Dell Precision R5500 Owner's Manual

Notes, Cautions, and Warnings

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

CAUTION: A CAUTION indicates potential damage to hardware or loss of data if instructions are not followed.

NOTE: A WARNING indicates a potential for property damage, personal injury, or death.

Rev. A00

Contents

Working on Your Computer

Topics:

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.

(i) **NOTE: 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.**

(i) **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
- Flash BIOS update program media

Memory Technology

Memory Supported

The Dell Precision R5500 uses the 1333MHz DDR3 Triple channel memory. It is a system architecture that is designed to triple the theoretical peak bandwidth over equivalent single channel systems. Triple channel refers to the system architecture of the motherboard, not the memory itself. Triple channel memory configurations are only possible with DDR3 memory modules. The Dell Precision R5500 runs best on triple channel mode. However, Dell Precision R5500 motherboard allows our user to run their system in single (debug mode) and dual channel mode as well.

Memory Population Rules

General memory population rules apply to the Dell Precision R5500:

- All modules should be of the same speed .
- All modules should be of the same capacity.
- All modules should be of the same latency.
- All memory configured in the system will run at the frequency and latency of the slowest DIMM. As an example, if one stick of PC3-1066 with timings of 10/10/10 is paired with two sticks of PC3-1333, the PC3-1333 will run at PC3-1066 speeds using that stick's 10/10/10 latency.

To further simplify memory population, refer to the below memory matrix of Dell Precision R5500:

Total System Memory	CPU 1						CPU 2					
	Channel A		Channel B		Channel C		Channel A		Channel B		Channel C	
	Slot A1	Slot A4	Slot A2	Slot A5	Slot A3	Slot A6	Slot B1	Slot B4	Slot B2	Slot B5	Slot B3	Slot B6
2GB*	1		1									
3GB	1		1		1							
4GB†	1	1	1		1							
6GB	2		2		2							
6GB	1		1		1		1		1		1	
12GB	2	2	2	2	2	2						
12GB	2		2		2		2		2		2	
24GB	4	4	4	4	4	4						
24GB	2	2	2	2	2	2	2	2	2	2	2	2
24GB	8		8		8							
32GB†	8	4	8	4	4	4						
48GB	8	8	8	8	8	8						
48GB	16		16		16							
48GB	4	4	4	4	4	4	4	4	4	4	4	4
64GB†	8	4	8	4	4	4	8	4	8	4	4	4
96GB	8	8	8	8	8	8	8	8	8	8	8	8
96GB	16	16	16	16	16	16						
128GB†	16	8	16	8	8	8	16	8	16	8	8	8
192GB	16	16	16	16	16	16	16	16	16	16	16	16

* Min Config

† Non-optimal config -- performance degradation of -8% or more from optimum config.

When one quad-rank DIMM is used, it must be populated in Slot A1/B1 (farthest from CPU) of a given channel.

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 7:

     Click **Start** , then click **Shut Down.**

   - In Windows Vista:

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

   - In Windows XP:

     Click **Start** > **Turn Off Computer** > **Turn Off**. The computer turns off after the operating system shutdown process is complete.

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. Verify that the computer works correctly by running the Dell Diagnostics.

Front Bezel

Removing the Front Bezel

1. Follow the procedures in Before Working Inside Your Computer.
2. Unlock the front bezel using the given key.

3. Lift the bezel release tab and gently pull the front bezel away from the computer.

Related tasks

Installing the Front Bezel

Installing the Front Bezel

1. Insert the front bezel in the slot downwards and push it towards the computer.
2. Secure the release tab.
3. Lock the front bezel using the given key.
4. Follow the procedures in After Working Inside Your Computer.

Related tasks

Removing the Front Bezel

Cover

Topics:

- Removing the Cover
- Installing the Cover

Removing the Cover

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Rotate the latch-release lock counter-clockwise to the unlocked position.

4. Lift the latch and slide the cover towards the back of the computer.

5. Hold the cover on both sides and lift it away from the computer.

Related tasks

Installing the Cover

Installing the Cover

1. Place the cover on the computer and press down until it clicks into place.
2. Press down the cover latch.
3. Using a screwdriver, rotate the latch-release lock clockwise, to lock the cover.
4. Install the front bezel.
5. Follow the procedures in After Working Inside Your Computer.

Related tasks

Removing the Cover

Cooling Shroud

Topics:

Removing the Cooling Shroud

⚠️ **CAUTION: The computer will be populated with one or two CPUs. Currently, when there is a single CPU installed, airflow can bypass CPU1 which increases fan speeds and therefore leads to poor acoustic performance. Adding a mylar piece in this region redirects airflow across CPU1. The mylar piece will need to be removed when the 2nd CPU is installed as it is no longer needed and will interfere with the heat sink.**

1. Cooling Shroud
2. Mylar — Needs to be removed if two CPUs are installed

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Remove the cover.
4. Gently lift the shroud straight up and away from the system board.

Related tasks

Installing the Cooling Shroud

Installing the Cooling Shroud

1. Gently place the shroud in front of the system fans into the system board.

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

Related tasks

Removing the Cooling Shroud

Optical Drive

Topics:

Removing the Optical Drive

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Remove the cover.
4. Remove the cooling shroud.
5. Disconnect the power and data cable from the back of the optical drive.

6. Press down and push the blue release tab toward the front of the computer.

7. Slide the optical drive through the front of the computer till it is free of the drive bay.

Related tasks

Installing the Optical Drive

Installing the Optical Drive

1. Insert the optical drive into the drive bay.
2. Connect the power and data cables.
3. Install the cooling shroud.
4. Install the cover.
5. Install the front bezel.
6. Follow the procedures in After Working Inside Your Computer.
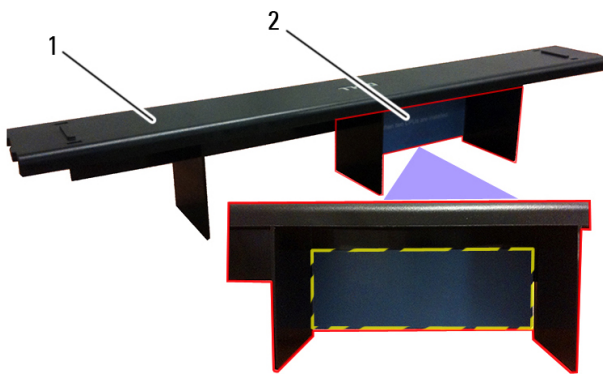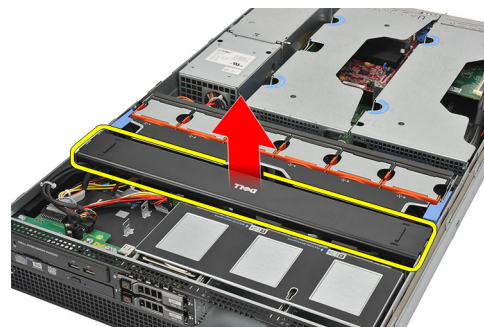
Related tasks

Removing the Optical Drive

Hard Drive Carrier

Topics:

Removing the Hard-Drive Carrier

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Remove the cover.
4. Remove the cooling shroud.
5. Remove the optical drive.
6. Press the release button.

7. Pull the hard-drive carrier handle open.
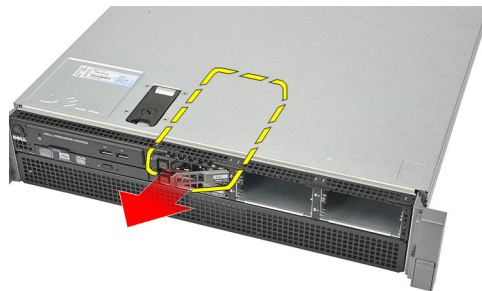
8. Hold the front of the hard drive and slide out until it is free of the drive bay.

Related tasks

Installing the Hard-Drive Carrier

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 cooling shroud.
4. Install the cover.
5. Install the front bezel.
6. Follow the procedures in After Working Inside Your Computer.

Related tasks

Removing the Hard-Drive Carrier

Hard Drive Assembly

Topics:

Removing the Hard-Drive Assembly
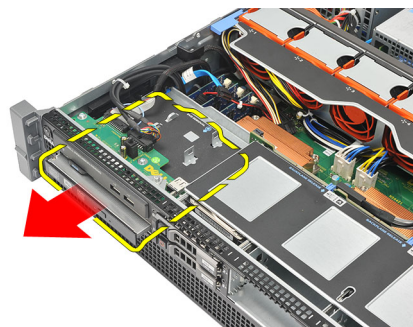
1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Remove the cover.
4. Remove the cooling shroud.
5. Remove the optical drive.
6. Remove the hard drive carrier.
7. Remove the screws securing the hard drive caddy to the hard drive.

