Dell PowerEdge T430

Owner's Manual

DELLEMC

Notes, cautions, and warnings

NOTE: A NOTE indicates important information that helps you make better use of your product.

CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

Contents

Dell PowerEdge T430 system overview

The Dell PowerEdge T430 is a rackable tower server that supports up to two processors based on the Intel Xeon E5-2600 v3 or v4 processor family, up to 12 DIMMs, and storage capacity of up to 16 hard drives/SSDs.

The T430 is available in the following configurations:

Table 1. Dell PowerEdge T430 system configurations

System	Configuration
3.5 inch hard-drive system	Up to four 3.5 inch cabled hard drives
	Up to eight 3.5 inch hot-swappable hard drives
2.5 inch hard-drive system	Up to sixteen 2.5 inch hot-swappable hard drives

Topics:

- Supported configurations on PowerEdge T430 systems
- Front panel
- Back panel features
- Diagnostic indicators
- Locating Service Tag of your system

Supported configurations on PowerEdge T430 systems

AC PSU: 450 W, 495 W, 750 W or 1100 W

iDRAC8 Enterprise or Express

2 x Xeon E5-2600 v3 or v4 processors

RDIMM, 12 x 32 GB, 4R, 2400 MT/s at 1.2 V

- 4 x 3.5" HDD
- 8 x 3.5" hot swappable HDD/SSD
- 16 x 2.5" HDD/SSD

Optional Optical drive

Optional Tape drive (up to 2 tape drives with hot swappable hard drive)
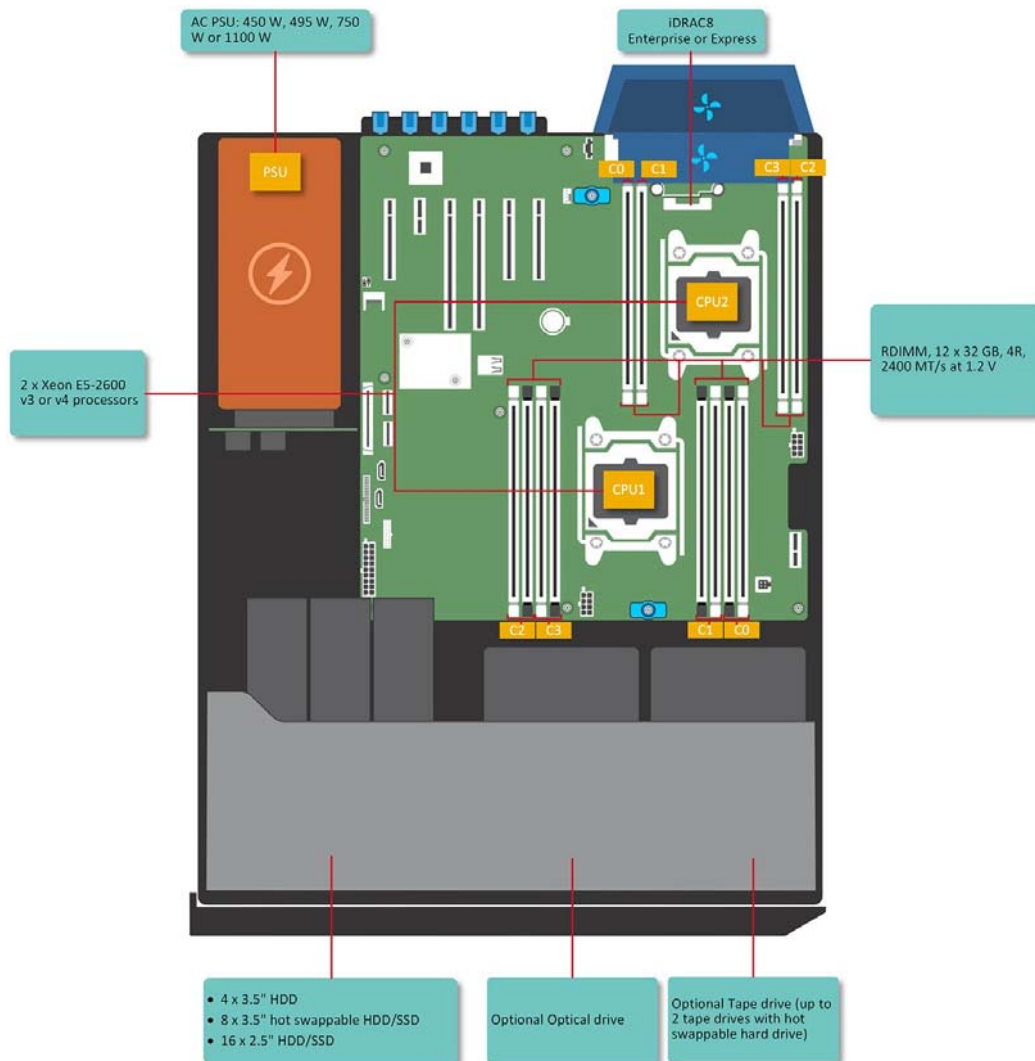
Figure 1. System view with supported configurations

Front panel

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

Front panel features of 16 x 2.5-inch hot swappable hard drive chassis
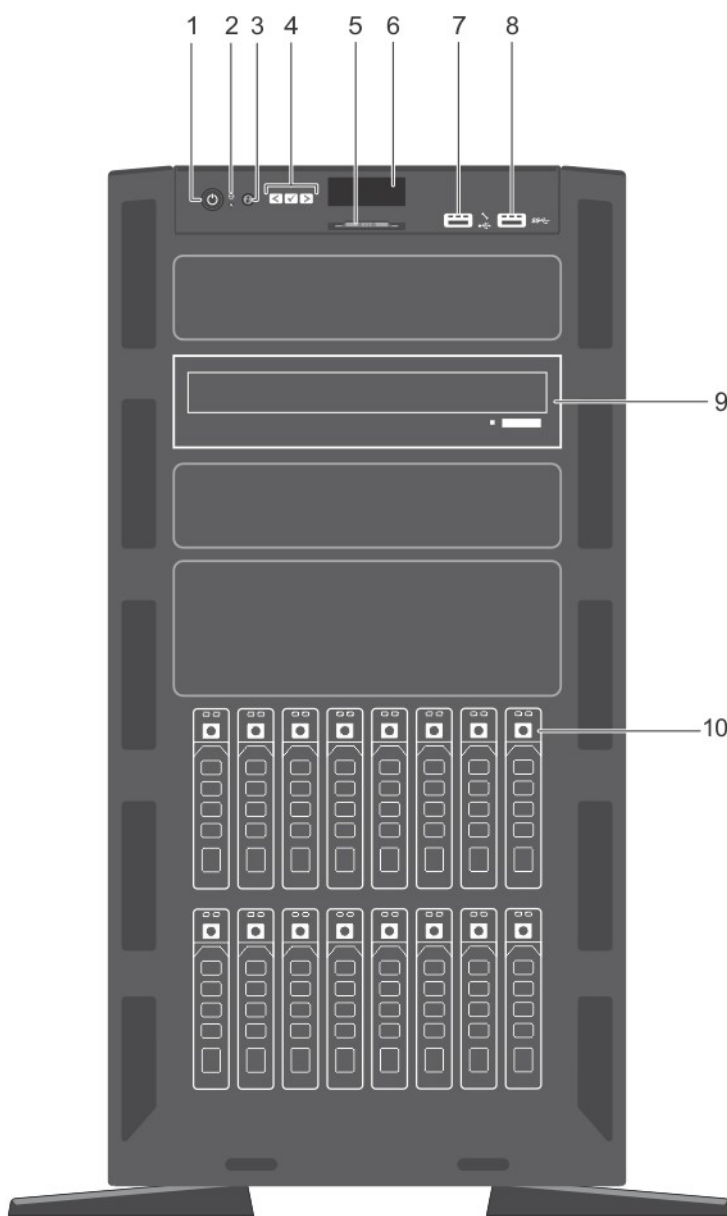
Figure 2. Front panel features a 16 x 2.5-inch hot swappable hard drive chassis

1	Power button	2	NMI button

3	System identification button	4	LCD menu buttons
5	Information tag	6	LCD panel
7	USB management port/iDRAC Direct port	8	USB port
9	Optical drive or tape-drive bay	10	Physical drives

Table 2. Front panel features - 16 x 2.5-inch hot swappable hard drive chassis

Indicator, button, or connector	Icon	Description
Power button	⏻	Indicates if the system is turned on or off. Press the power button to manually turn on or off the system. ⓘ NOTE: Press the power button to gracefully shut down an ACPI-compliant operating system.
NMI button	⊖	Press the Non-Maskable Interrupt (NMI) button to troubleshoot software application and device driver errors when running certain operating systems. Use the end of a paper clip to press the NMI button. ⓘ NOTE: Use the NMI button only if directed to do so by qualified support personnel or by the operating system documentation.
System identification button	ⓘ	ⓘ NOTE: To reset the iDRAC (if not disabled on the iDRAC setup page by pressing F2 during system boot), press and hold the System ID button for more than 15 seconds.
LCD menu buttons		The LCD menu buttons enables you to perform actions similar to GUI, RACADM, and the WS-Man interfaces.
Information tag		The Information Tag is a slide-out label panel that contains system information such as Service Tag, NIC, MAC address, and so on. If you have opted for secure default access to iDRAC, the Information tag also contains the iDRAC secure default password.
LCD panel		The LCD panel displays system ID, status information, and system error messages. For more information, see the LCD panel section. ⓘ NOTE: The LCD panel is not available in a cabled hard-drive system.
USB management port/iDRAC Direct port	•←←↙	The iDRAC Direct port is micro USB 2.0-compliant. This port enables you to access the iDRAC Direct features. For more information, see the iDRAC User's Guide at Dell.com/idracmanuals.
USB port	ss←←	The USB ports are 9-pin and 3.0-compliant. These ports enable you to connect USB devices to the system.
Optical drive or tape-drive bay		Allows you to install optical drives or tape drives. For more information on supported optical drives and tape drives, see the Optical drives and tape drives section..
Physical drives		3.5 inch hard drives and 2.5 inch hard drives/SSDs.

Related links

LCD panel
Optical drives and tape drives (optional)

Front panel features of a 8 x 3.5-inch hot swappable hard drive chassis

Figure 3. Front panel features of a 8 x 3.5-inch hot swappable hard drive chassis

1   Power button

2   NMI button

3   System identification button

4   LCD menu buttons

5   Information tag

6   LCD panel

7   USB management port/iDRAC Direct port

8   USB port

9   Optical drive or tape-drive bay

10   Physical drives

Table 3. Front panel features — 8 x 3.5-inch hot swappable hard drive chassis

Indicator, button, or connector	Icon	Description
Power button	⏻	Indicates if the system is turned on or off. Press the power button to manually turn on or off the system. ⓘ NOTE: Press the power button to gracefully shut down an ACPI-compliant operating system.
NMI button	⊝	Press the Non-Maskable Interrupt (NMI) button to troubleshoot software application and device driver errors when running certain operating systems. Use the end of a paper clip to press the NMI button. ⓘ NOTE: Use the NMI button only if directed to do so by qualified support personnel or by the operating system documentation.
System identification button	ⓘ	ⓘ NOTE: To reset the iDRAC (if not disabled on the iDRAC setup page by pressing F2 during system boot), press and hold the System ID button for more than 15 seconds.
LCD menu buttons		The LCD menu buttons enables you to perform actions similar to GUI, RACADM, and the WS-Man interfaces.
Information tag		The Information Tag is a slide-out label panel that contains system information such as Service Tag, NIC, MAC address, and so on. If you have opted for secure default access to iDRAC, the Information tag also contains the iDRAC secure default password.
LCD panel		The LCD panel displays system ID, status information, and system error messages. For more information, see the LCD panel section. ⓘ NOTE: The LCD panel is not available in a cabled hard-drive system.
USB management port/iDRAC Direct port	•⟨↜	The iDRAC Direct port is micro USB 2.0-compliant. This port enables you to access the iDRAC Direct features. For more information, see the iDRAC User's Guide at Dell.com/idracmanuals.
USB port	ss↜	The USB ports are 9-pin and 3.0-compliant. These ports enable you to connect USB devices to the system.
Optical drive or tape-drive bay		Allows you to install optical drives or tape drives. For more information on supported optical drives and tape drives, see the Optical drives and tape drives section..
Physical drives		3.5 inch hard drives and 2.5 inch hard drives/SSDs.

Related links
   LCD panel
   Optical drives and tape drives (optional)

Front panel features of 8 x 3.5-inch hot swappable hard drive chassis in rack mode
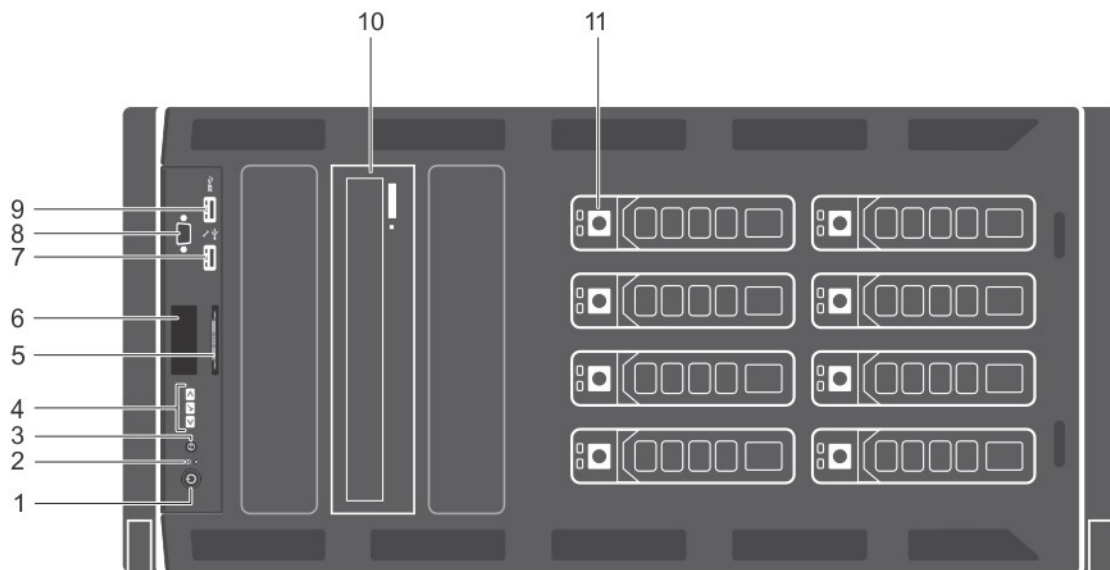
Figure 4. Front panel features - 8 x 3.5-inch hot swappable hard drive chassis in rack mode

1   Power button

2   NMI button

3   System identification button

4   LCD menu buttons

5   Information tag

6   LCD panel

7   USB management port/iDRAC Direct port

8   Video connector

9   USB port

10 Optical drive or tape-drive bay

11 Physical drives

Table 4. Front panel features — 8 x 3.5-inch hot swappable hard drive chassis

Indicator, button, or connector	Icon	Description
Power button	⏻	Indicates if the system is turned on or off. Press the power button to manually turn on or off the system. ⓘ NOTE: Press the power button to gracefully shut down an ACPI-compliant operating system.
NMI button	⊖	Press the Non-Maskable Interrupt (NMI) button to troubleshoot software application and device driver errors when running certain operating systems. Use the end of a paper clip to press the NMI button.

Indicator, button, or connector	Icon	Description
		(i) NOTE: Use the NMI button only if directed to do so by qualified support personnel or by the operating system documentation.
System identification button	(i)	(i) NOTE: To reset the iDRAC (if not disabled on the iDRAC setup page by pressing F2 during system boot), press and hold the System ID button for more than 15 seconds.
LCD menu buttons		The LCD menu buttons enables you to perform actions similar to GUI, RACADM, and the WS-Man interfaces.
Information tag		The Information Tag is a slide-out label panel that contains system information such as Service Tag, NIC, MAC address, and so on. If you have opted for secure default access to iDRAC, the Information tag also contains the iDRAC secure default password.
LCD panel		The LCD panel displays system ID, status information, and system error messages. For more information, see the LCD panel section. (i) NOTE: The LCD panel is not available in a cabled hard-drive system.
USB management port/iDRAC Direct port	●⟨⁺⟩	The iDRAC Direct port is micro USB 2.0-compliant. This port enables you to access the iDRAC Direct features. For more information, see the iDRAC User's Guide at Dell.com/idracmanuals.
Video connector		Enables you to connect a display device to the system. For more information, see the Technical specifications section. (i) NOTE: The video connector is available only in the rack-mode configuration of your system. For information on converting your system from tower to the rack mode, see the Preparing a system for conversion from tower mode to rack mode section.
USB port	SS⟨⁺	The USB ports are 9-pin and 3.0-compliant. These ports enable you to connect USB devices to the system.
Optical drive or tape-drive bay		Allows you to install optical drives or tape drives. For more information on supported optical drives and tape drives, see the Optical drives and tape drives section..
Physical drives		3.5 inch hard drives and 2.5 inch hard drives/SSDs.

Related links

LCD panel
Optical drives and tape drives (optional)
Technical specifications
Preparing a system for conversion from tower mode to rack mode

Front panel features of 4 x 3.5-inch cabled hard drive chassis
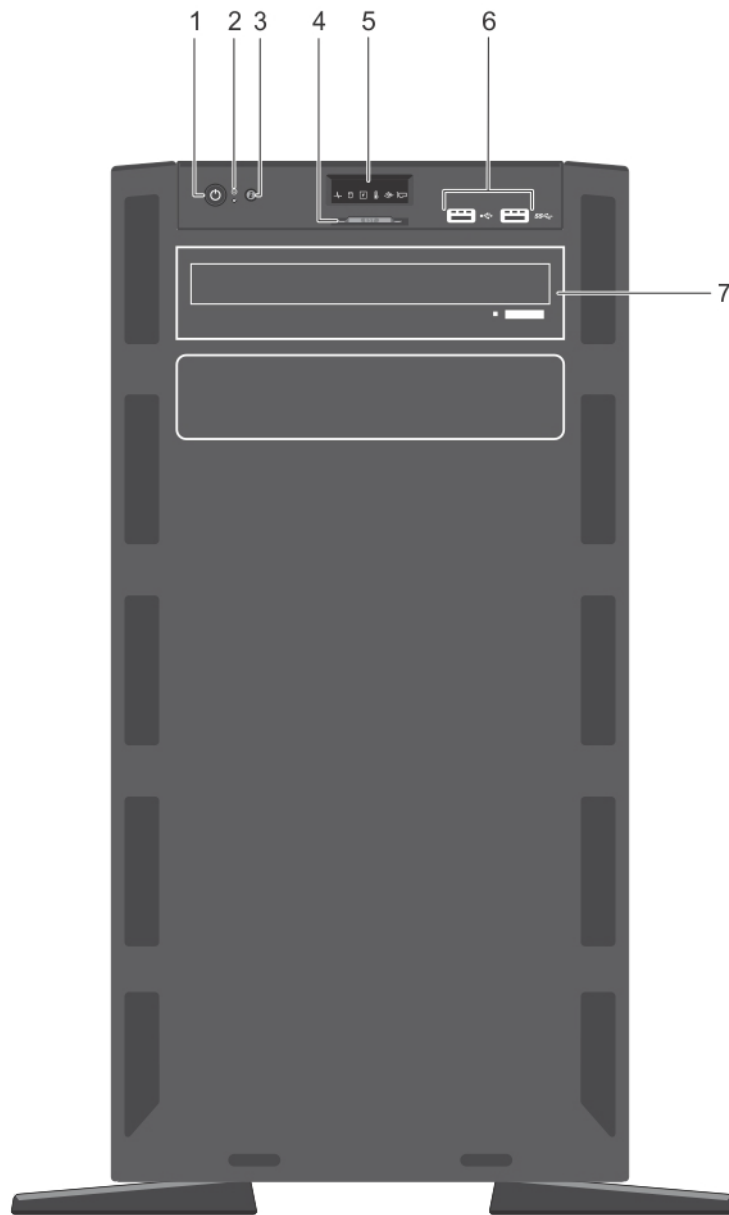
Figure 5. Front panel features and indicators- 4 x 3.5 inch cabled hard-drive chassis

1   Power button
2   NMI button
3   System identification button
4   Information tag
5   Diagnostic indicators
6   USB ports
7   Optical drive or tape-drive bay

Table 5. Front panel features - 4 x 3.5-inch cabled hard drive chassis

Indicator, Button, or Connector	Icon	Description
Power button	⏻	Indicates if the system is turned on or off. Press the power button to manually turn on or off the system. ⓘ NOTE: Press the power button to gracefully shut down an ACPI-compliant operating system.
NMI button	⊙	Press the Non-Maskable Interrupt (NMI) button to troubleshoot software application and device driver errors when running certain operating systems. Use the end of a paper clip to press the NMI button. ⓘ NOTE: Use the NMI button only if directed to do so by qualified support personnel or by the operating system documentation.
System identification button	ⓘ	ⓘ NOTE: To reset the iDRAC (if not disabled on the iDRAC setup page by pressing F2 during system boot), press and hold the System ID button for more than 15 seconds.
Information tag		The Information Tag is a slide-out label panel that contains system information such as Service Tag, NIC, MAC address, and so on. If you have opted for secure default access to iDRAC, the Information tag also contains the iDRAC secure default password.
Diagnostic indicators		The diagnostic indicators on the system front panel display error status during system startup. For more information, see the Diagnostic indicators section.
USB ports	⇜ ss⇜	Allows you to connect USB devices to the system. One port is USB 2.0-compliant and one port is USB 3.0-compliant.
Optical drive or tape-drive bay		Allows you to install optical drives or tape drives. For more information on supported optical drives and tape drives, see the Optical drives and tape drives section.

Related links

LCD panel
Optical drives and tape drives (optional)
Diagnostic indicators

LCD panel

The LCD panel of your system provides system information, status, and error messages to indicate if the system is functioning correctly or if the system needs attention. For more information about error messages, see the *Dell Event and Error Messages Reference Guide* at Dell.com/openmanagemanuals >OpenManage software.

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

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

- The LCD backlight is turned off when the system is in standby mode and can be turned on by pressing either the Select, Left, or Right button on the LCD panel.
- The LCD backlight remains off if LCD messaging is turned off using the iDRAC utility, the LCD panel, or other tools.
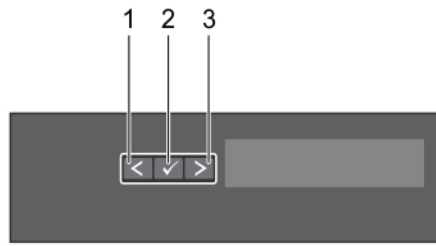
Figure 6. LCD panel features

Table 6. LCD panel features

Item	Button	Description
1	Left	Moves the cursor back in one-step increments.
2	Select	Selects the menu item highlighted by the cursor.
3	Right	Moves the cursor forward in one-step increments. During message scrolling: • Press and hold the button to increase scrolling speed. • Release the button to stop. NOTE: The display stops scrolling when the button is released. After 45 seconds of inactivity, the display starts scrolling.

Viewing Home screen

The Home screen displays user-configurable information about the system. This screen is displayed during normal system operation when there are no status messages or errors. When the system is in standby mode, the LCD backlight turns off after a few minutes of inactivity, if there are no error messages.

1 To view the Home screen, press one of the three navigation buttons (Select, Left, or Right).

2 To navigate to the Home screen from another menu, complete the following steps:

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

b Navigate to the ⬆ using the up arrow ⬆

c Select the Home icon.

d On the Home screen, press the Select button to enter the main menu.

Setup menu

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

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

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

View menu

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

Option	Description
iDRAC IP	Displays the IPv4 or IPv6 addresses for iDRAC8. Addresses include DNS (Primary and Secondary), Gateway, IP, and Subnet (IPv6 does not have Subnet).
MAC	Displays the MAC addresses for iDRAC, iSCSI, or Network devices.
Name	Displays the name of the Host, Model, or User String for the system.
Number	Displays the Asset tag or the Service tag for the system.
Power	Displays the power output of the system in BTU/hr or Watts. The display format can be configured in the Set home submenu of the Setup menu.
Temperature	Displays the temperature of the system in Celsius or Fahrenheit. The display format can be configured in the Set home submenu of the Setup menu.

Back 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, and USB and VGA ports. A majority of the expansion card ports can be accessed from the back panel. The hot swappable and cabled power supply units are accessible from the back panel.

Back panel features
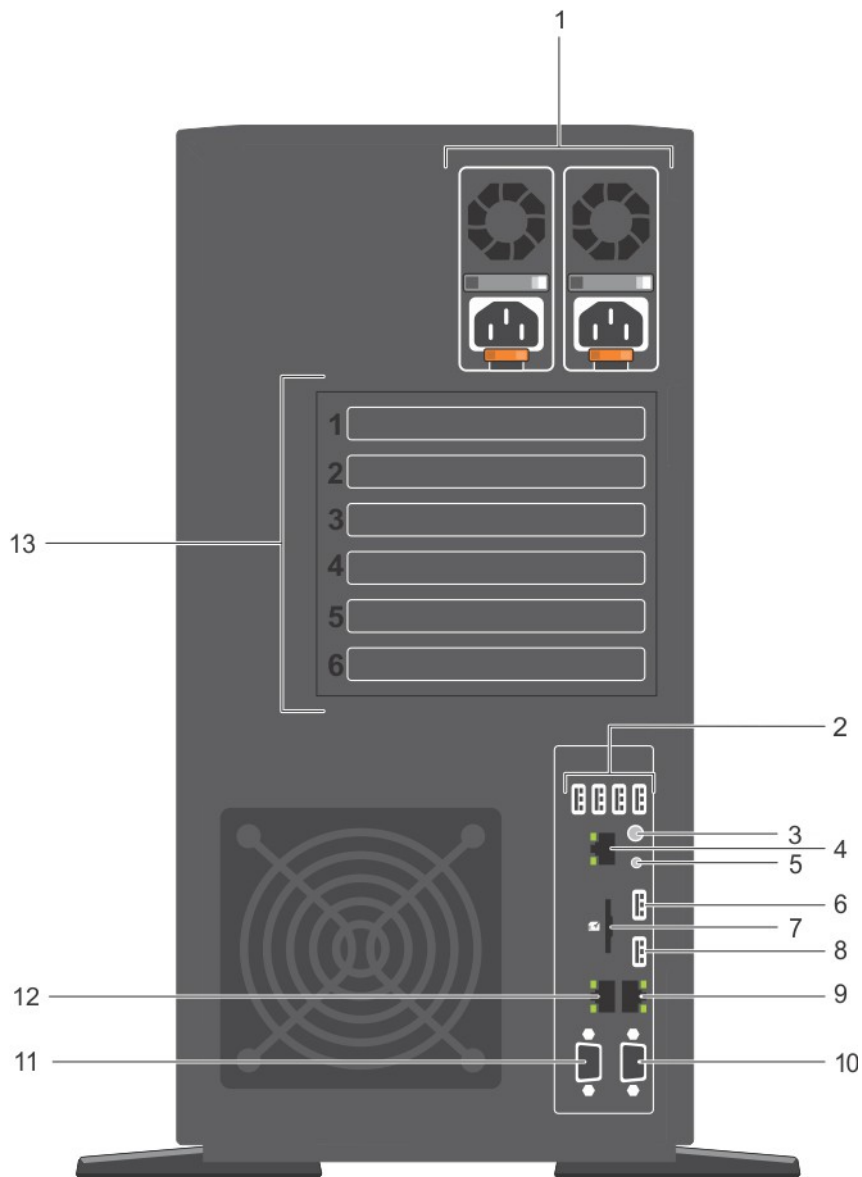
Figure 7. Back panel features

1	Power supplies (PSU1 and PSU2)	2	USB connectors (4)
3	System identification button	4	iDRAC port (optional)
5	System identification connector	6	USB port
7	vFlash media card slot (optional)	8	USB port
9	NIC port	10	Video connector
11	Serial connector	12	NIC port
13	PCIe expansion card slots (6)		

Table 7. Back panel Features

Indicator, button, or connector	Icon	Description	
Power supplies (PSU1 and PSU2)		Redundant power supply	Up to two 495 W, 750 W, or 1100 W redundant AC power supplies.
		Non-redundant power supply	One 450 W non-redundant AC power supply. ⓘ NOTE: Non-redundant power supply is supported in systems with cabled hard drives and systems with an x8 backplane.
USB ports (6)	⟌⟍ ss⟍	Allows you to connect USB devices to the system. Five ports are USB 2.0-compliant and one port is USB 3.0-compliant.	
System identification button	ⓘ	ⓘ NOTE: To reset the iDRAC (if not disabled on the iDRAC setup page by pressing F2 during system boot), press and hold the System ID button for more than 15 seconds.	
iDRAC port (optional)		Enables you to remotely access iDRAC. For more information, see the iDRAC User's Guide at Dell.com/idracmanuals.	
System identification connector		The System identification port connects the optional system status indicator assembly to the system through the optional cable management arm.	
vFlash media card slot (optional)	▤	Allows you to insert a vFlash media card.	
NIC port (2)	⬚	Two integrated 10/100/1000 Mbps NIC connectors.	
Video connector	▭	Enables you to connect a display device to the system. For more information, see the Technical specifications section.	
Serial connector	IOIOI	Enables you to connect a serial device to the system. For more information, see the Technical specifications section.	
PCIe expansion card slots (6)		Allows you to connect up to six full-height PCI expansion cards.	

Diagnostic indicators

The diagnostic indicators on the system indicate operation and error status.

Diagnostic indicators on the front panel

ⓘ 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 8. Diagnostic indicators

Icon	Description	Condition	Corrective action
	Health indicator	The indicator turns solid blue if the system is in good health.	None required.
		The indicator 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 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.

Hot swappable 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 8. Hot swappable hard drive indicators

1	hard drive activity indicator	2	hard drive status indicator
3	hard drive		

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

Table 9. Hot swappable hard drive indicators

Drive-status indicator pattern (RAID only)	Condition
Flashes green two times per second	Identifying drive or preparing for removal.
OFF	Drive ready for insertion or removal. (i) 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 turns off	Predicted drive failure
Flashes amber four times per second	Drive failed
Flashes green slowly	Drive rebuilding
Turns green	Drive online
Flashes green three seconds, amber three seconds, and turns off six seconds	Rebuild stopped

NIC indicator codes

The NIC on the back panel has an indicator that provides information about the network activity and link status. The activity LED indicates whether the NIC is currently connected or not. The link LED indicates the speed of the connected network.
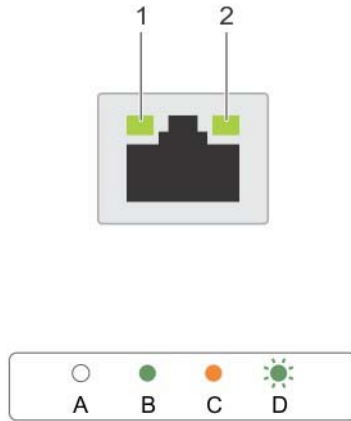
Figure 9. NIC indicators

1	link indicator	2	activity indicator

Table 10. NIC indicators

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

Redundant power supply unit indicator codes

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

Figure 10. AC PSU status indicator

1   AC PSU status indicator/handle

Table 11. AC PSU status indicator

Convention	Power Indicator Pattern	Description
A	Green	A valid power source is connected to the PSU and the PSU is operational.
B	Flashing green	When the firmware of the PSU is being updated, the PSU handle flashes green. ⚠ CAUTION: Do not disconnect the power cord or unplug the PSU when updating firmware. If firmware update is interrupted, the PSUs will not function. You must roll back the PSU firmware by using Dell Lifecycle Controller. See *Dell Lifecycle Controller User's Guide* at Dell.com/idracmanuals.
C	Flashes green and turns off	When hot-adding a PSU, the PSU handle flashes green five times at 4 Hz rate and turns off. This indicates that there is a PSU mismatch with respect to efficiency, feature set, health status, and supported voltage. ⚠ CAUTION: For AC PSUs, use only PSUs with the Extended Power Performance (EPP) label on the back. ⓘ NOTE: Ensure that both the PSUs are of the same capacity. ⓘ NOTE: Mixing PSUs from previous generations of Dell 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. ⚠ CAUTION: When correcting a PSU mismatch, replace only the PSU with the flashing indicator. Swapping the other PSU to make a matched pair can result in an error condition and unexpected system shutdown. To change from a High Output configuration to a Low Output configuration or vice versa, you must turn off the system.

Convention	Power Indicator Pattern	Description
		⚠ 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.

Indicator codes for non-redundant power supply unit

Press the self-diagnostic button to perform a quick health check on the non-redundant power supply unit (PSU) of the system.
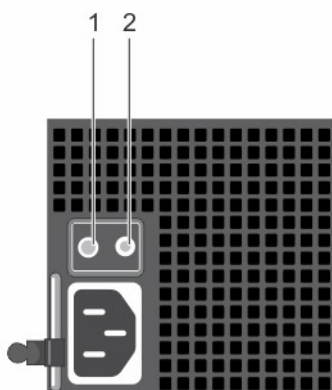
Figure 11. Non-redundant AC PSU status indicator and self-diagnostic button

1	self-diagnostic button	2	AC PSU status indicator

Table 12. Indicator codes for non-redundant power supply unit

Diagnostic Indicator Pattern	Description
Not lit	Power is not connected or PSU is faulty.
Green	A valid power source is connected to the PSU and the PSU is operational.

Internal dual SD module indicator codes

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.

ⓘ 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.
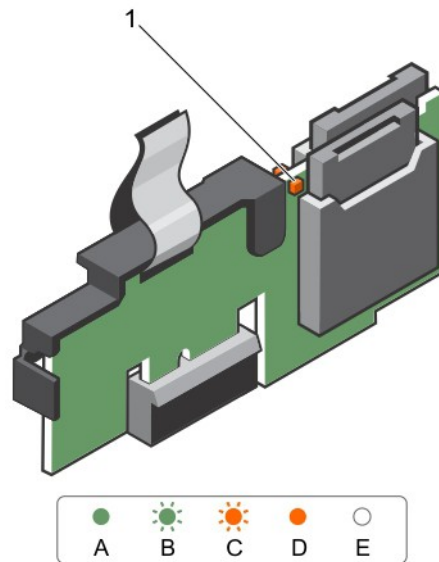
Figure 12. Internal dual SD module (IDSDM)

1   LED status indicator (2)

The following table describes the IDSDM indicator codes:

Table 13. IDSDM indicator codes

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

Locating Service Tag of your system

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

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

Converting the system from tower mode to rack mode

Your system can be converted from the tower mode to the rack mode.

To convert your system from the tower mode to the rack mode, you require the tower to rack conversion kit, which contains the following items:

- Rack ears (left and right) with three screws each
- VGA module included with the control panel for rack mode
- A pair of rails (optional)

Topics:

Safety instructions for converting system from tower to rack

△ 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: Do not attempt to convert your system into a rack unless authorized by Dell. Only customers certified by Dell for tower to rack conversion can convert a tower system into a rack system.

ⓘ NOTE: For specific caution statements and procedures, see the rack installation documentation for your system at Dell.com/poweredgemanuals. For complete safety and regulatory information, see the safety instructions that shipped with your system.

Observe the following precautions for stability and safety of the system in rack mode:

- Before installing your equipment in a rack, install the front and side rack stabilizers. Failure to install the stabilizers can cause the rack to tip over.
- Always load from bottom up, and load the heaviest items first.
- Do not overload the AC power supply branch circuit that provides power to the rack.

Preparing a system for conversion from tower mode to rack mode

Prerequisites

1 Ensure that you follow the safety instructions for converting system from tower to rack.
2 Keep the Phillips #2 screwdriver ready.
3 Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.

4   Place the system on a flat and stable surface.

5   If installed, remove the system feet or caster wheels.

6   Remove the system cover.

Steps

1   Remove the control panel assembly from the chassis.

2   Remove the control panel assembly cover.

3   Install the VGA module.

4   Install the control panel assembly cover for rack mode into the control panel assembly.

5   Remove the system top cover.

6   Install the control panel assembly for rack mode into the chassis.

7   To attach the rack ears, complete the following steps:

   a Align the screw holes on the right rack ear with the screw holes on the right side of the rack system.

   b Install the screws using a Phillips #2 screwdriver.
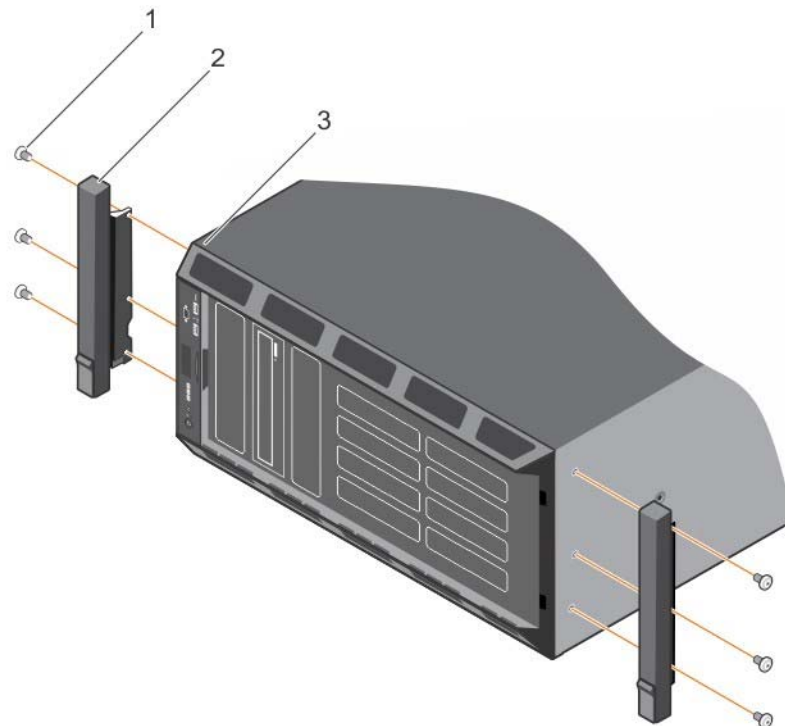
Figure 13. Removing and installing the rack ears

1	screw for each rack ear (3)	2	rack ear (2)
3	front panel		

Next steps

1   Install the system cover.

2   Install the system in a rack. For more information, see the system's Rack Installation Guide at Dell.com/poweredgemanuals.

