Hardware Reference Guide

HP rp5700

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HP rp5700

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About This Book

This guide provides basic information for upgrading this computer model.

WARNING! Text set off in this manner indicates that failure to follow directions could result in bodily harm or loss of life.

CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

NOTE: Text set off in this manner provides important supplemental information.

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1 Product Features

Standard Configuration Features

The HP Point of Sale System rp5700 features may vary depending on the model. For a complete listing of the hardware and software installed in the computer, run the diagnostic utility (included on some computer models only). Instructions for using the utility are provided in the *Troubleshooting Guide* on the *Documentation and Diagnostics CD*.

NOTE: The computer can also be used in a tower orientation. For more information, see Using the Computer in a Tower Orientation on page 8.

Figure 1-1 HP Point of Sale System rp5700 Configuration

Front Panel Components

Drive configuration may vary by model.

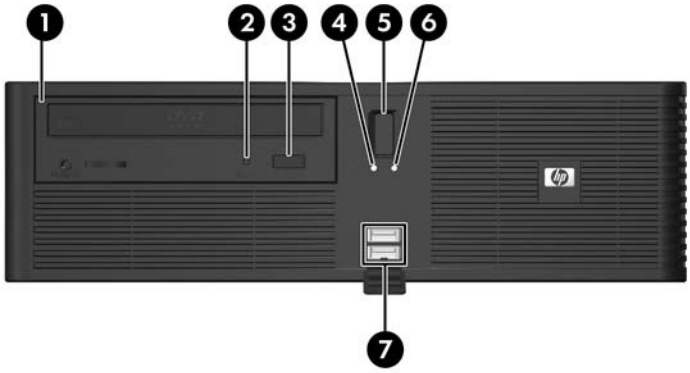


Table 1-1 Front Panel Components

1	5.25-inch Optical Drive (some models)[1]	5	Dual-State Power Button
2	Optical Drive Activity Light	6	Power On Light
3	Optical Drive Eject Button (some models)	7	USB ports (2)[2]
4	Hard Drive Activity Light		

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

The Power On Light is normally green when the power is on. If it is flashing red, there is a problem with the computer and it is displaying a diagnostic code. Refer to the *Troubleshooting Guide* on the *Documentation and Diagnostics CD* to interpret the code.

1 Some models have a bezel blank covering the 5.25-inch drive bay.

2 Before using the USB ports, remove the protective rubber cap.

Rear Panel Components

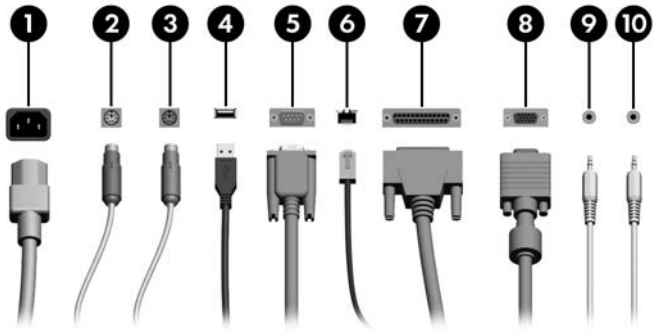


Table 1-2 Rear Panel Components

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

NOTE: 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 Computer Setup to use both connectors. For information about Boot Order, refer to the *Computer Setup (F10) Utility Guide* on the *Documentation and Diagnostics CD*.

* Serial ports can be configured to support powered serial port. Refer to Powered Serial Ports on page 49 for details.

Keyboard

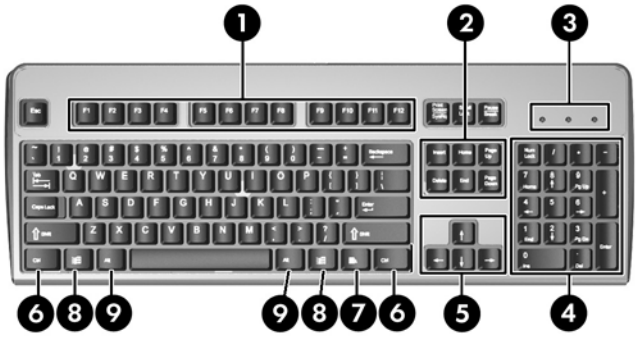


Table 1-3 Keyboard Components

1	Function Keys	Perform special functions depending on the software application being used.
2	Editing Keys	Includes the following: Insert, Home, Page Up, Delete, End, and Page Down.
3	Status Lights	Indicate the status of the computer and keyboard settings (Num Lock, Caps Lock, and Scroll Lock).
4	Numeric Keys	Work like a calculator keypad.
5	Arrow Keys	Used to navigate through a document or Web site. These keys allow you to move left, right, up, and down, using the keyboard instead of the mouse.
6	Ctrl Keys	Used in combination with another key; their effect depends on the application software you are using.
7	Application Key[1]	Used (like the right mouse button) to open pop-up menus in a Microsoft Office application. May perform other functions in other software applications.
8	Windows Logo Keys[1]	Used to open the Start menu in Microsoft Windows. Used in combination with other keys to perform other functions.
9	Alt Keys	Used in combination with another key; their effect depends on the application software you are using.

[1] Keys available in select geographic regions.

Using the Windows Logo Key

Use the Windows Logo key in combination with other keys to perform certain functions available in the Windows operating system. Refer to Keyboard on page 4 to identify the Windows Logo key.

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

Special Mouse Functions

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

Serial Number Location

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

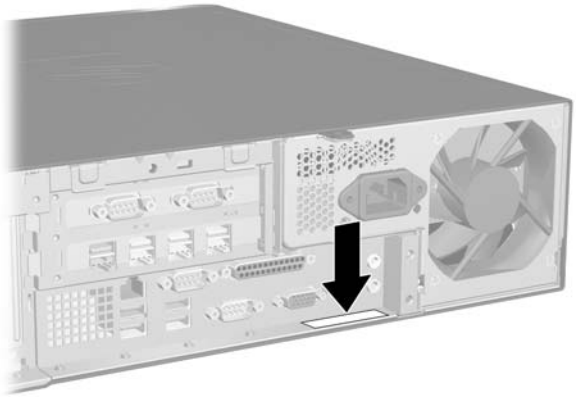


Figure 1-2 Serial Number and Product ID Location

2 Hardware Upgrades

Serviceability Features

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

Warnings and Cautions

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

WARNING! To reduce the risk of personal injury 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 and on the *Documentation and Diagnostics CD*.

CAUTION: Static electricity can damage the electrical components of the computer or optional equipment. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object. See Appendix D, Electrostatic Discharge on page 63, 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.

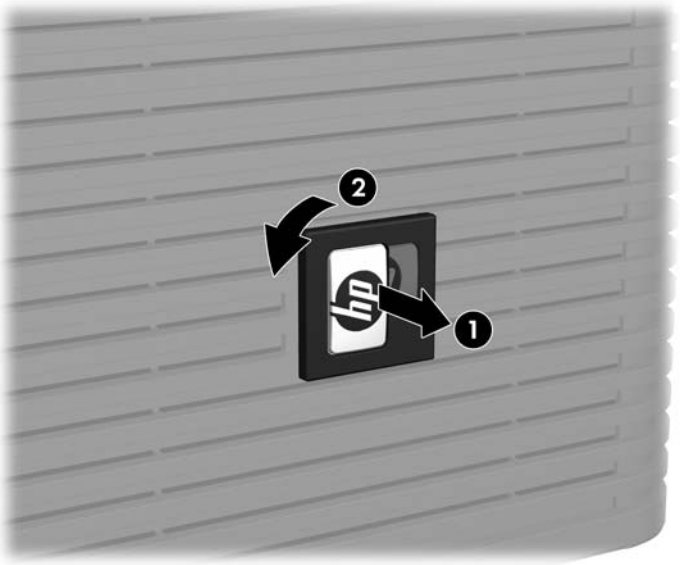
Using the Computer in a Tower Orientation

The computer can be configured in a tower orientation using the tower stand. The HP logo plate on the front bezel is adjustable for either desktop or tower orientation.

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

   CAUTION: Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

5. Remove the computer cover. See Removing the Computer Cover on page 10.
6. Push the peg out towards the front side of the bezel (1).
7. Rotate the plate 90 degrees (2) then pull back on the peg to lock the logo plate in place.



8. Replace the computer cover. See Replacing the Computer Cover on page 11.

9. Lift the computer so that its right side is facing down (1) and place it on the stand (2). Be sure that the arrow on the stand is pointing toward the front of the computer.

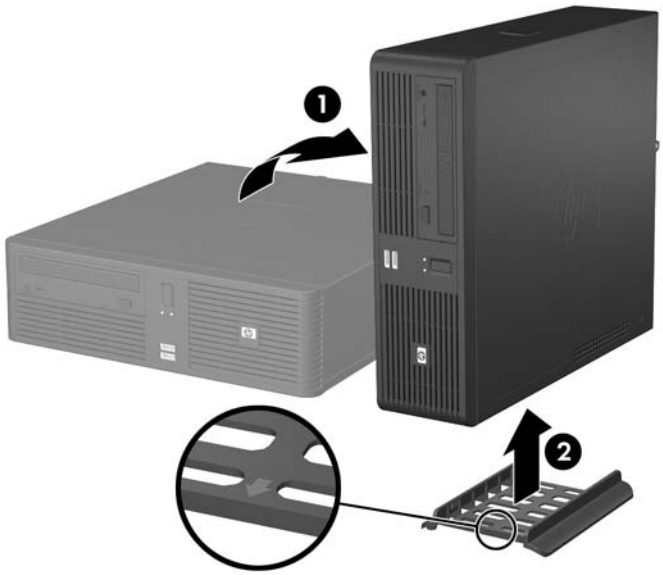


Figure 2-1 Changing from Desktop to Tower Orientation

10. Reconnect the power cord and any external devices, then turn on the computer.
11. Lock any security devices that were disengaged when the computer cover was removed.

CAUTION: Do not place the computer on its side without the tower stand. The stand is required to prevent the computer from falling on its side and damaging the unit.

NOTE: The front should be 100% open. Leave a 10-cm (3.93-inch) clearance on the sides and top of the computer and at least a 50-cm (19.69-inch) clearance in the rear. The rear vents should be 100% open.

Removing the Computer Cover

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

> **CAUTION:** Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

5. Push in on the tabs (1) on each side of the computer to release the latches that secure the cover to the computer chassis.
6. Slide the computer cover forward (2) about 1.3 cm (½ inch), then lift it off the unit.

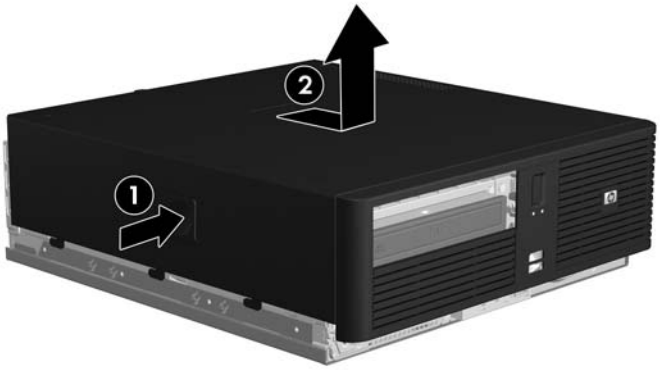


Figure 2-2 Removing the Computer Cover

Replacing the Computer Cover

Place the computer cover on the chassis about 1.3 cm (½ inch) in front of the final position and slide it back into place until it locks.

Figure 2-3 Replacing the Computer Cover

Removing the Bezel Blank

On some models, a bezel blank covering the 5.25-inch external drive bay must be removed before installing a drive. To remove a bezel blank:

1. Remove the computer cover.
2. Push the two retaining tabs that hold the bezel blank in place inwards (1) and pull the bezel blank inwards to remove it (2).

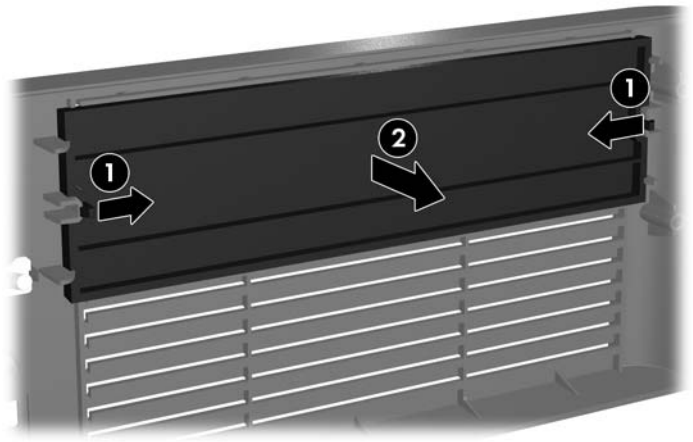


Figure 2-4 Removing a Bezel Blank

3. Replace the computer cover.

Installing Additional Memory

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

DIMMs

The memory sockets on the system board can be populated with up to four industry-standard DIMMs. These memory sockets are populated with at least one preinstalled DIMM. To achieve the maximum memory support, you can populate the system board with up to 8 GB of memory configured in a high-performing dual channel mode.

