

Dell EMC PowerEdge R240

Installation and Service Manual

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.

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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.

Dell EMC PowerEdge R240 system overview

The Dell EMC PowerEdge R240 system is a 1U server that supports:

- One Intel Xeon Scalable processor
- Four DIMM slots
- Cabled AC power supply unit
- Up to four 3.5-inch SAS, SATA drives or SSDs, or four 3.5-inch cabled drives, or two 3.5-inch cabled drives.

For more information about supported drives, see the [Drive specifications](#) section.

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

Topics:

- [Front view of the system](#)
- [Rear view of the system](#)
- [Inside the system](#)
- [Locating the information tag of your system](#)

Front view of the system



Figure 1. Front view of the 4 x 3.5-inch drive system

- | | | | |
|---|---------------------|---|--------------------------|
| 1 | Left control panel | 2 | Optical drive (optional) |
| 3 | Right control panel | 4 | Information tag |
| 5 | Drive (4) | | |

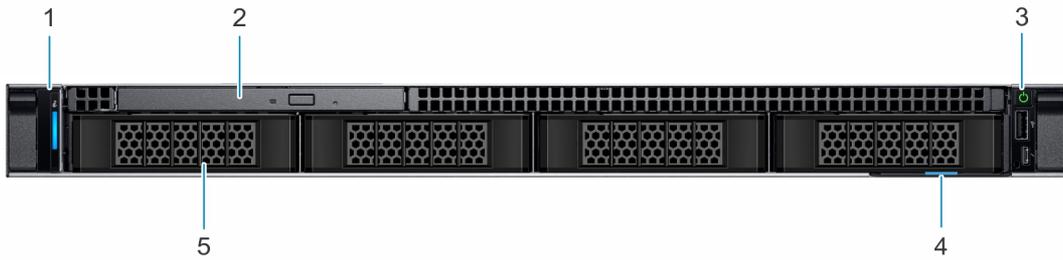


Figure 2. Front view of the 4 x 3.5-inch cabled drive system

- | | | | |
|---|---------------------|---|--------------------------|
| 1 | Left control panel | 2 | Optical drive (optional) |
| 3 | Right control panel | 4 | Information tag |
| 5 | Drive (4) | | |

NOTE: LED functionality is not supported on cabled disk drive configuration.

For more information about the ports, see the [Technical Specifications](#) section.

Control panels

Left control panel



Figure 3. Left control panel view

- | | |
|---|---------------------------------------|
| 1 | System health and system ID indicator |
|---|---------------------------------------|

Right control panel



Figure 4. Right control panel view

- | | | | |
|---|-----------------------------|---|------------------------|
| 1 | Power button | 2 | USB 2.0-compliant port |
| 3 | iDRAC direct Micro USB port | | |

NOTE: For more information on the ports, see the [Ports and connectors specifications](#) section.

Rear view of the system

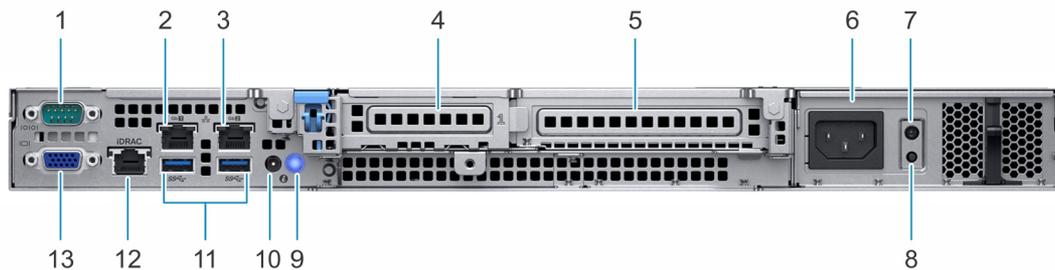


Figure 5. Rear view of the system

- | | | | |
|----|--------------------------------------|----|--|
| 1 | Serial port | 2 | NIC port (Gb 1) |
| 3 | NIC port (Gb 2) | 4 | Half-height PCIe expansion card slot |
| 5 | Full-height PCIe expansion card slot | 6 | Power supply unit |
| 7 | PSU Built-in Self Test (BIST) LED | 8 | PSU Built-in Self Test (BIST) button |
| 9 | System identification button | 10 | System status indicator cable port (CMA) |
| 11 | USB 3.0 ports (2) | 12 | iDRAC dedicated NIC port |
| 13 | VGA port | | |

For more information about the ports and connectors, see the [Technical Specifications](#) section.

Inside the system

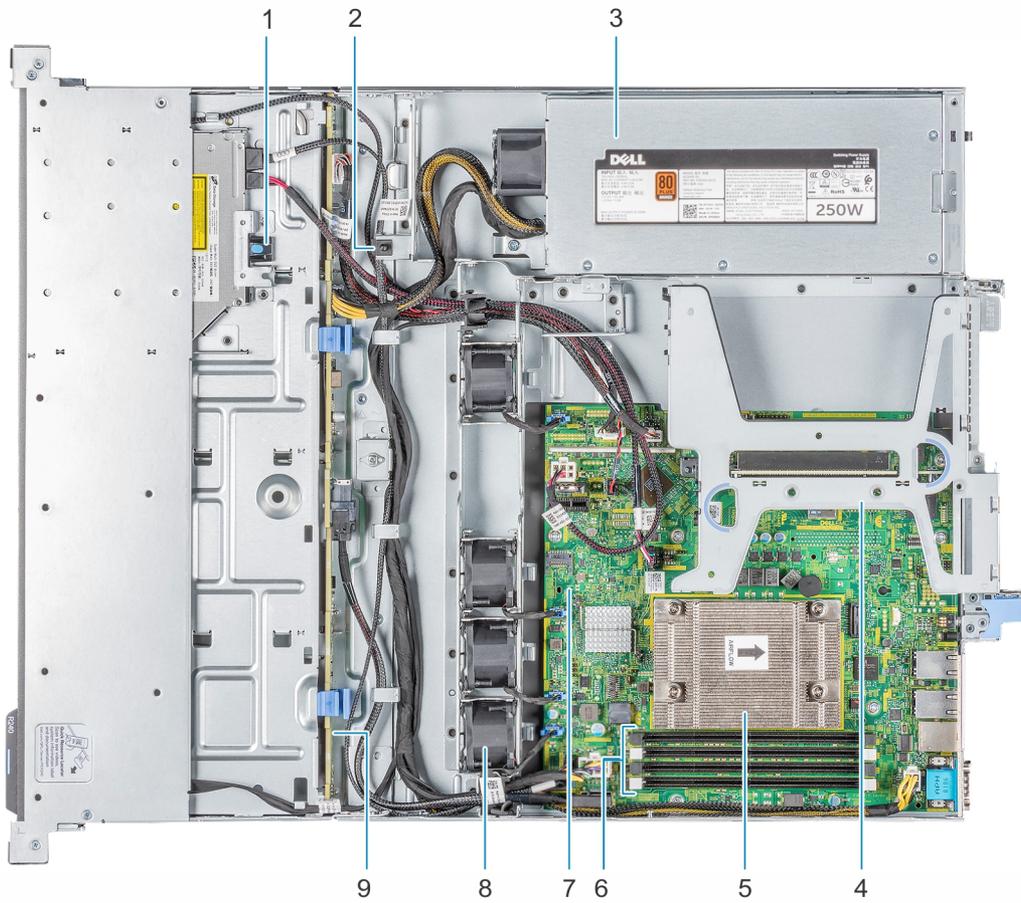


Figure 6. Inside the system - 4 x 3.5-inch drive system

- | | | | |
|---|-----------------------------|---|-----------------------|
| 1 | Optical drive | 2 | Intrusion switch |
| 3 | Cabled AC power supply unit | 4 | Expansion card riser |
| 5 | Processor and heat sink | 6 | Memory module sockets |
| 7 | System board | 8 | Fan (4) |
| 9 | Drive backplane | | |

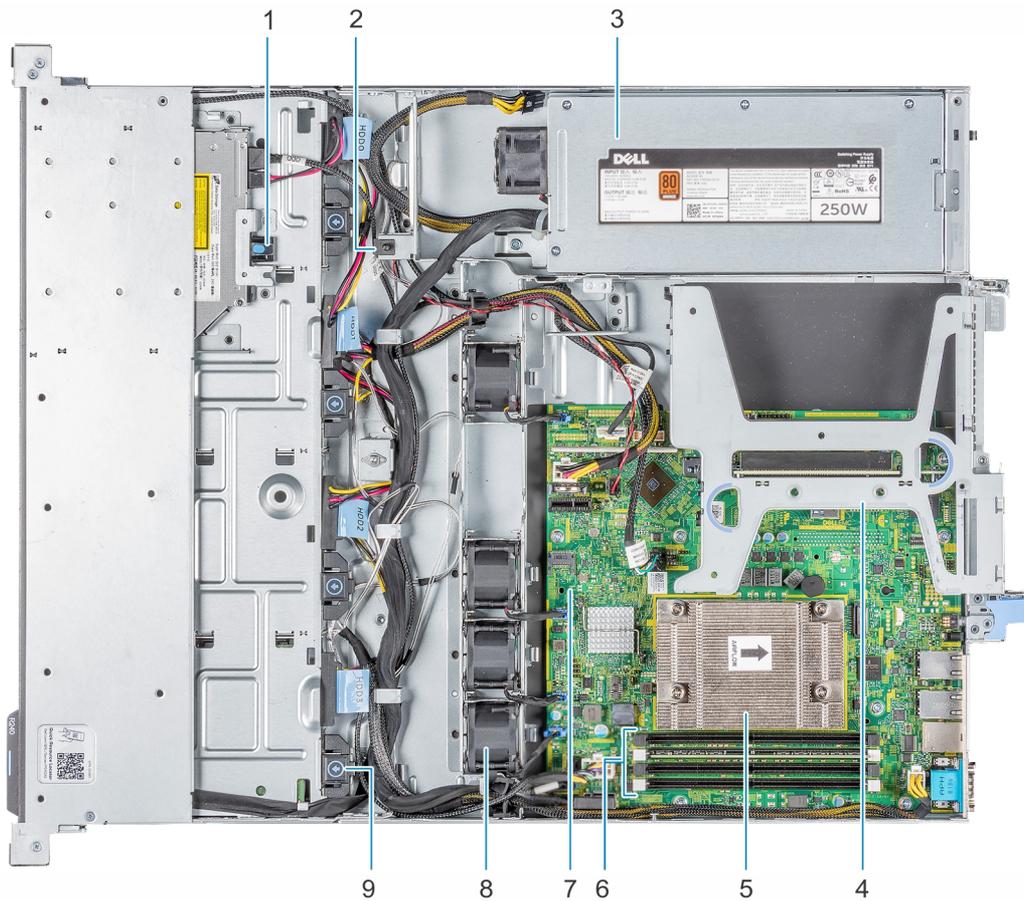


Figure 7. Inside the system - 4 x 3.5-inch cabled drive system

- | | | | |
|---|-----------------------------|---|-----------------------|
| 1 | Optical drive | 2 | Intrusion switch |
| 3 | Cabled AC power supply unit | 4 | Expansion card riser |
| 5 | Processor and heat sink | 6 | Memory module sockets |
| 7 | System board | 8 | Fan (4) |
| 9 | Cabled drive | | |

Locating the information tag of your system

Your system is identified by a unique Express Service Code and Service Tag number. You can view the Express Service Code and Service Tag by pulling out the information tag located on the front of the system. Alternatively, the information may be on the Mini Enterprise Service Tag (MEST) label on the chassis, on the rear of the system. This information is used by Dell to route support calls to the appropriate personnel.

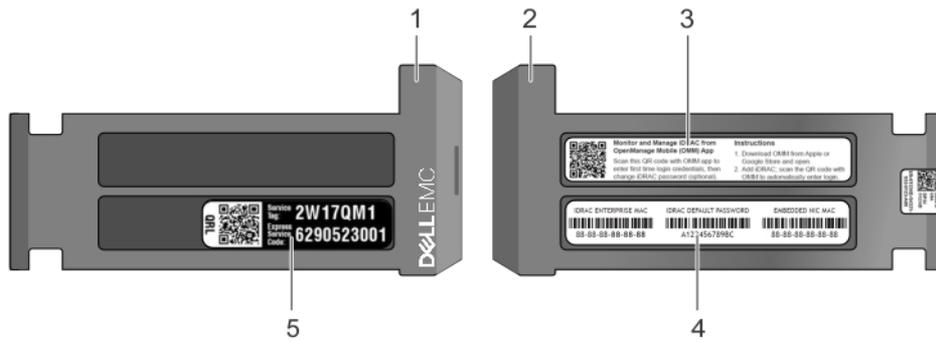


Figure 8. Locating Service Tag of your system

- | | |
|---|--|
| <ul style="list-style-type: none"> 1 Information tag (front view) 3 OpenManage Mobile (OMM) label 5 Service Tag, Express Service Code, QRL label | <ul style="list-style-type: none"> 2 Information tag (back view) 4 iDRAC MAC address and iDRAC secure password label |
|---|--|

Initial system setup and configuration

Setting up your system

Perform 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 Power on the system by pressing the power button or by using iDRAC.
- 6 Power on the attached peripherals.

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

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 about system issues and enables them to perform remote system management. This reduces the need for physical access to the system.

Options to set up iDRAC IP address

To enable communication between your system and iDRAC, you must first configure the network settings based on your network infrastructure.

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

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	<i>Dell Integrated Dell Remote Access Controller User's Guide</i> at Dell.com/poweredgemanuals
Dell Deployment Toolkit	<i>Dell Deployment Toolkit User's Guide</i> at Dell.com/openmanagemanuals > OpenManage Deployment Toolkit
Dell Lifecycle Controller	<i>Dell Lifecycle Controller User's Guide</i> at Dell.com/poweredgemanuals

NOTE: To access iDRAC, ensure that you connect the ethernet cable to the iDRAC9 dedicated network 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, you must use the iDRAC secure default password available on the system Information tag. If you have not opted for secure default access to iDRAC, then use the default user name and password `-root` and `calvin`. You can also log in by using your 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.

NOTE: The Intel Quick Assist Technology (QAT) on the Dell EMC PowerEdge R240 is supported with chipset integration and is enabled through an optional license. The license files are enabled on the sleds through iDRAC.

For more information about drivers, documentation, and white papers on the Intel QAT, see <https://01.org/intel-quickassist-technology>.

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/poweredgemanuals.

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

Options to install the operating system

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

Table 1. Resources to install the operating system

Resources	Location
iDRAC	Dell.com/idracmanuals
Lifecycle Controller	Dell.com/idracmanuals > Lifecycle Controller
OpenManage Deployment Toolkit	Dell.com/openmanagemanuals > OpenManage Deployment Toolkit
Dell certified VMware ESXi	Dell.com/virtualizationsolutions
Installation and How-to videos for supported operating systems on PowerEdge systems	Supported Operating Systems for Dell EMC PowerEdge systems

Methods to download firmware and drivers

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

Table 2. Firmware and drivers

Methods	Location
From the Dell EMC 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 > Repository Manager
Using Dell OpenManage Essentials (OME)	Dell.com/openmanagemanuals > OpenManage Essentials
Using Dell Server Update Utility (SUU)	Dell.com/openmanagemanuals > Server Update Utility
Using Dell OpenManage Deployment Toolkit (DTK)	Dell.com/openmanagemanuals > OpenManage Deployment Toolkit
Using iDRAC virtual media	Dell.com/idracmanuals

Downloading drivers and firmware

Dell EMC 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/home](https://dell.com/support/home).
- 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 the Service Tag, or click **View products**, and navigate to your product.

- 3 Click **Drivers & Downloads**.
The drivers that are applicable to your system 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](#)
- [System Setup](#)
- [Dell Lifecycle Controller](#)
- [Boot Manager](#)
- [PXE boot](#)

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 one of the following:

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

Viewing System Setup

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

- 1 Power 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.

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 utility. For more information about this utility, see <i>Integrated Dell Remote Access Controller User's Guide</i> at Dell.com/poweredgemanuals .
Device Settings	Enables you to configure device settings.

System BIOS

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

Viewing System BIOS

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

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

```
F2 = System Setup
```

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

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

System BIOS Settings details

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

Option	Description
System Information	Specifies information about the system such as the system model name, BIOS version, and Service Tag.
Memory Settings	Specifies information and options related to the installed memory.
Processor Settings	Specifies information and options related to the processor such as speed and cache size.
SATA Settings	Specifies options to enable or disable the integrated SATA controller and ports.
Boot Settings	Specifies options to specify the Boot mode (BIOS or UEFI). Enables you to modify UEFI and BIOS boot settings.
Network Settings	Specifies options to manage the UEFI network settings and boot protocols.

Option	Description
	Legacy network settings are managed from the Device Settings menu.
Integrated Devices	Specifies options to manage integrated device controllers and ports, specifies related features and options.
Serial Communication	Specifies options to manage the serial ports, its related features and options.
System Profile Settings	Specifies options to change the processor power management settings, memory frequency.
System Security	Specifies options to configure the system security settings, such as system password, setup password, Trusted Platform Module (TPM) security, and UEFI secure boot. It also manages the power button on the system.
Redundant OS Control	Sets the redundant OS info for redundant OS control.
Miscellaneous Settings	Specifies options to change the system date and time.

System Information

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

Viewing System Information

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

- 1 Power 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 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	Specifies the name of the system manufacturer.

Option	Description
System Manufacturer Contact Information	Specifies the contact information of the system manufacturer.
System CPLD Version	Specifies the current version of the system complex programmable logic device (CPLD) firmware.
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 Power on, or restart your system.
- 2 Press F2 immediately after you see the following message:
F2 = System Setup

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

Option	Description
Current State of Memory Operating Mode	Specifies the current state of the memory operating mode.

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, and logical processor idling.

Viewing Processor Settings

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

- 1 Power 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.
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.
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.
x2APIC Mode	Enables or disables the x2APIC mode. This option is set to Disabled by default.
Number of Cores per Processor	Controls the number of enabled cores in each processor. This option is set to All by default.
Processor Core Speed	Specifies the maximum core frequency of the processor.

Option	Description
Processor 1	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.
Microcode	Indicates the Microcode update signature.

SATA Settings

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

Viewing SATA Settings

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

- 1 Power 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 applicable only for AHCI Mode. 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.

Option	Description
Option	Description
Drive Type	Specifies the type of drive attached to the SATA port.
Capacity	Specifies the total capacity of the drive. This field is undefined for removable media devices such as optical drives.

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.

- **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, 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.
- **BIOS:** The **BIOS Boot Mode** is the legacy boot mode. It is maintained for backward compatibility.

Viewing Boot Settings

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

- 1 Power 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	<p>Enables you to set the boot mode of the system.</p> <p>CAUTION: Switching the boot mode may prevent the system from booting if the operating system is not installed in the same boot mode.</p> <p>If the operating system supports UEFI, you can set this option to UEFI. Setting this field to BIOS allows compatibility with non-UEFI operating systems. This option is set to UEFI by default.</p> <p>NOTE: Setting this field to UEFI disables the BIOS Boot Settings menu.</p>
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

Option	Description
	Hard-Disk Drive Sequence. This option is not enabled for UEFI Boot Mode . This option is set to Disabled by default.
Generic USB boot	Enables or disables generic USB boot.
Hard-disk Drive Placeholder	Enables or disables Hard-disk Drive Placeholder.
UEFI Boot Settings	Enables or disables UEFI Boot options. The Boot options include IPv4 PXE and IPv6 PXE . This option is set to IPv4 by default.
	 NOTE: This option is enabled only if the boot mode is UEFI.

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:** 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 Power 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
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.
HTTP Device n (n = 1 to 4)	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

You can use the iSCSI Settings screen to modify iSCSI device settings. The iSCSI Settings option is available only in the UEFI boot mode. BIOS does not control network settings in the BIOS boot mode. For the BIOS boot mode, the option ROM of the network controller handles the network settings.

Viewing UEFI iSCSI Settings

To view the **UEFI iSCSI Settings** screen, perform the following steps:

- 1 Power 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**.
- 5 On the **Network Settings** screen, scroll down to view **UEFI iSCSI Settings**.

UEFI iSCSI Settings details

The **UEFI iSCSI Settings** screen details are explained as follows:

Option	Description
iSCSI Initiator Name	Specifies the name of the iSCSI initiator (iqn format).
iSCSI Device1	Enables or disables the iSCSI device. When enabled, a UEFI boot option is created for the iSCSI device automatically.
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 Power 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	<p>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;</p> <p>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.</p> <p>NOTE: Selecting Only Back Ports On and All Ports Off disables the USB management port and also restricts access to the iDRAC features.</p>
Internal USB Port	<p>Enables or disables the internal USB port. This option is set to On or Off. This option is set to On by default.</p>
iDRAC Direct USB Port	<p>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.</p>
Embedded NIC1 and NIC2	<p>NOTE: The Embedded NIC1 and NIC2 options are only available on systems that do not have Integrated Network Card 1.</p> <p>Enables or disables the Embedded NIC1 and NIC2 options. If set to Disabled, the NIC may still be available for shared network access by the embedded management controller. The embedded NIC1 and NIC2 options are only available on systems that do not have Network Daughter Cards (NDCs). The Embedded NIC1 and NIC2 option is mutually exclusive with the Integrated Network Card 1 option. Configure the Embedded NIC1 and NIC2 option by using the NIC management utilities of the system.</p>
I/OAT DMA Engine	<p>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.</p>
Embedded Video Controller	<p>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.</p> <p>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.</p>
Current State of Embedded Video Controller	<p>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.</p>
OS Watchdog Timer	<p>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.</p>
Memory Mapped I/O above 4 GB	<p>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.</p>
Slot Disablement	<p>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.</p>

Option	Description
--------	-------------

Table 3. Slot Disablement

Option	Description
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.

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 Power 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.
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 Device1=COM2 or Serial Device 2=COM1 by default. <ul style="list-style-type: none"> 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. 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 the serial MUX setting to the default setting of Serial Device 1.
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.

Option	Description
	<p>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.</p> <p>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.</p>
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 Power 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	<p>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 (OS) by default.</p> <p>NOTE: All the parameters on the system profile setting screen are available only when the System Profile option is set to Custom.</p>
CPU Power Management	Sets the CPU power management. This option is set to OS DBPM by default.
Memory Frequency	Sets the speed of the system memory. You can select Maximum Performance , Maximum Reliability , 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.

Option	Description
C States	Enables or disables the processor to operate in all available power states. This option is set to Enabled 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.
Number of Turbo Boost Enabled Cores for Processor 1	<p>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.</p> <p>Controls the number of turbo boost enabled cores for Processor 1. The maximum number of cores is enabled by default.</p>
Monitor/Mwait	<p>Enables the Monitor/Mwait instructions in the processor. This option is set to Enabled for all system profiles, except Custom by default.</p> <p>NOTE: This option can be disabled only if the C States option in the Custom mode is set to disabled.</p> <p>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.</p>
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 Power 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
CPU 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.

