# Hardware Reference Guide

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**Product notice**

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

Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. Go to http://www.microsoft.com for details.

To access the latest user guide, go to http://www.hp.com/support, and follow the instructions to find your product. Then select **User Guides**.

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For any further information or to request a full refund of the price of the computer, please contact your seller.

# About This Guide

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

**WARNING!** Indicates a hazardous situation that, if not avoided, **could** result in serious injury or death.

**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

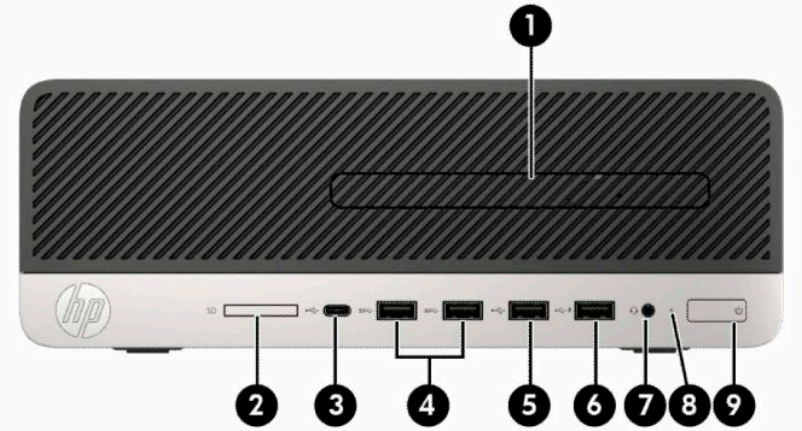
## Standard configuration features

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.



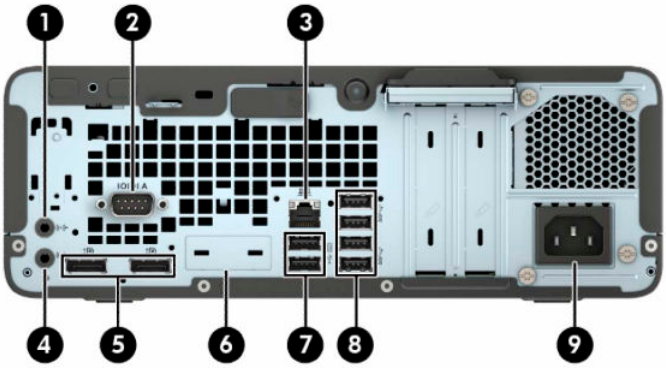

| Front panel components | | | |
|---|---|---|---|
| 1 | Slim optical drive (optional) | 6 | USB port with HP Sleep and Charge |
| 2 | SD card reader (optional) | 7 | Audio-out (headphone)/Audio-in (microphone) combo jack |
| 3 | USB Type-C port | 8 | Hard drive activity light |
| 4 | USB SuperSpeed ports (2) | 9 | Power button |
| 5 | USB port | | |

**NOTE:** The audio-out (headphone)/audio-in (microphone) combo jack supports headphones, line output devices, microphones, line input devices, or CTIA-style headsets.

**NOTE:** The USB port with HP Sleep and Charge provides current to charge a device such as a smart phone. The charging current is available whenever the power cord is connected to the system, even when the system is off.

**NOTE:** The light on the power button 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. See the *Maintenance and Service Guide* to interpret the code.

# Rear panel components




| Rear panel components | | | | | |
|---|---|---|---|---|---|
| 1 | | Audio-in jack | 6 | | Optional port |
| 2 | IO\|O\|A | Serial port (optional) | 7 | | USB ports (2) |
| 3 | | RJ-45 (network) jack | 8 | SS | USB SuperSpeed ports (4) |
| 4 | | Audio-out jack for powered audio devices | 9 | | Power cord connector |
| 5 | | DisplayPort monitor connectors (2) | | | |

**NOTE:** Your model may have additional optional ports available from HP.

When a graphics card is installed in one of the system board slots, you can use the video connectors on the graphics card, integrated graphics on the system board, or both. 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. You need a Torx T15 or flat-bladed screwdriver 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 you touch them.

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 into a grounded (earthed) AC 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, and proper posture, health, and work habits for computer users. The *Safety & Comfort Guide* also provides important electrical and mechanical safety information. The *Safety & Comfort Guide* is available 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 44 for more information.

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

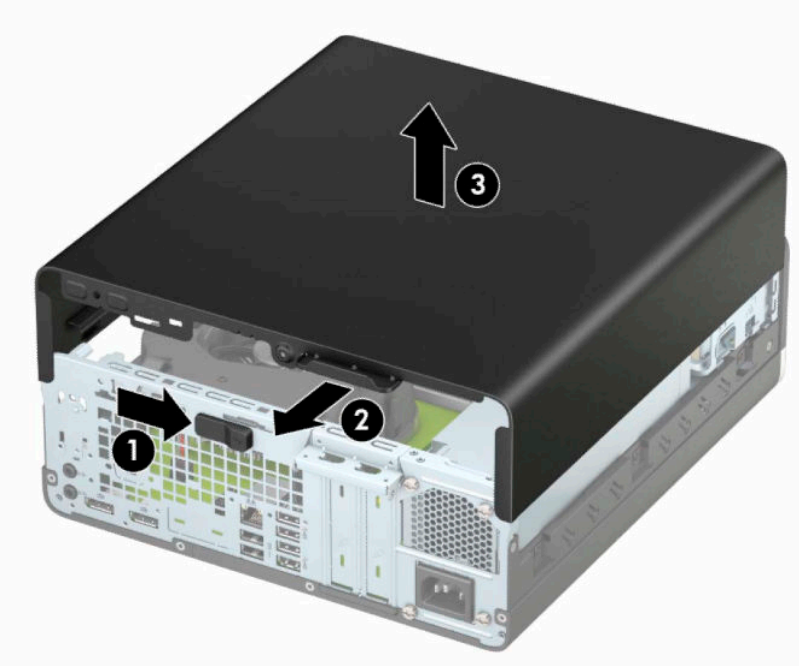
# Removing the computer access panel

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

1. Remove or 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.

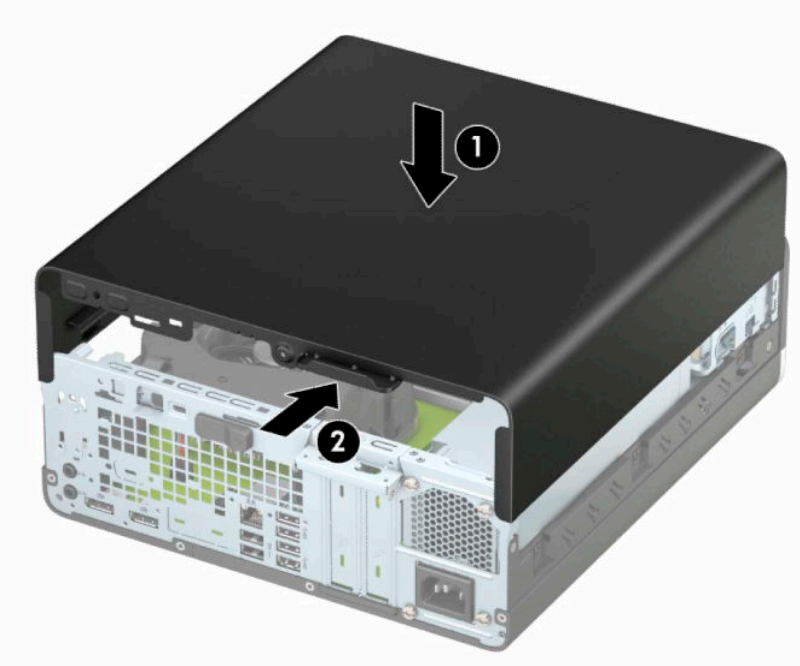
**IMPORTANT:** Regardless of the power state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. To prevent damage to internal components, you must disconnect the power cord from the power source before opening the computer.

5. If the computer is on a stand, remove the computer from the stand and lay the computer down.
6. Slide the access panel release lever to the right (1) so that it locks into place. Then slide the access panel back (2) and lift it off the computer (3).



# Replacing the computer access panel

Be sure that the access panel release lever is locked into place, place the access panel on the computer (1), and slide the panel forward (2). The release lever automatically moves back to the right and lock the access panel.

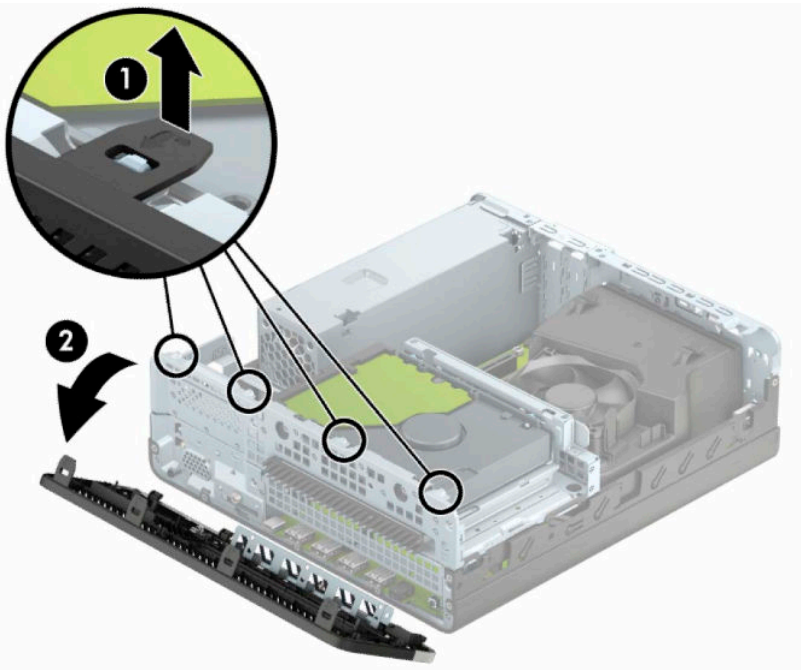


# Removing the front bezel

1. Remove or 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 state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. To prevent damage to internal components, you must disconnect the power cord from the power source before opening the computer.

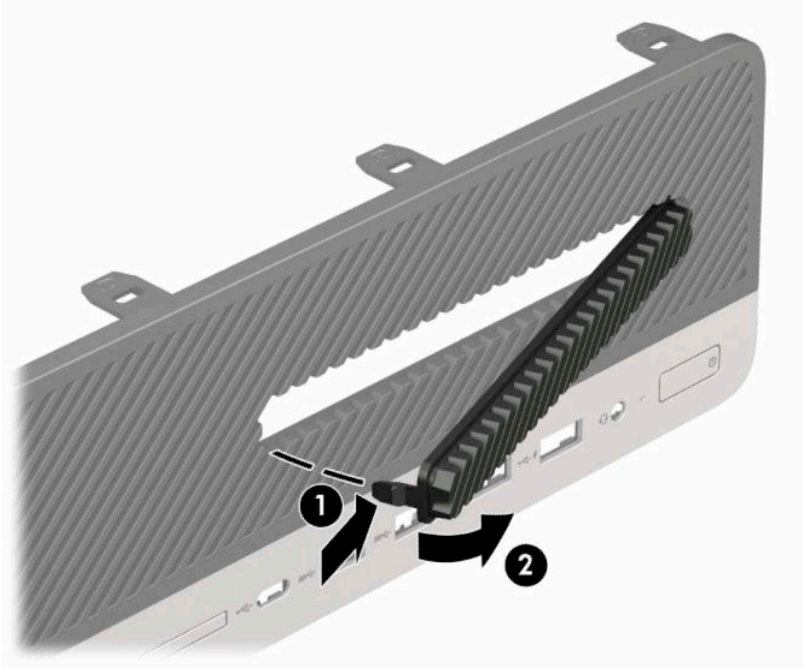
5. If the computer is on a stand, remove the computer from the stand and lay the computer down.
6. Remove the computer access panel.
7. Lift up the four tabs on the top of the bezel (1), and then rotate the bezel off the chassis (2).



