Hardware Reference Guide

HP Compaq Business Desktops
dx6120 Microtower Models

Document Part Number: 374967-001

September 2004

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.

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First Edition (September 2004)

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2 Hardware Upgrades

1

Product Features

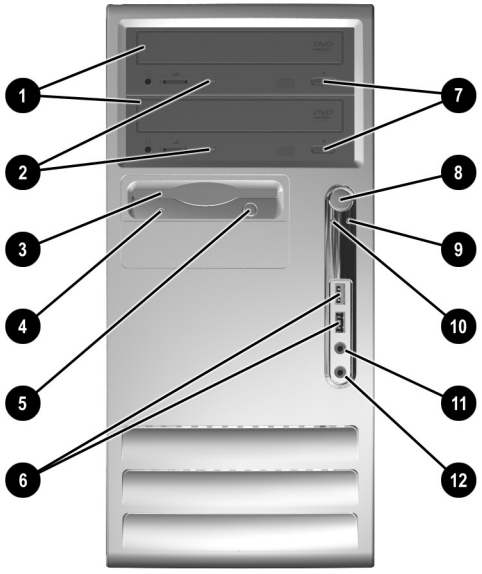
Standard Configuration Features

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

Microtower Configuration

Front Panel Components

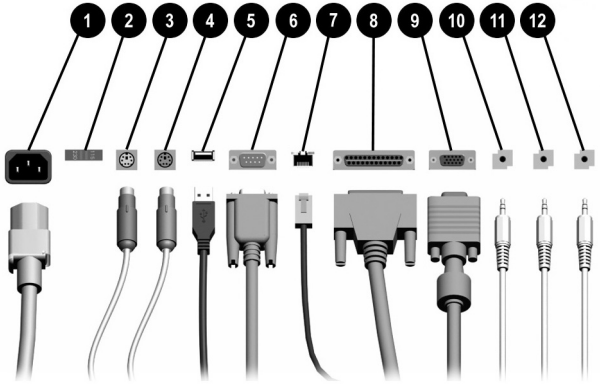
Drive configuration may vary by model.



Front Panel Components

❶	Optical Drives (CD-ROM, CD-R/RW, DVD-ROM, DVD+R/RW, or CD-RW/DVD Combo Drive)	❼	Optical Drive Eject Buttons
❷	Optical Drive Activity Lights	❽	Power Button
❸	Diskette Drive (optional)	❾	Power On Light
❹	Diskette Drive Activity Light (optional)	❿	Hard Drive Activity Light
❺	Diskette Eject Button (optional)	⓫	Headphone Jack
❻	USB (Universal Serial Bus) Ports	⓬	Microphone Connector

Rear Panel Components



Rear Panel Components

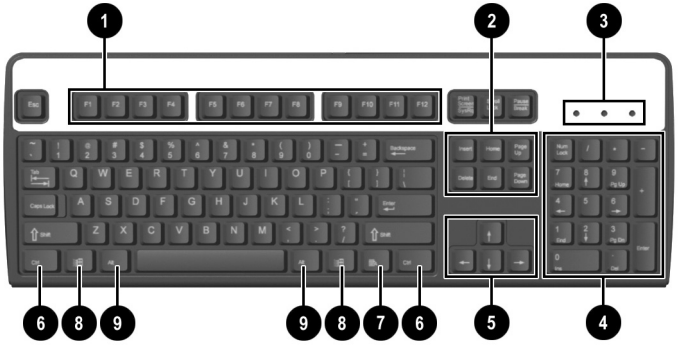
❶		Power Cord Connector	❼		RJ-45 Network Connector
❷		Voltage Select Switch	❽		Parallel Connector
❸		PS/2 Mouse Connector	❾		Monitor Connector
❹		PS/2 Keyboard Connector	❿		Headphone/Line-Out Connector
❺		Universal Serial Bus (USB)	⓫		Line-In Audio Connector
❻	IOIOI	Serial Connector	⓬		Microphone Connector

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 standard 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 CD*.

Keyboard



Keyboard Components

❶	Function Keys	Perform special functions depending on the software application being used.
❷	Editing Keys	Includes the following: Insert, Home, Page Up, Delete, End, and Page Down.
❸	Status Lights	Indicate the status of the computer and keyboard settings (Num Lock, Caps Lock, and Scroll Lock).
❹	Numeric Keys	Work like a calculator keypad.
❺	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.
❻	Ctrl Keys	Used in combination with another key; its effect depends on the application software you are using.
❼	Application Key*	Used (like the right mouse button) to open pop-up menus in a Microsoft Office application. May perform other functions in other software applications.
❽	Windows Logo Keys*	Used to open the Start menu in Microsoft Windows. Used in combination with other keys to perform other functions.
❾	Alt Keys	Used in combination with another key; its effect depends on the application software you are using.

*Keys available in select geographic regions.

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 Functions

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

Special Mouse Functions

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

Serial Number Location

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

Serial Number and Product ID Location

2

Hardware Upgrades

Serviceability Features

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

Warnings and Cautions

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

WARNING: To reduce the risk of personal injury from electrical shock and/or hot surfaces, be sure to disconnect the power cord from the wall outlet and allow the internal system components to cool before touching.

WARNING: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telecommunications/telephone connectors into the network interface controller (NIC) receptacles.

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.

CAUTION: Before removing the computer cover, ensure that the computer is turned off and that the power cord is disconnected from the electrical outlet.

Removing the Computer Access Panel

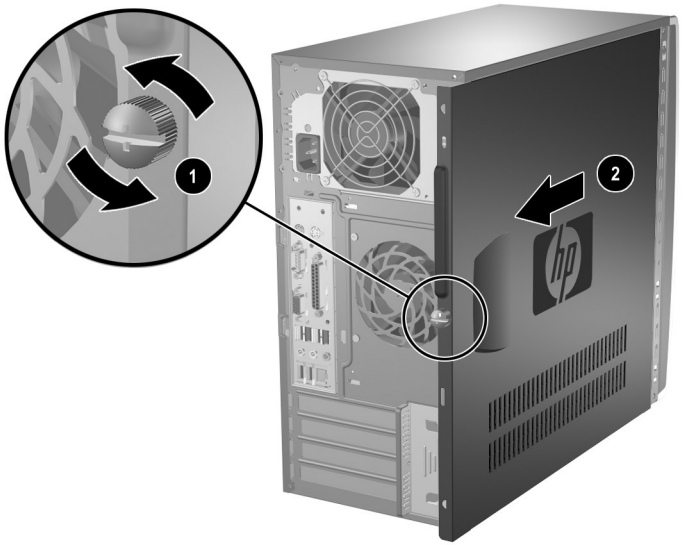
To remove the computer access panel:

1. Turn off the computer properly through the operating system and turn off any external devices.
2. Disconnect the power cord from the power outlet and the computer, and disconnect any external devices.

