

Dell XC720xd 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.

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About your system

Front-panel features and indicators

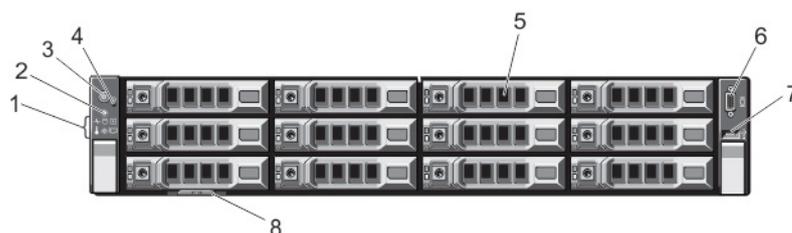


Figure 1. Front-panel features and indicators (3.5 inch chassis)

Table 1. Front-panel features and indicators

Item	Indicator, Button, or Connector	Icon	Description
1	Diagnostic indicators		The diagnostic indicators glow to display error status.
2	System identification button		<p>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.</p> <p>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.</p> <p>To reset iDRAC (if not disabled by entering iDRAC Setup mode by pressing <F2>) press and hold the button for more than 15 seconds.</p>
3	Power-on indicator, Power button		The Power-on indicator LED glows when the system power is on. The power button controls the power supply unit (PSU) output to the system.

Item	Indicator, Button, or Connector	Icon	Description
			 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		<p>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.</p> <p>Use the NMI button only if directed by qualified support personnel or by the OS's documentation.</p>
5	HDDs or SSDs		Up to 12, 3.5-inch HDDs or SSDs.
6	Video connector		Allows you to connect a VGA display to the system.
7	USB connector		Allows you to connect USB devices to the system. The port is USB 2.0-compliant.
8	Information tag		A slide-out label panel, which allows you to record system information such as Service Tag, NIC, and MAC address.

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 turned off. To start the system, plug it into a working power source and press the power button.

The table here describes system conditions and possible corrective actions associated with these indicators:

Table 2. System conditions and suggested corrective actions

Icon	Indicators	Condition	Corrective Action
	Health indicator	<p>If the system is turned on, and in good health, the indicator glows solid blue.</p> <p>The indicator blinks amber if the system is on or in standby, and if any error exists.</p>	<p>None required.</p> <p>See the System Event Log or system messages for the specific issue.</p>

Icon	Indicators	Condition	Corrective Action
	HDD or SSD indicator	The indicator blinks amber if a HDD or SSD experiences an error.	See the System Event Log to determine the HDD or SSD that has an error. Run the appropriate Online Diagnostics test. Restart system and run embedded diagnostics (ePSA). If the HDDs or SSDs are configured in a RAID array, restart the system and start the host adapter configuration utility program.
	Electrical indicator	The indicator blinks amber if the system experiences an electrical error (for example, voltage out of range, or a failed PSU, or voltage regulator).	See the System Event Log or system messages for the specific issue. If it is because of an issue with the PSU, check the LED on the PSU. Reseat the PSU by removing and reinstalling it. If the issue persists, see Getting help in this document.
	Temperature indicator	The indicator blinks amber if the system experiences a thermal error (for example, a temperature out of range or fan failure).	Make sure that none of the following conditions exist: <ul style="list-style-type: none"> • A cooling fan is removed or has stopped functioning. • 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 in this document.
	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

Icon	Indicators	Condition	Corrective Action
	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 PCIe card. If the issue persists, see Getting help in this document.

Front HDD or SSD indicator patterns

A healthy HDD or SSD LED flashes to indicate I/O activity. The Nutanix Web graphical user interface (GUI) provides a feature to help locate a specific HDD. When the front LEDs are turned on using the Nutanix Web GUI, the HDD or SSD you are trying to locate continues to blink as long as there is an I/O activity. The other HDDs or SSDs blink twice every second (in addition to blinking because of I/O activity). The HDD or SSD you are trying to locate does not blink twice every second.

If you turn off the HDDs or SSDs using the Nutanix Web GUI, LEDs blink only when I/O information is being communicated. The SSD slots, which occupy the slots, beginning at slot 0 from the factory, blink at a faster rate than the HDDs, which happens because of more I/O activity. Dell recommends that you leave the SSD in the factory installed slots so that you can easily identify their location.

Do not rely on LED lights to indicate when the HDD or SSD is offline. Do not remove a front HDD or SSD prior to the Nutanix Web GUI, indicating that HDD or SSD is ready to be removed. When the Nutanix Web GUI indicates the HDD or SSD is ready to be removed, you can replace the indicated HDD or SSD.



Figure 2. Front HDD or SSD indicators

1. HDD or SSD activity indicator (green — enabled)
2. HDD or SSD status indicator (orange — not enabled)

Table 3. HDD or SSD status indicator pattern

Drive-activity Indicator Pattern	Condition
Blinking in random pattern	HDD or SSD performing I/O operations
Blinking twice a second (500 ms interval)	HDD or SSD location is enabled or one of more HDDs or SSDs is in the failed state on the Nutanix Web GUI
Off	HDD or SSD has failed, or is being located from the Nutanix Web GUI

NOTE: If a drive fails or the drive is being located, all other HDDs or SSDs in the system blink twice every second. The failed drives or the drive being located does not follow this pattern. However, if the HDD or SSD is performing I/O operation, the activity indicator continues to blink.

Back-panel features and indicators

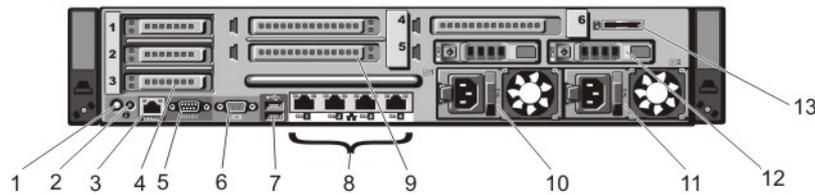


Figure 3. Back-panel features and indicators

Table 4. Back-panel features and indicators

Item	Indicator, Button, or Connector	Icon	Description
1	System identification button		<p>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.</p> <p>If the system stops responding during POST, press and hold the system ID button for more than five seconds to enter the BIOS progress mode.</p> <p>To reset iDRAC (if not disabled in <F2> iDRAC setup) press and hold the button for more than 15 seconds.</p>
2	System identification connector		Connects the optional system status indicator assembly through the optional cable management arm.
3	iDRAC7 Enterprise port		iDRAC7 Enterprise port is a dedicated management port for the iDRAC7.

Item	Indicator, Button, or Connector	Icon	Description
			 NOTE: You can use this port only if you have the iDRAC7 Enterprise license installed on your system.
4	PCIe expansion card slots low-profile (3)		Allows you to connect one PCIe network controller in slot 2.
5	Serial connector		Allows you to connect a serial device to the system.
6	Video connector		Allows you to connect a VGA display to the system.
7	USB connectors (2)		Allows you to connect USB devices to the system. The ports are USB 2.0-compliant.
8	Ethernet connectors		Four integrated connectors that include: <ul style="list-style-type: none"> • Two 100 Mbps/1 Gbps connectors • Two 10 Gbps SFP+/10 GbE T connectors
9	PCIe expansion card slots full height (3) (Dell XC720xd)		These are reserved for Dell PERC H310 and LSI 9207-8i.
10	Power supply unit (PSU1)		AC 750 W or 1100 W
11	Power supply unit (PSU2)		or DC 750 W or 1100 W
12	SSDs (2) (back)		Two hot-swappable 2.5 inch SSDs.
13	vFlash media card slot		Allows you to insert a vFlash media card.

Rear SSD indicator patterns



Figure 4. Rear SSD indicator patterns

1. SSD activity indicator (green)
2. SSD status indicator (green and amber)

NOTE: If an SSD is in Advanced Host Controller Interface (AHCI) mode, the status indicator (on the right side) does not function and remains off.

Table 5. Rear SSD indicator patterns

Drive-Status Indicator Pattern (RAID Only)	Condition
Blinks green two times per second	Identifying SSD or preparing for removal
Off	SSD ready for insertion or removal
	NOTE: The SSD status indicator remains off until all SSDs are initialized after the system is turned on. SSDs are not ready for insertion or removal during this time.
Blinks green, amber, and off	Predicted SSD failure
Blinks amber four times per second	SSD failed
Blinks green slowly	SSD rebuilding
Steady green	SSD online
Blinks green three seconds, amber three seconds, and off six seconds	Rebuild aborted

NIC indicator codes

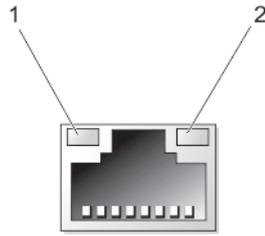


Figure 5. NIC Indicator

1. link indicator
2. activity indicator

Table 6. NIC indicator codes

Indicator	Indicator Code
Link and activity indicators are off	The NIC is not connected to the network.
Link indicator is green	The NIC is connected to a valid network at its maximum port speed (10 Gbps).
Link indicator is amber	The NIC is connected to a valid network at less than its maximum port speed.
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 PSU (when available) has an LED that shows whether power is on or a power fault has occurred.

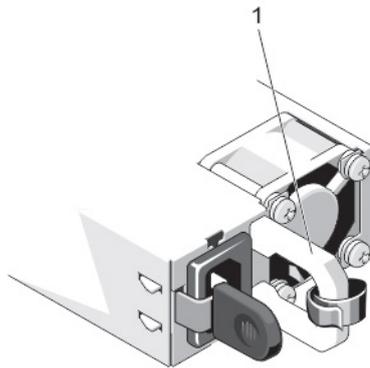


Figure 6. AC PSU Status Indicator

1. AC PSU status indicator/handle

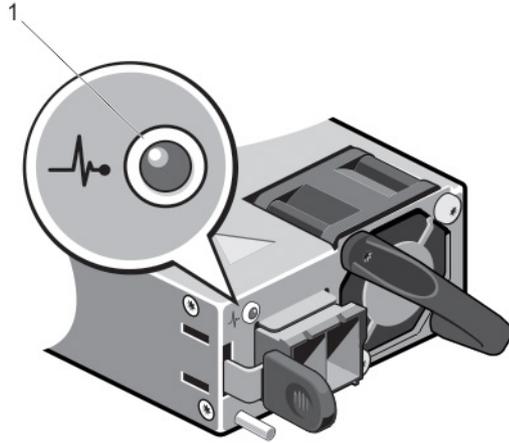


Figure 7. DC PSU Status Indicator

1. DC PSU status indicator

Table 7. Power Indicator Patterns

Power Indicator Pattern	Condition
Not lit	Power is not connected.
Green	The handle or LED indicator lights green indicating that a valid power source is connected to the PSU and that the PSU is operational.
Flashing amber	Indicates an issue in the PSU. <ul style="list-style-type: none"> △ CAUTION: When correcting a PSU mismatch, replace only the PSU with the flashing indicator. Swapping the opposite PSU to make a matched pair can result in an error condition and unexpected system shutdown. To change from a High Output configuration to a Low Output configuration or vice versa, you must power down the system. △ CAUTION: AC PSU support both 220 V and 110 V input voltages with the exception of Titanium PSUs, which support only 220 V. When two identical PSUs receive different input voltages, they can output different wattages, and trigger a mismatch. △ CAUTION: The PSU must be of the same type and have the same maximum output power. △ CAUTION: Combining AC and DC PSU is not supported and triggers a mismatch.
Flashing green	When hot-swapping a PSU, this indicates that the PSU is mismatched with the other PSU (in terms of efficiency, feature set, health status, and supported voltage). Replace the PSU that has the flashing LED indicator with a PSU that matches the capacity of the other installed PSU.

Other information you may need



WARNING: See the safety and regulatory information that shipped with your system. Warranty information may be included within this document or as a separate document.

- The *Getting Started Guide* provides an overview about setting up your system, and technical specifications. This document is available online at dell.com/support/home.
- The *Solutions Guide* provides procedures about Nutanix account setup, license activation and management, deployment and recovery, documentation access, and XC720xd management. This document is available online at dell.com/support/home.
- The rack documentation included with your rack solution describes how to install your system into a rack, if required.
- Any media that ships with your system that provides documentation and tools for configuring and managing your system, including those pertaining to the operating system, system management software, system updates, and system components that you purchased with your system.
- For the full name of an abbreviation or acronym used in this document, see the Glossary at dell.com/support/home.



NOTE: Always check for updates on dell.com/support/home and read through the updates first because they often supersede information in other documents.

Using system setup and boot manager

The System Setup feature allows you to manage your system hardware and specify BIOS-level options.

The following keyboard shortcuts provide access to system features during startup:

Table 8. System setup keystrokes

Keystroke	Description
<F2>	Opens the System Setup page.
<F10>	Opens System Services and starts Dell Lifecycle Controller, which support systems management features such as operating system deployment, hardware diagnostics, firmware updates, and platform configuration, using a GUI. The feature set available in Dell Lifecycle Controller is determined by the Dell iDRAC license installed.
<F11>	Opens the BIOS Boot Manager.
<F12>	Starts Preboot Execution Environment (PXE) boot.

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

You can access System Setup using the:

- Standard graphical browser, which is enabled by default
- Text browser, which is enabled using Console Redirection

To enable Console Redirection:

1. On the **System Setup** page, click **System BIOS**.
2. 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>.

Opening system setup page

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

If your OS begins to load before you press <F2>, allow the system to complete starting, and then restart your system.

Responding to error messages

If an error message is displayed while the system is starting, make a note of the message. For more information, see System Error Messages later in this document.

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

Using system setup navigation keys

Table 9. System setup navigation keys

Keys	Action
Up arrow	Moves to the previous field.
Down arrow	Moves to the next field.
<Enter>	Allows 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 menu, if applicable.
<Tab>	Moves to the next focus area.
	 NOTE: For the standard graphics browser only.
<Esc>	Moves to the previous page until you view the main screen. Pressing <Esc> on the main page displays a message that prompts you to save any unsaved changes and restarts the system.
<F1>	Displays the System Setup help file.
	 NOTE: For most of the options, any changes that you make are recorded but do not take effect until you restart the system.

System setup options

System Setup

 **NOTE:** Press <Alt + F> to reset the BIOS or Unified Extensible Firmware Interface (UEFI) settings to their default settings.

Table 10. System Setup options

Menu Item	Description
System BIOS	This option is used to view and configure BIOS settings.
iDRAC Settings	This option is used to view and configure iDRAC settings.
Device Settings	This option is used to view and configure device settings.

System BIOS

 **NOTE:** The options for System Setup change based on the system configuration.

 **NOTE:** System Setup defaults are listed under their respective options in the following sections, where applicable.

Table 11. System BIOS

Menu Item	Description
System Information	Displays information about the system such as the system model name, BIOS version, Service Tag, and so on.
Memory Settings	Displays information and options related to installed memory.
Processor Settings	Displays information and options related to the processor such as speed, and cache size.
Boot Settings	Displays options to specify the boot mode (BIOS or UEFI). Allows you to modify UEFI and BIOS boot settings.  NOTE: Dell XC720xd supports only BIOS boot mode.
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, TPM security, and so on. It also enables or disables support for local BIOS update, the power and NMI buttons on the system.
Miscellaneous Settings	Displays options to change the system date, time, and so on.

System Information

Table 12. 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 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.

Memory Settings

Table 13. Memory Settings

Menu Item	Description
System Memory Size	Displays the disk space available in the system.
System Memory Type	Displays the type of memory installed on the system.
System Memory Speed	Displays the system memory speed.
System Memory Voltage	Displays the system memory voltage.
Video Memory	Displays the video memory.
System Memory Testing	Specifies whether or not 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	<p>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.</p> <p> NOTE: The Dell XC720xd only supports Memory Operating Mode set to Optimizer Mode.</p>
Node Interleaving	<p>If the Node Interleaving option is set to Enabled, memory interleaving is supported if a symmetric memory configuration is installed. If the Node Interleaving option is set to Disabled, the system supports Non-Uniform Memory architecture (NUMA) (asymmetric) memory configurations. By default, the Node Interleaving option is set to Disabled.</p> <p> NOTE: Node Interleaving is not supported on Dell XC720xd.</p>
Serial Debug Output	By default, Serial Debug Output is disabled.

Processor Settings

Table 14. Processor Settings

Menu Item	Description
Logical Processor	Allows you to enable or disable 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 displays only one logical processor for each core. By default, the Logical Processor option is set to Enabled .
QPI Speed	Allows you to set the QuickPath Interconnect data rate settings. By default, the QPI Speed option is set to Maximum data rate .  NOTE: The QPI speed option displays only when both processors are installed.
Alternate RTID (Requestor Transaction ID) Setting	Allows you to allocate more RTIDs to the remote socket increasing cache performance between the sockets or work in normal mode for NUMA. By default, the Alternate RTID (Requestor Transaction ID) Setting feature is set to Disabled .
Virtualization Technology	Allows you to enable or disable the additional hardware capabilities provided for virtualization. By default, the Virtualization Technology option is set to Enabled .
Adjacent Cache Line Prefetch	Allows you to optimize 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 utilization of random memory access.
Hardware Prefetcher	Allows you to enable or disable hardware prefetcher. By default, the Hardware Prefetcher option is set to Enabled .
DCU Streamer Prefetcher	Allows you to enable or disable Data Cache Unit streamer prefetcher. By default, the DCU Streamer Prefetcher option is set to Enabled .
DCU IP Prefetcher	Allows you to enable or disable Data Cache Unit IP prefetcher. By default, the DCU IP Prefetcher option is set to Enabled .
Execute Disable	Allows you enable or disable execute disable memory protection technology. By default, the Execute Disable option is set to Enabled .
Logical Processor Idling	Allows you to enable or disable the OS capability to put logical processors in the idling state to reduce power consumption. By default, the option is set to Disabled .
Dell Controlled Turbo	Helps in controlling Turbo engagement. By default, the option is set to Disabled . This feature is also referred to as Dell Processor Acceleration Technology (DPAT).

