Dell DSS 2500

Owner's Manual

Regulatory Model: E29S Series
Regulatory Type: E29S002
August 2020
Rev. A03

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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Contents

1

Dell DSS 2500 system overview

The Dell DSS 2500 rack systems support up to:

- Two Intel Xeon E5-2600 v4 or E5-2600 v3 product family processors
- One Intel Xeon E5-1600 v4 or E5-1600 v3 product family processor
- 12 x 3.5-inch or 2.5-inch hot swappable hard drives/SSDs with redundant power supply unit (PSU)
- 16 DIMMs supporting up to 512 GB of memory
- Two AC redundant PSUs

Topics:

Supported configurations for the Dell DSS 2500 system

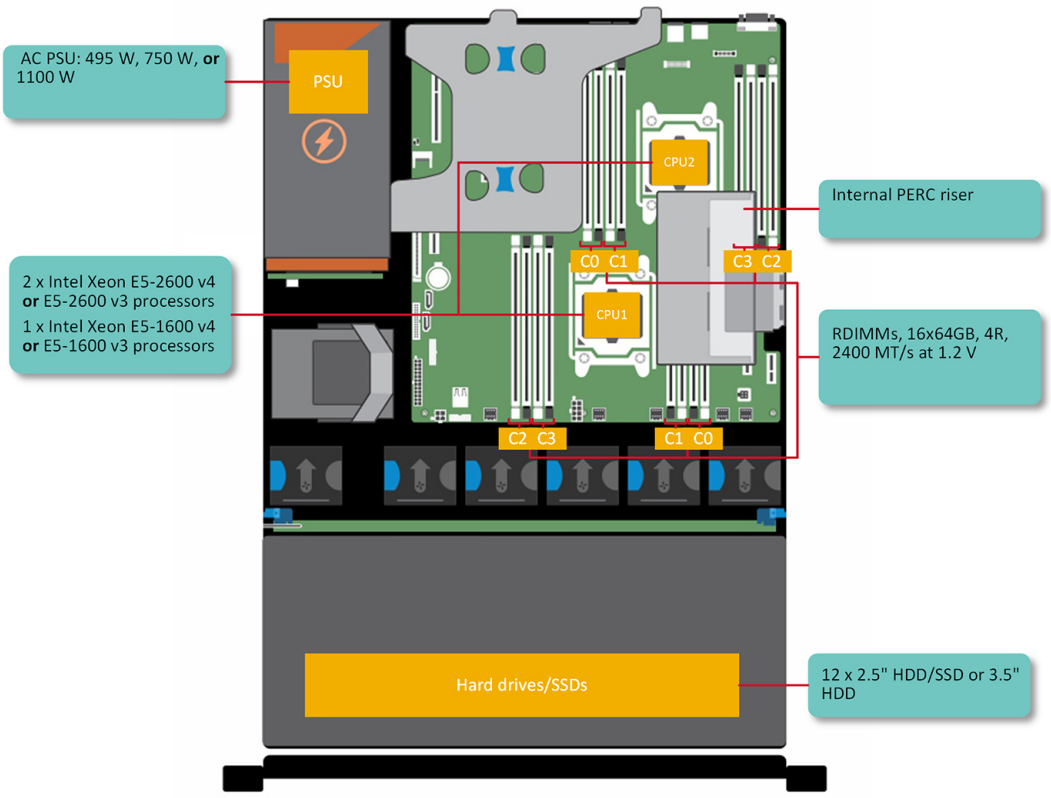

Figure 1. Supported configurations for the DSS 2500 system

Front panel

The front panel provides access to the features available on the front of the server, such as the power button, NMI button, system identification tag, system identification button, and USB and VGA ports. The hot swappable hard drives are accessible from the front panel.

12 x 3.5-inch or 2.5-inch hard drives/SSDs system

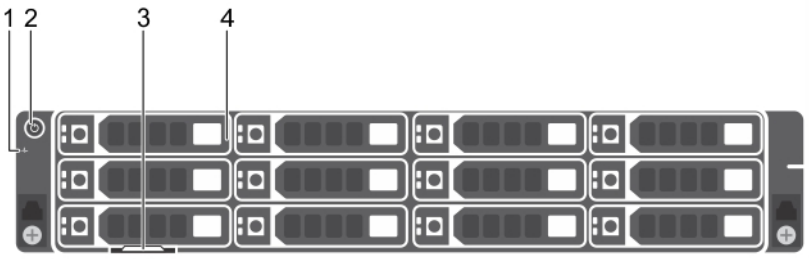

Figure 2. Front panel features of a 12 x 3.5-inch or 2.5-inch hard drives/SSDs system

1. diagnostic indicators
2. power button
3. information tag
4. hard drives or SSDs

Table 1. Front panel features of a 12 x 3.5-inch or 2.5-inch hard drives/SSDs system

Item	Indicator, button, or connector	Icon	Description
1	Diagnostic indicators		The diagnostic indicators light up to display error status. For more information, see the Diagnostic indicators section.
2	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.
3	Information tag		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.
4	Hard drives or SSDs		Up to twelve 3.5 inch or 2.5 inch (in a hybrid drive carrier) hot-swappable hard drives or SSDs. Enable you to install drives that are supported on your system. For more information about drives, see the Technical specifications section.

Related references

Diagnostic indicators on the front panel on page 11
Drive specifications on page 19

Back panel features

The back panel provides access to the features available on the back of the server, such as the system identification button, power supply sockets, cable management arm connectors, NIC ports, and USB and VGA ports. A majority of the expansion card ports can be accessed from the back panel. The hot swappable power supply units are accessible from the back panel.

System without dual riser module

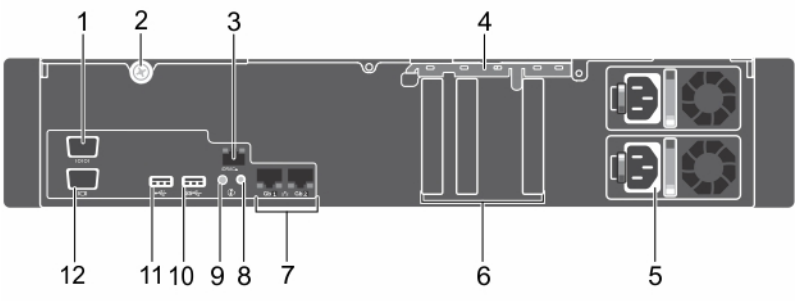

Figure 3. Back panel features of a system without dual riser module

1. serial port
2. retention screw
3. BMC port (optional)
4. PCIe expansion card retainer
5. redundant power supply unit (2)
6. half height PCIe expansion card slots (3)
7. Ethernet ports (2)
8. system identification button
9. system identification port
10. USB 3.0 port
11. USB 2.0 port
12. video port

Table 2. Back panel features of a system without dual riser module

Item	Indicator, button, or connector	Icon	Description
1	Serial port		Enables you to connect a serial device to the system. For more information, see the Technical specifications section.
2	Retention screw		Use the retention screw to secure the system cover to the chassis.
3	BMC port (optional)		Use the dedicated management port for the BMC ports card.
4	PCIe expansion card retainer		Use the PCIe expansion card retainer to lock the PCIe card in place.
5	Redundant power supply unit (2)		495 W EPP, 750 W EPP, or 1100 W EPP PSU1 is the primary PSU of the system. For more information, see the Technical specifications section.
6	Half height PCIe expansion card slots (3)		Use the card slots to connect up to three half-height PCIe expansion cards.
7	Ethernet connectors (2)		Use the Ethernet port to connect Local Area Networks (LANs) to the system. For more information about the supported Ethernet ports, see the Technical specifications section.
8	System identification button		Press the system ID button: 1. To locate a particular system within a rack 2. To turn the system ID on or off.

Table 2. Back panel features of a system without dual riser module (continued)

Item	Indicator, button, or connector	Icon	Description
			NOTE: To reset BMC using system ID, ensure that the system ID button is enabled in the BMC setup. **NOTE:** If the system stops responding during POST, press and hold the system ID button (for more than five seconds) to enter the BIOS progress mode.
9	System identification port		Use the system identification port to connect the system status indicator assembly through the optional cable management arm.
10	USB port		Use the USB 3.0 port to connect USB devices to the system. These ports are 9-pin, USB 3.0 compliant.
11	USB port		Use the USB 2.0 port to connect USB devices to the system. These ports are 4-pin, USB 2.0 compliant.
12	Video port		Use the video/VGA port to connect a display to the system. For more information about the supported video/VGA port, see the Technical specifications section.

Related references

Serial connector on page 20
PSU specifications on page 18
USB ports on page 20
NIC ports on page 20
VGA port on page 20

System with dual riser module

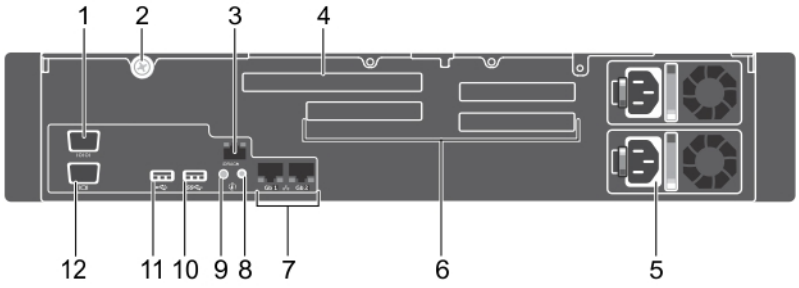

Figure 4. Back panel features of a system with dual riser module

1. serial port
2. retention screw
3. BMC port (optional)
4. full height, full length PCIe expansion card slot (1)
5. redundant power supply unit (2)
6. half height PCIe expansion card slots (3)
7. Ethernet ports (2)
8. system identification button
9. system identification port
10. USB 3.0 port
11. USB 2.0 port
12. video port

Table 3. Back panel features of a system with dual riser module

Item	Indicator, button, or connector	Icon	Description
1	Serial port		Enables you to connect a serial device to the system. For more information, see the Technical specifications section.

Table 3. Back panel features of a system with dual riser module (continued)

Item	Indicator, button, or connector	Icon	Description
2	Retention screw		Use the retention screw to secure the system cover to the chassis.
3	BMC port (optional)		Use the dedicated management port for the BMC ports card.
4	Full height, full length PCIe Expansion card slot (1)		Use the card slots to connect up to one full-height PCIe expansion cards.
5	Redundant power supply unit (2)		495 W EPP, 750 W EPP or 1100 W EPP PSU1 is the primary PSU of the system. For more information, see the Technical specifications section.
6	Half Height PCIe Expansion card slots (3)		Use the card slots to connect up to three half-height PCIe expansion cards.
7	Ethernet ports (2)		Use the Ethernet port to connect Local Area Networks (LANs) to the system. For more information about the supported Ethernet ports, see the Technical specifications section
8	System identification button		Press the system ID button: • To locate a particular system within a rack. • To turn the system ID on or off. To reset BMC, press and hold the button for more than 15 seconds. **NOTE:** To reset BMC using system ID, ensure that the system ID button is enabled in the BMC setup. **NOTE:** If the system stops responding during POST, press and hold the system ID button (for more than five seconds) to enter the BIOS progress mode.
9	System identification port		The System identification port connects the optional system status indicator assembly to the system through the optional cable management arm.
10	USB port		Use the USB 3.0 port to connect USB devices to the system. These ports are 9-pin, USB 3.0 compliant.
11	USB port		Use the USB 2.0 port to connect USB devices to the system. These ports are 4-pin, USB 2.0 compliant.
12	Video port		Enables you to connect a display device to the system. For more information, see the Technical specifications section.

Related references

Serial connector on page 20
PSU specifications on page 18
USB ports on page 20
NIC ports on page 20
VGA port on page 20

Diagnostic indicators on the front panel

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

NOTE: No diagnostic indicators are lit when the system is turned off. To turn on the system, plug it into a working power source and press the power button.

Table 4. Diagnostic indicators

Icon	Description	Condition	Corrective action
	Health indicator	The indicator turns solid blue if the system is in good health.	None required.
		The indicator blinks amber: • When the system is turned on. • When the system is in standby. • If any error condition exists. For example, a failed fan, power supply unit (PSU), or a hard drive.	Check the System Event Log or system messages for the specific issue. For more information about error messages, see the Dell Event and Error Messages Reference Guide at **Dell.com/openmanagemanuals > OpenManage software**. The POST process is interrupted without any video output due to invalid memory configurations. See the Getting help section.

Related references

Getting help on page 157

Hard drive indicator codes

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

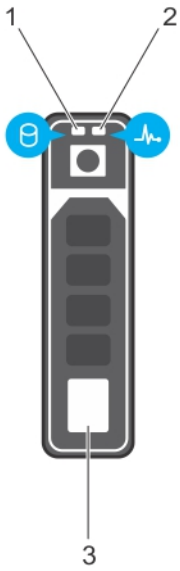

Figure 5. Hard drive indicators

1. Hard drive activity indicator
2. Hard drive status indicator
3. Hard drive

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

Table 5. Hard drive indicator codes

Drive-status indicator pattern	Condition
Flashes green twice per second	Identifying drive or preparing for removal.

Table 5. Hard drive indicator codes (continued)

Drive-status indicator pattern	Condition
Off	Drive ready for insertion or removal. **NOTE:** The drive status indicator remains off until all hard drives are initialized after the system is turned on. Drives are not ready for insertion or 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
Steady green	Drive online
Flashes green for three seconds, amber for three seconds, and then turns off after six seconds	Rebuild stopped

NIC indicator codes

The NIC on the back panel has an indicator that provides information about the network activity and link status. The activity LED indicates whether the NIC is currently connected or not. The link LED indicates the speed of the connected network.

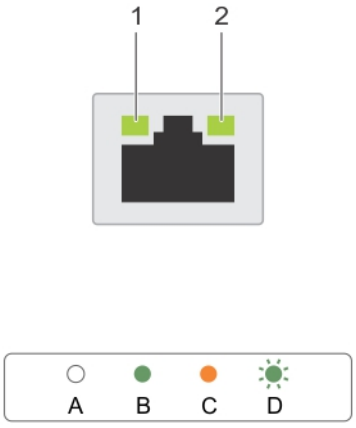

Figure 6. NIC Indicator Codes

1. link indicator
2. activity indicator

Table 6. NIC indicators

Convention	Status	Condition
A	Link and activity indicators are off.	The NIC is not connected to the network.
B	Link indicator is green.	The NIC is connected to a valid network at its maximum port speed (1 Gbps or 10 Gbps).
C	Link indicator is amber	The NIC is connected to a valid network at less than its maximum port speed.
D	Activity indicator is flashing. green	Network data is being sent or received.

Redundant power supply unit indicator codes

Each AC power supply unit (PSU) has an illuminated translucent handle that indicates whether power is present or whether a power fault has occurred.

Figure 7. AC PSU status indicator

1. AC PSU status indicator/handle

Table 7. AC PSU status indicator

Convention	Power Indicator Pattern	Description
A	Green	A valid power source is connected to the PSU and the PSU is operational.
B	Flashing green	When the firmware of the PSU is being updated, the PSU handle flashes green. **CAUTION: Do not disconnect the power cord or unplug the PSU when updating firmware. If firmware update is interrupted, the PSUs will not function.**
C	Flashes green and turns off	When hot-adding a PSU, the PSU handle flashes green five times at 4 Hz rate and turns off. This indicates that there is a PSU mismatch with respect to efficiency, feature set, health status, and supported voltage. **CAUTION: For AC PSUs, use only PSUs with the Extended Power Performance (EPP) label on the back.** **NOTE:** Ensure that both the PSUs are of the same capacity. **NOTE:** Mixing PSUs from previous generations of Dell servers can result in a PSU mismatch condition or failure to turn the system on.
D	Flashing amber	Indicates a problem with the PSU. **CAUTION: When correcting a PSU mismatch, replace only the PSU with the flashing indicator. Swapping the other 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.** **CAUTION: AC PSUs support both 220 V and 110 V input voltages with the exception of Titanium PSUs, which support only 220 V. When two identical PSUs receive different input voltages, they can output different wattages, and trigger a mismatch.**

Table 7. AC PSU status indicator (continued)

Convention	Power Indicator Pattern	Description
		CAUTION: If two PSUs are used, they must be of the same type and have the same maximum output power.
E	Not lit	Power is not connected.

Locating service tag of your system

Your system is identified by a unique Express Service Code and Service Tag number. The Express Service Code is and Service Tag are found on the front of the system by pulling out the information tag. Alternatively, the information may be on a sticker on the chassis of the system. This information is used by Dell to route support calls to the appropriate personnel.

2

Documentation resources

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

Table 8. Documentation resources for system

Task	Document	Location
Setting up your system	For information about installing the system into a rack, see the Rack documentation included with your rack solution.	www.dell.com/xemanuals
	For information about turning on the system and the technical specifications of your system, see the *Getting Started With Your System* that shipped with your system.	www.dell.com/xemanuals
Configuring your system	For information about BMC features, configuring and logging in to BMC, and managing your system remotely, see the Integrated Dell Remote Access Controller User's Guide.	www.dell.com/poweredgemanuals
	For information about installing the operating system, see the operating system documentation.	www.dell.com/operatingsystemmanuals
	For understanding Remote Access Controller Admin (RACADM) subcommands and supported RACADM interfaces, see the RACADM Command Line Reference Guide for iDRAC.	www.dell.com/poweredgemanuals
	For information about updating drivers and firmware, see the Methods to download firmware and drivers section in this document.	www.dell.com/support/drivers
Working with Dell PowerEdge RAID controllers	For understanding the features of the Dell PowerEdge RAID controllers (PERC) and deploying the PERC 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, see the Error Code Lookup.	www.dell.com/qrl
BMC FAQs	For frequently asked questions about BMC, see the Dell BMC FAQ guide.	www.dell.com/xemanuals

3

Technical specifications

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

Topics:

Chassis dimensions

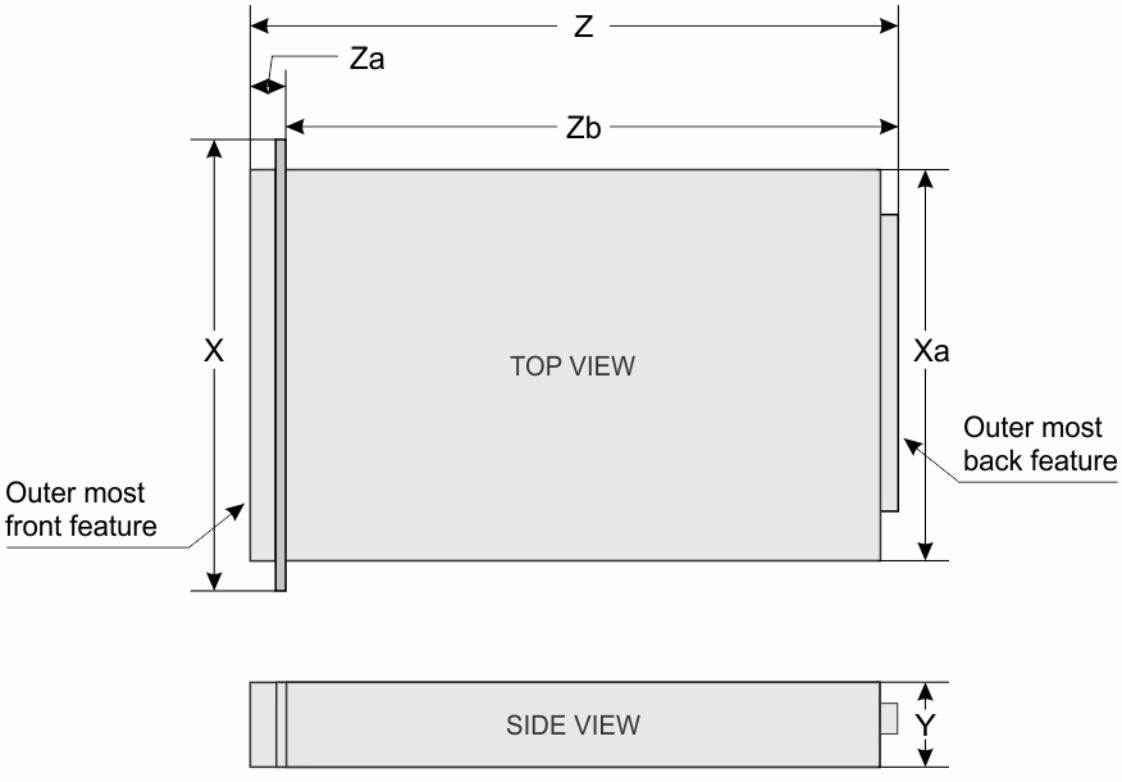

Figure 8. Chassis dimensions of DSS 2500

Table 9. Dimensions of the DSS 2500 system

System	X	Xa	Y	Za	Zb	Z
12 x 3.5-inch or 2.5-inch hard drive systems	482.4 mm (18.9 inch)	434.0 mm (17.08 inch)	86.8 mm (3.41 inch)	20.1 mm (0.79 inch)	646.7 mm (25.46 inch)	666.8 mm (26.25 inch)

Chassis weight

Table 10. Chassis weight

System	Maximum weight
12 x 3.5-inch hard drive or 2.5-inch hard drive/SSD systems	28.2 kg (62.17 lb)

Processor specifications

The DSS 2500 system supports up to two Intel Xeon E5-2600 v4 or E5-2600 v3 product family processors or a single Intel Xeon E5-1600 v4 or E5-1600 v3 product family processor.

PSU specifications

The DSS 2500 system supports up to two AC redundant power supply units (PSUs).

Table 11. PSU specifications

PSU	Class	Heat dissipation (maximum)	Frequency	Voltage	Current
495 W AC	Platinum	1908 BTU/hr	50/60 Hz	100–240 V AC, autoranging	6.5 A-3 A
750 W AC	Platinum	2891 BTU/hr	50/60 Hz	100–240 V AC, autoranging	10 A-5 A
1100 W AC	Platinum	4100 BTU/hr	50/60 Hz	100–240 V AC, autoranging	12 A-6.5 A

NOTE: Heat dissipation is calculated by using the PSU wattage rating.

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

System battery specifications

The DSS 2500 system supports CR 2032 3.0-V lithium coin cell system battery.

Storage controller specifications

The DSS 2500 system supports PERC H330, PERC H730, and PERC H730P storage controllers.

Expansion bus specifications

The Dell DSS 2500 system supports PCI express (PCIe) generation 3 expansion cards, which can be installed on the system board directly or by using expansion card risers. The following tables provide detailed information about the expansion bus specifications:

Table 12. Expansion slots (with optional expansion card risers) specifications

Expansion slots (with optional expansion card risers)	PCIe slots on the riser	Height	Length	Link
Dual riser module	Slot 1	Full height	Full Length	x16
	Slot 2	Low Profile	Half Length	x8
	Slot 3	Low Profile	Half Length	x8
	Slot 4	Low Profile	Half Length	x8
Internal PERC riser	Slot 5	Low Profile	Half Length	x8

Table 13. Expansion slots (without optional expansion card risers) specifications

Expansion slots (without optional expansion card risers)	PCIe slots on the system board	Height	Length	Link
PCIe slots	Slot 1	Low Profile	Half Length	x16
	Slot 2	Low Profile	Half Length	x16
	Slot 3	Low Profile	Half Length	x4

Memory specifications

The DSS 2500 system supports DDR4 registered DIMMs (RDIMMs) at 1866 MT/s, 2133 MT/s, or 2400 MT/s.

Table 14. Memory specifications

Memory module sockets	Memory capacity	Minimum RAM	Maximum RAM
sixteen 288-pins	8 GB and 16 GB (RDIMMs)	• 8 GB with single processor • 16 GB with dual processors (minimum one memory module per processor)	• Up to 256 GB with single processor • Up to 512 GB with dual processors

Drive specifications

The DSS 2500 system supports:

- Up to twelve 3.5 inch or 2.5 inch (with 3.5 inch drive carrier adapters), hot-swappable SAS, SATA, or Nearline SAS hard drives
- Up to twelve 3.5 inch or 2.5 inch (with hybrid drive carriers), hot-swappable SATA SSDs
- Up to two 2.5 inch, internal cabled SATA hard drives

  NOTE: These internal drives are used only for the operating system. They will not be controlled by the RAID controller. These hard drives are controlled by the PCH chipset.

Ports and connectors specifications

USB ports

The DSS 2500 system supports USB 2.0 and 3.0-compliant ports on the back panel.

Table 15. USB specifications

System	Back panel
12 x 3.5-inch or 2.5-inch hard drive/SSD	• One 9-pin, USB 3.0-compliant port • One 4-pin, USB 2.0-compliant port

NIC ports

The DSS 2500 system supports two 10/100/1000 Mbps Network Interface Controller (NIC) ports on the back panel.

VGA port

The Video Graphic Array (VGA) port enables you to connect the system to a VGA display. The DSS 2500 system supports one 15-pin VGA port on the back panel.

Remote management port

The DSS 2500 system supports one dedicated 1Gbe Ethernet port with optional card and up to two optional shared NIC ports.

Serial connector

The serial connector connects a serial device to the system. The DSS 2500 system supports one serial connector on the back panel, which is a 9-pin connector, Data Terminal Equipment (DTE), 16550-compliant.

Internal SAS connector

The DSS 2500 system supports one internal Mini-SAS connector.

Video specifications

The DSS 2500 system supports Integrated Matrox G200 graphics card with 16 MB capacity.

Environmental specifications

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

Table 16. Temperature specifications

Temperature	Specifications
Storage	–40°C to 65°C (–40°F to 149°F)
Continuous operation (for altitude less than 950 m or 3117 ft)	10°C to 35°C (50°F to 95°F) with no direct sunlight on the equipment. **NOTE:** Maximum of 145 W 22 core processor is supported in systems with eight 2.5-inches drives, two PCI slot chassis, and 75 W single wide active GPU.

Table 16. Temperature specifications (continued)

Temperature	Specifications
Fresh air	For information about fresh air, see Expanded Operating Temperature section.
Maximum temperature gradient (operating and storage)	20°C/h (36°F/h)

Table 17. Relative humidity specifications

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

Table 18. Maximum vibration specifications

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

Table 19. Maximum shock specifications

Maximum shock	Specifications
Operating	Six consecutively executed shock pulses in the positive and negative x, y, and z axes of 40 G for up to 2.3 ms.
Storage	Six consecutively executed shock pulses in the positive and negative x, y, and z axes (one pulse on each side of the system) of 71 G for up to 2 ms.

Table 20. Maximum altitude specifications

Maximum altitude	Specifications
Operating	30482000 m (10,0006560 ft)
Storage	12,000 m (39,370 ft)

Table 21. Operating temperature de-rating specifications

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

Particulate and gaseous contamination specifications

The following table defines the limitations that help avoid any equipment damage or failure from particulates and gaseous contamination. If the level of particulates or gaseous pollution exceed the specified limitations and result in equipment damage or failure, you may need to rectify the environmental conditions. Re-mediation of environmental conditions is the responsibility of the customer.

Table 22. Particulate contamination specifications

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

Table 23. Gaseous contamination specifications

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

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

Expanded operating temperature

Table 24. Expanded operating temperature specifications

Expanded operating temperature	Specifications
Continuous operation	5°C to 40°C at 5% to 85% RH with 29°C dew point. **NOTE:** Outside the standard operating temperature (10°C to 35°C), the system can operate continuously in temperatures as low as 5°C and as high as 40°C. For temperatures between 35°C and 40°C, de-rate maximum allowable dry bulb temperature by 1°C per 175 m above 950 m (1°F per 319 ft).
≤ 1% of annual operating hours	–5°C to 45°C at 5% to 90% RH with 29°C dew point. **NOTE:** Outside the standard operating temperature (10°C to 35°C), the system can operate down to –5°C or up to 45°C for a maximum of 1% of its annual operating hours. For temperatures between 40°C and 45°C, de-rate maximum allowable temperature by 1°C per 125 m above 950 m (1°F per 228 ft).

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

NOTE: When operating in the expanded temperature range, ambient temperature warnings maybe reported in the System Event Log.

4

Initial system setup and configuration

Topics:

Setting up your system

Complete 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 your system *Rack Installation Placemat* at **Dell.com/dssmanuals**.
3. Connect the peripherals to the system.
4. Connect the system to its electrical outlet.
5. Turn the system on by pressing the power button.
6. Turn on the attached peripherals.

Options to set up BMC IP address

You must configure the initial network settings based on your network infrastructure to enable the communication to and from BMC. You can set up the IP address by using one of the following interfaces:

Interfaces	Document/Section
iDRAC Settings utility	See *Dell Integrated Dell Remote Access Controller User's Guide* at **Dell.com/idracmanuals**
Dell Deployment Toolkit	See *Dell Deployment Toolkit User's Guide* at **Dell.com/openmanagemanuals**
Remote Access Controller Admin (RACADM)	See *RACADM Command Line Interface Reference Guide* and *Integrated Dell Remote Access Controller User's Guide* at **Dell.com/idracmanuals**
Remote Services that include Web Services Management (WS-Man)	See *Dell Integrated Dell Remote Access Controller User's Guide* at **Dell.com/idracmanuals**

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

NOTE: To access BMC, ensure that you install the remote management port card or connect the network cable to the Ethernet connector 1 on the system board.

NOTE: Ensure that you change the default user name and password after setting up the BMC IP address.

Log in to BMC

You can log in to BMC as:

- BMC local user
- Microsoft Active Directory user
- Lightweight Directory Access Protocol (LDAP) user

The default user name and password are `root` and `calvin`. You can also log in by using Single Sign-On or Smart Card.

NOTE: You must have BMC local credentials to log in to BMC local.

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

You can also access iDRAC by using RACADM. For more information, see the *RACADM Command Line Interface Reference Guide* and the *Integrated Dell Remote Access Controller User's Guide* available at Dell.com/idracmanuals.

Options to install the operating system

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

Table 25. Resources to install the operating system

Resources	Location
Dell Systems Management Tools and Documentation media	https://www.dell.com/operatingsystemmanuals
Dell certified VMware ESXi	https://www.dell.com/virtualizationsolutions
Supported operating systems on Dell DSS systems	www.dell.com/ossupport

Methods to download firmware and drivers

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

Table 26. Firmware and drivers

Methods	Location
From the Dell Support site	Global Technical Support
Using BMC	Dell.com/idracmanuals

Downloading the 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 Dell.com/support/drivers.
2. In the **Drivers & Downloads** section, type the Service Tag of your system in the **Service Tag or Express Service Code** box, and then click **Submit**.

   NOTE: If you do not have the Service Tag, select **Detect My Product** to allow the system to automatically detect your Service Tag, or in **General support**, navigate to your product.

3. Click **Drivers & Downloads**.
   The drivers that are applicable to your selection are displayed.
4. Download the drivers to a USB drive, CD, or DVD.

5

Pre-operating system management applications

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

Topics:

Options to manage the pre-operating system applications

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

- System Setup
- Boot Manager
- Preboot Execution Environment (PXE)

Related concepts

System Setup on page 26
Boot Manager on page 51
PXE boot on page 52

System Setup

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

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

You can access system setup by using two methods:

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

Related references

System Setup details on page 27

Related tasks

Viewing System Setup on page 27

Viewing System Setup

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

Steps

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

```
F2 = System Setup
```

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

Related concepts

System Setup on page 26

Related references

System Setup details on page 27

System Setup details

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

Option	Description
System BIOS	Enables you to configure BIOS settings.
iDRAC Settings	Enables you to configure BMC settings. The iDRAC settings utility is an interface to set up and configure the BMC parameters by using UEFI. You can enable or disable various BMC parameters by using the iDRAC settings utility. For more information about this utility, see *Integrated Dell Remote Access Controller 8 User's Guide* at **Dell.com/idracmanuals**.
Device Settings	Enables you to configure device settings.

Related concepts

System Setup on page 26

Related references

iDRAC Settings utility on page 50
Device Settings on page 51

Related tasks

Viewing System Setup on page 27

System BIOS

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

Related references

System BIOS Settings details on page 28
Boot Settings on page 29

Network Settings on page 31
System Information on page 37
Memory Settings on page 39
Processor Settings on page 40
SATA Settings on page 42
Integrated Devices on page 43
Serial Communication on page 45
System Profile Settings on page 46
Miscellaneous Settings on page 48
iDRAC Settings utility on page 50
Device Settings on page 51
System Security on page 33

Related tasks

Viewing System BIOS on page 28

Viewing System BIOS

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

Steps

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

```
F2 = System Setup
```

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

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

Related references

System BIOS on page 27
System BIOS Settings details on page 28

System BIOS Settings details

About this task

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

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

Option	Description
Serial Communication	Specifies options to manage the serial ports and specify related features and options.
System Profile Settings	Specifies options to change the processor power management settings, memory frequency, and so on.
System Security	Specifies options to configure the system security settings, such as system password, setup password, Trusted Platform Module (TPM) security. It also manages the power and NMI buttons on the system.
Miscellaneous Settings	Specifies options to change the system date, time, and so on.

