![HP invent logo]

Hardware Reference Guide

HP Business Desktops
  dx5150 Small Form Factor model

Document Part Number: 373997-002

February 2005

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.

Hardware Reference Guide

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First Edition December 2004
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Product Features

Standard Configuration Features

The HP dx5150 Small Form Factor 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*.

✎ To use the computer in a minitower configuration, you must purchase a tower stand from HP (part number 316593-001).For more information, see the "Using the Small Form Factor Computer in a Minitower Configuration" section in this guide.

dx5150 Small Form Factor Configuration

Front Panel Components

Drive configuration may vary by model.
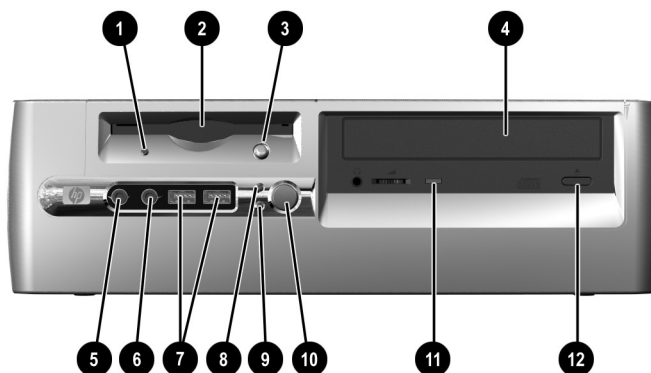
Front Panel Components

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

Rear Panel Components
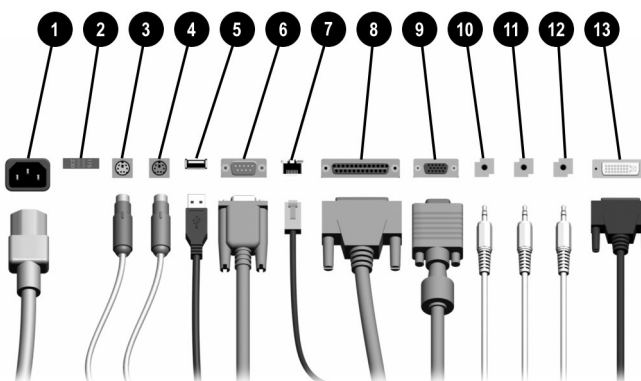
Rear Panel Components

❶		Power Cord Connector	❽	🖶	Parallel Connector
❷		Voltage Select Switch	❾	🖵	Monitor Connector
❸	🖱	PS/2 Mouse Connector	❿	♪←	Headphone/Line-Out Connector
❹	⌨	PS/2 Keyboard Connector	⓫	→♪	Line-In Audio Connector
❺	•←⟋	Universal Serial Bus (USB)	⓬	🎤	Microphone Connector
❻	IOIOI	Serial Connector	⓭	🖵	Digital Video Interface (DVI–D) Monitor Connector
❼	😾	RJ-45 Network Connector			

✎ Arrangement and number of connectors may vary by model.

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

The DVI–D connector will only work with flat panel displays.

Standard Keyboard Components
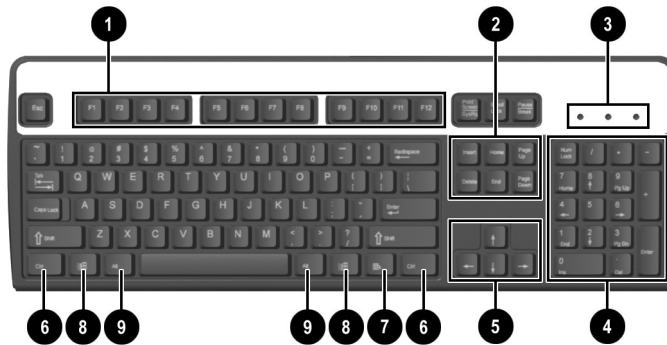
❶	Function Keys	Perform special functions, depending on the software application being used.
❷	Editing Keys	Include the following: **Insert, Home, Page Up, Delete, End,** and **Page Down.**
❸	Status Lights	Indicate the status of the computer and keyboard settings **(Num Lock, Caps Lock,** and **Scroll 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 other keys; 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 other keys; its effect depends on the application software you are using.

*Keys available in select geographic regions.

Optional HP Modular Keyboard

If the computer kit includes an HP Modular Keyboard, refer to the HP Modular Keyboard User Guide on the Documentation CD for component identification and setup information.

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. Keep this number available for use when contacting customer service for assistance.

Serial Number Location

2
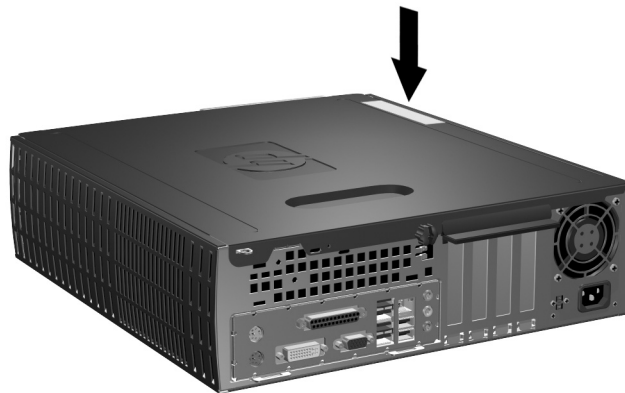
Hardware Upgrades

Serviceability Features

This 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 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. Refer to Appendix D, "Electrostatic Discharge" in this guide for additional information on preventing electrostatic discharge.

⚠ **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.

# Using the Small Form Factor Computer in a Minitower Configuration

The Small Form Factor computer can be used in either a minitower or desktop configuration. To use it in the minitower configuration, you must purchase a tower stand from HP (part number 316593-001).

⚠ **CAUTION:** If the computer is in the desktop configuration, ensure at least 4 inches (10.2 cm) of space on all sides of the computer remains clear and free of obstructions.

To install the tower stand:

1. Rotate the computer into the tower position ❶ and align the hole at the base of the computer with the post and thumbscrew in the stand ❷.

