DR6300

Owner's Manual

Table of Contents

DR6300 system overview

Your DR6300 system is 2U rack server that supports up to two Intel Xeon E5-2680 v4 processors, up to 24 DIMMs, and twelve 3.5-inch hard drives and 2 optional 2.5-inch back-accessible hard drives for the operating system.

Front panel features and indicators

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 diagnostic LEDs or the LCD panel is prominently on the front panel. The hot swappable hard drives are accessible from the front panel.

Figure 1. Dell DR6300 system front panel features and indicators
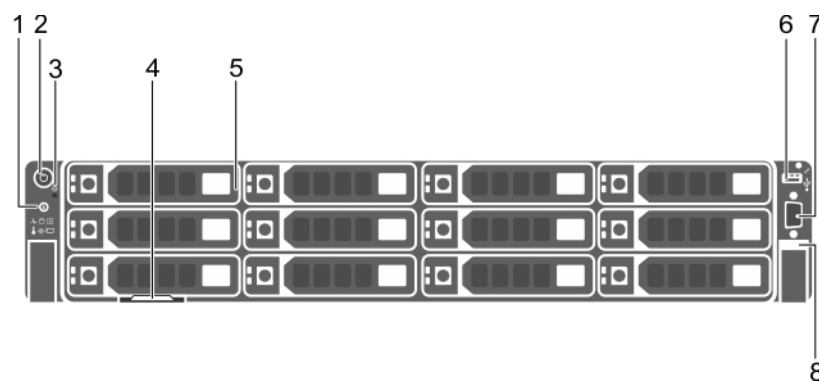
1. System identification button
2. Power button
3. NMI button
4. Information tag
5. Hard drives
6. USB management port/iDRAC Direct
7. Video connector
8. Quick Sync

Table 1. Front panel features and indicators

Item 1 is the system identification button on the front and back panels, that can be used to locate a particular system within a rack. When one of these buttons is pressed, the LCD panel on the front and the system status indicator on the back flashes until one of the buttons is pressed again. Press to toggle the system ID on or off. If the system stops responding during POST, press and hold the system ID button for more than five seconds to enter BIOS progress mode. To reset iDRAC (if not disabled in F2 iDRAC set up) press and hold the button for more than 15 seconds. Item 2 is the power button. Enables you to know the power status of the system. The power indicator turns on when the system power is on. The power button controls the power supply output to the system. Item 3 is the NMI button, that is used to troubleshoot software and device driver errors when running certain operating systems. This button can be pressed using the end of a paper clip. Use this button only if directed to do so by qualified support personnel or by the operating system documentation. Item 4 is the information tag, a slide-out label panel that allows you to record system information such as Service Tag, NIC, and MAC address, as per your need. Item 5 indicates the hard drives, you can have up to twelve 3.5-inch hot-swappable hard drives. Item 6 is the USB management port/iDRAC Direct port. The USB management port can function as a regular USB port or provide access to the iDRAC Direct features. For more information, see the Integrated Dell Remote Access Controller User's Guide at **Dell.com/idracmanuals**. The USB

management port is USB 3.0-compliant. Item 8 is Quick Sync, that indicates a Quick Sync enabled system. The Quick Sync feature is optional and requires a Quick Sync bezel. This feature allows management of the system using mobile devices. This feature aggregates hardware or firmware inventory and various system level diagnostic and error information that can be used in troubleshooting the system. For more information, see the Integrated Dell Remote Access Controller User's Guide at **Dell.com/idracmanualsDell.com/idracmanuals**

Item	Indicator, Button, or Connector	Icon	Description
1	System identification button		Enables you to locate a particular system within a rack. The identification buttons are on the front and back panels.
			Press the system identification button to turn the system ID on or off.
		i	• If the system stops responding during POST, press and hold the system ID button (for more than five seconds) to enter BIOS progress mode.
			• To reset the iDRAC (if not disabled in F2 iDRAC set up) press and hold the button (for more than 15 seconds).
2	Power button		Enables you to know the power status of the system. The power indicator turns on when the system power is on. The power button controls the power supply output to the system.
		i	NOTE: On ACPI-compliant operating systems, when the power button is used to shut down the system, the operating system performs a graceful shut down the system power is turned off.
3	NMI button		Enables you to troubleshoot software and device driver errors when running certain operating systems. This button can be pressed by using the end of a paper clip.
		i	NOTE: Use this button only if directed to do so by qualified support personnel or by instructions in the operating system's documentation.
4	Information tag		Contains system information such as service tag, NIC, MAC address for your reference. The information tag is a slide-out label panel.
5	Hard drives		Up to twelve 3.5-inch hot-swappable hard drives.
6	USB management port/ iDRAC Direct		The USB management port is USB 2.0 compliant. Enables you to connect USB devices to the system or provides access to the iDRAC Direct features. For more information, see the Integrated Dell Remote Access Controller User's Guide at **Dell.com/ idracmanuals**.

Item	Indicator, Button, or Connector	Icon	Description
7	Video connector	▭	Enables you to connect a display to the system.
8	Quick Sync (optional)		Indicates a Quick Sync enabled system. The Quick Sync feature is optional and needs a Quick Sync bezel. This feature allows management of the system by using mobile devices. This feature aggregates hardware or firmware inventory and various system level diagnostic and error information that can be used in troubleshooting the system. For more information, see the Integrated Dell Remote Access Controller User's Guide at **Dell.com/idracmanuals**.

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, iDRAC storage media, NIC ports, USB and VGA ports. Most of the expansion card ports can be accessed from the back panel. The hot swappable power supply units, and if installed, the rear accessible hard drives are accessible from the back panel.

Figure 2. Back panel features
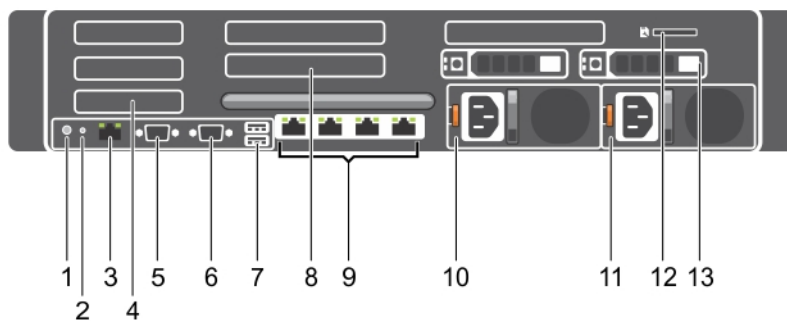
1. System identification button
2. System identification connector
3. iDRAC8 Enterprise port
4. Half-height PCIe expansion card slot
5. Serial connector
6. Video connector
7. USB port
8. Full-height PCIe expansion card slot
9. Ethernet connector
10. Power supply unit 1
11. Power supply unit 2
12. vFlash media card slot
13. Hard drive

Table 2. Back panel features

Item 1 is the system identification button on the front and back panels, that can be used to locate a particular system within a rack. When one of these buttons is pressed, the LCD panel on the front and the system status indicator on the back flashes until one of the buttons is pressed again. Press to toggle the system ID on and off. If the system stops responding during POST, press and hold the system ID button for more than five seconds to enter BIOS progress mode. To reset iDRAC (if not disabled in F2 iDRAC set up) press and hold the button for more than 15 seconds. Item 2 is System identification connector, that Enables you to connect the optional system status indicator assembly through the optional cable management arm. Item 3 is iDRAC8 Enterprise port. It is a dedicated management port. The port is available for use only if the iDRAC8 Enterprise license is installed on your system. Item 4 is PCIe expansion card slot, that Enables you to connect three low profile PCIe expansion cards. Item 5 is serial connector, that Enables you to connect a serial device to the system. Item 6 is video connector, that Enables you to connect a VGA display to the system. Item 7 is USB ports (2), that Enables you to connect USB devices to the system. The ports are USB 3.0-compliant. Item 8 is PCIe expansion card slot that Enables you to connect up to four full height three-fourth length PCIe expansion cards. Item 9 are Ethernet connectors (4) that has four integrated 10/100/1000 Mbps NIC connectors or four integrated connectors and two integrated 10/100/1000 Mbps NIC connectors, two integrated 100 Mbps/1 Gbps/10 Gbps SFP+ connectors. Item 10 and 11 are power supply units (PSU1 and (PSU2) that supports 1100 W AC PSU. Item 12 is the SD vFlash card slot that Enables you to insert a vFlash media card. Item 13 is the rear hard drive slots that allow you to install up to two hot-swappable 2.5-inch hard drives

Item	Indicator, button, or connector	Icon	Description
1	System identification button	ⓘ	The identification buttons on the front and back panels can be used to locate a particular system within a rack.
			Press to toggle the system identification (ID) on or off.
			If the system stops responding during POST, press and hold the system ID button for more than five seconds to enter BIOS progress mode.
			To reset iDRAC (if not disabled in F2 iDRAC set up) press and hold the button for more than 15 seconds.
2	System identification connector		Connects the optional system status indicator assembly through the optional cable management arm.
3	iDRAC8 Enterprise port	🔧	Dedicated management port.
4	Half-height PCIe expansion card slot (3)		Enables you to connect up to 3 half-height PCI Express expansion cards.
5	Serial connector	IOIOI	Enables you to connect a serial device to the system.
6	Video connector	⊡	Enables you to connect a VGA display to the system.
7	USB port (2)	SS⇌	Enables you to connect USB devices to the system. The ports are USB 3.0-compliant.
8	Full-height PCIe expansion card slot (3)		Enables you to connect up to 3 full-height PCI Express expansion cards.
9	Ethernet connector (4)	⛶	Four integrated 10/100/1000 Mbps Network Interface Card (NIC) connectors

Item	Indicator, button, or connector	Icon	Description
			or
			Four integrated connectors that include:
			• Two 10/100/1000 Mbps NIC connectors
			• Two 100 Mbps/1 Gbps/10 Gbps SFP+/10 GbE T connectors
10	Power supply unit (PSU1)		AC 1100 W
11	Power supply unit (PSU2)		AC 1100 W

Diagnostic indicators on the front panel

ℹ **NOTE:** The diagnostic indicators are not present if the system is equipped with an LCD display.

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

Table 3. Diagnostic indicators

Item 1 is the health indicator, that indicates the health status of the system. The indicator turns solid blue if the system is turned on and in good health. The indicator flashes amber if the system is turned on or in standby, and if any issue occurs (for example, a failed fan or hard drive). Item 2 is the hard drive indicator, that flashes amber if an error occurs related to hard drive. Item 3 is the electrical indicator that flashes amber if an electrical error occurs (for example, voltage out of range, or a failed power supply unit or voltage regulator). Item 4 is the temperature indicator that flashes amber if a thermal error occurs (for example, a temperature out of range or fan failure). Item 5 is the memory indicator that flashes amber if a memory error occurs. Item 6 is the PCIe indicator that flashes amber if an error occurs related to PCIe card.

Icon	Description	Condition	Corrective action
	Health indicator	The indicator turns solid blue if the system is in good health.	None required.
		The indicator flashes amber: • When the system is turned on. • When the system is in standby. • If any error condition exists. For example, a failed fan, 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.
	Hard drive indicator	The indicator flashes amber if there is a hard drive error.	Check the System Event Log to determine the hard drive that has an error. Run the

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

Related references
   See also: Getting help
   See also: Expansion card installation guidelines

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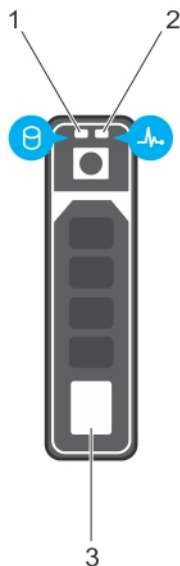
1. hard drive activity indicator
2. hard drive status indicator
3. hard drive

ℹ️ 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 4. Hard drive indicator codes

The Hard drive indicator codes table describes the indicator codes: flashing green, steady green, and amber.

Drive-status indicator pattern (RAID only)	Condition
Flashes green twice per second	Identifying drive or preparing for removal.
Off	Drive ready for insertion or removal. ℹ️ 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

Each 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 4. NIC indicators
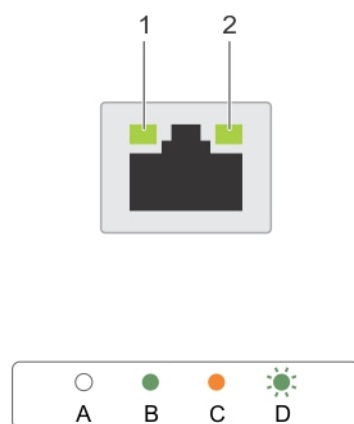
1. link indicator
2. activity indicator

Table 5. NIC indicators

The NIC indicators table describes different NIC indicator codes and condition of the connectivity.

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.

Power supply unit indicator codes

AC power supply units (PSUs) have an illuminated translucent handle that serves as an indicator and DC PSUs have an LED that serves as an indicator. The indicator shows whether power is present or a power fault has occurred.

Figure 5. AC PSU status indicator

1. AC PSU status indicator/handle

Table 6. AC PSU status indicators

This table describes the AC PSU status indicators and what condition is the PSU when the power indicator light is green, flashing green, flashing amber, and when it is not lit.

Convention	Power indicator pattern	Condition
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.
C	Flashing 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 a PSU mismatch with respect to efficiency, feature set, health status, and supported voltage. **i** NOTE: Ensure that both the PSUs are of the same capacity. **!** CAUTION: **For AC PSUs, use only PSUs with the Extended Power Performance (EPP) label on the back.** **i** NOTE: Mixing PSUs from previous generations of Dell PowerEdge servers can result in a PSU mismatch condition or failure to turn the system on.
D	Flashing amber	Indicates a problem with the PSU.

Convention	Power indicator pattern	Condition
		! **CAUTION:** **When correcting a PSU mismatch, replace only the PSU with the flashing indicator. Swapping the PSU to make a matched pair can result in an error condition and unexpected system shutdown. To change from a high output configuration to a low output configuration or vice versa, you must turn off the system.**
		! **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.**
		! **CAUTION:** **If two PSUs are used, they must be of the same type and have the same maximum output power.**
		! **CAUTION:** **Combining AC and DC PSUs is not supported and triggers a mismatch.**
E	Not lit	Power is not connected.

iDRAC Direct LED indicator codes

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

i NOTE: The iDRAC Direct LED indicator does not turn on when the USB port is used in the USB mode.

Figure 6. iDRAC Direct LED indicator

1. iDRAC Direct status indicator

The iDRAC Direct LED indicator table describes iDRAC Direct activity when configuring iDRAC Direct by using the management port (USB XML Import).

Table 7. iDRAC Direct LED indicators

This table describes the iDRAC Direct status indicators and what is the condition when the LED flashes green, continuously flashes green and when it's not lit.

Convention	iDRAC Direct LED indicator pattern	Condition
A	Green	Turns green for a minimum of two seconds to indicate the start and end of a file transfer.
B	Flashing green	Indicates file transfer or any operation tasks.
C	Green and turns off	Indicates that the file transfer is complete.
D	Not lit	Indicates that the USB is ready to be removed or that a task is complete.

The following table describes iDRAC Direct activity when configuring iDRAC Direct by using your laptop and cable (Laptop Connect):

Table 8. iDRAC Direct LED indicator patterns

The iDRAC Direct LED indicator patterns table describes the iDRAC status when it is solid green, flashing green, and when it is turned off.

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

Quick Sync indicator codes

Figure 7. Quick Sync
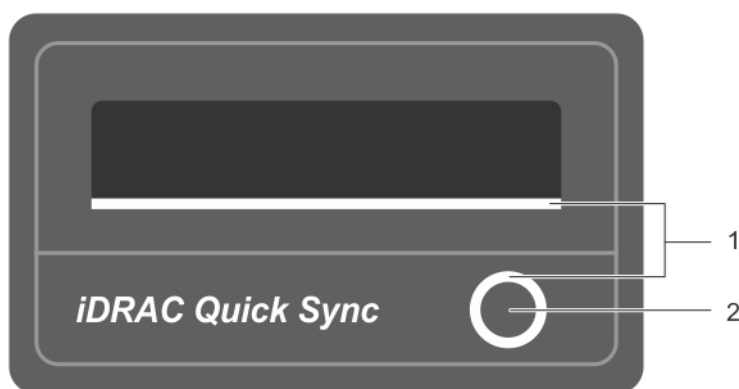
1. Quick Sync Status Indicator
2. Quick Sync Activation Button

Table 9. Quick Sync indicator codes

This table describes the Quick Sync indicator codes.

Quick Sync indicator pattern	Condition
Slow blink	Quick Sync is waiting to be configured from iDRAC.
Solid	Quick Sync is ready to transfer.
Blinks three times rapidly and then turns off	Quick Sync feature is disabled from iDRAC.
Blinks continuously when the mobile device touches antenna	Indicates data transfer activity.
Blinks rapidly continuously when the activation button is pressed	Quick Sync hardware is not responding properly.
Turns off	Indicates that the Quick Sync feature is turned off. Use the activation button to activate it. If pressing the activation button does not turn on the LEDs, it indicates that power is not delivered to the Quick Sync bezel.

Locating Service Tag of your system

Your system is identified by a unique Express Service Code and Service Tag number. The Express Service Code 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.

Documentation matrix

The documentation matrix describes documents for setting up and managing your system.

Table 10. Documentation matrix

This table provides the documentation matrix available for your system.

To...	Refer to...
Install your system into a rack	Rack documentation included with your rack solution.

To...	Refer to...
Set up your system and know the system technical specifications	Getting Started With Your System that shipped with your system or see **support.quest.com/DR-Series**
Troubleshoot the system and install or replace system components	DR6300 System Owner's Manual at support.quest.com/DR-Series
Manage DR Series system data backup and replication operations	DR Series System Command Line Reference Guide at **support.quest.com/DR-Series**
Know the latest information about new features and known issues with a specific product release.	DR Series System Release Notes at **support.quest.com/DR-Series**
Gather information about supported hardware and software versions for the Dell DR Series system.	DR Series System Interoperability Guide at **support.quest.com/DR-Series**
Deploy the virtual DR2000v system on supported virtual platforms.	DR2000v Deployment Guide at **support.quest.com/DR-Series**
Configure, manage, update, and restore the system	DR Series System Administrator Guide at **support.quest.com/DR-Series**
Install the operating system	Operating system documentation at **Dell.com/operatingsystemmanuals**
Get an overview of the Dell Systems Management offerings	Dell OpenManage Systems Management Overview Guideat **Dell.com/openmanagemanuals**
Configure and log in to iDRAC, set up managed and management system, know the iDRAC features and troubleshoot using iDRAC	Integrated Dell Remote Access Controller User's Guide at **Dell.com/esmmanuals**
Know about the RACADM subcommands and supported RACADM interfaces	RACADM Command Line Reference Guide for iDRAC and CMC at **Dell.com/esmmanuals**
Launch, enable and disable Lifecycle Controller, know the features, use and troubleshoot Lifecycle Controller	Dell Lifecycle Controller User's Guide at **Dell.com/esmmanuals**
Use Lifecycle Controller Remote Services	Dell Lifecycle Controller Remote Services Quick Start Guide at **Dell.com/esmmanuals**
Set up, use, and troubleshoot OpenManage Server Administrator	Dell OpenManage Server Administrator User's Guide at **Dell.com/openmanagemanuals**
Install, use, and troubleshoot OpenManage Essentials	Dell OpenManage Essentials User's Guide at **Dell.com/openmanagemanuals**
Know the features of the storage controller cards, deploy the cards, and manage the storage subsystem	Storage controller documentation at **Dell.com/storagecontrollermanuals**

To...	Refer to...
Check the event and error messages generated by the system firmware and agents that monitor system components	Dell Event and Error Messages Reference Guide at **Dell.com/esmmanuals**

Technical specifications

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

Chassis dimensions

This section describes the physical dimensions of the system.

Figure 8. Chassis dimensions of your Dell DR6300 system
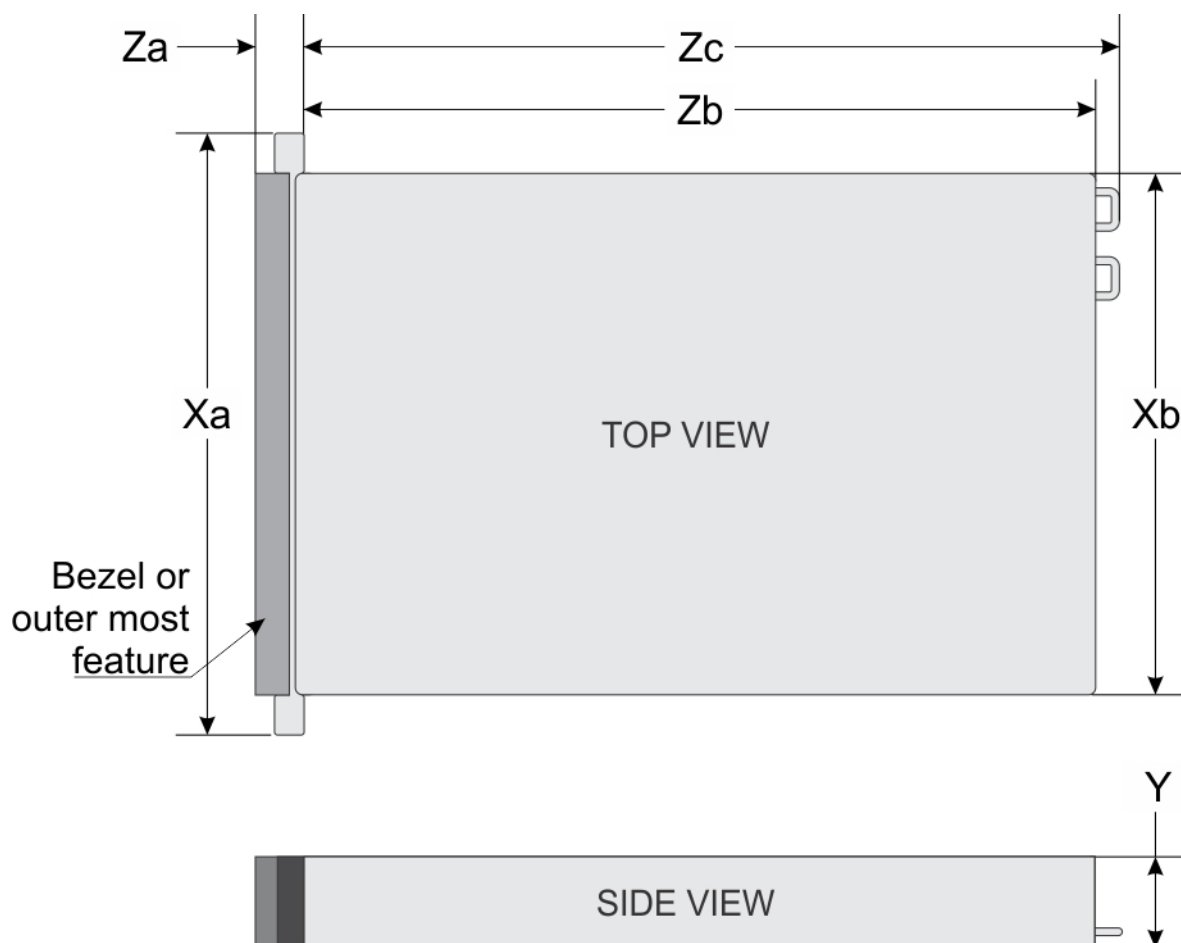
Table 11. Dimensions of your system

This table gives details of the dimensions of the Dell DR6300 system. The dimensions are as follows: Xa=482.4 mm, Xb=444.0 mm, Y=87.3 mm, Za (with bezel) =32.0 mm, Za (without bezel) =18.0 mm, Zb=684.0 mm, and Zc=723.0 mm.

Xa	Xb	Y	Za (with bezel)	Za (without bezel)	Zb	Zc
482.4 mm	444.0 mm	87.3 mm	32.0 mm	18.0 mm	684.0 mm	723.0 mm

Chassis weight

This section describes the weight of the system.

Table 12. Chassis weight

For Dell DR6300 systems 3.5–inch hard drive system, the maximum chassis weight is 36.5 kg (80.47 lb).

System	Maximum weight (with all hard drives/SSDs)
Dell DR6300 system	36.5 kg (80.47 lb) (3.5-inch hard drive systems)

Processor specifications

Your DR6300 system supports up to two Intel Xeon E5-2680 v4 processors.

PSU specifications

Your Dell DR6300 system supports up to two AC redundant power supply units (PSUs).

Table 13. PSU specifications

For 1100 W AC platinum PSU, the maximum heat dissipation is 4100 BTU/hr, frequency is 50/60 Hz, and voltage range is 100-240 V AC autoranging.

PSU	Class	Heat dissipation (maximum)	Frequency	Voltage
1100 W AC	Platinum	4100 BTU/hr	50/60 Hz	100–240 V AC, autoranging

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

ℹ 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

Your Dell DR6300 system supports CR 2032 3.0-V lithium coin cell system battery.

Expansion bus specifications

The Dell DR6300 system supports PCI express (PCIe) generation 3 expansion cards, which need to be installed on the system board using expansion card risers. This system supports three types of expansion card risers. The following table provides the expansion card riser specifications:

Table 14. Expansion card riser specifications

This table describes the details of the PICe slots on the expansion card risers. Riser 1 supports PCIe slots 1 through 3, with half height, low profile, x8 link speed cards. Riser 2 supports two PCIe cards on slots 4 and 5. PCIe slot 4 supports a full height, full length, x16 card and PCIe slot 5 supports a full height, full length x8 card. Riser 3 has two card options. The alternate Riser 3 option supports a single PCIe card on PCIe slot 6. The PCIe slot 6 supports a full height, full length x16 card.

Expansion card riser	PCIe slots on the riser	Height	Length	Link
Riser 1	Slot 1	half-height	low-profile	x8
Riser 1	Slot 2	half-height	low-profile	x8
Riser 1	Slot 3	half-height	low-profile	x8
Riser 2	Slot 4	full-height	full-length	x16
Riser 2	Slot 5	full-height	full-length	x8
Riser 3 (alternate)	Slot 6	full-height	full-length	x16

ℹ️ NOTE: When using slots 1 through 4 on the riser, ensure that both the processors are installed on the system.

Memory specifications

The Dell DR6300 system supports DDR4 registered DIMMs (RDIMMs). Supported memory bus frequencies are 1333MT/s, 1600 MT/s, 1866 MT/s, 2133MT/s, or 2400 MT/s.

Table 15. Memory specifications

Your system supports 24 memory module sockets of 288-pins each. The system supports RDIMMs of memory capacity 4 GB, 8 GB, or 16GB single rank, and RDIMMs of memory capacity 8 GB, 16 GB, or 32 GB dual rank. For system with single processor, the minimum RAM is 4 GB and for dual processor systems the minimum RAM is 8 GB.

Memory module sockets	Memory capacity	Minimum RAM	Maximum RAM
Twenty-four 288–pin	8 GB or 16 GB dual-ranked RDIMMs	• 4 GB with single processor • 8 GB with dual processors (minimum one memory module per processor)	128 GB with two processors

Drive specifications

Hard drives

The Dell DR6300 system supports up to twelve 3.5-inch hard drives and two optional 2.5-inch back-accessible SAS, SATA, or Nearline SAS hard drives.

Ports and connectors specifications

USB ports

The Dell DR6300 system supports:

- USB 2.0-compliant ports on the front panel
- USB 3.0-complaint ports on the back panel
- internal USB 3.0-compliant port

The following table provides more information about the USB specifications:

Table 16. USB specifications

The Dell DR6300 system supports one 4-pin, USB 2.0-compliant port on the front panel. Your system supports two 9-pin, USB 3.0-compliant ports on the back panel and one 9-pin, USB 3.0-compliant internal port.

System	Front panel	Back panel	Internal
Dell DR6300 system	One USB management port/iDRAC Direct	Two 9-pin, USB 3.0-compliant ports	One 9-pin, USB 3.0-compliant port

NIC ports

The Dell DR6300 system supports four Network Interface Controller (NIC) ports on the back panel, which is available in one of the following three NIC configurations:

- Four 1 Gbps
- Two 1 Gbps and two 10 Gbps
- Four 10 Gbps

Serial connector

The serial connector connects a serial device to the system. The Dell DR6300 system supports one serial connector on the back panel, which is a 9-pin connector, Data Terminal Equipment (DTE), 16550-compliant.

VGA ports

The Video Graphic Array (VGA) port enables you to connect the system to a VGA display. The Dell DR6300 system supports two 15-pin VGA ports on the front and back panels.

Internal Dual SD Module

The Dell DR6300 system supports two optional flash memory card slots with an internal dual SD module.

> **i** NOTE: One card slot is dedicated for redundancy.

Video specifications

The Dell DR6300 system supports Matrox G200eR2 graphics card with 16 MB capacity.

Environmental specifications

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

Table 17. Temperature specifications

When the system is in continuous operation (for altitude less than 950 m or 3117 ft), the temperature specification ranges from 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. When the system is not in operation, the temperature specification is –40°C to 65°C (–40°F to 149°F). The Maximum temperature gradient for both opertaion and non-opertaional systems is 20°C/h (36°F/h). Information about fresh air specification is described in the Expanded Operating Temperature section.

