

Dell DL1300 Appliance Owner's Manual

Regulatory Model: E33S Series
Regulatory Type: E33S001



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.

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2016 - 05

Rev. A01

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Dell DL1300 overview

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

Supported configurations

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

Table 1. Specifications for DL1300 2 TB Appliance

| 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

| 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

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

Front panel features

Four x 3.5-inch hard drive chassis

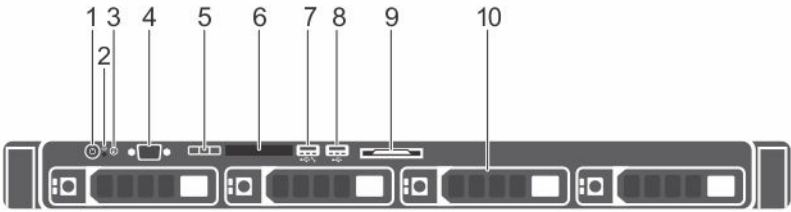





Figure 1. Front panel features and indicators — four 3.5-inch hot swappable hard drive chassis

- 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 | Indicator, button, or connector | Icon | Description |
|------|----------------------------------|------|--|
| 1 | Power-on indicator, power button | | <p>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.</p> <p> 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.</p> |
| 2 | NMI button | | <p>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.</p> <p>Use this button only if directed to do so by qualified support personnel or by the operating system's documentation.</p> |
| 3 | System identification button | | <p>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</p> |

| Item | Indicator, button, or connector | Icon | Description |
|------|---|---|--|
| | | | <p>pressed, the LCD panel on the front and the system status indicator on the back flash until one of the buttons is pressed again.</p> <p>Press the button to turn the system ID on and off.</p> <p>If the system stops responding during POST, press and hold the system ID button for more than five seconds to enter BIOS progress mode.</p> <p>To reset iDRAC (if not disabled in F2 iDRAC setup) press and hold the button for more than 15 seconds.</p> |
| 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 3.5-inch hot swappable adapters. |

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.

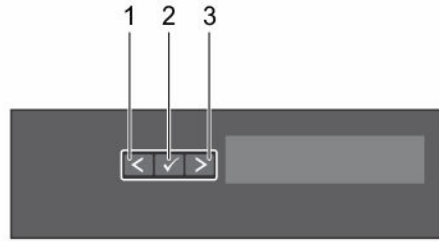






Figure 2. LCD panel features

Table 5. LCD panel features


| 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: <ul style="list-style-type: none"> Press and hold the button to increase scrolling speed. Release the button to stop. <p> NOTE: The display stops scrolling when the button is released. After 45 seconds of inactivity the display starts scrolling.</p> |

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.

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

Setup menu

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


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

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

Related Links

[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. |

Back panel features

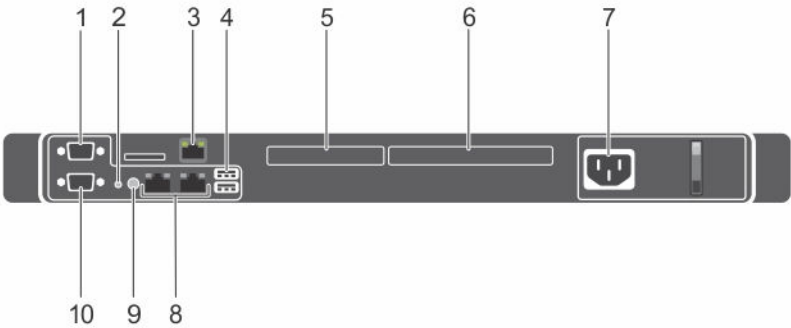







Figure 3. Back panel features (two PCIe expansion cards)

- | | |
|--|---|
| 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 | Indicator, button, or connector | Icon | Description |
|------|---|---|---|
| 1 | Serial connector |  | Enables you to connect a serial device to the system. |
| 2 | System identification button |  | <p>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.</p> <p>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.</p> <p>To reset the iDRAC (if not disabled in F2 iDRAC setup) press and hold the button for more than 15 seconds.</p> |
| 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. |

| Item | Indicator, button, or connector | Icon | Description |
|------|--|---|---|
| 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. |

Hot swappable hard drive indicator codes

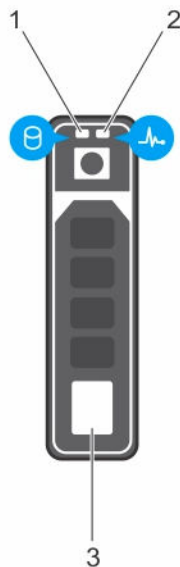



Figure 4. Hot swappable hard drive indicators

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

| 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. |

| Drive-status indicator pattern (RAID only) | Condition |
|---|--|
| |  NOTE: The drive status indicator remains OFF until all hard drives are initialized after the system is turned on. Drives are not ready for insertion or removal during this time. |
| Flashes green, amber, and turns off | Predicted drive failure |
| Flashes amber four times per second | Drive failed |
| Flashes green slowly | Drive rebuilding |
| Turns green | Drive online |
| Flashes green three seconds, amber three seconds, and turns off six seconds | Rebuild stopped |

NIC indicator codes

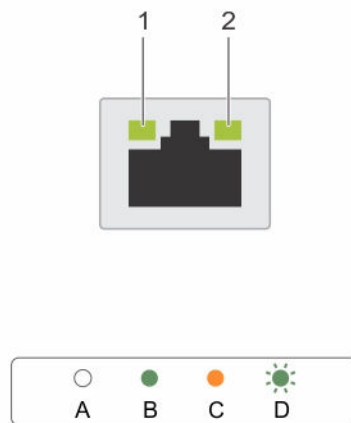


Figure 5. NIC indicators

1. link indicator
2. activity indicator

Table 8. NIC indicators

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

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.

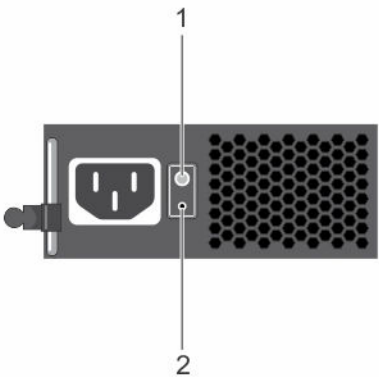


Figure 6. Cabled AC PSU status indicator and self-diagnostic button

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

Table 9. Non-redundant AC PSU status indicator

| 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. |

Documentation matrix

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

Table 10. Documentation resources for system

| Task | Document | Location |
|-------------------------|--|--|
| Setting up your system | For information about installing the system into a rack, see the Rack documentation included with your rack solution. | Dell.com/poweredge manuals |
| | For information about turning on the system and the technical specifications of your system, see the <i>Getting Started With Your System</i> that shipped with your system. | Dell.com/support/home |
| Configuring your system | For information about deploying your system, see the <i>Dell DL1300 Deployment Guide</i> . | Dell.com/support/home |
| | For information about iDRAC features, configuring and logging in to iDRAC, and managing your system remotely, see the <i>Integrated Dell Remote Access Controller User's Guide</i> . | Dell.com/idrac manuals |
| | 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/idrac manuals |
| | 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 <i>Dell DL1300 Appliance User's Guide</i> . | Dell.com/support/home |
| | For information about supported hardware and software versions for your system, see the <i>Dell DL1300 Appliance Interoperability Guide</i> . | Dell.com/support/home |

| Task | Document | Location |
|--|--|--|
| | For information about the features of the Dell OpenManage Systems Management, see the <i>Dell OpenManage Systems Management Overview Guide</i> . | Dell.com/openmanagemanuals |
| | For information about setting up, using, and troubleshooting OpenManage, see the <i>Dell OpenManage Server Administrator User's Guide</i> . | Dell.com/openmanagemanuals |
| | For information about installing, using, and troubleshooting Dell OpenManage Essentials, see the <i>Dell OpenManage Essentials User's Guide</i> . | Dell.com/openmanagemanuals |
| | For understanding the features of Dell Lifecycle Controller (LCC), see the <i>Dell Lifecycle Controller User's Guide</i> . | 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 <i>Dell Event and Error Messages Reference Guide</i> . | 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) |

Processor specifications

| Processor | Specification |
|-----------|------------------------------------|
| Type | One Intel Xeon E3 series processor |

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 |

PCI Express
Generation 3
expansion slots
using
expansion card
riser

Specification


| | |
|------------|--|
| | (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 |

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.

Related Links

[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

Storage controller specifications

| Storage controller | Specification |
|--------------------|---------------|
|--------------------|---------------|

| | |
|-------------------------|-----------|
| Storage controller type | PERC H330 |
|-------------------------|-----------|

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

Drive specifications

| Drives | Specification |
|--------|---------------|
|--------|---------------|

| | |
|-------------------------|--|
| Four hard drive systems | Four 3.5-inch hot swappable Nearline SAS hard drives |
|-------------------------|--|

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 |
|-----|------------------------------|

Video specifications

| Video | Specification |
|-------|---------------|
|-------|---------------|

| | |
|--------------|------------------------|
| Video type | Integrated Matrox G200 |
| Video memory | 16 MB shared |

Environmental specifications



NOTE: For additional information about environmental measurements for specific system configurations, see [Dell.com/environmental_datasheets](https://www.dell.com/environmental_datasheets).

Table 11. Temperature specifications

| Temperature | Specifications |
|--|---|
| Storage | –40°C to 65°C (–40°F to 149°F) |
| Continuous operation (for altitude less than 950 m or 3117 ft) | 10°C to 35°C (50°F to 95°F) with no direct sunlight on the equipment. |
| 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

| 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

| 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

| 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

| Maximum altitude | Specifications |
|------------------|----------------------|
| Operating | 3048 m (10,000 ft) |
| Storage | 12,000 m (39,370 ft) |

Table 16. Operating temperature de-rating specifications

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

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





| Particulate contamination | Specifications |
|---------------------------|---|
| Air filtration | <p>Data center air filtration as defined by ISO Class 8 per ISO 14644-1 with a 95% upper confidence limit.</p> <p> 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.</p> <p> NOTE: Air entering the data center must have MERV11 or MERV13 filtration.</p> |
| Conductive dust | <p>Air must be free of conductive dust, zinc whiskers, or other conductive particles.</p> <p> NOTE: This condition applies to data center and non-data center environments.</p> |
| Corrosive dust | <ul style="list-style-type: none"> Air must be free of corrosive dust. Residual dust present in the air must have a deliquescent point less than 60% relative humidity. <p> NOTE: This condition applies to data center and non-data center environments.</p> |

Table 18. Gaseous contamination specifications

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



NOTE: Maximum corrosive contaminant levels measured at $\leq 50\%$ relative humidity.

Initial system setup and configuration

Setting up your system

Complete the following steps to set up your system:

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

iDRAC configuration


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

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**.

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**.

Downloading the drivers and firmware


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

Prerequisites

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

Steps

1. Go to **Dell.com/support/drivers**.
2. 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.

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**.

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)

Navigation keys


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

Table 19. 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. |
| <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. |

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.

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.

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 <i>Integrated Dell Remote Access Controller User's Guide</i> at Dell.com/idracmanuals . |
| Device Settings | Enables you to configure device settings. |

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.

System BIOS

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

Viewing System BIOS

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

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

F2 = System Setup



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

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

System BIOS Settings details

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

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


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.

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**.

