Dell Precision Workstation R7610
Owner's Manual

Regulatory Model: E15S
Regulatory Type: E15S002

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.

2013 - 05

Rev. A00

Contents

1

Working on Your Computer

Before Working Inside Your Computer

Use the following safety guidelines to help protect your computer from potential damage and to help to ensure your personal safety. Unless otherwise noted, each procedure included in this document assumes that the following conditions exist:

- You have read the safety information that shipped with your computer.
- A component can be replaced or--if purchased separately--installed by performing the removal procedure in reverse order.

WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support 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 avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface, such as a connector on the back of the computer.

CAUTION: Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a processor by its edges, not by its pins.

CAUTION: When you disconnect a cable, pull on its connector or on its pull-tab, not on the cable itself. Some cables have connectors with locking tabs; if you are disconnecting this type of cable, press in on the locking tabs before you disconnect the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, ensure that both connectors are correctly oriented and aligned.

NOTE: The color of your computer and certain components may appear differently than shown in this document.

To avoid damaging your computer, perform the following steps before you begin working inside the computer.

1. Ensure that your work surface is flat and clean to prevent the computer cover from being scratched.
2. Turn off your computer (see Turning Off Your Computer).

   CAUTION: To disconnect a network cable, first unplug the cable from your computer and then unplug the cable from the network device.
3. Disconnect all network cables from the computer.
4. Disconnect your computer and all attached devices from their electrical outlets.
5. Press and hold the power button while the computer is unplugged to ground the system board.
6. Remove the cover.

CAUTION: Before touching anything inside your computer, ground yourself by touching an unpainted metal surface, such as the metal at the back of the computer. While you work, periodically touch an unpainted metal surface to dissipate static electricity, which could harm internal components.

Recommended Tools

The procedures in this document may require the following tools:

- Small flat-blade screwdriver
- Phillips screwdriver
- Small plastic scribe

Turning Off Your Computer

CAUTION: To avoid losing data, save and close all open files and exit all open programs before you turn off your computer.

1. Shut down the operating system:
   - In Windows 8:
     * Using a touch-enabled device:
       a. Swipe in from the right edge of the screen, opening the Charms menu and select **Settings**.
       b. Select the and then select **Shut down**
     * Using a mouse:
       a. Point to upper-right corner of the screen and click **Settings**.
       b. Click the and select **Shut down**.
   - In Windows 7:
     1. Click **Start**.
     2. Click **Shut Down.**

     or

     1. Click **Start**.
     2. Click the arrow in the lower-right corner of the **Start** menu as shown below, and then click **Shut Down.**.

2. Ensure that the computer and all attached devices are turned off. If your computer and attached devices did not automatically turn off when you shut down your operating system, press and hold the power button for about 6 seconds to turn them off.

After Working Inside Your Computer

After you complete any replacement procedure, ensure you connect any external devices, cards, and cables before turning on your computer.

1. Replace the cover.

CAUTION: To connect a network cable, first plug the cable into the network device and then plug it into the computer.

2. Connect any telephone or network cables to your computer.
3. Connect your computer and all attached devices to their electrical outlets.
4. Turn on your computer.
5. If required, verify that the computer works correctly by running the Dell Diagnostics.

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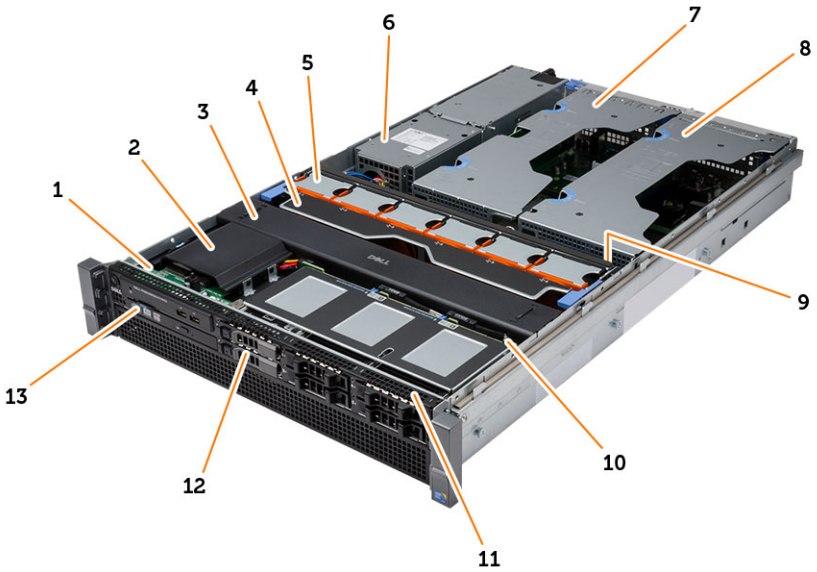
System Overview

The figure below displays the inside view of the computer after the front bezel and the cover have been removed. The callouts show the names and the layout of the components inside the computer.



1. control panel
2. plastic cover
3. cooling shroud
4. fan bracket
5. system fans
6. power distribution unit
7. center expansion-card cage
8. outer expansion-card cage
9. coin-cell battery
10. SAS back plane
11. front-chassis assembly
12. hard drive
13. optical drive

Removing the Front Bezel

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Unlock the front bezel using the key provided.
   a) Lift the bezel-release tab and pull the front bezel away from the computer.

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Installing the Front Bezel

1. Insert the front bezel in its slot in a downward direction and push it towards the computer.
2. Secure the release tab.
3. Lock the front bezel using the key provided.
4. Follow the procedures in *After Working Inside Your Computer*.

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Removing the Cover

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
   - front bezel
3. Rotate the latch-release lock counter-clockwise to the unlocked position.
   a) Lift the latch and slide the cover towards the back of the computer.

4. Lift the cover away from the computer.

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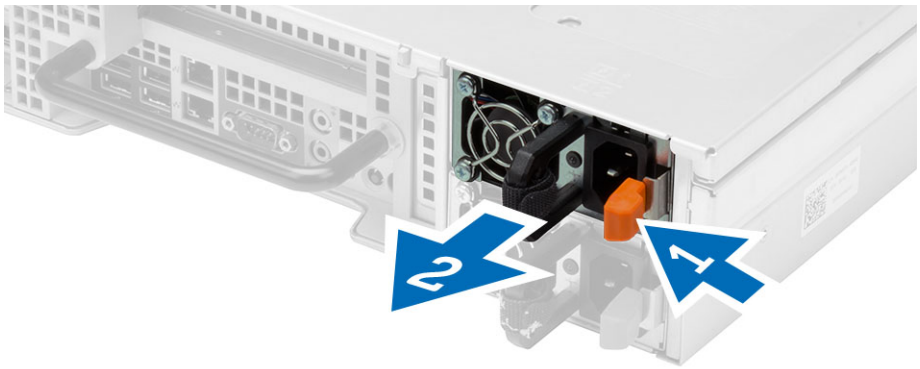
Installing the Cover

1. Place the cover on the computer and press it down until it clicks into place.
2. Press down the cover latch.
3. Install the front bezel.
4. Follow the procedures in *After Working Inside Your Computer*.

Removing the Power Supply

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Press and hold the orange tab towards the latch and pull the power supply unit away from the computer.



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Installing the Power Supply Unit

1. Insert the power supply unit into the computer until it clicks into place.
2. Follow the procedures in *After Working Inside Your Computer*.

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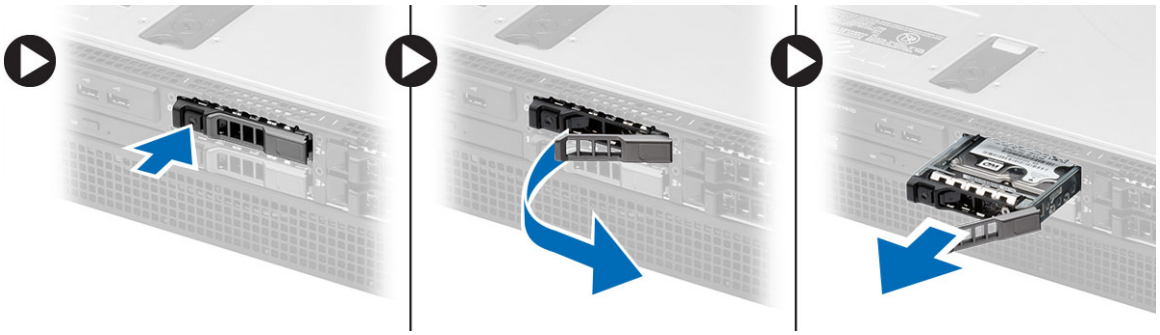
Removing the Hard Drive Carrier

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the front bezel.
3. Press the hard-drive carrier release button.
   a) Pull the hard-drive carrier handle open.
   b) Slide the hard drive out of the drive bay.



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Installing the Hard Drive Carrier

1. Insert the hard drive into the drive bay.
2. Press the hard-drive carrier handle until it clicks into place.
3. Install the front bezel.
4. Follow the procedures in *After Working Inside Your Computer*.

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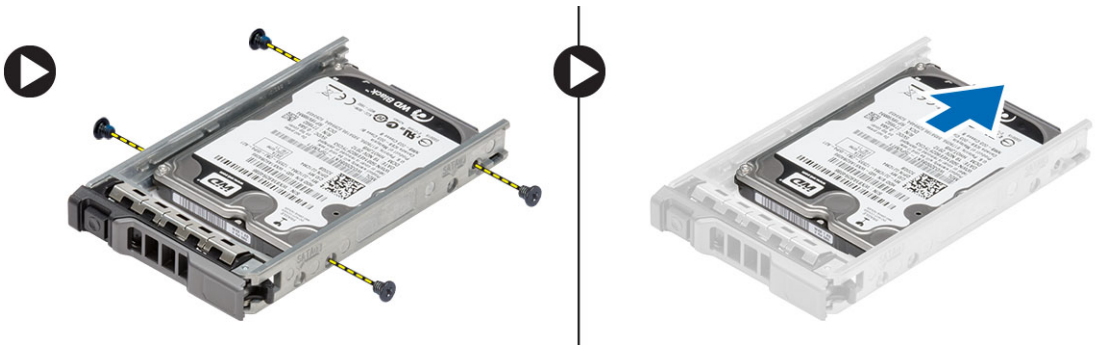
Removing the Hard Drive Assembly

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
   - front bezel
   - hard drive carrier
3. Remove the screws that secure the hard drive caddy to the hard drive.
   a) Slide the hard drive out of the drive assembly.



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Installing the Hard Drive Assembly

1. Place the hard drive in the hard-drive caddy.
2. Tighten the screws that secure the hard drive on either side of the hard-drive caddy.
3. Install :
   - hard drive carrier
   - front bezel
4. Follow the procedures in *After Working Inside Your Computer*.