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.
Fresh air	For information about fresh air, see Expanded Operating Temperature section.
Maximum temperature gradient (operating and storage)	20°C/h (68°F/h)

Table 18. Relative humidity specifications

For a non-operational system, the ambient relative humidity ranges from 5% to 95% with 33°C (91°F) maximum dew point. Atmosphere must be non-condensing at all times. For an operational system, the ambient relative humidity ranges from 10% to 80% with 29°C (84.2°F) maximum dew point.

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 19. Maximum vibration specifications

The maximum vibration specification of an operational system is 0.26 Grms at 5 Hz to 350 Hz (all operation orientations).The maximum vibration specification of a non-operational system is 1.88 Grms at 10 Hz to 500 Hz for 15 min (all six sides tested).

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 20. Maximum shock specifications

The maximum shock specification of an operational system is six consecutively executed shock pulses in the positive and negative x, y, and z axes of 40 G for up to 2.3 ms. The maximum shock specification of a non-operational system is 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.

Maximum vibration	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 21. Maximum altitude specifications

The maximum altitude specification for an operational system is 3048 m (10,000 ft). The maximum altitude specification for a non-operational system is 12,000 m (39,370 ft).

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

Table 22. Operating temperature de-rating specifications

If the operating temerature of a system is up to 35 °C (95 °F), the maximum temperature is reduced by 1 °C/300 m (1 °F/547 ft) above 950 m (3,117 ft). If the operating temperature of a system ranges from 35 °C to 40 °C (95 °F to 104 °F), the maximum temperature is reduced by 1 °C/175 m (1 °F/319 ft) above 950 m (3,117 ft). If the operating temperature of a system ranges from 40 °C to 45 °C (104 °F to 113 °F), the maximum temperature is reduced by 1 °C/125 m (1 °F/228 ft) above 950 m (3,117 ft).

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).

Operating temperature de-rating	Specifications
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 levels 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 23. Particulate contamination specifications

Air filtration specification: Data center air filtration as defined by ISO Class 8 per ISO 14644-1 shpuld have 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 specification: 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 specification: 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.

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.
	ℹ NOTE: This condition applies to data center environments only. Air filtration requirements do not apply to IT equipment designed to be used outside a data center, in environments such as an office or factory floor.
	ℹ 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.
	ℹ 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.
	ℹ NOTE: This condition applies to data center and non-data center environments.

Table 24. Gaseous contamination specifications

The copper coupon corrosion rate is <300 Å/month per Class G1 as defined by ANSI/ISA71.04-1985. The silver coupon corrosion rate is <200 Å/month as defined by AHSRAE TC9.9.

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.

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

Standard operating temperature

Table 25. Standard operating temperature specifications

The standard operating temperature for altitude less than 950 metres or 3117 feet ranges from 10°C to 35°C (50°F to 95°F) with no direct sunlight on the equipment. Note: The 2.5-inch hard drive chassis supports a maximum of 145 W processors.

Standard operating temperature	Specifications
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.

Expanded operating temperature

Table 26. Expanded operating temperature specifications

When the system is in continuous operation, the expanded operating temperature ranges from 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 temperature by 1°C per 175 m above 950 m (1°F per 319 ft). When the system is operating at < 1% of annual operating hours, the expanded operating temperature is –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).

Expanded operating temperature	Specifications
Continuous operation	5°C to 40°C at 5% to 85% RH with 29°C dew point. > **i** 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 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.

Expanded operating temperature	Specifications
	ℹ️ 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).

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

ℹ️ NOTE: When operating in the expanded temperature range, ambient temperature warnings maybe reported on the LCD panel and in the System Event Log.

Expanded operating temperature restrictions

- Do not perform a cold startup below 5°C.
- The operating temperature specified is for a maximum altitude of 3050 m (10,000 ft).
- 160 W or higher wattage processor is not supported.
- Redundant power supply units are required.
- Non-Dell qualified peripheral cards and/or peripheral cards greater than 25 W are not supported.
- The 3.5-inch hard drive chassis supports a maximum of 120 W processor.
- The 2.5-inch hard drive chassis supports a maximum of 145 W processor.
- Only SSDs are allowed in the hard drive slots at the back of the 3.5-inch hard drive chassis.
- Mid drive configurations, eight 3.5-inch and eighteen 1.8-inch SSD configurations are not supported.
- GPU is not supported
- Tape backup unit (TBU) is not supported.

Initial system setup and configuration

Setting up your system

Complete the following steps to set up your system:

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

iDRAC configuration

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

Options to set up iDRAC IP address

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

Interfaces

Document/Section

iDRAC Settings utility

See Dell Integrated Dell Remote Access Controller User's Guide at **Dell.com/idracmanuals**

Dell Deployment Toolkit

See Dell Deployment Toolkit User's Guide at **Dell.com/openmanagemanuals**

Dell Lifecycle Controller

See Dell Lifecycle Controller User's Guide at **Dell.com/idracmanuals**

Chassis or Server LCD panel

See the LCD panel section

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

> **i** NOTE: To access iDRAC, ensure that you install the iDRAC port card or connect the network cable to the Ethernet connector 1 on the system board.

> **i** NOTE: Ensure that you change the default user name and password after setting up the iDRAC IP address.

Log in to iDRAC

You can log in to iDRAC as:

- iDRAC 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.

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

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

Options to install the operating system

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

Table 27. Resources to install the operating system

This section provides the resources of installing the OS.

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

Methods to download firmware and drivers

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

Table 28. Firmware and drivers

You can download the firmware and drivers from Dell support site at Dell.com/support/home, You can download the firmware and drivers from by using Dell Remote Access Controller Lifecycle Controller (iDRAC with LC) at Dell.com/idracmanuals. You can download the firmware and drivers by using Dell Repository Manager, Dell OpenManage Essentials, Dell Server Update Utility, Dell OpenManage Deployment Toolkit at Dell.com/openmanagemanuals.

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

Downloading the drivers and firmware

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

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

1. Go to **Dell.com/support/drivers**.
2. Under the **Drivers & Downloads** section, type the Service Tag of your system in the **Service Tag or Express Service Code** box.

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

3. Click **Drivers & Downloads**.

   The drivers that are applicable to your selection are displayed.
4. Download the drivers you need to a USB drive, CD, or DVD.

Manage your system

This section provides the information about server management software.

Server Management Software

Description

OpenManage

The Dell OpenManage Server Administrator provides a comprehensive one-to-one systems management solution for both local and remote servers and their storage controllers and Direct Attached Storage (DAS).

For information about OpenManage documents, see **Dell.com/openmanagemanuals**.

OpenManage Essentials

Dell OpenManage Essentials is the newest one-to-many management console for managing Dell PowerEdge servers and direct-attached storage as it provides a simple and easy interface for system administrators to maximize the uptime and health of Dell systems.

For information about OpenManage documents, see **Dell.com/openmanagemanuals**.

Remote Access Controller with Dell Lifecycle Controller (iDRAC with LC)

iDRAC with Dell Lifecycle Controller allows administrators to deploy, update, monitor, and manage Dell servers from any location without the use of agents in a one-to-one or one-to-many method. This out-of-band management allows the updates to be sent from Dell or appropriate third-party consoles directly to iDRAC with Dell Lifecycle Controller on a Dell PowerEdge server, regardless of the operating system that may or may not be running.

For information about Remote Enterprise Systems Management documents, see **Dell.com/idracmanuals**.

Partner Programs Enterprise Systems Management

For information about OpenManage Connections Enterprise Systems Management documents, see **Dell.com/ omconnectionsenterprisesystemsmanagement**.

OpenManage Connections Client Systems Management

For information about OpenManage Connections Client Systems Management documents, see **Dell.com/ dellclientcommandsuitemanuals**.

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.

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
- Dell Lifecycle Controller
- Preboot Execution Environment (PXE)

Related concepts
    See also: System Setup
    See also: Boot Manager
    See also: Dell Lifecycle Controller
    See also: PXE boot

System Setup

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

> **i** 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 tasks
    See also: Viewing System Setup
Related references
    See also: System Setup details

Viewing System Setup

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

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

   ```
   F2 = System Setup
   ```

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

Related concepts
> See also: System Setup

Related references
> See also: System Setup details

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 iDRAC settings.

The iDRAC settings utility is an interface to set up and configure the iDRAC parameters by using UEFI (Unified Extensible Firmware Interface). You can enable or disable various iDRAC parameters by using the iDRAC settings utility. For more information about this utility, see *Integrated Dell Remote Access Controller User's Guide* at **Dell.com/idracmanuals**.

Device Settings

Enables you to configure device settings.

Related concepts
> See also: System Setup

Related tasks
> See also: Viewing System Setup

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 concepts
> See also: Secure Boot Custom Policy Settings

Related tasks
> See also: Viewing System BIOS

Related references
> See also: System BIOS Settings details
> See also: Boot Settings
> See also: Network Settings

See also: System Information
See also: Memory Settings
See also: Processor Settings
See also: SATA Settings
See also: Integrated Devices
See also: Serial Communication
See also: System Profile Settings
See also: Miscellaneous Settings
See also: iDRAC Settings utility
See also: Device Settings

Viewing System BIOS

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

1. Turn on, or restart your system.

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

   ```
   F2 = System Setup
   ```

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

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

Related references
See also: System BIOS
See also: System BIOS Settings details

System BIOS Settings details

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

Option

Description

System Information

Specifies information about the system such as the system model name, BIOS version, and Service Tag.

Memory Settings

Specifies information and options related to the installed memory.

Processor Settings

Specifies information and options related to the processor such as speed and cache size.

SATA Settings

Specifies options to enable or disable the integrated SATA controller and ports.

Boot Settings

Specifies options to specify the boot mode (BIOS or UEFI). Enables you to modify UEFI and BIOS boot settings.

Network Settings

Specifies options to change the network settings.

Integrated Devices

Specifies options to manage integrated device controllers and ports and specify related features and options.

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 tasks
    See also: Viewing System BIOS
Related references
    See also: System BIOS

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 tasks
    See also: Boot Settings details
    See also: Viewing Boot Settings
    See also: Changing the boot order
Related references
    See also: System BIOS
    See also: Choosing the system boot mode

Viewing Boot Settings

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

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

   `F2 = System Setup`

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

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

Related tasks

   See also: Boot Settings details
   See also: Changing the boot order

Related references

   See also: Boot Settings
   See also: Choosing the system boot mode

Boot Settings details

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.

   i | 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.

Boot Option Settings

Configures the boot sequence and the boot devices.

BIOS Boot Settings

Enables or disables BIOS boot options.

i | NOTE: This option is enabled only if the boot mode is BIOS.

UEFI Boot Settings

Enables or disables UEFI Boot options. The Boot options include **IPv4 PXE** and **IPv6 PXE**. This option is set to **IPv4** by default.

i | NOTE: This option is enabled only if the boot mode is UEFI.

Related tasks
> See also: Viewing Boot Settings
> See also: Changing the boot order

Related references
> See also: Boot Settings
> See also: Choosing the system boot mode

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) 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.

i | 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.

i | NOTE: For the latest information about supported operating systems, go to **Dell.com/ossupport**.

Related tasks
> See also: Boot Settings details
> See also: Viewing Boot Settings

Related references
> See also: Boot Settings

Changing the boot order

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

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 tasks
> See also: Boot Settings details
> See also: Viewing Boot Settings

Related references
> See also: Boot Settings

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.

i | 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
    See also: UEFI iSCSI Settings
Related tasks
    See also: Viewing Network Settings
    See also: Viewing UEFI iSCSI Settings
Related references
    See also: Network Settings screen details
    See also: UEFI iSCSI Settings details
    See also: System BIOS

Viewing Network Settings

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

1. Turn on, or restart your system.

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

    `F2 = System Setup`

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

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

4. On the **System BIOS** screen, click **Network Settings**.

Related references
    See also: Network Settings
    See also: Network Settings screen details

Network Settings screen details

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

Option

Description

PXE Device n (n = 1 to 4)

Enables or disables the device. When enabled, a UEFI boot option is created for the device.

PXE Device n Settings(n = 1 to 4)

Enables you to control the configuration of the PXE device.

Related tasks
    See also: Viewing Network Settings
Related references
    See also: Network Settings

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 tasks
> See also: Viewing UEFI iSCSI Settings

Related references
> See also: UEFI iSCSI Settings details
> See also: UEFI iSCSI Settings

Viewing UEFI iSCSI Settings

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

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

   ```
   F2 = System Setup
   ```

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

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

Related references
> See also: UEFI iSCSI Settings

UEFI iSCSI Settings details

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

Option

Description

ISCSI Initiator Name

Specifies the name of the iSCSI initiator (iqn format).

ISCSI 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 concepts
> See also: Secure Boot Custom Policy Settings

Related tasks
> See also: System Security Settings details
> See also: Viewing System Security
> See also: Creating a system and setup password
> See also: Using your system password to secure your system
> See also: Deleting or changing system and setup password

Related references
> See also: Operating with a setup password enabled
> See also: System BIOS

Viewing System Security

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

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

   `F2 = System Setup`

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

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

Related tasks
   See also: System Security Settings details

Related references
   See also: System Security

System Security Settings details

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

> **i** 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.

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

Enables Secure Boot, where the BIOS authenticates each pre-boot image by using the certificates in the Secure Boot Policy. Secure Boot is disabled by default.

Secure Boot Policy

When Secure Boot policy is set to **Standard**, the BIOS uses the system manufacturer's key and certificates to authenticate pre-boot images. When Secure Boot policy is set to **Custom**, the BIOS uses the user-defined key and certificates. Secure Boot policy is set to **Standard** by default.

Secure Boot Policy Summary

Specifies the list of certificates and hashes that secure boot uses to authenticate images.

Related tasks
    See also: Viewing System Security
Related references
    See also: System Security

Secure Boot Custom Policy Settings

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

Related tasks
    See also: Viewing Secure Boot Custom Policy Settings
Related references
    See also: Secure Boot Custom Policy Settings details

Viewing Secure Boot Custom Policy Settings

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

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

   `F2 = System Setup`

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

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

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.

> **i** 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.

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.

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

Related references
See also: System Security

Using your system password to secure your system

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

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

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

> ℹ️ 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
See also: System Security

Deleting or changing system and setup password

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

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.

Related references
See also: System Security

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.

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

Related references
    See also: System Security

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 tasks
    See also: Viewing System Information
Related references
    See also: System Information details
    See also: System BIOS

Viewing System Information

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

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

    ```
    F2 = System Setup
    ```

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

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

Related references
    See also: System Information

System Information details

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

Option

Description

System Model Name

Specifies the system model name.

System BIOS Version

Specifies the BIOS version installed on the system.

System Management Engine Version

Specifies the current version of the Management Engine firmware.

System Service Tag

Specifies the system Service Tag.

System Manufacturer

Specifies the name of the system manufacturer.

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 tasks
> See also: Viewing System Information

Related references
> See also: System Information
> See also: System Information details

Memory Settings

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

Related tasks
> See also: Viewing Memory Settings

Related references
> See also: Memory Settings details
> See also: System BIOS

Viewing Memory Settings

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

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

   ```
   F2 = System Setup
   ```

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

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

Related references
> See also: Memory Settings
> See also: Memory Settings details

Memory Settings details

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

Option

Description

System Memory Size

Specifies the memory size in the system.

System Memory Type

Specifies the type of memory installed in the system.

System Memory Speed

Specifies the system memory speed.

System Memory Voltage

Specifies the system memory voltage.

Video Memory

Specifies the amount of video memory.

System Memory Testing

Specifies whether the system memory tests are run during system boot. Options are **Enabled** and **Disabled**. This option is set to **Disabled** by default.

Memory Operating Mode

Specifies the memory operating mode. The options available are **Optimizer Mode**, **Advanced ECC Mode**, **Mirror Mode**, **Spare Mode**, **Spare with Advanced ECC Mode**, **Dell Fault Resilient Mode** and **Dell NUMA Fault Resilient Mode**. This option is set to **Optimizer Mode** by default.

> **i** NOTE: The **Memory Operating Mode** option can have different default and available options based on the memory configuration of your system.

> **i** NOTE: The **Dell Fault Resilient Mode** option establishes an area of memory that is fault resilient. This mode can be used by an operating system that supports the feature to load critical applications or enables the operating system kernel to maximize system availability.

Node Interleaving

Specifies if Non-Uniform Memory architecture (NUMA) is supported. If this field is set to **Enabled**, memory interleaving is supported if a symmetric memory configuration is installed. If the field is set to **Disabled**, the system supports NUMA (asymmetric) memory configurations. This option is set to **Disabled** by default.

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 tasks
    See also: Viewing Memory Settings
Related references
    See also: Memory Settings

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 tasks
Related references

Viewing Processor Settings

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

1. Turn on, or restart your system.

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

    `F2 = System Setup`

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

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

4. On the **System BIOS** screen, click **Processor Settings**.

Related references

Processor Settings details

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

Option

Description

Logical Processor

Enables or disables the logical processors and displays the number of logical processors. If this option is set to **Enabled**, the BIOS displays all the logical processors. If this option is set to **Disabled**, the BIOS displays only one logical processor per core. This option is set to **Enabled** by default.

QPI Speed

Enables you to control QuickPath Interconnect data rate settings.

Alternate RTID (Requestor Transaction ID) Setting

Modifies Requestor Transaction IDs, which are QPI resources. This option is set to **Disabled** by default.

i 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.

Execute Disable

Enables you to run the disable memory protection technology. 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.

i NOTE: This option is only available on certain stock keeping units (SKUs) of the processors.

X2Apic Mode

Enables or disables the X2Apic mode.

Dell Controlled Turbo

Controls the turbo engagement. Enable this option only when **System Profile** is set to **Performance**.

i NOTE: Depending on the number of installed CPUs, there may be up to four processor listings.

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.

Processor 1

i 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

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 tasks
See also: Viewing Processor Settings
Related references
See also: Processor Settings

SATA Settings

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

Related tasks
See also: SATA Settings details
See also: Viewing SATA Settings
Related references
See also: System BIOS

Viewing SATA Settings

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

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

   ```
   F2 = System Setup
   ```

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

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

Related tasks

See also: SATA Settings details

Related references

See also: SATA Settings

SATA Settings details

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

Option

Description

Embedded SATA

Enables the embedded SATA option to be set to **Off**, **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.

Port C

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 D

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 E

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 F

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 G

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 H

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 I

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 J

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 tasks
Related references

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 tasks
Related references

Viewing Integrated Devices

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

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

   ```
   F2 = System Setup
   ```

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

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

Related tasks

Related references

Integrated Devices details

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.

i NOTE: Selecting **Only Back Ports On** and **All Ports Off** disables the USB management port and also restricts access to iDRAC features.

Internal USB Port

Enables or disables the internal USB port. This option is set to **Enabled** by default.

Integrated RAID Controller

Enables or disables the integrated RAID controller. This option is set to **Enabled** by default.

Integrated Network Card 1

Enables or disables the integrated network card.

Embedded NIC1 and NIC2

i 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.

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 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 tasks

See also: Viewing Integrated Devices

Related references

See also: Integrated Devices

Serial Communication

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

Related tasks

See also: Serial Communication details

See also: Viewing Serial Communication

Related references

See also: System BIOS

Viewing Serial Communication

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

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

   ```
   F2 = System Setup
   ```

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

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

Related tasks
   See also: Serial Communication details
Related references
   See also: Serial Communication

Serial Communication details

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

Option

Description

Serial Communication

Selects serial communication devices (Serial Device 1 and Serial Device 2) in BIOS. BIOS console redirection can also be enabled and the port address can be specified. This option is set to **Auto** by default.

Serial Port Address

Enables you to set the port address for serial devices. This option is set to **Serial Device 1=COM2, Serial Device 2=COM1** by default.

> **i** 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.

> **i** 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.

> **i** 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.

> **i** 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 tasks
   See also: Viewing Serial Communication
Related references

See also: Serial Communication

System Profile Settings

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

Related tasks
    See also: System Profile Settings details
    See also: Viewing System Profile Settings
Related references
    See also: System BIOS

Viewing System Profile Settings

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

1. Turn on, or restart your system.

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

    ```
    F2 = System Setup
    ```

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

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

4. On the **System BIOS** screen, click **System Profile Settings**.

Related tasks
    See also: System Profile Settings details
Related references
    See also: System Profile Settings

System Profile Settings details

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

Option

Description

System Profile

Sets the system profile. If you set the **System Profile** option to a mode other than **Custom**, the BIOS automatically sets the rest of the options. You can only change the rest of the options if the mode is set to **Custom**. This option is set to **Performance Per Watt Optimized (DAPC)** by default. DAPC is Dell Active Power Controller.

> **i** NOTE: All the parameters on the system profile setting screen are available only when the **System Profile** option is set to **Custom**.

CPU Power Management

Sets the CPU power management. This option is set to **System DBPM (DAPC)** by default. DBPM is Demand-Based Power Management.

Memory Frequency

Sets the speed of the system memory. You can select **Maximum Performance**, **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.

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

> **i** 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.

> **i** NOTE: This option can be disabled only if the **C States** option in the **Custom** mode is set to **disabled**.

> **i** 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 tasks
> See also: Viewing System Profile Settings

Related references
> See also: System Profile Settings

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 tasks
> See also: Miscellaneous Settings details
> See also: Viewing Miscellaneous Settings

Related references
> See also: System BIOS

Viewing Miscellaneous Settings

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

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

   ```
   F2 = System Setup
   ```

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

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

Related tasks
> See also: Miscellaneous Settings details

Related references
> See also: Miscellaneous Settings

Miscellaneous Settings details

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

Option

Description

System Time

Enables you to set the time on the system.

System Date

Enables you to set the date on the system.

Asset Tag

Specifies the asset tag and enables you to modify it for security and tracking purposes.

Keyboard NumLock

Enables you to set whether the system boots with the NumLock enabled or disabled. This option is set to **On** by default.

> **i** 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**.

> **i** 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 change(s) 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 tasks
    See also: Viewing Miscellaneous Settings
Related references
    See also: Miscellaneous Settings

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.

> **i** 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
    See also: Device Settings

Related tasks
    See also: Entering the iDRAC Settings utility
    See also: Changing the thermal settings
Related references
    See also: System BIOS

Entering the iDRAC Settings utility

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
    See also: iDRAC Settings utility

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
    See also: iDRAC Settings utility

Device Settings

Device Settings enables you to configure device parameters.
Related references
    See also: System BIOS

Dell Lifecycle Controller

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

Embedded system management

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

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

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

Related references
    See also: Dell Lifecycle Controller

Boot Manager

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

Related tasks
    See also: Viewing Boot Manager
Related references
    See also: Boot Manager main menu
    See also: System BIOS

Viewing Boot Manager

To enter **Boot Manager**:
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
    See also: Boot Manager
    See also: Boot Manager main menu

Boot Manager main menu

Menu item

Description

Continue Normal Boot

The system attempts to boot to devices starting with the first item in the boot order. If the boot attempt fails, the system continues with the next item in the boot order until the boot is successful or no more boot options are found.

One-shot Boot Menu

Enables you to access boot menu, where you can select a one-time boot device to boot from.

Launch System Setup

Enables you to access System Setup.

Launch Lifecycle Controller

Exits the Boot Manager and invokes the Dell Lifecycle Controller program.

System Utilities

Enables you to launch System Utilities menu such as System Diagnostics and UEFI shell.

Related tasks
> See also: Viewing Boot Manager

Related references
> See also: Boot Manager

One-shot BIOS boot menu

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

Related references
> See also: Boot Manager

System Utilities

System Utilities contains the following utilities that can be launched:

- Launch Diagnostics

- BIOS Update File Explorer

- Reboot System

Related references
> See also: Boot Manager

PXE boot

The Preboot Execution Environment (PXE) is an industry standard client or interface that allows networked computers that are not yet loaded with an operating system to be configured and booted remotely by an administrator.

Installing and removing system components

Safety instructions

i | 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.**

i | NOTE: Dell recommends that you always use a static mat and static strap while working on components inside the system.

i | 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

Follow the safety guidelines listed in the Safety instructions section.

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

   For more information, see the Rack Installation placemat at **Dell.com/poweredgemanuals**.

5. Remove the system cover.

Related tasks
   See also: Removing the optional front bezel
   See also: Removing the system cover

After working inside your system

Follow the safety guidelines listed in the Safety instructions section.

1. Install the system cover.
2. If applicable, install the system into the rack.

   For more information, see the Rack Installation placemat at **Dell.com/poweredgemanuals**.

3. If removed, install the optional front bezel.
4. Reconnect the peripherals and connect the system to the electrical outlet.
5. Turn on the system, including any attached peripherals.

Related tasks
    See also: Installing the system cover
    See also: Installing the optional front bezel

Recommended tools

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

- Key to the bezel lock.

    This is needed only if your system includes a bezel.

- Phillips #2 screwdriver

- Wrist grounding strap

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

- AMP 90871-1 hand-crimping tool or equivalent

- Tyco Electronics 58433-3 or equivalent

- Wire-stripper pliers to remove insulation from size 10 AWG solid or stranded, insulated copper wire

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

Front bezel (optional)

The front bezel is attached to the front side of the server and prevents accidents while removing the hard drive or when pressing the reset or power button. The front bezel can also be locked for additional security.

Removing the optional front bezel

Follow the safety guidelines listed in the Safety instructions section.

1. Locate and remove the bezel key.

> **i** NOTE: The bezel key is attached to the back of the bezel.

2. Unlock the bezel by using the key.
3. Slide the release latch up and pull the left end of the bezel.
4. Unhook the right end, and remove the bezel.

Figure 9. Removing the optional front bezel
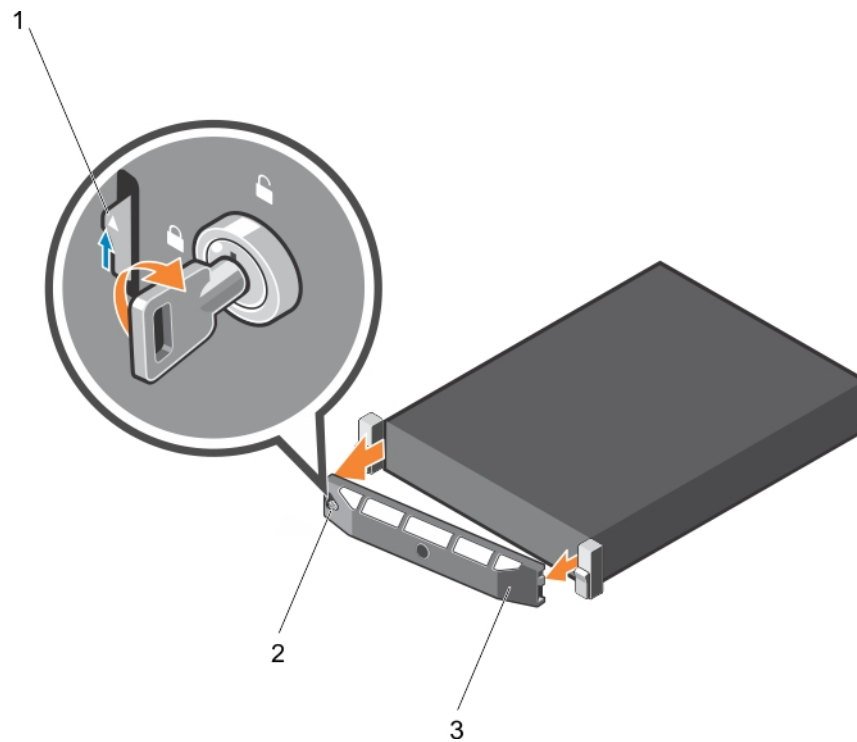
a. release latch
b. bezel lock
c. front bezel

Figure 10. Removing the optional Quick Sync front bezel
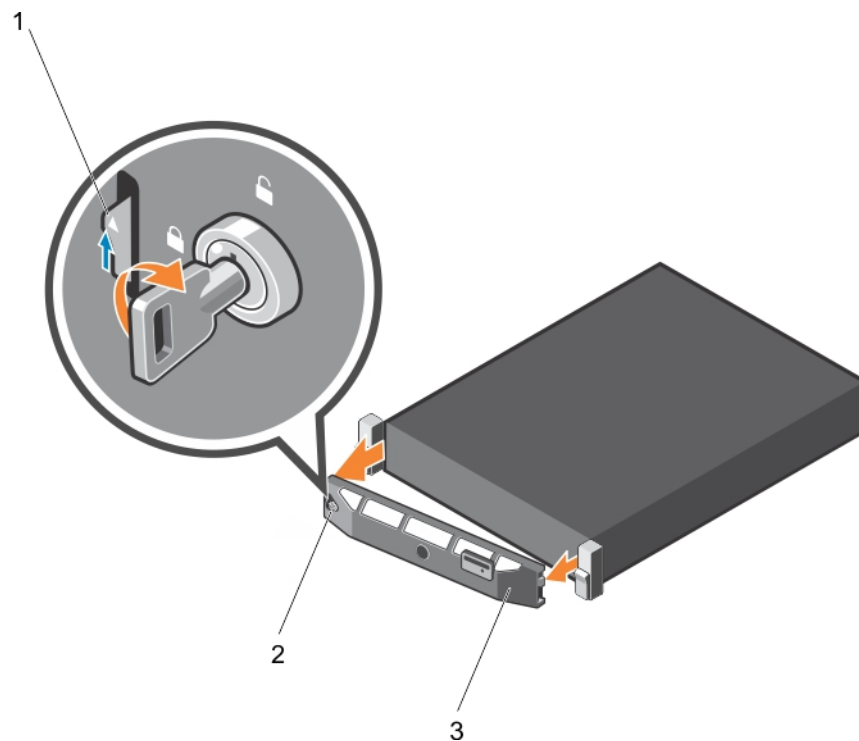
a. release latch
b. bezel lock
c. Quick Sync bezel

Installing the optional front bezel

Follow the safety guidelines listed in the Safety instructions section.

