Quest™

DL1300 Appliance

Owner's Manual

Table of Contents

Notes, cautions, and warnings

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

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.

Quest DL1300 overview

The Quest DL1300 supports one Intel Xeon E3 series processor, four memory modules, and four hot-swappable hard disk drives (HDDs).

Supported configurations

Your Quest DL1300 Appliance supports the following configurations: 2 TB, 3 TB+2VM, and 4 TB+2VM.

Table 1. Specifications for DL1300 2 TB Appliance

Your Quest DL1300 2 TB appliance has Intel Intel Xeon E3-1270 v5 3.6GHz 4C/8T processor, four 4 TB hot swappable Nearline SAS HDDs, and default memory of 16 GB with Four 4 GB-UDIMMs (default), which can be expanded to 32 GB or 64 GB, by using four 8 GB-UDIMMs or four 16 GB-UDIMMs respectively.

Component	Specification
Processor	Intel Xeon E3-1270 v5 3.6GHz 4C/8T
Hard drives	Four 4 TB hot swappable Nearline SAS HDDs
Memory	Four 4 GB-UDIMMs (default) or four 8 GB-UDIMMs or four 16 GB-UDIMMs

Table 2. Specifications for DL1300 3 TB+2VM

Your Quest DL1300 3TB+2VM Appliances have Intel Xeon E3-1280 v5 3.7GHz 4C/8T processor, four 4 TB hot swappable Nearline SAS HDDs, and default memory of 32 GB with Four 8 GB-UDIMMs (default), which can be expanded to 64 GB using four 16 GB-UDIMMs.

Component	Specification
Processor	Intel Xeon E3-1280 v5 3.7GHz 4C/8T
Hard drives	Four 4 TB hot swappable Nearline SAS HDDs
Memory	Four 8 GB-UDIMMs (default) or four 4 GB-UDIMMs or four 16GB-UDIMMs

Table 3. Specifications for DL1300 4 TB+2VM Appliances

Your Quest DL1300 4 TB+2VM Appliance has Intel Xeon E3-1280 v5 3.7GHz 4C/8T processor, four 4 TB hot swappable Nearline SAS HDDs, and default memory of 64 GB with four 16 GB-UDIMMs.

Component	Specification
Processor	Intel Xeon E3-1280 v5 3.7GHz 4C/8T
Hard drives	Four 4 TB hot swappable Nearline SAS HDDs

Component	Specification
Memory	Four 16 GB-UDIMMs (default) or four 8 GB-UDIMMs

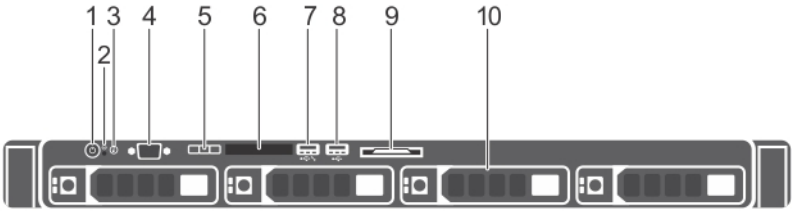
Parent topic

Front panel features

Parent topic

Four x 3.5-inch hard drive chassis

Figure 1. Front panel features and indicators — four 3.5-inch hot swappable hard drive chassis



1. Power-on indicator, power button
2. NMI button
3. System identification button
4. Video connector
5. LCD menu buttons
6. LCD panel
7. USB management port/iDRAC Direct port
8. USB connector
9. Information tag
10. Hard drives

Table 4. Front panel features and indicators — four 3.5-inch hot swappable hard drive chassis

Item 1 is the power-on indicator or power button that glows when the system power is on. The power button controls the power supply output to the system. On ACPI-compliant operating systems, turning off the system by using the power button causes the system to perform a graceful shutdown before power to the system is turned off. Item 2 is the NMI button that is used to troubleshoot software and device driver errors when running certain operating systems. This button can be pressed using the end of a paper clip. Use this button only if directed to do so by qualified support personnel or by the operating system documentation. Item 3 are the system identification buttons on the front and back panels that can be used to locate a particular system within a rack. When one of these buttons is pressed, the LCD panel on the front and the system status indicator on the back flash until one of the buttons is pressed again. Press to toggle the system ID on and off. If the system stops responding during POST, press and hold the system ID button for more than five seconds to enter BIOS progress mode. To reset iDRAC (if not disabled in F2 iDRAC set up), press and hold the button for more than 15 seconds. Item 4 is the video connector that allows you to connect a display to the system. Item 5 are the LCD menu buttons that allow you to navigate the control panel LCD menu. Item 6 is the LCD panel that displays system ID, status information, and system error messages. For more information, see LCD panel features. Item 7 is the USB management port/iDRAC Direct that allows you to connect USB devices to the system or provides access to the iDRAC Direct

features. For more information, see the Integrated Dell Remote Access Controller User's Guide at Dell.com/idracmanuals. The USB management port is USB 2.0-compliant. Item 8 is the USB connector that allows you to connect USB devices to the system. The ports are USB 2.0-compliant. Item 9 is the information tag, a slide-out label panel that allows you to record system information such as Service Tag, NIC, MAC address, as per your need. Item 10 are the hot swappable hard drives. Item 11 is the optical drive that has one optional SATA DVD-ROM drive or DVD+/-RW drive.

Item	Indicator, button, or connector	Icon	Description
1	Power-on indicator, power button		Enables you to know the power status of the system. The power-on indicator glows when the system power is on. The power button controls the power supply output to the system. NOTE: On ACPI-compliant operating systems, turning off the system using the power button causes the system to perform a graceful shutdown before power to the system is turned off.
2	NMI button		Enables you to troubleshoot software and device driver errors when running certain operating systems. This button can be pressed by using the end of a paper clip. Use this button only if directed to do so by qualified support personnel or by the operating system's documentation.
3	System identification button		Enables you to locate a particular system within a rack. The identification buttons are on the front and back panels. When one of these buttons is pressed, the LCD panel on the front and the system status indicator on the back flash until one of the buttons is pressed again.

Item	Indicator, button, or connector	Icon	Description
			Press the button to turn the system ID on and off. If the system stops responding during POST, press and hold the system ID button for more than five seconds to enter BIOS progress mode. To reset iDRAC (if not disabled in F2 iDRAC setup) press and hold the button for more than 15 seconds.
4	Video connector		Enables you to connect a display to the system.
5	LCD menu buttons		Enable you to navigate the control panel LCD menu.
6	LCD panel		Displays system ID, status information, and system error messages. See the LCD panel section.
7	USB management port/ iDRAC Direct port		Functions as a regular USB port or provides access to the iDRAC Direct features. For more information, see the iDRAC User's Guide at Dell.com/idracmanuals.
8	USB connector		Enables you to connect USB devices to the system. The port is USB 2.0-compliant.
9	Information tag		Contains system information such as service tag, NIC, MAC address for your reference. The information tag is a slide-out label panel.
10	Hard drives		Enables you to install up to four 3.5-inch hot swappable hard drives in

Item	Indicator, button, or connector	Icon	Description
			3.5-inch hot swappable adapters.

Parent topic

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 2. LCD panel features

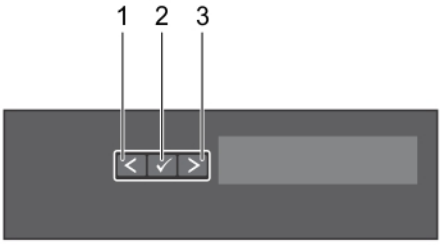


Table 5. LCD panel features

The LCD Panel features table describes the LCD panel buttons: Left, Select and Right, and their functions.

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.

Item	Button	Description
		NOTE: The display stops scrolling when the button is released. After 45 seconds of inactivity the display starts scrolling.

Parent topic

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.

Parent topic

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.

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.

Parent topic
Related references
See also: View menu

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.

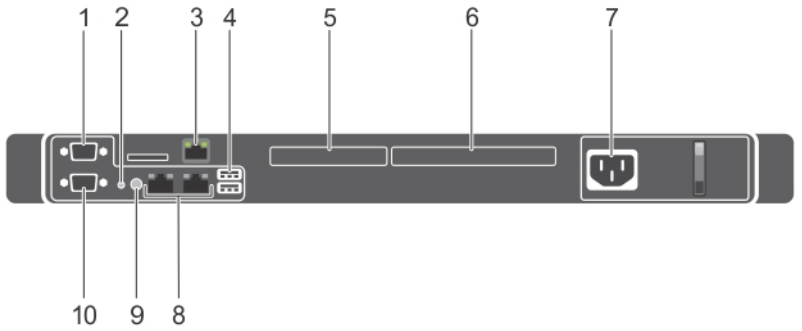
Temperature

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.

Parent topic

Back panel features

Figure 3. Back panel features (two PCIe expansion cards)



1. Serial connector
2. System identification button
3. iDRAC port (optional)
4. USB connectors (2)
5. PCIe expansion card slot (x8 slot, low profile)

6. PCIe expansion card slot (x16 slot, full height)
7. Power supply unit (PSU)
8. Ethernet connectors
9. System identification connector
10. Video connector

Table 6. Back panel features (two PCIe expansion cards)

Item 1 is the serial connector that allows you to connect a serial device to the system. Item 2 is the system identification button on the front and back panels that can be used to locate a particular system within a rack. When one of these buttons is pressed, the LCD panel on the front and the system status indicator on the back flash until one of the buttons is pressed again. Press to toggle the system ID on and off. If the system stops responding during POST, press and hold the system ID button for more than five seconds to enter BIOS progress mode. Item 3 is the vFlash media card slot that allows you to insert a vFlash media card. Item 4 is the iDRAC8 Enterprise port that is the dedicated management port. Item 5 are the USB connectors that allows you to connect USB devices to the system. The ports are USB 3.0-compliant. Item 6 is a low profile PCIe expansion card slot, that allows you to connect PCI Express expansion cards. Item 7 is a full height PCIe expansion card slot, that allows you to connect full-height PCI Express expansion cards.Item 8 is the Power supply unit (PSU) that has AC PSU of 250 W. Item 9 are the ethernet connectors that has two integrated 10/100/1000 Mbps NIC connectors. Item 10 is the system identification connector that connects the optional system status indicator assembly through the optional cable management arm. Item 11 is the video connector that allows you to connect a VGA display to the system.

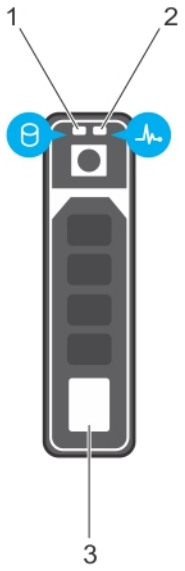
Item	Indicator, button, or connector	Icon	Description
1	Serial connector		Enables you to connect a serial device to the system.
2	System identification button		Enables you to locate a particular system within a rack. The identification buttons are on the front and back panels. When one of these buttons is pressed, the LCD panel on the front and the system status indicator on the back flash until one of the buttons is pressed again. Press the button to turn the system ID on or off. If the system stops responding during POST, press and hold the system ID button for more than five seconds to enter BIOS progress mode. To reset the iDRAC (if not disabled in F2 iDRAC setup) press and hold the button for more than 15 seconds.

Item	Indicator, button, or connector	Icon	Description
3	iDRAC port (optional)		Enables you to install a dedicated management port card.
4	USB connectors (2)		Enable you to connect USB devices to the system. The port is USB 3.0-compliant.
5	PCIe expansion card slot (x8 slot, low profile)		Enables you to connect a PCI Express expansion card.
6	PCIe expansion card slot (x16 slot, full height)		
7	Power supply unit (PSU)		Enables you to install one 250 W AC PSU.
8	Ethernet connectors		Enable you to connect integrated 10/100/1000 Mbps NIC connector.
9	System identification connector		Connects the optional system status indicator assembly through the optional cable management arm.
10	Video connector		Enables you to connect a VGA display to the system.

Parent topic

Hot swappable hard drive indicator codes

Figure 4. Hot swappable hard drive indicators



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

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 7. Hot swappable hard drive indicators

If the drive-status indicator flashes green two times per second, it indicates the identifying drive or preparing for removal. If the drive-status indicator is OFF, it indicates the drive is ready for insertion or removal. Note. The drive status indicator remains OFF until all hard drives are initialized after the system is turned on. Drives are not ready for insertion or removal during this time. If the drive-status indicator flashes green, amber, and turns off, it indicates the predicted drive failure. If the drive-status indicator flashes amber four times per second, that indicates the drive has failed. If the drive-status indicator flashes green slowly, it indicates the drive is rebuilding. If the drive-status indicator turns green, it indicates the drive is online. If the drive-status indicator flashes green three seconds, amber three seconds, and turns off six seconds, it indicates the rebuild has stopped.

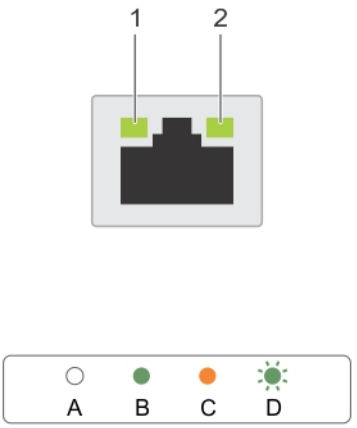
Drive-status indicator pattern (RAID only)	Condition
Flashes green two times per second	Identifying drive or preparing for removal.
OFF	Drive ready for insertion or removal. NOTE: The drive status indicator remains OFF until all hard drives are initialized after the system is turned on. Drives are not ready for insertion or removal during this time.
Flashes green, amber, and turns off	Predicted drive failure

Drive-status indicator pattern (RAID only)	Condition
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

Parent topic

NIC indicator codes

Figure 5. NIC indicators



1. link indicator
2. activity indicator

Table 8. NIC indicators

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

Convention	Status	Condition
A	Link and activity indicators are off	The NIC is not connected to the network.
B	Link indicator is green	The NIC is connected to a valid network at its maximum port speed (1 Gbps).
C	Link indicator is amber	The NIC is connected to a valid network at less than its maximum port speed.

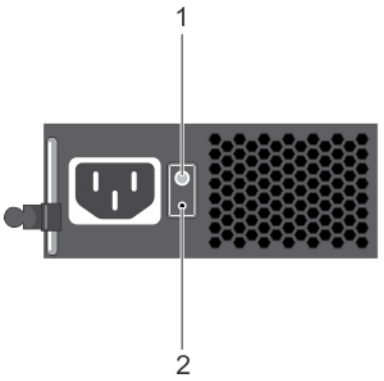
Convention	Status	Condition
D	Activity indicator is flashing green	Network data is being sent or received.

Parent topic

Cabled power supply unit indicator codes

Press the self-diagnostic button to perform a quick health check on the cabled power supply unit (PSU) of the system.

Figure 6. Cabled AC PSU status indicator and self-diagnostic button



1. self-diagnostic button
2. AC PSU status indicator

Table 9. Non-redundant AC PSU status indicator

This table describes about non-redundant AC PSU status indicator.

Power Indicator Pattern	Condition
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.

Parent topic

Documentation matrix

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

Table 10. Documentation resources for system

The following describes the additional information about the resources available to operate your system.

Task	Document	Location
Setting up your system	For information about installing the system into a rack, see the Rack documentation included with your rack solution.	Dell.com/poweredgemanuals
	For information about turning on the system and the technical specifications of your system, see the Getting Started With Your System that shipped with your system.	Quest.com/support
Configuring your system	For information about deploying your system, see the Quest DL1300 Deployment Guide.	Quest.com/support
	For information about 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 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 Download firmware and drivers section in this document.	Dell.com/support/drivers
Managing your system	For information about working with your system, see the Quest DL1300 Appliance User's Guide.	Quest.com/support
	For information about supported hardware and software versions for your system, see the Quest	Quest.com/support

Task	Document	Location
	DL1300 Appliance Interoperability Guide.	
	For information about the features of the Dell OpenManage Systems Management, 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 understanding the features of Dell Lifecycle Controller (LCC), see the Dell Lifecycle Controller User's Guide.	Dell.com/idracmanuals
Working with Dell PowerEdge RAID controllers	For information about understanding the features of the Dell PowerEdge RAID controllers (PERC) and deploying the PERC 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

Technical specifications

Dimensions and weight

Physical

Dimensions

Height

42.8 mm (1.68 inch)

Width with rack latches

482.38 mm (19 inch)

Width without rack latches

434.15 mm (17.09 inch)

Depth without bezel

497 mm (19.5 inch)

Maximum weight for four 3.5-inch hot swappable hard drive chassis

9.51 kg (20.96 lb)

Empty weight for four 3.5-inch hot swappable hard drive chassis

5.25 kg (11.57 lb)

Parent topic

Processor specifications

Processor

Specification

Type

One Intel Xeon E3 series processor

Parent topic

Expansion bus specifications

PCI Express Generation 3 expansion slots using expansion card riser

Specification

PCIE_G3_X16

(Slot 1) one half-height, half-length x16 link for processor 1

(Slot 2) one full-height, half-length x16 link for processor 1

PCIE_G3_X8

(Slot 1) one full-height, half-length x4 link for processor 1

(Slot 2) one half-height, half-length x8 link for processor 1

Parent topic

Memory specifications

Memory

Specification

Architecture

DDR3 UDIMMs that operates at 2133 MT/s.