CAUTION: Before removing the computer access panel, ensure that the computer is turned off and that the power cord is disconnected from the electrical outlet.

3. Loosen the captive thumbscrew ❶ that secures the access panel to the computer chassis.
4. Slide the access panel back ❷ about 2.5 cm (1 inch), then lift it off the unit.

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

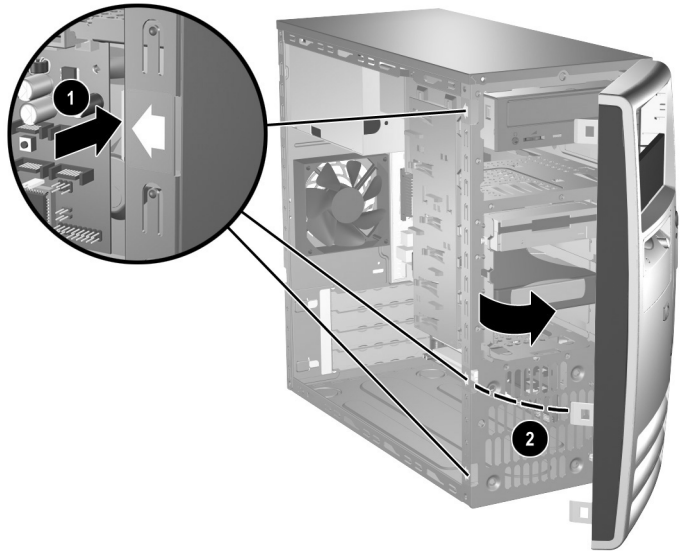


Removing the Computer Access Panel

Removing the Front Bezel

To remove the front bezel:

1. Turn off the computer properly through the operating system and turn off any external devices.
2. Disconnect the power cord from the power outlet and the computer, and disconnect any external devices.
3. Remove the computer access panel.
4. To remove the front bezel, press down on all three tabs on the left side of the bezel ❶ then rotate the bezel off the chassis ❷, beginning with the left side then the right side.



Removing the Front Bezel

Installing Additional Memory

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

DIMMs

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

DDR2-SDRAM DIMMs

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

- industry-standard 240-pin
- unbuffered PC3200 400 MHz-compliant or PC4300 533 MHz-compliant
- 1.8 volt DDR2-SDRAM DIMMs

The DDR2-SDRAM DIMMs must also:

- support CAS latency 2.5 or 3 (CL = 2.5 or CL = 3)
- contain the mandatory JEDEC SPD information

In addition, the computer supports:

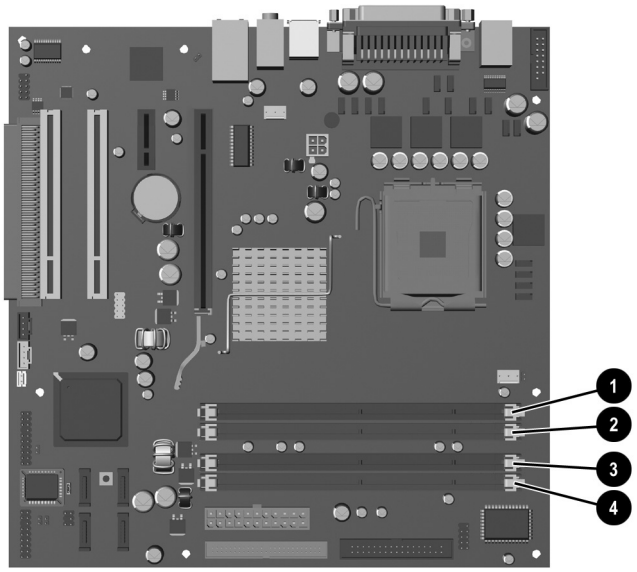
- 256Mbit, 512Mbit, and 1Gbit non-ECC memory technologies
- single-sided and double-sided DIMMS
- DIMMs constructed with x8 and x16 DDR devices; DIMMs constructed with x4 SDRAM are not supported

Populating DIMM Sockets

The system will automatically operate in single channel mode, dual channel Asymmetric mode, or a higher-performing dual channel Interleaved 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 dual channel Asymmetric 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.
- The system will operate in a higher-performing dual channel Interleaved 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. However, 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 Interleaved mode.
- In any mode, the maximum operational speed is determined by the slowest DIMM in the system. For example, if the system is populated with a DIMM that is 333 MHz and a second DIMM that is 400 MHz, the system will run at the slower of the two speeds.

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



DIMM Socket Locations

Item	Description	Socket Color
❶	DIMM socket XMM1, Channel A	White
❷	DIMM socket XMM2, Channel A	Black
❸	DIMM socket XMM3, Channel B	White
❹	DIMM socket XMM4, Channel B	Black

Installing DIMMs

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

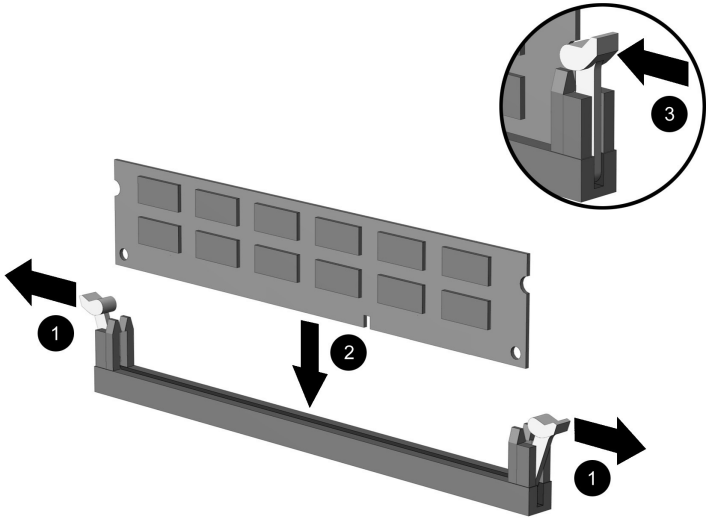
CAUTION: Static electricity can damage the electronic components of the computer or optional cards. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object. For more informations, refer to Appendix D, "Electrostatic Discharge."

