

Hardware Reference Guide - dc5700 Microtower Model

HP Compaq Business PC



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Hardware Reference Guide

HP Compaq Business PC

dc5700 Microtower Model

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About This Book

This guide provides basic information for upgrading this computer model.



WARNING! Text set off in this manner indicates that failure to follow directions could result in bodily harm or loss of life.



CAUTION Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.



NOTE Text set off in this manner provides important supplemental information.

Table of contents

1 Product Features

Standard Configuration Features	1
Front Panel Components	2
Rear Panel Components	3
Keyboard	4
Using the Windows Logo Key	5
Special Mouse Functions	6
Serial Number Location	6

2 Hardware Upgrades

Serviceability Features	7
Warnings and Cautions	7
Removing the Computer Access Panel	8
Replacing the Computer Access Panel	9
Removing the Front Bezel	10
Replacing the Front Bezel	11
Installing Additional Memory	12
DIMMs	12
DDR2-SDRAM DIMMs	12
Populating DIMM Sockets	13
Installing DIMMs	14
Removing or Installing an Expansion Card	16
Drive Positions	22
Installing Additional Drives	23
Removing an External 5.25-inch or 3.5-inch Drive	24
Installing an External 5.25-inch or 3.5-inch Drive	26
Removing an Internal 3.5-inch Hard Drive	29
Installing an Internal 3.5-inch Hard Drive	31

Appendix A Specifications

Appendix B Battery Replacement

Appendix C External Security Devices

Installing a Security Lock	39
Cable Lock	39
Padlock	40

Appendix D Electrostatic Discharge

Preventing Electrostatic Damage 41
Grounding Methods 41

Appendix E Computer Operating Guidelines, Routine Care and Shipping Preparation

Computer Operating Guidelines and Routine Care 43
Optical Drive Precautions 44
 Operation 44
 Cleaning 44
 Safety 44
Shipping Preparation 44

Index 45

1 Product Features

Standard Configuration Features

The HP Compaq Microtower features may vary depending on the model. For a complete listing of the hardware and software installed in the computer, run the diagnostic utility (included on some computer models only). Instructions for using the utility are provided in the *Troubleshooting Guide* on the *Documentation and Diagnostics CD*.



Figure 1-1 Microtower Configuration

Front Panel Components

Drive configuration may vary by model.

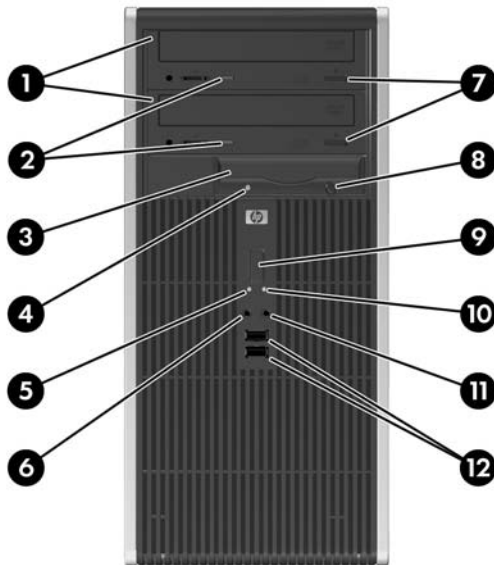


Table 1-1 Front Panel Components

1	5.25-inch Optical Drives ¹	7	Optical Drive Eject Buttons
2	Optical Drive Activity Lights	8	Diskette Eject Button (optional)
3	3.5-inch Diskette Drive (optional) ²	9	Dual-State Power Button
4	Diskette Drive Activity Light (optional)	10	Power On Light
5	Hard Drive Activity Light	11	Headphone Connector
6	Microphone Connector	12	USB (Universal Serial Bus) 2.0 Ports



NOTE An optical drive is a CD-ROM , CD-R/RW, DVD-ROM , DVD+R/RW, or CD-RW/DVD Combo drive.

The Power On Light is normally green when the power is on. If it is flashing red, there is a problem with the computer and it is displaying a diagnostic code. Refer to the *Troubleshooting Guide* on the *Documentation and Diagnostics CD* to interpret the code.

¹ Some models have bezel blanks covering one or both of the 5.25-inch drive bays.

² Some models have a bezel blank covering the 3.5-inch drive bay. An optional media card reader is available from HP for this drive bay.

Rear Panel Components

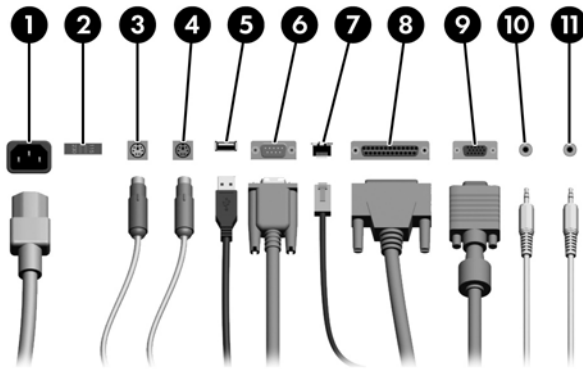


Table 1-2 Rear Panel Components

1	Power Cord Connector	7	 RJ-45 Network Connector
2	Voltage Select Switch	8	 Parallel Connector
3	 PS/2 Mouse Connector (green)	9	 Monitor Connector
4	 PS/2 Keyboard Connector (purple)	10	 Line-Out Connector for powered audio devices (green)
5	 Universal Serial Bus (USB)	11	 Line-In Audio Connector (blue)
6	IO/IO Serial Connector		



NOTE Arrangement and number of connectors may vary by model.

If a PCI graphics card is installed, the connectors on the card and the system board may be used at the same time. Some settings may need to be changed in Computer Setup to use both connectors. For information about Boot Order, refer to the *Computer Setup (F10) Utility Guide* on the *Documentation and Diagnostics CD*.

The Line-In and Line-Out audio connectors can be “retasked” to work as either Line-In, Line-Out, or Microphone connectors by clicking the Realtek HD Audio Manager icon (a red speaker) in the task tray or the Realtek entry in the operating system’s Control Panel and selecting the Retasking Enable option.

Keyboard

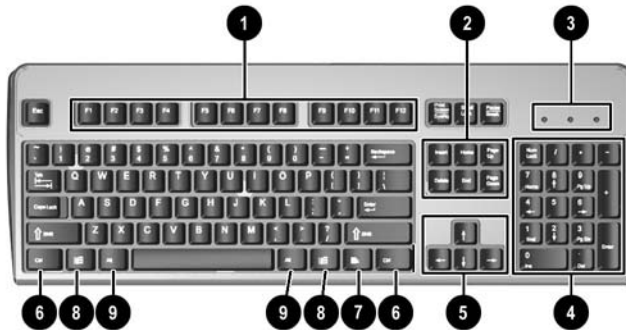


Table 1-3 Keyboard Components

1	Function Keys	Perform special functions depending on the software application being used.
2	Editing Keys	Includes the following: Insert, Home, Page Up, Delete, End, and Page Down.
3	Status Lights	Indicate the status of the computer and keyboard settings (Num Lock, Caps Lock, and Scroll Lock).
4	Numeric Keys	Work like a calculator keypad.
5	Arrow Keys	Used to navigate through a document or Web site. These keys allow you to move left, right, up, and down, using the keyboard instead of the mouse.
6	Ctrl Keys	Used in combination with another key; their effect depends on the application software you are using.
7	Application Key ¹	Used (like the right mouse button) to open pop-up menus in a Microsoft Office application. May perform other functions in other software applications.
8	Windows Logo Keys ¹	Used to open the Start menu in Microsoft Windows. Used in combination with other keys to perform other functions.
9	Alt Keys	Used in combination with another key; their effect depends on the application software you are using.

¹ Keys available in select geographic regions.

Using the Windows Logo Key

Use the Windows Logo key in combination with other keys to perform certain functions available in the Windows operating system. Refer to the [Keyboard](#) section to identify the Windows Logo key.

Windows Logo Key	Displays or hides the Start menu
Windows Logo Key + d	Displays the Desktop
Windows Logo Key + m	Minimizes all open applications
Shift + Windows Logo Key + m	Undoes Minimize All
Windows Logo Key + e	Launches My Computer
Windows Logo Key + f	Launches Find Document
Windows Logo Key + Ctrl + f	Launches Find Computer
Windows Logo Key + F1	Launches Windows Help
Windows Logo Key + l	Locks the computer if you are connected to a network domain, or allows you to switch users if you are not connected to a network domain
Windows Logo Key + r	Launches the Run dialog box
Windows Logo Key + u	Launches the Utility Manager
Windows Logo Key + Tab	Activates the next Taskbar button

Special Mouse Functions

Most software applications support the use of a mouse. The functions assigned to each mouse button depend on the software applications you are using.

Serial Number Location

Each computer has a unique serial number and product ID number that are located on the top cover of the computer. Keep these numbers available for use when contacting customer service for assistance.



Figure 1-2 Serial Number and Product ID Location

2 Hardware Upgrades

Serviceability Features

The computer includes features that make it easy to upgrade and service. No tools are needed for most of the installation procedures described in this chapter.