2. Tighten the screw to secure the computer to the stand ❸. This adds stability and helps to ensure proper airflow to the internal components.
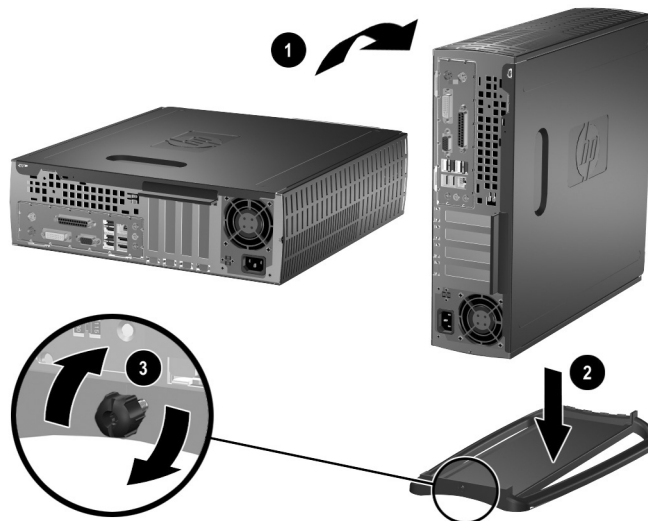
Installing the Tower Stand

Removing the Computer Access Panel and Front Bezel

To remove the computer access panel:

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 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.

✎ Lay the computer on its side (with the computer access panel facing up) *before* removing the computer access panel and installing hardware.

3. Loosen the thumbscrew on the rear of the computer ❶, slide the access panel toward the rear of the computer ❷, then lift it off.
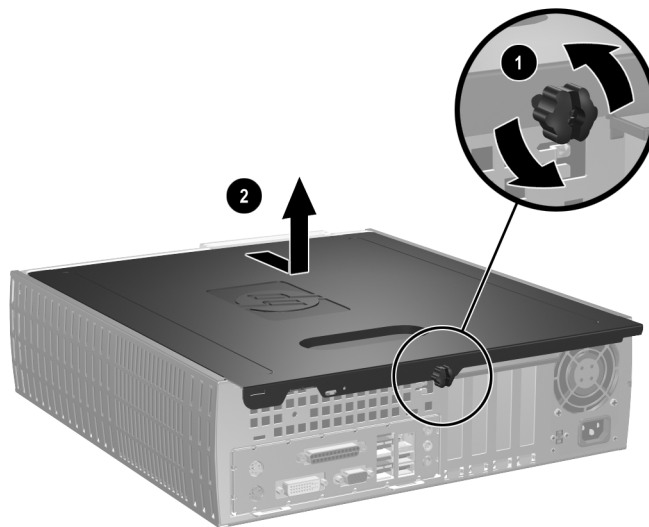
Removing the Computer Access Panel

4. To remove the front bezel, gently pull up all three tabs ❶ on the top of the bezel, then pull the bezel ❷ away from the chassis.

Removing the Front Bezel

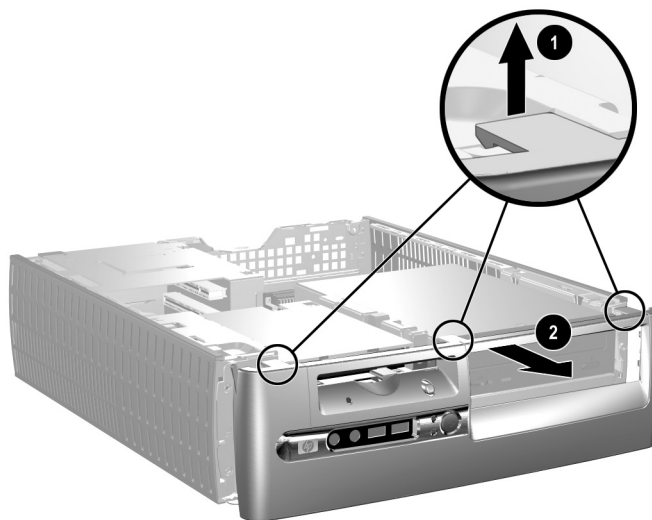To reassemble the computer, reverse the above procedure.

✎ Press down while replacing the access panel. Refer to the label on the inside of the access panel for more information.

✎ To re-install the front bezel, insert the two bezel bottom tabs, then rotate the front bezel forward to snap the three tabs on the top of the bezel in place.

Installing Additional Memory

The computer comes with double data rate synchronous dynamic random access memory (DDR-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 8GB (1-Gbit Technology) of memory configured in a high-performing dual channel mode.

✎ The memory available may be limited by the operating system.

DDR-SDRAM DIMMs

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

■ industry-standard 184-pin

■ unbuffered PC3200 400 MHz-compliant

■ 2.5 volt DDR-SDRAM DIMMs.

The DDR-SDRAM DIMMs must also:

■ support CAS latency 3 (CL = 3)

■ contain the mandatory JEDEC SPD information

In addition, the computer supports:

■ 128Mbit, 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

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

DIMM Sockets

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

■ In single channel mode, always populate the XMM1 socket first. If you add a second DIMM of a different memory size than the first, install it in XMM3. Otherwise, the system will not operate.

✎ In single channel mode, the maximum operational speed is determined by the slowest DIMM in the system. If the system is populated with a DIMM that is 266 MHz and a second DIMM that is 333 MHz, the system will run at the slower of the two speeds.

■ In dual channel mode, all DIMMs must be identically matched. If you are populating only two DIMM sockets, you must use identical DIMMs and populate them in XMM1 and XMM2, the black sockets. If you are populating all four DIMM sockets, you must either use identical DIMMs in all sockets or use identical DIMM pairs in each pair of sockets, XMM1 and XMM2 black sockets and XMM3 and XMM4 blue sockets. Otherwise, the system may not operate properly.