Related links

Documentation resources

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

Table 14. Additional documentation resources for your system

Task	Document	Location
Setting up your system	For more information about installing and securing the system into a rack, see the rack documentation included with your rack solution.	Dell.com/poweredgemanuals
	For information about setting up and turning on the system, see the *Getting Started Guide* document that is shipped with your system.	Dell.com/poweredgemanuals
Configuring your system	For information about the iDRAC features, configuring and logging in to iDRAC, and managing your system remotely, see the Integrated Dell Remote Access Controller User's Guide.	Dell.com/idracmanuals
	For information about installing the operating system, see the operating system documentation.	Dell.com/operatingsystemmanuals
	For information about understanding Remote Access Controller Admin (RACADM) subcommands and supported RACADM interfaces, see the RACADM Command Line Reference Guide for iDRAC.	Dell.com/idracmanuals
	For information about updating drivers and firmware, see the Methods to download firmware and drivers section in this document.	To download drivers: Dell.com/support/drivers
Managing your system	For information about systems management software offered by Dell, see the Dell OpenManage Systems Management Overview Guide.	Dell.com/openmanagemanuals
	For information about setting up, using, and troubleshooting OpenManage, see the Dell OpenManage Server Administrator User's Guide.	Dell.com/openmanagemanuals
	For information about installing, using, and troubleshooting Dell OpenManage Essentials, see the Dell OpenManage Essentials User's Guide.	Dell.com/openmanagemanuals
	For information about installing and using Dell SupportAssist, see the Dell EMC SupportAssist Enterprise User's Guide.	Dell.com/serviceabilitytools
	For understanding the features of Dell Lifecycle Controller, see the Dell Lifecycle Controller User's Guide.	Dell.com/idracmanuals

Task	Document	Location
	For information about partner programs enterprise systems management, see the OpenManage Connections Enterprise Systems Management documents.	Dell.com/openmanagemanuals
	For information about viewing inventory, performing configuration and monitoring tasks, remotely turning on or off servers, and enabling alerts for events on servers and components using the Dell Chassis Management Controller (CMC), see the CMC User's Guide.	Dell.com/esmmanuals
Working with the Dell PowerEdge RAID controllers	For information about understanding the features of the Dell PowerEdge RAID controllers (PERC), Software RAID controllers, or BOSS card and deploying the cards, see the Storage controller documentation.	Dell.com/storagecontrollermanuals
Understanding event and error messages	For information about checking the event and error messages generated by the system firmware and agents that monitor system components, see the Dell Event and Error Messages Reference Guide.	Dell.com/openmanagemanuals > OpenManage software
Troubleshooting your system	For information about identifying and troubleshooting the PowerEdge server issues, see the Server Troubleshooting Guide.	Dell.com/poweredgemanuals

Technical specifications

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

Chassis dimensions
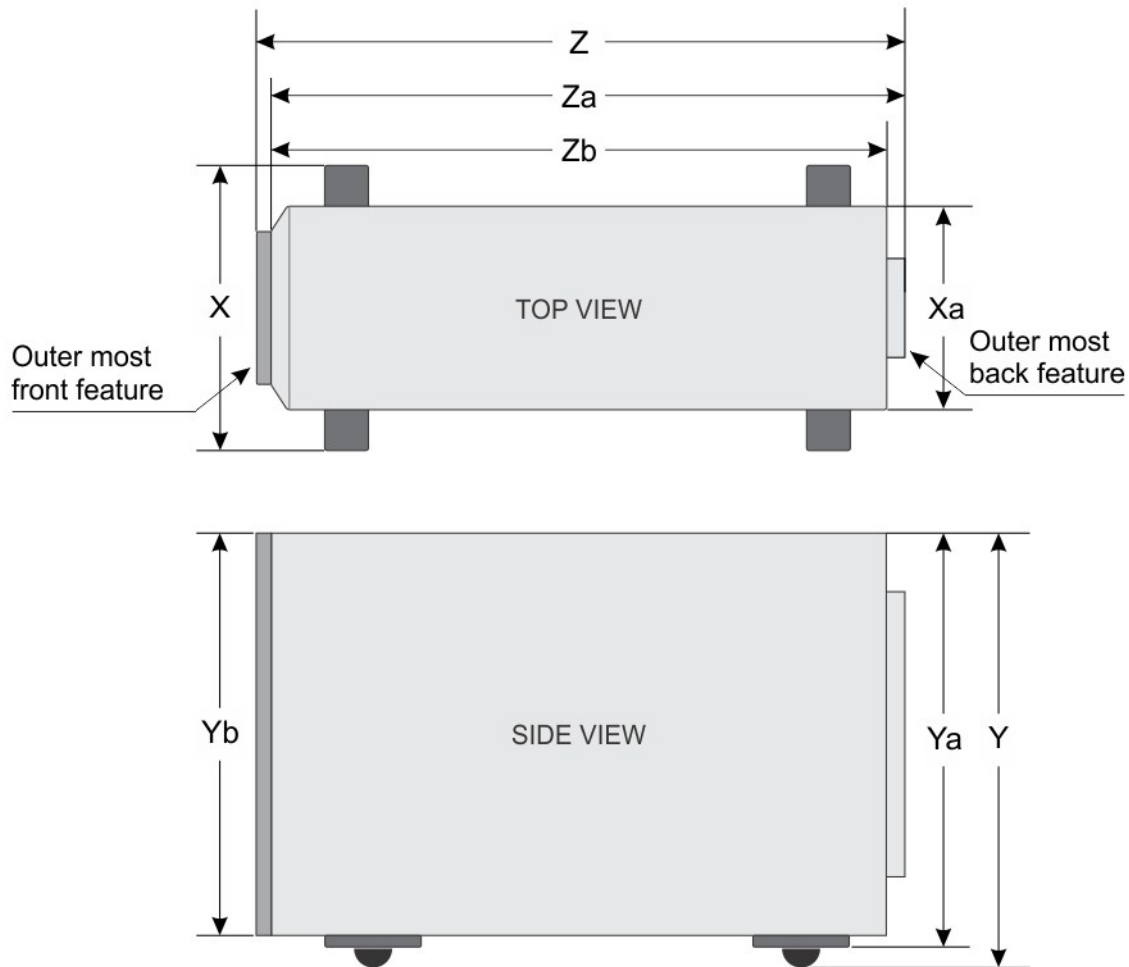
Figure 14. Chassis dimensions of Dell PowerEdge T430 system

Table 15. Dimensions of Dell PowerEdge T430 system

System	X	Xa	Y	Ya	Yb	Z	Za	Zb
PowerEdge T430	304.5 mm (11.99 inches)	218 mm (8.58 inches)	471.3 mm (18.55 inches)	430.3 mm (16.94 inches)	443.3 mm (17.45 inches)	594.82 mm (23.42 inches)	578.42 mm (22.77 inches)	542.2 mm (21.35 inches)

Chassis weight

System	Maximum weight
PowerEdge T430	36 Kg (79.37 lb)

Processor specifications

The PowerEdge T430 system supports up to two Intel Xeon E5-2600 v4 or Xeon E5-2600 v3 product family processors.

PSU specifications

The PowerEdge T430 system supports up to two AC or DC redundant power supply units (PSUs).

Table 17. PSU specifications

PSU	Class	Heat dissipation (maximum)	Frequency	Voltage
450 W AC	Bronze	1871 BTU/hr		100 – 240 V AC, 6.5 A – 3.5 A, autoranging
495 W AC	Platinum	1908 BTU/hr		100 – 240 V AC, 6.5 A – 3 A, autoranging
750 W AC	Platinum	2891 BTU/hr	50/60 Hz	100 – 240 V AC, 10 A – 5 A, autoranging
1100 W AC	Platinum	4100 BTU/hr		100 – 240 V AC, 12 A – 6.5 A, autoranging

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

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

System battery specifications

The PowerEdge T430 system supports CR 2032 3.0-V lithium coin cell system battery.

Expansion bus specifications

The PowerEdge T430 system supports PCI express (PCIe) generation 3 and 2 expansion cards. The following table describes the supported expansion cards:

Table 18. Supported PCI express generation 3 expansion cards

PCIe Slot	Processor Connection	Height	Length	Link Width	Slot Width
1 (Gen2)	Platform Controller Hub	Full height	Half Length	x4	x8
2 (Gen2)	Platform Controller Hub	Full height	Half length	x1	x1
3 (Gen3)	Processor 1	Full height	Full length	x16	x16
4 (Gen3)	Processor 1	Full height	Full length	x16	x16
5 (Gen3)	Processor 2	Full height	Half length	x8	x8
6 (Gen3)	Processor 2	Full height	Half length	x8	x8

> ⓘ NOTE: To use PCIe slots 5 and 6, both the processors must be installed.

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

Memory specifications

The PowerEdge T430 system supports 1866 MT/s, 2133 MT/s or 2400 MT/s DDR4 Registered DIMMs.

Table 19. Memory specifications

Memory module sockets	Memory capacity	Minimum RAM	Maximum RAM
Twelve 288–pin	• 4 GB single-rank (RDIMMs) • 8 GB, 16 GB, and 32 GB single and dual-rank (RDIMMs)	• 4 GB with single processor • 8 GB with dual processors (minimum one memory module per processor)	• Up to 256 GB with a single processor • Up to 384 GB with dual processors

Drive specifications

Your system supports up to four 3.5 inch cabled hard drives or eight 3.5 inch hot swappable hard drives or sixteen 2.5 inch hot swappable hard drives

Hard drives

The PowerEdge T430 system supports:

Table 20. Hard Drive Specification

Drives	
Hard drives	
Four–hard-drive systems	Up to four 3.5 inch, internal, cabled SATA, or nearline SAS hard drives.
Eight–hard-drive systems	Up to eight 3.5 inch, internal, hot-swappable SATA, or nearline SAS hard drives. > ⓘ NOTE: 2.5 inch hard drives in 3.5 inch carriers are supported for SAS, and SATA SSD hard drives.
Sixteen–hard-drive systems	Up to sixteen 2.5 inch, internal, hot-swappable SATA, nearline SAS, SAS, or SATA SSD hard drives.

Optical drive

The PowerEdge T430 system supports one optional SATA DVD-ROM drive or DVD+/-RW drive or One optional slim SATA DVD-ROM drive or DVD +/-RW drive.

Table 21. Optical Drive Specifications

Drives	
Optical drive	One optional SATA DVD-ROM drive or DVD+/-RW drive.

ⓘ NOTE: If your system is installed with a double-width GPU card, the system supports only one 5.25 inch removable media storage device.

Tape drive

The PowerEdge T430 system supports up to two optional 5.25 inch tape drive.

ⓘ NOTE: If your system is installed with a double-width GPU card, the system supports only one 5.25 inch removable media storage device.

Ports and connectors specifications

Serial connector

The serial connector connects a serial device to the system. The PowerEdge T430 system supports DB-9 Serial Port connector.

Internal Dual SD Module

The PowerEdge RT430 system supports two optional flash memory card slots with an internal SD module.

ⓘ NOTE: One card slot is dedicated for redundancy.

VGA ports

The Video Graphic Array (VGA) port enables you to connect the system to a VGA display. The PowerEdge T430 system with 2.5-inch and 3.5-inch hot-swappable hard-drive chassis supports two 15-pin VGA ports on the front and back panels. The PowerEdge T430 system with 3.5-inch cabled hard-drive chassis supports one 15-pin VGA port on the back panel.

USB ports

The PowerEdge T430 system supports:

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

The following table provides more information about the USB specifications:

Table 22. USB specifications

System	Front panel	Back panel	Internal
PowerEdge T430	• One USB 2.0-compliant port • and one USB 3.0-complaint port	• Six Hi-Speed USB Host • Five USB 2.0 compliant ports • one USB 3.0-complaint ports	One 9-pin, USB 3.0-compliant port

NIC ports

The PowerEdge T430 system supports two Network Interface Controller (NIC) ports on the back panel, which is available in the following NIC configurations:

• Two 10/100/1000 Mbps

iDRAC 8

The PowerEdge R430 system supports one optional 1 GbE Ethernet

SD vFlash

The PowerEdge R430 system supports one optional SD vFlash memory card

Video specifications

The PowerEdge T430 system supports Integrated Matrox G200 with iDRAC8 and 16 MB application memory.

Table 23. Supported video resolution options

Resolution	Refresh Rate (Hz)	Color Depth (bit)
640 x 480	60, 70	8, 16, 32
800 x 600	60, 75, 85	8, 16, 32
1024 x 768	60, 75, 85	8, 16, 32
1280 x 1024	60	8, 16, 32
1440 x 900	60	8, 16, 32

Environmental specifications

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

Table 24. Environmental specifications

Type	Condition	Temperature or Specification
Temperature		
	Maximum Temperature Gradient (Operating and Storage)	20 °C/h (36 °F/h)
	Storage Temperature Limits	–40 °C to 65 °C (–40 °F to 149 °F)

Type	Condition	Temperature or Specification
	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.
Relative Humidity		
	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.
Maximum Vibration		
	Operating	0.26 G_{rms} at 5 Hz to 350 Hz (all operation orientations).
	Storage	1.88 G_{rms} at 10 Hz to 500 Hz for 15 minutes (all six sides tested).
Maximum Shock		
	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.
Maximum Altitude		
	Operating	3,048 m (10,000 ft)
	Storage	12,000 m (39,370 ft)
Operating Altitude De-rating		
	Up to 35 °C (95 °F)	Maximum temperature is reduced by 1 °C/300 m (1 °F/547 ft) above 950 m (3,117 ft).
	35 °C to 40 °C (95 °F to 104 °F)	Maximum temperature is reduced by 1 °C/175 m (1 °F/319 ft) above 950 m (3,117 ft).
	40 °C to 45 °C (104 °F to 113 °F)	Maximum temperature is reduced by 1 °C/125 m (1 °F/228 ft) above 950 m (3,117 ft).

Particulate and gaseous contamination specifications

The following table defines the limitations that help avoid any equipment damage or failure from particulates and gaseous contamination. If the 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.

ⓘ NOTE: This section defines the limits to help avoid IT equipment damage and/or failure from particulates and gaseous contamination. If it is determined that levels of particulates or gaseous pollution are beyond the limits specified in the following table and are the reason for the damage and/or failures to your equipment, it may be necessary for you to re-mediate the environmental conditions that are causing the damage and/or failures. Re-mediation of environmental conditions will be the responsibility of the customer.

Table 25. Particulate contamination specifications

Particulate contamination	Specifications
Air Filtration ⓘ NOTE: 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.	Data center air filtration as defined by ISO Class 8 per ISO 14644-1 with a 95% upper confidence limit. ⓘ NOTE: Air entering the data center must have MERV11 or MERV13 filtration.
Conductive Dust ⓘ NOTE: Applies to data center and non-data center environments.	Air must be free of conductive dust, zinc whiskers, or other conductive particles.
Corrosive Dust ⓘ NOTE: Applies to data center and non-data center environments.	• Air must be free of corrosive dust. • Residual dust present in the air must have a deliquescent point less than 60% relative humidity.

Table 26. Gaseous contamination specifications

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

Expanded operating temperature

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

Table 27. Expanded Operating Temperature

Condition	Temperature
Continuous operation	5 °C to 40 °C at 5% to 85% RH with 29°C dew point. ⓘ NOTE: Outside the standard operating temperature (10˚C to 35˚C), the system can operate continuously down to 5˚C or 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. ⓘ 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 Restrictions	• For low-power CPUs (55 W/ 65 W), both the internal cooling fan and the external cooling fan need to be installed. • The operating temperature specified is for a maximum altitude of 3048 m (10,000 ft). • GPU card is not supported.

Condition	Temperature
	• LRDIMM is not supported.
	• Non-redundant power supplies are not supported.
	• Cabled power supply units are not supported.
	• Non Dell qualified peripheral cards and/or peripheral cards greater than 25 W are not supported.

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

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

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 EMC 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.

ⓘ 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.

ⓘ 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.

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

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

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 28. Resources to install the operating system

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 29. Firmware and drivers

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

Downloading the drivers and firmware

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

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

Steps

1   Go to Dell.com/support/drivers.

2   In the Drivers & Downloads section, type the Service Tag of your system in the Service Tag or Express Service Code box, and then click Submit.

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

3   Click Drivers & Downloads.

The drivers that are applicable to your selection are displayed.

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

Downloading the drivers and firmware

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

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

Steps

1   Go to Dell.com/support/drivers.

2   In the Drivers & Downloads section, type the Service Tag of your system in the Service Tag or Express Service Code box, and then click Submit.

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

3   Click Drivers & Downloads.

The drivers that are applicable to your selection are displayed.

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

Pre-operating system management applications

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

Topics:

- Options to manage the pre-operating system applications
- System Setup
- Dell Lifecycle Controller
- Boot Manager
- PXE boot

Options to manage the pre-operating system applications

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

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

Related links
System Setup
Boot Manager
Dell Lifecycle Controller
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 links
System Setup details
Viewing System Setup

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
```

> ① 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 links

System Setup
System Setup details
System BIOS
iDRAC Settings utility
Device Settings

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 links

System Setup
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.

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

   ⓘ 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.

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.

Option	Description
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 links

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 links

Viewing Boot Settings

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

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

`F2 = System Setup`

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

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

Related links

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.

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

Related links

Viewing Boot Settings
Choosing the system boot mode
Changing the boot order

Choosing the system boot mode

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

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

1 From the System Setup Main Menu, click Boot Settings, and select Boot Mode.

2 Select the boot mode you want the system to boot into.

⚠ CAUTION: Switching the boot mode may prevent the system from booting if the operating system is not installed in the same boot mode.

3 After the system boots in the specified boot mode, proceed to install your operating system from that mode.

ⓘ NOTE:

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

Related links

Boot Settings
Boot Settings details
Viewing Boot Settings

Changing the boot order

About this task

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

Steps

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

Related links

Boot Settings
Boot Settings details
Viewing 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.

ⓘ 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 links

Network Settings screen details
System BIOS
Viewing Network Settings

Viewing Network Settings

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

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

```
F2 = System Setup
```

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

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

Related links

Network Settings
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.

Option	Description
PXE Device n Settings(n = 1 to 4)	Enables you to control the configuration of the PXE device.

Related links

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.

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
```

ⓘ 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.

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.

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 links

Viewing System Security

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

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

```
F2 = System Setup
```

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

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

Related links

System Security
System Security Settings details

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	ⓘ NOTE: The TPM menu is available only when the TPM module is installed. Enables you to control the reporting mode of the TPM. The TPM Security option is set to Off by default. You can only modify the TPM Status, TPM Activation, and Intel TXT fields if the TPM Status field is set to either On with Pre-boot Measurements or On without Pre-boot Measurements.
TPM Information	Changes the operational state of the TPM. This option is set to No Change by default.
TPM Status	Specifies the TPM status.
TPM Command	⚠ CAUTION: Clearing the TPM results in the loss of all keys in the TPM. The loss of TPM keys may affect booting to the operating system. Clears all the contents of the TPM. The TPM Clear option is set to No by default.
Intel TXT	Enables or disables the Intel Trusted Execution Technology (TXT) option. To enable the Intel TXT option, virtualization technology and TPM Security must be enabled with Pre-boot measurements. This option is set to Off by default.
Power Button	Enables or disables the power button on the front of the system. This option is set to Enabled by default.
NMI Button	Enables or disables the NMI button on the front of the system. This option is set to Disabled by default.
AC Power Recovery	Sets how the system behaves after AC power is restored to the system. This option is set to Last by default.
AC Power Recovery Delay	Sets the time delay for the system to power up after AC power is restored to the system. This option is set to Immediate by default.
User Defined Delay (60s to 240s)	Sets the User Defined Delay option when the User Defined option for AC Power Recovery Delay is selected.

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

Related links

Secure Boot Custom Policy Settings

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

Viewing Secure Boot Custom Policy Settings

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

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

```
F2 = System Setup
```

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

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

Secure Boot Custom Policy Settings details

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

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

Creating a system and setup password

Prerequisite

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

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

Steps

1 To enter System Setup, press F2 immediately after turning on or rebooting your system.

2 On the System Setup Main Menu screen, click System BIOS > System Security.

3 On the System Security screen, verify that Password Status is set to Unlocked.

4 In the System Password field, type your system password, and press Enter or Tab.

Use the following guidelines to assign the system password:

- A password can have up to 32 characters.

- The password can contain the numbers 0 through 9.

- Only the following special characters are allowed: space, ("), (+), (,), (-), (.), (/), (;), ([), (\), (]), (`).

A message prompts you to reenter the system password.

5 Reenter the system password, and click OK.

6 In the Setup Password field, type your setup password and press Enter or Tab.

A message prompts you to reenter the setup password.

7 Reenter the setup password, and click OK.

8 Press Esc to return to the System BIOS screen. Press Esc again.

A message prompts you to save the changes.

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

Related links

System Security

Using your system password to secure your system

About this task

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

Steps

1 Turn on or reboot your system.

2 Type the system password and press Enter.

Next step

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

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

Related links

System Security

Deleting or changing system and setup password

Prerequisite

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

Steps

1 To enter System Setup, press F2 immediately after turning on or restarting your system.

2 On the System Setup Main Menu screen, click System BIOS > System Security.

3 On the System Security screen, ensure that Password Status is set to Unlocked.

4   In the System Password field, 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 links
   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.

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

Related links
   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 links
   System Information details
   System BIOS
   Viewing System Information

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
```

ⓘ 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 links
   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 links

System Information
System Information details
Viewing System Information

Memory Settings

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

Related links

Memory Settings details
System BIOS
Viewing Memory Settings

Viewing Memory Settings

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

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

```
F2 = System Setup
```

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

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

Related links

Memory Settings
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 memory speed.
System Memory Voltage	Specifies the memory voltage.
Video Memory	Specifies the amount of video memory.
System Memory Testing	Specifies whether the memory tests are run during system boot. Options are Enabled and Disabled. This option is set to Disabled by default.
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 the Non-Uniform Memory Architecture (NUMA) is supported. If this field is set to Enabled, memory interleaving is supported if a symmetric memory configuration is installed. If the field is set to Disabled, the system supports NUMA (asymmetric) memory configurations. This option is set to Disabled by default.
Snoop Mode	Specifies the Snoop Mode options. The Snoop Mode options available are Home Snoop, Early Snoop, and Cluster on Die. This option is set to Early Snoop by default. This field is available only when the Node Interleaving is set to Disabled.

Related links

Memory Settings
Viewing 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 links

Processor Settings details
System BIOS
Viewing Processor Settings

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 links
  Processor Settings
  Processor Settings details

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.

Option	Description
Configurable TDP	Enables you to reconfigure the processor Thermal Design Power (TDP) levels during POST based on the power and thermal delivery capabilities of the system. TDP verifies the maximum heat the cooling system is needed to dissipate. This option is set to Nominal by default. ⓘ NOTE: This option is only available on certain stock keeping units (SKUs) of the processors.
X2Apic Mode	Enables or disables the X2Apic mode.
Dell Controlled Turbo	Controls the turbo engagement. Enable this option only when System Profile is set to Performance. ⓘ NOTE: Depending on the number of installed CPUs, there 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	ⓘ 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 links

Processor Settings
Viewing 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 links

SATA Settings details
System BIOS
Viewing SATA Settings

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 links

SATA Settings
SATA Settings details

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.

Option	Description
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.

Option	Description
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.

Option	Description
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.

Option	Description
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.

Option	Description
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.

Option	Description
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.

Option	Description
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.

Option	Description	
	Option	Description
	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.

Option	Description
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.

Option	Description
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 links
  SATA Settings
  Viewing SATA Settings

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 links
  Integrated Devices details
  System BIOS
  Viewing Integrated Devices

Viewing Integrated Devices

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

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

```
F2 = System Setup
```

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

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

4   On the System BIOS screen, click Integrated Devices.

Related links

Integrated Devices

Integrated Devices details

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.
I/O Snoop Holdoff Response	Selects the number of cycles PCI I/O can withhold snoop requests from the CPU, to allow time to complete its own write to LLC. This setting can help improve performance on workloads where throughput and latency are critical.
Embedded Video Controller	Enables or disables the Embedded Video Controller option. This option is set to Enabled by default.
Current State of Embedded Video Controller	Displays the current state of the embedded video controller. The Current State of Embedded Video Controller option is a read-only field. If the Embedded Video Controller is the only display capability in the 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

Option	Description
	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 links

Integrated Devices

Viewing Integrated Devices

Serial Communication

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

Related links

Serial Communication details

System BIOS

Viewing Serial Communication

Viewing Serial Communication

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

1 Turn on, or restart your system.

2 Press F2 immediately after you see the following message:

```
F2 = System Setup
```

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

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

4 On the System BIOS screen, click Serial Communication.

Related links

Serial Communication

Serial Communication details

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.
	ⓘ NOTE: You can use only Serial Device 2 for the Serial Over LAN (SOL) feature. To use console redirection by SOL, configure the same port address for console redirection and the serial device.
	ⓘ NOTE: Every time the system boots, the BIOS syncs the serial MUX setting saved in iDRAC. The serial MUX setting can independently be changed in iDRAC. Loading the BIOS default settings from within the BIOS setup utility may not always revert the serial MUX setting to the default setting of Serial Device 1.
External Serial Connector	Enables you to associate the External Serial Connector to Serial Device 1, Serial Device 2, or the Remote Access Device by using this option.

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

Related links

Serial Communication
Viewing Serial Communication

System Profile Settings

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

System Profile Settings details
System BIOS
Viewing System Profile Settings

Viewing System Profile Settings

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

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