Support for advanced ECC or memory optimized operation

Memory module sockets

Four 288-pin sockets

Memory module capacities (UDIMM)

4 GB (single-rank), 8 GB (dual-rank), 16 GB (dual-rank)

Minimum RAM

16 GB

Maximum RAM

64 GB

NOTE: For system specific memory details, see Supported configurations section.

Parent topic

Related references

See also: Supported configurations

Power specifications

Power supply unit

Specification

Power rating per power supply unit (PSU)

250 W (Bronze) AC (100–240 V, 50/60 Hz, 4.0 A-2.0 A)

Heat dissipation

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

1039 BTU/hr maximum (250 W PSU)

Voltage

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

100–240 V AC, autoranging, 50/60 Hz

Parent topic

Storage controller specifications

Storage controller

Specification

Storage controller type

PERC H330

NOTE: Only the DL1300 4 TB+2VM system supports PERC H830 RAID controller.

Parent topic

Drive specifications

Drives

Specification

Four hard drive systems

Four 3.5-inch hot swappable Nearline SAS hard drives

Parent topic

Connectors specifications

Back connectors

Specification
NIC
Two 10/100/1000 Mbps
Serial
9-pin, DTE, 16550-compatible
USB
Two 9-pin, USB 3.0-compliant
Video
15-pin VGA
iDRAC8
One optional 1 GbE Ethernet

Front connectors

Specification
USB
Two 4-pin, USB 2.0-compliant
Video
15-pin VGA

Internal connectors

Specification
USB
One 9-pin, USB 3.0-compliant

Parent topic

Video specifications

Video

Specification
Video type
Integrated Matrox G200
Video memory
16 MB shared

Parent topic

Environmental specifications

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

Table 11. Temperature specifications

When the system is in continuous operation (for altitude less than 950 m or 3117 ft), the temperature specification ranges from 10°C to 35°C (50°F to 95°F) with no direct sunlight on the equipment. NOTE: Maximum of 145 W 22 core processor is supported in systems with eight 2.5-inches drives, two PCI slot chassis, and 75 W single wide active GPU. When the system is not in operation, the temperature specification is –40°C to 65°C (–40°F to 149°F). The Maximum temperature gradient for both opertaion and non-opertaional systems is 20°C/h (36°F/h). For information about fresh air, view the Expanded Operating Temperature section.

Temperature	Specifications
Storage	–40°C to 65°C (–40°F to 149°F)
Continuous operation (for altitude less than 950 m or 3117 ft)	10°C to 35°C (50°F to 95°F) with no direct sunlight on the equipment.
For information about fresh air, see Expanded Operating Temperature section.	
Maximum temperature gradient (operating and storage)	20°C/h (36°F/h)

Table 12. Relative humidity specifications

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

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

Table 13. Maximum vibration specifications

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

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

Table 14. Maximum shock specifications

The maximum shock specification of an operational system is six consecutively executed shock pulses in the positive and negative x, y, and z axes of 40 G for up to 2.3 ms. The maximum shock specification of a non-operational system is six consecutively executed shock pulses in the positive and negative x, y, and z axes (one pulse on each side of the system) of 71 G for up to 2 ms.

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

Table 15. Maximum altitude specifications

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

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

Table 16. Operating temperature de-rating specifications

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

Operating temperature de-rating	Specifications
Up to 35°C (95°F)	Maximum temperature is reduced by 1°C/300 m (1°F/547 ft) above 950 m (3,117 ft).

Parent topic

Particulate and gaseous contamination specifications

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

Table 17. Particulate contamination specifications

Air filtration specification: Data center air filtration as defined by ISO Class 8 per ISO 14644-1 shpuld have a 95% upper confidence limit. Note: This condition applies only to data center environments. Air filtration requirements do not apply to IT equipment designed to be used outside a data center, in environments such as an office or factory floor. Note: Air entering the data center must have MERV11 or MERV13 filtration. Conductive dust specification:

Air must be free of conductive dust, zinc whiskers, or other conductive particles. Note: This condition applies to data center and non-data center environments. Corrosive dust specification: Air must be free of corrosive dust. Residual dust present in the air must have a deliquescent point less than 60% relative humidity. Note: This condition applies to data center and non-data center environments.

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

Table 18. Gaseous contamination specifications

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

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

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

Parent topic

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.

Parent topic

iDRAC configuration

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

Parent topic

Setting up and configuring the iDRAC IP address

You can set up the Integrated Dell Remote Access Controller (iDRAC) IP address by using one of the following interfaces:

- iDRAC Settings utility
- Dell Lifecycle Controller
- Dell OpenManage Deployment Toolkit
- Server LCD panel

You can 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.

You can configure iDRAC IP address by using the following interfaces:

NOTE: Make sure that you change the default user name and password after setting up the iDRAC IP address.

- iDRAC web interface — For more information, see the Integrated Dell Remote Access Controller User's Guide.
- Remote Access Controller Admin (RACADM) — For more information, see the RACADM Command Line Interface Reference Guide and the Integrated Dell Remote Access Controller User's Guide.
- Remote Services that include Web Services Management (WS-Man) — For more information, see the Dell Lifecycle Controller Remote Services Quick Start Guide.

For more information about setting up and configuring iDRAC, see the Integrated Dell Remote Access Controller User's Guide at Dell.com/idracmanuals.

Parent topic

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

Parent topic

Downloading the drivers and firmware

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

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

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

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

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

Parent topic

Managing your system remotely

To perform out-of-band systems management by using iDRAC, configure iDRAC for remote accessibility, set up the management station and managed system, and configure the supported web browsers. For more information, see the Integrated Dell Remote Access Controller User's Guide at Dell.com/idracmanuals.

You can also remotely monitor and manage the server by using the Dell OpenManage Server Administrator (OMSA) software and OpenManage Essentials (OME) systems management console. For more information, see Dell.com/openmanagemanuals > OpenManage Server Administrator or Dell.com/openmanagemanuals > OpenManage Essentials.

Parent topic

Pre-operating system management applications

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

Options to manage the pre-operating system applications

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

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

Parent topic

Navigation keys

The navigation keys can help you quickly access the pre-operating system management applications.

Table 19. Navigation keys

This table describes Navigation keys.

Key	Description
<Page Up>	Moves to the previous screen.
<Page Down>	Moves to the next screen.
Up arrow	Moves to the previous field.
Down arrow	Moves to the next field.
<Enter>	Enables you to type a value in the selected field (if applicable) or follow the link in the field.
Spacebar	Expands or collapses a drop-down list, if applicable.

Key	Description
<Tab>	Moves to the next focus area. NOTE: This feature is applicable for the standard graphic browser only.
<Esc>	Moves to the previous page until you view the main screen. Pressing <Esc> in the main screen exits System BIOS or iDRAC Settings/ Device Settings/ Service Tag Settings and proceeds with system boot.
<F1>	Displays the System Setup help.

Parent topic

System Setup

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

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

You can access system setup by using two methods:

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

Parent topic

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
   ```

   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.

Parent topic

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.

Parent topic

Entering System Setup

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

   ```
   F2 = System Setup
   ```

   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.

Parent topic

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.

Parent topic

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.

Parent topic

System BIOS Settings details

The System BIOS Settings screen details are explained as follows:

Option	Description
System Information	Specifies information about the system such as the system model name, BIOS version, and Service Tag.
Memory Settings	Specifies information and options related to the installed memory.
Processor Settings	Specifies information and options related to the processor such as speed and cache size.
SATA Settings	Specifies options to enable or disable the integrated SATA controller and ports.
Boot Settings	Specifies options to specify the boot mode (BIOS or UEFI). Enables you to modify UEFI and BIOS boot settings.
Network Settings	Specifies options to change the network settings.
Integrated Devices	Specifies options to manage integrated device controllers and ports and specify related features and options.
Serial Communication	Specifies options to manage the serial ports and specify related features and options.
System Profile Settings	Specifies options to change the processor power management settings, memory frequency, and so on.
System Security	Specifies options to configure the system security settings, such as system password, setup password, Trusted Platform Module (TPM) security. It also manages the power and NMI buttons on the system.
Miscellaneous Settings	Specifies options to change the system date, time, and so on.

Parent topic

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.

Parent topic

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.

Parent topic

Boot Settings details

The Boot Settings screen details are explained as follows:

Option

Description

Boot Mode

Enables you to set the boot mode of the system.

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

If the operating system supports UEFI, you can set this option to UEFI. Setting this field to BIOS allows compatibility with non-UEFI operating systems. This option is set to BIOS by default.

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.

Parent topic

Choosing the system boot mode

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

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

1. From the System Setup Main Menu, click Boot Settings, and select Boot Mode.
2. Select the boot mode you want the system to boot into.

   CAUTION: Switching the boot mode may prevent the system from booting if the operating system is not installed in the same boot mode.
3. After the system boots in the specified boot mode, proceed to install your operating system from that mode.

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.

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

Parent topic

Changing the boot order

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

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

Parent topic

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.

Parent topic

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.

Parent topic

Network Settings screen details

The Network Settings screen details are explained as follows:

Option

Description

PXE Device n (n = 1 to 4)

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

PXE Device n Settings(n = 1 to 4)

Enables you to control the configuration of the PXE device.

Parent topic

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.

Parent topic

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.

Parent topic

UEFI iSCSI Settings screen details

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 BIOS boot mode, the option ROM of the network controller handles the network settings.

To view the UEFI ISCSI Settings screen, click System Setup Main Menu > System BIOS > Network Settings > UEFI ISCSI Settings.

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.

Parent topic

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.

Parent topic

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.

Parent topic

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.

UEFI Variable Access

Provides varying degrees of securing UEFI variables. When set to Standard (the default), UEFI variables are accessible in the operating system per the UEFI specification. When set to Controlled, selected UEFI variables are protected in the environment and new UEFI boot entries are forced to be at the end of the current boot order.

Secure Boot

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

Secure Boot Policy

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

Secure Boot Policy Summary

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

Parent topic

Secure Boot Custom Policy Settings

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

Parent topic

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.

Parent topic

Secure Boot Custom Policy Settings screen details

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

To view the Secure Boot Custom Policy Settings screen, click System Setup Main Menu > System BIOS > System Security > Secure Boot Custom Policy Settings.

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).

Parent topic

Creating a system and setup password

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

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

1. To enter System Setup, press F2 immediately after turning on or rebooting your system.
2. On the System Setup Main Menu screen, click System BIOS > System Security.
3. On the System Security screen, verify that Password Status is set to Unlocked.
4. In the System Password field, type your system password, and press Enter or Tab.

   Use the following guidelines to assign the system password:

   - A password can have up to 32 characters.
   - The password can contain the numbers 0 through 9.
   - Only the following special characters are allowed: space, ("), (+), (,), (-), (.), (/), (;), ([), (\), (]), (`).

   A message prompts you to reenter the system password.
5. Reenter the system password, and click OK.
6. In the Setup Password field, type your setup password and press Enter or Tab.

   A message prompts you to reenter the setup password.
7. Reenter the setup password, and click OK.
8. Press Esc to return to the System BIOS screen. Press Esc again.

A message prompts you to save the changes.

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

Parent topic
Related references
See also: System board jumper settings
Related information
System Security Settings details

Using your system password to secure your system

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

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

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

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.

Parent topic

Deleting or changing system and setup password

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

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

   If you change the system and setup password, a message prompts you to reenter the new password. If you delete the system and setup password, a message prompts you to confirm the deletion.
6. Press Esc to return to the System BIOS screen. Press Esc again, and a message prompts you to save the changes.

Parent topic

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.

Parent topic

System Information

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

Parent topic

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.

Parent topic

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.

Parent topic

Memory Settings

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

Parent topic

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.

Parent topic

Memory Settings details

The Memory Settings screen details are explained as follows:

Option

Description

System Memory Size

Specifies the memory size in the system.

System Memory Type

Specifies the type of memory installed in the system.

System Memory Speed

Specifies the system memory speed.

System Memory Voltage

Specifies the system memory voltage.

Video Memory

Specifies the amount of video memory.

System Memory Testing

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

Memory Operating Mode

Specifies the memory operating mode. The available option is Optimizer Mode.

Parent topic

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.

Parent topic

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
   ```

   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.

Parent topic

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.

Virtualization Technology

Enables or disables the additional hardware capabilities provided for virtualization. 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.

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

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.

Parent topic

SATA Settings

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

Parent topic

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
   ```

   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.

Parent topic

SATA Settings details

The SATA Settings screen details are explained as follows:

Option

Description

Embedded SATA

Enables the embedded SATA option to be set to Off, AHCI, or RAID modes. This option is set to AHCI by default.

Security Freeze Lock

Sends Security Freeze Lock command to the Embedded SATA drives during POST. This option is applicable only for AHCI mode.

Write Cache

Enables or disables the command for Embedded SATA drives during POST.

Port A

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.

Port B

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.

Port C

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.

Port D

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.

Port E

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.

Port F

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.

Parent topic

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.

Parent topic

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.

Parent topic

Integrated Devices details

The Integrated Devices screen details are explained as follows:

Option

Description

User Accessible USB Ports

Enables or disables the USB ports. Selecting Only Back Ports On disables the front USB ports, selecting All Ports Off disables all USB ports. The USB keyboard and mouse operate during boot process in certain operating systems. After the boot process is complete, the USB keyboard and mouse do not work if the ports are disabled.

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

Internal USB Port

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

Integrated Network Card 1

Enables or disables the integrated network card.

Embedded NIC1 and NIC2

NOTE: The Embedded NIC1 and NIC2 options are only available on systems that do not have Integrated Network Card 1.

Enables or disables the Embedded NIC1 and NIC2 options. If set to Disabled, the NIC may still be available for shared network access by the embedded management controller. The embedded NIC1 and NIC2 options are only available on systems that do not have Network Daughter Cards (NDCs). The Embedded NIC1 and NIC2 option is mutually exclusive with the Integrated Network Card 1 option. Configure the Embedded NIC1 and NIC2 option by using the NIC management utilities of the system.

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.

OS Watchdog Timer

If your system stops responding, this watchdog timer aids in the recovery of your operating system. When this option is set to Enabled, the operating system initializes the timer. When this option is set to Disabled (the default), the timer does not have any effect on the system.

Memory Mapped I/O above 4 GB

Enables or disables the support for PCIe devices that need large amounts of memory. This option is set to Enabled by default.

Slot Disablement

Enables or disables the available PCIe slots on your system. The slot disablement feature controls the configuration of PCIe cards installed in the specified slot. Slots must be disabled only when the installed peripheral card prevents booting into the operating system or causes delays in system startup. If the slot is disabled, both the Option ROM and UEFI drivers are disabled.

Parent topic

Serial Communication

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

Parent topic

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.

Parent topic

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.

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.

Parent topic

System Profile Settings

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

Parent topic

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.

Parent topic

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 (OS).

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 OS DBPM by default. DBPM is Demand-Based Power Management.

Memory Frequency

Sets the speed of the system memory. You can select Maximum Performance, Maximum Reliability, or a specific speed.

Turbo Boost

Enables or disables the processor to operate in the turbo boost mode. This option is set to Enabled by default.

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.

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

Controls the number of turbo boost enabled cores for processor 1. The maximum number of cores is enabled by default.

Monitor/Mwait

Enables the Monitor/Mwait instructions in the processor. This option is set to Enabled for all system profiles, except Custom by default.

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

NOTE: When C States is set to Enabled in the Custom mode, changing the Monitor/Mwait setting does not impact the system power or performance.

Parent topic

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.

Parent topic

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
   ```

   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.

Parent topic

Miscellaneous Settings details

The Miscellaneous Settings screen details are explained as follows:

Option

Description

System Time

Enables you to set the time on the system.

System Date

Enables you to set the date on the system.

Asset Tag

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

Keyboard NumLock

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

NOTE: This option does not apply to 84-key keyboards.

F1/F2 Prompt on Error

Enables or disables the F1/F2 prompt on error. This option is set to Enabled by default. The F1/F2 prompt also includes keyboard errors.

Load Legacy Video Option ROM

Enables you to determine whether the system BIOS loads the legacy video (INT 10H) option ROM from the video controller. Selecting Enabled in the operating system does not support UEFI video output standards. This field is available only for UEFI boot mode. You cannot set the option to Enabled if UEFI Secure Boot mode is enabled.

In-System Characterization

Enables or disables In-System Characterization. This option is set to Disabled by default. The two other options are Enabled and Enabled - No Reboot.

NOTE: The default setting for In-System Characterization is subject to change in future BIOS releases.

When enabled, In-System Characterization (ISC) executes during POST upon detecting relevant change(s) in system configuration to optimize system power and performance. ISC takes about 20 seconds to execute, and system reset is needed for ISC results to be applied. The Enabled - No Reboot option executes ISC and continues without applying ISC results until the next time system reset occurs. The Enabled option executes ISC and forces an immediate system reset so that ISC results can be applied. It takes the system longer to be ready due to the forced system reset. When disabled, ISC does not execute.

Parent topic

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.

Parent topic

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.

Parent topic

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.

Parent topic

Dell Lifecycle Controller

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

Parent topic

Embedded system management

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

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.

Parent topic

Boot Manager

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

Parent topic

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.

