

# ALIENWARE® AREA-51 SERVICE MANUAL

## 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.

The contents herein are subject to change without notice.

© 2009 Dell Inc. All rights reserved.

**Reproduction of these materials in any manner whatsoever without the prior written permission of Dell Inc. is strictly prohibited.**

Trademarks used in this manual: *Alienware* is a registered trademark of Alienware Corporation. *Dell* is a trademark of Dell Inc.; *Intel* and *SpeedStep* are registered trademarks of Intel Corporation in the U.S. and other countries; *Microsoft*, *Windows*, *Windows Vista*, and *Windows Vista* start button logo are either trademarks or registered trademarks of Microsoft Corporation in the United States and/or other countries; *Bluetooth* is a registered trademark owned by Bluetooth SIG, Inc. and is used by Dell under license.

Other trademarks and trade names may be used in this manual to refer to either the entities claiming the marks and names or their products. Dell Inc. disclaims any proprietary interest in trademarks and trade names other than its own.

CONTENTS

- CHAPTER 1: BEFORE YOU BEGIN** ..... 6
  - Recommended Tools ..... 7
  - Turning Off Your Computer ..... 7
  - Before Working Inside Your Computer ..... 8
- CHAPTER 2: TECHNICAL OVERVIEW** ..... 9
  - System Board Components ..... 11
  - Master I/O Board Components ..... 12
- CHAPTER 3: CHASSIS** ..... 13
  - Removing the Left Side-Panel ..... 15
  - Replacing the Left Side-Panel ..... 15
  - Removing the Right Side-Panel ..... 16
  - Replacing the Right Side-Panel ..... 16
  - Removing the Left Bottom-Panel ..... 17
  - Replacing the Left Bottom-Panel ..... 17
  - Removing the Right Bottom-Panel ..... 18
  - Replacing the Right Bottom-Panel ..... 18
  - Removing the Chassis-Intrusion Switch ..... 19
  - Replacing the Chassis-Intrusion Switch ..... 19

- CHAPTER 4: SHROUDS** ..... 20
  - Removing the PCI Shroud ..... 22
  - Replacing the PCI Shroud ..... 22
  - Removing the Drive-Bay Shroud ..... 23
  - Replacing the Drive-Bay Shroud ..... 23
- CHAPTER 5: MEMORY MODULE(S)** ..... 24
  - Removing Memory Module(s) ..... 26
  - Replacing Memory Module(s) ..... 27
- CHAPTER 6: PCI AND PCI-EXPRESS CARDS** ..... 29
  - Removing PCI and PCI-Express Cards ..... 31
  - Replacing PCI and PCI-Express Cards ..... 32
- CHAPTER 7: DRIVES** ..... 33
  - Removing Optical Drive(s) ..... 35
  - Replacing Optical Drive(s) ..... 37
  - Removing the Media Card Reader ..... 38
  - Replacing the Media Card Reader ..... 40
  - Removing Hard Drive(s) ..... 41
  - Replacing Hard Drive(s) ..... 43

**CHAPTER 8: FRONT BEZEL** ..... 44  
 Removing the Front Bezel ..... 46  
 Replacing the Front Bezel ..... 46

**CHAPTER 9: FANS** ..... 47  
 Removing the PCI Fan ..... 49  
 Replacing the PCI Fan ..... 50  
 Removing the Hard-Drive Fan(s) ..... 51  
 Replacing the Hard-Drive Fan(s) ..... 52

**CHAPTER 10: ACTIVE-VENTING ASSEMBLY** ..... 53  
 Removing the Active-Venting Assembly ..... 55  
 Replacing the Active-Venting Assembly ..... 56

**CHAPTER 11: TOP I/O PANEL** ..... 57  
 Removing the Top I/O Panel ..... 59  
 Replacing the Top I/O Panel ..... 61

**CHAPTER 12: BLUETOOTH MODULE** ..... 62  
 Removing the Bluetooth Module ..... 64  
 Replacing the Bluetooth Module ..... 65

**CHAPTER 13: LIQUID-COOLING ASSEMBLY** ..... 66  
 Removing the Liquid-Cooling Assembly ..... 68  
 Replacing the Liquid-Cooling Assembly ..... 69

**CHAPTER 14: PROCESSOR** ..... 70  
 Removing the Processor ..... 72  
 Replacing the Processor ..... 73

**CHAPTER 15: MASTER I/O BOARD** ..... 75  
 Removing the Master I/O Board ..... 77  
 Replacing the Master I/O Board ..... 78

**CHAPTER 16: SYSTEM BOARD** ..... 79  
 Removing the System Board ..... 81  
 Replacing the System Board ..... 82

**CHAPTER 17: POWER SUPPLY** ..... 83  
 Removing the Power Supply ..... 85  
 Replacing the Power Supply ..... 86

- CHAPTER 18: BATTERY ..... 87**
  - Removing the Coin-Cell Battery ..... 89
  - Replacing the Coin-Cell Battery ..... 90
  - Removing the Theater-Lighting Batteries ..... 91
  - Replacing the Theater-Lighting Batteries ..... 92
  
- CHAPTER 19: SYSTEM SETUP ..... 93**
  - Overview ..... 95
  - Entering System Setup ..... 95
  - System Setup Options ..... 96
  - Clearing CMOS Settings ..... 102
  - Flashing the BIOS ..... 103



## CHAPTER 1: BEFORE YOU BEGIN

This manual provides procedures for removing and installing the components in your computer. Unless otherwise noted, each procedure assumes that the following conditions exist:

- You have performed the steps in “Turning Off Your Computer” on page 7 and “Before Working Inside Your Computer” on page 8.
- 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.

## Recommended Tools



The procedures in this document may require the following tools:

- Small flat-blade screwdriver
- Phillips screwdriver

## 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. Save and close all open files and exit all open programs.
2. Shut down the operating system; click **Start** , click the arrow , and then click **Shut Down**.  
The computer turns off after the operating system shutdown process finishes.
3. Ensure that the computer is turned off. If your computer did not automatically turn off when you shut down the operating system, press and hold the power button until the computer turns off.

## Before Working Inside Your Computer

Use the following safety guidelines to help protect your computer from potential damage and to help to ensure your own personal safety.



**WARNING:** Before you begin any of the procedures in this section, follow the safety instructions that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at [www.dell.com/regulatory\\_compliance](http://www.dell.com/regulatory_compliance).



**CAUTION:** Only a certified service technician should perform repairs on your computer. Damage due to servicing that is not authorized by Dell™ is not covered by your warranty.



**CAUTION:** Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges. 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.



**CAUTION:** To avoid damaging the computer, perform the following steps before you begin working inside the computer.

1. Ensure that the work surface is flat and clean.
2. Ensure that sufficient space exists to support the computer with the side panel(s) opened.
3. Turn off your computer (see “Turning Off Your Computer” on page 7) and all attached devices.



**CAUTION:** To disconnect a network cable, first unplug the cable from your computer and then unplug the cable from the network device.

4. Disconnect all telephone or network cables from the computer.
5. Disconnect your computer and all attached devices from their electrical outlets.
6. Disconnect all attached devices from your computer.
7. Press the power button to ground the system board.



**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.



ገጽ ፩ ፡ ስለ-ቴክኒካዊ ድጋፍ

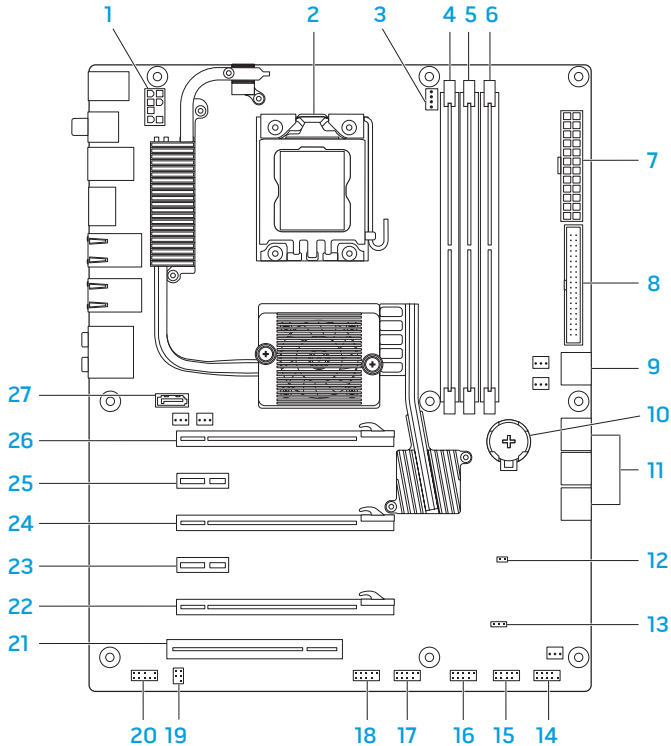
# CHAPTER 2: TECHNICAL OVERVIEW

# Technical Overview



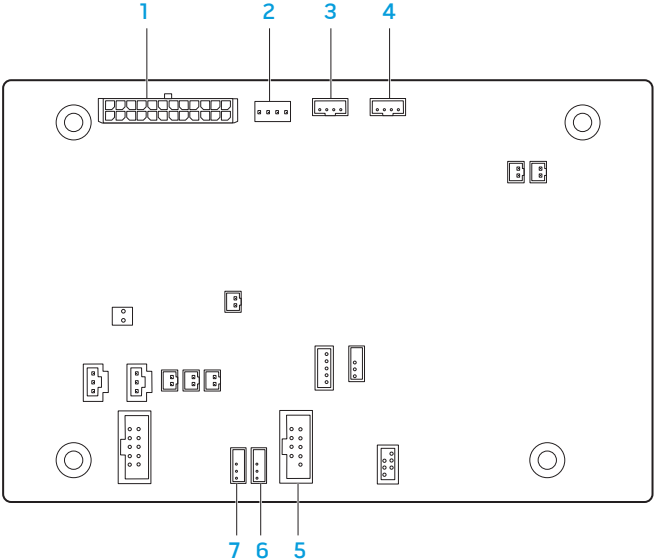
WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at [www.dell.com/regulatory\\_compliance](http://www.dell.com/regulatory_compliance).

# System Board Components



- 1 12 V power connector (PWR1)
- 2 CPU socket
- 3 CPU-fan connector (CPUFAN1)
- 4 memory-module connector (DIMM1)
- 5 memory-module connector (DIMM2)
- 6 memory-module connector (DIMM3)
- 7 main power connector (PWR2)
- 8 IDE connector (IDE1)
- 9 SATA connectors (SATA 7 and SATA 8) for optical drives
- 10 battery socket (BAT1)
- 11 SATA connectors (SATA 1-SATA 6) for hard drives
- 12 password reset jumper (PASSWORD)
- 13 CMOS reset jumper (CLEAR\_CMOS)
- 14 front-panel connector (FP1)
- 15 internal USB header (USB1)
- 16 internal USB header (USB2)
- 17 internal USB header (USB3)
- 18 IEEE 1394 header (1394\_1)
- 19 S/PDIF header (SPDIF\_IN)
- 20 front-panel audio connector (FP\_AUDIO)
- 21 PCI card slot (PCI1)
- 22 PCI-Express x16 card slot (PCI\_E5)
- 23 PCI-Express x1 card slot (PCI\_E4)
- 24 PCI-Express x16 card slot (PCI\_E3)
- 25 PCI-Express x1 card slot (PCI\_E2)
- 26 PCI-Express x16 card slot (PCI\_E1)
- 27 internal eSATA header (SATA9)

# Master I/O Board Components



- 1 fan connector (FANCONN1)
- 2 PCI-fan connector (PCI\_FAN1)
- 3 hard-drive fan connector (HDD\_FAN2)
- 4 hard-drive fan connector (HDD\_FAN1)
- 5 system-board USB header (MB\_USB1)
- 6 bluetooth-module connector (BLUETOOTH)
- 7 wireless-module connector (WIRELESS)

ሥራዊት ስርዓት

# CHAPTER 3: CHASSIS

## Chassis



**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](http://www.dell.com/regulatory_compliance).



**WARNING:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the side panel(s).



**WARNING:** Do not operate your equipment with any cover(s) (including side panels, bezels, filler brackets, front-panel inserts, etc.) removed.



**CAUTION:** Only a certified service technician should perform repairs on your computer. Damage due to servicing that is not authorized by Dell™ is not covered by your warranty.



**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:** Ensure that sufficient space exists to support the computer with the side panel(s) opened.