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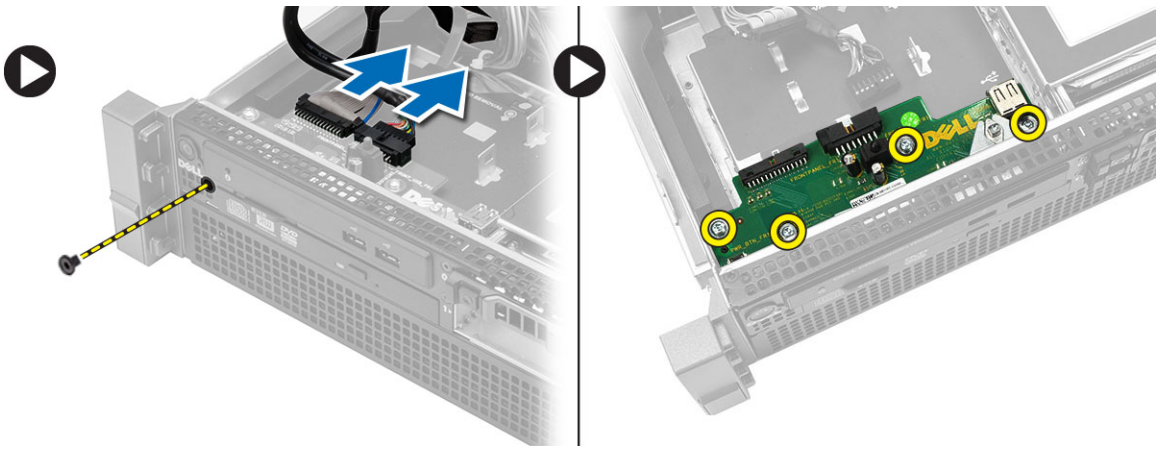
Removing the Control Panel

CAUTION: Two different Torx screwdrivers are needed for the control panel disassembly/reassembly, a T10 and T8.

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
   - front bezel
   - cover
3. Remove the torx screw that secures the control panel.
   a) Disconnect the control panel cables.
   b) Remove the screws that secure the control panel board.



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Installing the Control Panel

1. Connect the control panel cables.
2. Install the screws that secure the control panel.
3. Replace the torx screw that secures the control panel.
4. Install :
   - cover
   - front bezel.
5. Follow the procedures in *After Working Inside Your Computer*.

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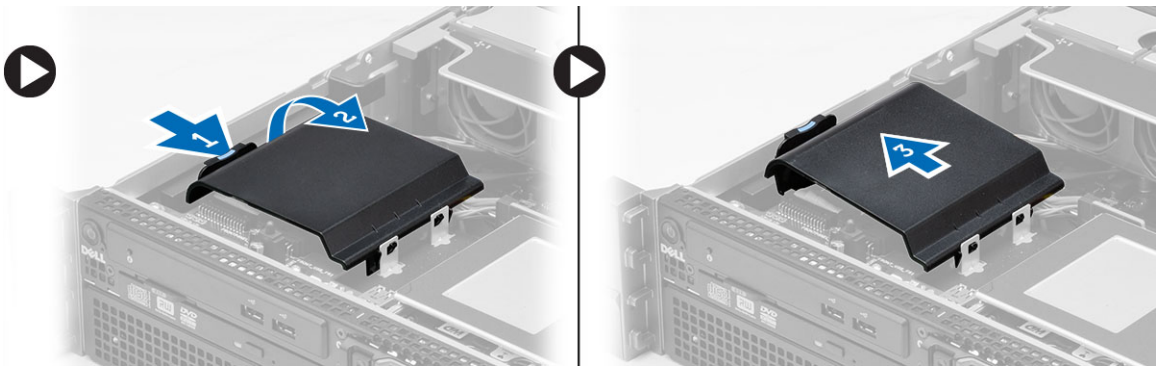
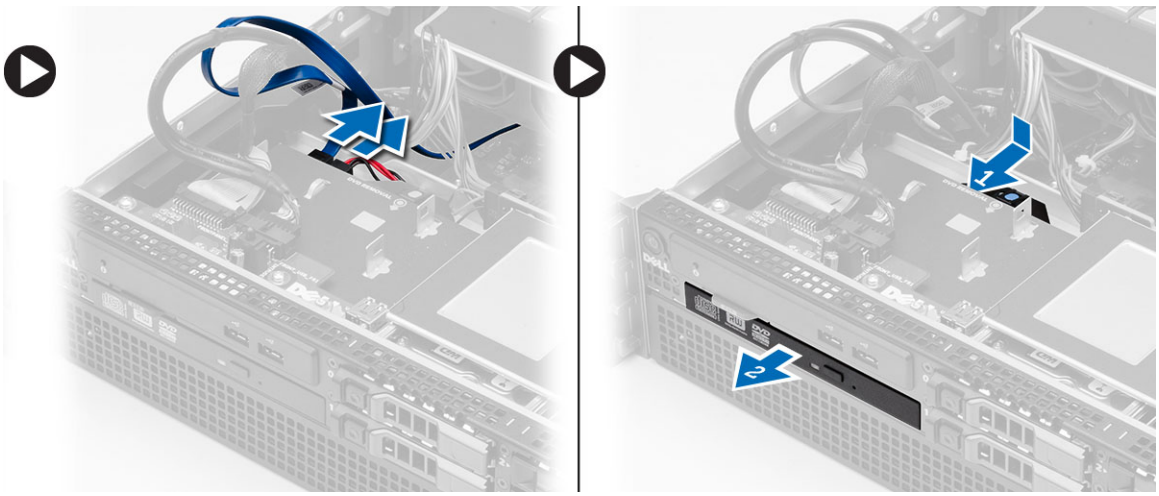
Removing the Optical Drive

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
   - front bezel
   - cover
   - cooling shroud
3. Push the blue release tab in the direction indicated and lift the plastic cover.
   a) Release the plastic cover from the hinges that secure it on the other side and remove it from the computer.



4. Disconnect the power and data cables from the optical drive.
   a) Press down and push the blue release tab towards the front of the computer.
   b) Slide the optical drive out through the front of the computer .



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Installing the Optical Drive

1. Insert the optical drive into the drive bay.
2. Connect the power and data cables.
3. Replace the plastic cover by securing the tabs on one side to the metal hinges and by pressing down the other side until it clicks into place.
4. Install:
   - cooling shroud
   - cover
   - front bezel
5. Follow the procedures in *After Working Inside Your Computer*.

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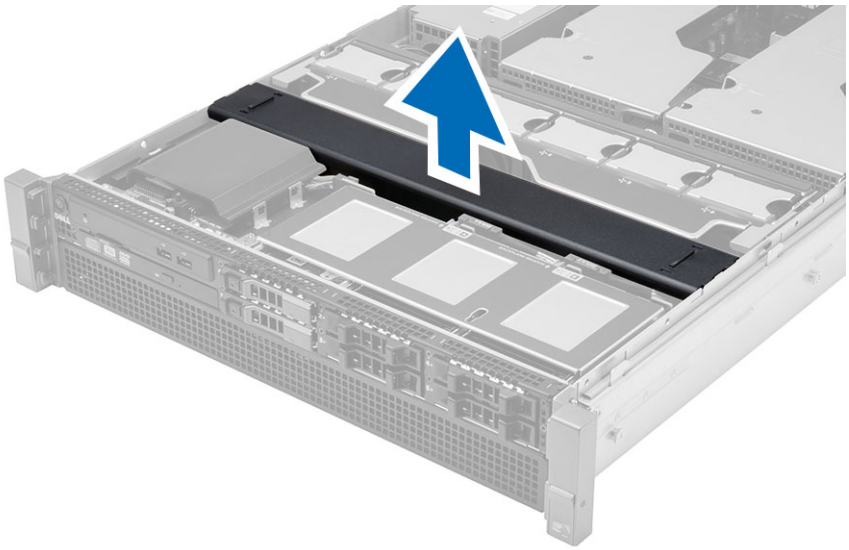
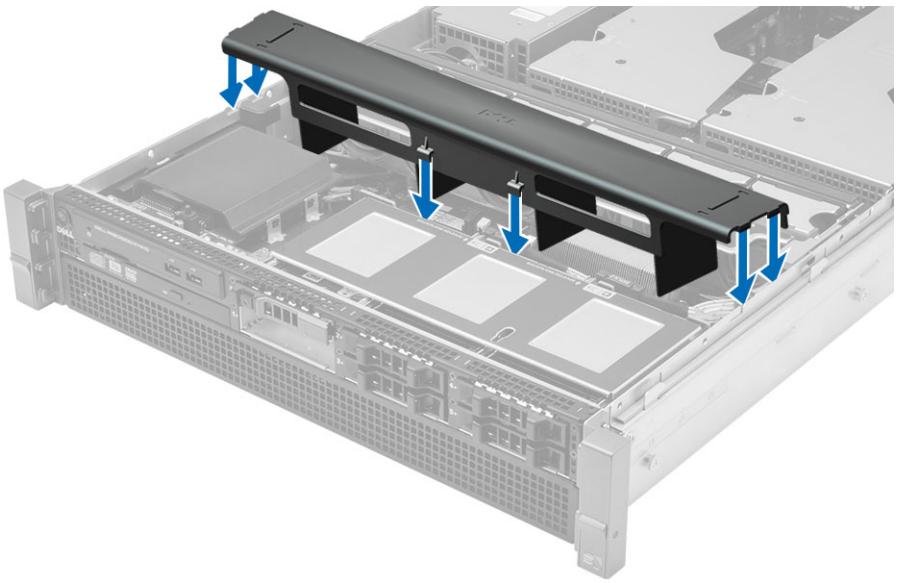
Removing the Cooling Shroud

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
   - front bezel
   - cover
3. Lift the cooling shroud straight up and away from the system board.