8. Rotate and repeat the same removal steps for the other side of the hard drive caddy.

9. Lift up the hard-drive caddy from the hard drive and remove.

Related tasks

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 the hard drive carrier.
4. Install the cooling shroud.
5. Install the cover.
6. Install the front bezel.
7. Follow the procedures in After Working Inside Your Computer.

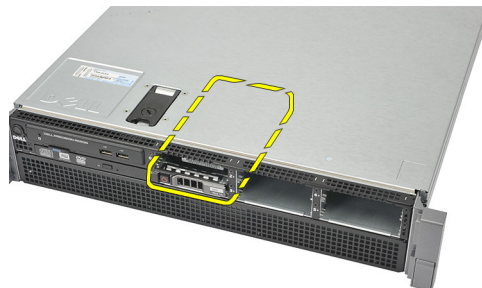**Related tasks**

SAS Backplane

Topics:

Removing the SAS Backplane

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Remove the cover.
4. Remove the cooling shroud.
5. Remove the optical drive.
6. Remove the hard drive carrier.
7. Remove the hard-drive assembly.
8. Disconnect the SAS cables.

9. Push the blue release tabs in the direction of the arrows marked on the hard-drive housing assembly. Slide the backplane upwards.
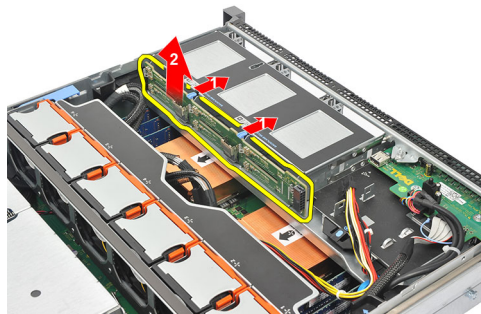
Related tasks

Installing the SAS Backplane

Installing the SAS Backplane

1. Push the blue release tabs and insert the backplane in the slot along the hard-drive assembly.
2. Connect the SAS cables.
3. Install the hard drive assembly.
4. Install the hard drive carrier.

5. Install the optical drive.
6. Install the cooling shroud.
7. Install the cover.
8. Install the front bezel.
9. Follow the procedures in After Working Inside Your Computer.

Related tasks

Removing the SAS Backplane

Power Supply

Topics:

- Removing the Power Supply
- Installing the Power Supply

Removing the Power Supply

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Remove the cover.
4. Remove the cooling shroud.
5. Remove the optical drive.
6. Remove the hard drive carrier.
7. Remove the hard-drive assembly.
8. Remove the SAS Backplane.
9. Press and hold the orange tab towards latch. Then pull the power supply unit away from the computer.

Related tasks

Installing the Power Supply

Installing the Power Supply

1. Insert the power supply unit into the computer until it clicks into place.
2. Install the SAS backplane.
3. Install the hard drive assembly.
4. Install the hard-drive carrier.
5. Install the optical drive.
6. Install the cooling shroud.
7. Install the cover.
8. Install the front bezel.
9. Follow the procedures in After Working Inside Your Computer.
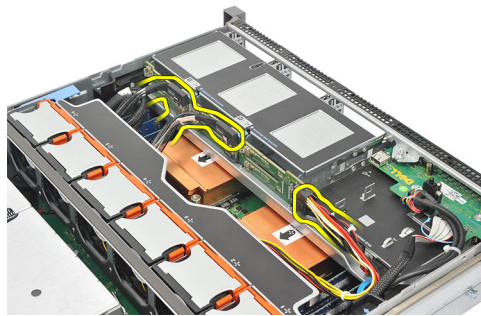
Related tasks

Removing the Power Supply

Control Panel

Topics:

Removing the Control Panel

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

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Remove the cover.
4. Remove the cooling shroud.
5. Remove the optical drive.
6. Remove the hard drive carrier.
7. Remove the hard-drive assembly.
8. Remove the SAS Backplane.
9. Remove the power supply.
10. Locate and remove the torx screw securing the control panel.

11. Remove the control panel cables.
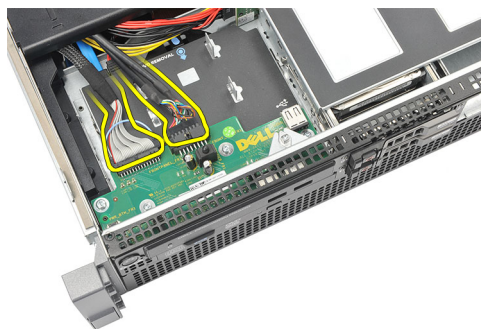
Related tasks

Installing the Control Panel

Installing the Control Panel

1. Attach the control panel cables.
2. Replace the torx screw securing the control panel.
3. Install the power supply.
4. Install the SAS backplane.
5. Install the hard drive assembly.
6. Install the hard-drive carrier.
7. Install the optical drive.
8. Install the cooling shroud.
9. Install the cover.
10. Install the front bezel.
11. Follow the procedures in After Working Inside Your Computer.
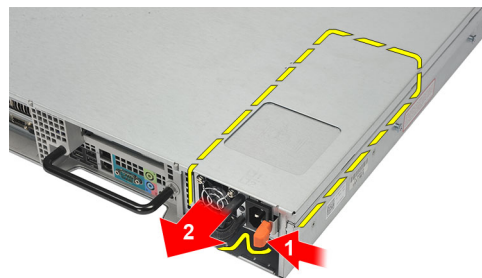
Related tasks

Removing the Control Panel

System Fan

Topics:

- Removing the System Fans
- Installing the System Fans

Removing the System Fans

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Remove the cover.
4. Remove the cooling shroud.
5. Remove the optical drive.
6. Remove the hard drive carrier.
7. Remove the hard-drive assembly.
8. Remove the SAS Backplane.
9. Remove the power supply.
10. Remove the control panel.
11. Press the release tab and lift the fan out of the cooling fan assembly.

12. Repeat step 11 to remove the remaining five cooling fans.
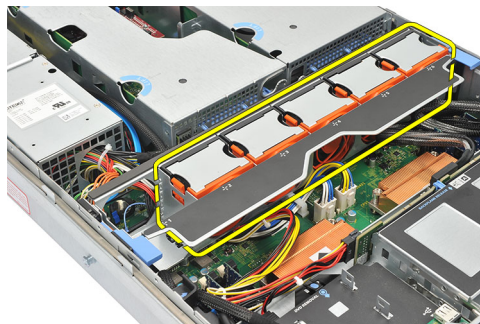
Related tasks

Installing the System Fans

Installing the System Fans

1. Insert the fan in the cooling fan assembly until it clicks into place.

2. Repeat step 1 for the remaining cooling fans.
3. Install the control panel.
4. Install the power supply.
5. Install the SAS backplane.
6. Install the hard drive assembly.
7. Install the hard-drive carrier.
8. Install the optical drive.
9. Install the cooling shroud.
10. Install the cover.
11. Install the front bezel.
12. Follow the procedures in After Working Inside Your Computer.
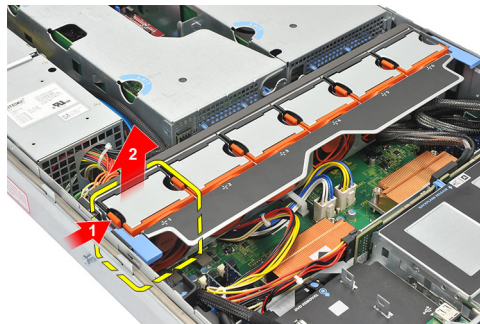
Related tasks

Removing the System Fans

Fan Bracket

Topics:

- Removing the Removable Fan Bracket
- Installing the Removable Fan Bracket

Removing the Removable Fan Bracket

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Remove the cover.
4. Remove the cooling shroud.
5. Remove the optical drive.
6. Remove the hard drive carrier.
7. Remove the hard-drive assembly.
8. Remove the SAS Backplane.
9. Remove the power supply.
10. Remove the control panel.
11. Remove the system fans.
12. Pull both release tabs upwards simultaneously to release the bracket.

