Dell EMC PowerEdge R840

Installation and Service Manual

DELLEMC

Notes, cautions, and warnings

ⓘ | **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, technical specifications, diagnostic tools, and guidelines to be followed while installing certain components.

PowerEdge R840 system overview

The PowerEdge R840 is a 2U server that supports up to:

- Four Intel Xeon Processor Scalable family (Skylake-EP) processors
- 48 DIMM slots
- Two AC or DC power supply units
- 26 SAS, SATA, Nearline SAS hard drives or SSDs including two rear accessible drives, and up to 24 NVMe drives.
  For more information about supported drives, see the Technical specifications section.

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

Topics:

- Front view of the system
- Back view of the system
- Inside the system
- Locating the Service Tag of your system

Front view of the system
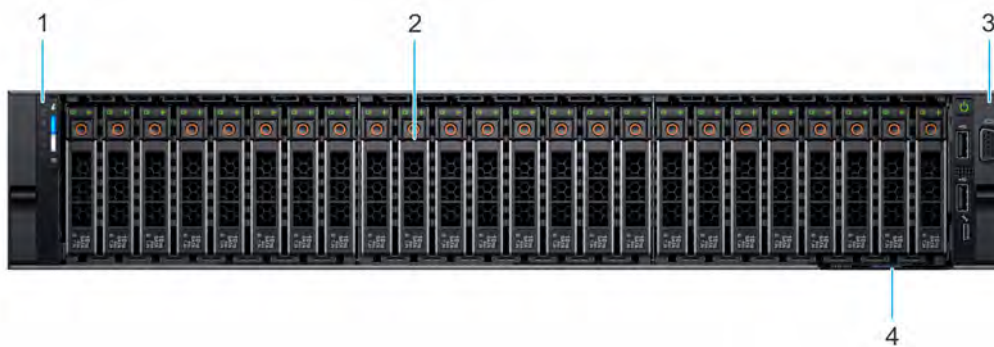
Figure 1. Front view 24 x 2.5-inch drive system

| 1 | Left control panel | 2 | Drives |
| 3 | Right control panel | 4 | Service Tag |
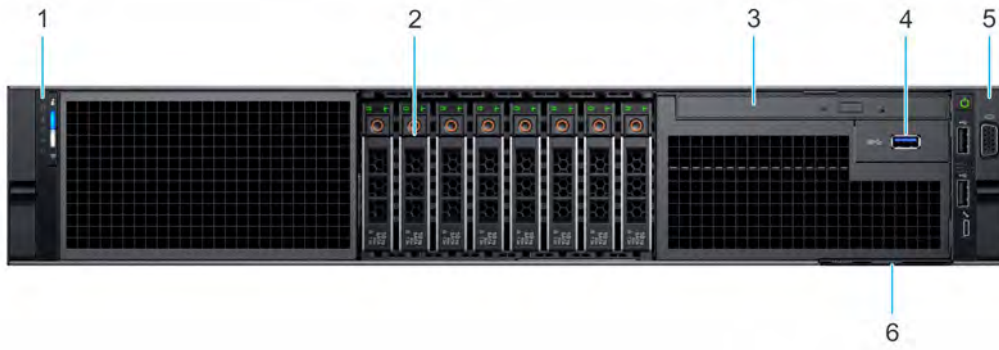
Figure 2. Front view 8 × 2.5-inch drive system

1	Left control panel	2	Drive slots
3	Optical drive (Optional)	4	USB 3.0 port (Optional)
5	Right control panel	6	Service Tag

For more information about the ports, see the Technical Specifications section.

Control panels

The control panels allow you to manually control the inputs to the server.

Left control panel
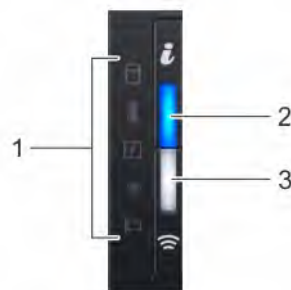
Figure 3. Left control panel view (with optional iDRAC Quick Sync 2.0 indicator)

1	Status LED indicators	2	System health and system ID indicator
3	iDRAC Quick Sync 2 wireless indicator (optional)		

> ⓘ NOTE: iDRAC Quick Sync 2 feature allows you to manage your system using mobile devices. This feature is only available on certain configurations. For more information about the feature, see the Integrated Dell Remote Access Controller User's Guide at Dell.com/idracmanuals.

Right control panel view
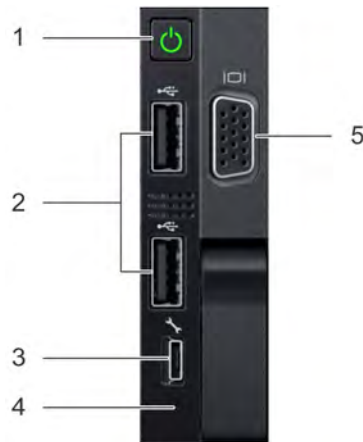
Figure 4. Right control panel view

1	Power button	2	USB 2.0 port (2)
3	iDRAC Direct port	4	iDRAC Direct LED
5	VGA port		

ⓘ NOTE: For more information on the ports, see the Technical Specifications section.

LCD panel

The LCD panel provides system information, status, and error messages to indicate if the system is functioning correctly or requires attention. The LCD panel can also be used to configure or view the system's iDRAC IP address. For more information about error messages, see the *Dell Event and Error Messages Reference Guide* at Dell.com/openmanagemanuals > OpenManage software.

The LCD panel is available only on the optional front bezel. The optional front bezel is hot pluggable.

The statuses and conditions of the LCD panel are outlined here:

- The LCD backlight is white during normal operating conditions.
- When the system needs attention, the LCD backlight turns amber, and displays an error code followed by descriptive text.

  ⓘ NOTE: If the system is connected to a power source and an error is detected, the LCD turns amber regardless of whether the system is turned on or off.

- When the system turns off and there are no errors, LCD enters the standby mode after five minutes of inactivity. Press any button on the LCD to turn it on.
- If the LCD panel stops responding, remove the bezel and reinstall it. If the problem persists, see Getting help.
- The LCD backlight remains off if LCD messaging is turned off using the iDRAC utility, the LCD panel, or other tools.

Figure 5. LCD panel features

Table 1. LCD panel features

Item	Button or display	Description
1	Left	Moves the cursor back in one-step increments.
2	Select	Selects the menu item highlighted by the cursor.
3	Right	Moves the cursor forward in one-step increments. During message scrolling: • Press and hold the right button to increase scrolling speed. • Release the button to stop. ⓘ NOTE: **The display stops scrolling when the button is released. After 45 seconds of inactivity, the display starts scrolling.**
4	LCD display	Displays system information, status, and error messages or iDRAC IP address.

Viewing Home screen

The **Home** screen displays user-configurable information about the system. This screen is displayed during normal system operation when there are no status messages or errors. When the system turns off and there are no errors, LCD enters the standby mode after five minutes of inactivity. Press any button on the LCD to turn it on.

1 To view the **Home** screen, press one of the three navigation buttons (Select, Left, or Right).
2 To navigate to the **Home** screen from another menu, complete the following steps:

   a Press and hold the navigation button till the up arrow ⌐ is displayed.

   b Navigate to the **Home** icon ⬆ using the up arrow ⌐ .
   c Select the **Home** icon.
   d On the **Home** screen, press the **Select** button to enter the main menu.

Setup menu

ⓘ NOTE: **When you select an option in the Setup menu, you must confirm the option before proceeding to the next action.**

Option	Description
iDRAC	Select **DHCP** or **Static IP** to configure the network mode. If **Static IP** is selected, the available fields are **IP**, **Subnet (Sub)**, and **Gateway (Gtw)**. Select **Setup DNS** to enable DNS and to view domain addresses. Two separate DNS entries are available.
Set error	Select **SEL** to view LCD error messages in a format that matches the IPMI description in the SEL. This enables you to match an LCD message with an SEL entry.

Option	Description
	Select **Simple** to view LCD error messages in a simplified user-friendly description. For more information about error messages, see the *Dell Event and Error Messages Reference Guide* at **Dell.com/openmanagemanuals** > **OpenManage software**.
Set home	Select the default information to be displayed on the **Home** screen. See View menu section for the options and option items that can be set as the default on the **Home** screen.

View menu

ⓘ **NOTE: When you select an option in the View menu, you must confirm the option before proceeding to the next action.**

Option	Description
iDRAC IP	Displays the **IPv4** or **IPv6** addresses for iDRAC9. Addresses include **DNS** (**Primary** and **Secondary**), **Gateway**, **IP**, and **Subnet** (IPv6 does not have Subnet).
MAC	Displays the MAC addresses for **iDRAC**, **iSCSI**, or **Network** devices.
Name	Displays the name of the **Host**, **Model**, or **User String** for the system.
Number	Displays the **Asset tag** or the **Service tag** for the system.
Power	Displays the power output of the system in BTU/hr or Watts. The display format can be configured in the **Set home** submenu of the **Setup** menu.
Temperature	Displays the temperature of the system in Celsius or Fahrenheit. The display format can be configured in the **Set home** submenu of the **Setup** menu.

Back view of the system

The back view displays the features available on the back of the system.
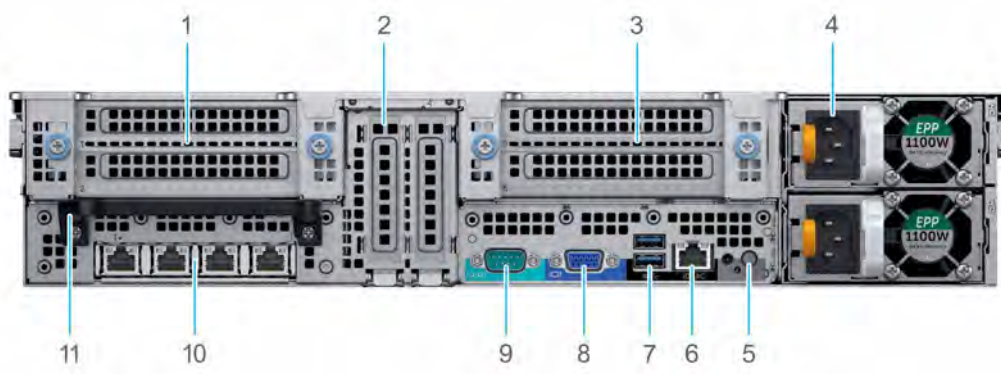
Figure 6. Back view of the 24 x 2.5-inch drive system

1	Full-height PCIe expansion card slots (Slot 1 and 2)	2	Half-height PCIe expansion card slots (Slot 3 and 4)
3	Full-height PCIe expansion card slots (Slot 5 and 6)	4	Power supply units (2)
5	System identification button	6	iDRAC9 dedicated port
7	USB 3.0 ports (2)	8	VGA port
9	Serial port	10	NIC ports (4)
11	Rear handle		
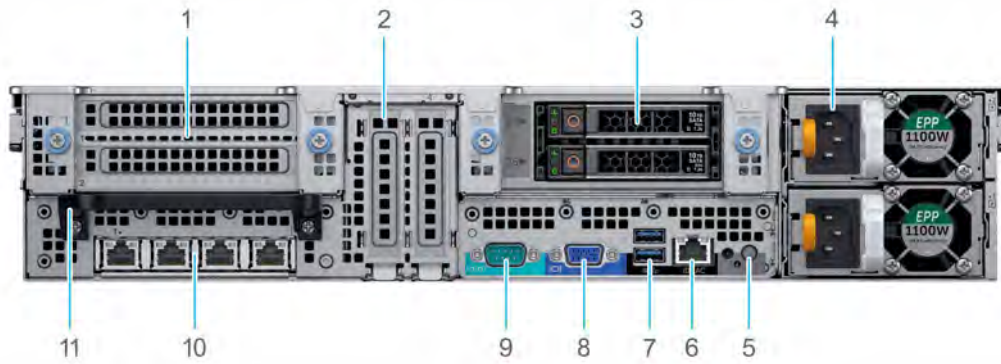
Figure 7. Back view of the 24 x 2.5-inch + 2 x 2.5-inch (rear) drive system

1	Full-height PCIe expansion card slots (Slot 1 and 2)	2	Half-height PCIe expansion card slots (Slot 3 and 4)
3	Rear drives (2)	4	Power supply units (2)
5	System identification button	6	iDRAC9 dedicated port
7	USB 3.0 ports (2)	8	VGA port
9	Serial port	10	NIC ports (4)
11	Rear handle		

ⓘ **NOTE: For more information about the ports and connectors, see the** Technical Specifications **section.**

Inside the system

ⓘ **NOTE: Components that are hot swappable have orange touch points and the components that are not hot swappable have blue touch points.**
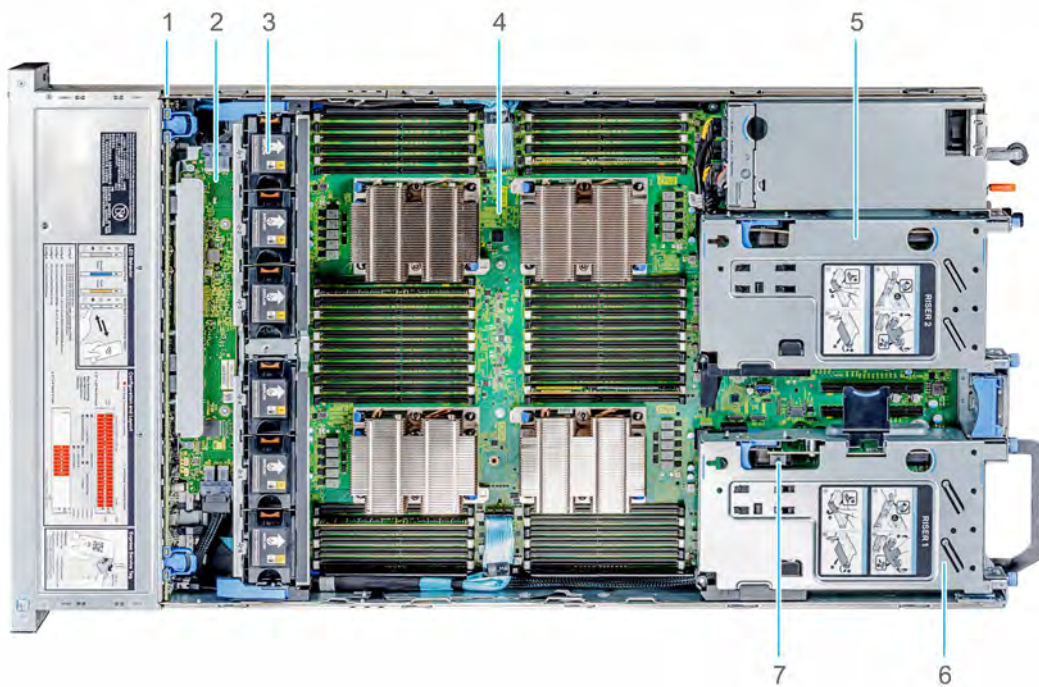
Figure 8. Inside the system without rear drive cage

1	Drive backplane	2	SAS Expander board
3	Cooling fans (6)	4	System board
5	Full-height expansion card Riser 2	6	Full-height expansion card Riser 1
7	Intrusion switch		
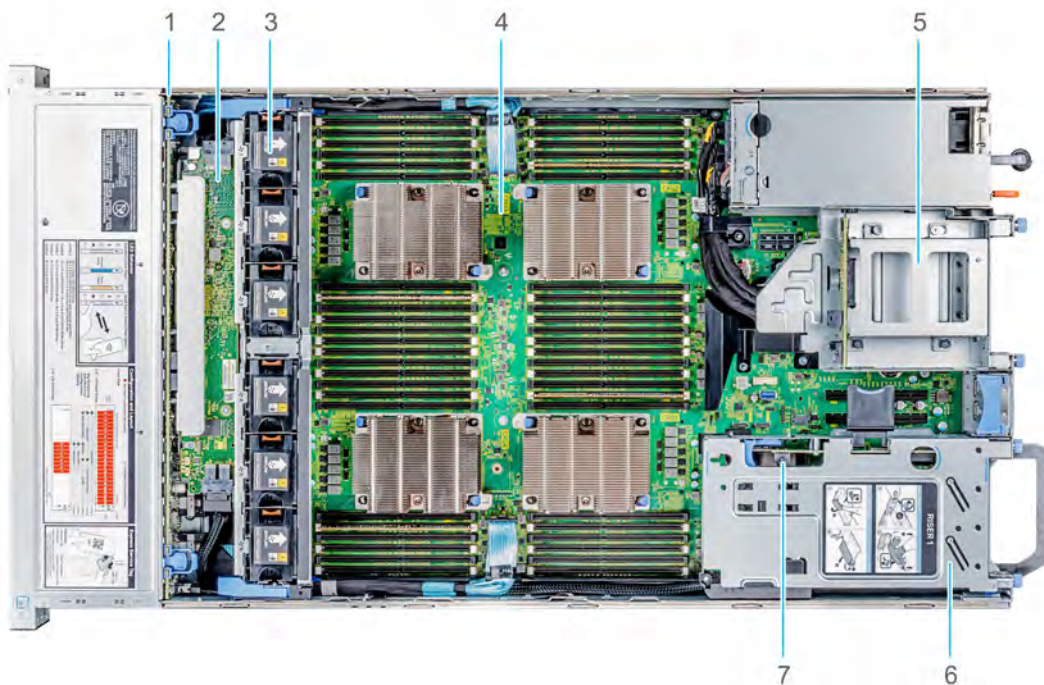
Figure 9. Inside the system with rear drive cage

1	Drive backplane	2	SAS Expander board
3	Cooling fans (6)	4	System board
5	Drive cage (rear)	6	Full-height expansion card Riser 1
7	Intrusion switch		

Locating the Service Tag of your system

You can identify your system using the unique Express Service Code and Service Tag. Pull out the information tag in front of the system to view the Express Service Code and Service Tag. Alternatively, the information may be on a sticker on the chassis of the system. The mini Enterprise Service Tag (EST) is found on the back of the system. This information is used by Dell to route support calls to the appropriate personnel.

Figure 10. Locating Service Tag of your system

1   Information tag (top view)
2   Information tag (bottom view)
3   OpenManage Mobile (OMM) label (optional)

4   iDRAC MAC address and iDRAC secure password label

> (i) **NOTE: If you have opted for secure default access to iDRAC, the iDRAC secure default password is available on the back of the system Information tag. This section of label will be blank, if you have not opted for secure default access to iDRAC, then the default user name and password are root and calvin.**

5   Service Tag

3

Initial system setup and configuration

Setting up your system

Complete the following steps to set up your system:

1   Unpack the system.
2   Install the system into the rack. For more information about installing the system into the rack, see the *Rail Installation Guide* at Dell.com/poweredgemanuals.
3   Connect the peripherals to the system.
4   Connect the system to its electrical outlet.
5   Turn the system on by pressing the power button or by using iDRAC.
6   Turn on the attached peripherals.
    For more information about setting up your system, see the *Getting Started Guide* that shipped with your system.

Related links
    iDRAC configuration
    Options to set up iDRAC IP address

iDRAC configuration

The Integrated Dell Remote Access Controller (iDRAC) is designed to make system administrators more productive and improve the overall availability of Dell systems. iDRAC alerts administrators to system issues, helps them perform remote system management, and reduces the need for physical access to the system.

Options to set up iDRAC IP address

You must configure the initial network settings based on your network infrastructure to enable the communication to and from iDRAC.

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

You must use the default iDRAC IP address 192.168.0.120 to configure the initial network settings, including setting up DHCP or a static IP for iDRAC.

This option is set to **DHCP** by Default. You can set up the IP address by using one of the following interfaces:

Interfaces	Document/Section
iDRAC Settings utility	See *Dell Integrated Dell Remote Access Controller User's Guide* at Dell.com/idracmanuals
Dell Deployment Toolkit	See *Dell Deployment Toolkit User's Guide* at Dell.com/openmanagemanuals
Dell Lifecycle Controller	See *Dell Lifecycle Controller User's Guide* at Dell.com/idracmanuals
Server LCD panel	See the LCD panel section

Interfaces	Document/Section
iDRAC Direct and Quick Sync 2 (optional)	See *Dell Integrated Dell Remote Access Controller User's Guide* at Dell.com/idracmanuals

ⓘ **NOTE: To access iDRAC, ensure that you connect the ethernet cable to the dedicated NIC port. You can also access iDRAC through the shared LOM mode, if you have opted for a system that has the shared LOM mode enabled.**

Log in to iDRAC

You can log in to iDRAC as:

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

If you have opted for secure default access to iDRAC, the iDRAC secure default password is available on the back of the system Information tag. If you have not opted for secure default access to iDRAC, then the default user name and password are `root` and `calvin`. You can also log in by using Single Sign-On or Smart Card.

ⓘ **NOTE: You must have the iDRAC credentials to log in to iDRAC.**

ⓘ **NOTE: Ensure that you change the default user name 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 Dell.com/idracmanuals.

You can also access iDRAC by using RACADM. For more information, see the *RACADM Command Line Interface Reference Guide* at Dell.com/idracmanuals.

Options to install the operating system

If the system is shipped without an operating system, install the supported operating system by using one of the following resources:

Table 2. Resources to install the operating system

Resources	Location
Systems Management Tools and Documentation media	Dell.com/operatingsystemmanuals
Lifecycle Controller	Dell.com/idracmanuals
OpenManage Deployment Toolkit	Dell.com/openmanagemanuals
Dell certified VMware ESXi	Dell.com/virtualizationsolutions
Supported operating systems on PowerEdge systems	Dell.com/ossupport
Installation and How-to videos for supported operating systems on PowerEdge systems	Supported Operating Systems for Dell PowerEdge Systems

Methods to download firmware and drivers

You can download the firmware and drivers by using any of the following methods:

Table 3. Firmware and drivers

Methods	Location
From the Dell Support site	Dell.com/support/home
Using Dell Remote Access Controller Lifecycle Controller (iDRAC with LC)	Dell.com/idracmanuals
Using Dell Repository Manager (DRM)	Dell.com/openmanagemanuals
Using Dell OpenManage Essentials (OME)	Dell.com/openmanagemanuals
Using Dell Server Update Utility (SUU)	Dell.com/openmanagemanuals
Using Dell OpenManage Deployment Toolkit (DTK)	Dell.com/openmanagemanuals

Downloading drivers and firmware

Dell recommends that you download and install the latest BIOS, drivers, and systems management firmware on your system.

Prerequisite

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

Steps

1   Go to Dell.com/support/drivers.

2   In the **Drivers & Downloads** section, type the Service Tag of your system in the **Enter a Service Tag or product ID** box, and then click **Submit**.

> ⓘ NOTE: **If you do not have the Service Tag, select Detect Product to allow the system to automatically detect your Service Tag, or click View products, and navigate to your product.**

3   Click **Drivers & Downloads**.

The drivers that are applicable to your selection are displayed.

4   Download the drivers to a USB drive, CD, or DVD.

Pre-operating system management applications

You can manage basic settings and features of a system without booting to the operating system by using the system firmware.

Topics:

Options to manage the pre-operating system applications

Your system has the following options to manage the pre-operating system applications:

- System Setup
- Dell Lifecycle Controller
- Boot Manager
- Preboot Execution Environment (PXE)

System Setup

By using the **System Setup** screen, you can configure the BIOS settings, iDRAC settings, and device settings of your system.

ⓘ **NOTE: Help text for the selected field is displayed in the graphical browser by default. To view the help text in the text browser, press F1.**

You can access system setup by using two methods:

- Standard graphical browser—The browser is enabled by default.
- Text browser—The browser is enabled by using Console Redirection.

System Setup details

The **System Setup Main Menu** screen details are explained as follows:

Option	Description
System BIOS	Enables you to configure BIOS settings.
iDRAC Settings	Enables you to configure the iDRAC settings.
	The iDRAC settings utility is an interface to set up and configure the iDRAC parameters by using UEFI (Unified Extensible Firmware Interface). You can enable or disable various iDRAC parameters by using the iDRAC settings

Option	Description
	utility. For more information about this utility, see *Integrated Dell Remote Access Controller User's Guide* at Dell.com/idracmanuals.
Device Settings	Enables you to configure device settings such as network cards or storage controllers.

System BIOS

You can use the **System BIOS** screen to edit specific functions such as boot order, system password, setup password, set the SATA and PCIe NVMeRAID mode, and enable or disable USB ports.

System Information

You can use the **System Information** screen to view system properties such as Service Tag, system model name, and the BIOS version.

Viewing System Information

To view the **System Setup** screen, perform the following steps:

1 Turn on, or restart your system.
2 Press F2 immediately after you see the following message:

```
F2 = System Setup
```

> (i) NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3 On the **System Setup Main Menu** screen, click **System BIOS**.
4 On the **System BIOS** screen, click **System Information**.

System Information details

The **System Information** screen details are explained as follows:

Option	Description
System Model Name	Specifies the system model name.
System BIOS Version	Specifies the BIOS version installed on the system.
System Management Engine Version	Specifies the current version of the Management Engine firmware.
System Service Tag	Specifies the system Service Tag.
System Manufacturer	Indicates the name of the Original Equipment Manufacturer (OEM).
System Manufacturer Contact Information	Indicates the contact information of the Original Equipment Manufacturer (OEM).
System CPLD Version	Specifies the current version of the system, complex programmable logic device (CPLD) firmware.

Option	Description
UEFI Compliance Version	Specifies the UEFI compliance level of the system firmware.

Memory Settings

You can use the **Memory Settings** screen to view all the memory settings and enable or disable specific memory functions, such as system memory testing and node interleaving.

Viewing Memory Settings

To view the **Memory Settings** screen, perform the following steps:

1   Turn on, or restart your system.
2   Press F2 immediately after you see the following message:

```
F2 = System Setup
```

> ⓘ **NOTE:** If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3   On the **System Setup Main Menu** screen, click **System BIOS**.
4   On the **System BIOS** screen, click **Memory Settings**.

Memory Settings details

The **Memory Settings** screen details are explained as follows:

Option	Description
System Memory Size	Specifies the memory size in the system.
System Memory Type	Specifies the type of memory installed in the system.
System Memory Speed	Specifies the system memory speed.
System Memory Voltage	Specifies the system memory voltage.
Video Memory	Specifies the amount of video memory.
System Memory Testing	Specifies whether the system memory tests are run during system boot. Options are **Enabled** and **Disabled**. This option is set to **Disabled** by default.
Memory Operating Mode	Specifies the memory operating mode. The options available are **Optimizer Mode**, **Single Rank Spare Mode**, **Multi Rank Spare Mode**, **Mirror Mode**, and **Dell Fault Resilient Mode**. This option is set to **Optimizer Mode** by default. ⓘ **NOTE:** The Memory Operating Mode option can have different default and available options based on the memory configuration of your system. ⓘ **NOTE:** The Fault Resilient Mode option establishes an area of memory that is fault resilient. This mode can be used by an operating system that supports the feature to load critical applications or enables the operating system kernel to maximize system availability.
Current State of Memory Operating Mode	Specifies the current state of the memory operating mode.

Option	Description
Node Interleaving	Specifies if Non-Uniform Memory Architecture (NUMA) is supported. If this field is set to **Enabled**, memory interleaving is supported if a symmetric memory configuration is installed. If the field is set to **Disabled**, the system supports NUMA (asymmetric) memory configurations. This option is set to **Disabled** by default.
Opportunistic Self-Refresh	Enables or disables opportunistic self-refresh feature. This option is set to **Disabled** by default.
Persistent Memory	This field controls Persistent Memory on the system.

Processor Settings

You can use the **Processor Settings** screen to view the processor settings, and perform specific functions such as enabling virtualization technology, hardware prefetcher, logical processor idling, and opportunistic self-refresh.

Viewing Processor Settings

To view the **Processor Settings** screen, perform the following steps:

1 Turn on, or restart your system.
2 Press F2 immediately after you see the following message:

```
F2 = System Setup
```

> ⓘ NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3 On the **System Setup Main Menu** screen, click **System BIOS**.
4 On the **System BIOS** screen, click **Processor Settings**.

Processor Settings details

The **Processor Settings** screen details are explained as follows:

Option	Description
Logical Processor	Enables or disables the logical processors and displays the number of logical processors. If this option is set to **Enabled**, the BIOS displays all the logical processors. If this option is set to **Disabled**, the BIOS displays only one logical processor per core. This option is set to **Enabled** by default.
CPU Interconnect Speed	Enables you to govern the frequency of the communication links among the CPUs in the system. ⓘ NOTE: The standard and basic bin processors support lower link frequencies. The options available are **Maximum data rate**, **10.4 GT/s**, and **9.6 GT/s**. This option is set to **Maximum data rate** by default. Maximum data rate indicates that the BIOS runs the communication links at the maximum frequency supported by the processors. You can also select specific frequencies that the processors support, which can vary. For best performance, you should select **Maximum data rate**. Any reduction in the communication link frequency affects the performance of non-local memory accesses and cache coherency traffic. In addition, it can slow access to non-local I/O devices from a particular CPU. However, if power saving considerations outweigh performance, you might want to reduce the frequency of the CPU communication links. If you do this, you should localize memory and I/O accesses to the nearest NUMA node to minimize the impact to system performance.

Option	Description
Virtualization Technology	Enables or disables the virtualization technology for the processor. This option is set to **Enabled** by default.
Adjacent Cache Line Prefetch	Optimizes the system for applications that need high utilization of sequential memory access. This option is set to **Enabled** by default. You can disable this option for applications that need high utilization of random memory access.
Hardware Prefetcher	Enables or disables the hardware prefetcher. This option is set to **Enabled** by default.
DCU Streamer Prefetcher	Enables or disables the Data Cache Unit (DCU) streamer prefetcher. This option is set to **Enabled** by default.
DCU IP Prefetcher	Enables or disables the Data Cache Unit (DCU) IP prefetcher. This option is set to **Enabled** by default.
Sub NUMA Cluster	Sub NUMA Clustering (SNC) is a feature for breaking up the LLC into disjoint clusters based on address range, with each cluster bound to a subset of the memory controllers in the system. It improves average latency to the LLC. Enables or disables the Sub NUMA Cluster. This option is set to **Disabled** by default.
UPI Prefetch	Enables you to get the memory read started early on DDR bus. The Ultra Path Interconnect (UPI) Rx path will spawn the speculative memory read to Integrated Memory Controller (iMC) directly. This option is set to **Enabled** by default.
Logical Processor Idling	Enables you to improve the energy efficiency of a system. It uses the operating system core parking algorithm and parks some of the logical processors in the system which in turn allows the corresponding processor cores to transition into a lower power idle state. This option can only be enabled if the operating system supports it. It is set to **Disabled** by default. ⓘ **NOTE: This feature is not supported if CPU Power Management is set to Maximum Performance.**
x2APIC Mode	Enables or disables the x2APIC mode. This option is set to **Disabled** by default.
Dell Controlled Turbo	Controls the turbo engagement. Enable this option only when **System Profile** is set to **Performance**. ⓘ **NOTE: Depending on the number of installed CPUs, there might be up to two processor listings.**
Number of Cores per Processor	Controls the number of enabled cores in the processor. Under certain circumstances, you may see limited performance improvements to Intel Turbo Boost Technology and benefits from potentially larger shared caches, when you reduce the number of enabled cores. Most computing environments tend to benefit more from larger number of processing cores, so you must carefully weigh the disabling of cores to gain nominal performance enhancements.
Process Core Speed	Displays the core speed of the processor(s).
Process Bus Speed	Displays the bus speed of the processor(s).
Processor n	The following settings are displayed for each processor installed in the system:

Option	Description
Family-Model-Stepping	Specifies the family, model, and stepping of the processor as defined by Intel.
Brand	Specifies the brand name.
Level 2 Cache	Specifies the total L2 cache.
Level 3 Cache	Specifies the total L3 cache.
Number of Cores	Specifies the number of cores per processor.

SATA Settings

You can use the **SATA Settings** screen to view the SATA settings of SATA devices and enable SATA and PCIe NVMe RAID mode on your system.

Viewing SATA Settings

To view the **SATA Settings** screen, perform the following steps:

1   Turn on, or restart your system.
2   Press F2 immediately after you see the following message:

```
F2 = System Setup
```

> ⓘ NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3   On the **System Setup Main Menu** screen, click **System BIOS**.
4   On the **System BIOS** screen, click **SATA Settings**.

SATA Settings details

The **SATA Settings** screen details are explained as follows:

Option	Description
Embedded SATA	Enables the embedded SATA option to be set to **Off** , **AHCI**, or **RAID** modes. This option is set to **AHCI Mode** by default.
Security Freeze Lock	Sends **Security Freeze Lock** command to the embedded SATA drives during POST. This option is set to **Enabled** by default.
Write Cache	Enables or disables the command for the embedded SATA drives during POST. This option is set to **Disabled** by default.
Port n	Sets the drive type of the selected device. For **AHCI Mode** or **RAID Mode**, BIOS support is always enabled.

Option	Description
Model	Specifies the drive model of the selected device. ⓘ NOTE: If no device is installed, it displays Unkown.
Drive Type	Specifies the type of drive attached to the SATA port. ⓘ NOTE: If no device is installed, it displays Unkown Device.
Capacity	Specifies the total capacity of the drive. This field is undefined for removable media devices such as optical drives. ⓘ NOTE: If no device is installed, it displays N/A.

NVMe Settings

The NVMe settings enable you to set the NVMe drives to either **RAID** mode or **Non-RAID** mode.

ⓘ NOTE: To configure these drives as RAID drives, click System BIOS Settings > SATA Settings > Embedded SATA Option and enable RAID mode. If not, you must set this field to Non-RAID mode.

Viewing NVMe Settings

To view the **NVMe Settings** screen, perform the following steps:

1   Turn on, or restart your system.
2   Press F2 immediately after you see the following message:

    ```
    F2 = System Setup
    ```

    ⓘ NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3   On the **System Setup Main Menu** screen, click **System BIOS**.
4   On the **System BIOS** screen, click **NVMe Settings**.

NVMe Settings details

The NVMe Settings screen details are explained as follows:

Option	Description
NVMe Mode	Enables you to set the NVMe mode. This option is set to **Non RAID** by default.

Boot Settings

You can use the **Boot Settings** screen to set the boot mode to either **BIOS** or **UEFI**. It also enables you to specify the boot order.

- **BIOS**: The **BIOS Boot Mode** is the legacy boot mode. It is maintained for backward compatibility.
- **UEFI**: The Unified Extensible Firmware Interface (UEFI) is a new interface between operating systems and platform firmware. The interface consists of data tables with platform related information, also boot and runtime service calls that are available to the operating system and its loader. The following benefits are available when the **Boot Mode** is set to **UEFI**:
  - Support for drive partitions larger than 2 TB.
  - Enhanced security (e.g., UEFI Secure Boot).
  - Faster boot time.

    ⓘ NOTE: You must use only the UEFI boot mode in order to boot from NVMe drives.

Viewing Boot Settings

To view the **Boot Settings** screen, perform the following steps:

1   Turn on, or restart your system.
2   Press F2 immediately after you see the following message:

    ```
    F2 = System Setup
    ```

    ⓘ NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3   On the **System Setup Main Menu** screen, click **System BIOS**.
4   On the **System BIOS** screen, click **Boot Settings**.

Boot Settings details

The **Boot Settings** screen details are explained as follows:

Option	Description
Boot Mode	Allows you to configure the Boot Sequence and Enable or Disable the individual boot options. The available options are **BIOS** and **UEFI**. The option is set to **UEFI** by default.
Boot Sequence Retry	Enables or disables the **Boot Sequence Retry** feature. If this option is set to **Enabled** and the system fails to boot, the system re-attempts the boot sequence after 30 seconds. This option is set to **Enabled** by default.
Hard-Disk Failover	Specifies the drive that is booted in the event of a drive failure. The devices are selected in the **Hard-Disk Drive Sequence** on the **Boot Option Setting** menu. When this option is set to **Disabled**, only the first drive in the list is attempted to boot. When this option is set to **Enabled**, all drives are attempted to boot in the order selected in the **Hard-Disk Drive Sequence**. This option is not enabled for **UEFI Boot Mode**. This option is set to **Disabled** by default.

UEFI Boot Settings

The **UEFI Boot Settings** enables you to specify the UEFI boot order.

Option	Description
UEFI Boot Sequence	Enables you to change the **PXE** boot device order.
Boot Options Enable/Disable	Enables you to enable or disable the **PXE** boot devices.

Network Settings

You can use the **Network Settings** screen to modify UEFI PXE, iSCSI, and HTTP boot settings. The network settings option is available only in the UEFI mode.

ⓘ NOTE: **The BIOS does not control network settings in the BIOS mode. For the BIOS boot mode, the optional Boot ROM of the network controllers handles the network settings.**

Viewing Network Settings

To view the **Network Settings** screen, perform the following steps:

1   Turn on, or restart your system.
2   Press F2 immediately after you see the following message:
```
F2 = System Setup
```

ⓘ NOTE: **If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.**

3   On the **System Setup Main Menu** screen, click **System BIOS**.
4   On the **System BIOS** screen, click **Network Settings**.

Network Settings screen details

The **Network Settings** screen details are explained as follows:

Option	Description
UEFI PXE Settings	Enables you to control the configuration of the UEFI PXE device.
PXE Device n (n = 1 to 4)	Enables or disables the device. When enabled, a UEFI PXE boot option is created for the device.
PXE Device n Settings(n = 1 to 4)	Enables you to control the configuration of the PXE device.

Option	Description
UEFI HTTP Settings	Enables or disables the device. When enabled, a UEFI HTTP boot option is created for the device.
HTTP Device n Settings (n = 1 to 4)	Enables you to control the configuration of the HTTP device.
UEFI iSCSI Settings	Enables you to control the configuration of the iSCSI device.

Table 4. UEFI iSCSI Settings screen details

Option	Description
iSCSI Initiator Name	Specifies the name of the iSCSI initiator in IQN format.
iSCSI Device1	Enables or disables the iSCSI device. When disabled, a UEFI boot option is created for the iSCSI device automatically. This is set to **Disabled** by default.
iSCSI Device1 Settings	Enables you to control the configuration of the iSCSI device.

Integrated Devices

You can use the **Integrated Devices** screen to view and configure the settings of all integrated devices including the video controller, integrated RAID controller, and the USB ports.

Viewing Integrated Devices

To view the **Integrated Devices** screen, perform the following steps:

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:
   ```
   F2 = System Setup
   ```

   ⓘ NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.
3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Integrated Devices**.

Integrated Devices details

The **Integrated Devices** screen details are explained as follows:

Option	Description
User Accessible USB Ports	Configures the user accessible USB ports. Selecting **Only Back Ports On** disables the front USB ports; selecting **All Ports Off** disables all front and back USB ports; selecting **All Ports Off (Dynamic)** disables all front and back USB ports during POST and front ports can be enabled or disabled dynamically by authorized user without resetting the system. The USB keyboard and mouse still function in certain USB ports during the boot process, depending on the selection. After the boot process is complete, the USB ports will be enabled or disabled as per the setting.
Internal USB Port	Enables or disables the internal USB port. This option is set to **On** by default.

Option	Description
iDRAC Direct USB Port	The iDRAC Direct USB port is managed by iDRAC exclusively with no host visibility. This option is set to **ON** or **OFF**. When set to **OFF**, iDRAC does not detect any USB devices installed in this managed port. This option is set to **On** by default.
Integrated Network Card 1	Enables or disables the integrated network card (NDC). When set to **Disabled**, the NDC is not available to the operating system (OS). This option is set to **Enabled** by default. ⓘ **NOTE: If set to Disabled (OS), the Integrated NICs might still be available for shared network access by iDRAC.**
I/OAT DMA Engine	Enables or disables the I/O Acceleration Technology (I/OAT) option. I/OAT is a set of DMA features designed to accelerate network traffic and lower CPU utilization. Enable only if the hardware and software support the feature.
Embedded Video Controller	Enables or disables the use of Embedded Video Controller as the primary display. When set to **Enabled**, the Embedded Video Controller will be the primary display even if add-in graphic cards are installed. When set to **Disabled**, an add-in graphics card will be used as the primary display. BIOS will output displays to both the primary add-in video and the embedded video during POST and pre-boot environment. The embedded video will then be disabled right before the operating system boots. This option is set to **Enabled** by default. ⓘ **NOTE: When there are multiple add-in graphic cards installed in the system, the first card discovered during PCI enumeration is selected as the primary video. You might have to re-arrange the cards in the slots in order to control which card is the primary video.**
Current State of Embedded Video Controller	Displays the current state of the embedded video controller. The **Current State of Embedded Video Controller** option is a read-only field. If the Embedded Video Controller is the only display capability in the system (that is, no add-in graphics card is installed), then the Embedded Video Controller is automatically used as the primary display even if the **Embedded Video Controller** setting is set to **Enabled**.
SR-IOV Global Enable	Enables or disables the BIOS configuration of Single Root I/O Virtualization (SR-IOV) devices. This option is set to **Disabled** by default.
OS Watchdog Timer	If your system stops responding, this watchdog timer aids in the recovery of your operating system. When this option is set to **Enabled**, the operating system initializes the timer. When this option is set to **Disabled** (the default), the timer does not have any effect on the system.
Memory Mapped I/O above 4 GB	Enables or disables the support for the PCIe devices that need large amounts of memory. Enable this option only for 64-bit operating systems. This option is set to **Enabled** by default.
Memory Mapped I/O Base	When set to **12 TB**, the system will map MMIO base to 12 TB. Enable this option for an OS that requires 44 bit PCIe addressing. Enable this option only for the 4 GPU DGMA issue. This option is set to **56 TB** by default. When set to **512 GB**, the system will map MMIO base to 512 GB.

Slot Disablement

The **Slot Disablement** screen details are explained as follows:

Slot Disablement	Enables or disables the available PCIe slots on your system. The slot disablement feature controls the configuration of the PCIe cards installed in the specified slot. Slots must be disabled only when the installed peripheral card prevents booting into the operating system or causes delays in system startup. If the slot is disabled, both the Option ROM and UEFI drivers are disabled. Only slots that are present on the system will be available for control.

Table 5. Slot Disablement

Slot 1	Enables or disables or only the boot driver is disabled for the PCIe slot 1. This option is set to **Enabled** by default.
Slot 2	Enables or disables or only the boot driver is disabled for the PCIe slot 2. This option is set to **Enabled** by default.
Slot 3	Enables or disables or only the boot driver is disabled for the PCIe slot 3. This option is set to **Enabled** by default.
Slot 4	Enables or disables or only the boot driver is disabled for the PCIe slot 4. This option is set to **Enabled** by default.

Slot 5	Enables or disables or only the boot driver is disabled for the PCIe slot 5. This option is set to **Enabled** by default.
Slot 6	Enables or disables or only the boot driver is disabled for the PCIe slot 6. This option is set to **Enabled** by default.

Slot Bifurcation

The **Slot Bifurcation** screen details are explained as follows:

Slot Bifurcation	Allows **Platform Default Bifurcation**, **Auto discovery of Bifurcation** and **Manual bifurcation Control**. The default is set to **Platform Default Bifurcation**. The slot bifurcation field is accessible when set to **Manual bifurcation Control** and is grayed out when set to **Platform Default Bifurcation** or **Auto discovery of Bifurcation**.