1. Locate and remove the bezel key.

   ℹ **NOTE:** The bezel key is attached to the back of the bezel.

2. Hook the right end of the bezel onto the chassis.
3. Fit the free end of the bezel onto the system.
4. Lock the bezel by using the key.

System cover

The system cover protects the components inside the system and helps in maintaining air flow inside the system. Removing the system cover actuates the intrusion switch which aids in maintaining system security.

Removing the system cover

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 disconnect the peripherals.

4. If installed, remove the optional bezel. For more information, see the Removing the optional front bezel section.

1. Rotate the latch release lock counter clockwise to the unlocked position.

2. Lift the latch toward the back of the system.

   The system cover slides back and the tabs on the system cover disengage from the slots on the chassis.

   ℹ NOTE: The position of the latch may vary depending on the configuration of your system.

3. Hold the cover on both sides, and lift the cover away from the system.

   Figure 11. Removing the system cover
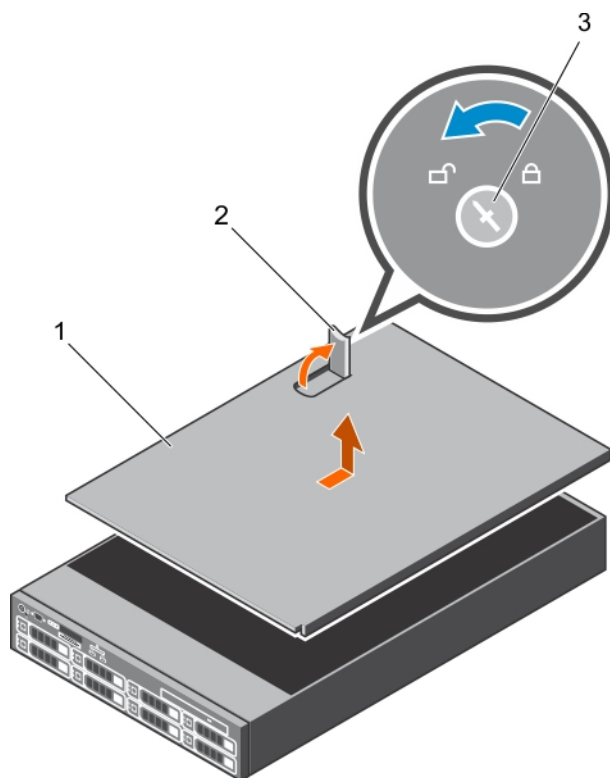
   a. system cover
   b. latch
   c. latch release lock

1. Install the system cover.

Related tasks
   See also: Removing the optional front bezel
   See also: Installing the system cover
Related references
   See also: Safety instructions

Installing the system cover

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

2. Ensure that all internal cables are connected and placed out of the way and no tools or extra parts are left inside the system.

1. Align the slots on the system cover with the tabs on the chassis.

2. Push the system cover latch down to move the system cover into the closed position.

   The system cover slides forward and the slots on the system cover engage with the tabs on the chassis. The system cover latch locks into place when the system cover is completely engaged with the tabs on the chassis.

3. Rotate the latch release lock clockwise to the locked position.

1. If removed, install the front bezel.

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

3. Turn on the system, including any attached peripherals.

Related tasks
    See also: Installing the optional front bezel
Related references
    See also: Safety instructions

Cooling shroud

The cooling shroud has aerodynamically placed openings that direct 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

> **!** **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 operate your system with the cooling shroud removed. The system may get overheated quickly, resulting in shutdown of the system and loss of data.**

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

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

3. If installed, remove the full-length PCIe card.

1. Holding the touch points, lift the cooling shroud away from the system.

   Figure 12. Removing the cooling shroud

a. cooling shroud

b. touch point (2)

1. Install the cooling shroud.

2. If required, install the full-length PCIe card.

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

Related tasks

See also: Before working inside your system
See also: Removing an expansion card from expansion card riser 2 or 3
See also: Installing the cooling shroud
See also: After working inside your system

Related references

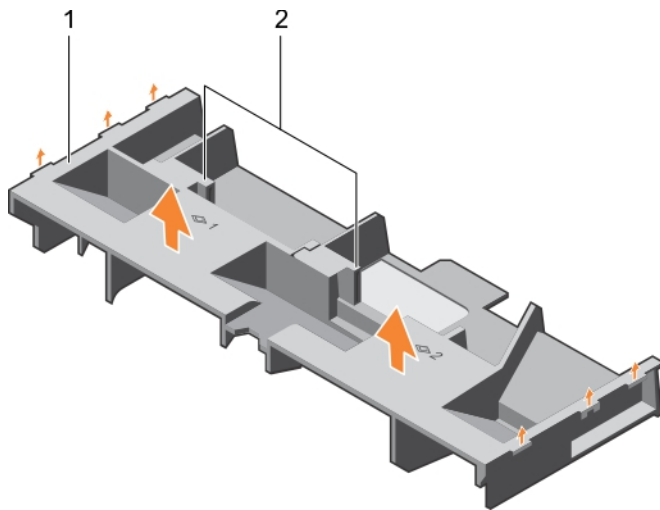See also: Safety instructions

Installing the cooling shroud

> ! **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, route the cables inside the system along the chassis wall and secure the cables by using the cable-securing bracket.

1. Align the tabs on the cooling shroud with the securing slots on the chassis.

2. Lower the cooling shroud into the chassis until it is firmly seated.

1. If removed, install the full-length PCIe card.

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

Related tasks

See also: Before working inside your system
See also: Installing an expansion card into the expansion card riser 2 or 3
See also: Installing an expansion card into the expansion card riser 1
See also: After working inside your system

Related references

See also: Safety instructions

Cooling fans

Your system supports six hot-swappable cooling fans.

i NOTE: In the event of a problem with a particular fan, the fan number is referenced by the system management software, allowing you to easily identify and replace the proper fan by noting the fan numbers on the cooling fan assembly.

Removing a cooling fan

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

! 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 cooling fans are hot-swappable. To maintain proper cooling while the system is on, replace only one fan at a time.**

i NOTE: The procedure for removing each fan is identical.

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

Figure 13. Removing a cooling fan
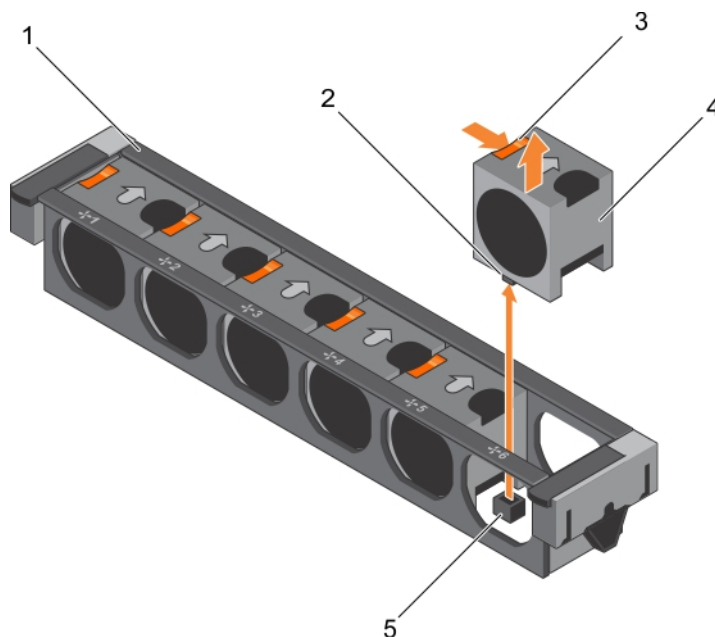
 a. cooling fan assembly
 b. cooling fan connector (6)
 c. fan release tab (6)
 d. cooling fan (6)

     e.   cooling fan connector on the system board (6)

1. Install the cooling fan.
2. Follow the procedure listed in the After working inside your system section.

Related tasks
> See also: Before working inside your system
> See also: Installing a cooling fan
> See also: After working inside your system

Related references
> See also: Safety instructions

Installing a cooling fan

> ⚠ **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.

> ℹ **NOTE:** The procedure for installing each fan is identical.

1. Align the connector at the base of the cooling fan with the connector on the system board.
2. Slide the cooling fan into the securing slot until the tab locks into place.

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

Related tasks
> See also: Before working inside your system
> See also: After working inside your system

Related references
> See also: Safety instructions

Cooling-fan assembly

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

Removing the cooling fan assembly

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

> ⚠ **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. Unlock the cooling fan assembly from the chassis by lifting the release levers.
2. Lift the cooling fan assembly out of the chassis.

Figure 14. Removing the cooling fan assembly
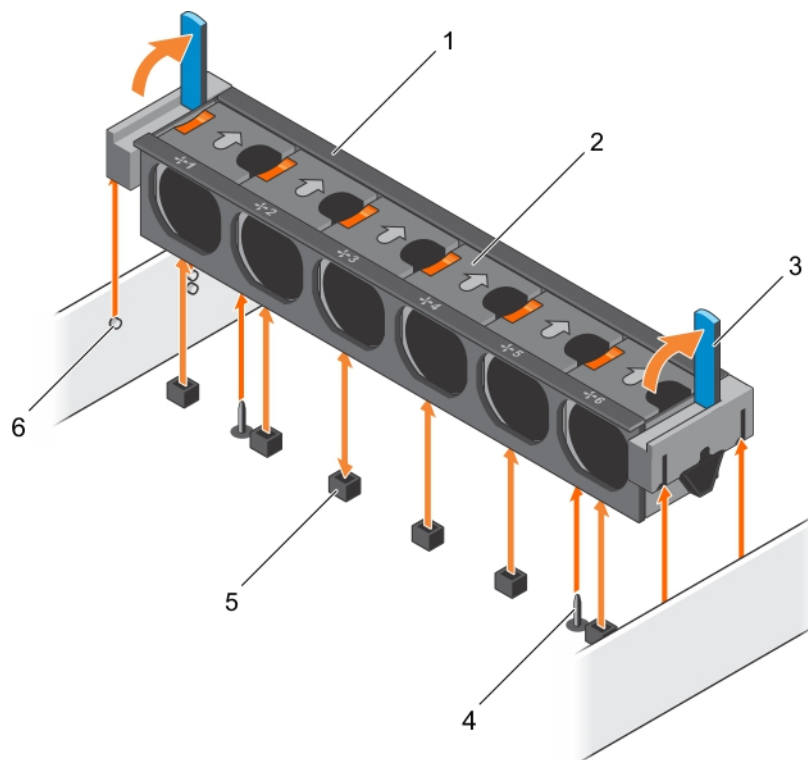
a. cooling fan assembly
b. cooling fan (6)
c. release lever (2)
d. guide pin on the system board (2)
e. cooling fan connector (6)
f. guide pin on the chassis (6)

1. Install the cooling fan assembly.
2. Follow the procedure listed in the After working inside your system section.

Related tasks
See also: Before working inside your system
See also: Installing the cooling fan assembly
See also: After working inside your system

Related references
See also: Safety instructions

Installing the cooling fan assembly

> ⚠ **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 Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.

> ⚠ **CAUTION: Ensure that the cables are correctly installed and retained by the cable retention bracket before installing the cooling fan assembly. Incorrectly installed cables may get damaged.**

1. Align the slots on the cooling fan assembly with the guide pins on the chassis.
2. Slide the cooling fan assembly into the chassis.
3. Lock the cooling fan assembly into the chassis by lowering the release levers until firmly seated.

Figure 15. Installing the cooling fan assembly
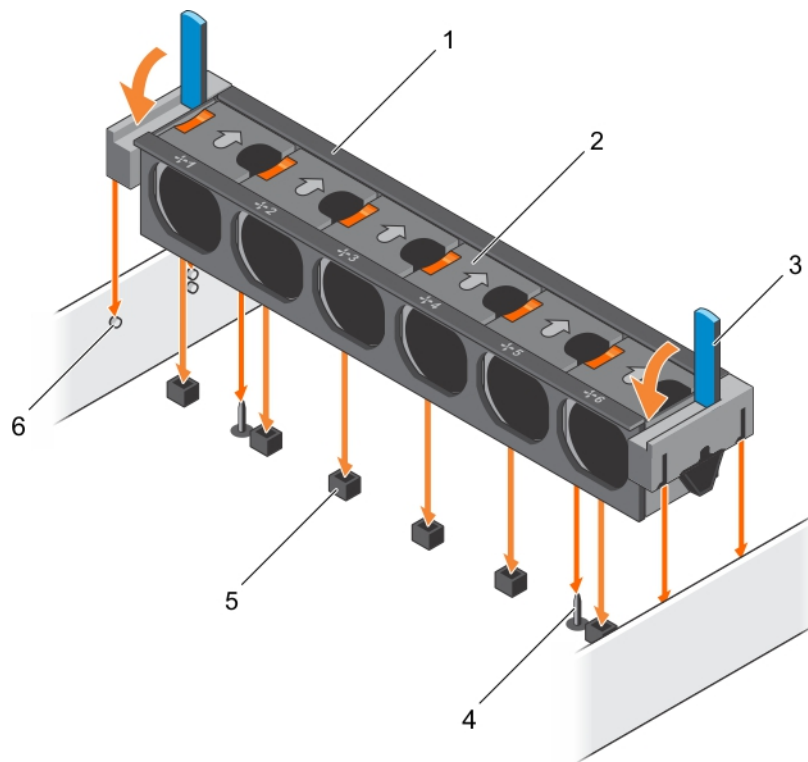
a. cooling fan assembly
b. cooling fan (6)
c. release lever (2)
d. guide pin on the system board (2)
e. cooling fan connector (6)
f. guide pin on the chassis (6)

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

Related tasks
    See also: Before working inside your system
    See also: After working inside your system
Related references
    See also: Safety instructions

System memory

Your system supports DDR4 registered DIMMs (RDIMMs). System memory holds the instructions that are executed by the processor.

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

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

- DIMM type (RDIMM)
- DIMM type (RDIMM or LRDIMM)
- 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 24 memory sockets split into two sets of 12 sockets, one set per processor. Each 12-socket set is organized into four channels. In each channel, the release tabs of the first socket are marked white, the second socket black, and the third socket green.

Figure 16. Memory socket locations
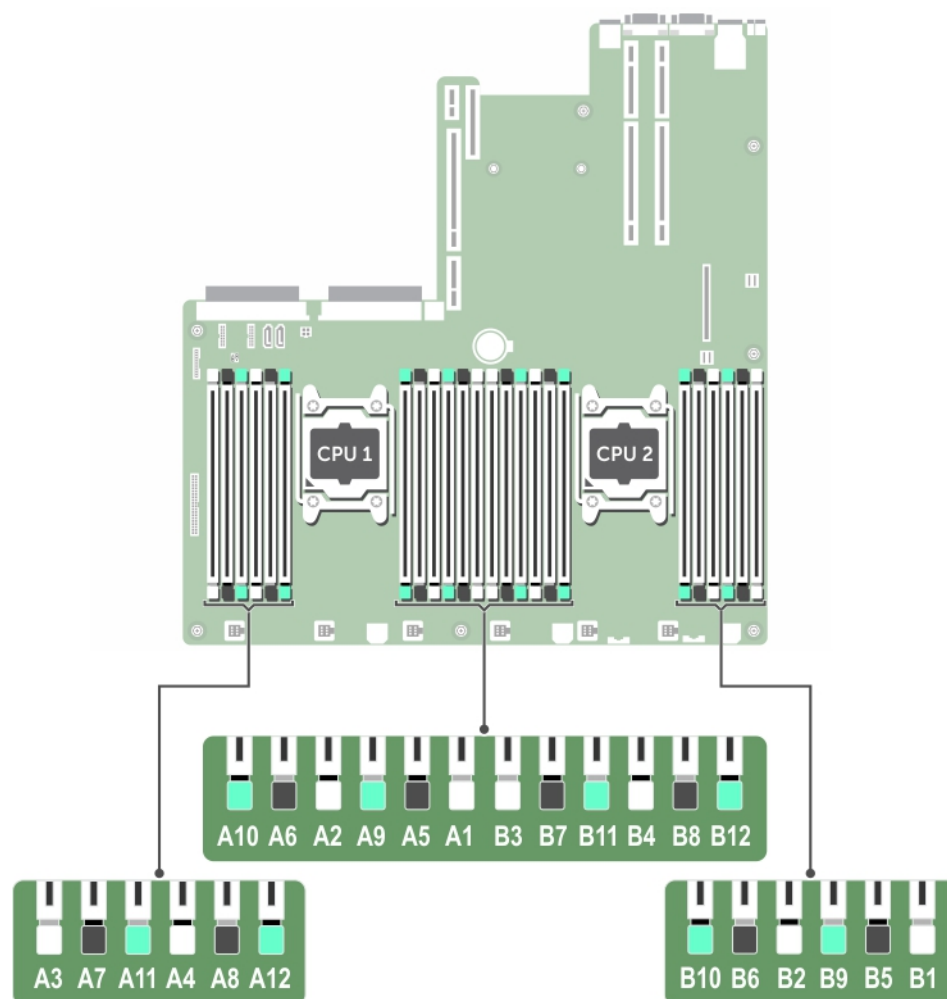
Memory channels are organized as follows:

Table 29. Memory channels

This tables describes memory channels and how the channels are organized.

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

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

Table 30. Memory population

This table describes the memory population and the operating frequencies.

DIMM Type	DIMMs Populated/ Channel	Voltage	Operating Frequency (in MT/s)	Maximum DIMM Rank/ Channel
RDIMM	1	1.2 V	2133, 1866, 1600, 1333	Dual rank or single rank
	2		2133, 1866, 1600, 1333	Dual rank or single rank
	3		1866, 1600, 1333	Dual rank or single rank

General memory module installation guidelines

ℹ️ NOTE: Memory configurations that fail to observe these guidelines can prevent your system from booting, stop responding during memory configuration, or operating with reduced memory.

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

- x4 and x8 DRAM based memory modules can be mixed. For more information, see the Mode-specific guidelines section.

- Up to three dual- or single-rank RDIMMs can be populated per channel.

- If memory modules with different speeds are installed, they will operate at the speed of the slowest installed memory module(s) or slower depending on system DIMM configuration.

- Populate memory module sockets only if a processor is installed. For single-processor systems, sockets A1 to A12 are available. For dual-processor systems, sockets A1 to A12 and sockets B1 to B12 are available.

- Populate all the sockets with white release tabs first, followed by the black release tabs, and then the green release tabs.

- 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 memory modules, populate 8 GB

memory modules in the sockets with white release tabs and 4 GB memory modules in the sockets with black release tabs.

- In a dual-processor configuration, the memory configuration for each processor should be identical. For example, if you populate socket A1 for processor 1, then populate socket B1 for processor 2, and so on.

- Memory modules of different capacities can be mixed provided other memory population rules are followed (for example, 4 GB and 8 GB memory modules can be mixed).

- Mixing of more than two memory module capacities in a system is not supported.

- Populate four memory modules per processor (one DIMM per channel) at a time to maximize performance.

Mode-specific guidelines

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

Advanced Error Correction Code (lockstep)

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.

Memory mirroring

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

The installation guidelines for memory modules are as follows:

- Memory modules must be identical in size, speed, and technology.

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

Table 31. Processor configuration

This table describes the memory population and its configuration

Processor	Configuration	Memory population rules	Memory population information
Single CPU	Memory population order	{1,2}, {3,4}	See Memory mirroring note

Sample memory configurations

The following table shows sample memory configurations for two processor configuration that follows the appropriate memory guidelines.

i | NOTE: 1R and 2R in the following table indicates single and dual ranks DIMMs respectively.

Table 32. Sample Memory configurations

This section describes the memory configurations for a two processors.

System capacity (in GB)	DIMM size (in GB)	Number of DIMMs	DIMM rank, organization, and frequency	DIMM slot population
128	8	16	1R, x8, 2400 MT/s 1R, x8, 2133 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 2R, x8, 2133 MT/s	A1, A2, A3, A4, B1, B2, B3, B4

Removing memory modules

! | **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.
4. If installed, remove the cooling fan assembly. For more information, see the Removing the cooling fan assembly section.

> **i** 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.**

1. Locate the appropriate memory module socket.

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

2. 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 17. Removing the memory module

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

1. Install the memory module.

> **i** NOTE: If you are removing the memory module permanently, install a memory module blank.

2. Install the cooling shroud.
3. Follow the procedure listed in the After working inside your system section.

Related tasks

See also: Before working inside your system
See also: Removing the cooling shroud
See also: Removing the cooling fan assembly

See also: After working inside your system
Related references
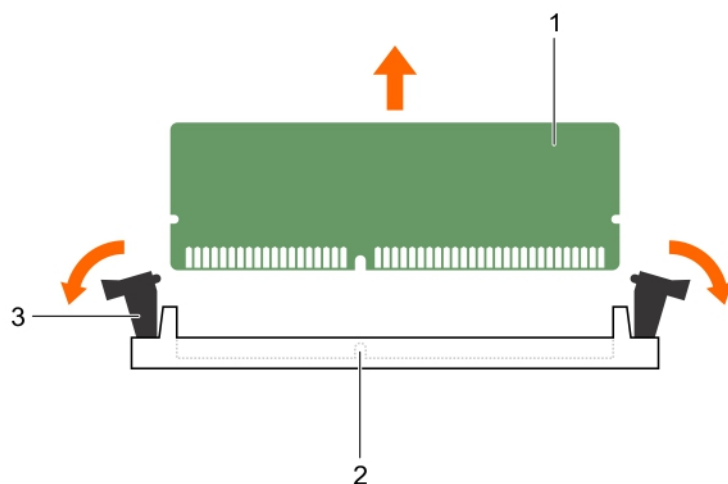   See also: Safety instructions

Installing memory modules

i 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: **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. Removing the cooling fan assembly.
1. Locate the appropriate memory module socket.

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

2. 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.**

   i 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 18. Installing the memory module
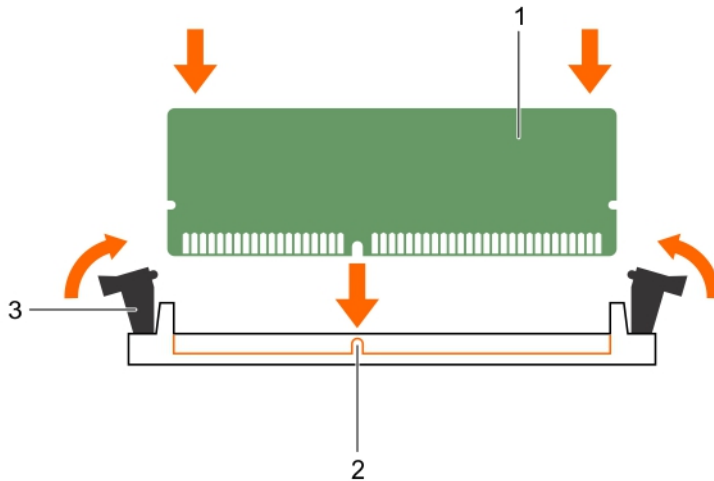
- a. memory module
- b. alignment key
- c. memory module socket ejector (2)

1. Follow the procedure listed in the After working inside your system section.
2. Press F2 to enter System Setup, and check the **System Memory** setting.

   The system should have already changed the value to reflect the installed memory.
3. If the value is incorrect, one or more of the memory modules may not be installed properly. Ensure that the memory module is firmly seated in the memory module socket.
4. Run the system memory test in system diagnostics.

Related tasks

See also: Before working inside your system
See also: Removing the cooling shroud
See also: Removing the cooling fan assembly
See also: After working inside your system

Related references

See also: Safety instructions

Processors and heat sinks

Use the following procedure when:

- Removing and installing a heat sink

- Installing an additional processor

- Replacing a processor

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

Removing a heat sink

⚠ **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.**

■ **WARNING: The heat sink will be hot to touch. Allow the heat sink to cool for some time after powering down the system.**

1. Follow the safety guidelines listed in the Safety instructions section.
2. Keep the Phillips #2 screwdriver ready.
3. Follow the procedure listed in the Before working inside your system section.
4. If installed, remove the full-length PCIe card(s).
5. Remove the cooling shroud.

1. 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.

2. Remove the screw diagonally opposite the screw you first removed.
3. Repeat the procedure for the remaining two screws.
4. Remove the heat sink.

Figure 19. Removing a heat sink
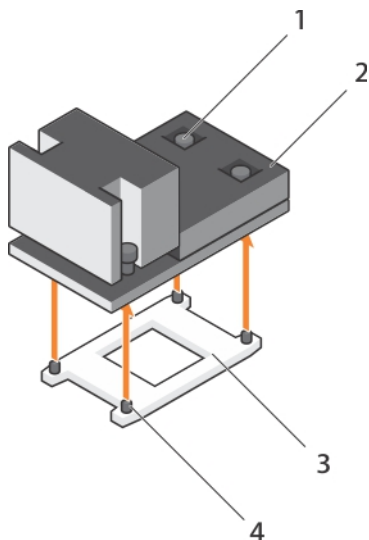
a. retention screw (4)
b. heat sink
c. processor shield
d. retention screw slot (4)

1. Replace the heat sink(s) and processor(s).
2. Follow the procedure listed in the After working inside your system section.

Related tasks

See also: Before working inside your system
See also: Removing an expansion card from expansion card riser 2 or 3
See also: Removing the cooling shroud
See also: Removing a processor
See also: Installing a processor
See also: Installing a heat sink
See also: Installing the cooling shroud

Related references

Removing a processor

! **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.**

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

i NOTE: If you are upgrading your system, 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.

i NOTE: You can update the system BIOS by using the Dell Lifecycle Controller.

i 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. Keep the Phillips #2 screwdriver ready.
4. If installed, remove the full-length PCIe card(s).
5. Remove the cooling shroud.
6. Remove the heat sink.

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

1. Release the open first socket lever near the unlock icon 🔓 by pushing the lever down and out from under the tab.

2. Release the close first socket release lever near the lock icon 🔒 by pushing the lever down and out from under the tab. Lift the lever 90 degrees upward.

3. Lower the open first socket-release lever to lift the processor shield.

4. Hold the tab on the processor shield and lift the processor shield until the open first socket-release lever lifts up.

   ! **CAUTION: The socket pins are fragile and can be permanently damaged. Be careful not to bend the pins in the socket when removing the processor out of the socket.**

5. Lift the processor out of the socket and leave the open first socket-release lever up.

   i NOTE: If you are permanently removing the processor, you must install a socket protective cap in the vacant socket to protect the socket pins and keep the socket free of dust.

   i NOTE: After removing the processor, place it in an anti-static container for reuse, return, or temporary storage. Do not touch the bottom of the processor. Touch only the side edges of the processor.

