



## Hardware Reference Guide

HP Compaq 8100 Elite Small Form Factor Business  
PC and HP Z200 Small Form Factor Workstation

© Copyright 2010 Hewlett-Packard  
Development Company, L.P.

Microsoft, Windows, and Windows Vista are either trademarks or registered trademarks of Microsoft Corporation in the United States and/or other countries.

The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

This document contains proprietary information that is protected by copyright. No part of this document may be photocopied, reproduced, or translated to another language without the prior written consent of Hewlett-Packard Company.

#### **Hardware Reference Guide**

HP Compaq 8100 Elite Small Form Factor  
Business PC and HP Z200 Small Form  
Factor Workstation

Second Edition (February 2010)

Document Part Number: 593073-002

## About This Book

This guide provides basic information for upgrading this computer model.

- △ **WARNING!** Text set off in this manner indicates that failure to follow directions could result in bodily harm or loss of life.
- △ **CAUTION:** Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.
- 📄 **NOTE:** Text set off in this manner provides important supplemental information.



---

# Table of contents

<b>Hardware Upgrades</b> .....	<b>1</b>
Warnings and Cautions .....	1
Additional Information .....	1
Unlocking the Smart Cover Lock .....	1
Smart Cover FailSafe Key .....	2
Using the Smart Cover FailSafe Key to Remove the Smart Cover Lock .....	2
Removing the Computer Access Panel .....	4
Replacing the Computer Access Panel .....	5
Removing the Front Bezel .....	6
Removing Bezel Blanks .....	6
Replacing the Front Bezel .....	8
Using the Small Form Factor Computer in a Tower Orientation .....	8
Installing Additional Memory .....	11
DIMMs .....	11
DDR3-SDRAM DIMMs .....	11
Installing DIMMs .....	12
Removing or Installing an Expansion Card .....	15
Drive Positions .....	20
Installing and Removing Drives .....	21
Removing an External 5.25-inch Drive .....	23
Installing an Optical Drive into the 5.25-inch Drive Bay .....	25
Removing an External 3.5-inch Drive .....	28
Installing a Drive into the 3.5-inch External Drive Bay .....	30
Removing and Replacing the Primary 3.5-inch Internal SATA Hard Drive .....	32
Removing and Replacing a Removable 3.5-inch SATA Hard Drive .....	36
Battery Replacement .....	40
Installing a Security Lock .....	43
HP/Kensington MicroSaver Security Cable Lock .....	43
Padlock .....	43
HP Business PC Security Lock .....	44
Front Bezel Security .....	47
<b>Appendix A Electrostatic Discharge</b> .....	<b>49</b>
Preventing Electrostatic Damage .....	49
Grounding Methods .....	49
<b>Appendix B Computer Operating Guidelines, Routine Care and Shipping Preparation</b> .....	<b>50</b>
Computer Operating Guidelines and Routine Care .....	50

Optical Drive Precautions .....	51
Operation .....	51
Cleaning .....	51
Safety .....	51
Shipping Preparation .....	51

<b>Index .....</b>	<b>52</b>
--------------------	-----------

---

# Hardware Upgrades

## Warnings and Cautions

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

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

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

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

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

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

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

**WARNING!** Energized and moving parts inside.

Disconnect power to the equipment before removing the enclosure.

Replace and secure the enclosure before re-energizing the equipment.

- △ **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 [Electrostatic Discharge on page 49](#) 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.

---

## Additional Information

For more information on removing and replacing hardware components, desktop management, the Computer Setup utility, and troubleshooting, refer to the *Maintenance and Service Guide* (available in English only) for your computer model at <http://www.hp.com>.

## Unlocking the Smart Cover Lock

-  **NOTE:** The Smart Cover Lock is an optional feature included on some models only.
- 

The Smart Cover Lock is a software-controllable cover lock, controlled by the setup password. This lock prevents unauthorized access to the internal components. The computer ships with the Smart Cover Lock in the unlocked position. For more information about locking the Smart Cover Lock, refer to the *Maintenance and Service Guide* (available in English only).

## Smart Cover FailSafe Key

If you enable the Smart Cover Lock and cannot enter your password to disable the lock, you will need a Smart Cover FailSafe Key to open the computer cover. You will need the key to access the internal computer components in any of the following circumstances:

- Power outage
- Startup failure
- PC component (for example, processor or power supply) failure
- Forgotten password

---

 **NOTE:** The Smart Cover FailSafe Key is a specialized tool available from HP. Be prepared; order this key before you need it.

---

To obtain a FailSafe Key:

- Contact an authorized HP reseller or service provider. Order PN 166527-001 for the wrench-style key or PN 166527-002 for the screwdriver bit key.
- Refer to the HP Web site (<http://www.hp.com>) for ordering information.
- Call the appropriate number listed in the warranty or in the *Support Telephone Numbers* guide.

## Using the Smart Cover FailSafe Key to Remove the Smart Cover Lock

To open the access panel with the Smart Cover Lock engaged:

1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as compact discs or USB flash drives, 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.

6. Use the Smart Cover FailSafe Key to remove the tamper-proof screw that secures the Smart Cover Lock to the chassis.

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 1** Removing the Smart Cover Lock Screw



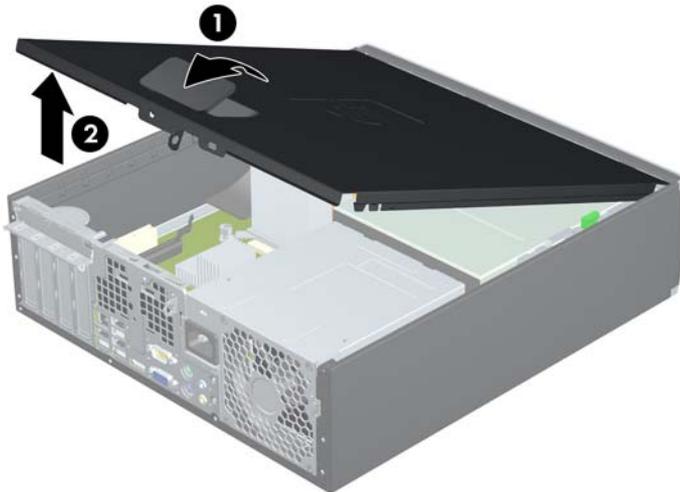
You can now remove the access panel. See [Removing the Computer Access Panel on page 4](#).

To reattach the Smart Cover Lock, secure the lock in place with the tamper-proof screw.

## Removing the Computer Access Panel

1. Remove/disengage any security devices that prohibit opening the computer.
  2. Remove all removable media, such as compact discs or USB flash drives, 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.
  6. Lift up on the access panel handle (1) then lift the access panel off the computer (2).
- 
- 📄 **NOTE:** Your computer may look different than the illustration shown below.
- 

**Figure 2** Removing the Access Panel



## Replacing the Computer Access Panel

Slide the lip on the front end of the access panel under the lip on the front of the chassis (1) then press the back end of the access panel onto the unit so that it locks into place (2).

 **NOTE:** Your computer may look different than the illustration shown below.

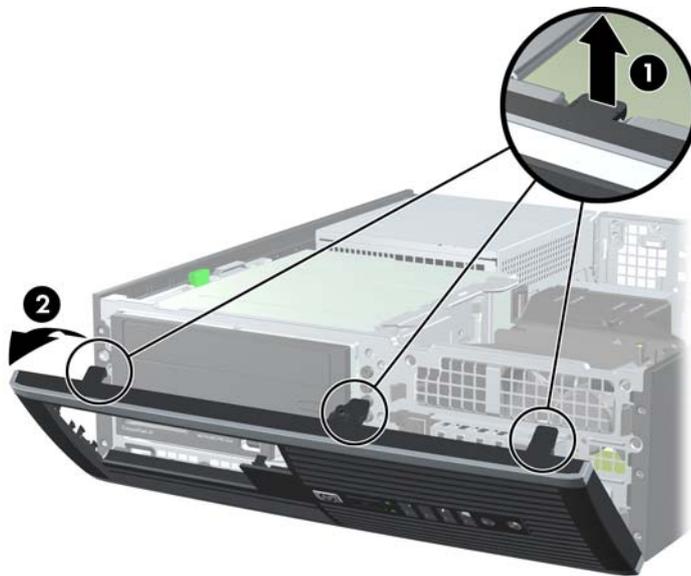
**Figure 3** Replacing the Access Panel



## Removing the Front Bezel

1. Remove/disengage any security devices that prohibit opening the computer.
  2. Remove all removable media, such as compact discs or USB flash drives, from the computer.
  3. Turn off the computer properly through the operating system, then turn off any external devices.
  4. Disconnect the power cord from the power outlet and disconnect any external devices.
- 
- △ **CAUTION:** Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.
- 
5. Remove the access panel.
  6. Lift up the three tabs on the side of the bezel (1), then rotate the bezel off the chassis (2).
- 
- 📄 **NOTE:** Your computer may look different than the illustration shown below.
- 

**Figure 4** Removing the Front Bezel



## Removing Bezel Blanks

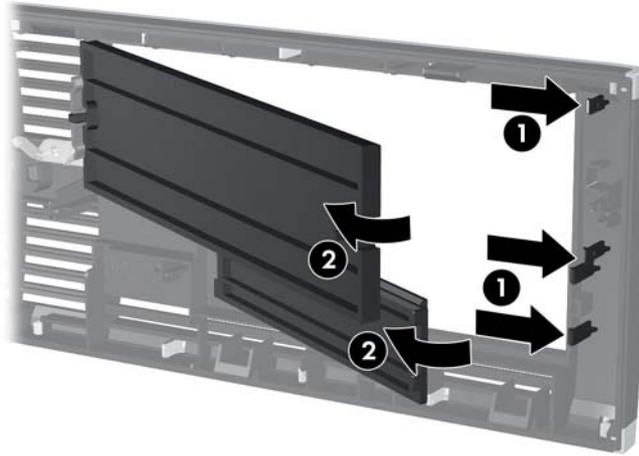
On some models, there are bezel blanks covering the 3.5-inch and 5.25-inch external drive bays that need to be removed before installing a drive. To remove a bezel blank:

1. Remove the access panel and front bezel.

2. To remove a bezel blank, push the two retaining tabs that hold the bezel blank in place towards the outer right edge of the bezel (1) and slide the bezel blank back and to the right to remove it (2).