## Removing the Left Side-Panel

1. Follow the instructions in “Before You Begin” on page 6.



**NOTE:** Ensure that any attached security cable is removed before attempting to lift the release panel.

2. Lift the release panel and open the left side-panel as far as possible.

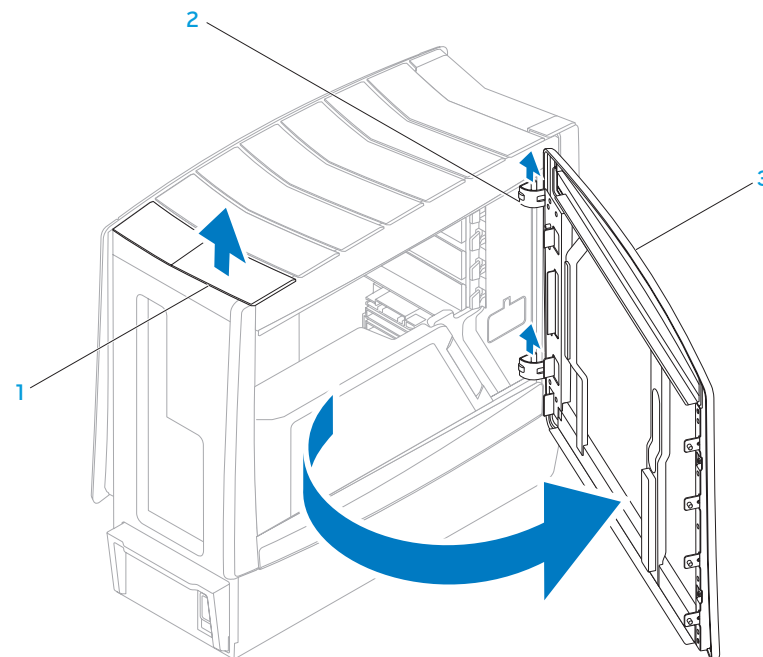


**NOTE:** Theater lighting turns on automatically when the side panel is opened.

3. To remove the left side-panel completely from the chassis, lift the left side-panel and rotate it away from the chassis to release it from the hinges.

## Replacing the Left Side-Panel

1. Follow the instructions in “Before You Begin” on page 6.
2. If the left side-panel was removed completely from the chassis, align it with the hinges and replace it in the chassis.
3. Push the left side-panel against the side of the computer until it locks into place.
4. Connect your computer and devices to electrical outlets, and then turn them on.



1 release panel  
2 hinges (2)

3 left side-panel

## Removing the Right Side-Panel

1. Follow the instructions in “Before You Begin” on page 6.



**NOTE:** Ensure that any attached security cable is removed before attempting to lift the release panel.

2. Lift the release panel and open the right side-panel as far as possible.

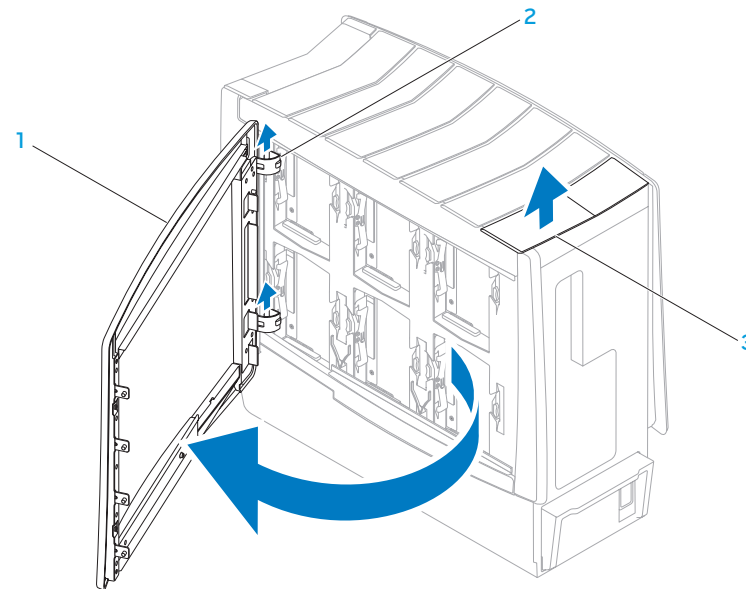


**NOTE:** Theater lighting turns on automatically when the side panel is opened.

3. To remove the right side-panel completely from the chassis, lift the right side-panel and rotate it away from the chassis to release it from the hinges.

## Replacing the Right Side-Panel

1. Follow the instructions in “Before You Begin” on page 6.
2. If the right side-panel was removed completely from the chassis, align it with the hinges and replace it in the chassis.
3. Push the right side-panel against the side of the computer until it locks into place.
4. Connect your computer and devices to electrical outlets, and then turn them on.



1 right side-panel

2 hinges (2)

3 release panel

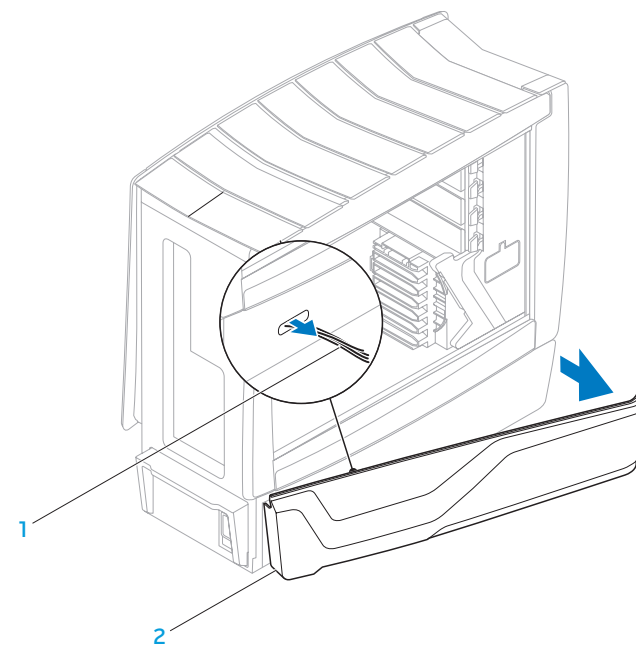


## Removing the Left Bottom-Panel

1. Follow the instructions in “Before You Begin” on page 6.
2. Remove the left side-panel (see “Removing the Left Side-Panel” on page 15).
3. Disconnect the left bottom-panel cable from the SIDE\_LEFT connector on the master I/O board.
4. Press out to release the left bottom-panel clamps that secure the left bottom-panel to the chassis.
5. Remove the left bottom-panel.

## Replacing the Left Bottom-Panel

1. Follow the instructions in “Before You Begin” on page 6.
2. Route the left bottom-panel cable through the chassis and connect it to the SIDE\_LEFT connector on the master I/O board.
3. Align the left bottom-panel clamps with the clamp inserts on the chassis.
4. Push the left bottom-panel towards the chassis until the left bottom-panel clamps snap into place.
5. Replace the left side-panel (see “Replacing the Left Side-Panel” on page 15).
6. Connect your computer and devices to electrical outlets, and then turn them on.



1 left bottom-panel cable

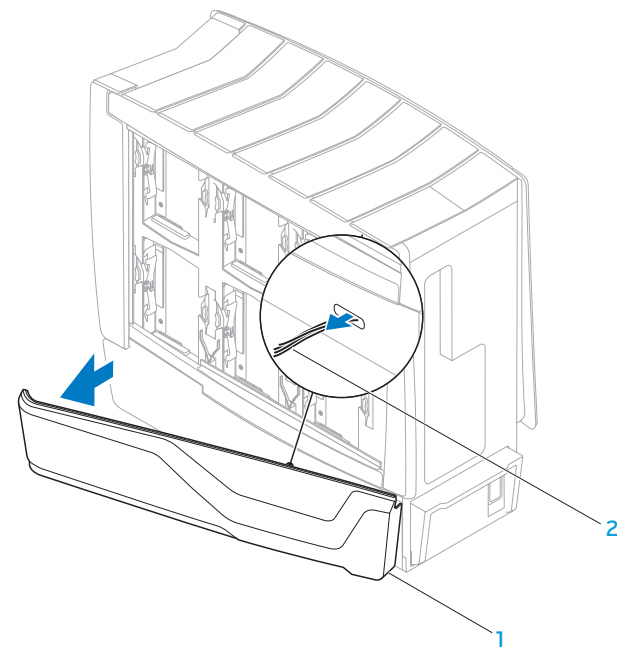
2 left bottom-panel

## Removing the Right Bottom-Panel

1. Follow the instructions in “Before You Begin” on page 6.
2. Remove the right side-panel (see “Removing the Right Side-Panel” on page 16).
3. Disconnect the right bottom-panel cable from the SIDE\_RIGHT connector on the master I/O board.
4. Remove the hard-drive fans (see “Removing the Hard-Drive Fan(s)” on page 51).
5. Press out to release the right bottom-panel clamps that secure the right bottom-panel to the chassis.
6. Remove the right bottom-panel.

## Replacing the Right Bottom-Panel

1. Follow the instructions in “Before You Begin” on page 6.
2. Route the right bottom-panel cable through the chassis and connect it to the SIDE\_RIGHT connector on the master I/O board.
3. Align the right bottom-panel clamps with the clamp inserts on the chassis.
4. Push the right bottom-panel towards the chassis until the right bottom-panel clamps snap into place.
5. Replace the hard-drive fans (see “Replacing the Hard-Drive Fan(s)” on page 52).
6. Replace the right side-panel (see “Replacing the Right Side-Panel” on page 16).
7. Connect your computer and devices to electrical outlets, and then turn them on.



1 right bottom-panel

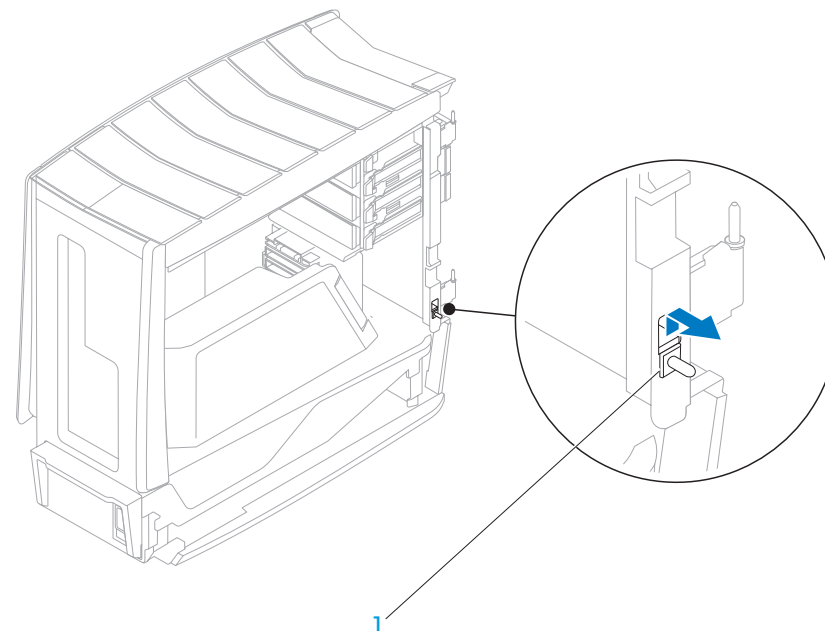
2 right bottom-panel cable

## Removing the Chassis-Intrusion Switch

1. Follow the instructions in “Before You Begin” on page 6.
2. Remove the left side-panel (see “Removing the Left Side-Panel” on page 15).
3. Disconnect the chassis-intrusion switch cable from the master I/O board connector.
4. Slide the chassis-intrusion switch towards the top of the computer and then pull it away.

## Replacing the Chassis-Intrusion Switch

1. Follow the instructions in “Before You Begin” on page 6.
2. Route the chassis-intrusion switch cable through the chassis and connect it to the master I/O board connector.
3. Replace the chassis-intrusion switch in the chassis.
4. Slide the chassis-intrusion switch towards the bottom of the computer until the chassis-intrusion switch snaps into place.
5. Replace the left side-panel (see “Replacing the Left Side-Panel” on page 15).
6. Connect your computer and devices to electrical outlets, and then turn them on.



1 chassis-intrusion switch

אֲשֶׁר נִשְׁחַדְתָּ וְנִשְׁחַדְתָּ

## CHAPTER 4: SHROUDS

## Shrouds



**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](http://www.dell.com/regulatory_compliance).



**WARNING:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the side panel(s).



**WARNING:** Do not operate your equipment with any cover(s) (including side panels, bezels, filler brackets, front-panel inserts, etc.) removed.



**CAUTION:** Only a certified service technician should perform repairs on your computer. Damage due to servicing that is not authorized by Dell™ is not covered by your warranty.



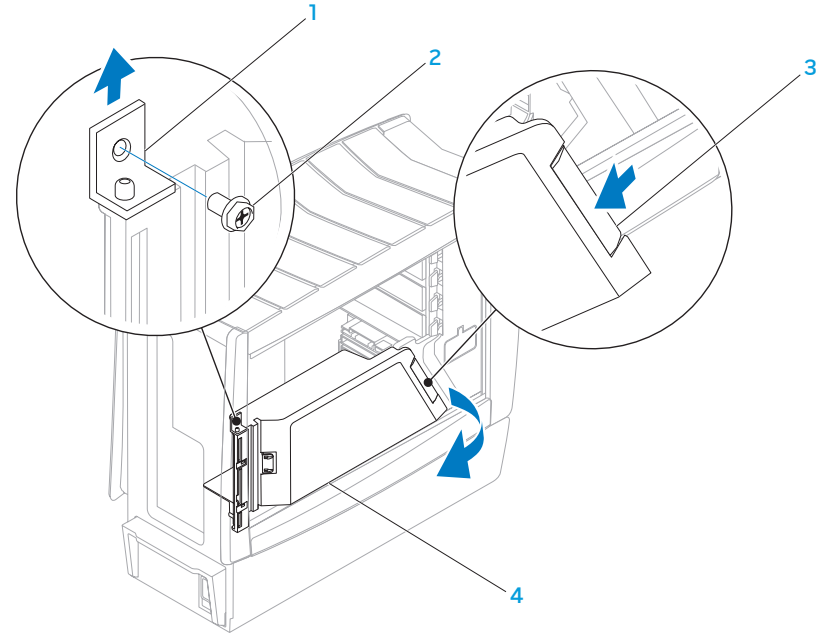
**CAUTION:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as a connector on the back of the computer).