Figure 20. Processor shield
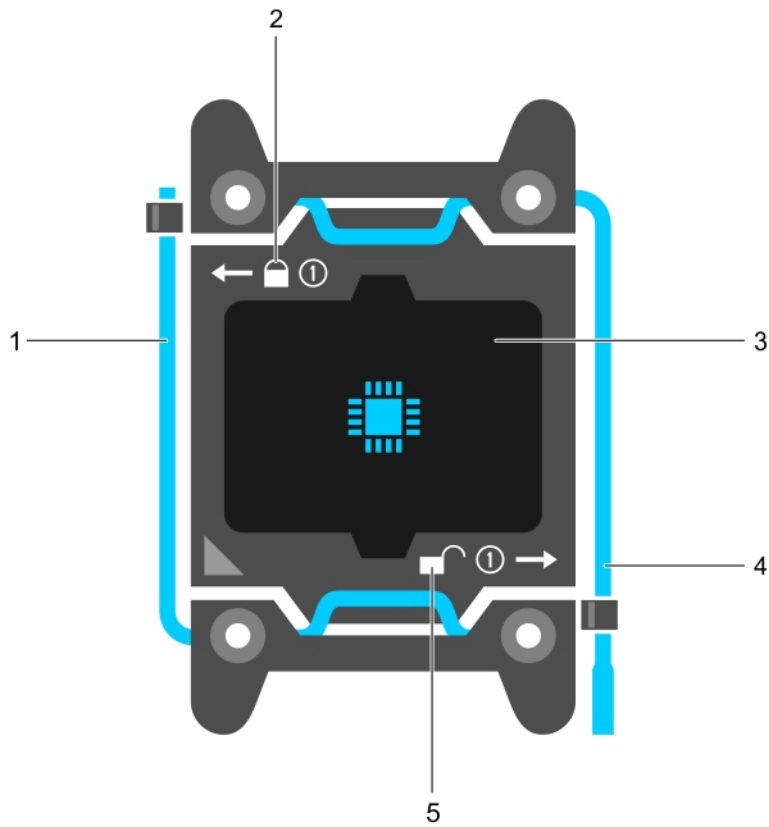
a.   close first socket release lever
b.   lock icon
c.   processor
d.   open first socket release lever
e.   unlock icon

Figure 21. Removing a processor
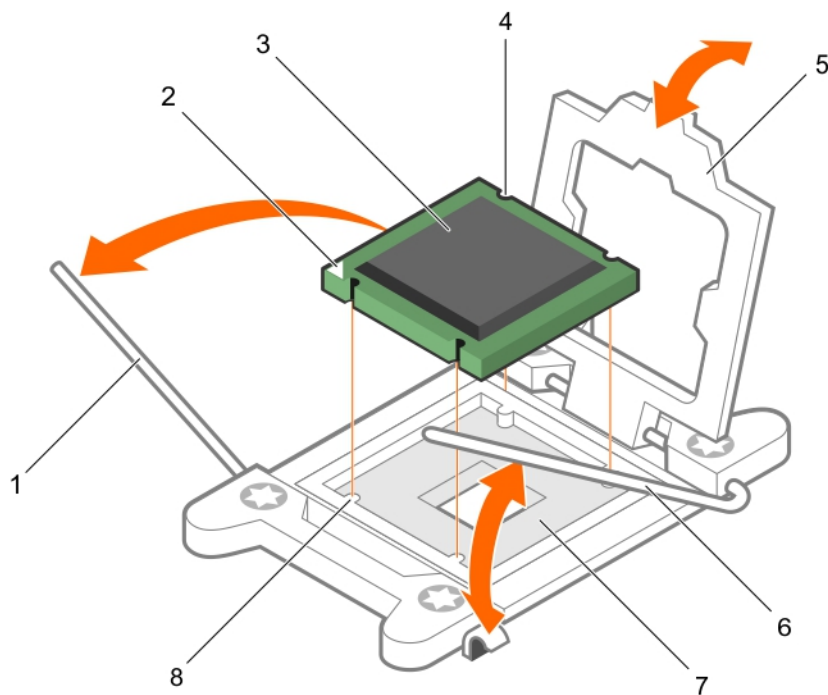
a.   close first socket-release lever

b.   pin-1 indicator of processor

c.   processor

d.   slot (4)

e.   processor shield

f.   open first socket-release lever

g.   socket

h.   socket keys (4)

1.   Replace the processor(s).

2.   Install the heat sink.

3.   Reinstall the cooling shroud.

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

Related tasks

See also: Before working inside your system
See also: Removing an expansion card from expansion card riser 2 or 3
See also: Removing the cooling shroud
See also: Removing a heat sink
See also: Installing a processor
See also: Installing a heat sink
See also: Installing the cooling shroud
See also: Installing an expansion card into the expansion card riser 2 or 3
See also: After working inside your system

Related references

See also: Safety instructions

Installing a processor

> ⚠ **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. If you are upgrading your system, 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.

   > ℹ **NOTE:** You can also update the system BIOS by using the Dell Lifecycle Controller.

5. Remove the cooling shroud.

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

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

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

> ⚠ **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.**

> ℹ **NOTE:** If you are installing a single processor, it must be installed in socket CPU1.

1. Unpack the new processor.

   > ℹ **NOTE:** If the processor has previously been used in a system, remove any remaining thermal grease from the processor by using a lint-free cloth.

2. Locate the processor socket.
3. If applicable, remove the socket protective cap.
4. Release the open first socket-release lever near the unlock icon 🔓 by pushing the lever down and out from under the tab.
5. Similarly, release the close first socket-release lever near the lock icon 🔒 by pushing the lever down and out from under the tab. Lift the lever 90 degrees upward.
6. Hold the tab near the lock symbol on the processor shield and lift it up and out of the way.

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

   > ⚠ **CAUTION: While removing or reinstalling the processor, wipe your hands of any contaminants. Contaminants on the processor pins such as thermal grease or oil can damage the processor.**

7. Align the processor with the socket keys.

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

8. Align the pin-1 indicator of the processor with the triangle on the system board.
9. Place the processor on the socket such that the slots on the processor align with the socket keys.
10. Close the processor shield.
11. Lower the close first socket-release lever near the lock icon 🔒 and push it under the tab to lock it.
12. Similarly, lower the open first socket-release lever near the unlock icon 🔓 and push it under the tab to lock it.

Figure 22. Installing a processor
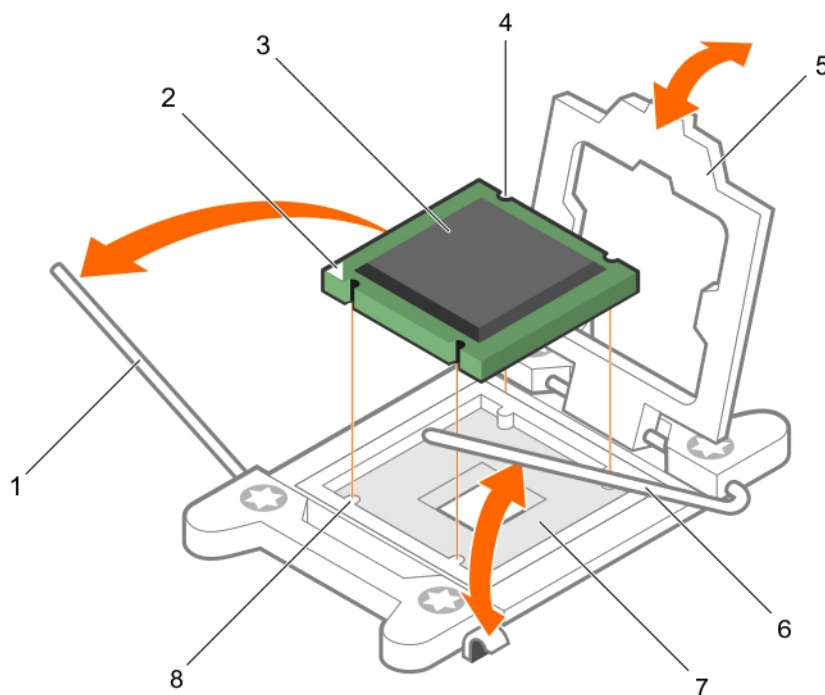
a. socket-release lever 1
b. pin–1 corner of the processor
c. processor
d. slot (4)
e. processor shield
f. socket-release lever 2
g. processor socket
h. tab (4)

> **ⓘ 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. If removed, reinstall the PCIe expansion card riser.
3. If disconnected, reconnect the cables to the expansion card(s).

4. While booting, press F2 to enter System Setup and verify that the processor information matches the new system configuration.

5. Run the system diagnostics to verify that the new processor operates correctly.

Related tasks

See also: Before working inside your system
See also: Removing an expansion card from expansion card riser 2 or 3
See also: Removing an expansion card from the expansion card riser 1
See also: Removing the cooling shroud
See also: Removing a heat sink
See also: Installing a heat sink
See also: Installing the cooling shroud
See also: Installing an expansion card into the expansion card riser 2 or 3
See also: Installing an expansion card into the expansion card riser 1
See also: After working inside your system

Related references

See also: Safety instructions

Installing a heat sink

> **!** **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. Install the processor.

> **i** NOTE: If you are installing a single processor, it must be installed in socket CPU1.

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. Use the thermal grease syringe included with your processor kit to apply the grease in a thin spiral on the top of the processor.

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

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

Figure 23. Applying thermal grease on the top of the processor
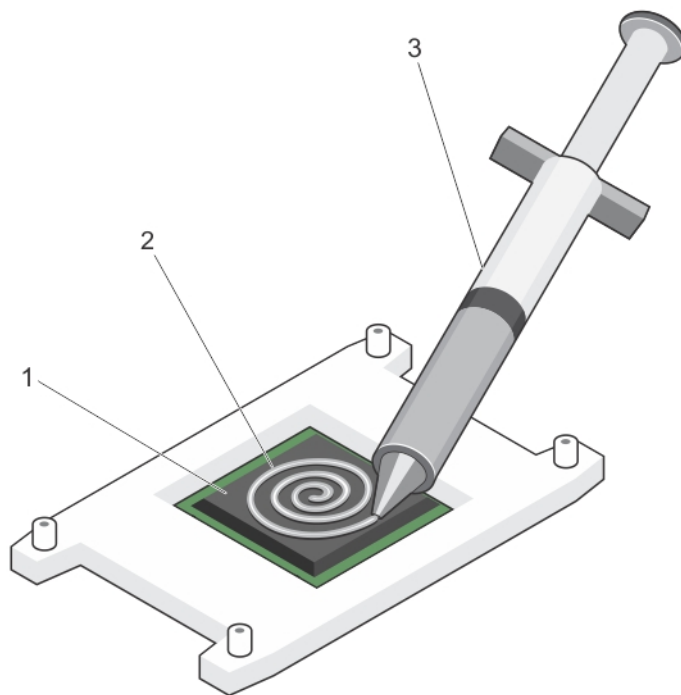
     a.   processor

     b.   thermal grease

     c.   thermal grease syringe

3.   Place the heat sink onto the processor.

4.   Tighten one of the four screws to secure the heat sink to the system board.

5.   Tighten the screw diagonally opposite to the first screw you have tightened.

> **i**   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, and stop after the screw is seated. The screw tension should not be more than 6 in-lb (6.9 kg-cm).

6.   Repeat the procedure for the remaining two screws.

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

2.   While booting, press F2 to enter System Setup and verify that the processor information matches the new system configuration.

3.   Run the system diagnostics to verify that the new processor operates correctly.

PCIe card holder

The PCIe card holder can be extended to support a full length PCIe card. This will prevent any damage to the card that may occur due to its length.

Removing the PCIe card holder

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 installed, remove the full-length PCIe card.

⚠ **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: Do not use your system without the PCIe card holder installed. The PCIe card holder is necessary to ensure proper system cooling.**

1. Press the release tab and slide the card holder toward the back of the chassis to release the PCIe card holder from the chassis.
2. Lift the PCIe card holder out of the chassis.

ℹ NOTE: To ensure proper system cooling, you must replace the PCIe card holder.

Figure 24. Removing the PCIe card holder

a. PCIe card holder
b. release tab

1. Replace the PCIe card holder.
2. If removed, install the full-length PCIe card.
3. Follow the procedure listed in the After working inside your system section.

Related tasks
See also: Before working inside your system
See also: Removing an expansion card from expansion card riser 2 or 3
See also: Installing the PCIe card holder
See also: Installing an expansion card into the expansion card riser 2 or 3
See also: After working inside your system

Related references
See also: Safety instructions

Installing the PCIe card holder

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

⚠ **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: Do not use your system without the PCIe card holder installed. The PCIe card holder is necessary to ensure proper system cooling.**

1. Align the PCIe card holder with the notches and tabs on the power supply unit cage.
2. Press the release tab and slide the PCIe card holder toward the front of the chassis until firmly seated.

Figure 25. Installing the PCIe card holder

   a.   PCIe card holder

   b.   release tab

1. If applicable, replace the full-length PCIe card.
2. Follow the procedure listed in the After working inside your system section.

Related tasks

    See also: Before working inside your system
    See also: Installing an expansion card into the expansion card riser 2 or 3
    See also: After working inside your system

Related references

    See also: Safety instructions

Opening and closing the PCIe card holder latch

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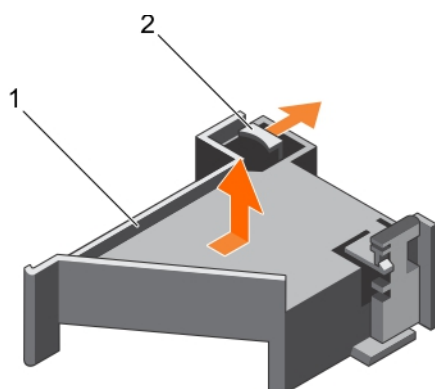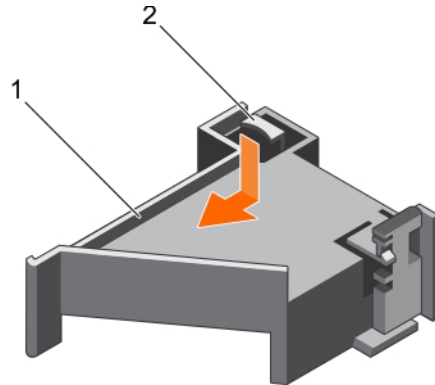2. Follow the procedure listed in the Before working inside your system section.

> ⚠ **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. To open the PCIe card holder latch, press the release tab.
2. To close the PCIe card holder latch, rotate the latch clockwise until it locks.

> ℹ **NOTE:** Before installing a full-length PCIe card, the PCIe card holder latch must be closed. When the full-length PCIe card is installed, open the PCIe card holder latch. Before removing the full-length PCIe card, you must close the PCIe card holder latch.

Figure 26. Opening the PCIe card holder latch
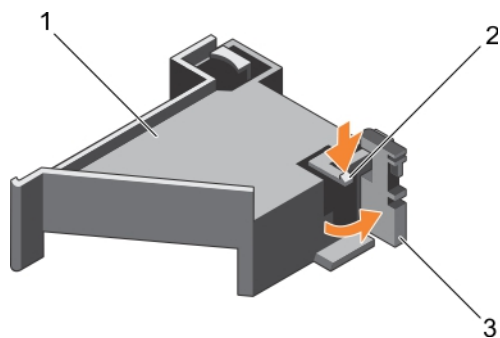
a. PCIe card holder

b. release tab

c. PCIe card holder latch

Figure 27. Closing the PCIe card holder latch
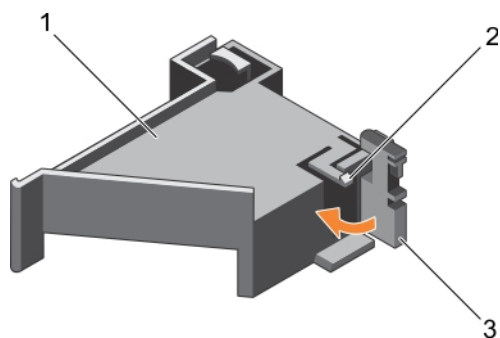
a. PCIe card holder

b. release tab

c. PCIe card holder latch

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

Cable retention bracket

Cable retention bracket provides support to the installed cables. The cable retention bracket also helps to prevent the cables from moving out of place, which may result in loose connections and reduced air flow inside the server.

Removing the cable retention bracket

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 installed, remove the cooling shroud.
4. Remove the PCIe card holder.
5. Remove all cables routed through the cable retention bracket.

> **⚠ 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. Pull the tab to release it from the notch and slide the cable retention bracket toward the front of the chassis to release it from the chassis.
2. Lift the cable retention bracket out of the chassis.

Figure 28. Removing the cable retention bracket
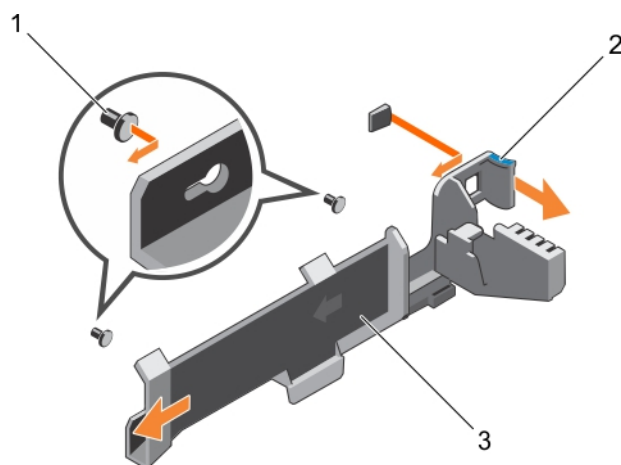
a. alignment pin (2)
b. tab
c. cable retention bracket

1. Install the cable retention bracket and reconnect all cables routed through the cable retention bracket.
2. If removed, install the PCIe card holder.
3. If removed, install the cooling shroud.
4. Follow the procedure listed in the After working inside your system section.

Related tasks
See also: Before working inside your system
See also: Removing the cooling shroud
See also: Removing the PCIe card holder
See also: Installing the cable retention bracket
See also: Installing the cooling shroud
See also: Installing the PCIe card holder
See also: After working inside your system
Related references
See also: Safety instructions

Installing the cable retention bracket

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 installed, remove the cooling shroud.
4. Remove the PCIe card holder.

> ⚠ **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. Align the cable retention bracket with the alignment pins on the chassis.
2. Slide the cable retention bracket along the chassis wall until the tab clicks and locks the keyhole slots.
3. Place all cables to be routed in the cable retention bracket.

Figure 29. Installing the cable retention bracket
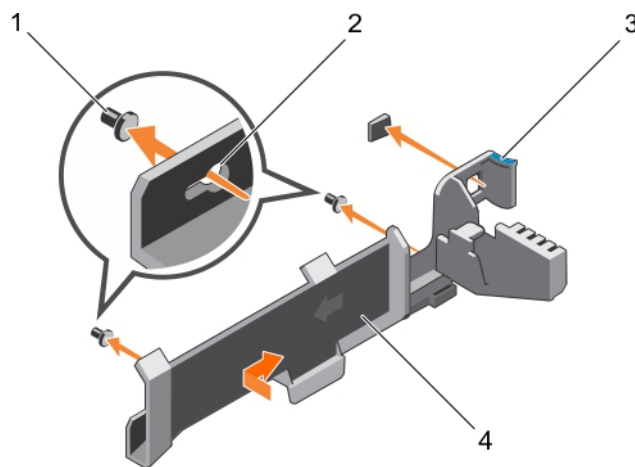
    a. alignment pin (2)
    b. keyhole slot
    c. tab
    d. cable retention bracket

1. Install the PCIe card holder.
2. Install the cooling shroud.
3. Follow the procedure listed in the After working inside your system section.

Related tasks
    See also: Before working inside your system
    See also: Removing the cooling shroud
    See also: Removing the PCIe card holder
    See also: Installing the cooling shroud
    See also: Installing the PCIe card holder
    See also: After working inside your system
Related references
    See also: Safety instructions

Integrated storage controller card

Your system includes a dedicated expansion card slot on the system board for an integrated controller card. The integrated storage controller card provides the integrated storage subsystem for the internal hard drives in your system. The controller supports SAS and SATA hard drives and also enables you to set up the hard drives in RAID configurations. The RAID configurations depend on the version of the storage controller included with your system.

Removing the integrated storage controller card

> **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.
4. Remove the expansion card riser 1.
5. Keep the Phillips #2 screwdriver ready.

1. Loosen the screws that secure the integrated storage controller cable to the integrated storage controller card connector on the system board.
2. Lift the integrated storage controller cable away from the integrated storage controller.
3. Lift one end of the card and angle it to disengage the card from the integrated storage controller card holder on the system board.
4. Lift the card out of the system.

Figure 30. Removing the integrated storage controller card

a. integrated storage controller cable
b. integrated storage controller card
c. integrated storage controller card connector on the system board
d. integrated storage controller card holder

1. Install the expansion card riser 1.
2. Install the cooling shroud.
3. Installing the integrated storage controller card.
4. Follow the procedure listed in the After working inside your system section.

Related tasks

See also: Before working inside your system
See also: Removing the cooling shroud
See also: Removing expansion card risers
See also: Installing expansion card risers
See also: Installing the cooling shroud
See also: After working inside your system

Related references

See also: Safety instructions
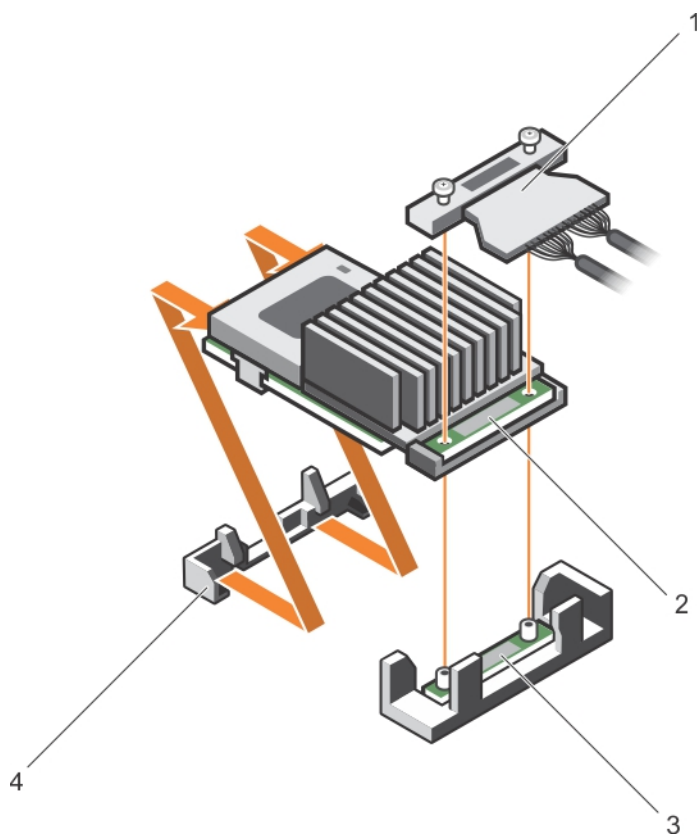
Installing the integrated storage controller card

> ⚠ 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.
4. Remove the expansion card riser 1.
5. Keep the Phillips #2 screwdriver ready.
1. Align the end of the integrated storage controller card with the controller card connector on the system board.
2. Lower the connector side of the integrated storage controller card into the integrated storage controller card connector on the system board.

> ℹ NOTE: Ensure that the tabs on the system board align with the screw holes on the integrated storage controller card.

3. Align the screws on the integrated storage controller card cable with the screw holes on the connector.
4. Tighten the screws to secure the integrated storage controller card cable with the integrated storage controller card connector on the system board.

Figure 31. Installing the integrated storage controller card

a. integrated storage controller cable

b. integrated storage controller card

c. integrated storage controller card connector on the system board

d. integrated storage controller card holder

1. Install the expansion card riser 1.

2. Install the cooling shroud.

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

Related tasks

See also: Before working inside your system
See also: Removing the cooling shroud
See also: Removing expansion card risers
See also: Installing expansion card risers
See also: Installing the cooling shroud
See also: After working inside your system

Related references

See also: Safety instructions
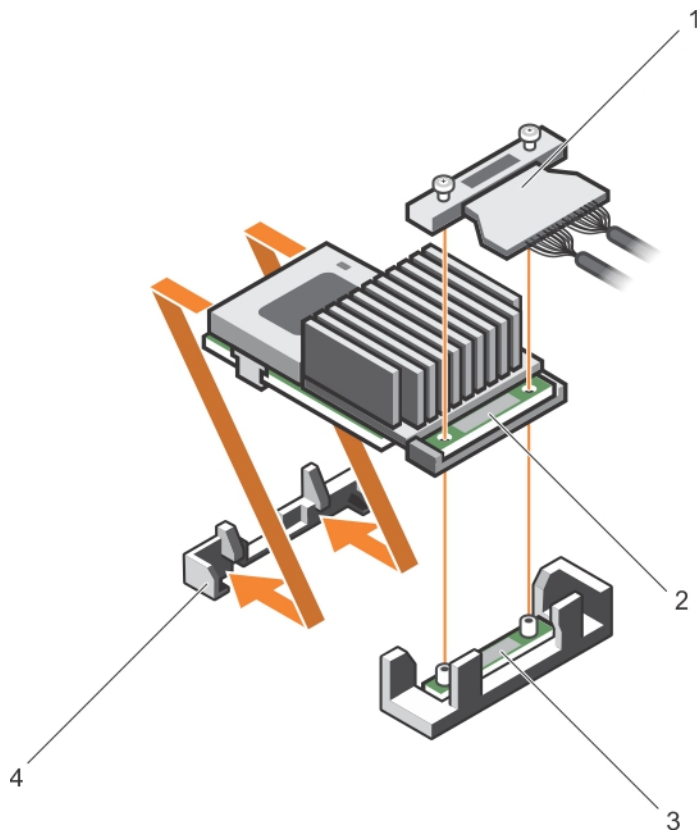
Expansion cards and expansion card riser

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

i NOTE: A System Event Log (SEL) event is logged if an expansion card riser is unsupported or missing. It does not prevent your system from turning on and no BIOS POST message or F1/F2 pause is displayed.

Expansion card installation guidelines

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

Table 33. Supported expansion cards

Item 1 is the PCIe slot 1, on Riser 1 and is connected to Processor 2, it supports a low profile, half length 8x card. The slot width is 16x. Item 2 is the PCIe slot 2, on Riser 1 and is connected to Processor 2, it supports a low profile, half length 8x card. Item 3 is the PCIe slot 3, on Riser 1 and is connected to Processor 2, it supports a low profile, half length 8x card. The slot width is 16x. Item 4 is the PCIe slot 4, on Riser 2 and is connected to Processor 2, it supports a full height, full length 16x card. The slot width is 16x. Item 5 is the PCIe slot 5, on Riser 2 and is connected to Processor 1, it supports a full height, full length 8x card. The slot width is 16x. Item 6 is the PCIe slot 6, on Riser 3 and is connected to Processor 1, it supports a full height, full length 16x card. The slot width is 16x (alternate).

PCIe slot	Riser	Processor connection	Height	Length	Link width	Slot width
1	1	Processor 2	Low Profile	Half Length	x8	x16
2	1	Processor 2	Low Profile	Half Length	x8	x16
3	1	Processor 2	Low Profile	Half Length	x8	x16
4	2	Processor 2	Full Height	Full Length	x16	x16
5	2	Processor 1	Full Height	Full Length	x8	x16
6	3 (alternate)	Processor 1	Full Height	Full Length	x16	x16

> **i** NOTE: To use PCIe slots 1 through 4 on the risers 1 and 2, both the processors must be installed.

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

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

> **i** NOTE: Ensure that the 100 G OPA x16 card is installed in slot 6 (x16 PCIe) on the alternate riser 3.

Removing an expansion card from expansion card riser 2 or 3

> **!** 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: **When removing the NV-RAM card ensure that, after powering down the system gracefully from the GUI or CLI, both green and amber LEDs on the card are off.**

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. When removing a card from riser 3, ensure that the PCIe holder latch is closed.
1. Disconnect any cables connected to the expansion card.
2. Lift the expansion card latch out of the guide slot.
3. Hold the expansion card by its edges, and remove it from the expansion card connector.
4. If you are removing the card permanently, install a metal filler bracket over the empty expansion slot opening and close the expansion card latch.

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

5. Install the expansion card latch into the slot.
6. Close the expansion card locking tabs.

Figure 32. Removing an expansion card from expansion card riser 2 or 3

a. expansion card
b. expansion card latch
c. expansion card riser
d. power connector (for GPU cards)
e. expansion card connector

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

Related tasks

See also: Before working inside your system
See also: Installing an expansion card into the expansion card riser 2 or 3

See also: After working inside your system
Related references
  See also: Safety instructions

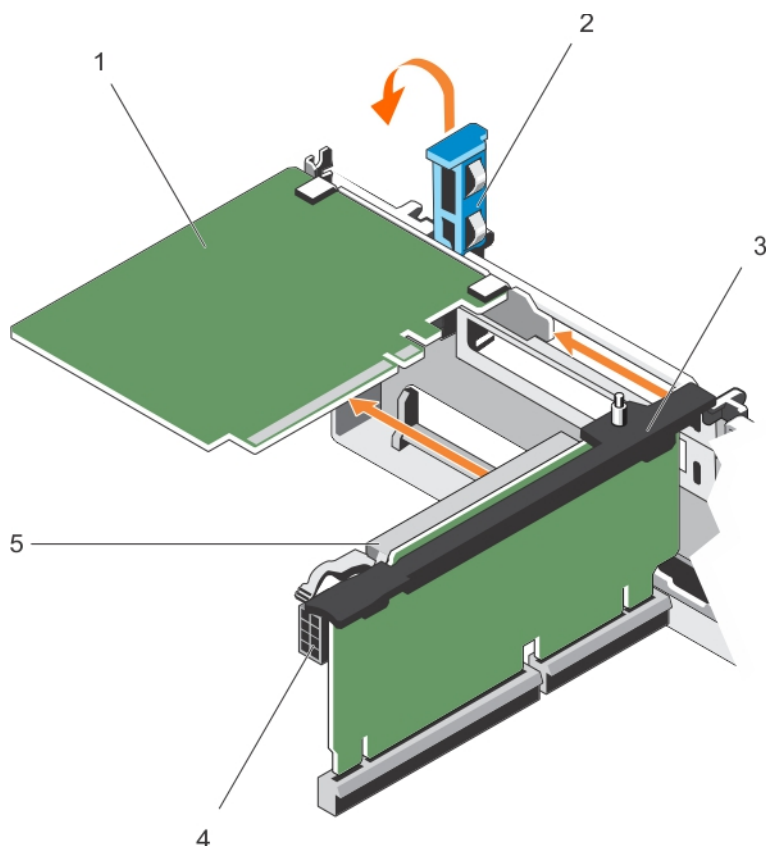# Installing an expansion card into the expansion card riser 2 or 3

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

> **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. Unpack the expansion card and prepare it for installation.

   For instructions, see the documentation accompanying the card.

2. Lift the expansion card latch and remove the filler bracket.
3. Holding the card by its edges, position the card so that the connector on the expansion card aligns with the expansion card connector on the riser.
4. Insert the card-edge connector firmly into the expansion card connector until the card is fully seated.
5. Press the touch points to open the expansion card locking tabs.
6. Close the expansion card latch.
7. If applicable, connect the cables to the expansion card.

