

ThinkCentre®

M920t User Guide and Hardware Maintenance Manual

Think

Lenovo

Energy Star Machine Types: 10SF, 10SG, 10SH, 10TM, 10U0 and 10U1

Note: Before using this information and the product it supports, be sure to read and understand the *Important Product Information Guide* and Appendix A “Notices” on page 71.

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Chapter 1. Overview

This chapter provides basic information to help you get familiar with your computer.

Front view

Note: Your computer model might look slightly different from the illustration.

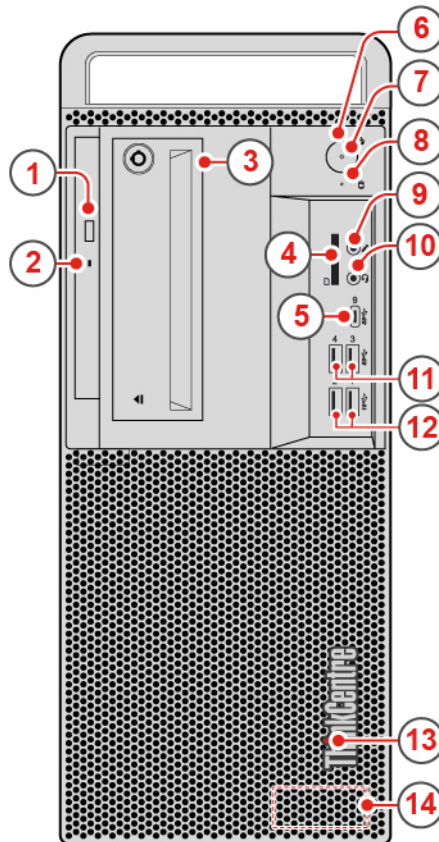


Figure 1. Front view

1 Optical drive eject/close button (optional)	2 Optical drive status indicator (optional)
3 Front-access storage enclosure	4 Card reader slot (optional)
5 USB-C™ connector (only supports USB data transmission)	6 Power button
7 Power indicator	8 Storage drive activity indicator
9 Microphone connector	10 Headset connector
11 USB 3.1 Gen 1 connectors (2)	12 USB 3.1 Gen 2 connectors (2)
13 Illuminated red dot	14 Internal speaker

1 Optical drive eject/close button

Used to eject the tray of the optical drive. After you insert a disc into the tray, press the eject/close button to close the tray.

2 Optical drive status indicator

This indicator is on when the optical drive is in use.

3 Front-access storage enclosure

Used to provide access to the hot-swappable storage drive.

4 Card reader slot

Used to read data from a supported memory card.

5 USB-C connector (only supports USB data transmission)

Use the connector to transfer data (USB 3.1 Gen 1, 5.0Gbps), charge your device (5V/3A), or connect to USB-C accessories to help expand your computer functionality. To purchase USB-C accessories, go to: <https://www.lenovo.com/accessories>

6 Power button

Used to turn on your computer. When you cannot shut down the computer from the operating system, press and hold the power button for four or more seconds to turn off the computer.

7 Power indicator

This indicator is on when the computer is on.

8 Storage drive activity indicator

This indicator is on when the storage drive is in use.

9 Microphone connector

Used to connect a microphone to your computer. You can use the microphone to record sounds or interact with the computer using speech-recognition software.

10 Headset connector

Used to connect headset to your computer.

11 USB 3.1 Gen 1 connectors

Used to connect a USB-compatible device. For optimal data transfer, connect a USB 3.1 Gen 1 device to a USB 3.1 Gen 2 or USB 3.1 Gen 1 connector instead of a USB 2.0 connector.

12 USB 3.1 Gen 2 connectors

Used to connect a USB-compatible device. For optimal data transfer, connect a USB 3.1 Gen 2 device to a USB 3.1 Gen 2 connector instead of a USB 3.1 Gen 1 or USB 2.0 connector.

13 Illuminated red dot

This indicator is on when the computer is on.

14 Internal speaker

Used to listen to the sounds from your computer without using a headset or headphones.

Rear view

Note: Your computer model might look slightly different from the illustration.

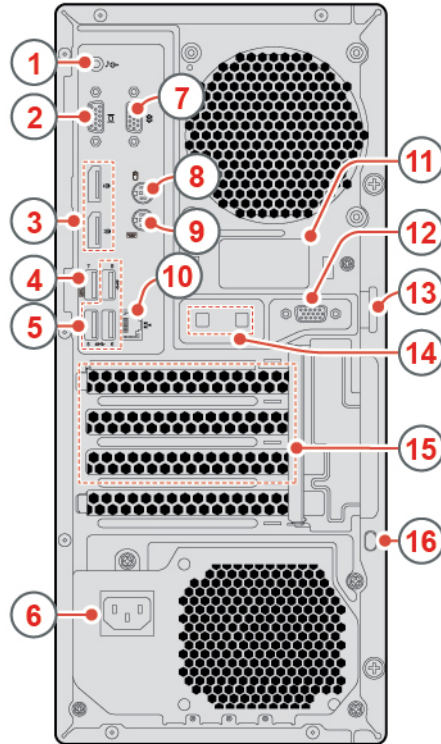


Figure 2. Rear view

1 Audio line-out connector	2 VGA-out connector
3 DisplayPort® 1.2 out connector	4 USB 3.1 Gen 1 connector
5 USB 3.1 Gen 1 connectors (3)	6 Power cord connector
7 Serial connector	8 PS/2 mouse connector (optional)
9 PS/2 keyboard connector (optional)	10 Ethernet connector
11 Rear Wi-Fi antenna cover	12 Serial connector (optional)
13 Padlock loop	14 Smart cable clip slots (2)
15 PCI-Express card area (different cards provide different connectors)	16 Security-lock slot

1 Audio line-out connector

Used to send audio signals from the computer to external devices, such as powered stereo speakers, headphones, or multimedia keyboards. To connect a stereo system or other external recording device, connect a cable between the audio line-in connector of the device and the audio line-out connector of the computer.

Note: If your computer has both an audio line-out connector and a headset or headphone connector, always use the headset connector or headphone connector for earphones, headphones, or a headset. The headphone connector does not support headset microphones.

2 VGA-out connector

Used to send video signals from the computer to another video device, such as a monitor.

3 DisplayPort 1.2 out connector

Used to send audio and video signals from the computer to another audio or video device, such as a high-performance monitor.

4 USB 3.1 Gen 1 connector

Used to connect a USB-compatible device. For optimal data transfer, connect a USB 3.1 Gen 1 device to a USB 3.1 Gen 2 or USB 3.1 Gen 1 connector instead of a USB 2.0 connector. This connector supports the smart power on feature that enables you to turn on the computer or wake it up from S4 hibernation mode by pressing Alt+P on the keyboard. You can enable or disable the smart power on feature from the Setup Utility program. For detailed information, see the *Important Product Information Guide*.

5 USB 3.1 Gen 1 connectors

Used to connect a USB-compatible device. For optimal data transfer, connect a USB 3.1 Gen 1 device to a USB 3.1 Gen 2 or USB 3.1 Gen 1 connector instead of a USB 2.0 connector.

6 Power cord connector

Used to connect the power cord to your computer for power supply.

7 Serial connector

Used to connect an external modem, a serial printer, or other devices that use a serial connector.

8 PS/2 mouse connector

Used to connect a mouse, a trackball, or other pointing devices that use a PS/2 mouse connector.

9 PS/2 keyboard connector

Used to connect a keyboard that uses a Personal System/2 (PS/2) keyboard connector.

10 Ethernet connector

Used to connect an Ethernet cable for network access.

11 Rear Wi-Fi antenna cover

Used to protect the rear Wi-Fi antenna that is optional.

12 Serial connector

Used to connect an external modem, a serial printer, or other devices that use a serial connector.

13 Padlock loop

Used to secure a padlock.

14 Smart cable clip slots

Used to secure a smart cable clip.

15 PCI-Express card area

To improve the operating performance of the computer, you can connect PCI-Express cards into this area. Depending on the computer model, the connectors in this area vary.

16 Security-lock slot

Used to secure a Kensington-style cable lock.

System board

Note: See “Front view” on page 1 and “Rear view” on page 3 for additional component descriptions.