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 5** Removing a Bezel Blank

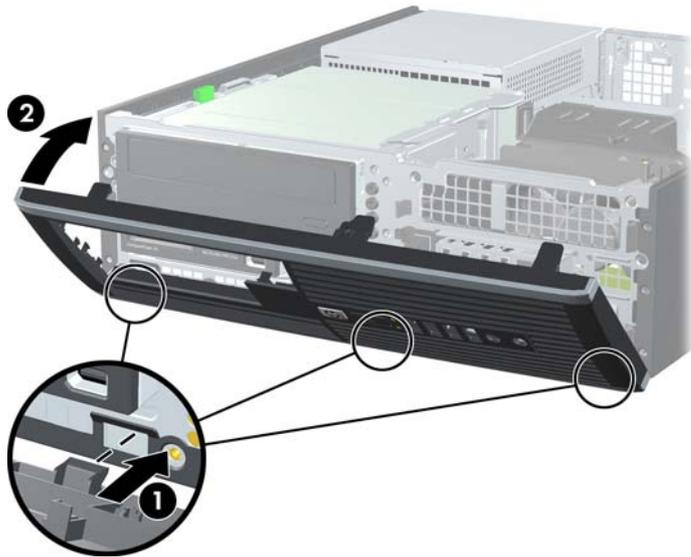


## Replacing the Front Bezel

Insert the three hooks on the bottom side of the bezel into the rectangular holes on the chassis (1) then rotate the top side of the bezel onto the chassis (2) and snap it into place.

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 6** Replacing the Front Bezel



## Using the Small Form Factor Computer in a Tower Orientation

The Small Form Factor computer can be used in a tower orientation with an optional tower stand that can be purchased from HP.

1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as compact discs or USB flash drives, 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. Orient the computer so that its right side is facing down and place the computer in the optional stand.

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 7** Changing from Desktop to Tower Orientation

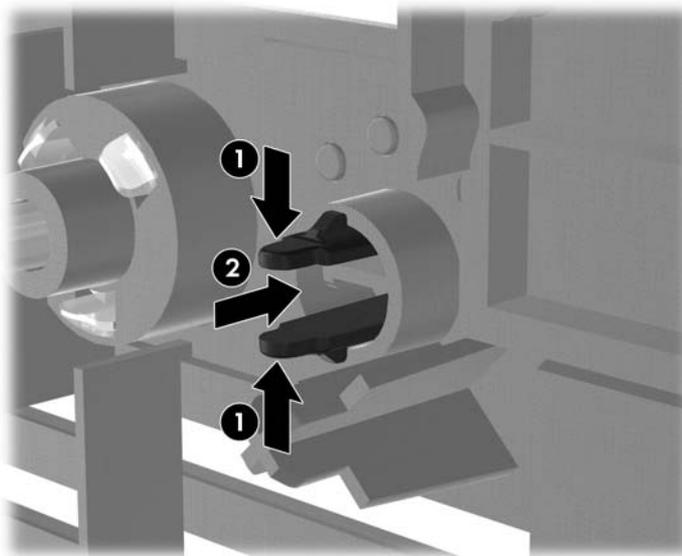


 **NOTE:** To stabilize the computer in a tower orientation, HP recommends the use of the optional tower stand.

6. On the back of the Z200 Small Form Factor (SFF) Workstation front bezel, squeeze the HP logo mounting tabs (1) and press the logo outward (2) as shown in the following illustration.

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 8** Rotating the Z200 SFF Logo



Rotate the HP logo 90 degrees counterclockwise, and then release the logo and press it back into place in the front bezel.

7. Reconnect the power cord and any external devices, then turn on the computer.

---

 **NOTE:** Ensure at least 10.2 centimeters (4 inches) of space on all sides of the computer remains clear and free of obstructions.

---

# Installing Additional Memory

The computer comes with double data rate 3 synchronous dynamic random access memory (DDR3-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 16-GB of memory.

## DDR3-SDRAM DIMMs

For proper system operation, the DDR3-SDRAM DIMMs must be:

- industry-standard 240-pin
- unbuffered non-ECC PC3-8500 DDR3-1066 MHz-compliant or PC3-10600 DDR3-1333 MHz-compliant
- unbuffered ECC PC3-10600 DDR3-1333 MHz-compliant (Z200 SFF only)
- 1.5 volt DDR3-SDRAM DIMMs

The DDR3-SDRAM DIMMs must also:

- support CAS latency 7 DDR3 1066 MHz (7-7-7 timing) and CAS latency 9 DDR3 1333 MHz (9-9-9 timing)
- contain the mandatory JEDEC SPD information

In addition, the computer supports:

- single-sided and double-sided DIMMs
- DIMMs constructed with x8 and x16 DDR devices; DIMMs constructed with x4 SDRAM are not supported

---

 **NOTE:** The 8100 SFF supports 512Mbit, 1Gbit, and 2Gbit non-ECC memory technologies. The Z200 SFF supports 512Mbit, 1Gbit, and 2Gbit ECC and non-ECC memory technologies.

---

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

---

## Installing DIMMs

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

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 [Electrostatic Discharge on page 49](#).

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

---

-  **NOTE:** Do not intermix non-ECC memory DIMMs with ECC memory DIMMs.
- 

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

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

5. If the computer is on a stand, remove the computer from the stand.
6. Remove the access panel.

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

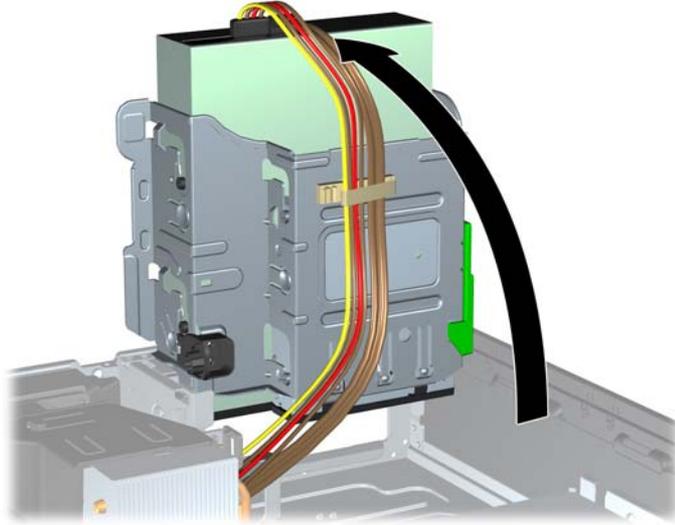
7. Rotate up the external drive bay housing to access the memory module sockets on the system board.

---

 **NOTE:** Your computer may look different than the illustration shown below.

---

**Figure 9** Rotating the Drive Cage Up



8. Locate the memory modules on the system board.

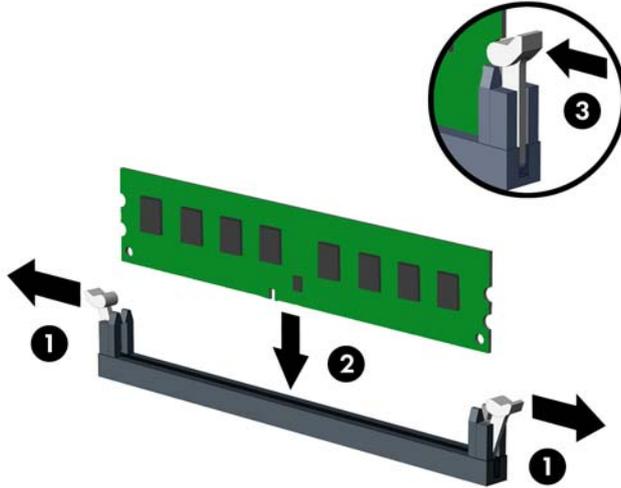
9. Open both latches of the memory module socket (1), and insert the memory module into the socket (2).

