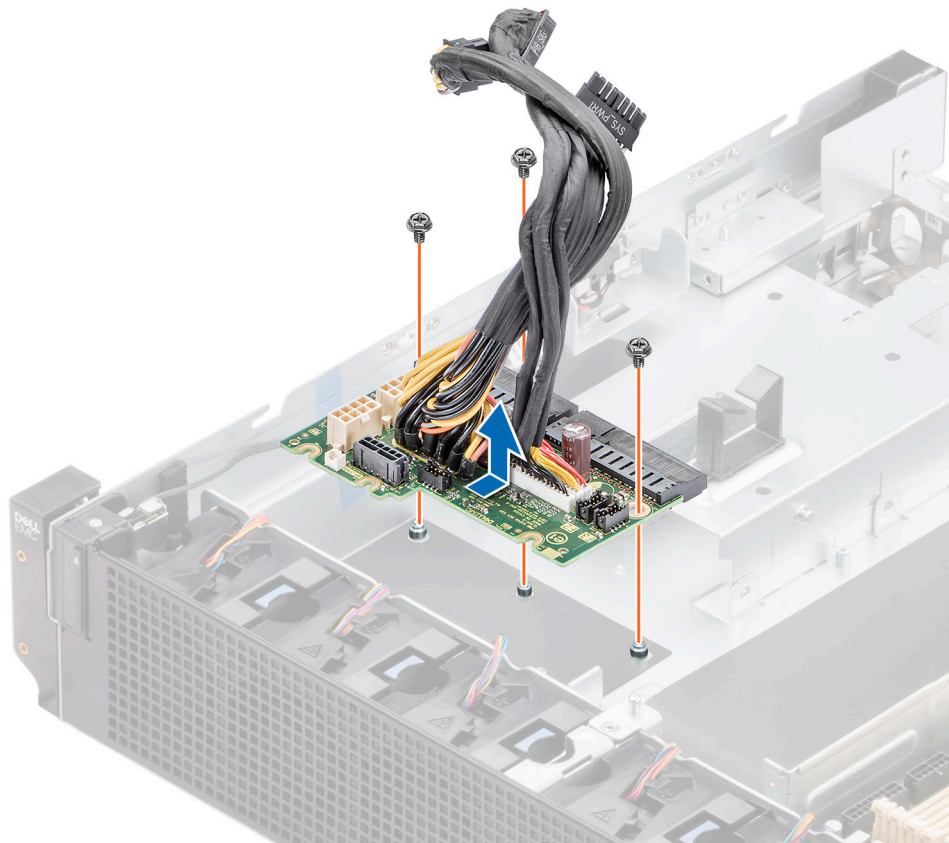
Figure 134. Removing the power interposer board

Next steps

Replace the power interposer board.

Installing the power interposer board

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card risers 2.
4. Remove the air shroud.
5. Remove a power supply unit or Remove a power supply unit blank.
6. Disconnect the cables that are connected to power interposer board (PIB) and from the system board.

(i) **NOTE:** The procedure to install the PIB is same for Rear Accessed and Front Accessed configurations.

Steps

1. Align the slots on the PIB with the hook on the chassis and slide it into place.
2. Using Phillips 2 screwdriver, tighten the screws to secure the PIB to the system.
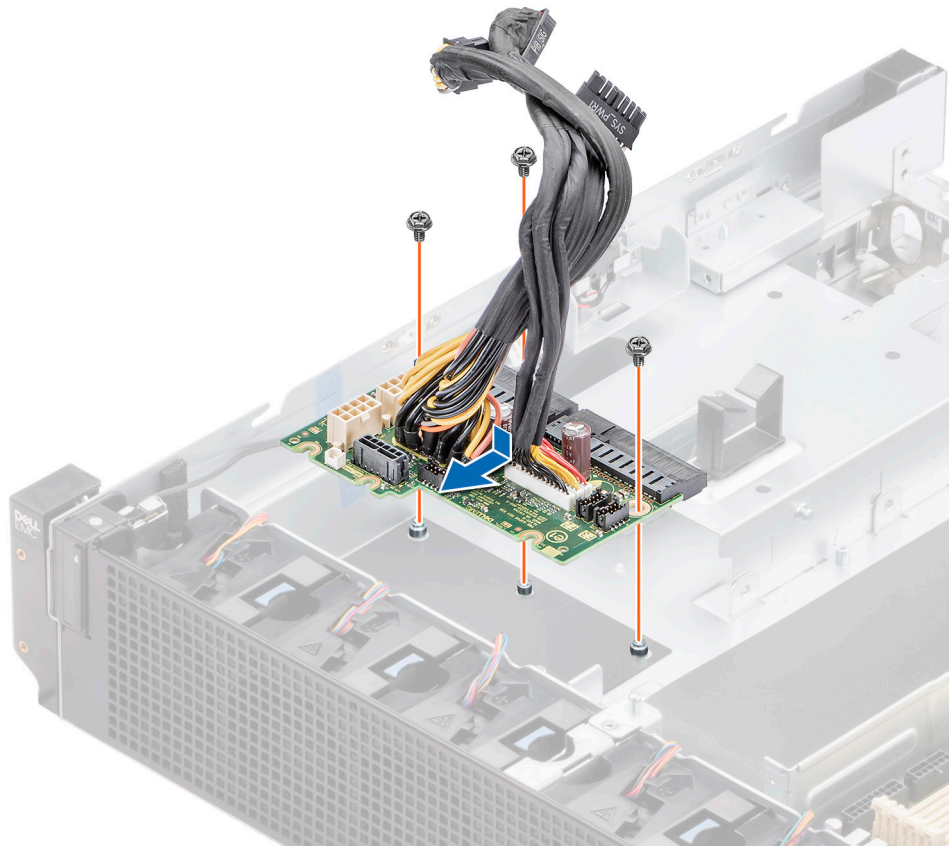
Figure 135. Installing the power interposer board

3. Reconnect the cables that are connected to the power interposer board (PIB) and also to the system board.

Next steps

1. Install the air shroud.
2. Install the expansion card risers 2.
3. Follow the procedure listed in After working inside your system.

System battery

This is a service technician replaceable part only.

Replacing the system battery

Prerequisites

⚠️ **WARNING: There is a danger of a new battery exploding if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions. See the Safety instructions that came with your system for more information.**

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card risers 2.
4. Remove the air shroud.
5. Remove the expansion card risers 1.
6. If applicable, disconnect the power or data cables from the expansion cards.

Steps

1. To remove the battery:
   a. Push the battery holder clip away from the battery.

   ⚠️ **CAUTION: To avoid damage to the battery holder clip, ensure that you do not bend the battery holder clip while installing or removing a battery.**

   b. Pull the battery out of the battery holder.

   ⓘ **NOTE:** Ensure that the **+** side of the battery is facing the battery holder clip.

   ⓘ **NOTE:** The procedure to remove the system battery is same for Rear Accessed and Front Accessed configurations.
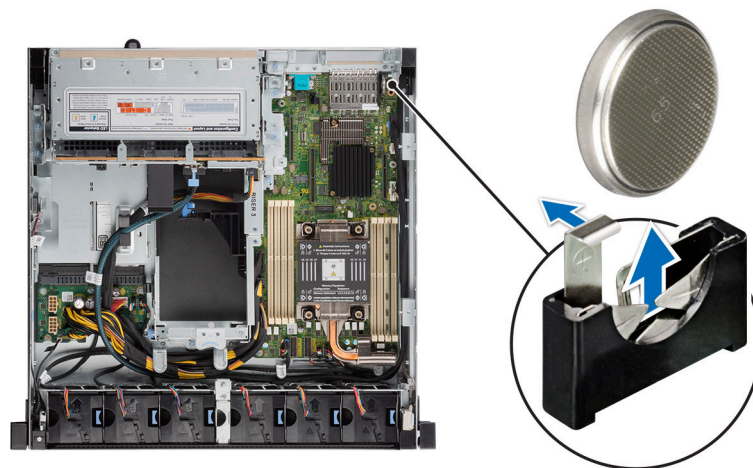

Figure 136. Removing the system battery

⚠️ **CAUTION: To avoid damage to the battery connector, you must firmly support the connector while installing or removing a battery.**

2. To install a new system battery:
   a. Push the battery holder clip away.

   ⓘ **NOTE:** Ensure that the **+** side of the battery is facing the battery holder clip.

b. Insert the battery in the battery holder until the battery holder clip snaps into place.

⚠ **CAUTION: To avoid damage to the battery holder clip, ensure that you do not bend the battery holder clip while installing or removing a battery.**

ⓘ **NOTE:** The procedure to install the system battery is same for Rear Accessed and Front Accessed configurations.
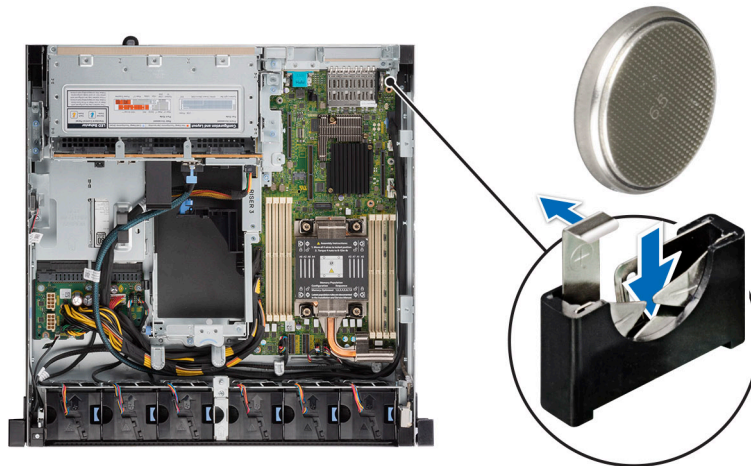
Figure 137. Installing the system battery

Next steps

1. Installing the expansion card riser 1.
2. Install the air shroud.
3. Install the expansion card risers 2.
4. Follow the procedure listed in the After working inside your system.
5. Confirm that the battery is operating properly, by performing the following steps:
   a. Enter the System Setup, while booting, by pressing F2.
   b. Enter the correct time and date in the System Setup **Time** and **Date** fields.
   c. **Exit** the System Setup.
   d. To test the newly installed battery, remove the system from the enclosure for at least an hour.
   e. Reinstall the system into the enclosure after an hour.
   f. Enter the System Setup and if the time and date are still incorrect, see Getting help section.

System board

This is a service technician replaceable part only.

Removing the system board

Prerequisites

⚠ **CAUTION: If you are using the Trusted Platform Module (TPM) with an encryption key, you may be prompted to create a recovery key during program or System Setup. Be sure to create and safely store this recovery key. If you replace this system board, you must supply the recovery key when you restart your system or program before you can access the encrypted data on your drives.**

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the following components:
   a. Expansion card riser 2
   b. Air shroud

c. Expansion card riser 1
d. Drive cage
e. Expansion card riser 3
f. Memory modules
g. Processor and heat sink module
h. Internal USB memory key (if installed)
i. M.2 BOSS card
j. Disconnect all cables from the system board.

> ⚠ **CAUTION: Take care not to damage the system identification button while removing the system board from the system.**

ⓘ **NOTE:** The procedure to remove the system board is same for Rear Accessed and Front Accessed configurations.

Steps

1. Using a Phillips 2 screwdriver, remove the screws that secure the system board to the chassis
2. To disengage the ports from the slots on the chassis, slide the system board toward the fan chassis.
3. Incline the system board at an angle and lift the system board out of the chassis.
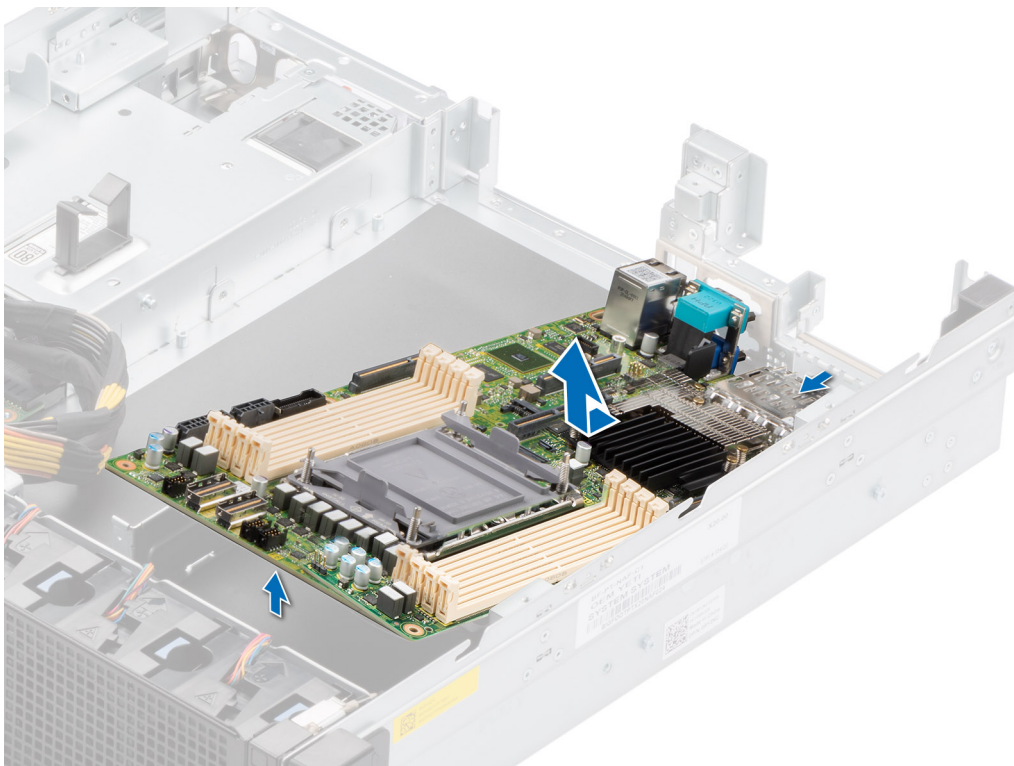
Figure 138. Removing the system board

Next steps

Install the system board.

