Dell XC630 Web-Scale Hyperconverged Appliance
Owner's Manual

Regulatory Model: E14S Series
Regulatory Type: E14S001

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.

2016 - 05

Rev. A04

Contents

1

About your system

The Dell XC630 is a web-scale converged appliance based on the Dell PowerEdge R630 that supports two processors based on the Intel Xeon E5-2600 v3 processor family, up to 24 DIMMs, and storage capacity of up to 10 drive slots.

NOTE: The system supports only internal, hot-swappable hard drives.

NOTE: In this document, HDD generically refers to both HDD and SSD.

Supported configurations

Table 1. Supported configurations

System	Configurations
Ten hard-drive systems	Ten 2.5-inch hard drives

Front-panel features and indicators

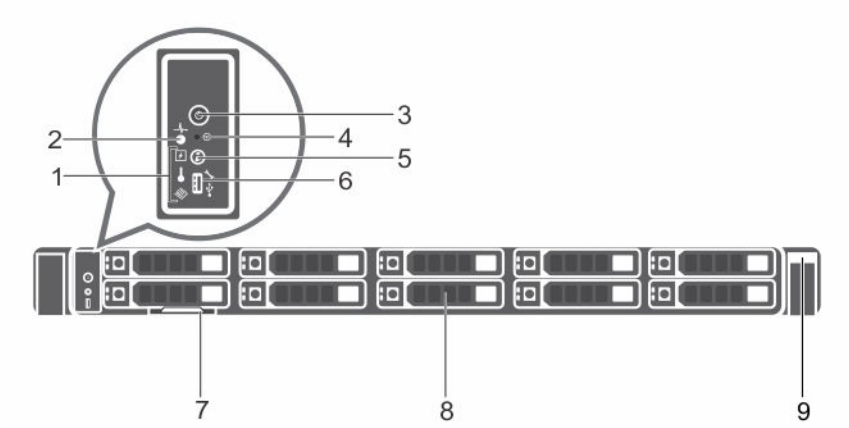

Figure 1. Front-panel features and indicators—10 hard-drive system

Table 2. Front-panel features and indicators

Item	Indicator, Button, or Connector	Icon	Description
1	Diagnostic indicators		The diagnostic indicators light up to display error status.
2	System health indicator		The system health indicator blinks amber when a system fault is detected.
3	Power-on indicator, power button		The Power-on indicator lights when the system Power is on. The Power button controls the power supply output to the system. **NOTE:** On the Advanced Configuration and Power Interface (ACPI)-compliant operating systems (OSs), turning off the system by using the power button causes the system to perform a graceful shutdown before power to the system is disconnected.
4	NMI button		Use the Non-Maskable Interrupt (NMI) button to troubleshoot software and device driver errors while running certain OSs. Press the NMI button using the end of a paper clip. Use the NMI button only if directed by qualified support personnel or by the OSs documentation.
5	System identification button		You can use the identification buttons on the front — and back panels to locate a particular system within a rack. When one of these buttons is pressed, the system status indicator on the back flashes until one of the buttons is pressed again. Press to toggle the system ID on and off. If the system stops functioning during POST, press and hold the system ID button for more than five seconds to enter the BIOS progress mode. To reset iDRAC (if not disabled by entering iDRAC Setup mode by pressing F2) press and hold the button for more than 15 seconds.
6	Mini USB connector/ iDRAC Direct		Allows you to connect USB devices to the system or provides access to the iDRAC Direct features. For more information, see the *Integrated Dell Remote Access Controller User's Guide* at **Dell.com/idracmanuals**. The port is USB 2.0-compliant.
7	Information tag		A slide-out label panel, which allows you to record system information, such as Service Tag, NIC, and MAC address.

Item	Indicator, Button, or Connector	Icon	Description
8	Hard drives (10)		Up to ten 2.5-inch hot-swappable hard drives. Up to six 2.5 hot-swappable hard drives and up to four 2.5 inch Dell PowerEdge Express Flash devices (PCIe SSDs).
9	Quick Sync		Indicates a Quick Sync enabled system. The optional Quick Sync feature requires a Quick Sync bezel. This feature allows management of the system by using mobile devices. This feature aggregates hardware or firmware inventory and various system level diagnostic and error information that can be used in troubleshooting the system. For more information, see the Integrated Dell Remote Access Controller User's Guide at **Dell.com/idracmanuals**.

Diagnostic indicators

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

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

Table 3. Diagnostic indicators

Icon	Description	Condition	Corrective action
	Health indicator	If the system is on, and in good health, the indicator lights solid blue.	None required.
		The indicator blinks amber if the system is on or in standby, and if any error exists (for example, a failed fan or hard drive).	See the System Event Log or system messages for the specific issue. For more information on error messages, see the *Dell Event and Error Messages Reference Guide* at **Dell.com/openmanagemanuals > OpenManage software**.
			Invalid memory configurations can cause the system to halt at startup without any video output. See Getting help.
	Hard drive indicator	The indicator blinks amber if a hard drive experiences an error.	See the System Event Log to determine the hard drive that has an error. Run the appropriate Online Diagnostics test. Restart system and run embedded diagnostics (ePSA).
	Electrical indicator	The indicator blinks amber if the system experiences an electrical error (for example,	See the System Event Log or system messages for the specific issue. If it is due to a problem with the power supply, check the

Icon	Description	Condition	Corrective action
		voltage out of range, or a failed power supply or voltage regulator).	LED on the power supply. Re-seat the power supply by removing and reinstalling it. If the problem persists, see Getting help.
	Temperature indicator	The indicator blinks amber if the system experiences a thermal error (for example, a temperature out of range or fan failure).	Ensure that none of the following conditions exist: • A cooling fan is removed or has failed. • System cover, cooling shroud, EMI filler panel, memory-module blank, or back-filler bracket is removed. • Ambient temperature is too high. • External airflow is obstructed. See Getting help.
	Memory indicator	The indicator blinks amber if a memory error occurs.	See the system event log or system messages for the location of the failed memory. Reinstall the memory device. If the problem persists, see Getting help.
	PCIe indicator	The indicator blinks amber if a PCIe card experiences an error.	Restart the system. Update any required drivers for the PCIe card. Re-install the card. If the problem persists, see Getting help. NOTE: For more information on supported PCIe cards, see Expansion card installation guidelines.

Hard drive indicator codes

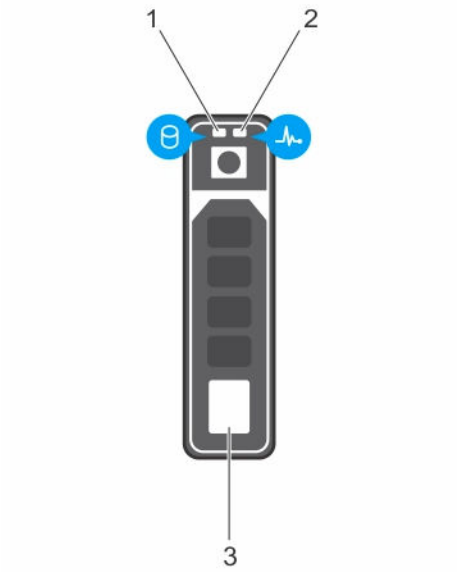

Figure 2. Hard drive indicators

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 4. Hard drive indicators

Drive-status indicator pattern	Condition
Blinks green two times per second	Identifying drive or preparing for removal.
Blinks amber four times per second	Drive failed
Steady green	Drive online

iDRAC Direct LED indicator codes

NOTE: The iDRAC Direct LED indicator does not light up for the USB mode.

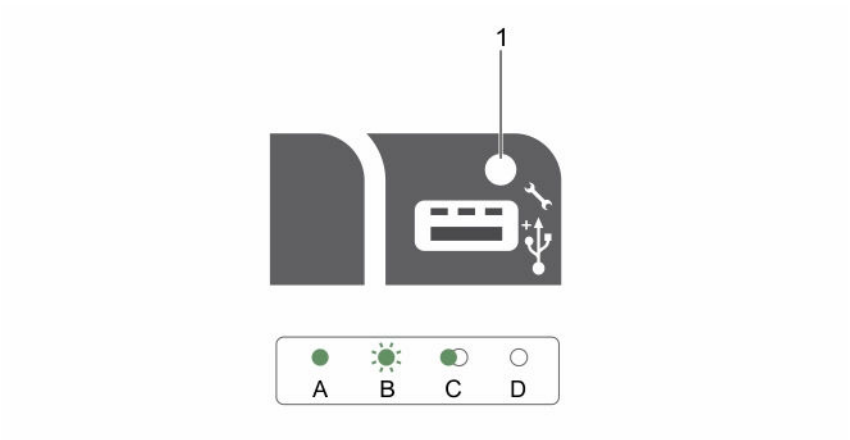

Figure 3. iDRAC Direct LED indicator

1. iDRAC Direct status indicator

The table below displays iDRAC Direct activity when configuring iDRAC Direct by using the management port (USB XML Import).

Table 5. iDRAC Direct LED indicator using management port

Convention	iDRAC Direct LED indicator pattern	Condition
A	Green	Lights green for a minimum of 2 seconds at the beginning and end of a file transfer.
B	Flashing green	Indicates file transfer or any operation tasks.
C	Green and turns off	Indicates that the file transfer is complete.
D	Not lit	Indicates that the USB is ready to be removed or that a task is complete.

The table below displays iDRAC Direct activity when configuring iDRAC Direct using your laptop and cable (Laptop Connect).

Table 6. iDRAC Direct LED indicator using laptop and cable

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

Back-panel features and indicators

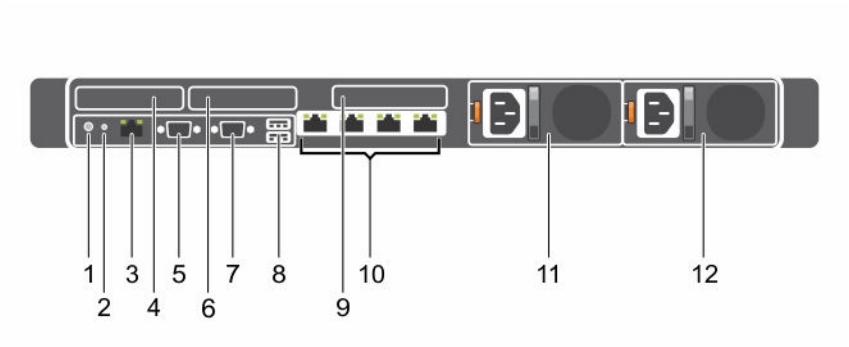

Figure 4. Back-panel features and indicators–10 hard-drive system (3 PCIe expansion cards)

Table 7. Back-panel features and indicators

Item	Indicator, Button, or Connector	Icon	Description
1	System identification button		The identification buttons on the front and back panels can be used to locate a particular system within a rack. **10 Hard-Drive System**: When one of these buttons is pressed, the system status indicator on the back flashes until one of the buttons is pressed again. Press to toggle the System ID on and off. If the system stops responding during POST, press and hold the System ID button for more than five seconds to enter BIOS progress mode. To reset iDRAC (if not disabled in F2 iDRAC setup) press and hold for more than 15 seconds.
2	System identification connector		Allows you to connect the optional system status indicator assembly through the optional cable management arm.
3	iDRAC8 Enterprise port		Dedicated management port. **NOTE:** The port is available for use only if the iDRAC8 Enterprise license is installed on your system.
4	LP PCIe expansion card slot (riser 1)		Allows you to connect a low profile PCIe expansion card.
5	Serial connector		Allows you to connect a serial device to the system.

Item	Indicator, Button, or Connector	Icon	Description
6	LP PCIe expansion card slot (riser 2)		Allows you to connect a low profile PCIe expansion card.
7	Video connector		Allows you to connect a VGA display to the system.
8	USB connectors (2)		Allows you to connect USB devices to the system. The ports are USB 3.0-compliant.
9	LP PCIe expansion card slot (riser 3)		Allows you to connect a LP PCIe expansion card.
10	Ethernet connectors (4)		Four integrated 10/100/1000 Mbps NIC connectors or Four integrated connectors: • Two integrated 10/100/1000 Mbps NIC connectors • Two integrated 100 Mbps/1 Gbps/10 Gbps SFP + connectors
11	Power supply unit (PSU1)		AC 495 W, 750 W, or 1100 W
12	Power supply unit (PSU2)		DC 750 W or 1100 W

NIC indicator codes

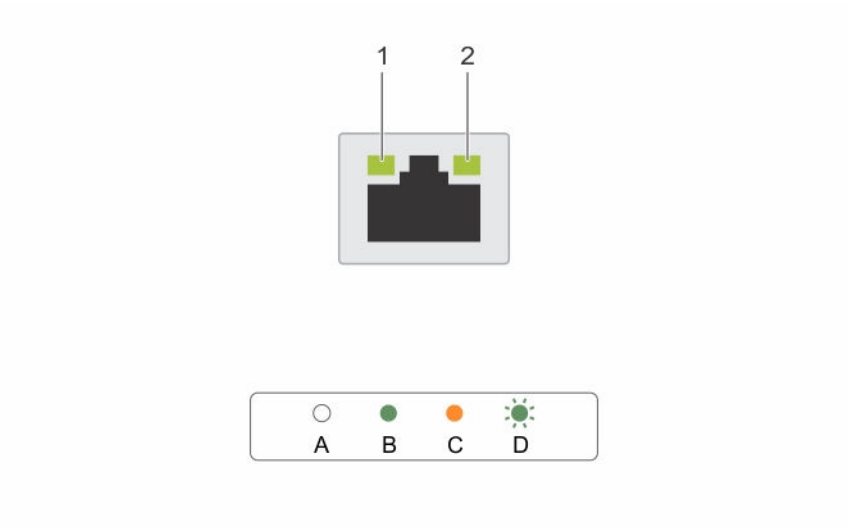

Figure 5. NIC indicators

1. link indicator
2. activity indicator

Table 8. NIC indicators

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

Power indicator codes

Each AC power supply unit (PSU) has an illuminated translucent handle and each DC power supply unit (when available) has an LED that serves as an indicator to show whether power is present or a power fault has occurred.

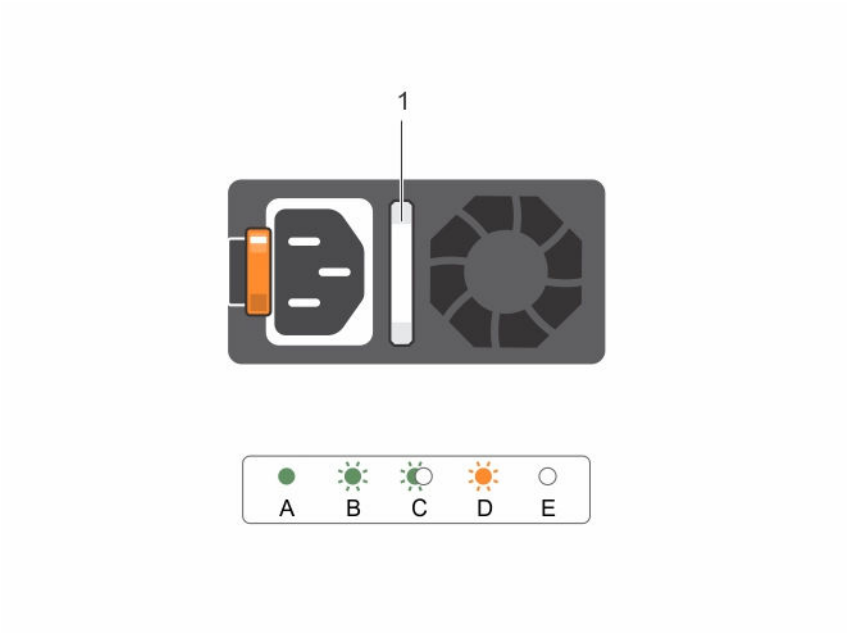

Figure 6. AC power supply unit status indicator

1. AC power supply unit status indicator/handle

Table 9. AC power indicators

Convention	Power indicator pattern	Condition
A	Green	The handle indicator lights green indicating that a valid power source is connected to the power supply unit and that the power supply unit is operational.
B	Flashing green	When updating the firmware of the power supply unit, the power supply unit handle flashes green.
C	Flashing green and turns off	When hot-adding a power supply unit (PSU), the power supply unit handle flashes green five times at 4 Hz rate and turns off. This indicates that the power supply unit is mismatched with the other power supply unit (in terms of efficiency, feature set, health status, and supported voltage). Replace the power supply unit that has the flashing indicator with a power supply unit that matches the capacity of the other installed power supply unit. **NOTE:** For AC power supply units, use only PSUs with the Extended Power Performance (EPP) label on the back. Mixing PSUs from previous generations of servers can result in a PSU mismatch condition or failure to power on.
D	Flashing amber	Indicates a problem with the power supply unit. **CAUTION: When correcting a power supply unit mismatch, replace only the power supply unit with the flashing indicator. Swapping the opposite power supply unit to make a matched pair can result in an error condition and unexpected system shutdown. To change from a High Output configuration to a Low Output configuration or vice versa, you must power down the system.** **CAUTION: AC power supplies support both 220 V and 110 V input voltages. When two identical power supplies receive different input voltages with the exception of Titanium power supplies, which support only 220 V. When two identical power supplies receive different input voltages, they can output different wattages, and trigger a mismatch.** **CAUTION: If two power supplies are used, they must be of the same type and have the same maximum output power.** **CAUTION: Combining AC and DC power supplies is not supported and triggers a mismatch.**
E	Not lit	Power is not connected.

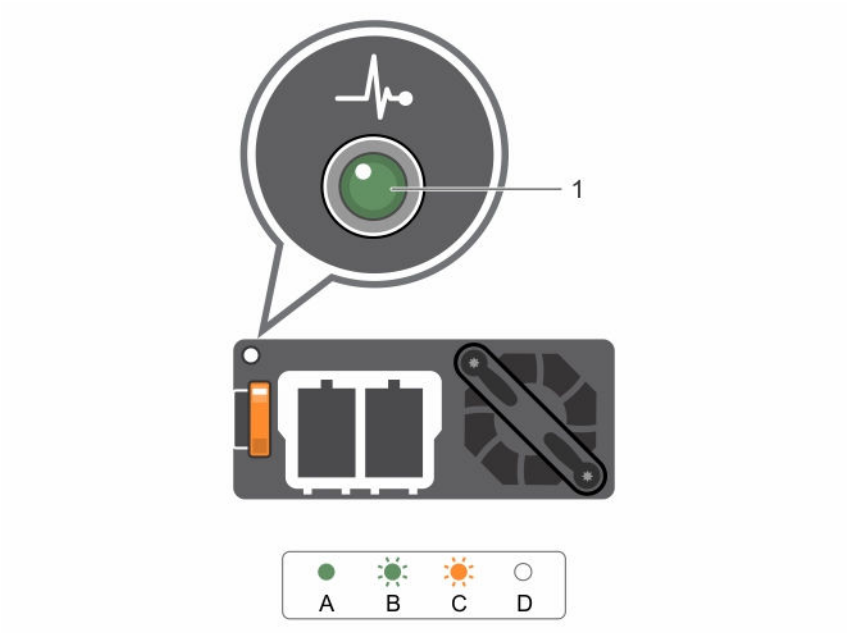

Figure 7. DC power supply unit status indicator

1. DC power supply unit status indicator

Table 10. DC power indicator

Convention	Power indicator pattern	Condition
A	Green	The handle/LED indicator lights green indicating that a valid power source is connected to the power supply unit and that the power supply unit is operational.
B	Flashing green	When hot-adding a power supply unit, power supply unit LED flashes green. This indicates that the power supply unit is mismatched with the other power supply unit (in terms of efficiency, feature set, health status, and supported voltage). Replace the power supply unit that has the flashing indicator with a power supply unit that matches the capacity of the other installed power supply unit.
C	Flashing amber	Indicates a problem with the power supply unit. △ **CAUTION: When correcting a power supply unit mismatch, replace only the power supply unit with the flashing indicator. Swapping the opposite power supply unit to make a matched pair can result in an error condition and unexpected system shutdown. To change from a High Output configuration to a Low Output configuration or vice versa, you must power down the system.**

Convention	Power indicator pattern	Condition
		CAUTION: AC power supplies support both 220 V and 110 V input voltages with the exception of Titanium power supplies, which support only 220 V. When two identical power supplies receive different input voltages, they can output different wattages, and trigger a mismatch. **CAUTION: If two power supplies are used, they must be of the same type and have the same maximum output power.** **CAUTION: Combining AC and DC power supplies is not supported and triggers a mismatch.**
D	Not lit	Power is not connected.