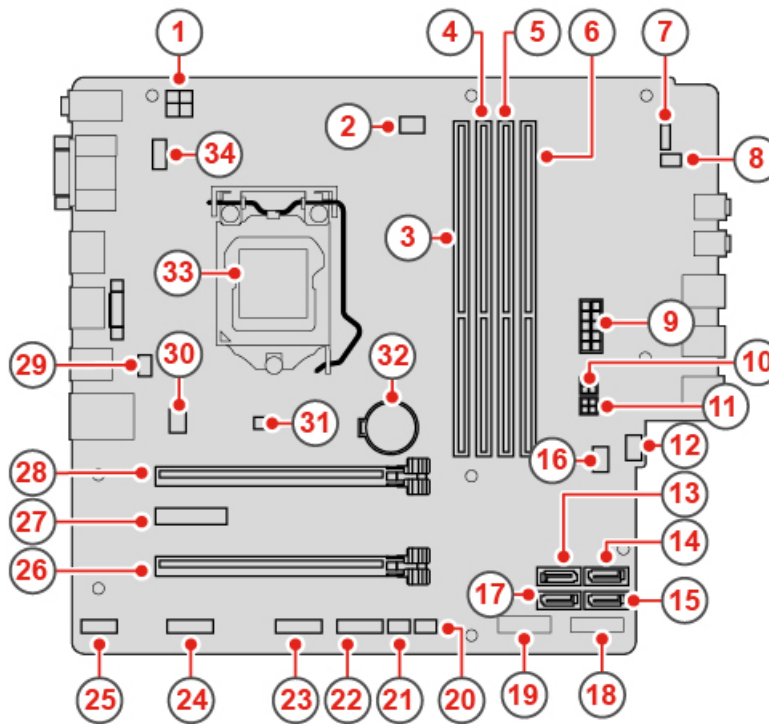


Figure 3. System board

1 4-pin power connector	2 Microprocessor fan connector
3 Memory slot (DIMM1)	4 Memory slot (DIMM2)
5 Memory slot (DIMM3)	6 Memory slot (DIMM4)
7 Power button board connector	8 Internal speaker connector
9 10-pin power connector	10 SATA power connector
11 SATA power connector	12 Auxiliary fan connector
13 SATA 3.0 connector	14 SATA 3.0 connector

15 SATA 3.0 connector	16 Clear CMOS jumper
17 SATA 3.0 connector	18 M.2 storage drive slot
19 M.2 Wi-Fi card slot	20 Thermal sensor connector
21 Illuminated red dot connector	22 Front USB 2.0 connector
23 Front USB 2.0 connector	24 Serial connector (optional)
25 Thunderbolt connector	26 PCI Express card slot (physical link width x16; negotiable link width x4, x1)
27 PCI Express x1 card slot	28 PCI Express x16 graphics card slot
29 E-lock connector	30 System fan connector
31 Cover presence switch	32 Coin-cell battery
33 Microprocessor socket	34 PS/2 keyboard and mouse connector

Machine type and model label

The machine type and model label identifies the computer. When you contact Lenovo for help, the machine type and model information helps support technicians to identify the computer and provide faster service. The machine type and model label is attached on the side of the computer as shown.



Figure 4. Machine type and model label

Chapter 2. Specifications

Power supply

- 180 watt automatic voltage-sensing power supply
- 250 watt automatic voltage-sensing power supply
- 400 watt automatic voltage-sensing power supply

Storage drives

Up to four SATA storage drives (including one hot-swap storage drive) and one M.2 storage drive

Video features

- The integrated graphics card supports the following:
 - DisplayPort-out connector
 - VGA-out connector
- The optional discrete graphics card provides an enhanced video experience and extended capabilities.

Audio features

- The integrated audio card supports the following:
 - Audio line-out connector
 - Headset connector
 - Internal speaker
 - Microphone connector
- The optional discrete audio card provides an enhanced audio experience and extended capabilities.

Input/Output (I/O) features

- Audio connectors (audio line-out connector, headset connector, and microphone connector)
- Card reader slot (optional)
- Display connectors (DisplayPort-out connector and VGA-out connector)
- Ethernet connector
- PS/2 keyboard connector (optional)
- PS/2 mouse connector (optional)
- Serial connector
- USB connectors

Expansion

- Card reader (optional)
- Memory slot
- Optical drive (optional)
- PCI Express card slot (physical link width x16; negotiable link width x4, x1)
- PCI Express x1 card slot
- PCI Express x16 graphics card slot
- Storage drive bay

Network features

- Ethernet LAN
- Wireless LAN (optional)
- Bluetooth (optional)

Physical dimensions

- Width: 165.0 mm (6.5 inches)
- Height: 410.3 mm (16.2 inches)
- Depth: 321.4 mm (12.7 inches)

Weight (without the package)

Maximum configuration as shipped: 10.0 kg (22.1 lb)

Statement on USB transfer rate

Depending on many factors such as the processing capability of the host and peripheral devices, file attributes, and other factors related to system configuration and operating environments, the actual transfer rate using the various USB connectors on this device will vary and will be slower than the data rate listed below for each corresponding device.

USB device	Data rate (Gbit/s)
3.1 Gen 1	5
3.1 Gen 2	10
3.2	20

Chapter 3. Computer locks

This chapter provides instructions on how to lock your computer with the locking devices to keep your computer safe.

Enabling or disabling the E-lock

Your computer may have a security lock solution installed to protect the computer from unauthorized tampering of the internal components. Using the E-Lock, you can mechanically lock or unlock the computer cover.

To enable or disable the E-Lock, do the following:

1. Turn on or restart the computer.
2. Before Windows starts up, repeatedly press and release the F1 or Fn+F1 key until the Setup Utility program opens.
3. Click **Security** → **Electronic Lock** to enable or disable the E-lock.
4. Press F10 or Fn+F10 to save the changes and reboot the computer.

Note: Changes do not take effect until the setting is saved and the system is rebooted.

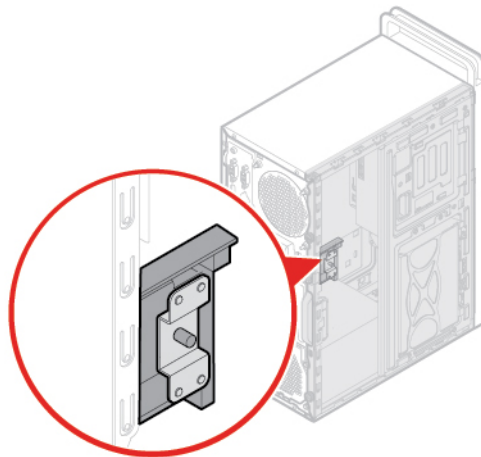


Figure 5. Enabling or disabling the E-lock

Locking the computer cover

Locking the computer cover helps prevent unauthorized access to the inside of your computer. Your computer features a padlock loop so that the computer cover cannot be removed when a padlock is installed.

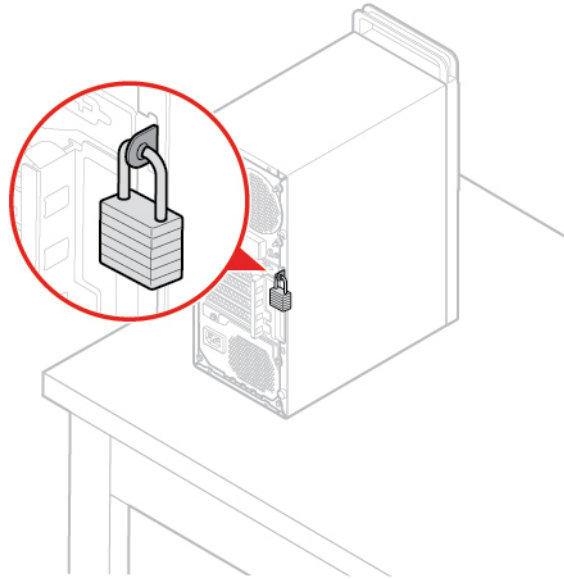


Figure 6. Locking the computer cover

Attaching a Kensington-style cable lock

You can use a Kensington-style cable lock to secure your computer to a desk, table, or other nonpermanent fixture. The cable lock connects to the security-lock slot at the rear of your computer. Depending on the type selected, the cable lock can be operated with a key or combination. The cable lock also locks the buttons used to open the computer cover. This is the same type of lock used with many notebook computers. You can order such a cable lock directly from Lenovo by searching for *Kensington* at: <http://www.lenovo.com/support>

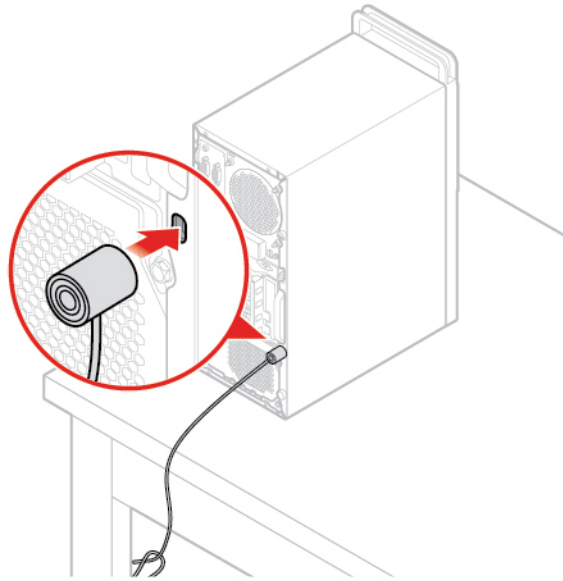


Figure 7. Attaching a Kensington-style cable lock

Attaching a cable lock

A cable lock can be used to secure devices, such as the keyboard and the mouse, by locking the device cables to the computer. The cable lock connects to the cable-lock slots on the rear of the computer. To install a cable lock, do the following:

1. Insert the clip **1** into the cable-lock slot **4**.
2. Pull the cables you want to lock through the dents in the cable lock.
3. Press the clip **2** into the cable-lock slot **3** until it snaps into position.

