

Dell PowerEdge R940

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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PowerEdge R940 overview

The PowerEdge R940 is a 3U rack system, which is available in the following configurations:

Table 1. PowerEdge R940 configurations

Configurations	Specifications
8-drive bay system (without Processor Expansion Module)	<ul style="list-style-type: none">• Two Intel Xeon Scalable processors• 24 DIMM slots supporting up to 3 TB of memory• Up to two AC or DC power supply units (PSUs)• 8 drives or SSDs
24-drive bay system (with PEM)	<ul style="list-style-type: none">• Four Intel Xeon Scalable processors• 48 DIMM slots supporting up to 6 TB of memory• Up to two AC or DC power supply units (PSUs)• 24 drives or SSDs

 **NOTE:** The PowerEdge R940 system supports hot swappable hard drives.

 **NOTE:** The PowerEdge R940 system is also available in a diskless (no backplane) configuration.

For more information, see the Dell Technologies PowerEdge R940 Technical Specifications on the product documentation page.

Topics:

- [Supported configurations for the PowerEdge R940](#)
- [Front view of the system](#)
- [Back view of the system](#)
- [Drive indicator codes](#)
- [LCD panel](#)
- [Locating the Service Tag of your system](#)
- [System information label](#)

Supported configurations for the PowerEdge R940

The PowerEdge R940 system supports the following configurations:

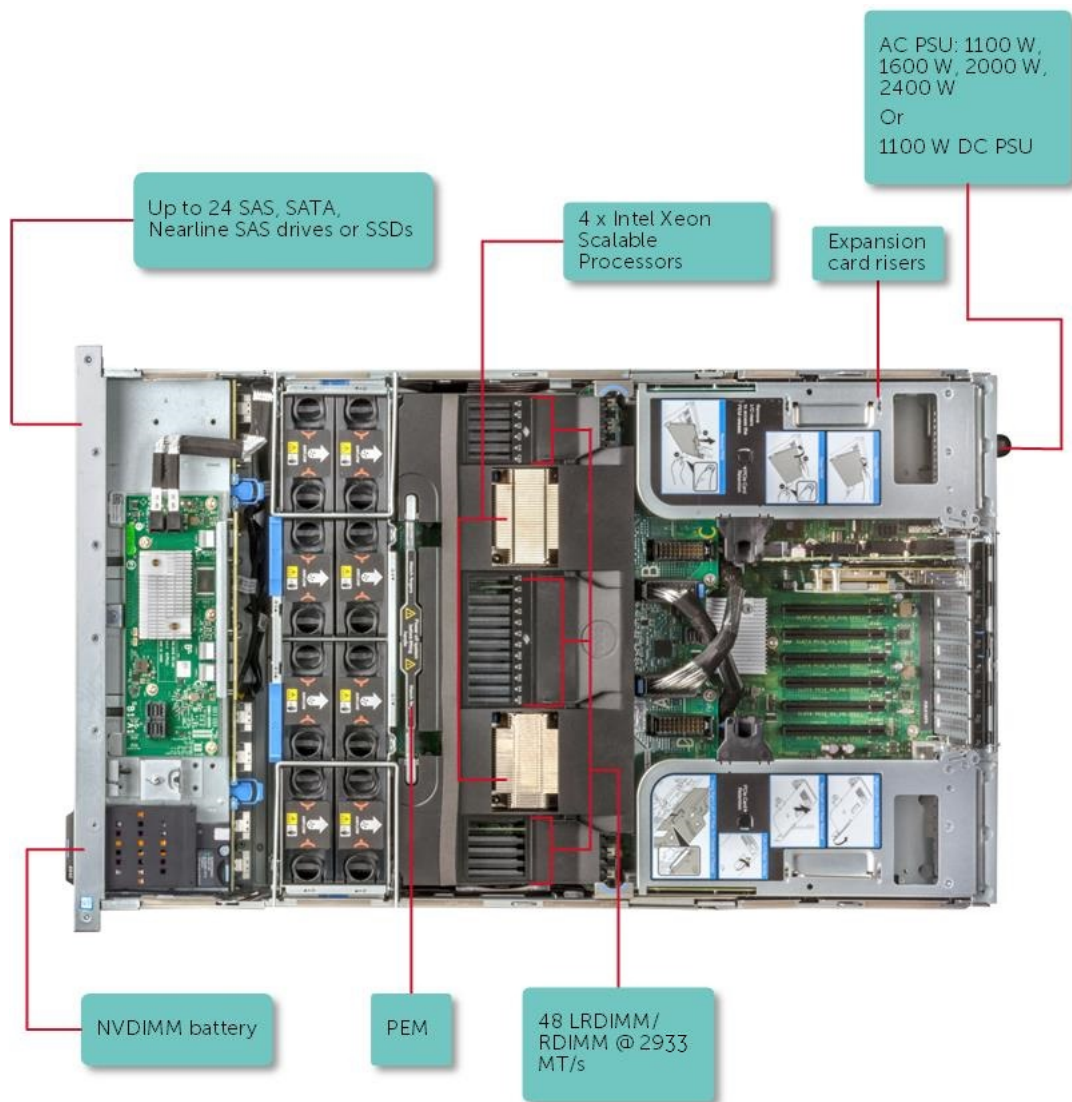


Figure 1. Supported configurations for the PowerEdge R940

Front view of the system

You can access the following components from the front of the system:



Figure 2. Front view of 24 x 2.5-inch drive system

Table 2. Features available on the front view of 24 x 2.5-inch drive system

Item	Component	Icon	Description
1	Left control panel	N/A	Contains the system health and system ID, status LED, and the iDRAC Quick Sync 2 (wireless) indicator. NOTE: The iDRAC Quick Sync 2 indicator is available only on certain configurations.
2	Drive slots	N/A	Enable you to install drives that are supported on your system. For more information about drives, see the Technical specifications section.
3	Right control panel	N/A	Contains the power button, VGA port, iDRAC Direct port and USB ports.
4	Information tag	N/A	The Information tag is a slide-out label panel that contains system information such as Service Tag, NIC, MAC address, and so on. If you have opted for the secure default access to iDRAC, the Information tag also contains the iDRAC secure default password.

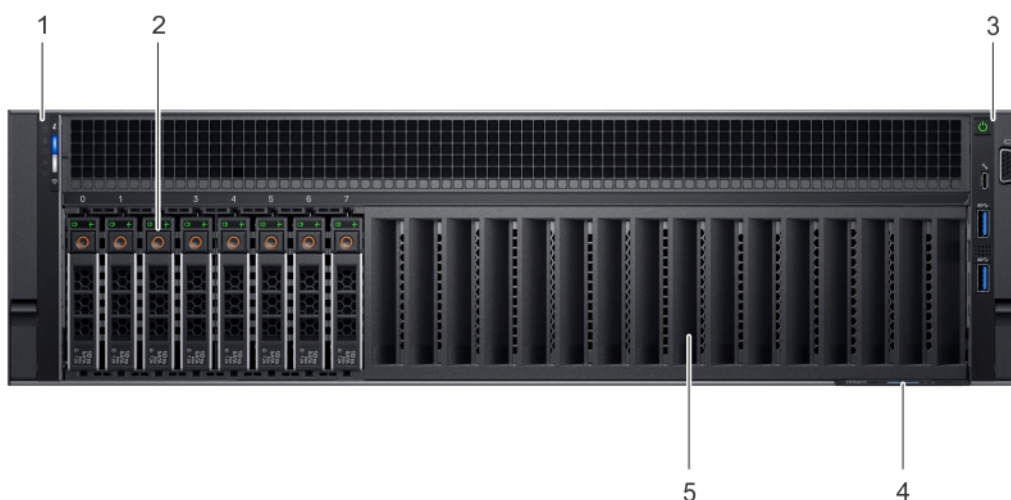


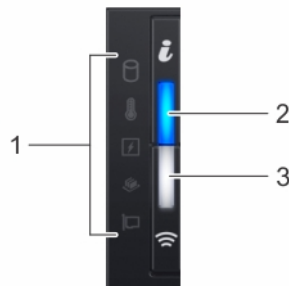
Figure 3. Front view of 8 x 2.5-inch drive system

Table 3. Features available on the front view of 8 x 2.5-inch drive system

Item	Component	Icon	Description
1	Left control panel	N/A	Contains the system health and system ID, status LED, and the iDRAC Quick Sync 2 (wireless) indicator. NOTE: The iDRAC Quick Sync 2 indicator is available only on certain configurations.
2	Drive slots	N/A	Enable you to install drives that are supported on your system. For more information about drives, see the Technical specifications section.
3	Right control panel	N/A	Contains the power button, VGA port, iDRAC Direct port and USB ports.
4	Information tag	N/A	The Information tag is a slide-out label panel that contains system information such as Service Tag, NIC, MAC address, and so on. If you have opted for the secure default access to iDRAC, the Information tag also contains the iDRAC secure default password.
5	Drive bay blank	N/A	For the 8 x 2.5-inch drive system, a drive bay blank is installed in the hard drive slots 8 - 23.

For more information, see the Dell EMC PowerEdge R940 Technical Specifications on the product documentation page.

Left control panel view

**Figure 4. Left control panel with optional iDRAC Quick Sync 2.0 indicator****Table 4. Left control panel**

Item	Indicator, button, or connector	Icon	Description
1	Status LED indicators	N/A	Indicate the status of the system. For more information, see the Status LED indicators section.
2	System health and system ID indicator		Indicates the system health. For more information, see the System health and system ID indicator codes section.
3	iDRAC Quick Sync 2 wireless indicator (optional)		Indicates if the iDRAC Quick Sync 2 wireless option is activated. The Quick Sync 2 feature allows management of the system using mobile devices. This feature aggregates hardware/firmware inventory and various system level diagnostic/error information that can be used in troubleshooting the system. You can access system inventory, Dell Lifecycle Controller logs or system logs, system health status, and also configure iDRAC, BIOS, and networking parameters. You can also launch the virtual Keyboard, Video, and Mouse (KVM) viewer and virtual Kernel-based Virtual Machine (KVM), on a supported

Table 4. Left control panel (continued)

Item	Indicator, button, or connector	Icon	Description
			mobile device. For more information, see the Integrated Dell Remote Access Controller User's Guide at www.dell.com/poweredgemanuals

Status LED indicators


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

Table 5. Status LED indicators and descriptions






Icon	Description	Condition	Corrective action
	Drive indicator	The indicator turns solid amber if there is a drive error.	<ul style="list-style-type: none"> Check the System Event Log to determine if the drive has an error. Run the appropriate Online Diagnostics test. Restart the system and run embedded diagnostics (ePSA). If the drives are configured in a RAID array, restart the system, and enter the host adapter configuration utility program.
	Temperature indicator	The indicator turns solid amber if the system experiences a thermal error (for example, the ambient temperature is out of range or there is a fan failure).	<p>Ensure that none of the following conditions exist:</p> <ul style="list-style-type: none"> A cooling fan has been removed or has failed. System cover, air shroud, memory module blank, or back filler bracket is removed. Ambient temperature is too high. External airflow is obstructed. <p>If the problem persists, see Getting help.</p>
	Electrical indicator	The indicator turns solid amber if the system experiences an electrical error (for example, voltage out of range, or a failed power supply unit (PSU) or voltage regulator).	<p>Check the System Event Log or system messages for the specific issue. If it is due to a problem with the PSU, check the LED on the PSU. Reseat the PSU.</p> <p>If the problem persists, see Getting help.</p>
	Memory indicator	The indicator turns solid amber if a memory error occurs.	Check the System Event Log or system messages for the location of the failed memory. Reseat the memory module.

Table 5. Status LED indicators and descriptions (continued)

Icon	Description	Condition	Corrective action
			If the problem persists, see Getting help .
	PCIe indicator	The indicator turns solid amber if a PCIe card experiences an error.	Restart the system. Update any required drivers for the PCIe card. Reinstall the card. If the problem persists, see Getting help .

System health and system ID indicator codes

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

**Figure 5. System health and system ID indicators****Table 6. System health and system ID indicator codes**

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

iDRAC Quick Sync 2 indicator codes

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

**Figure 6. iDRAC Quick Sync 2 indicators****Table 7. iDRAC Quick Sync 2 indicators and descriptions**

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

Table 7. iDRAC Quick Sync 2 indicators and descriptions (continued)

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

Right control panel





Figure 7. Right control panel

Table 8. Right control panel

Item	Button or port	Icon	Description
1	Power button		Indicates if the system is powered on or off. Press the power button to manually power on or off the system. NOTE: Press the power button to gracefully shut down an ACPI-compliant operating system.
2	iDRAC Direct port		The iDRAC Direct port is micro USB 2.0-compliant. This port enables you to access the iDRAC Direct features. For more information, see the <i>Integrated Dell Remote Access Controller User's Guide</i> at www.dell.com/poweredgemanuals .

Table 8. Right control panel (continued)

Item	Button or port	Icon	Description
3	USB ports		The USB ports are 9-pin, USB 3.0-compliant. These ports enable you to connect USB devices to the system.
4	VGA port		Enables you to connect a display device to the system. For more information, see the Technical specifications section.

iDRAC Direct LED indicator codes

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

You can configure iDRAC Direct by using a USB to micro USB (type AB) cable, which you can connect to your laptop or tablet. The following table describes iDRAC Direct activity when the iDRAC Direct port is active:

Table 9. iDRAC Direct LED indicator codes

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

Back view of the system

You can access the following components from the back of the system:

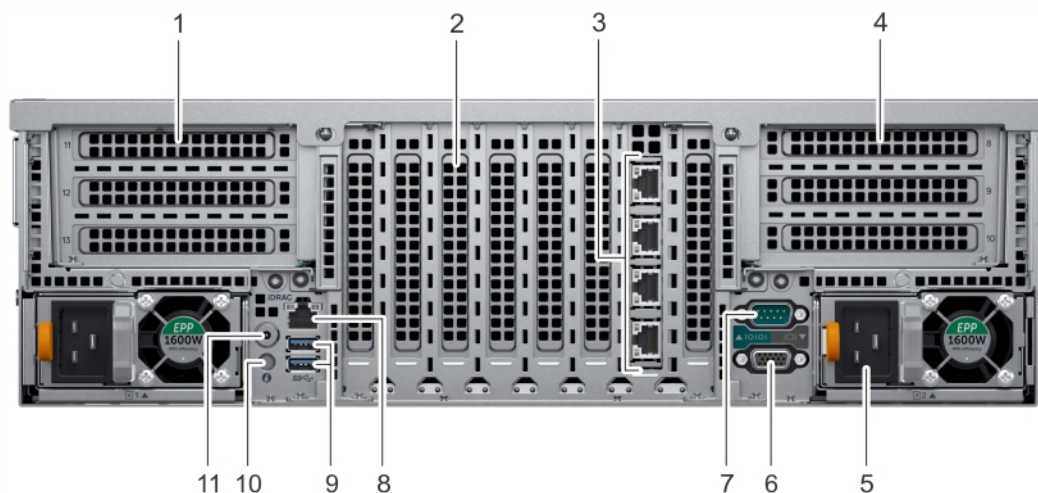









Figure 8. Back view features

Table 10. Features available on the back of the system

Item	Slot, button, or connector	Icon	Description
1	expansion card riser (right)	N/A	The expansion card riser (right) supports up to three full-height PCI Express expansion cards. For more information, see the Expansion card installation guidelines section.

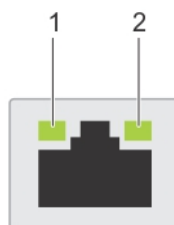
Table 10. Features available on the back of the system (continued)

Item	Slot, button, or connector	Icon	Description
2	expansion card slot	N/A	The expansion slots on the system board supports full-height half-length PCI Express expansion cards.
3	NIC port (4)		The NIC ports that are integrated on the network daughter card (NDC) provide network connectivity. For more information about the supported configurations, see the Technical specifications section.
4	expansion card riser (left)	N/A	The expansion card riser (left) supports up to three full-height PCI Express expansion cards. For more information, see the Expansion card installation guidelines section.
5	Power supply unit (2)		For more information, see the Technical specifications section.
6	Video port		Enables you to connect a display device to the system. For more information, see the Technical specifications section.
7	Serial port		Enables you to connect a serial device to the system. For more information, see the Technical specifications section.
8	iDRAC9 Enterprise port		Enables you to remotely access iDRAC. For more information, see the iDRAC User's Guide at www.dell.com/poweredgemanuals .
9	USB port (2)		The USB ports are 9-pin, USB 3.0-compliant. These ports enable you to connect USB devices to the system.
10	System identification button		The System Identification (ID) button is available on the front and back of the systems. Press the button to identify a system in a rack by turning on the system ID button. You can also use the system ID button to reset iDRAC and to access BIOS using the step through mode.
11	System status indicator cable port		Enables you to connect the status indicator cable and view system status when the CMA is installed.

For more information, see the Dell EMC PowerEdge R940 Technical Specifications on the product documentation page.

NIC indicator codes

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

**Figure 9. NIC indicator codes**

1. Link LED indicator
2. Activity LED indicator

Table 11. NIC indicator codes

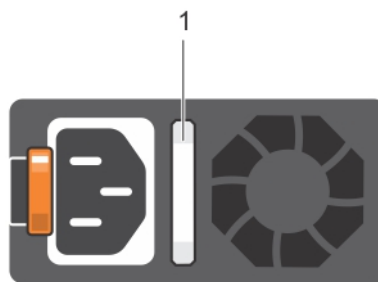
Status	Condition
Link and activity indicators are off.	The NIC is not connected to the network.
Link indicator is green, and activity indicator is blinking green.	The NIC is connected to a valid network at its maximum port speed, and data is being sent or received.
Link indicator is amber, and activity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

Power supply unit indicator codes

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

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

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

**Figure 10. AC PSU status indicator**

1. AC PSU status indicator/handle

Table 12. AC PSU status indicator codes

Power indicator codes	Condition
Green	A valid power source is connected to the PSU and the PSU is operational.
Blinking amber	Indicates a problem with the PSU.
Not illuminated	Power is not connected to the PSU.
Blinking green	When the firmware of the PSU is being updated, the PSU handle blinks green. CAUTION: Do not disconnect the power cord or unplug the PSU when updating firmware. If firmware update is interrupted, the PSUs do not function.
Blinking green and turns off	When hot-plugging a PSU, the PSU handle blinks green five times at a rate of 4 Hz and turns off. This indicates a PSU mismatch with respect to efficiency, feature set, health status, or supported voltage. CAUTION: If two PSUs are installed, both the PSUs must have the same type of label; for example, Extended Power Performance (EPP) label. Mixing PSUs from previous generations of PowerEdge servers is not supported, even if the PSUs have the same power rating. This results in a PSU mismatch condition or failure to turn the system on. CAUTION: When correcting a PSU mismatch, replace only the PSU with the blinking indicator. Swapping the PSU to make a matched pair can result in an error condition

Table 12. AC PSU status indicator codes (continued)

Power indicator codes	Condition
	and unexpected system shutdown. To change from a high output configuration to a low output configuration or vice versa, you must turn off the system.
△	CAUTION: AC PSUs support both 240 V and 120 V input voltages with the exception of Titanium PSUs, which support only 240 V. When two identical PSUs receive different input voltages, they can output different wattages, and trigger a mismatch.
△	CAUTION: If two PSUs are used, they must be of the same type and have the same maximum output power.
△	CAUTION: Combining AC and DC PSUs is not supported and triggers a mismatch.

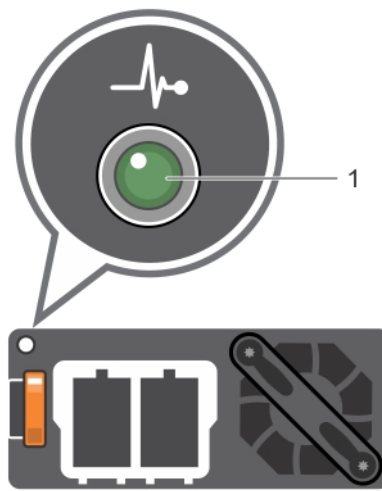


Figure 11. DC PSU status indicator

1. DC PSU status indicator

Table 13. DC PSU status indicator codes

Power indicator codes	Condition
Green	A valid power source is connected to the PSU and the PSU is operational.
Blinking amber	Indicates a problem with the PSU.
Not illuminated	Power is not connected to the PSU.
Blinking green	<p>When hot-plugging a PSU, the PSU indicator blinks green. This indicates that there is a PSU mismatch with respect to efficiency, feature set, health status, or supported voltage.</p> <p>△ CAUTION: If two PSUs are installed, both the PSUs must have the same type of label; for example, Extended Power Performance (EPP) label. Mixing PSUs from previous generations of PowerEdge servers is not supported, even if the PSUs have the same power rating. This results in a PSU mismatch condition or failure to turn the system on.</p> <p>△ CAUTION: When correcting a PSU mismatch, replace only the PSU with the blinking indicator. Swapping the PSU to make a matched pair can result in an error condition and unexpected system shutdown. To change from a High Output configuration to a Low Output configuration or vice versa, you must turn off the system.</p> <p>△ CAUTION: If two PSUs are used, they must be of the same type and have the same maximum output power.</p> <p>△ CAUTION: Combining AC and DC PSUs is not supported and triggers a mismatch.</p>

Drive indicator codes

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

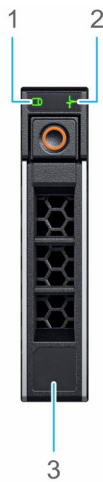


Figure 12. Drive indicators on the drive and the mid drive tray backplane

- 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 14. 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.

LCD panel

The LCD panel provides system information, status, and error messages to indicate if the system is functioning correctly or requires attention. The LCD panel can also be used to configure or view the system's iDRAC IP address. For information about the event and error messages generated by the system firmware and agents that monitor system components, go to url.dell.com > **Look Up** > **Error Code**, type the error code, and then click **Look it up**.

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

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

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

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

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

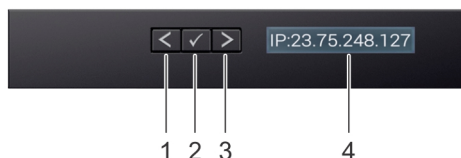


Figure 13. LCD panel features




Table 15. LCD panel features

Item	Button or display	Description
1	Left	Moves the cursor back in one-step increments.
2	Select	Selects the menu item highlighted by the cursor.
3	Right	Moves the cursor forward in one-step increments. During message scrolling: <ul style="list-style-type: none"> • Press and hold the right button to increase scrolling speed. • Release the button to stop. NOTE: The display stops scrolling when the button is released. After 45 seconds of inactivity, the display starts scrolling.
4	LCD display	Displays system information, status, and error messages or iDRAC IP address.

Viewing Home screen

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

Steps

1. To view the **Home** screen, press one of the three navigation buttons (Select, Left, or Right).
2. To navigate to the **Home** screen from another menu, complete the following steps:
 - a. Press and hold the navigation button till the up arrow  is displayed.
 - b. Navigate to the **Home** icon  using the up arrow .
 - c. Select the **Home** icon.
 - d. On the **Home** screen, press the **Select** button to enter the main menu.

Setup menu

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

Option	Description
iDRAC	Select DHCP or Static IP to configure the network mode. If Static IP is selected, the available fields are IP , Subnet (Sub) , and Gateway (Gtw) . Select Setup DNS to enable DNS and to view domain addresses. Two separate DNS entries are available.

Option	Description
Set error	<p>Select SEL to view LCD error messages in a format that matches the IPMI description in the SEL. This enables you to match an LCD message with an SEL entry.</p> <p>Select Simple to view LCD error messages in a simplified user-friendly description. For more information about error messages, see the <i>Dell Event and Error Messages Reference Guide</i> at openmanage manuals.</p>
Set home	Select the default information to be displayed on the Home screen. See View menu section for the options and option items that can be set as the default on the Home screen.

View menu

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

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

Locating the Service Tag of your system

The Information Tag is a slide-out label panel that contains system information such as Service Tag, NIC, MAC address, and so on. If you have opted for the secure default access to iDRAC, the Information Tag also contains the iDRAC secure default password.

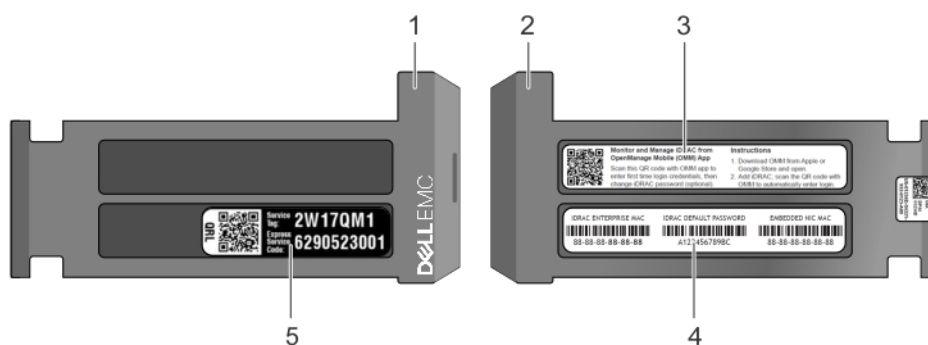


Figure 14. Locating Service Tag of your system

1. Information tag (front view)
2. Information tag (back view)
3. OpenManage Mobile (OMM) label
4. iDRAC MAC address and iDRAC secure password label
5. Service Tag

System information label

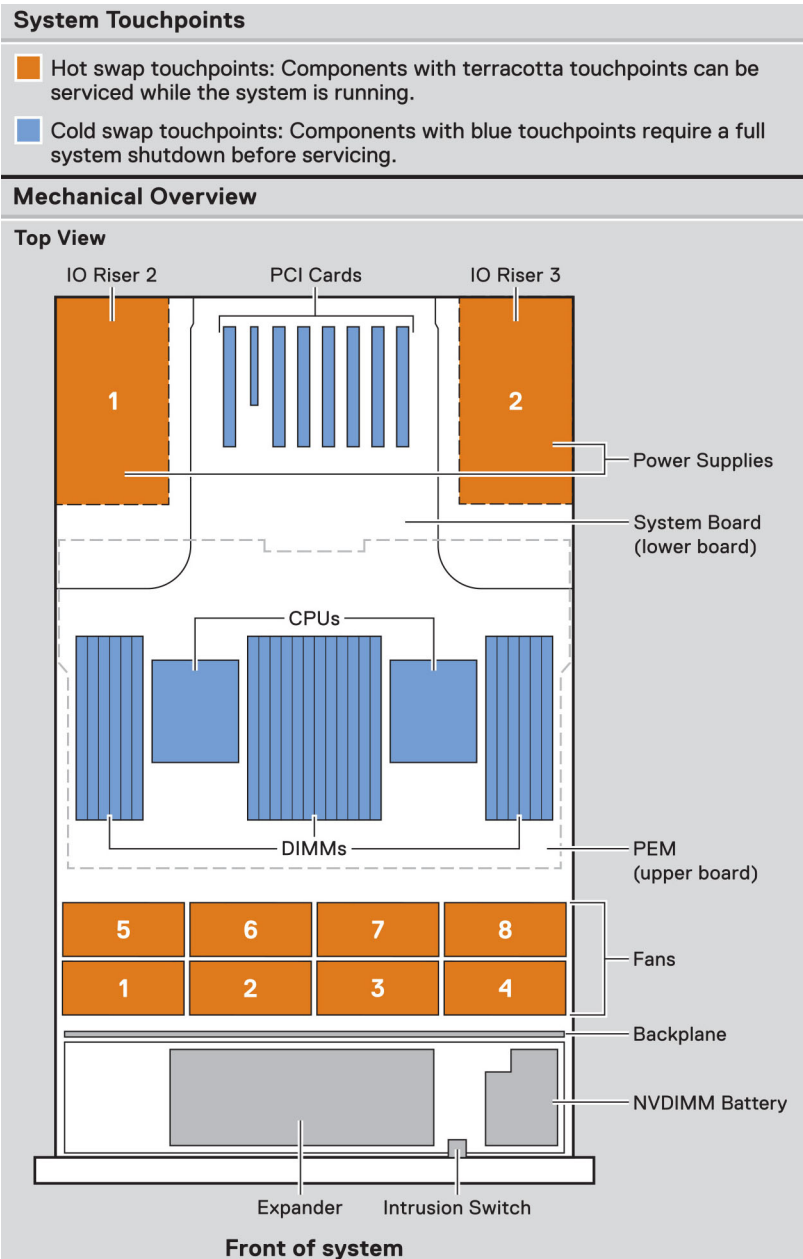


Figure 15. PowerEdge R940 system touch points

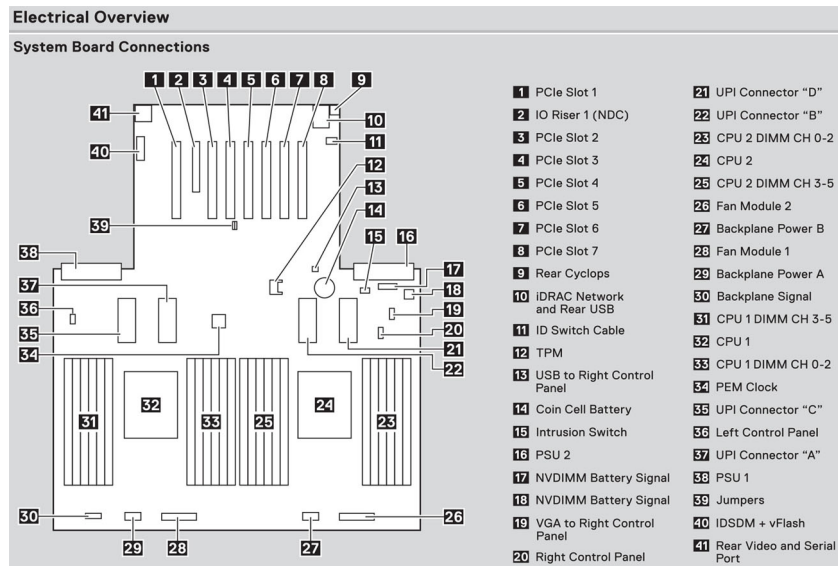


Figure 16. PowerEdge R940 system board information

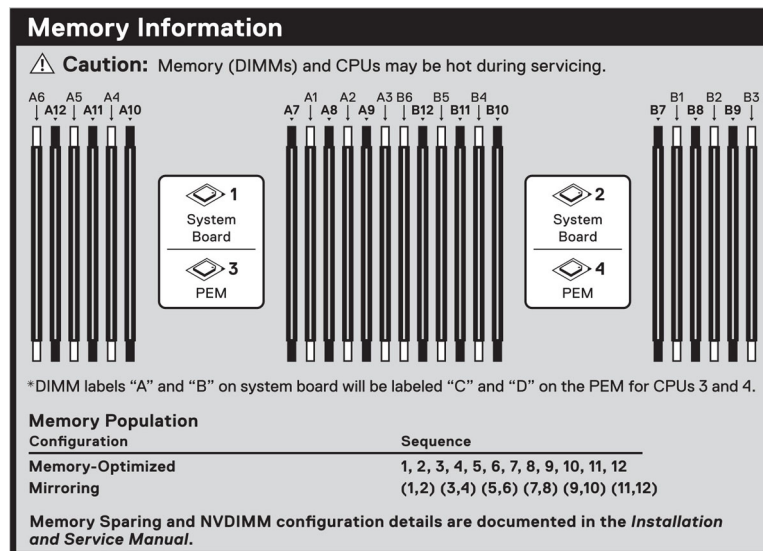


Figure 17. PowerEdge R940 memory information

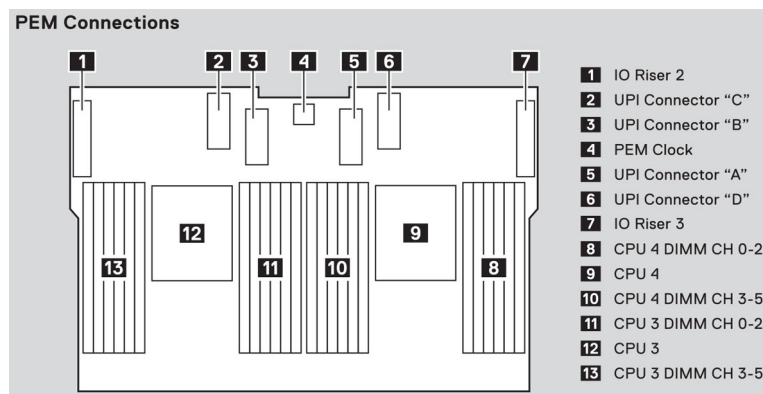


Figure 18. PowerEdge R940 Processor Expansion Module (PEM) information

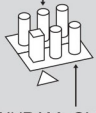




Jumper Settings		
Jumper	Setting	Description
	 (default)	BIOS password can be enabled.
	 (default)	BIOS password is disabled. iDRAC local access unlocked at next AC power cycle. iDRAC password reset is enabled in F2 iDRAC settings menu.
	 (default)	BIOS configuration settings retained at system boot.
	 (default)	BIOS configuration settings cleared at system boot.

Figure 19. PowerEdge R940 jumper settings

Documentation resources

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

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


- From the Dell Technologies support site:
 1. Click the documentation link that is provided in the Location column in the table.
 2. Click the required product or product version.
-  **NOTE:** To locate the product name and model, see the front of your system.
- 3. On the Product Support page, click **Manuals & documents**.
- Using search engines:
 - Type the name and version of the document in the search box.

Table 16. Documentation resources

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

Table 16. Documentation resources (continued)

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

Initial system setup and configuration

Topics:

- [Setting up your system](#)
- [iDRAC configuration](#)
- [Options to install the operating system](#)

Setting up your system

Perform the following steps to set up your system:

Steps

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 www.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.


For information on how to manage basic settings and features of the system, see the Dell EMC PowerEdge R940 BIOS and UEFI Reference Guide on the product documentation page.

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 www.dell.com/poweredgemanuals
Dell Deployment Toolkit	<i>Dell Deployment Toolkit User's Guide</i> at www.dell.com/openmanagemanuals > OpenManage Deployment Toolkit
Dell Lifecycle Controller	<i>Dell Lifecycle Controller User's Guide</i> at www.dell.com/poweredgemanuals
Server LCD panel	LCD panel section

Interfaces Document/Section

iDRAC Direct and Quick Sync 2 (optional) See *Dell Integrated Dell Remote Access Controller User's Guide* at www.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 username and password after setting up the iDRAC IP address.

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

You can also access iDRAC by using RACADM. For more information, see the *RACADM Command Line Interface Reference Guide* at www.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 17. Resources to install the operating system

Resources	Location
iDRAC	www.dell.com/idracmanuals
Lifecycle Controller	www.dell.com/idracmanuals > Lifecycle Controller
OpenManage Deployment Toolkit	www.dell.com/openmanagemanuals > OpenManage Deployment Toolkit
Dell certified VMware ESXi	Virtualization solutions
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 18. Firmware and drivers

Methods	Location
From the Dell Technologies support site	www.dell.com/support/home
Using Dell Remote Access Controller Lifecycle Controller (iDRAC with LC)	www.dell.com/idracmanuals

Table 18. Firmware and drivers (continued)

Methods	Location
Using Dell Repository Manager (DRM)	www.dell.com/openmanagemanuals > Repository Manager
Using Dell OpenManage Essentials	www.dell.com/openmanagemanuals > OpenManage Essentials
Using Dell OpenManage Enterprise	www.dell.com/openmanagemanuals > OpenManage Enterprise
Using Dell Server Update Utility (SUU)	www.dell.com/openmanagemanuals > Server Update Utility
Using Dell OpenManage Deployment Toolkit (DTK)	www.dell.com/openmanagemanuals > OpenManage Deployment Toolkit
Using iDRAC virtual media	www.dell.com/idracmanuals


Downloading drivers and firmware

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

Prerequisites

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

Steps


1. Go to www.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.

Installing and removing system components

Topics:


- Safety instructions
- Before working inside your system
- After working inside your system
- Recommended tools
- Optional front bezel
- System cover
- Inside the system
- Air shroud
- Cooling fans
- Fan cage
- Intrusion switch
- Drives
- Drive backplane
- Cable routing
- System memory
- Processors and heat sinks
- Processor expansion module
- PEM power board
- Expansion cards and expansion card risers
- M.2 SSD module
- Network daughter card riser
- Network daughter card
- Storage controller card
- Optional IDSDM or vFlash module
- Optional IDSDM or vFlash module
- Power supply unit
- NVDIMM-N battery
- System battery
- Optional internal USB memory key
- System board
- Trusted Platform Module
- Control panel

Safety instructions


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


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

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

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or

telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.