```
F2 = System Setup
```

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

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

Related links

System Profile Settings
System Profile Settings details

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.

Option	Description
	(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.
Memory Frequency	Sets the speed of the memory. You can select Maximum Performance, Maximum Reliability, or a specific speed.
Turbo Boost	Enables or disables the processor to operate in the turbo boost mode. This option is set to Enabled by default.
Energy Efficient Turbo	Enables or disables the Energy Efficient Turbo option. Energy Efficient Turbo (EET) is a mode of operation where a processor's core frequency is adjusted to be within the turbo range based on workload.
C1E	Enables or disables the processor to switch to a minimum performance state when it is idle. This option is set to Enabled by default.
C States	Enables or disables the processor to operate in all available power states. This option is set to Enabled by default.
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 links

System Profile Settings
Viewing 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 links

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 links

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 changes in system configuration to optimize system power and performance. ISC takes about 20 seconds to execute, and system reset is needed for ISC results to be applied. The Enabled - No Reboot option executes ISC and continues

Option	Description
	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 links

Miscellaneous Settings

Viewing 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.

ⓘ 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 links

Device Settings

System BIOS

Entering the iDRAC Settings utility

Changing the thermal settings

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 links

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 links

iDRAC Settings utility

Device Settings

Device Settings enables you to configure device parameters.

Related links

System BIOS

Dell Lifecycle Controller

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

Related links

Embedded systems management

Embedded systems management

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

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

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

Related links

Dell Lifecycle Controller

Boot Manager

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

Related links

Boot Manager main menu
System BIOS
Viewing Boot Manager

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 links

Boot Manager
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 links

Boot Manager
Viewing Boot Manager

One-shot BIOS boot menu

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

Boot Manager

System Utilities

System Utilities contains the following utilities that can be launched:

- Launch Diagnostics
- BIOS Update File Explorer
- Reboot System

Related links

Boot Manager

PXE boot

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

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

Installing and removing system components

Safety instructions

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

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

⚠ CAUTION: Do not operate the system without the cover for a duration exceeding five minutes.

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

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

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

Before working inside your system

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

Steps
1   Turn off the system, including any attached peripherals.
2   Disconnect the system from the electrical outlet and disconnect the peripherals.
3   If 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   Lay the system on its side.
6   Remove the system cover.

Related links
Safety instructions
Removing the system cover
Removing the optional front bezel

After working inside your system

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

Steps
1   Install the system cover.
2   Place the system upright on a flat, stable surface.

3   If applicable, install the system into the rack.

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

4   If removed, install the front bezel.

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

6   Turn on the system, including any attached peripherals.

Related links

Installing the system cover

Installing the optional front bezel

Recommended tools

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

- Key to the bezel lock.

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

- Phillips #2 screwdriver

- Plastic scribe

- Wrist grounding strap

Front bezel (optional)

The front bezel is attached to the front side of the system 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

Steps

1   Unlock the bezel by using the bezel keys.

     ⓘ NOTE: There are two bezel keys attached to the back of the bezel.

2   Press the release latch at the top of the bezel.

3   Pull the top end of the bezel away from the system.

4   Unhook the bezel tabs from the slots at the bottom of the system board, and pull the bezel away from the system.
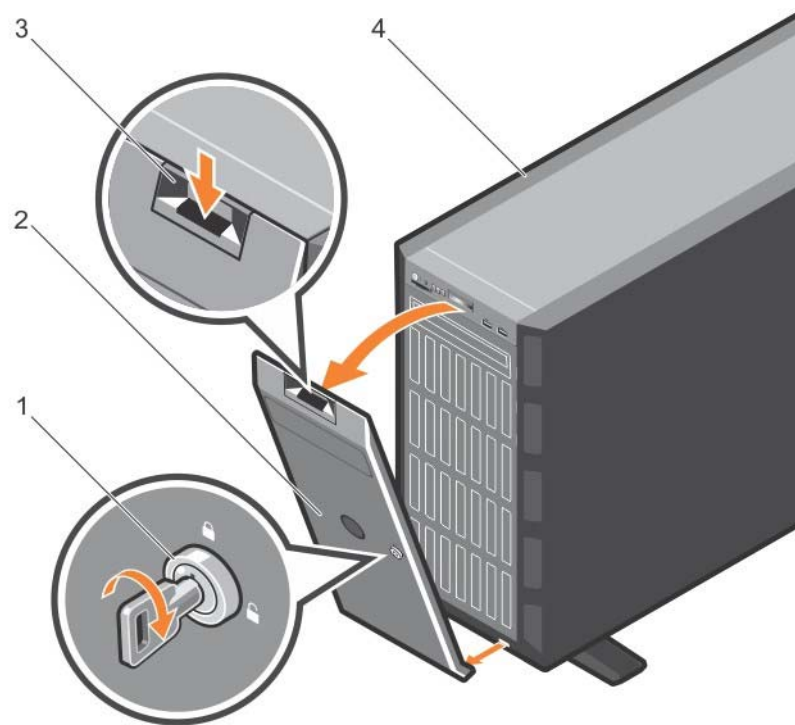
Figure 15. Removing the front bezel

1	bezel key	2	bezel
3	release latch	4	system

Next step
Install the optional front bezel.
Related links
  Installing the optional front bezel

Installing the optional front bezel

1   Locate and remove the bezel keys.

   ⓘ NOTE: There are two bezel keys attached to the back of the bezel.
2   Insert the bezel tabs into the bezel tab slots in the chassis.
3   Press the release latch, and push the bezel toward the system until the bezel locks into place.
4   Lock the bezel by using the key.
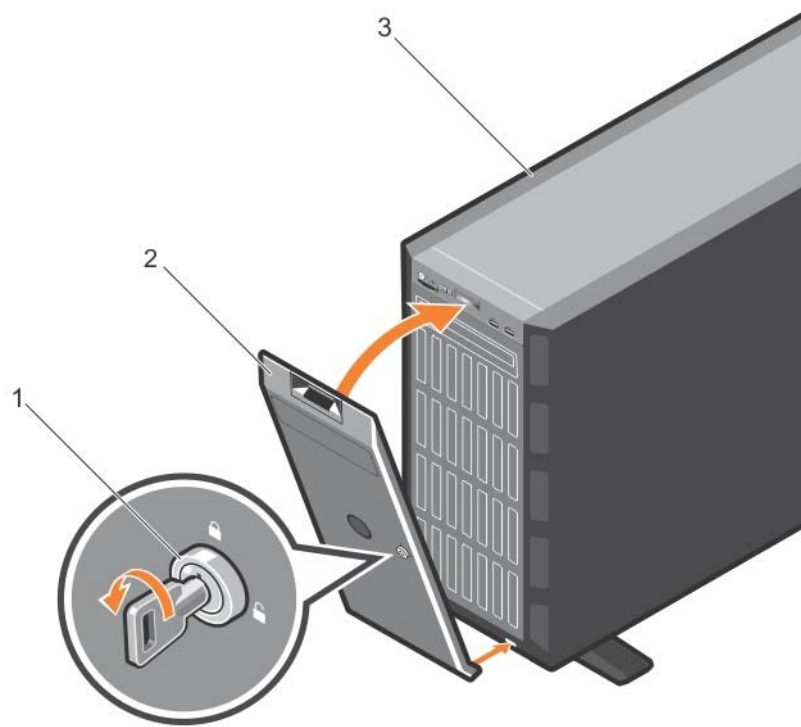
Figure 16. Installing the front bezel

1	bezel key	2	bezel
3	system		

Related links

Removing the optional front bezel

System feet

The system feet provide stability to the system in the tower mode.

Removing the system feet

Prerequisites

ⓘ NOTE: It is recommended that you remove the system feet only when you are converting the system from the tower mode to the rack mode, or when you are replacing the system feet with the wheel assembly.

1 Follow the safety guidelines listed in the Safety instructions section.
2 Keep the Phillips #2 screwdriver ready.
3 Turn the system feet inward.
4 Place the system on its side on a flat and stable surface.

Step

Remove the screws that secure the system feet to the base of the tower.
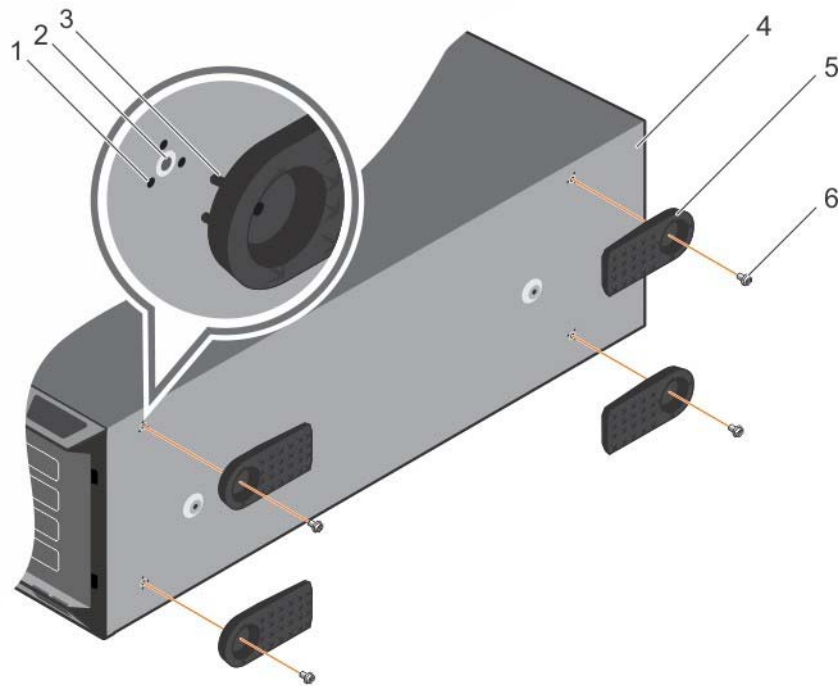
Figure 17. Removing the system feet

1	slot (12)	2	screw hole (4)
3	tab (12)	4	base of the tower
5	system feet (4)	6	screw (4)

Next step
Installing the system feet.
Related links
  Safety instructions
  Installing the system feet

Installing the system feet

Prerequisites

⚠ CAUTION: Installing the feet on a stand-alone tower system is necessary to provide a stable foundation for the system. Failure to install the feet poses the risk of having the system tip over, possibly causing bodily injury or damage to the system.

1   Follow the safety guidelines listed in the Safety instructions section.
2   Keep the Phillips #2 screwdriver ready.
3   Place the system on its side on a flat and stable surface.

Steps
1   Align the tabs on the system feet with the slots on the base of the chassis.
2   Secure the system feet to the base of the chassis by using the screws.
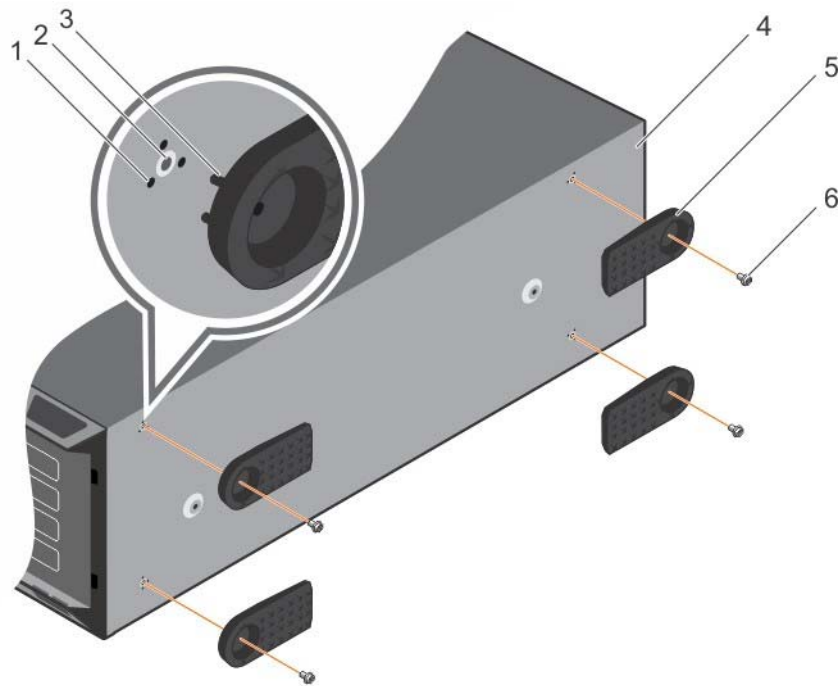
Figure 18. Installing the system feet

1	slot (12)	2	screw hole (4)
3	tab (12)	4	base of the tower
5	system feet (4)	6	screw (4)

Next step

Place the system upright on a flat and stable surface, and turn the system feet outward.

Related links

Safety instructions
Removing the system feet

Caster wheels (optional)—tower mode

Caster wheels provide mobility to the system in the tower mode.

The caster wheel assembly consists of:

- Caster wheel units (front and back)
- Two screws for the caster wheel units

Installing caster wheels

Prerequisites

1 Follow the safety guidelines listed in the Safety instructions section.
2 Keep the Phillips #2 screwdriver ready.
3 Place the system on its side on a flat and stable surface with the base of the system extending off the edge of the surface.
4 If installed, remove the system feet.

Steps

1 Align the retention hooks on the back wheel unit with the slots on the base of the chassis, and insert the hooks into the slots.
2 Slide the back wheel to the back of the system and secure the unit in place using a screw.
3 Align the retention hooks on the front wheel with the slots on the base of the chassis, and insert the hooks into the slots.
4 Slide the front wheel to the front of the system, and secure the unit in place using a screw.
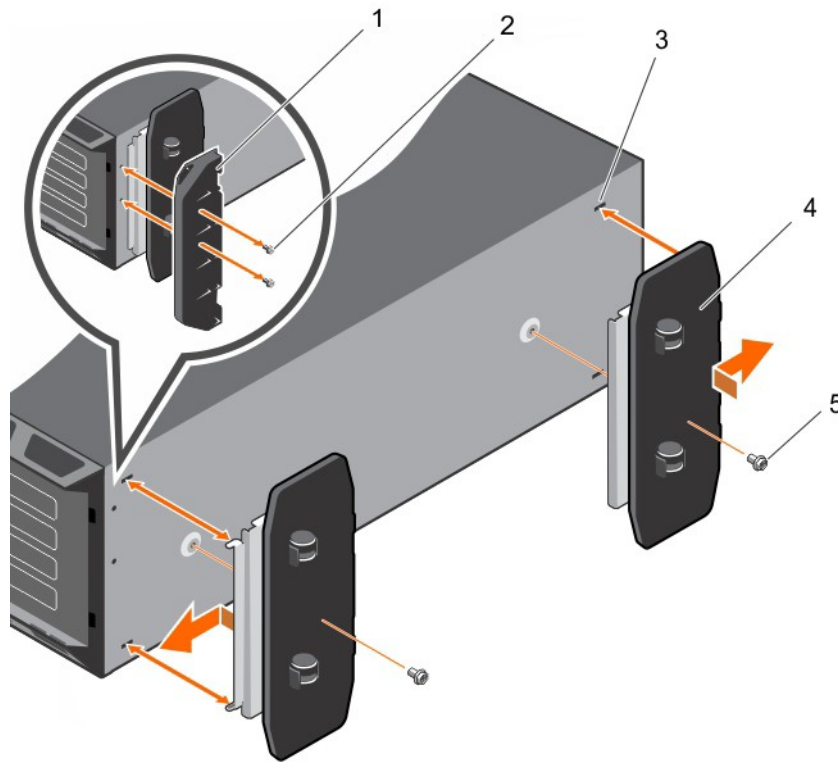
Figure 19. Installing caster wheels

1	support unit	2	screw for support unit (2)
3	slot on base of the tower (4)	4	wheel assembly unit (2)
5	screw for wheel assembly (2)		

Related links

Safety instructions
Removing the system feet
Removing caster wheels

Removing caster wheels

Prerequisites

1 Follow the safety guidelines listed in the Safety instructions section.
2 Keep the Phillips #2 screwdriver ready.
3 Place the system on a flat and stable surface with the wheels extending beyond the edge of the surface.

Steps

1 Remove the screw that secures the front wheel unit to the base of the chassis.
2 Slide the front wheel unit slightly to the back of the system to release the retention hooks, and pull the front wheel unit.
3 Remove the screw securing the back wheel unit to the base of the chassis.
4 Slide the back wheel unit slightly to the front of the system to release the retention hooks, and pull the back wheel unit.
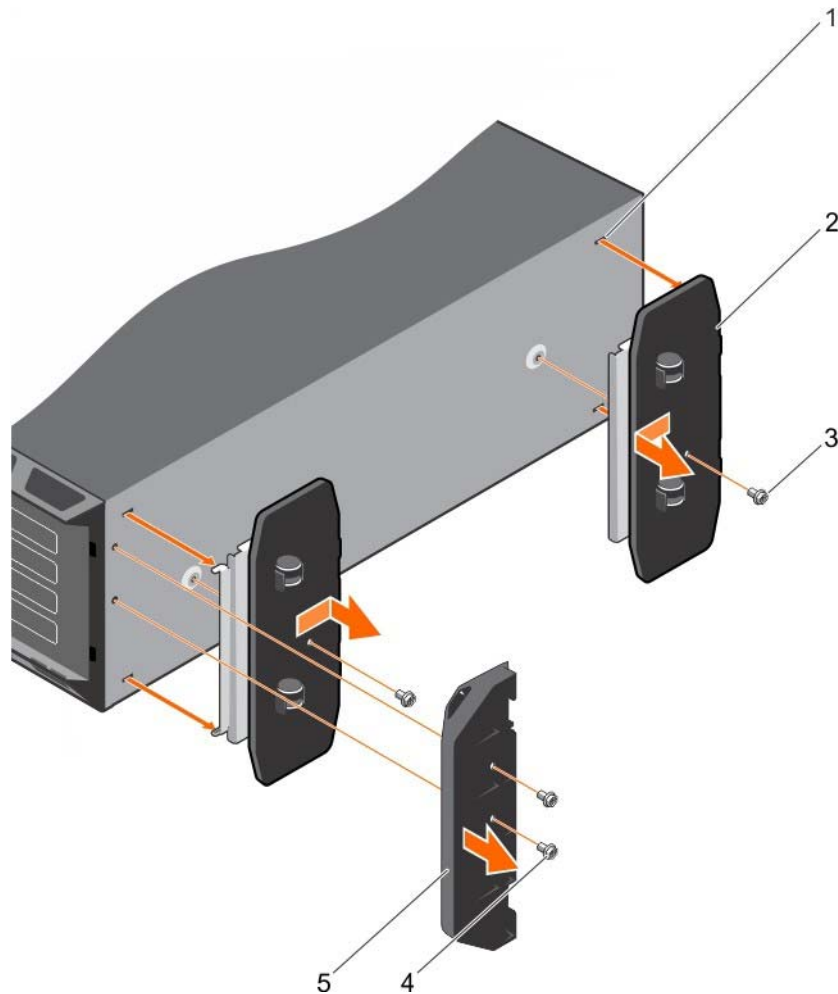
Figure 20. Removing caster wheels

1	slot on base of the tower (4)	2	wheel assembly unit (2)
3	screw for wheel assembly (2)	4	screw for support unit (2)
5	support unit		

Related links
Safety instructions
Installing caster wheels
Installing the system feet

System cover

The system cover protects the components inside the system and helps in maintaining air flow inside the system. Removing the system cover activates the intrusion switch.

Removing the system cover

Prerequisites

1   Follow the safety guidelines listed in the Safety instructions section.
2   Turn off the system and any attached peripherals.
3   Disconnect the system from the electrical outlet and peripherals.
4   If installed, remove the front bezel.
5   Place the system on a flat, stable surface.

Steps

1   Turn the latch release lock to the unlocked position.
2   Press the cover release latch and remove the system cover.
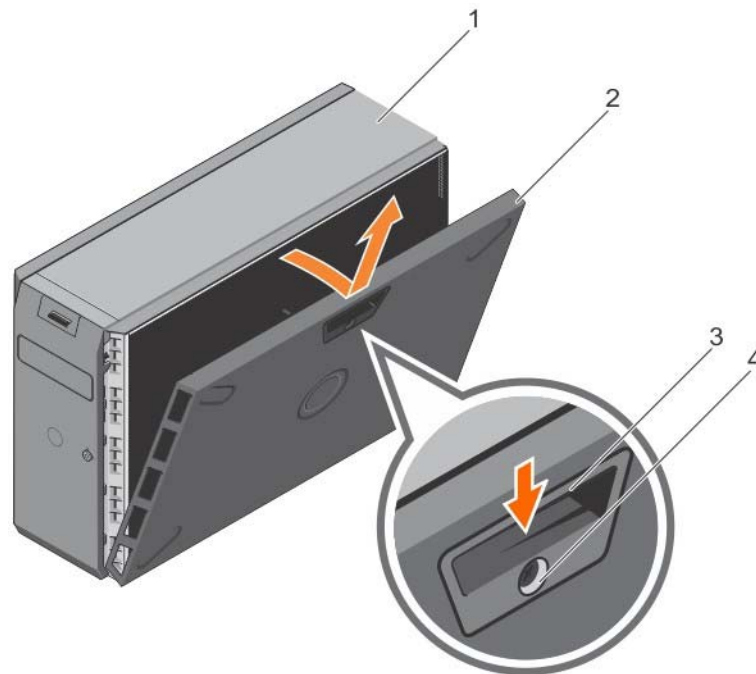
Figure 21. Removing the system cover

1	system	2	system cover
3	cover release latch	4	cover release latch lock

Next steps

1   Install the system cover.
2   Place the system upright on its feet on a flat and stable surface.
3   Reconnect the peripherals and connect the system to the electrical outlet.
4   Turn the system on, including any attached peripherals.

Installing the system cover

Prerequisites

1   Follow the safety guidelines listed in the Safety instructions section.
2   Follow the procedure listed in the Before working inside your system section.
3   Ensure that all internal cables are connected and placed out of the way, and no tools or extra parts are left inside the system.

Steps

1   Align the slots on the system cover with the tabs on the chassis.
2   Press the cover release latch, and push the cover toward the chassis until the latch locks into place.
3   Rotate the latch release lock clockwise to the locked position.
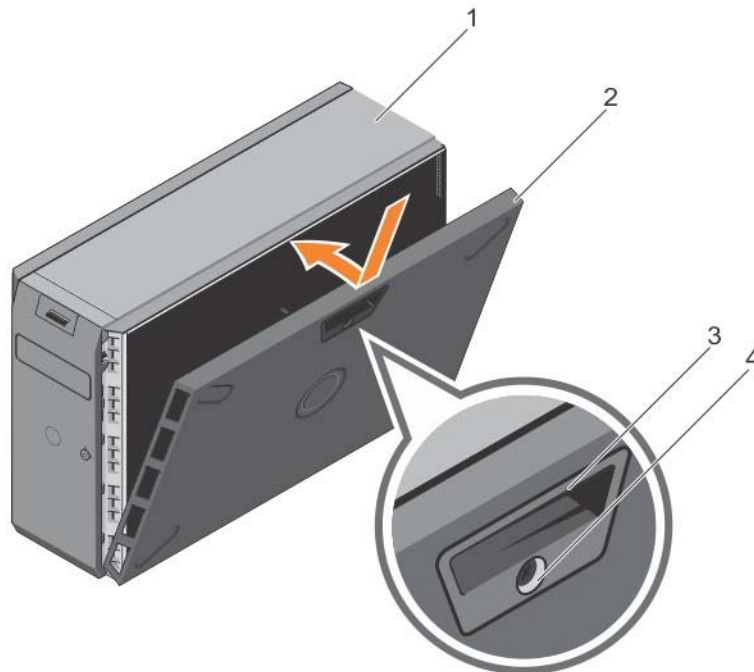
Figure 22. Installing the system cover

1	system	2	system cover
3	cover release latch	4	cover release latch lock

Next steps

1   Place the system upright on its feet on a flat and stable surface.
2   If removed, install the front bezel.
3   Reconnect the peripherals and connect the system to the electrical outlet.
4   Turn on the system, including any attached peripherals.
5   Follow the procedure listed in the After working inside your system section.

Inside the system

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

ⓘ NOTE: Components that are hot-swappable are marked orange and touch-points on the components are marked blue.
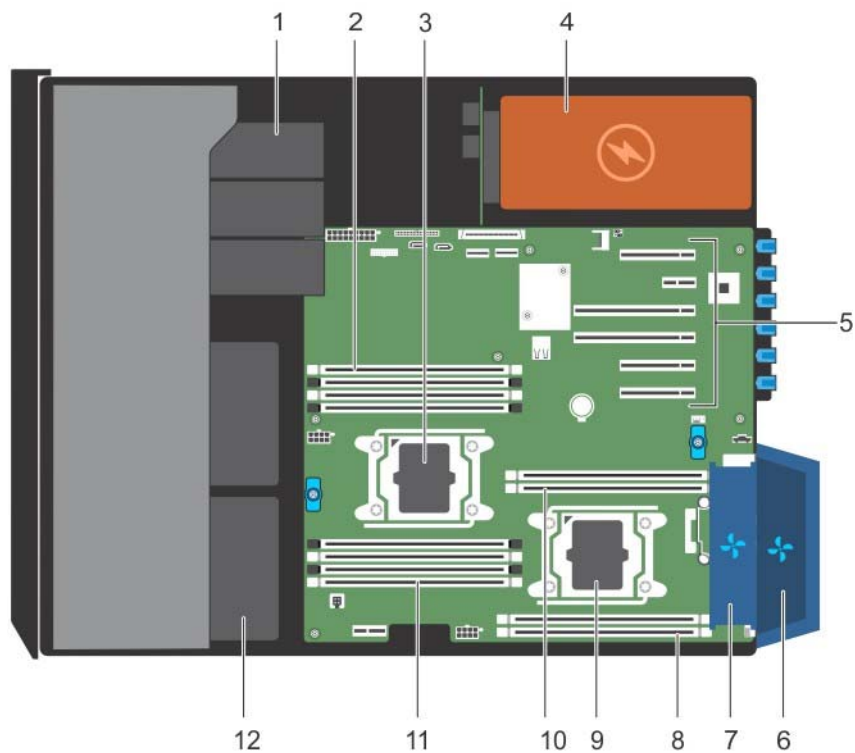
Figure 23. Inside the system

1	optical drive or tape drive	2	memory-module slots (4)
3	processor 1	4	power supply unit (2)
5	expansion card slots	6	external cooling fan (optional)
7	internal cooling fan	8	memory-module slots (2)
9	processor 2	10	memory-module slots (2)
11	memory-module slots (4)	12	hard drives

Optical drives and tape drives (optional)

Your system supports one of the following configurations:

- Systems with cabled hard drives support one optical drive and one tape drive.
- Systems with hot-swappable hard drives support up to one optical drive and two tape drives.

  ⓘ NOTE: If your system is installed with a double-width GPU card, the system supports only one 5.25 inch removal media storage.

  ⓘ NOTE: You can also install a Dell PowerVault RD1000 removable media device on your system.

For systems with hot-swappable hard drives, the optical and tape drives can be configured as follows:

Slot 1	SATA optical drive or PowerVault RD1000
Slot 2	PowerVault RD1000 or blank
Slot 3	SAS tape drive or blank

Removing the optical drive or tape drive

Prerequisites

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

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

Steps

1 Disconnect the power and data cables from the back of the optical drive or tape drive.

  ⓘ NOTE: Note the routing of the power and data cable inside the chassis when you remove them from the system board and the optical drive or tape drive. You must route these cables correctly and in a similar manner when you replace them to prevent them from being pinched or crimped.

2 To remove the optical/tape drive, push the release latch as indicated in the figure.
3 Slide the optical drive or tape drive out of the drive bay.
4 If you are not immediately replacing the optical drive or tape drive, install the optical drive or tape drive blank.

  ⓘ NOTE: Blanks must be installed on empty optical drive or tape drive slots to maintain FCC certification of the system. The blanks also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.

  ⓘ NOTE: The procedure to install an optical drive or tape drive blank is similar to the procedure to install an optical drive or tape drive.
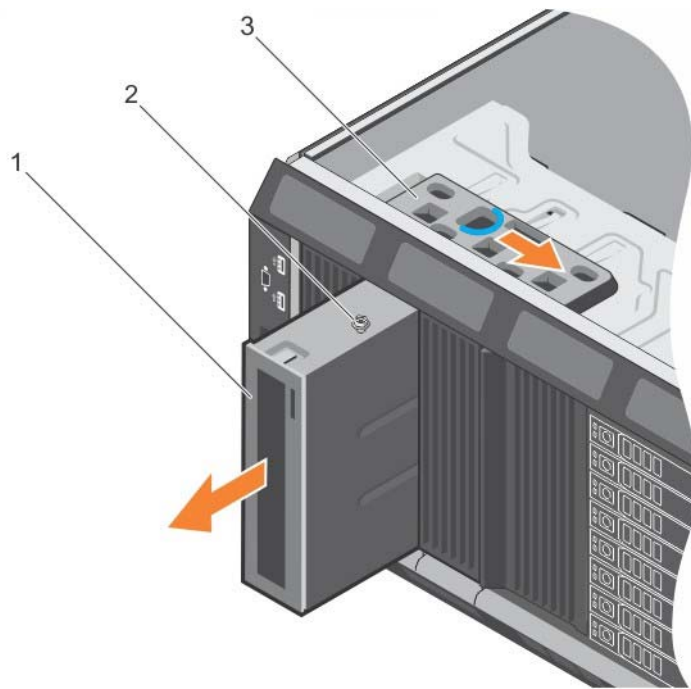
Figure 24. Removing and installing the optical drive or tape drive

1	optical drive or tape drive	2	guide
3	release latch		

ⓘ NOTE: The following figure shows the cabling diagram for an optical drive/tape drive with an x16 backplane. All backplanes have an ODD connector.
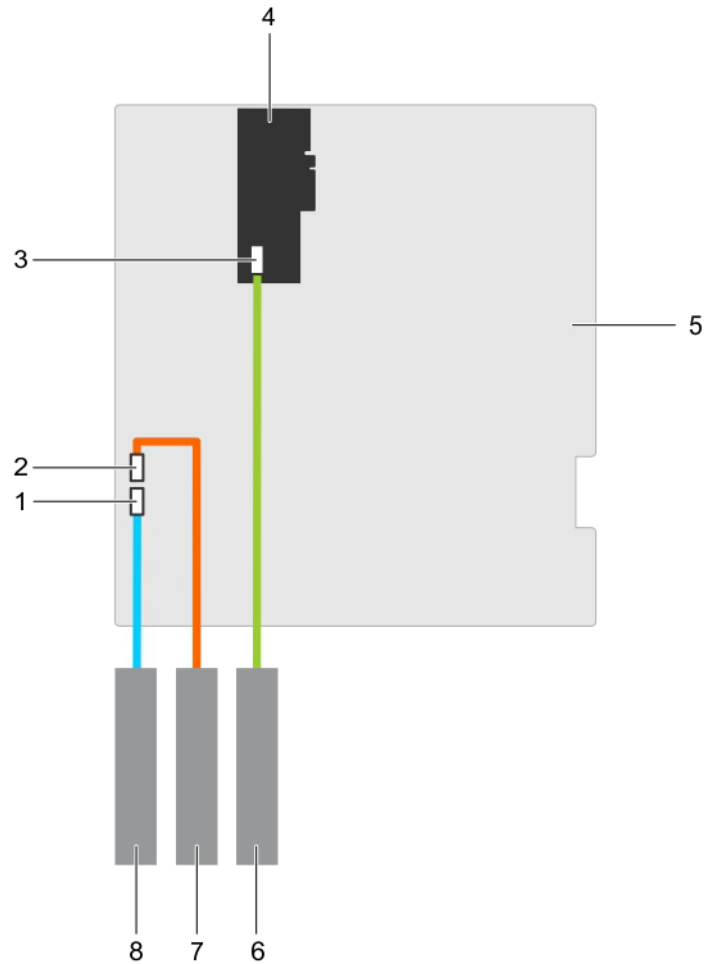
Figure 25. Cabling— optical drive and tape drive

1	optical drive connector on system board	2	tape drive connector on system board
3	SAS tape drive connector on the PERC card	4	PERC card
5	system board	6	SAS tape drive
7	tape drive	8	optical drive

Next steps

1 Install the optical drive or tape drive.

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

Related links

Safety instructions
Before working inside your system
Installing the optical drive or tape drive

Installing the optical drive or tape drive

Prerequisites

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

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

Steps

1 Unpack and prepare the drive for installation.

   For instructions, see the documentation that shipped with the drive.

   If you are installing a SAS tape drive, you must have an internal tape adapter installed. For more information on installing a SAS tape drive, see installing an expansion card section.

2 If applicable, remove the old drive or the drive blank.
3 Align the guide on the drive with the slot on drive bay.
4 Slide the drive into the slot until the latch snaps into place.
5 Connect the power and data cable to the back of the drive.
6 Connect the power and data cables to the backplane and the system board.

   The system board connectors are ODD1/TBU and ODD2/TBU. The system can connect up to two optical drives, or one optical drive with one SATA tape backup unit, and one SAS tape backup unit using Dell OpenManage IT Assistant.
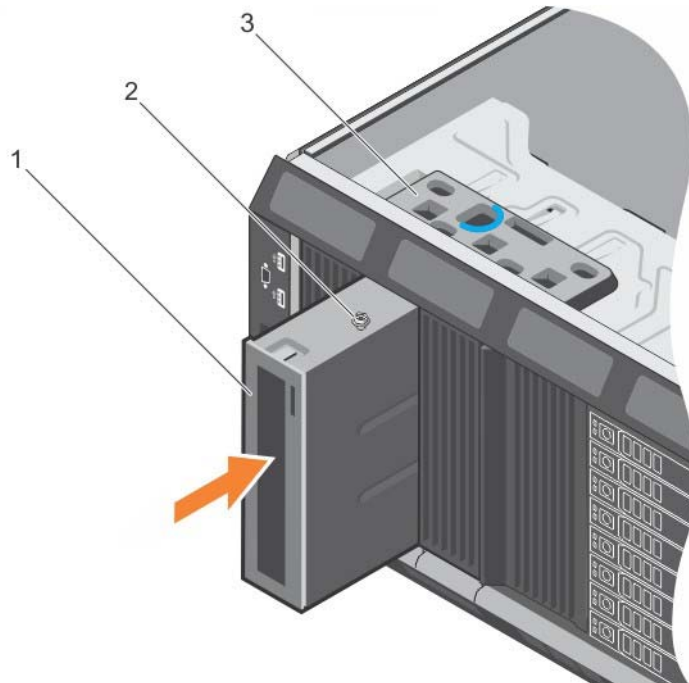
Figure 26. Installing the optical drive or tape drive

1	optical drive/tape drive	2	guide
3	release latch		

Next step

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

Related links

Cooling shroud

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

Removing the cooling shroud

Prerequisites

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

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

1 Follow the safety guidelines listed in 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.

Step

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

ⓘ NOTE: Systems with x16 hard-drive backplanes use a different cooling shroud. To ensure proper cooling, always install the cooling shroud provided with your system.
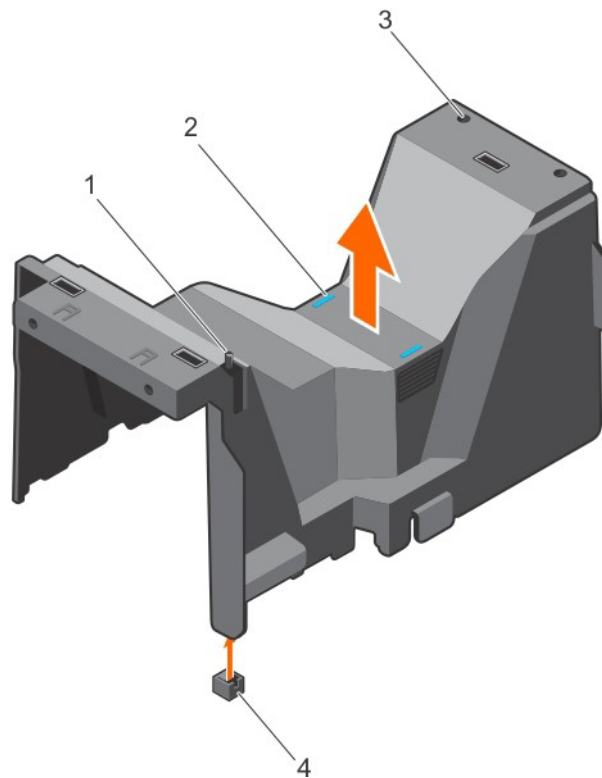
Figure 27. Removing the cooling shroud — 3.5 inch hard-drive system

1	chassis intrusion switch	2	touch points (2)
3	slots (2)	4	chassis intrusion-switch connector on the system board

Next steps

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 links

Safety instructions
Before working inside your system
Removing an expansion card
Installing the cooling shroud
Installing an expansion card
After working inside your system

Installing the cooling shroud

Prerequisites

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

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: Do not operate the system with the cover removed for a duration exceeding 5 minutes.**

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

Steps

1   Align the slots on the cooling shroud with the tabs on the internal cooling fan.
2   Lower the cooling shroud into the system until the slots on the cooling shroud are flush with the tabs on the internal cooling fan.

ⓘ **NOTE:** When the cooling shroud is properly seated, the chassis intrusion-switch on the cooling shroud connects to the chassis intrusion-switch connector on the system board.
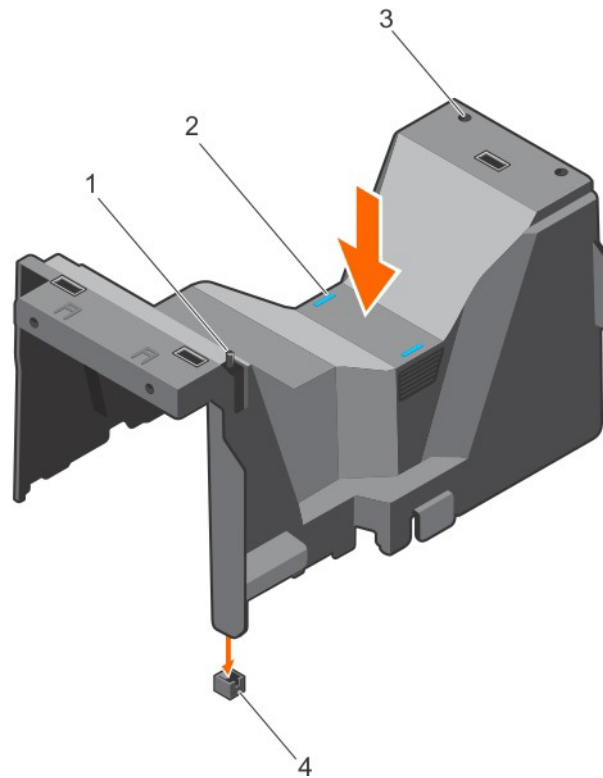
Figure 28. Installing the cooling shroud

1	chassis intrusion switch	2	touch points (2)
3	slots (2)	4	chassis intrusion switch connector on the system board

Next steps

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

Related links

Hot-swappable hard drives

Your system supports Entry Hard Drives and Enterprise Class Hard Drives. Entry Hard Drives are designed for 8x5 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.

ⓘ | NOTE: Do not mix Enterprise Class Drives with Entry Hard Drives.

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.

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

All hard drives connect 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 completed. Be aware that high-capacity hard drives can take a number of hours to format.

Removing a hot swappable hard drive carrier

Prerequisites

1 Follow the safety guidelines listed in the Safety instructions section.
2 If installed, remove the front bezel.
3 Using the management software, prepare the hard drive for removal. For more information, see the documentation for the storage controller.
   If the hard drive is online, the green activity or fault indicator flashes when the hard drive is turned off. You can remove the hard drive when the hard drive indicators turn off.

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

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

Steps
1 To open the hard drive carrier release handle, press the release button.
2 Slide the hard drive carrier out of the hard drive slot.

   △ | CAUTION: To maintain proper system cooling, all empty hard drive slots must have hard drive carrier blanks installed.
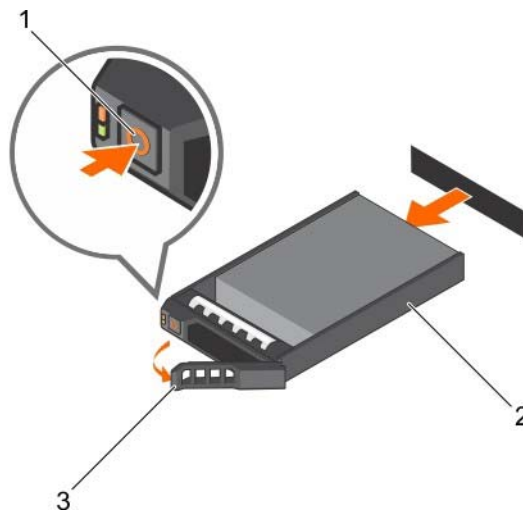
Figure 29. Removing a hot swappable hard drive or SSD

1	release button	2	hard drive carrier
3	hard drive carrier handle		

Next steps

1 If you are not replacing the hard drive immediately, insert a hard drive carrier blank in the empty hard drive slot, or install a hard drive carrier.
2 If removed, install the front bezel.

Related links

Safety instructions
Before working inside your system
Installing a hot swappable hard drive carrier

Installing a hot swappable hard drive carrier

Prerequisites

