



Hardware Reference Guide

HP EliteDesk 705 G3 SFF Business PC

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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.

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About This Book

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






-  **WARNING!** Indicates a hazardous situation that, if not avoided, **could** result in death or serious injury.
 -  **CAUTION:** Indicates a hazardous situation that, if not avoided, **could** result in minor or moderate injury.
 -  **IMPORTANT:** Indicates information considered important but not hazard-related (for example, messages related to property damage). A notice alerts the user that failure to follow a procedure exactly as described could result in loss of data or in damage to hardware or software. Also contains essential information to explain a concept or to complete a task.
 -  **NOTE:** Contains additional information to emphasize or supplement important points of the main text.
 -  **TIP:** Provides helpful hints for completing a task.
-

Table of contents

1 Product features	1
Standard configuration features	1
Front panel components	2
Rear panel components	3
Serial number location	4
2 Hardware upgrades	5
Serviceability features	5
Warnings and cautions	5
Removing the computer access panel	6
Replacing the computer access panel	7
Removing the front bezel	8
Removing a slim optical drive bezel blank	9
Replacing the front bezel	10
Cleaning the optional dust filter	10
Changing from desktop to tower configuration	13
System board connections	14
Installing additional memory	15
DIMMs	15
DDR4-SDRAM DIMMs	15
Populating DIMM sockets	15
Installing DIMMs	16
Removing or installing an expansion card	18
Drive positions	22
Removing and installing drives	23
Removing a 9.5 mm slim optical drive	24
Installing a 9.5 mm slim optical drive	25
Removing and replacing a primary 3.5-inch hard drive	27
Removing a secondary 3.5-inch hard drive	30
Installing a secondary 3.5-inch hard drive	32
Removing a 2.5-inch hard drive	35
Installing a 2.5-inch hard drive	37
Installing a security lock	40
Cable lock	40
Padlock	40
HP Business PC Security Lock V2	41

Front bezel security	46
Appendix A Battery replacement	47
Appendix B Electrostatic discharge	50
Preventing electrostatic damage	50
Grounding methods	50
Appendix C Computer operating guidelines, routine care and shipping preparation	51
Computer operating guidelines and routine care	51
Optical drive precautions	52
Operation	52
Cleaning	52
Safety	52
Shipping preparation	52
Appendix D Accessibility	53
Supported assistive technologies	53
Contacting support	53
Index	54

1 Product features

Standard configuration features

Features may vary depending on the model. For support assistance and to learn more about the hardware and software installed on your computer model, run the HP Support Assistant utility.

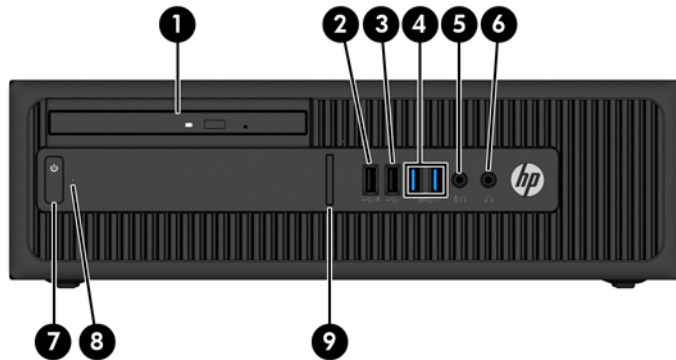


NOTE: This computer model can be used in a tower orientation or a desktop orientation.



Front panel components

Drive configuration may vary by model. Some models have a bezel blank covering the slim optical drive bay.



Front panel components

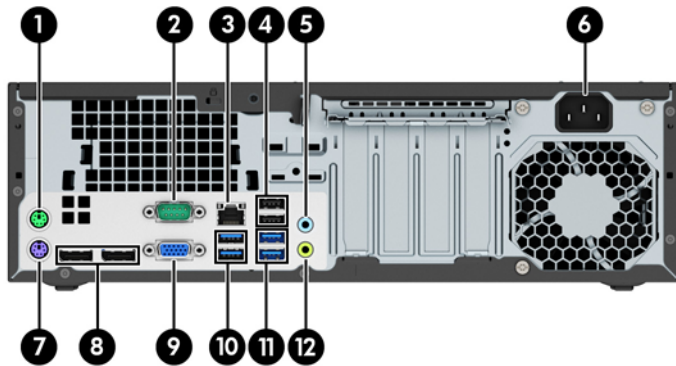
1	Slim optical drive (optional)	6	Audio-out (headphone) jack
2	USB 2.0 charging (powered) port (black)	7	Power button
3	USB 2.0 port (black)	8	Hard drive activity light
4	USB 3.0 ports (blue)	9	SD card reader (optional)
5	Audio-out (headphone)/Audio-in (microphone) combo jack		

NOTE: When a device is plugged into the Audio-out (headphone)/Audio-in (microphone) combo jack, a dialog box will pop up asking if you want to use the jack for a microphone or a headphone. You can reconfigure the jack at any time by double-clicking the Audio Manager icon in the Windows® taskbar.












NOTE: The USB 2.0 charging port also provides current to charge a device such as a smart phone. The charging current is available whenever the power cord is plugged into the system, even when the system is off.

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



Rear panel components

1		PS/2 mouse connector (green)	7		PS/2 keyboard connector (purple)
2		Serial port	8		DisplayPort monitor connectors
3		RJ-45 (network) jack	9		VGA monitor connector
4		USB 2.0 ports (black) with keyboard wakeup function	10		USB 3.1 ports (blue)
5		Audio-in jack (blue)	11		USB 3.1 ports (blue)
6		Power cord connector	12		Audio-out jack for powered audio devices (green)

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

If using a USB keyboard, HP recommends connecting the keyboard to one of the USB 2.0 ports with the wakeup feature. The wakeup feature is also supported on the PS/2 connector if enabled in BIOS F10 Setup.

When a device is plugged into the microphone/headphone jack, a dialog box will pop up asking if you want to use the jack for a microphone or a headphone. You can reconfigure the jack at any time by double-clicking the Audio Manager icon in the Windows taskbar.

When a graphics card is installed in one of the system board slots, the video connectors on the graphics card and/or the integrated graphics on the system board may be used. The specific graphics card installed and software configuration will determine the behavior.

The system board graphics can be disabled by changing settings in BIOS F10 Setup.

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. A Torx T15 or flat-bladed screwdriver is needed for some 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 AC 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.


 **IMPORTANT:** 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 50](#) 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.

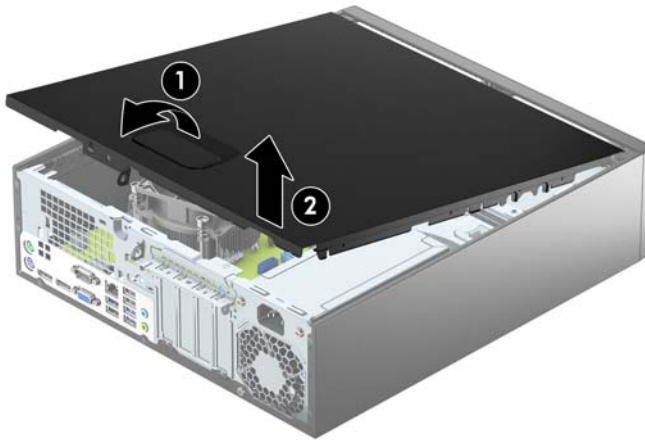
Removing the computer access panel

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, and turn off any external devices.
4. Disconnect the power cord from the AC outlet and disconnect any external devices.

 **IMPORTANT:** 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. Pull up the access panel handle (1), and then lift the panel off the computer (2).




Replacing the computer access panel

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

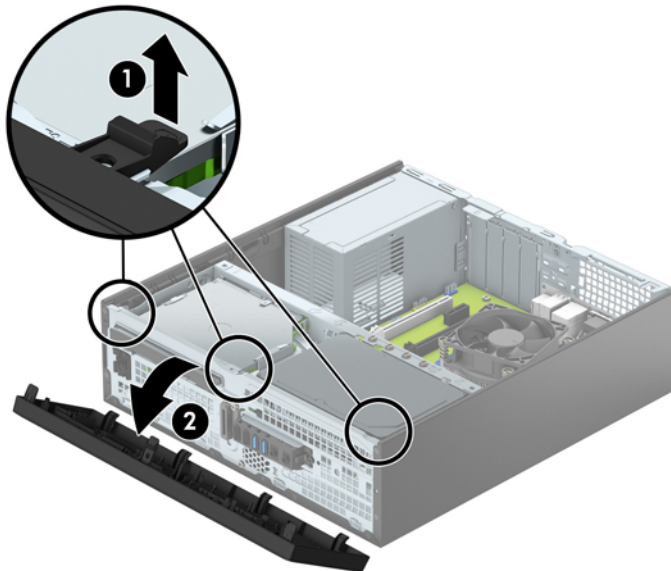


Removing the front bezel

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, and turn off any external devices.
4. Disconnect the power cord from the AC outlet and disconnect any external devices.

 **IMPORTANT:** 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.

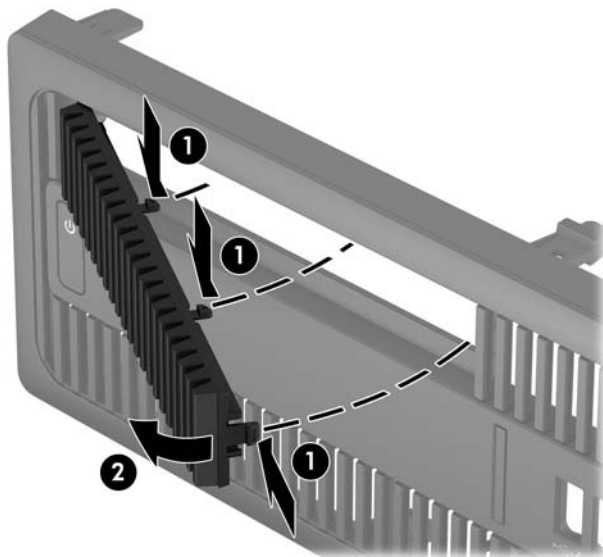
5. If the computer is on a stand, remove the computer from the stand and lay the computer down.
6. Remove the computer access panel.
7. Lift up the three tabs on the side of the bezel (1), and then rotate the bezel off the chassis (2).