Installing the Cooling Shroud

1. Place the cooling shroud in front of the system fans into the system board.



2. Install:
   - cover
   - front bezel
3. Follow the procedures in *After Working Inside Your Computer*.

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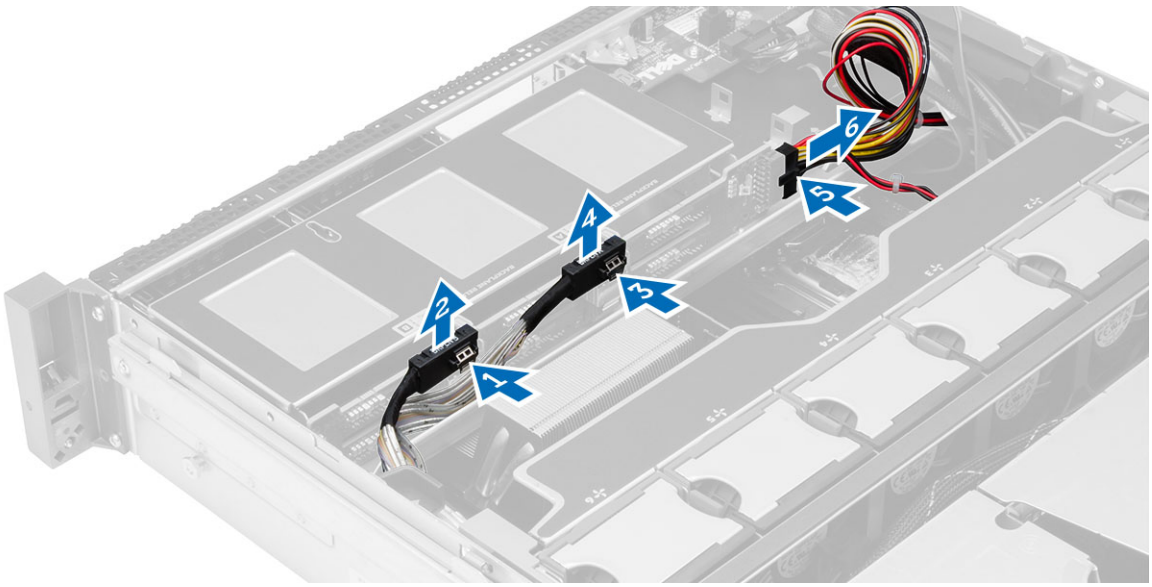
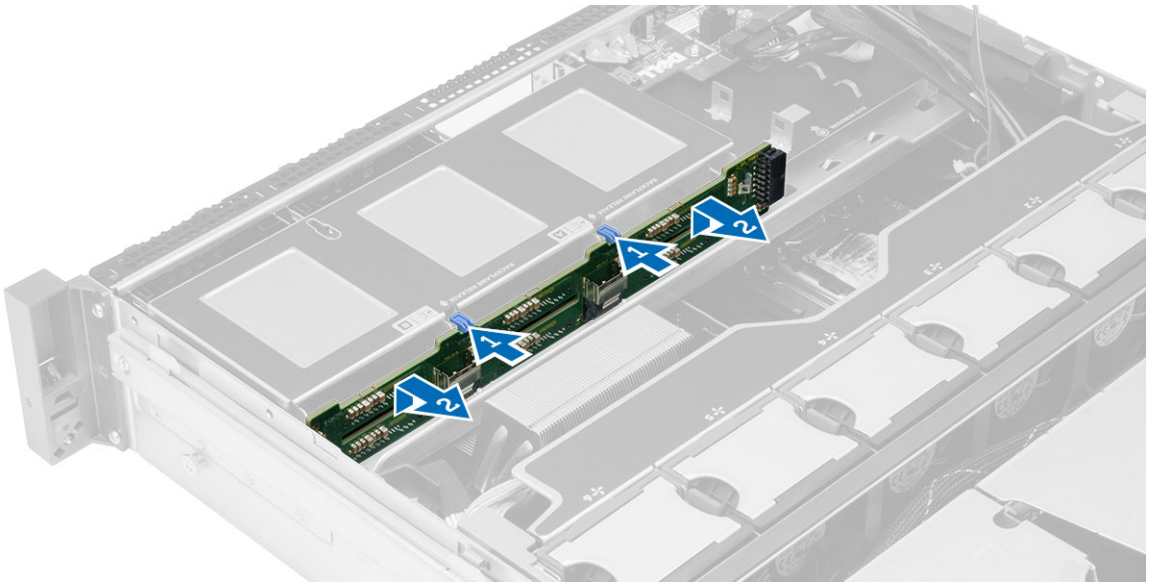
Removing the SAS (Serial attached SCSI) Backplane

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
   - front bezel
   - cover
   - cooling shroud
   - optical drive
   - hard-drive carrier
   - hard-drive assembly
3. Disconnect all the SAS cables by pressing on their respective release tabs.



4. Push the blue release tabs in the direction of the arrows towards the hard-drive assembly to release the SAS backplane from the system board.
   a) Lift and remove the SAS backplane from the computer.



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Installing the SAS (Serial Attached SCSI) backplane

1. Push the blue release tabs and insert the backplane in the slot on the system board along the hard-drive assembly.
2. Connect the SAS cables.
3. Install:
   - hard-drive assembly
   - hard-drive carrier
   - optical drive
   - cooling shroud
   - cover
   - front bezel
4. Follow the procedures in *After Working Inside Your Computer*.

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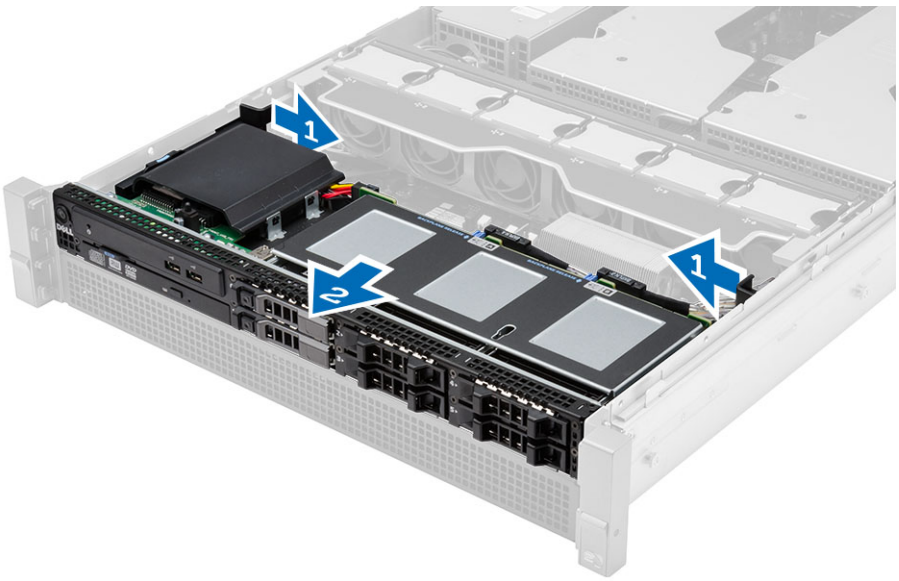
Removing the Front-Chassis Assembly

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
   - front bezel
   - cover
   - cooling shroud
3. Press inwards on the two release tabs and slide the front-chassis assembly towards the front of the computer .



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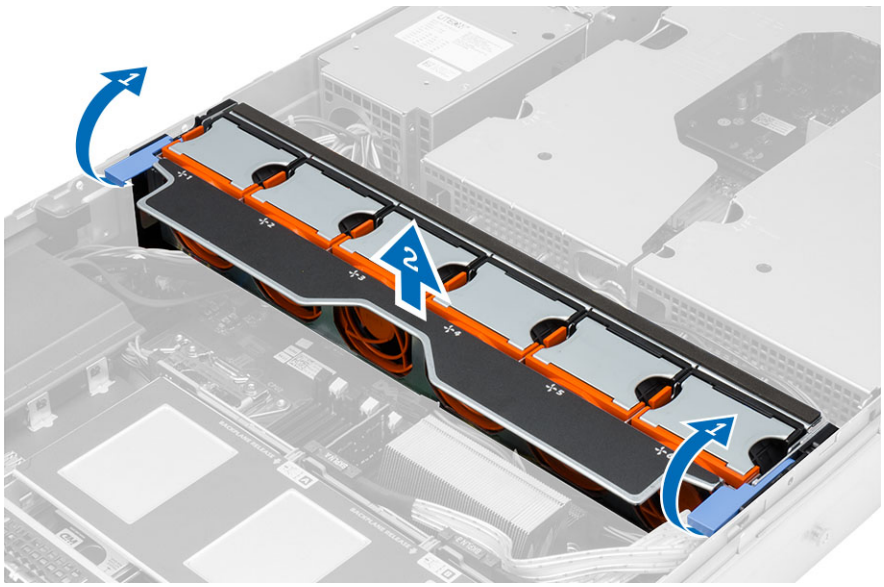
Installing the Front-Chassis Assembly

1. Slide the front-chassis assembly towards the back of the computer until it clicks into place.
2. Install:
   - cooling shroud
   - cover
   - front bezel
3. Follow the procedures in *After Working Inside Your Computer*.

Removing the Fan Bracket

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
   - cover
   - cooling shroud
3. Pull both release tabs upwards simultaneously to release the fan bracket.
   a) Lift the fan-bracket and remove it from the computer.



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Installing the Fan Bracket

1. Place the fan bracket in the computer.
2. Ensure that there are no cables on top of the fan connectors.
3. Press both release tabs downwards simultaneously to secure the bracket.
4. Install:
   - cooling shroud
   - cover
5. Follow the procedures in *After Working Inside Your Computer*.

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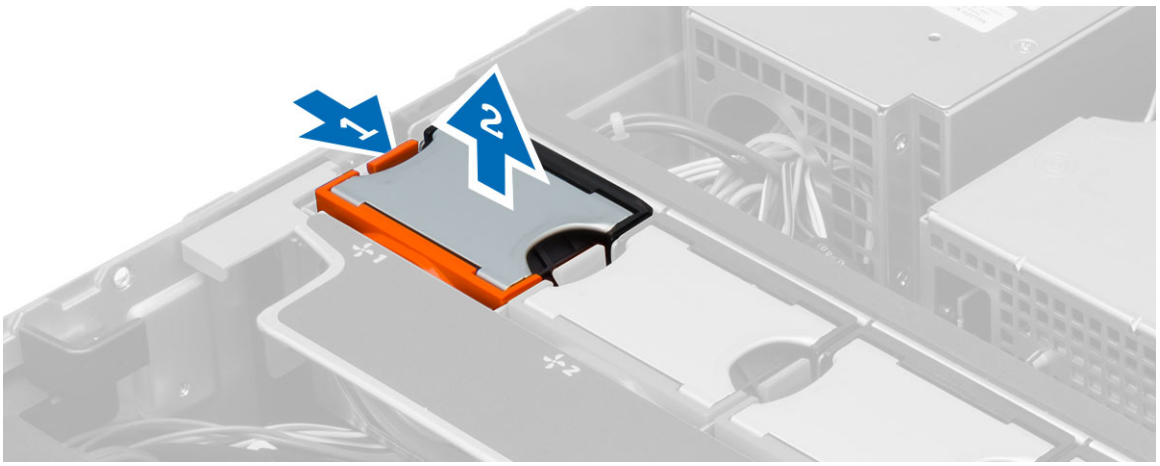
Removing the System Fans

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
   - cover
   - front chassis assembly
3. Press the release tab and lift the fan out of the system fan assembly.
   a) Repeat the above step to remove the remaining system fans from the assembly.



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Installing the System Fans

1. Insert the fan in the system fan assembly until it clicks into place.
2. Repeat the above step to install the remaining system fans into the assembly.
3. Install:
   - front chassis assembly
   - cover
4. Follow the procedures in *After Working Inside Your Computer*.

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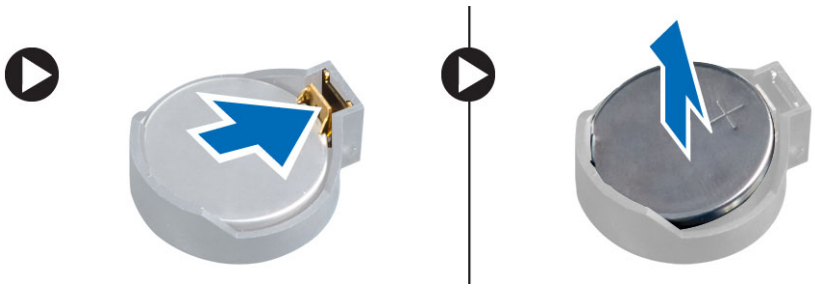
Removing the Coin-Cell Battery

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
   - front bezel
   - cover
   - cooling shroud
   - fan bracket
3. Press the release latch away from the battery to allow the battery to pop-up from the socket. Lift the coin-cell battery out of the computer.