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

1. Turn off the computer properly through the operating system and turn off any external devices.
2. Disconnect the power cord from the power outlet and disconnect any external devices.
3. Remove the computer access panel.
4. 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.

5. Open both latches of the memory module socket ❶, and insert the memory module into the socket ❷.



Installing a DIMM

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

For maximum performance, poplulate the sockets so that the memory capacity of Channel A is equal to the memory capacity of Channel B. Fo example, if you have one preinstalled DIMM in socket XMM1 and are adding a second DIMM, it is recommended that you install a DIMM of equal memory capacity into the XMM3 or XMM4 socket.

6. 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 ❸.
7. Repeat steps 5 and 6 to install any additional modules.
8. Replace the access panel.

The computer should automatically recognize the additional memory the next time you turn on the computer.

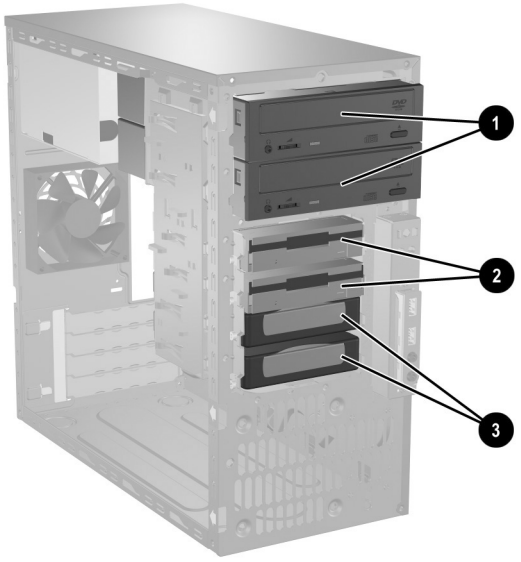
Replacing or Upgrading a Drive

The computer supports up to six drives that may be installed in various configurations.

This section describes the procedure for replacing or upgrading the storage drives. A Torx screwdriver is needed to replace the guide screws on a drive.

CAUTION: Make sure you back up your personal files on the hard drive to an external storage device, such as a CD, before removing the hard drive. Failure to do so will result in data loss. After replacing the primary hard drive, you will need to run the *Restore Plus!* CD to load the HP factory-installed files.

Locating Drive Positions

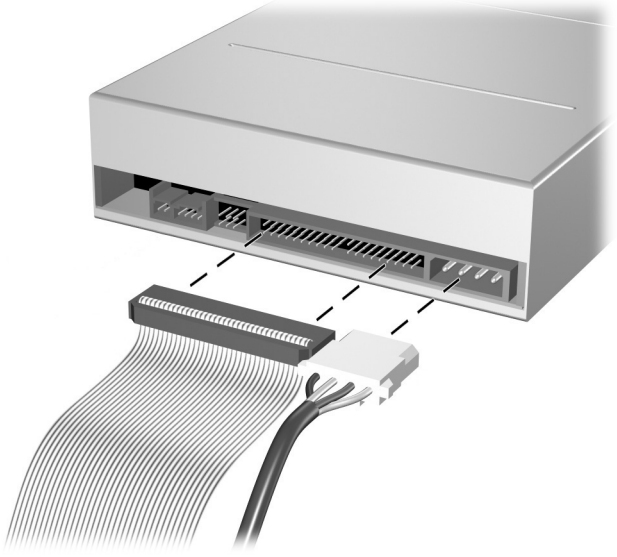


Drive Positions

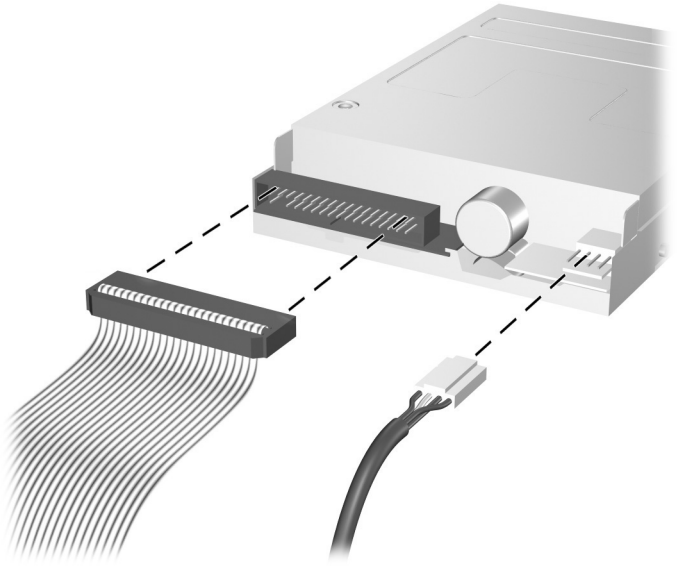
❶	Two 5.25-inch, half-height bays for optional drives
❷	Two standard 3.5-inch, one-third height bays (1.44-MB diskette drive shown)
❸	Two internal 3.5-inch, one-third height bays for hard drives

Removing a Drive

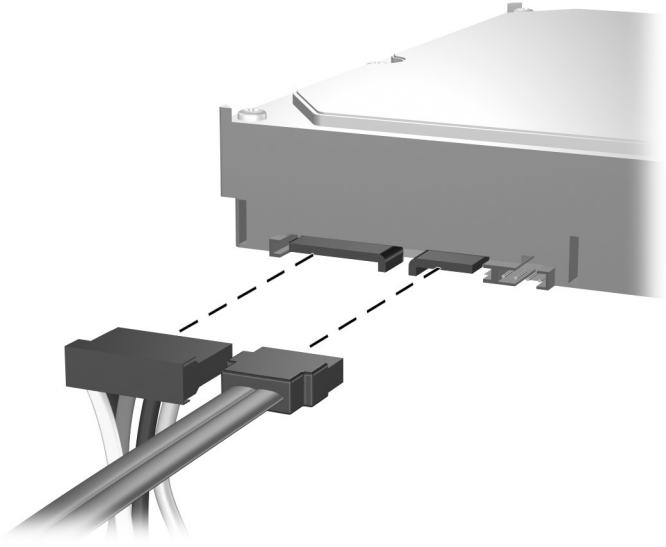
1. Turn off the computer properly through the operating system and turn off any external devices. Disconnect the power cord from the power outlet and disconnect any external devices.
2. Remove the access panel and front bezel.
3. Disconnect the power and data cables from the back of the drive, as indicated in the following illustrations.