Warnings and Cautions

Before performing upgrades be sure to carefully read all of the applicable instructions, cautions, and warnings in this guide.



WARNING! To reduce the risk of personal injury from electrical shock, hot surfaces, or fire:

Disconnect the power cord from the wall outlet and allow the internal system components to cool before touching.

Do not plug telecommunications or telephone connectors into the network interface controller (NIC) receptacles.

Do not disable the power cord grounding plug. The grounding plug is an important safety feature.

Plug the power cord in a grounded (earthed) outlet that is easily accessible at all times.

To reduce the risk of serious injury, read the *Safety & Comfort Guide*. It describes proper workstation, setup, posture, and health and work habits for computer users, and provides important electrical and mechanical safety information. This guide is located on the Web at <http://www.hp.com/ergo> and on the *Documentation and Diagnostics CD*.




CAUTION Static electricity can damage the electrical components of the computer or optional equipment. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object. See Appendix D, [Electrostatic Discharge](#) for more information.


When the computer is plugged into an AC power source, voltage is always applied to the system board. You must disconnect the power cord from the power source before opening the computer to prevent damage to internal components.

Removing the Computer Access Panel

1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as diskettes or compact discs, from the computer.
3. Turn off the computer properly through the operating system, then turn off any external devices.
4. Disconnect the power cord from the power outlet and disconnect any external devices.

 **CAUTION** Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

5. Loosen the captive thumbscrew (1) that secures the access panel to the computer chassis.
6. Slide the access panel back (2) about 1.3 cm (1/2 inch), then lift it off the unit.

 **NOTE** You may want to lay the computer on its side to install internal parts. Be sure the side with the access panel is facing up.

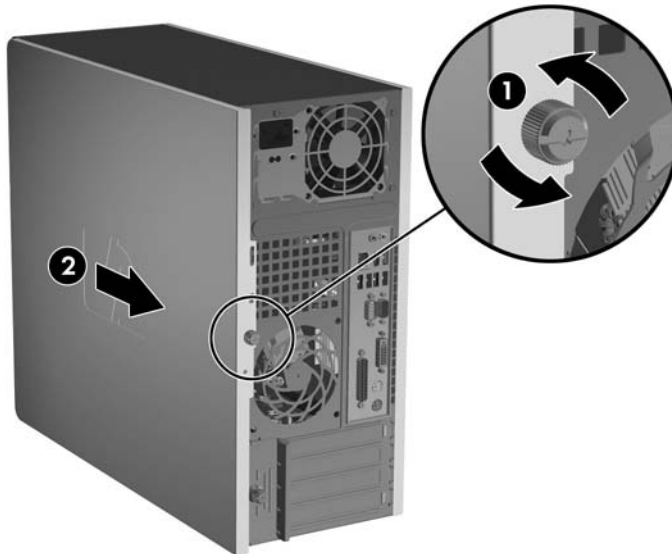


Figure 2-1 Removing the Computer Access Panel

Replacing the Computer Access Panel

Place the access panel on the chassis with about 1.3 cm (1/2 inch) of the panel hanging off the back of the chassis and slide it into place (1). Ensure that the hole for the thumbscrew is aligned with the hole in the chassis and tighten the thumbscrew (2).

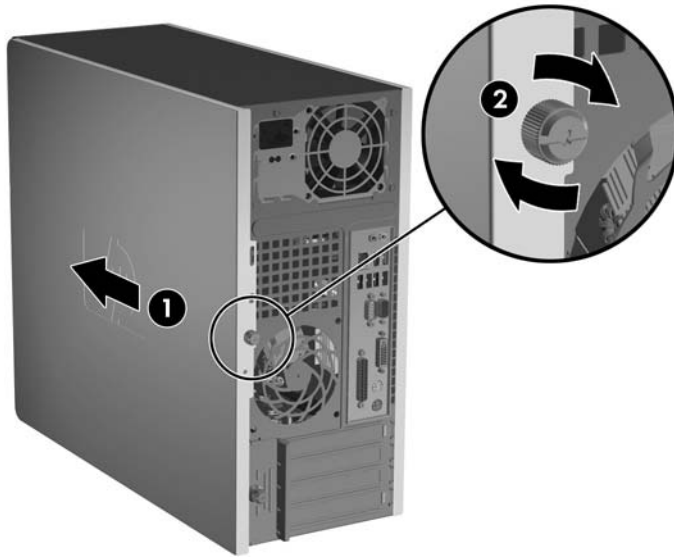



Figure 2-2 Replacing the Computer Access Panel

Removing the Front Bezel

1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as diskettes or compact discs, from the computer.
3. Turn off the computer properly through the operating system, then turn off any external devices.
4. Disconnect the power cord from the power outlet and disconnect any external devices.

 **CAUTION** Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

5. Remove the computer access panel.
6. Press the green latch on the bottom right of the chassis (1) to release the bottom of the bezel, then swing the bottom of the bezel away from the chassis (2) to release the top of the bezel.

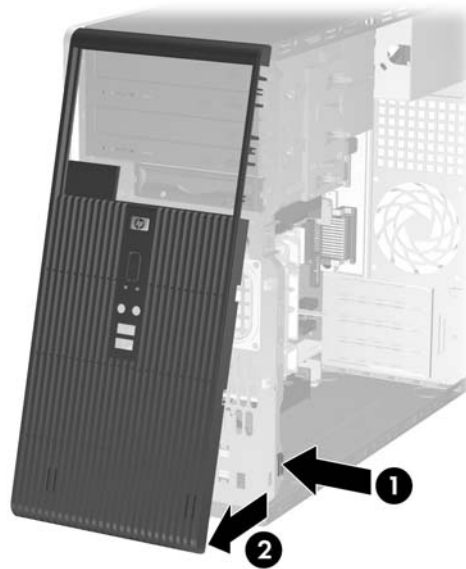


Figure 2-3 Removing the Front Bezel

Replacing the Front Bezel

Position the chassis in the upright position. Insert the two hooks on the top of the bezel into the rectangular holes on the chassis (1) then rotate the bottom of the bezel onto the chassis (2) so that the bottom two hooks on the bezel snap into place.

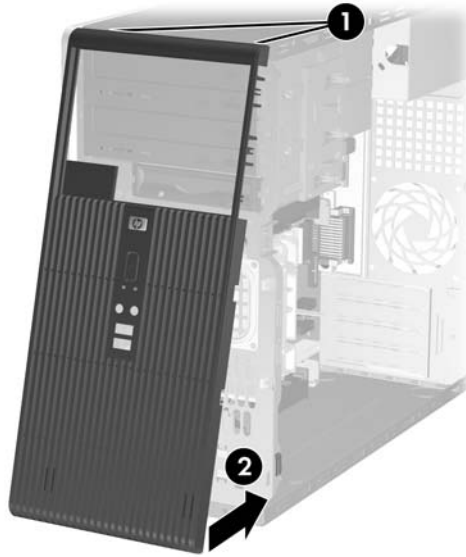


Figure 2-4 Replacing the Front Bezel

Installing Additional Memory

The computer comes with double data rate 2 synchronous dynamic random access memory (DDR2-SDRAM) dual inline memory modules (DIMMs).

DIMMs

The memory sockets on the system board can be populated with up to four industry-standard DIMMs. These memory sockets are populated with at least one preinstalled DIMM. To achieve the maximum memory support, you can populate the system board with up to 4 GB of memory configured in a high-performing dual channel mode.

DDR2-SDRAM DIMMs

For proper system operation, the DDR2-SDRAM DIMMs must be:

- industry-standard 240-pin
- unbuffered PC2-5300 667 MHz-compliant
- 1.8 volt DDR2-SDRAM DIMMs

The DDR2-SDRAM DIMMs must also:

- support CAS latency 4 and 5 for DDR2/667 MHz
- contain the mandatory JEDEC SPD information

In addition, the computer supports:

- 256Mbit, 512Mbit, and 1Gbit non-ECC memory technologies
- single-sided and double-sided DIMMs
- DIMMs constructed with x8 and x16 DDR devices; DIMMs constructed with x4 SDRAM are not supported



NOTE The system will not start if you install unsupported DIMMs.

Populating DIMM Sockets

There are four DIMM sockets on the system board, with two sockets per channel. The sockets are labeled XMM1, XMM2, XMM3, and XMM4. Sockets XMM1 and XMM2 operate in memory channel A. Sockets XMM3 and XMM4 operate in memory channel B.