   > **NOTE:** When installing a GPU card on riser 2 or riser 3 (default), connect the GPU card power cable to the power connector on the riser.

Figure 33. Installing an expansion card into the expansion card riser 2 or 3
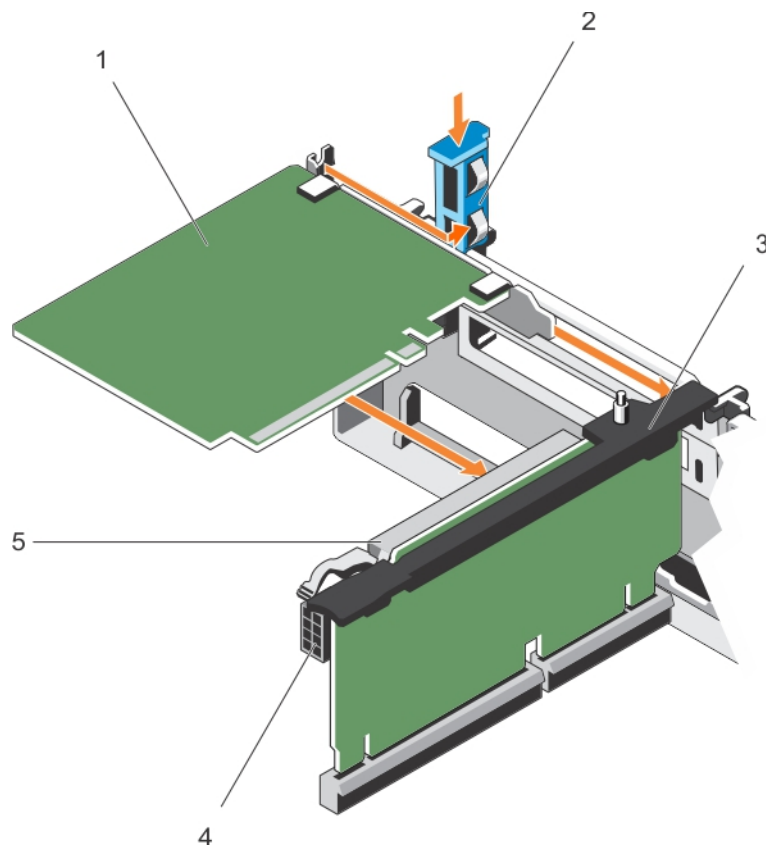
a. expansion card

b. expansion card latch

c. expansion card riser

d. power connector (for GPU cards)

e. expansion card connector

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

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

Related tasks

See also: Before working inside your system

See also: After working inside your system

Related references

See also: Safety instructions

Removing an expansion card from the expansion card riser 1

> ⚠ **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.

ℹ️ NOTE: The expansion card riser 1 can be used only when both the processors are installed.

1. Press tab A and rotate the latch clockwise.

2. Press tab B and rotate the latch downward.

3. Remove the expansion card from the expansion card riser 1.

4. If you are removing the card permanently, install a metal filler bracket over the empty expansion slot opening, and then close the expansion card latch.

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

5. Close the latches of tab A and tab B.

Figure 34. Removing an expansion card from expansion card riser 1
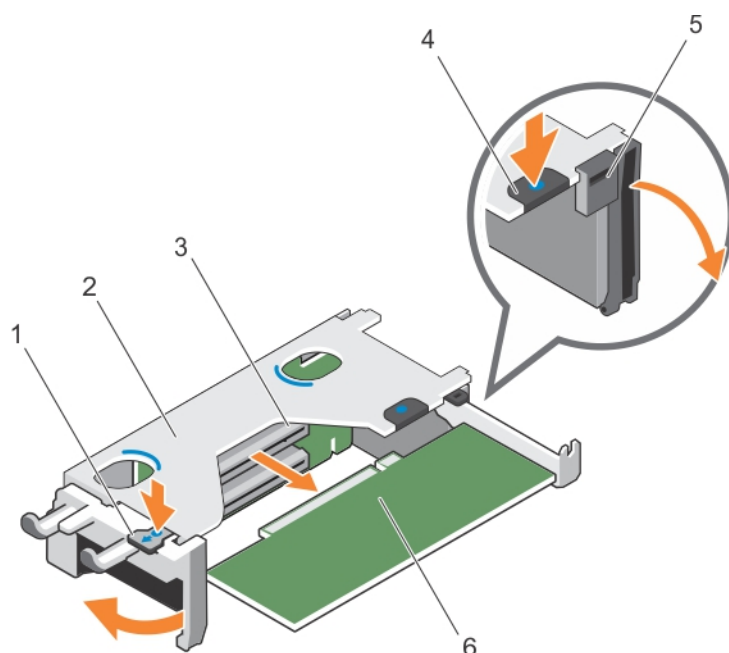
a. tab A
b. expansion card riser 1 cage
c. expansion card connector
d. tab B
e. latch
f. expansion card

1. Install the expansion card.

2. Install the expansion card riser.

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

Related tasks

See also: Before working inside your system
See also: Removing expansion card risers
See also: Installing an expansion card into the expansion card riser 1
See also: Installing expansion card risers
See also: After working inside your system

Related references

Installing an expansion card into the expansion card riser 1

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 expansion card riser.

> **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 expansion card riser 1 can be used only when both the processors are installed.

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

   For instructions, see the documentation accompanying the card.

2. Press tab A and rotate the latch clockwise.
3. Press tab B and rotate the latch down.
4. Holding the card by its edges, position the card so that the card-edge connector aligns with the expansion card connector.
5. Insert the card-edge connector firmly into the expansion card connector until the card is fully seated.
6. Close the latches of tab A and tab B.

Figure 35. Installing an expansion card into the expansion card riser 1

a. tab A
b. expansion card riser 1 cage
c. expansion card connector

    d.   tab B

    e.   latch

    f.   expansion card

1. Install the expansion card riser.

2. If applicable, connect any cables to the expansion card.

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

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

Related tasks

    See also: Before working inside your system
    See also: Removing expansion card risers
    See also: Installing expansion card risers
    See also: After working inside your system

Related references

    See also: Safety instructions

Removing the riser 1 blank

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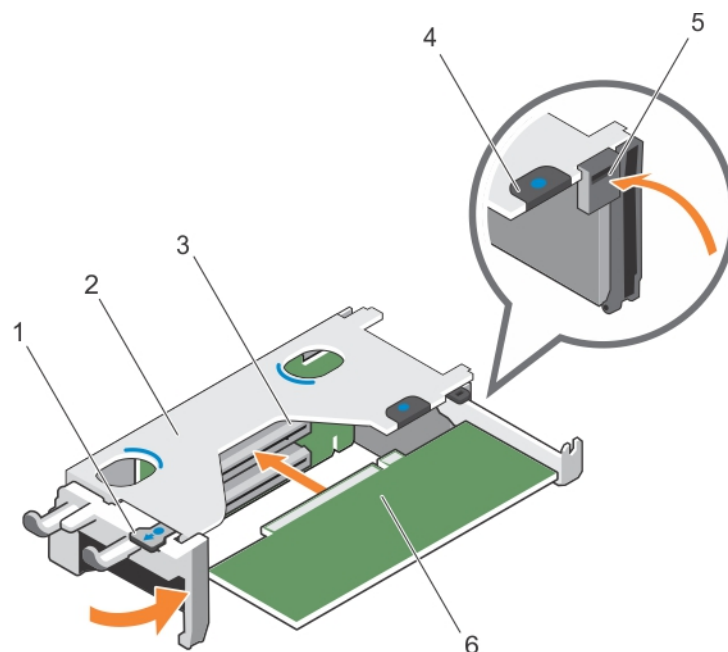
1. Follow the safety guidelines listed in the Safety instructions section.

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

3. Remove the expansion card riser.

1. Press the tabs on the riser 1 blank and push the riser 1 blank out of the chassis.

Figure 36. Removing the riser 1 blank

    a.   slot on the chassis

b.   tab (2)

c.   riser 1 blank

1.   Install the expansion card risers.

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

Related tasks
See also: Before working inside your system
See also: Removing expansion card risers
See also: Installing expansion card risers
See also: After working inside your system
Related references
See also: Safety instructions
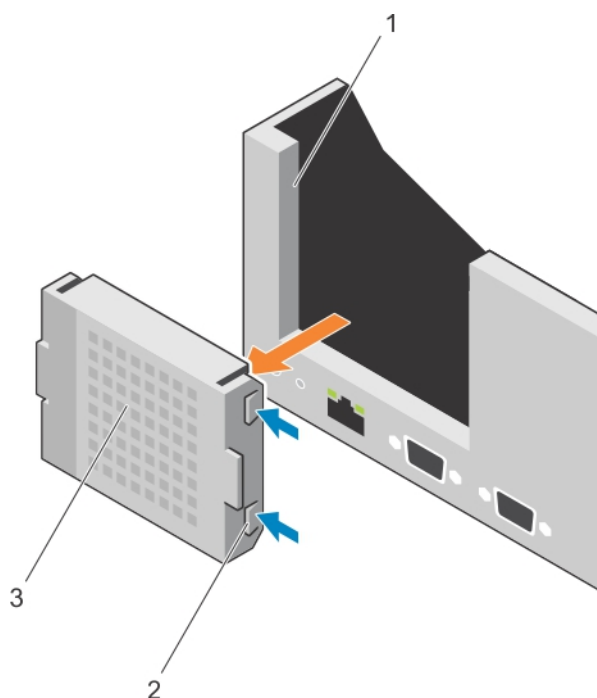
Installing the riser 1 blank

> ⚠ **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.   To install the riser 1 blank, align the blank with the slot on the chassis and insert it into the chassis until it clicks into place.

Figure 37. Installing the riser 1 blank

a.   slot on the chassis

b.   tab (2)

c.   riser 1 blank

1.   Install the expansion card risers.

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

Related tasks
See also: Before working inside your system

Related references

Removing expansion card risers

> **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 installed, remove any expansion card installed on risers 2 and 3.

> **NOTE:** The expansion card riser 1 can be used only when both the processors are installed.

1. Holding the slots on the expansion card riser, lift the riser from the riser connector on the system board.
2. To remove expansion card risers 2 and 3, hold the edges of the expansion card riser, and lift the riser from the riser connector on the system board.

> **NOTE:** To ensure proper system cooling, the riser 1 blank must be installed in the riser 1 slot. Remove the riser 1 blank only if you are installing riser 1.

Figure 38. Removing the expansion card riser 1

a. expansion card riser 1 cage
b. expansion card riser 1
c. riser guide-back (right)
d. riser guide-back (left)

e.   expansion card riser 1 connector

f.   riser guide-front

Figure 39. Identifying connectors on the expansion card riser 1
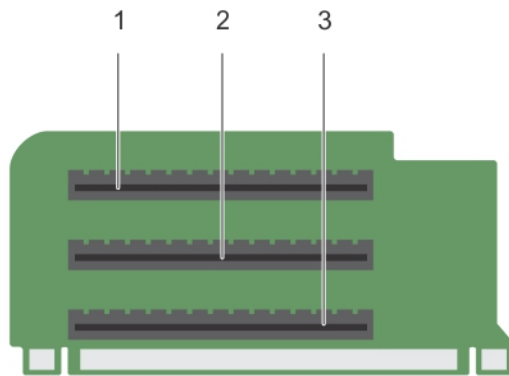
a.   expansion card slot 1

b.   expansion card slot 2

c.   expansion card slot 3

Figure 40. Removing the expansion card riser 2
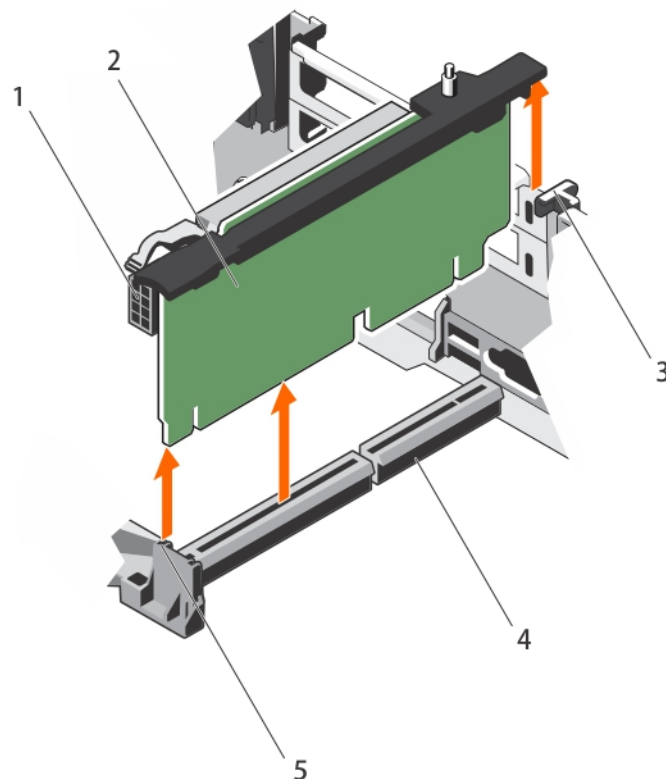
a. power connector (for GPU cards)

b. expansion card riser 2

c. riser guide-back

d. expansion card riser 2 connector

e. riser guide-front

Figure 41. Identifying connectors on the expansion card riser 2
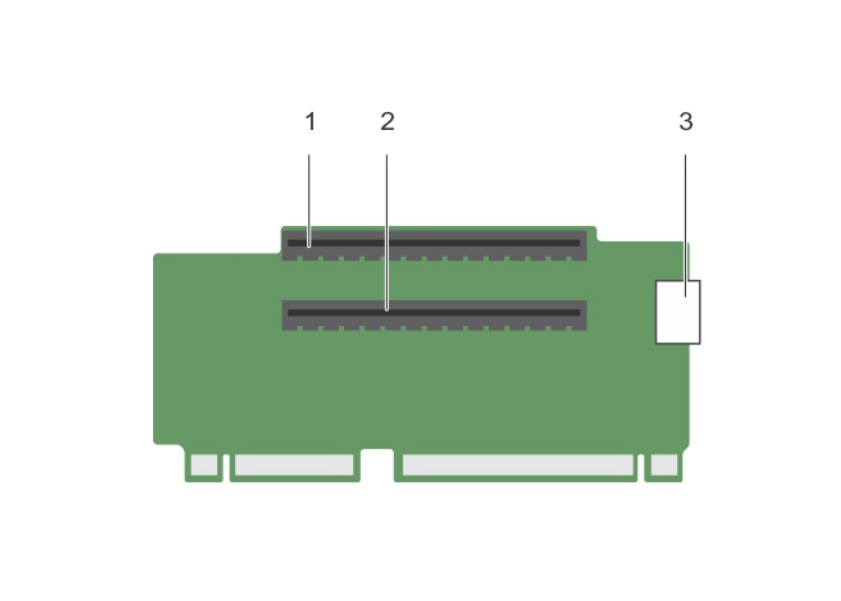
a. expansion card slot 4

b. expansion card slot 5

c. power connector (for GPU cards)

Figure 42. Removing the expansion card riser 3

a. riser guide-front
b. power connector (for GPU cards)
c. expansion card riser 3
d. riser guide-back
e. expansion card riser 3 connector

Figure 43. Identifying connectors on the expansion card riser 3 (default)

a. expansion card slot 6
b. expansion card slot 7
c. power connector (for GPU cards)

Figure 44. Identifying connectors on the expansion card riser 3 (alternate)

a. expansion card slot 6

b. power connector (for GPU cards)

1. If removed, install an expansion card on the riser.

2. If applicable, replace the expansion card riser.

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

Related tasks

See also: Before working inside your system
See also: Removing an expansion card from expansion card riser 2 or 3
See also: Removing an expansion card from the expansion card riser 1
See also: Installing an expansion card into the expansion card riser 1
See also: Installing an expansion card into the expansion card riser 2 or 3
See also: After working inside your system

Related references

See also: Safety instructions

Installing expansion card risers

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 removed, install the expansion card(s) into the expansion card riser 1.

> **!** **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. Align the expansion card riser with the connectors and the riser guides on the system board.

2. Lower the expansion card riser into place until the expansion card riser is fully seated in the connector.

Figure 45. Installing the expansion card riser 1
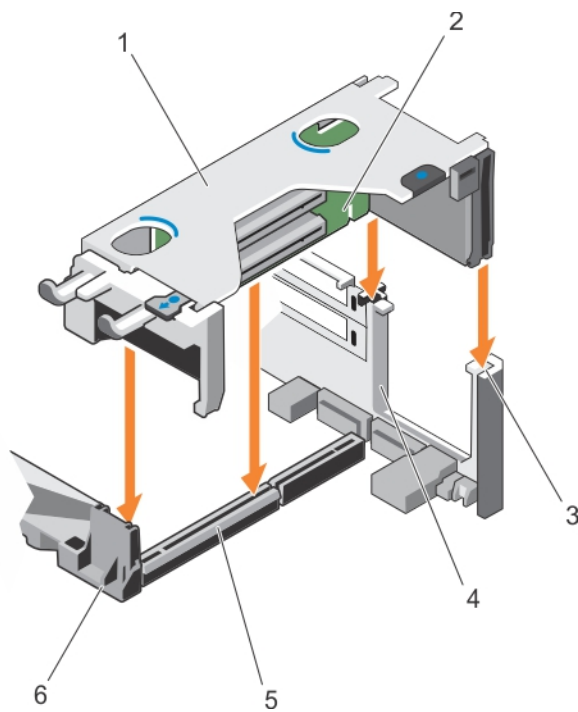
a.   expansion card riser 1 cage

b.   expansion card riser 1

c.   riser guide-back (right)

d.   riser guide-back (left)

e.   expansion card riser 1 connector

f.   riser guide-front

Figure 46. Installing the expansion card riser 2
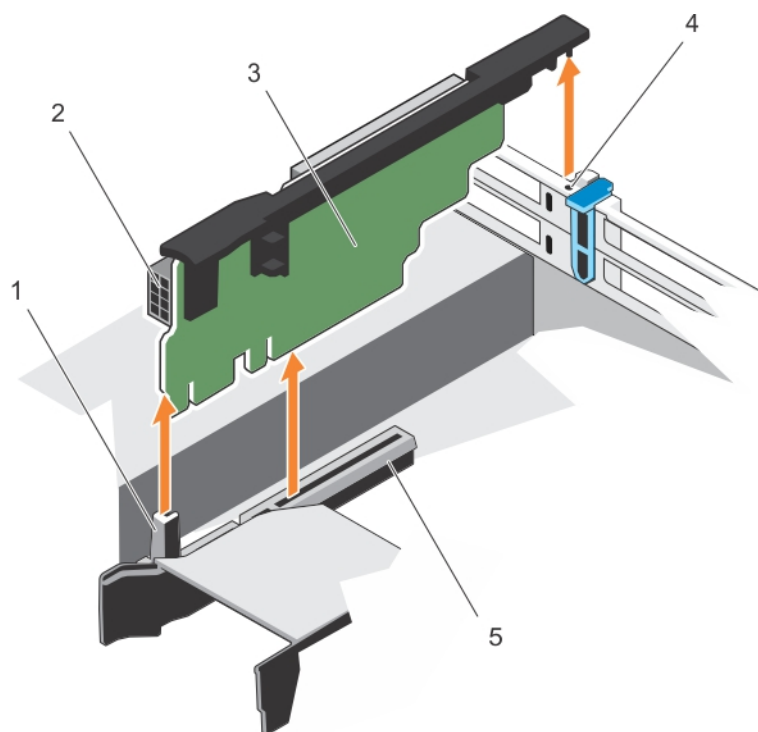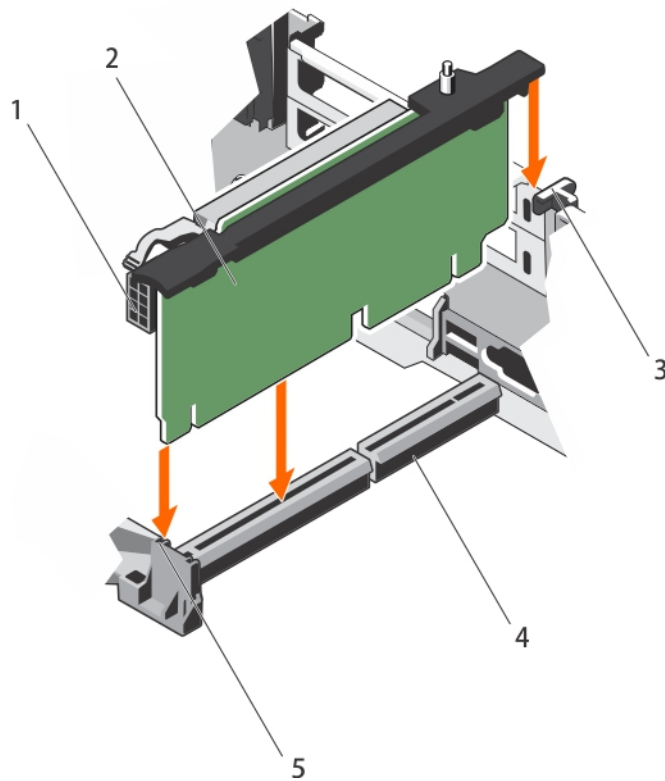
a.   power connector (for GPU cards)
b.   expansion card riser 2
c.   riser guide-back
d.   expansion card riser 2 connector
e.   riser guide-front
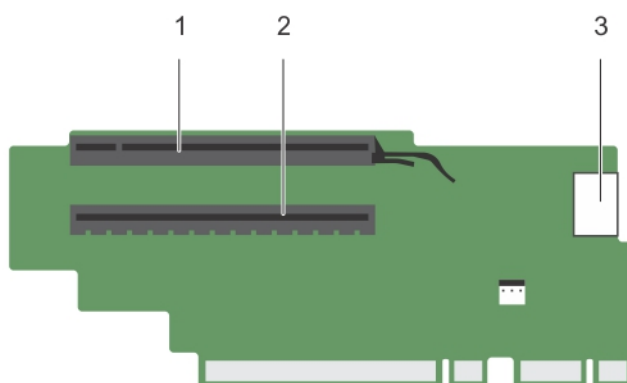
Figure 47. Installing the expansion card riser 3
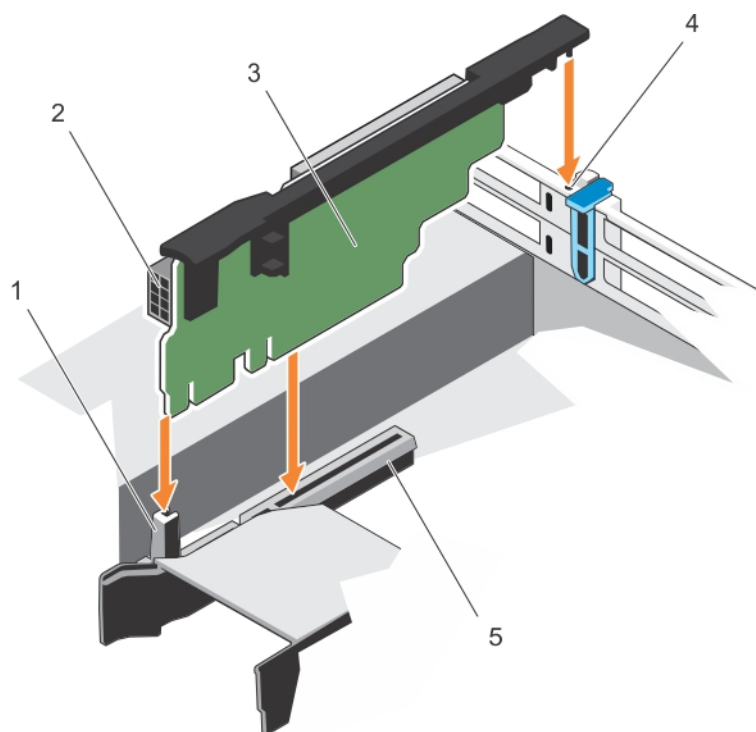
a. riser guide-front

b. power connector (for GPU cards)

c. expansion card riser 3
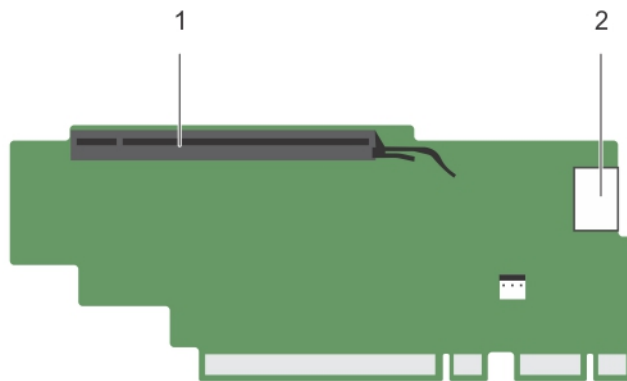
d. riser guide-back

e. expansion card riser 3 connector

1. Install the expansion card(s) into the expansion card risers 2 or 3.

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

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

Internal dual SD module (optional)

The Internal Dual SD module (IDSDM) provides you with a redundant SD card solution. You can configure the IDSDM for storage or as the OS boot partition. The IDSDM card offers the following features:

• Dual card operation — maintains a mirrored configuration by using SD cards in both the slots and provides redundancy.

> **i** NOTE: When the **Redundancy** option is set to **Mirror Mode** in the **Integrated Devices** screen of System Setup, the information is replicated from one SD card to another.

• Single card operation — single card operation is supported, but without redundancy.

Removing an internal SD card

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

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

> **! 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.**

> **i NOTE:** Temporarily label each SD card with its corresponding slot number before removal. Re-install the SD card(s) into the corresponding slots.

1. Locate the SD card slot on the internal dual SD module and press the card to release it from the slot.

Figure 48. Removing an internal SD card

a. IDSDM
b. SD card 1
c. SD card 2
d. SD card slot 2
e. SD card slot 1

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

Related tasks
> See also: Before working inside your system
> See also: After working inside your system

Related references
> See also: Safety instructions

Installing an internal SD card

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
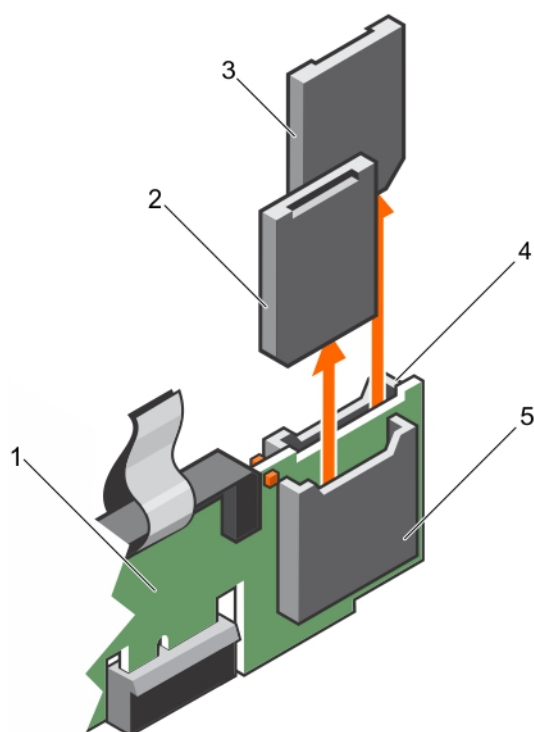
> **!** **CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.**

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

> **i** NOTE: Temporarily label each SD card with its corresponding slot number before removal. Re-install the SD card(s) into the corresponding slots.

1. Locate the SD card connector on the internal dual SD module. Orient the SD card appropriately and insert the contact-pin end of the card into the slot.

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

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

Figure 49. Installing an internal SD card
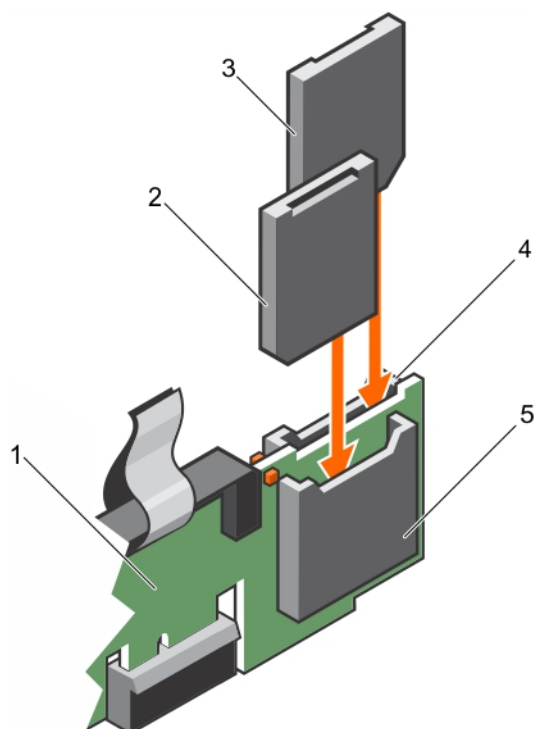
   a.   IDSDM
   b.   SD card 2
   c.   SD card 1
   d.   SD card slot 1
   e.   SD card slot 2

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

Related tasks
   See also: Before working inside your system
   See also: After working inside your system
Related references
   See also: Safety instructions

Removing the optional internal dual SD module

> ⚠ **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 installed, remove the SD cards.