DDR2-SDRAM DIMMs

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

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

The DDR2-SDRAM DIMMs must also:

- support CAS latency 4 and 5 for DDR2/667 MHz
- contain the mandatory JEDEC SPD information

In addition, the computer supports:

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

NOTE: The system will not start if you install unsupported DIMMs.

Populating DIMM Sockets

There are four DIMM sockets on the system board, with two sockets per channel. The sockets are labeled DIMM 1, DIMM 2, DIMM 3, and DIMM 4. Sockets DIMM 1 and DIMM 2 operate in memory channel A. Sockets DIMM 3 and DIMM 4 operate in memory channel B.

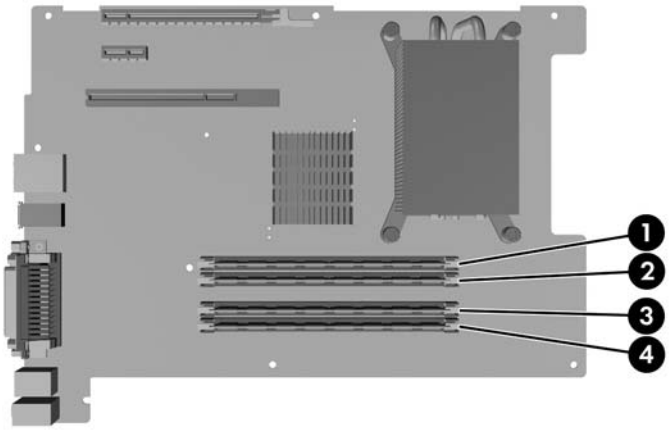


Figure 2-5 DIMM Socket Locations

Item	Description	Socket Color
1	DIMM socket DIMM 1, Channel A (populate first)	Black
2	DIMM socket DIMM 2, Channel A	White
3	DIMM socket DIMM 3, Channel B (populate second)	Black
4	DIMM socket DIMM 4, Channel B	White

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

- The system will operate in single channel mode if the DIMM sockets are populated in one channel only.
- The system will operate in a higher-performing dual channel mode if the total memory capacity of the DIMMs in Channel A is equal to the total memory capacity of the DIMMs in Channel B. The technology and device width can vary between the channels. For example, if Channel A is populated with two 256MB DIMMs and Channel B is populated with one 512MB DIMM, the system will operate in dual channel mode.
- The system will operate in flex mode if the total memory capacity of the DIMMs in Channel A is not equal to the total memory capacity of the DIMMs in Channel B. In flex mode, the channel populated with the least amount of memory describes the total amount of memory assigned to dual channel and the remainder is assigned to single channel. For optimal speed, the channels should be balanced so that the largest amount of memory is spread between the two channels. For example, if you are populating the sockets with one 1GB DIMM, two 512MB DIMMs, and one 256MB DIMM,

one channel should be populated with the 1GB DIMM and one 256MB DIMM and the other channel should be populated with the two 512MB DIMMs. With this configuration, 2 GB will run as dual channel and 256 MB will run as single channel.

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

Installing DIMMs

CAUTION: You must disconnect the power cord 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. If you see an LED light on the system board, voltage is still present.

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

Static electricity can damage the electronic components of the computer or optional cards. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object. For more information, refer to Appendix D, Electrostatic Discharge on page 63.

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

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

   CAUTION: 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. If you see an LED light on the system board, voltage is still present.

5. If the computer is on a stand, remove the computer from the stand.
6. Remove the computer cover.
7. Locate the memory module sockets on the system board.

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

8. Raise the drive cage to the upright position.

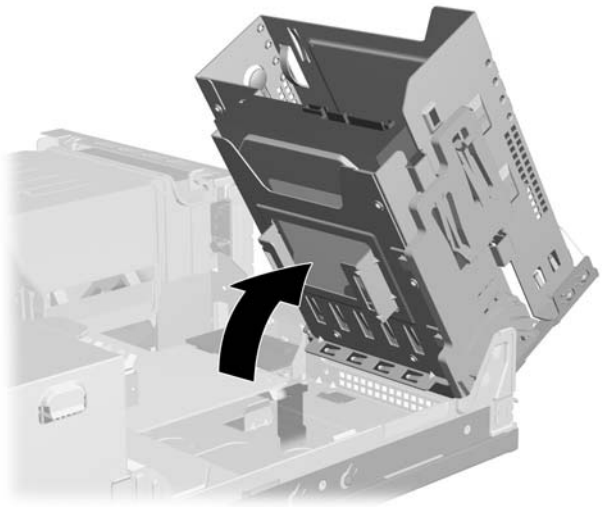


Figure 2-6 Rotating the Drive Cage Up

9. Rotate the fan duct out of the chassis.

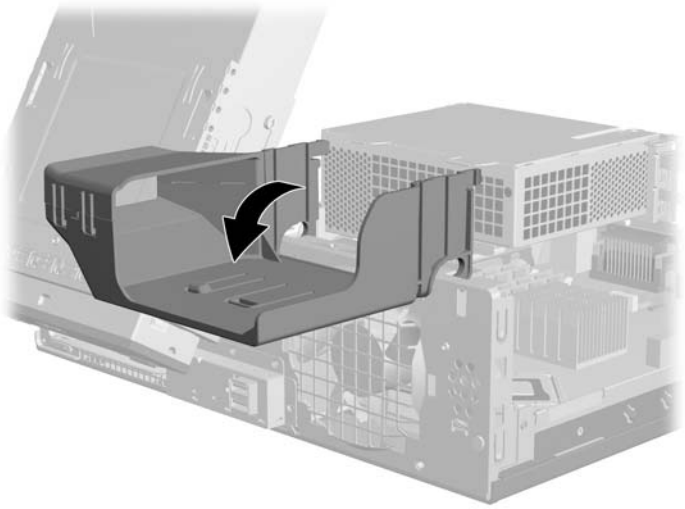


Figure 2-7 Rotating the Fan Duct

10. Press the latch release on the front of the power supply (1), and then raise the power supply to the upright position (2).

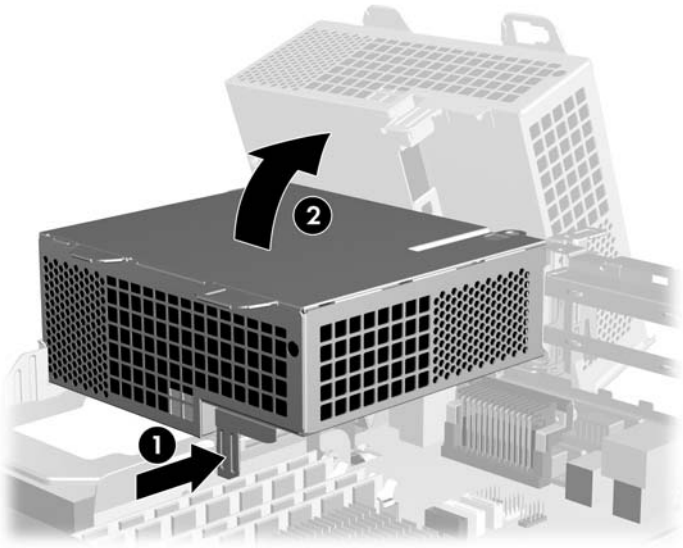


Figure 2-8 Releasing and Rotating the Power Supply

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

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

For maximum performance, populate the sockets so that the memory capacity is spread as equally as possible between Channel A and Channel B. Refer to Populating DIMM Sockets on page 14 for more information.

12. 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).

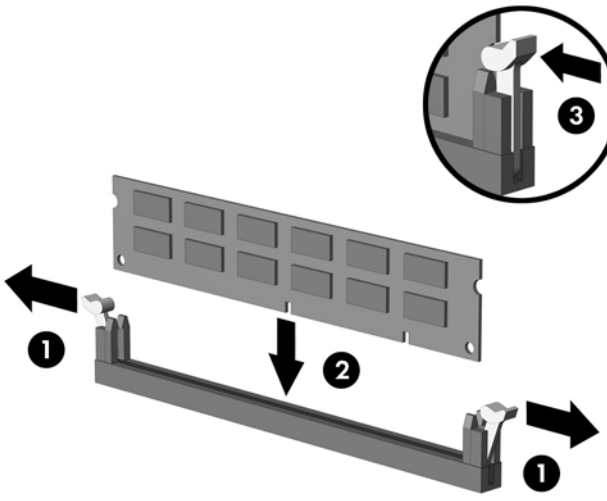


Figure 2-9 Installing a DIMM

13. Repeat steps 10 and 11 to install any additional modules.
14. Return the power supply to the down position until it locks.
15. Return the fan duct to the down position.
16. Return the drive cage to the down position.
17. Replace the computer cover.
18. If the computer was on a stand, replace the stand.
19. Reconnect the power cord and any external devices, then turn on the computer. The computer should automatically recognize the additional memory when you turn on the computer.
20. Lock any security devices that were disengaged when the computer cover was removed.

Removing or Installing an Expansion Card

The computer has the following expansion slots:

- one ADD2/SDVO expansion slot
- one low-profile PCI Express x1 expansion slot
- one PCI expansion slot populated with a riser card that can accommodate two full-height PCI cards

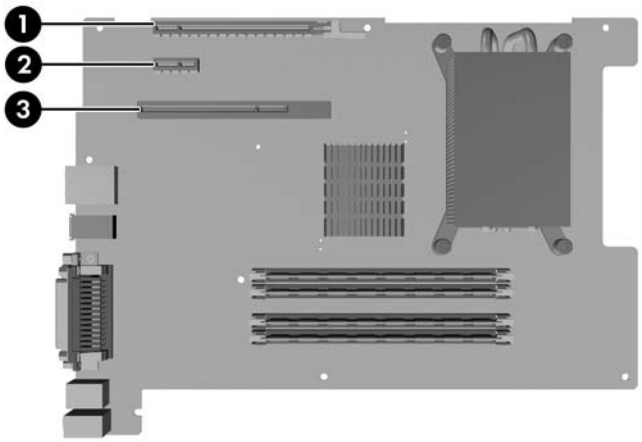


Figure 2-10 Expansion Slot Locations

Item	Description
1	ADD2/SDVO expansion slot
2	PCI Express x1 expansion slot, low profile
3	PCI expansion slot, low profile populated with riser card

CAUTION: The PCI expansion slot ships populated with a PCI riser card. To avoid damage to the riser card or installed PCI expansion cards, be sure to remove all installed PCI expansion cards before attempting to remove the riser card from the chassis.

NOTE: The computer only supports the use of normal (or non-reversed) layout ADD2 (Advanced Digital Display 2) adapter cards inserted into the SDVO (Serial Digital Video Output) connector on the platform's system board. ADD2 cards are used to give multi-monitor capabilities to the integrated graphics controller.

The ADD2/SDVO connector on the system board has the physical appearance of a PCI Express x16 connector; however, the platform does NOT support the use of conventional PCI Express cards or reversed-layout ADD2 cards.

Installing and Removing an ADD2/SDVO Card or a PCI Express Card

You can install a ADD2/SDVO expansion card and a low-profile PCI Express x1 expansion card in the computer.

To install an ADD2/SDVO card or a PCI Express card:

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

   CAUTION: Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

5. If the computer is on a stand, remove the computer from the stand.
6. Remove the computer cover.
7. Open the slot cover retainer that secures the slot covers.

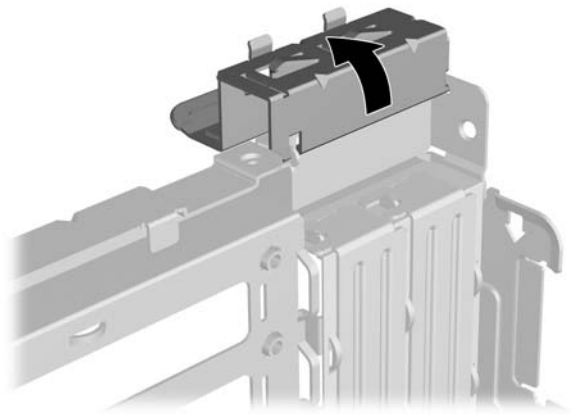


Figure 2-11 Opening the Expansion Slot Retainer

8. 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 out of the chassis.