Removing a slim optical drive bezel blank

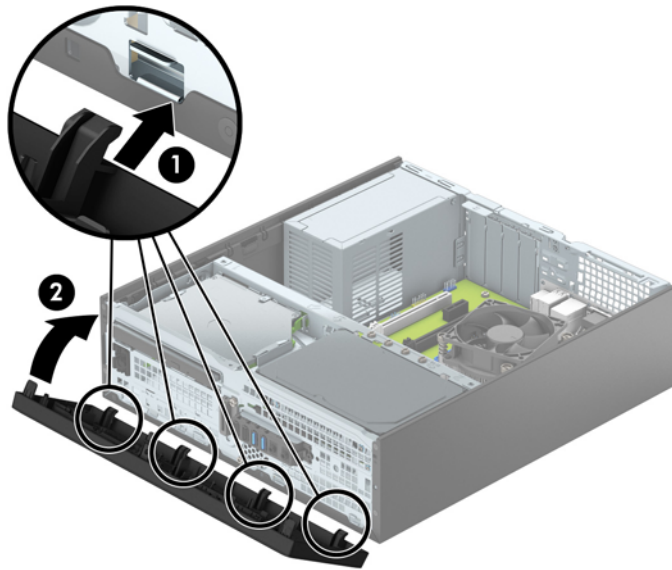
On some models, there is a bezel blank covering the slim optical drive bay. Remove the bezel blank before installing an optical drive. To remove the bezel blank:

1. Remove the computer access panel and front bezel.
2. To remove the bezel blank, press inward on the three retaining tabs that hold the bezel blank in place (1), and then rotate the bezel blank off the front bezel (2).



Replacing the front bezel

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




Cleaning the optional dust filter

Some models are equipped with a front bezel that includes a dust filter. You must periodically clean the dust filter so that the dust collected on the filter does not impede air flow through the computer.

 **NOTE:** The optional dust filter front bezel is available from HP.

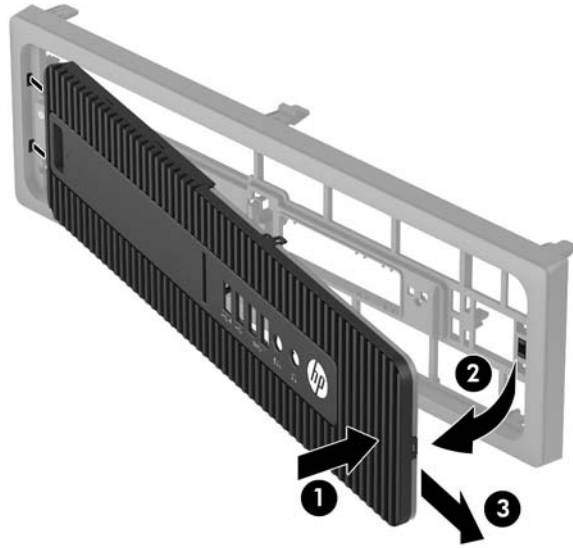
To clean the dust filter:

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, and turn off any external devices.
4. Disconnect the power cord from the AC outlet and disconnect any external devices.

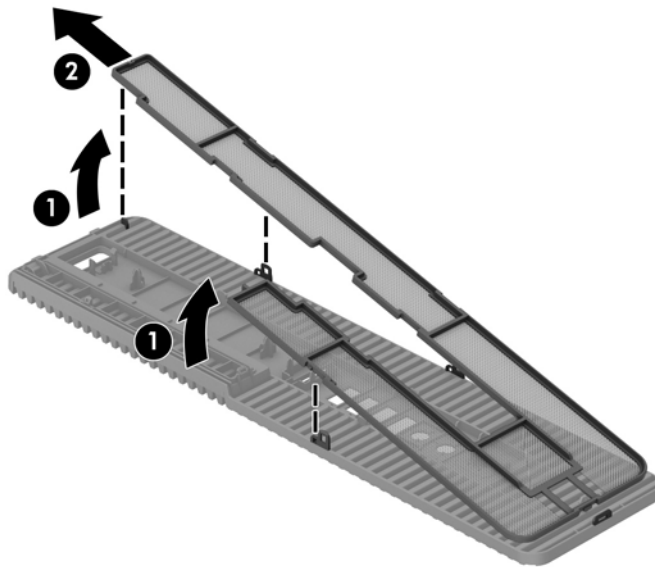
 **NOTE:** Regardless of the power-on state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. You must disconnect the power cord to avoid damage to the internal components of the computer.

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

7. To remove the dust filter access panel, press the right side of the filter access panel on the main bezel (1), rotate the right side of the filter access panel off the main bezel (2), and then pull the left side of the filter access panel out of the main bezel (3).

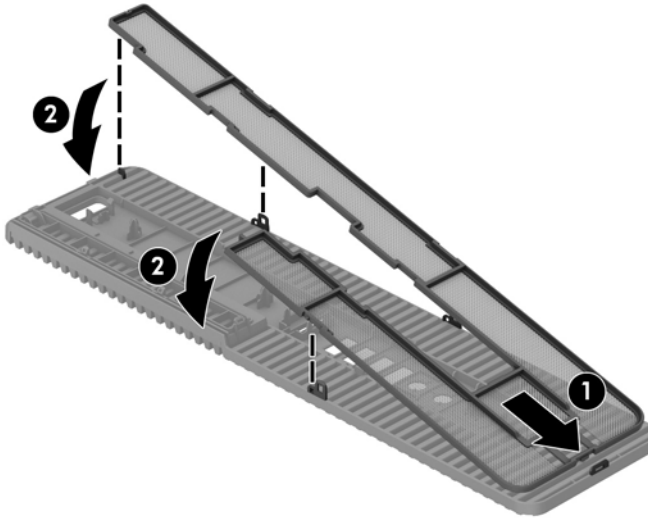


8. To remove the dust filter, lift the two separated ends of the filter (1), and then pull the filter off the filter access panel (2).

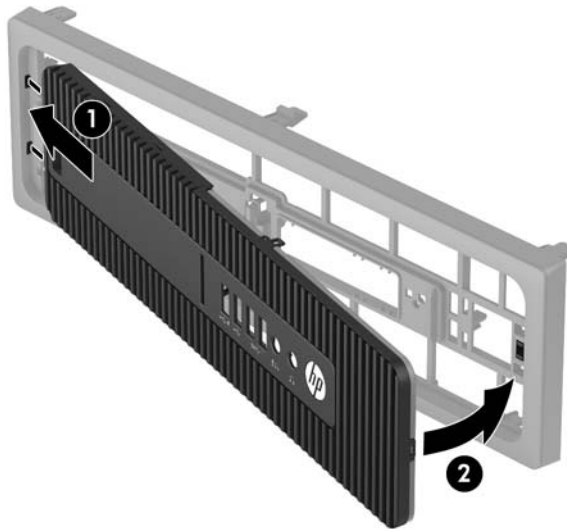


9. Clean dust from the filter access panel with a soft brush or cloth. If heavily soiled, rinse the filter access panel clean with water.
10. Clean the filter element with a soft brush or cloth. If heavily soiled, rinse the filter clean with water.

11. To replace the dust filter, slide the right side of the filter onto the filter access panel (1), and then press the filter onto the filter access panel (2) to secure it in place.



12. To replace the filter access panel, slide the left side of the filter access panel onto the main bezel (1), and then press the right side of the filter access panel onto the main bezel (2) to secure it in place.




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

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, and turn off any external devices.
4. Disconnect the power cord from the AC outlet and disconnect any external devices.


 **IMPORTANT:** 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.

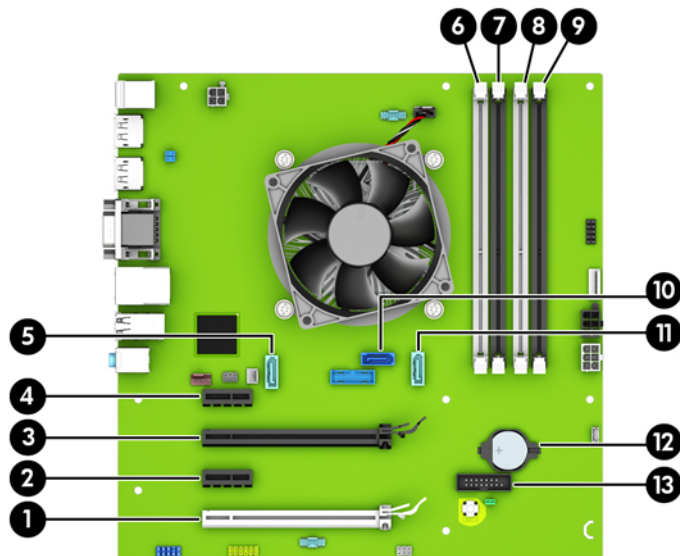
6. Reconnect the power cord and any external devices, and then turn on the computer.

 **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.



Item	System board connector	System board label	Color	Component
1	PCI Express x16 Gen 2 downshifted to a x4	X4PCIEXP	white	Expansion card
2	PCI Express x1 Gen 2	X1PCIEXP2	black	Expansion card
3	PCI Express x16 Gen 3	X16PCIEXP	black	Expansion card
4	PCI Express x1 Gen 2	X1PCIEXP1	black	Expansion card
5	SATA 3.0	SATA2	light blue	Any SATA device other than the primary hard drive
6	DIMM4 (Channel A)	DIMM4	white	Memory module
7	DIMM3 (Channel A)	DIMM3	black	Memory module
8	DIMM2 (Channel B)	DIMM2	white	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	Any SATA device other than the primary hard drive
12	Battery	BAT	black	Battery
13	Serial port	COMB	black	Optional second serial port

Installing additional memory

The computer comes with double data rate 4 synchronous dynamic random access memory (DDR4-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 64 GB of memory configured in a high-performing dual channel mode.

DDR4-SDRAM DIMMs

For proper system operation, the DIMMs must be:

- industry-standard 288-pin
- unbuffered non-ECC PC4-17000 DDR4-2133 MHz-compliant
- 1.2 volt DDR4-SDRAM DIMMs

The DIMMs must also:

- support CAS latency 15 DDR4 2133 MHz (15-15-15 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 four DIMM sockets on the system board, with two sockets per channel. The sockets are labeled DIMM1, DIMM2, DIMM3, and DIMM4. Sockets DIMM1 and DIMM2 operate in memory channel B. Sockets DIMM3 and DIMM4 operate 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 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 1 GB DIMMs and Channel B is populated with one 2 GB 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. If one channel will have more memory than the other, the larger amount should be assigned to Channel A. For example, if you are populating the sockets with one 2 GB DIMM, and three 1 GB DIMMs, Channel A should be populated with the 2 GB DIMM and one 1 GB DIMM, and Channel B should be populated with the other two 1 GB DIMMs. With this configuration, 4 GB will run as dual channel and 1 GB will run as single channel.