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

1. Locate the internal dual SD module (IDSDM) on the system board. To locate the internal dual SD module connector, see the System board connectors section.
2. Holding the pull tab, lift the IDSDM out of the system.

   Figure 50. Removing the internal dual SD module (IDSDM)
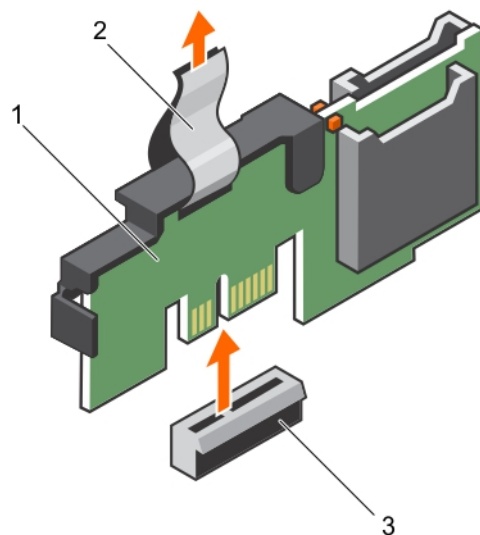
   a. IDSDM
   b. pull tab
   c. IDSDM connector

   The following table describes the IDSDM indicator codes:

Table 34. IDSDM indicator codes

The IDSDM indicator glows green when the card is online. The IDSDM indicator flashes green to indicate rebuild or activity. The IDSDM indicator flashes amber to indicate card mismatch or that the card has failed. The IDSDM indicator does not glow to indicate that the card is missing or is booting.

Convention	IDSDM indicator code	Description
A	Green	Indicates that the card is online.
B	Flashing green	Indicates rebuild or activity.

Convention	IDSDM indicator code	Description
C	Flashing amber	Indicates card mismatch or that the card has failed.
D	Amber	Indicates that the card is offline, has failed, or is write protected.
E	Not lit	Indicates that the card is missing or is booting.

1. Install the IDSDM.
2. If removed, install the SD cards.
3. Follow the procedure listed in the After working inside your system section.

Related tasks
    See also: Before working inside your system
    See also: Removing an internal SD card
    See also: Installing the optional internal dual SD module
    See also: After working inside your system
Related references
    See also: Safety instructions
    See also: System board jumpers and connectors

Installing the optional internal dual SD module

> ⚠ **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.

> ℹ NOTE: Temporarily label each SD card with its corresponding slot before removal.

1. Locate the internal dual SD module (IDSDM) connector on the system board. To locate the IDSDM connector, see the System board connectors section.
2. Align the IDSDM with the connector on the system board.
3. Push the IDSDM until it is firmly seated on the system board.
1. Install the SD cards.

> ℹ NOTE: Re-install the SD cards into the same slots based on the labels you had marked on the cards during removal.

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

Related tasks
    See also: Before working inside your system
    See also: Installing an internal SD card
    See also: After working inside your system
Related references
    See also: Safety instructions

Network daughter card

The Network daughter card (NDC) is a small, removable mezzanine card. The NDC provides you with the flexibility of choosing different network connectivity options, for example—4 x 1GbE, 2 x 10GbE and 2 x Converged Network Adapter.

Removing the network daughter card

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 installed, remove expansion card(s) from the expansion card riser 2.
4. Keep the Phillips #1 screwdriver ready.

> **!** **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. Loosen the captive screws that secure the network daughter card (NDC) to the system board.
2. Hold the NDC by the edges on either side of the touch point and lift the card to remove it from the connector on the system board.
3. Slide the NDC away from the back of the system until the Ethernet connectors are clear of the slot in the back panel.
4. Lift the NDC out of the chassis.

Figure 51. Removing the NDC
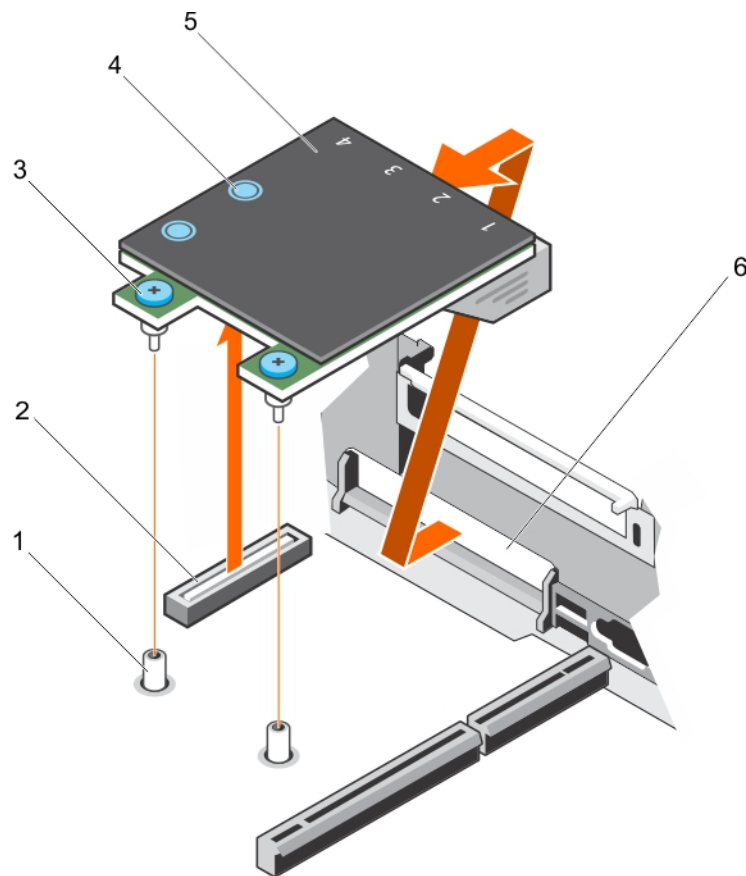
a.   captive screw socket (2)

b.   connector on the system board

c.   captive screw (2)

d.   touch point (2)

e.   network daughter card (NDC)

f.   back panel slot for Ethernet connectors

1.   Install the NDC.

2.   If removed, install the expansion card(s) on the expansion card riser 2.

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

Related tasks
See also: Before working inside your system
See also: Removing an expansion card from expansion card riser 2 or 3
See also: Installing an expansion card into the expansion card riser 2 or 3
See also: Installing the network daughter card
See also: After working inside your system

Related references
See also: Safety instructions

Installing the network daughter card

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(s) in the expansion card riser 2.

4. Keep the Phillips #1 screwdriver ready.

> ⚠ **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. Orient the network daughter card (NDC) so that the Ethernet connectors fit through the slot in the back panel.
2. Align the captive screws on the card with the captive screw sockets on the system board.
3. Press the touch points on the card until the card connector is firmly seated on the system board connector.
4. Tighten the captive screws to secure the NDC to the system board.

Figure 52. Installing the NDC
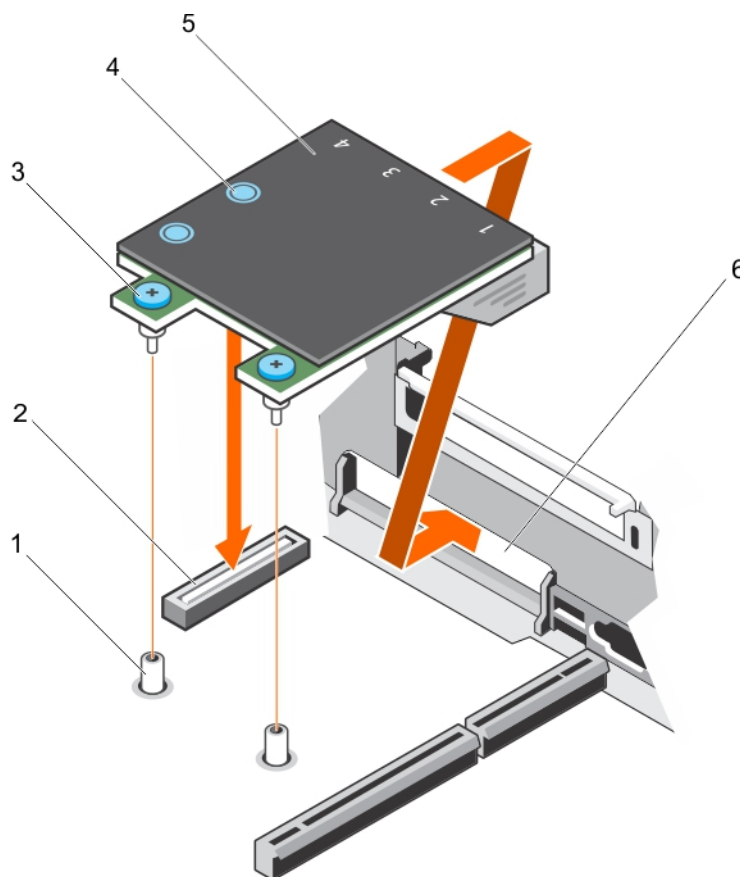
   a. captive screw socket (2)
   b. connector on the system board
   c. captive screw (2)
   d. touch point (2)
   e. network daughter card (NDC)
   f. back panel slot for Ethernet connectors

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

Related tasks

   See also: Before working inside your system
   See also: Removing an expansion card from expansion card riser 2 or 3
   See also: Installing an expansion card into the expansion card riser 2 or 3

See also: After working inside your system
Related references
    See also: Safety instructions

Internal USB memory key (optional)

An optional USB memory key installed inside your system can be used as a boot device, security key, or mass storage device.

To boot from the USB memory key, configure the USB memory key with a boot image and then specify the USB memory key in the boot sequence in System Setup.

The internal USB port must be enabled in **Internal USB Port** option in the **Integrated Devices** screen of **System Setup**.

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

Replacing the optional internal USB memory key

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

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

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

    Figure 53. Removing the internal USB memory key
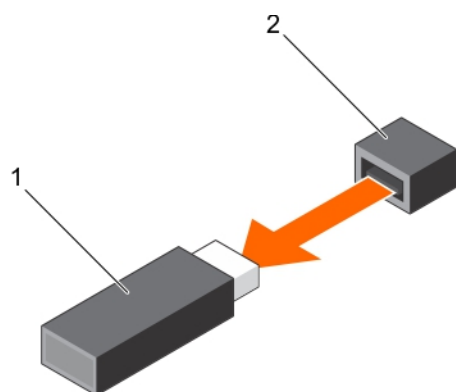
    a. USB memory key
    b. USB port
3. Insert the replacement USB memory key into the USB port.

    Figure 54. Installing the internal USB memory key
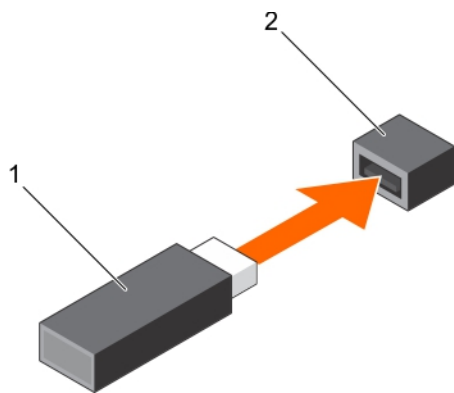
    a.   USB memory key

    b.   USB port

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

2. While booting, press F2 to enter System Setup and verify that the system detects the USB memory key.

Related tasks

    See also: Before working inside your system
    See also: After working inside your system

Related references

    See also: Safety instructions
    See also: System board jumpers and connectors

System battery

The system battery is used for low-level system functions like powering the real-time clock and storing the computer's BIOS settings.

Replacing the system battery

ℹ️ 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. Remove the cooling shroud.

1. Locate the battery socket. For more information, see the Jumpers and connectors section.

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

2. Place your finger between the securing tabs at the negative side of the battery connector and lift the battery out of the socket.

    Figure 55. Removing the system battery
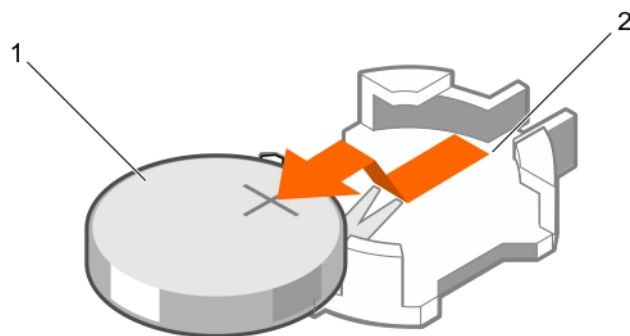
    a. system battery

    b. system battery slot

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

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

Figure 56. Installing the system battery
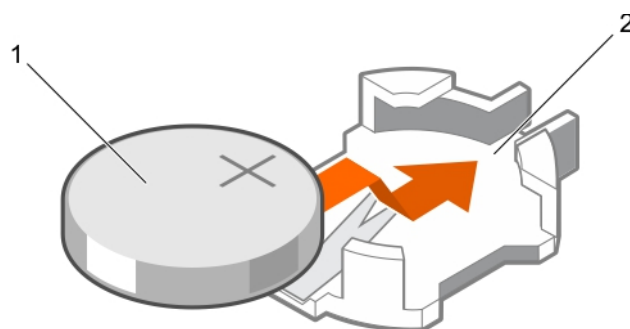
    a. system battery

    b. system battery slot

1. Install the cooling shroud.

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

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

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

5. Exit System Setup.

Related tasks

    See also: Before working inside your system
    See also: Removing the cooling shroud
    See also: Installing the cooling shroud
    See also: After working inside your system

Related references

    See also: Safety instructions
    See also: System board jumpers and connectors

Power supply units (PSU)

Your system supports two 1100 W AC PSU modules.

> **CAUTION: For AC PSUs, use only PSUs with the Extended Power Performance (EPP) label on the back. Mixing PSUs from previous generations of systems can result in a PSU mismatch condition or failure to turn on.**

> **NOTE:** Titanium PSU is nominally rated for 200 V AC to 240 V AC input only.

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

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

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.

> **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.

1. 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 57. Removing the PSU blank

a. PSU blank

b. PSU bay

Install the PSU or PSU blank.

Installing the power supply unit blank

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

> ▌ **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.

1. 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 58. Installing the PSU blank

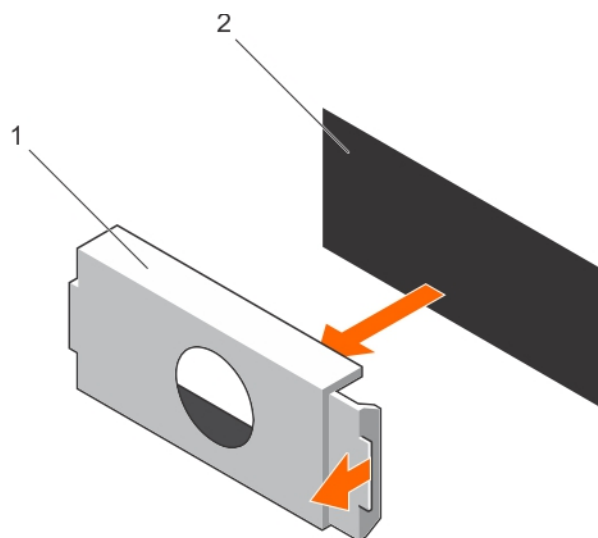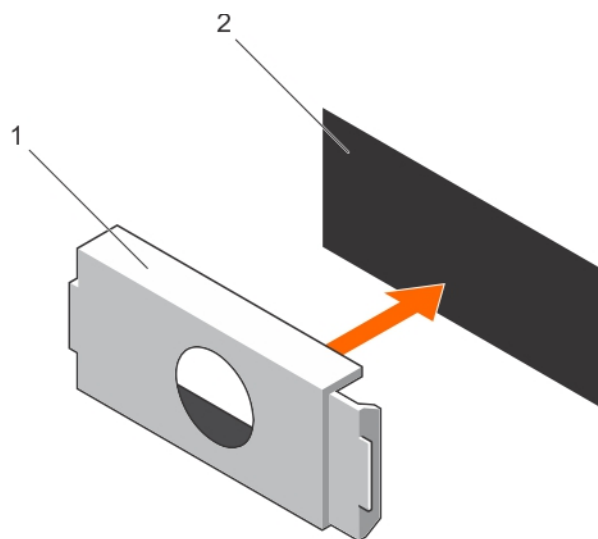a. PSU blank

b. PSU bay

Removing an AC power supply unit

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

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

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

2. Press the release latch and slide the PSU out of the chassis by using the PSU handle.

Figure 59. Removing an AC PSU

a. release latch

b. PSU cable connector

c. PSU

d. power connector

e. PSU handle

Installing an AC power supply unit

> ⚠ **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.**

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

1. Follow the safety guidelines listed in the Safety instructions section.
2. 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
3. If installed, remove the PSU blank.
1. Slide the new PSU into the chassis until the PSU is fully seated and the release latch snaps into place.

> **i** | NOTE: If you unlatched the cable management arm, relatch it. For information about the cable management arm, see the rack documentation of your system.

2. 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.**

> **i** | NOTE: When installing, hot swapping, or hot-adding a new PSU, wait for 15 seconds for the system to recognize the PSU and determine its status. The PSU redundancy may not occur until discovery is complete. 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 60. Installing an AC PSU
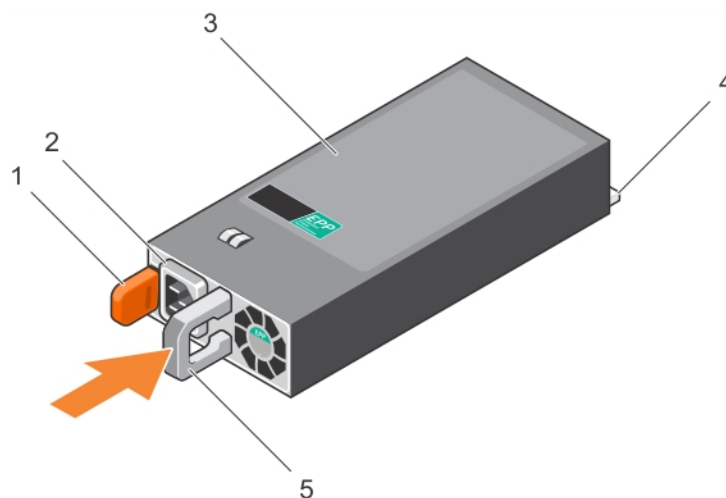
a. release latch
b. PSU cable connector
c. PSU
d. power connector
e. PSU handle

System board

A system board (also known as the motherboard) is the main printed circuit board found in systems. The system board allows communication between many of the crucial electronic components of the system, such as the central processing unit (CPU) and memory, and also provides connectors for other peripherals. Unlike a backplane, a system board contains significant number of sub-systems such as the processor expansion cards, and other components.

Removing the system board

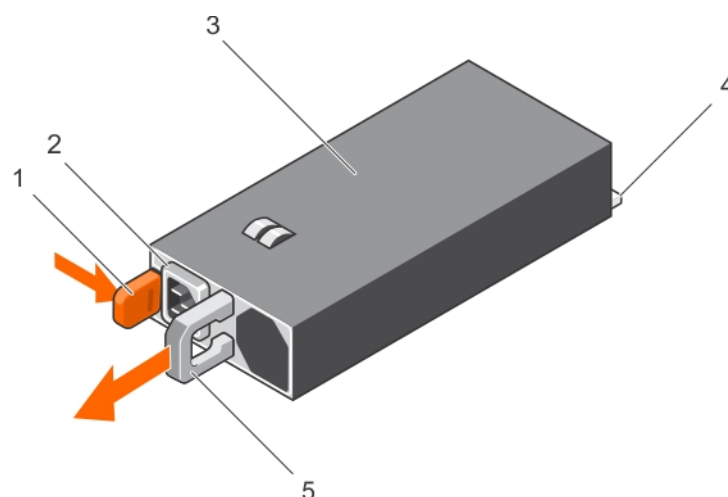> ⚠ **CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by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

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

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

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the following:
   a. Cooling shroud
   b. Cooling fan assembly
   c. Power supply unit(s)
   d. All expansion card risers
   e. Integrated storage controller card
   f. Internal dual SD module
   g. Internal USB key (if installed)
   h. PCIe card holder
   i. Cable retention bracket
   j. Heat sink(s)/heat sink blank(s)
   k. Processors(s)/processor blank(s)

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

   l. Memory modules and memory module blanks
   m. Network daughter card
1. Disconnect all cables from the system board.

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

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

2. Hold the system board holder, lift the blue release pin, lift the system board, and then slide it toward the front of the chassis.

   Sliding the system board toward the front of the chassis disengages the connectors from the back of the chassis slots.

3. Lift the system board out of the chassis.

   Figure 61. Removing the system board
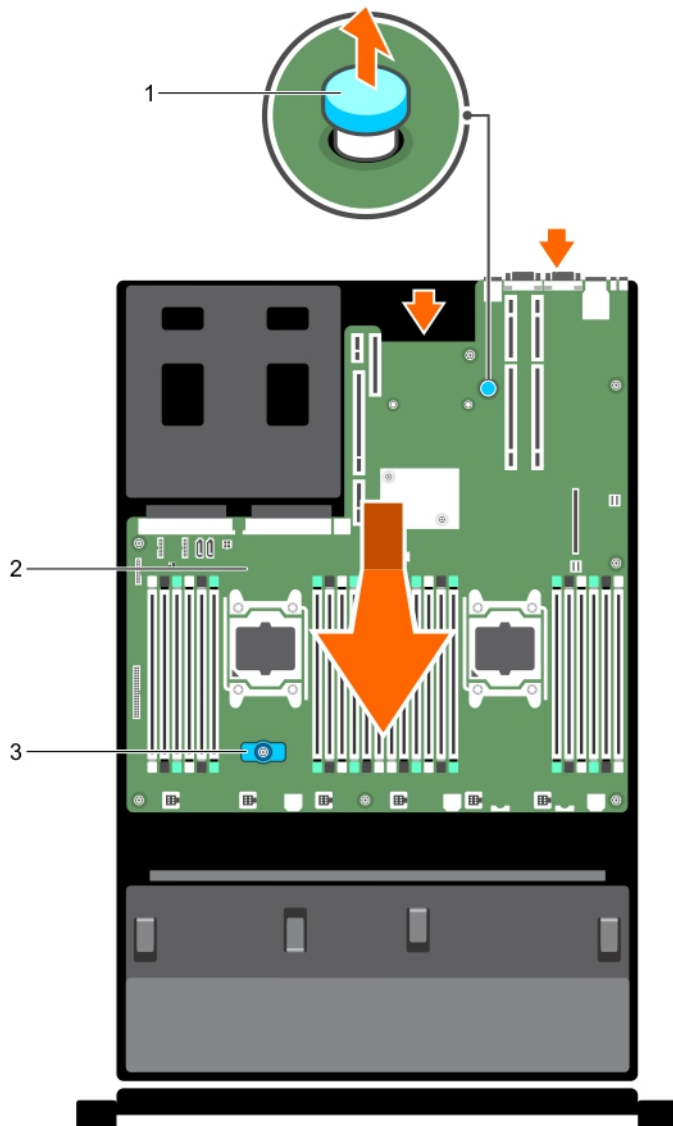
- a. release pin
- b. system board
- c. system board holder

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

Related tasks
  See also: Before working inside your system
  See also: Removing the cooling shroud
  See also: Removing the cooling fan assembly
  See also: Removing an AC power supply unit
  See also: Removing expansion card risers
  See also: Removing the integrated storage controller card
  See also: Removing the optional internal dual SD module
  See also: Replacing the optional internal USB memory key
  See also: Removing the PCIe card holder
  See also: Removing the cable retention bracket
  See also: Removing a heat sink

See also: Removing a processor
See also: Removing memory modules
See also: Removing the network daughter card
See also: Installing the system board
See also: After working inside your system
Related references
See also: Safety instructions

Installing the system board

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

> ! 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. 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 touch points and lower the system board into the chassis.
3. Push the system board toward the back of the chassis until the board clicks into place.

Figure 62. Installing the system board
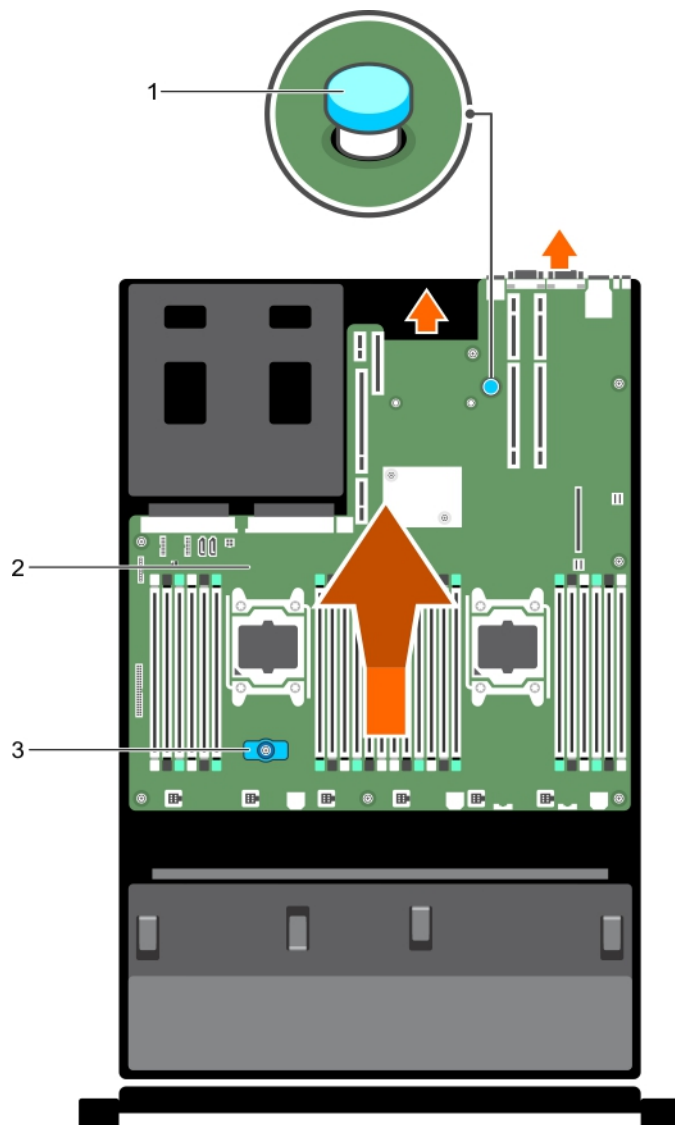
    a.   release pin

    b.   system board

    c.   system board holder

1.   Install the Trusted Platform Module (TPM). For information about how to install the TPM, see the Installing the Trusted Platform Module section. For more information on the TPM, see the Trusted Platform Module section.

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

2.   Replace the following:

    a.   Cable retention bracket

    b.   PCIe card holder

    c.   Integrated storage controller card

    d.   Internal USB key (if applicable)

    e.   Internal dual SD module

    f.   All expansion card risers

  g. Heat sink(s)/heat sink blank(s) and processors(s)/processor blank(s)

  h. Memory modules and memory module blanks

  i. Network daughter card

  j. Cooling fan assembly

  k. Cooling shroud

  l. Power supply unit(s)

3. Reconnect all cables to the system board.

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

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

5. Import your new or existing iDRAC Enterprise license. For more information, see Integrated Dell Remote Access Controller User's Guide, at **Dell.com/esmmanuals**.

6. Ensure that you:

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

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

  c. Update the BIOS and iDRAC versions.

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

Related tasks

 See also: Installing the cable retention bracket
 See also: Installing the PCIe card holder
 See also: Installing the integrated storage controller card
 See also: Replacing the optional internal USB memory key
 See also: Installing the optional internal dual SD module
 See also: Installing expansion card risers
 See also: Installing a heat sink
 See also: Installing a processor
 See also: Installing memory modules
 See also: Installing the network daughter card
 See also: Installing the cooling fan assembly
 See also: Installing the cooling shroud
 See also: Installing an AC power supply unit

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.

1. Turn on the system.

2. Press F2 to enter System Setup.

3. Click **Service Tag Settings**.

4. Enter the Service Tag.

> **i**   NOTE: You can enter the Service Tag only when the **Service Tag** field is empty. Ensure that you enter the correct Service Tag. After the Service Tag is entered, it cannot be updated or changed.

5. Click **Ok**.

6. Import your new or existing iDRAC Enterprise license.

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

Restoring the Service Tag by using the Easy Restore feature

The Easy Restore feature enables you to restore your system's 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.

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:

   After the restore process is complete, BIOS prompts to restore the system configuration data.

3. Perform one of the following steps:

   • Press **Y** to restore the system configuration data.

   • Press **N** to use the default configuration settings.

   After the restore process is complete, the system restarts.

Trusted Platform Module

Trusted Platform Module (TPM) is a dedicated microprocessor designed to secure hardware by integrating cryptographic keys into devices. A software can use a Trusted Platform Module to authenticate hardware devices. As each TPM chip has a unique and secret RSA key burned in as it is produced, it can perform the platform authentication.