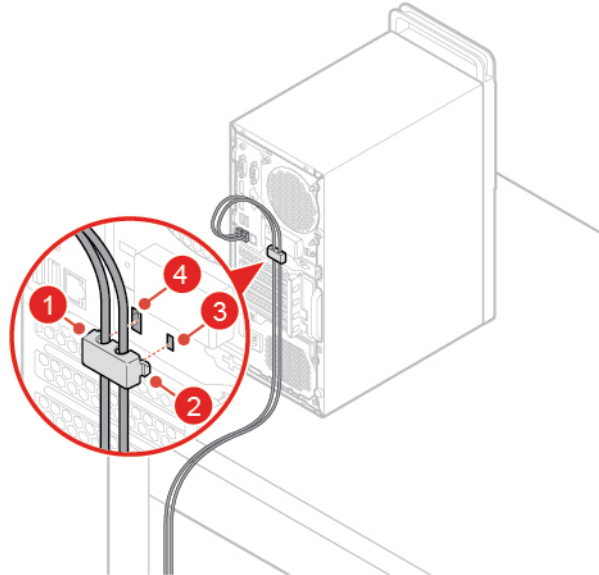


Figure 8. Attaching a cable lock

Chapter 4. Replacing hardware

This chapter provides instructions on how to replace hardware for your computer.

Before replacing hardware

Attention: Do not open your computer or attempt any repairs before reading this section and the *Important Product Information Guide*.

Notes before replacing hardware

- Use computer components provided only by Lenovo.
- When installing or replacing an option, use the appropriate instructions explained in this manual along with the instructions that come with the option.
- In most areas of the world, Lenovo requires the return of defective CRUs. Information about this will come with the CRU or will come a few days after the CRU arrives.

Handling static-sensitive devices

Do not open the static-protective package containing the new part until the defective part has been removed and you are ready to install the new part. Static electricity, although harmless to you, can seriously damage computer components and options.

When you handle options and other computer components, take these precautions to avoid static-electricity damage:

- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle options and other computer components carefully. Handle PCI/PCIe cards, memory modules, system boards, and microprocessors by the edges. Never touch any exposed circuitry.
- Prevent others from touching the options and other computer components.
- Touch the static-protective package containing the part to a metal expansion-slot cover or other unpainted metal surface on the computer for at least two seconds. This reduces static electricity from the package and your body before you install or replace a new part.
- When possible, remove the new part from the static-protective package, and install it directly in the computer without setting the part down. When this is not possible, place the static-protective package on a smooth, level surface and place the part on the package.
- Do not place the part on the computer cover or other metal surface.

Knowing FRUs (including CRUs)

- Field Replaceable Units (FRUs) are computer parts that a trained technician can upgrade or replace. FRUs include all CRUs. For detailed FRU information, such as the FRU part numbers and supported computer models, go to:
<http://www.lenovo.com/serviceparts-lookup>
- Customer Replaceable Units (CRUs) are computer parts that a user can upgrade or replace.
 - Self-service CRUs: You can install self-service CRUs easily. These CRUs might be stand-alone, latched, or secured by up to two screws. Examples of self-service CRUs include the keyboard, mouse, any USB device. You are responsible for replacing all self-service CRUs.
 - Optional-service CRUs: Handling optional-service CRUs requires some technical skills and simple tools (such as a screwdriver). These CRUs are isolated parts within the computer. They are usually

concealed by an access panel that is secured by more than two screws. You must remove the screws and panel to access the specific CRU. Optional-service CRUs can be removed and installed by users or, during the warranty period, by a Lenovo service technician.

Before replacing FRUs

Before replacing any FRU, read the following:

- Only certified and trained personnel can service the computer.
- Before replacing an FRU, read the entire section about replacing the part.
- Be extremely careful during writing operations such as copying, saving, or formatting.

The sequence of the drives in the computer that you are servicing might have been altered. If you select an incorrect drive, data or programs might be overwritten.

- Replace an FRU only with another FRU of the correct model.

When you replace an FRU, ensure that the model of the machine and the FRU part number are correct.

- An FRU should not be replaced because of a single, unreproducible failure.

Single failures can occur for a variety of reasons that have nothing to do with a hardware defect, such as cosmic radiation, electrostatic discharge, or software errors. Consider replacing an FRU only when a problem recurs. If you suspect that an FRU is defective, clear the error log and run the test again. If the error does not recur, do not replace the FRU.

- Only replace a defective FRU.

Locating FRUs (including CRUs)

Notes:

- Some of the following components are optional.
- To replace a component that is not in the list below, contact a Lenovo service technician. For a list of Lenovo Support phone numbers, go to:
<http://www.lenovo.com/support/phone>

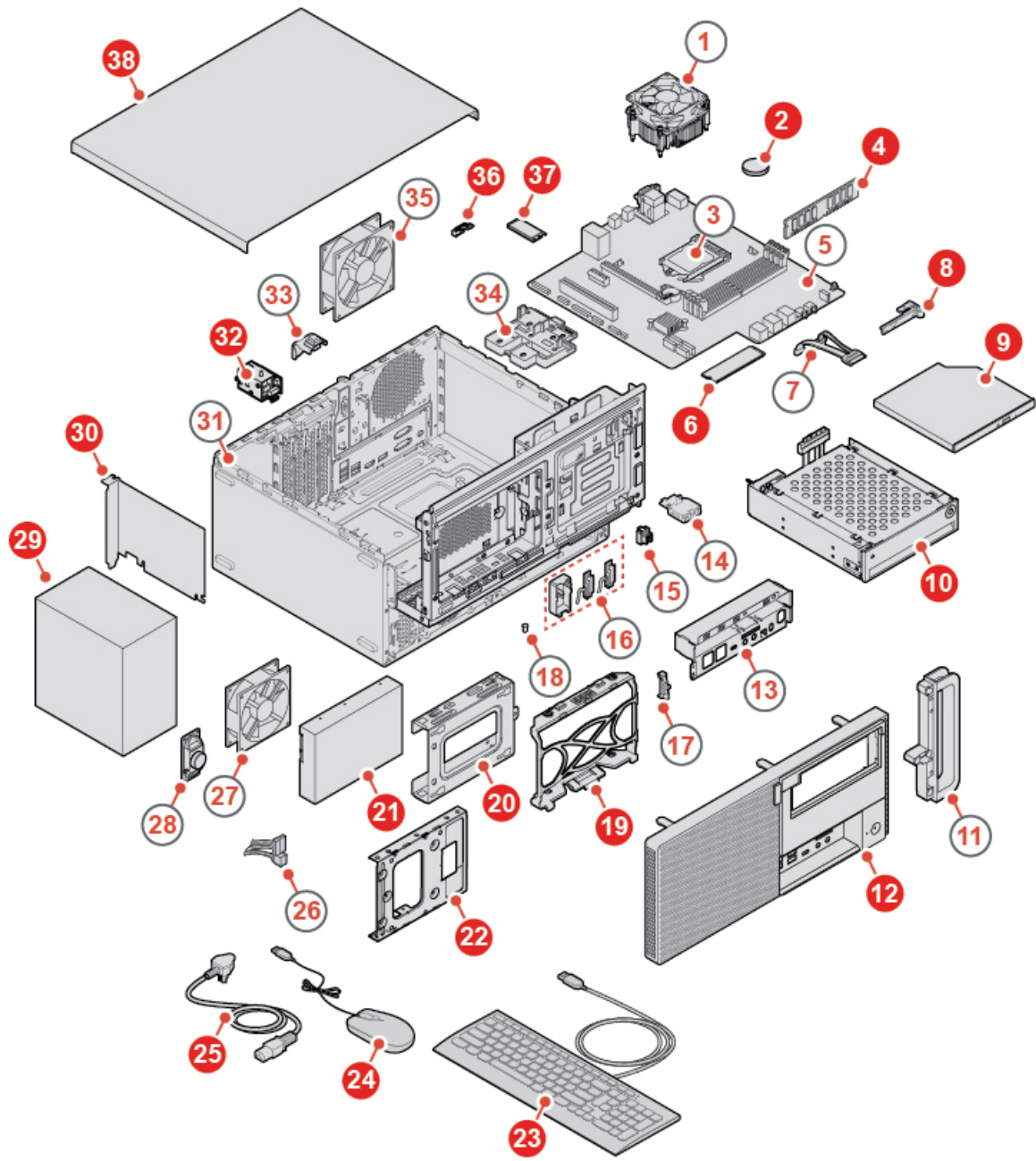


Figure 9. Locating FRUs (including CRUs)

