

Hardware Reference Guide—dc7700 Series Ultra-Slim Desktop

HP Compaq Business PC



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Hardware Reference Guide

dc7700 Ultra-Slim Desktop 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.

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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* on the *Documentation and Diagnostics CD*.



Figure 1-1 Ultra-Slim Desktop

Front Panel Components

Drive configuration may vary by model.

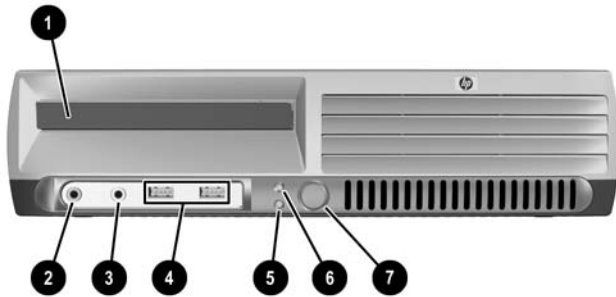


Table 1-1 Front Panel Components

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



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

Rear Panel Components

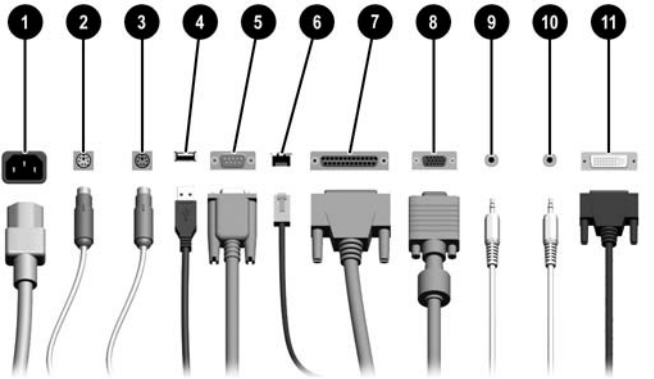












Table 1-2 Rear Panel Components

1		Power Cord Connector	7		Parallel Connector
2		PS/2 Mouse Connector(green)	8		Monitor Connector (blue)
3		PS/2 Keyboard Connector(purple)	9		Line-Out Connector for powered audio devices (green)
4		Universal Serial Bus (USB) (6)	10		Line-In Audio Connector (blue)
5		Serial Connector	11		Digital Video Interface (DVI-D) Monitor connector (optional)
6		RJ-45 Network Connector			



NOTE Arrangement and number of connectors may vary by model.

The monitor connector on the system board is inactive when a PCI Express graphics card is installed in the computer.

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

Keyboard

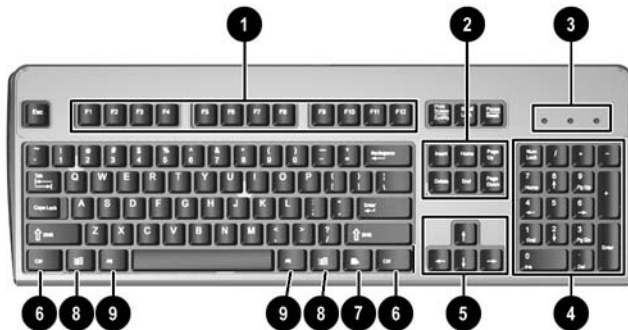


Table 1-3 Keyboard Components

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 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

Serial Number Location

Each computer has a unique serial number and a product ID number 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 1-2 Serial Number and Product ID Location

Changing from Desktop to Tower Configuration

1. If the Smart Cover Sensor is enabled, restart the computer and enter Computer Setup to disable it.
2. Remove any removable media (such as an optical disk).
3. Turn off the computer properly through the operating system and turn off any external devices. Disconnect the power cord from the power outlet and disconnect any external devices.

4. Rotate the computer into the tower position with the fan on the bottom and the expansion slot on the top.



5. Lower the computer into the stand so that the hooks on the front of the tower stand fit into the vents on the bottom of the computer, then slide the computer back until the hooks engage (1).
6. Tighten the screw (2) to secure the computer to the stand. This adds stability and helps to ensure proper airflow to the internal components.



7. Reconnect the external equipment, plug the power cord into a power outlet, and turn the computer on.
8. Use Computer Setup to enable the Smart Cover Sensor, if desired.

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

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> 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

To access system memory, the expansion slot assembly, and other 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 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. 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 rear of the computer, then lift it off (2).