⚠ 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: 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. Ensure that the replacement hard drive is blank or contains data that you wish to overwrite. Any data on the replacement hard drive is immediately lost after the hard drive is installed.

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

1 If installed, remove the front bezel.
2 If installed, remove the hard drive carrier blank.
3 Install a hot swappable hard drive into the hot swappable hard drive carrier.

Steps

1 Press the release button on the front of the hot swappable hard drive carrier and open the hot swappable hard drive carrier handle.
2 Insert the hot swappable hard drive carrier into the hard drive slot, and push the hot swappable hard drive carrier until it comes in contact with the backplane.
3 Close the hot swappable hard drive carrier handle to lock the hot swappable hard drive carrier in place.
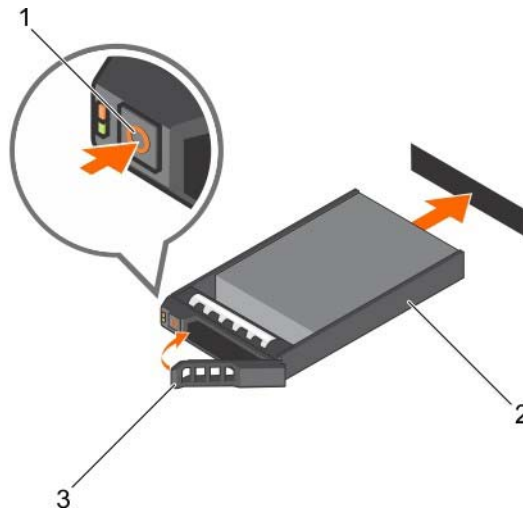
Figure 30. Installing a hot swappable hard drive carrier

1	release button	2	hard drive carrier
3	hard drive carrier handle		

Next step

If removed, install the front bezel.

Related links

Safety instructions
Before working inside your system
Removing a hot swappable hard drive carrier
Removing the optional front bezel
Installing the optional front bezel
Removing a hard-drive blank
Safety instructions
Before working inside your system

Removing a hard-drive blank

Prerequisites

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

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

1 Follow the safety guidelines listed in the Safety instructions section.
2 If installed, remove the bezel.

Step

Press the release button and slide the hard-drive blank out of the hard-drive slot.
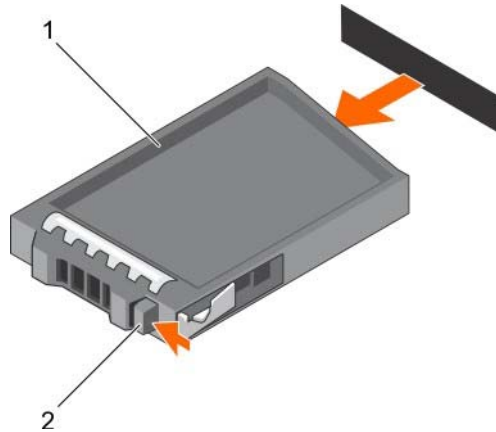
Figure 31. Removing a 2.5 inch hard-drive blank

1	hard-drive blank	2	release button
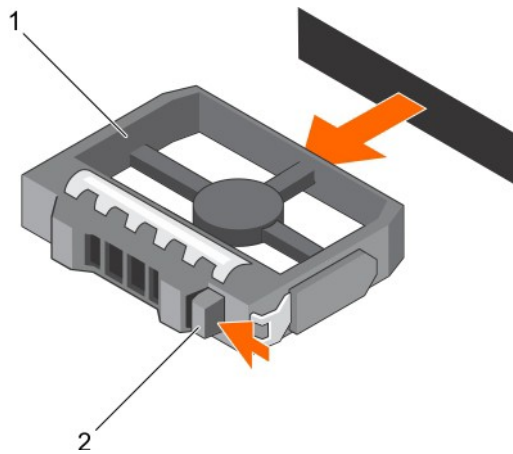
Figure 32. Removing a 3.5 inch hard-drive blank

1	hard-drive blank	2	release button

Related links
  Installing a hard-drive blank
  Removing the optional front bezel
  Installing the optional front bezel

Installing a hard-drive blank

Prerequisites

1   Follow the safety guidelines listed in the Safety instructions section.
2   If installed, remove the front bezel.

Step

Insert the hard-drive blank into the hard-drive slot until the release button clicks into place.
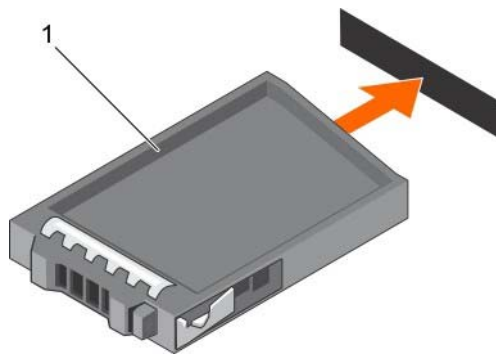
Figure 33. Installing a 2.5-inch hard drive blank
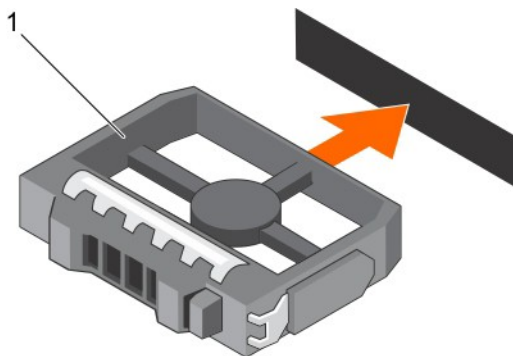
    1   hard drive blank

Figure 34. Installing a 3.5 inch hard drive blank

    1   hard drive blank

Next step

If applicable, install the front bezel.

Related links

    Removing a hard-drive blank
    Removing the optional front bezel
    Installing the optional front bezel

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

Prerequisites

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

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

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

Steps

1 Remove the screws from the side of the 3.5-inch hard drive adapter.
2 Remove the 2.5-inch hot swappable hard drive from the 3.5-inch hard drive adapter.
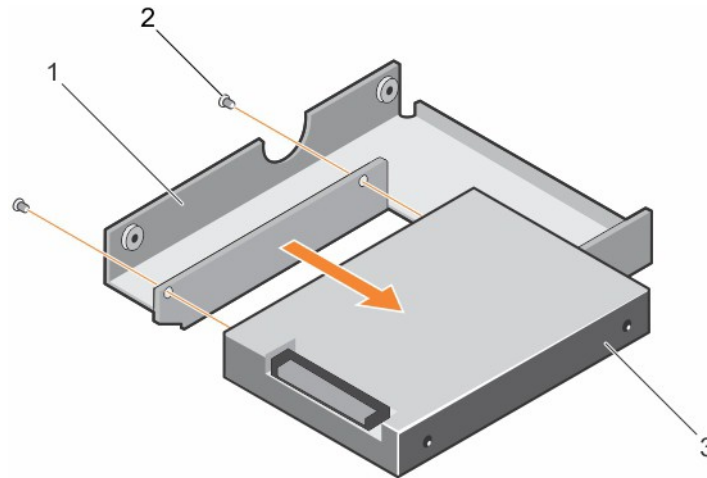
Figure 35. Removing 2.5-inch hot swappable hard drive from a 3.5-inch hard drive adapter

| 1 | 3.5-inch hard drive adapter | 2 | screw (2) |
| 3 | 2.5-inch hot swappable hard drive | | |

Related links

Safety instructions
Installing a 2.5-inch hot swappable hard drive into a 3.5-inch hard drive adapter

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

Prerequisites

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

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

Steps

1 Align the screw holes on the 2.5-inch hot swappable hard drive with the screw holes on the 3.5-inch hard drive adapter.
2 Install the screws to secure the 2.5-inch hot swappable hard drive to the 3.5-inch hard drive adapter.
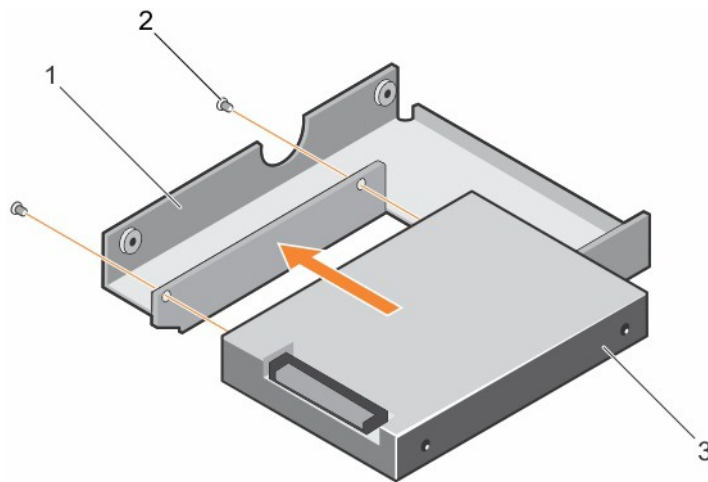
Figure 36. Installing a 2.5-inch hot swappable hard drive into a 3.5-inch hard drive adapter

1	3.5-inch hard drive adapter	2	screw (2)
3	2.5-inch hard drive		

Next step

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

Related links

Safety instructions
Removing a 2.5-inch hot swappable hard drive from a 3.5-inch hard drive adapter

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

Prerequisites

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

Steps

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

Next step

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

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

Prerequisites

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

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

Steps

1   Insert the 3.5-inch hard drive adapter into the 3.5-inch hot swappable hard drive carrier with the connector end of the hard drive toward the back of the 3.5-inch hot swappable hard drive carrier.
2   Align the screw holes on the 3.5-inch hard drive adapter and the 3.5-inch hard drive with the holes on the 3.5-inch hot swappable hard drive carrier.
3   Install the screws to secure the 3.5-inch hard drive adapter to the 3.5-inch hot swappable hard drive carrier.
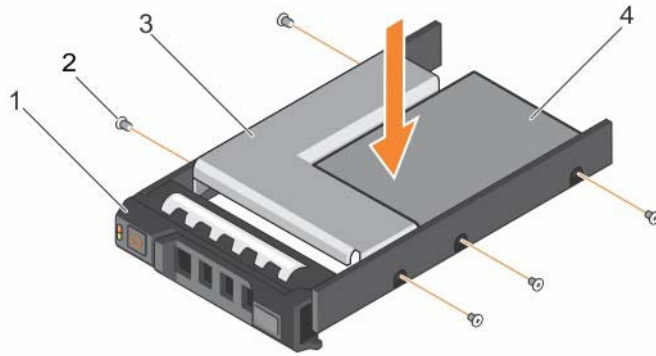
Figure 37. Installing a 3.5-inch hard drive adapter into a hot swappable hard drive carrier

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

Next step

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

Related links

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

Removing a hot swappable hard drive from a hard drive carrier

Prerequisites

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

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

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

Steps

1   Remove the screws from the side rails on the hard drive carrier.
2   Lift the hard drive out of the hard drive carrier.
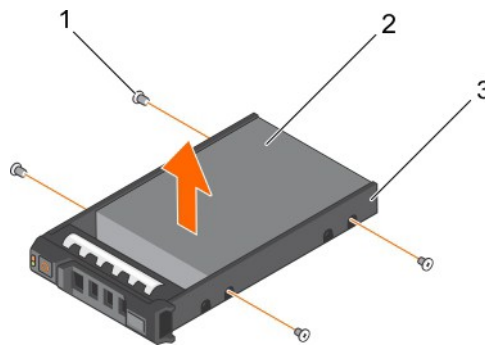
Figure 38. Removing a hot swappable hard drive from a hard drive carrier

1	screw (4)	2	hard drive
3	hard drive carrier		

Next steps

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

Related links

Safety instructions
Installing a hot swappable hard drive into a hard drive carrier

Installing a hot swappable hard drive into a hard drive carrier

Prerequisite

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

Keep the Phillips #2 screwdriver ready.

Steps

1 Insert the hard drive into the hard drive carrier with the connector end of the hard drive facing the back of the hard drive carrier.
2 Align the screw holes on the hard drive with the screw holes on the hard drive carrier.

When aligned correctly, the back of the hard drive is flush with the back of the hard drive carrier.
3 Install the screws to secure the hard drive to the hard drive carrier.
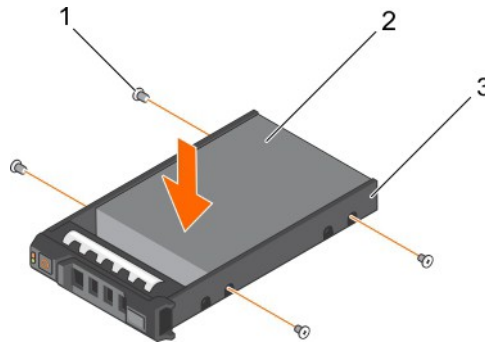
Figure 39. Installing a hard drive into a hard drive carrier

1	screw (4)	2	hard drive
3	hard drive carrier		

Related links

Safety instructions
Before working inside your system
Safety instructions
Removing a hot swappable hard drive from a hard drive carrier

Cabled hard drives

Your system supports up to four 3.5 inch (SAS or SATA) cabled hard drives. Cabled hard drives are installed in an internal hard-drive bay.

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

ⓘ NOTE: Use only hard drives that have been tested and approved for use with your system.

Removing the internal hard drive bay

Prerequisites

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

1 Follow the safety guidelines listed in the Safety instructions section.
2 Keep the #2 Phillips screwdriver ready.
3 Follow the procedure listed in the Before working inside your system section.
4 Disconnect the data and power cable(s) from the hard drive(s).

Steps

1 Loosen the two captive screws securing the internal hard drive bay to the chassis.
2 Lift the internal hard drive bay up and out of the chassis.
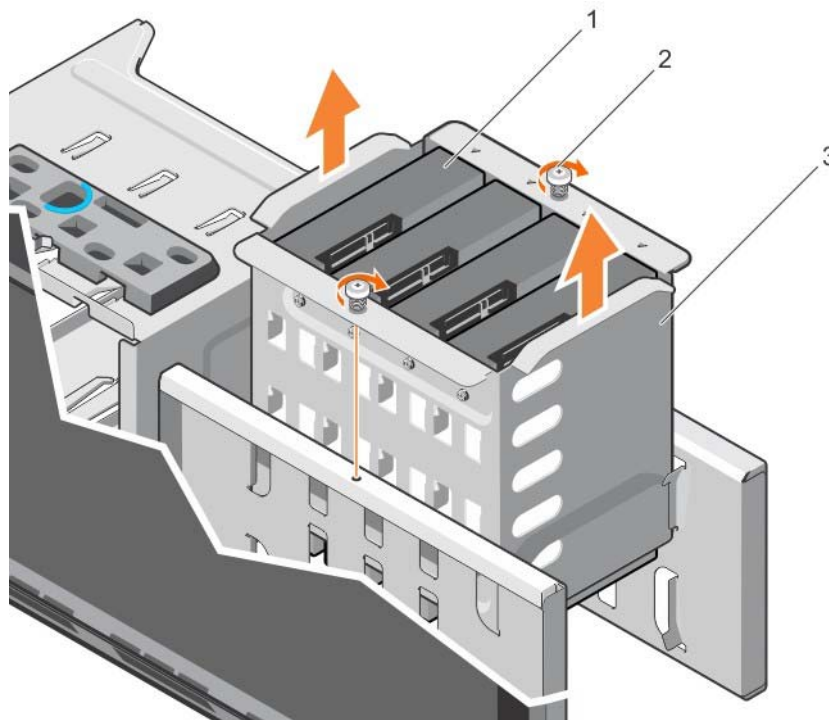
Figure 40. Removing the internal hard drive bay

1	cabled hard drives (4)	2	captive screws (2)
3	internal hard drive bay		

Next step

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

Related links

Safety instructions

Before working inside your system

Installing the internal hard drive bay

Removing a cabled hard drive

After working inside your system

Installing the internal hard drive bay

Prerequisites

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

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

Steps

1. Align the internal hard-drive bay with the tabs on the chassis and slide the internal hard drive bay into the chassis.
2. Secure the internal hard drive bay to the chassis using the two captive screws.
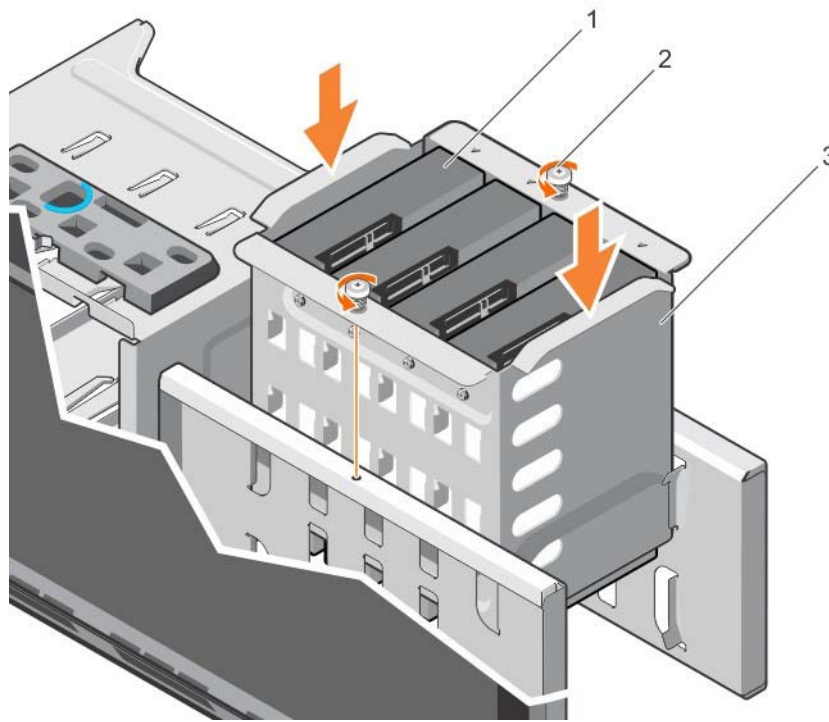
Figure 41. Installing the internal hard drive bay

1	cabled hard drives (4)	2	captive screws (2)
3	internal hard drive bay		

Next steps

1   Connect the data and power cables to the hard drive(s).
2   Follow the procedure listed in the After working inside your system section.

Related links

Safety instructions
Before working inside your system
Removing the internal hard drive bay
Installing a cabled hard drive
After working inside your system

Removing a cabled hard drive

Prerequisites

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

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

Steps

1 Remove the four screws securing the hard drive to the internal hard-drive bay.

2 Remove the hard drive from the internal hard-drive bay.
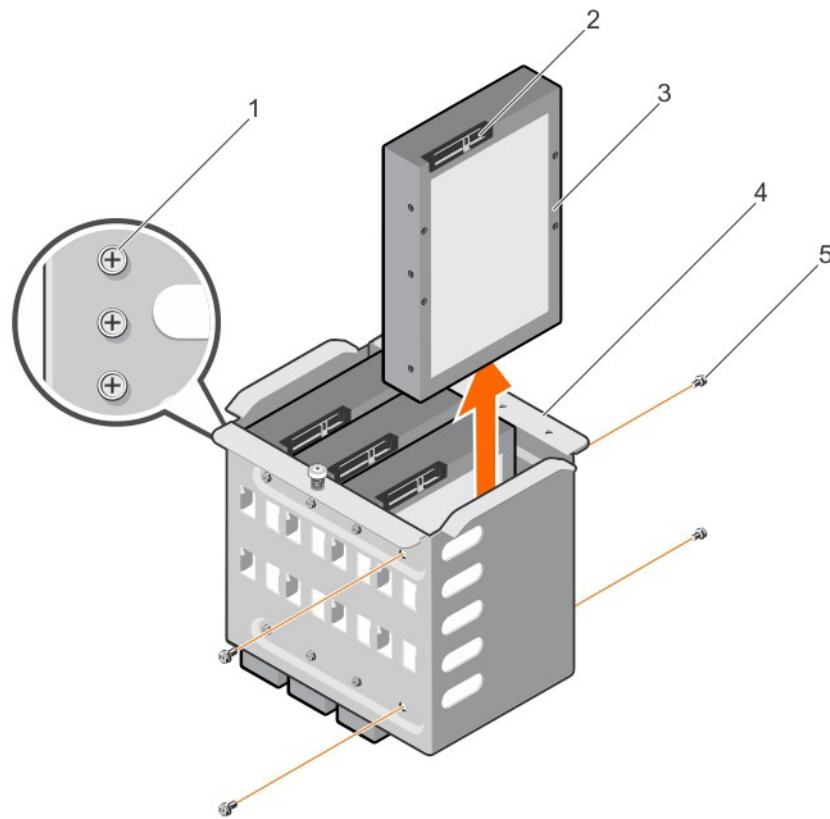
Figure 42. Removing a cabled hard drive

1	spare screws	2	hard drive connector
3	hard drive	4	internal hard-drive bay
5	screws (4)		

Figure 43. Cabling—Cabled hard-drives

1	SATA optical drive connector on system board	2	SATA tape drive connector on system board
3	SATA A connector on system board	4	system board
5	hard drives	6	tape drive
7	optical drive		
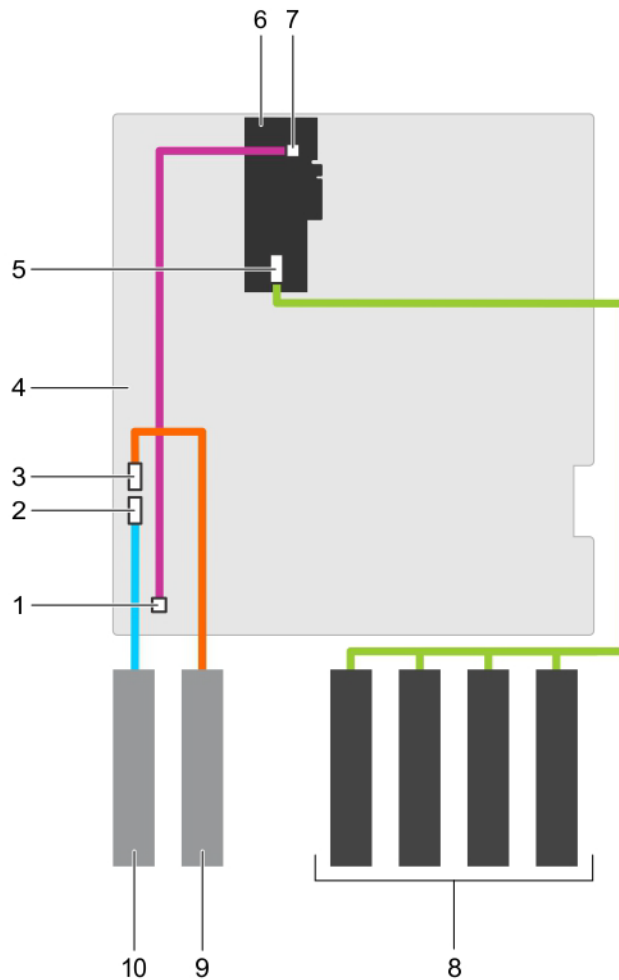
Figure 44. Cabling—Cabled hard-drives with a PERC card

1	front-panel HDD LED controller connector on the system board	2	SATA optical drive connector on system board
3	SATA tape drive connector on system board	4	system board
5	SAS connector on PERC card	6	PERC card
7	front-panel HDD LED controller connector on the PERC card	8	hard drives
9	tape drive	10	optical drive

Next steps

1 Install the internal hard-drive bay into the chassis.

2 If disconnected, reconnect the power and data cable(s) to the remaining hard drive(s) in the internal hard-drive bay.

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

Related links

Safety instructions
Before working inside your system
Removing the internal hard drive bay
Installing a cabled hard drive
Installing the internal hard drive bay

Installing a cabled hard drive

Prerequisites

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

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

Steps

1 Insert the hard drive into the internal hard drive bay with the hard drive connector facing outward.
2 Secure the hard drive to the internal hard drive bay using the four screws.

ⓘ NOTE: When installing new hard drives into the internal hard drive bay, use the spare hard drive screws attached to the hard drive bay.
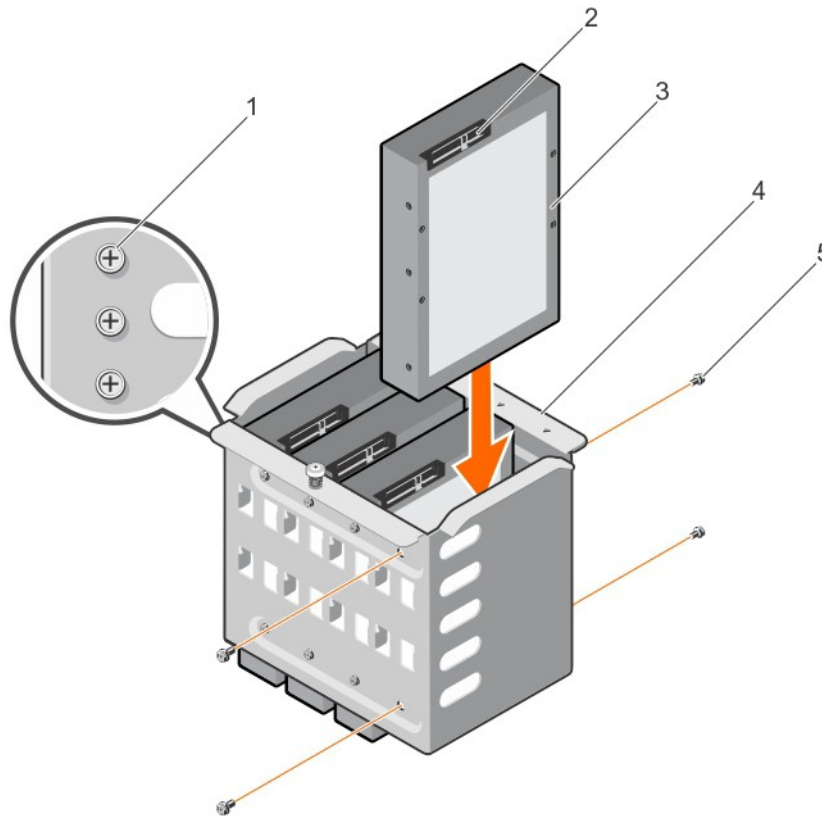
Figure 45. Installing a cabled hard drive

1	spare screws	2	hard drive connector
3	hard drive	4	internal hard drive bay

5   screws (4)

Next steps

1   Install the internal hard drive bay into the chassis.
2   Connect the power and data cables to the hard drive(s).
3   Follow the procedure listed in the After working inside your system section.
4   Enter System Setup and ensure that the hard drive controller is enabled.
5   Exit System Setup and restart the system.
6   Install any software required for operating the hard drive as described in the documentation for the hard drive.

Related links

Safety instructions
Before working inside your system
Removing the internal hard drive bay
Installing the internal hard drive bay
Removing a cabled hard drive

Hard drive backplane

Your system supports one of the following configurations:

• x8 SAS/SATA backplane for 3.5 inch hard drives

  ⓘ NOTE: The x8 backplane also supports up to eight 2.5 inch (SAS, SATA, or SSD) hot swappable hard drives installed in 3.5 inch hard drive adapters, which are then installed in the 3.5 inch hard drive carriers.

• x16 SAS/SATA backplane for 2.5 inch hard drives

ⓘ NOTE: Only systems with hot swappable hard drives support hard drive backplanes.

Removing the hard drive backplane

Prerequisites

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

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

  ⚠ CAUTION: Note the slot number of each hard drive and temporarily label the slots before removing the hard drives so that you can replace them in the same locations.

3   Remove all hard drives.

Steps

1   Disconnect the SAS, power, and signal cables from the hard drive backplane.

  ⓘ NOTE: For the x8 backplane, press the SAS connector and push the connector toward the top of the system to release the SAS cable from the backplane.

2   Pull the release pin and lift the backplane out of the system.
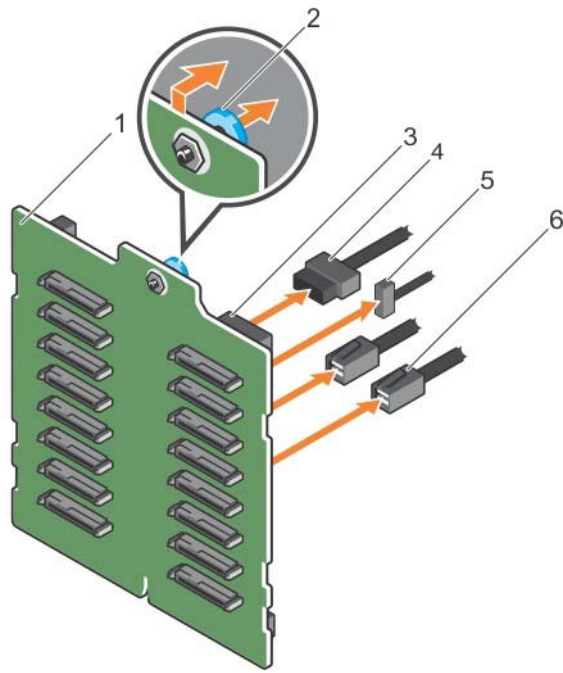
Figure 46. Removing an x16 hard drive backplane

1	x16 hard drive backplane	2	release pin
3	power connector	4	power cable
5	signal cable	6	SAS cable
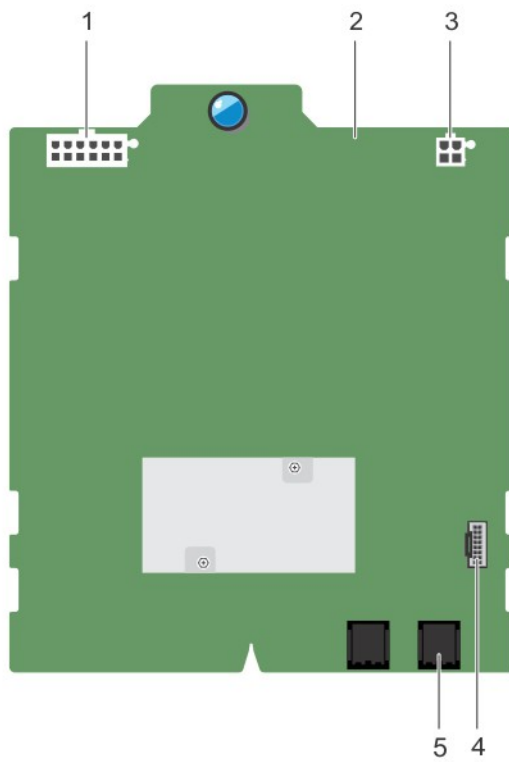
Figure 47. Connectors on an x16 hard drive backplane

1	backplane power connector	2	x16 backplane
3	power connector for the optical and tape drives	4	signal connector
5	SAS A connector		
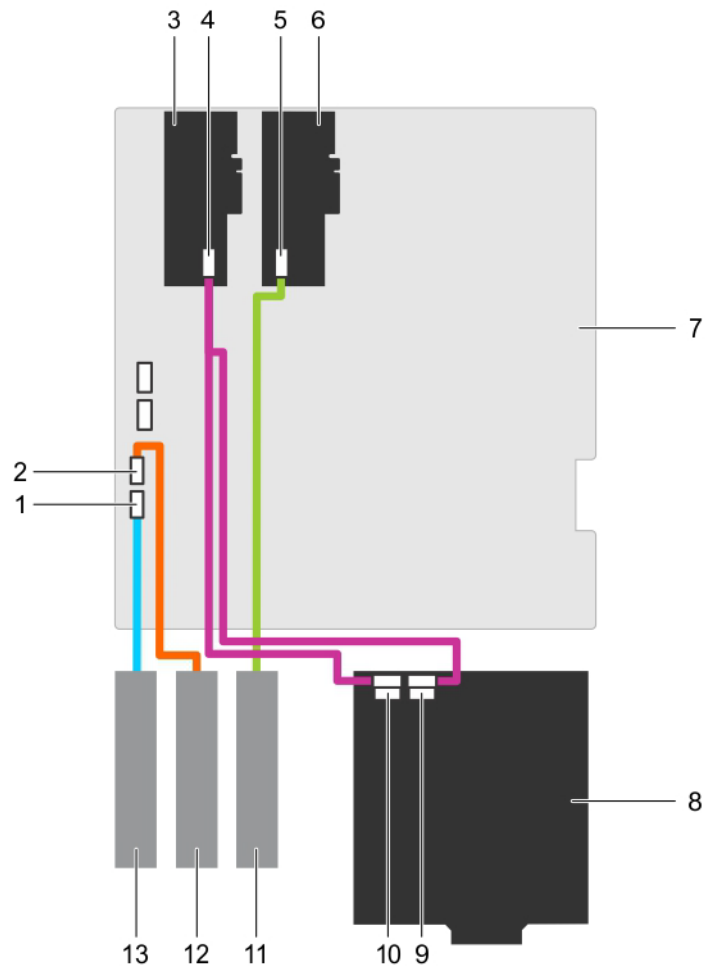
Figure 48. Cabling—x16 hard drive backplane with two PERC cards

1	SATA optical drive connector on system board	2	SATA tape drive connector on system board
3	PERC card	4	SAS connector on PERC card
5	SAS connector on PERC card	6	PERC card
7	system board	8	x16 backplane
9	SAS B connector on the x16 backplane	10	SAS A connector on the x16 backplane
11	SAS tape drive	12	SATA tape drive
13	optical drive		
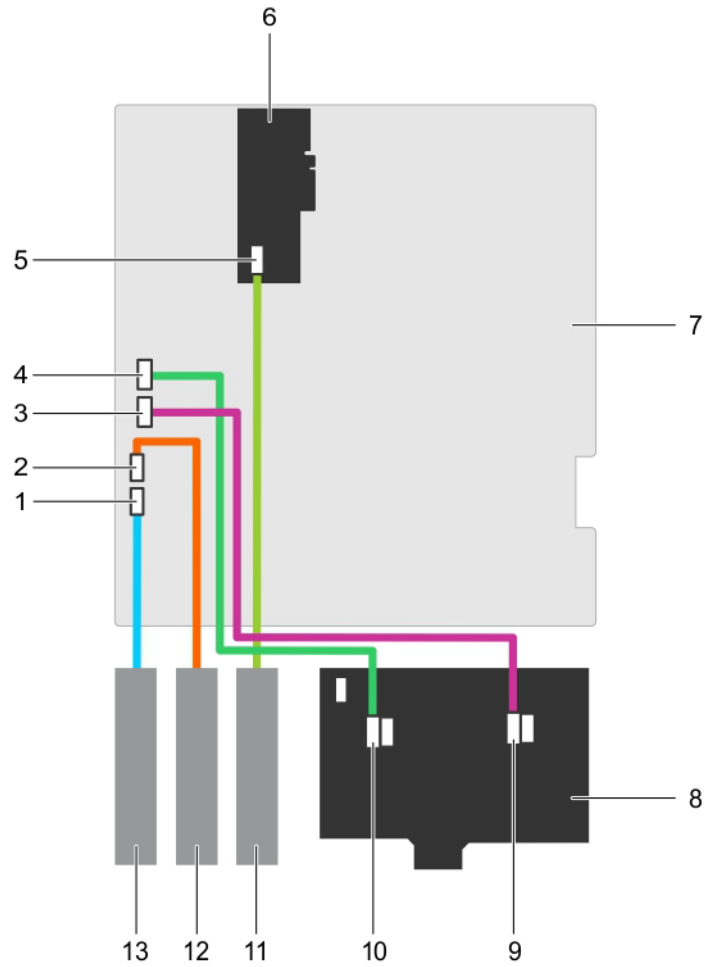
Figure 49. Cabling—x8 hard drive backplane with one PERC card
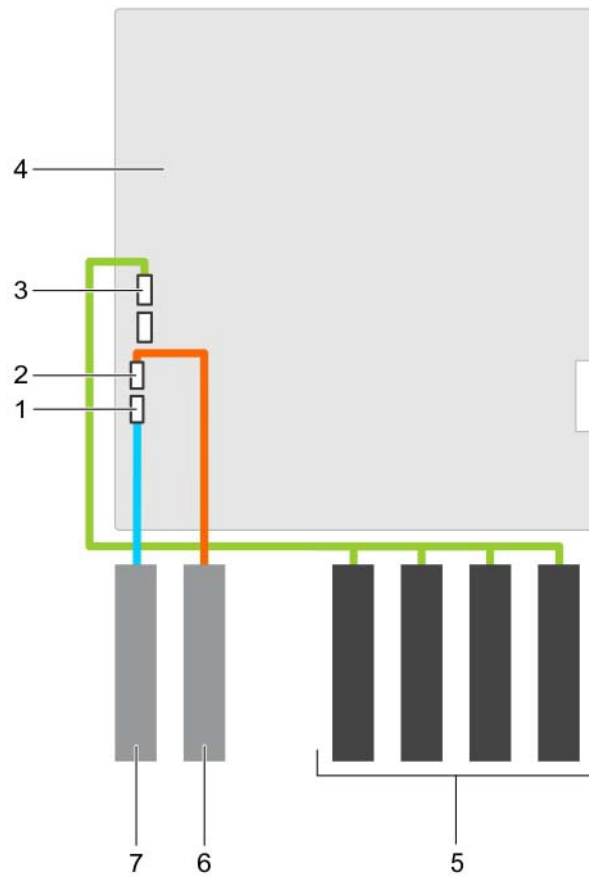
1	SATA optical drive connector on system board	2	SATA tape drive connector on system board
3	SATA B connector on system board	4	SATA A connector on system board
5	SAS connector on PERC card	6	PERC card
7	system board	8	x8 backplane
9	SAS B connector on backplane	10	SAS A connector on backplane
11	SAS tape drive	12	SATA tape drive
13	optical drive		
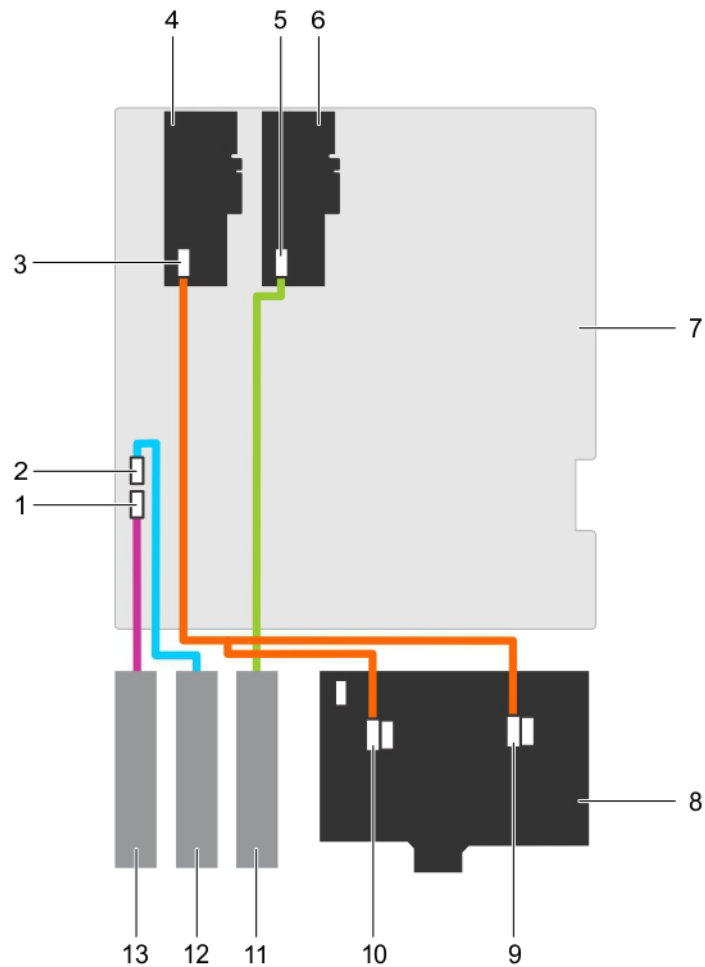
Figure 50. Cabling—x8 hard drive backplane with two PERC cards

1	SATA optical drive connector on system board	2	SATA tape drive connector on system board
3	SAS connector on PERC card	4	PERC card
5	SAS connector on PERC card	6	PERC card
7	system board	8	x8 backplane
9	SAS B connector on backplane	10	SAS A connector on backplane
11	SAS tape drive	12	SATA tape drive
13	optical drive		

Related links

Safety instructions
Before working inside your system
Removing a hot swappable hard drive carrier
Installing the hard drive backplane

Installing the hard drive backplane

Prerequisites

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

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

Steps

1 Use the hooks at the back of the hard drive bay as guides to align the hard drive backplane.
2 Slide down the hard drive backplane until the release pin locks into the slot.
3 Connect the SAS, power, and signal cables to the hard drive backplane.
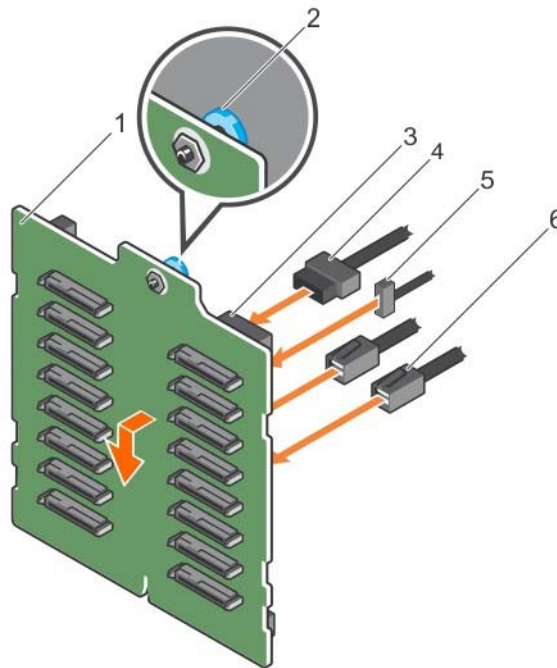
Figure 51. Installing an x16 hard drive backplane

1	x16 hard drive backplane	2	release pin
3	power connector	4	power cable
5	signal cable	6	SAS cable

Next steps

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

Related links

Four-slot hard drive blank

Systems with x8 hard drive backplanes configured for software RAID support only four hard drives. The remaining hard drive slots are pre-installed with the four-slot hard drive blank, and are not available for software RAID.

Removing a four-slot hard drive blank

Prerequisites

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

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

   ⚠ CAUTION: Note the slot number of each hard drive and temporarily label the slots before removing the hard drives so that you can replace them in the same location(s).

3   Remove the cooling shroud.
4   Remove all hard drives.
5   Remove the x8 hard drive backplane.

Steps

1   Using a screwdriver, push the release tabs on the corners of the blank from inside the system, to unlock the four-slot hard drive blank from the chassis.
2   From the front of the system, pull the four-slot hard drive blank at the corners until it is free of the hard drive slot.
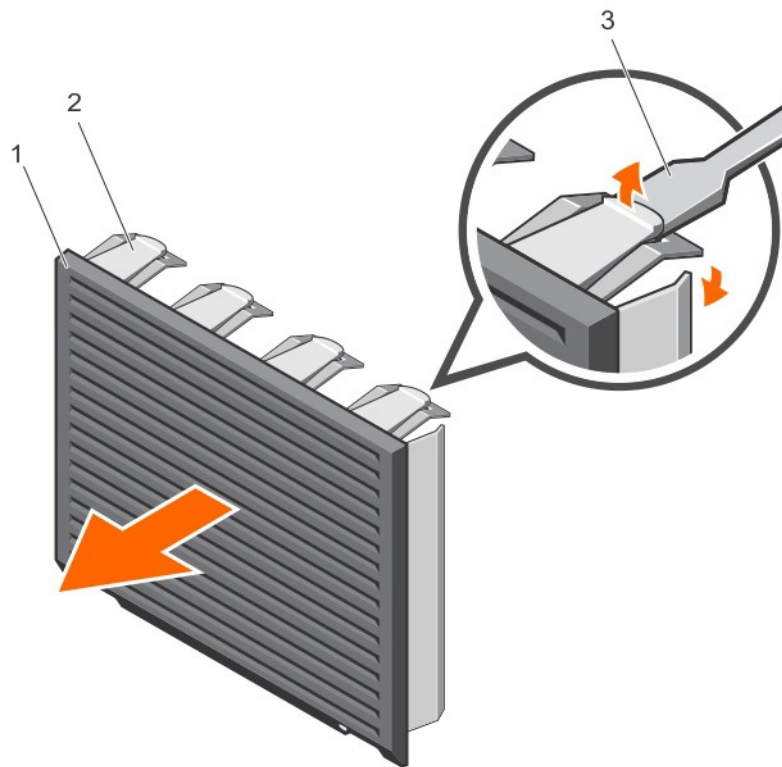
Figure 52. Removing the four-slot hard drive blank

1	four-slot hard drive blank	2	release tab (4)
3	screwdriver		

Next steps

1 Install the four-slot hard drive blank.
2 Follow the procedure listed in the After working inside your system section.

Related links

Safety instructions
Before working inside your system
Removing the cooling shroud
Removing the hard drive backplane
Installing a four-slot hard drive blank
After working inside your system

Installing a four-slot hard drive blank

Prerequisites

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

Steps

1 Locate the hard drive slots numbered from four to seven.
2 Insert the four-slot hard drive blank into the hard drive slot, and push it until the release tabs click into place.
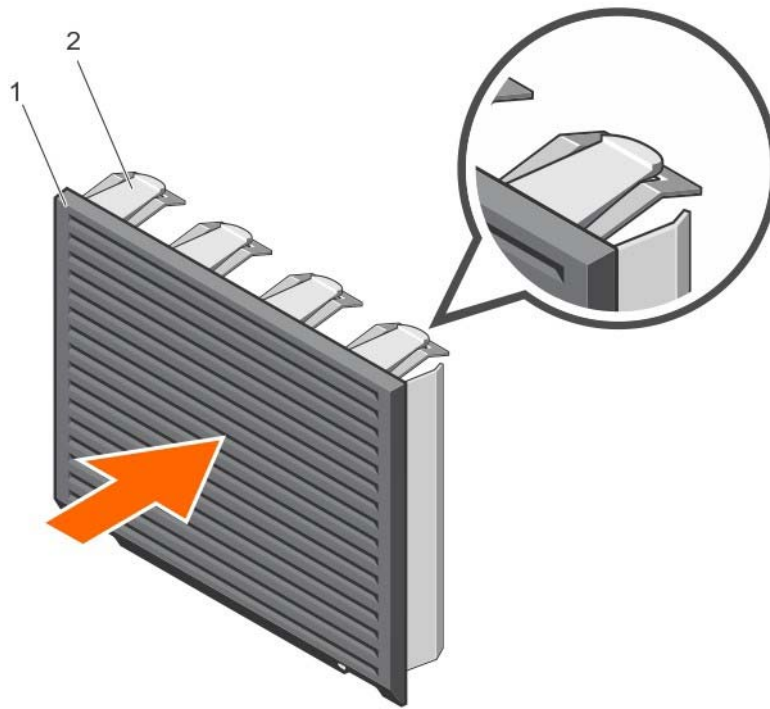
Figure 53. Installing the four-slot hard drive blank

| 1 | four-slot hard drive blank | 2 | release tab (4) |

Next step

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

Related links

Safety instructions
Before working inside your system
Removing a four-slot hard drive blank
Installing the hard drive backplane
Installing the cooling shroud
After working inside your system

System memory

Your system supports DDR4 registered DIMMs (RDIMMs). It supports DDR4 voltage specifications.

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

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

• System profile selected (for example, Performance Optimized, Custom, or Dense Configuration Optimized)
• Maximum supported DIMM frequency of the processors

Your system contains 12 memory sockets split into four sets— two sets of 4 sockets and two sets of 2 sockets each. DIMMs in sockets A1 to A8 are assigned to processor 1 and DIMMs in sockets B1 to B4 are assigned to processor 2. Each 4-socket set is organized into two channels and each 2–socket set is organized into one channel. In each channel of the 4-socket set, the release levers of the first socket are marked white and those of the second socket are marked black. In the 2-socket set, each release lever is marked white.
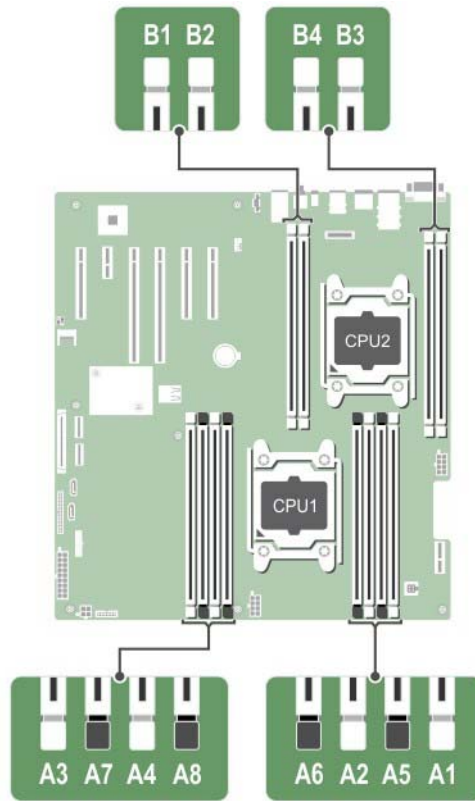
Figure 54. Memory socket locations

Memory channels are organized as follows:

Table 30. Memory channels

Processor	Channel 0	Channel 1	Channel 2	Channel 3
Processor 1	slots A1 and A5	slots A2 and A6	slots A3 and A7	slots A4 and A8
Processor 2	slot B1	slot B2	slot B3	slot B4

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

Table 31. Memory populations and operating frequencies

DIMM Type	DIMMs Populated/Channel	Voltage	Operating Frequency (in MT/s)	Maximum DIMM Rank/Channel
RDIMM	1	1.2 V	2400, 2133, and 1866	Single rank or dual rank
	2			

General memory module installation guidelines

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

- LRDIMMs, and RDIMMs must not be mixed.

- x4 and x8 DRAM based DIMMs can be mixed. For more information, see the Mode-specific guidelines section.
- A maximum of three single- or dual-rank RDIMMs can be populated in a channel.
- If memory modules with different speeds are installed, they operate at the speed of the slowest installed memory module(s) or slower depending on system DIMM configuration.
- Populate DIMM sockets only if a processor is installed. For single-processor systems, sockets A1 to A8 are available. For dual-processor systems, sockets A1 to A8 and sockets B1 to B4 are available.
- Populate all sockets with white release tabs first, and then black.
- Populate the sockets by highest capacity DIMM in the following order - first in sockets with white release levers and then black. For example, if you want to mix 16 GB and 8 GB DIMMs, populate 16 GB DIMMs in the sockets with white release tabs and 8 GB DIMMs in the sockets with black release tabs.
- In a dual-processor configuration, the memory configuration for each processor must 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 sizes can be mixed provided that other memory population rules are followed (for example, 4 GB and 8 GB memory modules can be mixed).
- Depending on mode-specific guidelines, populate four DIMMs per processor (one DIMM per channel) at a time to maximize performance. For more information, see the Mode-specific guidelines section.

