# Hardware Reference Guide - dc7800 Series Ultra-Slim Desktop

HP Compaq Business PC

Hardware Reference Guide

dc7800 Ultra-Slim Desktop Model

First Edition (July 2007)

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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

The HP Compaq Ultra-Slim Desktop computer comes with features that 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*.

**Figure 1-1** Ultra-Slim Desktop

# Front Panel Components

Drive configuration may vary by model.

**Figure 1-2**  Front Panel Components
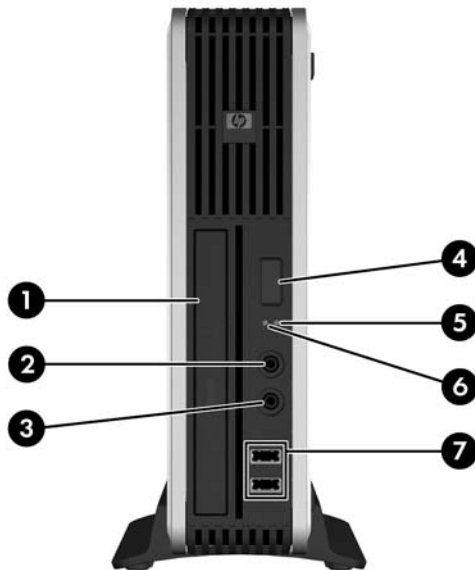


**Table 1-1**  Front Panel Components

| 1 | Optical Drive | 5 | System Power LED |
|---|---|---|---|
| 2 | Headphone Connector | 6 | Hard Drive Activity Light |
| 3 | Microphone Connector | 7 | USB (Universal Serial Bus) Ports |
| 4 | Dual-State Power Button | | |

**NOTE:**  An optical drive is a DVD-ROM drive, a DVD-CDRW Combo drive, or a SuperMulti LightScribe drive.

# Rear Panel Components

**Figure 1-3**  Rear Panel Components
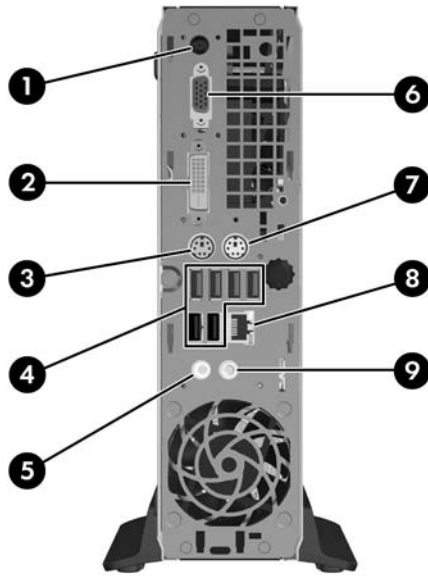


**Table 1-2**  Rear Panel Components

| | | | | | |
|---|---|---|---|---|---|
| 1 | | Power Cord Connector | 6 | 🖵 | VGA Monitor Connector (blue) |
| 2 | 🖵 | Digital Video Interface (DVI-D) Monitor connector (white) | 7 | 🖰 | PS/2 Mouse Connector (green) |
| 3 | ⌨ | PS/2 Keyboard Connector (purple) | 8 | 品品 | RJ-45 Network Connector |
| 4 | ⟡ | Universal Serial Bus (USB) (6) | 9 | ↲ | Line-In Audio Connector (blue) |
| 5 | ↲ | Line-Out Connector for powered audio devices (green) | | | |

**NOTE:**  Arrangement and number of connectors may vary by model.

The Line-in audio connector can be retasked as a microphone connector in the audio driver's control panel.

The DVI-D connector will only work with DVI displays. It cannot be adapted to support displays with analog inputs.

# Keyboard

Keyboard Components
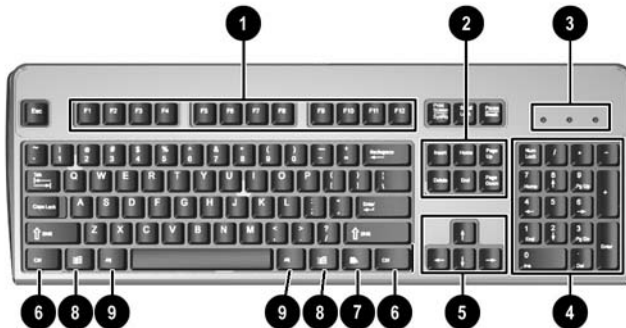


**Table 1-3** Keyboard Components

| | | |
|---|---|---|
| 1 | Function Keys | Perform special functions depending on the software application being used. |
| 2 | Editing Keys | Include 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 Keyboard on page 4 to identify the Windows Logo key.

**Table 1-4  Windows Logo Key Functions**

| | |
|---|---|
| The following Windows Logo Key functions are available in Microsoft Windows XP and Microsoft Windows Vista. | |
| 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 | Cycles through the Taskbar buttons (Windows XP) |
| | Cycles through programs on the Taskbar using the Windows Flip 3-D (Windows Vista) |
| In addition to the Windows Logo Key functions described above, the following functions are also available in Microsoft Windows Vista. | |
| Ctrl + Windows Logo Key + Tab | Use the arrow keys to cycle through programs on the Taskbar by using Windows Flip 3-D |
| Windows Logo Key + Spacebar | Bring all gadgets to the front and select Windows Sidebar |
| Windows Logo Key + g | Cycle through Sidebar gadgets |
| Windows Logo Key + u | Launches Ease of Access Center |
| Windows Logo Key + x | Launches Windows Mobility Center |
| Windows Logo Key + any number key | Launches the Quick Launch shortcut that is in the position that corresponds to the number (for example, Windows Logo Key + 1 launches the first shortcut in the Quick Launch menu) |

# Serial Number Location

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

**Figure 1-5** Serial Number and Product ID Location

# Changing from Desktop to Tower Configuration

1.  Remove/disengage any security devices that prohibit opening the computer.

2.  Remove all removable media, such as a compact disc, 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.  If the computer is on a stand, remove the computer from the stand and lay the computer down.