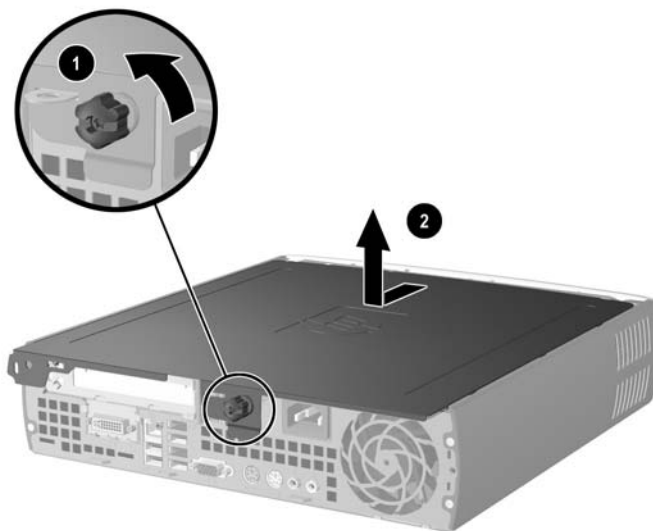



Figure 2-1 Removing the Computer Access Panel


 **CAUTION** After opening the computer cover, look for the LED on the system board between the DIMM sockets. If the LED is illuminated, the system still has power. Turn off the computer and remove the power cord before proceeding.

Replace the computer access panel by aligning the panel with the computer chassis, then sliding it onto the chassis toward the front. Tighten the thumbscrew to secure the access panel.


Removing the Front Bezel Assembly

To access the internal hard drive, you must remove the front bezel assembly.

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. If the computer is on a stand, remove the computer from the stand and lay the computer down.
6. Remove the computer access panel.

 **CAUTION** After opening the computer cover, look for the LED on the system board between the DIMM sockets. If the LED is illuminated, the system still has power. Turn off the computer and remove the power cord before proceeding.

7. Lift up the two release tabs on the left and right sides of the chassis.

This unlatches the front bezel and pushes it about 1.3 cm (0.5 inches) away from the chassis and stops.

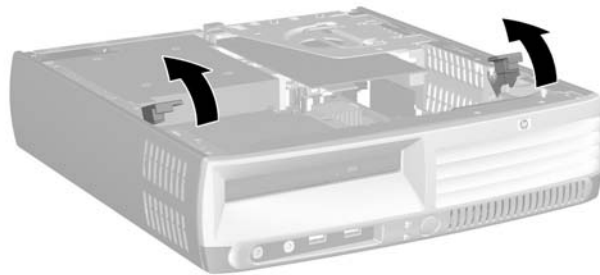


Figure 2-2 Releasing the Front Bezel

8. Disconnect the optical drive cable from the back of the optical drive.



NOTE When removing cables, pull on the connector instead of the cable itself. This will help prevent cable damage.