Option	Description
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.
TPM Security	<p> NOTE: The TPM menu is available only when the TPM module is installed.</p> <p>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 fields if the TPM Status field is set to either On with Pre-boot Measurements or On without Pre-boot Measurements.</p>
TPM Information	Changes the operational state of the TPM. This option is set to No Change by default.
TPM Status	Specifies the TPM status.
TPM Command	<p>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.</p> <p> CAUTION: Clearing the TPM results in the loss of all keys in the TPM. The loss of TPM keys may affect booting to the operating system.</p> <p>This field is read-only when TPM Security is set to Off. The action requires an additional reboot before it can take effect.</p>
Intel(R) TXT	<p>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.</p> <p>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.</p>
Intel(R) SGX	<p>Enables or disables the Intel Software Guard Extension (SGX) option. This option is set to Software by default.</p> <p> NOTE: The SGX menu is available, only when E-2186G/E-2176G/E-2174G CPU is installed</p>
SGX Launch Control Policy	Allows controlling the Launch Control Policy (LCP) of Software Guard Extensions (SGX) technology. This option is set to Unlocked by default.
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.
User Defined Delay (60 s to 240 s) User Defined Delay (60 s to 600 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	<p>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.</p> <p> 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.</p>

Option	Description
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.
Audit Mode	In Audit mode , PK is not present. The BIOS does not authenticate programmatic updates to the policy objects, and transitions between modes. Audit Mode is useful for programmatically determining a working set of policy objects. BIOS performs signature verification on pre-boot images and logs results in the image Execution Information Table, but executes the images whether they pass or fail verification.
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 Specifies the list of certificates and hashes that secure boot uses to authenticate images.

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

Creating a system and setup password

Prerequisite

Ensure that the password jumper is enabled. The password jumper enables or disables the system password and setup password features. For more information, see the System board jumper settings section.

NOTE: If the password jumper setting is disabled, the existing system password and setup password are deleted and you need not provide the system password to boot the system.

Steps

- 1 To enter System Setup, press F2 immediately after turning on or rebooting your system.
- 2 On the **System Setup Main Menu** screen, click **System BIOS > System Security**.
- 3 On the **System Security** screen, verify that **Password Status** is set to **Unlocked**.

- 4 In the **System Password** field, type your system password, and press Enter or Tab.
Use the following guidelines to assign the system password:
 - A password can have up to 32 characters.
 - The password can contain the numbers 0 through 9.
 - Only the following special characters are allowed: space, ("), (+), (,), (-), (.), (/), (:), ([), (\), (]), (').A message prompts you to reenter the system password.
- 5 Reenter the system password, and click **OK**.
- 6 In the **Setup Password** field, type your setup password and press Enter or Tab.
A message prompts you to reenter the setup password.
- 7 Reenter the setup password, and click **OK**.
- 8 Press Esc to return to the System BIOS screen. Press Esc again.
A message prompts you to save the changes.

NOTE: Password protection does not take effect until the system reboots.

Using your system password to secure the system

About this task

If you have assigned a setup password, the system accepts your setup password as an alternate system password.

Steps

- 1 Power on or reboot your system.
- 2 Type the system password and press Enter.

Next step

When **Password Status** is set to **Locked**, type the system password and press Enter when prompted at reboot.

NOTE: If an incorrect system password is typed, the system displays a message and prompts you to reenter your password. You have three attempts to type the correct password. After the third unsuccessful attempt, the system displays an error message that the system has stopped functioning and must be turned off. Even after you turn off and restart the system, the error message is displayed until the correct password is entered.

Deleting or changing system and setup password

Prerequisite

NOTE: You cannot delete or change an existing system or setup password if the **Password Status** is set to **Locked**.

Steps

- 1 To enter System Setup, press F2 immediately after turning on or restarting your system.
- 2 On the **System Setup Main Menu** screen, click **System BIOS > System Security**.
- 3 On the **System Security** screen, ensure that **Password Status** is set to **Unlocked**.
- 4 In the **System Password** field, change or delete the existing system password, and then press Enter or Tab.
- 5 In the **Setup Password** field, alter or delete the existing setup password, and then press Enter or Tab.

NOTE: If you change the system password or setup password, a message prompts you to reenter the new password. If you delete the system password or setup password, a message prompts you to confirm the deletion.

- 6 Press Esc to return to the **System BIOS** screen. Press Esc again, and a message prompts you to save the changes.
- 7 Select **Setup Password**, change, or delete the existing setup password and press Enter or Tab.

NOTE: If you change the system password or setup password, a message prompts you to reenter the new password. If you delete the system password or setup password, a message prompts you to confirm the deletion.

Operating with setup password enabled

If **Setup Password** is set to **Enabled**, type the correct setup password before modifying the system setup options.

If you do not type the correct password in three attempts, the system displays the following message:

```
Invalid Password! Number of unsuccessful password attempts: <x> System Halted! Must power down.
```

```
Password Invalid. Number of unsuccessful password attempts: <x> Maximum number of password attempts exceeded. System halted.
```

Even after you turn off and restart the system, the error message is displayed until the correct password is typed. The following options are exceptions:

- If **System Password** is not set to **Enabled** and is not locked through the **Password Status** option, you can assign a system password. For more information, see the System Security Settings screen section.
- You cannot disable or change an existing system password.

NOTE: You can use the password status option with the setup password option to protect the system password from unauthorized changes.

Redundant OS Control

In the **Redundant OS Control** screen you can set the redundant OS information. This enables you to set up a physical recovery disk on the system.

Viewing Redundant OS Control

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

- 1 Power 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: <ul style="list-style-type: none">• None• IDSDM• SATA Ports in AHCI mode• BOSS PCIe Cards (Internal M.2 Drives)

Option	Description
	<ul style="list-style-type: none"> Internal USB <p>NOTE: RAID configurations and NVMe cards not are included as BIOS does not have the ability to distinguish between individual drives in those configurations.</p>
Redundant OS State	<p>NOTE: This option is disabled if Redundant OS Location is set to None.</p> <p>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.</p> <p>NOTE: BIOS will disable the device in hardware, so it cannot be accessed by the OS.</p>
Redundant OS Boot	<p>NOTE: This option is disabled if Redundant OS Location is set to None or if Redundant OS State is set to Hidden.</p> <p>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.</p>

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 Power 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.

Option	Description
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/poweredgemanuals.

Device Settings

Device Settings enables you to configure the below device parameters:

- Controller Configuration Utility
- Embedded NIC Port1-X Configuration
- NICs in slotX, Port1-X Configuration
- BOSS Card configuration

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 lifecycle of the system. The Dell Lifecycle Controller can be started during the boot sequence and can function independently of the operating system.

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/poweredgemanuals.

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 Power on, or restart your system.
- 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 Boot Menu	Enables you to access boot menu, where you can select a one-time boot device to boot from.
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 select a boot device 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.

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

Before working inside your system

Prerequisite

Follow the safety guidelines listed in [Safety instructions](#).

Steps

- 1 Power off the system and all attached peripherals.
- 2 Disconnect the system from the electrical outlet, and disconnect the peripherals.
- 3 If applicable, remove the system from the rack.
For more information, see the *Rail Installation Guide* 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 Replace 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 Power on the attached peripherals and then power 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 #T15 screwdriver
- Plastic scribe
- 1/4 inch flat blade screwdriver
- Wrist grounding strap connected to the ground
- ESD mat

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).

Front bezel

Removing the front bezel

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Keep the bezel key handy.

Steps

- 1 Unlock the bezel.
- 2 Press the release button, and remove the left end of the bezel.
- 3 Unhook the right end of the bezel, and remove the bezel.



Figure 9. Removing the front bezel

Next step

- 1 Replace the bezel.

Installing the front bezel

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Locate and remove the bezel key.

NOTE: The bezel key is part of the bezel package.

Steps

- 1 Align and insert the tabs on the right end of the bezel into the slots on the system.
- 2 Fit the left end of the bezel onto the system and press the bezel until you hear the button click.
- 3 Lock the bezel.



Figure 10. Installing the front bezel

System cover

Removing the system cover

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Disconnect the system from the electrical outlet and disconnect the peripherals.
- 3 If applicable, remove the system from the rack.

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

Steps

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



Figure 11. Removing the system cover

Installing the system cover

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Power 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 release-latch.
- 3 Using a 1/4 inch flat head or Phillips #2 screwdriver, turn the lock on the release-latch clockwise to the lock position.



Figure 12. Installing the system cover

Next step

- 1 Follow the procedure listed in the [After working inside your system.](#)

Air shroud

Removing the air shroud

Prerequisites

⚠ CAUTION: Never operate your system with the air shroud removed. The system may get overheated, 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.](#)

Step

Holding the blue touch points, lift the air shroud out of the system.

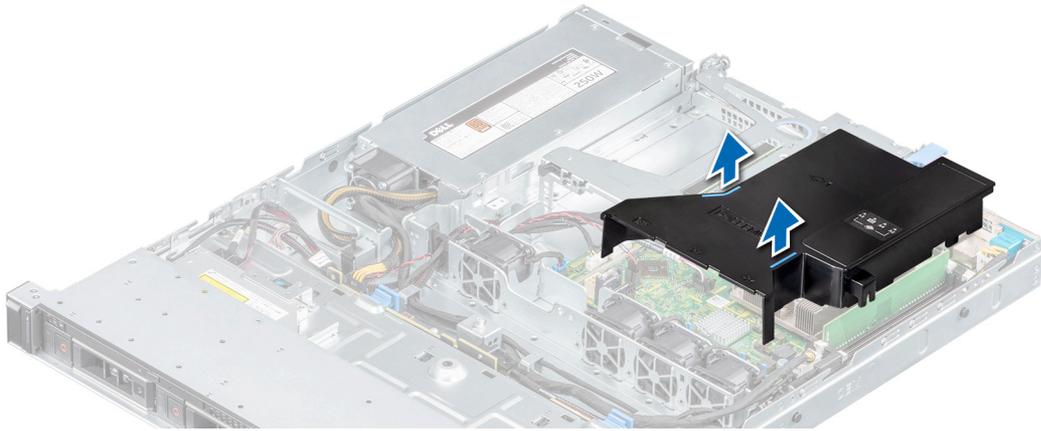


Figure 13. Removing the air shroud

Next step

- 1 [Replace the air shroud.](#)

Installing the air shroud

Prerequisite

- 1 Follow the safety guidelines listed in [Safety instructions.](#)
- 2 Follow the procedure listed in [Before working inside your system.](#)

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

Steps

- 1 Align the tab on the air shroud with the slot on the system.
- 2 Lower the air shroud into the system until it is firmly seated.

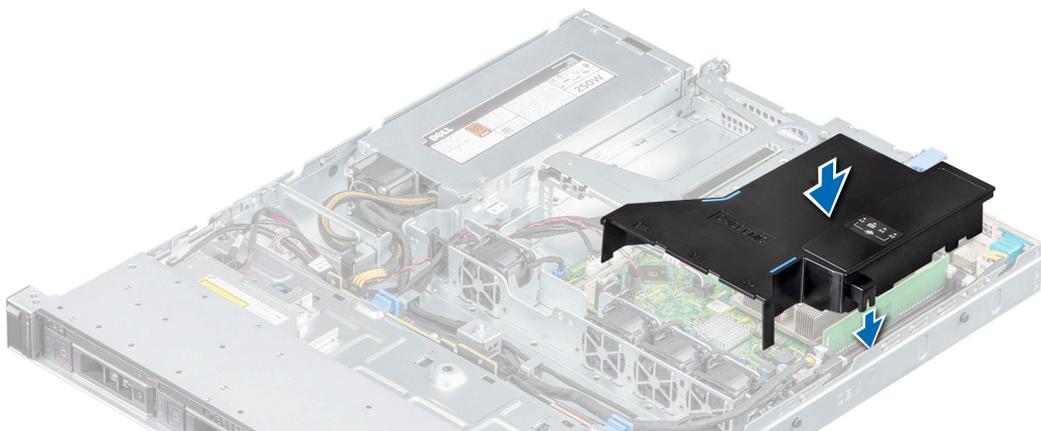


Figure 14. Installing the air shroud

Next step

- 1 Follow the procedure listed in the [After working inside your system.](#)

Cooling fans

Removing the cooling fan blank

Prerequisites

- 1 Follow the safety guidelines listed in [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).

Steps

- 1 Press the release tabs and push the fan blank out to disengage it from the fan cage.
- 2 Lift the fan blank out of the fan cage.

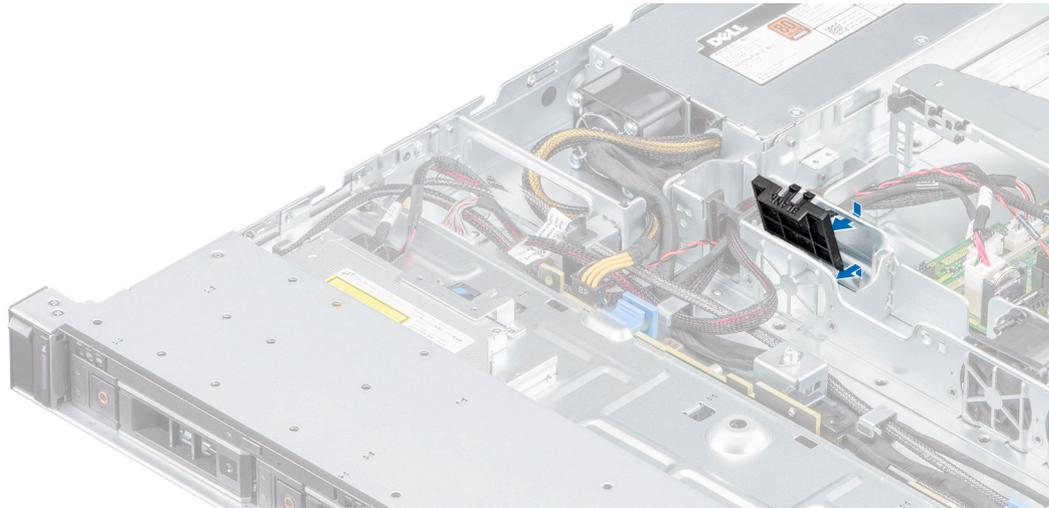


Figure 15. Removing the fan blank

Next step

- 1 If applicable, [replace the cooling fan blank](#) or [install the cooling fan](#).

Installing the cooling fan blank

Prerequisites

- 1 Follow the safety guidelines listed in [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).

Steps

- 1 Lower the fan blank into the fan cage.
- 2 Insert the lower tabs on the fan blank into the lower wall on the fan cage.
- 3 Press the fan blank until the release tabs lock into place.

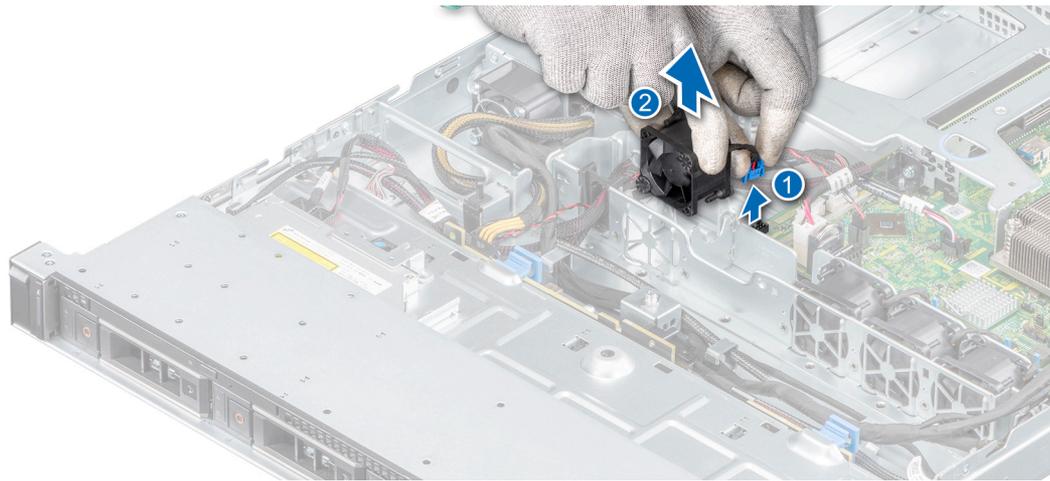


Figure 17. Removing a cooling fan

Next step

- 1 [Replace the cooling fan blank](#) or [install the cooling fan](#).

Installing a cooling fan

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in [Before working inside your system](#).
- 3 [Remove the air shroud](#).
- 4 If installed, [remove the fan blank](#).

Steps

- 1 Lower the fan into the fan cage.
- 2 Press the release tabs on the fan cable connector and connect the cable connector to the connector on the system board.

NOTE: Route the cable properly when installing, to prevent the cable from being pinched or crimped.

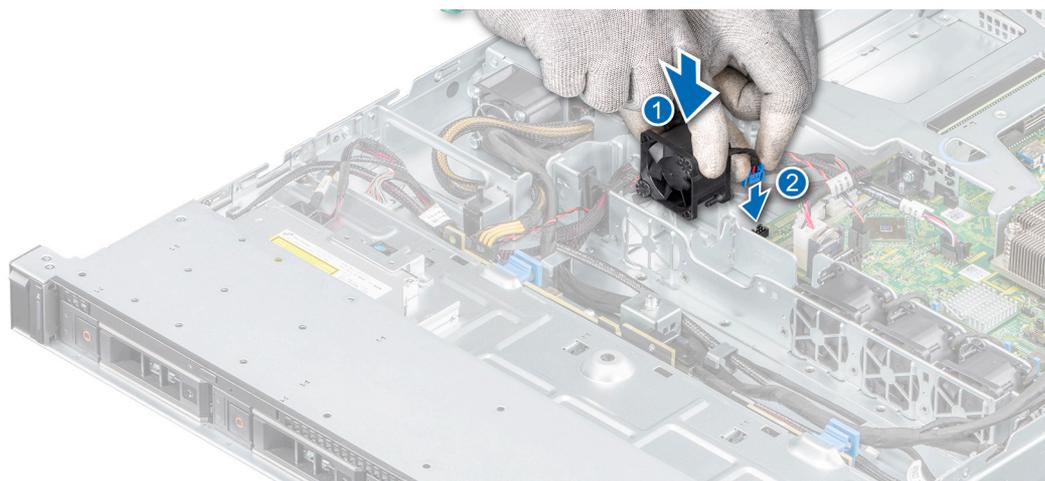


Figure 18. Installing a fan

Next step

- 1 Follow the procedure listed in the [After working inside your system](#).

Drives

Removing a drive blank

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 [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.

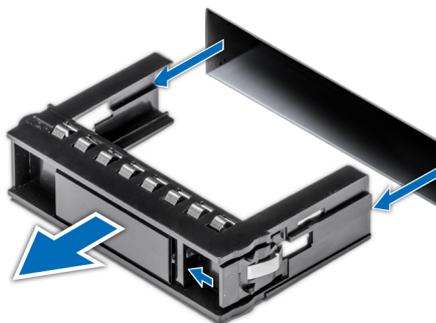


Figure 19. Removing a drive blank

Next step

- 1 If applicable, [replace the blank](#) or [install a drive](#).

Installing a drive blank

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 [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

Insert the drive blank into the drive slot, and push the blank until the release button clicks into place.



Figure 20. Installing a drive blank

Next step

- 1 [Replace the front bezel](#).

Removing a hot-swappable drive

Prerequisites

- 1 Follow the safety guidelines listed in [Safety instructions](#).
- 2 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 power off. When the drive indicators are off, the drive is ready for removal. For more information, see the documentation for the storage controller.

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

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

- 3 [Remove the front bezel](#).

Steps

- 1 Press the release button to open the drive release handle.
- 2 Holding the handle, slide the drive out of the drive slot.

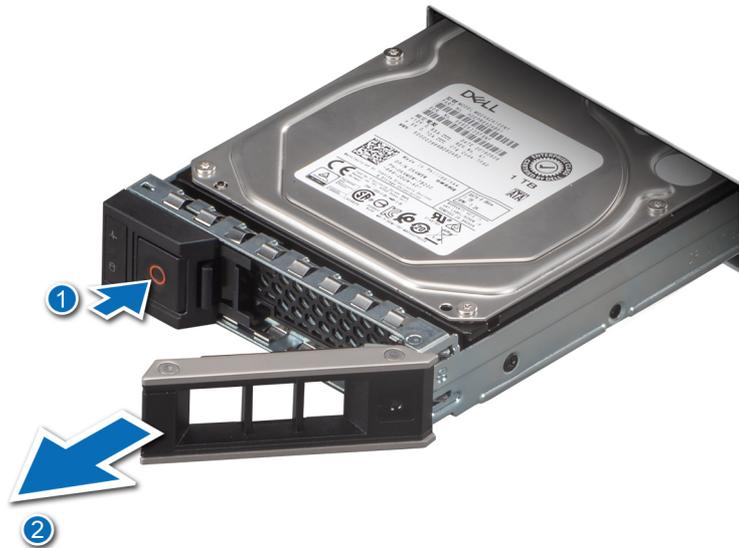


Figure 21. Removing a hot-swappable drive

Next step

- 1 Replace the drive or install a drive blank.

Installing the hot-swappable drive

Prerequisites

- ⚠ **CAUTION:** Before removing or installing a drive while the system is running, see the documentation for the storage controller card to ensure that the host adapter is configured correctly to support drive removal and insertion.
- ⚠ **CAUTION:** Combining SAS and SATA drives in the same RAID volume is not supported.
- ⚠ **CAUTION:** When installing a drive, ensure that the adjacent drives are fully installed. Inserting a drive carrier and attempting to lock its handle next to a partially installed carrier can damage the partially installed carrier's shield spring and make it unusable.
- ⚠ **CAUTION:** To prevent data loss, ensure that your operating system supports hot-swap drive installation. See the documentation supplied with your operating system.
- ⚠ **CAUTION:** When a replacement hot swappable drive is installed and the system is powered on, the drive automatically begins to rebuild. Ensure that the replacement drive is blank or contains data that you wish to overwrite. Any data on the replacement drive is immediately lost after the drive is installed.
- 📘 **NOTE:** Ensure that the drive release handle of the drive carrier is in the open position before inserting the carrier into the slot.

- 1 Follow the safety guidelines listed in [Safety instructions](#).
- 2 [Remove the front bezel](#).
- 3 [Remove the drive blank](#).

Steps

- 1 Press the release button on the front of the drive carrier to open the release handle.
- 2 Slide the drive into the drive slot.

- 3 Close the drive release handle to lock the drive in place.



Figure 22. Installing the hot-swappable drive

Next step

- 1 Replace the front bezel.

Removing the drive from the drive carrier

Prerequisites

- 1 Follow the safety guidelines listed in [Safety instructions](#).
- 2 If installed, [remove the front bezel](#).
- 3 [Remove the drive](#).

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.

