Hardware Reference Guide

HP ProDesk 400 G1 Small Form Factor

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Hardware Reference Guide

HP ProDesk 400 G1 Small Form Factor

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Product Notice

This guide describes features that are common to most models. Some features may not be available on your computer.

Not all features are available in all editions of Windows 8. This computer may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8 functionality. See http://www.microsoft.com for details.

This computer may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See http://windows.microsoft.com/en-us/windows7/get-know-windows-7 for details.

About This Book

This guide provides basic information for upgrading the HP ProDesk Business PC.

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

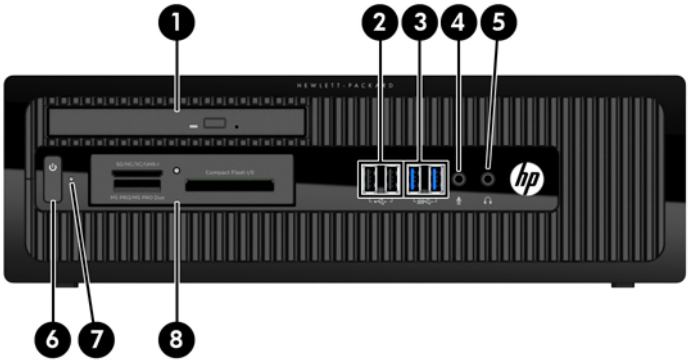
Standard configuration features

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).

NOTE: This computer model can be used in a tower orientation or a desktop orientation.

Front panel components

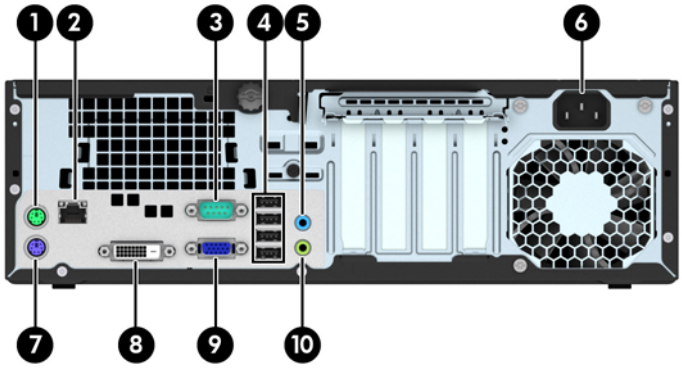
Drive configuration may vary by model. Some models have a bezel blank covering one or more drive bays.



1	Slim Optical Drive (optional)	5	Headphone Connector
2	USB 2.0 Ports (black)	6	Dual-State Power Button
3	USB 3.0 Ports (blue)	7	Hard Drive Activity Light
4	Microphone Connector	8	3.5-inch Media Card Reader (optional)

NOTE: The Power On Light is normally white 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 *Maintenance and Service Guide* to interpret the code.

Rear panel components



1		PS/2 Mouse Connector (green)	6		Power Cord Connector
2		RJ-45 Network Connector	7		PS/2 Keyboard Connector (purple)
3		Serial Connector	8		DVI-D Monitor Connectors
4		USB 2.0 Ports (black)	9		VGA Monitor Connector
5		Line-In Audio Connector (blue)	10		Line-Out Connector for powered audio devices (green)

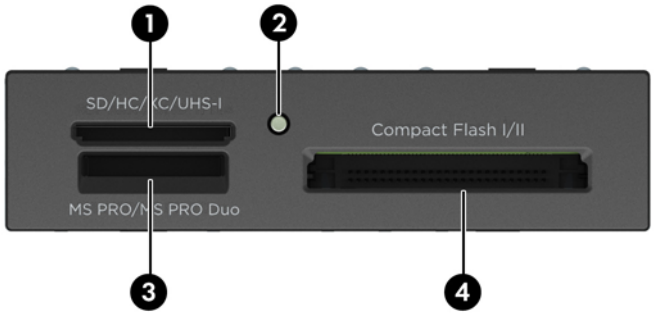
NOTE: An optional second serial port and an optional parallel port are available from HP.

When a graphics card is installed in one of the system board slots, the video connectors on the graphics card and the integrated graphics on the system board may be used at the same time. However, for such a configuration, only the display connected to the discrete graphics card will display POST messages.

The system board graphics can be disabled by changing settings in Computer Setup.

Media card reader components

The media card reader is an optional device available on some models only. Refer to the following illustration and table to identify the media card reader components.



No.	Slot	Media		
1	**SD/HC/XC/UHS-1**	• Secure Digital (SD)	• Secure Digital High Capacity (SDHC)	• Secure Digital Extended Capacity Memory Card (SDXC)
2	**Media Card Reader Activity Light**			
3	**MS PRO/MS PRO Duo**	• Memory Stick (MS) • Memory Stick Select • Memory Stick PRO (MS PRO)	• Memory Stick MagicGate • Memory Stick Duo (MS Duo) • Memory Stick PRO Duo (MS PRO Duo)	• Memory Stick MagicGate Duo • Memory Stick PRO-HG Duo
4	**CompactFlash I/II**	• CompactFlash Card Type 1	• CompactFlash Card Type 2	• MicroDrive

Serial number location

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

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.

⚠ **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 51 for more information.

When the computer is plugged into an AC power source, voltage is always applied to the system board. You must disconnect the power cord from the power source before opening the computer to prevent damage to internal components.

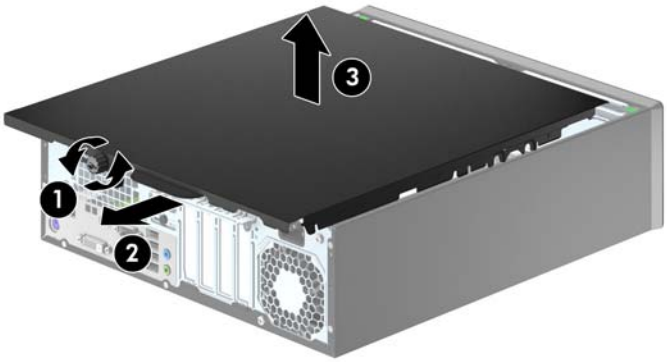
Removing the computer access panel

To access internal components, you must remove the access panel:

1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as 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.

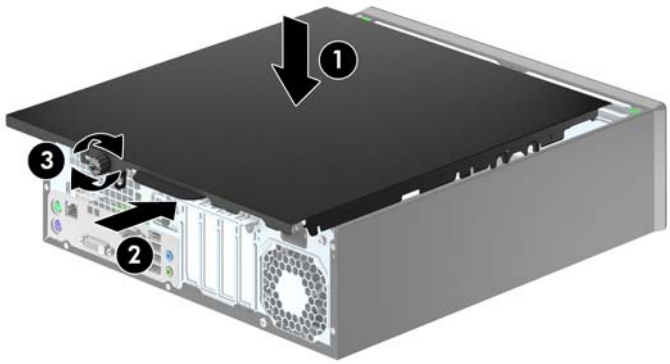
CAUTION: Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

5. If the computer is on a stand, remove the computer from the stand and lay the computer down.
6. Loosen the thumbscrew on the rear of the computer (1) then slide the panel back (2) and lift if off the computer (3).



Replacing the computer access panel

Place the panel on the computer (1) then slide it forward (2) and tighten the thumbscrew (3) to secure the panel in place.

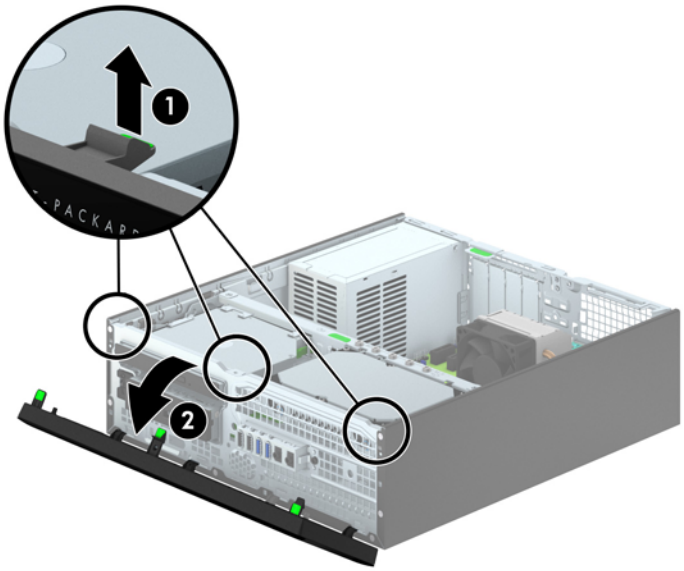


Removing the front bezel

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. If the computer is on a stand, remove the computer from the stand and lay the computer down.
6. Remove the computer access panel.
7. Lift up the three tabs on the side of the bezel (1), then rotate the bezel off the chassis (2).

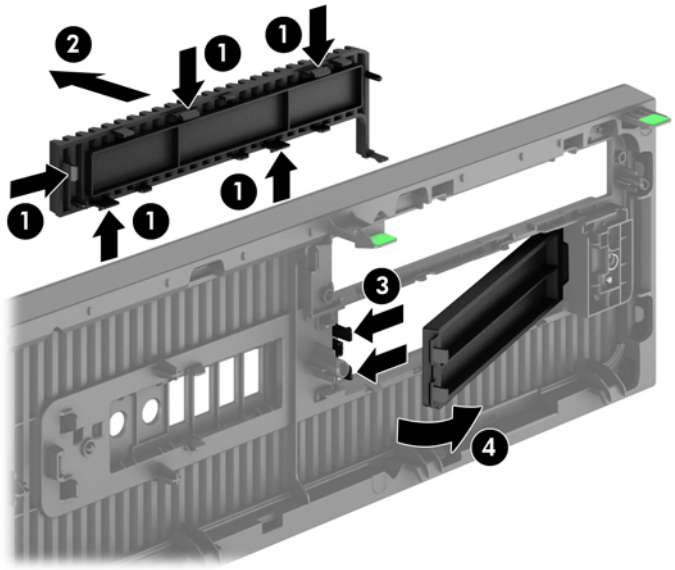


Removing bezel blanks

On some models, there are bezel blanks covering the 3.5-inch and slim optical 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 slim optical drive bezel blank, press inward on the five retaining tabs (1) and pull the blank off the front bezel (2).