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

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

Before working inside your system

Prerequisites

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

Steps

1. Turn off the system, including all attached peripherals.
2. Disconnect the system from the electrical outlet and disconnect the peripherals.
3. Remove the system cover.

After working inside your system

Prerequisites

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

Steps

1. Install the system cover.
2. Reconnect the peripherals and connect the system to the electrical outlet.
3. Turn on the attached peripherals and then turn on the system.

Recommended tools

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


- Key to the bezel lock

The key is required only if your system includes a bezel.

- Phillips #1 screwdriver
- Phillips #2 screwdriver
- Torx #T30 screwdriver
- Torx #T8 screwdriver
- Wrist grounding strap

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

- AMP 90871-1 hand-crimping tool or equivalent
- Tyco Electronics 58433-3 or equivalent
- Wire-stripper pliers to remove insulation from size 10 AWG solid or stranded, insulated copper wire

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

Optional front bezel

Removing the optional front bezel

Prerequisites

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

Steps

1. Unlock the bezel by using the bezel key.
2. Press the release button, and pull the left end of the bezel.
3. Unhook the right end, and remove the bezel.



Figure 20. Removing the optional front bezel with the LCD panel

Next steps


[Install the optional front bezel.](#)

Installing the optional front bezel

Prerequisites

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

Steps

1. Locate and remove the bezel key.
 **NOTE:** The bezel key is part of the LCD bezel package.
2. Align and insert the right end of the bezel onto the system.
3. Press the release button and fit the left end of the bezel onto the system.

4. Lock the bezel by using the key.



Figure 21. Installing the optional front bezel with the LCD panel

System cover

Removing the system cover

Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Power off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.

Steps

1. Using a 1/4 inch flat head or a Phillips #2 screwdriver, rotate the latch release lock counter clockwise to the unlocked position.
2. Lift the latch till the system cover slides back and the tabs on the system cover disengage from the guide slots on the system.
3. Hold the cover on both sides, and lift the cover away from the system.



Figure 22. Removing the system cover

Next steps

[Installing the system cover.](#)

Installing the system cover

Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. 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. Push the system cover latch down.
The system cover slides forward, the tabs on the system cover engage with the guide slots on the system and the system cover latch locks into place.
3. Using a 1/4 inch flat head or Phillips #2 screwdriver, rotate the latch release lock clockwise to the locked position.



Figure 23. Installing the system cover

Next steps

1. Reconnect the peripherals and connect the system to the electrical outlet.
2. Power on the system, including any attached peripherals.

Inside the system

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.

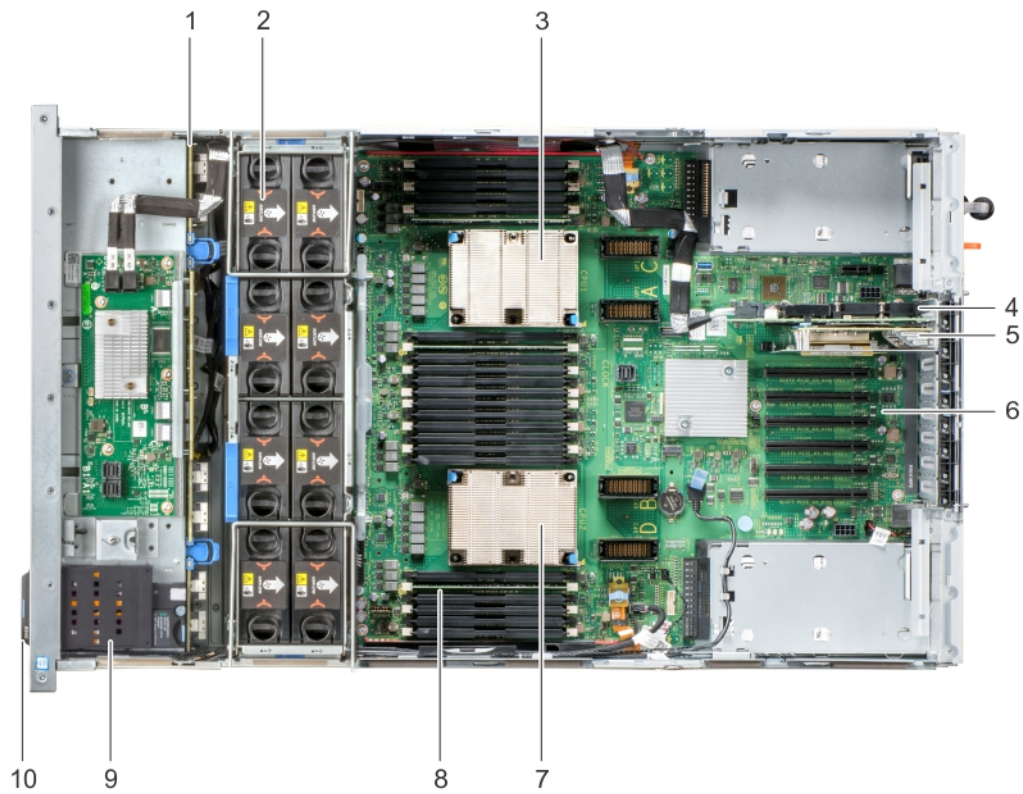


Figure 24. Inside the system — Two processor system

- | | |
|---|----------------------------|
| 1. hard drive/SSD backplane with expander board | 2. cooling fan (8) |
| 3. heat sink (CPU1) | 4. storage controller card |
| 5. network daughter card riser | 6. system board |
| 7. heat sink (CPU2) | 8. memory module (24) |
| 9. NVDIMM-N battery | 10. information tag |

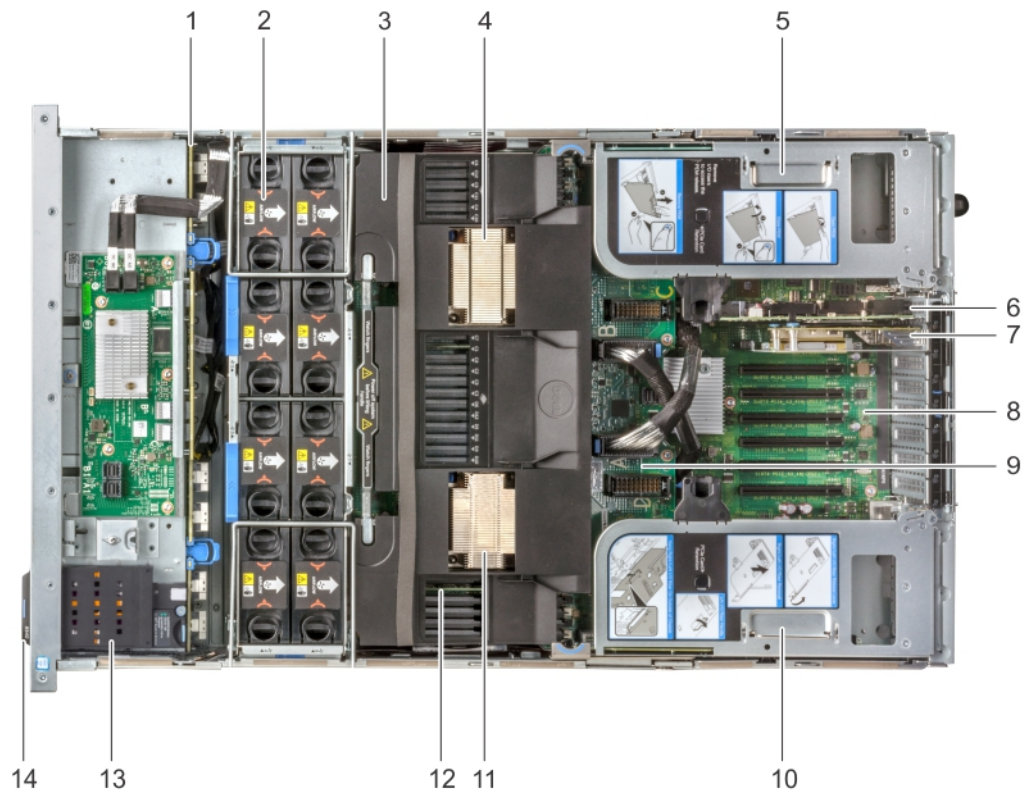


Figure 25. Inside the system — Four processor system with processor expansion module (PEM)

- | | |
|---|--------------------------------|
| 1. hard drive/SSD backplane with expander board | 2. cooling fan (8) |
| 3. air shroud | 4. heat sink (CPU3) |
| 5. left expansion card riser | 6. storage controller card |
| 7. network daughter card riser | 8. system board |
| 9. processor expansion module (PEM) | 10. right expansion card riser |
| 11. heat sink (CPU4) | 12. memory module (48) |
| 13. NVDIMM-N battery | 14. information tag |

Air shroud

Removing the air shroud

Prerequisites

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

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

Steps

1. To remove the air shroud from a two processor configuration system, hold the shroud at both ends and lift it out of the system.

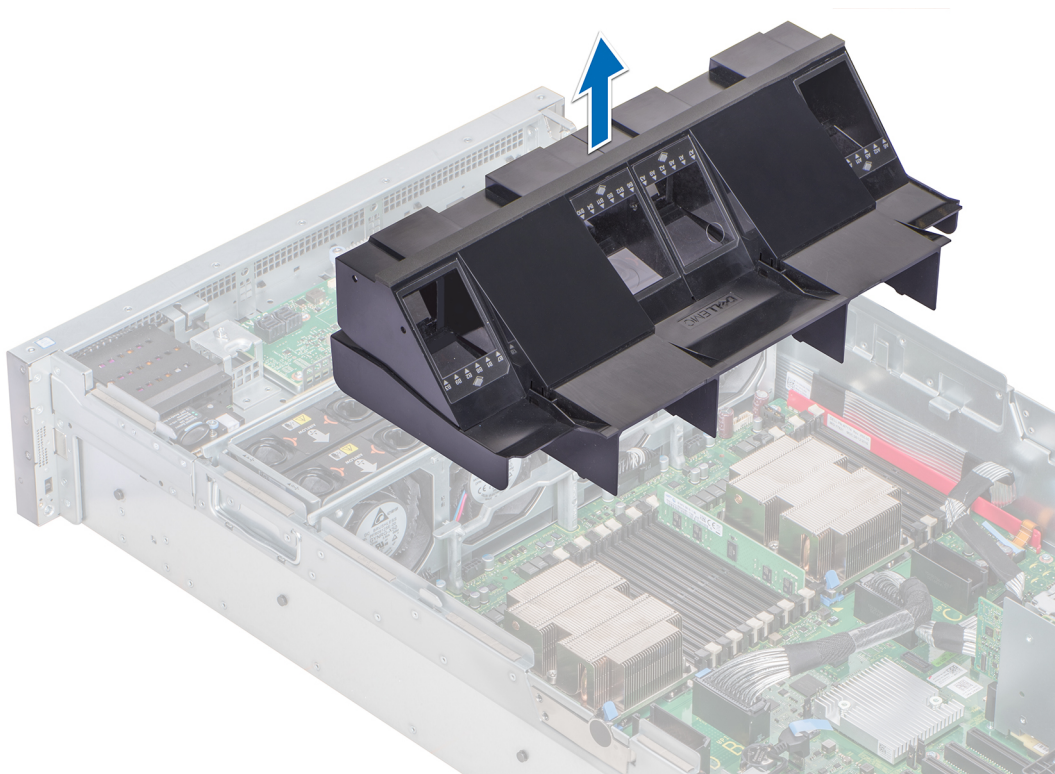


Figure 26. Removing the air shroud — Two processor system

2. To remove the air shroud from a four processor configuration system:
 - a. Remove the expansion card risers. See [Removing the expansion card riser](#).
 - b. Hook the expansion card riser on the side of the system by using the I/O riser handle on the expansion card riser.

CAUTION: To avoid damage to the PCIe cables connected to the NVMe cards installed in the expansion card riser, ensure that you hook the riser to the system using the I/O riser handle.
 - c. Hold the shroud at both ends and lift it away from the system.

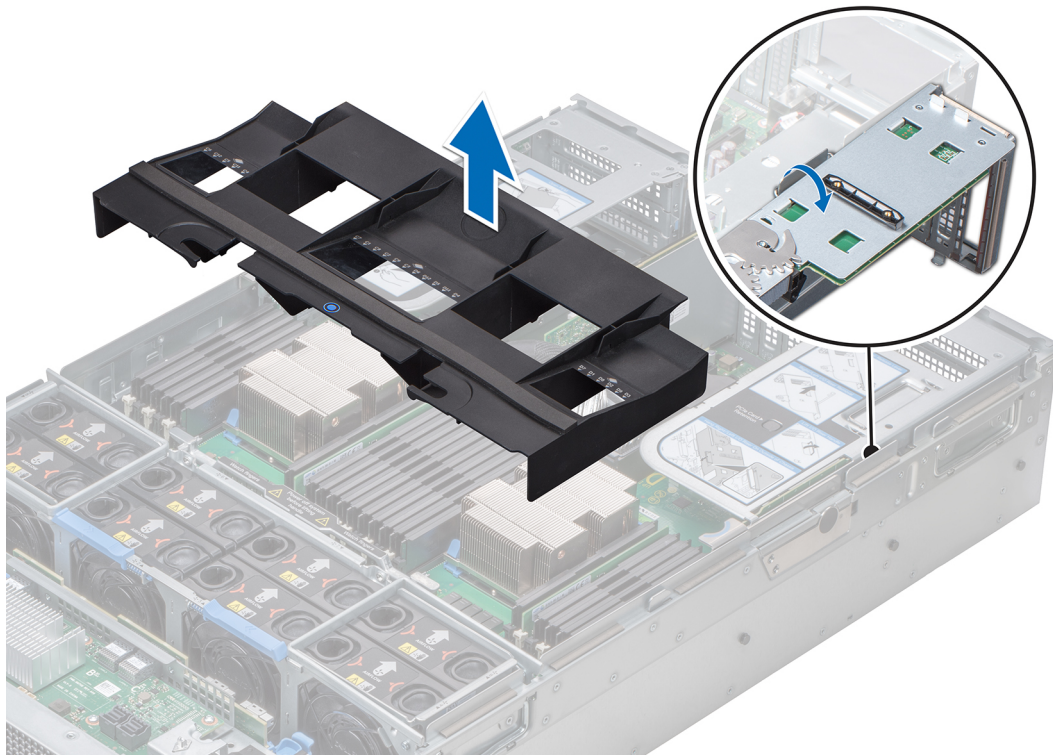


Figure 27. Removing the air shroud — Four processor system

Next steps

[Install the air shroud.](#)

Installing the air shroud

Prerequisites

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

Steps

1. To install the air shroud in a two processor configuration system:
 - a. Lower the air shroud into the system until it is firmly seated.
When firmly seated, the memory socket numbers marked on the air shroud align with the respective memory sockets on the system board.

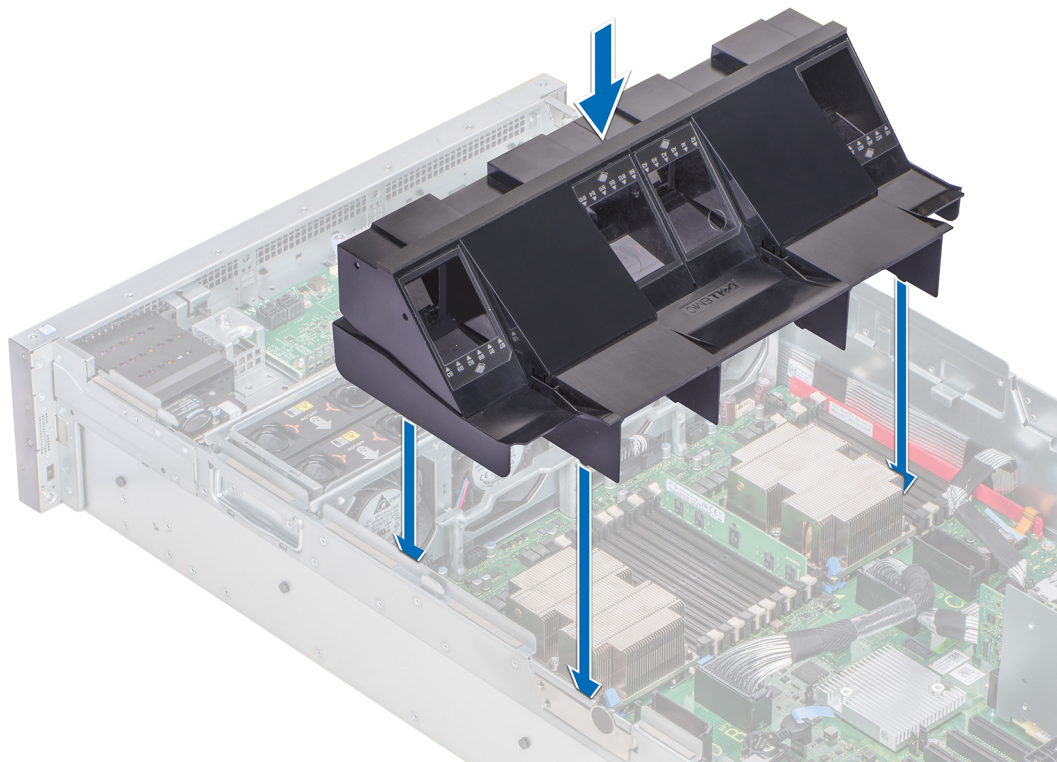


Figure 28. Installing the air shroud — Two processor system

2. To install the air shroud in a four processor configuration system:
 - a. Align the slots on the air shroud with the tabs on the processor expansion module (PEM) handle.
 - b. Lower the air shroud into the system until it is firmly seated.

When firmly seated, the memory socket numbers marked on the air shroud align with the memory sockets on the PEM.
 - c. Press the blue touch point to ensure that the air shroud is seated firmly.
 - d. Unhook the expansion card riser from the side of the system.
 - e. Install the expansion card risers. See [Installing the expansion card riser](#).

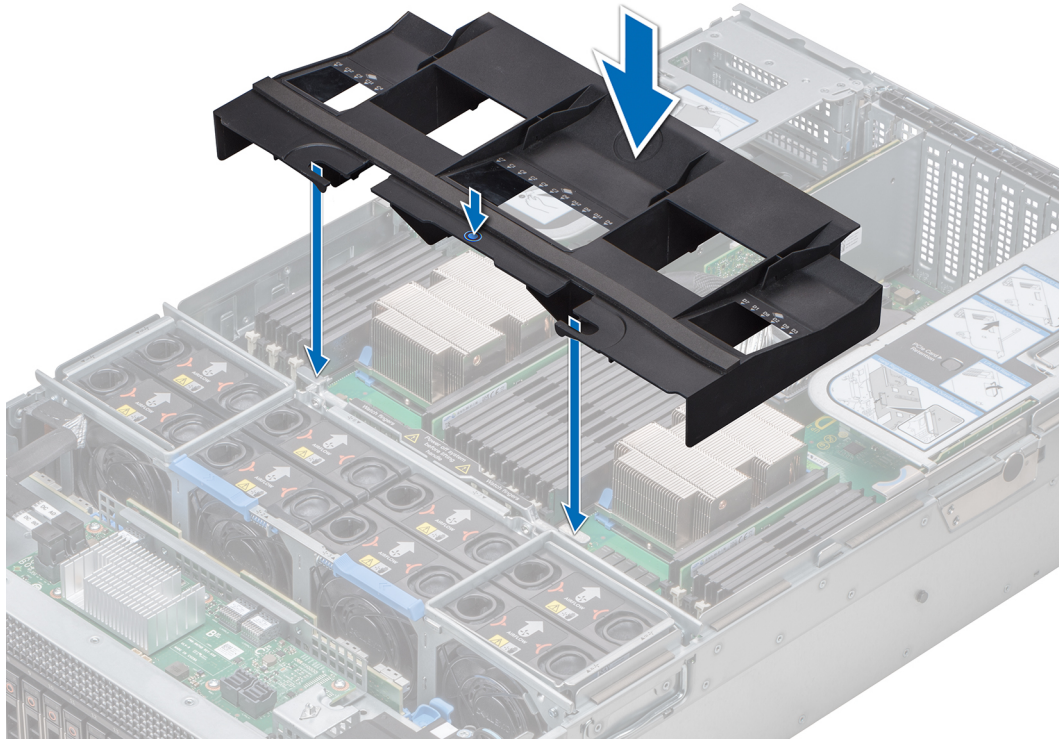


Figure 29. Installing the air shroud — Four processor system

Next steps

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

Cooling fans

Removing the cooling fan

Prerequisites

⚠ WARNING: Do not drop the fan into the fan cage while removing or installing the fan as this may cause damage to the connectors on the fan tray. Exercise utmost care while removing or installing cooling fans.

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

Steps

Press the release tabs and lift the cooling fan out of the fan cage.

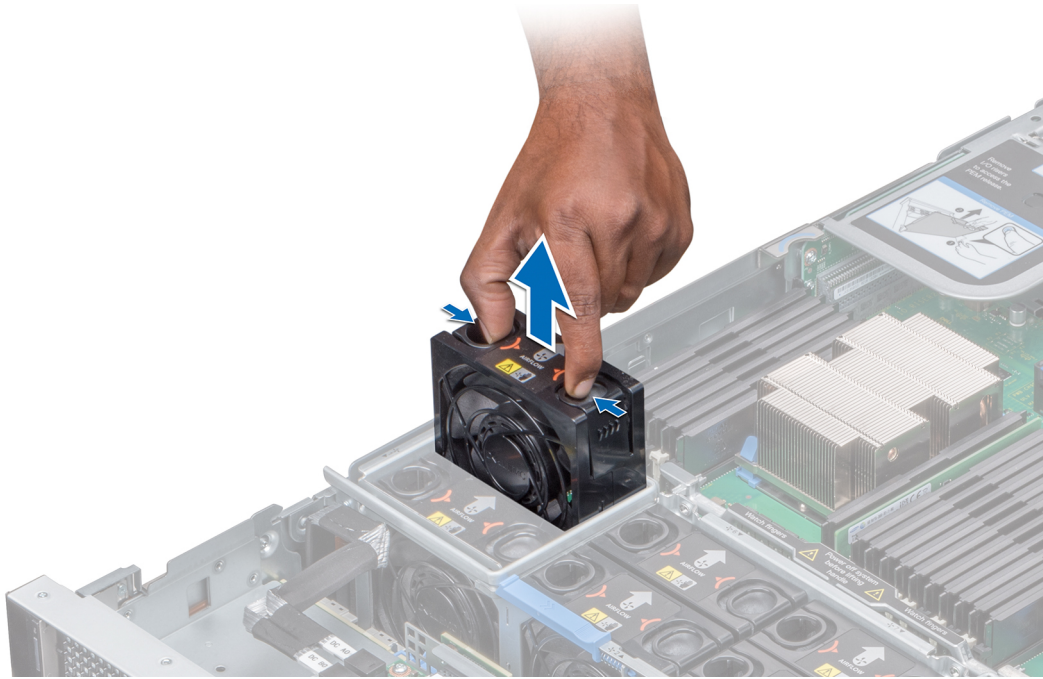


Figure 30. Removing the cooling fan

Next steps

Install the cooling fan.

Installing the cooling fan

Prerequisites

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

⚠ WARNING: Do not drop the fan into the fan cage while removing or installing the fan as this may cause damage to the connectors on the fan tray. Exercise utmost care while removing or installing cooling fans.

Steps

1. Holding the release tabs, insert the cooling fan into the fan cage with the arrow marked on the fan pointing towards the back of the system.
2. Lower the cooling fan to connect the connector on the fan to the connector on the fan tray.

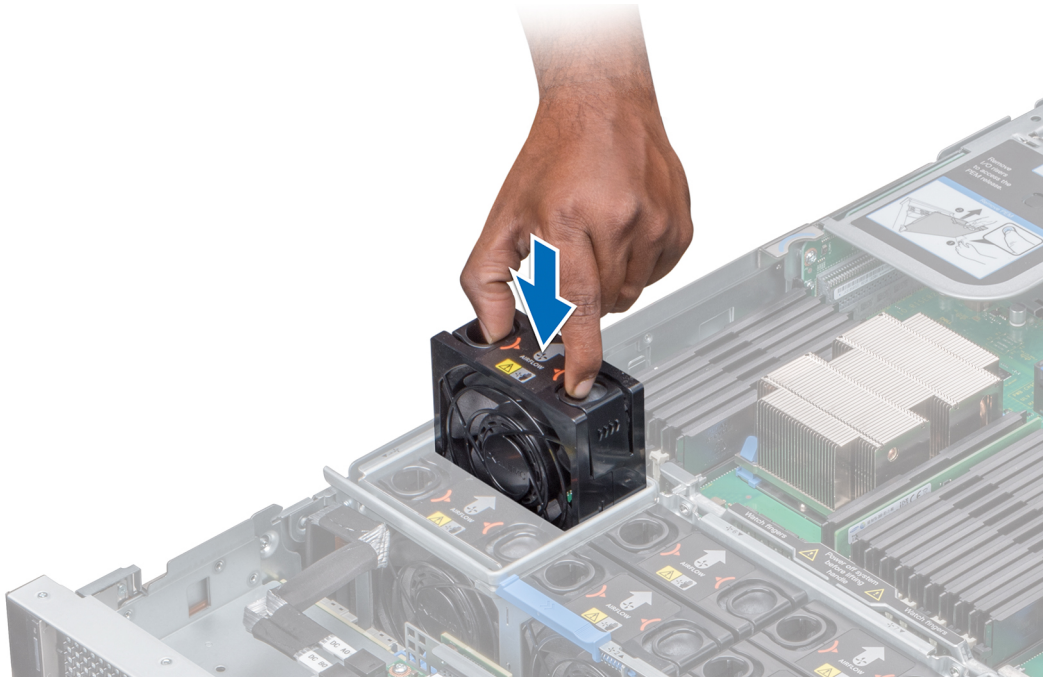


Figure 31. Installing the cooling fan

Next steps

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

Fan cage

Removing the fan cage

Prerequisites

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

Steps

1. Slide the fan cage locks in the direction of the arrow indicated on the locks.
2. Hold the cage handle and lift the cage out of the fan tray.

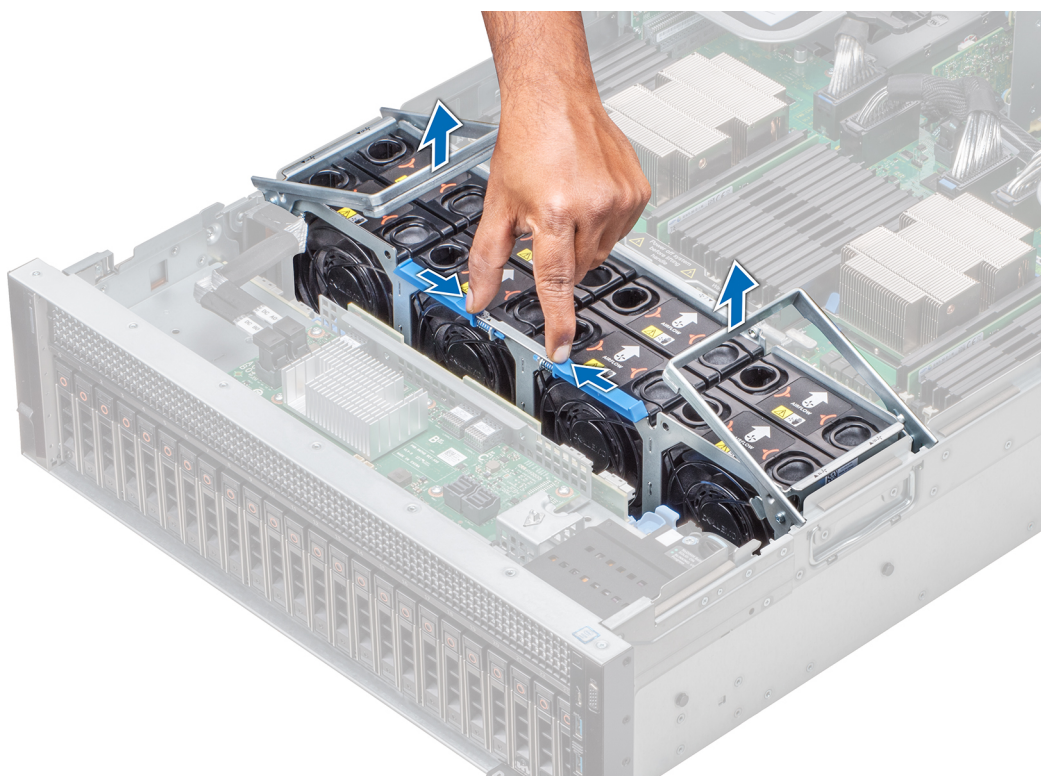


Figure 32. Removing the fan cage

Next steps

Install the fan cage.

Installing the fan cage

Prerequisites

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

Steps

1. Holding the cage handles, lower the cage into the fan tray.
2. Lower the cage handles until the handles lock into place.

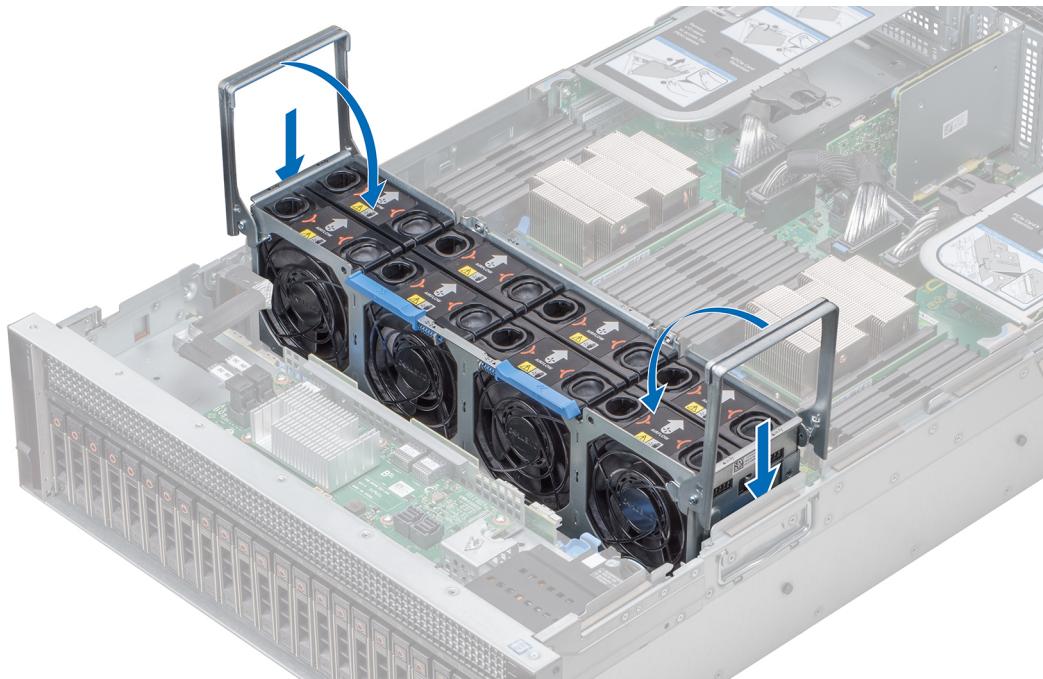


Figure 33. Installing the fan cage

Next steps

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

Removing the fan tray

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 fan cage](#).
5. If installed, [remove the expansion card risers](#).
6. If applicable, lift the PEM by using the PEM handle until the PEM is in an upright position.
7. Release the backplane and fan power cables from the cable clips on the fan tray and disconnect the power cables from the connectors on the system board.

Steps

1. Press the blue release tabs on the side of the fan tray to unlock the tray.
2. Holding the fan tray lift the tray out of the system.

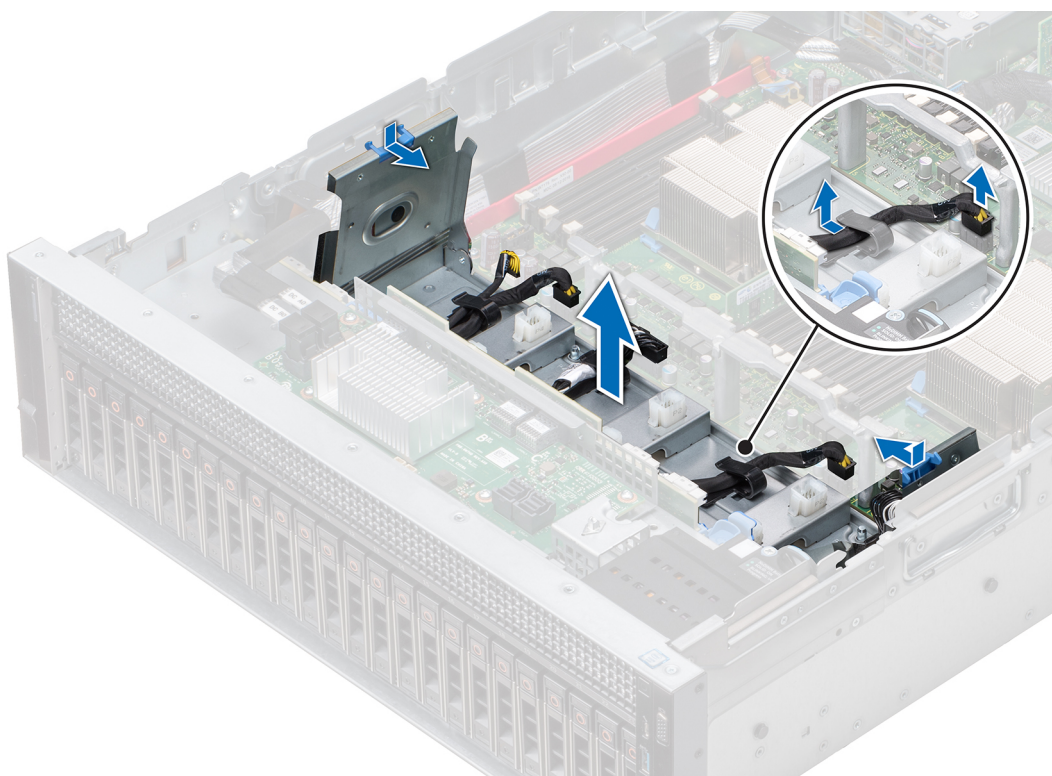


Figure 34. Removing the fan tray

Next steps

Install the fan tray.

Installing the fan tray

Prerequisites

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

Steps

1. Holding the fan tray, align the slots on the fan tray with the standoffs on the system.
2. Lower the fan tray into the system until the slots on the fan tray engage with the standoffs on the system.
3. Press the blue release tabs on the side of fan tray towards the side of the system until the tabs click in place.

NOTE: Ensure that you route the cables correctly against the side of the system.