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 XMM3 operate in memory channel A. Sockets XMM2 and XMM4 operate in memory channel B.
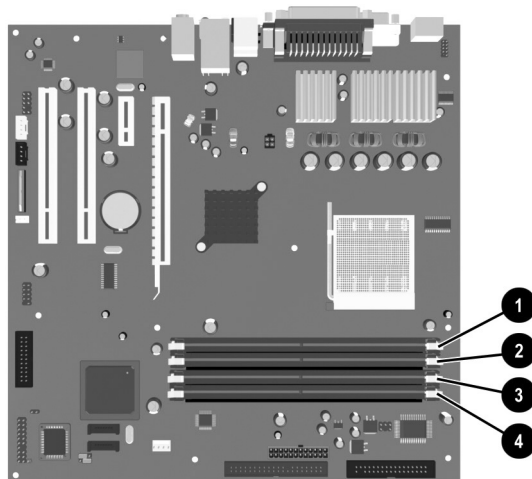
DIMM Socket Locations

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

Installing DDR-SDRAM 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. Refer to Appendix D, "Electrostatic Discharge" for more information.

⚠ **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, then 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 and front bezel. Refer to "Removing the Computer Access Panel and Front Bezel."

⚠ **CAUTION:** Check the position of all cables and wires before raising or lowering the Easy Access drive bay to prevent damage.

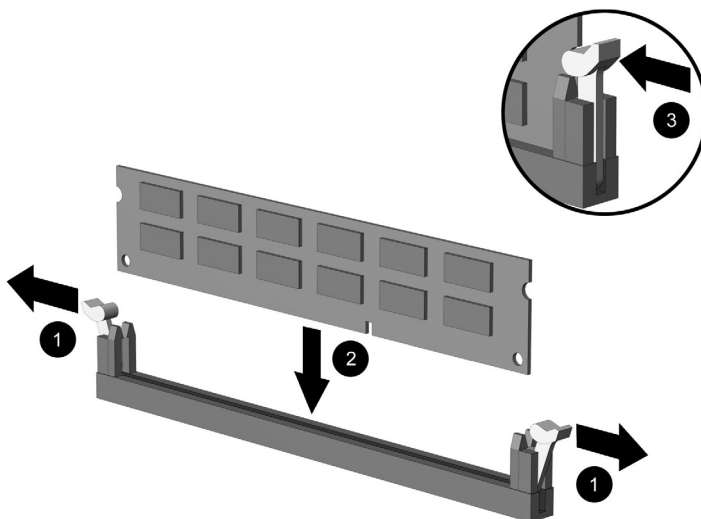4. Rotate the Easy Access drive bay to an upright position.
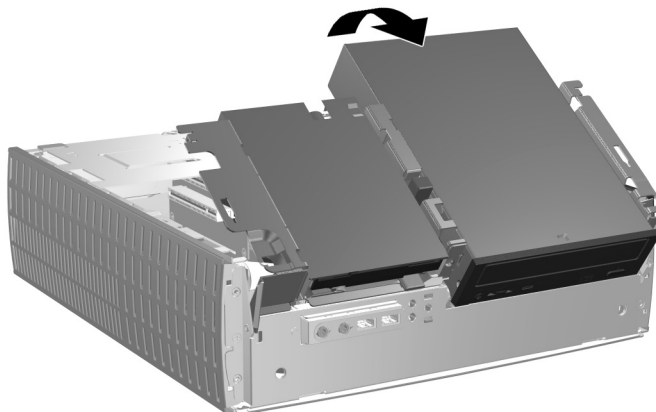
Rotating the Easy Access Drive Bay

5. Locate the memory module sockets.

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

6. Open both latches of the memory module socket ❶, then 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.

✎ If you have one preinstalled DIMM in socket XMM1 and are adding a second DIMM, it is recommended that you install an identical DIMM into the XMM2 socket. If you are populating all four DIMM sockets, use identical DIMMs in each socket. Otherwise, the computer will not operate in dual channel mode.

7. 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.

8. Repeat steps 6 and 7 for any additional modules that you want to install.

9. Return the Easy Access drive bay to the down position. Be sure not to pinch the cables in the chassis when lowering the Easy Access drive bay.

10. Replace the front bezel and computer access panel.

The computer automatically recognizes the additional memory the next time you power on the computer.

Installing an Expansion Card

The computer has four PCI expansion slots. Each slot can accommodate a half-height PCI or PCI Express expansion card up to 6.6 inches (16.764 cm) in length.

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

To install an expansion card:

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.

3. Remove the computer access panel. Refer to "Removing the Computer Access Panel and Front Bezel."

4. Identify the slot into which you want to insert the expansion card.

5. Release the slot cover retention latch that secures the PCI slot covers by pulling the latch up ❶.

6. Remove the slot cover by sliding the slot cover up and pulling it toward the inside of the chassis ❷.
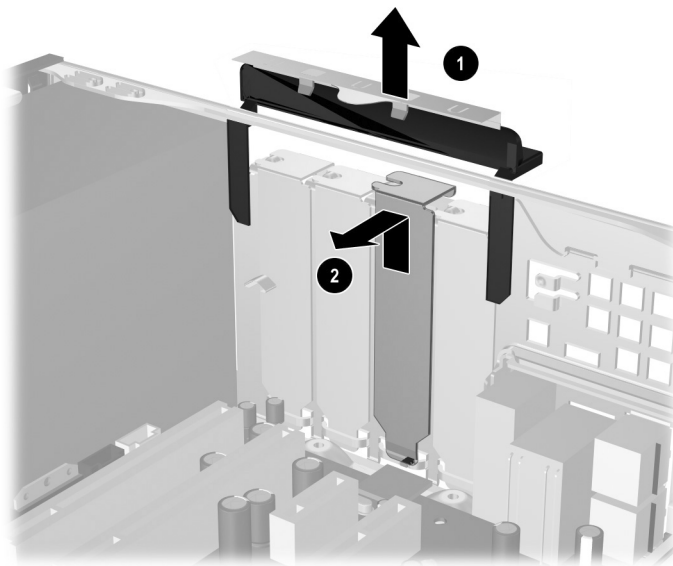
Removing the Expansion Slot Cover

7. Install the expansion card by carefully placing the expansion card under the slot cover retention latch ❶, then firmly pushing the expansion card into the connector ❷. Ensure that the expansion card is firmly and properly seated in the expansion card slot.