## Removing the PCI Shroud

1. Follow the instructions in “Before You Begin” on page 6.
2. Lift the release panel and open the left side-panel
3. Press the PCI-shroud button to release the PCI shroud and then rotate the PCI shroud away from the computer.
4. To remove the PCI-shroud completely from the chassis:
  - a. Remove the PCI-shroud clamp screw and lift the PCI-shroud clamp out of the chassis.
  - b. Lift the PCI shroud up and away from the chassis.

## Replacing the PCI Shroud

1. Follow the instructions in “Before You Begin” on page 6.
2. If the PCI shroud was removed completely from the chassis:
  - a. Align the PCI shroud with the hinges and replace it in the chassis.
  - b. Replace the PCI-shroud clamp in the chassis.
  - c. Replace the PCI-shroud clamp screw.
3. Push the PCI shroud to snap it into place.
4. Close the left-side panel.
5. Connect your computer and devices to electrical outlets, and then turn them on.



- 1 PCI-shroud clamp
- 2 PCI-shroud clamp screw

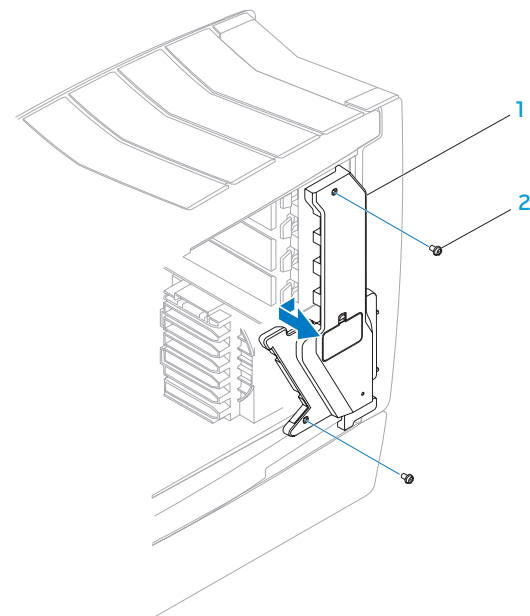
- 3 PCI-shroud button
- 4 PCI shroud

## Removing the Drive-Bay Shroud

1. Follow the instructions in “Before You Begin” on page 6.
2. Remove the left side-panel (see “Removing the Left Side-Panel” on page 15).
3. Remove the PCI shroud (see “Removing the PCI Shroud” on page 22).
4. Disconnect the drive-bay shroud cables from the master I/O board connectors.
5. Remove the two screws that secure the drive-bay shroud to the chassis.
6. Slide and pull the drive-bay shroud away from the computer.

## Replacing the Drive-Bay Shroud

1. Follow the instructions in “Before You Begin” on page 6.
2. Align the screw holes on the drive-bay shroud with the screw holes on the chassis.
3. Replace the two screws that secure the drive-bay shroud to the chassis.
4. Connect the drive-bay shroud cables to the master I/O board connectors.
5. Replace the PCI shroud (see “Replacing the PCI Shroud” on page 22).
6. Replace the left side-panel (see “Replacing the Left Side-Panel” on page 15).
7. Connect your computer and devices to electrical outlets, and then turn them on.



1 drive-bay shroud

2 screws (2)



## CHAPTER 5: MEMORY MODULE(S)

You can increase your computer memory by installing memory modules on the system board. See the specifications in your *Desktop Manual* or in the *Comprehensive Specifications* at [support.dell.com](http://support.dell.com) for information on the memory supported by your computer. Install only memory modules that are supported by your computer.



**NOTE:** Memory modules purchased from Dell or Alienware are covered under your computer warranty.

Your computer has three internally-accessible DDR3 DIMM sockets.



## Memory Module(s)



**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](http://www.dell.com/regulatory_compliance).



**WARNING:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the side panel(s).



**WARNING:** Do not operate your equipment with any cover(s) (including side panels, bezels, filler brackets, front-panel inserts, etc.) removed.



**CAUTION:** Only a certified service technician should perform repairs on your computer. Damage due to servicing that is not authorized by Dell™ is not covered by your warranty.



**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).

## Removing Memory Module(s)

1. Follow the instructions in "Before You Begin" on page 6.
2. Lift the release panel and open the left side-panel.
3. Locate the memory-module connectors on the system board (see "System Board Connectors" on page 11).

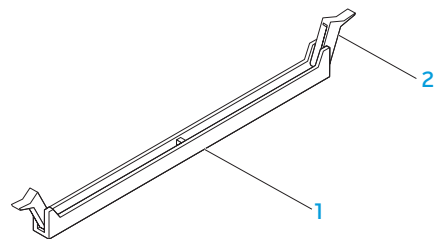


**CAUTION:** The memory module(s) may become very hot during normal operation. Allow the memory module(s) to cool before touching them.



**NOTE:** For better access to the memory module(s), remove the graphics card if the card is full length (see "Removing PCI and PCI Express Cards" on page 31).

4. Press out the securing clip at each end of the memory-module connector.
5. Lift the memory module off the memory-module connector. If the memory module is difficult to remove, gently ease the memory module back and forth to remove it from the memory-module connector.



1 memory-module connector

2 securing clips (2)

## Replacing Memory Module(s)

1. Follow the instructions in “Before You Begin” on page 6.
2. Align the notch on the bottom of the memory module with the tab on the memory-module connector.



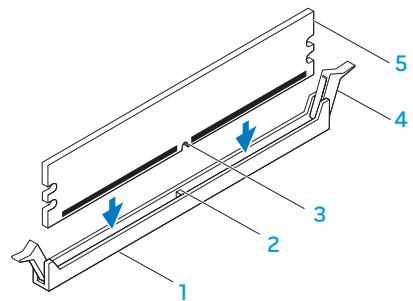
**CAUTION:** To avoid damage to the memory module, press the memory module straight down into the memory-module connector while you apply equal force to each end of the memory module.

3. Insert the memory module into the memory-module connector until the memory module snaps into position.



**NOTE:** If the memory module is not installed properly, the computer may not boot.

4. If you insert the memory module correctly, the securing clips snap into the cutouts at each end of the memory module.
5. Close the left-side panel.
6. Connect your computer and devices to electrical outlets, and then turn them on.



1 memory-module connector

2 tab

3 notch

4 securing clips (2)


5 memory module

As the computer boots, it detects the additional memory and automatically updates the system configuration information. To confirm the amount of memory installed in the computer:

*Windows Vista®*

Click **Start**  → **Control Panel** → **System and Maintenance**.

*Windows® 7*

Click **Start**  → **Control Panel** → **System and Security** → **System**.

סיכום פרק 6: כרטיסי PCI ו-PCI-Express

## CHAPTER 6: PCI AND PCI-EXPRESS CARDS

## PCI and PCI-Express Cards



**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](http://www.dell.com/regulatory_compliance).



**WARNING:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the side panel(s).



**WARNING:** Do not operate your equipment with any cover(s) (including side panels, bezels, filler brackets, front-panel inserts, etc.) removed.



**CAUTION:** Only a certified service technician should perform repairs on your computer. Damage due to servicing that is not authorized by Dell™ is not covered by your warranty.



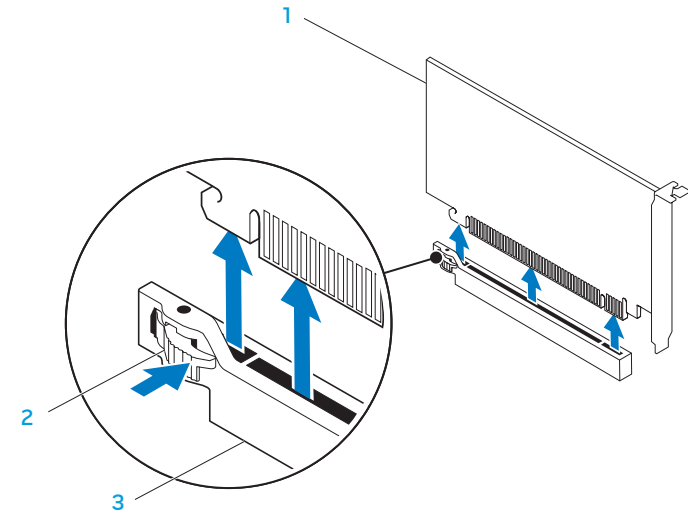
**CAUTION:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as a connector on the back of the computer).

## Removing PCI and PCI-Express Cards

1. Follow the instructions in "Before You Begin" on page 6.
2. Lift the release panel and open the left side-panel.
3. Remove the PCI shroud (see "Removing the PCI Shroud" on page 22).
4. Disconnect any cables connected to the card (if applicable).
5. Remove the card:
  - For a PCI or PCI-Express x1 card, grasp the card by its top corners, and ease it out of its connector.
  - For a PCI-Express x16 card, push the retention mechanism on the card connector as you grasp the card by its top corners, and then ease the card out of the connector.



**NOTE:** If you are not replacing a card, install a filler bracket in the empty card-slot opening.



1 PCI-Express x16 card

3 PCI-Express x16 connector

2 retention mechanism

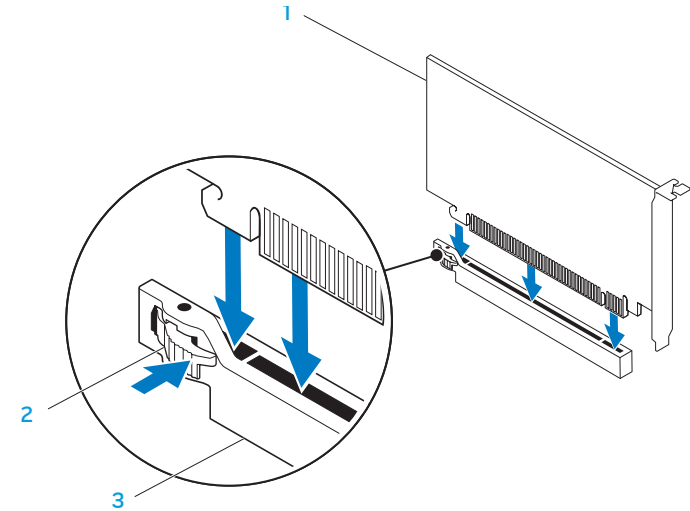
## Replacing PCI and PCI-Express Cards

1. Follow the instructions in “Before You Begin” on page 6.
2. Remove the filler bracket to create a card-slot opening (if applicable).



**NOTE:** For information on configuring, customizing, and making internal connections on the card, see the documentation that shipped with the card.

3. Align the card with the connector on the system board.
4. Place the card in the connector and press down firmly. Ensure that the card is firmly seated in the connector.  
If you are installing the PCI-Express card into the x16 card connector, push the retention mechanism and insert the card in the connector.
5. Connect any cables that should be attached to the card (if applicable).
6. Replace the PCI shroud (see “Replacing the PCI Shroud” on page 22).
7. Close the left side-panel.
8. Connect your computer and devices to electrical outlets, and then turn them on.



1 PCI-Express x16 card  
2 retention mechanism

3 PCI-Express x16 connector



אֲשֶׁר לִפְנֵי יְהוָה

## CHAPTER 7: DRIVES

## Drives



**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](http://www.dell.com/regulatory_compliance).



**WARNING:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the side panel(s).



**WARNING:** Do not operate your equipment with any cover(s) (including side panels, bezels, filler brackets, front-panel inserts, etc.) removed.



**WARNING:** If you remove the hard drive from the computer when the drive is hot, do not touch the metal housing of the hard drive.



**CAUTION:** Only a certified service technician should perform repairs on your computer. Damage due to servicing that is not authorized by Dell™ is not covered by your warranty.



**CAUTION:** To prevent data loss, turn off your computer (see “Turning Off Your Computer” on page 7) before removing the hard drive. Do not remove the hard drive while the computer is on or in Sleep state.



**CAUTION:** Hard drives are extremely fragile. Exercise care when handling the hard drive.



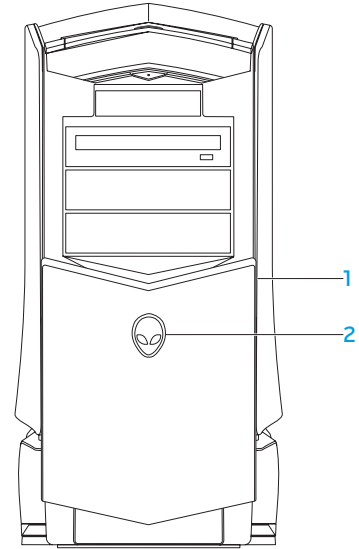
**NOTE:** Dell does not guarantee compatibility or provide support for hard drives from sources other than Dell or Alienware.



**NOTE:** If you are installing a hard drive from a source other than Dell or Alienware, you need to install an operating system, drivers, and utilities on the new hard drive.