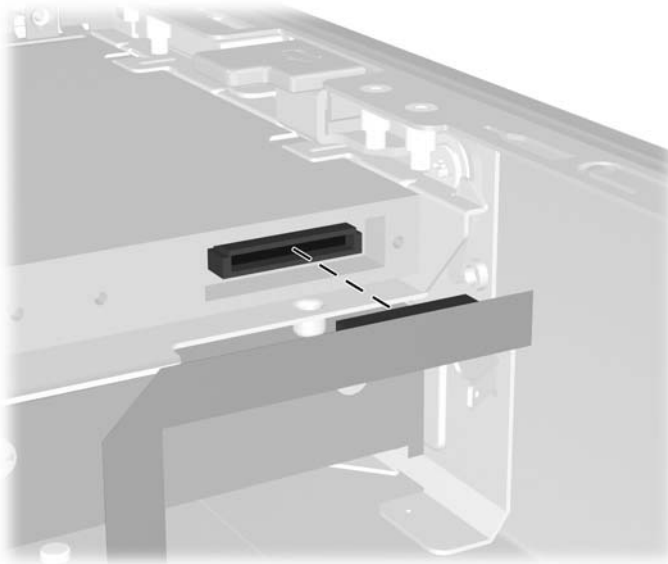


Figure 2-3 Disconnecting the Optical Drive Cable

9. Disconnect the fan and speaker cables from the system board.

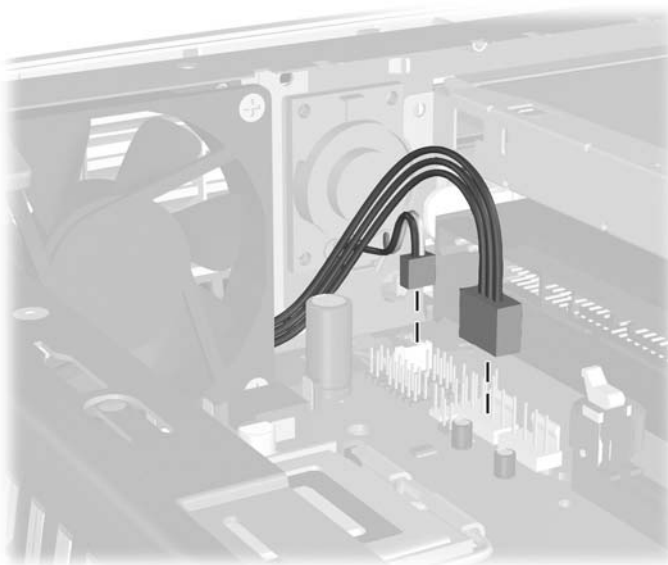


Figure 2-4 Disconnecting the Fan and Speaker Cables from the Front Bezel

10. Lift the release tabs again (1) and pull the front bezel assembly out of the chassis (2).



Figure 2-5 Removing the Front Bezel

To replace the front bezel assembly:

1. Align the front bezel assembly with the front of the chassis and slide the assembly in. Stop about 1.3 cm (0.5 inch) away from the chassis.