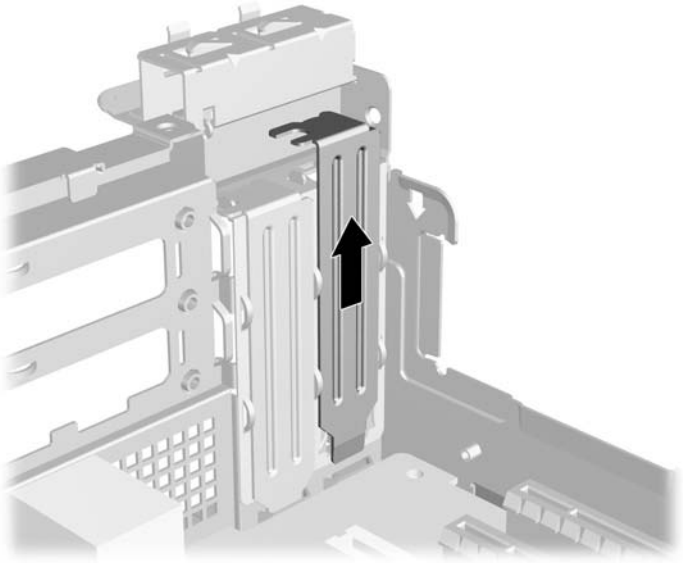


Figure 2-12 Removing an Expansion Slot Cover

   b. If you are replacing an existing expansion card, carefully rock the existing card back and forth until the connectors pull free from the socket. Pull the expansion card straight up from the socket to release it from the chassis frame. Be sure not to scrape the card against the other components.

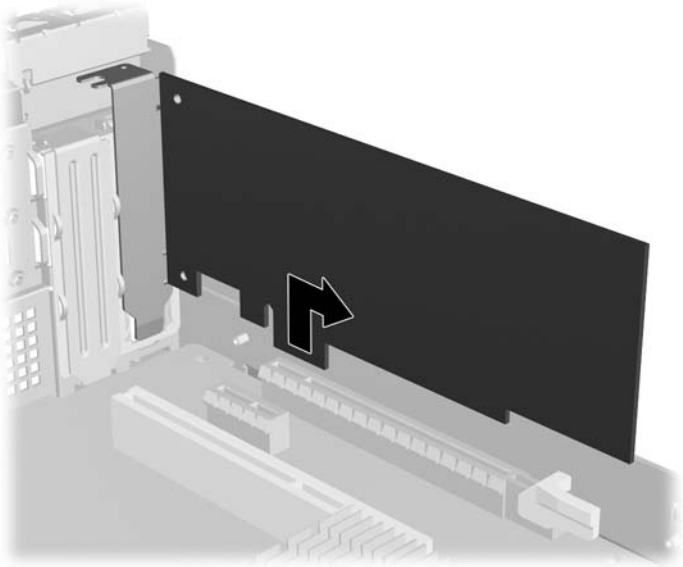


Figure 2-13 Removing a PCI Express x1 Expansion Card

9. Store the removed card in anti-static packaging.

10. 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.

11. To install a new expansion card, align the bracket on the card with the open slot on the rear of the chassis and press the card straight into the expansion socket.

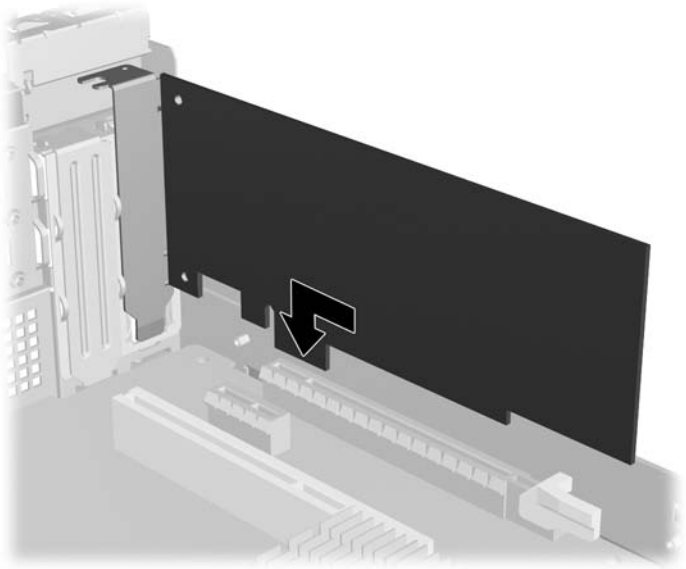


Figure 2-14 Installing a PCI Express x1 Expansion Card

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

12. Close the slot cover retainer.

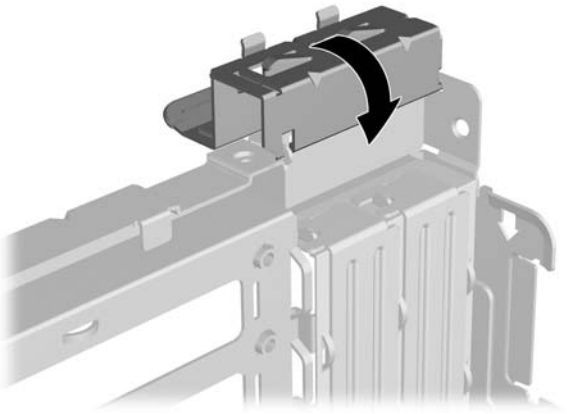


Figure 2-15 Closing the Slot Cover Retainer

NOTE: The slot cover retainer is secured in place by the computer cover.

13. Replace the computer cover.
14. If the computer was on a stand, replace the stand.
15. Reconnect the power cord and any external devices, then turn on the computer.
16. Lock any security devices that were disengaged when the computer cover was removed.
17. Reconfigure the computer, if necessary. Refer to the *Computer Setup (F10) Utility Guide* on the *Documentation and Diagnostics CD* for instructions about using Computer Setup.

Installing and Removing a PCI Card in the Riser Card

You can install two full-height PCI cards in the riser card.

CAUTION: To avoid damage to the riser card or installed PCI expansion cards, be sure to remove all installed PCI expansion cards before attempting to remove the riser card from the chassis.

To install a PCI card in the riser:

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

CAUTION: Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

5. If the computer is on a stand, remove the computer from the stand.
6. Remove the computer cover.
7. Press the latch release on the front of the power supply (1), and then raise the power supply to the upright position (2).

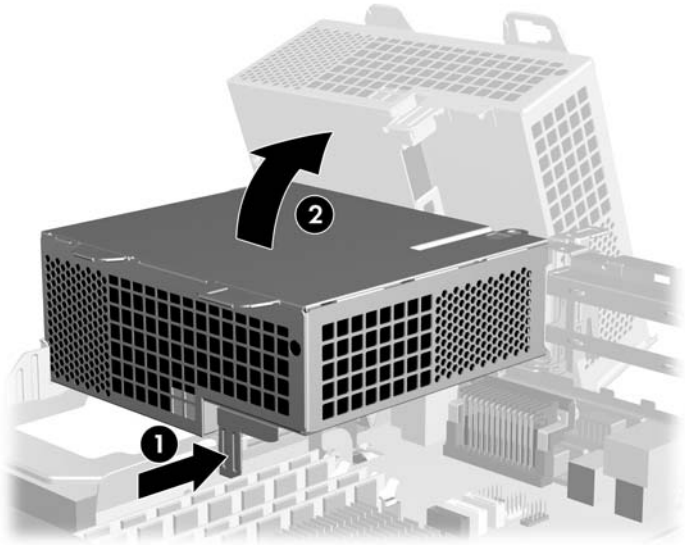


Figure 2-16 Releasing and Rotating the Power Supply

8. Locate the correct vacant expansion socket in the PC riser and the corresponding expansion slot on the back of the computer chassis.
9. Open the slot cover retainer that secures the slot covers by turning the retainer to the side.

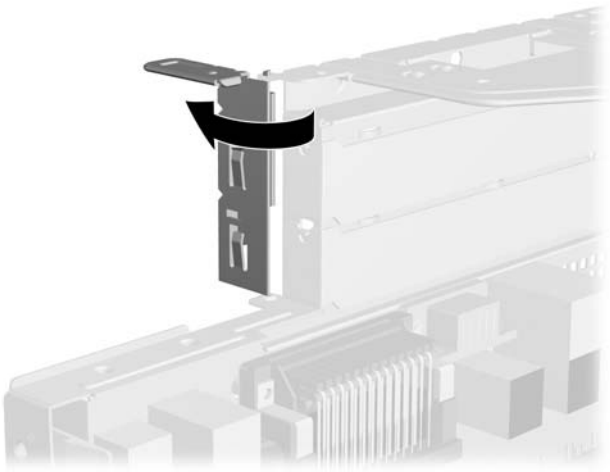


Figure 2-17 Opening the Riser Card Expansion Slot Retainer

10. 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 out toward the left side of the chassis.

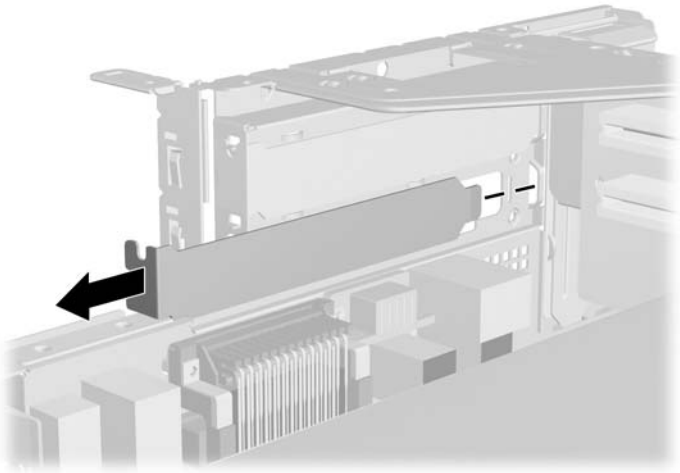


Figure 2-18 Removing a PCI Riser Card Expansion Slot Cover

b. If you are replacing an existing card, hold the PCI card at each end, and carefully rock it back and forth until the connectors pull free from the socket. Pull the expansion card toward the left side of the chassis straight out of the riser. 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.

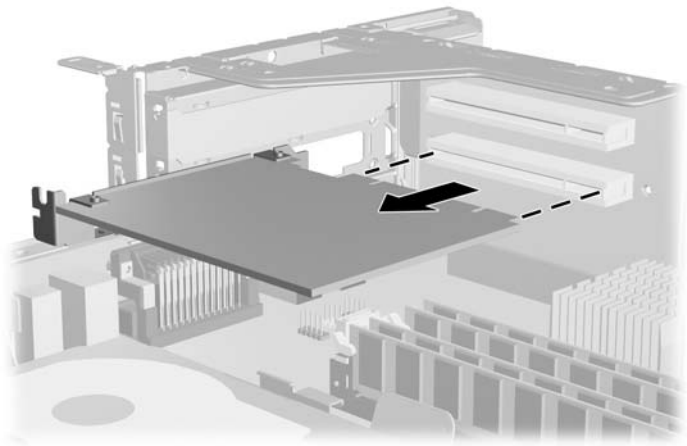


Figure 2-19 Removing a Standard PCI Expansion Card

11. Store the removed card in anti-static packaging.
12. 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.

13. To install a new expansion card in the riser card, align the bracket on the expansion card with the open slot on the rear of the chassis and press the card straight into the expansion socket.

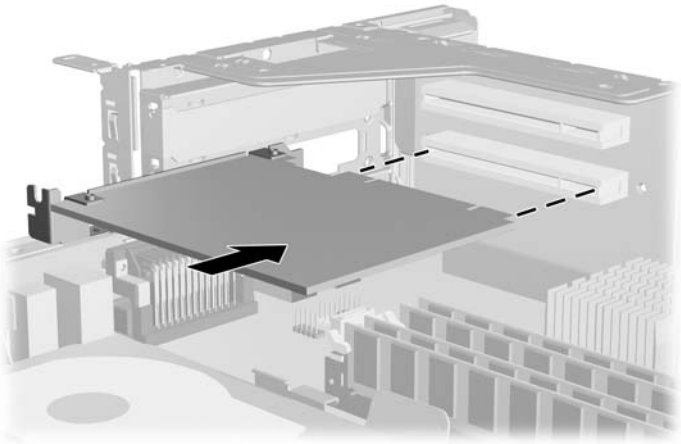


Figure 2-20 Installing a PCI Expansion Card

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

14. Close the slot cover retainer.

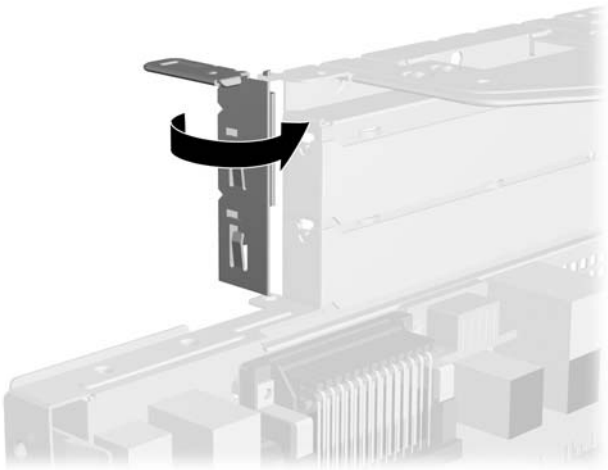


Figure 2-21 Closing the Riser Card Slot Cover Retainer

NOTE: The slot cover retainer is secured in place by the computer cover.