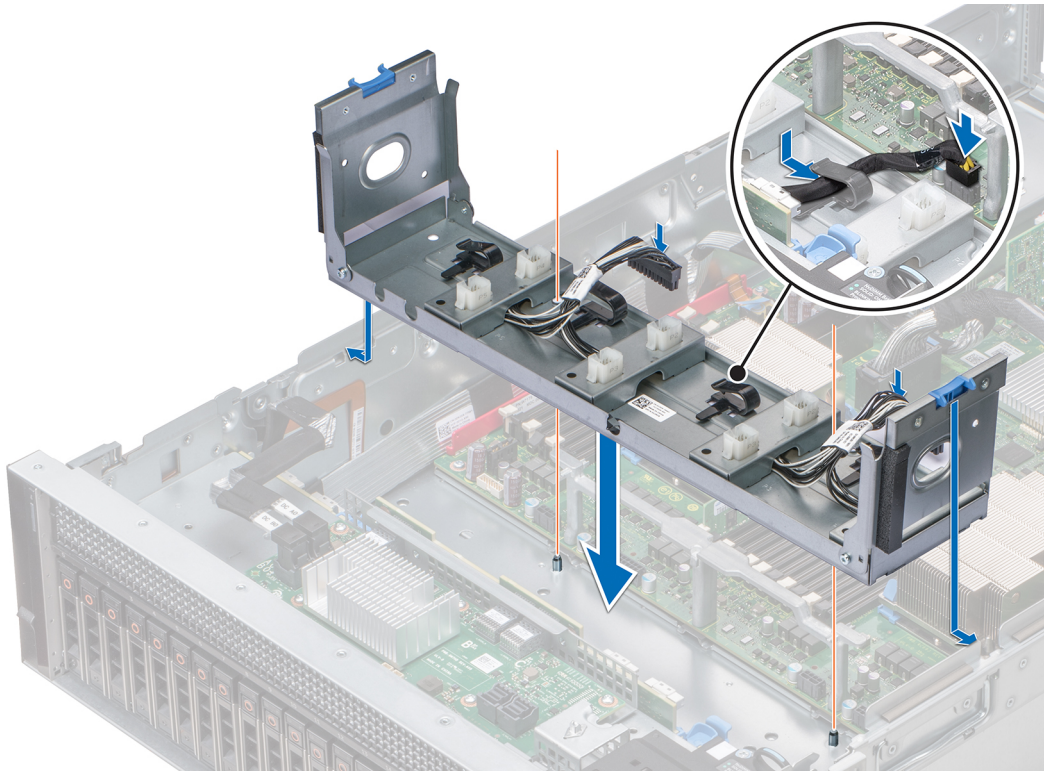


Figure 35. Installing the fan tray

Next steps

1. Route the fan power cables and the backplane cables through the cable clips on the fan tray and connect the cables to the connectors on the system board.
2. If applicable, lower the PEM by using PEM handle until the PEM clicks in place.
3. If removed, [install the expansion card risers](#).
4. [Install the fan cage](#).
5. [Install the air shroud](#).
6. Follow the procedure listed in [After working inside your system](#).

Intrusion switch

Removing an intrusion switch

Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
3. [Remove the fan cage](#).
4. [Remove the air shroud](#).
5. If applicable, [remove the expansion card risers](#).
6. [Remove the PEM](#).
7. Press the blue release tabs on the fan tray and lower the sides of the tray.
8. Disconnect the cable connected to the intrusion switch connector (INTRUSION) on the system board.

Steps

1. Press the cable management bracket down until the tabs on the bracket disengage from the slots on the side of the system.
2. Lift the cable management bracket out of the system.

3. Press the tab on the intrusion switch cable connector and disconnect the cable connected to the intrusion switch connector (INTRUSION) on the system board.
4. Remove the cables routed through the cable routing hooks on the right side of the system.
5. Push the intrusion switch out of the intrusion switch slot.

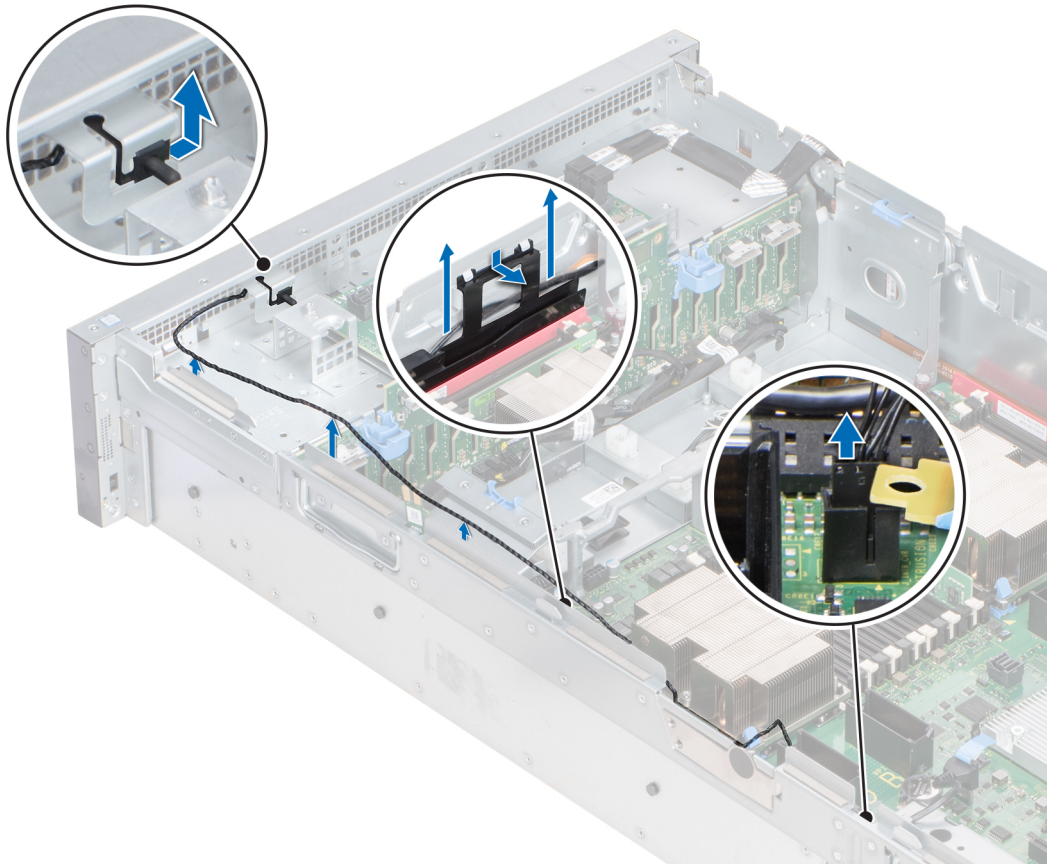


Figure 36. Removing an intrusion switch

Next steps

Install an intrusion switch.

Installing an intrusion switch

Prerequisites

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

Steps

1. Slide the intrusion switch into the intrusion switch slot.
2. Route the cables through the cable routing hooks on the side of the system.
3. Lower the cable management bracket into the system.
4. Press the bracket and insert the tabs on the bracket into the slots on the right side of the system.
5. Connect the cable to the connector (INTRUSION) on the system board.

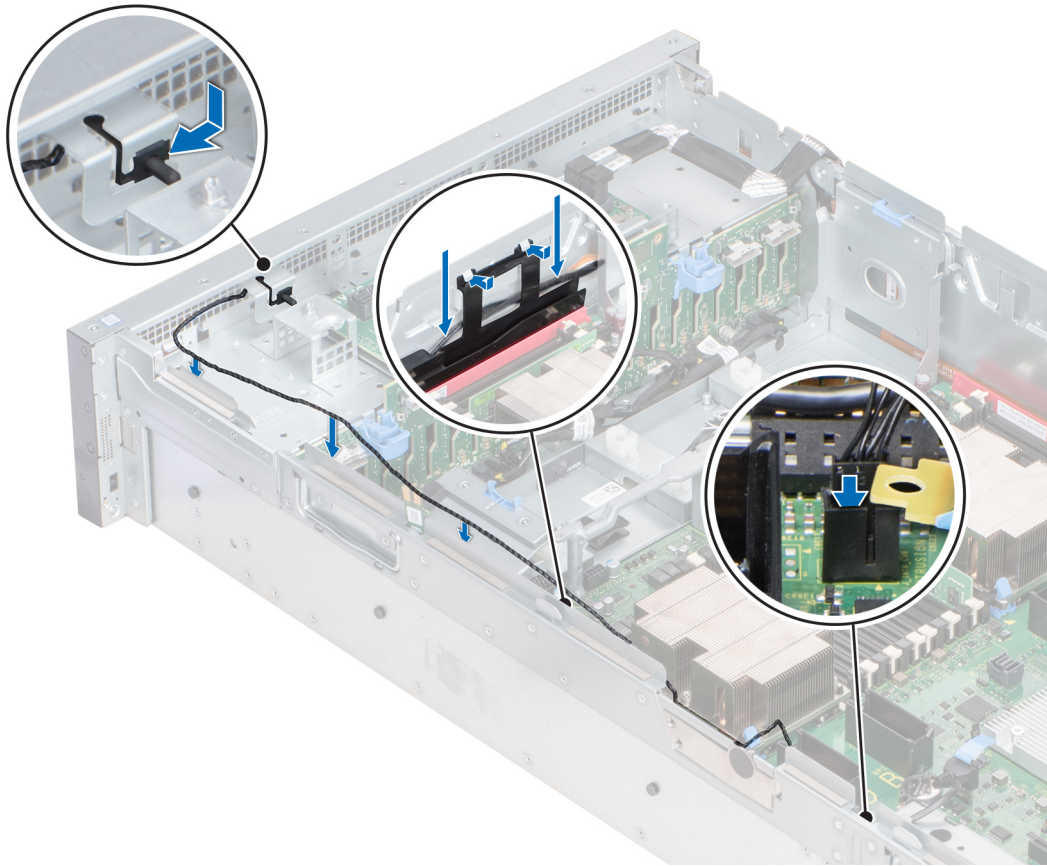


Figure 37. Installing an intrusion switch

Next steps

1. Lift the sides of the fan tray until the blue release tabs click in place.
2. [Install the PEM.](#)
3. If removed, [install the expansion card risers.](#)
4. [Install the air shroud.](#)
5. [Install the fan cage.](#)
6. Follow the procedure listed in [After working inside your system.](#)

Drives

Removing a drive blank

Prerequisites

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

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

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

Steps

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

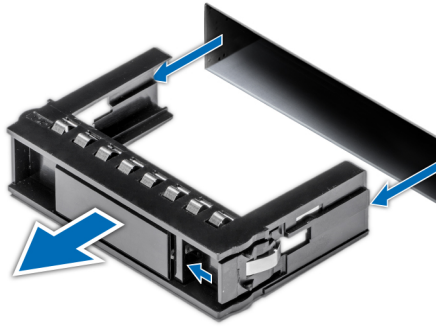


Figure 38. Removing a drive blank

Next steps

Install a drive or drive blank.

Installing a drive blank

Prerequisites

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

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

Steps

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

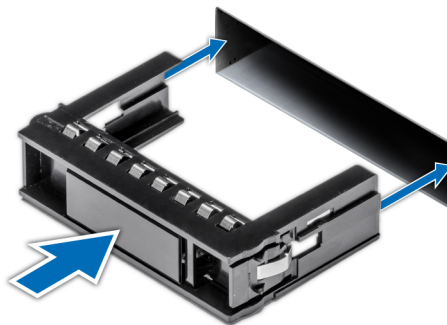


Figure 39. Installing a drive blank

Next steps

If removed, [install the front bezel](#).

Removing a drive carrier

Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. If installed, [remove the front bezel](#).
3. Using the management software, prepare the drive for removal.

If the drive is online, the green activity or fault indicator flashes while the drive is turning off. When the drive indicators are off, the drive is ready for removal. For more information, see the 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: Mixing drives from previous generations of PowerEdge servers is not supported.

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

Steps

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



Figure 40. Removing a drive carrier

Next steps

1. [Install a drive carrier.](#)
2. If you are not replacing the drive immediately, insert a drive blank in the empty drive slot to maintain proper system cooling.

Installing a drive carrier

Prerequisites

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

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

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

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

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

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

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

Steps

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



Figure 41. Installing a drive carrier

Next steps

If removed, [install the front bezel](#).

Removing the drive from the drive carrier

Prerequisites

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

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

Steps

1. Using a Phillips #1 screwdriver, remove the screws from the slide rails on the drive carrier.
NOTE: If the hard drive or SSD carrier has Torx screw, use Torx 6 (for 2.5-inch drive) or Torx 8 (for 3.5-inch drive) screwdriver to remove the drive.



2. Lift the drive out of the drive carrier.



Figure 42. Removing the drive from the drive carrier

Next steps

Install the drive into the drive carrier.

Installing a drive into the drive carrier

Prerequisites

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

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

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

Steps

1. Insert the drive into the drive carrier with the connector end of the drive towards the back of the carrier.
2. Align the screw holes on the drive with the screws holes on the drive carrier.
When aligned correctly, the back of the drive is flush with the back of the drive carrier.
3. Using a Phillips #1 screwdriver, secure the drive to the drive carrier with screws.
NOTE: If the hard drive or SSD carrier has Torx screw, use Torx 6 (for 2.5-inch drive) or Torx 8 (for 3.5-inch drive) screwdriver to install the drive.



Figure 43. Installing a drive into the drive carrier

Drive backplane

Drive backplane connectors

Depending on the configuration, your system supports the following backplanes:

Table 19. Supported drive backplane options for the PowerEdge R940 system

Backplane	Description
8 x 2.5 inch drive backplane	Up to eight 2.5 inch (SAS, SATA or Nearline SAS) front accessible drives in slots 0 through 7
24 x 2.5 inch drive backplane	Up to twenty four 2.5 inch (SAS, SATA or Nearline SAS) front accessible drives in slots 0 through 23
24 x 2.5 inch drive backplane	Up to twenty SAS + 4 NVMe SAS/SATA drives in slots 0 to 19 + slots 20 to 23
24 x 2.5 inch drive backplane	Up to sixteen SAS + 8 NVMe SAS/SATA drives in slots 0 to 15 + slots 16 to 23

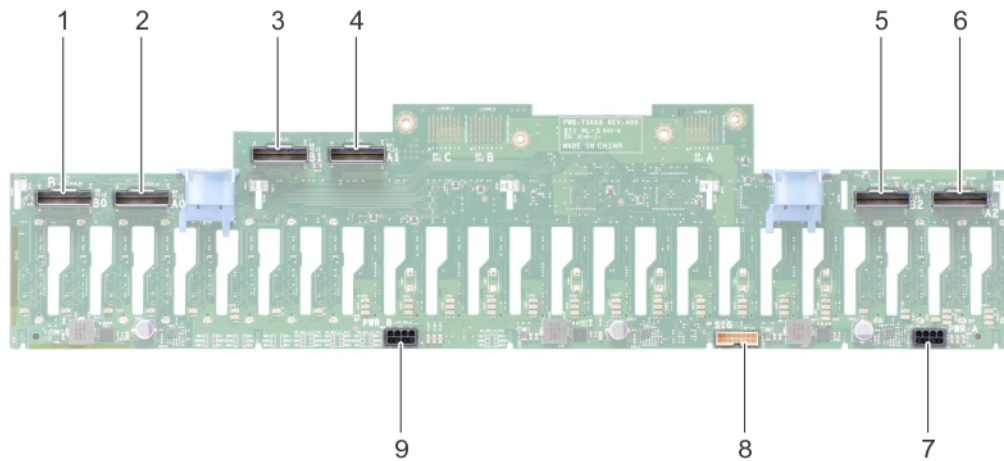


Figure 44. Connectors on the 24 x 2.5 inch drive backplane

- | | |
|--------------------------------|--------------------------------|
| 1. PCIe connector (BP PCIE B0) | 2. PCIe connector (BP PCIE A0) |
| 3. PCIe connector (BP PCIE B1) | 4. PCIe connector (BP PCIE A1) |
| 5. PCIe connector (BP PCIE B2) | 6. PCIe connector (BP PCIE A2) |
| 7. power connector (BP PWR_A) | 8. signal connector (BP SIG) |
| 9. power connector (BP PWR_B) | |

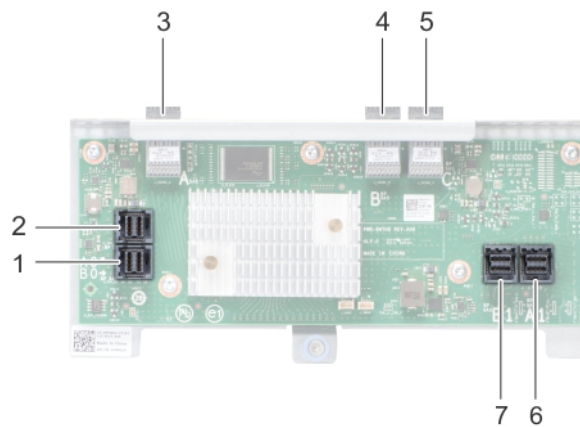


Figure 45. Connectors on the expander board

- | | |
|------------------------------|------------------------------|
| 1. SAS connector (BP SAS B0) | 2. SAS connector (BP SAS A0) |
| 3. SAS connector (BP SAS A) | 4. SAS connector (BP SAS B) |
| 5. SAS connector (BP SAS C) | 6. SAS connector (BP SAS A1) |
| 7. SAS connector (BP SAS B1) | |

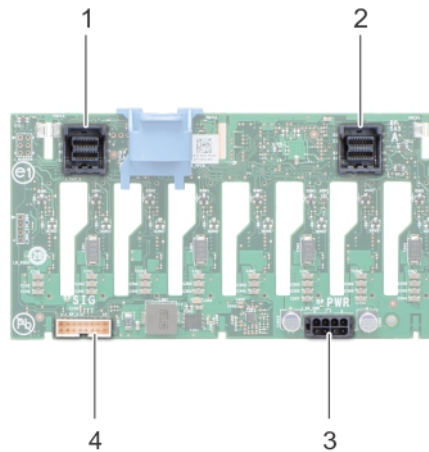


Figure 46. Connectors on the 8 x 2.5 inch drive backplane

- | | |
|-----------------------------|------------------------------|
| 1. SAS connector (BP SAS B) | 2. SAS connector (BP SAS A) |
| 3. power connector (BP PWR) | 4. signal connector (BP SIG) |

Removing drive backplane

Prerequisites

- CAUTION:** To prevent damage to the drives and backplane, remove the hard drives from the system before removing the backplane.
- CAUTION:** Note the number of each hard drive and temporarily label them before you remove the hard drive so that you can replace them in the same location.

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
3. If installed, [remove the front bezel](#).
4. [Remove the drives](#).
5. [Remove the fan cage](#).

Steps

1. To remove the 2.5-inch (x24) drive backplane:
 - a. Disconnect all the cables connected to the drive backplane and expander board.
 - NOTE:** To disconnect the NVMe cables, ensure that you remove the NVMe cables routed through the side of the system by lowering the fan tray side wall.
 - b. Loosen the retention screw that secures the expander board to the system.
 - c. Press the blue release tabs on the drive backplane.
 - d. Tilt the backplane to disengage the guides on the system from the slots on the backplane.
 - e. Lift the backplane out of the system.

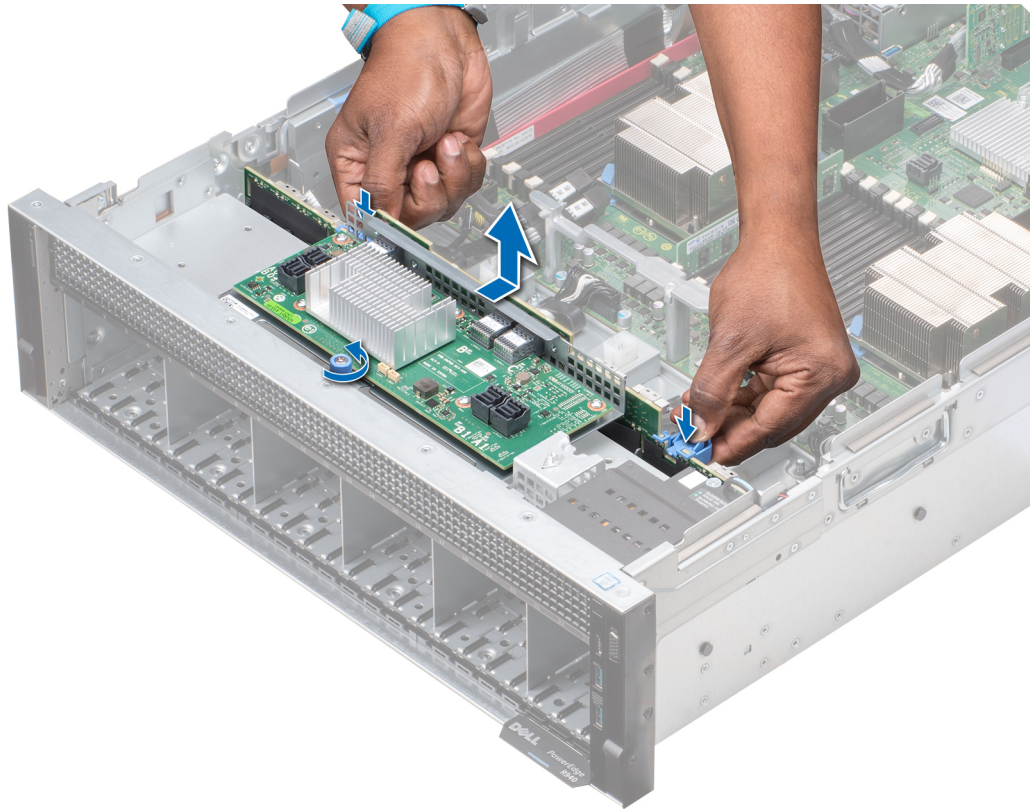


Figure 47. Removing the 2.5-inch (x24) drive backplane

2. To remove the 2.5-inch (x8) drive backplane:
 - a. Disconnect all the cables connected to the drive backplane.
 - b. Press the release tab on the drive backplane.
 - c. Lift the backplane away from the system until the hooks on the system disengage from the slots on the backplane.

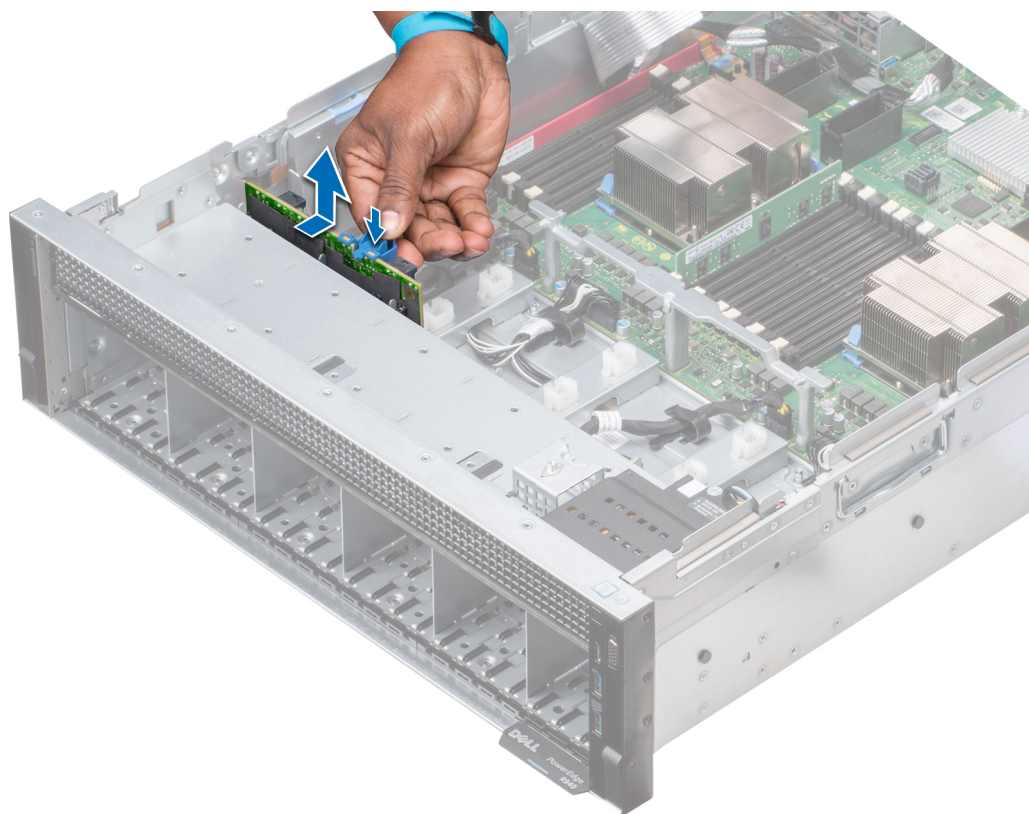


Figure 48. Removing the 2.5-inch (x8) drive backplane

Next steps

Install the drive backplane.

Installing drive backplane

Prerequisites

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

Steps

1. To install the 2.5-inch (x24) drive backplane:
 - a. Holding the release latches, align the hooks on the system with the slots on the drive backplane.
 - b. Lower the backplane into the system until the hooks on the system engage with the slots on the backplane.
 - c. Push the expander board bracket until the release latches on the backplane click into place.
 - d. Tighten the retention screw to secure the expander board to the system.

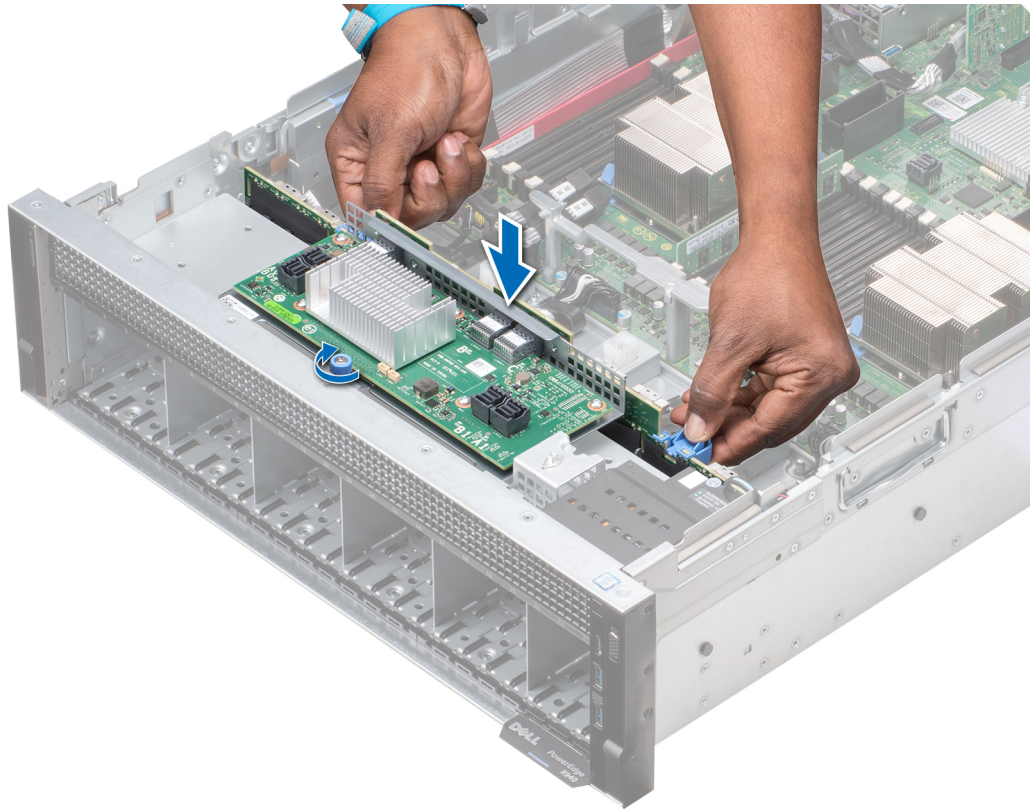


Figure 49. Installing the 2.5-inch (x24) drive backplane

2. To install the 2.5-inch (x8) drive backplane:
 - a. Align the hooks on the system with the slots on the drive backplane.
 - b. Lower the backplane into the system until the hooks on the system engage with the slots on the backplane.

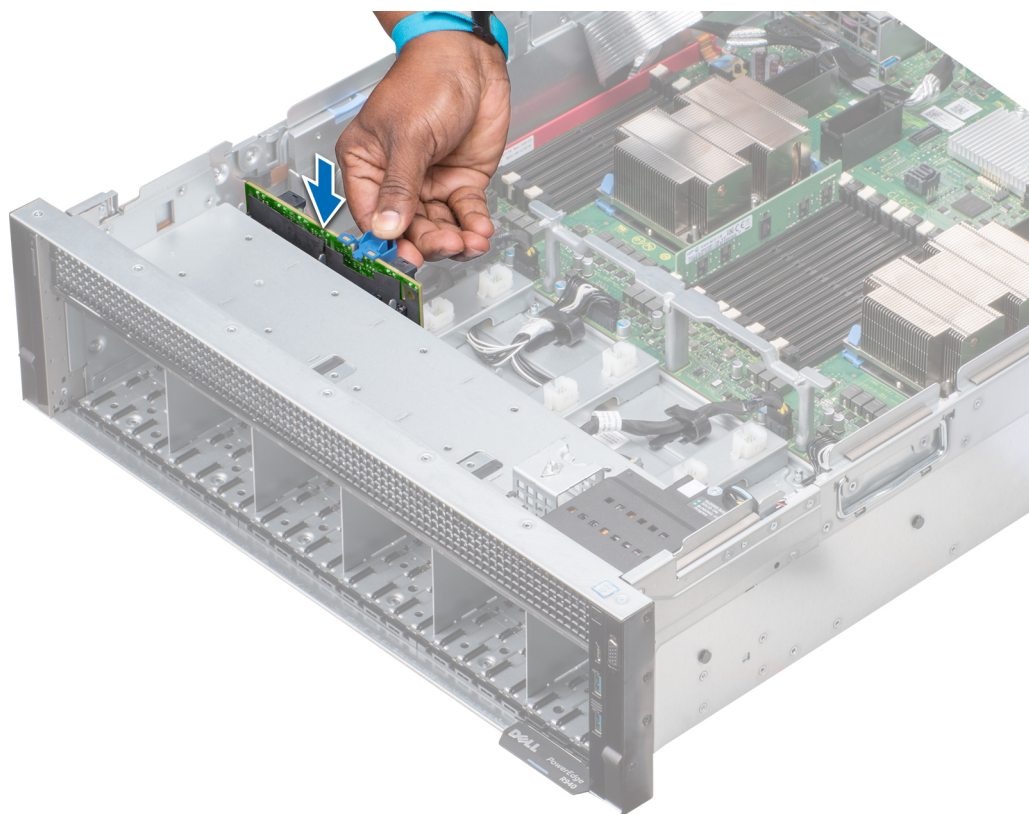


Figure 50. Installing the 2.5-inch (x8) drive backplane

Next steps

1. Connect all the cables to the drive backplane.
2. [Install the fan cage.](#)
3. [Install the drives.](#)
4. If removed, [install the front bezel.](#)
5. Follow the procedure listed in [After working inside your system.](#)

Cable routing

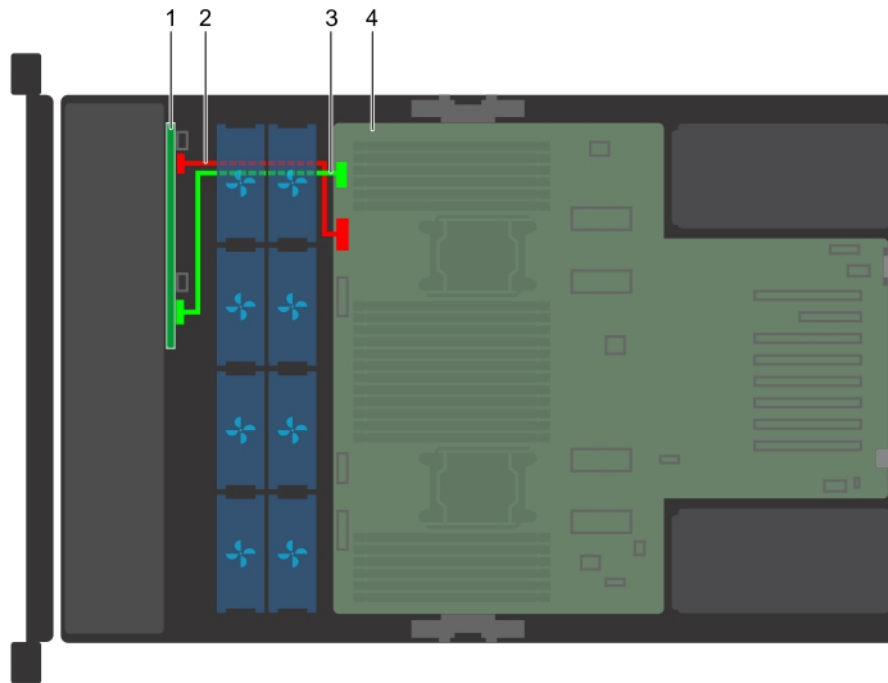


Figure 51. Cable routing – 8 x 2.5 inch hard drive backplane

- | | |
|--|---|
| 1. 8 x 2.5 inch hard drive backplane | 2. backplane power cable (BP: BP PWR to MB) |
| 3. backplane signal cable (BP: BP SIG to MB) | 4. system board |

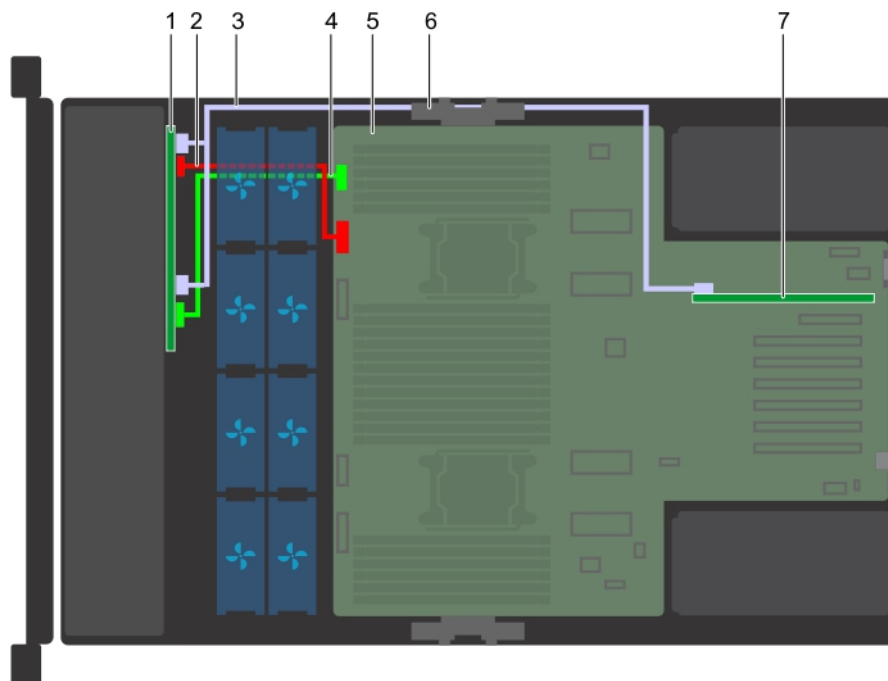


Figure 52. Cable routing – 8 x 2.5 inch hard drive backplane with PERC

- | | |
|--|--|
| 1. 8 x 2.5 inch hard drive backplane | 2. backplane power cable (BP: BP PWR to MB) |
| 3. SAS cable (BP: BP SAS B, BP SAS A to RAID controller) | 4. backplane signal cable (BP: BP SIG to MB) |
| 5. system board | 6. cable management bracket |

7. storage controller card (slot 1)