# Removing a slim optical drive bezel blank

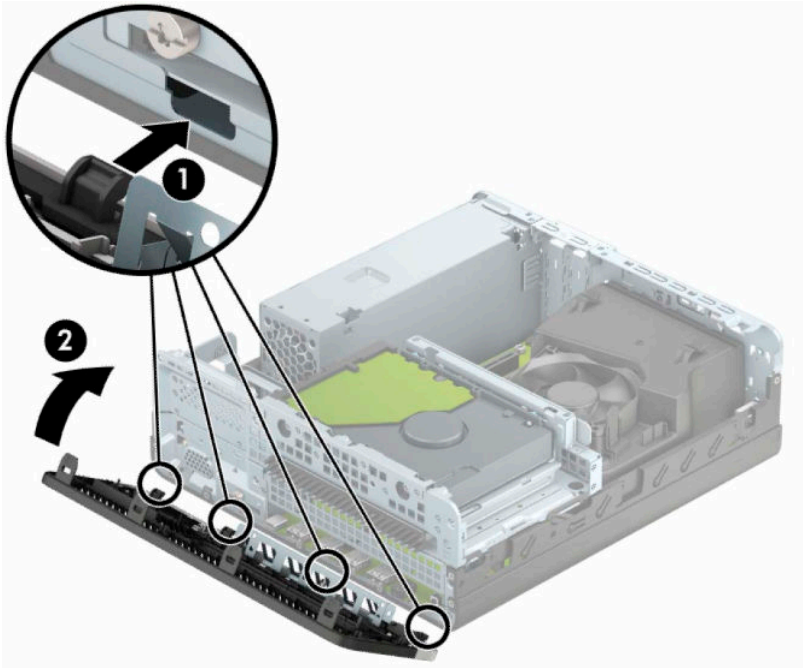
On some models, a bezel blank covers the slim optical drive bay. Remove the bezel blank before installing an optical drive. To remove the bezel blank:

1. Remove the computer access panel and front bezel.
2. Press inward on the tab on the left side of the blank (1), and then rotate the blank off the front bezel (2).



# Replacing the front bezel

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

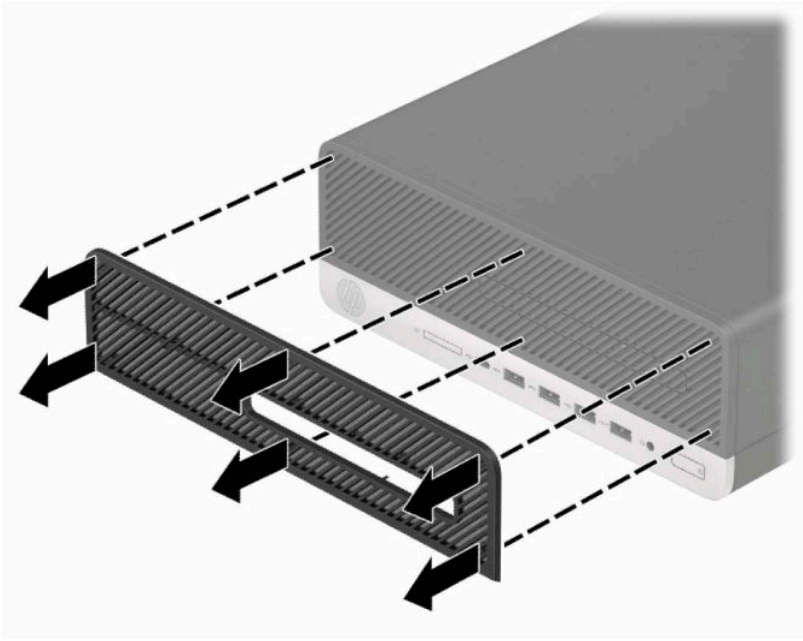
**NOTE:** The optional dust filter front bezel is available from HP.

To remove, clean, and replace the dust filter:

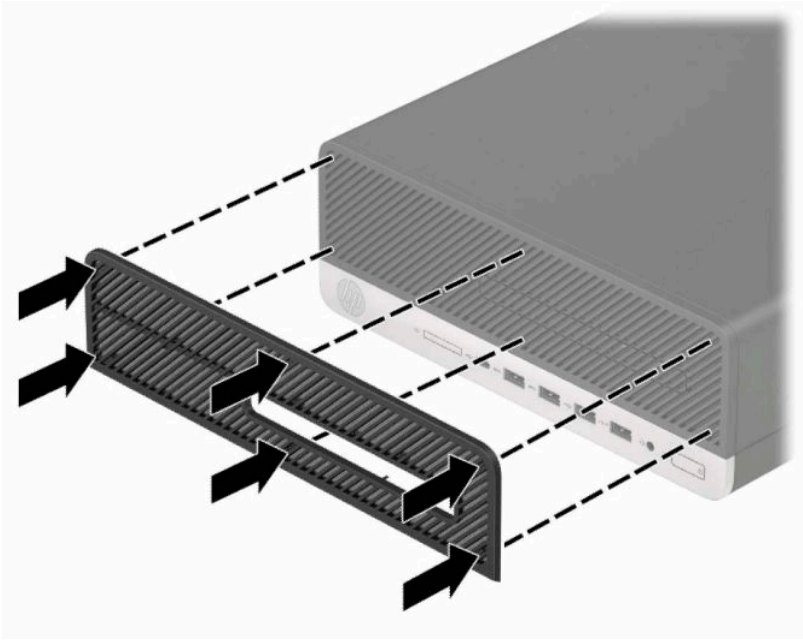
1. Turn off the computer properly through the operating system, and turn off any external devices.
2. Disconnect the power cord from the AC outlet and disconnect any external devices.

**IMPORTANT:** Regardless of the power state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. To prevent damage to internal components, you must disconnect the power cord from the power source before opening the computer.

3. To remove the dust filter, use your fingers to separate the filter from the front bezel at the tab locations shown below.



4. Use a soft brush or cloth to clean dust from the filter. If the filter is heavily soiled, rinse it clean with water.
5. To replace the dust filter, press the filter firmly onto the front bezel at the tab locations shown in the following illustration.



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

# Changing from desktop to tower configuration

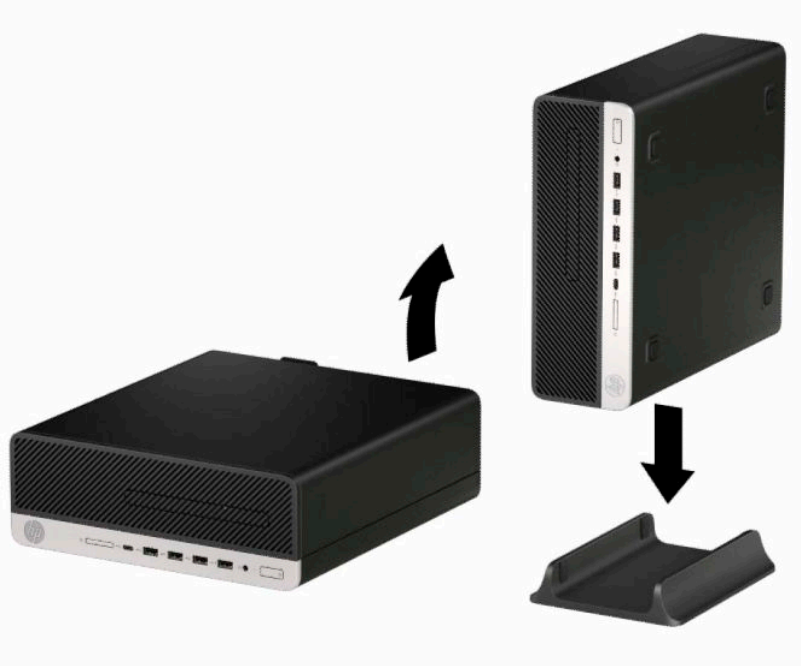
You can use the small form factor computer in a tower orientation with an optional tower stand that can be purchased from HP.

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

1. Remove or disengage any security devices that prohibit moving 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 state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. To prevent damage to internal components, you must disconnect the power cord from the power source before opening the computer.

5. Orient the computer so that its right side is facing up, and place the computer in the optional stand.



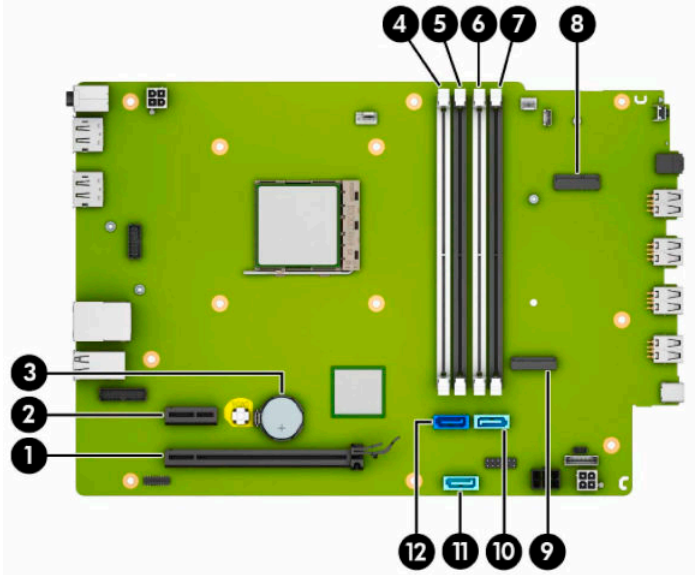
6. Reconnect the power cord and any external devices, and then turn on the computer.

   **NOTE:** Be sure that at least 10.2 cm (4 inches) of space on all sides of the computer remains clear and free of obstructions.

7. Lock any security devices that you disengaged before you moved the computer.

# System board connections

See 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 ×16 | X16PCIEXP | black | Expansion card |
| 2 | PCI Express ×1 | X1PCIEXP | black | Expansion card |
| 3 | Battery | BATTERY | black | Battery |
| 4 | DIMM4 (Channel A) | DIMM4 | white | Memory module |
| 5 | DIMM3 (Channel B) | DIMM3 | black | Memory module |
| 6 | DIMM2 (Channel A) | DIMM2 | white | Memory module |
| 7 | DIMM1 (Channel B) | DIMM1 | black | Memory module |
| 8 | M.2 WLAN 2230 | WIRELESS | black | M.2 WLAN card |
| 9 | M.2 SSD 2280 | SSD1 | black | M.2 SSD storage card |
| 10 | SATA 3.0 | SATA1 | light blue | Any SATA device other than the primary hard drive |
| 11 | SATA 3.0 | SATA2 | light blue | Any SATA device other than the primary hard drive |
| 12 | SATA 3.0 | SATA0 | dark blue | Primary hard drive |

# Upgrading system memory

The computer comes with double data rate 4 synchronous dynamic random access memory (DDR4-SDRAM) dual inline memory modules (DIMMs).

The memory sockets on the system board are populated with at least one preinstalled memory module. 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.

For proper system operation, the DIMMs must adhere to the following specifications:

- Industry-standard 288 pin
- Unbuffered non-ECC PC4-19200 DDR4-2400 MHz compliant
- 1.2 volt DDR4-SDRAM memory modules
- CAS latency 17 DDR4 2400 MHz (17-17-17 timing)
- Mandatory JEDEC SPD information

The computer supports the following:

- 512 MB, 1 GB, 2 GB, and 4 GB non-ECC memory technologies
- Single-sided and double-sided memory modules
- Memory modules constructed with ×8 and ×16 DDR devices; memory modules constructed with ×4 SDRAM are not supported

**NOTE:** The system does not operate properly if you install unsupported memory modules.

## Installing a memory module

There are four memory sockets on the system board, with two sockets per channel. The sockets are labeled DIMM1, DIMM2, DIMM3, and DIMM4. Sockets DIMM1 and DIMM3 operate in memory channel B. Sockets DIMM2 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 operates in single-channel mode if the DIMM sockets are populated in one channel only.
- The system operates 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 operates in dual-channel mode.
- The system operates 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 to Channel A. For example, if you populate 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 runs as dual-channel and 1 GB runs as single-channel.

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

**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 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 can 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, oxidation, or both 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, make sure that you are discharged of static electricity by briefly touching a grounded metal object. For more information, see Electrostatic discharge on page 44.

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

1. Remove or 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.

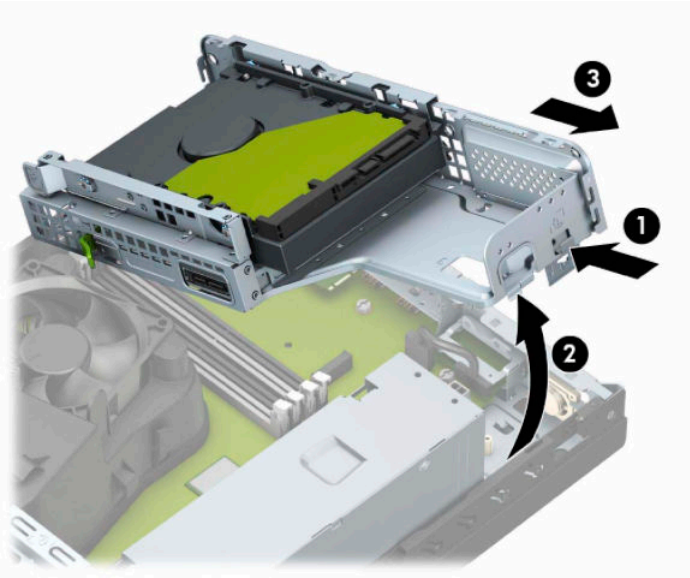
   **IMPORTANT:** You must disconnect the power cord and wait approximately 30 seconds for the power to drain before adding or removing memory modules. Regardless of the power state, voltage is always supplied to the memory modules as long as the computer is plugged into an active AC outlet. Adding or removing 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.