Boot Settings details

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

| Option | Description |
|-----------------------------|--|
| Boot Mode | <p>Enables you to set the boot mode of the system.</p> <p> CAUTION: Switching the boot mode may prevent the system from booting if the operating system is not installed in the same boot mode.</p> <p>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.</p> <p> NOTE: Setting this field to UEFI disables the BIOS Boot Settings menu. Setting this field to BIOS disables the UEFI Boot Settings menu.</p> |
| Boot Sequence Retry | <p>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.</p> |
| Hard-Disk Failover | <p>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.</p> |
| Boot Option Settings | <p>Configures the boot sequence and the boot devices.</p> |
| BIOS Boot Settings | <p>Enables or disables BIOS boot options.</p> <p> NOTE: This option is enabled only if the boot mode is BIOS.</p> |
| UEFI Boot Settings | <p>Enables or disables UEFI Boot options. The Boot options include IPv4 PXE and IPv6 PXE. This option is set to IPv4 by default.</p> <p> NOTE: This option is enabled only if the boot mode is UEFI.</p> |

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.

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.

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.

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**.

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. |

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.

Viewing UEFI iSCSI Settings

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

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



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

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

UEFI iSCSI Settings 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. |


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.

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**.

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. |

| Option | Description |
|---|---|
| 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. |

Secure Boot Custom Policy Settings

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

Viewing Secure Boot Custom Policy Settings

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

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:
F2 = System Setup
3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **System Security**.
5. On the **System Security** screen, click **Secure Boot Custom Policy Settings**.

Secure Boot Custom Policy Settings 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). |

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

Creating a system and setup password

Prerequisites


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

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

Steps

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

A message prompts you to reenter the system password.
5. Reenter the system password, and click **OK**.
6. In the **Setup Password** field, type your setup password and press Enter or Tab.
A message prompts you to reenter the setup password.
7. Reenter the setup password, and click **OK**.
8. Press Esc to return to the System BIOS screen. Press Esc again.
A message prompts you to save the changes.

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

Related Links

[System Security Settings details](#)
[System board jumper settings](#)

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.

Steps

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


Next steps

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

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

Deleting or changing system and setup password

Prerequisites

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

Steps

1. To enter System Setup, press F2 immediately after turning on or restarting your system.
2. On the **System Setup Main Menu** screen, click **System BIOS → System Security**.
3. On the **System Security** screen, ensure that **Password Status** is set to **Unlocked**.
4. In the **System Password** field, alter or delete the existing system password, and then press Enter or Tab.
5. In the **Setup Password** field, alter or delete the existing setup password, and then press Enter or Tab.
If you change the system and setup password, a message prompts you to reenter the new password.
If you delete the system and setup password, a message prompts you to confirm the deletion.
6. Press Esc to return to the **System BIOS** screen. Press Esc again, and a message prompts you to save the changes.

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.

System Information

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

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**.

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. |

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.

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**.

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 . |

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.

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**.

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

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 | <p>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.</p> <p> NOTE: This option is only available on certain stock keeping units (SKUs) of the processors.</p> | | | | |
| X2Apic Mode | Enables or disables the X2Apic mode. | | | | |
| Dell Controlled Turbo | <p>Controls the turbo engagement. Enable this option only when System Profile is set to Performance.</p> <p> NOTE: Depending on the number of installed CPUs, there may be up to four processor listings.</p> | | | | |
| 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: | | | | |
| | <table> <tr> <th>Option</th><th>Description</th></tr> <tr> <td>Family-Model-Stepping</td><td>Specifies the family, model, and stepping of the processor as defined by Intel.</td></tr> </table> | Option | Description | Family-Model-Stepping | Specifies the family, model, and stepping of the processor as defined by Intel. |
| Option | Description | | | | |
| Family-Model-Stepping | Specifies the family, model, and stepping of the processor as defined by Intel. | | | | |

| Option | Description |
|------------------------|--|
| Option | Description |
| 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. |

SATA Settings

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

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**.

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. | | | | | | | | |
| | <table> <tr> <th>Option</th><th>Description</th></tr> <tr> <td>Model</td><td>Specifies the drive model of the selected device.</td></tr> <tr> <td>Drive Type</td><td>Specifies the type of drive attached to the SATA port.</td></tr> <tr> <td>Capacity</td><td>Specifies the total capacity of the hard drive.</td></tr> </table> | 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. |
| 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. | | | | | | | | |
| | <table> <tr> <th>Option</th><th>Description</th></tr> <tr> <td>Model</td><td>Specifies the drive model of the selected device.</td></tr> </table> | Option | Description | Model | Specifies the drive model of the selected device. | | | | |
| Option | Description | | | | | | | | |
| Model | Specifies the drive model of the selected device. | | | | | | | | |

| Option | Description | |
|---------------|--|--|
| | Option | Description |
| | Drive Type | Specifies the type of drive attached to the SATA port. |
| | Capacity | Specifies the total capacity of the hard drive. |
| 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. |

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.

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**.

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 . |

| Option | Description |
|-------------------------------------|---|
| 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. |

Serial Communication

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

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**.

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. <ul style="list-style-type: none">  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. |

| Option | Description |
|----------------------------------|--|
| External Serial Connector | <p>Enables you to associate the External Serial Connector to Serial Device 1, Serial Device 2, or the Remote Access Device by using this option.</p> <p> 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.</p> <p> 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.</p> |
| 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. |


System Profile Settings

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

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**.

System Profile Settings details

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

| Option | Description |
|-----------------------|---|
| System Profile | <p>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).</p> <p> NOTE: All the parameters on the system profile setting screen are available only when the System Profile option is set to Custom.</p> |

| Option | Description |
|---|---|
| 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. |

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.

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**.

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. |

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.

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.

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**.

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.

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**.

Boot Manager

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

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.

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. |








PXE boot

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

Installing and removing system components

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

Safety instructions

-  **WARNING:** Whenever you need to lift the system, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.
-  **WARNING:** Opening or removing the system cover while the system is powered on may expose you to a risk of electric shock.
-  **CAUTION:** Do not operate the system without the cover for a duration exceeding five minutes.
-  **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.
-  **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.

Before working inside your system

Prerequisites

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Turn off the system, including any attached peripherals.
2. Disconnect the system from the electrical outlet and disconnect the peripherals.
3. If 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/poweredge manuals.
5. Remove the system cover.

Related Links

- [Removing the optional front bezel](#)
- [Removing the system cover](#)
- [Safety instructions](#)

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

After working inside your system

Prerequisites

Follow the safety guidelines listed in the Safety instructions section.

Steps

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

Related Links

- [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.

Installing the optional front bezel

Prerequisites

Follow the safety guidelines listed in the Safety instructions section.

Steps

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.

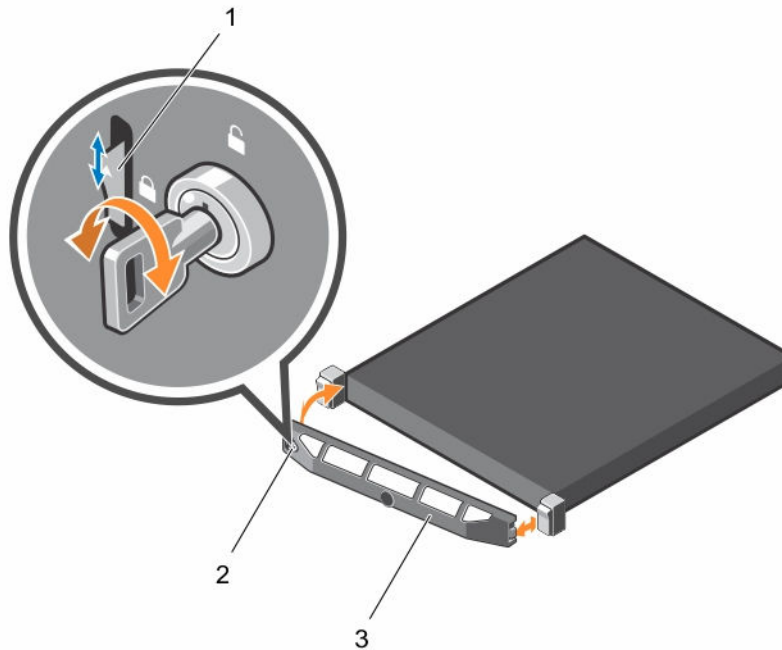


Figure 7. Installing the optional front bezel

- | | |
|------------------|---------|
| 1. release latch | 2. lock |
| 3. front bezel | |

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.

System cover


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

Removing the system cover

Prerequisites

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.

Steps

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.

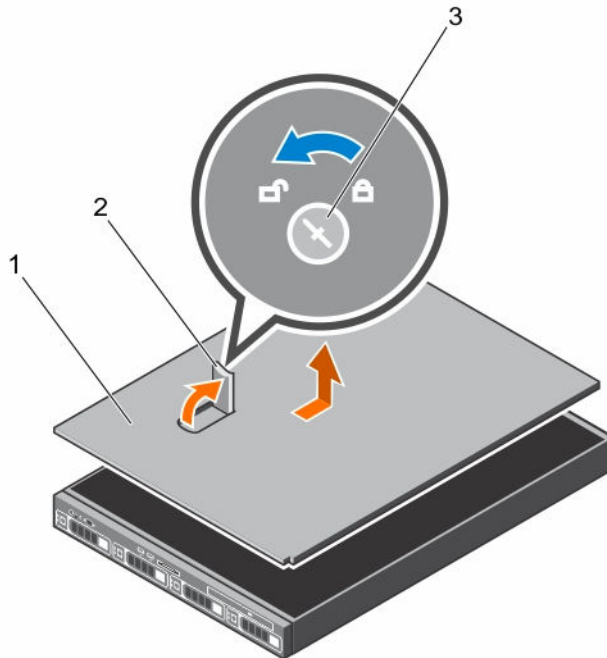


Figure 8. Removing the system cover

- | | |
|-----------------------|----------|
| 1. system cover | 2. latch |
| 3. latch release lock | |

Next steps

1. Install the system cover.

Related Links

[Removing the optional front bezel](#)
[Installing the system cover](#)
[Safety instructions](#)

Installing the system cover

Prerequisites

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.

Steps

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.

Next steps

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

Related Links

[Installing the optional front bezel](#)

[Safety instructions](#)

Inside the system

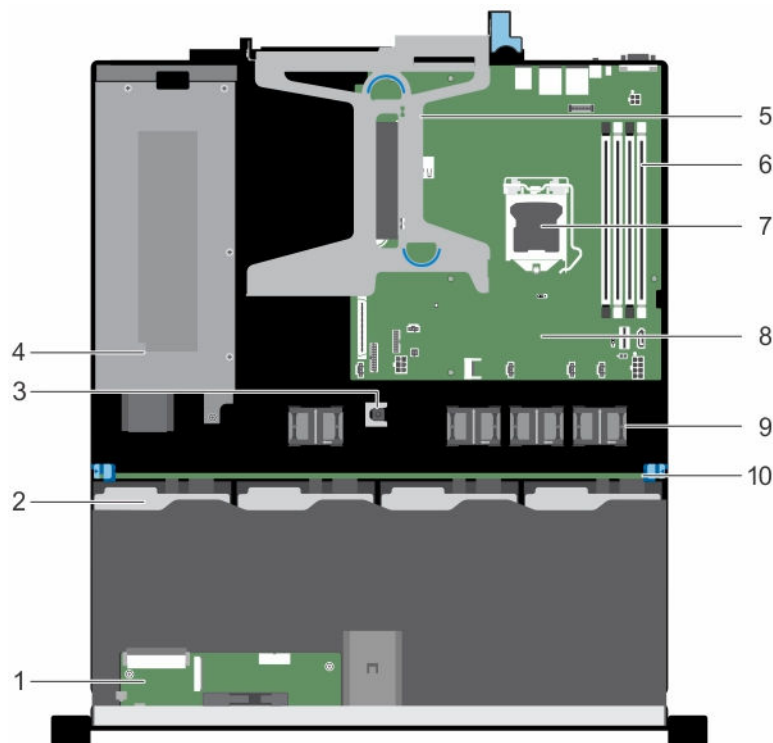



Figure 9. Inside the system—four 3.5-inch hot-swappable hard drive systems

- | | |
|-------------------------|-----------------------------------|
| 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 |

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.