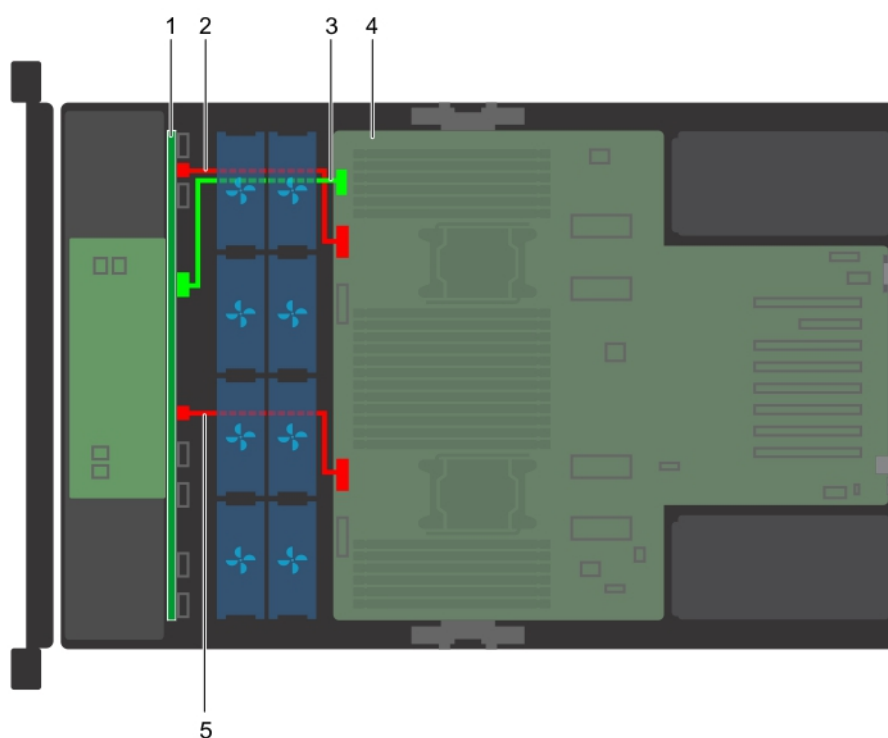


Figure 53. Cable routing – 24 x 2.5 inch hard drive backplane

- | | |
|---|---|
| 1. 24 x 2.5 inch hard drive backplane with expander board | 2. backplane power cable A (BP: BP PWR_A to MB) |
| 3. backplane signal cable (BP: BP SIG to MB) | 4. system board |
| 5. backplane power cable B (BP: BP PWR_B to MB) | |

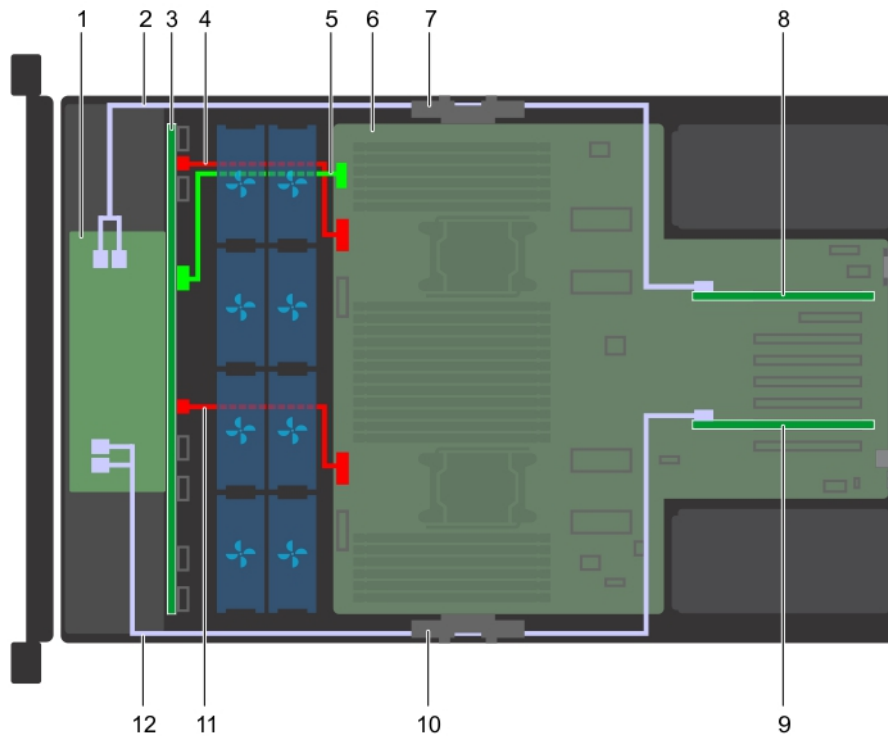


Figure 54. Cable routing – 24 x 2.5 inch hard drive backplane with PERC

- | | |
|--|---|
| 1. expander board | 2. SAS cable (BP: BP SAS A1, BP SAS B1 to RAID controller) |
| 3. 24 x 2.5 inch hard drive backplane | 4. backplane power cable A (BP: BP PWR_A to MB) |
| 5. backplane signal cable (BP: BP SIG to MB) | 6. system board |
| 7. cable management bracket (left) | 8. storage controller card (slot 1) |
| 9. storage controller card (slot 6) | 10. cable management bracket (right) |
| 11. backplane power cable B (BP: BP PWR_B to MB) | 12. SAS cable (BP: BP SAS A0, BP SAS B0 to RAID controller) |

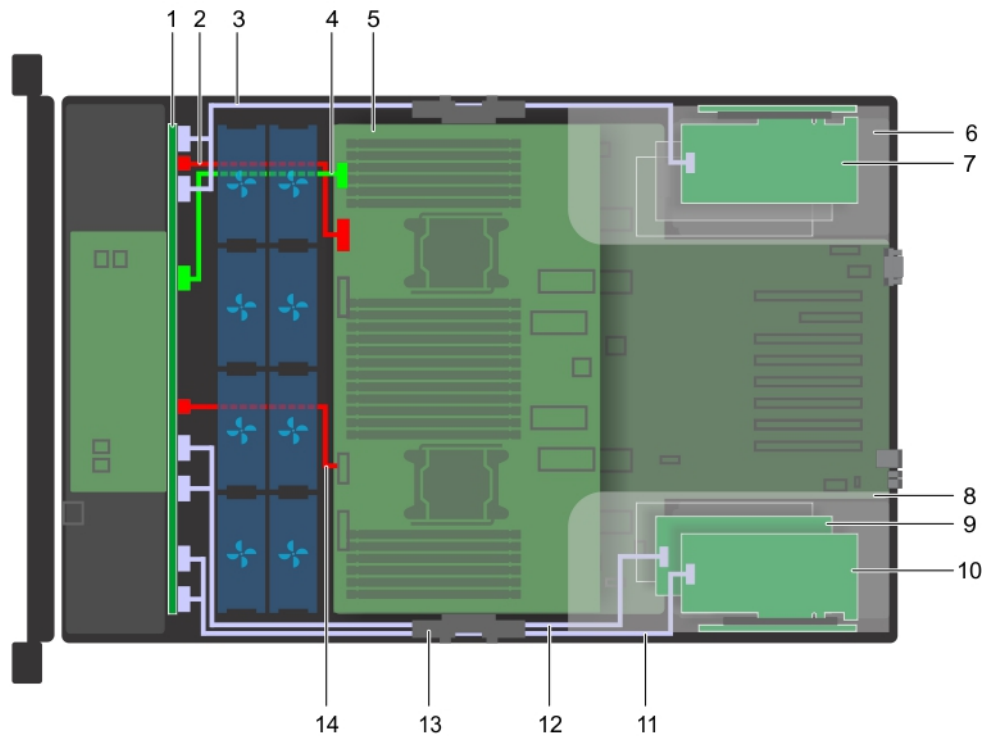


Figure 55. Cable routing – 24 x 2.5 inch hard drive backplane with NVMe cards

- | | |
|--|--|
| 1. 24 x 2.5 inch hard drive backplane with expander board | 2. backplane power cable A (BP: BP PWR_A to MB) |
| 3. PCIe cable (BP: BP PCIE B2, BP PCIE A2 to RAID controller) | 4. backplane signal cable (BP: BP SIG to MB) |
| 5. system board | 6. expansion card riser (left) |
| 7. NVMe card (slot 8) | 8. expansion card riser (right) |
| 9. NVMe card (slot 12) | 10. NVMe card (slot 11) |
| 11. PCIe cable (BP: BP PCIE B0, BP PCIE A0 to RAID controller) | 12. PCIe cable (BP: BP PCIE B1, BP PCIE A1 to RAID controller) |
| 13. cable management bracket (right) | 14. backplane power cable B (BP: BP PWR_B to MB) |

System memory

System memory guidelines

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

The PowerEdge R940 system (without PEM) contains 24 memory sockets split into two sets of 12 sockets, one set per processor. Each 12-socket set is organized into six channels. Six memory channels are allocated to each processor. In each channel, the release tabs of the first socket are marked white, and the second socket black.

The PowerEdge R940 system (with PEM) contains 48 memory sockets split into four sets of 12 sockets, one set per processor. Each 12-socket set is organized into six channels. Six memory channels are allocated to each processor. In each channel, the release tabs of the first socket are marked white, and the second socket black.

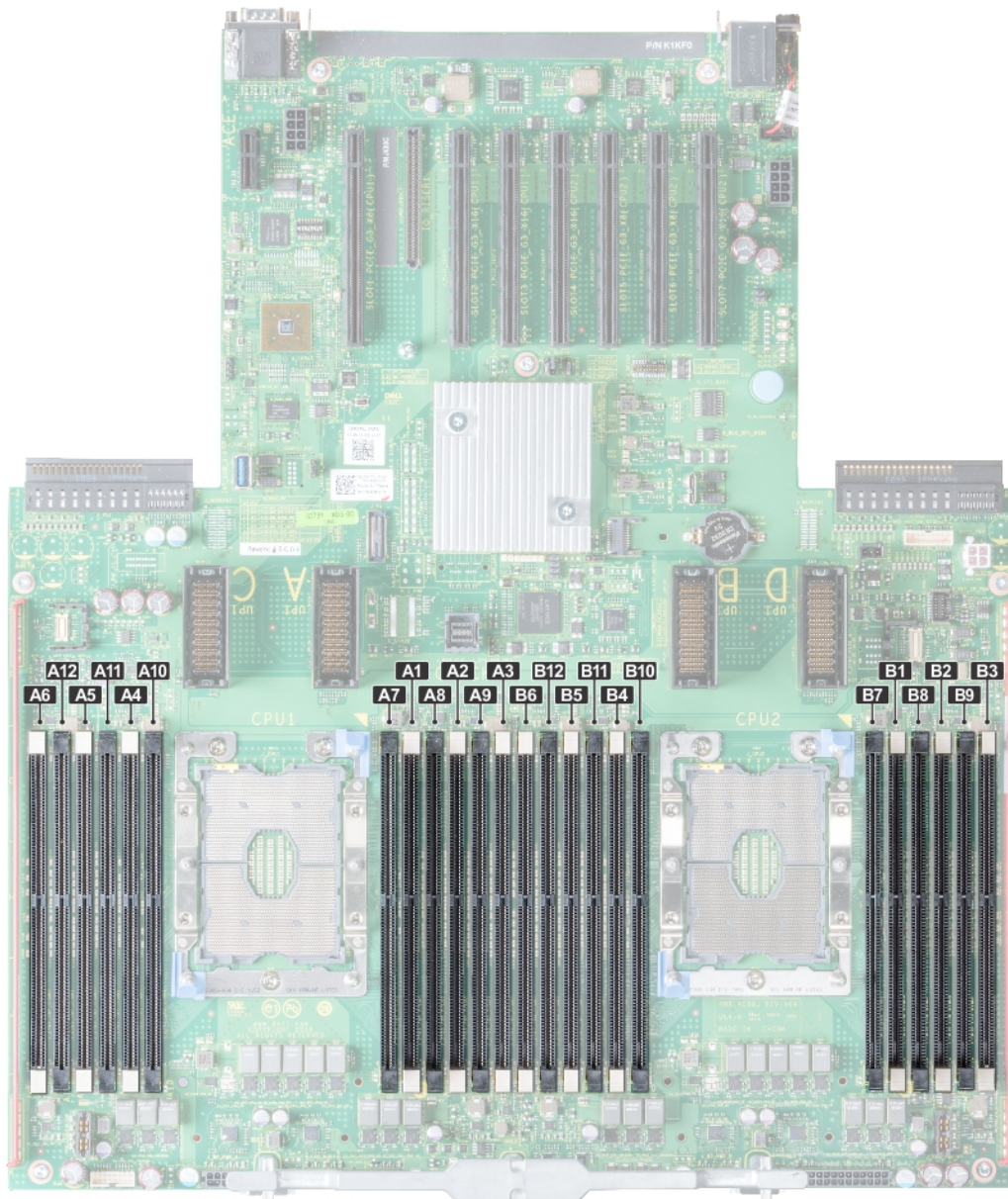


Figure 56. Memory socket location

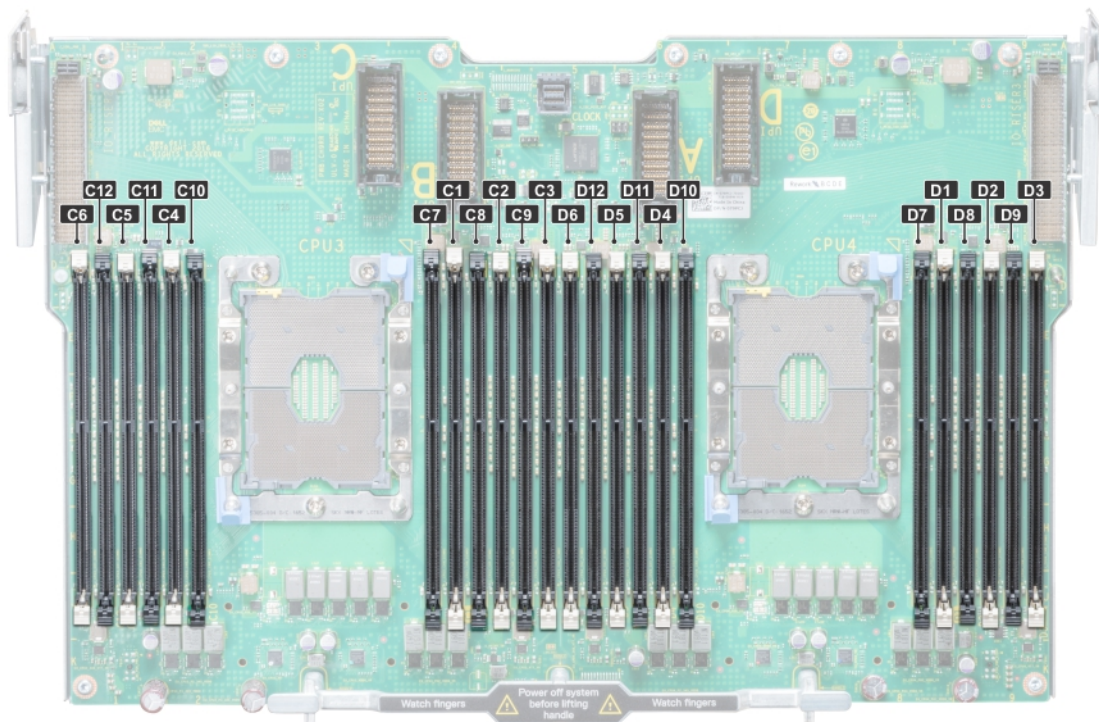


Figure 57. Memory socket location on the processor expansion module

Memory channels are organized as follows:

Table 20. Memory channels

Processor	Channel 0	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5
Processor 1	Slots A1 and A7	Slots A2 and A8	Slots A3 and A9	Slots A4 and A10	Slots A5 and A11	Slots A6 and A12
Processor 2	Slots B1 and B7	Slots B2 and B8	Slots B3 and B9	Slots B4 and B10	Slots B5 and B11	Slots B6 and B12
Processor 3	Slots C1 and C7	Slots C2 and C8	Slots C3 and C9	Slots C4 and C10	Slots C5 and C11	Slots C6 and C12
Processor 4	Slots D1 and D7	Slots D2 and D8	Slots D3 and D9	Slots D4 and D10	Slots D5 and D11	Slots D6 and D12

General memory module installation guidelines

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 frequencies 2933 MT/s, 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. For memory frequency of 2933 MT/s, one DIMM per channel is supported.
- 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.
 - RDIMMs and LRDIMMs must not be mixed.
 - NVDIMMs and LRDIMMs must not be mixed.
 - NVDIMMs and RDIMMs can be mixed.
 - 64 GB LRDIMMs that are DDP (Dual Die Package) LRDIMMs must not be mixed with 128 GB LRDIMMs that are TSV (Through Silicon Via/3DS) LRDIMMs.
 - x4 and x8 DRAM based memory modules can be mixed.
 - Up to two RDIMMs can be populated per channel regardless of rank count.
 - Up to two LRDIMMs can be populated per channel regardless of rank count.
 - 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 A12 are available.
 - For dual-processor systems, sockets A1 to A12 and sockets B1 to B12 are available.
 - 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.
 - i NOTE:** 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.
 - i NOTE:** For example, 8 GB and 16 GB memory modules can be mixed.
 - In a dual-processor configuration, the memory configuration for each processor must be identical.
 - i NOTE:** For example, if you populate socket A1 for processor 1, then populate socket B1 for processor 2, and so on.
 - Mixing of more than two memory module capacities in one 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.
 - Populate six identical memory modules per processor (one DIMM per channel) at a time to maximize performance.
- DIMM population update for Performance Optimized mode with quantity of 4 and 8 DIMMs per processor.
- When the DIMM quantity is 4 per processor, the population is slot 1, 2, 4, 5.
 - When the DIMM quantity is 8 per processor, the population is slot 1, 2, 4, 5, 7, 8, 10, 11.

NVDIMM-N memory module installation guidelines

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

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

i NOTE: NVDIMM-N memory slots are not hot-pluggable.

For more information about the supported NVDIMM-N configurations, see the *NVDIMM-N User Guide* at www.dell.com/poweredgemanuals.

Table 21. Supported NVDIMM-N for dual processor configurations

Configuration	Description	Memory population rules	
		RDIMMs	NVDIMM-N
Configuration 1	12x 16 GB RDIMMs, 1x NVDIMM-N	Processor1 {A1, 2, 3, 4, 5, 6} Processor2 {B1, 2, 3, 4, 5, 6}	Processor1 {A7}
Configuration 2	12x 32 GB RDIMMs, 1x NVDIMM-N	Same for all 12x RDIMM configurations. See Configuration 1.	Processor1 {A7}
Configuration 3	23x 32 GB RDIMMs, 1x NVDIMM-N	Processor1 {A1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12} Processor2 {B1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11}	Processor2 {B12}
Configuration 4	12x 16 GB RDIMMs, 2x NVDIMM-Ns	Same for all 12x RDIMM configurations. See Configuration 1.	Processor1 {A7} Processor2 {B7}
Configuration 5	12x 32 GB RDIMMs, 2x NVDIMM-Ns	Same for all 12x RDIMM configurations. See Configuration 1.	Processor1 {A7} Processor2 {B7}
Configuration 6	22x 32 GB RDIMMs, 2x NVDIMM-Ns	Processor1 {A1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11} Processor2 {B1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11}	Processor1 {A12} Processor2 {B12}
Configuration 7	12x 16 GB RDIMMs, 4x NVDIMM-Ns	Same for all 12x RDIMM configurations. See Configuration 1.	Processor1 {A7, A8} Processor2 {B7, B8}
Configuration 8	22x 32 GB RDIMMs, 4x NVDIMM-Ns	Same for all 12x RDIMM configurations. See Configuration 1.	Processor1 {A7, A8} Processor2 {B7, B8}
Configuration 9	20x 32 GB RDIMMs, 4x NVDIMM-Ns	Processor1 {A1, 2, 3, 4, 5, 6, 7, 8, 9, 10} Processor2 {B1, 2, 3, 4, 5, 6, 7, 8, 9, 10}	Processor1 {A11, 12} Processor2 {B11, 12}
Configuration 10	12x 16 GB RDIMMs, 6x NVDIMM-Ns	Same for all 12x RDIMM configurations. See Configuration 1.	Processor1 {A7, 8, 9} Processor2 {B7, 8, 9}
Configuration 11	12x 32 GB RDIMMs, 6x NVDIMM-Ns	Same for all 12x RDIMM configurations. See Configuration 1.	Processor1 {A7, 8, 9} Processor2 {B7, 8, 9}
Configuration 12	18x 32 GB RDIMMs, 6x NVDIMM-Ns	Processor1 {1, 2, 3, 4, 5, 6, 7, 8, 9} Processor2 {1, 2, 3, 4, 5, 6, 7, 8, 9}	Processor1 {A10, 11, 12} Processor2 {B10, 11, 12}
Configuration 13	12x 16 GB RDIMMs, 12x NVDIMM-Ns	Same for all 12x RDIMM configurations. See Configuration 1.	Processor1 {A7, 8, 9, 10, 11, 12} Processor2 {B7, 8, 9, 10, 11, 12}

Table 21. Supported NVDIMM-N for dual processor configurations (continued)

Configuration	Description	Memory population rules	
		RDIMMs	NVDIMM-N
Configuration 14	12x 32 GB RDIMMs, 12x NVDIMM-Ns	Same for all 12x RDIMM configurations. See Configuration 1.	Processor1 {A7, 8, 9, 10, 11, 12} Processor2 {B7, 8, 9, 10, 11, 12}

Table 22. Supported NVDIMM-N for quad processor configurations

Configuration	Description	Memory population rules	
		RDIMMs	NVDIMM-N
Configuration 1	24x 16 GB RDIMMs, 1x NVDIMM-N	Processor1 {A1, 2, 3, 4, 5, 6}, Processor2 {B1, 2, 3, 4, 5, 6}, Processor3 {C1, 2, 3, 4, 5, 6} Processor4 {D1, 2, 3, 4, 5, 6}	Processor1 {A7}
Configuration 2	24x 32 GB RDIMMs, 1x NVDIMM-N	Same for all 24x RDIMM configurations. See Configuration 1.	Processor1 {A7}
Configuration 3	47x 32 GB RDIMMs, 1x NVDIMM-N	Processor1 {A1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12} , Processor2 {B1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11} , Processor3 {C1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12} Processor 4 {D1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12}	Processor2 {B12}
Configuration 4	24x 16 GB RDIMMs, 2x NVDIMM-Ns	Processor1 {A1, 2, 3, 4, 5, 6}, Processor2 {B1, 2, 3, 4, 5, 6} Processor3 {C1, 2, 3, 4, 5, 6} Processor4 {D1, 2, 3, 4, 5, 6}	Processor1 {A7}, Processor2 {B7}
Configuration 5	24x 32 GB RDIMMs, 2x NVDIMM-Ns	Processor1 {A1, 2, 3, 4, 5, 6}, Processor2 {B1, 2, 3, 4, 5, 6}, Processor3 {C1, 2, 3, 4, 5, 6} Processor4 {D1, 2, 3, 4, 5, 6}	Processor1 {A7}, Processor2 {B7}
Configuration 6	46x 32 GB RDIMMs, 2x NVDIMM-Ns	Processor1 {A1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11}, Processor2 {B1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11} , Processor3 {C1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12} Processor 4 {D1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12}	Processor1 {A12}, Processor2 {B12}
Configuration 7	24x 16 GB RDIMMs, 4x NVDIMM-Ns	Processor1 {A1, 2, 3, 4, 5, 6}, Processor2 {B1, 2, 3, 4, 5, 6}, Processor3 {C1, 2, 3, 4, 5, 6} Processor4 {D1, 2, 3, 4, 5, 6}	Processor1 {A7,8}, Processor2 {B7,8}
Configuration 8	24x 32 GB RDIMMs, 4x NVDIMMs	Processor1 {A1, 2, 3, 4, 5, 6}, Processor2 {B1, 2, 3, 4, 5, 6},	Processor1 {A7,8}, Processor2 {B7,8}


Table 22. Supported NVDIMM-N for quad processor configurations (continued)

Configuration	Description	Memory population rules	
		RDIMMs	NVDIMM-N
		Processor3 {C1, 2, 3, 4, 5, 6} Processor4 {D1, 2, 3, 4, 5, 6}	
Configuration 9	44x 32 GB RDIMMs, 4x NVDIMM-Ns	Processor1 {A1, 2, 3, 4, 5, 6, 7, 8, 9, 10}, Processor2 {B1, 2, 3, 4, 5, 6, 7, 8, 9, 10}, Processor3 {C1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12} Processor4 {D1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12}	Processor1 {A11, 12}, Processor2 {B11, 12}
Configuration 10	24x 16 GB RDIMMs, 6x NVDIMM-Ns	Processor1 {A1, 2, 3, 4, 5, 6}, Processor2 {B1, 2, 3, 4, 5, 6} Processor3 {C1, 2, 3, 4, 5, 6} Processor4 {D1, 2, 3, 4, 5, 6}	Processor1 {A7, 8, 9} Processor2 {B7, 8, 9}
Configuration 11	24x 32 GB RDIMMs, 6x NVDIMM-Ns	Processor1 {A1, 2, 3, 4, 5, 6}, Processor2 {B1, 2, 3, 4, 5, 6}, Processor3 {C1, 2, 3, 4, 5, 6} Processor4 {D1, 2, 3, 4, 5, 6}	Processor1 {A7, 8, 9} Processor2 {B7, 8, 9}
Configuration 12	42x 32 GB RDIMMs, 6x NVDIMM-Ns	Processor1 {A1, 2, 3, 4, 5, 6, 7, 8, 9}, Processor2 {B1, 2, 3, 4, 5, 6, 7, 8, 9} Processor3 {C1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12} Processor4 {D1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12}	Processor1 {A10,11,12} Processor2 {B10, 11, 12}
Configuration 13	24x 16 GB RDIMMs, 12x NVDIMM-Ns	Processor1 {A1, 2, 3, 4, 5, 6}, Processor2 {B1, 2, 3, 4, 5, 6}, Processor3 {C1, 2, 3, 4, 5, 6} Processor4 {D1, 2, 3, 4, 5, 6}	Processor1 {A7, 8, 9, 10, 11, 12}, Processor2 {B7, 8, 9, 10, 11, 12}
Configuration 14	24x 32 GB RDIMMs, 12x NVDIMM-Ns	Processor1 {A1, 2, 3, 4, 5, 6}, Processor2 {B1, 2, 3, 4, 5, 6}, Processor3 {C1, 2, 3, 4, 5, 6} Processor4 {D1, 2, 3, 4, 5, 6}	Processor1 {A7, 8, 9, 10, 11, 12}, Processor2 {B7, 8, 9, 10, 11, 12}
Configuration 15	36x 32 GB RDIMMs, 12x NVDIMM-Ns	Processor1 {A1, 2, 3, 4, 5, 6}, Processor2 {B1, 2, 3, 4, 5, 6}, Processor3 {C1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12} Processor 4 {D1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12}	Processor1 {A7, 8, 9, 10, 11, 12}, Processor2 {B7, 8, 9, 10, 11, 12}

PMem installation guidelines

The following are the recommended guidelines for installing data center persistent memory module (PMem) memory modules:

- Each system supports maximum of one PMem memory module per channel.

 **NOTE:** If two different PMem capacities are mixed, an F1/F2 warning is displayed as the configuration is not supported.

- PMem can be mixed with RDIMM, LRDIMM, and 3DS LRDIMM.
- Mixing of DDR4 DIMM types (RDIMM, LRDIMM, and 3DS LRDIMM), within channels, for Integrated Memory Controller (iMC), or across sockets are not supported.
- Mixing of PMem operating modes (App Direct, Memory Mode) is not supported.
- If only one DIMM is populated on a channel, it should always go to the first slot in that channel (white slot).
- If a PMem and a DDR4 DIMM are populated on the same channel, always plug PMem on second slot (black slot).
- If the PMem is configured in Memory Mode, the recommended DDR4 to PMem capacity ratio is 1:4 to 1:16 per iMC.
- PMems' cannot be mixed with other PMems capacities or NVDIMMs.
- Mixing different capacities of RDIMMs and LRDIMMs are not allowed when PMem is installed.
- PMems of different capacities are not allowed.

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

Table 23. 2 socket PMem configurations

No. of CPUs in the Server	PMem Population	DRAM Population	DRAM Capacity (GB)	PMem Capacity (GB)	Operating system Memory in Memory Mode (GB)	Total Memory (GB)	Total Memory per CPU (GB)	Ratio DRAM to Optane Memory	Requires an M or L CPU	Supported in App Direct Mode	Supported in Memory Mode
2	128 GB x 1	16 GB x 12	192	128	N/A	320	160	1 : 0.7	No	Yes	No
2	128 GB x 2	16 GB x 12	192	256	N/A	448	224	1 : 1.3	No	Yes	No
2	128 GB x 4	16 GB x 8	128	512	512	640	320	1 : 4	No	Yes	Yes
2	128 GB x 4	16 GB x 12	192	512	N/A	704	352	1 : 2.7	No	Yes	No
2	128 GB x 8	16 GB x 12	192	1,024	1,024	1,216	608	1 : 5.3	No	Yes	Yes
2	128 GB x 12	16 GB x 12	192	1,536	1,536	1,728	864	1 : 8	No	Yes	Yes
2	128 GB x 1	32 GB x 12	384	128	N/A	512	256	1 : 0.3	No	Yes	No
2	128 GB x 2	32 GB x 12	384	256	N/A	640	320	1 : 0.7	No	Yes	No
2	128 GB x 4	32 GB x 12	384	512	N/A	896	448	1 : 1.3	No	Yes	No
2	128 GB x 8	32 GB x 12	384	1,024	N/A	1,408	704	1 : 2.7	No	Yes	No
2	128 GB x 12	32 GB x 12	384	1,536	1,536	1,920	960	1 : 4	No	Yes	Yes
2	128 GB x 4	64 GB x 12	768	512	N/A	1,280	640	1 : 0.7	No	Yes	No
2	128 GB x 8	64 GB x 12	768	1,024	N/A	1,792	896	1 : 1.3	No	Yes	No
2	128 GB x 12	64 GB x 12	768	1,536	N/A	2,304	1,152	1 : 2	L SKU	Yes	No
2	128 GB x 12	128 GB x 12	1,536	1,536	N/A	3,072	1,536	1 : 1	L SKU	Yes	No
2	512 GB x 8	32 GB x 12	384	4,096	4,096	4,480	2,240	1 : 10.7	L SKU	Yes	Yes

Table 23. 2 socket PMem configurations (continued)


No. of CPUs in the Server	PMem Population	DRAM Population	DRAM Capacity (GB)	PMem Capacity (GB)	Operating system Memory in Memory Mode (GB)	Total Memory (GB)	Total Memory per CPU (GB)	Ratio DRAM to Optane Memory	Requires an M or L CPU	Supported in App Direct Mode	Supported in Memory Mode
2	512 GB x 12	32 GB x 12	384	6,144	6,144	6,528	3,264	1 : 16	L SKU	Yes	Yes
2	512 GB x 8	64 GB x 12	768	4,096	4,096	4,864	2,432	1 : 5.3	L SKU	Yes	Yes
2	512 GB x 12	64 GB x 12	768	6,144	6,144	6,912	3,456	1 : 8	L SKU	Yes	Yes
2	512 GB x 12	128 GB x 12	1,536	6,144	6,144	7,680	3,840	1 : 4	L SKU	Yes	Yes
2	256 GB x 8	16 GB x 12	192	2,048	2,048	2,240	1,120	1 : 10.7	L SKU	Yes	Yes
2	256 GB x 8	32 GB x 12	384	2,048	2,048	2,432	1,216	1 : 5.3	L SKU	Yes	Yes
2	256 GB x 12	32 GB x 12	384	3,072	3,072	3,456	1,728	1 : 8	L SKU	Yes	Yes
2	256 GB x 8	64 GB x 12	768	2,048	N/A	2,816	1,408	1 : 2.7	L SKU	Yes	No
2	256 GB x 12	64 GB x 12	768	3,072	3,072	3,840	1,920	1 : 4	L SKU	Yes	Yes
2	256 GB x 12	128 GB x 12	1,536	3,072	N/A	4,608	2,304	1 : 2	L SKU	Yes	No


Table 24. 4 socket PMem configurations

No. of CPUs in the Server	PMem Population	DRAM Population	DRAM Capacity (GB)	PMem Capacity (GB)	Operating system Memory in Memory Mode (GB)	Total Memory (GB)	Total Memory per CPU (GB)	Ratio DRAM to Optane Memory	Requires an M or L CPU	Supported in App Direct Mode	Supported in Memory Mode
4	128 GB x 16	16 GB x 24	384	2,048	2,048	2,432	608	1 : 5.3	No	Yes	Yes
4	128 GB x 24	16 GB x 24	384	3,072	3,072	3,456	864	1 : 8	No	Yes	Yes
4	128 GB x 16	32 GB x 24	768	2,048	N/A	2,816	704	1 : 2.7	No	Yes	No
4	128 GB x 24	32 GB x 24	768	3,072	3,072	3,840	960	1 : 4	No	Yes	Yes
4	128 GB x 24	64 GB x 24	1,536	3,072	N/A	4,608	1,152	1 : 2	L SKU	Yes	No
4	128 GB x 24	128 GB x 24	3,072	3,072	N/A	6,144	1,536	1 : 1	L SKU	Yes	No
4	512 GB x 16	32 GB x 24	768	8,192	8,192	8,960	2,240	1 : 10.7	L SKU	Yes	Yes

Table 24. 4 socket PMem configurations (continued)

No. of CPUs in the Server	PMem Population	DRAM Population	DRAM Capacity (GB)	PMem Capacity (GB)	Operating system Memory in Memory Mode (GB)	Total Memory (GB)	Total Memory per CPU (GB)	Ratio DRAM to Optane Memory	Requires an M or L CPU	Supported in App Direct Mode	Supported in Memory Mode
4	512 GB x 24	32 GB x 24	768	12,288	12,288	13,056	3,264	1 : 16	L SKU	Yes	Yes
4	512 GB x 16	64 GB x 24	1,536	8,192	8,192	9,728	2,432	1 : 5.3	L SKU	Yes	Yes
4	512 GB x 24	64 GB x 24	1,536	12,288	12,288	13,824	3,456	1 : 8	L SKU	Yes	Yes
4	512 GB x 24	128 GB x 24	3,072	12,288	12,288	15,360	3,840	1 : 4	L SKU	Yes	Yes
4	256 GB x 16	16 GB x 24	384	4,096	4,096	4,480	1,120	1 : 10.7	L SKU	Yes	Yes
4	256 GB x 24	16 GB x 24	384	6,144	6,144	6,528	1,632	1 : 16	L SKU	Yes	Yes
4	256 GB x 16	32 GB x 24	768	4,096	4,096	4,864	1,216	1 : 5.3	L SKU	Yes	Yes
4	256 GB x 24	32 GB x 24	768	6,144	6,144	6,912	1,728	1 : 8	L SKU	Yes	Yes
4	256 GB x 16	64 GB x 24	1,536	4,096	N/A	5,632	1,408	1 : 2.7	L SKU	Yes	No
4	256 GB x 24	64 GB x 24	1,536	6,144	6,144	7,680	1,920	1 : 4	L SKU	Yes	Yes
4	256 GB x 24	128 GB x 24	3,072	6,144	N/A	9,216	2,304	1 : 2	L SKU	Yes	No

 **NOTE:** There are limited configurations available for Dual Socket Servers with only one CPU populated.

 **NOTE:** PMem is supported on systems with 1600W and 2400W PSU configuration.

Mode-specific guidelines

The configurations allowed depend on the memory mode selected in the System BIOS.