Table 32. Heat sink — processor configurations

Processor Configuration	Processor Type (in Watts)	Heat Sink Width	Number of DIMMs	
			Maximum System Capacity	Reliability, Availability, and Serviceability (RAS) Features
Single processor	105 W, 120 W or 135 W	68 mm	8	8
Dual processor	105 W, 120 W or 135 W	68 mm	12	12

Related links

Mode-specific guidelines

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.

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

(i) | 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.
- DIMMs installed in memory sockets with white release tabs must be identical and similar rule applies for sockets with black release tabs. This ensures that identical DIMMs are installed in matched pairs—for example, A1 with A2, A3 with A4.

  (i) | NOTE: Mirroring and Advanced ECC modes require minimum of two DIMMs per CPU and must be populated in pairs of either two or four DIMMs per CPU.

Table 33. Processor 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 tables show sample memory configurations for one and two processor configurations that follow the appropriate memory guidelines.

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

Table 34. Memory configurations—single processor

System Capacity (in GB)	DIMM Size (in GB)	Number of DIMMs	DIMM Rank, Organization, and Frequency	DIMM Slot Population
4	4	1	1R, x8, 2400 MT/s, 1R, x8, 2133 MT/s, 1R, x8, 1866 MT/s	A1
8	4	2	1R, x8, 2400 MT/s, 1R, x8, 2133 MT/s, 1R, x8, 1866 MT/s	A1, A2

System Capacity (in GB)	DIMM Size (in GB)	Number of DIMMs	DIMM Rank, Organization, and Frequency	DIMM Slot Population
	8	1	1R, x8, 2400 MT/s, 1R, x8, 2133 MT/s, 1R, x8, 1866 MT/s	A1
16	4	4	1R, x8, 2400 MT/s, 1R, x8, 2133 MT/s, 1R, x8, 1866 MT/s	A1, A2, A3, A4
	8	2	2R, x8, 2400 MT/s, 2R, x8, 2133 MT/s, 2R, x8, 1866 MT/s	A1, A2
	16	1	2R, x8, 2400 MT/s, 2R, x8, 2133 MT/s, 2R, x8, 1866 MT/s	A1
24	4	6	1R, x8, 2400 MT/s, 1R, x8, 2133 MT/s, 1R, x8, 1866 MT/s	A1, A2, A3, A4, A5, A6
	8	3	1R, x8, 2400 MT/s, 1R, x8, 2133 MT/s, 1R, x8, 1866 MT/s	A1, A2, A3
32	4	8	1R, x8, 2400 MT/s, 1R, x8, 2133 MT/s, 1R, x8, 1866 MT/s	A1, A2, A3, A4, A5, A6, A7, A8
	8	4	1R, x8, 2400 MT/s, 1R, x8, 2133 MT/s, 1R, x8, 1866 MT/s	A1, A2, A3, A4
	16	2	1R, x8, 2400 MT/s, 1R, x8, 2133 MT/s, 1R, x8, 1866 MT/s	A1, A2
	32	1	1R, x8, 2400 MT/s, 1R, x8, 2133 MT/s, 1R, x8, 1866 MT/s	A1

System Capacity (in GB)	DIMM Size (in GB)	Number of DIMMs	DIMM Rank, Organization, and Frequency	DIMM Slot Population
48	8	6	2R, x8, 2400 MT/s, 2R, x8, 2133 MT/s, 2R, x8, 1866 MT/s	A1, A2, A3, A4, A5, A6
	16	3	2R, x8, 2400 MT/s, 2R, x8, 2133 MT/s, 2R, x8, 1866 MT/s	A1, A2, A3
64	8	8	2R, x8, 2400 MT/s, 2R, x8, 2133 MT/s, 2R, x8, 1866 MT/s	A1, A2, A3, A4, A5, A6, A7, A8
	16	4	2R, x8, 2400 MT/s, 2R, x8, 2133 MT/s, 2R, x8, 1866 MT/s	A1, A2, A3, A4
	32	2	2R, x8, 2400 MT/s, 2R, x8, 2133 MT/s, 2R, x8, 1866 MT/s	A1, A2
96	16	6	2R, x8, 2400 MT/s, 2R, x4, 2133 MT/s, 2R, x4, 1866 MT/s	A1, A2, A3, A4, A5, A6
	32	3	2R, x8, 2400 MT/s, 2R, x4, 2133 MT/s, 2R, x4, 1866 MT/s	A1, A2, A3
128	16	8	2R, x8, 2400 MT/s, 2R, x4, 2133 MT/s, 2R, x4, 1866 MT/s,	A1, A2, A3, A4, A5, A6, A7, A8
	32	4	2R, x8, 2400 MT/s, 2R, x4, 2133 MT/s, 2R, x4, 1866 MT/s,	A1, A2, A3, A4
192	32	6	2R, x4, 2400 MT/s, 2R, x4, 2133 MT/s, 2R, x4, 1866 MT/s	A1, A2, A3, A4, A5, A6

System Capacity (in GB)	DIMM Size (in GB)	Number of DIMMs	DIMM Rank, Organization, and Frequency	DIMM Slot Population
256	32	8	2R, x4, 2400 MT/s 2R, x4, 2133 MT/s 2R, x4, 1866 MT/s	A1, A2, A3, A4, A5, A6, A7, A8

Table 35. Memory configurations—two processors

System Capacity (in GB)	DIMM Size (in GB)	Number of DIMMs	DIMM Rank, Organization, and Frequency	DIMM Slot Population
8	4	2	1R, x8, 2400 MT/s, 1R, x8, 2133 MT/s, 1R, x8, 1866 MT/s	A1, B1
16	4	4	1R, x8, 2400 MT/s, 1R, x8, 2133 MT/s, 1R, x8, 1866 MT/s	A1, A2, B1, B2
	8	2	1R, x8, 2400 MT/s, 1R, x8, 2133 MT/s, 1R, x8, 1866 MT/s	A1, B1
24	4	6	1R, x8, 2400 MT/s, 1R, x8, 2133 MT/s, 1R, x8, 1866 MT/s	A1, A2, A3, B1, B2, B3
32	4	8	1R, x8, 2400 MT/s, 1R, x8, 2133 MT/s, 1R, x8, 1866 MT/s	A1, A2, A3, A4, B1, B2, B3, B4
	8	4	2R, x8, 2400 MT/s, 2R, x8, 2133 MT/s, 2R, x8, 1866 MT/s	A1, A2, B1, B2
	16	2	2R, x8, 2400 MT/s, 2R, x8, 2133 MT/s, 2R, x8, 1866 MT/s	A1, B1
48	4	12	2R, x8, 2400 MT/s, 2R, x8, 2133 MT/s,	A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4

System Capacity (in GB)	DIMM Size (in GB)	Number of DIMMs	DIMM Rank, Organization, and Frequency	DIMM Slot Population
			2R, x8, 1866 MT/s	
	8	6	2R, x8, 2400 MT/s, 2R, x8, 2133 MT/s, 2R, x8, 1866 MT/s	A1, A2, A3, B1, B2, B3
64	8	8	2R, x8, 2400 MT/s, 2R, x8, 2133 MT/s, 2R, x8, 1866 MT/s	A1, A2, A3, A4, B1, B2, B3, B4
	16	4	2R, x8, 2400 MT/s, 2R, x8, 2133 MT/s, 2R, x8, 1866 MT/s	A1, A2, B1, B2
	32	2	2R, x8, 2400 MT/s, 2R, x8, 2133 MT/s, 2R, x8, 1866 MT/s	A1, B1
96	8	12	2R, x8, 2400 MT/s, 2R, x8, 2133 MT/s, 2R, x8, 1866 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4
	16	6	2R, x8, 2400 MT/s, 2R, x8, 2133 MT/s, 2R, x8, 1866 MT/s	A1, A2, A3, B1, B2, B3
128	16	8	2R, x4, 2400 MT/s, 2R, x4, 2133 MT/s, 2R, x4, 1866 MT/s	A1, A2, A3, A4, B1, B2, B3, B4
	32	4	2R, x4, 2400 MT/s, 2R, x4, 2133 MT/s, 2R, x4, 1866 MT/s	A1, A2, B1, B2
160	16 and 8	12	2R, x4, 2400 MT/s, 2R, x8, 2400 MT/s, 2R, x4, 2133 MT/s, 2R, x8, 2133 MT/s, 2R, x4, 1866 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4 (i) NOTE: 16 GB DIMMs must be installed in slots numbered A1, A2, A3, A4, B1, B2, B3, and B4 and 8 GB DIMMs must be installed in slots A5, A6, A7, and A8.

System Capacity (in GB)	DIMM Size (in GB)	Number of DIMMs	DIMM Rank, Organization, and Frequency	DIMM Slot Population
			2R, x8, 1866 MT/s	
192	16	12	2R, x4, 2400 MT/s, 2R, x4, 2133 MT/s, 2R, x4, 1866 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4
	32	6	2R, x4, 2400 MT/s 2R, x4, 2133 MT/s 2R, x4, 1866 MT/s	A1, A2, A3, B1, B2, B3
256	32	8	2R, x4, 2400 MT/s 2R, x4, 2133 MT/s 2R, x4, 1866 MT/s	A1, A2, A3, A4, B1, B2, B3, B4
384	32	12	2R, x4, 2400 MT/s 2R, x4, 2133 MT/s 2R, x4, 1866 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4

Removing memory modules

Prerequisites

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

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

△ WARNING: The memory modules are hot to touch for some time after the system has been powered down. Allow the memory modules to cool before handling them. Handle the memory modules by the card edges and avoid touching the components or metallic contacts on the memory module.

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

Steps

1 Locate the appropriate memory module socket.

   △ 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.
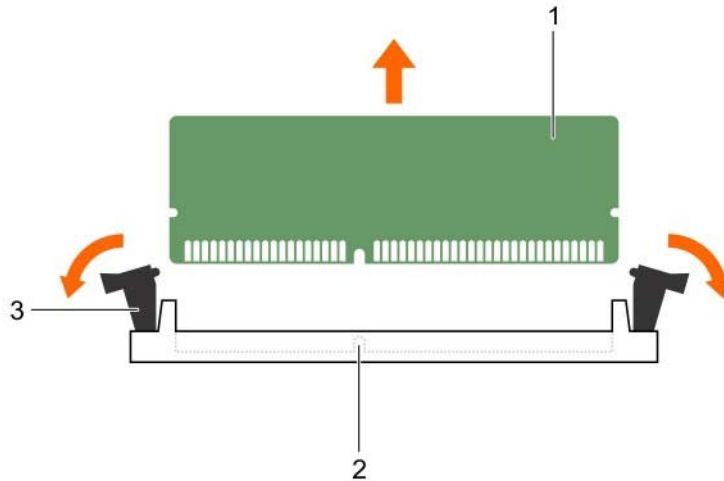
Figure 55. Removing the memory module

1	memory module	2	memory module socket
3	memory module socket ejector (2)		

Next steps

1 Install the memory module.

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

2 Install the cooling shroud.

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

Related links

Safety instructions
Before working inside your system
Installing memory modules
Removing the cooling shroud
Installing the cooling shroud
After working inside your system

Installing memory modules

Prerequisites

⚠ WARNING: 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.

Steps

1   Locate the appropriate memory module socket.

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

2   Open the ejectors on the memory module socket outward to allow the memory module to be inserted into the socket.

3   Align the edge connector of the memory module with the alignment key of the memory module socket, and insert the memory module in the socket.

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

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

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

When the memory module is properly seated in the socket, the levers on the memory module socket align with the levers on the other sockets that have memory modules installed.
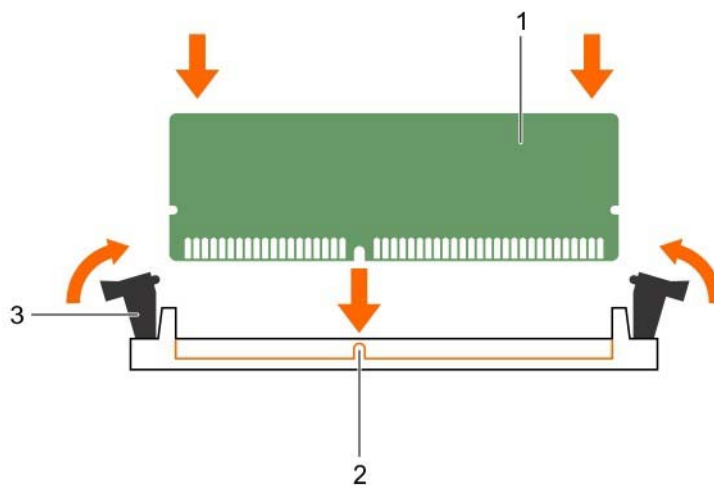
Figure 56. Installing the memory module

1	memory module	2	alignment key
3	memory module socket ejector (2)		

Next steps

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 links

Cooling fans

The system supports the following:

- An internal cooling fan
- An optional external cooling fan at the back of the chassis

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

Removing the internal cooling fan

Prerequisites

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

△ CAUTION: Never operate your system with the internal cooling fan removed. The system can overheat and result in shutdown of the system and loss of data.

△ CAUTION: Do not operate the system with the cover removed for a duration exceeding 5 minutes.

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.

Steps

1 Disconnect the internal cooling fan power cable from the system board.
2 Press the release tab, and holding the internal cooling fan, slide it out in the direction of the arrow marked on the fan.
3 Holding the internal cooling fan, press the release tab, and slide the cooling fan out in the direction of the arrow marked on the fan.

△ CAUTION: Do not remove or install the internal cooling fan by holding the fan blades.
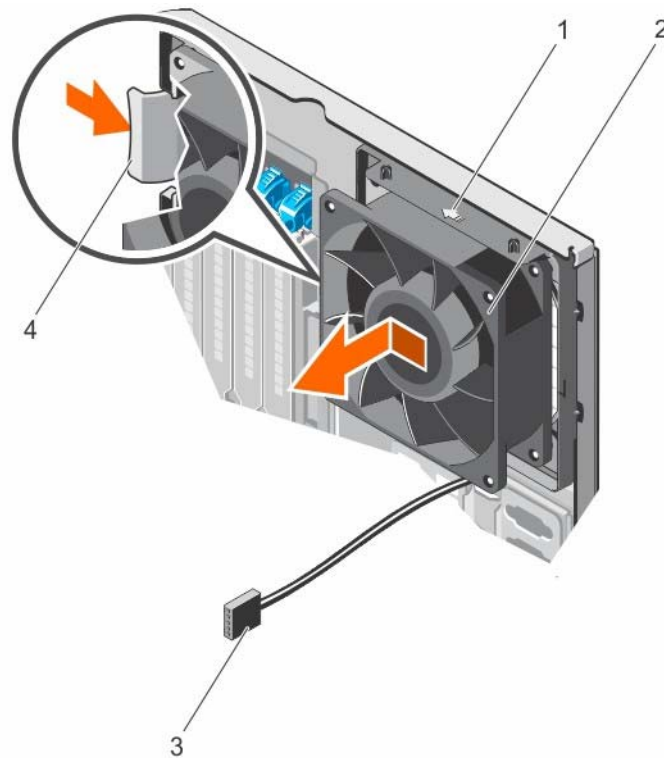
Figure 57. Removing the internal cooling fan

1	arrow	2	internal cooling fan
3	internal cooling fan power cable	4	release tab

Next steps

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

Related links

Safety instructions
Before working inside your system
Removing the cooling shroud
Installing the internal cooling fan
After working inside your system

Installing the internal cooling fan

Prerequisites

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

⚠ CAUTION: Do not operate the system with the cover removed for a duration exceeding 5 minutes.

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.

Steps

1   Hold the cooling fan by the sides with the cable end facing the bottom of the chassis.

⚠ CAUTION: Do not remove or install the internal cooling fan by holding the fan blades.

2   Align the four tabs on the internal cooling fan with the four slots on the chassis wall.

3   Press and slide the internal cooling fan into the slots until the release tab locks into place.

4   Connect the internal cooling fan power cable to the FAN1 connector on the system board.
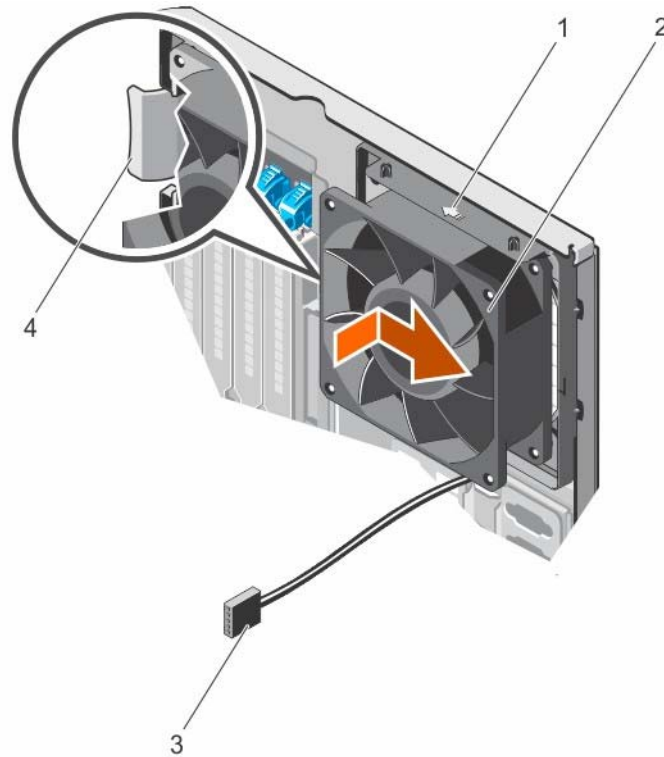
Figure 58. Installing the internal cooling fan

1	arrow	2	internal cooling fan
3	internal cooling fan power cable	4	release tab

Next steps

1   Install the cooling shroud.

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

Related links

Safety instructions
Before working inside your system
Installing the cooling shroud
Removing the internal cooling fan
After working inside your system

Removing the external cooling fan

Prerequisites

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

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

Steps

1 Disconnect the external cooling fan power cable from the system board.
2 Remove the four screws that secure the external cooling fan to the chassis.
3 Lift the external cooling fan to disengage the upper and the lower hooks from the slots on the chassis wall and remove the cooling fan.
4 Remove the external cooling fan power cable from of the system through the external cooling fan power cable slot at the back of the chassis.
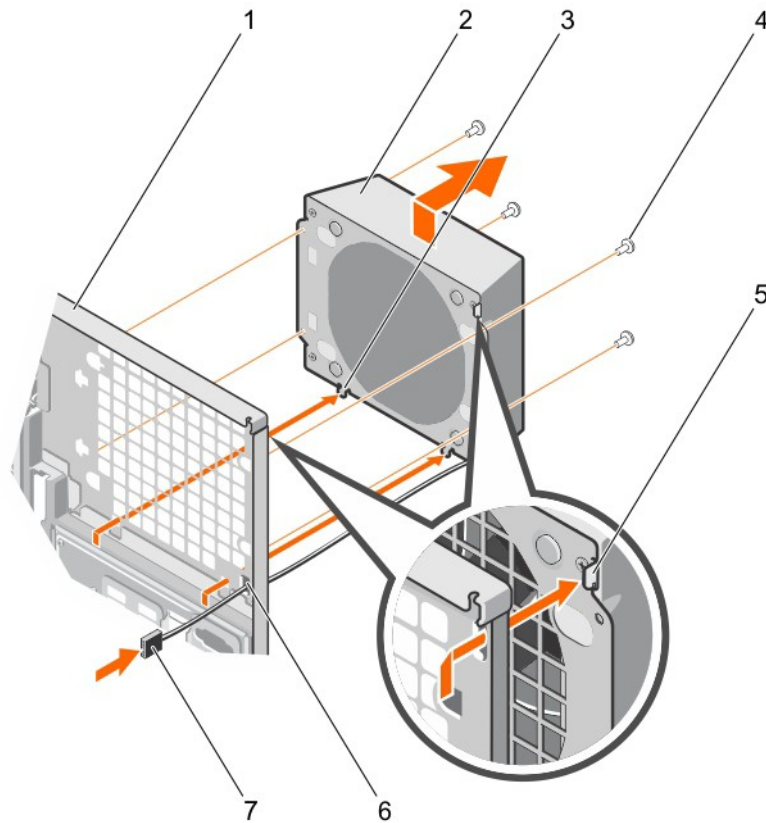
Figure 59. Removing the external cooling fan

1	back of the system chassis		2	external cooling fan
3	bottom hook (2)		4	screw (4)
5	upper hook		6	external cooling fan power cable slot

7   external cooling fan power cable

Related links

Installing the external cooling fan

Prerequisites

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

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

Steps

1   Route the external cooling fan power cable into the system through the external cooling fan power cable slot at the back of the chassis.
2   Align and insert the lower and upper hooks on the external cooling fan into the corresponding slots at the back of the chassis.
3   Use the four screws to secure the external cooling fan to the chassis.
4   Connect the external cooling fan power cable to the FAN2 connector on the system board.
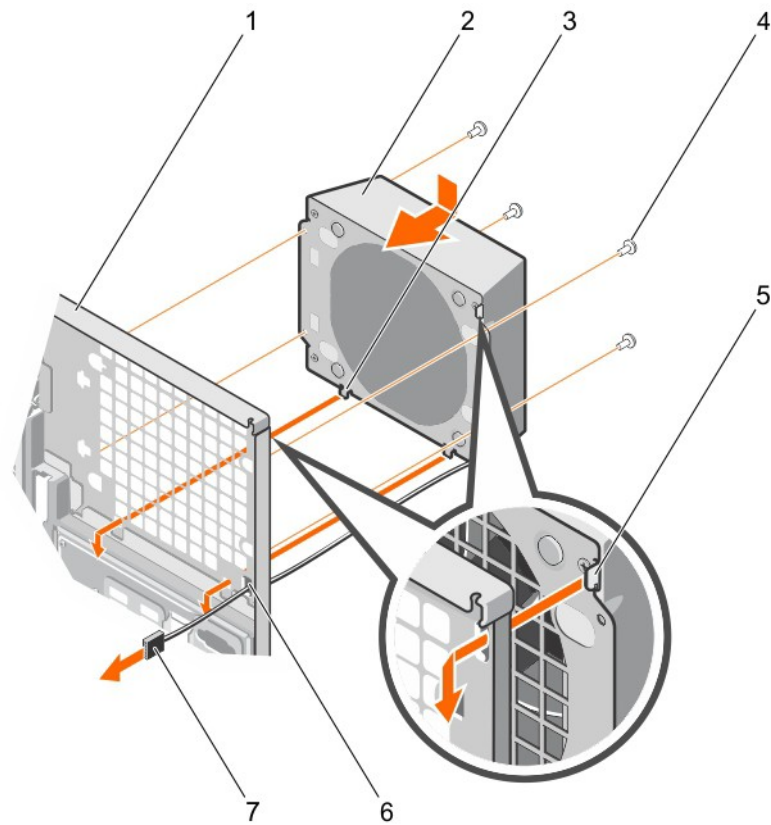
Figure 60. Installing the external cooling fan

1	back of the system chassis	2	external cooling fan
3	bottom hook (2)	4	screw (4)
5	upper hook	6	external cooling fan power cable slot
7	external cooling fan power cable		

Next steps

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

Related links

Safety instructions
Before working inside your system
Installing the cooling shroud
Removing the external cooling fan
After working inside your system

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.

(i) 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

Prerequisites

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

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

Steps

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

(i) NOTE: To locate the internal USB connector on the system board, see the System board connectors section.

2   If installed, remove the USB memory key from the USB connector.
3   Insert the replacement USB memory key into the USB connector.
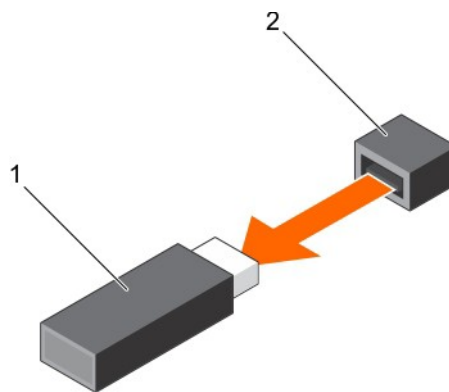
Figure 61. Removing the internal USB memory key

1   USB memory key   2   USB port
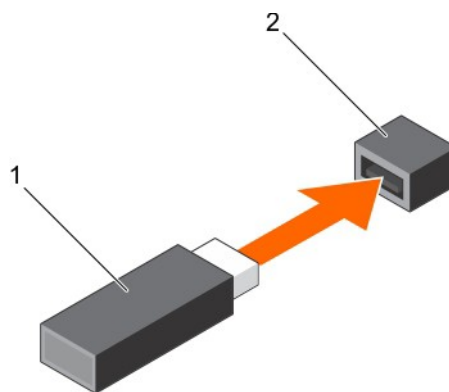
Figure 62. Installing the internal USB memory key

1   USB memory key   2   USB port

Next steps

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 USB memory key is detected by the system.

Related links

Safety instructions
System board connectors
Before working inside your system
After working inside your system

Expansion card holder

Removing the expansion card holder

Prerequisites

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

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

Step

Press the tab and remove the expansion-card holder from the chassis.
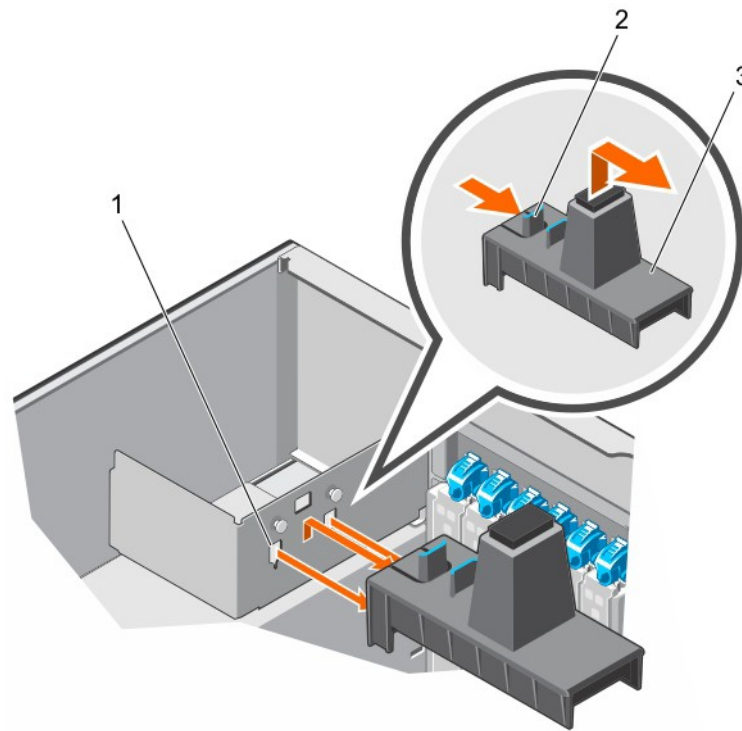
Figure 63. Removing the expansion card holder

1	projection (2)	2	tab
3	expansion card holder		

Related links

Safety instructions
Before working inside your system
Installing the expansion card holder
After working inside your system

Installing the expansion card holder

Prerequisites

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

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

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

Step

Align the expansion card holder with the projections on the chassis and push it down until firmly seated.
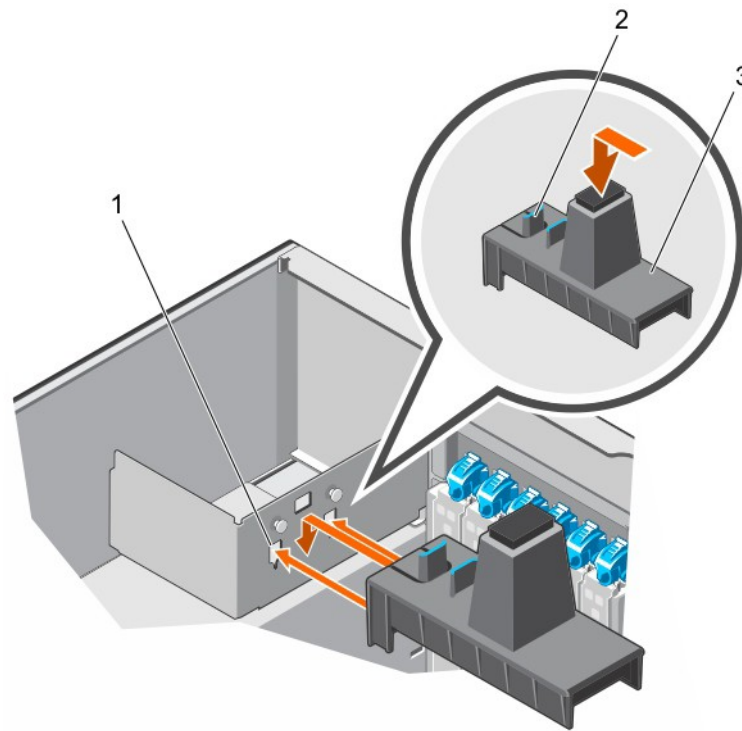
Figure 64. Installing the expansion card holder

1	projection (2)	2	tab
3	expansion card holder		

Next step

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

Related links

Safety instructions
Before working inside your system
Removing the expansion card holder
After working inside your system

Expansion cards

An expansion card in the system 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.

Expansion card installation guidelines

Table 36. PCI Express Generation 3 expansion cards supported

PCIe Slot	Processor Connection	Height	Length	Link Width	Slot Width
1	Platform Controller Hub	Full Height	Half Length	x4	x8
2	Platform Controller Hub	Full Height	Half Length	x1	x1
3	Processor 1	Full Height	Full Length	x16	x16

PCIe Slot	Processor Connection	Height	Length	Link Width	Slot Width
4	Processor 1	Full Height	Full Length	x16	x16
5	Processor 2	Full Height	Half Length	x8	x8
6	Processor 2	Full Height	Half Length	x8	x8

ⓘ NOTE: Only slots 3, 4, 5, and 6 support Generation 3 PCIe expansion cards.

ⓘ NOTE: Do not use slots 5 and 6 for single processor configuration (CPU1).

ⓘ NOTE: When your system is installed with a double-width GPU card in slot 3, you cannot install an expansion card in slot 2.

ⓘ NOTE: When your system is installed with a double-width GPU card in slot 4, you cannot install an expansion card in slot 3.

ⓘ NOTE: The expansion cards are not hot-swappable.

ⓘ NOTE: The upgrade from embedded controller or Software RAID controller to Hardware RAID controller is not supported.

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

Table 37. Expansion card installation order

Card Priority	Card Type	Slot Priority	Maximum Allowed
1	GPU (Double-width)	4	1
	GPU (Single-width)	3, 4	2
2	RAID	3, 4	2
	RAID (H830)	3, 4, 5, 6	4
3	10 Gb NICs	3, 4, 5, 6, 1	5
4	FC8 HBA	3, 4, 5, 6, 1	5
5	1 Gb NICs	3, 4, 5, 6, 1	5
	1 Gb NIC (Broadcom Dual Port)	3, 4, 5, 6, 1, 2	6
6	Non-RAID	3, 4, 5, 6	4

GPU card installation guidelines

Observe the following guidelines while installing a GPU card:

- Ensure that all GPU cards are of the same type or model.
- You can install one double-width card on slot 4 and two single-width cards on slot 3 and slot 4 with single or dual processor system.
- Systems with a double-width GPU card can support only one 5.25 inch removable media storage device.
- GPU cards must be installed on a system with redundant 1100 W AC power supplies.
- Your system supports GPU cards of only 300 W or less.

Removing an expansion card

Prerequisites

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

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

Steps

1 Disconnect the data cables from the PERC card and/or the power cables from the GPU card.
2 Open the expansion card latch in the direction of the arrow shown in the following figure.
3 Hold the expansion card by its edge, pull the card up to remove it from the expansion card slot and out of the system.
4 Install the filler bracket by performing the following steps:
   a Align the tab on the filler bracket with the expansion card slot.
   b Press the expansion card latch until the filler bracket locks into place.

ⓘ NOTE: Filler brackets must be installed over empty expansion card slots to maintain FCC certification of the system. The brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.
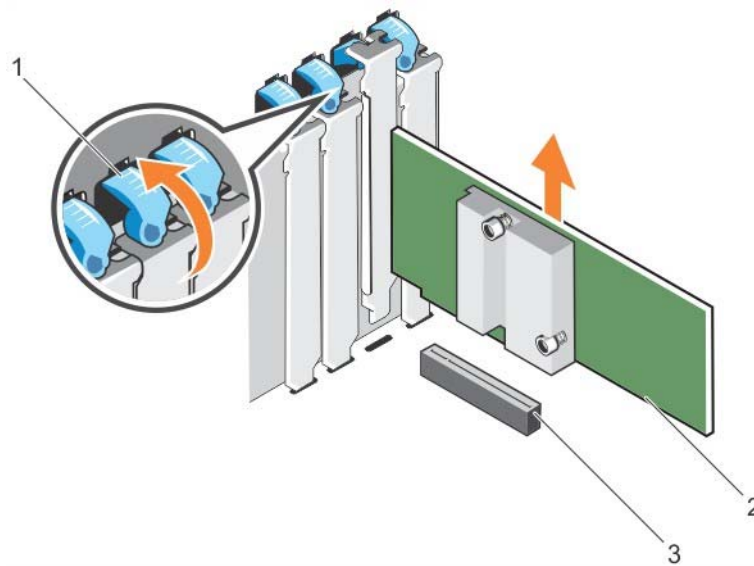
Figure 65. Removing an expansion card

1	expansion card latch		2	expansion card
3	expansion card connector			
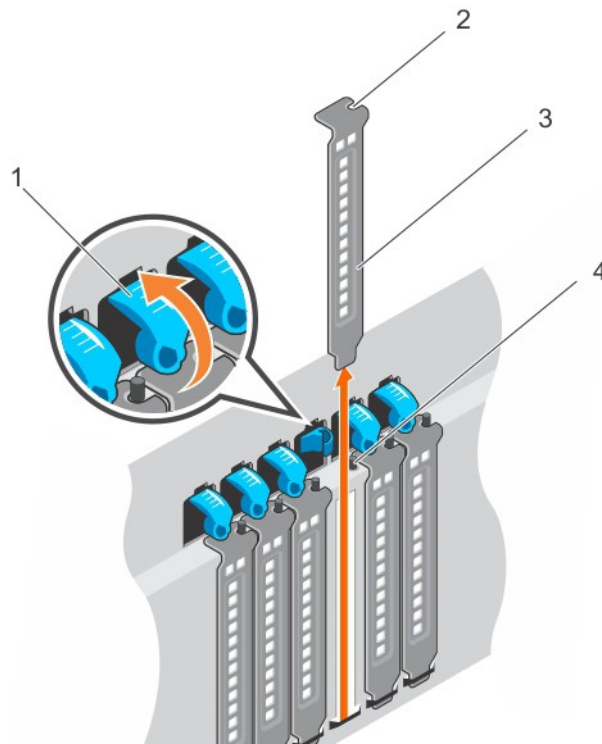
Figure 66. Removing the filler bracket

1	expansion card latch	2	slot
3	filler bracket	4	guide pin

Related links

Safety instructions
Before working inside your system
Removing the expansion card holder
Installing an expansion card
After working inside your system

Installing an expansion card

Prerequisites

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

1   Follow the safety guidelines listed in the Safety instructions section.
2   Follow the procedure listed in the Before working inside your system section.
3   Remove the cooling shroud.
4   Remove the expansion card holder.
5   Disconnect the cables from the expansion card.

Steps

1   Unpack the expansion card and prepare it for installation.

For instructions, see the documentation accompanying the card.

2 Open the expansion card latch for the slot in which you want to install the expansion card.

3 Remove the filler bracket by performing the following steps.

    a Open the two expansion card latches.

    b Slide the filler brackets out from the system.

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

4 Holding the card by its edges, position the card so that the card-edge connector aligns with the expansion card connector.

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

6 Close the expansion card latch by pushing the latch down until the latch snaps into place.

7 Reconnect all the cables to the expansion card.

8 Replace the expansion card holder.
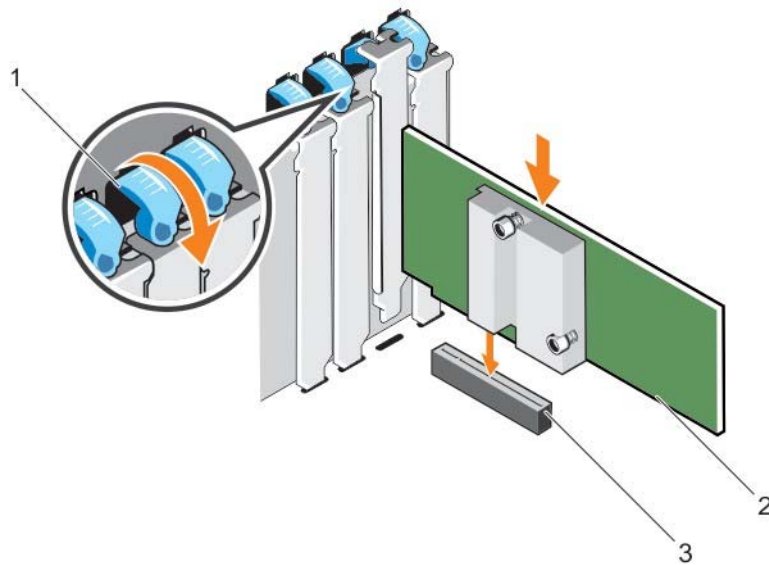
1	expansion card latch	2	expansion card
3	expansion card connector		
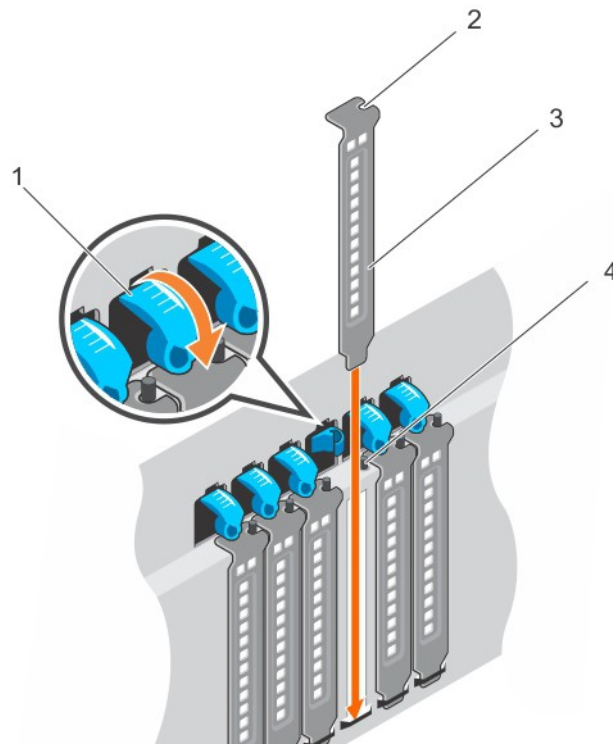
Figure 68. Installing the filler bracket

1	expansion card latch	2	slot
3	filler bracket	4	guide pin

Next steps

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

Related links

Safety instructions
Before working inside your system
Removing the expansion card holder
Installing the expansion card holder
Removing an expansion card
After working inside your system

Removing a GPU card

Prerequisites

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

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

3   Remove the cooling shroud.

4   Remove the expansion-card holder.

Steps

1   Disconnect the cables from the GPU card.

⚠ CAUTION: Do not use excessive force when removing the cables as it can damage the connectors.

2   Open the two expansion-card latches by pressing the latches.

3   Hold the card by its edge, pull the card up to remove it from the card connector and out of the system.
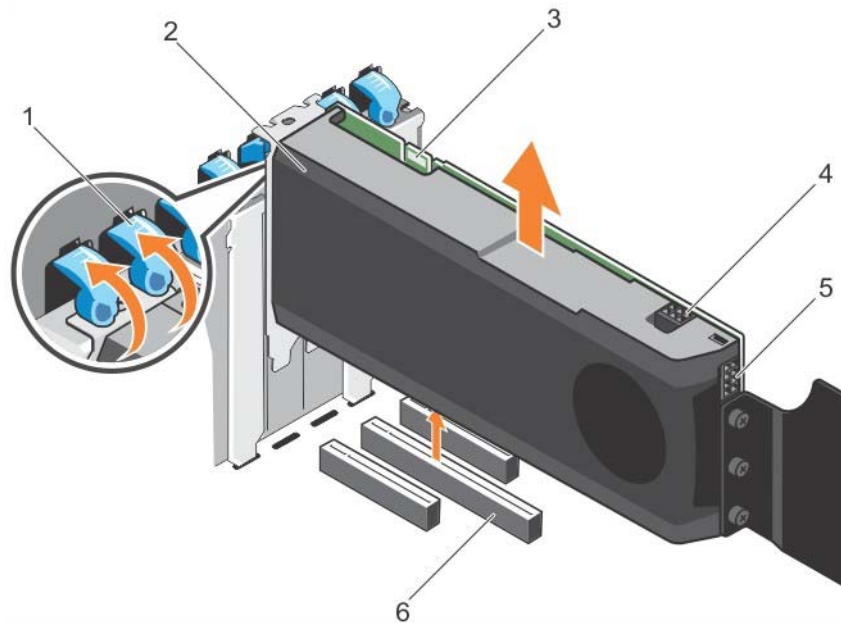
Figure 69. Removing a GPU card

1	expansion card latch (2)	2	GPU card
3	SLI data connector	4	GPU card power connector
5	GPU card power connector	6	x16 connector

Next steps