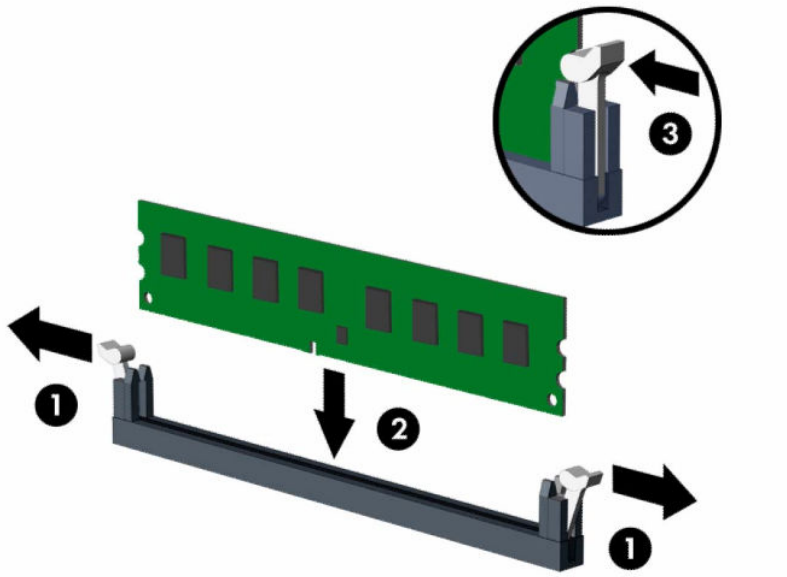
   **WARNING!** To reduce risk of personal injury from hot surfaces, allow the internal system components to cool before you touch them.

7. Disconnect the power and data cables from the rear of the drives in the drive cage.

8. Press the release lever on the side of the drive cage (1), and lift that side of the drive cage up (2). Then slide the drive cage (3) out of the chassis.




9. Open both latches of the memory module socket (1), and insert the memory module into the socket (2). Press the module down into the socket, making sure that the module is fully inserted and properly seated. Make sure the latches are in the closed position (3).



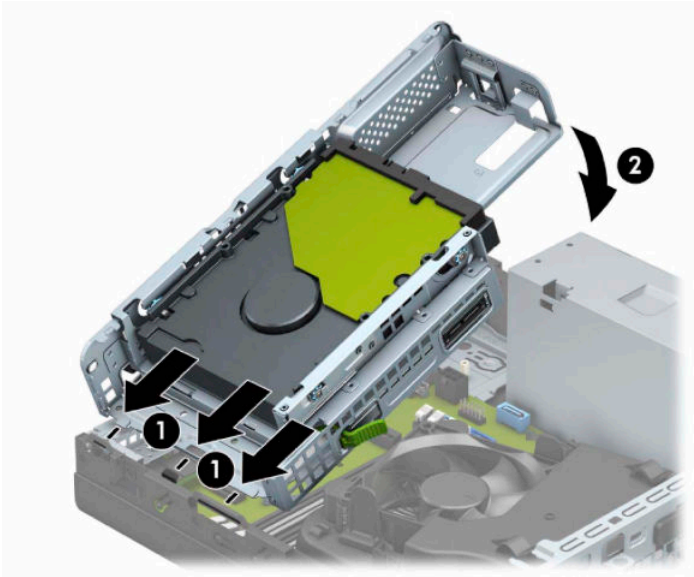

**NOTE:** A memory module can be installed in only one way. Match the notch on the module with the tab on the memory socket.

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.

10. Repeat step 9 to install any additional modules.

11. Hold the drive cage at an angle so that the tabs and slots on the side of the drive cage and chassis are aligned, and then slide the tabs and slots together (1). Then press the other side of the drive cage down (2) so that the release lever locks the drive cage in place.




12. Connect the power and data cables to the rear of the drives in the drive cage.
13. Replace the 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. The computer should automatically recognize the additional memory.
16. Lock any security devices that you disengaged when you removed the access panel.

# Removing or installing an expansion card

The computer has one PCI Express ×1 expansion socket and one PCI Express x16 expansion socket.

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

You can install a PCI Express ×1, ×4, ×8, or ×16 expansion card in the PCI Express ×16 socket.

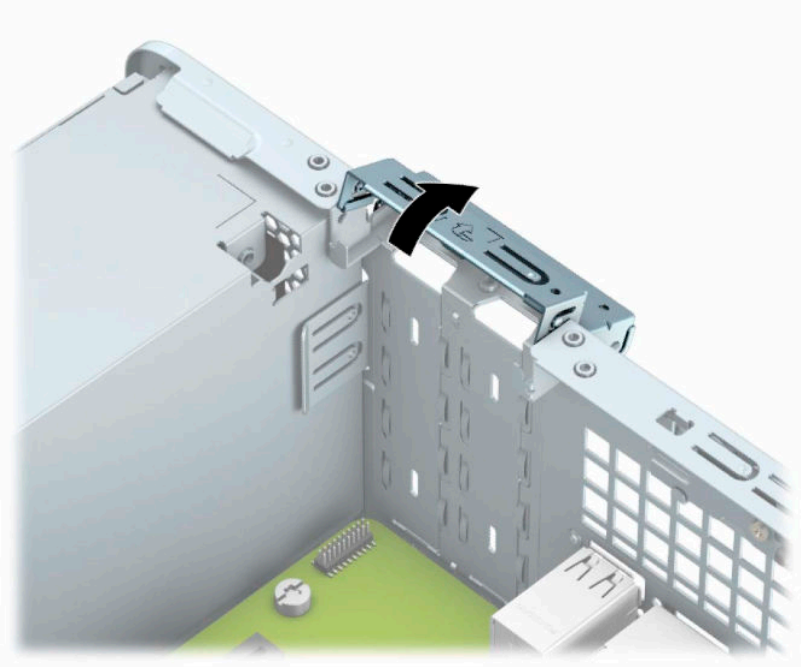
For dual graphics card configurations, the first (primary) card must be installed in the PCI Express ×16 socket.

To remove, replace, or add an expansion card:

1. Remove or 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. To prevent damage to internal components, you must disconnect the power cord from the power source before opening the computer.

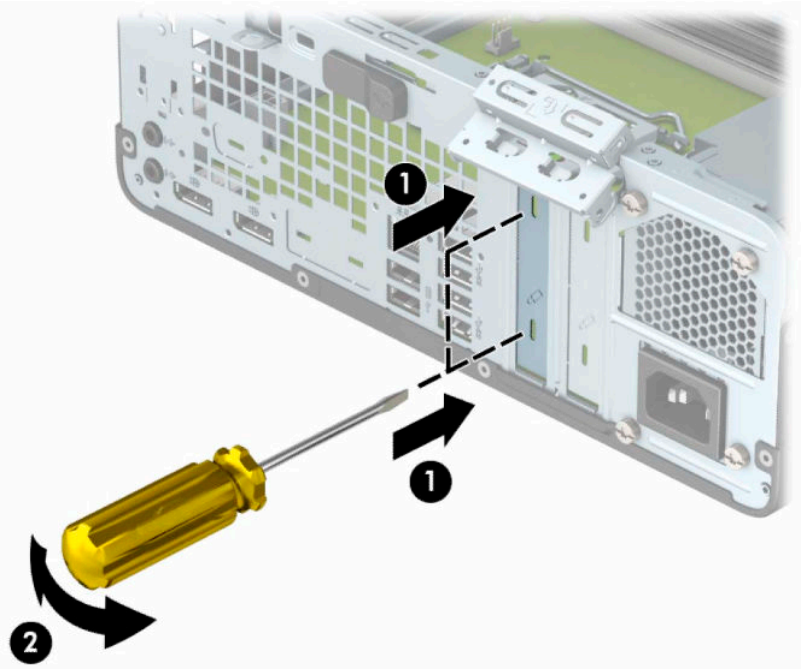
5. If the computer is on a stand, remove the computer from the stand.
6. Remove the computer access panel.
7. Locate the correct vacant expansion socket on the system board and the corresponding expansion slot on the back of the computer chassis.
8. Rotate the slot cover retention latch that secures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



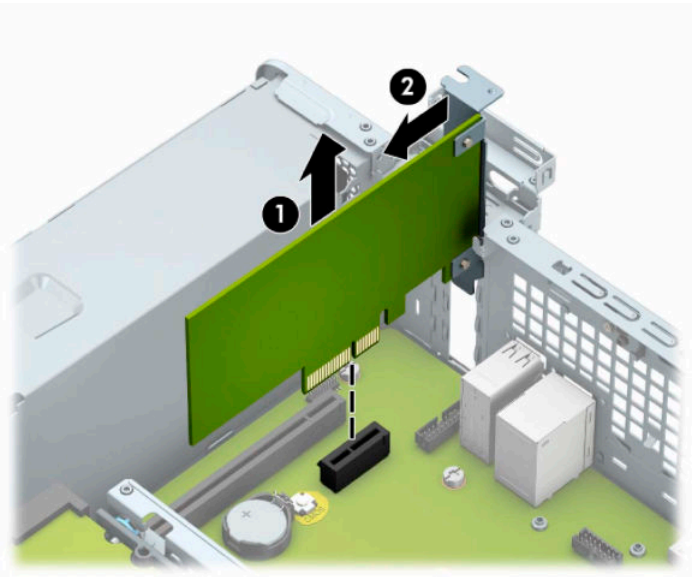
9. Before installing an expansion card, remove the expansion slot cover or the existing expansion card.

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

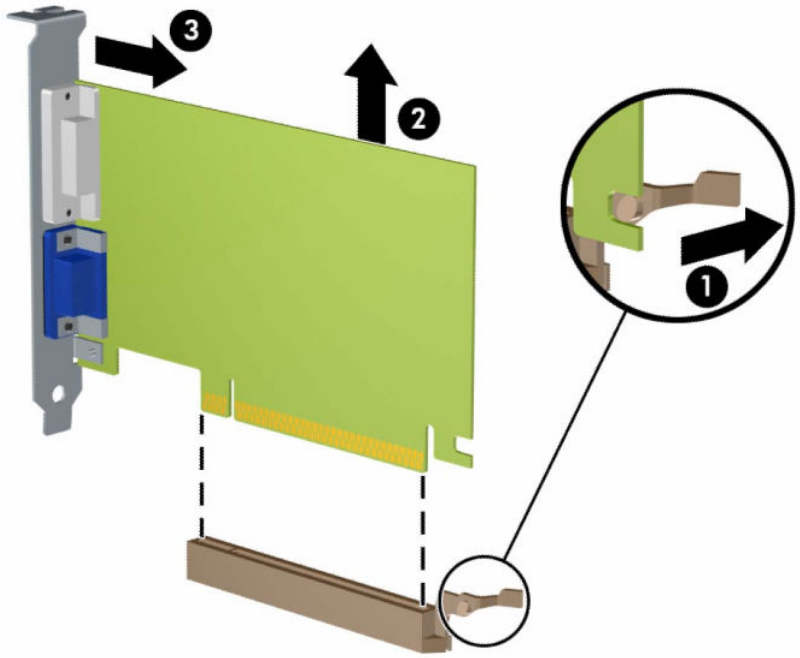
**a.** Insert a flat-bladed screwdriver into the slots on the rear of slot cover (1) and rock the slot cover back and forth (2) to break it free from the chassis.




**b.** If you are removing a PCI Express ×1 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) and then away from the inside of the chassis (2) to remove it. Be sure not to scrape the card against other components.