---

 **NOTE:** Your computer may look different than the illustration shown below.

---

**Figure 10** 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 black DIMM0 socket.

---

 **NOTE:** Populate the DIMM sockets in the following load order: DIMM1, DIMM3, DIMM2, then DIMM4.

---

10. 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).
11. Repeat steps 9 and 10 to install any additional modules.
12. Replace the access panel.
13. If the computer was on a stand, replace the stand.
14. Reconnect the power cord and turn on the computer.
15. Lock any security devices that were disengaged when the access panel was removed.

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

# Removing or Installing an Expansion Card

The computer has one PCI expansion slot, one PCI Express x1 expansion slot, one PCI Express x16 expansion slot, and one PCI Express x16 expansion slot that is downshifted to a x4 slot.

---

 **NOTE:** The PCI and PCI Express slots support only low profile cards.

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

**NOTE:** For dual graphics card configurations, the first (primary) card must be installed in the black PCI Express x16 slot that is NOT downshifted to a x4 slot.

**NOTE:** On the Z200 SFF, only HP supported cards (CTO or AMO) may be installed in the PCI Express x16 slot.

---

To remove, replace, or add an expansion card:

1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as compact discs or USB flash drives, 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.
6. Remove the access panel.
7. Locate the correct vacant expansion socket on the system board and the corresponding expansion slot on the back of the computer chassis.

8. Release the slot cover retention latch that secures the PCI slot covers by lifting the green tab on the latch and rotating the latch to the open position.

---

 **NOTE:** Your computer may look different than the illustration shown below.

---

**Figure 11** Opening the Expansion Slot Retainer



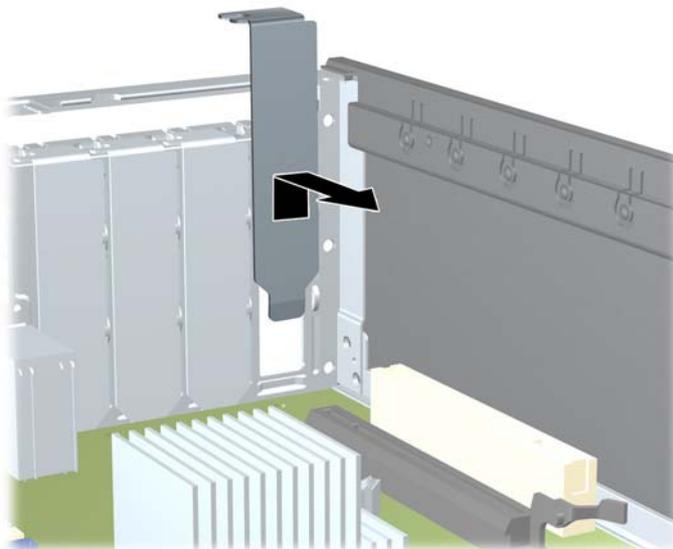
9. Before installing an expansion card, remove the expansion slot cover or the existing expansion card.
  - a. If you are installing an expansion card in a vacant socket, remove the appropriate expansion slot cover on the back of the chassis. Pull the slot cover straight up then away from the inside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

---

 **NOTE:** Your computer may look different than the illustration shown below.

---

**Figure 12** Removing an Expansion Slot Cover

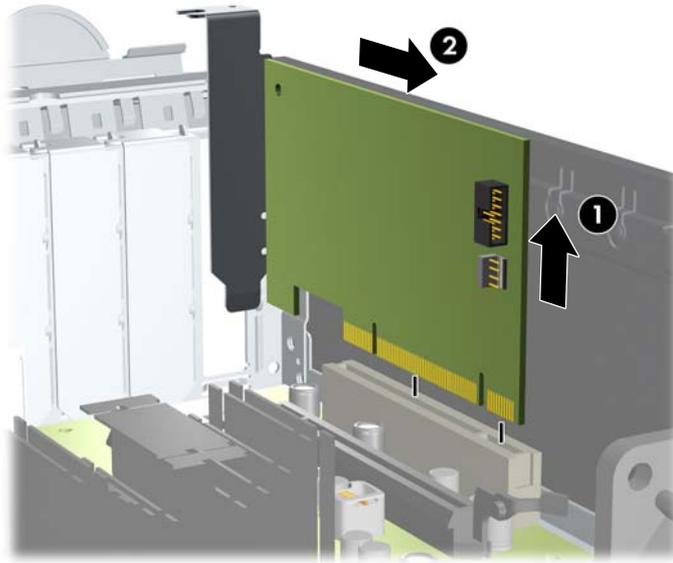


- b. If you are removing a standard PCI card or PCI Express x1 card, hold the card at each end, and carefully rock it back and forth until the connectors pull free from the socket. Pull the expansion card straight up from the socket (1) then away from the inside of the chassis to release it from the chassis frame (2). Be sure not to scrape the card against the other components.

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

**NOTE:** Your computer may look different than the illustration shown below.

**Figure 13** Removing a Standard PCI Expansion Card



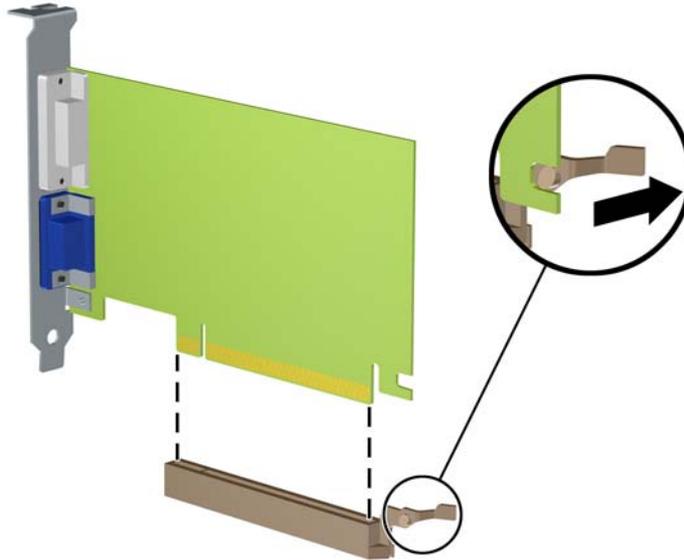
- c. If you are removing a PCI Express x16 card, pull the retention arm on the back of the expansion socket away from the card and carefully rock the card back and forth until the connectors pull free from the socket. Pull the expansion card straight up from the socket then away from the inside of the chassis to release it from the chassis frame. Be sure not to scrape the card against the other components.

---

 **NOTE:** Your computer may look different than the illustration shown below.

---

**Figure 14** Removing a PCI Express x16 Expansion Card

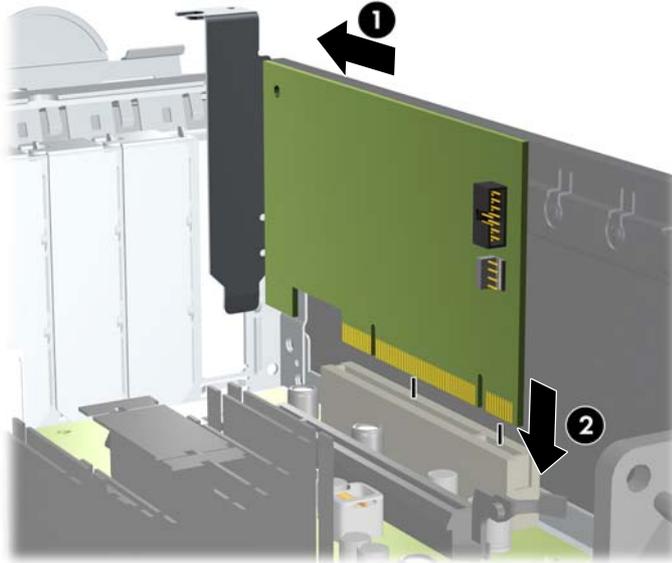


10. Store the removed card in anti-static packaging.
  11. If you are not installing a new expansion card, install an expansion slot cover to close the open slot.
- 
- △ **CAUTION:** After removing an expansion card, you must replace it with a new card or expansion slot cover for proper cooling of internal components during operation.
-

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

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 15** Installing an Expansion Card

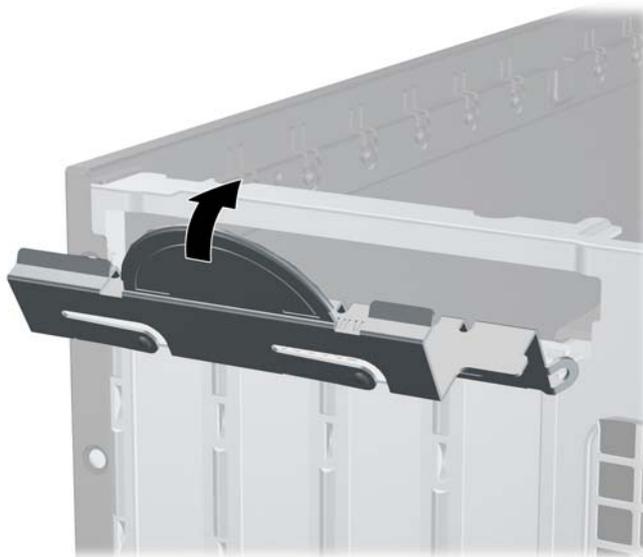


 **NOTE:** When installing an expansion card, press firmly on the card so that the whole connector seats properly in the expansion card slot.