Installing the system board

Prerequisites

ⓘ **NOTE:** Before replacing the system board, replace the old iDRAC MAC address label in the Information tag with the iDRAC MAC address label of the replacement system board

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in Before working inside your system.

3. If you are replacing the system board, remove all the components that are listed in the Remove the system board section.

ⓘ **NOTE:** The procedure to install the system board is same for Rear Accessed and Front Accessed configurations.

Steps

1. Unpack the new system board assembly.

   ⓘ **NOTE:** Do not remove the processor socket cover until the system board is assembled in the chassis and the processor and heat sink module is ready for installation.

   ⚠ **CAUTION: Do not lift the system board by holding a memory module, processor, or other components.**

   ⚠ **CAUTION: Take care not to damage the system identification button while placing the system board into the chassis.**

2. Holding the system board by the edges, lower the system board into the system.

3. Incline the system board at an angle and align the connectors on the system board with the slots on the I/O of the chassis until the connectors are firmly seated in the slots.
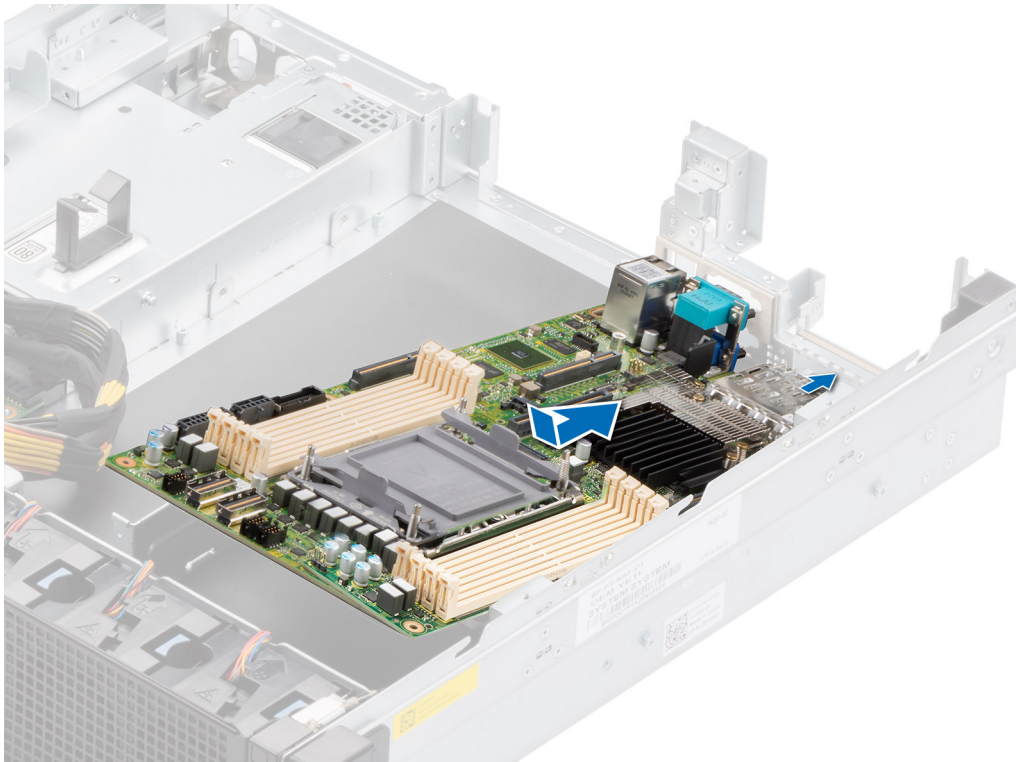

Figure 139. Installing the system board

4. Using a Phillips 2 screwdriver, tighten the screws that secure the system board to the chassis in the sequence shown in below image.
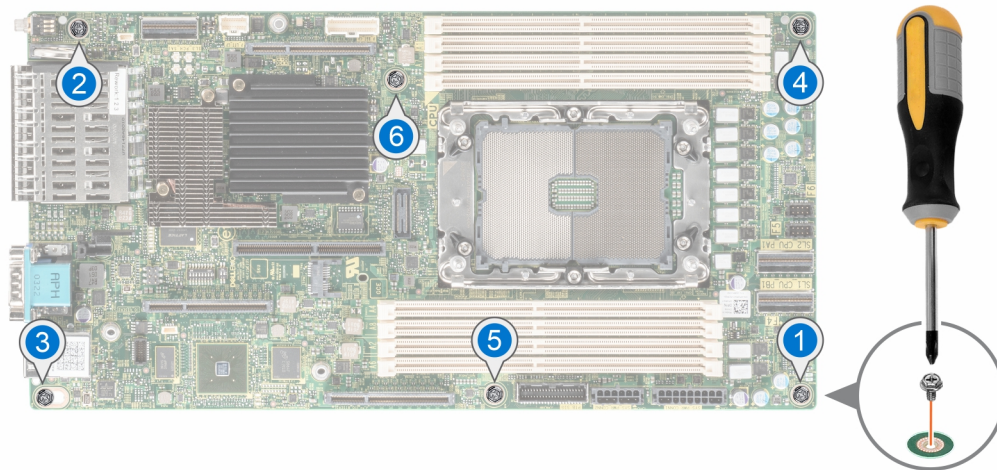
Figure 140. Tightening the system board screws in sequence

Next steps

1. Replace the following components:
   a. Trusted Platform Module
   b. ⓘ **NOTE:** The TPM Module must be replaced only while installing a new system board.
   c. Internal USB memory key (if installed)
   d. Processor and heat sink module
   e. M.2 BOSS card
   f. Memory modules
   g. Expansion card riser 3
   h. Drive cage
   i. Expansion card riser 1
   j. Air shroud
   k. Expansion card riser 2
   l. Reconnect all cables to the system board.
      ⓘ **NOTE:** Ensure that the cables inside the system are routed along the chassis wall and secured using the cable securing brackets.
2. Ensure that you perform the following steps:
   a. Use the Easy Restore feature to restore the Service Tag. See the Restoring the system by using the Easy Restore feature section.
   b. If the service tag is not backed up in the backup flash device, enter the system service tag manually. See the Manually update the Service Tag by using System Setup section.
   c. Update the BIOS and iDRAC versions.

      Re-enable the Trusted Platform Module (TPM). See the Upgrading the Trusted Platform Module section.
3. If you are not using Easy restore, import your new or existing iDRAC Enterprise license. For more information, see the *Integrated Dell Remote Access Controller User's Guide* available at https://www.dell.com/idracmanuals..
4. Follow the procedure listed in After working inside your system.

Restoring the system using Easy Restore

The Easy Restore feature enables you to restore your service tag, license, UEFI configuration, and the system configuration data after replacing the system board. All data is backed up in a backup flash device automatically. If BIOS detects a new system board, and the service tag in the backup flash device, BIOS prompts the user to restore the backup information.

About this task

Below is a list of options/steps available:
- Restore the service tag, license, and diagnostics information, press **Y**

- Navigate to the Lifecycle Controller based restore options, press **N**
- Restore data from a previously created **Hardware Server Profile**, press **F10**
  - (i) **NOTE:** When the restore process is complete, BIOS prompts to restore the system configuration data.
- Restore data from a previously created **Hardware Server Profile**, press **F10**
- To restore the system configuration data, press **Y**
- To use the default configuration settings, press **N**
- (i) **NOTE:** After the restore process is complete, system reboots.

Manually update the Service Tag

After replacing a system board, if Easy Restore fails, follow this process to manually enter the Service Tag, using **System Setup**.

About this task

If you know the system service tag, use the **System Setup** menu to enter the service tag.

Steps

1. Power on the system.
2. To enter the **System Setup**, press **F2**.
3. Click **Service Tag Settings**.
4. Enter the service tag.
   - (i) **NOTE:** You can enter the service tag only when the **Service Tag** field is empty. Ensure that you enter the correct service tag. Once the service tag is entered, it cannot be updated or changed.
5. Click **OK**.

Trusted Platform Module

This is a service technician replaceable part only.

Upgrading the Trusted Platform Module

Removing the TPM

Prerequisites

(i) **NOTE:**
- Ensure the operating system is compatible with the TPM version you are installing.
- Ensure that you download and install the latest BIOS firmware on your system.
- Ensure that the BIOS is configured to enable UEFI boot mode.

⚠️ **CAUTION: The TPM plug-in module is cryptographically bound to that particular system board after it is installed. When the system is powered on, any attempt to remove an installed TPM plug-in module breaks the cryptographic binding, and the removed TPM cannot be installed on another system board. Ensure any keys you have stored on the TPM have been securely transferred.**

Steps

1. Locate the TPM connector on the system board. For more information, see System board connectors.
2. Press to hold the module down and remove the screw using the security Torx 8-bit shipped with the TPM module.
3. Slide the TPM module out from its connector.
4. Push the plastic rivet away from the TPM connector and rotate it 90° counterclockwise to release it from the system board.

5. Pull the plastic rivet out of its slot on the system board.

Installing the TPM

Steps

1. To install the TPM, align the edge connectors on the TPM with the slot on the TPM connector.
2. Insert the TPM into the TPM connector such that the plastic rivet aligns with the slot on the system board.
3. Press the plastic rivet until the rivet snaps into place.
4. Replace the screw that secures the TPM to the system board.
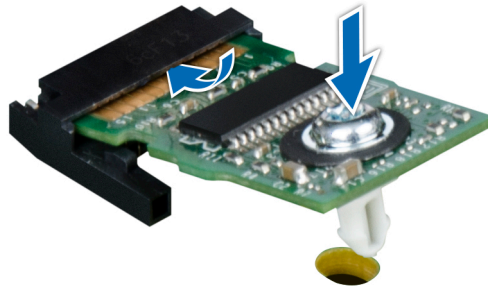
Figure 141. Installing the TPM

Initializing TPM for users

Steps

1. Initialize the TPM.
    For more information, see Initializing the TPM for users.
2. The **TPM Status** changes to **Enabled, Activated**.

Initializing the TPM 2.0 for users

Steps

1. While booting your system, press F2 to enter System Setup.
2. On the **System Setup Main Menu** screen, click **System BIOS** > **System Security Settings**.
3. From the **TPM Security** option, select **On**.
4. Save the settings.
5. Restart your system.

Control panel

This is a service technician replaceable part only.

Removing the status LED control panel

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.

2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2
4. Remove the air shroud
5. Remove the expansion card riser 1

Steps

1. Disconnect the control panel cable from the system board connector.

   ⓘ **NOTE:** Observe the routing of the cable as you remove it from the system.

2. Using the Phillips 2, remove screws from rack ear assembly.
3. Using the Torx 8, remove screws from status LED control panel assembly.
4. Hold the status LED control panel assembly and remove the status LED control panel along with the cable from the system.

   ⓘ **NOTE:** The numbers on the image do not depict the exact steps. The numbers are for representation of sequence.