Self-service CRUs	Optional-service CRUs	Non-CRUs
2 Coin-cell battery	29 Power supply assembly	1 Heat sink and fan assembly
4 Memory module	32 E-lock	3 Microprocessor
6 M.2 storage drive	36 Wi-Fi card shield	5 System board
8 Optical drive bracket	37 Wi-Fi card	7 Optical drive cable
9 Optical drive		11 Computer handle

Self-service CRUs	Optional-service CRUs	Non-CRUs
<ul style="list-style-type: none"> 10 Front access enclosure 12 Front bezel 19 Inner storage drive bracket 20 Outer storage drive bracket 21 2.5-inch or 3.5-inch storage drive 22 Storage drive converter 23 Keyboard 24 Mouse 25 Power cord 30 PCI Express card 34 M.2 storage drive bracket 38 Computer cover 		<ul style="list-style-type: none"> 13 Front I/O bracket 14 Card reader 15 Power button 16 Wi-Fi antennas and rear antenna cover 17 Thermal sensor 18 Illuminated red dot 26 Storage drive cable 27 Front fan 28 Internal speaker 31 Chassis 33 Cover presence switch 35 Rear fan

Replacing the power cord

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Replace the power cord.

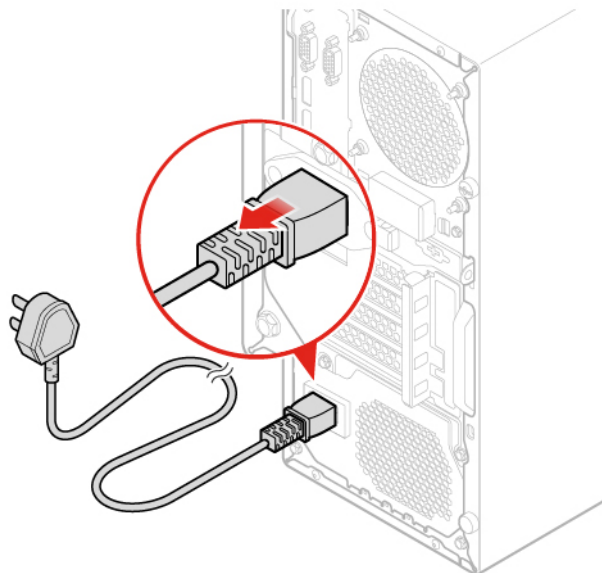


Figure 10. Removing the power cord

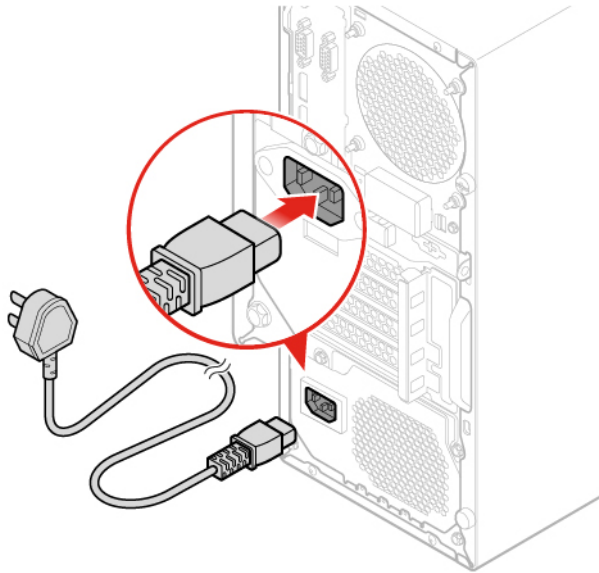


Figure 11. Installing the power cord

Removing the computer cover

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

CAUTION:



Before you open the computer cover, turn off the computer and wait several minutes until the computer is cool.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Unlock any locking device that secures the computer cover.

3. Remove the computer cover.

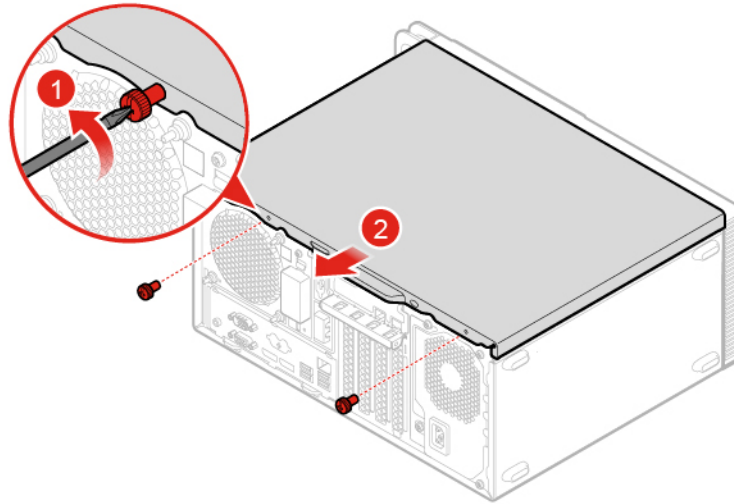


Figure 12. Removing the computer cover

4. Complete the replacement. See “Completing the parts replacement” on page 68.

Replacing the front bezel

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Replace the front bezel.

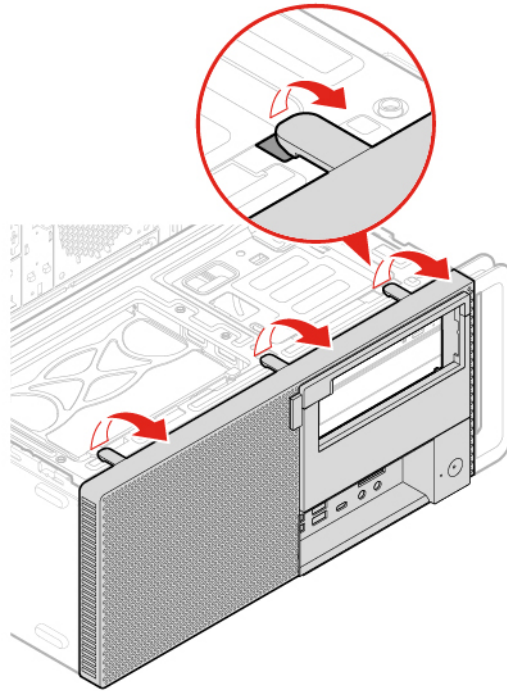


Figure 13. Removing the front bezel

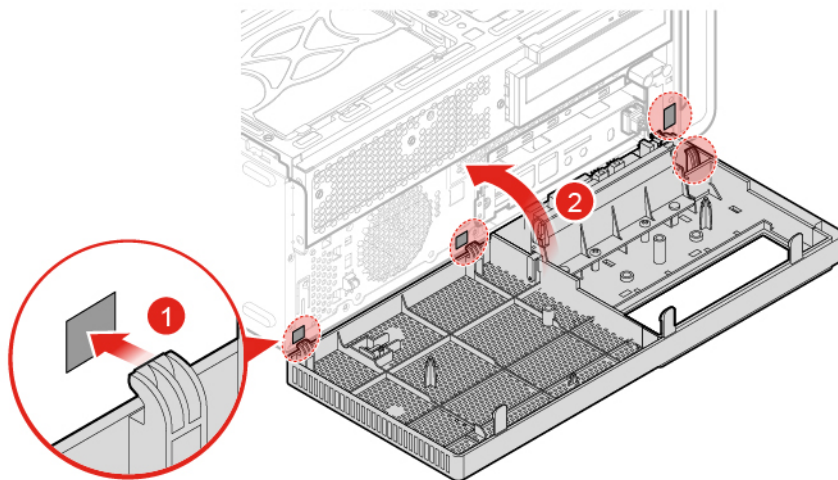


Figure 14. Installing the front bezel

4. Complete the replacement. See “Completing the parts replacement” on page 68.

Pivoting the drive bay assembly upward and downward

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.

2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.
4. Pivot the drive bay assembly upward and downward.