6.  Remove the access panel.

7.  Remove the front bezel.

8.  On the back side of the logo plate, press down on the "step" to remove the logo plate from the bezel (1).

9.  Rotate the plate 90 degrees (2) then press the logo plate back into the bezel.

    **Figure 1-6** Rotating the HP Logo Plate
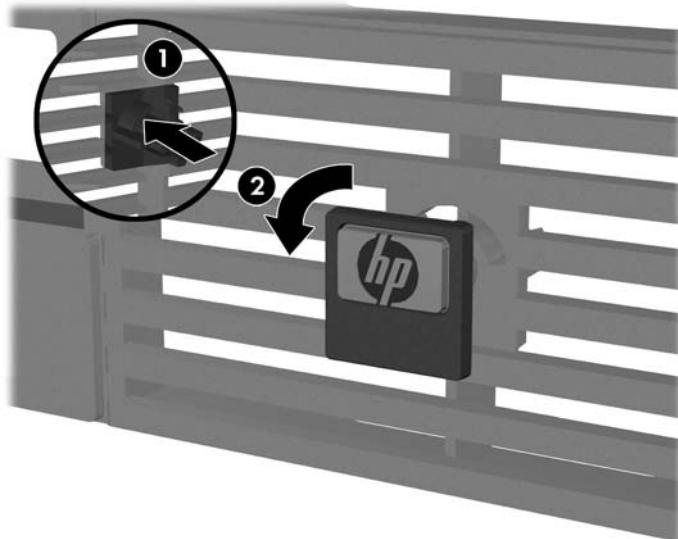


10. Replace the front bezel.

11. Replace the access panel.

**12.** Place the computer firmly down into the stand.

**Figure 1-7** Placing the Computer on the Stand



**13.** Reconnect the external equipment, plug the power cord into a power outlet, and turn the computer on.

**14.** Lock any security devices that were disengaged when the computer cover or access panel was removed.

To change from the tower configuration to the desktop configuration, reverse the previous steps.

**NOTE:** An optional Quick Release mounting bracket is available from HP for mounting the computer to a wall, desk, or swing arm.

# 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 or equipment damage from electrical shock, hot surfaces, or fire:

Disconnect the power cord from the power 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.

△ **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 on page 39 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

To access internal components, you must remove the access panel:

1.  Remove/disengage any security devices that prohibit opening the computer.

2.  Remove all removable media, such as a compact disc, 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.  If the computer is on a stand, remove the computer from the stand and lay the computer down.

6.  Loosen the thumbscrew on the rear of the computer (1), slide the access panel toward the front of the computer, then lift it off (2).

    **Figure 2-1** Removing the Computer Access Panel
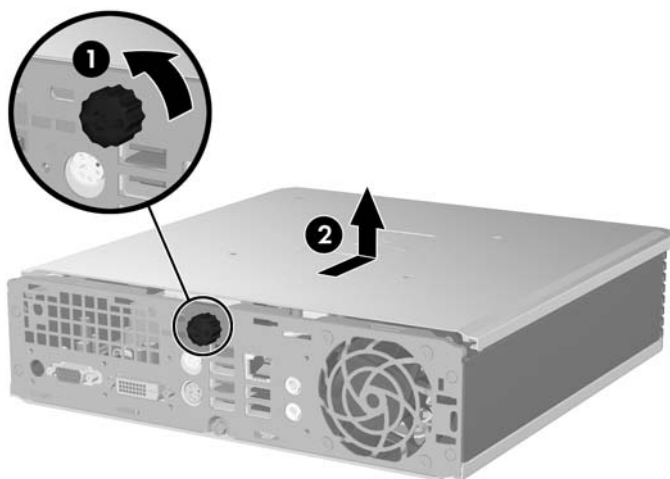


Replace the computer access panel by aligning the panel with the computer chassis, then sliding it onto the chassis toward the rear. Tighten the thumbscrew to secure the access panel.
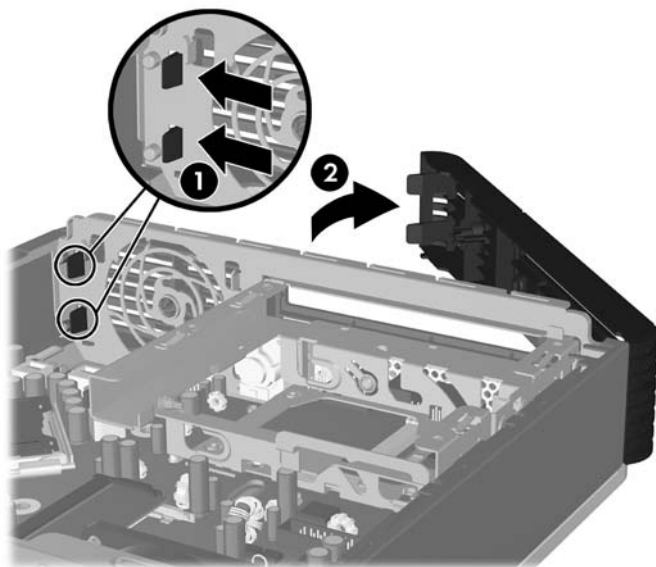
# Removing and Replacing the Front Bezel

**1.** Remove/disengage any security devices that prohibit opening the computer.

**2.** Remove all removable media, such as a compact disc, 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.** If the computer is on a stand, remove the computer from the stand and lay the computer down.

**6.** Remove the computer access panel.

**7.** Lift the fan shroud up and place it on top of the optical drive to access the front bezel release tabs. You do not need to disconnect the fan cable from the system board.

**Figure 2-2** Lifting the Fan Shroud
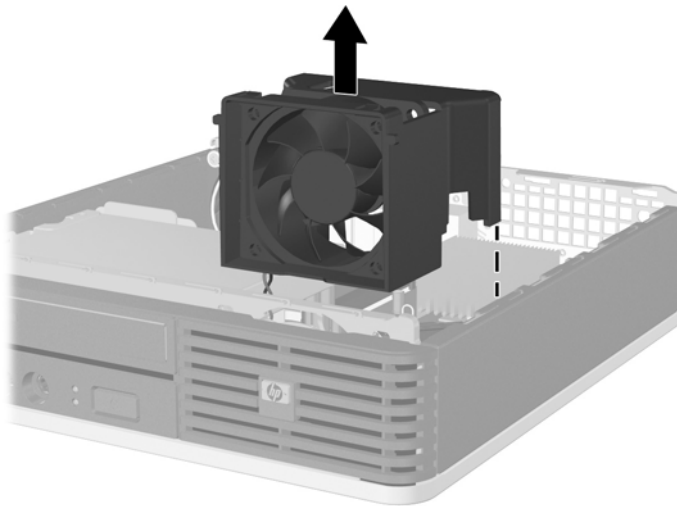
8.  Press the two release tabs on the inside of the bezel towards the right side of the computer (1) and rotate the bezel off from right to left (2).