Figure 142. Removing the left ear for Rear Accessed configuration

Figure 143. Removing the status LED control panel for Rear Accessed configuration
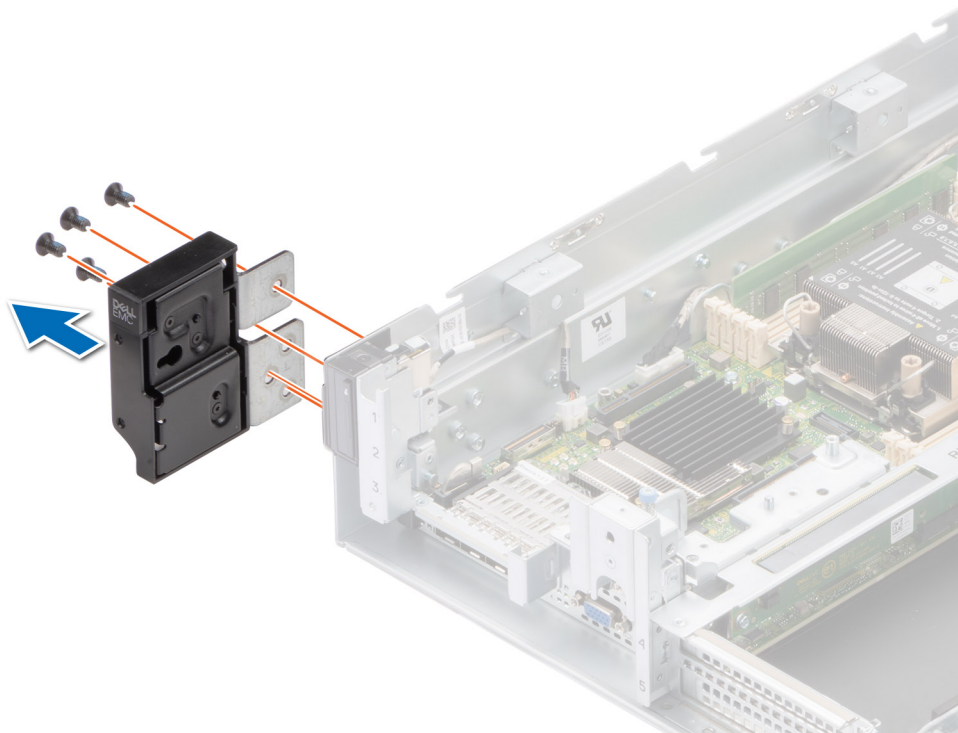
Figure 144. Removing the left ear for Front Accessed configuration

Figure 145. Removing the status LED control panel for Front Accessed configuration

Next steps

Replace the status LED control panel.

Installing the status LED control panel

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2
4. Remove the air shroud
5. Remove the expansion card riser 1

Steps

1. Route the control panel cable through the guide slots in the system and connector on system board.

   (i) **NOTE:** Route the cable properly to prevent the cable from being pinched or crimped.

2. Align and insert the status LED control panel assembly in the slot on the system.
3. Using the Torx 8, tighten screws from status LED control panel assembly.
4. Using the Phillips 2, tighten screws from rack ear assembly.

   (i) **NOTE:** The numbers on the image do not depict the exact steps. The numbers are for representation of sequence.
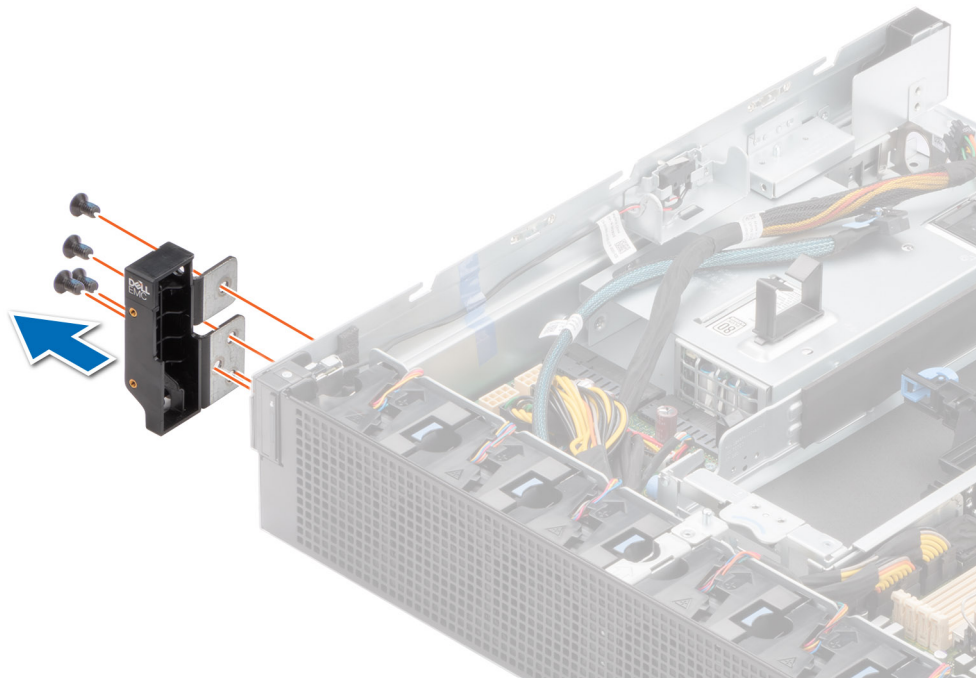
Figure 146. Installing the status LED control panel for Rear Accessed configuration

Figure 147. Installing the left ear for Rear Accessed configuration

Figure 148. Installing the status LED control panel for Front Accessed configuration

Figure 149. Installing the left ear for Front Accessed configuration