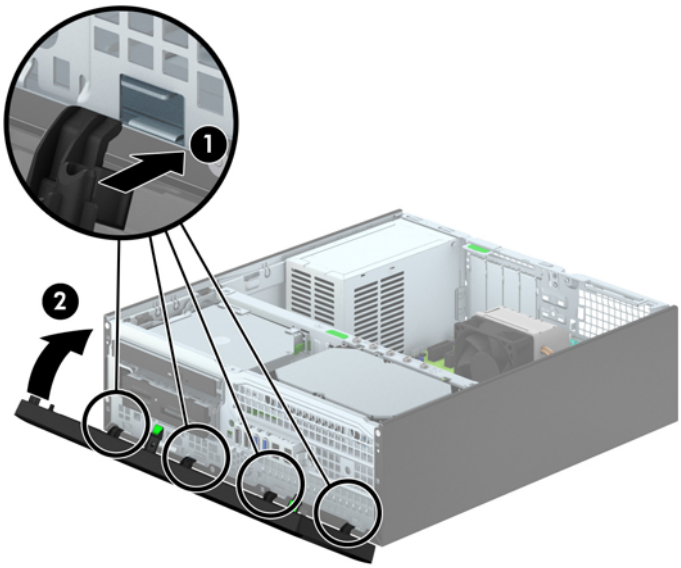
   To remove a 3.5-inch bezel blank, press the two retaining tabs that hold the bezel blank in place towards the outer right edge of the bezel (3) and slide the bezel blank back and to the right to remove it (4).



NOTE: After removing the slim optical drive bezel blank and installing a slim optical drive, you can install an optional bezel trim piece (available from HP) that surrounds the front of the slim optical drive.

Replacing the front bezel

Insert the four 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.



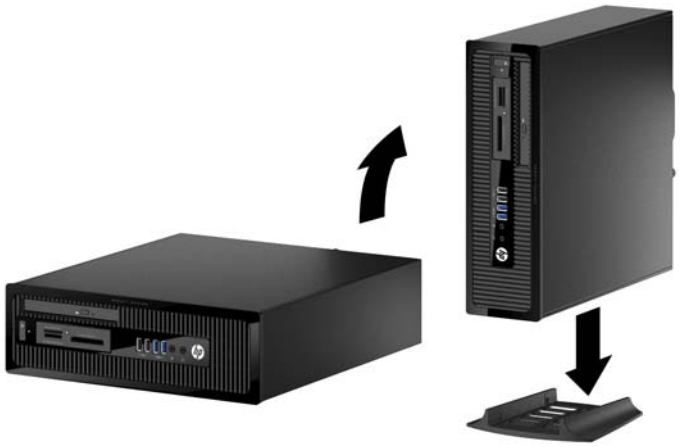
Changing from desktop to tower configuration

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

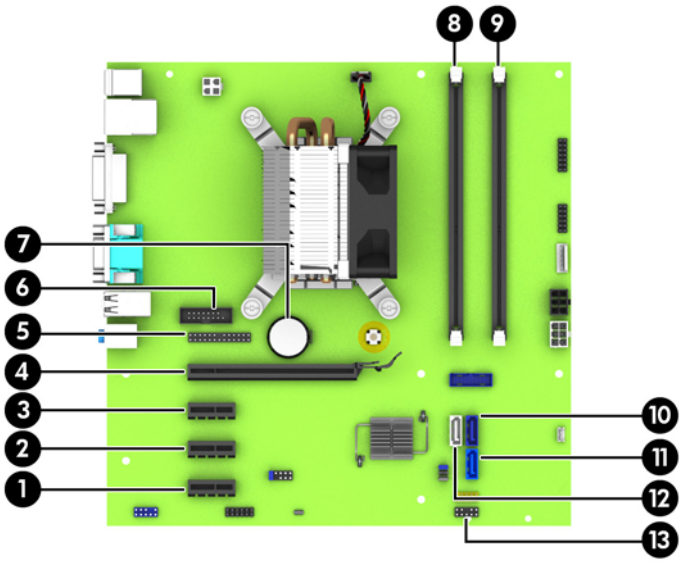
6. Reconnect the power cord and any external devices, then turn on the computer.

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

7. Lock any security devices that were disengaged when the access panel was removed.

System board connections

Refer to the following illustration and table to identify the system board connectors for your model.



No.	System Board Connector	System Board Label	Color	Component
1	PCI Express x1	X1PCIEXP3	black	Expansion Card
2	PCI Express x1	X1PCIEXP2	black	Expansion Card
3	PCI Express x1	X1PCIEXP1	black	Expansion Card
4	PCI Express x16	X16PCIEXP	black	Expansion Card
5	Parallel Port	PAR	black	Optional Parallel Port
6	Serial Port	COMB	black	Optional Second Serial Port
7	Battery	BAT	black	Memory Module
8	DIMM3 (Channel A)	DIMM3	black	Memory Module
9	DIMM1 (Channel B)	DIMM1	black	Memory Module
10	SATA 3.0	SATA0	dark blue	Primary Hard Drive
11	SATA 3.0	SATA1	light blue	Secondary Hard Drive
12	SATA 2.0	SATA5	white	Optical Drive
13	USB 2.0	MEDIA	black	USB 2.0 Device, such as a Media Card Reader

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 two 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 configured in a high-performing dual channel mode.

DDR3-SDRAM DIMMs

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

- industry-standard 240-pin
- unbuffered non-ECC PC3-12800 DDR3-1600 MHz-compliant
- 1.35 volt or 1.5 volt DDR3/DDR3L-SDRAM DIMMs

The DDR3-SDRAM DIMMs must also:

- support CAS latency 11 DDR3 1600 MHz (11-11-11 timing)
- contain the mandatory JEDEC SPD information

In addition, the computer supports:

- 512-Mbit, 1-Gbit, and 2-Gbit 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 operate properly if you install unsupported DIMMs.

Populating DIMM sockets

There are two DIMM sockets on the system board, with one socket per channel. The sockets are labeled DIMM1 and DIMM3. Socket DIMM1 operates in memory channel B. Socket DIMM3 operates in memory channel A.

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

NOTE: Single channel and unbalanced dual channel memory configurations will result in inferior graphics performance.

- 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 memory capacity of the DIMM in Channel A is equal to the memory capacity of the DIMM in Channel B.

- The system will operate in flex mode if the memory capacity of the DIMM in Channel A is not equal to the memory capacity of the DIMM 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. If one channel will have more memory than the other, the larger amount should be assigned to Channel A.
- 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.

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 51.

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

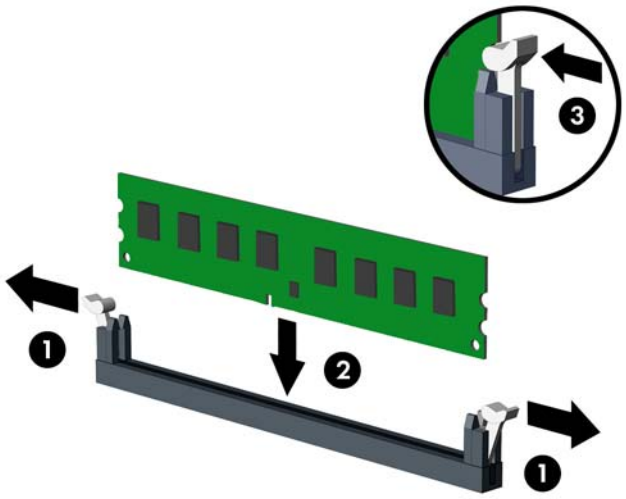
1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as compact discs or USB flash drives, from the computer.
3. Turn off the computer properly through the operating system, then turn off any external devices.
4. Disconnect the power cord from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

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

7. 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.

8. 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).
9. Repeat steps 7 and 8 to install an additional module.
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.

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 three PCI Express x1 expansion slots and one PCI Express x16 expansion slot.

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

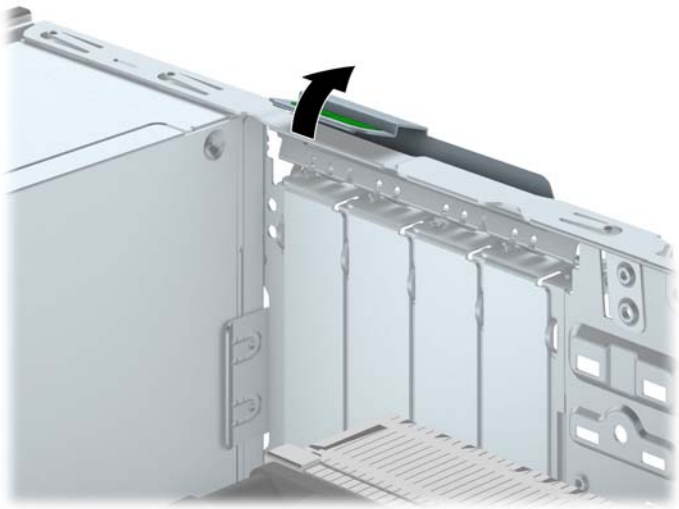
You can install a PCI Express x1, x4, x8, or x16 expansion card in the PCI Express x16 slot.

For dual graphics card configurations, the first (primary) card must 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.