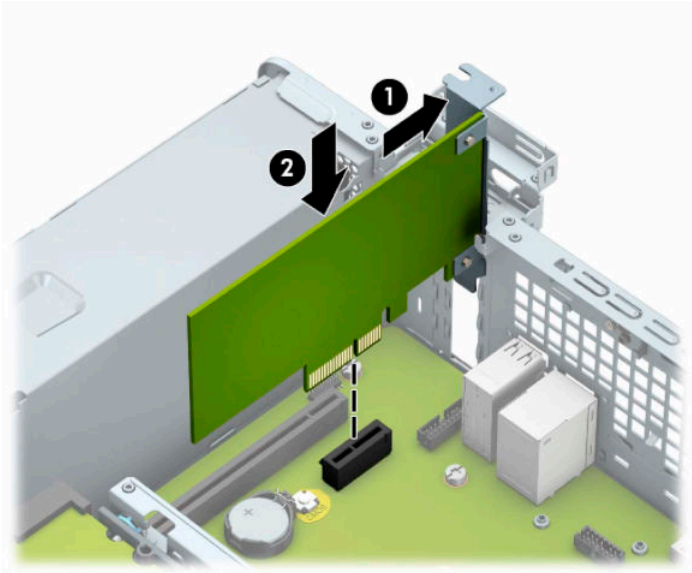
c. If you are removing a PCI Express x16 card, pull the retention arm on the back of the expansion socket away from the card (1) and carefully rock the card back and forth until the connectors pull free from the socket. Lift the card straight up (2) and then away from the inside of the chassis (3) to remove it. Be sure not to scrape the card against other components.




10. Store the removed card in antistatic packaging.
11. If you are not installing a new expansion card, install an expansion slot cover to close the open slot.

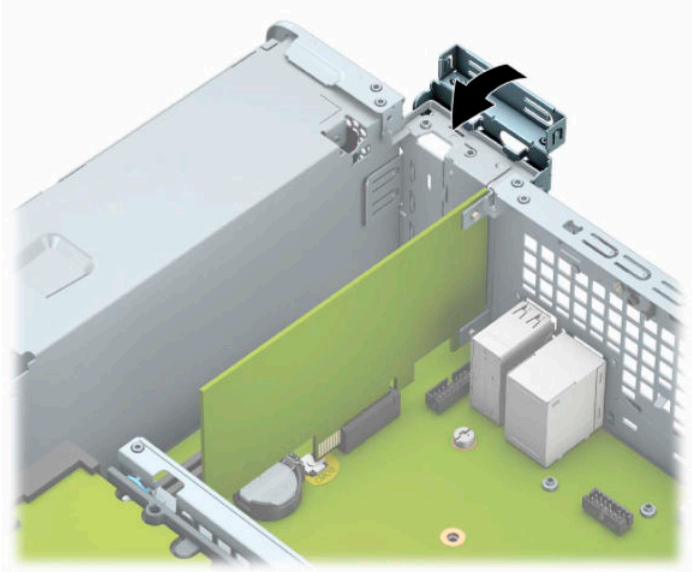
**IMPORTANT:** After removing an expansion card, you must replace it with a new card or expansion slot cover for proper cooling of internal components during operation.

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.

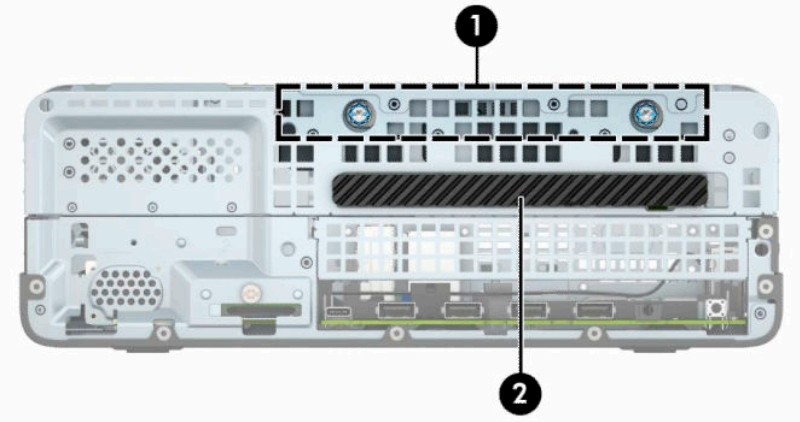
13. Rotate the slot cover retention latch back in place to secure the expansion card.



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 you disengaged when you removed the access panel.
19. Reconfigure the computer, if necessary.

# Drive positions




| Drive positions | |
|---|---|
| 1 | 3.5-in hard drive bay |
| 2 | 9.5 mm slim optical drive bay |

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

# 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 an optical drive to one of the light-blue SATA connectors on the system board (labeled SATA1 and SATA2).

**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, see Electrostatic discharge on page 44.

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.”

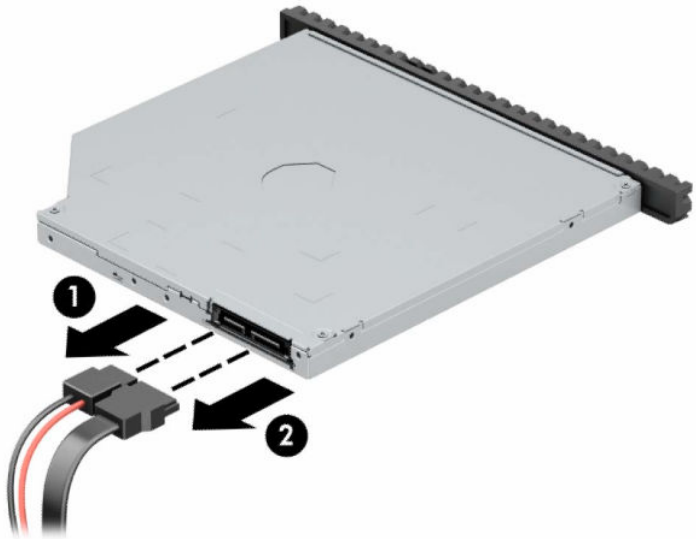
## Removing a 9.5 mm slim optical drive

1. Remove or 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.

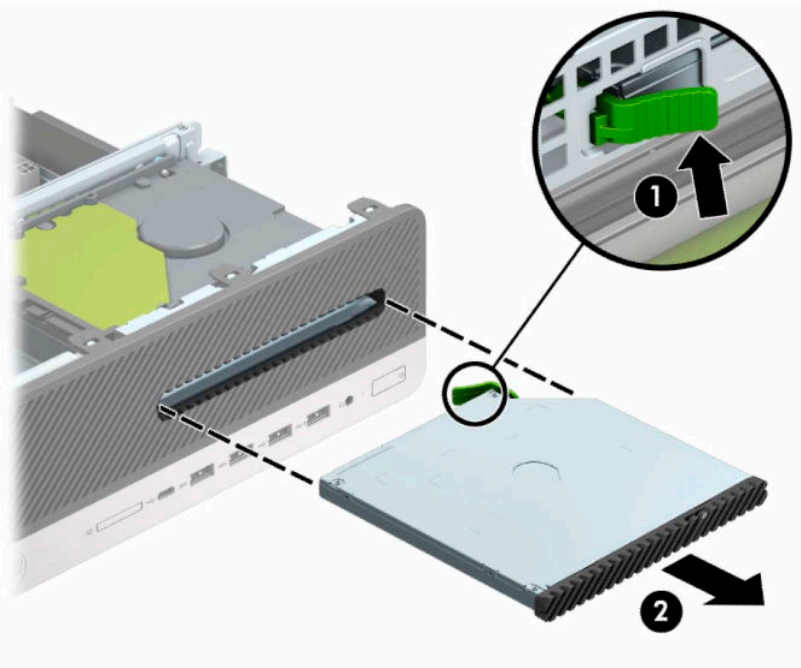
**IMPORTANT:** Regardless of the power state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. To prevent damage to internal components, you must disconnect the power cord from the power source before opening the computer.

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.

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



8. Push the green release latch on the right rear side of the drive toward the center of the drive (1), and then slide the drive forward and out of the bay (2).



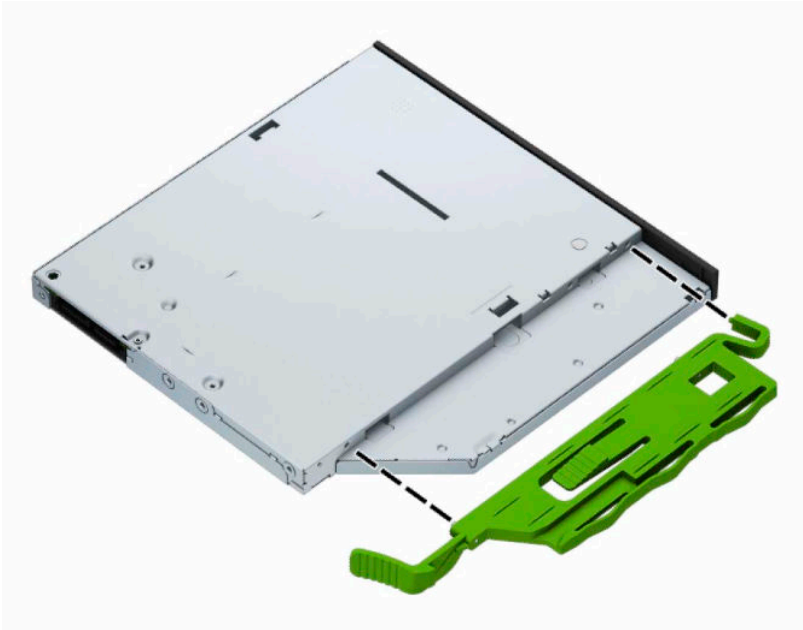

## Installing a 9.5 mm slim optical drive

1. Remove or 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.

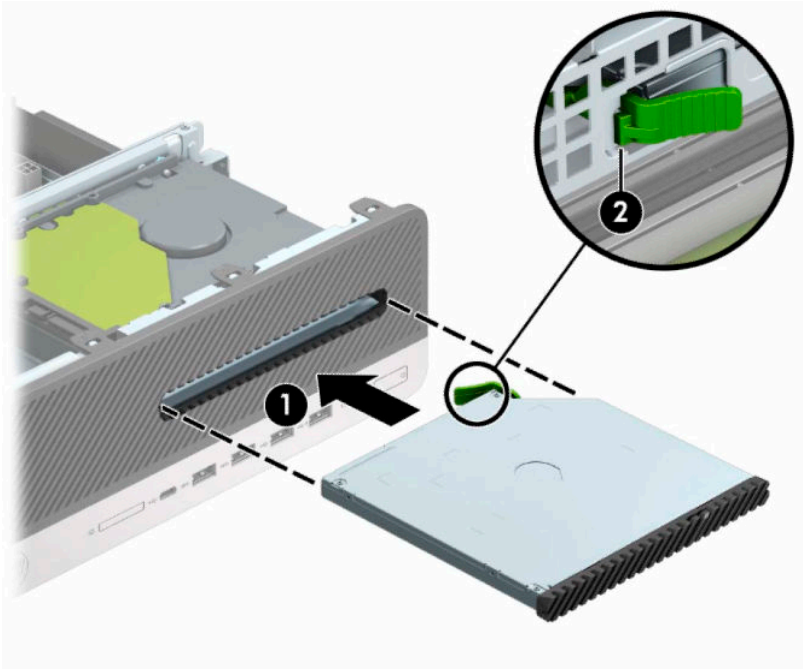
**IMPORTANT:** Regardless of the power state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. To prevent damage to internal components, you must disconnect the power cord from the power source before opening the computer.

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 8 for more information.

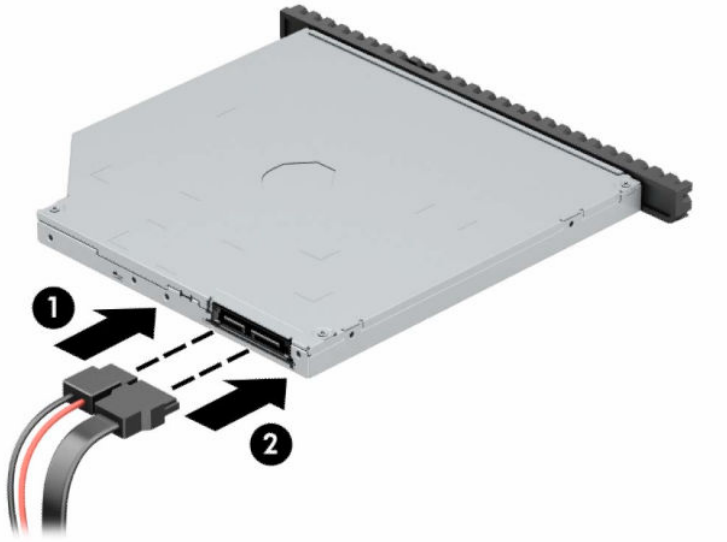
8. Align the small pin on the release latch with the small hole on the side of the drive, and press the latch firmly onto the drive.