Documentation references

For information about the Dell documents, see the Support Matrix specific for your product.

For information about the Nutanix documents that applies to a specific release of Nutanix solution software, see the Support Matrix specific for your product.

Quick Resource Locator

Use the Quick Resource Locator (QRL) to get immediate access to system information and how-to videos. This can be done by visiting **Dell.com/QRL** or by using your smartphone or tablet and a model specific Quick Resource (QR) code located on your Dell system. To try out the QR code, scan the following image.

Figure 8. Quick Resource Locator

2

Performing initial system configuration

After you receive your system, you must set it up, install the operating system if it is not pre-installed, and set up and configure the system iDRAC IP address.

Setting up your system

1. Unpack the server.
2. Install the server into the rack. For more information on installing the server into the rack, see your system's *Rack Installation Placemat* at **Dell.com/xcseriesmanuals**.
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 using iDRAC.
6. Turn on the attached peripherals.

Methods of 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
- Lifecycle Controller
- Dell Deployment Toolkit
- Server LCD panel

You can configure iDRAC IP using:

1. iDRAC Web Interface.
   For more information on setting up and configuring iDRAC, see the *Integrated Dell Remote Access Controller User's Guide*.
2. 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*.
3. Remote Services that includes Web Services Management (WS-Man).
   For more information, see the *Lifecycle Controller Remote Services Quick Start Guide*.

Information about logging in to iDRAC

You can log in to iDRAC as an iDRAC local user, a Microsoft Active Directory user, or a Lightweight Directory Access Protocol (LDAP) user. You can also log in by using Single Sign-On or a Smart Card. The default user name is **root** and password is **calvin**. For more information on logging in to iDRAC and

iDRAC licenses, see the *Integrated Dell Remote Access Controller User's Guide* at **Dell.com/idracmanuals**.

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

Methods of installing the operating system

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

- Dell Systems Management Tools and Documentation media. See the operating system documentation at **Dell.com/operatingsystemmanuals**.
- Dell Lifecycle Controller. See the Lifecycle Controller documentation at **Dell.com/idracmanuals**.
- Dell OpenManage Deployment Toolkit. See the OpenManage documentation at **Dell.com/openmanagemanuals**.

For information on the list of operating systems supported on your system, see the operating systems support matrix at **Dell.com/ossupport**.

Remote management

To perform out-of-band systems management using iDRAC, you must 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 software and OpenManage Essentials systems management console. For more information, see **Dell.com/openmanagemanuals**.

Downloading and installing 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.

Steps

1. Go to **dell.com/support/drivers**.
2. In the upper left corner click **Support** to the right of the Home symbol, under the Support 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 and downloads**.

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

3

Pre-operating system management applications

The pre-operating system management applications for your system helps you manage different settings and features of your system without booting to the operating system.

Your system has the following pre-operating system management applications:

- System Setup
- Boot Manager
- Dell Lifecycle Controller

Dell Lifecycle Controller allows you to perform useful tasks such as configuring BIOS and hardware settings, deploying operating system, updating drivers, and saving hardware profiles. For more information about Dell Lifecycle Controller, see the documentation at **Dell.com/idracmanuals**.

Navigation keys

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

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 graphical browser only.
Esc	Moves to the previous page until you view the main screen. Pressing Esc in the main screen exits System BIOS/iDRAC Settings/Device Settings/Service Tag Settings and proceeds with system boot.
F1	Displays the System Setup help.
F2	Enables you to enter **System Setup**
F10	Enables you to enter **Dell Lifecycle Controller**

Key	Description
F11	Enables you to enter **Boot Manager**
F12	Enables you to enter **PXE boot**

About System Setup

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

NOTE: There are a several generic server settings that appear during system setup that do not apply to this system, such as RAID or UEFI.

You can access System Setup in two methods:

- Standard Graphical Browser — This is enabled by default.
- Text Browser — This is enabled by using Console Redirection.

To enable Console Redirection:

- On the **System Setup** page, click **System BIOS**.
- On the **Serial Communications** page, click **Serial Communication**, and then select **On with Console Redirection**.

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

From System Setup, you can:

- Change the NVRAM settings after you add or remove hardware
- View the system hardware configuration
- Enable or disable integrated devices
- Set performance and power management thresholds
- Manage system security

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, allow the system to finish booting, and then restart your system and try again.

   NOTE: If an error message is displayed while the system is starting, make a note of the message. For more information, see System messages.

   NOTE: After installing a memory upgrade, it is normal for your system to display a message the first time you start your system.

System Setup Main Menu

Table 11. System setup main menu

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. You can enable or disable various iDRAC parameters by using the iDRAC Settings utility. For more information about this utility, see the *Integrated Dell Remote Access Controller User's Guide* at **Dell.com/idracmanuals**.
Device Settings	Enables you to configure device settings.

Editing system BIOS screen settings

You can use the **System BIOS** screen to view the BIOS settings. You can also edit some of the settings such as Boot Order, System Password, Setup Password, and enable or disable USB ports.

Go to **System Setup Main Menu**, and then click **System BIOS**.

The **System BIOS** screen is displayed.

System BIOS screen settings

The **System BIOS** screen details are explained below.

Table 12. System BIOS

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

Menu Item	Description
	so on. It also enables or disables support for the power and NMI buttons on the system.
Miscellaneous Settings	Displays options to change the system date, time, and so on.

Editing system information

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

1. Go to **System Setup Main Menu**, and then click **System BIOS**.
2. On the **System BIOS** screen, click **System Information**.
   The **System Information** screen is displayed.

System information screen settings

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

Table 13. System information

Menu Item	Description
System Model Name	Displays the system model name.
System BIOS Version	Displays the BIOS version installed on the system.
System Management Engine Version	Displays the current revision of the Management Engine firmware.
System Service Tag	Displays the system Service Tag.
System Manufacturer	Displays the name of the system manufacturer.
System Manufacturer Contact Information	Displays the contact information of the system manufacturer.
System CPLD Version	Displays the current revision of the system CPLD firmware.
UEFI Compliance Version	Displays the system firmware UEFI compliance level.

Editing memory settings

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

1. Go to **System Setup Main Menu**, and then click **System BIOS**.
2. On the **System BIOS** screen, click **Memory Settings**.
   The **Memory Settings** screen displayed.

Memory screen settings

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

Table 14. Memory settings

Menu Item	Description
System Memory Size	Displays the amount of memory installed in the system.
System Memory Type	Displays the type of memory installed in the system.
System Memory Speed	Displays the system memory speed.
System Memory Voltage	Displays the system memory voltage.
Video Memory	Displays the amount of video memory.
System Memory Testing	Specifies whether system memory tests are run during system boot. Options are **Enabled** and **Disabled**. By default, the **System Memory Testing** option is set to **Disabled**.
Memory Operating Mode	Specifies the memory operating mode. The options available are **Optimizer Mode**, **Advanced ECC Mode**, **Mirror Mode**, **Spare Mode**, **Spare with Advanced ECC Mode**, and **Dell Fault Resilient Mode**. By default, the **Memory Operating Mode** option is set to **Optimizer Mode**. NOTE: The **Memory Operating Mode** can have different defaults and available options based on the memory configuration of your system. NOTE: The **Dell Fault Resilient Mode** establishes an area of memory that is fault resilient. This mode can be used by an operating system that supports the feature to load critical applications or enables the operating system kernel to maximize system availability.
Node Interleaving	Specifies if Non-Uniform Memory architecture (NUMA) is supported. If this field is **Enabled**, memory interleaving is supported if a symmetric memory configuration is installed. If **Disabled**, the system supports NUMA (asymmetric) memory configurations. By default, **Node Interleaving** option is set to **Disabled**.
Snoop Mode	Specifies the Snoop Mode options. Snoop Mode options available are **Home Snoop**, **Early Snoop**, **Cluster on Die**. By default, the Snoop Mode option is set to **Early Snoop**. The field is only available when Node Interleaving is **Disabled**.

Editing processor settings

You can use the **Processor Settings** screen to view the processor settings. You can also enable virtualization technology, hardware prefetcher, and logical processor idling.

1. Go to **System Setup Main Menu**, and then click **System BIOS**.
2. On the **System BIOS** screen, click **Processor Settings**.
   The **Processor Settings** screen displayed.

Processor settings screen

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

Table 15. Processor settings

Menu Item	Description
Logical Processor	Enables or disables the logical processors and displays the number of logical processors. If the **Logical Processor** option is set to **Enabled**, the BIOS displays all the logical processors. If this option is set to **Disabled**, the BIOS only displays one logical processor per core. By default, the **Logical Processor** option is set to **Enabled**.
Alternate RTID (Requestor Transaction ID) Setting	Enables you to allocate more RTIDs to the remote socket, thereby increasing cache performance between the sockets or easing work in normal mode for NUMA. By default, the **Alternate RTID (Requestor Transaction ID) Setting** is set to **Disabled**.
Virtualization Technology	Enables or disables the additional hardware capabilities provided for virtualization. By default, the **Virtualization Technology** option is set to **Enabled**.
Address Translation Service (ATS)	Defines the Address Translation Cache (ATC) for devices to cache the DMA transactions. This field provides an interface to a chipset's Address Translation and Protection Table to translate DMA addresses to host addresses. By default, the option is set to **Enabled**.
Adjacent Cache Line Prefetch	Optimizes the system for applications that require high usage of sequential memory access. By default, the **Adjacent Cache Line Prefetch** option is set to **Enabled**. You can disable this option for applications that require high usage of random memory access.
Hardware Prefetcher	Enables or disables the hardware prefetcher. By default, the **Hardware Prefetcher** option is set to **Enabled**.
DCU Streamer Prefetcher	Allows you to enable or disable the Data Cache Unit (DCU) streamer prefetcher. By default, the **DCU Streamer Prefetcher** option is set to **Enabled**.
DCU IP Prefetcher	Enables or disables the Data Cache Unit (DCU) IP prefetcher. By default, the **DCU IP Prefetcher** option is set to **Enabled**.
Execute Disable	Enables or disables the execute disable memory protection technology. By default, the **Execute Disable** option is set to **Enabled**.
Logical Processor Idling	Enables or disables the operating system capability to put logical processors in the idling state in order to reduce power consumption. By default, the option is set to **Disabled**.
Configurable TDP	Allows reconfiguration of Thermal Design Power (TDP) to lower levels. TDP refers to the maximum amount of power the cooling system is required to dissipate.
X2Apic Mode	Enables or disables the X2Apic mode.
Dell Controlled Turbo	NOTE: Depending on the number of installed CPUs, there may be up to four processor listings. Controls the turbo engagement. Enable this option only when **System Profile** is set to **Performance**.
Number of Cores per Processor	Controls the number of enabled cores in each processor. By default, the **Number of Cores per Processor** option is set to **All**.
Processor 64-bit Support	Specifies if the processor(s) support 64-bit extensions.

Menu Item	Description
Processor Core Speed	Displays the maximum core frequency of the processor.
Processor 1	NOTE: Depending on the number of installed CPUs, there may be up to four processors listings. The following settings are displayed for each processor installed in the system. • **Family-Model-Stepping**: Displays the family, model and stepping of the processor as defined by Intel. • **Brand**: Displays the brand name reported by the processor. • **Level 2 Cache**: Displays the total L2 cache. • **Level 3 Cache**: Displays the total L3 cache. • **Number of Cores**: Displays the number of cores per processor.

Editing SATA Settings

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

1. Go to **System Setup Main Menu**, and then click **System BIOS** .
2. On the **System BIOS** screen, click **SATA Settings**.
   The **SATA Settings** screen displayed.

SATA settings screen

The **SATA Settings** screen details are explained below.

Table 16. SATA settings

Menu Item	Description
Embedded SATA	Enables the embedded SATA to be set to **Off**, **ATA**, **AHCI**, or **RAID** modes. By default, the **Embedded SATA** option is set to **AHCI**.
Security Freeze Lock	Sends Security Freeze Lock command to the Embedded SATA drives during POST. This option is applicable only to ATA and AHCI mode.
Write Cache	Enables or disables the command for Embedded SATA drives during POST.
Port A	Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support. For **AHCI** mode or **RAID** mode, BIOS always enables support. **Model**: Displays the drive model of the selected device. **Drive Type**: Displays the type of drive attached to the SATA port. **Capacity**: Displays the total capacity of the hard drive. The field is undefined for removable media devices such as optical drives.
Port B	Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support.

Menu Item	Description
	For **AHCI** mode or **RAID** mode, BIOS always enables support. **Model**: Displays the drive model of the selected device. **Drive Type**: Displays the type of drive attached to the SATA port. **Capacity**: Displays the total capacity of the hard drive. The field is undefined for removable media devices such as optical drives.
Port C	Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support. For **AHCI** mode or **RAID** mode, BIOS always enables support. **Model**: Displays the drive model of the selected device. **Drive Type**: Displays the type of drive attached to the SATA port. **Capacity**: Displays the total capacity of the hard drive. The field is undefined for removable media devices such as optical drives.
Port D	Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support. For **AHCI** mode or **RAID** mode, BIOS always enables support. **Model**: Displays the drive model of the selected device. **Drive Type**: Displays the type of drive attached to the SATA port. **Capacity**: Displays the total capacity of the hard drive. The field is undefined for removable media devices such as optical drives.
Port E	Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support. For **AHCI** mode or **RAID** mode, BIOS always enables support. **Model**: Displays the drive model of the selected device. **Drive Type**: Displays the type of drive attached to the SATA port. **Capacity**: Displays the total capacity of the hard drive. The field is undefined for removable media devices such as optical drives.
Port F	Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support. For **AHCI** mode or **RAID** mode, BIOS always enables support. **Model**: Displays the drive model of the selected device. **Drive Type**: Displays the type of drive attached to the SATA port.

Menu Item	Description
	Capacity: Displays the total capacity of the hard drive. The field is undefined for removable media devices such as optical drives.
Port G	Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support. For **AHCI** mode or **RAID** mode, BIOS always enables support. **Model**: Displays the drive model of the selected device. **Drive Type**: Displays the type of drive attached to the SATA port. **Capacity**: Displays the total capacity of the hard drive. The field is undefined for removable media devices such as optical drives.
Port H	Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support. For **AHCI** mode or **RAID** mode, BIOS always enables support. **Model**: Displays the drive model of the selected device. **Drive Type**: Displays the type of drive attached to the SATA port. **Capacity**: Displays the total capacity of the hard drive. The field is undefined for removable media devices such as optical drives.
Port I	Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support. For **AHCI** mode or **RAID** mode, BIOS always enables support. **Model**: Displays the drive model of the selected device. **Drive Type**: Displays the type of drive attached to the SATA port. **Capacity**: Displays the total capacity of the hard drive. The field is undefined for removable media devices such as optical drives.
Port J	Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support. For **AHCI** mode or **RAID** mode, BIOS always enables support. **Model**: Displays the drive model of the selected device. **Drive Type**: Displays the type of drive attached to the SATA port. **Capacity**: Displays the total capacity of the hard drive. The field is undefined for removable media devices such as optical drives.

Editing boot settings screen

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

1. Go to **System Setup Main Menu**, and then click **System BIOS**.
2. On the **System BIOS** screen, click **Boot Settings**.
   The **Boot Settings** screen displayed.

Boot Settings

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

Table 17. Boot settings

Menu Item	Description
Boot Mode	Enables you to set the boot mode of the system. NOTE: This system supports only BIOS boot mode. **CAUTION: Switching the boot mode may prevent the system from booting if the operating system is not installed in the same boot mode.** NOTE: Setting this field to **UEFI** disables the **BIOS Boot Settings** menu. Setting this field to **BIOS** disables the **UEFI Boot Settings** menu. 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. By default, the **Boot Mode** option is set to **BIOS**. NOTE: This system supports only BIOS boot mode.
Boot Sequence Retry	Enables or disables the Boot Sequence Retry feature. If this field is enabled and the system fails to boot, the system reattempts the boot sequence after 30 seconds. By default, the **Boot Sequence Retry** option is set to **Enabled**.
Hard-Disk Failover	Specifies which devices in the **Hard-Disk Drive Sequence** are attempted in the boot sequence. When the option is **Disabled**, only the first hard disk device in the list is attempted to boot. When set to **Enabled**, all hard disk devices are attempted in order, as listed in the **Hard-Disk Drive Sequence**. This option is not enabled for UEFI Boot Mode.
Boot Option Settings	Configures the boot sequence and the boot devices.

Editing network settings

You can use the **Network Settings** screen to modify Preboot eXecution Environment (PXE) device settings. Network Settings are only available in UEFI boot mode. BIOS does not control network settings in the BIOS boot mode. For BIOS boot mode, the network settings are handled by the network controllers option ROM.

1. Go to **System Setup Main Menu**, and then click **System BIOS**.
2. On the **System BIOS** screen, click **Network Settings**.

The **Network Settings** screen displayed.

Network settings screen

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

Table 18. Network settings

Menu Item	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)	Allows you to control the configuration of the PXE device.

Editing integrated devices details

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.

1. Go to **System Setup Main Menu**, and then click **System BIOS**.
2. On the **System BIOS** screen, click **Integrated Devices**.
   The **Integrated Devices** screen displayed.

Integrated devices screen details

The **Integrated Devices** screen details are explained below.

Table 19. Integrated devices

Menu Item	Description
USB 3.0 Setting	Enables or disables the USB 3.0 support. Enable this option only if your operating system supports USB 3.0. If you disable this option, devices operate at USB 2.0 speed. USB 3.0 is disabled by default.
User Accessible USB Ports	Enables or disables the USB ports. Selecting **Only Back Ports On** disables the front USB ports, selecting **All Ports Off** disables all USB ports. The USB keyboard and mouse operates 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 restrict access to iDRAC features.
Internal USB Port	Enables or disables the internal USB port. By default, the option is set to **Enabled**.
Integrated RAID Controller	Enables or disables the integrated RAID controller. By default, the option is set to **Enabled**.
Integrated Network Card 1	Enables or disables the integrated network card.
Embedded NIC1 and NIC2	NOTE: The Embedded NIC1 and NIC2 option is only available on systems that do not have **Integrated Network Card 1**. Enables or disables the Embedded NIC1 and NIC2 . If set to **Disabled**, the NIC may still be available for shared network access by the embedded

Menu Item	Description
	management controller. The embedded NIC1 and NIC2 option is only available on systems that do not have NDCs. This option is mutually exclusive with the Integrated Network Card 1 option. Configure this function using the NIC management utilities of the system.
I/OAT DMA Engine	Enables or disables the I/OAT option. Enable only if the hardware and software support the feature.
Embedded Video Controller	Enables or disables the **Embedded Video Controller**. By default, the embedded video controller is **Enabled**. **Current state of Embedded Video Controller** is **Enabled**. **Current State of Embedded Video Controller** is a read only field, indicating the current state for the Embedded Video Controller. 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 **Disabled**.
Current State of Embedded Video Controller	Displays the current state of the **Embedded Video Controller**. **Current State of Embedded Video Controller** is a read only field, indicating the current state for the Embedded Video Controller.
SR-IOV Global Enable	Enables or disables the BIOS configuration of Single Root I/O Virtualization (SR-IOV) devices. By default, the **SR-IOV Global Enable** option is set to **Enabled**.
OS Watchdog Timer	If your system stops responding, this OS Watchdog Timer aids in the recovery of your operating system. When this field is set to **Enabled**, the operating system is allowed to initialize the timer. When the option is set to **Disabled** (the default), the timer has no effect on the system.
Memory Mapped I/O above 4GB	Enables or disables the support for PCIe devices that require large amounts of memory. By default, the option is set to **Enabled**.
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. Slot disablement must be used only when the installed peripheral card is preventing booting into the operating system or causing delays in system startup. If the slot is disabled, both the Option ROM and UEFI driver are disabled.