Table 6. Slot Bifurcation

Option	Description
Auto Discovery Bifurcation Settings	Platform Default Bifurcation, Auto Bifurcation, Manual bifurcation
Slot 1 Bifurcation	x4 Bifurcation or x8 Bifurcation
Slot 2 Bifurcation	x16 Bifurcation, or x8 Bifurcation, or x4 Bifurcation, or x4, x4, x8 Bifurcation, or x8, x4, x4 Bifurcation
Slot 3 Bifurcation	x16 Bifurcation, or x8 Bifurcation, or x4 Bifurcation, or x4, x4, x8 Bifurcation, or x8, x4, x4 Bifurcation
Slot 4 Bifurcation	x16 Bifurcation, or x8 Bifurcation, or x4 Bifurcation, or x4, x4, x8 Bifurcation, or x8, x4, x4 Bifurcation
Slot 5 Bifurcation	x4 Bifurcation or x8 Bifurcation
Slot 6 Bifurcation	x
	x16 Bifurcation, or x8 Bifurcation, or x4 Bifurcation, or x4, x4, x8 Bifurcation, or x8, x4, x4 Bifurcation

Serial Communication

You can use the **Serial Communication** screen to view the properties of the serial communication port.

Viewing Serial Communication

To view the **Serial Communication** screen, perform the following steps:

1   Turn on, or restart your system.
2   Press F2 immediately after you see the following message:

```
F2 = System Setup
```

> ⓘ **NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.**

3   On the **System Setup Main Menu** screen, click **System BIOS**.
4   On the **System BIOS** screen, click **Serial Communication**.

Serial Communication details

The **Serial Communication** screen details are explained as follows:

Option	Description
Serial Communication	Selects serial communication devices (Serial Device 1 and Serial Device 2) in BIOS. BIOS console redirection can also be enabled, and the port address can be specified. This option is set to **Auto** by default.
	Enables the **COM** port or **Console Redirection** options. This option is set to **Off** by default.
Serial Port Address	Enables you to set the port address for serial devices. This field sets the serial port address to either COM1 or COM2 (COM1=0x3F8, COM2=0x2F8). This option is set to **Serial Device 2=COM1** by default.
	> ⓘ **NOTE: You can use only Serial Device 2 for the Serial Over LAN (SOL) feature. To use console redirection by SOL, configure the same port address for console redirection and the serial device.**
External Serial Connector	Enables you to associate the External Serial Connector to **Serial Device 1**, **Serial Device 2**, or the **Remote Access Device** by using this option. This option is set to **Serial Device 1** by default.
	> ⓘ **NOTE: Only Serial Device 2 can be used for Serial Over LAN (SOL). To use console redirection by SOL, configure the same port address for console redirection and the serial device.**
	> ⓘ **NOTE: Every time the system boots, the BIOS syncs the serial MUX setting saved in iDRAC. The serial MUX setting can independently be changed in iDRAC. Loading the BIOS default settings from within the BIOS setup utility may not always revert this setting to the default setting of Serial Device 1.**
	Enables you to associate the External Serial Connector to Serial Device 1.
Failsafe Baud Rate	Specifies the failsafe baud rate for console redirection. The BIOS attempts to determine the baud rate automatically. This failsafe baud rate is used only if the attempt fails, and the value must not be changed. This option is set to **115200** by default.
Remote Terminal Type	Sets the remote console terminal type. This option is set to ANSI **VT100/VT220** by default.
Redirection After Boot	Enables or disables the BIOS console redirection when the operating system is loaded. This option is set to **Enabled** by default.

System Profile Settings

You can use the **System Profile Settings** screen to enable specific system performance settings such as power management.

Viewing System Profile Settings

To view the **System Profile Settings** screen, perform the following steps:

1   Turn on, or restart your system.
2   Press F2 immediately after you see the following message:

`F2 = System Setup`

> ⓘ **NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.**

3   On the **System Setup Main Menu** screen, click **System BIOS**.
4   On the **System BIOS** screen, click **System Profile Settings**.

System Profile Settings details

The **System Profile Settings** screen details are explained as follows:

Option	Description
System Profile	Sets the system profile. If you set the System Profile option to a mode other than **Custom**, the BIOS automatically sets the rest of the options. You can only change the rest of the options if the mode is set to **Custom**. This option is set to **Performance Per Watt Optimized (DAPC)** by default. DAPC is Dell Active Power Controller.Other options include **Performance Per Watt (OS)**, **Performance**, and **Workstation Performance**. ⓘ **NOTE: All the parameters on the system profile setting screen are available only when the System Profile option is set to Custom.**
CPU Power Management	Sets the CPU power management. This option is set to **System DBPM (DAPC)** by default. DBPM is Demand-Based Power Management.
Memory Frequency	Sets the speed of the system memory. You can select **Maximum Performance** or a specific speed. This option is set to **Maximum Performance** by default.
Turbo Boost	Enables or disables the processor to operate in the turbo boost mode. This option is set to **Enabled** by default.
C1E	Enables or disables the processor to switch to a minimum performance state when it is idle. This option is set to **Enabled** by default.
C States	Enables or disables the processor to operate in all available power states. This option is set to **Enabled** by default.
Write Data CRC	Enables or disables the Write Data CRC. This option is set to **Disabled** by default.
Memory Patrol Scrub	Sets the memory patrol scrub frequency. This option is set to **Standard** by default.
Memory Refresh Rate	Sets the memory refresh rate to either 1x or 2x. This option is set to **1x** by default.
Uncore Frequency	Enables you to select the **Processor Uncore Frequency** option. **Dynamic mode** enables the processor to optimize power resources across the cores and uncore during runtime. The optimization of the uncore frequency to either save power or optimize performance is influenced by the setting of the **Energy Efficiency Policy** option.
Energy Efficient Policy	Enables you to select the **Energy Efficient Policy** option.
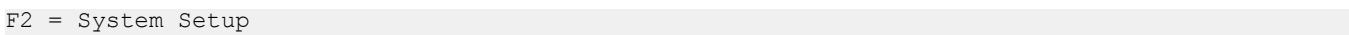
Option	Description
	The CPU uses the setting to manipulate the internal behavior of the processor and determines whether to target higher performance or better power savings. This option is set to **Balanced Performance** by default.
Number of Turbo Boost Enabled Cores for Processor 1	ⓘ **NOTE: If there are two processors installed in the system, you will see an entry for Number of Turbo Boost Enabled Cores for Processor 2.** Controls the number of turbo boost enabled cores for Processor 1. The maximum number of cores is enabled by default.
Monitor/Mwait	Enables the Monitor/Mwait instructions in the processor. This option is set to **Enabled** for all system profiles, except **Custom** by default. ⓘ **NOTE: This option can be disabled only if the C States option in the Custom mode is set to disabled.** ⓘ **NOTE: When C States is set to Enabled in the Custom mode, changing the Monitor/Mwait setting does not impact the system power or performance.**
CPU Interconnect Bus Link Power Management	Enables or disables the CPU Interconnect Bus Link Power Management. This option is set to **Enabled** by default.
PCI ASPM L1 Link Power Management	Enables or disables the PCI ASPM L1 Link Power Management. This option is set to **Enabled** by default.

System Security

You can use the **System Security** screen to perform specific functions such as setting the system password, setup password and disabling the power button.

Viewing System Security

To view the **System Security** screen, perform the following steps:

1 Turn on, or restart your system.
2 Press F2 immediately after you see the following message:

```
F2 = System Setup
```

ⓘ **NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.**

3 On the **System Setup Main Menu** screen, click **System BIOS**.
4 On the **System BIOS** screen, click **System Security**.

System Security Settings details

The **System Security Settings** screen details are explained as follows:

Option	Description
Intel(R) AES-NI	Improves the speed of applications by performing encryption and decryption by using the Advanced Encryption Standard Instruction Set (AES-NI). This option is set to **Enabled** by default.
System Password	Sets the system password. This option is set to **Enabled** by default and is read-only if the password jumper is not installed in the system.
Setup Password	Sets the setup password. This option is read-only if the password jumper is not installed in the system.
Password Status	Locks the system password. This option is set to **Unlocked** by default.

Option	Description
TPM Information	

ⓘ **NOTE: The TPM menu is available only when the TPM module is installed.**

Enables you to control the reporting mode of the TPM. The **TPM Security** option is set to **Off** by default. You can only modify the TPM Status, and TPM Activation, and the Intel TXT fields if the **TPM Status** field is set to either **On with Pre-boot Measurements** or **On without Pre-boot Measurements**.

When TPM 1.2 is installed, the **TPM Security** option is set to **Off**, **On with Pre-boot Measurements**, or **On without Pre-boot Measurements**.

Table 7. TPM 1.2 security information

TPM Information	Changes the operational state of the TPM. This option is set to **No Change** by default.
TPM Firmware	Indicates the firmware version of the TPM.
TPM Status	Specifies the TPM status.
TPM Command	Controls the Trusted Platform Module (TPM). When set to **None**, no command is sent to the TPM. When set to **Activate**, the TPM is enabled and activated. When set to **Deactivate**, the TPM is disabled and deactivated. When set to **Clear**, all the contents of the TPM are cleared. This option is set to **None** by default.

When TPM 2.0 is installed, the **TPM Security** option is set to **On** or **Off**. This option is set to **Off** by default.

Table 8. TPM 2.0 security information

TPM Information	Changes the operational state of the TPM. This option is set to **No Change** by default.
TPM Firmware	Indicates the firmware version of the TPM.
TPM Hierarcy	Enable, disable, or clear the storage and endorsement hierarchies. When set to **Enabled**, the storage and endorsement hierarchies can be used.
	When set to **Disabled**, the storage and endorsement hierarchies cannot be used.
	When set to **Clear**, the storage and endorsement hierarchies are cleared of any values, and then reset to **Enabled**.

Option	Description
Intel(R) TXT	Enables or disables the Intel Trusted Execution Technology (TXT) option. To enable the **Intel TXT** option, virtualization technology and TPM Security must be enabled with Pre-boot measurements. This option is set to **Off** by default.
	When TPM 2.0 is installed, **TPM 2 Algorithm** option is available. It enables you to select a hash algorithm from those supported by the TPM (SHA1, SHA256). **TPM 2 Algorithm** option must be set to **SHA256**, to enable TXT.
Power Button	Enables or disables the power button on the front of the system. This option is set to **Enabled** by default.
AC Power Recovery	Sets how the system behaves after AC power is restored to the system. This option is set to **Last** by default.
AC Power Recovery Delay	Sets the time delay for the system to power up after AC power is restored to the system. This option is set to **Immediate** by default.

Option	Description
User Defined Delay (60 s to 240 s)	Sets the **User Defined Delay** option when the **User Defined** option for **AC Power Recovery Delay** is selected.
UEFI Variable Access	Provides varying degrees of securing UEFI variables. When set to **Standard** (the default), UEFI variables are accessible in the operating system per the UEFI specification. When set to **Controlled**, selected UEFI variables are protected in the environment and new UEFI boot entries are forced to be at the end of the current boot order.
In-Band Manageability Interface	When set to **Disabled**, this setting will hide the Management Engine's (ME), HECI devices, and the system's IPMI devices from the operating system. This prevents the operating system from changing the ME power capping settings, and blocks access to all in-band management tools. All management should be managed through out-of-band. This option is set to **Enabled** by default. ⓘ **NOTE:** BIOS update requires HECI devices to be operational and DUP updates require IPMI interface to be operational. This setting needs to be set to Enabled to avoid updating errors.
Secure Boot	Enables Secure Boot, where the BIOS authenticates each pre-boot image by using the certificates in the Secure Boot Policy. Secure Boot is set to **Disabled** by default.
Secure Boot Policy	When Secure Boot policy is set to **Standard**, the BIOS uses the system manufacturer's key and certificates to authenticate pre-boot images. When Secure Boot policy is set to **Custom**, the BIOS uses the user-defined key and certificates. Secure Boot policy is set to **Standard** by default.
Secure Boot Mode	Configures how the BIOS uses the Secure Boot Policy Objects (PK, KEK, db, dbx). If the current mode is set to **Deployed Mode**, the available options are **User Mode** and **Deployed Mode**. If the current mode is set to **User Mode**, the available options are **User Mode**, **Audit Mode**, and **Deployed Mode**.

Options	Description
User Mode	In **User Mode**, PK must be installed, and BIOS performs signature verification on programmatic attempts to update policy objects. The BIOS allows unauthenticated programmatic transitions between modes.
Deployed Mode	**Deployed Mode** is the most secure mode. In **Deployed Mode**, PK must be installed and the BIOS performs signature verification on programmatic attempts to update policy objects. **Deployed Mode** restricts the programmatic mode transitions.

Secure Boot Policy Summary

The **Secure Boot Policy Summary** screen details are explained as follows:

Secure Boot Policy Summary	Specifies the list of certificates and hashes that secure boot uses to authenticate images.

Secure Boot Custom Policy Settings

The **Secure Boot Custom Policy Settings** screen details are explained as follows:

Secure Boot Custom Policy Settings	Configures the Secure Boot Custom Policy. To enable this option, set the Secure Boot Policy to **Custom** option.

Redundant OS Control

You can use the **Redundant OS Control** screen to set the redundant OS info for redundant OS control. It enables you to set up a physical recovery disk on your system.

Viewing Redundant OS Control

To view the **Redundant OS Control** screen, perform the following steps:

1   Turn on, or restart your system.
2   Press F2 immediately after you see the following message:
```
F2 = System Setup
```

> ⓘ **NOTE:** If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3   On the **System Setup Main Menu** screen, click **System BIOS**.
4   On the **System BIOS** screen, click **Redundant OS Control**.

Redundant OS Control screen details

The **Redundant OS Control** screen details are explained as follows:

Option	Description
Redundant OS Location	Enables you to select a backup disk from the following devices: · **None** · **Internal SD card** · **SATA Ports in AHCI mode** · **BOSS PCIe cards (Internal M.2 Drives)** · **Internal USB** ⓘ **NOTE:** RAID configurations and NVMe cards not are included as BIOS does not have the ability to distinguish between individual drives in those configurations.
Redundant OS State	ⓘ **NOTE:** This option is disabled if Redundant OS Location is set to None. When set to **Visible**, the backup disk is visible to the boot list and OS. When set to **Hidden**, the backup disk is disabled and is not visible to the boot list and OS. This option is set to **Visible** by default. ⓘ **NOTE:** BIOS will disable the device in hardware, so it cannot be accessed by the OS.
Redundant OS Boot	ⓘ **NOTE:** This option is disabled if Redundant OS Location is set to None or if Redundant OS State is set to Hidden. When set to **Enabled**, BIOS boots to the device specified in **Redundant OS Location**. When set to **Disabled**, BIOS preserves the current boot list settings. This option is set to **Enabled** by default.

Miscellaneous Settings

You can use the **Miscellaneous Settings** screen to perform specific functions such as updating the asset tag and changing the system date and time.

Viewing Miscellaneous Settings

To view the **Miscellaneous Settings** screen, perform the following steps:

1   Turn on, or restart your system.
2   Press F2 immediately after you see the following message:

    `F2 = System Setup`

> ⓘ **NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.**

3   On the **System Setup Main Menu** screen, click **System BIOS**.
4   On the **System BIOS** screen, click **Miscellaneous Settings**.

Miscellaneous Settings details

The **Miscellaneous Settings** screen details are explained as follows:

Option	Description
System Time	Enables you to set the time on the system.
System Date	Enables you to set the date on the system.
Asset Tag	Specifies the asset tag and enables you to modify it for security and tracking purposes.
Keyboard NumLock	Enables you to set whether the system boots with the NumLock enabled or disabled. This option is set to **On** by default. ⓘ **NOTE: This option does not apply to 84-key keyboards.**
F1/F2 Prompt on Error	Enables or disables the F1/F2 prompt on error. This option is set to **Enabled** by default. The F1/F2 prompt also includes keyboard errors.
Load Legacy Video Option ROM	Enables you to determine whether the system BIOS loads the legacy video (INT 10H) option ROM from the video controller. Selecting **Enabled** in the operating system does not support UEFI video output standards. This field is available only for UEFI boot mode. You cannot set the option to **Enabled** if **UEFI Secure Boot** mode is enabled. This option is set to **Disabled** by default.
Dell Wyse P25/P45 BIOS Access	Enables or disables the Dell Wyse P25/P45 BIOS Access. This option is set to **Enabled** by default.
Power Cycle Request	Enables or disables the Power Cycle Request. This option is set to **None** by default.

iDRAC Settings utility

The iDRAC settings utility is an interface to set up and configure the iDRAC parameters by using UEFI. You can enable or disable various iDRAC parameters by using the iDRAC settings utility.

> ⓘ **NOTE: Accessing some of the features on the iDRAC settings utility needs the iDRAC Enterprise License upgrade.**

For more information about using iDRAC, see *Dell Integrated Dell Remote Access Controller User's Guide* at **Dell.com/idracmanuals**.

Device Settings

Device Settings enables you to configure device parameters.

Dell Lifecycle Controller

Dell Lifecycle Controller (LC) provides advanced embedded systems management capabilities including system deployment, configuration, update, maintenance, and diagnosis. LC is delivered as part of the iDRAC out-of-band solution and Dell system embedded Unified Extensible Firmware Interface (UEFI) applications.

Embedded System Management

The Dell Lifecycle Controller provides advanced embedded system management throughout the system's lifecycle. The Dell Lifecycle Controller can be started during the boot sequence and can function independently of the operating system.

(i) | **NOTE: Certain platform configurations may not support the full set of features provided by the Dell Lifecycle Controller.**

For more information about setting up the Dell Lifecycle Controller, configuring hardware and firmware, and deploying the operating system, see the Dell Lifecycle Controller documentation at **Dell.com/idracmanuals**.

Boot Manager

The **Boot Manager** screen enables you to select boot options and diagnostic utilities.

Viewing Boot Manager

About this task

To enter Boot Manager:

Steps

1   Turn on, or restart your system.

Enter the result of your step here (optional).

2   Press F11 when you see the following message:

```
F11 = Boot Manager
```

If your operating system begins to load before you press F11, allow the system to complete the booting, and then restart your system and try again.

Boot Manager main menu

Menu item	Description
Continue Normal Boot	The system attempts to boot to devices starting with the first item in the boot order. If the boot attempt fails, the system continues with the next item in the boot order until the boot is successful or no more boot options are found.
One-shot UEFI Boot menu	Enables you to access the UEFI Boot menu and select an one-shot boot option to boot from.

Menu item	Description
Launch System Setup	Enables you to access System Setup.
Launch Lifecycle Controller	Exits the Boot Manager and invokes the Dell Lifecycle Controller program.
System Utilities	Enables you to launch System Utilities menu such as System Diagnostics and UEFI shell.

One-shot UEFI Boot menu

One-shot UEFI Boot menu enables you to access the UEFI Boot menu and select an one-shot boot option to boot from.

System Utilities

System Utilities contains the following utilities that can be launched:

- Launch Diagnostics
- BIOS Update File Explorer
- Reboot System

PXE boot

You can use the Preboot Execution Environment (PXE) option to boot and configure the networked systems, remotely.

To access the **PXE boot** option, boot the system and then press F12 during POST instead of using standard Boot Sequence from BIOS Setup. It does not pull any menu or allows managing of network devices.

5

Installing and removing system components

Safety instructions

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

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

⚠ **CAUTION: 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 bays in the system and system fans must be always populated with a component or a blank.**

Before working inside your system

Prerequisite

Follow the safety guidelines listed in Safety instructions.

Steps

1 Turn off the system, including 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* at Dell.com/poweredgemanuals.

4 Remove the system cover.

After working inside your system

Prerequisite

Follow the safety guidelines listed in Safety instructions.

Steps

1 Install the system cover.

2 If applicable, install the system into the rack.

   For more information, see the *Rail Installation Guide* at Dell.com/poweredgemanuals.

3 Reconnect the peripherals and connect the system to the electrical outlet.

4 Turn on the attached peripherals and then turn on the system.

Recommended tools

You need the following tools to perform the removal and installation procedures:

- Key to the bezel lock

  The key is required only if your system includes a bezel.
- Phillips #1 screwdriver
- Phillips #2 screwdriver
- Torx #T30 screwdriver
- 1/4 inch flat head screwdriver
- Wrist grounding strap

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

  ⓘ **NOTE: Use alpha wire part number 3080 or equivalent (65/30 stranding).**

Optional front bezel

A lock on the bezel is used to protect unauthorized access to the drives. The system status can be viewed on the bezel with the LCD panel. For more information, see the LCD panel section.

Removing front bezel

Prerequisite

1   Follow the safety guidelines listed in Safety instructions.

Steps

1   Unlock the bezel by using the bezel key.

2   Press the release button, and pull the left end of the bezel.

3   Unhook the right end, and remove the bezel.

Figure 11. Removing optional front bezel

Next step

1   Replace the bezel.

Installing the front bezel

Prerequisites

1   Follow the safety guidelines listed in Safety instructions.
2   Locate and remove the bezel key.

> ⓘ | **NOTE: The bezel key is part of the LCD bezel package.**

Steps

1   Align and insert the right end of the bezel onto the system.
2   Press the release button and fit the left end of the bezel onto the system.
3   Lock the bezel by using the key.

Figure 12. Installing the optional front bezel

System cover

System cover provides security for the entire system and also helps in maintaining proper air flow inside the system.

Removing the system cover

Prerequisites

1 Follow the safety guidelines listed in Safety instructions.
2 Turn off the system, including all attached peripherals.
3 Disconnect the system from the electrical outlet and disconnect the peripherals.
4 If applicable, remove the system from the rack.

   ⓘ NOTE: **For more information, see the** *Rail Installation Guide* **at Dell.com/poweredgemanuals.**

Steps

1 Use a 1/4 inch flat head or a Phillips #2 screwdriver to turn the latch release lock counterclockwise to the unlock position.
2 Open the latch till the system cover slides back.
3 Lift the cover away from the system.

Figure 13. Removing the system cover

Next step

1 Replace the system cover.

Installing system cover

Prerequisites

1 Follow the safety guidelines listed in Safety instructions.

2 Turn off the system, including all attached peripherals.

3 Disconnect the system from the electrical outlet, and disconnect the peripherals.

4 If applicable, remove the system from the rack.

> ⓘ **NOTE: For more information, see the** *Rail Installation Guide* **at Dell.com/poweredgemanuals.**

5 Ensure that all internal cables are routed correctly and connected, 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 latch.

3 Using a 1/4 inch flat head or Phillips #2 screwdriver, rotate the latch release lock clockwise to the lock position.

Figure 14. Installing system cover

Next step

1   Follow the procedure listed in After working inside your system.

Air shroud

The air shroud directs the airflow across the entire system and maintain uniform airflow in the system. Air shroud prevents the system from overheating and is used to maintain uniform airflow inside the system. The system supports two types of air shrouds:

- Non-GPU air shroud
- GPU air shroud

Removing the non-GPU 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 Safety instructions.
2   Follow the procedure listed in Before working inside your system.
3   If installed, remove the NVDIMM battery.

Step

Hold the air shroud and lift it away from the system.
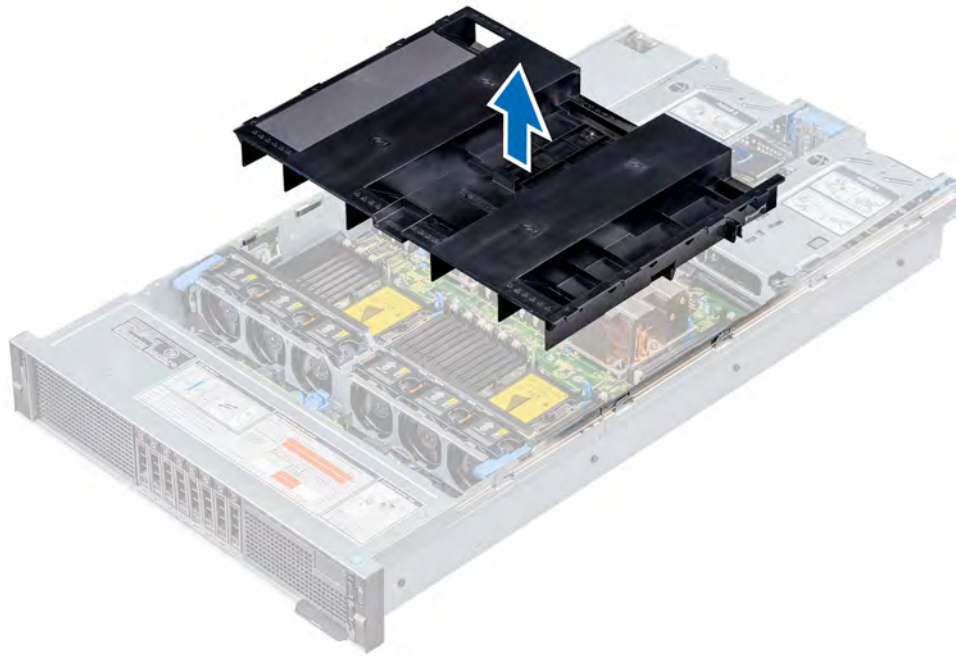
Figure 15. Removing the non-GPU air shroud

Next step

1   Replace the non-GPU air shroud.

Installing the non-GPU air shroud

Prerequisites

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

Steps

1   Align the tabs on the air shroud with the slots on the system.
2   Lower the air shroud into the system until it is firmly seated.
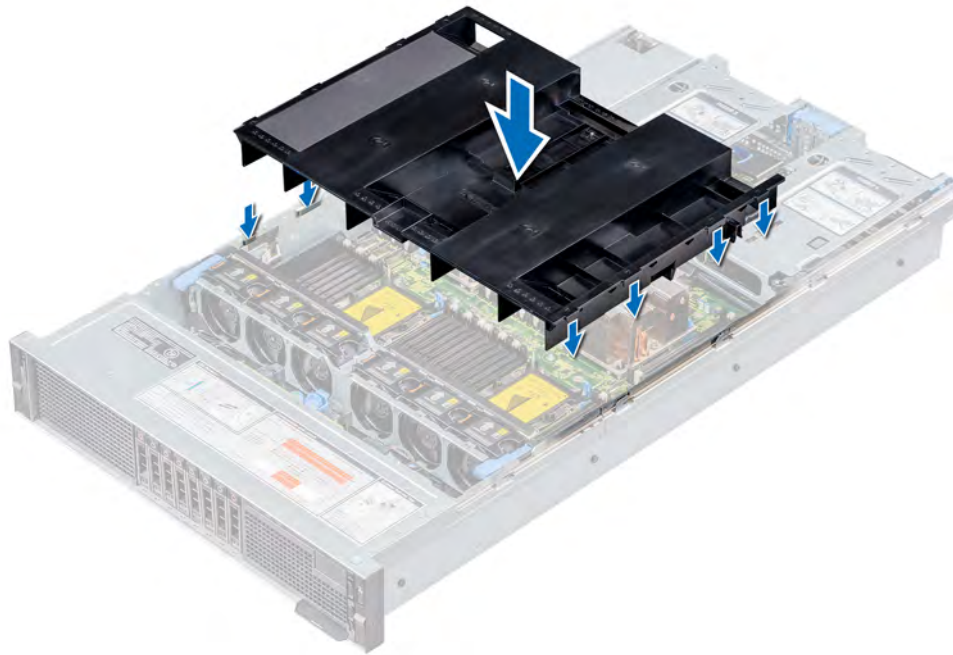
Figure 16. Installing the non-GPU air shroud

Next steps

1 If applicable, install the NVDIMM battery.
2 Follow the procedure listed in After working inside your system.

Removing the GPU 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 Safety instructions.
2 Follow the procedure listed in Before working inside your system.

Steps

1 Holding the air shroud cover at the blue touch point, lift the cover at an angle to disengage it from the air shroud, and then lift it away from the system.
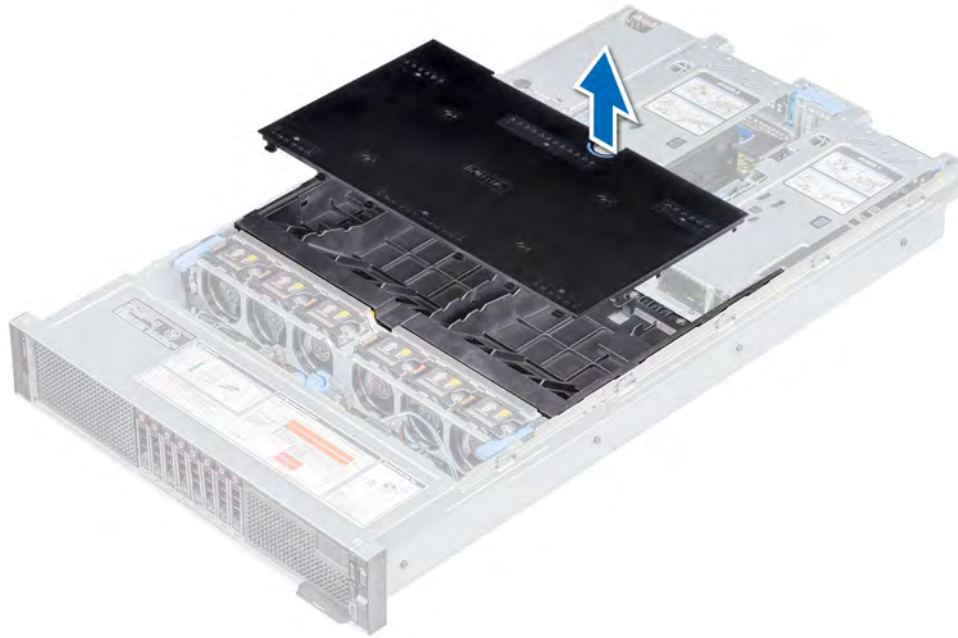
Figure 17. Removing the GPU air shroud cover

2   If installed, remove the NVDIMM-N battery.
3   Remove the expansion card riser 1 and 2.
4   Hold the air shroud and lift it away from the system.
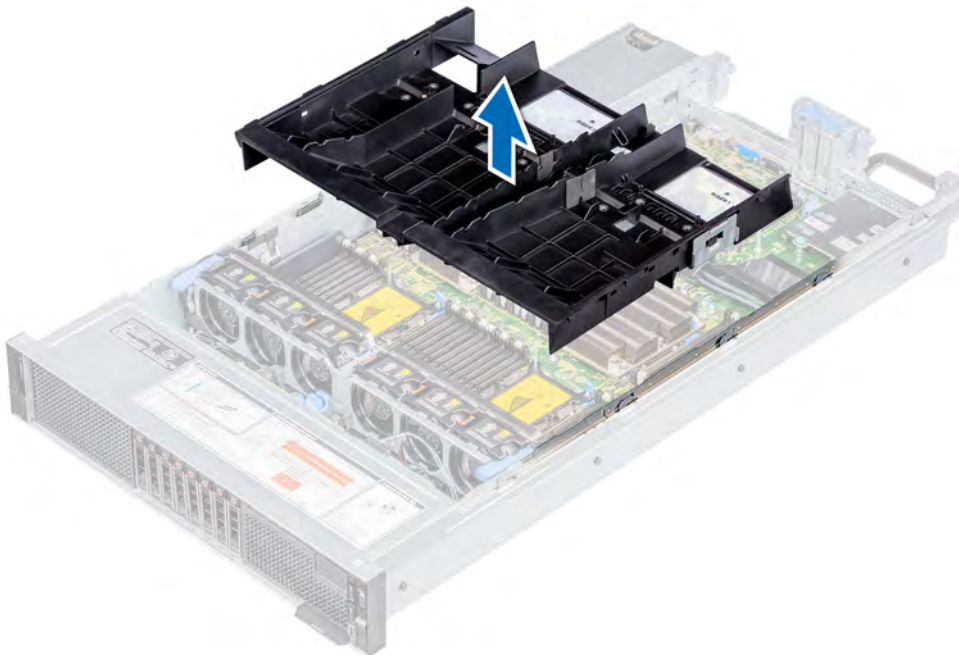
Figure 18. Removing the GPU air shroud

Next step

1   Replace the air shroud.

Installing the GPU air shroud

Prerequisites

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

Steps

1 Align the tabs on the air shroud with the slots on the system.
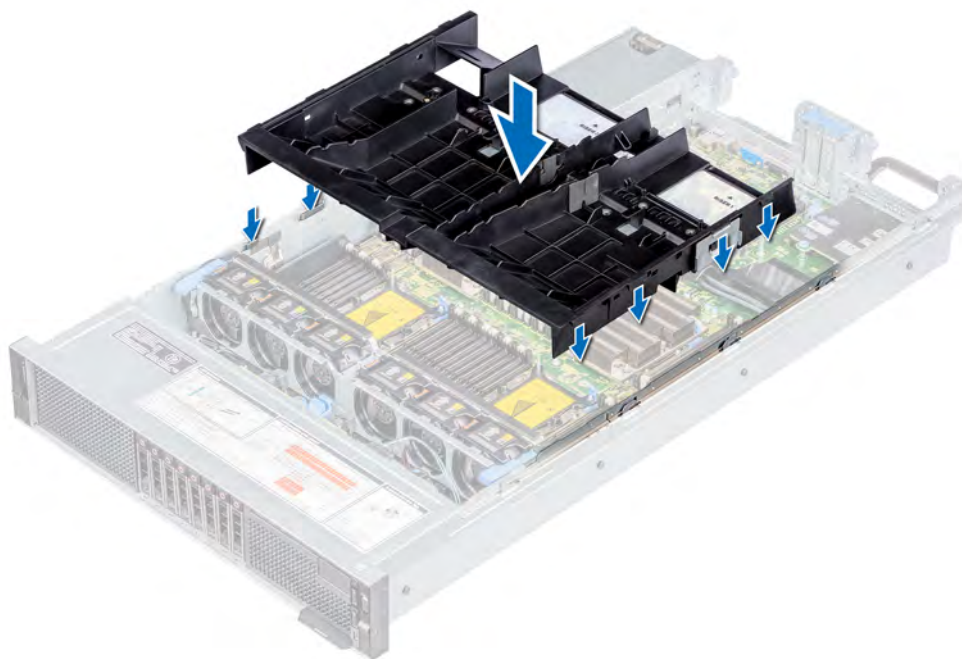
Figure 19. Installing the GPU air shroud

2 Lower the air shroud into the system until it is firmly seated.
3 Install the expansion card riser 1 and 2.
4 If applicable, install the NVDIMM-N battery.
5 Holding the blue touch point on the air shroud cover, incline the cover at an angle, and then push it down until it is firmly seated.

Figure 20. Installing the GPU air shroud cover

Next step

1   Follow the procedure listed in After working inside your system.

Cooling fan assembly

The cooling fan assembly ensures that the key components of the server such as the processors, drives, and memory get adequate air circulation to keep them cool. A failure in the server's cooling system can result in the server overheating and may lead to damage.

Removing the cooling fan assembly

Prerequisites

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

Steps
1   Lift the release levers to unlock the cooling fan assembly.
2   Holding the release levers, lift the cooling fan assembly out of the system.

Figure 21. Removing the cooling fan assembly

Next step

1   Replace the cooling fan assembly.

Installing the cooling fan assembly

Prerequisites

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

Steps

1   Align the guide slots on the cooling fan assembly with the standoffs on the system.
2   Lower the cooling fan assembly into the system until the cooling fan connectors engage with the connectors on the system board.
3   Press the release levers to lock the cooling fan assembly in place.

Figure 22. Installing the cooling fan assembly

Next step

1   Follow the procedure listed in After working inside your system.

Cooling fans

The cooling fans are integrated into the system to dissipate the heat generated by the functioning of the system. These fans provide cooling for the processors, expansion cards, and memory modules.

ⓘ **NOTE:** Each fan is listed in the systems management software, referenced by the respective fan number. If there is a problem with a particular fan, you can easily identify and replace the proper fan by noting the fan numbers on the cooling fan assembly.

Removing a cooling fan

Prerequisites

⚠ **WARNING: Opening or removing the system cover when the system is on may expose you to a risk of electric shock. Exercise utmost care while removing or installing cooling fans.**

⚠ **CAUTION: The cooling fans are hot swappable. To maintain proper cooling while the system is on, replace only one fan at a time.**

1   Follow the safety guidelines listed in Safety instructions.
2   Follow the procedure listed in Before working inside your system.
3   Remove the non-GPU air shroud or GPU air shroud.

Step

Press the release tab and lift the cooling fan out of the cooling fan assembly.

Figure 23. Removing cooling fan

Next step

1   Replace the cooling fan.

Installing a cooling fan

Prerequisites

⚠ **WARNING: Opening or removing the system cover when the system is on may expose you to a risk of electric shock. Exercise utmost care while removing or installing cooling fans.**

⚠ **CAUTION: The cooling fans are hot swappable. To maintain proper cooling while the system is on, replace only one fan at a time.**

1   Follow the safety guidelines listed in Safety instructions.
2   Follow the procedure listed in Before working inside your system.
3   Remove the non-GPU air shroud or GPU air shroud.

Steps

1   Holding the touch points on the cooling fan, align the connector on the cooling fan with the connector on the system board.
2   Slide the cooling fan into the cooling fan assembly until the release tab locks into place.

Figure 24. Installing cooling fan

Next steps

1 Install the non-GPU air shroud or GPU air shroud.
2 Follow the procedure listed in After working inside your system.

NVDIMM-N battery
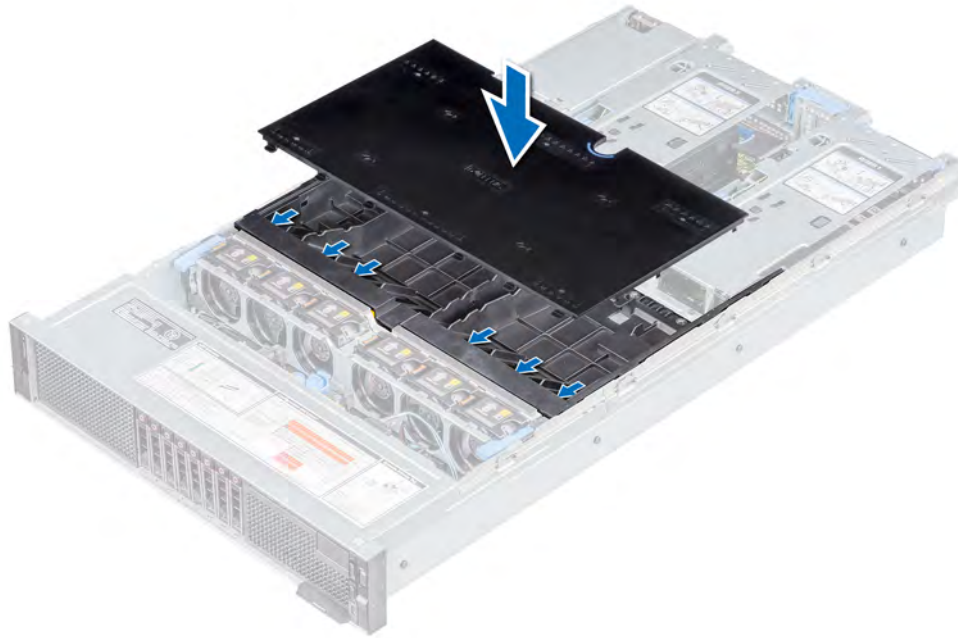
The NVDIMM-N battery is installed on the air shroud.

Removing the NVDIMM-N battery

Prerequisites

1 Follow the safety guidelines listed in Safety instructions.
2 Follow the procedure listed in Before working inside your system.
3 For GPU air shroud, remove the GPU air shroud cover.

⚠ **CAUTION: NVDIMM-N battery is not hot swappable. To prevent data loss and potential damage to your system, ensure that your system, LEDs on system, LEDs on NVDIMM-N and LEDs on NVDIMM-N battery are turned off, by disconnecting the cables, before removing the NVDIMM-N battery.**

ⓘ **NOTE: To avoid damage to the battery connector, hold the connector while installing or removing a battery.**

Steps

1 Disconnect the cables from the NVDIMM-N battery.
2 Using Phillips #2 screwdriver, loosen the screw securing the NVDIMM-N battery to the air shroud.
3 Holding the blue touch point, lift the NVDIMM-N battery at an angle to disengage it from the slot on the air shroud.

4   Lift the NVDIMM-N battery away from the system.
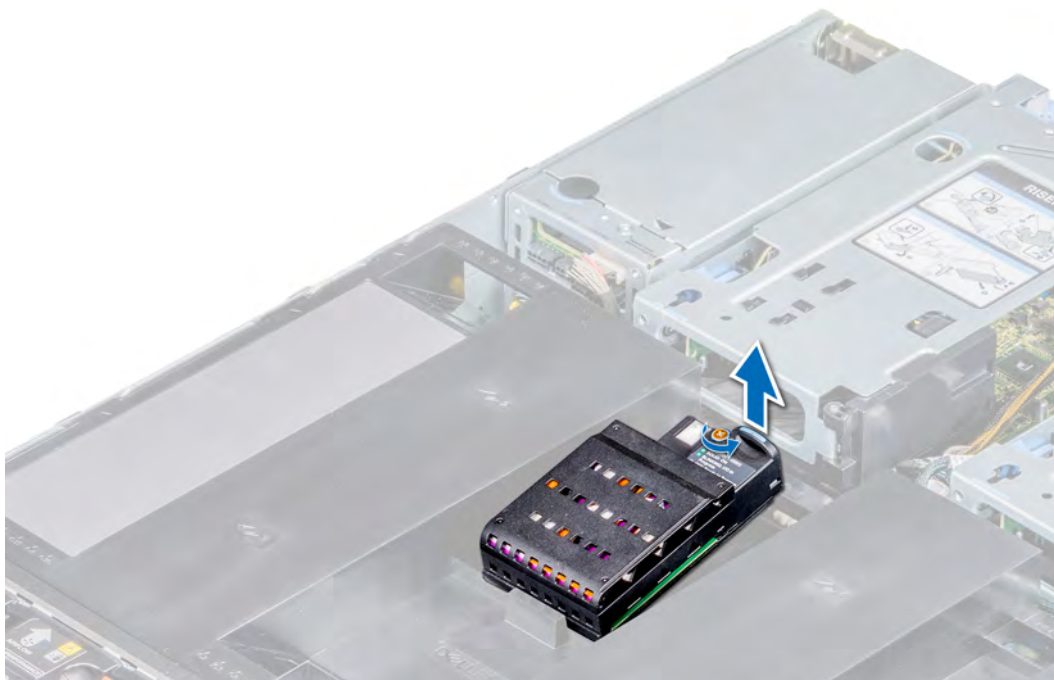
Figure 25. Removing the NVDIMM-N battery from the non-GPU air shroud
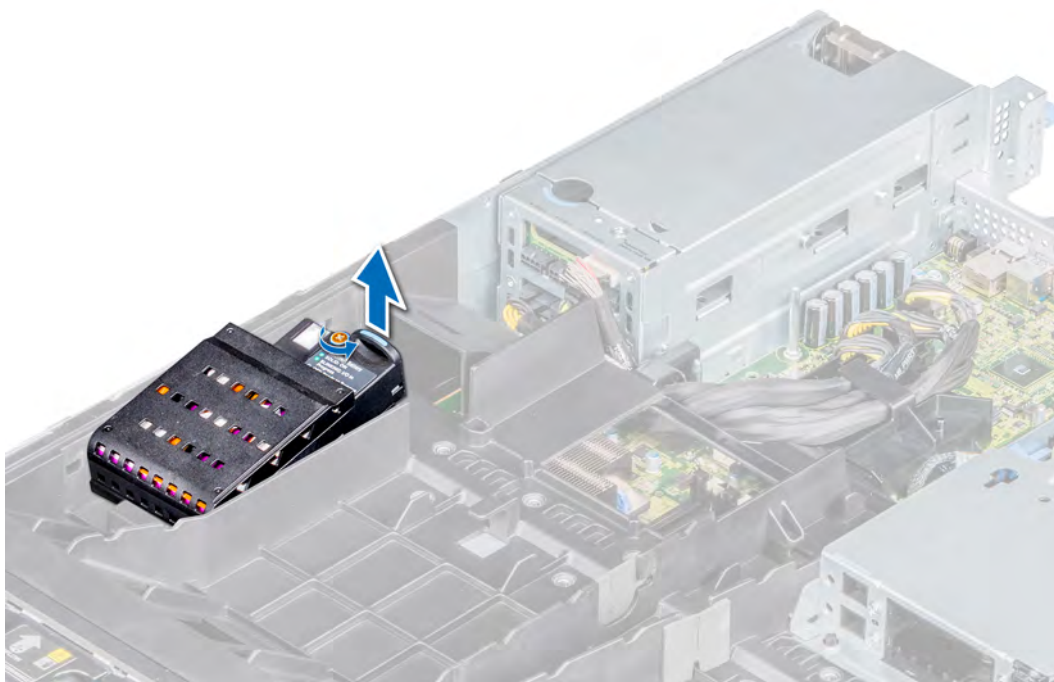
Figure 26. Removing the NVDIMM-N battery from the GPU air shroud

Next step

1   Replace the NVDIMM-N battery.

Installing NVDIMM-N battery

Prerequisites

1   Follow the safety guidelines listed in Safety instructions.
2   Follow the procedure listed in Before working inside your system
3   For GPU air shroud, remove the GPU air shroud cover.