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

16. Return the power supply to the down position until it locks.
17. Replace the computer cover.
18. If the computer was on a stand, replace the stand.
19. Reconnect the power cord and any external devices, then turn on the computer.
20. Lock any security devices that were disengaged when the computer cover was removed.
21. Reconfigure the computer, if necessary. Refer to the *Computer Setup (F10) Utility Guide* on the *Documentation and Diagnostics CD* for instructions about using Computer Setup.

Drive Positions

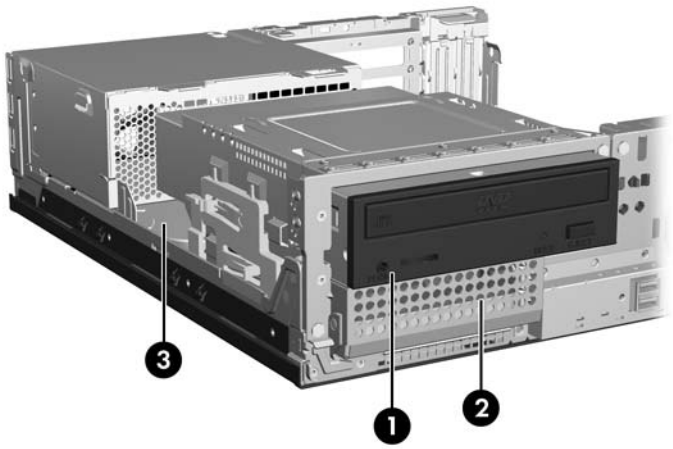


Figure 2-22 Drive Positions

1	5.25-inch external drive bay with optical drive installed (some models)
2	Primary 3.5-inch internal hard drive bay
3	Secondary 3.5-inch internal hard drive bay

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* on the *Documentation and Diagnostics CD* for more information.

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 SATA connector on the system board labeled SATA 0.
- Connect a SATA optical drive to the white SATA connector on the system board labeled SATA 1.
- Always populate the dark blue SATA 0 and white SATA 1 connectors before the light blue SATA 2 connectors.
- The system does not support Parallel ATA (PATA) optical drives or PATA hard drives.
- You may install either a third-height or a half-height drive into a half-height bay.
- You must install guide screws to ensure the drive will line up correctly in the drive cage and lock in place. HP has provided eight extra guide screws installed on the optical drive cage. Four of the guide screws are silver 6-32 standard screws used for hard drives only. The other four guide screws are black M3 metric screws used for all other drives.

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 Appendix D, Electrostatic Discharge on page 63.

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.”

NOTE: It is not necessary to remove the front bezel when removing or installing drives unless you need to remove a bezel blank or need to retrieve the extra guide screws under the front bezel. The illustrations in the following sections show the front bezel off the chassis so that it is easier to see the drives being removed or installed.

Removing and Replacing the Optical Drive (some models)

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

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

To remove an optical drive:

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

   CAUTION: Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

5. If the computer is on a stand, remove the computer from the stand.
6. Remove the computer cover.
7. Disconnect the power cable (1) and data cable (2) from the rear of the optical drive.

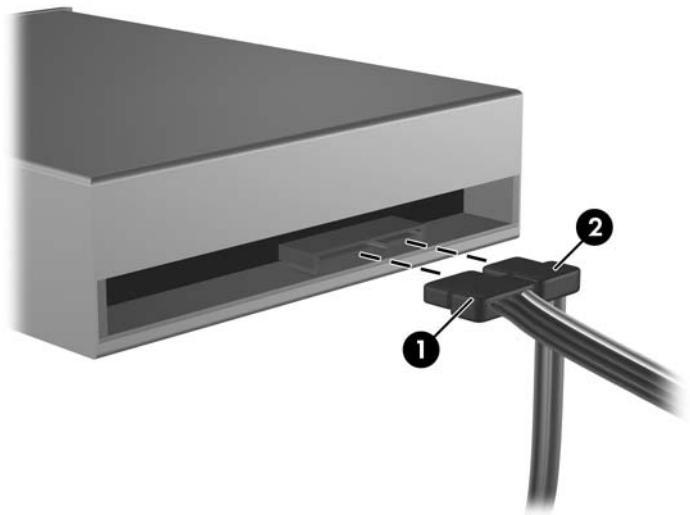


Figure 2-23 Disconnecting the Optical Drive Power and Data Cables

8. Pull out the lever on the left side of the drive (1) to release the drive, and then slide the drive forward out of the drive bay (2).

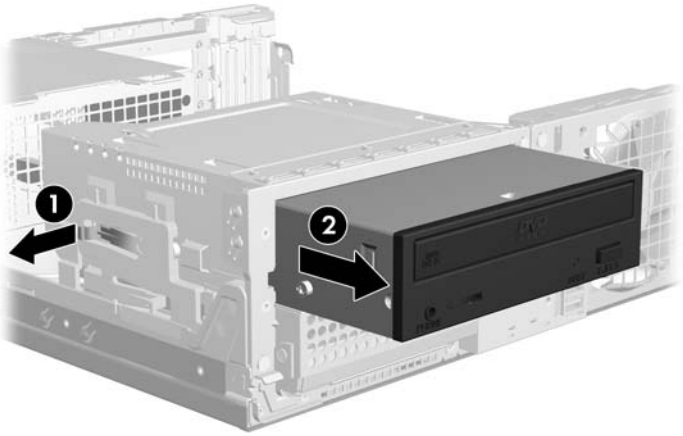


Figure 2-24 Removing the Optical Drive

NOTE: When replacing a drive, transfer the four guide screws from the old drive to the new one.

To install an optical drive:

1. If necessary, remove the bezel blank covering the 5.25-inch drive bay.

2. Install two 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.

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.

Figure 2-25 Installing Guide Screws in the Optical Drive

3. Align the guide screws on the drive with the slots on the chassis. Slide the drive into the optical drive bay all the way back until it locks.

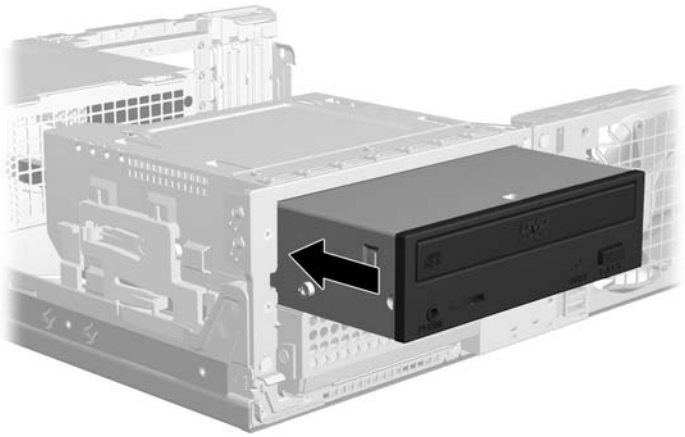


Figure 2-26 Installing the Optical Drive

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

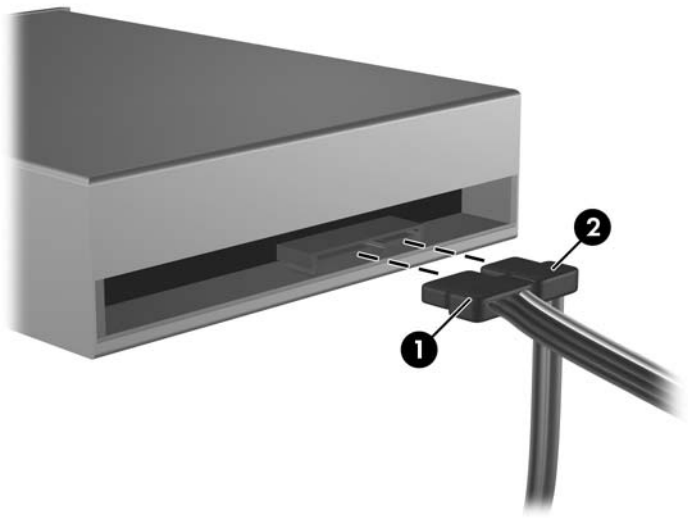


Figure 2-27 Connecting the Optical Drive Power and Data Cables

CAUTION: Never crease or bend a SATA data cable tighter than a 30 mm (1.18 in) radius. A sharp bend can break the internal wires.

5. Connect the other end of the SATA data cable to the white system board connector labeled SATA 1.
6. Replace the computer cover.
7. If the computer was on a stand, replace the stand.
8. Reconnect the power cord and any external devices, then turn on the computer.
9. Lock any security devices that were disengaged when the computer cover was removed.

The system automatically recognizes the drive and reconfigures the computer.

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. Also, if you are replacing the primary hard drive, make sure you have the *Restore Plus!* CD set that you created when you initially set up the computer to restore the operating system, software drivers, and any software applications that were preinstalled on the computer. If you do not have this CD set, create it now. Refer to the *HP Backup and Recovery Manager User Guide* in the Windows **Start** menu for more information. You may wish to print this guide for easy reference.

The preinstalled 3.5-inch hard drive is located under the external drives. 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, 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 computer cover.
7. Raise the drive cage to the upright position.

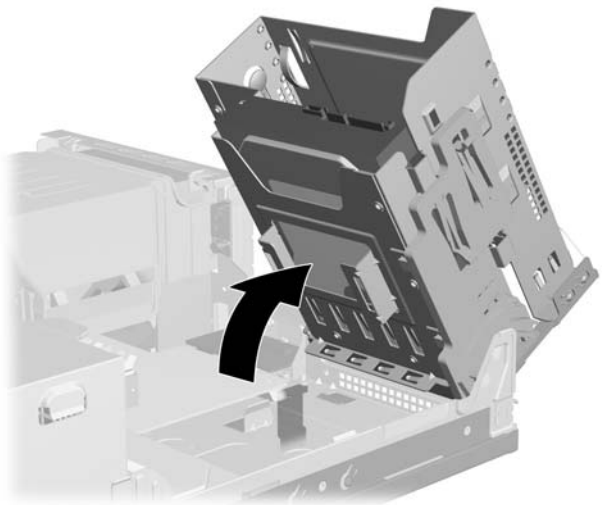


Figure 2-28 Rotating the Drive Cage Up

8. If an optical drive is installed, disconnect the power cable (1) and data cable (2) from the back of the optical drive.

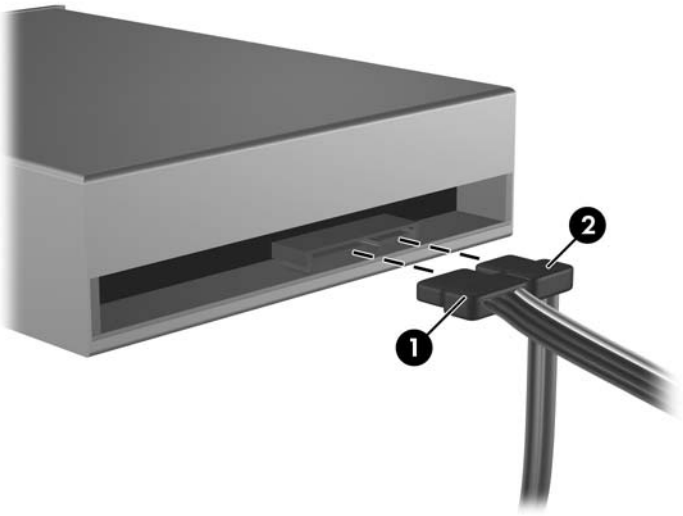


Figure 2-29 Disconnecting the Optical Drive Power and Data Cables

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

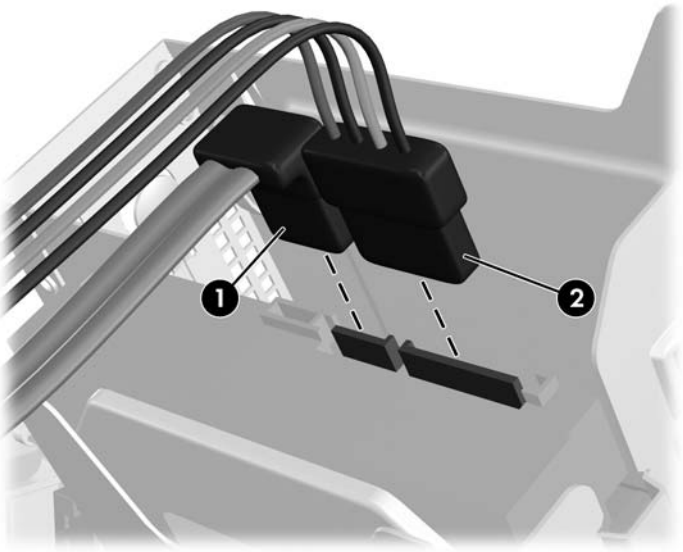


Figure 2-30 Disconnecting the Primary Hard Drive Data and Power Cables

CAUTION: Never crease or bend a SATA data cable tighter than a 30 mm (1.18 in) radius. A sharp bend can break the internal wires.