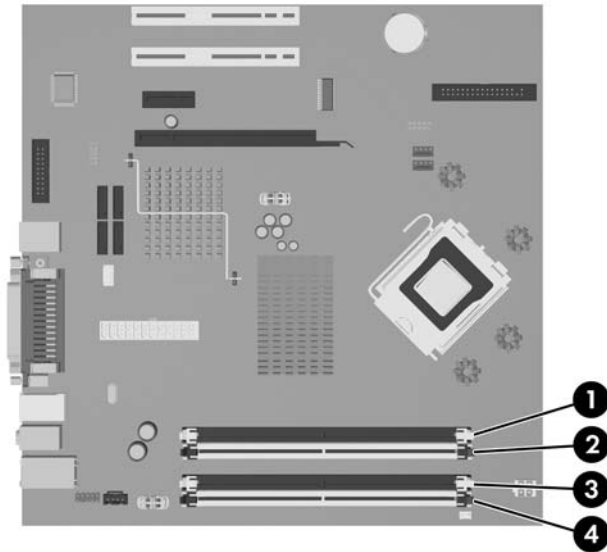


Figure 2-5 DIMM Socket Locations

Item	Description	Socket Color
1	DIMM socket XMM1, Channel A (populate first)	Black
2	DIMM socket XMM2, Channel A	White
3	DIMM socket XMM3, Channel B (populate second)	Black
4	DIMM socket XMM4, Channel B	White

The system will automatically operate in single channel mode, dual channel mode, or flex mode, depending on how the DIMMs are installed.

- The system will operate in single channel mode if the DIMM sockets are populated in one channel only.
- The system will operate in a higher-performing dual channel mode if the total memory capacity of the DIMMs in Channel A is equal to the total memory capacity of the DIMMs in Channel B. The technology and device width can vary between the channels. For example, if Channel A is populated with two 256MB DIMMs and Channel B is populated with one 512MB DIMM, the system will operate in dual channel mode.
- The system will operate in flex mode if the total memory capacity of the DIMMs in Channel A is not equal to the total memory capacity of the DIMMs in Channel B. In flex mode, the channel populated with the least amount of memory describes the total amount of memory assigned to dual channel and the remainder is assigned to single channel. For optimal speed, the channels should be balanced so that the largest amount of memory is spread between the two channels. For example, if you are populating the sockets with one 1GB DIMM, two 512MB DIMMs, and one 256MB DIMM,

one channel should be populated with the 1GB DIMM and one 256MB DIMM and the other channel should be populated with the two 512MB DIMMs. With this configuration, 2 GB will run as dual channel and 256 MB will run as single channel.

- In any mode, the maximum operational speed is determined by the slowest DIMM in the system.

Installing DIMMs



CAUTION You must disconnect the power cord and wait approximately 30 seconds for the power to drain before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged into an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board. If you see an LED light on the system board, voltage is still present.

The memory module sockets have gold-plated metal contacts. When upgrading the memory, it is important to use memory modules with gold-plated metal contacts to prevent corrosion and/or oxidation resulting from having incompatible metals in contact with each other.

Static electricity can damage the electronic components of the computer or optional cards. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object. For more information, refer to Appendix D, [Electrostatic Discharge](#).

When handling a memory module, be careful not to touch any of the contacts. Doing so may damage the module.

1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as diskettes or compact discs, from the computer.
3. Turn off the computer properly through the operating system, then turn off any external devices.
4. Disconnect the power cord from the power outlet and disconnect any external devices.



CAUTION You must disconnect the power cord and wait approximately 30 seconds for the power to drain before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged into an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board. If you see an LED light on the system board, voltage is still present.

5. Remove the computer access panel.
6. Locate the memory module sockets on the system board.



WARNING! To reduce risk of personal injury from hot surfaces, allow the internal system components to cool before touching.

7. Open both latches of the memory module socket (1), and insert the memory module into the socket (2).

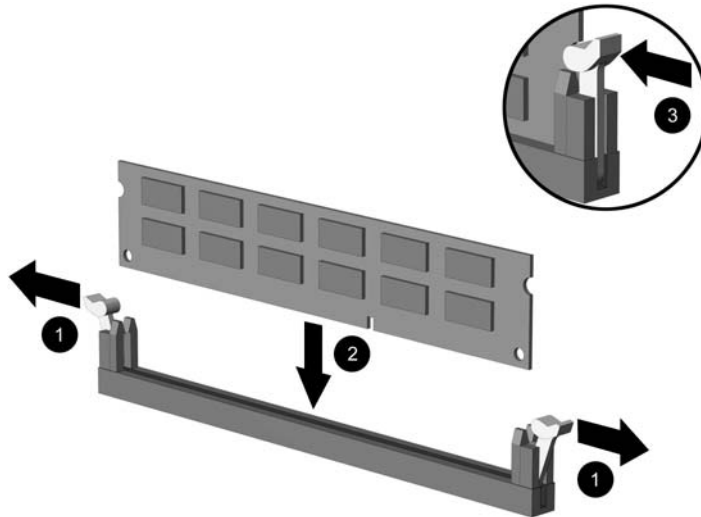


Figure 2-6 Installing a DIMM



NOTE A memory module can be installed in only one way. Match the notch on the module with the tab on the memory socket.

For maximum performance, populate the sockets so that the memory capacity is spread as equally as possible between Channel A and Channel B. Refer to [Populating DIMM Sockets](#) for more information.

8. Push the module down into the socket, ensuring that the module is fully inserted and properly seated. Make sure the latches are in the closed position (3).
9. Repeat steps 7 and 8 to install any additional modules.
10. Replace the computer access panel.
11. Reconnect the power cord and any external devices, then turn on the computer. The computer should automatically recognize the additional memory when you turn on the computer.
12. Lock any security devices that were disengaged when the access panel was removed.

Removing or Installing an Expansion Card

The computer has two standard PCI expansion slots that can accommodate an expansion card up to 17.46 cm (6.875 inches) in length. The computer also has one PCI Express x1 expansion slot and one ADD2/SDVO expansion slot.

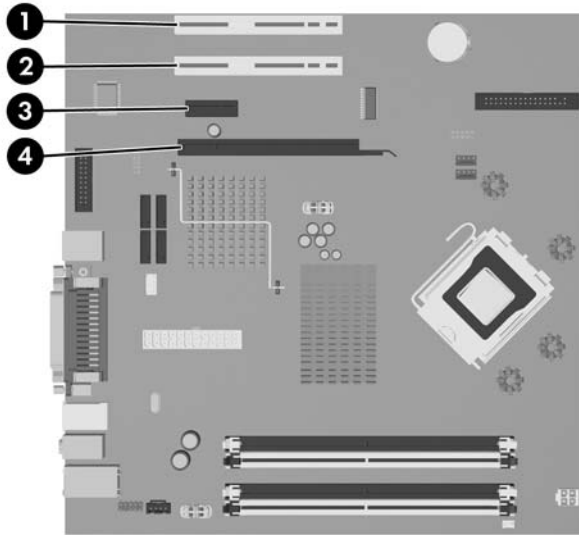


Figure 2-7 Expansion Slot Locations

Item	Description
1	PCI expansion slot
2	PCI expansion slot
3	PCI Express x1 expansion slot
4	ADD2/SDVO expansion slot




NOTE The dc5700 platform only supports the use of normal (or non-reversed) layout ADD2 (Advanced Digital Display 2) adapter cards inserted into the SDVO (Serial Digital Video Output) connector on the platform's system board. ADD2 cards are used to give multi-monitor capabilities to the integrated graphics controller.

The ADD2/SDVO connector on the system board has the physical appearance of a PCI Express x16 connector; however, the platform does NOT support the use of conventional PCI Express cards or reversed-layout ADD2 cards.

To remove, replace, or add an expansion card:

1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as diskettes or compact discs, from the computer.
3. Turn off the computer properly through the operating system, then turn off any external devices.
4. Disconnect the power cord from the power outlet and disconnect any external devices.

 **CAUTION** Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

5. Remove the computer access panel.
6. Locate the correct vacant expansion socket on the system board and the corresponding expansion slot on the back of the computer chassis.
7. On the rear of the computer, a sliding slot cover lock secures the expansion card brackets and expansion slot covers in place. Loosen the captive thumbscrew that holds the slot cover lock in place (1) and slide the slot cover lock up and off the chassis (2).

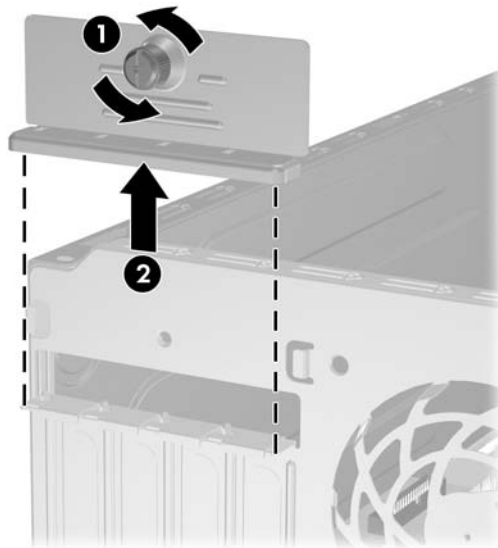


Figure 2-8 Releasing the Slot Cover Lock

8. Before installing an expansion card, remove the expansion slot cover or the existing expansion card.



NOTE Before removing an installed expansion card, disconnect any cables that may be attached to the expansion card.

- a. If you are installing an expansion card in a vacant socket, remove the appropriate expansion slot cover on the back of the chassis. Pull the slot cover straight up then away from the inside of the chassis.