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

Installing DIMMs


 **IMPORTANT:** 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 50](#).

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

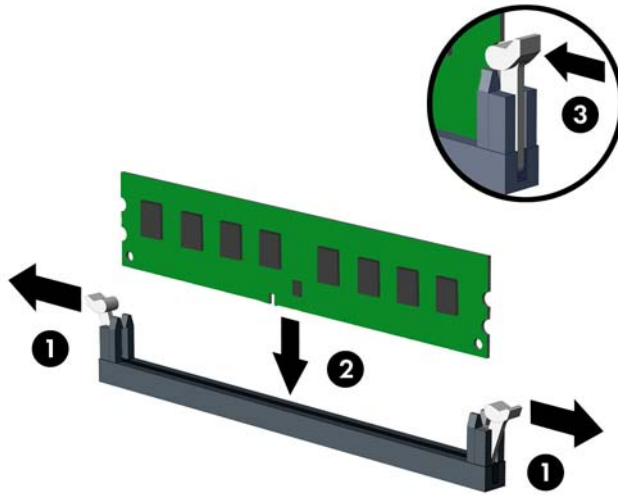
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1. Remove/disengage any security devices that prohibit opening the computer.
 2. Remove all removable media, such as compact discs or USB flash drives, from the computer.
 3. Turn off the computer properly through the operating system, and turn off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

 **IMPORTANT:** 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.

Populate the black DIMM sockets before the white DIMM sockets.

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 15](#) 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 any additional modules.
10. Replace the computer access panel.
11. If the computer was on a stand, replace the stand.
12. Reconnect the power cord and any external devices, and then 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 two PCI Express x1 expansion sockets, one PCI Express x16 expansion socket, and one PCI Express x16 expansion socket that is downshifted to a x4 socket.


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

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

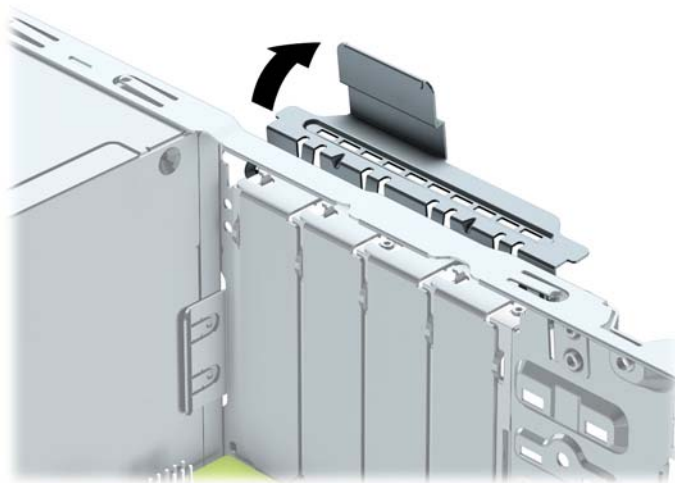
For dual graphics card configurations, the first (primary) card must be installed in the PCI Express x16 socket that is NOT downshifted to a x4.

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, and turn off any external devices.
4. Disconnect the power cord from the AC outlet and disconnect any external devices.

 **IMPORTANT:** 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.

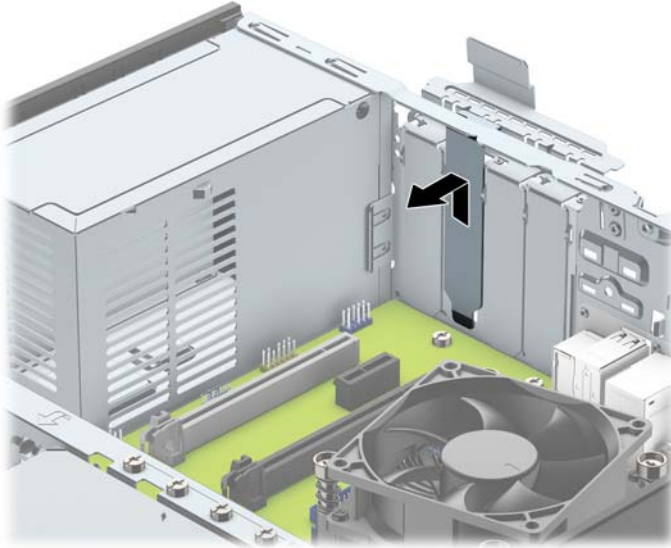
5. If the computer is on a stand, remove the computer from the stand.
6. Remove the computer access panel.
7. Locate the correct vacant expansion socket on the system board and the corresponding expansion slot on the back of the computer chassis.
8. Release the slot cover retention latch that secures the slot covers by lifting the tab on the latch and rotating the latch to the open position.



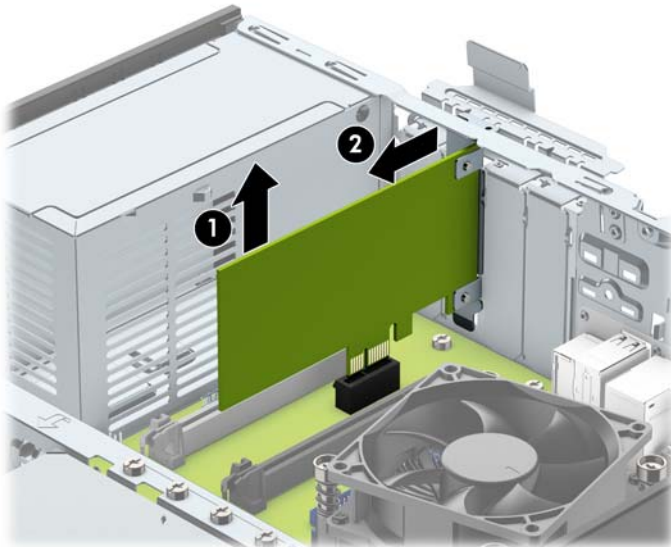
9. Before installing an expansion card, remove the expansion slot cover or the existing expansion card.

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

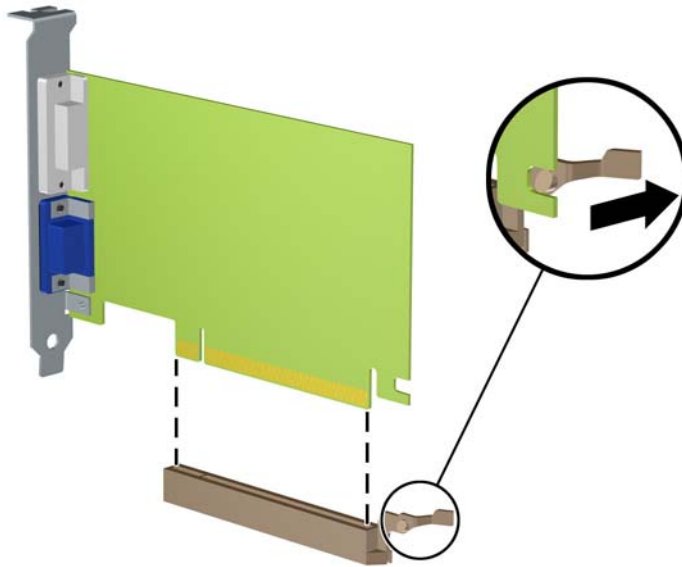
- a. If you are installing an expansion card in a vacant socket, remove the appropriate expansion slot cover on the back of the chassis. Pull the slot cover straight up then away from the inside of the chassis.



- 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. Lift the card straight up (1) then away from the inside of the chassis (2) to remove it. Be sure not to scrape the card against 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. Lift the card straight up then away from the inside of the chassis to remove it. Be sure not to scrape the card against other components.

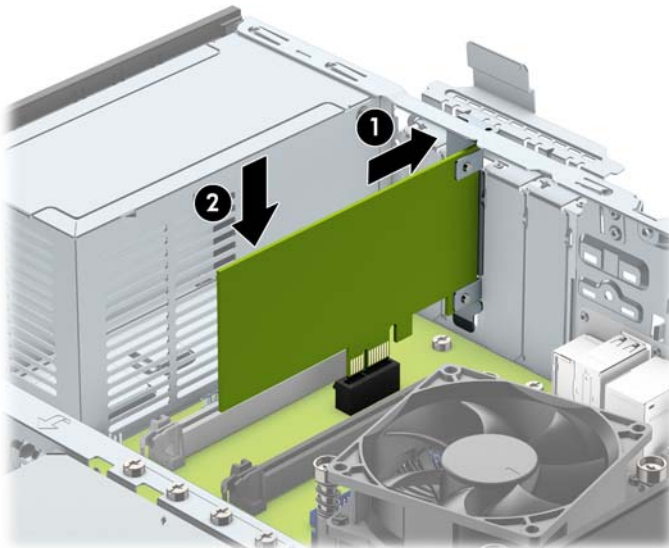



10. Store the removed card in anti-static packaging.

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

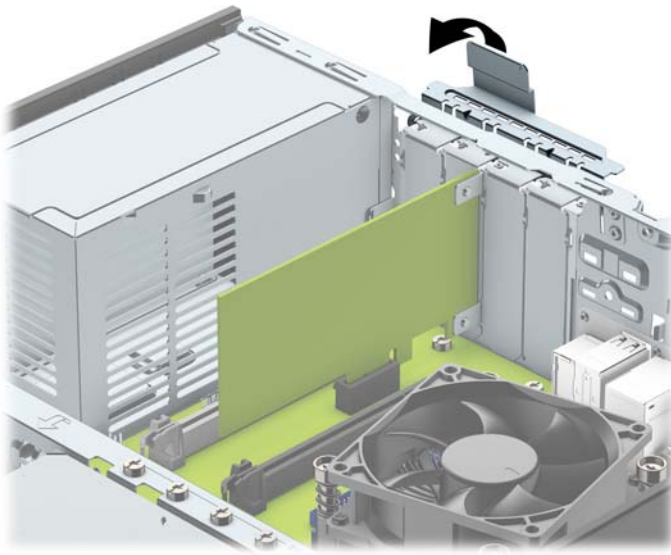
 **IMPORTANT:** After removing an expansion card, you must replace it with a new card or expansion slot cover for proper cooling of internal components during operation.

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 bottom of the bracket on the card slides into the small slot on the chassis. Press the card straight down into the expansion socket on the system board (2).