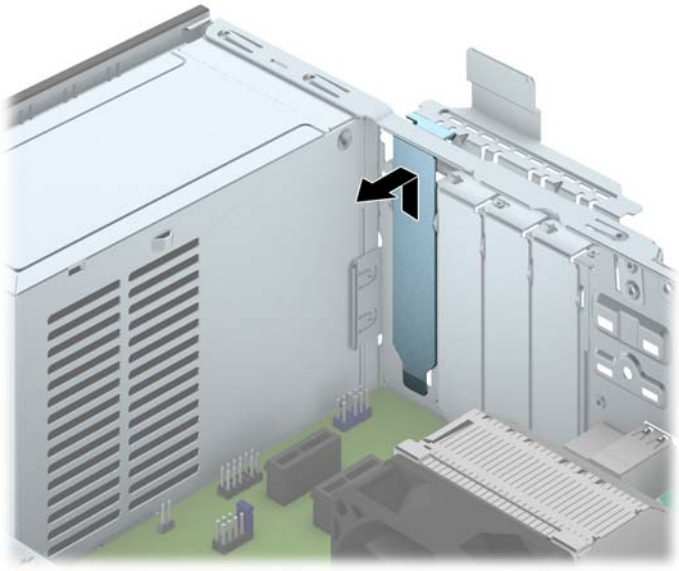
   CAUTION: Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.
5. If the computer is on a stand, remove the computer from the stand.
6. Remove the computer 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 slot covers by lifting the green tab on the latch and rotating the latch to the open position.



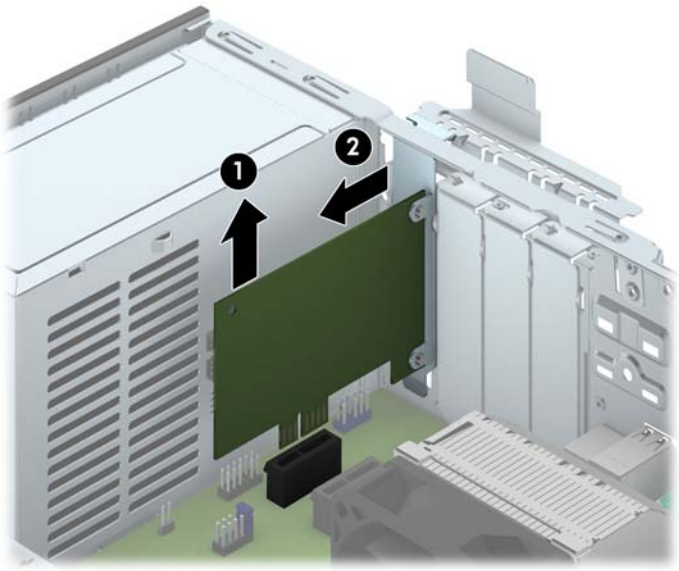
9. Before installing an expansion card, remove the expansion slot cover or the existing expansion card.

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

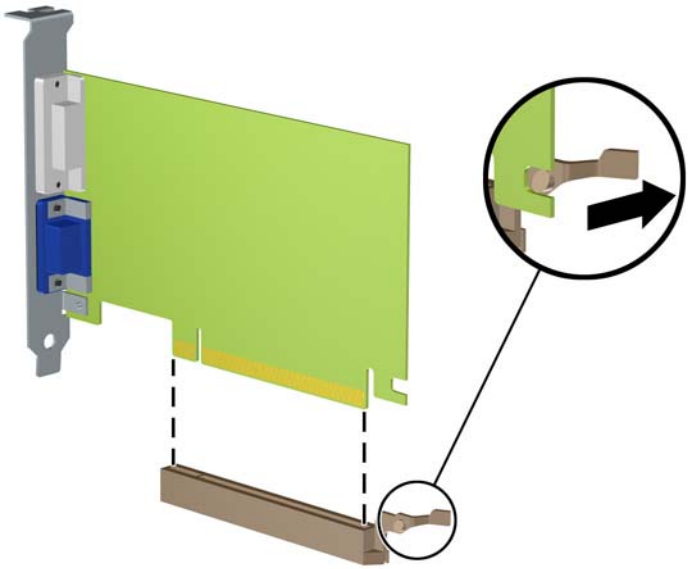
a. If you are installing an expansion card in a vacant socket, remove the appropriate expansion slot cover on the back of the chassis. Pull the slot cover straight up then away from the inside of the chassis.



b. If you are removing a 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.



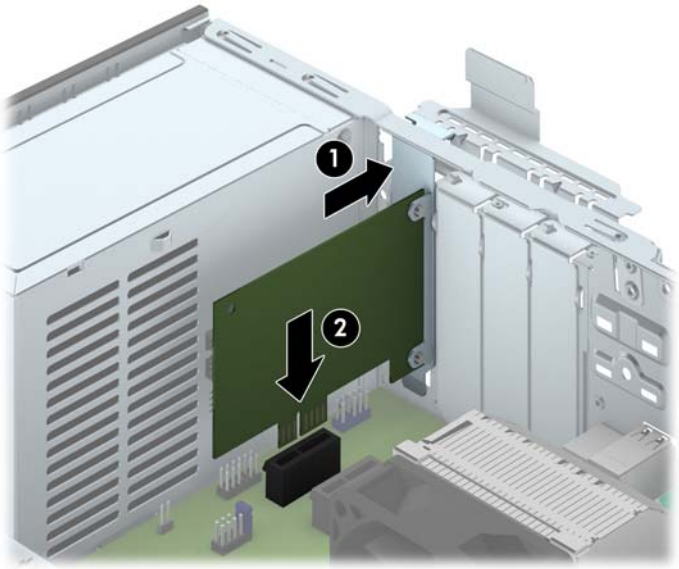
c. If you are removing a PCI Express x16 card, pull the retention arm on the back of the expansion socket away from the card and carefully rock the card back and forth until the connectors pull free from the socket. Pull the expansion card straight up from the socket then away from the inside of the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



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.

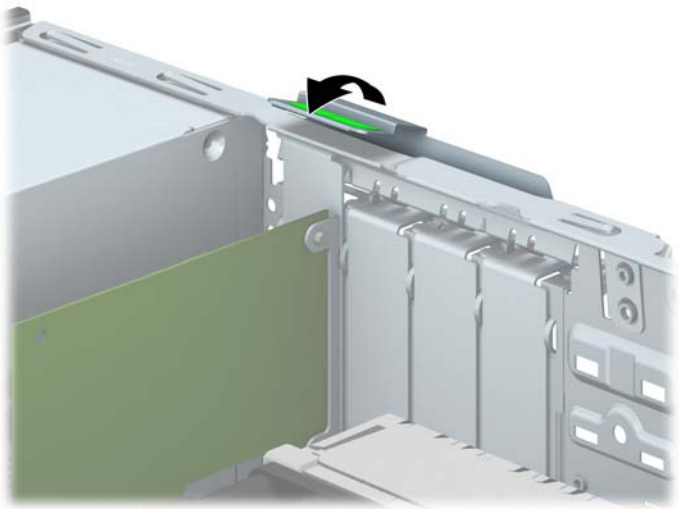
⚠ **CAUTION:** After removing an expansion card, you must replace it with a new card or expansion slot cover for proper cooling of internal components during operation.

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

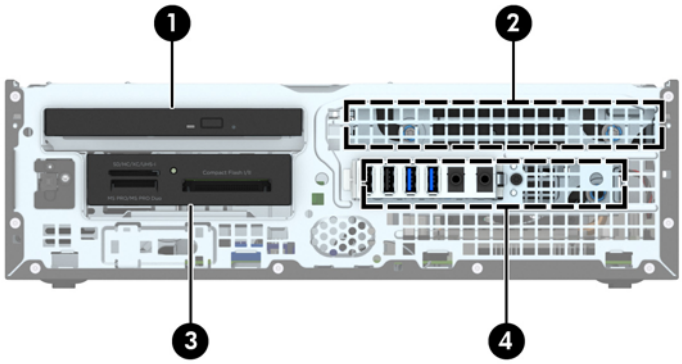
13. Rotate the slot cover retention latch back in place to secure the expansion card.



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



1	Slim optical drive bay
2	3.5-inch internal hard drive bay
3	3.5-inch drive bay for optional drives (media card reader shown)
4	2.5-inch internal hard drive bay

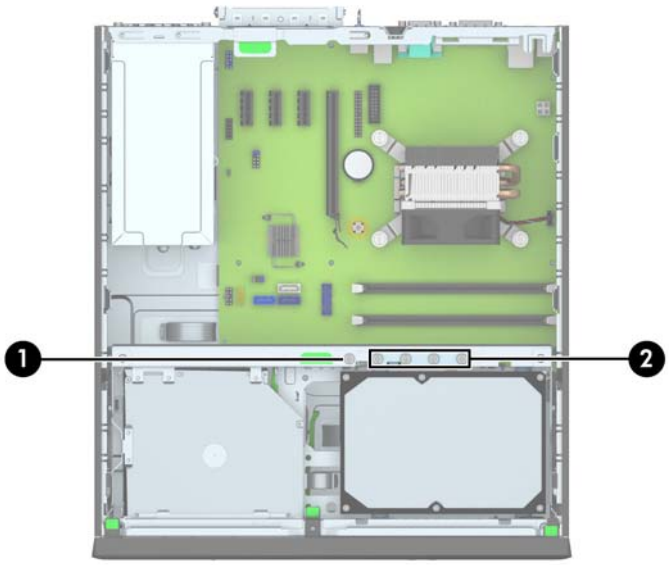
NOTE: The drive configuration on your computer may be different than the drive configuration shown above.

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

Installing and removing drives

When installing 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 labeled SATA0.
- Connect a secondary hard drive to the light blue SATA connector on the system board labeled SATA1.
- Connect an optical drive to the white SATA connector on the system board labeled SATA5.
- Connect a media card reader USB 3.0 cable with a USB 3.0 to USB 2.0 adapter to the USB 2.0 connector on the system board labeled MEDIA.
- The power cable for the drives has two branches coming off the system board connector. The first branch is a dual-headed cable with the first connector (four-wire) routed to the 3.5-inch optional drive bay and the second connector (two-wire) routed to the slim optical drive bay. The second branch is a dual-headed cable with the first connector routed to the 3.5-inch hard drive bay and the second connector routed to the 2.5-inch hard drive 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 four extra 6-32 standard guide screws installed on the top of the drive bay. The 6-32 standard guide screws are required for a media card reader or a secondary hard drive installed in the 3.5-inch optional drive bay. M3 isolation mounting guide screws for 2.5-inch hard drives are not provided. If you are replacing a drive, remove the guide screws from the old drive and install them in the new drive.