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Installing the Coin-Cell Battery

1. Place the coin-cell battery into the slot on the system board.
2. Press the coin-cell battery downward until the release latch springs back into place and secures it.
3. Install:
   - fan bracket
   - cooling shroud
   - cover
   - front bezel
4. Follow the procedures in *After Working Inside Your Computer*.

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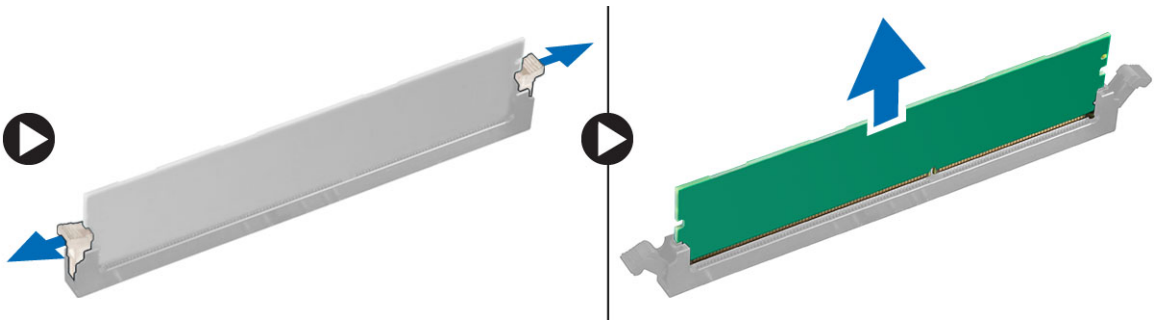
Removing the Memory

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
   - front bezel
   - cover
   - cooling shroud
   - front chassis assembly
   - fan bracket
3. Press down on the memory-securing clips on each side of the memory module, and lift the memory module upwards to remove it from the computer.



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Installing the Memory

1. Insert the memory module into the memory socket.
2. Press down on the memory module until the securing clips secure the memory in place.
3. Install:
   - fan bracket
   - front chassis assembly
   - cooling shroud
   - cover
   - front bezel
4. Follow the procedures in *After Working Inside Your Computer*.

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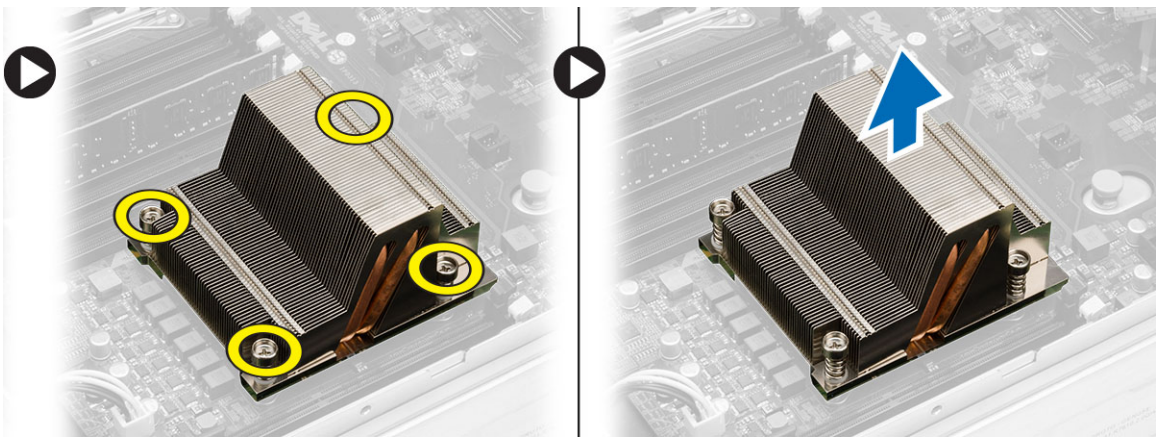
Removing the Heat Sink

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
   - front bezel
   - cover
   - cooling shroud
   - fan bracket
3. Slide the front chassis assembly forward.
4. Loosen the captive screws on the heat sink. It is recommended to begin loosening the diagonal-facing screws to prevent one side of the heat sink from lifting during removal.
   a) Lift the heat sink and remove it from the computer.



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Installing the Heat Sink

1. Place the heat sink over the processor on the system board.
2. Tighten and secure the diagonally-facing captive screws on the heat sink.
3. Install:
   - fan bracket
   - front-chassis assembly
   - cooling shroud
   - cover
   - front bezel
4. Follow the procedures in *After Working Inside Your Computer*.

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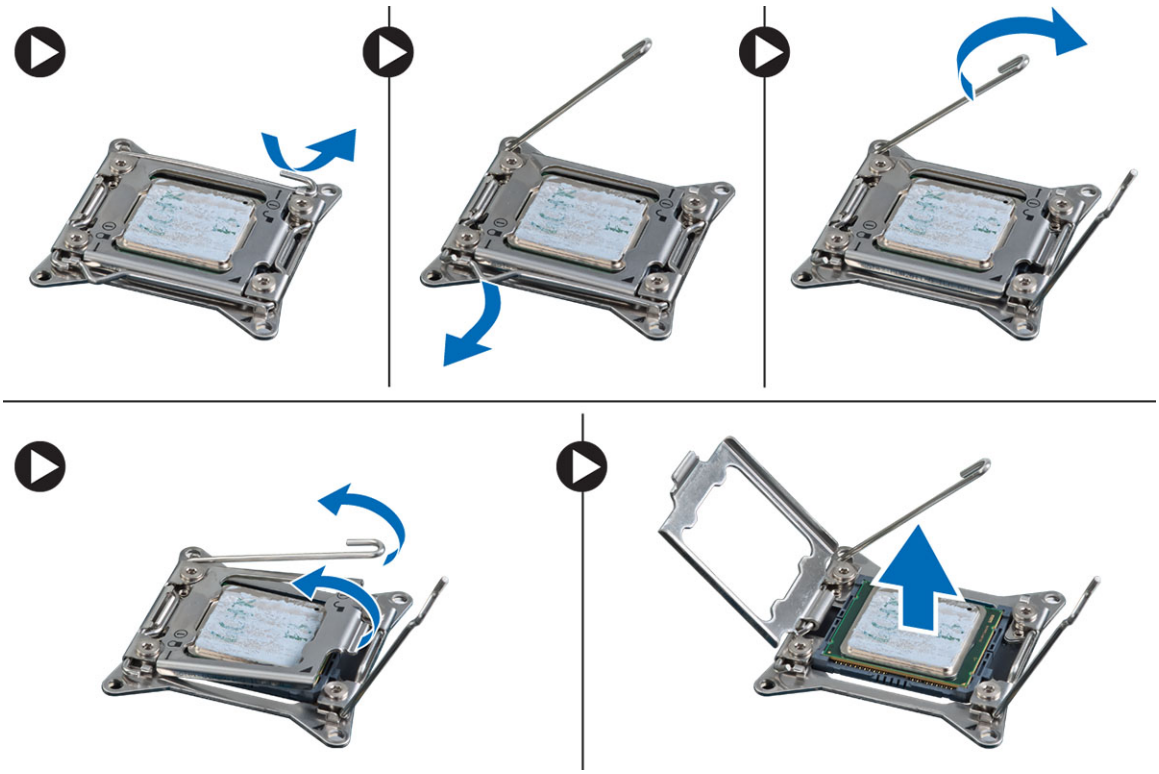
Removing the Processor

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
   - front bezel
   - cover
   - cooling shroud
   - front chassis assembly
   - fan bracket
   - heat sink
3. To remove the processor:

   NOTE: The processor cover is secured by two levers. They have icons that indicate which lever needs to be opened first and which lever closes first.

   a) Press down on the first lever holding the processor cover in place and release it sideways from its retention hook.
   b) Repeat step 'a' to release the second lever from its retention hook.
   c) Lift up and remove the processor cover.
   d) Lift the processor to remove it from the socket and place it in antistatic package.



4. Repeat the above steps to remove the second processor (if available) from the computer.
   To verify if your computer has dual processor slots, see the System Board Components.

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Installing the Processor

1. Place the processor in its socket.
2. Replace the processor cover.

   NOTE: The processor cover is secured by two levers. They have icons that indicate which lever needs to be opened first and which lever closes first
3. Slide the first lever sideways into the retention hook to secure the processor.
4. Repeat step '3' to slide the second lever into the retention hook.
5. Install:
   - heat sink
   - fan bracket
   - front chassis assembly
   - cooling shroud
   - cover
   - front bezel
6. Follow the procedures in *After Working Inside Your Computer*.

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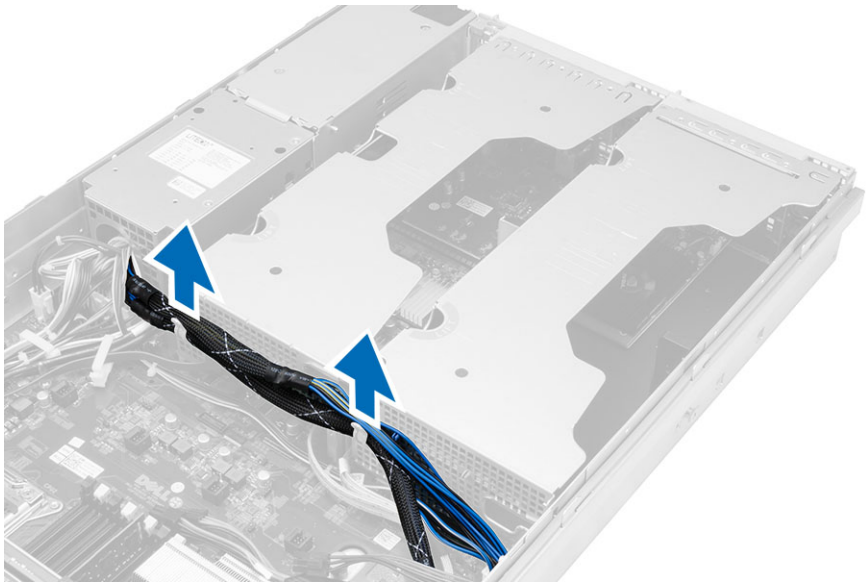
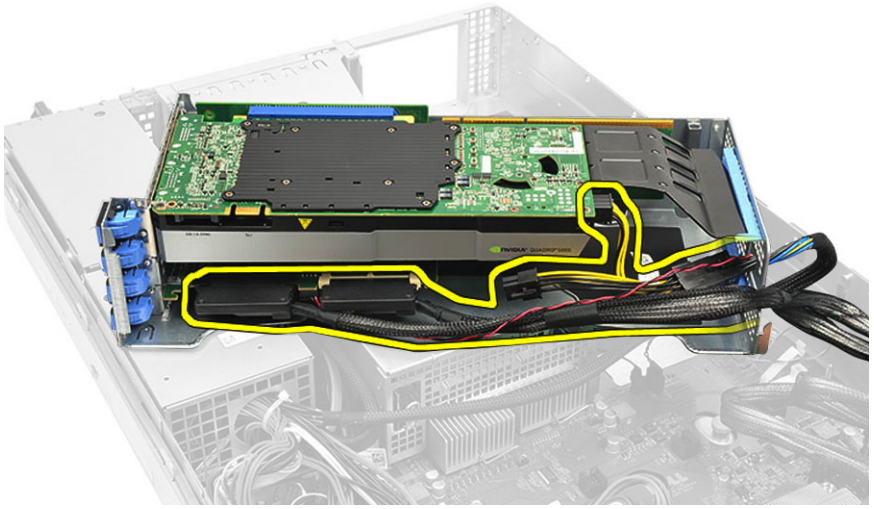
Removing the Expansion Card Cages

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
   - front bezel
   - cover
3. Release the power cables from the metal clips .