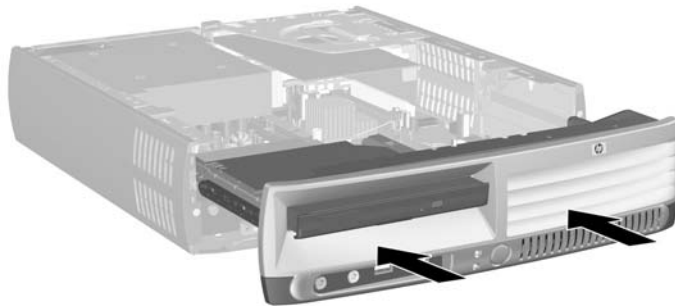


Figure 2-6 Aligning the Front Bezel Assembly

2. Connect the fan and speaker cables to the system board.

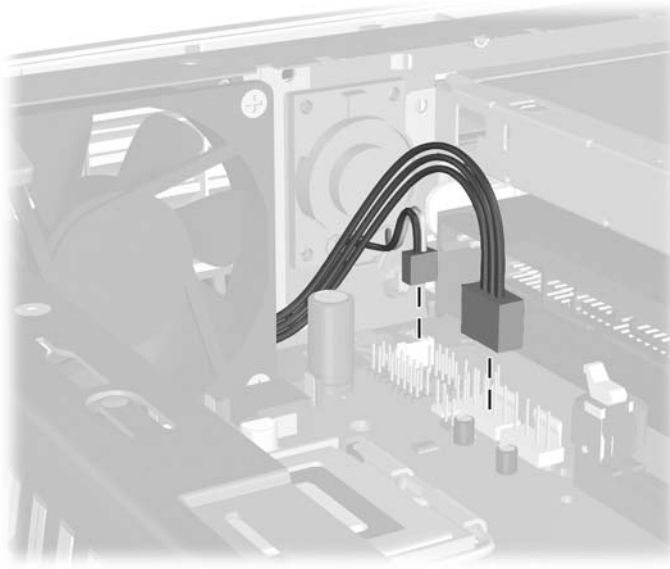


Figure 2-7 Connecting the Fan and Speaker Cables

3. Connect the optical drive cable to the back of the optical drive.

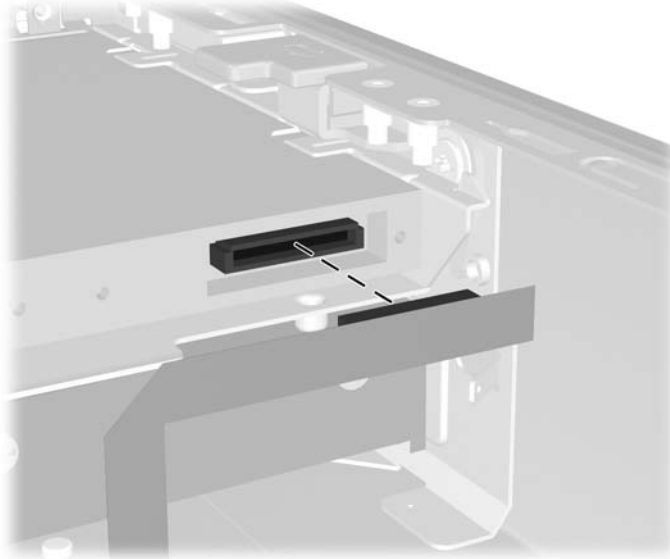



Figure 2-8 Connecting the Optical Drive Cable

4. Slide the front bezel assembly all the way into the chassis until it stops.
5. Replace the access panel.
6. Reassemble the computer.


Rotating the Power Supply

The power supply must be rotated up to access the system battery and various connectors on the system board.

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. If the computer is on a stand, remove the computer from the stand and lay the computer down.
6. Remove the computer access panel.

 **CAUTION** After opening the computer cover, look for the LED on the system board between the DIMM sockets. If the LED is illuminated, the system still has power. Turn off the computer and remove the power cord before proceeding.

7. Slide the power supply toward the front of the chassis until it stops (1), lift the power supply slightly (2), and then rotate it out (3).

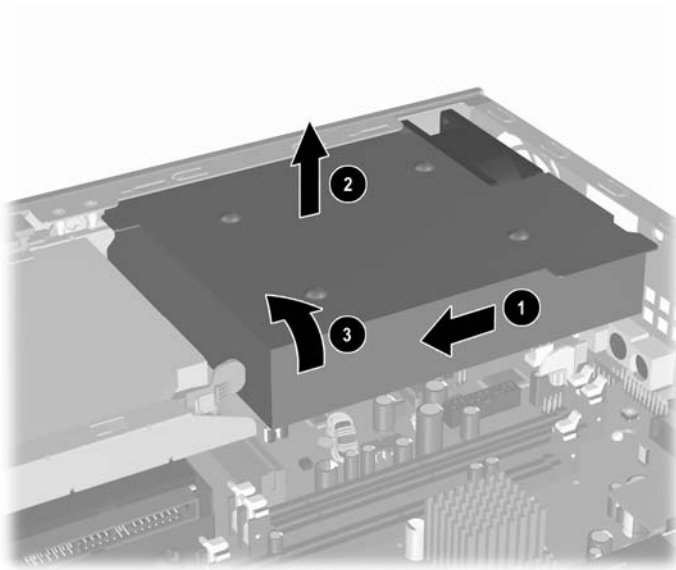


Figure 2-9 Rotating the Power Supply

To return the power supply to its original position, reverse the previous steps.

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 three 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 3 GB of memory configured in a high-performing dual-channel mode.

DDR2-SDRAM DIMMs

For proper system operation, the DIMMs must be:

- industry-standard 240-pin
- unbuffered PC2-5300 667 MHz-compliant or PC2-6400 800 MHz-compliant
- 1.8 volt DDR2-SDRAM DIMMs

The DDR2-SDRAM DIMMs must also:

- support CAS latency 4 (CL = 4) for DDR2/667 MHz or CAS latency 5 (CL = 5) for DDR2/800 MHz
- contain the mandatory Joint Electronic Device Engineering Council (JEDEC) DDR2 DIMM specification

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.

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

Populating DIMM Sockets

There are three DIMM sockets on the system board, with two sockets in memory Channel A and one socket in memory Channel B. The sockets are labeled XMM1, XMM2, and XMM3. Sockets XMM1 and XMM2 operate in memory Channel A; socket XMM3 operates in memory Channel B.

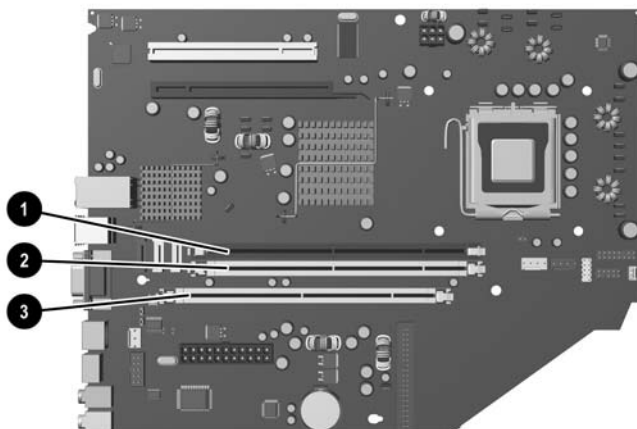


Figure 2-10 DIMM Socket Locations

Item	Description	Socket Color
1	DIMM socket XMM1, Channel A	Black
2	DIMM socket XMM2, Channel A	White
3	DIMM socket XMM3, 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 two 1GB DIMMs and one 512MB DIMM, Channel A should be populated with one 1GB DIMM and one 512MB DIMM and Channel B should be populated with

one 1GB DIMM. With this configuration, 2 GB will run as dual channel and 512 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 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](#).