13. Gently lift the removable fan-bracket from the computer.
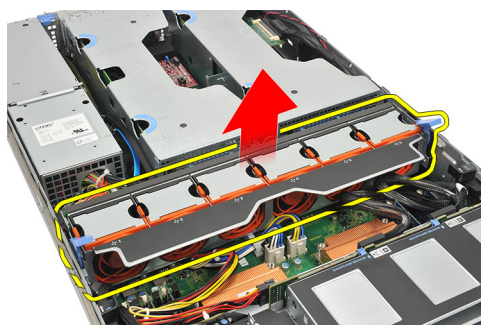
Related tasks

Installing the Removable Fan Bracket

Installing the Removable Fan Bracket

1. Place the fan bracket in the computer.
2. Press both release tabs downwards simultaneously to secure the bracket.
3. Install the system fans.
4. Install the control panel.
5. Install the power supply.
6. Install the SAS backplane.
7. Install the hard drive assembly.
8. Install the hard-drive carrier.
9. Install the optical drive.
10. Install the cooling shroud.
11. Install the cover.
12. Install the front bezel.
13. Follow the procedures in After Working Inside Your Computer.
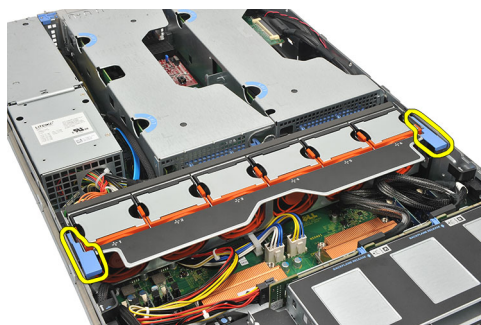
Related tasks

Removing the Removable Fan Bracket

Card Cages

Topics:

Removing the Expansion Card Cages

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Remove the cover.
4. Remove the cooling shroud.
5. Remove the optical drive.
6. Remove the hard drive carrier.
7. Remove the hard-drive assembly.
8. Remove the SAS Backplane.
9. Remove the power supply.
10. Remove the control panel.
11. Remove the system fans.
12. Remove the removable fan bracket.
13. Release the clip securing the power cables.
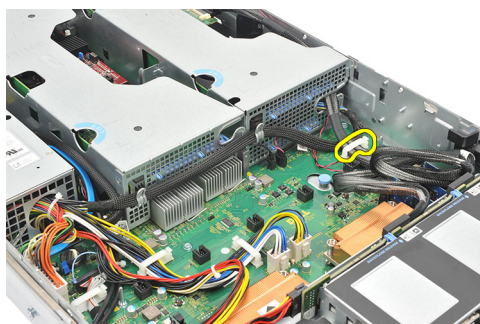
14. Unthread the cables leading to the expansion card cage.
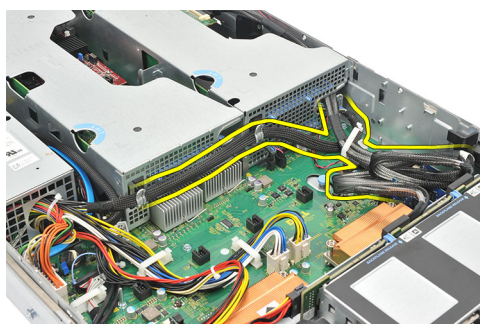
15. Carefully lift the expansion card cage.
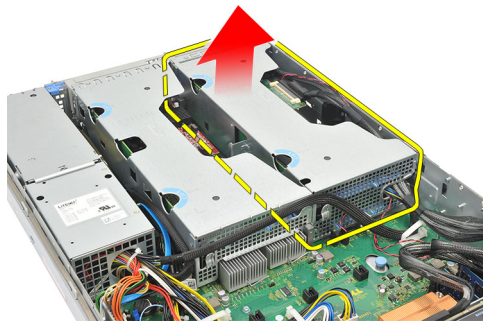
16. Flip the expansion cage over.
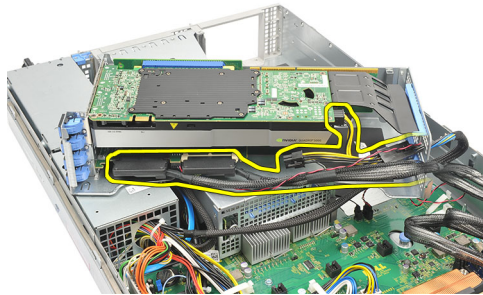
17. Disconnect cables leading to the expansion cards.
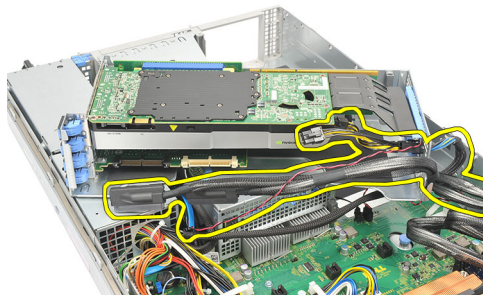
18. Carefully lift the outer expansion card-cage away from the computer.
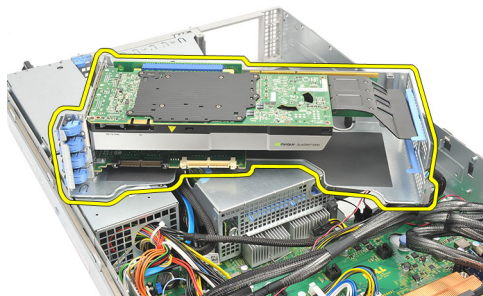
19. Disconnect cables leading to the expansion card cage.
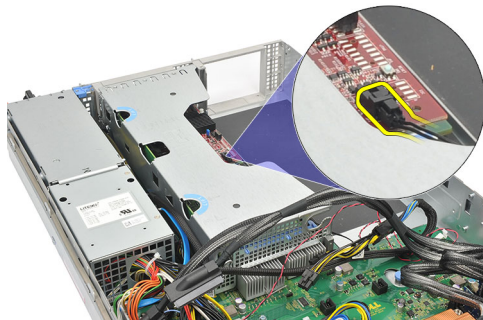
20. Carefully lift the inner expansion card-cage away from the computer.
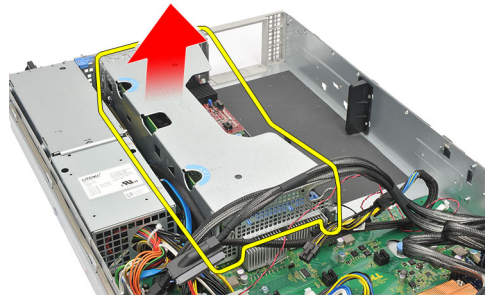
Related tasks

Installing the Expansion Card Cages

Installing the Expansion Card Cages

1. Fix the inner expansion card cage in the computer.
2. Connect the cables leading to the expansion card cage.
3. Fix the outer expansion card cage in the computer.
4. Connect the cables leading to the expansion cards.
5. Flip the expansion cage.
6. Place and fix the expansion card cage.
7. Thread the cables leading to the expansion card cage.
8. Attach the clip securing the power cables.
9. Install the fan bracket.
10. Install the system fans.
11. Install the control panel.
12. Install the power supply.
13. Install the SAS backplane.
14. Install the hard drive assembly.
15. Install the hard-drive carrier.
16. Install the optical drive.
17. Install the cooling shroud.
18. Install the cover.
19. Install the front bezel.
20. Follow the procedures in After Working Inside Your Computer.

Related tasks

Removing the Expansion Card Cages

Power Distribution Unit

Topics:

Removing the Power Distribution Unit

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Remove the cover.
4. Remove the cooling shroud.
5. Remove the optical drive.
6. Remove the hard drive carrier.
7. Remove the hard-drive assembly.
8. Remove the SAS Backplane.
9. Remove the power supply.
10. Remove the control panel.
11. Remove the system fans.
12. Remove the removable fan bracket.
13. Remove the expansion card cages.
14. Release the cable clips leading to the Power Distribution Unit.
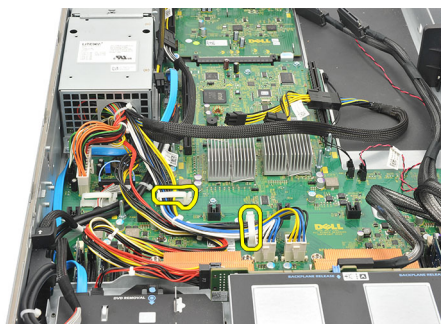
15. Disconnect CPU 1, CPU 2, SAS backplane and optical drive power connector.
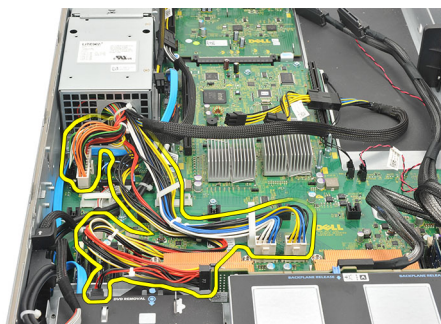
16. Unroute CPU 1, CPU 2, SAS backplane and optical drive power cables.
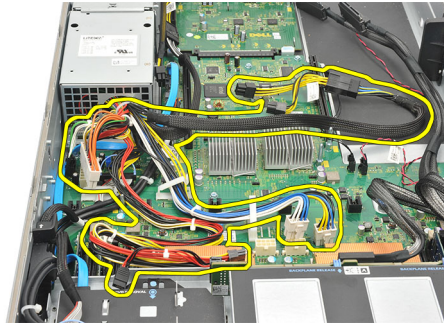
17. Remove the screws securing the Power Distribution Unit.
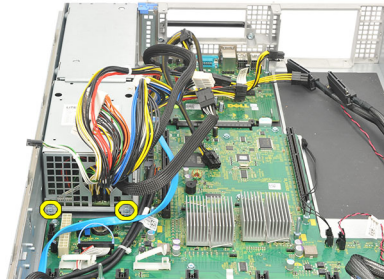
18. Carefully lift the Power Distribution Unit up and away from the computer.
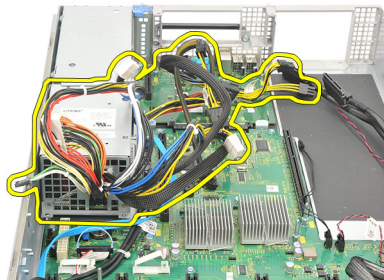
Related tasks

Installing the Power Distribution Unit

Installing the Power Distribution Unit

1. Place the power distribution unit on the computer.
2. Fix the screws securing the power distribution unit.
3. Route and place the CPU 1, CPU 2, SAS Backplane and optical driver power cables.
4. Connect CPU 1, CPU 2, SAS Backplane and optical driver power connectors.
5. Attach the cables leading to the power distribution unit.
6. Install the card cages.
7. Install the fan bracket.
8. Install the system fans.
9. Install the control panel.
10. Install the power supply.
11. Install the SAS backplane.
12. Install the hard drive assembly.
13. Install the hard drive carrier.
14. Install the optical drive.
15. Install the cooling shroud.