    **Figure 2-3** Removing the Front Bezel

    

9.  Replace the fan shroud.

To replace the front bezel:

1.  Slide the hooks on the left side of the bezel into the slots on the chassis (1) then press the right side of the bezel onto the chassis so that the latches snap in place (2).

    **Figure 2-4** Replacing the Front Bezel
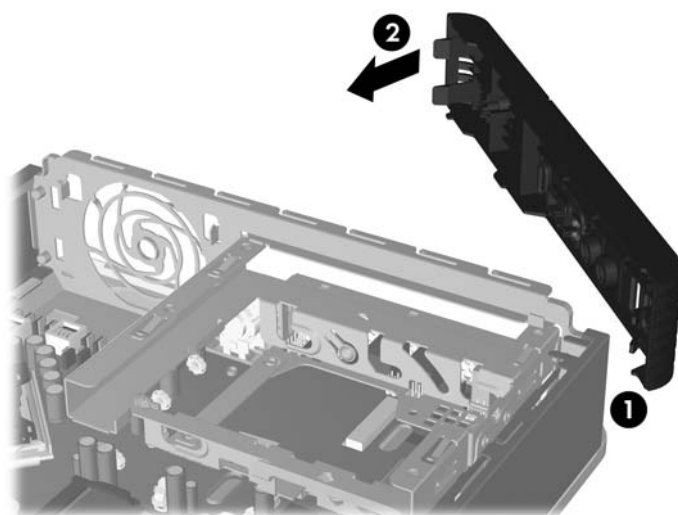
    

2.  Replace the access panel.

3.  If the computer was on a stand, replace the stand.

4.  Reconnect the power cord and turn on the computer.

5.  Lock any security devices that were disengaged when the access panel was removed.

# Removing a Bezel Blank
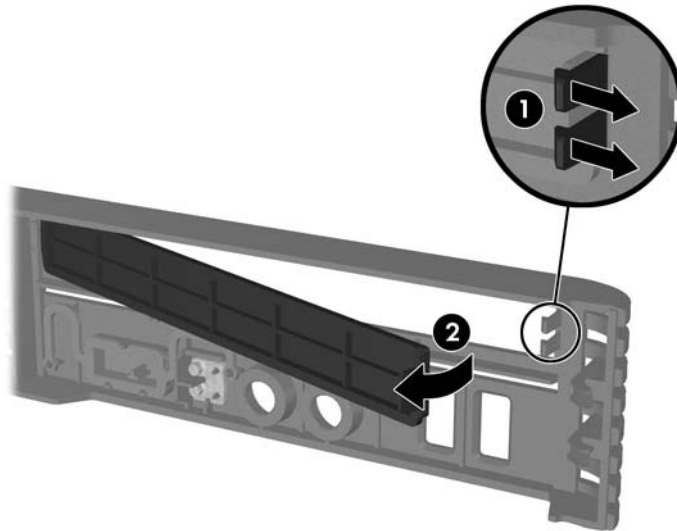
On some models, there is a bezel blank covering the external drive bay that needs to be removed before installing a drive. To remove a bezel blank:

1. Remove the front bezel.

2. Push the two retaining tabs that hold the bezel blank in place towards the outer right edge of the bezel (1) and pull the bezel blank inwards to remove it (2).

**Figure 2-5**  Removing a Bezel Blank

# Installing Additional Memory

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

## SODIMMs

The memory sockets on the system board can be populated with up to two industry-standard SODIMMs. These memory sockets are populated with at least one preinstalled SODIMM. To achieve the maximum memory support, you can populate the system board with up to 4GB of memory.

## DDR2-SDRAM SODIMMs

For proper system operation, the SODIMMs must be:

- industry-standard 200-pin

- unbuffered PC2-5300 667 MHz-compliant or PC2-6400 800 MHz-compliant

- 1.8 volt DDR2-SDRAM SODIMMs

The DDR2-SDRAM SODIMMs must also:

- support CAS latency 5 DDR2 667 Mhz (5-5-5 timing) and CAS latency 6 DDR2 800 Mhz (6-6-6 timing)

- contain the mandatory Joint Electronic Device Engineering Council (JEDEC) specification

In addition, the computer supports:

- 512Mbit and 1Gbit non-ECC memory technologies

- single-sided and double-sided SODIMMS

- SODIMMs constructed with x8 and x16 devices; SODIMMs constructed with x4 SDRAM are not supported

**NOTE:** The system will not operate properly if you install unsupported SODIMMs.

Refer to the *Computer Setup (F10) Utility Guide* for information on how to determine the processor bus frequency of a specific computer.

# Populating SODIMM Sockets

There are two SODIMM sockets on the system board, with one socket per channel. The sockets are labeled DIMM1 and DIMM3. The DIMM1 socket operates in memory channel A. The DIMM3 socket operates in memory channel B.
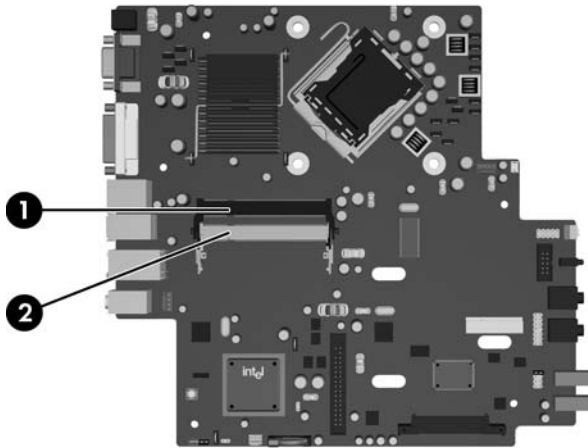
**Figure 2-6** SODIMM Socket Locations



**Table 2-1** SODIMM Socket Locations

| Item | Description | Socket Color |
|------|-------------|--------------|
| 1 | SODIMM1 socket, Channel A | Black |
| 2 | SODIMM3 socket, Channel B | White |

**NOTE:** A SODIMM must occupy the black DIMM1 socket. Otherwise, the system will display a POST error message indicating that a memory module must be installed in the black socket.

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

- The system will operate in single channel mode if the SODIMM sockets are populated in one channel only.

- The system will operate in a higher-performing dual channel mode if the memory capacity of the SODIMM in Channel A is equal to the memory capacity of the SODIMM in Channel B.