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 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.



CAUTION After opening the computer cover, look for the LED on the system board between the DIMM sockets. If the LED is illuminated, the system still has power. Turn off the computer and remove the power cord before proceeding.

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

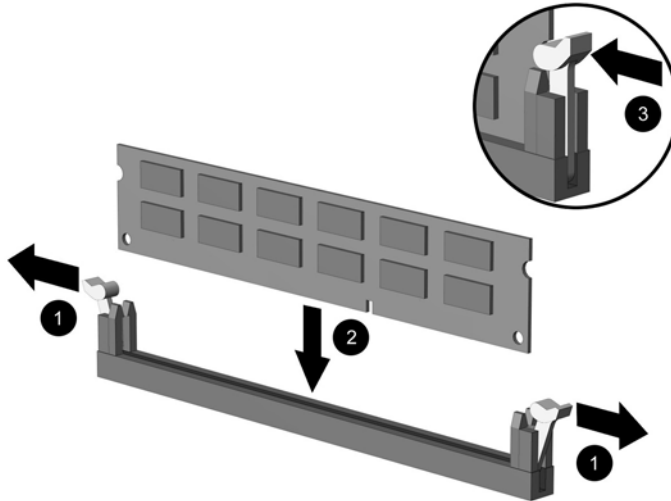


Figure 2-11 Installing a DIMM



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

A DIMM must occupy the XMM1 socket.

For maximum performance, populate the sockets so that the memory capacity of Channel A is equal to the total memory capacity of Channel B. Refer to Populating DIMM Sockets for more information.

9. 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).
10. Repeat steps 8 and 9 to install any additional modules.
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.

Replacing an Expansion Card Bracket

The computer supports one full-height, half-length PCI expansion slot or one half-height, half-length PCI Express x16 expansion slot. The computer ships with a PCI Express bracket. An optional PCI Express expansion card bracket assembly with riser card or PCI expansion card bracket assembly with riser card can be obtained from HP or an authorized provider.

A variety of optional PCI cards are available including:

- Wireless LAN card
- FireWire card
- Modem card
- NIC card
- Graphics card



NOTE Adding a graphics card will, by default, disable the integrated graphics on the system board. The integrated graphics can be reenabled by changing the BIOS settings in Computer Setup.

A USDT serial/parallel I/O assembly, available as an option, replaces the expansion slot cover and connects directly to the system board.

To remove the expansion card bracket that ships with 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. If the computer is on a stand, remove the computer from the stand and lay the computer down.
6. Remove the computer access panel.



CAUTION After opening the computer cover, look for the LED on the system board between the DIMM sockets. If the LED is illuminated, the system still has power. Turn off the computer and remove the power cord before proceeding.

7. Lift the handle (1) on the expansion card assembly and pull the assembly straight up out of the computer (2).

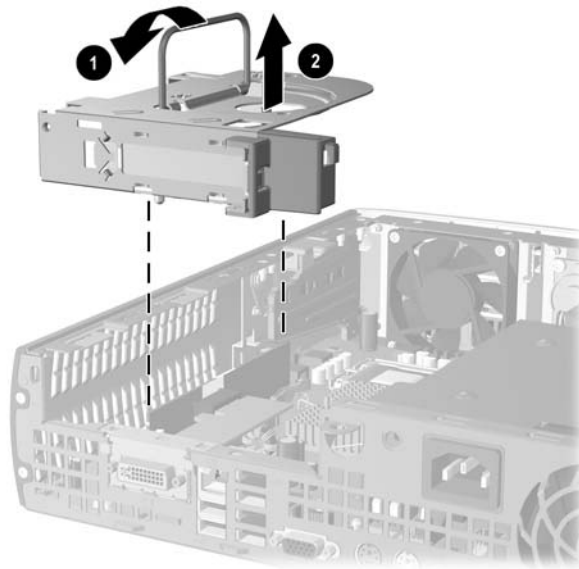


Figure 2-12 Removing the PCI Express Expansion Card Bracket

8. Install the new expansion card in the optional bracket assembly with riser card, according to the directions that ship with the assembly.
9. Line up the tabs on the expansion card bracket assembly with the slots on the computer chassis and press the assembly firmly down into place.
10. Connect external cables to the installed card, if needed. Connect internal cables to the system board, if needed.
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.
15. 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.