Next steps

1. Install the expansion card riser 1.
2. Install the air shroud.

3. Install the expansion card riser 2.
4. Follow the procedure listed in the After working inside your system.

Removing the power button control panel

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2.
4. Remove the air shroud.
5. Remove the expansion card riser 1.

Steps

1. Disconnect the control panel cable from the system board connector.

    (i) **NOTE:** Observe the routing of the cable as you remove it from the system.

2. Using the Phillips 2, remove screws from rack ear assembly.
3. Using the Torx 8, remove screws from power button control panel assembly.
4. Hold the control panel assembly and remove the control panel along with the cable from the system.

    (i) **NOTE:** The numbers on the image do not depict the exact steps. The numbers are for representation of sequence.
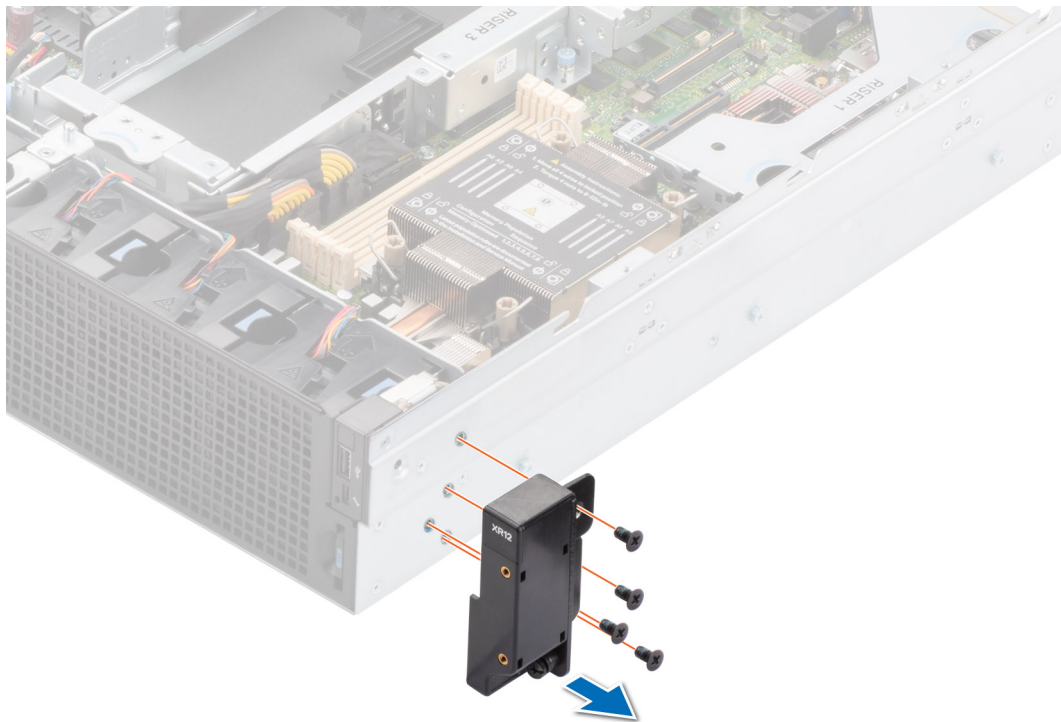
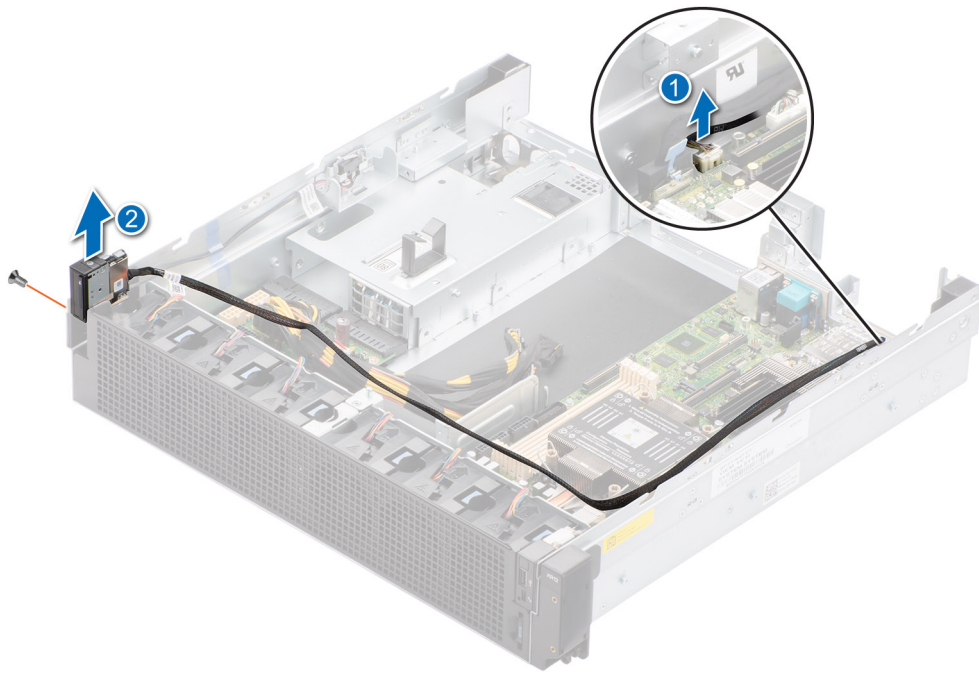**Figure 150. Removing the right ear for Rear Accessed configuration**
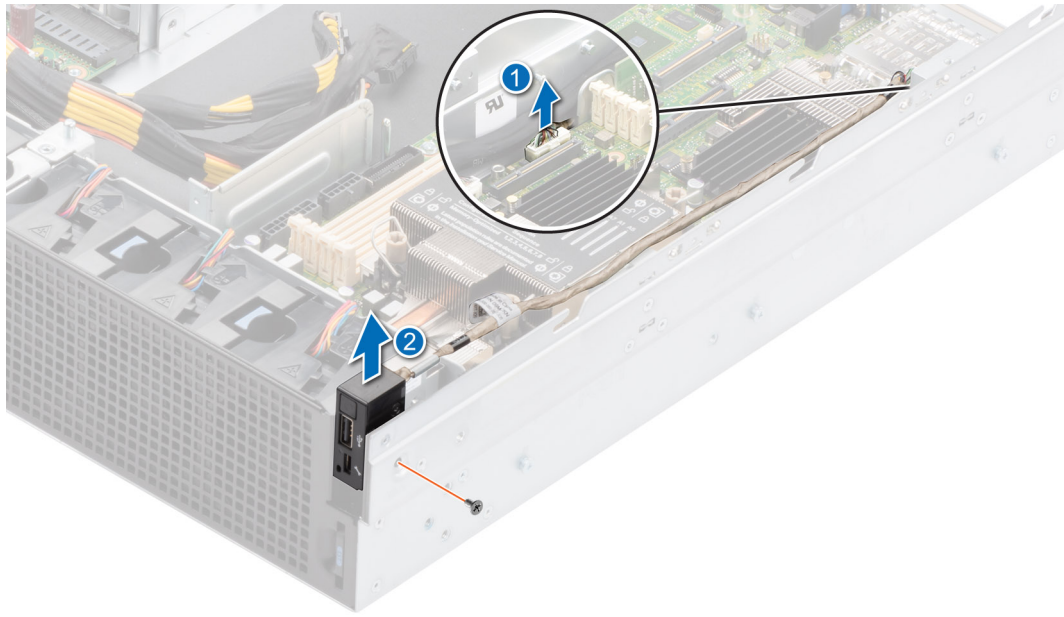
**Figure 151. Removing the power button control panel for Rear Accessed configuration**
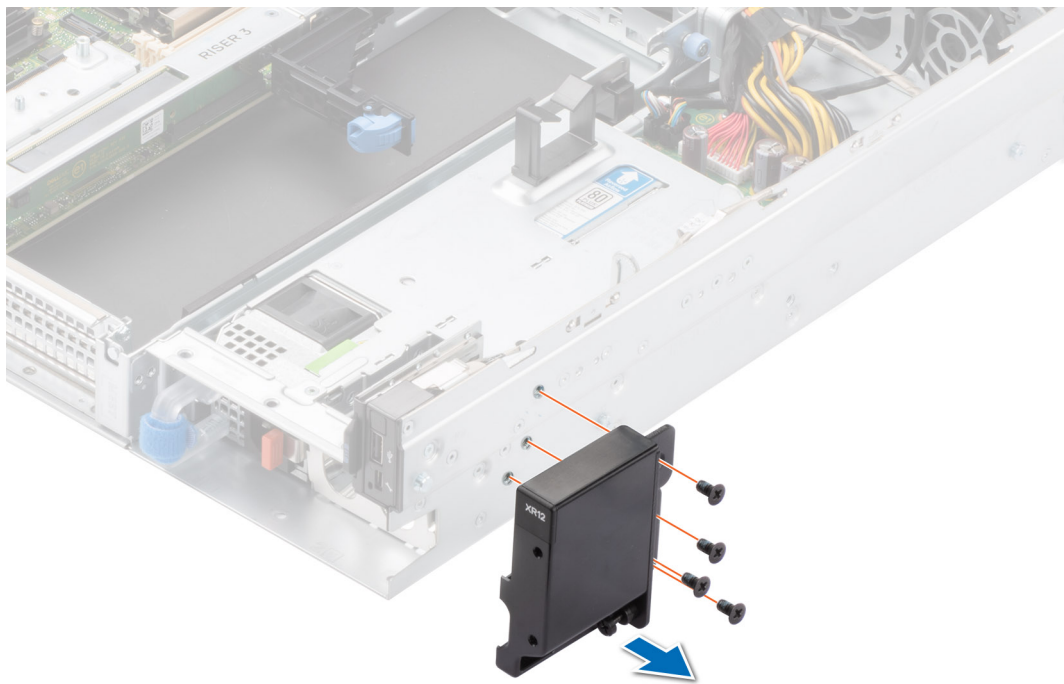
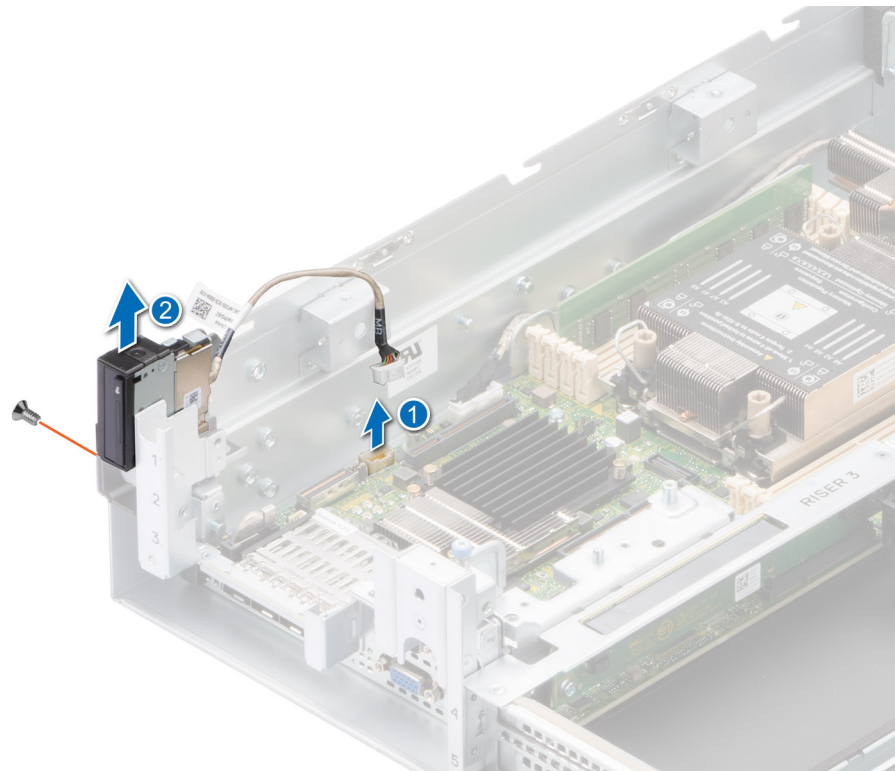**Figure 152. Removing the right ear for Front Accessed configuration**
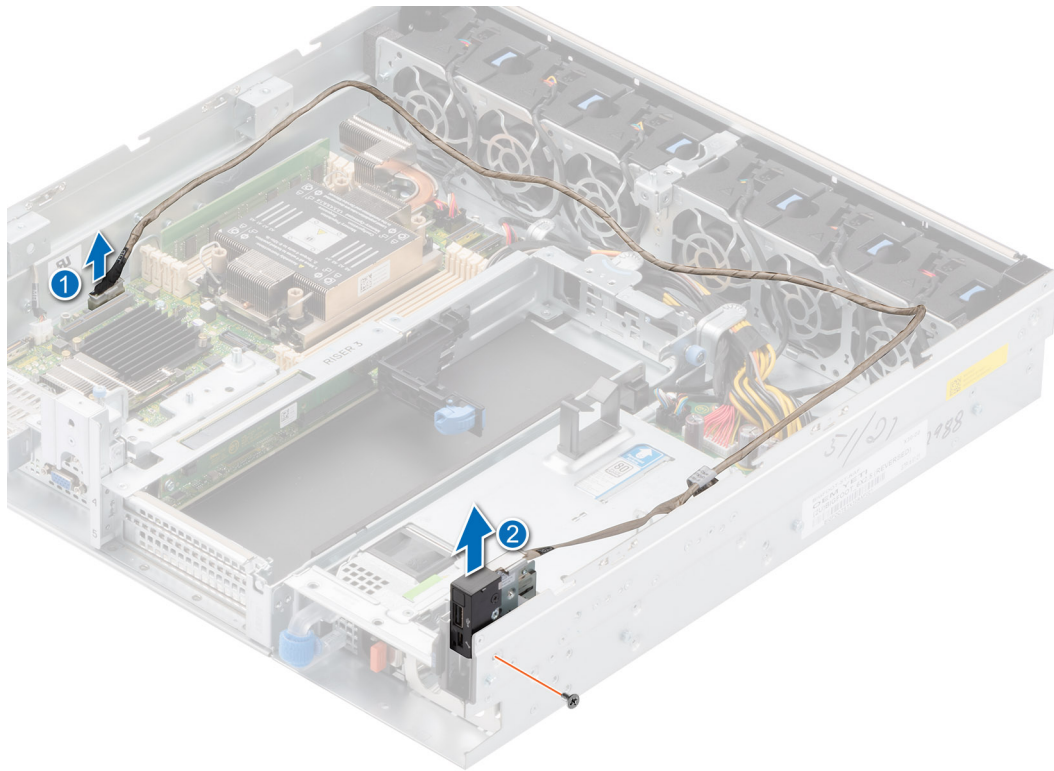
Figure 153. Removing the power button control panel for Front Accessed configuration