✎ Be sure not to scrape other components in the chassis when installing an expansion card.
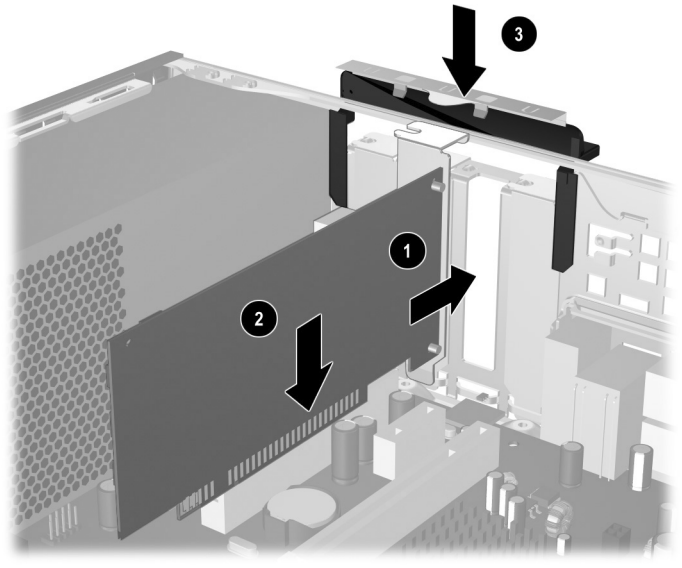
Installing an Expansion Card

8. Push the expansion slot latch down ❸ to secure the expansion card in place.

9. If you are *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 open slot, then push the expansion slot latch down to secure the slot cover in place.

⚠ **CAUTION:** After removing an expansion card, you must replace it with a new card or cover the open slot (for example, with a metal slot cover or a piece of duct tape) for proper cooling of internal components during operation.)

Removing an Expansion Card

To remove an expansion card:

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.

3. Remove the computer cover. Refer to "Removing the Computer Access Panel and Front Bezel."

4. Release the slot cover retention latch on the back of the computer that secures the PCI slot covers by pulling the latch up.

5. 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. Be sure not to scrape the card against the other components.

6. Store the card in anti-static packaging.

7. If you are not installing a new expansion card, install an expansion slot cover to close the open slot.

8. Push the expansion slot cover latch down to secure the expansion cards and expansion slot covers.

$\triangle$ **CAUTION:** All expansion card slots on the rear of the computer must contain either an expansion card or slot cover for proper cooling of internal components during operation.
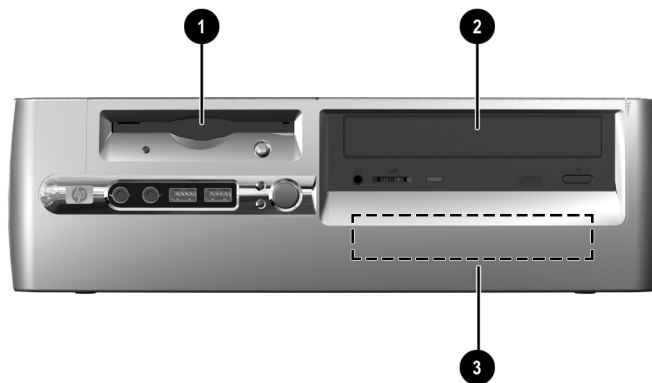
Installing Additional Drives

The computer has two external drive bays. When installing additional drives, install guide screws to ensure the drive will line up correctly in the drive cage and lock in place. HP has provided extra guide screws (four 6-32 standard screws and four M3 metric screws), installed in the front of the chassis, behind the bezel. The hard drive uses 6-32 standard screws. All other drives use M3 metric screws. The HP-supplied metric screws are black and the HP-supplied standard screws are silver.

⚠ **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, see Appendix D, "Electrostatic Discharge."

■ Handle a drive carefully; do not drop it.

■ Do not use excessive force when inserting a drive.

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

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

Locating Drive Positions

Desktop Drive Positions

❶	3.5-inch drive bay (1.44-MB diskette drive shown)*
❷	5.25-inch drive bay for optional drives
❸	3.5-inch, internal, standard hard drive bay

*If the computer has a 1.44-MB diskette drive installed, it will be configured with a diskette drive bezel as shown in the illustration. If the computer contains an empty 3.5-inch drive bay, then a bezel blank will be installed on the computer instead. If you do not have a drive in this slot, you may choose to install a 3.5-inch device (such as a diskette drive, hard drive, or Zip drive) later on. However, to install a 3.5-inch device other than a diskette drive or hard drive, you must order the 3.5-inch device bezel (PN 316008-001).

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

Removing an Optical Drive or Diskette Drive

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

✎ An optical drive is a CD-ROM, CD-RW, or DVD-ROM drive.

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.

3. Remove the computer access panel and front bezel. Refer to "Removing the Computer Access Panel and Front Bezel."

4. Raise the Easy Access drive bay to the upright position.

5. Disconnect the audio, signal, and drive power cables. The other end of the audio cable should remain connected to the audio connector on the system board.

✎ Only Linux systems will have an audio cable connected to the optical drive.

6. Return the Easy Access drive bay to the down position.

7. Push the drive release latch ❶ toward the rear of the chassis and hold.

8. Slide the drive ❷ toward the front of the drive cage, then lift the drive out of the computer.
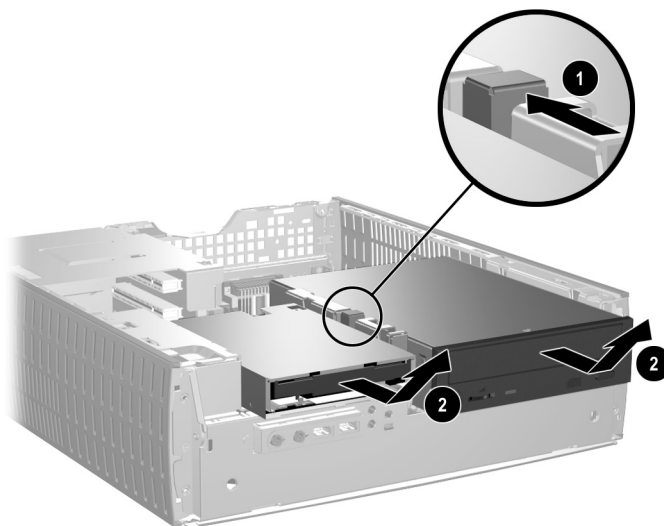
Removing the Optical Drive or Diskette Drive

To replace the drive, reverse the removal procedures.