Editing serial communication settings

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

1. Go to **System Setup Main Menu**, and then click **System BIOS**.
2. On the **System BIOS** screen, click **Serial Communication**.
   The **Serial Communication** screen is displayed.

Serial Communication screen settings

The **Serial Communication** screen details are explained below.

Table 20. Serial communication

Menu Item	Description
Serial Communication	Selects serial communication devices (Serial Device 1 and Serial Device 2) in the BIOS. This is where you can select BIOS console redirection and specify the port address. By default, **Serial Communication** option is set to **Auto**.
Serial Port Address	With Serial Communication, you can set the port address for serial devices. By default, the **Serial Port Address** option is set to **Serial Device 1=COM2, Serial Device 2=COM1** NOTE: You can only use Serial Device 2 for Serial Over LAN (SOL). To use console redirection by SOL, configure the same port address for console redirection and the serial device. NOTE: Every time the system boots, the BIOS syncs the serial MUX setting saved in iDRAC. The serial MUX setting can independently be changed in iDRAC. Therefore, 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.
External Serial Connector	With the External Serial Connector, you can associate the External Serial Connector to Serial Device 1, Serial Device 2, or the Remote Access Device using this field. NOTE: You can only use Serial Device 2 for Serial Over LAN (SOL). To use console redirection by SOL, configure the same port address for console redirection and the serial device. NOTE: Every time the system boots, the BIOS syncs the serial MUX setting saved in iDRAC. The serial MUX setting can independently be changed in iDRAC. Therefore, loading the BIOS default settings from within the BIOS setup utility may not always revert this setting to the default setting of Serial Device 1.
Failsafe Baud Rate	Displays 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. By default, the **Failsafe Baud Rate** option is set to **115200**.
Remote Terminal Type	Sets the remote console terminal type. By default, the **Remote Terminal Type** option is set to **VT 100/VT 220**.
Redirection After Boot	Enables or disables the BIOS console redirection when the operating system is loaded. By default, the **Redirection After Boot** option is set to **Enabled**.

Editing system profile

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

1. Go to **System Setup Main Menu**, and then click **System BIOS**.
2. On the **System BIOS** screen, click **System Profile Settings**.
   The **System Profile Settings** screen is displayed.

System profile screen settings

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

Table 21. System profile settings

Menu Item	Description
System Profile	Sets the system profile. If you set the **System Profile** option to a mode other than **Custom**, the BIOS automatically sets the rest of the options. You can only change the rest of the options if the mode is set to **Custom**. By default, the **System Profile** option is set to **Performance Per Watt Optimized (DAPC)**. DAPC is Dell Active Power Controller. NOTE: The following parameters are available only when the **System Profile** is set to **Custom**. • **CPU Power Management**: Sets the CPU power management. By default, the **CPU Power Management** option is set to **System DBPM (DAPC)**. 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 turbo boost mode. By default, the **Turbo Boost** option is set to **Enabled**. • **Energy Efficient Turbo**: Enables or disables the **Energy Efficient Turbo**. Energy Efficient Turbo (EET) is a mode of operation where a processor's core frequency is adjusted within the turbo range based on workload. • **C1E**: Enables or disables the processor to switch to a minimum performance state when it is idle. By default, the **C1E** option is set to **Enabled**. • **C States**: Enables or disables the processor to operate in all available power states. By default, the **C States** option is set to **Enabled**. • **Collaborative CPU Performance Control**: Enables or disables the CPU power management. When set to **Enabled**, the CPU power management is controlled by the OS DBPM and the System DBPM (DAPC). By default, the option is set to **Disabled**. • **Memory Patrol Scrub**: Sets the memory patrol scrub frequency. By default, the **Memory Patrol Scrub** option is set to **Standard**. • **Memory Refresh Rate**: Sets the memory refresh rate to either 1x or 2x. By default, the **Memory Refresh Rate** option is set to **1x**. • **Uncore Frequency**: Selects the **Processor Uncore Frequency**. Dynamic mode allows 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**. • **Energy Efficient Policy**: Enables you to selects the **Energy Efficient Policy**. The CPU uses the setting to manipulate the internal behavior of the processor and determines whether to target higher performance or better power savings. • **Number of Turbo Boot Enabled Cores for Processor 1**: NOTE: If there are two processors installed in the system, you see an entry for **Number of Turbo Boost Enabled Cores for Processor 2**. Controls the number of turbo boost enabled cores for processor 1. By default, the maximum number of cores is enabled. • **Monitor/Mwait**: Enables the Monitor/Mwait instructions in the processor. By default, the Monitor/Mwait option is set to **Enabled** for all system profiles, except **Custom**.

Menu Item	Description
	NOTE: You can only disable this option if **C States** option in **Custom** mode is disabled. NOTE: When **C States** is enabled in **Custom** mode, changing the Monitor/Mwait setting does not impact system power/performance.

Editing system security

You can use the **System Security** screen to edit some settings such as setting the system password, setup password and disabling the power button.

1. Go to **System Setup Main Menu**, and then click **System BIOS**.
2. On the **System BIOS** screen, click **System Security**.
   The **System Security** screen is displayed.

System security screen settings

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

Table 22. System security settings

Menu Item	Description
Intel AES-NI	Improves the speed of applications by performing encryption and decryption using the Advanced Encryption Standard Instruction Set and 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. By default, the **Password Status** option is set to **Unlocked**.
TPM Security	NOTE: The TPM menu is available only when the TPM module is installed. Allows you to control the reporting mode of the Trusted Platform Module (TPM). By default, the **TPM Security** option is set to **Off**. 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. By default, the **TPM Activation** option is set to **No Change**.
TPM Status	Displays 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. By default, the **TPM Clear** option is set to **No**.
Intel TXT	Enables or disables the Intel Trusted Execution Technology (TXT). To enable **Intel TXT**, Virtualization Technology must be enabled and TPM

Menu Item	Description
	Security must be **Enabled** with Pre-boot measurements. By default, the **Intel TXT** option is set to **Off**
Power Button	Enables or disables the Power button on the front of the system. By default, the **Power Button** option is set to **Enabled**.
NMI Button	Enables or disables the NMI button on the front of the system. By default, the **NMI Button** option is set to **Disabled**.
AC Power Recovery	Sets how the system reacts after AC power is restored to the system. By default, the **AC Power Recovery** option is set to **Last**.
AC Power Recovery Delay	Sets how the system supports staggering of power up after AC power is restored to the system. By default, the **AC Power Recovery Delay** option is set to **Immediate**.
User Defined Delay (60s to 240s)	Sets the **User Defined Delay** 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 using the certificates in the Secure Boot Policy. Secure Boot is disabled by default.
Secure Boot Policy	When Secure Boot policy is **Standard**, the BIOS uses the system manufacturer's key and certificates to authenticate pre-boot images. When Secure Boot policy is **Custom**, the BIOS uses the user-defined key and certificates. Secure Boot policy is **Standard** by default.
Secure Boot Policy Summary	Displays the list of certificates and hashes that secure boot uses to authenticate images.

Secure Boot Custom Policy Settings screen

Secure Boot Custom Policy Settings is displayed only when **Secure Boot Policy** is set to **Custom**.
In the **System Setup Main Menu**, click **System BIOS → System Security → Secure Boot Custom Policy Settings**.

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

Table 23. Secure boot custom policy settings

Menu Item	Description
Platform Key	Imports, exports, deletes, or restores the platform key (PK).
Key Exchange Key Database	Allows 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).

Editing miscellaneous settings

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

1. Go to **System Setup Main Menu**, and then click **System BIOS**.
2. On the **System BIOS** screen, click **Miscellaneous Settings**.
   The **Miscellaneous Settings** screen displays.

Miscellaneous settings screen

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

Table 24. Miscellaneous settings

Menu Item	Description
System Time	System Time lets you set the time on the system.
System Date	System Date lets you set the date on the system.
Asset Tag	Displays the asset tag and lets you to modify it for security and tracking purposes.
Keyboard NumLock	Keyboard NumLock lets you set whether the system boots with the NumLock enabled or disabled. By default the **Keyboard NumLock** is set to **On**. NOTE: This option does not apply to 84-key keyboards.
F1/F2 Prompt on Error	Enables or disables the F1/F2 prompt on error. By default, **F1/F2 Prompt on Error** is set to **Enabled**. The F1/F2 prompt also includes keyboard errors.
Load Legacy Video Option ROM	You can 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 only for UEFI boot mode. You cannot set this to **Enabled** if **UEFI Secure Boot** mode is enabled.
In-System Characterization	This option enables or disables **In-System Characterization**. By default, **In-System Characterization** is set to **Disabled**. 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) runs during POST upon detecting relevant change(s) in system configuration to optimize system power and performance. ISC takes about 20 seconds to run, and system reset is required for ISC results to be applied. The **Enabled - No Reboot**

Menu Item	Description
	option runs ISC and continues without applying ISC results until the next time system reset occurs. The **Enabled** option runs 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 run.

About Boot Manager

With Boot Manager you can add, delete, and arrange boot options. You can also access System Setup and boot options without restarting the system.

Entering Boot Manager

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

1. Turn on or restart your system.
2. Press F11 when you see the message `F11 = Boot Manager`.

   If your operating system begins to load before you press F11, allow the system to finish 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	Displays the boot menu where you can select a one time boot device to boot from.
Launch System Setup	Allows you to access the System Setup.
Launch Lifecycle Controller	Closes the Boot Manager and invokes the Dell Lifecycle Controller program.
System Utilities	Opens system utilities menu such as system diagnostics and UEFI shell.

Changing the boot order

You may have to change the boot order if you want to boot from a USB key or an optical drive. The instructions given here 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 + and - keys to move the device down-or up in the order.
4. Click **Exit**, and then click **Yes** to save the settings on exit.

Choosing the system boot mode

With System Setup, you can to specify the boot mode for installing your operating system:

- BIOS boot mode (the default) is the standard BIOS-level boot interface.
- UEFI boot mode is an enhanced 64-bit boot interface based on Unified Extensible Firmware Interface (UEFI) specifications that overlays the system BIOS.

You must select the boot mode in the **Boot Mode** field of the **Boot Settings** screen of System Setup. Once you specify the boot mode, the system boots in the specified boot mode and you then proceed to install your operating system from that mode. Thereafter, you must boot the system in the same boot mode (BIOS or UEFI) to access the installed operating system. Trying to boot the operating system from the other boot mode causes the system to halt at startup.

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 on supported operating systems, go to **Dell.com/ossupport**.

Assigning a system and setup password

Prerequisites

NOTE: The password jumper enables or disables the System Password and Setup Password features. For more information about the password jumper settings, see System board connectors.

You can assign a new **System Password** and **Setup Password** or change an existing **System Password** and **Setup Password** only when the password jumper setting is **enabled** and **Password Status** is **Unlocked**.

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.

About this task

To assign a **System Password** and **Setup Password**, follow the steps below:

Steps

1. To go to system setup, press F2 immediately after a power-on or reboot.
2. On the **System Setup Main Menu** screen, select **System BIOS**, and then press Enter.
3. On the **System BIOS** screen, select **System Security**, and then press Enter.
4. On the **System Security** screen, verify that **Password Status** is **Unlocked**.
5. Select **System Password**, enter your system password, and then 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: white space, (”), (+), (,), (-), (.), (/), (;), ([), (\), (]), (`).

   A message prompts you to reenter the system password.
6. Reenter the system password and click **OK**.

7. Select **Setup Password**, enter your system password and press Enter or Tab.
   A message prompts you to re-enter the setup password.
8. Reenter the setup password and click **OK**.
9. 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.

Deleting or changing an existing system password and setup password

Prerequisites

Ensure that the Password jumper is set to enabled and the **Password Status** is **Unlocked** before attempting to delete or change the existing System and/or Setup password. You cannot delete or change an existing System or Setup password if the **Password Status** is **Locked**.

Steps

1. To go to system setup, press F2 immediately after a power on or restart.
2. On the **System Setup Main Menu** screen, select **System BIOS**, and then press Enter.
   The **System BIOS** screen is displayed.
3. On the **System BIOS** screen, select **System Security**, and then press Enter.
   The **System Security** screen is displayed.
4. On the **System Security** screen, verify that **Password Status** is **Unlocked**.
5. Select **System Password**, alter or delete the existing system password and press Enter or Tab.
6. Select **Setup Password**, alter or delete the existing setup password and 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.
7. Press Esc to return to the **System BIOS** screen. Press Esc again, and a message prompts you to save the changes.

4

Installing and removing system components

Safety instructions

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

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

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

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

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

NOTE: To ensure of proper operation and cooling, you must populate all bays in the system at all times with either a module or with a blank.

Before working inside your system

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.
   For more information, see Removing the front bezel.
4. Remove the system cover.
   For more information, see Removing the system cover.

After working inside your system

1. Install the system cover.
   For more information, see Installing the system cover.
2. Install the optional bezel.
   For more information, see Installing the front bezel.
3. Reconnect the system to its electrical outlet and peripherals.
4. Turn the system on, including any attached peripherals.

Recommended tools

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

- Key to the bezel lock. This is only required when you have a bezel.
- #2 Phillips screwdriver

The following tools are required for assembling cables for a DC power supply unit (PSU):

- AMP 90871-1 hand-crimping tool or equivalent
- Tyco Electronics 58433-3 or equivalent
- Wire-stripper pliers capable of removing insulation from size 10 AWG solid or stranded, insulated copper wire

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

Front bezel (optional)

Removing the front bezel

1. Unlock the bezel lock at the left end of the bezel.
2. Lift the release latch next to the bezel lock.
3. Pull the left end of the bezel, unhook the right end and remove the bezel.

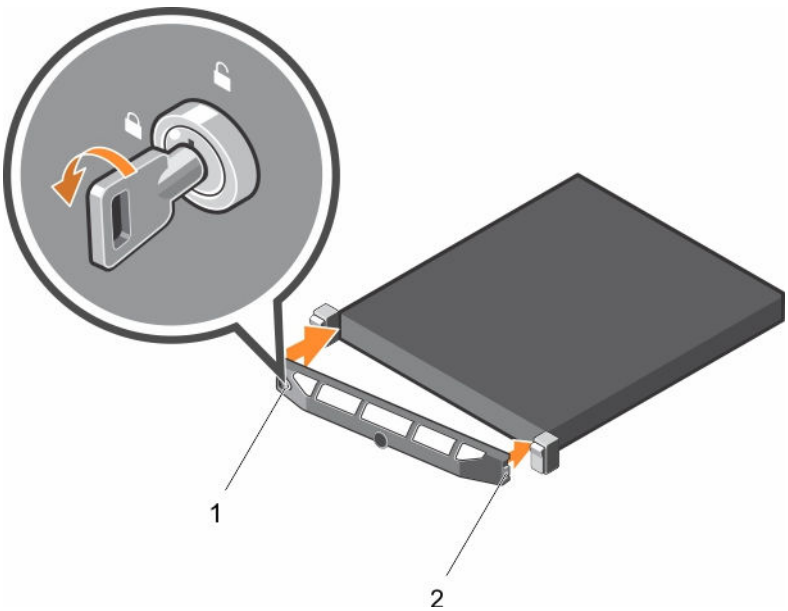

Figure 9. Removing and installing the front bezel

Installing the front bezel

1. Hook the right end of the bezel onto the chassis.
2. Fit the free end of the bezel onto the system.
3. Secure the bezel with the keylock.

Removing the system cover

Prerequisites

1. Ensure that you read the Safety instructions.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and peripherals.
4. Remove the optional bezel. For more information, see Removing the front bezel.

Steps

1. Turn the latch release lock to the unlock position.
2. Lift the cover release latch and remove the system cover.

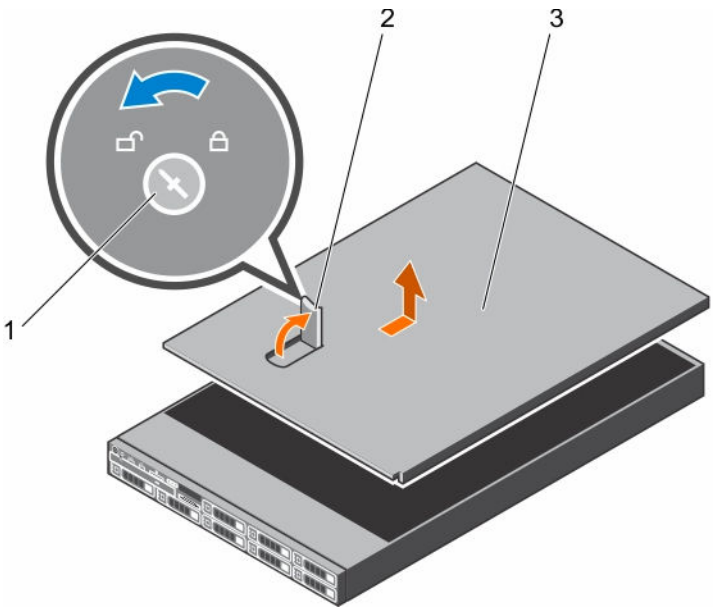

Figure 10. Removing and installing the system

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

Installing the system cover

Prerequisites

Ensure that you read the Safety instructions.

Steps

1. Align the slots of the system cover with the tabs on the chassis.
2. Press the cover release latch, and push the cover toward the front of the chassis until the latch locks into place.
3. Turn the latch release lock clockwise to the locked position.
4. Install the optional bezel.
5. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

Inside the system

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

NOTE: Components that are hot-swappable are marked orange and touch points on the components are marked blue.