Menu Item	Description
	<p> NOTE: This option is available only on systems installed with an E5-2690 or E5-2600 V2 Xeon series processor and support Turbo. Enable Turbo Boost under System Profile Settings and set the System Profile to Performance mode when utilizing this feature. Enabling Dell Controlled Turbo make fans run at maximum RPM.</p> <p> NOTE: DPAT works when DPAT is enabled in BIOS setup and either one of the following settings is available:</p> <ul style="list-style-type: none"> • System Profile is set to Maximum Performance. This automatically enables Turbo mode. • System Profile is set to Custom and CPU Power Management is set to Maximum Performance and Turbo is enabled. <p> NOTE: When Dell Processor Acceleration Technology (DPAT) is disabled, fan offset speed does not change and remains high. Set Fan offset to normal on the iDRAC Thermal Settings page.</p>
Number of Cores per Processor	Allows you to control 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 processors support 64-bit extensions.
Processor Core Speed	Displays the maximum core frequency of the processor.
Processor Bus Speed	Displays the bus speed of the processors.
	<p> NOTE: The processor bus speed option displays only when both the processors are installed.</p>
Processor 1	<p> NOTE: The following settings are displayed for each processor installed on the system.</p> <ul style="list-style-type: none"> • 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 for each processor.

SATA Settings

Table 15. SATA Settings

Menu Item	Description
Embedded SATA	Allows the embedded SATA to be set to Off, ATA, AHCI, or RAID mode. By default, Embedded SATA is set to AHCI Mode.
Port A	Auto enables BIOS support for the device attached to SATA port A. By default, Port A is set to Auto.

Menu Item	Description
Port B	Auto enables BIOS support for the device attached to SATA port B. By default, Port B is set to Auto.
Port C	Auto enables BIOS support for the device attached to SATA port C. By default, Port C is set to Auto.
Port D	Auto enables BIOS support for the device attached to SATA port D. By default, Port D is set to Auto.
Port E	Auto enables BIOS support for the device attached to SATA port E. By default, Port E is set to Auto.
Port F	Auto enables BIOS support for the device attached to SATA port F. By default, Port F is set to Auto.

 **NOTE:** Ports A, B, C, and D are used for the backplane drives, port E for the optical drive (CD/DVD), and port F for the tape drive.

Boot Settings

Table 16. Boot Settings

Menu Item	Description
Boot Mode	Allows you to set the boot mode of a system.  CAUTION: Dell XC720xd supports only BIOS boot mode.
Boot Sequence Retry	Allows you to enable or disable the boot sequence retry feature. If this field is enabled and the system stopped boot operation, the system reattempts the boot sequence after 30 seconds. By default, the Boot Sequence Retry option is set to Disabled .
BIOS Boot Settings	Allows you to enable or disable BIOS Boot options.  NOTE: This option is enabled only if the boot mode is BIOS.
One-Time Boot	Allows you to enable or disable a one-time boot from a selected device.

Integrated Devices

Table 17. Integrated Devices options

Menu Item	Description
User Accessible USB Ports	Allows you enable or disable the user accessible USB ports. Selecting Only Back Ports On disables the front USB ports and selecting All Ports Off disables both front and back USB ports. By default,

Menu Item	Description
Internal USB Port	the User Accessible USB Ports option is set to All Ports On . Allows you to enable or disable the internal USB port. By default, the Internal USB Port option is set to On.
Integrated Network Card 1	Allows you to enable or disable the Integrated Network Card 1 option. By default, the Integrated Network Card 1 option is set to Enabled .
OS Watchdog Timer	Allows you to enable or disable the OS Watchdog Timer option. When this option is enabled, OS initializes the timer and OS Watchdog Timer helps in recovering the OS. By default, the OS Watchdog Timer option is set to Disabled .
Embedded Video Controller	Allows you to enable or disable Embedded Video Controller . By default, Embedded Video Controller is Enabled .
SR-IOV Global Enable	Allows you to enable or disable BIOS configuration of Single Root I/O Virtualization (SR-IOV) devices. By default, the SR-IOV Global Enable option is set to Disabled .
Slot Disablement	Allows you to enable or disable available PCIe slots on your system. The Slot Disablement feature controls the configuration of PCIe cards installed in the specified slot.  CAUTION: Slot disablement must be used only when the installed peripheral card is preventing booting into the Operating System or causing delays in system startup.
Memory Mapped I/O above 4 GB	Allows you to enable support for PCIe devices that require large amounts of memory. By default, the option is set to Enabled .

Serial Communications

Table 18. Serial Communications

Menu Item	Description
Serial Communication	Allows you to select serial communication devices (Serial Device 1 and Serial Device 2) in the BIOS. You can enable BIOS console redirection and specify the port address. By default, the Serial

Menu Item	Description
Serial Port Address	<p>Communication option is set to On without Console Redirection.</p> <p>Allows you to 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.</p> <p> NOTE: Only Serial Device 2 can be used for Serial Over LAN (SOL). To use console redirection by SOL, configure the same port address for console redirection and the serial device.</p>
External Serial Connector	<p>Allows you to associate the external serial connector to serial device 1, serial device 2, or remote access device. By default, the External Serial Connector option is set to Serial Device1.</p> <p> NOTE: Only Serial Device 2 can be used for SOL. To use console redirection by SOL, configure the same port address for console redirection and the serial device.</p>
Failsafe Baud Rate	<p>Displays the failsafe Bauds per second (BPS) 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 11520.</p>
Remote Terminal Type	<p>Allows you to set the remote console terminal type. By default, the Remote Terminal Type option is set to VT 100/VT 220.</p>
Redirection After Boot	<p>Allows you to enable or disable the BIOS console redirection when the operating system is loaded. By default, the Redirection After Boot option is set to Enabled.</p>

System Profile Settings

Table 19. System Profile Settings

Menu Item	Description
System Profile	<p>Allows you to set 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</p>

Menu Item	Description
	<p data-bbox="831 239 1402 300">Per Watt Optimized (DAPC). DAPC is Dell Active Power Controller.</p> <p data-bbox="831 321 1402 382"> NOTE: The following parameters are available only when the System Profile is set to Custom.</p> <ul data-bbox="831 403 1402 1774" style="list-style-type: none"> <li data-bbox="831 403 1402 533">• CPU Power Management — Allows you to set the CPU power management. By default, the CPU Power Management option is set to System DBPM (DAPC). DBPM is Demand-Based Power Management. <li data-bbox="831 554 1402 646">• Memory Frequency — Allows you to set the memory frequency. By default, the Memory Frequency option is set to Maximum Performance. <li data-bbox="831 667 1402 760">• Turbo Boost — Allows you to enable or disable the processor to operate in turbo boost mode. By default, the Turbo Boost option is set to Enabled. <li data-bbox="831 781 1402 873">• C1E — Allows you to enable or disable the processor to switch to a minimum performance state when it is idle. By default, the C1E option is set to Enabled. <li data-bbox="831 894 1402 987">• C States — Allows you to enable or disable the processor to operate in all available power states. By default, the C States option is set to Enabled. <li data-bbox="831 1008 1402 1117">• Monitor/Mwait — Allows you to enable Monitor/Mwait instructions in the processor. By default, the Monitor/Mwait option is set to Enabled for all system profiles, except Custom. <p data-bbox="831 1138 1402 1199"> NOTE: This option can be disabled only if the C States option in Custom mode is disabled.</p> <p data-bbox="831 1220 1402 1329"> NOTE: When C States is enabled in Custom mode, changing the Monitor/Mwait setting does not impact system power/performance.</p> <ul data-bbox="831 1350 1402 1774" style="list-style-type: none"> <li data-bbox="831 1350 1402 1411">• Memory Patrol Scrub — Allows you to set the memory patrol scrub frequency. By default, the Memory Patrol Scrub option is set to Standard. <li data-bbox="831 1432 1402 1493">• Memory Refresh Rate — Allows you to set the memory refresh rate. By default, the Memory Refresh Rate option is set to 1x. <li data-bbox="831 1514 1402 1703">• Memory Operating Voltage — Allows you to set the DIMM voltage selection. When set to Auto, the system automatically sets the system voltage to the optimal setting based on the DIMM capacity and the number of DIMMs installed. By default, the Memory Operating Voltage option is set to Auto. <li data-bbox="831 1724 1402 1774">• Collaborative CPU Performance Control — When set to Enabled, the CPU power

Menu Item	Description
	management is controlled by the OS Demand Based Power Management (DBPM) and the System DBPM Performance per Watt (DAPC). By default, the option is set to Disabled .

System Security

Table 20. System Security

Menu Item	Description
Intel AES-NI	Improves the application speed by performing encryption and decryption using the Advanced Encryption Standard Instruction Set and is set to Enabled by default.
System Password	Allows you to set 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	Allows you to set the setup password. This option is read-only if the password jumper is not installed in the system.
Password Status	Allows you to lock the system password. By default, the Password Status option is set to Unlocked .
TPM Security	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 modify only 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 Activation	Allows you to change the operational state of the TPM. By default, the TPM Activation option is set to No Change.
TPM Status	Displays the TPM status.
TPM Clear	 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.
	Allows you to clear all the contents of the TPM. By default, the TPM Clear option is set to No.
Intel TXT	Allows you to enable or disable Intel Trusted Execution Technology (TXT). To enable Intel TXT , you must enable Virtualization Technology and TPM Security must be Enabled with Pre-boot

Menu Item	Description
BIOS Update Control	<p>measurements. By default, the Intel TXT option is set to Off.</p> <p>Allows you to update the BIOS using either DOS or UEFI shell-based flash utilities. For environments that do not require local BIOS updates, Dell recommends to set this option to Disabled. By default, the BIOS Update Control option is set to Unlocked.</p> <p> NOTE: BIOS updates using the Dell Update Package are not affected by this option.</p>
Power Button	Allows you to enable or disable the power button on the front of the system. By default, the Power Button option is set to Enabled .
NMI Button	Allows you to enable or disable the NMI button on the front of the system. By default, the NMI Button option is set to Disabled .
AC Power Recovery	Allows you to set 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	Allows you to set 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)	Allows you to set the User Defined Delay mode when the User Defined option for AC Power Recovery Delay is selected.

Memory Settings

Table 21. Memory Settings

Menu Item	Description
System Memory Size	Displays the disk space available in the system.
System Memory Type	Displays the type of memory installed on the system.
System Memory Speed	Displays the system memory speed.
System Memory Voltage	Displays the system memory voltage.
Video Memory	Displays the video memory.
System Memory Testing	Specifies whether or not 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

Menu Item	Description
	<p>with Advanced ECC Mode, and Dell Fault Resilient Mode. By default, the Memory Operating Mode option is set to Optimizer Mode.</p> <p> NOTE: The Dell XC720xd only supports Memory Operating Mode set to Optimizer Mode.</p>
Node Interleaving	<p>If the Node Interleaving option is set to Enabled, memory interleaving is supported if a symmetric memory configuration is installed. If the Node Interleaving option is set to Disabled, the system supports Non-Uniform Memory architecture (NUMA) (asymmetric) memory configurations. By default, the Node Interleaving option is set to Disabled.</p> <p> NOTE: Node Interleaving is not supported on Dell XC720xd.</p>
Serial Debug Output	By default, Serial Debug Output is disabled.

System and setup password features

You can create a system password and a setup password to secure your system. To enable creation of the system and setup password, the password jumper must be set to enabled. For more information about the password jumper settings, see System Board Jumper Settings in this document.

System password	You must enter this password before you can boot your system.
Setup password	You must enter this password to access and make changes to the BIOS settings of your system.

 **CAUTION:** The password features provide a basic level of security for the data on your system.

 **CAUTION:** Anyone can access the data stored on your system if the system is running and unattended.

 **NOTE:** Your system is shipped with the system and setup password feature disabled.

Assigning a system and/or setup password

 **NOTE:** The password jumper enables or disables the **System Password** and **Setup Password** options. For more information on the password jumper settings, see System Board Jumper Settings in this document.

You can assign a new system password and/or setup password or change an existing system password and/or setup password only when the password jumper setting is enabled and **Password Status** is **Unlocked**. If the **Password Status** is **Locked**, you cannot change the system password and/or setup password.

If the password jumper setting is disabled, the existing System Password and Setup Password is deleted and you need not provide the system password to boot the system.

To assign a system and/or setup password:

1. From the system console, enter **System Setup**, press <F2> immediately after a system turn on or restart.
2. On the **System Setup** page, select **System BIOS** and press <Enter>. The **System BIOS** page is displayed.
3. On the **System BIOS** page, select **System Security** and press <Enter>. The **System Security** page is displayed.
4. On the **System Security** page, verify that password status is set to **Unlocked**.
5. Select **System Password**, enter your system password, and press <Enter> or <Tab>. Use the following guidelines to assign the system password:
 - A password can have up to 32 characters.
 - The password can contain the numbers 0 through 9.
 - Only the following special characters are allowed: whitespace, ("), (+), (,), (-), (.), (/), (:), (|), (\), (|), (').

A message prompts you to reenter the system password.

6. Retype the system password that you entered earlier and click **OK**.
7. Select **Setup Password**, enter your system password and press <Enter> or <Tab>. A message prompts you to reenter the setup password.
8. Reenter the setup password that you entered earlier and click **OK**.
9. Press <Esc> to return to the **System BIOS** page. Press <Esc> again, and a message prompts you to save the changes.



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

Deleting or changing an existing system and/or setup password

Make sure 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.

To delete or change the existing System and/or Setup password:

1. To enter **System Setup**, press <F2> immediately after a power-on or restart.
2. On the **System Setup** page, select **System BIOS** and press <Enter>. The **System BIOS** page is displayed.
3. On the **System BIOS page**, select **System Security** and press <Enter>. The **System Security** page is displayed.
4. On the **System Security** page, verify that the 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>.



NOTE: If you change the System and/or Setup password a message prompts you to reenter the new password. If you delete the System and/or Setup password, a message prompts you to confirm the deletion.

7. Press <Esc> to return to the System BIOS page. Press <Esc> again, and a message prompts you to save the changes.

Using system password to secure the system

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

1. Turn on or restart your system.
2. Type your password and press <Enter>.

When the password status is shown as **Locked**, type the password and press <Enter> when prompted during system restart.

If an incorrect system password is entered, the system displays a message and prompts you to reenter your password. You have three attempts to enter the correct password. After the third unsuccessful attempt, the system displays an error message that the system has halted and must be powered down.

Even after you turn off and restart the system, the error message is displayed until you type the correct password.

 **NOTE:** You can use the **Password Status** option in conjunction with the **System Password** and **Setup Password** options to protect your system from unauthorized users.

Operating with a setup password enabled

If **Setup Password** option is set to **Enabled**, type the correct setup password before modifying most of the system setup option.

If you do not enter the correct password in three attempts, the system displays the message

```
Invalid Password! Number of unsuccessful password attempts: <x> System Halted!  
Must power down.
```

Even after you turn off and restart the system, the error message is displayed until the correct password is entered. The following options are exceptions:

- If the **System Password** is not **Enabled** and is not locked by selecting the **Password Status** option, you can assign a system password.
- You cannot disable or change an existing system password.

 **NOTE:** You can use the **Password Status** option in conjunction with the **Setup Password** option to protect the system password from unauthorized changes.

Entering UEFI boot manager

 **NOTE:** OSs must be 64-bit UEFI-compatible (for example, Microsoft Windows Server 2008 x64 version) to be installed from the UEFI boot mode. DOS and 32-bit operating systems can only be installed from the BIOS boot mode.

To enter the Boot Manager mode:

1. Turn on or restart your system.
2. Press <F11> after you see the following message:
<F11> = UEFI Boot Manager

If your OS begins to load before you press <F11>, allow the system to finish booting, and then restart your system and try the operation again.

Using the boot manager navigation keys

Table 22. Boot manager navigation keys

Key	Description
Up arrow	Moves to the previous box.
Down arrow	Moves to the next box.
<Enter>	Allows you to type a value in the selected box (if applicable) or use the link in the box.
Spacebar	Expands or collapses a drop-down menu, if applicable.
<Tab>	Moves to the next focus area.
	 NOTE: For the standard graphics browser only.
<Esc>	Moves to the previous page until you view the main screen. When on the main page, press <Esc> exits the Boot Manager and restart the system.
<F1>	Displays the System Setup help file.

 **NOTE:** For most of the options, any changes that you make are recorded but do not take effect until you restart the system.

Boot Manager

Table 23. Boot Manager options

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 is unsuccessful, the system continues with the next item in the boot order until the boot is successful or no more boot options are found.
BIOS Boot Menu	Displays the list of available BIOS boot options (marked with asterisks). Select the boot option you want to use and press <Enter>.
UEFI Boot Menu	Displays the list of available UEFI boot options (marked with asterisks). Select the boot option you want to use and press <Enter>. The UEFI Boot Menu allows you to add and delete a boot option, and enable booting from a file.
Driver Health Menu	Displays a list of the drivers installed on the system and their health status.
Launch System Setup	Enables you to access the system setup.
System Utilities	Enables you to access the system setup.

UEFI boot menu

Table 24. UEFI boot menu options

Menu Item	Description
Select UEFI Boot Option	Displays the list of available UEFI boot options (marked with asterisks), select the boot option you want to use and press <Enter>.
Add Boot Option	Adds a new boot option.
Delete Boot Option	Deletes an existing boot option.
Boot From File	Sets a one-time boot option not included in the boot option list.

Embedded system management

The Dell Lifecycle Controller provides advanced embedded systems management throughout the server's lifecycle. You can start the Lifecycle Controller during the boot sequence, which functions independently of the operating system.

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

For more information about setting up Dell Lifecycle Controller, configuring hardware and firmware, and deploying the OS, see the Dell Lifecycle Controller documentation at dell.com/support/home.

iDRAC Settings feature

The iDRAC Settings feature is an interface to set up and configure iDRAC parameters using UEFI. You can enable or disable various iDRAC parameters using the iDRAC Settings feature.

 **NOTE:** Accessing some of the features on the iDRAC Settings feature requires the iDRAC8 Enterprise License upgrade.

For more information about using iDRAC, see the *iDRAC User's Guide* at dell.com/esmmanuals.

Entering the iDRAC Settings page

1. Turn on or restart the managed system.
2. Press <F2> during Power-on Self-test (POST).
3. On the **System Setup** page, click **iDRAC Settings**.
The **iDRAC Settings** page is displayed.

Changing thermal settings

The iDRAC Settings feature enables you to select and customize the thermal control settings of your system.

1. Start iDRAC by logging in with your credentials. When the company logo appears, press <F2> on the **iDRAC Settings** page, click **Thermal**, and then click **User Option**.
 - Default

- Maximum Exhaust Temperature
- Fan Speed Offset



NOTE: When the **User Option** option is set to the default **Auto** setting, you cannot modify **User Option** .

2. Type appropriate values in the **Maximum Air Exhaust Temperature** or the **Fan Speed Offset** boxes.
3. Click **Back** → **Finish** → **Yes**.