✎ When replacing the drive, transfer the four screws from the old drive to the new one. The screws take the place of drive rails.

Installing an Optional Optical Drive

To install an optional optical drive:

1. Remove the optical drive if present.

2. Install two guide screws in the lower holes on each side of the drive.

$\triangle$ **CAUTION:** Use only 3/16-inch or 5-mm long screws as guide screws. Longer screws can damage the internal components of the drive.

✎ When replacing the drive, transfer the four screws from the old drive to the new one. The screws take the place of drive rails.

Installing Guide Screws in the Optical Drive

3. Position the guide screws on the drive into the J-slots in the drive bay ❶. Then, slide the drive toward the rear of the computer ❷.
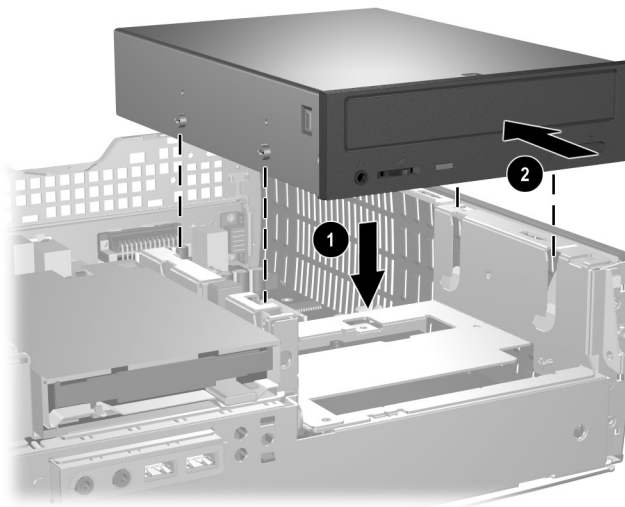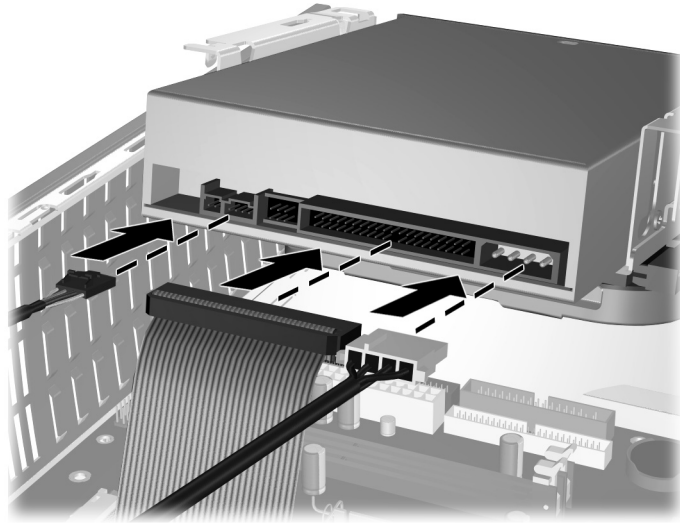

Installing the Optical Drive

✎ The drive release latch automatically locks in place when installing a drive.

4. Raise the Easy Access drive bay to the upright position and connect the flat ribbon cable and audio cable to the system board.

Connecting the Flat Ribbon Cable and Audio Cable

5. Connect the power cable, flat ribbon cable, and audio cable to the rear of the optical drive.

✎ Only Linux systems require an audio cable to be connected to the optical drive.

6. Return the Easy Access drive bay to the down position. Be sure not to pinch the cables in the chassis when lowering the Easy Access drive bay.

7. Replace the front bezel and computer access panel.

The system automatically recognizes the drive and reconfigures the computer.

⚠ **CAUTION:** When servicing the computer, ensure that cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the computer.

Upgrading the Hard Drive

Removing and Replacing the Hard Drive

✎ Only a serial advanced technology attachment (SATA) hard drive can be installed on this computer.

✎ 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.

The preinstalled 3.5-inch hard drive is located on the right side of the computer. To remove and replace the hard drive:

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.

3. Remove the computer access panel and front bezel. Refer to "Removing the Computer Access Panel and Front Bezel."

4. Raise the Easy Access drive bay to the upright position.

5. Disconnect the power cable and data cable from the back of the drive.
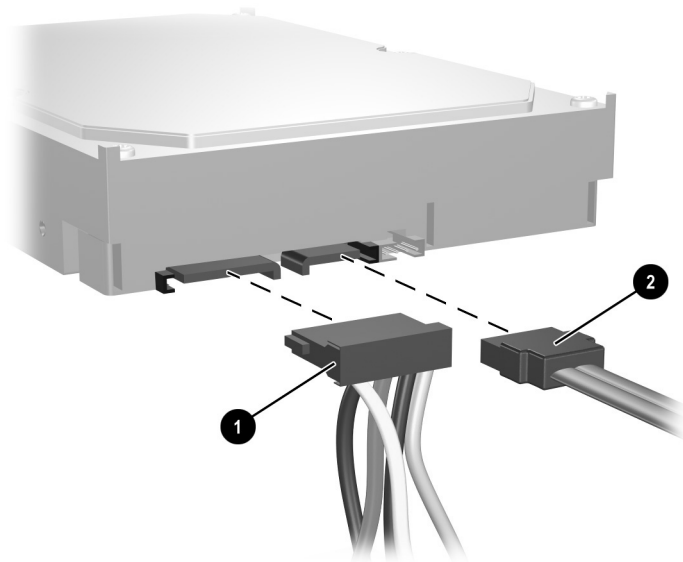
6. Press and hold the drive release latch ❶.