16. Install the cover.
17. Install the front bezel.
18. Follow the procedures in After Working Inside Your Computer.

Related tasks

Removing the Power Distribution Unit

Center Riser Board

Topics:

Removing the Center Riser Board

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Remove the cover.
4. Remove the cooling shroud.
5. Remove the optical drive.
6. Remove the hard drive carrier.
7. Remove the hard-drive assembly.
8. Remove the SAS Backplane.
9. Remove the power supply.
10. Remove the control panel.
11. Remove the system fans.
12. Remove the removable fan bracket.
13. Remove the expansion card cages.
14. Remove the power distribution unit.
15. Lift the release tab upwards and gently slide the center riser board towards the right.
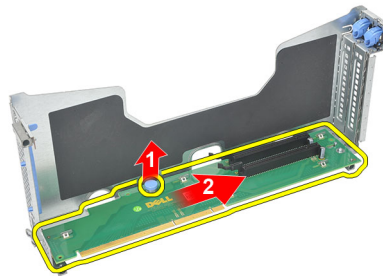
16. Lift the center riser board up and away from the computer.
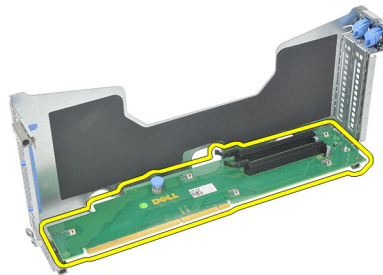
Related tasks

Installing the Center Riser Board

Installing the Center Riser Board

1. Place the center riser board on the computer.
2. Slide the center riser board into place and press the release tab downwards.
3. Install the power distribution unit.
4. Install the card cages.
5. Install the fan bracket.
6. Install the system fans.
7. Install the control panel.
8. Install the power supply.
9. Install the SAS backplane.
10. Install the hard drive assembly.
11. Install the hard-drive carrier.
12. Install the optical drive.
13. Install the cooling shroud.
14. Install the cover.
15. Install the front bezel.
16. Follow the procedures in After Working Inside Your Computer.

Related tasks

Removing the Center Riser Board

CMOS Battery

Topics:

Removing the CMOS Battery

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Remove the cover.
4. Remove the cooling shroud.
5. Remove the optical drive.
6. Remove the hard drive carrier.
7. Remove the hard-drive assembly.
8. Remove the SAS Backplane.
9. Remove the power supply.
10. Remove the control panel.
11. Remove the system fans.
12. Remove the removable fan bracket.
13. Remove the expansion card cages.
14. Remove the power distribution unit.
15. Remove the center riser board.
16. Disconnect cables leading to the power distribution unit.
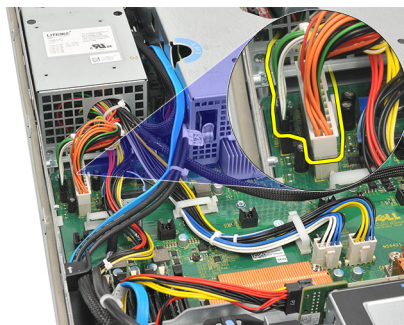
17. Press the coin-cell battery inward to allow the battery to pop up from the socket. (power distribution unit removed for visibility purposes)
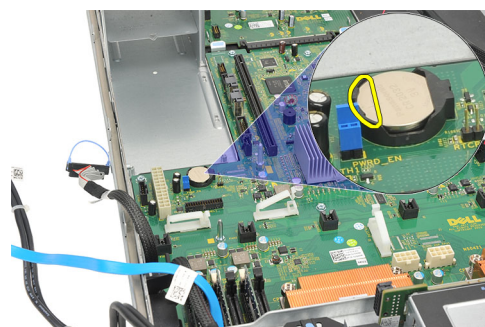
18. Lift the coin-cell battery out of the system and properly dispose of the battery.
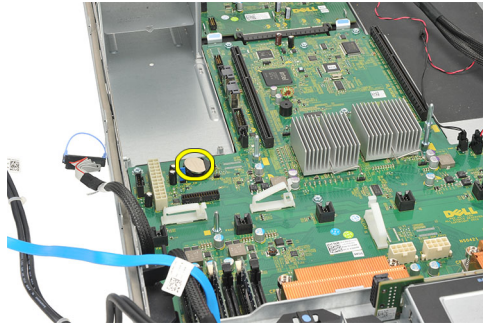
Related tasks

Installing the CMOS Battery

Installing the CMOS Battery

1. Fix the coin-cell battery in the socket of the computer.
2. Connect the cables leading to the power distribution unit.
3. Install the center riser board.
4. Install the power distribution unit.
5. Install the card cages.
6. Install the fan bracket.
7. Install the system fans.
8. Install the control panel.
9. Install the power supply.
10. Install the SAS backplane.
11. Install the hard drive assembly.
12. Install the hard drive carrier.
13. Install the optical drive.
14. Install the cooling shroud.
15. Install the cover.
16. Install the front bezel.
17. Follow the procedures in After Working Inside Your Computer.

Related tasks

Removing the CMOS Battery

Video Card

Topics:

Removing the Video Card

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Remove the cover.
4. Remove the cooling shroud.
5. Remove the optical drive.
6. Remove the hard drive carrier.
7. Remove the hard-drive assembly.
8. Remove the SAS Backplane.
9. Remove the power supply.
10. Remove the control panel.
11. Remove the system fans.
12. Remove the removable fan bracket.
13. Remove the expansion card cages.
14. Remove the power distribution unit.
15. Remove the center riser board.
16. Remove the CMOS battery.
17. Press the release latch to unsecure the video card.
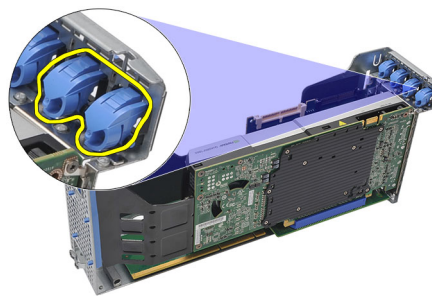
18. Press the release tab in the direction shown by (1) and carefully lift the video card up and away from the computer as shown by direction marked (2).
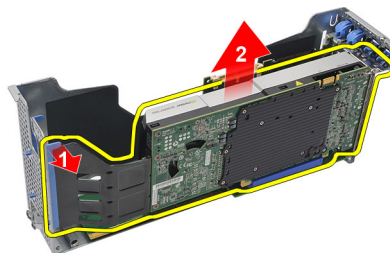
Installing the Video Card

1. Insert the video card in the slot provided until it clicks into place.
2. Press the release latch to secure the video card.
3. Install the CMOS battery.
4. Install the center riser board.
5. Install the power distribution unit.
6. Install the card cages.
7. Install the fan bracket.
8. Install the system fans.
9. Install the control panel.
10. Install the power supply.
11. Install the SAS backplane.
12. Install the hard drive assembly.
13. Install the hard drive carrier.
14. Install the optical drive.
15. Install the cooling shroud.
16. Install the cover.
17. Install the front bezel.
18. Follow the procedures in After Working Inside Your Computer.