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 came with the product.
-  **NOTE:** It is recommended that you always use a static mat and static strap while working on components inside the system.
-  **NOTE:** To make sure proper operation and cooling, all bays in the system must be populated at all times with either a module or with a blank.

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
- #1 Phillips screwdriver
- T6, T8, T10, and T15 Torx screwdrivers

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

Removing front bezel

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

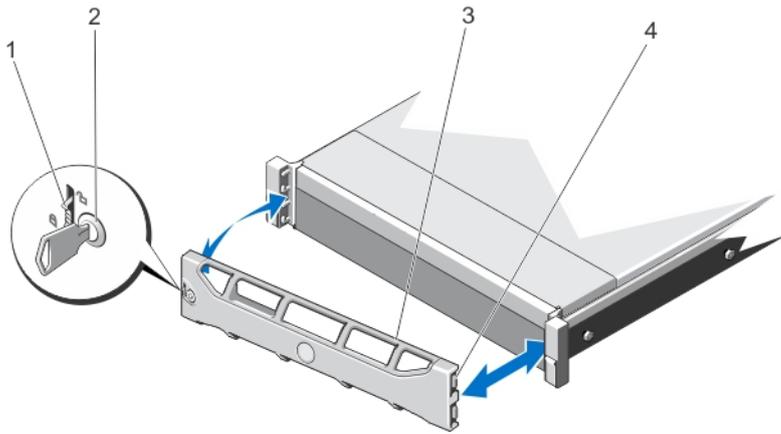


Figure 8. Removing and installing the front bezel

- | | |
|------------------|-----------------|
| 1. release latch | 2. keylock |
| 3. front bezel | 4. locking hook |

Installing front bezel

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

Removing the system cover

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

1. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
2. Rotate the latch release lock counter clockwise to the unlocked position.
3. Lift the latch on top of the system and slide the cover back.
4. Grasp the cover on both sides, and carefully lift the cover away from the system.

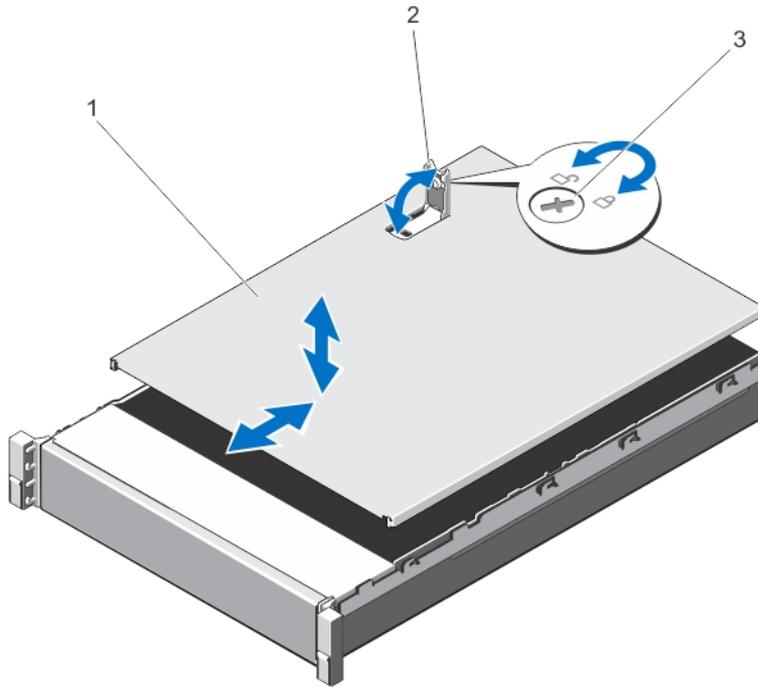


Figure 9. Removing and installing the system cover

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

Installing the system cover

1. Lift the latch on the cover.
2. Place the cover on the chassis and offset the cover slightly back so that it clears the chassis hooks and lays flush on the chassis.
3. Press down the latch to move the cover into the closed position.
4. Rotate the latch release lock in a clockwise direction to secure the cover.
5. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

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

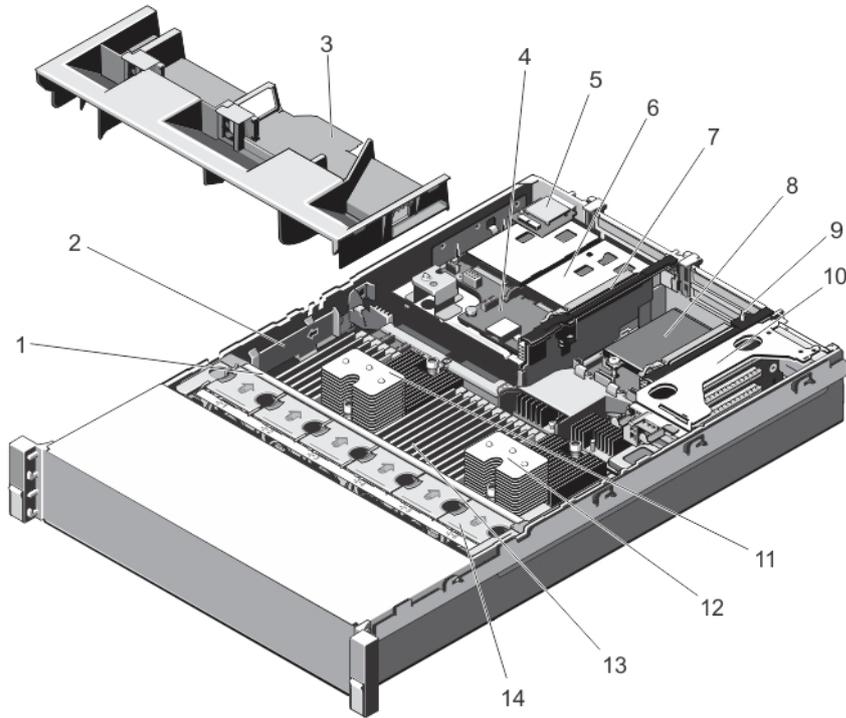


Figure 10. Inside system

- | | |
|-------------------------------|--------------------------------|
| 1. cooling-fan assembly | 2. cable securing bracket |
| 3. cooling shroud | 4. HDD or SSD backplane (back) |
| 5. vFlash media slot | 6. HDDs or SSDs (back) (2) |
| 7. expansion-card riser 3 | 8. network daughter card |
| 9. expansion-card riser 2 | 10. expansion-card riser 1 |
| 11. heat sink for processor 1 | 12. heat sink for processor 2 |
| 13. DIMMs (24) | 14. cooling fans (6) |

Cooling shroud

Removing the cooling shroud

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

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

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

3. If installed, remove the full-length PCIe card.
4. Hold the touch points and lift the shroud away from the system.

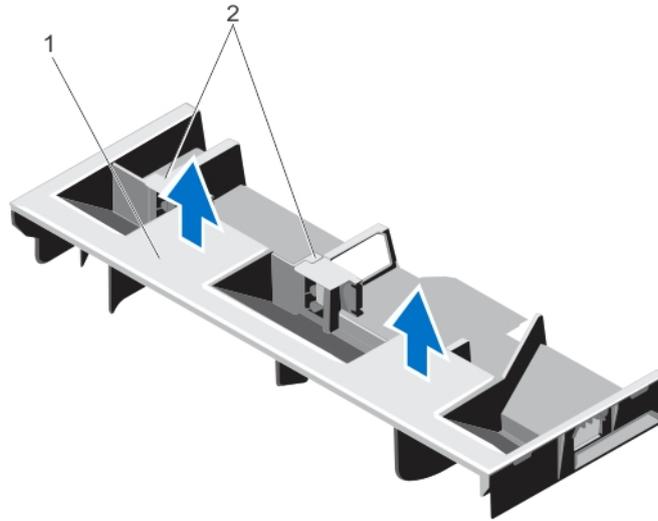


Figure 11. Removing and installing the cooling shroud

1. cooling shroud

2. supports for a full-length PCIe card

Installing the cooling shroud

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

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

1. Align the tabs on the cooling shroud with the securing slots on the chassis.
2. Lower the cooling shroud into the chassis until it is firmly seated.
3. If applicable, replace the full-length PCIe card.
4. Install the system cover.
5. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

System memory

Your system supports DDR3, registered DIMMs (RDIMMs) and load reduced DIMMs (LRDIMMs). It supports DDR3 and DDR3L voltage specifications.

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

Memory bus operating frequency can be 1866 MT/s, 1600 MT/s, 1333 MT/s, 1066 MT/s, or 800 MT/s depending on:

- DIMM type (RDIMM or LRDIMM)

- DIMM configuration (number of ranks)
- Maximum frequency of the DIMMs
- Number of DIMMs populated per channel
- DIMM operating voltage
- System profile selected (Performance Optimized)
- Maximum supported DIMM frequency of the processors

The system contains 24 memory sockets split into two sets of 12 sockets, one set for each 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.

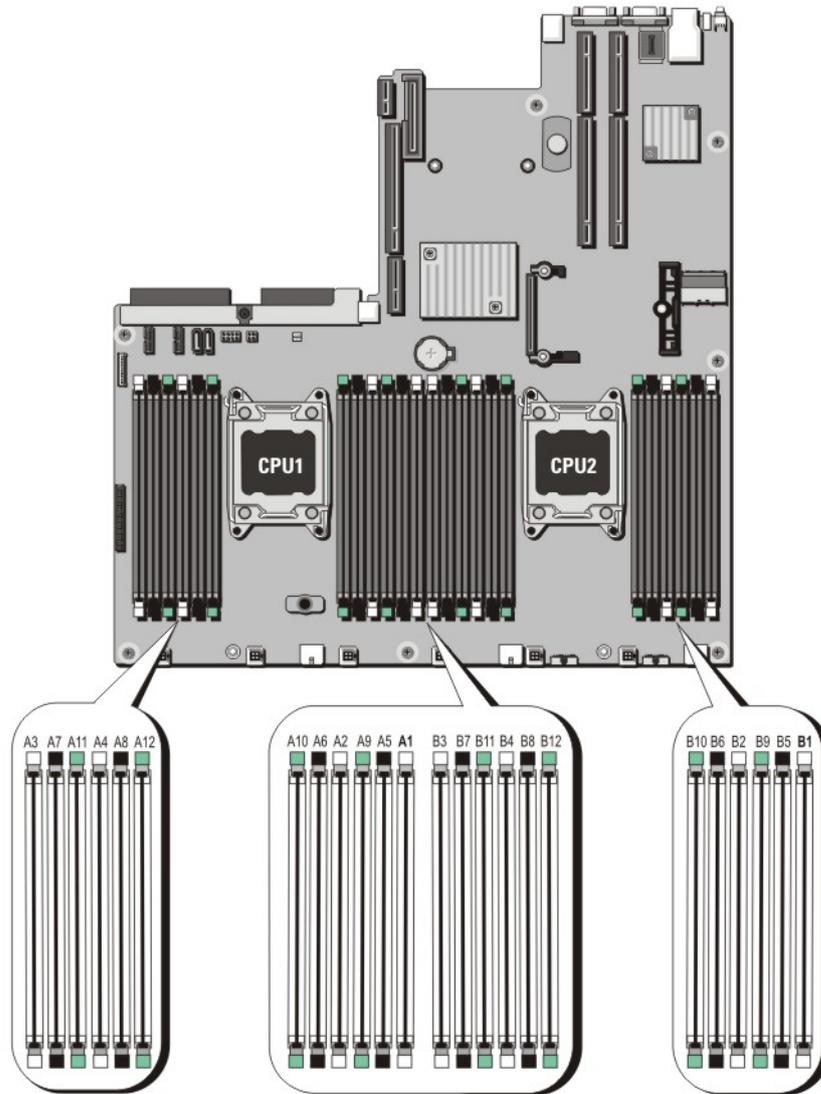


Figure 12. Memory socket locations

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 configurations

System Capacity (GB)	DIMM Size	Number of DIMMs	DIMM Slot Population
64	16	2	A1 B1
128	16	4	A1, A2 B1, B2
256	16	8	A1, A2, A3, A4 B1, B2, B3, B4
384	16	12	A1, A2, A3, A4, A5, A6 B1, B2, B3, B4, B5, B6
512	32	16	A1, A2, A3, A4, A5, A6, A7, A8 B1, B2, B3, B4, B5, B6, B7, B8
768	32	24	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12 B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12

General memory module installation guidelines

This system supports Flexible Memory Configuration, you can configure and run the system in any valid chipset architectural configuration. The following are the recommended guidelines for best performance:

- RDIMMs and LRDIMMs must not be mixed.
- You can use x4 and x8 DRMS-based DIMMs. For more information, see Mode-Specific Guidelines in this document.

- Populate up to two quad-rank RDIMMs and up to three dual- or single-rank RDIMMs for each channel. When you populate a quad-rank RDIMM in the first slot with white release levers, the third DIMM slot in the channel with green release levers cannot be populated.
- Populate up to three LRDIMMs regardless of rank count.
- Populate all sockets with white release tabs first, then black, and then green.
- Do not populate the third DIMM socket in a channel with green release tabs, if a quad-rank RDIMM is populated in the first socket with white release tabs.
- 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 quad-rank and dual-rank DIMMs, populate quad-rank DIMMs in the sockets with white release tabs and dual-rank DIMMs in the sockets with black release tabs.
- 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.
- You can use different sizes of memory modules, provided that other memory population rules are followed (for example, you can use 2 GB and 4 GB memory modules).
- Populate four DIMMs for each processor (one DIMM per channel) at a time to maximize performance.
- If memory modules with different speeds are installed, they operate at the speed of the slowest installed memory modules or slower depending on system DIMM configuration.

Mode-Specific guidelines

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

 **NOTE:** You can use x4 and x8 DRAM-based DIMMs, providing support for RAS features. However, you must follow all guidelines for specific RAS features. 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.

Install identical DIMMs in matched pairs - for example, A1 with A2, A3 with A4, A5 with A6, and so on.

Sample memory configurations

The following table shows sample memory configurations that follow the appropriate memory guidelines.

Table 26. Sample memory configurations

System Capacity (GB)	DIMM Size	Number of DIMMs	DIMM Slot Population
128	32	4	A1, A2 B1, B2
256	32	8	A1, A2, A3, A4 B1, B2, B3, B4
384	32	12	A1, A2, A3, A4, A5, A6 B1, B2, B3, B4, B5, B6
512	32	16	A1, A2, A3, A4, A5, A6, A7, A8 B1, B2, B3, B4, B5, B6, B7, B8

System Capacity (GB)	DIMM Size	Number of DIMMs	DIMM Slot Population
768	32	24	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

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

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

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

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
2. Remove the system cover.
3. Remove the cooling shroud.
4. Locate the appropriate memory-module sockets.
5. To release the memory-module blank from the socket, simultaneously press the ejectors on both ends of the 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. To avoid damaging the memory module, handle only one memory module at a time.

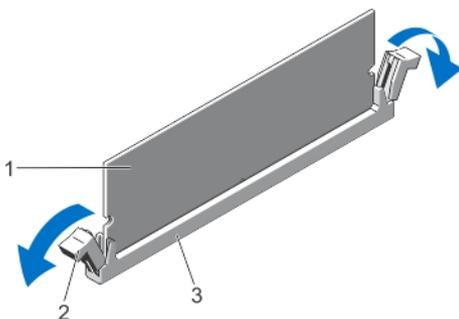


Figure 13. Ejecting The Memory Module

1. memory module
 2. memory-module socket ejectors (2)
 3. memory-module socket
6. If a memory module or a memory-module blank is installed in the socket, remove it.

 **NOTE:** Retain removed memory-module blanks for future use.

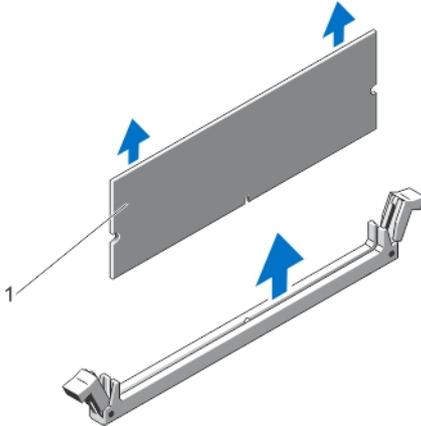


Figure 14. Removing The Memory Module

1. memory module/memory-module blank
7. Install the cooling shroud.
8. Install the system cover.
9. Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.

Installing memory modules

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

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

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

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system cover.
3. If applicable, remove the cooling shroud.
4. Locate the memory-module sockets.

 **CAUTION:** Handle each memory module only by the card edges, making sure not to touch the middle of the memory module or metallic contacts. To avoid damaging the memory module, handle only one memory module at a time.

5. If a memory module or a memory-module blank is installed in the socket, remove it.

 **NOTE:** Retain removed memory-module blanks for future use.

- Align the memory-module's edge connector 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:** To prevent damage to the memory-module socket during installation, apply pressure at both ends of the memory module evenly. Do not apply pressure to the center of the memory module.

- Press down on the memory module with your thumbs until the memory module snaps into place.

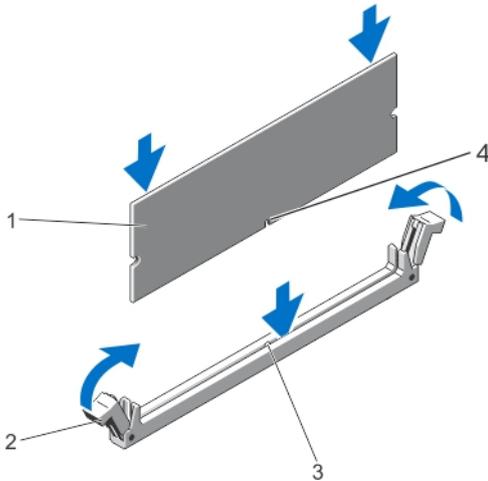


Figure 15. Installing Memory Module

- | | |
|---------------------------------------|--------------------------------|
| 1. memory module | 2. memory-module ejectors |
| 3. memory-module socket alignment key | 4. memory-module alignment key |

 **NOTE:** When the memory module is properly seated in the socket, the levers on the memory-module socket align with the levers on the other identical sockets that have memory modules installed.