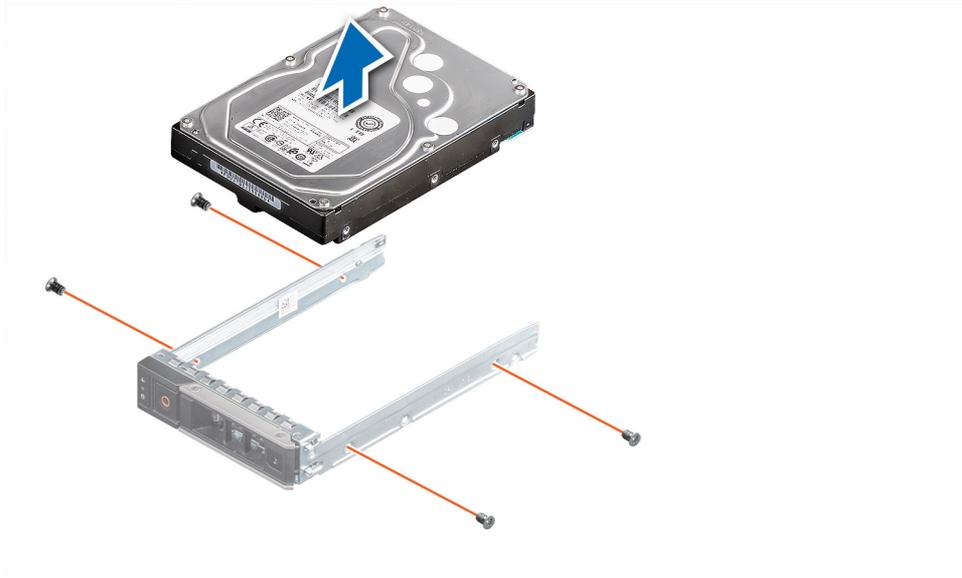


Figure 23. Removing the drive from the drive carrier

Installing the drive into the drive carrier

Prerequisites

- 1 Follow the safety guidelines listed in [Safety instructions](#).
- 2 If installed, [remove the front bezel](#).
- 3 [Remove the drive blank](#).

Steps

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

① **NOTE:** When installing a drive into the drive carrier, ensure that the screws are torqued to 4 inch-pounds.

① **NOTE:** Use the screws shipped with the drive carrier to secure the drive to the drive carrier.

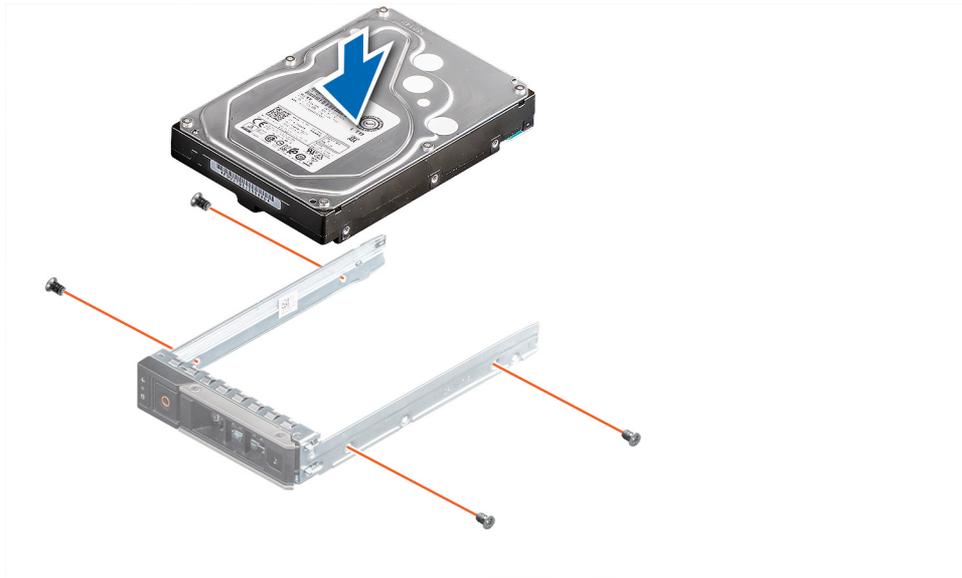


Figure 24. Installing a drive into the drive carrier

Next steps

- 1 [Install the drive carrier.](#)
- 2 If removed, [install the front bezel.](#)

Removing a 2.5-inch drive from a 3.5-inch drive adapter

Steps

- 1 Using a Phillips #1 screwdriver, remove the screws from the side of the 3.5-inch drive adapter.
- 2 Remove the drive from the 3.5-inch drive adapter.

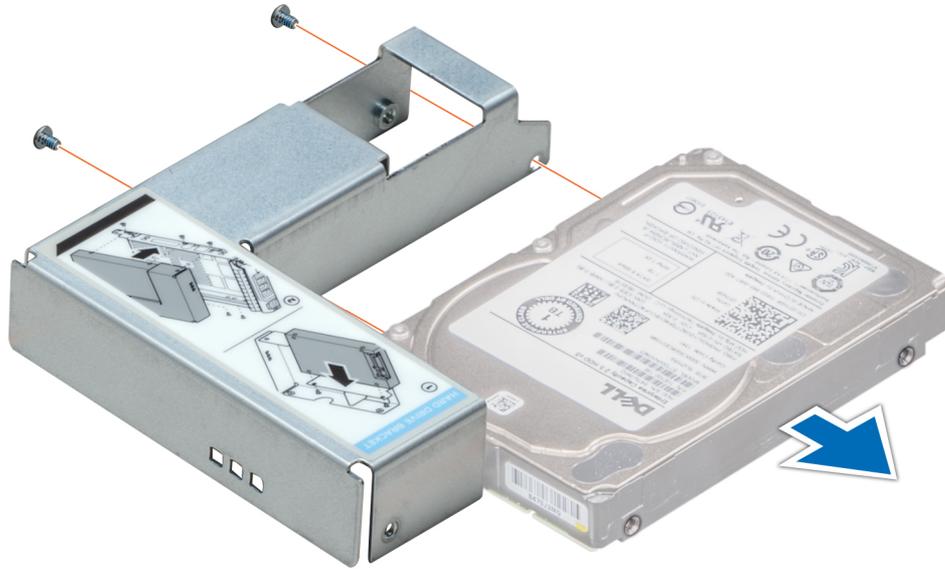


Figure 25. Removing a 2.5-inch drive from a 3.5-inch drive adapter

Next step

- 1 Install a 2.5-inch drive into the 3.5-inch drive adapter.

Installing a 2.5-inch drive into a 3.5-inch drive adapter

Steps

- 1 Align the screw holes on the 2.5-inch drive with the screw holes on the 3.5-inch drive adapter.
- 2 Using a Phillips #1 screwdriver, install the screws to secure the drive to the 3.5-inch drive adapter.

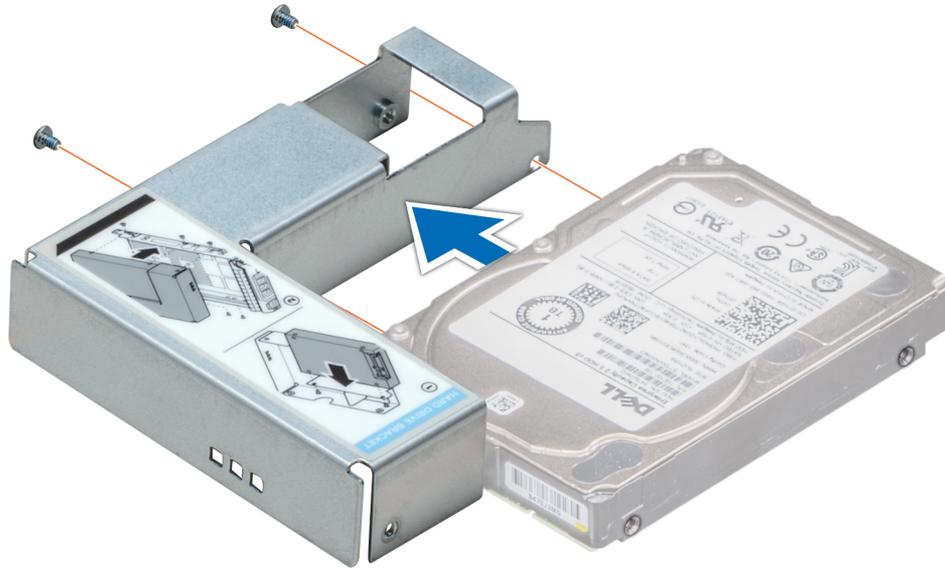


Figure 26. Installing a 2.5-inch drive into a 3.5-inch drive adapter

Next step

- 1 Follow the procedure listed in the [After working inside your system.](#)

Removing a 3.5-inch drive adapter from a 3.5-inch drive carrier

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions.](#)
- 2 [Remove the 3.5-inch drive carrier.](#)

Steps

- 1 Remove the screws from the rails on the drive carrier.
- 2 Lift the 3.5 inch drive adapter out of the drive carrier.

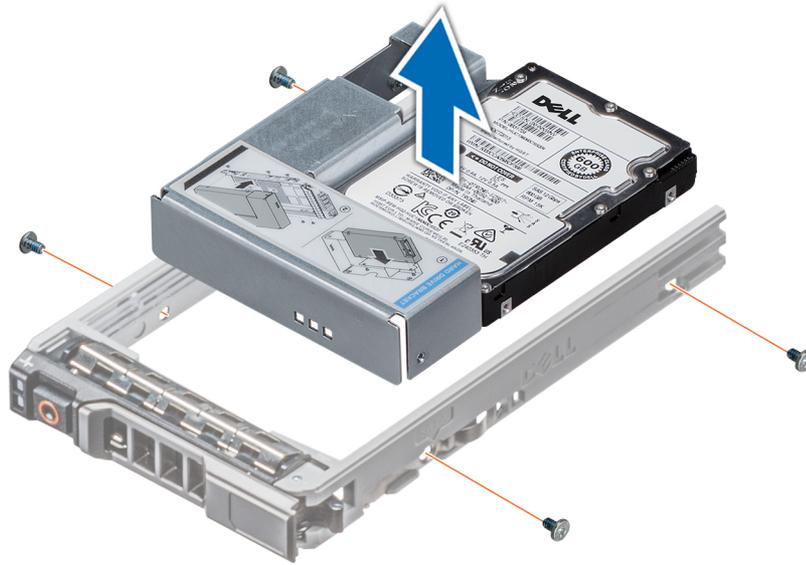


Figure 27. Removing a 3.5-inch drive adapter from a 3.5-inch drive carrier

Next step

Replace a 3.5-inch adapter into a 3.5-inch drive carrier.

Installing a 3.5-inch adapter into a 3.5-inch drive carrier

Prerequisite

- 1 Follow the safety guidelines listed in the [Safety instructions](#).

Steps

- 1 Insert the 3.5 inch drive adapter into the drive carrier with the connector end of the drive toward the back of the drive carrier.
- 2 Align the screw holes on the drive with the holes on the drive carrier.
- 3 Install the screws to secure the drive to the drive carrier.

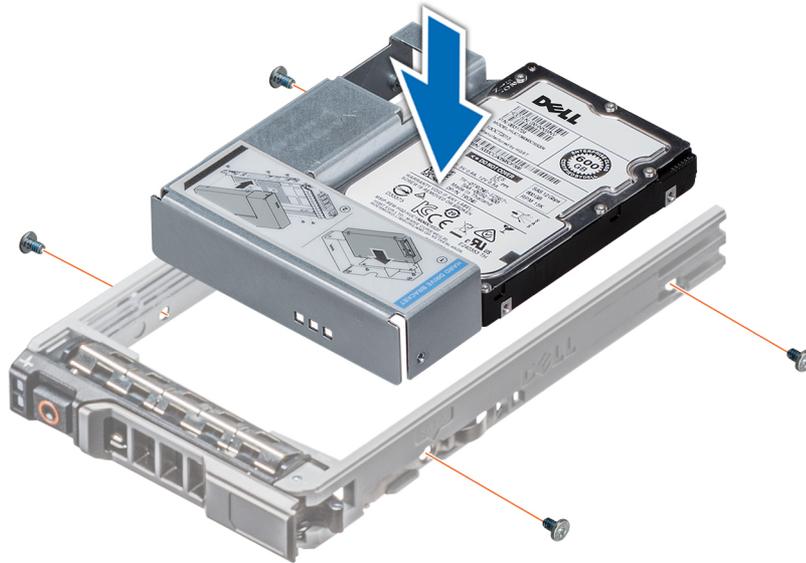


Figure 28. Installing a 3.5-inch drive adapter into the 3.5-inch drive carrier

Next steps

- 1 Replace a 3.5-inch drive carrier.
- 2 Follow the procedure listed in [After working inside your system](#).

Removing a cabled drive

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).

⚠ CAUTION: Mixing drives from previous generations of PowerEdge servers is not supported.

Steps

- 1 Disconnect the power and data cable connector that is connected to the drive.
- 2 Press the release button, and slide the drive out of the drive slot.

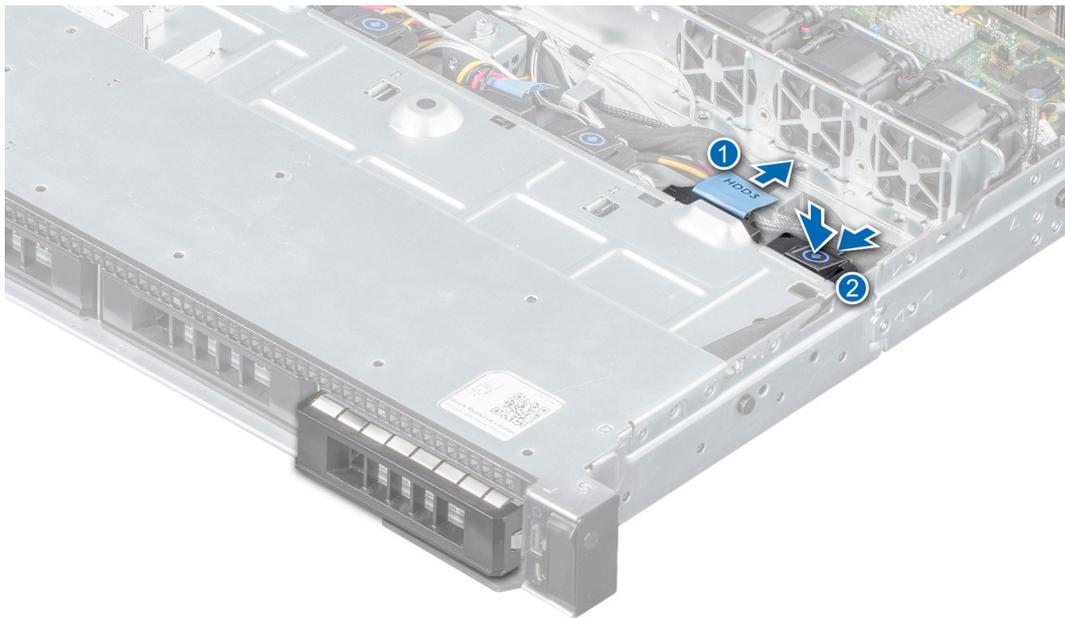


Figure 29. Removing a cabled drive

Next step

- 1 Install the drive into the drive carrier.

Installing a cabled drive

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).

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

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

Steps

- 1 Insert the drive into the drive slot until the release button clicks into place.
- 2 Connect the power and data cable connector to the drive.

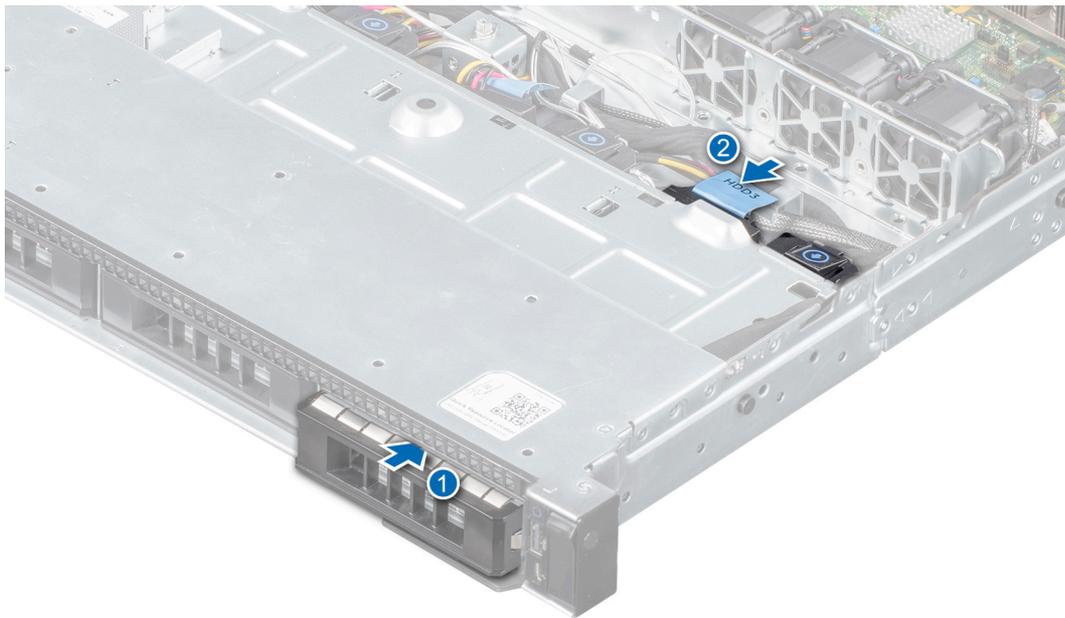


Figure 30. Installing a cabled drive

Next step

- 1 Follow the procedure listed in the [After working inside your system.](#)

Removing the cabled drive from the drive carrier

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions.](#)
- 2 Follow the procedure listed in the [Before working inside your system.](#)
- 3 [Remove the front bezel.](#)
- 4 [Remove the drive.](#)

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

⚠ CAUTION: To maintain proper system cooling, all empty drive slots must have drive carrier blanks installed.

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.

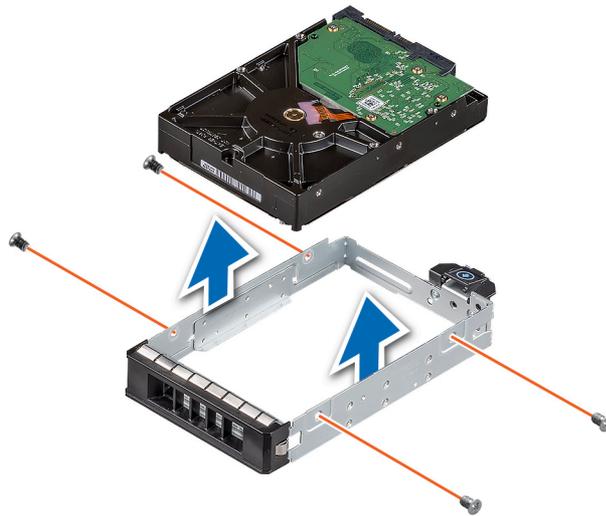


Figure 31. Removing the cabled drive from the drive carrier

Next step

- 1 [Install the drive into the drive carrier.](#)

Installing a cabled drive into the drive carrier

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 [Remove the front bezel.](#)

Steps

- 1 Insert the drive into the drive carrier with the connector end of the drive toward the back of the drive carrier.
- 2 Align the screw holes on the drive with the screw holes on the drive carrier. When aligned correctly, the back of the drive is flush with the back of the drive carrier.
- 3 Install the screws to secure the drive to the drive carrier.

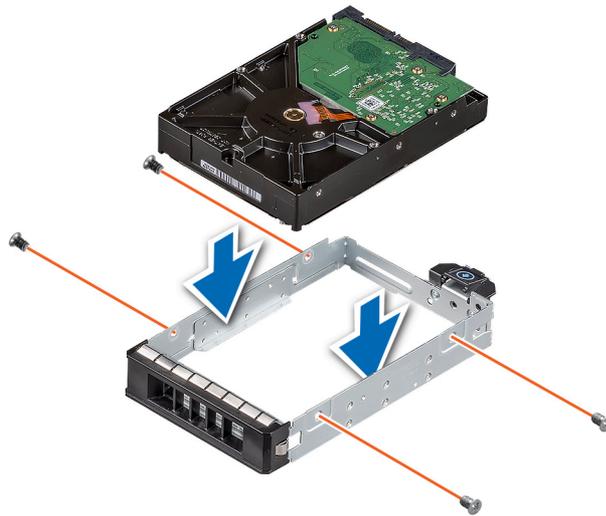


Figure 32. Installing a cabled drive into the drive carrier

Next steps

- 1 Enter System Setup and ensure that the controller of the drive is enabled.
- 2 Exit System Setup and reboot the system.
- 3 Install any software required for the drive operation as described in the documentation for the drive.
- 4 Follow the procedure listed in the [After working inside your system](#).

Intrusion switch

Removing the intrusion switch

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 Keep the plastic scribe ready.

Steps

- 1 Disconnect and remove the intrusion switch cable connector from the connector on the system board.

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 plastic scribe, slide the intrusion switch out of the intrusion switch slot.



Figure 33. Removing the intrusion switch

Next step

- 1 [Replace the intrusion switch.](#)

Installing the intrusion switch

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).

Steps

- 1 Align and slide the intrusion switch into the slot in the system.
- 2 Route the intrusion switch cable through the cable routing clips.
- 3 Connect the intrusion switch cable connector to the connector on the system board.



Figure 34. Installing the intrusion switch

Next step

- 1 Follow the procedure listed in the [After working inside your system](#).

System memory

System memory guidelines

Your system contains 4 memory sockets organized into two channels. In each channel, the 1st socket is marked white and the 2nd socket black.