Related references

System BIOS on page 27

Related tasks

Viewing System BIOS on page 28

Boot Settings

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

Related references

System BIOS on page 27
Choosing the system boot mode on page 30

Related tasks

Boot Settings details on page 30
Viewing Boot Settings on page 29
Changing the boot order on page 31

Viewing Boot Settings

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

Steps

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

```
F2 = System Setup
```

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

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

Related references

Boot Settings on page 29
Choosing the system boot mode on page 30

Related tasks

Boot Settings details on page 30
Changing the boot order on page 31

Boot Settings details

About this task

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

Option	Description
Boot Mode	Enables you to set the boot mode of the system. **CAUTION: Switching the boot mode may prevent the system from booting if the operating system is not installed in the same boot mode.** If the operating system supports UEFI, you can set this option to **UEFI**. Setting this field to **BIOS** allows compatibility with non-UEFI operating systems. This option is set to **BIOS** by default. **NOTE:** Setting this field to **UEFI** disables the **BIOS Boot Settings** menu. Setting this field to **BIOS** disables the **UEFI Boot Settings** menu.
Boot Sequence Retry	Enables or disables the Boot Sequence Retry feature. If this option is set to **Enabled** and the system fails to boot, the system reattempts the boot sequence after 30 seconds. This option is set to **Enabled** by default.
Hard-Disk Failover	Specifies the hard drive that is booted in the event of a hard drive failure. The devices are selected in the **Hard-Disk Drive Sequence** on the **Boot Option Setting** menu. When this option is set to **Disabled**, only the first hard drive in the list is attempted to boot. When this option is set to **Enabled**, all hard drives are attempted to boot in the order selected in the **Hard-Disk Drive Sequence**. This option is not enabled for UEFI Boot Mode.

Related references

Boot Settings on page 29
Choosing the system boot mode on page 30

Related tasks

Viewing Boot Settings on page 29
Changing the boot order on page 31

Choosing the system boot mode

System Setup enables you to specify one of the following boot modes for installing your operating system:

- BIOS boot mode (the default) is the standard BIOS-level boot interface.
- Unified Extensible Firmware Interface (UEFI) (the default) boot mode is an enhanced 64-bit boot interface. If you have configured your system to boot to UEFI mode, it replaces the system BIOS.

1. From the **System Setup Main Menu**, click **Boot Settings**, and select **Boot Mode**.
2. Select the boot mode you want the system to boot into.
   CAUTION: Switching the boot mode may prevent the system from booting if the operating system is not installed in the same boot mode.
3. After the system boots in the specified boot mode, proceed to install your operating system from that mode.

NOTE:

- Operating systems must be UEFI-compatible to be installed from the UEFI boot mode. DOS and 32-bit operating systems do not support UEFI and can only be installed from the BIOS boot mode.
- For the latest information about supported operating systems, go to Dell.com/ossupport.

Related references

Boot Settings on page 29

Related tasks

Boot Settings details on page 30
Viewing Boot Settings on page 29

Changing the boot order

About this task

You may have to change the boot order if you want to boot from a USB key or an optical drive. The following instructions may vary if you have selected **BIOS** for **Boot Mode**.

Steps

1. On the **System Setup Main Menu** screen, click **System BIOS** > **Boot Settings**.
2. Click **Boot Option Settings** > **Boot Sequence**.
3. Use the arrow keys to select a boot device, and use the plus (+) and minus (-) sign keys to move the device down or up in the order.
4. Click **Exit**, and then click **Yes** to save the settings on exit.

Related references

Boot Settings on page 29

Related tasks

Boot Settings details on page 30
Viewing Boot Settings on page 29

Network Settings

You can use the **Network Settings** screen to modify PXE device settings. The network settings option is available only in the UEFI mode.

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

Related concepts

UEFI iSCSI Settings on page 32

Related references

Network Settings screen details on page 32
UEFI iSCSI Settings details on page 33
System BIOS on page 27

Related tasks

Viewing Network Settings on page 32
Viewing UEFI iSCSI Settings on page 33

Viewing Network Settings

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

Steps

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

```
F2 = System Setup
```

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

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

Related references

Network Settings on page 31
Network Settings screen details on page 32

Network Settings screen details

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

About this task

Option	Description
PXE Device n (n = 1 to 2)	Enables or disables the device. When enabled, a UEFI boot option is created for the device.
PXE Device n Settings(n = 1 to 2)	Enables you to control the configuration of the PXE device.

Related references

Network Settings on page 31

Related tasks

Viewing Network Settings on page 32

UEFI iSCSI Settings

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

Related references

UEFI iSCSI Settings details on page 33

Related tasks

Viewing UEFI iSCSI Settings on page 33

Viewing UEFI iSCSI Settings

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

Steps

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

```
F2 = System Setup
```

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

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

Related references

UEFI iSCSI Settings on page 32

UEFI iSCSI Settings details

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

Option	Description
ISCSI Initiator Name	Specifies the name of the iSCSI initiator (iqn format).
ISCSI Device n (n = 1 to 4)	Enables or disables the iSCSI device. When disabled, a UEFI boot option is created for the iSCSI device automatically.

System Security

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

Related references

Operating with a setup password enabled on page 37
System BIOS on page 27

Related tasks

System Security Settings details on page 34
Viewing System Security on page 33
Creating a system and setup password on page 36
Using your system password to secure your system on page 36
Deleting or changing system and setup password on page 37

Viewing System Security

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

Steps

1. Turn on, or restart your system.

2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

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

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

Related references

System Security on page 33

Related tasks

System Security Settings details on page 34

System Security Settings details

About this task

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

Option	Description
Intel AES-NI	Improves the speed of applications by performing encryption and decryption by using the Advanced Encryption Standard Instruction Set (AES-NI). This option is set to **Enabled** by default.
System Password	Sets the system password. This option is set to **Enabled** by default and is read-only if the password jumper is not installed in the system.
Setup Password	Sets the setup password. This option is read-only if the password jumper is not installed in the system.
Password Status	Locks the system password. This option is set to **Unlocked** by default.
TPM Security	**NOTE:** The TPM menu is available only when the TPM module is installed. Enables you to control the reporting mode of the TPM. The **TPM Security** option is set to **Off** by default. You can only modify the TPM Status, TPM Activation, and Intel TXT fields if the **TPM Status** field is set to either **On with Pre-boot Measurements** or **On without Pre-boot Measurements**.
TPM Information	Changes the operational state of the TPM. This option is set to **No Change** by default.
TPM Status	Specifies the TPM status.
TPM Command	**CAUTION: Clearing the TPM results in the loss of all keys in the TPM. The loss of TPM keys may affect booting to the operating system.** Clears all the contents of the TPM. The **TPM Clear** option is set to **No** by default.
Intel TXT	Enables or disables the Intel Trusted Execution Technology (TXT) option. To enable the **Intel TXT** option, virtualization technology and TPM Security must be enabled with Pre-boot measurements. This option is set to **Off** by default.
Power Button	Enables or disables the power button on the front of the system. This option is set to **Enabled** by default.
NMI Button	Enables or disables the NMI button on the front of the system. This option is set to **Disabled** by default.
AC Power Recovery	Sets how the system behaves after AC power is restored to the system. This option is set to **Last** by default.
AC Power Recovery Delay	Sets the time delay for the system to power up after AC power is restored to the system. This option is set to **Immediate** by default.
User Defined Delay (60s to 240s)	Sets the **User Defined Delay** option when the **User Defined** option for **AC Power Recovery Delay** is selected.

Option	Description
UEFI Variable Access	Provides varying degrees of securing UEFI variables. When set to **Standard** (the default), UEFI variables are accessible in the operating system per the UEFI specification. When set to **Controlled**, selected UEFI variables are protected in the environment and new UEFI boot entries are forced to be at the end of the current boot order.
Secure Boot Policy	When Secure Boot policy is set to **Standard**, the BIOS uses the system manufacturer's key and certificates to authenticate pre-boot images. When Secure Boot policy is set to **Custom**, the BIOS uses the user-defined key and certificates. Secure Boot policy is set to **Standard** by default.
Secure Boot Policy Summary	Specifies the list of certificates and hashes that secure boot uses to authenticate images.

Related references

System Security on page 33

Related tasks

Viewing System Security on page 33

Secure Boot Custom Policy Settings

Secure Boot Custom Policy Settings is displayed only when **Secure Boot Policy** is set to **Custom**.

Viewing Secure Boot Custom Policy Settings

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

Steps

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

```
F2 = System Setup
```

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

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **System Security**.
5. On the **System Security** screen, click **Secure Boot Custom Policy Settings**.

Secure Boot Custom Policy Settings details

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

Option	Description
Platform Key	Imports, exports, deletes, or restores the platform key (PK).
Key Exchange Key Database	Enables you to import, export, delete, or restore entries in the Key Exchange Key (KEK) Database.
Authorized Signature Database	Imports, exports, deletes, or restores entries in the Authorized Signature Database (db).
Forbidden Signature Database	Imports, exports, deletes, or restores entries in the Forbidden Signature Database (dbx).

Creating a system and setup password

Prerequisites

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

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

Steps

1. To enter System Setup, press F2 immediately after turning on or rebooting your system.
2. On the **System Setup Main Menu** screen, click **System BIOS** > **System Security**.
3. On the **System Security** screen, verify that **Password Status** is set to **Unlocked**.
4. In the **System Password** field, type your system password, and press Enter or Tab.
   Use the following guidelines to assign the system password:
   - A password can have up to 32 characters.
   - The password can contain the numbers 0 through 9.
   - Only the following special characters are allowed: space, (”), (+), (,), (-), (.), (/), (;), ([), (\), (]), (`).

   A message prompts you to reenter the system password.
5. Reenter the system password, and click **OK**.
6. In the **Setup Password** field, type your setup password and press Enter or Tab.
   A message prompts you to reenter the setup password.
7. Reenter the setup password, and click **OK**.
8. Press Esc to return to the System BIOS screen. Press Esc again.
   A message prompts you to save the changes.
   NOTE: Password protection does not take effect until the system reboots.

Related references

System board jumper settings on page 143

Using your system password to secure your system

About this task

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

Steps

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

Next steps

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

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

Related references

System Security on page 33

Deleting or changing system and setup password

Prerequisites

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

Steps

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

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

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

Related references

System Security on page 33

Operating with a setup password enabled

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

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

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

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

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

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

Related references

System Security on page 33

Related tasks

Viewing System Security on page 33

System Information

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

Related references

System Information details on page 38
System BIOS on page 27

Related tasks

Viewing System Information on page 38

Viewing System Information

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

Steps

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

```
F2 = System Setup
```

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

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

Related references

System Information on page 37

System Information details

About this task

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

Option	Description
System Model Name	Specifies the system model name.
System BIOS Version	Specifies the BIOS version installed on the system.
System Management Engine Version	Specifies the current version of the Management Engine firmware.
System Service Tag	Specifies the system Service Tag.
System Manufacturer	Specifies the name of the system manufacturer.
System Manufacturer Contact Information	Specifies the contact information of the system manufacturer.
System CPLD Version	Specifies the current version of the system complex programmable logic device (CPLD) firmware.
UEFI Compliance Version	Specifies the UEFI compliance level of the system firmware.

Related references

System Information on page 37
System Information details on page 38

Related tasks

Viewing System Information on page 38

Memory Settings

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

Related references

Memory Settings details on page 39
System BIOS on page 27

Related tasks

Viewing Memory Settings on page 39

Viewing Memory Settings

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

Steps

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

```
F2 = System Setup
```

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

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

Related references

Memory Settings on page 39
Memory Settings details on page 39

Memory Settings details

About this task

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

Option	Description
System Memory Size	Specifies the memory size in the system.
System Memory Type	Specifies the type of memory installed in the system.
System Memory Speed	Specifies the memory speed.
System Memory Voltage	Specifies the memory voltage.
Video Memory	Specifies the amount of video memory.
System Memory Testing	Specifies whether the memory tests are run during system boot. Options are **Enabled** and **Disabled**. This option is set to **Disabled** by default.

Option	Description
Memory Operating Mode	Specifies the memory operating mode. The options available are **Optimizer Mode**, **Advanced ECC Mode**, **Mirror Mode**, **Spare Mode**, **Spare with Advanced ECC Mode**. This option is set to **Optimizer Mode** by default. **NOTE:** The **Memory Operating Mode** option can have different default and available options based on the memory configuration of your system.
Node Interleaving	Specifies if the Non-Uniform Memory Architecture (NUMA) is supported. If this field is set to **Enabled**, memory interleaving is supported if a symmetric memory configuration is installed. If the field is set to **Disabled**, the system supports NUMA (asymmetric) memory configurations. This option is set to **Disabled** by default.
Snoop Mode	Specifies the Snoop Mode options. The Snoop Mode options available are **Home Snoop**, **Early Snoop**, and **Cluster on Die**. This option is set to **Early Snoop** by default. This field is available only when the **Node Interleaving** is set to **Disabled**.

Related references

Memory Settings on page 39

Related tasks

Viewing Memory Settings on page 39

Processor Settings

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

Related references

Processor Settings details on page 41
System BIOS on page 27

Related tasks

Viewing Processor Settings on page 40

Viewing Processor Settings

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

Steps

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

```
F2 = System Setup
```

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

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

Related references

Processor Settings on page 40
Processor Settings details on page 41

Processor Settings details

About this task

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

Option	Description
Logical Processor	Enables or disables the logical processors and displays the number of logical processors. If this option is set to **Enabled**, the BIOS displays all the logical processors. If this option is set to **Disabled**, the BIOS displays only one logical processor per core. This option is set to **Enabled** by default.
Alternate RTID (Requestor Transaction ID) Setting	Modifies Requestor Transaction IDs, which are QPI resources. This option is set to **Disabled** by default. **NOTE:** Enabling this option may negatively impact the overall system performance.
Virtualization Technology	Enables or disables the additional hardware capabilities provided for virtualization. This option is set to **Enabled** by default.
Address Translation Service (ATS)	Defines the Address Translation Cache (ATC) for devices to cache the DMA transactions. This option provides an interface between CPU and DMA Memory Management to a chipset's Address Translation and Protection Table to translate DMA addresses to host addresses. This option is set to **Enabled** by default.
Adjacent Cache Line Prefetch	Optimizes the system for applications that need high utilization of sequential memory access. This option is set to **Enabled** by default. You can disable this option for applications that need high utilization of random memory access.
Hardware Prefetcher	Enables or disables the hardware prefetcher. This option is set to **Enabled** by default.
DCU Streamer Prefetcher	Enables or disables the Data Cache Unit (DCU) streamer prefetcher. This option is set to **Enabled** by default.
DCU IP Prefetcher	Enables or disables the Data Cache Unit (DCU) IP prefetcher. This option is set to **Enabled** by default.
Logical Processor Idling	Enables you to improve the energy efficiency of a system. It uses the operating system core parking algorithm and parks some of the logical processors in the system which in turn allows the corresponding processor cores to transition into a lower power idle state. This option can only be enabled if the operating system supports it. It is set to **Disabled** by default.
Configurable TDP	Enables you to reconfigure the processor Thermal Design Power (TDP) levels during POST based on the power and thermal delivery capabilities of the system. TDP verifies the maximum heat the cooling system is needed to dissipate. This option is set to **Nominal** by default. **NOTE:** This option is only available on certain stock keeping units (SKUs) of the processors.
X2Apic Mode	Enables or disables the X2Apic mode.
Number of Cores per Processor	Controls the number of enabled cores in each processor. This option is set to **All** by default.
Processor 64-bit Support	Specifies if the processor(s) support 64-bit extensions.
Processor Core Speed	Specifies the maximum core frequency of the processor.
Process Bus Speed	Displays the bus speed of the processor. **NOTE:** The processor bus speed option displays only when both processors are installed.
Processor 1	**NOTE:** Depending on the number of CPUs, there may be up to four processors listed. The following settings are displayed for each processor installed in the system:

Option	Description

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

Related references

Processor Settings on page 40

Related tasks

Viewing Processor Settings on page 40

SATA Settings

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

Related references

System BIOS on page 27

Related tasks

SATA Settings details on page 43
Viewing SATA Settings on page 42

Viewing SATA Settings

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

Steps

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

```
F2 = System Setup
```

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

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

Related references

SATA Settings on page 42

Related tasks

SATA Settings details on page 43

SATA Settings details

About this task

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

Option	Description
Embedded SATA	Enables the embedded SATA option to be set to **Off**, **ATA**, **AHCI**, or **RAID** modes. This option is set to **AHCI** by default.
Security Freeze Lock	Sends Security Freeze Lock command to the Embedded SATA drives during POST. This option is applicable only for ATA and AHCI modes.
Write Cache	Enables or disables the command for Embedded SATA drives during POST.
Port A	Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support. For **AHCI** or **RAID** mode, BIOS support is always enabled.

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

Port B	Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support. For **AHCI** or **RAID** mode, BIOS support is always enabled.

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

Related references

SATA Settings on page 42

Related tasks

Viewing SATA Settings on page 42

Integrated Devices

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

Related references

System BIOS on page 27

Related tasks

Integrated Devices details on page 44
Viewing Integrated Devices on page 44

Viewing Integrated Devices

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

Steps

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

```
F2 = System Setup
```

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

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

Related references

Integrated Devices on page 43

Related tasks

Integrated Devices details on page 44

Integrated Devices details

About this task

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

Option	Description
USB 3.0 Setting	Enables or disables the USB 3.0 support. Enable this option only if your operating system supports USB 3.0. If you disable this option, devices operate at USB 2.0 speed. USB 3.0 is enabled by default.
User Accessible USB Ports	Enables or disables the USB ports. Selecting **Only Back Ports On** disables the front USB ports, selecting **All Ports Off** disables all USB ports. The USB keyboard and mouse operate during boot process in certain operating systems. After the boot process is complete, the USB keyboard and mouse do not work if the ports are disabled. **NOTE:** Selecting **Only Back Ports On** and **All Ports Off** disables the USB management port and also restricts access to iDRAC features.
Embedded NIC1 and NIC2	**NOTE:** The Embedded NIC1 and NIC2 options are only available on systems that do not have **Integrated Network Card 1**. Enables or disables the Embedded NIC1 and NIC2 options. If set to **Disabled**, the NIC may still be available for shared network access by the embedded management controller. The embedded NIC1 and NIC2 options are only available on systems that do not have Network Daughter Cards (NDCs). The Embedded NIC1 and NIC2 option is mutually exclusive with the Integrated Network Card 1 option. Configure the Embedded NIC1 and NIC2 option by using the NIC management utilities of the system.
I/OAT DMA Engine	Enables or disables the I/OAT option. Enable only if the hardware and software support the feature.
I/O Snoop Holdoff Response	Selects the number of cycles PCI I/O can withhold snoop requests from the CPU, to allow time to complete its own write to LLC. This setting can help improve performance on workloads where throughput and latency are critical.
Embedded Video Controller	Enables or disables the **Embedded Video Controller** option. This option is set to **Enabled** by default.
Current State of Embedded Video Controller	Displays the current state of the embedded video controller. The **Current State of Embedded Video Controller** option is a read-only field. If the Embedded Video Controller is the only display capability in the

Option	Description
	system (that is, no add-in graphics card is installed), then the Embedded Video Controller is automatically used as the primary display even if the **Embedded Video Controller** setting is set to **Disabled**.
SR-IOV Global Enable	Enables or disables the BIOS configuration of Single Root I/O Virtualization (SR-IOV) devices. This option is set to **Disabled** by default.
OS Watchdog Timer	If your system stops responding, this watchdog timer aids in the recovery of your operating system. When this option is set to **Enabled**, the operating system initializes the timer. When this option is set to **Disabled** (the default), the timer does not have any effect on the system.
Memory Mapped I/O above 4 GB	Enables or disables the support for PCIe devices that need large amounts of memory. This option is set to **Enabled** by default.
Slot Disablement	Enables or disables the available PCIe slots on your system. The slot disablement feature controls the configuration of PCIe cards installed in the specified slot. Slots must be disabled only when the installed peripheral card prevents booting into the operating system or causes delays in system startup. If the slot is disabled, both the Option ROM and UEFI drivers are disabled.

Related references

Integrated Devices on page 43

Related tasks

Viewing Integrated Devices on page 44

Serial Communication

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

Related references

System BIOS on page 27

Related tasks

Serial Communication details on page 46
Viewing Serial Communication on page 45

Viewing Serial Communication

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

Steps

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

```
F2 = System Setup
```

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

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

Related references

Serial Communication on page 45

Related tasks

Serial Communication details on page 46

Serial Communication details

About this task

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

Option	Description
Serial Communication	Selects serial communication devices (Serial Device 1 and Serial Device 2) in BIOS. BIOS console redirection can also be enabled and the port address can be specified. This option is set to **Auto** by default.
Serial Port Address	Enables you to set the port address for serial devices. This option is set to **Serial Device 1=COM2, Serial Device 2=COM1** by default. **NOTE:** You can use only Serial Device 2 for the Serial Over LAN (SOL) feature. To use console redirection by SOL, configure the same port address for console redirection and the serial device. **NOTE:** Every time the system boots, the BIOS syncs the serial MUX setting saved in iDRAC. The serial MUX setting can independently be changed in iDRAC. Loading the BIOS default settings from within the BIOS setup utility may not always revert the serial MUX setting to the default setting of Serial Device 1.
External Serial Connector	Enables you to associate the External Serial Connector to Serial Device 1, Serial Device 2, or the Remote Access Device by using this option. **NOTE:** Only Serial Device 2 can be used for Serial Over LAN (SOL). To use console redirection by SOL, configure the same port address for console redirection and the serial device. **NOTE:** Every time the system boots, the BIOS syncs the serial MUX setting saved in iDRAC. The serial MUX setting can independently be changed in iDRAC. Loading the BIOS default settings from within the BIOS setup utility may not always revert this setting to the default setting of Serial Device 1.
Failsafe Baud Rate	Specifies the failsafe baud rate for console redirection. The BIOS attempts to determine the baud rate automatically. This failsafe baud rate is used only if the attempt fails, and the value must not be changed. This option is set to **115200** by default.
Remote Terminal Type	Sets the remote console terminal type. This option is set to **VT 100/VT 220** by default.
Redirection After Boot	Enables or disables the BIOS console redirection when the operating system is loaded. This option is set to **Enabled** by default.

Related references

Serial Communication on page 45

Related tasks

Viewing Serial Communication on page 45

System Profile Settings

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

Related references

System BIOS on page 27

Related tasks

System Profile Settings details on page 47
Viewing System Profile Settings on page 47

Viewing System Profile Settings

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

Steps

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

```
F2 = System Setup
```

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

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

Related references

System Profile Settings on page 46

Related tasks

System Profile Settings details on page 47

System Profile Settings details

About this task

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

Option	Description
System Profile	Sets the system profile. If you set the **System Profile** option to a mode other than **Custom**, the BIOS automatically sets the rest of the options. You can only change the rest of the options if the mode is set to **Custom**. This option is set to **Performance Per Watt Optimized (DAPC)** by default. DAPC is Dell Active Power Controller. **NOTE:** All the parameters on the system profile setting screen are available only when the **System Profile** option is set to **Custom**.
CPU Power Management	Sets the CPU power management. This option is set to **System DBPM (DAPC)** by default.
Memory Frequency	Sets the speed of the memory. You can select **Maximum Performance**, **Maximum Reliability**, or a specific speed.
Turbo Boost	Enables or disables the processor to operate in the turbo boost mode. This option is set to **Enabled** by default.
Energy Efficient Turbo	Enables or disables the **Energy Efficient Turbo** option. Energy Efficient Turbo (EET) is a mode of operation where a processor's core frequency is adjusted to be within the turbo range based on workload.
C1E	Enables or disables the processor to switch to a minimum performance state when it is idle. This option is set to **Enabled** by default.
C States	Enables or disables the processor to operate in all available power states. This option is set to **Enabled** by default.

Option	Description
Collaborative CPU Performance Control	Enables or disables the CPU power management option. When set to **Enabled**, the CPU power management is controlled by the OS DBPM and the System DBPM (DAPC). This option is set to **Disabled** by default.
Memory Patrol Scrub	Sets the memory patrol scrub frequency. This option is set to **Standard** by default.
Memory Refresh Rate	Sets the memory refresh rate to either 1x or 2x. This option is set to **1x** by default.
Uncore Frequency	Enables you to select the **Processor Uncore Frequency** option. Dynamic mode enables the processor to optimize power resources across the cores and uncore during runtime. The optimization of the uncore frequency to either save power or optimize performance is influenced by the setting of the **Energy Efficiency Policy** option.
Energy Efficient Policy	Enables you to select the **Energy Efficient Policy** option. The CPU uses the setting to manipulate the internal behavior of the processor and determines whether to target higher performance or better power savings.
Number of Turbo Boot Enabled Cores for Processor 1	**NOTE:** If there are two processors installed in the system, you see an entry for **Number of Turbo Boost Enabled Cores for Processor 2**. Controls the number of turbo boost enabled cores for processor 1. The maximum number of cores is enabled by default.
Monitor/Mwait	Enables the Monitor/Mwait instructions in the processor. This option is set to **Enabled** for all system profiles, except **Custom** by default. **NOTE:** This option can be disabled only if the **C States** option in the **Custom** mode is set to **disabled**. **NOTE:** When **C States** is set to **Enabled** in the **Custom** mode, changing the Monitor/Mwait setting does not impact the system power or performance.

Related references

System Profile Settings on page 46

Related tasks

Viewing System Profile Settings on page 47

Miscellaneous Settings

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

Related references

System BIOS on page 27

Related tasks

Miscellaneous Settings details on page 49
Viewing Miscellaneous Settings on page 49

Viewing Miscellaneous Settings

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

Steps

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

```
F2 = System Setup
```

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

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

Related references

Miscellaneous Settings on page 48

Related tasks

Miscellaneous Settings details on page 49

Miscellaneous Settings details

About this task

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

Option	Description
System Time	Enables you to set the time on the system.
System Date	Enables you to set the date on the system.
Asset Tag	Specifies the asset tag and enables you to modify it for security and tracking purposes.
Keyboard NumLock	Enables you to set whether the system boots with the NumLock enabled or disabled. This option is set to **On** by default. **NOTE:** This option does not apply to 84-key keyboards.
F1/F2 Prompt on Error	Enables or disables the F1/F2 prompt on error. This option is set to **Enabled** by default. The F1/F2 prompt also includes keyboard errors.
Load Legacy Video Option ROM	Enables you to determine whether the system BIOS loads the legacy video (INT 10H) option ROM from the video controller. Selecting **Enabled** in the operating system does not support UEFI video output standards. This field is available only for UEFI boot mode. You cannot set the option to **Enabled** if **UEFI Secure Boot** mode is enabled.
In-System Characterization	Enables or disables **In-System Characterization**. This option is set to **Disabled** by default. The two other options are **Enabled** and **Enabled - No Reboot**. **NOTE:** The default setting for **In-System Characterization** is subject to change in future BIOS releases. When enabled, In-System Characterization (ISC) executes during POST upon detecting relevant changes in system configuration to optimize system power and performance. ISC takes about 20 seconds to execute, and system reset is needed for ISC results to be applied. The **Enabled - No Reboot** option executes ISC and continues without applying ISC results until the next time system reset occurs. The **Enabled** option executes ISC and forces an immediate system reset so that ISC results can be applied. It takes the system longer to be ready due to the forced system reset. When disabled, ISC does not execute.

Related references

Miscellaneous Settings on page 48

Related tasks

Viewing Miscellaneous Settings on page 49

iDRAC Settings utility

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

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

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

Related concepts

Device Settings on page 51

Related references

System BIOS on page 27

Related tasks

Entering the iDRAC Settings utility on page 50
Changing the thermal settings on page 50

Entering the iDRAC Settings utility

Steps

1. Turn on or restart the managed system.
2. Press F2 during Power-on Self-test (POST).
3. On the **System Setup Main Menu** page, click **iDRAC Settings**.
   The **iDRAC Settings** screen is displayed.

Related references

iDRAC Settings utility on page 50

Changing the thermal settings

The iDRAC settings utility enables you to select and customize the thermal control settings for your system.

1. Click **iDRAC Settings** > **Thermal**.
2. Under **SYSTEM THERMAL PROFILE** > **Thermal Profile**, select one of the following options:
   - Default Thermal Profile Settings
   - Maximum Performance (Performance Optimized)
   - Minimum Power (Performance per Watt Optimized)
3. Under **USER COOLING OPTIONS**, set the **Fan Speed Offset**, **Minimum Fan Speed**, and **Custom Minimum Fan Speed**.
4. Click **Back** > **Finish** > **Yes**.

Related references

iDRAC Settings utility on page 50

Device Settings

Device Settings enables you to configure device parameters.

Related references

System BIOS on page 27

Boot Manager

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

Related references

Boot Manager main menu on page 51
System BIOS on page 27

Related tasks

Viewing Boot Manager on page 51

Viewing Boot Manager

To enter **Boot Manager**:

Steps

1. Turn on, or restart your system.
2. Press F11 when you see the following message:

   ```
   F11 = Boot Manager
   ```

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

Related references

Boot Manager on page 51
Boot Manager main menu on page 51

Boot Manager main menu

Menu item	Description
Continue Normal Boot	The system attempts to boot to devices starting with the first item in the boot order. If the boot attempt fails, the system continues with the next item in the boot order until the boot is successful or no more boot options are found.
One-shot Boot Menu	Enables you to access boot menu, where you can select a one-time boot device to boot from.
Launch System Setup	Enables you to access System Setup.
System Utilities	Enables you to launch System Utilities menu such as System Diagnostics and UEFI shell.

Related references

Boot Manager on page 51

Related tasks

Viewing Boot Manager on page 51

One-shot BIOS boot menu

One-shot BIOS boot menu enables you to select a boot device to boot from.

Related references

Boot Manager on page 51

System Utilities

System Utilities contains the following utilities that can be launched:

- Launch Diagnostics
- BIOS/UEFI Update File Explorer
- Reboot System

NOTE: Depending on the boot mode selected, you might have BIOS or UEFI Update File Explorer.

Related references

Boot Manager on page 51

PXE boot

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

NOTE: To access the **PXE boot** option, boot the system and then press F12. The system scans and displays the active networked systems.

6

Installing and removing system components

This section provides information about installing and removing the system components.

Topics:

Safety instructions

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

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.

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.

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

Before working inside your system

Prerequisites

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Turn off the system, including any attached peripherals.
2. Disconnect the system from the electrical outlet and disconnect the peripherals.
3. If applicable, remove the system from the rack.
4. Remove the system cover.

Related references

Safety instructions on page 53

Related tasks

Removing the system cover on page 54

After working inside your system

Prerequisites

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Install the system cover.
2. If applicable, install the system into the rack.
3. Reconnect the peripherals and connect the system to the electrical outlet.
4. Turn on the system, including any attached peripherals.

Related references

Safety instructions on page 53

Related tasks

Installing the system cover on page 55

Recommended tools

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

- Phillips #1 screwdriver
- Phillips #2 screwdriver
- #T15 Torx screwdriver
- Plastic scribe
- Wrist grounding strap

System cover

The system cover protects the components inside the system and helps in maintaining air flow inside the system.

Removing the system cover

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.

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

Steps

1. Loosen the screw that secures the system cover to the chassis.
2. Hold the cover on both sides, and lift the cover away from the system.

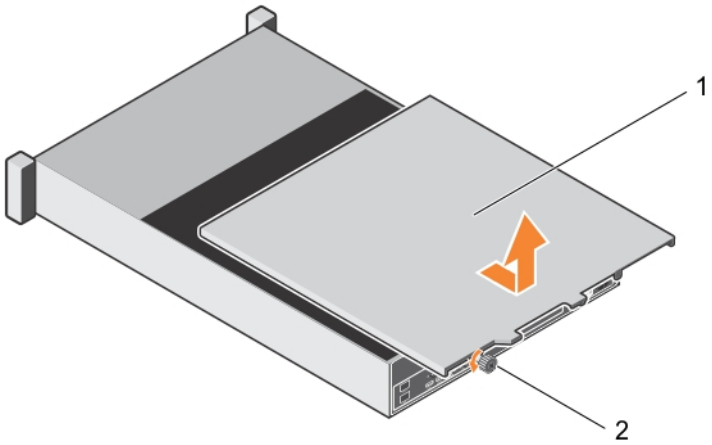

Figure 9. Removing the system cover

a. system cover
b. retention screw

Related references

Safety instructions on page 53

Related tasks

Installing the system cover on page 55

Installing the system cover

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.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Align the slots of the system cover with the tabs on the chassis and slide the cover forward.
2. Tighten the screw securing the system cover to the chassis.