Parent topic

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.

Parent topic

PXE boot

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

Parent topic

Installing and removing system components

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

Safety instructions

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

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

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

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

CAUTION: Operating the system without the system cover can result in component damage.

NOTE: Dell recommends that you always use a static mat and static 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.

Parent topic

Before working inside your system

Follow the safety guidelines listed in the Safety instructions section.

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

   For more information, see the Rack Installation placemat at Dell.com/poweredgemanuals.
5. Remove the system cover.

Parent topic
Related references

See also: Safety instructions

Related information

Removing the optional front bezel
Removing the system cover

Recommended tools

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

- Key to the bezel lock.

  This is needed only if your system includes a bezel.
- Phillips #2 screwdriver
- Plastic scribe
- Wrist grounding strap

Parent topic

After working inside your system

Follow the safety guidelines listed in the Safety instructions section.

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

   For more information, see the Rack Installation placemat at Dell.com/poweredgemanuals.
3. If removed, install the optional front bezel.
4. Reconnect the peripherals and connect the system to the electrical outlet.
5. Turn on the system, including any attached peripherals.

Parent topic

Related information

Installing the optional front bezel
Installing the system cover

Front bezel (optional)

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

Parent topic

Installing the optional front bezel

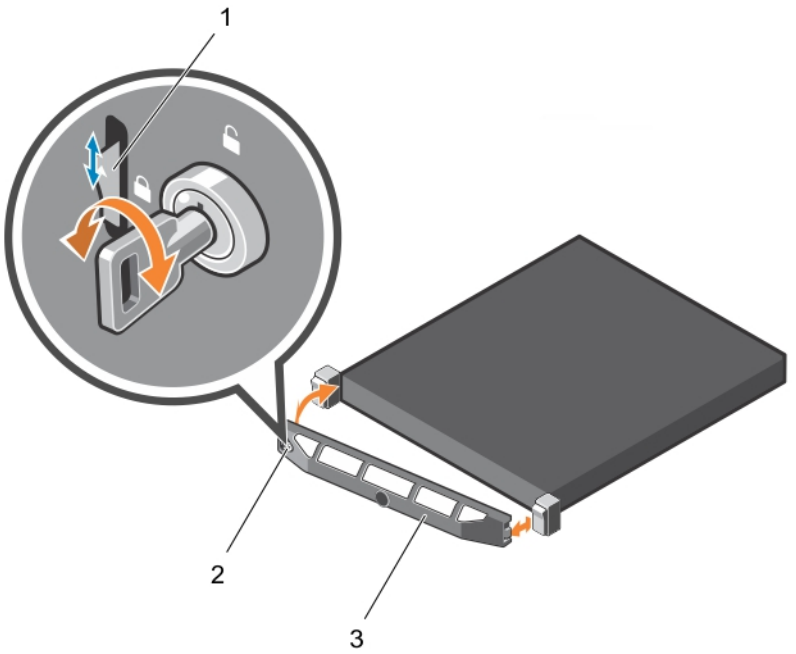
Follow the safety guidelines listed in the Safety instructions section.

1. Locate and remove the bezel key.

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

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

Figure 7. Installing the optional front bezel



a. release latch
b. lock
c. front bezel

Parent topic

Removing the optional front bezel

1. Unlock the keylock at the left end of the bezel.
2. Lift the release latch next to the keylock.
3. Rotate the left end of the bezel away from the front panel.
4. Unhook the right end of the bezel and pull the bezel away from the system.

Parent topic

System cover

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

Parent topic

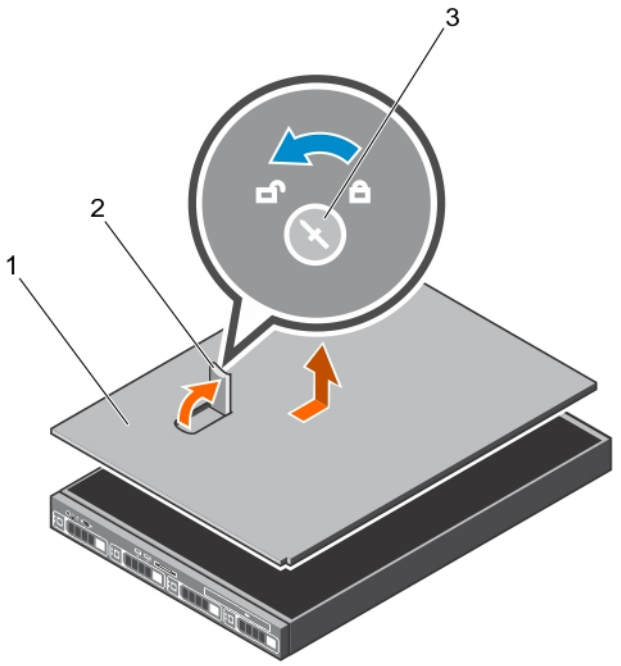
Removing the system cover

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. If installed, remove the optional bezel. For more information, see the Removing the optional front bezel section.
5. If installed, remove the front bezel.
1. Rotate the latch release lock counter clockwise to the unlocked position.
2. Lift the latch toward the back of the system.

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

   NOTE: The position of the latch may vary depending on the configuration of your system.
3. Hold the cover on both sides, and lift the cover away from the system.

   Figure 8. Removing the system cover



   a. system cover
   b. latch
   c. latch release lock

1. Install the system cover.

Parent topic
Related references
See also: Safety instructions
Related information
Removing the optional front bezel
Installing the system cover

Installing the system cover

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

1. Align the slots on the system cover with the tabs on the chassis.
2. Push the system cover latch down to move the system cover into the closed position.

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

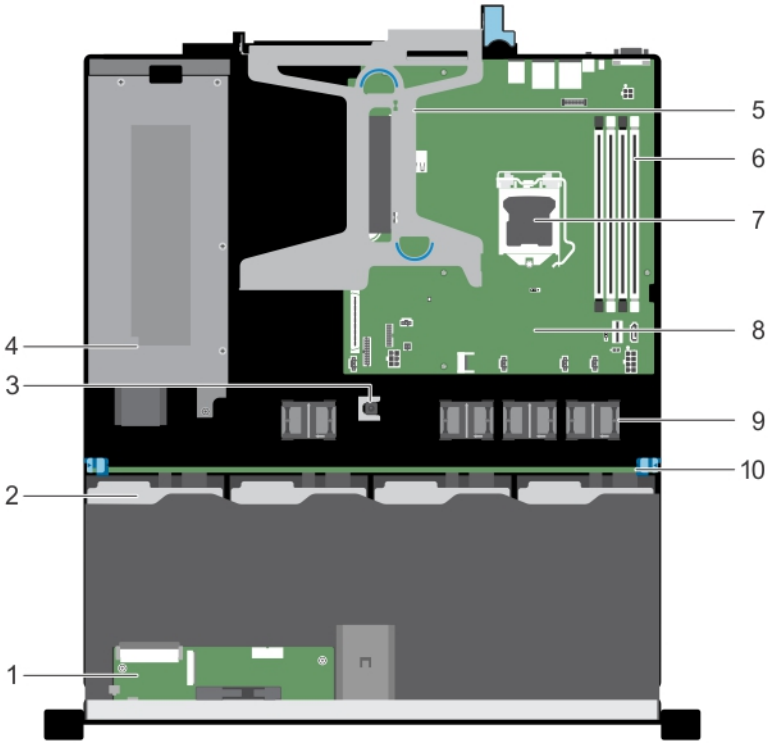
3. Rotate the latch release lock clockwise to the locked position.

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

Parent topic
Related references
See also: Safety instructions
Related information
Installing the optional front bezel

Inside the system

Figure 9. Inside the system—four 3.5-inch hot-swappable hard drive systems



1. control panel module

2. hot-swappable hard drive (4)
3. intrusion switch
4. power supply unit
5. expansion card riser
6. memory module (A1, A2, A3, A4)
7. processor
8. system board
9. cooling fan (4)
10. hard drive backplane

Parent topic

Chassis intrusion switch

The Chassis Intrusion Switch detects any intrusion into the interior of your system and provides an indication of the same in the system event logs. This switch is activated as soon as the cover of your system chassis is removed.

NOTE: If the intrusion cable is missing or not connected, a notification is received in the ESM and intrusion status is not logged in the system event log.

The chassis intrusion switch detects any unauthorized access into the interior of your system and provides an indication of the same. This switch is activated as soon as the system cover is removed and access is made to the interior of your system.

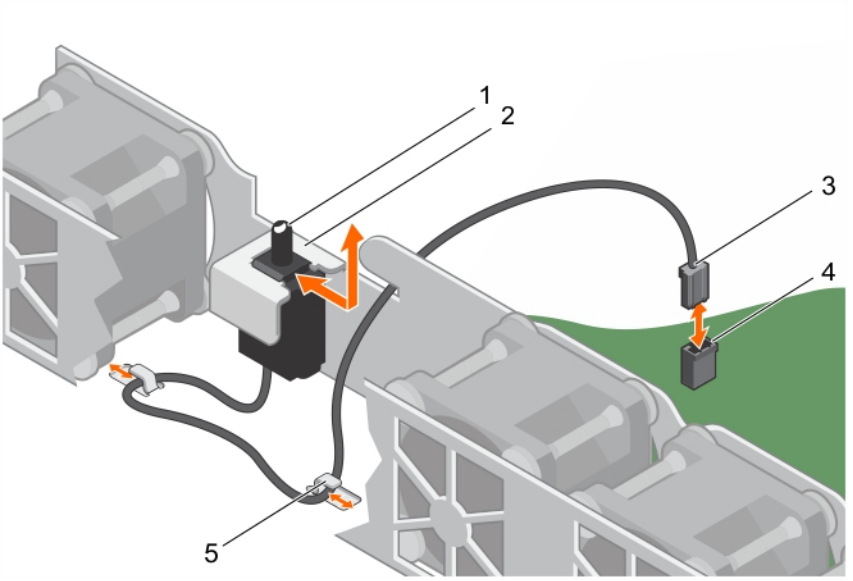
Parent topic

Removing the intrusion switch

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

1. Follow the safety guidelines listed in safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Keep the plastic scribe ready.
1. Disconnect the intrusion switch cable from the connector on the system board.
2. Using a plastic scribe, slide the intrusion switch and remove it from under the intrusion switch slot.

Figure 10. Removing the intrusion switch



a. intrusion switch
b. intrusion switch slot
c. intrusion switch cable
d. intrusion switch connector on the system board
e. cable routing clip (2)

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

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system
After working inside your system

Installing the intrusion switch

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

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
1. Insert the intrusion switch into the intrusion switch slot.
2. Slide the intrusion switch until it locks into position.
3. Route the intrusion switch cable through the cable routing tab.
4. Connect the intrusion switch cable to the connector on the system board.
1. Follow the procedure listed in After working inside your system section.

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system

After working inside your system

Cooling shroud

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

Parent topic

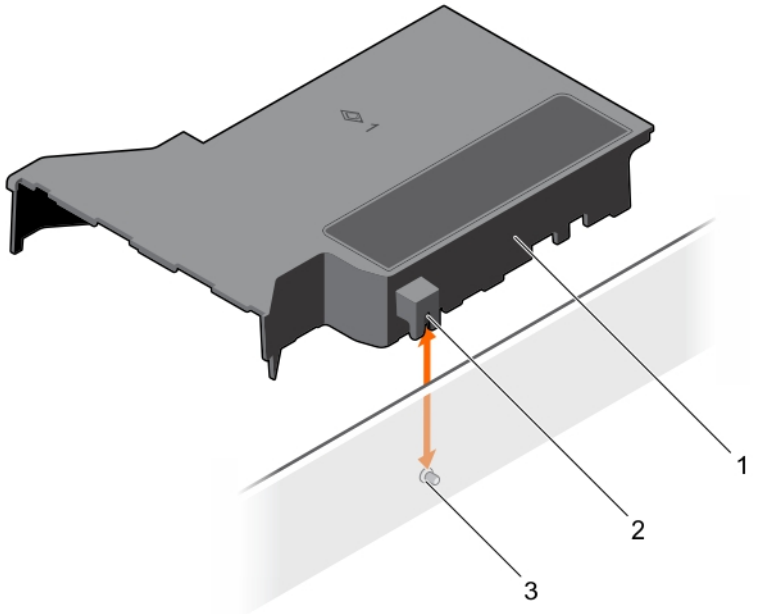
Removing the cooling shroud

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

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

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. If installed, remove the full-length PCIe card.
1. Holding the touch points, lift the cooling shroud away from the system.

Figure 11. Removing the cooling shroud



a. cooling shroud
b. guide on the cooling shroud
c. guide pin on the chassis wall

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

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system
After working inside your system

Installing the cooling shroud

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

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. If applicable, route the cables inside the system along the chassis wall and secure the cables by using the cable-securing bracket.
1. Align the tabs on the cooling shroud with the securing slots on the chassis.
2. Lower the cooling shroud into the chassis until it is firmly seated.

   When firmly seated, the memory socket numbers marked on the cooling shroud align with the respective memory sockets.
1. Follow the procedure listed in the After working inside your system section.

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system

System memory

Your system supports DDR3 ECC unbuffered DIMMs (UDIMMs).

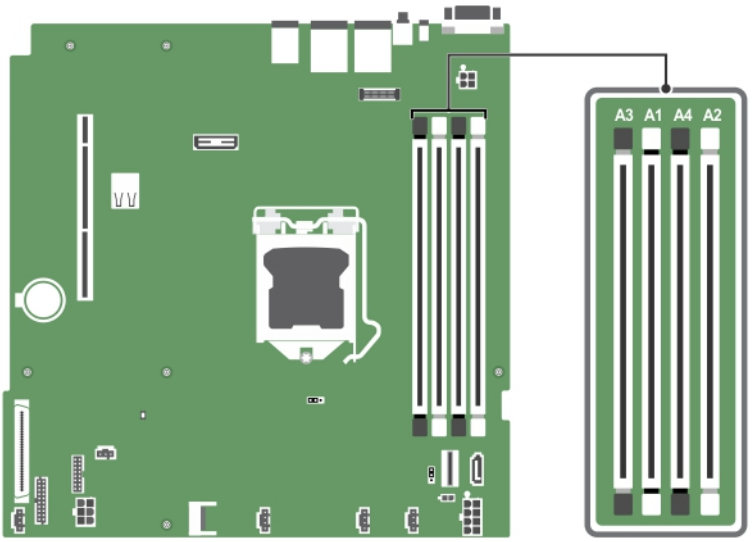
NOTE: MT/s indicates memory module speed in Mega Transfers per second.

Memory bus operating frequency is 2133 MT/s depending on the following factors:

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

The system contains four memory sockets — two sets of 2–sockets each. Each 2–socket set is organized into one channel. In each 2-socket set, the first socket release lever is marked white and the second socket release lever is marked black.

Figure 12. Memory socket locations on the system board



Memory channels are organized as follows:

Processor 1

channel 0: memory sockets A1 and A3

channel 1: memory sockets A2 and A4

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

Table 20. Memory populations and operating frequencies for the supported configurations

One or two dual or single-rank ECC UDIMMs populated per channel operate at 2133 frequency.

Memory module type	Memory modules populated per channel	Operating frequency (in MT/s)	Maximum memory module ranks per channel
		1.2 V	
ECC (UDIMM)	1	2133	Dual rank or single rank
	2	2133	Dual rank or single rank

Parent topic

General memory module installation guidelines

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

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

- x4 and x8 DRAM-based memory modules can be mixed. For more information, see the Mode-specific guidelines section.
- Up to two dual- or single-rank UDIMMs can be populated per channel.
- Populate DIMM sockets only if a processor is installed. For single-processor systems, sockets A1 to A4 are available.
- 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.
- When mixing memory modules with different capacities, populate the sockets with memory modules with the highest capacity first. For example, to mix 4 GB and 8 GB DIMMs, populate 8 GB DIMMs in the sockets with white release levers and 4 GB DIMMs in the sockets with black release levers.
- Memory modules of different capacities can be mixed provided other memory population rules are followed (for example, 4 GB and 8 GB memory modules can be mixed).

Parent topic

Sample memory configurations

The following table shows sample memory configurations for a single processor configuration.

NOTE: 1R and 2R in the following table indicate single and dual-rank memory modules respectively.

Table 21. Memory configurations—single processor

1. In a single memory processor with a populated capacity of 4 GB, install the 4 GB memory modules in slot A1. 2. In a single memory processor with a populated capacity of 8 GB, install the 4 GB memory modules in slots A1 and A2. 3. In a single memory processor with a populated capacity of 16 GB, install the 4 GB memory modules in slots A1, A2, A3 and A4. 4. In a single memory processor with a populated capacity of 16 GB, install the 8 GB memory modules in slots A1 and A2. 5. In a single memory processor with a populated capacity of 32 GB, install the 8 GB memory modules in slots A1, A2, A3 and A4. In a single memory processor with a populated capacity of 32 GB, install the 16 GB memory modules in slots A1 and A2. 6. In a single memory processor with a populated capacity of 64 GB, install the 16 GB memory modules in slots A1, A2, A3 and A4.