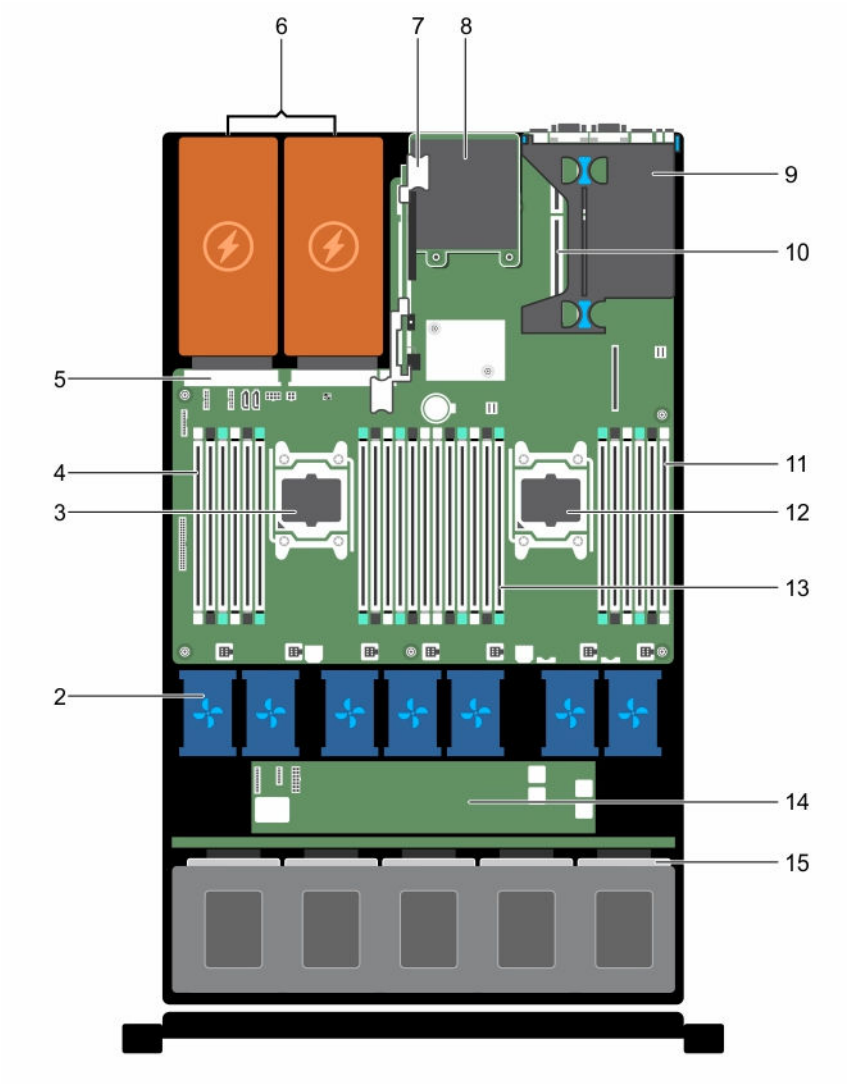

Figure 11. Inside the system—10 hard-drive system

1. control panel assembly
2. cooling fans (7)
3. processor 1
4. DIMMs (6)
5. PSU connector
6. power supply (2)
7. riser card 3
8. network daughter card
9. riser card 1
10. riser card 2
11. DIMMs (6)
12. processor 2
13. DIMMs (12)
14. expander board
15. hard drive

Cooling shroud

Removing the cooling shroud

Prerequisites

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside 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.

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.

Steps

Hold the touch points and lift the shroud away from the system.

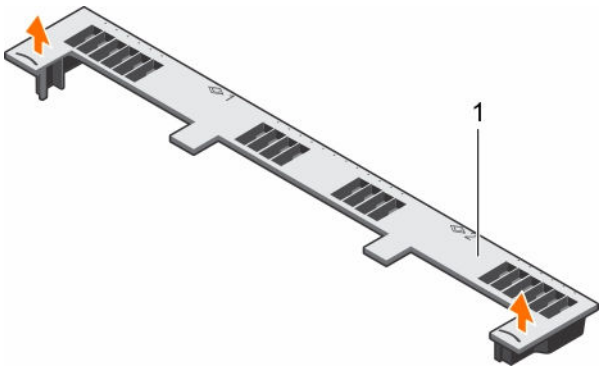

Figure 12. Removing and installing the cooling shroud

1. cooling shroud

Next steps

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

Installing the cooling shroud

Prerequisites

- Ensure that you read the Safety instructions.

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

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

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.

Next steps

Follow the procedure listed in After working inside your system.

System memory

Your system supports DDR4 registered DIMMs (RDIMMs), and load reduced DIMMs (LRDIMMs).

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

Memory bus operating frequency can be 1333 MT/s, 1600 MT/s, 1866 MT/s, or 2133 MT/s depending on the following factors:

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

The system contains 24 memory sockets split into two sets of 12 sockets, one set per processor. Each 12-socket set is organized into four channels. In each channel, the release levers of the first socket are marked white, the second socket black, and the third socket green.

NOTE: DIMMs in sockets A1 to A12 are assigned to processor 1 and DIMMs in sockets B1 to B12 are assigned to processor 2.

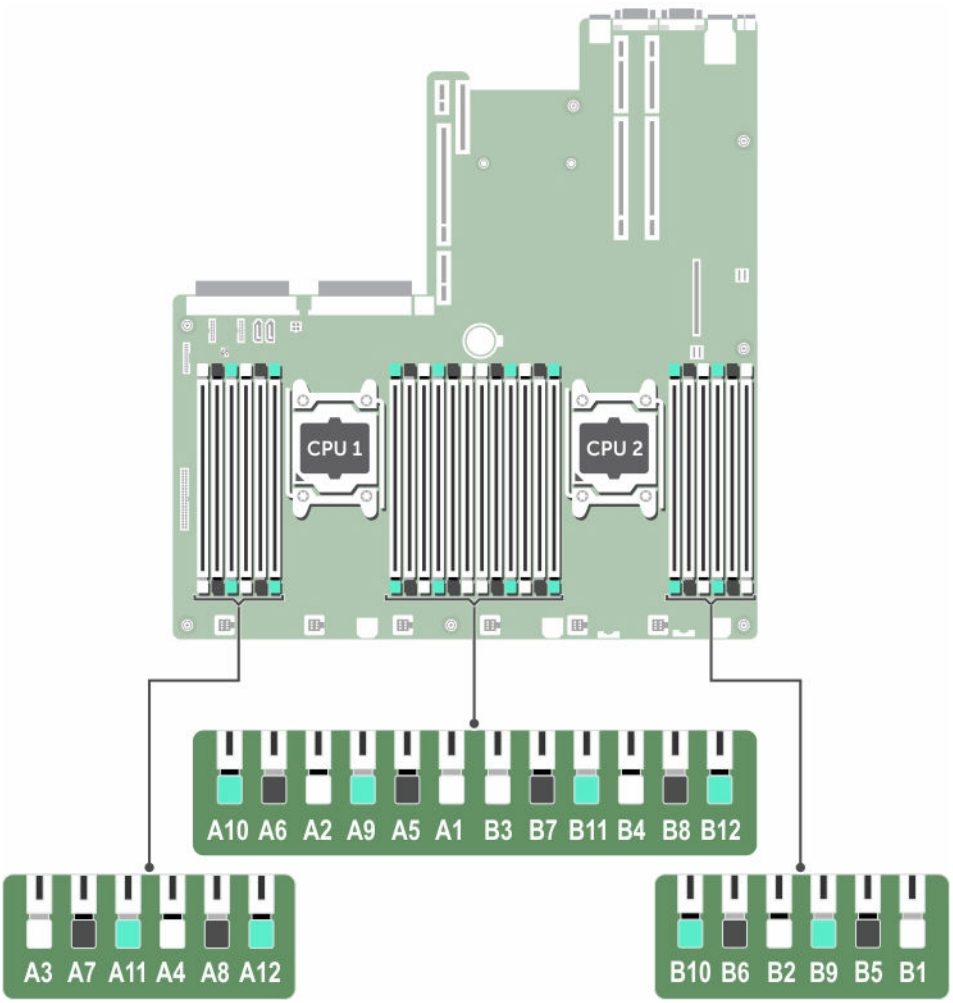

Figure 13. Memory socket locations

Memory channels are organized as follows:

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

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

Table 25. Sample memory configuration

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

General memory module installation guidelines

This system supports Flexible Memory Configuration, which lets you configure the system to run in any valid chipset architectural configuration. The following are the recommended guidelines for installing memory modules:

- RDIMMs and LRDIMMs must not be mixed.
- x4 and x8 DRAM based DIMMs can be mixed. For more information, see Mode-specific guidelines.
- Up to three dual- or single-rank RDIMMs can be populated per channel.
- Up to three LRDIMMs can be populated per channel regardless of rank count.
- Populate DIMM sockets only if a processor is installed. For single-processor systems, sockets A1 to A12 are available. For dual-processor systems, sockets A1 to A12 and sockets B1 to B12 are available.
- Populate all sockets with white release tabs first, then black, and then green.
- Populate the sockets by highest rank count in the following order — first in sockets with white release levers, then black, and then green. For example, if you want to mix single-rank and dual-rank DIMMs, populate dual-rank DIMMs in the sockets with white release tabs and single-rank DIMMs in the sockets with black release tabs.
- When mixing memory modules with different capacities, populate the sockets with memory modules with highest capacity first. For example, if you want to mix 4 GB and 8 GB DIMMs, populate 8 GB DIMMs in the sockets with white release tabs and 4 GB DIMMs in the sockets with black release tabs.
- In a dual-processor configuration, the memory configuration for each processor must be identical. For example, if you populate socket A1 for processor 1, then populate socket B1 for processor 2, and so on.
- Memory modules of different capacities can be mixed provided other memory population rules are followed (for example, 4 GB and 8 GB memory modules can be mixed).
- Mixing of more than two DIMM capacities in a system is not supported.
- Populate four DIMMs per processor (one DIMM per channel) at a time to maximize performance.

Mode-specific guidelines

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

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

The following sections provide additional slot population guidelines for each mode:

Advanced ECC (lockstep)

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

Memory installation guidelines:

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

NOTE: Advanced ECC with Mirroring is not supported.

Memory optimized (independent channel) mode

This mode supports SDDC only for memory modules that use x4 device width, and the mode does not impose any specific slot population requirements.

Memory sparing

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

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

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

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

NOTE: Both Advanced ECC/Lockstep and Optimizer modes support Memory Sparing.

Memory mirroring

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

Memory installation guidelines:

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

Sample memory configurations

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

NOTE: 1R, 2R, and 4R in the following tables indicate single-, dual-, and quad-rank DIMMs respectively.

Table 26. Memory configurations—two processors

System capacity (in GB)	DIMM size (in GB)	Number of DIMMs	DIMM rank, organization, and frequency	DIMM slot population
64	16	4	2R, x4, 2133 MT/s, 2R, x4, 1866 MT/s,	A1, A2, B1, B2
128	16	8	2R, x4, 2133 MT/s, 2R, x4, 1866 MT/s,	A1, A2, A3, A4, B1, B2, B3, B4
256	16	16	2R, x4, 2133 MT/s, 2R, x4, 1866 MT/s,	A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4, B5, B6, B7, B8
384	16	24	2R, x4, 2133 MT/s, 2R, x4, 1866 MT/s,	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12
512	32	16	LRDIMM, 4R, x4, 2133 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4, B5, B6, B7, B8
768	32	24	RDIMM, 4R, x4, 2133 MT/s LRDIMM, 4R, x4, 2133 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12
1500	64	24	RDIMM, 4R, x4, 2133 MT/s LRDIMM, 4R, x4, 1600 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12

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. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
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 of proper system cooling, you must install memory-module blanks 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.

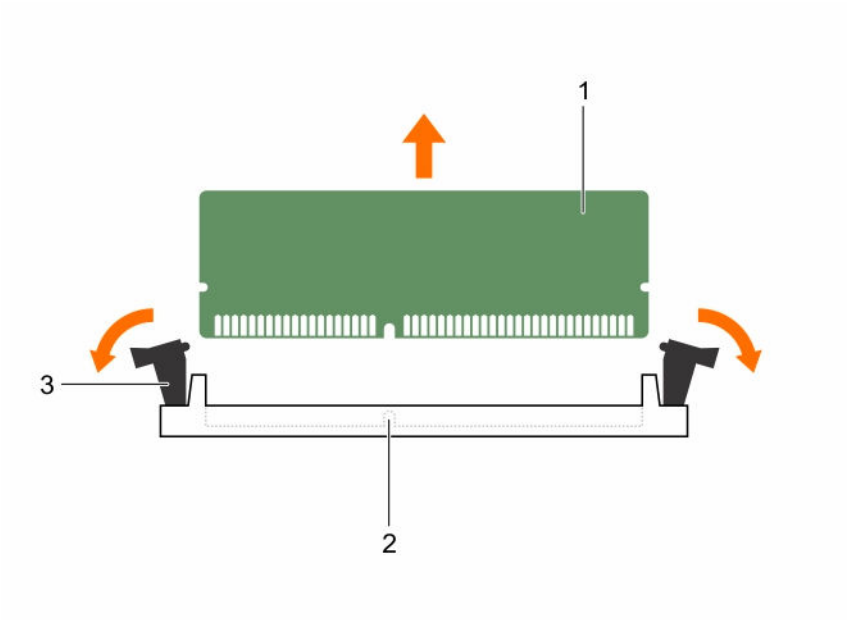

Figure 14. Removing and installing a memory module

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

Installing 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. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.

3. Remove the cooling shroud.
4. Removing the cooling-fan assembly.

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.

Steps

1. Locate the appropriate memory-module socket.

   CAUTION: Handle each memory module only by the card edges, making sure 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. 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.

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

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

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

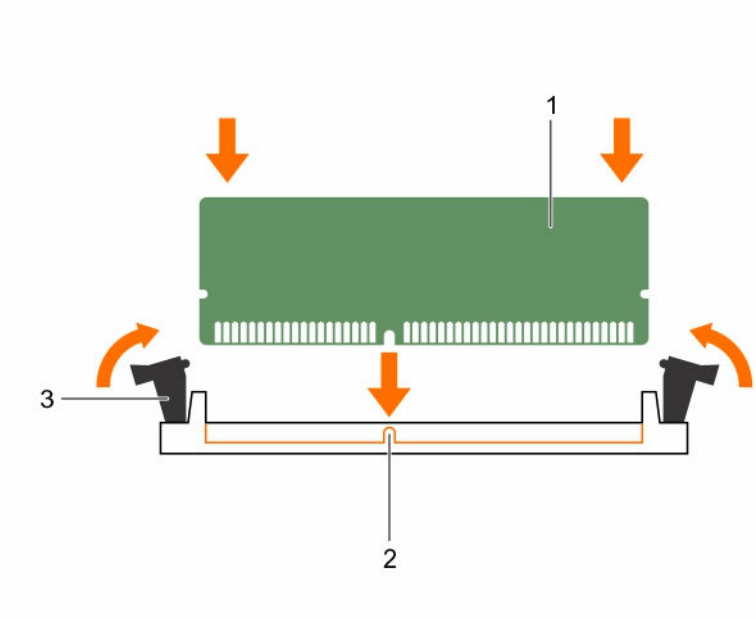

Figure 15. Installing the memory module

1. memory module
2. alignment key

3. memory-module socket ejector (2)

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.

5. Repeat steps 1 to 4 of this procedure to install the remaining memory modules.

Next steps

1. Install the cooling shroud.
2. Follow the procedure listed in After working inside your system.
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. Repeat step 1 through step 4 of this procedure and check to ensure that the memory modules are firmly seated in their sockets.
5. Run the system memory test in the system diagnostics.

Hard drives

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

CAUTION: Before attempting to remove or install a hard drive while the system is running, see the documentation for the storage controller card to ensure that the host adapter is configured correctly to support hot-swap hard drive removal and insertion.

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

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

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

Removing a 2.5 inch hard-drive blank

Prerequisites

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

1. Ensure that you read the Safety instructions.
2. If installed, remove the bezel.

Steps

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

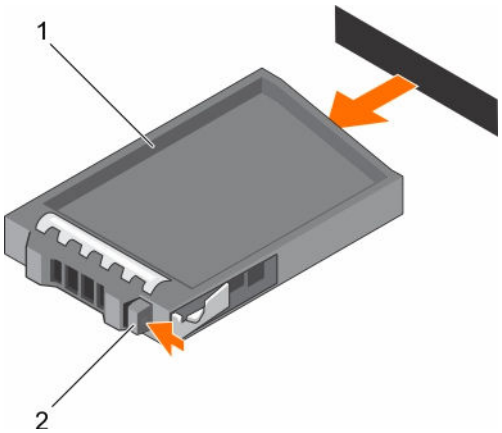

Figure 16. Removing and installing a 2.5 inch hard-drive blank

1. hard-drive blank
2. release button

Installing a 2.5 inch hard-drive blank

Prerequisites

1. Ensure that you read the Safety instructions.
2. If installed, remove the front bezel.

Steps

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

Next steps

If applicable, install the front bezel.

Removing a hot-swappable hard drive

Prerequisites

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

1. Ensure that you read the Safety instructions.
2. If applicable, remove the bezel.

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

Steps

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

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

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

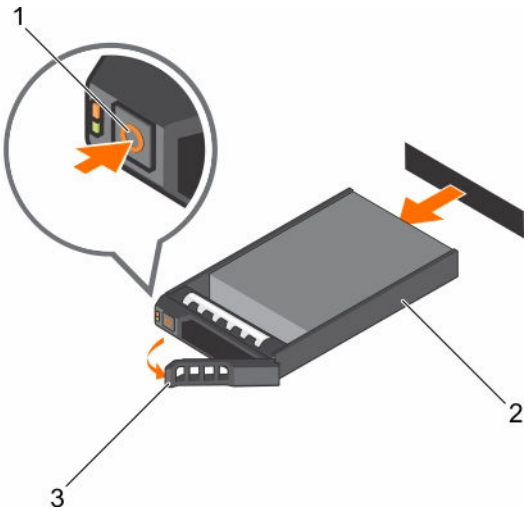

Figure 17. Removing and installing a hot-swappable HDD or SSD

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

Installing a hot-swappable hard drive

Prerequisites

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

1. Ensure that you read the Safety instructions.

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

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

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

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

Steps

1. If a hard-drive blank is installed in the hard-drive slot, remove it.
2. Install a hard drive in the hard-drive carrier. For more information, see Installing a hard drive into a hard-drive carrier.
3. Press the release button on the front of the hard-drive carrier and open the hard-drive carrier handle.
4. Insert the hard-drive carrier into the hard-drive slot until the carrier connects with the backplane.
5. Close the hard-drive carrier handle to lock the hard drive in place.

Next steps
Install the optional front bezel.

Removing a hard drive from a hard-drive carrier

Prerequisites

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

Steps

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

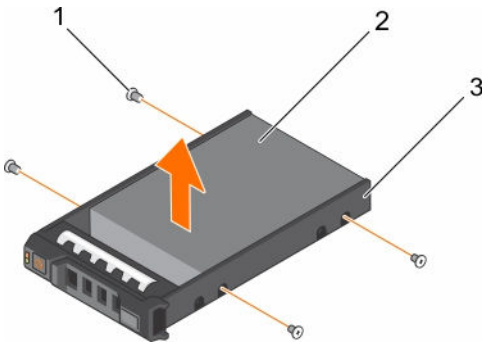

Figure 18. Removing and installing a hard drive into a hard-drive carrier

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

Installing a hard drive into a hard-drive carrier

Prerequisites

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

Keep the #1 Phillips screwdriver handy.

Steps

1. Insert the 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.

SATADOM

A SATADOM is a disk-on-module (DOM) form factor with an incorporated standard SATA data connection. By default, the SATADOM comes with a power cable installed and is set in a Read/Write position.

The SATADOM uses an onboard SATA controller and does not require an additional controller.

With Nutanix, you can locate the boot device on a separate controller from the data drives, which improves system disk performance.

Important information about SATADOM

The SATA Disk-On-Motherboard (SATADOM) shipped with XC Series appliances is intended as an appliance boot device.

NOTE: Write intensive activities and processes leveraged by XC appliances, are intended to take place on the SSDs and HDDs and not the boot device.

The hypervisor boot device is not intended for application use.

WARNING: Adding additional write intensive software to the SATADOM boot disk results in heavy wear on the device beyond design specifications resulting in premature hardware failure.