9. Slide the optical drive through the front bezel all the way into the bay (1) so that the latch on the rear of the drive locks into place (2).



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




11. Connect the opposite end of the data cable to one of the light-blue SATA connectors on the system board labeled SATA1 or SATA2.

**NOTE:** See System board connections on page 12 for an illustration of the system board drive connectors.

12. Replace the front bezel if it was removed.
13. Replace the 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 you disengaged when you removed the access panel.

## Removing a 3.5-inch hard drive

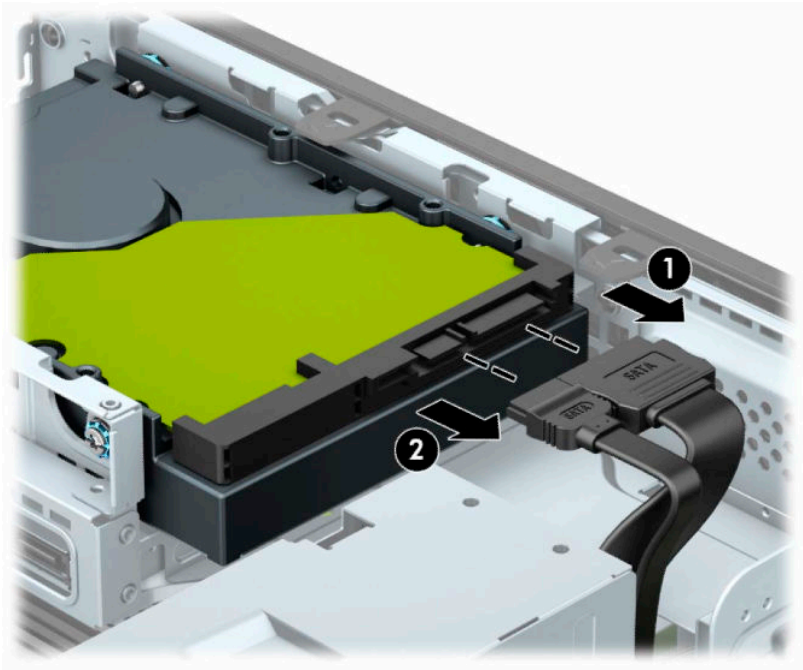
**NOTE:** Before you remove the old hard drive, be sure to bacnck up the data from the old hard drive so that you can transfer the data to the new hard drive.

1. Remove or 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.

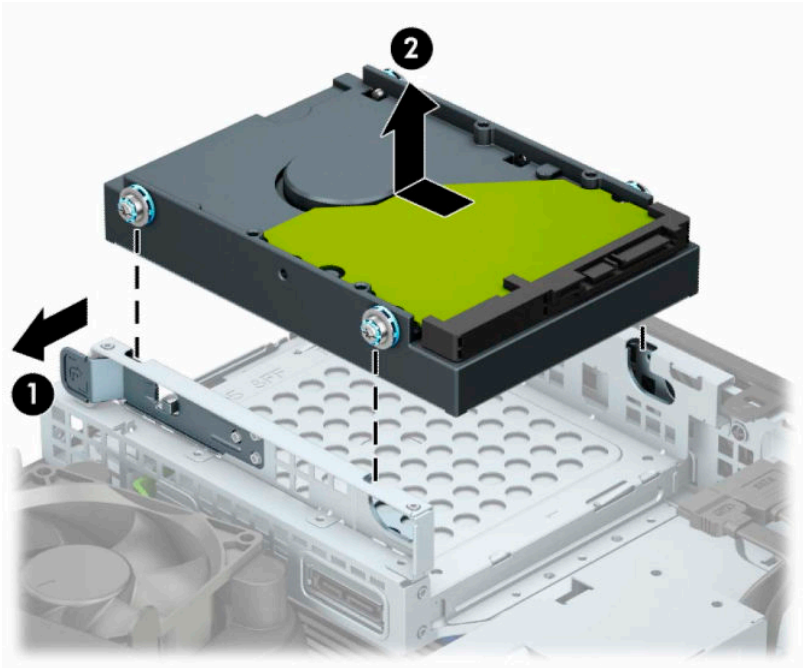
**IMPORTANT:** Regardless of the power state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. To prevent damage to internal components, you must disconnect the power cord from the power source before opening the computer.

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 and lift it out of the bay (2).




## Installing a 3.5-inch hard drive

1. Remove or 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.

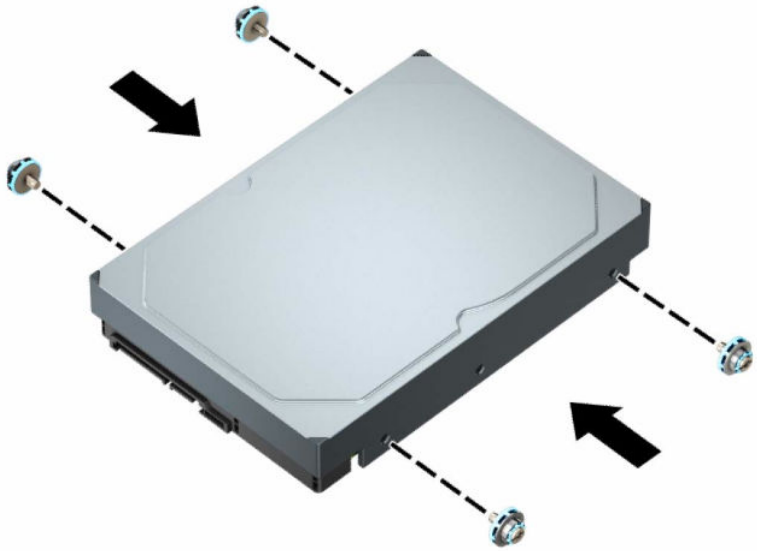
**IMPORTANT:** Regardless of the power state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. To prevent damage to internal components, you must disconnect the power cord from the power source before opening the computer.

5. If the computer is on a stand, remove the computer from the stand.
6. Remove the computer access panel.
7. Install mounting screws on the sides of the hard drive using standard 6-32 silver-and-blue mounting screws.

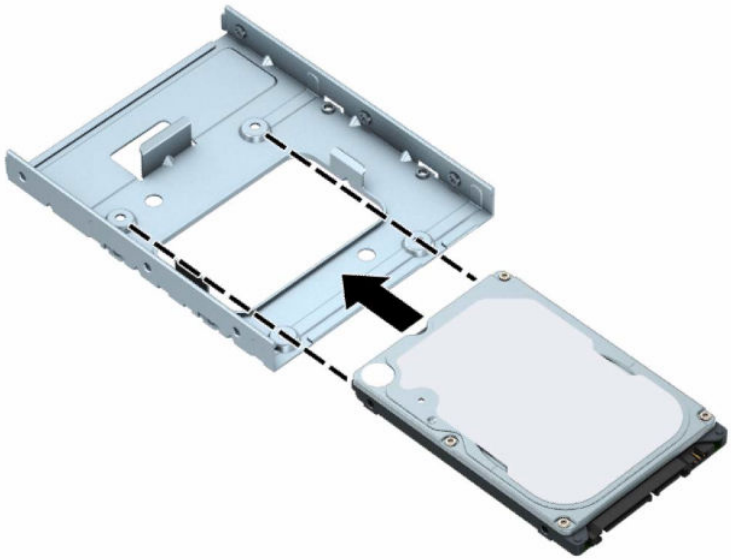
**NOTE:** You can purchase 6-32 mounting screws from HP.

If you are replacing a drive, transfer the mounting screws from the old drive to the new drive.

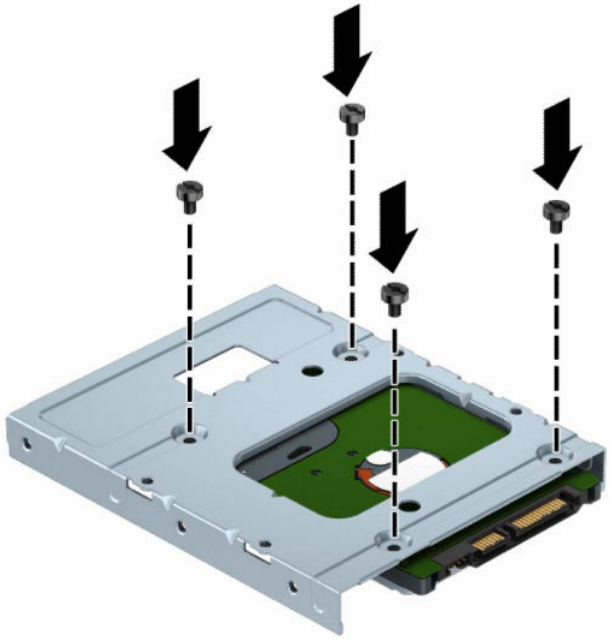
- Install four silver-and-blue 6-32 mounting screws (two on each side of the drive).



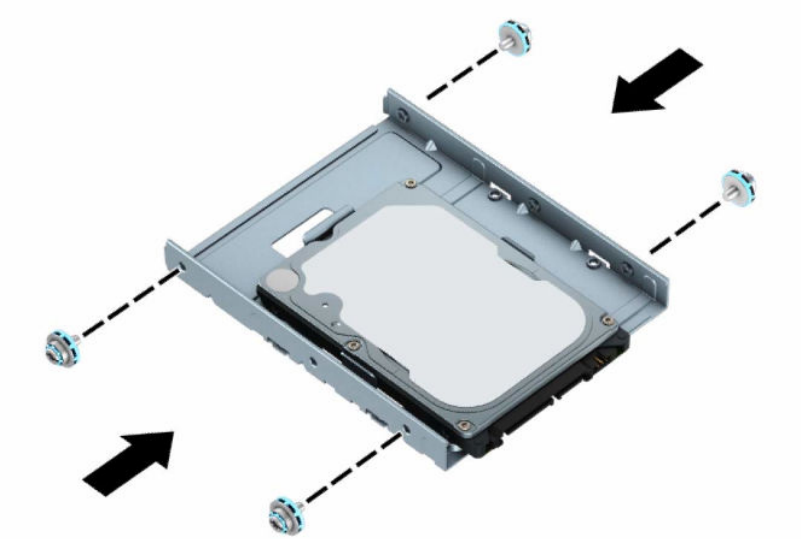
- You can also install a 2.5-inch hard drive into a 3.5-inch drive bay using an adapter bracket similar to the following example.
  - Slide the 2.5 inch drive into the 3.5 inch adapter bracket.



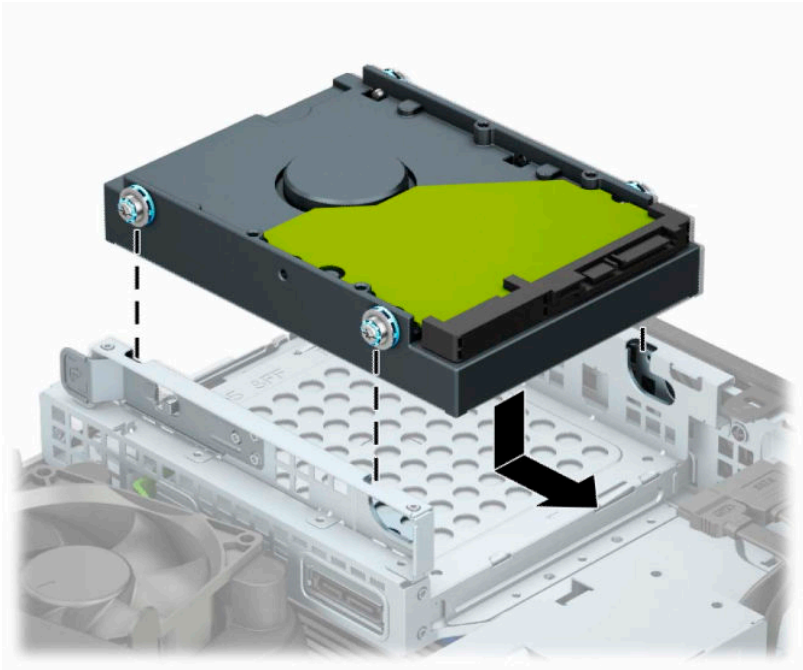
– Secure the drive to the bay adapter bracket by installing four black M3 adapter bracket screws through the underside of the bracket and into the drive.