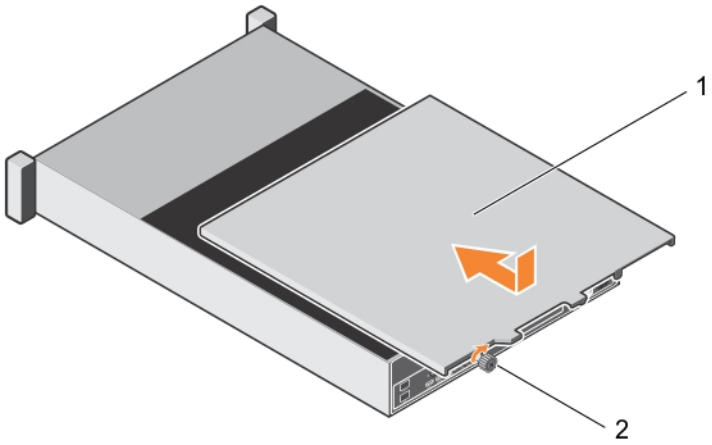

Figure 10. Installing the system cover

a. system cover
b. retention screw

Related references

Safety instructions on page 53

Related tasks

Removing the system cover on page 54

Inside the system

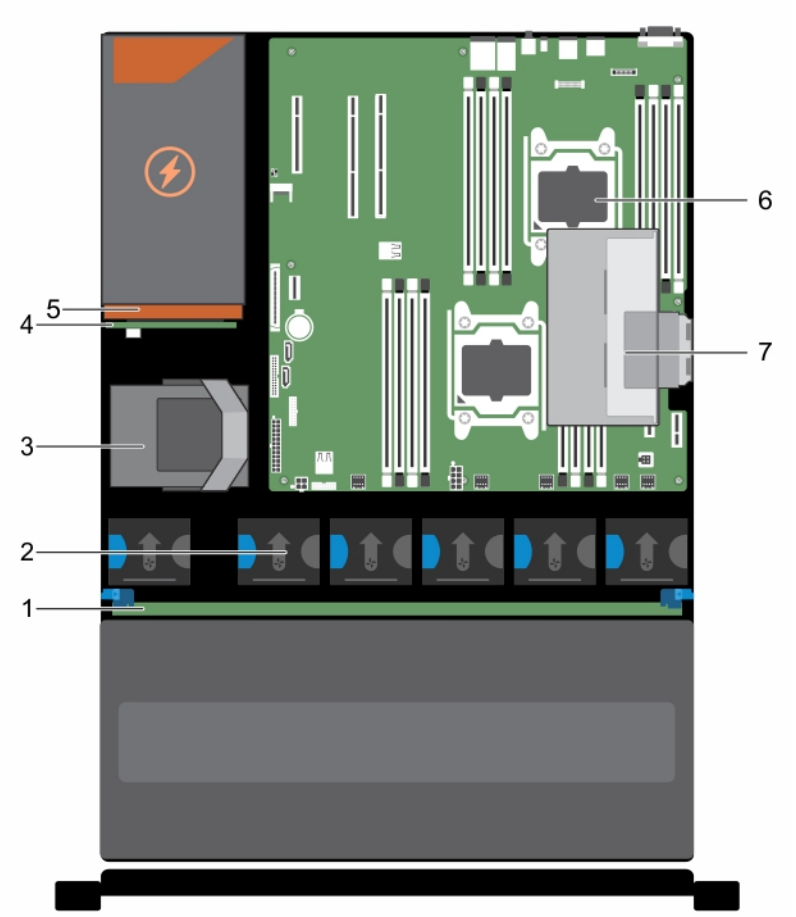

Figure 11. Inside the system— with internal PERC riser

1. hard-drive backplane
2. cooling fan (6)
3. internal hard drive module
4. power-interposer board
5. power supply
6. processor (2)
7. internal PERC riser

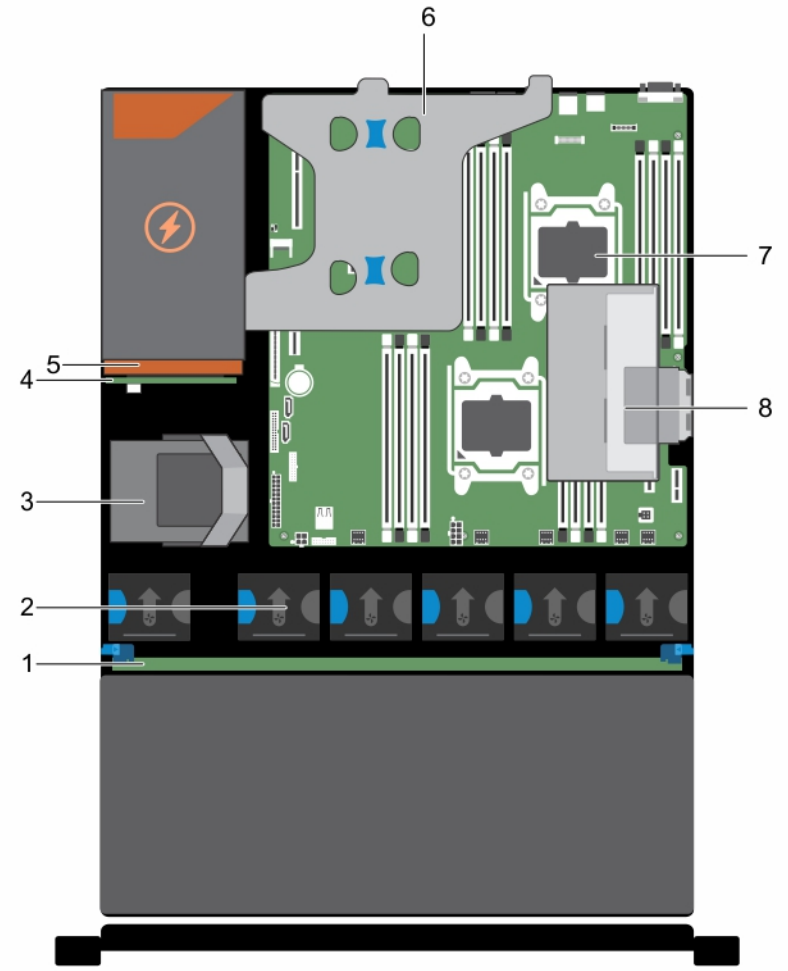

Figure 12. Inside the system— with dual riser module and internal PERC riser

1. hard-drive backplane
2. cooling fan (6)
3. internal hard drive module
4. power-interposer board
5. power supply
6. dual riser module
7. processor (2)
8. internal PERC riser

Cooling shroud

The cooling shroud aerodynamically directs the airflow across the entire system. The airflow passes through all the critical parts of the system, where the vacuum pulls air across the entire surface area of the heat sink, thus allowing increased cooling.

Removing the cooling shroud

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. If connected, disconnect the cables from expansion card(s).

   NOTE: If required, close the expansion card latch on the cooling shroud to release the full length card.
4. If installed, remove the expansion card riser.

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.

Steps

Hold the sides of the cooling shroud and lift the cooling shroud away from the system.

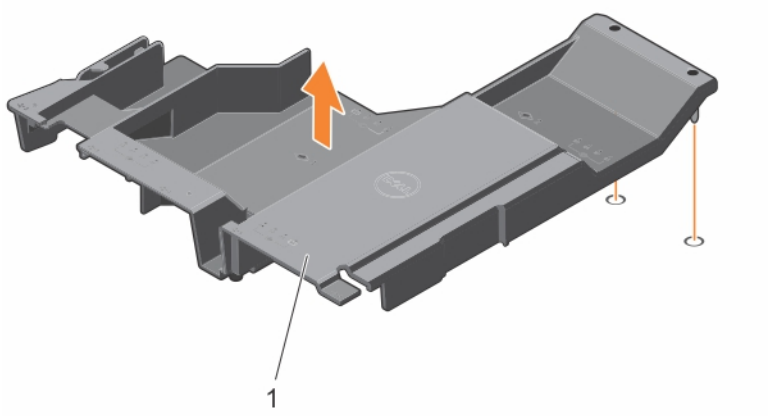

Figure 13. Removing the cooling shroud (135 W processor)

a. cooling shroud

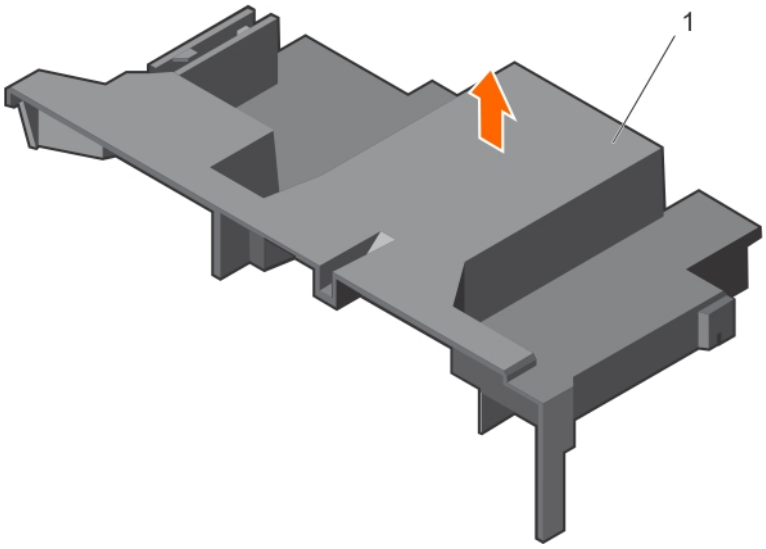

Figure 14. Removing the cooling shroud (140 W processor)

a. cooling shroud

Next steps

1. Reinstall the cooling shroud.
2. If removed, reinstall the optional PCIe expansion card riser.
3. If disconnected, connect the cables to the expansion card(s).
4. If required, open the expansion-card latch on the cooling shroud to support the full length expansion card.
5. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the dual riser module (optional) on page 92
Removing the internal PERC riser on page 94
Installing the cooling shroud on page 60
Installing the internal PERC riser on page 95
Installing the dual riser module (optional) on page 93
After working inside your system on page 54

Installing the cooling shroud

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.

NOTE: For proper seating of the cooling shroud in the chassis, ensure that the cables inside the system are routed along the chassis wall and secured using the cable securing bracket.

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

Steps

1. Align the tabs on the cooling shroud with the securing holes at the back of the chassis.
2. Lower the cooling shroud into the chassis until it is firmly seated.

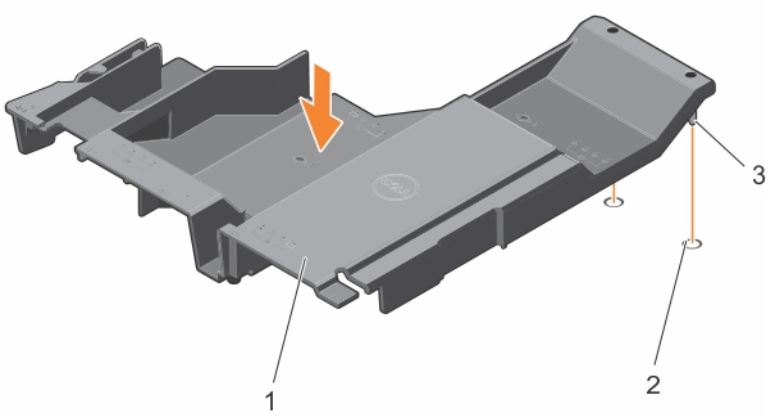

Figure 15. Installing the cooling shroud (135 W processor)

a. cooling shroud
b. cooling shroud alignment slot (2)
c. cooling shroud alignment pin (2)

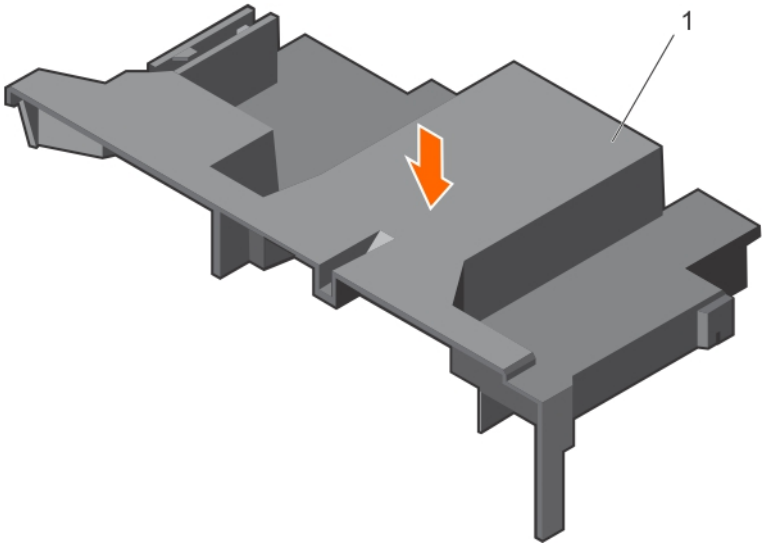

Figure 16. Installing the cooling shroud (140 W processor)

a. cooling shroud

Next steps

1. Install the optional PCIe expansion card riser.
2. If disconnected, reconnect the cables to the expansion card(s).
3. If required, open the expansion-card latch on the cooling shroud to support the full length expansion card.
4. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Installing the internal PERC riser on page 95
Installing the dual riser module (optional) on page 93

After working inside your system on page 54

System memory

Your system supports DDR4 registered DIMMs (RDIMM).

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

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

- DIMM type (RDIMM)
- Number of DIMMs populated per channel
- System profile selected (for example, Performance Optimized, Custom, or Dense Configuration Optimized)
- Maximum supported DIMM frequency of the processors

Your system contains 16 memory sockets split into four sets of four sockets. DIMMs in sockets A1 to A8 are assigned to processor 1 and DIMMs in sockets B1 to B8 are assigned to processor 2. Each 4-socket set is organized into two channels. In each channel of the 4-socket set, the release levers of the first socket are marked white and those of the second socket are marked black.

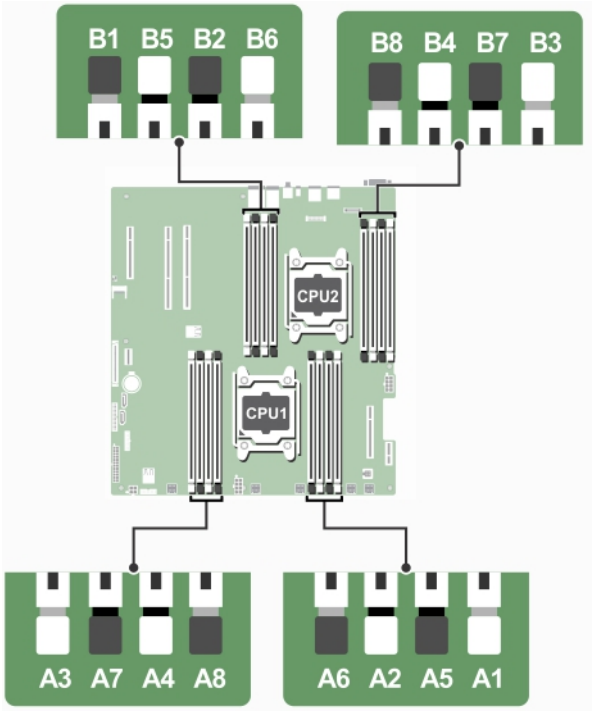

Figure 17. Memory socket locations

Memory channels are organized as follows:

Table 27. Memory channels

Processor	channel 0	channel 1	channel 2	channel 3
Processor 1	slots A1 and A5	slots A2 and A6	slots A3 and A7	slots A4 and A8
Processor 2	slots B1 and B5	slots B2 and B6	slots B3 and B7	slots B4 and B8

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

Table 28. Memory populations and operating frequencies

DIMM Type	DIMMs Populated/ Channel	Voltage	Operating Frequency (in MT/s)	Maximum DIMM Rank/Channel
RDIMM	1	1.2 v	2400, 2133, and 1866	Single rank or dual rank

Table 28. Memory populations and operating frequencies (continued)

DIMM Type	DIMMs Populated/ Channel	Voltage	Operating Frequency (in MT/s)	Maximum DIMM Rank/Channel
	2			

General memory module installation guidelines

Your 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:

- x4 and x8 DRAM based DIMMs can be mixed. For more information, see the Mode specific guidelines section.
- Up to two dual- or single-rank RDIMMs can be populated per channel.
- Populate DIMM sockets only if a processor is installed. For single-processor systems, sockets A1 to A8 are available. For dual-processor systems, sockets A1 to A8 and sockets B1 to B8 are available.
- Populate all sockets with white release levers first, and then all the sockets with black release levers.
- When mixing memory modules with different capacities, populate the sockets with memory modules with highest capacity first. For example, if you want to mix 4 GB and 8 GB DIMMs, populate 8 GB DIMMs in the sockets with white release levers and 4 GB DIMMs in the sockets with black release levers.
- In a dual-processor configuration, the memory configuration for each processor should be identical through the first eight slots. For example, if you populate socket A1 for processor 1, then populate socket B1 for processor 2, and so on.
- Memory modules of different capacities can be mixed provided other memory population rules are followed (for example, 4 GB and 8 GB memory modules can be mixed).
- Mixing of more than two DIMM capacities in a system is not supported.
- Populate two DIMMs per processor (one DIMM per channel) at a time to maximize performance.

Related references

Mode-specific guidelines on page 63

Mode-specific guidelines

Four memory channels are allocated to each processor. The allowable configurations depend on the memory mode selected.

NOTE: You can mix x4 and x8 DRAM based DIMMs to support RAS features. However, all guidelines for specific RAS features must be followed. x4 DRAM based DIMMs retain Single Device Data Correction (SDDC) in memory optimized (independent channel) mode. x8 DRAM based DIMMs need Advanced ECC mode to gain SDDC.

Advanced Error Correction Code

Advanced Error Correction Code (ECC) mode extends SDDC from x4 DRAM based DIMMs to both x4 and x8 DRAMs. This protects against single DRAM chip failures during normal operation.

The installation guidelines for memory modules are as follows:

- Memory modules must be identical in size, speed, and technology.
- DIMMs installed in memory sockets with white release levers must be identical and the same rule applies for sockets with black release levers. This ensures that identical DIMMs are installed in matched pair —for example, A1 with A2, A3 with A4, A5 with A6, and so on.

Memory optimized independent channel mode

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

Memory sparing

NOTE: To use memory sparing, this feature must be enabled in System Setup.

In this mode, one rank per channel is reserved as a spare. If persistent correctable errors are detected on a rank, the data from this rank is copied to the spare rank, and the failed rank is disabled.

With memory sparing enabled, the system memory available to the operating system is reduced by one rank per channel. For example, in a dual-processor configuration with sixteen 4 GB single-rank memory modules, the available system memory is: 3/4 (ranks/channel) × 16 (memory modules) × 4 GB = 48 GB, and not 16 (memory modules) × 4 GB = 64 GB.

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

NOTE: Both Advanced ECC/Lockstep and Optimizer modes support memory sparing.

Related concepts

System Setup on page 26

Sample memory configurations

The following tables show sample memory configurations for one and two processor configurations that follow the appropriate memory guidelines.

NOTE: 1R and 2R in the following tables indicate single- and dual-rank DIMMs respectively.

Table 29. Memory configurations—single processor

System Capacity (in GB)	DIMM Size (in GB)	Number of DIMMs	DIMM Rank, Organization, and Frequency	DIMM Slot Population
8	8	1	1R, x8, 2400 MT/s	A1
16	8	2	1R, x8, 2400 MT/s	A1, A2
	16	1	2R, x8, 2400 MT/s	A1
32	8	4	1R, x8, 2400 MT/s	A1, A2, A3, A4
	16	2	2R, x8, 2400 MT/s	A1, A2
	32	1	2R, x4, 2400 MT/s	A1
48	8	6	1R, x8, 2400 MT/s	A1, A2, A3, A4, A5, A6
	16	3	2R, x8, 2400 MT/s	A1, A2, A3
64	8	8	1R, x8, 2400 MT/s	A1, A2, A3, A4, A5, A6, A7, A8
	16	4	2R, x8, 2400 MT/s	A1, A2, A3, A4
	32	2	2R, x4, 2400 MT/s	A1, A2
96	16	6	2R, x8, 2400 MT/s	A1, A2, A3, A4, A5, A6
	32	3	2R, x4, 2400 MT/s	A1, A2, A3
128	16	8	2R, x8, 2400 MT/s	A1, A2, A3, A4, A5, A6, A7, A8
	32	4	2R, x4, 2400 MT/s	A1, A2, A3, A4
192	32	6	2R, x4, 2400 MT/s	A1, A2, A3, A4, A5, A6
256	32	8	2R, x4, 2400 MT/s	A1, A2, A3, A4, A5, A6, A7, A8

Table 30. Memory configurations—two processors

System Capacity (in GB)	DIMM Size (in GB)	Number of DIMMs	DIMM Rank, Organization, and Frequency	DIMM Slot Population
16	8	2	1R, x8, 2400 MT/s	A1,B1
32	8	4	1R, x8, 2400 MT/s	A1, A2, B1, B2
	16	2	2R, x8, 2400 MT/s	A1, B1
48	8	6	1R, x8, 2400 MT/s	A1, A2, A3, B1, B2, B3
64	8	8	1R, x8, 2400 MT/s	A1, A2, A3, A4, B1, B2, B3, B4
	16	4	2R, x8, 2400 MT/s	A1, A2, B1, B2
	32	2	2R, x4, 2400 MT/s	A1, B1
96	8	12	1R, x8, 2400 MT/s	A1, A2, A3, A4, A5, A6, B1, B2, B3, B4, B5, B6
	16	6	2R, x8, 2400 MT/s	A1, A2, A3, B1, B2, B3
112	8	14	1R, x8, 2400 MT/s	A1, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, B5, B6, B7
128	8	16	1R, x8, 2400 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4, B5, B6, B7, B8
	16	8	2R, x8, 2400 MT/s	A1, A2, A3, A4, B1, B2, B3, B4
	32	4	2R, x4, 2400 MT/s	A1, A2, B1, B2
192	16	12	2R, x8, 2400 MT/s	A1, A2, A3, A4, A5, A6, B1, B2, B3, B4, B5, B6
	32	6	2R, x4, 2400 MT/s	A1, A2, A3, B1, B2, B3
224	16	14	2R, x8, 2400 MT/s	A1, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, B5, B6, B7
256	16	16	2R, x8, 2400 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4, B5, B6, B7, B8
	32	8	2R, x4, 2400 MT/s	A1, A2, A3, A4, B1, B2, B3, B4
384	32	12	2R, x4, 2400 MT/s	A1, A2, A3, A4, A5, A6, B1, B2, B3, B4, B5, B6
448	32	14	2R, x4, 2400 MT/s	A1, A2, A3, A4, A5, A6, A7, B1, B2, B3, B4, B5, B6, B7
512	32	16	2R, x4, 2400 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4, B5, B6, B7, B8

Removing memory modules

Prerequisites

1. Remove the cooling shroud.

   NOTE: If open, close the expansion card latch on the cooling shroud to release the full length card.

2. If connected, disconnect the cables from expansion card(s).
3. If installed, remove the expansion card riser.

NOTE: The memory modules are hot to touch for some time after the system has been powered down. Allow the memory modules to cool before handling them. 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.
2. To release the memory module from the socket, simultaneously press the ejectors on both ends of the memory module socket.
3. Lift and remove the memory module from the system.

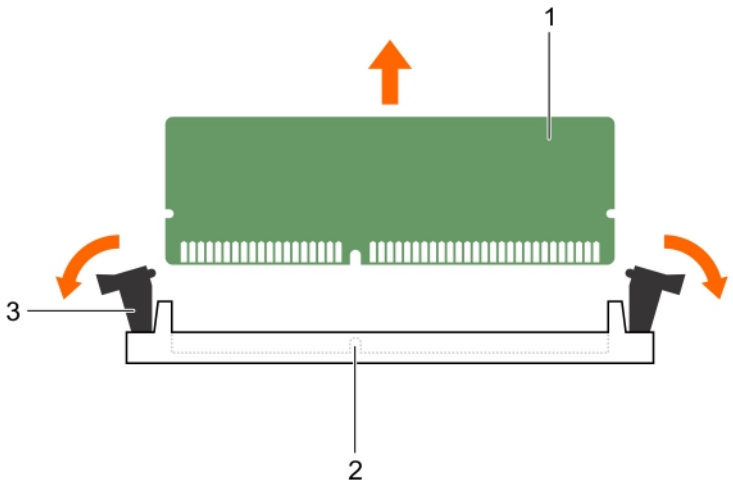

Figure 18. Removing the memory module

a. memory module
b. memory module socket
c. memory module socket ejector (2)

Next steps

1. Install the memory module.

   NOTE: If you are removing the memory module permanently, install a memory module blank.
2. If removed, install the PCIe expansion card riser.
3. If disconnected, reconnect the cables to the expansion card(s).
4. Install the cooling shroud.
5. If closed, open the expansion card latch on the cooling shroud to support the full length expansion card.

Related concepts

System Setup on page 26

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the cooling shroud on page 59
Removing the dual riser module (optional) on page 92
Removing the internal PERC riser on page 94
Installing memory modules on page 67
Installing the internal PERC riser on page 95
Installing the dual riser module (optional) on page 93
Installing the cooling shroud on page 60
After working inside your system on page 54

Installing memory modules

Steps

1. Locate the appropriate memory module socket.
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.

   When the memory module is properly seated in the socket, the levers on the memory module socket align with the levers on the other sockets that have memory modules installed.

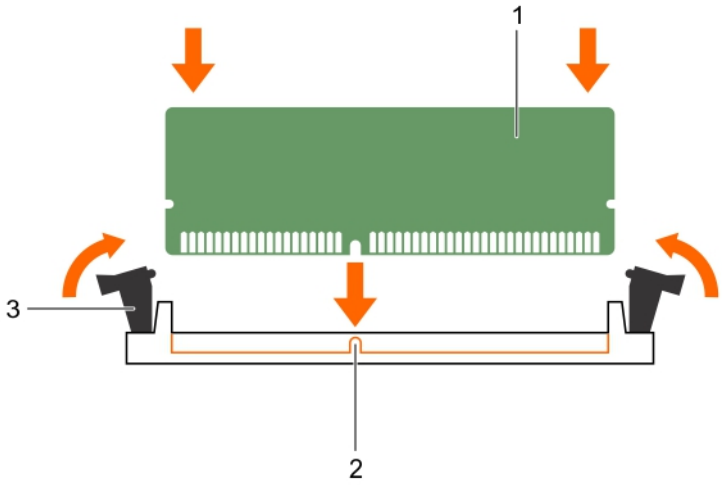

Figure 19. Installing the memory module

a. memory module
b. alignment key
c. memory module socket ejector (2)

Related concepts

System Setup on page 26

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the cooling shroud on page 59
Removing the internal PERC riser on page 94
Installing the internal PERC riser on page 95
Installing the cooling shroud on page 60
After working inside your system on page 54
Using system diagnostics on page 141

Hard drives

Your system supports up to twelve 3.5 inch or 2.5 inch (with 3.5 inch drive carrier adapters) hot-swappable hard drives/SSDs and two internal 2.5 inch cabled hard drives/SSDs.

Hard drives that connect to the system board through the hard drive backplane are hot-swappable. Hot-swappable hard drives are supplied in hot-swappable hard drive carriers that fit in the hard drive slots. The internal cabled hard drives/SSDs are not hot-swappable.

CAUTION: Before attempting to remove or install a hard 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 hot-swap hard drive removal and insertion.

CAUTION: Do not turn off or reboot your system while the hard drive is being formatted. Doing so can cause a hard drive failure.

NOTE: Use only hard drives that have been tested and approved for use with the hard drive backplane.

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

Removing a hot swappable hard drive carrier

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 came with the product.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Using the management software, prepare the hard drive for removal. For more information, see the documentation for the storage controller.

   If the hard drive is online, the green activity/fault indicator flashes when the hard drive is turned off. You can remove the hard drive when the hard drive indicators turn off.

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

Steps

1. Press the release button to open the hard drive carrier release handle.
2. Slide the hard drive carrier out of the hard drive slot.

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

3. If you are not replacing the hard drive immediately, insert a hard drive blank in the empty hard drive slot.

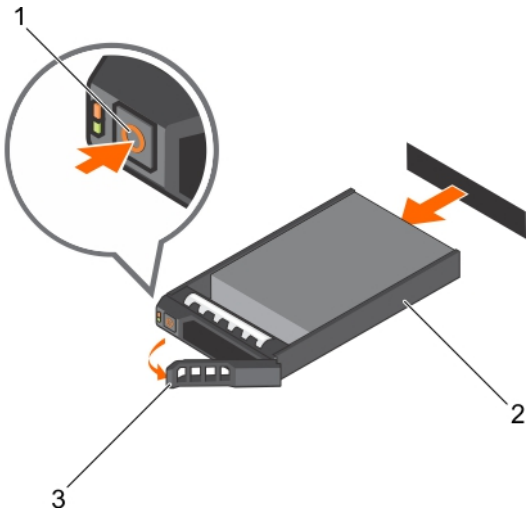

Figure 20. Removing a hot swappable hard drive carrier

a. release button
b. hard drive carrier
c. hard drive carrier handle

Related references

Safety instructions on page 53

Related tasks

Installing a hot-swappable hard drive carrier on page 69

Installing a hot-swappable hard drive carrier

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.

CAUTION: Use only hard drives that have been tested and approved for use with the hard drive backplane.

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

CAUTION: When installing a hard drive, ensure that the adjacent drives are fully installed. Inserting a hard 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.

Steps

1. If a hard drive blank is installed in the hard drive slot, remove it.
2. Install a hard drive in the hard drive carrier.

3. Press the release button on the front of the hard drive carrier and open the hard drive carrier handle.
4. Insert the hard drive carrier into the hard drive slot until the carrier comes in contact with the backplane.
5. Close the hard drive carrier handle to lock the hard drive in place.

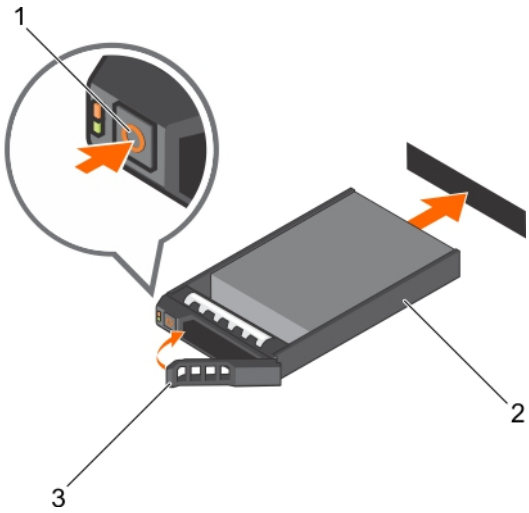

Figure 21. Installing a hot-swappable hard drive carrier

a. release button
b. hard drive carrier
c. hard drive carrier handle

Related references

Safety instructions on page 53

Related tasks

Removing a hot swappable hard drive carrier on page 68

Removing a 3.5-inch hard drive blank

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 came with the product.

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

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

Steps

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

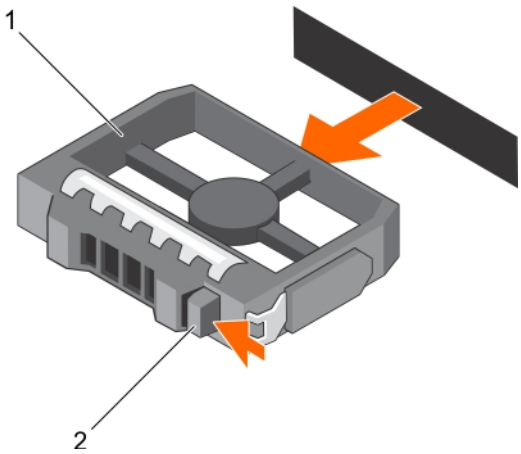

Figure 22. Removing a 3.5-inch hard drive blank

a. hard drive blank
b. release button

Related references

Safety instructions on page 53

Related tasks

Installing a 3.5-inch hard drive blank on page 71

Installing a 3.5-inch hard drive blank

Prerequisites

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

Steps

Insert the hard drive blank into the hard drive slot until the release button clicks into place.