Table 25. Memory operating modes








Memory Operating Mode	Description
Optimizer Mode	The Optimizer Mode if enabled, the DRAM controllers operate independently in the 64-bit mode and provide optimized memory performance.  NOTE: PMem supports only Optimizer mode.
Mirror Mode	The Mirror Mode if enabled, the system maintains two identical copies of data in memory, and the total available system memory is one half of the total installed physical memory. Half of the installed memory is used to mirror the active memory modules. This feature provides maximum reliability and enables the system to continue running even during a catastrophic memory failure by switching over to the mirrored copy. The installation guidelines to enable Mirror Mode require that the memory modules be identical in size, speed, and technology, and they must be populated in sets of 6 per processor.

Table 25. Memory operating modes (continued)

Memory Operating Mode	Description
Single Rank Spare Mode	Single Rank Spare Mode allocates one rank per channel as a spare. If excessive correctable errors occur in a rank or channel, while the operating system is running, they are moved to the spare area to prevent errors from causing an uncorrectable failure. Requires two or more ranks to be populated in each channel.
Multi Rank Spare Mode	<p>Multi Rank Spare Mode allocates two ranks per channel as a spare. If excessive correctable errors occur in a rank or channel, while the operating system is running, they are moved to the spare area to prevent errors from causing an uncorrectable failure. Requires three or more ranks to be populated in each channel.</p> <p>With single rank memory sparing enabled, the system memory available to the operating system is reduced by one rank per channel.</p> <p>For example, in a dual-processor configuration with 24x 16 GB dual-rank memory modules, the available system memory is: $\frac{3}{4}$ (ranks/channel) \times 24 (memory modules) \times 16 GB = 288 GB, and not 24 (memory modules) \times 16 GB = 384 GB. For multi rank sparing, the multiplier changes to $\frac{1}{2}$ (ranks/channel).</p> <p> NOTE: To use memory sparing, this feature must be enabled in the BIOS menu of System Setup.</p> <p> NOTE: Memory sparing does not offer protection against a multi-bit uncorrectable error.</p>
Dell Fault Resilient Mode	<p>The Dell Fault Resilient Mode if enabled, the BIOS creates an area of memory that is fault resilient. This mode can be used by an OS that supports the feature to load critical applications or enables the OS kernel to maximize system availability.</p> <p> NOTE: This feature is only supported in Gold and Platinum Intel processors.</p> <p> NOTE: Memory configuration has to be of same size DIMM, speed, and rank.</p>

Optimizer Mode


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

- Dual processor: Populate the slots in round robin sequence starting with processor 1.
 **NOTE:** Processor 1 and processor 2 population should match.
- Quad processor: Populate the slots in round robin sequence starting with processor 1.
 **NOTE:** Processor 1, processor 2, processor 3, and processor 4 population should match.

Removing a memory module

The procedure for removing a DIMM module and an NVDIMM-N module is identical.

Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
 **CAUTION:** To prevent data loss and potential damage to your system, ensure that your system, LEDs on system, LEDs on NVDIMM-N and LEDs on NVDIMM-N battery are turned off before removing the NVDIMM-N battery.
3. [Remove the air shroud](#).

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

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

Steps

1. Locate the appropriate memory module socket.

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

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

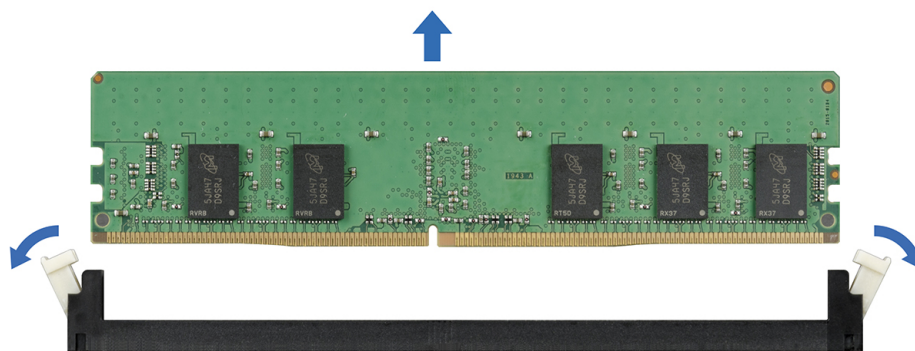


Figure 58. Removing a memory module

Next steps

1. [Install the memory module.](#)
2. 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.

Installing a memory module

The procedure for installing a DIMM module and an NVDIMM-N module is identical.

Prerequisites

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

CAUTION: Ensure that you install the NVDIMM-N battery if you are using NVDIMM-N.

CAUTION: To prevent data loss and potential damage to your system, ensure that your system, LEDs on system, LEDs on NVDIMM-N and LEDs on NVDIMM-N battery are turned off before installing the NVDIMM-N battery.

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

Steps

1. Locate the appropriate memory module socket.

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

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

2. Open the ejectors on the memory module socket outward to allow the memory module to be inserted into the socket.
3. Align the edge connector of the memory module with the alignment key of the memory module socket, and insert the memory module in the socket.

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

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

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

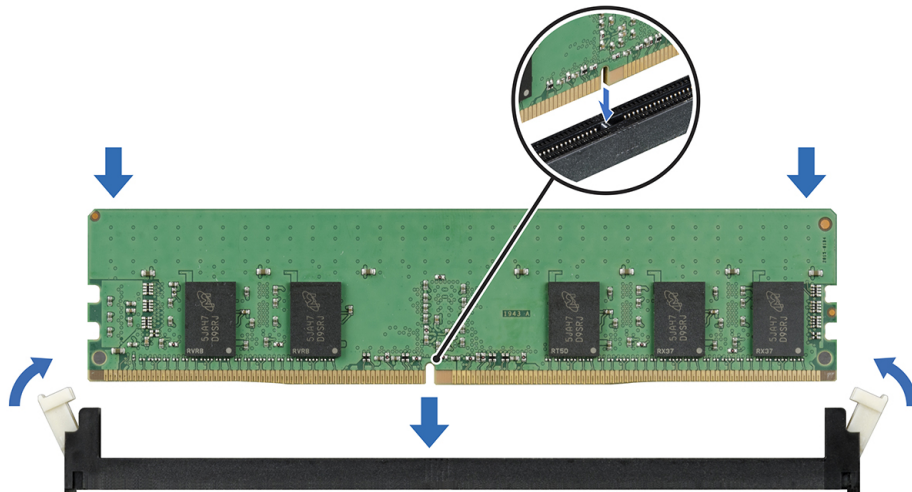


Figure 59. Installing a memory module

Next steps

1. [Install the air shroud.](#)
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.

Processors and heat sinks

Removing a processor and heat sink module

Prerequisites

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

1. Follow the safety guidelines listed in [Safety instructions.](#)
2. Follow the procedure listed in [Before working inside your system.](#)
3. [Remove the air shroud.](#)
4. If installed, [remove the expansion card risers](#) and lift the PEM to the upright position.

NOTE: When using a four processor system, ensure to follow step 3 only if you have to remove the processors installed on the system board.

Steps

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

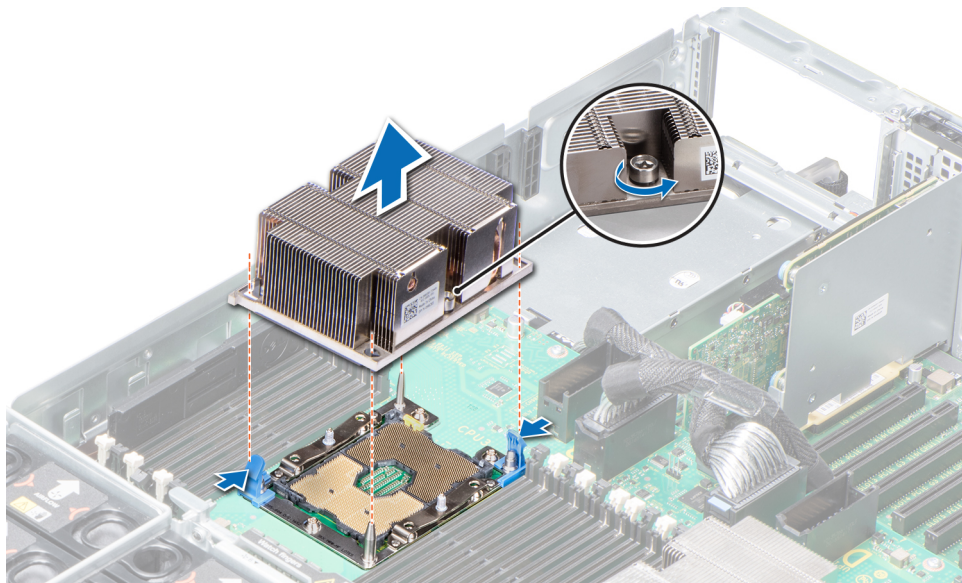


Figure 60. Removing the processor and heat sink module

Next steps

Install the PHM.

Removing the processor from the processor and heat sink module

Prerequisites

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

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

Steps

1. Place the heat sink with the processor side facing up.
2. Insert a flat blade screwdriver into the release slot marked with a yellow label. Twist (do not pry) the screwdriver to break the thermal paste seal.
3. Push the retaining clips on the processor bracket to unlock the bracket from the heat sink.

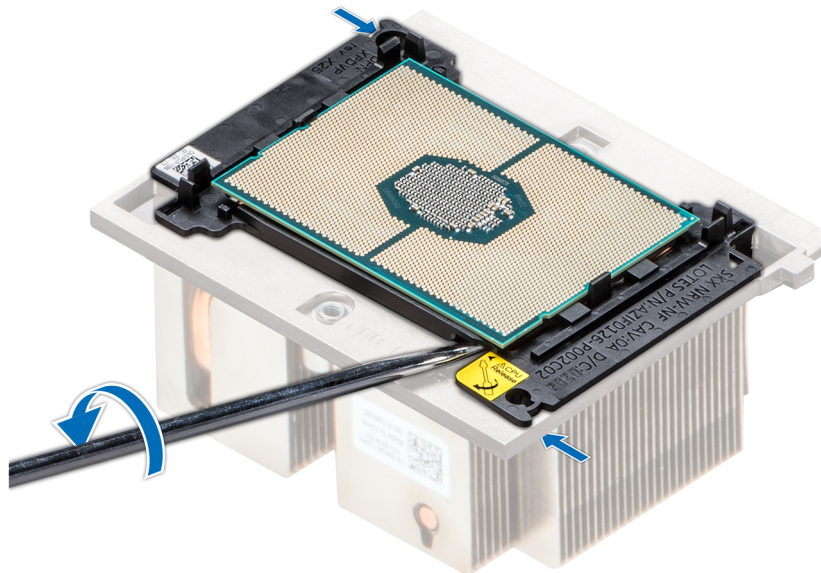


Figure 61. Loosening the processor bracket

4. Lift the bracket and the processor away from the heat sink, and place the processor connector side down on the processor tray.
5. Flex the outer edges of the bracket to release the bracket from the processor.

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

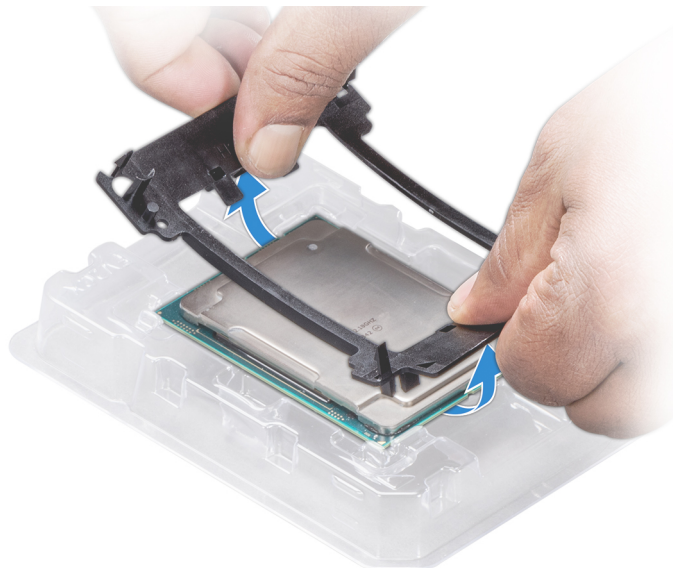


Figure 62. Removing the processor bracket

Next steps

Install the processor into the processor and heat sink module.

Installing the processor into a processor and heat sink module

Prerequisites

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

Steps

1. Place the processor in the processor tray.

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

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

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

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



Figure 63. Installing the processor bracket

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

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

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

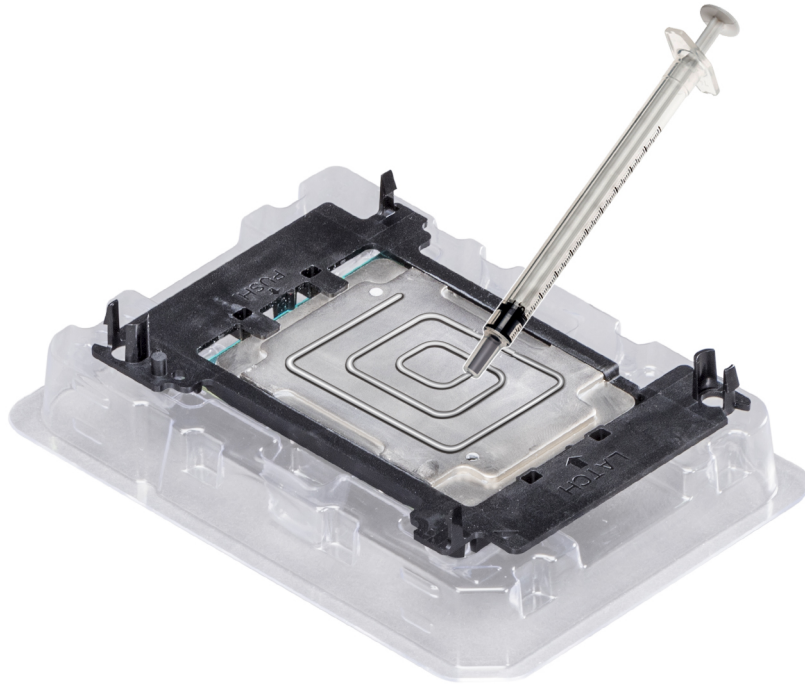


Figure 64. Applying thermal grease on top of the processor

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

i NOTE:

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

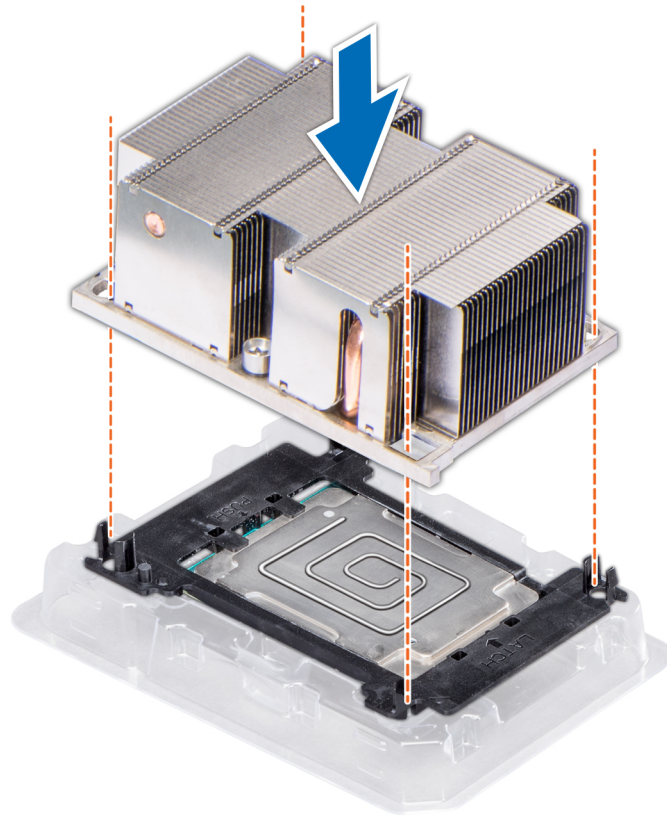


Figure 65. Installing the heat sink onto the processor

Next steps

1. [Install the processor and heat sink module.](#)
2. [Install the air shroud.](#)
3. Follow the procedure listed in [After working inside your system.](#)

Installing a processor and heat sink module

Prerequisites

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

1. Follow the safety guidelines listed in [Safety instructions.](#)
2. Follow the procedure listed in [Before working inside your system.](#)
3. If installed, remove the processor blank and CPU dust cover.

Steps

1. Align the pin 1 indicator of the heat sink to the system board and then place the processor and heat sink module (PHM) on the processor socket.

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

NOTE: Ensure that the PHM is held parallel to the system board to prevent damaging the components.

2. Push the blue retention clips inward to allow the heat sink to drop into place.
3. Using the Torx #T30 screwdriver, tighten the screws on the heat sink in the order below:

- a. Partially tighten the first screw (approximately 3 turns).
- b. Tighten the second screw completely.
- c. Return to the first screw and tighten it completely.

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

- a. Loosen both the heat sink screws completely.
- b. Lower the PHM on to the blue retention clips, following the procedure described in step 2.
- c. Secure the PHM to the system board, following the replacement instructions listed in this step above. 4.

NOTE: The processor and heat sink module retention screws should not be tightened to more than 0.13 kgf-m (1.35 N.m or 12 in-lbf).

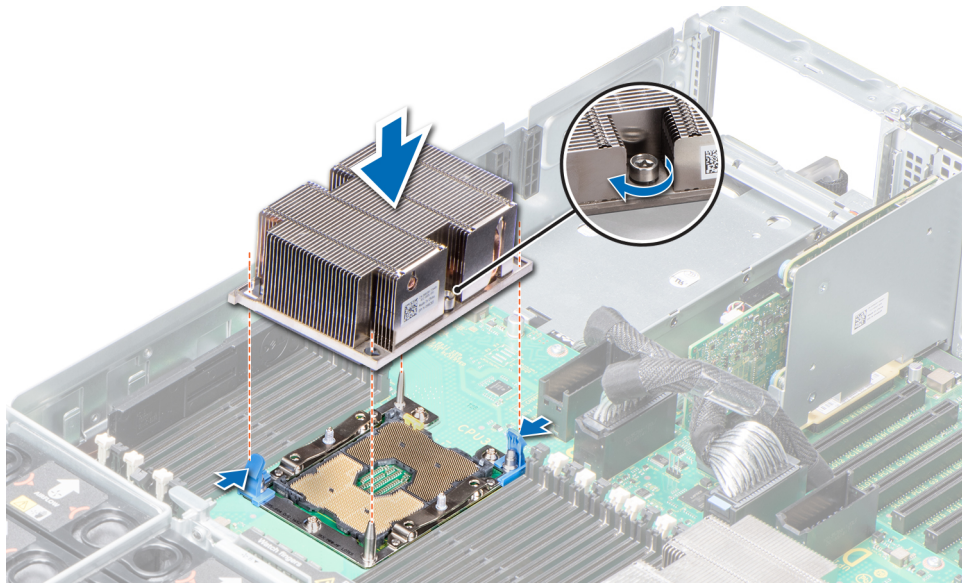


Figure 66. Installing the processor and heat sink module

Next steps

1. Lower the PEM until it firmly seats in place.
2. If removed, [install the expansion card risers](#).
3. Follow the procedure listed in [After working inside your system](#).

Processor expansion module

Removing the PEM

Prerequisites

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

Steps

1. Lift the PEM using the handle until the PEM is in an upright position.
2. Press the release latch on the cable and disconnect the cables connected to the connectors on the PEM.
3. Press the release latch on the side of the chassis and lift the PEM out of the system.

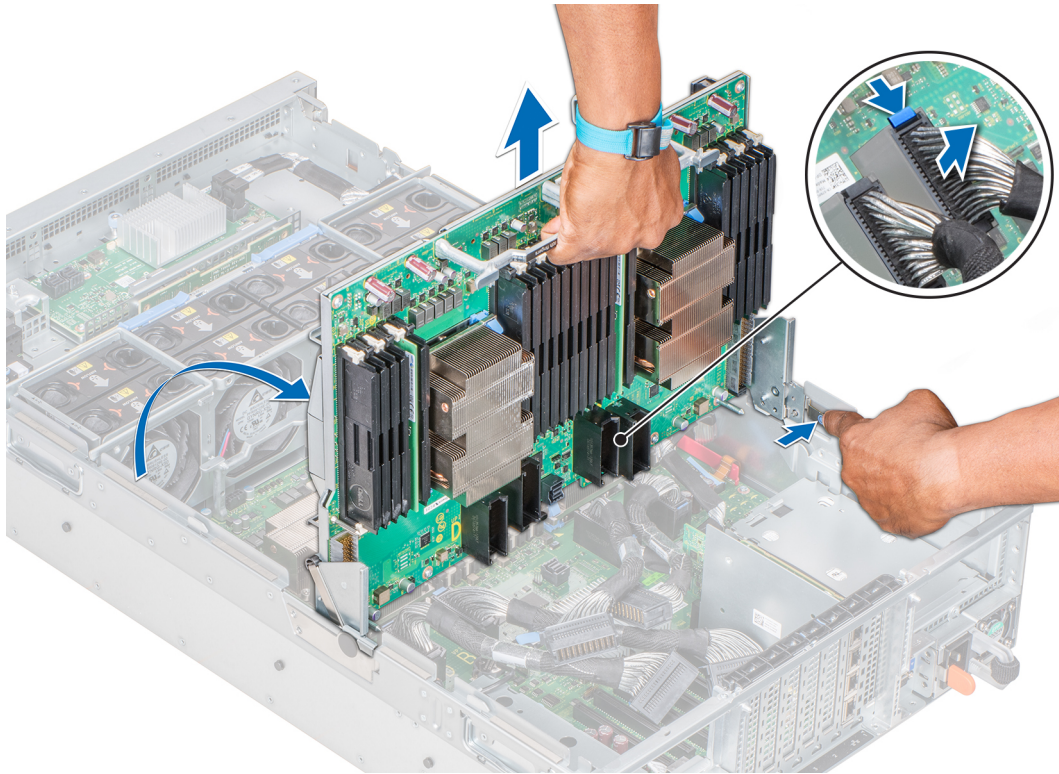


Figure 67. Removing the PEM

Next steps

Install the PEM.

Installing the PEM

Prerequisites

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

Steps

1. Hold the PEM using the handle and align the slots on the sides of the PEM with the standoffs on the sides of the system.
2. Lower the PEM until it clicks into place.
3. Re-connect the cables to the PEM. For information about cable routing, see the section [UPI cable routing](#).
4. Hold the PEM handle and lower the PEM until it firmly seats in place.

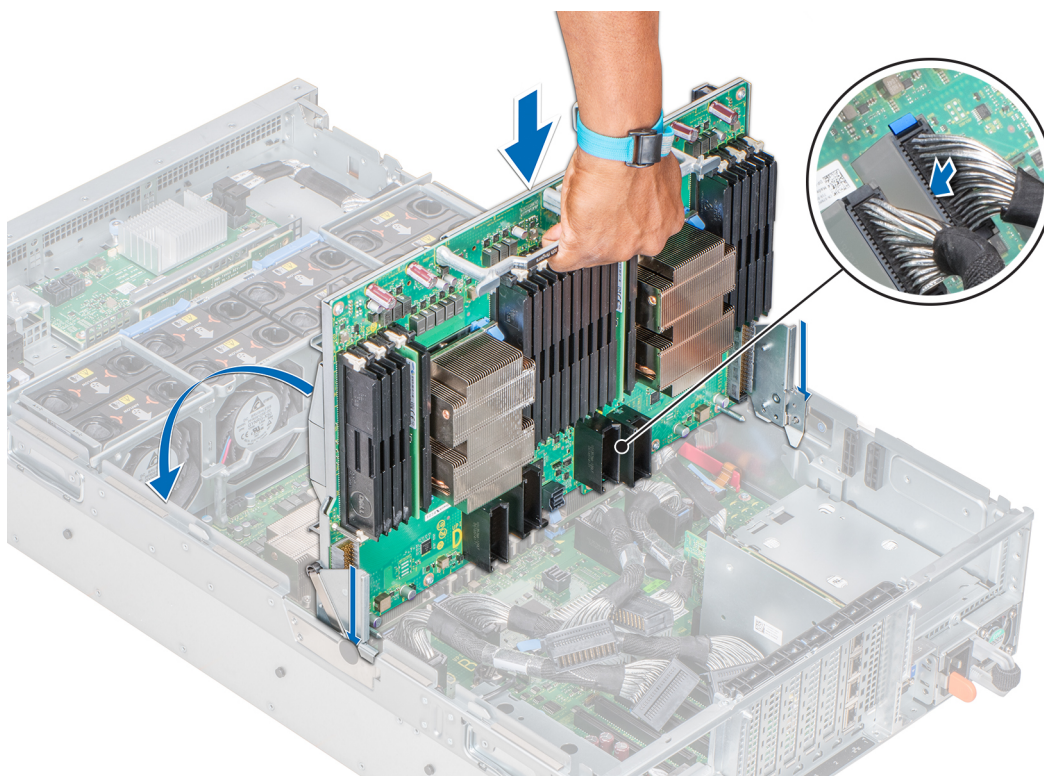


Figure 68. Installing the PEM

Next steps

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

UPI cable routing

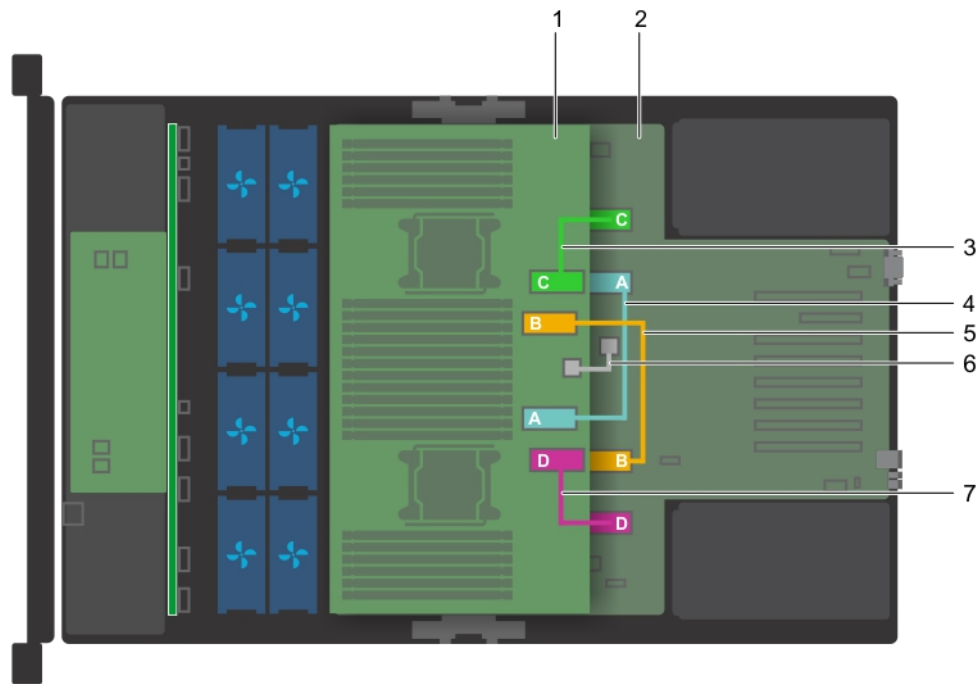


Figure 69. Cable routing - Four processor system

1. PEM
2. system board
3. UPI cable connecting RM_UPI_C connectors on system board and PEM
4. UPI cable connecting RM_UPI_A connectors on system board and PEM
5. UPI cable connecting RM_UPI_B connectors on system board and PEM
6. cable connecting the J_PEM_CLK connectors on system board and PEM
7. UPI cable connecting RM_UPI_D connectors on system board and PEM

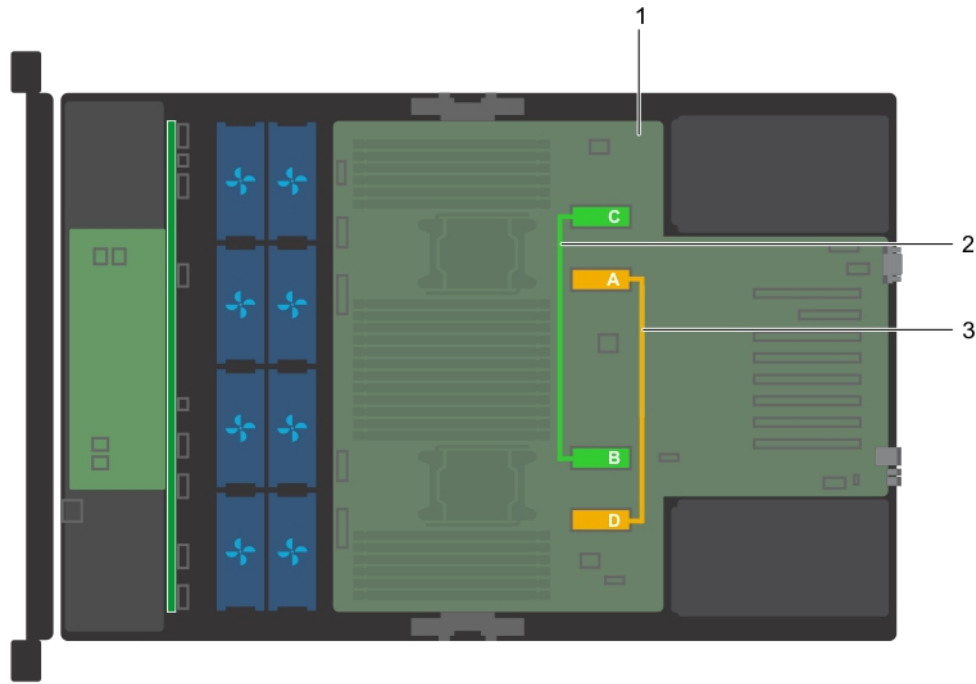


Figure 70. Cable routing - Two processor system

1. system board
2. UPI cable connecting RM_UPI_A and RM_UPI_D connectors on system board
3. UPI cable connecting RM_UPI_C and RM_UPI_B connectors on system board

NOTE: This is only applicable for using Intel Processor 61xx, 62xx, 81xx and 82xx series.

PEM power board

Removing the PEM power board

Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
3. [Remove the air shroud](#).
4. Lift the PEM by using the PEM handle until the PEM is in an upright position.

Steps

Hold the PEM power board by its edges and remove the power board from the connector on the system board.

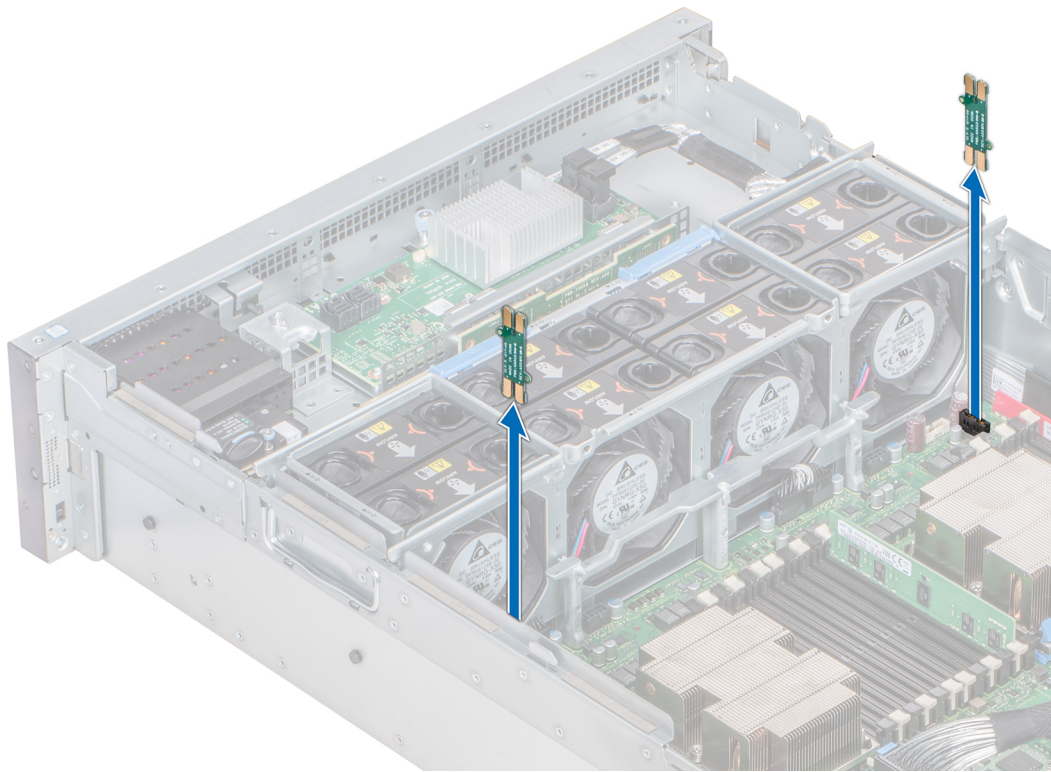


Figure 71. Removing the PEM power board

Next steps

Install the PEM power board.

Installing the PEM power board

Prerequisites

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

Steps

1. Hold the PEM power board by its edges, position the power board so that the power board connector aligns with the connector on the system board.
2. Insert the power board into the connector on the system board until the power board is fully seated.