Disconnecting the Optical Drive Cables

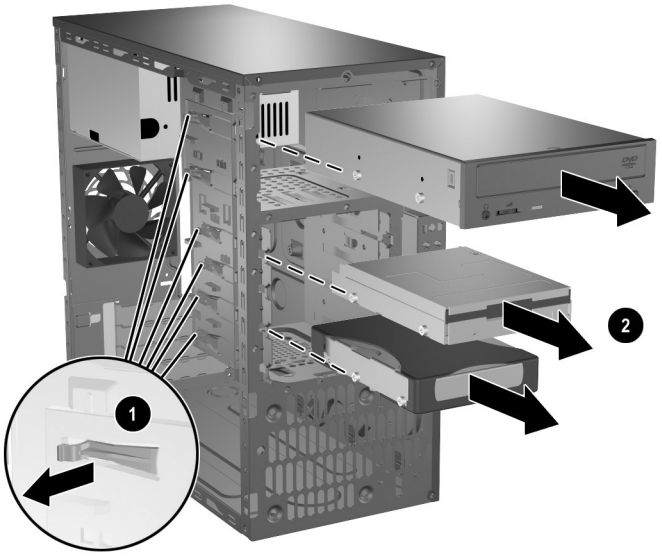


Disconnecting the Diskette Drive Cables



Disconnecting the Hard Drive Cables

4. A latch drive bracket with release tabs secures the drives in the drive bay. Lift the release tab on the latch drive bracket ❶ for the drive you want to remove, then slide the drive from its drive bay ❷.



Removing the Drives

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

Replacing a Drive

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

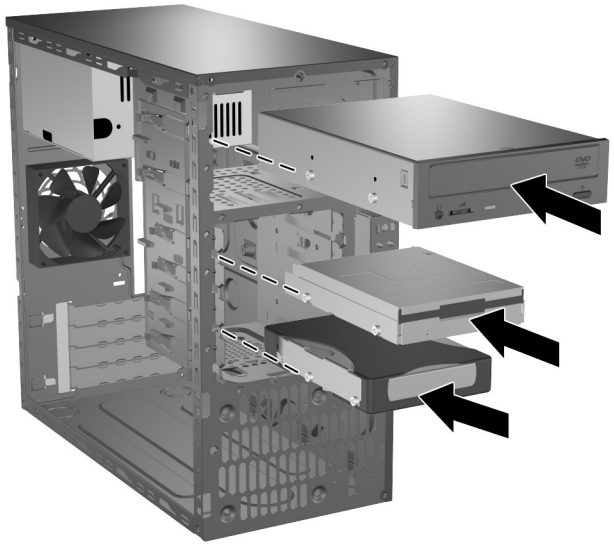
- If you are inserting or removing a hard drive, shut down the operating system properly, then turn off the computer. Do not remove a hard drive while the computer is on or in standby mode.
- Before handling a drive, ensure that you are discharged of static electricity. While handling a drive, avoid touching the connector. For more information about preventing electrostatic damage, refer to Appendix D, "Electrostatic Discharge."
- Handle a drive carefully; do not drop it.
- Do not use excessive force when inserting a drive.
- Avoid exposing a hard drive to liquids, temperature extremes, or products that have magnetic fields such as monitors or speakers.

Make sure to back up the data on the old hard drive before removing it so that you can install the data onto the new hard drive.

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

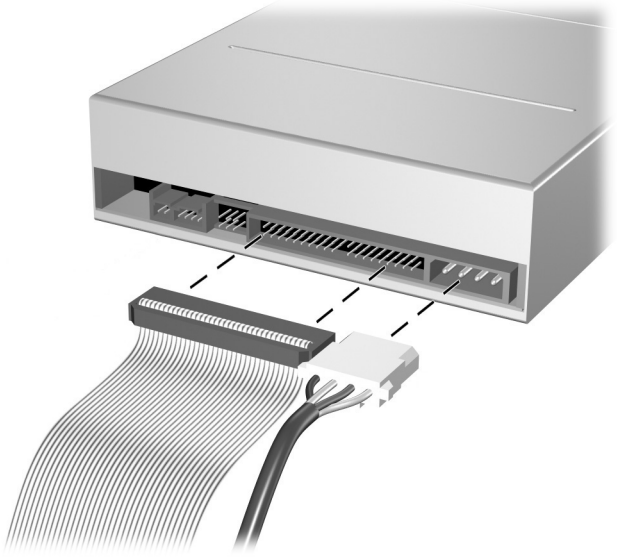
There are a total of eight extra guide screws on the front of the chassis under the bezel. Four have 6-32 standard threads and four have M3 metric threads. Standard screws are used for hard drives and have a silver finish. Metric screws are used for all other drives and have a black finish. Make sure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