SAS Controller Card

Topics:

Removing the SAS Controller Card

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Remove the cover.
4. Remove the cooling shroud.
5. Remove the optical drive.
6. Remove the hard drive carrier.
7. Remove the hard-drive assembly.
8. Remove the SAS Backplane.
9. Remove the power supply.
10. Remove the control panel.
11. Remove the system fans.
12. Remove the removable fan bracket.
13. Remove the expansion card cages.
14. Remove the power distribution unit.
15. Remove the center riser board.
16. Remove the CMOS battery.
17. Remove the video card.
18. Press the release latch to unsecure the SAS Controller Card.
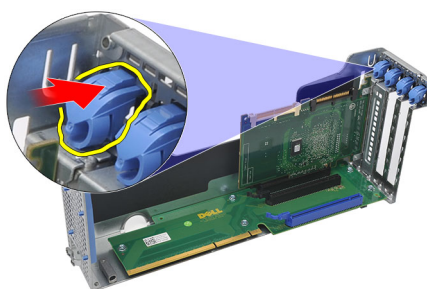
19. Carefully lift the SAS Controller Card up and away from the computer.
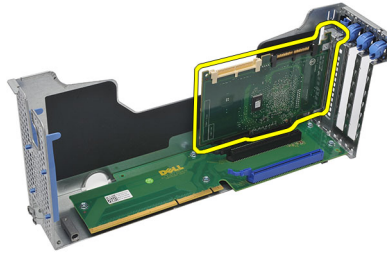
Related tasks

Installing the SAS Controller Card

Installing the SAS Controller Card

1. Place and insert the SAS controller card on the computer.
2. Replace the release latch to secure the SAS controller card.
3. Install the video card.
4. Install the CMOS battery.
5. Install the center riser board.
6. Install the power distribution unit.
7. Install the card cages.
8. Install the fan bracket.
9. Install the system fans.
10. Install the control panel.
11. Install the power supply.
12. Install the SAS backplane.
13. Install the hard drive assembly.
14. Install the hard drive carrier.
15. Install the optical drive.
16. Install the cooling shroud.
17. Install the cover.
18. Install the front bezel.
19. Follow the procedures in After Working Inside Your Computer.
20. To enable RAID, see RAID Configuration.

Related tasks

Removing the SAS Controller Card

RAID Configuration

The Dell Precision R5500 supports RAID configurations 0, 1, 5 and, 10.

ⓘ **NOTE: For more information, see the SAS controller card user guide available on support.dell.com/manuals**

ⓘ **NOTE: Due to the Dell Precision R5500 hard disk drive backplane architecture, only one hard disk drive controller can be used at any one time.**

You must set your computer to RAID-enabled mode before starting any RAID configuration procedures. Use the following steps to configure RAID on your computer:

1. Enter System setup, select **Drives**. Press <Enter>.
2. Select **SATA operation**, press <Enter>.
3. Select **RAID On** and press <Enter>, and then press <Esc>.

4. Select **Save/Exit** and press <Enter>. Exit the system setup and resume the boot process.

Remote Access Host Card

Topics:

Removing the Remote Access Host Card

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Remove the cover.
4. Remove the cooling shroud.
5. Remove the optical drive.
6. Remove the hard drive carrier.
7. Remove the hard-drive assembly.
8. Remove the SAS Backplane.
9. Remove the power supply.
10. Remove the control panel.
11. Remove the system fans.
12. Remove the removable fan bracket.
13. Remove the expansion card cages.
14. Remove the power distribution unit.
15. Remove the center riser board.
16. Remove the CMOS battery.
17. Remove the video card.
18. Remove the SAS controller card.
19. Press the release latch to unsecure the Remote Access Host Card.
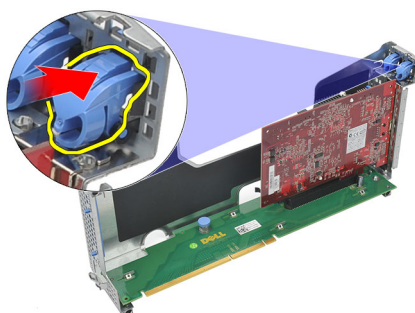
20. Carefully lift the Remote Access Host Card up and away from the computer.
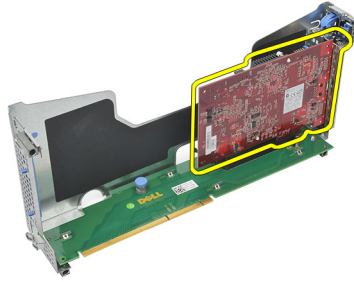
Related tasks

Installing the Remote Access Host Card

Installing the Remote Access Host Card

1. Place and insert the Remote Access Host Card in to the slot provided.
2. Replace the release latch to secure the Remote Access Host Card.
3. Install the SAS controller card.
4. Install the video card.
5. Install the CMOS battery.
6. Install the center riser board.
7. Install the power distribution unit.
8. Install the card cages.
9. Install the fan bracket.
10. Install the system fans.
11. Install the control panel.
12. Install the power supply.
13. Install the SAS backplane.
14. Install the hard drive assembly.
15. Install the hard drive carrier.
16. Install the optical drive.
17. Install the cooling shroud.
18. Install the cover.
19. Install the front bezel.
20. Follow the procedures in After Working Inside Your Computer.

Related tasks

Removing the Remote Access Host Card

Front Chassis Assembly

Topics:

Removing the Front Chassis Assembly

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Remove the cover.
4. Remove the cooling shroud.
5. Remove the optical drive.
6. Remove the hard drive carrier.
7. Remove the hard-drive assembly.
8. Remove the SAS Backplane.
9. Remove the power supply.
10. Remove the control panel.
11. Remove the system fans.
12. Remove the removable fan bracket.
13. Remove the expansion card cages.
14. Remove the power distribution unit.
15. Remove the center riser board.
16. Remove the CMOS battery.
17. Remove the video card.
18. Remove the SAS controller card.
19. Remove the remote access host card.
20. Press down on the two release tabs (marked as 1) and slide the front-chassis assembly towards the front of the computer (marked as 2).
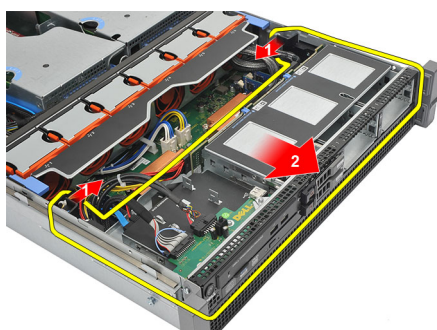
Related tasks

Installing the Front Chassis Assembly

Installing the Front-Chassis Assembly

1. Slide the front-chassis assembly towards the back of the computer until it clicks into place.
2. Install the remote access host card.

3. Install the SAS controller card.
4. Install the video card.
5. Install the CMOS battery.
6. Install the center riser board.
7. Install the power distribution unit.
8. Install the card cages.
9. Install the fan bracket.
10. Install the system fans.
11. Install the control panel.
12. Install the power supply.
13. Install the SAS backplane.
14. Install the hard drive assembly.
15. Install the hard drive carrier.
16. Install the optical drive.
17. Install the cooling shroud.
18. Install the cover.
19. Install the front bezel.
20. Follow the procedures in After Working Inside Your Computer.

Related tasks

Removing the Front-Chassis Assembly

Processor and Heat Sink

Topics:

Removing the Processors and Heat Sink

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Remove the cover.
4. Remove the cooling shroud.
5. Remove the optical drive.
6. Remove the hard drive carrier.
7. Remove the hard-drive assembly.
8. Remove the SAS Backplane.
9. Remove the power supply.
10. Remove the control panel.
11. Remove the system fans.
12. Remove the removable fan bracket.
13. Remove the expansion card cages.
14. Remove the power distribution unit.
15. Remove the center riser board.
16. Remove the CMOS battery.
17. Remove the video card.
18. Remove the SAS controller card.
19. Remove the remote access host card.
20. Remove the front chassis assembly.
21. Loosen the retaining screws on the heat sink.
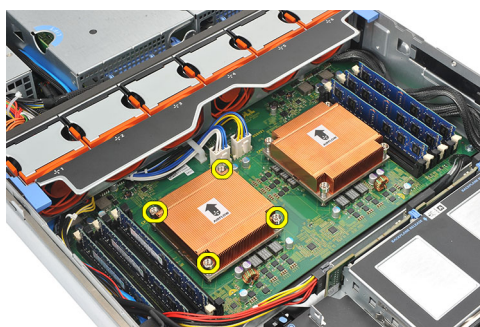
22. Gently lift the heat sink off the processor and remove it from the computer.
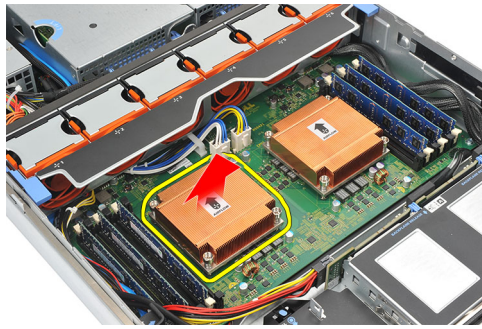
23. Position your thumb firmly over the processor socket-release lever. Release the lever from the locked position by pushing down and pulling out from under the tab.
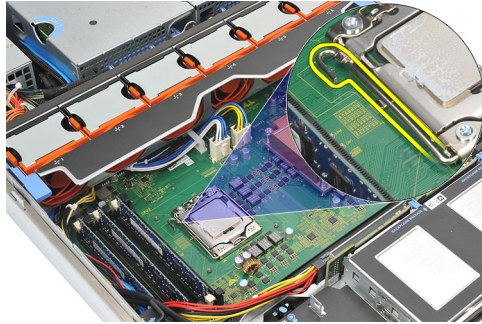
24. Rotate the lever 90 degrees upward until the processor is released from the socket. Rotate the processor shield upward and remove it.
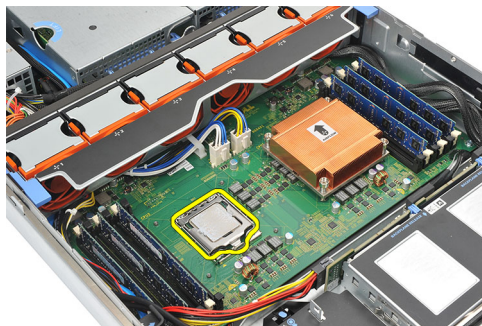
25. Carefully lift the processor out of the socket.
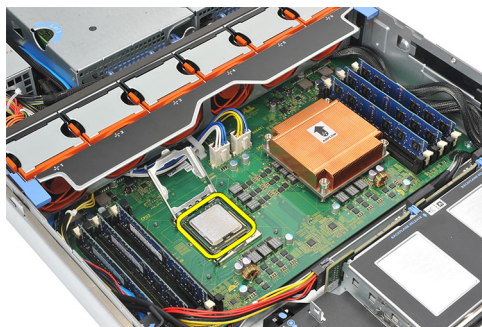
26. Repeat steps 21 to 25 for the second processor (if installed).
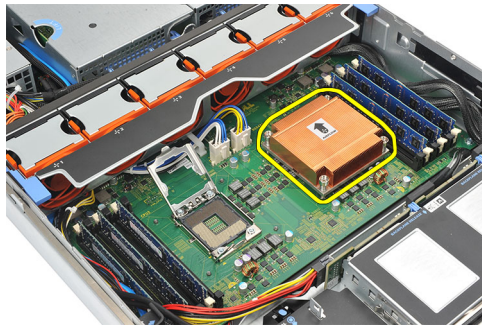
Related tasks

Installing the Processors and Heat Sink

Installing the Processors and Heat Sink

1. Place and insert the processor in the socket.
2. Press the processor shield downwards and cover the socket.
3. Press the processor socket-release lever downwards and fix it under the tab in the locked position.
4. Place the heat sink over the processor on the system board.
5. Tighten and secure the retaining screws on the heat sink.
6. Repeat steps 1 to 5 for the second processor.
7. Install the front chassis assembly.
8. Install the remote access host card.
9. Install the SAS controller card.
10. Install the video card.
11. Install the CMOS battery.
12. Install the center riser board.
13. Install the power distribution unit.
14. Install the card cages.
15. Install the fan bracket.
16. Install the system fans.
17. Install the control panel.
18. Install the power supply.
19. Install the SAS backplane.
20. Install the hard drive assembly.
21. Install the hard drive carrier.
22. Install the optical drive.
23. Install the cooling shroud.
24. Install the cover.
25. Install the front bezel.
26. Follow the procedures in After Working Inside Your Computer.

Related tasks

Removing the Processors and Heat Sink

Memory

**Topics:**

Removing the Memory

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Remove the cover.
4. Remove the cooling shroud.
5. Remove the optical drive.
6. Remove the hard drive carrier.
7. Remove the hard-drive assembly.
8. Remove the SAS Backplane.
9. Remove the power supply.
10. Remove the control panel.
11. Remove the system fans.
12. Remove the removable fan bracket.
13. Remove the expansion card cages.
14. Remove the power distribution unit.
15. Remove the center riser board.
16. Remove the CMOS battery.
17. Remove the video card.
18. Remove the SAS controller card.
19. Remove the remote access host card.
20. Remove the front chassis assembly.
21. Remove the processor and heat sink.
22. Release the memory tabs.
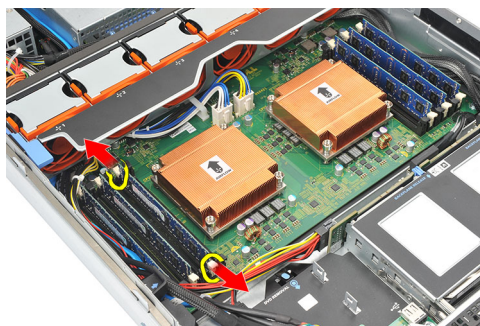
23. Remove the memory module.
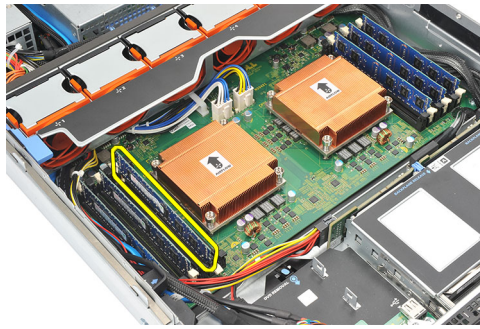
24. Repeat steps 22 and 23 for the other memory modules.
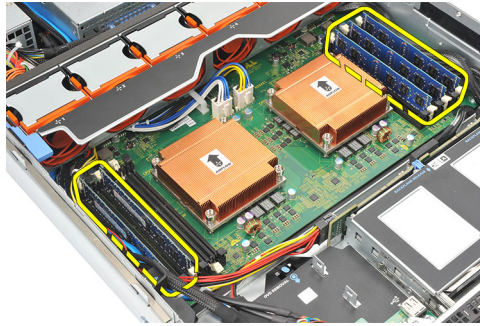
Related tasks

Installing the Memory

Installing the Memory

1. Insert the memory module in the slot.
2. Press back the memory tabs to lock it into place.
3. Repeat steps 1 and 2 for the remaining memory modules.
4. Install the processor and heat sink.
5. Install the front chassis assembly.
6. Install the remote access host card.
7. Install the SAS controller card.
8. Install the video card.
9. Install the CMOS battery.
10. Install the center riser board.
11. Install the power distribution unit.
12. Install the card cages.
13. Install the fan bracket.
14. Install the system fans.
15. Install the control panel.
16. Install the power supply.
17. Install the SAS backplane.
18. Install the hard drive assembly.
19. Install the hard drive carrier.
20. Install the optical drive.
21. Install the cooling shroud.
22. Install the cover.
23. Install the front bezel.
24. Follow the procedures in After Working Inside Your Computer.

Related tasks

Removing the Memory

System Board

Topics:

Removing the System Board

1. Follow the procedures in Before Working Inside Your Computer.
2. Remove the front bezel.
3. Remove the cover.
4. Remove the cooling shroud.
5. Remove the optical drive.
6. Remove the hard drive carrier.
7. Remove the hard-drive assembly.
8. Remove the SAS Backplane.
9. Remove the power supply.
10. Remove the control panel.
11. Remove the system fans.
12. Remove the removable fan bracket.
13. Remove the expansion card cages.
14. Remove the power distribution unit.
15. Remove the center riser board.
16. Remove the CMOS battery.
17. Remove the video card.
18. Remove the SAS controller card.
19. Remove the remote access host card.
20. Remove the front chassis assembly.
21. Remove the processors and heat sink.
22. Remove the memory.
23. Disconnect all cables leading to the system board.
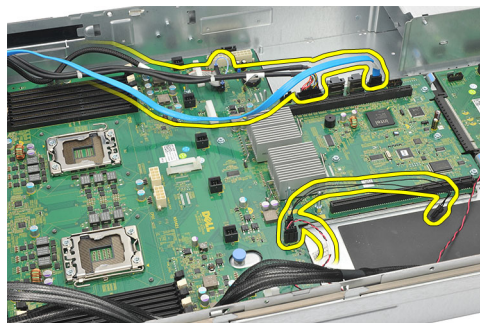
24. Lift the blue release tab and gently slide the system board towards the left.
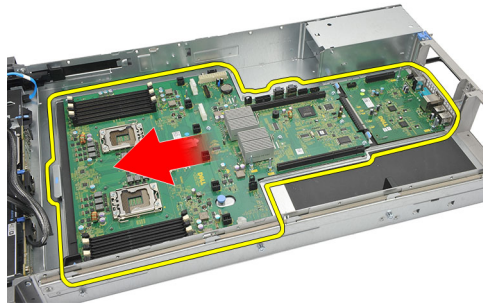
25. Carefully lift the system board up and away from the chassis.
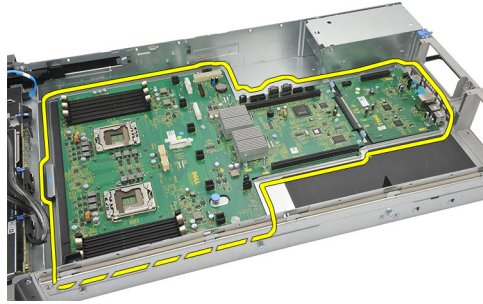
Related tasks

Installing the System Board

Installing the System Board

1. Place the system board on the chassis.
2. Gently slide the system board towards the back of the computer. Press the blue release tab.
3. Connect all cables to the system board.
4. Install the memory.
5. Install the processor and heat sink.
6. Install the front chassis assembly.
7. Install the remote access host card.
8. Install the SAS controller card.
9. Install the video card.
10. Install the CMOS battery.
11. Install the center riser board.
12. Install the power distribution unit.
13. Install the card cages.
14. Install the fan bracket.
15. Install the system fans.
16. Install the control panel.
17. Install the power supply.
18. Install the SAS backplane.
19. Install the hard drive assembly.
20. Install the hard drive carrier.
21. Install the optical drive.
22. Install the cooling shroud.
23. Install the cover.
24. Install the front bezel.
25. Follow the procedures in After Working Inside Your Computer.