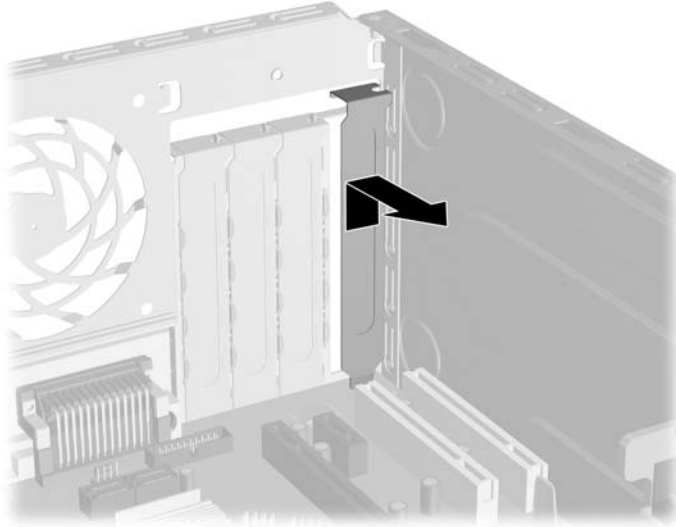


Figure 2-9 Removing an Expansion Slot Cover

- b. If you are removing a standard PCI card, hold the card at each end, and carefully rock it back and forth until the connectors pull free from the socket. Pull the expansion card straight up from the socket (1) then away from the inside of the chassis (2) to release it from the chassis frame. Be sure not to scrape the card against the other components.

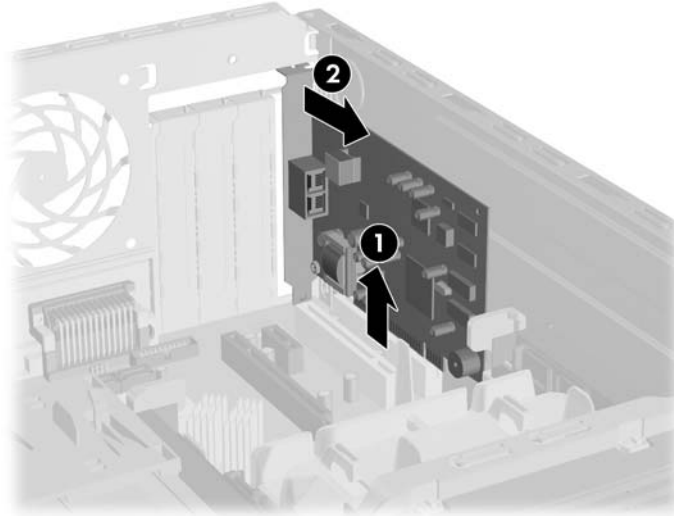


Figure 2-10 Removing a Standard PCI Expansion Card

- c. If you are removing a ADD2/SDVO card, pull the retention arm on the back of the expansion socket away from the card and carefully rock the card back and forth until the connectors pull free from the socket. Pull the expansion card straight up from the socket then away from the inside of the chassis to release it from the chassis frame. Be sure not to scrape the card against the other components.

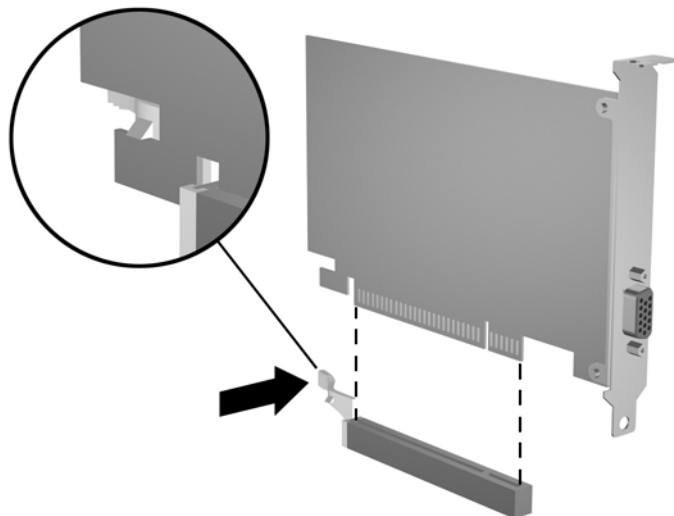


Figure 2-11 Removing a ADD2/SDVO Expansion Card

9. Store the removed card in anti-static packaging.
10. If you are not installing a new expansion card, install an expansion slot cover to close the open slot.



CAUTION After removing an expansion card, you must replace it with a new card or expansion slot cover for proper cooling of internal components during operation.

11. To install a new expansion card, hold the card just above the expansion socket on the system board then move the card toward the rear of the chassis (1) so that the bracket on the card is aligned with the open slot on the rear of the chassis. Press the card straight down into the expansion socket on the system board (2).

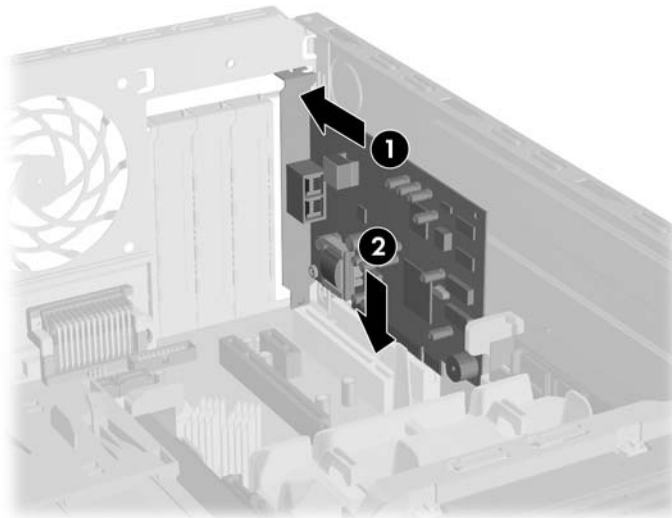


Figure 2-12 Installing an Expansion Card



NOTE When installing an expansion card, press firmly on the card so that the whole connector seats properly in the expansion card slot.

12. While holding the expansion card bracket against the chassis, slide the slot cover lock down toward the expansion card brackets and slot covers (1) to secure them in place then replace the thumbscrew (2) that secures the slot cover lock.

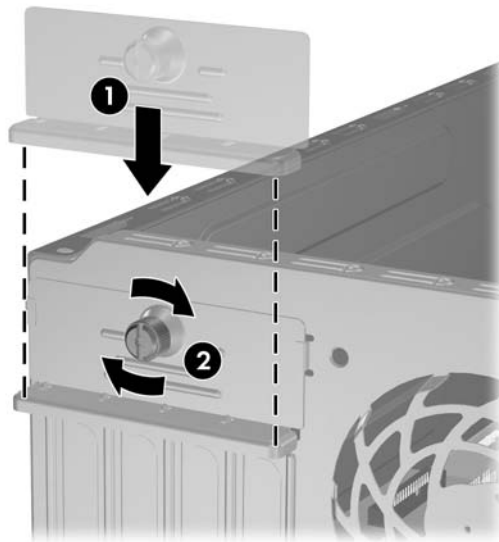


Figure 2-13 Securing the Expansion Cards and Slot Covers

13. Connect external cables to the installed card, if needed. Connect internal cables to the system board, if needed.
14. Replace the computer access panel.
15. Reconnect the power cord and any external devices, then turn on the computer.
16. Lock any security devices that were disengaged when the access panel was removed.
17. Reconfigure the computer, if necessary. Refer to the *Computer Setup (F10) Utility Guide* on the *Documentation and Diagnostics CD* for instructions about using Computer Setup.

Drive Positions

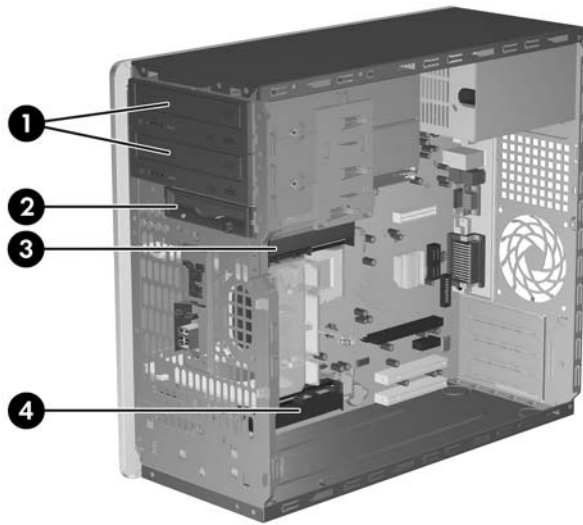


Figure 2-14 Drive Positions

-
- | | |
|---|--|
| 1 | Two 5.25-inch external drive bays for optional drives (optical drives shown) |
| 2 | One 3.5-inch external drive bay for optional drive (diskette drive shown) |
| 3 | Primary 3.5-inch internal hard drive bay |
| 4 | Secondary 3.5-inch internal hard drive bay for optional hard drive |
-

To verify the type and size of the storage devices installed in the computer, run Computer Setup. Refer to the *Computer Setup (F10) Utility Guide* on the *Documentation and Diagnostics CD* for more information.