13. Rotate the slot cover retention latch back in place to secure the expansion card.

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 16** Closing the Expansion Slot Retainer



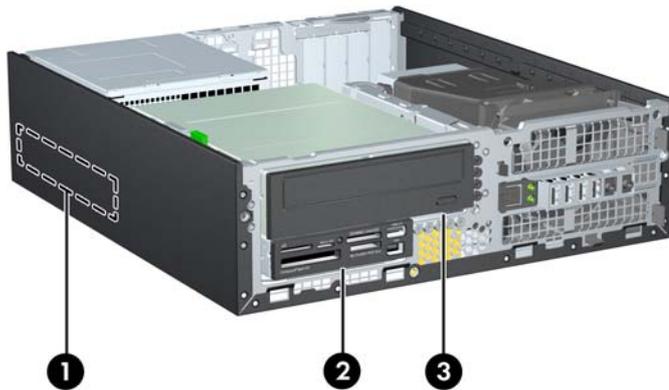
14. Connect external cables to the installed card, if needed. Connect internal cables to the system board, if needed.

15. Replace the access panel.
16. If the computer was on a stand, replace the stand.
17. Reconnect the power cord and turn on the computer.
18. Lock any security devices that were disengaged when the access panel was removed.
19. Reconfigure the computer, if necessary.

## Drive Positions

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 17** Drive Positions



**Table 1** Drive Positions

1	3.5-inch internal hard drive bay
2	3.5-inch external drive bay for a second hard drive or optional drives (media card reader shown)
3	5.25-inch external drive bay for optional drives (optical drive shown)

**NOTE:** The drive configuration on your computer may be different than the drive configuration shown above.

To verify the type, size, and capacity of the storage devices installed in the computer, run Computer Setup.

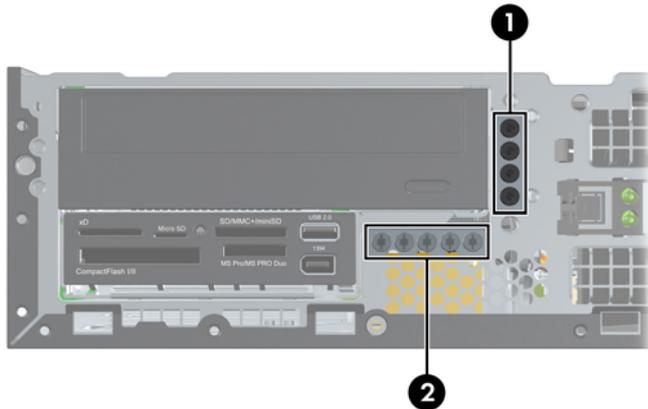
# Installing and Removing Drives

When installing additional drives, follow these guidelines:

- The primary Serial ATA (SATA) hard drive must be connected to the dark blue primary SATA connector on the system board.
- Connect a SATA optical drive to the white SATA connector on the system board.
- Connect an optional eSATA adapter cable to the black ESATA connector on the system board.
- Connect a media card reader USB cable to the media USB connector on the system board. If the media card reader has a 1394 port, connect the 1394 cable to the 1394 PCI card.
- The system does not support Parallel ATA (PATA) optical drives or PATA hard drives.
- You must 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 for the external drive bays (five 6-32 standard screws and four M3 metric screws), installed in the front of the chassis, under the front bezel. The 6-32 standard screws are required for a secondary hard drive. All other drives (except the primary hard drive) use M3 metric screws. The HP-supplied metric screws are black and the HP-supplied standard screws are silver. If you are replacing the primary hard drive, you must remove the four silver and blue 6-32 isolation mounting guide screws from the old hard drive and install them in the new hard drive.

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 18** Extra Guide Screw Locations



No.	Guide Screw	Device
1	Black M3 Metric Screws	All Drives (except hard drives)
2	Silver 6-32 Standard Screws	Secondary Hard Drive

There are a total of five extra silver 6-32 standard screws. Four are used as guide screws for a secondary hard drive. The fifth is used for bezel security (see [Front Bezel Security on page 47](#) for more information).

---

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

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

Before handling a drive, ensure that you are discharged of static electricity. While handling a drive, avoid touching the connector. For more information about preventing electrostatic damage, refer to [Electrostatic Discharge on page 49](#).

Handle a drive carefully; do not drop it.

Do not use excessive force when inserting a drive.

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

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

---

## Removing an External 5.25-inch Drive

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

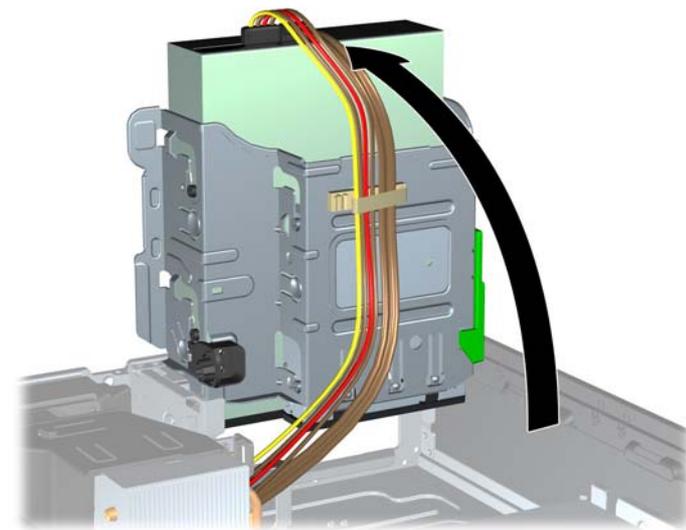
To remove a 5.25-inch external drive:

1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as compact discs or USB flash drives, 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.
6. Remove the access panel.
7. Rotate the drive cage to its upright position.

- 📄 **NOTE:** Your computer may look different than the illustration shown below.

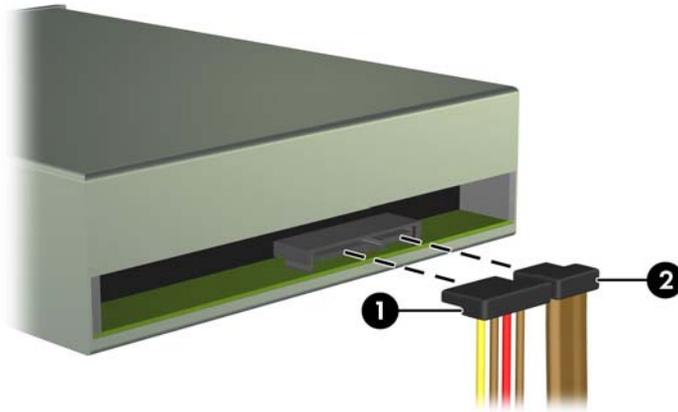


**Figure 19** Rotating the Drive Cage Up

8. If removing an optical drive, disconnect the power cable (1) and data cable (2) from the rear of the optical drive.

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 20** Disconnecting the Power and Data Cables

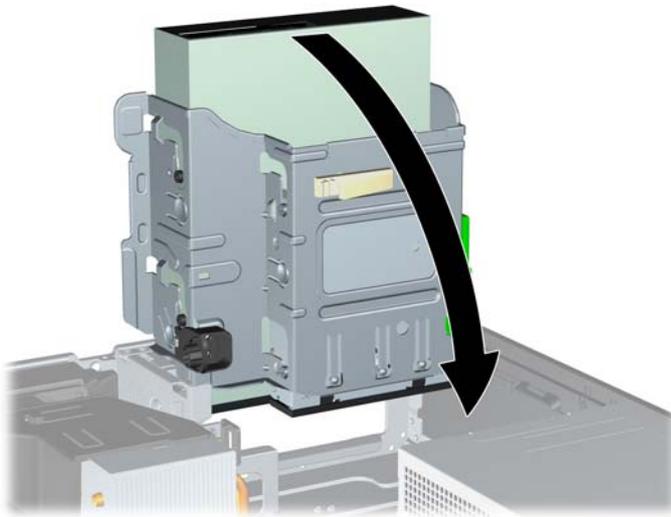


9. Rotate the drive cage back down to its normal position.

 **NOTE:** Your computer may look different than the illustration shown below.

 **CAUTION:** Be careful not to pinch any cables or wires when rotating the drive cage down.

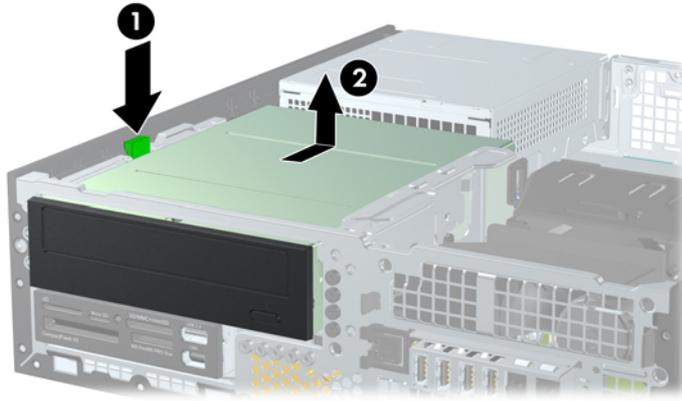
**Figure 21** Rotating the Drive Cage Down



10. Press down on the green drive retainer button located on the left side of the drive to disengage the drive from the drive cage (1). While pressing the drive retainer button, slide the drive back until it stops, then lift it up and out of the drive cage (2).