Next steps

Installing the power button control panel.

Installing the power button control panel

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions.
2. Follow the procedure listed in the Before working inside your system.
3. Remove the expansion card riser 2.
4. Remove the air shroud.
5. Remove the expansion card riser 1.

Steps

1. Route the control panel cable through the side wall of the system.

   ⓘ **NOTE:** Route the cable properly to prevent the cable from being pinched or crimped.

2. Align and insert the control panel in the slot on the system.
3. Connect the control panel cable to the connector on the system board.
4. Using the Torx 8, tighten screws from power button control panel assembly.
5. Using the Phillips 2, tighten screws from rack ear assembly.

   ⓘ **NOTE:** The numbers on the image do not depict the exact steps. The numbers are for representation of sequence.
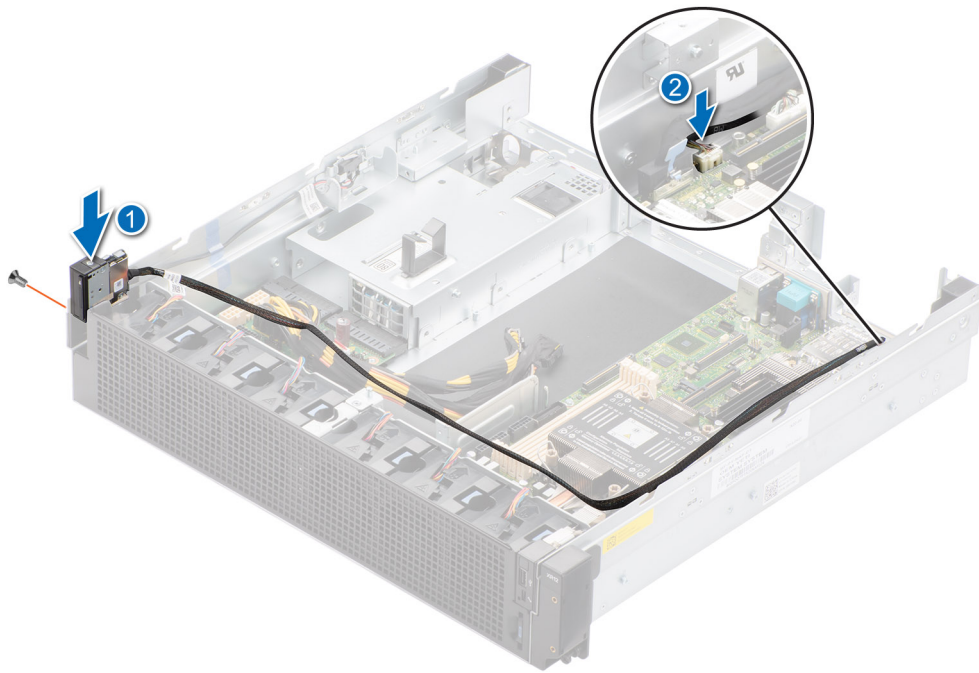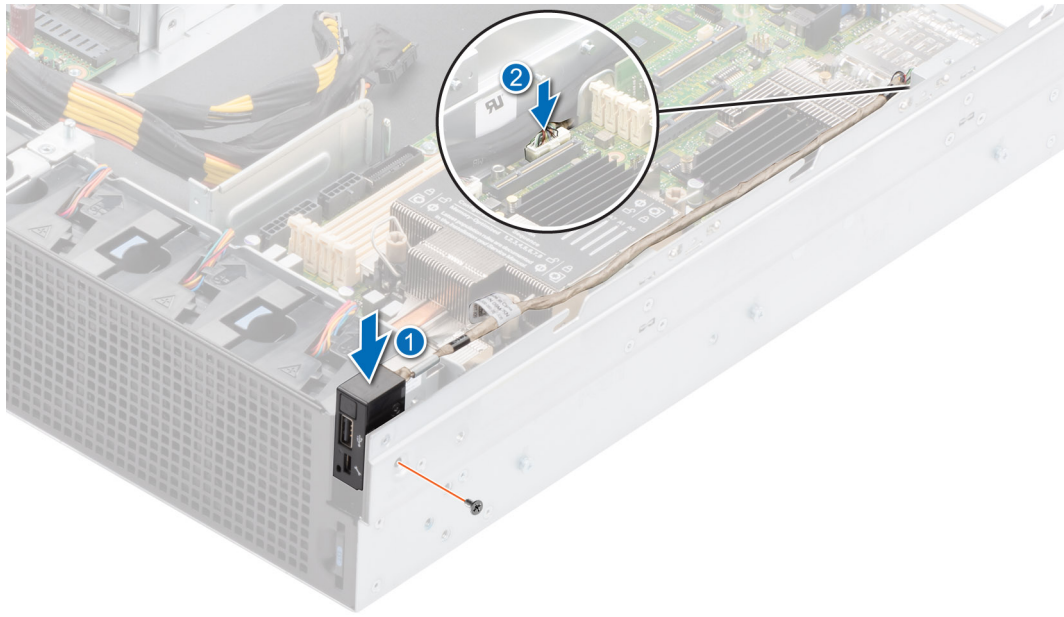
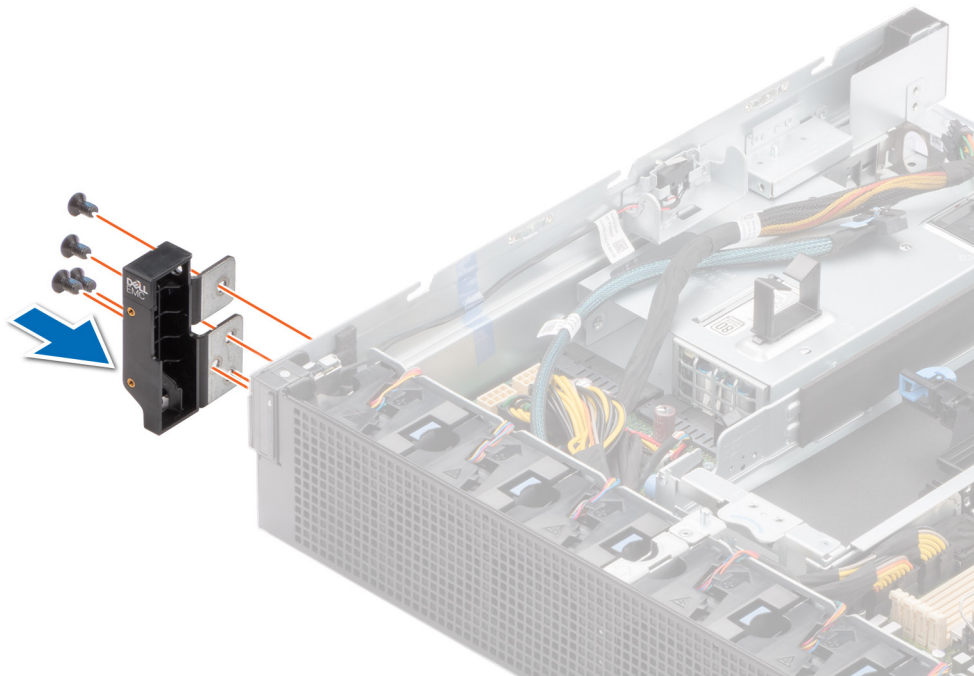**Figure 154. Installing the power button control panel for Rear Accessed configuration**
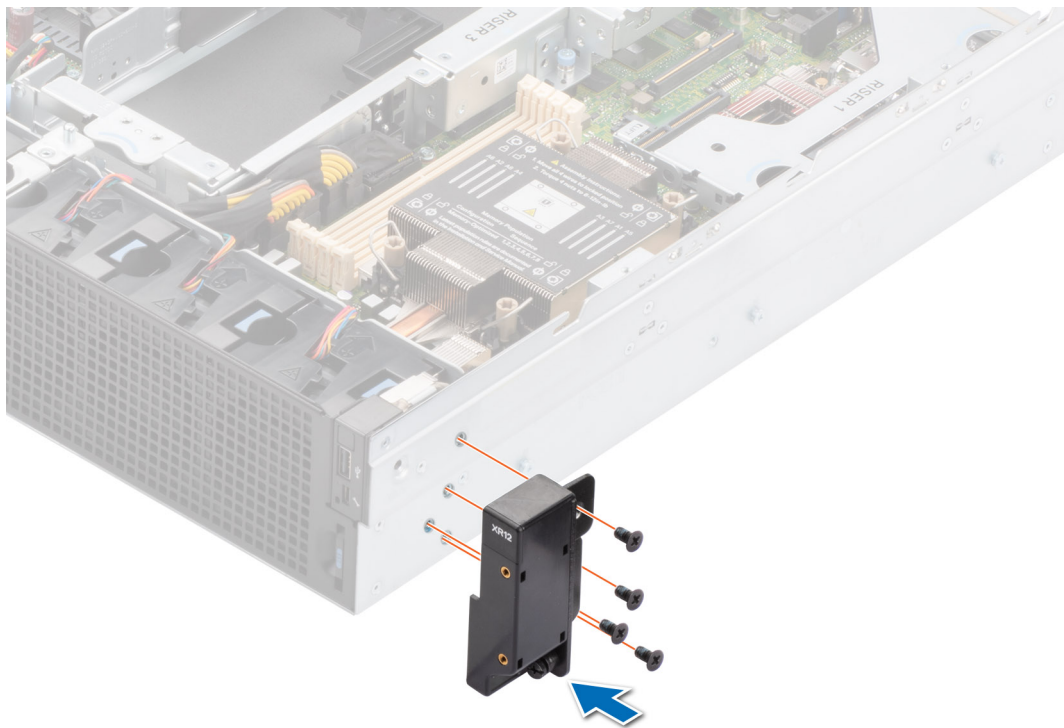
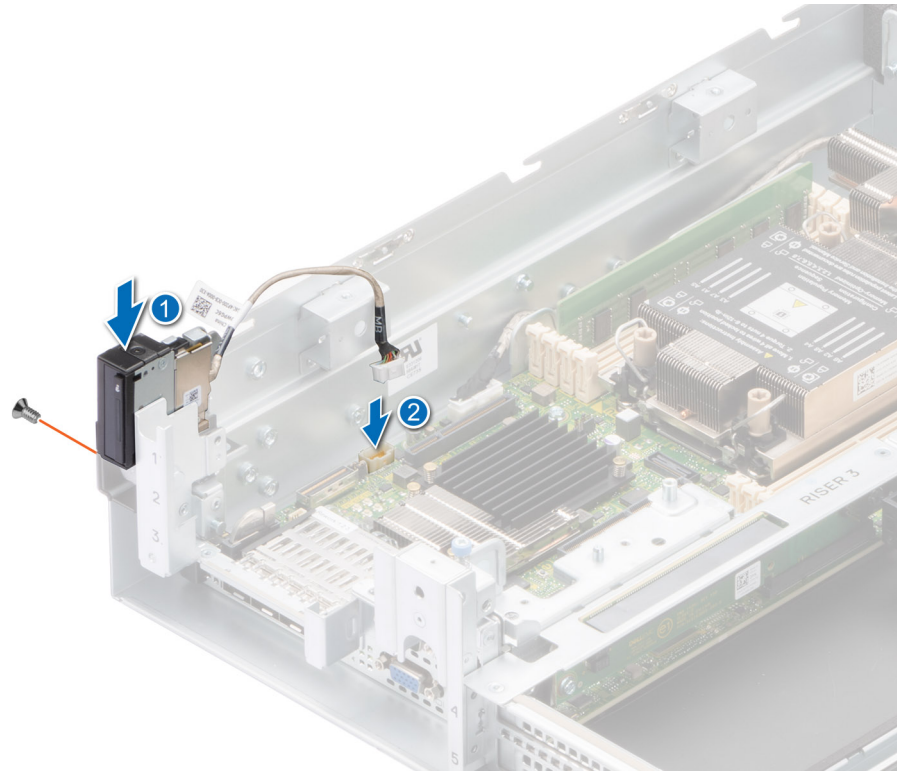**Figure 155. Installing the right ear for Rear Accessed configuration**
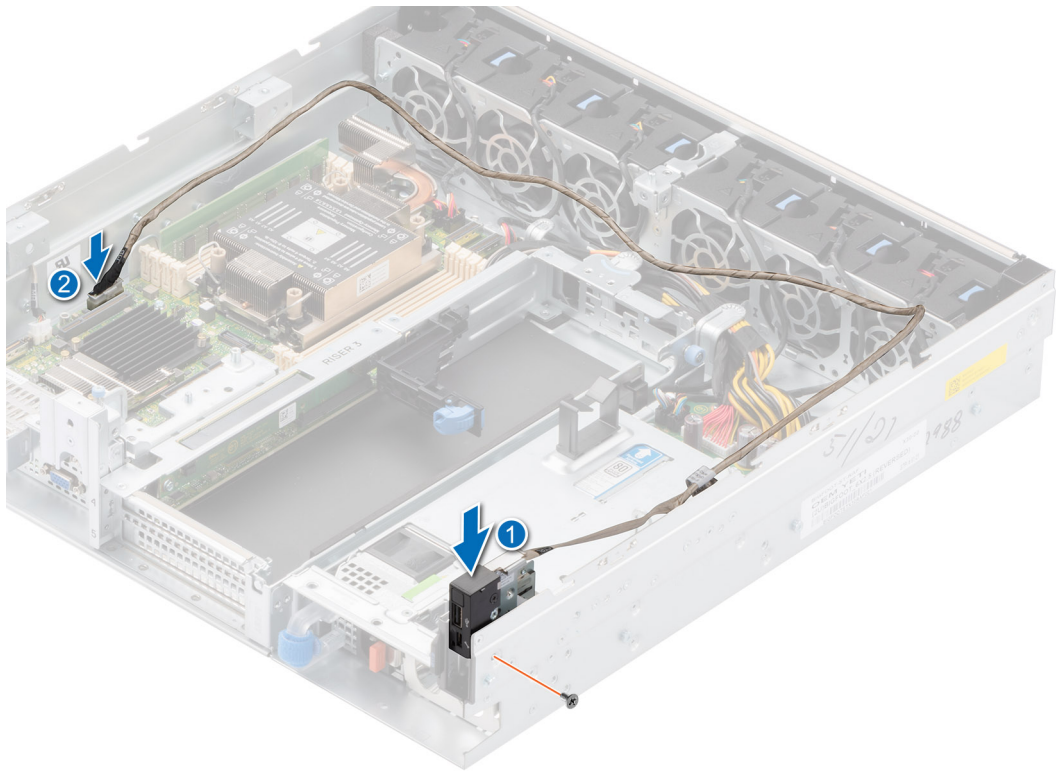
Figure 156. Installing the power button control panel for Front Accessed configuration
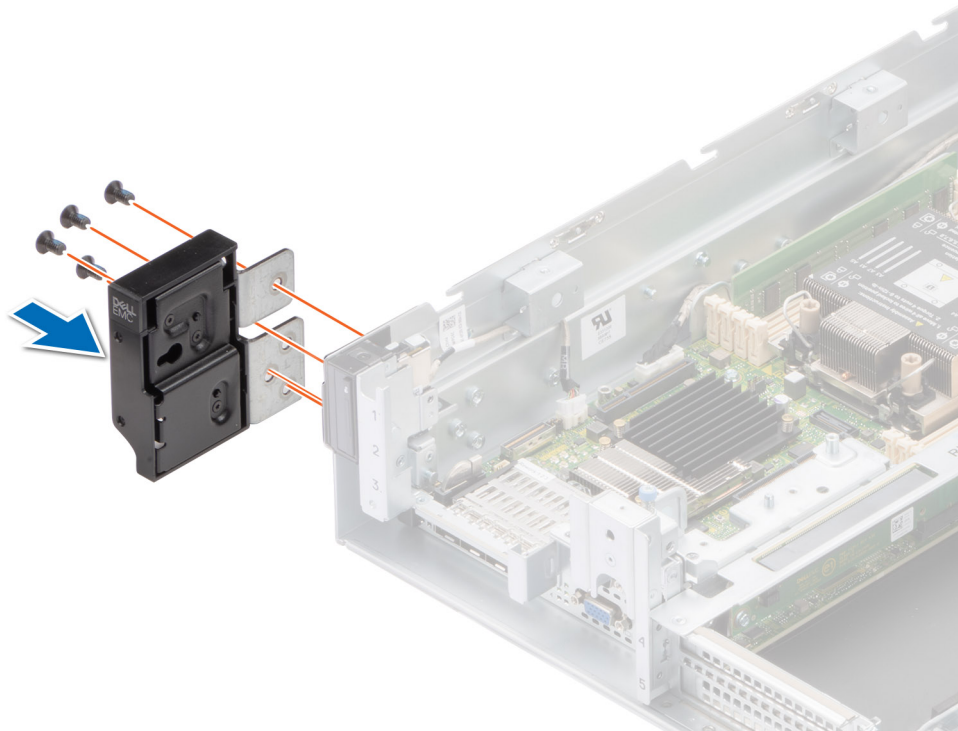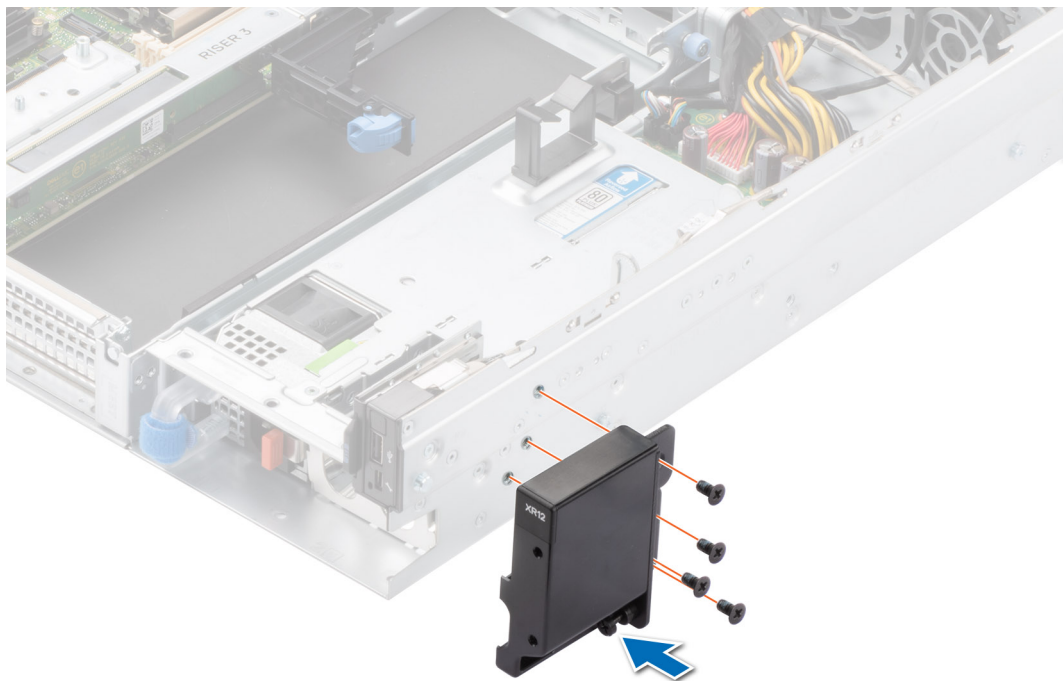

Figure 157. Installing the right ear for Front Accessed configuration

Next steps

1. Install the expansion card riser 1.
2. Install the air shroud.

3. Install the expansion card riser 2.
4. Follow the procedure listed in the After working inside your system.

6

MIL 901E and MIL 461G rugged kit

The MIL 901E and MIL 461G rugged kit provides rugged protection for the PowerEdge XR12 server. The MIL 901E and MIL 461G rugged kit consists of the components mentioned below:

- Power supply rugged bracket
- Drive rugged bracket
- Nine countersunk screws

Topics:

- Installing the MIL 901E and MIL 461G rugged kit

Installing the MIL 901E and MIL 461G rugged kit

Prerequisites

(i) **NOTE:** The MIL 901E and MIL 461G rugged kits are ordered separately from Dell.