> **⚠ CAUTION: Do not attempt to remove the Trusted Platform Module (TPM) from the system board. After the TPM is installed, it is cryptographically bound to that specific system board. Any attempt to remove an installed TPM breaks the cryptographic binding, and it cannot be re-installed or installed on another system board.**

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

Installing the Trusted Platform Module

> **⚠ 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: Do not attempt to remove the Trusted Platform Module (TPM) from the system board. Once the TPM is installed, it is cryptographically bound to that specific system board. Any attempt to remove an installed TPM breaks the cryptographic binding, and it cannot be re-installed or installed on another system board.**

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
1. Locate the TPM connector on the system board.

| | NOTE: To locate the TPM connector on the system board, see the System board connectors section. |

2. Align the edge connectors on the TPM with the slot on the TPM connector.
3. Insert the TPM into the TPM connector such that the plastic rivet aligns with the slot on the system board.
4. Press the plastic rivet until the rivet snaps into place.

Figure 63. Installing the TPM
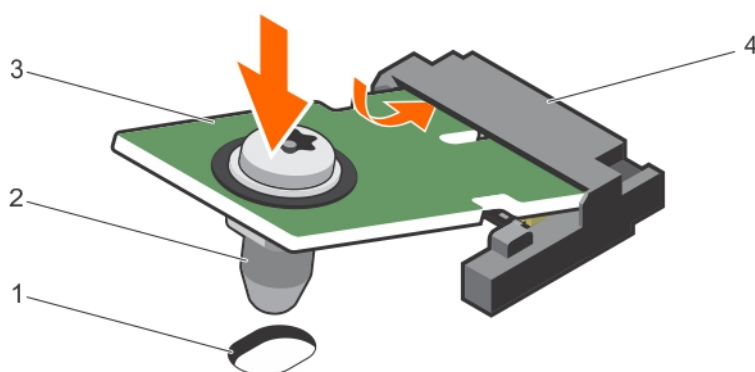
a. rivet slot on the system board
b. plastic rivet
c. TPM
d. TPM connector

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

Related tasks
See also: Before working inside your system
See also: Installing the system board
See also: After working inside your system

Related references
See also: Safety instructions
See also: System board jumpers and connectors

Initializing the TPM for BitLocker users

1. Initialize the TPM.

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

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

Initializing the TPM for TXT users

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

Hard drives

Your system supports entry hard drives and enterprise-class hard drives. Entry hard drives are designed for 5x8 operating environment with less workload rating to drives and enterprise-class drives are designed for 24x7 operating environment. Selecting the correct drive class will enable the critical areas of quality, functionality, performance, and reliability to be optimized for the target implementation.

> **i** NOTE: Do not mix enterprise-class hard drives with entry hard drives.

Choosing the right drive type depends on the usage pattern. Improper use of entry hard drives (workload rating exceeds 55TB/year) will lead to significant risk and increase the drives failure rate.

For more information on these hard drives, see the 512e and 4Kn Disk Formats whitepaper and 4K Sector HDD FAQ document at **Dell.com/poweredgemanuals.**

All hard drives are connected to the system board through the hard drive backplane. Hard drives are supplied in hot-swappable hard drive carriers that fit in the hard drive slots.

> **!** 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 restart your system while the hard drive is being formatted. Doing so can cause a hard drive failure.**

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 complete. Be aware that high-capacity hard drives can take a long time to format.

Removing a 2.5 inch hard drive blank (rear)

> **!** 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.**

Follow the safety guidelines listed in safety instructions section.

1. Pull the hard drive blank out until it is free of the hard drive slot.

Figure 64. Removing and installing a 2.5 inch hard drive blank (rear)
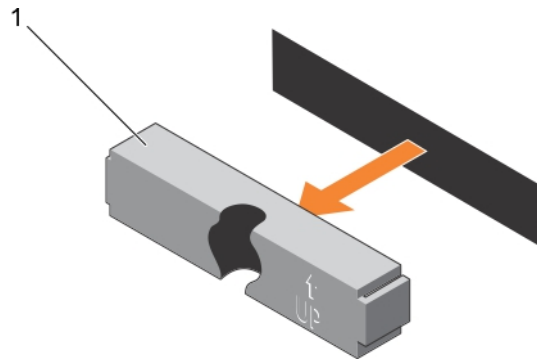
a. hard drive blank (rear)

Related references
See also: Safety instructions

Installing a 2.5 inch hard drive blank (rear)

1. Follow the safety guidelines listed in the Safety instructions section.
1. Insert the hard drive blank into the hard drive slot until it clicks into place.

Figure 65. Installing a 2.5 inch hard drive blank (rear)

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

Related references
See also: Safety instructions

Removing a 3.5-inch hard drive blank

! **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.
2. If installed, remove the front bezel.
1. Press the release button and slide the blank out of the hard drive slot.

Figure 66. Removing a 3.5-inch hard drive blank
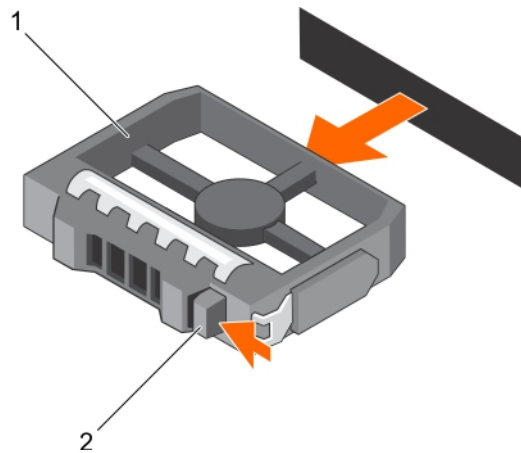
a. hard drive blank
b. release button

   If applicable, install the front bezel.

Related tasks
   See also: Removing the optional front bezel
   See also: Installing the optional front bezel
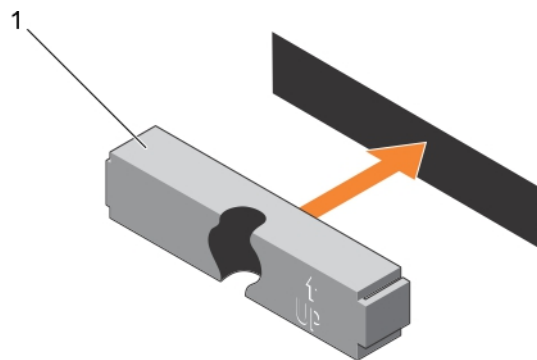Related references
   See also: Safety instructions

Installing a 3.5-inch hard drive blank

1. Follow the safety guidelines listed in the Safety instructions section.
2. If installed, remove the front bezel.
1. Insert the hard drive blank into the hard drive slot until the release button clicks into place.

Figure 67. Installing a 3.5-inch hard drive blank

a. hard drive blank

If applicable, install the front bezel.

Related tasks
See also: Removing the optional front bezel
See also: Installing the optional front bezel
Related references
See also: Safety instructions
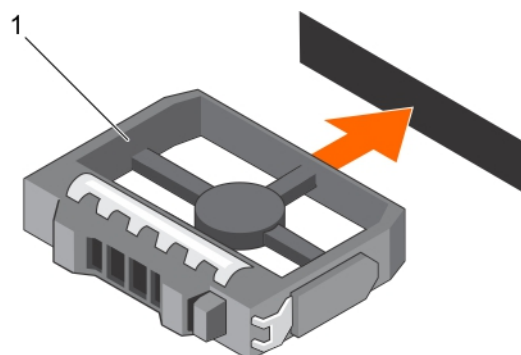
Removing a hot swappable hard drive or SSD

> ⚠ **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. Follow the procedure listed in the Before working inside your system section.
3. If applicable, remove the bezel.
4. Using the management software, prepare the hard drive for removal. If the hard drive is online, the green activity or fault indicator flashes while the drive is turning off. When the hard drive indicators are off, the hard drive is ready for removal.

   For more information, see the documentation for the storage controller.

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

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

> ⚠ **CAUTION: To maintain proper system cooling, all empty hard drive or SSD slots must have hard drive or SSD blanks installed.**

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

Figure 68. Removing a hot swappable hard drive or SSD
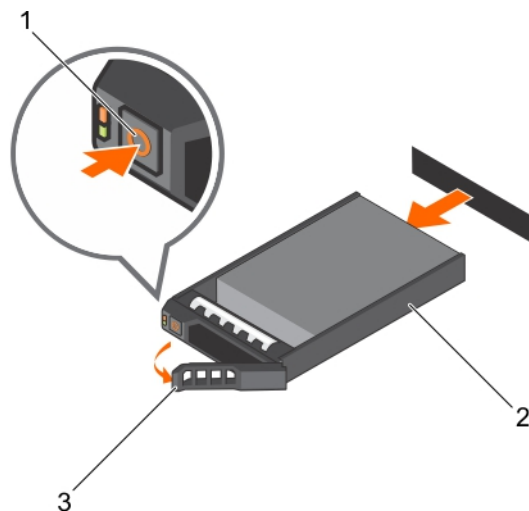
a. release button
b. hard drive or SSD carrier
c. hard drive or SSD carrier handle

Related tasks
See also: Before working inside your system
See also: Removing the optional front bezel
See also: Installing the optional front bezel
Related references
See also: Safety instructions

Installing a hot-swap hard 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.**

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

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

> ⚠ **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 hard drive is installed and the system is powered on, the hard drive automatically begins to rebuild. Make absolutely sure that the replacement hard drive is blank or contains data that you wish to have over-written. Any data on the replacement hard drive is immediately lost after the hard drive is installed.**

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 connects with the backplane.
5. Close the hard drive carrier handle to lock the hard drive in place.

Figure 69. Installing a hot-swappable hard drive or SSD
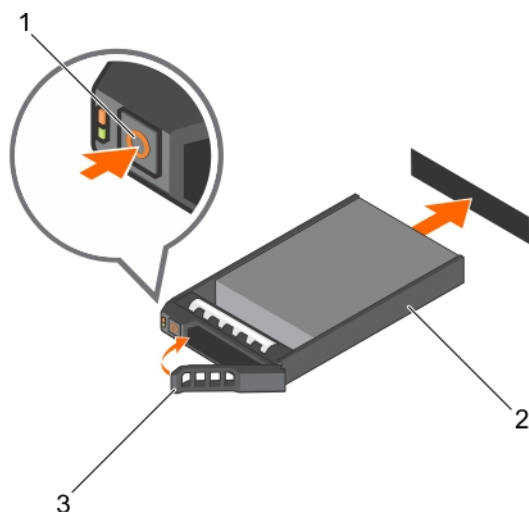
a. release button

b. hard drive or SSD carrier

c. hard drive or SSD carrier handle

Related tasks

See also: Removing a 3.5-inch hard drive blank

Removing a hard drive from a hard drive carrier

1. Keep the Phillips #1 screwdriver ready.
2. Remove the hot swappable hard drive carrier from the system.
1. Remove the screws from the slide rails on the hard drive carrier.
2. Lift the hard drive out of the hard drive carrier.

Figure 70. Removing a hard drive into a hard drive carrier
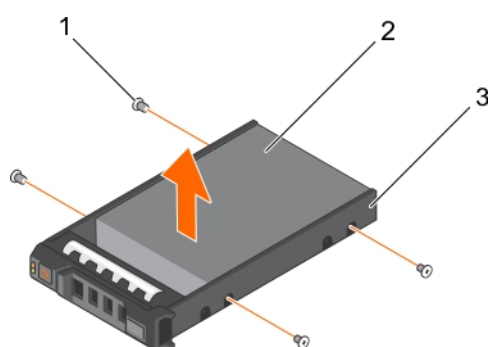
a. screw (4)

b. hard drive

c. hard drive carrier

Installing a hard drive into a hard drive carrier

> **!** **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. Insert the hard drive into the hard drive carrier with the connector end of the hard drive toward the back of the carrier.

2. Align the screw holes on the hard drive with the screws 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. Attach the screws to secure the hard drive to the hard drive carrier.

Figure 71. Installing a hard drive into a hard drive carrier
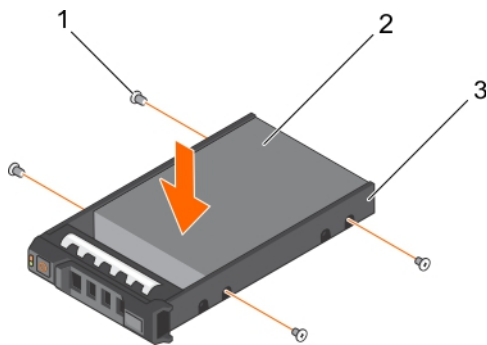
a. screw (4)

b. hard drive

c. hard drive carrier

Install the hot swappable hard drive carrier.

Hard drive backplane

Your system supports 3.5 inch (x12) SAS/SATA backplane plus 2.5 inch (x2) SAS/SATA backplane (back).

Removing the hard drive backplane

⚠ **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 drives and backplane, you must remove the hard drives from the system before removing the backplane.**

⚠ **CAUTION: You must note the number of each hard drive and temporarily label them before removal so that you can replace them in the same 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 the cooling shroud.
4. Remove the cooling fan assembly.
5. Remove all hard drives.
1. Disconnect the SAS/SATA data, signal, and power cable(s) from the backplane.
2. Press the release tabs and lift the backplane upward and slide it toward the back of the chassis.

   ℹ **NOTE:** To prevent damage to the control panel flex cable, unlatch the blocking tab on the connector before removing the flex cable. Do not bend the flex cable at the connector. To unlatch the blocking tab for the x12 backplane, pull the locking tab up. For the x18 and x2 backplanes, rotate the locking tab 90 degrees clockwise.

Figure 72. Removing the 3.5 inch (x12) SAS/SATA backplane
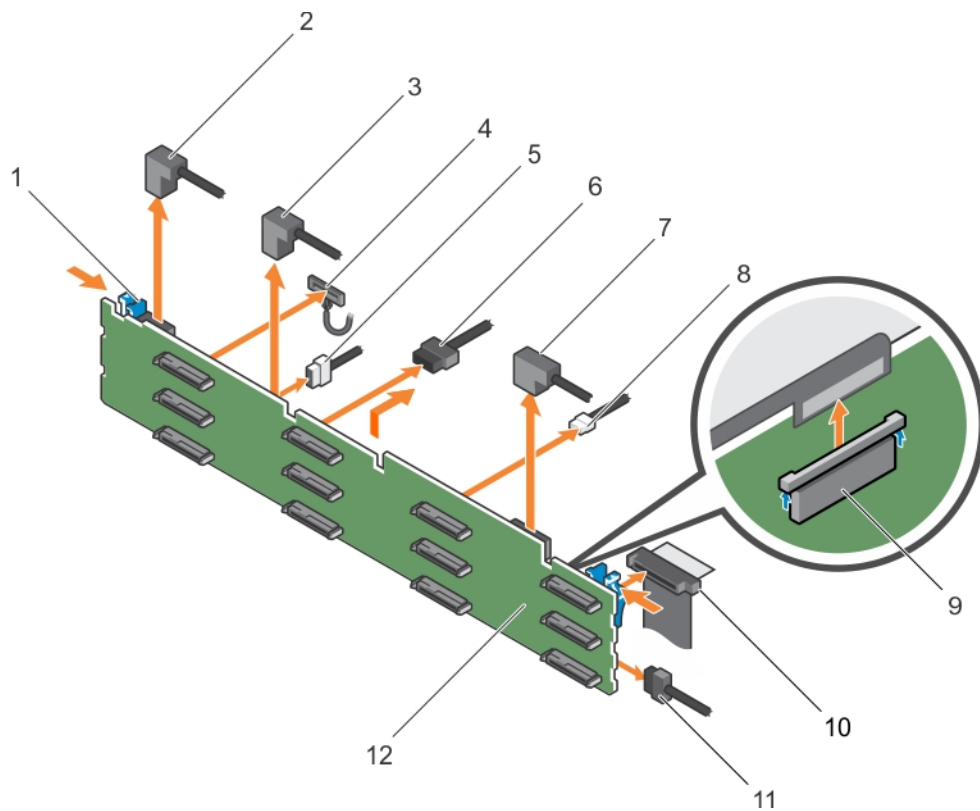
Figure 73. Cabling diagram—3.5 inch (x12) SAS/SATA backplane

a. release tab (2)
b. SAS cable A2
c. SAS cable A1
d. left ear control panel cable
e. backplane signal cable
f. backplane power cable (2)
g. SAS cable A0/B0
h. USB cable
i. control panel cable
j. right ear control panel flex cable
k. hard drive backplane
l. hard drive backplane connector (12)

a. hard drive backplane
b. system board
c. backplane signal connector 0
d. backplane signal connector 1
e. integrated storage controller card

1. Install the hard drive backplane.
2. Follow the procedure listed in the After working inside your system section.

Related tasks

See also: Before working inside your system
See also: Removing a hot swappable hard drive or SSD
See also: Removing the cooling shroud

Related references

Installing the hard drive backplane

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

> **!** **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 control panel flex cable, do not bend the control panel flex cable after it is inserted into the connector.**

1. Use the hooks on the chassis as guides to align the hard drive backplane.
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 74. Installing the 3.5 inch (x12) SAS/SATA backplane
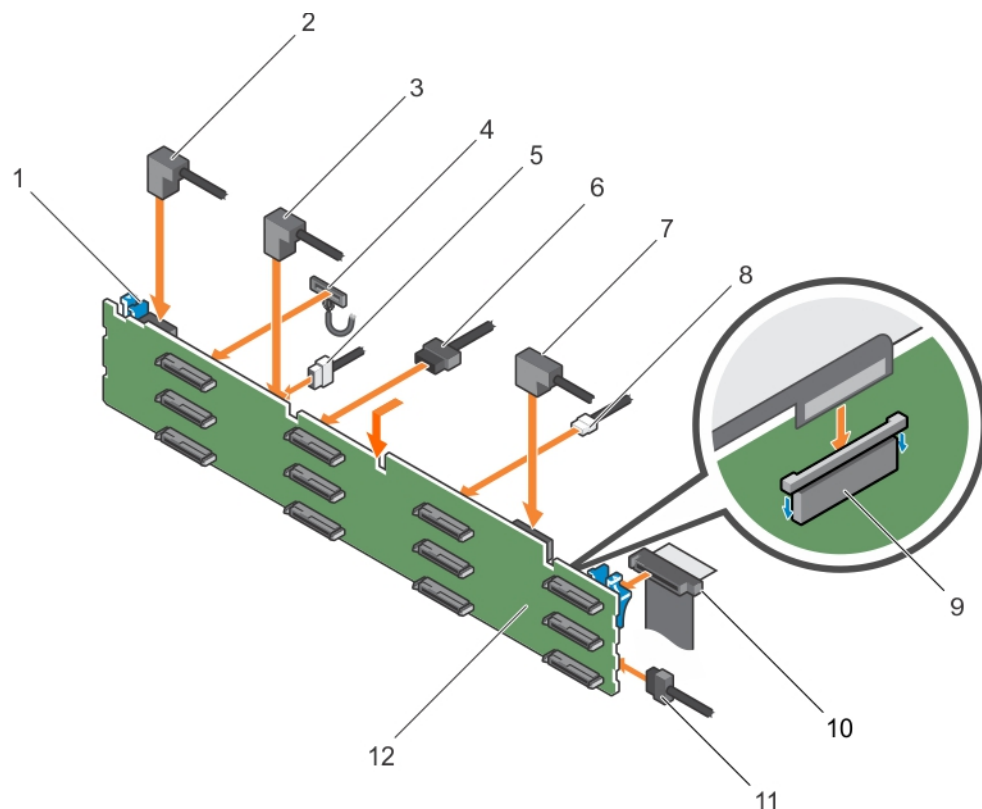
a. release tab (2)
b. SAS cable A2

    c.   SAS cable A1

    d.   left ear control panel cable

    e.   backplane signal cable

    f.   backplane power cable (2)

    g.   SAS cable A0/B0

    h.   USB cable

    i.   control panel cable

    j.   right ear control panel flex cable

    k.   hard drive backplane

    l.   hard drive backplane connector (12)

1. Replace the cooling fan assembly.
2. Replace the cooling shroud.
3. Install the hard drives in their original locations.
4. Follow the procedure listed in the After working inside your system section.

Related tasks

    See also: Before working inside your system
    See also: Installing a hot-swap hard drive
    See also: Installing the cooling fan assembly
    See also: Installing the cooling shroud
    See also: After working inside your system

Related references

    See also: Safety instructions

# Removing the optional hard drive backplane (rear)

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 both hard drives.

> **!** **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 drives and backplane, you must remove the hard drives from the system before removing the backplane.**

> **!** **CAUTION: You must note the number of each hard drive and temporarily label them before removal so that you can replace them in the same locations.**

1. Disconnect all the cables from the backplane.
2. Lift the release pin and slide the backplane toward the front of the chassis.
3. Lift the backplane to remove it from the chassis.

    Figure 75. Removing the optional 2.5 inch (x2) hard drive backplane

a. SAS cable
b. release pin
c. hard drive connector (2)
d. power cable
e. backplane signal cable

Related tasks
See also: Before working inside your system
See also: Removing a hot swappable hard drive or SSD
See also: After working inside your system
Related references
See also: Safety instructions

Installing the optional hard drive backplane (rear)

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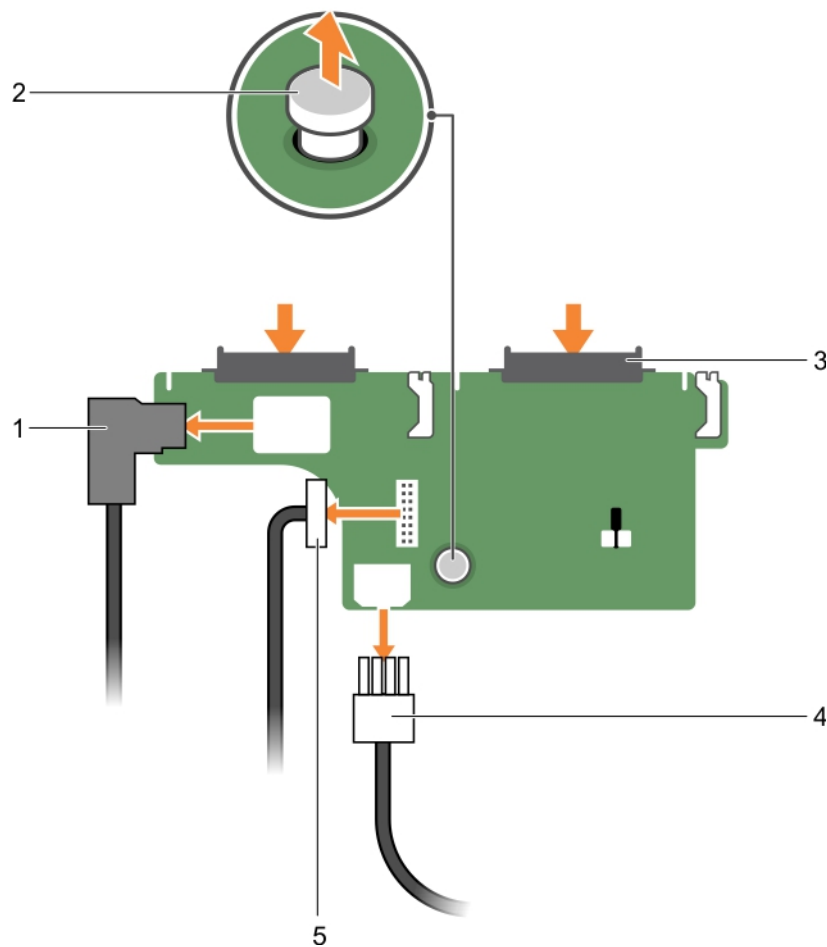2. Follow the procedure listed in the Before working inside your system section.

> ⚠ **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. Align the notches on the backplane with the notches on the chassis.
2. Lift the release pin and slide the backplane toward the back of the chassis until firmly seated.
3. Release the release pin to lock the backplane to the chassis.
4. Reconnect all the cables to the backplane.

Figure 76. Installing the optional 2.5 inch (x2) hard drive backplane
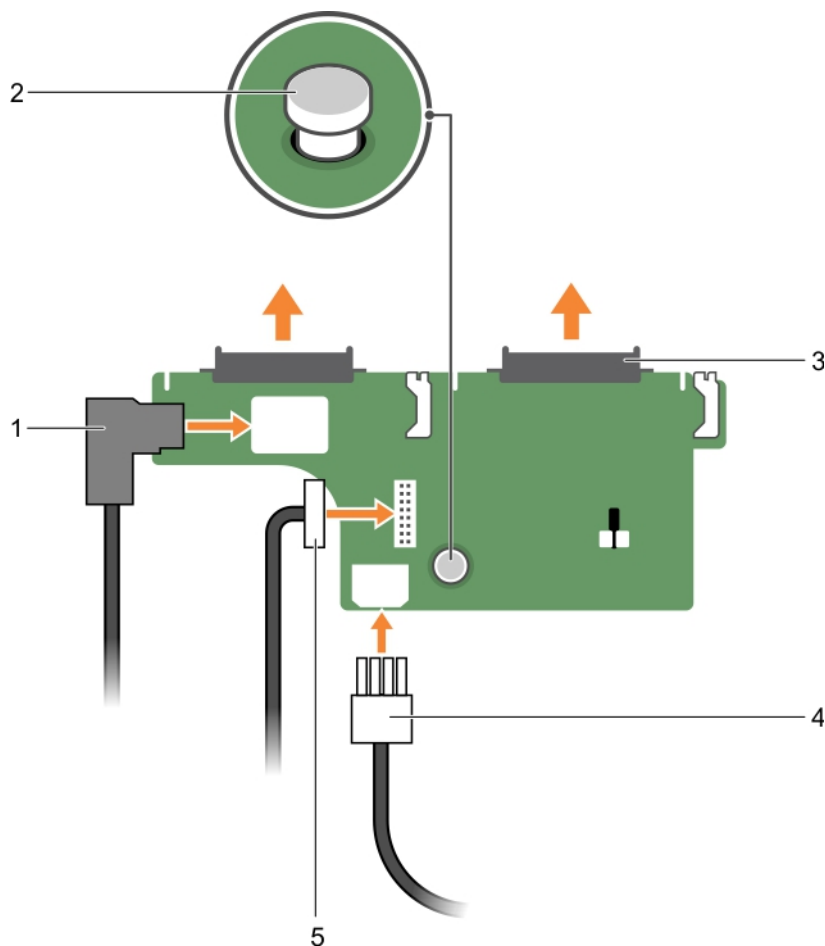
a. SAS cable
b. release pin
c. hard drive connector (2)
d. power cable
e. backplane signal cable

1. Install both the hard drives in their original location.
2. Follow the procedure listed in the After working inside your system section.

Related tasks
    See also: Before working inside your system
    See also: After working inside your system
Related references
    See also: Safety instructions

SD vFlash card (optional)

An SD vFlash card is a Secure Digital (SD) card that plugs into the SD vFlash card slot in the iDRAC port card. It provides persistent on-demand local storage and a custom deployment environment that enables automation of server configuration, scripts, and imaging. It emulates USB device(s). For more information, see the Integrated Dell Remote Access Controller User's Guide at **Dell.com/idracmanuals**.

Replacing an optional SD vFlash media card

1. Locate the SD vFlash media slot on the system.
2. To remove the SD vFlash media card, push the card inward to release it, and pull the card from the card slot.

   Figure 77. Removing the SD vFlash media card

   a. SD vFlash media card
   b. SD vFlash media card slot

3. To install an SD vFlash media card, with the label side facing up, insert the contact-pin end of the SD vFlash media card into the card slot on the module.

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

4. Press the card inward to lock it into the slot.

   Figure 78. Installing the SD vFlash media card
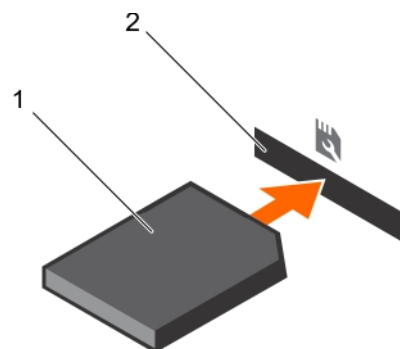
   a. SD vFlash media card
   b. SD vFlash media card slot

Removing the vFlash media unit

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 #1 screwdriver ready.

> ⚠ **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. Remove the screw securing the vFlash media unit to the chassis.
2. Remove the cable from the vFlash media unit and the backplane.
3. Slide the vFlash media unit toward the front of chassis and lift it out of the system.

Figure 79. Removing the vFlash media unit

 a. cable
 b. screw
 c. vFlash media unit
 d. vFlash media slot
 e. standoff

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

Related tasks
 See also: Before working inside your system
 See also: After working inside your system
Related references
 See also: Safety instructions

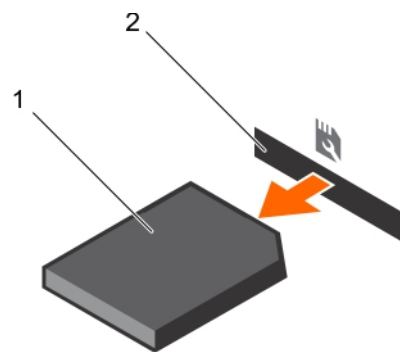# Installing the vFlash media unit

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 #1 screwdriver ready.

> ⚠ **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. Slide the vFlash media unit in and align it with the v Flash media slot on the back of the chassis.
2. Connect the cable to the vFlash media unit.
3. Insert and tighten the screw securing the vFlash media unit to the chassis.