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 22** Removing the 5.25-inch Drive



 **NOTE:** To replace the drive, reverse the removal procedure. When replacing a drive, transfer the four guide screws from the old drive to the new one.

## Installing an Optical Drive into the 5.25-inch Drive Bay

To install an optional 5.25-inch optical drive:

1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as compact discs or USB flash drives, 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.
6. Remove the access panel.
7. If you are installing a drive in a bay covered by a bezel blank, remove the front bezel then remove the bezel blank. See [Removing Bezel Blanks on page 6](#) for more information.

8. Install four M3 metric guide screws in the lower holes on each side of the drive. HP has provided four extra M3 metric guide screws on the front of the chassis, under the front bezel. The M3 metric guide screws are black. Refer to [Installing and Removing Drives on page 21](#) for an illustration of the extra M3 metric guide screws location.

△ **CAUTION:** Use only 5-mm long screws as guide screws. Longer screws can damage the internal components of the drive.

📝 **NOTE:** When replacing the drive, transfer the four M3 metric guide screws from the old drive to the new one.

**NOTE:** Your computer may look different than the illustration shown below.

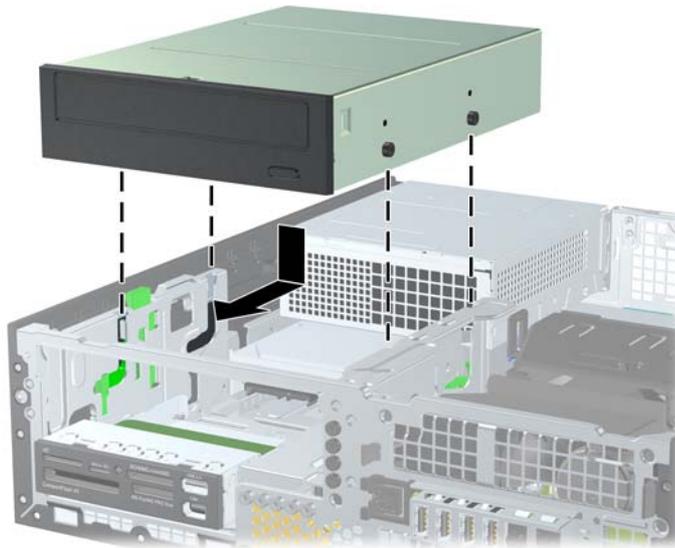
**Figure 23** Installing Guide Screws in the Optical Drive



9. Position the guide screws on the drive into the J-slots in the drive bay. Then slide the drive toward the front of the computer until it locks into place.

📝 **NOTE:** Your computer may look different than the illustration shown below.

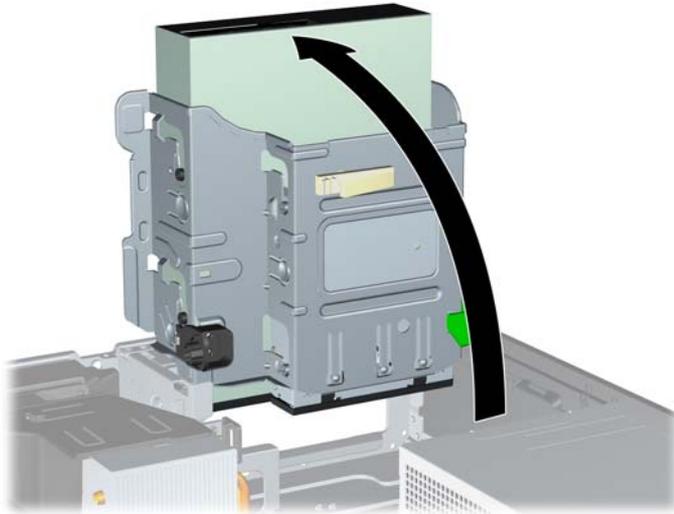
**Figure 24** Installing the Optical Drive



10. Rotate the drive cage to its upright position.

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 25** Rotating the Drive Cage Up



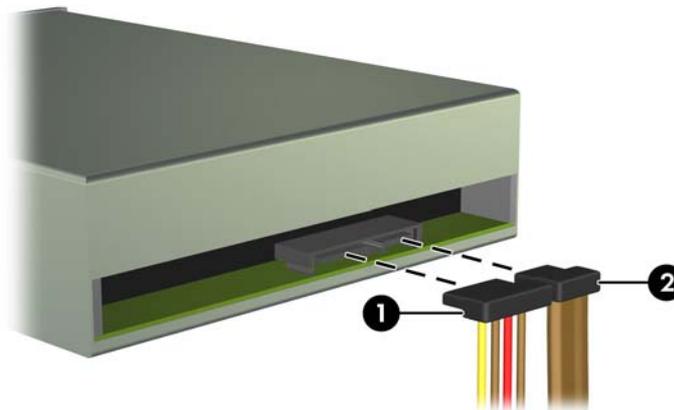
11. Connect the SATA data cable to the white system board connector.
12. Route the data cable through the cable guides.

 **CAUTION:** There are two cable guides that keep the data cable from being pinched by the drive cage when raising or lowering it. One is located on the bottom side of the drive cage. The other is located on the chassis frame under the drive cage. Ensure that the data cable is routed through these guides before connecting it to the optical drive.

13. Connect the power cable (1) and data cable (2) to the rear of the optical drive.

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 26** Connecting the Power and Data Cables



14. Rotate the drive cage back down to its normal position.

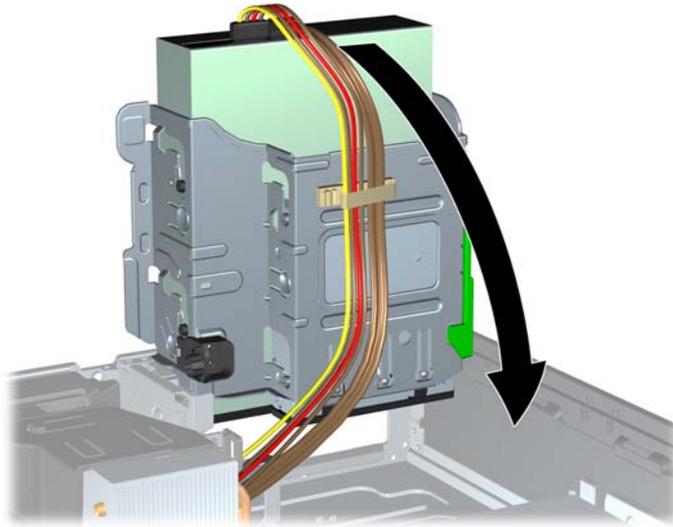
---

 **NOTE:** Your computer may look different than the illustration shown below.

 **CAUTION:** Be careful not to pinch any cables or wires when rotating the drive cage down.

---

**Figure 27** Rotating the Drive Cage Down



15. Replace the access panel.
16. If the computer was on a stand, replace the stand.
17. Reconnect the power cord and turn on the computer.
18. Lock any security devices that were disengaged when the access panel was removed.

The system automatically recognizes the drive and reconfigures the computer.

## Removing an External 3.5-inch Drive

---

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

---

The 3.5-inch drive is located underneath the 5.25-inch drive. You must remove the external 5.25-inch drive before removing the external 3.5-inch drive.

1. Follow the procedure in [Removing an External 5.25-inch Drive on page 23](#) to remove the 5.25-inch drive and access the 3.5-inch drive.

---

 **CAUTION:** Ensure that the computer is turned off and that the power cord is disconnected from the electrical outlet before proceeding.

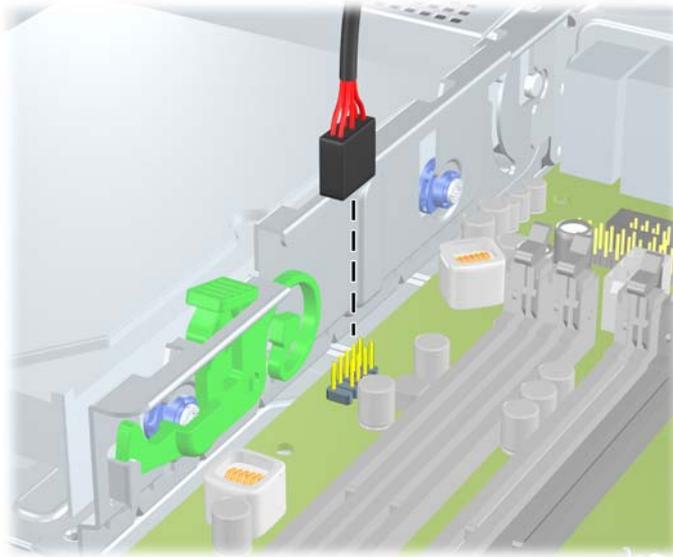
---

2. Disconnect the drive cables from the rear of the drive, or, if you are removing a media card reader, disconnect the USB and 1394 cables from the system board as indicated in the following illustrations.