## Removing Optical Drive(s)

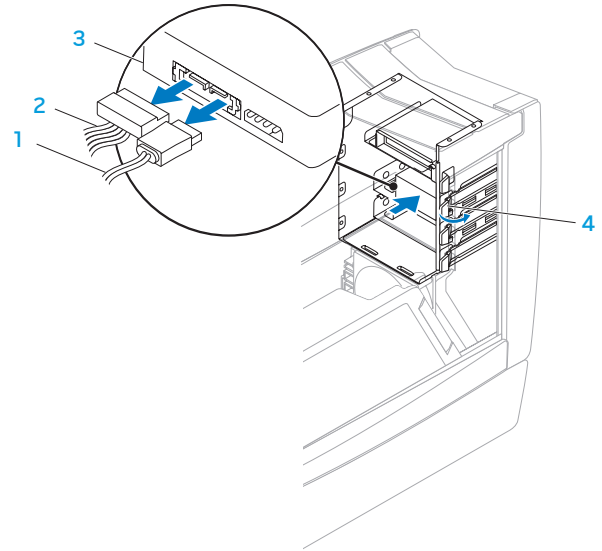
1. Follow the instructions in “Before You Begin” on page 6.
2. Press the AlienHead to lower the drive panel.



1 drive panel

2 AlienHead

3. Lift the release panel and open the left side-panel.
4. Disconnect the power cable and the data cable from the back of the optical drive.
5. Pull the securing tab on the optical-drive bracket and slide the optical drive out through the front of the computer.



1 data cable  
2 power cable

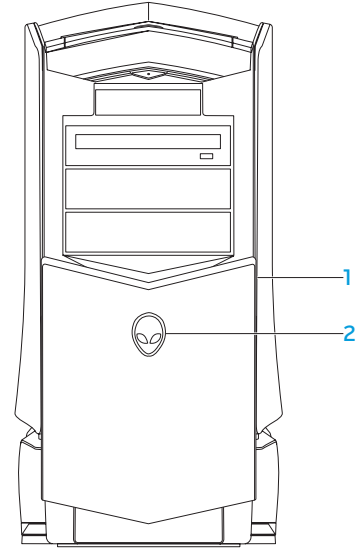
3 optical drive  
4 securing tab

## Replacing Optical Drive(s)

1. Follow the instructions in “Before You Begin” on page 6.
2. Remove the new drive from its packaging.  
Save the original packaging for storing or shipping the optical drive.
3. Remove the optical-drive bay filler, if applicable:  
Pull the securing tab on the optical-drive bracket and slide the optical-drive bay filler out through the front of the computer.
4. Pull the securing tab on the optical-drive bracket and slide the optical drive into the optical-drive bay, until the securing tab snaps into place.
5. Connect the power cable and the data cable to the optical drive.
6. Close the left side-panel.
7. Connect your computer and devices to electrical outlets, and then turn them on.

## Removing the Media Card Reader

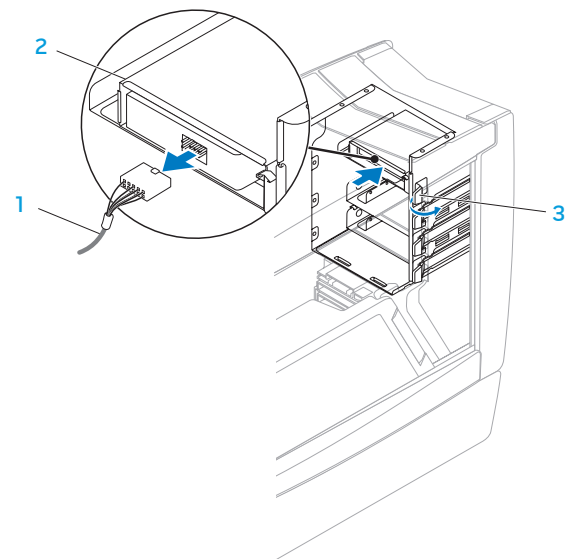
1. Follow the instructions in “Before You Begin” on page 6.
2. Press the AlienHead to lower the drive panel.



1 drive panel

2 AlienHead

3. Lift the release panel and open the left side-panel.
4. Disconnect the FlexBay cable from the back of the Media Card Reader.
5. Pull the securing tab on the FlexBay bracket and slide the Media Card Reader out through the front of the computer.



- 1 FlexBay cable  
2 Media Card Reader

- 3 securing tab

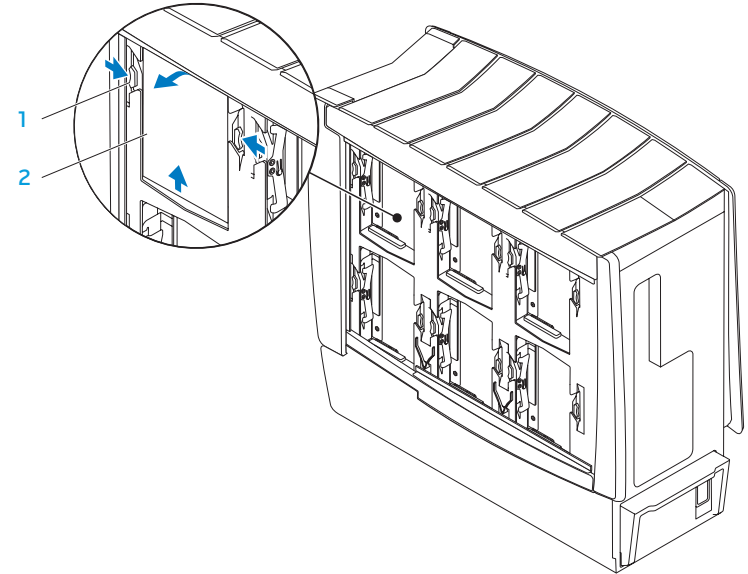
## Replacing the Media Card Reader

1. Follow the instructions in “Before You Begin” on page 6.
2. Remove the new Media Card Reader from its packaging.  
Save the original packaging for storing or shipping the Media Card Reader.
3. Remove the FlexBay filler, if applicable:  
Pull the securing tab on the FlexBay bracket and slide the FlexBay filler out through the front of the computer.
4. Pull the securing tab on the FlexBay bracket and slide the Media Card Reader into the FlexBay, until the securing tab snaps into place.
5. Connect the FlexBay cable to the Media Card Reader.
6. Close the left side-panel.
7. Connect your computer and devices to electrical outlets, and then turn them on.



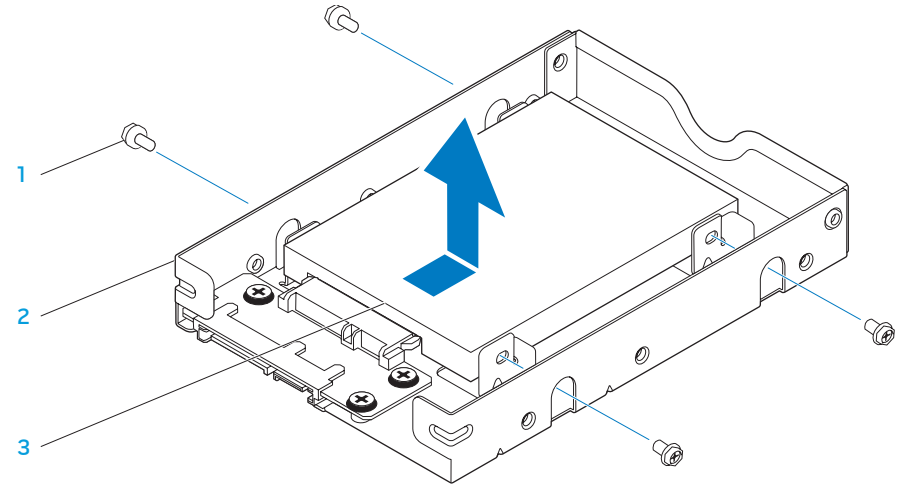
## Removing Hard Drive(s)

1. Follow the instructions in "Before You Begin" on page 6.
2. Lift the release panel and open the right side-panel.
3. Press the hard-drive release tabs simultaneously and slide the hard drive towards the top and out of the computer.



1 hard-drive release tabs (2) 2 hard drive

4. If you are removing a solid-state drive (SSD):
  - a. Remove the four screws that secure the SSD to the hard-drive bracket.
  - b. Slide and lift the SSD out of the hard-drive bracket.



1 screws (4)

2 hard-drive bracket

3 SSD

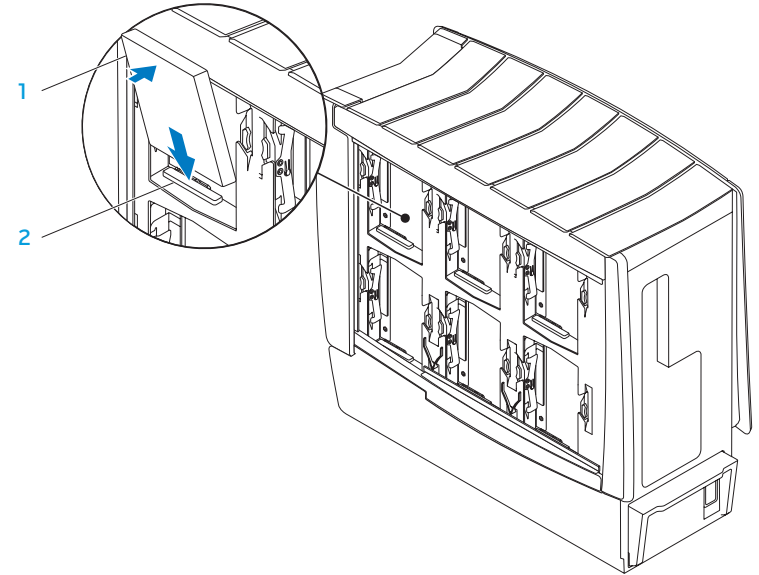
## Replacing Hard Drive(s)

1. Follow the instructions in “Before You Begin” on page 6.



**NOTE:** See the documentation that shipped with your new hard-drive to verify that it is configured for your computer.

2. If you are replacing an SSD:
  - a. Replace the SSD in the hard-drive bracket.
  - b. Replace the four screws that secure the SSD to the hard-drive bracket.
3. Slide the new hard-drive into the hard-drive bay and align it with the hard-drive connector.
4. Press the hard drive down until it locks into place.
5. Close the right side-panel.
6. Connect your computer and devices to electrical outlets, and then turn them on.



1 hard drive

2 hard-drive connector

ህዝብ ለግንባታው ይገባል

## CHAPTER 8: FRONT BEZEL

## Front Bezel



**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](http://www.dell.com/regulatory_compliance).



**WARNING:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the side panel(s).



**WARNING:** Do not operate your equipment with any cover(s) (including side panels, bezels, filler brackets, front-panel inserts, etc.) removed.



**CAUTION:** Only a certified service technician should perform repairs on your computer. Damage due to servicing that is not authorized by Dell™ is not covered by your warranty.



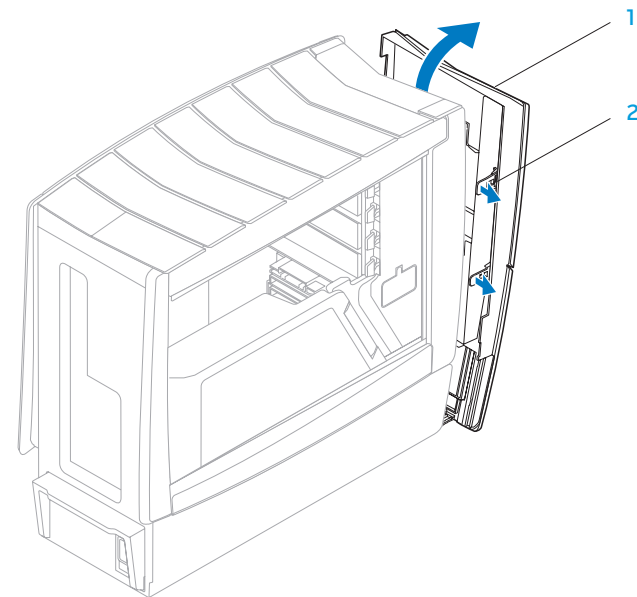
**CAUTION:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as a connector on the back of the computer).

## Removing the Front Bezel

1. Follow the instructions in “Before You Begin” on page 6.
2. Remove the left side-panel (see “Removing the Left Side-Panel” on page 15).
3. Remove the right side-panel (see “Removing the Right Side-Panel” on page 16).
4. Disconnect the front-bezel cables from the master I/O board connectors.
5. Release the front-bezel clamps that secure the front bezel to the chassis.
6. Pull the front bezel away from the front of the computer.

## Replacing the Front Bezel

1. Follow the instructions in “Before You Begin” on page 6.
2. Align the front-bezel clamps with the front-bezel clamp inserts on the chassis.
3. Push the front bezel towards the computer until the front-bezel clamps snap into place.
4. Connect the front-bezel cables to the master I/O board connectors.
5. Replace the right side-panel (see “Replacing the Right Side-Panel” on page 16).
6. Replace the left side-panel (see “Replacing the Left Side-Panel” on page 15).
7. Connect your computer and devices to electrical outlets, and then turn them on.



1 front bezel

2 front-bezel clamps (6)



## CHAPTER 9: FANS

## Fans



**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](http://www.dell.com/regulatory_compliance).



**WARNING:** To guard against likelihood of electric shock, laceration by moving fan blades or other unexpected injuries, always unplug your computer from the electrical outlet before opening the side panel(s).



**WARNING:** Do not operate your equipment with any cover(s) (including side panels, bezels, filler brackets, front-panel inserts, etc.) removed.



**CAUTION:** Only a certified service technician should perform repairs on your computer. Damage due to servicing that is not authorized by Dell™ is not covered by your warranty.