1. Follow the safety guidelines listed in Safety instructions.
2. Unpack the 901E and MIL 461G rugged brackets.
3. Remove the front bezel for Front Accessed configuration.
4. Remove the system cover.

Steps

1. Remove the expansion card riser 2.
    a. Using the Phillips 1 screwdriver, loosen the blue thumbscrew.
    b. Lift the L-shaped bracket from the expansion card riser, and remove the screws.
    c. For full-length GPU or expansion card installation, release the blue latch and remove the plastic card guide from riser.
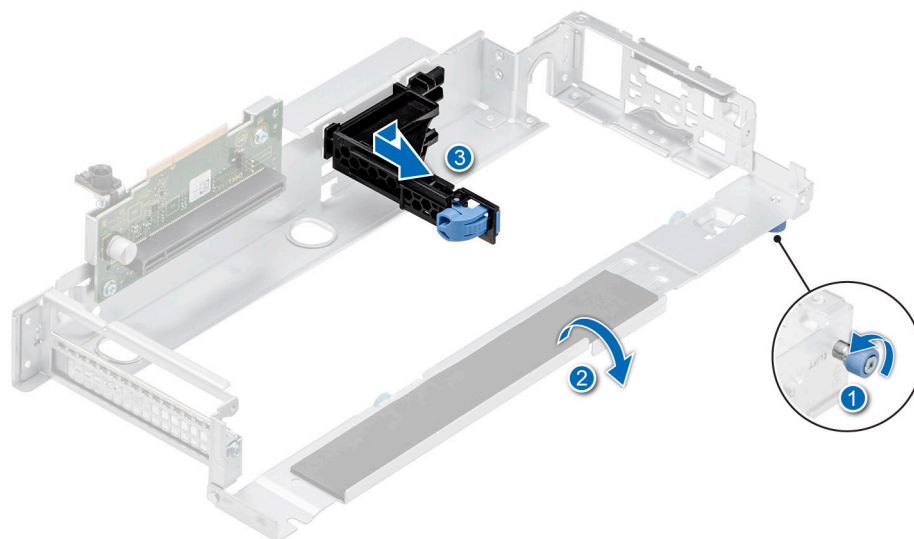
Figure 158. Removing the plastic card guide from Riser

    d. Install the expansion card into the expansion card riser 2.
2. Remove the air shroud.
3. Remove the expansion card riser 1 .

4. Install the expansion card into the expansion card riser 1 for half-length expansion cards.
5. To install the half-length expansion cards, align the expansion card holder to the screw slots on the riser. Using a Phillips 2 screwdriver, tighten the screws to secure the card holder in place.
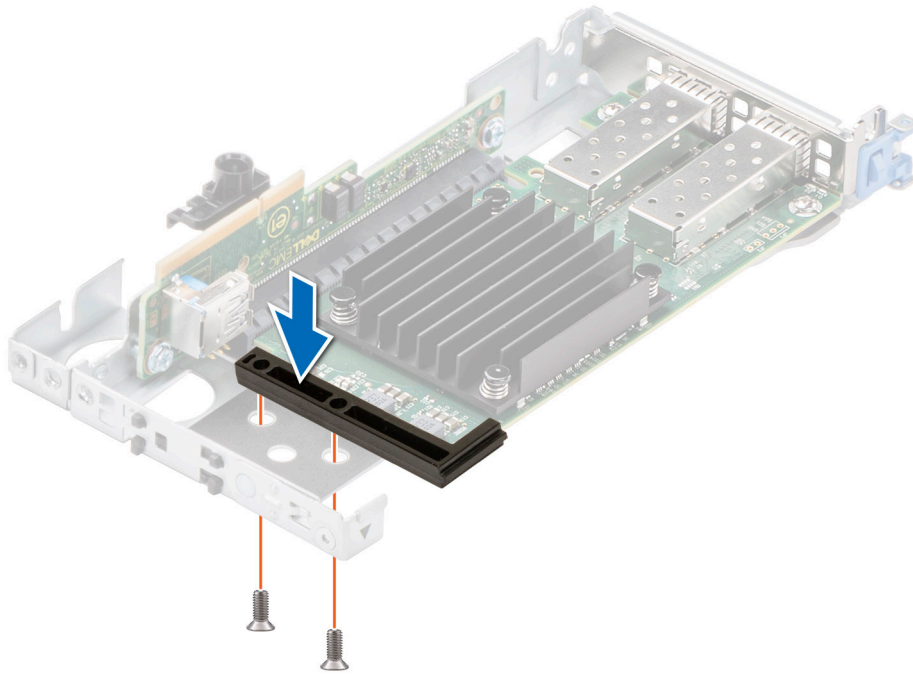
Figure 159. Installing the expansion card holder on riser 1 for half-length expansion cards

6. To install the full-height expansion cards, remove old expansion card holder by pressing on the middle retention clip with a screwdriver, and push the card holder to the left.
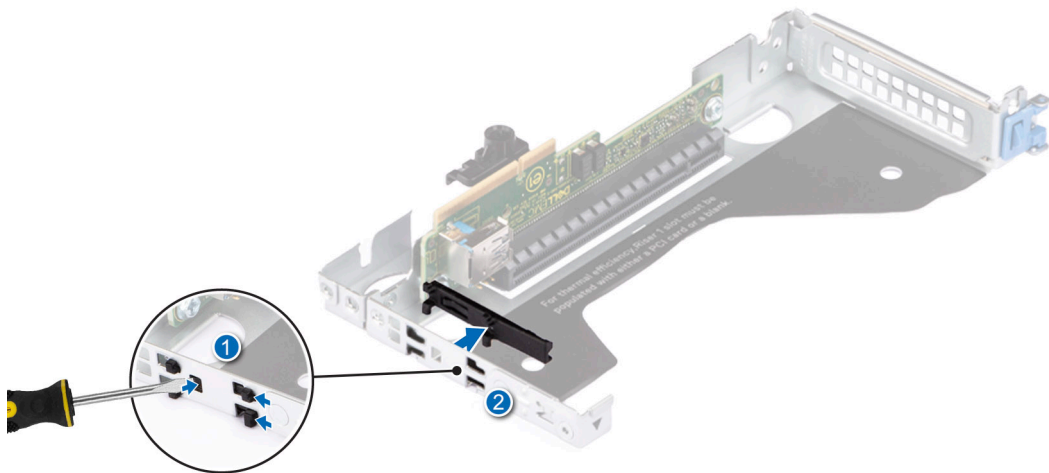
Figure 160. Removing the expansion card holder on riser 1

7. Align the new expansion card holder retention clips to the guide slots on the riser and push the bracket to the right to secure it in place.
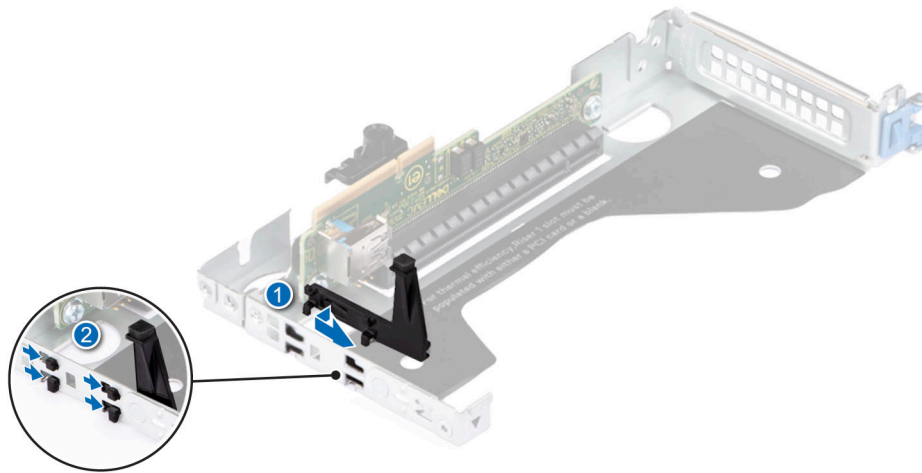
Figure 161. Installing the expansion card holder on riser 1 for full-height expansion cards

8. Install the expansion card into the expansion card riser 1 for full-height expansion cards .
9. Install the expansion card riser 1.
10. Remove the M.2 BOSS card and paste the foam on the M.2 BOSS card.
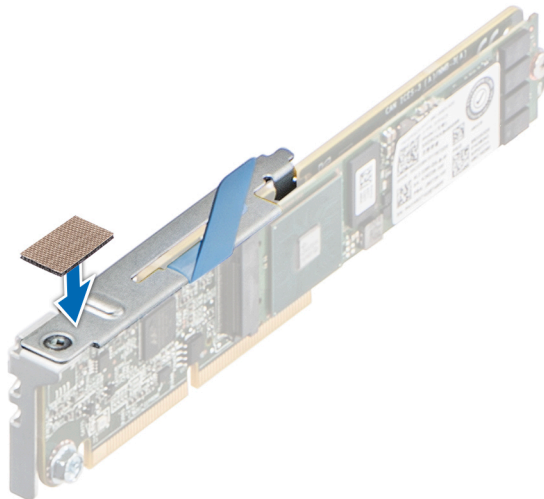
Figure 162. Pasting the foam on the M.2 BOSS card

11. Install the M.2 BOSS card.
12. Remove the drives.
13. Remove the backplane.
14. Remove the drive cage.
15. Align the power supply bracket to the rear of the power supply cage and slide it in to secure it in place. Using a Phillips 2 screwdriver, secure the power supply rugged bracket.

    (i) **NOTE:** The kits consists of screws. Use three screws on the bottom side of the chassis. The three screws on the top side of the chassis are from the system cover.
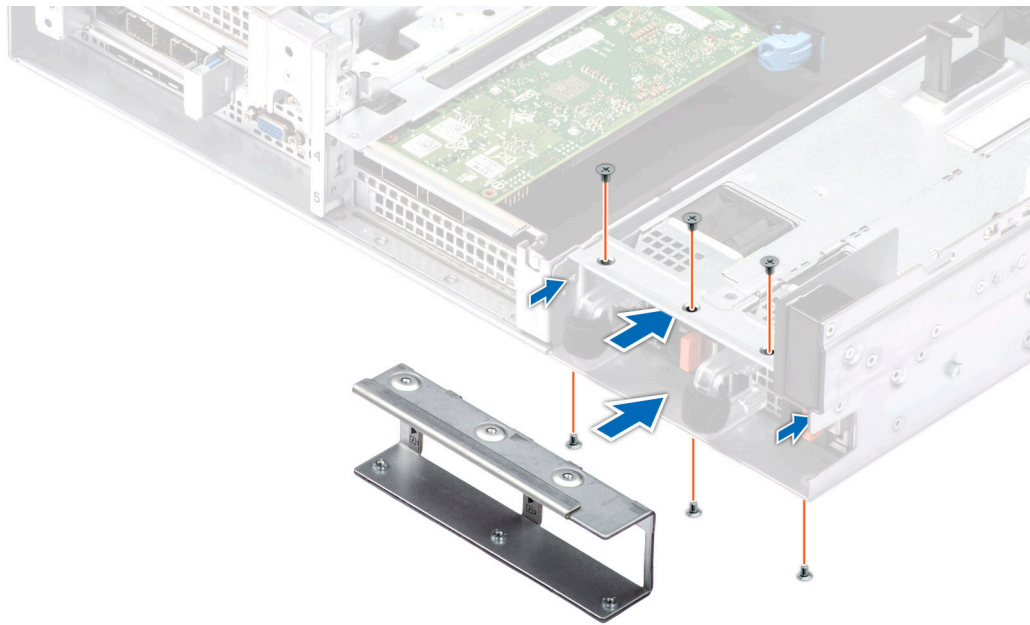
Figure 163. Installing the power supply bracket

16. Install the drive cage.
17. Install the backplane.
18. Install the drives.
19. Install the air shroud.
20. Install the expansion card riser 2.
21. Align the tabs on the system cover with the guide slots on the system.
22. Close the system cover release latch.
23. Using a Phillips 2 screwdriver, tighten the screw to secure the system cover.