 **NOTE:** On some models, the media card reader does not include a 1394 port or cable.

**NOTE:** Your computer may look different than the illustration shown below.

**Figure 28** Disconnecting the Media Card Reader USB Cable



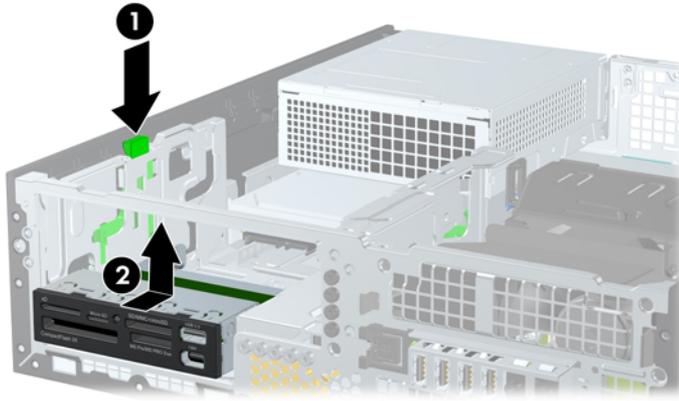
**Figure 29** Disconnecting the Media Card Reader 1394 Cable



3. Press down on the green drive retainer button located on the left side of the drive to disengage the drive from the drive cage (1). While pressing the drive retainer button, slide the drive back until it stops, then lift it up and out of the drive cage (2).

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 30** Removing a 3.5-inch Drive (Media Card Reader Shown)



 **NOTE:** To replace the 3.5-inch drive, reverse the removal procedure.

When replacing a 3.5-inch drive, transfer the four guide screws from the old drive to the new one.

## Installing a Drive into the 3.5-inch External Drive Bay

The 3.5-inch bay is located underneath the 5.25-inch drive. To install a drive into the 3.5-inch bay:

 **NOTE:** 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 for the external drive bays (four 6-32 standard screws and four M3 metric screws), installed in the front of the chassis, under the front bezel. A secondary hard drive uses 6-32 standard screws. All other drives (except the primary hard drive) use M3 metric screws. The HP-supplied M3 metric screws are black and the HP-supplied 6-32 standard screws are silver. Refer to [Installing and Removing Drives on page 21](#) for illustrations of the guide screw locations.

1. Follow the procedure in [Removing an External 5.25-inch Drive on page 23](#) to remove the 5.25-inch drive and access the 3.5-inch drive bay.

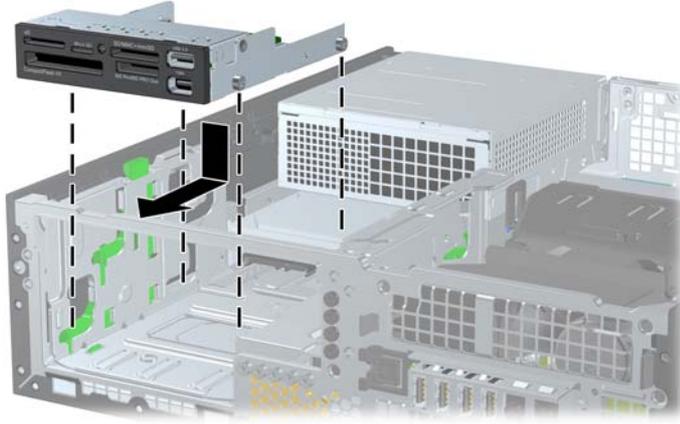
 **CAUTION:** Ensure that the computer is turned off and that the power cord is disconnected from the electrical outlet before proceeding.

2. If you are installing a drive in a bay covered by a bezel blank, remove the front bezel then remove the bezel blank. See [Removing Bezel Blanks on page 6](#) for more information.

3. Position the guide screws on the drive into the J-slots in the drive bay. Then slide the drive toward the front of the computer until it locks into place.

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 31** Installing a Drive into the 3.5-inch Drive Bay (Media Card Reader Shown)



4. Connect the appropriate drive cables:
  - a. If installing a second hard drive, connect the power and data cables to the rear of the drive and connect the other end of the data cable to the next available (unpopulated) SATA connector on the system board by following the numbered sequence of the connectors.
  - b. If installing a media card reader, connect the USB cable from the media card reader to the media USB connector on the system board. If the media card reader includes a 1394 port, connect the 1394 cable to the 1394 PCI card.
5. Replace the 5.25-inch drive.
6. Replace the front bezel and access panel.
7. If the computer was on a stand, replace the stand.
8. Reconnect the power cord and turn on the computer.
9. Lock any security devices that were disengaged when the access panel was removed.

## Removing and Replacing the Primary 3.5-inch Internal SATA Hard Drive

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

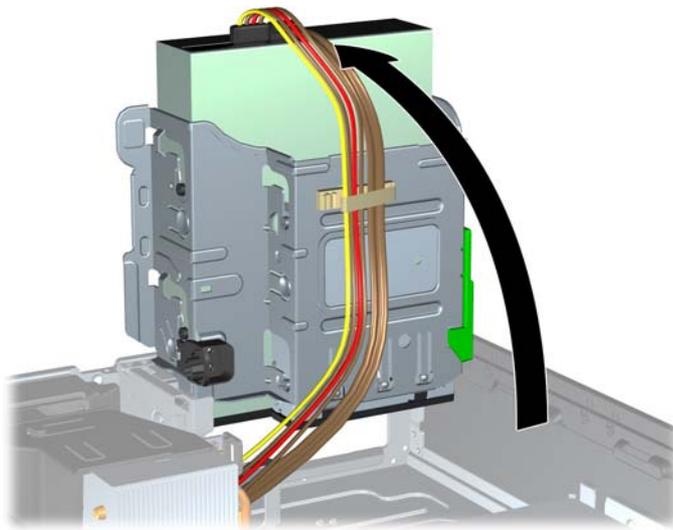
Before you remove the old hard drive, be sure to back up the data from the old hard drive so that you can transfer the data to the new hard drive.

The preinstalled 3.5-inch hard drive is located under the power supply. To remove and replace the hard drive:

1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as compact discs or USB flash drives, 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.
6. Remove the access panel.
7. Rotate the drive cage for external drives to its upright position.

 **NOTE:** Your computer may look different than the illustration shown below.

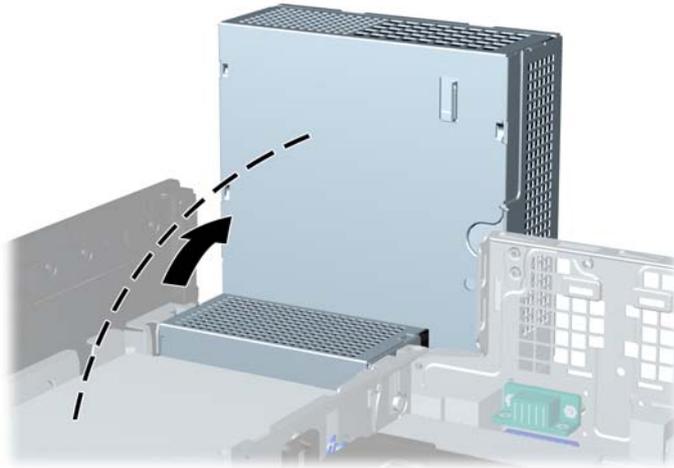
**Figure 32** Rotating the Drive Cage Up



8. Rotate the power supply to its upright position. The hard drive is located beneath the power supply.

 **NOTE:** Your computer may look different than the illustration shown below.

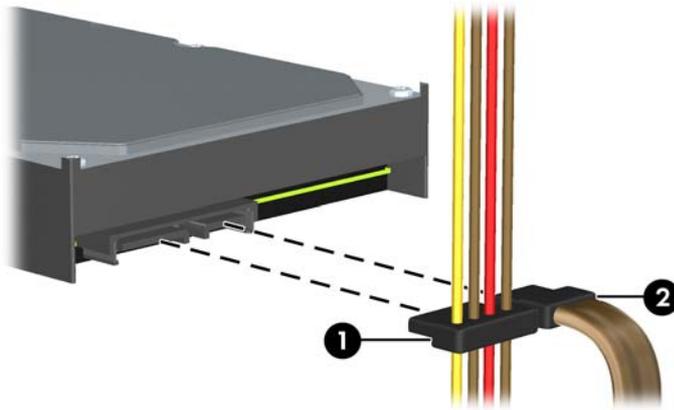
**Figure 33** Raising the Power Supply



9. Disconnect the power cable (1) and data cable (2) from the back of the hard drive.

 **NOTE:** Your computer may look different than the illustration shown below.

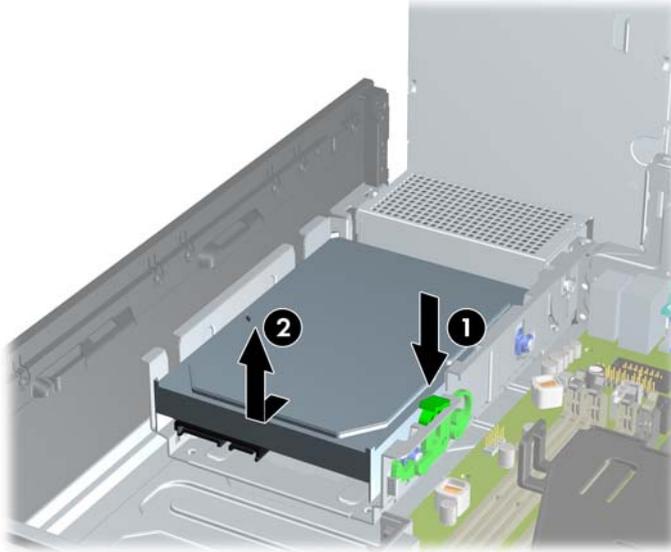
**Figure 34** Disconnecting the Hard Drive Power Cable and Data Cable



10. Press down on the green release latch next to the hard drive (1). While holding the latch down, slide the drive forward until it stops, then lift the drive up and out of the bay (2).