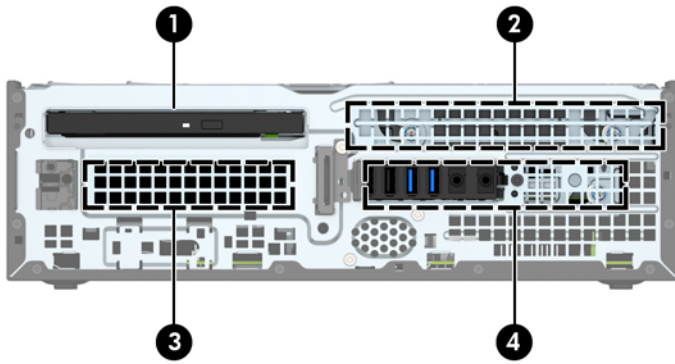
 **NOTE:** When installing an expansion card, press firmly on the card so that the whole connector seats properly in the expansion card socket.

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 any external devices, and then 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



Drive positions

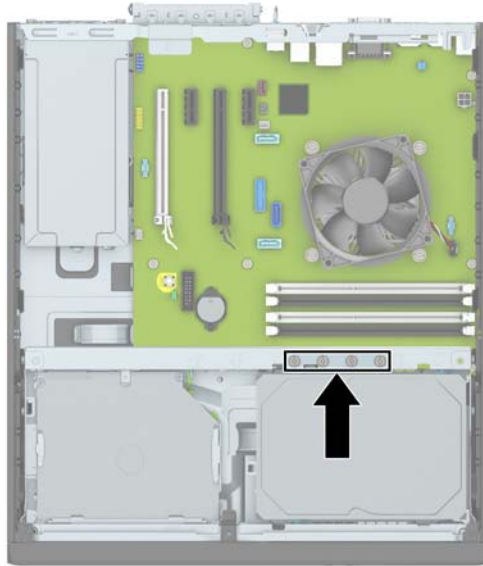
- | | |
|---|-----------------------------------|
| 1 | 9.5 mm slim optical drive bay |
| 2 | 3.5-inch primary hard drive bay |
| 3 | 3.5-inch secondary hard drive bay |
| 4 | 2.5-inch hard drive bay |
-


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

Removing and installing 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 secondary hard drives and optical drives to one of the light blue SATA connectors on the system board (labeled SATA1 and SATA2).
- HP has provided four extra 6-32 hard drive mounting screws installed on the top of the hard drive cage (1) for installing a hard drive into the 3.5-inch secondary hard drive bay. If you are replacing a hard drive, remove the mounting screws from the old drive and install them in the new drive.



 **NOTE:** You can also use one of the extra mounting screws to secure the front bezel (see [Front bezel security on page 46](#) for more information).

 **IMPORTANT:** 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, be sure 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 50](#).

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.”

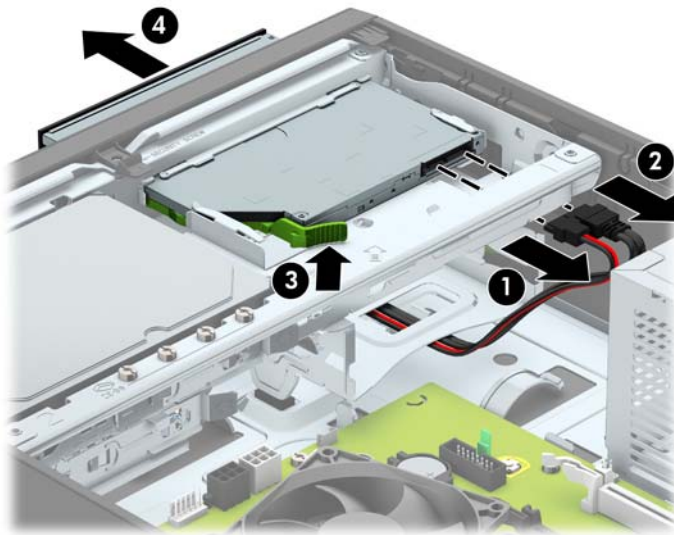
Removing a 9.5 mm slim optical drive

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, and turn off any external devices.
4. Disconnect the power cord from the AC outlet and disconnect any external devices.

 **IMPORTANT:** 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 rear of the optical drive, push the green release latch on the right rear side of the drive toward the center of the drive (3), and then slide the drive forward and out of the bay through the front bezel (4).

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



Installing a 9.5 mm slim optical drive

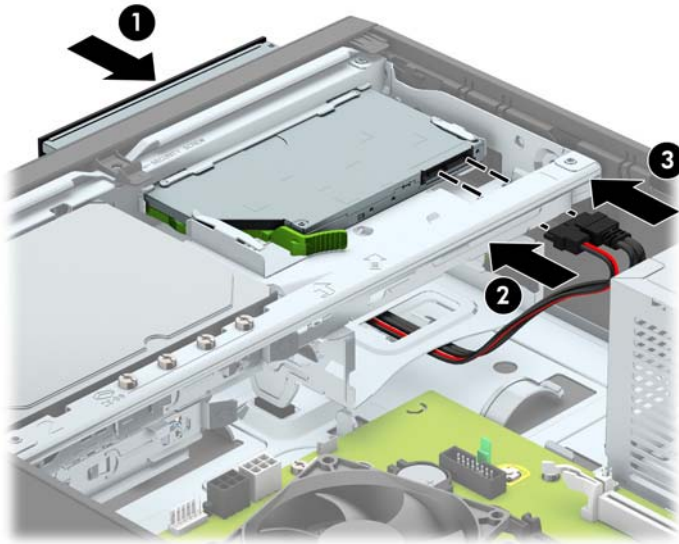
1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as compact discs or USB flash drives, from the computer.
3. Turn off the computer properly through the operating system, and turn off any external devices.
4. Disconnect the power cord from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

 **IMPORTANT:** 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. If you are installing a slim optical drive in a bay covered by a bezel blank, remove the front bezel and then remove the bezel blank. See [Removing a slim optical drive bezel blank on page 9](#) for more information.
8. Align the small pin on the release latch with the small hole on the side of the drive and press the latch firmly onto the drive.



- Slide the optical drive through the front of the chassis (1) all the way into the bay so that it locks in place, and then connect the power cable (2) and data cable (3) to the rear of the drive.




- Connect the opposite end of the data cable to one of the light blue SATA connectors on the system board (labeled SATA1 or SATA2) if not already connected.




NOTE: Refer to [System board connections on page 14](#) for an illustration of the system board drive connectors.

- Replace the front bezel if it was removed.
- Replace the computer access panel.
- If the computer was on a stand, replace the stand.
- Reconnect the power cord and any external devices, and then turn on the computer.
- Lock any security devices that were disengaged when the access panel was removed.

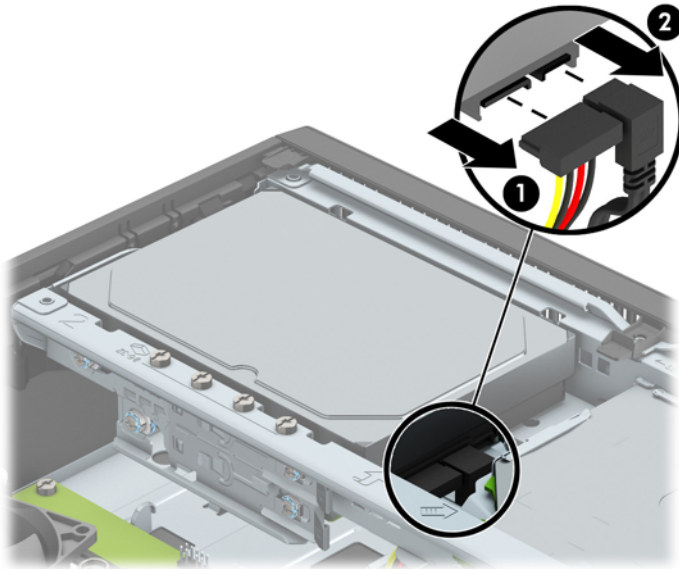
Removing and replacing a primary 3.5-inch hard drive

 **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.

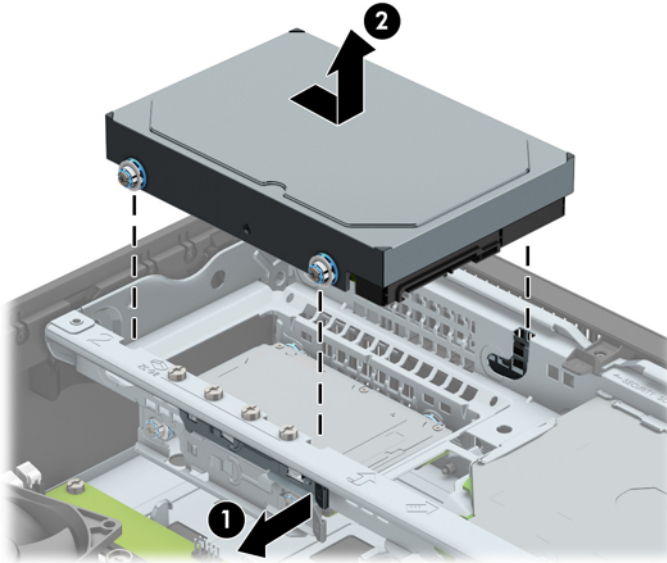
1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as compact discs or USB flash drives, from the computer.
3. Turn off the computer properly through the operating system, and turn off any external devices.
4. Disconnect the power cord from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

 **IMPORTANT:** 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.

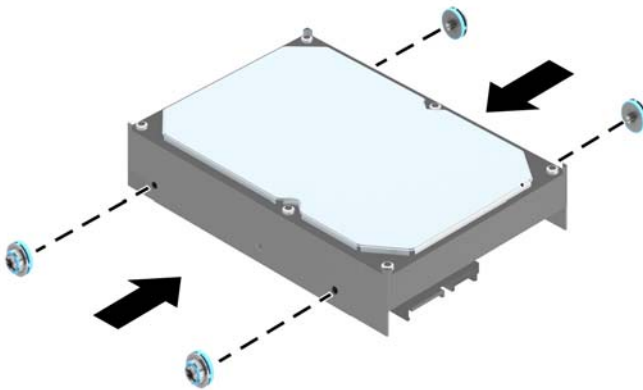
5. If the computer is on a stand, remove the computer from the stand.
6. Remove the computer access panel.
7. Disconnect the power cable (1) and data cable (2) from the rear of the hard drive.