Removing the intrusion switch

Prerequisites

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

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

Steps

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.

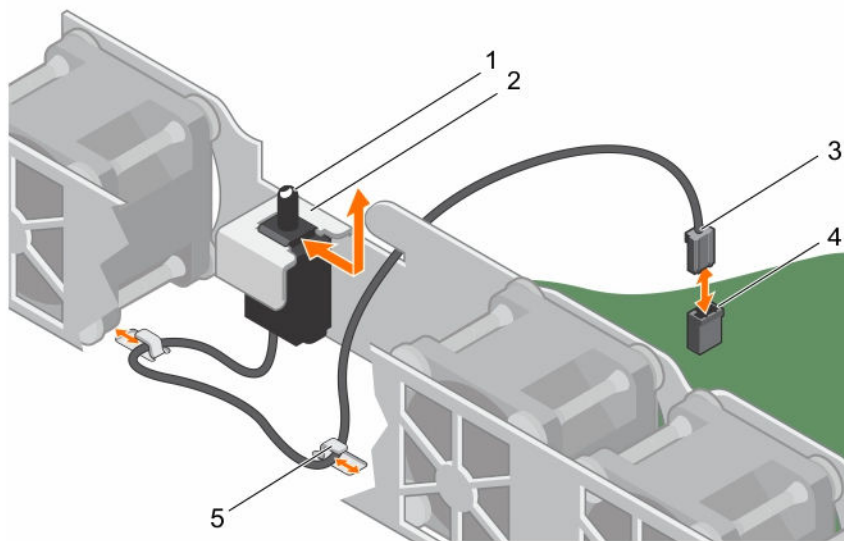


Figure 10. Removing the intrusion switch

- | | |
|---------------------------|---|
| 1. intrusion switch | 2. intrusion switch slot |
| 3. intrusion switch cable | 4. intrusion switch connector on the system board |
| 5. cable routing clip (2) | |

Next steps

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

Related Links

[Before working inside your system](#)
[After working inside your system](#)
[Safety instructions](#)

Installing the intrusion switch

Prerequisites

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

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

Steps

1. 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.

Next steps

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

Related Links

[Before working inside your system](#)

[After working inside your system](#)


[Safety instructions](#)


Cooling shroud

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

Removing the cooling shroud

Prerequisites

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

 **CAUTION:** Never operate your system with the 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.

Steps

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

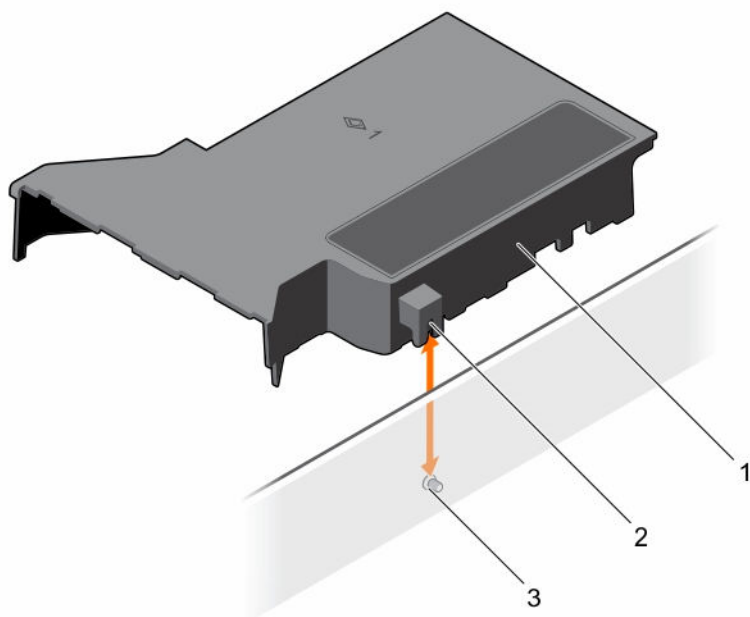


Figure 11. Removing the cooling shroud

- | | |
|----------------------------------|--------------------------------|
| 1. cooling shroud | 2. guide on the cooling shroud |
| 3. guide pin on the chassis wall | |

Next steps

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

Related Links

[Before working inside your system](#)
[After working inside your system](#)
[Safety instructions](#)

Installing the cooling shroud

Prerequisites



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

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. If applicable, route the cables inside the system along the chassis wall and secure the cables by using the cable-securing bracket.

Steps

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.

Next steps

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


Related Links

[Before working inside your system](#)

[Safety instructions](#)

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.

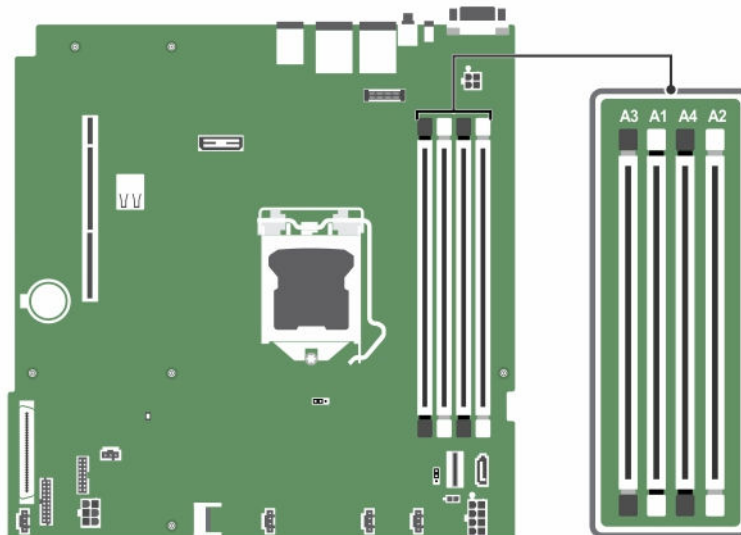


Figure 12. Memory socket locations on the system board

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

| 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 |

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).

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


| 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 |


Removing memory modules

Prerequisites

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


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

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

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

Steps

1. Locate the appropriate memory module socket.

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

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

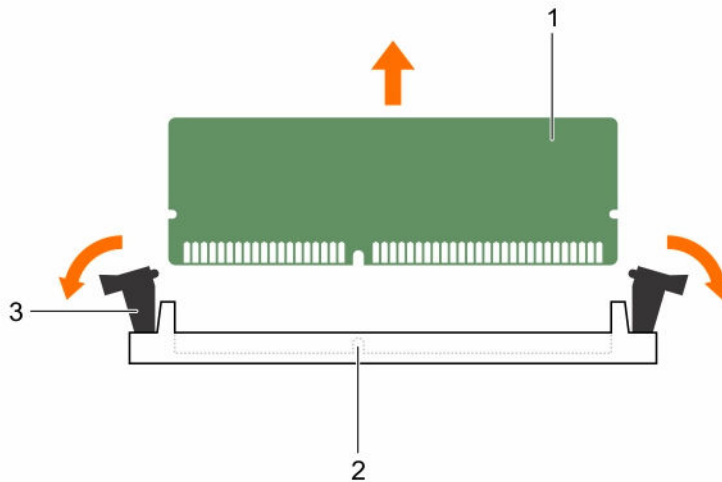



Figure 13. Removing the memory module

- | | |
|-------------------------------------|-------------------------|
| 1. memory module | 2. memory module socket |
| 3. memory module socket ejector (2) | |

Next steps



1. Install the memory module.
-  **NOTE:** If you are removing the memory module permanently, install a memory module blank.
2. Install the cooling shroud.
3. Follow the procedure listed in the After working inside your system section.

Related Links

[Before working inside your system](#)
[Safety instructions](#)

Installing memory modules

Prerequisites


-  **WARNING:** The memory modules are hot to touch for some time after the system has been powered down. Allow the memory modules to cool before handling them. Handle the memory modules by the card edges and avoid touching the components or metallic contacts on the memory module.
-  **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.

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


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


Steps

1. Locate the appropriate memory module socket.

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

2. 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.

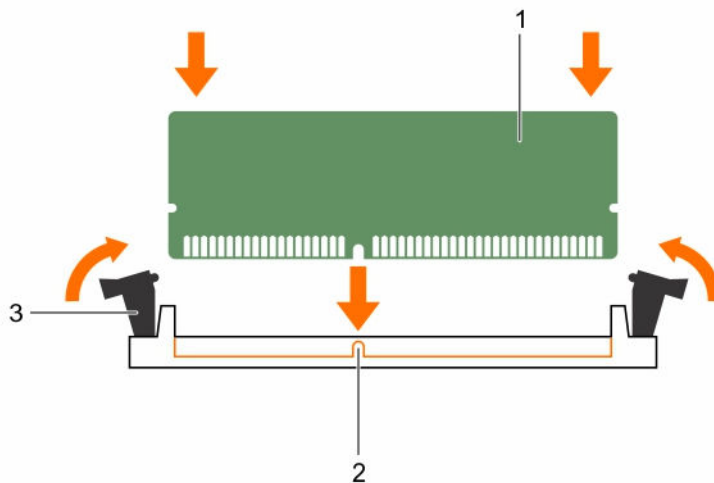


Figure 14. Installing the memory module

1. memory module

2. alignment key

3. memory module socket ejector (2)

Next steps

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.

Related Links

[Before working inside your system](#)


[After working inside your system](#)


[Safety instructions](#)

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/poweredge manuals**.

 **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.

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.

Removing a 3.5-inch hot swappable hard drive carrier blank

Prerequisites

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

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

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

Steps

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

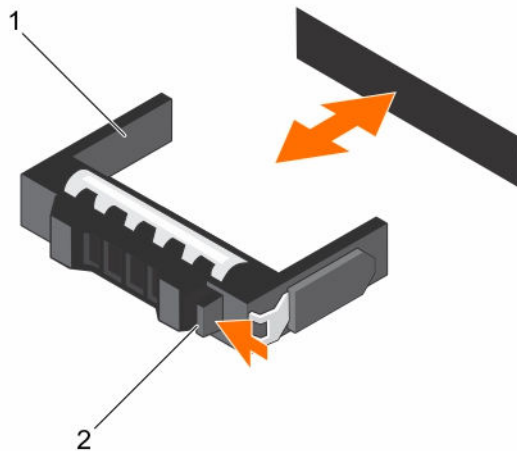


Figure 15. Removing and installing a 3.5-inch hot swappable hard drive carrier blank

1. hard drive carrier blank

2. release button

Next steps

If removed, install the front bezel.

Related Links

- [Installing the optional front bezel](#)
- [Removing the optional front bezel](#)
- [Safety instructions](#)

Installing a 3.5-inch hot swappable hard drive carrier blank

Prerequisites

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

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

Steps

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.

Next steps

If removed, install the front bezel.

Related Links

[Installing the optional front bezel](#)

[Removing the optional front bezel](#)

[Safety instructions](#)

Removing a hot swappable hard drive carrier

Prerequisites



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

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

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



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



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

Steps

1. 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.

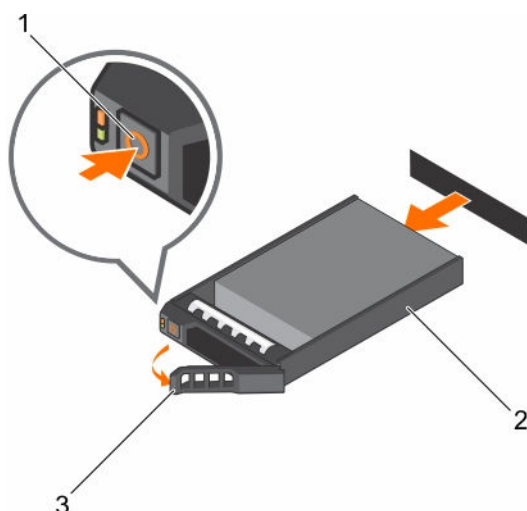


Figure 16. Removing a hot swappable hard drive or SSD

- | | |
|------------------------------|-----------------------|
| 1. release button | 2. hard drive carrier |
| 3. hard drive carrier handle | |

Next steps

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.