You should not run applications on the hypervisor operating system.

Examples of write intensive applications

Following are the examples of write intensive applications:

- System Center Agents.
  - System Center Configuration Manager (CCMExec.exe).
  - System Center Operations Manager (MonitoringHost.exe).
- Write-intensive Agents.
- Databases.
- Disk management utilities (third-party disk defragmentation or partitioning tools).
- Additional roles outside of the appliance's intended use (web server, domain controller, RDS, and so on.).
- Client-based Antivirus.
- Run Virtual Machines directly on the SATADOM. Ensure that the Virtual Machines run on Solid State Drives (SSDs) and Hard Disk Drives (HDDs).

Removing the SATADOM

Prerequisites

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside 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 came with the product.

Steps

1. Unplug the power cable from the SATADOM Tape Backup Unit (TBU) power connector.
2. Press the lock release on the SATADOM and pull it up and away from the system.

NOTE: After removing the SATADOM, place it in an anti-static container for reuse, return, or temporary storage.

NOTE: Dell recommends that you do not modify the SATADOM Read/Write default setting.

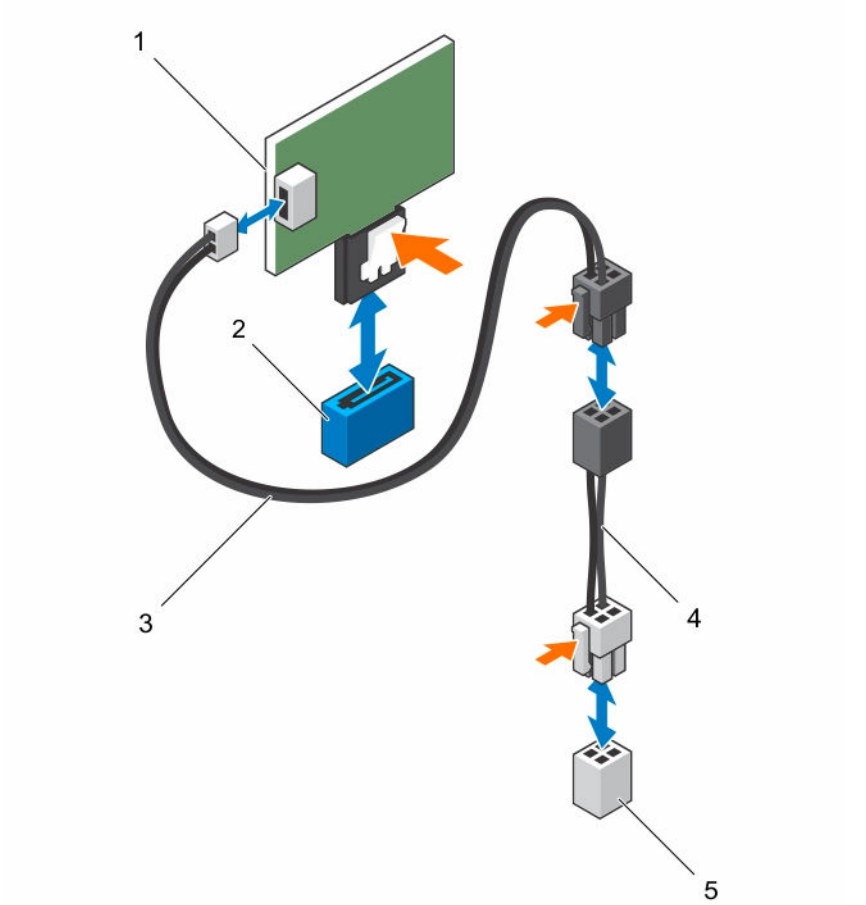

Figure 19. Removing and installing SATADOM

1. SATADOM
2. SATA connector
3. power cable
4. power adapter
5. SATADOM TBU power connector

Next steps

Follow the procedure listed in After working inside your system.

Installing the SATADOM

Prerequisites

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside 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 came with the product.

NOTE: Dell recommends that you do not modify the SATADOM Read/Write default setting.

Steps

1. Press the lock release on the SATADOM and plug the SATADOM into the preferred SATADOM connector on the system board.

   NOTE: The preferred SATADOM connector is SATA9 and is indicated in blue. You can also use SATA8 connector that is indicated in black.

2. Plug the power cable into the SATADOM TBU power connector on the system board.

Next steps

Follow the procedure listed in After working inside your system.

Cooling fans

Your system supports hot-swappable cooling fans.

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

Removing a cooling fan

Prerequisites

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.

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

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

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

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

NOTE: The procedure for removing each fan is identical.

Steps

Hold the fan and lift it out of the system.

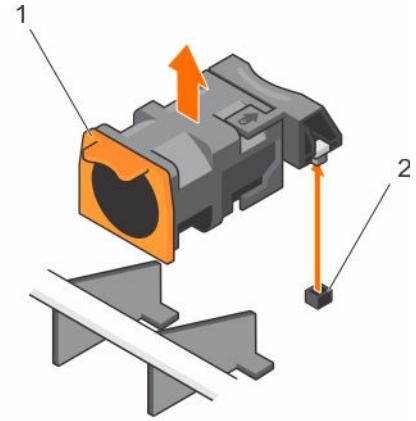

Figure 20. Removing and installing a cooling fan

1. cooling fans (7)
2. cooling fan connectors (7)

Installing a cooling fan

Prerequisites

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside 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 came with the product.

Steps

1. Align the plug at the base of the cooling fan with the connector on the system board.
2. Slide the cooling fan into the securing slots until the tabs lock into place.

Next steps

Follow the procedure listed in After working inside your system.

Expansion cards and expansion-card risers

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

Expansion card installation guidelines

Your system supports PCI Express Generation 3 expansion cards.

Table 27. Systems supporting three PCIe expansion cards

Riser	PCIe Slot	Processor Connection	Height	Length	Link Width	Slot Width
1	1	Processor 2	Low Profile	Half Length	x16	x16
1	2	Processor 2	Low Profile	Half Length	x8	x16
3	3	Processor 1	Low Profile	Half Length	x16	x16

NOTE: You must install both processors to use riser 1 slots.

Table 28. Systems supporting two PCIe expansion cards

Riser	PCIe Slot	Processor Connection	Height	Length	Link Width	Slot Width
2	1	Processor 1	Low Profile	Half Length	x8	x16
		Processor 2	Low Profile	Half Length	x16	x16

NOTE: Only a three-fourth length card is supported for the PCIe expansion card slot (slot 2) on riser 3.

NOTE: For a server with three PCIe cards, only MiniSAS HD third party cards are supported in slot 3. For a server with two PCIe cards, only MiniSAS HD third party cards are supported in slot 1.

NOTE: You can install expansion cards only on one slot on riser 2.

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

Table 29. Expansion-card installation priority

Card Priority	Card Type	Systems Supporting up to 3 PCIe Expansion Cards	
		Slot Priority	Max Allowed
1	PCIe Bridge	1	1
2	10 Gb NICs	3, 2, 1	3
3	1 Gb NICs	3, 2, 1	3
4	Integrated RAID	Integrated Slot	1
5	NDC	Integrated Slot	1

Removing an expansion card

Prerequisites

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

CAUTION: Many repairs may only be done by a certified service technician. You must perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support 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.

Steps

1. Disconnect any cables connected to the expansion card or expansion card riser.
2. To remove the expansion card, lift the expansion-card latch.
3. Grasp the expansion card by its edges and remove it from the expansion-card connector on the riser.
4. If you are removing the card permanently, install a metal filler bracket over the empty expansion slot opening and close the expansion-card latch.

NOTE: Install a filler bracket over an empty expansion 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.

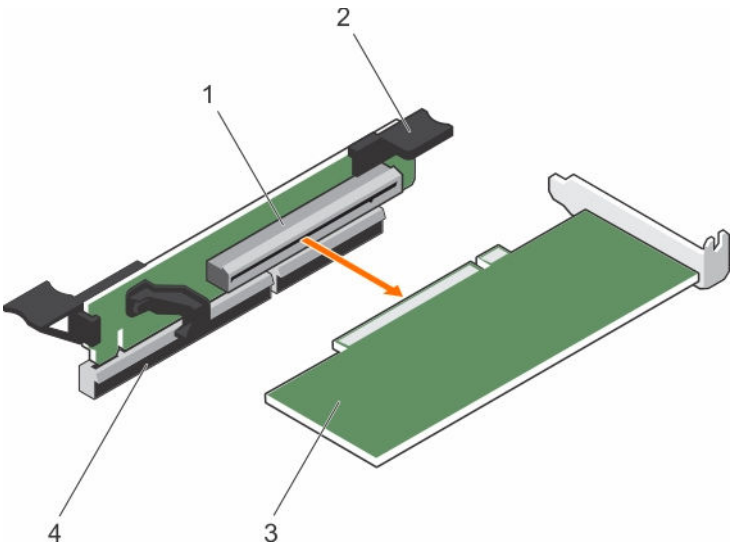

Figure 21. Removing and installing the expansion card

1. expansion connector
2. expansion card latch
3. expansion-card
4. expansion-card latch

Next steps

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

Related video http://www.Dell.com/XCSeries/XC630/PCI

Installing an expansion card

Prerequisites

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside 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 came with the product.

NOTE: You can only use the expansion-card riser 1 and the x16 link on the riser 2 slot when both the processors are installed.

Steps

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

   For instructions, see the documentation accompanying the card.
2. Locate the expansion-card connector on the system board/riser.
3. Open the expansion-card latch and remove the filler bracket.
4. Holding the card by its edges, position the card so that the card-edge connector aligns with the expansion-card connector.
5. Insert the card-edge connector firmly into the expansion-card connector until the card is fully seated.
6. Slide the expansion-card latch into position.

Next steps

1. Close the system.
2. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.
3. Install any device drivers required for the card as described in the documentation for the card.
4. Follow the procedure listed in After working inside your system.
5. Install any device drivers required for the card as described in the documentation for the card.

Removing expansion-card risers

Prerequisites

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside 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 came with the product.

NOTE: You can only use the expansion-card riser 1 and the x16 link on the riser 2 slot when both the processors are installed.

Steps

1. Holding the touch points, lift the expansion-card riser from the riser connector on the system board.

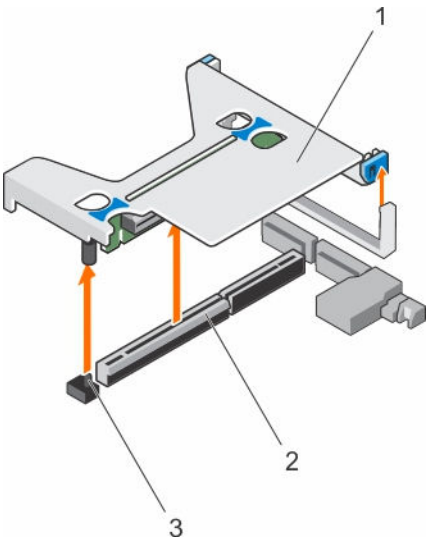

Figure 22. Removing and installing the expansion card riser 1

1. expansion-card riser 1
2. connector
3. riser guide pin

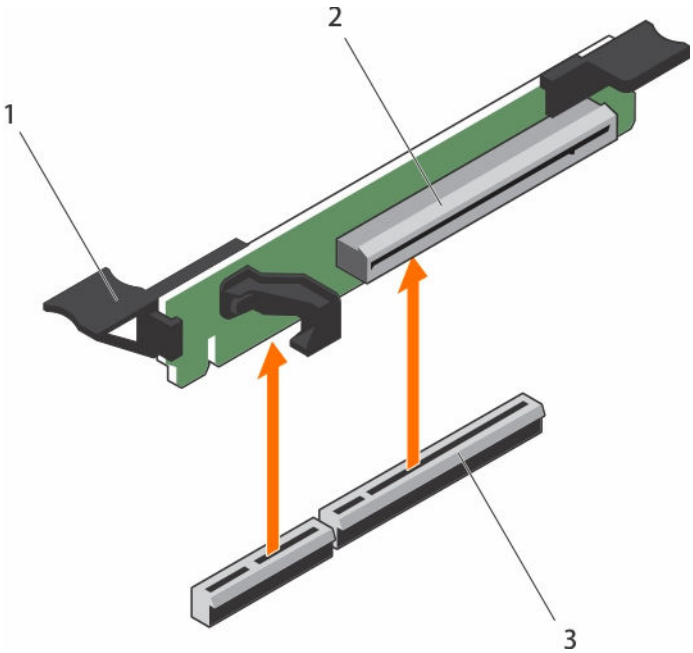

Figure 23. Removing and installing the expansion card riser 3

1. connector
2. expansion card riser 3
3. expansion card release latch

2. If applicable, remove or install an expansion card on the riser.

3. Replace the expansion-card riser.

Next steps
Follow the procedure listed in After working inside your system.

Installing expansion card risers

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. If applicable, reinstall the expansion card(s) into the expansion card riser.
2. Align the expansion-card riser with the connector and the riser guide pin on the system board.
3. Lower the expansion-card riser into place until the expansion-card riser connector is fully seated in the connector.

Next steps

1. Follow the procedure listed in After working inside your system.
2. Install any device drivers required for the card as described in the documentation for the card.

Internal dual SD module

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

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

  NOTE: When the **Redundancy** option is set to **Mirror Mode** in the **Integrated Devices** screen of System Setup, the information is replicated from one SD card to another.
- Single card operation — single card operation is supported, but without redundancy.

Removing the internal dual SD module

Prerequisites

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

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.

Steps

1. Locate the internal dual SD module on the system board.
2. If installed, remove the SD card(s).
3. Hold the plastic pull tab and pull the dual SD module out of the system board.

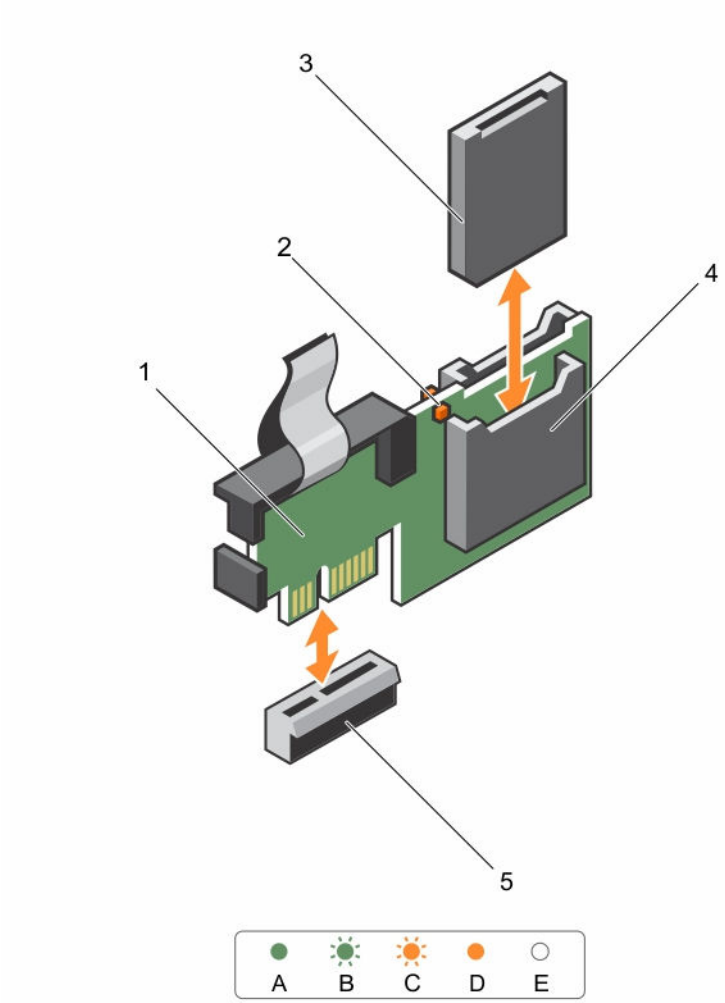

Figure 24. Removing and installing the Internal Dual SD Module (IDSDM)

1. Internal Dual SD module
2. LED status indicator (2)
3. SD card (2)
4. SD card slot 2
5. SD card slot 1
6. IDSDM connector

The following table describes the IDSDM indicator codes.

Table 30. IDSDM indicator code

Convention	IDSDM indicator code	Description
A	Green	Indicates that the card is online
B	Flashing green	Indicates rebuild or activity
C	Flashing amber	Indicates card mismatch or that the card has failed

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

Next steps

Follow the procedure listed in After working inside your system.

Installing the internal dual SD module

Prerequisites

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

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.

Steps

1. Locate the IDSDM connector on the system board. To locate the IDSDM connector, see System board connectors.
2. Align the connectors on the system board and the dual SD module.
3. Push the dual SD module until it is firmly seated on the system board.

Next steps

1. Install the SD vFlash media card(s). Temporarily label each SD card with its corresponding slot before removal. Replace the SD card(s) into the same slots.
2. Follow the procedure listed in After working inside your system.

Internal SD card

Removing an internal SD Card

Prerequisites

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.

NOTE: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support 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.

Steps

Locate the SD card slot on the internal dual SD module or the backplane expander board and press inward on the card to release it from the slot and remove the card.

Next steps

Follow the procedure listed in After working inside your system.

Installing an internal SD card

Prerequisites

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside 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 came with the product.

NOTE: To use an SD card with your system, ensure that the internal SD card port is enabled in the System Setup.

Steps

1. Locate the SD card connector on the internal dual SD module or the backplane expander board. With the label side facing up, insert the contact-pin end of the card into the slot.

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

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

Next steps

Follow the procedure listed in After working inside your system.

Integrated storage controller card

Your system includes a dedicated expansion-card slot on the system board for an integrated controller card. The integrated storage controller card provides the integrated storage subsystem for your system's internal hard drives. The controller supports SAS and SATA hard drives as supported by the version of the storage controller included with your system.

Removing the integrated storage controller card

Prerequisites

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Remove the cooling shroud.
4. Remove the expansion-card riser 1.
5. Keep the #2 Phillips screwdriver handy.

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

Steps

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

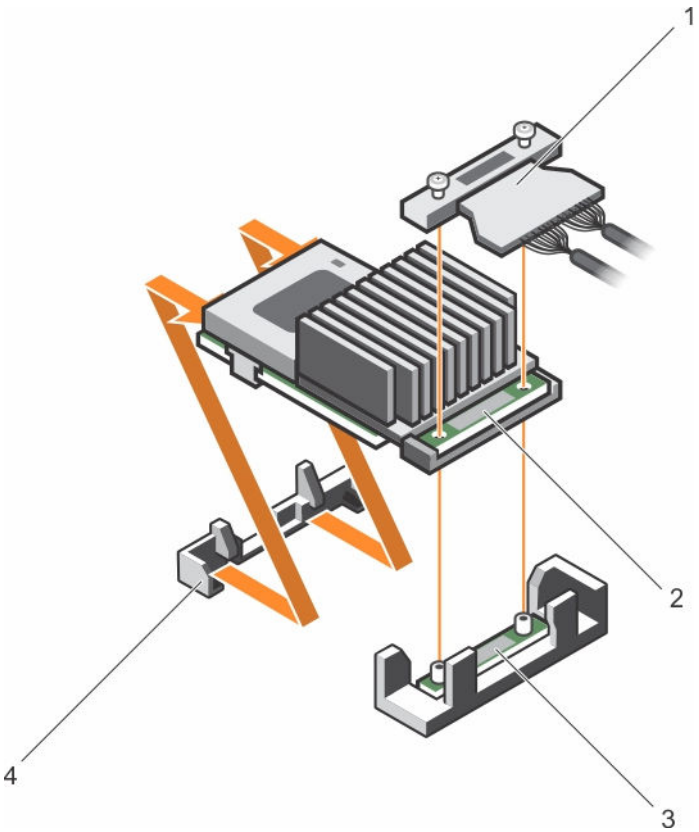

Figure 25. Removing and installing the integrated storage controller card

1. integrated storage controller cable
2. integrated storage controller card
3. integrated storage-controller card connector on the system board
4. integrated storage controller card holder

Next steps

1. Replace the expansion-card riser 1.
2. Replace the cooling shroud.
3. Follow the procedure listed in After working inside your system.