⚠ **CAUTION: NVDIMM-N battery is not hot swappable. To prevent data loss and potential damage to your system, ensure that your system, LEDs on system, LEDs on NVDIMM-N and LEDs on NVDIMM-N battery are turned off, by disconnecting the cables, before installing the NVDIMM-N battery.**

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

Steps

1   Incline the NVDIMM-N battery at an angle, and place the battery on the slot on the air shroud.
2   Using a Phillips #2 screwdriver, replace the screw to secure the NVDIMM-N battery to the air shroud.
3   Connect the cables to the NVDIMM-N battery.
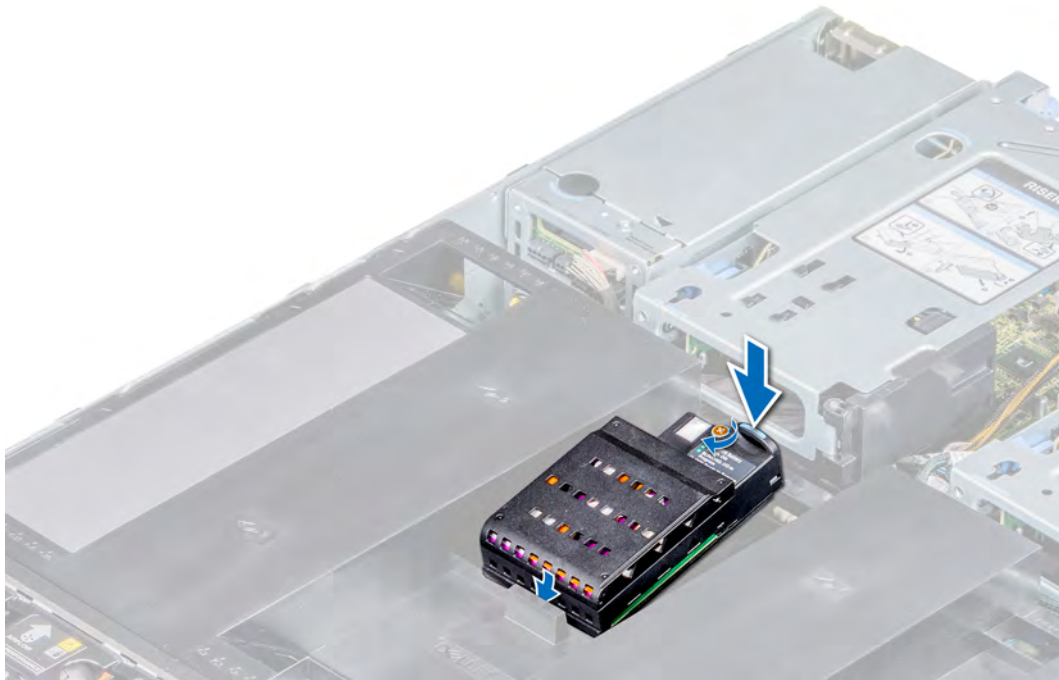
Figure 27. Installing NVDIMM-N battery into non-GPU air shroud
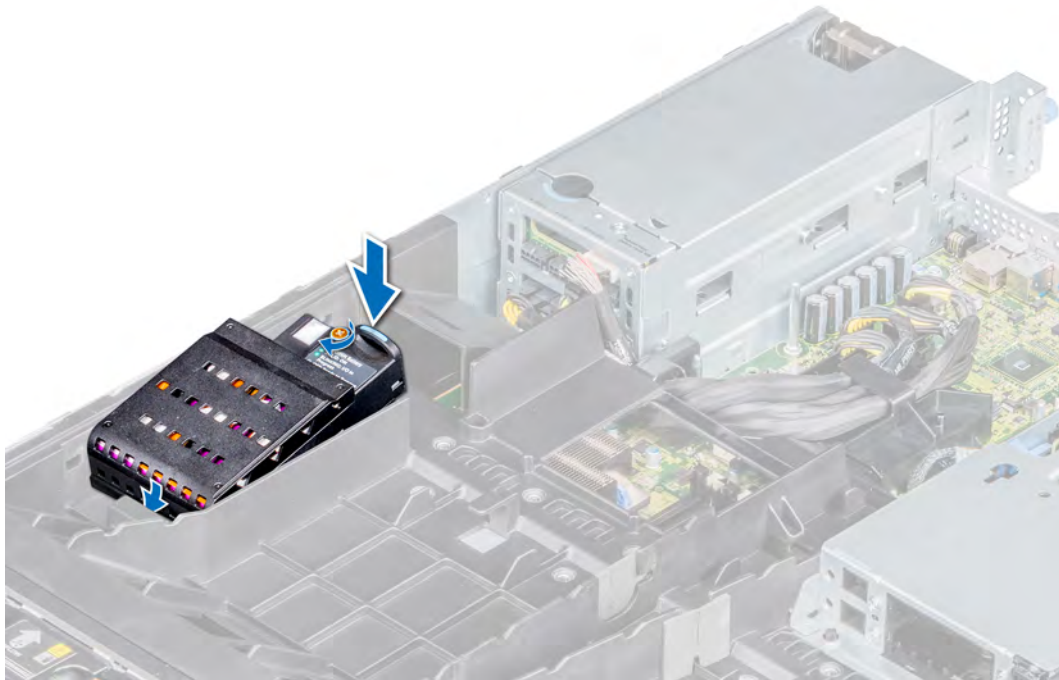
Figure 28. Installing NVDIMM-N battery into GPU air shroud

Next steps

1   For GPU air shroud, install the GPU air shroud cover.
2   Follow the procedure listed in After working inside your system.

Drives

Drives are supplied in hot swappable drive carriers that fit in the drive slots.

⚠ **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.**

⚠ **CAUTION: Do not turn off or restart your system while a drive is being formatted. Doing so can cause a drive failure.**

When you format a drive, allow enough time for the formatting to complete. Be aware that high-capacity drives can take a long time to format.

Removing a drive blank

Prerequisites

1   Follow the safety guidelines listed in Safety instructions.
2   Follow the procedure listed in Before working inside your system.
3   If installed, remove the front bezel.

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

⚠ **CAUTION: Mixing drive blanks from previous generations of PowerEdge servers is not supported.**

Step

Press the release button, and slide the drive blank out of the drive slot.

Figure 29. Removing a drive blank

Next step

1   Install a drive or drive blank.

Installing a drive blank

Prerequisites

1   Follow the safety guidelines listed in Safety instructions.
2   Follow the procedure listed in Before working inside your system.
3   If installed, remove the front bezel.

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

⚠ | **CAUTION: Mixing drive blanks from previous generations of PowerEdge servers is not supported.**

Step

Slide the drive blank into the drive slot until the release button clicks into place.

Figure 30. Installing a drive blank

Next steps

1   Install the front bezel, if applicable.
2   Follow the procedure listed in After working inside your system.

Removing a drive carrier

Prerequisites

1 Follow the safety guidelines listed in Safety instructions.
2 Follow the procedure listed in Before working inside your system.
3 If installed, remove the front bezel.
4 Using the management software, prepare the drive for removal.

If the drive is online, the green activity or fault indicator flashes while the drive is turning off. When the drive indicators are off, the drive is ready for removal. For more information, see the storage controller documentation.

△ **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: Mixing drive carriers from previous generations of PowerEdge servers is not supported.**

△ **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 handle, slide the drive carrier out of the drive slot.

ⓘ **NOTE: If you are not replacing the drive immediately, install a drive blank in the empty drive slot to maintain proper system cooling.**

Figure 31. Removing a drive carrier

Next step

1 Install a drive carrier or drive blank.

Installing a drive carrier

Prerequisites

⚠ | **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: 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.**

1 Follow the safety guidelines listed in Safety instructions.
2 Follow the procedure listed in Before working inside your system.
3 If installed, remove the front bezel.
4 If installed, remove the drive blank.

Steps

1 Press the release button on the front of the drive carrier to open the release handle.
2 Insert the drive carrier into the drive slot and push the drive until it connects with the backplane.
3 Close the drive carrier release handle to lock the drive in place.

Figure 32. Installing a drive carrier

Next steps

1 If applicable, install the front bezel.
2 Follow the procedure listed in After working inside your system.

Removing the drive from the drive carrier

Prerequisites

1   Follow the safety guidelines listed in Safety instructions.

   ⚠ **CAUTION: Mixing drive carriers from previous generations of PowerEdge servers is not supported.**

2   Follow the procedure listed in Before working inside your system.

3   If installed, remove the front bezel.

4   Remove the drive carrier.

Steps

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

2   Lift the drive out of the drive carrier.

Figure 33. Removing the drive from the drive carrier

Next step

1   Install the drive into the drive carrier.

Installing a drive into the drive carrier

Prerequisites

1   Follow the safety guidelines listed in Safety instructions.

2   Follow the procedure listed in Before working inside your system.

3   If installed, remove the front bezel.

4   Remove the drive carrier.

⚠ **CAUTION: Mixing drive carriers from other generations of PowerEdge servers is not supported.**

Steps

1 Insert the drive into the drive carrier with the connector end of the drive towards the back of the carrier.

2 Align the screw holes on the drive with the screws holes on the drive carrier.

   When aligned correctly, the back of the drive is flush with the back of the drive carrier.

3 Using a Phillips #1 screwdriver, secure the drive to the drive carrier with screws.

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

Figure 34. Installing a drive into the drive carrier

Next steps

1 Install the drive carrier.

2 If applicable, install the front bezel.

3 Follow the procedure listed in After working inside your system.

Rear drive cage

The rear drive cage supports up to two 2.5 inch drives.

Removing the rear drive cage

Prerequisites

1 Follow the safety guidelines listed in Safety instructions.

2 Follow the procedure listed in Before working inside your system.

3 Remove the air shroud.

4 Remove all the drives.

5 Disconnect all the cables from the rear drive backplane.

Steps

1 Using a Phillips #2 screwdriver, loosen the screws that secure the drive cage to the system.

2 Hold the drive cage and lift it away from the system.
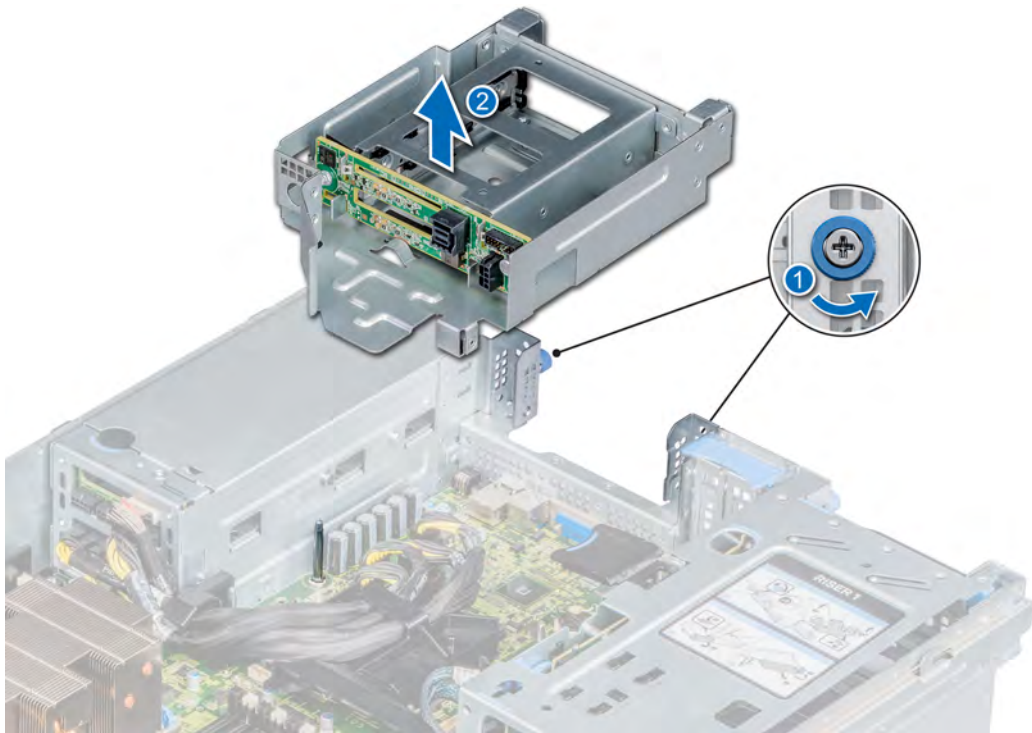
Figure 35. Removing the rear drive cage

Next step

1 Replace the rear drive cage.

Installing the rear drive cage

Prerequisites

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

Steps

1 Align the slots on drive cage with the guides on the system chassis.
2 Lower the drive cage into the system until it is firmly seated.
3 Using a Phillips #2 screwdriver, tighten the screws.
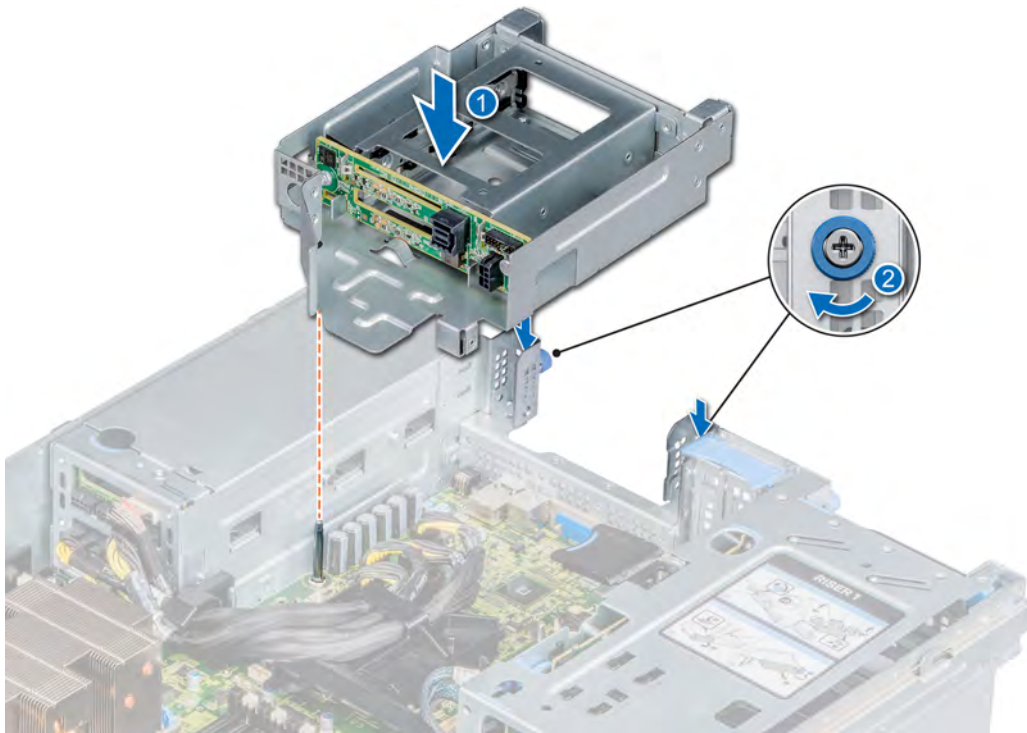
Figure 36. Installing the rear drive cage

Next steps

1   Connect all the cables to the rear drive backplane.
2   Install the drives.
3   Install the air shroud.
4   Follow the procedure listed in After working inside your system.

System memory

The system supports DDR4 registered DIMM (RDIMMs) slots, load reduced DIMM (LRDIMMs) slots and non-volatile dual in-line DIMM-Ns (NVDIMM-Ns). System memory holds the instructions that are executed by the processor.

System memory population guidelines

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

Memory bus operating frequency can be 2666 MT/s, 2400 MT/s, 2133, or 1866 MT/s depending on the following factors:

*   DIMM type (RDIMM or LRDIMM)
*   Number of DIMM slots populated per channel
*   System profile selected (for example, Performance Optimized, or Custom [can be run at any supported speed])
*   Maximum supported DIMM frequency of the processors

Your system contains 48 memory sockets split into four sets of 12 sockets, one set per processor. Each 12-socket set is organized into six channels. In each channel, the release tabs of the first socket are marked white, and the second socket black.
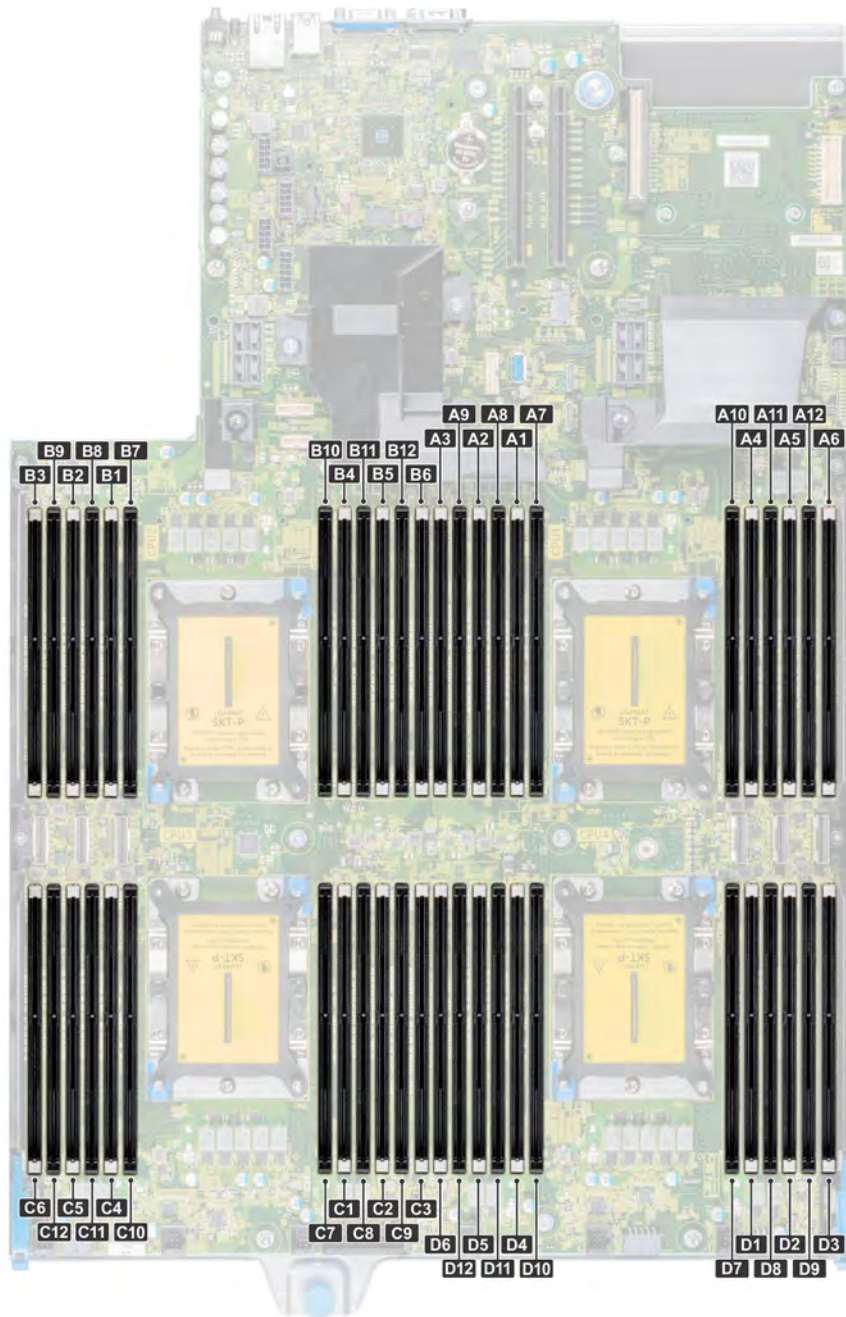
Figure 37. Memory socket locations

Memory channels are organized as follows:

Table 9. Memory channels

Processor	Channel 0	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5
Processor 1	Slots A1 and A7	Slots A2 and A8	Slots A3 and A9	Slots A4 and A10	Slots A5 and A11	Slots A6 and A12
Processor 2	Slots B1 and B7	Slots B2 and B8	Slots B3 and B9	Slots B4 and B10	Slots B5 and B11	Slots B6 and B12

Processor	Channel 0	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5
Processor 3	Slots C1 and C7	Slots C2 and C8	Slots C3 and C9	Slots C4 and C10	Slots C5 and C11	Slots C6 and C12
Processor 4	Slots D1 and D7	Slots D2 and D8	Slots D3 and D9	Slots D4 and D10	Slots D5 and D11	Slots D6 and D12

General memory module installation guidelines

(i) | **NOTE: If you do not observe the system's memory configuration guidelines, your system might not boot, might stop responding during memory configuration, or might operate with reduced memory.**

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:

- Only DDR4 RDIMMs, LRDIMMs, and NVDIMMs are supported.
- RDIMMs and LRDIMMs must not be mixed.
- NVDIMMs and LRDIMMs must not be mixed.
- NVDIMMs and RDIMMs can be mixed.
- 64 GB LRDIMMS that are DDP (Dual Die Package) LRDIMMs must not be mixed with 128 GB LRDIMMs that are TSV (Through Silicon Via/3DS) LRDIMMs.
- x4 and x8 DRAM based memory modules can be mixed. For more information, see the Mode-specific guidelines section.
- Up to two RDIMMs can be populated per channel regardless of rank count.
- Up to two LRDIMMs can be populated per channel regardless of rank count.
- If memory modules with different speeds are installed, they will operate at the speed of the slowest installed memory module(s) or slower depending on the system DIMM configuration.
- Populate memory module sockets only if a processor is installed. Sockets available: A1 to A12 and B1 to B12.
- Populate all the sockets with white release tabs first, followed by the black release tabs.
- When mixing memory modules with different capacities, populate the sockets with memory modules with the highest capacity first. For example, if you want to mix 8 GB and 16 GB memory modules, populate 16 GB memory modules in the sockets with white release tabs and 8 GB memory modules in the sockets with black release tabs.
- In a dual-processor configuration, the memory configuration for each processor should be identical. For example, if you populate socket A1 for processor 1, then populate socket B1 for processor 2, and so on.
- Memory modules of different capacities can be mixed provided other memory population rules are followed (for example, 8 GB and 16 GB memory modules can be mixed).
- Mixing of more than two memory module capacities in a system is not supported.
- Populate six memory modules per processor (one DIMM per channel) at a time to maximize performance.

NVDIMM-N memory module installation guidelines

The following are the recommended guidelines for installing NVDIMM-N memory modules:

- NVDIMM-Ns or RDIMMs must not be mixed with LRDIMMs.
- NVDIMM-Ns must not be mixed with AEP DIMMs.
- DDR4 NVDIMM-Ns must be populated only on the black release tabs on processor 1 and 2.
- For systems with four processors, RDIMMs populated on processor 3 and 4 must be identical to the number of RDIMMs populated on processor 1 and 2.
- All slots on configurations 3, 6, 9, and 12 can be used, but a maximum of 12 NVDIMM-Ns can be installed in a system.

For more information on the supported NVDIMM-N configurations, see the *NVDIMM-N User Guide* at Dell.com/poweredgemanuals.

Table 10. Supported NVDIMM-N for dual processor configurations

Configuration	Description	Memory population rules	
		RDIMMs	NVDIMM-N
Configuration 1	12x 16 GB RDIMMs, 1x NVDIMM-N	CPU1{A1,2,3,4,5,6} CPU2{B1,2,3,4,5,6}	CPU1{A7}
Configuration 2	12x 32 GB RDIMMs, 1x NVDIMM-N	Same for all 12x RDIMM configurations. See Configuration 1.	CPU1{A7}
Configuration 3	23x 32 GB RDIMMs, 1x NVDIMM-N	CPU1{A1,2,3,4,5,6,7,8,9,10,11,12} CPU2{B1,2,3,4,5,6,7,8,9,10,11}	CPU2{B12}
Configuration 4	12x 16 GB RDIMMs, 2x NVDIMM-Ns	Same for all 12x RDIMM configurations. See Configuration 1.	CPU1{A7} CPU2{B7}
Configuration 5	12x 32 GB RDIMMs, 2x NVDIMM-Ns	Same for all 12x RDIMM configurations. See Configuration 1.	CPU1{A7} CPU2{B7}
Configuration 6	22x 32 GB RDIMMs, 2x NVDIMM-Ns	CPU1{A1,2,3,4,5,6,7,8,9,10,11} CPU2{B1,2,3,4,5,6,7,8,9,10,11}	CPU1{A12} CPU2{B12}
Configuration 7	12x 16 GB RDIMMs, 4x NVDIMM-Ns	Same for all 12x RDIMM configurations. See Configuration 1.	CPU1{A7,A8} CPU2{B7,B8}
Configuration 8	22x 32 GB RDIMMs, 4x NVDIMM-Ns	Same for all 12x RDIMM configurations. See Configuration 1.	CPU1{A7,A8} CPU2{B7,B8}
Configuration 9	20x 32 GB RDIMMs, 4x NVDIMM-Ns	CPU1{A1,2,3,4,5,6,7,8,9,10} CPU2{1,2,3,4,5,6,7,8,9,10}	CPU1{A11,12} CPU2{B11,12}
Configuration 10	12x 16 GB RDIMMs, 6x NVDIMM-Ns	Same for all 12x RDIMM configurations. See Configuration 1.	CPU1{A7,8,9} CPU2{B7,8,9}
Configuration 11	12x 32 GB RDIMMs, 6x NVDIMM-Ns	Same for all 12x RDIMM configurations. See Configuration 1.	CPU1{A7,8,9} CPU2{B7,8,9}
Configuration 12	18x 32 GB RDIMMs, 6x NVDIMM-Ns	CPU1{1,2,3,4,5,6,7,8,9} CPU2{1,2,3,4,5,6,7,8,9}	CPU1{A10,11,12} CPU2{B10,11,12}
Configuration 13	12x 16 GB RDIMMs, 12x NVDIMM-Ns	Same for all 12x RDIMM configurations. See Configuration 1.	CPU1{A7,8,9,10,11,12} CPU2{B7,8,9,10,11,12}

Configuration	Description	Memory population rules	
		RDIMMs	NVDIMM-N
Configuration 14	12x 32 GB RDIMMs, 12x NVDIMM-Ns	Same for all 12x RDIMM configurations. See Configuration 1.	CPU1{A7,8,9,10,11,12} CPU2{B7,8,9,10,11,12}

Table 11. Supported NVDIMM-N for quad processor configurations

Configuration	Description	Memory population rules	
		RDIMMs	NVDIMM-N
Configuration 1	24x 16GB RDIMMs, 1x NVDIMM-N	CPU1{A1,2,3,4,5,6}, CPU2{B1,2,3,4,5,6}, CPU3{C1,2,3,4,5,6}, CPU4{D1,2,3,4,5,6}	CPU1{A7}
Configuration 2	24x 32GB RDIMMs, 1x NVDIMM-N	Same for all 24x RDIMM configurations. See Configuration 1.	CPU1{A7}
Configuration 3	47x 32GB RDIMMs, 1x NVDIMM-N	CPU1{A1,2,3,4,5,6,7,8,9,10,11,12}, CPU2{B1,2,3,4,5,6,7,8,9,10,11}, CPU3{C1,2,3,4,5,6,7,8,9,10,11,12}, CPU4{D1,2,3,4,5,6,7,8,9,10,11,12}	CPU2{B12}
Configuration 4	24x 16GB RDIMMs, 2x NVDIMM-Ns	CPU1{A1,2,3,4,5,6}, CPU2{B1,2,3,4,5,6}, CPU3{C1,2,3,4,5,6}, CPU4{D1,2,3,4,5,6}	CPU1{A7}, CPU2{B7}
Configuration 5	24x 32GB RDIMMs, 2x NVDIMM-Ns	CPU1{A1,2,3,4,5,6}, CPU2{B1,2,3,4,5,6}, CPU3{C1,2,3,4,5,6}, CPU4{D1,2,3,4,5,6}	CPU1{A7}, CPU2{B7}
Configuration 6	46x 32GB RDIMMs, 2x NVDIMM-Ns	CPU1{A1,2,3,4,5,6,7,8,9,10,11}, CPU2{B1,2,3,4,5,6,7,8,9,10,11}, CPU3{C1,2,3,4,5,6,7,8,9,10,11,12}, CPU4{D1,2,3,4,5,6,7,8,9,10,11,12}	CPU1{A12}, CPU2{B12}
Configuration 7	24x 16GB RDIMMs, 4x NVDIMM-Ns	CPU1{A1,2,3,4,5,6}, CPU2{B1,2,3,4,5,6}, CPU3{C1,2,3,4,5,6}, CPU4{D1,2,3,4,5,6}	CPU1{A7,8}, CPU2{B7,8}
Configuration 8	24x 32GB RDIMMs, 4x NVDIMMs	CPU1{A1,2,3,4,5,6}, CPU2{B1,2,3,4,5,6}, CPU3{C1,2,3,4,5,6}, CPU4{D1,2,3,4,5,6}	CPU1{A7,8}, CPU2{B7,8}

Configuration	Description	Memory population rules	
		RDIMMs	NVDIMM-N
Configuration 9	44x 32GB RDIMMs, 4x NVDIMM-Ns	CPU1{A1,2,3,4,5,6,7,8,9,10}, CPU2{B1,2,3,4,5,6,7,8,9,10}, CPU3{C1,2,3,4,5,6,7,8,9,10,11,12}, CPU4{D1,2,3,4,5,6,7,8,9,10,11,12}	CPU1{A11,12}, CPU2{B11,12}
Configuration 10	24x 16GB RDIMMs, 6x NVDIMM-Ns	CPU1{A1,2,3,4,5,6}, CPU2{B1,2,3,4,5,6}, CPU3{C1,2,3,4,5,6}, CPU4{D1,2,3,4,5,6}	CPU1{A7,8,9}, CPU2{B7,8,9}
Configuration 11	24x 32GB RDIMMs, 6x NVDIMM-Ns	CPU1{A1,2,3,4,5,6}, CPU2{B1,2,3,4,5,6}, CPU3{C1,2,3,4,5,6}, CPU4{D1,2,3,4,5,6}	CPU1{A7,8,9}, CPU2{B7,8,9}
Configuration 12	42x 32GB RDIMMs, 6x NVDIMM-Ns	CPU1{A1,2,3,4,5,6,7,8,9}, CPU2{B1,2,3,4,5,6,7,8,9}, CPU3{C1,2,3,4,5,6,7,8,9,10,11,12}, CPU4{D1,2,3,4,5,6,7,8,9,10,11,12}	CPU1{A10,11,12}, CPU2{B10,11,12}
Configuration 13	24x 16GB RDIMMs, 12x NVDIMM-Ns	CPU1{A1,2,3,4,5,6}, CPU2{B1,2,3,4,5,6}, CPU3{C1,2,3,4,5,6}, CPU4{D1,2,3,4,5,6}	CPU1{A7,8,9,10,11,12}, CPU2{B7,8,9,10,11,12}
Configuration 14	24x 32GB RDIMMs, 12x NVDIMM-Ns	CPU1{A1,2,3,4,5,6}, CPU2{B1,2,3,4,5,6}, CPU3{C1,2,3,4,5,6}, CPU4{D1,2,3,4,5,6}	CPU1{A7,8,9,10,11,12}, CPU2{B7,8,9,10,11,12}
Configuration 15	36x 32GB RDIMMs, 12x NVDIMM-Ns	CPU1{A1,2,3,4,5,6}, CPU2{B1,2,3,4,5,6}, CPU3{C1,2,3,4,5,6,7,8,9,10,11,12}, CPU4{D1,2,3,4,5,6,7,8,9,10,11,12}	CPU1{A7,8,9,10,11,12}, CPU2{B7,8,9,10,11,12}

Mode-specific guidelines

Six memory channels are allocated to each processor. The configurations allowed depend on the memory mode selected.

Memory optimized (independent channel) mode

This mode supports Single Device Data Correction (SDDC) only for memory modules that use x4 device width. It does not impose any specific slot population requirements.

Memory sparing

ⓘ | **NOTE: To use memory sparing, this feature must be enabled in the BIOS menu of System Setup.**

Table 12. Memory sparing

Memory sparing (Single Rank)	Single Rank memory sparing allocates one rank per channel as a spare. If excessive correctable errors occur in a rank or channel, while the operating system is running, they are moved to the spare area to prevent errors from causing an uncorrectable failure. Requires two or more ranks to be populated in each channel.
Memory sparing (Multi Rank)	Multi Rank memory sparing allocates two ranks per channel as a spare. If excessive correctable errors occur in a rank or channel, while the operating system is running, they are moved to the spare area to prevent errors from causing an uncorrectable failure. Requires three or more ranks to be populated in each channel.

With single rank memory sparing enabled, the system memory available to the operating system is reduced by one rank per channel. For example, in a dual-processor configuration with 24x 16 GB dual-rank memory modules, the available system memory is: 3/4 (ranks/channel) × 24 (memory modules) × 16 GB = 288 GB, and not 24 (memory modules) × 16 GB = 384 GB. For multi rank sparing, the multiplier changes to 1/2 (ranks/channel).

ⓘ | **NOTE: Memory sparing does not offer protection against a multi-bit uncorrectable error.**

Memory mirroring

Memory mirroring offers the strongest memory module reliability, providing improved uncorrectable multi-bit failure protection. In a mirrored configuration, the total available system memory is one half of the total installed physical memory. Half of the installed memory is used to mirror the active memory modules. In the event of an uncorrectable error, the system switches over to the mirrored copy. This ensures Single Device Data Correction (SDDC) and multi-bit protection.

The installation guidelines for memory modules are as follows:

- Memory modules must be identical in size, speed, and technology.
- Memory modules must be populated in sets of 6 per processor to enable memory mirroring.

Table 13. Dual processor memory population rules

Processor	Configuration	Memory population	Memory population information
Dual Processor (Starting with Processor1, Processor1 and Processor2 population should match)	Optimized population order (Independent channel)	A{1}, B{1}, A{2}, B{2}, A{3}, B{3}, A{4}, B{4},	Odd amount of DIMM slots per processor allowed.

Processor	Configuration	Memory population	Memory population information
		A{5}, B{5}, A{6}, B{6}	
	Mirroring population order	A{1, 2, 3, 4, 5, 6}, B{1, 2, 3, 4, 5, 6}, A{7, 8, 9, 10, 11, 12}, B{7, 8, 9, 10, 11, 12}	Mirroring is supported with 6 or 12 DIMM slots per processor.
	Single rank sparing population order	A{1}, B{1}, A{2}, B{2}, A{3}, B{3}, A{4}, B{4}, A{5}, B{5}, A{6}, B{6}	Populate in this order, odd amount perprocessor allowed. Requires two ranks or more per channel.
	Multi rank spare population order	A{1}, B{1}, A{2}, B{2}, A{3}, B{3}, A{4}, B{4}, A{5}, B{5}, A{6}, B{6}	Populate in this order, odd amount per processor allowed. Requires three ranks or more per channel.
	Fault resilient population order	A{1, 2, 3, 4, 5, 6}, B{1, 2, 3, 4, 5, 6}, A{7, 8, 9, 10, 11, 12}, B{7, 8, 9, 10, 11, 12}	Supported with 6 or 12 DIMM slots per processor.

Table 14. Quad processor memory population rules

Processor	Configuration	Memory population	Memory population information
Quad Processor (Starting with Processor1, and Processor1, Processor2, Processor3, and Processor4 population should match)	Optimized population order (Independent channel)	A{1}, B{1}, C{1}, D{1}, A{2}, B{2}, C{2}, D{2}, A{3}, B{3} C{3}, D{3}, A{4}, B{4} C{4}, D{4}	Odd amount of DIMM slots per processor allowed.
	Mirroring population order	A{1, 2, 3, 4, 5, 6}, B{1, 2, 3, 4, 5, 6}, C{1, 2, 3, 4, 5, 6}, D{1, 2, 3, 4, 5, 6} A{7, 8, 9, 10, 11, 12}, B{7, 8, 9, 10, 11, 12}, C{7, 8, 9, 10, 11, 12}, D{7, 8, 9, 10, 11, 12}	Mirroring is supported with 6 or 12 DIMM slots per processor.
	Single rank sparing population order	A{1}, B{1}, C{1}, D{1}, A{2}, B{2}, C{2}, D{2}, A{3}, B{3}, C{3}, D{3}, A{4}, B{4}, C{4}, D{4}	Populate in this order, odd amount per processor allowed. Requires two ranks or more per channel.
	Multi rank spare population order	A{1}, B{1}, C{1}, D{1}, A{2}, B{2}, C{2}, D{2}, A{3}, B{3}, C{3}, D{3}, A{4}, B{4}, C{4}, D{4}	Populate in this order, odd amount perprocessor allowed. Requires three ranks or more per channel.

Processor	Configuration	Memory population	Memory population information
	Fault resilient population order	A{1, 2, 3, 4, 5, 6}, B{1, 2, 3, 4, 5, 6}, C{1, 2, 3, 4, 5, 6}, D{1, 2, 3, 4, 5, 6} A{7, 8, 9, 10, 11, 12}, B{7, 8, 9, 10, 11, 12}, C{7, 8, 9, 10, 11, 12}, D{7, 8, 9, 10, 11, 12}	Supported with 6 or 12 DIMM slots per processor.

Removing a memory module

Prerequisites

⚠ **WARNING: Allow the memory modules to cool after you power off the system. Handle the memory modules by the card edges and avoid touching the components or metallic contacts on the memory module.**

⚠ **CAUTION: To ensure proper system cooling, when processor 1 and processor 2 are installed, memory module blanks must be installed in memory sockets that are not occupied. Remove memory module blanks only if you intend to install memory modules in those sockets.**

1   Follow the safety guidelines listed in Safety instructions.
2   Follow the procedure listed in Before working inside your system.
3   Remove the applicable air shroud:
    · Non-GPU air shroud

    OR

    · GPU air shroud

Steps

1   Locate the appropriate memory module socket.

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

2   Push the ejectors outward on both ends of the memory module socket to release the memory module from the socket.
3   Lift and remove the memory module from the system.
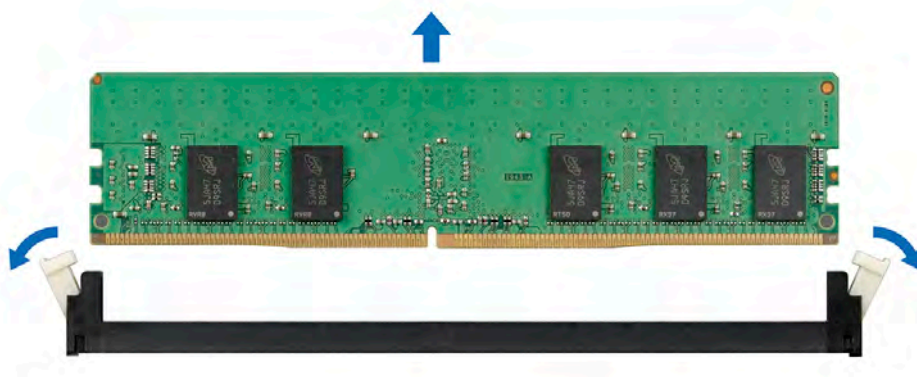

Figure 38. Removing a memory module

ⓘ **NOTE: If you are removing the memory module permanently, install a memory module blank. The procedure to install a memory module blank is similar to that of the memory module.**

Next step

1   Replace the memory module.

Installing a memory module

Prerequisites

1   Follow the safety guidelines listed in Safety instructions.
2   Follow the procedure listed in Before working inside your system.
3   Remove the applicable air shroud:
   · Non-GPU air shroud

   OR
   · GPU air shroud

Steps

1   Locate the appropriate memory module socket.

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

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

2   Open the ejectors on the memory module socket outward to allow the memory module to be inserted into the socket.
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: **Do not apply pressure at the center of the memory module; apply pressure at both ends of the memory module evenly.**

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

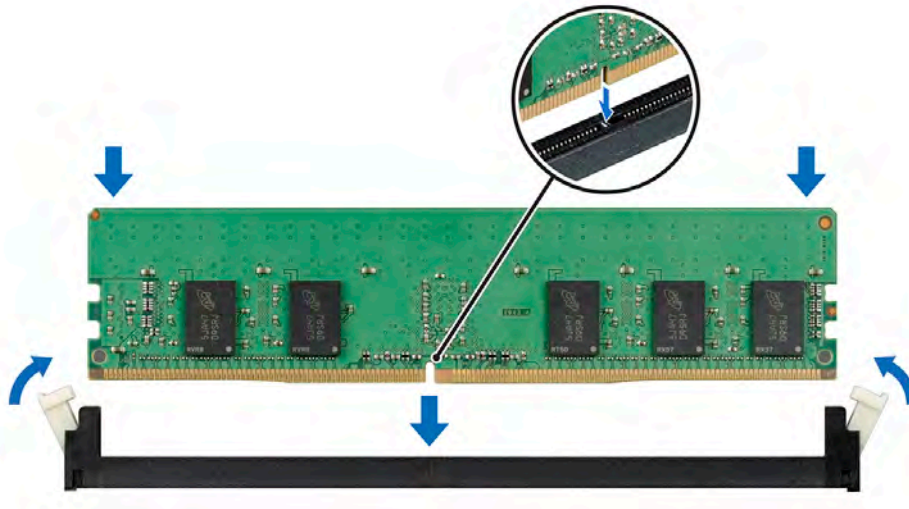4   Press the memory module with your thumbs until the socket levers firmly click into place.

Figure 39. Installing a memory module

Next steps

1   Install the applicable air shroud:

   ·   GPU air shroud

   OR

   ·   Non-GPU air shroud

2   Follow the procedure listed in After working inside your system.

3   Verify if the memory module has been installed properly, by pressing F2 and navigating 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. If the value is incorrect, one or more of the memory modules may not be installed properly. Ensure that the memory module is firmly seated in the memory module socket. Run the system memory test in system diagnostics.

Expansion cards and expansion card risers

An expansion card in the system is an add-on card that can be installed into an expansion slot on the system board or a slot on a riser to add enhanced functionality to the system through the expansion bus.