7. Slide the drive to the right of the bay ❷, then pull the drive from the bay ❸.
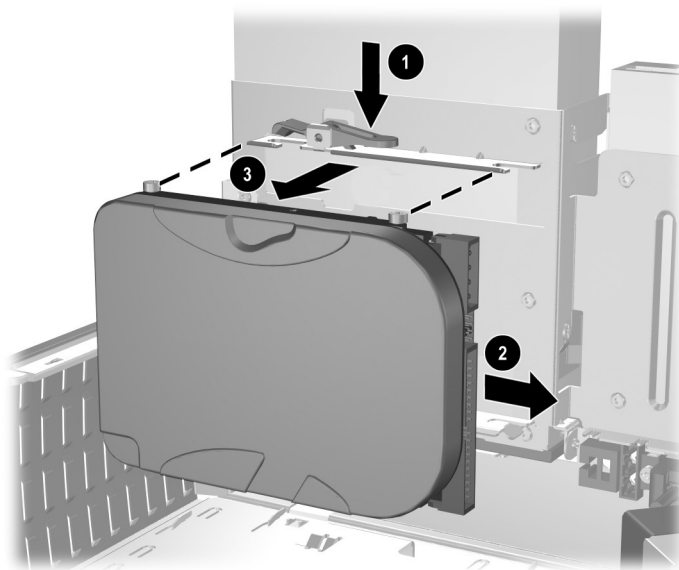
Removing the Hard Drive

8. To install a hard drive, reverse the above procedure.

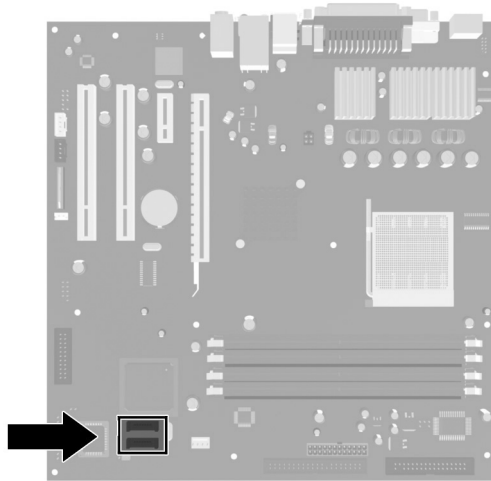9. Connect the power cable ❶ and data cable ❷ to the hard drive.

Connecting the Power Cable and Data Cable

10. Connect the opposite end of the data cable to the appropriate system board connector.

✎ If your system has only one hard drive, you must connect the hard drive to the connector labeled 0 first to avoid any hard drive performance problems.

Hard Drive Connector Locations

✎ When replacing the hard drive, transfer the four screws from the old drive to the new one. The screws take the place of drive rails. You will need a Torx T-15 screwdriver to remove and re-install the guide screws.

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

Configuring the SATA Hard Drive

After installing a SATA hard drive, enable the appropriate controller in Computer Setup.

1. Turn on or restart the computer. If you are in Microsoft Windows, click **Start > Shut Down > Restart**.

2. As soon as the computer is turned on, press and hold **F10** until you enter Computer Setup.

✎ If you do not press **F10** at the appropriate time, you must restart the computer and press and hold **F10** to access the utility.

3. Use the arrow keys to select **Integrated Peripherals** and press Enter.

4. Use the arrow keys to select **South OnChip PCI Device** and press Enter.

5. Use the arrow keys to select **Onboard Chip SATA** and press Enter.

6. Use the arrow keys to select **SATA Disabled**, **IDE Controller** (non-RAID), or **RAID Controller**.

7. Press **F10** to save to CMOS and exit Computer Setup.

If you selected the RAID controller, you must create and configure RAID sets.

1. Turn on or restart the computer. If you are in Microsoft Windows, click **Start > Shut Down > Restart**.

2. At the prompt, press **Ctrl**+**S** or **F4** to enter the RAID utility.

Follow the instructions to create RAID sets. For more detailed information, see the RAID installation guide at http://www.hp.com under support and drivers for the dx5150.
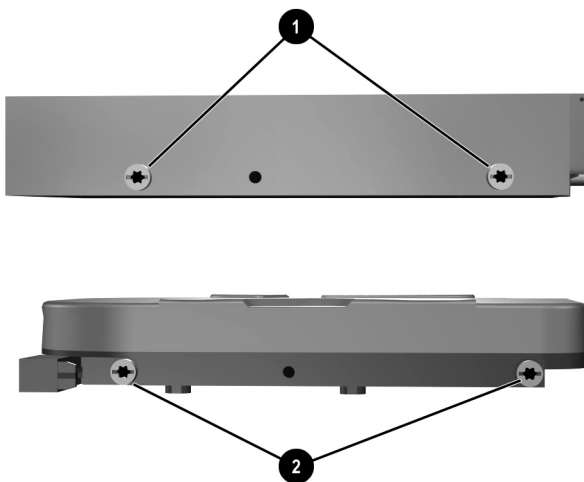
Installing a Drive into the 3.5-inch Drive Bay

Depending on the computer configuration, the 3.5-inch drive bay on the left side of the computer may be configured with a diskette drive or it may be an empty drive bay. The type of bezel covering the drive bay will vary depending on the original computer configuration.

If the computer was not configured with the optional diskette drive, you can install a 3.5-inch device, such as a diskette drive or hard drive, into the drive bay at any time.

✎ The type of bezel you need will depend on the type of device you plan to install. If you are installing a diskette drive, you must install a diskette drive bezel (PN 316002-001). If you are installing a hard drive, you must install a bezel blank (PN 316006-001). If you are installing a 3.5-inch device other than a diskette drive or hard drive, you must install the 3.5-inch device bezel (PN 316008-001). Contact an authorized HP reseller or service provider to order the appropriate bezel when reconfiguring the computer.

Guide Screw Locations

✎ The guide screws on a 3.5-inch diskette drive ❶ are placed closer together than on the hard drive ❷.