- The system will operate in flex mode if the memory capacity of the SODIMM in Channel A is not equal to the memory capacity of the SODIMM 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. If one channel will have more memory than the other, the larger amount should be assigned to channel A.

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

# Installing SODIMMs

△ **CAUTION:** You must disconnect the power cord 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.

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 on page 39.

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 a compact disc, 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.

5. If the computer is on a stand, remove the computer from the stand and lay the computer down.

6. Remove the computer access panel.

7. 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.

**8.** If you are adding a second SODIMM, remove the SODIMM from the top DIMM1 socket to access the bottom DIMM3 socket. Press outward on the two latches on each side of the SODIMM (1) then pull the SODIMM out of the socket (2).

**Figure 2-7** Removing a SODIMM
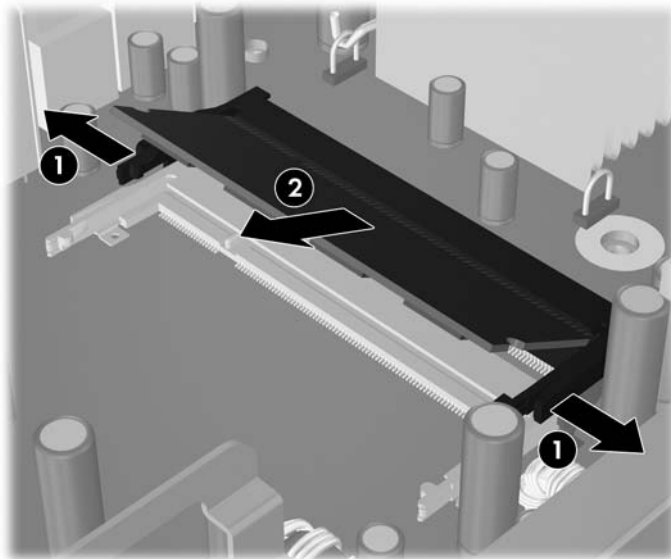


**9.** Slide the new SODIMM into the socket at approximately a 30° angle (1) then press the SODIMM down (2) so that the latches lock it in place.

**Figure 2-8** Installing a SODIMM
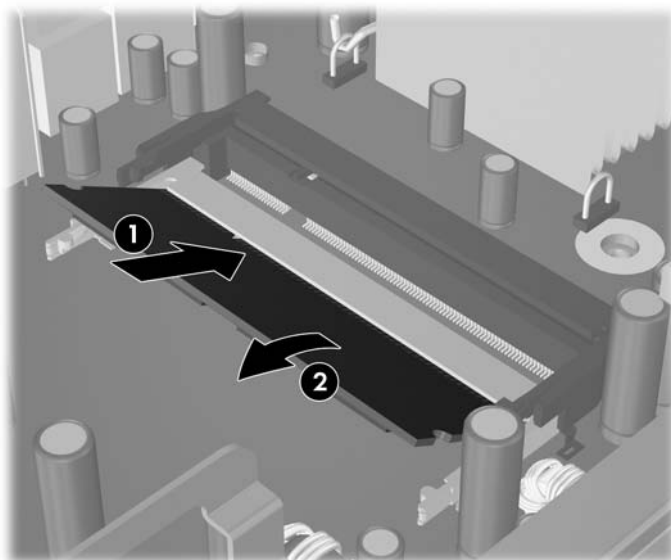


> **NOTE:** A memory module can be installed in only one way. Match the notch on the module with the tab on the memory socket.
>
> A SODIMM must occupy the DIMM1 (top) socket.

**10.** Replace the SODIMM in the DIMM1 socket if it was removed.

**11.** Replace the access panel.

**12.** If the computer was on a stand, replace the stand.

**13.** Reconnect the power cord and turn on the computer.

**14.** Lock any security devices that were disengaged when the computer cover or access panel was removed.

The computer automatically recognizes the additional memory when you turn on the computer.

# Upgrading the Hard Drive

📝 **NOTE:** The Ultra-Slim Desktop supports only 2.5-inch Serial ATA (SATA) internal hard drives; parallel ATA (PATA) internal hard drives are not supported.

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 created a Recovery Disc Set 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, select **Start** > **HP Backup and Recovery** and create it now.

The 2.5-inch hard drive is enclosed in a carrier under the optical drive.

1.  Remove/disengage any security devices that prohibit opening the computer.

2.  Remove all removable media, such as a compact disc, 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.  If the computer is on a stand, remove the computer from the stand and lay the computer down.

6.  Remove the computer access panel.

7.  Remove the optical drive. Refer to Removing the Existing Optical Drive on page 24 for instructions.

8.  Press in the release latch on the left side of the hard drive carrier (1) then rotate the carrier handle to the right (2).

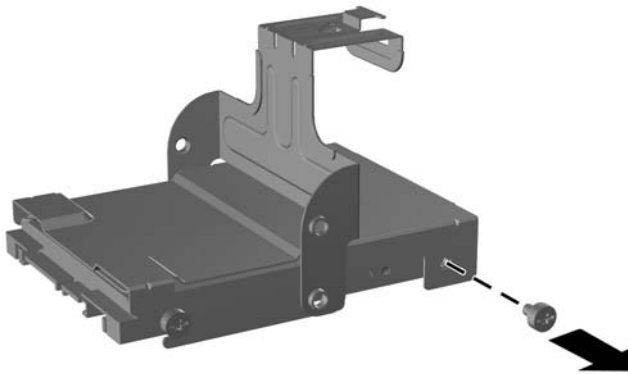**Figure 2-9** Unlocking the Hard Drive Carrier
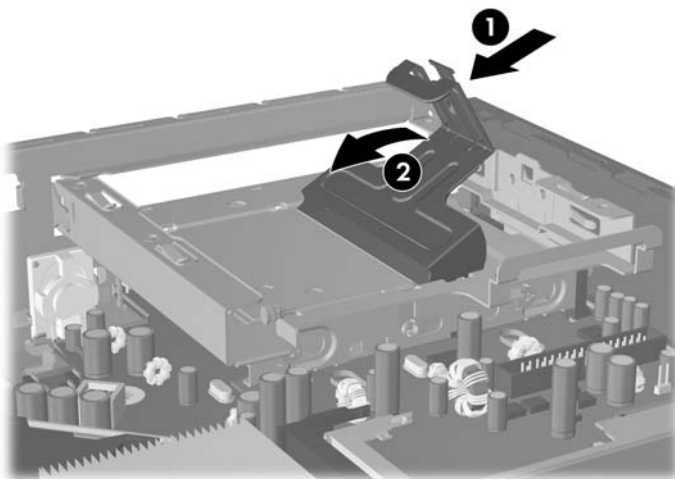
9. Lift the hard drive carrier straight up and out of the chassis.