Related Links

- [Installing the optional front bezel](#)
- [Removing the optional front bezel](#)
- [Installing a 3.5-inch hot swappable hard drive carrier blank](#)
- [Safety instructions](#)

Removing a hot swappable hard drive from a hard drive carrier

Prerequisites



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



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

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

Steps

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

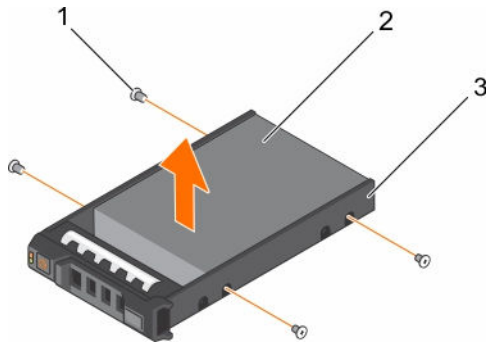


Figure 17. Removing a hot swappable hard drive from a hard drive carrier

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

Next steps

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

Related Links

[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

Prerequisites

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

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

1. Keep the Phillips #2 screwdriver ready.
2. Remove the hot swappable hard drive carrier.

Steps

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.

Next steps

Install the hard drive carrier into the system.

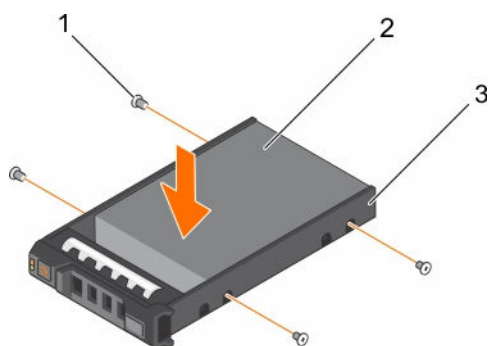


Figure 18. Installing a hot swappable hard drive into a hot swappable hard drive carrier

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

Related Links

[Removing a hot swappable hard drive carrier](#)

[Safety instructions](#)

Installing a hot swappable hard drive carrier

Prerequisites

- ⚠ **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.
- ⚠ **CAUTION:** Use only hard drives that have been tested and approved for use with the hard drive backplane.
- ⚠ **CAUTION:** Combining SAS and SATA hard drives in the same RAID volume is not supported.
- ⚠ **CAUTION:** When installing a hard drive, ensure that the adjacent drives are fully installed. Inserting a hard drive carrier and attempting to lock its handle next to a partially installed carrier can damage the partially installed carrier's shield spring and make it unusable.
- ⚠ **CAUTION:** To prevent data loss, ensure that your operating system supports hot-swap drive installation. See the documentation supplied with your operating system.
- ⚠ **CAUTION:** When a replacement hot swappable 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.

Steps

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

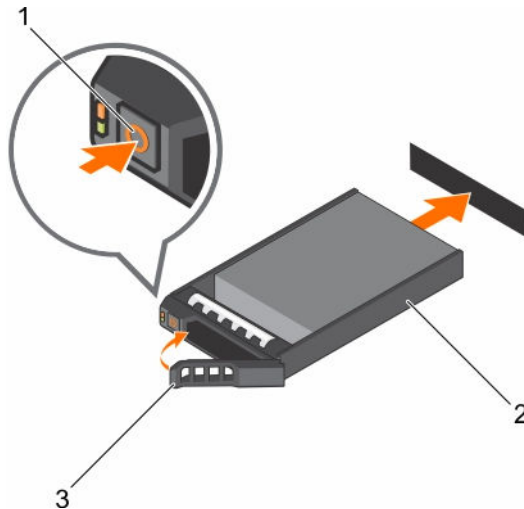


Figure 19. Installing a hot swappable hard drive carrier

- | | |
|------------------------------|-----------------------|
| 1. release button | 2. hard drive carrier |
| 3. hard drive carrier handle | |

Next steps

If removed, install the front bezel.



Related Links

[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

| System configuration | Number of fans |
|---|----------------|
| Systems with four 3.5-inch hot swappable hard drives and expansion card | 4 |
| Systems with four 3.5-inch hot swappable hard drives and without expansion card | 3 |

Removing the cooling fan blank

Prerequisites

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

Steps

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.

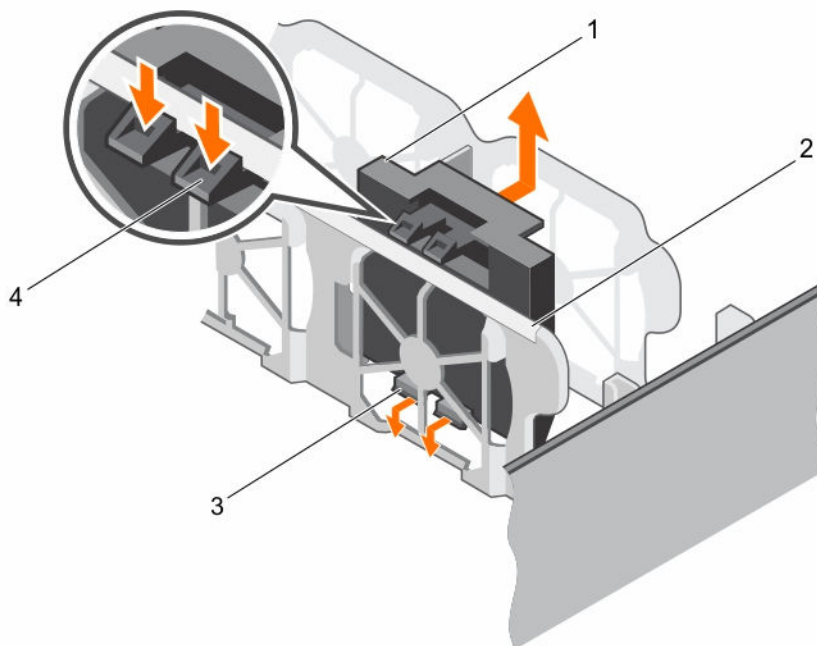


Figure 20. Removing and installing a cooling fan blank

- | | |
|--------------------------|------------------------|
| 1. cooling fan blank (2) | 2. cooling fan bracket |
| 3. tab | 4. release tab (2) |

Next steps

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


Related Links

[Before working inside your system](#)

[Safety instructions](#)

Installing the cooling fan blank

Prerequisites

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

Steps

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.

Next steps

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


Related Links


[Before working inside your system](#)

[Safety instructions](#)

Removing a cooling fan

Prerequisites

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

 **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.

Steps

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.

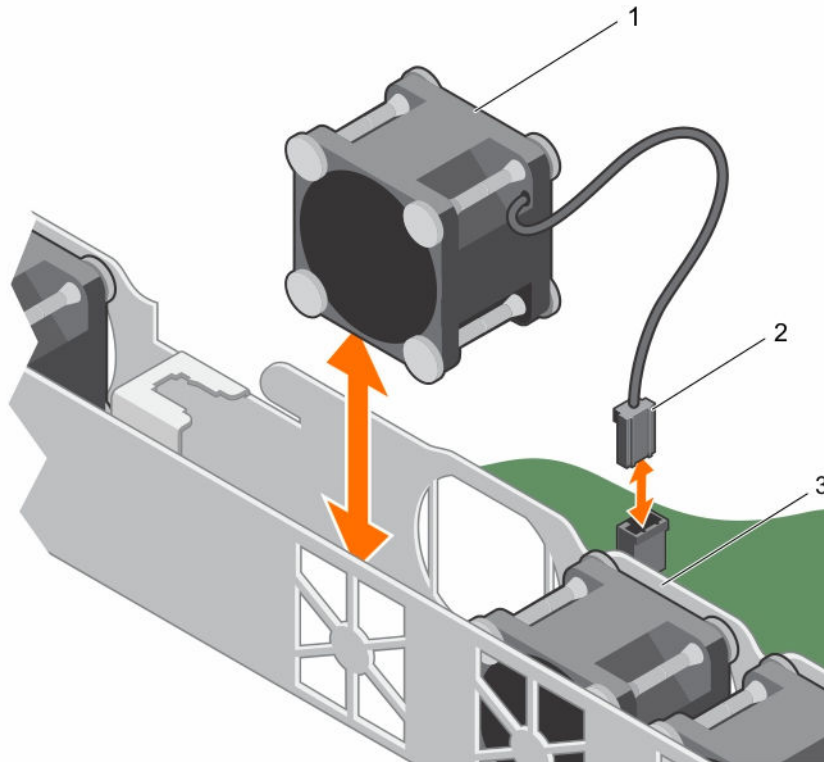


Figure 21. Removing and installing a cooling fan

- | | |
|------------------------|--------------------------|
| 1. cooling fan | 2. power cable connector |
| 3. cooling fan bracket | |

Next steps


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


Related Links

[Before working inside your system](#)
[After working inside your system](#)
[Removing the cooling shroud](#)
[Installing a cooling fan](#)
[Installing the cooling shroud](#)
[Safety instructions](#)

Installing a cooling fan

Prerequisites

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

 **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.

Steps

1. Lower the fan into the cooling fan bracket.
2. Connect the power cable to the power cable connector on the system board.

Next steps

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

Related Links

[Before working inside your system](#)

[After working inside your system](#)


[Removing the cooling shroud](#)

[Installing the cooling shroud](#)

[Safety instructions](#)

Expansion cards and expansion card riser

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


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

Expansion card installation guidelines

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

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

| 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


| 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 |

Removing the expansion card riser

Prerequisites

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

1. Follow the safety guidelines listed in 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.

Steps

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.

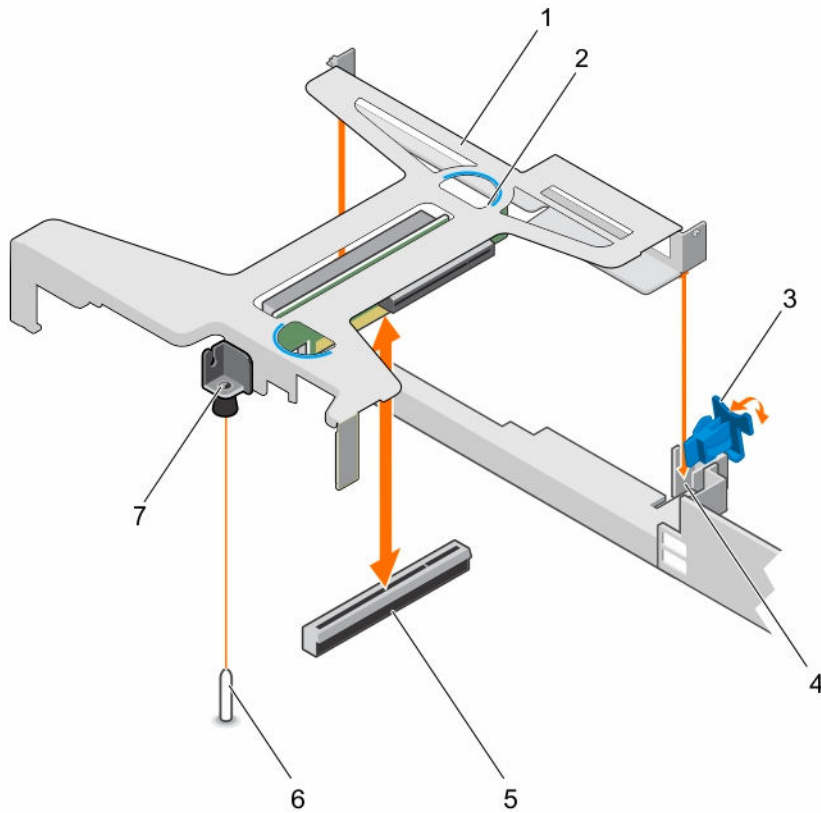


Figure 22. Removing and installing the expansion card riser

- | | |
|---|----------------------------------|
| 1. expansion card riser | 2. touch point (2) |
| 3. expansion card latch | 4. guide slot on the chassis |
| 5. riser connector on the system board | 6. guide pin on the system board |
| 7. guide slot on the expansion card riser | |

Next steps

Install the expansion card riser.