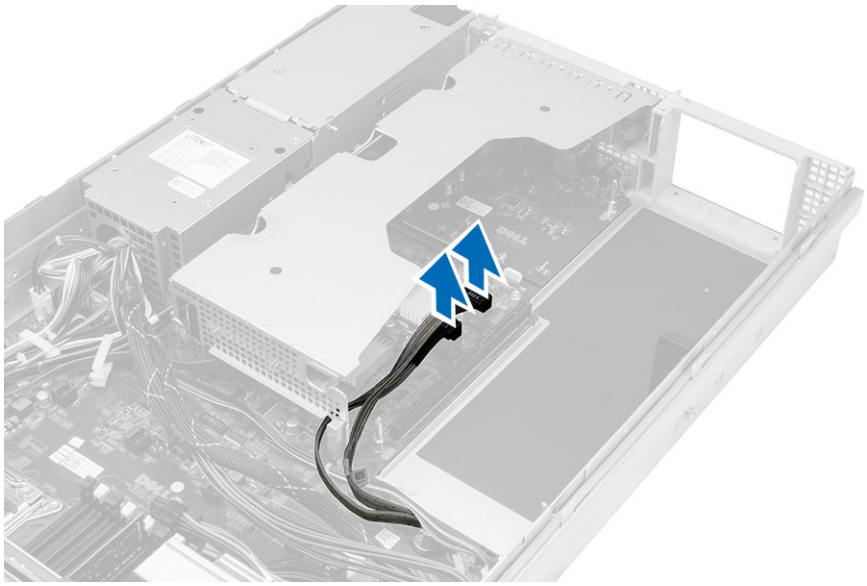


4. Lift the outer expansion-card cage and flip it over.

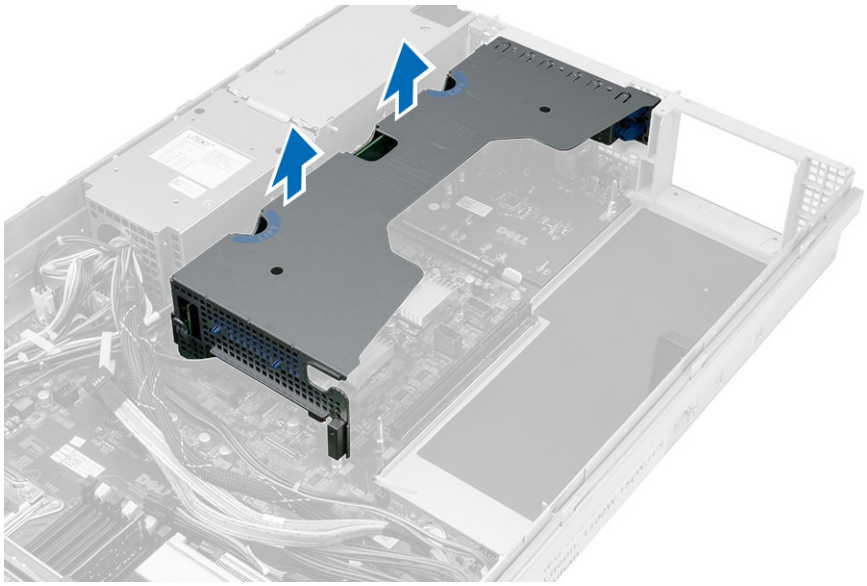
5. Disconnect all the cables leading up to the outer expansion-card cage and lift it away from the computer.



6. Disconnect all the cables leading up to the center expansion-card cage.



7. Lift the center expansion-card upwards and move it away from the computer.



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Installing the Expansion Card Cages

1. Connect the cables leading to the center expansion-card cage.
2. Install the center expansion-card cage in the computer.
3. Connect the cables leading to the outer expansion-card cage.
4. Install the outer expansion-card cage in the computer.
5. Thread the cables leading to the expansion card cage.
6. Install:
   - cover
   - front bezel
7. Follow the procedures in *After Working Inside Your Computer*.

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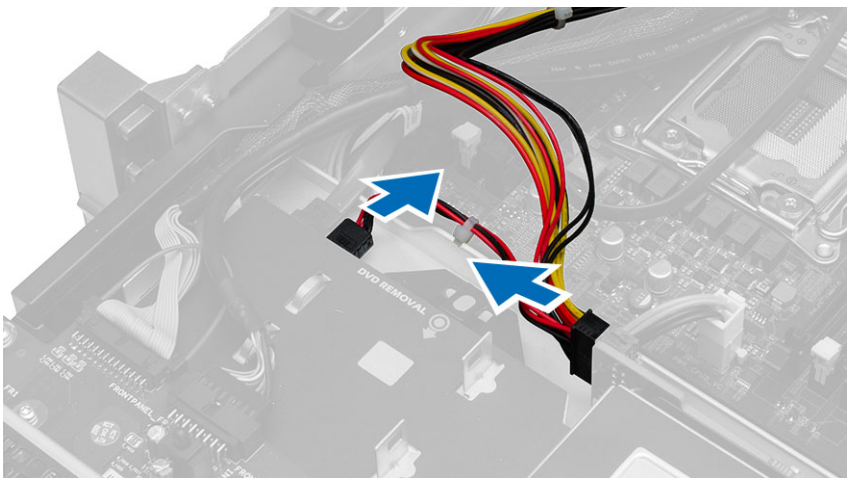
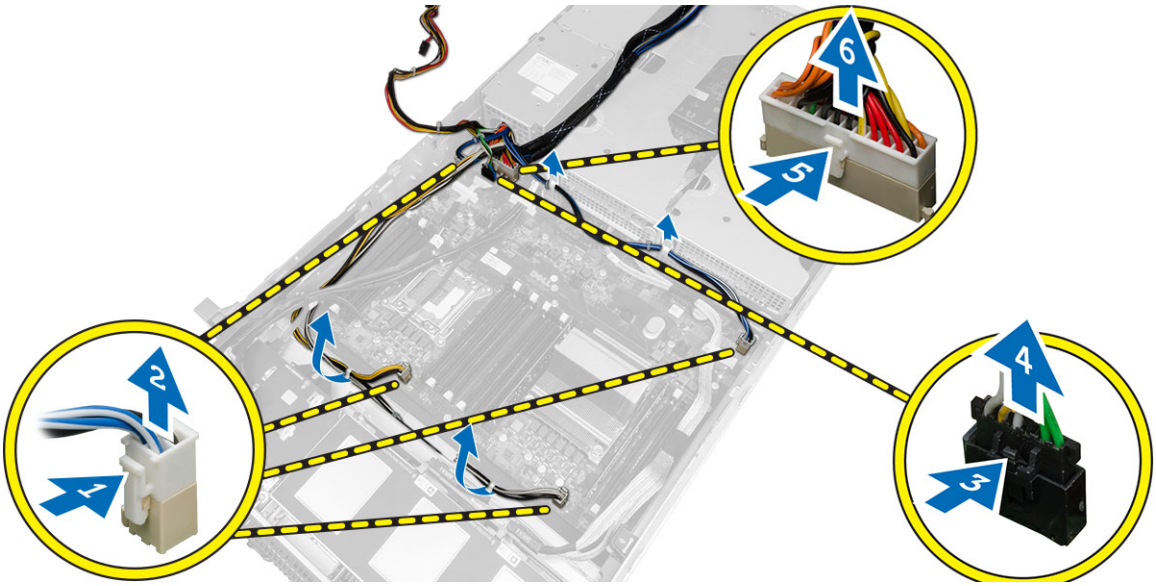
Removing the Power-Distribution Unit

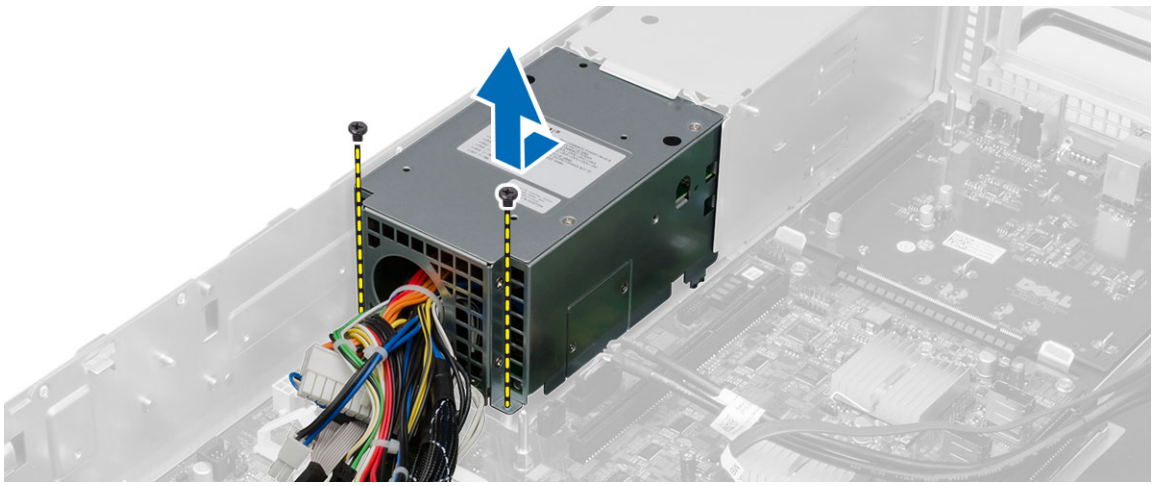
1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
   - front bezel
   - cover
   - cooling shroud
   - power supply
   - system fans
   - fan bracket
3. Slide the front chassis assembly forward.
4. Disconnect the optical drive power connector and the SAS backplane connector by pressing the notch on each individual connector and pulling them in an outward direction.



5. Disconnect the CPU 1, CPU 2 power connectors, CPU 1, CPU 2 memory power connectors, power-distribution unit connector and the 24–pin connector from the system board.



6. Unroute all the cables from the routing tabs.
7. Remove the screws that secure the power-distribution unit.
   a) Lift the power-distribution unit upwards and remove it from the computer.



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Installing the Power-Distribution Unit

1. Place the power-distribution unit on the computer.
2. Install the screws that secure the power distribution unit.
3. Route all the power cables through their routing channels.
4. Connect the CPU 1, CPU 2, SAS Backplane and optical driver power connectors.
5. Slide the front chassis assembly to its original position.
6. Install:
   - expansion card cages
   - fan bracket
   - system fans
   - hard-drive assembly
   - cooling shroud
   - cover
   - front bezel
7. Follow the procedures in *After Working Inside Your Computer*.