Populated system capacity (in GB)	Memory module size (in GB)	Number of memory modules	Memory module rank, organization, and frequency	memory module slot population
16	4	4	1R, x8, 2133 MT/s	A1, A2, A3, A4
32	8	4	2R, x8, 2133 MT/s	A1, A2, A3, A4
64	16	4	2R, x8, 2133 MT/s	A1, A2, A3, A4

Parent topic

Removing memory modules

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

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

3. Remove the cooling shroud.

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

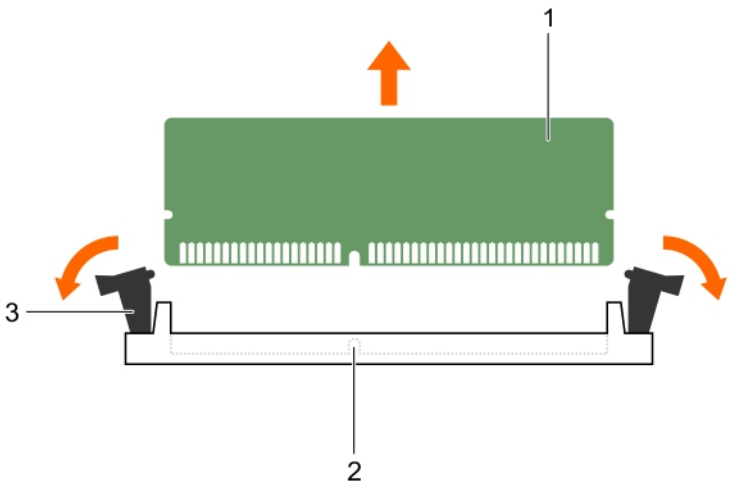
CAUTION: To ensure proper system cooling, memory module blanks must be installed in any memory socket that is not occupied. Remove memory module blanks only if you intend to install memory modules in those sockets.

1. Locate the appropriate memory module socket.

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

2. To release the memory module from the socket, simultaneously press the ejectors on both ends of the memory module socket.
3. Lift and remove the memory module from the system.

Figure 13. Removing the memory module



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

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.

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system

Installing memory modules

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

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

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the cooling shroud.
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. If a memory module or a memory module blank is installed in the socket, remove it.

   NOTE: Retain the removed memory module blank(s) for future use.

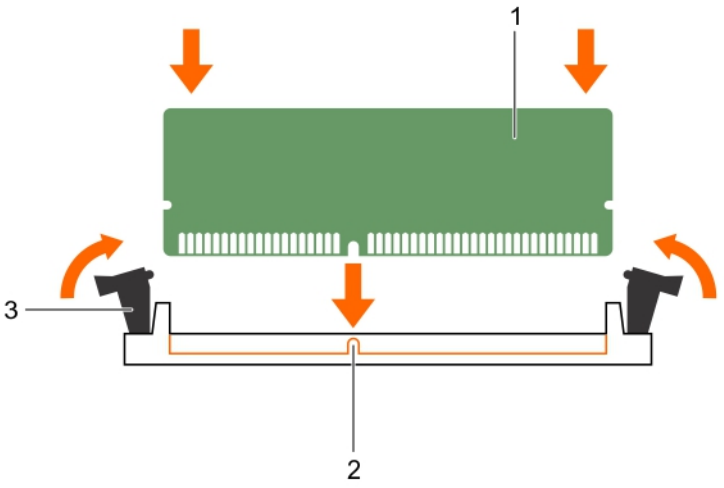
   CAUTION: To prevent damage to the memory module or the memory module socket during installation, do not bend or flex the memory module; insert both ends of the memory module simultaneously.
3. Open the ejectors on the memory module socket outward to allow the memory module to be inserted into the socket.
4. 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.
5. 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 14. Installing the memory module



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

1. Install the cooling shroud.
2. Follow the procedure listed in the After working inside your system section.
3. 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.
4. If the value is incorrect, one or more of the memory modules may not be installed properly. Ensure that the memory module is firmly seated in the memory module socket.
5. Run the system memory test in system diagnostics.

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system
After working inside your system

Hard drives

Your system supports enterprise class hard drives. Enterprise class drives are designed for 24x7 operating environment. Selecting the correct drive class enables optimization of the critical areas of quality, functionality, performance, and reliability for the target implementation.

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

CAUTION: Before removing or installing a hot swappable hard drive, read the storage controller card documentation to ensure that the host adapter is configured to support hot swappable hard drive removal and installation.

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. High-capacity hard drives can take several hours to format.

Parent topic

Supported hard drive configuration

Your system supports up to four 3.5-inch hot swappable nearline SAS drives. The hot swappable hard drives connect to the system board through the hard drive backplane. Hot swappable hard drives are supplied in hot swappable hard drive carriers that fit in the hard drive slots.

Parent topic

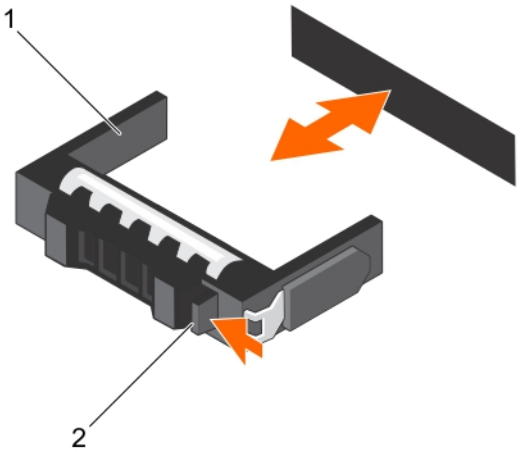
Removing a 3.5-inch hot swappable hard drive carrier blank

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

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

1. Follow the safety guidelines listed in Safety instructions section.
2. If installed, remove the front bezel.
1. Press the release button and slide the hard drive carrier blank out of the hard drive slot.

Figure 15. Removing and installing a 3.5-inch hot swappable hard drive carrier blank



a. hard drive carrier blank
b. release button

If removed, install the front bezel.

Parent topic
Related references
See also: Safety instructions
Related information
Installing the optional front bezel
Removing the optional front bezel

Installing a 3.5-inch hot swappable hard drive carrier blank

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

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

If removed, install the front bezel.

Parent topic
Related references
See also: Safety instructions
Related information
Installing the optional front bezel
Removing the optional front bezel

Removing a hot swappable hard drive carrier

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

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.

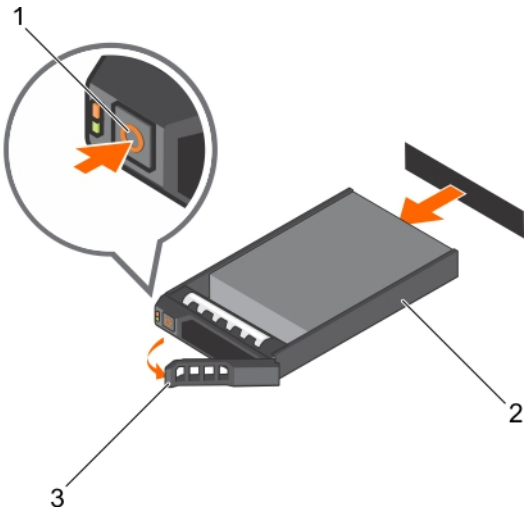
CAUTION: To prevent data loss, ensure that your operating system supports hot-swap drive installation. See the documentation supplied with your operating system.

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

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

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

Figure 16. Removing a hot swappable hard drive or SSD



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

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.

Parent topic
Related references
See also: Safety instructions
Related information
Installing the optional front bezel
Removing the optional front bezel
Installing a 3.5-inch hot swappable hard drive carrier blank

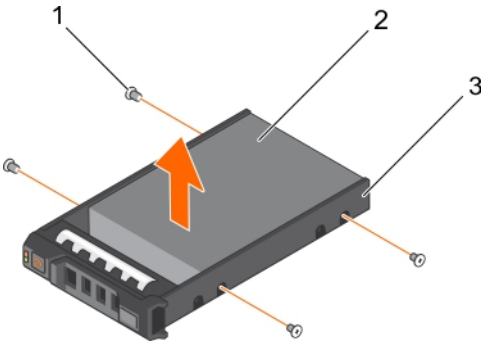
Removing a hot swappable hard drive from a hard drive carrier

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

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.
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 17. Removing a hot swappable hard drive from a hard drive carrier



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

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

Parent topic
Related information
Installing a hot swappable hard drive carrier
Installing a hot swappable hard drive into a hot swappable hard drive carrier

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

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

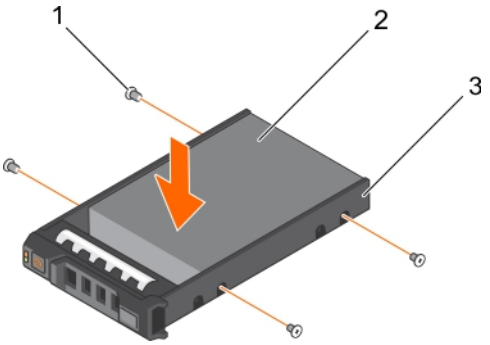
NOTE: Hot swappable hard drives are supplied in hot swappable hard drive carriers that fit in the hard drive slots.

1. Keep the Phillips #2 screwdriver ready.
2. Remove the hot swappable hard drive carrier.
1. Insert the hot swappable hard drive into the hard drive carrier with the connector end of the hard drive toward the back.
2. Align the screw holes on the hard drive with the set of 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. Attach the screws to secure the hard drive to the hard drive carrier.

Install the hard drive carrier into the system.

Figure 18. Installing a hot swappable hard drive into a hot swappable hard drive carrier



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

Parent topic

Related references

See also: Safety instructions

Related information

Removing a hot swappable hard drive carrier

Installing a hot swappable hard drive carrier

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

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

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

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

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

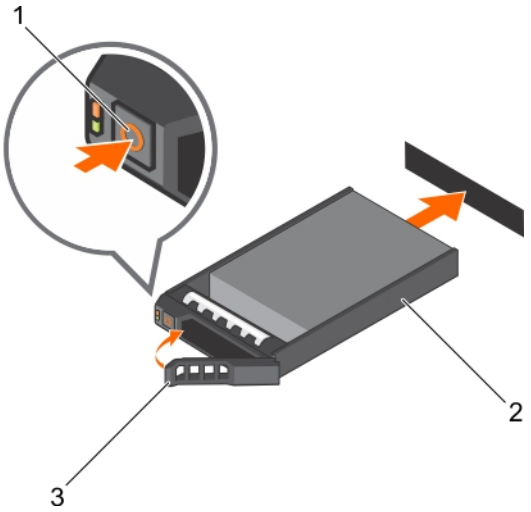
CAUTION: When a replacement hot swappable hard drive is installed and the system is powered on, the hard drive automatically begins to rebuild. Make absolutely sure that the replacement hard drive is blank or contains data that you wish to have over-written. Any data on the replacement hard drive is immediately lost after the hard drive is installed.

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 hard drive carrier blank.
2. Install a hot swappable hard drive into the hot swappable hard drive carrier.

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 19. Installing a hot swappable hard drive carrier



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

If removed, install the front bezel.

Parent topic
Related information
Installing a hot swappable hard drive into a hot swappable hard drive carrier
Installing the optional front bezel

Cooling fans

Depending on your system configuration, your system can support up to four cooling fans.

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

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

The following table shows the number of fans required for different system configurations:

NOTE: Ensure that you install a cooling fan blank in an empty cooling fan bracket.

Table 22. Number of fans based on system configuration

Systems with four 3.5-inch hot swappable or cabled hard drives and expansion cards support four cooling fans. Systems with four 3.5-inch hot swappable or cabled hard drives and without expansion cards support three cooling fans. Systems with two 2.5-inch cabled hard drives and expansion cards support three cooling fans. Systems with two 2.5-inch cabled hard drives and without expansion cards support two cooling fans.

System configuration	Number of fans
Systems with four 3.5-inch hot swappable hard drives and expansion card	4

System configuration	Number of fans
Systems with four 3.5-inch hot swappable hard drives and without expansion card	3

Parent topic

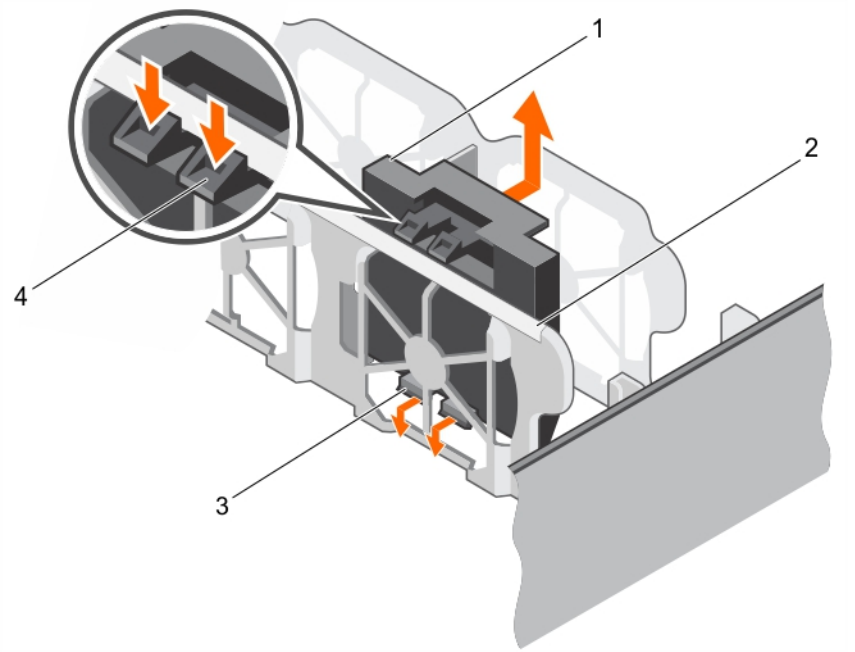
Removing the cooling fan blank

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

NOTE: The procedure for removing each cooling fan blank is identical.

1. Follow the safety guidelines listed in Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
1. Press the release tabs and push the cooling fan blank to disengage it from the cooling fan bracket.
2. Lift the cooling fan blank out of the cooling fan bracket.

Figure 20. Removing and installing a cooling fan blank



a. cooling fan blank (2)
b. cooling fan bracket
c. tab
d. release tab (2)

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

Parent topic

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

Installing the cooling fan blank

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

NOTE: The procedure for removing each cooling fan blank is identical.

1. Follow the safety guidelines listed in Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
1. Lower the cooling fan blank into the cooling fan bracket.
2. Insert the tabs on the cooling fan blanks into the slots on the cooling fan bracket.
3. Press the cooling fan blank until it clicks into place.

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

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system

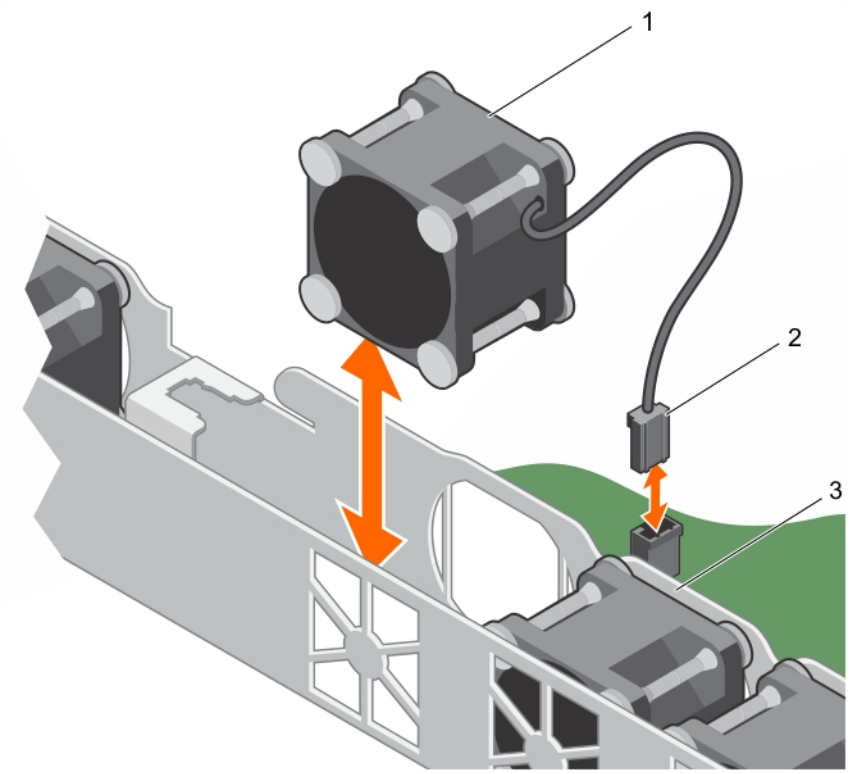
Removing a cooling fan

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

NOTE: The procedure for removing each fan is identical.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the cooling shroud.
1. Disconnect the power cable from the power connector on the system board by pressing the sides of the power cable.
2. Lift the fan out of the cooling fan bracket.

Figure 21. Removing and installing a cooling fan



a. cooling fan
b. power cable connector
c. cooling fan bracket

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

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system
After working inside your system
Removing the cooling shroud
Installing a cooling fan
Installing the cooling shroud

Installing a cooling fan

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

NOTE: The procedure for installing each fan is identical.