CAUTION To insure proper cooling of internal components during operation after removing an expansion card, you must replace it with a new card or with the expansion card bracket that shipped with the computer, cover the open slot (for example, with a metal slot cover), or replace the expansion card bracket assembly with the bracket that shipped with the computer.

Upgrading the Hard Drive



NOTE The Ultra-Slim Desktop supports only 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, 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.

The 3.5-inch hard drive is located on the left side of the computer under the optical drive.

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. If the computer is on a stand, remove the computer from the stand and lay the computer down.
6. Remove the computer access panel.



CAUTION After opening the computer cover, look for the LED on the system board between the DIMM sockets. If the LED is illuminated, the system still has power. Turn off the computer and remove the power cord before proceeding.

7. Remove the front bezel. Refer to [Removing the Front Bezel Assembly](#) for more information.
8. Pull the hard drive latch toward the front of the computer (1).

9. Rotate the right side of the hard drive up (2), then pull the drive out to the right (3).

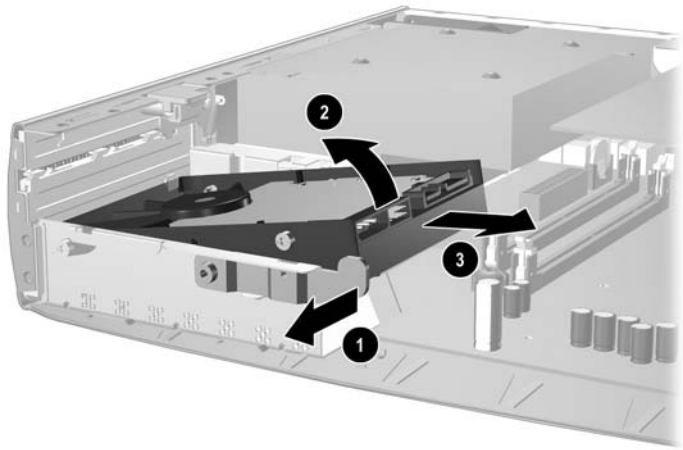


Figure 2-13 Removing the Internal Hard Drive



NOTE When removing cables, pull on the connector instead of the cable itself. This will help prevent cable damage.

10. Disconnect the data cable (1) from the hard drive by pulling the connector out of the socket in the hard drive.
11. Disconnect the power cable (2) from the hard drive by pulling the connector out of the socket in the hard drive.

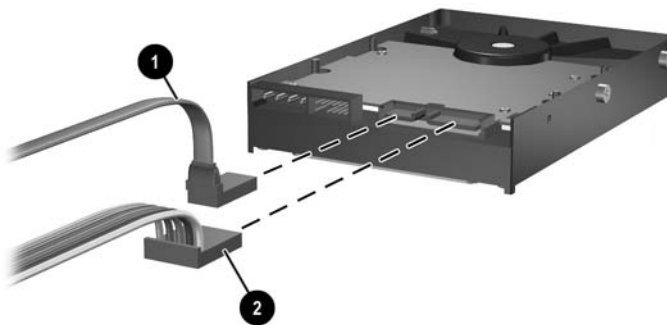


Figure 2-14 Disconnecting the Data Cable and Power Cable from the Hard Drive

12. Transfer the screws from the sides of the old drive to the new drive. The screws take the place of drive rails.



NOTE Four US 6-32 screws with a silver finish (two screws on each side of the hard drive) help guide the drive into its proper position.

When transferring the screws, carefully note the position of the screws on the old drive. The screws must be transferred to the same position on the new drive.



Figure 2-15 Transferring the Screws to the New Hard Drive

13. Connect the data cable and power cable to the new hard drive.
14. Align the screws on the left side of the hard drive over the corresponding slots in the chassis. Gently lower the left side of the hard drive down and to the left, then rotate the right side of the drive down until it locks.
15. Replace the front bezel. Refer to [Removing the Front Bezel Assembly](#) for more information.
16. Replace the computer access panel.
17. If the computer was on a stand, replace the stand.
18. Reconnect the power cord and turn on the computer.
19. 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 *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.