10. Pull out the lever on the left side of the primary hard drive (1) to release the drive, and then slide the drive up out of the drive cage (2).

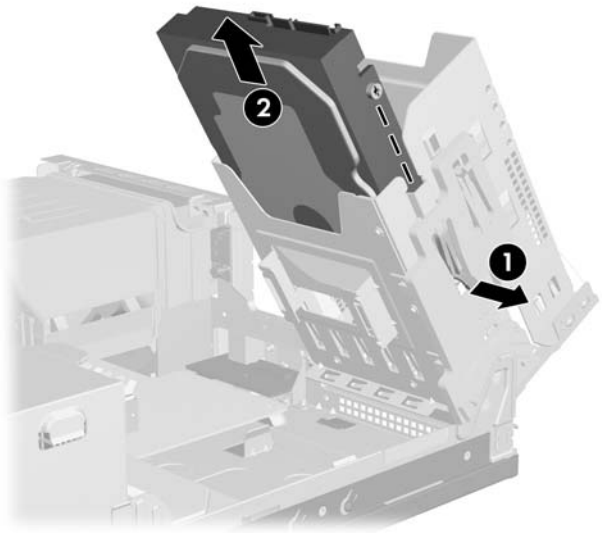


Figure 2-31 Removing the Primary Hard Drive

To install a primary hard drive:

1. Install two 6–32 metric guide screws in the lower holes on each side of the drive.

NOTE: When replacing the hard drive, transfer the four screws from the old drive to the new one. You will need a Torx T-15 screwdriver to remove and re-install the guide screws. HP has provided four extra 6-32 standard guide screws on the front of the chassis, under the front bezel. The 6-32 standard guide screws are silver.

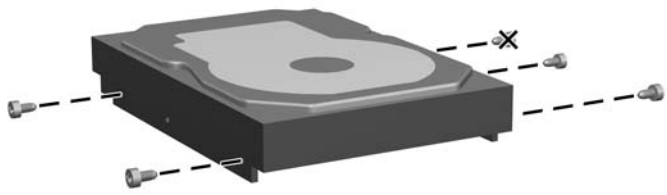


Figure 2-32 Installing Guide Screws in the Primary Hard Drive

2. Insert the primary hard drive “upside down.” Align the hard drive with the primary hard drive bay in the drive cage so that the bottom of the hard drive is next to the optical drive compartment and the power and data connectors are up. Slide the drive all the way down into the drive cage until it locks in place.

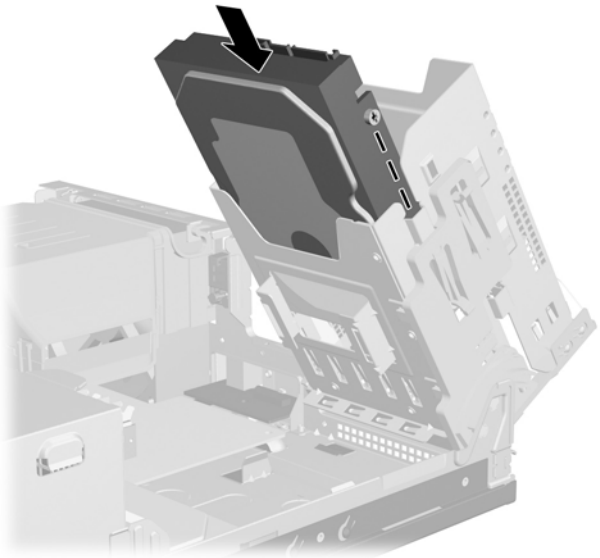


Figure 2-33 Installing the Primary Hard Drive

3. Connect the data cable (1) and power cable (2) to the back of the primary hard drive.

NOTE: If the system has only one SATA hard drive, the data cable must be connected to the dark blue connector labeled SATA 0 on the system board to avoid any hard drive performance problems.

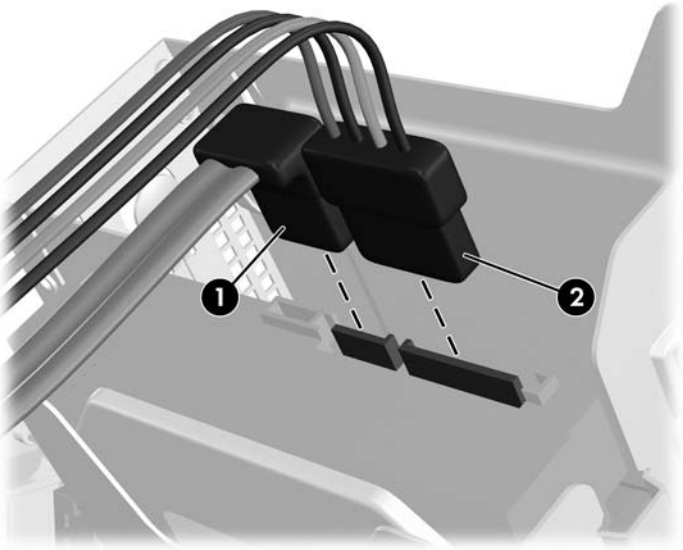


Figure 2-34 Connecting the Primary Hard Drive Data and Power Cables

4. Connect the power cable (1) and data cable (2) to the back of the optical drive, if applicable.

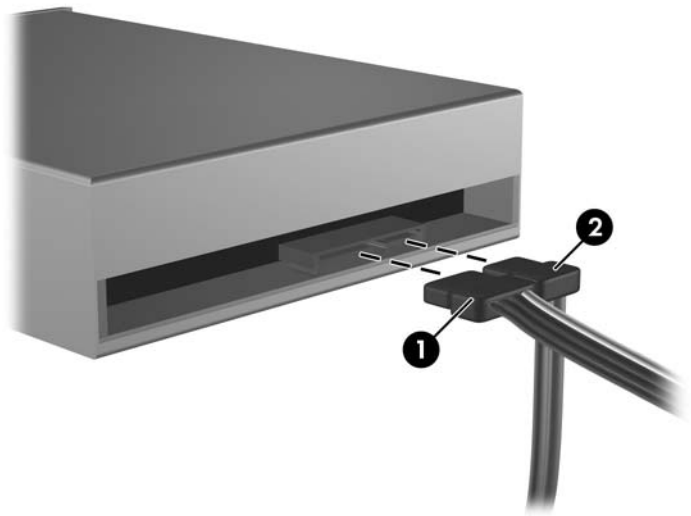


Figure 2-35 Connecting the Optical Drive Power and Data Cables

5. Return the drive cage to the down position into the computer.
6. Replace the computer cover.
7. If the computer was on a stand, replace the stand.
8. Reconnect the power cord and any external devices, then turn on the computer.
9. Lock any security devices that were disengaged when the computer cover was removed.

NOTE: If you replaced the primary hard drive, use the *Restore Plus!* CD set that you created when you initially set up the computer to restore the operating system, software drivers, and any software applications that were preinstalled on the computer. When the restore process has completed, reinstall any personal files that you backed up before replacing the hard drive.

Removing and Replacing the Secondary 3.5-inch Hard Drive

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

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

CAUTION: Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

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

6. Remove the computer cover.
7. Raise the drive cage to the upright position.

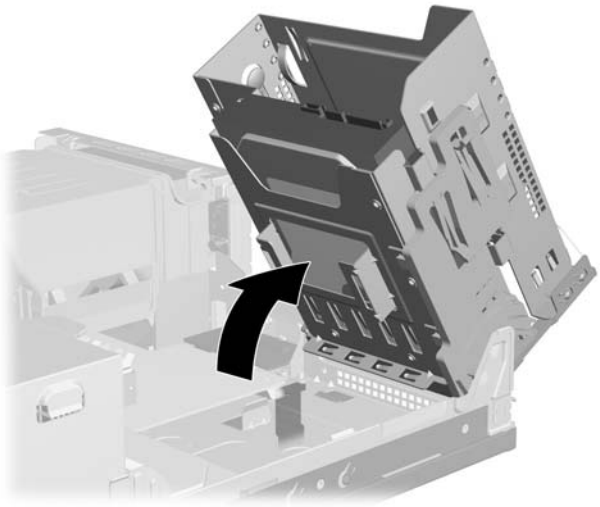


Figure 2-36 Rotating the Drive Cage Up

8. Press the latch release on the front of the power supply (1), and then raise the power supply to the upright position (2)

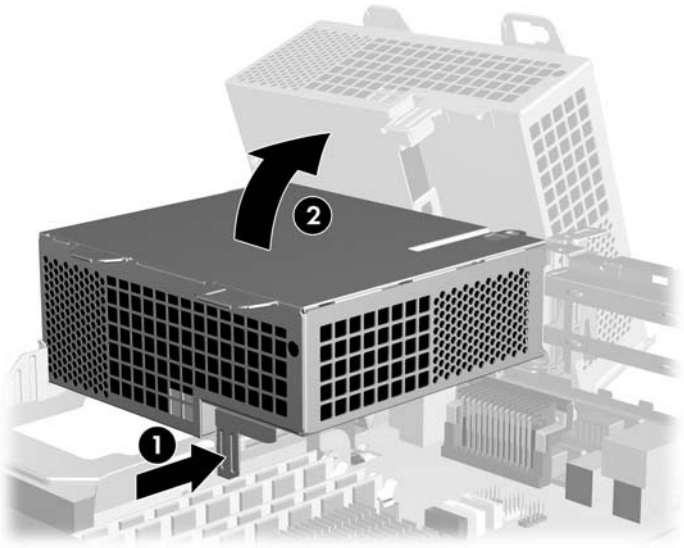


Figure 2-37 Releasing and Rotating the Power Supply

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

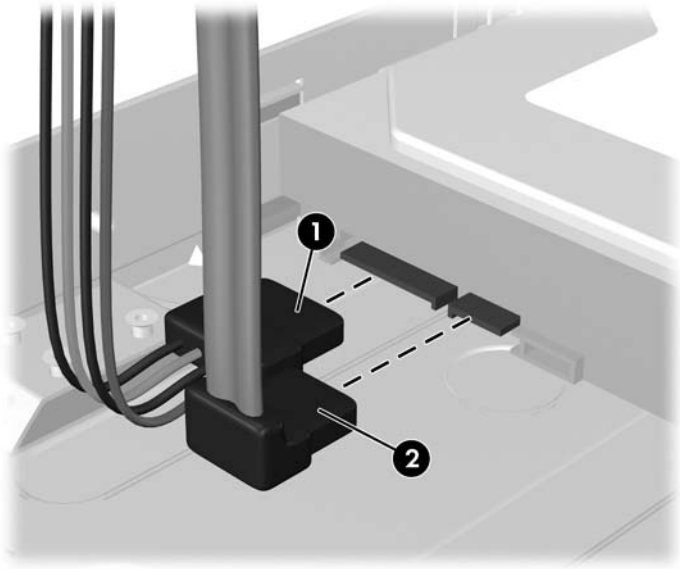


Figure 2-38 Disconnecting the Secondary Hard Drive Power and Data Cables

10. Press the release catch on the right side of the secondary hard drive (1), slide the drive forward until it stops, then lift it straight out of the chassis (2).

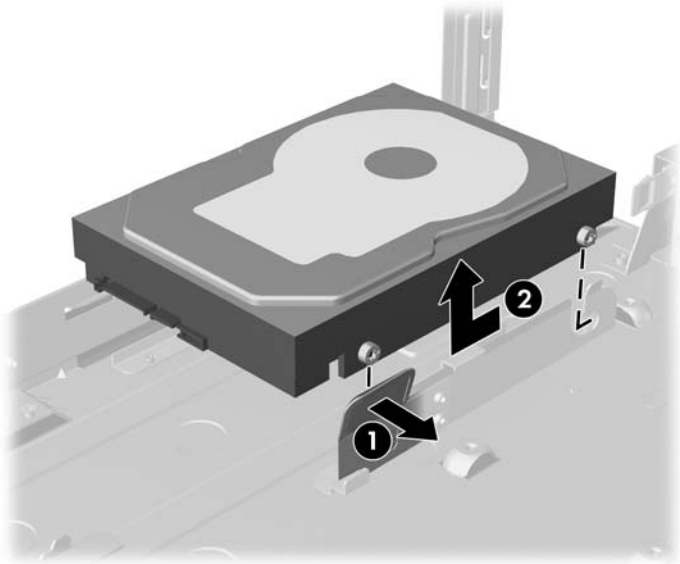


Figure 2-39 Removing the Secondary Hard Drive

To install a secondary hard drive:

1. Install two 6–32 metric guide screws in the lower holes on each side of the drive.

NOTE: When replacing the secondary hard drive, transfer the four screws from the old drive to the new one. You will need a Torx T-15 screwdriver to remove and re-install the guide screws. HP has provided four extra 6-32 standard guide screws on the front of the chassis, under the front bezel. The 6-32 standard guide screws are silver.