Installing Additional Drives

When installing additional drives, follow these guidelines:

- The primary Serial ATA (SATA) hard drive must be connected to the dark blue SATA connector on the system board labeled SATA0.
- Connect the first SATA optical drive to the white SATA connector on the system board labeled SATA1.
- Always populate the dark blue SATA0 and white SATA1 connectors before the light blue SATA4 and orange SATA5 connectors.
- Connect a second SATA optical drive to the orange SATA5 connector.
- Connect additional SATA hard drives to the next available (unpopulated) SATA connector on the system board in the following order: SATA0, SATA1, SATA5, SATA4.
- Connect a diskette drive to the connector labeled FLOPPY P10.
- The system does not support Parallel ATA (PATA) optical drives or PATA hard drives.
- You may install either a third-height or a half-height drive into a half-height bay.
- You must install guide screws to ensure the drive will line up correctly in the drive cage and lock in place. HP has provided eight extra guide screws installed on the chassis behind the front bezel. Four of the guide screws are silver 6-32 standard screws used for hard drives only. The other four guide screws are black M3 metric screws used for all other drives.



CAUTION To prevent loss of work and damage to the computer or drive:

If you are inserting or removing a drive, shut down the operating system properly, turn off the computer, and unplug the power cord. Do not remove a drive while the computer is on or in standby mode.

Before handling a drive, ensure that you are discharged of static electricity. While handling a drive, avoid touching the connector. For more information about preventing electrostatic damage, refer to Appendix D, [Electrostatic Discharge](#).


Handle a drive carefully; do not drop it.

Do not use excessive force when inserting a drive.


Avoid exposing a hard drive to liquids, temperature extremes, or products that have magnetic fields such as monitors or speakers.

If a drive must be mailed, place the drive in a bubble-pack mailer or other protective packaging and label the package “Fragile: Handle With Care.”

Removing an External 5.25-inch or 3.5-inch Drive

 **CAUTION** All removable media should be taken out of a drive before removing the drive from the computer.

1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as diskettes or compact discs, from the computer.
3. Turn off the computer properly through the operating system, then turn off any external devices.
4. Disconnect the power cord from the power outlet and disconnect any external devices.

 **CAUTION** Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

5. Remove the access panel and front bezel.
6. Disconnect the drive cables, as indicated in the following illustrations.
 - a. If you are removing a 5.25-inch optical drive, disconnect the power cable (1) and data cable (2) from the back of the drive.

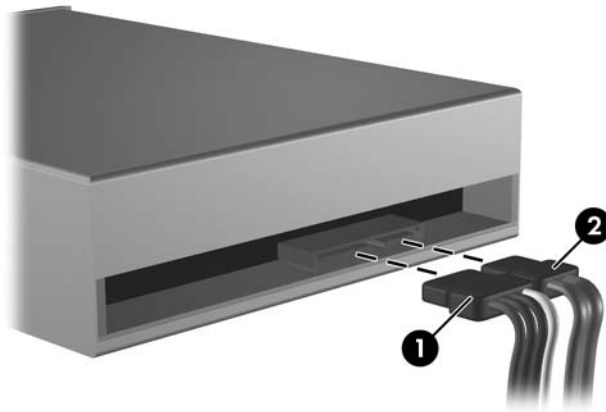


Figure 2-15 Disconnecting the Optical Drive Cables

- b. If you are removing a diskette drive, disconnect the data cable (1) and power cable (2) from the back of the drive.

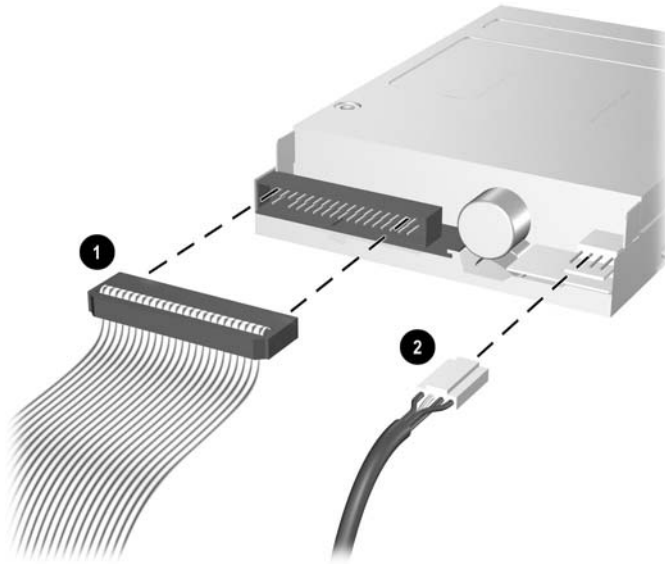


Figure 2-16 Disconnecting the Diskette Drive Cables

7. A latch drive bracket with release tabs secures the drives in the drive bay. Lift the release tab on the latch drive bracket (1) for the drive you want to remove, then slide the drive from its drive bay (2).

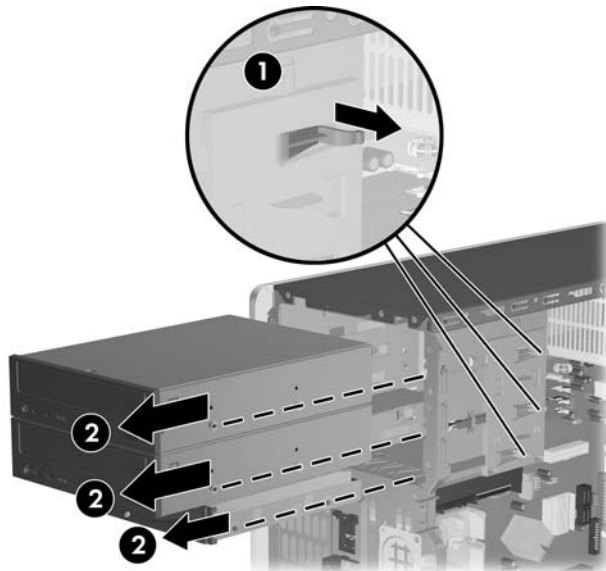


Figure 2-17 Removing the External Drives

8. Remove the four guide screws (two on each side) from the old drive. You will need these screws to install a new drive.

Installing an External 5.25-inch or 3.5-inch Drive



NOTE An optical drive is a CD-ROM, CD-R/RW, DVD-ROM, DVD+R/RW, or CD-RW/DVD Combo drive.

The system does not support Parallel ATA (PATA) optical drives.

1. Install the four guide screws (two on each side) that were removed from the old drive into the new drive. The screws help guide the drive into its proper position in the bay. Extra guide screws are provided on the front of the chassis under the front bezel.



Figure 2-18 Installing Guide Screws (Optical Drive Shown)



NOTE There are a total of eight extra guide screws on the front of the chassis under the bezel. Four have 6-32 standard threads and four have M3 metric threads. Standard screws are used for hard drives and have a silver finish. Metric screws are used for all other drives and have a black finish. Make sure to install the appropriate guide screws into the drive.

2. Slide the drive into the drive bay, making sure to align the guide screws with the guide slots, until the drive snaps into place.

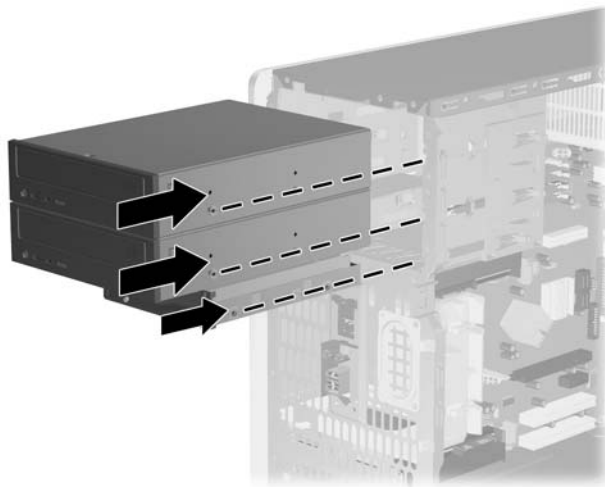


Figure 2-19 Sliding the External Drives into the Drive Cage

3. Connect the power and data cables to the drive as indicated in the following illustrations.
 - a. If you are installing an optical drive, connect the power cable (1) and data cable (2) to the back of the drive.

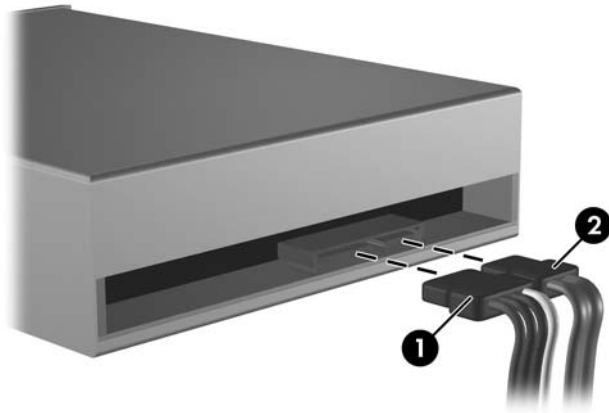


Figure 2-20 Connecting the Optical Drive Cables



CAUTION Never crease or bend a SATA data cable tighter than a 30 mm (1.18 in) radius. A sharp bend can break the internal wires.