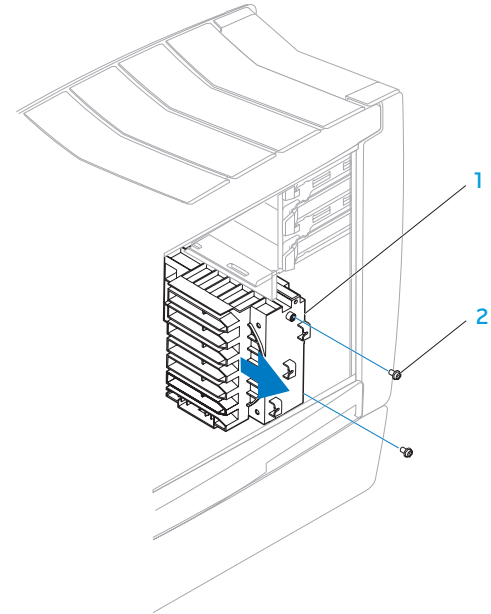


**CAUTION:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as a connector on the back of the computer).



## Removing the PCI Fan

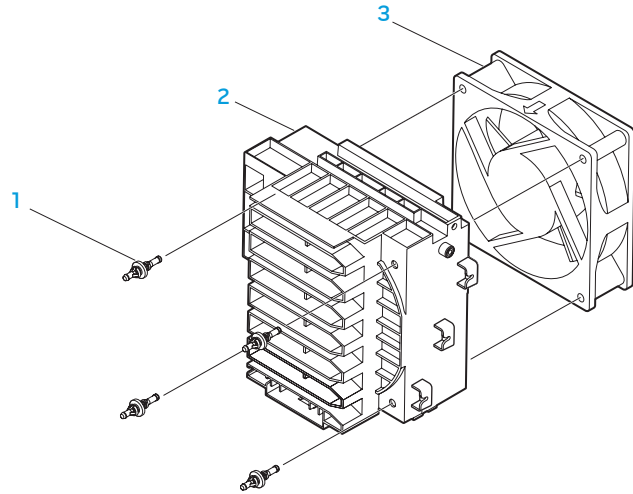
1. Follow the instructions in “Before You Begin” on page 6.
2. Remove the left side-panel (see “Removing the Left Side-Panel” on page 15).
3. Remove the drive-bay shroud (see “Removing the Drive-Bay Shroud” on page 23).
4. Disconnect the PCI-fan cable from the PCI\_FAN1 connector on the master I/O board (see “Master I/O Board Connectors” on page 12).
5. Remove the two screws that secure the PCI-fan shroud to the chassis.
6. Slide the PCI-fan shroud out of the chassis.



1 PCI-fan shroud

2 screws (2)

7. Pull to detach the four rubber grommets that secure the PCI fan to the PCI-fan shroud.



1 rubber grommets (4)  
2 PCI-fan shroud

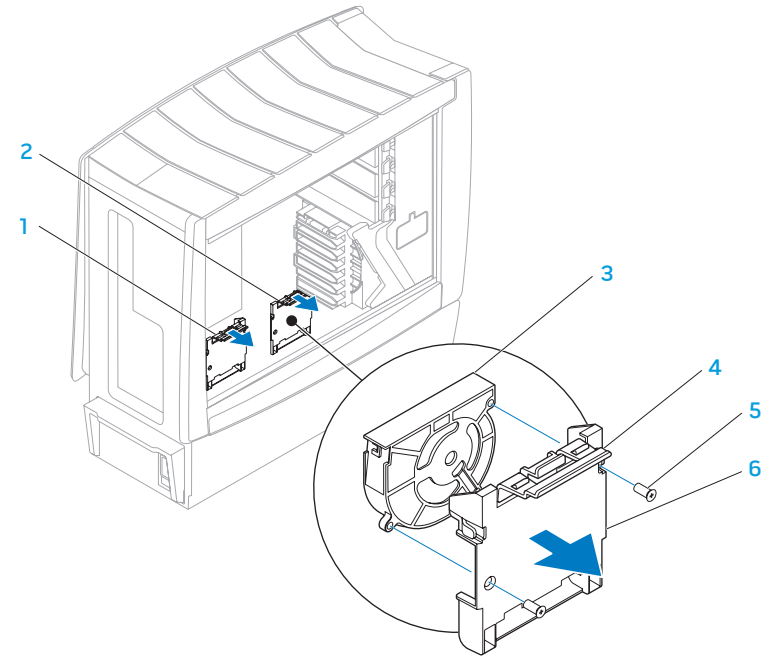
3 PCI fan

## Replacing the PCI Fan

1. Follow the instructions in “Before You Begin” on page 6.
2. Orient the PCI-fan cable downward and replace the PCI fan in the PCI-fan shroud.
3. Align the rubber grommets with the openings in each corner of the PCI-fan shroud, and then pull the grommets through until they snap into place.
4. Slide the PCI-fan shroud into the chassis.
5. Replace the two screws that secure the PCI-fan shroud to the chassis.
6. Connect the PCI-fan cable to the PCI\_FAN1 connector on the master I/O board (see “Master I/O Board Connectors” on page 12).
7. Replace the drive-bay shroud (see “Replacing the Drive-Bay Shroud” on page 23).
8. Replace the left side-panel (see “Replacing the Left Side-Panel” on page 15).
9. Connect your computer and devices to electrical outlets, and then turn them on.

## Removing the Hard-Drive Fan(s)

1. Follow the instructions in "Before You Begin" on page 6.
2. Remove the left side-panel (see "Removing the Left Side-Panel" on page 15).
3. Remove the PCI shroud (see "Removing the PCI Shroud" on page 22).
4. If you are removing the left hard-drive fan, remove the power supply (see "Removing the Power Supply" on page 85).
5. Disconnect the hard-drive fan cables from the HDD\_FAN1 and HDD\_FAN2 connectors on the master I/O board (see "Master I/O Board Connectors" on page 12).
6. Press the hard-drive fan shroud handle down and pull the hard-drive fan out of the chassis.
7. Remove the two screws that secure the hard-drive fan to the hard-drive fan shroud.
8. Remove the hard-drive fan from the hard-drive fan shroud.



- 1 left hard-drive fan shroud
- 2 right hard-drive fan shroud
- 3 hard-drive fan

- 4 hard-drive fan shroud handle
- 5 screws (2)
- 6 hard-drive fan shroud

## Replacing the Hard-Drive Fan(s)

1. Follow the instructions in “Before You Begin” on page 6.
2. Replace the hard-drive fan in the hard-drive fan shroud.
3. Replace the two screws that secure the hard-drive fan to the hard-drive fan shroud.
4. Push the hard-drive fan into the chassis until the hard-drive fan handle clicks into place.
5. Connect the hard-drive fan cables to the HDD\_FAN1 and HDD\_FAN2 connectors on the master I/O board (see “Master I/O Board Connectors” on page 12).
6. If you removed the power supply, replace it (see “Replacing the Power Supply” on page 86).
7. Replace the PCI shroud (see “Replacing the PCI Shroud” on page 22).
8. Replace the left side-panel (see “Replacing the Left Side-Panel” on page 15).
9. Connect your computer and devices to electrical outlets, and then turn them on.

אשכולות 10: אשכולות פעיל-הנעת

# CHAPTER 10: ACTIVE-VENTING ASSEMBLY

## Active-Venting Assembly



**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](http://www.dell.com/regulatory_compliance).



**WARNING:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the side panel(s).



**WARNING:** Do not operate your equipment with any cover(s) (including side panels, bezels, filler brackets, front-panel inserts, etc.) removed.



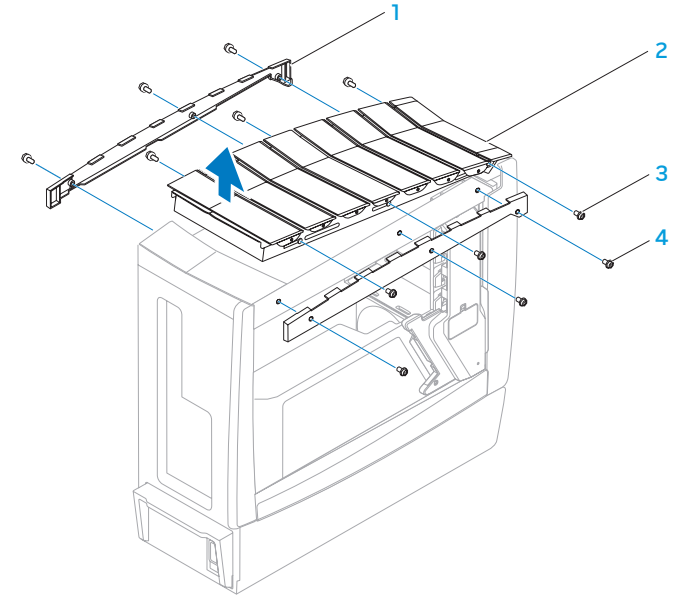
**CAUTION:** Only a certified service technician should perform repairs on your computer. Damage due to servicing that is not authorized by Dell™ is not covered by your warranty.



**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).

## Removing the Active-Venting Assembly

1. Follow the instructions in "Before You Begin" on page 6.
2. Remove the left side-panel (see "Removing the Left Side-Panel" on page 15).
3. Remove the right side-panel (see "Removing the Right Side-Panel" on page 16).
4. Disconnect the active-venting assembly cables from the connectors on the master I/O board.
5. Remove the six screws (three on each side) that secure the active-venting panels to the active-venting assembly.
6. Remove the active-venting panels.
7. Remove the six screws (three on each side) that secure the active-venting assembly to the chassis.
8. Pivot the back of the active-venting assembly upwards and lift it off the chassis.



1 active-venting panels (2)

2 active-venting assembly

3 active-venting assembly screws (6)

4 active-venting panel screws (6)

## Replacing the Active-Venting Assembly

1. Follow the instructions in “Before You Begin” on page 6.
2. Replace the active-venting assembly on the chassis.
3. Replace the six screws (three on each side) that secure the active-venting assembly to the chassis.
4. Replace the active-venting panels.
5. Replace the six screws (three on each side) that secure the active-venting panels to the active-venting assembly.
6. Connect the active-venting cables to the connectors on the master I/O board.
7. Replace the right side-panel (see “Replacing the Right Side-Panel” on page 16).
8. Replace the left side-panel (see “Replacing the Left Side-Panel” on page 15).



**CAUTION:** Before turning on the computer, replace all screws and ensure that no stray screws remain inside the computer. Failure to do so may result in damage to the computer.

9. Connect your computer and devices to electrical outlets, and then turn them on.



ህድረ ገጽ 11: ስምጽ ስምጽ

## CHAPTER 11: TOP I/O PANEL

## Top I/O Panel



**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](http://www.dell.com/regulatory_compliance).



**WARNING:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the side panel(s).



**WARNING:** Do not operate your equipment with any cover(s) (including side panels, bezels, filler brackets, front-panel inserts, etc.) removed.



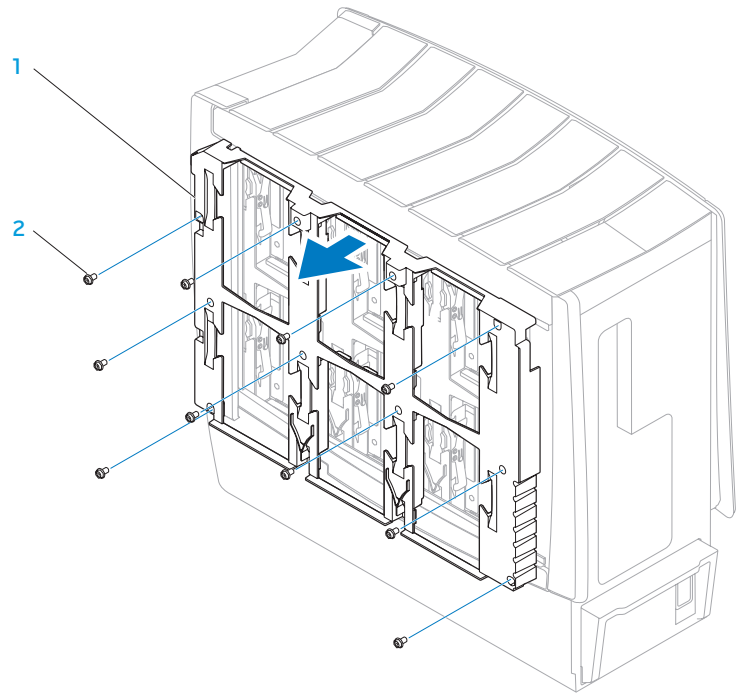
**CAUTION:** Only a certified service technician should perform repairs on your computer. Damage due to servicing that is not authorized by Dell™ is not covered by your warranty.



**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).

## Removing the Top I/O Panel

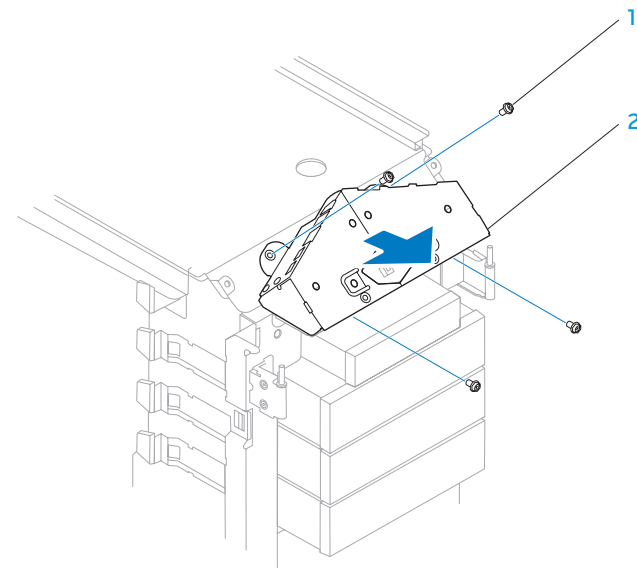
1. Follow the instructions in "Before You Begin" on page 6.
2. Remove the left side-panel (see "Removing the Left Side-Panel" on page 15).
3. Remove the right side-panel (see "Removing the Right Side-Panel" on page 16).
4. Remove the front bezel (see "Removing the Front Bezel" on page 46).
5. Remove the ten screws that secure the hard-drive shroud to the chassis.
6. Pull to remove the hard-drive shroud off the chassis.