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 35** Removing the Hard Drive



11. To install a hard drive, you must transfer the silver and blue isolation mounting guide screws from the old hard drive to the new hard drive.

 **NOTE:** Your computer may look different than the illustration shown below.

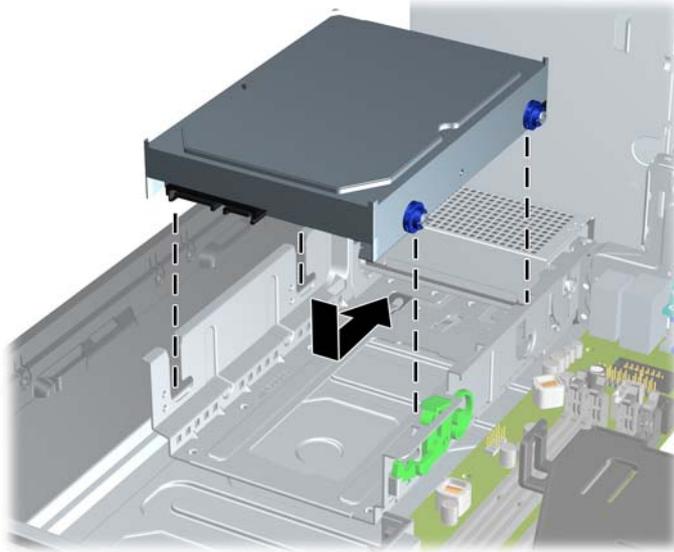
**Figure 36** Installing Hard Drive Guide Screws



12. Align the guide screws with the slots on the chassis drive cage, press the hard drive down into the bay, then slide it back until it stops and locks in place.

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 37** Installing the Hard Drive



13. Connect the power and data cables to the back of the hard drive.

 **NOTE:** When replacing the primary hard drive, be sure to route the SATA and power cables through the cable guide on the bottom of the chassis frame behind the hard drive.

If the system has only one SATA hard drive, the data cable must be connected to the dark blue connector on the system board to avoid any hard drive performance problems.

14. Rotate the drive cage for external drives and the power supply down to their normal positions.
15. Replace the access panel.
16. If the computer was on a stand, replace the stand.
17. Reconnect the power cord and turn on the computer.
18. Lock any security devices that were disengaged when the access panel was removed.

## Removing and Replacing a Removable 3.5-inch SATA Hard Drive

Some models are equipped with a Removable SATA Hard Drive Enclosure in the 5.25-inch external drive bay. The hard drive is housed in a carrier that can be quickly and easily removed from the drive bay. To remove and replace a drive in the carrier:

 **NOTE:** Before you remove the old hard drive, be sure to back up the data from the old hard drive so that you can transfer the data to the new hard drive.

1. Unlock the hard drive carrier with the key provided and slide the carrier out of the enclosure.
2. Remove the screw from the rear of the carrier (1) and slide the top cover off the carrier (2).

 **NOTE:** Your computer may look different than the illustration shown below.

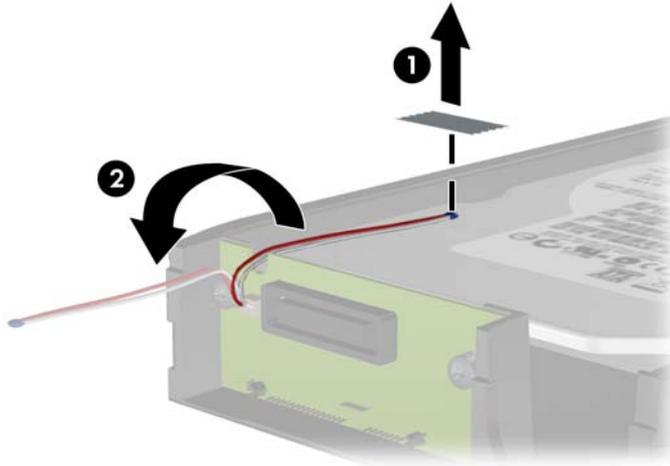
**Figure 38** Removing the Carrier Cover



3. Remove the adhesive strip that secures the thermal sensor to the top of the hard drive (1) and move the thermal sensor away from the carrier (2).

 **NOTE:** Your computer may look different than the illustration shown below.

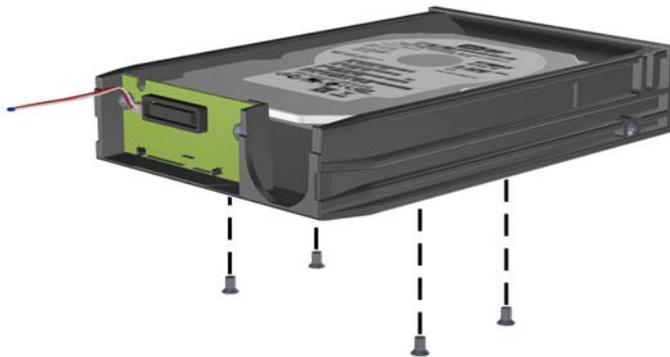
**Figure 39** Removing the Thermal Sensor



4. Remove the four screws from the bottom of the hard drive carrier.

 **NOTE:** Your computer may look different than the illustration shown below.

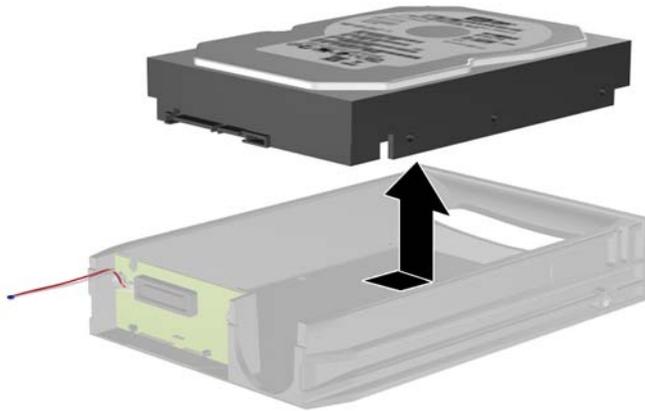
**Figure 40** Removing the Security Screws



5. Slide the hard drive back to disconnect it from the carrier then lift it up and out of the carrier.

 **NOTE:** Your computer may look different than the illustration shown below.

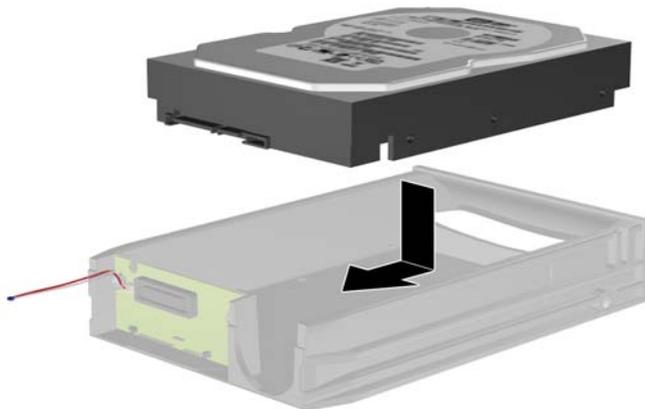
**Figure 41** Removing the Hard Drive



6. Place the new hard drive in the carrier then slide the hard drive back so that it seats in the SATA connector on the carrier's circuit board. Be sure the connector on the hard drive is pressed all the way into the connector on the carrier's circuit board.

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 42** Replacing the Hard Drive



7. Replace the four screws in the bottom of the carrier to hold the drive securely in place.

 **NOTE:** Your computer may look different than the illustration shown below.

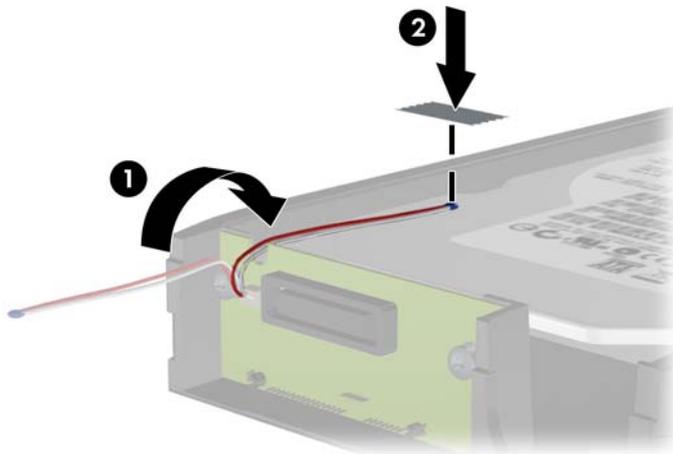
**Figure 43** Replacing the Security Screws



8. Place the thermal sensor on top of the hard drive in a position that does not cover the label (1) and attach the thermal sensor to the top of the hard drive with the adhesive strip (2).