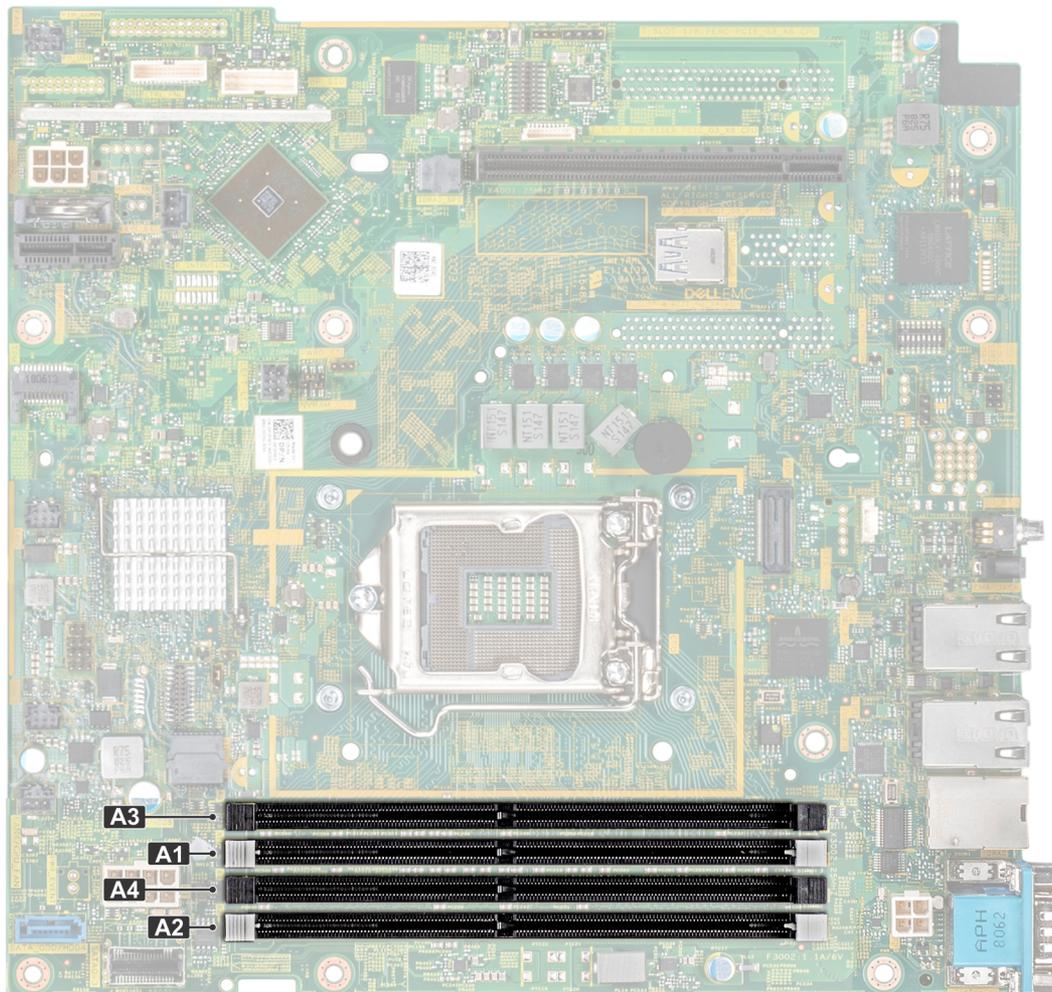


Figure 35. Memory socket locations

Memory channels are organized as follows:

Table 4. Memory channels

Memory socket locations on the system board

Processor 1	Channel 0: Memory slots A1 and A3	Channel 1: Memory slots A2 and A4
-------------	-----------------------------------	-----------------------------------

Table 5. Memory population

DIMM Type	DIMMs Populated/ Channel	Voltage	Operating Frequency (in MT/s)	Maximum DIMM Rank/Channel
UDIMM	1	1.2 V	2666	Dual rank or Single rank
	2			

General memory module installation guidelines

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

The memory bus may operate at frequency can be 2666 MT/s, 2400 MT/s, or 2133 MT/s depending on the following factors:

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

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

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

- All DIMMs must be DDR4.
- A maximum of two different ranked DIMMs can be populated in a 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).
- Populate memory module sockets only if a processor is installed.
 - For single-processor systems, sockets A1 to A4 are available.
 - In **Optimizer Mode**, the DRAM controllers operate independently in the 64-bit mode and provide optimized memory performance.

Table 6. Memory population rules

Processor	Configuration	Memory population	Memory population information
Single processor	Optimizer (Independent channel) population order	1, 2, 3, 4	Odd amount of DIMMs per processor allowed.

- 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.
- 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.
- Unbalanced memory configurations will result in a performance loss so always populate memory channels identically with identical DIMMs for best performance.
- To ensure proper system cooling, memory module blanks must be installed in memory sockets that are not occupied.

Removing a memory module

Prerequisites

⚠ WARNING: Allow the memory modules to cool after you power off the system.

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 [Remove the 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.

📌 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.

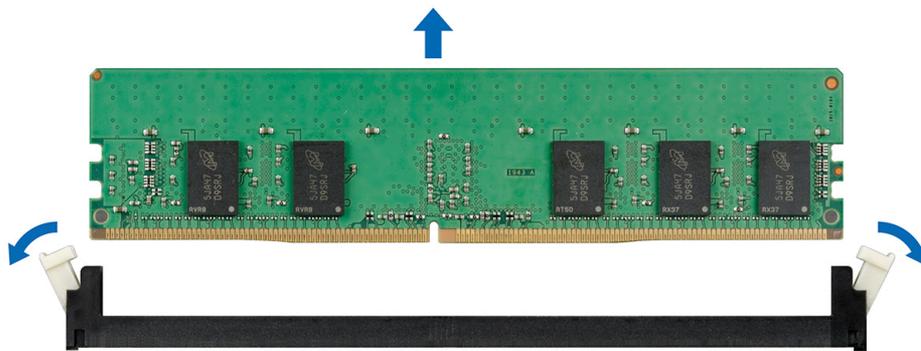


Figure 36. Removing a memory module

Next step

- 1 [Replace the memory module](#).

Installing a memory module

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 [Remove the air shroud](#).

Steps

- 1 Locate the appropriate memory module socket. If installed, [remove the memory module or memory module blank](#).

① **NOTE:** The procedure to remove a memory module blank is similar to the procedure to remove a memory module. Retain the removed memory module blank for future use.

⚠ **CAUTION:** Handle each memory module only by the 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 enable 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.

① **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 ejectors firmly click into place.

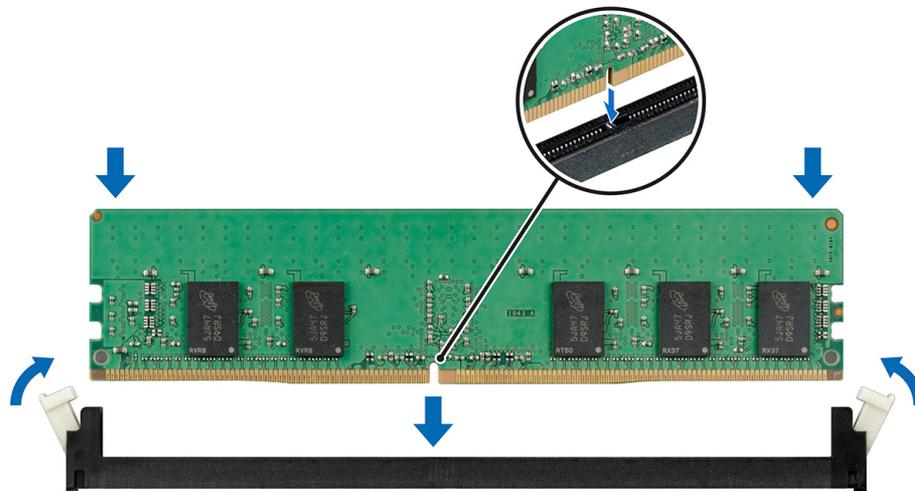


Figure 37. Installing a memory module

Next steps

- 1 [Install the air shroud.](#)
- 2 Follow the procedure listed in the [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

① **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 with an error message, see *Troubleshooting expansion cards* section in the *Dell EMC PowerEdge Servers Troubleshooting Guide* at Dell.com/poweredgemanuals.

Expansion card installation guidelines

To ensure proper cooling and mechanical fit, the following table provides guidelines for installing expansion cards. 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-cards are not hot-swappable.

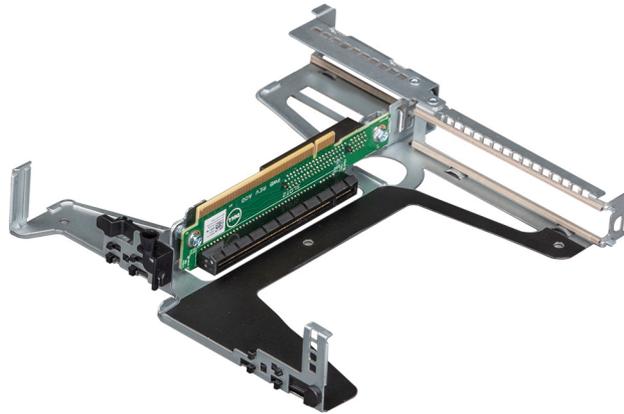


Figure 38. Expansion card riser

Table 7. Expansion card riser specifications

PCIe slot	Riser	PCIe slot height	PCIe slot length	Slot width
Slot 1	x8 PCIe	Low-profile	Half-length	x8
Slot 2	x16 PCIe	Low-profile/Full-height	Half-length	x16

Table 8. Riser configuration

Card type	Slot priority	Maximum number of cards supported
PERC H730P+, Adapter, Plus	2	1
PERC H330+, Adapter, Plus	2	1
PWA, CTL, HBA330, PLUS, ADPT	2	1
PWA, CTL, 12GB-SAS-HBA, ADPT, FH	2	1
CRD, NTKW, 10G, SFP+, DP FVL, INTEL	2	1
CRD, NTKW, 10G, SFP+, DP FVL, IN, LP	1	1
CRD, NTKW, 10GBT, INTEL, FH, V2	2	1
CRD, NTKW, 10GBT, INTEL, LP, V2	1	1
ASSY, CRD, CTL, BOSS2, SATA, HWR, FH	2	1
ASSY, CRD, CTL, BOSS2, SATA, HWR, LP	1	1
CRD, NTKW, PCIE, QP, 1G, BCOM, V2	2	1

Card type	Slot priority	Maximum number of cards supported
CRD, NTKW, PCIE, QP, 1G, BCOM, LP, V2	1	1
CRD, NTKW, PCIE, 1GB, QP, INTEL, V3	2	1
CRD, NTKW, PCIE, 1GB, QP, INT, LP, V3	1	1
CRD, NTKW, DP, BCOM, 1G	2	1
CRD, NTKW, DP, BCOM, 1G, LP	1	1
CRD, NTKW, PCIE, 1GB, DP, INTEL, V3	2	1
CRD, NTKW, PCIE, 1GB, DP, INT, LP, V3	1	1

Removing the expansion card riser

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 [Remove the air shroud](#).

Steps

- 1 Open the blue expansion card riser retention-latch located on the system.
- 2 Holding the blue touch points, lift the expansion card riser out of the system.

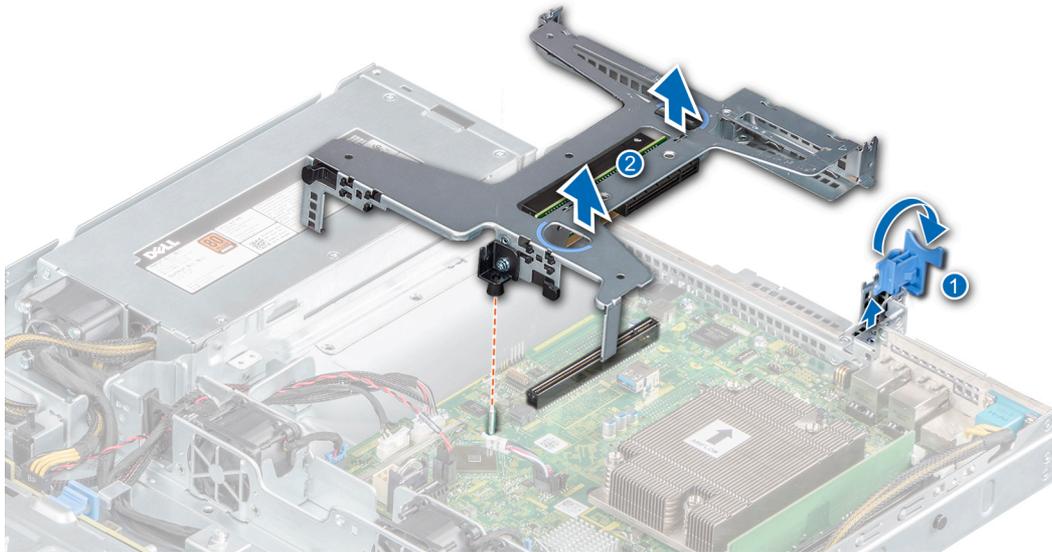


Figure 39. Removing the expansion card riser

- 3 If you are not replacing the expansion card riser, install a expansion card riser filler bracket by performing the following steps:
 - a Align the expansion card riser filler bracket with the slot on the system.
 - b Push the expansion card riser filler bracket downward until firmly seated.
 - c Close the blue expansion card retention latch by pushing the latch down until the latch snaps into place.
 - d Using a Phillips #2 screwdriver, tighten the screw to secure the expansion card riser filler to the chassis.

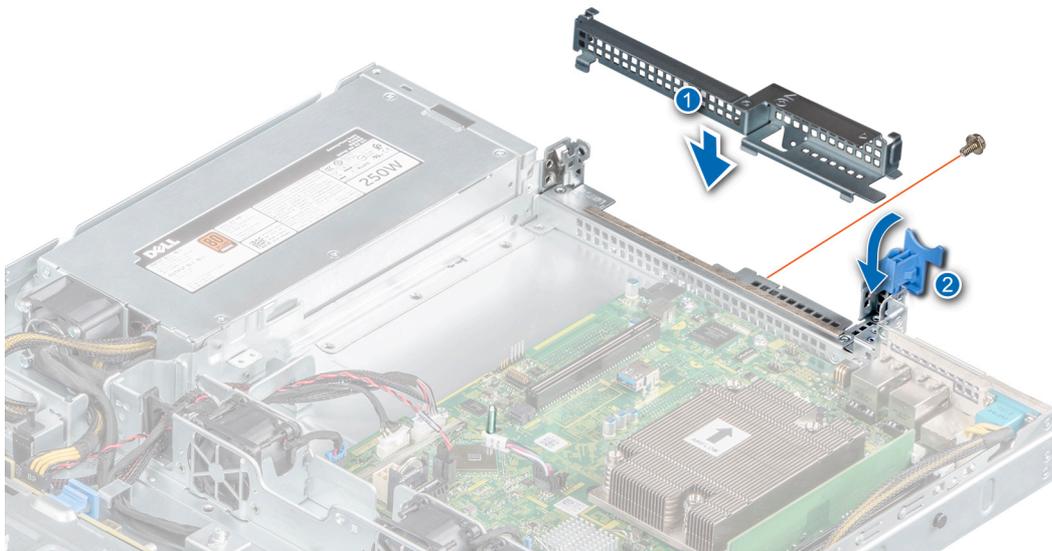


Figure 40. Installing the expansion card riser filler

Next step

- 1 If applicable, [replace the expansion card riser](#).

Installing the expansion card riser

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 [Remove the air shroud](#).
- 4 [Install the expansion card in the expansion card riser](#).

Steps

- 1 If applicable, remove the expansion card riser filler by performing the following steps:
 - a Open the blue expansion card retention latch lock.
 - b Using a Phillips #2 screwdriver, remove the screw securing the expansion card riser filler to the system board.
 - c Slide the expansion card riser filler bracket up and out of the system.

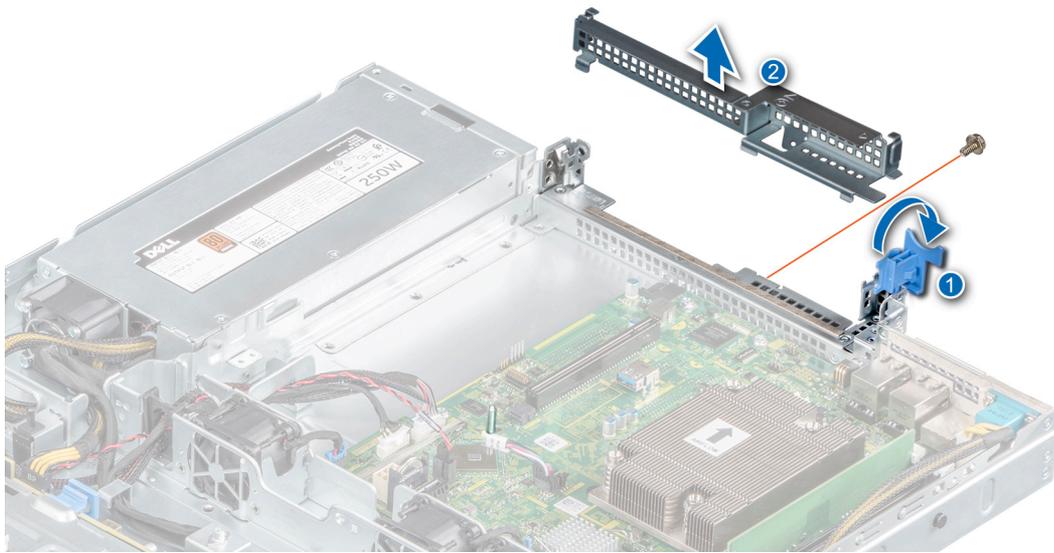


Figure 41. Removing the expansion card riser filler

- 2 Holding the blue touch points on the expansion card riser, align the expansion card with the connector on the system board.
- 3 Lower the expansion card riser into place until the expansion card riser is fully seated with the connector on the system board.
- 4 Close the blue expansion card retention latch.

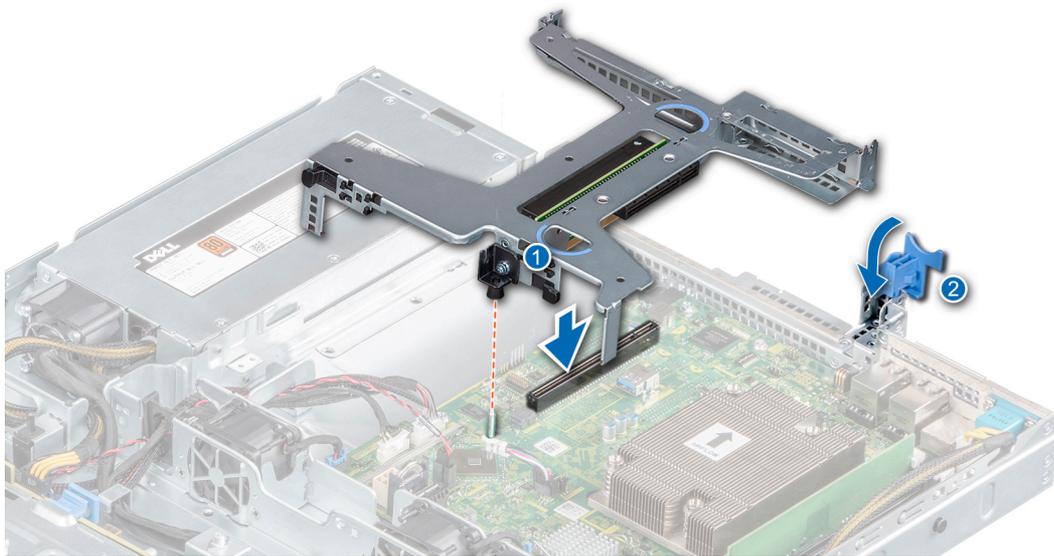


Figure 42. Installing the expansion card riser

Next steps

- 1 [Install the air shroud.](#)
- 2 Follow the procedure listed in the [After working inside your system.](#)

Removing expansion card from the expansion card riser

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 [Remove the air shroud](#).
- 4 If installed, [remove the expansion card riser](#).
- 5 If applicable, disconnect the cables from the expansion card.

Steps

- 1 Turn-over the the expansion card riser, and holding the expansion card by its edges, remove the card from the riser.

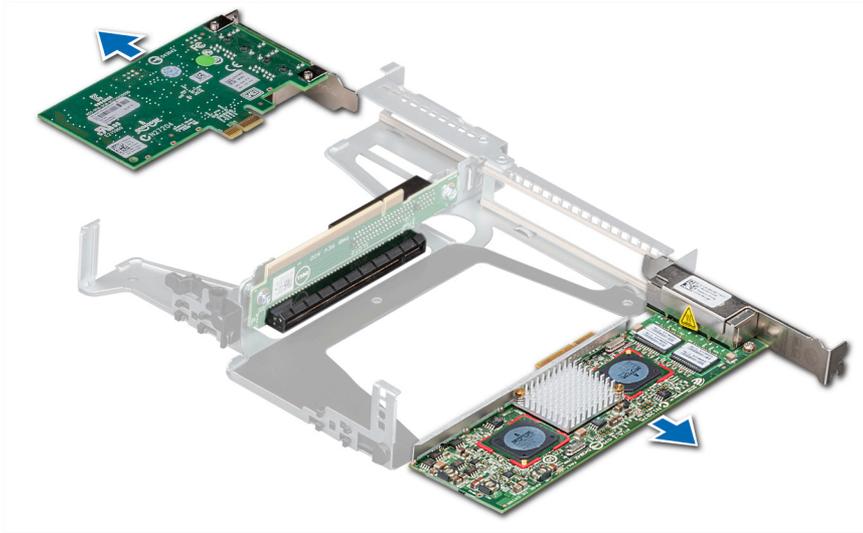


Figure 43. Removing expansion card from the expansion card riser

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

① **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.

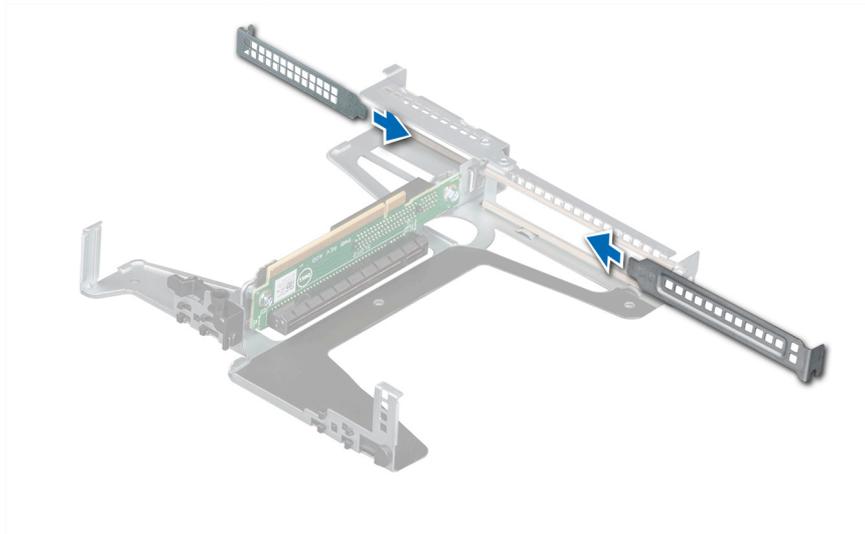


Figure 44. Installing the expansion card filler

Next step

- 1 Install the expansion card into the expansion card riser.

Installing expansion card into the expansion card riser

Prerequisites

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

NOTE: For instructions, see the documentation accompanying the card.

- 4 Remove the air shroud.
- 5 Remove the expansion card riser.

Steps

- 1 Remove the filler bracket.

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

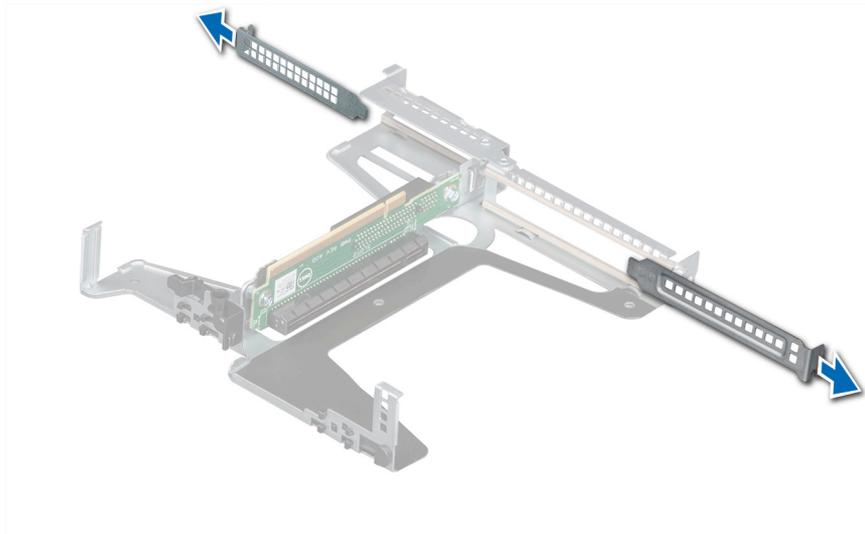


Figure 45. Removing expansion card filler

- 2 Holding the card by its edges, insert the expansion card to connect it to the connector on the riser.