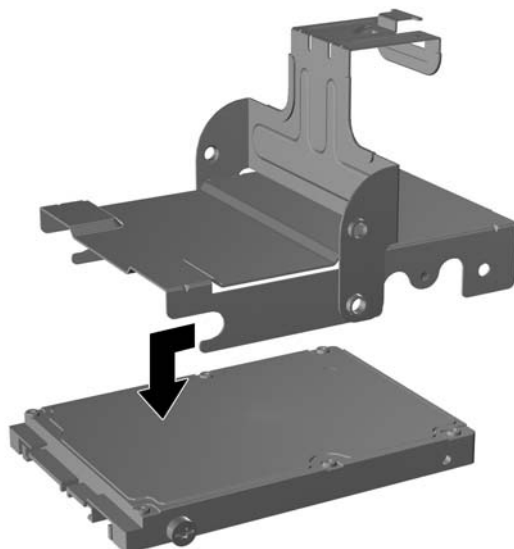Figure 2-10 Removing the Hard Drive Carrier
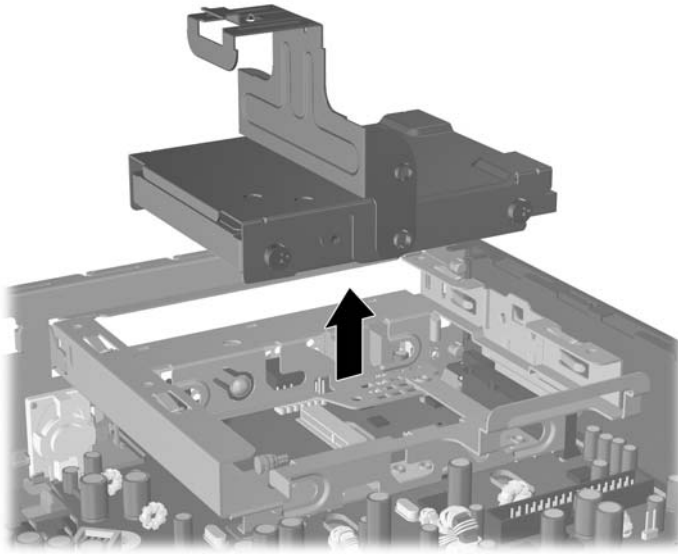


10. To remove the hard drive from the carrier, remove the guide screw from the front left side of the carrier.

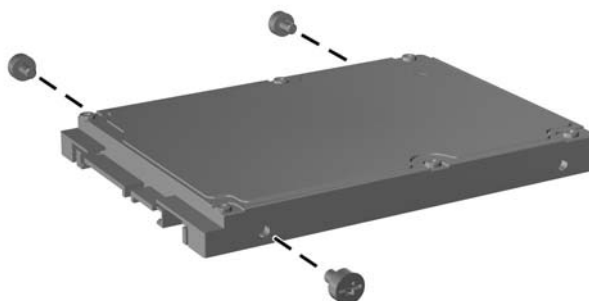Figure 2-11 Removing the Hard Drive Guide Screw

**11.** Slide the carrier back and remove the hard drive.

**Figure 2-12** Removing the Hard Drive



**12.** Transfer the three remaining guide screws (two on the right and one on the rear left) from the old drive to the new drive.

**Figure 2-13** Transferring the Guide Screws

13. Align the guide screws with the slots on the carrier and slide the new hard drive into the carrier (1), then replace the guide screw on the front left of the carrier to secure the drive in the carrier (2).

**Figure 2-14** Installing the Hard Drive in the Carrier
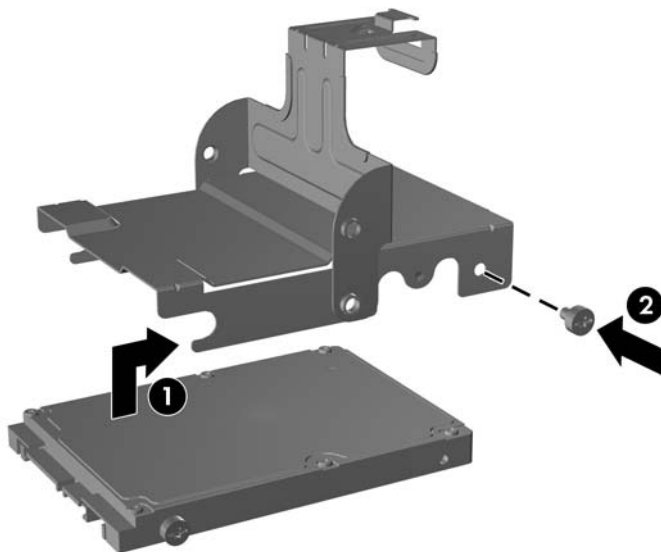


14. To place the hard drive carrier back in the chassis, align the guide screws with the slots on the drive bay, drop the carrier straight down into the drive bay (1), and press the handle on the carrier all the way down to the down (2) so that the drive is properly seated and locked in place.

**Figure 2-15** Installing the Hard Drive Carrier
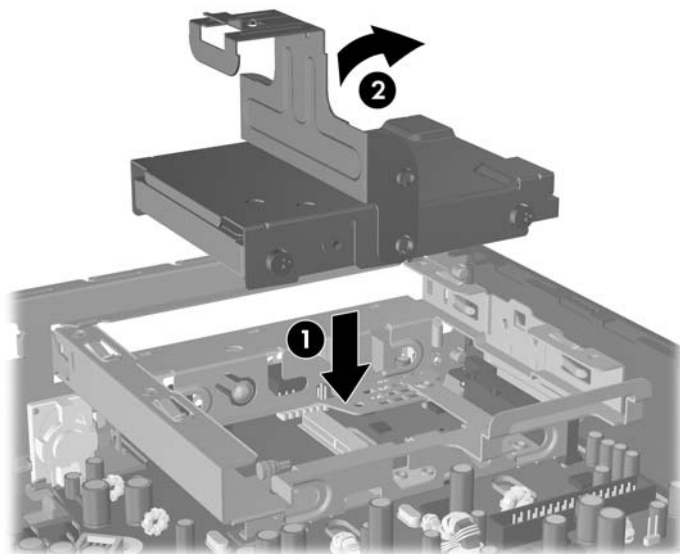


15. Replace the computer access panel.

16. If the computer was on a stand, replace the stand.

17. Reconnect the power cord and turn on the computer.

18. Lock any security devices that were disengaged when the computer cover or access panel was removed.

**NOTE:** No configuration of the SATA hard drive is necessary; the computer automatically recognizes it the next time you turn on the computer.