Replacing the Optical Drive


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

Removing the Existing Optical Drive

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. If the computer is on a stand, remove the computer from the stand and lay the computer down.
6. Remove the computer access panel.

 **CAUTION** After opening the computer cover, look for the LED on the system board between the DIMM sockets. If the LED is illuminated, the system still has power. Turn off the computer and remove the power cord before proceeding.

7. Disconnect the cable from the back of the optical drive.

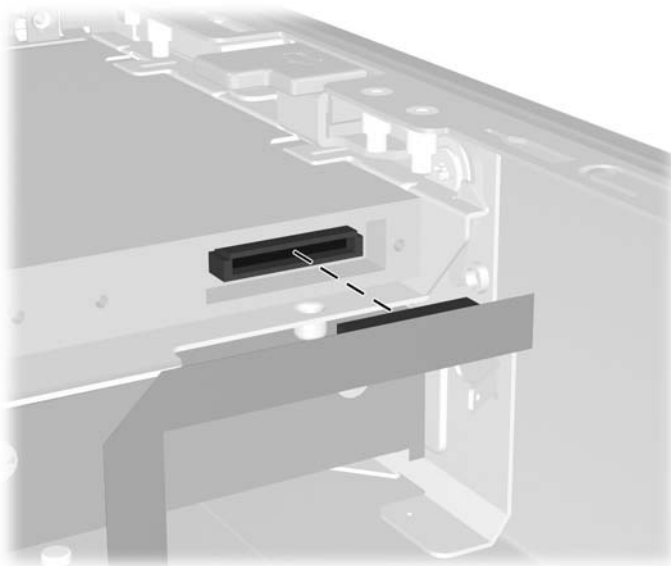


Figure 2-16 Disconnecting the Optical Drive Cable

8. Push the release latch on the side of the optical drive toward the outside of the computer (1) and slide the optical drive out of the computer through the front bezel (2).

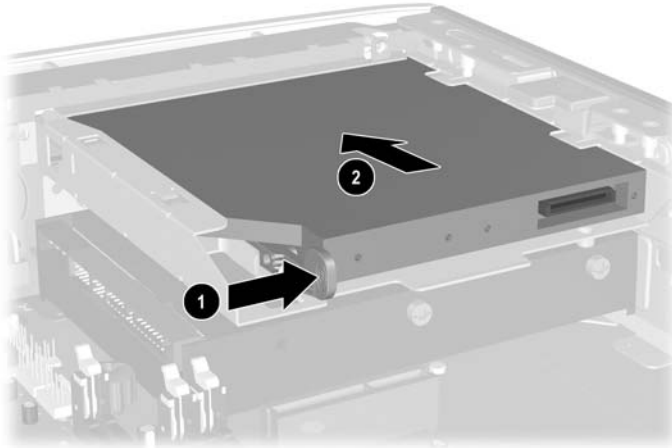


Figure 2-17 Removing the Optical Drive



NOTE If you are not replacing the optical drive at this time, disconnect the optical drive cable from the system board and store it carefully for future use.

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 (1), and press firmly.

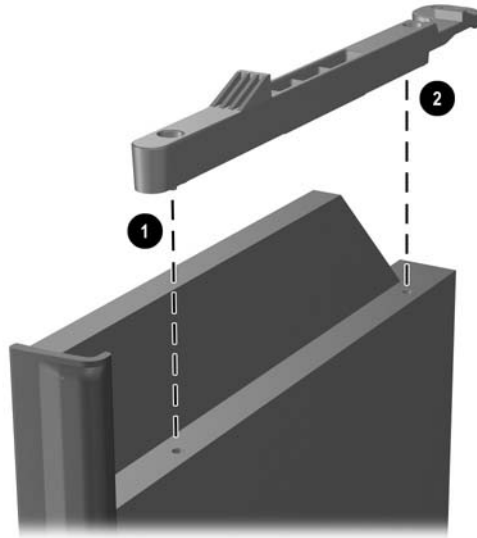


Figure 2-18 Aligning the Release Latch

4. Insert the second pin (2), and press the entire release latch firmly to fasten the latch securely to the optical drive.

Installing the New Optical Drive

1. 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.