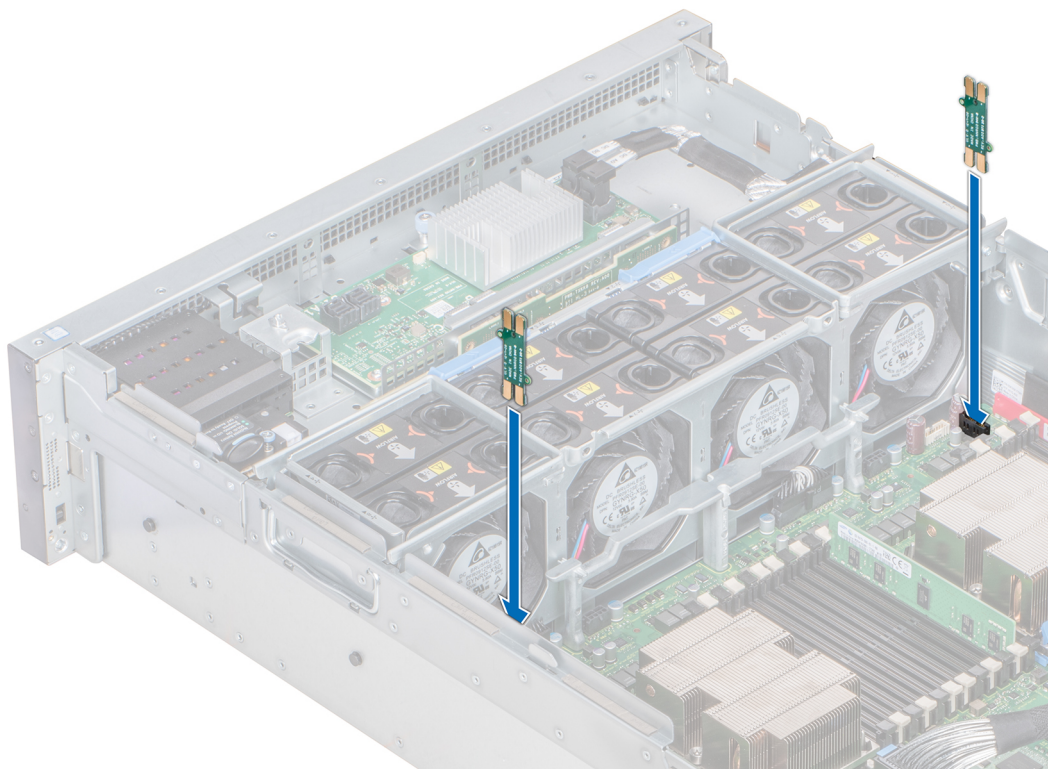


Figure 72. Installing the PEM power board

Next steps

1. Holding the PEM handle, lower the PEM until it firmly seats in place.
2. [Install the air shroud.](#)
3. Follow the procedure listed in [After working inside your system.](#)

Expansion cards and expansion card risers

Expansion card installation guidelines

Depending on your system configuration, the following PCI Express (PCIe) generation 3 expansion cards are supported:

Table 26. Expansion card riser configurations

Riser	PCIe slot on the expansion card riser	Processor connection	PCIe slots on riser (Height)	PCIe slots on riser (length)	Link width	Slot width
Riser 2 (IO_RISER2)	Slot 8	Processor 3	full height	3/4 length	x16	x16
	Slot 9	Processor 3	full height	half length	x16	x16
	Slot 10	Processor 3	full height	half length	x16	x16
Riser 3 (IO_RISER3)	Slot 11	Processor 4	full height	3/4 length	x16	x16
	Slot 12	Processor 4	full height	half length	x16	x16
	Slot 13	Processor 4	full height	half length	x16	x16

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

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

Table 27. Expansion card installation order—Two processor configuration

Card type	Slot priority	Maximum number of cards
PERC 10, H740P Internal Storage adapter	1,6	2
PERC 9, H730P Internal Storage adapter	1,6	2
PERC H330 Internal Storage adapter	1	1
PCIe extender card	4, 7, 2	3
PCIe HCA : EDR card(Mellanox)	4, 3, 2, 7	3
100 Gb NIC (Mellanox)	4, 3, 2, 7	3
100 Gb OPA (Intel)	2, 4, 3, 7	4
External adapter (12 Gbps HBA, H840, H830)	5, 1, 6, 2, 4, 3, 7	2
NVMe PCIe storage PM17 Series (Samsung/Dell/Intel)	5, 4, 3, 7, 2, 6, 1	7
NVMe PCIe storage P4800X (Dell/Intel)	5, 4, 3, 2, 6, 1	6
40 Gb (x8) NIC (Intel/Mellanox)	5, 1, 6, 2, 4, 3, 7	7
FC32 HBA (Emulex/QLogic)	5, 1, 6, 2, 4, 3, 7	7
25 Gb NIC x8 (Intel/Broadcom/Mellanox/Qlogic)	5, 1, 6, 2, 4, 3, 7	7
25 Gb NIC x16 (Mellanox)	4, 3, 2, 7	3
FC16 HBA (Emulex/QLogic)	5, 1, 6, 2, 4, 3, 7	7
10 Gb NIC Base-T Quad Port (Intel)	4, 3, 5, 2	4
10 Gb NIC Dual Port - 57412 (Broadcom)	5, 1, 6, 2, 4, 3, 7	7
10 Gb NIC Dual Port - 57416 (Broadcom)	5, 1, 6, 2, 4, 3	6
10 Gb NIC SFP+(Intel)	5, 1, 6, 2, 4, 3, 7	7
10 Gb NIC SFP+ (Mellanox)	4, 3, 2, 7, 5, 1, 6	7
10 Gb NIC BT, DP (QLogic)	5, 1, 6, 2, 4, 3	6
10 Gb NIC SFP, DP (QLogic)	5, 1, 6, 2, 4, 3, 7	7
10 Gb NIC SFP+, DP (QLogic)	5, 1, 6, 2, 4, 3, 7	7
10 Gb NIC BT QP (QLogic)	2, 4, 3, 7	4
10 Gb NIC SFP QP (QLogic)	5, 1, 6, 2, 4, 3, 7	7
10 GB NIC SF852P/SF852X DP (SolarFlare)	5, 1, 6, 2, 4, 3, 7	7
10 Gb NIC Base-T Dual Port (Intel)	5, 1, 6, 2, 4, 3	6
FC 8 HBA (Emulex and QLogic)	5, 1, 6, 2, 4, 3, 7	7
1 GB NIC (Broadcom and Intel)	5, 1, 6, 2, 4, 3	6
BOSS adapter - Internal Storage	5, 1, 6, 2, 4, 3	1

Table 28. Expansion card installation order—Four processor configuration

Card type	Slot priority	Maximum number of cards
PERC 10, H740P Internal Storage adapter	1,6	2
PERC 9, H730P Internal Storage adapter	1,6	2
PERC H330 Internal Storage adapter	1	1
PCIe extender card	11,12,8	3
PCIe HCA : EDR CX5 card(Mellanox)	11, 8, 3, 4, 12, 9, 2, 10, 13, 7	4
PCIe HCA : EDR CX4 card(Mellanox)	11, 8, 3, 4, 12, 9, 2, 10, 13, 7	8
100 Gb NIC (Mellanox)	11, 8, 3, 4, 12, 9, 2, 10, 13, 7	8
HCA H100 Card (Mellanox)	11, 8, 3, 4, 12, 9, 2, 10, 13, 7	4
100 Gb OPA (Intel)	2, 4, 8, 11, 3, 7, 9, 12, 10, 13	4
External adapter (12 Gbps HBA, H840, H830)	5, 1, 6, 8, 11, 2, 4, 9, 12, 3, 7, 10, 13	2
NVMe PCIe storage PM17 Series (Samsung/Dell/Intel)	5, 8, 11, 4, 9, 12, 3, 7, 10, 13	10
NVMe PCIe storage P4800X (Dell/Intel)	5, 8, 11, 4, 9, 12, 3, 10, 13	9
NVMe PCIe Storage P4500/P4600	5, 8, 11, 4, 9, 12, 3, 7, 10, 13	10
40 Gb (x8) NIC (Intel)	5, 1, 6, 8, 11, 2, 4, 9, 12, 3, 7, 10, 13	13
40 Gb (x8) NIC (Mellanox)	11, 8, 3, 4, 12, 9, 2, 10, 13, 7, 6, 1, 5	8
FC32 HBA (Emulex/QLogic)	5, 1, 6, 8, 11, 2, 4, 9, 12, 3, 7, 10, 13	13
25 Gb NIC x8 (Intel/Broadcom/Mellanox/QLogic)	5, 1, 6, 8, 11, 2, 4, 9, 12, 3, 7, 10, 13	13
25 Gb NIC x16 (Mellanox)	11, 8, 3, 4, 12, 9, 2, 10, 13, 7	8
FC16 HBA (Emulex/QLogic)	5, 1, 6, 8, 11, 2, 4, 9, 12, 3, 7, 10, 13	13
10 Gb NIC Base-T Quad Port (Intel)	11, 10, 2, 4	4
10 Gb NIC Dual Port - 57412 (Broadcom)	5, 1, 6, 8, 11, 2, 4, 9, 12, 3, 7, 10, 13	13
10 Gb NIC Dual Port - 57416 (Broadcom)	5, 1, 6, 11, 2, 4, 9, 12, 3, 10, 13	11
10 Gb NIC SFP+(Intel)	5, 1, 6, 8, 11, 2, 4, 9, 12, 3, 7, 10, 13	13
10 Gb NIC SFP+ (Mellanox)	11, 8, 3, 4, 12, 9, 2, 10, 13, 7, 6, 1, 5	8
10 Gb NIC BT, DP (QLogic)	5, 1, 6, 11, 2, 4, 9, 12, 3, 10, 13	11
10 Gb NIC SFP, DP (QLogic)	5, 1, 6, 8, 11, 2, 4, 9, 12, 3, 7, 10, 13	13
10 Gb NIC SFP+, DP (QLogic)	5, 1, 6, 8, 11, 2, 4, 9, 12, 3, 7, 10, 13	13
10 Gb NIC BT QP (QLogic)	8, 11, 2, 4, 3, 7	6
10 Gb NIC SFP QP (QLogic)	5, 1, 6, 8, 11, 2, 4, 9, 12, 3, 7, 10, 13	13
10 GB NIC SF852P/SF852X DP (SolarFlare)	5, 1, 6, 8, 11, 2, 4, 9, 12, 3, 7, 10, 13	13
10 Gb NIC Base-T Dual Port (Intel)	5, 1, 6, 11, 2, 4, 9, 12, 3, 10, 13	11
FC 8 HBA (Emulex and QLogic)	5, 1, 6, 8, 11, 2, 4, 9, 12, 3, 7, 10, 13	13
1 GB NIC (Broadcom and Intel)	5, 1, 6, 11, 2, 4, 9, 12, 3, 10, 13	11
BOSS adapter - Internal Storage	5, 1, 6, 11, 2, 4, 9, 12, 3, 10, 13	1

Removing expansion card riser blank

Prerequisites

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

Steps

Hold the expansion card riser blank and lift the blank out of the system.

i NOTE: When you upgrade your system from two processor configuration to four processor, ensure that you remove the riser blanks from the system.

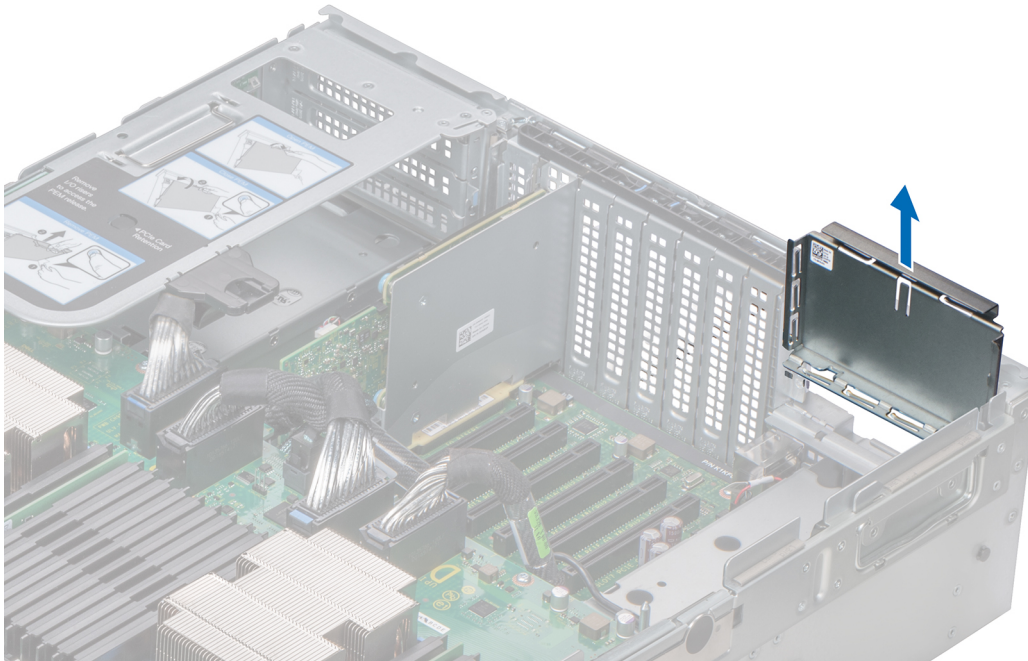


Figure 73. Removing expansion card riser blank

Next steps

Install the expansion card riser blank.

Installing expansion card riser blank

Prerequisites

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

Steps

Lower the expansion card riser blank into the system until the blank is seated on the corresponding slot at the back of the system.

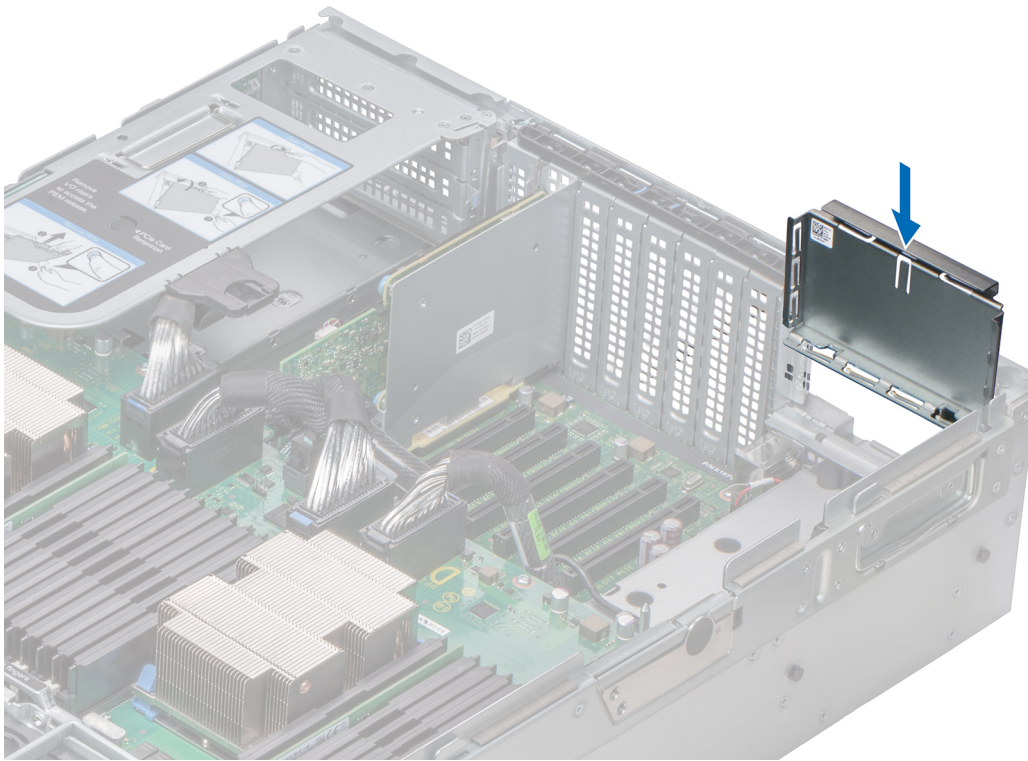


Figure 74. Installing expansion card riser blank (right)

Next steps

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

Removing the expansion card riser

Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
3. Disconnect any cables connected to the expansion card.

Steps

1. Lift the release lever until the connector on the riser disconnects from the connector on the processor expansion module (PEM).
2. Lift the riser away from the system.

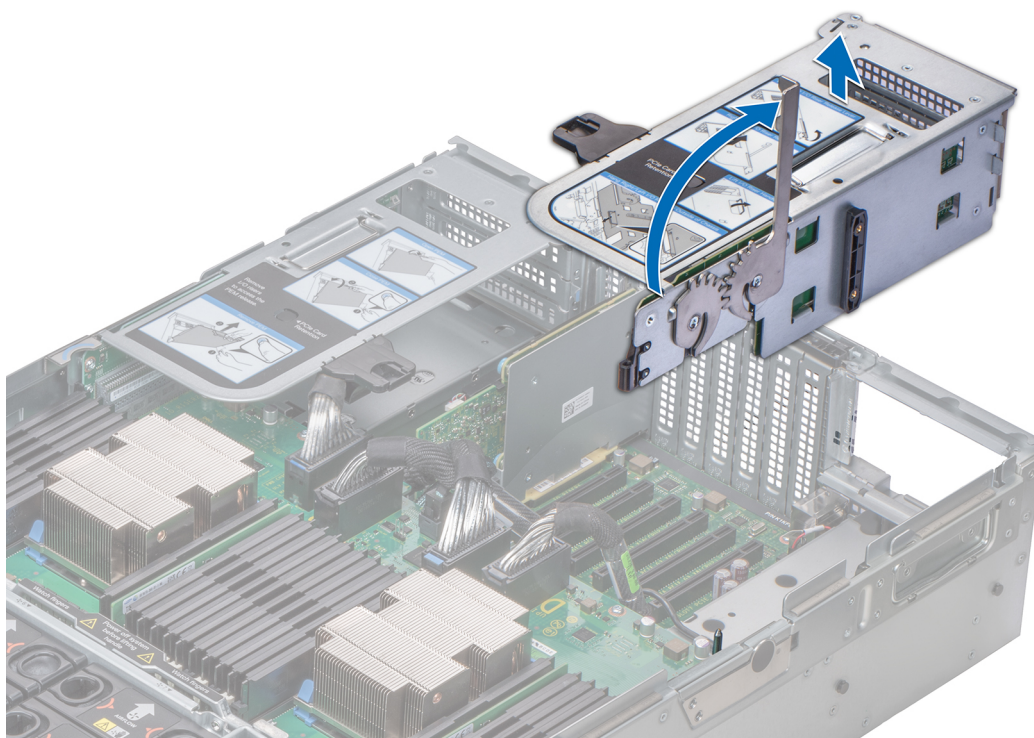


Figure 75. Removing expansion card riser (right)

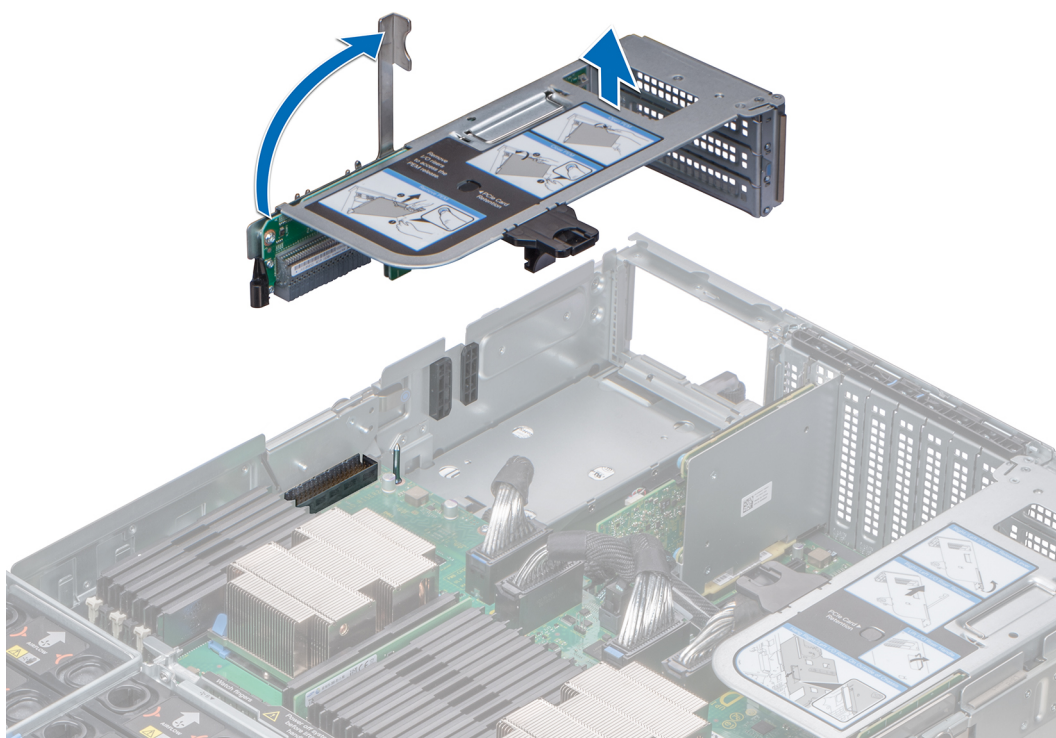


Figure 76. Removing expansion card riser (left)

Next steps

Install the expansion card riser.

Installing the expansion card riser

Prerequisites

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

Steps

1. Align the guide rail on the side of the riser with the slot on the side of the chassis and lower the riser into the system.
2. Lower the release lever until the connector on the riser connects with the connector on the processor expansion module (PEM).

 **CAUTION:** To avoid damage to the connectors on the PEM, you must only use the release levers to seat the expansion card risers firmly on the PEM.

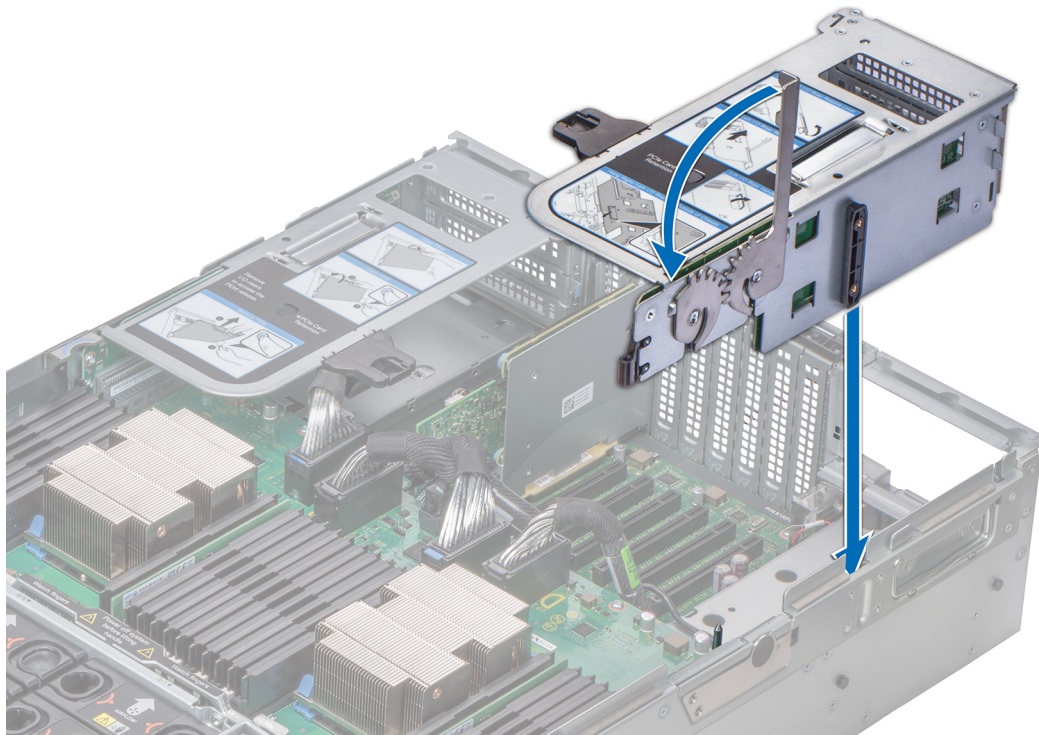


Figure 77. Installing expansion card riser (right)

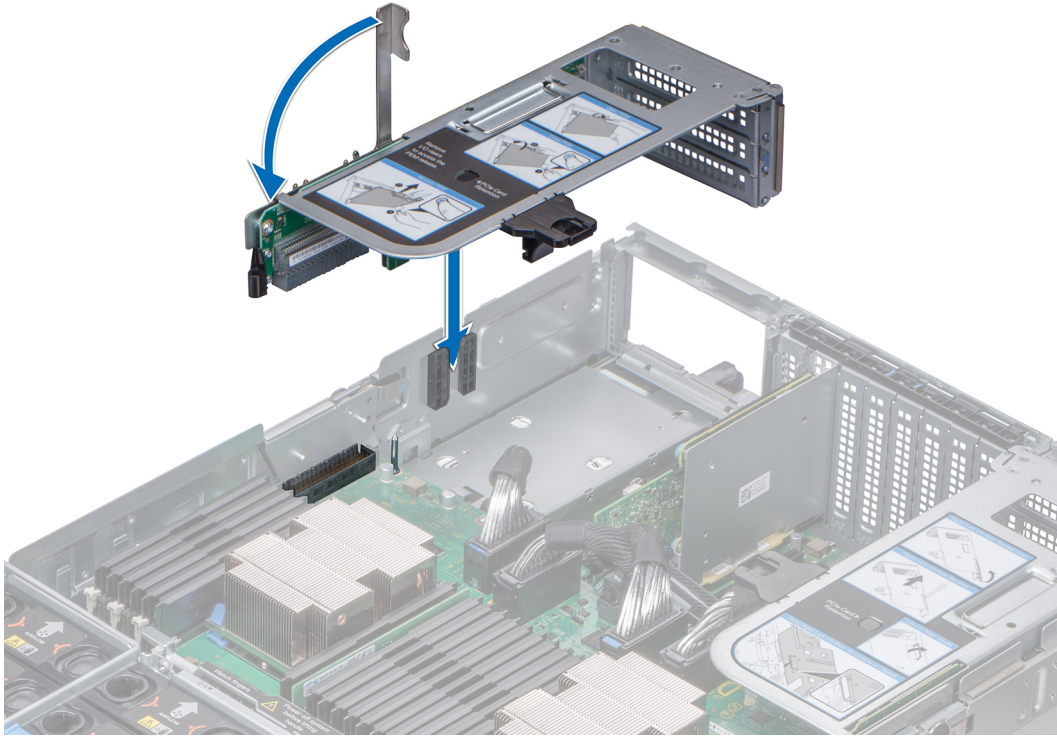


Figure 78. Installing expansion card riser (left)

Next steps

1. Connect the cables to the expansion card.
2. Follow the procedure listed in [After working inside your system](#).

Removing the expansion card from expansion card riser

Prerequisites

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

Steps

1. Press the black tab on the expansion card riser and slide the PCIe retention bracket up.

NOTE: This step is applicable only if you are removing the expansion cards from the slots 12 and 13 of Riser 3 (IO_RISER3) and slots 9 and 10 of Riser 2 (IO_RISER2).

2. Lift the PCIe card latch.
3. Hold the expansion card by its edges, and lift the card out until the connector on the card disconnects from the connector on the riser.

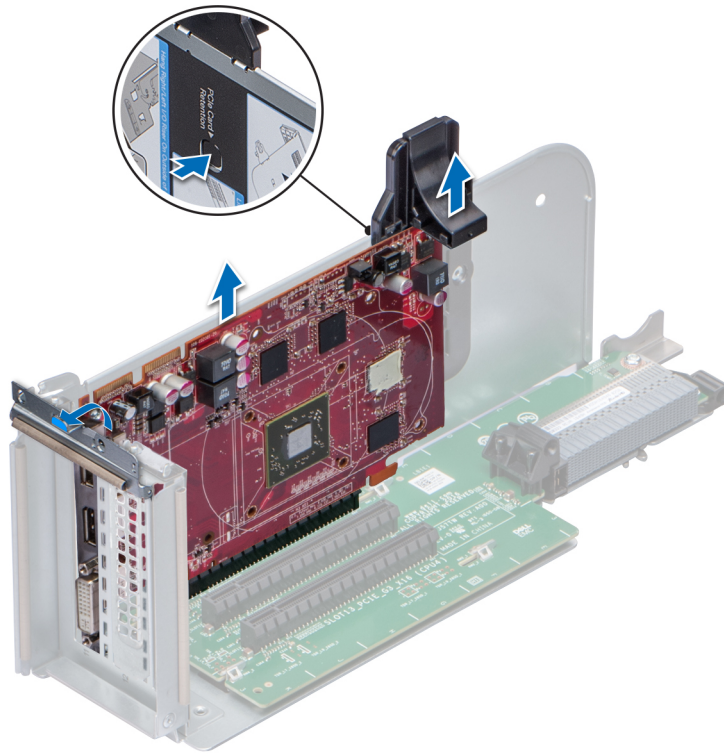


Figure 79. Removing the expansion card from expansion card riser

Next steps

1. [Install the expansion card into expansion card riser.](#)
2. If you are removing the card permanently, install a metal filler bracket over the empty expansion slot opening and lower the PCIe card latch to lock the bracket in place.

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

Installing expansion card into expansion card riser

Prerequisites

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

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

Steps

1. If installed, remove the filler bracket.

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

2. Holding the expansion card by its edges, position the card so that the connector on the card aligns with the connector on the riser.
3. Insert the connector on the card into the connector on the riser until the card is fully seated.
4. Slide the PCIe retention bracket down to hold the card in place.

NOTE: This step is applicable only if you are installing the expansion cards in the slots 12 and 13 of Riser 3 (IO_RISER3) and slots 9 and 10 of Riser 2 (IO_RISER2).

5. Close the PCIe card latch.

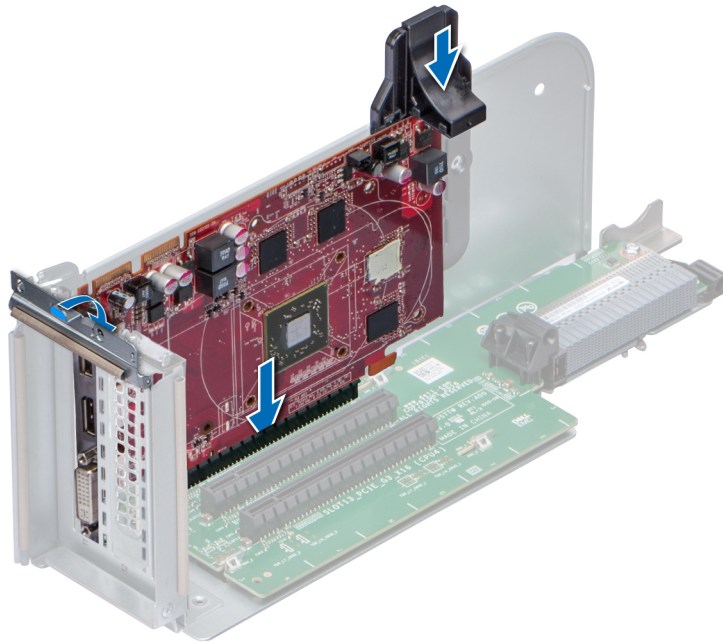


Figure 80. Installing expansion card into expansion card riser

Next steps

1. [Install the expansion card riser.](#)
2. Connect the cables to the expansion card.
3. Follow the procedure listed in [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: Removing the BOSS card is similar to the procedure for [removing an expansion card riser.](#)

Steps

1. Loosen the screws and lift the retention straps that secure the M.2 SSD module on the BOSS card.
2. Pull the M.2 SSD module away from the BOSS card.

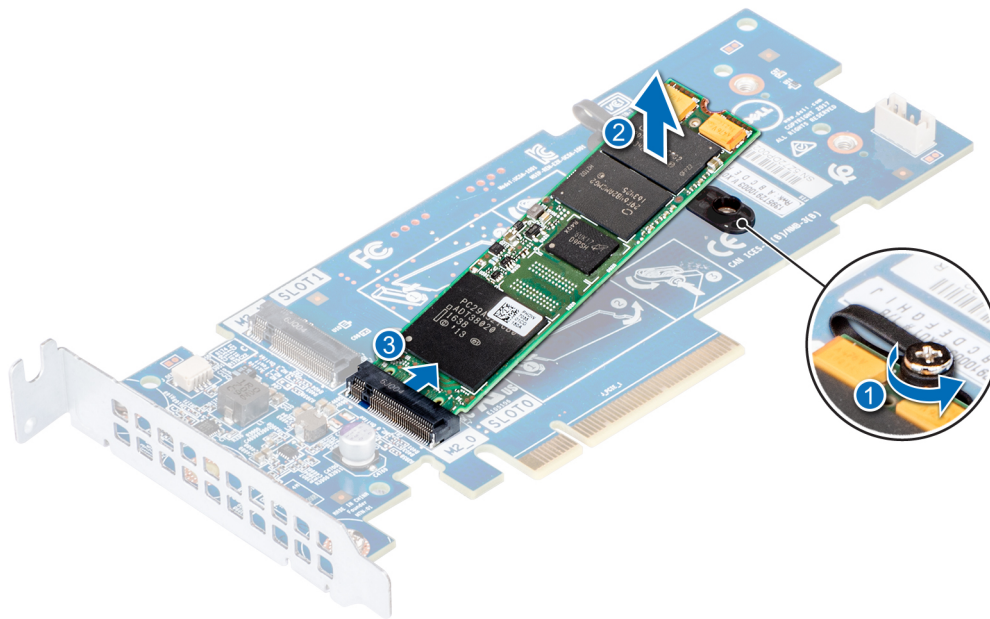


Figure 81. Removing the M.2 SSD module

Next steps

Install 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](#).

Steps

1. Align the M.2 SSD module connectors with the connectors on the BOSS card.
2. Push the M.2 SSD module until the module is seated firmly on the BOSS card.
3. Secure the M.2 SSD module on the BOSS card with the retention straps and screws.

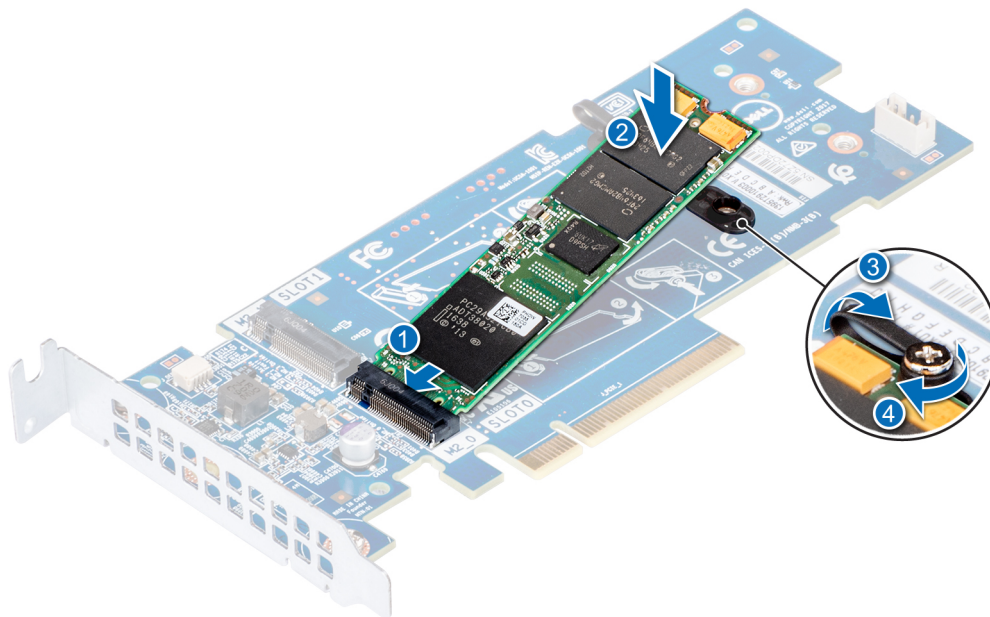


Figure 82. Installing the M.2 SSD module

Next steps

1. Install the BOSS card.
 ⓘ **NOTE:** Installing the BOSS card is similar to [installing the expansion card riser](#).
2. [Install the air shroud](#).
3. Follow the procedure listed in [After working inside your system](#).

Network daughter card riser

Removing the NDC riser

Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
3. Disconnect the cables connected to the Network Daughter Card (NDC) riser.

Steps

1. Slide the riser retention bracket to unlock the NDC riser.
2. Hold the NDC riser by its edges, and pull the NDC riser until the card edge connector disengages from the connector on the system board.
3. Lift the NDC riser from the system.

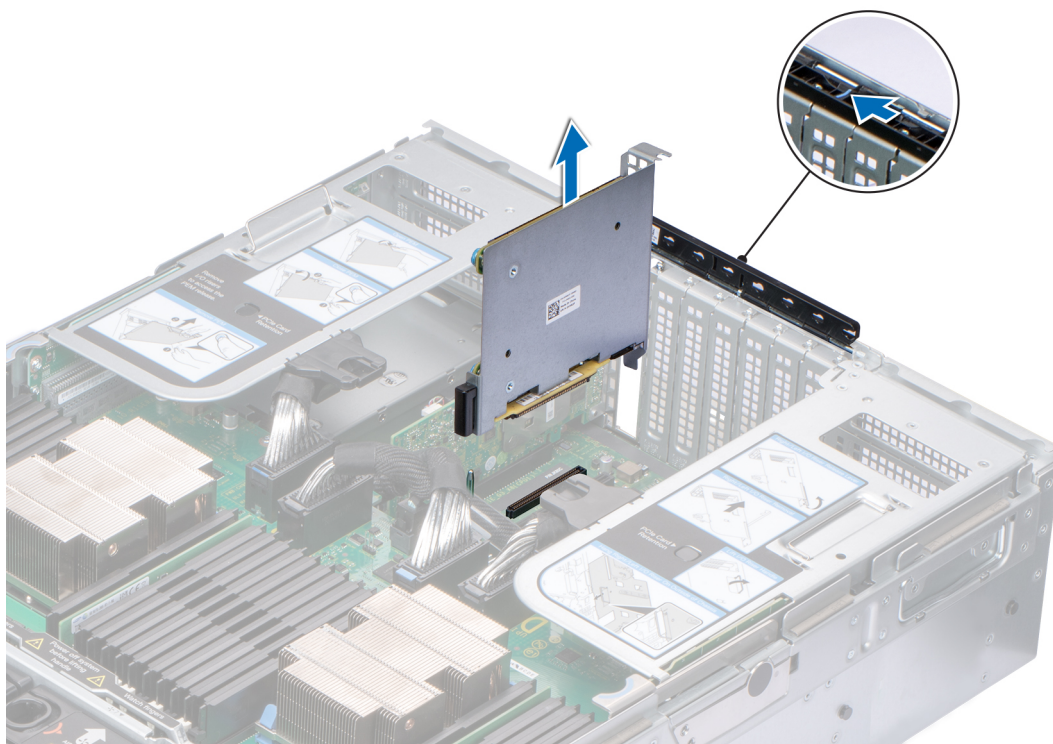


Figure 83. Removing the NDC riser

Next steps

1. [Install the NDC riser.](#)

Installing the NDC riser

Prerequisites

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

Steps

1. Hold the Network Daughter Card (NDC) riser by its edges and align the connector on the NDC riser and guide pin on the system board.
2. Insert the NDC riser until the card is fully seated.
3. Close the riser retention bracket and slide the bracket to lock the NDC riser.