1   Install the filler brackets by performing the following steps:

a   Align the slot on the filler bracket with the guide pin on the expansion card slot.

b   Press the expansion card latch until the filler bracket locks into place.

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

2   Close the two expansion card latches.

3   Replace the expansion card holder.

4   Install the cooling shroud.

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

Related links

Safety instructions
Before working inside your system
Removing the cooling shroud
Removing the expansion card holder
Installing an optional GPU card
After working inside your system

Installing an optional GPU card

Prerequisites

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

1   Follow the safety guidelines listed in the Safety instructions section.
2   Follow the procedure listed in the Before working inside your system section.
3   Remove the cooling shroud.
4   Remove the expansion card holder.
5   Open the two expansion card latches.
6   Remove the filler brackets.

ⓘ NOTE: Store this bracket for future use. Filler brackets must be installed in empty expansion-card slots to maintain FCC certification of the system. The brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.
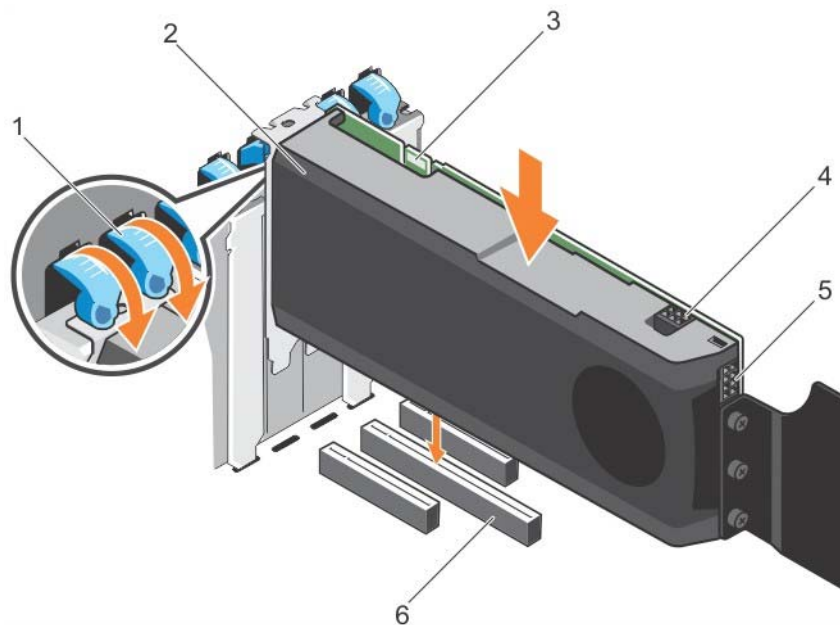
Figure 70. Installing a GPU card

1	expansion card latch (2)	2	GPU card
3	SLI data connector	4	GPU card power connector
5	GPU card power connector	6	x16 connector

Steps

1   Locate the x16 slot on the system board.
2   Insert the GPU card into the slot.
3   Connect the cables to the GPU card.
4   Close the two expansion card latches.

Next steps

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

Related links
Safety instructions
Before working inside your system
Removing the cooling shroud
Removing the expansion card holder
Installing the expansion card holder
Installing the cooling shroud
Removing a GPU card
After working inside your system

iDRAC port card (optional)

The iDRAC port card consists of a SD vFlash card slot and an iDRAC port. The iDRAC port card is used for advanced management of the system. An SD vFlash card is a Secure Digital (SD) card that plugs into the SD vFlash card slot in the system. It provides persistent on-demand local storage and a custom deployment environment that allows 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/esmmanuals.

The iDRAC port card consists of the SD vFlash card slot and an iDRAC port. The iDRAC port card features a dedicated NIC port and is used for remote, advanced management of the system through the network.

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

Removing the iDRAC port card

Prerequisites

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

1   Follow the safety guidelines listed in the Safety instructions section.
2   Follow the procedure listed in the Before working inside your system section.
3   Keep the Phillips #2 screwdriver ready.
4   Remove the cooling shroud.
5   Remove the internal cooling fan.
6   Disconnect any cables connected to the iDRAC port card.

Steps
1   Loosen the two captive screws that secures the iDRAC port card holder to the system board.
2   Pull the iDRAC port card to disengage it from the iDRAC port card connector on the system board, and remove the card from the chassis.
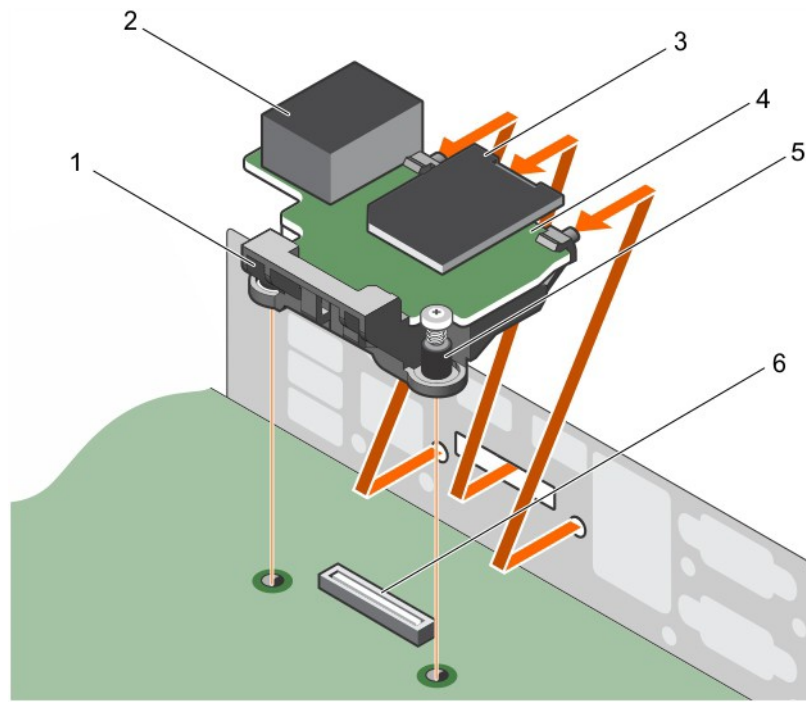
Figure 71. Removing the iDRAC port card

1	iDRAC port card holder	2	iDRAC port
3	SD vFlash media card	4	iDRAC port card
5	captive screw(2)	6	iDRAC port card connector

Next steps

1 Install the iDRAC port card.
2 Install the cooling shroud.
3 Install the internal cooling fan.
4 Follow the procedure listed in the After working inside your system section.

Related links

Safety instructions
Before working inside your system
Removing the cooling shroud
Removing the internal cooling fan
Installing the iDRAC port card
Installing the cooling shroud
Installing the internal cooling fan
After working inside your system

Installing the iDRAC port card

Prerequisites

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

1   Follow the safety guidelines listed in the Safety instructions section.
2   Follow the procedure listed in the Before working inside your system section.
3   Keep the Phillips #2 screwdriver ready.
4   Remove the cooling shroud.
5   Remove the internal cooling fan.

Steps

1   Align and insert the tabs on the iDRAC port card on the slots on the chassis wall.
2   Insert the iDRAC port card into the connector on the system board.
3   Secure the iDRAC port card using the two captive screws.
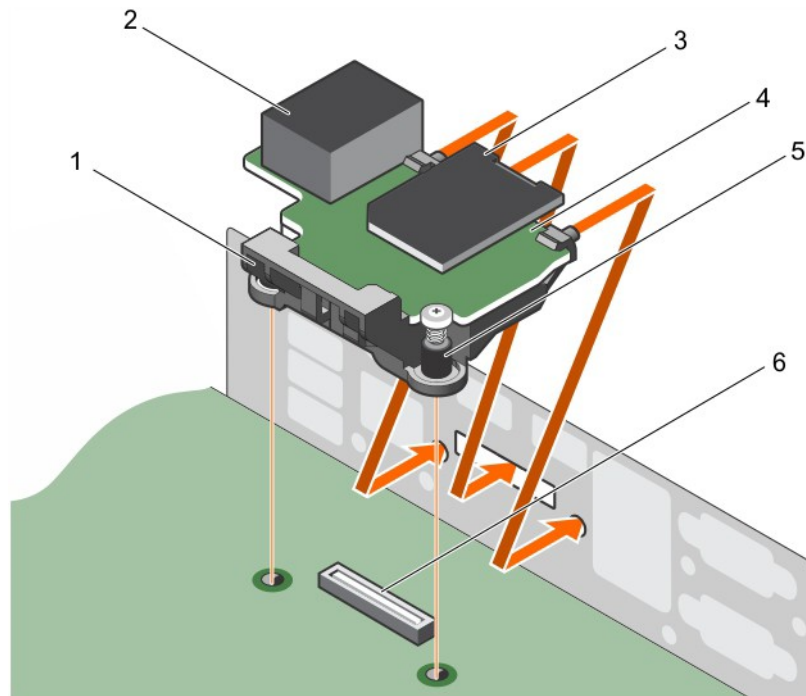
Figure 72. Installing the iDRAC port card

1	iDRAC port card holder	2	iDRAC port
3	SD vFlash media card	4	iDRAC port card
5	captive screw (2)	6	iDRAC port card connector

Next steps

1   Reconnect all the cables to the iDRAC port card.
2   Install the internal cooling fan.
3   Install the cooling shroud.
4   Follow the procedure listed in the After working inside your system section.

Related links

Replacing an SD vFlash card

Prerequisite

ⓘ NOTE: This procedure applies only to the eight hard drive system.

Steps

1 Locate the vFlash media slot on the system.
2 To remove the installed SD vFlash card, push inward on the card to release it and pull the card from the card slot.
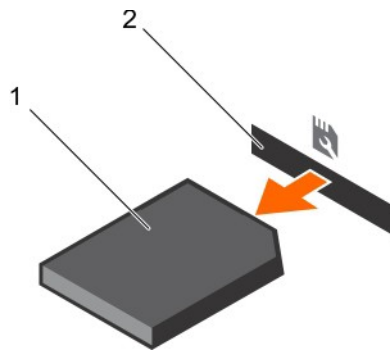
Figure 73. Removing the SD vFlash card

| 1 | SD vFlash card | 2 | SD vFlash card slot |

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

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

4 Press inward on the card to lock it into the slot.
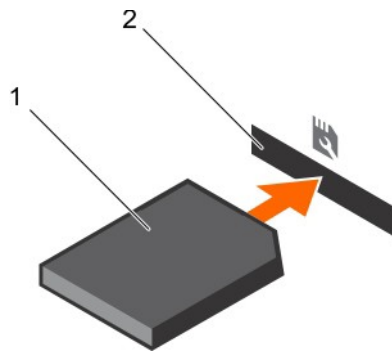
Figure 74. Installing the SD vFlash card

1	SD vFlash card	2	SD vFlash card slot

Related links
Safety instructions

Internal dual SD module (optional)

The Internal Dual SD Module (IDSDM) card provides two SD card slots. This card offers the following features:

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

> ⓘ 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 the internal dual SD module

Prerequisites

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

1 Follow the safety guidelines listed in the Safety instructions section.
2 Follow the procedure listed in the Before working inside your system section.
3 Remove the cooling shroud.
4 Locate the Internal Dual SD Module (IDSDM) on the system board.
5 If installed, remove the SD card(s).

Step

Hold the pull tab and pull the IDSDM out of the system.
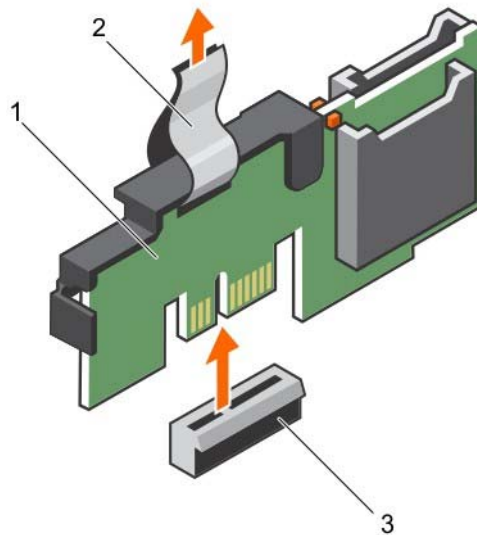
Figure 75. Removing the internal dual SD module (IDSDM)

1	IDSDM	2	pull tab
3	IDSDM connector		

Next steps

1   Install the internal dual SD module.
2   Install the cooling shroud.
3   Follow the procedure listed in the After working inside your system section.

Related links

Safety instructions
Before working inside your system
Removing the cooling shroud
Removing an (optional) internal SD card
Installing the internal dual SD module
Installing the cooling shroud
After working inside your system

Installing the internal dual SD module

Prerequisites

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

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

Steps

1   Locate the Internal Dual SD Module (IDSDM) connector on the system board.
2   Align the IDSDM with the IDSDM connector on the system board.

3   Push the IDSDM until it is firmly seated on the system board.
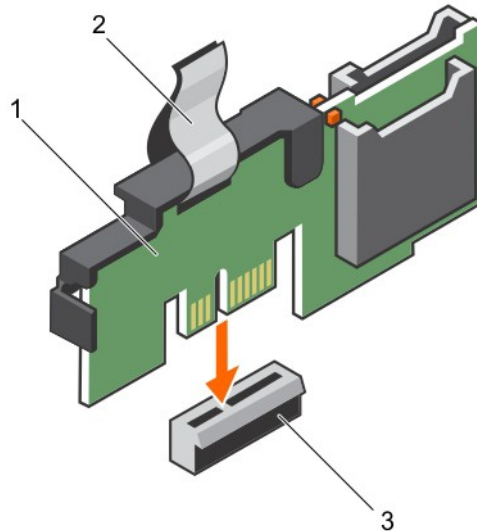
Figure 76. Installing the optional internal dual SD module

1   Internal Dual SD module   2   pull tab

3   IDSDM connector

Next steps

1   Install the SD card(s).

ⓘ NOTE: Temporarily label each SD card with its corresponding slot before removal. Replace the SD card(s) into the same slots.

2   Install the cooling shroud.

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

Related links
Safety instructions
Before working inside your system
Installing an (optional) internal SD card
Installing the cooling shroud
Removing the internal dual SD module
After working inside your system

Internal SD card

Removing an (optional) internal SD card

Prerequisites

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

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

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

3   Remove the cooling shroud.

Steps

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

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

2   Lift the SD card away from the internal dual SD module.
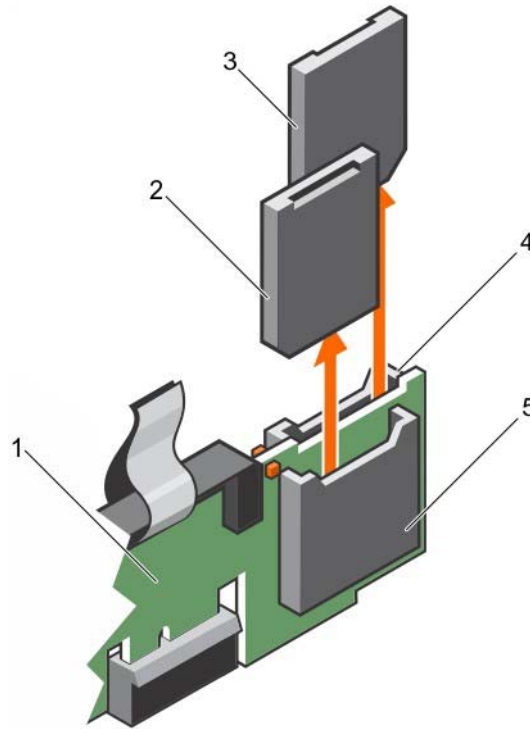
Figure 77. Removing internal SD card.

1	Internal Dual SD module	2	SD card 1
3	SD card 2	4	SD card slot 2
5	SD card slot 1		

Next steps

1   Install an internal SD card.

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

Related links

Safety instructions
Before working inside your system
Removing the cooling shroud
Installing an (optional) internal SD card
After working inside your system

Installing an (optional) internal SD card

Prerequisites

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

1 Follow the safety guidelines listed in the Safety instructions section.
2 Follow the procedure listed in the Before working inside your system section.
3 Ensure that the Internal SD Card Port option is set to Enabled in System Setup.
4 If installed, remove the cooling shroud.

Steps

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.

ⓘ 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.
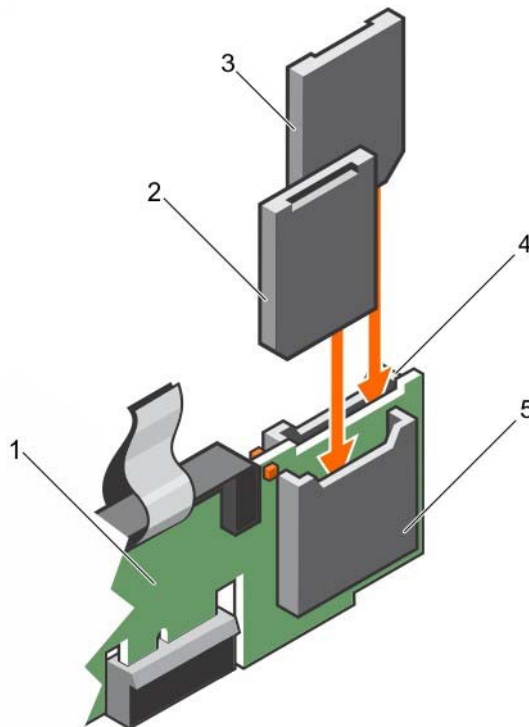
Figure 78. Installing internal SD card.

1	Internal Dual SD module	2	SD card 1
3	SD card 2	4	SD card slot 2
5	SD card slot 1		

Next step
Related links

Processors and heat sinks

Use the following procedures when:

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

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

Removing a heat sink

Prerequisites

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

Steps

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 to the screw that you first removed.
3   Repeat step 1 and 2 for removing the remaining two screws.
4   Remove the heat sink.
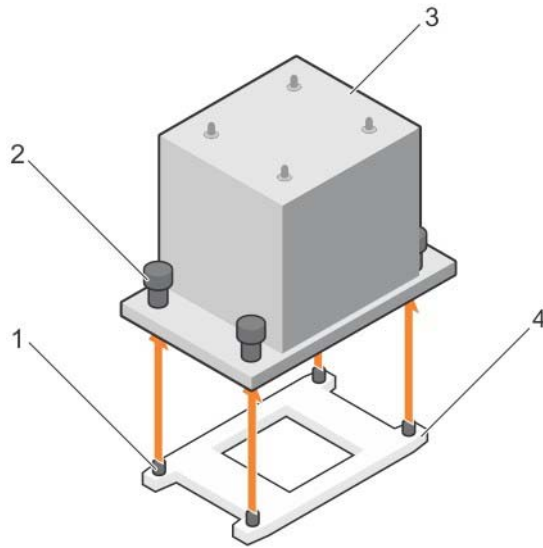
Figure 79. Removing a heat sink

| 1 | retention screw slot (4) | 2 | retention screw (4) |
| 3 | heat sink | 4 | processor shield |

Next steps

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

Related links

Safety instructions
Before working inside your system
Removing the cooling shroud
Installing a heat sink
Installing the cooling shroud
After working inside your system

Removing the processor

Prerequisites

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

1   Follow the safety guidelines listed in the Safety instructions section.
2   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.

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

3   Follow the procedure listed in the Before working inside your system section.
4   Remove the cooling shroud.
5   Remove the heat sink.

6   Keep the Phillips #2 screwdriver ready.

⚠ WARNING: The processor will be 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 held.

Steps

1   Release the socket lever by pushing the lever down and out from under the tab on the processor shield.

2   Lift the lever upward until the processor shield lifts.

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

3   Lift the processor out of the socket.

ⓘ NOTE: After removing the processor, place it in an antistatic container for reuse, return, or temporary storage. Do not touch the bottom of the processor to avoid damage to the processor contacts. Touch only the side edges of the processor.
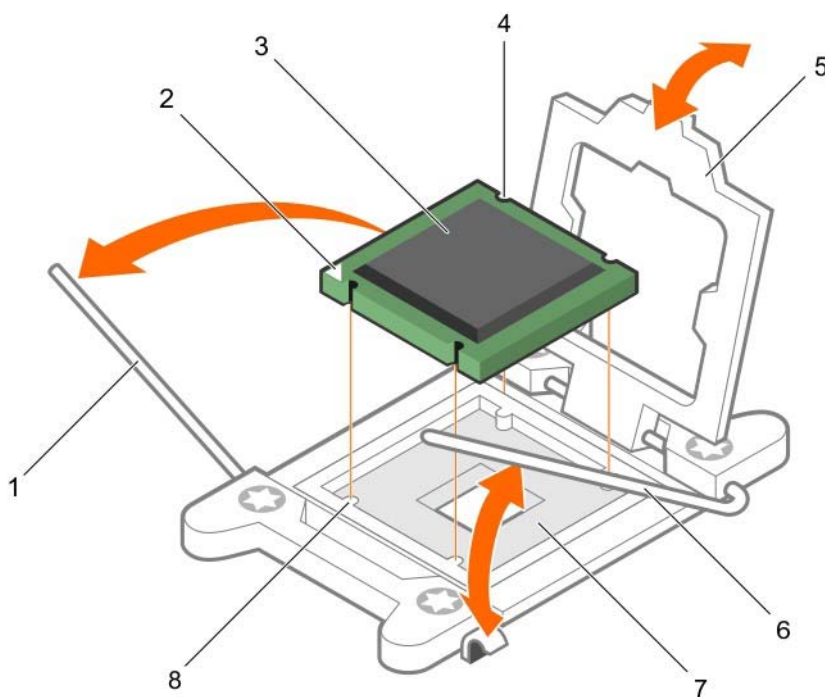
Figure 80. Removing a processor

1	close *first* socket-release lever	2	pin-1 indicator of processor
3	processor	4	slot (4)
5	processor shield	6	open *first* socket-release lever
7	socket	8	socket keys (4)

Next steps

1   Install the processor.

2   Install the heat sink.

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

Related links

Installing a processor

Prerequisites

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

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.

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

5   Remove the cooling shroud.

  ⓘ 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.

⚠ WARNING: 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.

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

Steps

1   Unpack the new processor.

  ⓘ 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.
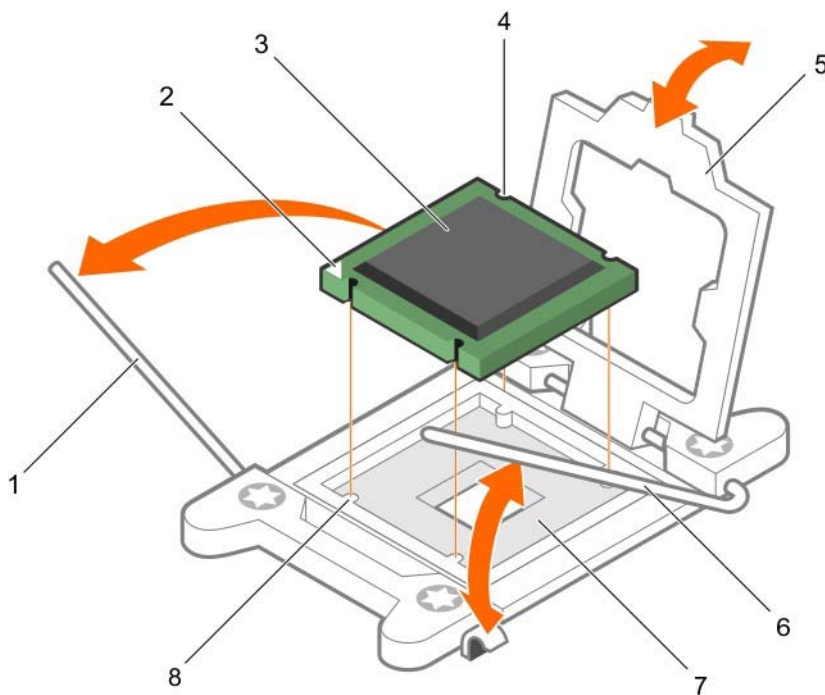
Figure 81. Installing a processor

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

Next steps

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

1 Install the heat sink.

2 If removed, reinstall the PCIe expansion card riser.

3 If disconnected, reconnect the cables to the expansion card(s).

4   Install the cooling shroud.

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

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

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

Related links

Safety instructions
Before working inside your system
Removing the cooling shroud
Removing the processor
Removing a heat sink
Installing the cooling shroud
After working inside your system

Installing a heat sink

Prerequisites

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

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

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

3   Install the processor.

4   Keep the Phillips #2 screwdriver ready.

Steps

1   If you are using an existing heat sink, remove the thermal grease from the heat sink by using a clean lint-free cloth.

2   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.

ⓘ NOTE: The thermal grease syringe is intended for one-time use only. Dispose of the syringe after you use it.
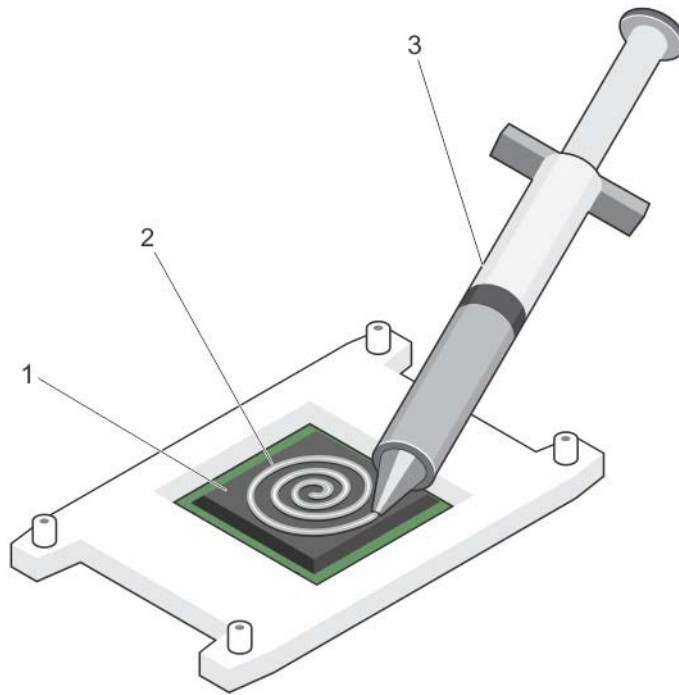
Figure 82. Applying thermal grease on the top of the processor

1	processor	2	thermal grease
3	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 Repeat the procedure for the remaining two screws.
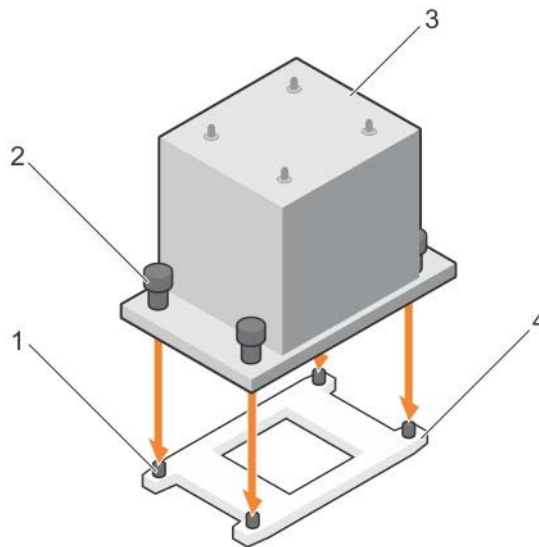
Figure 83. Installing the heat sink

1	retention screw slot (4)	2	retention screw (4)

	3	heat sink		4	processor shield

Next steps

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.

Related links
Safety instructions
Before working inside your system
Removing the cooling shroud
Removing a heat sink
After working inside your system

Redundant AC power supply

Your system supports either:

- Two 495 W, 750 W, or 1100 W (Platinum) AC power supply modules or
- Two 450 W (Bronze) AC power supply modules

ⓘ 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 to maximize efficiency.

△ CAUTION: If two power supplies are used, they must be of the same maximum output power.

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

ⓘ NOTE: When you have more than two GPU cards on your system, you will need two 1100 W power supply units installed on your system.

Hot spare feature

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

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

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

The default PSU settings are as follows:

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

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

Removing a redundant AC power supply unit

Prerequisites

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

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

1   Follow the safety guidelines listed in the Safety instructions section.
2   Disconnect the power cable from the power source and from the PSU you intend to remove and remove the cables from the strap.

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

Steps

1   Press the release latch.
2   Holding the PSU handle, pull the PSU out of the PSU bay to release the PSU from the Power Distribution Board (PDB).
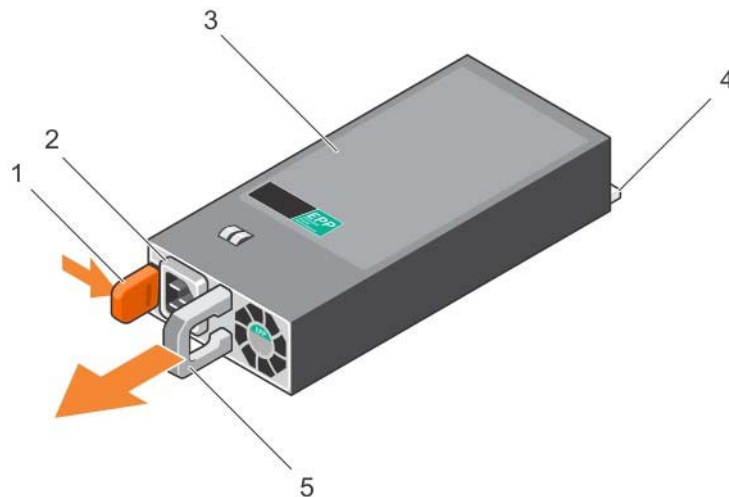
Figure 84. Removing an AC PSU

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

Next step

If you are not replacing the PSU in the second PSU bay immediately, install the PSU blank in the empty PSU bay.

Related links

Safety instructions
Installing the power supply unit blank
Installing a redundant power supply unit

Installing a redundant power supply unit

Prerequisites

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

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

2 Verify that both power supply units (PSUs) are of the same type and have the same maximum output power.

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

3 If installed, remove the PSU blank.

Step

Slide the new PSU into the chassis until the PSU is fully seated and the release latch snaps into place.
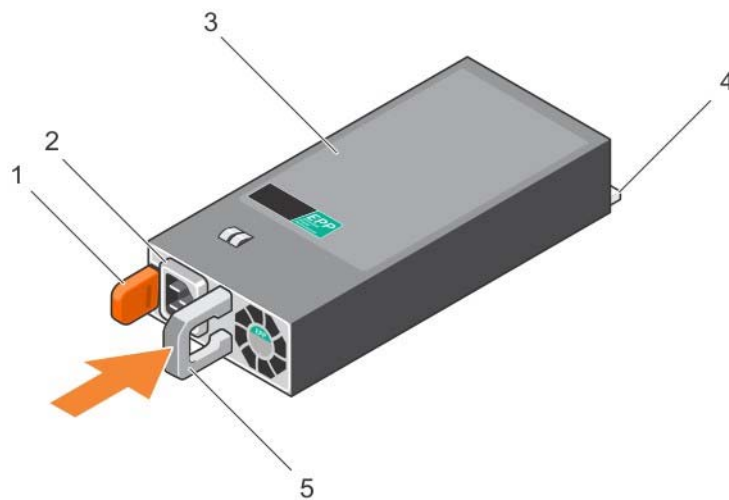
Figure 85. Installing a redundant PSU

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

Next steps

1 If you have unlatched the cable management arm, relatch it. For information about the cable management arm, see the rack documentation of the 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.

ⓘ NOTE: When installing, hot-swapping, or hot-adding a new PSU in a system with two PSUs, allow several seconds for the system to recognize the PSU and determine its status. The PSU status indicator turns green to signify that the PSU is functioning properly.

Related links

Safety instructions
Removing the power supply unit blank
Removing a redundant AC power supply unit

Removing the power supply unit blank

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

Prerequisite

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

Follow the safety guidelines listed in the Safety instructions section.

Step

    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.
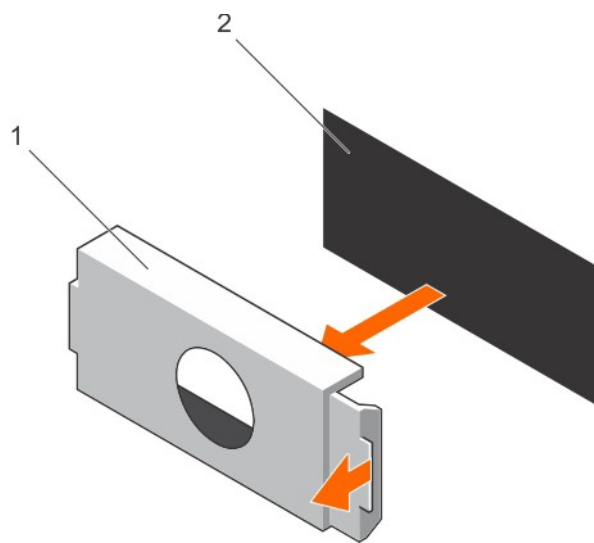
Figure 86. Removing the PSU blank

1	PSU blank	2	PSU bay

Next step

Install the PSU or PSU blank.

Related links

Safety instructions
Installing the power supply unit blank
Installing a redundant power supply unit
Safety instructions
Before working inside your system
Removing a redundant AC power supply unit
Removing the power supply unit blank
Installing a redundant power supply unit
Installing the power supply unit blank
After working inside your system

Installing the power supply unit blank

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

Prerequisite

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

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

Step

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.
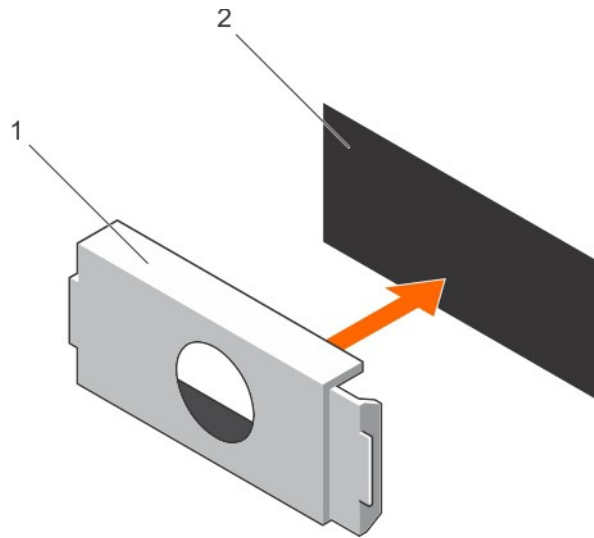
Figure 87. Installing the PSU blank

1	PSU blank	2	PSU bay

Related links

Safety instructions
Removing the power supply unit blank
Removing a redundant AC power supply unit

Replacing the power supply unit divider

Prerequisites

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

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

2   If installed, remove the redundant power supply units (PSUs) or PSU blank.

Steps

1 Remove the screw that secures the PSU divider to the chassis.
2 Slide out the PSU divider and turn it clockwise to free the tabs on the PSU divider from the slots on the PSU cage.
3 Slide the PSU divider out of the chassis.
4 Align the tabs of the new PSU divider with the slots of the PSU cage.
5 Turn the PSU divider counterclockwise and slide it in until the PSU divider is seated on the slots of the PSU cage.
6 Tighten the screw to secure the PSU divider to the chassis.
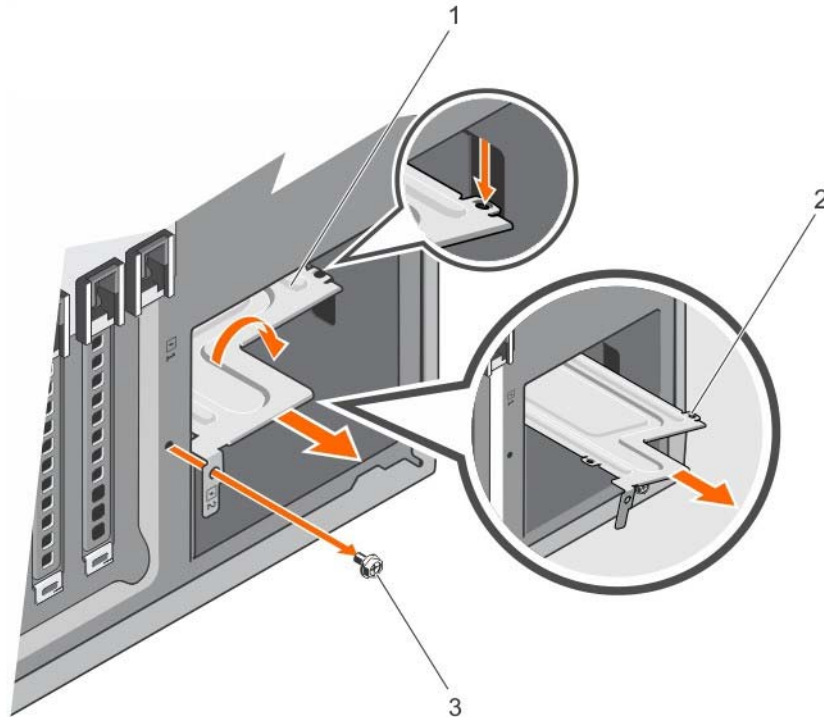
Figure 88. Removing and installing the PSU divider

1	PSU divider	2	tabs (4)
3	screw		

Next steps

1 Install the redundant PSUs or PSU blank as applicable.
2 Reconnect the system to its electrical outlet and power on the system, including any attached peripherals.

Non-redundant AC/cabled power supply unit

Your system supports a non-redundant 450 W AC power supply unit (PSU).

ⓘ NOTE: Non-redundant PSU is supported in systems with cabled hard drives and systems with an x8 backplane.

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

Removing a cabled power supply unit

Prerequisites

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

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

Steps

1 Disconnect all the power cables from the power supply unit (PSU) to the system board, hard drive backplane, hard drives, and optical drives.
2 Remove the screw securing the PSU to the chassis and slide the PSU out of the PSU cage.
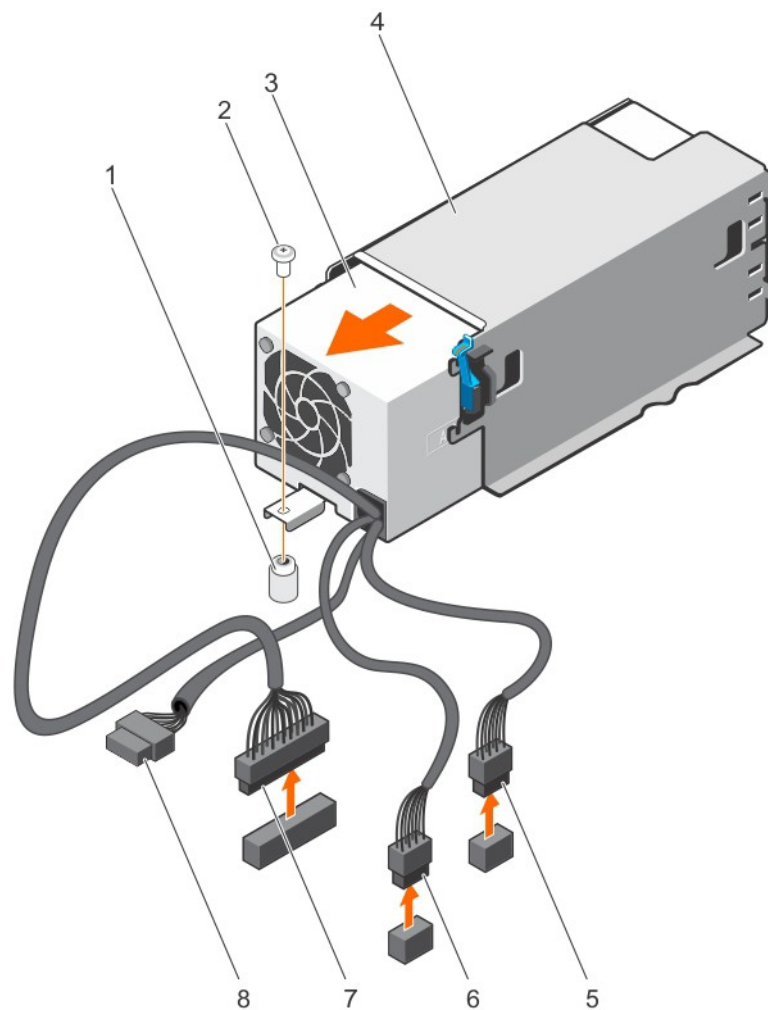
Figure 89. Removing a cabled PSU

1	standoff on the chassis	2	screw
3	cabled power supply	4	power supply unit cage

5	P1 cable connector	6	P2 cable connector
7	P3 cable connector	8	backplane connector

Next steps

1 Install a cabled PSU.
2 Follow the procedure listed in the After working inside your system section.

Related links

Safety instructions
Before working inside your system
Installing a cabled power supply unit
After working inside your system

Installing a cabled power supply unit