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

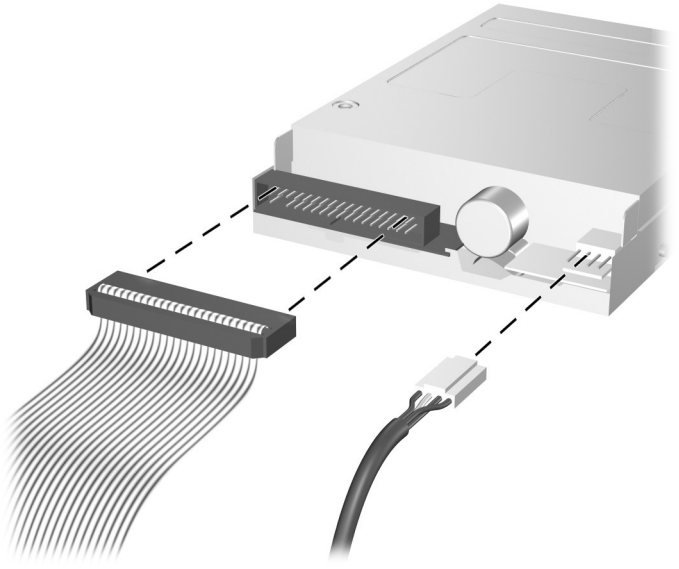


Sliding the Drives into the Drive Cage

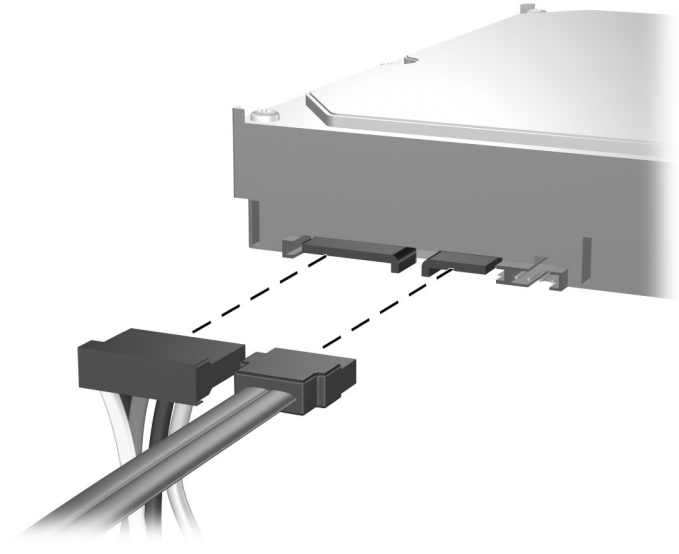
3. Reconnect the power and data cables to the drive as indicated in the following illustrations.



Reconnecting the Optical Drive Cables



Reconnecting the Diskette Drive Cables



Reconnecting the Hard Drive Cables

4. If installing a new hard drive, connect the data cable to the system board.

The replacement hard drive kit includes several data cables. Make sure to use the cable that is exactly the same as the factory-installed cable.

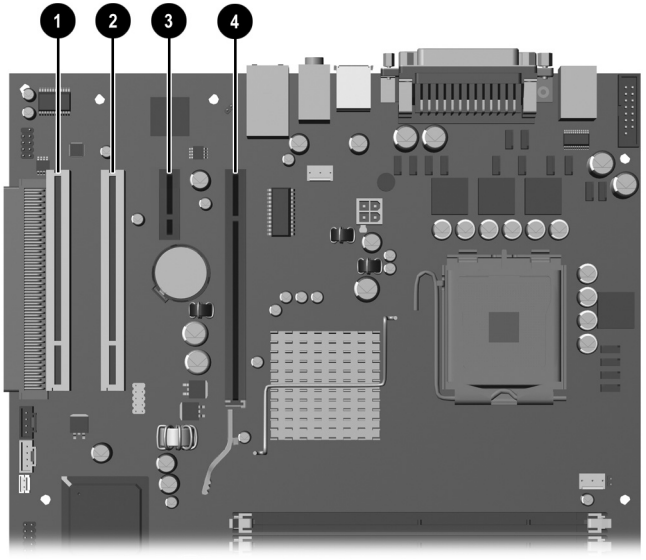
If your system has only one SATA hard drive, you must connect the hard drive data cable to the connector labeled P60 SATA 0 to avoid any hard drive performance problems. If you are adding a second hard drive, connect the hard drive data cable to the connector labeled P61 SATA 1.

5. Complete the procedure described in the "Reassembling the Computer" section of this chapter.
6. Turn on the computer.

If you replaced the primary hard drive, insert the *Restore Plus!* CD to restore the operating system, software drivers, and/or any software applications that were preinstalled on the computer from HP. Follow the instructions in the guide included with the restore CD. When the restore process has completed, reinstall any personal files that you backed up before replacing the hard drive.

Removing or Installing an Expansion Card

The computer has two PCI expansion slots that can accommodate an expansion card up to 17.46 cm (6.875 inches) in length. The computer also has one PCI Express x1 expansion slot and one PCI Express x16 expansion slot.



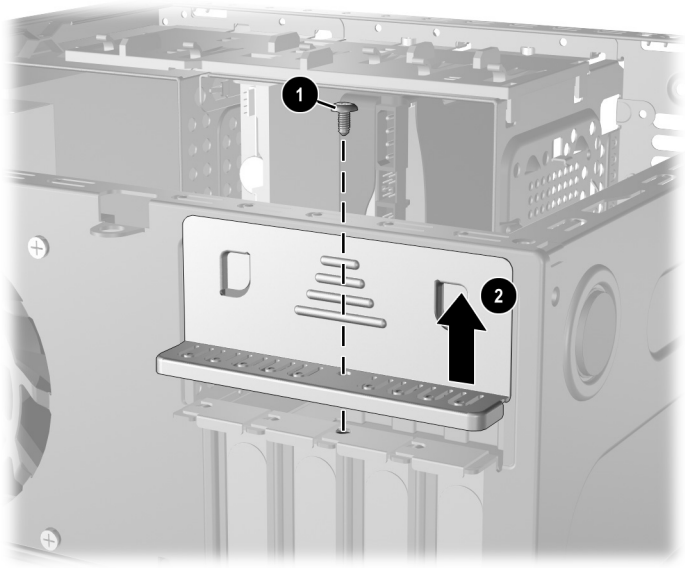
Expansion Slot Locations

Item	Description
❶	PCI expansion slot
❷	PCI expansion slot
❸	PCI Express x1 expansion slot
❹	PCI Express x16 expansion slot

You can install a PCI Express x1, x4, x8, or x16 expansion card in the PCI Express x16 expansion slot.

To remove, replace, or add an expansion card.