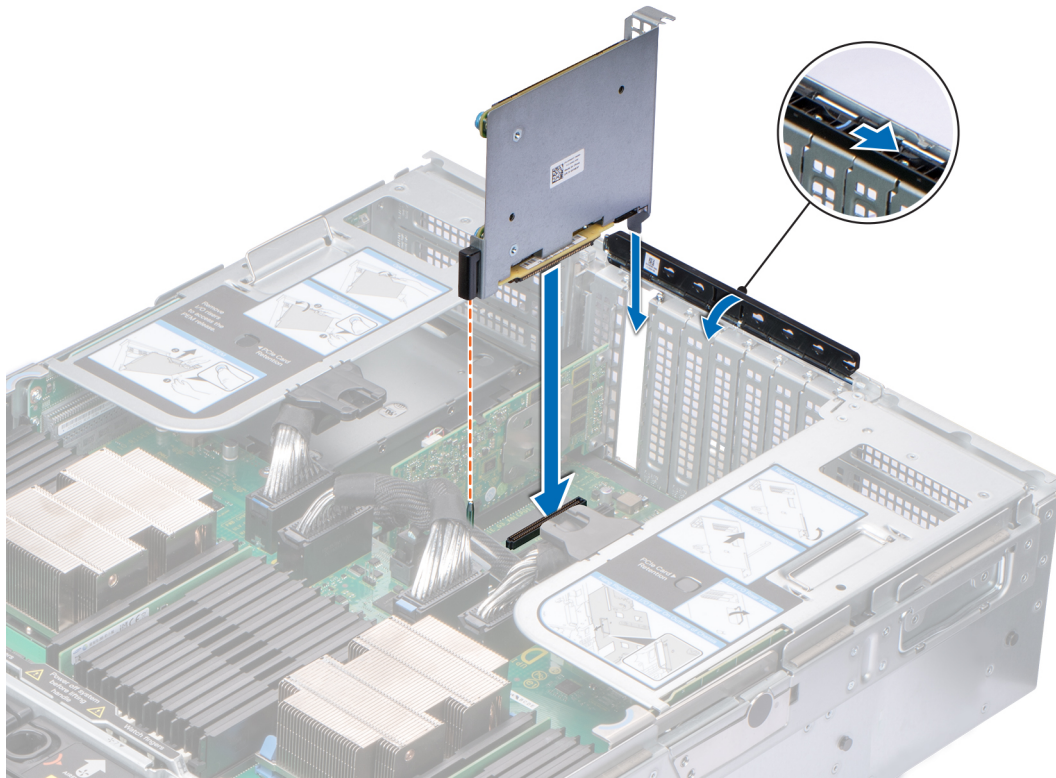


Figure 84. Install the NDC riser

Next steps

1. Connect the cables to the NDC riser.
2. Follow the procedure listed in [After working inside your system](#).

Network daughter card

Removing the NDC

Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
3. [Remove the Network Daughter Card \(NDC\) riser](#).

Steps

1. Using a Phillips #2 screwdriver, loosen the captive screws that secure the NDC to the NDC riser.
2. Hold the NDC by the edges on either side of the touch points, and lift to remove it from the connector on the NDC riser.
3. Slide the NDC away from the NDC riser bracket until the Ethernet connectors are clear of the slot in the NDC riser.

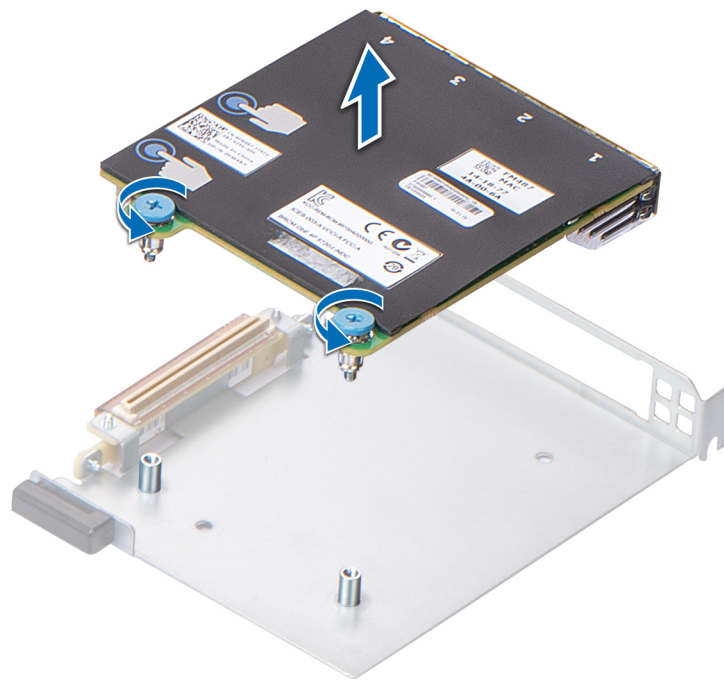


Figure 85. Removing the NDC

Next steps

1. [Install the NDC.](#)

Installing the NDC

Prerequisites

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

Steps

1. Orient and slide the NDC so that the Ethernet ports fit through the slot in the NDC riser.
2. Align the captive screws on the card with the screw holes on the NDC riser.
3. Press the touch points on the card until the connector connects with the connector on the NDC riser.
4. Using a Phillips #2 screwdriver, tighten the captive screws to secure the NDC to the NDC riser.

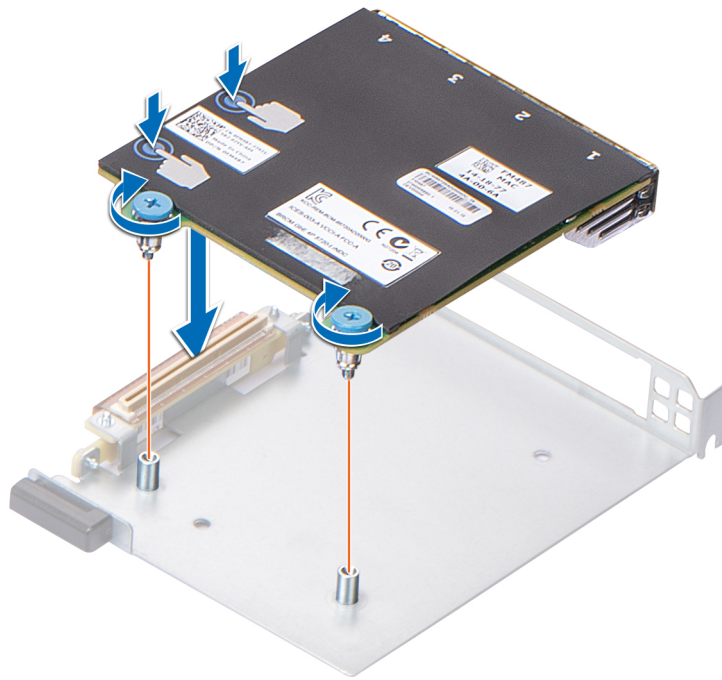


Figure 86. Installing the NDC

Next steps

1. [Install the NDC riser.](#)
2. Follow the procedure listed in [After working inside your system.](#)

Storage controller card

Removing the storage controller 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 Network Daughter Card \(NDC\) riser.](#)

Steps

1. Slide the riser retention bracket to unlock the storage controller card.
2. Hold the storage controller card by its edges and lift to remove it from the connector on the system board.
3. Press the release tab on the SAS cable connector to disconnect the cable from the storage controller card.

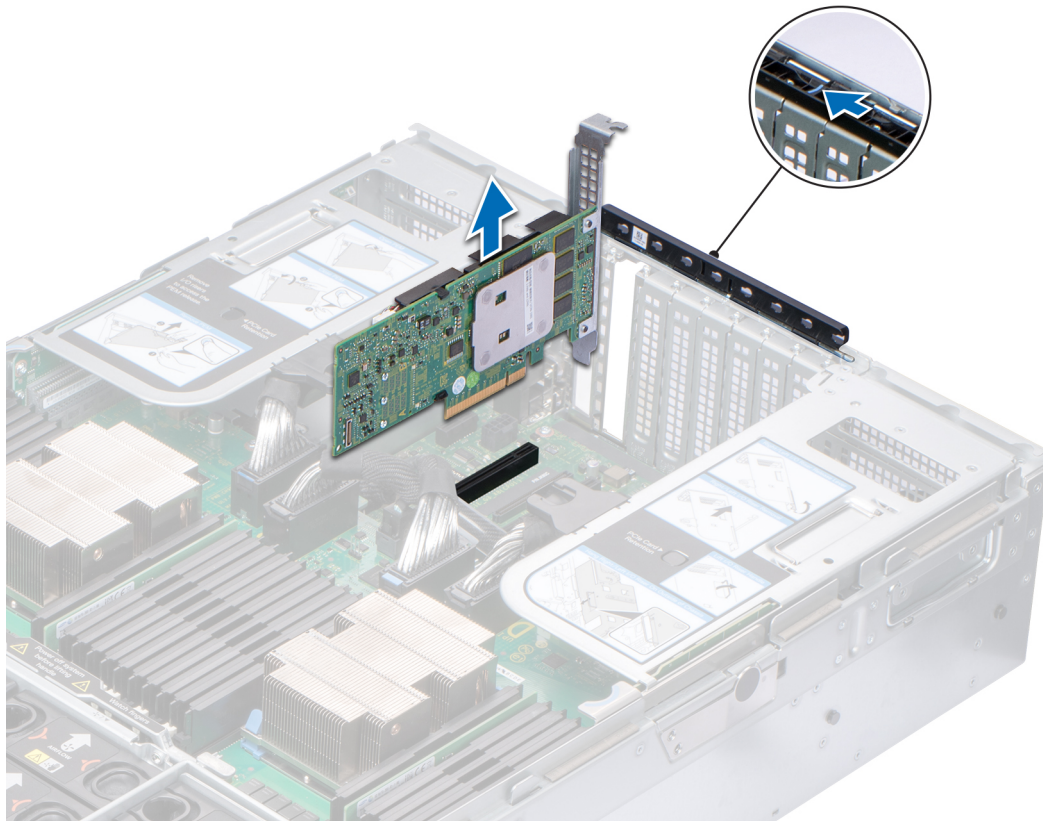


Figure 87. Removing the storage controller card

Next steps

1. [Install the storage controller card.](#)

Installing the storage controller card

Prerequisites

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

Steps

1. Connect the SAS cables to the card.

NOTE: Ensure that you use the labels on the cable to connect the cables to the correct connectors. The cable does not function properly if reversed.

2. Hold the storage controller card by its edges, and align the connector on the card with the connector on the system board.
3. Lower the card into the system until the card is firmly seated.
4. Route the SAS cable through the channel on the inner side of the chassis.
5. Connect the SAS cables from the storage controller card to the connectors on hard drive backplane. For more information about cabling images, see the [Cable routing](#).
6. Close the riser retention bracket and slide the bracket to lock the storage controller card.

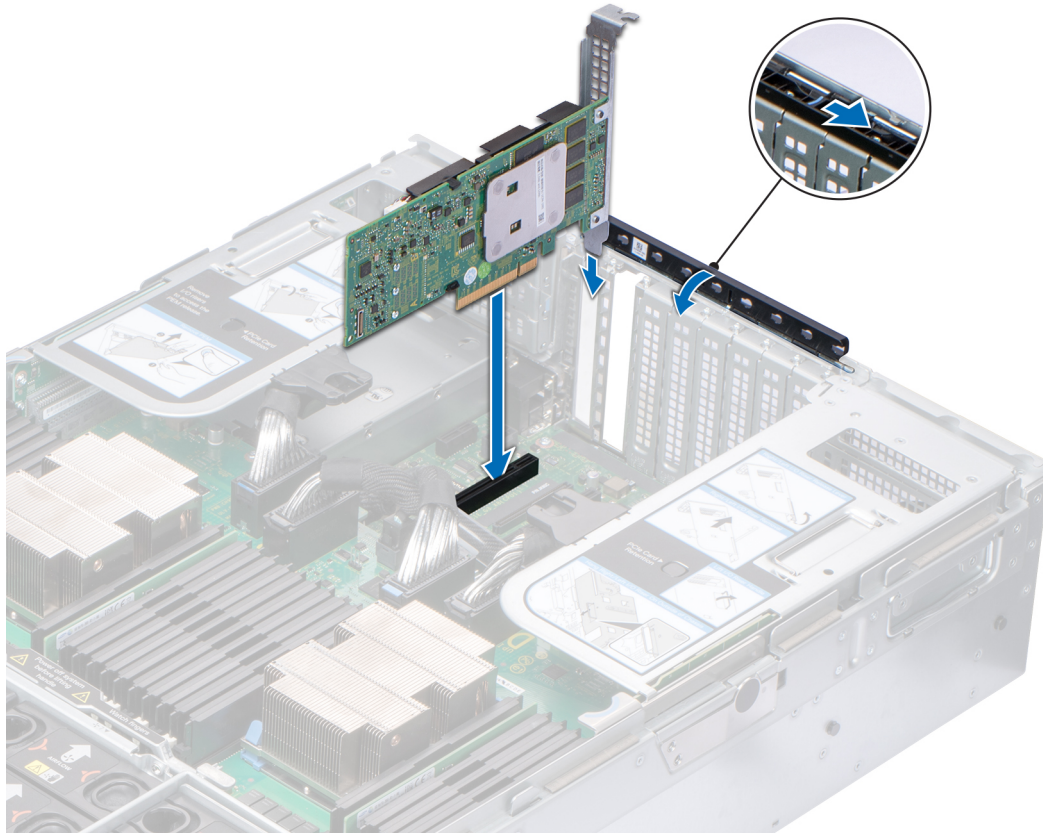


Figure 88. Installing the storage controller card

Next steps

1. [Install the NDC riser.](#)
2. Follow the procedure listed in [After working inside your system.](#)

Optional IDSDM or vFlash module

Removing the MicroSD card

Prerequisites

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

Steps

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

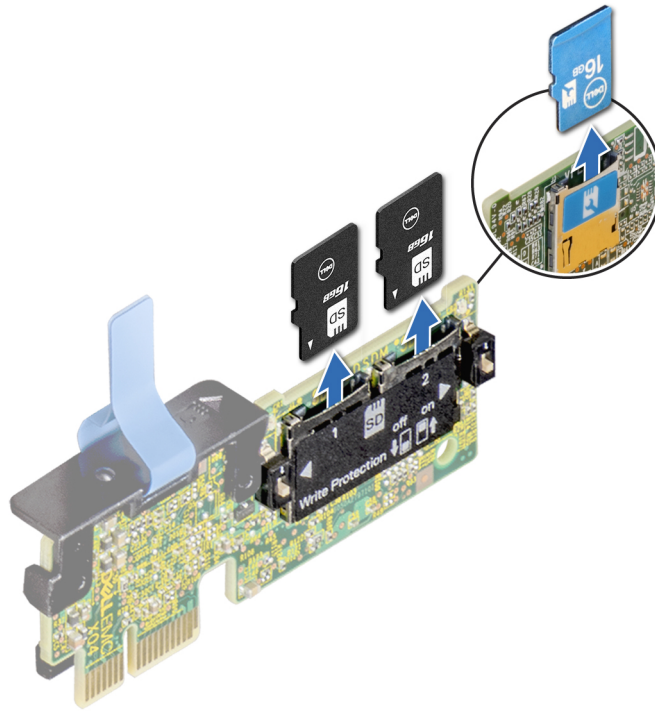


Figure 89. Removing the MicroSD card

Next steps

1. [Install a MicroSD card.](#)

Installing the MicroSD card

Prerequisites

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

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

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

Steps

1. Locate the MicroSD card connector on the IDSDM module. Orient the MicroSD card appropriately and insert the contact-pin end of the card into the slot. To locate IDSDM module, 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.

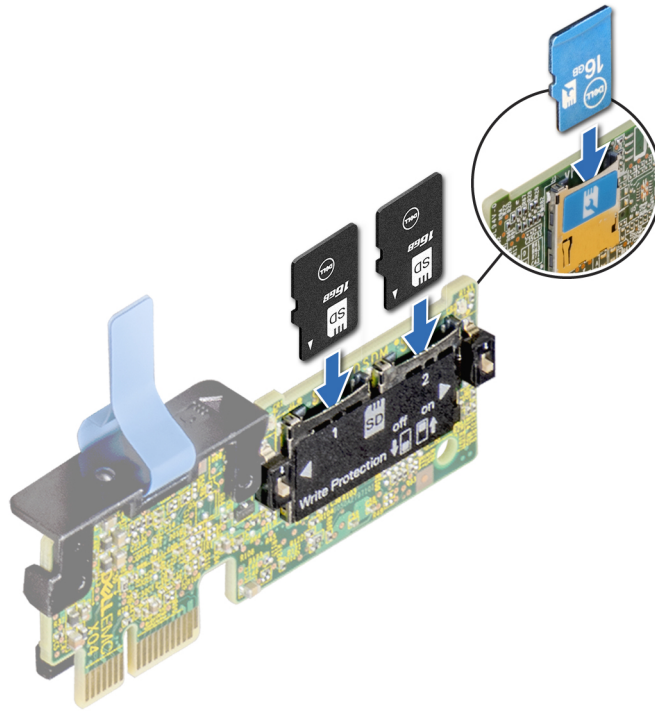


Figure 90. Installing the MicroSD card

Next steps

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

Optional IDSDM or vFlash module

Removing the optional IDSDM module

Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
 2. Follow the procedure listed in [Before working inside your system](#).
 3. If you are replacing the IDSDM module, [remove the MicroSD cards](#).
- NOTE:** Temporarily label each MicroSD card with its corresponding slot number after removal.

Steps

1. Locate the IDSDM module connector on the system board.
To locate IDSDM module connector, see the [System board jumpers and connectors](#) section.
2. Holding the pull tab, lift the IDSDM module out of the system.

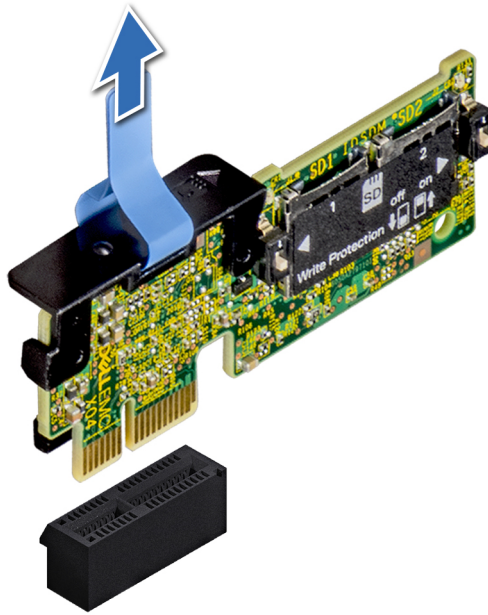


Figure 91. Removing the optional IDSDM module

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

Next steps

Install the optional IDSDM module.

Installing optional IDSDM module

Prerequisites

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

Steps

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

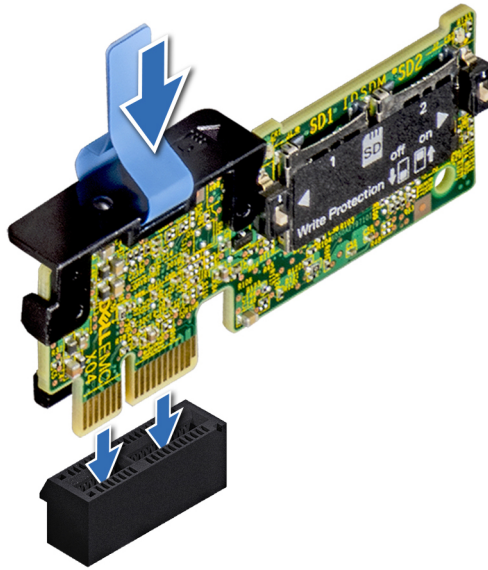


Figure 92. Installing optional IDSDM module

Next steps

1. [Install the MicroSD cards.](#)

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

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

Power supply unit

Hot spare feature

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

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

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

The default PSU settings are as follows:

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

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

Removing a power supply unit blank

Prerequisites

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

Steps

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

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

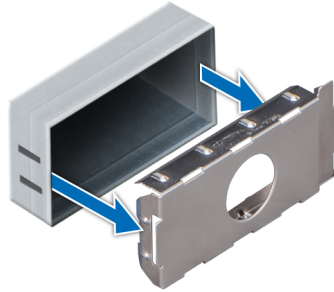


Figure 93. Removing a power supply unit blank

Next steps

Install the second power supply unit blank.

Installing a power supply unit blank

Prerequisites

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

NOTE: Install the power supply unit (PSU) blank only in the second PSU bay.

Steps

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

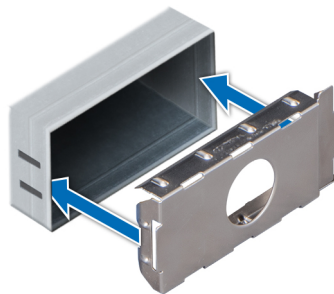


Figure 94. Installing a power supply unit blank

Removing a power supply unit

The procedure for removing AC and DC PSUs is identical.

Prerequisites

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

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

2. Disconnect the power cable from the power source and from the PSU you intend to remove, and then remove the cable from the strap on the PSU handle.
3. Unlatch and lift the optional cable management arm if it interferes with the PSU removal.

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

Steps

Press the orange release latch and slide the PSU out of the system by using the PSU handle.

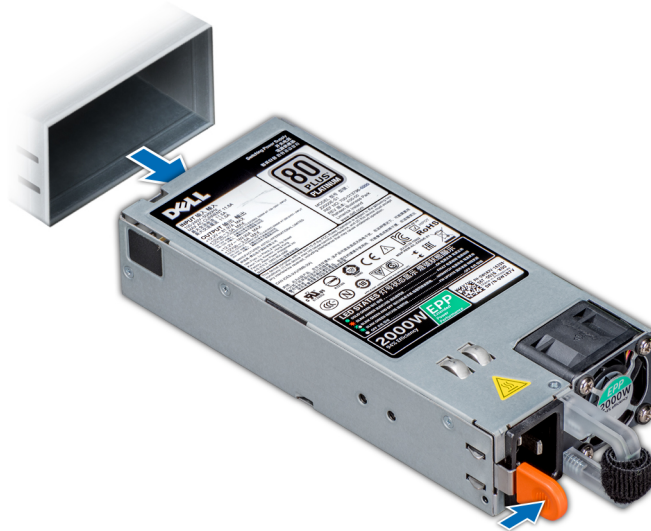


Figure 95. Removing a power supply unit

Next steps

Install the PSU or the PSU blank.

Installing a power supply unit

The procedure for installing AC and DC PSUs is identical.

Prerequisites

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

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

Steps

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

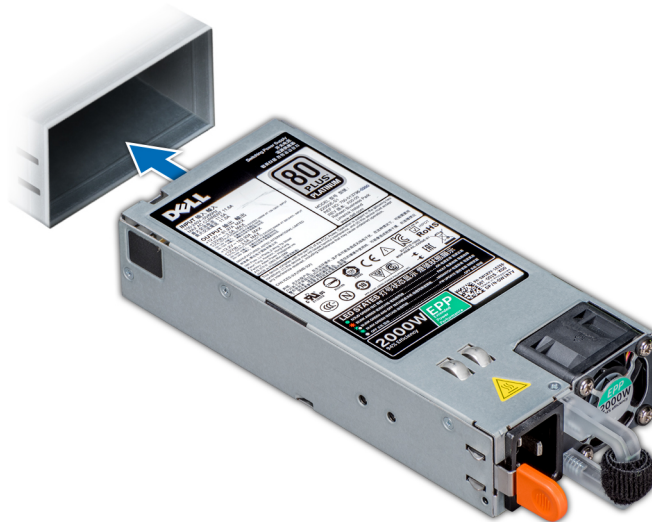


Figure 96. Installing a power supply unit

Next steps

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

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

NOTE: When installing, hot swapping, or hot adding a new PSU, wait for 15 seconds for the system to recognize the PSU and determine its status. The PSU redundancy may not occur until discovery is complete. Wait until the new PSU is discovered and enabled before you remove the other PSU. The PSU status indicator turns green to signify that the PSU is functioning properly.

Wiring instructions for a DC power supply unit

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

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

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

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

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

Input requirements


- Supply voltage: $-(48-60)$ V DC
- Current consumption: 32 A (maximum)

Kit contents

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

Required tools

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

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

Required wires


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


NVDIMM-N battery

Removing the NVDIMM-N battery

Prerequisites

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

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

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

Steps

1. Disconnect the cables from the NVDIMM-N battery.
2. Using Phillips #2 screwdriver, loosen the retention screw that secures the battery to the system.
3. Holding the edges, slide the battery toward the back of the system until the battery disengages from the slot on the system.
4. Lift the battery away from the system.

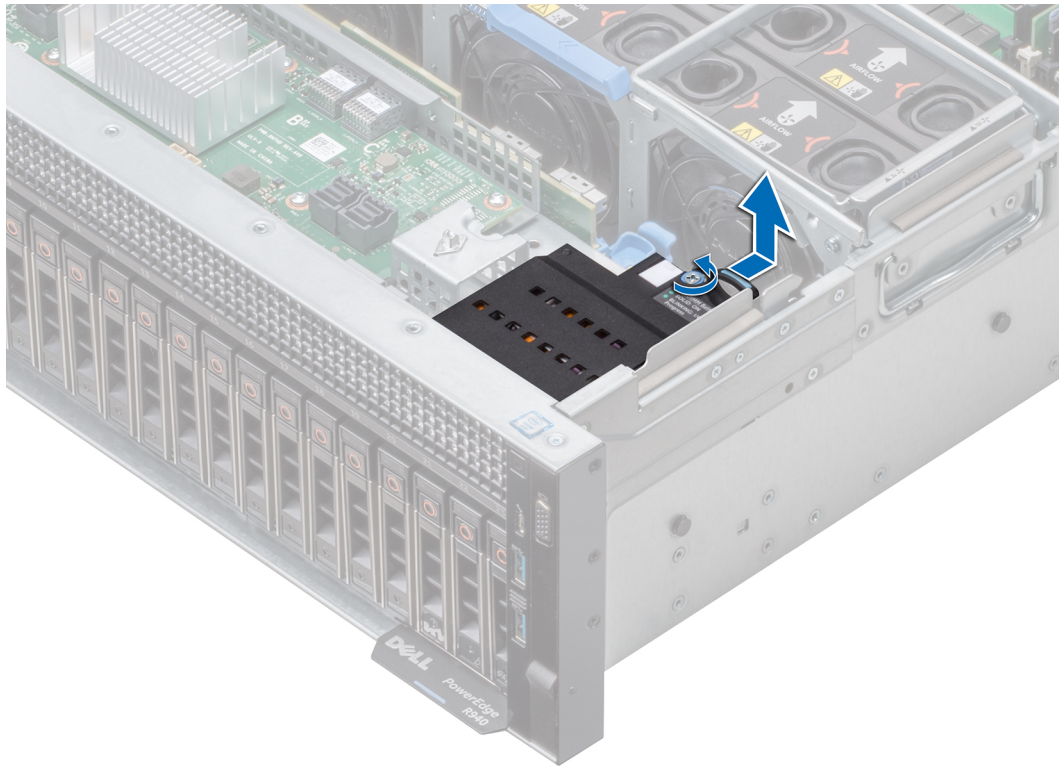


Figure 97. Removing the NVDIMM-N battery

Next steps

Install the NVDIMM-N battery.

Installing NVDIMM-N battery

Prerequisites

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

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

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

Steps

1. Place the NVDIMM-N battery on the NVDIMM slot on the system and slide the battery into place.
2. Using Phillips #2 screwdriver, tighten the retention screw to secure the battery to the system.
3. Reconnect the cables to the battery.

CAUTION: Exercise care when installing the NVDIMM-N battery so that you do not cause any damage to the intrusion switch cable.

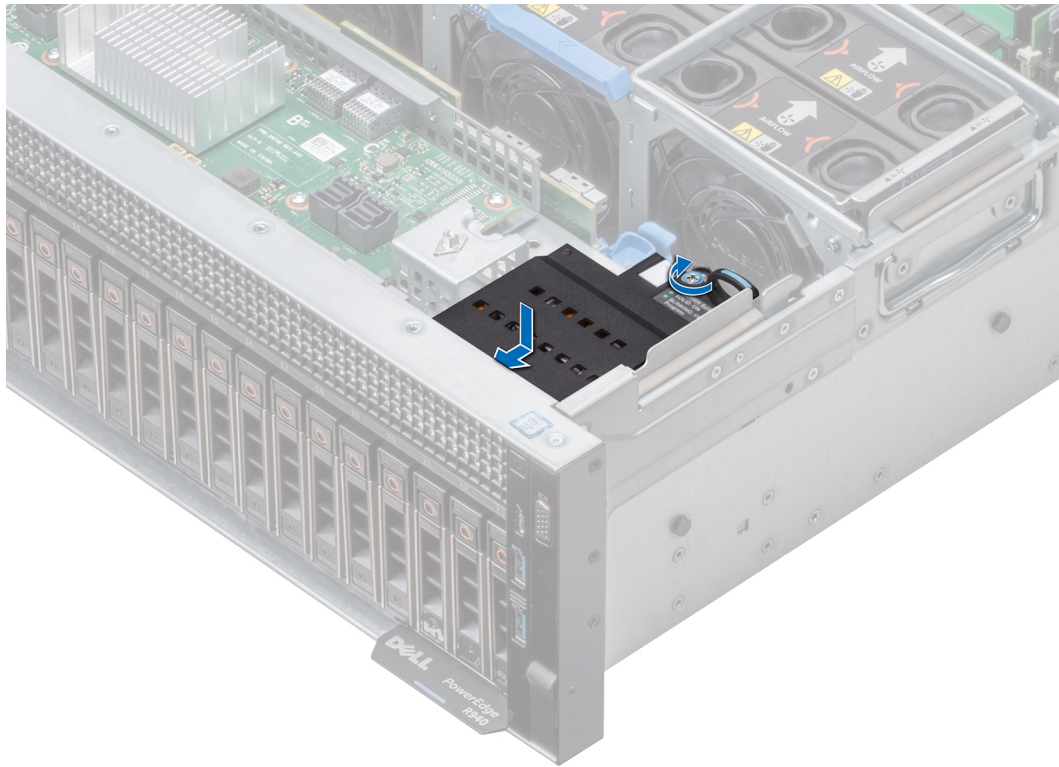


Figure 98. Installing NVDIMM-N battery

Next steps

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

NVDIMM battery cable routing

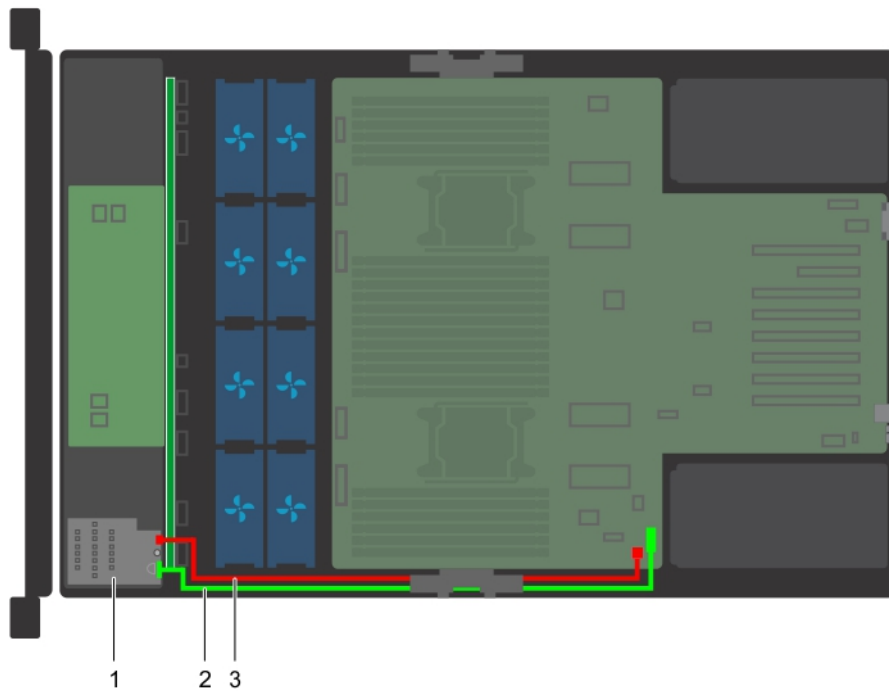


Figure 99. Cable routing – NVDIMM battery cables

1. NVDIMM battery
2. battery cable connecting J_NVDIMM_BATT connector on the system board
3. battery power cable connecting BATT_PWR connector on the system board

NOTE: For information about system board connectors, see [System board jumpers and connectors](#).

System battery

Replacing system battery

Prerequisites

NOTE: There is a danger of a new battery exploding if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. For more information, see the safety information that is shipped with your system.

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

Steps

1. Locate the battery socket. For more information on locating the system battery, see the [System board jumpers and connectors](#) section.

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

2. Use a plastic scribe to pry out the system battery as shown in the illustration below.



Figure 100. Removing the system battery

3. To install a new system battery, hold the battery with the positive side facing up and slide it under the securing tabs.
4. Press the battery into the connector until it snaps into place.



Figure 101. Installing the system battery


Next steps

1. If removed, [install the PEM](#).
2. If removed, [install the expansion card risers](#).
3. If applicable, connect the cables to the expansion card(s).
4. [Install the air shroud](#).
5. Follow the procedure listed in [After working inside your system](#).
6. While booting, press F2 to enter the System Setup and ensure that the battery is operating properly.
7. Enter the correct time and date in the System Setup **Time** and **Date** fields.
8. Exit the System Setup.

Optional internal USB memory key

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 are 15.9 mm wide x 57.15 mm long x 7.9 mm high.

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

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](#).
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. Follow the procedure listed in [After working inside your system](#).
2. While booting, press F2 to enter **System Setup** and verify that the system detects the USB memory key.

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 hard drives.

 **CAUTION:** Do not attempt to remove the TPM plug-in module from the system board. 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, and it cannot be re-installed or installed on another system board.

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

- a. [Air shroud](#)
- b. [Fan cage with cooling fans](#)
- c. [Power supply unit\(s\)](#)
- d. [All expansion cards and risers](#)
- e. [Processor expansion module \(PEM\)](#)
- f. [Integrated storage controller card](#)
- g. [IDSDM module](#)
- h. [Internal USB key \(if applicable\)](#)
- i. [Processor and heat sink module](#)
- j. [Processors](#)

 **CAUTION:** To prevent damage to the processor pins when replacing a faulty system board, ensure that you cover the processor socket with the processor protective cap.