After replacing the hard drive, use the Recovery Disc 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.
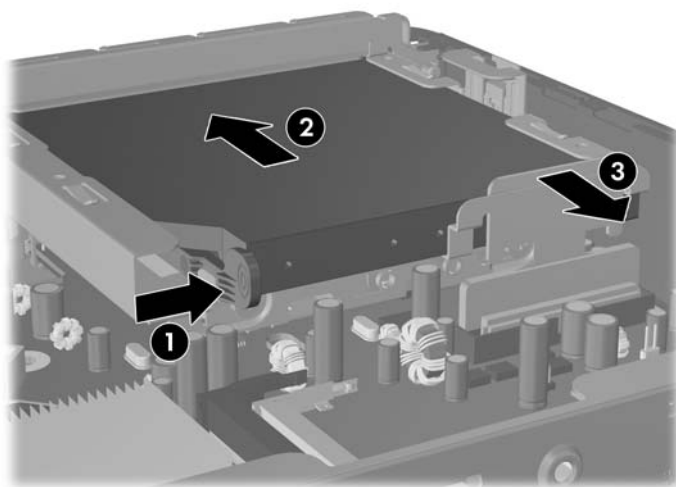
# Replacing the Optical Drive

An optical drive is a DVD-ROM drive, a DVD-CDRW Combo drive, or a SuperMulti LightScribe drive.

## Removing the Existing Optical Drive

1. Remove/disengage any security devices that prohibit opening the computer.

2. Remove all removable media, such as a compact disc, 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. If the computer is on a stand, remove the computer from the stand and lay the computer down.

6. Remove the computer access panel.

7. Push the green release latch on the right rear side of the optical drive toward the center of the optical drive (1), slide the optical drive forward approximately 6 mm (1/4 inch) (2), then disconnect the cable on the rear of the drive (3).

   **Figure 2-16** Disengaging the Optical Drive

**8.** Slide the drive all the way out of the bay through the front bezel.

**Figure 2-17** Removing the Optical Drive
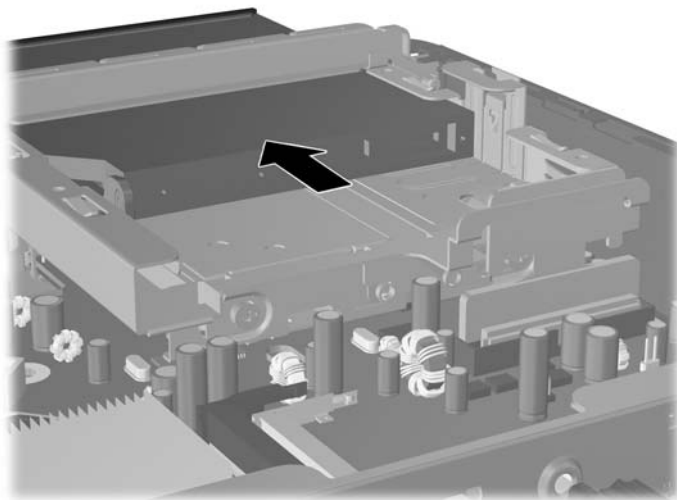
# Preparing the New Optical Drive

Before the new optical drive can be used, the release latch must be attached.

1. Peel the backing off the adhesive on the release latch.

2. Without allowing the release latch to touch the optical drive, carefully align the holes on the release latch with the pins on the side of the optical drive. Make sure the release latch is oriented properly.

3. Insert the pin at the front of the optical drive into the hole at the end of the release latch, and press firmly.

4. Insert the second pin, and press the entire release latch firmly to fasten the latch securely to the optical drive.

   **Figure 2-18** Aligning the Release Latch
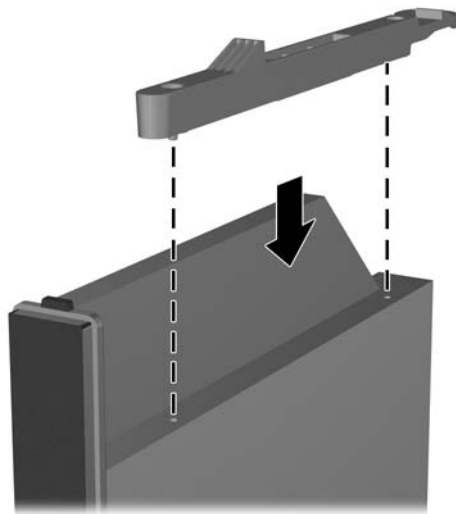
# Installing the New Optical Drive

📝 **NOTE:** If you are installing an optical drive in a bay that did not previously have a drive in it, you must remove the access panel and the bezel blank covering the opening of the bay before proceeding. Follow the procedures in Removing the Computer Access Panel on page 10 and Removing a Bezel Blank on page 13.

1.  Attach the release latch to the new optical drive. Refer to Preparing the New Optical Drive on page 26.

2.  Align the optical drive with the opening in the front bezel. Make sure the back of the optical drive is being inserted first and the release latch is on the inner side of the drive.

3.  Slide the optical drive into the computer through the front bezel. However, do not slide it all the way in until it locks. Leave it approximately 6 mm (1/4 inch) short of the fully-inserted locked position to allow room to connect the cable.

    **Figure 2-19** Inserting the Optical Drive
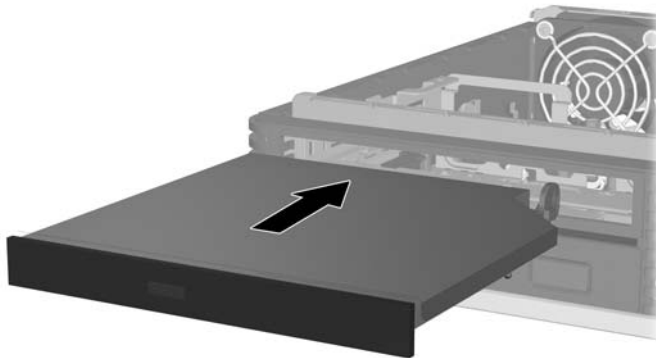


4.  Connect the cable to the rear of the optical drive (1), then slide the drive the rest of the way into the bay so that it locks in place (2).