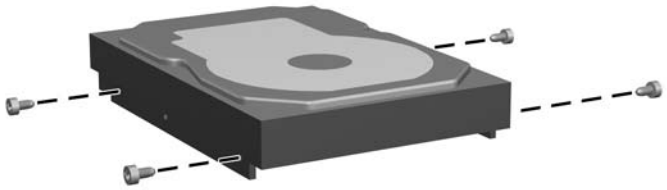


Figure 2-40 Installing Guide Screws in the Secondary Hard Drive

2. Align the guide screws on the secondary hard drive with the slots in the chassis, and then lower the drive into the slots and slide the drive back until it locks in place.

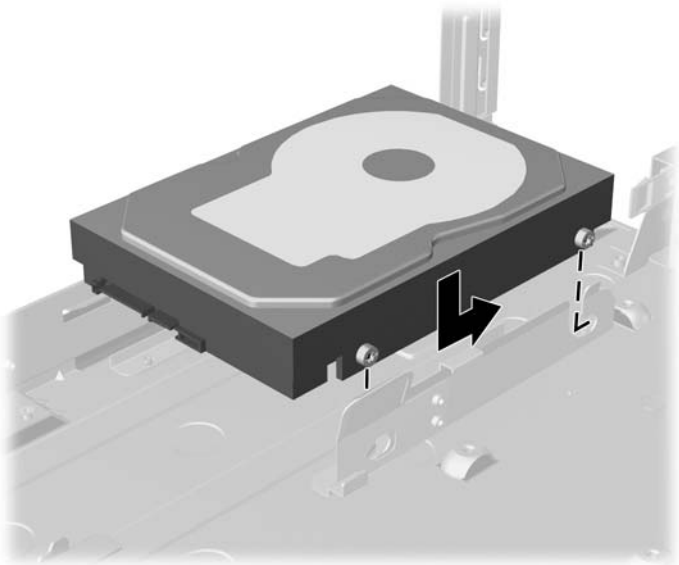


Figure 2-41 Installing the Secondary Hard Drive

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

NOTE: The primary hard drive data cable must be connected to the dark blue connector labeled SATA 0 on the system board to avoid any hard drive performance problems. Connect the other end of the secondary hard drive data cable to the next available (unpopulated) SATA connector on the system board in the following order: SATA 0, SATA 1, SATA 2.

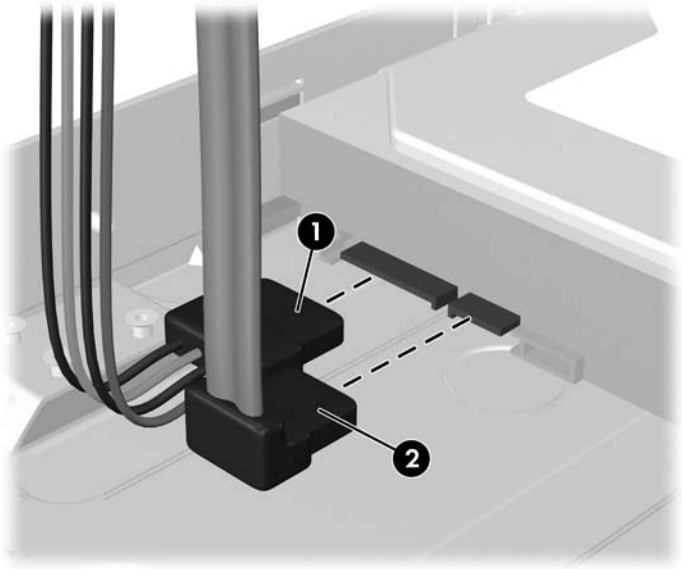


Figure 2-42 Connecting the Power and Data Cables to the Secondary Hard Drive

4. Return the power supply to the down position until it locks.
5. Return the drive cage to the down position into the computer.
6. Replace the computer cover.
7. If the computer was on a stand, replace the stand.
8. Reconnect the power cord and any external devices, then turn on the computer.
9. Lock any security devices that were disengaged when the computer cover was removed.

A Specifications

Desktop Dimensions		
Height	3.94 in	10 cm
Width	13.40 in	34 cm
Depth	15.00 in	38 cm
Approximate Weight	19.6 lb	8.9 kg
Temperature Range		
Operating	50° to 104°F	10° to 40°C
Nonoperating	-22° to 140°F	-30° to 60°C
Relative Humidity (noncondensing)		
Operating	20-85%	20-85%
Nonoperating (38.7°C max wet bulb)	90%	90%
Maximum Altitude (unpressurized)		
Operating	10,000 ft	3048 m
Nonoperating	30,000 ft	9144 m

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

Heat Dissipation		
Maximum	1260 BTU/hr	317 kg-cal/hr
Typical (idle)	388 BTU/hr	98 kg-cal/hr
Power Supply	**115V**	**230V**
Operating Voltage Range[1]	90-264 VAC	90-264 VAC
Rated Voltage Range	100-240 VAC	100-240 VAC
Rated Line Frequency	50-60 Hz	50-60 Hz
Power Output	240 W	240 W
Rated Input Current (maximum)[1]	5A @ 90 VAC	5A @ 90 VAC

[1] This system utilizes an active power factor corrected power supply. This allows the system to pass the CE mark requirements for use in the countries of the European Union. The active power factor corrected power supply also has the added benefit of not requiring an input voltage range select switch.

B USB PlusPower Ports (some models)

Some models have a USB PlusPower expansion card installed. This card provides one red-colored 24–volt USB+ connector (1) and three teal-colored 12–volt USB+ connectors (2).

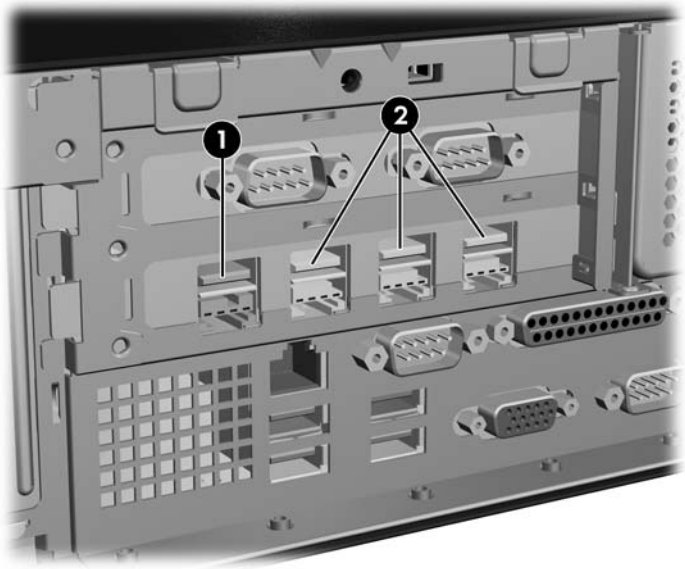


Figure B-1 USB PlusPower Ports

The 24–volt USB+ connector (1) and 12–volt USB+ connectors (2) are configured differently as a precaution to prevent connection errors.

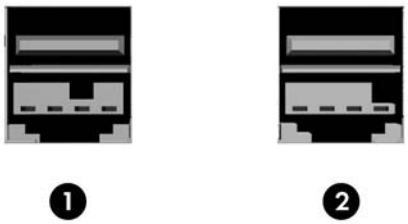


Figure B-2 24–volt USB+ connector and 12–volt USB+ connectors

To remove and install a USB PlusPower Expansion Card:

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

   CAUTION: Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

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

7. Remove the USB PlusPower Expansion Card.

   a. Press the latch release on the front of the power supply (1), and then raise the power supply to the upright position (2)

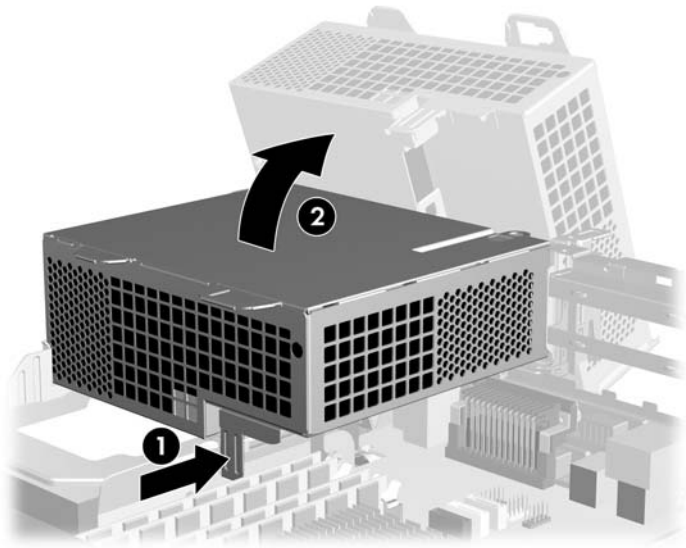


Figure B-3 Releasing and Rotating the Power Supply

   b. Locate the USB PlusPower Expansion Card in the lower socket of the PC riser. Disconnect the power and system board cables attached to the expansion card.

   c. Hold the expansion card at each end, and carefully rock it back and forth until the connectors pull free from the socket. Pull the expansion card toward the left side of the chassis straight out of the riser. Be sure not to scrape the card against the other components.

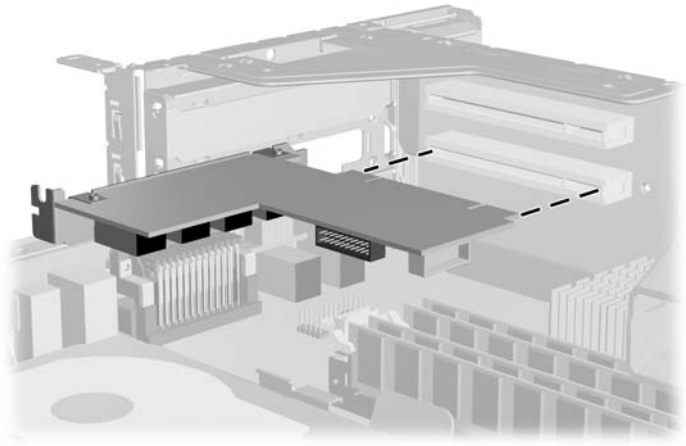


Figure B-4 Removing the USB PlusPower Expansion Card

8. Install the new USB PlusPower Expansion Card in the lower socket of the riser card.

   a. Align the bracket on the card with the open slot on the rear of the chassis and press the card straight into the expansion socket.

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

   b. Connect the system board harness to the system board (1) and the expansion card (2). Connect the power cable to the expansion card (3).

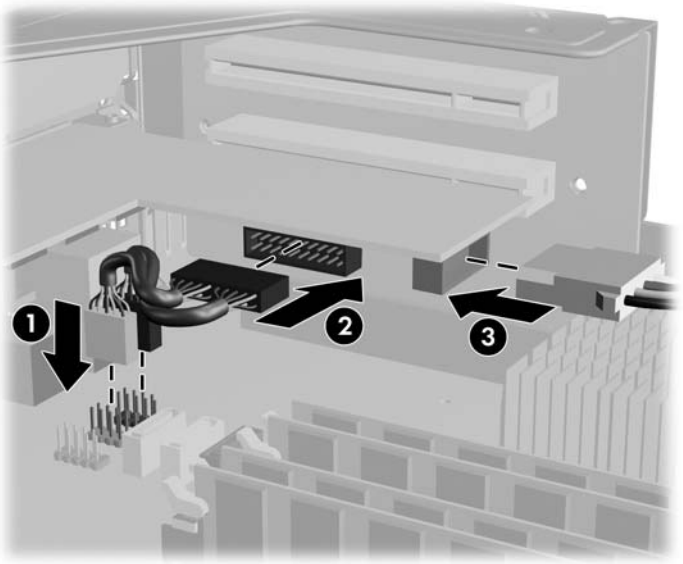


   Figure B-5 Connecting System Board and Power Cables to the USB PlusPower Expansion Card

   c. Return the power supply to the down position until it locks.