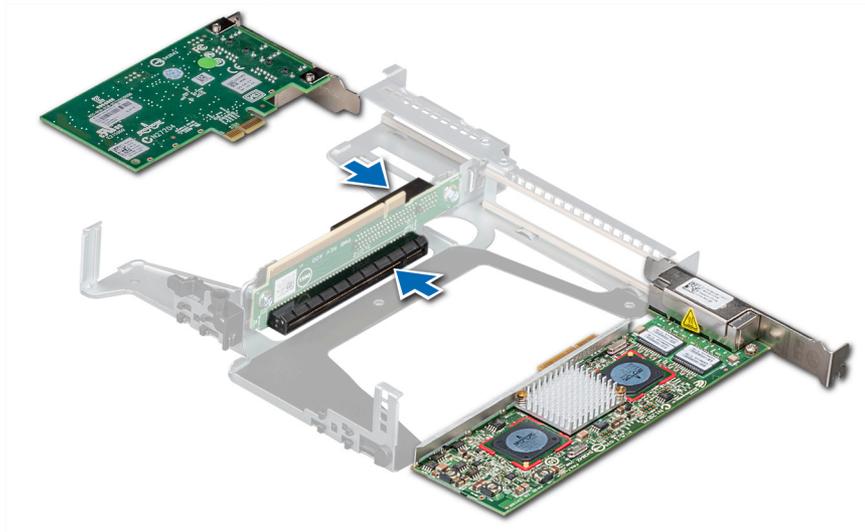


Figure 46. Installing expansion card into the expansion card riser

Next steps

- 1 [Replace the expansion card riser.](#)
- 2 [Install the air shroud.](#)
- 3 Follow the procedure listed in the [After working inside your system.](#)

M.2 SSD module

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 Remove the BOSS card.

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

Steps

- 1 Using the Phillips #1 screwdriver, remove the screws securing the M.2 SSD module to the BOSS card.
- 2 Pull the M.2 SSD module to disconnect from the BOSS card connector.

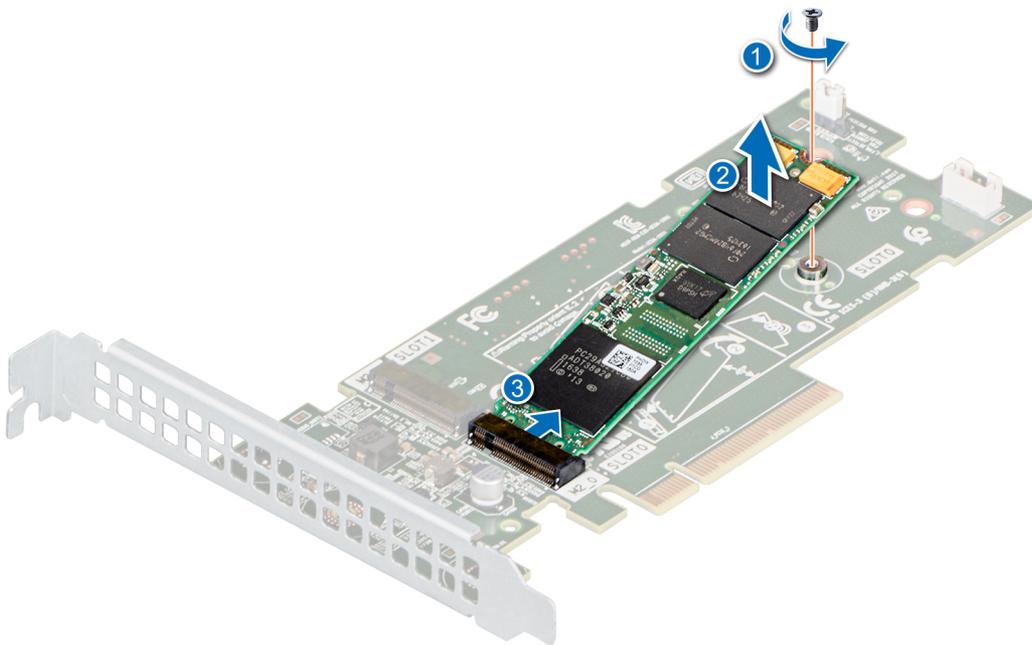


Figure 47. Removing the M.2 SSD module

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

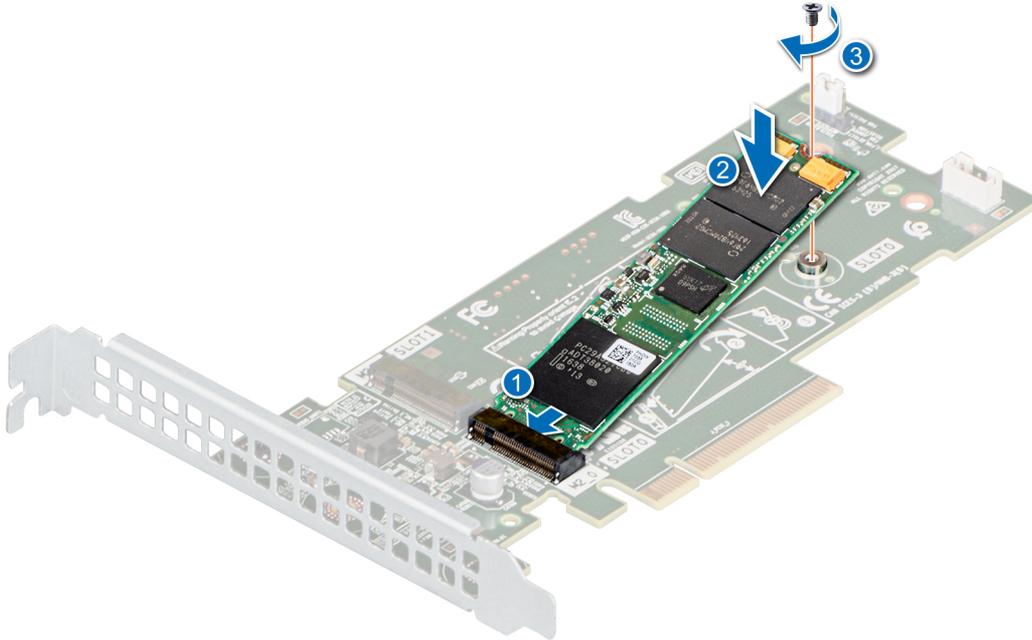


Figure 48. Installing the M.2 SSD module

Next steps

- 1 Install the BOSS card.

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

- 2 Install the air shroud.
- 3 Follow the procedure listed in the [After working inside your system](#).

System battery

Replacing the system battery

Prerequisites

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

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 [Remove the air shroud](#).

Steps

- 1 To remove the battery:
 - a Push the battery holder clip.

NOTE: Ensure that you do not push the battery holder clip more than 3.2 millimeters, It may damage the battery holder.

- b Push the battery toward the positive side of the battery until the battery disengages from the connector.
 - c Lift the battery away from the system.

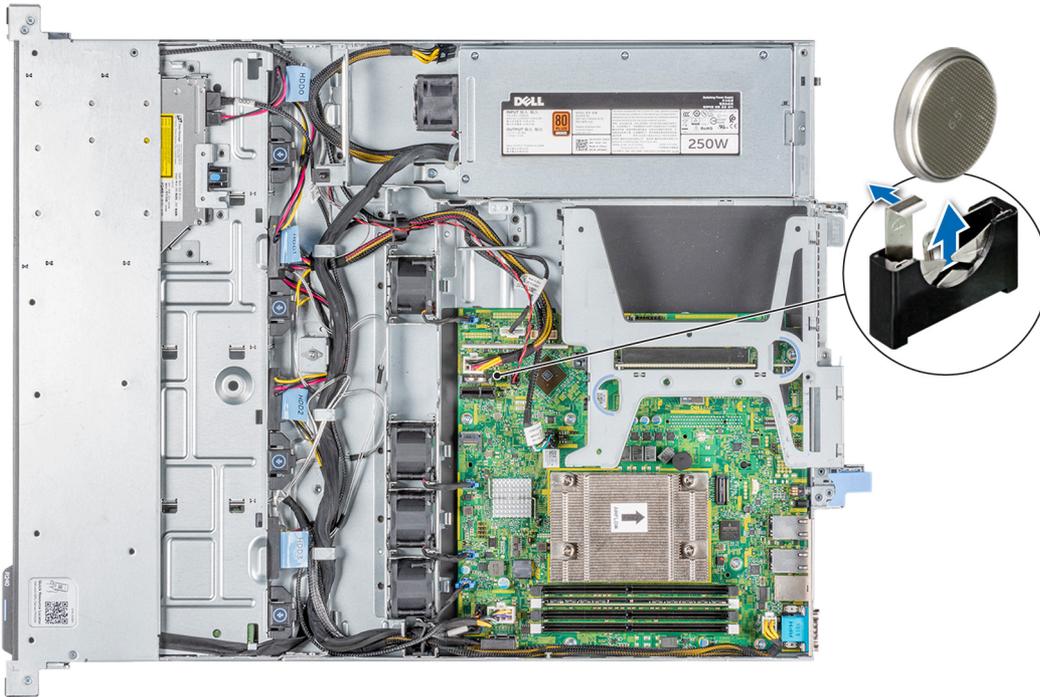


Figure 49. Removing system battery

- 2 To install a new system battery:
 - a Push the battery lock slightly away.

NOTE: Ensure that you do not push the battery clip more than 3.2 millimeters or you might risk damaging the part.

- b Hold the battery with the + sign facing the positive side of the battery connector.
 - c Insert the battery down into the connector until the battery snaps into place.

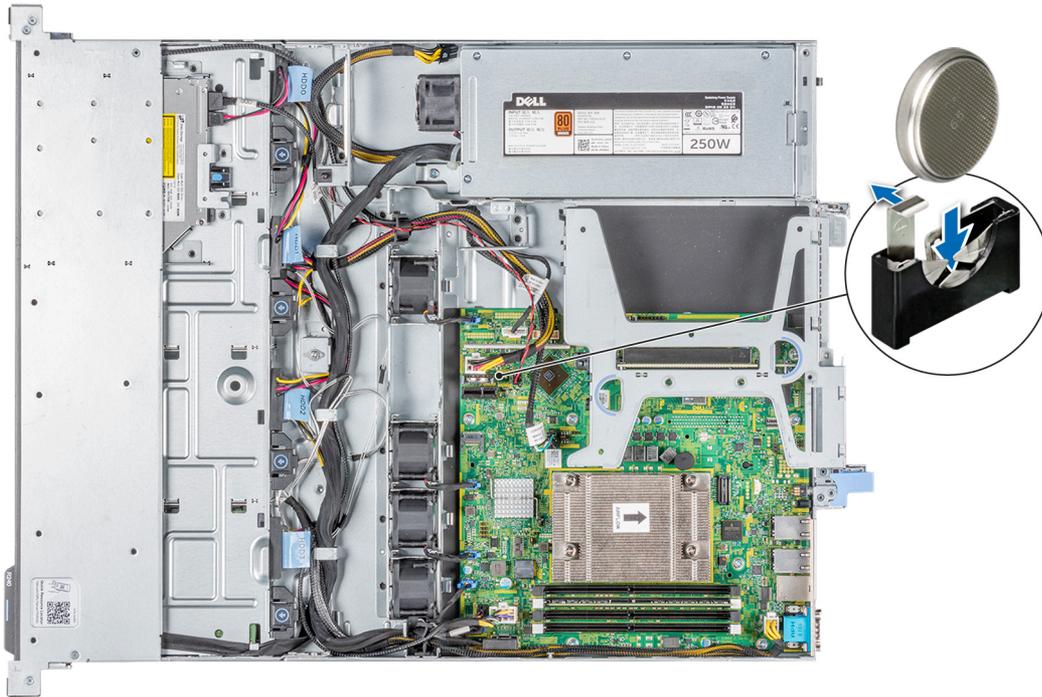


Figure 50. Installing system battery

Next steps

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

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.

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

Replacing the 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: 15.9 mm width x 57.15 mm length x 7.9 mm height.

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 [Remove the expansion card riser](#).

Steps

- 1 Locate the USB port or USB memory key on the system board.
To locate the USB port, 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 [Replace the expansion card riser](#).
- 2 Follow the procedure that is 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

Removing the optional optical drive

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 [Remove the front bezel](#).
- 4 [Remove the air shroud](#).
- 5 Disconnect the cables from the connectors on the optical drive.

i 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.

Steps

- 1 Press the release tab to release the optical drive from the system.
- 2 Slide the optical drive out of the system until it is free of the optical drive slot.
- 3 If you are not installing a new optical drive, install the optical drive blank.

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

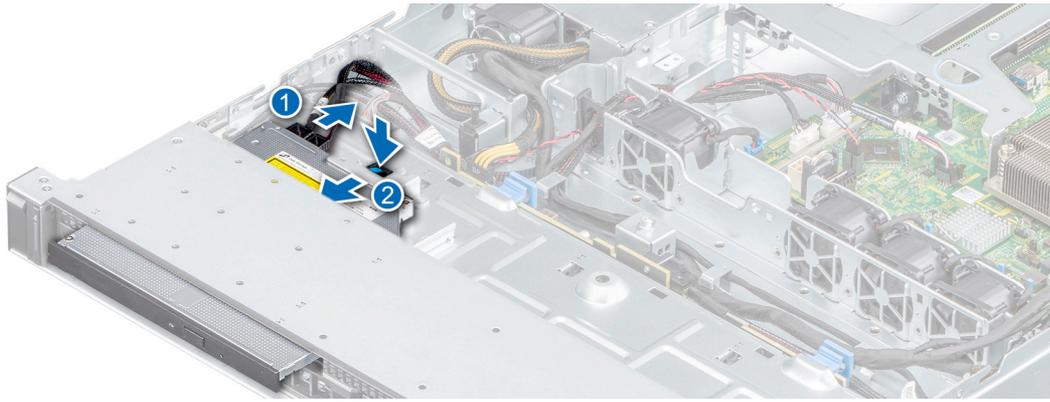


Figure 51. Removing the optional optical drive

Next step

- 1 If applicable, [replace the optical drive](#).

Installing the optional optical drive

Prerequisites

The procedure for installing an optical drive and optical drive blank.

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 [Remove the front bezel](#).
- 4 [Remove the air shroud](#).
- 5 If installed, remove the optical drive blank.

NOTE: The procedure to remove the optical drive blank and the optical drive is similar.

Steps

- 1 Align and slide the optical drive into the slot until the release tab snaps into place.
- 2 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.

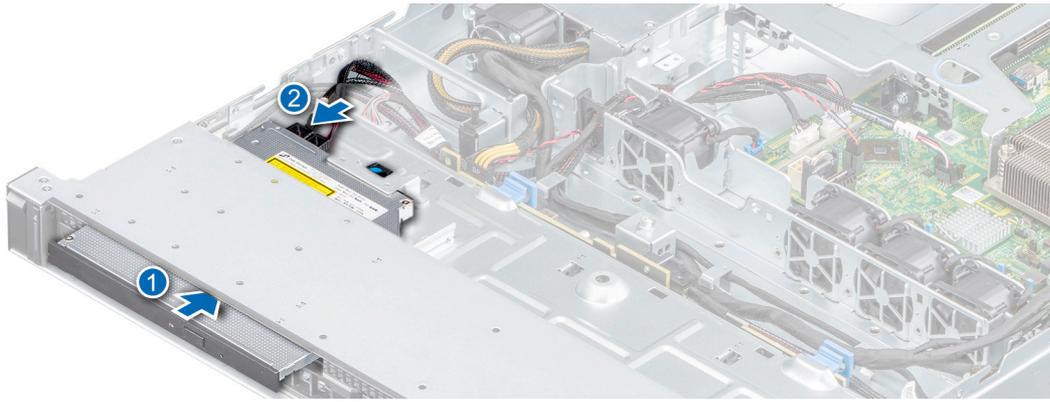


Figure 52. Installing the optional optical drive

Next steps

- 1 [Install the front bezel.](#)
- 2 Follow the procedure listed in the [After working inside your system.](#)

Processor and heat sink

Removing the heat sink

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 the [Safety instructions.](#)
- 2 Follow the procedure listed in the [Before working inside your system.](#)
- 3 [Remove the air shroud.](#)
- 4 [Remove the expansion card riser.](#)

Steps

- 1 Using a Philips #2 screwdriver, loosen the screws on the heat sink in the order mentioned below:
 - a Loosen the first screw three turns.
 - b Loosen the screw diagonally opposite to the screw you loosened first.
 - c Return to the first screw and loosen it completely.
 - d Repeat the procedure for the remaining two screws.
- 2 Lift the heat sink away from the system.

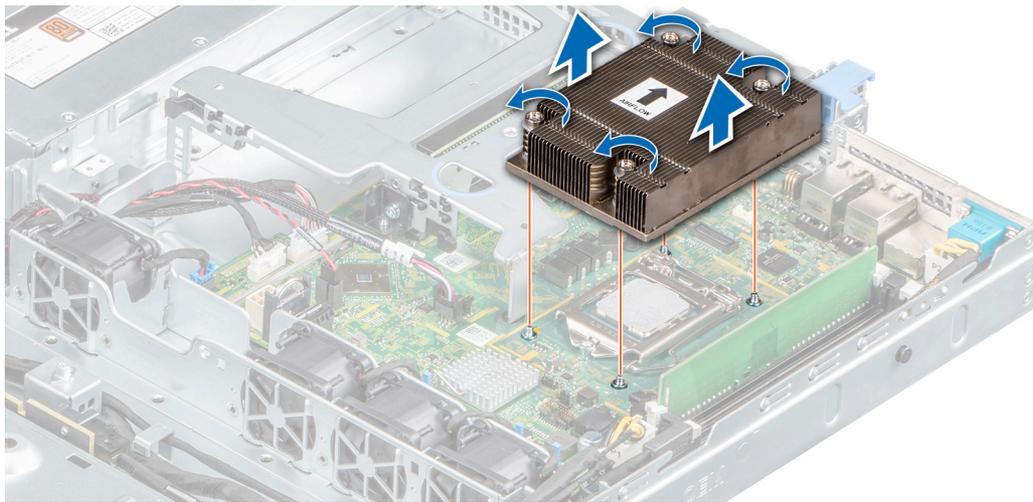


Figure 53. Removing the heat sink

Next step

- 1 If you are removing a faulty heat sink, [replace the heat sink](#), if not, [remove the processor](#).

Removing the processor

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 [Remove the air shroud](#).
- 4 [Remove the heat sink module](#).

Steps

- 1 Release the socket lever by pushing the lever down and out from under the tab on the processor shield.
- 2 Lift the lever until the processor shield is fully open.

CAUTION: Do not touch the processor socket pins, they are fragile and can be permanently damaged. Be careful not to bend the pins in the processor socket when removing the processor out of the socket.

- 3 Lift the processor out of the socket.



Figure 54. Removing the processor

Next steps

- 1 [Install the processor.](#)
- 2 [Install the heat sink.](#)

Installing the processor

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 [Remove the air shroud.](#)
- 4 [Remove the heat sink.](#)

Steps

- 1 Align the pin-1 indicator of the processor with the triangle on the system board and place the processor on the socket.

CAUTION: Do not use force to seat the processor. When the processor is positioned correctly, it engages into the socket.

- 2 Close the processor shield by sliding it under the retention screw on the system board.
- 3 Lower the lever and push it under the tab to lock it.

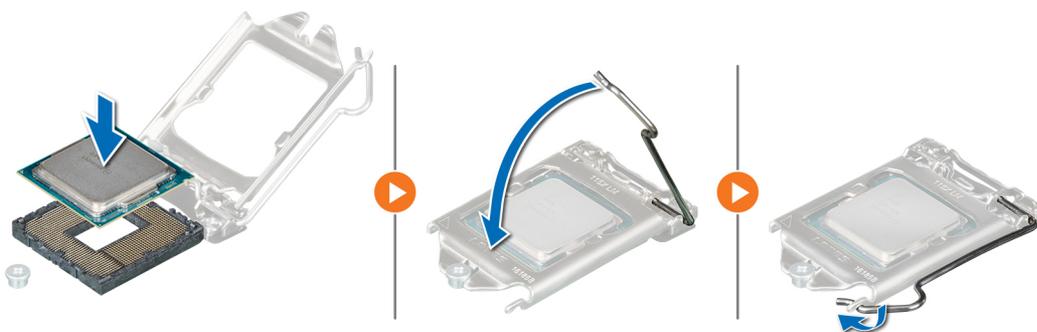


Figure 55. Installing the processor

Next steps

- 1 [Install the heat sink.](#)

NOTE: Ensure that you install the heat sink after you install the processor. The heat sink is necessary to maintain proper thermal conditions.

- 2 Follow the procedure listed in the [After working inside your system.](#)

Installing the heat sink

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions.](#)
- 2 Follow the procedure listed in the [Before working inside your system.](#)
- 3 [Remove the air shroud.](#)
- 4 [Install the processor.](#)

Steps

- 1 If you are using an existing heat sink, remove the thermal grease from the heat sink using a clean lint free cloth.
- 2 Using the thermal grease syringe included with your processor kit apply the grease in a thin spiral on the top of the processor.

NOTE: 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 one-time use only. Dispose of the syringe after you use it.

- 3 Align the screws on the heat sink with the standoffs on the system board.
- 4 Using a Philips #2 screwdriver tighten the screws in the following order to secure the heat sink to the system board.
 - a Partially tighten the first screw (approximately 3 turns).
 - b Tighten the screw that is diagonally opposite to it.
 - c Return to the first screw and tighten it completely.
- 5 Repeat the procedure for the remaining two screws.

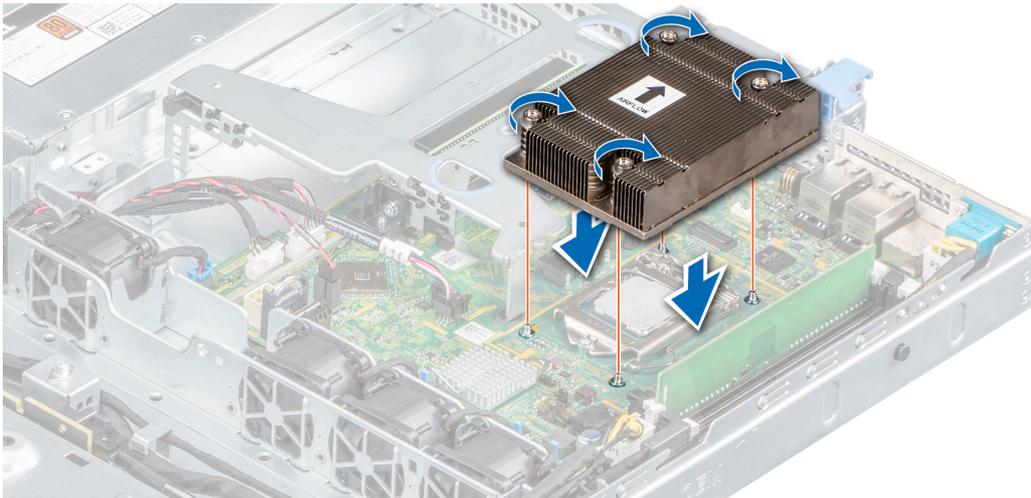


Figure 56. Installing the heat sink

Next steps

- 1 [Install the air shroud.](#)
- 2 Follow the procedure listed in the [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 the optional IDSDM or vFlash 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 If you are replacing the IDSDM/vFlash card, [remove the MicroSD cards](#).