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

4. If installed, remove the cooling fan blank.
1. Lower the fan into the cooling fan bracket.
2. Connect the power cable to the power cable connector on the system board.
1. Install the cooling shroud.
2. Follow the procedure listed in the After working inside your system section.

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system
After working inside your system
Removing the cooling shroud
Installing the cooling shroud

Expansion cards and expansion card riser

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

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

Parent topic

Expansion card installation guidelines

Your system supports Generation 3 cards. The following table provides riser configurations.

Table 23. Expansion card slots available on the expansion card riser

The PCIe slot 1 on the expansion card riser is mapped to the processor. This slot supports half height, half length x4 expansion cards. This is an x8 slot. The PCIe slot 2 on the expansion card riser is mapped to processor. This slot supports full height, half length x8 expansion cards. This is an x16 slot

PCIe slot on the expansion card riser	Height	Length	Link width	Slot width
1	Half height	Half length	x4	x8
2	Full height	Half length	x8	x16

NOTE: The expansion cards are not hot swappable.

The following table is 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 in card priority and slot priority order.

Table 24. Expansion card installation order

1. Card priority 1 is assigned to PowerEdge RAID Controller (PERC) H730 (full height). The slot priority for PERC H730 (full height) is 2 and supports a maximum of 1 card. 2. Card priority 2 is assigned to PERC H730P (low profile). The slot priority for PERC H730P (low profile) is 1 and supports a maximum of 1 card. 3. Card priority 3 is assigned to PERC H330 (full height). The slot priority for PERC H330 (full height) is 2 and a supports a maximum

of 1 card. 4. Card priority 4 is assigned to PERC H330 (low profile). The slot priority for PERC H330 (low profile) is 1 and a supports a maximum of 1 card. 5. Card priority 5 is assigned to PERC H830 (full height). The slot priority for PERC H830 (full height) is 2 and a supports a maximum of 1 card. 6. Card priority 6 is assigned to PERC H830 (low profile). The slot priority for PERC H830 (low profile) is 1 and a supports a maximum of 1 card. 7. Card priority 7 is assigned to 1 Gb NIC (full height). The slot priority for 1 Gb NIC (full height) is 2 and a supports a maximum of 1 card. 8. Card priority 8 is assigned to 1 Gb NIC (low profile). The slot priority for 1 Gb NIC (low profile) is 1 and a supports a maximum of 1 card. 9. Card priority 9 is assigned to 1 Gb NIC (Broadcom quad port). The slot priority for 1 Gb NIC (Broadcom quad port) is 2 and a supports a maximum of 1 card. 10. Card priority 10 is assigned to 1 Gb NIC (Broadcom low profile). The slot priority for 1 Gb NIC (Broadcom low profile) is 1 and a supports a maximum of 1 card. 11. Card priority 11 is assigned to 1 Gb NIC (Intel dual port). The slot priority for 1 Gb NIC (Intel dual port) is 2 and a supports a maximum of 1 card. 12. Card priority 12 is assigned to 1 Gb NIC (Intel dual port, low profile). The slot priority for 1 Gb NIC (Intel dual port, low profile) is 1 and a supports a maximum of 1 card. 13. Card priority 13 is assigned to 1 Gb NIC (Intel dual port, low profile). The slot priority for 1 Gb NIC (Intel dual port, low profile) is 1 and a supports a maximum of 1 card. 14. Card priority 14 is assigned to 1 Gb NIC (Broadcom dual port, low profile). The slot priority for 1 Gb NIC (Broadcom dual port, low profile) is 1 and a supports a maximum of 1 card. 15. Card priority 15 is assigned to 12 Gb SAS (full height). The slot priority for 12 Gb SAS (full height) is 1 and a supports a maximum of 1 card. 16. Card priority 16 is assigned to 12 Gb SAS (low profile). The slot priority for 12 Gb SAS (low profile) is 1 and a supports a maximum of 1 card.

Card priority	Card type	Slot priority	Maximum allowed
1	PERC H330 (full height)	2	1
2	PERC H330 (low profile)	1	1
3	PERC H830 (full height)	2	1
4	PERC H830 (low profile)	1	1

Parent topic

Removing the expansion card riser

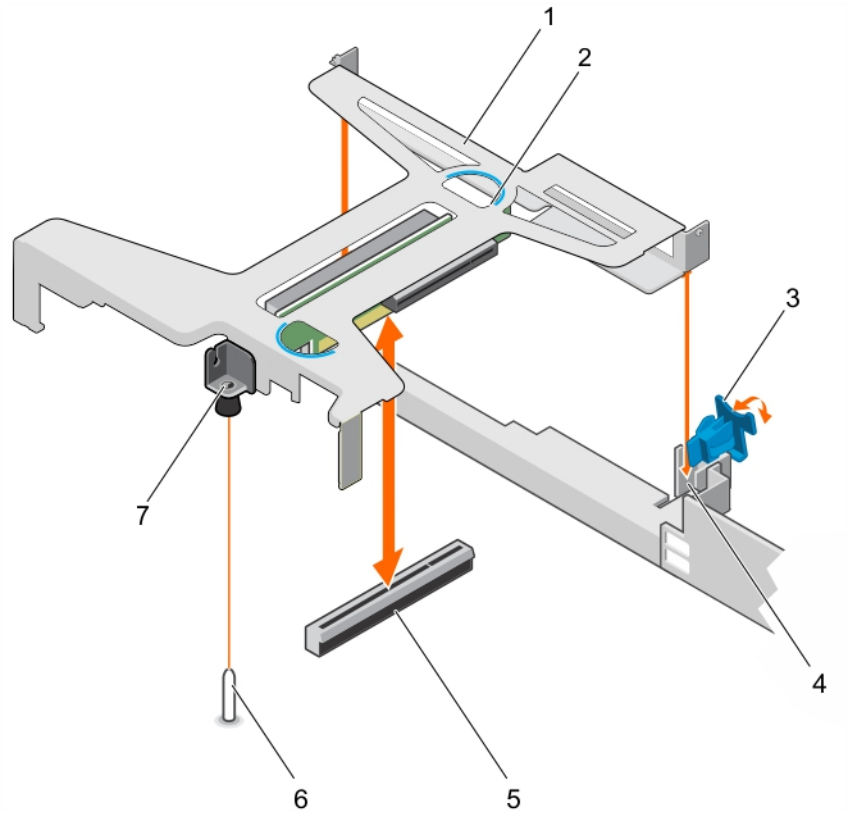
CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell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

1. Follow the safety guidelines listed in Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Disconnect the PERC card LED cable.

NOTE: This step is applicable only to the cabled hard drive systems.

1. Lift and rotate the expansion card riser latch to open it.
2. Holding the touch points, lift the expansion card riser from the riser connector on the system board.

Figure 22. Removing and installing the expansion card riser



a. expansion card riser
b. touch point (2)
c. expansion card latch
d. guide slot on the chassis
e. riser connector on the system board
f. guide pin on the system board
g. guide slot on the expansion card riser

Install the expansion card riser.

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system
Removing an expansion card
Installing an expansion card
Installing the expansion card riser

Installing the expansion card riser

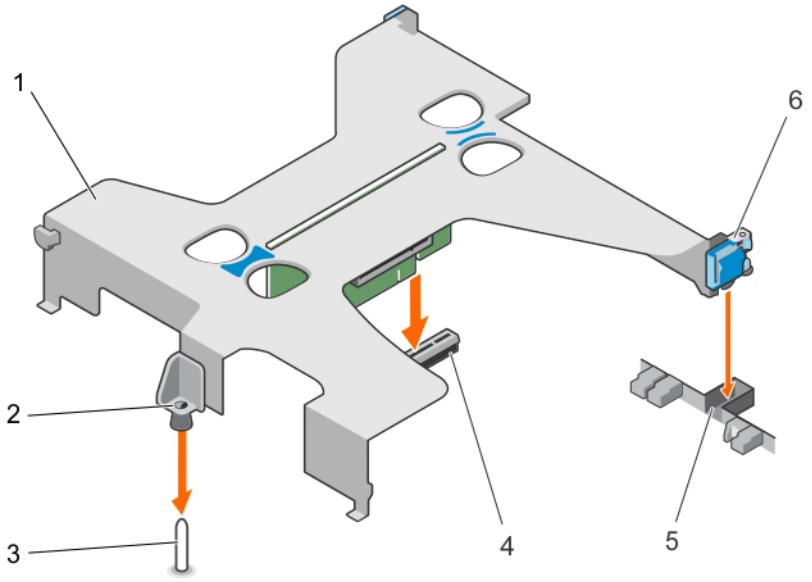
CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell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

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

3. Install the expansion card into the expansion card riser.

1. Open the expansion card riser latch.
2. Align the following:
    a. Guide on the expansion card riser with the guide pin on the system board.
    b. Expansion card riser connector with the connector on the system board.
3. Lower the expansion card riser until the expansion card riser is firmly seated in the connector on the system board.
4. Close the expansion card riser latch.

Figure 23. Installing the expansion card riser



a. expansion card riser
b. guide on the expansion card riser
c. guide pin on the system board
d. riser connector on the system board
e. slot on the chassis
f. expansion card latch

1. If removed, connect the PERC card LED cable.
2. Follow the procedure listed in the After working inside your system section.

Parent topic
Related references
See also: Safety instructions
Related information
After working inside your system
Installing an expansion card

Removing an expansion card

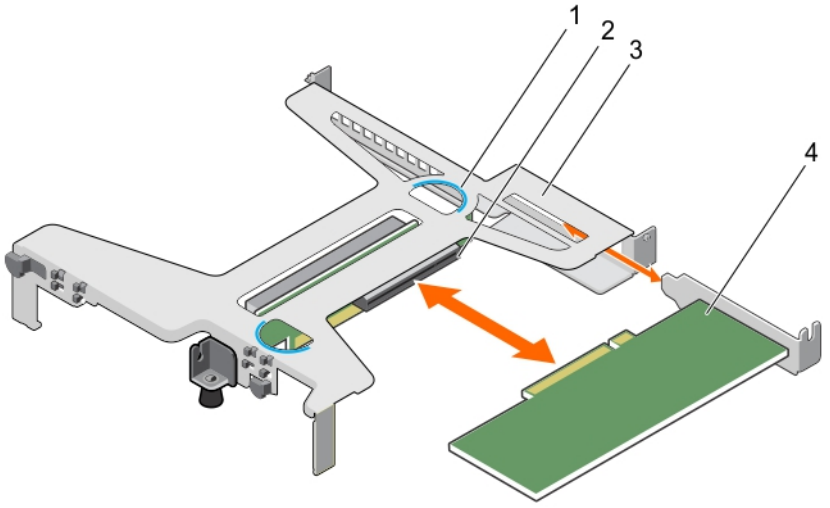
CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell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

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

2. Follow the procedure listed in the Before working inside your system section.
3. Disconnect any cables connected to the expansion card or expansion card riser.
4. If installed, remove the expansion card riser.
1. Hold the expansion card by its edges and remove it from the expansion card riser connector.
2. If you are removing the card permanently, install a filler bracket in the empty expansion card slot and close the expansion card latch.

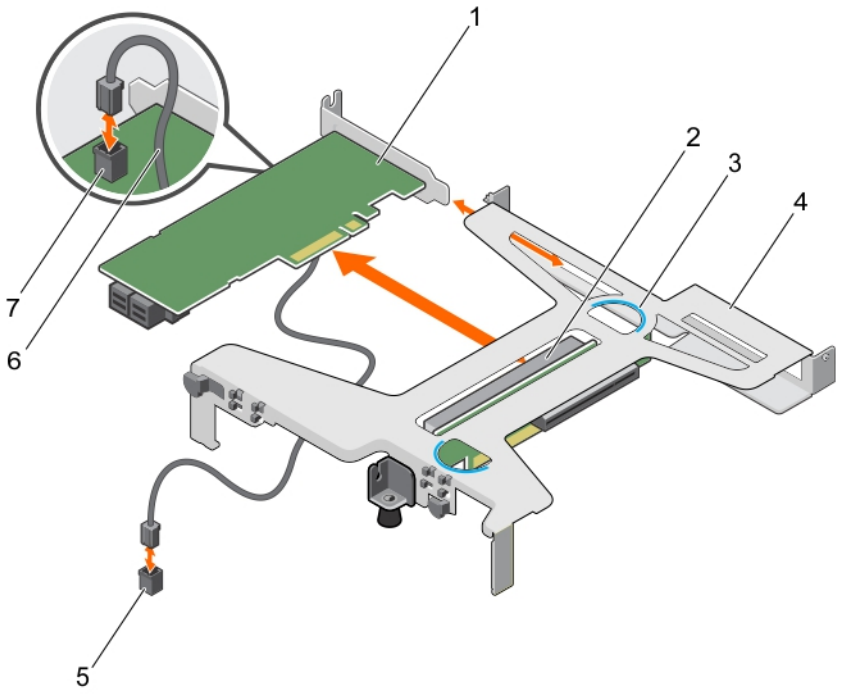
NOTE: You must install a filler bracket over an empty expansion card slot to maintain Federal Communications Commission (FCC) certification of the system. The brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.

Figure 24. Removing and installing the expansion card from the expansion card riser



a. touch point (2)
b. expansion card riser connector
c. expansion card riser
d. expansion card

Figure 25. Removing and installing the expansion card from the expansion card riser



a. PERC card
b. expansion card connector on the riser
c. touch point (2)
d. expansion card riser
e. LED connector on the system board
f. LED cable
g. LED connector on the PERC card

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

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system
After working inside your system

Installing an expansion card

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

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

3. Remove the expansion card riser.
1. Locate the expansion card connector on the riser.
2. Holding the expansion card by its edges, position the card so that the card connector aligns with the connector on the expansion card riser.
3. Align the expansion card bracket with the hooks on the chassis.
4. Insert the card connector into the expansion card riser connector until the card is firmly seated.

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

5. If required, connect the cables to the expansion card.
1. Install the expansion card riser.
2. Follow the procedure listed in the After working inside your system section.

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system
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.

Parent topic

Removing the optional iDRAC port card

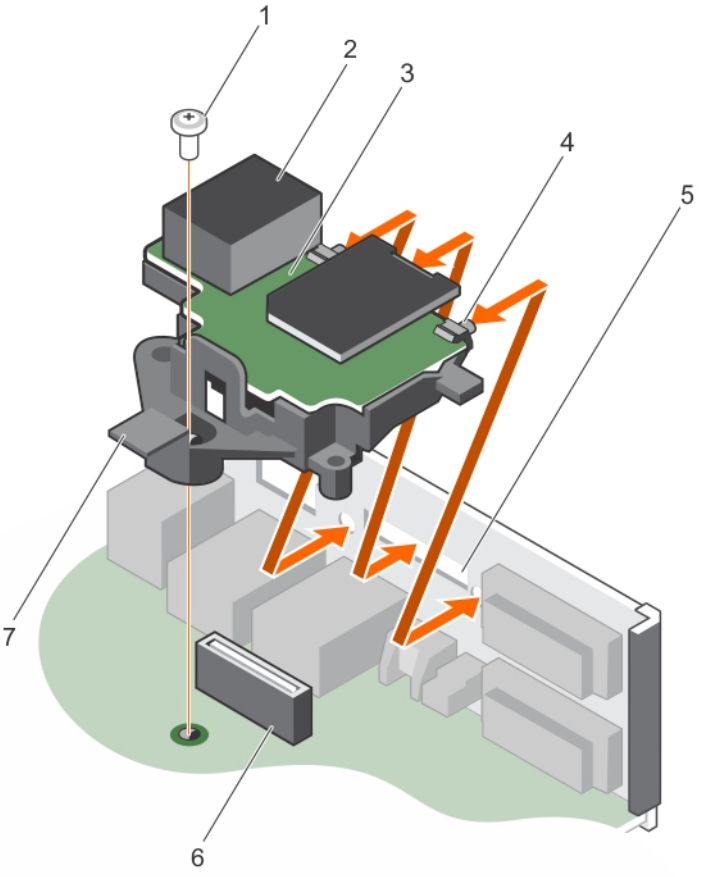
CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell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

1. Follow the safety guidelines listed in Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Keep the Phillips #2 screwdriver ready.
4. If connected, disconnect the network cable from the iDRAC port card.

5. Remove the cooling shroud.

1. Loosen the screw securing 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 26. Removing and installing the iDRAC port card



a. screw
b. iDRAC port
c. iDRAC port card board
d. tabs on the iDRAC port
e. slots on the chassis
f. iDRAC port card connector
g. iDRAC port card holder

1. Install the iDRAC port card.
2. If disconnected, reconnect the network cable.
3. Follow the procedure listed in the After working inside your system section.

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system
After working inside your system

Installing the optional iDRAC port card

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

1. Ensure that you 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.

1. Align and insert the tabs on the iDRAC port card into the slots on the chassis.
2. Insert the iDRAC port card into the connector on the system board.
3. Tighten the screw that secures the iDRAC port card holder to the system board.

1. Install the cooling shroud.
2. If disconnected, reconnect the network cable.
3. Follow the procedure listed in the After working inside your system section.

Parent topic

Processors and heat sinks

Use the following procedure when:

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

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

Parent topic

Removing the heat sink

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

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

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

1. Ensure that you follow the safety guidelines listed in the Safety instructions section.
2. Keep the Phillips #2 screwdriver ready.