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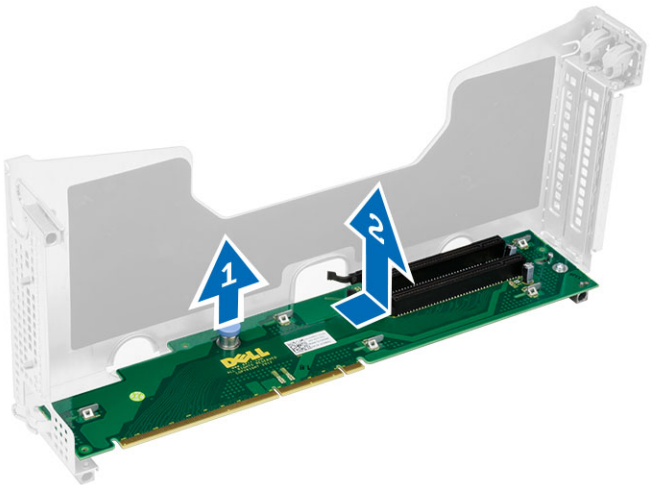
Removing the Remote Access Host Card

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
   - front bezel
   - cover
   - expansion card cages
3. Remove all the cards from the card riser cage.
4. Lift the release tab upwards and slide the riser board towards the right to remove it from the computer.



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Installing the Remote Access Host Card

1. Install the remote access host card in its slot.
2. Install:
   - expansion card cages
   - cover
   - front bezel
3. Follow the procedures in *After Working Inside Your Computer*.

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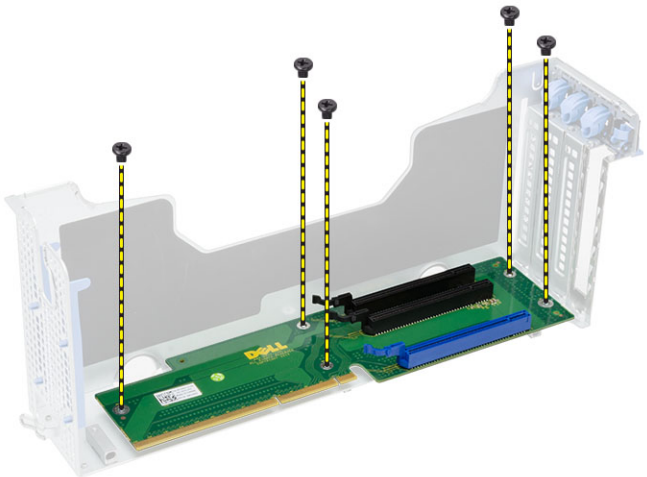
Removing the SAS Controller Card

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
   - front bezel
   - cover
   - expansion card cages
   - remote access host card
3. Remove the screws that secure the SAS controller card and remove it from the computer.



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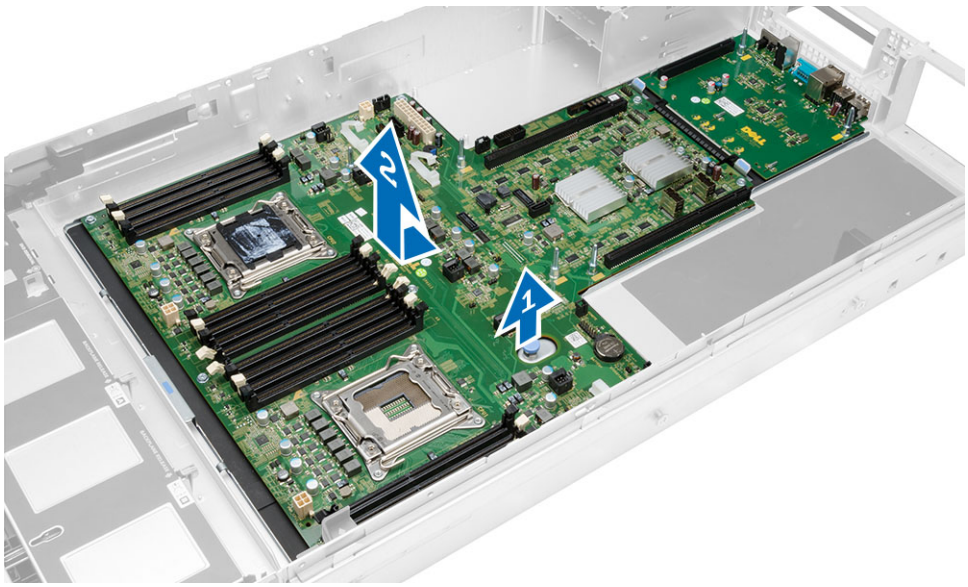
Installing the SAS Controller Card

1. Install the screws that secure the SAS controller card.
2. Install:
   - remote access host card
   - expansion card cages
   - cover
   - front bezel
3. Follow the procedures in *After Working Inside Your Computer*.

Removing the System Board

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
   - front bezel
   - cover
   - cooling shroud
   - heat sink
   - processor
   - memory
   - front-chassis assembly
   - power supply
   - fan bracket
   - expansion card cages
   - power distribution unit
3. Lift the blue release tab, slide the system board forward in the direction indicated and remove it from the computer.



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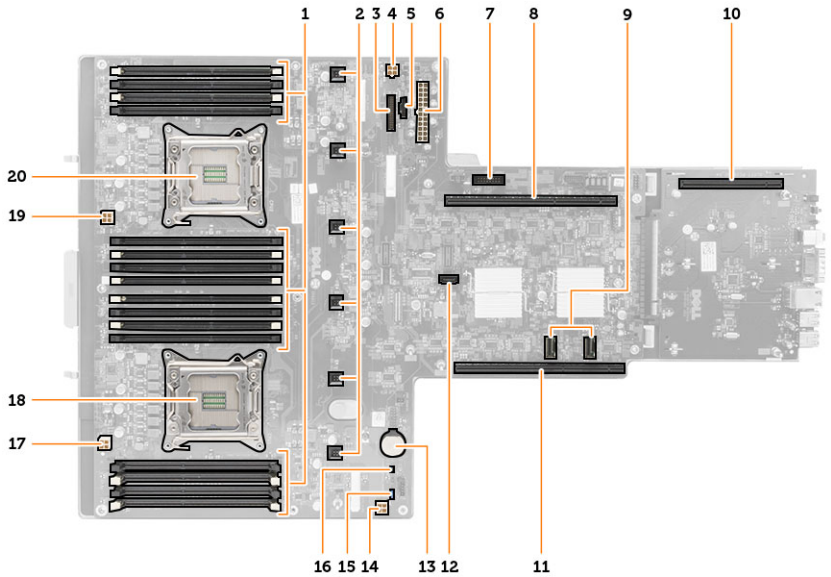
Installing the System Board

1. Place the system board on the chassis.
2. Slide the system board towards the back of the computer.
3. Press the blue release tab.
4. Install:
   - power distribution unit
   - expansion card cages
   - fan bracket
   - memory
   - processor
   - heat sink
   - front-chassis assembly
   - cooling shroud
   - cover
   - front bezel
5. Follow the procedures in *After Working Inside Your Computer*.

System Board Components

The following image displays the system board components .



1. DIMM slots
2. System-fan connectors
3. Front-panel connector
4. CPU 2 memory power connector
5. Power-distribution unit connector
6. 24-pin power connector
7. Front USB connector
8. I/O riser bus
9. SAS connectors
10. PCIe G2 S7 bus connector
11. I/O riser bus
12. SATA connector
13. coin-cell battery slot
14. CPU 1 memory power connector
15. Password reset jumper
16. Real-time clock reset jumper
17. Processor 1 power connector
18. Processor 1
19. Processor 2 power connector
20. Processor 2

Troubleshooting

Diagnostic LEDs

NOTE: The diagnostic LEDs only serve as an indicator of the progress through the POST process. These LEDs do not indicate the problem that caused the POST routine to stop.

The diagnostic LEDs are located on the front of the chassis next to the power button. These diagnostic LEDs are only active and visible during the POST process. Once the operating system starts to load, they turn off and are no longer visible.

The system now includes pre-POST and POST LEDs in an attempt to help pinpointing a possible problem with the system easier and more accurate.

NOTE: The diagnostic lights will blink when the power button is amber or off, and will not blink when it is blue. This has no other significance.

Light Pattern		Problem Description	Troubleshooting Steps
Diagnostic LEDs	Power Button LED		
		The computer is either turned off or is not receiving power.	• Re-seat the power cable in the power connector at the back of the computer and the electrical outlet. • Bypass power strips, power extension cables, and other power protection devices to verify that the computer turns on properly. • Ensure that any power strips being used are plugged into an electrical outlet and are turned on. • Ensure that the electrical outlet is working by testing it with another

Light Pattern		Problem Description	Troubleshooting Steps
Diagnostic LEDs	Power Button LED		
			device, such as a lamp. • Ensure that the main power cable and front panel cable are securely connected to the system board.
		A possible system board failure has occurred.	Unplug the computer. Allow one minute for the power to drain. Plug the computer into a working electrical outlet and press the power button.
		A possible system board, power supply, or peripheral failure has occurred.	• Power off computer, leaving the computer plugged in. Press and hold the power supply test button at the rear of the power supply unit. If the LED next to the switch illuminates, the problem may be with your system board. • If the LED next to the switch does not illuminate, disconnect all internal and external peripherals, and press and hold the power supply test button. If it illuminates, there could be a problem with a peripheral. • If the LED still does not illuminate, remove the PSU connections from the system board, then press and hold the power supply button. If it illuminates, there could be a problem with the system board. • If the LED still does not illuminate, the

Light Pattern		Problem Description	Troubleshooting Steps
Diagnostic LEDs	Power Button LED		
			problem is with the power supply.
		Memory modules are detected, but a memory power failure has occurred.	• If two or more memory modules are installed, remove the modules, then re-install one module and re-start the computer. If the computer starts normally, continue to install additional memory modules (one at a time) until you have identified a faulty module or reinstalled all modules without error. If only one memory module is installed, try moving it to a different DIMM connector and re-start the computer. • If available, install verified working memory of the same type into your computer.
		A possible CPU or system board failure has occurred.	Replace the CPU with a known good CPU. If the computer still fails to boot, inspect the CPU socket for damage.
		BIOS may be corrupt or missing.	The computer hardware is operating normally but the BIOS may be corrupt or missing.
		A possible system board failure has occurred.	Remove all peripheral cards from the PCI and PCIe slots and restart the computer. If the computer boots, add the peripheral cards back one by one until you find the bad one.
		Power connector not installed properly.	Re-seat the 2x2 power connector from the power supply unit.