1 hard-drive shroud

2 screws (10)

7. Remove the active-venting assembly (see “Removing the Active-Venting Assembly” on page 55).
8. Disconnect the top I/O panel cables from the system board connectors and remove the cables from their routing guides.
9. Remove the four screws that secure the top I/O panel to the chassis.
10. Pull the top I/O panel off the chassis.



1 screws (4)

2 top I/O panel

## Replacing the Top I/O Panel

1. Follow the instructions in “Before You Begin” on page 6.
2. Replace the top I/O panel on the chassis.
3. Replace the four screws that secure the top I/O panel to the chassis.
4. Route the top I/O panel cables through their routing guides and connect the cables to the system board connectors.
5. Replace the active-venting assembly (see “Replacing the Active-Venting Assembly” on page 56).
6. Replace the hard-drive shroud on the chassis.
7. Replace the ten screws that secure the hard-drive shroud to the chassis.
8. Replace the front bezel (see “Replacing the Front Bezel” on page 46).
9. Replace the right side-panel (see “Replacing the Right Side-Panel” on page 16).
10. Replace the left side-panel (see “Replacing the Left Side-Panel” on page 15).
11. Connect your computer and devices to electrical outlets, and then turn them on.

አዲስ አበባ፣ ኢትዮጵያ

# CHAPTER 12: BLUETOOTH MODULE

## Bluetooth Module



**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](http://www.dell.com/regulatory_compliance).



**WARNING:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the side panel(s).



**WARNING:** Do not operate your equipment with any cover(s) (including side panels, bezels, filler brackets, front-panel inserts, etc.) removed.



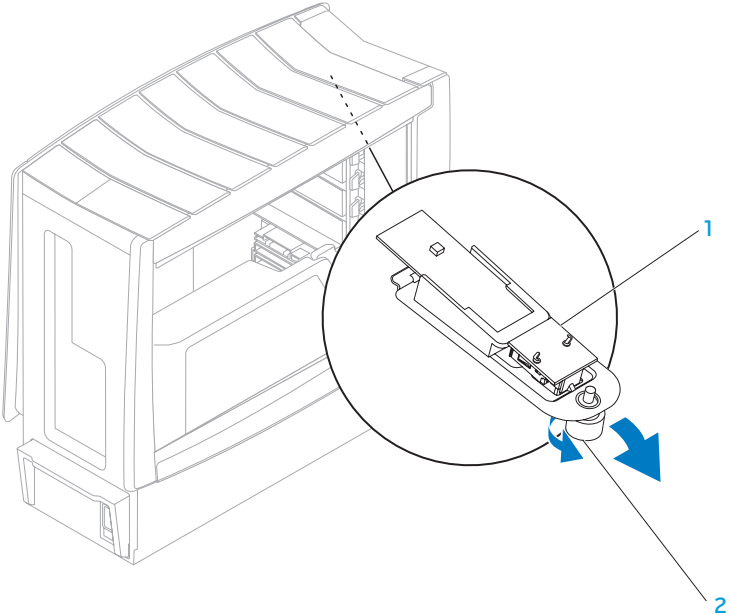
**CAUTION:** Only a certified service technician should perform repairs on your computer. Damage due to servicing that is not authorized by Dell™ is not covered by your warranty.



**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).

## Removing the Bluetooth Module

1. Follow the instructions in "Before You Begin" on page 6.
2. Remove the left side-panel (see "Removing the Left Side-Panel" on page 15).
3. Disconnect the Bluetooth®-module cable from the BLUETOOTH connector on the master I/O board (see "Master I/O Board Connectors" on page 12).
4. Loosen the thumbscrew that secures the Bluetooth module to the chassis.
5. Remove the Bluetooth module from the chassis.



1 Bluetooth module

2 thumbscrew



## Replacing the Bluetooth Module

1. Follow the instructions in “Before You Begin” on page 6.
2. Replace the Bluetooth module in the chassis.
3. Tighten the thumbscrew that secures the Bluetooth module to the chassis.
4. Connect the Bluetooth-module cable to the BLUETOOTH connector on the master I/O board (see “Master I/O Board Connectors” on page 12).
5. Replace the left side-panel (see “Replacing the Left Side-Panel” on page 15).
6. Connect your computer and devices to electrical outlets, and then turn them on.

ህዳር ፳፭፣ ፳፻፲፯ ዓ.ም. - የፌዴራል ምክርቤት

# CHAPTER 13: LIQUID-COOLING ASSEMBLY

## Liquid-Cooling Assembly



**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](http://www.dell.com/regulatory_compliance).



**WARNING:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the side panel(s).



**WARNING:** Do not operate your equipment with any cover(s) (including side panels, bezels, filler brackets, front-panel inserts, etc.) removed.



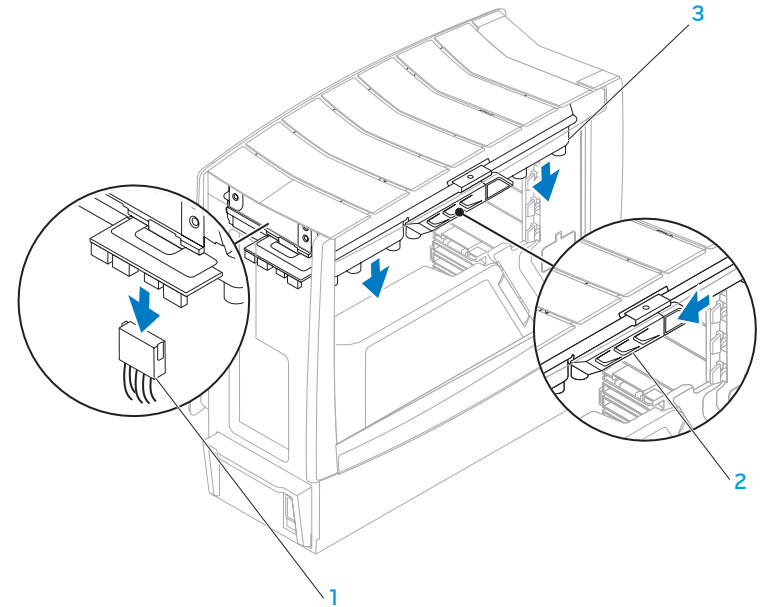
**CAUTION:** Only a certified service technician should perform repairs on your computer. Damage due to servicing that is not authorized by Dell™ is not covered by your warranty.



**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).

## Removing the Liquid-Cooling Assembly

1. Follow the instructions in "Before You Begin" on page 6.
2. Remove the left side-panel (see "Removing the Left Side-Panel" on page 15).
3. Disconnect the liquid-cooling assembly cable from the liquid-cooling assembly.
4. Push the release latch towards the back of the computer to release the liquid-cooling assembly from the chassis.
5. Rotate the liquid-cooling assembly down and pull it away from the chassis.



1 liquid-cooling assembly cable

2 release latch

3 liquid-cooling assembly

## Replacing the Liquid-Cooling Assembly

1. Follow the instructions in “Before You Begin” on page 6.
2. Replace the liquid-cooling assembly in the chassis and rotate the liquid-cooling assembly upwards until it snaps into place.
3. Connect the liquid-cooling assembly cable to the liquid-cooling assembly.
4. Replace the left side-panel (see “Replacing the Left Side-Panel” on page 15).
5. Connect your computer and devices to electrical outlets, and then turn them on.

የግብርና ጽ/ቤት

# CHAPTER 14: PROCESSOR

## Processor



**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](http://www.dell.com/regulatory_compliance).



**WARNING:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the side panel(s).



**WARNING:** Do not operate your equipment with any cover(s) (including side panels, bezels, filler brackets, front-panel inserts, etc.) removed.



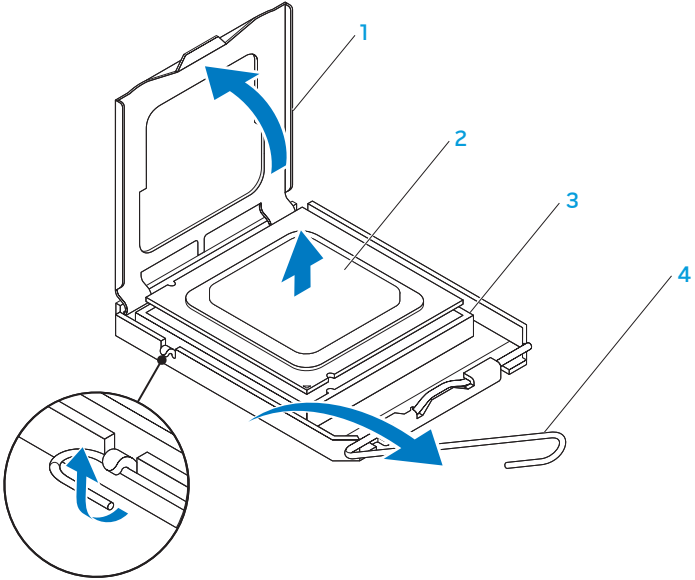
**CAUTION:** Only a certified service technician should perform repairs on your computer. Damage due to servicing that is not authorized by Dell™ is not covered by your warranty.



**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).

## Removing the Processor

1. Follow the instructions in "Before You Begin" on page 6.
2. Remove the left side-panel (see "Removing the Left Side-Panel" on page 15).
3. Remove the PCI shroud (see "Removing the PCI Shroud" on page 22).
4. Remove the liquid-cooling assembly (see "Removing the Liquid-Cooling Assembly" on page 68).
5. Press and push the release lever down and out to release it from the tab that secures it.
6. Open the processor cover and gently lift the processor to remove it from the socket.



1 processor cover

2 processor

3 socket

4 release lever



## Replacing the Processor

1. Follow the instructions in “Before You Begin” on page 6.
2. Unpack the new processor, being careful not to touch the underside of the processor.



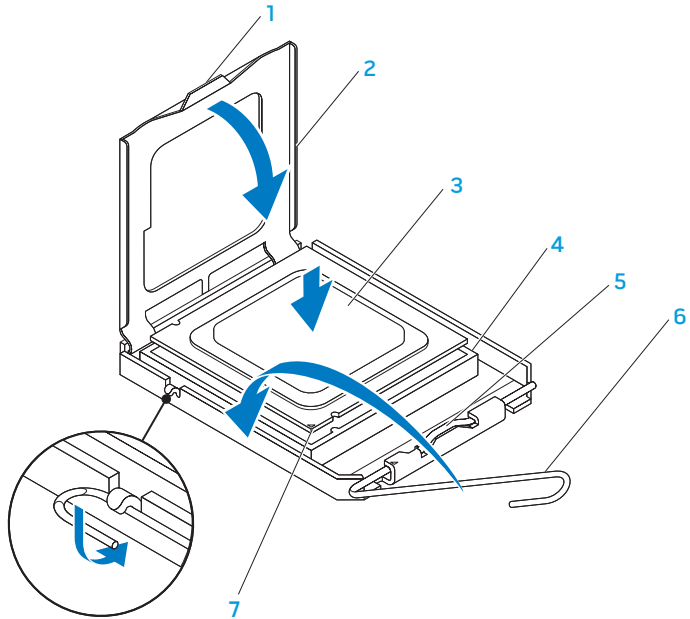
**CAUTION:** You must position the processor correctly in the socket to avoid permanent damage to the processor and the computer when you turn on the computer.

3. If the release lever on the socket is not fully extended, move it to that position.
4. Align the pin-1 corners of the processor and socket.



**CAUTION:** To avoid damage, ensure that the processor aligns properly with the socket, and do not use excessive force when you install the processor.

5. Set the processor lightly in the socket and ensure that the processor is positioned correctly.
6. When the processor is fully seated in the socket, close the processor cover. Ensure that the tab on the processor cover is positioned underneath the center cover latch on the socket.
7. Pivot the socket release lever back toward the socket, and snap it into place to secure the processor.



1 tab

2 processor cover

3 processor

4 socket

5 center cover latch

6 release lever

7 processor pin-1 indicator



**CAUTION:** Ensure that you apply new thermal grease. New thermal grease is critical for ensuring adequate thermal bonding, which is a requirement for optimal processor operation.

8. Apply the new thermal grease to the top of the processor.
9. Replace the liquid-cooling assembly (see “Replacing the Liquid-Cooling Assembly” on page 69).
10. Replace the PCI shroud (see “Replacing the PCI Shroud” on page 22).
11. Replace the left side-panel (see “Replacing the Left Side-Panel” on page 15).
12. Connect your computer and devices to electrical outlets, and then turn them on.