Related Links

[Before working inside your system](#)
[Removing an expansion card](#)
[Installing an expansion card](#)
[Installing the expansion card riser](#)
[Safety instructions](#)

Installing the expansion card riser

Prerequisites



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

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

Steps

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.

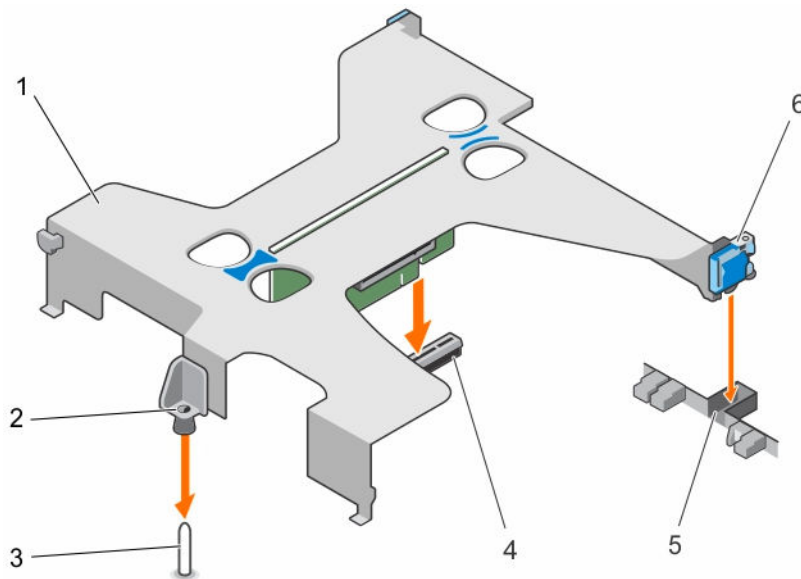


Figure 23. Installing the expansion card riser

- | | |
|----------------------------------|--|
| 1. expansion card riser | 2. guide on the expansion card riser |
| 3. guide pin on the system board | 4. riser connector on the system board |
| 5. slot on the chassis | 6. expansion card latch |

Next steps

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

Related Links

[After working inside your system](#)

[Installing an expansion card](#)

[Safety instructions](#)

Removing an expansion card

Prerequisites

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

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Disconnect any cables connected to the expansion card or expansion card riser.
4. If installed, remove the expansion card riser.

Steps

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.

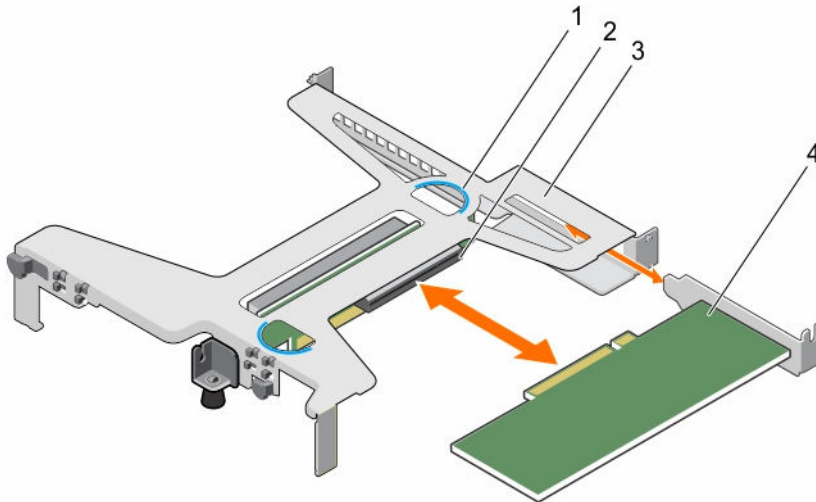


Figure 24. Removing and installing the expansion card from the expansion card riser

- | | |
|-------------------------|-----------------------------------|
| 1. touch point (2) | 2. expansion card riser connector |
| 3. expansion card riser | 4. expansion card |

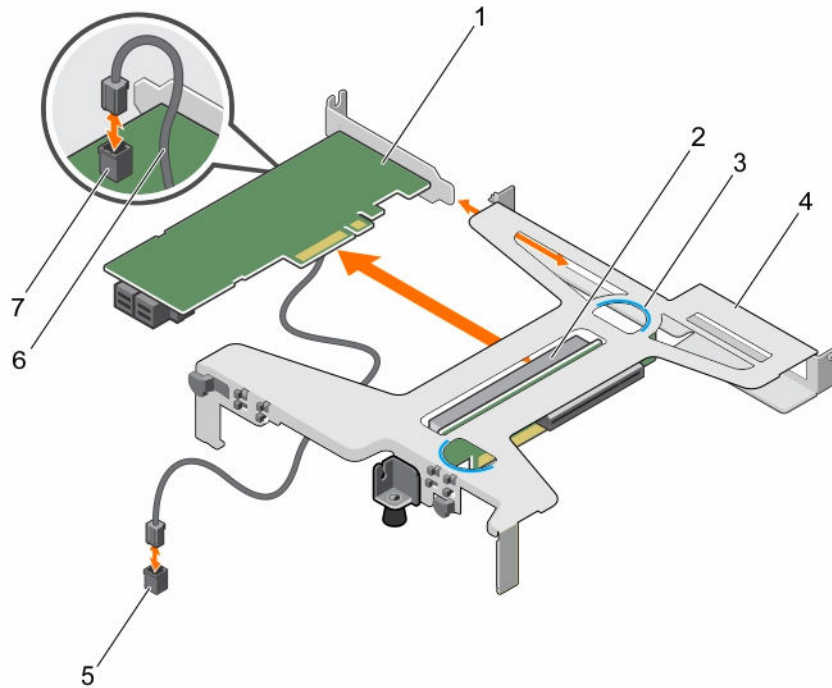


Figure 25. Removing and installing the expansion card from the expansion card riser

- | | |
|--------------------------------------|--|
| 1. PERC card | 2. expansion card connector on the riser |
| 3. touch point (2) | 4. expansion card riser |
| 5. LED connector on the system board | 6. LED cable |
| 7. LED connector on the PERC card | |

Next steps

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

Related Links

[Before working inside your system](#)

[After working inside your system](#)

[Safety instructions](#)

Installing an expansion card

Prerequisites



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

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

2. Follow the procedure listed in the Before working inside your system section.
3. Remove the expansion card riser.

Steps

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.

Next steps

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

Related Links

[Before working inside your system](#)

[After working inside your system](#)

[Safety instructions](#)

iDRAC port card (optional)

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

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

Removing the optional iDRAC port card

Prerequisites



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

1. Follow the safety guidelines listed in 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.

Steps

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.

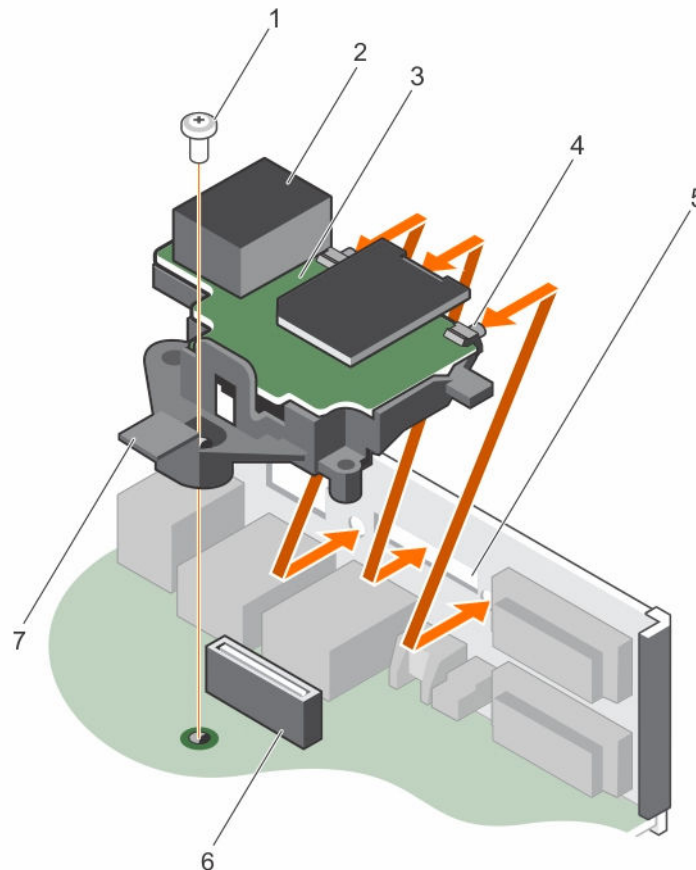


Figure 26. Removing and installing the iDRAC port card

- | | |
|---------------------------|------------------------------|
| 1. screw | 2. iDRAC port |
| 3. iDRAC port card board | 4. tabs on the iDRAC port |
| 5. slots on the chassis | 6. iDRAC port card connector |
| 7. iDRAC port card holder | |

Next steps

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.

Related Links


[Before working inside your system](#)

[After working inside your system](#)

[Safety instructions](#)

Installing the optional iDRAC port card

Prerequisites

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

1. 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.

Steps

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.


Next steps

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.

Processors and heat sinks


Use the following procedure when:

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

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

Removing the heat sink

Prerequisites

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

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

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

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.

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

Steps

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.

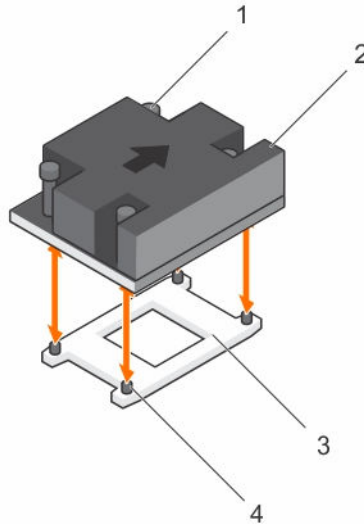


Figure 27. Removing and installing a heat sink

- | | |
|----------------------|--------------|
| 1. captive screw (4) | 2. heat sink |
| 3. processor socket | 4. slot (4) |

Next steps

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.

Related Links

[Before working inside your system](#)
[After working inside your system](#)
[Safety instructions](#)

Installing a heat sink

Prerequisites



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



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

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

Steps

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



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



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

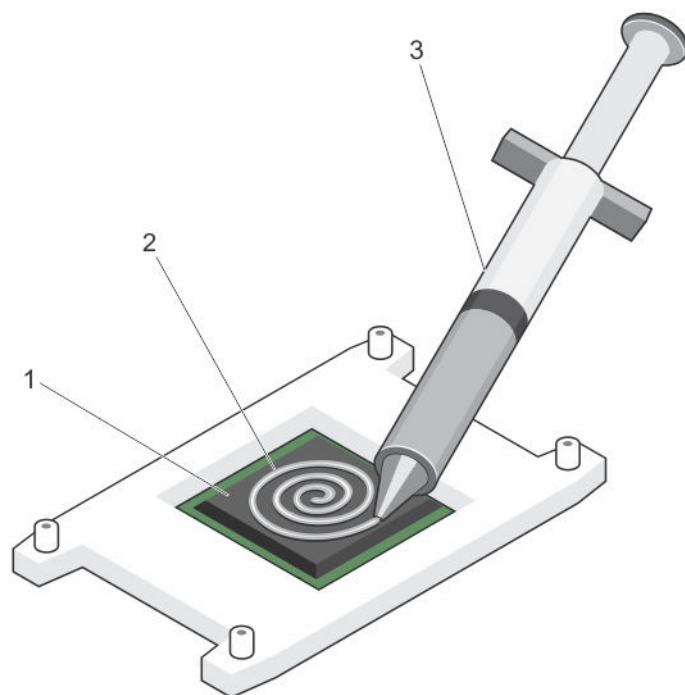



Figure 28. Applying thermal grease on the top of the processor

1. processor
 2. thermal grease
 3. thermal grease syringe
3. Place the heat sink onto the processor.
 4. Tighten one of the four screws to secure the heat sink to the system board.
 5. 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.