ⓘ **NOTE: A System Event Log (SEL) event is logged if an expansion card riser is not supported or missing. It does not prevent your system from turning on. However, if a F1/F2 pause occurs, an error message is displayed.**

Table 15. Expansion card riser specifications

PCIe slot	Riser	Processor connection	Height	Length	Slot width
1	X8 PCIe Riser 1	Processor 1	Full height	Half length	x8
2	X16 PCIe Riser 1	Processor 1	Full height	Full length	x16
	X8 PCIe Riser 1	Processor 1	Full height	Half length	x8
3	Located on the system board	Processor 1	Low profile	Half length	x16
4	Located on the system board	Processor 2	Low profile	Half length	x16
5	X8 PCIe Riser 2	Processor 2	Full height	Half length	x8
6	X16 PCIe Riser 2	Processor 2	Full height	Full length	x16
	X8 PCIe Riser 2	Processor 2	Full height	Half length	x8

Expansion card installation guidelines

The following table describes the supported expansion cards:

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

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

Table 16. x16 PCIe riser 1+ x16 PCIe riser 2 configuration

Card type	Slot priority	Maximum number of cards supported
100G NIC	3, 4, 2, 6	2
10Gb NIC	3, 4, 2, 6	2
1Gb NIC	3, 4, 2, 6	2
25G NIC	3, 4, 2, 6	2
25Gb NIC	3, 4, 2, 6	2
40G NIC	3, 4, 2, 6	2
40Gb NIC	3, 4, 2, 6	2
BOSS	3, 4, 2, 6	1
External RAID	3, 4, 2, 6	2
FC16 HBA	3, 4, 2, 6	2
FC32 HBA	3, 4, 2, 6	2
FC8 HBA	3, 4, 2, 6	2
FPGA	2, 6	2
GPU	2, 6	2
Infiniband HCA EDR	3, 4, 2, 6	2
Infiniband HCA FDR	3, 4	2
Non-RAID	3, 4, 2, 6	2
NVMe PCIe SSD	3, 4, 2, 6	2
Omni-Path HFI	3, 4, 2, 6	2
PERC 9	3	1
PERC 10	3	1
rNDC	Integrated Slot	1

Table 17. x8 PCIe riser 1 + Null riser configuration

Card type	Slot priority	Maximum number of cards supported
100G NIC	3, 4	2
10Gb NIC	3, 4, 1, 2	2
1Gb NIC	3, 4, 1, 2	2
25G NIC	3, 4, 1, 2	2
25Gb NIC	3, 4, 1, 2	2
40G NIC	3, 4, 1, 2	2
40Gb NIC	3, 4, 1, 2	2

Card type	Slot priority	Maximum number of cards supported
BOSS	3, 4, 1, 2	1
External RAID	3, 4, 1, 2	2
FC16 HBA	3, 4, 1, 2	2
FC32 HBA	3, 4, 1, 2	2
FC8 HBA	3, 4, 1, 2	2
Infiniband HCA EDR	3, 4	2
Infiniband HCA FDR	3, 4	2
Non-RAID	3, 4, 1, 2	2
NVMe PCIe SSD	3, 4, 1, 2	2
Omni-Path HFI	3, 4	2
PERC 9	1, 2	2
	1	1
PERC 10	1, 2	2
	1	1
rNDC	Integrated Slot	1

Table 18. x8 PCIe riser 1 + x8 PCIe riser 2 configuration

Card type	Slot priority	Maximum number of cards supported
100G NIC	3, 4	2
10Gb NIC	1, 2, 5, 6	4
	3, 4	2
10Gb NIC	1, 2, 5, 6	4
1Gb NIC	3, 4	2
	1, 2, 5, 6	4
25G NIC	3, 4	2
	1, 2, 5, 6	4
25Gb NIC	3, 4	2
	1, 2, 5, 6	4
40G NIC	3, 4	2
	1, 2, 5, 6	4
40Gb NIC	3, 4	2
	1, 2, 5, 6	4
BOSS	1, 2, 5, 6, 3, 4	1
External RAID	1, 2, 5, 6, 3, 4	2

Card type	Slot priority	Maximum number of cards supported
FC16 HBA	3, 4	2
	1, 2, 5, 6	4
FC32 HBA	3, 4	2
	1, 2, 5, 6	4
FC8 HBA	3, 4	2
	1, 2, 5, 6	4
Infiniband HCA EDR	3, 4	2
Infiniband HCA FDR	3, 4	2
Non-RAID	3, 4	2
	1, 2, 5, 6	4
NVMe PCIe SSD	1, 2, 5, 6, 3, 4	2
Omni-Path HFI	3, 4	2
PERC 9	1, 2	2
	1	1
PERC 10	1, 2	2
	1	1
rNDC	Integrated Slot	1

Removing expansion card from the expansion card riser

**Prerequisites**

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

ⓘ | **NOTE: The procedure to remove expansion card from riser for all risers is identical.**

Steps

1 Open the black expansion card latch on the riser.
2 Open the blue card holder latch on the riser.
3 Hold the expansion card by its edges, and pull the card until the card edge connector disengages from the connector on the riser.
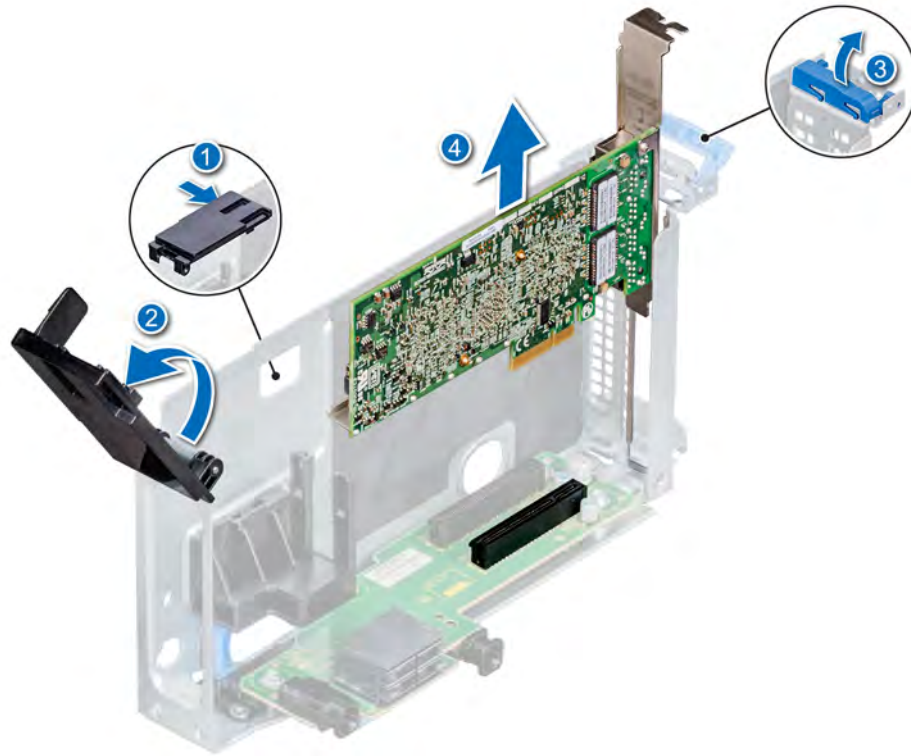
Figure 40. Removing the expansion card from the riser

4   Install a filler bracket if you are not going to replace the expansion card.

ⓘ 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.**

Figure 41. Installing a filler bracket for a riser
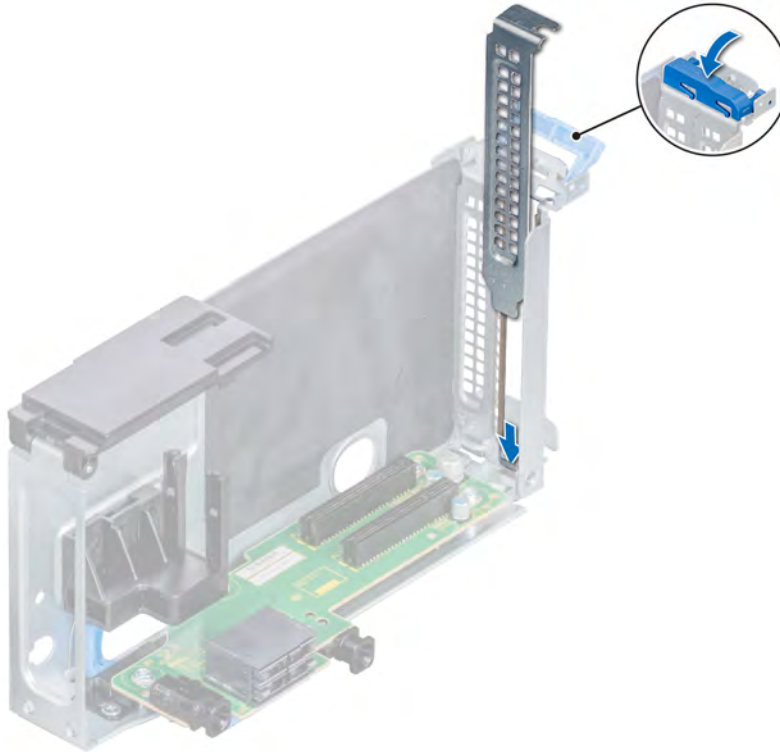
Next step

1   Install expansion card into the expansion card riser.

Installing expansion card into the expansion card riser

Prerequisites

1   Follow the safety guidelines listed in Safety instructions.
2   Follow the procedure listed in 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 applicable air shroud.
5   Remove the expansion card risers.

ⓘ | **NOTE: The procedure to remove expansion card from riser for all risers is identical.**
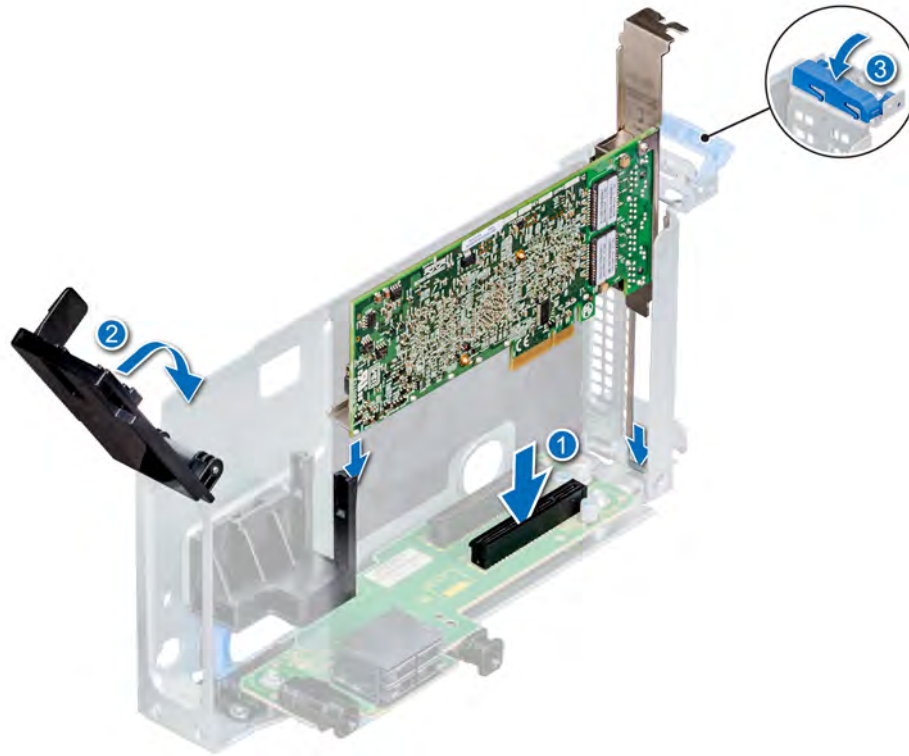
Steps
1   Open the black expansion card latch on the riser.
2   Open the blue card holder latch on the riser.
3   If installed, remove the filler bracket.
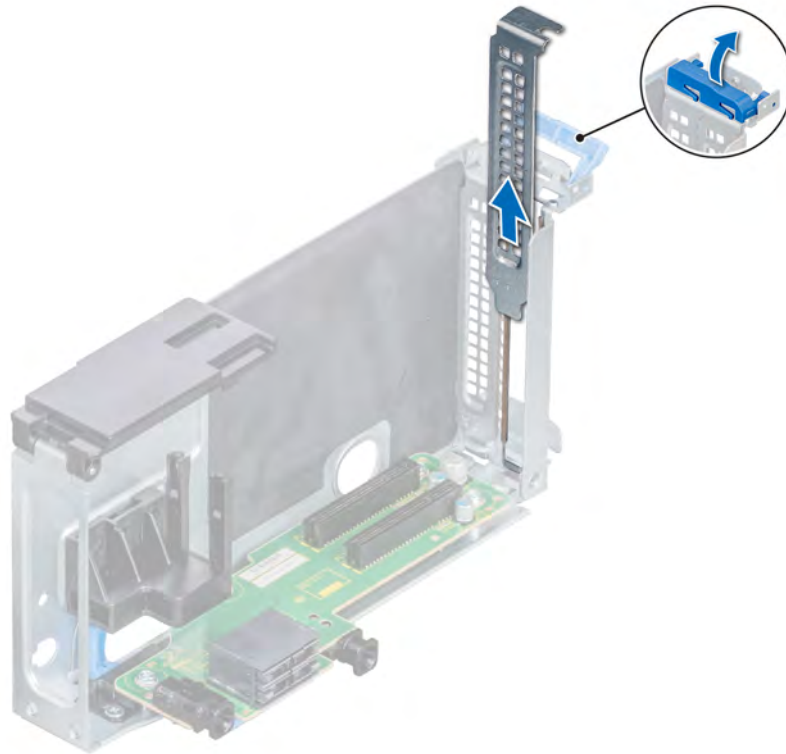
Figure 42. Removing a filler bracket from a riser

ⓘ **NOTE: If applicable, connect the cables to the expansion card.**

4   Hold the card by its edges, and align the card edge connector with the connector on the riser.

5   Insert the card edge connector firmly into the expansion card connector until the card is fully seated.

6   Close the expansion card retention latch.

Figure 43. Installing the expansion card into a riser

Next steps

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

Removing the expansion card risers

Prerequisites

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

Steps

1 Using the Phillips #2 screwdriver, loosen the screws that secure the riser to the system.
2 Press the blue release tab, and holding the riser by its edges, lift the riser from the riser connector on the system board.
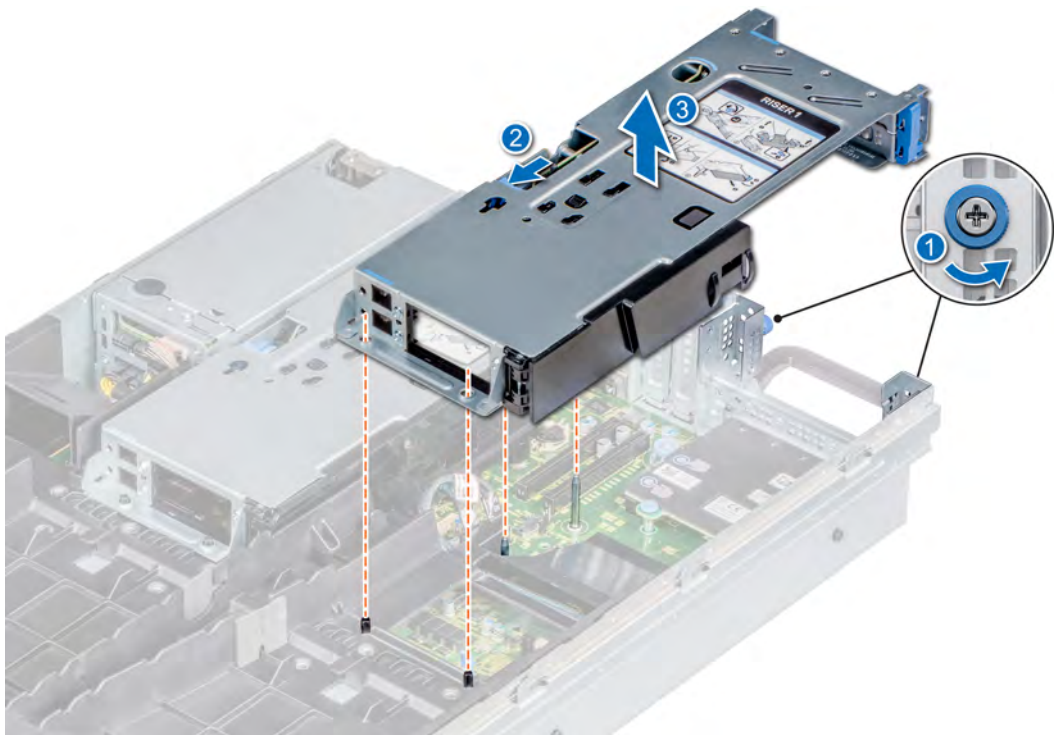
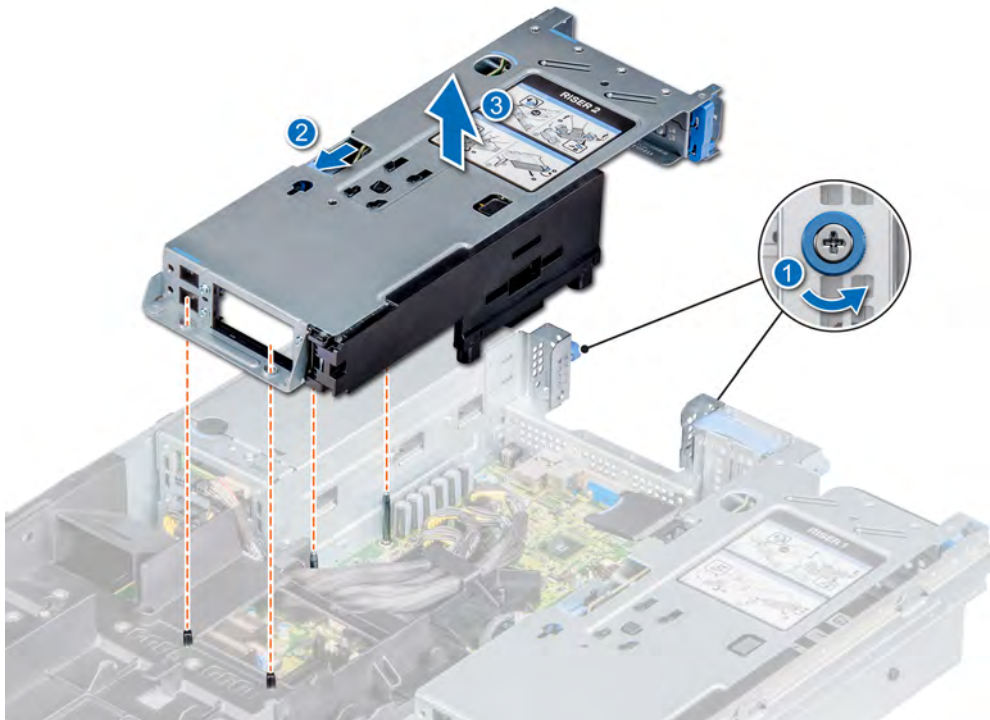Figure 44. Removing the expansion card x16 PCIe riser 1

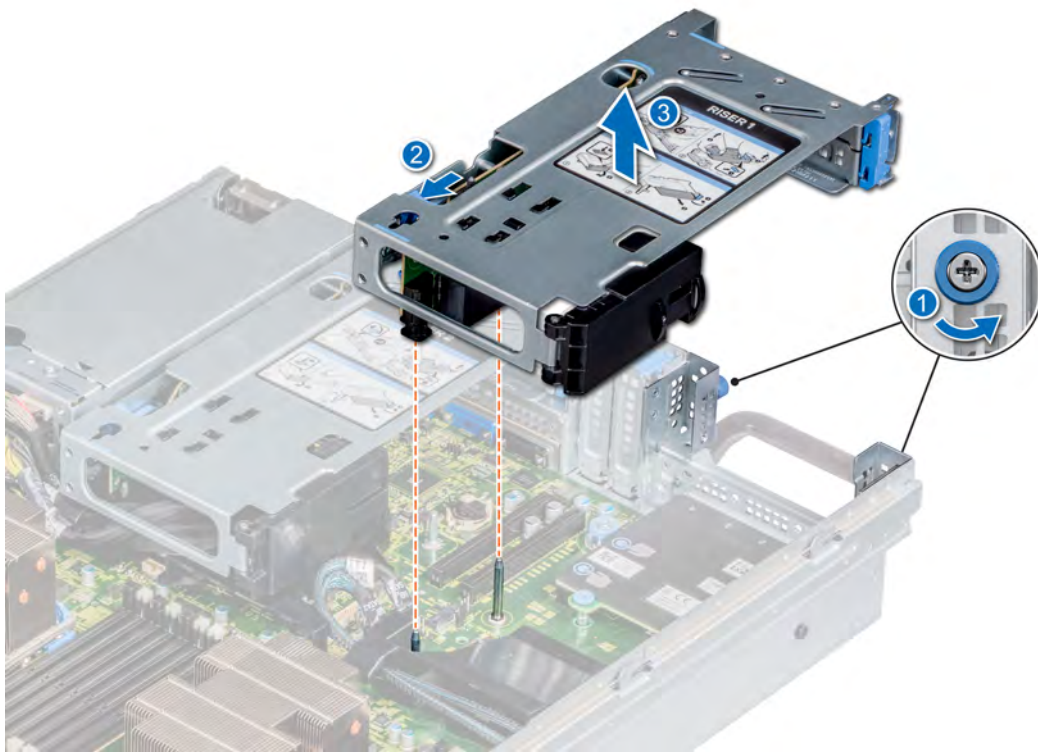Figure 45. Removing the expansion card x16 PCIe riser 2

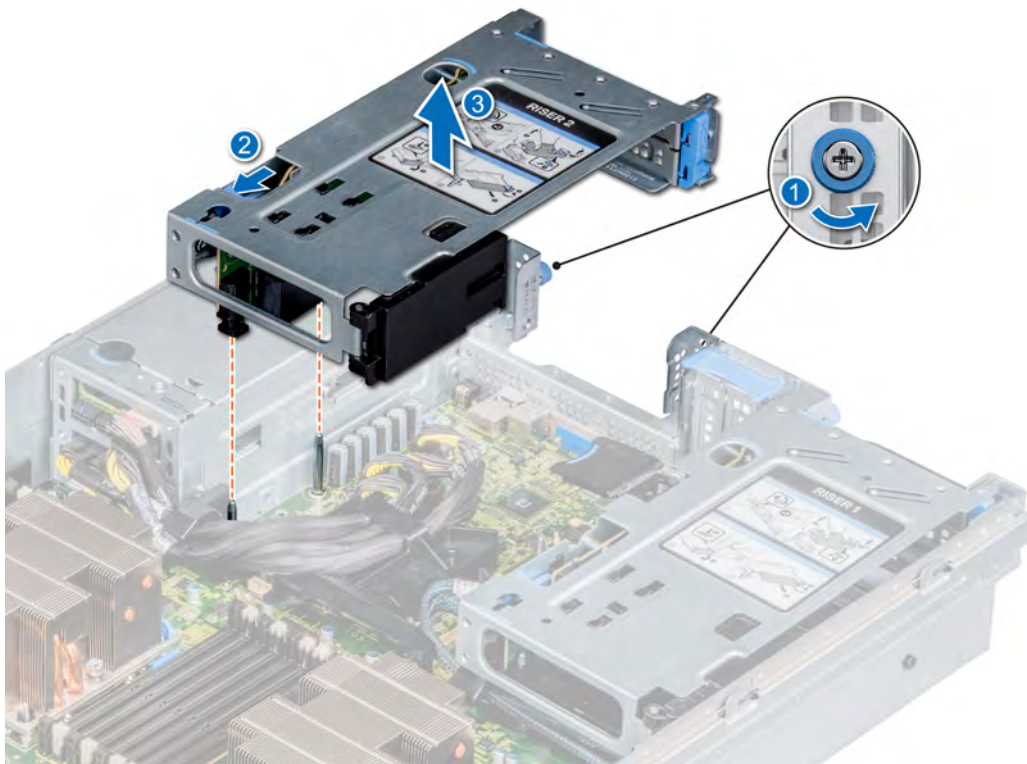**Figure 46. Removing the expansion card x8 PCIe riser 1**

Figure 47. Removing the expansion card x8 PCIe riser 2

Next step

1   Install the expansion card risers.

Installing the expansion card risers

Prerequisites

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

Steps

1   If removed, install the expansion cards into the expansion card risers.
2   Holding the touch points, align the slots on the riser with the guides on the system board and air shroud.
3   Lower the expansion card riser into place until the expansion card riser connector is fully seated in the connector.
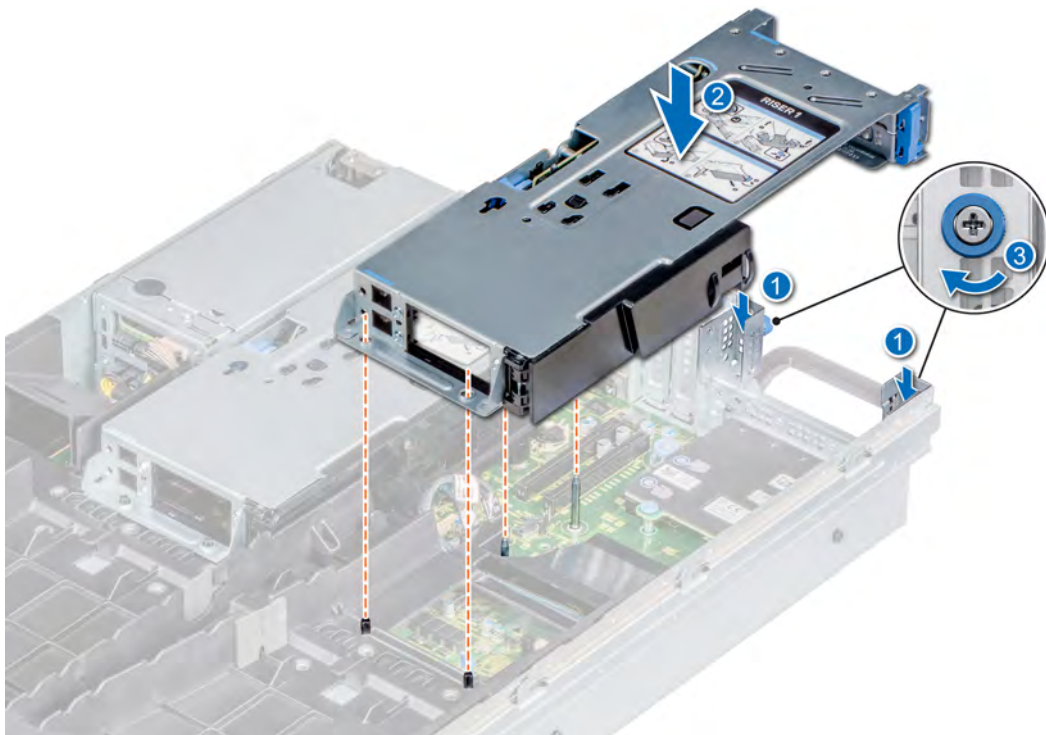4   Tighten the captive screws to secure the riser to the system.

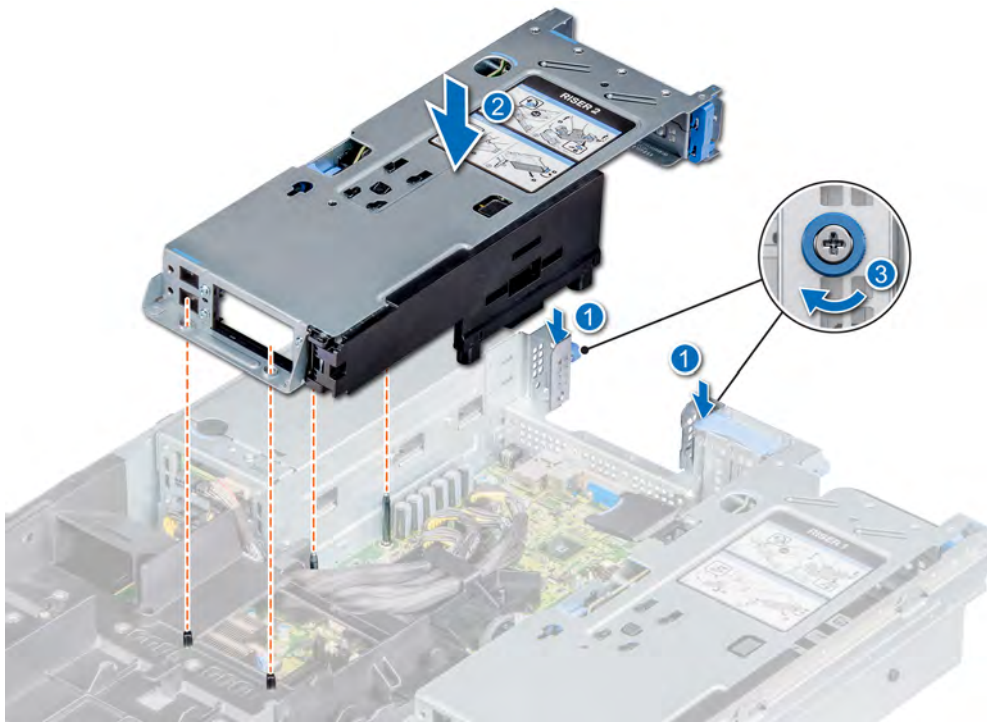**Figure 48. Installing the expansion card x16 PCIe riser 1**

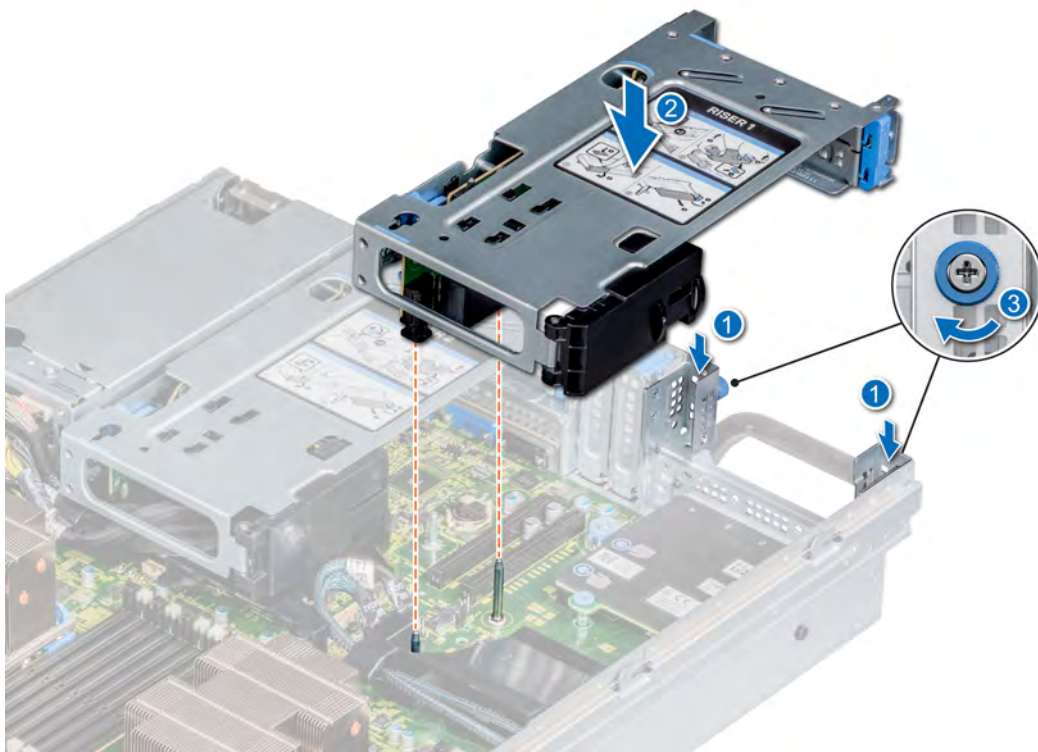Figure 49. Installing the expansion card x16 PCIe riser 2

Figure 50. Installing the expansion card x8 PCIe riser 1
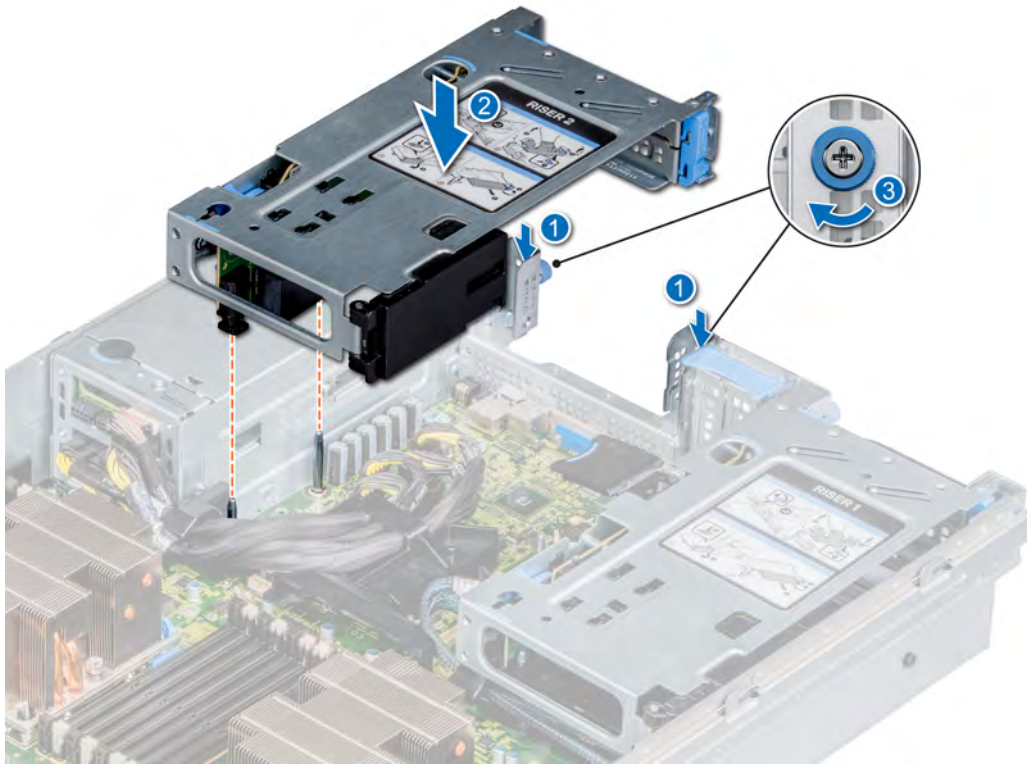
Figure 51. Installing the expansion card x8 PCIe riser 2

Next steps

1 Install any device drivers required for the card as described in the documentation for the card.

2 Install the air shroud.

3 Follow the procedure listed in After working inside your system.

Removing a PCIe expansion card

Prerequisites

1 Follow the safety guidelines listed in Safety instructions.

2 Follow the procedure listed in Before working inside your system.

3 Remove the air shroud.

4 Disconnect any cables connected to the expansion card.

Steps

1 Open the blue expansion card retention latch lock.

2 Hold the expansion card by the edge, and pull the card to disconnect from the system board connector.

Figure 52. Removing an expansion card from the system board

3 If you are not replacing the expansion card, install a filler bracket by performing the following steps:

    a   Align the slot on the filler bracket with the tab on the expansion card slot.

    b   Align the filler bracket with the slot on the system.

    c   Push the filler bracket downward until firmly seated.

    d   Close the blue expansion card retention latch.
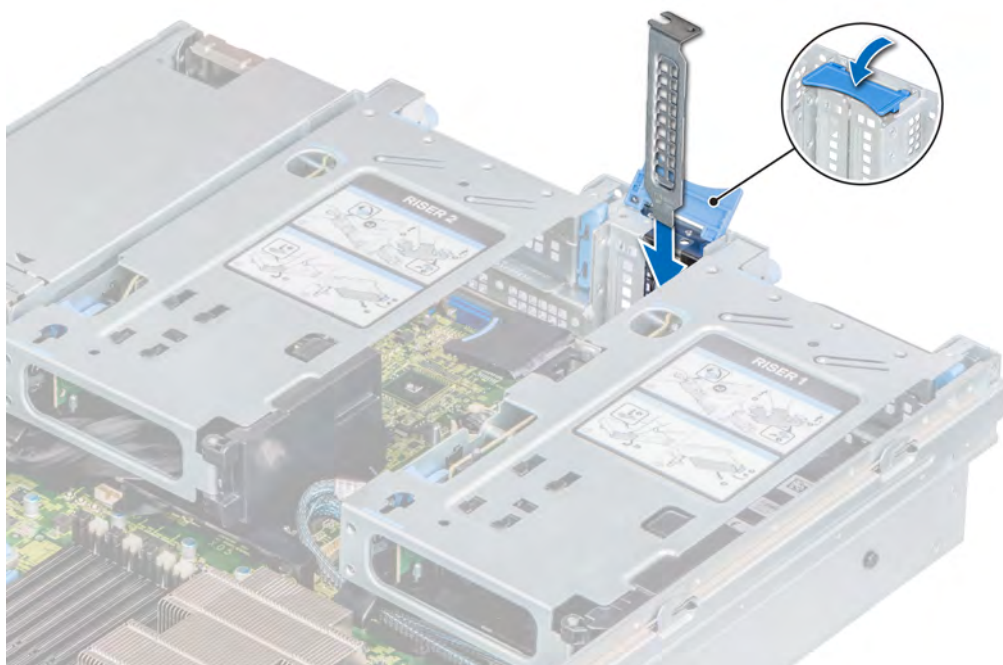
Figure 53. Installing the filler bracket
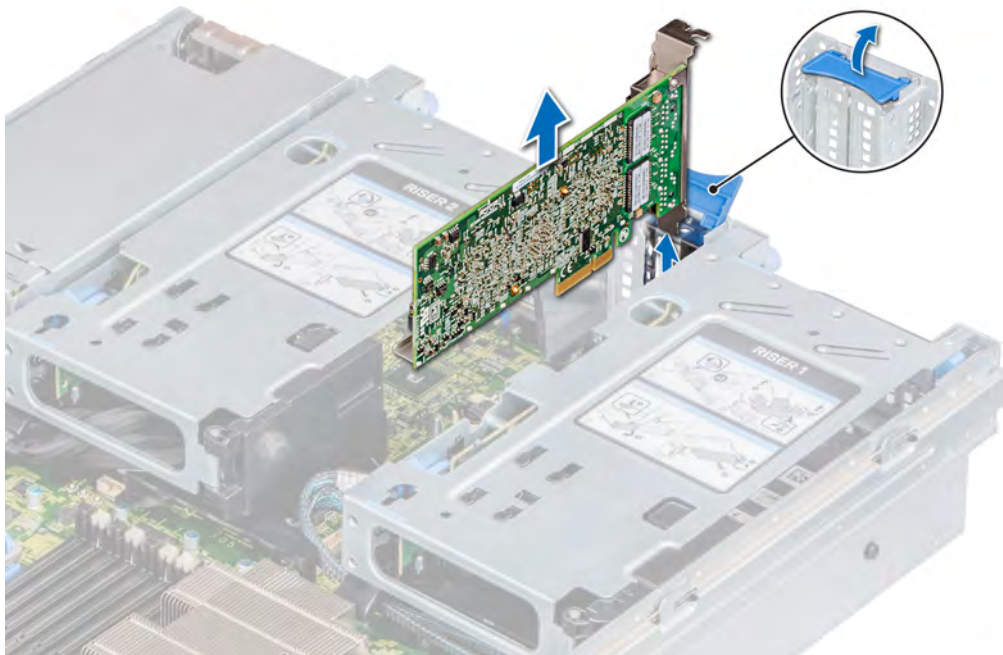
Next step

1   Install an expansion card.

Installing a PCIe expansion card

Prerequisites

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

Steps

1   Unpack the expansion card and prepare it for installation.

    For instructions, see the documentation accompanying the card.

2   If you are installing a new card, remove the filler bracket.

      a   Open the blue expansion card retention latch lock.
      b   Slide the filler bracket out of the system.
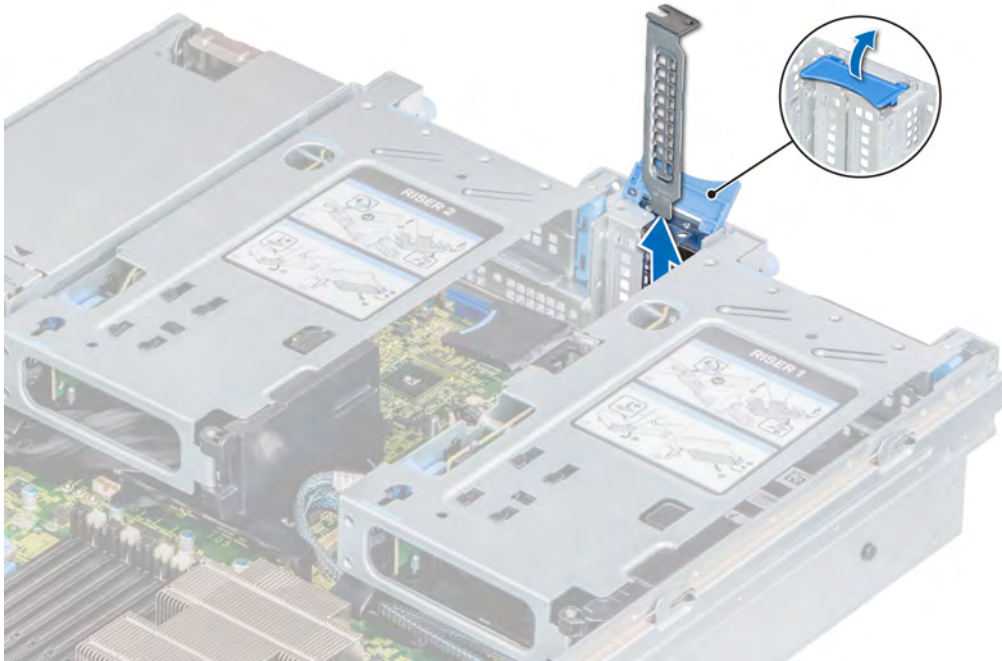
        Figure 54. Removing the filler bracket

    ⓘ **NOTE: Store the filler bracket for future use. Filler brackets must be installed in empty expansion card slots to maintain 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.**

3   Holding the card on the edges, align the card with the expansion card connector on the system board.
4   Press the expansion card firmly into the expansion card connector on the system board until the card is fully seated.
5   Close the blue expansion card retention latch.

Figure 55. Installing an expansion card on the system board

Next steps

1 Connect the required cables to the expansion card.
2 Install the air shroud.
3 Follow the procedure listed in After working inside your system.

GPU card installation guidelines

- Ensure that both the processors are installed.
- The processor must use the GPU kit low-profile heat sink.
- To ensure adequate cooling when one or more GPUs are installed, the ambient inlet temperature is restricted to 30°C for CPU 150 W/8 C, 165 W/12 C, 200 W, 205 W. For more information, see the Ambient temperature limitations section.
- All GPUs must be of the same type and model.
- The cover on the GPU air shroud must be removed before installing the GPU.
- Ensure that high performance fans and GPU air shroud are installed.