NOTE: Temporarily label each SD card with its corresponding slot number before removal. Reinstall the SD cards into the corresponding slots.

Step

Holding the pull tab, lift the IDSDM/vFlash card out of the system.

Next step

NOTE: If you are replacing the IDSDM or vFlash module, remove the MicroSD cards.

- 1 [Replace the IDSDM/vFlash module](#).

Installing optional IDSDM or vFlash card

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 [Remove the air shroud](#).

Steps

- 1 Locate the IDSDM/vFlash connector on the system board. To locate IDSDM/vFlash connector, see [System board jumpers and connectors](#) section.
- 2 Align the IDSDM/vFlash card with the connector on the system board.
- 3 Push the IDSDM/vFlash card until it is firmly seated on the system board.

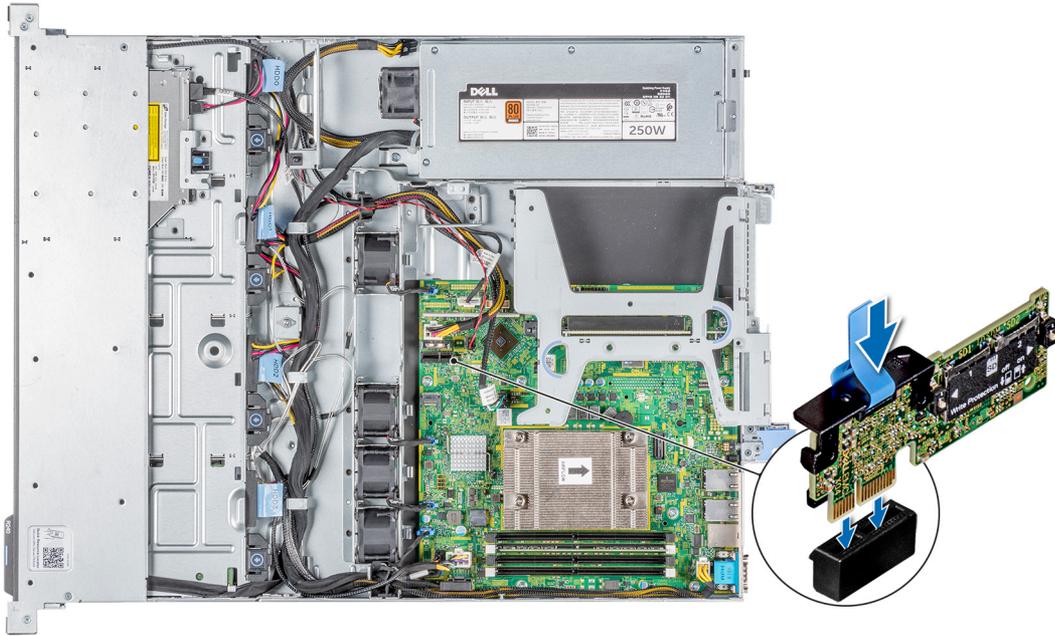


Figure 57. Installing the optional IDSDM or vFlash card

Next steps

- 1 Install the MicroSD cards.

NOTE: Reinstall the MicroSD cards into the same slots that are based on the labels you had marked on the cards during removal.

- 2 Install the air shroud.
- 3 Follow the procedure that is listed in [After working inside your system](#).

Removing the MicroSD card

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 [Remove the air shroud](#).
- 4 [Remove the IDSDM or vFlash module](#).

Steps

- 1 Locate the MicroSD card slot on the vFlash/IDSDM module, and press the card to partially release it from the slot. To locate IDSDM/vFlash module, see the [System board jumpers and connectors](#) section.
- 2 Hold the MicroSD card and remove it from the slot.

NOTE: Temporarily label each MicroSD card with its corresponding slot number after removal.

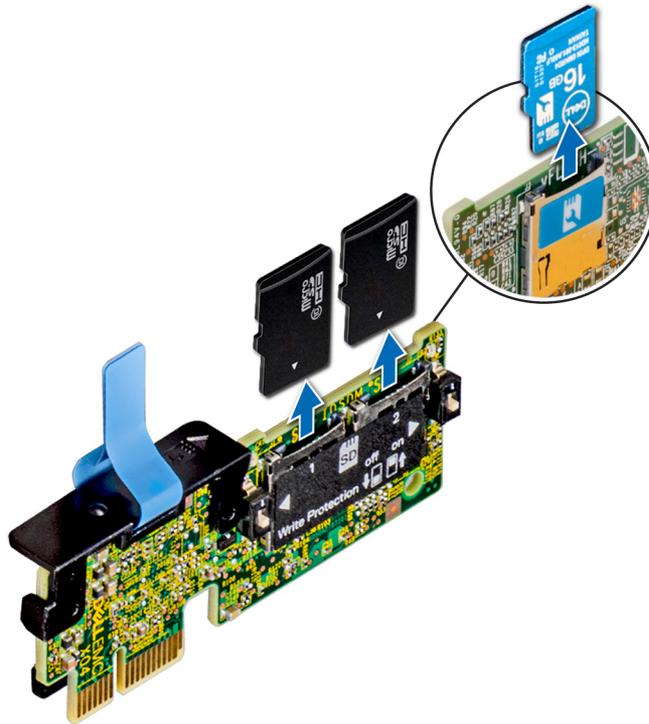


Figure 58. Removing the MicroSD card

Next step

- 1 Replace the MicroSD cards.

Installing the MicroSD card

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 [Remove the air shroud](#).
- 4 [Remove the IDSDM or vFlash module](#).

NOTE: To use a 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/vFlash module. Orient the MicroSD card appropriately and insert the contact-pin end of the card into the slot. To locate IDSDM/vFlash, see the [System board jumpers and connectors](#) section.

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.

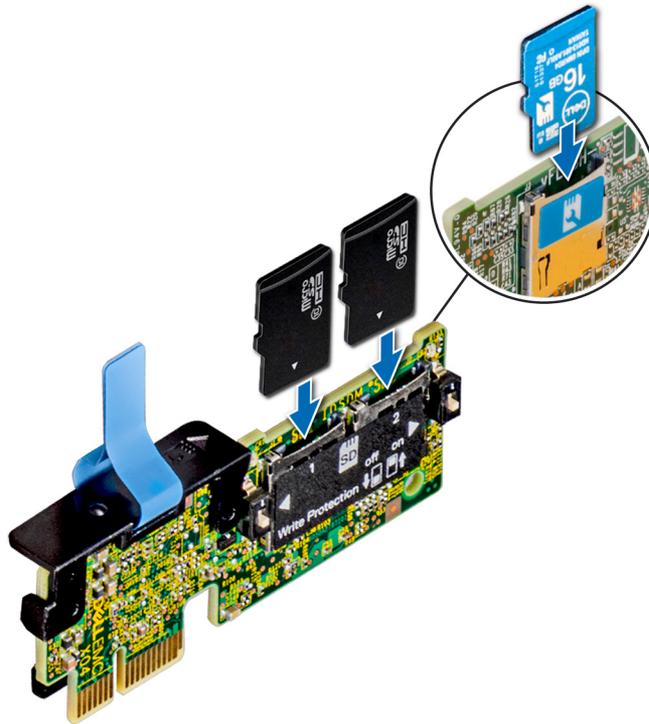


Figure 59. Installing the MicroSD card

Next steps

- 1 Install the IDSDM or vFlash module.
- 2 Follow the procedure listed in the [After working inside your system.](#)

Drive backplane

Drive backplane

The PowerEdge R240 system supports 3.5-inch (x4) SAS/SATA backplane.

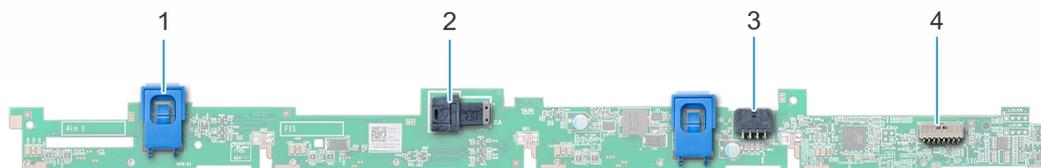


Figure 60. 3.5-inch (x4) SAS/SATA backplane

- | | |
|---|--|
| <ol style="list-style-type: none"> 1 Release tab (2) 3 Backplane Power A connector (BP_PWR_A) | <ol style="list-style-type: none"> 2 Backplane SAS A0 connector (BP_SAS_A) 4 Backplane signal connector (BP_SIG) |
|---|--|

Removing the drive backplane

Prerequisites

⚠ CAUTION: You must note the number of each drive and temporarily label them before removal so that you can replace them in the same drive slots.

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 [Remove the drives](#).

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

- 4 Disconnect the following cables from the backplane:
 - a Backplane signal cable
 - b Backplane power cable
 - c PERC cable

Steps

- 1 Press the blue release tabs to disengage the backplane from the hooks on the system.
- 2 Lift the backplane out of the system.

① NOTE: To avoid damaging the backplane, ensure that you move the control panel cables from the cable routing clips before removing the backplane.

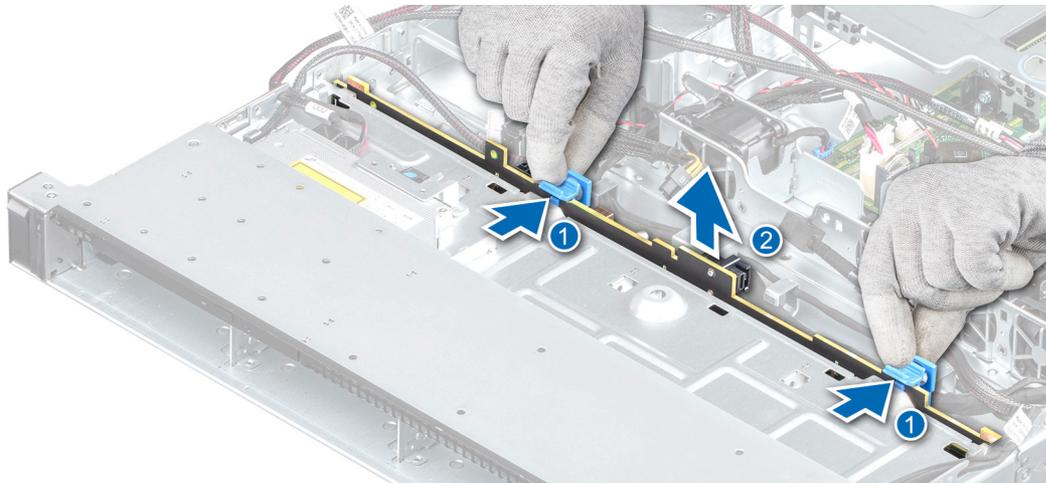


Figure 61. Removing the drive backplane

Next step

- 1 [Replace the backplane](#).

Installing the drive backplane

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).

- 2 Follow the procedure listed in the [Before working inside your system.](#)
- 3 Remove the drives.

NOTE: To avoid damaging the backplane, ensure to move the control panel cables from the cable routing clips before removing the backplane.

NOTE: Route the cable properly when you replace it to prevent the cable from being pinched or crimped.

Steps

- 1 Align the slots on the backplane with the hooks on the system.
- 2 Lower the backplane until the blue release tabs click into place.

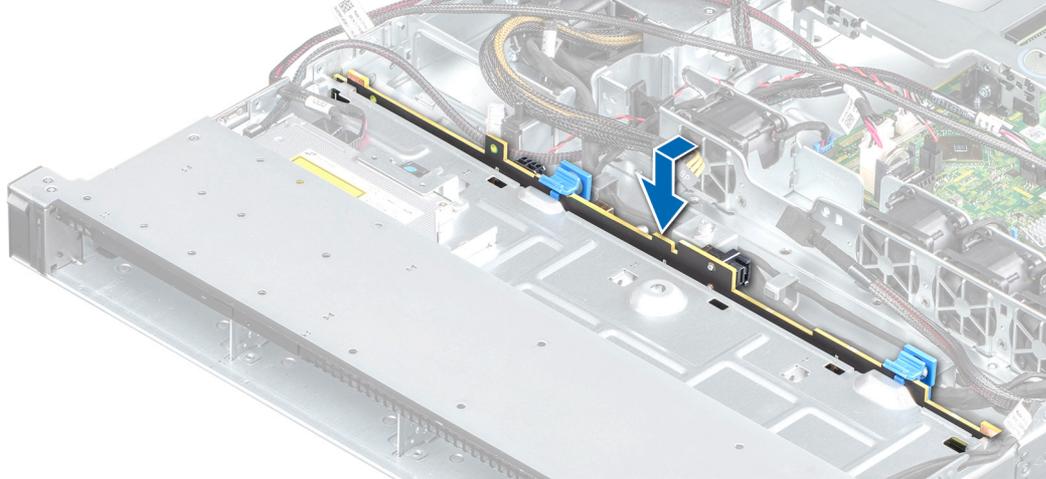


Figure 62. Installing the backplane

Next steps

- 1 Connect the following cables to the backplane:
 - a Backplane signal cable
 - b Backplane power cable
 - c PERC cable
- 2 Replace the drives.
- 3 Follow the procedure listed in the [After working inside your system.](#)

Cable routing

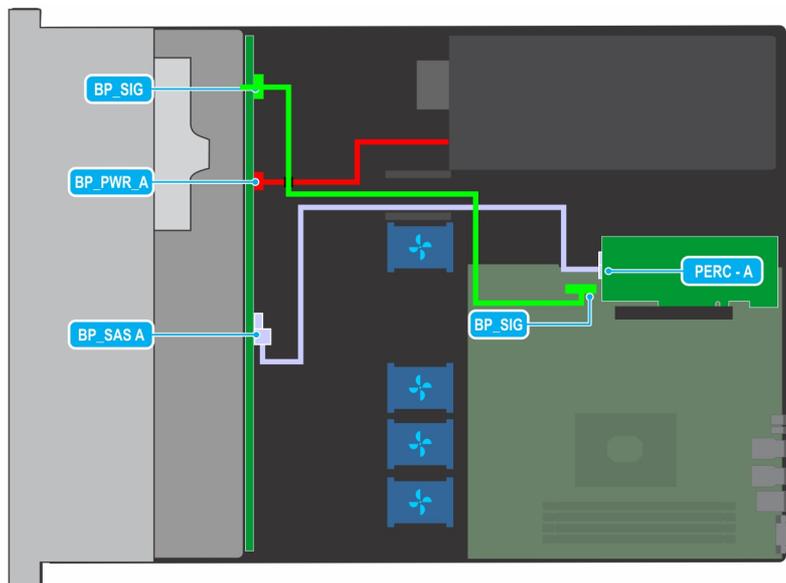


Figure 63. Cable routing - 4 x 3.5-inch drive backplane with PERC

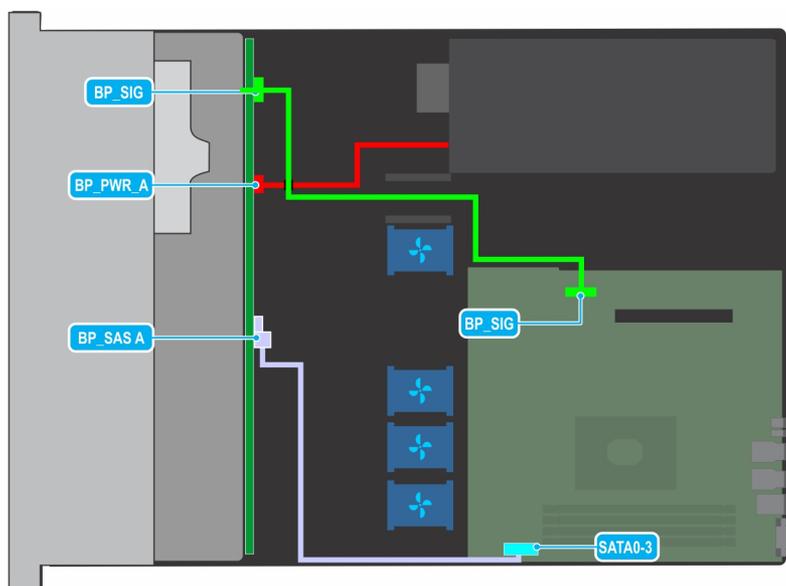


Figure 64. Cable routing - 4 x 3.5-inch drive backplane with SATA

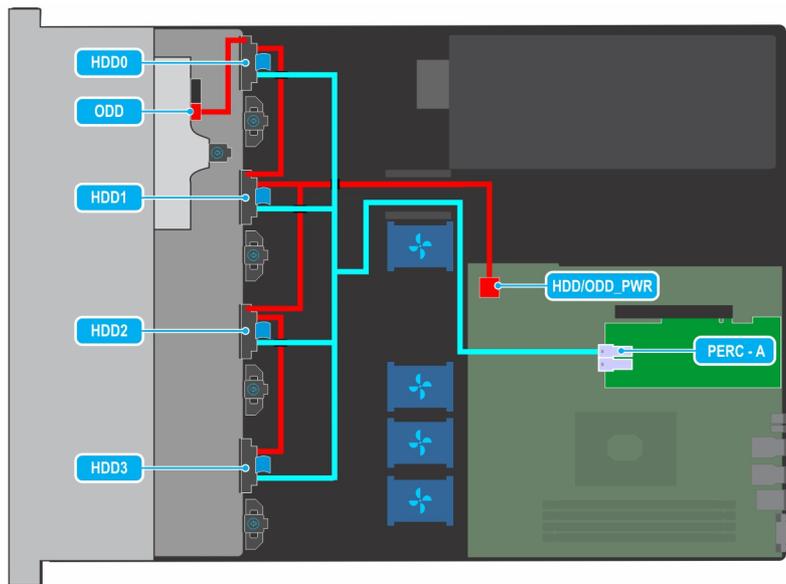


Figure 65. Cable routing - 4 x 3.5-inch cabled drive with PERC

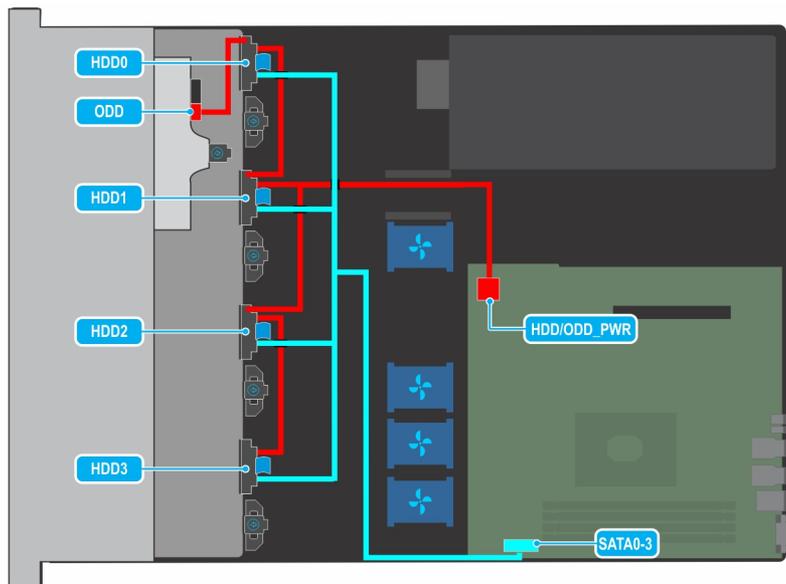


Figure 66. Cable routing - 4 x 3.5-inch cabled drive with SATA

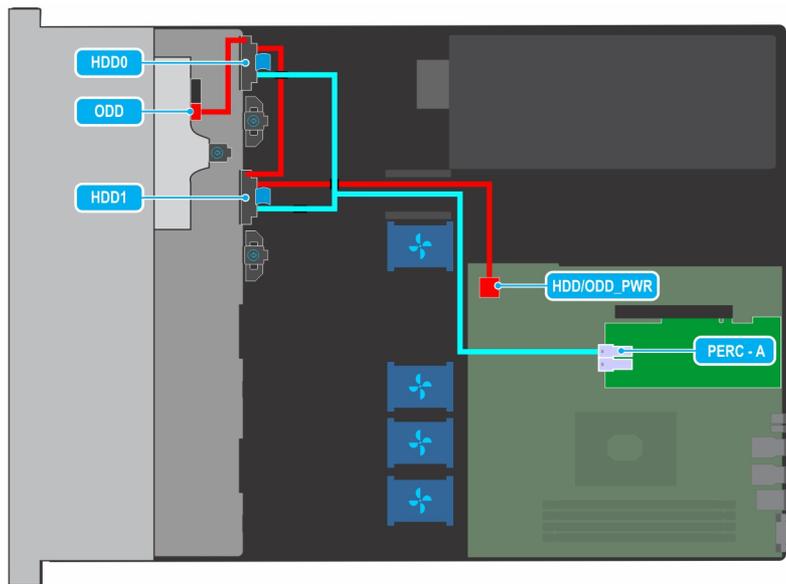


Figure 67. Cable routing - 2 x 3.5-inch cabled drive with PERC

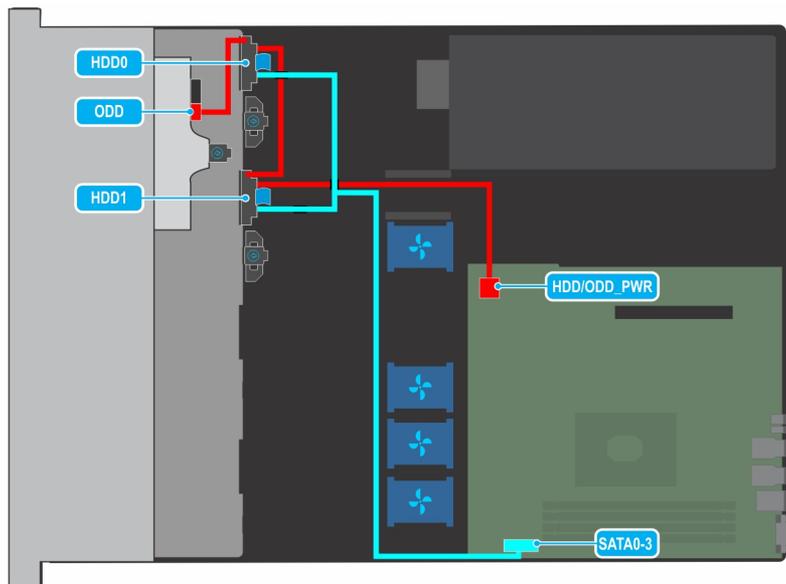


Figure 68. Cable routing - 2 x 3.5-inch cabled drive with SATA

Power supply unit

① | **NOTE:** For more information, see the [Technical specifications](#) section.