Prerequisites

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

1 Follow the safety guidelines listed in the Safety instructions section.
2 Unpack the replacement power supply unit (PSU).

Steps

1 Slide the new PSU into the PSU cage until the PSU is fully seated.
2 Tighten the screw to secure the PSU to the chassis.
3 Connect all the power cables from the PSU to the system board, hard drive backplane, hard drives, and optical drives.
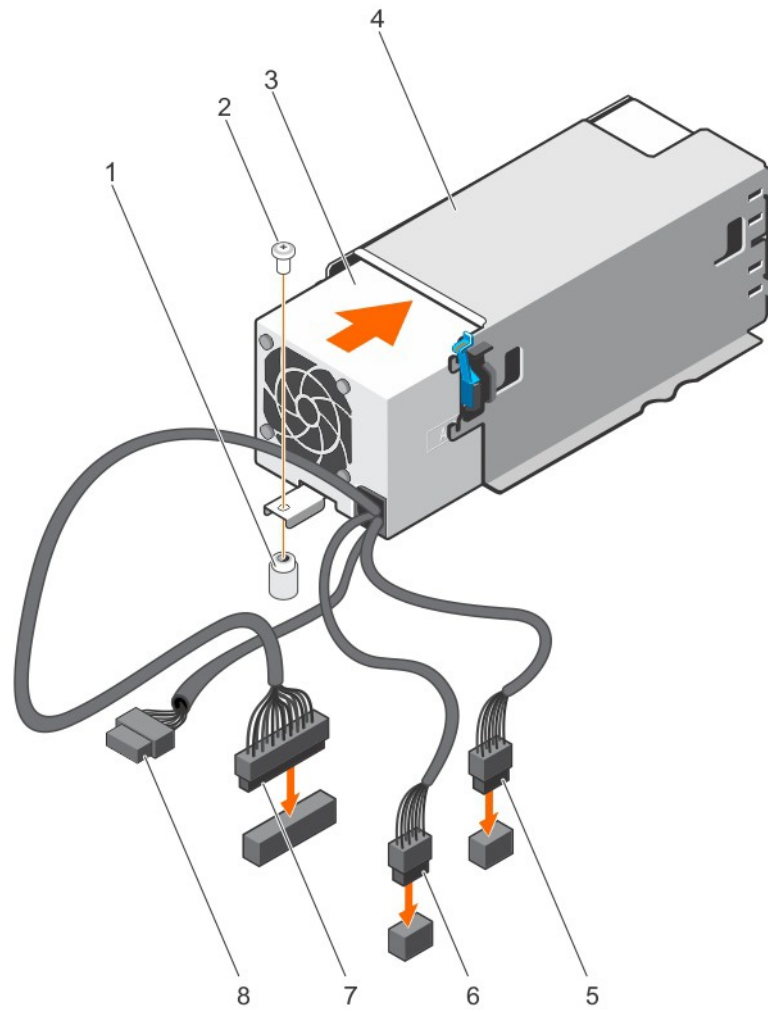
Figure 90. Installing a cabled PSU

1	standoff on the chassis	2	screw
3	cabled power supply unit	4	power supply unit cage
5	P1 cable connector	6	P2 cable connector
7	P3 cable connector	8	backplane connector
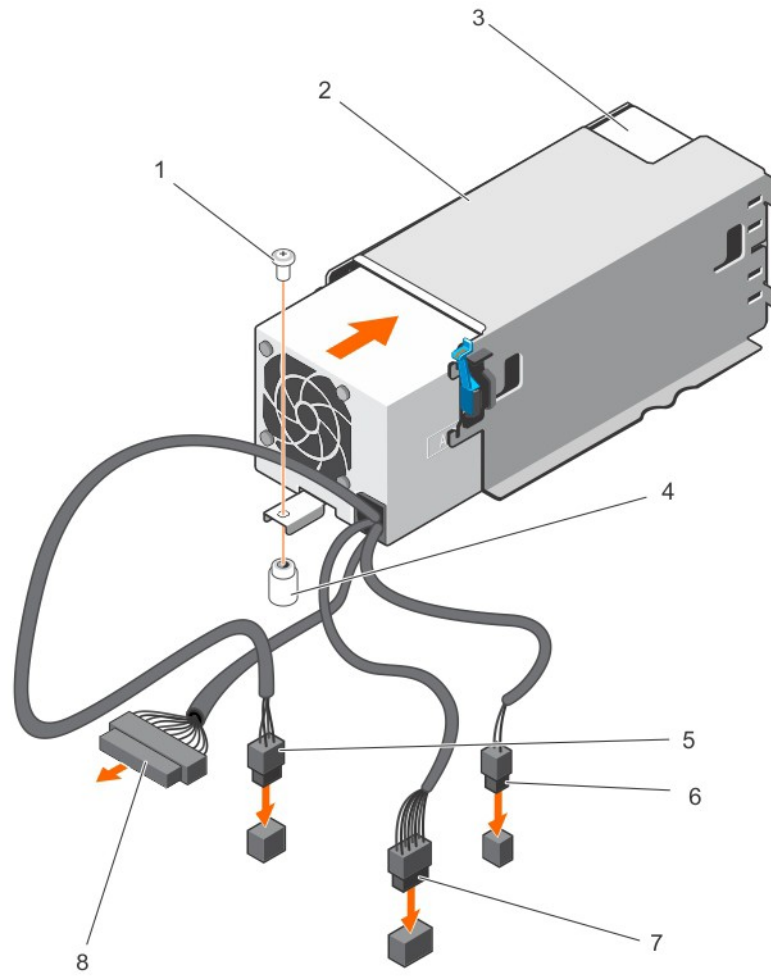
Figure 91. Installing a cabled PSU

1	screw	2	PSU cage
3	non-redundant PSU	4	standoff on the chassis
5	P2 power cable connector	6	P1 signal cable connector
7	P1 power cable connector	8	P4/backplane connector

Next step
Follow the procedure listed in the After working inside your system section.
Related links
Safety instructions
Before working inside your system
Removing a cabled power supply unit
After working inside your system

Power interposer board

The power interposer board (PIB) is a board that connects the redundant power supply units (PSUs) to the system board. The PIB is only supported in systems with redundant PSUs.

Removing the power interposer board

Prerequisites

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

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

⚠️ CAUTION: To prevent damage to the power interposer board, you must remove the power supply units (PSUs) or PSU blank from the system before removing the power interposer board (PIB).

3   Remove the PSUs or PSU blanks from the back of the chassis.
4   Remove the cooling shroud.

Steps

1   Disconnect the power cables from the hard drive backplane and the system board.

🛈 NOTE: If installed, remove the expansion card to enable removing the P3 power cable from the system board.

2   Pressing the release latch on the PIB, lift the PIB to release it from the hooks on the PSU cage.
3   Lift the PIB out of the chassis.
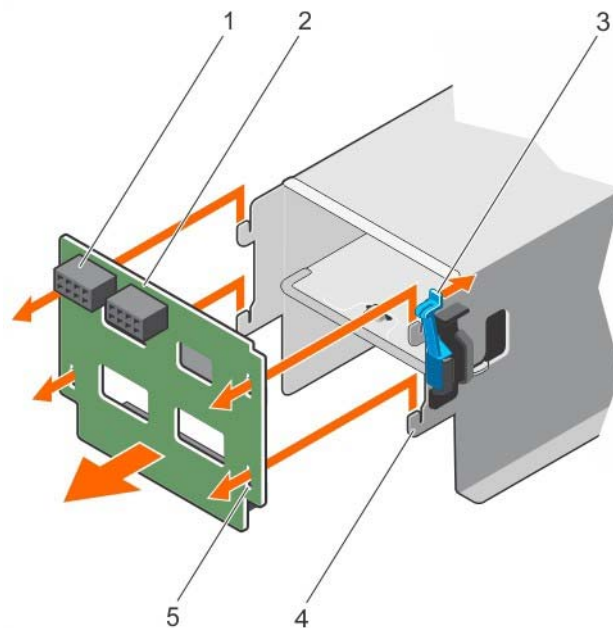
Figure 92. Removing and installing the power interposer board

1	GPU power connector	2	power interposer board
3	release latch	4	hooks (4)

5   slots (4)

Next steps

1   Install the PIB.

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

Related links

Safety instructions

Before working inside your system

Removing a redundant AC power supply unit

Removing the cooling shroud

Installing the power interposer board

After working inside your system

Installing the power interposer board

Prerequisite

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

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

Steps

1   Align the slots on the power interposer board (PIB) with the hooks on the power supply unit (PSU) cage and slide the PIB until it snaps into place.

2   Route the P3 power cable through the securing clip on the system board and connect power cable to the hard drive backplane.
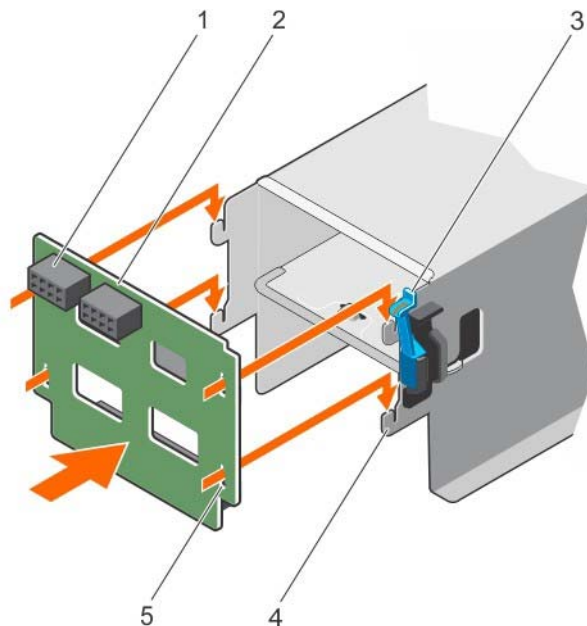
Figure 93. Installing the power interposer board

1   GPU power connector   2   power interposer board

| 3 | release latch | 4 | hooks (4) |
| 5 | slots (4) | | |

Next steps

1   Install the cooling shroud.

2   Install the PSUs or PSU blank.

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

Related links

Safety instructions
Before working inside your system
Installing the cooling shroud
Installing a redundant power supply unit
Removing the power interposer board
After working inside your system

System battery

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

Replacing the system battery

Prerequisites

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

⚠ 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 expansion card riser.

Steps

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.
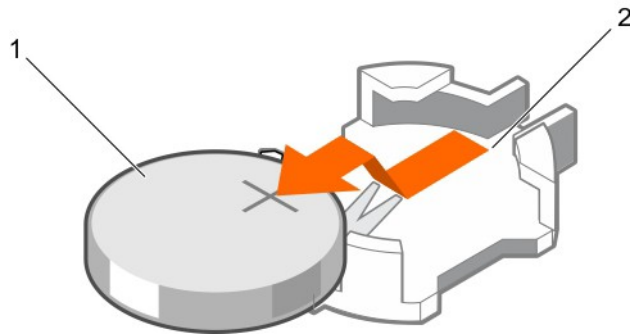
Figure 94. Removing the system battery

1	system battery	2	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.
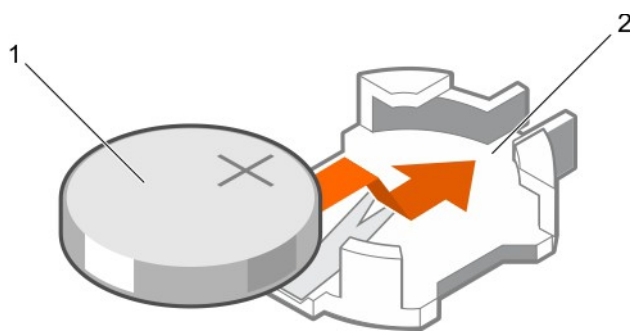
Figure 95. Installing the system battery

1	system battery	2	system battery slot

Next steps

1 Install the cooling shroud.

2 If removed, install the expansion card riser.

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

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

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

6 Exit System Setup.

Related links

Safety instructions
Before working inside your system
Removing the cooling shroud
Installing the cooling shroud
After working inside your system
System board connectors

Control panel assembly

Removing the control panel assembly

Prerequisites

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

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

Steps

1   Remove the screw securing the control panel to the chassis.
2   Disconnect the control panel cable and the control panel USB cable from the system board.

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

3   Slide the control panel out of the chassis.
4   Disconnect the control panel cable and the control panel USB cable from the control panel.
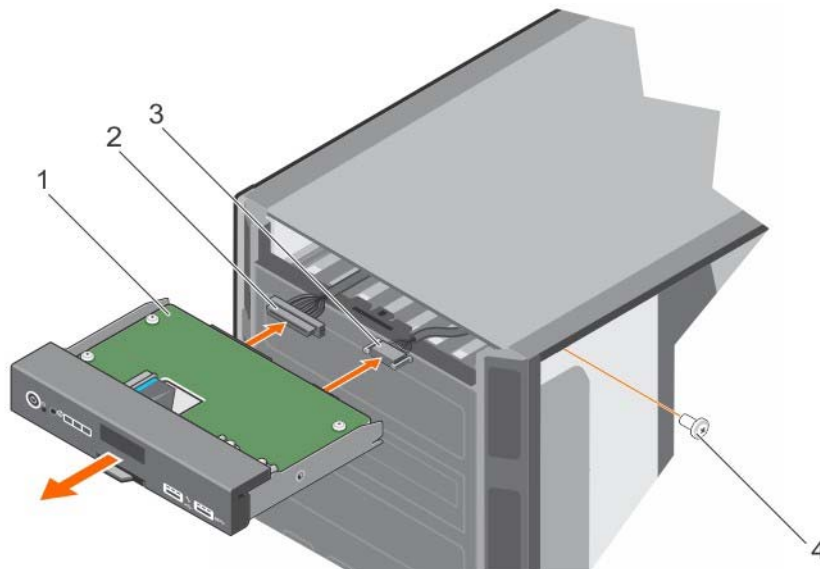
Figure 96. Removing the control panel assembly

| 1 | control panel | 2 | control panel cable |
| 3 | control panel USB cable | 4 | screw |

5   Locate and press the tabs on the information tag.
6   Push the information tag out of the slot to remove it from the control panel.

ⓘ NOTE: Retain the information tag to replace it in the new control panel.
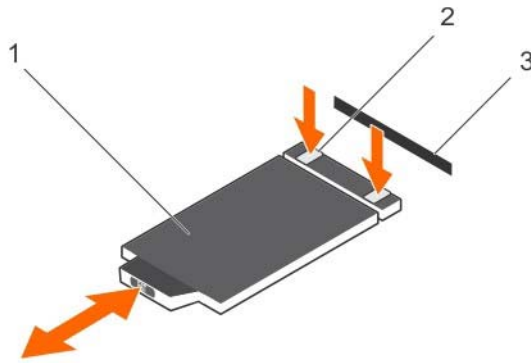
Figure 97. Removing and installing the information tag

1	information tag	2	tab (2)
3	slot		

Next steps

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

Related links

Safety instructions
Before working inside your system
Preparing a system for conversion from tower mode to rack mode
Installing the control panel assembly
After working inside your system

Installing the control panel assembly

Prerequisites

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

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

Steps

1   Replace the blank information tag in the new control panel with the information tag retained from the old control panel.

     ⓘ NOTE: Information tag lists system information such as Service Tag, NIC, MAC address.

2   To install the information tag, push the information tag into the control panel slot.
3   Connect the control panel cable and the control panel USB cable to the control panel module.
4   Align and insert the control panel into the control panel slot in the chassis.
5   Tighten the screw to secure the control panel to the chassis.
6   Connect the control panel cable and the control panel USB cable to the system board.
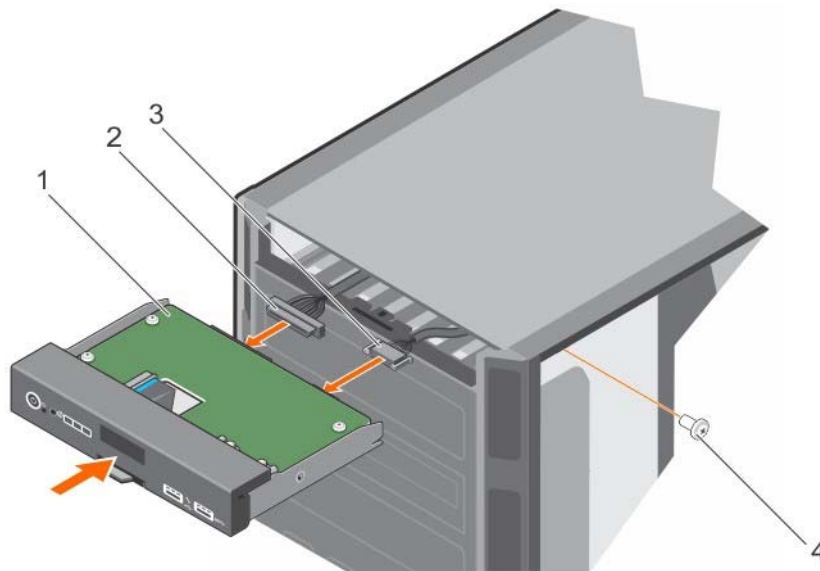
Figure 98. installing the control panel assembly

1	control panel	2	control panel cable
3	control panel USB cable	4	screw

Next steps

1 Install the optical drive and tape drives.
2 Follow the procedure listed in the After working inside your system section.

Related links

Safety instructions
Before working inside your system
Preparing a system for conversion from tower mode to rack mode
Removing the control panel assembly
After working inside your system

Removing the control panel assembly cover

Prerequisites

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

Steps

1 Unhook the tab adjacent to the power button.
2 Unhook the tab on the bottom of the control panel assembly cover.
3 Pull the control panel assembly cover to detach it from the control panel.
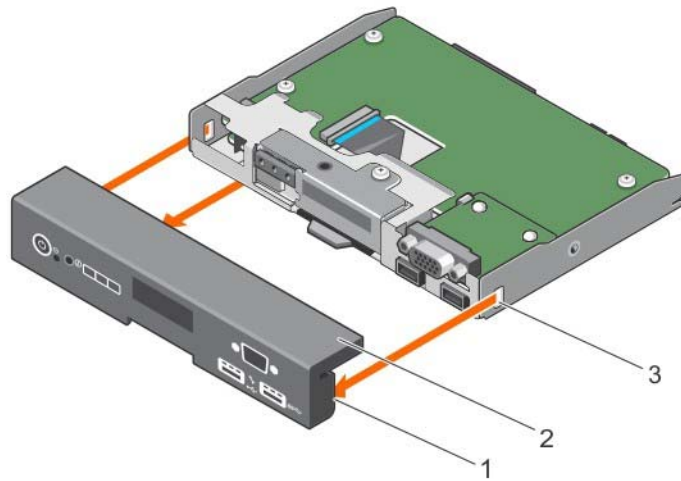
Figure 99. Removing the control panel assembly cover for system with LCD panel
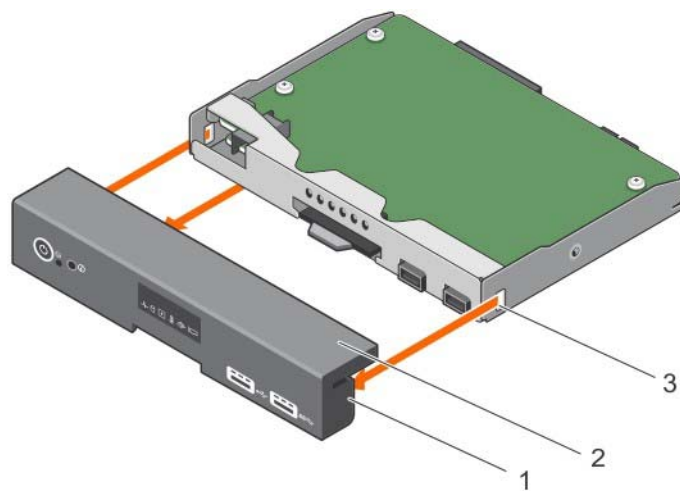
Figure 100. Removing the control panel assembly cover for system with LED panel

1	tab (3)	2	control panel assembly cover
3	slot (3)		

Next steps

1   Install the control panel assembly cover.
2   Follow the procedure listed in the After working inside your system section.

Related links

Safety instructions
Before working inside your system
Removing the control panel assembly
Preparing a system for conversion from tower mode to rack mode
Installing the control panel assembly cover
After working inside your system

Installing the control panel assembly cover

Prerequisites

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

Steps

1   Align the three tabs on the control panel assembly cover with the slots on the control panel.
2   Push the cover until the tabs lock into place.
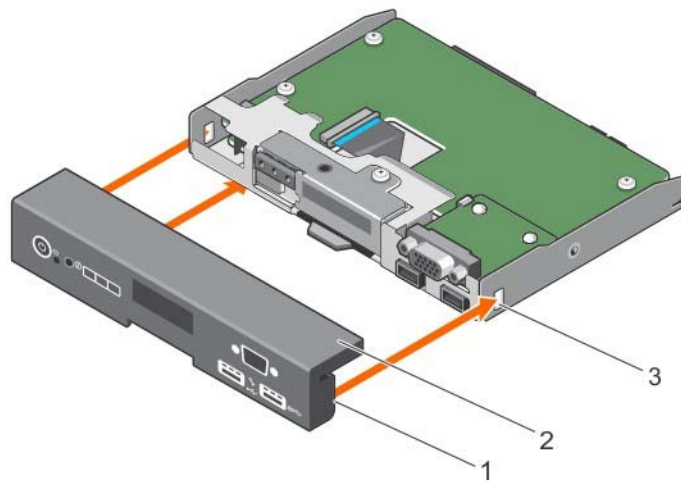
Figure 101. Installing the control panel assembly cover for system with LCD panel
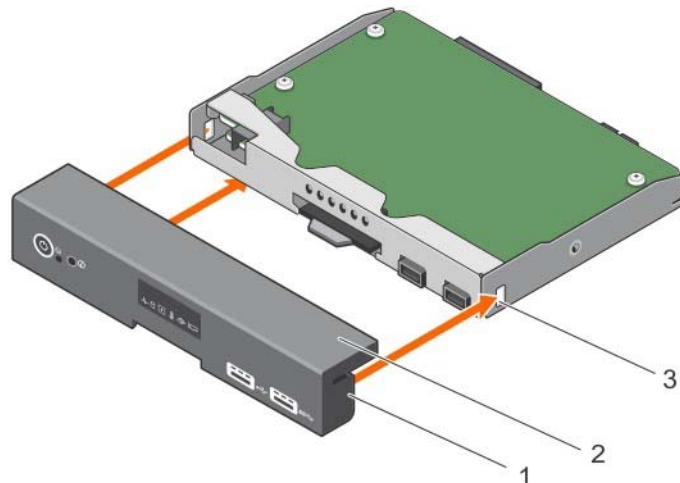
Figure 102. Installing the control panel assembly cover for system with LED panel

| 1 | tab (3) | 2 | control panel assembly cover |

3 slot (3)

Next steps

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

Related links
Safety instructions
Before working inside your system
Installing the control panel assembly
Preparing a system for conversion from tower mode to rack mode
Removing the control panel assembly cover
After working inside your system

Removing the control panel board

Prerequisites

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

1 Follow the safety guidelines listed in the Safety instructions section.
2 Keep the Phillips #2 screwdriver ready.
3 Follow the procedure listed in the Before working inside your system section.
4 Remove the control panel assembly.
5 Remove the control panel assembly cover.

Steps
1 Remove the screws that secure the control panel board to the control panel.
2 Lift the control panel board until the control panel board disengages from the slots on the control panel.
3 Slide the control panel board toward the back of the control panel, and lift the control panel board away from the control panel.
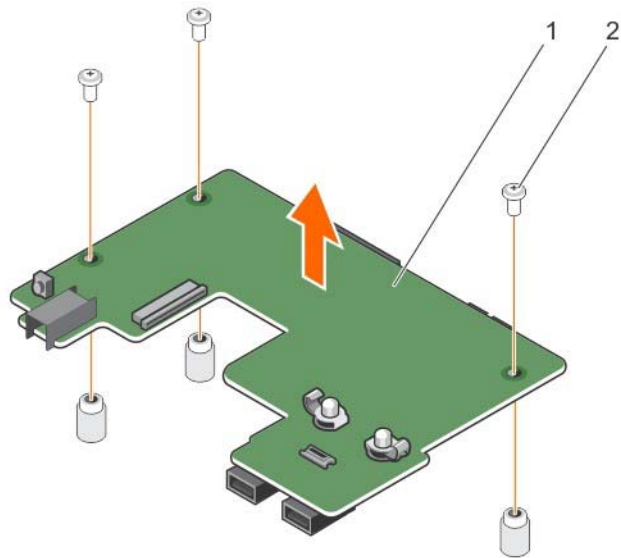
Figure 103. Removing the control panel board for systems with hot swappable hard drives
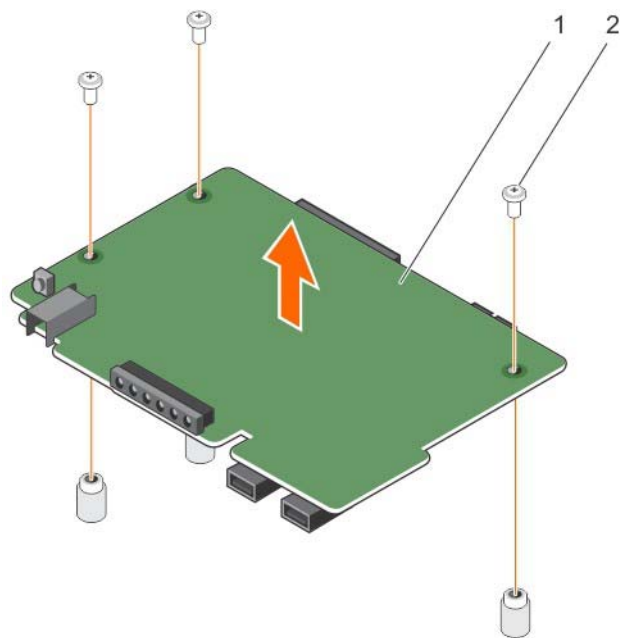
Figure 104. Removing and installing the control-panel board for systems with cabled hard drives

1	control-panel board	2	screw (3)

Next steps

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

Related links
Safety instructions
Before working inside your system
Installing the control panel board
After working inside your system

Installing the control panel board

Prerequisites

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

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

Steps

1 Align the control panel board with the control panel.

   ⚠ CAUTION: Take care not to damage the mylar covering the ID switch.

2 Slide the control panel board toward the front of the control panel to lock the slide tabs and the screw holes into the respective slots on the control panel.
3 Tighten the screws to secure the control panel board to the control panel.
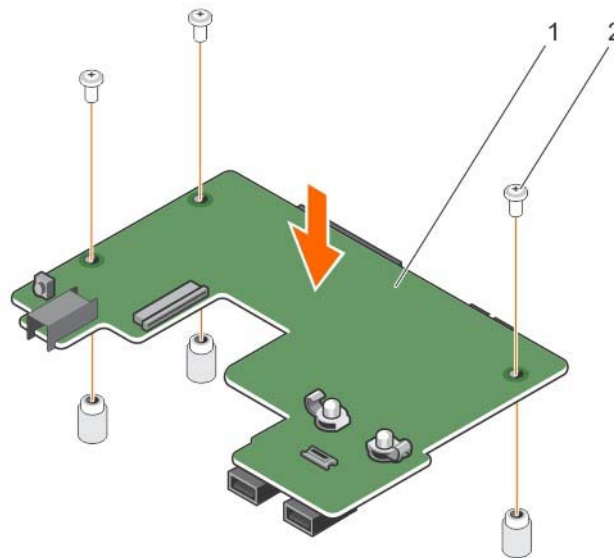
Figure 105. Installing the control panel board for systems with hot swappable hard drives
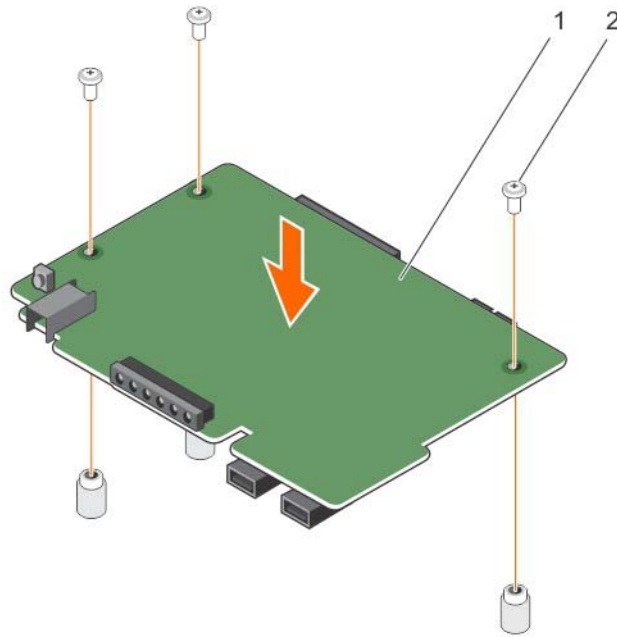
Figure 106. Installing the control panel board for systems with cabled hard drives

Next steps

1   Install the control panel assembly cover.
2   Install the control panel assembly.
3   Follow the procedure listed in the After working inside your system section.

Related links
Safety instructions
Before working inside your system
Installing the control panel assembly cover
Installing the control panel assembly
Removing the control panel board
After working inside your system

Removing the LCD module

Prerequisites

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

1   Follow the safety guidelines listed in the Safety instructions section.
2   Keep the Phillips #2 screwdriver ready.
3   Follow the procedure listed in the Before working inside your system section.
4   Remove the control panel assembly.
5   Remove the control panel assembly cover.

Steps

1   Disconnect the LCD cable. Perform the following steps to disconnect the LCD cable:

    a Pull the retention tab that secures the LCD cable to the LCD cable connector on the control panel board.

    b Pull the LCD cable out of the LCD cable connector.

2   Remove the screw that secures the LCD module to the control panel.

3   Remove the LCD module out of the control panel assembly.
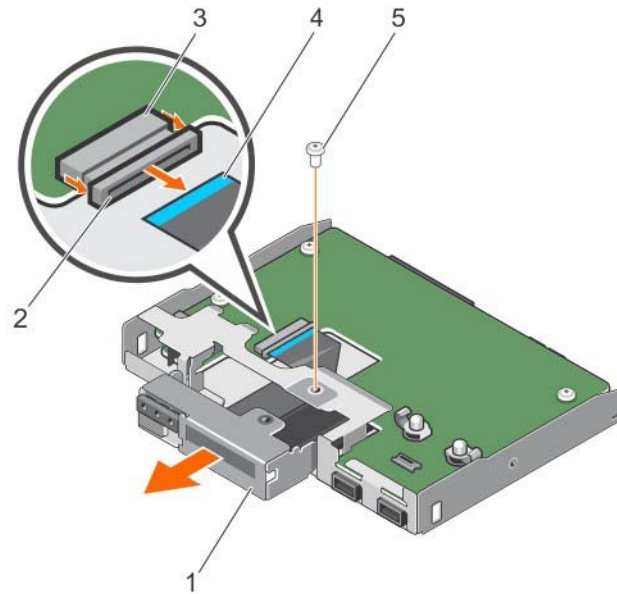
Figure 107. Removing the LCD Module

1	LCD module	2	retention tab
3	LCD cable connector	4	LCD cable
5	screw		

Next steps

1   Install the LCD module.

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

Related links

Safety instructions

Before working inside your system

Removing the control panel assembly

Removing the control panel assembly cover

Installing the LCD module

After working inside your system

Installing the LCD module

Prerequisites

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

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

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

3   Keep the Phillips #2 screwdriver ready.

Steps

1   Align the LCD module with the LCD module slot and insert the LCD module into the control panel.
2   Tighten the screw to secure the LCD module to the control panel.
3   Insert the LCD module cable into it's connector on the control panel board and push the retention tab in to secure the cable.
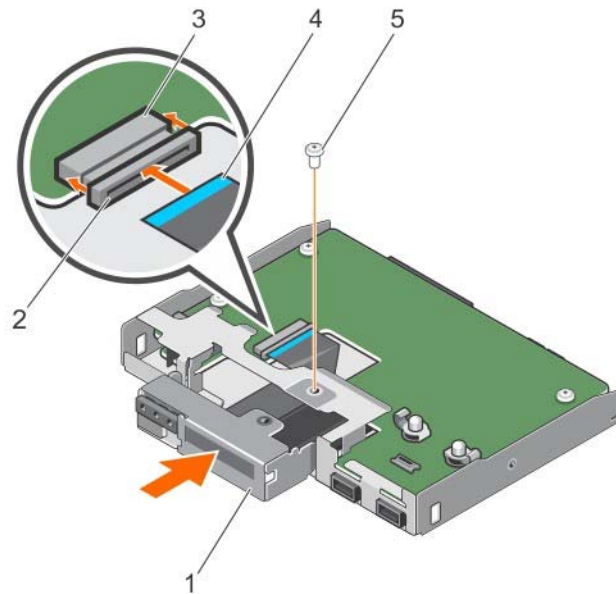
Figure 108. Installing the LCD Module

1	LCD module	2	retention tab
3	LCD cable connector	4	LCD cable
5	screw		

Next steps

1   Install the control panel assembly cover.
2   Connect the LCD cable, the control panel cable, and the control panel USB cable to the control panel board.
3   Install the control panel assembly.
4   Connect the control panel cable, the LCD cable, and the control panel USB cable to the system board.
5   Follow the procedure listed in the After working inside your system section.

Related links

Safety instructions
Before working inside your system
Installing the control panel assembly cover
Installing the control panel assembly
Removing the LCD module
After working inside your system

Removing the VGA module

Prerequisites

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

1   Follow the safety guidelines listed in the Safety instructions section.
2   Follow the procedure listed in the Before working inside your system section.
3   Remove the control panel assembly.
4   Remove the control panel assembly cover.

Step

Release the hooks that secure the VGA module to the control panel board, and remove the VGA module.
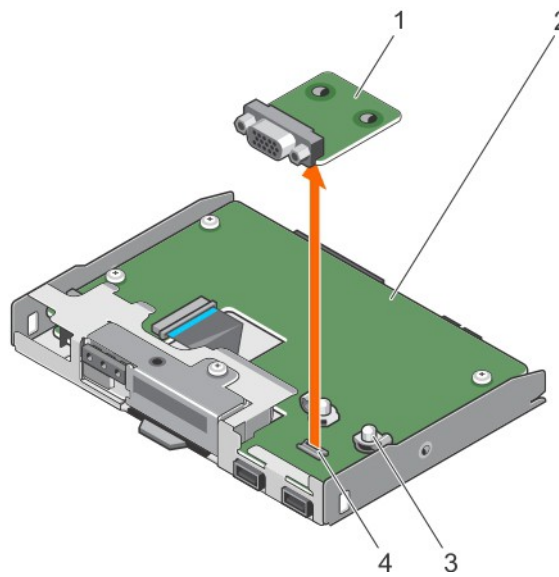
Figure 109. Removing the VGA module

1	VGA module	2	control panel
3	hook (2)	4	VGA connector on the control panel board

Next steps

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

Related links

Safety instructions
Before working inside your system
Removing the control panel assembly
Removing the control panel assembly cover
Installing the VGA module
After working inside your system

Installing the VGA module

Prerequisites

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

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

Steps

1 Align the slots on the VGA module with the VGA connector and hooks on the control panel board.
2 Press the VGA module until the hooks snap into place.
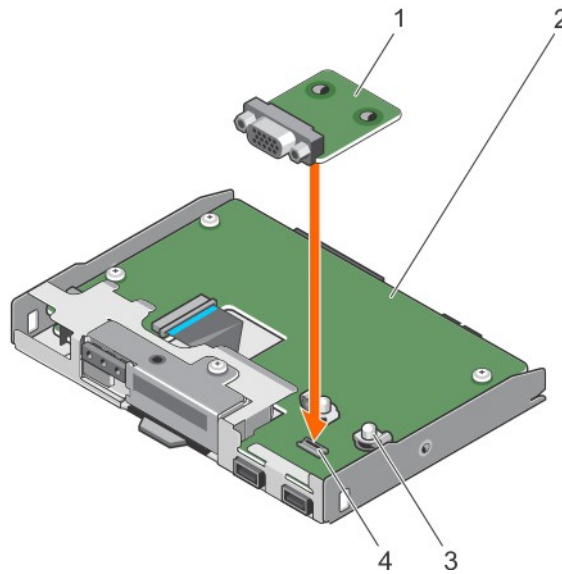
Figure 110. Installing the VGA module

| 1 | VGA module | 2 | control panel |
| 3 | hook (2) | 4 | VGA connector on the control panel board |

Next steps

1 Install the control panel assembly cover.
2 Install the control panel assembly.
3 Follow the procedure listed in the After working inside your system section.

Related links

Safety instructions
Before working inside your system
Installing the control panel assembly cover
Installing the control panel assembly
Preparing a system for conversion from tower mode to rack mode
Removing the VGA module
After working inside your system

System board

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

Removing the system board

Prerequisites

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

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

> △ CAUTION: If you are using the Trusted Program 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 motherboard. Once the TPM plug-in module is installed, it is cryptographically bound to that specific motherboard. Any attempt to remove an installed TPM plug-in module breaks the cryptographic binding, and it cannot be re-installed or installed on another motherboard.

4 Remove the following:
    a   expansion card holder
    b   expansion cards
    c   cooling shroud
    d   internal dual SD module
    e   internal USB key (if installed)
    f   internal cooling fan
    g   iDRAC ports card (if installed)
    h   heat sink(s)
    i   processors(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.

    j   memory modules

Steps

1 Disconnect all cables from the system board.

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

2 Remove the screws that secure the system board to the chassis.
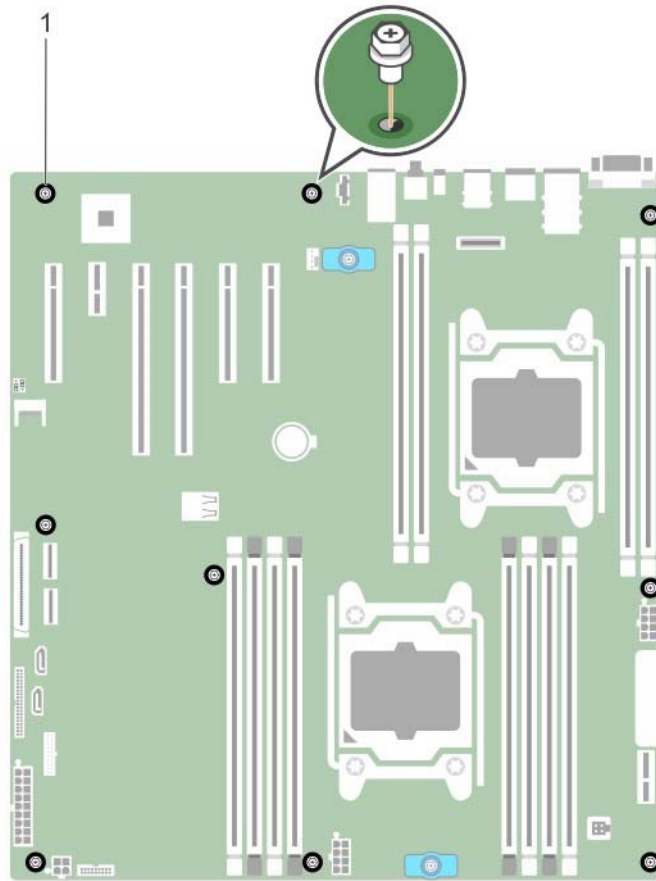
Figure 111. Removing the screws on the system board

    1   screws (9)

△ | CAUTION: Do not lift the system board by holding a memory module, processor, or other components.
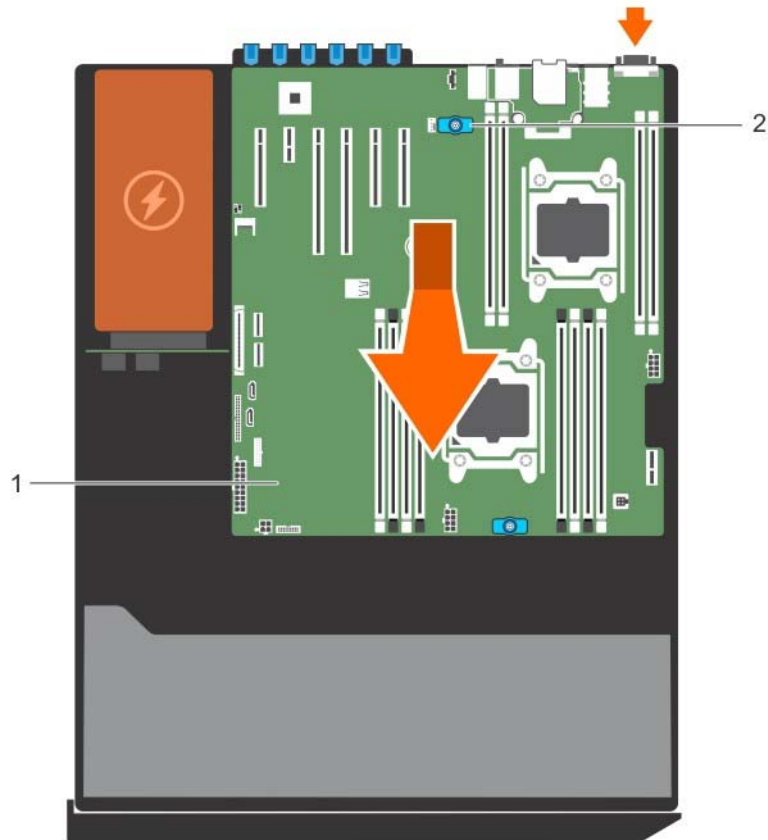
Figure 112. Removing the system board

| 1 | system board | 2 | t-handle posts(2) |

3 Hold the t-handle posts and slide the system board toward the front of the system.

4 Hold the t-handle posts and lift the system board out of the chassis.

Related links

Safety instructions
Before working inside your system
Removing the expansion card holder
Removing the cooling shroud
Removing the internal dual SD module
Removing the internal cooling fan
Removing the iDRAC port card
Removing the processor
Removing memory modules
Installing the system board
After working inside your system

Installing the system board

Prerequisites

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

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

Steps

1. Unpack the new system board assembly.

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

2. Hold the posts and lower the system board into the chassis.
3. Push the system board toward the back of the chassis such that the ports on the system board align with the corresponding slots on the chassis.
4. Install the screws to secure the system board to the chassis.
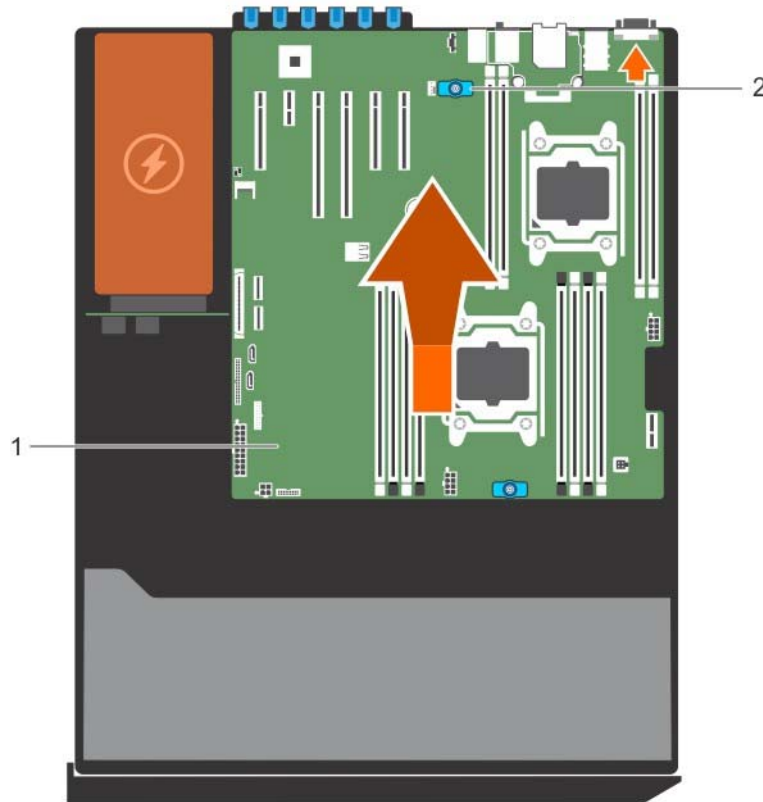
Figure 113. Installing the system board

1	system board	2	t-handle posts(2)
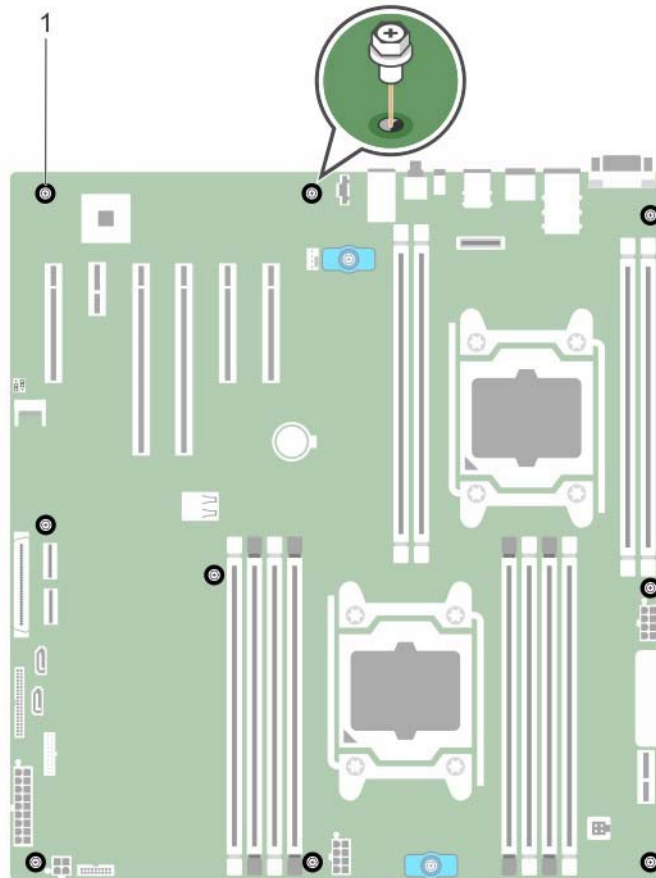
Figure 114. Installing the screws on the system board

1   screws (9)

Next steps

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

2   Replace the following:

   a   processors(s) and heat sink(s)

   b   internal USB key (if required)

   c   internal dual SD module

   d   cooling shroud

   e   internal cooling fan

   f   expansion cards

   g   expansion card holder

   h   iDRAC ports card

3   Reconnect all cables to the system board.

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

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

5   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 TPM for BitLocker users section or Re-enabling the TPM for TXT users section.

Related links

Restoring the Service Tag by using the Easy Restore feature

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

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.

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.

ⓘ 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.

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

Prerequisites

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

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

Steps

1   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.
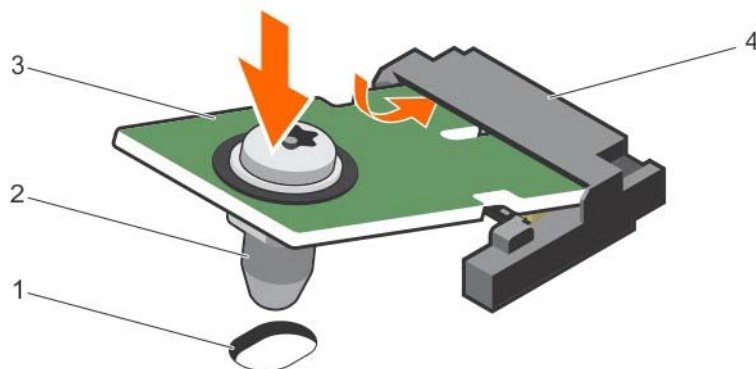
Figure 115. Installing the TPM

1	rivet slot on the system board	2	plastic rivet
3	TPM	4	TPM connector

Next steps

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

Related links

Initializing the TPM for BitLocker users

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.

System top cover

Do not remove the system top cover unless you are converting the system from tower to rack mode.

Removing the system top cover

Prerequisites

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

1   Follow the safety guidelines listed in the Safety instructions section.
2   Keep the Phillips #2 screwdriver ready.
3   Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
4   Remove the system cover.

Steps

1   Remove the screws that secure the top cover to the chassis.
2   Slide the cover toward the back of the system and lift it from the system.
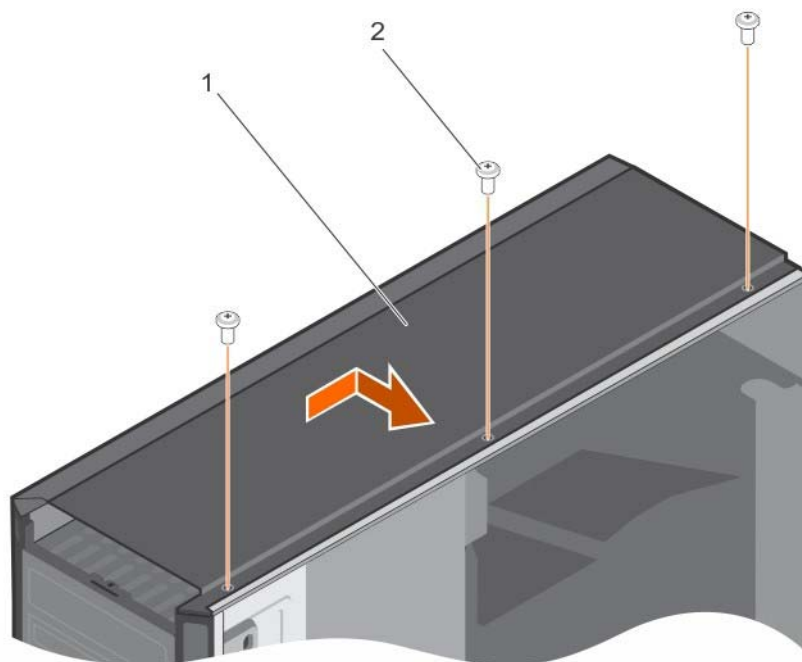
Figure 116. Removing the system top cover

1	system top cover	2	screw (3)

Related links

Safety instructions