    **Figure 2-20** Connecting the Cable and Locking the Drive in Place
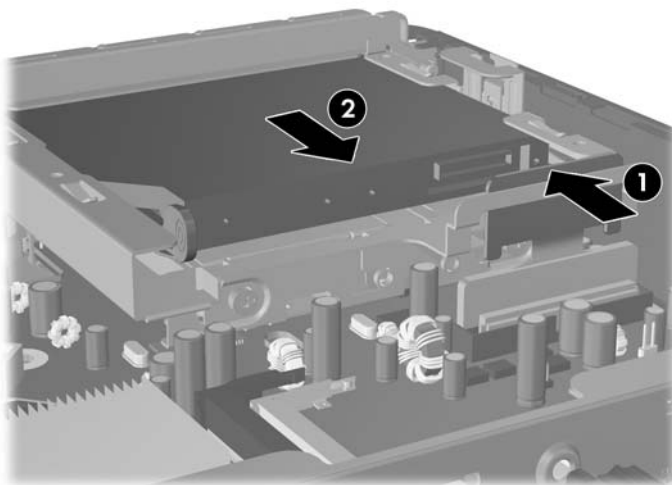
5. Replace the access panel.

6. If the computer was on a stand, replace the stand.

7. Reconnect the power cord and turn on the computer.

8. Lock any security devices that were disengaged when the computer cover or access panel was removed.

# Installing and Removing a Port Cover

An optional rear port cover is available for the computer.

To install the port cover:

1.  Thread the cables through the bottom hole on the port cover (1) and connect the cables to the rear ports on the computer.

2.  Insert the hooks on the port cover into the slots on the rear of the chassis, then slide the cover to the right to secure it in place (2).

**Figure 2-21** Installing a Port Cover
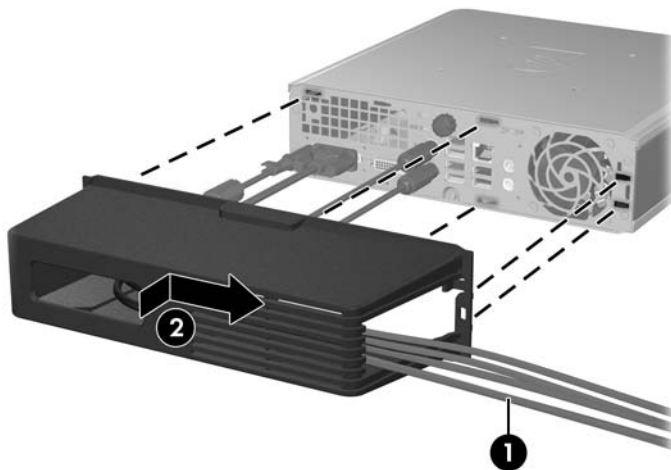


**NOTE:** For security purposes, you can install an optional cable lock to the chassis that locks the port cover and secures the computer. See <u>Installing a Security Lock on page 35</u>.

The port cover is secured in place by a retention lever just inside the port cover opening. To remove the port cover, pull the lever back towards the port cover opening (1), then slide the cover to the left and off the computer (2).

**Figure 2-22** Removing a Port Cover
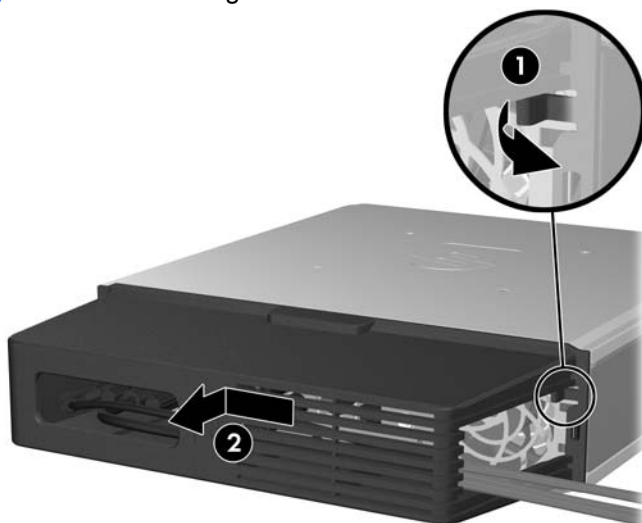
# A Specifications

**Table A-1**  Specifications

| Desktop Dimensions (in the desktop position) | | |
|---|---|---|
| Height | 6.6 cm | 2.60 in |
| Width | 25.1 cm | 9.90 in |
| Depth | 25.4 cm | 10.00 in |
| (depth will increase if the computer is equipped with a port security bracket) | | |
| **Approximate Weight** | 3.15 kg | 6.95 lb |
| **Weight Supported** (maximum distributed load in desktop position) | 35 kg | 77 lb |
| **Temperature Range** (values subject to change with increasing altitude above sea level) | | |
| Operating | 10° to 35° C | 50° to 95° F |
| Nonoperating | -30° to 60° C | -22° to 140° F |

**NOTE:** Operating temperature is derated 1.0° C per 300 m (1,000 ft) to 3,000 m (10,000 ft) above sea level, no direct sustained sunlight. Maximum rate of change is 10° C (50° F)/Hr. The upper limit may be limited by the type and number of options installed.

| Relative Humidity (noncondensing) | | |
|---|---|---|
| Operating (28° C (82.4° F) max wet bulb) | 10-90% | |
| Nonoperating (38.7° C (101.66° F) max wet bulb) | 5-95% | |
| **Maximum Altitude** (unpressurized) | | |
| Operating | 3,048 m | 10,000 ft |
| Nonoperating | 9,144 m | 30,000 ft |
| **Mechanical Shock** (11 ms 1/2 sine shock pulse) | | |
| Operating | 5 Gs | |
| Nonoperating | 20 Gs | |
| **Vibration** (random, Gs nominal) | | |
| Operating (10 to 300 Hz) | .25 | |
| Nonoperating (10 to 500 Hz) | .50 | |
| **Power Supply** | | |
| Operating Voltage Range[1] | 90-264 VAC | |
| Rated Voltage Range[1] | 100-240 VAC | |
| Rated Line Frequency | 50-60 Hz | |
| **Power Output** | 135 W | |

**Table A-1 Specifications (continued)**

| | | |
|---|---|---|
| **Rated Input Current** (maximum)[1] | 2.2A @ 100VAC | 1.1A @ 200VAC |
| **Heat Dissipation** | | |
| Maximum | 139 kg-cal/hr | 550 BTU/hr |
| Typical (idle) | 56 kg-cal/hr | 222 BTU/hr |

[1] This system utilizes an active power factor corrected external power supply. This allows the system to pass the CE mark requirements for use in the countries of the European Union. The active power factor corrected power supply also has the added benefit of not requiring 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 (140ºF).