- b. If you are installing a diskette drive, connect the data cable (1) and power cable (2) to the back of the drive.

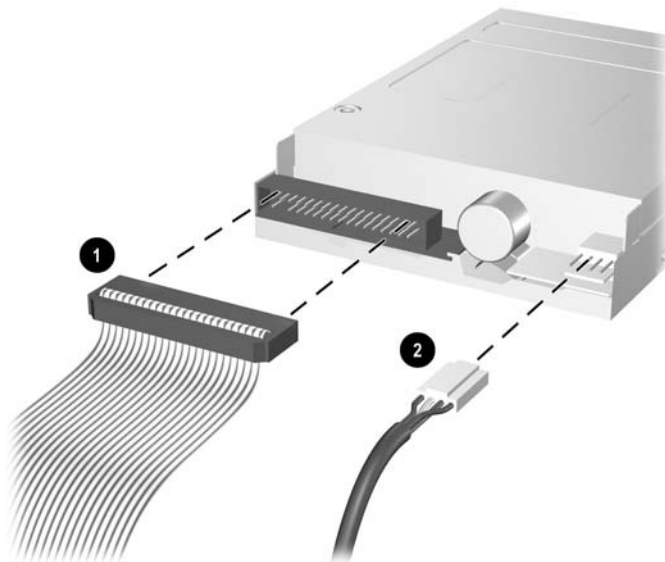


Figure 2-21 Connecting the Diskette Drive Cables

4. If installing a new drive, connect the opposite end of the data cable to the appropriate system board connector.



NOTE If you are installing a SATA optical drive, connect the first optical drive to the white SATA connector on the system board labeled SATA1. Connect a second optical drive to the orange SATA connector labeled SATA5.

If you are installing a diskette drive, connect it to the connector on the system board labeled FLOPPY P10.

5. If necessary, remove the appropriate drive bezel blank from the front bezel by pressing the two retaining tabs towards the outer left edge of the bezel (1) and pull the bezel blank inwards to remove it (2).

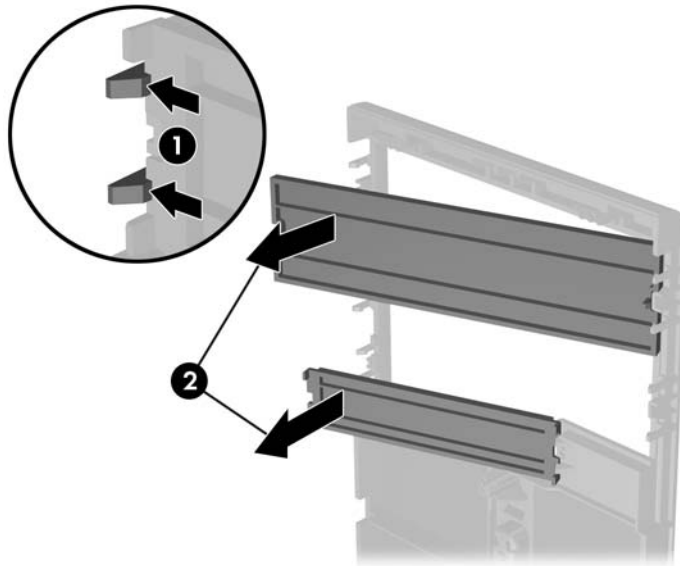


Figure 2-22 Removing Bezel Blanks

6. Replace the removed drive bezel with the appropriate bezel by pushing the bezel into place.



NOTE The type of bezel you need will depend on the type of drive you plan to install.

7. Replace the front bezel and computer access panel.
8. Reconnect the power cord and any external devices, then turn on the computer.
9. Lock any security devices that were disengaged when the access panel was removed.

Removing an Internal 3.5-inch Hard Drive



NOTE Before you remove the old hard drive, be sure to back up the data from the old hard drive so that you can transfer the data to the new hard drive. Also, if you are replacing the primary hard drive, make sure you have the *Restore Plus!* CD set that you created when you initially set up the computer to restore the operating system, software drivers, and any software applications that were preinstalled on the computer. If you do not have this CD set, create it now. Refer to the *HP Backup and Recovery Manager User Guide* in the Windows **Start** menu for more information. You may wish to print this guide for easy reference.

1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as diskettes or compact discs, from the computer.
3. Turn off the computer properly through the operating system, then turn off any external devices.
4. Disconnect the power cord from the power outlet and disconnect any external devices.



CAUTION Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

5. Remove the access panel and front bezel.
6. Disconnect the power cable (1) and data cable (2) from the back of the hard drive.

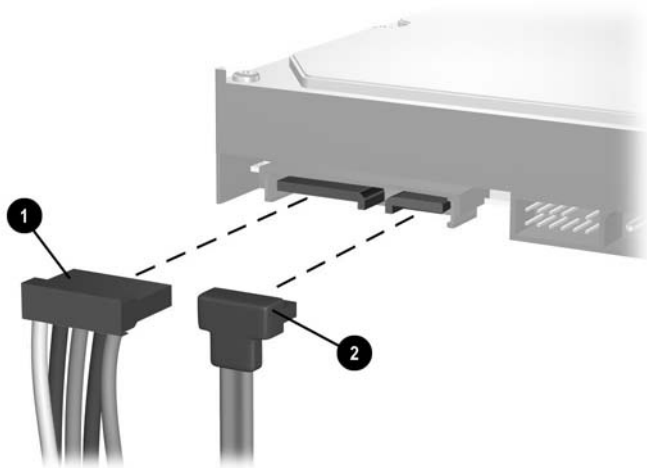


Figure 2-23 Disconnecting the Hard Drive Cables

7. Remove the power cable (1) and primary data cable (2) and secondary data cable (if necessary) (3) from the cable retainers to make it easier to access the drive.

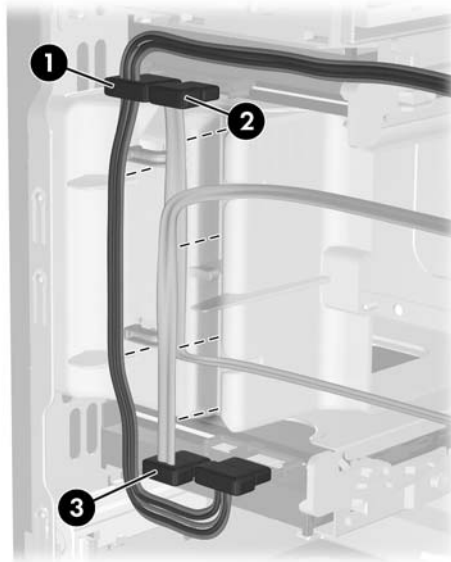


Figure 2-24 Removing Cables from Cable Retainers

8. Release the drive by pulling the green release tab away from the drive (1) and sliding the drive out of the bay (2).

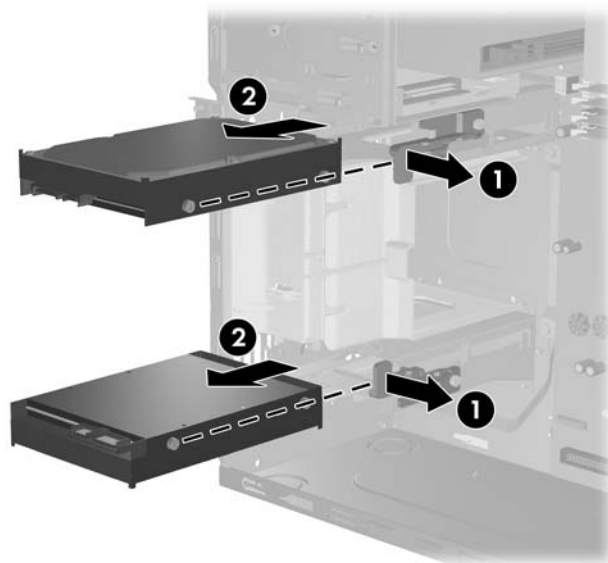


Figure 2-25 Removing a Hard Drive

9. Remove the four guide screws (two on each side) from the old drive. You will need these screws to install a new drive.

Installing an Internal 3.5-inch Hard Drive



NOTE The system does not support Parallel ATA (PATA) hard drives

1. Install the four guide screws (two on each side) that were removed from the old drive into the new drive. The screws help guide the drive into its proper position in the bay. Extra guide screws are provided on the front of the chassis under the front bezel.

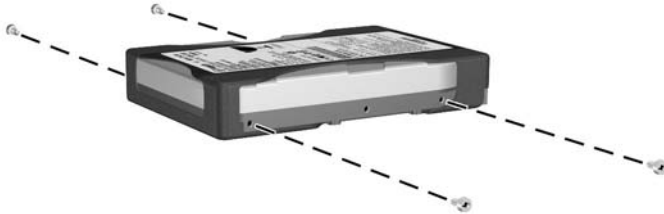


Figure 2-26 Installing Hard Drive Guide Screws



NOTE There are a total of eight extra guide screws on the front of the chassis under the bezel. Four have 6-32 standard threads and four have M3 metric threads. Standard screws are used for hard drives and have a silver finish. Metric screws are used for all other drives and have a black finish. Make sure to install the appropriate guide screws into the drive.