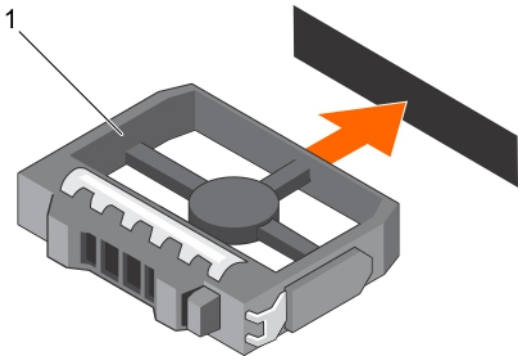

Figure 23. Installing a 3.5-inch hard drive blank

a. hard drive blank

Related references

Safety instructions on page 53

Related tasks

Removing a 3.5-inch hard drive blank on page 70

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

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Keep the Phillips #2 screwdriver ready.
3. Remove a 3.5-inch hot swappable hard drive adapter from a 3.5-inch hot swappable hard drive carrier.

Steps

1. Align the screw holes on the 2.5-inch hard drive with the screw holes on the 3.5-inch hard drive adapter.
2. Install the screws to secure the hard drive to the 3.5-inch hard drive adapter.

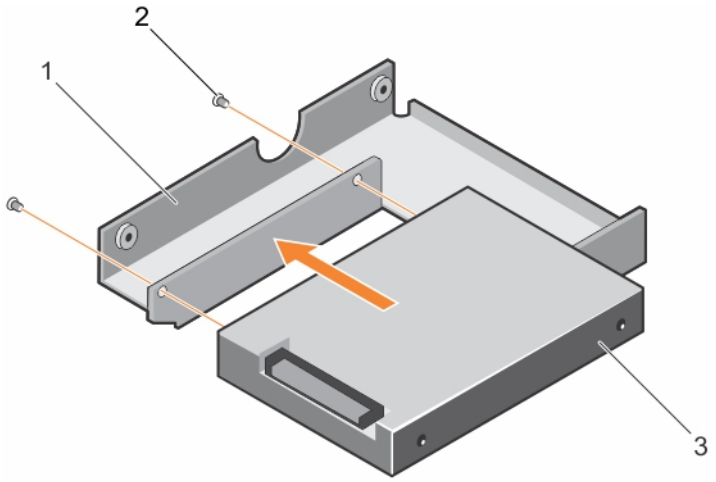

Figure 24. Installing a 2.5-inch hard drive into a 3.5-inch hard drive adapter

a. 3.5-inch hard drive adapter
b. screw (2)
c. 2.5-inch hard drive

Next steps

Install the 3.5-inch adapter into the 3.5-inch hard drive carrier.

Related tasks

Removing a 3.5-inch hard drive adapter from a 3.5-inch hot swappable hard drive carrier on page 73
Installing a 3.5-inch hard drive adapter into the 3.5-inch hot swappable hard drive carrier on page 74

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

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 came with the product.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Keep the Phillips #2 screwdriver ready.

3. Remove the 3.5-inch hard drive adapter from the 3.5-inch hot swappable hard drive carrier.

NOTE: A 2.5-inch hot swappable hard drive is installed in a 3.5-inch hard drive adapter, which is then installed in the 3.5-inch hot swappable hard drive carrier.

Steps

1. Remove the screws from the side of the 3.5-inch hard drive adapter.
2. Remove the hard drive from the 3.5-inch hard drive adapter.

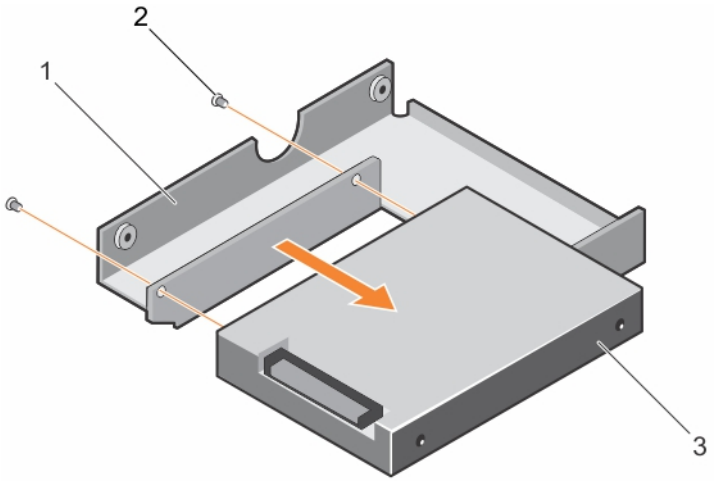

Figure 25. Removing a 2.5-inch hard drive from a 3.5-inch hard drive adapter

a. 3.5-inch hard drive adapter
b. screw (2)
c. 2.5-inch hard drive

Next steps

Install a 2.5-inch hard drive into a 3.5-inch hard drive adapter.

Related references

Safety instructions on page 53

Related tasks

Removing a 3.5-inch hard drive adapter from a 3.5-inch hot swappable hard drive carrier on page 73

Removing a 3.5-inch hard drive adapter from a 3.5-inch hot swappable hard drive carrier

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions section.
2. Keep the Phillips #2 screwdriver ready.
3. Remove the 3.5-inch hot swappable hard drive carrier from the system.

Steps

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

Next steps

Remove the 2.5-inch hot swappable hard drive from a 3.5-inch hard drive adapter.

Related references

Safety instructions on page 53

Related tasks

Removing a hot swappable hard drive carrier on page 68

Installing a 3.5-inch hard drive adapter into the 3.5-inch hot swappable hard drive carrier

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Keep the Phillips #2 screwdriver ready.
3. Install the 2.5-inch hot swappable hard drive into the 3.5-inch hard drive adapter.

Steps

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

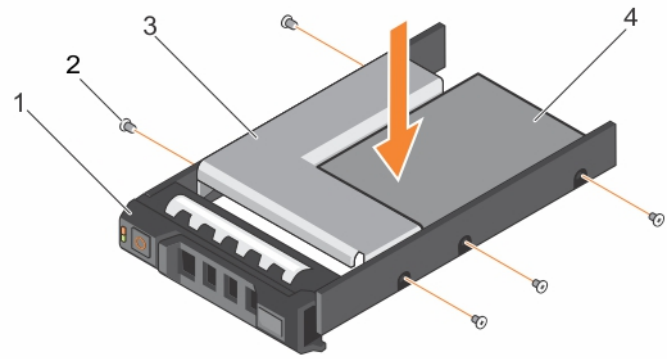

Figure 26. Installing a 3.5-inch hard drive adapter into a hot swappable hard drive carrier

1. 3.5-inch hot swappable hard drive carrier
2. screw (5)
3. hard drive adapter
4. 2.5-inch hard drive

Next steps

Install the 3.5-inch hot swappable hard drive carrier into the system.

Related references

Safety instructions on page 53

Related tasks

Installing a 2.5-inch hard drive into a 3.5-inch hard drive adapter on page 72
Installing a hot-swappable hard drive carrier on page 69

Removing a hot swappable hard drive from a hard drive carrier

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.

NOTE: Hot swappable hard drives are supplied in hot swappable hard drive carriers that fit in the hard drive slots.

1. Keep the Phillips #2 screwdriver ready.
2. Remove the hard drive carrier from the system.

Steps

1. Remove the screws from the side rails on the hard drive carrier.
2. Lift the hard drive out of the hard drive carrier.

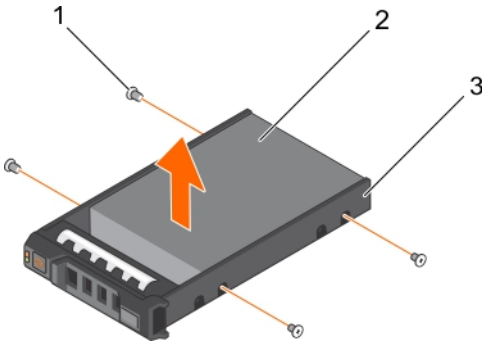

Figure 27. Removing a hot swappable hard drive from a hard drive carrier

a. screw (4)
b. hard drive
c. hard drive carrier

Next steps

1. Install the hot swappable hard drive into the hard drive carrier.
2. Install the hot swappable hard drive carrier into the system.

Related tasks

Installing a hot swappable hard drive into a hard drive carrier on page 75

Installing a hot swappable hard drive into a hard drive carrier

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.

Keep the Phillips #2 screwdriver ready.

Steps

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

2. Align the screw holes on the hard drive with the screw holes on the hard drive carrier.
   When aligned correctly, the back of the hard drive is flush with the back of the hard drive carrier.
3. Install the screws to secure the hard drive to the hard drive carrier.

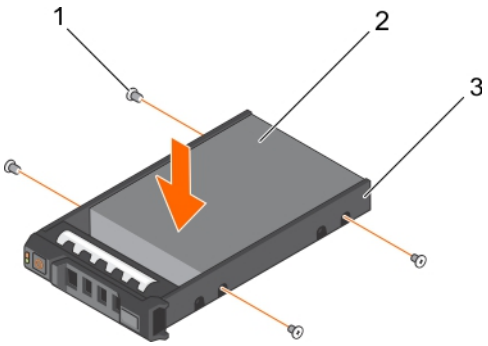

Figure 28. Installing a hard drive into a hard drive carrier

a. screw (4)
b. hard drive
c. hard drive carrier

Related tasks

Removing a hot swappable hard drive from a hard drive carrier on page 75

Removing the (optional) 2.5 inch internal hard drive carrier

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. If connected, disconnect the cables from expansion card(s).
4. If installed, remove the PCIe expansion card riser.
5. Remove the cooling shroud.

   NOTE: If applicable, close the expansion card latch on the cooling shroud to release the full length card.
6. Disconnect the power and data cables from the internal hard drive.

Steps

1. Lift the handle-lock to the open position
2. Lift the 2.5 inch internal hard drive carrier out of the chassis.

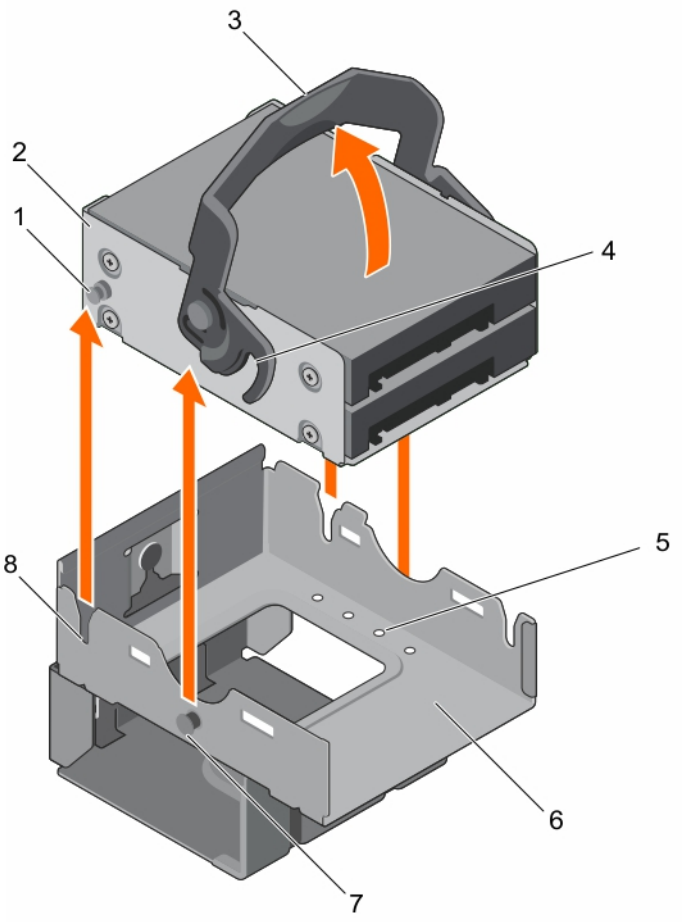

Figure 29. Removing the 2.5 inch internal hard drive carrier

1. internal hard drive carrier guide
2. internal hard drive carrier
3. handle-lock
4. lock guide
5. hard drive retention screw (8)
6. internal hard drive cage
7. lock guide pin
8. guide slot

Next steps

1. Install the 2.5 inch internal hard drive carrier.
2. Reconnect the power and data cables to the internal hard drives.
3. If removed, install the PCIe expansion card riser.
4. If disconnected, reconnect the cables to the expansion card(s).
5. Reinstall the cooling shroud.
6. If required, open the expansion card latch on the cooling shroud to support the full length expansion card.
7. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the cooling shroud on page 59
Removing the internal PERC riser on page 94
Installing the cooling shroud on page 60
Installing the (optional) 2.5 inch internal hard drive carrier on page 78
After working inside your system on page 54

Installing the (optional) 2.5 inch internal hard drive carrier

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. If applicable, disconnect the power or data cables from expansion card(s).
4. If required, remove the PCIe expansion card riser.

   NOTE: If applicable, close the expansion card latch on the cooling shroud to release the full length card.
5. Remove the cooling shroud.

Steps

1. Align the internal hard drive carrier with the guide pins to the slot on the internal hard drive cage.
2. Insert the internal hard drive carrier into the internal hard drive cage and press the handle-lock down to the lock position.

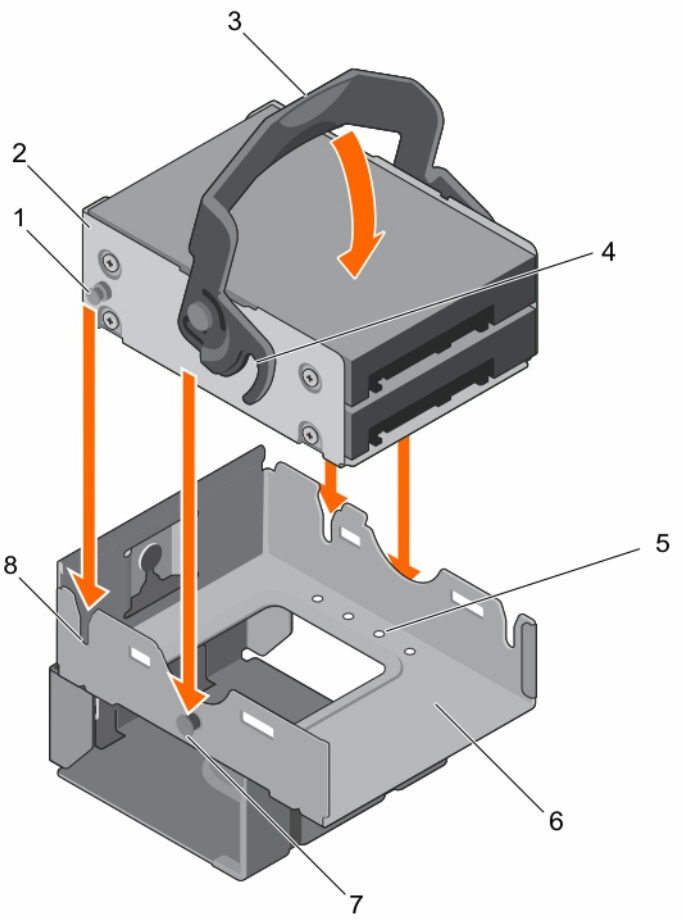

Figure 30. Installing the (optional) 2.5 inch internal hard drive carrier

1. internal hard drive carrier guide
2. internal hard drive carrier
3. handle-lock
4. lock guide
5. hard drive retention screw (8)
6. internal hard drive cage
7. lock guide pin
8. guide slot

Next steps

1. Reconnect the power and data cables to the internal hard drives.
2. If removed, reinstall the PCIe expansion card riser.
3. If disconnected, reconnect the cables to the expansion card(s).

4. Reinstall the cooling shroud.
5. If required, open the expansion card latch on the cooling shroud to support the full length expansion card.
6. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the cooling shroud on page 59
Removing the (optional) 2.5 inch internal hard drive carrier on page 76
Removing the internal PERC riser on page 94
Installing the internal PERC riser on page 95
Installing the cooling shroud on page 60
After working inside your system on page 54

Removing the (optional) 2.5 inch internal hard drive from the internal hard drive carrier

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Keep the Phillips #2 screwdriver ready.
4. Disconnect the power and data cables from the hard drive.
5. Remove the internal hard drive carrier.

Steps

1. Remove the screws that secure the hard drive to the internal hard drive carrier.
2. Slide the hard drive out of the internal hard drive carrier.

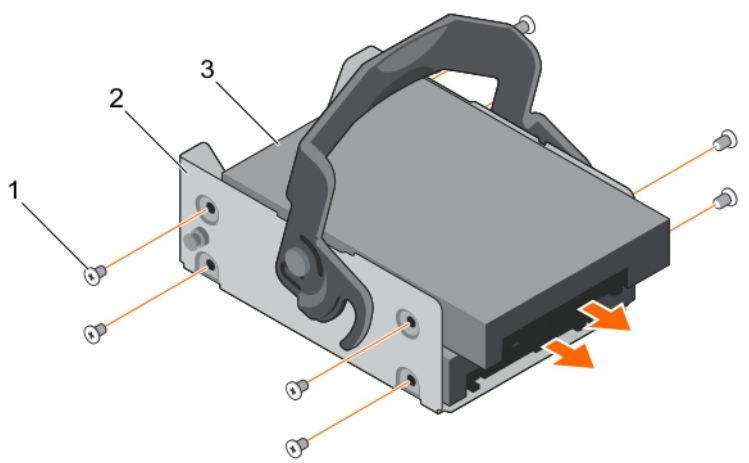

Figure 31. Removing the (optional) 2.5 inch internal hard drive from the internal hard drive carrier

a. screw (8)
b. internal hard drive carrier
c. hard drive

Next steps

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

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Installing the (optional) 2.5 inch internal hard drive into the internal hard drive carrier on page 80
After working inside your system on page 54

Installing the (optional) 2.5 inch internal hard drive into the internal hard drive carrier

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Keep the Phillips #2 screwdriver ready.
4. Remove the internal hard drive carrier.

Steps

1. Slide the hard drive into the internal hard drive carrier.
2. Secure the hard drive to the internal hard drive carrier.

NOTE: The screws are located on the 2.5 inch internal hard drive cage.

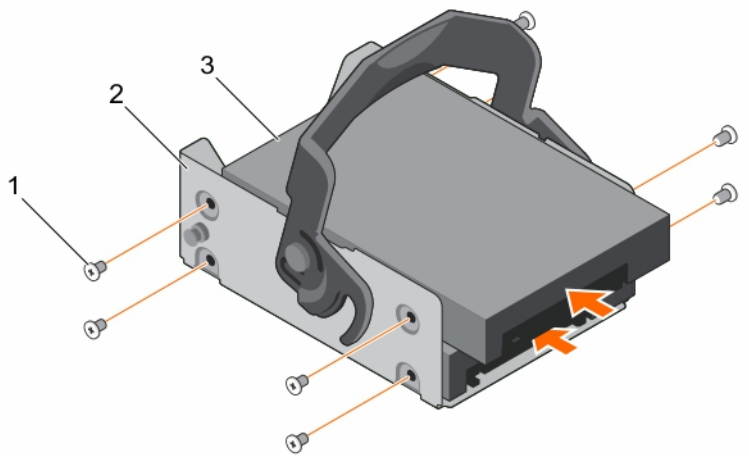

Figure 32. Installing the (optional) 2.5 inch internal hard drive into the internal hard drive carrier

a. screw (8)
b. internal hard drive carrier
c. hard drive

Next steps

1. Connect the data and power cables to the hard drive.

2. Install the internal hard drive carrier.
3. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the (optional) 2.5 inch internal hard drive from the internal hard drive carrier on page 79
After working inside your system on page 54

Removing the (optional) 2.5 inch internal hard drive cage

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Keep the Phillips #2 screwdriver ready.
4. If connected, disconnect the cables from expansion card(s).
5. If required, remove the PCIe expansion card riser.

   NOTE: If applicable, close the expansion card latch on the cooling shroud to release the full length card.
6. Remove the cooling shroud.
7. Disconnect the power and data cables from the hard drive.
8. Remove the internal hard drive carrier.
9. Disconnect the FAN1 cable from the power interposer board.

   NOTE: The FAN1 cable is routed behind the internal hard drive cage.

Steps

1. Remove the screw that secures the internal hard drive cage to the chassis.
2. Lift the internal hard drive cage out of the chassis.

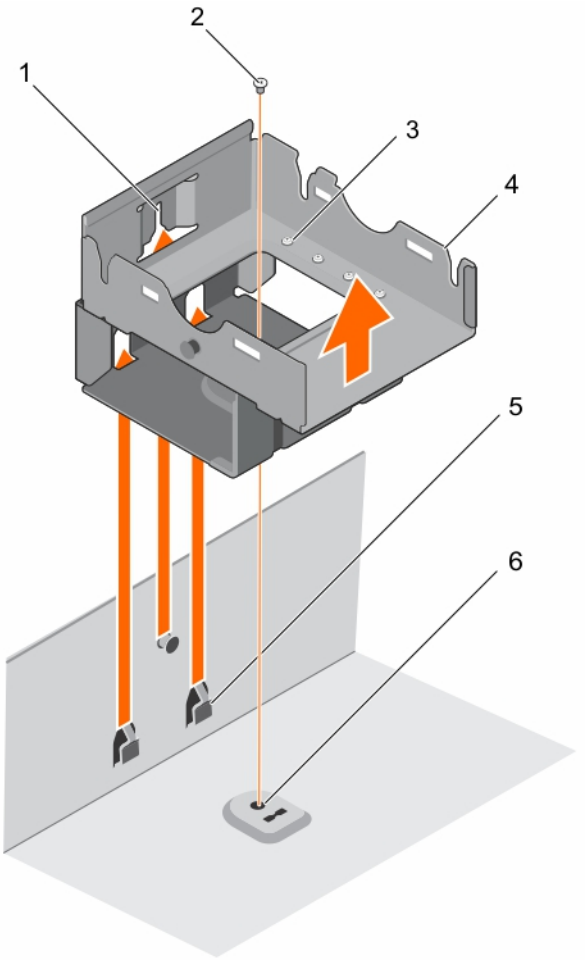

Figure 33. Removing the 2.5 inch internal hard drive cage

1. internal hard drive cage guide
2. screw
3. hard drive retention screw (8)
4. internal hard drive cage
5. internal hard drive cage guide slot
6. screw hole on chassis

Next steps

1. Install the internal hard drive carrier.
2. Reconnect the FAN1 cable to the power interposer board.
3. If installed, reinstall the PCIe expansion card riser.
4. If disconnected, reconnect the cables to the expansion card(s).
5. Reinstall the cooling shroud.
6. If required, open the expansion card latch on the cooling shroud to support the full length expansion card.
7. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the dual riser module (optional) on page 92
Removing the internal PERC riser on page 94
Removing the cooling shroud on page 59
Removing the (optional) 2.5 inch internal hard drive carrier on page 76
Installing the (optional) 2.5 inch internal hard drive cage on page 83

Installing the (optional) 2.5 inch internal hard drive carrier on page 78
Installing the cooling shroud on page 60
Installing the internal PERC riser on page 95
Installing the dual riser module (optional) on page 93
After working inside your system on page 54

Installing the (optional) 2.5 inch internal hard drive cage

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system.
3. Keep the Phillips #2 screwdriver ready.
4. If connected, disconnect the cables from expansion card(s).
5. If required, remove the PCIe expansion card riser.

   NOTE: If applicable, close the expansion card latch on the cooling shroud to release the full length card.
6. Remove the cooling shroud.
7. Disconnect the power and data cables from the hard drive.
8. Disconnect the FAN1 cable from the power interposer board.

   NOTE: The FAN1 cable is routed behind the internal hard drive cage.

Steps

1. Align the internal hard drive cage guide with the guide slots on the chassis.
2. Insert the internal hard drive cage into the chassis.
3. Install the screw to secure the internal hard drive cage to the chassis.

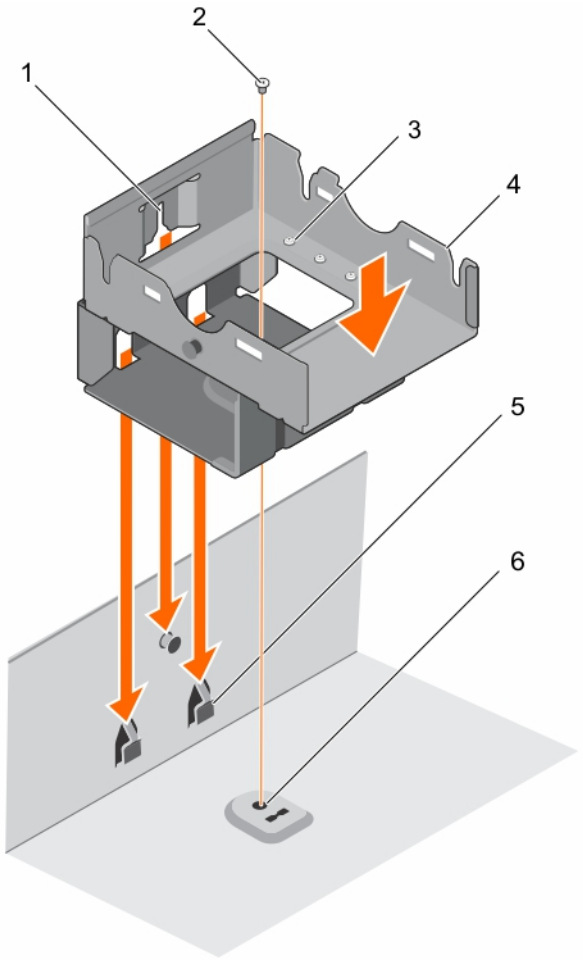

Figure 34. Installing the (optional) 2.5 inch internal hard drive cage

1. internal hard drive cage guide
2. screw
3. hard drive retention screw (8)
4. internal hard drive cage
5. internal hard drive cage guide slot
6. screw hole on chassis

Next steps

1. Install the internal hard drive carrier.
2. Reconnect the FAN1 cable to the power interposer board.
3. If removed, reinstall the PCIe expansion card riser.
4. If disconnected, reconnect the cables to the expansion card(s).
5. Reinstall the cooling shroud.
6. If required, open the expansion card latch on the cooling shroud to support the full length expansion card.
7. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the dual riser module (optional) on page 92
Removing the internal PERC riser on page 94
Removing the cooling shroud on page 59
Removing the (optional) 2.5 inch internal hard drive carrier on page 76
Installing the (optional) 2.5 inch internal hard drive carrier on page 78

Installing the cooling shroud on page 60
Installing the internal PERC riser on page 95
Installing the dual riser module (optional) on page 93
After working inside your system on page 54

Cooling fans

Your system supports six cooling fans. A fan blank is pre-installed on the sixth cooling fan slot (FAN6) in a single processor configuration. FAN6 is required in a dual processor configuration.

NOTE: Hot-swap removal or installation of the fans is not supported.

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

The following table lists the fan configuration which shows the various fan configurations based on the processor configuration in the system.

Table 31. Fan configuration table

Processor Type	CPU 1	CPU 2	PSU Type	FAN1	FAN2	FAN3	FAN4	FAN5	FAN6
55 W-140 W	Y	N	Redundant	Y	Y	Y	Y	Y	N
	Y	Y	Redundant	Y	Y	Y	Y	Y	Y

Removing a cooling fan

Prerequisites

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

CAUTION: 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: The procedure for removing each cooling fan is the same.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. If applicable, remove the expansion card riser.
   NOTE: If applicable, close the expansion card latch on the cooling shroud to release the full length card.
4. Remove the cooling shroud.

Steps

1. Remove the fan cable connector from the system board by pressing the release tab on the system board end of the connector, and lifting it away from the system board.
2. Release the cable from the cable holders on the fan bracket.
3. Press the release tab on the cooling fan and lift the fan away from the chassis.

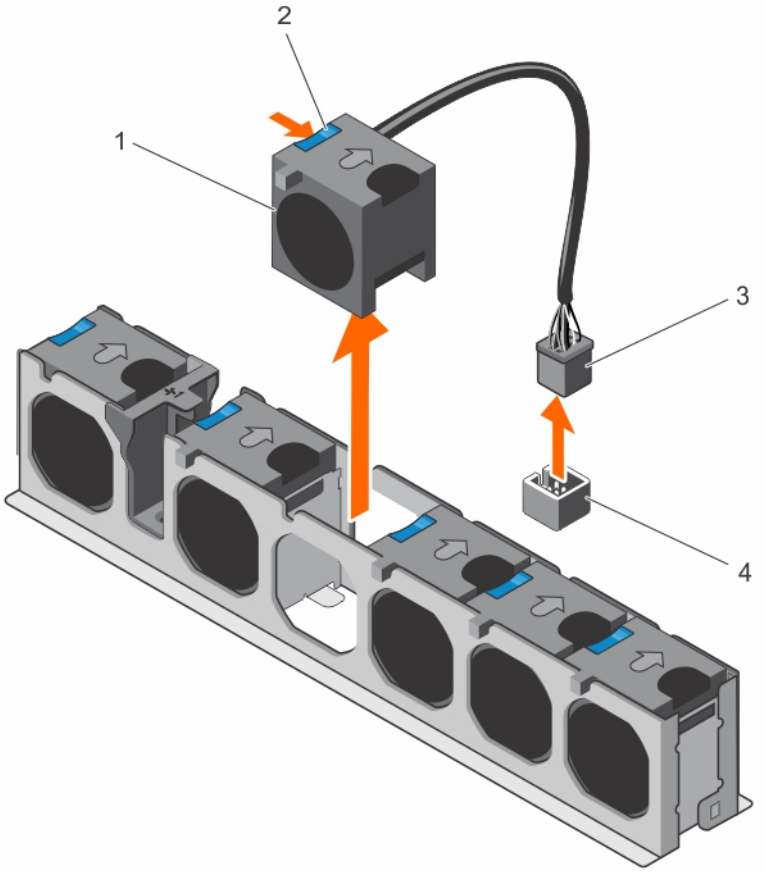

Figure 35. Removing a cooling fan

1. cooling fans (6)
2. cooling fan release tab
3. cooling fan cable connector
4. cooling fan connector on the system board

Next steps

1. If applicable, install the PCIe expansion card riser.
2. Reinstall the cooling shroud.
3. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the dual riser module (optional) on page 92
Removing the internal PERC riser on page 94
Removing the cooling shroud on page 59
Installing a cooling fan on page 87
Installing the cooling shroud on page 60
Installing the internal PERC riser on page 95
Installing the dual riser module (optional) on page 93
After working inside your system on page 54

Installing a cooling fan

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.

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

Steps

1. Align the fan with the cable end of the fan toward the system board connector and power interposer board.
2. Lower the fan into the fan bracket until it clicks into position.
3. Connect the fan power cable to the corresponding power connector on the system board or the power interposer board.
4. Route the cable through the cable holders on the fan bracket.

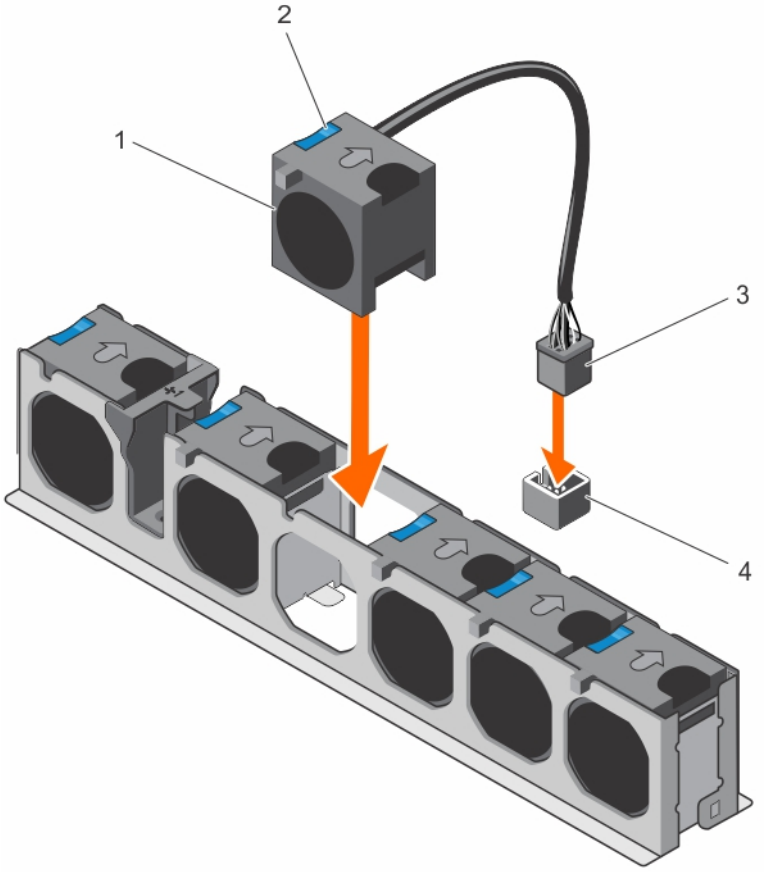

Figure 36. Installing the cooling fan

1. cooling fans (6)
2. cooling fan release tab
3. cooling fan cable connector
4. cooling fan connector on the system board

NOTE: FAN1 connects to the power interposer board, route the cable behind the internal hard drive cage.