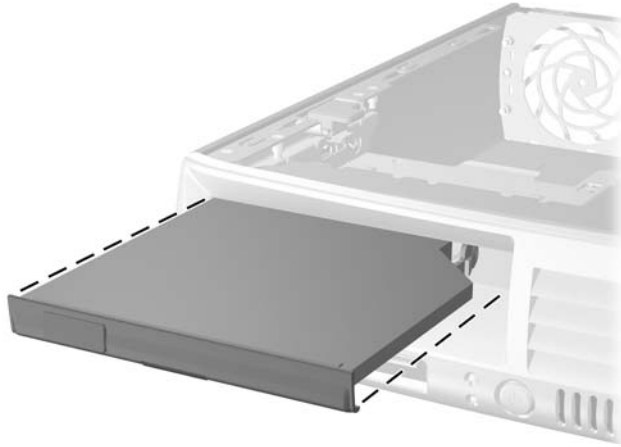



Figure 2-19 Aligning the Optical Drive

2. Slide the optical drive into the computer until it locks.
3. Attach the optical drive cable to the back of the drive.
4. Replace the access panel.
5. If the computer was on a stand, replace the stand.
6. Reconnect the power cord and turn on the computer.
7. Lock any security devices that were disengaged when the computer cover or access panel was removed.

A Specifications

Desktop Dimensions (in the tower position)		
Height	31.5 cm	12.40 in
Width	7.0 cm	2.75 in
Depth	33.5 cm	13.18 in
(depth will increase if the computer is equipped with a port security bracket)		
Approximate Weight	6.3 kg	13.9 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	200 W	
Rated Input Current (maximum) ¹	4A (@ 100 VAC)	2A (@ 200 VAC)
Heat Dissipation		
Maximum	265 kg-cal/hr	1,050 BTU/hr
Typical (idle)	86 kg-cal/hr	341 BTU/hr

¹ This system utilizes an active power factor corrected 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 (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. If the computer is on a stand, remove the computer from the stand and lay the computer down.
6. Remove the computer cover or access panel.



CAUTION After opening the computer cover, look for the LED on the system board between the DIMM sockets. If the LED is illuminated, the system still has power. Turn off the computer and remove the power cord before proceeding.

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.

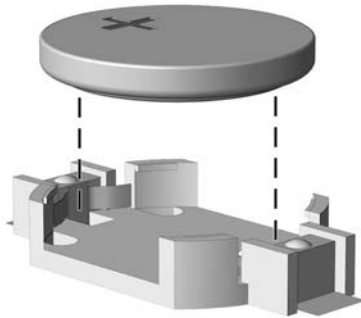


Figure B-1 Removing a Coin Cell Battery (Type 1)

- 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).

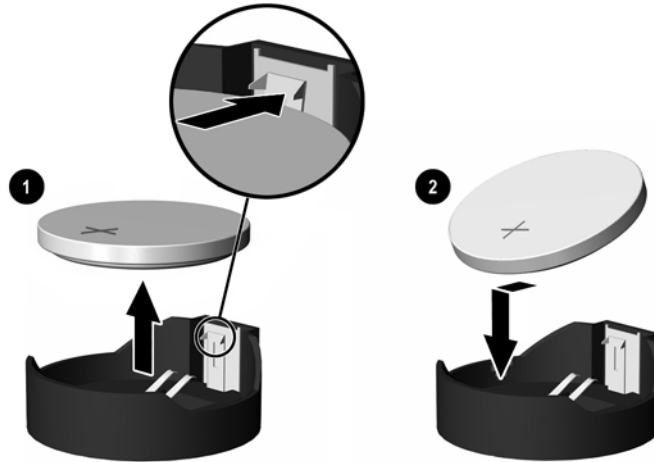


Figure B-2 Removing and Replacing a Coin Cell Battery (Type 2)

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.

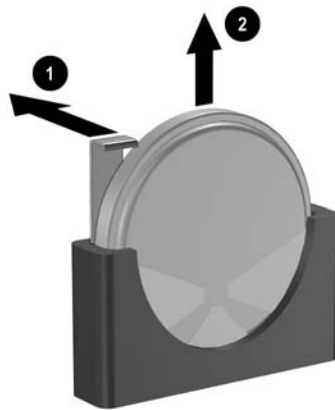


Figure B-3 Removing a Coin Cell Battery (Type 3)



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* on the *Documentation and Diagnostics CD*.
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* and the *Desktop Management Guide* on the *Documentation and Diagnostics CD* and the *HP ProtectTools Security Manager Guide* (some models) at www.hp.com.

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

Installing a Security Lock

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.

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