Before working inside your system
Removing the system cover
Installing the system top cover
Preparing a system for conversion from tower mode to rack mode
After working inside your system

Installing the system top cover

Prerequisites

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

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

Steps

1   Align the tabs under the top cover with the slots on the top of the chassis.
2   Slide the cover toward the front of the system until the screw holes on the cover align with the screw holes on the chassis.
3   Tighten the screws to secure the cover onto the chassis.
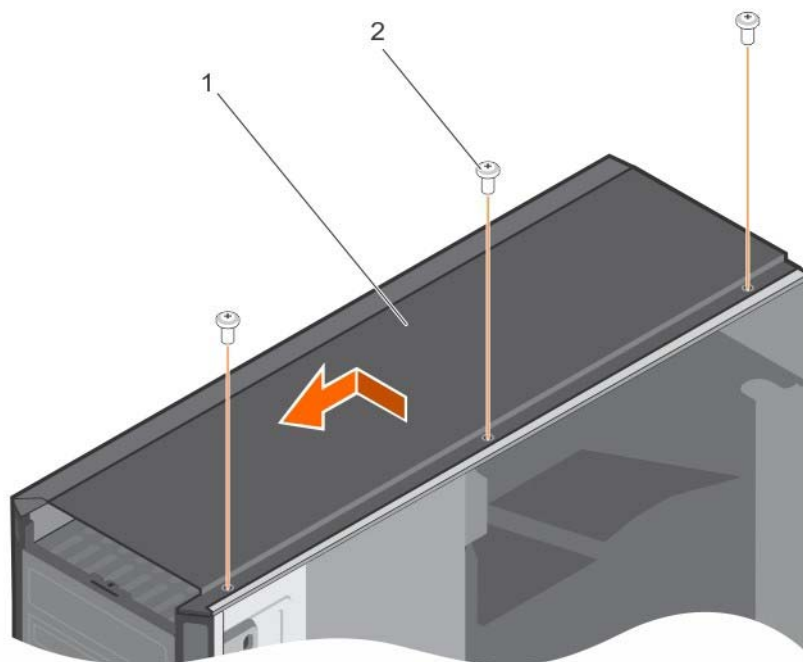
Figure 117. Installing the system top cover

| 1 | system top cover | 2 | screw (3) |

Next steps

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

Related links

Safety instructions
Before working inside your system

Using system diagnostics

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

Dell Embedded System Diagnostics

ⓘ NOTE: The Dell Embedded System Diagnostics is also known as Enhanced Pre-boot System Assessment (ePSA) diagnostics.

The Embedded System Diagnostics provides a set of options for particular device groups or devices allowing you to:

- Run tests automatically or in an interactive mode
- Repeat tests
- Display or save test results
- Run thorough tests to introduce additional test options to provide extra information about the failed device(s)
- View status messages that inform you if tests are completed successfully
- View error messages that inform you of problems encountered during testing

Running the Embedded System Diagnostics from Boot Manager

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

Steps
1 When the system is booting, press F10.
2 Use the up arrow and down arrow keys to select System Utilities > Launch Diagnostics.

   The ePSA Pre-boot System Assessment window is displayed, listing all devices detected in the system. The diagnostics starts executing the tests on all the detected devices.

Running the Embedded System Diagnostics from the Dell Lifecycle Controller

1 As the system boots, press F10.
2 Select Hardware Diagnostics → Run Hardware Diagnostics.

   The ePSA Pre-boot System Assessment window is displayed, listing all devices detected in the system. The diagnostics starts executing the tests on all the detected devices.

System diagnostics controls

Menu	Description
Configuration	Displays the configuration and status of all detected devices.
Results	Displays the results of all tests that are executed.
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

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

Topics:

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

System board connectors
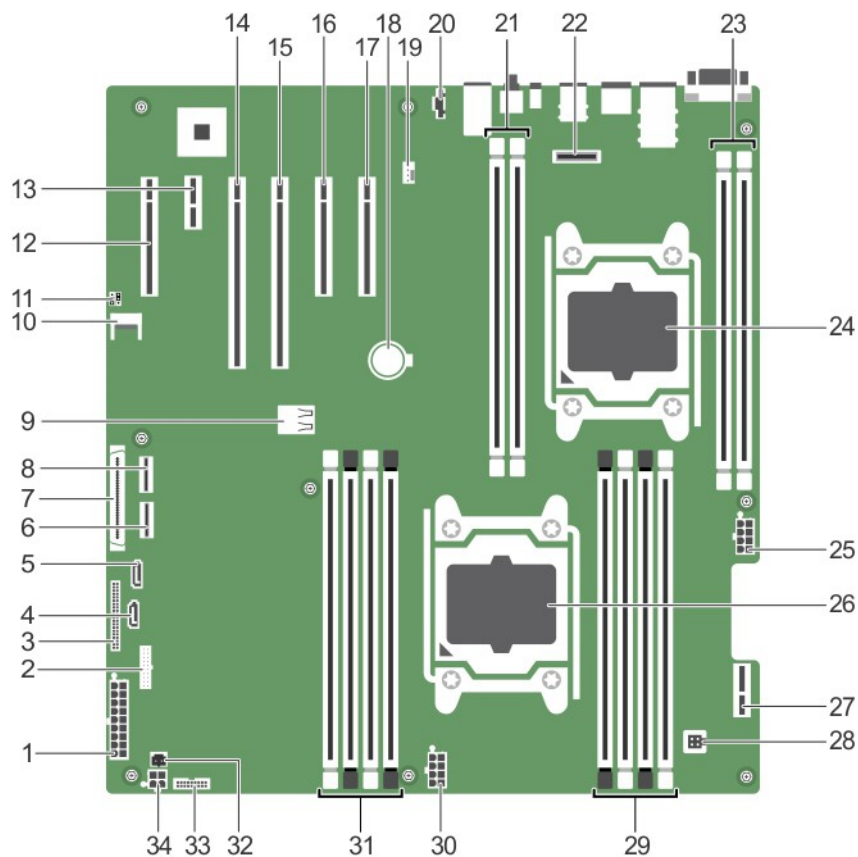
Figure 118. System board connectors

Table 38. System board connectors

Item	Connector	Description
1	SLOT4	PCI Express x16 slot (wired as x4)
2	SLOT3	PCI Express x4 slot
3	SLOT2	PCI slot
4	SLOT1	PCI Express x16 Gen 3 slot
5	R_USB3	USB 3.0 connector
6	HDMI	HDMI connector
7	SERIAL	serial port connector
8	DP_PORT1DP_PORT2	2 x Display port
9	NIC_USB	USB 2.0 with Network connector
10	KYBD_MOUSE	keyboard/mouse connector
11	INTRUDER	intrusion switch connector
12	ATX_CPU	P2 power connector
13	FAN_SYS	System fan connector
14	CPU	CPU socket
15	FAN_CPU	CPU fan connector
16	BATTERY	coin cell battery
17	DIMM slots	Memory slot
18	F_PANEL1	front power switch connector
19	ATX_SYS_1	8-pin power connector
20	SATA1	SATA 1 connector
21	SATA2	SATA 2 connector
22	SATA_PWR	HDD_ODD_Power cable connector
23	F_USB4	USB 3.0 connector
24	SATA0	SATA 0 connector
25	F_USB3	Front I/O panel connector
26	SATA3	SATA 3 connector
27	PSWD	password reset jumper

Item	Connector	Description
28	SERVICE_MODE	Service_Mode Jumper connector

Table 39. System board connectors
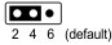
Item	Connector	Description
1	SYS_PWR_CONN (P1)	Power connector
2	FP_USB	Control panel USB connector
3	PIB_CONN	PIB signal connector
4	SATA_CDROM	Optical drive SATA connector
5	SATA_TBU	Tape drive SATA connector
6	J_SATA_B	SATA connector B
7	CTRL_PNL	Control panel interface connector
8	J_SATA_A	SATA connector A
9	INT_USB_3.0	Internal USB connector
10	TPM_MODULE	Trusted Platform Module (TPM) connector
11	J_PSWD_NVRAM	See System Board Jumper Settings
12	SLOT1 PCIE_G2_X4 (PCH)	PCIe card connector 1
13	SLOT2 PCIE_G2_ X1 (PCH)	PCIe card connector 2
14	SLOT3 PCIE_G3_X16 (CPU1)	PCIe card connector 3
15	SLOT4 PCIE_G3_X16 (CPU1)	PCIe card connector 4
16	SLOT5 PCIE_G3_X8 (CPU2)	PCIe card connector 5
17	SLOT6 PCIE_G3_X8 (CPU2)	PCIe card connector 6
18	BATTERY	System battery
19	FAN1	Internal cooling fan connector
20	FAN2	External cooling fan connector
21	B1, B2	Memory module sockets
22	J_AMEA	Advanced Management Enablement Adapter (AMEA) connector
23	B4, B3	Memory module sockets
24	CPU2	Processor 2
25	PWR_CONN_C (P3)	CPU2 power connector
26	CPU1	Processor 1
27	IDSDM	Internal dual SD module connector
28	INTRUSION	Intrusion switch connector
29	A1, A5, A2, A6	Memory module sockets
30	PWR_CONN_B (P2)	CPU1 power connector
31	A8, A4, A7, A3	Memory module sockets

Item	Connector	Description
32	ACT_LED	Front-panel hard-drive LED controller connector
33	BP_SIG	Backplane signal connector
34	ODD_PWR	Optical drive power connector

System board jumper settings

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

Table 40. System board jumper settings

Jumper	Setting	Description
PWRD_EN	2 4 6 (default)	The password reset feature is enabled (pins 2–4).
	2 4 6	The password reset feature is disabled (pins 4–6). The iDRAC local access is unlocked at the next AC power cycle.
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 links

Disabling forgotten password

Disabling forgotten password

The software security features of the system include a system password and a setup password. The password jumper enables or disables password features and clears any password(s) currently in use.

Prerequisite

Steps

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

2 Remove the system cover.

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

4 Install the system cover.

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

ⓘ NOTE: If you assign a new system and/or setup password with the jumper on pins 2 and 4, the system disables the new password(s) the next time it boots.

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

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

7 Remove the system cover.

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

9 Install the system cover.

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

11 Assign a new system and/or setup password.

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.

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

Topics:

Troubleshooting system startup failure

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

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

Troubleshooting external connections

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

Troubleshooting the video subsystem

Prerequisite

ⓘ 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.

Steps

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.

Next step

If the tests fail, see the Getting help section.

Related links

Getting help

Troubleshooting a USB device

Prerequisite

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

Steps

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

ⓘ NOTE: Older operating systems may not support USB 3.0.

4   Check if USB 3.0 is enabled in System Setup. If enabled, disable it and see if the issue is resolved.
5   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.

If the problem is not resolved, proceed 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.

Next step

If all troubleshooting fails, see the Getting help section.

Related links
   Getting help
   Getting help

Troubleshooting iDRAC Direct (USB XML configuration)

For information about USB storage device and system configuration, see *Integrated Dell Remote Access Controller User's Guide* at Dell.com/idracmanuals.

Steps

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 *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.

Next step
If all troubleshooting fails, see the Getting help section.
Related links
   Getting help

Troubleshooting iDRAC Direct (Laptop connection)

For information about USB laptop connection and system configuration, see the *Integrated Dell Remote Access Controller User's Guide* at Dell.com/idracmanuals.

Steps

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.

Next step
If all troubleshooting fails, see the Getting help section.
Related links
   Getting help

Troubleshooting a serial I/O device

Prerequisite

Steps

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

Next step

If the problem persists, see the Getting help section.

Related links
   Getting help
   Getting help

Troubleshooting a NIC

Steps

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

Next step

If the problem persists, see the Getting help section.

Related links
   Getting help
   Getting help
   Using system diagnostics

Troubleshooting a wet system

Prerequisite

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

Steps

1   Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
2   Remove the system cover.
3   Remove the following components (if installed) from the system:
    • Power supply unit(s)
    • Optical drive
    • Hard drives
    • Hard drive backplane
    • USB memory key
    • Hard drive tray
    • Cooling shroud
    • Expansion card risers (if installed)
    • Expansion cards
    • Cooling fan assembly (if installed)
    • Cooling fan(s)
    • Memory modules
    • Processor(s) and heat sink(s)
    • System board
4   Let the system dry thoroughly for at least 24 hours.
5   Reinstall the components you removed in step 3 except the expansion cards.
6   Install the system cover.
7   Turn on the system and attached peripherals.
    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.

Next step

If the tests fail, see the Getting help section.

Related links
   Getting help
   Using system diagnostics
   Getting help
   Using system diagnostics

Troubleshooting a damaged system

Prerequisite

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

Steps

1 Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
2 Remove the system cover.
3 Ensure that the following components are properly installed:

- cooling shroud
- expansion card risers (if installed)
- expansion cards
- power supply unit(s)
- cooling fan assembly (if installed)
- cooling fan(s)
- processor(s) and heat sink(s)
- memory modules
- hard drive carriers or 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.

Next step

If the problem persists, see the Getting help section.

Related links

Getting help
Using system diagnostics

Troubleshooting the system battery

Prerequisites

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

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

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

Steps

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

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

Next step

If the problem persists, see the Getting help section.

Related links

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.

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

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.

Power supply unit problems

1   Ensure that no loose connections exist.

    For example, loose power cables.

2   Ensure that the power supply unit (PSU) handle or LED indicates that the PSU is working properly.

    For more information about PSU indicators, see the Power indicator codes section.

3   If you have recently upgraded your system, ensure that the PSU has enough power to support the new system.

4   If you have a redundant PSU configuration, ensure that both the PSUs are of the same type and wattage.

    You may have to upgrade to a higher wattage PSU.

5   Ensure that you use only PSUs with the Extended Power Performance (EPP) label on the back.

6   Reseat the PSU.

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

    If the problem persists, see the Getting help section.

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

Prerequisites

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

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

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

Steps

1   Reseat the fan or the fan's power cable.
2   Restart the system.

Next steps

1   Follow the procedure listed in the After working inside your system section.
2   If the problem persists, see the Getting help section.

Related links

Getting help

Troubleshooting system memory

Prerequisite

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

Steps

1   If the system is operational, run the appropriate diagnostic test. See the Using system diagnostics section for the available diagnostic tests.

    If the diagnostic tests indicate a fault, follow the corrective actions provided by the diagnostic tests.

2   If the system is not operational, turn off the system and attached peripherals, and unplug the system from the power source. Wait at least for 10 seconds, and then reconnect the system to the power source.

3   Turn on the system and attached peripherals, and note the messages on the screen.

    If an error message is displayed indicating a fault with a specific memory module, go to step 12.

4   Enter System Setup, and check the system memory setting. Make any changes to the memory settings, if needed.

    If the memory settings match the installed memory but the problem still persists, go to step 12.

5   Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

6   Remove the system cover.

7   Check the memory channels and ensure that they are populated correctly.

    ⓘ NOTE: See the system event log or system messages for the location of the failed memory module. Reinstall the memory device.

8   Reseat the memory modules in their sockets.

9   Install the system cover.

10 Enter System Setup and check the system memory setting.

    If the problem is not resolved, proceed with step 11.

11 Remove the system cover.

12 If a diagnostic test or error message indicates a specific memory module as faulty, swap or replace the module with a known working memory module.

13 To troubleshoot an unspecified faulty memory module, replace the memory module in the first DIMM socket with a module of the same type and capacity.

    If an error message is displayed on the screen, this may indicate a problem with 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.

Next step

If the problem persists, see the Getting help section.

Related links

    Getting help
    Using system diagnostics

Troubleshooting an internal USB key

Prerequisite

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

Steps

1   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.

Next step

If the problem persists, see the Getting help section.

Related links

Getting help

Troubleshooting an SD card

Prerequisites

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

👁 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.

Steps

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.

   ⓘ 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.

ⓘ NOTE: The rebuild is always sourced from the primary SD card to the secondary SD card.

Troubleshooting an optical drive

Prerequisite

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

Steps

1   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.

Next step

If the problem persists, see the Getting help section.

Related links

Getting help

Using system diagnostics

Troubleshooting a tape backup unit

Prerequisite

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

Steps

1   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.

Next step

If you cannot resolve the problem, see the Getting help section.

Related links

Troubleshooting a hard drive or SSD

Prerequisites

⚠ 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.

Steps

1   Run the appropriate diagnostic test. See the Using system diagnostics section.

    Depending on the results of the diagnostics test, proceed as required through the following steps.

2   If your system has a RAID controller and your 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. For more information, see the operating system documentation.

4   Restart the system and enter the System Setup.

5   Verify that the controller is enabled and the drives are displayed in the System Setup.

Next step

If the problem persists, see the Getting help section.

Troubleshooting a storage controller

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

ⓘ NOTE: When troubleshooting a controller, see the documentation for your operating system and the controller.

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 links
　　Getting help
　　Using system diagnostics

Troubleshooting expansion cards

Prerequisites

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

ⓘ NOTE: When troubleshooting an expansion card, you also have to see the documentation for your operating system and the expansion card.

Steps

1   Run the appropriate diagnostic test. See the Using system diagnostics section.

2   Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

3   Remove the system cover.

4   Ensure that each expansion card is firmly seated in its connector.

5   Install the system cover.

6   Turn on the system and attached peripherals.

7   If the problem is not resolved, turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

8   Remove the system cover.

9   Remove all expansion cards installed in the system.

10   Install the system cover.

11   Run the appropriate diagnostic test. See the Using system diagnostics section.

　　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.

Next step

If the problem persists, see the Getting help section.

Related links

Troubleshooting processors

Prerequisite

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

Steps

1   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 links

Getting help

Topics:

- Contacting Dell
- Documentation feedback
- Accessing system information by using QRL

Contacting Dell

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

1 Go to Dell.com/support.
2 Select your country from the drop-down menu on the lower right corner of the page.
3 For customized support:
    a Enter your system Service Tag in the Enter your Service Tag field.
    b Click Submit.
       The support page that lists the various support categories is displayed.
4 For general support:
    a Select your product category.
    b Select your product segment.
    c Select your product.
       The support page that lists the various support categories is displayed.
5 For contact details of Dell Global Technical Support:
    a Click Global TechnicalSupport.
    b The Contact Technical Support page is displayed with details to call, chat, or e-mail the Dell Global Technical Support team.

Related links
   Getting help

Documentation feedback

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

Accessing system information by using QRL

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

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

The QRL includes the following information about your system:

- How-to videos

- Reference materials, including the Owner's Manual, LCD diagnostics, and mechanical overview
- Your system service tag to quickly access your specific hardware configuration and warranty information
- A direct link to Dell to contact technical assistance and sales teams

Steps

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

Quick Resource Locator

Use the Quick Resource Locator (QRL) to get immediate access to system information and how-to videos. This can be done by visiting dell.com/QRL or by using your smartphone or tablet and a model specific Quick Resource (QR) code located on your Dell PowerEdge system. To try out the QR code, scan the following image.

Appendix. Supported processor for T430

Model	CPU	Speed	Cores	threads	Memory Speed	TDP
T430	E5-2603V3	1.6	6	6	1600	85W
T430	E5-2603V4	1.7	6	6	1866	85W
T430	E5-2609V3	1.9	6	6	1600	85W
T430	E5-2609V4	1.7	8	8	1866	85W
T430	E5-2620V3	2.4	6	12	1866	85W
T430	E5-2620V3	2.4	6	12	1866	85W
T430	E5-2620V4	2.1	8	16	2133	85W
T430	E5-2623V3	3	4	8	1866	105W
T430	E5-2623V4	2.6	4	8	2133	85W
T430	E5-2630LV3	1.8	8	16	1866	55W
T430	E5-2630LV4	1.8	10	20	2133	55W
T430	E5-2630V3	2.4	8	16	1866	85W
T430	E5-2630V3	2.4	8	16	1866	85W
T430	E5-2630V4	2.2	10	20	2133	85W
T430	E5-2640V3	2.6	8	16	1866	90W
T430	E5-2640V4	2.4	10	20	2133	90W
T430	E5-2650LV3	1.8	12	24	2133	65W
T430	E5-2650LV4	1.7	14	28	2400	65W
T430	E5-2650V3	2.3	10	20	2133	105W
T430	E5-2650V4	2.2	12	24	2400	105W
T430	E5-2660V3	2.6	10	20	2133	105W
T430	E5-2660V4	2	14	28	2400	105W