2. Slide the drive into the drive bay, making sure to align the guide screws with the guide slots, until the drive snaps into place. The upper bay is for the primary hard drive. The bottom bay is for an optional secondary hard drive.

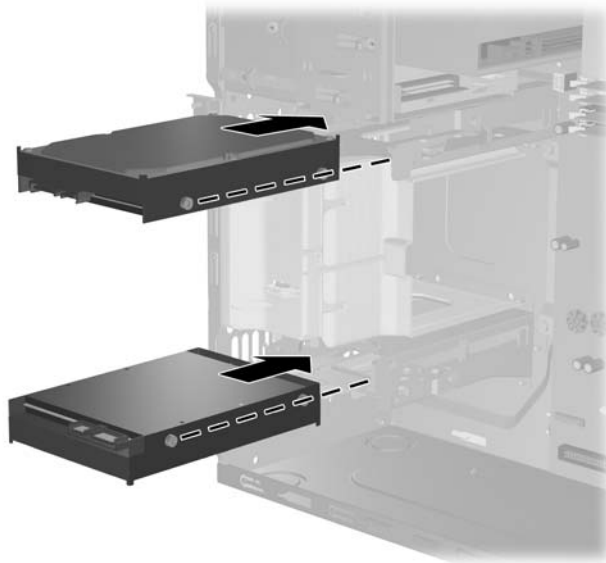


Figure 2-27 Sliding a Hard Drive into the Drive Bay

3. Connect the power cable (1) and data cable (2) to the back of the hard drive.



NOTE If you are installing a primary hard drive, use the power connector labeled P4. If you are installing a secondary hard drive, use the power connector labeled P5.

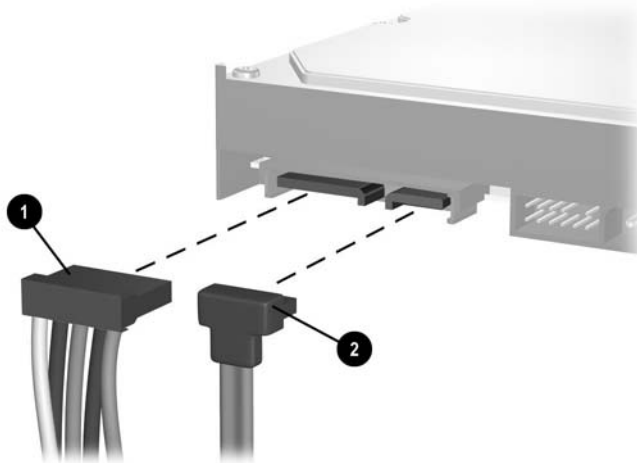


Figure 2-28 Connecting the Hard Drive Cables



CAUTION Never crease or bend a SATA data cable tighter than a 30 mm (1.18 in) radius. A sharp bend can break the internal wires.

4. If installing a new drive, connect the opposite end of the data cable to the appropriate system board connector.




NOTE If your system has only one SATA hard drive, you must connect the hard drive data cable to the dark blue connector labeled SATA0 to avoid any hard drive performance problems. If you are adding a second hard drive, connect the data cable to the next available (unpopulated) SATA connector on the system board in the following order: SATA0, SATA1, SATA5, SATA4.

5. Route the power and data cables in their cable retainers.
6. Replace the front bezel and computer access panel.
7. Reconnect the power cord and any external devices, then turn on the computer.
8. Lock any security devices that were disengaged when the access panel was removed.



NOTE If you replaced the primary hard drive, use the *Restore Plus!* CD set that you created when you initially set up the computer to restore the operating system, software drivers, and any software applications that were preinstalled on the computer. When the restore process has completed, reinstall any personal files that you backed up before replacing the hard drive.

A Specifications

Desktop Dimensions		
Height	19.94 in	50.65 cm
Width	6.98 in	17.73 cm
Depth	16.88 in	42.87 cm
Approximate Weight		
	23.5 lb	10.66 kg
Temperature Range		
Operating	50° to 95°F	10° to 35°C
Nonoperating	-22° to 140°F	-30° to 60°C
Relative Humidity (noncondensing)		
Operating	10-90%	10-90%
Nonoperating (38.7°C max wet bulb)	5-95%	5-95%
Maximum Altitude (unpressurized)		
Operating	10,000 ft	3048 m
Nonoperating	30,000 ft	9144 m
 NOTE	Operating temperature is derated 1.0° C per 300 m (1000 ft) to 3000 m (10,000 ft) above sea level; no direct sustained sunlight. Maximum rate of change is 10° C/Hr. The upper limit may be limited by the type and number of options installed.	
Heat Dissipation		
Maximum	1575 BTU/hr	397 kg-cal/hr
Typical (idle)	315 BTU/hr	80 kg-cal/hr
Power Supply		
	115V	230V
Operating Voltage Range ¹	90-132 VAC	180-264 VAC
Rated Voltage Range	100-127 VAC	200-240 VAC
Rated Line Frequency	50-60 Hz	50-60 Hz
Power Output		
	300 W	300 W

Rated Input Current (maximum)¹

8A @ 100 VAC

4A @ 200 VAC

- ¹ This system utilizes a passive power factor corrected power supply. The power factor correction is present in the 230V operating mode only. This allows the system to pass the CE mark requirements for use in the countries of the European Union. This supply requires the use of an input voltage range select switch.

B Battery Replacement

The battery that comes with the computer provides power to the real-time clock. When replacing the battery, use a battery equivalent to the battery originally installed in the computer. The computer comes with a 3-volt lithium coin cell battery.



WARNING! The computer contains an internal lithium manganese dioxide battery. There is a risk of fire and burns if the battery is not handled properly. To reduce the risk of personal injury:

Do not attempt to recharge the battery.

Do not expose to temperatures higher than 60°C (140°F).

Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.

Replace the battery only with the HP spare designated for this product.



CAUTION Before replacing the battery, it is important to back up the computer CMOS settings. When the battery is removed or replaced, the CMOS settings will be cleared. Refer to the *Computer Setup (F10) Utility Guide* on the *Documentation and Diagnostics CD* for information on backing up the CMOS settings.

Static electricity can damage the electronic components of the computer or optional equipment. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object.



NOTE The lifetime of the lithium battery can be extended by plugging the computer into a live AC wall socket. The lithium battery is only used when the computer is NOT connected to AC power.

HP encourages customers to recycle used electronic hardware, HP original print cartridges, and rechargeable batteries. For more information about recycling programs, go to <http://www.hp.com/recycle>.

1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as diskettes or compact discs, from the computer.
3. Turn off the computer properly through the operating system, then turn off any external devices.
4. Disconnect the power cord from the power outlet and disconnect any external devices.



CAUTION Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

5. Remove the computer access panel.
6. Locate the battery and battery holder on the system board.



NOTE On some computer models, it may be necessary to remove an internal component to gain access to the battery.

7. Depending on the type of battery holder on the system board, complete the following instructions to replace the battery.

Type 1

- a. Lift the battery out of its holder.

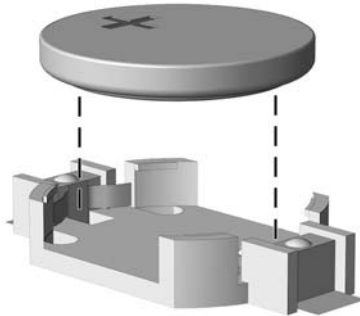


Figure B-1 Removing a Coin Cell Battery (Type 1)

- b. Slide the replacement battery into position, positive side up. The battery holder automatically secures the battery in the proper position.

Type 2

- a. To release the battery from its holder, squeeze the metal clamp that extends above one edge of the battery. When the battery pops up, lift it out (1).

- b. To insert the new battery, slide one edge of the replacement battery under the holder's lip with the positive side up. Push the other edge down until the clamp snaps over the other edge of the battery (2).

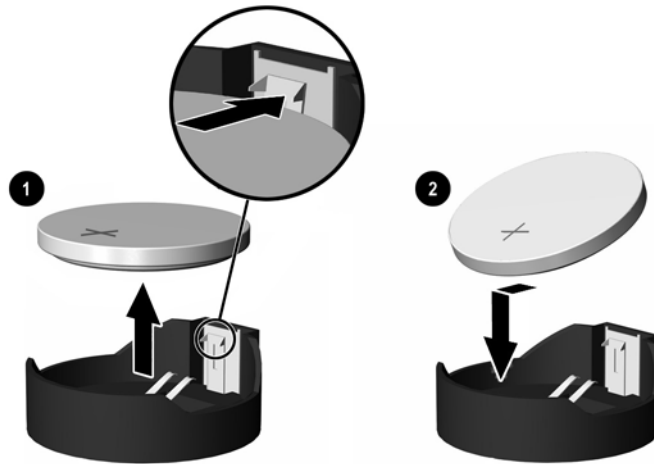


Figure B-2 Removing and Replacing a Coin Cell Battery (Type 2)

Type 3

- a. Pull back on the clip (1) that is holding the battery in place, and remove the battery (2).
- b. Insert the new battery and position the clip back into place.