ⓘ **NOTE: When using systems with GPU, ensure that you install PSUs with 1100 W or higher, and set the PSU configuration to non-redundant mode.**

Removing a GPU

Prerequisites

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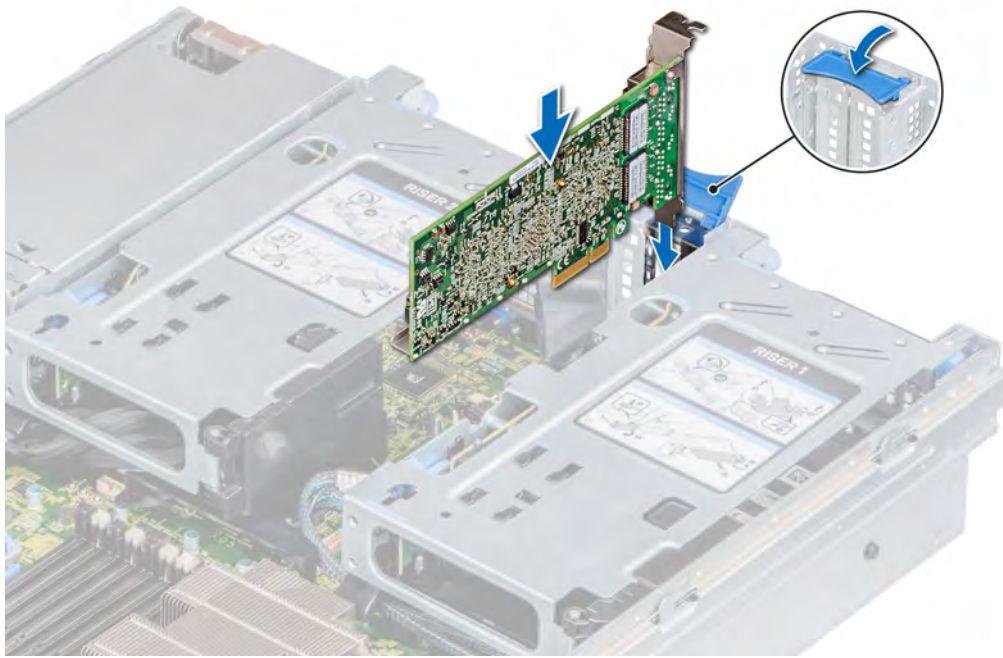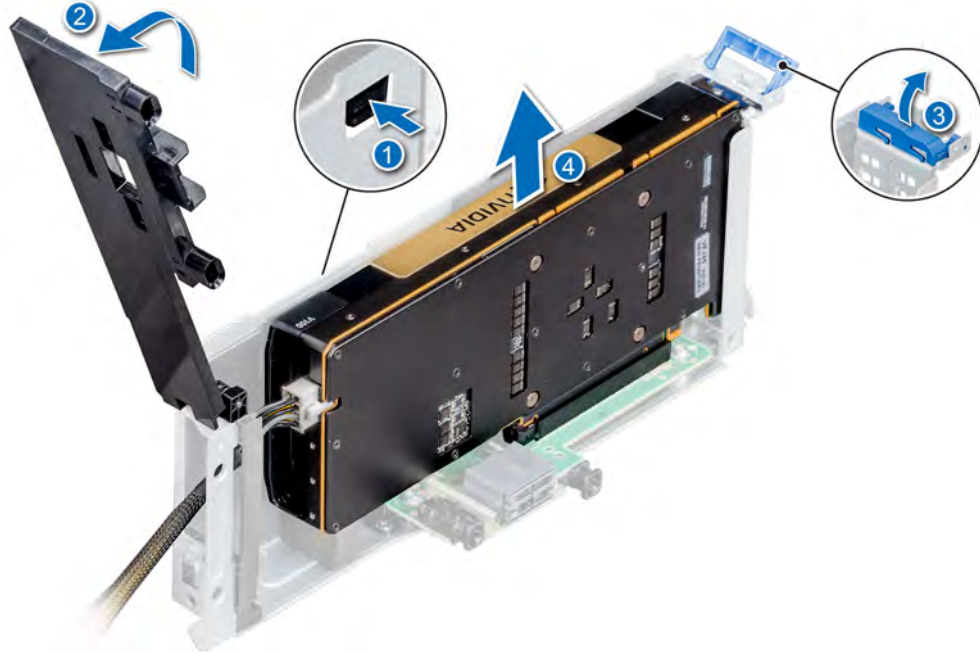
Steps

1 Disconnect the GPU power cable from the PIB.

2 Open the expansion card latch and the card holder latch on the riser.

Figure 56. Removing the GPU card from the riser

3 Holding the card by its edges, lift to release it from the connector on the riser.

4 Disconnect the GPU power cable from the GPU.

5 If you are removing the GPU permanently, 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 brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system. The filler bracket is necessary to maintain proper thermal conditions.**

Next step

Replace the GPU.

Installing a GPU

Prerequisites

1 Follow the safety guidelines listed in Safety Instructions.

2 Follow the procedure listed in Before working inside your system.

3 Remove the GPU air shroud cover.

4 Remove the expansion card riser.

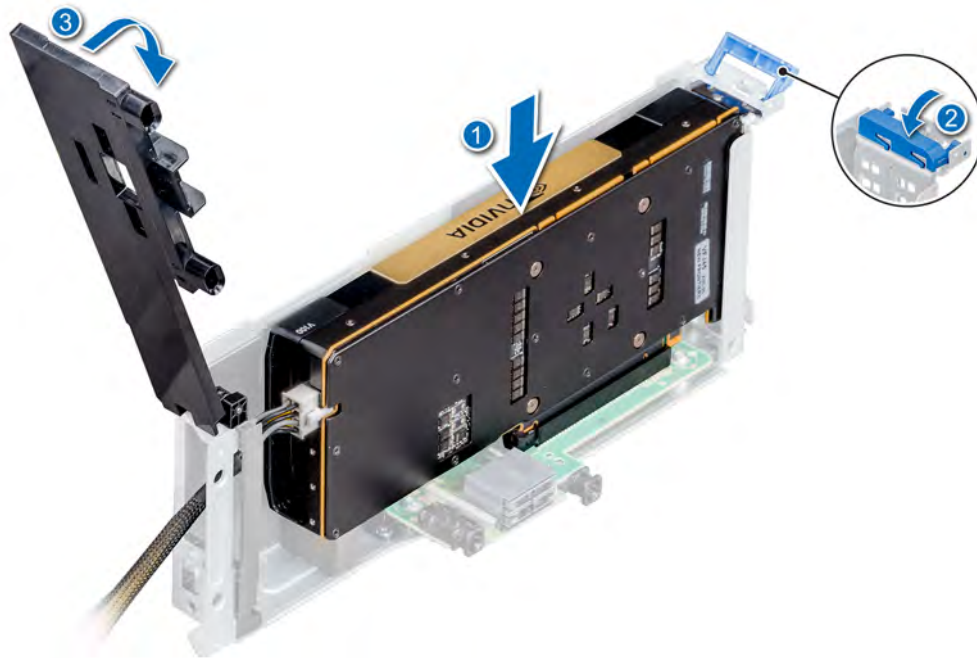**Steps**

1 Connect the GPU power cable to the connector on the GPU.

2 Open the expansion card latch and the card holder latch on the riser.

3 Remove the existing expansion card or filler bracket from the riser.

ⓘ **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 filler bracket is necessary to maintain proper thermal conditions.**

4   Route the GPU power cable through the slot on the riser bracket.

5   Holding the card by its edges, position the card so that the card aligns with the expansion card connector.

6   Insert the card firmly into the expansion card connector until the card is fully seated.

7   Close the expansion card latch and the card holder latch.

Figure 57. Installing the GPU card on the riser

8   Connect the other end of the GPU power cable to the PIB.

Next steps

1   Install the top cover of the GPU air shroud.

2   Follow the procedure listed in After working inside your system.

Optional M.2 SSD module

The BOSS card is a simple RAID solution card designed specifically for booting a server's operating system. The card supports up to two 6 Gbps M.2 SATA drives. The BOSS adapter card has a x8 connector using PCIe gen 2.0 x2 lanes, available in both the low-profile and full-height form factor.

Removing the M.2 SSD module

Prerequisites

1   Follow the safety guidelines listed in Safety instructions.

2   Follow the procedure listed in Before working inside your system.

3   Remove the air shroud.

4   If installed, remove the rear drive cage.

5   Remove the BOSS card.

ⓘ **NOTE: The procedure to remove the BOSS card is similar to the removing an expansion card.**

Steps

1   Loosen the screw and lift the retention strap that secures the M.2 SSD module on the BOSS card.

2   Lift the M.2 SSD module and slide it out of the connector on the BOSS card.
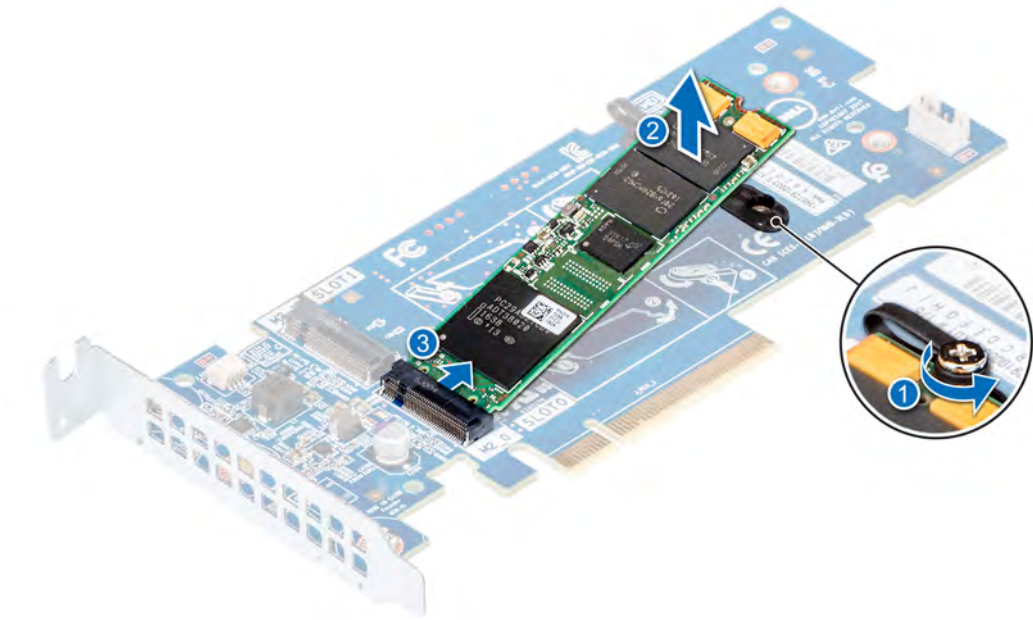
Figure 58. Removing the M.2 SSD module

Next step

Replace the M.2 SSD module.

Installing the M.2 SSD module

Prerequisites

1   Follow the safety guidelines listed in Safety instructions.

2   Follow the procedure listed in Before working inside your system.

3   Remove the air shroud.

4   Remove the BOSS card.

ⓘ **NOTE: The procedure to remove the BOSS card is similar to the removing an expansion card.**

Steps

1   Connect the M.2 SSD module to the connector on the BOSS card.

2   Place the retention strap on the M.2 SSD module, and tighten the screw to secure the module.
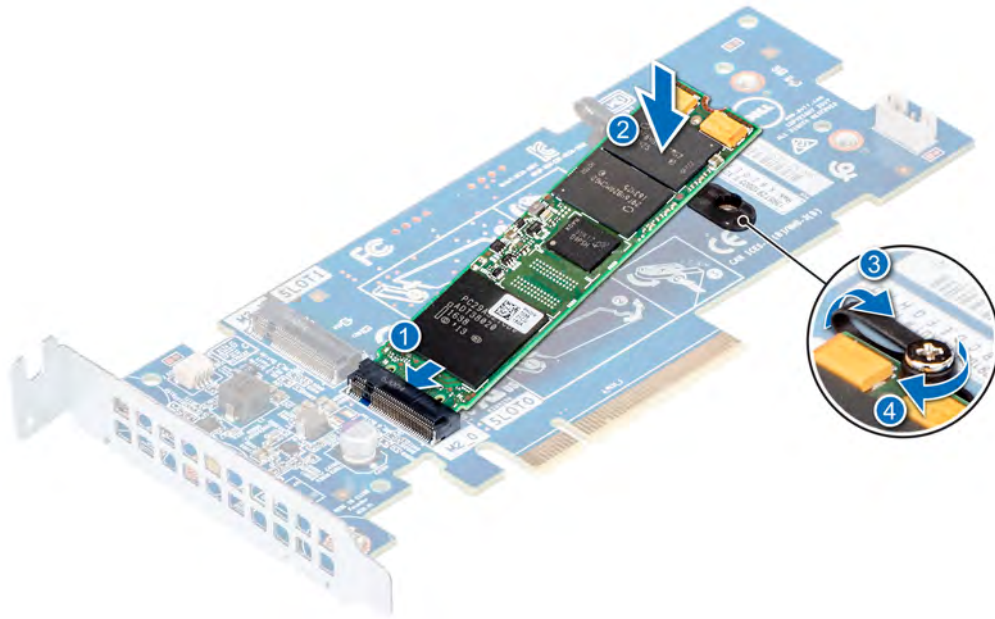
Figure 59. Installing the M.2 SSD module

Next steps

1   Install the BOSS card.

       ⓘ **NOTE: The procedure to install the BOSS card is similar to the** removing an expansion card.

2   Install the applicable air shroud.

3   Follow the procedure listed in After working inside your system.

Processors and heat sinks

The processor controls memory, peripheral interfaces, and other components of the system. The system can have more than one processor configurations.

The heat sink absorbs the heat generated by the processor, and helps the processor to maintain its optimal temperature level.

Table 19. Processor wattage and heat sink dimensions

Heat sink	
Heat sink type	Heat sink dimensions
1U heat sink For GPU configuration	L x W x H: 128 mm x 82 mm x 25.5 mm
2U heat sink For non-GPU configuration	L x W x H: 110 mm x 82 mm x 61 mm

Dual processor configuration

The system will function normally if there are two processors installed in the CPU 1 and 2 sockets. Processor and memory blanks associated with CPU 3 and 4 are not required to be installed. For information on the expansion card slots supported on dual processor, see Expansion card riser specifications section.

Quad processor configuration

For quad processor configurations, all installed risers will be functional.

Removing a processor and heat sink module

Prerequisites

⚠ **WARNING: The heat sink may be hot to touch for some time after the system is powered down. Allow the heat sink to cool before removing it.**

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

Steps

1   Using a Torx #T30 screwdriver, loosen the screws on the heat sink in the order below:
    a   Loosen the first screw three turns.
    b   Loosen the second screw completely.
    c   Return to the first screw and loosen it completely.
2   Pushing both blue retention clips simultaneously, lift the processor and heat sink module (PHM).
3   Set the PHM aside with the processor side facing up.
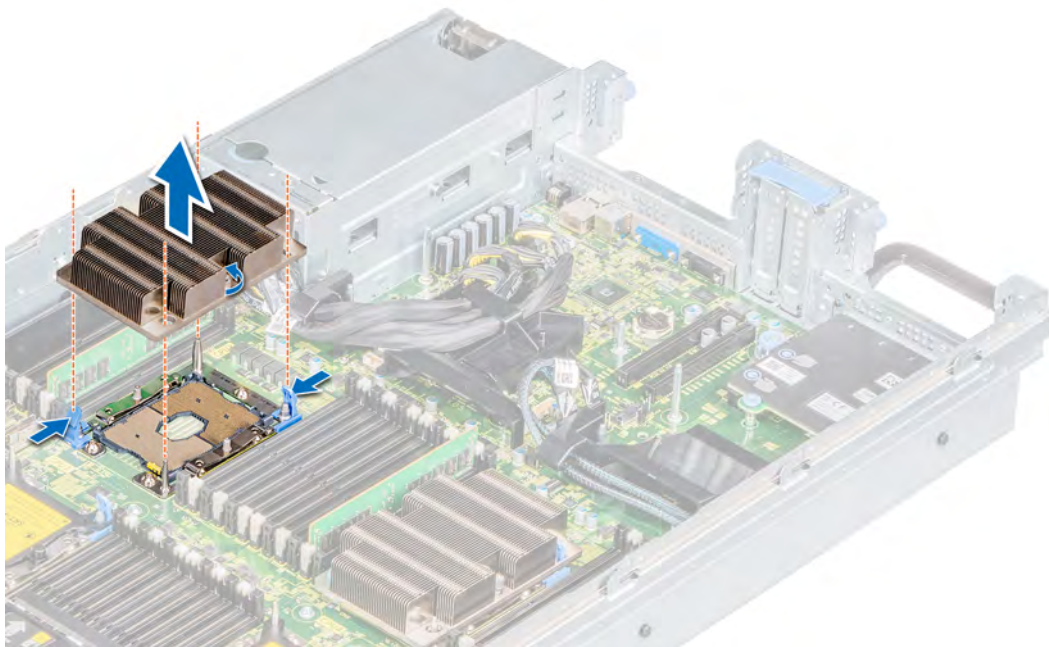
Figure 60. Removing the processor and heat sink module 1U
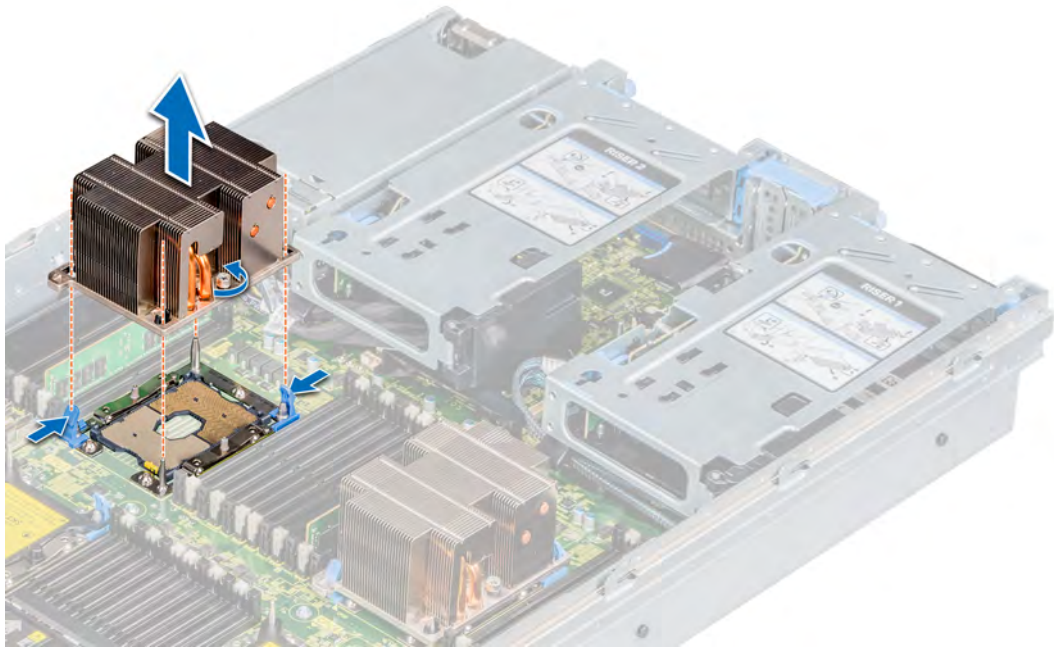
Figure 61. Removing the processor and heat sink module 2U

Next step

1   Replace the processor and heat sink module.

Removing the processor from the processor and heat sink module

Prerequisites

⚠ **WARNING: The heat sink may be hot to touch for some time after the system has been powered down. Allow the heat sink to cool before removing it.**

ⓘ **NOTE: Only remove the processor from the processor and heat sink module if you are replacing the processor or heat sink. This procedure is not required when replacing a system board.**

1   Follow the safety guidelines listed in Safety instructions.

2   Follow the procedure listed in Before working inside your system.

3   Remove the processor and heat sink module.

Steps

1   Place the heat sink with the processor side facing up.

2   Insert a flat blade screwdriver into the release slot marked with a yellow label. Twist (do not pry) the screwdriver to break the thermal paste seal.

3   Push the retaining clips on the processor bracket to unlock the bracket from the heat sink.
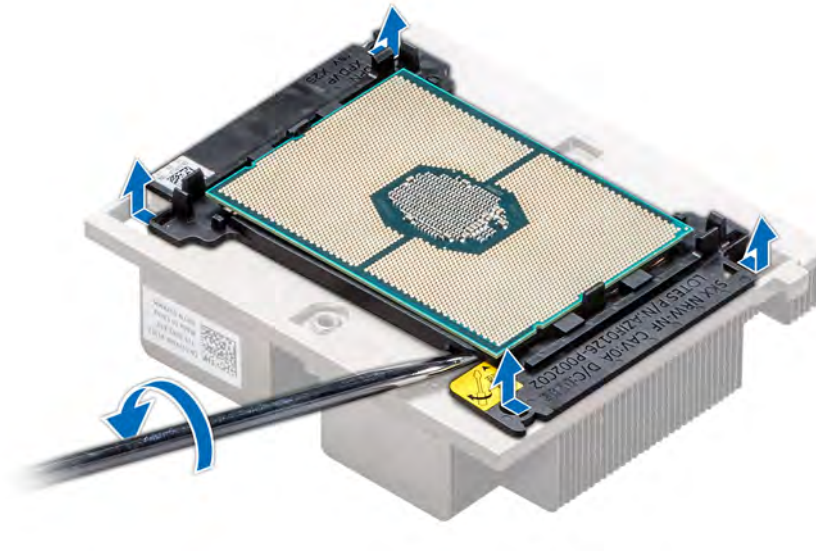
Figure 62. Loosening the processor bracket

4   Lift the bracket and the processor from the heat sink, and place the processor connector side down on the processor tray.

5   Flex the outer edges of the bracket to release the bracket from the processor.

ⓘ **NOTE: Ensure that the processor and the bracket are placed in the tray after you remove the heat sink.**

Figure 63. Removing the processor bracket

Next step

1   Install the processor into the processor and heat sink module.

Installing the processor into a processor and heat sink module

Prerequisites

1   Follow the safety guidelines listed in Safety instructions.
2   Follow the procedure listed in Before working inside your system.
3   Remove the processor and heat sink module.

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   Flex the outer edges of the bracket around the processor ensuring that the processor is locked into the clips on the bracket.

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

> ⓘ **NOTE:** Ensure that the processor and the bracket are placed in the tray before you install the heat sink.

Figure 64. Installing the processor bracket

3   If you are using an existing heat sink, remove the thermal grease from the heat sink by using a clean lint-free cloth.
4   Use the thermal grease syringe included with your processor kit to apply the grease in a quadrilateral design on the top of the processor.

> △ **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 the syringe after you use it.

Figure 65. Applying thermal grease on top of the processor

5   Place the heat sink on the processor and push down on the base of the heat sink until the bracket locks onto the heat sink.

ⓘ **NOTE:**

- Ensure that the two guide pin holes on the bracket match the guide holes on the heat sink.
- Do not press on the heat sink fins.
- Ensure that the pin 1 indicator on the heat sink is aligned with the pin 1 indicator on the bracket before placing the heat sink onto the processor and bracket.
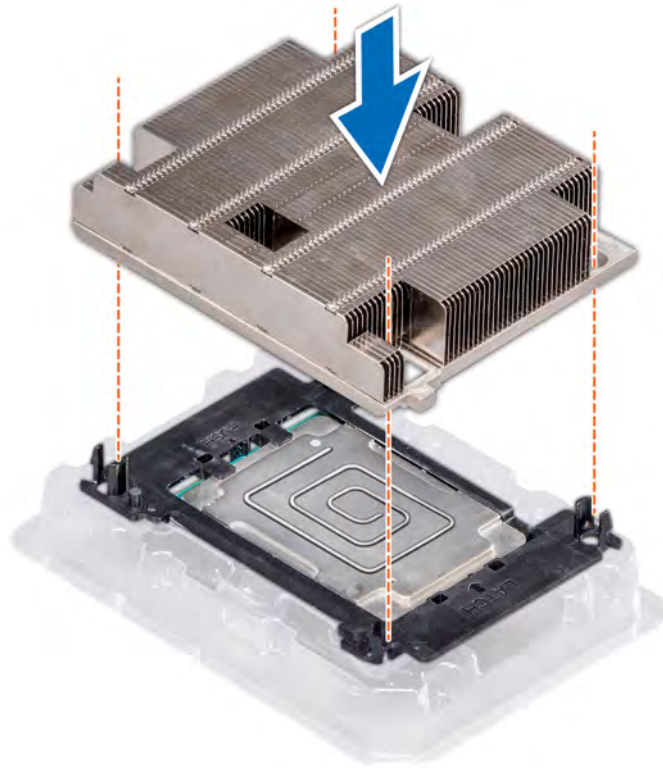
Figure 66. Installing the heat sink onto the processor 1U
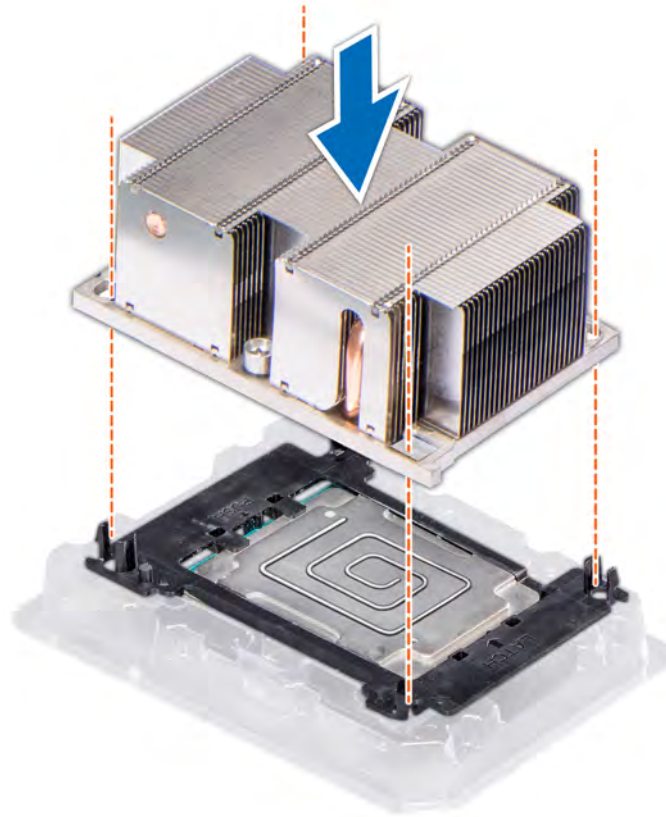
Figure 67. Installing the heat sink onto the processor 2U

Next step

1   Install the processor and heat sink module.

Installing a 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 Safety instructions.
2   Follow the procedure listed in Before working inside your system.
3   Remove the processor blank and CPU dust cover, if installed.

Steps

1   Align the Pin1 indicator on the heat sink with the indicator on the system board and place the processor and heat sink module (PHM) 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 PHM is held parallel to the system board to prevent damaging the components.**

2   Push the blue retention clips inward to allow the heat sink to drop in place.

3   Using the Torx #T30 screwdriver, tighten the screws on the heat sink in the order below:

    a   Partially tighten the first screw (approximately 3 turns).

    b   Tighten the second screw completely.

    c   Return to the first screw and tighten it completely.

If the PHM slips off the blue retention clips when the screws are partially tightened, follow these steps to secure the PHM:

a   Loosen both the heat sink screws completely.

b   Lower the PHM on to the blue retention clips.

c   Secure the PHM to the system board, following the replacement instructions listed in this step mentioned above.

ⓘ **NOTE: The processor and heat sink module retention screws should not be tightened to more than 0.13 kgf-m (1.35 N.m or 12 in-lbf).**
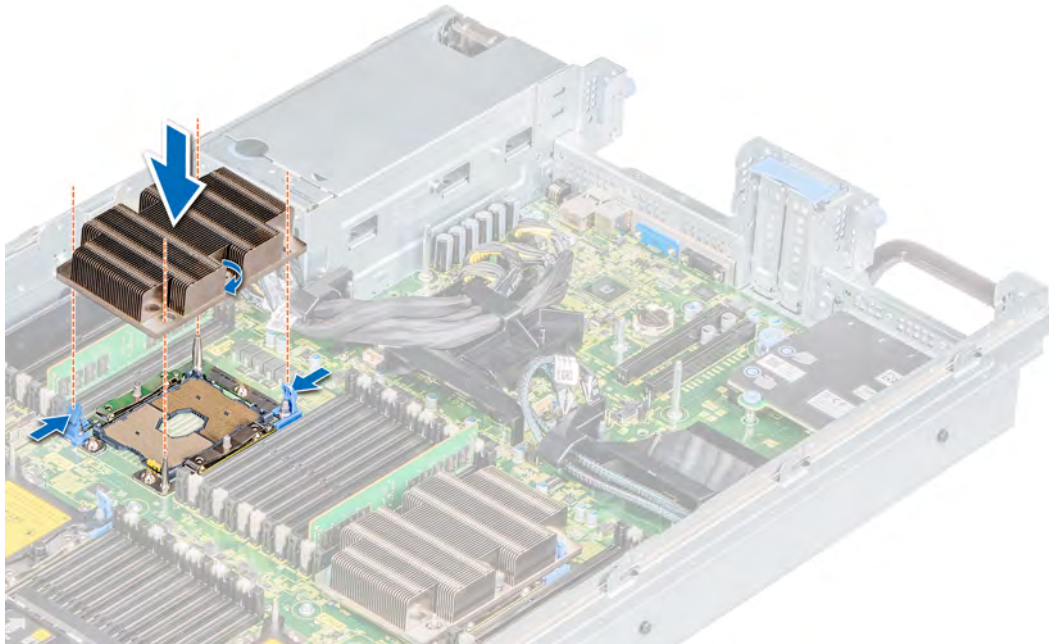
Figure 68. Installing a processor and 1U heat sink module
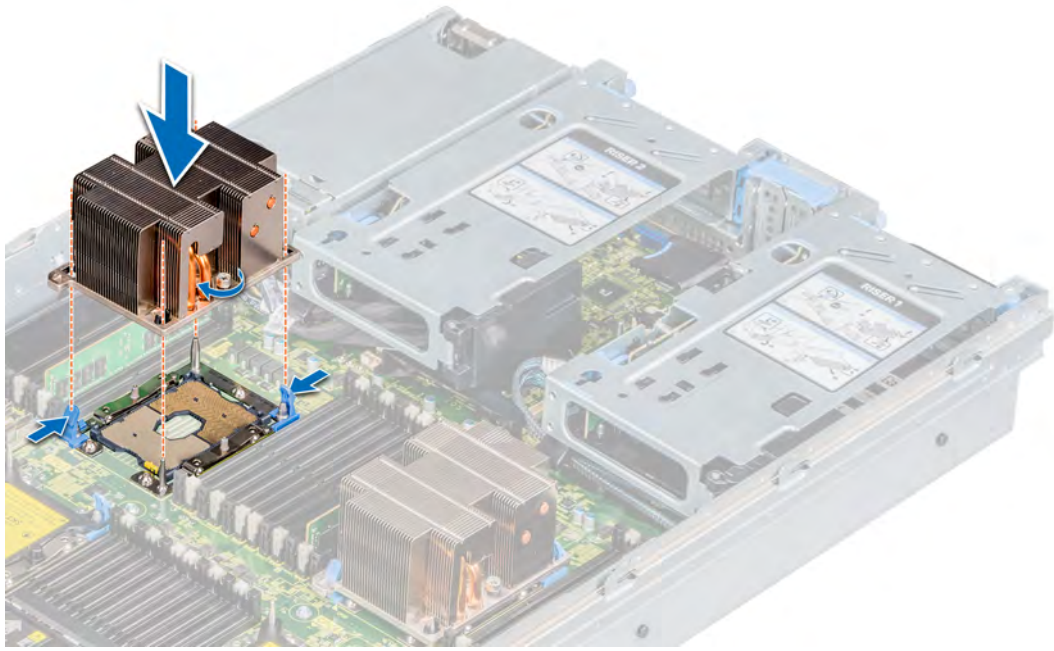
Figure 69. Installing a processor and 2U heat sink module

Next steps

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

Optional IDSDM or vFlash module

The IDSDM or vFlash module combines the IDSDM and/or vFlash features into a single module.

ⓘ **NOTE: The write-protect switch is on the IDSDM or vFlash module.**

Removing IDSDM or vFlash module

Prerequisites

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

Steps

1   Locate the IDSDM or vFlash connector on riser 1.
2   Holding the pull tab, lift the IDSDM or vFlash module out of the system.
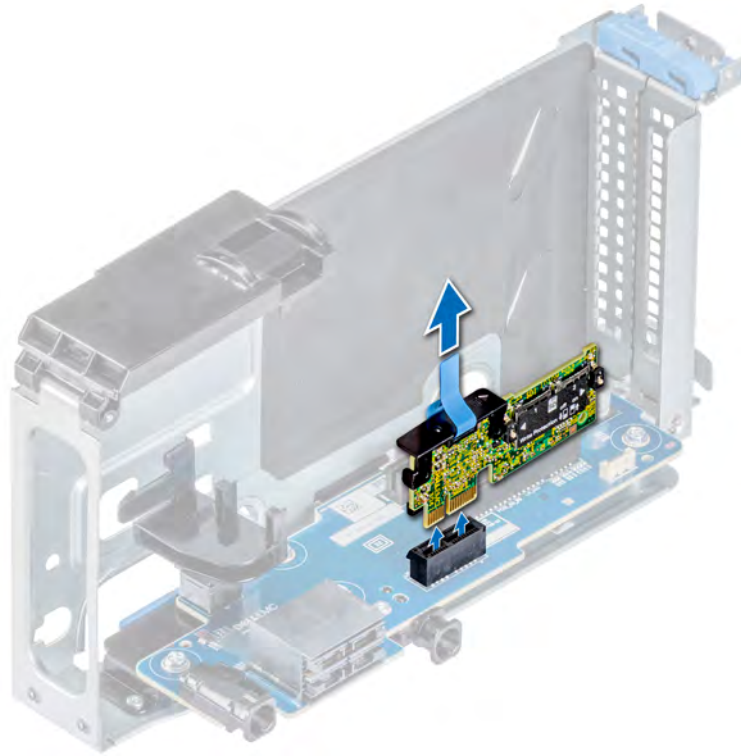
Figure 70. Removing IDSDM or vFlash module

ⓘ **NOTE: There are two dip switches on the IDSDM or vFlash module for write-protection.**

ⓘ **NOTE: If you are replacing the IDSDM or vFlash module, remove the microSD cards.**

Next step
Install the IDSDM or vFlash module.

Installing IDSDM or vFlash module

Prerequisites

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

Steps
1   Locate the IDSDM or vFlash connector on riser 1.
2   Align IDSDM or vFlash module with the connector on the riser.
3   Push IDSDM or vFlash module until it is firmly seated in the connector on the riser.

Figure 71. Installing IDSDM or vFlash module

Next steps

1   Install the microSD cards.

    ⓘ **NOTE: Reinstall the microSD cards into the same slots based on the labels you had marked on the cards during removal.**

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

Removing the MicroSD card

Prerequisites

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

Steps

1   Locate the MicroSD card slot on the IDSDM or vFlash module, and press the card to partially release it from the slot.

Figure 72. Removing the MicroSD card

2   Hold the MicroSD card and remove it from the slot.

      ⓘ **NOTE: Temporarily label each MicroSD card with its corresponding slot number after removal.**
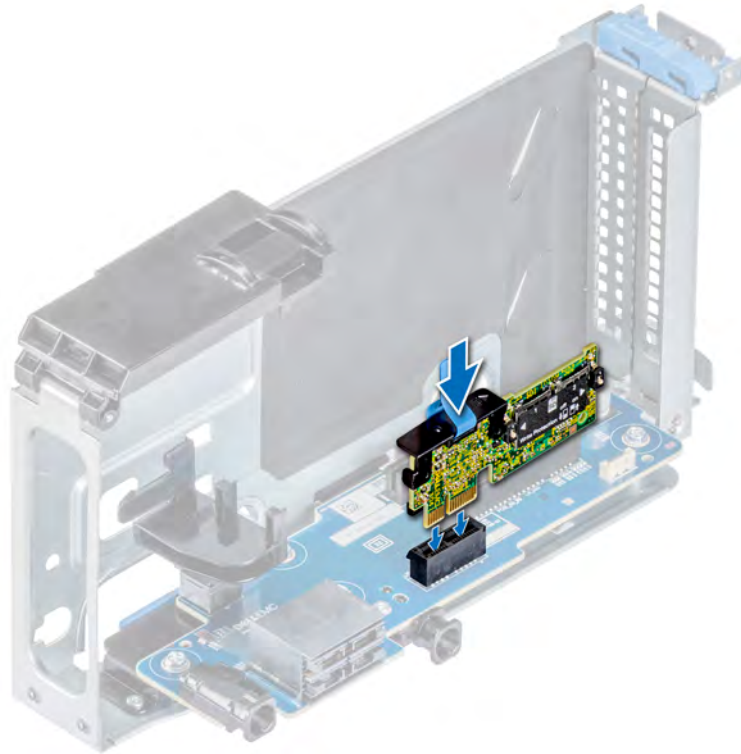
Next step
Install the MicroSD card.

Installing the MicroSD card

Prerequisites

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

ⓘ **NOTE: To use an MicroSD card with your system, ensure that the Internal SD Card Port is enabled in System Setup.**

ⓘ **NOTE: If reinstalling, ensure that you install the MicroSD cards into the same slots based on the labels you had marked on the cards during removal.**

Steps
1   Locate the MicroSD card connector on the IDSDM or vFlash module. Orient the MicroSD card appropriately and insert the contact-pin end of the card into the slot.

Figure 73. Installing the MicroSD card

> ⓘ **NOTE: The slot is keyed to ensure correct insertion of the card.**

2   Press the card into the card slot to lock it into place.

Next steps

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

Network daughter card

The network daughter card (NDC) is a small, removable mezzanine card, which provides the flexibility of selecting different network connectivity options.

Removing network daughter card

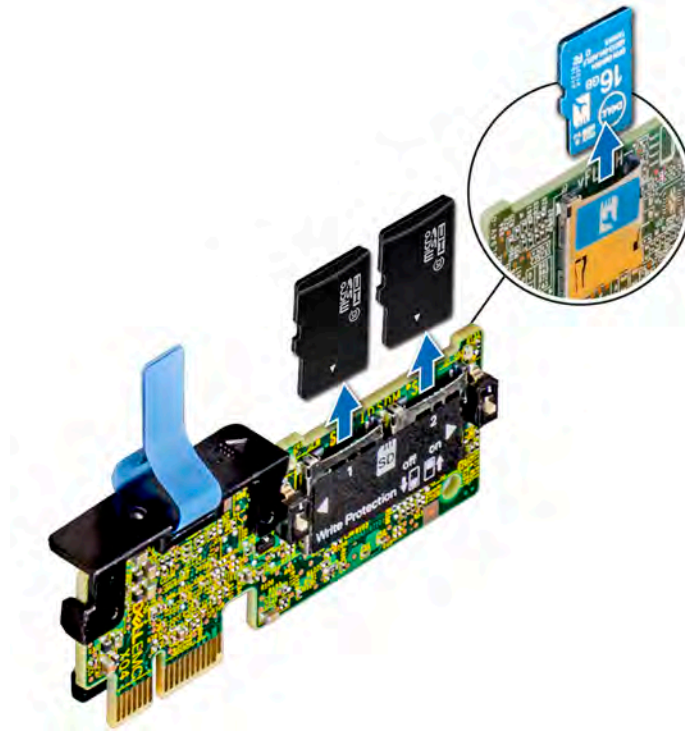**Prerequisites**

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

Steps

1   Using a Phillips #2 screwdriver, loosen the captive screws that secure the network daughter card (NDC) to the system board.

2   Hold the NDC by the edges, and lift to disengage it from the connector on the system board.

3   Slide the NDC towards the front of the system until the Ethernet connectors are clear of the slot in the back of the system.
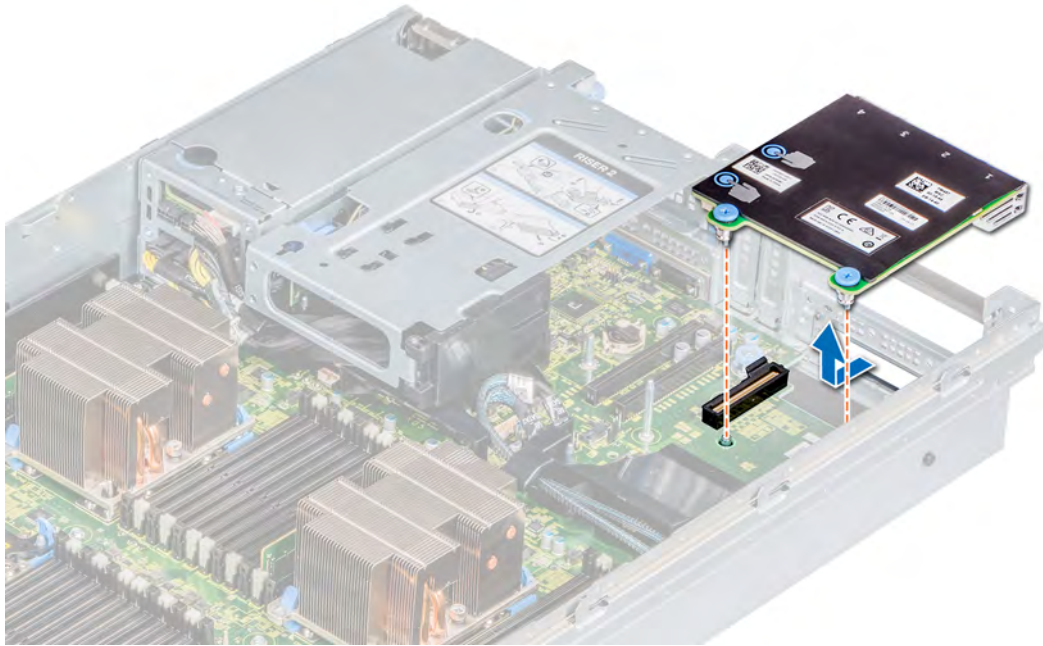
Figure 74. Removing network daughter card

Next step

1   Replace the Network daughter card.

Installing network daughter card

Prerequisites
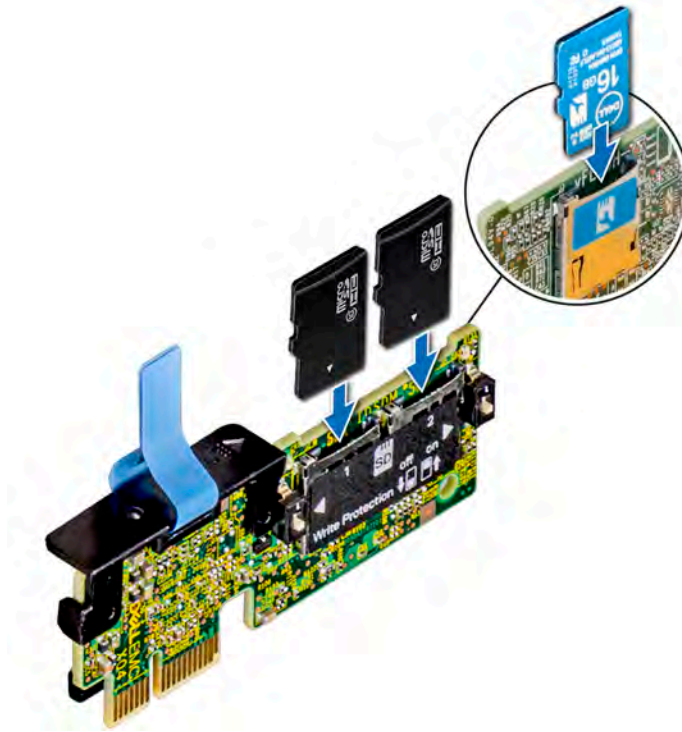
1   Follow the safety guidelines listed in Safety instructions.