Next steps


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

Related Links


[Before working inside your system](#)
[After working inside your system](#)
[Safety instructions](#)

Installing a processor


Prerequisites

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


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


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

5. Remove the cooling shroud.

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

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


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


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

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


Steps


1. Unpack the new processor.

 **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.


Next steps

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

1. Install the heat sink.
2. If removed, reinstall the PCIe expansion card riser.
3. If disconnected, reconnect the cables to the expansion card(s).
4. 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.

Removing the processor

Prerequisites

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


 **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.

Steps

1. Release the socket lever by pushing the lever down and out from under the tab on the processor shield.
2. Lift the lever upward until the processor shield lifts.

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

3. Lift the processor out of the socket.

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

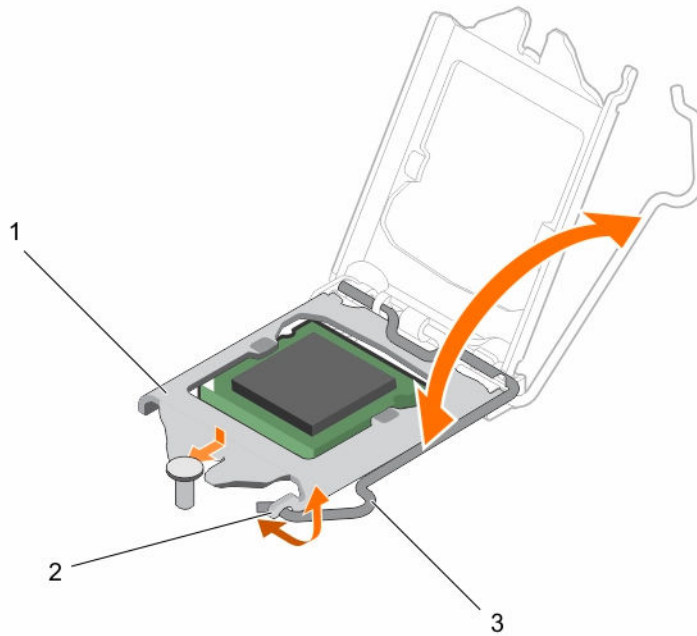


Figure 29. Opening and closing the processor shield

- | | |
|---------------------|--------------------------------|
| 1. processor shield | 2. tab on the processor shield |
| 3. socket lever | |

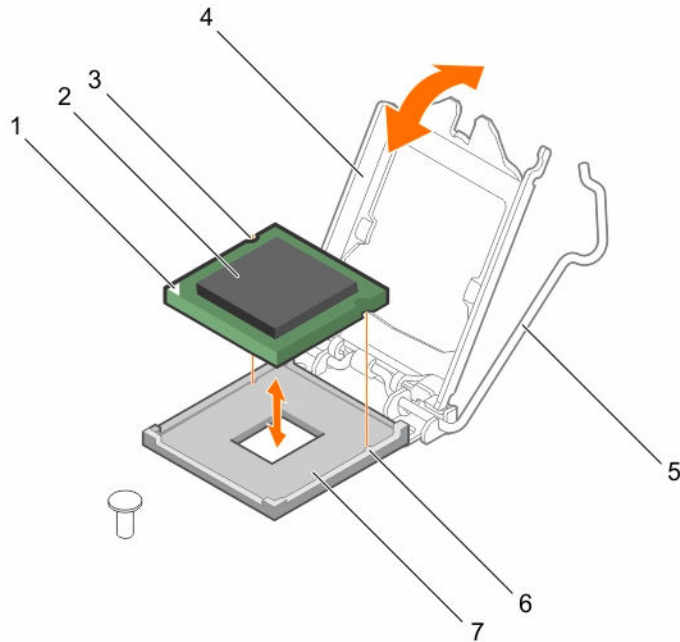


Figure 30. Removing and installing a processor

- | | |
|---------------------------------|---------------------|
| 1. pin-1 indicator of processor | 2. processor |
| 3. slot (2) | 4. processor shield |
| 5. socket lever | 6. socket keys (2) |
| 7. socket | |

Next steps

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

Related Links

[Before working inside your system](#)

[Safety instructions](#)

Power supply unit

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

Removing a cabled power supply unit

Prerequisites

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

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Disconnect the power cables from the power supply unit (PSU) to the system board and hard drives.

Steps

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.

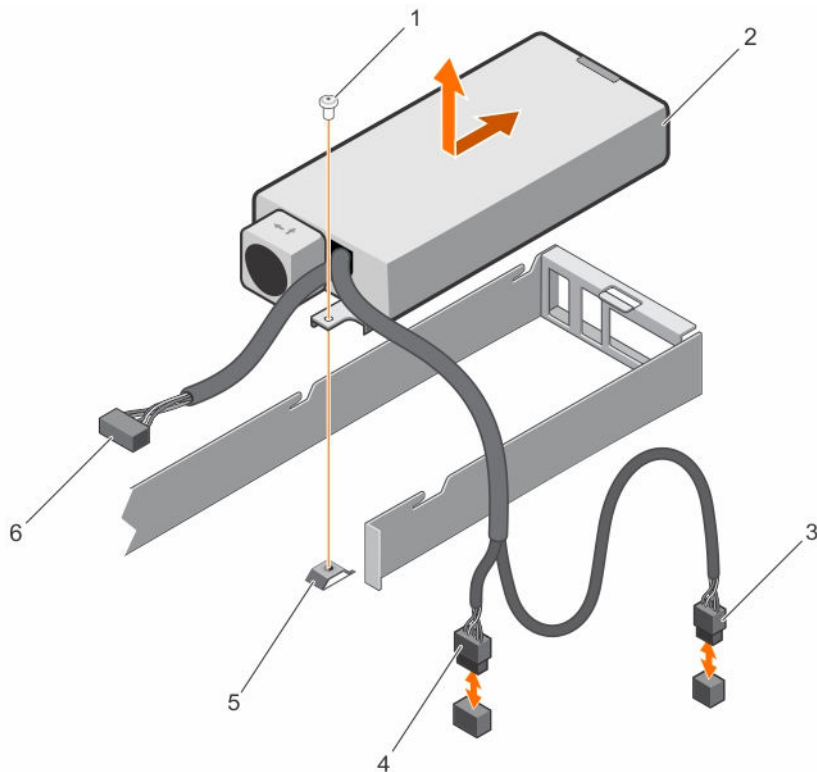


Figure 31. Removing and installing a cabled power supply unit

- | | |
|-----------------------|-----------------------|
| 1. screw | 2. PSU |
| 3. P2 cable connector | 4. P1 cable connector |
| 5. standoff | 6. P3 cable connector |

Next steps


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

Related Links

[Before working inside your system](#)
[After working inside your system](#)
[Installing a cabled power supply unit](#)
[Safety instructions](#)

Installing a cabled power supply unit

Prerequisites

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

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

Steps

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.

Next steps

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

Related Links

[Before working inside your system](#)

[After working inside your system](#)

[Safety instructions](#)


System battery


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


Replacing the system battery

Prerequisites

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.

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

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

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

Steps

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:

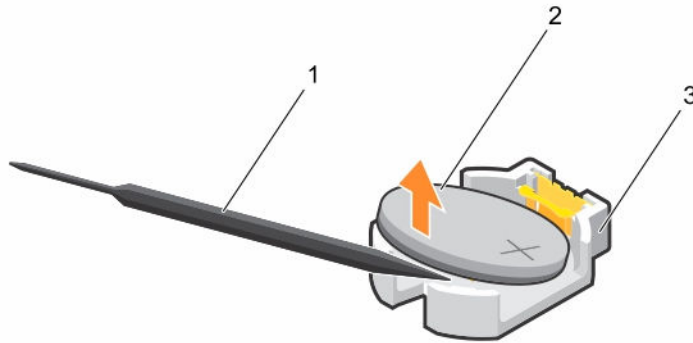


Figure 32. Removing the system battery

1. plastic scribe
 2. positive side of the battery connector
 3. 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.

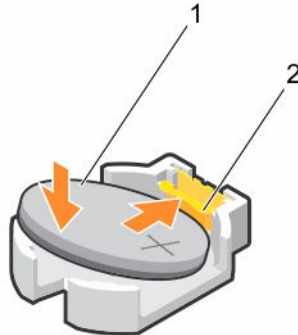


Figure 33. Installing the system battery

1. positive side of the battery connector
2. battery connector

Next steps

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.

Related Links

[Before working inside your system](#)

[After working inside your system](#)

[Installing the expansion card riser](#)


[Safety instructions](#)

Hard drive backplane


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

Removing the hard drive backplane

Prerequisites

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

 **CAUTION:** To prevent damage to the 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.

Steps

Press the release tabs and lift the hard drive backplane out of the chassis.

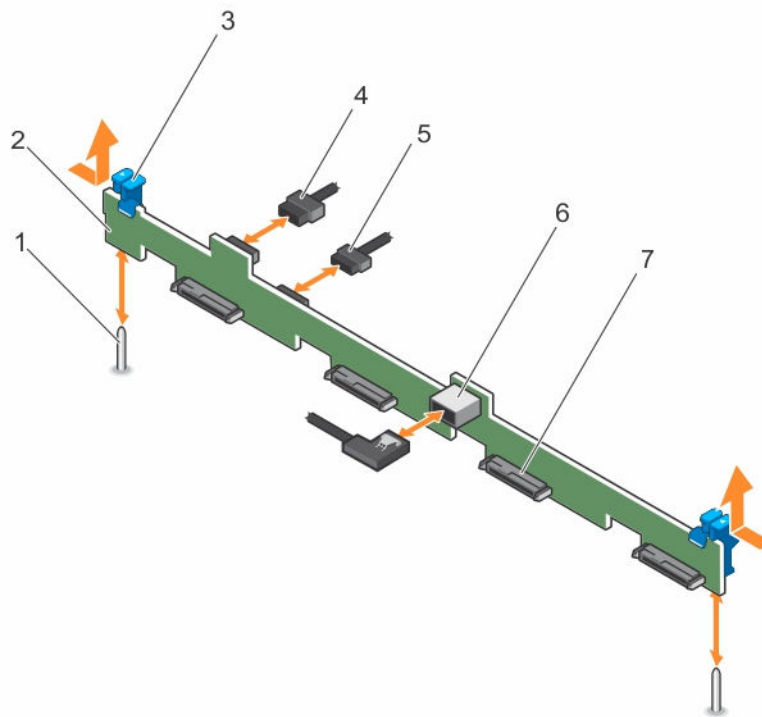


Figure 34. Removing and Installing the four 3.5-inch hot swappable SAS hard drive backplane

- | | |
|-----------------------------|-------------------------------------|
| 1. guide (2) | 2. hard drive backplane |
| 3. release tab (2) | 4. backplane power cable |
| 5. backplane signal cable | 6. SAS_A connector on the backplane |
| 7. hard drive connector (4) | |

Next steps


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

Related Links

[Before working inside your system](#)
[After working inside your system](#)
[Installing the hard drive backplane](#)
[Safety instructions](#)

Installing the hard drive backplane

Prerequisites

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

 **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.

Steps

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.