- k. [Memory modules and memory module blanks](#)
- l. [Network daughter card risers](#)
- m. [Cable management bracket](#)

Steps

1. Disconnect all cables from the system board.
2. Holding the system board handle, pull the blue release pin, slide the system board towards the front of the system. Sliding the system board toward the front of the system disengages the connectors from the back of the system slots.
3. Lift the system board out of the system.

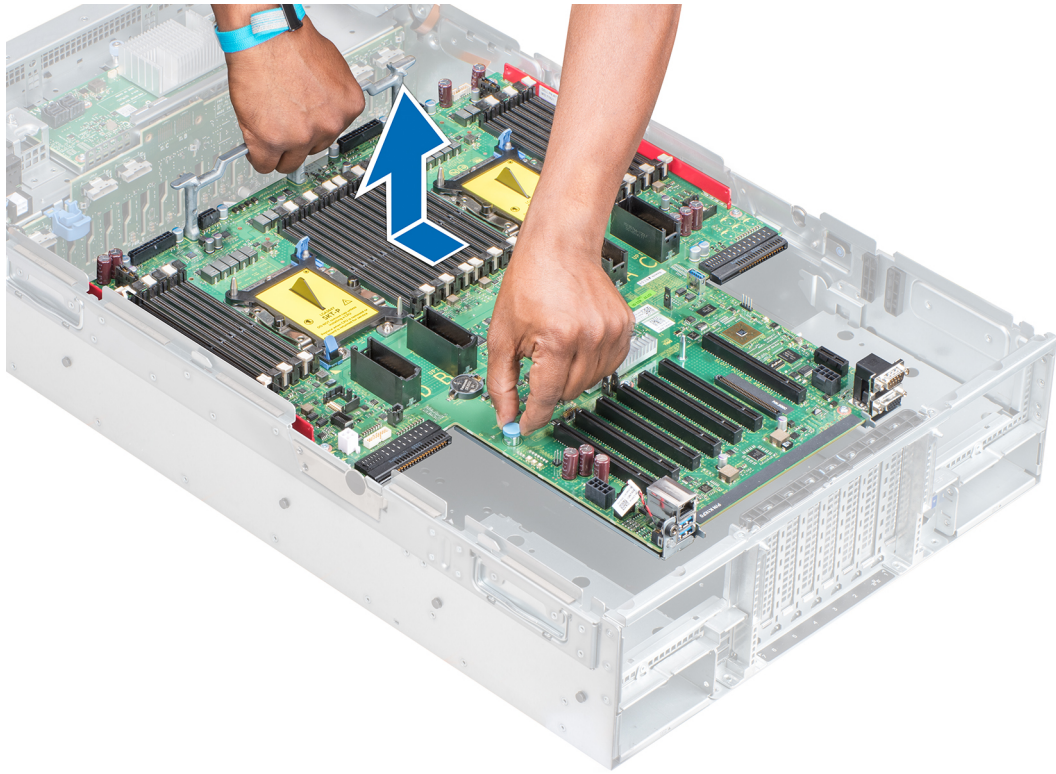


Figure 102. Removing system board

Next steps

Install the system board.

Installing the system board

Prerequisites

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

Steps

1. Unpack the replacement system board assembly.

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

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

2. Holding the system board handle and blue release pin, incline the system board and lower the system board into the system.
3. Slide the system board toward the back of the system until the release pin clicks into place.

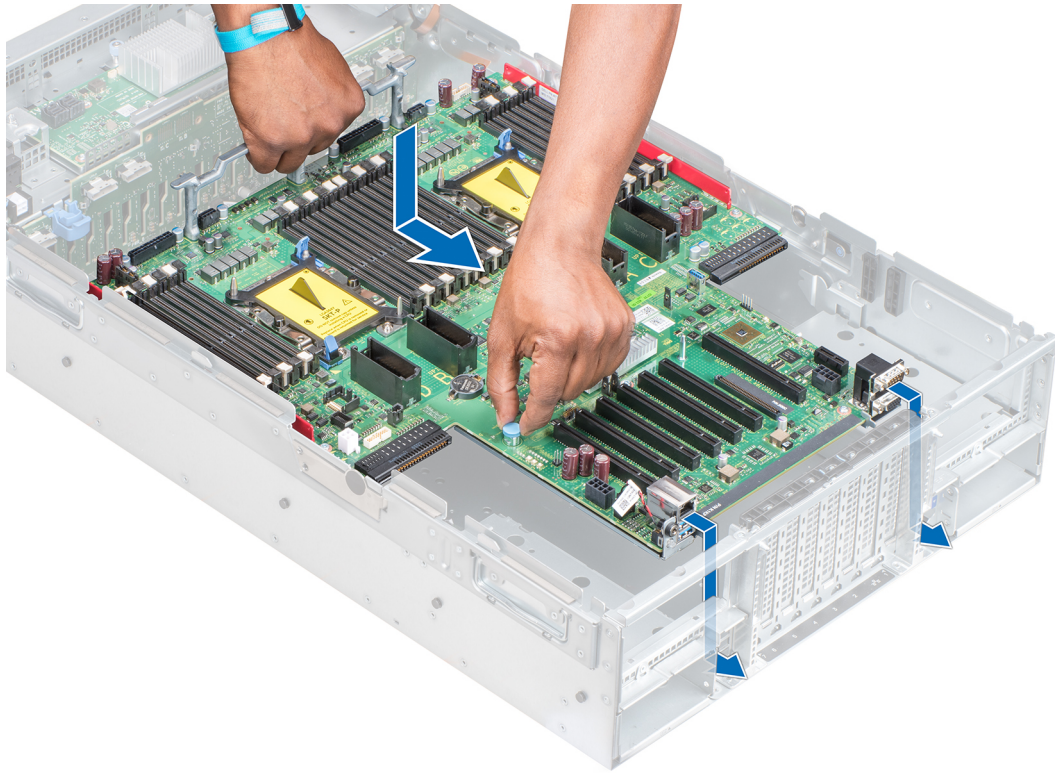


Figure 103. Installing system board

Next steps

1. Replace the following:

- a. [Trusted Platform Module \(TPM\)](#)

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

- b. Cable management bracket
- c. [Integrated storage controller card](#)
- d. [Internal USB key \(if applicable\)](#)
- e. [IDSDM module](#)
- f. [Processor expansion module \(PEM\)](#)
- g. [Expansion cards and risers](#)
- h. [Processor and heat sink module](#)
- i. [Processors](#)
- j. [Memory modules and memory module blanks](#)
- k. [Network daughter card riser](#)
- l. [Fan cage with cooling fans](#)
- m. [Air shroud](#)
- n. [Power supply unit\(s\)](#)

2. Reconnect all cables to the system board.

NOTE: Ensure that the cables inside the system are routed along the chassis wall and secured using the cable securing bracket.

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

4. Ensure that you:

- a. Use the Easy Restore feature to restore the Service Tag. For more information, see the [Restoring the Service Tag by using the Easy Restore feature](#) 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 [Entering the system Service Tag by using System Setup](#) section.
- c. Update the BIOS and iDRAC versions.


- d. Re-enable the Trusted Platform Module (TPM). For more information, see the [Upgrading the Trusted Platform Module](#) section.
5. Import your new or existing iDRAC Enterprise license. For more information, see Integrated Dell Remote Access Controller User's Guide, at www.dell.com/poweredge manuals.

Entering the system Service Tag by using System Setup

If Easy Restore fails to restore the Service Tag, use System Setup to enter the Service Tag.

Steps

1. Turn on the system.
2. Press F2 to enter System Setup.
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. After the Service Tag is entered, it cannot be updated or changed.

5. Click **OK**.
6. Import your new or existing iDRAC Enterprise license.

For more information, see the *Integrated Dell Remote Access Controller User's Guide* at

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

Restoring the Service Tag by using the Easy Restore feature

By using the Easy Restore feature, you can restore your Service Tag, license, UEFI configuration, and the system configuration data after replacing the system board. All data is automatically backed up in a backup flash device. 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.

Steps

1. Turn on the system.
If BIOS detects a new system board, and if the Service Tag is present in the backup flash device, BIOS displays the Service Tag, the status of the license, and the **UEFI Diagnostics** version.
2. Perform one of the following steps:
 - Press **Y** to restore the Service Tag, license, and diagnostics information.
 - Press **N** to navigate to the Dell Lifecycle Controller based restore options.
 - Press F10 to restore data from a previously created **Hardware Server Profile**.After the restore process is complete, BIOS prompts to restore the system configuration data.
3. Perform one of the following steps:
 - Press **Y** to restore the system configuration data.
 - Press **N** to use the default configuration settings.After the restore process is complete, the system restarts.

Trusted Platform Module

Upgrading the Trusted Platform Module


Prerequisites


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

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:** 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. Work with the customer to create and safely store this recovery key. When replacing 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 hard drives.

 **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

Steps

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.

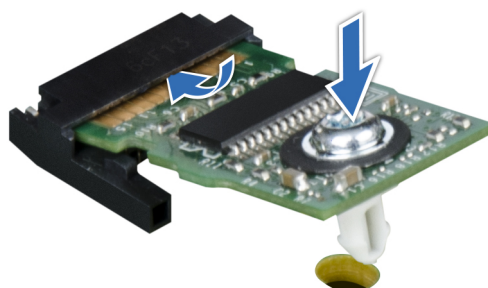


Figure 104. Installing the TPM

Initializing TPM for BitLocker users

Steps

Initialize the TPM.

For more information, see <https://technet.microsoft.com/en-us/library/cc753140.aspx>.

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

Initializing the TPM 1.2 for TXT users

Steps

1. While booting your system, press F2 to enter System Setup.
2. On the **System Setup Main Menu** screen, click **System BIOS > System Security Settings**.
3. From the **TPM Security** option, select **On with Pre-boot Measurements**.
4. From the **TPM Command** option, select **Activate**.
5. Save the settings.
6. Restart your system.
7. Enter **System Setup** again.
8. On the **System Setup Main Menu** screen, click **System BIOS > System Security Settings**.
9. From the **Intel TXT** option, select **On**.

Initializing the TPM 2.0 for TXT users


Steps

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

Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
 2. Follow the procedure listed in [Before working inside your system](#).
 3. [Remove the fan cage](#).
 4. [Remove the air shroud](#).
 5. If installed, [remove the expansion card risers](#).
 6. If installed, [remove the PEM](#).
-  **NOTE:** Ensure that you note the routing of the cables as you remove them from the system board. You must route the cables properly when you replace them to prevent the cables from being pinched or crimped.
7. Press the blue release tabs on the fan tray and lower the sides of the tray.

Steps

1. Press the cable management bracket until the tabs on the bracket disengage from the slots on the right side of the system and lift the cable management bracket from the system.

2. Holding the pull tab, disconnect the control panel cable from the system board.
3. Using a Torx #T30 screwdriver, remove the screws that connect the control panel to the system.
4. Holding the control panel by its sides, remove the control panel away from the system.

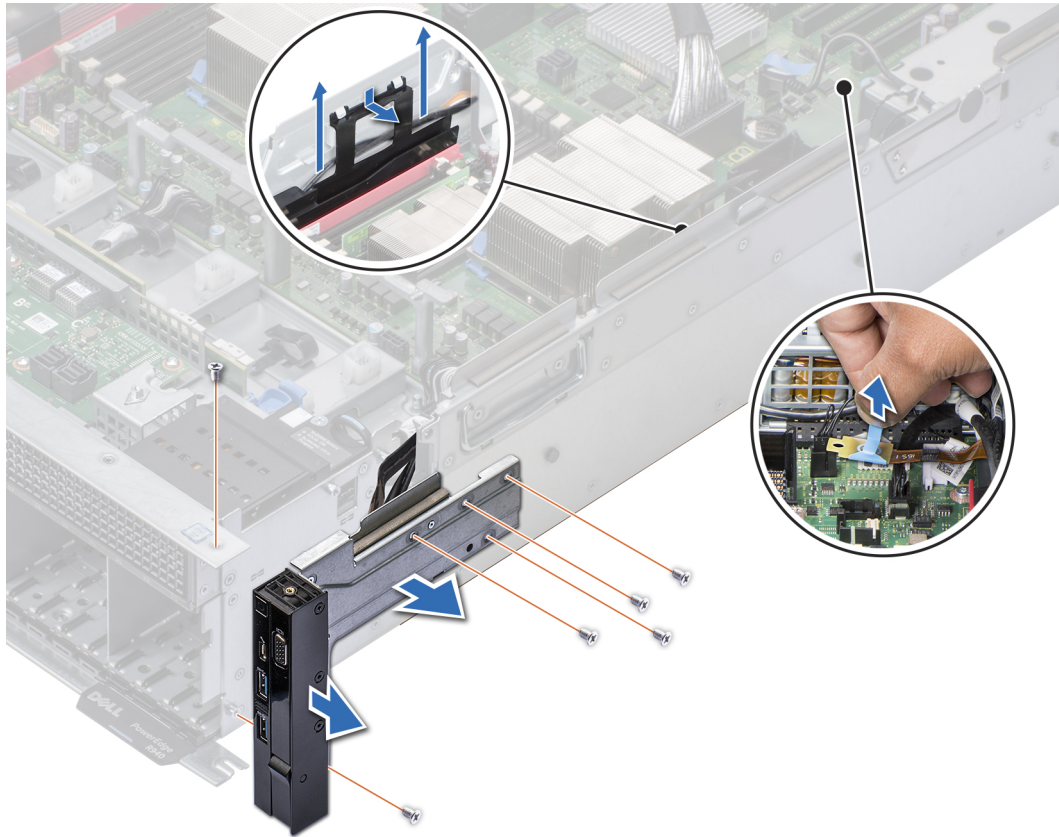


Figure 105. Removing the right control panel

Next steps

Install the right control panel.

Installing the right control panel

Prerequisites

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

Steps

1. Route the cables through the cable routing hooks on the side of the system.
2. Lower the cable management bracket into the system.
3. Press the bracket and insert the tabs on the bracket into the slots on the right side of the system.
4. Align the control panel with the control panel slot on the system and attach the control panel to the system.
5. Connect the control panel cable connector on the system board.
6. Using a Torx #T30 screwdriver, install the screws that secure the control panel to the system.

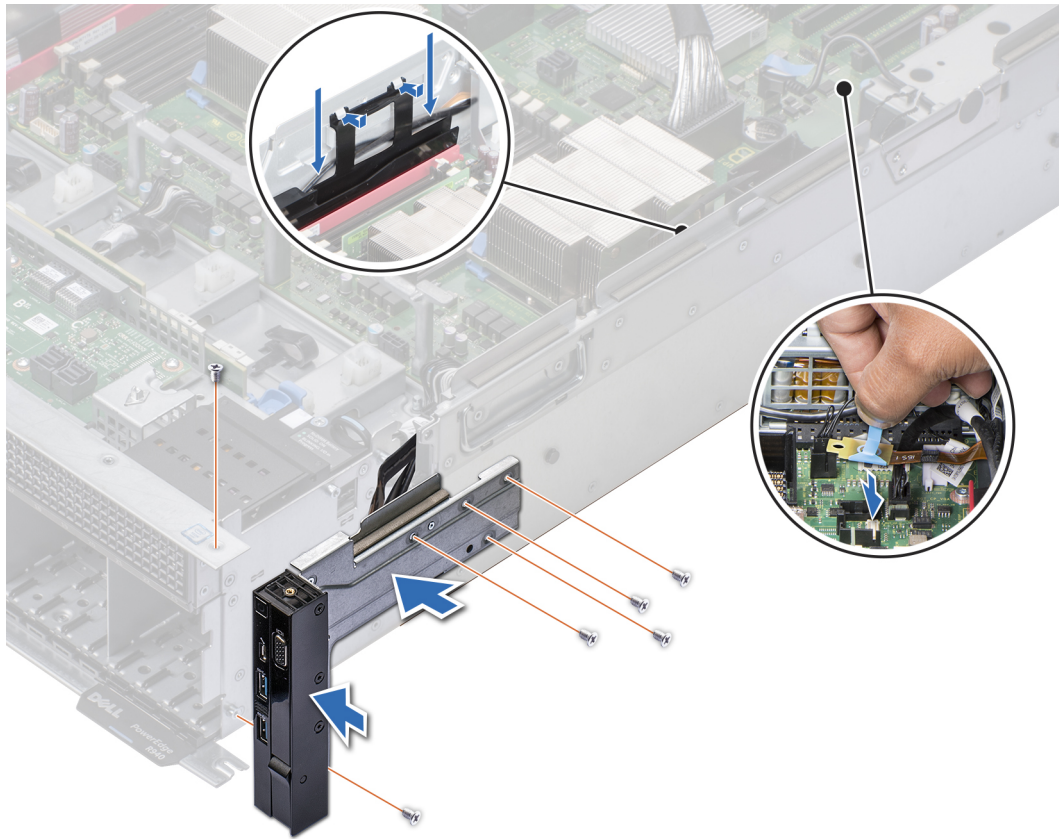


Figure 106. Installing the right control panel

Next steps

1. Lift the sides of the fan tray until the blue release tabs click in place.
2. If removed, [install the expansion card risers](#)
3. If removed, [install the PEM](#).
4. [Install the air shroud](#).
5. [Install the fan cage](#).
6. Follow the procedure listed in [After working inside your system](#).

Removing the left control panel

Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
3. [Remove the fan cage](#).
4. [Remove the air shroud](#).
5. If installed, [remove the expansion card risers](#).
6. If installed, [remove the PEM](#).

NOTE: Ensure that you note the routing of the cables as you remove them from the system. You must route the cables properly when you replace them to prevent the cables from being pinched or crimped.

7. Press the blue release tabs on the fan tray and lower the sides of the tray.

Steps

1. Holding the pull tab, disconnect the control panel cable from the connector on the system board.
2. Using a Torx #T30 screwdriver, remove the screws that secure the left control panel to the system.

3. Holding the control panel by its sides, remove the control panel away from the system.

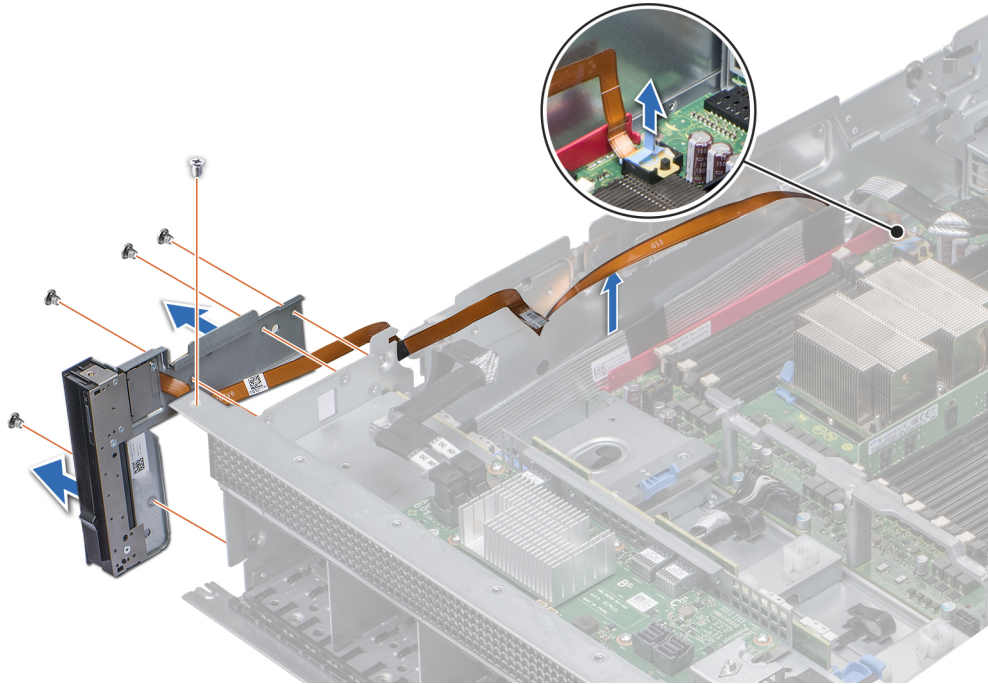


Figure 107. Removing left control panel

Next steps

[Install the left control panel.](#)

Installing the left control panel

Prerequisites

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

Steps

1. Route the control panel cable through the side wall of the system.
2. Align the control panel with the control panel slot on the system and attach the control panel to the system.
3. Connect the control panel cable connector on the system board.
4. Using a Torx #T30 screwdriver, install the screws that secure the control panel to the system.

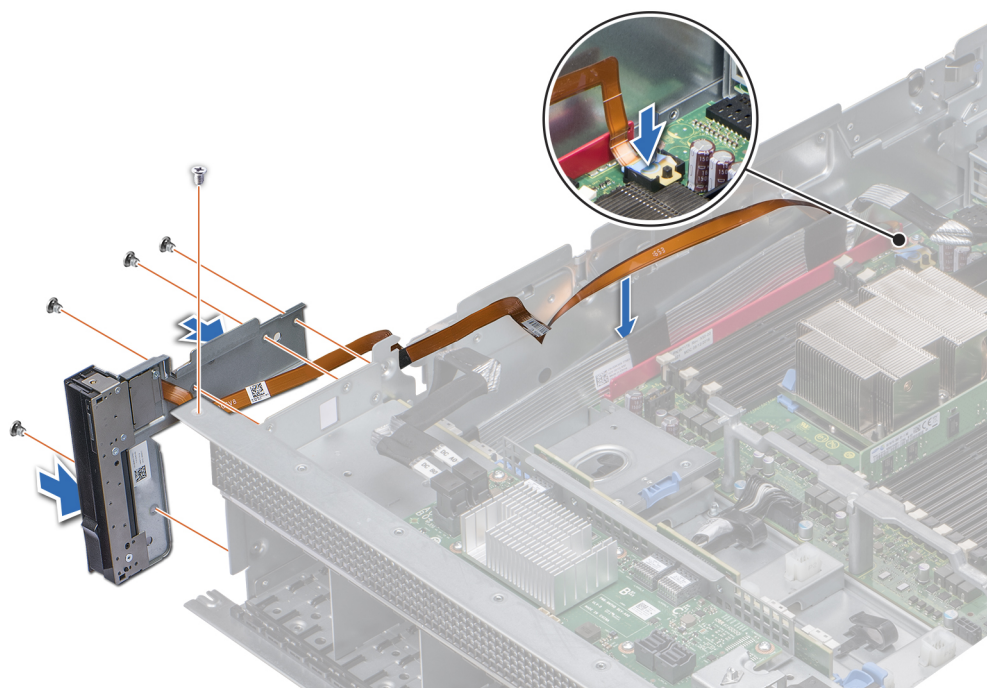


Figure 108. Installing left control panel

Next steps

1. Lift the sides of the fan tray until the blue release tabs click in place.
2. If removed, [install the expansion card risers](#).
3. If removed, [install the PEM](#).
4. [Install the air shroud](#).
5. [Install the fan cage](#).
6. Follow the procedure listed in [After working inside your system](#).


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.

Topics:

- [Dell Embedded System Diagnostics](#)

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.

Steps

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

Running the Embedded System Diagnostics from the Dell Lifecycle Controller

Steps

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.

Menu	Description
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.

PowerEdge R940 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 system board or PEM board. Jumpers on the system board help to disable the system and setup passwords. You must know the connectors on the system board or PEM board to install components and cables correctly.

Topics:

- [System board jumpers and connectors](#)
- [System board jumper settings](#)
- [Disabling forgotten password](#)

System board jumpers and connectors

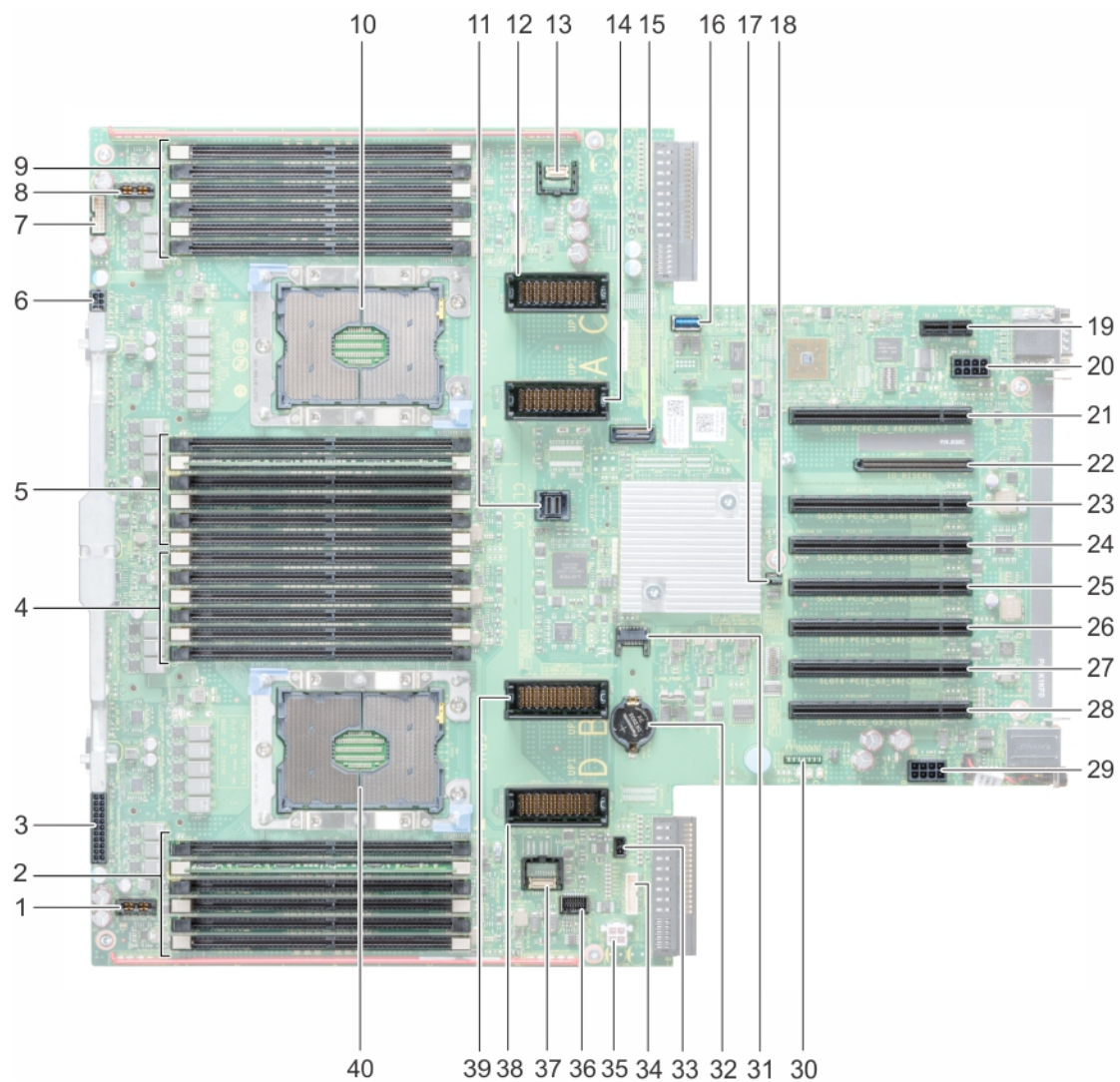


Figure 109. System board jumpers and connectors

Table 29. System board jumpers and connectors

Item	Connector	Description
1	J_PEM_PWR_R	Right PEM power board connector
2	B7, B1, B8, B2, B9, B3	Memory module sockets
3	FAN_MOD2	Fan module cable connector
4	B6, B12, B5, B11, B4, B10	Memory module sockets
5	A7, A1, A8, A2, A9, A3	Memory module sockets
6	J_BP_P1	Backplane 1 power connector
7	J_BP_SIG1	Backplane 1 signal connector
8	J_PEM_PWR_L	Left PEM power board connector
9	A6, A12, A5, A11, A4, A10	Memory module sockets
10	CPU1	CPU1 processor heat sink module socket
11	J_PEM_CLK	PEM clock connector
12	RM_UPI_C	UPI cable connector "C"
13	LFT_CTRL_PNL	Left control panel connector
14	RM_UPI_A	UPI cable connector "A"
15	J_M.2	SATA M.2 connector
16	INT_USB_3.0	Internal USB 3.0 connector
17	PWRD_EN	Reset BIOS password
18	NVRAM_CLR	Clear NVRAM
19	J_IDSDM	iDSDM and vFlash connector
20	PCIE_PWR1	PCIe power connector 1
21	SLOT1 PCIE_G3_X8(CPU1)	PCIe slot 1
22	IO_RISER1	Network daughter card riser connector
23	SLOT2 PCIE_G3_X16(CPU1)	PCIe slot 2
24	SLOT3 PCIE_G3_X16(CPU1)	PCIe slot 3
25	SLOT4 PCIE_G3_X16(CPU2)	PCIe slot 4
26	SLOT5 PCIE_G3_X8(CPU2)	PCIe slot 5
27	SLOT6 PCIE_G3_X8(CPU2)	PCIe slot 6
28	SLOT7 PCIE_G3_X16(CPU2)	PCIe slot 7
29	PCIE_PWR2	PCIe power connector 2
30	System board LED Diagnostic Indicators	System board LED Diagnostic Indicators
31	J_TPM	Trusted Platform Module (TPM) connector
32	BATTERY	System board battery connector
33	INTRUSION	Intrusion switch connector
34	J_NVDIMM_BATT	NVDIMM-N battery connector
35	BATT_PWR	NVDIMM-N battery power connector
36	RM_RGT_CP_GUIDE	VGA to right control panel connector
37	RGT_CTRL_PNL	Right control panel connector

Table 29. System board jumpers and connectors (continued)

Item	Connector	Description
38	RM_UPI_D	UPI cable connector "D"
39	RM_UPI_B	UPI cable connector "B"
40	CPU2	CPU2 processor heat sink module socket

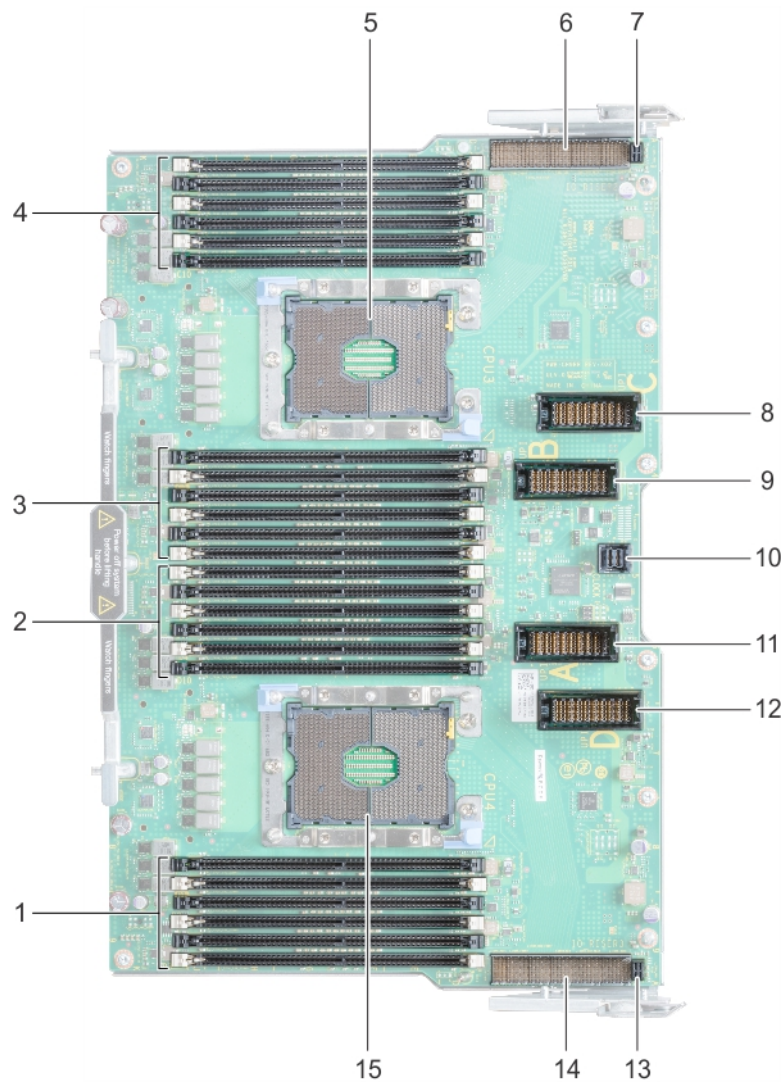


Figure 110. Processor expansion module (PEM) connectors

Table 30. Processor expansion module (PEM) connectors

Item	Connector	Description
1	D7, D1, D8, D2, D9, D3	Memory module sockets
2	D6, D12, D5, D11, D4, D10	Memory module sockets
3	C7, C1, C8, C2, C9, C3	Memory module sockets
4	C6, C12, C5, C11, C4, C10	Memory module sockets
5	CPU3	CPU3 processor heat sink module socket
6	IO_RISER2	Riser 2 connector
7	J_IORL_PWR	Left expansion card riser power connector





Table 30. Processor expansion module (PEM) connectors (continued)

Item	Connector	Description
8	RM_UPI_C	UPI cable connector "C"
9	RM_UPI_B	UPI cable connector "B"
10	J_PEM_CLK	PEM clock connector
11	RM_UPI_A	UPI cable connector "A"
12	RM_UPI_D	UPI cable connector "D"
13	J_IORR_PWR	Right expansion card riser power connector
14	IO_RISER3	Riser 3 connector
15	CPU4	CPU4 processor heat sink module socket

System board jumper settings

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

Table 31. 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.


Prerequisites

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

Steps

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system cover.
3. Move the jumper on the system board jumper from pins 2 and 4 to pins 4 and 6.
4. Install the system cover.


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

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

5. Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.
6. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
7. Remove the system cover.
8. Move the jumper on the system board jumper from pins 4 and 6 to pins 2 and 4.
9. Install the system cover.
10. Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.
11. Assign a new system and/or setup password.

Minimum configuration to POST

The components mentioned below are the minimum configuration to POST:

- Two processor configurations:
 - Two Processors one in each socket, processor 1 and processor 2
 -  **NOTE:** For using Intel 61xx and 81xx series processors, you will need 2 UPI cables. For more information, see the Dell EMC PowerEdge R940 Installation and Service manual.
 - Two memory dimms one for processor 1 on channel A1 and second for processor 2 on channel B1
 - One power supply unit
 - Right control panel and cable (for power button functionality)
 - System board
- Four processor configurations:
 - Four processors in socket processor 1, processor 2, processor 3, and processor 4
 - One memory module (DIMM) on each channel A1, B1, C1, D1 for processor 1, processor 2, processor 3, and processor 4
 - PEM
 - 4 UPI cables and a clock cable
 - Two PEM power boards
 - One power supply unit
 - Right control panel and cable (for power button functionality)
 - System board

Getting help

Topics:

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

Recycling or End-of-Life service information

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

Contacting Dell

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:

Steps

1. Go to www.dell.com/support/home.
2. Select your country from the drop-down menu on the lower right corner of the page.
3. For customized support:
 - a. Enter 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 [Contact Technical Support](#).
 - b. Enter your system Service Tag in the **Enter your Service Tag** field on the Contact Us webpage.

Documentation feedback

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

Accessing system information by using QRL

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

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, LCD diagnostics, 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 www.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 PowerEdge R940 system



Figure 111. Quick Resource Locator for PowerEdge R940 system

Receiving automated support with SupportAssist

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

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

- **Proactive contact** — A Dell EMC Technical Support agent contacts you about the support case and helps you resolve the issue.

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