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

C Powered Serial Ports

Two powered serial ports, COM 1 and COM 2, are standard on the computer. Some models have a powered serial port expansion card installed that supplies two additional powered serial ports, COM 3 and COM 4.

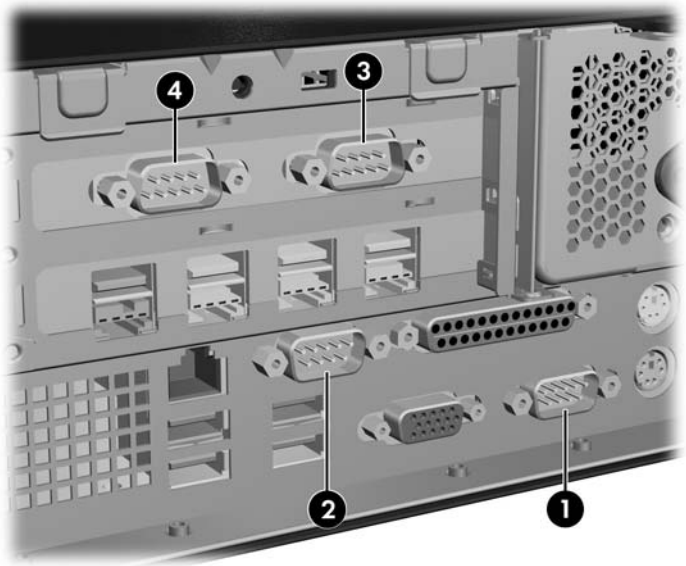


Figure C-1 Powered Serial Ports

Item	Description	Supports		
		+5V	+9V	+12V
1	COM 1 (yellow)	Yes	Yes	Yes
2	COM 2 (teal)	Yes	No	Yes
3	COM 3 (teal) (some models)	Yes	No	Yes
4	COM 4 (teal) (some models)	Yes	No	Yes

Removing the Powered Serial Port Caps

These powered serial ports have been protected with plastic caps. Turn off the computer and remove the caps before connecting powered serial Point of Sale devices.

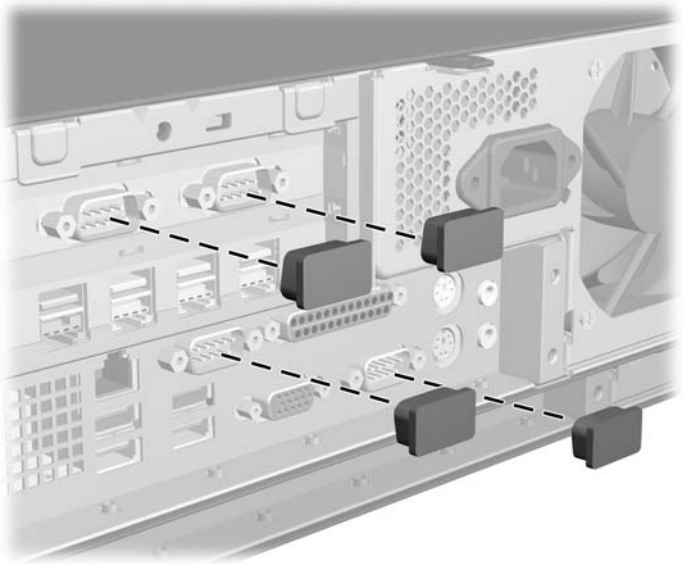


Figure C-2 Removing the Powered Serial Port Caps

Configuring Power to a Serial Port

The serial ports on the HP Point of Sale System computer can be configured as standard (non-powered) serial ports or powered serial ports. Some Point of Sale devices use a powered serial port. If the serial port is configured as a powered port, devices that support a powered serial interface do not require an external power source.

NOTE: The computer ships with all serial ports configured in standard serial mode.

Power to the ports can be configured by moving jumpers and serial port jumper wires on the serial port headers. The computer ships with a jumper on each serial port header. Jumper wires are available as an option from HP or an authorized HP provider.

Figure C-3 Serial Port Jumper Wire

The serial port jumpers on the system board are located as shown in the following illustration:

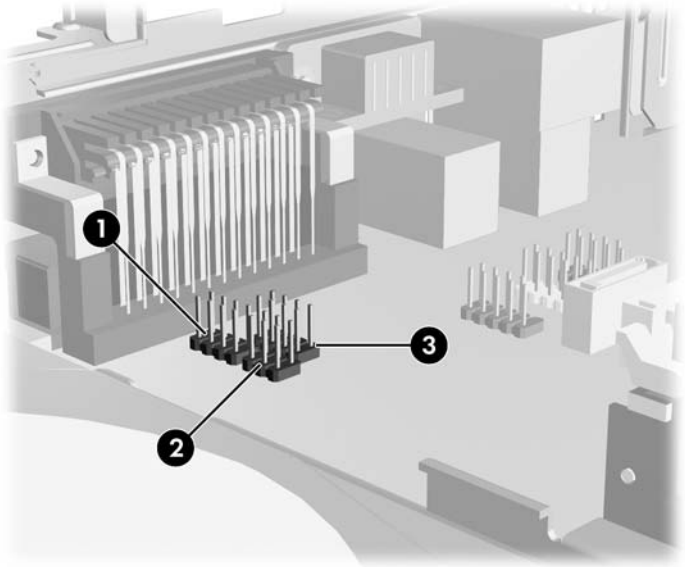


Figure C-4 Serial Port Jumper Locations on the System Board

The serial port jumpers on the powered serial port expansion card are located as shown in the following illustration:

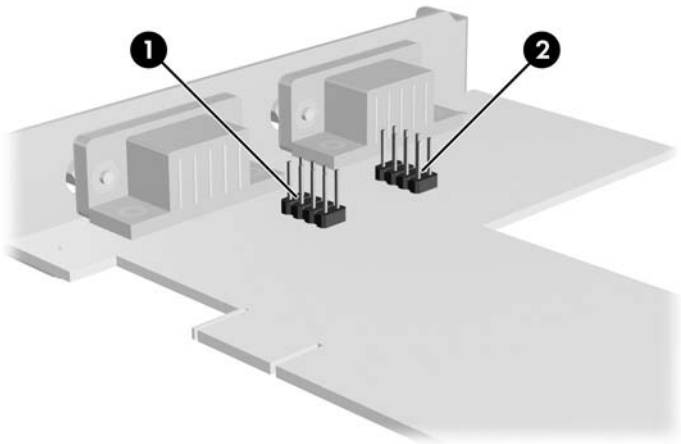


Figure C-5 Powered Serial Port Expansion Card Jumper Locations

To configure power to the serial ports:

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

   CAUTION: Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

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

7. If you are changing the COM 1 or COM 2 serial port configuration, remove the Powered Serial Port Expansion Card.

   a. Press the latch release on the front of the power supply (1), and then raise the power supply to the upright position (2)

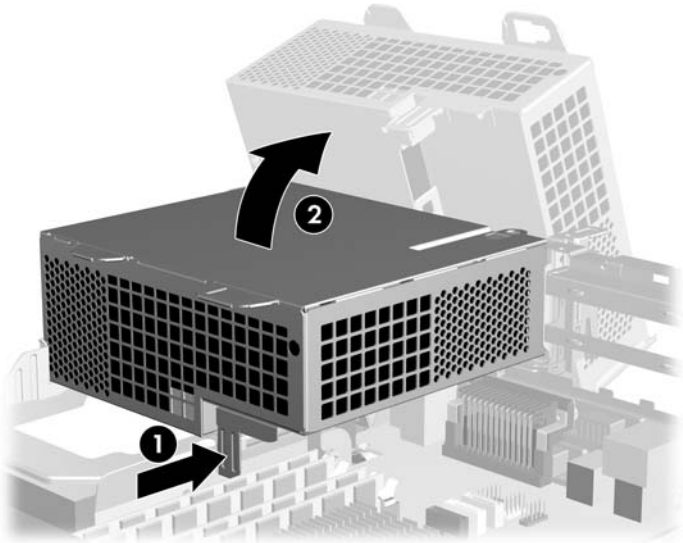


Figure C-6 Releasing and Rotating the Power Supply

   b. Locate the Powered Serial Port Expansion Card in the upper socket of the PC riser. Disconnect the power and system board cables attached to the expansion card.

   c. Hold the PCI card at each end, and carefully rock it back and forth until the connectors pull free from the socket. Pull the expansion card toward the left side of the chassis straight out of the riser. Be sure not to scrape the card against the other components.

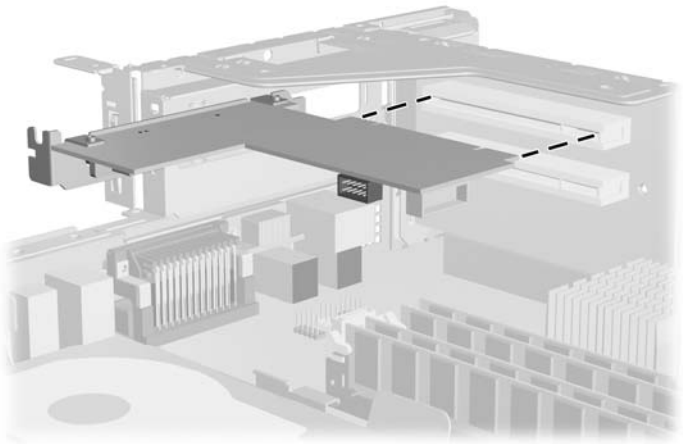


Figure C-7 Removing the Powered Serial Port Expansion Card

8. Place jumpers and jumper wires on the appropriate pins. (See Table C-1 Configuring Serial Port Power on page 55 to determine the appropriate pins.)

9. Install the new Powered Serial Port Expansion Card in the upper socket of the riser card.

   a. Align the bracket on the card with the open slot on the rear of the chassis and press the card straight into the expansion socket.

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

   b. Connect the system board cables to the system board (1) and the expansion card (2). Connect the power cable to the expansion card (3).

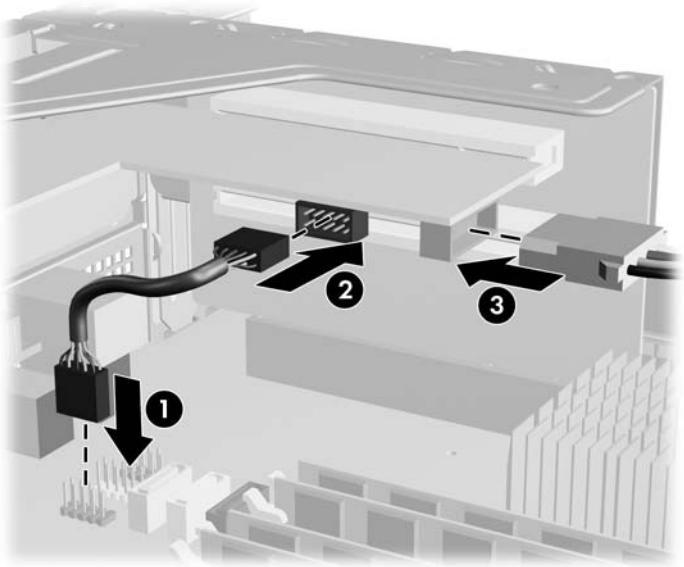
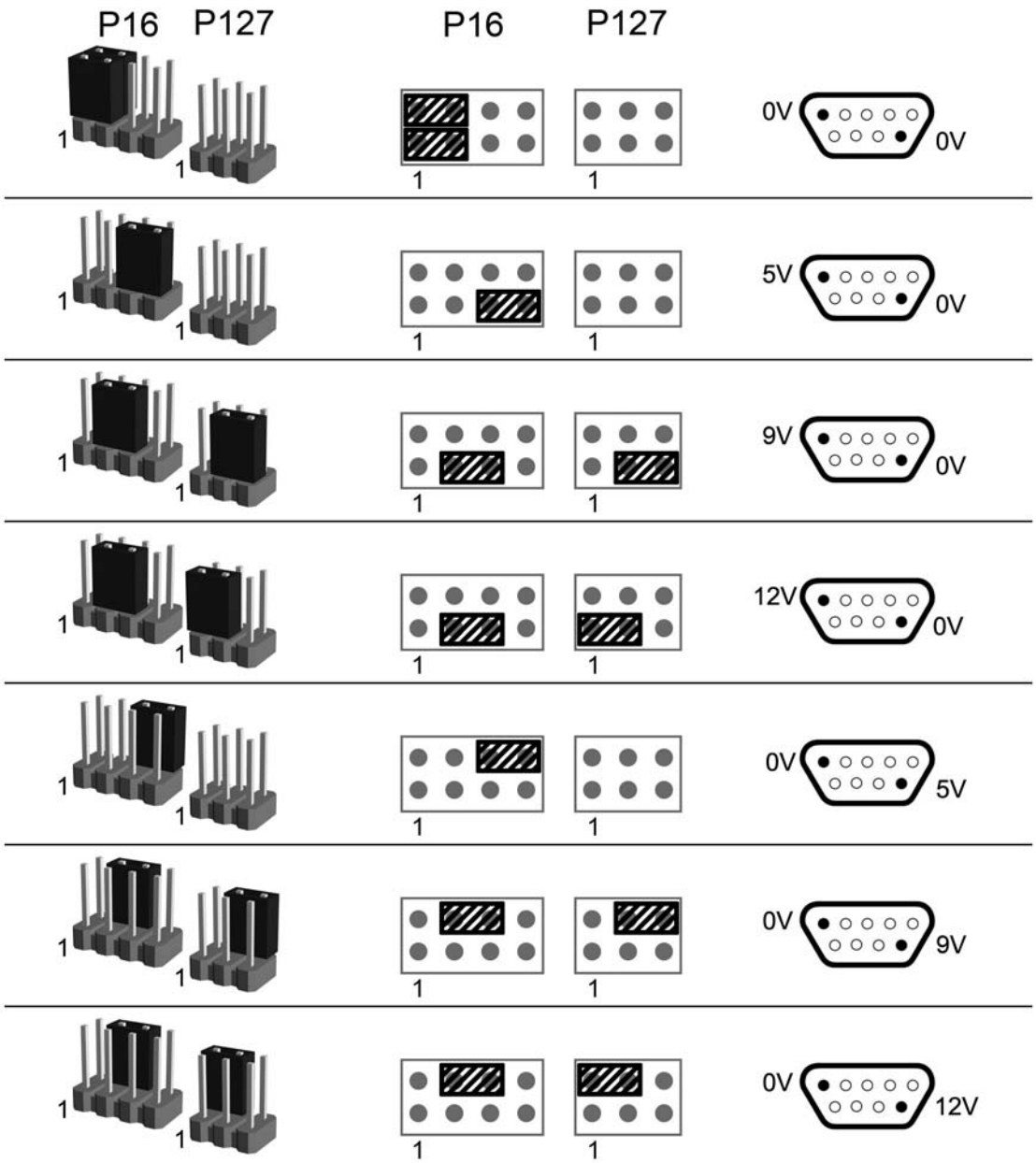