Installing the integrated storage controller card

Prerequisites

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Remove the cooling shroud.
4. Remove the expansion-card riser 1.
5. Keep the #2 Phillips screwdriver handy.

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

Steps

1. Align the end of the integrated storage-controller card opposite the connector with the integrated storage-controller card holder.
2. Lower the connector side of the integrated storage-controller card into the integrated storage-controller card connector on the system board.

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

Next steps

1. Replace the expansion-card riser 1.
2. Replace the cooling shroud.
3. Follow the procedure listed in After working inside your system.

Network daughter card

Removing the network daughter card

Prerequisites

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Keep the #2 Philips screwdriver handy.

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

Steps

1. Remove the expansion-card riser 3.
2. Using a #2 Phillips screwdriver, loosen the two captive screws that secure the network daughter card to the system board.
3. Hold the network daughter card by the edges on either side of the touch points and lift to remove it from the connector on the system board.
4. Slide the network daughter card away from the back of the system until the Ethernet connectors are clear of the slot in the back panel.
5. Lift the network daughter card out of the system.

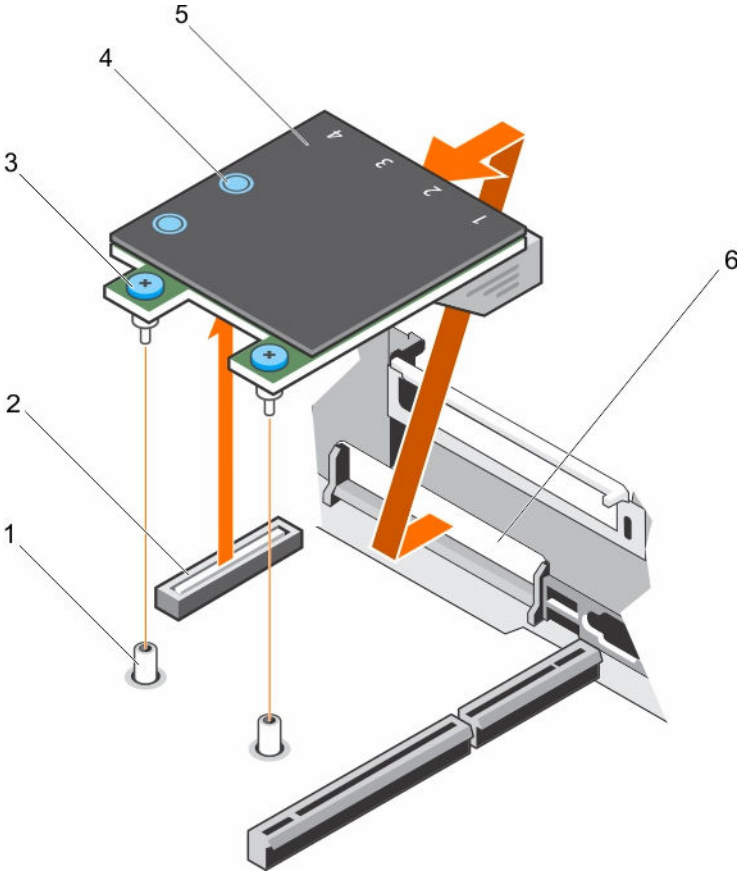

Figure 26. Removing and installing the network daughter card

1. captive screw socket (2)
2. connector on the system board
3. captive screw (2)
4. touch point (2)
5. network daughter card
6. back panel slots for Ethernet connectors

Installing the network daughter card

Prerequisites

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.

3. Keep the #1 Philips screwdriver handy.

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

NOTE: If the server has three PCIe cards, ensure that you install the PCIe cooling shroud in your system.

Steps

1. Angle the card so that the Ethernet connectors fit through the slot in the back panel.
2. Align the captive screws at the backend of the card with the screw holes on the system board.
3. Press the touch point on the card to ensure that the connector on the card is in contact with the connector on the system board.
4. Using a #2 Phillips screwdriver, tighten the two captive screws to secure the network daughter card to the system board.
5. Install the expansion-card riser 3.

Next steps

Follow the procedure listed in After working inside your system.

Heat sinks and processors

Use the following procedure when:

- Installing an additional processor
- Replacing a processor

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

Removing a 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 came with the product.

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

1. Ensure that you read the Safety instructions.
2. Keep the #2 Phillips screwdriver handy.
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 using the Lifecycle Controller.
4. Follow the procedure listed in Before working inside your system.
5. If installed, remove the full-length PCIe card(s).

6. 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.

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.

Steps

1. To remove the heat sink:
   a. Loosen one of the screws that secure the heat sink to the system board.
      Wait 30 seconds for the heat sink to loosen from the processor.
   b. Remove the screw diagonally opposite the screw you first removed.
   c. Repeat the procedure for the remaining two screws.
   d. Remove the heat sink.

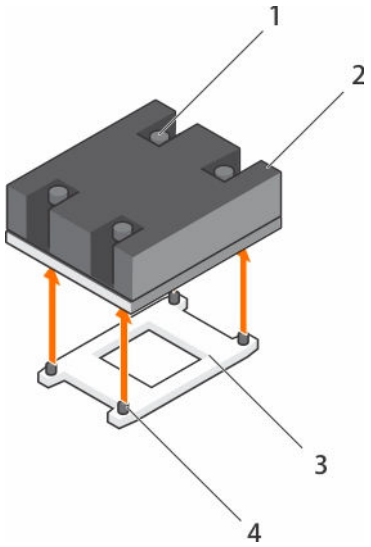

Figure 27. Removing and installing a processor heat sink

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

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

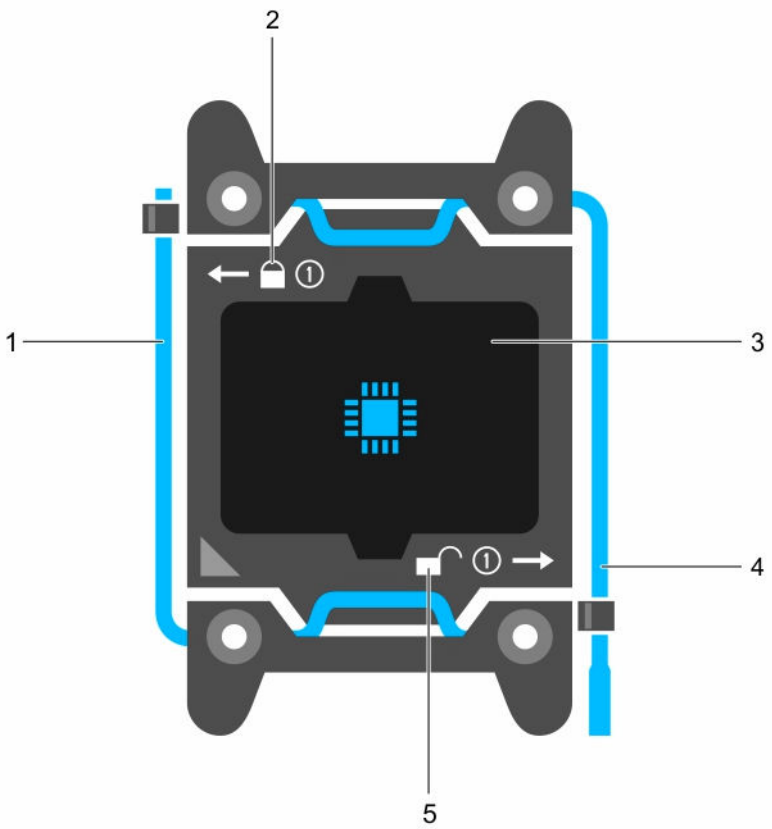

Figure 28. Processor shield

1. *close first* socket release lever
2. lock icon
3. processor
4. *open first* socket release lever
5. unlock icon

2. To remove the processor:

a. Release the *open first* socket-lever near the unlock icon by pushing the lever down and out from under the tab.

b. Similarly, release the *close first* socket-release lever near the lock icon by pushing the lever down and out from under the tab. Lift the lever 90 degrees upward.

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

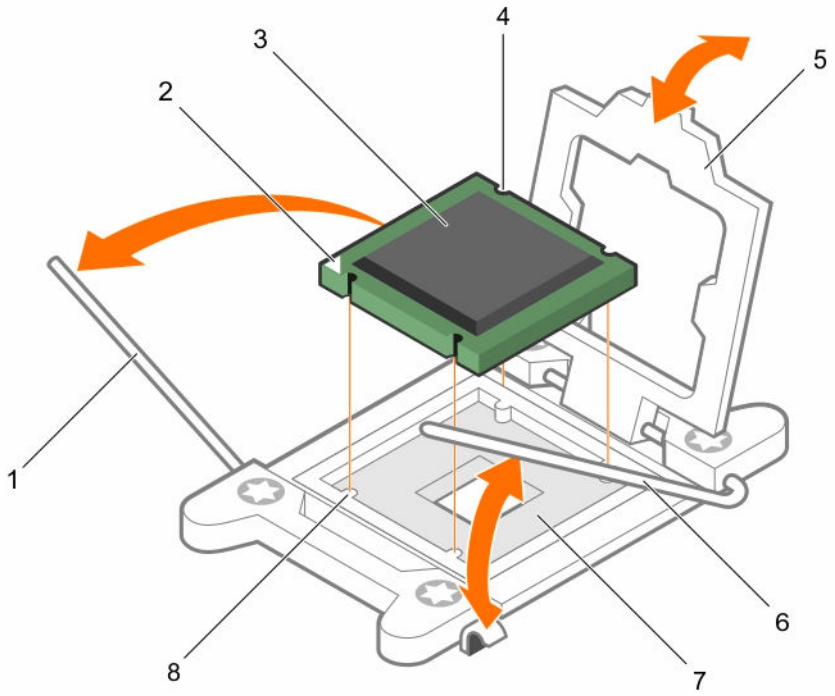

Figure 29. Removing and installing a processor

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

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

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

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

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

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

Next steps

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

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 came with the product.

1. Ensure that you read the Safety instructions.
2. Keep the #2 Phillips screwdriver handy.
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 using the Lifecycle Controller.
4. Follow the procedure listed in Before working inside your system.
5. 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.

   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. Remove the heat sink.
2. Unpack the new processor.

   If the processor has previously been used in a system, remove any remaining thermal grease from the processor using a lint-free cloth.
3. Locate the processor socket.
4. If applicable, remove the socket protective cap.
5. Release the *open first* socket-release lever near the unlock icon by pushing the lever down and out from under the tab.
6. Similarly, release the *close first* socket-release lever near the lock icon by pushing the lever down and out from under the tab. Lift the lever 90 degrees upward.
7. Hold the tab near the lock symbol on the processor shield and lift it up and out of the way.
8. To install the processor in 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.

   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.

   a. 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.

b. Align the pin-1 indicator of the processor with the triangle on the socket .

c. Place the processor on the socket such that the slots on the processor align 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.

d. Close the processor shield.

e. Lower the *close first* socket-release lever near the lock icon and push it under the tab to lock it..

f. Similarly, lower the *open first* socket-release lever near the unlock icon and push it under the tab to lock it.

9. To install the heat sink:

a. If applicable, remove the existing thermal grease from the heat sink using a clean lint-free cloth.

b. Apply thermal grease on the top of the processor. Use the thermal-grease syringe included with your processor kit to apply the grease in a thin spiral on the top of the processor as shown in the figure.

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

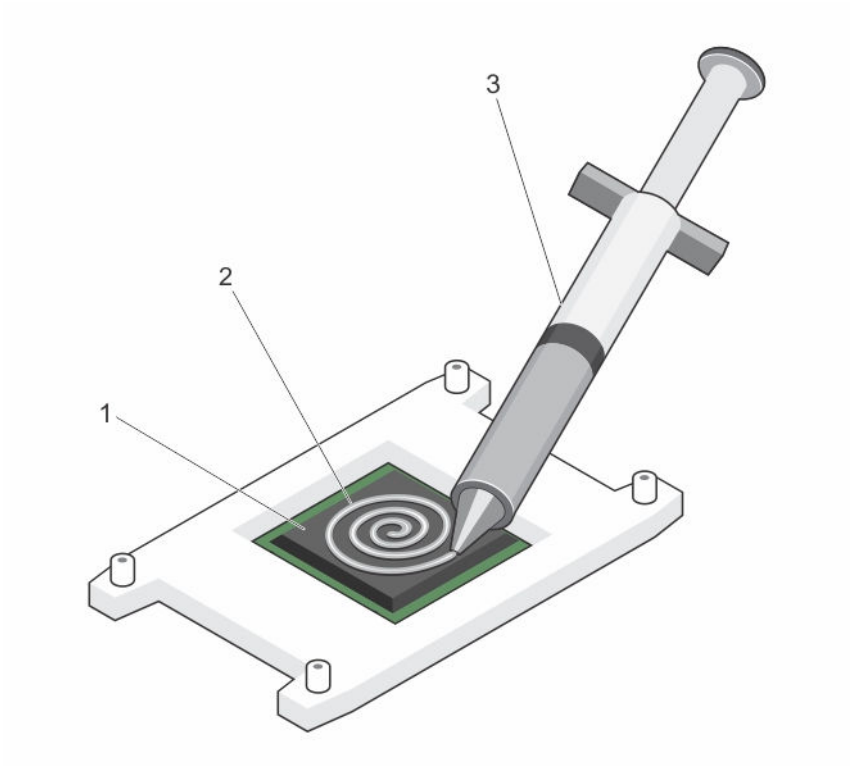

Figure 30. Applying thermal grease on the top of the processor

1. processor
2. thermal grease
3. thermal-grease syringe

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

c. Place the heat sink onto the processor.
d. Tighten the four screws to secure the heat sink to the system board.

NOTE: Tighten the screws diagonally opposite to each other. 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 once the screw is seated. The screw tension should be no more than 6 in-lb (6.9 kg-cm).

Next steps

1. Install the cooling shroud.
2. If applicable, install the PCIe card.
3. If applicable, install the cooling fan assembly.
4. Follow the procedure listed in After working inside your system.
5. While booting, press F2 to enter the System Setup and check that the processor information matches the new system configuration.
6. Run the system diagnostics to verify that the new processor operates correctly.

Power supply units

Your system supports one of the following:

- Two 495 W, 750 W, or 1100 W AC power supply modules or
- Two 1100 W DC power supply modules or
- Two 750 W mixed mode power supply modules

NOTE: Titanium power supply unit is nominally rated for 200 VAC to 240 VAC input only.

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

NOTE: If two power supply units are used, they must be of the same maximum output power.

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

Hot Spare feature

Your system supports the Hot Spare feature that significantly reduces the power overhead associated with power supply redundancy.

When the Hot Spare feature is enabled, one of the redundant power supplies is switched to a sleep state. The active power supply supports 100 percent of the load, thus operating at higher efficiency. The power supply in the sleep state monitors output voltage of the active power supply. If the output voltage of the active power supply drops, the power supply in the sleep state returns to an active output state.

If having both power supplies active is more efficient than having one power supply in a sleep state, the active power supply can also activate a sleeping power supply.

The default power supply settings are as follows:

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

You can configure the Hot Spare feature using the iDRAC settings. For more information on iDRAC settings, see the *Integrated Dell Remote Access Controller User's Guide* at **dell.com/support/home**.

Removing the power supply unit blank

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

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

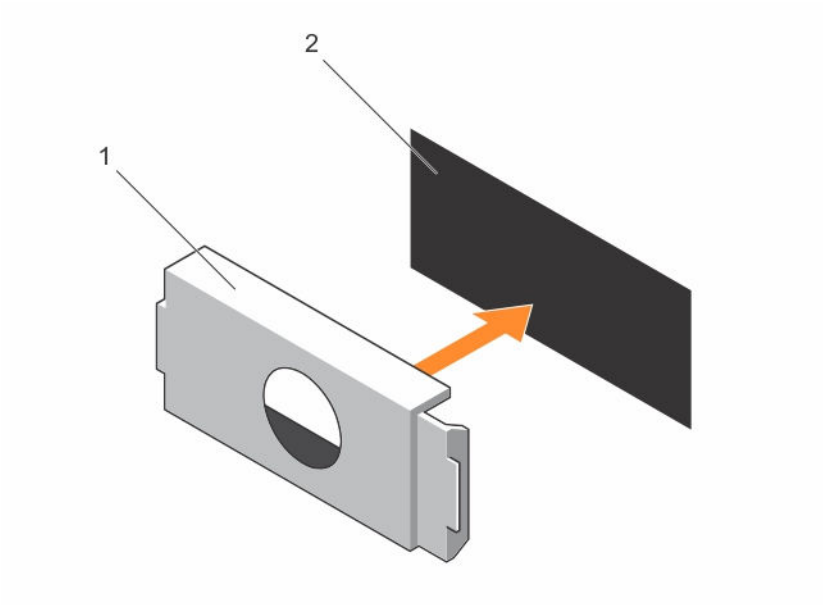

Figure 31. Removing and installing the power supply blank

1. power supply blank
2. power supply bay

Installing the power supply unit blank

Install the power supply unit blank only in the second power supply unit bay.

To install the power supply unit blank, align the blank with the power supply unit bay and push it into the chassis until it clicks into place.

Removing an AC power supply unit

Prerequisites

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

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

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

Steps

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

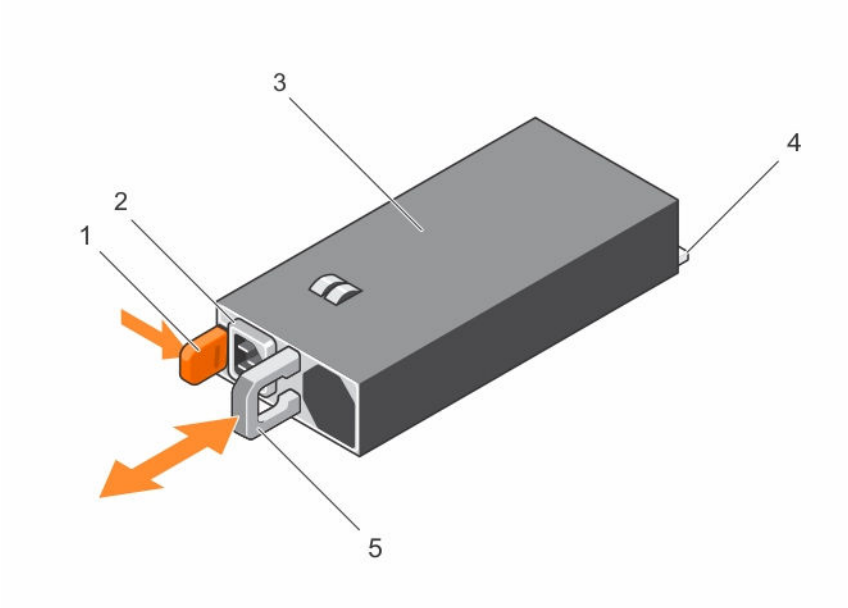

Figure 32. Removing and installing an AC power supply unit

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

Installing an AC power supply unit

Prerequisites

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

Steps

1. Verify that both the power supply units are the same type and have the same maximum output power.

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

2. If applicable, remove the power supply unit blank.
3. Slide the new power supply unit into the chassis until the power supply unit is fully seated and the release latch snaps into place.