Removing a cabled power supply unit

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).

- 3 [Remove the air shroud.](#)
- 4 Disconnect the system from the electrical outlet.
- 5 Disconnect all the cables connected from the PSU to the system board and the backplane.
- 6 If applicable, [remove the expansion card riser.](#)

Steps

- 1 Using a Phillips #2 screwdriver, remove the screw securing the PSU to the system.
- 2 Slide the PSU out of the PSU bay in the chassis.

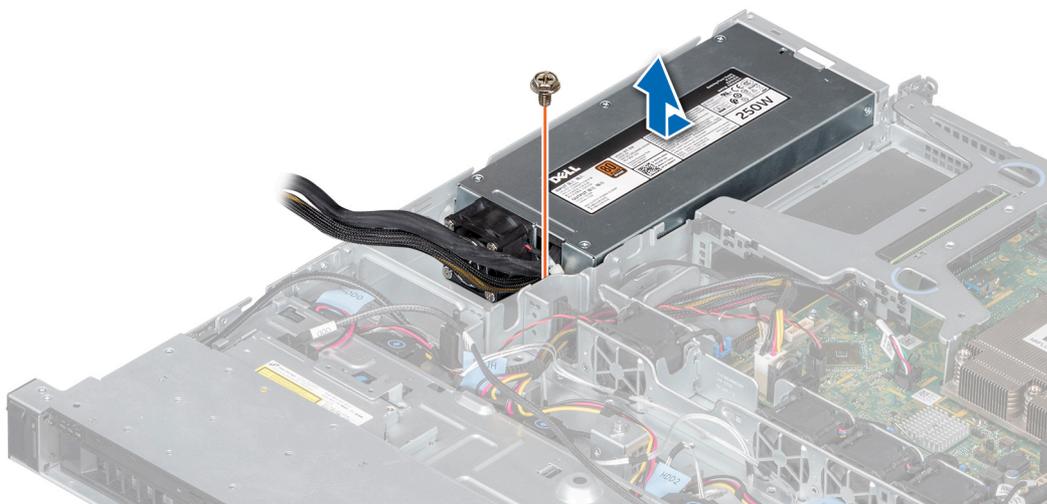


Figure 69. Removing a cabled power supply unit

Next step

- 1 [Replace cabled AC power supply.](#)

Installing a cabled power supply unit

Prerequisites

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

Steps

- 1 Slide the new PSU into the PSU bay in the chassis until the PSU is fully seated.
- 2 Using a Phillips #2 screwdriver, replace the screw to secure the PSU to the system.

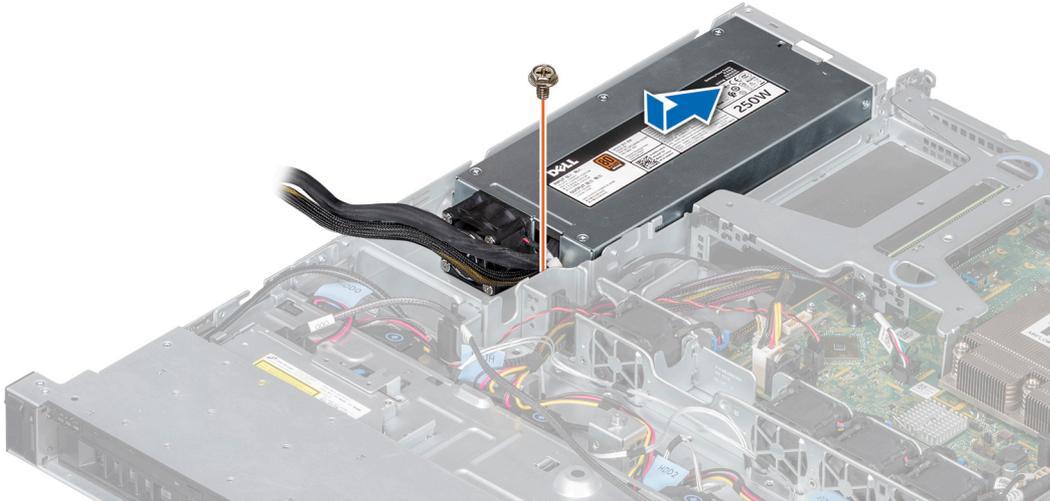


Figure 70. Installing a cabled power supply unit

Next steps

- 1 Connect the PSU cables to the connectors on the system board and the backplane.
- 2 If applicable, [install the expansion card riser](#).
- 3 [Install the air shroud](#).
- 4 Follow the procedure listed in the [After working inside your system](#).

System board

Removing the system board

Prerequisites

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

⚠ 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 the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 Remove the following:
 - a [Air shroud](#)
 - b [Memory modules](#)
 - c [Expansion card riser](#)
 - d [Processor and heat sink](#)

⚠ 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.

- e [Internal USB key](#), if installed

- f [Internal Dual SD module](#), if installed
- 4 Disconnect all the cables that are connected to 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.

Steps

- 1 Using a Phillips #2 screwdriver, remove the screws securing the system board to the chassis.

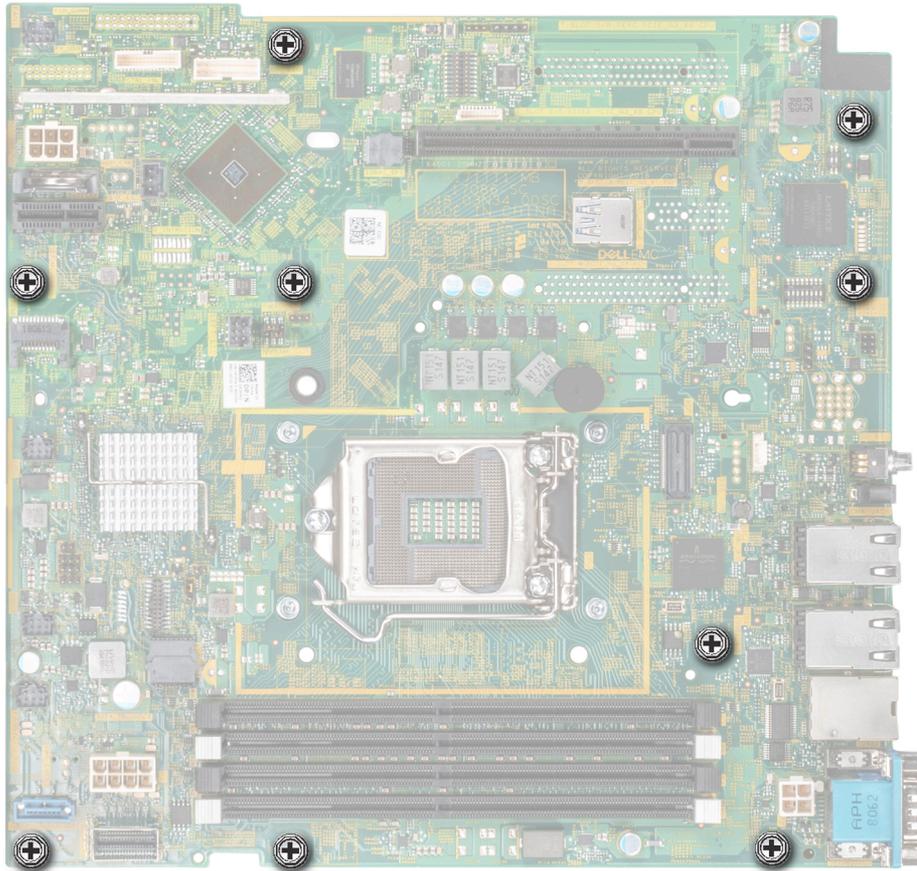


Figure 71. Screws securing the system board

- 2 Holding the system board holder, slightly lift the system board, and slide the system board to the front of the system.
- 3 Using the system board holder, lift the system board out of the system.

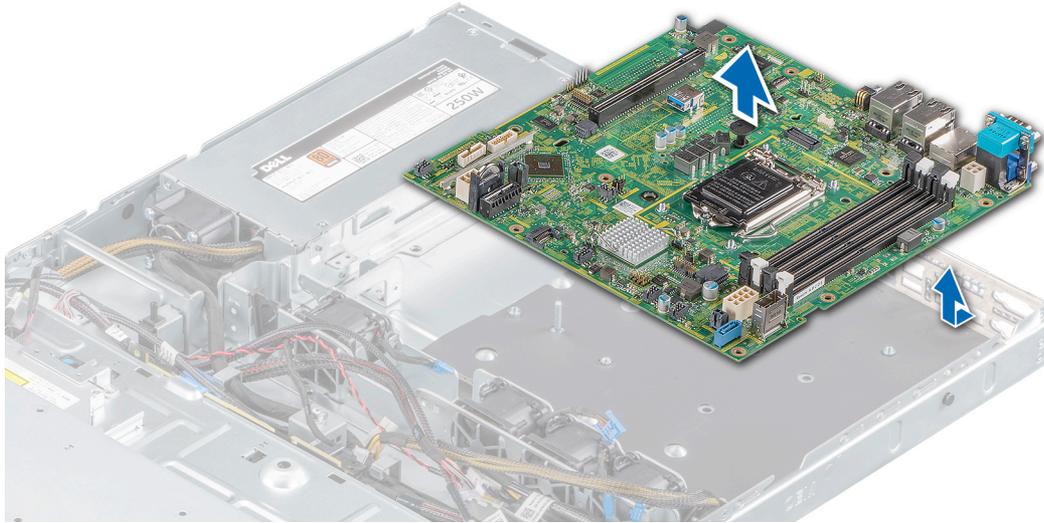


Figure 72. Removing the system board

Next step

- 1 [Install the system board.](#)

Installing the system board

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 If you are replacing the system board, remove all the components listed in the [Removing the system board](#) section.

Steps

- 1 Holding the system board holder, lower the system board into the system.

△ 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 Incline the system board at an angle and align the connectors on the system board with the slots on the rear of the chassis.
- 3 Slide the system board toward the rear of the chassis until the connectors are firmly seated in the slots.

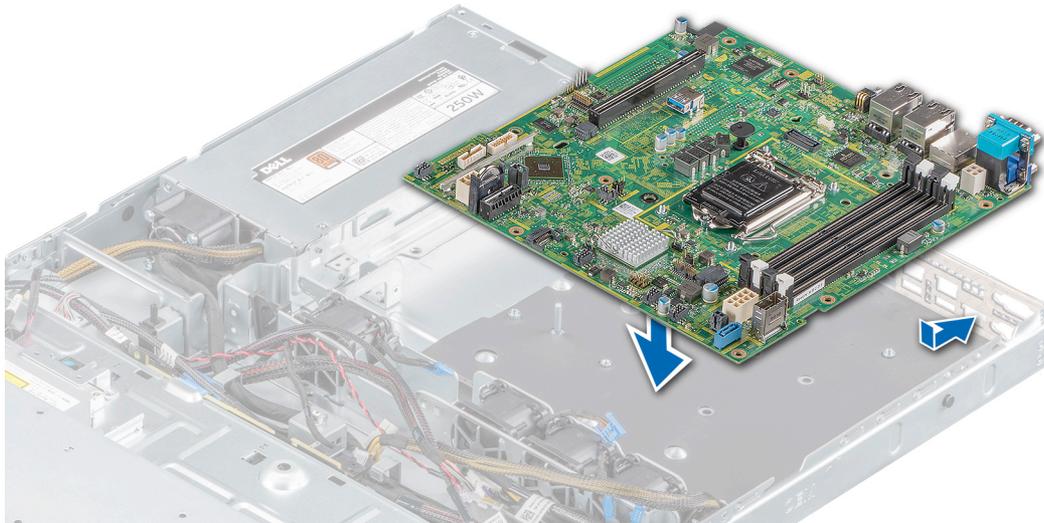


Figure 73. Installing the system board

- 4 Using a Phillips #2 screwdriver, tighten the screws that secure the system board to the chassis.

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 [Internal Dual SD module](#)
- c [Processor and heat sink](#)
- d [Internal USB key](#), if installed.
- e [Expansion card riser](#)
- f [Memory module](#)
- g [Air shroud](#)

- 2 Replace the iDRAC MAC address label on the Information tag located on the front of the system with the new iDRAC MAC address label that is supplied with the replacement system board.

- 3 Reconnect all the 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 Power on 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 system 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 [Re-enabling the TPM for BitLocker users](#) section.

- 7 Import the new or existing iDRAC Enterprise license. For more information, see the *Integrated Dell Remote Access Controller User's Guide*, at Dell.com/idracmanuals.

Restoring the system using Easy Restore

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

Below is a list of options available:

- Restore the service tag, license, and diagnostics information, press **Y**
- Navigate to the Lifecycle Controller based restore options, press **N**.
- Restore data from a previously created **Hardware Server Profile**, press **F10**

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

- To restore the system configuration data, press **Y**
- To use the default configuration settings, press **N**

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

Manually update the Service Tag

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

About this task

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

Steps

- 1 Power on the system.
- 2 To enter the **System Setup**, press **F2**.
- 3 Click **Service Tag Settings**.
- 4 Enter the service tag.

NOTE: You can enter the service tag only when the Service Tag field is empty. Ensure that you enter the correct service tag. Once the service tag is entered, it cannot be updated or changed.

- 5 Click **OK**.

Trusted Platform Module

Upgrading the Trusted Platform Module

Prerequisite

NOTE:

- Ensure that your operating system supports the version of the TPM module 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: Once 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.
- 2 Press to hold the module down and remove the screw using the security Torx 8-bit shipped with the TPM module.
- 3 Slide the TPM module out from its connector.
- 4 Push the plastic rivet away from the TPM connector and rotate it 90° counterclockwise to release it from the system board.
- 5 Pull the plastic rivet out of its slot on the system board.

Installing the TPM

Steps

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



Figure 74. Installing the TPM

Next steps

- 1 [Replace the system board.](#)
- 2 Follow the procedure listed in [After working inside your system.](#)
- 3 To verify if the memory module has been installed properly, press F2 and navigate to **System Setup Main Menu > System BIOS > Memory Settings**. In the **Memory Settings** screen, the System Memory Size must reflect the updated capacity of the installed memory.
- 4 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.
- 5 Run the system memory test in system diagnostics.

Initializing TPM for BitLocker users

- 1 Initialize the TPM.
For more information, see [initializing the TPM for Intel TXT users.](#)
- 2 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 Preboot 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**.

Initializing the TPM 2.0 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**.
- 4 Save the settings.
- 5 Restart your system.
- 6 Enter **System Setup** again.
- 7 On the **System Setup Main Menu** screen, click **System BIOS > System Security Settings**.
- 8 Select the **TPM Advanced Settings** option.
- 9 From the **TPM2 Algorithm Selection** option, select **SHA256**, then go back to **System Security Settings** screen.
- 10 On the **System Security Settings** screen, from the **Intel TXT** option, select **On**.
- 11 Save the settings.
- 12 Restart your system.

Control panel

Removing the left control panel

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 [Remove the front bezel](#).
- 4 [Remove the air shroud](#).

Steps

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

NOTE: Ensure that you note the routing of the cable as you remove it from the system board.

- 2 Using the appropriate screwdriver, remove the screws that secure the left control panel assembly to the system.
- 3 Disengage the left control panel housing clip that is located at the bottom of the control panel assembly.
- 4 Holding the control panel assembly, remove the control panel along with the cable away from the system.

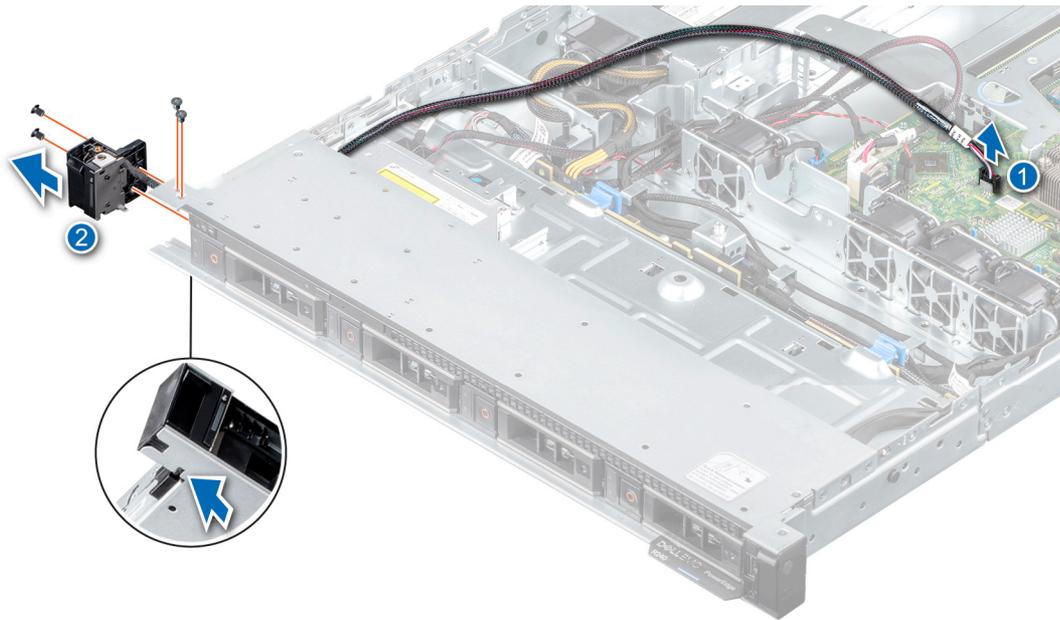


Figure 75. Removing the left control panel

Next step

- 1 [Install the left control panel.](#)

Installing the left control panel

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 [Remove the front bezel](#).
- 4 [Remove the air shroud](#).

Steps

- 1 Route the control panel cable through the side and the guide slots in the system.

① | NOTE: Route the cable properly to prevent the cable from being pinched or crimped.

- 2 Align and insert the left control panel assembly in the slot on the system.
- 3 Connect the control panel cable to the system board connector.
- 4 Using the appropriate screwdriver, replace the screws that secure the left control panel assembly to the system.

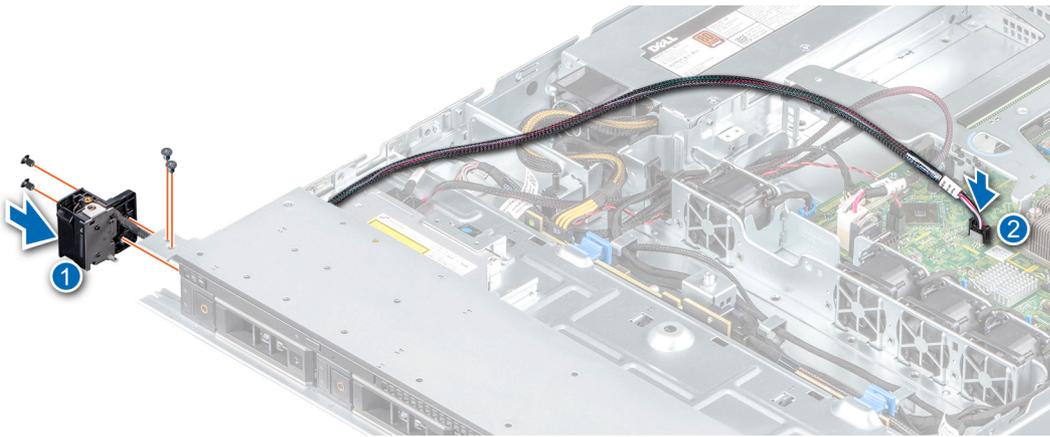


Figure 76. Installing the left control panel

Next step

- 1 Follow the procedure listed in the [After working inside your system](#).

Removing the right control panel

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 If applicable, [remove the front bezel](#).
- 4 [Remove the air shroud](#).

Steps

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

NOTE: Ensure that you note the routing of the cables as you remove them from the system board.

- 2 Using the appropriate screwdriver, remove the screws that secure the right control panel assembly to the system.
- 3 Holding the control panel assembly, remove the control panel from the system.

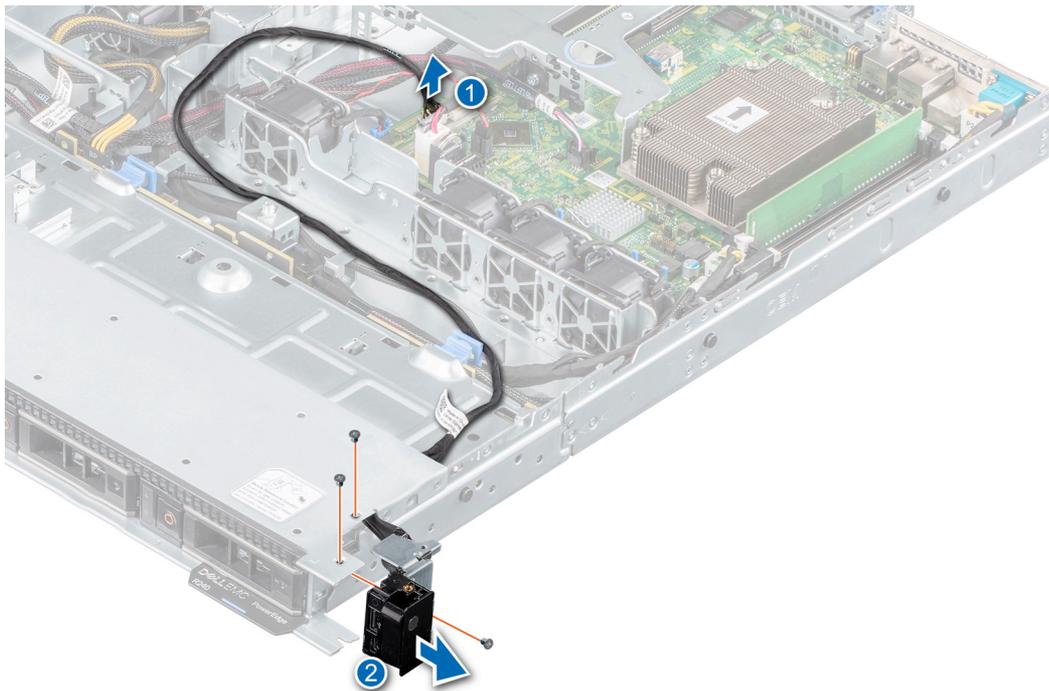


Figure 77. Removing the right control panel

Next step

- 1 Install the right control panel.

Installing the right control panel

Prerequisites

- 1 Follow the safety guidelines listed in the [Safety instructions](#).
- 2 Follow the procedure listed in the [Before working inside your system](#).
- 3 [Remove the front bezel](#).
- 4 [Remove the air shroud](#).

Steps

- 1 Route the control panel cable through the side and the guide slots in the system.
NOTE: Route the cable properly to prevent the cable from being pinched or crimped.
- 2 Align and insert the right control panel assembly in the slot on the system.
- 3 Connect the control panel cable to the system board connector.
- 4 Using the appropriate screwdriver, replace the screws that secure the right control panel to the system.