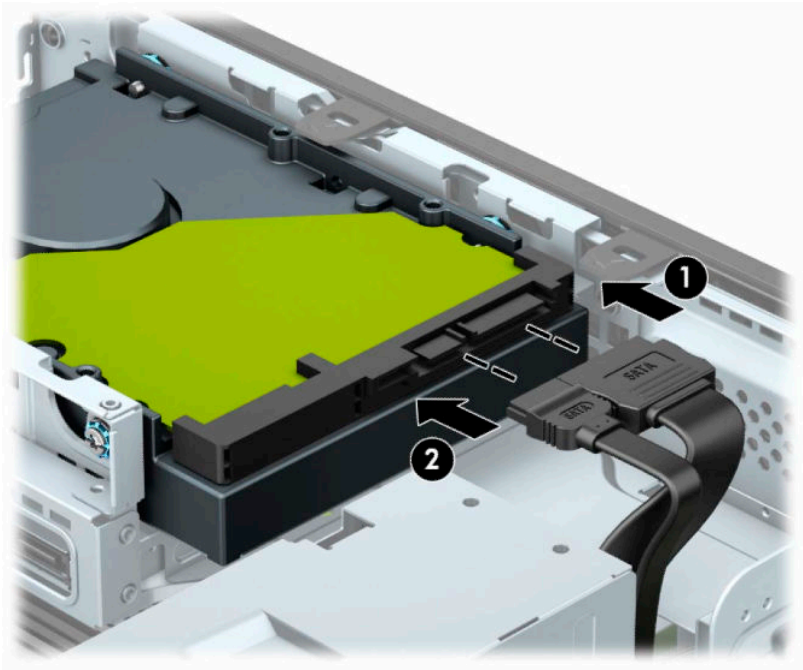
– Install four 6-32 silver-and-blue mounting screws in the adapter bracket (two on each side of the bracket).



8. Align the mounting screws with the slots on the drive cage. Lower the drive into the drive cage, and then slide it back to secure it in place.



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




10. If installing a new drive, connect the opposite end of the data cable to the appropriate system board connector.

**NOTE:** If the 3.5-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 drive, connect the other end of the data cable to one of the light-blue SATA connectors on the system board.

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 you disengaged when you removed the access panel.

## Removing and installing an M.2 SSD storage card

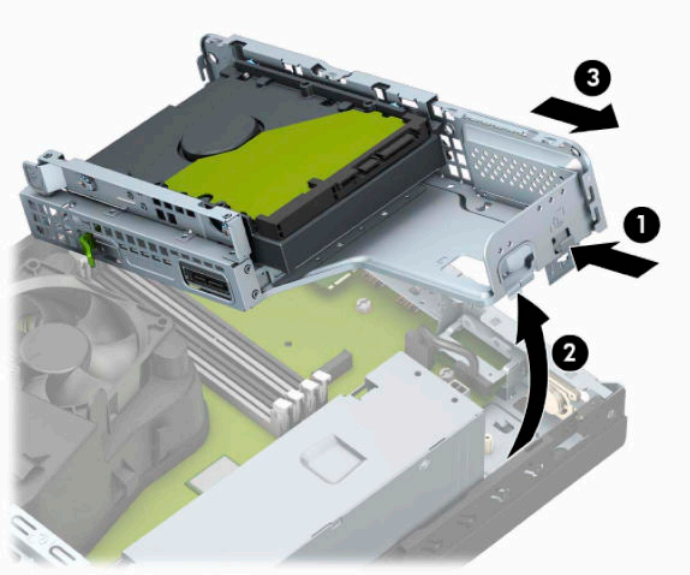
**NOTE:** There are two M.2 SSD sockets on the system board. The computer supports 2230 and 2280 M.2 SSD cards.

1. Remove or 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.

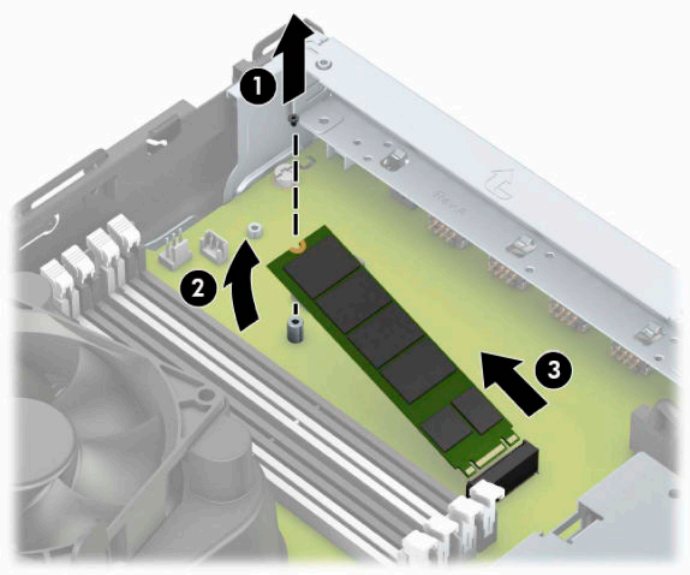
**IMPORTANT:** Regardless of the power state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. To prevent damage to internal components, you must disconnect the power cord from the power source before opening the computer.

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

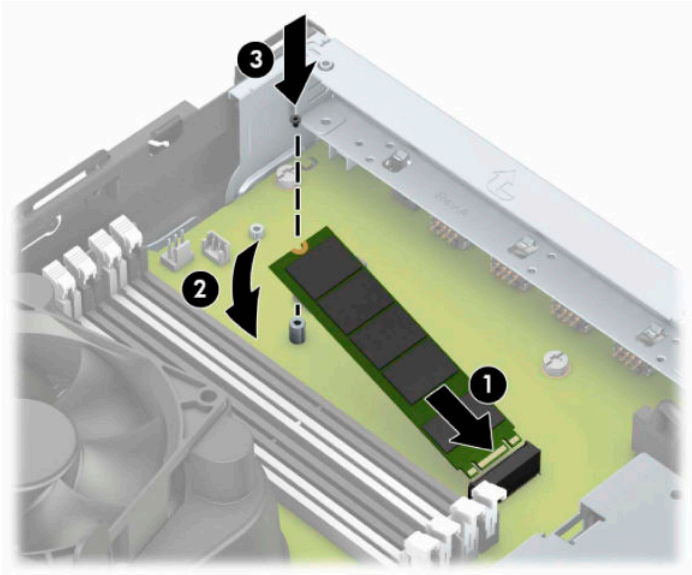
7. Remove the front bezel.
8. Disconnect the power and data cables from the rear of the drives in the drive cage.
9. Press the release lever on the side of the drive cage (1), and lift that side of the drive cage up (2). Then slide the drive cage (3) out of the chassis.



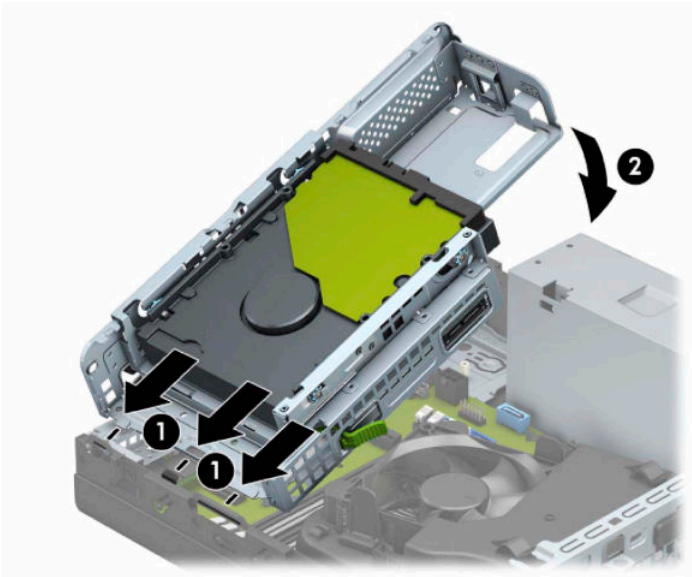

10. To remove an M.2 SSD card, remove the screw that secures the card (1), lift the end of the card up (2), and then slide the card out of the system board connector (3).



11. To install an M.2 SSD card, slide the pins on the card into the system board connector while holding the card at approximately a 30° angle (1). Press the other end of the card down (2), and then secure the card with the screw (3).




12. Hold the drive cage at an angle so that the tabs and slots on the side of the drive cage and chassis are aligned, and then slide the tabs and slots together (1). Then press the other side of the drive cage down (2) so that the release lever locks the drive cage in place.




13. Connect the power and data cables to the rear of the drives in the drive cage.
14. Replace the front bezel.
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 you disengaged when you removed the access panel.

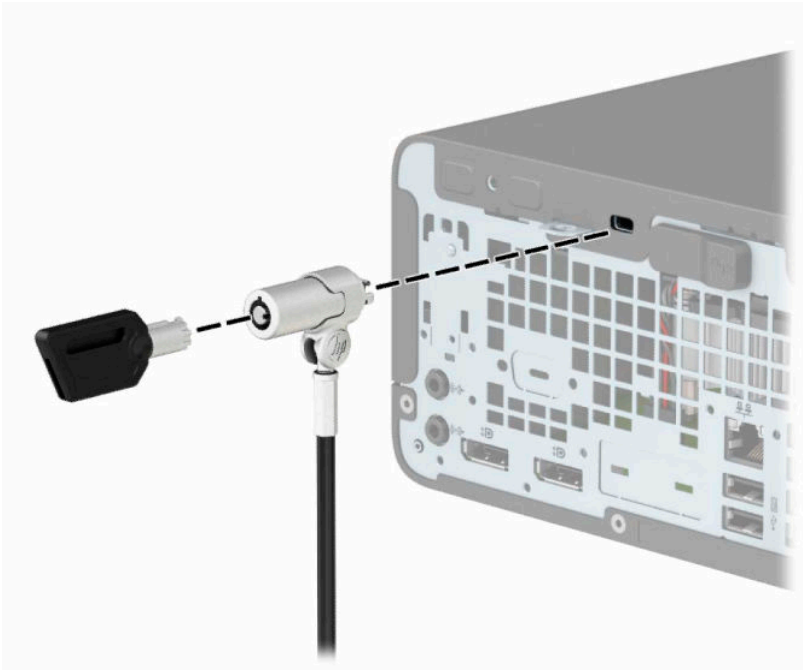
# Installing a security lock

You can use the following security locks to secure the computer.

## Security cable lock

1. Loop the security cable around a stationary object.

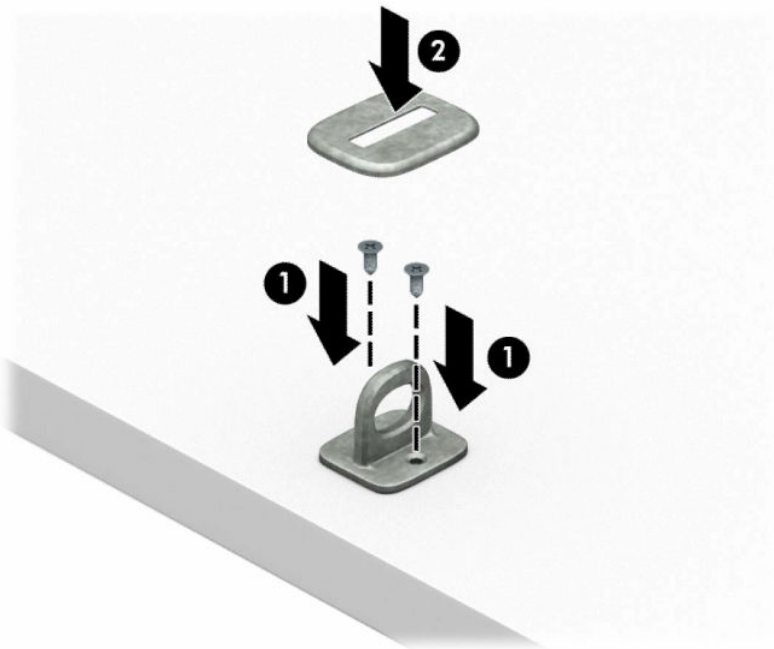
2. Insert the security cable lock into the security cable slot. Then lock it in place with the key.