   NOTE: If you unlatched the cable management arm, re-latch it. For information about the cable management arm, see the system's rack documentation.

4. Connect the power cable to the power supply unit and plug the cable into a power outlet.

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

NOTE: When installing, hot-swapping, or hot-adding a new power supply unit, wait for 15 seconds for the system to recognize the power supply unit and determine its status. The power supply redundancy may not occur until discovery is complete. Wait until the new power supply unit is discovered and enabled before you remove the other power supply unit. The power-supply unit status indicator turns green to signify that the power supply unit is functioning properly.

Wiring instructions for a DC power supply unit

Your system supports up to two –(48–60) V DC power supplies (when available).

WARNING: For equipment using –(48–60) V DC power supply units (PSUs), a qualified electrician must perform all connections to DC power and to safety grounds. Do not attempt connecting to DC power or installing grounds yourself. All electrical wiring must comply with applicable local or national codes and practices. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow all safety instructions that came with the product.

CAUTION: Wire the unit with copper only, unless otherwise specified, use only 10 American Wire Gauge (AWG) wire rated minimum 90 ºC for source and return. Protect the –(48–60) V DC (1 wire) with a branch circuit over-current protection rated 50 A for DC with a high interrupt current rating.

CAUTION: Connect the equipment to a –(48–60) V DC supply source that is electrically isolated from the AC source (reliably grounded –(48–60) V DC SELV source). Ensure that the –(48–60) V DC source is efficiently secured to earth (ground).

NOTE: A readily accessible disconnect device that is suitably approved and rated shall be incorporated in the field wiring.

Input requirements

- Supply voltage: –(48–60) V DC
- Current consumption: 32 A (maximum)

Kit contents

- Dell part number 6RYJ9 terminal block or equivalent (1)
- #6-32 nut equipped with lock washer (1)

Required tools

Wire-stripper pliers capable of removing insulation from size 10 AWG solid or stranded, insulated copper wire

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

Required wires

- One UL 10 AWG, 2 m maximum (stranded) black wire [–(48–60) V DC]
- One UL 10 AWG, 2 m maximum (stranded) red wire (V DC return)
- One UL 10 AWG, 2 m maximum green/yellow, green with a yellow stripe, stranded wire (safety ground)

Removing a DC power supply unit

Prerequisites

WARNING: For equipment using –(48–60) V DC power supply units (PSUs), a qualified electrician must perform all connections to DC power and to safety grounds. Do not attempt connecting to DC power or installing grounds yourself. All electrical wiring must comply with applicable local or national codes and practices. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow all safety instructions that came with the product.

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

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

Steps

1. Disconnect the power wires from the power source and the connector from the power supply you intend to remove.
2. Disconnect the safety ground wire.
3. Press the release latch and slide the power supply out of the chassis.

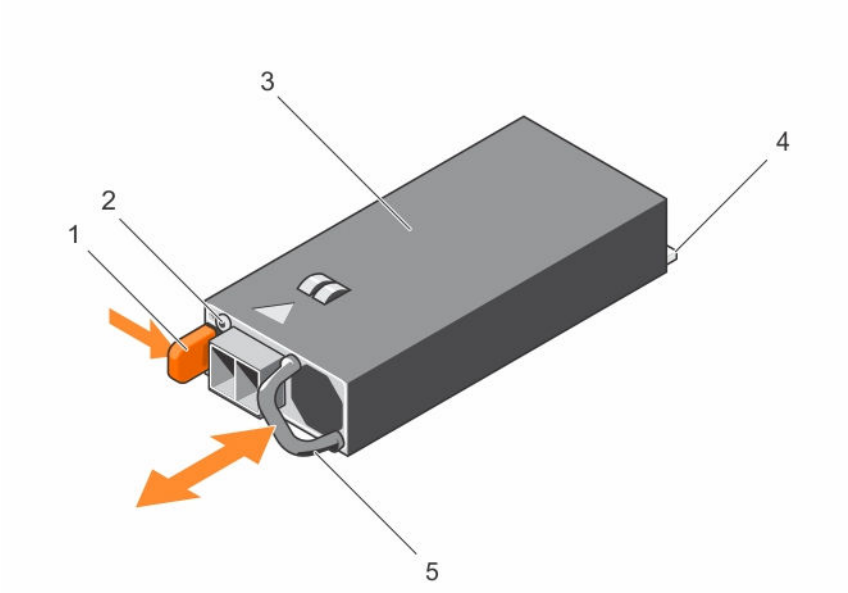

Figure 33. Removing and installing a DC power supply

1. release latch
2. power supply status indicator
3. power supply
4. connector
5. power supply handle

Installing a DC power supply unit

Prerequisites

WARNING: For equipment using –(48–60) V DC power supply units (PSUs), a qualified electrician must perform all connections to DC power and to safety grounds. Do not attempt connecting to DC power or installing grounds yourself. All electrical wiring must comply with applicable local or national codes and practices. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow all safety instructions that came with the product.

Steps

1. Verify that both the power supplies are of the same type and have the same maximum output power.

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

2. If installed, remove the power supply blank.
3. Slide the new power supply unit into the chassis until the power supply unit is fully seated and the release latch snaps into place.

   NOTE: If you unlatched the cable management arm, relatch it. For information about the cable management arm, see the system's rack documentation.

4. Connect the safety ground wire.
5. Install the DC power connector in the power supply unit.

   CAUTION: When connecting the power wires, secure the wires with the strap to the power supply handle.

6. Connect the wires to a DC power source.

   NOTE: When installing, hot-swapping, or hot-adding a new power supply, wait for 15 seconds for the system to recognize the power supply and determine its status. The power-supply status indicator turns green to signify that the power supply is functioning properly.

System battery

Replacing the system battery

Prerequisites

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Remove the cooling shroud.

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.

Steps

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

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

2. To install a new system battery, hold the battery with the "+" facing up and slide it under the securing tabs.
3. Press the battery into the connector until it snaps into place.

Next steps

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

Hard-drive backplane

The 10–Hard-drive system supports 2.5 inch (x10) SAS/SATA backplane.

Removing the hard-drive backplane

Prerequisites

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Remove all hard drives.

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

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

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

Steps

1. Disconnect the SAS/SATA/SSD data cable(s) and power cable from the backplane.
2. If applicable, disconnect the power/data cable from the optical drive.
3. Push the backplane blue release tabs in the direction of the arrows and lift the backplane upwards.
4. Pull the backplane away from the system until the securing slots on the backplane are free from the tabs on the chassis.

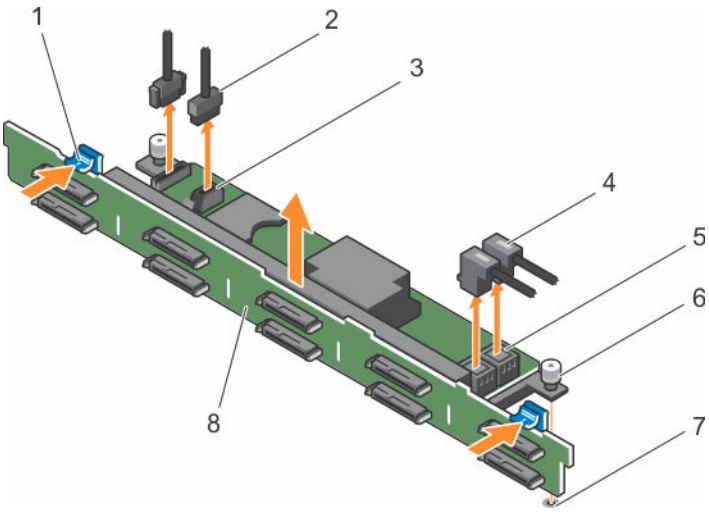

Figure 34. Removing and installing the 2.5 Inch (x10) hard-drive backplane

1. SD signal cable
2. SD signal cable connector
3. SAS cables(2)
4. SAS cable connector (2)
5. guide pin
6. guide pin slot
7. hard-drive connector
8. SAS backplane

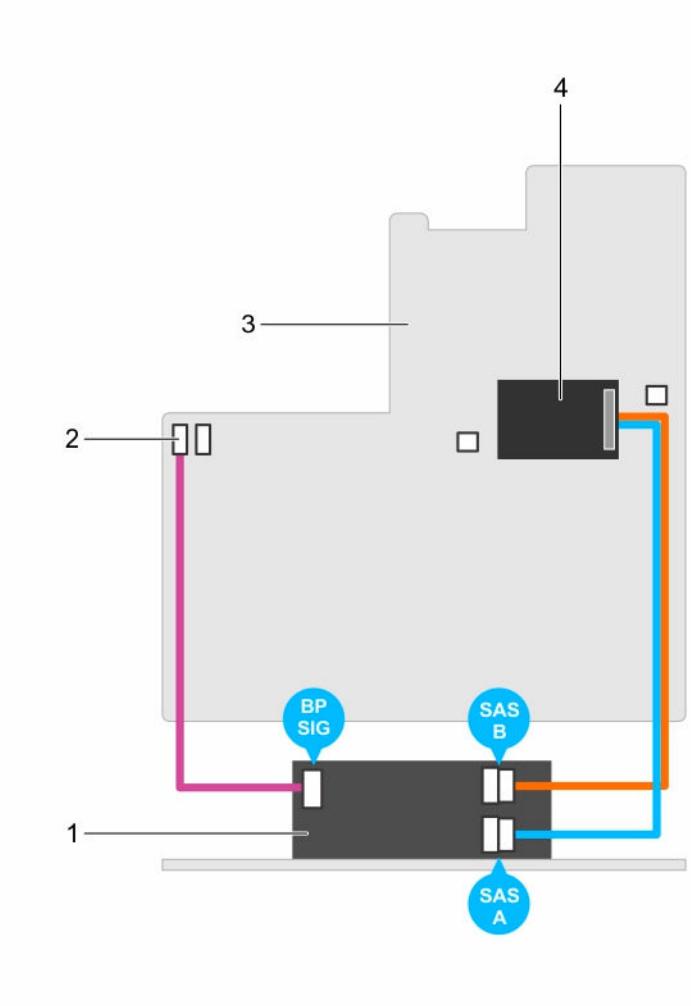

Figure 35. Cabling diagram—2.5 Inch (x10) systems

1. SAS backplane expander card
2. signal cable connector on the system board
3. system board
4. integrated storage controller card

Installing the hard-drive backplane

Prerequisites

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside 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.

Steps

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

Next steps

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

Control panel assembly

Removing the control panel–10 hard drive

Prerequisites

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Keep the #1 Philips screwdriver ready.

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

Steps

1. Using a #1 Philips screwdriver, remove the screw (located at the bottom of the chassis) that secures the control panel to the chassis.
2. Remove the control panel cable from the connectors on the system board (J_CP and J_FP_USB) and the hard-drive expander card.

   NOTE: To locate the connectors on the system board, see System Board Connectors.
3. Press the control panel latch and slide the control panel out of the chassis.
4. Disconnect the control panel cable from the control panel.

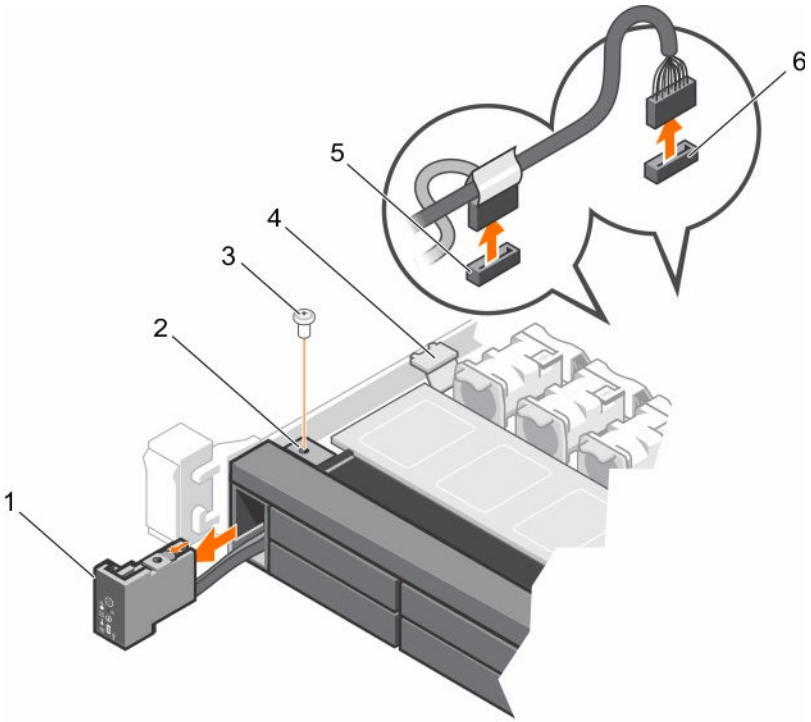

Figure 36. Removing and installing the control panel

1. control panel release latch
2. cable securing clip
3. control panel cable connecting to system board
4. J_FP_USB connector cable
5. screw
6. control panel

Installing the control panel–10 hard–drive 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.

Keep the #1 Philips screwdriver ready.

Steps

1. Route the control panel cable through the chassis and connect the control panel cable to the control panel.
2. Push the control panel into the chassis till it snaps into place.
3. Using a #1 Philips screwdriver, replace the screw (located at the bottom of the chassis) that secures the control panel to the chassis.
4. Locate the connectors J_CP and J_FP_USB on the system board.

NOTE: To locate the connectors on the system board, see System Board Connectors.

5. Connect the control panel cable to the connectors on the system board (J_CP and J_FP_USB) and the hard-drive expander card.

   NOTE: Ensure that the control panel cable inside the system is routed along the chassis wall and secured using the cable securing bracket.

Next steps

Follow the procedure listed in After working inside your system.

System board

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.

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

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

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Remove the following:

   a. cooling shroud
   b. memory modules
   c. cooling fans
   d. power supply unit(s)
   e. all expansion-card risers and expansion cards

      WARNING: The heat sink is hot to touch for some time after the system has been powered down. Ensure that you do not touch the heat sink(s) while removing the system board.

   f. heat sink(s) or heat-sink blanks and processor(s) or processor blanks

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

   g. integrated storage controller card
   h. network daughter card
   i. internal dual SD module

j. internal USB key (if installed)

k. hot-swappable hard drives

l. hard drive backplane

CAUTION: To avoid damaging the mini SAS cable and connector, follow the correct procedure when removing the mini SAS cable from the system board.

Steps

1. Disconnect the mini SAS cable from the system board:
   a. Push the mini SAS cable connector to slide it further into the connector on the system board.
   b. Press down and hold the metal tab on the mini SAS cable connector.
   c. Pull the mini SAS cable out of the connector on the system board.
2. Disconnect all other cables from the system board.

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

3. Grasp the system-board holder, lift the blue release pin, slide the system board toward the front of the system, and lift the system board out of the chassis.

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

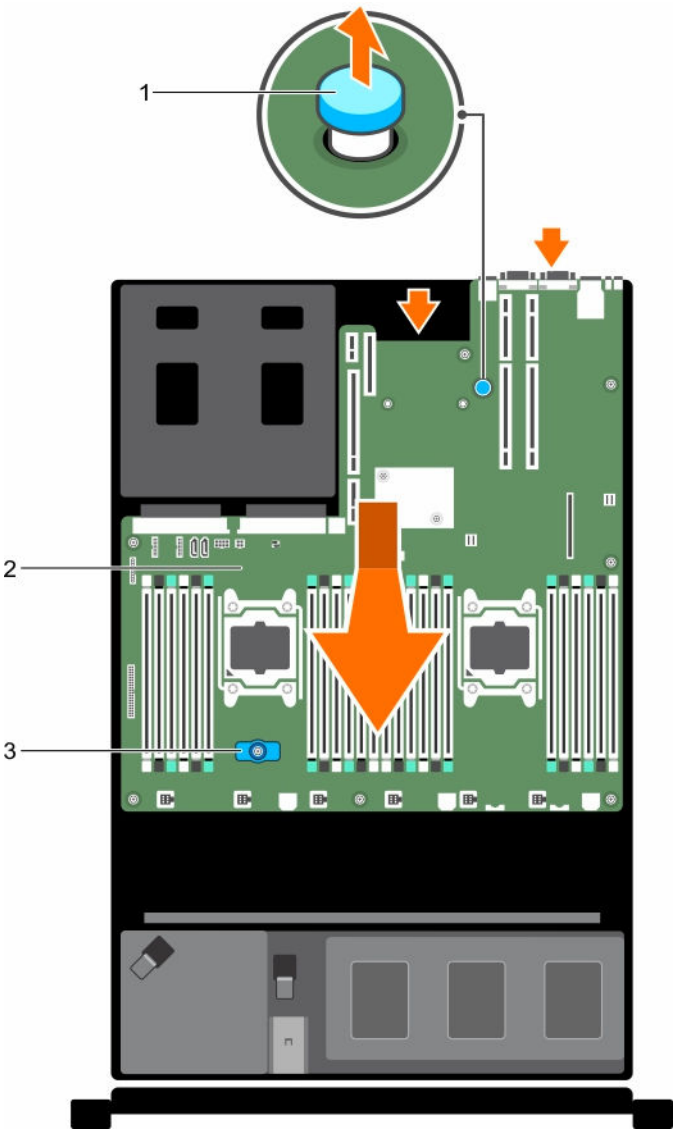

Figure 37. Removing and Installing the System Board

1. system board holder
2. system-board
3. release pin

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.

Steps

1. Unpack the new system board assembly.

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

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

2. Hold the touch points and lower the system board into the chassis.
3. Push the system board toward the back of the chassis until the board is seated correctly.

Next steps

1. Install the Trusted Platform Module (TPM). For information on how to install TPM Installing the Trusted Platform Module. For more information on TPM, see Trusted Platform Module.
2. Replace the following:
   a. integrated storage controller card
   b. internal dual SD module
   c. all expansion-card risers
   d. heat sink(s)/heat-sink blank(s) and processor(s)/processor blank(s)
   e. memory modules and memory module blanks
   f. network daughter card
   g. cooling-fan assembly
   h. cooling shroud
   i. PSUs
3. Reconnect all cables to the system board.

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

4. Follow the procedure listed in After working inside your system.
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/esmmanuals**.
6. Ensure that you:
   a. Use the Easy Restore feature to restore the Service Tag. For more information, see Easy Restore.
   b. If the Service Tag is not backed up in the backup flash device, enter the system Service Tag manually. For more information, see Entering the system Service Tag .
   c. Update the BIOS and iDRAC versions.
   d. Re-enable the Trusted Platform Module (TPM). For more information, see Re-enabling the TPM for BitLocker users or Re-enabling the TPM for TXT users.

Entering the system Service Tag using System Setup

About this task

If you know the system Service Tag, use the System Setup menu to enter the Service Tag.

Steps

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

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

5. Click **Ok**.

Restoring the Service Tag using Easy Restore

About this task

Use the Easy Restore feature if you do not know the Service Tag of your system. The Easy Restore feature allows you to restore your system's Service Tag, license, UEFI configuration, and the system configuration data after replacing the system board. All data is backed up in a backup flash device automatically. If BIOS detects a new system board and the Service Tag in the backup flash device, BIOS prompts the user to restore the backup information.