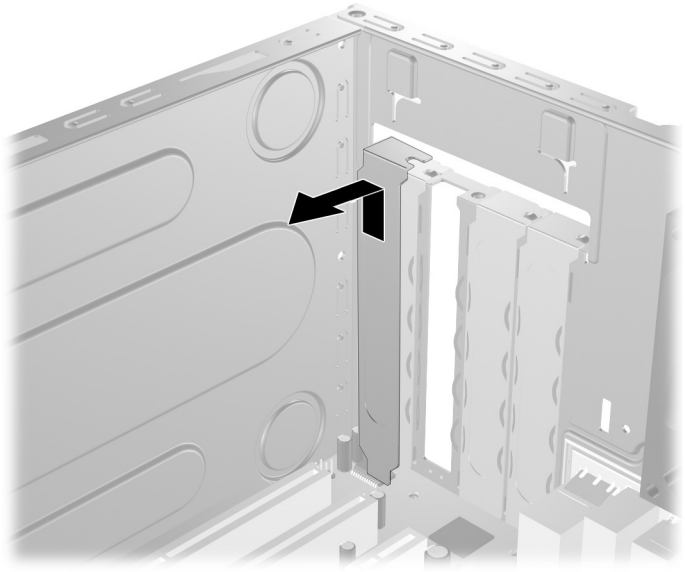
1. Turn off the computer properly through the operating system and turn off any external devices. Disconnect the power cord from the power outlet and disconnect any external devices.
2. Remove the access panel and lay the computer on its side with the opening to internal parts where the access panel was located facing up.
3. On the rear of the computer, a sliding slot cover lock secures the expansion card brackets and expansion slot covers in place. Remove the screw that holds the slot cover lock in place ❶ and slide the slot cover lock away from the brackets ❷ so that they are no longer secured by the lock.



Releasing the Slot Cover Lock

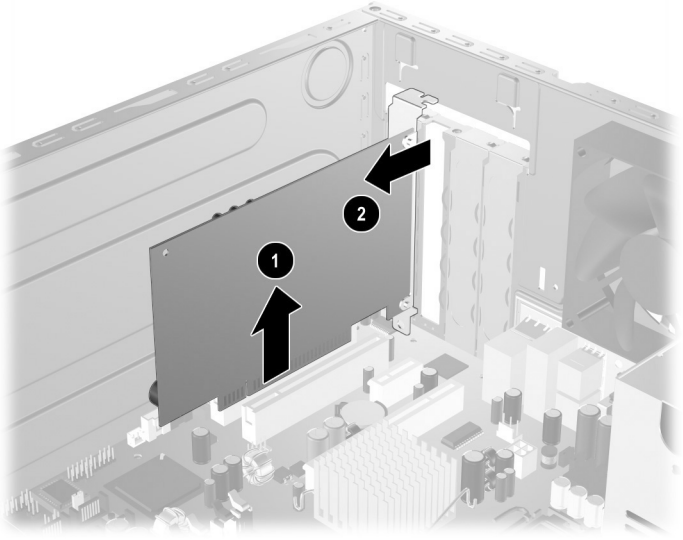
4. Before installing an expansion card, remove the expansion slot cover or the existing expansion card.

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



Removing an Expansion Slot Cover

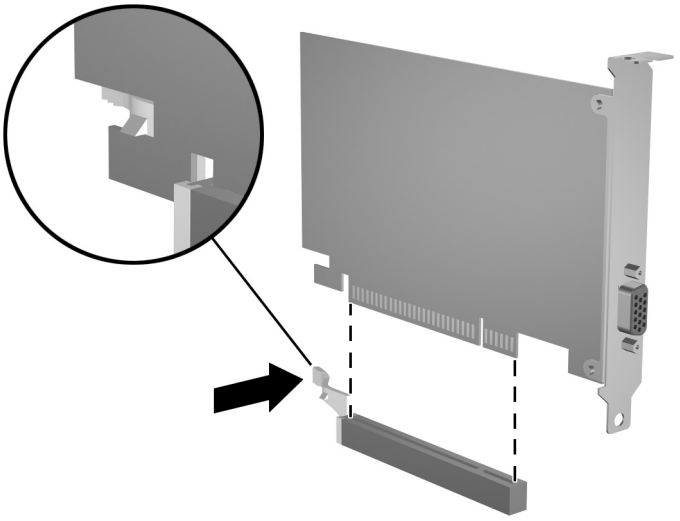
b. If removing a standard PCI expansion card, hold the card at each end, and carefully rock it back and forth until the connectors pull free from the socket. Pull the expansion card straight up from the socket ❶ then away from the inside of the chassis ❷ to release it from the chassis frame. Be sure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



Removing an Expansion Card

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

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

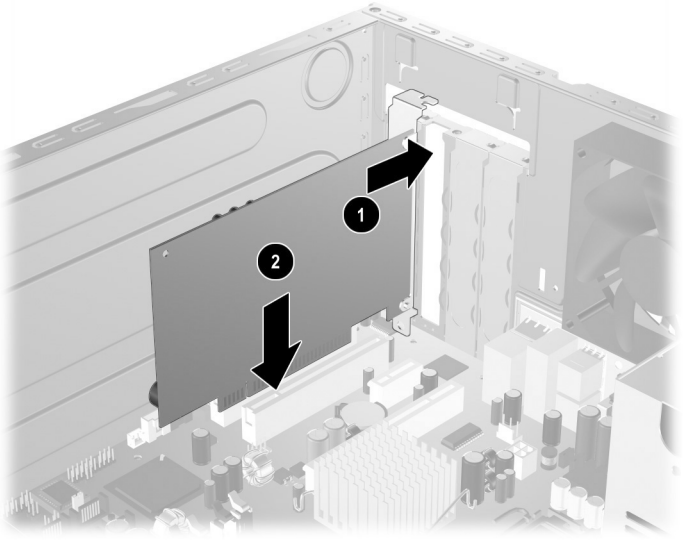


Removing a PCI Express Expansion Card

5. If not replacing the old expansion card with a new expansion card, install an expansion slot cover to close the open slot. Insert the metal slot cover in the opened slot and slide the slot cover lock down to secure the slot cover in place.

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

6. If replacing or adding a new expansion card, hold the card just above the expansion slot on the system board then move the card toward the rear of the chassis ❶ so that the bracket on the card is aligned with the open slot on the rear of the chassis. Gently press the card straight down into the expansion slot on the system board ❷.