- Repeat tasks 4–7 of this procedure to install the remaining memory modules.
- Replace the cooling shroud.
- Install the system cover..
- Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.
- Press <F2> to open the **System Setup** page, and check the memory settings.
The system should have already changed the value to reflect the newly installed memory.
- If the value is incorrect, one or more of the memory modules may not be installed properly. Repeat steps 4 through 7 of this procedure, checking to make sure that the memory modules are firmly seated in their sockets.
- Run the appropriate diagnostic test. For more information, see Using System Diagnostics in this document.

Hard disk drives

All HDDs or SSDs connect to the system board through the HDD or SSD backplane. HDDs or SSDs are supplied in hot-swappable HDD or SSD carriers that fit in the HDD or SSD slots.

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

CAUTION: Do not turn off or reboot your system while the HDD or SSD is being formatted. Doing so can cause an HDD or SSD failure.

NOTE: Use only HDDs or SSDs that have been tested and approved for use with the Dell XC720xd HDD or SSD backplane.

When you format an HDD or SSD, allow enough time for the formatting to be completed. Be aware that high-capacity HDDs or SSDs can take a number of hours to format.

Removing 3.5-inch HDD or SSD blank

CAUTION: To maintain proper system cooling, all empty HDD or SSD slots must have drive blanks installed.

1. If a blank is installed, remove the front bezel.
2. Grasp the front of the HDD or SSD blank, press the release button and slide the blank out until it is free of the HDD or SSD slot.

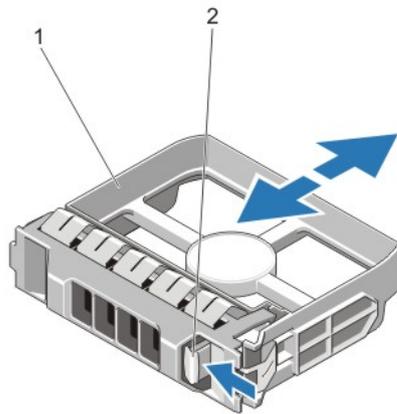


Figure 16. Removing and installing 3.5-inch HDD or SSD blank

1. HDD or SSD blank
2. release button

Installing a 3.5 inch HDD or SSD blank

1. If the front bezel is in place, remove it.
2. Insert the HDD or SSD blank into the HDD or SSD slot until the release button clicks into place.
3. Replace the front bezel.

Removing front hot-swappable HDD or SSD

CAUTION: To prevent data loss, make sure that your operating system supports hot-swap drive installation. See the documentation supplied with your operating system and installed application.

1. From the Nutanix Web GUI, prepare the HDD or SSD for removal. For more information, see Front HDD or SSD indicator patterns in this document available at dell.com/support/home.

NOTE: After the Nutanix Web GUI has prepared the disk for removal, you can remove it.

2. Press the release button to open the HDD or SSD carrier release handle.
3. Slide the HDD or SSD carrier out until it is free of the HDD or SSD slot.

CAUTION: To maintain proper system cooling, all empty HDD or SSD slots must have HDD or SSD blanks installed.

4. Insert an HDD or SSD blank in the empty HDD or SSD slot.

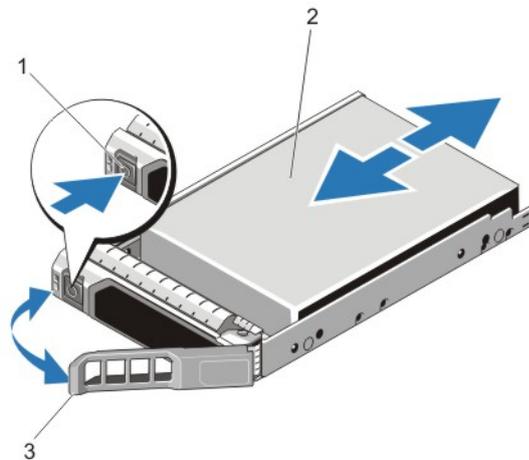


Figure 17. Removing and installing a hot-swappable HDD or SSD

- | | |
|------------------------------|---------------|
| 1. release button | 2. HDD or SSD |
| 3. HDD or SSD carrier handle | |

Removing rear hot-swappable SSD

CAUTION: To prevent data loss, make sure that your operating system supports hot-swappable SSD installation. See the documentation supplied with your operating system and installed application.

1. Wait until the indicators on the SSD carrier signal that the SSD can be removed safely.
If the SSD is turned on, the green activity or fault indicator blinks as the SSD is turned off. When the SSD indicators are off, the SSD is ready for removal.
2. Press the release button to open the SSD carrier release handle.
3. Slide the SSD carrier out until it is free of the SSD slot.

△ CAUTION: To maintain proper system cooling, all empty SSD slots must have SSD blanks installed.

4. Insert an SSD blank in the empty SSD slot.

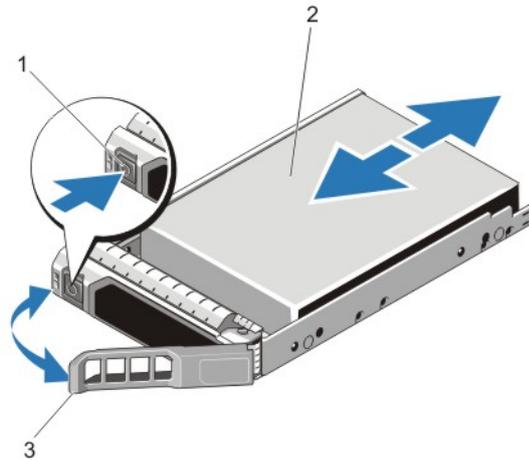


Figure 18. Removing and installing a hot-swappable SSD

1. release button
2. SSD
3. SSD carrier handle

Installing a hot-swappable HDD or SSD

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

△ CAUTION: Use only HDDs or SSDs that have been tested and approved for use with the HDD or SSD backplane.

△ CAUTION: Combining SAS and SATA HDDs or SSDs in the same RAID volume is not supported.

△ CAUTION: When installing an HDD or SSD, make sure that the adjacent drives are fully installed. Inserting an HDD or SSD 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, make sure that your operating system supports hot-swap drive installation. See the documentation supplied with your operating system.

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

1. If an HDD or SSD blank is installed in the HDD or SSD slot, remove it.
2. Install an HDD or SSD in the HDD or SSD carrier.
3. Press the release button on the front of the HDD or SSD carrier and open the HDD or SSD carrier handle.
4. Insert the HDD or SSD carrier into the HDD or SSD slot until the carrier connects with the backplane.

5. Close the HDD or SSD carrier handle to lock the HDD or SSD in place.

Removing HDD or SSD from HDD or SSD carrier

1. Remove the screws from the slide rails on the HDD or SSD carrier.
2. Lift the HDD or SSD out of the HDD or SSD carrier.

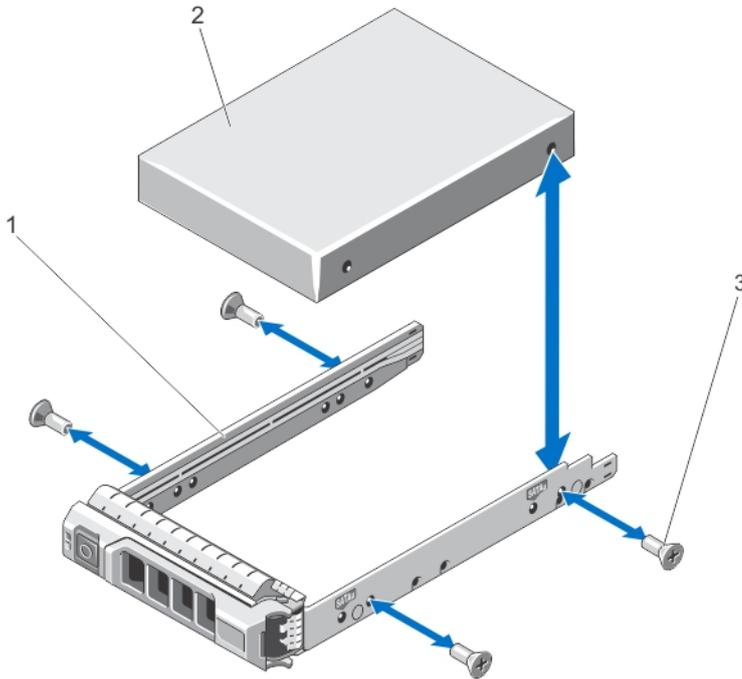


Figure 19. Removing and installing HDD or SSD into HDD or SSD carrier

1. HDD or SSD carrier
2. HDD or SSD
3. screws (4)

Installing HDD or SSD into HDD or SSD carrier

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

1. Insert the HDD or SSD into the HDD or SSD carrier with the connector end of the HDD or SSD toward the back.
2. Align the screw holes on the HDD or SSD with the set of screw holes on the HDD or SSD carrier. When aligned correctly, the back of the HDD or SSD is flush with the back of the HDD or SSD carrier.
3. Attach the screws to secure the HDD or SSD to the HDD or SSD carrier.

Cooling fans

Your system supports hot-swappable cooling fans.

NOTE: If a fan fails, the fan number is referenced by the system management software. This allows you to easily identify and replace the proper fan by noting the fan numbers on the cooling-fan assembly.

Removing a cooling fan

- 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.

1. Remove the system cover.
2. Press the fan release tab and lift the cooling fan out of the cooling-fan assembly.

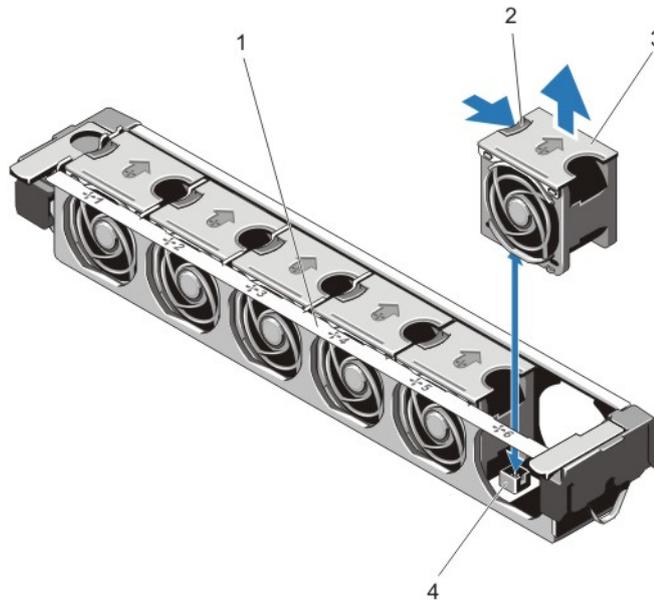


Figure 20. Removing and Installing a Cooling Fan

1. cooling-fan assembly
2. fan release tab

3. cooling fans (6)

4. cooling-fan connectors (6)

Installing a cooling fan

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

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

Removing the cooling fan assembly

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

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
2. Remove the system cover.
3. Unlock the cooling fan assembly from the chassis by rotating the blue release lever upward.
4. Lift the cooling fan assembly out of the chassis.

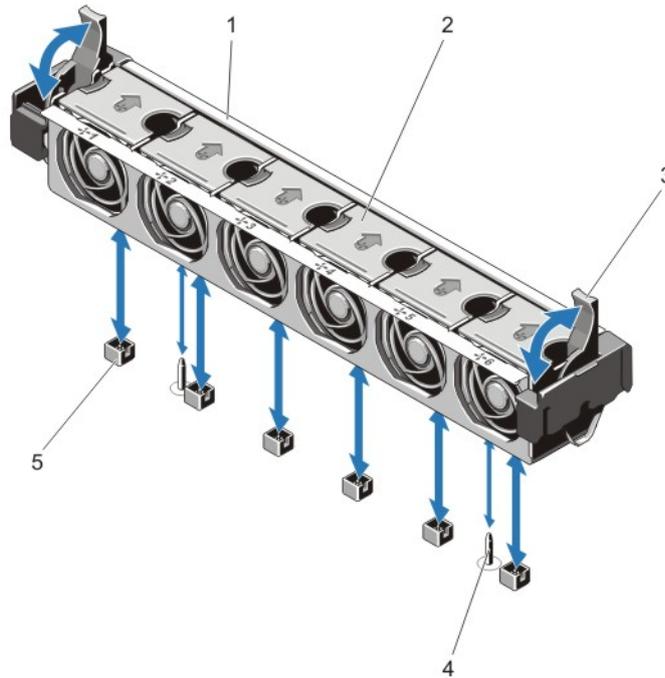


Figure 21. Removing and installing the cooling fan assembly

- | | |
|-------------------------------|---------------------|
| 1. cooling fan assembly | 2. cooling fans (6) |
| 3. blue release levers (2) | 4. guide pins (2) |
| 5. cooling fan connectors (6) | |

Installing the cooling fan assembly

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

CAUTION: Make sure that the cables are correctly installed and retained by the cable retention bracket before installing the cooling-fan assembly. Incorrectly installed cables may get damaged.

1. Align the cooling-fan assembly slots with the guide pins on the chassis.
2. Slide the cooling-fan assembly into the chassis.
3. Lock the cooling-fan assembly into the chassis by rotating the blue release levers downward until firmly seated.
4. Install the system cover.
5. Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.

PCIe card holder

Removing PCIe card holder

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

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

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
2. Remove the system cover.
3. If installed, remove the full-length PCIe card.
4. Press the release tab and the touch-point to release the PCIe card holder from the chassis.
5. Lift the PCIe card holder out of the chassis.

🔧 **NOTE:** To make sure proper system cooling, you must replace the PCIe card holder.

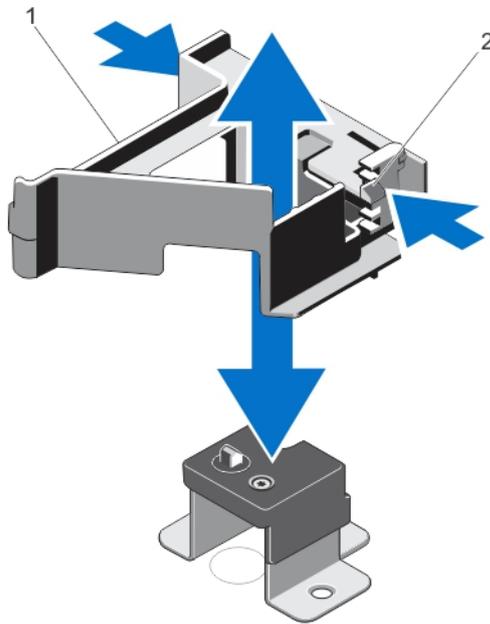


Figure 22. Removing and installing the PCIe card holder

1. PCIe card holder

2. release tab

Installing the PCIe card holder

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

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

1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
2. Remove the system cover.
3. Align the PCIe card holder with the projection on the chassis, push it down and slide it forward until firmly seated.
4. If applicable, replace the full-length PCIe card.
5. Install the system cover.
6. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

Opening and closing the PCIe card holder latch

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support 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. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
2. Remove the system cover.
3. To open the PCIe card holder latch, press the tab.
4. To close the PCIe card holder latch, rotate the latch clockwise until it locks.

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

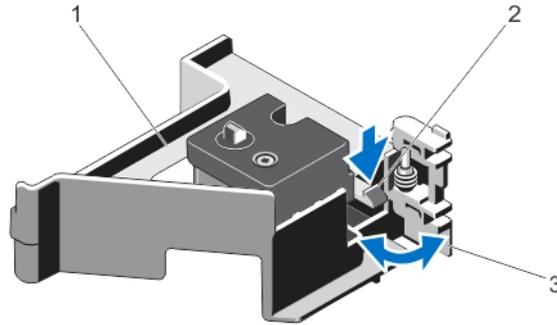


Figure 23. Opening and closing the PCIe card holder latch

1. PCIe card holder
 2. tab
 3. PCIe card holder latch
5. Install the system cover.
 6. Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.

System cover lock latch

Installing the top cover lock latch

⚠ CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support 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. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
2. Remove the system cover.
3. If applicable, remove the PCIe card holder.
4. Orient the top cover lock latch in a direction such that the screw hole on the top cover lock latch is aligned with the screw hole on the latch.
5. Slide the top cover lock latch until the screw holes are completely aligned.
6. Attach the top cover lock latch to the latch using the Torx screw.

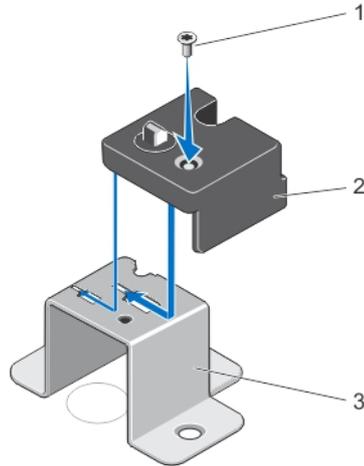


Figure 24. Installing the top cover lock latch

1. screw
 2. top cover lock latch
 3. latch
7. If applicable, install the PCIe card holder.
 8. Install the system cover.
 9. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

Cable retention bracket

Removing the cable retention bracket

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

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
2. Remove the system cover.
3. Remove the cooling shroud.
4. Remove all cables routed through the cable retention bracket.
5. Press the tab and slide the cable retention bracket toward the front of the chassis to release it from the chassis.
6. Lift the cable retention bracket out of the chassis.

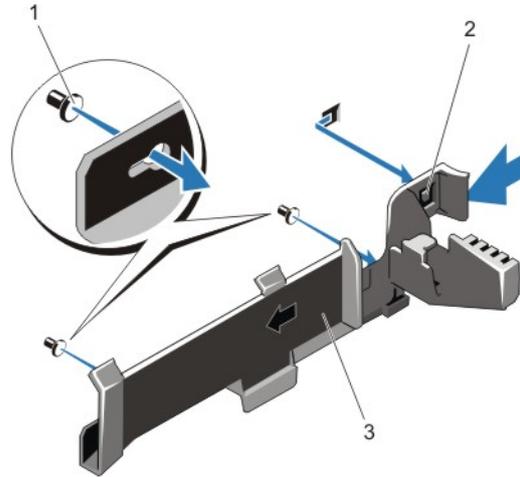


Figure 25. Removing and installing the cable retention bracket

- | | |
|----------------------------|--------|
| 1. alignment pins (2) | 2. tab |
| 3. cable retention bracket | |

Installing cable retention bracket

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

1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
2. Remove the system cover.
3. Using alignment pins as guide, slide the cable retention bracket along the chassis wall until the tab snaps into place.
4. Place all cables to be routed in the cable retention bracket.
5. Install the cooling shroud.
6. Install the system cover.
7. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

Expansion cards and expansion-card risers

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

Expansion card installation guidelines

Dell XC720xd supports the following three PCIe Generation 3 expansion cards.