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* 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 a compact disc, 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.  If the computer is on a stand, remove the computer from the stand and lay the computer down.

6.  Remove the computer access panel.

7.  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.

8. 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.

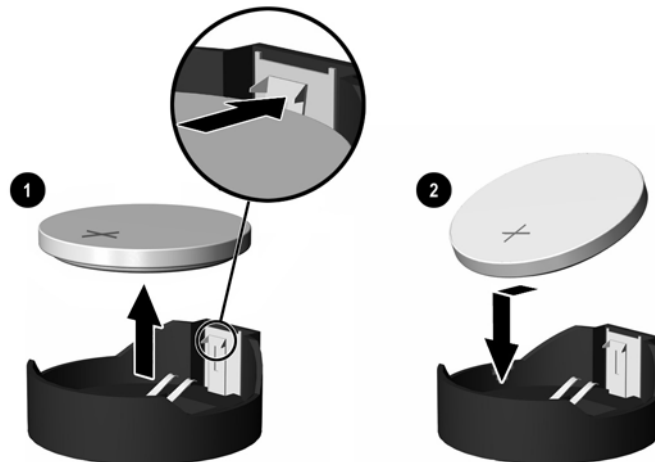**Figure B-1** Removing a Coin Cell Battery (Type 1)
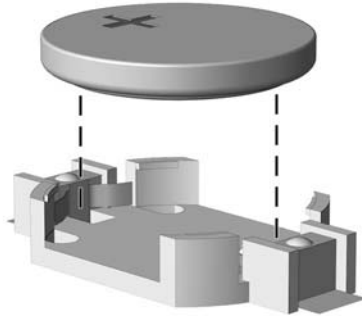


**b.** Slide the replacement battery into position, positive side up. The battery holder automatically secures the battery in the proper position.

**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)
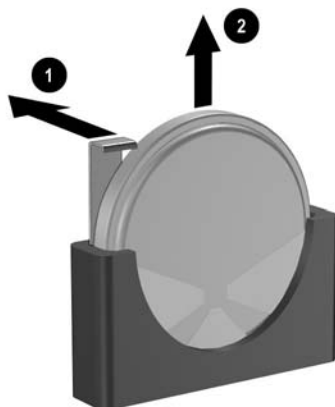


**NOTE:** After the battery has been replaced, use the following steps to complete this procedure.

**9.** Replace the access panel.

**10.** If the computer was on a stand, replace the stand.

**11.** Reconnect the power cord and turn on the computer.

**12.** Reset the date and time, your passwords, and any special system setups, using Computer Setup. Refer to the *Computer Setup (F10) Utility Guide* for more information.

**13.** Lock any security devices that were disengaged when the computer cover or access panel was removed.

# C   Security Lock Provisions

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

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

# Installing a Security Lock

## Cable Lock

There are two cable lock slots on the rear of the computer. The slot next to the thumbscrew should be used when there is no port cover. The slot on the far right should be used when a port cover is installed.

**Figure C-1**  Installing a Cable Lock with No Port Cover



**Figure C-2**  Installing a Cable with a Port Cover Installed

# Padlock

**Figure C-3** Installing a Padlock

# HP Business PC Security Lock

1. Fasten the security cable by looping it around a stationary object.

   **Figure C-4** Securing the Cable to a Fixed Object

   

2. Thread the keyboard and mouse cables through the lock.

   **Figure C-5** Threading the Keyboard and Mouse Cables
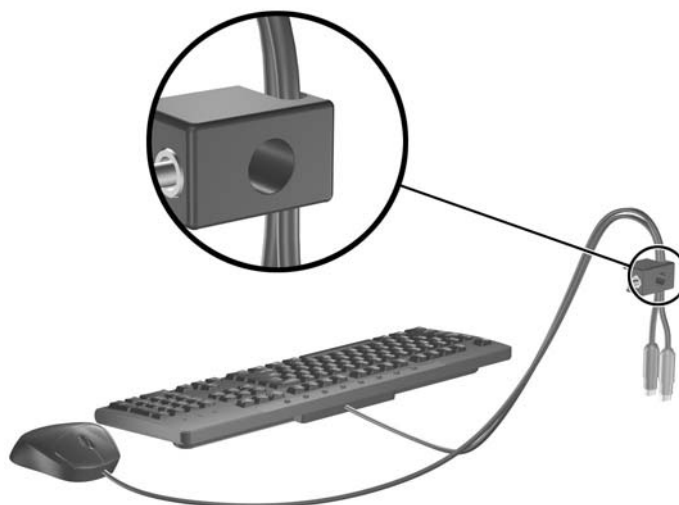
**3.** Screw the lock to the chassis using the screw provided.

**Figure C-6** Attaching the Lock to the Chassis



**4.** Insert the plug end of the security cable into the lock (1) and push the button in (2) to engage the lock. Use the key provided to disengage the lock.

**Figure C-7** Engaging the Lock
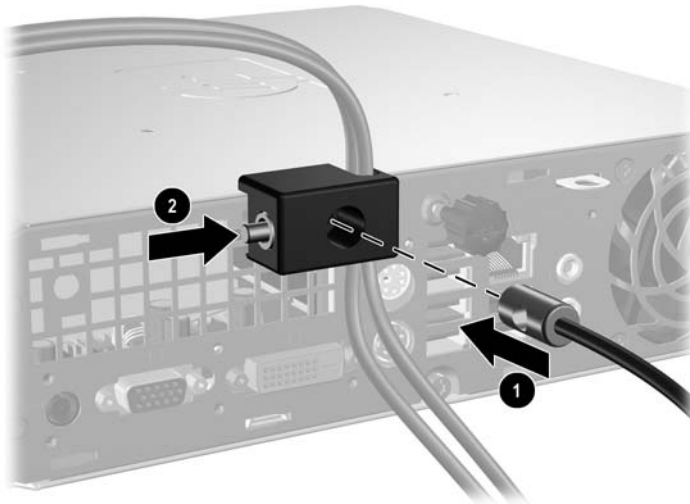
# D    Electrostatic Discharge

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 RoutineCare

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 access 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