To install a drive into the bay:

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.

3. Remove the computer access panel and front bezel. Refer to "Removing the Computer Access Panel and Front Bezel."

4. Remove the diskette drive bezel by pushing the tab inward ❶ and pulling the diskette drive bezel ❷ away from the front bezel.

✎ The type of bezel will vary depending on the computer configuration.
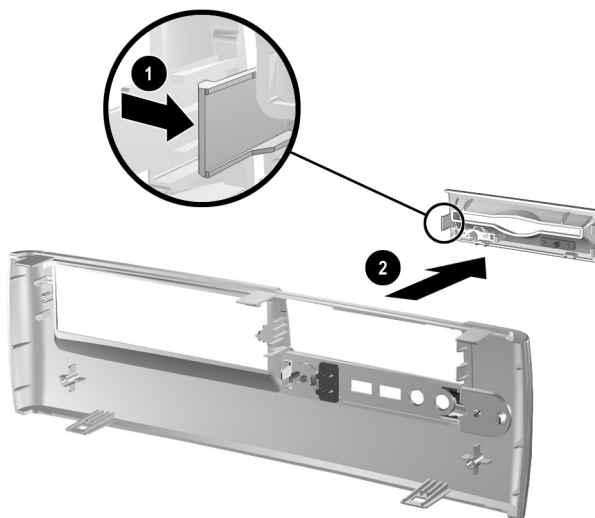
Removing the Diskette Drive Bezel

5. Insert the rear screws of the hard drive ❶ into the rear J-slots. Slide the drive ❷ toward the back of the drive cage until the front screws are aligned with the front J-slots. Then lower the front of the drive. Continue to slide the drive all the way back until it locks into place.

✎ If replacing a diskette drive, the guide screws (front and rear) will line up on the J-slots. Insert the guide screws into the J-slots, then slide the drive toward the back of the drive cage until it locks into place.
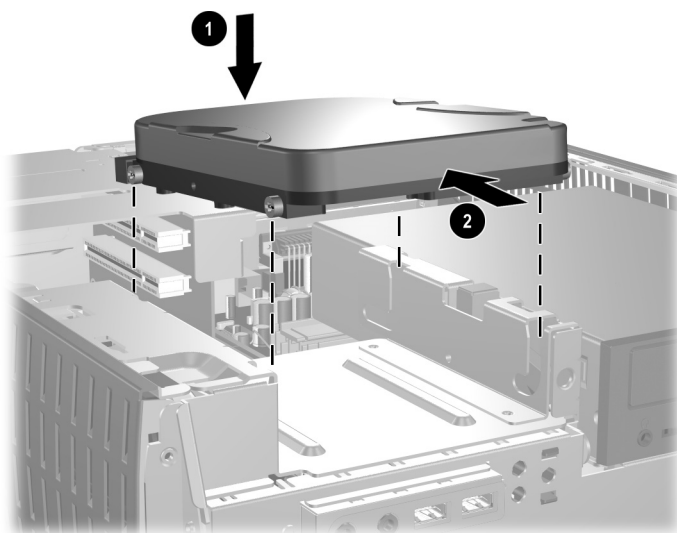
Installing a Hard Drive into the 3.5-inch Drive Bay

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

✎ The type of bezel you need will depend on the type of device you are installing. If you are installing a diskette drive, you must install a diskette drive bezel (PN 316002-001). If you are installing a hard drive, you must install a bezel blank (PN 316006-001) as shown in the illustration below. If you are installing a 3.5-inch device other than a diskette drive or hard drive, you must install the 3.5-inch device bezel (PN 316008-001). Contact an authorized HP reseller or service provider to order the appropriate bezel when reconfiguring the computer.
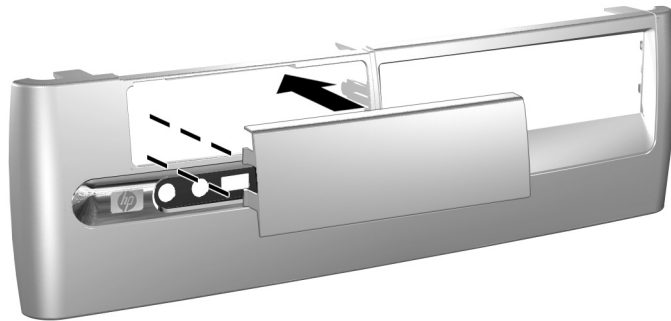
Installing a Bezel Blank

7. Connect the power and data cables.

8. Replace the front bezel and computer access panel.

A

Specifications

⚠️ **CAUTION:** If the computer is in the desktop configuration, ensure at least 4 inches (10.2 cm) of space on all sides remains clear and free of obstructions.

HP dx5150 Small Form Factor

Desktop Dimensions		
Height	3.95 inches	10.3 cm
Width	13.3 inches	33.78 cm
Depth	15.1 inches	38.35 cm
Approximate Weight	21 lb	9.53 kg
Temperature Range		
Operating	50× to 95× F	10× to 35× C
Nonoperating	-22× to 140× F	-30× to 60× C
Relative Humidity (noncondensing)		
Operating	10–90%	10–90%
Nonoperating (38.7° C max wet bulb)	5–95%	5–95%
Maximum Altitude (unpressurized)		
Operating	10,000 ft	3048 m
Nonoperating	30,000 ft	9144 m

✎ 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.

HP dx5150 Small Form Factor *(Continued)*

Heat Dissipation

Maximum	971 BTU/hr	245 kg-cal/hr
Typical (idle)	256 BTU/hr	65 kg-cal/hr

	Input Voltage Switch Setting	
Power Supply	**115 V**	**230 V**
Operating Voltage Range	90–132 VAC	180–264 VAC
Rated Voltage Range	100–127 VAC	200–240 VAC
Rated Line Frequency	47–63 Hz	47–63 Hz

✎ This system utilizes a passive power factor corrected power supply when used in the 230V mode. This allows the system to pass the CE mark requirements for use in the countries of the European Union.