Table 27. Supported expansion cards

Riser	PCIe Slot	Processor Connection	Height	Length	Link Width	Slot Width
1	1	Processor 2	Low Profile	Half Length	x8	x16
1	2	Processor 2	Low Profile	Half Length	x8	x16
1	3	Processor 2	Low Profile	Half Length	x8	x16
2	4	Processor 2	Standard Height	Full Length	x16	x16
2	5	Processor 1	Standard Height	Full Length	x8	x16
3 (default)	6	Processor 1	Standard Height	Full Length	x8	x16

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

The following table provides guidelines for installing expansion cards to make sure proper cooling and mechanical fit. You should install the expansion cards with the highest priority first using the slot priority indicated. You should install all other expansion cards in card priority and slot priority order.

Table 28. Expansion cards installation order

Card Priority	Card Type	Slot Priority	Minimum Required	Maximum Allowed
1	LSI 9207 Host Bus Adapter	4	1	1
2	PERC H310 Adapter	6	1	1
3	10G NIC Low Profile (LP)	2	0	1

Removing an expansion card from the expansion-card riser 2 or 3

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

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
2. Remove the system cover.
3. Disconnect any cables connected to the expansion card.
4. Lift the expansion-card latch out of the slot.
5. Hold the expansion card by its edges, and remove it from the expansion-card connector.
6. 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:** You must 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.

7. Install the system cover.

8. Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.

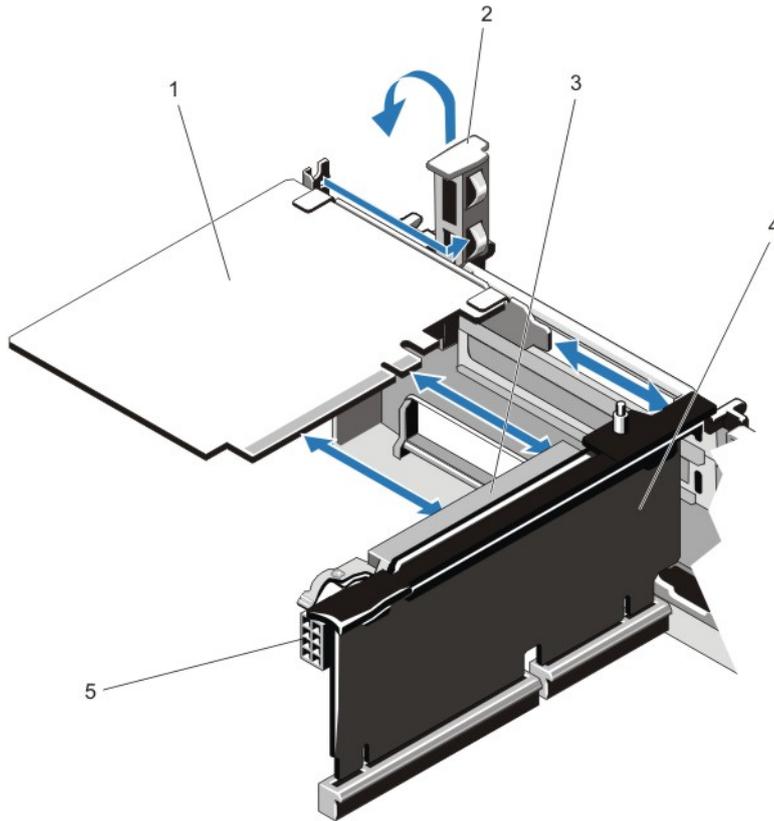


Figure 26. Removing and installing the expansion card

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

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

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

1. Unpack the expansion card and prepare it for installation.
For instructions, see the documentation accompanying the card.
2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
3. Remove the system cover.
4. Lift the expansion-card latch and remove the filler bracket.

5. Holding the card by its edges, position the card so that the connector on the expansion card aligns with the expansion-card connector on the riser.
6. Insert the card-edge connector firmly into the expansion-card connector until the card is fully seated.
7. Replace the expansion-card latch.
8. To install a full-length card, use the supports provided on the cooling shroud.
9. If applicable, connect cables to the expansion card.
10. Install the system cover.
11. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.
12. Install any device drivers required for the card as described in the documentation for the card.

Removing an expansion card from the expansion-card riser 1

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

 **NOTE:** You can use expansion-card riser 1 only when both the processors are installed.

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
2. Remove the system cover.
3. Disconnect any cables connected to the expansion card.
4. Remove the expansion-card riser.
5. Press tab A and rotate the latch clockwise.
6. Press tab B and rotate the latch down.
7. Remove the expansion card from the expansion-card riser.
8. 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:** You must 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.

9. Reinstall the expansion-card riser.
10. Install the system cover.
11. Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.

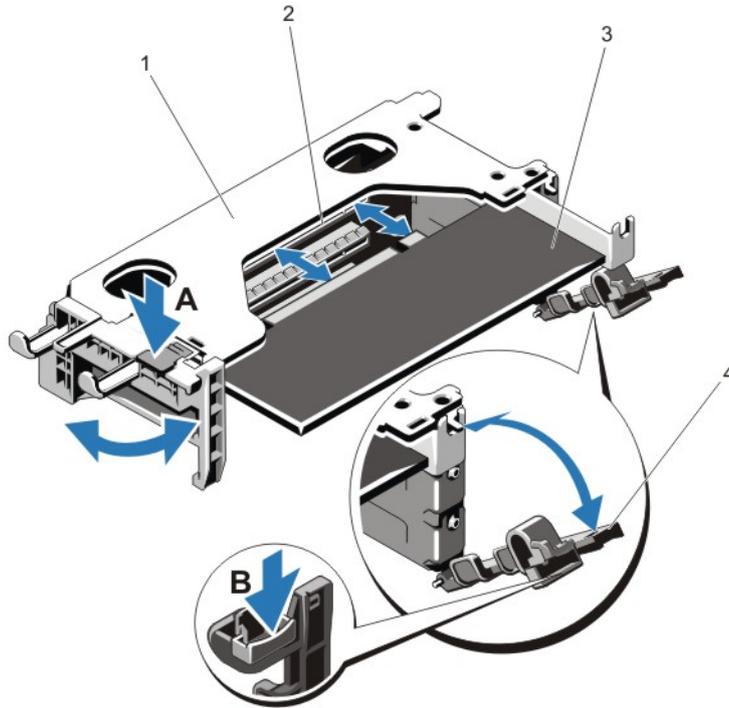


Figure 27. Removing and Installing the Expansion-Card Riser 1

- | | |
|--------------------------------|-------------------------------|
| 1. expansion-card riser 1 cage | 2. expansion-card connector |
| 3. expansion card | 4. expansion-card latches (2) |

Installing expansion card into the expansion-card riser 1

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

NOTE: You can use the expansion-card riser 1 only when both the processors are installed.

1. Unpack the expansion card and prepare it for installation.
For instructions, see the documentation accompanying the card.
2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
3. Install the system cover.
4. Remove the expansion-card riser.
5. Press tab A and rotate the latch clockwise.
6. Press tab B and rotate the latch down.
7. Holding the card by its edges, position the card so that the card-edge connector aligns with the expansion-card connector.
8. Insert the card-edge connector firmly into the expansion-card connector until the card is fully seated.

9. Close the expansion-card latches.
10. If applicable, connect any cables to the expansion card.
11. Install the expansion-card riser.
12. Remove the system cover.
13. Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.
14. Install any device drivers required for the card as described in the documentation for the card.

Removing expansion-card risers

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

NOTE: You can use the expansion-card riser 1 only when both the processors are installed.

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
2. Remove the system cover.
3. Holding the touch points, lift the expansion-card riser from the riser connector on the system board.

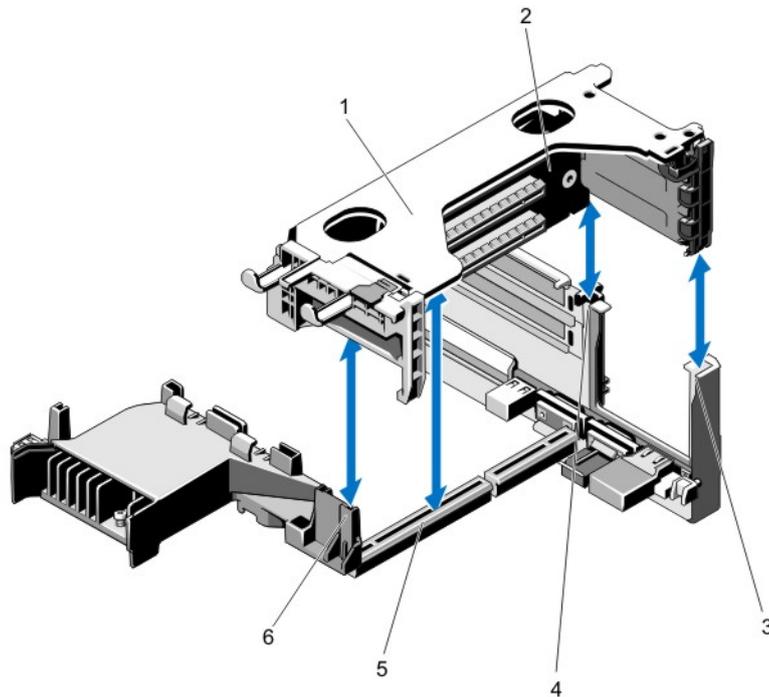


Figure 28. Removing and installing the expansion card riser 1

- | | |
|--------------------------------|----------------------------|
| 1. expansion-card riser 1 cage | 2. expansion-card riser 1 |
| 3. riser guide-back (right) | 4. riser guide-back (left) |

- 5. expansion-card riser 1 connector
- 6. riser guide-front

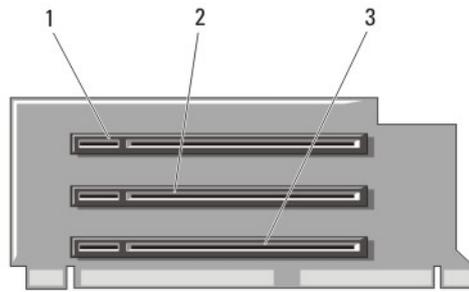


Figure 29. Identifying connectors on the expansion card riser 1

- 1. expansion-card slot 1
- 2. expansion-card slot 2
- 3. expansion-card slot 3

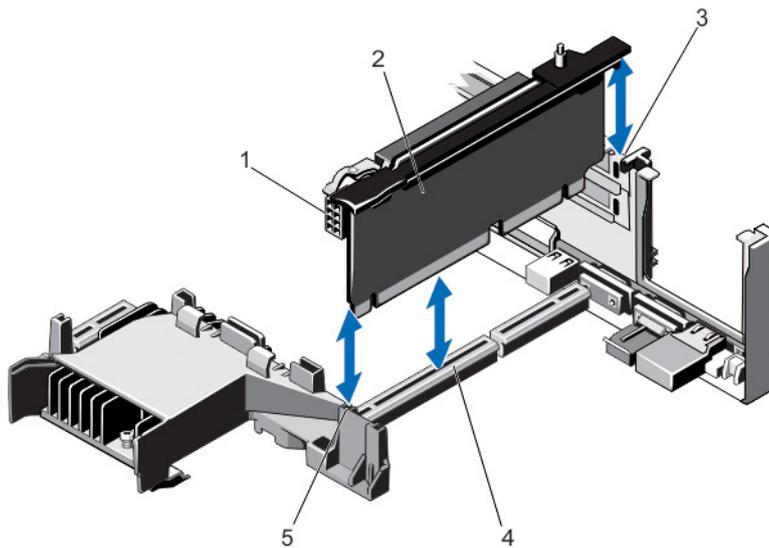


Figure 30. Removing and installing the expansion card riser 2

- 1. power connector (for GPU cards)
- 2. expansion-card riser 2
- 3. riser guide-back
- 4. expansion-card riser 2 connector
- 5. riser guide-front

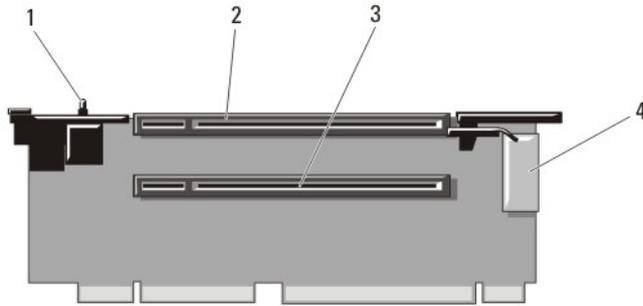


Figure 31. Identifying connectors on the expansion card riser 2

- | | |
|-----------------------------|------------------------------------|
| 1. chassis intrusion switch | 2. expansion-card slot 4 |
| 3. expansion-card slot 5 | 4. power connector (for GPU cards) |

Installing expansion-card risers

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

1. If applicable, reinstall the expansion cards into the expansion card riser.
2. Align the expansion-card riser with the connectors and the riser guide pins on the system board.
3. Lower the expansion-card riser into place until the expansion-card riser is fully seated in the connector.
4. Install the system cover.
5. Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.
6. Install any device drivers required for the card as described in the documentation for the card.

Replacing SD vFlash card

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

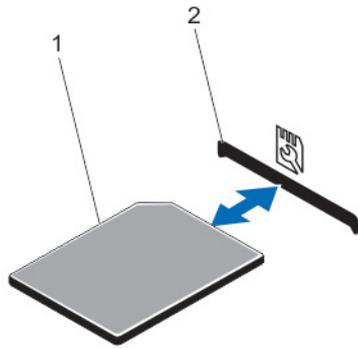


Figure 32. Removing and installing the SD vFlash card

1. SD vFlash card
2. SD vFlash card slot
3. To install the SD vFlash card, with the label side facing up, insert the contact-pin end of the SD card into the card slot on the module.
 **NOTE:** The slot is keyed to make sure correct insertion of the card.
4. Press inward on the card to lock it into the slot.

Removing the vFlash media unit

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

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
2. Remove the system cover.
3. Remove the screw securing the vFlash media unit to the chassis.
4. Remove the cable from the vFlash media unit and the backplane.
5. Slide the vFlash media unit toward front of chassis and lift it out of the system.
6. Install the system cover.
7. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

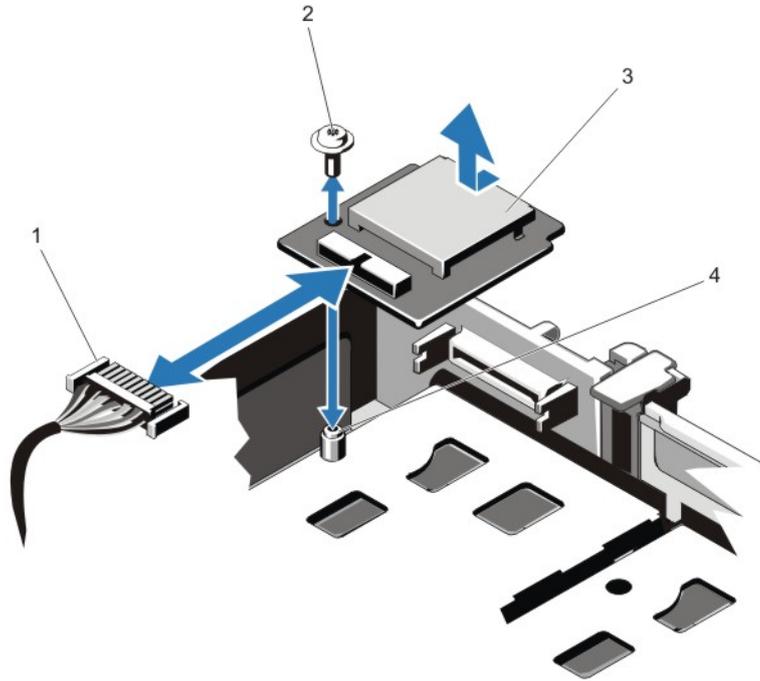


Figure 33. Removing and installing the vFlash Media Unit

- | | |
|----------------------|-------------|
| 1. cable | 2. screw |
| 3. vFlash media unit | 4. standoff |

Installing vFlash media

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support 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. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
2. Remove the system cover.
3. Slide in and align the vFlash media unit toward the back of chassis.
4. Connect the cable to the vFlash media unit.
5. Replace the screw securing the vFlash media unit to the chassis.
6. Install the system cover.
7. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

Network daughter card

Removing network daughter card

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

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
2. Remove the system cover.
3. If installed, remove expansion cards from the expansion-card riser 2.
4. Using a #2 Phillips screwdriver, loosen the two captive screws that secure the network daughter card to the system board.
5. Hold the network daughter card by the edges on either side of the touch point and lift to remove it from the connector on the system board.
6. Slide the network daughter card away from the back of the system until the NIC connectors are clear of the slot in the back panel.
7. Lift the network daughter card out of the chassis.

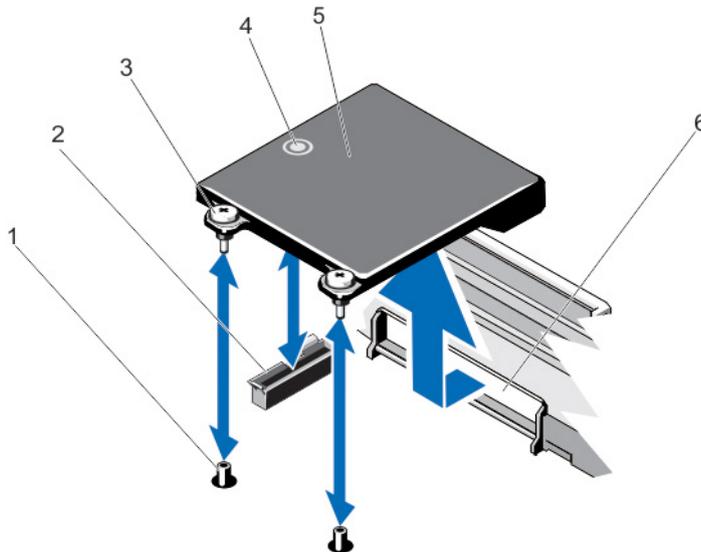


Figure 34. Removing and installing the network daughter card

- | | |
|------------------------------|---|
| 1. captive screw sockets (2) | 2. connector on the system board |
| 3. captive screws (2) | 4. touch point |
| 5. network daughter card | 6. back panel slot for RJ-45 connectors |

Installing network daughter card

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

1. Angle the card so that the RJ-45 connectors fit through the slot in the back panel.
2. Align the captive screws at back-end of the card with the captive screw sockets on the system board.
3. Press the touch point on the card until the card connector is firmly seated on the system board connector.
4. Using a #2 Phillips screwdriver, tighten the two captive screws to secure the network daughter card to the system board.
5. If applicable, install the expansion cards in the expansion-card riser 2.
6. Install the system cover.
7. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

Processors

Use the following procedure when:

- Installing an additional processor
- Replacing a processor

 **NOTE:** To make sure proper system cooling, you must install a processor blank and a heat sink blank in any empty processor socket.