There are a total of five extra silver 6-32 standard screws. One is used for bezel security (1) (see Front bezel security on page 46 for more information). The other four are used as guide screws for a media card reader or a secondary hard drive in the 3.5-inch optional drive bay (2).

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 51.

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.”

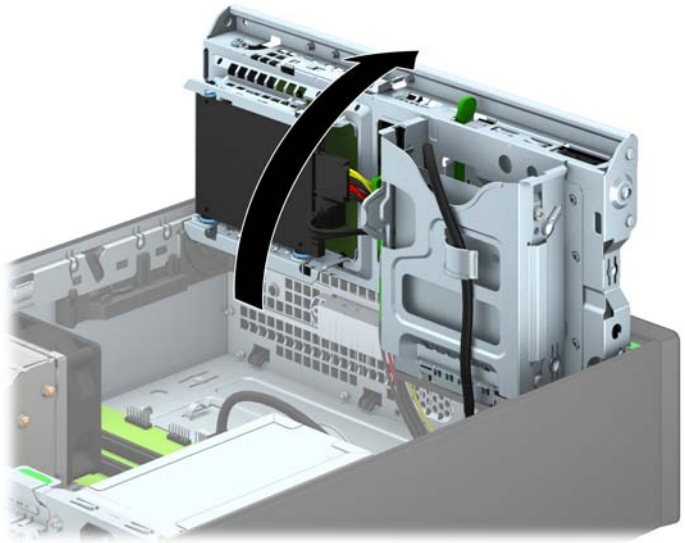
Removing a 3.5-inch device

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

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.

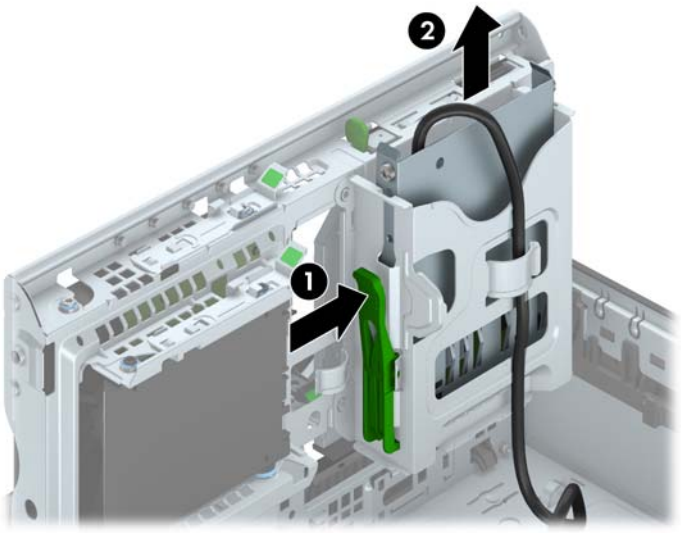
   CAUTION: Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

5. If the computer is on a stand, remove the computer from the stand.
6. Remove the access panel and front bezel.
7. Rotate the drive cage to its upright position.



8. Disconnect the drive cables from the rear of the drive, or, if you are removing a media card reader, disconnect the USB cable from the system board as indicated in the following illustration.

9. Press inward on the release lever at the rear of the device (1) and slide the device out of the rear of the drive bay (2).



Installing a 3.5-inch device

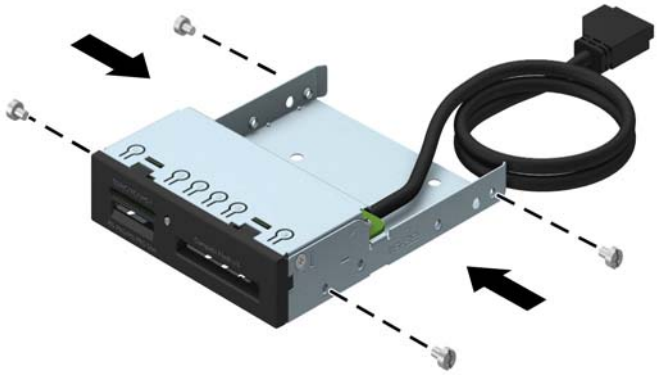
1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as compact discs or USB flash drives, from the computer.
3. Turn off the computer properly through the operating system, then turn off any external devices.
4. Disconnect the power cord from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

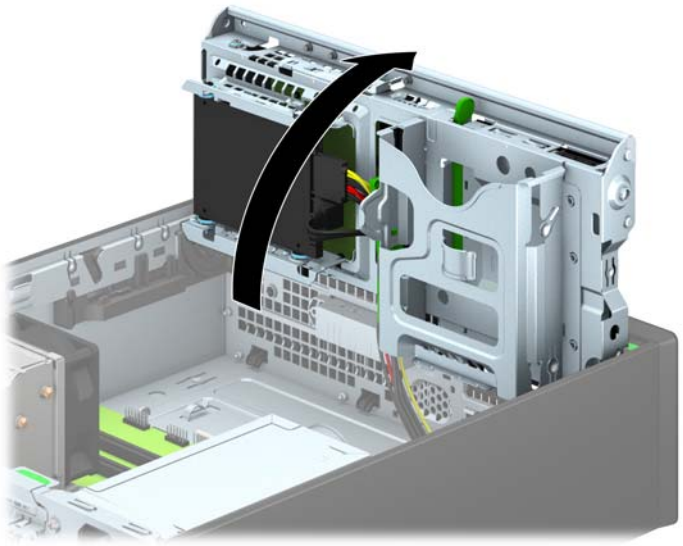
5. If the computer is on a stand, remove the computer from the stand.
6. Remove the computer access panel.
7. Remove the front bezel. If you are installing a device in a bay covered by a bezel blank, remove the bezel blank. See Removing bezel blanks on page 10 for more information.
8. Install 6-32 guide screws in the holes on each side of the device.

NOTE: HP has supplied four extra 6-32 guide screws on top of the drive cage. Refer to Installing and removing drives on page 22 for an illustration of the extra guide screws location.

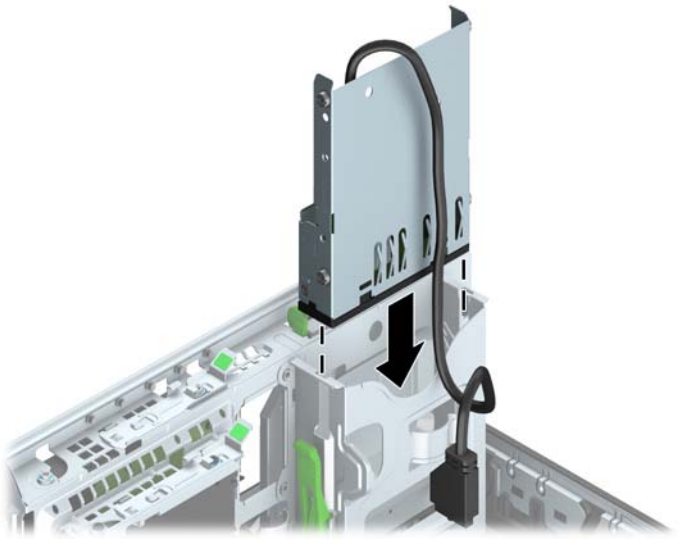
When replacing a device, transfer the four 6-32 guide screws from the old device to the new one.



9. Rotate the drive cage to its upright position.



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

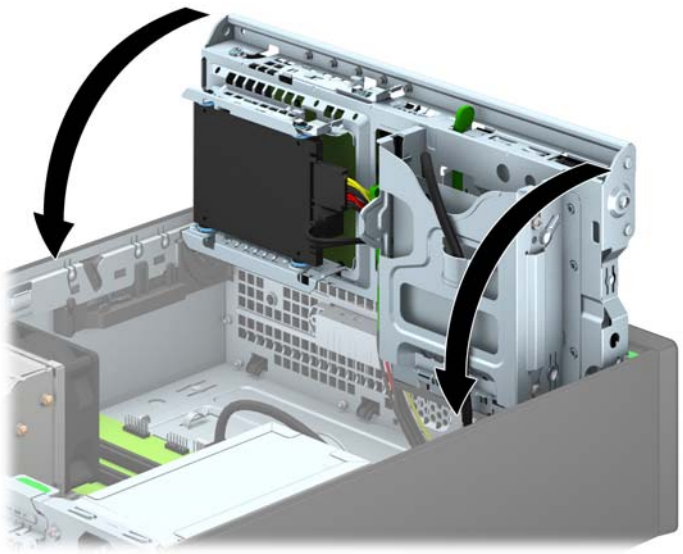


11. If installing a USB 3.0 media card reader, you must use the USB 3.0 to USB 2.0 adapter and connect the adapter cable from the media card reader to the USB 2.0 connector on the system board labeled MEDIA.

NOTE: Refer to System board connections on page 13 for an illustration of the system board drive connectors.

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

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



13. Replace the front bezel.
14. Replace the computer access panel.
15. If the computer was on a stand, replace the stand.

16. Reconnect the power cord and any external devices, then turn on the computer.
17. Lock any security devices that were disengaged when the access panel was removed.

Removing a slim optical drive

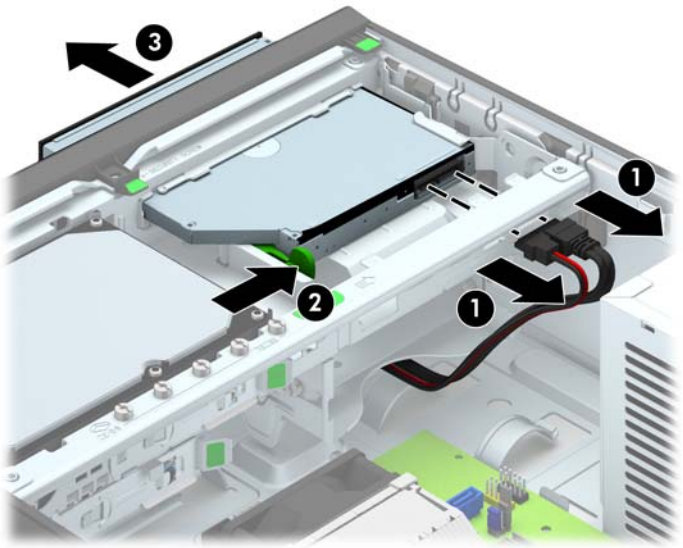
⚠ **CAUTION:** All removable media should be taken out of a drive before removing the drive from the computer.