Power Output	200 W	200 W
Rated Input Current (maximum)	6 A @ 115 VAC	3 A @ 230 VAC

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. Disconnect the power cord from the power outlet and disconnect any external devices. Then remove the computer access panel.
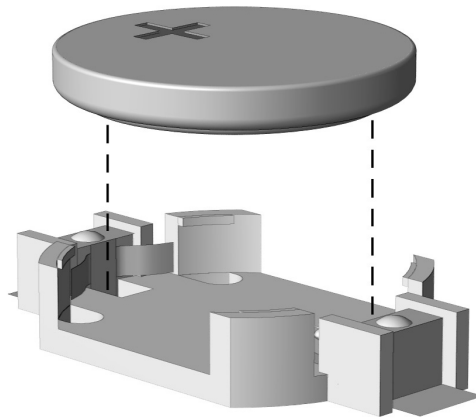
✎ It may be necessary to remove an expansion card to gain access to the battery.

2. Locate the battery and battery holder on the system board.

3. 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.

b. When the battery pops up, lift it out.
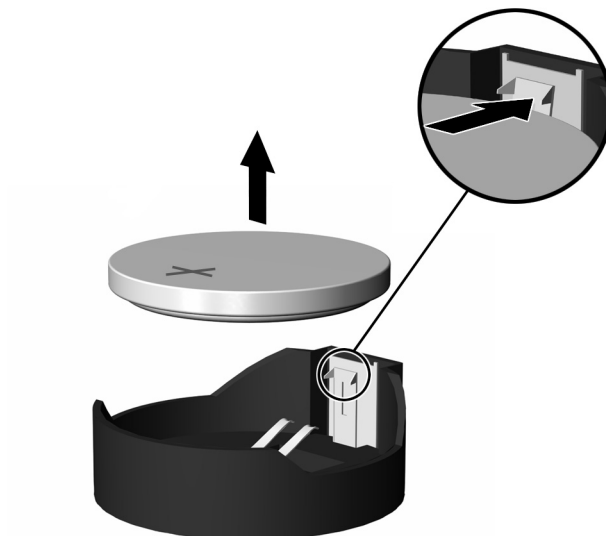
Removing a Coin Cell Battery (Type 2)

c. 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.
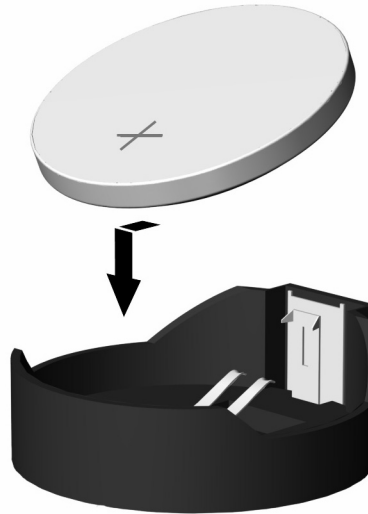
Replacing a Coin Cell Battery (Type 2)

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

4. Replace the computer access panel.

5. Plug in the computer and turn on power to the computer.

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

C

Security Lock Provisions

Installing a Security Lock

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

✎ If present, insert the cable lock in the location shown below. The cable lock can also be inserted in the secondary hole highlighted below.
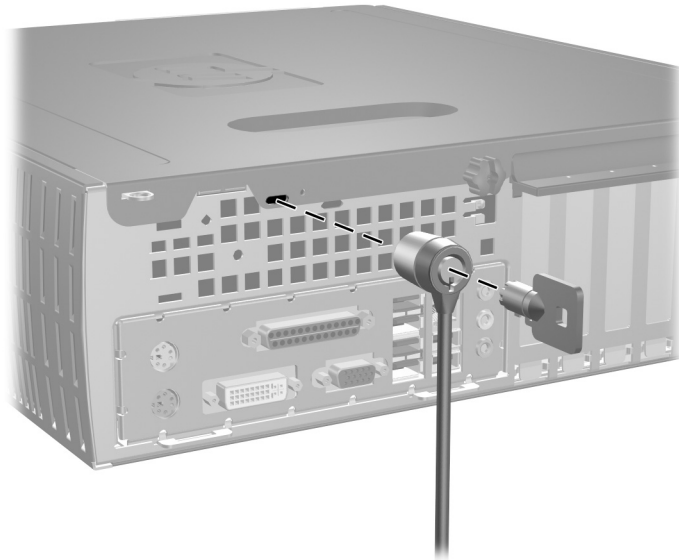
Installing a Cable Lock
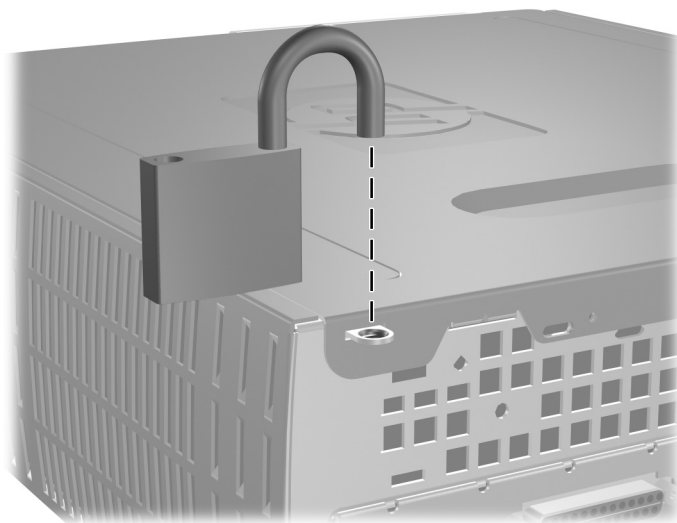
Installing a Padlock

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

Computer Operating Guidelines, Routine Care and Shipping Preparation

Computer Operating Guidelines and Routine Care

⚠️ **CAUTION:** If the computer is in the desktop configuration, ensure at least 4 inches (10.2 cm) of space on all sides of the computer remains clear and free of obstructions.

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. For information about the recommended temperature and humidity ranges for the computer, refer to Appendix A, "Specifications" in this guide.

■ 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.

✎ 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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