Removing processor

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

1. Before upgrading your system, download the latest system BIOS version from dell.com/support/home 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 Dell Lifecycle Controller.

2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet. When disconnected from the power source, press and hold the power button for three seconds to fully drain the system of stored power prior to removing the cover.
3. Remove the system cover.
4. Remove the cooling shroud.

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

5. Using a #2 Phillips screwdriver, loosen one of the heat sink retention sockets. Wait for 30 seconds for the heat sink to loosen from the processor.
6. Loosen the second heat sink retention socket.
7. Lift the heat sink away from the processor and set the heat sink aside.

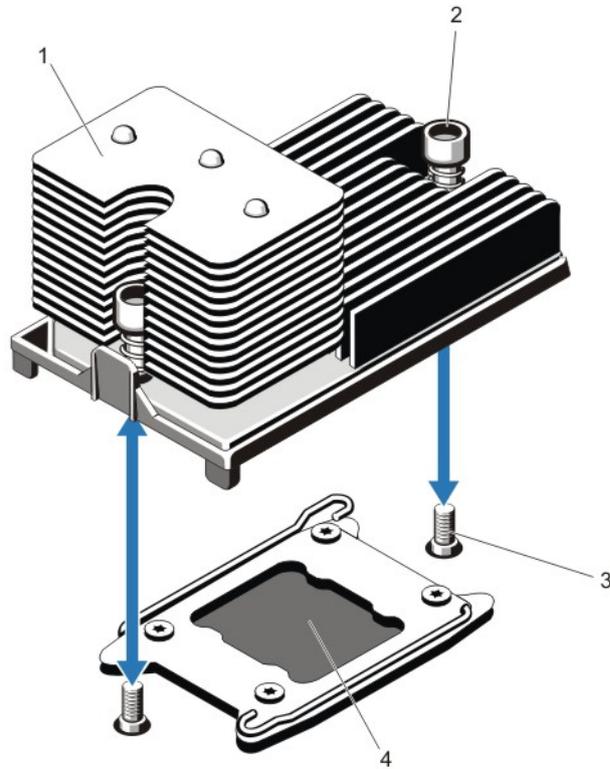


Figure 35. Removing and installing the processor heat sink

- | | |
|-------------------------|--------------------------|
| 1. heat sink | 2. retention sockets (2) |
| 3. retention screws (2) | 4. processor |

△ 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.

8. Position your thumb firmly over the processor socket-release lever near the unlock icon  and release the lever from the locked position by pushing down and out from under the tab.
9. Similarly, position your thumb firmly over the processor socket-release lever near the lock icon  and release the lever from the locked position by pushing down and out from under the tab. Rotate the lever 90 degrees upward.

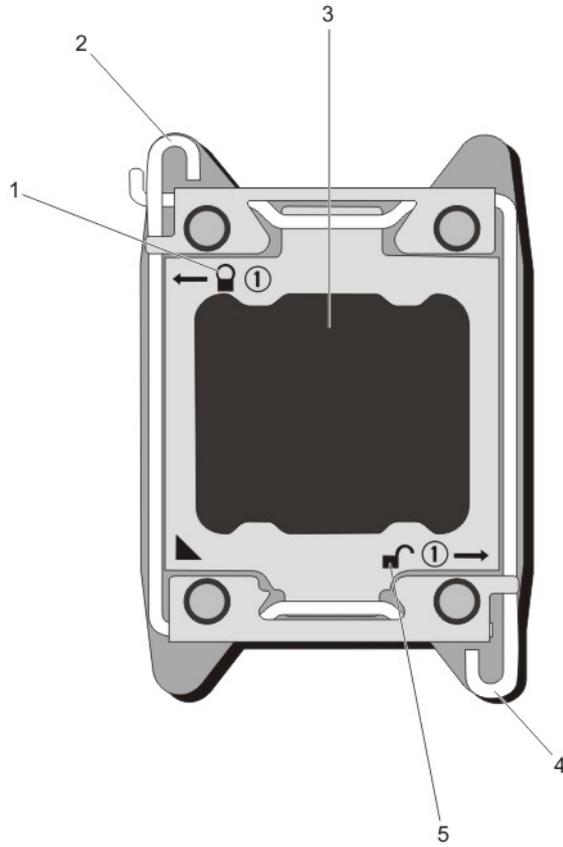


Figure 36. Processor shield opening and closing lever sequence

- | | |
|----------------------|-----------------------------------|
| 1. close-lock symbol | 2. processor socket-release lever |
| 3. processor | 4. processor socket-release lever |
| 5. open-lock symbol | |

10. Rotate the processor shield upward and out of the way.

⚠ 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.

11. Lift the processor out of the socket and leave the release lever up so that the socket is ready for the new processor.

🔧 NOTE: If you are permanently removing a processor, you must install a processor or DIMM blank in the vacant socket to make sure proper system cooling. The processor or DIMM blank covers the vacant sockets for the DIMMs and the processor.

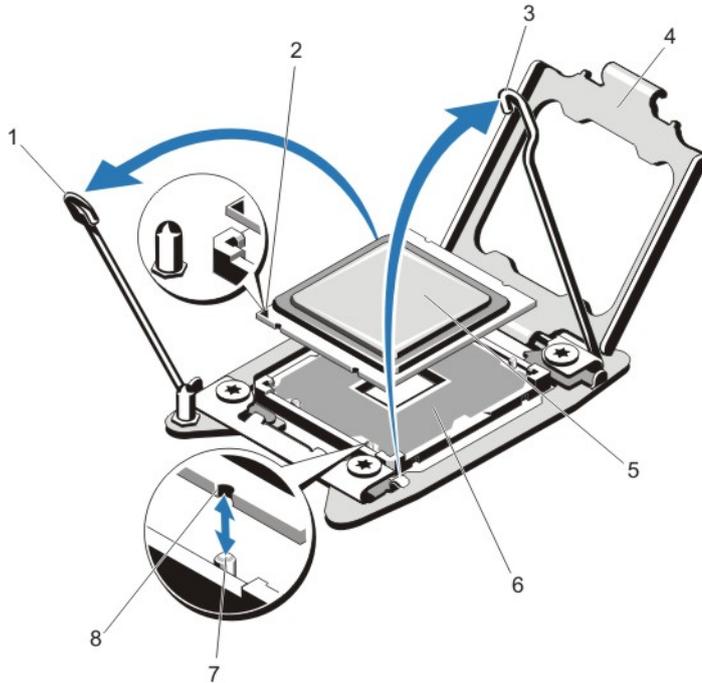


Figure 37. Removing and installing a processor

- | | |
|-----------------------------------|-----------------------------|
| 1. processor socket-release lever | 2. pin 1 indicator |
| 3. processor socket-release lever | 4. processor shield |
| 5. processor | 6. ZIF socket |
| 7. socket keys (4) | 8. notches in processor (4) |

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

Installing processor

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

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

1. Before upgrading your system, download the latest system BIOS version from dell.com/support/home and follow the instructions included in the compressed download file to install the latest BIOS version on your system.

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

2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet. When disconnected from the power source, press and hold the power button for three seconds to fully drain the system of stored power prior to removing the cover.

3. Remove the system cover.
4. Remove the cooling shroud.
 -  **WARNING: The heat sink and processor are hot to the touch for some time after the system has been powered down. Allow the heat sink and processor to cool 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.**
5. Remove the heat sink/heat sink blank and processor/processor blank, as applicable.
 -  **NOTE:** The procedure to remove the heat sink blank or processor blank is similar to removing a heat sink or processor.
6. Unpack the new processor.
7. Align the processor with the socket keys on the Zero insertion force (ZIF) 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: Do not use force to seat the processor. When the processor is positioned correctly, it engages easily into the socket.**
8. With the release levers on the processor socket in the open position, align pin 1 of the processor, using pin 1 position guide on the socket, as reference and set the processor lightly in the socket.
9. Close the processor shield.
10. Rotate the socket-release lever near the lock icon  until it is locked in position.
11. Similarly, rotate the socket-release lever near the unlock icon  until it is locked in position.
12. Using a clean lint-free cloth, remove the thermal grease from the heat sink.
 -  **CAUTION: Applying too much thermal grease can result in excess grease coming in contact with and contaminating the processor socket.**
13. Open the grease applicator included with your processor kit and apply all of the thermal grease in the applicator to the center of the topside of the new processor.
14. Place the heat sink on the processor.
15. Using a #2 Phillips screwdriver, tighten the heat sink retention sockets.
16. Install the cooling shroud.
17. Install the system cover.
18. Reconnect your system and peripherals to their electrical outlets, and turn on the system.
19. Press <F2> to open the **System Setup** page and check that the processor information matches the new system configuration.
20. Run the system diagnostics to verify that the new processor operates correctly.

Power supply units (PSUs)

Your system supports either:

- Two 750 W or 1100 W AC PSU modules or
- Two 750 W or 1100 W DC PSU modules

-  **NOTE:** Titanium PSU is nominally rated for 200 VAC to 240 VAC input only. The two identical PSUs are installed, the PSU configuration is redundant (1 + 1). In redundant mode, power is supplied to the system equally from both PSUs to maximize efficiency.
-  **NOTE:** If two PSUs are used, they must be of the same type and have the same maximum output power.

Hot-spare feature

Your system supports the hot-spare feature that significantly reduces the power overhead associated with PSU redundancy.

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

The active PSU can also activate a sleeping PSU if having both PSUs active is more efficient than having the redundant PSU in a sleep state. The PSU defaults are to wake both PSUs if the load on the active PSU is greater than 50 percent and to sleep the redundant PSU if the load falls below 20 percent.

You can configure the hot-spare feature using the iDRAC settings. For more information about iDRAC settings, see the *iDRAC User's Guide* at dell.com/support/home.

Removing AC power supply unit

-  **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.
 -  **CAUTION:** The system requires one PSU for normal operation. On power-redundant systems, remove and replace only one PSU 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 PSU removal. For information about the cable management arm, see the system's rack documentation.
1. Disconnect the power cable from the power source and the PSU you intend to remove and remove the cables from the strap.
 2. Press the release latch and slide the PSU out of the chassis.

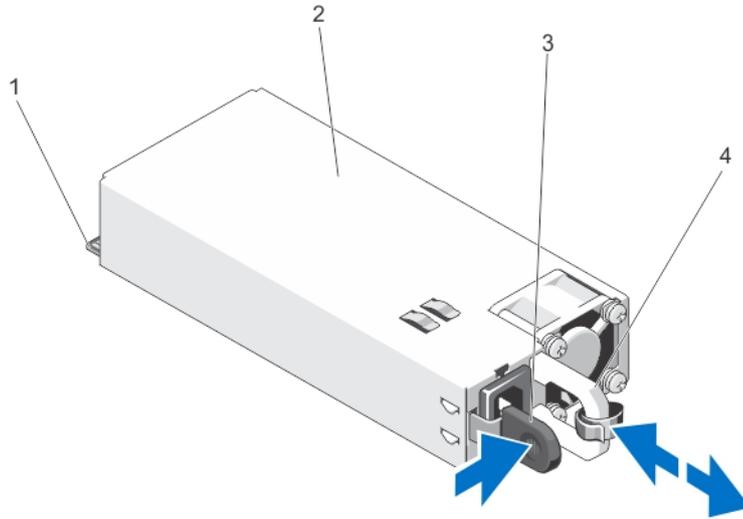


Figure 38. Removing and installing AC power supply unit

- | | |
|------------------|---------------|
| 1. connector | 2. PSU |
| 3. release latch | 4. PSU handle |

Installing AC power supply unit

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

1. Verify that both the PSUs are the same type and have the same maximum output power.
 - 🔧 NOTE:** The maximum output power (shown in Watt) is listed on the PSU label.
2. If applicable, remove the PSU blank.
3. Slide the new PSU into the chassis until the PSU 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 power cable to the PSU and plug the cable into a power outlet.

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

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

Wiring instructions for DC PSU

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

-  **WARNING:** For equipment using –(48–60) V DC PSU, 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 °C 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). Make sure 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 or yellow, green with a yellow stripe, stranded wire (safety ground)

Removing DC power supply unit

-  **WARNING:** For equipment using –(48–60) V DC power supplies, 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 PSU for normal operation. On power-redundant systems, remove and replace only one PSU 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 PSU removal. For information about the cable management arm, see the system's rack documentation.

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

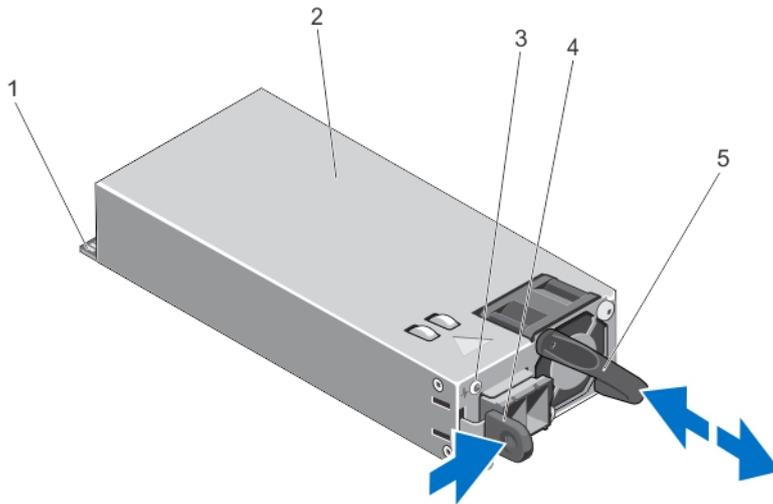


Figure 39. Removing and installing DC power supply unit

- | | |
|-------------------------|------------------|
| 1. connector | 2. PSU |
| 3. PSU status indicator | 4. release latch |
| 5. PSU handle | |

Installing DC PSU

WARNING: For equipment using $-(48-60)$ V DC 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.

1. Verify that both the PSUs 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 PSU blank.
3. Slide the new PSU into the chassis until the PSU 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 safety ground wire.
5. Install the DC power connector in the PSU.

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

6. Connect the wires to a DC power source.

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

System battery

Replacing the system battery

⚠ 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 came with the product.

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
2. Remove the system cover.
3. Remove the cooling shroud.
4. Locate the battery socket.

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

5. To remove the battery, support the battery connector by pressing down firmly on the positive side of the connector.

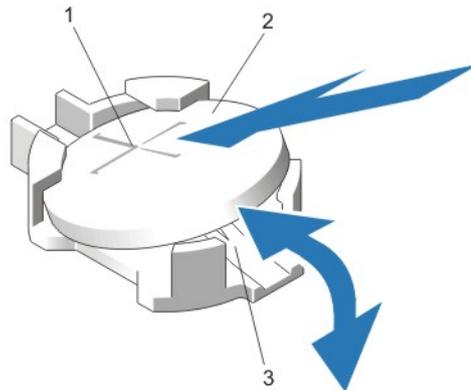


Figure 40. Replacing the System Battery

1. positive side of battery connector
 2. system battery
 3. negative side of battery connector
6. Lift the battery out of the securing tabs at the negative side of the connector.

7. To install a new system battery, support the battery connector by pressing down firmly on the positive side of the connector.
8. Hold the battery with the "+" symbol facing up and slide it under the securing tabs at the positive side of the connector.
9. Press the battery straight down into the connector until it snaps into place.
10. Install the cooling shroud.
11. Install the system cover.
12. Reconnect the system to the electrical outlet and turn the system on, including any attached peripherals.
13. When the company logo is displayed, press <F2>. The **System Setup** page is displayed. Make sure that the battery is operating properly.
14. Enter the correct time and date in the **Time** and **Date** boxes on the **System Setup** page.
15. Close the **System Setup** page.

HDD and SSD backplanes (front and rear)

Removing front HDD or SSD backplane

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

1. If installed, remove the front bezel.
2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.

 **CAUTION: To prevent damage to the drives and backplane, you must remove the HDDs or SSDs from the system before removing the backplane.**

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

4. Remove the cooling shroud.
5. Remove the cooling fan assembly.
6. Remove all HDDs or SSDs.
7. Disconnect the SAS/SATA/SSD data, signal, and power cables from the backplane.
8. Press the release tabs and slide the backplane upward.