Related tasks

Removing the System Board

System Setup

Topics:

- Boot Menu
- Timing Key Sequences
- Dell Diagnostics
- System Setup Options

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> or <Ctrl><Alt><F8>	Enter Boot Menu	One-time boot and diagnostics utility menu.
<F3>	Network Boot	Bypass the BIOS boot sequence and boot directly to the network.

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 "F2=Setup" prompt appears in the top right-hand corner of the screen during boot.

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.

(i) **NOTE: The utility partition is not protected from debug routines or the FDISK utility.**

System Setup Options

(i) **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** and **DIMM 12 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
	- #2300 ID00 LUN0 FUJITSU MBE2147RC
	- #2300 ID01 LUN0 FUJITSU MBE2147RC
	- CD/DVD/CD-RW Drive
	- Onboard or USB CD-ROM Drive
	- USB Device

Drives

Diskette Drive	Determines how the BIOS configures floppy drives

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)
SMART Reporting	Controls if hard drive errors for integrated drives are reported during start up.
	Enable Smart Reporting — Disabled by default
Drives	These fields let you enable or disable various drives in the computer:
	• SATA-0
	• SATA-1
	• SATA-2
	• SATA-3
	• SATA-4
	• SATA-5

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
Spread Spectrum Clocking	Enables or disables spread spectrum clocking.
	• Disable
	• Enable (default)
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.
	• Option 1
	• Option 2

Performance

Multi Core Support	Specifies whether the computer will have one or all cores enabled.

Performance

	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

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: 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.

Security

	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
	(i) **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.**
Low Power 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.

Maintenance

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
Keyboard Errors	Specifies if keyboard related errors are reported when the system boots
	Enable Keyboard Error Detection
FX100 BIOS Access	If enabled, allows a remote user to access BIOS Setup via FX100 Portal.
	Enable FX100 BIOS Access — Enabled by default

System Logs

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

Troubleshooting

Topics:

Diagnostic LEDs

(i) **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.

(i) **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**		
(1)(2)(3)(4)	⏻	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 device, such as a lamp. • Ensure that the main power cable and front panel cable are securely connected to the system board.

Light Pattern		Problem Description	Troubleshooting Steps
Diagnostic LEDs	**Power Button LED**		
①②**③**④	⏻	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.
①②**③**④	⏻	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 problem is with the power supply.
①②**③④**	⏻	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.
①**②③**④	⏻	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.
①**②③④**	⏻	BIOS may be corrupt or missing.	The computer hardware is operating normally but the BIOS may be corrupt or missing.
①②③④	⏻	A possible system board failure has occurred.	Remove all peripheral cards from the PCI and PCI-E slots and re-start the computer. If the computer boots, add the peripheral cards back one by one until you find the bad one.
①②③**④**	⏻	Power connector not installed properly.	Re-seat the 2x2 power connector from the power supply unit.
①**②**③④	⏻	Possible peripheral card or system board failure has occurred.	Remove all peripheral cards from the PCI and PCI-E slots and re-start the computer. If the computer boots, add the peripheral cards back one by one until you find the bad one.
①②③④	⏻	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.

Light Pattern		Problem Description	Troubleshooting Steps
Diagnostic LEDs	**Power Button LED**		
			• If the problem persists, the system board is faulty.
①②③④ (1,2,3 orange)	(amber)	A possible coin cell battery failure has occurred.	Remove the coin cell battery for one minute, reinstall the battery, and restart.
①②③④ (none lit)	(blue)	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.
①②③④ (3 orange)	(blue)	A possible processor failure has occurred.	Re-seat the processor.
①②③④ (3,4 orange)	(blue)	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 identified a faulty module or reinstalled all modules without error. • If available, install working memory of the same type into your computer.
①②③④ (2,4 orange)	(blue)	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.
①②③④ (2,3 orange)	(blue)	A possible floppy drive or hard drive failure has occurred.	Re-seat all power and data cables.
①②③④ (2,3,4 orange)	(blue)	A possible USB failure has occurred	Re-install all USB devices and check all cable connections.
①②③④ (1 orange)	(blue)	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.
①②③④ (1,3 orange)	(blue)	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.

Light Pattern		Problem Description	Troubleshooting Steps
Diagnostic LEDs	**Power Button LED**		
① ② ③ ④	⏻	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.
① ② ③ ④	⏻	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.
① ② ③ ④	⏻	Some other failure has occurred.	• Ensure that the display/monitor is plugged into a 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.

Beep Codes

The computer can emit a series of beeps during start-up if the display cannot show errors or problems. These series of beeps, called beep codes, identify various problems. The delay between each beep is 300 ms, the delay between each set of beeps is 3 sec, and the beep sound lasts 300 ms. After each beep and each set of beeps, the BIOS should detect if the user presses the power button. If so, BIOS will jump out from looping and execute the normal shutdown process and power system.

Code	1-1-2
Cause	Microprocessor register failure

Code	1-1-3
Cause	NVRAM

Code	1-1-4
Cause	ROM BIOS checksum failure

Code	1-2-1
Cause	Programmable interval timer

Code	1-2-2
Cause	DMA initialization failure

Code	1-2-3
Cause	DMA page register read/write failure
Code	1-3-1 through 2-4-4
Cause	DIMMs not being properly identified or used
Code	3-1-1
Cause	Slave DMA register failure
Code	3-1-2
Cause	Master DMA register failure
Code	3-1-3
Cause	Master interrupt mask register failure
Code	3-1-4
Cause	Slave interrupt mask register failure
Code	3-2-2
Cause	Interrupt vector loading failure
Code	3-2-4
Cause	Keyboard Controller Test failure
Code	3-3-1
Cause	NVRAM power loss
Code	3-3-2
Cause	NVRAM configuration
Code	3-3-4
Cause	Video Memory Test failure
Code	3-4-1
Cause	Screen initialization failure
Code	3-4-2
Cause	Screen retrace failure
Code	3-4-3
Cause	Search for video ROM failure
Code	4–2–1
Cause	No time tick
Code	4–2–2
Cause	Shutdown failure
Code	4–2–3
Cause	Gate A20 failure
Code	4–2–4
Cause	Unexpected interrupt in protected mode

Code	4–3–1
Cause	Memory failure above address 0FFFFh

Code	4–3–3
Cause	Timer-chip counter 2 failure

Code	4–3–4
Cause	Time-of-day clock stopped

Code	4–4–1
Cause	Serial or parallel port test failure

Code	4–4–2
Cause	Failure to decompress code to shadowed memory

Code	4–4–3
Cause	Math coprocessor test failure

Code	4–4–4
Cause	Cache test failure

Error Messages

Address mark not found

Description	The BIOS found a faulty disk sector or could not find a particular disk sector.

Alert! Previous attempts at booting this system have failed at checkpoint [nnnn]. For help in resolving this problem, please note this checkpoint and contact Dell Technical Support.

Description	The computer failed to complete the boot routine three consecutive times for the same error. Contact Dell and report the checkpoint code (nnnn) to the support technician

Alert! Security override Jumper is installed.

Description	The MFG_MODE jumper has been set and AMT Management features are disabled until it is removed.

Attachment failed to respond

Description	The floppy or hard drive controller cannot send data to the associated drive.

Bad command or file name

Description	Ensure that you have spelled the command correctly, put spaces in the proper place, and used the correct pathname.

Bad error-correction code (ECC) on disk read

Description   The floppy or hard drive controller detected an uncorrectable read error.

Controller has failed

Description   The hard drive or the associated controller is defective.

Data error

Description   The floppy or hard drive cannot read the data. For the Windows operating system, run the chkdsk utility to check the file structure of the floppy or hard drive. For any other operating system, run the appropriate corresponding utility.

Decreasing available memory

Description   One or more memory modules may be faulty or improperly seated. Re-install the memory modules and, if necessary, replace them.