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 computer access panel.
7. Disconnect the power and data cables (1) from the rear of the optical drive, push the green release latch on the right rear side of the drive toward the center of the drive (2), then slide the drive forward and out of the bay through the front bezel (3).

⚠ **CAUTION:** When removing the cables, pull the tab or connector instead of the cable itself to avoid damaging the cable.

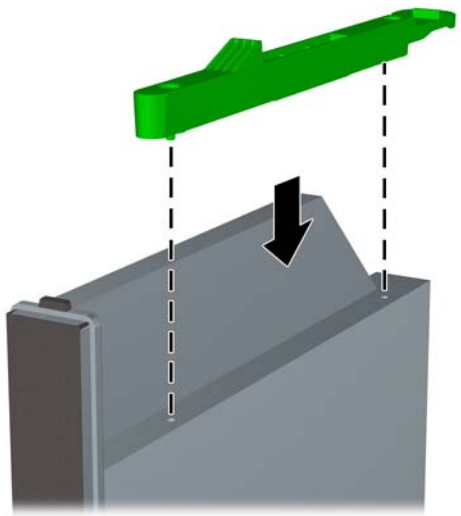


Installing a slim optical drive

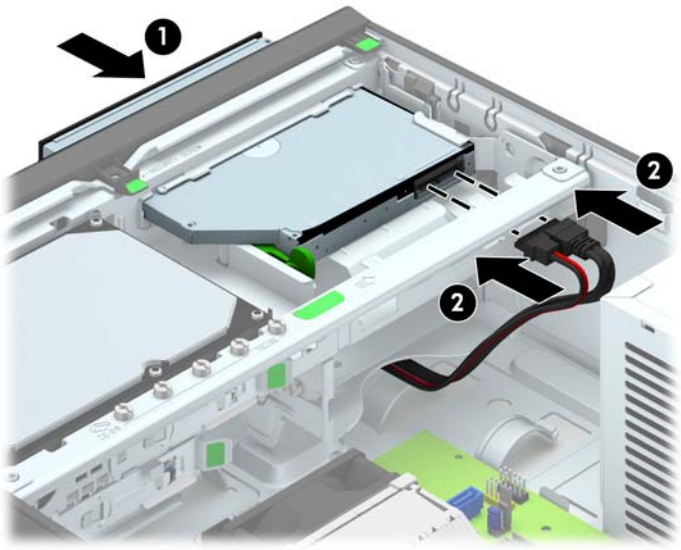
1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as compact discs or USB flash drives, from the computer.
3. Turn off the computer properly through the operating system, then turn off any external devices.
4. Disconnect the power cord from 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 computer access panel.
7. Remove the front bezel if you are installing a drive in a bay covered by a bezel blank, then remove the bezel blank. See Removing bezel blanks on page 10 for more information.
8. Before the new optical drive can be used, the release latch must be attached.
   a. Peel the backing off the adhesive on the release latch.
   b. Without allowing the release latch to touch the optical drive, carefully align the holes on the release latch with the pins on the side of the optical drive. Make sure the release latch is oriented properly.
   c. Insert the pin at the front of the optical drive into the hole at the end of the release latch, and press firmly.
   d. Insert the second pin, and press the entire release latch firmly to fasten the latch securely to the optical drive.



9. Slide the optical drive through the front bezel all the way into the bay so that it locks in place (1), then connect the power and data cables to the rear of the drive (2).



10. Connect the opposite end of the data cable to the white SATA connector on the system board labeled SATA5.

NOTE: Refer to System board connections on page 13 for an illustration of the system board drive connectors.

11. Replace the front bezel if it was removed.

NOTE: An optional bezel trim piece that surrounds the front of the optical drive is available from HP. Install the bezel trim piece in the front bezel before installing the front bezel.

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

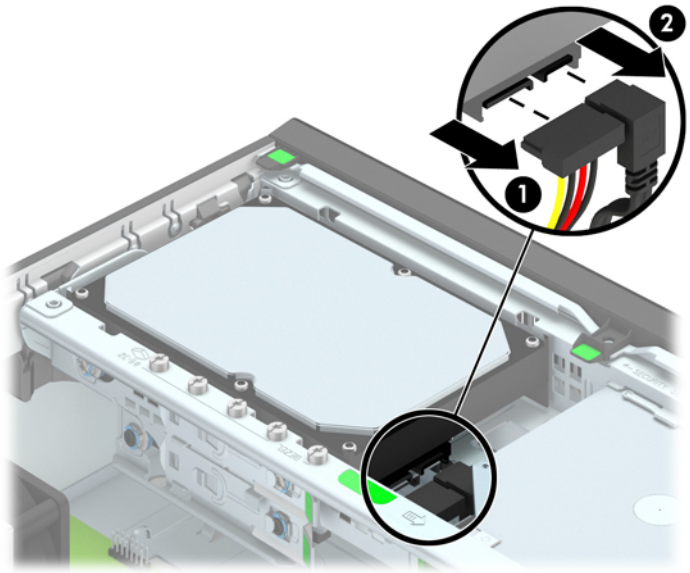
Removing and replacing a 3.5-inch hard drive

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.

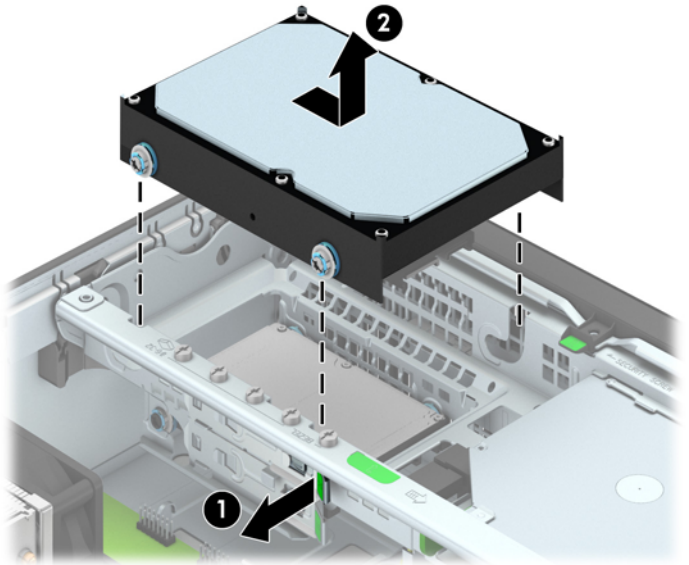
1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as compact discs or USB flash drives, from the computer.
3. Turn off the computer properly through the operating system, then turn off any external devices.
4. Disconnect the power cord from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

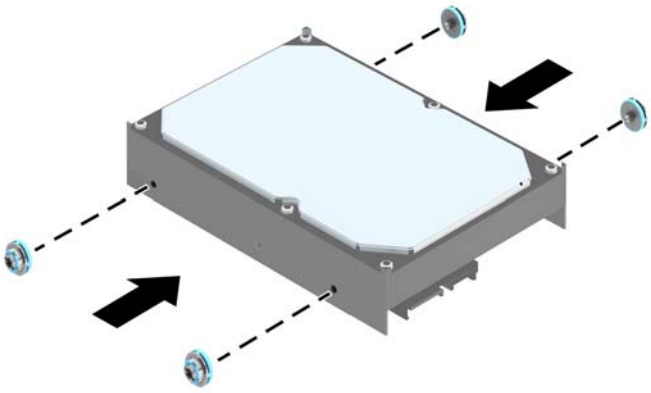
5. If the computer is on a stand, remove the computer from the stand.
6. Remove the computer access panel.
7. Disconnect the power cable (1) and data cable (2) from the back of the hard drive.



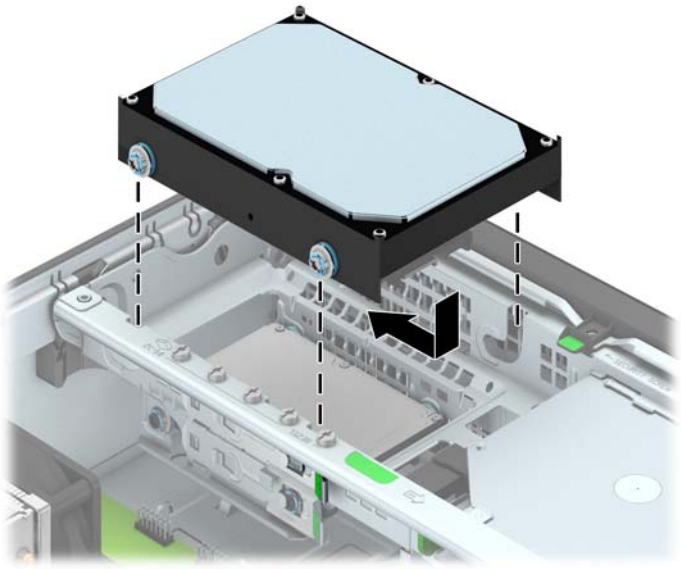
8. Pull the release lever next to the rear of the hard drive outward (1). While pulling the release lever out, slide the drive back until it stops, then lift the drive up and out of the bay (2).



9. 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.

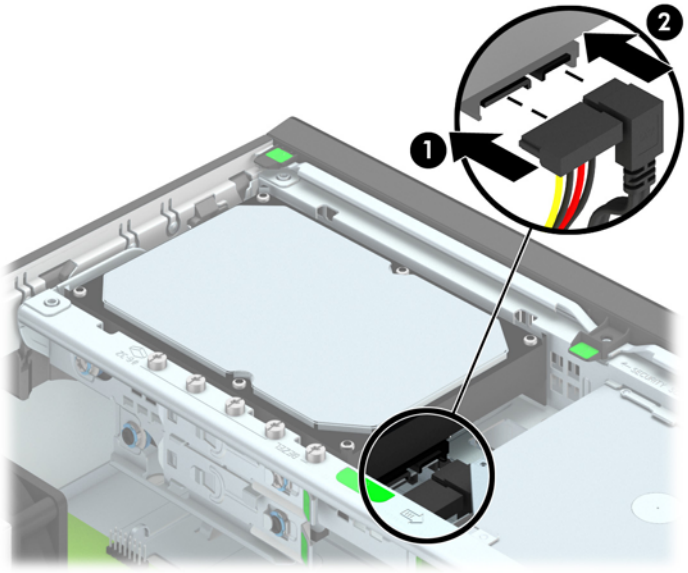


10. Align the guide screws with the slots on the chassis drive cage, press the hard drive down into the bay, then slide it forward until it stops and locks in place.