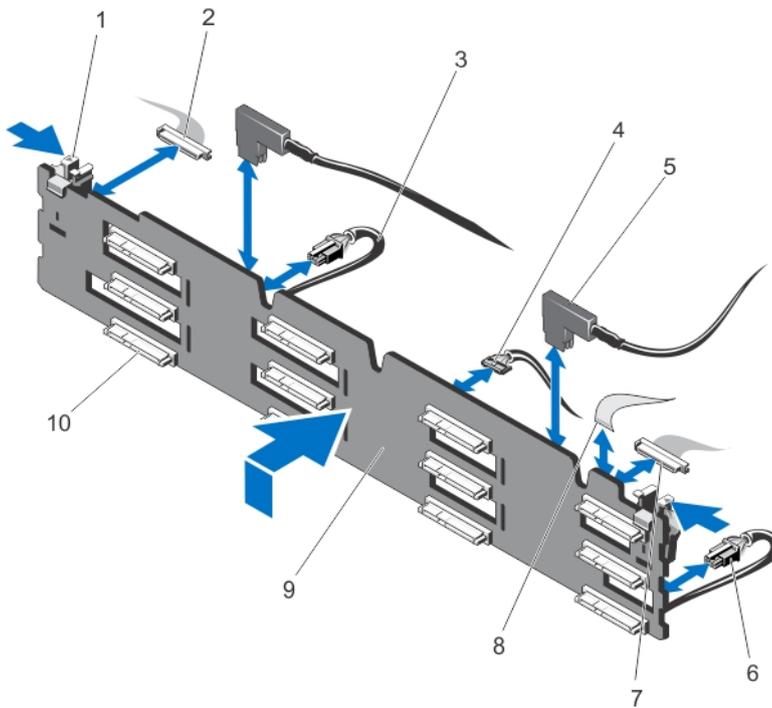


Figure 41. Removing and Installing the front 3.5 Inch (x12) SAS/SATA Backplane

- | | |
|-----------------------------|--|
| 1. release tabs (2) | 2. left control panel cable |
| 3. power cable A | 4. USB cable |
| 5. SAS cables (2) | 6. power cable B |
| 7. front I/O cable | 8. right control panel cable |
| 9. x12 HDD or SSD backplane | 10. HDD or SSD backplane connectors (12) |

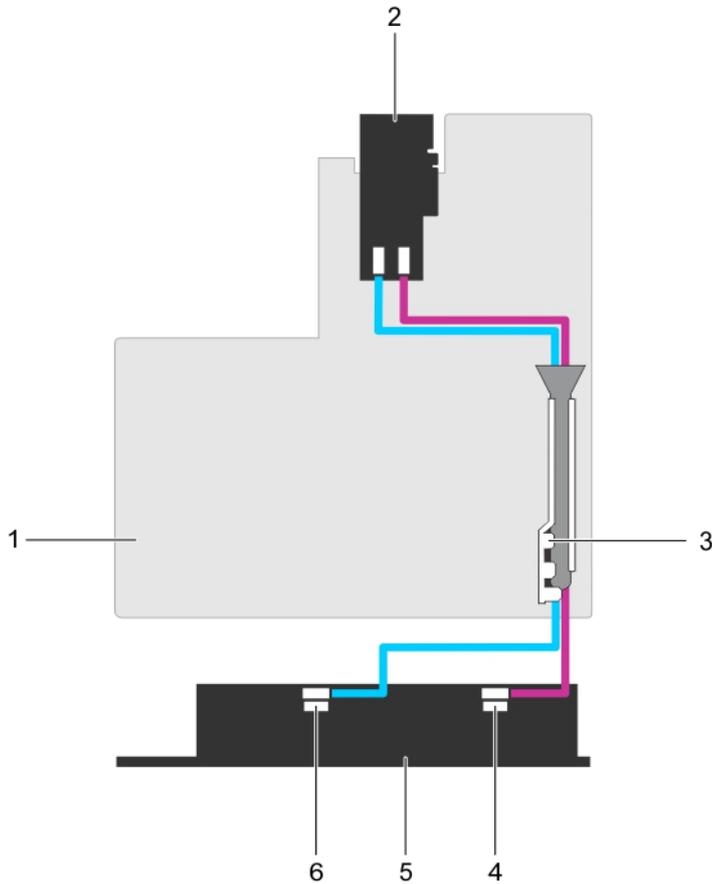


Figure 42. Cabling Diagram — 3.5 inch (x12) SAS/SATA Backplane

- | | |
|-----------------------------------|--------------------------------|
| 1. system board | 2. LSI 9207 adapter |
| 3. SAS cable retainer | 4. front backplane SAS cable B |
| 5. front x12 HDD or SSD backplane | 6. front backplane SAS cable A |

Installing the front HDD or SSD backplane

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

1. Use the hooks at the base of the chassis as guides to align the HDD or SSD backplane.
2. Slide down the HDD or SSD backplane until the release tabs snap into place.
3. Connect the SAS/SATA/SSD data, signal, and power cables to the backplane.
4. Replace the cooling fan assembly.
5. Replace the cooling shroud.
6. Install the HDDs or SSDs in their original locations.

7. Install the system cover.
8. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.
9. If applicable, install the front bezel.

Removing rear SSD backplane

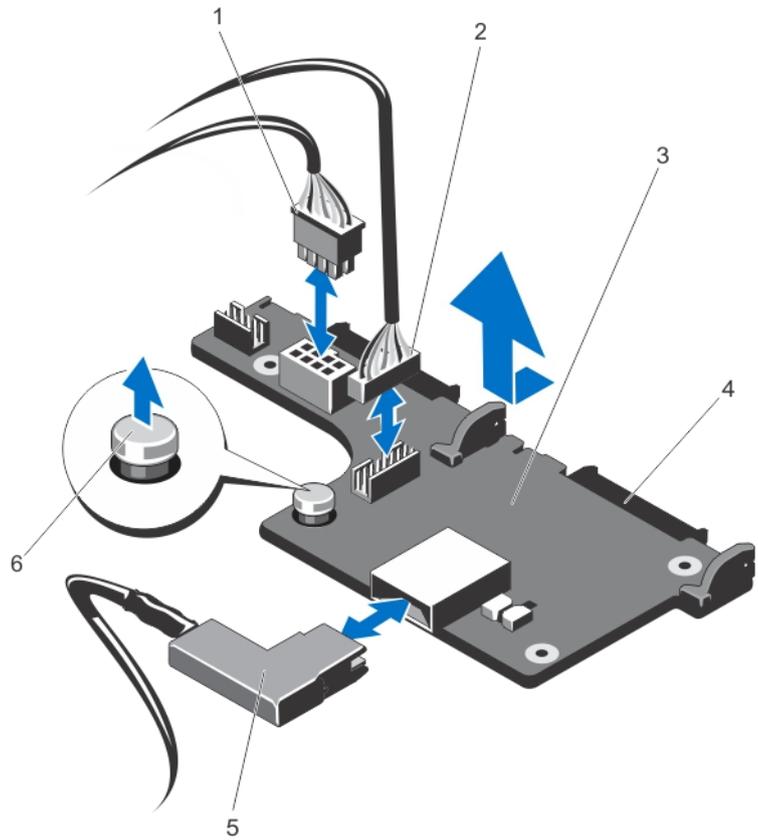
 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell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

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

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

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

3. Remove both SSDs.
4. Disconnect all the cables from the backplane.
5. Lift the release pin and slide the backplane away from the chassis.
6. Lift the backplane to remove it from the chassis.



- 1. I2C cable
- 2. sideband cable
- 3. SSD backplane (back)
- 4. SAS/SATA connectors (2)
- 5. SAS cable
- 6. release pin

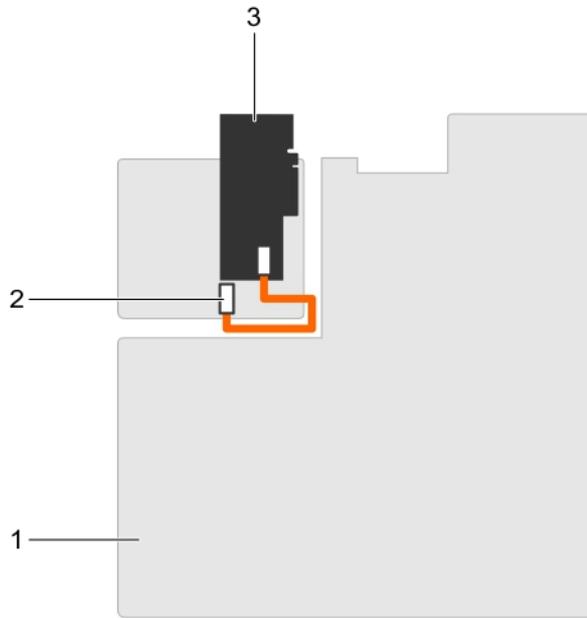


Figure 43. Cabling Diagram — 2.5 Inch (x2) rear SSD backplane

- | | |
|----------------------|-----------------------------|
| 1. system board | 2. rear backplane SAS cable |
| 3. PERC H310 Adapter | |

Installing rear SSD backplane

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

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system cover.
3. Align the notches on the backplane with the notches on the chassis.
4. Lift the release pin and slide the backplane on the chassis until firmly seated.
5. Release the release pin to lock the backplane to the chassis.
6. Reconnect all the cables to the backplane.
7. Install both the HDDs or SSDs in their original location.
8. Install the system cover.
9. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

Removing control panel

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support 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. If installed, remove the front bezel.
2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
3. Remove the system cover.

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

4. Disconnect the control panel cable from the backplane by pulling on the pull tab.
5. Remove the three Torx screws that secure the I/O panel to the chassis.
6. Fold the pull tab close to the connector.
7. Pull out the control panel cable as you guide the connector and the pull tab through the channel on the chassis.

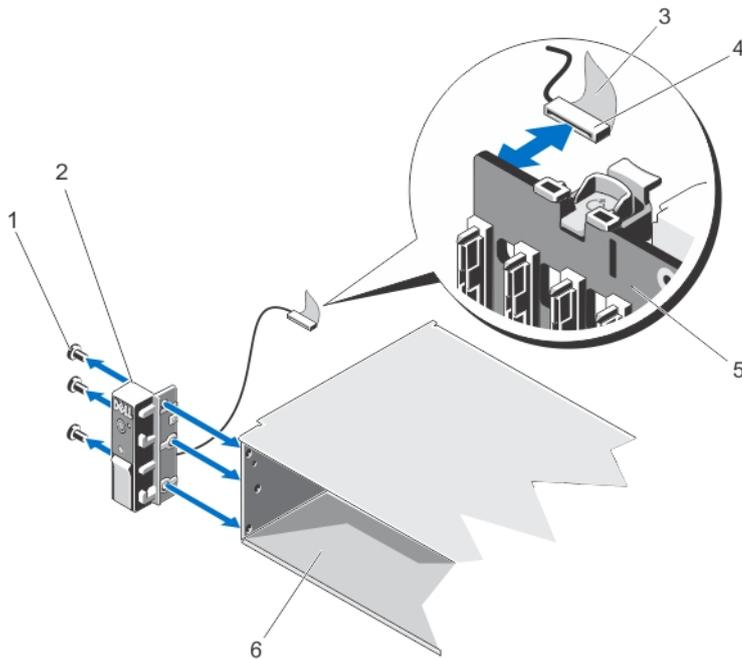


Figure 44. Removing and installing the control panel

- | | |
|-------------------------|------------------|
| 1. torx screws (3) | 2. control panel |
| 3. pull tab | 4. connector |
| 5. HDD or SSD backplane | 6. chassis |

Installing the control panel

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support 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. If installed, remove the front bezel.
2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
3. Remove the system cover.
4. Fold the label around the cable.
5. Fold the pull tab close to the connector and guide the connector and pull tab into the channel.
6. Push the cable until the cable passes completely through the channel.
7. Tighten the three Torx screws to secure the control panel to the chassis.

 **NOTE:** You must route the cable properly to prevent it from being pinched or crimped.

8. Connect the cable connector on the backplane by pushing on the center of the connector.
9. Install the system cover.
10. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.
11. If applicable, install the front bezel.

Removing I/O panel

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support 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. If installed, remove the front bezel.
2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
3. Remove the system cover.

 **CAUTION:** To prevent damage to the I/O cable, you must release the locking tab before removing or installing the I/O cable from the connector on the HDD or SSD backplane.

4. Rotate the locking tab on the I/O cable connector clockwise 90 degrees to release the lock.
5. Disconnect the I/O cable from the backplane.
6. Remove the three Torx screws securing the I/O panel to the chassis.
7. Pull out the I/O panel cable through the channel on the chassis.

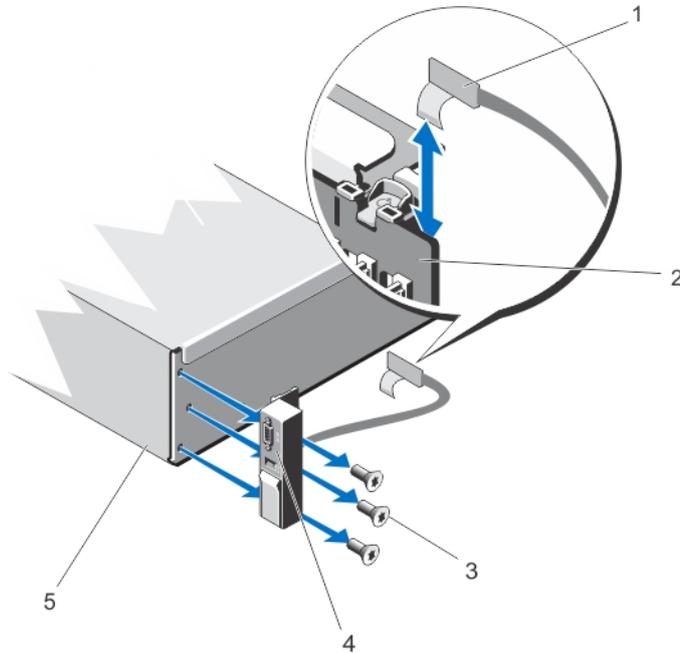


Figure 45. Removing and installing I/O panel

- | | |
|--------------------|-------------------------|
| 1. I/O panel cable | 2. HDD or SSD backplane |
| 3. torx screws (3) | 4. I/O panel |
| 5. chassis | |

Installing I/O panel

⚠ CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support 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. If installed, remove the front bezel.
2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.
3. Remove the system cover.
4. Fold the label around the cable.
5. Push the cable until the cable passes completely through the channel.

⚠ CAUTION: To prevent damage to the I/O cable, you must release the locking tab before removing or installing the I/O cable from the connector on the HDD or SSD backplane.

6. If locked, rotate the locking tab on the I/O cable connector clockwise 90 degrees to release the lock.
7. Connect the I/O panel cable to the connector on the HDD or SSD backplane.
8. Rotate the locking tab on the I/O cable connector counter clockwise 90 degrees to secure the lock.
9. Tighten the three Torx screws to secure the control panel to the chassis.

 **NOTE:** You must route the cable properly to prevent it from being pinched or crimped.

10. Install the system cover.
11. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.
12. If applicable, install the front bezel.

System board

Removing system board

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

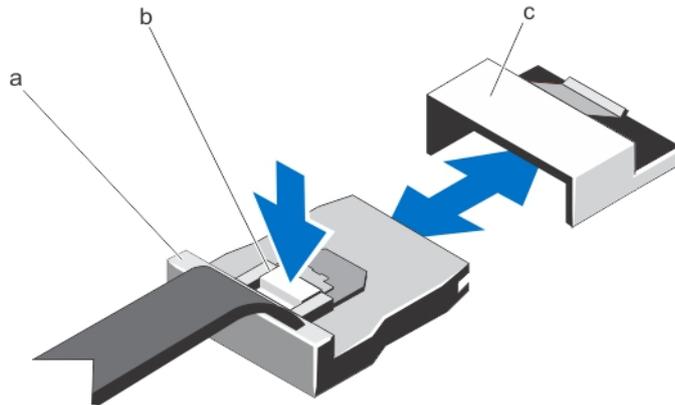
 **CAUTION:** If you are using the Trusted Program Module (TPM) with an encryption key, you may be prompted to create a recovery key during program or System Setup. Be sure to create and safely store this recovery key. If you replace this system board, you must supply the recovery key when you restart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

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. If installed, remove the front bezel.
3. Remove the system cover.
4. Remove the following:
 - a. cooling shroud
 - b. cooling fan assembly
 - c. PSUs
 - d. all expansion-card risers
 - e. PCIe card holder
 - f. cable retention bracket
 - g. support bracket (if present)

 **NOTE:** The support bracket is present on certain system configurations for protection during shipping and can be discarded after removal.

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

5. Disconnect the mini SAS cable from the system board:
 - a. Push the mini SAS cable connector to slide it further into the connector (J_SASX8) 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.



- a. mini SAS cable connector
- b. metal tab
- c. connector on the system board

6. Disconnect all cables from the system board.

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

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

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

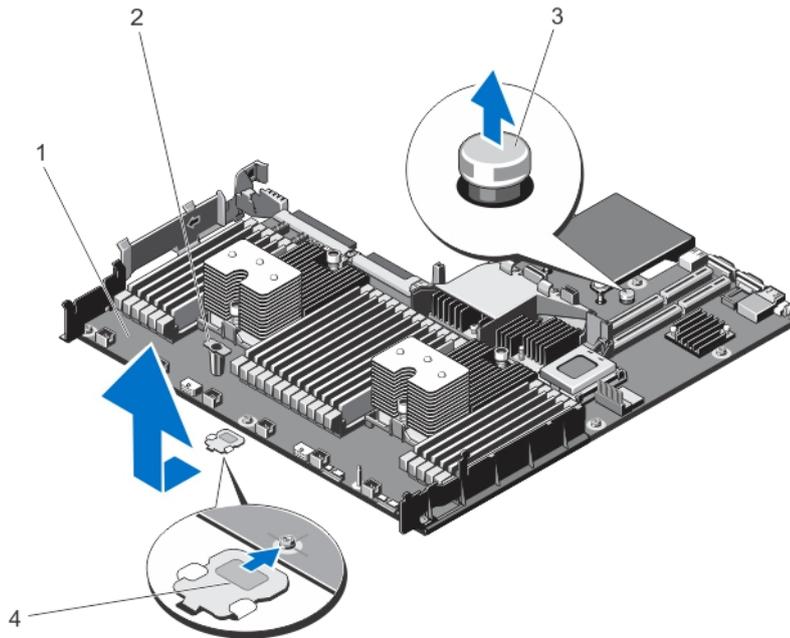


Figure 46. Removing and installing the system board

- 1. system board
- 2. system-board holder

3. release pin

4. support bracket (present on certain systems only)

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

8. Remove heat sinks or heat sink blanks and processors or processor blanks.
9. Remove memory modules and memory module blanks.
10. Remove network daughter card.

Installing system board

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

1. Unpack the new system board assembly.
2. Transfer the following components to the new system board:
 - a. heat sinks or heat sink blanks and processors or processor blanks
 - b. memory modules and memory module blanks
 - c. network daughter card

 **CAUTION: Do not lift the system board assembly 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.**

3. Hold the touch points and lower the system board into the chassis.
4. Push the system board toward the back of the chassis until the board clicks into place.
5. Replace the following:
 - a. cable retention bracket
 - b. PCIe card holder
 - c. all expansion card risers
 - d. cooling fan assembly
 - e. cooling shroud
 - f. PSU
6. Reconnect all cables to the system board.

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

7. Install the system cover.
8. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.
9. Import your new or existing iDRAC Enterprise license. For more information, see *iDRAC User's Guide*, at dell.com/support/home.

Troubleshooting your system

Safety first—for you and your system

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Troubleshooting system startup failure

If you boot the system to the BIOS boot mode after installing an OS from the UEFI Boot Manager, the system stops responding. The reverse is also true. You must boot to the same boot mode in which you installed the OS.

For all other startup issues, note the system messages that appear on the screen.