Next steps

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

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the dual riser module (optional) on page 92
Removing the internal PERC riser on page 94
Removing the cooling shroud on page 59
Installing the cooling shroud on page 60
Installing the internal PERC riser on page 95
Installing the dual riser module (optional) on page 93
After working inside your system on page 54

Expansion cards and expansion card riser (optional)

NOTE: A missing or an unsupported expansion card riser logs an SEL event. It does not prevent your system from powering on and no BIOS POST message or F1/F2 pause is displayed.

Expansion card installation guidelines

Your system supports PCI Express Generation 2 and Generation 3 expansion cards.

Use the following table as a guide for installing expansion cards to ensure proper cooling and mechanical fit. The expansion cards with the highest priority must be installed first by using the slot priority indicated.

Table 32. Expansion card slots available on system board only

Location	PCIe slot	Processor connection	Height	Length	Link width	Slot width
System board	1	Processor 1	Low profile	Half length	x16	x16
System board	2	Processor 1	Low profile	Half length	x16	x16
System board	3	Platform Controller Hub (Mapped to Processor 1)	Low profile	Half length	x4	x8

Table 33. Expansion card slots available with optional dual riser module and optional internal PERC riser

Location	PCIe slot	Processor connection	Height	Length	Link width	Slot width
Dual riser module	1	Processor 1	Full height	Full length	x16	x16
Dual riser module	2	Processor 1	Low profile	Half length	x8	x8
Dual riser module	3	Processor 1	Low profile	Half length	x8	x8
Dual riser module	4	Processor 1	Low profile	Half length	x8	x8
Internal riser	5	Processor 2	Low profile	Half length	x8	x8

NOTE: The optional dual riser module is installed on PCIe slot 1 and 2 on the system board.

NOTE: When your system is installed with the optional dual riser module in PCIe slot 1 and 2 on the system board, you cannot install an expansion card in PCIe slot 3 of the system board.

NOTE: When x16 card installed in PCIe Slot 1 on dual riser module the PCIe Slot 2 on the expansion card does not function. The expansion card riser can be used either with four x8 PCIe cards or with one x16 PCIe card on PCIe Slot 1 and two x8 PCIe cards on slots 3 and 4 of the dual riser module.

NOTE: Only slots 1, 2 and the internal PCIe slot support Generation 3 PCIe expansion cards.

NOTE: The expansion cards are not hot-swappable.

Table 34. Expansion card installation priority on system board only

Card Priority	Category	Slot Priority	Max Allowed
1	PowerEdge Raid Controller (PERC) (Low profile)	2	1
2	10 Gb NICs	1,2	2
3	1Gb NICs (Intel Quad Port)	1,2,3	3
	1Gb NICs (Intel Dual Port)	1,2,3	3
4	NICs/HCAs (single port)	1,2	2
	NICs/HCAs (dual port)		

Table 35. Expansion card installation priority on optional dual riser module and optional internal PERC riser

Card Priority	Category	Slot Priority	Maximum Allowed
1	PowerEdge Raid Controller (PERC) (Low profile)	Internal PCIe Slot	1
2	10 Gb NICs (Low profile)	2,3,4	3
	10 Gb NICs (Full height)	1	1
3	1 Gb NICs (Low profile)	2,3,4	3
	1 Gb NICs (Full height)	1	1
4	NICs/HCAs (single port)	1,2	2
	NICs/HCAs (dual port)		

Removing an expansion card from the system board

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.

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

Steps

1. If connected, disconnect the cables from the expansion card.
2. Pull the expansion card retention latch lock and lift the latch up to open the expansion card retention latch.
3. Hold the expansion card by its edge, pull the card up to remove it from the expansion card connector and out of the system.
4. If the expansion card is not going to be replaced, install a filler bracket by performing the following steps:
   a. Align the slot on the filler bracket with the tab on the expansion card slot.
   b. Press the expansion card latch till the filler bracket locks into place.

   NOTE: Filler brackets must be installed over empty expansion card slots to maintain FCC certification of the system. The brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.

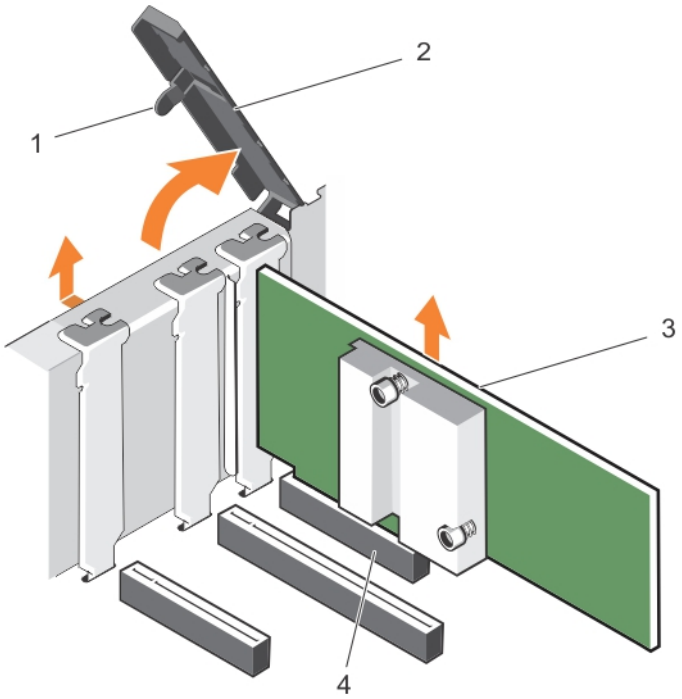

Figure 37. Removing an expansion card from the system board

1. expansion card retention latch lock
2. expansion card retention latch
3. expansion card
4. expansion card connector

Next steps

1. If disconnected, reconnect the cables to the expansion card.
2. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Installing an expansion card on the system board on page 90
After working inside your system on page 54

Installing an expansion card on the system board

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.

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

Steps

1. Unpack the expansion card and prepare it for installation.

For instructions, see the documentation accompanying the card.

2. Open the expansion card retention latch.
3. If you are installing a new card, remove the filler bracket.

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

4. Holding the card by its edges, position the card so that the card's edge connector aligns with the expansion card connector.
5. Insert the card's edge connector firmly into the expansion card connector until the card is fully seated.
6. Close the expansion card retention latch by pushing the latch down until the latch snaps into place.
7. Connect the required cables to the expansion card.

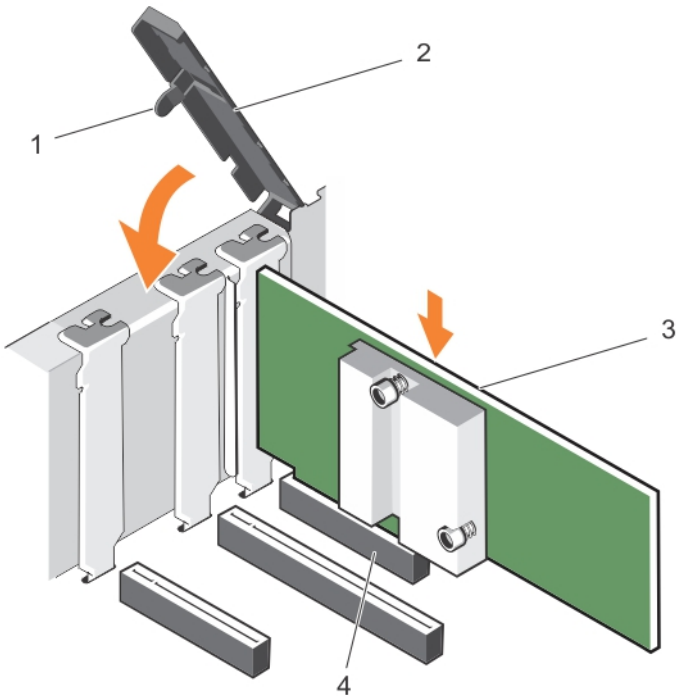

Figure 38. Installing an expansion card onto the system board

1. expansion card retention latch lock
2. expansion card retention latch
3. expansion card
4. expansion card connector

Next steps

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

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing an expansion card from the system board on page 89
After working inside your system on page 54

Removing the dual riser module (optional)

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system.
3. If connected, disconnect the cables from expansion card(s).

Steps

Holding the dual riser module by the finger holds, lift the dual riser module from the riser connector on the system board.

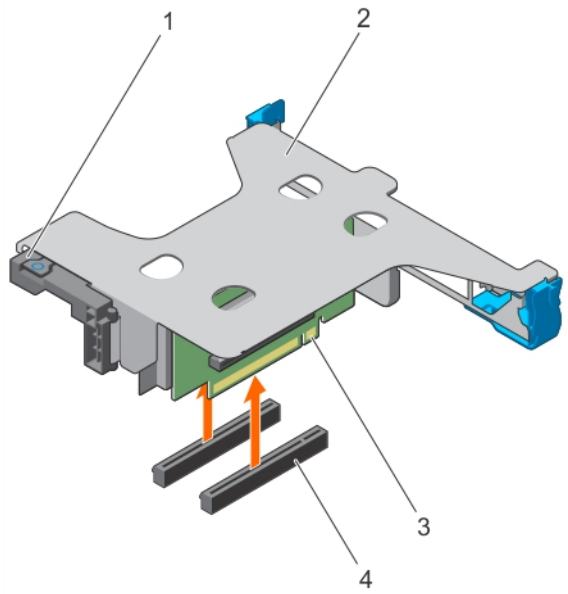

Figure 39. Removing the dual riser module

1. full height expansion card latch
2. dual riser module
3. expansion card riser (2)
4. PCIe connector on the system board (2)

Next steps

1. If removed, reinstall the expansion card(s) onto the dual riser module.
2. If disconnected, connect the power or data cables to the expansion card(s).
3. Install the dual riser module.
4. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Installing an expansion card into the dual riser module on page 101
Installing the dual riser module (optional) on page 93
After working inside your system on page 54

Installing the dual riser module (optional)

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Install the expansion card on to the dual riser module, if applicable.

   NOTE: Ensure that the expansion card is properly seated along the chassis, so that the expansion card latch can be closed.

Steps

1. Align the dual riser module with the guide pins on the chassis near PCIe slots 1 and 2.
2. Insert the dual riser module into the chassis and press the module to lock it into place.

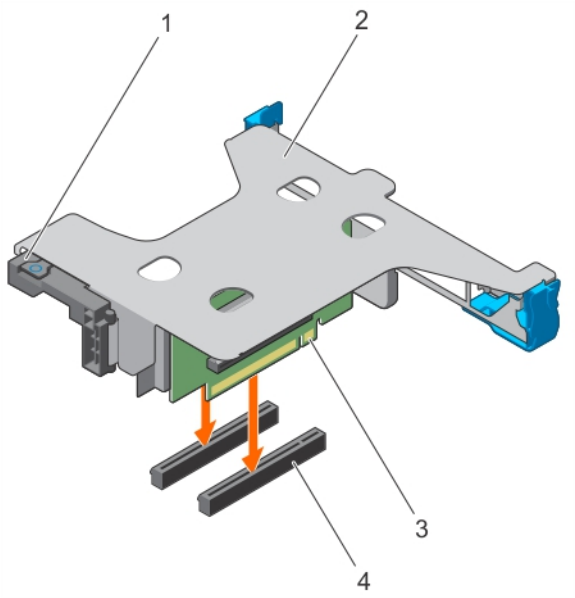

Figure 40. Installing the dual riser module

1. full height expansion card latch
2. dual riser module
3. expansion card riser (2)
4. PCIe connector on the system board (2)

Next steps

1. If applicable, connect the cables to the expansion card(s).
2. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the dual riser module (optional) on page 92
Removing an expansion card from the dual riser module on page 99
After working inside your system on page 54

Removing the internal PERC riser

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. If connected, disconnect the cables from the expansion card(s).
4. If required, remove the dual riser module.
5. Remove the cooling shroud.

Steps

Hold the internal PERC riser module by the edges and lift it out of the system.

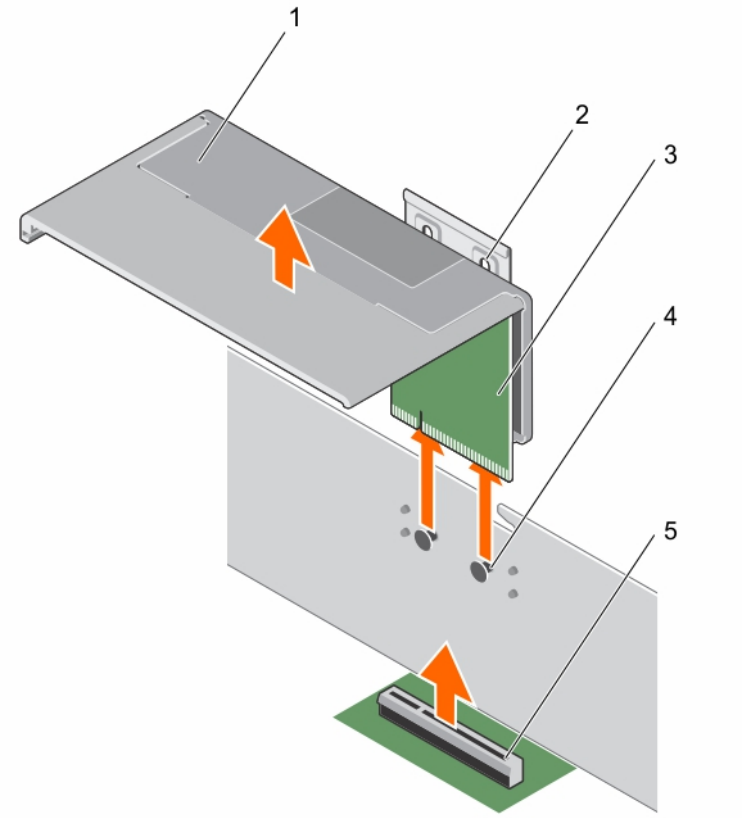

Figure 41. Removing the internal PERC riser

1. internal PERC riser module
2. guide slot on the internal PERC riser (2)
3. internal PERC riser
4. guide pin on the chassis (2)
5. PCIe connector on system board

Next steps

1. Install the cooling shroud.
2. If removed, reinstall the dual riser module.
3. Reconnect all disconnected cables.
4. If required, open the expansion card latch on the cooling shroud to support the full length expansion card.
5. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing an expansion card from the internal PERC riser on page 96
Removing the cooling shroud on page 59
Installing the internal PERC riser on page 95
Installing the cooling shroud on page 60
Installing an expansion card into the internal PERC riser on page 98
After working inside your system on page 54

Installing the internal PERC riser

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. If connected, disconnect the from expansion card(s).
4. If connected, remove the full length expansion card.
5. Remove the cooling shroud
6. If applicable, install the PERC card on the riser.

Steps

1. Align the guide slot on the internal PERC riser with the guide pin on the chassis.
2. Align the edge connector of the internal PERC riser with the PCIe connector on the system board.
3. Press down to lock the riser bracket to the chassis.

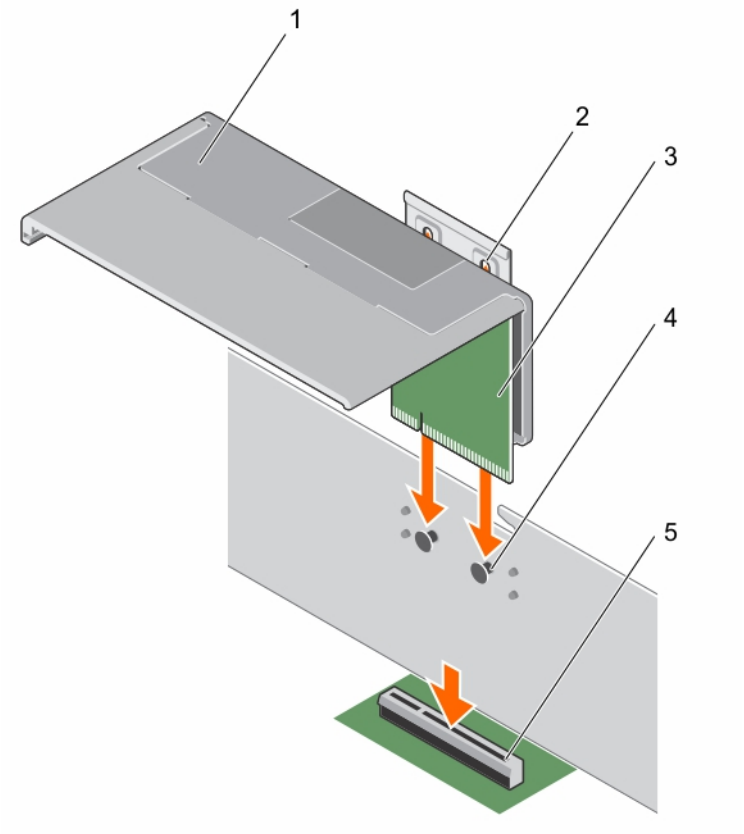

Figure 42. Installing the internal PERC riser

1. internal PERC riser module
2. guide slot on the internal PERC riser (2)
3. internal PERC riser
4. guide pin on the chassis (2)

5. PCIe connector on system board

Next steps

1. Reconnect all disconnected cables.
2. Install the cooling shroud.
3. If removed, reinstall the full length expansion card.
4. If required, open the expansion card latch on the cooling shroud to support the full length expansion card.
5. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing an expansion card from the internal PERC riser on page 96
Removing the cooling shroud on page 59
Removing the internal PERC riser on page 94
Installing the cooling shroud on page 60
Installing an expansion card into the internal PERC riser on page 98
After working inside your system on page 54

Removing an expansion card from the internal PERC riser

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. If connected, disconnect the cables from the expansion card(s).
4. If required, remove the dual riser module.

   NOTE: If required, close the expansion card latch on the cooling shroud to release the full length card.
5. Remove the cooling shroud.
6. Remove the internal PERC riser.

NOTE: The internal riser can be used only when both the processors are installed.

Steps

1. Press the blue release tab to disengage the lock from locking notch of the expansion card.
2. Slide the expansion card out of the internal PERC riser, until the expansion card is free of the guide slot on the internal PERC riser.
3. Lift the expansion card away from the system.

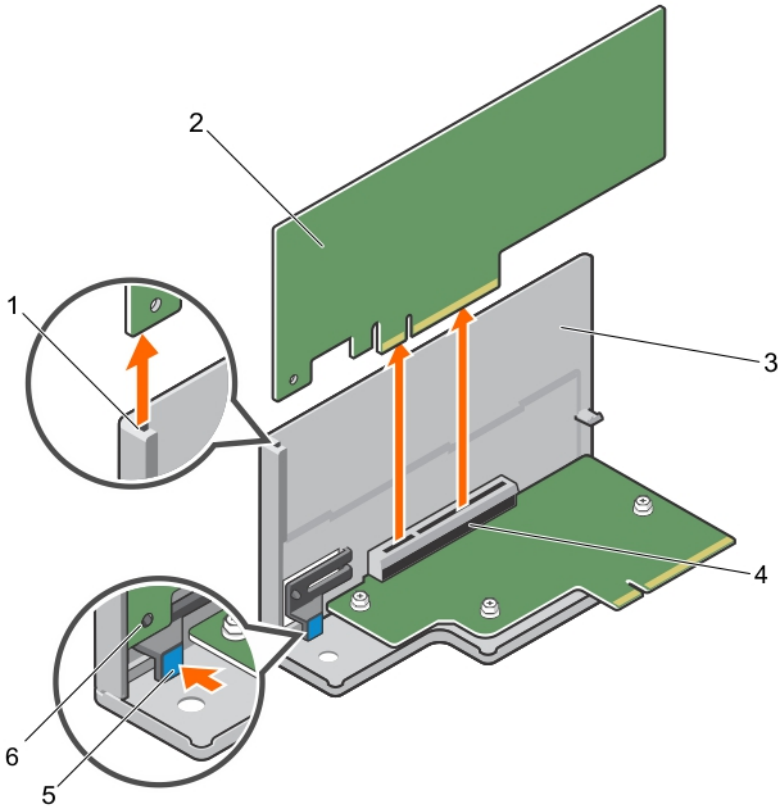

Figure 43. Removing an expansion card on the internal PERC riser

1. expansion card guide slot on internal PERC riser
2. expansion card
3. internal PERC riser
4. PCIe connector on internal PERC riser card
5. release tab
6. locking notch on the expansion card

Next steps

1. Follow the procedure listed in the After working inside your system section.
2. Install the internal PERC riser on the system board.
3. Install the cooling shroud.
4. If removed, reinstall the dual riser module.

   NOTE: If required, open the expansion card latch on the cooling shroud to support the full length card.
5. Reconnect the disconnected cables to the expansion card(s).

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the dual riser module (optional) on page 92
Removing the cooling shroud on page 59
Removing the internal PERC riser on page 94
Installing an expansion card into the internal PERC riser on page 98
Installing the internal PERC riser on page 95
Installing the cooling shroud on page 60
Installing the dual riser module (optional) on page 93
After working inside your system on page 54

Installing an expansion card into the internal PERC riser

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. If connected, disconnect the cables from expansion card (s).
4. If required, remove the dual riser module.

   NOTE: If open, close the expansion card latch on the cooling shroud to release the full length card.
5. Remove the cooling shroud.
6. If installed, remove the internal PERC riser

Steps

1. Locate the expansion card connector on the internal PERC riser.
2. Holding the card by its edges, position the card so that the card's edge connector aligns with the internal PERC expansion card connector.
3. Align the slot on the internal PERC riser with the expansion card.
4. Slide the expansion card into the internal riser connector until the card is fully seated and the blue release tab clicks into place.
5. If applicable, connect cables to the expansion card.
6. Install the expansion card riser on the system board.

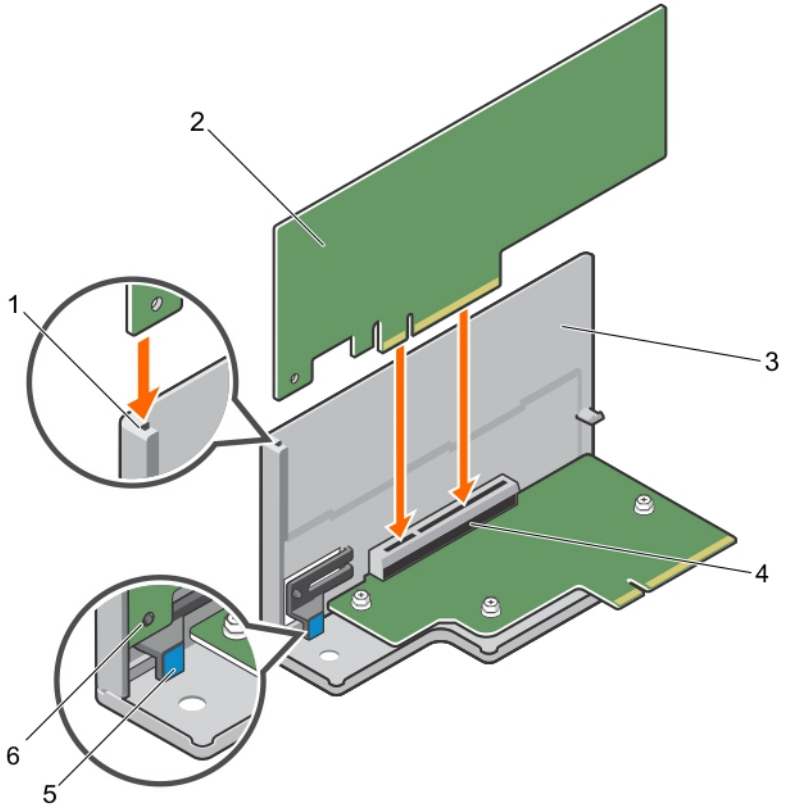

Figure 44. Installing an expansion card into the internal PERC riser

1. expansion card guide slot on internal PERC riser
2. expansion card
3. internal PERC riser
4. PCIe connector on internal PERC riser card

5. release tab
6. locking notch on the expansion card

Next steps

1. Follow the procedure listed in the After working inside your system section.
2. Install the internal PERC riser on the system board.
3. Install the cooling shroud.
4. Reconnect the disconnected cables to the expansion card(s).
5. If removed, reinstall the dual riser module.

   NOTE: If closed, open the expansion card latch on the cooling shroud to support the full length card.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the dual riser module (optional) on page 92
Removing the cooling shroud on page 59
Removing the internal PERC riser on page 94
Removing an expansion card from the internal PERC riser on page 96
Installing the internal PERC riser on page 95
Installing the cooling shroud on page 60
Installing the dual riser module (optional) on page 93
After working inside your system on page 54

Removing an expansion card from the dual riser module

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.

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

   NOTE: If applicable, close the expansion card latch on the cooling shroud to release the full length card.

Steps

1. For expansion cards:
   a. Installed in PCIe slots 3 and 4 of the dual riser module, lift the expansion card lock up.
   b. Installed in PCIe slots 1 and 2 of the dual riser module, pull the expansion card lock down and away from the dual riser module.
2. Pull the expansion card away from the riser.
3. If you want to remove the expansion card permanently, install a metal filler bracket over the empty expansion slot opening and close the expansion card latch.
4. Close the expansion card lock.

   NOTE: You must install a filler bracket over an empty expansion card slot. The brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system. The filler bracket is necessary to maintain proper thermal conditions.

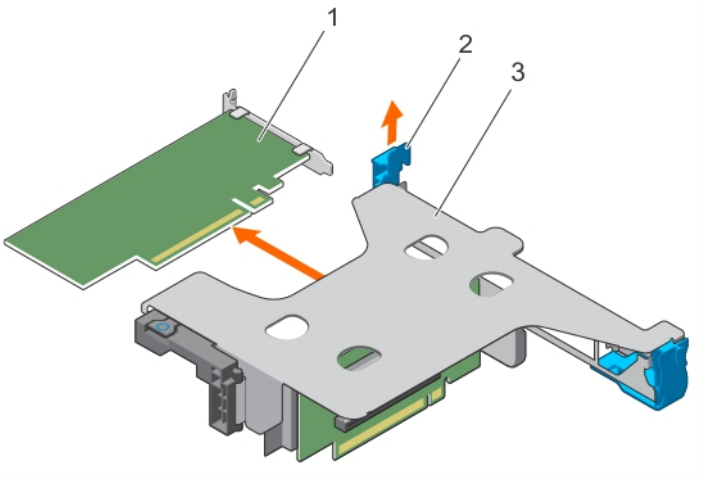

Figure 45. Removing a low profile expansion card from the dual riser module

a. low profile expansion card
b. expansion card retention latch
c. dual riser module

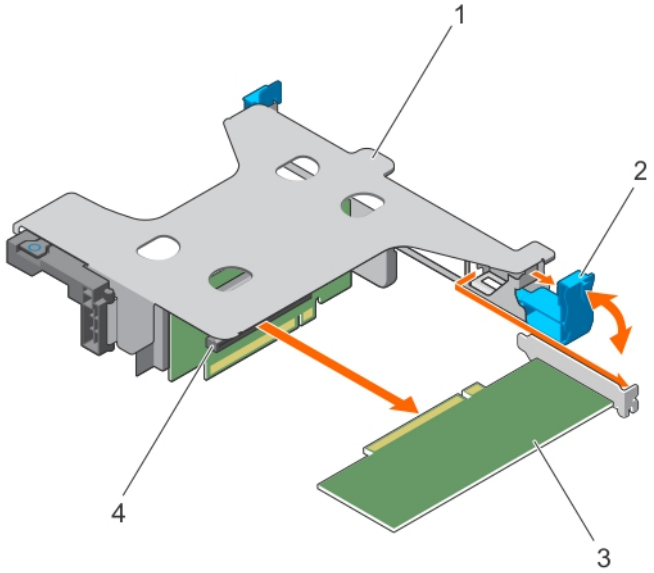

Figure 46. Removing a low profile expansion card from the dual riser module

1. dual riser module
2. expansion card retention latch
3. full height and full length expansion card
4. PCIe slot on riser card

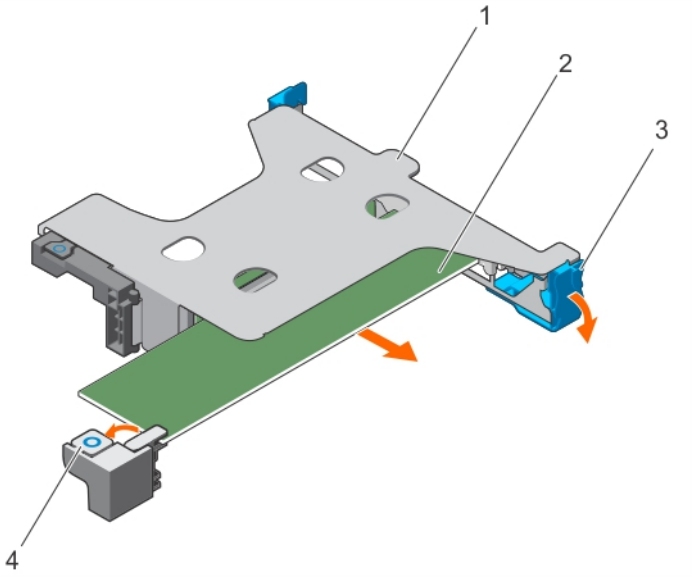

Figure 47. Removing full height and full length expansion card from the dual riser module

1. dual riser module
2. full height and full length expansion card
3. expansion card retention latch
4. full height and full length expansion card latch (on cooling shroud)

Next steps

1. If applicable, install the expansion card(s).
2. Install the dual riser module.
3. If applicable, open the expansion card latch on the cooling shroud to support a full length expansion card.
4. If disconnected, reconnect cables to the expansion card(s).
5. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the dual riser module (optional) on page 92
Removing the internal PERC riser on page 94
Installing the internal PERC riser on page 95
Installing the dual riser module (optional) on page 93
After working inside your system on page 54

Installing an expansion card into the dual riser module

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. If opened, close the expansion card latch on the cooling shroud.

4. Remove the expansion card riser.
5. Unpack the expansion card and prepare it for installation.

   NOTE: For instructions, see the documentation that shipped with the expansion card.

Steps

1. For expansion cards:
   a. To be installed in PCIe slots 3 and 4 of the dual riser module, lift the expansion card lock up.
   b. To be installed in PCIe slots 1 and 2 of the dual riser module pull, the expansion card lock down and away from the dual riser module.
2. Holding the card by its edges, position the card so that the card's edge connector aligns with the expansion card connector.
3. Insert the card's edge connector firmly into the expansion card connector until the card is fully seated.
4. Close the expansion card retention latch.