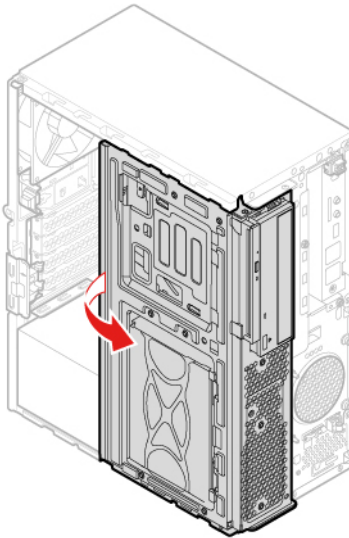


Figure 15. Pivoting the drive bay assembly upward

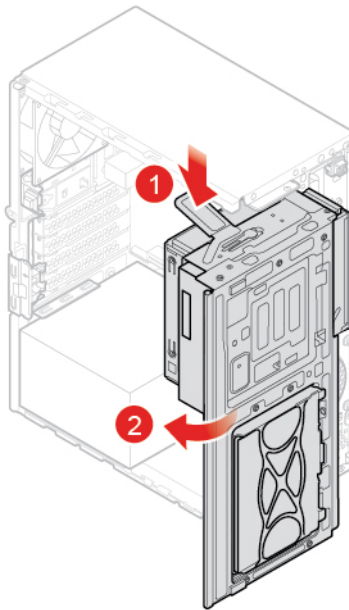


Figure 16. Pivoting the drive bay assembly downward

5. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the computer handle

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.
4. Replace the computer handle.

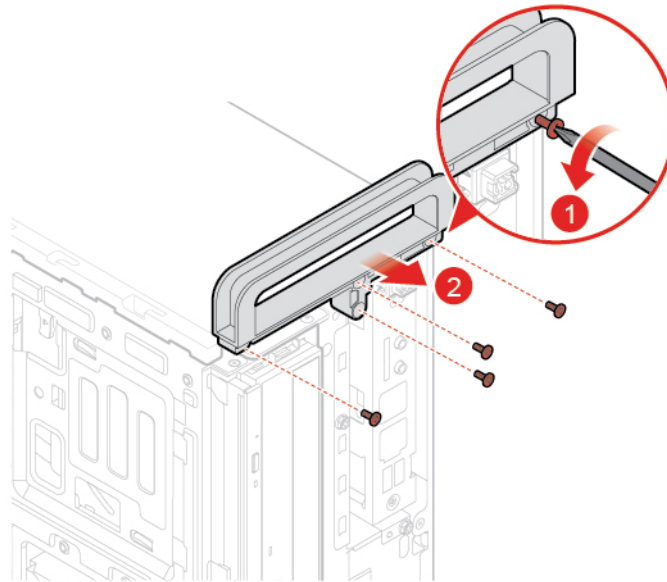


Figure 17. Removing the computer handle

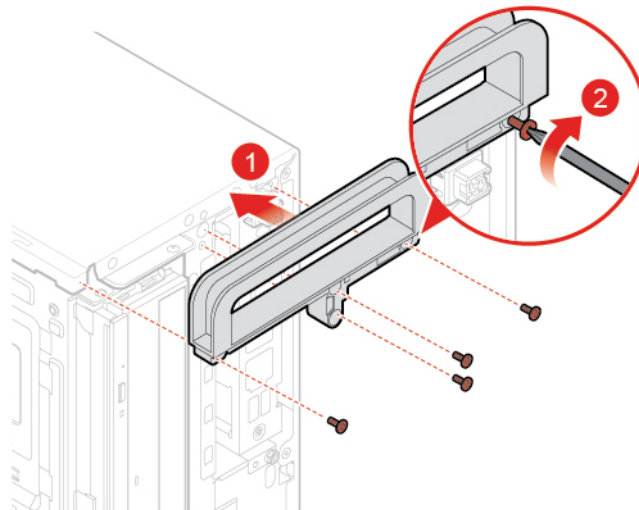


Figure 18. Installing the computer handle

5. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the optical drive

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.
4. Disconnect the signal cable and the power cable from the optical drive.
5. Replace the optical drive.

Slim optical drive

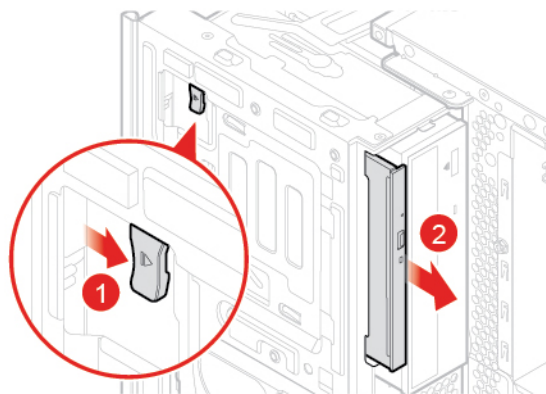


Figure 19. Removing the optical drive

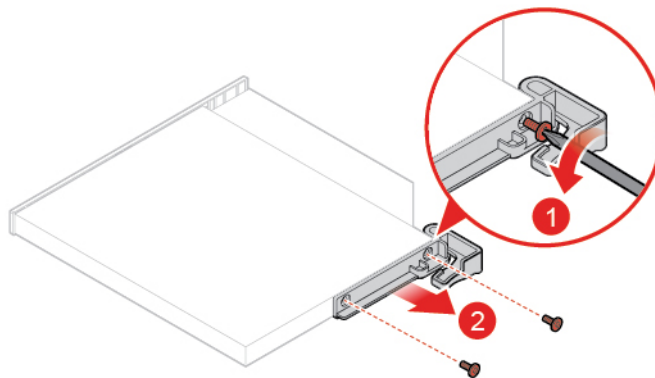


Figure 20. Removing the optical drive bracket

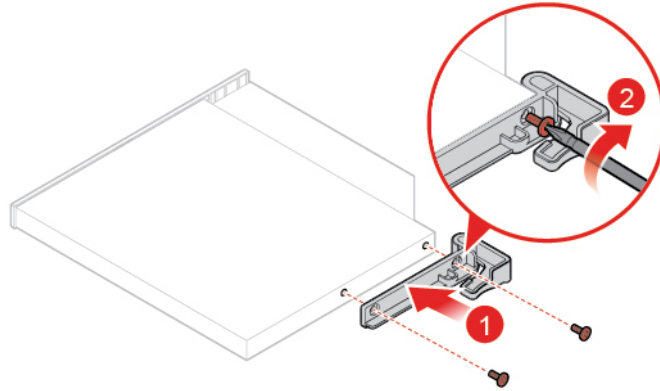


Figure 21. Installing the optical drive bracket

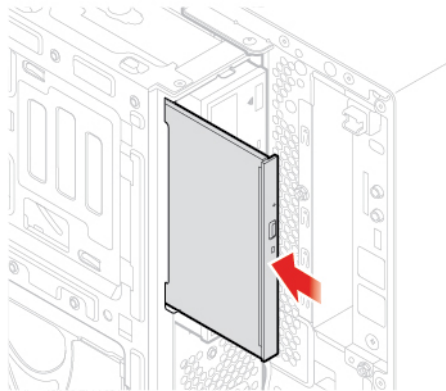


Figure 22. Installing the optical drive

6. Connect the signal cable and the power cable to the new optical drive.
7. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the power button

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.
4. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 19.
5. Disconnect the power button cable from the system board.
6. Replace the power button.

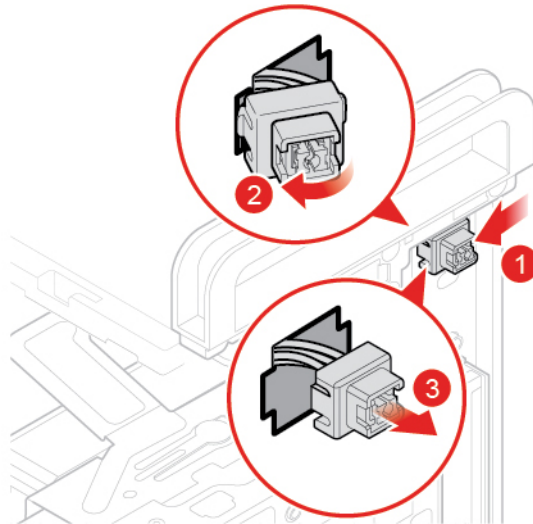


Figure 23. Removing the power button

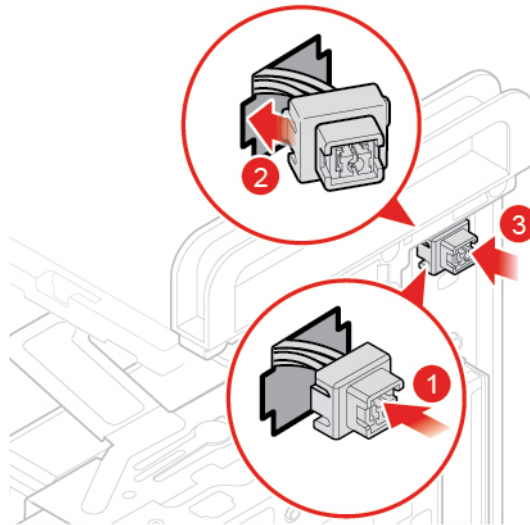


Figure 24. Installing the power button

7. Connect the new power button cable to the system board.
8. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the card reader

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.

4. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 19.
5. Disconnect the card reader cable from the system board.
6. Replace the card reader.

CAUTION:

Touch only the edges of the card reader. Do not touch the card reader’s circuit board.

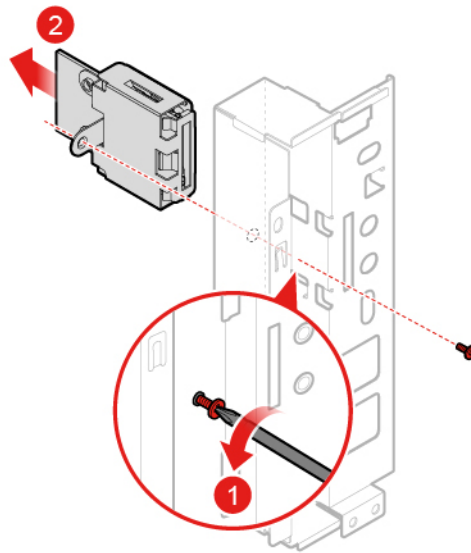


Figure 25. Removing the card reader

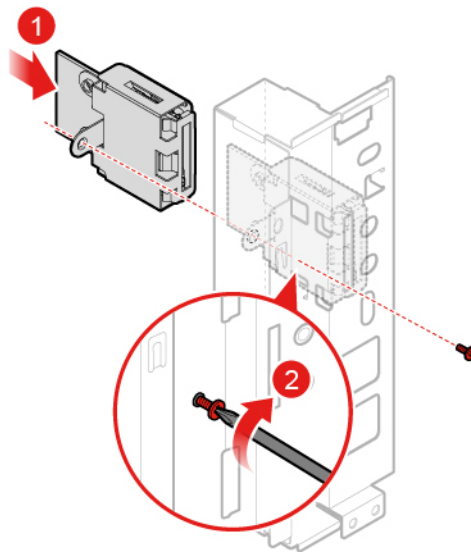


Figure 26. Installing the card reader

7. Connect the new card reader cable to the system board.
8. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the front I/O bracket

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.
4. Replace the front I/O bracket.

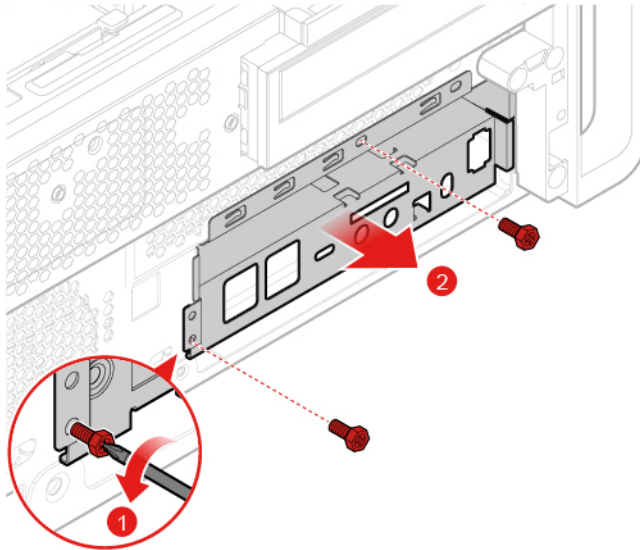


Figure 27. Removing the front I/O bracket

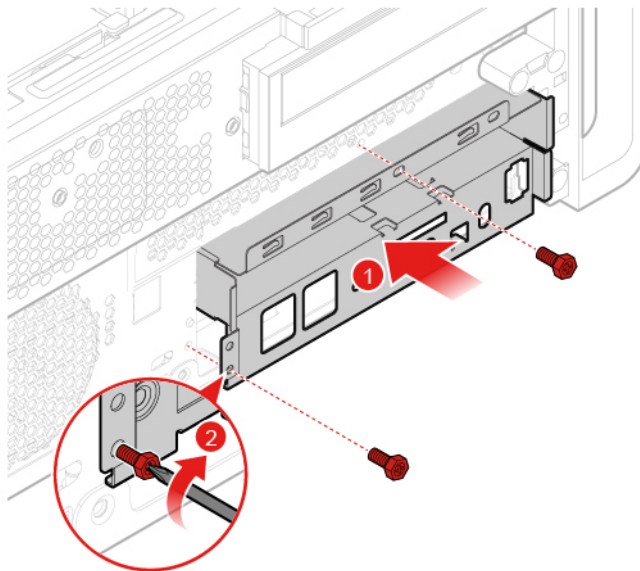


Figure 28. Installing the front I/O bracket

5. Connect the new front I/O bracket cable to the system board.
6. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the front fan

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.
4. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 19.
5. Disconnect the front fan cable from the system board.
6. Replace the front fan.

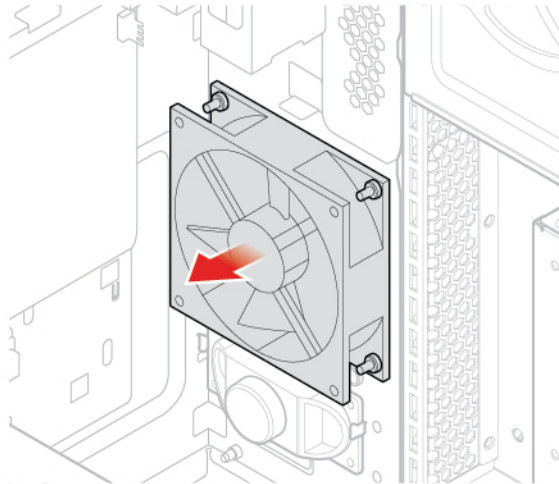


Figure 29. Removing the front fan

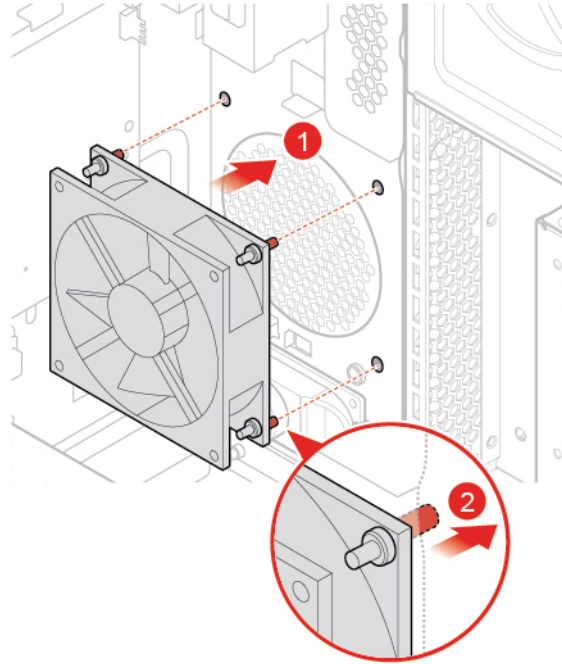


Figure 30. Installing the front fan

7. Connect the new front fan cable to the system board.
8. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the illuminated red dot

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.
4. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 19.
5. Disconnect the illuminated red dot cable from the system board.
6. Replace the illuminated red dot.

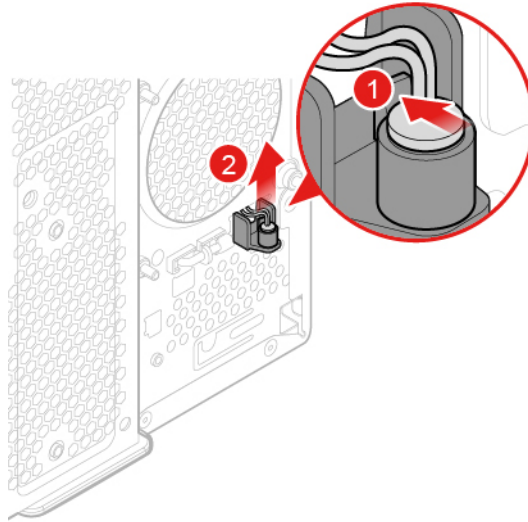


Figure 31. Removing the illuminated red dot

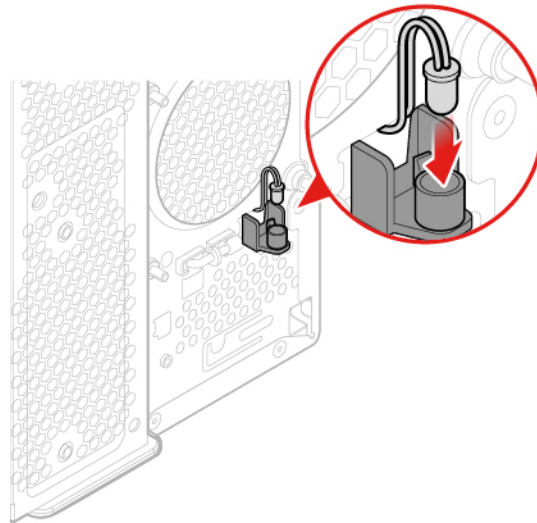


Figure 32. Installing the illuminated red dot

7. Connect the new illuminated red dot cable to the system board.
8. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the thermal sensor

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.

4. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 19.
5. Disconnect the thermal sensor cable from the system board.
6. Replace the thermal sensor.

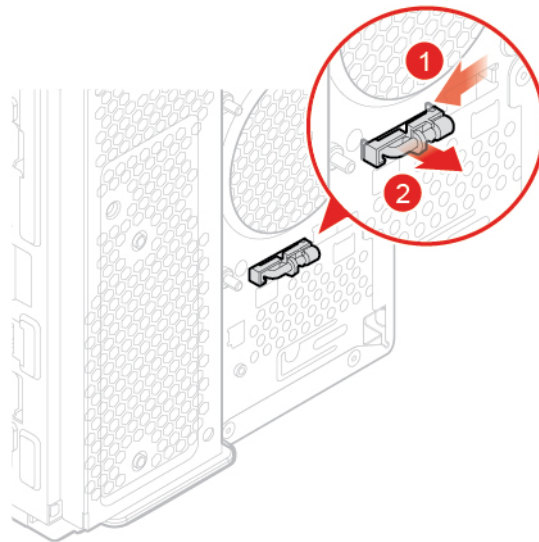


Figure 33. Removing the thermal sensor

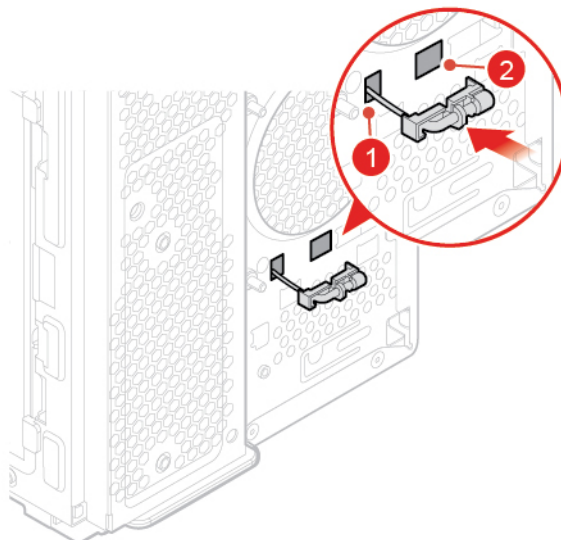


Figure 34. Installing the thermal sensor

7. Connect the new thermal sensor cable to the system board.
8. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the internal speaker

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.
4. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 19.
5. Disconnect the internal speaker cable from the system board.
6. Replace the internal speaker.

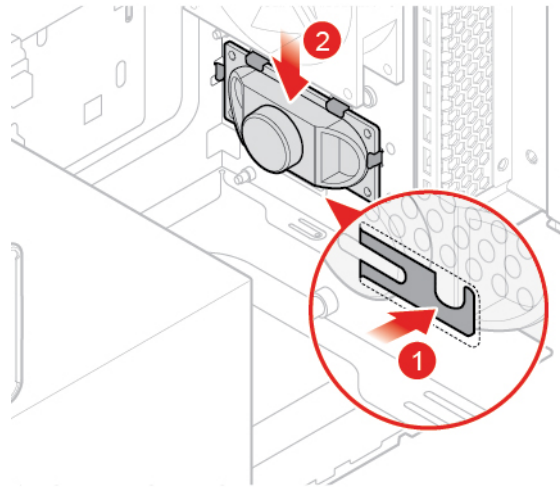


Figure 35. Removing the internal speaker

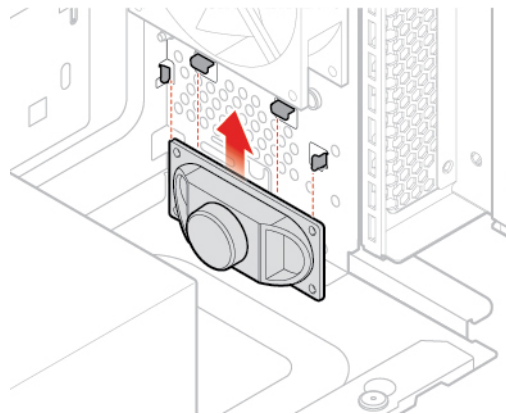


Figure 36. Installing the internal speaker

7. Connect the new internal speaker cable to the system board.
8. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the storage drive

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

Replacing the 3.5-inch storage drive in the primary or secondary drive bay

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.
4. If you are replacing the 3.5-inch storage drive in the secondary drive bay, pivot the drive bay assembly outward. See “Pivoting the drive bay assembly upward and downward” on page 19.
5. Disconnect the signal cable and the power cable from the storage drive.
6. Replace the 3.5-inch storage drive.
 - 3.5-inch storage drive in the primary storage drive bay