Diskette drive 0 seek failure

Description   A cable may be loose or the computer configuration information may not match the hardware configuration.

Diskette read failure

Description   The floppy disk may be defective or a cable may be loose. If the drive access light turns on, try a different disk.

Diskette subsystem reset failed

Description   The floppy drive controller may be faulty.

Gate A20 failure

Description   One or more memory modules may be faulty or improperly seated. Reinstall the memory modules and, if necessary, replace them.

General failure

Description   The operating system is unable to carry out the command. This message is usually followed by specific information —for example, **Printer out of paper**. Take the appropriate action to resolve the problem.

Hard-disk drive configuration error

Description   The hard drive failed initialization.

Hard-disk drive controller failure

Description The hard drive failed initialization.

Hard-disk drive failure

Description The hard drive failed initialization.

Hard-disk drive read failure

Description The hard drive failed initialization.

Invalid configuration information-please run SETUP program

Description The computer configuration information does not match the hardware configuration.

Invalid Memory configuration, please populate DIMM1

Description DIMM1 slot does not recognize a memory module. The module should be re-seated or installed.

Keyboard failure

Description A cable or connector may be loose, or the keyboard or keyboard/mouse controller may be faulty.

Memory address line failure at address, read value expecting value

Description A memory module may be faulty or improperly seated. Reinstall the memory modules and, if necessary, replace them.

Memory allocation error

Description The software you are attempting to run is conflicting with the operating system, another program, or a utility.

Memory data line failure at address, read value expecting value

Description A memory module may be faulty or improperly seated. Reinstall the memory modules and, if necessary, replace them.

Memory double word logic failure at address, read value expecting value

Description   A memory module may be faulty or improperly seated. Reinstall the memory modules and, if necessary, replace them.

Memory odd/even logic failure at address, read value expecting value

Description   A memory module may be faulty or improperly seated. Reinstall the memory modules and, if necessary, replace them

Memory write/read failure at address, read value expecting value

Description   A memory module may be faulty or improperly seated. Reinstall the memory modules and, if necessary, replace them.

Memory size in CMOS invalid

Description   The amount of memory recorded in the computer configuration information does not match the memory installed in the computer.

Memory tests terminated by keystroke

Description   A keystroke interrupted the memory test.

No boot device available

Description   The computer cannot find the floppy disk or hard drive.

No boot sector on hard-disk drive

Description   The computer configuration information in System Setup may be incorrect.

No timer tick interrupt

Description   A chip on the system board might be malfunctioning.

Non-system disk or disk error

Description   The floppy disk in drive A does not have a bootable operating system installed on it. Either replace the floppy disk with one that has a bootable operating system, or remove the floppy disk from drive A and restart the computer.

Not a boot diskette

Description   The operating system is trying to boot to a floppy disk that does not have a bootable operating system installed on it. Insert a bootable floppy disk.

Plug and play configuration error

Description   The computer encountered a problem while trying to configure one or more cards.

Read fault

Description   The operating system cannot read from the floppy or hard drive, the computer could not find a particular sector on the disk, or the requested sector is defective.

Requested sector not found

Description   The operating system cannot read from the floppy or hard drive, the computer could not find a particular sector on the disk, or the requested sector is defective.

Reset failed

Description   The disk re-set operation failed.

Sector not found

Description   The operating system cannot locate a sector on the floppy or hard drive.

Seek error

Description   The operating system cannot find a specific track on the floppy disk or hard drive.

Shutdown failure

Description   A chip on the system board might be malfunctioning.

Time-of-day clock stopped

Description   The battery might be dead.

Time-of-day not set-please run the System Setup program

Description   The time or date stored in System Setup does not match the computer clock.

Timer chip counter 2 failed

Description   A chip on the system board may be malfunctioning.

Unexpected interrupt in protected mode

Description   The keyboard controller may be malfunctioning or a memory module may be loose.

WARNING: Dell's Disk Monitoring System has detected that drive [0/1] on the [primary/secondary] EIDE controller is operating outside of normal specifications. It is advisable to immediately back up your data and replace your hard drive by calling your support desk or Dell.

Description   During initial startup, the drive detected possible error conditions. When your computer finishes booting, immediately back up your data and replace your hard drive (for installation procedures, see "Adding and Removing Parts" for your computer type). If no replacement drive is immediately available and the drive is not the only bootable drive, enter System Setup and change the appropriate drive setting to **None**. Then remove the drive from the computer.

Write fault

Description   The operating system cannot write to the floppy or hard drive.

Write fault on selected drive

Description   The operating system cannot write to the floppy or hard drive.

X:\ is not accessible. The device is not ready

Description   The floppy drive cannot read the disk. Insert a floppy disk into the drive and try again.

Specifications

Topics:

Specifications

(i) **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.**

Processor

Type		Intel Xeon 5600 series CPUs
Cache		
	Instruction Cache	32 kB
	Data Cache	32 kB
		256 kB Mid-Level Cache per core
		12 MB Last-Level Cache shared among all cores

System Information

Chipset	Intel 5520 chipset
BIOS chip (NVRAM)	16 Mb SPI

Memory

Type	DDR3, ECC only
Speed	1066 Mhz and 1333 MHz
Connectors	twelve DIMM slots
Capacity	1 GB, 2 GB, 4 GB, 8 GB, and 16 GB
Minimum memory	1 GB
Maximum memory	192 GB

Video

Discrete	Up to two PCI Express x16 graphics cards full-height, full-length. Maximum of 450 W

Audio

Integrated	Analog Devices ADI1984A

Network

Integrated	two Broadcom BCM5761 Gigabit Ethernet controllers with support for teaming.

Expansion Bus

Bus type:	PCI Express 2.0
	PCI 2.3
	SATA 1.0 and 2.0
	USB 2.0
Bus speed:	PCI: 133 MB/s
	PCI Express:
	• x4-slot bidirectional speed - 2 GB/s • x8-slots bidirectional speed - 4 GB/s • x16-slots bidirectional speed - 8 GB/s
	SATA: 1.5 Gbps and 3.0 Gbps
	USB: 480 Mbps high speed, 12 Mbps full speed, 1.2 Mbps low speed

Card Slots

Outer Riser:	
Slot 1	PCI Express x8/x16 electrical/mechanical, full-height, full-length
Slot 2	PCI Express x16 electrical and mechanical, full-height, full-length
Slot 3	N/A
Slot 4	PCI Express x16 electrical and mechanical, full-height, full-length
Center Riser Option 1:	
Slot 5	PCI 32b, 5V, full-height, full-length
Slot 6	PCI Express x16 electrical and mechanical, full-height, full-length
Center Riser Option 2:	
Slot 5	PCI Express x8/x16 electrical/mechanical, full-height, full-length
Slot 6	PCI Express x16 electrical and mechanical, full-height, full-length
Rear IO:	
Slot 7	PCI Express x4/x8 electrical/mechanical, half-height, half-length

Drives

Externally accessible:	
slimline SATA optical bays	one
2.5 inch drive bays	five SATA drives with onboard Intel controller or six SAS drives with SAS/PERC 6iR cards
Internally accessible	none

External connectors

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

Internal connectors

SATA	two 36-pin Mini-SAS connectors; one seven-pin SATA connector
Risers	two 280-pin connectors
Front USB	one 14-pin connector
Add-in HBA HDD LED	one four-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
Host card remote power control	one two-pin connector
CPU/Memory power	two eight-pin connectors
Memory	twelve 240-pin connectors (DDR3)

Rear IO:

PCI Express	one 98-pin connector (x8)
Serial	one 14-pin connector

Risers:

Outer Riser

PCI Express	three 164-pin connectors (x16)

Center Riser Option 1:

PCI	one 120-pin connector (32 bit)
PCI Express	one 164-pin connectors (x16)

Center Riser Option 2

PCI Express	two 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

Controls and Lights

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.

Controls and Lights

Network link integrity lights (rear):	off (no light) — The computer is not detecting a physical connection to the network.
	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.

Power

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 on 100 VAC to 120 VAC, 1100 W on 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.**

Physical

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	23.91 kg (52.6 lb)
	without front bezel	23.52 kg (51.7 lb)

Environmental

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

Environmental

Storage	105 G +/- 5% with pulse duration of 2 msec +/- 10% (equivalent to 50 in/sec [127 cm/sec])
Altitude:	
Operating	−15.2 m to 3048 m (−50 ft to 10,000 ft)
Storage	−15.2 m to 10,668 m (−50 ft to 35,000 ft)
Airborne contaminant level	G1 or lower as defined by ISA-S71.04–1985

27

Contacting Dell

Topics:

- Contacting Dell

Contacting Dell

ⓘ **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 **support.dell.com**.
2. Select your support category.
3. If you are not a U.S. customer, select your country code at the bottom of the page, or select **All** to see more choices.
4. Select the appropriate service or support link based on your need.