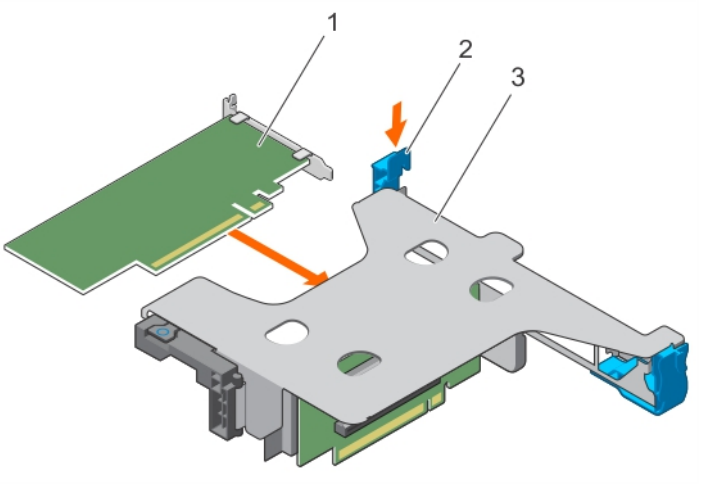

Figure 48. Installing a low profile expansion card into the dual riser module

a. low profile expansion card
b. expansion card retention latch
c. dual riser module

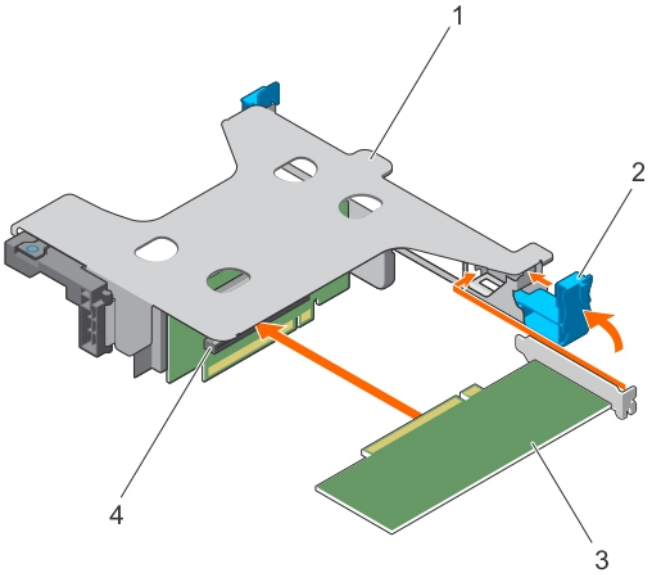

Figure 49. Installing a low profile expansion card into the dual riser module

1. dual riser module
2. expansion card retention latch
3. full height and full length expansion card
4. PCIe slot on riser card

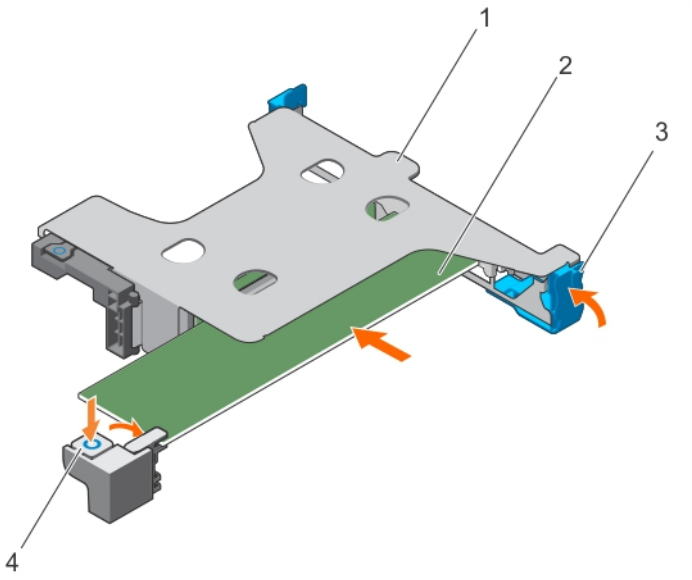

Figure 50. Installing full height and full length expansion card into the dual riser module

1. dual riser module
2. full height and full length expansion card
3. expansion card retention latch
4. full height and full length expansion card latch (on cooling shroud)

Next steps

1. Install the expansion card riser.
2. If disconnected, connect the required power or data cables to the expansion card.
3. If required, press the expansion card latch on the cooling shroud to support the full length expansion card.
4. Follow the procedure listed in the After working inside your system section.
5. Install any device drivers required for the expansion card as described in the documentation for the card.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the dual riser module (optional) on page 92
Removing the internal PERC riser on page 94
Removing an expansion card from the dual riser module on page 99
Installing the internal PERC riser on page 95
Installing the dual riser module (optional) on page 93
After working inside your system on page 54

Remote management port card (optional)

The remote management port card is used for advanced management of the system.

Removing the optional remote management port card

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. If applicable, disconnect the cables from expansion card(s).
4. Remove the expansion card riser.

   NOTE: If applicable, close the expansion card latch on the cooling shroud to release the full length card.
5. Remove the cooling shroud.
6. Keep the Phillips #2 screwdriver ready.

Steps

1. Disconnect the management network cable from the remote management port.
2. Loosen the two screws securing the remote management port card holder to the system board.
3. Pull the remote management port card up and toward the front of the system to disengage it from the connector and remove the card from the chassis.

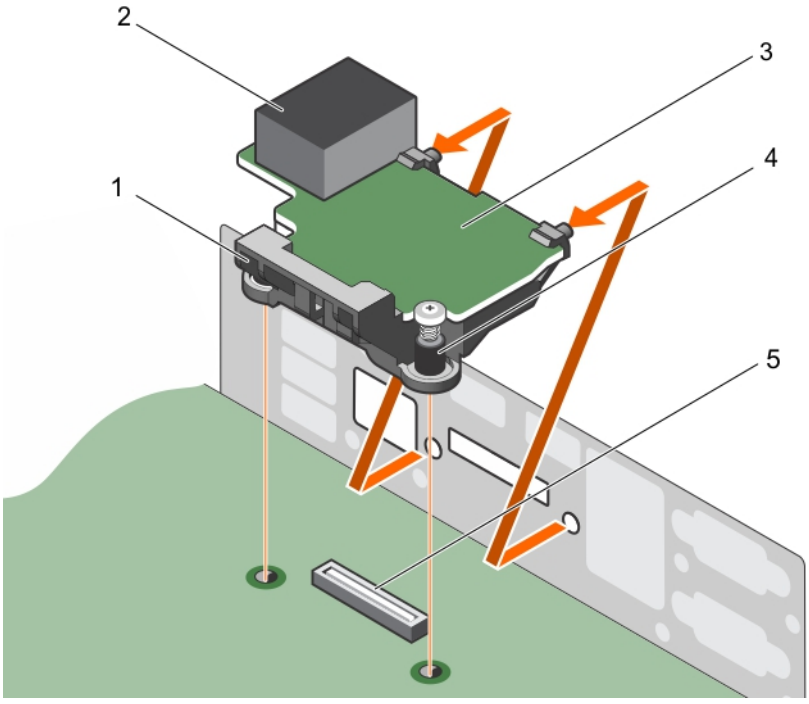

Figure 51. Removing the optional remote management port card

1. remote management port card holder
2. remote management port
3. remote management port card
4. screw (2)
5. remote management port card connector on the system board

Next steps

1. Install the expansion card riser.
2. If applicable, connect the required power or data cables to the expansion card(s).
3. Install the cooling shroud.
4. If applicable, open the expansion card latch on the cooling shroud to support the full length expansion card.
5. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the cooling shroud on page 59
Installing the optional remote management port card on page 105
Installing the cooling shroud on page 60
After working inside your system on page 54

Installing the optional remote management port card

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.

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

   NOTE: If applicable, close the expansion card latch on the cooling shroud to release the full length card.
4. If applicable, disconnect the cables from expansion card(s).
5. If applicable, remove the expansion card riser.

Steps

1. Align and insert the tabs on the remote management port card on the slots on the chassis wall.
2. Insert the remote management port card into the connector on the system board.
3. Tighten the screws to secure the remote management port card.

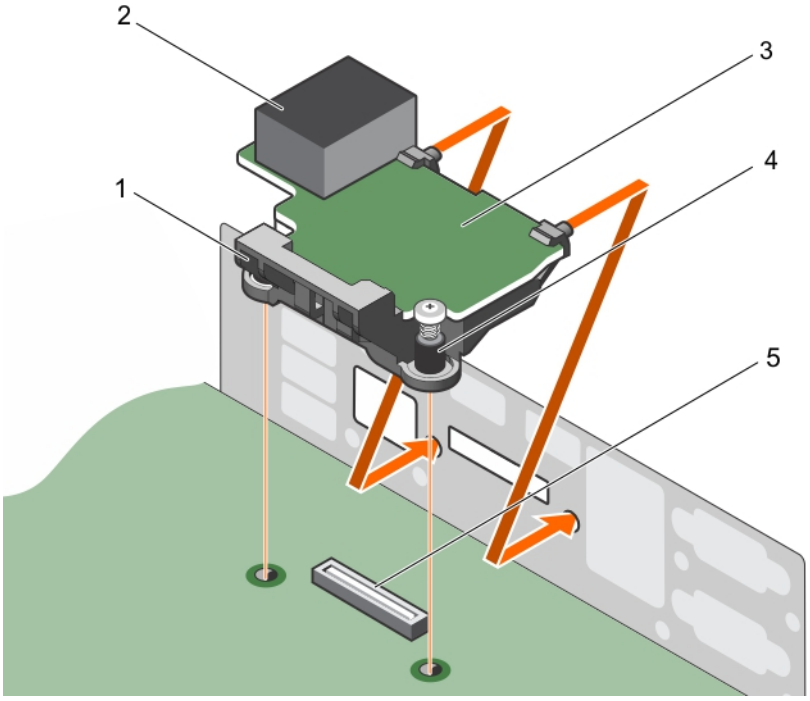

Figure 52. Installing the optional remote management port card

1. remote management port card holder
2. remote management port
3. remote management port card
4. screw (2)
5. remote management port card connector on the system board

Next steps

1. If removed, reinstall the PCIe expansion card riser.
2. If disconnected, connect the cables to the expansion card(s).
3. Reinstall the cooling shroud.
4. If required, open the expansion card latch on the cooling shroud to secure the full length expansion card.
5. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the cooling shroud on page 59
Installing the cooling shroud on page 60
After working inside your system on page 54

Processors and heat sinks

Use the following procedures when:

- Removing and installing a heat sink
- Installing an additional processor
- Replacing a processor

The following table provides information about the supported processor, heat sink, and cooling shroud configurations for DSS 2500.

Table 36. Processor wattage and heat sink dimensions

Processor	Number of processors supported	Heat sink		Cooling shroud
		Heat sink (dimensions)	Heat sink type	
Up to 135 W (Intel Xeon E5 2600 v3 and v4 product family processors)	Dual processor	84 mm x 106 mm x 40.95 mm	single heat sink (one heat sink for each processor)	135 W cooling shroud
140 W (Intel Xeon E5-1600 v3 and v4 product family processors)	Single processor	84 mm x 106 mm x 61.5 mm	single heat sink (single processor supported)	140 W cooling shroud

NOTE: To ensure proper cooling, you must install a processor blank in any empty processor socket.

Related tasks

Removing a heat sink on page 107
Removing a processor on page 108
Installing a processor on page 111
Installing a heat sink on page 112

Removing a heat sink

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.

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

NOTE: This is a Field Replaceable Unit (FRU). Removal and installation procedures should be performed only by Dell certified service technicians.

NOTE: To ensure proper system cooling, you must install a processor blank in any empty processor socket.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. If connected, disconnect the cables from expansion card(s).
4. If required, remove the PCIe expansion card riser.
5. Remove the cooling shroud.
   NOTE: If applicable, close the expansion card latch on the cooling shroud to release the full length card.
6. Keep the Phillips #2 screwdriver ready.

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

Steps

To remove a heat sink of up to 135 W, perform the following steps.

a. Loosen one of the screws that secure the heat sink to the system board.

Allow some time (approximately 30 seconds) for the heat sink to loosen from the processor.

b. Loosen the screw that is diagonally opposite the screw that you first loosened.
c. Repeat the procedure for the remaining screws.

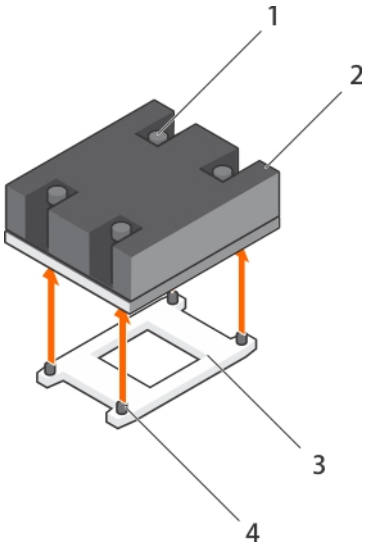

Figure 53. Removing the heat sink (up to 135 W)

1. captive screw (4)
2. heat sink
3. processor socket
4. screw hole (4)

Next steps

Remove the processor.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the cooling shroud on page 59
Removing a processor on page 108

Removing a processor

Prerequisites

WARNING: The processor is hot to touch for some time after the system has been powered down. Allow the processor to cool before removing it.

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

CAUTION: The processor is held in its socket under strong pressure. Be aware that the release lever can spring up suddenly if not firmly grasped.

NOTE: This is a Field Replaceable Unit (FRU). Removal and installation procedures should be performed only by Dell certified service technicians.

NOTE: To ensure proper system cooling, you must install a processor blank in any empty processor socket.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. If you are upgrading your system (from a single processor system to a dual processor system or a processor with a higher processor bin), download the latest system BIOS version from **Dell.com/support** and follow the instructions included in the compressed download file to install the update on your system.
4. If connected, disconnect the cables from expansion card(s).
5. If installed, remove the PCIe expansion card riser.
6. Remove the cooling shroud.
7. Remove the heat sink.
8. Keep the Phillips #2 screwdriver ready.

Steps

1. Using a clean, lint-free cloth remove any thermal grease from the surface of the processor shield.

   CAUTION: The processor is held in its socket under strong pressure. Be aware that the release lever can spring up suddenly if not firmly grasped.

2. Position your thumb firmly over the socket-release lever 1 and lever 2 of the processor and release both the levers simultaneously from the locked position by pushing down and out from under the tab.

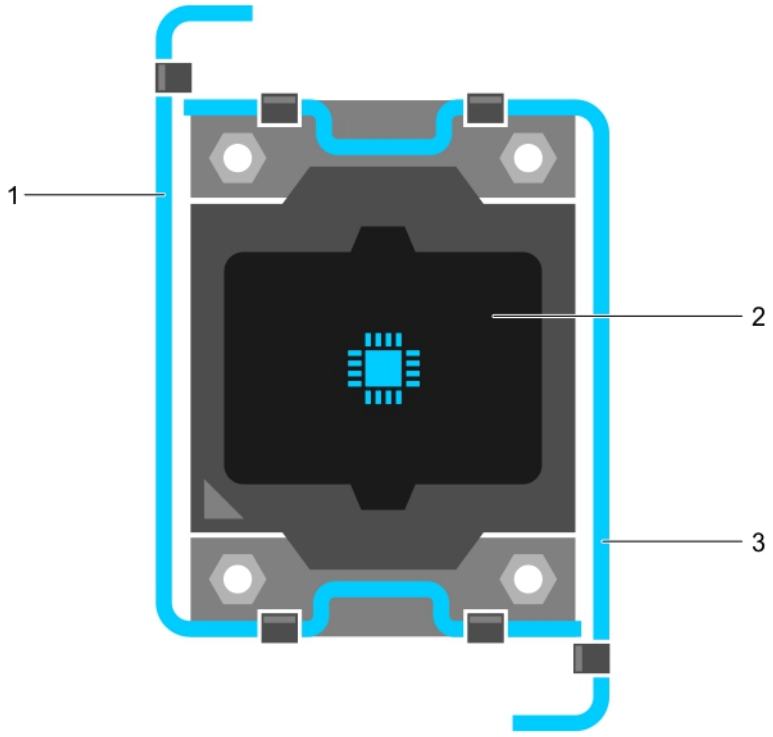

Figure 54. Processor shield opening and closing lever sequence

a. socket-release lever 1
b. processor
c. socket-release lever 2

3. Hold the tab on the processor shield and rotate the shield upward and out of the way.
4. Lift the processor out of the socket and leave the release lever up so that the socket is ready for the new processor.

   CAUTION: If you are permanently removing a processor, you must install a socket protective cap and a processor blank in the vacant socket to ensure proper system cooling. The processor blank covers the vacant sockets for the DIMMs and the processor.

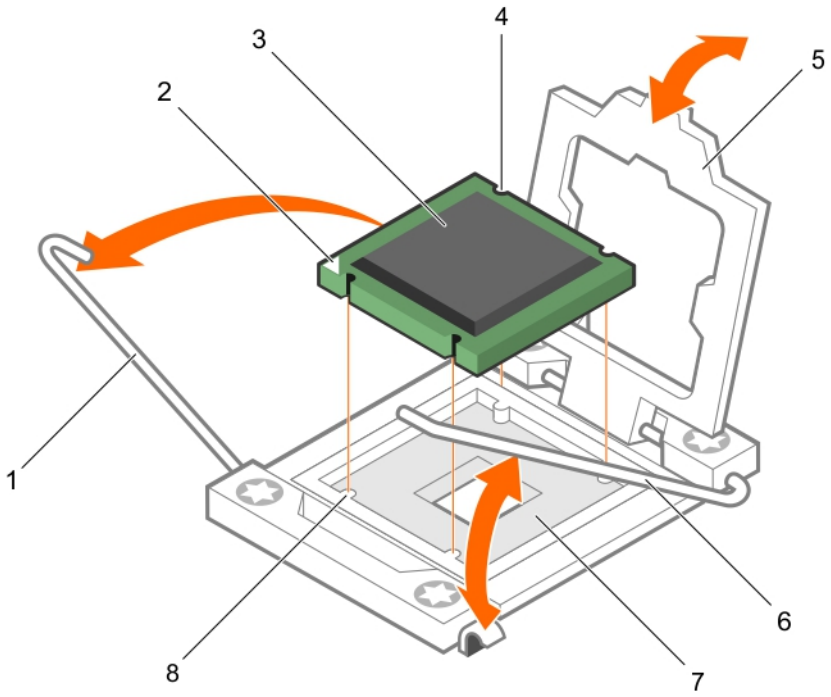

Figure 55. Removing a processor

1. socket-release lever 1
2. pin–1 corner of the processor
3. processor
4. slot (4)
5. processor shield
6. socket-release lever 2
7. processor socket
8. tab (4)

Next steps

1. If you are removing the processor permanently, install the processor blank.
2. Install a processor.
3. Install the heat sink.
4. If removed, reinstall the PCIe expansion card riser.
5. If disconnected, reconnect the cables to the expansion card(s).
6. Reinstall the cooling shroud.
7. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the cooling shroud on page 59
Removing a heat sink on page 107
Installing a processor on page 111
Installing a heat sink on page 112
Installing the cooling shroud on page 60
After working inside your system on page 54

Installing a processor

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.

NOTE: This is a Field Replaceable Unit (FRU). Removal and installation procedures should be performed only by Dell certified service technicians.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. If you are upgrading your system (from a single processor system to a dual processor system or a processor with a higher processor bin) download the latest system BIOS version from **Dell.com/support** and follow the instructions included in the compressed download file to install the update on your system.
4. Keep the Phillips #2 screwdriver ready.

NOTE: If you are installing a single processor, it must be installed in socket CPU 1.

Steps

1. Unpack the new processor.
2. Locate the processor socket.
3. Unlatch and rotate the socket-release levers 90 degrees upward and ensure that the socket-release lever is fully open.
4. Hold the tab on the processor shield and lift the shield and move it out of the way.
5. If installed, remove the socket protective cap from the processor shield. To remove the socket protective cap, push the cap from the inside of the processor shield and move it away from the socket pins.

   CAUTION: Positioning the processor incorrectly can permanently damage the system board or the processor. Be careful not to damage the pins in the socket.

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

   NOTE: It is recommended that you install or remove the socket protective cap from the processor shield with the processor shield in the open position.

6. Install the processor in the socket:
   a. Identify the pin-1 corner of the processor by locating the tiny gold triangle on one corner of the processor. Place this corner in the same corner of the ZIF (Zero Insertion Force) socket identified by a corresponding triangle on the system board.
   b. Install the processor into the socket such that the slots on the processor align with the socket keys.

      CAUTION: The system uses a ZIF processor socket. Do not use force to seat the processor. When the processor is positioned correctly, it engages easily into the socket.

   c. Close the processor shield.
   d. Rotate the socket-release lever 1 and lever 2 simultaneously until they are locked into position.

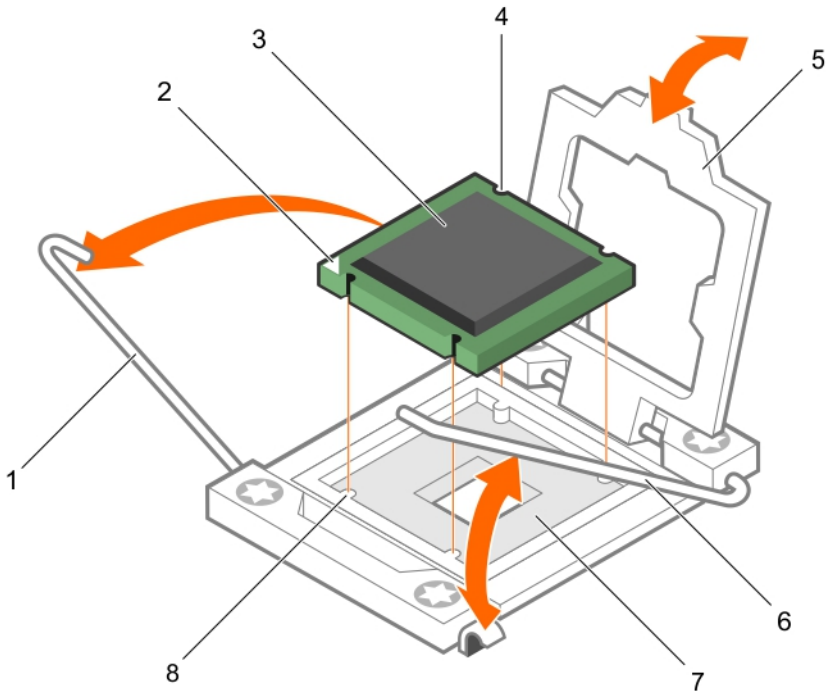

Figure 56. Installing a processor

1. socket-release lever 1
2. pin–1 corner of the processor
3. processor
4. slot (4)
5. processor shield
6. socket-release lever 2
7. processor socket
8. tab (4)

Next steps

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

1. Install the heat sink.
2. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Installing a heat sink on page 112
After working inside your system on page 54

Installing a heat sink

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.

NOTE: This is a Field Replaceable Unit (FRU). Removal and installation procedures should be performed only by Dell certified service technicians.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Install the processor.
4. Keep the Phillips #2 screwdriver ready.

NOTE: If you are installing a single processor, it must be installed in socket CPU 1.

Steps

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

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

   NOTE: The thermal grease syringe is intended for one-time use only. Dispose of the syringe after you use it.

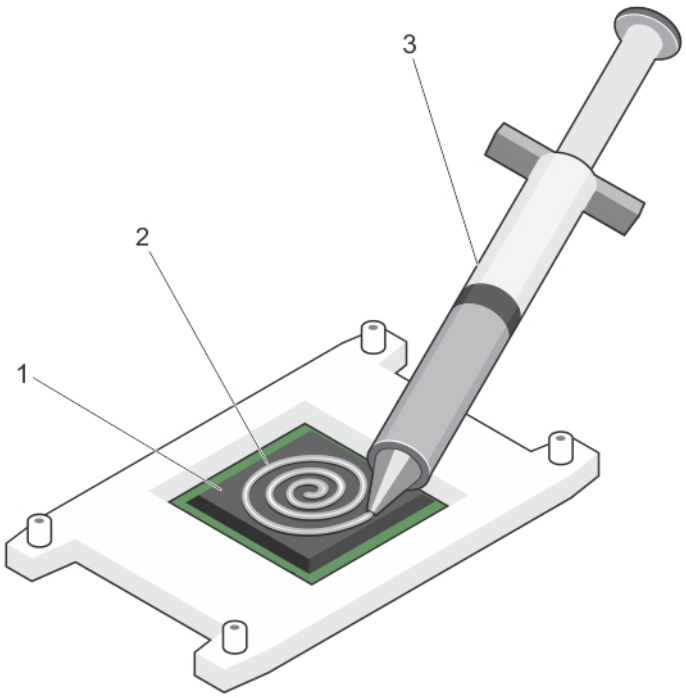

Figure 57. Applying thermal grease on the top of the processor

a. processor
b. thermal grease
c. thermal grease syringe

3. Place the heat sink on the processor.
4. To install a heat sink of up to 135 W, perform the following steps.
   a. Tighten one of the screws to secure the heat sink to the system board.
   b. Tighten the screw diagonally opposite to the first screw that you tightened.

NOTE: Do not over-tighten the heat sink retention screws when installing the heat sink. To prevent over-tightening, tighten the retention screw until resistance is felt. The screw tension should be not more than 6 in-lb (6.9 cm-kg).

c. Repeat the procedure for the remaining screws.

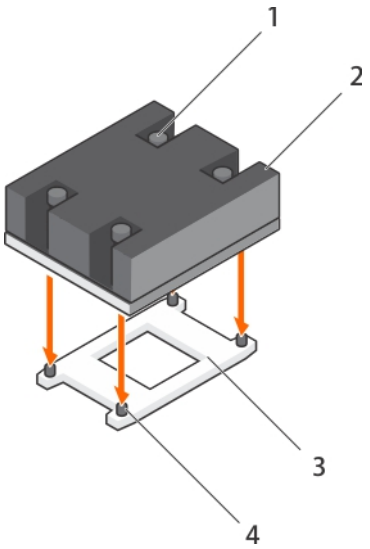

Figure 58. Installing a heat sink (up to 135 W)

1. captive screw (4)
2. heat sink
3. processor socket
4. screw hole (4)

Next steps

1. If removed, reinstall the PCIe expansion card riser.
2. If disconnected, reconnect the cables to the expansion card(s).
3. Reinstall the cooling shroud.
4. If required, open the expansion card latch on the cooling shroud to support the full length expansion card.
5. Follow the procedure listed in the After working inside your system section.
6. While booting, press F2 to enter System Setup and check that the processor information matches the new system configuration.
7. Run system diagnostics to verify that the new processor operates correctly.

Related concepts

System Setup on page 26

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Installing a processor on page 111
Installing the cooling shroud on page 60
After working inside your system on page 54

Power supplies

Your system supports two 495 W, 750 W, or 1100 W AC power supply modules.

When two identical power supplies are installed, the power supply configuration is redundant (1 + 1). In redundant mode, power is supplied to the system equally from both power supplies to maximize efficiency. When only one power supply is installed, the

power supply configuration is non-redundant (1 + 0). Power is supplied to the system only by the single power supply. When configured in a 2+0 configuration, 1+1 redundancy will not be supported.

NOTE: If two power supplies are used, they must be of the same type and must have the same maximum output power.

NOTE: For AC power supplies, use only power supplies with the Extended Power Performance (EPP) label on the back. Mixing power supplies from earlier generations of Dell DSS systems can result in a power supply mismatch condition or failure to power on.

Hot spare feature

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

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

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

The default PSU settings are as follows:

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

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

Removing the power supply unit blank

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

Steps

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

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

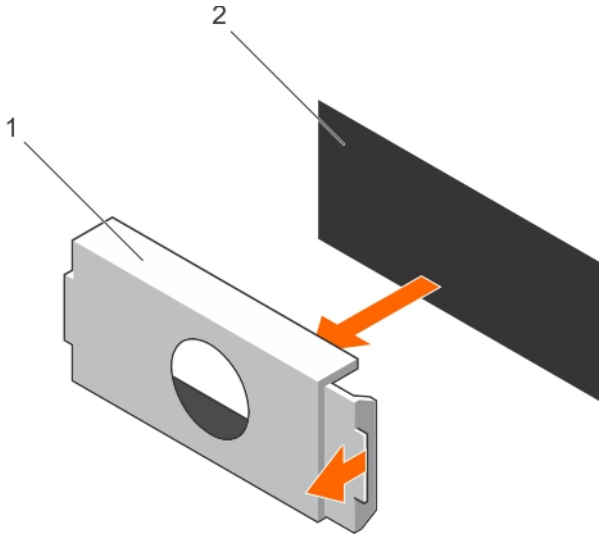

Figure 59. Removing the PSU blank

a. PSU blank
b. PSU bay

Next steps

Install the PSU or PSU blank.

Related references

Safety instructions on page 53

Related tasks

Installing an AC power supply unit on page 117
Installing the power supply unit blank on page 116

Installing the power supply unit blank

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

Steps

Align the power supply unit blank with the power supply unit slot and push it into the power supply unit slot until it clicks into place.

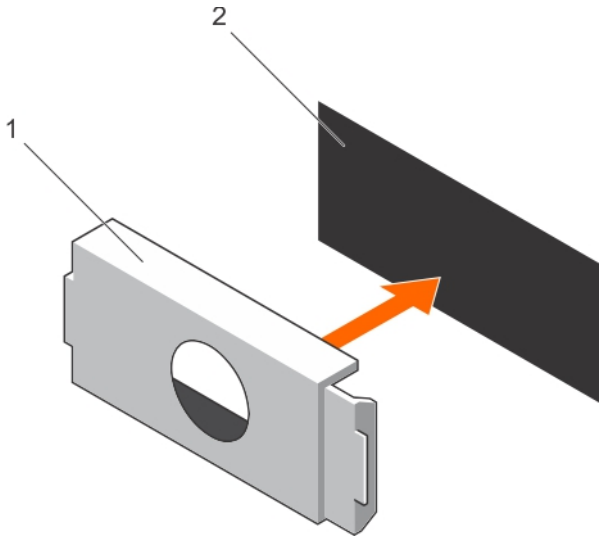

Figure 60. Installing the PSU blank

a. PSU blank
b. PSU bay

Related references

Safety instructions on page 53

Related tasks

Removing the power supply unit blank on page 115

Removing an AC power supply unit

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.

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

NOTE: You may have to unlatch and lift the optional cable management arm if it interferes with power supply removal. For information about the cable management arm, see the system's rack documentation.

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

Steps

1. Disconnect the power cable from the power source and from the power supply unit (PSU) that you intend to remove and remove the cables from the strap.
2. Press the release latch and slide the power supply unit out of the chassis.

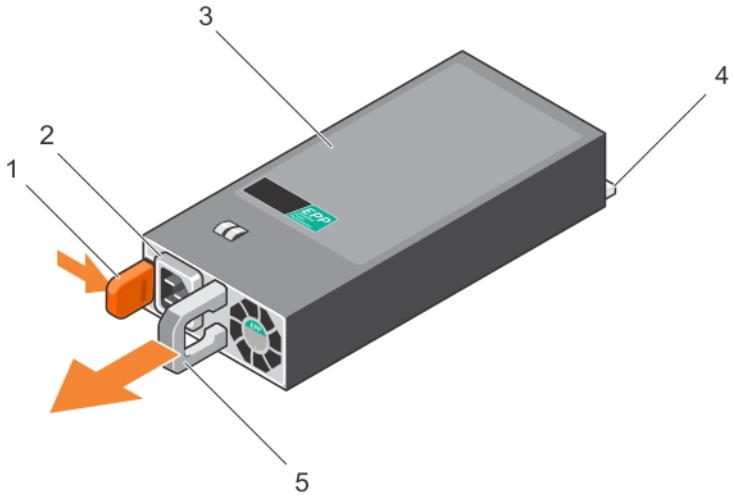

Figure 61. Removing an AC PSU

1. release latch
2. PSU cable connector
3. PSU
4. power connector
5. PSU handle

Next steps

1. Install the AC power supply unit.
2. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Installing an AC power supply unit on page 117
After working inside your system on page 54

Installing an AC power supply unit

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.

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

1. For systems that support redundant power supply units (PSUs), ensure that both the PSUs are of the same type and have the same maximum output power.
2. If installed, remove the PSU blank.

Steps

1. Slide the PSU into the chassis until the PSU is fully seated and the release latch snaps into place.
2. If applicable, relatch the cable management arm.
   For information about the cable management arm, see the rack documentation of your system.
3. Connect the power cable to the PSU, and plug the cable into a power outlet.

CAUTION: When connecting the power cable, secure the cable 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.

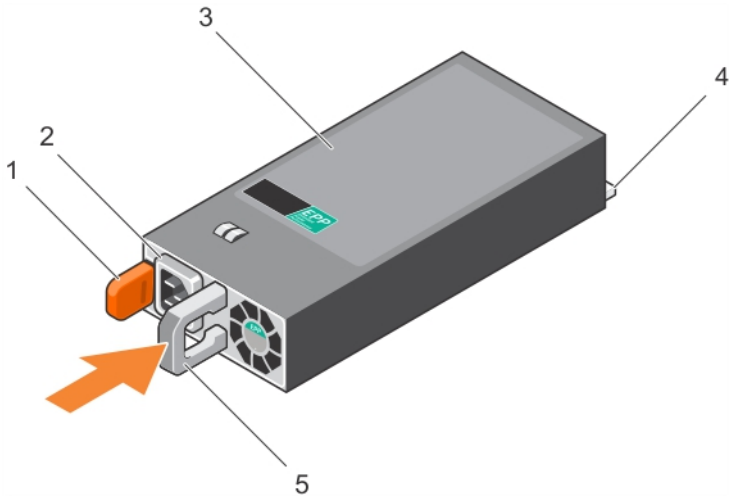

Figure 62. Installing an AC PSU

1. release latch
2. PSU cable connector
3. PSU
4. power connector
5. PSU handle

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the power supply unit blank on page 115
After working inside your system on page 54

Power interposer board

Removing the power interposer board

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.