2   Follow the procedure listed in Before working inside your system.

3   Remove the air shroud.

4   Remove the expansion card riser 1.

Steps

1   Orient the NDC so that the Ethernet connectors fit through the slot in the chassis.

2   Align the captive screws on the card with the screw holes on the system board.

3   Press the touch points on the card until the card connector is firmly seated on the system board connector.

4   Using a Phillips #2 screwdriver, tighten the captive screws to secure the NDC to the system board.
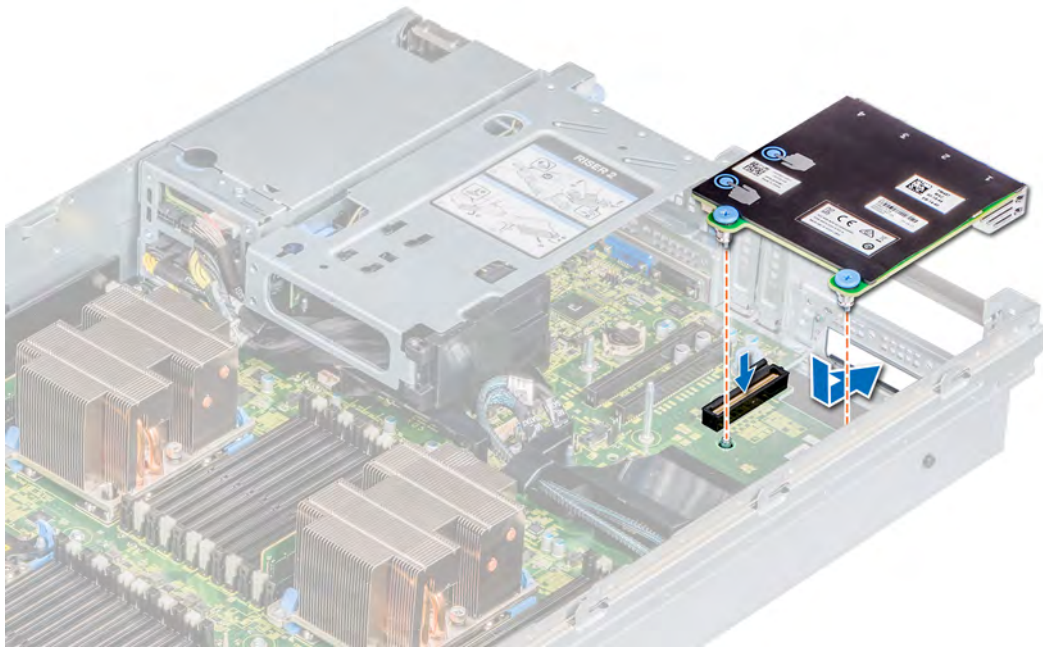
Figure 75. Installing the network daughter card

Next steps

1 Install the expansion card riser 1 or the rear drive cage, depending on the configuration of your system.
2 Install the air shroud.
3 Follow the procedure listed in After working inside your system.

Drive backplane

The drive backplanes supported in PowerEdge R840 are shown here:
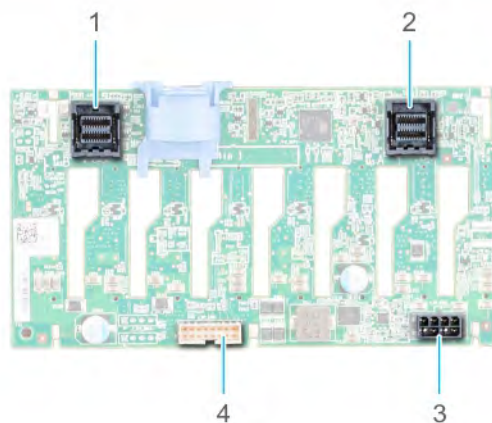
Figure 76. 8 x 2.5-inch backplane

1	miniSAS hard drive B 1	2	miniSAS hard drive A 1
3	Power cable connector	4	Backplane signal connector
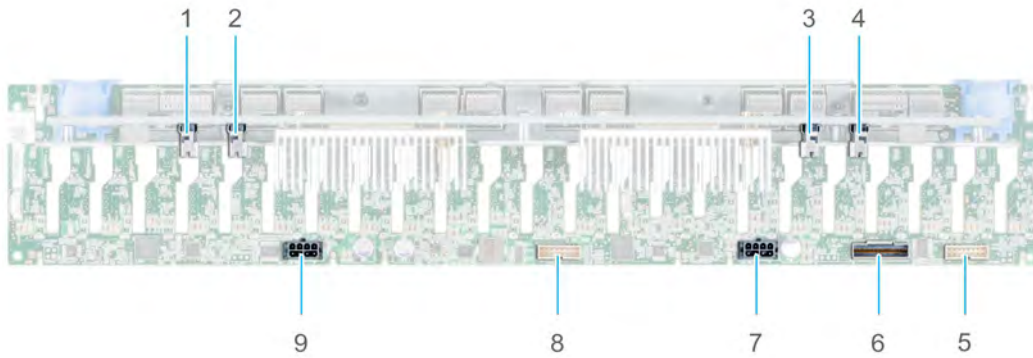
Figure 77. 24 x 2.5-inch (24 NVMe) backplane

1	PCIe cable connector	2	PCIe cable connector
3	PCIe cable connector	4	PCIe cable connector
5	Backplane signal connector	6	SAS/SATA cable connector
7	Power cable connector	8	Backplane signal connector
9	Power cable connector		
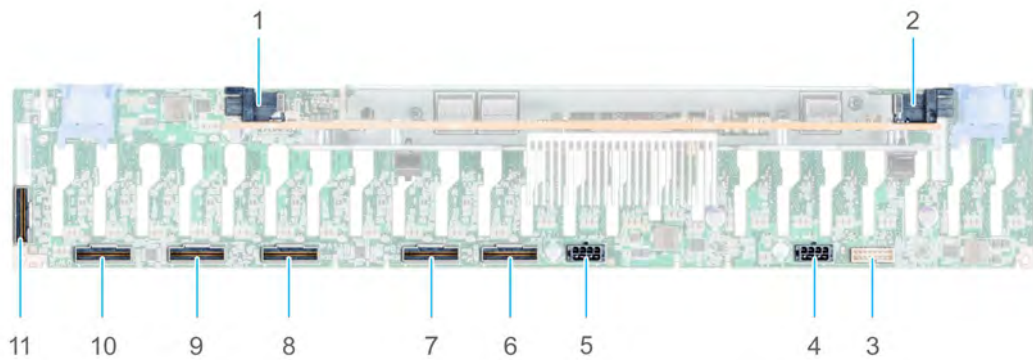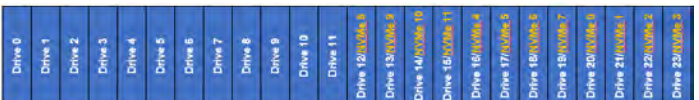
Figure 78. 2.5 inch (x24) SAS/SATA (expander) with universal slot for NVMe backplane

1	SAS cable connector A	2	SAS cable connector B
3	Backplane signal connector(J_BP_SIG)	4	Power cable connector (J_PWR_A)
5	Power cable connector (J_PWR_B)	6	PCIe cable connector
7	PCIe cable connector	8	PCIe cable connector
9	PCIe cable connector	10	PCIe cable connector
11	PCIe cable connector		

Drive mapping

Table 20. Supported drive options

Chassis options		Configurations
Twenty-four drive chassis	Drive 0 – Drive 23	Up to twenty four 2.5 inch SAS/SATA front accessible drives in slots 0 through 23
		Up to twenty four 2.5 inch SAS/SATA front accessible drives in slots 0 through 23 + two 2.5 inch rear accessible SAS/SATA drives
	Drive 0 – Drive 23/NVMe	Up to twelve 2.5 inch SAS/SATA front accessible drives in slots 0 through 11 + twelve SAS/SATA/NVMe front accessible drives in slots 12 through 23
	NVMe 0 – NVMe 11 (Bay 0 and Bay 1)	Up to twenty four 2.5 inch NVMe front accessible drives in slots 0 through 23
Eight hard drive chassis	Drive 0 – Drive 7	Up to eight 2.5 inch SAS/SATA front accessible drives in slots 0 through 7
		Up to eight 2.5 inch SATA front accessible drives in slots 0 through 7

Removing 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 replace them in the same location.**

ⓘ | **NOTE: The procedure to remove the backplane is similar for all backplane configurations.**

1 Follow the safety guidelines listed in Safety instructions.
2 Follow the procedure listed in Before working inside your system.
3 If applicable, remove the front bezel.
4 Remove all drives from the front bay.
5 Remove the air shroud.
6 Remove the cooling fan assembly.

Steps

1   Disconnect all the PERC cables from the adapter PERC cards.

2   Press and hold the blue release tabs, and lift the backplane up to disengage the slots on the backplane from the hooks on the system.

    ⓘ **NOTE: If your backplane has an expander board, the procedure to remove remains the same.**

Figure 79. Removing drive backplane

3   Lift the backplane and place it on the top of the hard drive bay, and then disconnect the power and I2C cables.

4   If applicable, disconnect all the slimline SAS cables from the system board.

Next step

1   Replace the drive backplane.

Installing drive backplane

Prerequisites

ⓘ **NOTE: The procedure to install the backplane is similar for all backplane configurations.**

1   Follow the safety guidelines listed in Safety instructions.

2   Follow the procedure listed in Before working inside your system.

3   Remove the front bezel, if applicable.

4   Remove all drives from the front bay.

5   Remove the air shroud.

6   Remove the cooling fan assembly.

Steps

1 Connect the cables.

    a   If applicable, connect the slimline SAS, I2C, and power cables to the backplane.

    b   Connect the I2C and power cables to the system board.

2 Holding the blue release tabs, align the slots on the backplane with the hooks on the system.

3 Lower the drive backplane until the blue release tabs snap into place.
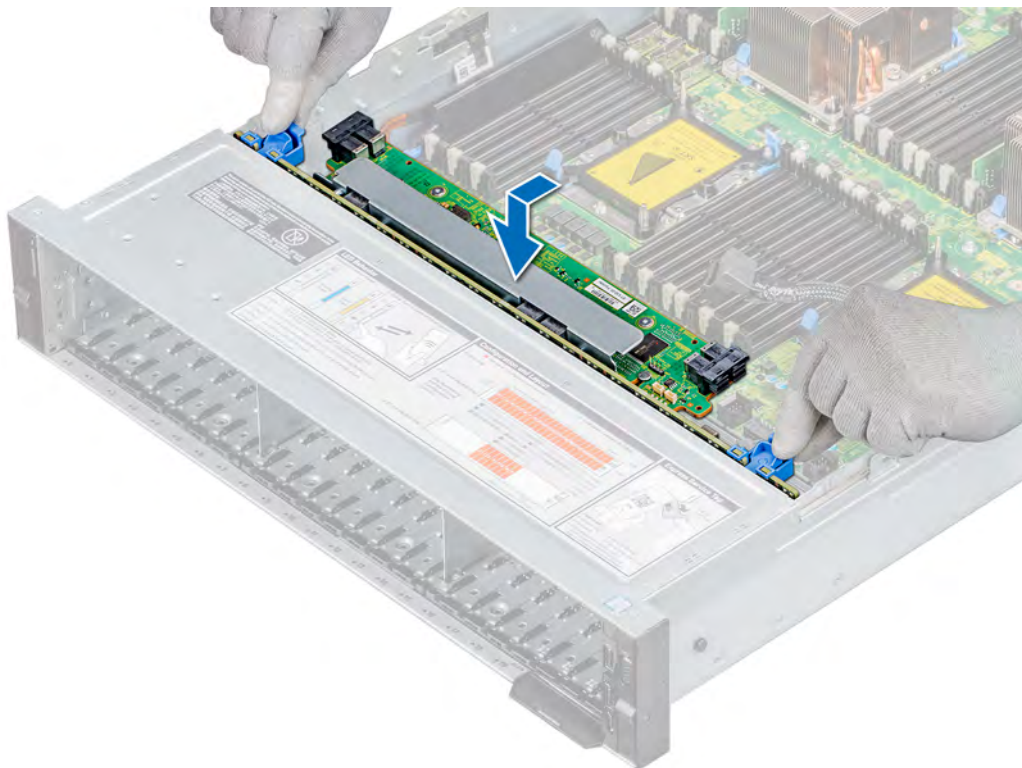
Figure 80. Installing drive backplane

4 If applicable, connect the slimline SAS cable to the system board.

5 If applicable, connect the PERC cables to the adapter PERC cards.

Next steps

1 Install the cooling fan assembly.

2 Install the air shroud.

3 Install the drives.

4 Install the front bezel, if applicable.

5 Follow the procedure listed in After working inside your system.

Cable routing
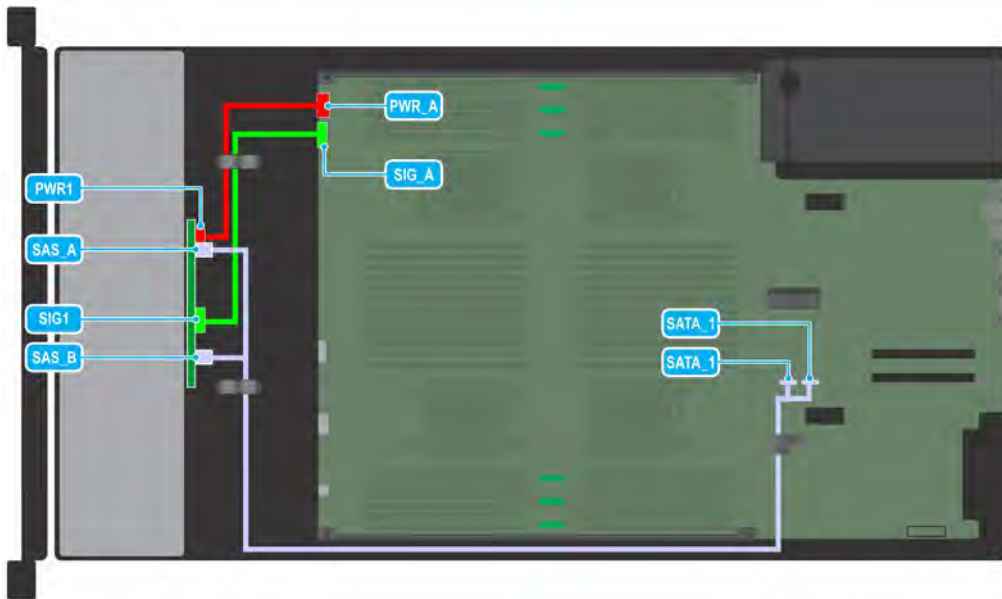
Figure 81. Cable routing - 8 x 2.5 inch, SATA drive backplane
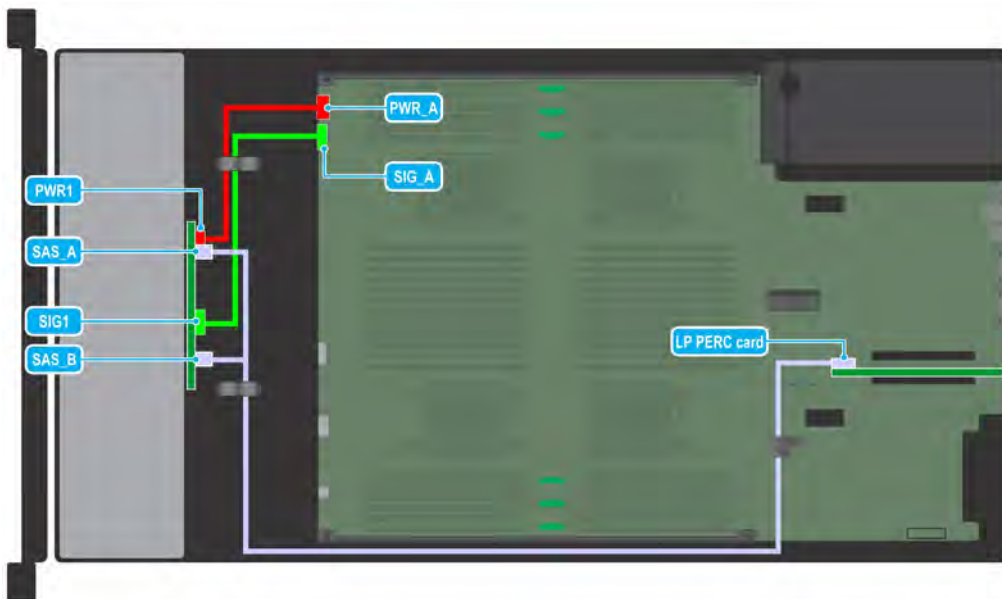
Figure 82. Cable routing - 8 x 2.5 inch, SAS/SATA drive backplane with GPU and single PERC card (Low profile riser)
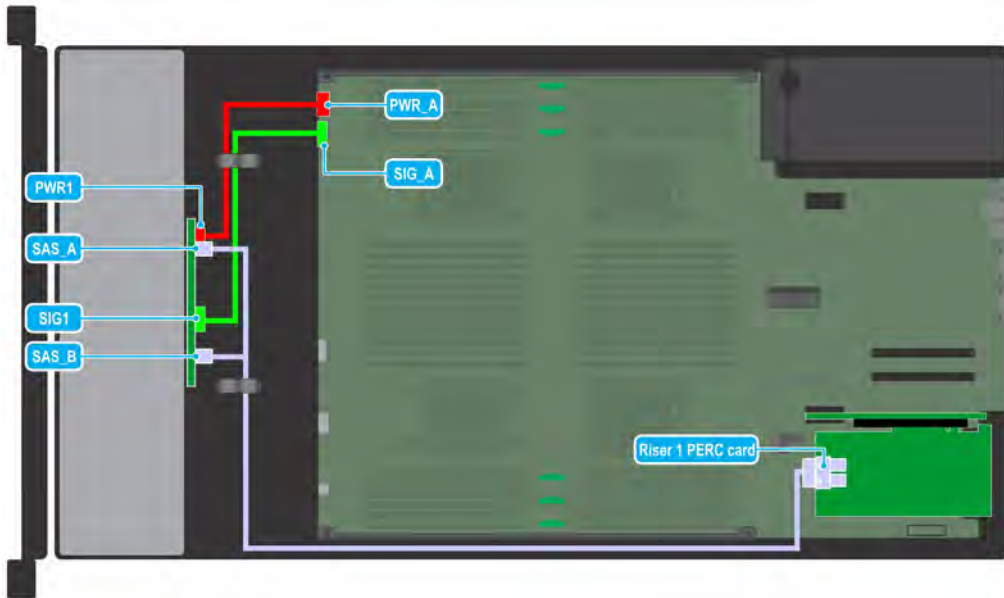
Figure 83. Cable routing - 8 × 2.5 inch, (SAS/SATA) drive backplane with single PERC card

ⓘ **NOTE:** If a GPU card is installed, the PERC card must be installed in the low profile expansion card slot on the system board.
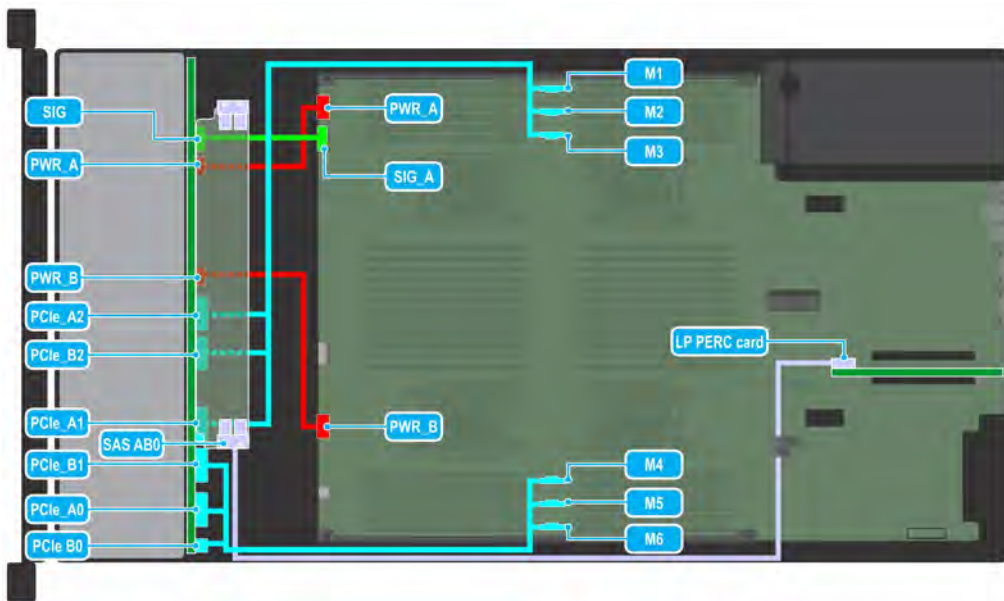
Figure 84. Cable routing - 24 × 2.5 inch, (SAS/SATA) drive backplane supporting x12 universal (SAS/SATA/NVMe) slots with GPU and single PERC card
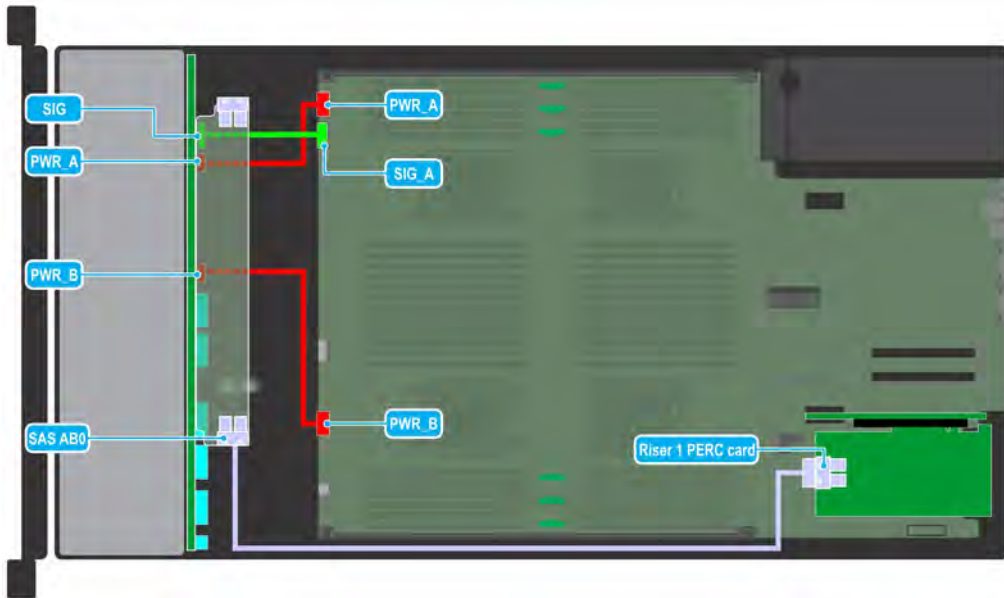
Figure 85. Cable routing - 24 × 2.5 inch, (SAS/SATA) drive backplane supporting with single PERC card
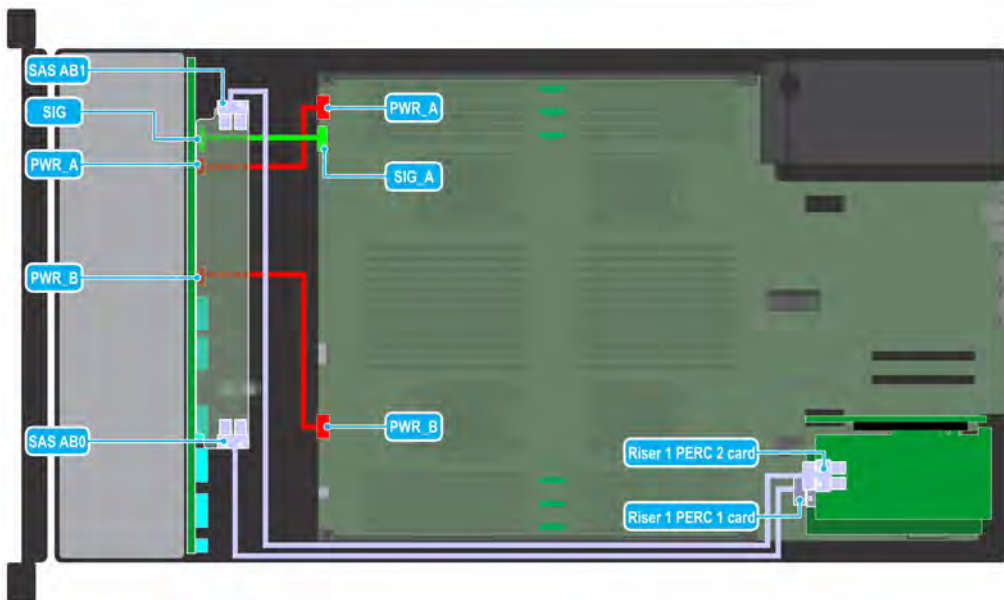
Figure 86. Cable routing - 24 × 2.5 inch, (SAS/SATA) drive backplane with dual PERC card
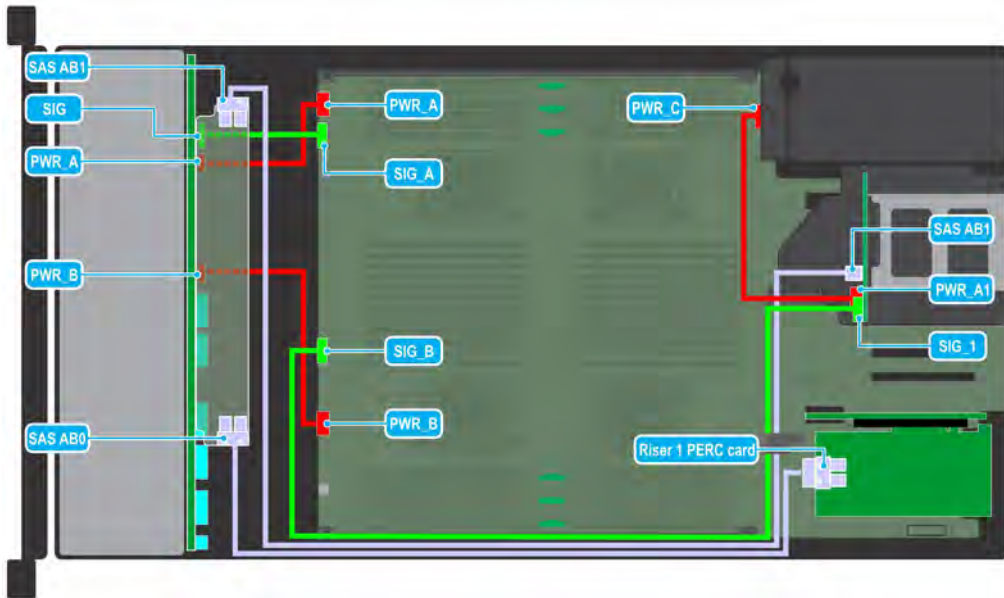
Figure 87. Cable routing - 26 x 2.5 inch, (SAS, 24 front + 2 rear) drive backplane with single PERC card
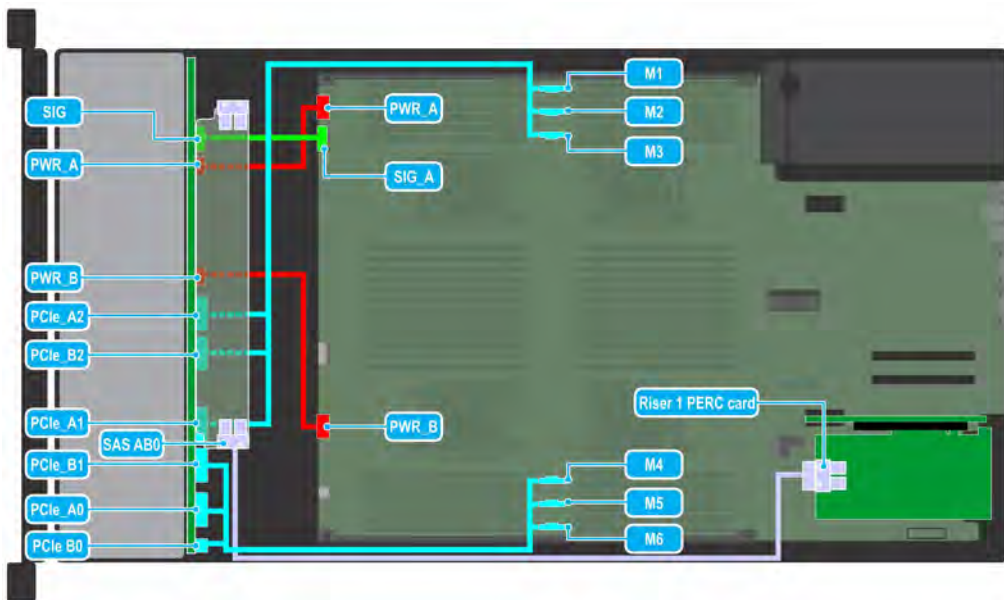
Figure 88. Cable routing - 24 x 2.5 inch, (12 SAS + 12 universal) drive backplane
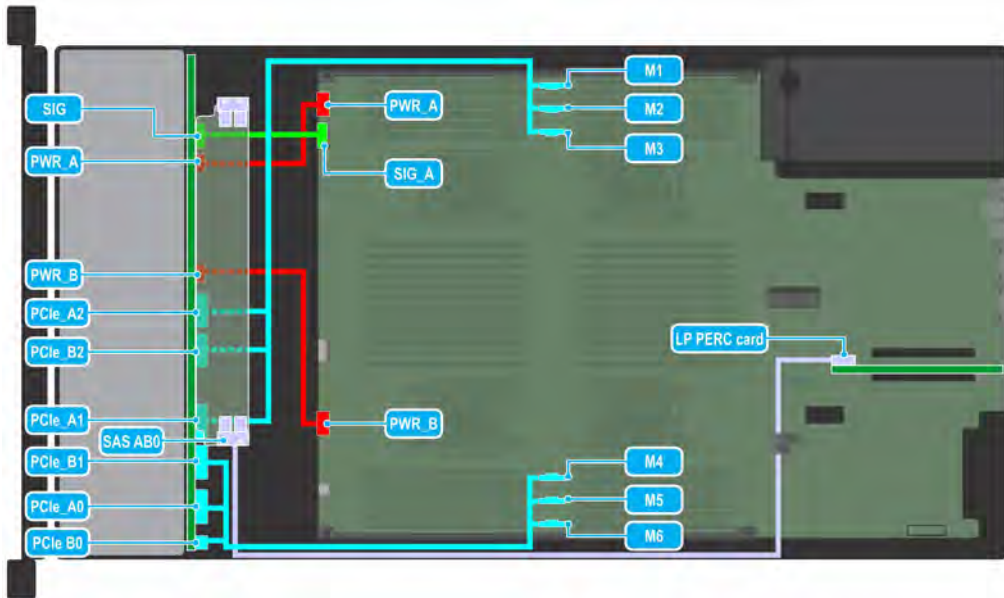
Figure 89. Cable routing - 24 × 2.5 inch, (12 SAS + 12 universal) drive backplane with single PERC card
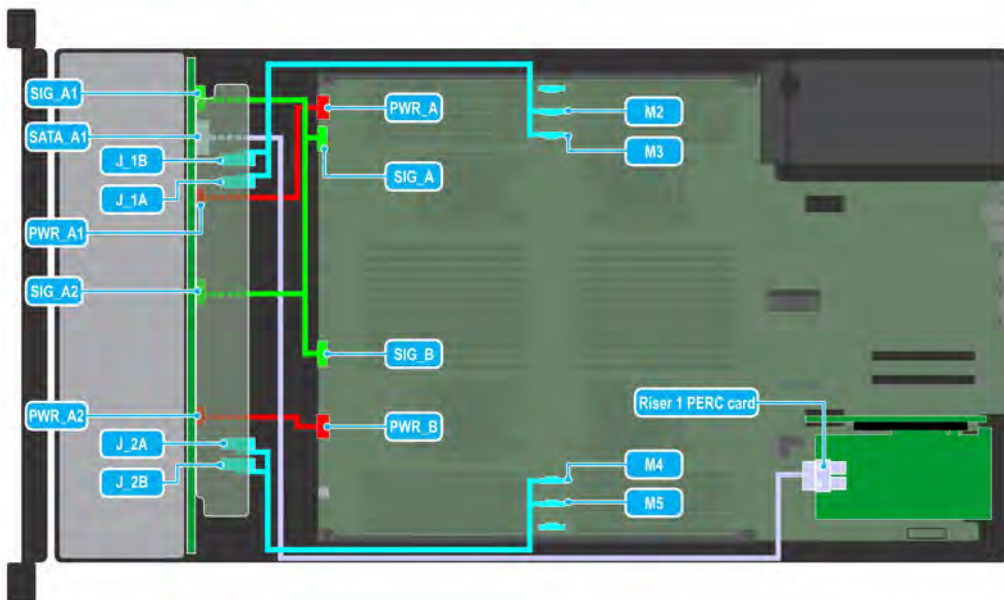
Figure 90. Cable routing - 24 × 2.5-inch, (16 NVMe + 8 universal) drive backplane with single PERC card

Figure 91. Cable routing - 24 x 2.5 inch, (16 NVMe + 8 universal) drive backplane

System battery

The system battery is used for low-level system functions such as powering the real-time and date settings of the system.

Replacing 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. For more information, see the safety information that shipped with your system.**
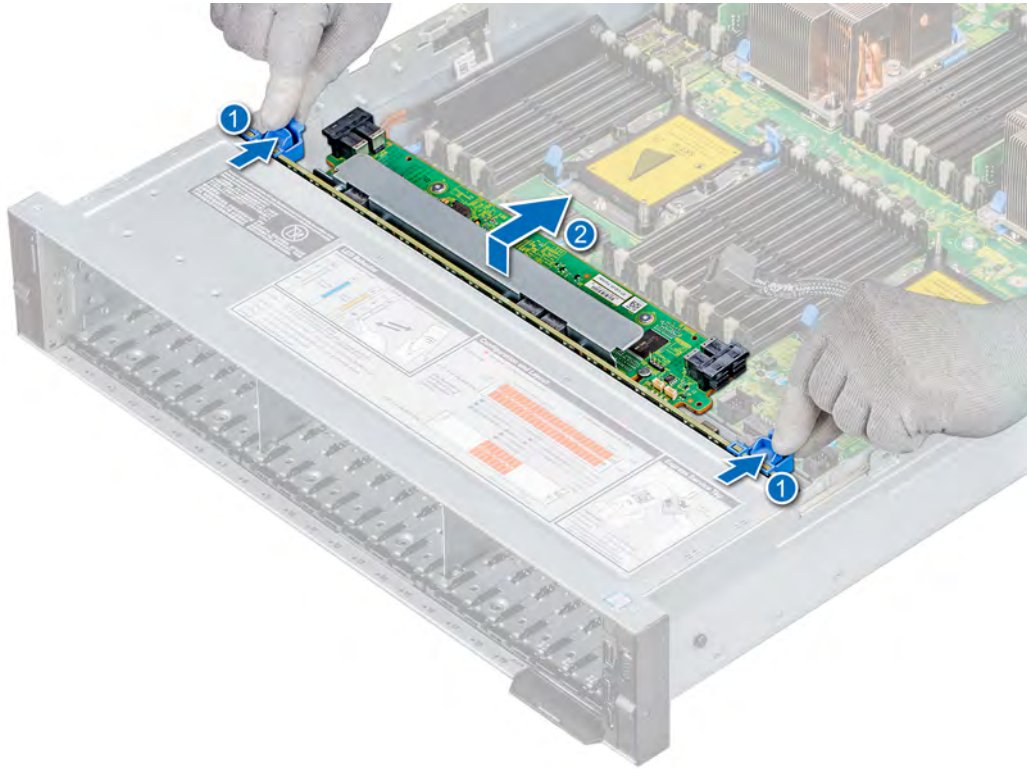
1 Follow the safety guidelines listed in Safety instructions.
2 Follow the procedure listed in Before working inside your system.
3 Remove the air shroud.
4 If applicable, disconnect the power or data cables from the expansion card riser x16 PCIe riser 2 or x8 PCIe riser 2.
5 If installed, remove the expansion card risers.
6 If installed, remove the PCIe expansion cards.

Steps

1 Locate the battery socket. For more information, see the System board jumpers and connectors section.

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

2 Use a plastic scribe to pry out the system battery.

Figure 92. Removing system battery

3   To install a new system battery, hold the battery with the positive side facing up and slide it under the securing tabs.

4   Press the battery into the connector until it snaps into place.

Figure 93. Installing system battery

Next steps

1   If applicable, install the low profile PCIe cards.

2   If applicable, install the expansion card riser x16 PCIe riser 2 or x8 PCIe riser 2.

3   Connect the power or data cables to the expansion card risers.

4   Install air shroud.

5   Follow the procedure listed in After working inside your system.

6   While booting, press F2 to enter the System Setup and ensure that the battery is operating properly.

7   Enter the correct time and date in the System Setup **Time** and **Date** fields.

8   Exit the System Setup.

Optional USB 3.0 module

The USB 3.0 module cable connects to the internal USB port on the system board.

(i) | **NOTE: The optional USB 3.0 module is supported only on the 8 x 2.5-inch system configuration.**

Removing USB 3.0 module

Prerequisites

1   Follow the safety guidelines listed in Safety instructions.

2   Follow the procedure listed in Before working inside your system.

3   Remove the air shroud.

4   Remove the cooling fan assembly.

5   Remove the internal USB memory key.

ⓘ **NOTE: Ensure that you note the routing of the cables as you remove them from the system board. Route these cables properly when you replace them to prevent them from being pinched or crimped.**

Steps

1 Disconnect the cables from the system board.

2 Using the Phillips #2 screwdriver, loosen the screw on the USB 3.0 module.

3 Slide the USB 3.0 module out of the system.

Figure 94. Removing USB 3.0 module

Next step

1 Replace the USB 3.0 module.

Installing USB 3.0 module

Prerequisites

1 Follow the safety guidelines listed in Safety instructions.

2 Follow the procedure listed in Before working inside your system.

3 Remove the air shroud.

4 Remove the cooling fan assembly.

Steps

1 Route the power and the USB cables on the USB 3.0 module through the USB 3.0 module slot on the front of the system.

2 Insert the USB 3.0 module into the slot on the front panel.

3 Align the screw on the module with the screw hole on the system.

4 Using a Phillips #2 screwdriver, tighten the screw to secure the module to the system.

5 Route and connect the USB cable to internal USB port and power cable to the backplane power connector on the system board. To locate the connector, see the System board jumpers and connectors section.

Figure 95. Installing USB 3.0 module

Next steps

1 Install the internal USB memory key.
2 Install the cooling fan assembly.
3 Install the air shroud.
4 Follow the procedure listed in After working inside your system.

Optional internal USB memory key

An optional USB memory key installed inside your system can be used as a boot device, security key, or mass storage device. To boot from the USB memory key, configure the USB memory key with a boot image and then specify the USB memory key in the boot sequence in System Setup.

An optional USB memory key can be installed in the internal USB 3.0 port.

(i) **NOTE: To locate the internal USB port on the system board, see the System board jumpers and connectors section.**

Replacing optional 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 wide × 57.15 mm long × 7.9 mm high.**

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

Steps

1   Locate the USB port or USB memory key on the system board.

     To locate the internal USB port on the system board, see the System board jumpers and connectors section.

2   If installed, remove the USB memory key from the USB port.

3   Insert the replacement USB memory key into the USB port.

Next steps

1   Install the air shroud.

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 optical drive

Optical drives retrieve and store data on optical discs such as CD and DVD. Optical drives can be categorized into two basic types: optical disc readers and optical disc writers.

ⓘ **NOTE: Optical drives are supported only on the 8 x 2.5-inch system configuration.**

Removing optical drive

Prerequisites

1   Follow the safety guidelines listed in Safety instructions.

2   Follow the procedure listed in Before working inside your system.

3   If applicable,remove the front bezel.

Steps

1   Press the release tab to release the optical drive.

2   Disconnect the power and data cables from the connectors on the optical drive.

     ⓘ **NOTE: Ensure that you note the routing of the power and data cable on the side of the system as you remove them from the system board and drive.**

3   Slide the optical drive out of the system until it is free of the optical drive slot.
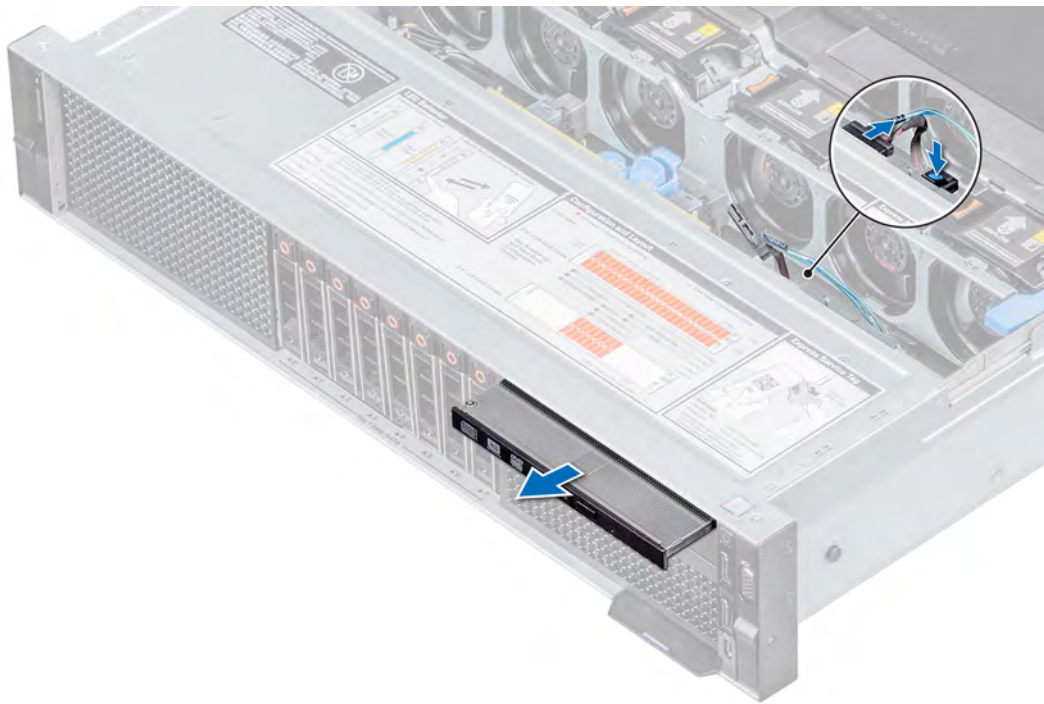
Figure 96. Removing optical drive

4   If you are not installing a new optical drive, install the optical drive blank.

ⓘ **NOTE: The procedure to install an optical blank is similar to the optical drive.**

Next step

1   Replace the optical drive.

Installing optical drive

Prerequisites

1   Follow the safety guidelines listed in Safety instructions.
2   Follow the procedure listed in Before working inside your system.
3   If applicable, remove the front bezel.

Steps

1   If installed, remove the optical drive blank.

ⓘ **NOTE: The procedure to remove an optical blank is similar to the optical drive.**

2   Align the optical drive with the optical drive slot on the front of the system.
3   Slide in the optical drive until the release tab snaps into place.
4   Connect the power and data cables to the connectors on the optical drive.