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

NOTE: The data cable for the primary hard drive must be connected to the dark blue SATA connector labeled SATA0 on the system board to avoid any hard drive performance problems.



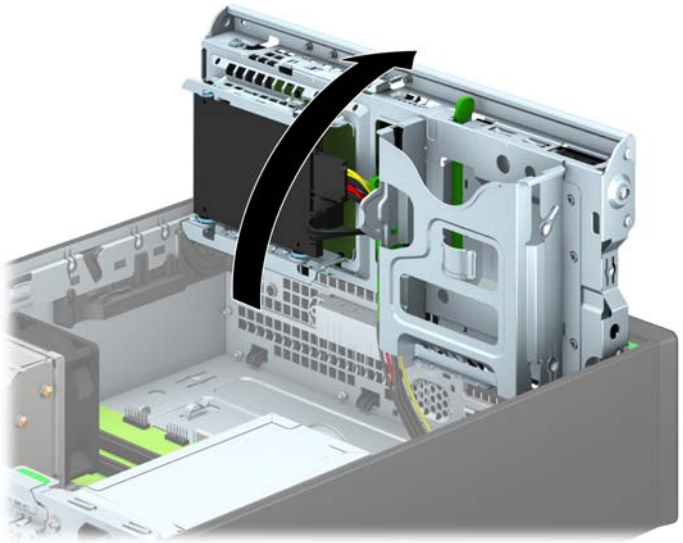
12. Replace the access panel.
13. If the computer was on a stand, replace the stand.
14. Reconnect the power cord and turn on the computer.
15. Lock any security devices that were disengaged when the access panel was removed.

Removing a 2.5-inch hard drive

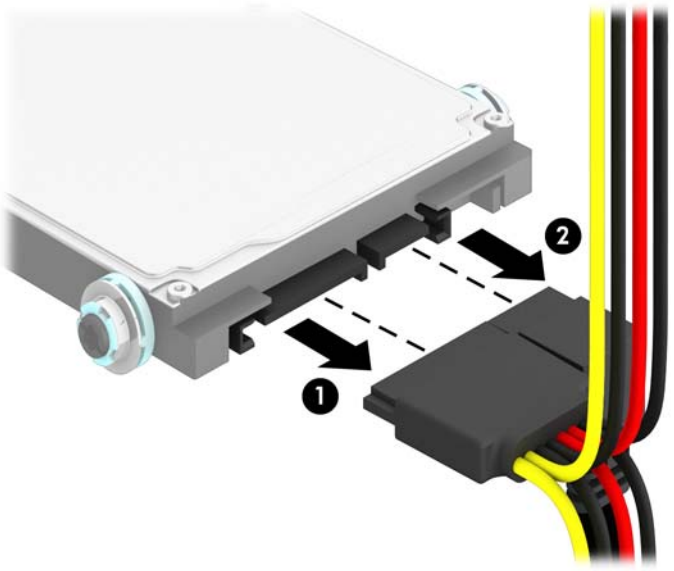
1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as compact discs or USB flash drives, from the computer.
3. Turn off the computer properly through the operating system, then turn off any external devices.
4. Disconnect the power cord from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

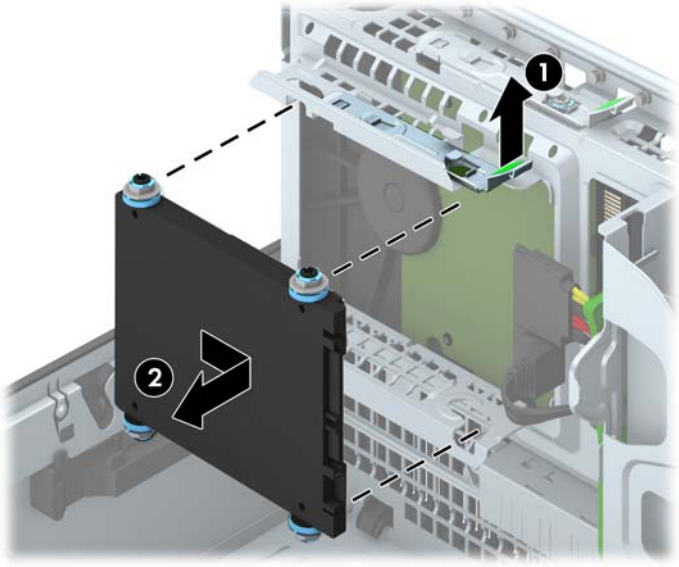
5. If the computer is on a stand, remove the computer from the stand.
6. Remove the computer access panel.
7. Rotate the drive cage to its upright position.



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



9. Pull outward on the release lever at the rear of the drive (1) then slide the drive back until it stops and pull it down and out of the drive bay (2).



Installing a 2.5-inch hard drive

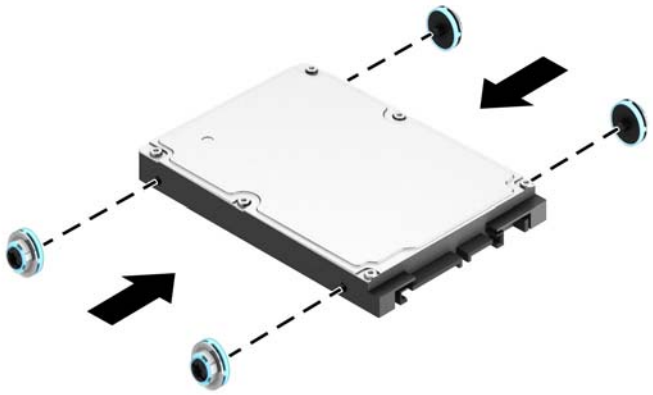
1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as compact discs or USB flash drives, from the computer.
3. Turn off the computer properly through the operating system, then turn off any external devices.
4. Disconnect the power cord from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

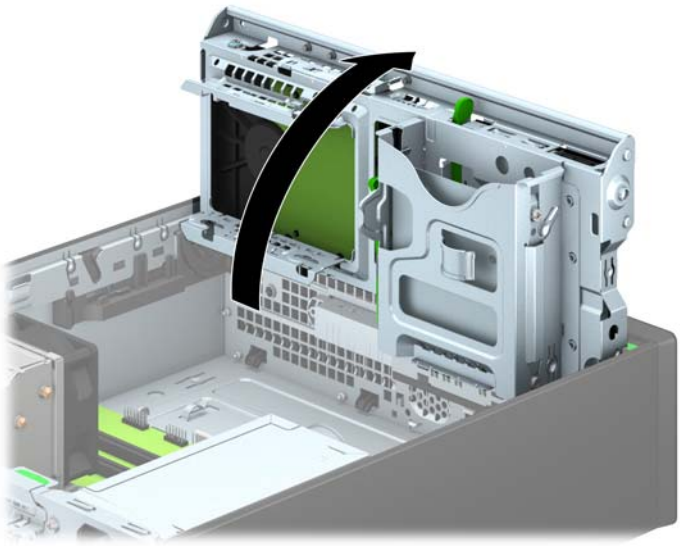
5. If the computer is on a stand, remove the computer from the stand.
6. Remove the computer access panel.
7. Install four black and blue M3 isolation mounting guide screws (two on each side of the drive).

NOTE: M3 metric isolation mounting guide screws can be purchased from HP.

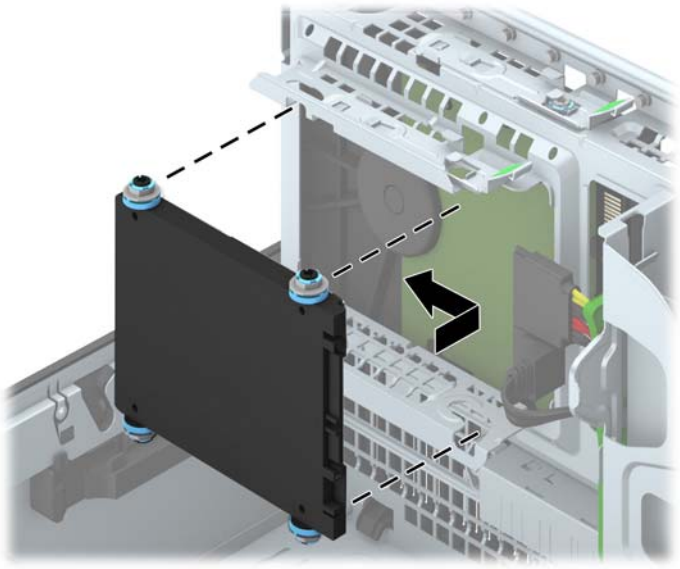
When replacing a drive, transfer the four M3 isolation mounting guide screws from the old drive to the new one.



8. Rotate the drive cage to its upright position.

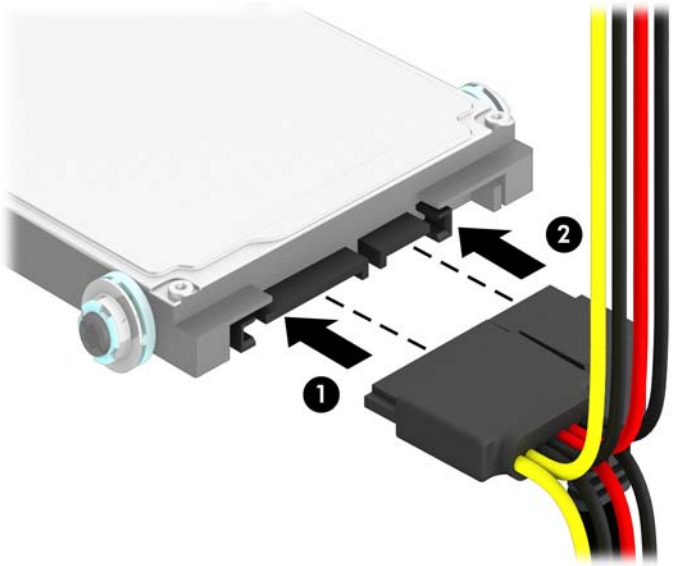


9. Align the guide screws on the drive with the J-slots on the sides of the drive bay. Press the drive up into the drive bay then slide it forward until it locks in place.