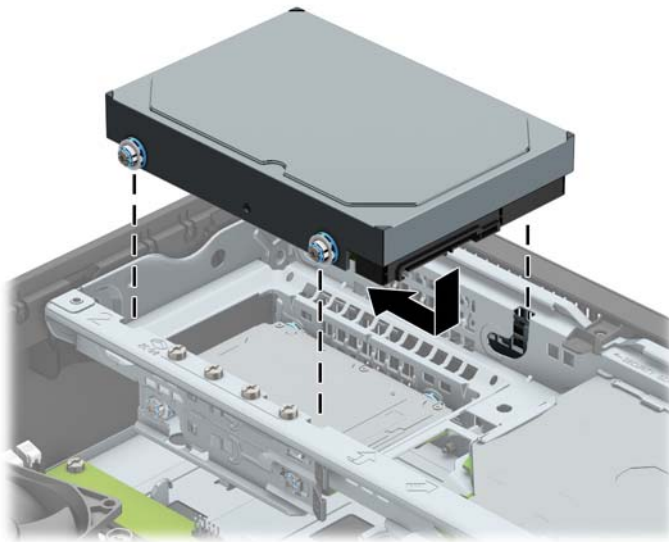
8. Pull the release lever next to the rear of the hard drive outward (1). While pulling the release lever out, slide the drive back until it stops, and then lift the drive up and out of the bay (2).



9. To install a hard drive, you must transfer the mounting screws from the old hard drive to the new hard drive.



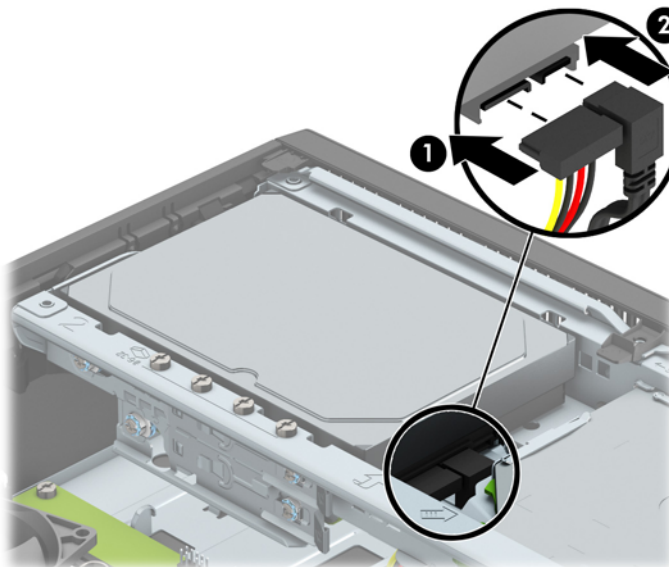
10. Align the mounting screws with the slots on the chassis drive cage, press the hard drive down into the bay, and then slide it forward until it stops and locks in place.



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




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



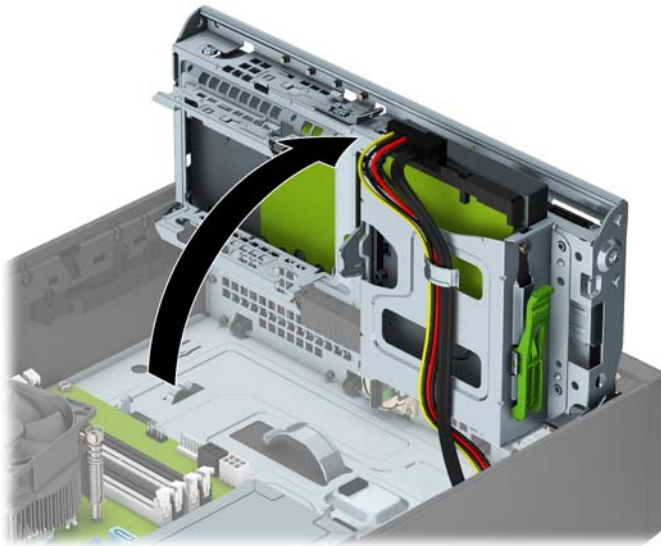
12. Replace the computer access panel.
13. If the computer was on a stand, replace the stand.
14. Reconnect the power cord and any external devices, and then turn on the computer.
15. Lock any security devices that were disengaged when the access panel was removed.

Removing a secondary 3.5-inch hard drive

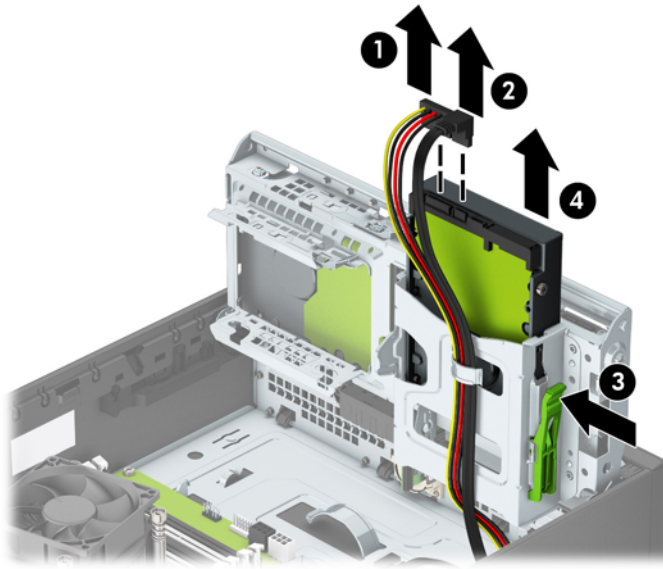
1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as compact discs or USB flash drives, from the computer.
3. Turn off the computer properly through the operating system, and turn off any external devices.
4. Disconnect the power cord from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

 **IMPORTANT:** 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 rear of the hard drive. Press the latch on the side of the drive cage (3), and then slide the drive out of the drive bay (4).




9. If you are installing a new drive, refer to [Installing a secondary 3.5-inch hard drive on page 32](#). If you are not installing a new drive, rotate the drive cage down and replace the access panel.

Installing a secondary 3.5-inch hard drive

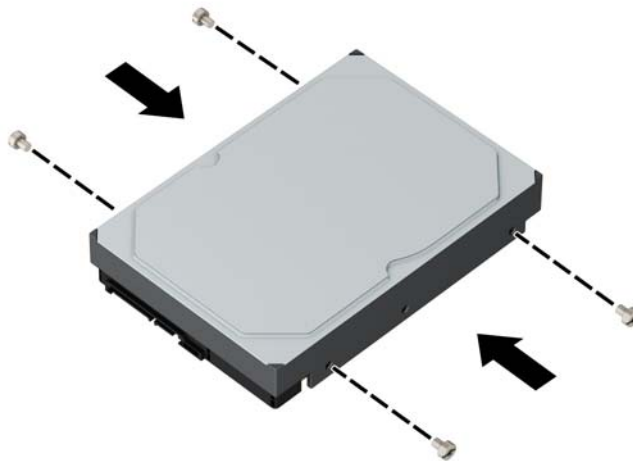
1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as compact discs or USB flash drives, from the computer.
3. Turn off the computer properly through the operating system, and turn off any external devices.
4. Disconnect the power cord from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

 **IMPORTANT:** 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.

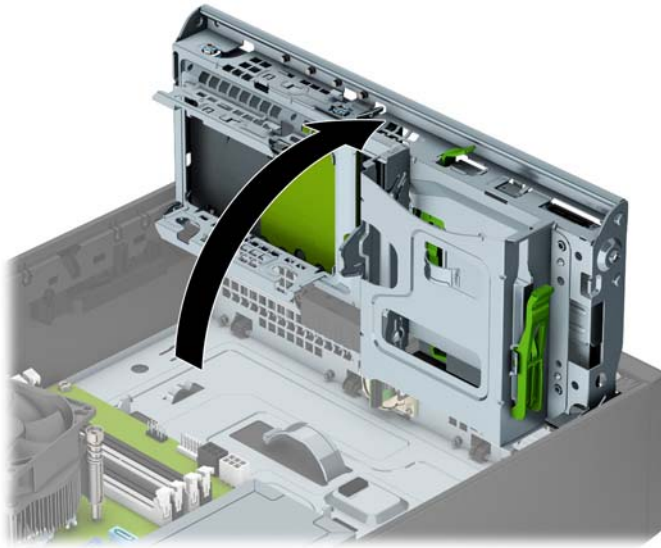
5. If the computer is on a stand, remove the computer from the stand.
6. Remove the computer access panel.
7. Install four silver 6-32 mounting screws on the sides of the drive (two on each side).

 **NOTE:** HP has supplied four extra silver 6-32 mounting screws installed on the chassis next to the primary 3.5-inch hard drive bay. Refer to [Removing and installing drives on page 23](#) for an illustration of the location of the extra mounting screws.


When replacing a drive, transfer the four mounting screws from the old drive to the new drive.

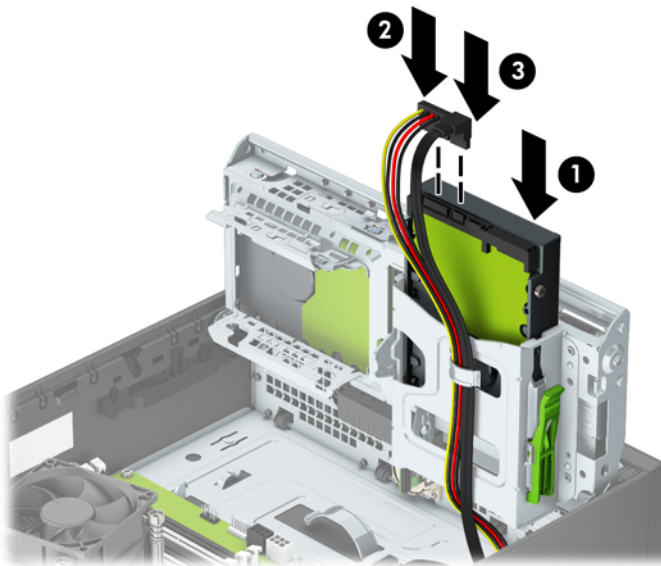


8. Rotate the drive cage to its upright position.



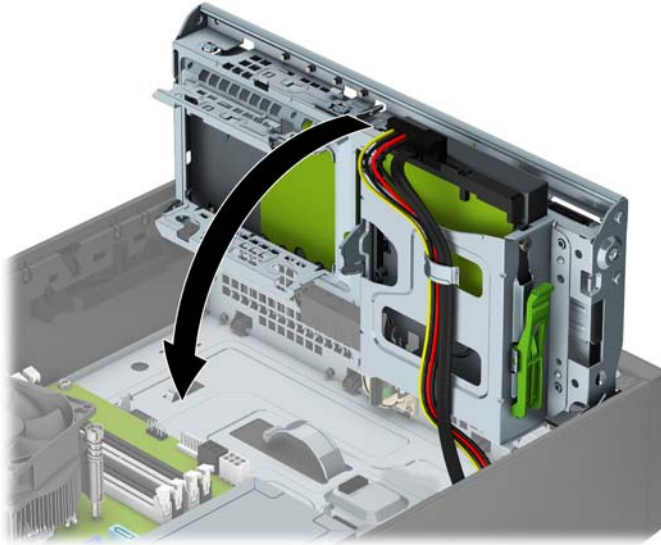
9. Slide the drive into the drive bay (1), and then connect the power cable (2) and data cable (3) to the rear of the hard drive.