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

   NOTE: If applicable, close the expansion card latch on the cooling shroud to release the full length card.
4. If applicable, disconnect the power or data cables from expansion card(s).
5. If applicable, remove the expansion card riser
6. Remove the internal hard drive carrier.
7. Remove the internal hard drive cage.

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

Steps

1. Remove the power supply module(s) from the back of the chassis.
2. Disconnect the power cables from the hard drive backplane and the system board.
3. Press the release latch on the PIB to release it from the hooks on the power supply unit cage.
4. Lift the PIB up and out of the chassis.

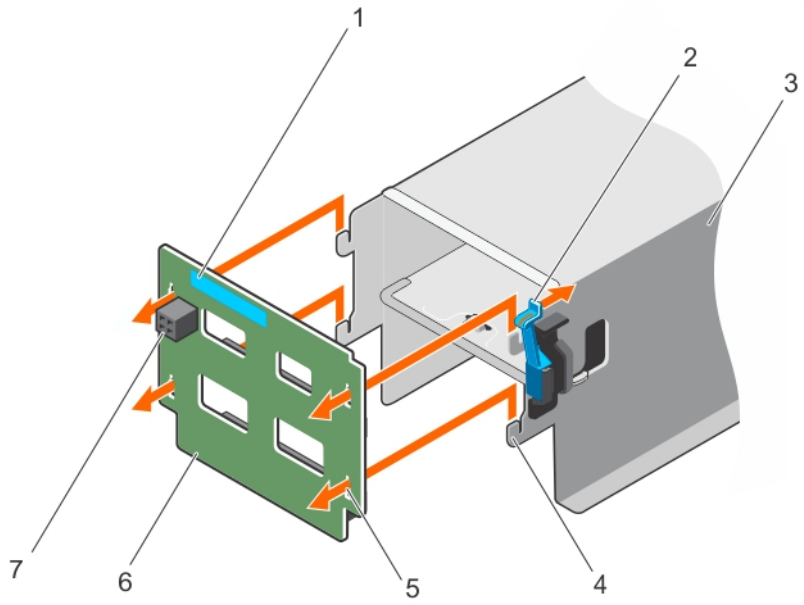

Figure 63. Removing the power interposer board

1. touch point
2. release latch
3. power supply unit cage
4. hook (4)
5. locking slot (4)
6. power interposer board
7. FAN1 power connector

Next steps

1. Install the replacement power interposer board and connect all the required cables to the system board and the hard drive backplane.
2. Install the internal hard drive cage.
3. Install the internal hard drive carrier.
4. If applicable, install the PCIe expansion card riser.
5. If applicable, connect the required power or data cables to the expansion card(s).
6. Reinstall the cooling shroud.
7. If applicable open the expansion card latch on the cooling shroud to secure the full length expansion card.
8. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the cooling shroud on page 59
Removing the (optional) 2.5 inch internal hard drive carrier on page 76
Removing the (optional) 2.5 inch internal hard drive cage on page 81
Removing the dual riser module (optional) on page 92
Removing the internal PERC riser on page 94
Installing the internal PERC riser on page 95
Installing the dual riser module (optional) on page 93
Installing the power interposer board on page 120
Installing the (optional) 2.5 inch internal hard drive cage on page 83
Installing the (optional) 2.5 inch internal hard drive carrier on page 78
Installing the cooling shroud on page 60
After working inside your system on page 54

Installing the power interposer board

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.

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

   NOTE: If applicable, close the expansion card latch on the cooling shroud to release the full length card.
4. If applicable, disconnect the power or data cables from expansion card (s).
5. If applicable, remove the expansion card riser
6. Remove the internal hard drive carrier.
7. Remove the internal hard drive cage.

Steps

1. Align the locking slots on the power interposer board with the hooks on the power supply cage and slide it into place.
2. Route the power cables as applicable, and connect the power cables to the system board and hard drive backplane.
3. Install the power supply module(s) in their original locations.

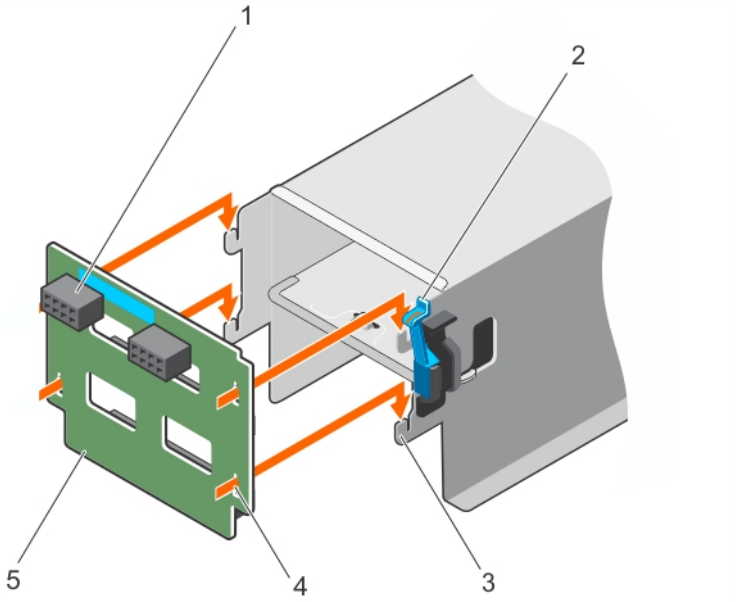

Figure 64. Installing the power interposer board

1. FAN1 power connector
2. release latch
3. hook (4)
4. locking slot (4)
5. power interposer board

Next steps

1. If applicable, install the PCIe expansion card riser.
2. If applicable, connect the required power or data cables to the expansion card(s).
3. Install the internal hard drive cage.
4. Install the internal hard drive carrier.
5. Reinstall the cooling shroud.
6. If applicable, open the expansion card latch on the cooling shroud to secure the full length expansion card.
7. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the cooling shroud on page 59
Removing the (optional) 2.5 inch internal hard drive carrier on page 76
Removing the (optional) 2.5 inch internal hard drive cage on page 81
Removing the power interposer board on page 119
Removing the dual riser module (optional) on page 92
Removing the internal PERC riser on page 94
Installing the internal PERC riser on page 95
Installing the dual riser module (optional) on page 93
Installing the (optional) 2.5 inch internal hard drive cage on page 83
Installing the (optional) 2.5 inch internal hard drive carrier on page 78
Installing the cooling shroud on page 60
After working inside your system on page 54

System battery

The system battery is used to power the real-time clock and storing the BIOS settings of the system.

Replacing the 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 shipped with your 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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Keep the plastic scribe ready.
4. Remove the cooling shroud.

   NOTE: If applicable, close the expansion card latch on the cooling shroud to release the full length card.
5. If applicable, disconnect the power or data cables from expansion card(s).
6. If applicable, remove the expansion card riser.

Steps

1. Locate the battery socket, see the System board 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.

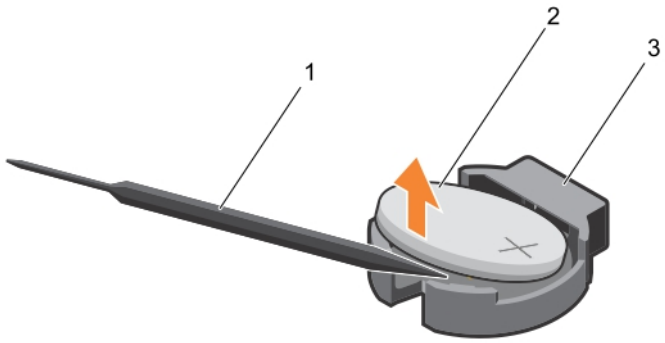

Figure 65. Removing the system battery

a. plastic scribe
b. positive side of battery
c. socket

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.

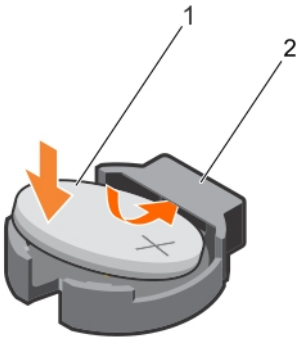

Figure 66. Installing the system battery

a. positive side of battery
b. socket

Next steps

1. If applicable, install the PCIe expansion card riser.
2. If applicable, connect the required power or data cables to the expansion card(s).
3. Reinstall the cooling shroud.
4. If applicable, open the expansion card latch on the cooling shroud to secure the full length expansion card.
5. Follow the procedure listed in the After working inside your system section.
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.

Related concepts

System Setup on page 26

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the cooling shroud on page 59
Removing the dual riser module (optional) on page 92
Removing the internal PERC riser on page 94
Installing the internal PERC riser on page 95
Installing the dual riser module (optional) on page 93
Installing the cooling shroud on page 60
After working inside your system on page 54

Hard drive backplane

Your 12 hard drive system supports 3.5-inch or 2.5-inch (x12) SAS/SATA backplane.

Removing the hard drive backplane

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.

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

CAUTION: You must note the number of each hard drive and temporarily label them before removal so that you can reinstall them in their original locations.

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

Steps

1. Disconnect the left control panel, SAS/SATA data cable(s), and power cables from the hard-drive backplane.
2. Press the hard drive backplane release tabs to disengage the backplane from the chassis.
3. Push the hard drive backplane away from the system until the securing hooks on the system chassis are free from the slots on the hard drive backplane.
4. Lift the backplane partially away from the system and disconnect the control panel cable, USB cable, and backplane signal cable.
5. Lift the backplane away from the system.

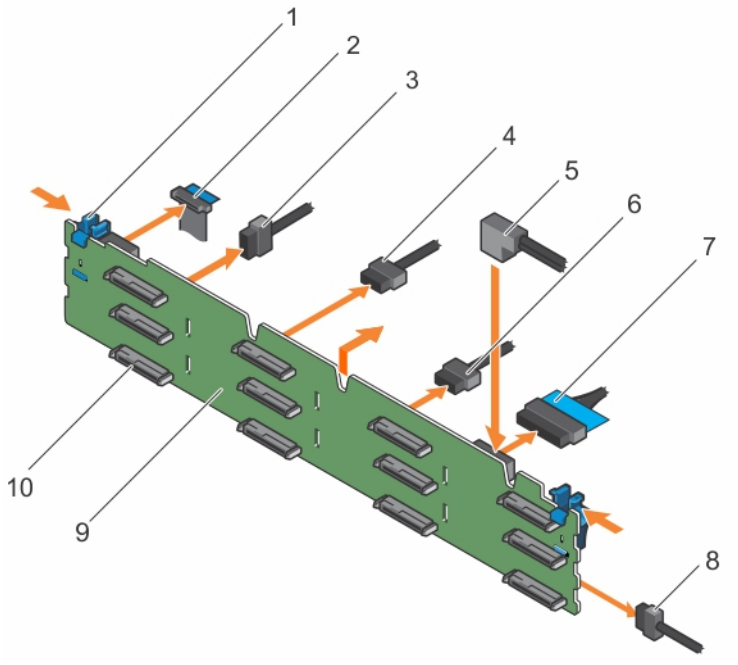

Figure 67. Removing the SAS/SATA backplane

1. release tab (2)
2. left control panel flex cable
3. backplane signal cable
4. backplane power cable
5. SAS cable B1/A1
6. USB cable
7. control panel
8. backplane power cable
9. hard drive backplane
10. hard drive backplane connector (12)

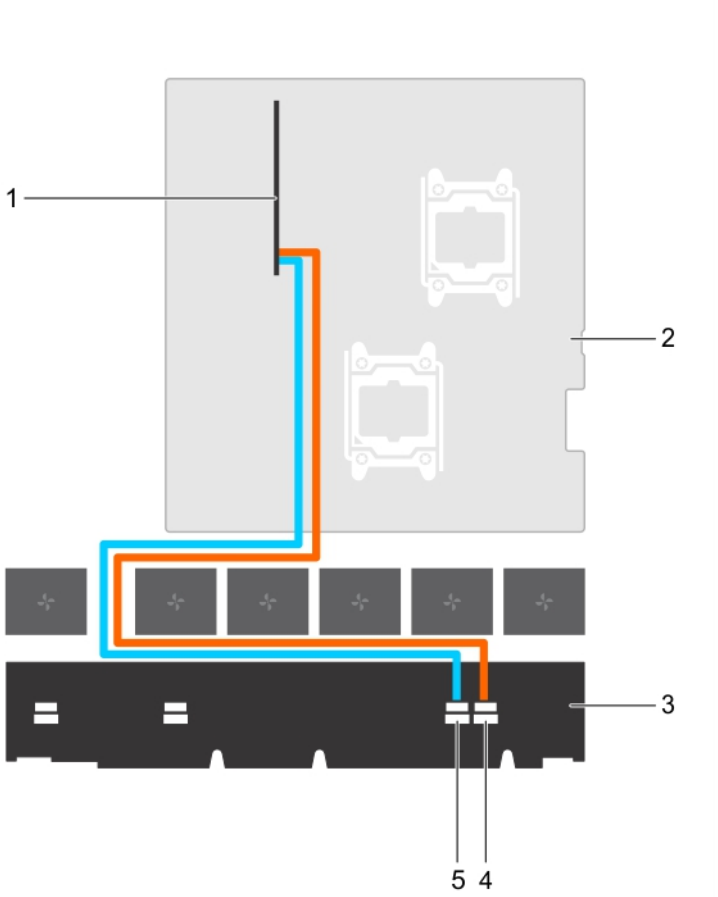

Figure 68. Cabling between the hard drive backplane and RAID controller card without any riser modules

1. RAID controller
2. system board
3. backplane
4. SAS A connectors on backplane
5. SAS B connectors on backplane

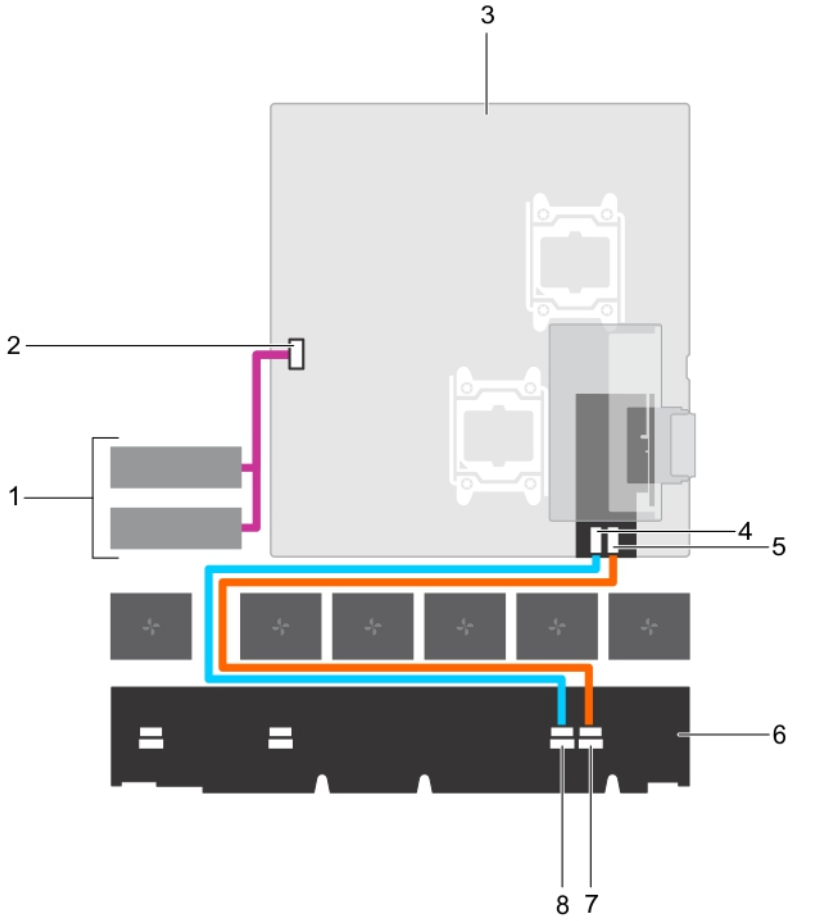

Figure 69. Cabling between the hard drive backplane and RAID controller on internal PERC riser and internal hard drive connections

1. internal hard drives (2)
2. internal SATA connector
3. system board
4. SAS A connector on RAID controller
5. SAS B connector on RAID controller
6. backplane
7. SAS B connectors on backplane
8. SAS A connectors on backplane

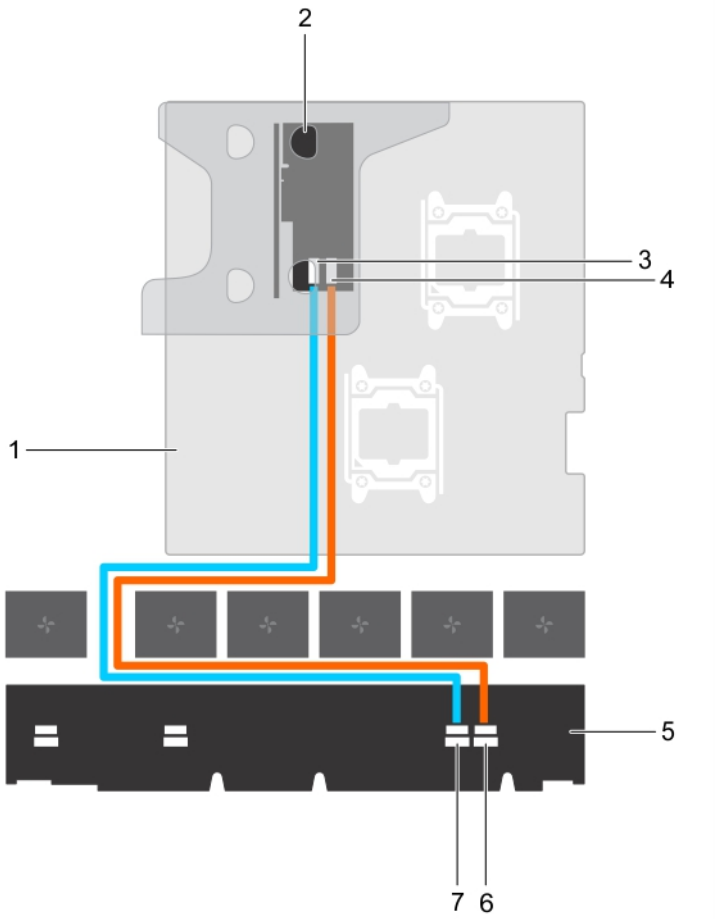

Figure 70. Cabling between the hard drive backplane RAID controller on dual riser module

1. system board
2. RAID controller on dual riser module
3. SAS A connector on RAID controller
4. SAS B connector on RAID controller
5. backplane
6. SAS B connectors on backplane
7. SAS A connectors on backplane

Next steps

1. Reconnect the data cable(s) and power cable to the hard drive backplane
2. Install all SAS/SATA/SSD hard drives into their original locations.
3. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing a hot swappable hard drive carrier on page 68
Installing a hot-swappable hard drive carrier on page 69
After working inside your system on page 54

Installing the hard drive backplane

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Disconnect the data, signal and power cables to the backplane.
4. Remove all SAS/SATA/SSD hard drives.

Steps

1. Use the hooks on the chassis as guides to align the hard drive backplane to the chassis.
2. Lower the hard drive backplane until the release tabs snap into place.
3. Connect the SAS/SATA/SSD data, signal, and power cable(s) to the backplane.

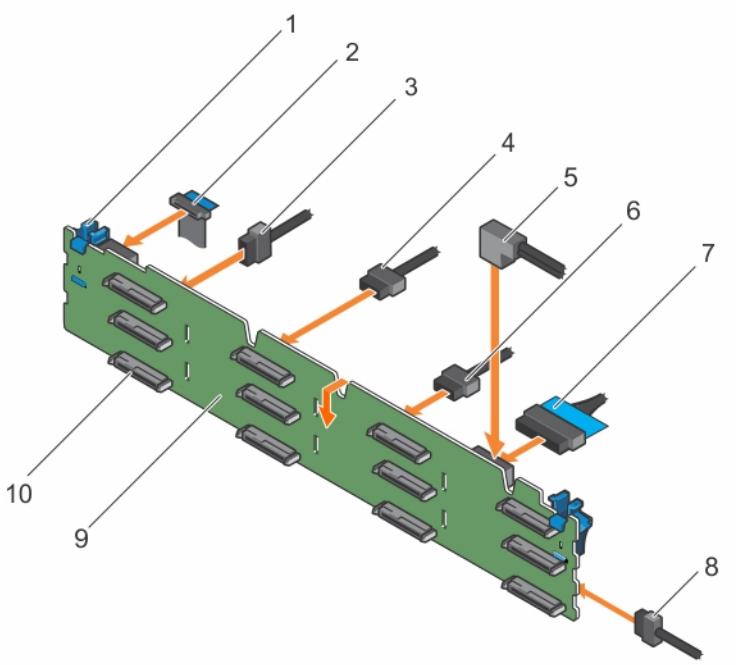

Figure 71. Installing the hard drive backplane

1. release tab (2)
2. left control panel flex cable
3. backplane signal cable
4. backplane power cable
5. SAS cable B1/A1
6. USB cable
7. control panel
8. backplane power cable
9. hard drive backplane
10. hard drive backplane connector (12)

Next steps

1. Install all SAS/SATA/SSD hard drives in their original locations.
2. Reconnect the data, signal and power cables to the backplane.
3. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing a hot swappable hard drive carrier on page 68
Removing the hard drive backplane on page 124
Installing a hot-swappable hard drive carrier on page 69
After working inside your system on page 54

Control panel

Removing the left control panel

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Keep the T15 Torx screwdriver ready.

CAUTION: Do not use excessive force when removing the left control panel cable as it can damage the connectors.

Steps

1. Disconnect the left control panel cable from the hard drive backplane by pulling on the plastic pull tab.
2. Remove the screws that secure the left control panel to the chassis.
3. Fold the plastic pull tab close to the connector.
4. Pull out the left control panel cable as you guide the connector and the plastic pull tab through the channel on the chassis.

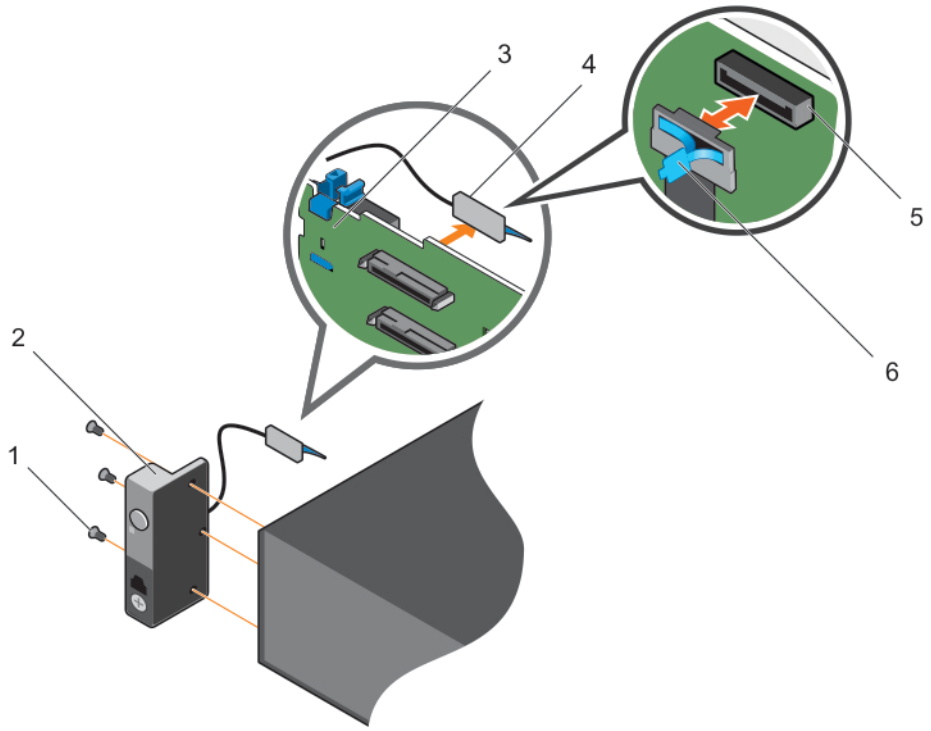

Figure 72. Removing the left control panel

1. screw (3)
2. left control panel
3. hard drive backplane
4. left control panel connector
5. left control panel connector on hard drive backplane
6. plastic pull tab

Next steps

1. Replace the left control panel.
2. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Installing the left control panel on page 130
After working inside your system on page 54

Installing the left control panel

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.

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

3. Keep the T15 Torx screwdriver ready.

Steps

1. Fold the PPID label around the cable.
2. Fold the pull tab close to the connector and guide the connector and pull tab into the channel.
3. Push the cable until the cable passes completely through the channel.
4. Tighten the screws to secure the left control panel to the chassis.

   NOTE: You must route the cable properly to prevent it from being pinched or crimped.

5. Connect the cable connector to the hard drive backplane by pushing on the center of the connector.

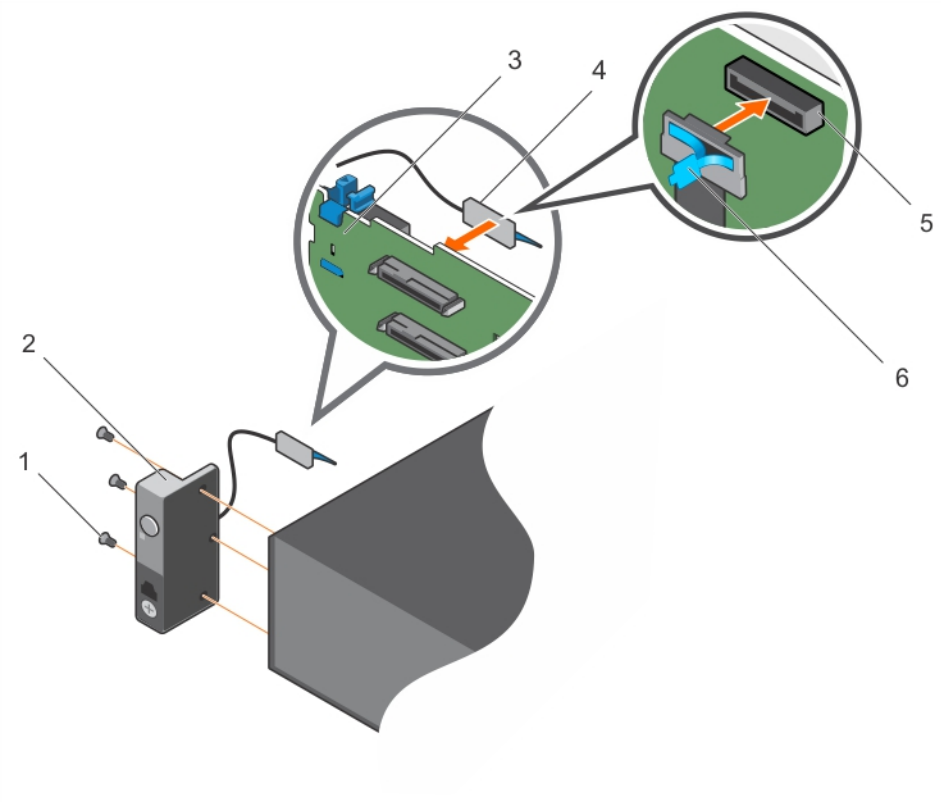

Figure 73. Installing the left control panel

1. screw (3)
2. left control panel
3. hard drive backplane
4. left control panel connector
5. left control panel connector on hard drive backplane
6. plastic pull tab

Next steps

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

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the left control panel on page 129
After working inside your system on page 54

Removing the right control panel

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Keep the T15 Torx screwdriver ready.

CAUTION: The right control panel module is connected to the backplane using a Zero Insertion Force (ZIF) connector. To prevent damage to the right control panel cable, you must release the locking tab of the ZIF connector on the hard drive backplane before removing or installing the right control panel cable. Do not use excessive force when removing the right control panel module cable as it can damage the connectors.

Steps

1. Lift the locking tab on the right control panel cable connector to release the lock.
2. Disconnect the right control panel cable from the backplane.
3. Remove the screws securing the right control panel to the chassis.
4. Pull out the right control panel cable through the channel on the chassis.

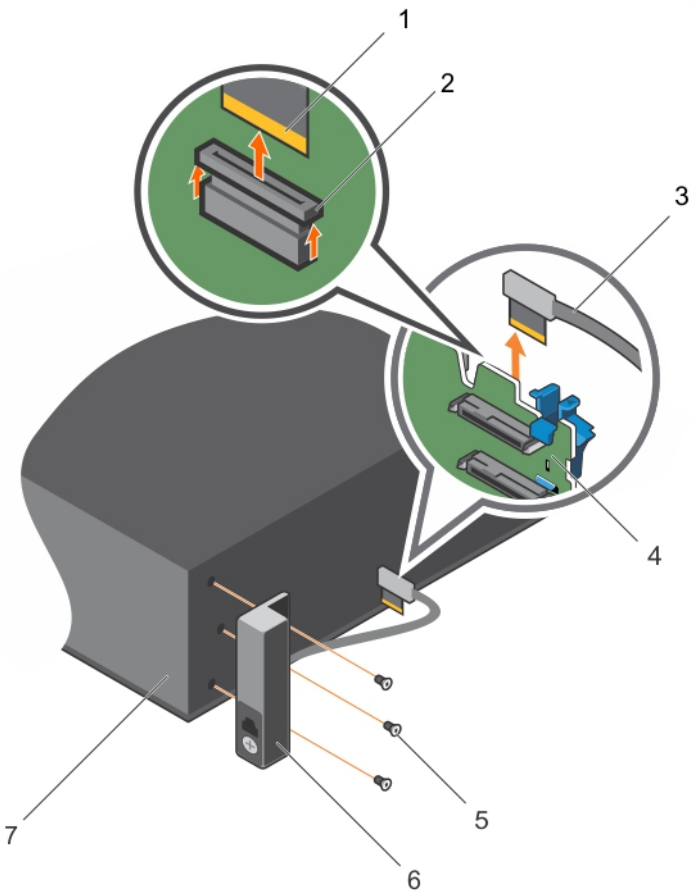

Figure 74. Removing the right control panel

1. right control panel cable connector
2. ZIF connector on the hard drive backplane
3. right control panel cable
4. hard drive backplane
5. screw (3)
6. right control panel

7. chassis

Next steps

1. Replace the right control panel.
2. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Installing the right control panel on page 133
After working inside your system on page 54

Installing the right control panel

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Keep the T15 Torx screwdriver ready.

Steps

1. Fold the PPID label around the cable.
2. Push the cable until the cable passes completely through the channel.

   CAUTION: To prevent damage to the right control panel cable, you must release the locking tab before removing or installing the right control panel cable from the connector on the hard drive backplane.

3. If locked, rotate the locking tab on the right control panel cable connector clockwise 90 degrees to release the lock.
4. Connect the right control panel cable to the connector on the hard-drive backplane.
5. Rotate the locking tab on the right control panel cable connector counter clockwise 90 degrees to secure the lock.
6. Tighten the screws to secure the right control panel to the chassis.

   NOTE: You must route the cable properly to prevent it from being pinched or crimped.

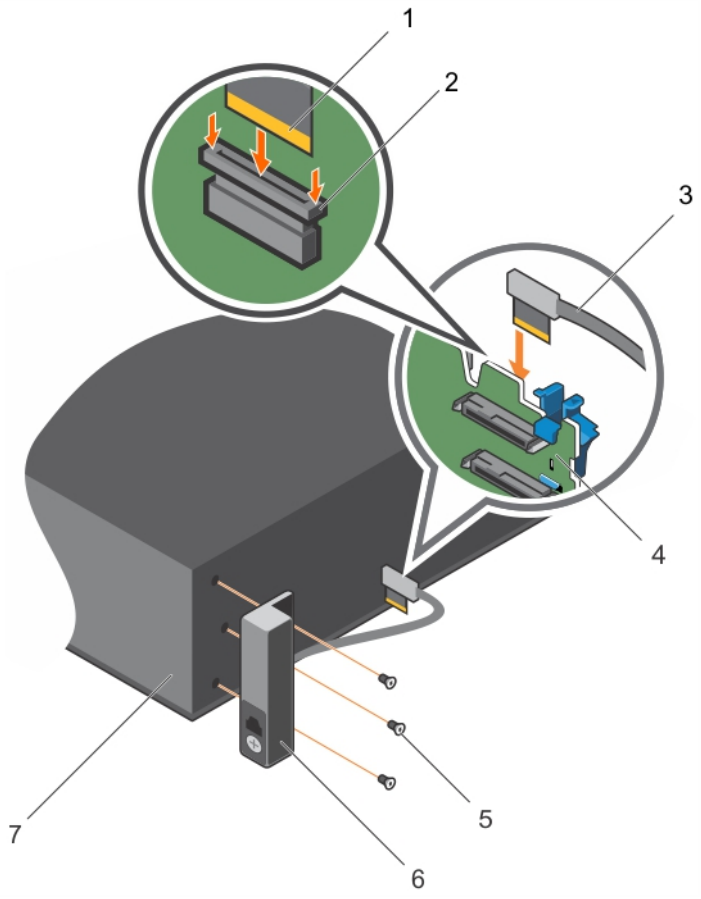

Figure 75. Installing the right control panel

1. right control panel cable connector
2. ZIF connector on the hard drive backplane
3. right control panel cable
4. hard drive backplane
5. screw (3)
6. right control panel
7. chassis

Next steps

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

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the right control panel on page 132
After working inside your system on page 54

System board

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

Removing the system board

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove or disconnect the following components:
   a. cooling shroud
   b. cooling fans
   c. power supply unit(s)
   d. expansion card riser(s)
   e. internal PERC riser card
   f. heat sink(s) or heat-sink blank(s)
   g. processors(s) or processor blank(s)
      CAUTION: To prevent damage to the processor socket pins when replacing a faulty system board, ensure that you cover the processor socket with the processor protective cap.
   h. memory modules and memory module blanks
4. Keep the Phillips #2 screwdriver ready.