## Padlock

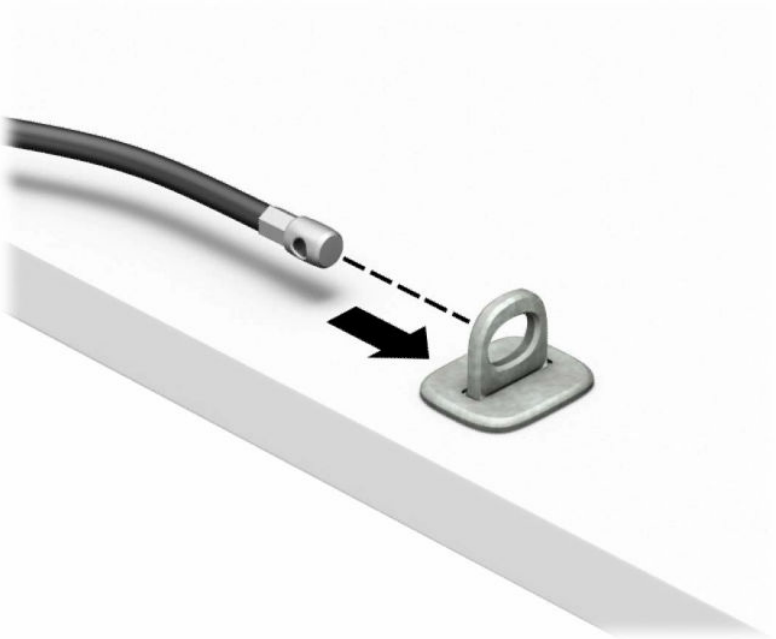
## HP Business PC Security Lock V2

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).

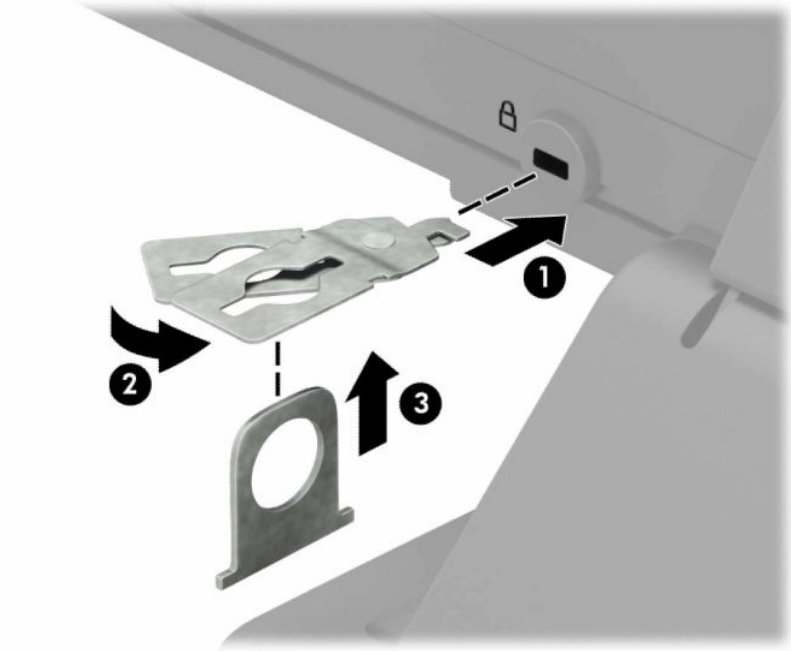


2. Loop the security cable around a stationary object.

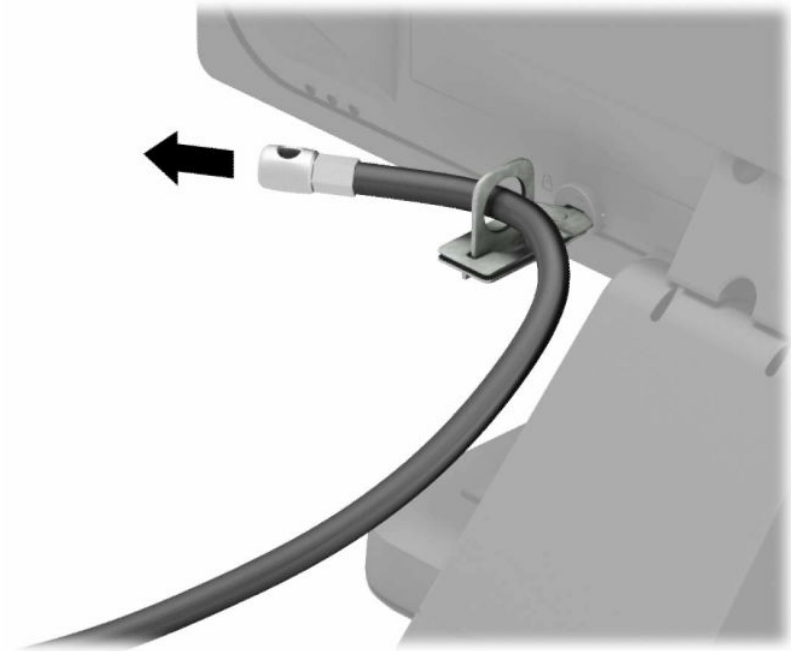
3. Slide the security cable through the security cable fastener.



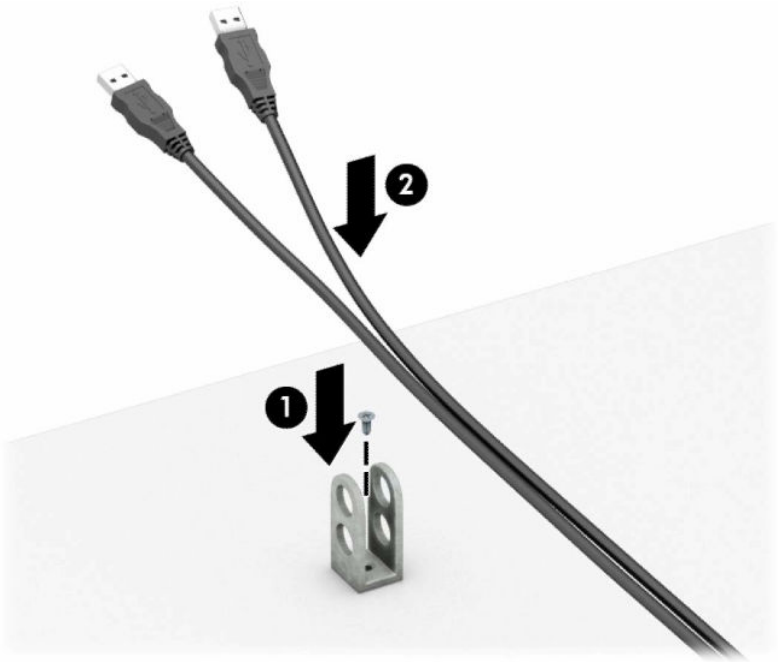
4. Pull the two scissor hands of the monitor lock apart, and insert the lock into the security cable slot on the rear of the monitor (1). Close the scissor hands together to secure the lock in place (2), and then slide the security cable guide through the center of the monitor lock (3).



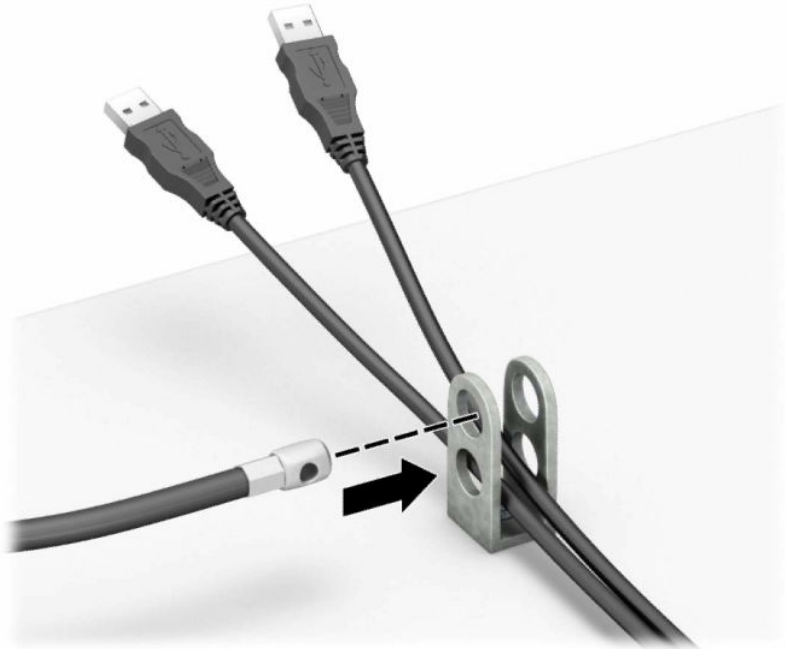

5. Slide the security cable through the security cable guide installed on the monitor.



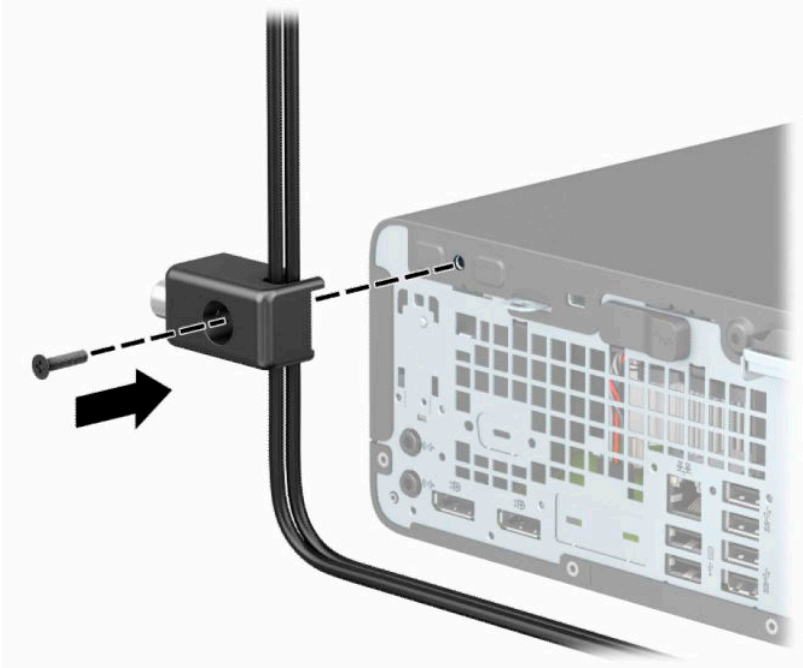
6. Attach the accessory cable fastener to a desktop using the appropriate screw for your environment (screw not provided) (1), and then place the accessory cables into the base of the fastener (2).



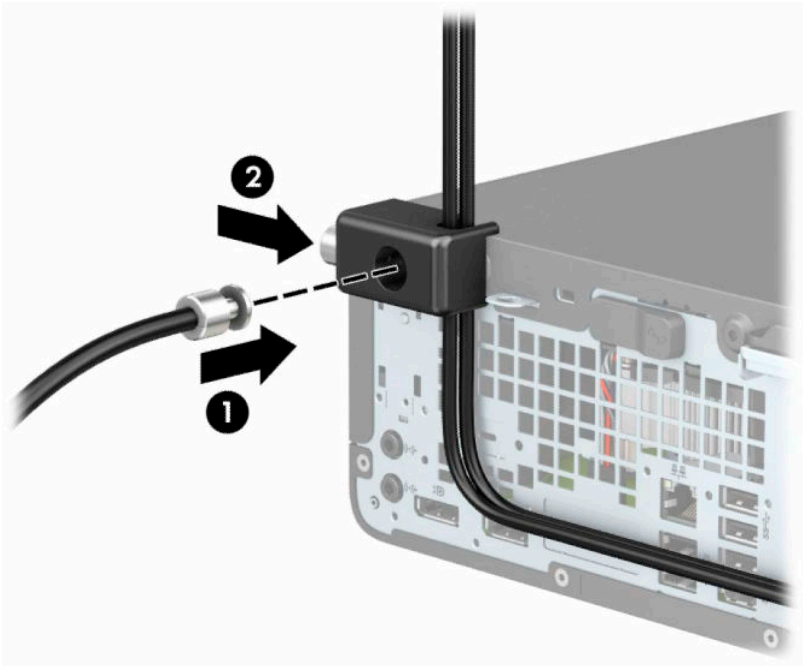

7. Slide the security cable through the holes in the accessory cable fastener.



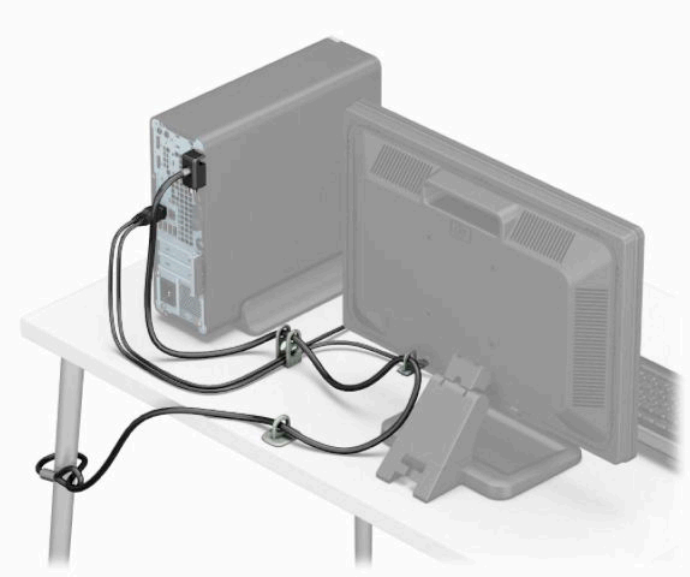
8. Screw the lock to the chassis using the screw provided.