 **NOTE:** If the drive is a secondary hard drive, connect the other end of data cable to one of the light blue SATA connectors on the system board. If the drive is the primary hard drive, connect the other end of the data cable to the dark blue SATA connector on the system board.



10. 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.



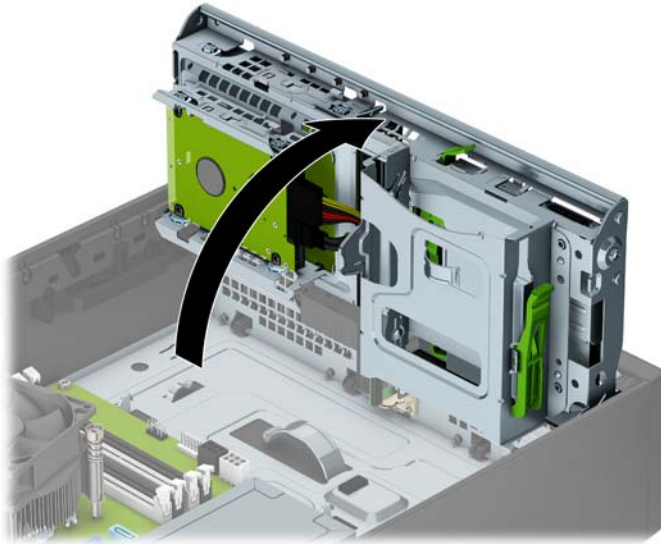
11. Replace the computer access panel.
12. If the computer was on a stand, replace the stand.
13. Reconnect the power cord and any external devices, and then turn on the computer.
14. Lock any security devices that were disengaged when the access panel was removed.

Removing a 2.5-inch hard drive

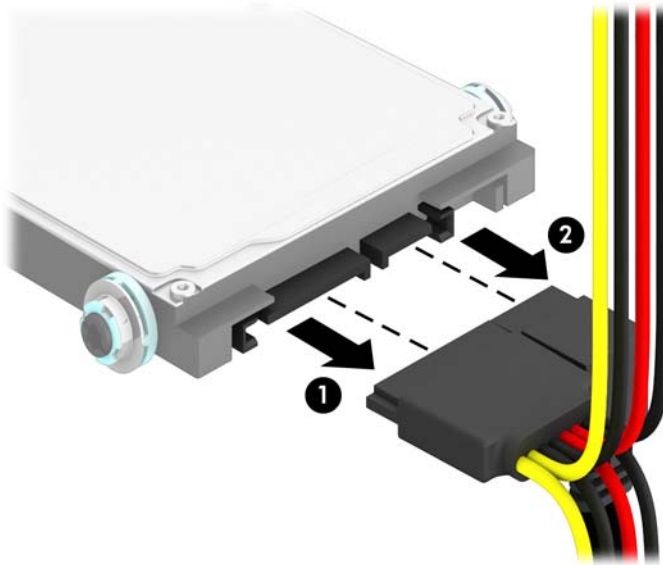
1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as compact discs or USB flash drives, from the computer.
3. Turn off the computer properly through the operating system, and turn off any external devices.
4. Disconnect the power cord from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

 **IMPORTANT:** 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.

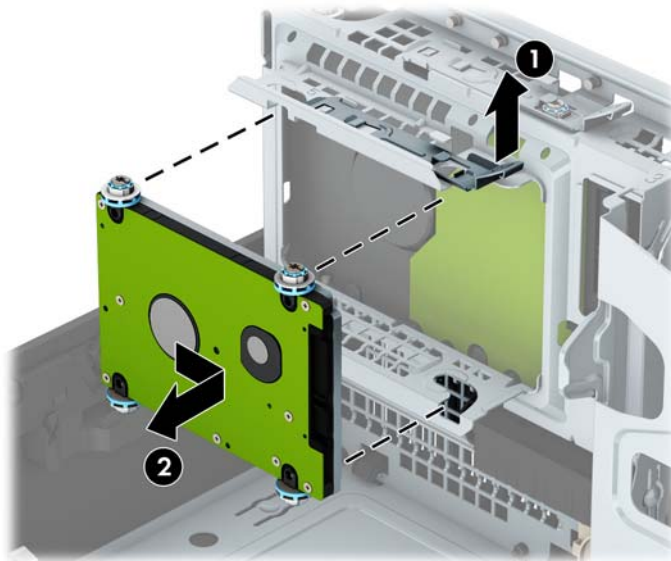
5. If the computer is on a stand, remove the computer from the stand.
6. Remove the computer access panel.
7. Rotate the drive cage to its upright position.



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



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



10. If you are installing a new drive, refer to [Installing a 2.5-inch hard drive on page 37](#). If you are not installing a new drive, rotate the drive cage down and replace the access panel.

Installing a 2.5-inch hard drive

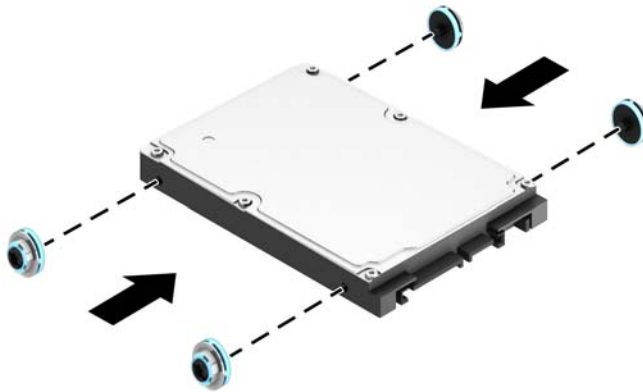
1. Remove/disengage any security devices that prohibit opening the computer.
2. Remove all removable media, such as compact discs or USB flash drives, from the computer.
3. Turn off the computer properly through the operating system, and turn off any external devices.
4. Disconnect the power cord from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

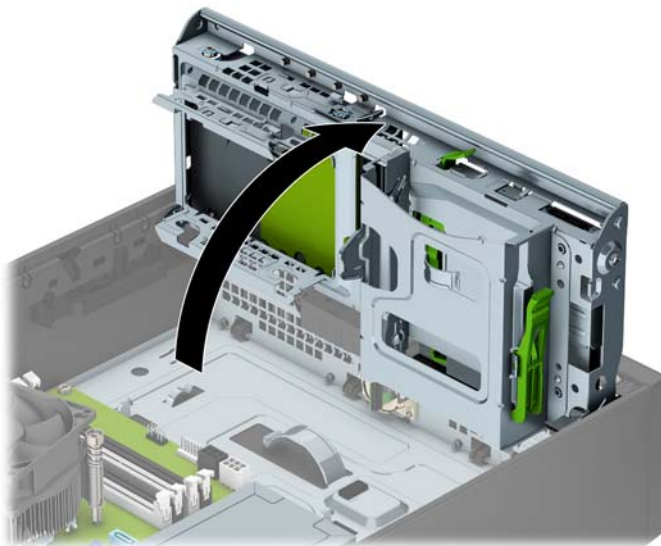
5. If the computer is on a stand, remove the computer from the stand.
6. Remove the computer access panel.
7. Install four black and blue M3 mounting screws (two on each side of the drive).

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

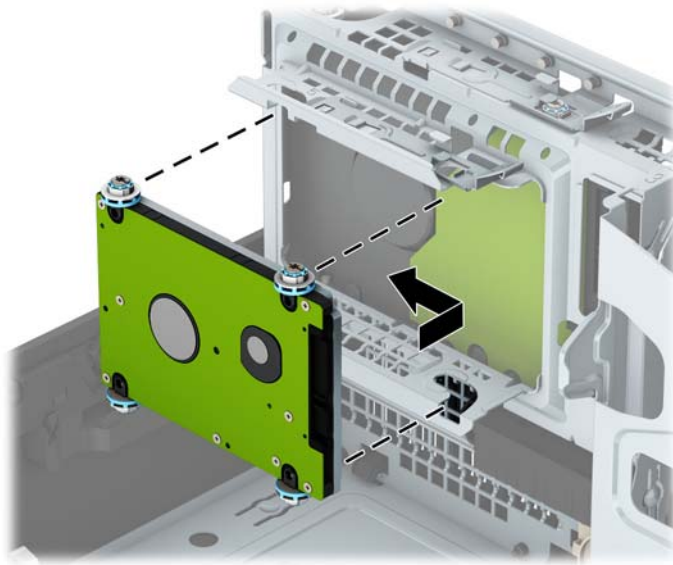
When replacing a drive, transfer the four mounting screws from the old drive to the new drive.




8. Rotate the drive cage to its upright position.

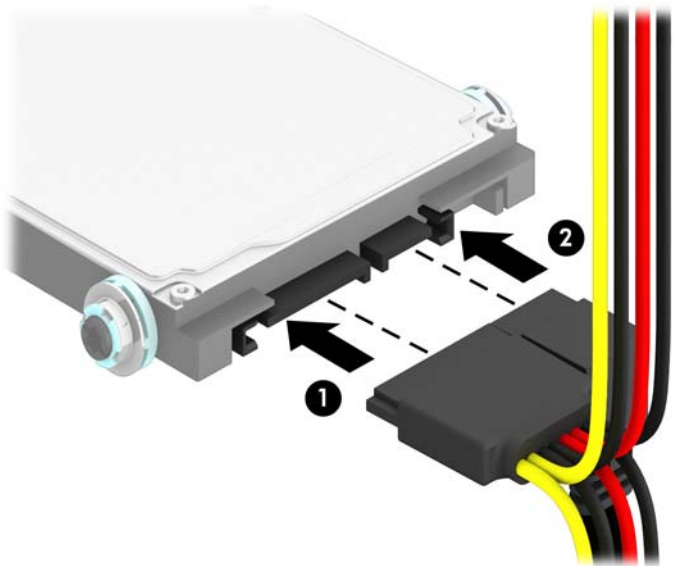


- Align the mounting screws on the drive with the J-slots on the sides of the drive bay. Press the drive into the drive bay, and then slide the drive forward until it locks in place.