Next steps

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

Related Links

[Before working inside your system](#)

[After working inside your system](#)


[Safety instructions](#)

Control panel

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

Removing the LCD control panel assembly

Prerequisites

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

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

Steps

1. 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.

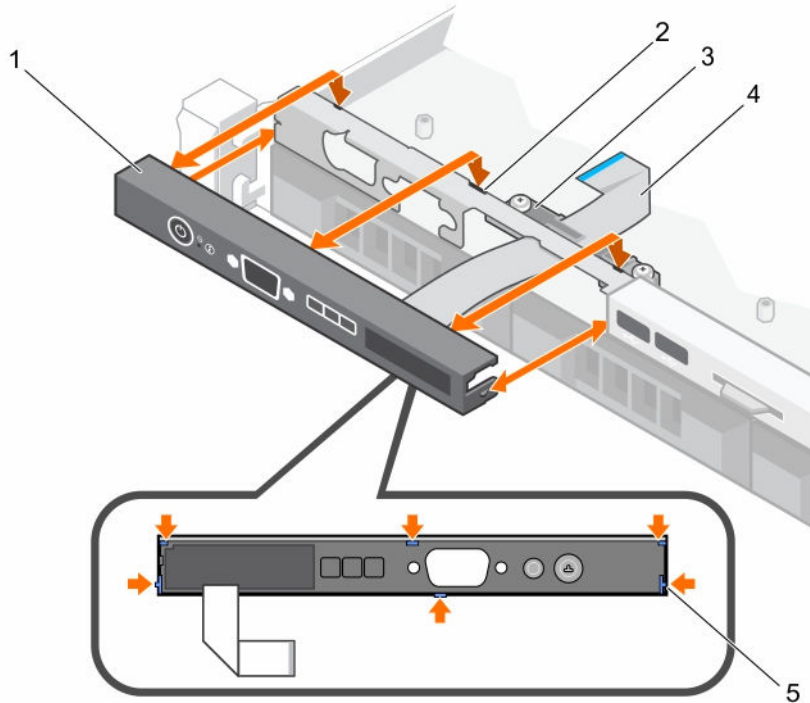


Figure 35. Removing and installing the LCD control panel—four 3.5-inch hot swappable hard drive chassis

- | | |
|--|-------------------------|
| 1. LCD control panel | 2. notches (6) |
| 3. display module cable retention clip | 4. display module cable |
| 5. tabs on the LCD control panel (6) | |

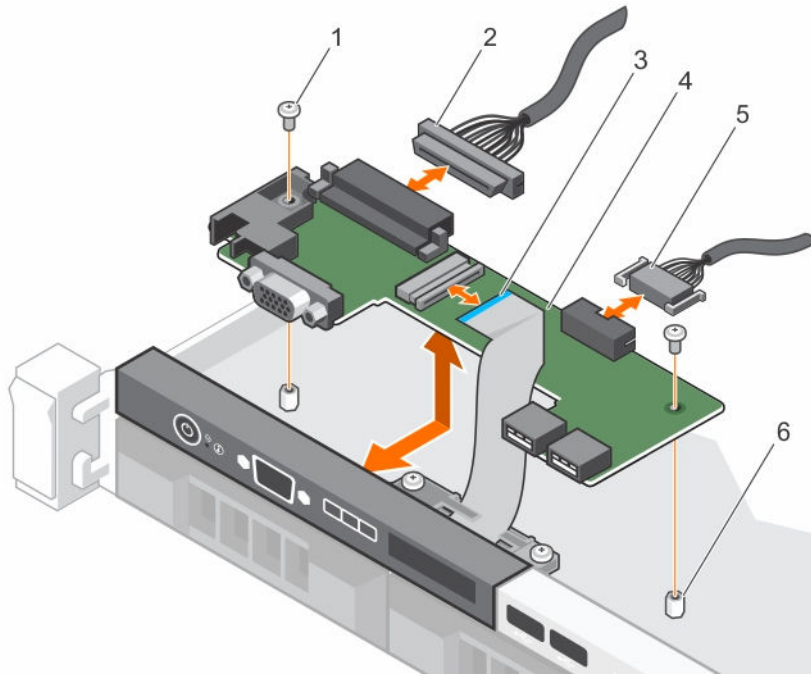


Figure 36. Removing and installing the LCD control panel board—four hard drive chassis

- | | |
|-------------------------|----------------------------------|
| 1. screw (2) | 2. control panel connector cable |
| 3. display module cable | 4. LCD control panel board |
| 5. USB connector cable | 6. standoff on the chassis (2) |

Next steps

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

Related Links

[Installing the LCD control panel assembly](#)
[Before working inside your system](#)
[After working inside your system](#)
[Safety instructions](#)

Installing the LCD control panel assembly

Prerequisites

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

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

Steps

1. Align the 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.

Next steps

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

Related Links

[Before working inside your system](#)

[After working inside your system](#)

[Safety instructions](#)

Removing the LED control panel assembly

Prerequisites



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

1. Follow the safety guidelines listed in 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.

Steps

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

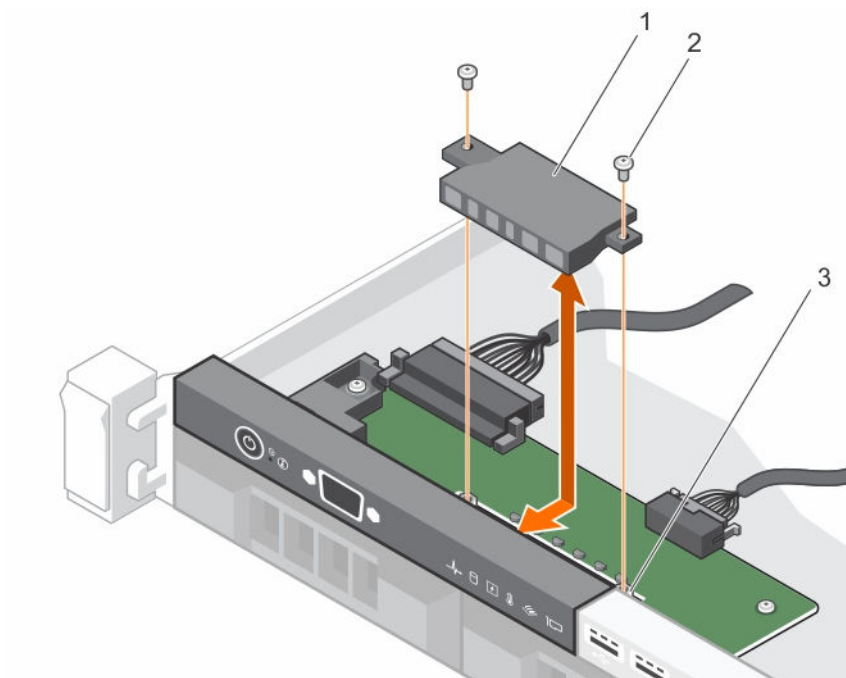


Figure 37. Removing and installing the LED module—four cabled hard drive chassis

- | | |
|------------------------|--------------|
| 1. LED module | 2. screw (2) |
| 3. slot on the chassis | |

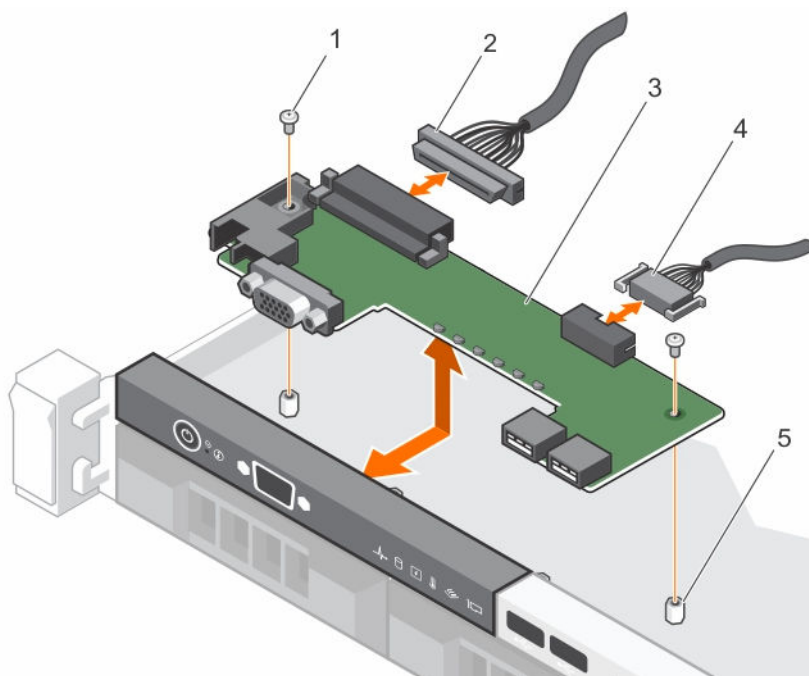


Figure 38. Removing and installing the LED control panel board—four cabled hard drive chassis

- | | |
|--------------|----------------------------------|
| 1. screw (2) | 2. control panel connector cable |
|--------------|----------------------------------|

3. control panel board
4. USB connector cable
5. standoff on the chassis (2)

Next steps

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

Related Links

[Before working inside your system](#)
[After working inside your system](#)
[Installing the LED control panel assembly](#)
[Safety instructions](#)

Installing the LED control panel assembly

Prerequisites



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

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

Steps

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.

Next steps

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

Related Links


[Before working inside your system](#)
[After working inside your system](#)
[Safety instructions](#)


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.


Removing the system board

Prerequisites

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

 **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

Steps

1. Disconnect all cables from the system board.

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

2. Remove the screws 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.

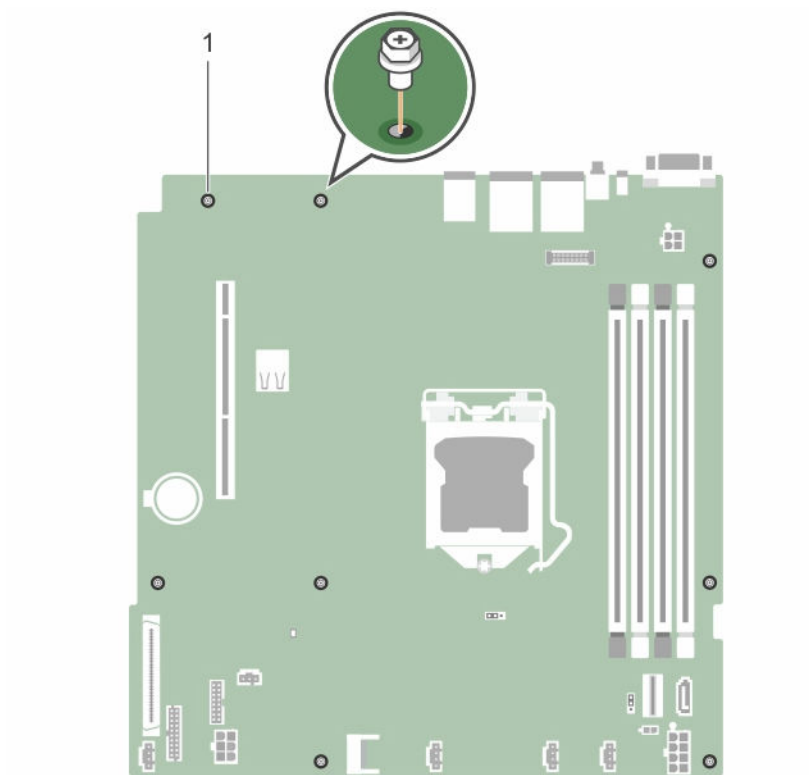


Figure 39. Removing and installing the screws on the system board

1. screw (8)