Figure 164. Installing the system cover

24. Align the left edge of the drive retention bracket to the features on the left side of the drive module. Rotate the bracket closed against the chassis. Slide the latch to the left, and then to the right so that it is fully seated. Using a Phillips 2 screwdriver, secure the 901E and MIL 461G drive rugged bracket.

   ⓘ **NOTE:** To secure the 901E and MIL 461G drive rugged bracket, ensure to use the black screws shipped with the 901E and MIL 461G kit.
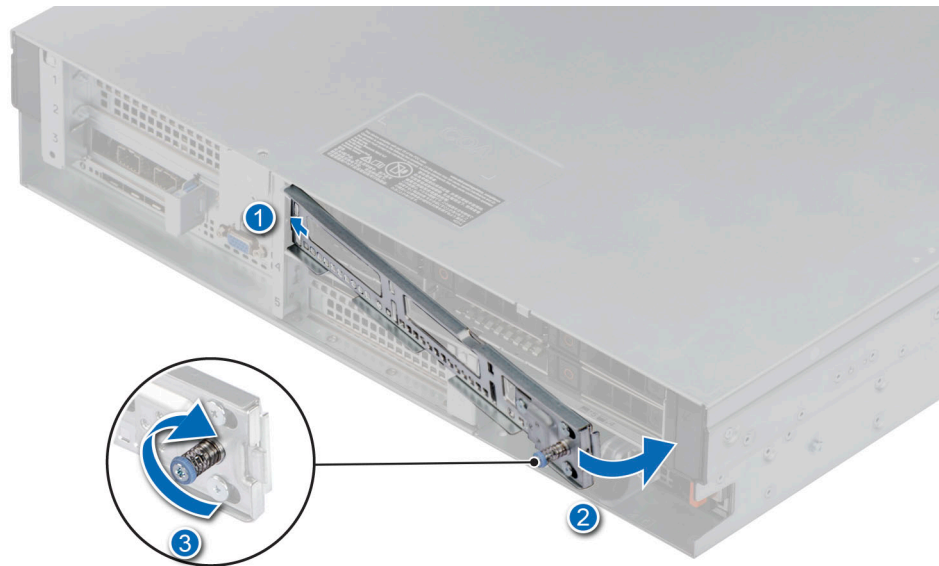
Figure 165. Installation of the drive bracket

25. Install the front bezel.

Next steps

Follow the procedure listed in After working inside your system.

Upgrade Kits

The table lists the available After Point Of Sale [APOS] kits.

Table 36. Upgrade kits

Kits	Related links to service instructions
Memory modules	See Installing the memory module
SSDs	See Installing the SSDs
Processors	See Installing the processor
Heat sink	See Installing the heat sink
Storage controller cards	See Installing the expansion card into the expansion card riser
HBA/CNA (third-party card)	
Network cards	
Power supplies	See Installing the power supply units
Cables	
Rail Kits	
Bezel	See Installing the bezel
Risers	See Installing an expansion card riser
Power cords	

Jumpers and connectors

This section provides essential and specific information about jumpers and switches. It also describes the connectors on the various boards in the system. Jumpers on the system board help to disable the system and reset the passwords. To install components and cables correctly, you must be able to identify the connectors on the system board.

Topics:

- System board connectors
- System board jumper settings
- Disabling a forgotten password

System board connectors
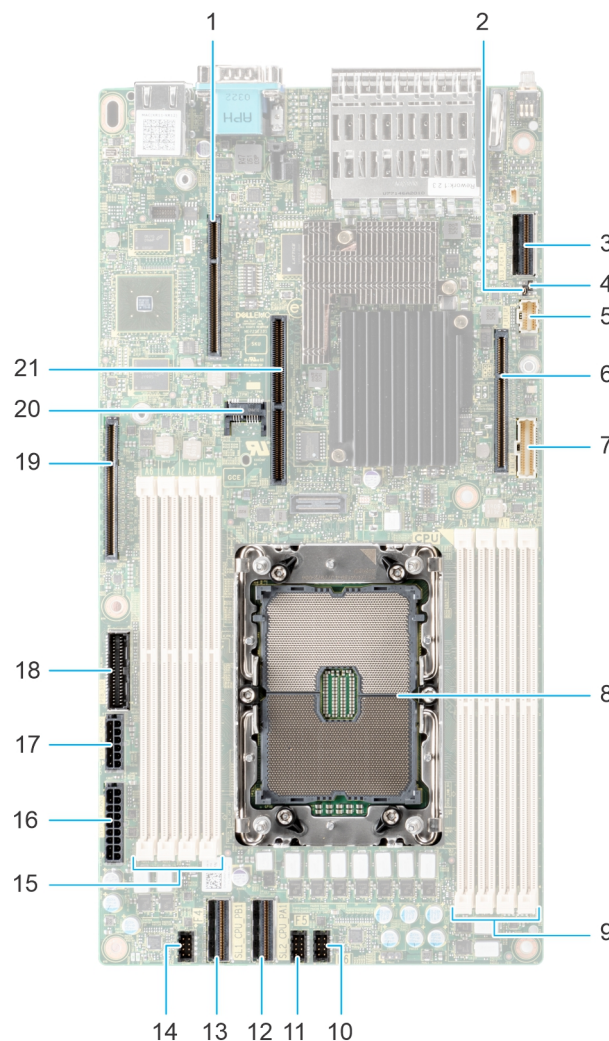
Figure 166. System board jumpers and connectors

1. IO_Riser2 (Riser 2connector)
2. PWRD_EN (BIOS password jumper)

3. SL3_PCH_SA1 (Signal cable connector for backplane)
4. NVRAM_CLR (NVRAM jumper)
5. Status LED control panel
6. IO_RISER1 (Riser 1 connector)
7. Power button control panel
8. Processor socket
9. DIMM slots (A3, A7, A1, A5)
10. Fan 6 slot
11. Fan 5 slot
12. SL2_CPU2_PA1 (PCIe cable connector)
13. SL1_CPU1_PB1 (PCIe cable connector)
14. Fan 4 slot
15. DIMM slots (A6, A2, A8, A4)
16. SYS_PWR_CONN1 (System power connection 1)
17. SYS_PWR_CONN2 (System power connection 2)
18. PIB_SIG (Power interposer board signal connector)
19. IO_Riser3 (Riser 3 connector)
20. TPM
21. BOSS S1 card slot

System board jumper settings

For information about resetting the password jumper to disable a password, see the Disabling a forgotten password section.

Table 37. System board jumper settings

Jumper	Setting	Description
PWRD_EN	▣▣• 2 4 6 (default)	The BIOS password feature is enabled.
	•▣▣ 2 4 6	The BIOS password feature is disabled. The BIOS password is now disabled and you are not allowed to set a new password.
NVRAM_CLR	•▣▣ 1 3 5 (default)	The BIOS configuration settings are retained at system boot.
	▣▣• 1 3 5	The BIOS configuration settings are cleared at system boot.

⚠ **CAUTION: You should be cautious when changing the BIOS settings. The BIOS interface is designed for advanced users. Any changes in the setting might prevent your system from starting correctly and may even result in data loss.**

Disabling a forgotten password

The software security features of the system include a system password and a setup password. The password jumper enables or disables password features and clears any password(s) currently in use.

Prerequisites

⚠ **CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.**

Steps

1. Power off the system and all attached peripherals. Disconnect the system from the electrical outlet, and disconnect the peripherals.
2. Remove the system cover.
3. Move the jumper on the system board from pins 2 and 4 to pins 4 and 6.
4. Replace the system cover.

    (i) **NOTE:** The existing passwords are not disabled (erased) until the system boots with the jumper on pins 4 and 6. However, before you assign a new system and/or setup password, you must move the jumper back to pins 2 and 4.

    (i) **NOTE:** If you assign a new system and/or setup password with the jumper on pins 4 and 6, the system disables the new password(s) the next time it boots.

5. Reconnect the peripherals and connect the system to the electrical outlet, and then power on the system.
6. Power off the system.
7. Remove the system cover.
8. Move the jumper on the system board from pins 4 and 6 to pins 2 and 4.
9. Replace the system cover.
10. Reconnect the peripherals and connect the system to the electrical outlet, and then power on the system.
11. Assign a new system and/or setup password.

System diagnostics and indicator codes

This section describes the diagnostic indicators on the system front panel that displays the system status during system startup.

Topics:

- Status LED indicators
- System health and system ID indicator codes
- iDRAC Direct LED indicator codes
- NIC indicator codes
- Power supply unit indicator codes
- Drive indicator codes
- Using system diagnostics

Status LED indicators

ⓘ **NOTE:** The indicators display solid amber if any error occurs.
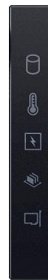
Figure 167. Status LED indicators

Table 38. Status LED indicators and descriptions

Icon	Description	Condition	Corrective action
🗄	Drive indicator	The indicator turns solid amber if there is a drive error.	• Check the System Event Log to determine if the drive has an error. • Run the appropriate Online Diagnostics test. Restart the system and run embedded diagnostics (ePSA). • If the drives are configured in a RAID array, restart the system, and enter the host adapter configuration utility program.
🌡	Temperature indicator	The indicator turns solid amber if the system experiences a thermal error (for example, the ambient temperature is out of range or there is a fan failure).	Ensure that none of the following conditions exist: • A cooling fan has been removed or has failed. • System cover, air shrouds, or back filler bracket has been removed. • Ambient temperature is too high. • External airflow is obstructed. If the problem persists, see the Getting help section.
⚡	Electrical indicator	The indicator turns solid amber if the system experiences an electrical error (for example,	Check the System Event Log or system messages for the specific issue. If it is due to a problem with

Table 38. Status LED indicators and descriptions (continued)

Icon	Description	Condition	Corrective action
		voltage out of range, or a failed power supply unit (PSU) or voltage regulator).	the PSU, check the LED on the PSU. Reseat the PSU.
			If the problem persists, see the Getting help section.
	Memory indicator	The indicator turns solid amber if a memory error occurs.	Check the System Event Log or system messages for the location of the failed memory. Reseat the memory module.
			If the problem persists, see the Getting help section.
	PCIe indicator	The indicator turns solid amber if a PCIe card experiences an error.	Restart the system. Update any required drivers for the PCIe card. Reinstall the card.
			If the problem persists, see the Getting help section.
			(i) **NOTE:** For more information about the supported PCIe cards, see the Expansion card installation guidelines section.

System health and system ID indicator codes

The system health and system ID indicator is located on the Status LED Control Panel of the system for Rear and Front Accessed configurations.

Figure 168. System health and system ID indicator

Table 39. System health and system ID indicator codes

System health and system ID indicator code	Condition
Solid blue	Indicates that the system is powered on, is healthy, and system ID mode is not active. Press the system health and system ID button to switch to system ID mode.
Blinking blue	Indicates that the system ID mode is active. Press the system health and system ID button to switch to system health mode.
Solid amber	Indicates that the system is in fail-safe mode. If the problem persists, see the Getting help section.
Blinking amber	Indicates that the system is experiencing a fault. Check the System Event Log for specific error messages. For information about the event and error messages generated by the system firmware and agents that monitor system components, go to qrl.dell.com > **Look Up** > **Error Code**, type the error code, and then click **Look it up**.

iDRAC Direct LED indicator codes

The iDRAC Direct LED indicator lights up to indicate that the port is connected and is being used as a part of the iDRAC subsystem.

You can configure iDRAC Direct by using a USB to micro USB (type AB) cable, which you can connect to your laptop or tablet. Cable length should not exceed 3 feet (0.91 meters). Performance could be affected by cable quality. The following table describes iDRAC Direct activity when the iDRAC Direct port is active:

Table 40. iDRAC Direct LED indicator codes

iDRAC Direct LED indicator code	Condition
Solid green for two seconds	Indicates that the laptop or tablet is connected.
Blinking green (on for two seconds and off for two seconds)	Indicates that the laptop or tablet connected is recognized.
LED Indicator off	Indicates that the laptop or tablet is unplugged.

NIC indicator codes

Each NIC on the back of the system has indicators that provide information about the activity and link status. The activity LED indicator indicates if data is flowing through the NIC, and the link LED indicator indicates the speed of the connected network.
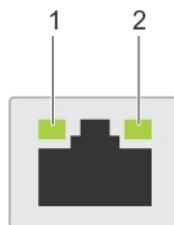
Figure 169. NIC indicator codes

1. Link LED indicator
2. Activity LED indicator

Table 41. NIC indicator codes

NIC indicator codes	Condition
Link and activity indicators are off.	Indicates that the NIC is not connected to the network.