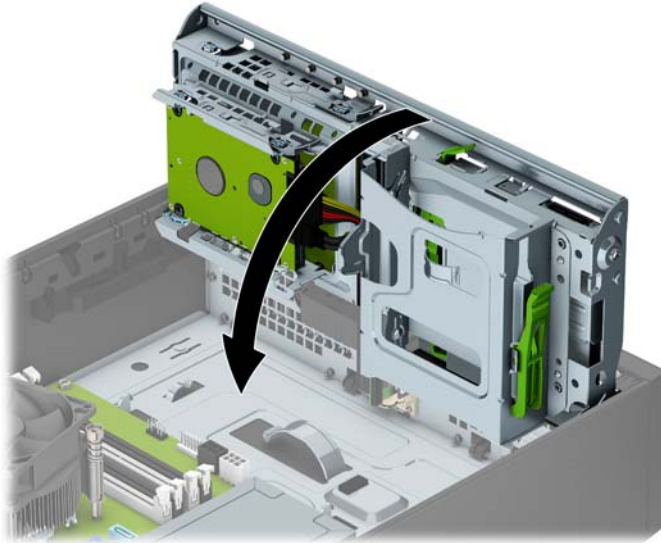
- Connect the power cable (1) and data cable (2) to the rear of the hard drive.

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



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

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

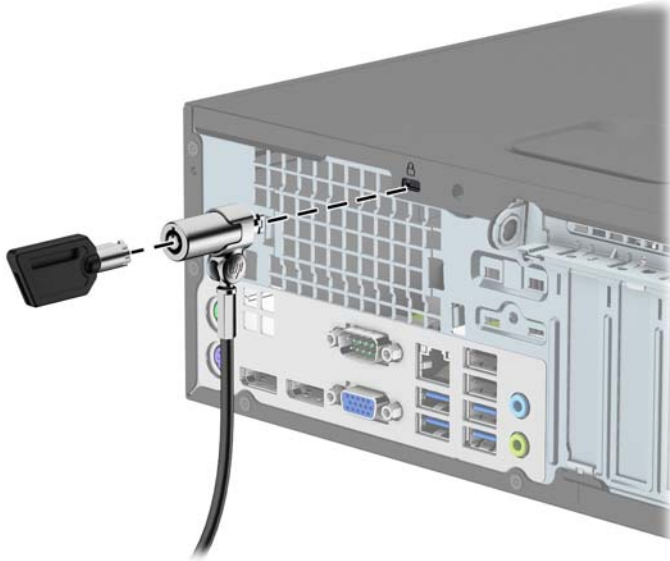


12. Replace the computer access panel.
13. If the computer was on a stand, replace the stand.
14. Reconnect the power cord and any external devices, and then turn on the computer.
15. Lock any security devices that were disengaged when the access panel was removed.

Installing a security lock

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

Cable lock

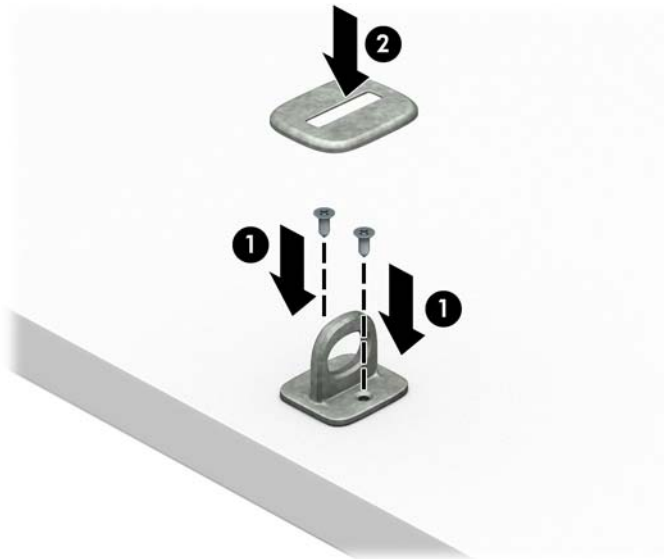


Padlock



HP Business PC Security Lock V2

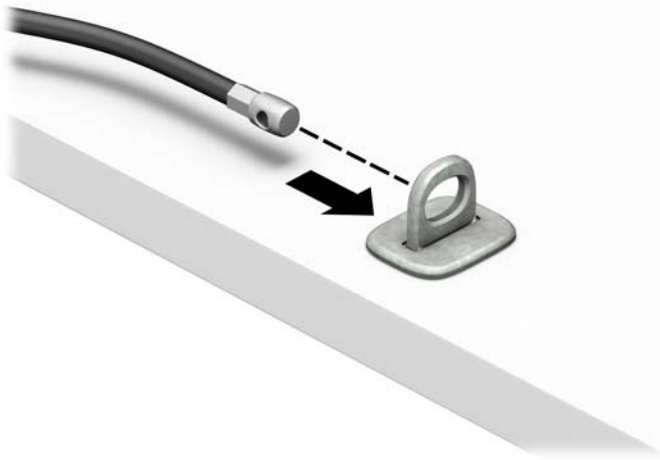
1. Attach the security cable fastener to a desktop using the appropriate screws for your environment (screws not provided) (1), and then snap the cover onto the base of the cable fastener (2).



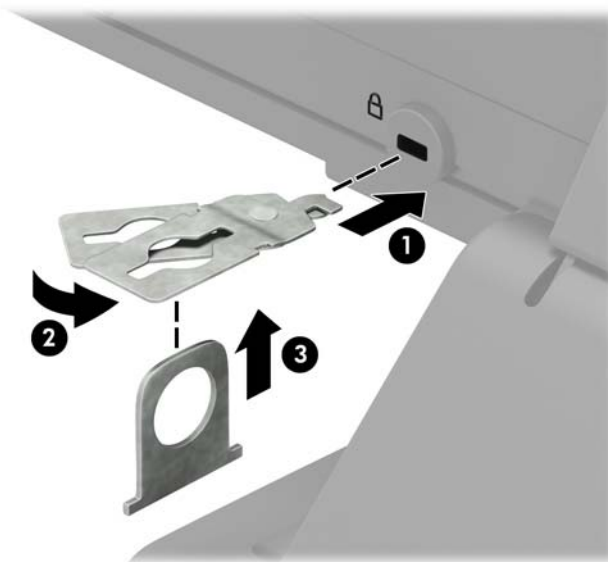
2. Loop the security cable around a stationary object.



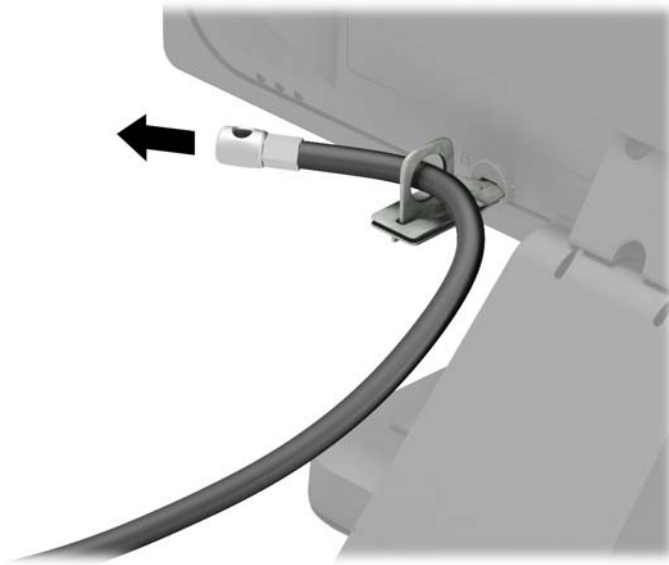
3. Slide the security cable through the security cable fastener.



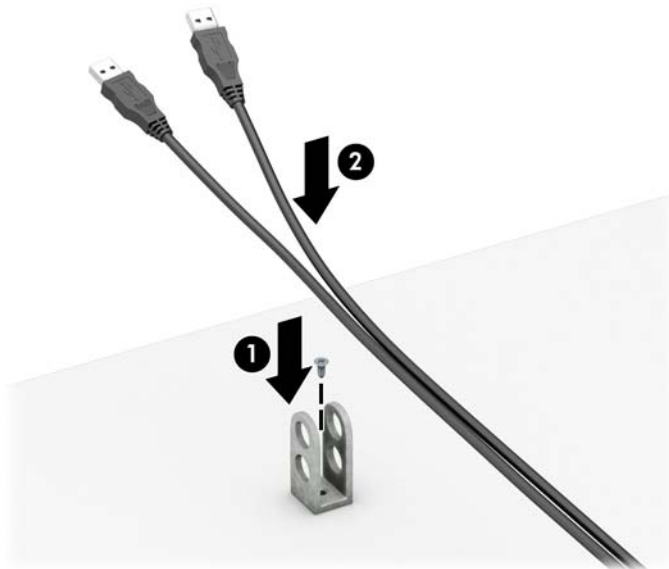
4. Pull the two scissor hands of the monitor lock apart and insert the lock into the security slot on the rear of the monitor (1), close the scissor hands together to secure the lock in place (2), and then slide the cable guide through the center of the monitor lock (3).



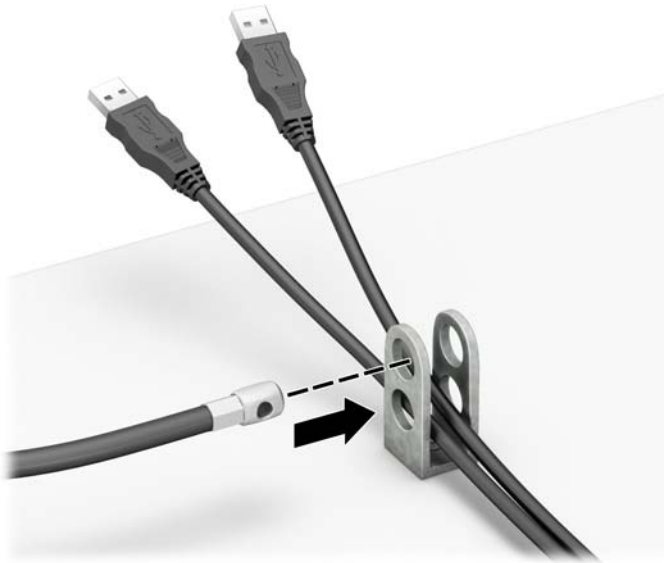
5. Slide the security cable through the security guide installed on the monitor.