~ህህርሎሳ ፎፍ፡ ገህደሎሳ ስ/ፎ ለፎህሳ"

# CHAPTER 15: MASTER I/O BOARD

## Master I/O Board



**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](http://www.dell.com/regulatory_compliance).



**WARNING:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the side panel(s).



**WARNING:** Do not operate your equipment with any cover(s) (including side panels, bezels, filler brackets, front-panel inserts, etc.) removed.



**CAUTION:** Only a certified service technician should perform repairs on your computer. Damage due to servicing that is not authorized by Dell™ is not covered by your warranty.



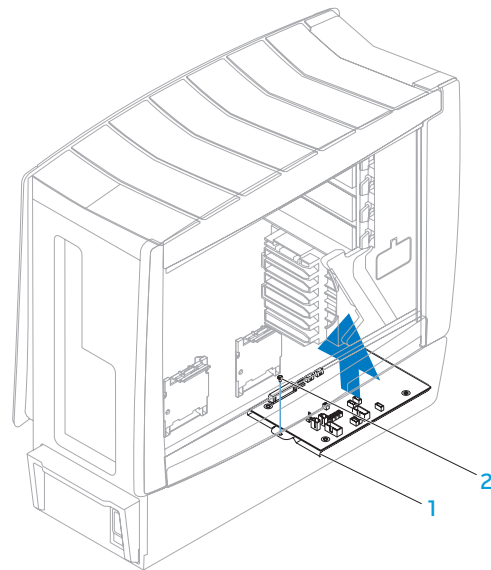
**CAUTION:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as a connector on the back of the computer).

## Removing the Master I/O Board

1. Follow the instructions in "Before You Begin" on page 6.
2. Remove the left side-panel (see "Removing the Left Side-Panel" on page 15).
3. Remove the PCI shroud (see "Removing the PCI Shroud" on page 22).
4. Disconnect all cables from the master I/O board. Note the routing of all cables as you remove them so that you can re-route them correctly after installing the new master I/O board.
5. Remove the screw that secures the master I/O board tray to the chassis.
6. Lift the master I/O board tray up and out of the chassis.



**NOTE:** Do not remove the master I/O board from the master I/O board tray. The master I/O board tray is shipped together with the replacement master I/O board.



1 master I/O board tray

2 screw

## Replacing the Master I/O Board

1. Follow the instructions in “Before You Begin” on page 6.
2. Replace the master I/O board tray in the chassis.
3. Replace the screw that secures the master I/O board tray to the chassis.
4. Route and connect the cables that you removed from the master I/O board.
5. Replace the PCI shroud (see “Replacing the PCI Shroud” on page 22).
6. Replace the left side-panel (see “Replacing the Left Side-Panel” on page 15).



**CAUTION:** Before turning on the computer, replace all screws and ensure that no stray screws remain inside the computer. Failure to do so may result in damage to the computer.

7. Connect your computer and devices to electrical outlets, and then turn them on.

מגוון מוצרים: מערכת מרכזית

## CHAPTER 16: SYSTEM BOARD

## System Board



**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](http://www.dell.com/regulatory_compliance).



**WARNING:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the side panel(s).



**WARNING:** Do not operate your equipment with any cover(s) (including side panels, bezels, filler brackets, front-panel inserts, etc.) removed.



**CAUTION:** Only a certified service technician should perform repairs on your computer. Damage due to servicing that is not authorized by Dell™ is not covered by your warranty.



**CAUTION:** Do not perform the following steps unless you are familiar with hardware removal and replacement. Performing these steps incorrectly could damage your system board. For information on contacting Dell, see your *Desktop Manual*.



**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).

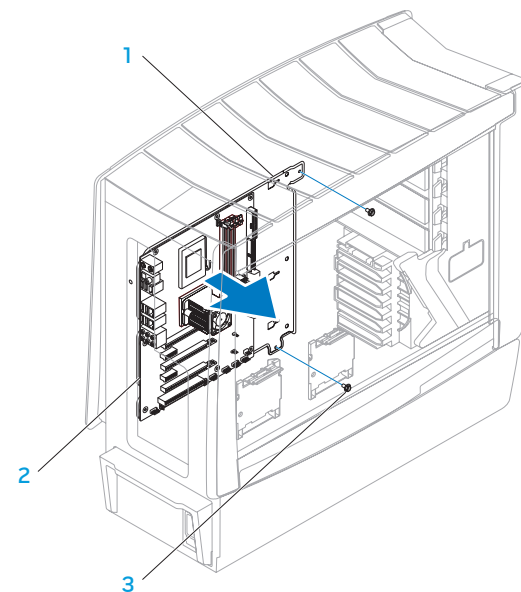


## Removing the System Board

1. Follow the instructions in “Before You Begin” on page 6.
2. Remove the left side-panel (see “Removing the Left Side-Panel” on page 15).
3. Remove the PCI shroud (see “Removing the PCI Shroud” on page 22).
4. Remove any add-on cards on the system board (see “Removing PCI and PCI Express Cards” on page 31).
5. Remove the memory modules (see “Removing Memory Module(s)” on page 26).
6. Remove the liquid-cooling assembly (see “Removing the Liquid-Cooling Assembly” on page 68).
7. Remove the processor (see “Removing the Processor” on page 72).
8. Disconnect all cables from the system board. Note the routing of all cables as you remove them so that you can re-route them correctly after installing the new system board.
9. Remove the two screws that secure the system-board tray to the chassis.
10. Carefully remove the system-board tray from the chassis.



**NOTE:** Do not remove the system board from the system-board tray. The system-board tray is shipped together with the replacement system board.



1 system-board tray

2 system board

3 screws (2)

## Replacing the System Board

1. Follow the instructions in “Before You Begin” on page 6.
2. Replace the system-board tray in the chassis.
3. Replace the two screws that secure the system-board tray to the chassis.
4. Route and connect the cables that you removed from the system board.
5. Replace the processor (see “Replacing the Processor” on page 73).
6. Replace the liquid-cooling assembly (see “Replacing the Liquid-Cooling Assembly” on page 69).
7. Replace the memory modules (see “Replacing Memory Module(s)” on page 27).
8. Replace any add-on cards on the system board (see “Replacing PCI and PCI Express Cards” on page 32).
9. Replace the PCI shroud (see “Replacing the PCI Shroud” on page 22).
10. Replace the left side-panel (see “Replacing the Left Side-Panel” on page 15).



**CAUTION:** Before turning on the computer, replace all screws and ensure that no stray screws remain inside the computer. Failure to do so may result in damage to the computer.

11. Connect your computer and devices to electrical outlets, and then turn them on.

ህዝብ ግንባታ ለግብርና

## CHAPTER 17: POWER SUPPLY

## Power Supply



**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](http://www.dell.com/regulatory_compliance).



**WARNING:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the side panel(s).



**WARNING:** Do not operate your equipment with any cover(s) (including side panels, bezels, filler brackets, front-panel inserts, etc.) removed.



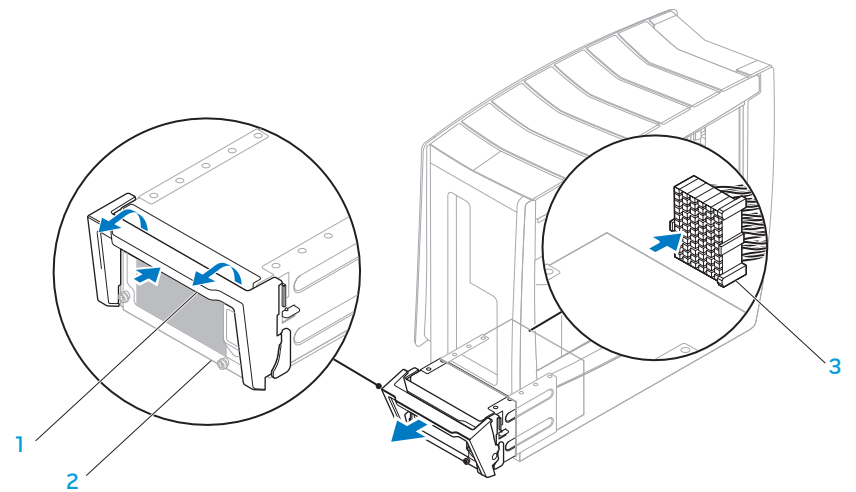
**CAUTION:** Only a certified service technician should perform repairs on your computer. Damage due to servicing that is not authorized by Dell™ is not covered by your warranty.



**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).

## Removing the Power Supply

1. Follow the instructions in "Before You Begin" on page 6.
2. Remove the left side-panel (see "Removing the Left Side-Panel" on page 15).
3. Remove the PCI shroud (see "Removing the PCI Shroud" on page 22).
4. Push the power-supply handle inwards to unlock it.
5. Using the power-supply handle, partially slide the power supply away from the computer to access the power-supply cable connector .
6. Disconnect the power-supply cable connector from the power supply.
7. Slide the power supply out of the chassis.



1 power-supply handle  
2 power supply

3 power-supply cable connector

## Replacing the Power Supply

1. Follow the instructions in “Before You Begin” on page 6.
2. Replace the power supply in the chassis and partially slide it towards the front of the computer.
3. Connect the power-supply cable connector to the power supply.
4. Slide the power supply completely into the chassis.
5. Push the power-supply handle inwards to lock it.
6. Replace the PCI shroud (see “Replacing the PCI Shroud” on page 22).
7. Replace the left side-panel (see “Replacing the Left Side-Panel” on page 15).
8. Connect your computer and devices to electrical outlets, and then turn them on.

ህዝብ ጋር ለመገናኛ

# CHAPTER 18: BATTERY

## Battery



**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](http://www.dell.com/regulatory_compliance).



**WARNING:** A new battery can explode if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.



**WARNING:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the side panel(s).



**WARNING:** Do not operate your equipment with any cover(s) (including side panels, bezels, filler brackets, front-panel inserts, etc.) removed.



**CAUTION:** Only a certified service technician should perform repairs on your computer. Damage due to servicing that is not authorized by Dell™ is not covered by your warranty.



**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).



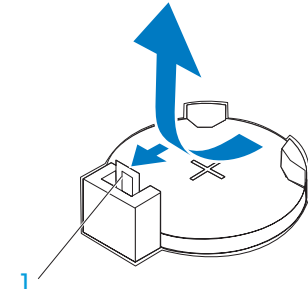
## Removing the Coin-Cell Battery

1. Record all the screens in system setup (see “System Setup” on page 93) so that you can restore the correct settings after the new battery has been installed.
2. Follow the instructions in “Before You Begin” on page 6.
3. Lift the release panel and open the left side-panel.
4. Remove the PCI shroud (see “Removing the PCI Shroud” on page 22).
5. Locate the battery socket (see “System Board Components” on page 11).



**CAUTION:** If you pry the battery out of its socket with a blunt object, be careful not to touch the system board with the object. Ensure that the object is inserted between the battery and the socket before you attempt to pry out the battery. Otherwise, you may damage the system board by prying off the socket or by breaking circuit traces on the system board.

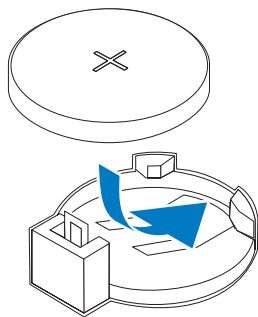
6. Press the battery-release lever to remove the battery.



1 battery-release lever

## Replacing the Coin-Cell Battery

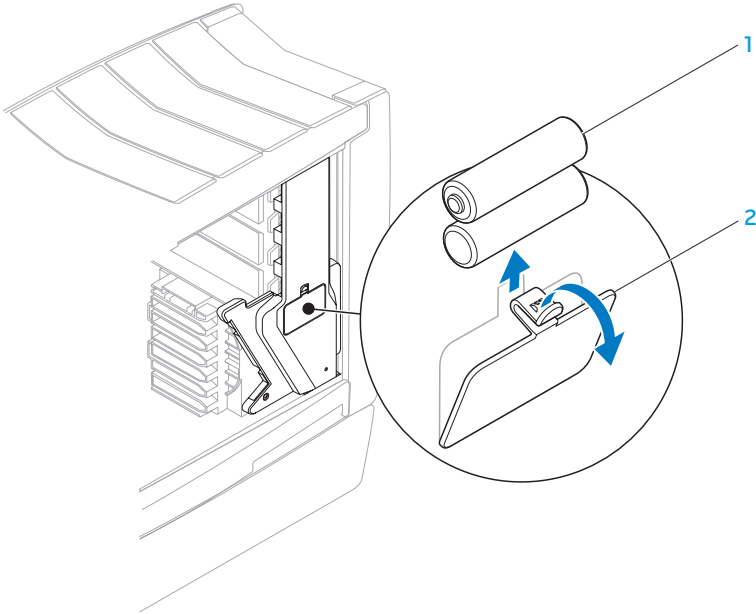
1. Follow the instructions in “Before You Begin” on page 6.
2. Insert the new battery (CR2032) into the socket with the side labeled “+” facing up, and press the battery into place.



3. Replace the PCI shroud (see “Replacing the PCI Shroud” on page 22).
4. Close the left-side panel.
5. Connect your computer and devices to electrical outlets, and then turn them on.
6. Enter system setup (see “Entering System Setup” on page 95) and restore the settings you recorded before removing the battery.

# Removing the Theater-Lighting Batteries

- 1. Follow the instructions in "Before You Begin" on page 6.
- 2. Lift the release panel and open the left side-panel.
- 3. Open the theater-lighting battery-compartment door.
- 4. Remove the two theater-lighting batteries.