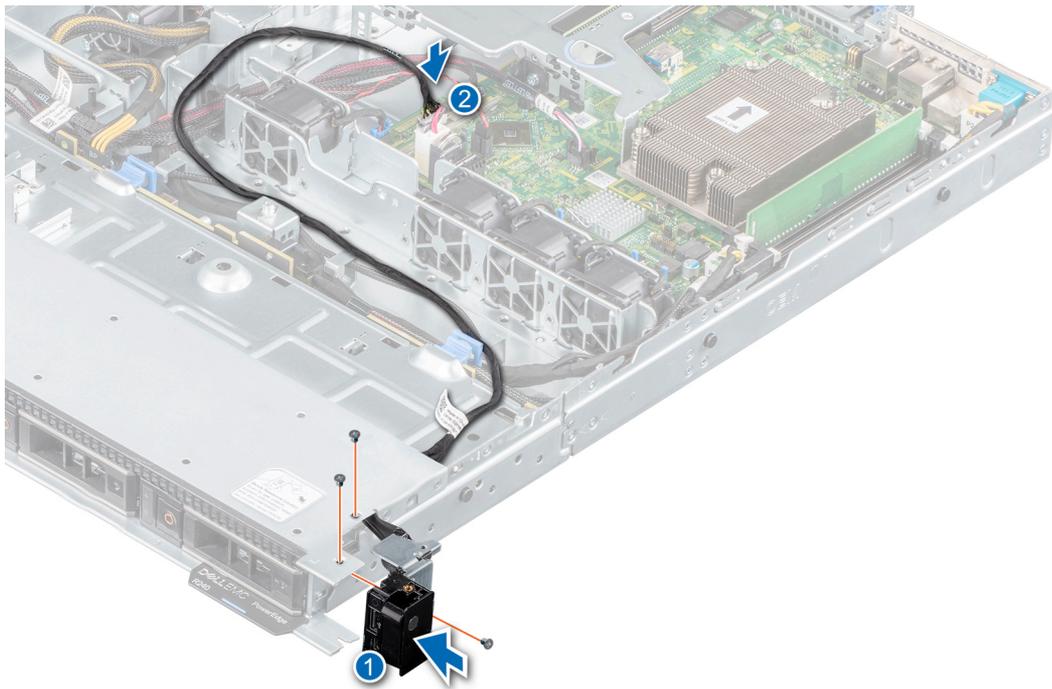


Figure 78. Installing the right control panel

Next step

- 1 Follow the procedure listed in the [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

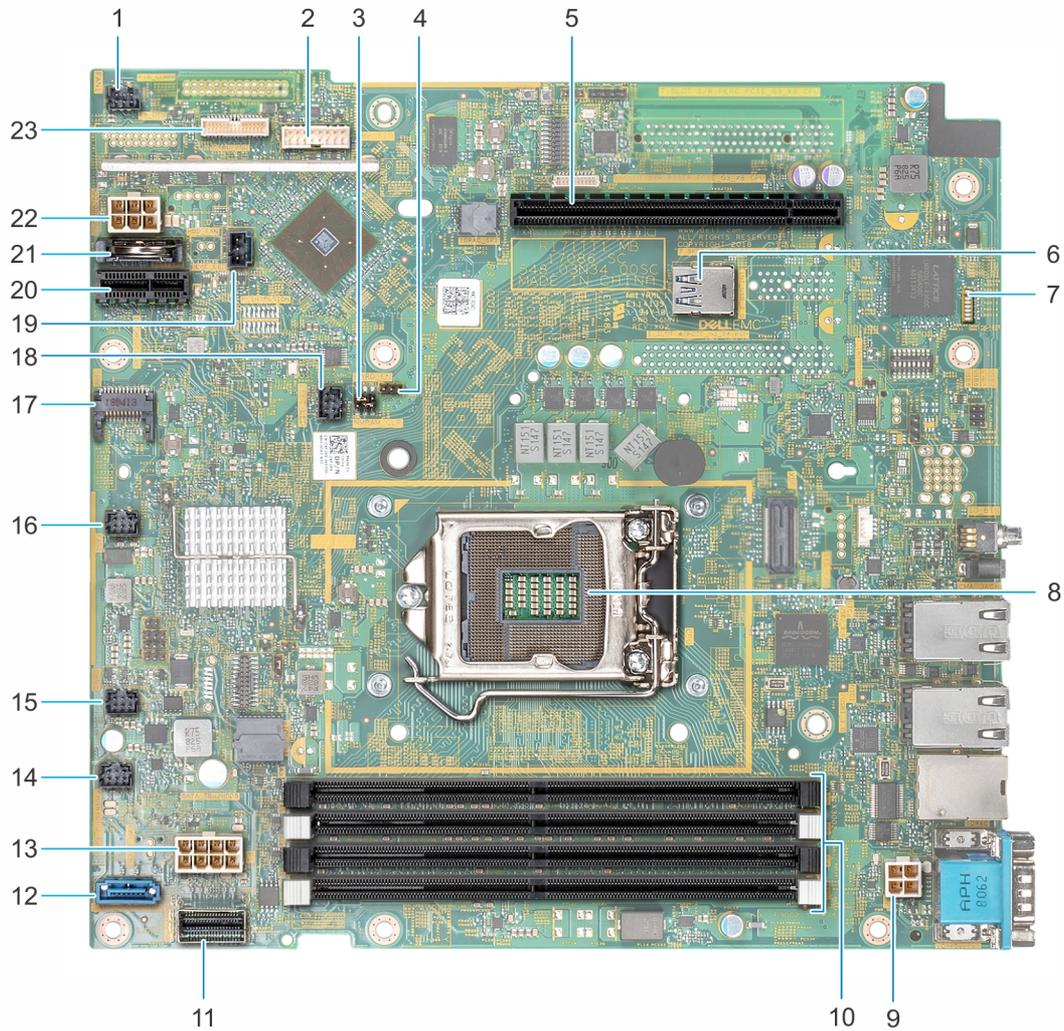


Figure 79. System board connectors

Table 9. System board connectors and descriptions

Item	Connector	Description
1	FAN 1	Fan 1 cable connector
2	BP_SIG	Backplane signal cable connector
3	NVRAM_CLR	Clear NVRAM
4	PWRD_EN	Reset BIOS password jumper
5	RISER_PCIE	PERC PCIe x8 socket
6	INT_USB_3.0	Internal USB 3.0 connector
7	OMNIVU_LED1	System board LED indicators (7)
8	CPU	Processor socket

Item	Connector	Description
9	P2	Power cable connector 2
10	A1, A2, A3, A4	Memory module sockets
11	SATA0-3	SATA signal cable connector
12	SATA_ODD-HDD4	SATA connector—Optical drive SATA connector
13	P1	Power cable connector 1
14	FAN4	Fan 4 cable connector
15	FAN3	Fan 3 cable connector
16	FAN2	Fan 2 cable connector
17	TPM	TPM connector
18	LEFT_LED	Left control panel cable connector
19	R_INTRUSION	Intrusion switch cable connector
20	IDSDM/vFlash	IDSDM/vFlash connector
21	CMOS Battery	CMOS battery connector
22	HDD/ODD_PWR	Optical drive power cable connector
23	CTRL_PNL	Right control panel cable connector

System board jumper settings

For information on resetting the password jumper to disable a password, see the [Disabling a forgotten password](#) section.

Table 10. 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_CLR	 1 3 5 (default)	The BIOS configuration settings are retained at system boot.
	 1 3 5	The BIOS configuration settings are cleared at system boot.

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 Power 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 power on the system, including any attached peripherals.
- 6 Power 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 power 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
- System weight
- Processor specifications
- PSU specifications
- Cooling fans specifications
- System battery specifications
- Expansion card riser specifications
- Memory specifications
- Storage controller specifications
- Drive specifications
- Ports and connectors specifications
- Video specifications
- Environmental specifications

Chassis dimensions

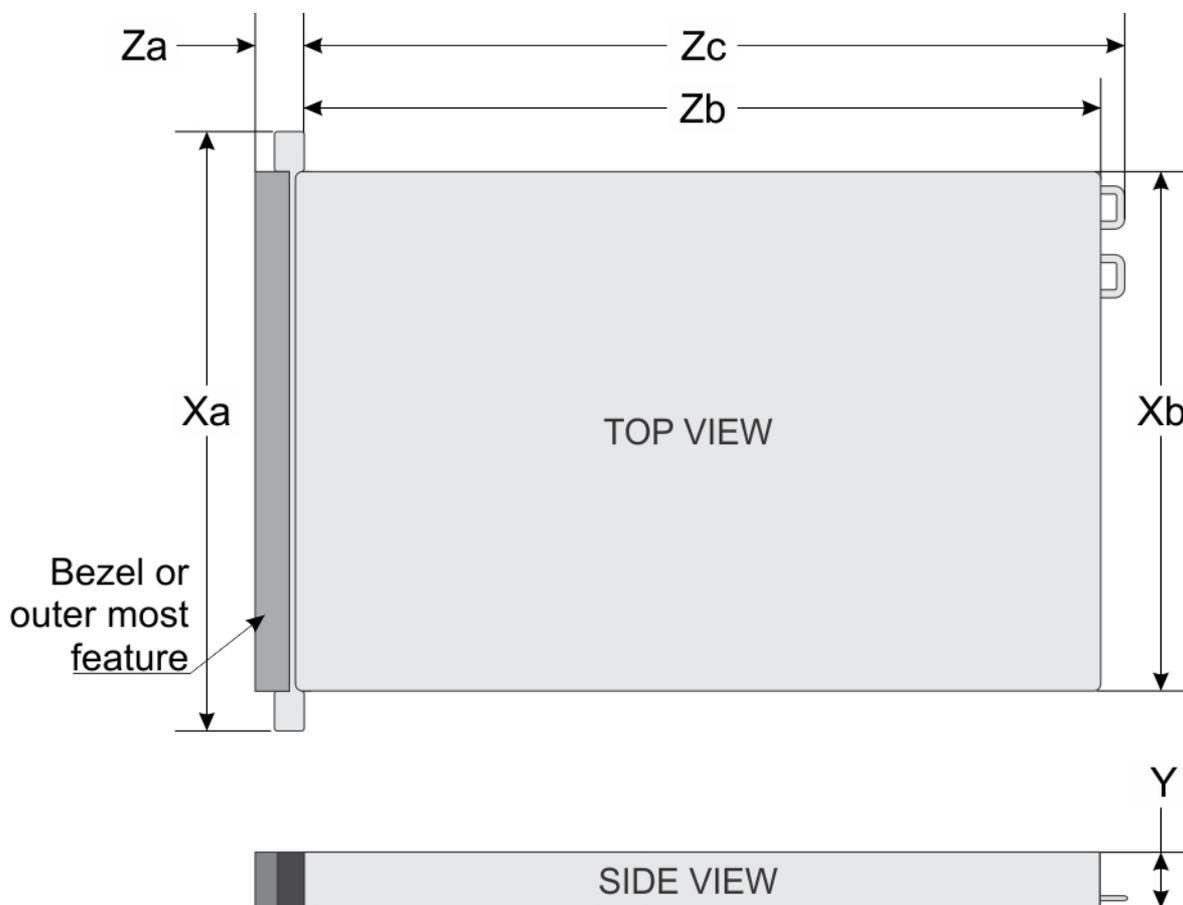


Figure 80. Chassis dimensions

Table 11. Dell EMC PowerEdge R240 chassis dimensions

Xa	Xb	Y	Za	Zb	Zc
482.0 mm (18.97 inches)	434.0 mm (17.08 inches)	42.8 mm (1.68 inches)	With bezel: 35.64 mm (1.4 inches) Without bezel: 22.0 mm (0.87 inches)	534.496 mm (21.04 inches)	573.596 mm (22.58 inches)

System weight

Table 12. Dell EMC PowerEdge R240 system weight

System configuration	Maximum weight (with all drives/SSDs)
4 x 3.5-inch drives	12.2 kg (26.89 lb)

Processor specifications

Table 13. Dell EMC PowerEdge R240 processor specifications

Supported processor	Number of processors supported
Intel Xeon Scalable Processor	One

PSU specifications

The Dell EMC PowerEdge R240 system supports a cabled AC power supply unit (PSU).

Table 14. Dell EMC PowerEdge R240 PSU specifications

PSU	Class	Heat dissipation (maximum)	Frequency	Voltage	AC		Current
					High line 100–240 V	Low line 100–120 V	
250 W AC	Bronze	1039 BTU/hr	50/60 Hz	100-240 V AC,autoranging	250 W	N/A	4.0A-2.0 A

NOTE: This system is also designed to connect to the IT power systems with a phase-to-phase voltage not exceeding 230 V.

Cooling fans specifications

The Dell EMC PowerEdge R240 system supports the following cooling fans.

NOTE: When selecting or upgrading the system configuration, to ensure optimum power utilization, verify the system power consumption with the Dell Energy Smart Solution Advisor available at Dell.com/ESSA.

Table 15. Dell EMC PowerEdge R240 fan support matrix

Front storage	Fan 1	Fan 2	Fan 3	Fan 4
Max allowable 3.5-inch drive counts = 2	Required when PCIe is installed	Required	Required	N/A
Max allowable 3.5-inch drive counts = 4	Required when PCIe is installed	Required	Required	Required

System battery specifications

The Dell EMC PowerEdge R240 system supports CR 2032 3.0-V lithium coin cell system battery.

Expansion card riser specifications

The Dell EMC PowerEdge R240 system supports up to two PCI express (PCIe) generation 3.

Table 16. Expansion card slots supported on the system board

PCIe slot	Riser	PCIe slot height	PCIe slot length	Slot width
Slot 1	x8 PCIe	Low-profile	Half-length	x8
Slot 2	x16 PCIe	Low-profile/Full-height	Half-length	x16

Memory specifications

The PowerEdge R240 system supports the following memory specifications for optimized operation.

Table 17. Memory specifications

DIMM type	DIMM rank	DIMM capacity	Minimum RAM	Maximum RAM
UDIMM	Single rank	8 GB	8 GB	32 GB
		16 GB	16 GB	64 GB
	Dual rank	8 GB	8 GB	32 GB
		16 GB	16 GB	64 GB

Table 18. Memory module sockets

Memory module sockets	Speed
Four 288-pin	2666 MT/s

Storage controller specifications

The Dell EMC PowerEdge R240 system supports the following controller cards:

Table 19. Dell EMC PowerEdge R240 system controller cards

Internal controllers	External controllers
<ul style="list-style-type: none"> • PERC H730P • PERC H330 • S140 • HBA330 	<ul style="list-style-type: none"> • 12Gbps SAS Ext. HBA

Drive specifications

Drives

The Dell EMC PowerEdge R240 system supports:

- 4 x 3.5-inch hot-swappable SAS, SATA, or SSD
- 4 x 3.5-inch cabled drives
- 2 x 3.5-inch cabled drives

NOTE: LED functionality is not supported on cabled hard disk drive configuration.

Backplane:

- Up to 4 x 3.5-inch SAS, SATA drives, or SSD drives
- Up to 4 x 2.5-inch SAS, SATA drives, or SSD drives

Optical drives

The Dell EMC PowerEdge R240 system supports the following optical drives.

Table 20. Supported optical drive type

Supported drive type	Supported number of drives
Dedicated SATA DVD-ROM drive or DVD +/-RW drive	One

Ports and connectors specifications

USB ports specifications

Table 21. Dell EMC PowerEdge R240 system USB specifications

Front		Rear		Internal	
USB port type	No. of ports	USB port type	No. of ports	USB port type	No. of ports
USB 2.0-compliant port	One	USB 3.0-compliant ports	Two	Internal USB 3.0-compliant port	One
Micro USB 2.0-compliant port for iDRAC Direct	One				

NOTE: The micro USB 2.0 compliant port can only be used as an iDRAC Direct or a management port.

NIC ports specifications

The Dell EMC PowerEdge R240 system supports up to two 10/100/1000 Mbps Network Interface Controller (NIC) ports that are located on the back panel.

Serial connector specifications

The Dell EMC PowerEdge R240 system supports one serial connector on the back panel, which is a 9-pin connector, Data Terminal Equipment (DTE), 16550-compliant.

VGA ports specifications

The Dell EMC PowerEdge R240 system supports DB-15 VGA connector.

IDSDM module

The Dell EMC PowerEdge R240 system supports optional Internal Dual SD module (IDSDM) module.

The module supports three microSD cards; two cards for IDSDM and one card for vFlash. In 14th generation of PowerEdge servers, the IDSDM or vFlash module is combined into a single card module, and is available in the following configurations:

- vFlash or
- vFlash and IDSDM

Table 22. Supported microSD card storage capacity

IDSDM card	vFlash card
<ul style="list-style-type: none">· 16 GB· 32 GB· 64 GB	<ul style="list-style-type: none">· 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 EMC branded microSD cards that are associated with the IDSDM or vFlash configured systems.

Video specifications

The Dell EMC PowerEdge R240 system supports integrated Matrox G200 graphics controller with 16 MB of video frame buffer.

Table 23. Supported video resolution options

Resolution	Refresh rate (Hz)	Color depth (bits)
640 x 480	60, 72	8, 16, 24
800 x 600	60, 75, 85	8, 16, 24
1024 x 768	60, 75, 85	8, 16, 24
1152 x 864	60, 75, 85	8, 16, 24
1280 x 1024	60, 75	8, 16, 24

Environmental specifications

NOTE: For additional information about environmental certifications, refer to the *Product Environmental Datasheet* located with the Manuals & Documents on Dell.com/support/home.

Table 24. Temperature specifications

Temperature	Specifications
Storage	-40–65°C (-40–149°F)
Continuous operation (for altitude less than 950 m or 3117 ft)	10–35°C (50–95°F) with no direct sunlight on the equipment

Temperature	Specifications
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 25. 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 26. 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 27. Maximum shock pulse specifications

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

Table 28. Maximum altitude specifications

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

Table 29. Operating temperature derating specifications

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 (104–113°F)	Maximum temperature is reduced by 1°C/125 m (1°F/228 ft), above 950 m (3,117 ft).

Standard operating temperature

Table 30. Standard operating temperature specifications

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

Expanded operating temperature

Table 31. Expanded operating temperature specifications

Expanded operating temperature	Specifications
Continuous operation	<p>5°C–40°C at 5% to 85% RH with 29°C dew point.</p> <p>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.</p> <p>For temperatures 35°C– 40°C, derate maximum allowable temperature by 1°C per 175 m (1°F per 319 ft) above 950 m (3,117 ft).</p>
≤ 1% of annual operating hours	<p>-5°C–45°C at 5% to 90% RH with 29°C dew point.</p> <p>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.</p> <p>For temperatures 40°C– 45°C, derate maximum allowable temperature by 1°C per 125 m (1°F per 228 ft) above 950 m (3,117 ft).</p>

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 System Event Log.

Expanded operating temperature restrictions

- Do not perform a cold startup of the system below 5°C.
- The operating temperature specified is for a maximum altitude of 950m for fresh air cooling.
- Four system fans are required.
- Support for up to 71W processor.
- GPU is not supported.
- Non-Dell qualified peripheral cards and/or peripheral cards greater than 25 W are not supported.

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 particulate and gaseous contamination. If the levels of particulate or gaseous pollution exceed the specified limitations and results in equipment damage or failure, you must rectify the environmental conditions. Remediation of environmental conditions is the responsibility of the customer.

Table 32. Particulate contamination specifications

Particulate contamination	Specifications
Air filtration	<p>Data center air filtration as defined by ISO Class 8 per ISO 14644-1 with a 95% upper confidence limit.</p> <p>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.</p> <p>NOTE: Air entering the data center must have MERV11 or MERV13 filtration.</p>
Conductive dust	<p>Air must be free of conductive dust, zinc whiskers, or other conductive particles.</p> <p>NOTE: This condition applies to data center and non-data center environments.</p>
Corrosive dust	<ul style="list-style-type: none"> Air must be free of corrosive dust. Residual dust present in the air must have a deliquescent point less than 60% relative humidity. <p>NOTE: This condition applies to data center and non-data center environments.</p>

Table 33. 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.

Topics:

- [System health and system ID indicator codes](#)
- [iDRAC Direct LED indicator codes](#)
- [NIC indicator codes](#)
- [Non-redundant cabled power supply unit indicator codes](#)
- [Drive indicator codes](#)
- [Using system diagnostics](#)

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 81. System health and system ID indicator

Drive indicator codes

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



Figure 84. Drive indicators

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

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

Table 38. 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

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:

- [Recycling or End-of-Life service information](#)
- [Contacting Dell](#)
- [Accessing system information by using QRL](#)
- [Receiving automated support with SupportAssist](#)

Recycling or End-of-Life service information

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

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/home
- 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.

Accessing system information by using QRL

You can use the Quick Resource Locator (QRL) located on the information tag in the front of the R240, to access the information about the Dell EMC PowerEdge R240.

Prerequisites

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

The QRL includes the following information about your system:

- How-to videos
- Reference materials, including the Installation and Service Manual, and mechanical overview

- Your system service tag to quickly access your specific hardware configuration and warranty information
- A direct link to Dell to contact technical assistance and sales teams

Steps

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

Quick Resource Locator for Dell EMC PowerEdge R240 system



Figure 85. Quick Resource Locator for Dell EMC PowerEdge R240 system

Receiving automated support with SupportAssist

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

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

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

Documentation resources

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

To view the document that is listed in the documentation resources table:

- From the Dell EMC support site:
 - a Click the documentation link that is provided in the Location column in the table.
 - b Click the required product or product version.

 **NOTE: To locate the product name and model, see the front of your system.**

- c On the Product Support page, click **Manuals & documents**.
- Using search engines:
 - Type the name and version of the document in the search box.

Table 39. Additional documentation resources for your system

Task	Document	Location
Setting up your system	For more information about installing and securing the system into a rack, see the Rail Installation Guide included with your rack solution. For information about setting up your system, see the <i>Getting Started Guide</i> 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. For information about understanding Remote Access Controller Admin (RACADM) subcommands and supported RACADM interfaces, see the RACADM CLI Guide for iDRAC. For information about Redfish and its protocol, supported schema, and Redfish Eventing implemented in iDRAC, see the Redfish API Guide. For information about iDRAC property database group and object descriptions, see the Attribute Registry Guide.	Dell.com/poweredgemanuals
	For information about earlier versions of the iDRAC documents. To identify the version of iDRAC available on your system, on the iDRAC web interface, click ? > About .	Dell.com/idracmanuals
	For information about installing the operating system, see the operating system documentation.	Dell.com/operatingsystemmanuals

Task	Document	Location
	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/poweredgemanuals
	For information about setting up, using, and troubleshooting OpenManage, see the Dell OpenManage Server Administrator User's Guide.	Dell.com/openmanagemanuals > OpenManage Server Administrator
	For information about installing, using, and troubleshooting Dell OpenManage Essentials, see the Dell OpenManage Essentials User's Guide.	Dell.com/openmanagemanuals > OpenManage Essentials
	For information about installing and using Dell SupportAssist, see the Dell EMC SupportAssist Enterprise User's Guide.	Dell.com/serviceabilitytools
	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 the event and error messages generated by the system firmware and agents that monitor system components, see the Error Code Lookup.	Dell.com/qrl
Troubleshooting your system	For information about identifying and troubleshooting the PowerEdge server issues, see the Server Troubleshooting Guide.	Dell.com/poweredgemanuals