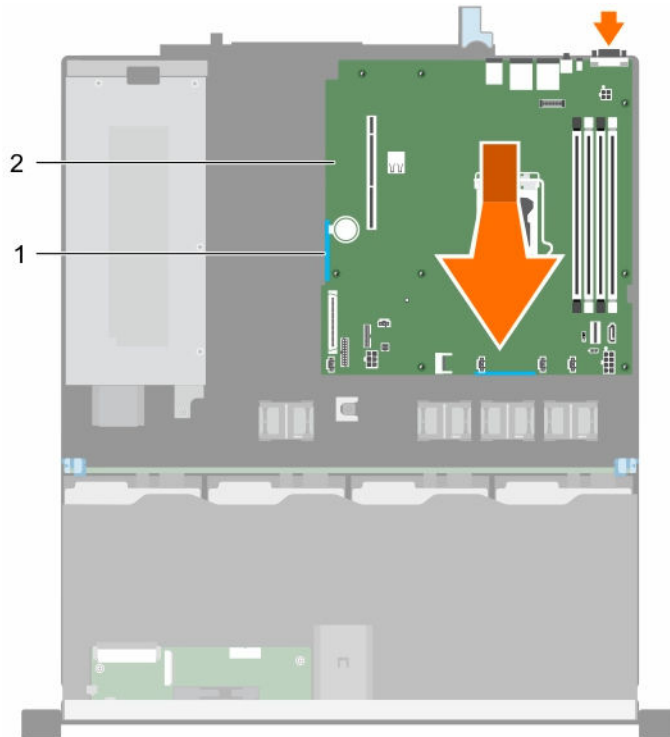


Figure 40. Removing and installing the system board

1. touch point (2)
2. system board

Next steps

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

Related Links

[Before working inside your system](#)
[After working inside your system](#)
[Trusted Platform Module](#)
[Installing the system board](#)
[Safety instructions](#)

Installing the system board


Prerequisites




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



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.

Steps

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.

Next steps

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.

Related Links

[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](#)
[Safety instructions](#)
[Entering the system Service Tag by using System Setup](#)

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.

Entering the system Service Tag by using System Setup

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

1. Turn on the system.
2. Press F2 to enter System Setup.
3. Click **Service Tag Settings**.
4. Enter the Service Tag.



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

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

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

Trusted Platform Module

Trusted Platform Module (TPM) is a dedicated microprocessor designed to secure hardware by integrating cryptographic keys into devices. A software can use a Trusted Platform Module to

authenticate hardware devices. As each TPM chip has a unique and secret RSA key burned in as it is produced, it can perform the platform authentication.

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

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

Installing the Trusted Platform Module

Prerequisites

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

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.

Steps

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.

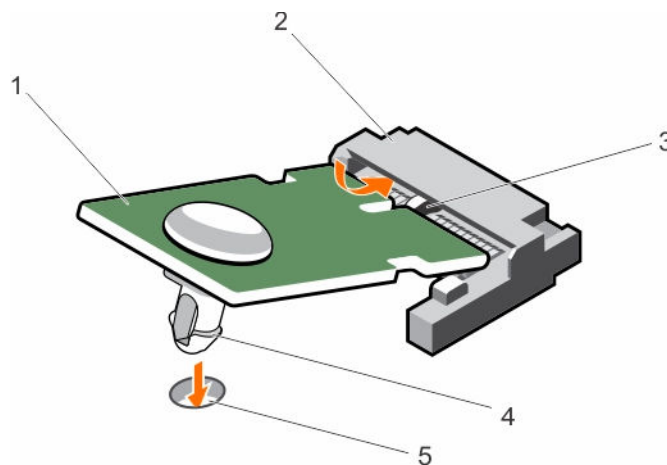


Figure 41. Installing the TPM

- | | |
|------------------------------|------------------|
| 1. TPM | 2. TPM connector |
| 3. slot on the TPM connector | 4. plastic bolt |

5. slot on the system board

Next steps

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

Related Links

[Before working inside your system](#)
[After working inside your system](#)
[Installing the system board](#)
[Safety instructions](#)
[System board jumpers and connectors](#)

Initializing the TPM for BitLocker users

Initialize the TPM.

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

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


Initializing the TPM for TXT users

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

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

When to use the Embedded System Diagnostics

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

Running the Embedded System Diagnostics from Boot Manager

Prerequisites

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

Steps

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

Running the Embedded System Diagnostics from the Dell Lifecycle Controller

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

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

System diagnostic controls

| Menu | Description |
|----------------------|---|
| Configuration | Displays the configuration and status information of all detected devices. |
| Results | Displays the results of all tests that are run. |
| System health | Provides the current overview of the system performance. |
| Event log | Displays a time-stamped log of the results of all tests run on the system. This is displayed if at least one event description is recorded. |

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

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

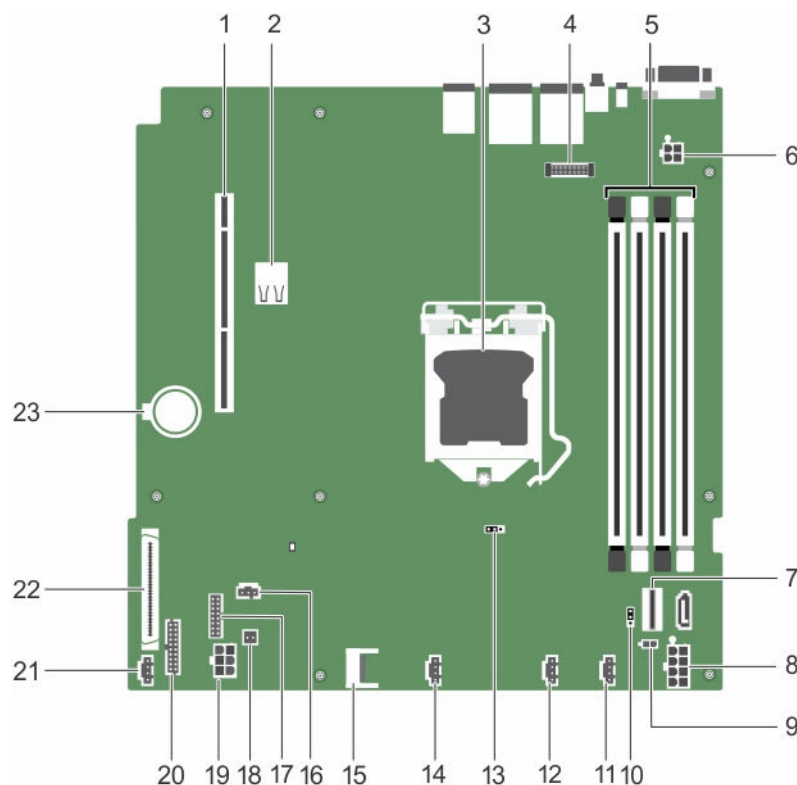



Figure 42. System board jumpers and connectors

Table 25. System board jumpers and connectors

| Item | Connector | Description |
|------|-------------|----------------------------|
| 1 | PCIE_G3_X8 | PCIe card connector 2 |
| 2 | INT_USB_3.0 | Internal USB connector 3.0 |





| Item | Connector | Description |
|------|----------------|-----------------------------------|
| 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 |

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

| 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). |

Related Links

[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.

Prerequisites



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Steps

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

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.

Troubleshooting external connections

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

Troubleshooting the video subsystem

Prerequisites



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

Steps

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

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

Next steps

If the tests fail, see the Getting help section.

Related Links

[Getting help](#)

Troubleshooting a USB device

Prerequisites



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

Steps

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

Next steps

If all troubleshooting fails, see the Getting help section.

Related Links

[Getting help](#)

Troubleshooting a serial I/O device

Steps

1. Turn off the system and any peripheral devices connected to the serial port.
2. Swap the serial interface cable with a known working cable, and turn on the system and the serial device.
If the problem is resolved, replace the interface cable with a known working cable.
3. Turn off the system and the serial device, and swap the serial device with a compatible device.
4. Turn on the system and the serial device.

Next steps

If the problem persists, see the Getting help section.

Related Links

[Getting help](#)

Troubleshooting a NIC

Steps

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

Next steps

If the problem persists, see the Getting help section.

Related Links

[Getting help](#)

[Using system diagnostics](#)

Troubleshooting a wet system

Prerequisites



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

Steps

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

Next steps

If the tests fail, see the Getting help section.

Related Links

[Getting help](#)

[Using system diagnostics](#)

Troubleshooting a damaged system

Prerequisites



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

Steps

1. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system cover.
3. Ensure that the following components are properly installed:
 - cooling shroud
 - expansion card risers (if installed)
 - expansion cards
 - power supply unit(s)
 - cooling fan assembly (if installed)
 - cooling 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.

Next steps

If the problem persists, see the Getting help section.


Related Links


[Getting help](#)


[Using system diagnostics](#)

Troubleshooting the system battery

Prerequisites

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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.

Steps

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

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


Next steps

If the problem persists, see the Getting help section.

Related Links

[Getting help](#)

Troubleshooting power supply units

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Troubleshooting power source problems

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

Power supply unit problems

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



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

If the problem persists, see the Getting help section.

Related Links

[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.

Troubleshooting cooling fans

Prerequisites



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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.

Steps

1. Remove the system cover.
2. Reseat the fan or the fan's power cable.
3. Install the system cover.
4. Restart the system.

Next steps

If the problem persists, see the Getting help section.

Related Links

[Before working inside your system](#)

[Safety instructions](#)

[Getting help](#)


Troubleshooting system memory

Prerequisites



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Steps

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.

Next steps

If the problem persists, see the Getting help section.



Related Links

[Using system diagnostics](#)

[Getting help](#)

Troubleshooting a hard drive

Prerequisites

-  **CAUTION:** This troubleshooting procedure can erase data stored on the hard drive. Before you proceed, back up all files on the hard drive.
-  **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.

Steps

1. Run the appropriate diagnostic test. See the Using system diagnostics section.
Depending on the results of the diagnostics test, proceed as 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 reseal 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.

Next steps



If the problem persists, see the Getting help section.

Related Links

[Using system diagnostics](#)

[Getting help](#)

Troubleshooting a storage controller

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

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

If the problem persists, see the Getting help section.

Related Links

[Using system diagnostics](#)

[Getting help](#)

Troubleshooting expansion cards

Prerequisites



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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.

Steps

1. Run the appropriate diagnostic test. See the Using system diagnostics section.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Ensure that each expansion card is firmly seated in its connector.
5. Install the system cover.

6. Turn on the system and attached peripherals.
7. If the problem is not resolved, turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
8. Remove the system cover.
9. Remove all expansion cards installed in the system.
10. Install the system cover.
11. Run the appropriate diagnostic test. See the Using system diagnostics section.
If the tests fail, see the Getting help section.
12. For each expansion card you removed in step 8, perform the following steps:
 - a. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
 - b. Remove the system cover.
 - c. Reinstall one of the expansion cards.
 - d. Install the system cover.
 - e. Run the appropriate diagnostic test. See the Using system diagnostics section.

Next steps

If the problem persists, see the Getting help section.

Related Links

[Using system diagnostics](#)

[Getting help](#)

Troubleshooting processors

Prerequisites



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

Steps

1. Run the appropriate diagnostics test. See the Using system diagnostics section.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Ensure that the processor and heat sink are properly installed.
5. Install the system cover.
6. Run the appropriate diagnostic test. See the Using system diagnostics section.
7. If the problem persists, see the Getting help section.

Related Links

[Using system diagnostics](#)

[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](https://dell.com/openmanagemanuals) > **OpenManage software**.

Warning messages

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



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.

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.

Related Links

[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.

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.

Locating Service Tag of your system

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

Documentation feedback

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