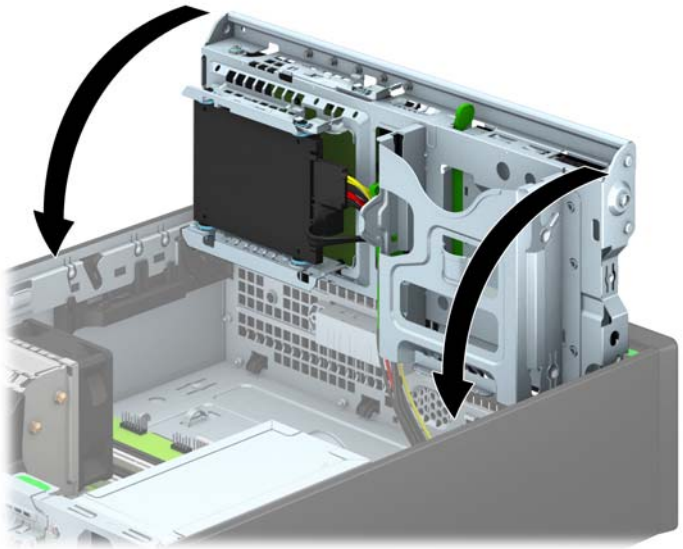
10. Connect the power cable (1) and data cable (2) to the back of the hard drive.

NOTE: If the 2.5-inch hard drive is the primary drive, connect the data cable to the dark blue SATA connector labeled SATA0 on the system board. If it is a secondary drive, connect the data cable to the light blue SATA connector on the system board labeled SATA1.



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

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

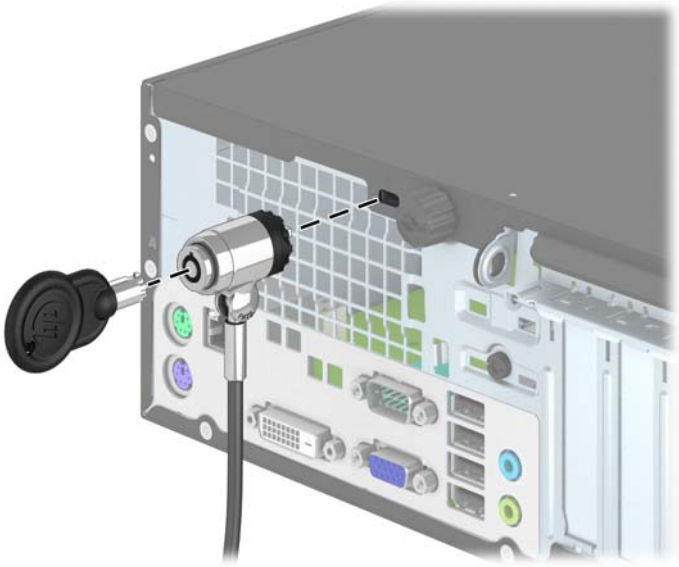


12. Replace the computer access panel.
13. If the computer was on a stand, replace the stand.
14. Reconnect the power cord and any external devices, then turn on the computer.
15. Lock any security devices that were disengaged when the access panel was removed.

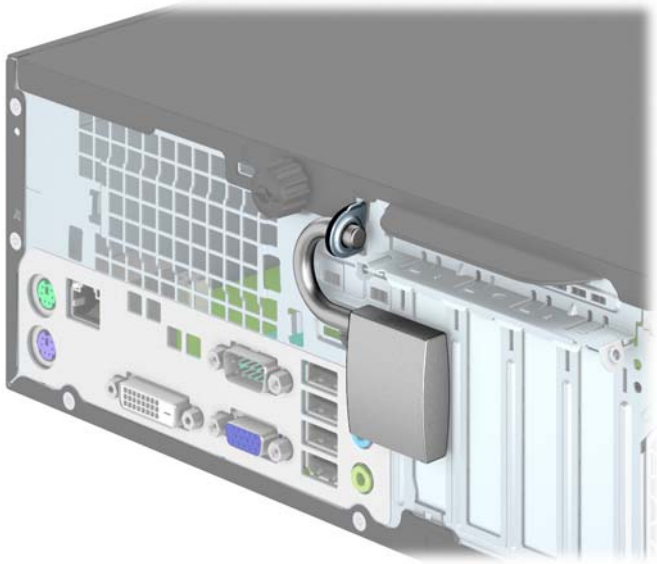
Installing a security lock

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

Cable lock



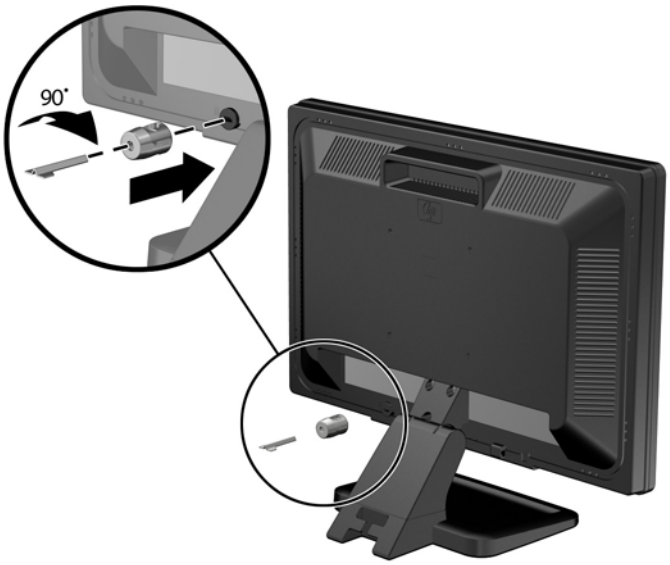
Padlock



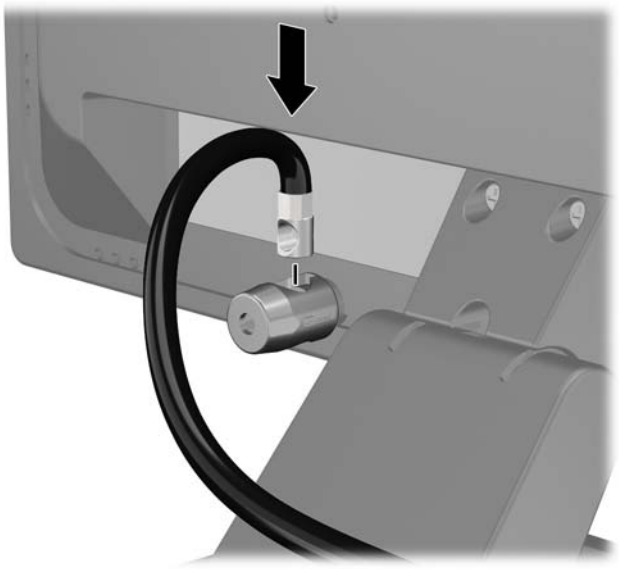
HP business PC security lock

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

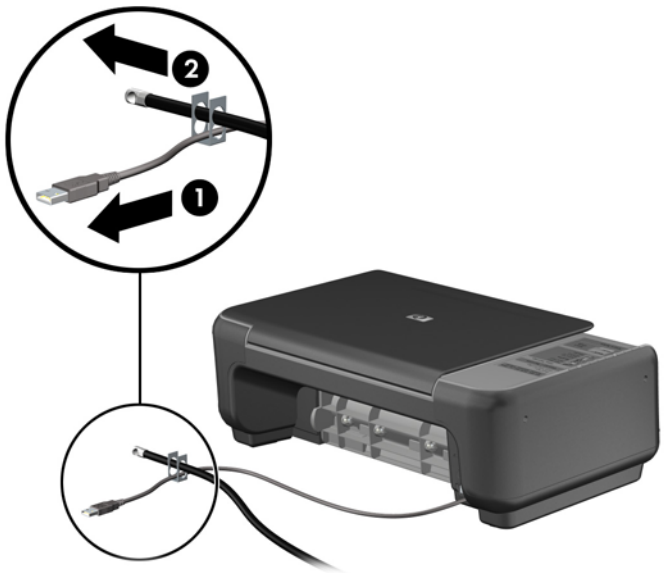
2. Insert the cable lock into the cable lock slot on the back of the monitor and secure the lock to the monitor by inserting the key into the key hole on the rear of the lock and rotating the key 90 degrees.



3. Slide the security cable through the hole in the cable lock on the rear of the monitor.

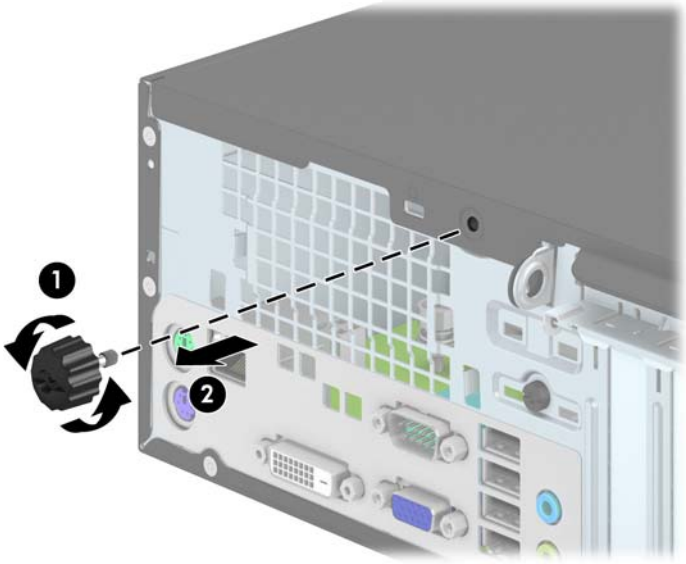


4. Use the bracket provided in the kit to secure other peripheral devices by laying the device cable across the center of the bracket (1) and inserting the security cable through one of the two holes in the bracket (2). Use the hole in the bracket that best secures the peripheral device cable.