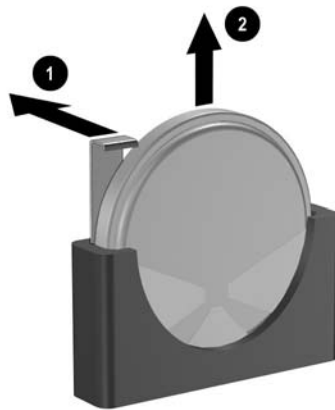


Figure B-3 Removing a Coin Cell Battery (Type 3)



NOTE After the battery has been replaced, use the following steps to complete this procedure.

8. Replace the computer access panel.
9. Plug in the computer and turn on power to the computer.
10. Reset the date and time, your passwords, and any special system setups using Computer Setup. Refer to the *Computer Setup (F10) Utility Guide* on the *Documentation and Diagnostics CD*.
11. Lock any security devices that were disengaged when the access panel was removed.

C External Security Devices



NOTE For information on data security features, refer to the *Computer Setup (F10) Utility Guide* and the *Desktop Management Guide* on the *Documentation and Diagnostics CD* and the *HP ProtectTools Security Manager Guide* (some models) at <http://www.hp.com>.

Installing a Security Lock

The security locks displayed below and on the following page can be used to secure the computer.

Cable Lock

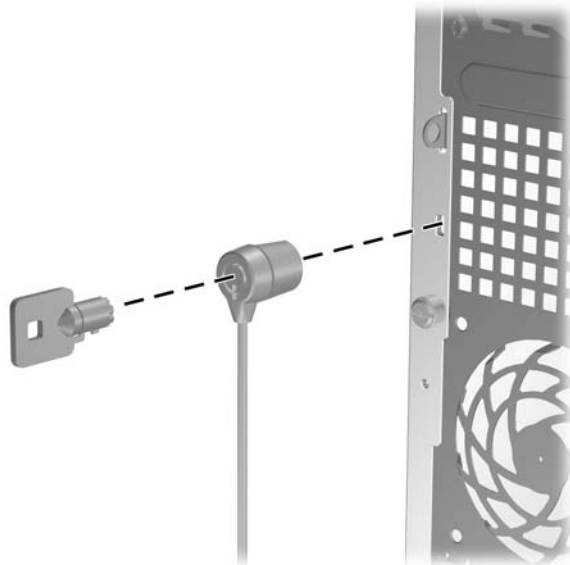


Figure C-1 Installing a Cable Lock

Padlock

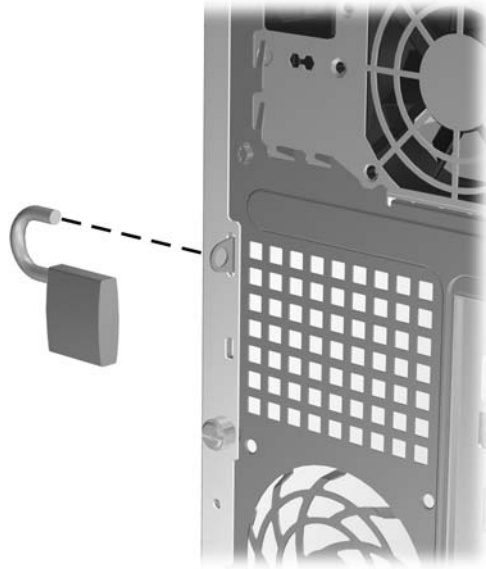


Figure C-2 Installing a Padlock

D Electrostatic Discharge

A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

Preventing Electrostatic Damage

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding Methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm +/- 10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heelstraps, toestraps, or bootstraps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, contact an HP authorized dealer, reseller, or service provider.



NOTE For more information on static electricity, contact an HP authorized dealer, reseller, or service provider.

E Computer Operating Guidelines, Routine Care and Shipping Preparation

Computer Operating Guidelines and Routine Care

Follow these guidelines to properly set up and care for the computer and monitor:

- Keep the computer away from excessive moisture, direct sunlight, and extremes of heat and cold.
- Operate the computer on a sturdy, level surface. Leave a 10.2-cm (4-inch) clearance on all vented sides of the computer and above the monitor to permit the required airflow.
- Never restrict the airflow into the computer by blocking any vents or air intakes. Do not place the keyboard, with the keyboard feet down, directly against the front of the desktop unit as this also restricts airflow.
- Never operate the computer with the cover or side panel removed.
- Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air.
- If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.
- Keep liquids away from the computer and keyboard.
- Never cover the ventilation slots on the monitor with any type of material.
- Install or enable power management functions of the operating system or other software, including sleep states.
- Turn off the computer before you do either of the following:
 - Wipe the exterior of the computer with a soft, damp cloth as needed. Using cleaning products may discolor or damage the finish.
 - Occasionally clean the air vents on all vented sides of the computer. Lint, dust, and other foreign matter can block the vents and limit the airflow.

Optical Drive Precautions

Be sure to observe the following guidelines while operating or cleaning the optical drive.

Operation

- Do not move the drive during operation. This may cause it to malfunction during reading.
- Avoid exposing the drive to sudden changes in temperature, as condensation may form inside the unit. If the temperature suddenly changes while the drive is on, wait at least one hour before you turn off the power. If you operate the unit immediately, it may malfunction while reading.
- Avoid placing the drive in a location that is subject to high humidity, extreme temperatures, mechanical vibration, or direct sunlight.

Cleaning

- Clean the panel and controls with a soft, dry cloth or a soft cloth lightly moistened with a mild detergent solution. Never spray cleaning fluids directly on the unit.
- Avoid using any type of solvent, such as alcohol or benzene, which may damage the finish.

Safety

If any object or liquid falls into the drive, immediately unplug the computer and have it checked by an authorized HP service provider.

Shipping Preparation

Follow these suggestions when preparing to ship the computer:

1. Back up the hard drive files on PD discs, tape cartridges, CDs, or diskettes. Be sure that the backup media is not exposed to electrical or magnetic impulses while stored or in transit.



NOTE The hard drive locks automatically when the system power is turned off.

2. Remove and store all removable media.
3. Insert a blank diskette into the diskette drive to protect the drive while in transit. Do not use a diskette on which you have stored or plan to store data.
4. Turn off the computer and external devices.
5. Disconnect the power cord from the electrical outlet, then from the computer.
6. Disconnect the system components and external devices from their power sources, then from the computer.



NOTE Ensure that all boards are seated properly and secured in the board slots before shipping the computer.

7. Pack the system components and external devices in their original packing boxes or similar packaging with sufficient packing material to protect them.

Index

A

- access panel
 - locking and unlocking 39
 - removing 8
 - replacing 9
- ADD2/SDVO card 16, 19
- audio connectors 2, 3

B

- backup and recovery 29
- battery replacement 35

C

- computer operating guidelines 43
- connecting drive cables 23

D

- DIMMs. *See* memory
- diskette drive
 - installing 26
 - removing 24
- drives
 - connecting cables 23
 - installing 23
 - locations 22

E

- electrostatic discharge, preventing damage 41
- expansion card
 - installing 16
 - removing 16
 - slot locations 16
- expansion slot cover
 - removing 18
 - replacing 20

F

- front bezel
 - removing 10
 - replacing 11
- front panel components 2

G

- guide screws 23

H

- hard drive
 - installing 31
 - removing 29
 - restoring software 29, 32
- headphone connector 2

I

- installation guidelines 7
- installing
 - battery 35
 - diskette drive 26
 - drive cables 23
 - expansion card 16
 - guide screws 23
 - hard drive 31
 - memory 12
 - optical drive 26
 - restore software 29, 32
 - security locks 39

K

- keyboard
 - components 4
 - connector 3

L

- line-in connector 3
- line-out connector 3

locks

- cable lock 39
- padlock 40

M

- memory
 - installing 12
 - populating sockets 13
 - specifications 12
- microphone connector 2
- monitor connector 3
- mouse
 - connector 3
 - special functions 6

N

- network connector 3

O

- optical drive
 - defined 2
 - cleaning 44
 - installing 26
 - precautions 44
 - removing 24

P

- parallel connector 3
- PCI card 16, 19
- PCI Express card 16
- power supply 33
- product ID location 6

R

- rear panel components 3
- removing
 - ADD2/SDVO card 19
 - battery 35
 - computer access panel 8
 - diskette drive 24

- expansion card 16
- expansion slot cover 18
- front bezel 10
- hard drive 29
- optical drive 24
- PCI card 19

S

- security
 - cable lock 39
 - padlock 40
- serial connector 3
- serial number location 6
- shipping preparation 44
- specifications
 - computer 33
 - memory 12

U

- unlocking access panel 39
- USB ports
 - front panel 2
 - rear panel 3

V

- ventilation guidelines 43

W

- Windows Logo key 5