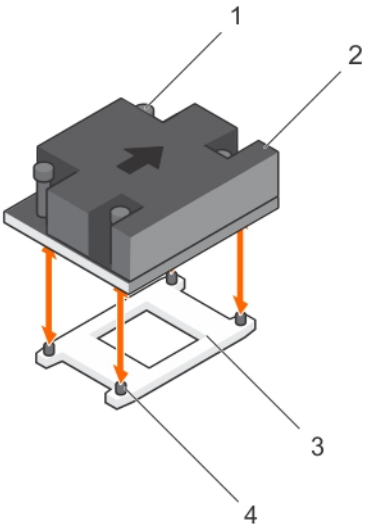
3. Follow the procedure listed in the Before working inside your system section.
4. Remove the cooling shroud.

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

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

   Allow some time (around 30 seconds) for the heat sink to loosen from the processor.
2. Loosen the screw that is diagonally opposite the screw you first removed.
3. Repeat the procedure for the remaining two screws.
4. Lift the heat sink away from the system.

Figure 27. Removing and installing a heat sink



a. captive screw (4)
b. heat sink
c. processor socket
d. slot (4)

1. If you are removing only a faulty heat sink, install the replacement heat sink, if not, remove the processor.
2. Follow the procedure listed in the After working inside your system section.

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system
After working inside your system

Installing a heat sink

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

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

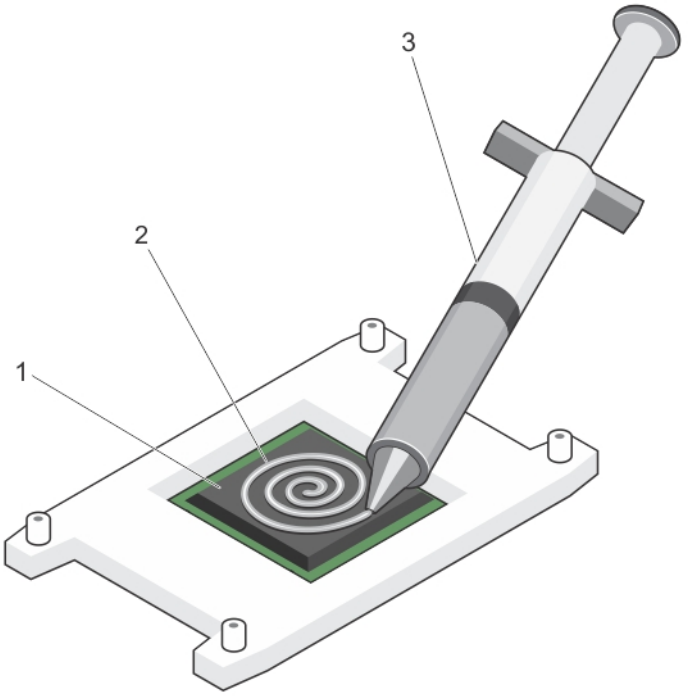
1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Keep the Phillips #2 screwdriver ready.
4. Remove the cooling shroud.
5. Install the processor.

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 28. Applying thermal grease on the top of the processor



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

3. Place the heat sink onto the processor.
4. Tighten one of the four screws to secure the heat sink to the system board.
5. Tighten the screw diagonally opposite to the first screw you have tightened.

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

6. Repeat the procedure for the remaining two screws.

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

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

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system
After working inside your system

Installing a processor

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

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Keep the Phillips #2 screwdriver ready.
4. If you are upgrading your system, download the latest system BIOS version from Dell.com/support and follow the instructions included in the compressed download file to install the update on your system.

   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.

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

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

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

1. Unpack the new processor.

   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.

   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. 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.

   CAUTION: Positioning the processor incorrectly can permanently damage the system board or the processor. Be careful not to bend the pins in the socket.
4. Align the pin-1 indicator of the processor with the triangle on the socket.

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

5. Place the processor on the socket such that the slots on the processor align with the socket keys.
6. Close the processor shield by sliding it under the retention screw.
7. Lower the socket lever and push it under the tab to lock it.

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. Follow the procedure listed in the After working inside your system.
5. While booting, press F2 to enter System Setup and verify that the processor information matches the new system configuration.
6. Run the system diagnostics to verify that the new processor operates correctly.

Parent topic

Removing the processor

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

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

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

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.

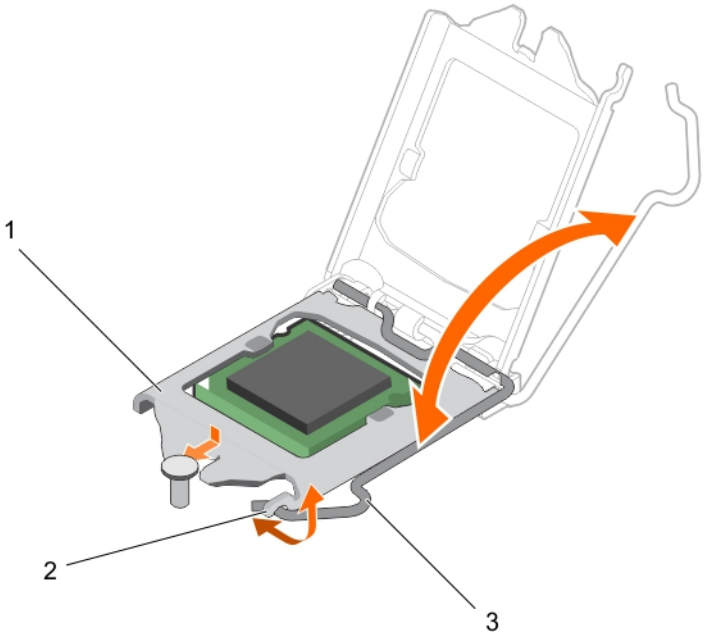
CAUTION: The processor is held in its socket under strong pressure. Be aware that the release lever can spring up suddenly if not firmly held.

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.

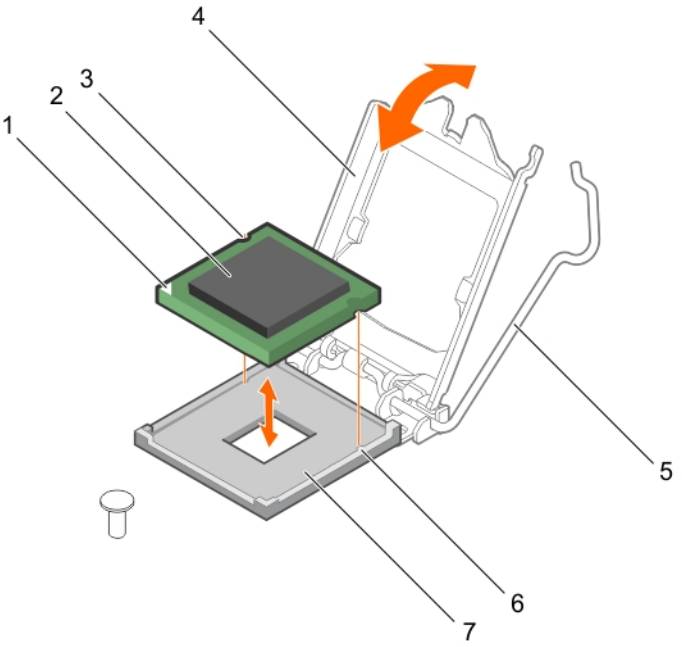
   NOTE: After removing the processor, place it in an antistatic container for reuse, return, or temporary storage. Do not touch the bottom of the processor to avoid damage to the processor contacts. Touch only the side edges of the processor.

Figure 29. Opening and closing the processor shield



a. processor shield
b. tab on the processor shield
c. socket lever

Figure 30. Removing and installing a processor



a. pin-1 indicator of processor

b. processor
c. slot (2)
d. processor shield
e. socket lever
f. socket keys (2)
g. socket

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

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system

Power supply unit

Your system supports a 250 W AC non-redundant power supply unit (PSU).

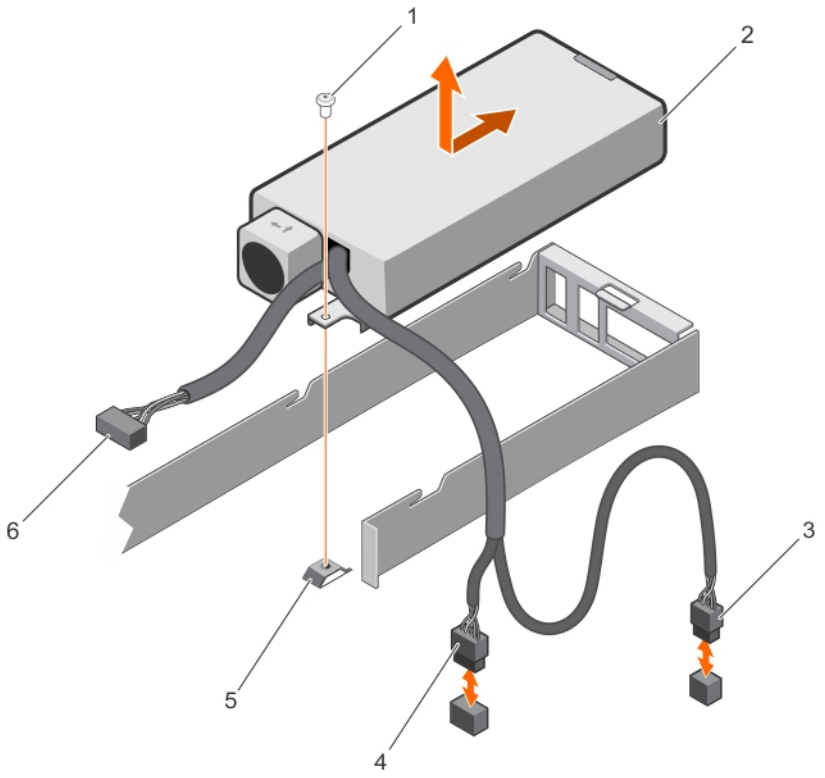
Parent topic

Removing a cabled power supply unit

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

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Disconnect the power cables from the power supply unit (PSU) to the system board and hard drives.
1. Remove the screw securing the PSU to the chassis, slide the PSU toward the front of the chassis and lift it out of the chassis.

Figure 31. Removing and installing a cabled power supply unit



a. screw
b. PSU
c. P2 cable connector
d. P1 cable connector
e. standoff
f. P3 cable connector

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

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system
After working inside your system
Installing a cabled power supply unit

Installing a cabled power supply unit

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

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

2. Follow the procedure listed in the Before working inside your system section.
1. Slide the PSU into the PSU slot.
2. Align the screw hole on the PSU with the standoff on the chassis.
3. Tighten the screw to secure the PSU to the chassis.
4. Connect all the power cables to the system board and hard drives.
1. Follow the procedure listed in the After working inside your system section.

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system
After working inside your system

System battery

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

Parent topic

Replacing the system battery

1. Follow the safety guidelines listed in safety instructions section.
2. Follow the procedure listed in the Before working in your system section.
3. Remove the expansion card riser.
4. Keep the plastic scribe ready.

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

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

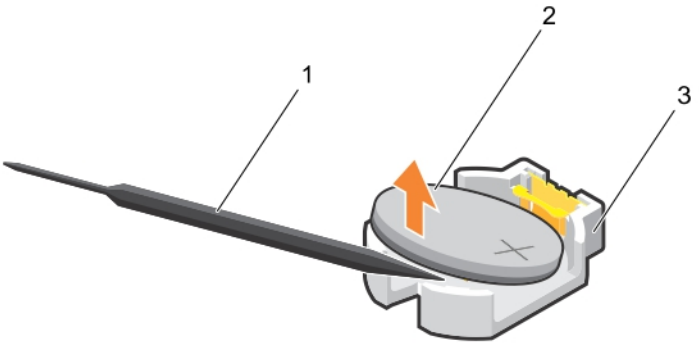
NOTE: This is a Field Replaceable Unit (FRU). Removal and installation procedures must be performed only by Dell certified service technicians.

1. Locate the battery socket. For more information, see the System board connectors section.

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

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

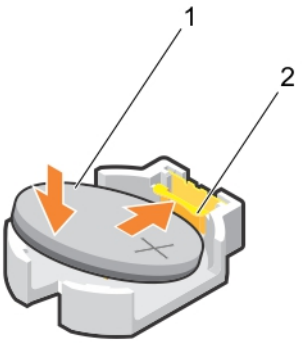
Figure 32. Removing the system battery



a. plastic scribe
b. positive side of the battery connector
c. securing tabs

3. Install a new system battery by holding the battery with the "+" sign facing up and slide it under the securing tabs.
4. Press the battery into the connector until it snaps into place.

Figure 33. Installing the system battery



a. positive side of the battery connector
b. battery connector

1. Install the expansion card riser.
2. Follow the procedure listed in the After working in your system section.
3. While booting, press F2 to enter System Setup and ensure that the battery is operating properly.
4. Enter the correct time and date in the System Setup Time and Date fields.
5. Exit System Setup.

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system
After working inside your system
Installing the expansion card riser

Hard drive backplane

The hard drive backplane supports four 3.5-inch hot swappable hard drives.

Parent topic

Removing the hard drive backplane

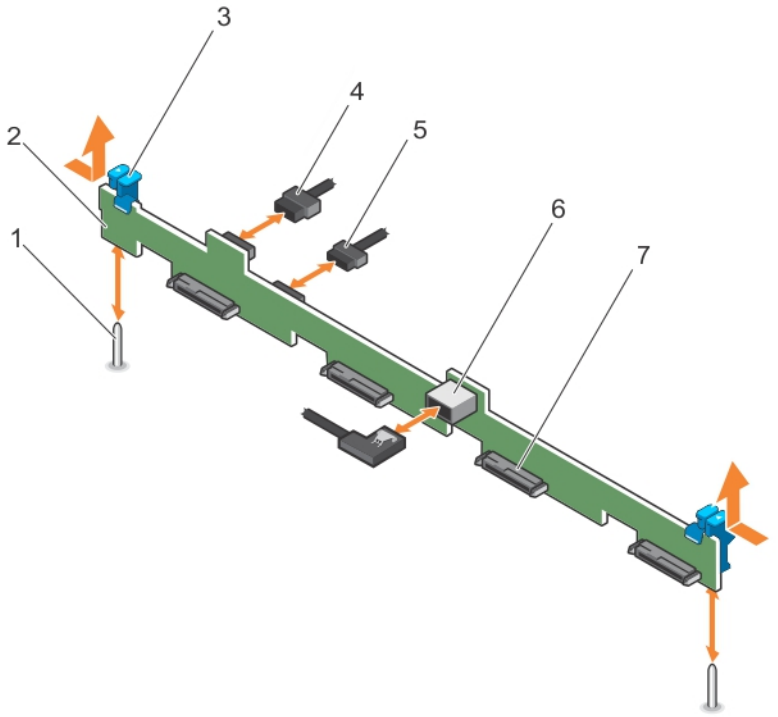
CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell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

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

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

1. Follow the safety guidelines listed in safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove all the hard drives.
4. Disconnect the SAS data, signal, and power cable(s) from the backplane.
1. Press the release tabs and lift the hard drive backplane out of the chassis.

Figure 34. Removing and Installing the four 3.5-inch hot swappable SAS hard drive backplane



a. guide (2)
b. hard drive backplane
c. release tab (2)
d. backplane power cable
e. backplane signal cable
f. SAS_A connector on the backplane
g. hard drive connector (4)

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

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system
After working inside your system
Installing the hard drive backplane

Installing the hard drive backplane

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

CAUTION: To prevent damage to the control panel flex cable, do not to bend the control panel flex cable after it is inserted into the connector.

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

2. Follow the procedure listed in the Before working inside your system section.
1. Align the slots on the backplane release tabs with the guide pins on the chassis.
2. Slide the hard drive backplane into the chassis until the release tabs snap into place.
3. Connect the SAS/SATA data, signal, and power cable(s) to the backplane.
1. Install the hard drives in their original locations.
2. Follow the procedure listed in the After working inside your system section.

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system
After working inside your system

Control panel

The control panel contains the power button, the diagnostic indicators, and the front USB ports.

Parent topic

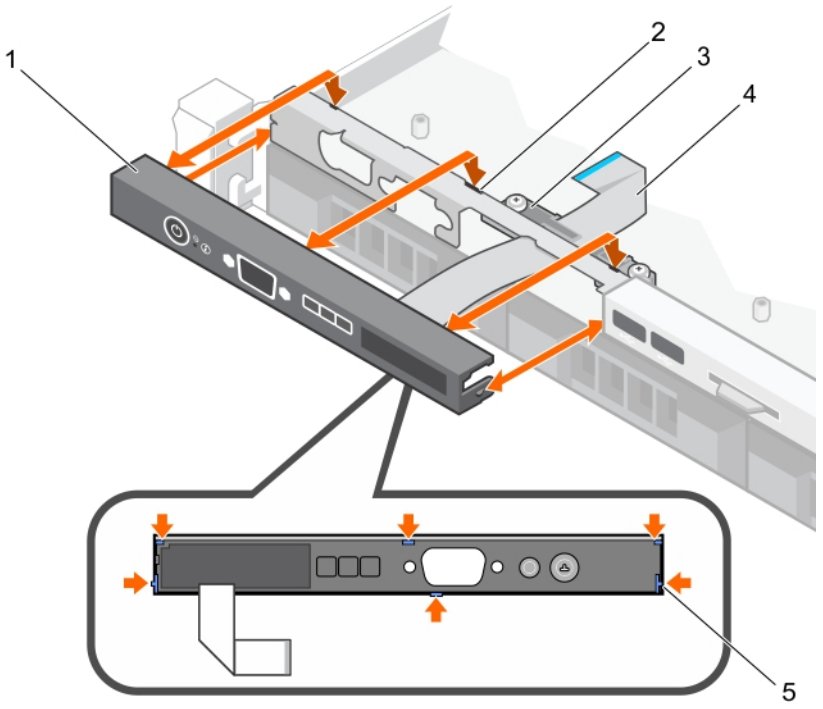
Removing the LCD control panel assembly

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

1. Follow the safety guidelines listed in safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Keep the Phillips #2 screwdriver ready.
1. Disconnect the cables from the control panel board.