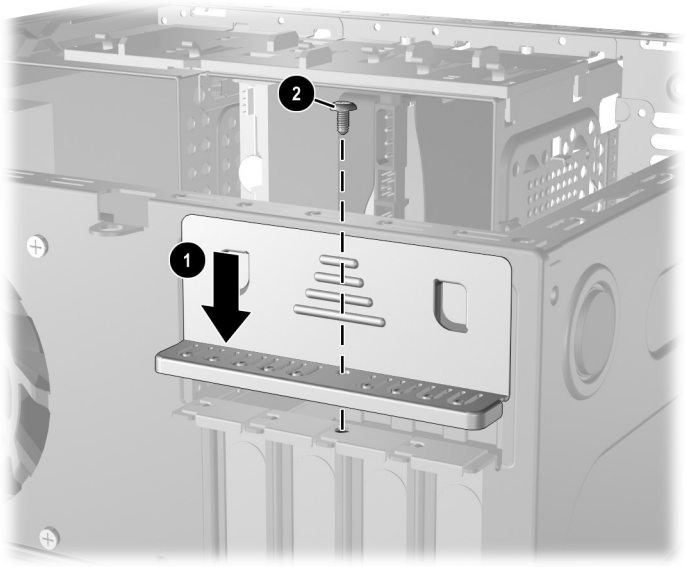


Replacing or Adding an Expansion Card

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

7. If you are replacing an expansion card, store the old card in the anti-static packaging that contained the new card.

8. While holding the expansion card bracket against the chassis, slide the slot cover lock down toward the expansion card brackets and slot covers ❶ to secure them in place and replace the screw ❷ that secures the slot cover lock.

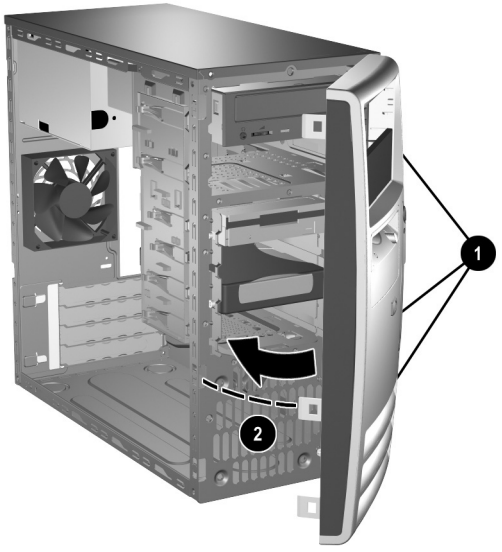


Securing the Expansion Cards and Slot Covers

9. Complete the procedure described in the "Reassembling the Computer" section of this chapter.

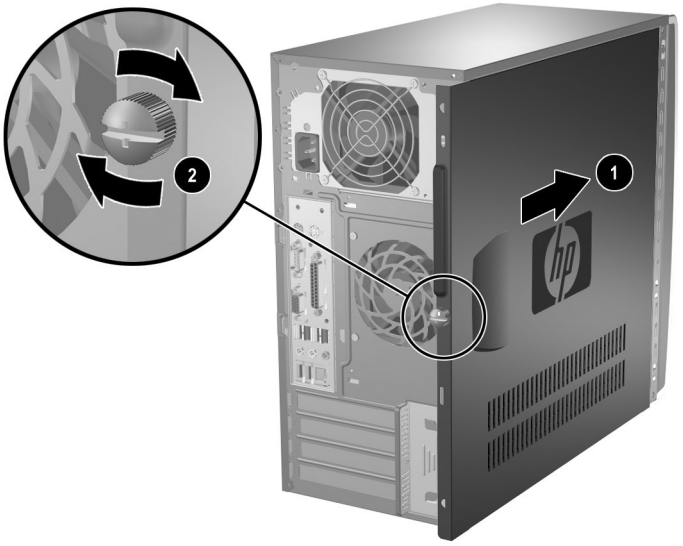
Reassembling the Computer

1. Position the chassis in the upright position. Insert the three hooks on the right side of the bezel ❶ into the rectangular holes on the chassis then rotate the bezel into place ❷ so that the three tabs on the left side of the bezel snap into the slots on the chassis.



Replacing the Front Bezel

2. Place the side access panel in the proper position on the chassis and slide it into place ❶. Ensure that the hole for the thumbscrew is aligned with the hole in the chassis and tighten the thumbscrew ❷.



Replacing the Side Access Panel

3. Reconnect the power cable to the computer and plug the cable into an electrical outlet.
4. Reconnect all peripheral devices to the computer.

WARNING: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telecommunications or telephone connectors into the network interface controller (NIC) ports.

5. Turn on the computer by pressing the power button.

A

Specifications

HP Compaq Microtower

Microtower Dimensions		
Height	14.5 in	36.8 cm
Width	6.88 in	17.5 cm
Depth (depth will increase if the computer is equipped with a port security bracket)	16.5 in	42.0 cm
Approximate Weight	23.8 lb	10.82 kg
Temperature Range		
Operating	50° to 95°F	10° to 35°C
Nonoperating	-22° to 140°F	-30° to 60°C
Relative Humidity (noncondensing)		
Operating	10-90%	10-90%
Nonoperating	5-95%	5-95%
Maximum Altitude (unpressurized)		
Operating	10,000 ft	3048 m
Nonoperating	30,000 ft	9144 m

✎ Operating temperature is derated 1.0° C per 300 m (1000 ft) to 3000 m (10,000 ft) above sea level, no direct sustained sunlight. Maximum rate of change is 10° C/Hr. The upper limit may be limited by the type and number of options installed.

Heat Dissipation		
Maximum	1575 BTU/hr	397 kg-cal/hr
Typical (idle)	340 BTU/hr	86 kg-cal/hr

HP Compaq Microtower *(Continued)*

	Input Voltage	
	115 V	**230 V**
Power Supply		
Operating Voltage Range*	90-132 VAC	180-264 VAC
Rated Voltage Range	100-127 VAC	200-240 VAC
Rated Line Frequency	50-60 Hz	50-60 Hz
Power Output	300 W	300 W
Rated Input Current (maximum)*	8A @ 100 VAC	4A @ 200 VAC

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

B

Battery Replacement

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

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.

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 *Troubleshooting Guide* on the *Documentation CD* for information on backing up the CMOS settings.

Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. In order to forward them to recycling or proper disposal, please use the public collection system or return them to HP, their authorized partners, or their agents.

CAUTION: 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.