Figure 80. Installing the vFlash media unit

a. cable
b. screw
c. vFlash media unit
d. vFlash media slot
e. standoff

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

Related tasks
See also: Before working inside your system
See also: After working inside your system
Related references
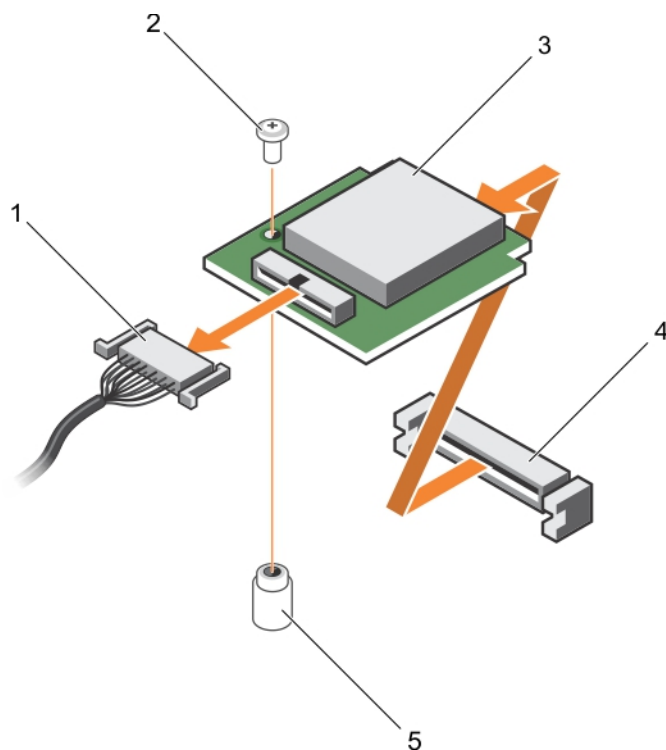See also: Safety instructions

Control panel assembly

Removing the control panel

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

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

Figure 81. Removing the control panel

   a. screw (3)
   b. control panel
   c. hard-drive backplane

d. connector

e. plastic pull tab

1. Replace the control panel.

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

Related tasks

See also: Before working inside your system
See also: Installing the control panel
See also: After working inside your system

Related references

See also: Safety instructions

Installing the control panel

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 handy.

> **!** **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. 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 control panel to the chassis.

> **i** 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 82. Installing the control panel
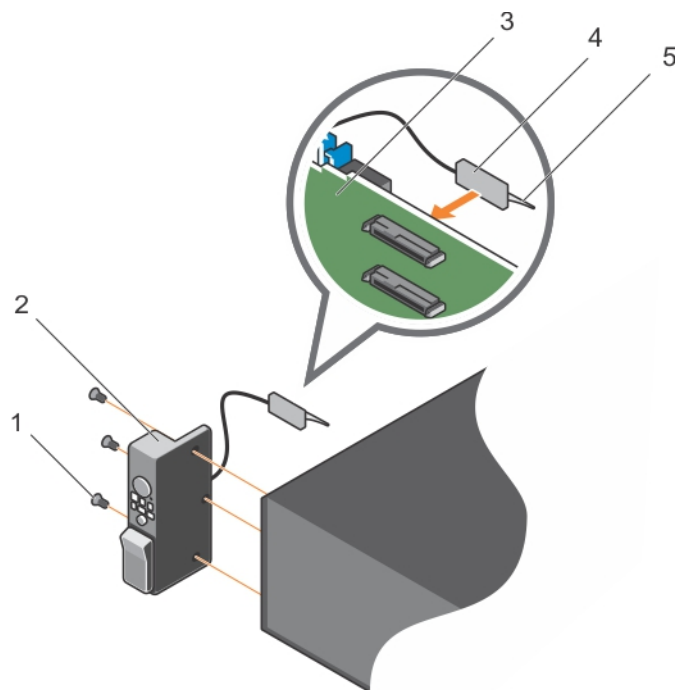
a. screw (3)

b. control panel

c. hard-drive backplane

d. connector

e. plastic pull tab

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

Related tasks
See also: Before working inside your system
See also: After working inside your system

Related references
See also: Safety instructions

Removing the I/O panel
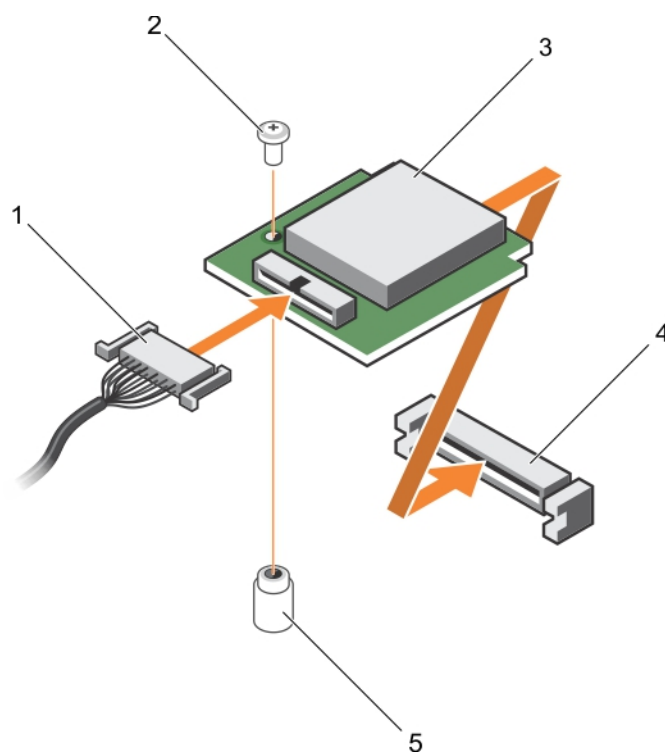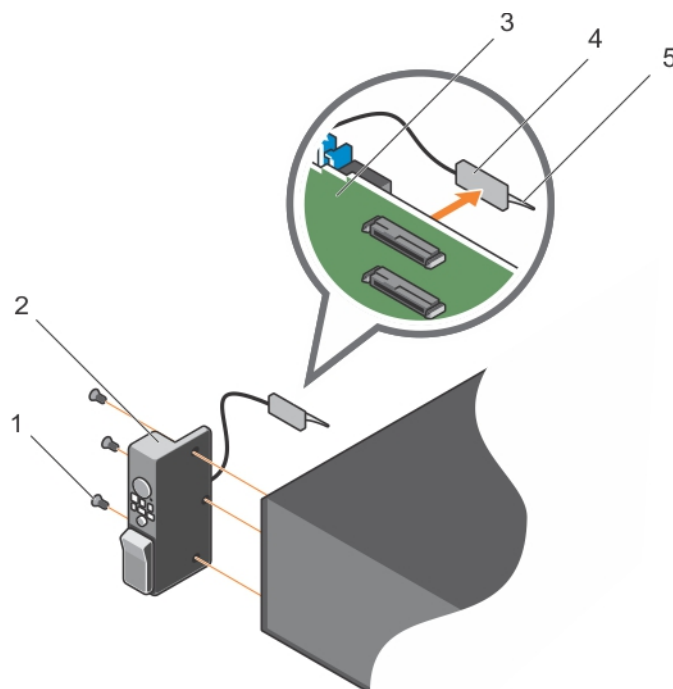
1. Follow the safety guidelines listed in the Safety instructions section.

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

3. Keep the T15 Torx screwdriver ready.

> ▮ **CAUTION: 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 I/O cable, you must release the locking tab before removing or installing the I/O cable from the connector on the hard drive backplane.

1. Rotate the locking tab on the I/O cable connector clockwise 90 degrees to release the lock.
2. Disconnect the I/O cable from the backplane.
3. Remove the screws securing the I/O panel to the chassis.
4. Pull out the I/O panel cable through the channel on the chassis.

Figure 83. Removing the I/O panel
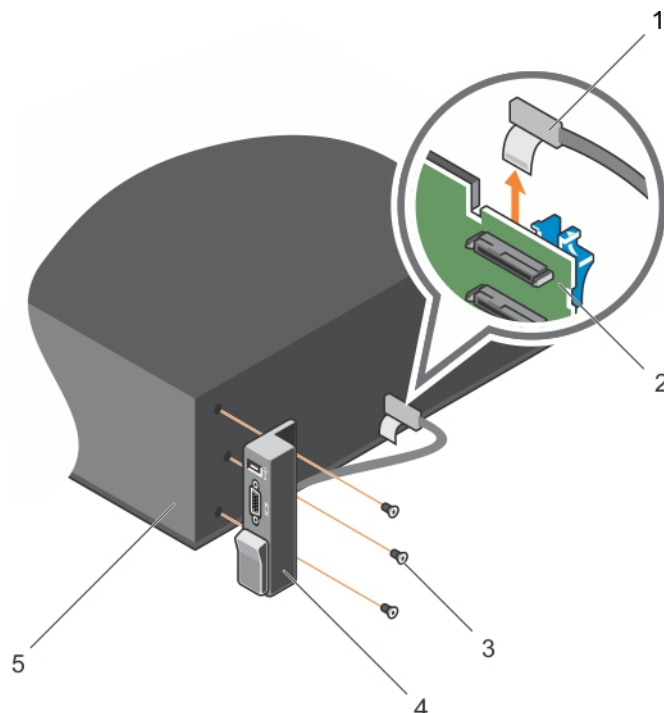
a. I/O panel cable
b. hard drive backplane
c. screw (3)
d. I/O panel
e. chassis

1. Replace the I/O panel.
2. Follow the procedure listed in the After working inside your system section.

Related tasks
    See also: Before working inside your system
    See also: Removing the hard drive backplane
    See also: Installing the I/O panel
    See also: After working inside your system

Related references
    See also: Safety instructions

Installing the I/O panel

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

> ⚠ **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. 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 I/O cable, you must release the locking tab before removing or installing the I/O cable from the connector on the hard drive backplane.**

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

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

Figure 84. Installing the I/O panel
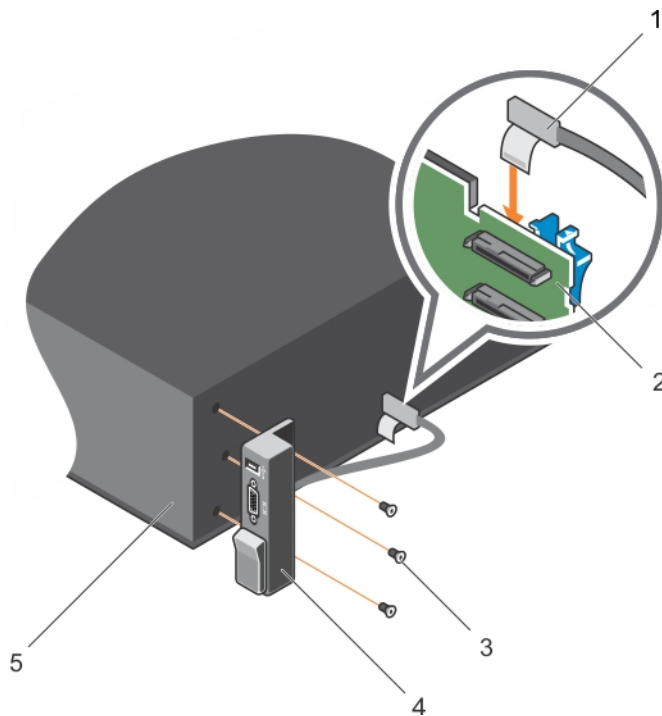
 a. I/O panel cable
 b. hard drive backplane
 c. screw (3)
 d. I/O panel
 e. chassis

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

Related tasks
 See also: Before working inside your system
 See also: After working inside your system
Related references
 See also: Safety instructions

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 requiring additional equipment or risking data loss. If you are unable to fix the problem yourself, service and support personnel can use the diagnostics results to help you solve the problem.

Dell Embedded System Diagnostics

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

The Embedded System Diagnostics provides a set of options for particular device groups or devices allowing you to:

* Run tests automatically or in an interactive mode
* Repeat tests
* Display or save test results
* Run thorough tests to introduce additional test options to provide extra information about the failed device(s)
* View status messages that inform you if tests are completed successfully
* View error messages that inform you of problems encountered during testing

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

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

1. When the system is booting, press F11.
2. Use the up arrow and down arrow keys to select **System Utilities > Launch Diagnostics**.

   The **ePSA Pre-boot System Assessment** window is displayed, listing all devices detected in the system. The diagnostics starts executing the tests on all the detected devices.

Running the Embedded System Diagnostics from the Dell Lifecycle Controller

1. As the system boots, press F11.
2. Select **Hardware Diagnostics** → **Run Hardware Diagnostics**.

   The **ePSA Pre-boot System Assessment** window is displayed, listing all devices detected in the system. The diagnostics starts executing the tests on all the detected devices.

System diagnostic controls

Menu

Description

Configuration

Displays the configuration and status information of all detected devices.

Results

Displays the results of all tests that are run.

System health

Provides the current overview of the system performance.

Event log

Displays a time-stamped log of the results of all tests run on the system. This is displayed if at least one event description is recorded.

Jumpers and connectors

System board jumper settings

Table 35. System board jumper settings

System board jumper settings.

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

Related tasks

See also: Disabling a forgotten password

System board jumpers and connectors

Figure 85. System board jumpers and connectors
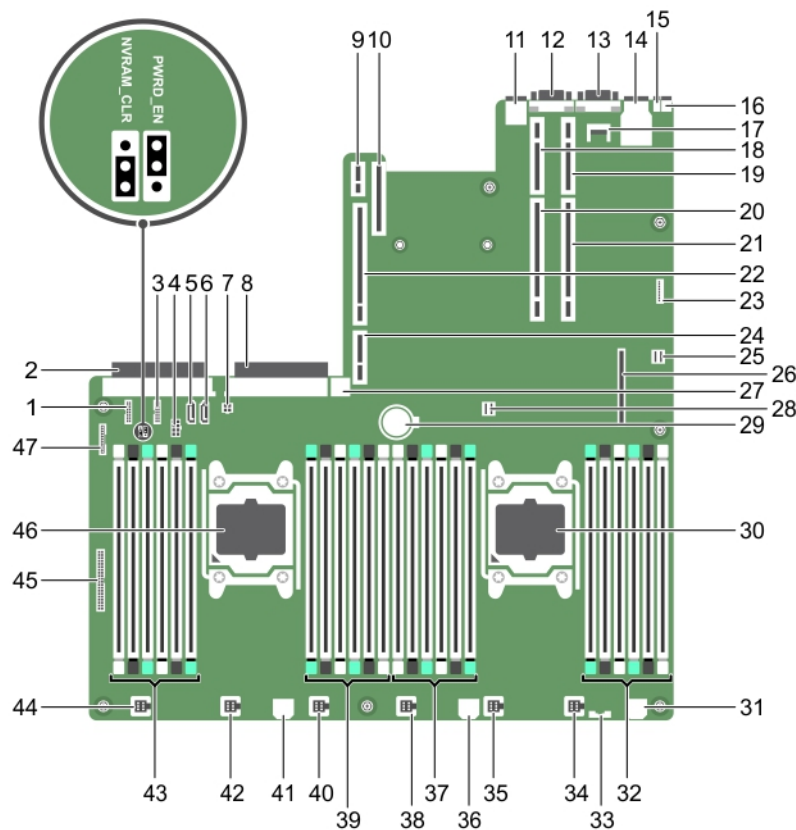
Table 36. System board connectors and jumpers

System board connectors and jumpers.

Item	Connector	Description
1	J_BP_SIG1	Backplane signal connector 1
2	J_PS_2	PSU 2 connector
3	J_BP_SIG0	Backplane signal connector 0
4	J_BP0	Backplane power connector 0
5	J_SATA_CD	Optical drive SATA connector
6	J_SATA_TBU	Tape backup unit SATA connector
7	J_TBU	Tape backup unit power connector

Item	Connector	Description
8	J_PS_1	PSU 1 connector
9	J_IDSDM	Internal dual SD module connector
10	J_NDC	Network daughter card connector
11	J_USB	USB port
12	J_VIDEO_REAR	Video connector
13	J_COM1	Serial connector
14	J_IDRAC_RJ45	iDRAC8 connector
15	J_CYC	System identification connector
16	CYC_ID	System identification button
17	J_TPM_MODULE	Trusted Platform Module connector
18	J_RISER_2AX	Riser 3 connector
19	J_RISER_1AX	Riser 1 connector
20	J_RISER_2BX	Riser 2 connector
21	J_RISER_1BX	Riser 1 connector
22	J_RISER_3AX	Riser 3 connector
23	J_QS	Quick Sync bezel connector
24	J_RISER_3BX	Riser 3 connector
25	J_SATA_B	Internal SAS connector
26	J_STORAGE	Mini PERC connector
27	J_USB_INT	Internal USB port
28	J_SATA_A	Internal SAS connector
29	BAT	Battery connector
30	CPU 2	Processor 2 socket
31	J_BP3	Backplane power connector 3

Item	Connector	Description
32	B10, B6, B2, B9, B5, B1	Memory module sockets
33	J_BP_SIG2	Backplane signal connector 2
34	J_FAN2U_6	Cooling fan connector
35	J_FAN2U_5	Cooling fan connector
36	J_BP2	Backplane power connector 2
37	B3, B7, B11, B4, B8, B12	Memory module sockets
38	J_FAN2U_4	Cooling fan connector
39	A10, A6, A2, A9, A5, A1	Memory module sockets
40	J_FAN2U_3	Cooling fan connector
41	J_BP1	Backplane power connector
42	J_FAN2U_2	Cooling fan connector
43	A3, A7, A11, A4, A8, A12	Memory module sockets
44	J_FAN2U_1	Cooling fan connector
45	J_CTRL_PNL	Control panel signal connector
46	CPU 1	Processor 1 socket
47	J_FP_USB	Front panel USB port

Disabling a forgotten password

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

> ⚠ **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. 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.

> **i** | 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 the system on, 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 the system on, including any attached peripherals.
11. Assign a new system and/or setup password.

Troubleshooting your system

Safety first — for you and 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.**

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 before troubleshooting any external devices.

Troubleshooting the video subsystem

> **i** NOTE: Ensure the **Local Server Video Enabled** option is selected in the iDRAC Graphical User Interface (GUI), under **Virtual Console**. If this option is not selected, local video is disabled.

1. Check the cable connections (power and display) to the monitor.
2. Check the video interface cabling from the system to the monitor.
3. Run the appropriate diagnostic test.

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

If the tests fail, see the Getting help section.

Related references
   See also: Getting help

Troubleshooting a USB device

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

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.

   ℹ 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. In **iDRAC Settings Utility**, ensure that **USB Management Port Mode** is configured as **Automatic** or **Standard OS Use**.
6. 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.

7. Turn off all attached USB devices, and disconnect them from the system.
8. Restart the system.
9. 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.
10. Check if USB 3.0 is enabled in System Setup. If it is enabled, disable it and restart your system.
11. 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
12. In the **IDRAC Settings Utility**, ensure that **USB Management Port Mode** is configured as **Automatic** or **Standard OS Use**.
13. Reconnect and turn on each USB device one at a time.
14. 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.

If all troubleshooting fails, see the Getting help section.

Related references
   See also: Getting help
   See also: System board jumper settings

Troubleshooting iDRAC Direct (USB XML configuration)

For information about USB storage device and server configuration, see the Integrated Dell Remote Access Controller User's Guide at **Dell.com/idracmanuals**.

1. Ensure that your USB storage device is connected to the front USB Management Port, identified by ⚡ icon.
2. Ensure that your USB storage device is configured with an NTFS or an FAT32 file system with only one partition.
3. Verify that the USB storage device is configured correctly. For more information about configuring the USB storage device, see the Integrated Dell Remote Access Controller User's Guide at **Dell.com/idracmanuals**.
4. In the **iDRAC Settings Utility**, ensure that **USB Management Port Mode** is configured as **Automatic** or **iDRAC Direct Only**.
5. Ensure that the **iDRAC Managed: USB XML Configuration** option is either **Enabled** or **Enabled only when the server has default credential settings**.
6. Remove and reinsert the USB storage device.
7. If import operation does not work, try with a different USB storage device.

   If all troubleshooting fails, see the Getting help section.

Related references
   See also: Getting help

Troubleshooting iDRAC Direct (Laptop connection)

For information about USB laptop connection and server configuration, see the Integrated Dell Remote Access Controller User's Guide at **Dell.com/idracmanuals**.

1. Ensure that your laptop is connected to the front USB Management Port, identified by ⚡ icon with a USB Type A/A cable.
2. On the **iDRAC Settings Utility** screen, ensure that **USB Management Port Mode** is configured as **Automatic** or **iDRAC Direct Only**.
3. If the laptop is running Windows operating system, ensure that the iDRAC Virtual USB NIC device driver is installed.
4. If the driver is installed, ensure that you are not connected to any network through WiFi or cabled ethernet, as iDRAC Direct uses a non-routable address.

   If all troubleshooting fails, see the Getting help section.

Related references
   See also: Getting help

Troubleshooting a serial I/O device

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 serial device.

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

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

If the problem persists, see the Getting help section.

Related references
   See also: Getting help

Troubleshooting a NIC

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 network cables are of the proper type and do not exceed the maximum length.

If the problem persists, see the Getting help section.

Related references
   See also: Getting help
   See also: Using system diagnostics

Troubleshooting a wet 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. 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 fans
   - 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.

   If the problem persists, see the Getting help section.

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.

If the tests fail, see the Getting help section.

Related references
   See also: Getting help
   See also: Using system diagnostics

Troubleshooting a damaged 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. 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 fans

   ◦ processor(s) and heat sink(s)

   ◦ memory modules

   ◦ hard drive carriers/cage

   ◦ hard 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.

If the problem persists, see the Getting help section.

Related references
   See also: Getting help
   See also: Using system diagnostics

Troubleshooting the system battery

! 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.**

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

i | 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.

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.

   If the problem persists, see the Getting help section.

Related references
   See also: Getting help

Troubleshooting power supply units

! | 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.

Troubleshooting power source problems

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.

Troubleshooting power supply unit problems

1. Ensure that no loose connections exist.

   For example, loose power cables.

2. Ensure that the power supply handle/LED indicates that the power supply is working properly.
3. If you have recently upgraded your system, ensure that the power supply unit has enough power to support the new system.
4. If you have a redundant power supply configuration, ensure that both the power supply units are of the same type and wattage.

If the LED You may have to upgrade to a higher wattage power supply unit.

5. Ensure that you use only power supply units with the Extended Power Performance (EPP) label on the back.

6. Reseat the power supply unit.

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

If the problem persists, see the Getting help section.

Related references

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, memory module blank, 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 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 the Integrated Dell Remote Access User's Guide at **Dell.com/idracmanuals**.

Troubleshooting 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.**

i NOTE: The fan number is referenced by the systems management software. 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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
1. Reseat the fan or the fan's power cable.
2. Restart the system.
1. Follow the procedure listed in the After working inside your system section.
2. If the problem persists, see the Getting help section.

Related tasks
   See also: Before working inside your system
Related references
   See also: Getting help
   See also: Safety instructions

Troubleshooting system memory

! 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. If the system is operational, run the appropriate system diagnostic test. See the Using system diagnostics section for the available diagnostic tests.

   If the diagnostic tests indicate a fault, follow the corrective actions 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.

   i 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 the installed DIMM type(s), incorrect DIMM installation, or defective DIMM(s). 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.

If the problem persists, see the Getting help section.

Related references
    See also: Getting help
    See also: Using system diagnostics

Troubleshooting an internal USB key

> ⚠ 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. Enter System Setup and ensure that the **USB key port** is enabled on the **Integrated Devices** screen.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Locate the USB key and reseat it.
5. Install the system cover.
6. Turn on the system and attached peripherals, and check if the USB key is functioning.
7. If the problem is not resolved, repeat step 2 and step 3.
8. Insert a known working USB key.
9. Install the system cover.

If the problem persists, see the Getting help section.

Related references
    See also: Getting help

Troubleshooting an SD card

> ⚠ 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.**

> ℹ NOTE: Certain SD cards have a physical write-protect switch on the card. If the write-protect switch is turned on, the SD card is not writable.

1. Enter System Setup, and ensure that the **Internal SD Card Port** is enabled.
2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.

> **i**　NOTE: When an SD card failure occurs, the internal dual SD module controller notifies the system. On the next restart, the system displayed a message indicating the failure. If redundancy is enabled at the time of SD card failure, a critical alert will be logged and chassis health will degrade.

4. Replace the failed SD card with a new SD card.
5. Install the system cover.
6. Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.
7. Enter System Setup, and ensure that the **Internal SD Card Port** and **Internal SD Card Redundancy** modes are set to the needed modes.

   Verify that the correct SD slot is set as **Primary SD Card**.

8. Check if the SD card is functioning properly.
9. If the **Internal SD Card Redundancy** option is set to **Enabled** at the time of the SD card failure, the system prompts you to perform a rebuild.

> **i**　NOTE: The rebuild is always sourced from the primary SD card to the secondary SD card.

Troubleshooting an optical 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.**

1. Try using a different CD or DVD.
2. If the problem is not resolved, enter System Setup and ensure that the integrated SATA controller and the drive's SATA port are enabled.
3. Run the appropriate diagnostic test.
4. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
5. If installed, remove the bezel.
6. Remove the system cover.
7. Ensure that the interface cable is securely connected to the optical drive and to the controller.
8. Ensure that a power cable is properly connected to the drive.
9. Install the system cover.

If the problem persists, see the Getting help section.

Related references
　　See also: Getting help

Troubleshooting a tape backup unit

> ⚠ **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. Use a different tape cartridge.
2. Ensure that the device drivers for the tape backup unit are installed and are configured correctly. See your tape drive documentation for more information about device drivers.
3. Reinstall the tape-backup software as instructed in the tape-backup software documentation.
4. Ensure that the interface cable of the tape drive is connected to the external port on the controller card.
5. Perform the following steps to ensure that the controller card is properly installed:
   a. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
   b. Remove the system cover.
   c. Reseat the controller card in the expansion card slot.
   d. Install the system cover.
   e. Turn on the system and attached peripherals.
6. Run the appropriate diagnostic test. For more information, see the Using system diagnostics.

If you cannot resolve the problem, see the Getting help section.

Related references
   See also: Getting help

Troubleshooting a hard drive

> ⚠ **CAUTION: This troubleshooting procedure can erase data stored on the hard drive. Before you proceed, back up all files on the hard 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.**

1. Run the appropriate diagnostic test. See the Using system diagnostics section.

   Depending on the results of the diagnostics test, proceed as needed through the following steps.

2. If your system has a RAID controller and your hard drives are configured in a RAID array, perform the following steps:
   a. Restart the system and press F10 during system startup to run the Dell Lifecycle Controller, and then run the Hardware Configuration wizard to check the RAID configuration.

   See the Dell Lifecycle Controller documentation or online help for information about RAID configuration.

   b. Ensure that the hard drives are configured correctly for the RAID array.
   c. Take the hard drive offline and reseat the drive.

d.   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. See the operating system documentation for more information.

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.

If the problem persists, see the Getting help section.

Related references
    See also: Getting help
    See also: Using system diagnostics

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.**

> **i** NOTE: When troubleshooting a SAS or PERC controller, see the documentation for your operating system and the controller.

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. If the tests fail, see the Getting help 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.

If the problem persists, see the Getting help section.

Related tasks
    See also: Removing the system cover
    See also: Removing an expansion card from expansion card riser 2 or 3
    See also: Installing an expansion card into the expansion card riser 2 or 3
    See also: Installing the system cover
Related references

See also: Getting help
See also: Using system diagnostics
See also: Safety instructions

Troubleshooting expansion cards

> ⚠ **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.**

> ℹ NOTE: When troubleshooting an expansion card, you also have to see the documentation for your operating system and the expansion card.

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.

    If the tests fail, see the Getting help 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.

If the problem persists, see the Getting help section.

Related tasks
  See also: Removing the system cover
  See also: Removing an expansion card from expansion card riser 2 or 3
  See also: Installing an expansion card into the expansion card riser 2 or 3
  See also: Installing the system cover
Related references
  See also: Getting help
  See also: Using system diagnostics
  See also: Safety instructions

Troubleshooting processors

⚠ **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. 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.
7. If the problem persists, see the Getting help section.

Related tasks
    See also: Removing the system cover
    See also: Installing the system cover
Related references
    See also: Getting help
    See also: Using system diagnostics

System messages

For a list of event and error messages generated by the system firmware and agents that monitor system components, see the Dell Event and Error Messages Reference Guide at **Dell.com/openmanagemanuals > OpenManage software**.

Warning messages

A warning message alerts you to a possible problem and prompts you to respond before the system continues a task. For example, before you format a hard drive, a message warns you that you may lose all data on the hard drive. Warning messages usually interrupt the task and need you to respond by typing y (yes) or n (no).

ℹ NOTE: Warning messages are generated by either the application or the operating system. For more information, see the documentation that shipped with the operating system or application.

Diagnostic messages

The system diagnostic utility will generate messages if there are errors detected when you run diagnostic tests on your system. For more information about system diagnostics, see the Using system diagnostics section.

Alert messages

The systems management software generates alert messages for your system. Alert messages include information, status, warning, and failure messages for drive, temperature, fan, and power conditions. For more

information, see the systems management software documentation links listed in the Documentation resources section of this manual.