9. 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.



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



# 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 V 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, be sure 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 used only 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 or 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 state, voltage is always present on the system board as long as the system is plugged into an active AC outlet. To prevent damage to internal components, you must disconnect the power cord from the power source before opening the computer.

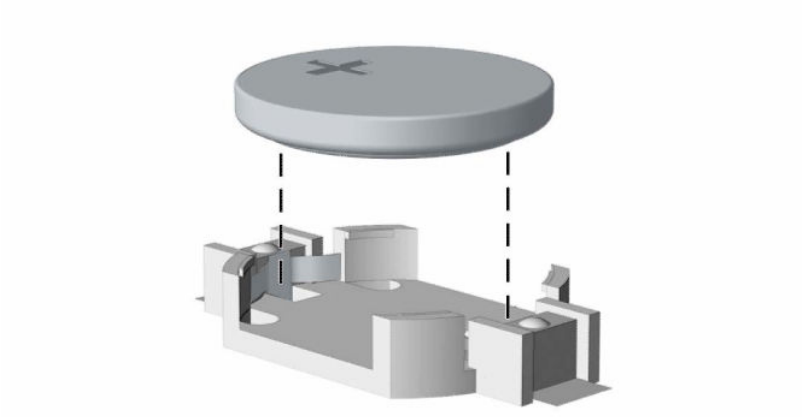
5. Remove the computer access panel.
6. Locate the battery and battery holder on the system board.

   **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**

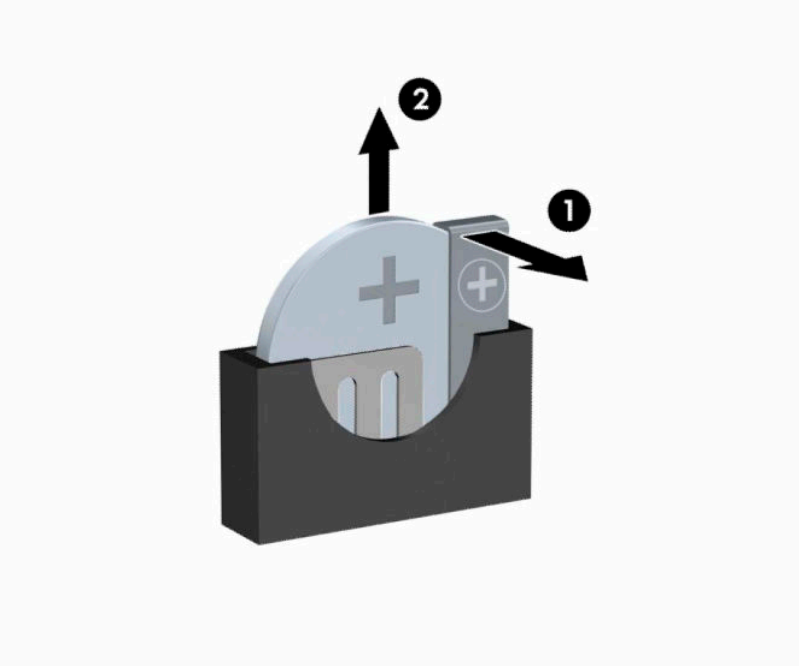
**a.** To release the battery from its holder, squeeze the metal clamp that extends above one edge of the battery (1). When the battery pops up, lift it out (2).

**b.** To insert the new battery, slide one edge of the replacement battery under the holder's lip with the positive side up (1). 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 you disengaged when you removed the computer access panel.

# 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 MΩ ± 10% 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 recirculated 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 previously 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 1 hr 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 and then from the computer.
5. Disconnect the system components and external devices from their power sources and 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 and accessibility

Because HP works to weave diversity, inclusion, and work/life into the fabric of the company, it is reflected in everything HP does. HP strives to create an inclusive environment focused on connecting people to the power of technology throughout the world.

### Finding the technology tools you need

Technology can unleash your human potential. Assistive technology removes barriers and helps you create independence at home, at work, and in the community. Assistive technology helps increase, maintain, and improve the functional capabilities of electronic and information technology. For more information, see Finding the best assistive technology on page 48.

### The HP commitment

HP is committed to providing products and services that are accessible for people with disabilities. This commitment supports the company's diversity objectives and helps ensure that the benefits of technology are available to all.

The HP accessibility goal is to design, produce, and market products and services that can be effectively used by everyone, including people with disabilities, either on a stand-alone basis or with appropriate assistive devices.

To achieve that goal, this Accessibility Policy establishes seven key objectives to guide HP actions. All HP managers and employees are expected to support these objectives and their implementation in accordance with their roles and responsibilities:

- Raise the level of awareness of accessibility issues within HP, and provide employees with the training they need to design, produce, market, and deliver accessible products and services.
- Develop accessibility guidelines for products and services, and hold product development groups accountable for implementing these guidelines where competitively, technically, and economically feasible.
- Involve people with disabilities in the development of accessibility guidelines and in the design and testing of products and services.
- Document accessibility features, and make information about HP products and services publicly available in an accessible form.
- Establish relationships with leading assistive technology and solution providers.
- Support internal and external research and development that improves assistive technology relevant to HP products and services.
- Support and contribute to industry standards and guidelines for accessibility.

### International Association of Accessibility Professionals (IAAP)

IAAP is a not-for-profit association focused on advancing the accessibility profession through networking, education, and certification. The objective is to help accessibility professionals develop and advance their careers and to better enable organizations to integrate accessibility into their products and infrastructure.

As a founding member, HP joined to participate with other organizations to advance the field of accessibility. This commitment supports HP's accessibility goal of designing, producing, and marketing products and services that people with disabilities can effectively use.

IAAP will make the profession strong by globally connecting individuals, students, and organizations to learn from one another. If you are interested in learning more, go to http://www.accessibilityassociation.org to join the online community, sign up for newsletters, and learn about membership options.

## Finding the best assistive technology

Everyone, including people with disabilities or age-related limitations, should be able to communicate, express themselves, and connect with the world using technology. HP is committed to increasing accessibility awareness within HP and with our customers and partners. Whether it's large fonts that are easy on the eyes, voice recognition that lets you give your hands a rest, or any other assistive technology to help with your specific situation—a variety of assistive technologies make HP products easier to use. How do you choose?

### Assessing your needs

Technology can unleash your potential. Assistive technology removes barriers and helps you create independence at home, at work, and in the community. Assistive technology (AT) helps increase, maintain, and improve the functional capabilities of electronic and information technology.

You can choose from many AT products. Your AT assessment should allow you to evaluate several products, answer your questions, and facilitate your selection of the best solution for your situation. You will find that professionals qualified to do AT assessments come from many fields, including those licensed or certified in physical therapy, occupational therapy, speech/language pathology, and other areas of expertise. Others, while not certified or licensed, can also provide evaluation information. You will want to ask about the individual's experience, expertise, and fees to determine if they are appropriate for your needs.

### Accessibility for HP products

The following links provide information about accessibility features and assistive technology, if applicable, included in various HP products. These resources will help you select the specific assistive technology features and product(s) most appropriate for your situation.

- HP Elite x3–Accessibility Options (Windows 10 Mobile)
- HP PCs–Windows 7 Accessibility Options
- HP PCs–Windows 8 Accessibility Options
- HP PC's–Windows 10 Accessibility Options
- HP Slate 7 Tablets–Enabling Accessibility Features on Your HP Tablet (Android 4.1/Jelly Bean)
- HP SlateBook PCs–Enabling Accessibility Features (Android 4.3, 4.2/Jelly Bean)
- HP Chromebook PCs–Enabling Accessibility Features on Your HP Chromebook or Chromebox (Chrome OS)
- HP Shopping–peripherals for HP products

If you need additional support with the accessibility features on your HP product, see Contacting support on page 51.

Additional links to external partners and suppliers that may provide additional assistance:

- Microsoft Accessibility information (Windows 7, Windows 8, Windows 10, Microsoft Office)
- Google Products accessibility information (Android, Chrome, Google Apps)

- Assistive Technologies sorted by impairment type
- Assistive Technologies sorted by product type
- Assistive Technology vendors with product descriptions
- Assistive Technology Industry Association (ATIA)

# Standards and legislation

## Standards

Section 508 of the Federal Acquisition Regulation (FAR) standards was created by the US Access Board to address access to information and communication technology (ICT) for people with physical, sensory, or cognitive disabilities. The standards contain technical criteria specific to various types of technologies, as well as performance-based requirements which focus on functional capabilities of covered products. Specific criteria cover software applications and operating systems, web-based information and applications, computers, telecommunications products, video and multimedia, and self-contained closed products.

### Mandate 376 – EN 301 549

The EN 301 549 standard was created by the European Union within Mandate 376 as the basis for an online toolkit for public procurement of ICT products. The standard specifies the functional accessibility requirements applicable to ICT products and services, together with a description of the test procedures and evaluation methodology for each accessibility requirement.

### Web Content Accessibility Guidelines (WCAG)

Web Content Accessibility Guidelines (WCAG) from the W3C's Web Accessibility Initiative (WAI) helps web designers and developers create sites that better meet the needs of people with disabilities or age-related limitations. WCAG advances accessibility across the full range of web content (text, images, audio, and video) and web applications. WCAG can be precisely tested, is easy to understand and use, and allows web developers flexibility for innovation. WCAG 2.0 has also been approved as ISO/IEC 40500:2012.

WCAG specifically addresses barriers to accessing the web experienced by people with visual, auditory, physical, cognitive, and neurological disabilities, and by older web users with accessibility needs. WCAG 2.0 provides characteristics of accessible content:

- **Perceivable** (for instance, by addressing text alternatives for images, captions for audio, adaptability of presentation, and color contrast)
- **Operable** (by addressing keyboard access, color contrast, timing of input, seizure avoidance, and navigability)
- **Understandable** (by addressing readability, predictability, and input assistance)
- **Robust** (for instance, by addressing compatibility with assistive technologies)

## Legislation and regulations

Accessibility of IT and information has become an area of increasing legislative importance. The links listed below provide information about key legislation, regulations, and standards.

- United States
- Canada
- Europe

- United Kingdom
- Australia
- Worldwide

# Useful accessibility resources and links

The following organizations might be good resources for information about disabilities and age-related limitations.

**NOTE:** This is not an exhaustive list. These organizations are provided for informational purposes only. HP assumes no responsibility for information or contacts you encounter on the Internet. Listing on this page does not imply endorsement by HP.

## Organizations

- American Association of People with Disabilities (AAPD)
- The Association of Assistive Technology Act Programs (ATAP)
- Hearing Loss Association of America (HLAA)
- Information Technology Technical Assistance and Training Center (ITTATC)
- Lighthouse International
- National Association of the Deaf
- National Federation of the Blind
- Rehabilitation Engineering & Assistive Technology Society of North America (RESNA)
- Telecommunications for the Deaf and Hard of Hearing, Inc. (TDI)
- W3C Web Accessibility Initiative (WAI)

## Educational institutions

- California State University, Northridge, Center on Disabilities (CSUN)
- University of Wisconsin - Madison, Trace Center
- University of Minnesota computer accommodations program

## Other disability resources

- ADA (Americans with Disabilities Act) Technical Assistance Program
- ILO Global Business and Disability network
- EnableMart
- European Disability Forum
- Job Accommodation Network
- Microsoft Enable

## HP links

Our contact webform

HP comfort and safety guide

HP public sector sales

# Contacting support

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

- Customers who are deaf or hard of hearing who have questions about technical support or accessibility of HP products:
  - Use TRS/VRS/WebCapTel to call (877) 656-7058 Monday through Friday, 6 a.m. to 9 p.m. Mountain Time.
- Customers with other disabilities or age-related limitations who have questions about technical support or accessibility of HP products, choose one of the following options:
  - Call (888) 259-5707 Monday through Friday, 6 a.m. to 9 p.m. Mountain Time.
  - Complete the Contact form for people with disabilities or age-related limitations.

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