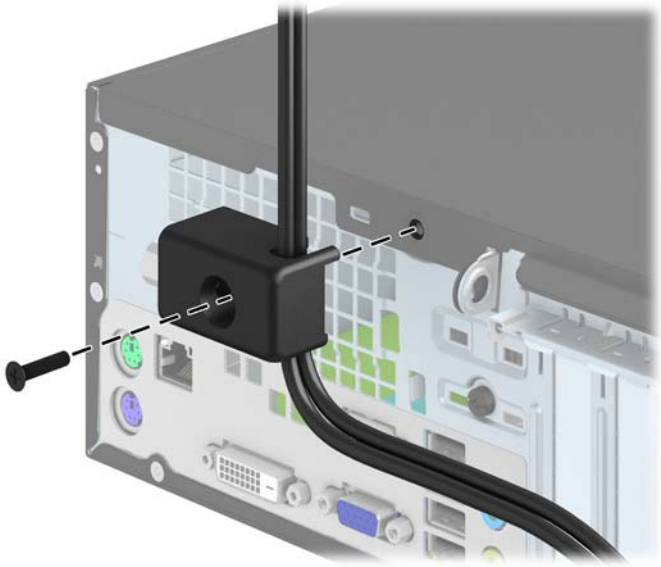


5. Thread the keyboard and mouse cables through the computer chassis lock.

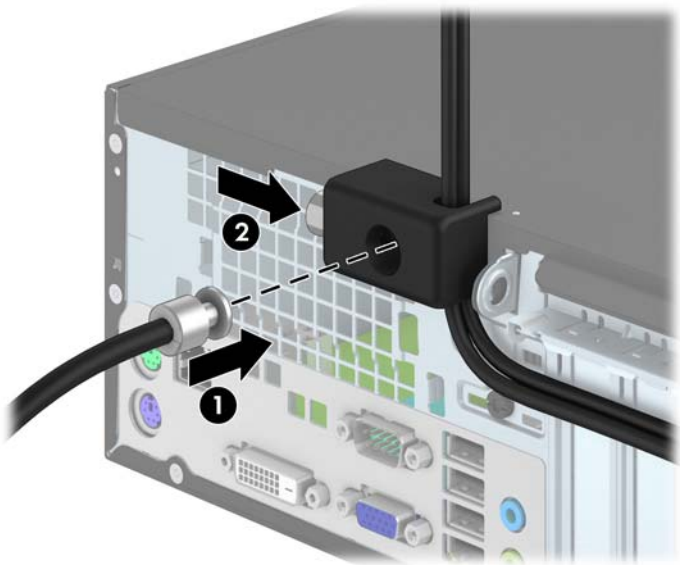
6. Unscrew the thumbscrew that secures the access panel to the chassis (1) all the way out to remove it from the access panel (2).



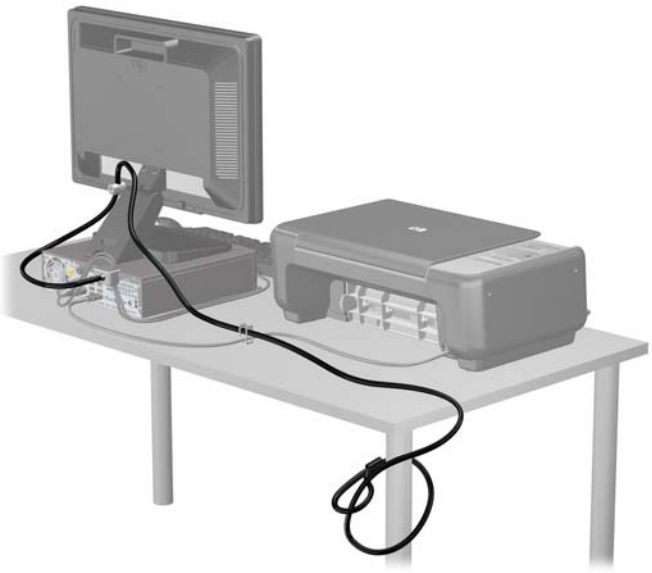
7. Screw the lock to the chassis in the thumbscrew hole using the screw provided.



8. 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.



9. When complete, all devices in your workstation will be secured.



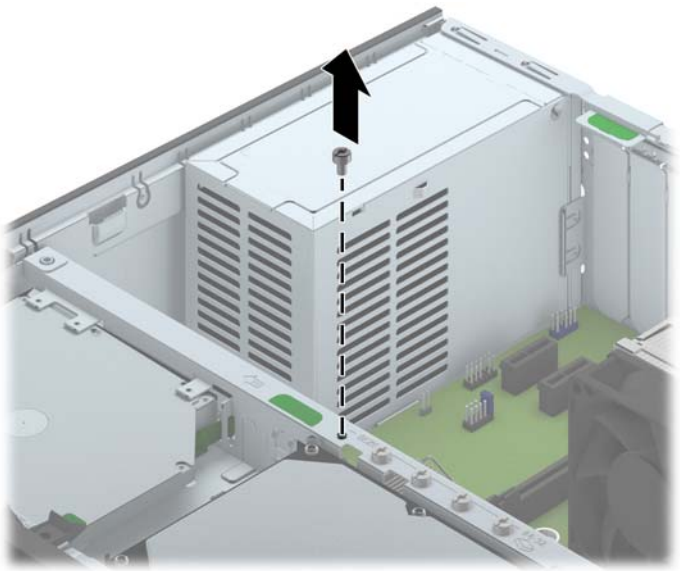
Front bezel security

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

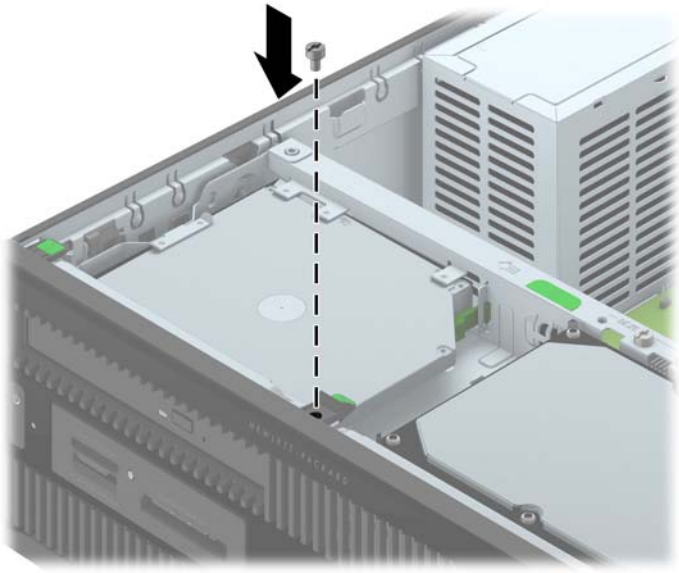
1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as compact discs or USB flash drives, from the computer.
3. Turn off the computer properly through the operating system, then turn off any external devices.
4. Disconnect the power cord from 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 computer access panel.
7. Remove one of the five silver 6-32 standard screws located on top of the drive cage.



8. Install the security screw through the middle front bezel release tab to secure the front bezel in place.



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

A 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.

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.

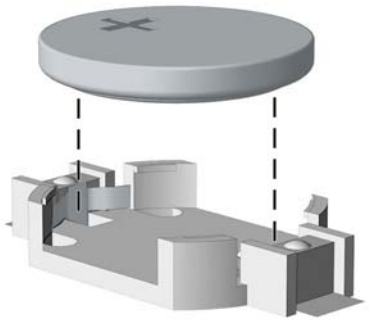
5. Remove the computer access panel.
6. Locate the battery and battery holder on the system board.

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

7. 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.

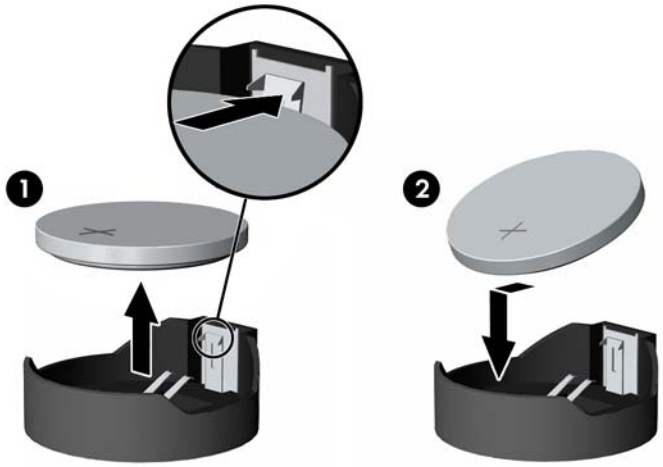


b. Slide the replacement battery into position, positive side up. The battery holder automatically secures the battery in the proper position.

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).

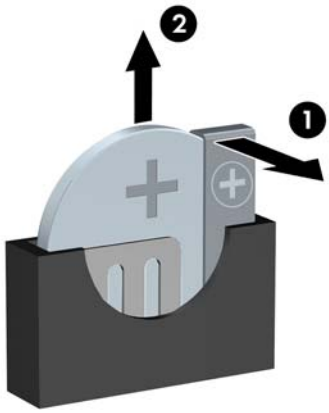
b. To insert the new battery, slide one edge of the replacement battery under the holder's lip with the positive side up. Push the other edge down until the clamp snaps over the other edge of the battery (2).



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.



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

8. Replace the computer access panel.
9. Plug in the computer and turn on power to the computer.
10. Reset the date and time, your passwords, and any special system setups using Computer Setup.
11. Lock any security devices that were disengaged when the computer access panel was removed.

B 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.

C 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 to an external storage device. 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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