1 theater-lighting batteries (2)

2 theater-lighting battery-compartment door

## Replacing the Theater-Lighting Batteries

1. Follow the instructions in “Before You Begin” on page 6.
2. Insert the two new batteries (rechargeable AA, NiMH type) in the theater-lighting battery compartment.
3. Close the theater-lighting battery-compartment door.
4. Close the left side-panel.
5. Connect your computer and devices to electrical outlets, and then turn them on.

ህዝብ ጋር ለመገናኛት

## CHAPTER 19: SYSTEM SETUP

## System Setup



**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](http://www.dell.com/regulatory_compliance).



**WARNING:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the side panel(s).



**WARNING:** Do not operate your equipment with any cover(s) (including side panels, bezels, filler brackets, front-panel inserts, etc.) removed.



**CAUTION:** Only a certified service technician should perform repairs on your computer. Damage due to servicing that is not authorized by Dell™ is not covered by your warranty.



**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).

## Overview

Use System Setup to:

- Change the system configuration information after you add, change, or remove any hardware in your desktop.
- Set or change a user-selectable option such as the user password.
- View the installed amount of memory or set the type of hard drive installed.

Before you use System Setup, it is recommended that you write down the current System Setup information for future reference.



**CAUTION:** Do not change the settings in System Setup unless you are an expert computer user. Certain changes can cause your computer to work incorrectly.

## Entering System Setup

1. Turn on (or restart) your computer.
2. While your computer is booting, press <F2> immediately before the operating system logo appears to access System Setup.



**NOTE:** If an error occurs during POST (Power On Self Test), press <F2> when the prompt appears to enter System Setup.



**NOTE:** If you wait too long and the operating system logo appears, continue to wait until you see the Microsoft® Windows® desktop, then shut down your desktop and try again.



**NOTE:** Keyboard failure may result when a key on the keyboard is held down for extended periods of time. To avoid possible keyboard failure, press and release <F2> in even intervals until the System Setup screen appears.

## System Setup Screens

The System Setup window displays current or changeable configuration information for your computer.

Key functions appear at the bottom of the System Setup window and lists keys and their functions within the active field.

## System Setup Options



**NOTE:** The items listed in this section may or may not appear exactly as listed depending on your computer model and installed devices.

### System Information

---

Product Name	Displays the product name.
BIOS Version	Displays the BIOS version, number, and date information.
Input Service Tag	Allows you to input the service tag.
Service Tag	Displays the service tag of the computer.
Asset Tag	Displays the asset tag of the computer.
Memory Installed	Displays the amount of memory installed in your computer.
Memory Available	Displays the amount of memory available in your computer.
Memory Technology	Displays the type of memory technology used.
Memory Speed	Displays the memory speed.
CPU ID/uCode ID	Displays the processor ID.

### System Information

---

CPU Speed	Displays the processor speed.
Current QPI Speed	Displays the QPI speed.
Cache L2	Displays the processor L2 cache size.
Cache L3	Displays the processor L3 cache size.

### Standard CMOS Features

---

System Time (hh:mm:ss)	Displays the current time.
System Date (mm:dd:yy)	Displays the current date.
SATA 1	Displays the SATA 1 drive integrated in your computer.
SATA 2	Displays the SATA 2 drive integrated in your computer.
SATA 3	Displays the SATA 3 drive integrated in your computer.
SATA 4	Displays the SATA 4 drive integrated in your computer.
SATA 5	Displays the SATA 5 drive integrated in your computer.
SATA 6	Displays the SATA 6 drive integrated in your computer.
SATA 7	Displays the SATA 7 drive integrated in your computer.
SATA 8	Displays the SATA 8 drive integrated in your computer.



**Standard CMOS Features**

---

IDE Master	Displays the IDE master drive integrated in your computer.
IDE Slave	Displays the IDE slave drive integrated in your computer.
Wait For 'F1' If Error	If enabled, the computer displays errors detected during POST. Press <F1> to continue.

**Advanced BIOS Features**

---

Bootup Num-Lock	Select power-on state for num-lock.
ACPI APIC support	Include ACPI APIC table pointer to RSDT pointer list.
OptionRom Display Screen	Set display mode for Raid Option Rom screen. (Hide; Display)
CD/DVD Drives	Sets the CD/DVD drive boot priority.

**Boot Configuration Features**

---

1st Boot Device	Displays the first boot device.
2nd Boot Device	Displays the second boot device.
Hard Disk Drives	Sets the hard drive boot priority. The items displayed are dynamically updated according to the hard drives detected.
CD/DVD Drives	Sets the CD/DVD drive boot priority.

**CPU Configuration**

---

XD Bit Capability	Enable XD Bit Capability to allow the processor to distinguish between the bits of code that can be executed and the ones that cannot be executed.
Intel® Speedstep® tech	If enabled, the processor clock speed and core voltage are adjusted dynamically based on the processor load.
Intel® C State Tech	If enabled, C State: Processor idle is set to C2/C3/C4.

**Integrated Devices**

USB Functions	Allows you to enable or disable the integrated USB controller.
HD Audio Controller	Allows you to enable or disable the integrated audio controller.
Onboard IEEE1394 Controller	Allows you to enable or disable the onboard IEEE1394 controller.
LAN1 BCM5784 Device	Allows you to enable or disable the onboard LAN1 controller.
LAN1 Option ROM	Allows you to enable or disable the network controller's boot option.
LAN2 BCM5784 Device	Allows you to enable or disable the onboard LAN2 controller.
LAN2 Option ROM	Allows you to enable or disable the network controller's boot option.
JMicron 363 ATA Controller	Allows you to enable or disable the onboard ATA controller.
SiL3132 E-Sata Device	Allows you to enable and disable the e-SATA controller.
Configure SATA#1-6 as	Allows you to configure the integrated hard drive controller to AHCI or RAID.
AHCI CD/DVD Boot Time out	Allows you to set the wait time for SATA or CD/DVD in AHCI mode.

**Power Management Setup**

Suspend Mode	Sets the energy-saving mode of the ACPI function.
AC Recovery	Sets what action the computer takes when power is restored.
Remote Wakeup	Sets the system to wake up from an onboard LAN, PCIE-X1 LAN card, or a PCI LAN card.
Auto Power On	Allows the computer to start up at a certain time.

**Frequency/Voltage Control**

CPU Speed	Displays the current processor speed.
Memory Speed	Displays the current memory speed.
Current QPI Speed	Displays current QPI Speed.
QPI Frequency	Allows you to change the QPI frequency.
Memory Ratio	Allows you to change the memory ratio.

### Frequency/Voltage Control

CPU Core (Non-Turbo) Ratio	Displays the ratio between the processor core clock and the FSB frequency.
Advance DRAM Configuration	Allows you to access the Advance DRAM Configuration submenu
Overclock Configuration	Allows you to access the Overclock Configuration submenu
Overvoltage Configuration	Allows you to access the Overvoltage Configuration submenu
Load Level 1 OC Setting	Allows you to restore the Level 1 overclocking settings that were shipped from the factory (only displayed with an XE processor).
Load Level 2 OC Setting	Allows you to restore the Level 2 overclocking settings that were shipped from the factory (only displayed with an XE processor).
Load Level 3 OC Setting	Allows you to restore the Level 3 overclocking settings that were shipped from the factory (only displayed with an XE processor).

### Advance DRAM Configuration Submenu

Memory-Z	Opens submenu to display the SPD configuration for each memory module.
Advanced Memory Settings	Allows you to toggle to Manual mode and set all of the timing parameters.
tCL	Displays the Column Address Strobe Latency (editable in Manual Mode).
tRCD	Displays timing of RAS to CAS delay (editable in Manual Mode).
tRP	Displays timing of RAS Precharge (editable in Manual Mode).
tRAS	Displays timing of Row Address Strobe (editable in Manual Mode).
tRFC	Displays timing of Refresh to Archive/Refresh cycle time (editable in Manual Mode).
tWR	Displays timing of Write Recover (editable in Manual Mode).
tWTR	Displays Write to Read Delay (editable in Manual Mode).

**Advance DRAM Configuration Submenu**

tRRD	Displays RAS to RAS delay (editable in Manual Mode).
tRTP	Displays Read to Precharge Command Delay (editable in Manual Mode).
1T/2T Timing	Displays the Command Rate (editable in Manual Mode).

**Overclock Configuration Submenu**

Adjust CPU BClk (MHz)	Allows you to adjust BClk of processor.
Spread Spectrum	Enable/Disable Spread Spectrum Modulation.
Adjust PCI Frequency (MHz)	Allows you to adjust PCI Frequency.
Adjust PCI-E Frequency (MHz)	Allows you to adjust PCI-E Frequency.
Intel® Turbo Mode tech	If enabled, allows processor to run at faster frequencies than marked.
[1-4] Core CPU Turbo Ratio Limit	Limit ratio for cores 1-4.
Turbo Mode TDC Limit Override	Allows you to program the current thresholds for the processor while in turbo mode.

**Overclock Configuration Submenu**

Turbo Mode TDP Limit Override	Allows you to program the power thresholds for the processor while in turbo mode.
-------------------------------	---

**Overvoltage Configuration Submenu**

CPU Temperature Sensor	Displays the processor temperature in Celsius and Fahrenheit.
VCore	Displays processor core voltage.
Dynamic CPU VCore Offset	Processor core voltage offset.
DDR3 Memory Voltage	Adjust the DDR3 memory voltage.
IOH Voltage	Adjust the IOH voltage.
QPI and Uncore Voltage	Adjust QPI and uncore voltage.

## BIOS Security Features

---

Change Supervisor Password	Allows you to set or change the supervisor password.
Change User Password	Allows you to set or change the user password. You cannot use the user password to make change to the BIOS settings.

## Exit

---

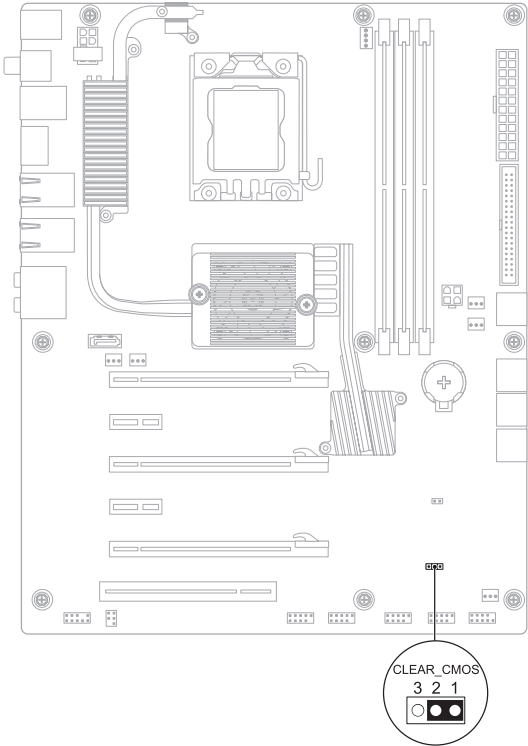
Exit Options	Provides options to Save Changes and Exit, Discard Changes and Exit, and Load Optimal Defaults.
--------------	---

# Clearing CMOS Settings



**NOTE:** This procedure does not clear or reset system and setup passwords.

1. Follow the instructions in "Before You Begin" on page 6.
2. Remove the left side-panel (see "Removing the Left Side-Panel" on page 15).
3. Remove the PCI shroud (see "Removing the PCI Shroud" on page 22).
4. Locate the 3-pin CMOS reset jumper on the system board (see "System Board Components" on page 11).
5. Remove the jumper plug from the CMOS reset jumper pins 1 and 2.
6. Place the jumper plug on the CMOS reset jumper pins 2 and 3 and wait for approximately five seconds.
7. Remove the jumper plug and replace it on the CMOS reset jumper pins 1 and 2.
8. Replace the PCI shroud (see "Replacing the PCI Shroud" on page 22).
9. Replace the left side-panel (see "Replacing the Left Side-Panel" on page 15).
10. Connect your computer and devices to electrical outlets, and then turn them on.



## Flashing the BIOS

The BIOS may require flashing when an update is available or when replacing the system board. To flash the BIOS:

1. Turn on the computer.
2. Visit **support.dell.com**.
3. Select your country and language.
4. Click **Drivers & Downloads**.
5. Locate the BIOS update file for your computer:



**NOTE:** The Service Tag for your computer is located on a label next to the FlexBay.

- If you have your computer's Service Tag:
  - a. Click **Enter a Service Tag**.
  - b. Enter your computer's Service Tag in the **Enter a service tag:** field, click **Go**, and proceed to step 6.

- If you do not have your computer's Service Tag:
  - a. Click **Select Your Product Model** in the **Select Your Entry Method** list.
  - b. Select the type of product in the **Select Your Product Family** list.
  - c. Select the product brand in the **Select Your Product Line** list.
  - d. Select the product model number in the **Select Your Product Model** list.



**NOTE:** If you have selected a different model and want to start over again, click **Start Over** on the top right of the menu.

- e. Click **Confirm**.
6. A list of results appear on the screen. Click **BIOS**.
7. Click **Download Now** to download the latest BIOS file. The **File Download** window appears.
8. Click **Save** to save the file on your desktop. The file downloads to your desktop.
9. Click **Close** if the **Download Complete** window appears. The file icon appears on your desktop and is titled the same as the downloaded BIOS update file.
10. Double-click the file icon on the desktop and follow the procedures that appear on the screen.