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

Next steps
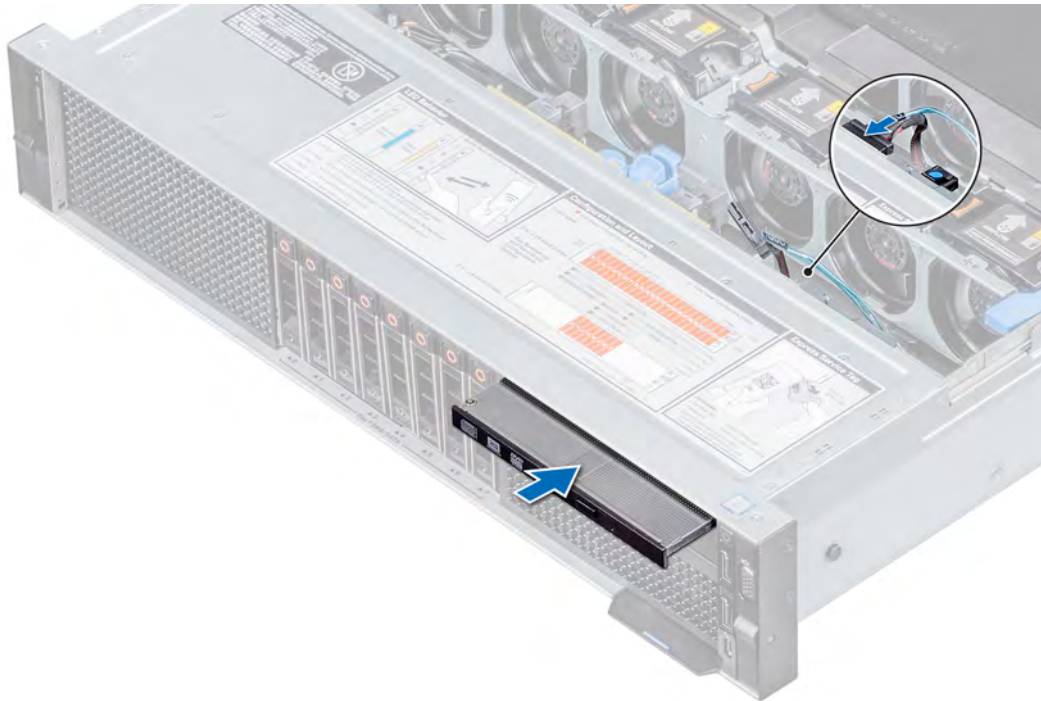
Figure 97. Installing optical drive

1   If applicable, install the front bezel.
2   Follow the procedure listed in After working inside your system.

Power supply units

The power supply unit (PSU) is an internal hardware component which supplies power to the components in the system.

Your system supports one of the following:

- Two 2400 W, 2000 W, 1600 W, 1100 W, or 750 W AC PSUs
- Two 1100 W DC PSUs
- Two 1100 W or 750 W Mixed Mode HVDC PSUs

ⓘ **NOTE: For more information about power supply units, see the Technical specifications section.**

⚠ **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. Mixing PSUs result in mismatch condition or failure to turn on the system.**

ⓘ **NOTE: When two identical PSUs are installed, power supply redundancy (1+1 – with redundancy or 2+0 – without redundancy) is configured in system BIOS. In redundant mode, power is supplied to the system equally from both PSUs when Hot Spare is disabled. When Hot Spare is enabled, one of the PSUs is put into the sleep mode when system utilization is low to maximize efficiency.**

ⓘ **NOTE: If two PSUs are used, they must be of the same maximum output power.**

ⓘ **NOTE: In a single PSU configuration, install the PSU in bay 1 (bottom PSU slot).**

Hot spare feature

Your system supports the hot spare feature that significantly reduces the power overhead associated with 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 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, then the redundant PSU is switched to the active state.
- If the load on the active PSU falls below 20 percent, 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 about iDRAC settings, see the *Integrated Dell Remote Access Controller User's Guide* available at **Dell.com/idracmanuals**.

Removing a power supply unit blank

Prerequisite
Follow the safety guidelines listed in Safety instructions.
Step

If you are installing a second PSU, remove the PSU blank in the bay by pulling the blank outward.

⚠ **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.**

Figure 98. Removing a power supply unit blank

Next step
Install the PSU or PSU blank.

Installing a power supply unit blank

Prerequisites

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

Step

Align the PSU blank with the PSU slot and push it into the PSU slot until it clicks into place.

Figure 99. Installing a power supply unit blank

Removing power supply unit

The procedure for removing AC and DC PSUs is identical.

Prerequisites

⚠ **CAUTION: The system needs 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 Safety instructions.

1   Disconnect the power cable from the power source and from the PSU you intend to remove, and then remove the cable from the strap on the PSU handle.

2   To remove the PSU, remove optional strain relief bar and strain relief bar attachment bracket, if they interfere with the PSU removal.

For information about the strain relief bar attachment bracket and strain relief bar, see the system's Rail Installation Guide at Dell.com/poweredgemanuals.

Step

Press the release latch, and holding the PSU handle slide the PSU out of the system.
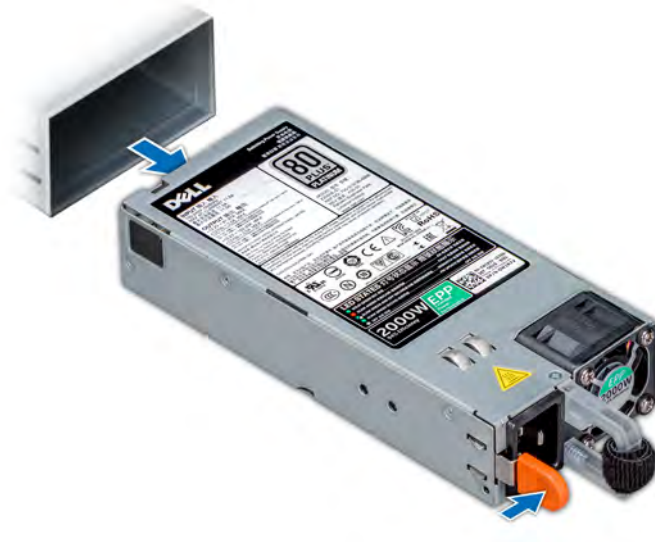
Figure 100. Removing power supply unit

Next step

1   Install the PSU or the PSU blank.

Installing power supply unit

The procedure for installing AC and DC PSUs is identical.

Prerequisites

1   Follow the safety guidelines listed in 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.

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

Step

Slide the PSU into the system until the PSU is fully seated and the release latch snaps into place.

Figure 101. Installing power supply unit

Next steps

1   If you have removed the strain relief bar attachment bracket and strain relief bar, reinstall them. For information about the strain relief bar attachment bracket and strain relief bar, see the system's Rail Installation Guide at 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.**

> ⓘ **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. Wait until the new PSU is discovered and enabled before you remove the other PSU. The PSU status indicator turns green to signify that the PSU is functioning properly.**

Wiring instructions for a DC power supply unit

Your system supports up to two –(48–60) V DC power supply units (PSUs).

> ⚠ **WARNING: For equipment using –(48–60) V DC power supply units (PSUs), a qualified electrician must perform all connections to DC power and to safety grounds. Do not attempt connecting to DC power or installing grounds yourself. All electrical wiring must comply with applicable local or national codes and practices. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow all safety instructions that came with the product.**

> △ **CAUTION: Wire the unit with copper only, unless otherwise specified, use only 10 American Wire Gauge (AWG) wire rated minimum 90ºC for source and return. Protect the –(48–60) V DC (1 wire) with a branch circuit over-current protection rated 50 A for DC with a high interrupt current rating.**

> △ **CAUTION: Connect the equipment to a –(48–60) V DC supply source that is electrically isolated from the AC source (reliably grounded –(48–60) V DC SELV source). Ensure that the –(48–60) V DC source is efficiently secured to earth (ground).**

> ⓘ **NOTE: A readily accessible disconnect device that is suitably approved and rated shall be incorporated in the field wiring.**

Input requirements

· Supply voltage: –(48–60) V DC

- Current consumption: 32 A (maximum)

Kit contents

- Dell part number 6RYJ9 terminal block or equivalent (1)
- #6-32 nut equipped with lock washer (1)

Required tools

Wire-stripper pliers capable of removing insulation from size 10 AWG solid or stranded, insulated copper wire.

ⓘ | **NOTE: Use alpha wire part number 3080 or equivalent (65/30 stranding).**

Required wires

- One UL 10 AWG, 2 m maximum (stranded) black wire [−(48−60) V DC].
- One UL 10 AWG, 2 m maximum (stranded) red wire (V DC return).
- One UL 10 AWG, 2 m maximum, green with a yellow stripe, stranded wire (safety ground).

Assembling and connecting safety ground wire

Prerequisite

⚠ | **WARNING: For equipment using −(48−60) V DC power supply units (PSUs), a qualified electrician must perform all connections to DC power and to safety grounds. Do not attempt connecting to DC power or installing grounds yourself. All electrical wiring must comply with applicable local or national codes and practices. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow all safety instructions that came with the product.**

Steps

1   Strip the insulation from the end of the green or yellow wire, exposing approximately 4.5 mm (0.175 inch) of copper wire.

2   Using a hand-crimping tool (Tyco Electronics, 58433-3 or equivalent), crimp the ring-tongue terminal (Jeeson Terminals Inc., R5-4SA or equivalent) to the green and yellow wire (safety ground wire).

3   Connect the safety ground wire to the grounding post on the back of the system by using a #6-32 nut equipped with a locking washer.

Assembling DC input power wires

Prerequisite

⚠ | **WARNING: For equipment using −(48−60) V DC power supply units (PSUs), a qualified electrician must perform all connections to DC power and to safety grounds. Do not attempt connecting to DC power or installing grounds yourself. All electrical wiring must comply with applicable local or national codes and practices. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow all safety instructions that came with the product.**

Steps

1   Strip the insulation from the ends of the DC power wires, exposing approximately 13 mm (0.5 inch) of copper wire.

⚠ | **WARNING: Reversing polarity when connecting DC power wires can permanently damage the power supply or the system.**

2   Insert the copper ends into the mating connectors and tighten the captive screws at the top of the mating connector using a Phillips #2 screwdriver.

⚠ | **WARNING: To protect the power supply from electrostatic discharge, the captive screws must be covered with the rubber cap before inserting the mating connector into the power supply.**

3   Rotate the rubber cap clockwise to fix it over the captive screws.

4   Insert the mating connector into the power supply.

Power Interposer Board

The Power Interposer Board (PIB) is a board that connects the hot swappable power supply units (PSUs) to the system board.

Removing Power Interposer Board

Prerequisites

1   Follow the safety guidelines listed in Safety instructions.

2   Follow the procedure listed in Before working inside your system.

3   Remove the applicable air shroud:

    a   Non-GPU air shroud

    b   Expansion card riser 2

    OR

    a   GPU air shroud

    b   Expansion card riser 2

4   Remove the power supply units

    ⚠ **CAUTION: To prevent damage to the power interposer board, you must remove the power supply module (s) or power supply blank from the system before removing the power interposer board or power distribution board.**

Steps

1   Disconnect the cables connected from the power interposer board (PIB) to the system board, and remove the cables from the cable retention brackets.

    ⓘ **NOTE: Observe the routing of the cable as you remove it from the system. Route the cable properly when you replace it to prevent the cable from being pinched or crimped.**

2   Using a Phillips #2 screwdriver, remove the screw securing the PIB to the system.

3   Holding the blue touch point on the PIB, gently lift, to release it from the PSU cage, and slide it out.

4   Lift the PIB away from the system.
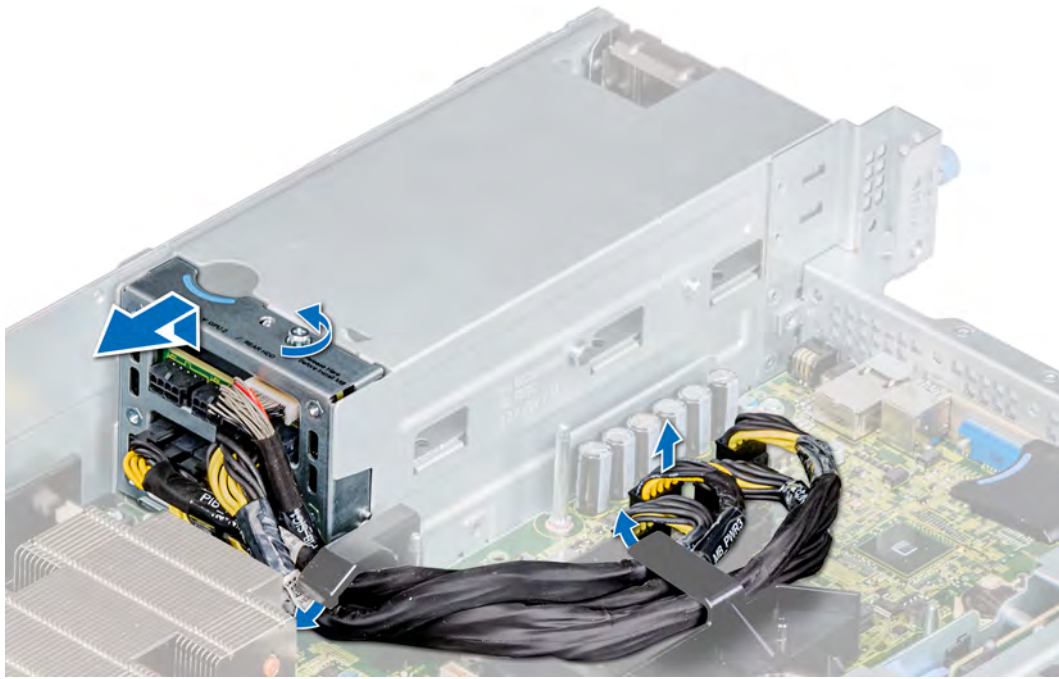
Figure 102. Removing power interposer board

Next step

1   Replace the power interposer board (PIB).

Installing Power Interposer Board

Prerequisites

1   Follow the safety guidelines listed in Safety instructions.
2   Follow the procedure listed in Before working inside your system.
3   Remove the applicable air shroud:

    a   Non-GPU air shroud

    b   Expansion card riser 2

    OR

    a   GPU air shroud

    b   Expansion card riser 2

4   Remove the power supply units

⚠ **CAUTION: To prevent damage to the power interposer board, you must remove the power supply module (s) or power supply blank from the system before removing the power interposer board or power distribution board.**

ⓘ **NOTE: Ensure that the cables inside the system are correctly routed and secured using the cable securing latches.**

Steps

1   Align and push the PIB to the PSU cage and slide it into place.
2   Using Phillips #2 screwdriver, tighten the screw to secure the PIB to the system.
3   Route the cables, and connect it to the system board.
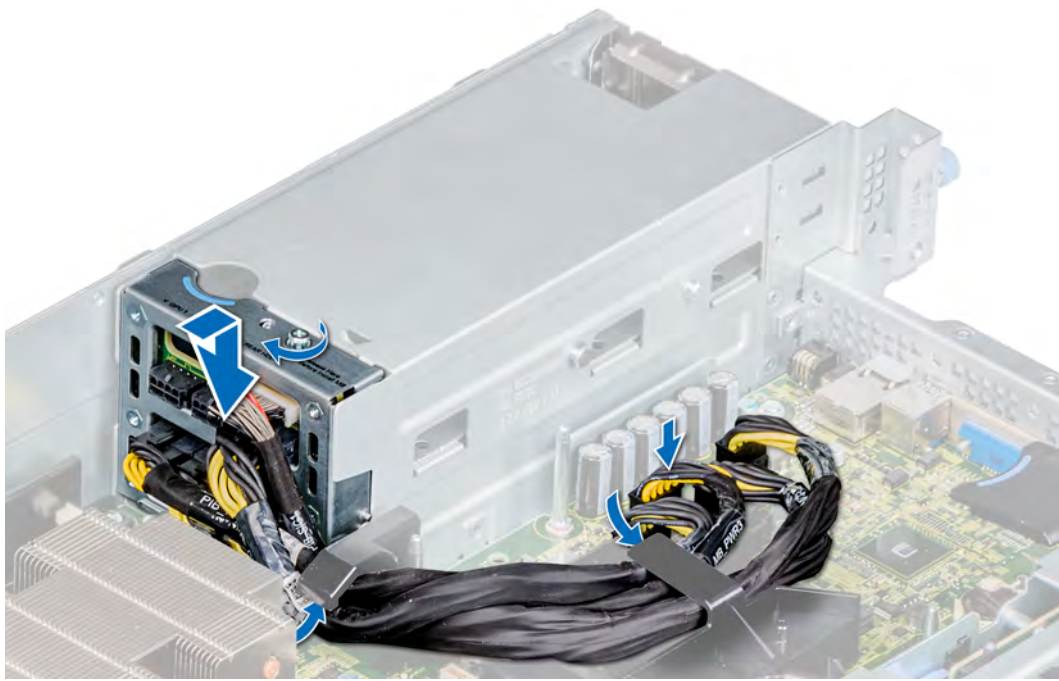
Figure 103. Installing power interposer board

Next steps

1 Install the power supply unit (PSU).
2 Install the applicable air shroud:
  a GPU air shroud
  b Expansion card riser 2

  OR

  a Expansion card riser 2
  b Non-GPU air shroud
3 Follow the procedure listed in After working inside your system.

System board

A system board (also known as the motherboard) is the main printed circuit board in the system with different connectors used to connect different components or peripherals of the system. A system board provides the electrical connections to the components in the system to communicate.

Removing 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.**

⚠ **CAUTION: Do not attempt to remove the TPM plug-in module from the system board. After the TPM plug-in module is installed, it is cryptographically bound to that specific system board. Any attempt to remove an installed TPM plug-in module breaks the cryptographic binding, and it cannot be reinstalled or installed on another system board.**

1 Follow the safety guidelines listed in Safety instructions.

2 Follow the procedure listed in Before working inside your system.

3 Remove the following:

    a   Non-GPU air shroud or GPU air shroud

    b   Cooling fan assembly.

    c   Processor and heat sink module

    d   Backplane cables connected to the system board

    e   Power interposer board (PIB).

> △ **CAUTION: When replacing the system board, disconnect the cables from the system board, but do not disconnect the cables attached to the PIB.**

    f   Expansion card risers

    g   iDSDM/vFlash card

    h   Internal USB key, if installed

    i   USB 3.0 module cable connected to the system board

    j   Processor blanks, if installed

> △ **CAUTION: To prevent damage to the processor socket when replacing a faulty system board, ensure that you cover the processor socket with the processor dust cover.**

    k   Network daughter card.

    l   Drive cage (rear), if installed.

Steps

1 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.**

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

2 Holding the blue plungers, slide the system board to the front of the system.

3 Incline the system board at an angle, and lift the system board out of the system.
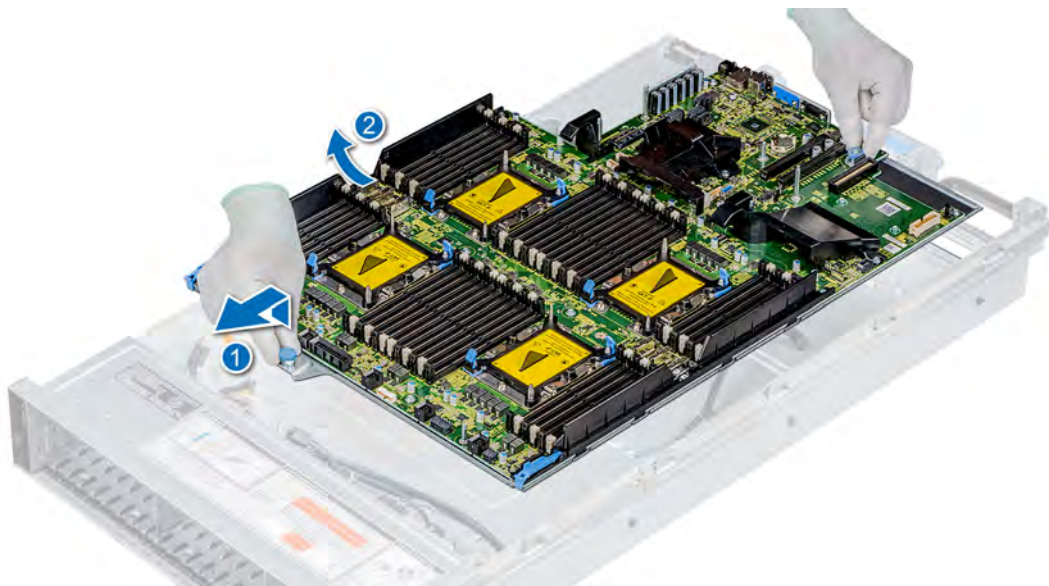
Figure 104. Removing system board

Next step

1 Replace or install the system board.

Installing system board

Prerequisites

1 Follow the safety guidelines listed in Safety instructions.
2 If you are replacing the system board, remove all the components listed in the Removing the system board section.

Steps

1 Unpack the replacement system board assembly.

> △ **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 system.**

2 Holding the system board plungers, incline the system board at an angle and align the connectors on the system board with the slots on the system, and lower the system board into the system.
3 Slide the system board toward the back of the system until the plungers click into place.
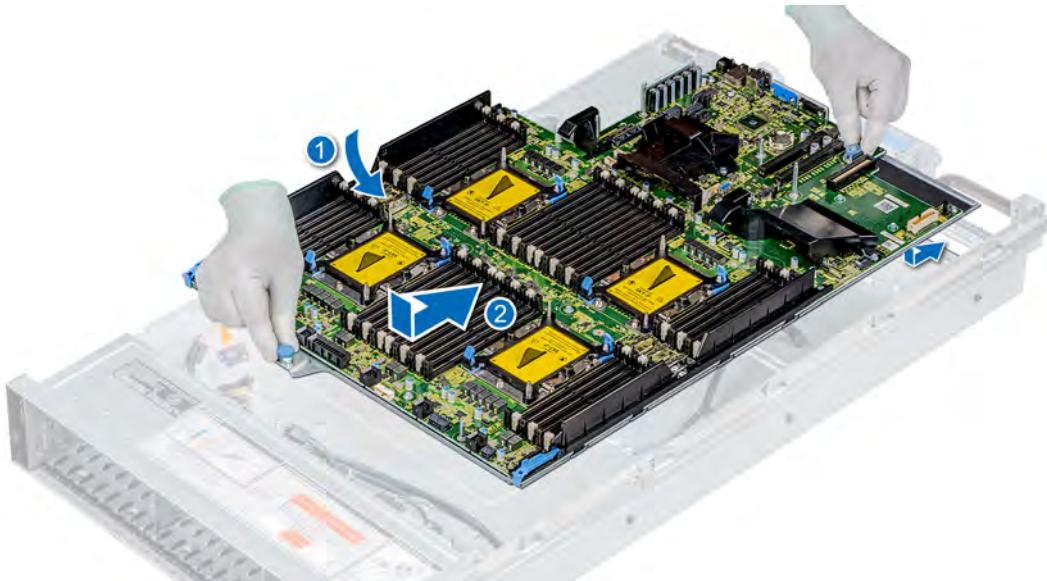
Figure 105. Installing system board

Next steps

1 Replace the following:
   a Trusted Platform Module (TPM)

> ⓘ **NOTE: The TPM must be replaced only while installing a new system board.**

> ⓘ **NOTE: The TPM plug-in module is attached to the system board and cannot be removed. A replacement TPM plug-in module is provided for all system board replacements, where a TPM plug-in module was installed.**

   b Network daughter card.
   c Power Interposer Board (PIB).
   d USB 3.0 module cables, if applicable
   e Backplane cables, if applicable
   f Processor and heat sink module
   g Internal USB key, if applicable

     h   iDSDM/vFlash module

     i   Expansion card risers

     j   Cooling fan assembly.

     k   Air shroud.

     l   Drive cage (rear), if applicable.

2   Replace the iDRAC MAC address label from the luggage tag on the front of the system with the new iDRAC MAC address label that came with the replacement system board.

3   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 bracket.**

4   Boot the system.

5   Follow the procedure listed in After working inside your system.

6   Ensure that you:

     a   Use the Easy Restore feature to restore the Service Tag. For more information, see the Restoring the Service Tag using Easy Restore section.

     b   If the Service Tag is not backed up in the backup flash device, enter the Service Tag manually. For more information, see the Manually update the Service Tag section.

     c   Update the BIOS and iDRAC versions.

     d   Re-enable the Trusted Platform Module (TPM). For more information, see the Upgrading the Trusted Platform Module (TPM) section.

7   Import your new or existing iDRAC Enterprise license.

     For more information, see iDRAC User's Guide, at Dell.com/iDRACmanuals.

8   Follow the procedure listed in After working inside your system.

Restoring Service Tag using Easy Restore

The Easy Restore feature allows you to restore your Service Tag, iDRAC license, UEFI configuration, and the system configuration data after replacing the system board. All data is backed up in a backup Flash drive device automatically. If BIOS detects a new system board, and the Service Tag in the backup Flash drive device is different, BIOS prompts the user to restore the backup information.

Following is a list of options available:

1   Restore the Service Tag, iDRAC license, and diagnostics information, press **Y.**

2   Navigate to the Lifecycle Controller based restore options, press **N.**

3   Restore data from a previously created **Hardware Server Profile**, press **F10.**

> ⓘ **NOTE: When the restore process is complete, BIOS prompts to restore the system configuration data.**

4   To restore the system configuration data, press **Y**

5   To use the default configuration settings, press **N**

> ⓘ **NOTE: After the restore process is complete, system reboots.**

> ⓘ **NOTE: If restoring the Service Tag is successful, you can check the Service Tag information in the System Information screen and compare it with the Service Tag on the system.**

Manually updating 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 Turn 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. After the Service Tag is entered, it cannot be updated or changed.**

5 Click **OK**.

Trusted Platform Module

Trusted Platform Module (TPM) is a dedicated microprocessor designed to secure hardware by integrating cryptographic keys into devices. Software can use a TPM to authenticate hardware devices. Because each TPM chip has a unique and secret RSA key which is embedded during the manufacture of the TPM, it is capable of performing platform authentication operation.

Upgrading Trusted Platform Module

Prerequisites

1 Follow the safety guidelines listed in Safety instructions.

2 Follow the procedure listed in Before working inside your system.

> (i) **NOTE:**
>
> • Ensure that your operating system supports the version of the TPM being installed.
>
> • Ensure that you download and install the latest BIOS firmware on your system.
>
> • Ensure that the BIOS is configured to enable UEFI boot mode.

About this task

> ⚠ **CAUTION: After the TPM plug-in module is installed, it is cryptographically bound to that specific system board. Any attempt to remove an installed TPM plug-in module breaks the cryptographic binding, the removed TPM cannot be reinstalled or installed on another system board.**

Removing the TPM

1 Locate the TPM connector on the system board.

> (i) **NOTE: To locate the TPM connector on the system board, see the** System board jumpers and connectors **section.**

2 Press to hold down the module 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.

Figure 106. Installing the TPM

Next steps

1   Install the system board.
2   Follow the procedure listed in After working inside your system.

Initializing TPM for BitLocker users

Initialize the TPM.
For more information, see http://technet.microsoft.com/en-us/library/cc753140.aspx.

The **TPM Status** changes to **Enabled, Activated**.

Initializing the TPM 1.2 for TXT users

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 with Pre-boot Measurements**.
4   From the **TPM Command** option, select **Activate**.
5   Save the settings.
6   Restart your system.
7   Enter **System Setup** again.
8   On the **System Setup Main Menu** screen, click **System BIOS** > **System Security Settings**.
9   From the **Intel TXT** option, select **On**.

Control panel

A control panel allows you to manually control the inputs to the server.

Removing left control panel

Prerequisites

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

3 Remove the non-GPU air shroud or GPU air shroud.

4 Remove the cooling fan assembly.

> ⓘ NOTE: Ensure that you note the routing of the cables as you remove them from the system board. To prevent the cables from being pinched or crimped, route the cables properly when you replace them.

Steps

1 Open the cable latch, and disconnect the control panel cable from the system board connector.

2 Using a Phillips #1 screwdriver, remove the screws that secure the control panel and ribbon cable to the system.

3 Holding the control panel and ribbon cable, remove the control panel along with the ribbon cable away from the system.
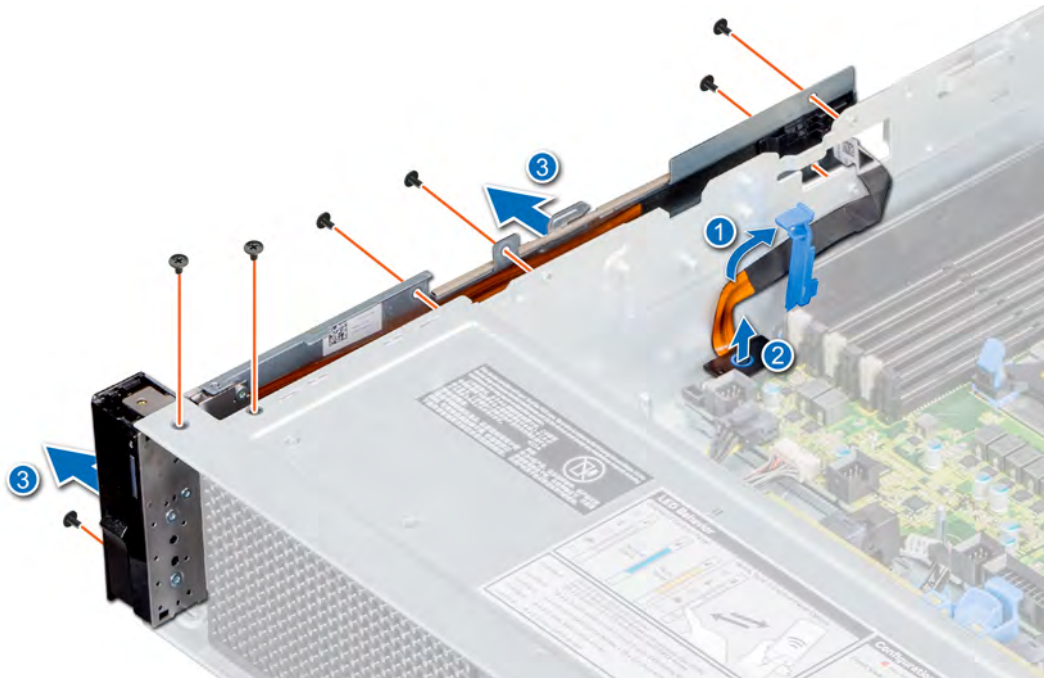
Figure 107. Removing left control panel

Next step

1 Install the left control panel.

Installing left control panel

Prerequisites

1 Follow the safety guidelines listed in Safety instructions.

2 Follow the procedure listed in Before working inside your system.

3 Remove the non-GPU air shroud or GPU air shroud.

4 Remove the cooling fan assembly.

> ⓘ NOTE: Ensure that you note the routing of the cables as you remove them from the system board. To prevent the cables from being pinched or crimped, you must route the cables properly when you replace them.

Steps

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

2 Align the control panel assembly with the control panel slot on the system and attach the control panel assembly to the system.

3 Connect the control panel cable to the system board connector.

4   Close the cable latch to secure the control panel cable.

5   Using a Phillips #1 screwdriver, install the screws that secure the control panel and ribbon cable to the system.
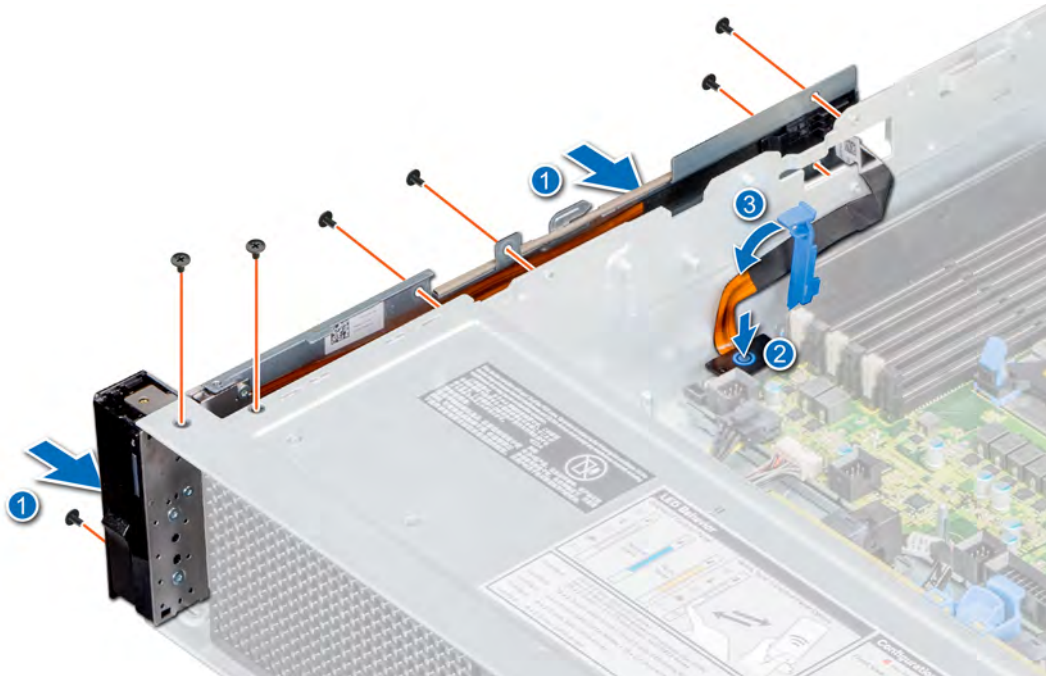
Figure 108. Installing left control panel

Next steps

1   Install the cooling fan assembly.

2   Install the non-GPU air shroud or GPU air shroud.

3   Follow the procedure listed in After working inside your system.

Removing right control panel

Prerequisites

1   Follow the safety guidelines listed in Safety instructions.

2   Follow the procedure listed in Before working inside your system.

3   Remove front bezel, if installed.

4   Remove drives, optical drive, or drive blanks, if installed.

5   Remove the non-GPU air shroud or GPU air shroud.

6   Remove the cooling fan assembly.

Steps

1   Disconnect the VGA cable from the system board.

2   Open the cable latch, and disconnect the control panel cable from the system board connector.

3   Using a Phillips #1 screwdriver, remove the screws that secure the control panel and ribbon cable to the system.

4   Holding the control panel and ribbon cable, remove the control panel along with the ribbon cable away from the system.
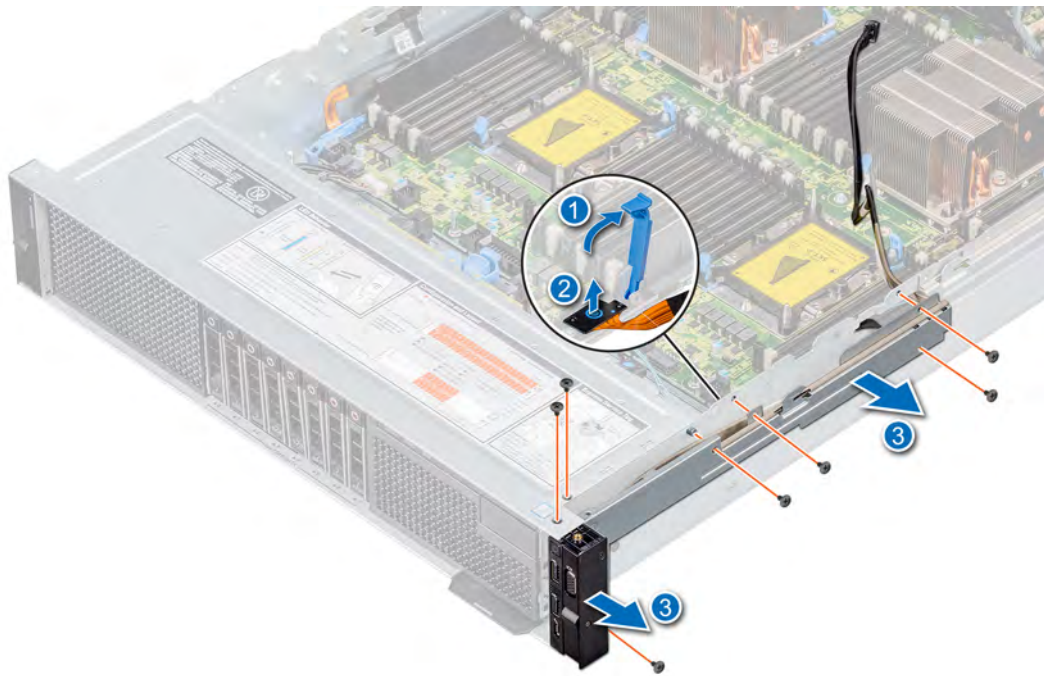
Figure 109. Removing right control panel

Next step

1   Replace the right control panel.

Installing right control panel

Prerequisites

1   Follow the safety guidelines listed in Safety instructions.
2   Follow the procedure listed in Before working inside your system.
3   Remove front bezel, if installed.
4   Remove drives, optical drive, or drive blanks, if installed.
5   Remove the air shroud.
6   Remove the cooling fan assembly.

ⓘ **NOTE: Ensure that you note the routing of the cables as you remove them from the system board. To prevent the cables from being pinched or crimped, you must route the cables properly when you replace them.**

Steps

1   Route the control panel cable and VGA cable through the side wall of the system.
2   Align the control panel with the control panel slot on the system and attach the control panel to the system.
3   Connect the VGA cable to the system board.
4   Connect the control panel cable to the system board and secure it using cable latch.
5   Using a Phillips #1 screwdriver, install the screws that secure the control panel and ribbon cable to the system.
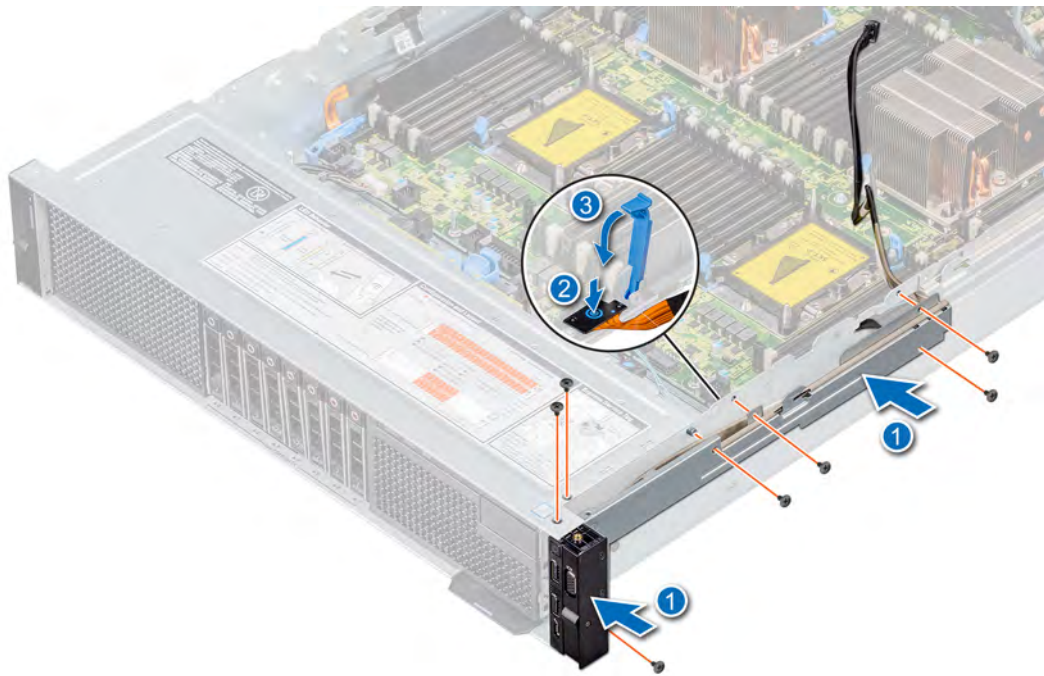
Figure 110. Installing right control panel

Next steps

1 Install the cooling fan assembly.
2 Install the non-GPU air shroud or GPU air shroud.
3 Install the drives, optical drives, or drive blanks, if applicable.
4 Install the front bezel, if applicable.
5 Follow the procedure listed in After working inside your system.

Jumpers and connectors

This topic provides specific information about the jumpers. It also provides some basic information about jumpers and switches and describes the connectors on the various boards in the system. Jumpers on the system board help to disable the system and setup passwords. You must know the connectors on the system board to install components and cables correctly.

Topics:

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

System board connectors
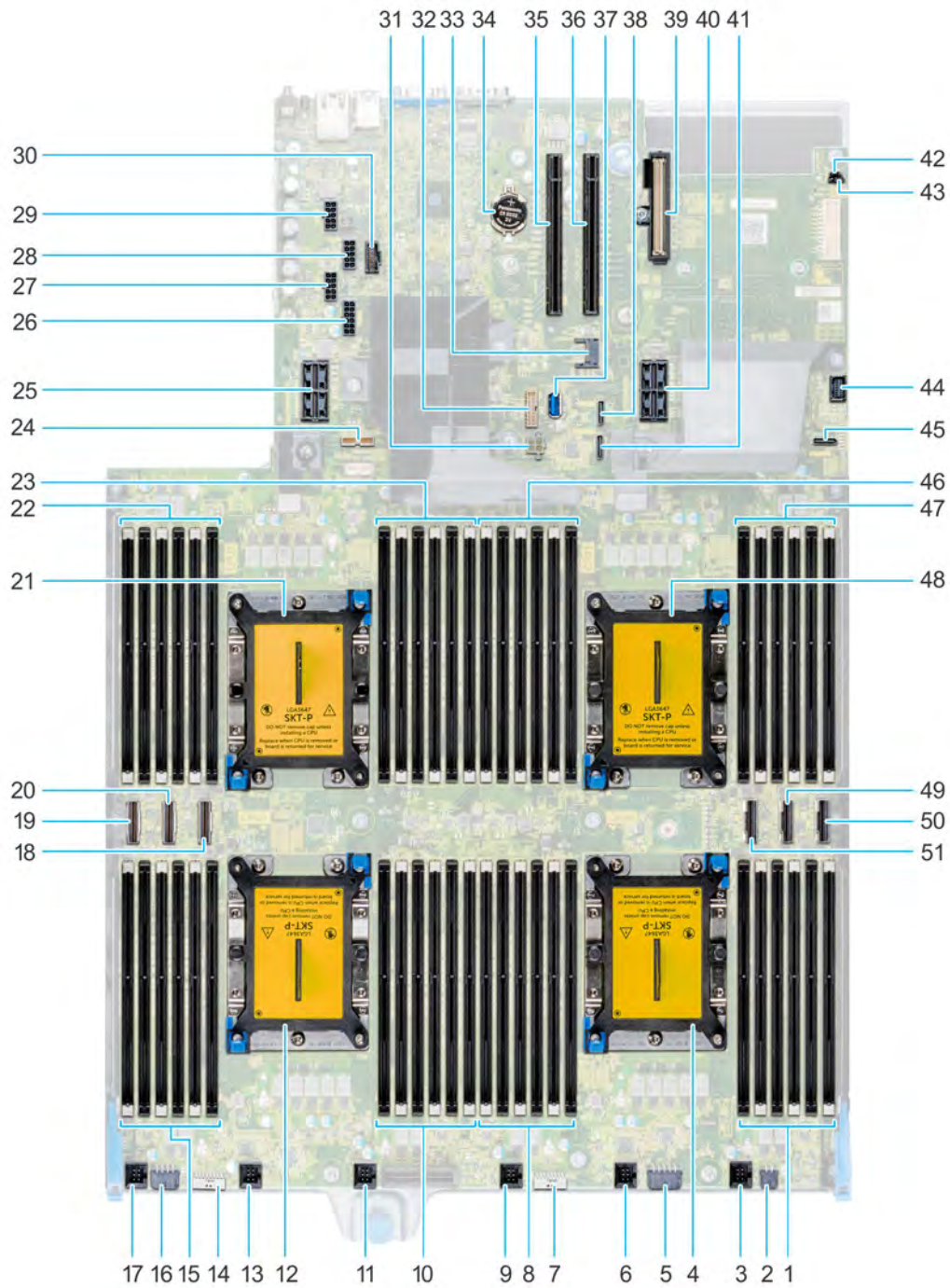
Figure 111. System board connectors

Table 21. System board jumpers and connectors

Item	Connector	Description
1	D7, D1, D8, D2, D9, D3	Memory module sockets
2	J_ODD	Optical drive power connector
3	J_FAN_6	Cooling fan 6 connector
4	CPU4	CPU4 processor and heat sink module socket—with dust cover
5	J_BP_PWR0	Backplane power connector
6	J_FAN_5	Cooling fan 5 connector
7	J_BP_SIG_B	Backplane B signal connector (rear)
8	D6, D12, D5, D11, D4, D10	Memory module sockets
9	J_FAN_4	Cooling fan 4 connector
10	C7, C1, C8, C2, C9, C3	Memory module sockets
11	J_FAN_3	Cooling fan 3 connector
12	CPU3	CPU3 processor and heat sink module socket—with dust cover
13	J_FAN_2	Cooling fan 2 connector
14	J_BP_SIG_A	Backplane A signal connector (front)
15	C6, C12, C5, C11, C4, C10	Memory module sockets
16	J_BP_PWR1	Backplane power connector
17	J_FAN_1	Cooling fan 1 connector
18	PCIe_M3	PCIe Signal M3 connector
19	PCIe_M1	PCIe Signal M1 connector
20	PCIe_M2	PCIe Signal M2 connector
21	CPU2	CPU2 processor and heat sink module socket—with dust cover
22	B3, B9, B2, B8, B1, B7	Memory module sockets
23	B10, B4, B11, B5, B12, B6	Memory module sockets
24	J_PIB_SIG1	Power Interposer Board signal connector
25	J_RISER2	PCIe riser 2 connector
26	J_PIB_PWR 4	PIB power connector 4
27	J_PIB_PWR 3	PIB power connector 3
28	J_PIB_PWR 2	PIB power connector 2
29	J_PIB_PWR 1	PIB power connector 1
30	U_USB_RECONN	USB Client power management

Item	Connector	Description
31	J_BATT_PWR	NVDIMM-N battery power connector
32	J_BATT_SIG	NVDIMM-N battery signal connector
33	J_TPM_MODULE	TPM connector
34	CMOS Battery	CMOS Battery connector
35	J_SLOT4	PCIe x16 connector
36	J_SLOT3	PCIe x16 connector
37	J_USB_INT	Internal USB connector
38	J_SATA_1	NPIO connector1 for x8 backplane
39	J_NDC	NDC connector
40	J_RISER1	PCIe riser 1 connector
41	J_SATA_2	NPIO connector 2 for x8 backplane
42	J_PSWD	Reset BIOS password
43	NVRAM_CLR	Clear NVRAM
44	J_FRONT_VIDEO	Video connector
45	J_SATA_3	SATA C connector—Optical drive SATA connector
46	A3, A9, A2, A8, A1, A7	Memory module sockets
47	A10, A4, A11, A5, A12, A6	Memory module sockets
48	CPU1	CPU1 processor and heat sink module socket—with dust cover
49	PCIe_M5	PCIe Signal M5 connector
50	PCIe_M6	PCIe Signal M6 connector
51	PCIe_M4	PCIe Signal M4 connector

System board jumper settings

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

Table 22. 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. iDRAC local access is unlocked at next AC power cycle. iDRAC password reset is enabled in F2 iDRAC settings menu.
NVRAM_C LR	1 3 5 (default)	The BIOS configuration settings are retained at system boot.