Table 41. NIC indicator codes (continued)

NIC indicator codes	Condition
Link indicator is green, and activity indicator is blinking green.	Indicates that the NIC is connected to a valid network at its maximum port speed, and data is being sent or received.
Link indicator is amber, and activity indicator is blinking green.	Indicates that the NIC is connected to a valid network at less than its maximum port speed, and data is being sent or received.
Link indicator is green, and activity indicator is off.	Indicates that the NIC is connected to a valid network at its maximum port speed, and data is not being sent or received.
Link indicator is amber, and activity indicator is off.	Indicates that the NIC is connected to a valid network at less than its maximum port speed, and data is not being sent or received.
Link indicator is blinking green, and activity is off.	Indicates that the NIC identity is enabled through the NIC configuration utility.

Power supply unit indicator codes

AC and DC power supply units (PSUs) have an illuminated translucent handle that serves as an indicator. The indicator shows if power is present or if a power fault has occurred.
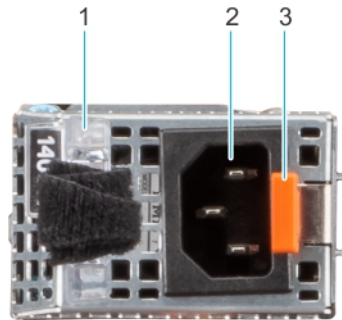
Figure 170. Rear Accessed configuration - AC PSU status indicator

1. AC PSU handle
2. Socket
3. Release latch

Figure 171. Front Accessed configuration - AC PSU status indicator

1. AC PSU handle
2. Socket
3. Release latch

Table 42. AC and DC PSU status indicator codes

Power indicator codes	Condition
Green	Indicates that a valid power source is connected to the PSU and the PSU is operational.
Blinking amber	Indicates an issue with the PSU.
Not powered on	Indicates that the power is not connected to the PSU.
Blinking green	Indicates that the firmware of the PSU is being updated. ⚠ **CAUTION: Do not disconnect the power cord or unplug the PSU when updating firmware. If firmware update is interrupted, the PSUs will not function.**
Blinking green and powers off	When hot-plugging a PSU, it blinks green five times at a rate of 4 Hz and powers off. This indicates a PSU mismatch due to efficiency, feature set, health status, or supported voltage. ⚠ **CAUTION: If two PSUs are installed, both the PSUs must have the same type of label; for example, Extended Power Performance (EPP) label. Mixing PSUs from previous generations of PowerEdge servers is not supported, even if the PSUs have the same power rating. This results in a PSU mismatch condition or failure to power on the system.** ⚠ **CAUTION: If two PSUs are used, they must be of the same type and have the same maximum output power.** ⚠ **CAUTION: When correcting a PSU mismatch, replace the PSU with the blinking indicator. Swapping the PSU to make a matched pair can result in an error condition and an unexpected system shutdown. To change from a high output configuration to a low output configuration or vice versa, you must power off the system.** ⚠ **CAUTION: When two identical PSUs receive different input voltages, they can output different wattage, and trigger a mismatch.** *For example a 1100W PSU connected to a High-Line AC (HLAC) 200Vac-240Vac input, it will output 1100W. But if a second 1100W PSU in the same system is connected to a Low Line 100-120Vac input, it will only output 1050W, triggering a mismatch.*

Drive indicator codes

The LEDs on the drive carrier indicate the state of each drive. Each drive carrier has two LEDs: an activity LED (green) and a status LED (bicolor, green/amber). The activity LED blinks whenever the drive is accessed.

Figure 172. Drive indicators

1. Drive activity LED indicator
2. Drive status LED indicator
3. Drive capacity label

(i) **NOTE:** If the drive is in the Advanced Host Controller Interface (AHCI) mode, the status LED indicator does not power on.

(i) **NOTE:** Drive status indicator behavior is managed by Storage Spaces Direct. Not all drive status indicators may be used.

Table 43. Drive indicator codes

Drive status indicator code	Condition
Blinks green twice per second	Indicates that the drive is being identified or preparing for removal.
Off	Indicates that the drive is ready for removal. (i) **NOTE:** The drive status indicator remains off until all drives are initialized after the system is powered on. Drives are not ready for removal during this time.
Blinks green, amber, and then powers off	Indicates that there is an unexpected drive failure.
Blinks amber four times per second	Indicates that the drive has failed.
Blinks green slowly	Indicates that the drive is rebuilding.
Solid green	Indicates that the drive is online.
Blinks green for three seconds, amber for three seconds, and then powers off after six seconds	Indicates that the rebuild has stopped.

Using system diagnostics

If you experience an issue with the system, run the system diagnostics before contacting Dell Technologies for technical assistance. The purpose of running system diagnostics is to test the system hardware without using additional equipment or risking data loss. If you are unable to fix the issue yourself, service and support personnel can use the diagnostics results to help you solve the issue.

Dell Embedded System Diagnostics

(i) **NOTE:** The Dell Embedded System Diagnostics is also known as Enhanced Pre-boot System Assessment (ePSA) diagnostics.

The Embedded System Diagnostics provide a set of options for particular device groups or devices allowing you to:
● Run tests automatically or in an interactive mode
● Repeat tests

- Display or save test results
- Run thorough tests to introduce additional test options to provide extra information about the failed device(s)
- View status messages that inform you if tests are completed successfully
- View error messages that inform you of issues encountered during testing

Running the Embedded System Diagnostics from the Dell Lifecycle Controller

Steps

1. When the system is booting, press F10.
2. Select **Hardware Diagnostics** → **Run Hardware Diagnostics**.
   The **ePSA Pre-boot System Assessment** window is displayed, listing all devices detected in the system. The diagnostics start executing the tests on all the detected devices.

Running the Embedded System Diagnostics from Boot Manager

Run the Embedded System Diagnostics (ePSA) if your system does not boot.

Steps

1. When the system is booting, press F11.
2. Use the up arrow and down arrow keys to select **System Utilities** > **Launch Diagnostics**.
3. Alternatively, when the system is booting, press F10, select **Hardware Diagnostics** > **Run Hardware Diagnostics**.
   The **ePSA Pre-boot System Assessment** window is displayed, listing all devices detected in the system. The diagnostics starts executing the tests on all the detected devices.

System diagnostic controls

Table 44. System diagnostic controls

Menu	Description
Configuration	Displays the configuration and status information of all detected devices.
Results	Displays the results of all tests that are run.
System health	Provides the current overview of the system performance.
Event log	Displays a time-stamped log of the results of all tests run on the system. This is displayed if at least one event description is recorded.

10

Getting help

Topics:

- Recycling or End-of-Life service information
- Contacting Dell Technologies
- Accessing system information by using QRL
- Receiving automated support with SupportAssist

Recycling or End-of-Life service information

Take back and recycling services are offered for this product in certain countries. If you want to dispose of system components, visit www.dell.com/recyclingworldwide and select the relevant country.

Contacting Dell Technologies

Dell provides online and telephone based support and service options. If you do not have an active internet connection, you can find Dell contact information on your purchase invoice, packing slip, bill or Dell product catalog. The availability of services varies depending on the country and product, and some services may not be available in your area. To contact Dell for sales, technical assistance, or customer service issues follow these steps:

Steps

1. Go to www.dell.com/support/home.
2. Select your country from the drop-down menu on the lower right corner of the page.
3. For customized support:
   a. Enter the system Service Tag in the **Enter a Service Tag, Serial Number, Service Request, Model, or Keyword** field.
   b. Click **Search**.
      The support page that lists the various support categories is displayed.
4. For general support:
   a. Select your product category.
   b. Select your product segment.
   c. Select your product.
      The support page that lists the various support categories is displayed.
5. For contact details of Dell Global Technical Support:
   a. Click Contact Technical Support.
   b. The **Contact Technical Support** page is displayed with details to call, chat, or e-mail the Dell Global Technical Support team.

Accessing system information by using QRL

You can use the Quick Resource Locator (QRL) located on the information tag in the front of Rear and Front Accessed configurations of the XR12 system, to access information about Dell Technologies PowerEdge XR12. There is also another QRL for accessing product information located on the back of the system cover.

Prerequisites

Ensure that your smartphone or tablet has a QR code scanner installed.

The QRL includes the following information about your system:

- How-to videos
- Reference materials, including the Installation and Service Manual, and mechanical overview
- The system service tag to quickly access the specific hardware configuration and warranty information
- A direct link to Dell to contact technical assistance and sales teams

Steps

1. Go to www.dell.com/qrl, and navigate to your specific product or
2. Use your smart phone or tablet to scan the model-specific Quick Resource (QR) code on your system or in the Quick Resource Locator section.

Quick Resource Locator for PowerEdge XR12 system

Figure 173. Quick Resource Locator for PowerEdge XR12 system

Receiving automated support with SupportAssist

Dell EMC SupportAssist is an optional Dell EMC Services offering that automates technical support for your Dell EMC server, storage, and networking devices. By installing and setting up a SupportAssist application in your IT environment, you can receive the following benefits:

- Automated issue detection — SupportAssist monitors your Dell EMC devices and automatically detects hardware issues, both proactively and predictively.
- Automated case creation — When an issue is detected, SupportAssist automatically opens a support case with Dell EMC Technical Support.
- Automated diagnostic collection — SupportAssist automatically collects system state information from your devices and uploads it securely to Dell EMC. This information is used by Dell EMC Technical Support to troubleshoot the issue.
- Proactive contact — A Dell EMC Technical Support agent contacts you about the support case and helps you resolve the issue.

The available benefits vary depending on the Dell EMC Service entitlement purchased for your device. For more information about SupportAssist, go to www.dell.com/supportassist.

Documentation resources

This section provides information about the documentation resources for your system.

To view the document that is listed in the documentation resources table:
- From the Dell Technologies support site:
  1. Click the documentation link that is provided in the Location column in the table.
  2. Click the required product or product version.

     (i) **NOTE:** To locate the model number, see the front of your system.

  3. On the Product Support page, click **Documentation**.
- Using search engines:
  - Type the name and version of the document in the search box.

Table 45. Additional documentation resources for your system

Task	Document	Location
Setting up your system	For more information about installing and securing the system into a rack, see the Rail Installation Guide included with your rail solution. For information about setting up your system, see the *Getting Started Guide* document that is shipped with your system.	www.dell.com/poweredgemanuals
Configuring your system	For information about the iDRAC features, configuring and logging in to iDRAC, and managing your system remotely, see the Integrated Dell Remote Access Controller User's Guide. For information about understanding Remote Access Controller Admin (RACADM) subcommands and supported RACADM interfaces, see the RACADM CLI Guide for iDRAC. For information about Redfish and its protocol, supported schema, and Redfish Eventing implemented in iDRAC, see the Redfish API Guide. For information about iDRAC property database group and object descriptions, see the Attribute Registry Guide. For information about Intel QuickAssist Technology, see the Integrated Dell Remote Access Controller User's Guide.	www.dell.com/poweredgemanuals
	For information about earlier versions of the iDRAC documents. To identify the version of iDRAC available on your system, on the iDRAC web interface, click **?** > **About**.	www.dell.com/idracmanuals

Table 45. Additional documentation resources for your system (continued)

Task	Document	Location
	For information about installing the operating system, see the operating system documentation.	www.dell.com/operatingsystemmanuals
	For information about updating drivers and firmware, see the Methods to download firmware and drivers section in this document.	www.dell.com/support/drivers
Managing your system	For information about systems management software offered by Dell, see the Dell OpenManage Systems Management Overview Guide.	www.dell.com/poweredgemanuals
	For information about setting up, using, and troubleshooting OpenManage, see the Dell OpenManage Server Administrator User's Guide.	www.dell.com/openmanagemanuals > OpenManage Server Administrator
	For information about installing and using Dell SupportAssist, see the Dell EMC SupportAssist Enterprise User's Guide.	https://www.dell.com/serviceabilitytools
	For information about partner programs enterprise systems management, see the OpenManage Connections Enterprise Systems Management documents.	www.dell.com/openmanagemanuals
Working with the Dell PowerEdge RAID controllers	For information about understanding the features of the Dell PowerEdge RAID controllers (PERC), Software RAID controllers, or BOSS card and deploying the cards, see the Storage controller documentation.	www.dell.com/storagecontrollermanuals
Understanding event and error messages	For information about the event and error messages generated by the system firmware and agents that monitor system components, go to qrl.dell.com > **Look Up** > **Error Code**, type the error code, and then click **Look it up**.	www.dell.com/qrl
Troubleshooting your system	For information about identifying and troubleshooting the PowerEdge server issues, see the Server Troubleshooting Guide.	www.dell.com/poweredgemanuals