Light Pattern		Problem Description	Troubleshooting Steps
Diagnostic LEDs	Power Button LED		
		Possible peripheral card or system board failure has occurred.	Remove all peripheral cards from the PCI and PCIe slots and restart the computer. If the computer boots, add the peripheral cards back one by one until you find the bad one.
		A possible system board failure has occurred.	• Disconnect all internal and external peripherals, and re-start the computer. If the computer boots, add the peripheral cards back one by one until you find the bad one. • If the problem persists, the system board is faulty.
		A possible coin cell battery failure has occurred.	Remove the coin cell battery for one minute, reinstall the battery, and restart.
		The computer is in a normal *on* condition. The diagnostic lights are not lit after the computer successfully boots to the operating system.	Ensure that the display is connected and powered on.
		A possible processor failure has occurred.	Re-seat the processor.
		Memory modules are detected, but a memory failure has occurred.	• If two or more memory modules are installed, remove the modules (see your service manual), then re-install one module (see your service manual) and re-start the computer. If the computer starts normally, continue to install additional memory modules (one at a time) until you have

Light Pattern		Problem Description	Troubleshooting Steps
Diagnostic LEDs	Power Button LED		
			identified a faulty module or reinstalled all modules without error. • If available, install working memory of the same type into your computer.
		A possible graphics card failure has occurred.	• Ensure that the display/monitor is plugged into a discrete graphic card. • Re-seat any installed graphics cards. • If available, install a working graphics card into your computer.
		A possible hard drive failure has occurred.	Re-seat all power and data cables.
		A possible USB failure has occurred	Re-install all USB devices and check all cable connections.
		No memory modules are detected.	• If two or more memory modules are installed, remove the modules, then reinstall one module and restart the computer. If the computer starts normally, continue to install additional memory modules (one at a time) until you have identified a faulty module or reinstalled all modules without error. • If available, install working memory of the same type into your computer.

Light Pattern		Problem Description	Troubleshooting Steps
Diagnostic LEDs	Power Button LED		
		Memory modules are detected, but a memory configuration or compatibility error has occurred.	• Ensure that no special requirements for memory module/ connector placement exist. • Ensure that the memory you are using is supported by your computer.
		A possible expansion card failure has occurred.	• Determine if a conflict exists by removing an expansion card (not a graphics card) and restarting the computer. • If the problem persists, reinstall the card you removed, then remove a different card and restart the computer. • Repeat this process for each expansion card installed. If the computer starts normally, troubleshoot the last card removed from the computer for resource conflicts.
		A possible system board resource and/or hardware failure has occurred.	• Clear CMOS. • Disconnect all internal and external peripherals, and restart the computer. If the computer boots, add the peripheral cards back one by one until you find the bad one. • If the problem persists, the system board / system board component is faulty.
		Some other failure has occurred.	• Ensure that the display/monitor is plugged into a

Light Pattern		Problem Description	Troubleshooting Steps
Diagnostic LEDs	Power Button LED		
			discrete graphic card. • Ensure that all hard drives and optical drive cables are properly connected to the system board. • If there is an error message on the screen identifying a problem with a device (such as the floppy drive or hard drive), check the device to make sure it is functioning properly. • If the operating system is attempting to boot from a device (such as the floppy drive or optical drive), check system setup to ensure the boot sequence is correct for the devices installed on your computer.

Error Messages

Errors That Halt the System Completely

The following is a list of BIOS error messages that will halt the system completely, requiring you to cycle the system's power:

- Error! Memory configured incorrectly. Please enter Setup for Memory Info details.
- Alert! Processor Cache Size Mismatch.
- Alert! Processor Type Mismatch.
- Alert! Processor Speed Mismatch.
- Alert! Incompatible Processor detected.

Errors That Soft Halt the System

The following is a list of BIOS error messages that will cause a soft halt of the system and the user will be prompted to press F1 to continue or F2 to enter the system setup:

- Alert! Air temperature sensor not detected.
- Alert! Card-cage fan failure.
- Alert! CPU 0 fan failure.

- Alert! Chipset heat sink not detected.
- Alert! Operating in debug mode. Please populate memory in pairs for normal operation.
- Alert! Power supply fan failure.
- Alert! Previous fan failure.
- Alert! Previous processor thermal failure.
- Alert! Previous reboot was due to voltage regulator failure.
- Alert! Previous shutdown due to thermal event.
- Alert! Previous voltage failure.
- Alert! System battery voltage is low.
- Alert! Uncorrectable memory error previously detected at XXXXXXXXh
- Alert! Unable to initialize fan controller.
- Plug & Play Configuration Error

Errors That Do Not Halt the System

The following is a list of BIOS error messages that do not halt the system but will display a warning message, pause for a few seconds, and then continue to boot:

- Alert! Cover was previously removed
- Alert! Error initializing PCI Express slot n (or bridge)

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Specifications

NOTE: Offerings may vary by region. The following specifications are only those required by law to ship with your computer. For more information regarding the configuration of your computer, click **Start → Help and Support** and select the option to view information about your computer.

Table 1. Processor

Feature	Specification
Type	4, 6, and 8 core Intel Xeon Processor
Cache	
Instruction Cache	32 KB
Data Cache	32 KB
	256 KB Mid-Level Cache per core
	up to 20 MB (4C: 10 MB, 6C: 15 MB/12 MB, 8C: 20 MB) Last-Level Cache shared among all cores

Table 2. System Information

Feature	Specification
Chipset	Intel C600 chipset
BIOS chip (NVRAM)	8 MB + 4 MB serial flash EEPROM

Table 3. Memory

Memory	Specification
Type	1600 DDR3 ECC RDIMM
Speed	1066 Mhz, 1333 Mhz, or 1600 MHz
Connectors	sixteen DIMM slots
Capacity	2 GB, 4 GB, 8 GB, and 16 GB
Minimum memory	4 GB (2 x 2 GB DIMM)
Maximum memory	256 GB

Table 4. Video

Video	Specification
Discrete	Up to three PCI Express x16 graphics cards full-height, full-length. Maximum of 600 W

Table 5. Audio

Audio	Specification
Integrated	Realtek ALC3220 audio codec

Table 6. Network

Network	Specification
Integrated	Intel 82579 and Intel 82574 Ethernet controllers

Table 7. Expansion Bus

Expansion Bus	Specification
Bus type:	PCI Express 3.0 PCI Express 2.0 PCI 2.3 (optional) SAS USB 2.0 SATA 3
Bus speed:	PCI: 133 MB/s PCI Express: • PCIe 3.0 x16 slots bidirectional speed - 16 GB/s • PCIe 3.0 x8-slots bidirectional speed - 8 GB/s • PCIe 3.0 x4 slots bidirectional speed - 4 GB/s • PCIe 2.0 x4-slots bidirectional speed - 2 GB/s PCI 2.3 (32-bit, 33MHz) : 133MB/s SAS: 3 Gbps and 6 Gbps SATA: 1.5 Gbps, 3 Gbps, and 6 Gbps USB: 480 Mbps high speed, 12 Mbps full speed, 1.2 Mbps low speed

Table 8. Card Slots

Card Slots	Specification
Outer Riser:	
Slot 1	PCI Express 3.0 x4/x16 electrical/mechanical, full-height, full-length
Slot 2	PCI Express 3.0 x16 electrical and mechanical, full-height, full-length
Slot 3	N/A
Slot 4	PCI Express 3.0 x16 electrical and mechanical, full-height, full-length
Center Riser Option 1:	

Card Slots	Specification
Slot 5	PCI Express 3.0 x8/x16 electrical/mechanical, full-height, full-length
Slot 6	PCI Express 3.0 x16 electrical and mechanical, full-height, full-length
Center Riser Option 2:	
Slot 5	PCI 32b, 5V, full-height, full-length
Slot 6	PCI Express 3.0 x16 electrical and mechanical, full-height, full-length
Rear IO:	
Slot 7	PCI Express 2.0 x4/x16 electrical/mechanical, half-height, half-length

Table 9. Drives

Drives	Specification
Externally accessible:	
slimline SATA optical bays	one
2.5– inch drive bays	six SAS or SATA drives with onboard LSI2308 controller, or six SAS or SATA drives with LSI9271-8i card
Internally accessible	none

Table 10. External Connectors

External connectors	Specification
Audio	stereo out, Mic/Line In
Network	two RJ-45
Serial	one 9-pin connector, 16550C-compatible
USB	front panel: 2; rear panel: 4
Video	video card dependant
System ID	Cable Management Arm (CMA) remote LED connector

Table 11. Internal Connectors

Internal connectors	Specification
SATA	two 36-pin Mini-SAS connectors; one seven-pin SATA connector
Risers	two 280-pin connectors
Front USB	one 14-pin connector
System power	one 24-pin connector
Power distribution board communication	one six-pin connector
Front panel control	one 28-pin connector
Systems fans	six four-pin connectors

Internal connectors	Specification
Host card remote power control	one two-pin connector
CPU/Memory power	four four-pin connectors
Memory	twelve 240-pin connectors (DDR3)
Rear IO:	
PCI Express	one 98-pin connector (x8)
Risers:	
Outer Riser	
PCI Express	three 164-pin connectors (x16)
Center Riser Option 1	
PCI Express	two 164-pin connectors (x16)
Center Riser Option 2:	
PCI	one 120-pin connector (32 bit)
PCI Express	one 164-pin connectors (x16)
Front IO:	
Front USB	one 14-pin connector
Internal USB	one four-pin connector
Front panel control	one 28-pin connector
HDD Back Panel :	
SATA	two 36-pin Mini-SAS connectors; six 29-pin HDD connectors
Power	one 14–pin connector

Table 12. Controls and Lights

Controls and Lights	Specification
Power button light:	off — system is off or unplugged.
	solid blue light — computer is operating normally.
	blinking blue light — computer is in stand by.
	solid amber light — the computer does not start, indicating a problem with the system board or power supply.
	blinking amber light — indicates a problem has occurred with the system board.
System ID button and light	blue light — flashes (front and back of chassis) when the button is pressed. Press the button again to turn it off.
Drive activity light	blue light — blinking blue light indicates that the computer is reading data from, or writing data to the hard drive.
Network link integrity lights (front):	blue light — A good connection exists between the network and the computer.
	off (no light) — The computer is not detecting a physical connection to the network.

Controls and Lights	Specification
Network link integrity lights (rear):	green light — A good connection at 10 Mbs exists between the network and the computer.
	orange light — A good connection at 100 Mbs exists between the network and the computer.
	amber light — A good connection at 1000 Mbs exists between the network and the computer.
Network activity lights	amber light — flashes when there is network activity on the connection.
Diagnostic lights:	off — computer is off or has completed POST.
	amber/blinking light — see the service manual for specific diagnostic codes.

Table 13. Power

Power	Specification
Coin-cell battery	3 V CR2032 lithium coin cell
Voltage	100 V to 240 V, 12.00 A to 6.00 A, 50 Hz to 60 Hz
Wattage	1023 W : 100 VAC to 120 VAC, 1100 W : 200 VAC to 240 VAC
	1400 W : 200 VAC to 240 VAC
Maximum heat dissipation	4774 BTU/hr

NOTE: Heat dissipation is calculated by using the power supply wattage rating.

NOTE: See the safety information that shipped with your computer for important voltage-setting information.