Steps

1. Disconnect the SAS cable from the system board.
2. Disconnect all other data and power cables from the system board.

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

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

3. Remove the screws securing the system board to the chassis.

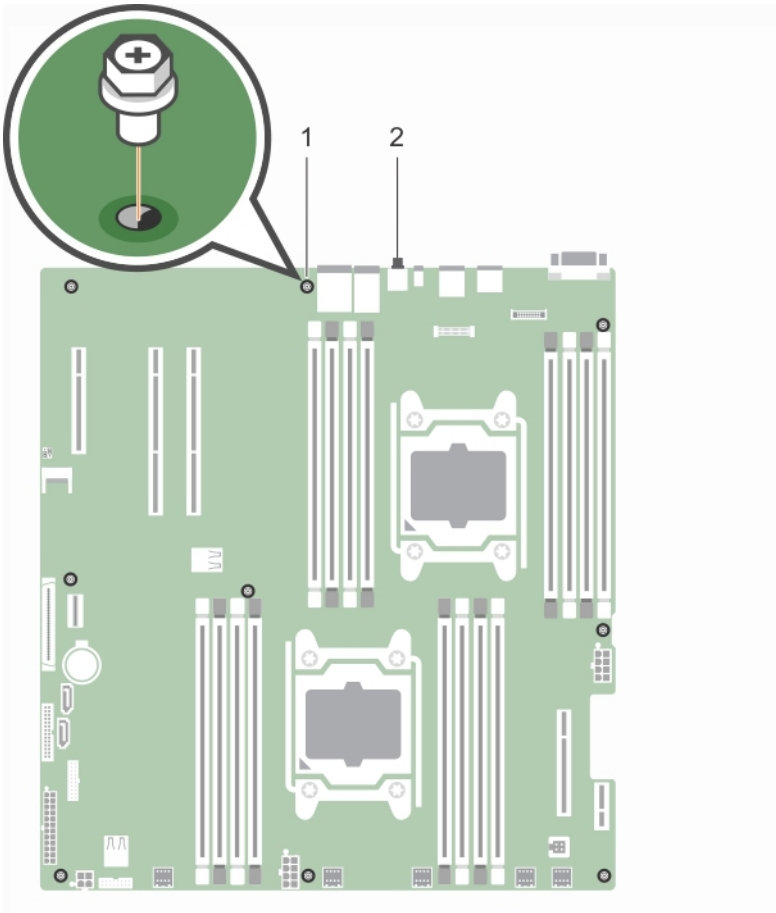

Figure 76. Screw location on the system board

a. screw (9)
b. system identification button

4. Lift the system board and slide it toward the front of the chassis.

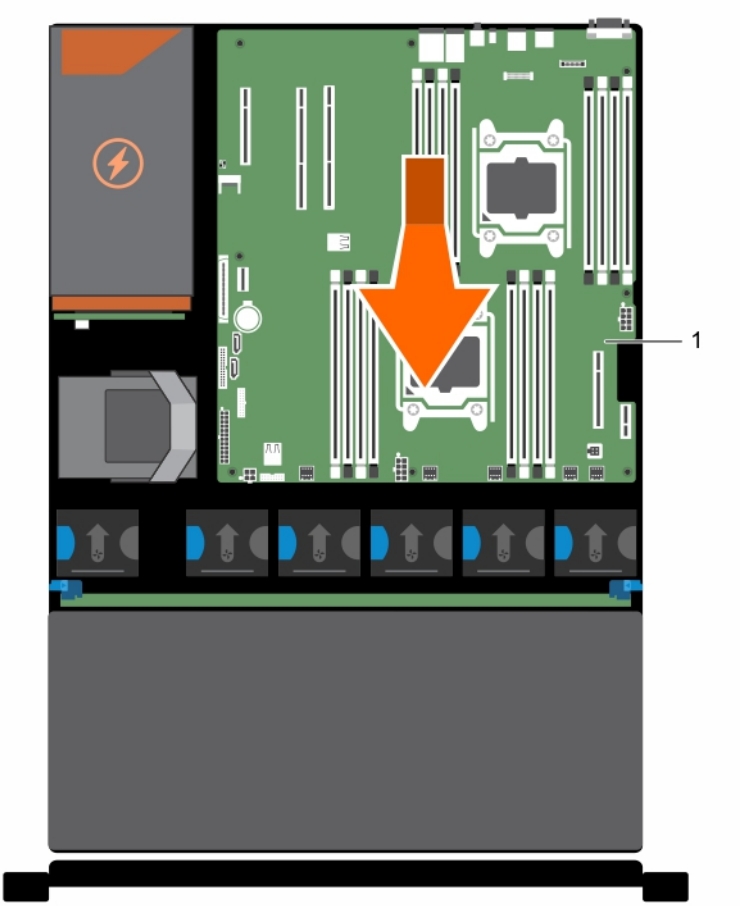

Figure 77. Removing the system board

a. system board

Related references

Safety instructions on page 53

Related tasks

Before working inside your system on page 53
Removing the cooling shroud on page 59
Removing a cooling fan on page 85
Removing an AC power supply unit on page 116
Removing the dual riser module (optional) on page 92
Removing the internal PERC riser on page 94
Removing a heat sink on page 107
Removing a processor on page 108
Removing memory modules on page 65

Installing the system board

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Keep the Phillips #2 screwdriver ready.

Steps

1. Unpack the new 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 chassis.

2. Hold the system board and lower it into the chassis.
3. Push the system board toward the back of the chassis until the board clicks into place.

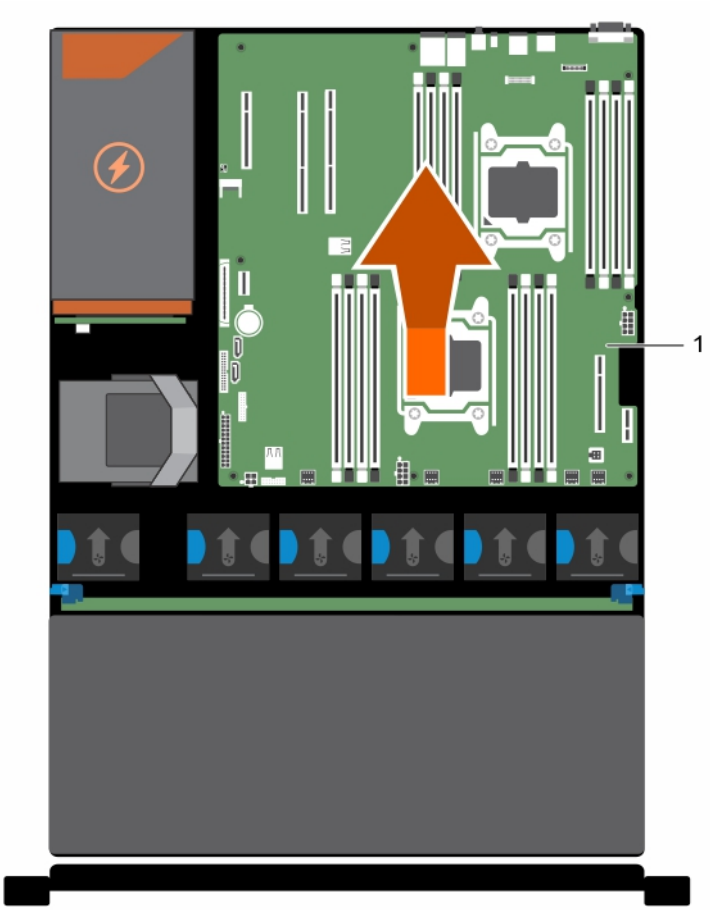

Figure 78. Installing the system board

a. system board

4. Install the screws that secure the system board onto the chassis.

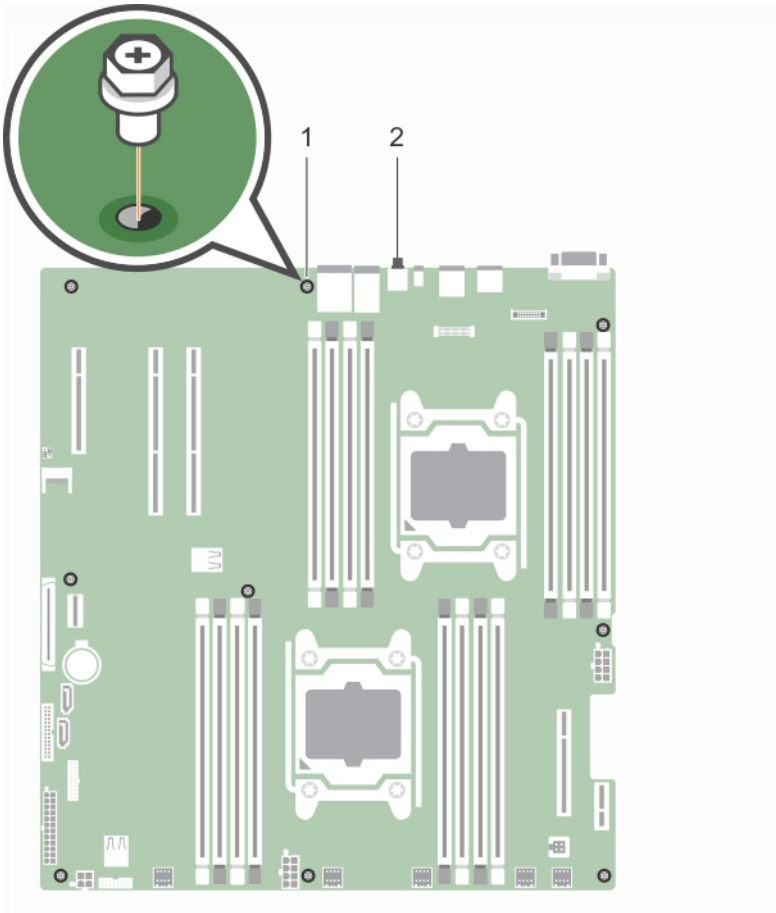

Figure 79. Screw location on the system board

a. screw (9)
b. system identification button

Next steps

1. Install or connect the following components:
   a. internal PERC riser card
   b. the expansion card riser(s)
   c. heat sink(s) or heat-sink blank(s)
   d. processors(s) or processor blank(s)
   e. memory modules and memory module blanks
   f. cooling fans
   g. cooling shroud
   h. 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 .
3. Follow the procedure listed in the After working inside your system section.
4. Ensure that you:
   a. Use the Easy Restore feature to restore the service tag.
   b. Update the BIOS and iDRAC versions.

Related references

Safety instructions on page 53

Related tasks

Installing memory modules on page 67
Installing a processor on page 111
Installing a heat sink on page 112
Installing the internal PERC riser on page 95
Installing the dual riser module (optional) on page 93
Installing an AC power supply unit on page 117
Installing a cooling fan on page 87
Installing the cooling shroud on page 60
After working inside your system on page 54

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 www.dell.com/poweredgemanuals .

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.

   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.

7

Using system diagnostics

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

NOTE: For more information about OEM diagnostic event messages, see the Event and Error Message Reference Guide for 13th Generation Dell PowerEdge Servers Version 1.2

Topics:

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

When to use the Embedded System Diagnostics

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

Running the Embedded System Diagnostics from Boot Manager

Prerequisites

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

Steps

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

System diagnostic controls

Menu	Description
Configuration	Displays the configuration and status information of all detected devices.
Results	Displays the results of all tests that are run.
Systemhealth	Provides the current overview of the system performance.

Menu	Description
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.

8

Jumpers and connectors

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

Topics:

System board jumper settings

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

Table 37. System board jumper settings

Jumper	Setting	Description
PWRD_EN		The password reset feature is enabled (pins 2–4).
		The password reset feature is disabled (pins 4–6). The iDRAC local access is unlocked at the next AC power cycle.
NVRAM_CLR		The configuration settings are retained at the next system boot (pins 3–5).
		The configuration settings are cleared at system boot (pins 1–3).

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.

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 4 and 6 to pins 2 and 4.
4. Install the system cover.

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

   NOTE: If you assign a new system and/or setup password with the jumper on pins 2 and 4, 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 2 and 4 to pins 4 and 6.
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.

Related tasks

Removing the system cover on page 54
Installing the system cover on page 55

System board connectors

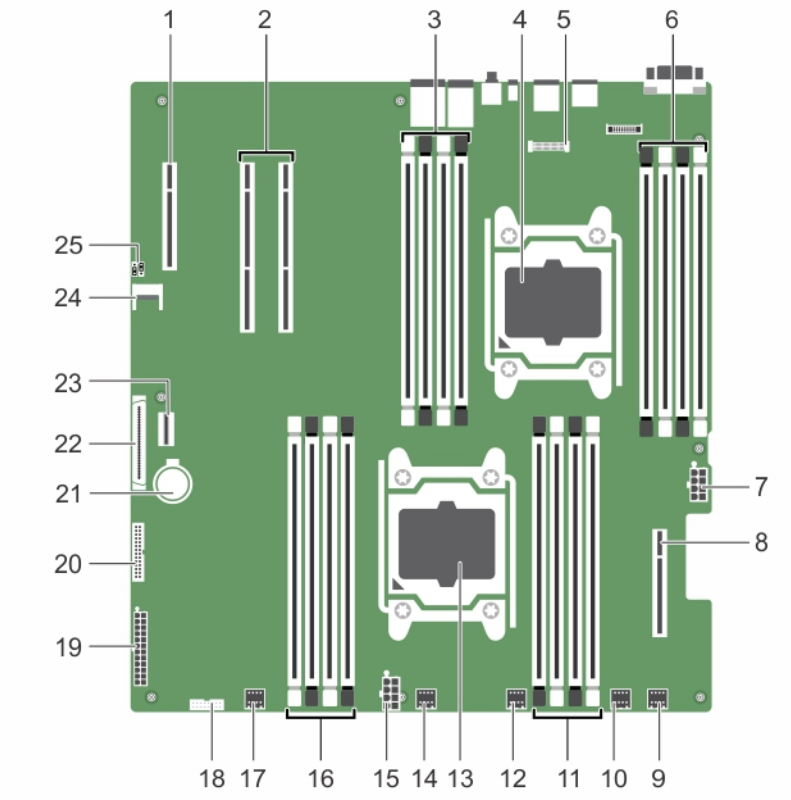

Figure 80. System board connectors and jumpers

Table 38. System board connectors and jumpers

Item	Connector	Description
1	PCIE _G3_X8 (PCH)	PCIE Slot 3 (x4)
2	PCIE_G3_X16 (CPU1)	PCIe Slot 2 and PCIe Slot 1 (PCIe Slot is closer to the CPU2 socket)
3	B1, B5, B2, B6	DIMMS for CPU2 channels 0&1
4	CPU2	Processor socket 2
5	J-AMEA	Remote management port card connector
6	B8, B4, B7, B3	DIMMS for CPU2 channels 2&3
7	CPU2_PWR_C (P3)	CPU2 power connector
8	Int_PCIE_G3_X8 (CPU2)	Internal PCIe slot
9	FAN6	Cooling fan 6 connector

Table 38. System board connectors and jumpers (continued)

Item	Connector	Description
10	FAN5	Cooling fan 5 connector
11	A1, A5, A2, A6	DIMMS for CPU1 channels 0&1
12	FAN4	Cooling fan 4 connector
13	CPU1	Processor socket 1
14	FAN3	Cooling fan 3 connector
15	PWR_CONN B (P2)	CPU1 power connector
16	A8, A4, A7, A3	DIMMS for CPU1 channels 2&3
17	FAN2	Cooling fan 2 connector
18	BP_SIG	Backplane signal connector
19	SYS_PWR_CONN (P1)	18-pin power connector
20	PIB_CONN	Power interface board signal connector
21	BATTERY	System battery connector
22	CTRL_PNL	Control panel signal connector
23	J_SATA_A	MINI SAS connector
24	TPM_MODULE	Trusted Platform Module connector
25	J_PSWD_NVRAM	Clear password / NVRAM jumpers

9

Troubleshooting your system

Safety first — for you and your system

NOTE: Solution validation was performed by using the factory shipped hardware configuration.

Topics:

Troubleshooting system startup failure

If you boot the system to the BIOS boot mode after installing an operating system from the UEFI Boot Manager, the system stops responding. To avoid this issue, you must boot to the same boot mode in which you installed the operating system.

For all other startup issues, note the system messages that appear on the screen.

Troubleshooting external connections

Before troubleshooting any external devices, ensure that all external cables are securely attached to the external connectors on your system.

- Compare the technical specification of the system with the external device to check the compatibility.
- Check the external device functionality with some other similar system so that we are sure that the device is working fine.
- Check any other similar external device with this system so that we are sure that the system port is working fine.

For any further queries contact, Global Technical Support.

Troubleshooting the video subsystem

Steps

1. Check the cable connections (power and display) to the monitor.
2. Check the video interface cabling from the system to the monitor.

Results

If the tests run successfully, the problem is not related to video hardware.

Related references

Getting help on page 157

Troubleshooting a USB device

Prerequisites

NOTE: Follow steps 1 to 6 to troubleshoot a USB keyboard or mouse. For other USB devices, go to step 7.

Steps

1. Disconnect the keyboard and/or mouse cables from the system and reconnect them.
2. If the problem persists, connect the keyboard and/or mouse to another USB port on the system.
3. If the problem is resolved, restart the system, enter System Setup, and check if the non-functioning USB ports are enabled.

   NOTE: Older operating systems may not support USB 3.0.

4. Check if USB 3.0 is enabled in System Setup. If enabled, disable it and see if the issue is resolved.
5. If the problem is not resolved, replace the keyboard and/or mouse with a known working keyboard or mouse.

   If the problem is not resolved, proceed to step 7 to troubleshoot other USB devices attached to the system.

   If the problem is not resolved, proceed to troubleshoot other USB devices attached to the system.

6. Turn off all attached USB devices, and disconnect them from the system.
7. Restart the system.
8. If your keyboard is functioning, enter System Setup, verify that all USB ports are enabled on the **Integrated Devices** screen. If your keyboard is not functioning, use remote access to enable or disable the USB options.
9. Check if USB 3.0 is enabled in System Setup. If it is enabled, disable it and restart your system.
10. If the system is not accessible, reset the NVRAM_CLR jumper inside your system and restore the BIOS to the default settings. See the System board jumper setting section
11. Reconnect and turn on each USB device one at a time.
12. If a USB device causes the same problem, turn off the device, replace the USB cable with a known good cable, and turn on the device.

Related concepts

System Setup on page 26

Related references

Getting help on page 157
System board jumper settings on page 143

Troubleshooting a serial input and output device

Steps

1. Turn off the system and any peripheral devices connected to the serial port.
2. Swap the serial interface cable with a known working cable, and turn on the system and the I/O serial device.

   If the problem is resolved, replace the interface cable with a known working cable.

3. Turn off the system and the I/O serial device, and swap the serial device with a compatible device.
4. Turn on the system and the I/O serial device.

Related references

Getting help on page 157

Troubleshooting a NIC

Prerequisites

NOTE: Network Daughter Card (NDC) slot is not hot-pluggable.

Steps

1. Run the appropriate diagnostic test. For more information, see the Using system diagnostics section for the available diagnostic tests.
2. Restart the system and check for any system messages pertaining to the NIC controller.
3. Check the appropriate indicator on the NIC connector:
   - If the link indicator does not glow, the cable connected might be disengaged.
   - If the activity indicator does not glow, the network driver files might be damaged or missing. Install or replace the drivers as necessary. For more information, see the NIC documentation.
   - Try another known good network cable.
   - If the problem persists, use another connector on the switch or hub.
4. Ensure that the appropriate drivers are installed and the protocols are bound. For more information, see the NIC documentation.
5. Enter System Setup and confirm that the NIC ports are enabled on the **Integrated Devices** screen.
6. Ensure that all the NICs, hubs, and switches on the network are set to the same data transmission speed and duplex. For more information, see the documentation for each network device.
7. Ensure that all the NICs and switches on the network are set to the same data transmission speed and duplex. For more information, see the documentation for each network device.
8. Ensure that all network cables are of the proper type and do not exceed the maximum length.

Related references

Getting help on page 157
Using system diagnostics on page 141

Troubleshooting a wet system

Steps

1. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system cover.
3. Remove the following components (if installed) from the system:
   - Power supply unit(s)
   - Optical drive
   - Hard drives
   - Hard drive backplane
   - USB memory key
   - Hard drive tray
   - Cooling shroud
   - Expansion card risers (if installed)
   - Expansion cards
   - Cooling fan assembly (if installed)
   - Cooling fan(s)
   - Memory modules
   - Processor(s) and heat sink(s)

- System board

4. Let the system dry thoroughly for at least 24 hours.
5. Reinstall the components you removed in step 3 except the expansion cards.
6. Install the system cover.
7. Turn on the system and attached peripherals.
8. If the system starts properly, turn off the system, and reinstall all the expansion cards that you removed.
9. Run the appropriate diagnostic test. For more information, see the Using system diagnostics section.

Related references

Getting help on page 157
Using system diagnostics on page 141

Related tasks

Removing the system cover on page 54
Removing the hard drive backplane on page 124
Removing the cooling shroud on page 59
Removing a cooling fan on page 85
Removing an AC power supply unit on page 116
Removing a hot swappable hard drive carrier on page 68
Removing a heat sink on page 107
Removing a processor on page 108
Removing memory modules on page 65
Removing the system board on page 135
Installing the system cover on page 55

Troubleshooting a damaged system

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 and attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system cover.
3. Ensure that the following components are properly installed:
   - cooling shroud
   - expansion card risers (if installed)
   - expansion cards
   - power supply unit(s)
   - cooling fan assembly (if installed)
   - cooling fan(s)
   - processor(s) and heat sink(s)
   - memory modules
   - drive carriers or cage
   - drive backplane
4. Ensure that all cables are properly connected.
5. Install the system cover.
6. Run the appropriate diagnostic test. For more information, see the Using system diagnostics section.

Related references

Getting help on page 157
Using system diagnostics on page 141

Related tasks

Removing the system cover on page 54
Installing a heat sink on page 112
Installing a processor on page 111
Installing memory modules on page 67
Installing a hot-swappable hard drive carrier on page 69
Installing the hard drive backplane on page 128
Installing the system cover on page 55

Troubleshooting the system battery

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.

NOTE: If the system is turned off for long periods of time (for weeks or months), the NVRAM may lose the system configuration information. This situation is caused by a defective battery.

NOTE: Some software may cause the system time to speed up or slow down. If the system seems to operate normally except for the time set in System Setup, the problem may be caused by a software, rather than by a defective battery.

Steps

1. Re-enter the time and date in System Setup.
2. Turn off the system, and disconnect it from the electrical outlet for at least an hour.
3. Reconnect the system to the electrical outlet, and turn on the system.
4. Enter System Setup.

   If the date and time displayed in System Setup are not correct, check the System Error Log (SEL) for system battery messages.

Related concepts

System Setup on page 26

Related references

Getting help on page 157

Troubleshooting power supply units

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.

The following sections provide information on troubleshooting power source and power supply units problems.

NOTE: Power Supply Units (PSUs) are hot-pluggable.

Troubleshooting power source problems

Steps

1. Press the power button to ensure that your system is turned on. If the power indicator does not glow when the power button is pressed, press the power button firmly.
2. Plug in another working power supply unit to ensure that the system board is not faulty.
3. Ensure that no loose connections exist.
   For example, loose power cables.
4. Ensure that the power source meets applicable standards.
5. Ensure that there are no short circuits.
6. Have a qualified electrician check the line voltage to ensure that it meets the needed specifications.

Results

NOTE: Some power supply units require 200-240V AC to deliver their rated capacity. For more information, see the system Technical Specifications section in the Installation and Service Manual available at www.dell.com/poweredgemanuals.

Power supply unit problems

Steps

1. Ensure that no loose connections exist.
   For example, loose power cables.
2. Ensure that the power supply unit (PSU) handle or LED indicates that the PSU is working properly.
   For more information about PSU indicators, see the Power indicator codes section.
3. If you have recently upgraded your system, ensure that the PSU has enough power to support the new system.
4. If you have a redundant PSU configuration, ensure that both the PSUs are of the same type and wattage.
   You may have to upgrade to a higher wattage PSU.
5. Ensure that you use only PSUs with the Extended Power Performance (EPP) label on the back.
6. Reseat the PSU.

   NOTE: After installing a PSU, allow several seconds for the system to recognize the PSU and determine if it is working properly.

   If the problem persists, see the Getting help section.

Related references

Getting help on page 157
Redundant power supply unit indicator codes on page 14

Troubleshooting cooling problems

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.

Ensure that the following conditions exist:

- System cover, cooling shroud, EMI filler panel, or back filler bracket is not removed.
- Ambient temperature is not higher than the system specific ambient temperature.
- External airflow is not obstructed.

- A cooling fan is not removed or has not failed.
- The expansion card installation guidelines have been followed.

Additional cooling can be added by one of the following methods:

From the iDRAC web GUI:

1. Click **Hardware** > **Fans** > **Setup**.
2. From the **Fan Speed Offset** drop-down list, select the cooling level that is required or set the minimum fan speed to a custom value.

From F2 System Setup:

1. Select **iDRAC Settings** > **Thermal**, and set a higher fan speed from the fan speed offset or minimum fan speed.

From RACADM commands:

1. Run the command `racadm help system.thermalsettings`

For more information, see *Integrated Dell Remote Access User's Guide* at www.dell.com/poweredgemanuals

Troubleshooting cooling fans

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.

NOTE: The fan number is referenced by the management software of the system. In the event of a problem with a particular fan, you can easily identify and replace it by noting down the fan numbers on the cooling fan assembly.

Steps

1. Reseat the fan or the fan's power cable.
2. Restart the system.

Related references

Safety instructions on page 53
Getting help on page 157

Related tasks

Before working inside your system on page 53
Removing the system cover on page 54
Installing a cooling fan on page 87
Installing the system cover on page 55

Troubleshooting system memory

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.

NOTE: Memory slots are not hot-pluggable.

NOTE: NVDIMM-N battery is not hot-pluggable.

Steps

1. If the system is operational, run the appropriate diagnostic test. See the Using system diagnostics section for the available diagnostic tests.

   If the diagnostic tests indicate a fault, follow the corrective actions that are provided by the diagnostic tests.

2. If the system is not operational, turn off the system and attached peripherals, and unplug the system from the power source. Wait at least for 10 seconds, and then reconnect the system to the power source.
3. Turn on the system and attached peripherals, and note the messages on the screen.

   If an error message is displayed indicating a fault with a specific memory module, go to step 12.

4. Enter System Setup, and check the system memory setting. Make any changes to the memory settings, if needed.

   If the memory settings match the installed memory but the problem still persists, go to step 12.

5. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
6. Remove the system cover.
7. Check the memory channels and ensure that they are populated correctly.

   NOTE: See the system event log or system messages for the location of the failed memory module. Reinstall the memory device.

8. Reseat the memory modules in their sockets.
9. Install the system cover.
10. Enter System Setup, and check the system memory setting.

    If the problem is not resolved, proceed with step 11.

11. Remove the system cover.
12. If a diagnostic test or error message indicates a specific memory module as faulty, swap or replace the module with a known working memory module.
13. To troubleshoot an unspecified faulty memory module, replace the memory module in the first DIMM socket with a module of the same type and capacity.

    If an error message is displayed on the screen, this may indicate a problem with one or more installed DIMM types, incorrect DIMM installation, or defective DIMMs. Follow the on-screen instructions to resolve the problem.

14. Install the system cover.
15. As the system boots, observe any error message that is displayed and the diagnostic indicators on the front of the system.
16. If the memory problem persists, repeat step 12 through step 15 for each memory module installed.

Related concepts

System Setup on page 26

Related references

Getting help on page 157
Using system diagnostics on page 141

Related tasks

Removing the system cover on page 54
Removing memory modules on page 65
Installing memory modules on page 67
Installing the system cover on page 55

Troubleshooting a drive or SSD

Prerequisites

CAUTION: This troubleshooting procedure can erase data stored on the drive. Before you proceed, back up all files on the drive.

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. Run the appropriate diagnostic test. See the Using system diagnostics section.

   Depending on the results of the diagnostics test, proceed as required through the following steps.

2. If your system has a RAID controller and your drives are configured in a RAID array, perform the following steps:
   a. Ensure that the drives are configured correctly for the RAID array.
   b. Take the drive offline and reseat the drive.
   c. Exit the configuration utility and allow the system to boot to the operating system.
3. Ensure that the needed device drivers for your controller card are installed and are configured correctly. For more information, see the operating system documentation.
4. Restart the system and enter the System Setup.
5. Verify that the controller is enabled and the drives are displayed in the System Setup.

Related concepts

System Setup on page 26

Related references

Getting help on page 157
Using system diagnostics on page 141

Troubleshooting a storage controller

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: When troubleshooting a controller, see the documentation for your operating system and the controller.

NOTE: Mini-PERC socket is not hot-pluggable.

1. Run the appropriate diagnostic test. See the Using system diagnostics section.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Verify that the installed expansion cards are compliant with the expansion card installation guidelines.
5. Ensure that each expansion card is firmly seated in its connector.
6. Install the system cover.
7. Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.
8. If the problem is not resolved, turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
9. Remove the system cover.
10. Remove all expansion cards installed in the system.
11. Install the system cover.
12. Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.
13. Run the appropriate diagnostic test. See the Using system diagnostics section.
14. For each expansion card you removed in step 10, perform the following steps:
    a. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
    b. Remove the system cover.
    c. Reinstall one of the expansion cards.

d. Install the system cover.
e. Run the appropriate diagnostic test. See the Using system diagnostics section.

Related references

Getting help on page 157
Using system diagnostics on page 141

Related tasks

Removing the system cover on page 54
Installing the system cover on page 55

Troubleshooting expansion cards

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.

NOTE: When troubleshooting an expansion card, you also have to see the documentation for your operating system and the expansion card.

NOTE: Riser slots are not hot-pluggable.

Steps

1. Run the appropriate diagnostic test. See the Using system diagnostics section.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Ensure that each expansion card is firmly seated in its connector.
5. Install the system cover.
6. Turn on the system and attached peripherals.
7. If the problem is not resolved, turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
8. Remove the system cover.
9. Remove all expansion cards installed in the system.
10. Install the system cover.
11. Run the appropriate diagnostic test. See the Using system diagnostics section.
12. For each expansion card you removed in step 8, perform the following steps:
    a. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
    b. Remove the system cover.
    c. Reinstall one of the expansion cards.
    d. Install the system cover.
    e. Run the appropriate diagnostic test. See the Using system diagnostics section.

Related references

Getting help on page 157
Using system diagnostics on page 141

Related tasks

Removing the system cover on page 54
Installing the system cover on page 55

Troubleshooting processors

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.

NOTE: Processor sockets are not hot-pluggable.

Steps

1. Run the appropriate diagnostics test. See the Using system diagnostics section.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Ensure that the processor and heat sink are properly installed.
5. Install the system cover.
6. Run the appropriate diagnostic test. See the Using system diagnostics section.

Related references

Getting help on page 157
Using system diagnostics on page 141

Related tasks

Removing the system cover on page 54
Installing the system cover on page 55

10

Getting help

Topics:

Contacting Dell EMC

Dell EMC 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 EMC product catalog. Availability varies by country and product, and some services may not be available in your area. To contact Dell EMC 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 EMC Global Technical Support:
   a. Click Global Technical Support.
   b. Enter your system Service Tag in the **Enter your Service Tag** field on the Contac Us webpage.

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