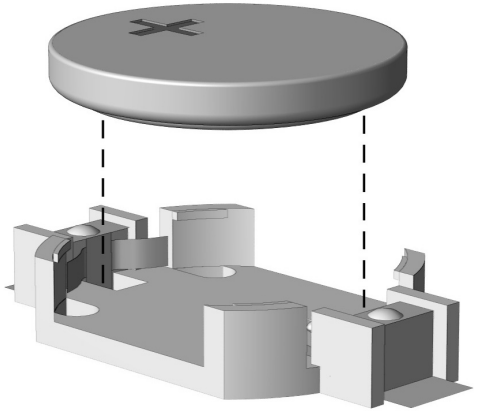
1. Turn off the computer properly through the operating system, then turn off any external devices.
2. Disconnect the power cord from the power outlet and disconnect any external devices. Then remove the computer access panel.

It may be necessary to remove an expansion card to gain access to the battery.

3. Locate the battery and battery holder on the system board.
4. 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.



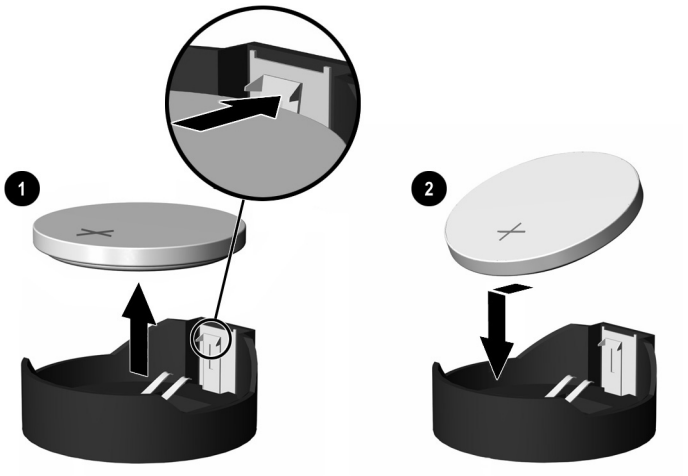
Removing a Coin Cell Battery (Type 1)

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 ❶.

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 ❷.

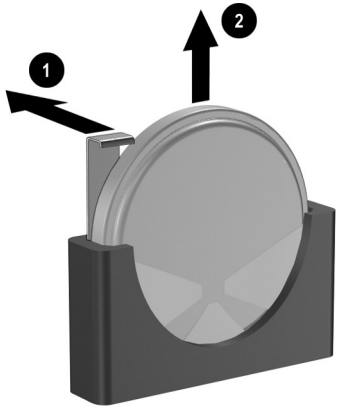


Removing and Replacing a Coin Cell Battery (Type 2)

Type 3

a. Pull back on the clip ❶ that is holding the battery in place, and remove the battery ❷.

b. Insert the new battery and position the clip back into place.



Removing a Coin Cell Battery (Type 3)

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

5. Replace the computer access panel.
6. Plug in the computer and turn on power to the computer.
7. 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 CD*.

C

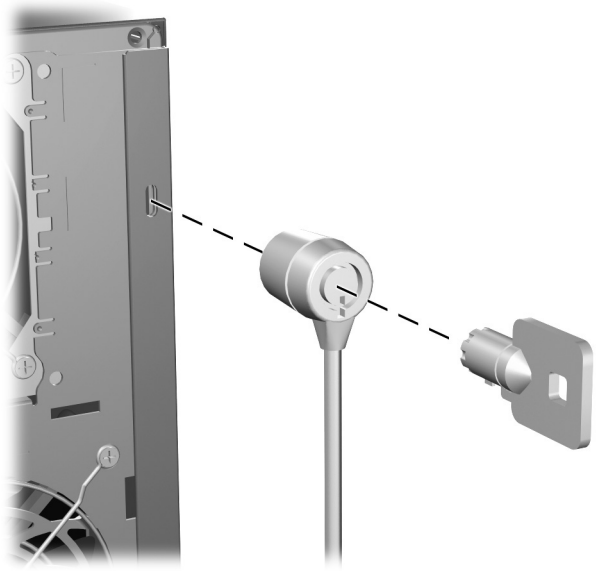
Security Lock Provisions

Installing a Security Lock

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

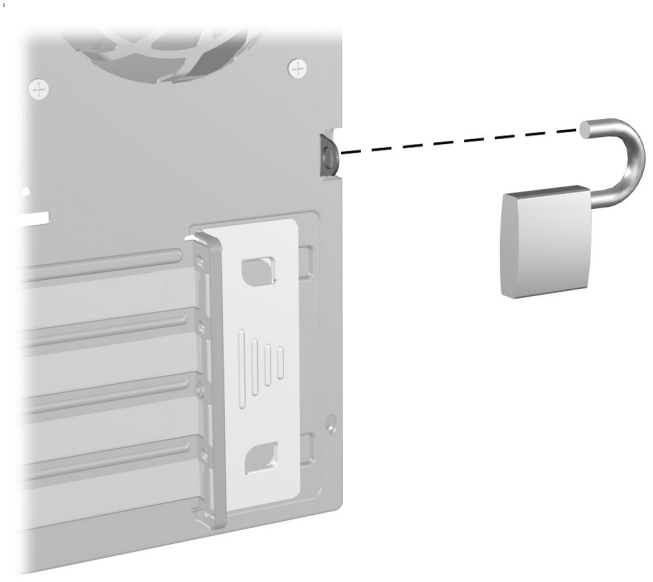
A port security bracket (not shown) is also available. Go to www.hp.com for more information.

Cable Lock



Installing a Cable Lock

Padlock



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.

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

E

Routine Computer Care and Shipping Preparation

Routine Computer Care

Follow these suggestions to take care of the computer and monitor:

- Operate the computer on a sturdy, level surface. Leave a 10.2-cm (4-inch) clearance at the back of the system unit and above the monitor to permit the required airflow.
- Never operate the computer with the cover or side panel removed.
- Never restrict the airflow into the computer by blocking the front vents or air intake. Do not place the keyboard, with the keyboard feet down, directly against the front of the desktop unit as this also restricts airflow.
- Keep the computer away from excessive moisture, direct sunlight, and extremes of heat and cold. For information about the recommended temperature and humidity ranges for the computer, refer to Appendix A, "Specifications" in this guide.
- Keep liquids away from the computer and keyboard.
- Never cover the ventilation slots on the monitor with any type of material.
- 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 the front and back of the computer. Lint 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.

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

2. Remove and store any program diskettes from the diskette drives.
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.

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.

For environmental nonoperating ranges, see Appendix A, “Specifications” in this guide.

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