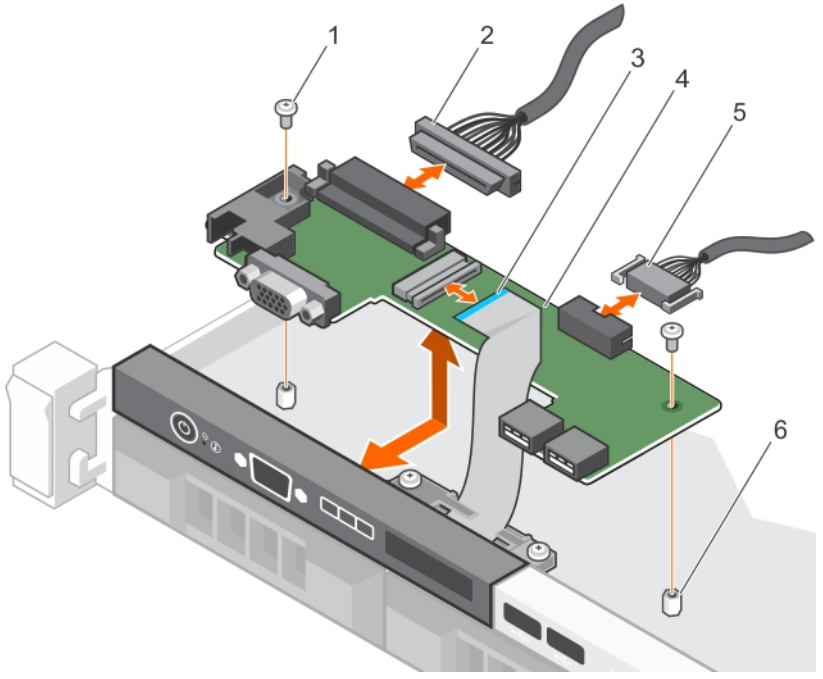
   CAUTION: Do not use excessive force when removing the control panel as it can damage the connectors.
2. Hold the top edge of the LCD control panel at the corners and pull upward until the LCD control panel tabs are released.
3. Pull the control panel away from the chassis.
4. Remove the screws securing the LCD control panel board.
5. Lift the LCD control panel board away from the chassis.

Figure 35. Removing and installing the LCD control panel—four 3.5-inch hot swappable hard drive chassis



a. LCD control panel
b. notches (6)
c. display module cable retention clip
d. display module cable
e. tabs on the LCD control panel (6)

Figure 36. Removing and installing the LCD control panel board—four hard drive chassis



a. screw (2)

b. control panel connector cable
c. display module cable
d. LCD control panel board
e. USB connector cable
f. standoff on the chassis (2)

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

Parent topic
Related references
See also: Safety instructions
Related information
Installing the LCD control panel assembly
Before working inside your system
After working inside your system

Installing the LCD control panel assembly

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

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

1. Align the tabs on the control panel with the notches on the chassis.
2. Route the LCD cable through the cable retention clip.
3. Push the control panel toward the chassis until it snaps into place.

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

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system
After working inside your system

Removing the LED control panel assembly

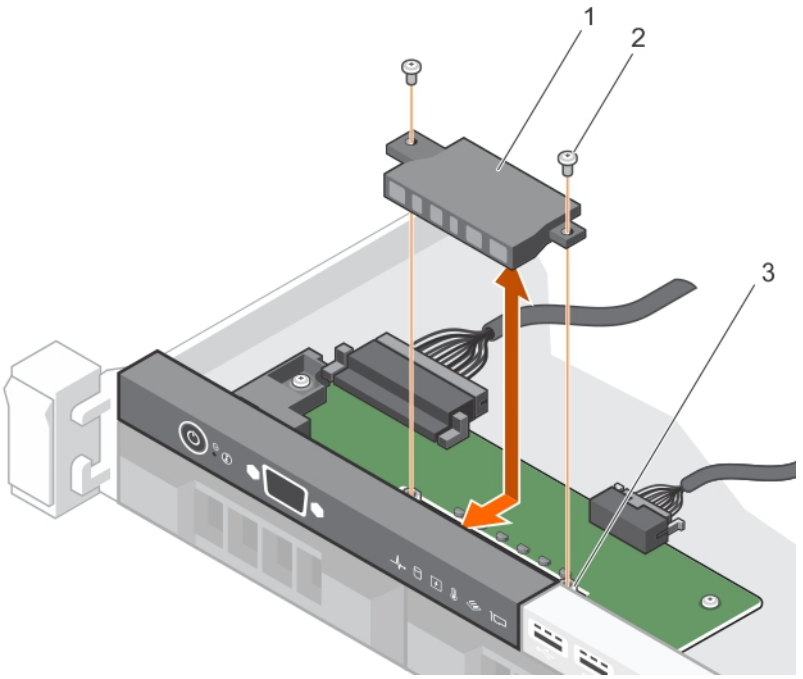
CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell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

1. Follow the safety guidelines listed in Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Disconnect the cables connected to the control panel module.

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

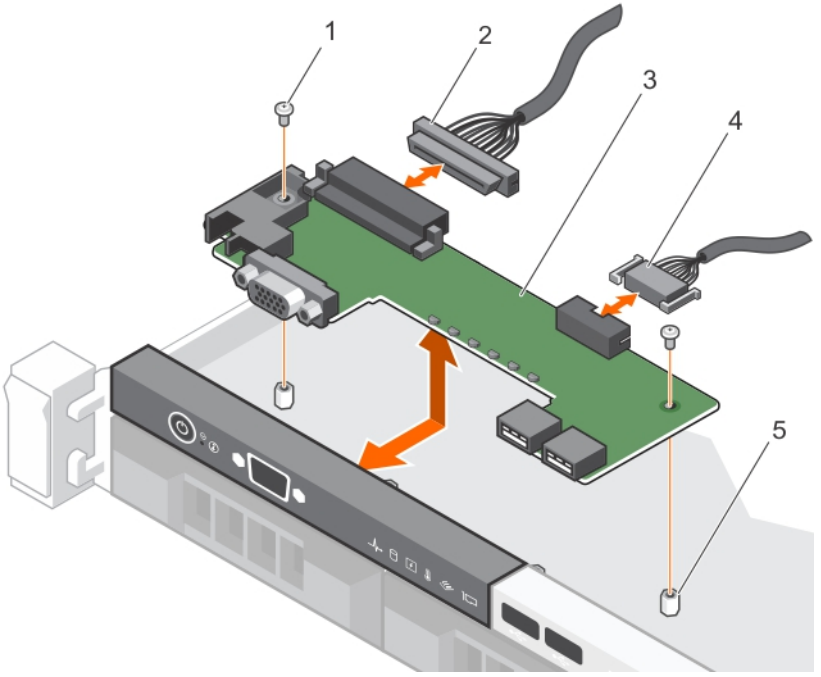
1. Remove the screws that secure the control panel board to the chassis.
2. Lift the control panel board away from the chassis.

Figure 37. Removing and installing the LED module—four cabled hard drive chassis



a. LED module
b. screw (2)
c. slot on the chassis

Figure 38. Removing and installing the LED control panel board—four cabled hard drive chassis



a. screw (2)
b. control panel connector cable
c. control panel board

d. USB connector cable
e. standoff on the chassis (2)

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

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system
After working inside your system
Installing the LED control panel assembly

Installing the LED control panel assembly

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

1. Follow the safety guidelines listed in safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
1. Insert the control panel board into the slot in the chassis and align the two screw holes on the control panel board with the corresponding holes on the chassis.
2. Secure the control panel board with the screws.
3. Connect all the cables to the control panel board.

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

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system
After working inside your system

System board

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

Parent topic

Removing the system board

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

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

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.

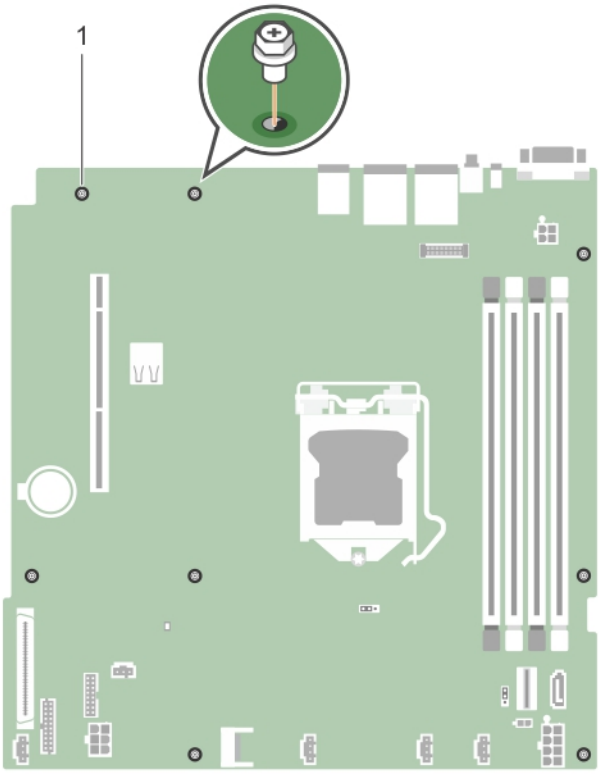
CAUTION: Do not attempt to remove the TPM plug-in module from the system board. After the TPM plug-in module is installed, it is cryptographically bound to that specific system board. Any attempt to remove an installed TPM plug-in module breaks the cryptographic binding, and it cannot be re-installed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

1. Follow the safety guidelines listed in 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 following components:
   a. cooling shroud
   b. memory modules
   c. cooling fan cables
   d. expansion cards
   e. expansion card riser
   f. heat sink and processor
   g. iDRAC port card, if installed
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 on the system board, and slide the system board toward the front of the chassis.
3. Hold the system board by the touch points and lift it out of the chassis.

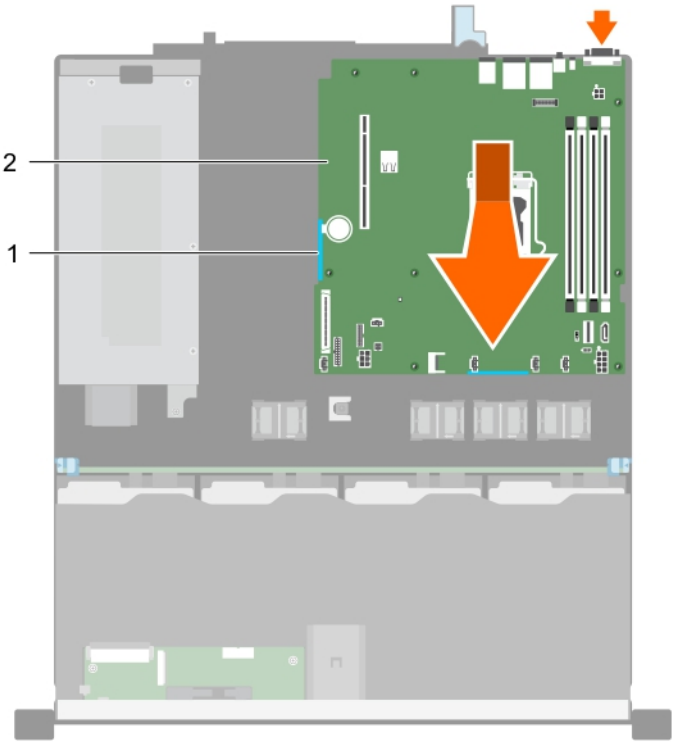
   CAUTION: To prevent damage to the system board, do not lift the system board by holding a memory module, processor, or other components; hold the system board by its edges only.

Figure 39. Removing and installing the screws on the system board



a. screw (8)

Figure 40. Removing and installing the system board



a. touch point (2)

b. system board

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

Parent topic
Related references
See also: Safety instructions
Related information
Before working inside your system
After working inside your system
Trusted Platform Module
Installing the system board

Installing the system board

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

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

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

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

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

1. Hold the system board by its edges, and orient it toward the back of the chassis.
2. Lower the system board into the chassis until the connectors at the back of the system board align with the slots on the back of the chassis.
3. Tighten the screws that secure the system board to the chassis.

1. If required, install the Trusted Platform Module (TPM). See, the Installing the Trusted Platform Module section.
2. Reinstall the following components:
   a. expansion card riser
   b. memory modules
   c. heat sink and processor
   d. cooling shroud
   e. iDRAC port card, if removed
3. Reconnect all cables to the system board.

   NOTE: Ensure that the cables inside the system are routed through the cable routing latch.
4. Follow the procedure listed in the After working inside your system section.
5. Import your new or existing iDRAC Enterprise license. For more information, see the Integrated Dell Remote Access Controller User's Guide, at Dell.com/idracmanuals.

   NOTE: If you are using Easy Restore, you do not have to import an existing iDRAC Enterprise license.
6. Ensure that you perform the following steps:
   a. Use the Easy Restore feature to restore the service tag. See the Restoring the Service Tag by using the Easy Restore feature section.

b. If the service tag is not backed up in the backup flash device, enter the system service tag manually. See the Entering the system service tag by using System Setup section.
c. Update the BIOS and iDRAC versions.
d. Re-enable the Trusted Platform Module (TPM). See the Re-enabling the TPM for BitLocker users section.

Parent topic
Related references
See also: Safety instructions
See also: Entering the system Service Tag by using System Setup
Related information
Before working inside your system
Installing the Trusted Platform Module
After working inside your system
Restoring the Service Tag by using the Easy Restore feature
Initializing the TPM for BitLocker users

Restoring the Service Tag by using the Easy Restore feature

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

1. Turn on the system.

   If BIOS detects a new system board, and if the Service Tag is present in the backup flash device, BIOS displays the Service Tag, the status of the license, and the UEFI Diagnostics version.
2. Perform one of the following steps:

   After the restore process is complete, BIOS prompts to restore the system configuration data.
3. Perform one of the following steps:
   - Press Y to restore the system configuration data.
   - Press N to use the default configuration settings.

   After the restore process is complete, the system restarts.

Parent topic

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.

Parent topic

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.

Parent topic

Installing the Trusted Platform Module

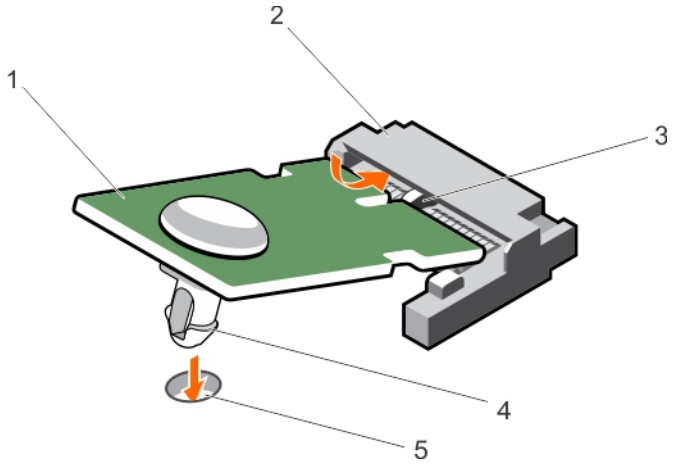
CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell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

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

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
1. Locate the Trusted Platform Module (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 bolt aligns with the slot on the system board.
4. Press the plastic bolt until the bolt snaps into place.

Figure 41. Installing the TPM



a. TPM
b. TPM connector
c. slot on the TPM connector
d. plastic bolt
e. slot on the system board

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

Parent topic
Related references
See also: Safety instructions
See also: System board jumpers and connectors
Related information
Before working inside your system
After working inside your system
Installing the system board

Initializing the TPM for BitLocker users

1. Initialize the TPM.

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

   The TPM Status changes to Enabled, Activated.

Parent topic

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.

Parent topic

Using system diagnostics

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

Dell Embedded System Diagnostics

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

Parent topic

When to use the Embedded System Diagnostics

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

Parent topic

Running the Embedded System Diagnostics from Boot Manager

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

1. When the system is booting, press F11.
2. Use the up arrow and down arrow keys to select System Utilities > Launch Diagnostics.

   The ePSA Pre-boot System Assessment window is displayed, listing all devices detected in the system. The diagnostics starts executing the tests on all the detected devices.