 **NOTE:** Your computer may look different than the illustration shown below.

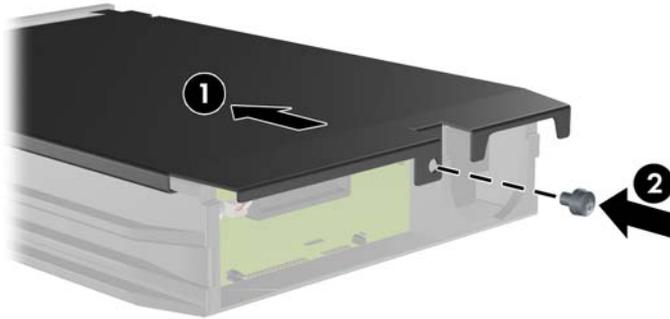
**Figure 44** Replacing the Thermal Sensor



- Slide the cover on the carrier (1) and replace the screw on the rear of the carrier to secure the cover in place (2).

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 45** Replacing the Carrier Cover



- Slide the hard drive carrier into the enclosure on the computer and lock it with the key provided.

 **NOTE:** The carrier must be locked for power to be supplied to the hard drive.

## 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.

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 compact discs or USB flash drives, 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.
6. Remove the access panel.
7. Locate the battery and battery holder on the system board.

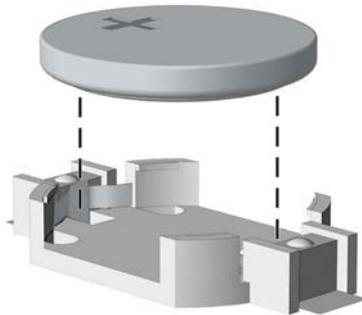
 **NOTE:** On some computer models, it may be necessary to remove an internal component to gain access to the battery.

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

#### Type 1

- a. Lift the battery out of its holder.

**Figure 46** Removing a Coin Cell Battery (Type 1)



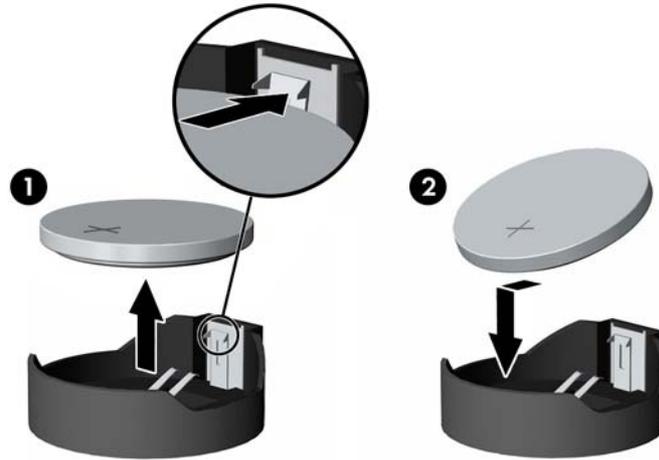
- b. Slide the replacement battery into position, positive side up. The battery holder automatically secures the battery in the proper position.

#### 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).

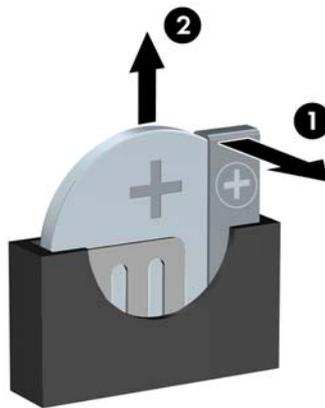
**Figure 47** Removing and Replacing a Coin Cell Battery (Type 2)



### 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 48** 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. Plug in the computer and turn on power to the computer.

12. Reset the date and time, your passwords, and any special system setups using Computer Setup.
13. Lock any security devices that were disengaged when the access panel was removed.

## Installing a Security Lock

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

### HP/Kensington MicroSaver Security Cable Lock

---

 **NOTE:** Your computer may look different than the illustration shown below.

---

**Figure 49** Installing a Cable Lock



### Padlock

---

 **NOTE:** Your computer may look different than the illustration shown below.

---

**Figure 50** Installing a Padlock



## HP Business PC Security Lock

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

**Figure 51** Securing the Cable to a Fixed Object



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

**Figure 52** Threading the Keyboard and Mouse Cables



3. Screw the lock to the chassis using the screw provided.

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 53** Attaching the Lock to the Chassis



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

 **NOTE:** Your computer may look different than the illustration shown below.

**Figure 54** Engaging the Lock



## Front Bezel Security

The front bezel can be locked in place by installing a security screw provided by HP. To install the security screw:

1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as compact discs or USB flash drives, 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.
6. Remove the access panel and front bezel.
7. Remove one of the five silver 6-32 standard screws located on the front of the chassis behind the bezel.

**NOTE:** Your computer may look different than the illustration shown below.

**Figure 55** Retrieving the Front Bezel Security Screw



8. Replace the front bezel.

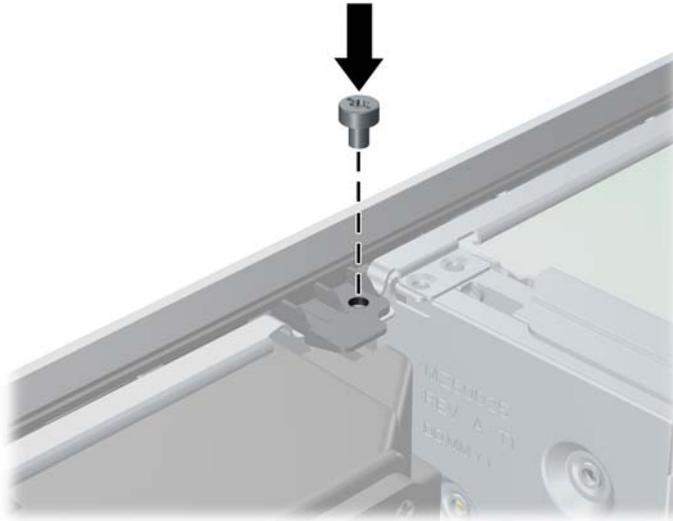
9. Install the security screw next to the middle front bezel release tab to secure the front bezel in place.

---

 **NOTE:** Your computer may look different than the illustration shown below.

---

**Figure 56** Installing the Front Bezel Security Screw



10. Replace the access panel.
11. If the computer was on a stand, replace the stand.
12. Reconnect the power cord and turn on the computer.
13. Lock any security devices that were disengaged when the access panel was removed.

---

# A 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.

---

---

# B 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 access panel or any of the expansion card slot covers 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 USB flash drives. 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. Turn off the computer and external devices.
4. Disconnect the power cord from the electrical outlet, then from the computer.
5. 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.

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

---

# Index

- A**
  - access panel
    - locking and unlocking 1
- B**
  - battery replacement 40
- C**
  - computer access panel
    - removing 3
    - replacing 5
  - computer operating guidelines 50
  - connecting drive cables 21
- D**
  - DIMMs. *See* memory
  - drives
    - connecting cables 21
    - installing 21
    - locations 20
- E**
  - electrostatic discharge, preventing damage 49
  - expansion card
    - installing 15
    - removing 15
    - slot locations 15
  - expansion slot cover
    - removing 16
    - replacing 18
- F**
  - FailSafe Key 2
  - front bezel
    - removing 6
    - removing blanks 6
    - replacing 8
    - security 21
- G**
  - guide screws 21
- H**
  - hard drive
    - installing 32
    - installing secondary 30
    - removing 32
- I**
  - installation guidelines 1
  - installing
    - battery 40
    - drive cables 21
    - expansion card 15
    - guide screws 21
    - hard drive 32
    - media card reader 30
    - memory 11
    - optical drive 25
    - removable hard drive 36
- M**
  - media card reader
    - installing 30
    - removing 28
  - memory
    - installing 11
    - specifications 11
- O**
  - optical drive
    - cleaning 51
    - installing 25
    - precautions 51
    - removing 23
- P**
  - PCI card 17
  - PCI Express card 18
- R**
  - removable hard drive
    - replacing 36
  - removing
    - battery 40
    - bezel blanks 6
    - computer access panel 3
    - expansion card 15
    - expansion slot cover 16
    - front bezel 6
    - hard drive 32
    - media card reader 28
    - optical drive 23
    - PCI card 17
    - PCI Express card 18
    - Smart Cover Lock 2
- S**
  - security
    - cable lock 43
    - front bezel 21
    - HP Business PC Security Lock 44
    - padlock 43
    - Smart Cover Lock 1
  - shipping preparation 51
  - Smart Cover Lock 1
  - specifications
    - memory 11
- T**
  - tower orientation 8
- U**
  - unlocking access panel 1
- V**
  - ventilation guidelines 50