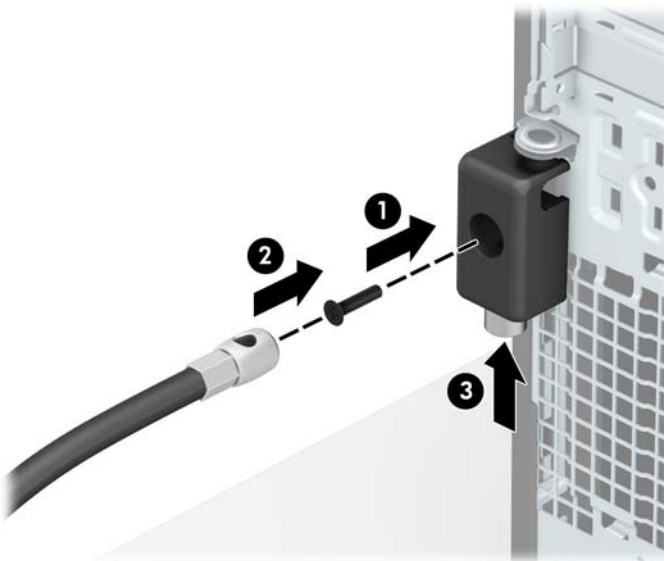
6. Attach the accessory cable fastener to a desktop using the appropriate screw for your environment (screw not provided) (1), and then place the accessory cables into the base of the fastener (2).



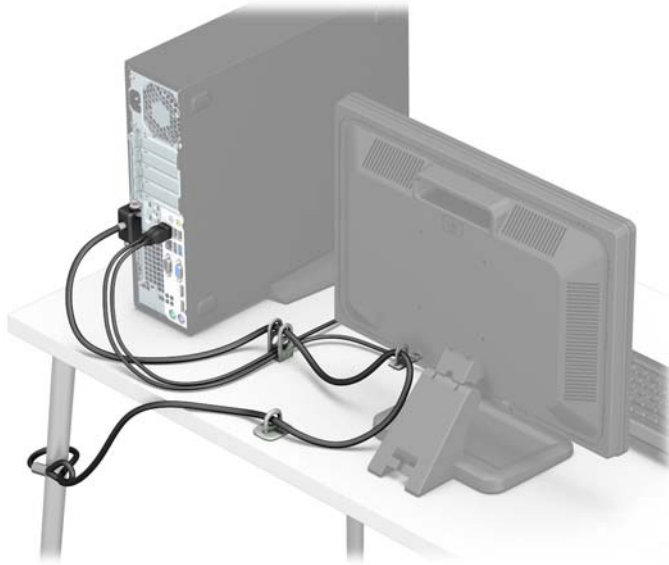
7. Slide the security cable through the holes in the accessory cable fastener.



8. Screw the lock to the chassis using the screw provided (1). Insert the plug end of the security cable into the lock (2) and push the button in (3) to engage the lock. Use the key provided to disengage the lock.




9. When you have completed all steps, all of the devices at your workstation will be secured.



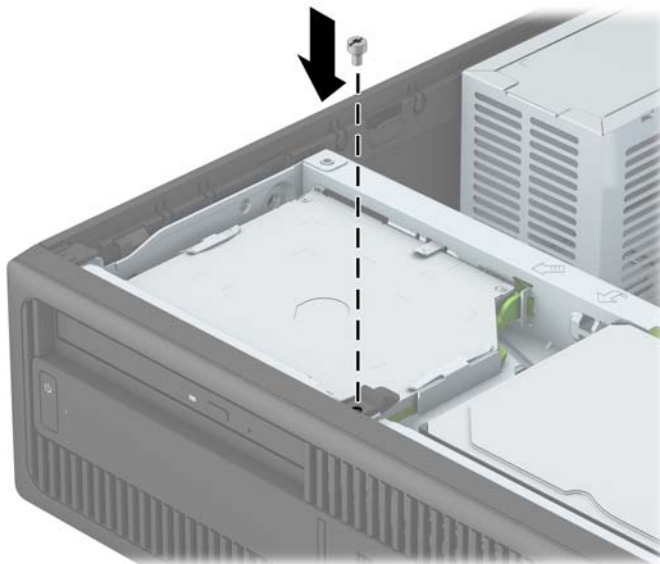
Front bezel security

The front bezel can be secured in place by installing a 6-32 screw through the center tab on the bezel into the chassis.

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, and turn off any external devices.
4. Disconnect the power cord from the AC outlet and disconnect any external devices.

 **IMPORTANT:** 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. If you do not have a 6-32 standard screw, remove one of the four silver 6-32 standard screws located on top of the drive cage. Refer to [Removing and installing drives on page 23](#) for an illustration of the 6-32 standard screw locations.
8. Install the 6-32 security screw through the middle front bezel release tab to secure the front bezel in place.



9. Replace the computer access panel.
10. If the computer was on a stand, replace the stand.
11. Reconnect the power cord and any external devices, and then 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 (140°F).

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

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


 **IMPORTANT:** 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 outlet. 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, and turn off any external devices.
4. Disconnect the power cord from the AC outlet and disconnect any external devices.

 **IMPORTANT:** 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.

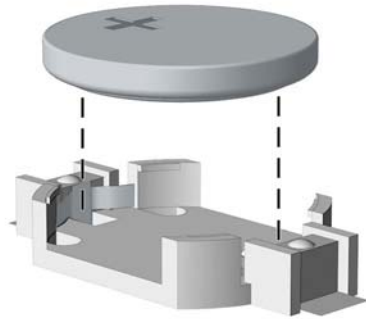
5. Remove the computer access panel.
6. Locate the battery and battery holder on the system board.

 **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

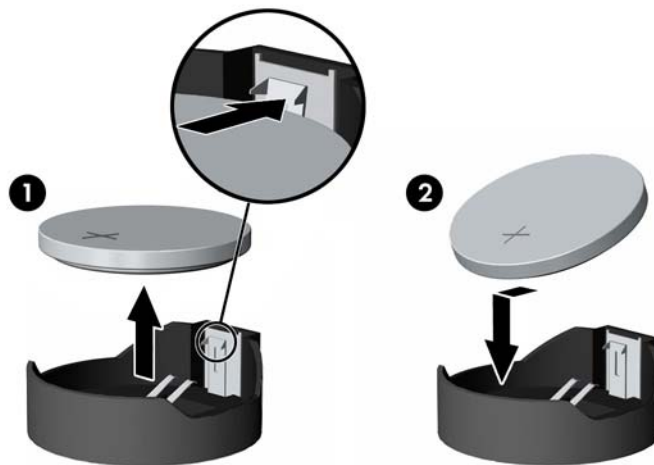
- a. Lift the battery out of its holder.



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

Type 2

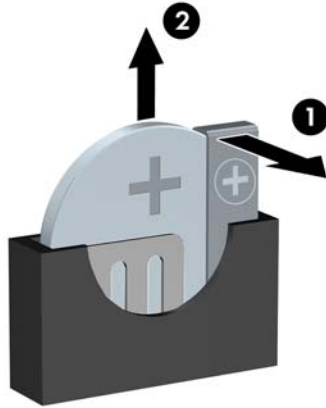
- a.** To release the battery from its holder, squeeze the metal clamp that extends above one edge of the battery. When the battery pops up, lift it out (1).
- b.** To insert the new battery, slide one edge of the replacement battery under the holder's lip with the positive side up. Push the other edge down until the clamp snaps over the other edge of the battery (2).




Type 3

- a.** Pull back 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. Reconnect the power cord and any external devices, and then turn on 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 AC outlet, then from the computer.
5. Disconnect the system components and external devices from their power sources, then from the computer.



NOTE: Be sure 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.

D Accessibility

HP designs, produces, and markets products and services that can be used by everyone, including people with disabilities, either on a stand-alone basis or with appropriate assistive devices.


Supported assistive technologies

HP products support a wide variety of operating system assistive technologies and can be configured to work with additional assistive technologies. Use the Search feature on your device to locate more information about assistive features.

 **NOTE:** For additional information about a particular assistive technology product, contact customer support for that product.

Contacting support

We are constantly refining the accessibility of our products and services and welcome feedback from users. If you have an issue with a product or would like to tell us about accessibility features that have helped you, please contact us at (888) 259-5707, Monday through Friday, 6 a.m. to 9 p.m. Mountain Time. If you are deaf or hard-of-hearing and use TRS/VRS/WebCapTel, contact us if you require technical support or have accessibility questions by calling (877) 656-7058, Monday through Friday, 6 a.m. to 9 p.m. North American Mountain Time.

 **NOTE:** Support is in English only.

Index

- A**
 - access panel
 - removal 6
 - replacement 7
 - accessibility 53
- B**
 - battery replacement 47
- C**
 - computer operating guidelines 51
- D**
 - DIMMs. *See* memory
 - drives
 - cable connections 23
 - installation 23
 - locations 22
- E**
 - electrostatic discharge, preventing
 - damage 50
 - expansion card
 - installation 18
 - removal 18
- F**
 - front bezel
 - blank removal 9
 - removal 8
 - replacement 10
 - security 46
 - front panel components 2
- H**
 - hard drive (2.5-inch)
 - installation 37
 - removal 35
 - hard drive (3.5-inch)
 - installation 27, 32
 - removal 27, 30
- I**
 - installation guidelines 5
- installing**
 - 2.5-inch hard drive 37
 - battery 47
 - drive cables 23
 - expansion card 18
 - memory 15
 - primary 3.5-inch hard drive 27
 - secondary 3.5-inch hard drive 32
 - slim optical drive 25
- L**
 - locks
 - cable lock 40
 - front bezel 46
 - HP Business PC Security Lock 41
 - padlock 40
- M**
 - memory
 - installation 15
 - socket population 15
 - specifications 15
- O**
 - optical drive
 - cleaning 52
 - installation 25
 - precautions 52
 - removal 24
- P**
 - product ID location 4
- R**
 - rear panel components 3
 - removing
 - 2.5-inch hard drive 35
 - battery 47
 - bezel blank 9
 - computer access panel 6
 - expansion card 18
 - front bezel 8
 - primary 3.5-inch hard drive 27
 - secondary 3.5-inch hard drive 30
 - slim optical drive 24
- S**
 - security
 - cable lock 40
 - front bezel 46
 - HP Business PC Security Lock 41
 - padlock 40
 - serial number location 4
 - shipping preparation 52
 - specifications
 - memory 15
 - system board connections 14
- T**
 - tower conversion 13
- V**
 - ventilation guidelines 51

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