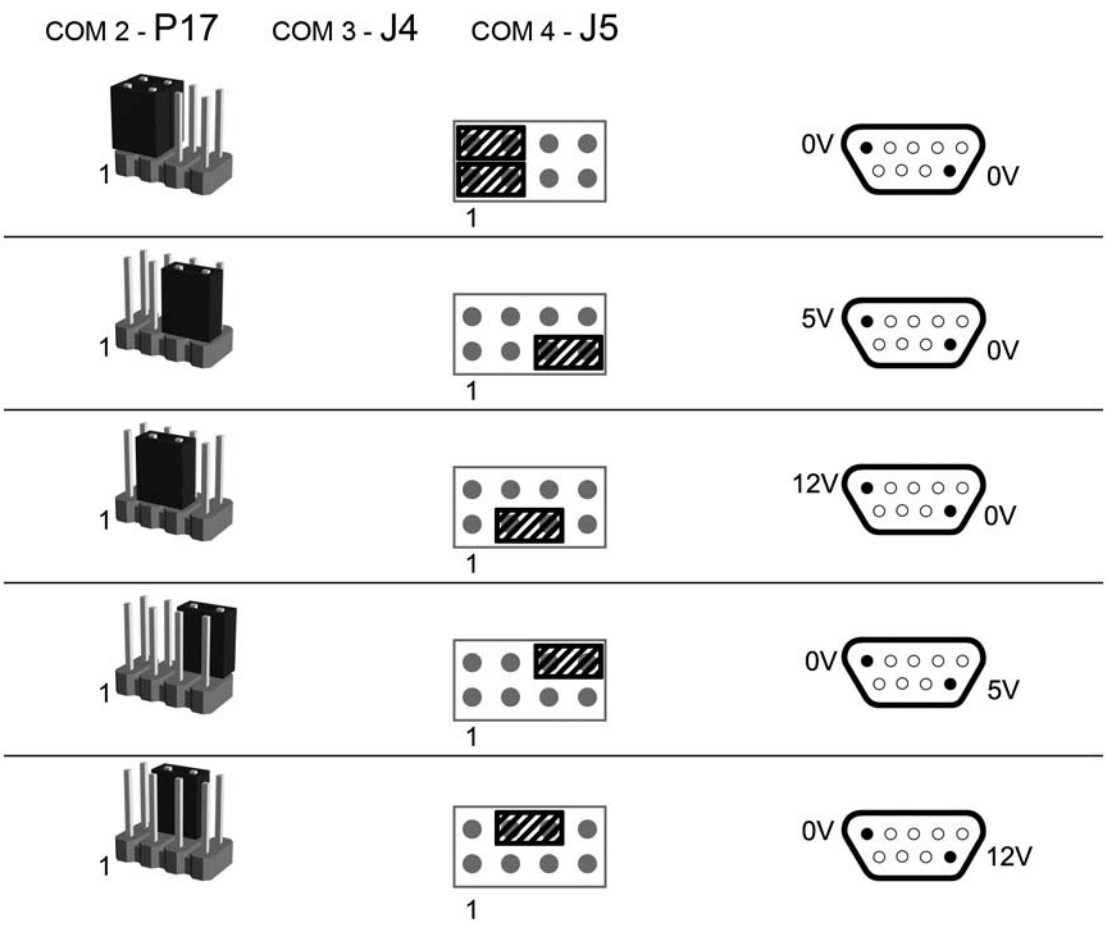
Figure C-8 Connecting System Board and Power Cables to the Powered Serial Port Expansion Card

   c. Return the power supply to the down position until it locks.

10. Replace the computer cover.
11. If the computer was on a stand, replace the stand.
12. Reconnect the power cord and any external devices, then turn on the computer.
13. Lock any security devices that were disengaged when the computer cover was removed.
14. If the serial ports are configured in powered mode, connect the powered Point of Sale device.

Table C-1 Configuring Serial Port Power




COM 2 - P17
COM 3 - J4
COM 4 - J5
1
1
0V
0V
1
1
5V
0V
1
1
12V
0V
1
1
0V
5V
1
1
0V
12V

D Battery Replacement

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

WARNING! The computer contains an internal lithium manganese dioxide battery. There is a risk of fire and burns if the battery is not handled properly. To reduce the risk of personal injury:

Do not attempt to recharge the battery.

Do not expose to temperatures higher than 60°C (140ºF).

Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.

Replace the battery only with the HP spare designated for this product.

CAUTION: Before replacing the battery, it is important to back up the computer CMOS settings. When the battery is removed or replaced, the CMOS settings will be cleared. Refer to the *Computer Setup (F10) Utility Guide* on the *Documentation and Diagnostics CD* for information on backing up the CMOS settings.

Static electricity can damage the electronic components of the computer or optional equipment. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object.

NOTE: The lifetime of the lithium battery can be extended by plugging the computer into a live AC wall socket. The lithium battery is only used when the computer is NOT connected to AC power.

HP encourages customers to recycle used electronic hardware, HP original print cartridges, and rechargeable batteries. For more information about recycling programs, go to http://www.hp.com/recycle.

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

CAUTION: Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

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

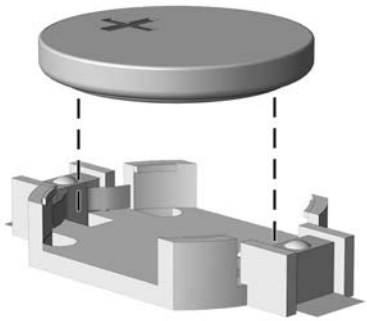


   Figure D-1 Removing a Coin Cell Battery (Type 1)

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

   Type 2

   a. To release the battery from its holder, squeeze the metal clamp that extends above one edge of the battery. When the battery pops up, lift it out (1).

b. To insert the new battery, slide one edge of the replacement battery under the holder's lip with the positive side up. Push the other edge down until the clamp snaps over the other edge of the battery (2).

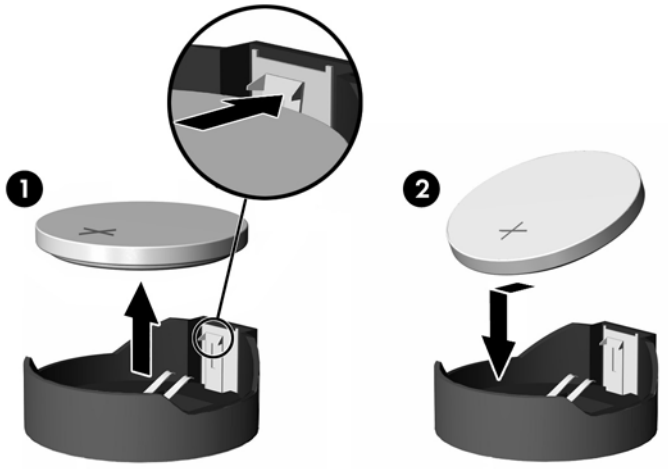


Figure D-2 Removing and Replacing a Coin Cell Battery (Type 2)

Type 3

a. Pull back on the clip (1) that is holding the battery in place, and remove the battery (2).

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

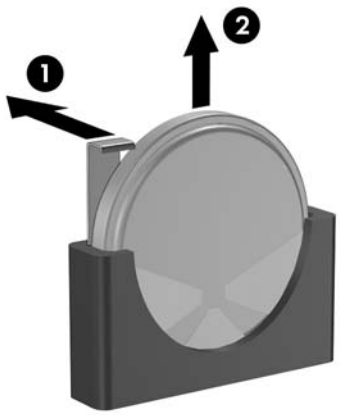


Figure D-3 Removing a Coin Cell Battery (Type 3)

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

9. Replace the computer cover.
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. Refer to the *Computer Setup (F10) Utility Guide* on the *Documentation and Diagnostics CD*.

13. Lock any security devices that were disengaged when the computer cover was removed.

E External Security Devices

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

Installing a Security Lock

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

Cable Lock

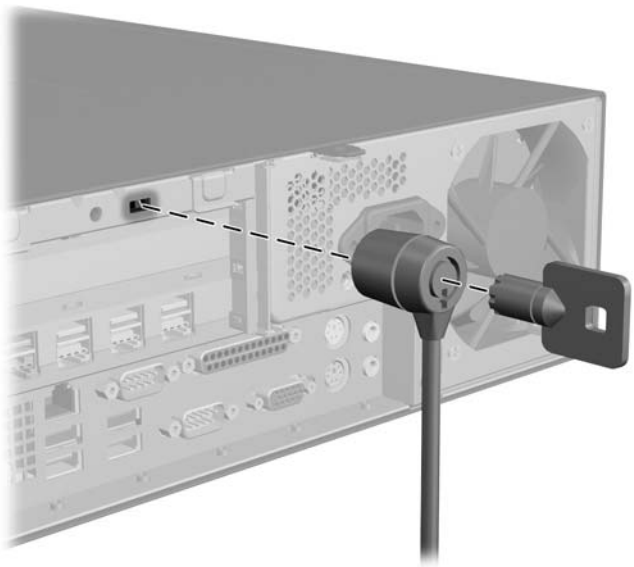


Figure E-1 Installing a Cable Lock

Padlock

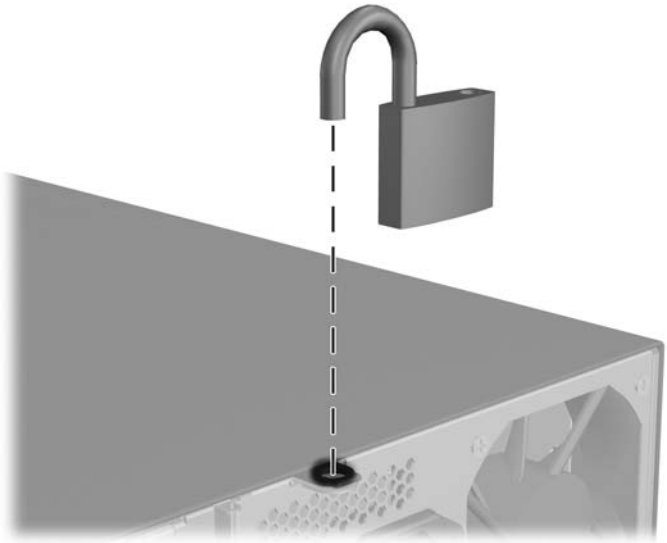


Figure E-2 Installing a Padlock

F 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.

G 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. The front should be 100% open. Leave a 10-mm (.39-inch) clearance on the sides and top of the computer and at least a 50-mm (1.97-inch) clearance in the rear. The rear vents should be 100% open.
- 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, or CDs. 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.

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