Table 14. Physical

Physical		Specification
Height		86.30 mm (3.40 inches)
Width		440.60 mm (17.35 inches)
Depth		
	with front bezel	792.70 mm (31.21 inches)
	without front bezel	753.60 mm (29.67 inches)
Weight (Minimum)		
	with front bezel	19.43 kg (42.74 lb)
	without front bezel	19.06 kg (41.92 lb)

Table 15. Environmental

Environmental	Specification
Temperature:	
Operating	10 °C to 35 °C (50 °F to 95 °F)
Storage	-40 °C to 65 °C (-40 °F to 149 °F)

Environmental	Specification
Relative humidity (maximum):	
Operating	10% to 90% (noncondensing)
Storage	5% to 95% (noncondensing)
Maximum vibration:	
Operating	5 Hz to 350 Hz at 0.0002 G2/Hz
Storage	5 Hz to 500 Hz at 0.001 to 0.01 G2/Hz
Maximum shock:	
Operating	40 G +/- 5% with pulse duration of 2 msec +/- 10% (equivalent to 20 in/sec [51 cm/sec])
Storage	105 G +/- 5% with pulse duration of 2 msec +/- 10% (equivalent to 50 in/sec [127 cm/sec])
Airborne contaminant level	G1 or lower as defined by ISA-S71.04–1985

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System Setup

Boot Menu

As with previous workstation platforms, this computer includes a one-time boot menu. This feature gives users a quick and convenient mechanism to bypass the System Setup-defined boot device order and boot directly to a specific device (for example: floppy, CD-ROM, or hard drive). The boot menu enhancements introduced on previous platforms are as follows:

- **Easier access —** Although the <Ctrl><Alt><F8> keystroke still exists and can be used to call up the menu, simply press <F12> during system boot to access the menu.
- **User prompting —** Not only is the menu easy to access, but the user is prompted to use the keystroke on the BIOS splash screen. The keystroke is no longer "hidden" from the user.
- **Diagnostics options —** The boot menu includes two diagnostic options, IDE Drive Diagnostics (90/90 Hard Drive Diagnostics) and Boot to the Utility Partition. The benefit here is that the user does not have to remember the <Ctrl><Alt><D> and <Ctrl><Alt><D> and <Ctrl><Alt><F10> keystrokes.

NOTE: Since the one-time boot menu only affects the current boot, it has the added benefit of not requiring the technician to restore the customer's boot order after completing troubleshooting.

The computer has several keystroke options available during the POST process at the Dell Logo screen. These keystrokes make several options available.

Keystroke	Function	Description
<F2>	Enter System Setup	Use System Setup to make changes to the user-definable settings.
<F12>	Enter Boot Menu	One-time boot and diagnostics utility menu.

Timing Key Sequences

The keyboard is not the first device initialized by Setup. As a result, if you press a keystroke too early, you lock out the keyboard. When this happens, a keyboard error message appears on the monitor, and you cannot restart the system with the <Ctrl><Alt><Del> keys.

To avoid this scenario, wait until the keyboard is initialized before pressing the keystroke. There are two ways to know that this has happened:

- The keyboard lights flash.

The second method is good if the monitor is already warmed up. If it is not, the system often passes the window of opportunity before the video signal is visible. If this is the case, rely on the first method—the keyboard lights—to know the keyboard is initialized.

Dell Diagnostics

Factory-installed platforms include 32-bit system diagnostics on the installed utility partition. Access these diagnostics using the <F12> keystroke during system boot and select Diagnostics.

After pressing the keystroke, the appropriate modules load and the PSA diagnostics run. If this passes, the standard Dell Diagnostics main menu appears. When exiting the diagnostics, the system reboots and returns to the installed operating system. Restarting the computer with the <Ctrl><Alt><Del> keystroke also returns the system to the normal boot sequence as well.

Drives sent for service replacement do not have the utility partition and therefore do not have this capability. If pressed, the keystroke is ignored on these drives.

NOTE: The utility partition is not protected from debug routines or the FDISK utility.

System Setup Options

NOTE: Depending on the computer and its installed devices, the items listed in this section may or may not appear.

- To make changes to the BIOS setup, select one of the below options, update the information and click **Apply**.
- To revert to the factory settings, click **Load Defaults**.
- To close the window, click **Exit**.

General	
System Board	Displays the following information: • System Information: Displays **BIOS Version, Service Tag, Express Service Code, Asset Tag, Manufacture Date,** and the **Ownership Date**. • Memory Information: Displays **Memory Installed, Memory Speed, Number of Active Channels, Memory Technology, DIMM 1 Size, DIMM 2 Size, DIMM 3 Size, DIMM 4 Size, DIMM 5 Size, DIMM 6 Size, DIMM 7 Size , DIMM 8 Size , DIMM 9 Size ,DIMM 10 Size, DIMM 11 Size, DIMM 12 Size, DIMM 13 Size , DIMM 14 Size, DIMM 15 Size** and **DIMM 16 Size**. • Processor Information: Displays processor information for each CPU. The following fields are common for CPU 1 and CPU 2: **Processor Type, Processor Speed, QPI Speed, Processor L2 Cache, Processor L3 Cache, Processor ID, Microcode Version, Multi Core Capable, HT Capable** and **64-Bit Technology.** • Slot Information: Displays **SLOT1, SLOT1, SLOT2, SLOT3, SLOT4, SLOT5, SLOT6,** and **SLOT7**.
Date/Time	Displays current date and time settings. Changes to the system date and time take effect immediately.
Boot Sequence	Specifies the order in which the computer attempts to find an operating system from the devices specified in this list. • USB Floppy Drive • Hard disk drive • CD/DVD/CD-RW Drive • Onboard or USB CD-ROM Drive • USB Device

Drives	
Diskette Drive	Determines how the BIOS configures floppy drives. • Disabled • Enabled (default)
SATA Operation	Configures the operating mode of the integrated hard-drive controller. • RAID Autodetect / AHCI • RAID Autodetect / ATA • RAID On (default)
Drives	These fields let you enable or disable various drives in the computer: • SAS-0 • SAS-1 • SAS-2 • SAS-3 • SAS-4 • SAS-5 • SAS-6

System Configuration	
Integrated NICs	Enables or disables the integrated network card. You can set the integrated NIC to: • Disable • Enable (default) • Enabled with PXE
USB Controller	Enables or disables the integrated USB controller. • Disable • Enable (Default) • No Boot
Serial Port #1	Determines how the built-in serial port operates. • Disable • Auto (default) • COM1 • COM3
Miscellaneous Devices	Enables or disables various system devices. • Front USB • Rear USB • Audio

Video	
Primary Video	Allows the user to specify the order in which the system assigns primary video controller when two or more controllers are available. • Controller 1 • Controller 2

Performance	
Multi Core Support	Specifies whether the computer will have one or all cores enabled. Enable Multi Core Support — Enabled by default.
Hyper-Threading Technology	Enables or disables the Hyper-Threading Technology. Enable Hyper-Threading Technology — Disabled by default.
Intel TurboBoost	Enables or disables the Intel TurboBoost mode of the processor. Enable Intel Turbo Boost Technology — Enabled by default
Intel SpeedStep	Enables or disables the Intel SpeedStep mode of the processor. Enable Intel SpeedStep — Enabled by default
C States Control	Enables or disables additional processor sleep states. C States Control — Enabled by default
Hardware Prefetcher	When enabled, it will automatically prefetch data and code for the processor. Enable Hardware Prefetcher — Enabled by default
Adjacent Cache Line Prefetch	When enabled, the processor will retrieve the current and subsequent cache line. Enable Adjacent Cache Line Prefetch — Enabled by default
Limit CPUID Value	When enabled, limits the maximum value the processor Standard CPUID Function will support. Enable CPUID Limit — Disabled by default
Memory Node Interleaving	Controls how many system memory distributed between physical processors is configured and reported to the operating system. • SMP (default) • NUMA (default for dual processor systems)

Virtualization Support	
Virtualization	Specifies whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by Intel Virtualization Technology. Enable Intel® Virtualization Technology - Enabled by default.
VT for Direct I/O	Specifies whether a Virtual Machine Monitor (VMM) can utilize additional hardware capabilities provided by Intel Virtualization technology for direct I/O. Enable Intel® VT for Direct I/O - Disabled by default.

Security	
Administrator Password	Used to prohibit an unauthorized user from changing any configuration settings. Enter the following details and click OK:

Security	
	1. Old Password 2. New Password 3. Re-enter the new password
System Password	Used to prohibit an unauthorized user from booting. Enter the following details and click OK. 1. Enter the old password — If the password is not set, the 'Enter the old password' field will not be set. 2. Enter the new password 3. Re-enter the password
Password Changes	Controls the interaction between the system password and the administrator password. Enable Password Changes (enabled by default)
TPM Security	Controls whether the Trusted Platform Module (TPM) in the system is enabled and visible to the operating system. When enabled, the BIOS will turn on the TPM during POST so that it can be used by the operating system. TPM Security (disabled by default) When the option is enabled, the user can select between three options: • Deactivate • Activate • Clear
CPU XD Support	Enables or disables the **Execute Disable** mode of the processor. Enable CPU XD Support — Enabled by default
OROM Protection	Determines whether access to the Option ROM configurations are permitted during boot (like CTRL+I or CRTL+P). Enable OROM Protection — Enabled by default
Computrace(R)	Activates or deactivates the BIOS module interface of the optional Computrace Service from Absolute Software. • Deactivate - Disabled by default. • Disable • Activate
Chassis Intrusion	Controls the chassis intrusion feature. You can set this option to: Clear Intrusion Warning — Enabled by default Options available are enabled when the check box is selected. • Disable • Enable • On-Silent — Enabled by default (if chassis intrusion is detected)

Power Management	
AC Recovery	Determines how the system responds when AC power is re-applied after a power loss. You can set the AC Recovery to: • Power Off (default) • Power On • Last State
Auto On Time	Sets time to automatically turn on the computer. Time is kept in standard 12-hour format (hour:minutes:seconds). Change the startup time by typing the values in the time and AM/PM fields. The options available are: • Disable (default) • Every Day • Weekdays **NOTE:** This feature does not work if you turn off your computer using the switch on a power strip or surge protector or if **Auto Power is set to disabled**.
Deep Sleep Mode	Determines how aggressive the computer is at conserving power while it is shutdown or in Hibernate mode. Enable Low Power Mode — Disabled by default
Remote Wake Up	Determines if the system can be powered up remotely from Suspend, Hibernate, or Off. • Disable • Enable • Enable with Boot to NIC

Maintenance	
Service Tag	Displays the Service Tag of your computer.
Asset Tag	Allows you to create a system asset tag if an asset tag is not already set.
System Management	Controls the System Management mechanism. • Disable (default) • DASH/ASF 2.0
SERR Messages	Controls the SERR message mechanism. Enable SERR Messages — Enabled by default

POST Behavior	
Fast Boot	Allows speeding up the boot process by bypassing some compatibility steps. Enable Fast Boot — Enabled by default
Numlock LED	Specifies if Numlock feature should be on when your computer starts. Enable Numlock LED — Enabled by default
POST Hotkeys	Specifies if the sign-on screen displays a message stating the keystroke sequence required to enter the Setup program or the QuickBoot feature. Enable F12 = Boot menu — Enabled by default

POST Behavior	
Keyboard Errors	Specifies if keyboard-related errors are reported when the system boots Enable Keyboard Error Detection
PCOIP BIOS Access	If enabled, allows a remote user to access BIOS Setup via PCOIP Portal. Enable PCOIP BIOS Access — Enabled by default

System Logs	
BIOS Events	Displays the system event log and allows you to: • Clear Log • Mark All Entries

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Contacting Dell

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NOTE: 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.

Dell provides several online and telephone-based support and service options. 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. Visit **dell.com/support**
2. Select your support category.
3. Verify your country or region in the Choose a Country/Region drop-down menu at the top of page.
4. Select the appropriate service or support link based on your need.