Steps

1. Turn on the system.

   If BIOS detects a new system board, and if the Service Tag is present in the backup flash device, BIOS displays the Service Tag, the status of the license, and the **UEFI Diagnostics** version.

2. Do one of the following:
   a. Press **Y** to restore the Service Tag, license, and diagnostics information.
   b. Press **N** to navigate to the Lifecycle Controller based restore options.
   c. Press F10 to restore data from a previously created **Hardware Server Profile**.
3. Do one of the following:
   a. Press **Y** to restore the system configuration data.
   b. Press **N** to use the default configuration settings.

Trusted Platform Module

The Trusted Platform Module (TPM) is used to generate/store keys, protect/authenticate passwords, and create/store digital certificates. You can also use TPM to enable the BitLocker hard drive encryption feature in Windows Server.

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.

Installing the Trusted Platform Module

About this task

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

Ensure that you read the Safety instructions.

Steps

1. Locate the TPM connector on the system board.
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.

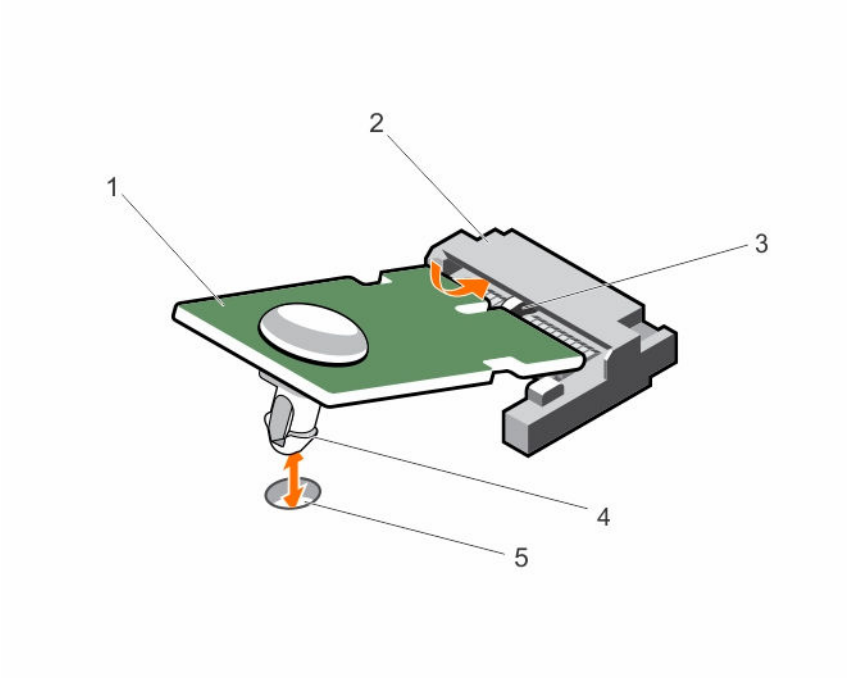

Figure 38. Installing the TPM

1. TPM
2. TPM connector
3. slot on the TPM connector
4. plastic bolt
5. slot on the system board

Re-enabling the TPM for BitLocker users

Initialize the TPM.

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

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

Re-enabling the TPM for TXT users

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

5

Troubleshooting your system

Safety first—for you and your system

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Troubleshooting system startup failure

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

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

Troubleshooting the video subsystem

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

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

If the tests fail, see Getting Help.

Troubleshooting a USB device

About this task

Use the following steps to troubleshoot a USB keyboard/mouse. For other USB devices, go to step 7.

Steps

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

Check if USB 3.0 is enabled in System Setup. If enabled, disable it and see if the issue is resolved (older operating systems may not support USB 3.0).

4. In the **IDRAC Settings Utility**, ensure the **USB Management Port Mode** is configured as **Automatic** or **Standard OS Use**.
5. Replace the keyboard/mouse with a working keyboard/mouse.

   If the problem is not resolved, proceed to the next step to begin troubleshooting other USB devices attached to the system.
6. Power down all attached USB devices and disconnect them from the system.
7. Restart the system and, if your keyboard is functioning, enter the System Setup.
8. Verify that all USB ports are enabled on the **Integrated Devices** screen, in the System Setup options.
9. Check if USB 3.0 is enabled in System Setup. If it is enabled, disable it and restart your system.

   If your keyboard is not functioning, you can also use remote access.
10. If the system is not accessible, reset the NVRAM_CLR jumper inside your system and restore the BIOS to the default settings.
11. In the **IDRAC Settings Utility**, ensure the **USB Management Port Mode** is configured as **Automatic** or **Standard OS Use**.
12. Reconnect and power on each USB device one at a time.
13. If a USB device causes the same problem, power down the device, replace the USB cable with a known good cable, and power up the device.

Next steps

If all troubleshooting fails, see Getting Help.

Troubleshooting iDRAC Direct (USB XML configuration)

For information on USB storage device and server configuration, see the Integrated Dell Remote Access Controller User's Guide at **dell.com/esmanuals**.

Steps

1. Ensure your USB storage device is connect to the front USB Management Port, identified by  icon.
2. Ensure your USB storage device is configured with an NTFS or a FAT32 file system with only one partition.
3. Verify that the USB storage device is configured correctly. For more information on configuring the USB storage device, see the *Integrated Dell Remote Access Controller User's Guide* at **dell.com/esmanuals**.
4. In the **IDRAC Settings Utility**, ensure the **USB Management Port Mode** is configured as **Automatic** or **iDRAC Direct Only**.
5. Ensure the **iDRAC Managed: USB XML Configuration** option is either **Enabled** or **Enabled only when the server has default credential settings**.
6. Remove and re-insert the USB storage device.
7. If import operation does not work, try with a different USB storage device.

Next steps

All troubleshooting fails, see Getting help.

Troubleshooting iDRAC Direct (laptop connection)

For information on USB laptop connection and server configuration, see the Integrated Dell Remote Access Controller User's Guide at **dell.com/esmanuals**.

Steps

1. Ensure your laptop is connected to the front USB Management Port, identified by  icon with a USB Type A/A cable.
2. In the **IDRAC Settings Utility**, ensure the **USB Management Port Mode** is configured as **Automatic** or **iDRAC Direct Only**.
3. If the laptop is running the Windows operating system, ensure the iDRAC Virtual USB NIC device driver is installed.
4. If the driver is installed, ensure you are not connected to any network through WiFi or cabled ethernet as iDRAC Direct uses a non-routable address.

Next steps

All troubleshooting fails, see 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 working cable, and turn on the system and the serial device. If the problem is resolved, replace the interface cable with a known good cable.
3. Turn off the system and the serial device, and swap the serial device with a comparable device.
4. Turn on the system and the serial device.

Next steps

If the problem persists, see Getting Help.

Troubleshooting a NIC

Steps

1. Run the appropriate diagnostic test. See Using system diagnostics for available diagnostic tests.
2. Reboot 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 light, check all cable connections.
   - If the activity indicator does not light, the network driver files might be damaged or missing. Remove and reinstall the drivers if applicable. See the NIC's documentation.
   - If applicable, change the autonegotiation setting.
   - Use another connector on the switch or hub.
4. Ensure that the appropriate drivers are installed and the protocols are bound. See the NIC's documentation.
5. Enter the System Setup and confirm that the NIC ports are enabled on the **Integrated Devices** screen.
6. Ensure that the NICs, hubs, and switches on the network are all set to the same data transmission speed and duplex. 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 all troubleshooting fails, see Getting Help.

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 from the system:
   - hard drives
   - hard-drive backplane
   - USB memory key
   - hard-drive tray
   - cooling shroud
   - expansion-card risers (if present)
   - expansion cards
   - power supply unit(s)
   - cooling-fan assembly (if present)
   - cooling fans
   - processor(s) and heat sink(s)
   - memory modules
4. Let the system dry thoroughly for at least 24 hours.
5. Reinstall the components you removed in step 3.
6. Install the system cover.
7. Turn on the system and attached peripherals.

   If the system does not start properly, see Getting Help.
8. If the system starts properly, shut down the system, and reinstall all the expansion cards that you removed.
9. Run the appropriate diagnostic test. For more information, see Using system diagnostics.

Next steps

If the tests fail, see Getting Help.

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 present)
   - Expansion cards
   - Power supply(s)
   - Cooling-fan assembly (if present)
   - Cooling fans
   - Processor(s) and heat sink(s)
   - Memory modules
   - Hard-drive carriers
   - 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 Using system diagnostics.

Next steps

If the tests fail, see Getting Help.

Troubleshooting the system battery

Prerequisites

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

NOTE: If the system is turned off for long periods of time (for weeks or months), the NVRAM may lose 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 kept in the System Setup, the problem may be caused by 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 one hour.
3. Reconnect the system to the electrical outlet and turn on the system.
4. Enter System Setup.

   If the date and time are not correct in System Setup, check the SEL for system battery messages.

Next steps

If the problem persists, see Getting Help.

Troubleshooting power supply units

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

Power source problems

1. Press the power button to ensure that your system is turned on. If the power indicator does not light up when the power button is pressed, press the power-on button firmly.
2. Plug in another working device 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 required specifications.

Power supply unit problems

1. Ensure that no loose connections exist.

   For example, loose power cables.
2. Ensure that the power supply handle/LED indicates that the power supply is working properly.
3. If you have recently upgraded your system, ensure that the power supply unit has enough power to support the new system.
4. If you have a redundant power supply configuration, ensure that both the power supply units are of the same type and wattage.

   If the LED You may have to upgrade to a higher wattage power supply unit.
5. Ensure that you use only power supply units with the Extended Power Performance (EPP) label on the back.
6. Reseat the power supply unit.

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

   If the problem persists, see Getting Help.

Troubleshooting cooling problems

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

Ensure that the following conditions exist:

- System cover, cooling shroud, EMI filler panel, or back-filler bracket is not removed.
- Ambient temperature is not too high.
- 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 needed 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 Controller User's Guide* at **dell.com/idracmanuals**.

Troubleshooting cooling fans

Prerequisites

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

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

Steps

1. Remove the system cover.
2. Reseat the fan or the fan's power cable.

3. Install the system cover.
4. Restart your system.,

Next steps

If the problem persists, see Getting Help.

Troubleshooting system memory

Prerequisites

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

Steps

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

   If diagnostics indicate a fault, follow the corrective actions provided by the diagnostic program.
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 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 the 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.
10. Enter the System Setup and check the system memory setting.

    If the problem is not resolved, proceed with the next step.
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 good 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. For more information, see General memory module installation guidelines.
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 after all memory modules have been checked, see Getting Help.

Troubleshooting an SD card

Prerequisites

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

NOTE: Certain SD cards have a physical write-protect switch on the card. If the write-protect switch is turned on, the SD card is not writeable.

Steps

1. Enter System Setup and ensure that the **Internal SD Card Port** is enabled.
2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.

   NOTE: When an SD card failure occurs, the internal dual SD module controller notifies the system. On the next restart, the system displays a message indicating the failure. If redundancy is enabled at the time of SD card failure, a critical alert is logged and chassis health degrades.
4. Replace the failed SD card with a new SD card.
5. Install the system cover.
6. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.
7. Enter the System Setup and ensure that the **Internal SD Card Port** and **Internal SD Card Redundancy** mode is set to the required mode.

   Verify that correct SD slot is set as **Primary SD Card**.
8. Check if the SD card is functioning properly.
9. If the **Internal SD Card Redundancy** option is set to **Enabled** at the time of the SD card failure, the system prompts you to perform a rebuild.

   NOTE: The rebuild always is sourced from the primary SD card to the secondary SD card. Perform the rebuild of the SD card as necessary.

Troubleshooting a hard drive

Prerequisites

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

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

Steps

1. Run the appropriate diagnostic test. For more information, see Using system diagnostics.

   Depending on the results of the diagnostics test, proceed as needed through the following steps.
2. Ensure that the required device drivers for your controller card are installed and are configured correctly. See the operating system documentation for more information.
3. Reboot the system and enter System Setup.
4. Verify that the controller is enabled and the drives are displayed in the System Setup.

Next steps

If the problem persists, try troubleshooting the expansion cards or see 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. For more information, see Using system diagnostics.
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. For more information, see Using system diagnostics. If the tests fail, see Getting Help.
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. For more information, see Using system diagnostics.

If the tests fail, see Getting Help.

Troubleshooting expansion cards

Prerequisites

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

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

Steps

1. Run the appropriate diagnostic test. For more information, see Using system diagnostics.
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. If the problem is not resolved, turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
7. Remove the system cover.
8. Remove all expansion cards installed in the system.
9. Install the system cover.

   If the tests fail, see Getting Help.
10. 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. For more information, see Using system diagnostics.

Next steps

If the problem persists, see 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 Using system diagnostics for available diagnostic tests.
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. For more information, see Using system diagnostics.

Next steps

If the problem persists, see 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/idracmanuals**

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 require 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 utilities may issue messages if you run diagnostic tests on your system. See Using system diagnostics for more information about 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.

6

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

If a major component or device in the system does not operate properly, running the embedded system diagnostics may indicate component failure.

Running the Embedded System Diagnostics from Boot Manager

1. As the system boots, press F11.
2. Use the up 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 running 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 running the tests on all the detected devices.

System diagnostic controls

Table 31. 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)* at **dell.com/support/home**.

7

Jumpers and connectors

System board jumper settings

For information on resetting the password jumper to disable a password, see Disabling a forgotten password.

Table 32. System board jumper settings

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

System board connectors

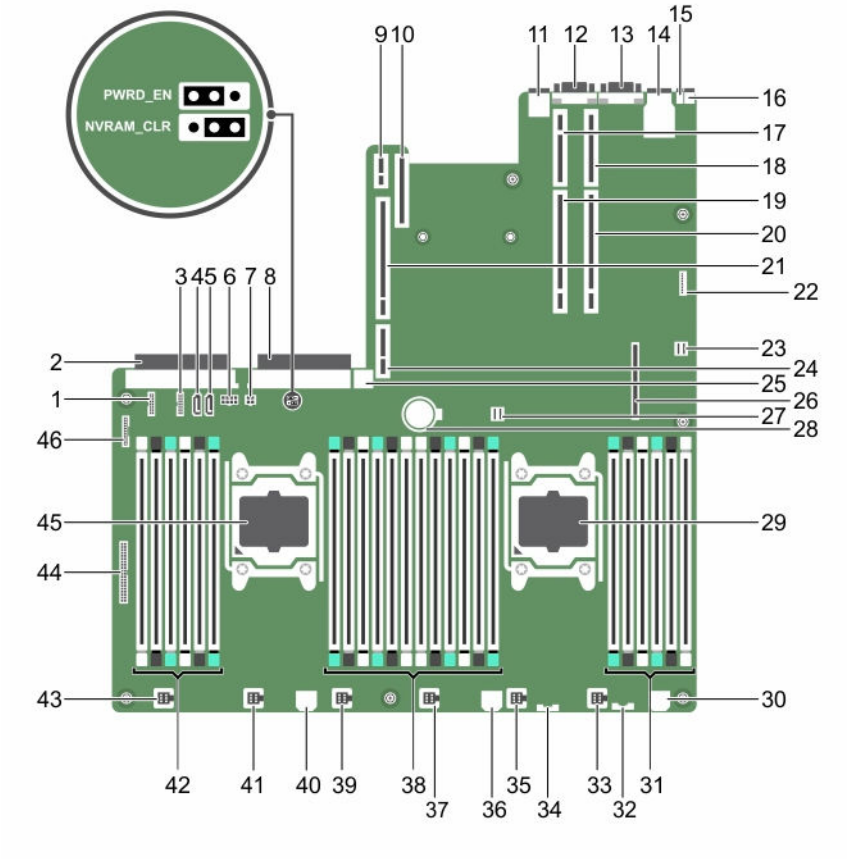

Figure 39. System board connectors and jumpers

Table 33. System board connectors and jumpers

Item	Connector	Description
1.	J_BP_SIG1	Backplane signal connector 1
2.	J_PS2	PSU 2 power connector
3.	J_BP_SIG0	Backplane signal connector 0
4	J_SATA_CD	Optical drive SATA connector, SATADOM connector
5.	J_SATA_TBU	SATA tape backup unit connector
6.	J_BP0	Backplane power connector
7.	J_TBU	Tape backup unit power connector
8	J_PS1	PSU 2 power connector
9.	J_IDSDM	Internal dual SD module connector

Item	Connector	Description
10.	J_NDC	Network daughter card connector
11	J_USB	USB connector
12	J_VIDEO_REAR	Video connector
13	J_COM1	Serial connector
14	J_IDRAC_RJ45	iDRAC8 connector
15	J_CYC	System identification connector
16	CYC_ID	System identification button
17	J_RISER_2AX	Riser 2 connector
18	J_RISER_1AX	Riser 1 connector
19	J_RISER_2BX	Riser 2 connector
20	J_RISER_1BX	Riser 1 connector
21	J_RISER_3AX	Riser 3 connector
22	J_SATA_B	SATA connector
23	J_QS	Quick Sync connector
24	J_RISER_3BX	Riser 3 connector
25	J_USB_INT	Internal USB connector
26	J_STORAGE	Storage controller card connector
27	J_SATA_A	SATA connector
28	BAT	Battery connector
29	CPU2	Processor socket 2
30	J_FAN1U_7	Cooling fan connector
31	B1, B5, B9, B2, B6, B10	Memory module sockets
32	J_BP3	Hard-drive backplane power connector
33	J_FAN1U_6	Cooling fan connector
34	J_BP_SIG2	Backplane signal connector 2
35	J_FAN1U_5	Cooling fan connector
36	J_BATT_SIG	Battery signal connector
37	J_FAN1U_4	Cooling fan connector
38	A1, A5, A9, A2, A6, A10, B3, B7, B11, B4, B8, B12	Memory module sockets
39	J_FAN1U_3	Cooling fan connector
40	J_FAN2U	Cooling fan connector
41	J_FAN1U_2	Cooling fan connector

Item	Connector	Description
42	A12, A8, A4, A7, A11, A3	Memory module sockets
43	J_FAN1U_1	Cooling fan connector
44	J_CTRL_PNL	Control panel connector
45	CPU1	Processor socket 1
46	J_FP_USB	Front panel USB connector

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

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing 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, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Open the system.
3. Move the jumper on the system-board jumper from pins 4 and 6 to pins 2 and 4.
4. Close the system.

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

   NOTE: If you assign a new system and/or setup password with the jumper on pins 2 and 4, the system disables the new password(s) the next time it boots.
5. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.
6. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
7. Open the system.
8. Move the jumper on the system-board jumper from pins 2 and 4 to pins 4 and 6.
9. Close the system.
10. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.
11. Assign a new system and/or setup password.

8

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 on 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 bottom 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 **Technical Support** page is displayed with details to call, chat, or e-mail the Dell Global Technical Support team.

Dell SupportAssist

For an enhanced Support Experience, Dell recommends installing and configuring Dell SupportAssist.

Dell SupportAssist is a software application that transparently collects information about your system and automatically creates support cases when issues are detected. Dell SupportAssist helps Dell to provide you an enhanced, personalized, and efficient support experience. Dell uses the data to solve common problem, designs and markets the products.

For more information about installing and configuring Dell SupportAssist, see: http://www.dell.com/en-us/work/learn/supportassist-servers-storage-networking.

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.

Quick Resource Locator

Use the Quick Resource Locator (QRL) to get immediate access to system information and how-to videos. This can be done by visiting **Dell.com/QRL** or by using your smartphone or tablet and a model specific Quick Resource (QR) code located on your Dell system. To try out the QR code, scan the following image.

Figure 40. Quick Resource Locator