Jumper	Setting	Description
	⊡▪ 1 3 5	The BIOS configuration settings are cleared at system boot.

⚠ **CAUTION: Be careful when altering BIOS settings. The BIOS interface is designed for advanced users, you can change a setting that could prevent your computer from starting correctly and you could suffer a potential loss of data.**

1 Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

2 Remove the system cover.

3 Move the jumper on the system board jumper from pins 3 and 5 to pins 1 and 3 and wait approximately 10 seconds.

4 Replace the jumper plug on pins 3 and 5.

5 Install the system cover. Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.

Disabling 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.

Prerequisite

⚠ **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 Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

2 Remove the system cover.

3 Move the jumper on the system board jumper from pins 2 and 4 to pins 4 and 6.

4 Install the system cover.

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.

ⓘ **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 system to its electrical outlet and turn on the system, including any attached peripherals.

6 Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

7 Remove the system cover.

8 Move the jumper on the system board jumper from pins 4 and 6 to pins 2 and 4.

9 Install the system cover.

10 Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.

11 Assign a new system and/or setup password.

Technical specifications

The technical and environmental specifications of your system are outlined in this section.

Topics:

- Chassis dimensions
- Chassis weight
- Processor specifications
- PSU specifications
- System battery specifications
- Expansion card riser specifications
- Memory specifications
- RAID controller specifications
- Drive specifications
- Ports and connectors specifications
- Video specifications
- Environmental specifications

Chassis dimensions
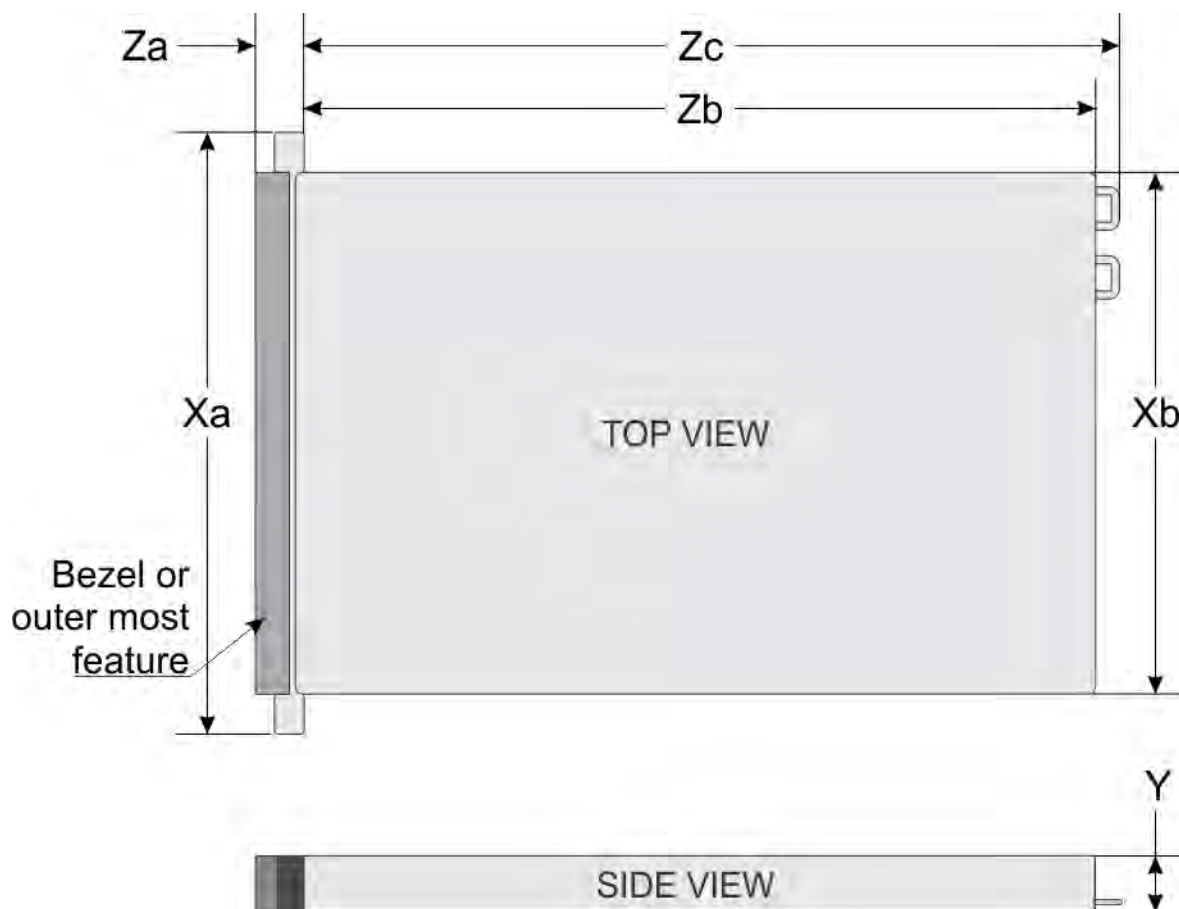
Figure 112. Dimensions of PowerEdge R840 system

Table 23. Dimensions of PowerEdge R840 system

Xa	Xb (without brackets)	Xb (w brackets)	Y	Za (with bezel)	Za (without bezel)	Zb*	Zc (with PSU handle)	Zc (with chassis rear wall handle)
482 mm (18.97 inches)	434 mm (17.08 inches)	444.0 (17.48 inches)	86.8 mm (3.41 inches)	37.84 mm (1.41 inches)	23.9 mm (0.94 inches)	812 mm (31.96 inches)	842 mm (33.14 inches)	902 mm (35.51 inches)

* - Zb refers to the nominal rear wall external surface, where the system board I/O connectors are located.

Chassis weight

Table 24. Chassis weight

System	Maximum weight (with all drives/SSDs)
2.5 inch	36.6 kg (80.68 lb)

Processor specifications

The PowerEdge R840 system supports four processors - Intel Xeon Scalable Processor family.

PSU specifications

The PowerEdge R840 system supports up to two AC or DC power supply units (PSUs).

Table 25. PSU specifications

PSU	Class	Heat dissipation (maximum)	Frequency	Voltage	High line 200V–240 V	Low line 100 V– 140 V	DC	Current
750 W AC	Platinum	2891 BTU/hr	50/60 Hz	100–240 V AC, autoranging	750 W	750 W	NA	10 A-5 A
750 W AC	Titanium	2843 BTU/hr	50/60 Hz	200–240 V AC, autoranging	750 W	NA	NA	5 A
750 W Mixed Mode HVDC (for China only)	Platinum	2891 BTU/hr	50/60 Hz	100–240 V AC, autoranging	750 W	750 W	NA	NA
	N/A	2891 BTU/hr	N/A	240 V DC, autoranging	NA	NA	750 W	4.5 A
1100 W AC	Platinum	4100 BTU/hr	50/60 Hz	100–240 V AC, autoranging	1100 W	1050 W	NA	12 A-6.5 A
1100 W DC	N/A	4416 BTU/hr	N/A	–(48–60) V DC, autoranging	NA	NA	1100 W	32 A
1100 W 10 A-5 A Mixed Mode HVDC (for China and Japan only)	Platinum	4100 BTU/hr	50/60 Hz	100–240 V AC, autoranging	1100 W	1050 W	NA	12 A-6.5 A
	N/A	4100 BTU/hr	N/A	200–380 V DC, autoranging	NA	NA	1100 W	6.4 A-3.2 A
1600 W AC	Platinum	6000 BTU/hr	50/60 Hz	100–240 V AC, autoranging	1600 W	800 W	NA	10 A
2000 W AC	Platinum	7500 BTU/hr	50/60 Hz	100–240 V AC, autoranging	2000 W	1000 W	NA	11.5 A
2400 W AC	Platinum	9000 BTU/hr	50/60 Hz	100–240 V AC, autoranging	2400 W	1400 W	NA	16 A

(i) **NOTE: Heat dissipation is calculated using the PSU wattage rating.**

System battery specifications

The PowerEdge R840 system supports CR 2032 3.0-V lithium coin cell system battery.

Expansion card riser specifications

The PowerEdge R840 system supports up to six PCI express (PCIe) generation 3 expansion cards that can be installed on the system board and expansion card risers. The following table provides detailed information about the expansion card riser specifications:

Table 26. Expansion card riser specifications

PCIe slot	Riser	Processor connection	Height	Length	Slot width
1	X8 PCIe Riser 1	Processor 1	Full height	Half length	x8
2	X16 PCIe Riser 1	Processor 1	Full height	Full length	x16
	X8 PCIe Riser 1	Processor 1	Full height	Half length	x8
3	On the system board	Processor 1	Low profile	Half length	x16
4	On the system board	Processor 2	Low profile	Half length	x16
5	X8 PCIe Riser 2	Processor 2	Full height	Half length	x8
6	X16 PCIe Riser 2	Processor 2	Full height	Full length	x16
	X8 PCIe Riser 2	Processor 2	Full height	Half length	x8

Memory specifications

The PowerEdge R840 system supports up to 48 288-pins RDIMMs (up to 32 GB), LRDIMMs (up to 128 GB), and NVDIMM-Ns (16 GB) supported with speeds of 2667 MT/s, 2400 MT/s, 2133 MT/s, and 1866 MT/s with support for memory optimized operation.

Table 27. Memory specifications

DIMM type	DIMM rank	DIMM capacity	Dual processors		Quad processors	
			Minimum RAM	Maximum RAM	Minimum RAM	Maximum RAM
LRDIMM	Octal rank	128 GB	256 GB	3072 GB	512 GB	6144 GB
LRDIMM	Quad rank	64 GB	128 GB	1536 GB	256 GB	3072 GB
RDIMM	Dual rank	32 GB	64 GB	768 GB	128 GB	1536 GB
RDIMM	Dual rank	16 GB	32 GB	384 GB	64 GB	768 GB
RDIMM	Single rank	8 GB	16 GB	192 GB	32 GB	384 GB
NVDIMM-N	Single rank	16 GB	RDIMM: 192 GB	RDIMM: 384 GB	RDIMM: 384 GB	RDIMM: 1152 GB
			NVDIMM-N: 16 GB	NVDIMM-N: 192 GB	NVDIMM-N: 16 GB	NVDIMM-N: 192 GB

(i) **NOTE:** Do not mix 8 GB RDIMMs and 16 GB NVDIMM-Ns.

(i) **NOTE:** Do not mix 64 GB LRDIMMs and 128 GB LRDIMMs.

Table 28. DIMM blank population rules

Processor configuration	Processor 1	Processor 2	Processor 3	Processor 4
Dual processor	Required	Required	Not required	Not required
Quad processor	Required	Required	Required	Required

RAID controller specifications

The PowerEdge R840 system supports:

- Internal storage controller cards: PowerEdge RAID Controller (PERC) H330, PERC H730P, H740P, HBA330, and Boot Optimized Server Storage (BOSS-S1)
- External storage controller cards: S140 and 12 Gbps SAS HBA

Drive specifications

Hard drives

The PowerEdge R840 system supports SAS, SATA, Nearline SAS hard drives/SSDs, or NVMe drives.

Table 29. Supported drive options for PowerEdge R840 system

Chassis options	Configurations
Eight hard drive chassis	Up to eight 2.5-inch SAS/SATA front accessible drives in slots 0–7
	Up to eight 2.5-inch SATA front accessible drives in slots 0–7
Twenty-four drive chassis	Up to twenty-four 2.5-inch SAS/SATA front accessible drives in slots 0–23
	Up to twelve 2.5-inch SAS/SATA front accessible drives in slots 0–11 + twelve SAS/SATA/NVMe front accessible drives in slots 12–23
	Up to twenty-four 2.5-inch NVMe front accessible drives in slots 0–23
Twenty four front + two rear drive chassis	Up to twenty-four 2.5 inch SAS/SATA or up to 24 NVMe front accessible drives in slots 0–23 + up to two 2.5-inch SAS/SATA rear accessible drives

(i) **NOTE:** Hot swap for NVMe drives is not supported for your system. Ensure that you turn off the system before installing or removing the NVMe drives.

Optical drives

The PowerEdge R840 system supports one optional slim SATA DVD-ROM drive or DVD +/-RW drive.

(i) **NOTE:** DVD devices support only data.

Tape drives

The PowerEdge R840 system supports external tape backup devices.

ⓘ | **NOTE: The PowerEdge R840 system does not support internal tape drives.**

Supported external tape drives:

- External RD1000 USB
- External LTO-5, LTO-6,LTO-7, and 6 Gb SAS tape drives
- 114X rack mount chassis with LTO-5, LTO-6, and LTO-7, 6 Gb SAS tape drives
- TL1000 with LTO-5, LTO-6, and LTO-7 6 Gb SAS tape drives
- TL2000 with LTO-5, LTO-6, and LTO-7 6 Gb SAS tape drives
- TL2000 with LTO-5, LTO-6, and LTO-7 8 Gb FC tape drives
- TL4000 with LTO-5, LTO-6, and LTO-7 6 Gb SAS tape drives
- TL4000 with LTO-5, LTO-6, and LTO-7 8 Gb FC tape drives
- ML6000 with LTO-5, LTO-6, 6 Gb SAS tape drives
- ML6000 with LTO-5, LTO-6, LTO-7 8 Gb FC tape drives

Ports and connectors specifications

USB ports

The PowerEdge R840 system supports both USB 2.0-compliant ports and USB 3.0-compliant ports:

The following table provides more information about the USB specifications:

Table 30. USB specifications

Front panel	Back panel	Internal USB
• Two USB 2.0-compliant ports • One micro USB 2.0-compliant port for iDRAC Direct ⓘ | **NOTE: The micro USB 2.0 compliant port can only be used as an iDRAC Direct or a management port.** • One optional USB 3.0-compliant port	• Two USB 3.0-compliant ports	• One internal USB 3.0-compliant port

NIC ports

The PowerEdge R840 system supports up to four Network Interface Controller (NIC) ports that are integrated on the network daughter card (NDC), and are available in the following configurations:

- Four RJ-45 ports that support 10 Mbps, 100 Mbps, and 1000 Mbps
- Four RJ-45 ports that support 100 M, 1 G, and 10 Gbps
- Four RJ-45 ports, where two ports support maximum of 10 G and the other two ports maximum of 1 G

- Two RJ-45 ports that support up to 1 Gbps and 2 SFP+ ports that support up to 10 Gbps
- Four SFP+ ports that support up to 10 Gbps
- Two SFP28 ports that support up to 25 Gbps

VGA ports

The Video Graphic Array (VGA) port enables you to connect the system to a VGA display.

The PowerEdge R840 system supports two 15-pin VGA ports, one each, on the front and back of the system.

Serial connector

The serial connector on the rear of system for serial device connection and console redirection.

The PowerEdge R840 system supports one serial connector on the back panel, which is a 9-pin connector, Data Terminal Equipment (DTE), 16550-compliant.

IDSDM or vFlash module

The PowerEdge R840 system supports optional Internal Dual SD module (IDSDM) or vFlash module. In 14th generation of PowerEdge servers, IDSDM or vFlash module is combined into a single card module, and are available in these configurations:

- vFlash or
- vFlash and IDSDM

The IDSDM or vFlash module is located in a slot on the back of the system. The module supports three microSD cards; two cards for IDSDM and one card for vFlash. The following capacities are supported:

- IDSDM: 16 GB, 32 GB, 64 GB
- vFlash: 16 GB

ⓘ NOTE: There are two dip switches on the IDSDM or vFlash module for write-protection.

ⓘ NOTE: One IDSDM card slot is dedicated for redundancy.

ⓘ NOTE: Use Dell branded microSD cards associated with the IDSDM or vFlash configured systems.

Video specifications

The PowerEdge R840 system supports integrated Matrox G200eW3 graphics controller with 16 MB of video frame buffer.

Table 31. Supported video resolution options

Resolution	Refresh rate (Hz)	Color depth (bits)
1024 x 768	60	8, 16, 32
1280 x 800	60	8, 16, 32
1280 x 1024	60	8, 16, 32
1360 x 768	60	8, 16, 32
1440 x 900	60	8, 16, 32

Resolution	Refresh rate (Hz)	Color depth (bits)
1600 x 900	60	8, 16, 32
1600 x 1200	60	8, 16, 32
1680 x 1050	60	8, 16, 32
1920 x 1080	60	8, 16, 32
1920 x 1200	60	8, 16, 32

ⓘ **NOTE: 1920 x 1080 and 1920 x 1200 resolutions are only supported in reduced blanking mode.**

Environmental specifications

ⓘ **NOTE: For more information about environmental measurements for specific system configurations, see Dell.com/ environmental_datasheets.**

Table 32. Temperature specifications

Temperature	Specifications
Storage	−40–65°C (−40 °F–149°F)
Continuous operation (for altitude less than 950 m or 3117 ft)	10–35°C (50 °F–95°F) with no direct sunlight on the equipment
Fresh air	For information about fresh air, see the Expanded Operating Temperature section.
Maximum temperature gradient (operating and storage)	20°C/h (36°F/h)

Table 33. Relative humidity specifications

Relative humidity	Specifications
Storage	5% to 95% RH with 33°C (91°F) maximum dew point. Atmosphere must be noncondensing at all times.
Operating	10% to 80% RH with 29°C (84.2°F) maximum dew point.

Table 34. Maximum vibration specifications

Maximum vibration	Specifications
Operating	0.26 G_{rms} at 5 Hz to 350 Hz (all operation orientations)
Storage	1.88 G_{rms} at 10 Hz to 500 Hz for 15 minutes (all six sides tested)

Table 35. Maximum shock pulse specifications

Maximum shock pulse	Specifications
Operating	Six consecutively executed shock pulses in the positive and negative x, y, and z axes of 6 G for up to 11 ms.
Storage	Six consecutively executed shock pulses in the positive and negative x, y, and z axes (one pulse on each side of the system) of 71 G for up to 2 ms.

Table 36. Maximum altitude specifications

Maximum altitude	Specifications
Operating	3048 m (10,000 ft)
Storage	12,000 m (39,370 ft)

Table 37. Operating temperature derating specification

Operating temperature derating	Specifications
Up to 35°C (95°F)	Maximum temperature is reduced by 1°C/300 m (1°F/547 ft), above 950 m (3,117 ft).
35–40 °C (95–104 °F)	Maximum temperature is reduced by 1°C/175 m (1°F/319 ft), above 950 m (3,117 ft).
40–45 °C (104 °F–113 °F)	Maximum temperature is reduced by 1°C/125 m (1°F/228 ft), above 950 m (3,117 ft).

Standard operating temperature

Table 38. Standard operating temperature specifications

Standard operating temperature	Specifications
Continuous operation (for altitude less than 950 m or 3117 ft)	10 °C–35°C (50 °F–95°F) with no direct sunlight on the equipment.

Expanded operating temperature

Table 39. Expanded operating temperature specifications

Expanded operating temperature	Specifications
Continuous operation	5 °C–40°C at 5% to 85% RH with 29°C dew point.
	ⓘ **NOTE: Outside the standard operating temperature (10 °C–35°C), the system can operate continuously in temperatures as low as 5°C and as high as 40°C.**
	For temperatures 35 °C – 40°C, derate maximum allowable temperature by 1°C per 175 m (1°F per 319 ft.) above 950 m (3,1171 ft.).
≤ 1% of annual operating hours	–5 °C–45°C at 5% to 90% RH with 29°C dew point.
	ⓘ **NOTE: Outside the standard operating temperature (10 °C–35°C), the system can operate down to –5°C or up to 45°C for a maximum of 1% of its annual operating hours.**

Expanded operating temperature	Specifications
	For temperatures 40 °C – 45°C, derate maximum allowable temperature by 1ºC per 125 m (1ºF per 228 ft.) above 950 m (3.117 ft.).

ⓘ **NOTE:** When operating in the expanded temperature range, the performance of the system may be impacted.

ⓘ **NOTE:** When operating in the expanded temperature range, ambient temperature warnings may be reported on the LCD panel and in the System Event Log.

Expanded operating temperature restrictions

- The operating temperature is specified for a maximum altitude of 950 m for Fresh Air Cooling.
- Do not perform cold start below 5ºC due to hard drive constraints.
- Apache Pass DIMM, NVDIMM, PCIe SSD, and NVMe are not supported.
- Tape Backup Unit (TBU) is not supported in Fresh Air.
- LRDIMM >32 GB is not supported in x4 sockets configuration.
- Rear installed drives and GPU configuration are not supported.
- Redundant power supplies are required.
- Non Dell qualified peripheral cards and /or peripheral cards greater than 25 W are not supported.
- Intel FPGA is not supported.
- 205 W SKUs, 200W/18C, 165W/12C, and 150W_8C processor are not supported on all x4 socket processor configurations.
- 165 W SKUs, 130W/8C, 115W/6C, and 105W_4C are not supported on the x4 socket processor configurations except front x8 inch SAS/SATA drives configurations.

Ambient temperature limitations

ⓘ **NOTE:** The ambient temperature limit must be adhered to ensure proper cooling and to avoid excess processor throttling, which may impact system performance.

Table 40. Configuration-based ambient temperature restrictions

R840 configurations		Backplane	8 x 2.5 inch SAS/SATA	24 x 2.5 inch SAS/SATA(Expander) + 2x 2.5 inch(rear)	24 x 2.5-inch NVMe(Expander)	24 x 2.5 inch SAS/SATA/NVMe(Expander)
		No. Of processors supported	4	4	4	2
		Processor heat sink	1U	1U	1U	1U
		No. Of GPUs supported	>1DW/SW GPU	>1DW/SW GPU	>1DW/SW GPU	>1DW/SW GPU
Supported processor	Processor Thermal Design Power (TDP)	Core count	Ambient support	Ambient support	Ambient support	Ambient support

Intel Xeon Platinum 8176	165 W	28	C35	C30	C30	C35
Intel Xeon Platinum 8170	165 W	26	C35	C30	C30	C35
Intel Xeon Gold 6150	165 W	18	C35	C30	C30	C35
Intel Xeon Gold 6134	130 W	8	C35	C30	C30	C35
Intel Xeon Gold 6128	115 W	6	C35	C30	C30	C35
Intel Xeon Gold 5122	105 W	4	C35	C30	C30	C35
Intel Xeon Platinum 8156	105 W	4	C35	C30	C30	C35
Intel Xeon Platinum 8164	150 W	26	C35	C30	C30	C35
Intel Xeon Platinum 8160	150 W	24	C35	C30	C30	C35
Intel Xeon Gold 6148	150 W	20	C35	C30	C30	C35
Intel Xeon Gold 6142	150 W	16	C35	C30	C30	C35
Intel Xeon Gold 6136	150 W	12	C35	C30	C30	C35
Intel Xeon Platinum 8158	150 W	12	C35	C30	C30	C35
Intel Xeon Gold 6152	140 W	22	C35	C30	C30	C35
Intel Xeon Gold 6140	140 W	18	C35	C30	C30	C35
Intel Xeon Gold 6132	140 W	14	C35	C30	C30	C35
Intel Xeon Gold 6138	125 W	20	C35	C30	C30	C35
Intel Xeon Gold 6130	125 W	16	C35	C30	C30	C35
Intel Xeon Platinum 8153	125 W	16	C35	C30	C30	C35
Intel Xeon Gold 6126	125 W	12	C35	C30	C30	C35
Intel Xeon Gold 5120	105 W	14	C35	C30	C30	C35

Intel Xeon Gold 5118	105 W	12	C35	C30	C30	C35
Intel Xeon Gold 5115	85 W	10	C35	C30	C30	C35

Table 41. Configuration-based ambient temperature restrictions

R840 configurations		Backplane	8 × 2.5 inch SAS/SATA	24 × 2.5 inch SAS/SATA(Expander) + 2x 2.5 inch(rear)	24 × 2.5-inch NVMe(Expander)	24 × 2.5 inch SAS/SATA/NVMe(Expander)
		No. Of processors supported	4	4	4	2
		Processor heat sink	1U	1U	1U	1U
		No. Of GPUs supported	Non-GPU	Non-GPU	Non-GPU	Non-GPU
Supported processor	Processor Thermal Design Power (TDP)	Core count	Ambient support	Ambient support	Ambient support	Ambient support
Intel Xeon Platinum 8180	205 W	28	C35	C30	C30	C35
Intel Xeon Platinum 8168	205 W	24	C35	C30	C30	C35
Intel Xeon Gold 6154	200 W	18	C35	C30	C30	C35
Intel Xeon Gold 6146	165 W	12	C35	C30	C30	C35
Intel Xeon Gold 6144	150 W	8	C35	C30	C30	C35
Intel Xeon Platinum 8176	165W	28	C35	C35	C30	C35
Intel Xeon Platinum 8170	165 W	26	C35	C35	C30	C35
Intel Xeon Gold 6150	165 W	18	C35	C35	C30	C35
Intel Xeon Gold 6134	130 W	8	C35	C35	C35	C35
Intel Xeon Gold 6128	115 W	8	C35	C35	C35	C35
Intel Xeon Gold 5122	105 W	6	C35	C35	C35	C35

Intel Xeon Platinum 8156	105 W	4	C35	C35	C35	C35
Intel Xeon Platinum 8164	150 W	4	C35	C35	C35	C35
Intel Xeon Platinum 8160	150 W	26	C35	C35	C35	C35
Intel Xeon Gold 6148	150 W	24	C35	C35	C35	C35
Intel Xeon Gold 6142	150 W	20	C35	C35	C35	C35
Intel Xeon Gold 6136	150W	16	C35	C35	C35	C35
Intel Xeon Platinum 8158	150 W	12	C35	C35	C35	C35
Intel Xeon Gold 6152	140 W	12	C35	C35	C35	C35
Intel Xeon Gold 6140	140 W	22	C35	C35	C35	C35
Intel Xeon Gold 6132	140 W	18	C35	C35	C35	C35
Intel Xeon Gold 6138	125 W	20	C35	C35	C35	C35
Intel Xeon Gold 6130	125 W	14	C35	C35	C35	C35
Intel Xeon Platinum 8153	125 W	20	C35	C35	C35	C35
Intel Xeon Gold 6126	125 W	16	C35	C35	C35	C35
Intel Xeon Gold 5120	105 W	16	C35	C35	C35	C35
Intel Xeon Gold 5118	105 W	12	C35	C35	C35	C35
Intel Xeon Gold 5115	85 W	10	C35	C35	C35	C35

Particulate and gaseous contamination specifications

The following table defines the limitations that help avoid any damages to the IT equipment and/or, or both failure from particulates and gaseous contamination. If the levels of particulates or gaseous pollution exceed the specified limitations and result in equipment damage or failure, you must rectify the environmental conditions. Remediation of environmental conditions is the responsibility of the customer.

Table 42. Particulate contamination specifications

Particulate contamination	Specifications
Air Filtration	Data center air filtration as defined by ISO Class 8 per ISO 14644-1 with a 95% upper confidence limit. ⓘ **NOTE: This condition applies to data center environments only. Air filtration requirements do not apply to IT equipment designed to be used outside a data center, in environments such as an office or factory floor.** ⓘ **NOTE: Air entering the data center must have MERV11 or MERV13 filtration.**
Conductive dust	Air must be free of conductive dust, zinc whiskers, or other conductive particles. ⓘ **NOTE: This condition applies to data center and non-data center environments.**
Corrosive dust	• Air must be free of corrosive dust. • Residual dust present in the air must have a deliquescent point less than 60% relative humidity. ⓘ **NOTE: This condition applies to data center and non-data center environments.**

Table 43. Gaseous contamination specifications

Gaseous contamination	Specifications
Copper Coupon Corrosion	<300 Å/month per Class G1 as defined by ANSI/ISA71.04-1985.
Silver Coupon Corrosion	<200 Å/month as defined by AHSRAE TC9.9.

ⓘ **NOTE: Maximum corrosive contaminant levels measured at ≤50% relative humidity.**

System diagnostics and indicator codes

The diagnostic indicators on the system front panel display system status during system startup.

Status LED indicators

ⓘ | **NOTE: The indicators display solid amber if any error occurs.**

Table 44. 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 shroud, memory module blank, or back filler bracket is removed. • Ambient temperature is too high. • External airflow is obstructed. If the problem persists, see Getting help.
⚡	Electrical indicator	The indicator turns solid amber if the system experiences an electrical error (for example, voltage out of range, or a failed power supply unit (PSU) or voltage regulator).	Check the System Event Log or system messages for the specific issue. If it is due to a problem with the PSU, check the LED on the PSU. Reseat the PSU. If the problem persists, see Getting help.
🗎	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 Getting help.
🖳	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 Getting help.

System health and system ID indicator codes

The system health and system ID indicator is located on the left control panel of your system.

Figure 113. System health and system ID indicators

Table 45. System health and system ID indicator codes

System health and system ID indicator code	Condition
Solid blue	Indicates that the system is turned on, system 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 or the LCD panel, if available on the bezel, for specific error messages. For more information about error messages, see the *Dell Event and Error Messages Reference Guide* at **Dell.com/ openmanagemanuals** > **OpenManage software**.

iDRAC Quick Sync 2 indicator codes

iDRAC Quick Sync 2 module (optional) is located on the left control panel of your system.

Figure 114. iDRAC Quick Sync 2 indicators

Table 46. iDRAC Quick Sync 2 indicators and descriptions

iDRAC Quick Sync 2 indicator code	Condition	Corrective action
Off (default state)	Indicates that the iDRAC Quick Sync 2 feature is turned off. Press the iDRAC Quick Sync 2 button to turn on the iDRAC Quick Sync 2 feature.	If the LED fails to turn on, reseat the left control panel flex cable and check. If the problem persists, see the Getting help section.
Solid white	Indicates that iDRAC Quick Sync 2 is ready to communicate. Press the iDRAC Quick Sync 2 button to turn off.	If the LED fails to turn off, restart the system. If the problem persists, see the Getting help section.

iDRAC Quick Sync 2 indicator code	Condition	Corrective action
Blinks white rapidly	Indicates data transfer activity.	If the indicator continues to blink indefinitely, see the Getting help section.
Blinks white slowly	Indicates that firmware update is in progress.	If the indicator continues to blink indefinitely, see the Getting help section.
Blinks white five times rapidly and then turns off	Indicates that the iDRAC Quick Sync 2 feature is disabled.	Check if iDRAC Quick Sync 2 feature is configured to be disabled by iDRAC. If the problem persists, see the Getting help section. For more information, see *Integrated Dell Remote Access Controller User's Guide* at **Dell.com/idracmanuals** or *Dell OpenManage Server Administrator User's Guide* at **Dell.com/openmanagemanuals**.
Solid amber	Indicates that the system is in fail-safe mode.	Restart the system. If the problem persists, see the Getting help section.
Blinking amber	Indicates that the iDRAC Quick Sync 2 hardware is not responding properly.	Restart the system. If the problem persists, see the Getting help section.

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. The following table describes iDRAC Direct activity when the iDRAC Direct port is active:

Table 47. iDRAC Direct LED indicator codes

iDRAC Direct LED indicator code	Condition
Solid green for two seconds	Indicates that the laptop or tablet is connected.
Flashing green (on for two seconds and off for two seconds)	Indicates that the laptop or tablet connected is recognized.
Turns 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 115. NIC indicator codes

1	link LED indicator	2	activity LED indicator

Table 48. NIC indicator codes

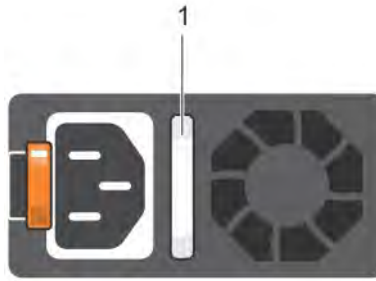| Status	Condition
Link and activity indicators are off	The NIC is not connected to the network.
Link indicator is green and activity indicator is blinking green	The NIC is connected to a valid network at its maximum port speed and data is being sent or received.
Link indicator is amber and activity indicator is blinking green	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	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	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	NIC identify is enabled through the NIC configuration utility.

Power supply unit indicator codes

AC power supply units (PSUs) have an illuminated translucent handle that serves as an indicator.

The DC PSUs have an LED that serves as an indicator.

For more information about the PSU specifications, see Technical Specifications.

For information about the event and error messages generated during POST, when a 2400W PSU is connected to a 110 V power source, see the Dell Event and Error Messages Reference Guide at Dell.com/openmanagemanuals > OpenManage software.

The indicator shows whether power is present or if a power fault has occurred.

Figure 116. AC PSU status indicator

1   AC PSU status indicator/handle

Table 49. AC PSU status indicator codes

Power indicator codes	Condition
Green	A valid power source is connected to the PSU, and the PSU is operational.
Blinking amber	Indicates a problem with the PSU.
Not illuminated	Power is not connected to the PSU.
Blinking green	When the firmware of the PSU is being updated, the PSU handle blinks green. ⚠ CAUTION: **Do not disconnect the power cable, or unplug the PSU when updating firmware. If firmware update is interrupted, the PSUs do not function.**
Blinking green and turns off	When hot-plugging a PSU, the PSU handle blinks green five times at a rate of 4 Hz and turns off. This indicates a PSU mismatch concerning 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 turn on the system.** ⚠ CAUTION: **When correcting a PSU mismatch, replace only the PSU with the blinking indicator. Swapping the PSU to make a matched pair can result in an error condition and unexpected system shutdown. To change from a high output configuration to a low output configuration or conversely, you must turn off the system.** ⚠ CAUTION: **AC PSUs support both 240 V and 120 V input voltages except for Titanium PSUs, which support only 240 V. When two identical PSUs receive different input voltages, they can output different wattages, and trigger a mismatch.** ⚠ CAUTION: **If two PSUs are used, they must be of the same type and have the same maximum output power.**

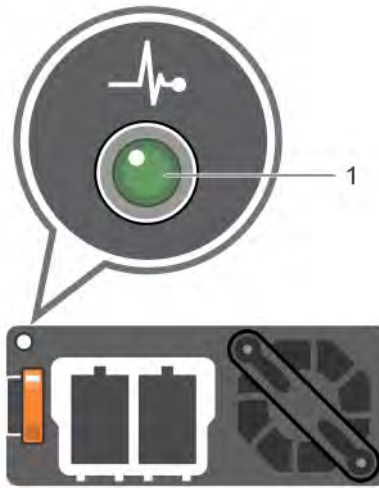| Power indicator codes	Condition
	⚠ **CAUTION: Combining AC and DC PSUs is not supported and triggers a mismatch.**

Figure 117. DC PSU status indicator

1   DC PSU status indicator

Table 50. DC PSU status indicator codes

Power indicator codes	Condition
Green	A valid power source is connected to the PSU, and the PSU is operational.
Blinking amber	Indicates a problem with the PSU.
Not illuminated	Power is not connected to the PSU.
Blinking green	When hot-plugging a PSU, the PSU indicator blinks green. This indicates that there is a PSU mismatch about 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 turn on the system.** ⚠ **CAUTION: When correcting a PSU mismatch, replace only the PSU with the blinking indicator. Swapping the PSU to make a matched pair can result in an error condition and unexpected system shutdown. To change from a High Output configuration to a Low Output configuration or conversely, you must turn off the system.** ⚠ **CAUTION: If two PSUs are used, they must be of the same type and have the same maximum output power.**

Power indicator codes	Condition
	⚠ **CAUTION: Combining AC and DC PSUs is not supported and triggers a mismatch.**

Drive indicator codes

Each drive carrier has an activity LED indicator and a status LED indicator. The indicators provide information about the current status of the drive. The activity LED indicator indicates whether the drive is currently in use or not. The status LED indicator indicates the power condition of the drive.

Figure 118. Drive indicators on the drive and the mid drive tray backplane

1	Drive activity LED indicator	2	Drive status LED indicator
3	Drive		

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

Table 51. Drive indicator codes

Drive status indicator code	Condition
Flashes green twice per second	Identifying drive or preparing for removal.
Off	Drive ready for removal. ⓘ **NOTE: The drive status indicator remains off until all drives are initialized after the system is turned on. Drives are not ready for removal during this time.**
Flashes green, amber, and then turns off	Predicted drive failure.
Flashes amber four times per second	Drive failed.
Flashes green slowly	Drive rebuilding.
Solid green	Drive online.
Flashes green for three seconds, amber for three seconds, and then turns off after six seconds	Rebuild stopped.

Using system diagnostics

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

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 provides 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 problems encountered during testing

Running the Embedded System Diagnostics from Boot Manager

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

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.

Running the Embedded System Diagnostics from the Dell Lifecycle Controller

1 As the system boots, 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 starts executing the tests on all the detected devices.

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.

Getting help

Topics:

Contacting Dell

Dell provides several online and telephone based support and service options. If you do not have an active internet connection, you can find contact information about your purchase invoice, packing slip, bill, or Dell product catalog. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical assistance, or customer service issues:

1. Go to Dell.com/support.
2. Select your country from the drop-down menu on the lower right corner of the page.
3. For customized support:
   a. Enter your system Service Tag in the **Enter your Service Tag** field.
   b. Click **Submit**.
      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 Global Technical Support.
   b. The **Contact Technical Support** page is displayed with details to call, chat, or e-mail the Dell Global Technical Support team.

Documentation feedback

You can rate the documentation or write your feedback on any of our Dell EMC documentation pages and click **Send Feedback** to send your feedback.

Accessing system information by using QRL

You can use the Quick Resource Locator (QRL) to get immediate access to the information about your system.

Prerequisites
Ensure that your smart phone or tablet has the QR code scanner installed.

The QRL includes the following information about your system:

- How-to videos

- Reference materials, including the Owner's Manual, LCD diagnostics, and mechanical overview
- Service Tag to quickly access the specific hardware configuration and warranty information
- A direct link to Dell to contact technical support and sales teams

Steps

1 Go to **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 Dell system or in the Quick Resource Locator section.

Receiving automated support with SupportAssist

Dell EMC SupportAssist is an optional Dell EMC 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 Dell EMC.com/SupportAssist.

Quick Resource Locator for PowerEdge R840 system

Figure 119. Quick Resource Locator for PowerEdge R840 system

Documentation resources

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

Table 52. Additional documentation resources for your system

Task	Document	Location
Setting up your system	For more information about installing and securing the system into a rail, see the rail documentation included with your rail solution.	Dell.com/poweredgemanuals
	For information about setting up and turning on the system, see the *Getting Started Guide* document that is shipped with your system.	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.	Dell.com/idracmanuals
	For information about installing the operating system, see the operating system documentation.	Dell.com/operatingsystemmanuals
	For information about understanding Remote Access Controller Admin (RACADM) subcommands and supported RACADM interfaces, see the RACADM Command Line Reference Guide for iDRAC.	Dell.com/idracmanuals
	For information about device drivers and to obtain the latest device drivers for your system, see the Drivers & Downloads section on the Dell Support website. For information about updating drivers and firmware, see the Methods to download firmware and drivers section in this document.	Dell.com/support/drivers
Managing your system	For information about systems management software offered by Dell, see the Dell OpenManage Systems Management Overview Guide.	Dell.com/openmanagemanuals
	For information about setting up, using, and troubleshooting OpenManage, see the Dell OpenManage Server Administrator User's Guide.	Dell.com/openmanagemanuals
	For information about installing, using, and troubleshooting Dell OpenManage Essentials, see the Dell OpenManage Essentials User's Guide.	Dell.com/openmanagemanuals
	For information about installing and using Dell SupportAssist, see the Dell EMC SupportAssist Enterprise User's Guide.	Dell.com/serviceabilitytools

Task	Document	Location
	For understanding the features of Dell Lifecycle Controller, see the Dell Lifecycle Controller User's Guide.	Dell.com/idracmanuals
	For information about partner programs enterprise systems management, see the OpenManage Connections Enterprise Systems Management documents.	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.	Dell.com/storagecontrollermanuals
Understanding event and error messages	For information about checking the event and error messages generated by the system firmware and agents that monitor system components, see the Dell Event and Error Messages Reference Guide.	Dell.com/openmanagemanuals > OpenManage software
Troubleshooting your system	For information about identifying and troubleshooting the PowerEdge server issues, see the Server Troubleshooting Guide.	Dell.com/poweredgemanuals

To view the document listed in the documentation resources table:

1   Click the documentation link provided in the Location column in the table.

2   In the **Search all PowerEdge** field, type the product name and model number.

   ⓘ | **NOTE: To locate the product name and model, see the front of your system.**

3   On the displayed product page, click **Manuals & documents**.