Parent topic

Running the Embedded System Diagnostics from the Dell Lifecycle Controller

1. As the system boots, press F11.
2. Select Hardware Diagnostics → Run Hardware Diagnostics.

   The ePSA Pre-boot System Assessment window is displayed, listing all devices detected in the system. The diagnostics starts executing the tests on all the detected devices.

Parent topic

System diagnostic controls

Menu

Description

Configuration

Displays the configuration and status information of all detected devices.

Results

Displays the results of all tests that are run.

System health

Provides the current overview of the system performance.

Event log

Displays a time-stamped log of the results of all tests run on the system. This is displayed if at least one event description is recorded.

For information about embedded system diagnostics, see the ePSA Diagnostics Guide (Notebooks, Desktops and Servers) available at Dell.com/support/home.

Parent topic

Jumpers and connectors

This topic provides specific information about the system 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 system and setup passwords. You must know the connectors on the system board to install components and cables correctly.

System board jumpers and connectors

Figure 42. System board jumpers and connectors

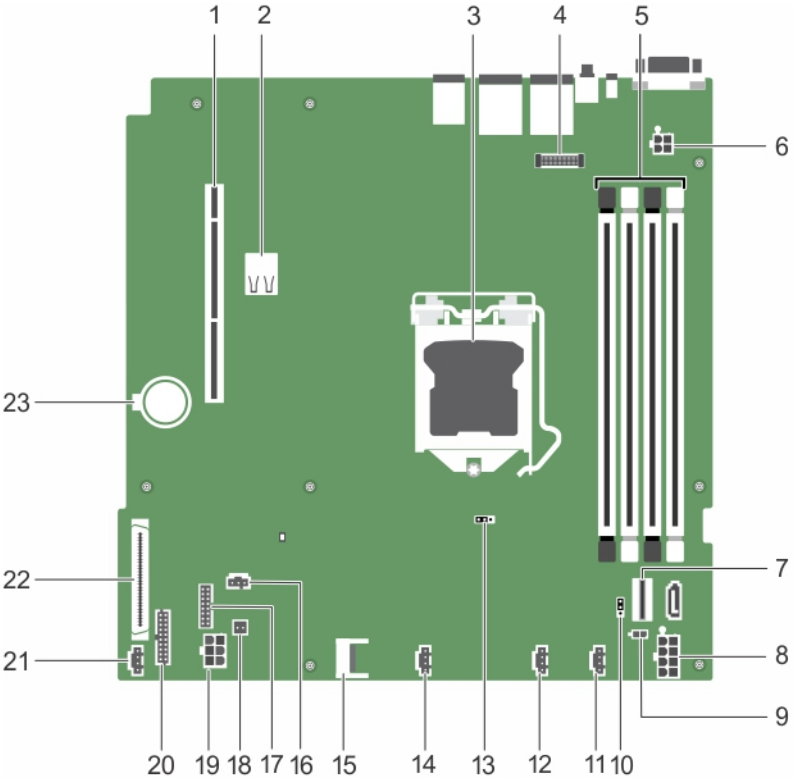


Table 25. System board jumpers and connectors

Item 1 is the PCIe card connector 2. Item 2 is the internal USB connector 3.0. Item 3 is the processor socket. Item 4 is the iDRAC port card connector. Item 5 is the memory module socket. Item 6 is the 4–pin power connector 2. Item 7 is the chipset SAS connector. Item 8 is the optical drive SATA connector. Item 9 is the 8-pin power connector. Item 10 is the power supply unit connector. Item 11 is the password jumpers. Item 12 is cooling fan 4 connector. Item 13 is cooling fan 3 connector. Item 14 is the NVRAM password jumper. Item 15 is cooling fan 2 connector. Item 16 is the Trusted platform module connector. Item 17 is the intrusion switch connector. Item 18 is the backplane signal connector. Item 19 is the PERC LED connector. Item 20 is the hard drive/optical disk

drive power connector. Item 21 is the front panel USB connector. Item 22 is cooling fan 1 connector. Item 23 is the control panel interface connector. Item 24 is the battery connector.

Item	Connector	Description
1	PCIE_G3_X8	PCIe card connector 2
2	INT_USB_3.0	Internal USB connector 3.0
3	CPU1	Processor socket
4	J_AMEA1	iDRAC port card connector
5	A3, A1, A4, A2	Memory module socket
6	PWR_CONN2	4–pin power connector 2
7	J_MINISAS1	Chipset SAS connector
8	SYS_PWR	8-pin power connector
9	PWR_EVENT	Power supply unit connector
10	PWD_EN	Password jumpers
11	FAN4	Cooling fan connector
12	FAN3	Cooling fan connector
13	NVRAM CLR	NVRAM password jumper
14	FAN2	Cooling fan connector
15	J_TPM1	Trusted platform module connector
16	R_INTRUSION	Intrusion switch connector
17	BP_SIG	Backplane signal connector
18	SAS_LED	PERC LED connector
19	HDD_PWR	Hard drive power connector
20	FP_USB	Front panel USB connector
21	FAN1	Cooling fan connector
22	CTRL_PNL	Control panel interface connector
23	BATTERY	Battery connector

Parent topic

System board jumper settings

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.

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

Table 26. System Board Jumper settings

To enable the password, fit the jumper on pins 1 and 2. To disable the password, fit the jumper on pins 2 and 3. To select the configuration settings at the next system boot, fit the jumper on pins 2 and 3. To clear the configuration settings at system boot, fit the jumper on pins 1 and 2.

Jumper	Setting	Description
PWRD_EN	 1 2 3 (default)	The password feature is enabled (pins 1–2).
	 1 2 3	The password feature is disabled (pins 2–3).
NVRAM_CLR	 1 2 3 (default)	The configuration settings are retained at system boot (pins 2–3).
	 1 2 3	The configuration settings are cleared at the next system boot. (pins 1–2).

Parent topic
Related information
Disabling a forgotten password

Disabling a forgotten password

The system's software security features include a system password and a setup password. The password jumper enables these password features or disables them and clears any password(s) currently in use.

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

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

The existing passwords are not disabled (erased) until the system boots with the jumper on pins 1 and 2. However, before you assign a new system and/or setup password, you must move the jumper back to pins 2 and 3.

NOTE: If you assign a new system and/or setup password with the jumper on pins 1 and 2, 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 1 and 2 to pins 2 and 3.
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 or setup password.

Parent topic

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.

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.

Parent topic

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.

Parent topic

Troubleshooting the video subsystem

NOTE: Ensure the Local Server Video Enabled option is selected in the iDRAC Graphical User Interface (GUI), under Virtual Console. If this option is not selected, local video is disabled.

1. Check the cable connections (power and display) to the monitor.
2. Check the video interface cabling from the system to the monitor.
3. Run the appropriate diagnostic test.

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

If the tests fail, see the Getting help section.

Parent topic
Related references
See also: Getting help

Troubleshooting a USB device

NOTE: Follow steps 1 to 5 to troubleshoot a USB keyboard or mouse. For other USB devices, go to step 6.

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.
4. In iDRAC Settings Utility, ensure that USB Management Port Mode is configured as Automatic or Standard OS Use.
5. If the problem is not resolved, replace the keyboard and/or mouse with a known working keyboard or mouse.

   If the problem is not resolved, proceed to step 6 to troubleshoot other USB devices attached to the system.
6. Turn off all attached USB devices, and disconnect them from the system.
7. Restart the system.
8. If your keyboard is functioning, enter System Setup, verify that all USB ports are enabled on the Integrated Devices screen. If your keyboard is not functioning, use remote access to enable or disable the USB options.
9. 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
10. In the IDRAC Settings Utility, ensure that USB Management Port Mode is configured as Automatic or Standard OS Use.
11. Reconnect and turn on each USB device one at a time.
12. If a USB device causes the same problem, turn off the device, replace the USB cable with a known good cable, and turn on the device.

If all troubleshooting fails, see the Getting help section.

Parent topic
Related references
See also: Getting help

Troubleshooting a serial I/O device

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

   If the problem is resolved, replace the interface cable with a known working cable.
3. Turn off the system and the serial device, and swap the serial device with a compatible device.
4. Turn on the system and the serial device.

If the problem persists, see the Getting help section.

Parent topic
Related references
See also: Getting help

Troubleshooting a NIC

1. Run the appropriate diagnostic test. For more information, see the Using system diagnostics section for the available diagnostic tests.
2. Restart the system and check for any system messages pertaining to the NIC controller.
3. Check the appropriate indicator on the NIC connector:
    - If the link indicator does not glow, the cable connected might be disengaged.
    - If the activity indicator does not glow, the network driver files might be damaged or missing.

      Install or replace the drivers as necessary. For more information, see the NIC documentation.
    - If the problem persists, use another connector on the switch or hub.
4. Ensure that the appropriate drivers are installed and the protocols are bound. For more information, see the NIC documentation.
5. Enter System Setup and confirm that the NIC ports are enabled on the Integrated Devices screen.
6. Ensure that all the NICs, hubs, and switches on the network are set to the same data transmission speed and duplex. For more information, see the documentation for each network device.
7. Ensure that all network cables are of the proper type and do not exceed the maximum length.

If the problem persists, see the Getting help section.

Parent topic
Related references
See also: Getting help
See also: Using system diagnostics

Troubleshooting a wet system

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

1. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system cover.
3. Remove the following components (if installed) from the system:
    - Power supply unit(s)
    - Hard drives
    - Hard drive backplane
    - USB memory key
    - Hard drive tray
    - Cooling shroud
    - Expansion card risers (if installed)
    - Expansion cards
    - Cooling fan assembly (if installed)
    - Cooling fans
    - Memory modules
    - Processor(s) and heat sink(s)
    - System board
4. Let the system dry thoroughly for at least 24 hours.
5. Reinstall the components you removed in step 3 except the expansion cards.
6. Install the system cover.
7. Turn on the system and attached peripherals.

   If the problem persists, see the Getting help section.
8. If the system starts properly, turn off the system, and reinstall all the expansion cards that you removed.
9. Run the appropriate diagnostic test. For more information, see the Using system diagnostics section.

If the tests fail, see the Getting help section.

Parent topic
Related references
See also: Getting help
See also: Using system diagnostics

Troubleshooting a damaged system

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

If the problem persists, see the Getting help section.

Parent topic
Related references
See also: Getting help
See also: Using system diagnostics

Troubleshooting the system battery

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

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

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

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

If the problem persists, see the Getting help section.

Parent topic
Related references
See also: Getting help

Troubleshooting power supply units

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Parent topic

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.

Parent topic

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.

Parent topic
Related references
See also: Getting help

Troubleshooting cooling problems

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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.

Parent topic

Troubleshooting cooling fans

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NOTE: The fan number is referenced by the systems management software. In the event of a problem with a particular fan, you can easily identify and replace it by noting down the fan numbers on the cooling fan assembly.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
1. Remove the system cover.
2. Reseat the fan or the fan's power cable.
3. Install the system cover.
4. Restart the system.

If the problem persists, see the Getting help section.

Parent topic
Related references
See also: Before working inside your system
See also: Safety instructions
See also: Getting help

Troubleshooting system memory

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

1. If the system is operational, run the appropriate system diagnostic test. See the Using system diagnostics section for the available diagnostic tests.

   If the diagnostic tests indicate a fault, follow the corrective actions provided by the diagnostic tests.
2. If the system is not operational, turn off the system and attached peripherals, and unplug the system from the power source. Wait at least for 10 seconds, and then reconnect the system to the power source.
3. Turn on the system and attached peripherals, and note the messages on the screen.

   If an error message is displayed indicating a fault with a specific memory module, go to step 12.
4. Enter System Setup, and check the system memory setting. Make any changes to the memory settings, if needed.

   If the memory settings match the installed memory but the problem still persists, go to step 12.
5. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
6. Remove the system cover.
7. Check the memory channels and ensure that they are populated correctly.

NOTE: See the system event log or system messages for the location of the failed memory module. Reinstall the memory device.

8. Reseat the memory modules in their sockets.
9. Install the system cover.
10. Enter System Setup and check the system memory setting.

    If the problem is not resolved, proceed with step 11.

11. Remove the system cover.
12. If a diagnostic test or error message indicates a specific memory module as faulty, swap or replace the module with a known working memory module.
13. To troubleshoot an unspecified faulty memory module, replace the memory module in the first DIMM socket with a module of the same type and capacity.

    If an error message is displayed on the screen, this may indicate a problem with the installed DIMM type(s), incorrect DIMM installation, or defective DIMM(s). Follow the on-screen instructions to resolve the problem.

14. Install the system cover.
15. As the system boots, observe any error message that is displayed and the diagnostic indicators on the front of the system.
16. If the memory problem persists, repeat step 12 through step 15 for each memory module installed.

If the problem persists, see the Getting help section.

Parent topic
Related references
See also: Using system diagnostics
See also: Getting help

Troubleshooting a hard drive

CAUTION: This troubleshooting procedure can erase data stored on the hard drive. Before you proceed, back up all files on the hard drive.

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1. Run the appropriate diagnostic test. See the Using system diagnostics section.

   Depending on the results of the diagnostics test, proceed as needed through the following steps.

2. If your system has a RAID controller and your hard drives are configured in a RAID array, perform the following steps:
   a. Restart the system and press F10 during system startup to run the Dell Lifecycle Controller, and then run the Hardware Configuration wizard to check the RAID configuration.

   See the Dell Lifecycle Controller documentation or online help for information about RAID configuration.

   b. Ensure that the hard drives are configured correctly for the RAID array.
   c. Take the hard drive offline and reseat the drive.
   d. Exit the configuration utility and allow the system to boot to the operating system.
3. Ensure that the needed device drivers for your controller card are installed and are configured correctly. See the operating system documentation for more information.
4. Restart the system and enter the System Setup.
5. Verify that the controller is enabled and the drives are displayed in the System Setup.

If the problem persists, see the Getting help section.

Parent topic
Related references
See also: Using system diagnostics
See also: Getting help

Troubleshooting a storage controller

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NOTE: When troubleshooting a SAS or PERC controller, see the documentation for your operating system and the controller.

1. Run the appropriate diagnostic test. See the Using system diagnostics section.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Verify that the installed expansion cards are compliant with the expansion card installation guidelines.
5. Ensure that each expansion card is firmly seated in its connector.
6. Install the system cover.
7. Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.
8. If the problem is not resolved, turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
9. Remove the system cover.
10. Remove all expansion cards installed in the system.
11. Install the system cover.
12. Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.
13. Run the appropriate diagnostic test. See the Using system diagnostics section. If the tests fail, see the Getting help section.
14. For each expansion card you removed in step 10, perform the following steps:
    a. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
    b. Remove the system cover.
    c. Reinstall one of the expansion cards.
    d. Install the system cover.
    e. Run the appropriate diagnostic test. See the Using system diagnostics section.

If the problem persists, see the Getting help section.

Parent topic
Related references
See also: Using system diagnostics
See also: Getting help

Troubleshooting expansion cards

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NOTE: When troubleshooting an expansion card, you also have to see the documentation for your operating system and the expansion card.

1. Run the appropriate diagnostic test. See the Using system diagnostics section.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Ensure that each expansion card is firmly seated in its connector.
5. Install the system cover.
6. Turn on the system and attached peripherals.
7. If the problem is not resolved, turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
8. Remove the system cover.
9. Remove all expansion cards installed in the system.
10. Install the system cover.
11. Run the appropriate diagnostic test. See the Using system diagnostics section.

    If the tests fail, see the Getting help section.
12. For each expansion card you removed in step 8, perform the following steps:
    a. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
    b. Remove the system cover.
    c. Reinstall one of the expansion cards.
    d. Install the system cover.
    e. Run the appropriate diagnostic test. See the Using system diagnostics section.

If the problem persists, see the Getting help section.

Parent topic
Related references
See also: Using system diagnostics
See also: Getting help

Troubleshooting processors

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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.

Parent topic
Related references
See also: Using system diagnostics
See also: Getting help

System messages

For a list of event and error messages generated by the system firmware and agents that monitor system components, see the Dell Event and Error Messages Reference Guide at Dell.com/openmanagemanuals > OpenManage software.

Parent topic

Warning messages

A warning message alerts you to a possible problem and prompts you to respond before the system continues a task. For example, before you format a hard drive, a message warns you that you may lose all data on the hard drive. Warning messages usually interrupt the task and need you to respond by typing y (yes) or n (no).

NOTE: Warning messages are generated by either the application or the operating system. For more information, see the documentation that accompanied the operating system or application.

Parent topic

Diagnostic messages

The system diagnostic utility will generate messages if there are errors detected when you run diagnostic tests on your system. For more information about system diagnostics, see the Using system diagnostics section.

Parent topic
Related references
See also: Using system diagnostics

Alert messages

The systems management software generates alert messages for your system. Alert messages include information, status, warning, and failure messages for drive, temperature, fan, and power conditions. For more information, see the systems management software documentation links listed in the Documentation resources section of this manual.

Parent topic

Getting help

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 Technical Support.
    b. The Contact Technical Support page is displayed with details to call, chat, or e-mail the Dell Global Technical Support team.

Parent topic

Locating Service Tag of your system

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

Parent topic

Documentation feedback

Click the Feedback link in any of the Dell documentation pages, fill out the form, and click Submit to send your feedback.

Parent topic