Troubleshooting external connections

Make sure 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 in this document.

Troubleshooting USB drive

Use the following tasks to troubleshoot a USB, keyboard, or mouse. For other USB drives, go to task 7 in this section.

1. Disconnect the keyboard and mouse cables from the system briefly and reconnect them.
2. Connect the keyboard or mouse to the USB ports on the opposite side of the system.

3. If the problem is resolved, restart the system, open the **System Setup** page, and check if the non-functioning USB ports are enabled.
4. Replace the keyboard or mouse with another working keyboard or mouse.
5. If the problem is resolved, replace the faulty keyboard or mouse.
6. If the problem is not resolved, proceed to the next step to begin troubleshooting the other USB drives attached to the system.
7. Turn off all attached USB drives and disconnect them from the system.
8. Restart the system and, if your keyboard is functioning, go to the **System Setup** page. Verify that all USB ports are enabled on the **Integrated Devices** page, in the **System Setup** options.
If your keyboard is not functioning, you can also use remote access. If the system is not accessible, reset the NVRAM_CLR jumper inside your system and restore the BIOS to the default settings.
9. Reconnect and turn on each USB drives, one at a time.
10. If a device causes the same problem, turn off the device, replace the USB cable with a known good cable, and turn on the device.

If all troubleshooting tasks are unsuccessful, see Getting help in this document.

Troubleshooting serial I/O device

1. Turn off the system and any peripheral devices connected to the serial port.
2. Swap the serial interface cable with a 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 device with a comparable device.
4. Turn on the system and the serial device.

If the issue persists, see Getting help in this document.

Troubleshooting NIC

1. Run the appropriate diagnostic test. For information about available diagnostic tests, see Using system diagnostics in this document.
2. Restart the system and check for any system messages pertaining to the NIC controller.
3. Check the appropriate indicator on the NIC connector:
 - If the link indicator does not glow, check all cable connections.
 - If the activity indicator does not glow, 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. Make sure 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** page.
6. Make sure that the NICs, hubs, and switches on the network are all set to the same data transmission speed and duplex mode. See the documentation for each network device.
7. Make sure that all network cables are of the proper type and do not exceed the maximum length.

If all troubleshooting tasks are unsuccessful, see Getting help in this document.

Troubleshooting a wet system

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1. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system cover.
3. Remove the following components from the system:
 - HDDs or SSDs
 - HDD or SSD backplane
 - USB memory key
 - HDD or SSD tray
 - cooling shroud
 - expansion card risers (if present)
 - expansion cards
 - PSUs
 - cooling fan assembly (if present)
 - cooling fans
 - processors and heat sinks
 - memory modules
4. Let the system dry thoroughly for at least 24 hours.
5. Reinstall the components you removed in task 3 earlier.
6. Install the system cover.
7. Turn on the system and attached peripherals.
If the system does not start properly, see Getting help in this document.
8. If the system starts properly, turn off the system, and reinstall all the expansion cards that you removed.
9. Run the appropriate diagnostic test. For more information, see Using system diagnostics in this document.

If the tests are unsuccessful, see Getting help in this document.

Troubleshooting a damaged system

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

1. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system cover.
3. Make sure that the following components are properly installed:
 - Cooling shroud

- Expansion-card risers (if present)
 - Expansion cards
 - PSUs
 - Cooling fan assembly (if present)
 - Cooling fans
 - Processor(s) and heat sink(s)
 - Memory modules
 - HDD or SSD carriers
 - HDD or SSD backplane
4. Make sure that all cables are properly connected.
 5. Install the system cover.
 6. Run the appropriate diagnostic test. For more information, see Using system diagnostics in this document.

If the tests fail, see Getting help in this document.

Troubleshooting system battery

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

1. In System Setup, reenter the time and date.
 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. Open the **System Setup** page by pressing <F2> when the company logo is displayed.
- If the date and time are not correct in the System Setup, check the SEL for system battery messages.

If the issue persists, see Getting help in this document.

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

Troubleshooting PSUs

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

Reseat the PSU by removing and reinstalling it.

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

If the issue persists, see Getting Help.

Troubleshooting cooling problems

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Make sure that none of the following conditions exist:

- 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.
- A cooling fan is removed or has failed.
- The expansion card installation guidelines have not been followed.

Troubleshooting cooling fans

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1. Remove the system cover.
2. Reseat the fan or the fan's power cable.
3. If the fan functions properly, install the system cover.

If the issue persists, see Getting help in this document.

Troubleshooting system memory

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

1. If the system is operational, run the appropriate diagnostic test. See Using system diagnostics in this document for available diagnostic tests.
If diagnostics indicates 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 for at least 10 seconds, and then reconnect the system to power.
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 task 12 in this section.

4. Open the **System Setup** page by pressing <F2> when the system is booted and the company logo is displayed, and then check the system memory setting. Make any changes to the memory settings, if required.

If the memory settings match the installed memory but an issue is still indicated, go to task 12 in this section.

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 make sure that they are populated correctly.
8. Reseat the memory modules in their sockets.
9. Install the system cover.
10. Open the **System Setup** page and check the system memory setting.
If the issue is not resolved, go to task 11.
11. Remove the system cover.
12. If a diagnostic test or error message indicates a specific memory module as faulty, swap or replace the module with a known 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 page, it implies that an issue exists either with the installed DIMM types, incorrect DIMM installation, or defective DIMMs. Follow the on-screen instructions to resolve the issue. For more information, see General Memory Module Installation Guidelines in this document.
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 issue is still indicated, complete tasks 12–15 for each memory module installed.

If the issue persists after all memory modules are checked, see Getting help in this document.

Troubleshooting HDD or SSD

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

 **CAUTION: This troubleshooting procedure can erase data stored on the HDD or SSD. Before you proceed, back up all files on the HDD or SSD.**

1. Run the appropriate diagnostic test. For more information, see Using system diagnostics in this document.
On the basis of the results of the diagnostics test, complete the following tasks as appropriate.
2. If your system has a RAID controller and your HDDs or SSDs are configured in a RAID array, complete the following tasks:
 - a. Restart the system and press <F10> during system startup to start Dell Lifecycle Controller, and then open the **Hardware Configuration** page to check the RAID configuration.
See the Lifecycle Controller documentation or online help for information on RAID configuration.
 - b. Make sure that the HDDs or SSDs are configured correctly for the RAID array.
 - c. Turn off the HDD or SSD offline and reset the HDD or SSD.

- d. Exit the configuration application and allow the system to boot to the OS.
3. Make sure that the required device drivers for your controller card are installed and are configured correctly. See the operating system documentation for more information.
4. Restart the system and open the **System Setup** page by pressing <F2> when the company logo is displayed.
5. Verify that the controller is enabled and the drives are displayed on the System Setup page.

If the issue persists, try troubleshooting the expansion cards or see Getting help in this document.

Troubleshooting 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 came with the 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 in this document.
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. Make sure 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 issue is not resolved, turn off the system and attached peripherals, and then 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 in this document. If the tests fail, see Getting help in this document.
14. For each expansion card you removed in task 10, perform the following tasks:
 - 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 in this document.

If the tests fail, see Getting help in this document.

Troubleshooting expansion cards

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

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

1. Run the appropriate diagnostic test. For more information, see Using system diagnostics in this document.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Make sure that each expansion card is firmly seated in its connector.
5. Install the system cover.
6. If the issue 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.
10. Run the appropriate diagnostic test. For more information, see Using system diagnostics in this document.

If the tests are unsuccessful, see Getting help in this document.

11. For each expansion card you removed in task 8, perform the following tasks:
 - 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 in this document.

If the issue persists, see Getting help in this document.

Troubleshooting processors

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

1. Run the appropriate diagnostics test. For information about available diagnostic tests, see Using system diagnostics in this document.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Make sure 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* in this document.

If the issue persists, see *Getting help* in this document.

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/esmmanuals.

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. For more information about system diagnostics, see *Using system diagnostics* in this document.

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*.

Using system diagnostics

If you experience a issue 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 issue yourself, service and support teams can use the diagnostics results to help you solve the issue.

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 devices
- 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 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 embedded system diagnostics

The embedded system diagnostics program is run from the Dell Lifecycle Controller.

 **CAUTION:** Use the embedded system diagnostics to test only your system. Using this program with other systems may cause invalid results or error messages.

1. When the system boots, press <F11>.
2. Use the up- and down arrow keys to select **System Utilities** → **Launch Dell 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 29. 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.

Jumpers and connectors

System board jumper settings

For information about resetting the password jumper to disable a password, see [Disabling forgotten password](#) in this document.

Table 30. 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

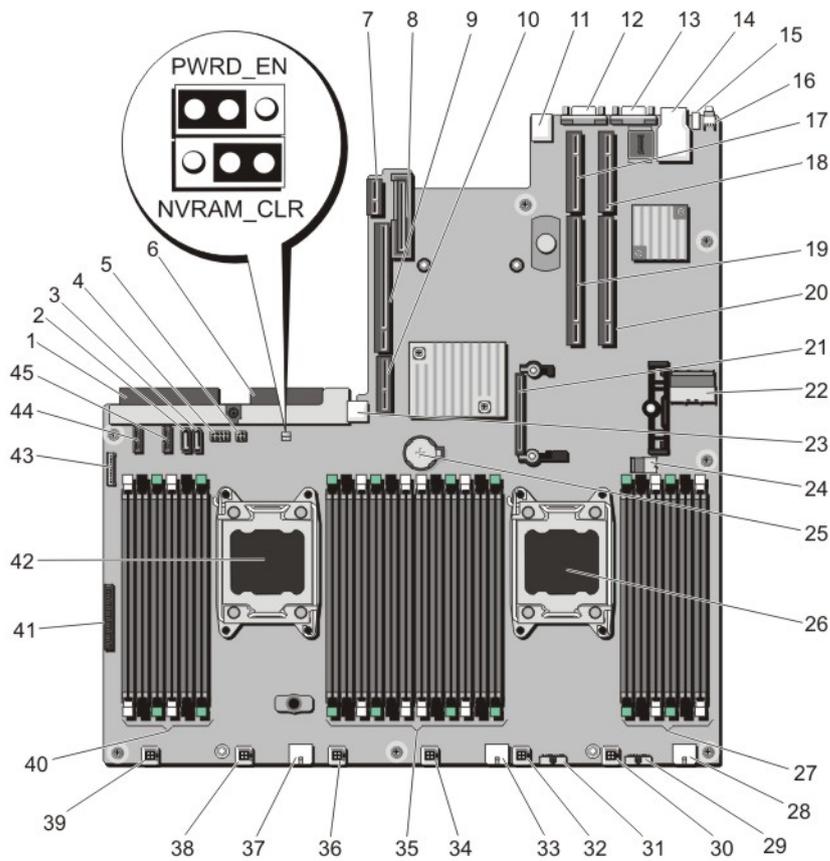


Figure 47. System board jumpers and connectors

Item	Connector	Description
1	J_PS2	PSU 2 power connector
2	J_SATA_CD	Optical drive SATA connector
3	J_SATA_TBU	Tape backup unit SATA connector
4	J_BP0	Optical drive power connector
5	J_TBU	Tape backup unit power connector
6	J_PS1	PSU 1 power connector
7	J_IDSMD	Internal dual SD module connector
8	J_NDC	Network daughter card connector
9	J_RISER_3A	Riser 3 connector
10	J_RISER_3B	Riser 3 connector

Item	Connector	Description
11	J_USB	USB connector
12	J_VIDEO_REAR	Video connector
13	J_COM1	Serial connector
14	J_IDRAC_RJ45	iDRAC7 connector
15	J_CYC	System identification connector
16	CYC_ID	System identification button
17	J_RISER_2A	Riser 2 connector
18	J_RISER_1A	Riser 1 connector
19	J_RISER_2B	Riser 2 connector
20	J_RISER_1B	Riser 1 connector
21	J_STORAGE	Integrated storage controller card connector
22	J_SASX8	Mini SAS connector
23	J_USB_INT	Internal USB connector
24	J_SAS_PCH	SAS connector for software RAID
25	BAT	Battery connector
26	CPU2	Processor socket 2
27	B10, B6, B2, B9, B5, B1	Memory module sockets
28	J_BP3	Backplane power connector
29	J_BP_SIG3	Backplane signal connector 3
30	J_FAN2U_6	Cooling fan connector
31	J_BP_SIG2	Backplane signal connector 2
32	J_FAN2U_5	Cooling fan connector
33	J_BP2	Backplane power connector
34	J_FAN2U_4	Cooling fan connector
35	A10, A6, A2, A9, A5, A1, B3, B7, B11, B4, B8, B12	Memory module sockets
36	J_FAN2U_3	Cooling fan connector
37	J_BP1	Backplane power connector
38	J_FAN2U_2	Cooling fan connector
39	J_FAN2U_1	Cooling fan connector
40	A3, A7, A11, A4, A8, A12	Memory module sockets
41	J_CP	Control panel interface connector
42	CPU1	Processor socket 1

Item	Connector	Description
43	J_FP_USB	Front-panel USB connector
44	J_BP_SIG1	Backplane signal connector 1
45	J_BP_SIG0	Backplane signal connector 0

Disabling 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 passwords currently in use.

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1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system cover.
3. Move the jumper on the system-board jumper from pins 4 and 6 to pins 2 and 4.
4. Install the system cover.

The existing passwords are not disabled (deleted) 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 passwords the next time it boots.

5. Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.
6. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
7. Remove the system cover.
8. Move the jumper on the system-board jumper from pins 2 and 4 to pins 4 and 6.
9. Install the system cover.
10. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.
11. Assign a new system and/or setup password.

Technical specifications

Processor	
Processor type	One or two Intel Xeon processor E5-2600 or E5-2600v2 product family
Expansion Bus	
Bus type	PCIe Generation 3
Expansion slots using riser card:	
Riser 1	(Slot 1) One half-height, low-profile x8 link (Slot 2) One half-height, low-profile x8 link (Slot 3) One half-height, low-profile x8 link
Riser 2	(Slot 4) One full-height, full-length x16 link  NOTE: To use slots 1 through 4, both the processors must be installed. (Slot 5) One full-height, full-length x8 link
Memory	
Architecture	1333 MT/s, 1600 MT/s, 1866 MT/s DDR3 registered or load-reduced Error Correcting Code (ECC) DIMMs
Memory module sockets	Twenty-four 240-pin
Memory module capacities	
LRDIMMs	32 GB quad-ranked
RDIMMs	16 GB dual-ranked
Minimum RAM	64 GB
Maximum RAM	
LRDIMMs	Up to 768 GB
RDIMMs	Up to 384 GB
Drives	
HDDs or SSDs	

Drives

(Dell XC720xd)

Twelve plus two—hard-drive systems

Up to twelve 3.5-inch, internal, hot-swappable SATA SSD, or Nearline SAS drives, and two 2.5-inch back-accessible SSDs or HDDs in HDD or SSD slots 0 through 11, and 12 through 13.

Connectors

Back

NIC	Two 10/100/1000 Mbps and two 100 Mbps/1 Gbps/10 Gbps
Serial	9-pin, DTE, 16550-compatible
USB	Two 4-pin, USB 2.0-compliant (Dell XC720xd)
Video	15-pin VGA
External vFlash card (Dell XC720xd)	One flash memory card slot with iDRAC7 Enterprise card



NOTE: The card slot is available for use only if the iDRAC7 Enterprise license is installed on your system.

Front

USB	One 4-pin, USB 2.0-compliant (Dell XC720xd)
Video	15-pin VGA

Internal

USB	One 4-pin, USB 2.0-compliant
-----	------------------------------

Video

Video type	Integrated Matrox G200
Video memory	16 MB (shared)

Environmental



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

Temperature

Maximum Temperature Gradient (Operating and Storage) 20 °C/h (36 °F/h)

Storage Temperature Limits –40 °C to 65 °C (–40 °F to 149 °F)

Temperature (Continuous Operation)

Environmental

Temperature Ranges (for altitude less than 950 m or 3117 ft) 10 °C to 35 °C (50 °F to 95 °F) with no direct sunlight on the equipment.

Humidity Percentage Range 10 to 80 percent Relative Humidity with 26 °C (78.8 °F) maximum dew point.

Relative Humidity

Storage 5% to 95% RH with 33 °C (91 °F) maximum dew point. Atmosphere must be non-condensing at all times.

Maximum Vibration

Operating 0.26 G_{rms} at 5 Hz to 350 Hz (all operation orientations).

Storage 1.87 G_{rms} at 10 Hz to 500 Hz for 15 min (all six sides tested).

Maximum Shock

Operating One shock pulse in the positive z-axis of 31 G for 2.6 ms in all operational orientations.

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

Maximum Altitude

Operating 3048 m (10,000 ft).

Storage 12,000 m (39,370 ft).

Operating Altitude De-rating

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

35 °C to 40 °C (95 °F to 104 °F) Maximum temperature is reduced by 1 °C/175 m (1 °F/319 ft) above 950 m (3,117 ft).

40 °C to 45 °C (104 °F to 113 °F) Maximum temperature is reduced by 1 °C/125 m (1 °F/228 ft) above 950 m (3,117 ft).

Particulate Contamination

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

Environmental

Air Filtration

 **NOTE:** Applies to data center environments only. Air filtration requirements do not apply to IT equipment designed to be used outside a data center, in environments such as an office or factory floor.

Data center air filtration as defined by ISO Class 8 per ISO 14644-1 with a 95 percent upper confidence limit.

 **NOTE:** Air entering the data center must have MERV11 or MERV13 filtration.

Conductive Dust

 **NOTE:** Applies to data center and non-data center environments.

Air must be free from conductive dust, zinc whiskers, or other conductive particles.

Corrosive Dust

 **NOTE:** Applies to data center and non-data center environments.

- Air must be free from corrosive dust.
- Residual dust present in the air must have a deliquescent point less than 60 percent relative humidity.

Gaseous Contamination

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

Copper Coupon Corrosion Rate

$<300 \text{ \AA}/\text{month}$ per Class G1 as defined by ANSI/ISA71.04-1985.

Silver Coupon Corrosion Rate

$<200 \text{ \AA}/\text{month}$ as defined by AHSRAE TC9.9.

Getting help

Contacting Dell

 **NOTE:** 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 support, or customer-service issues:

1. Go to **dell.com/support/home**.
2. Select your country from the drop-down menu on the top left corner of the page.
3. For customized support:
 - a. Enter your system service tag in the **Enter your Service Tag** box.
 - 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.