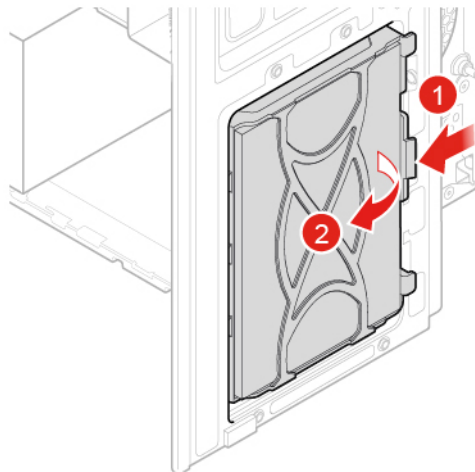


Figure 37. Removing the inner storage drive bracket

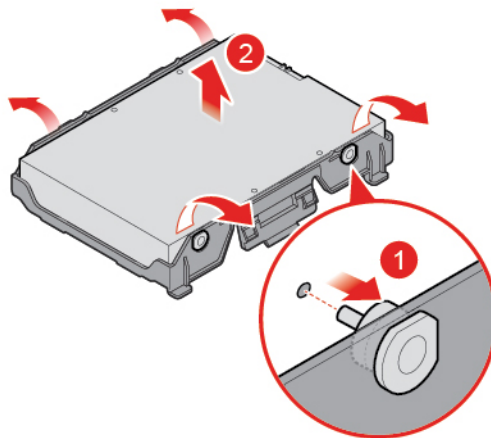


Figure 38. Removing the storage drive

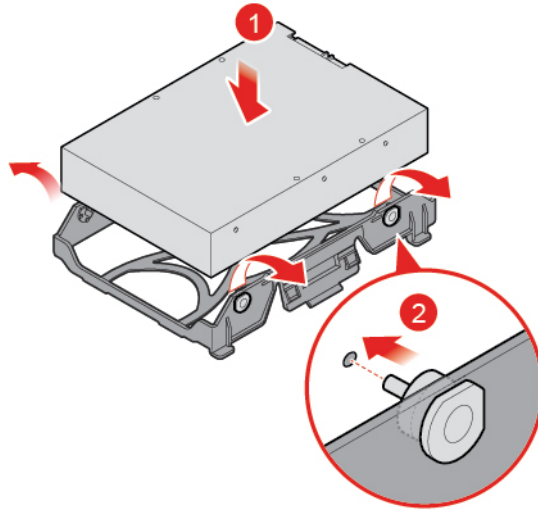


Figure 39. Installing the storage drive

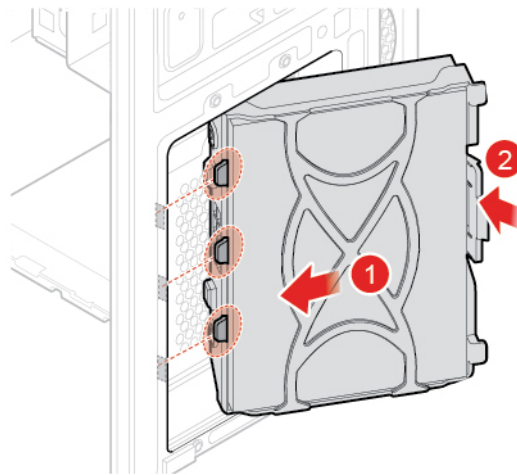


Figure 40. Installing the inner storage drive bracket

- 3.5-inch storage drive in the secondary storage drive bay

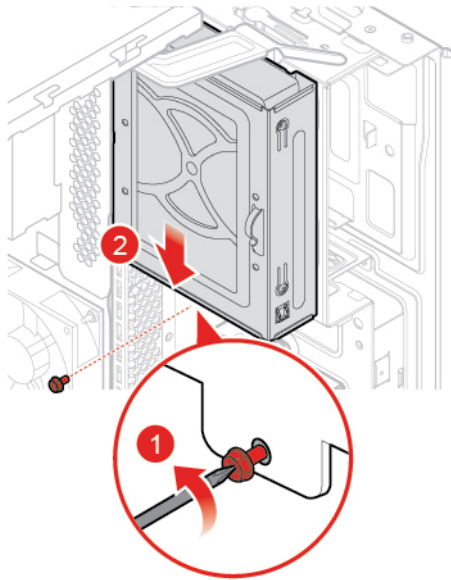


Figure 41. Removing the outer storage drive bracket

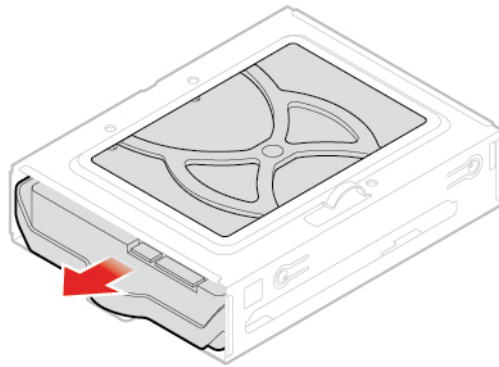


Figure 42. Removing the inner storage drive bracket

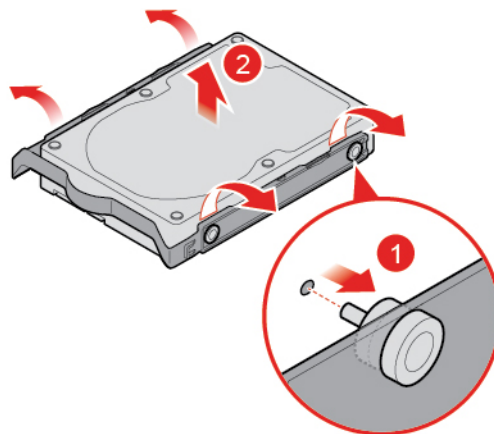


Figure 43. Removing the storage drive

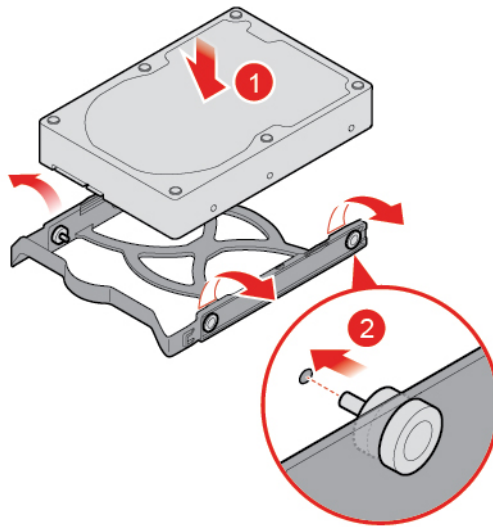


Figure 44. Installing the storage drive

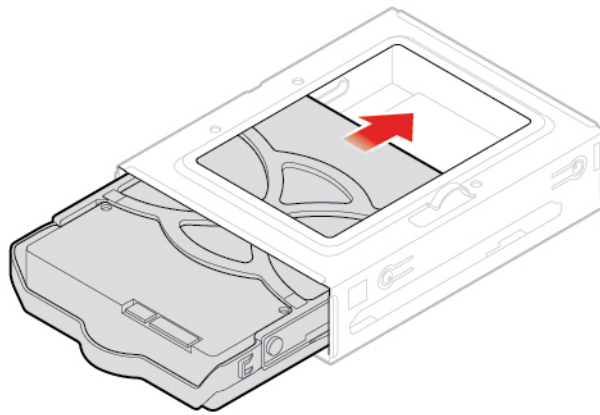


Figure 45. Installing the inner storage drive bracket

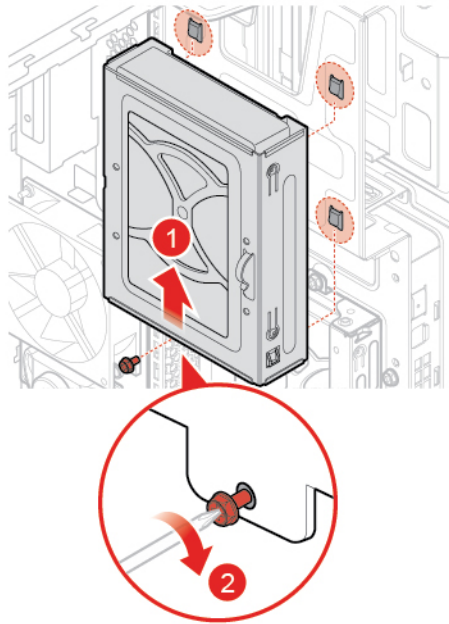


Figure 46. Installing the outer storage drive bracket

7. Connect the signal cable and the power cable to the new 3.5-inch storage drive.
8. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the 3.5-inch storage drive in the front-access storage enclosure

1. Replace the 3.5-inch storage drive in the front-access storage enclosure.

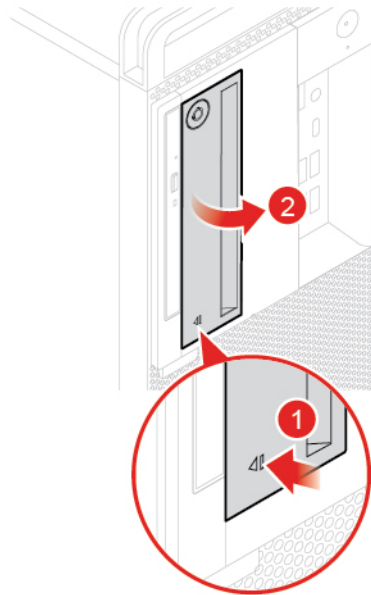


Figure 47. Opening the front-access storage enclosure

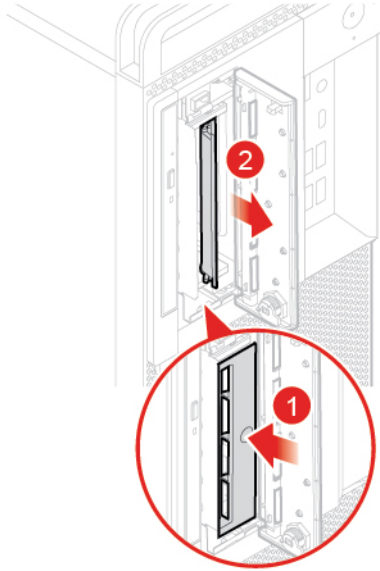


Figure 48. Removing the inner storage drive bracket

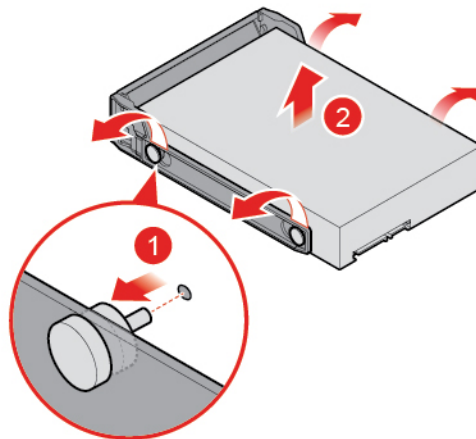


Figure 49. Removing the storage drive

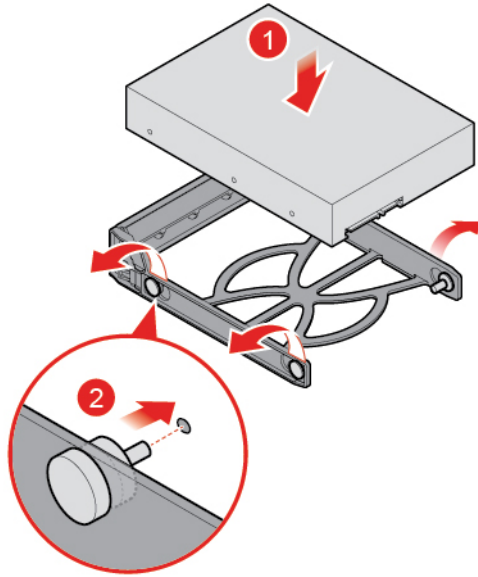


Figure 50. Installing the storage drive

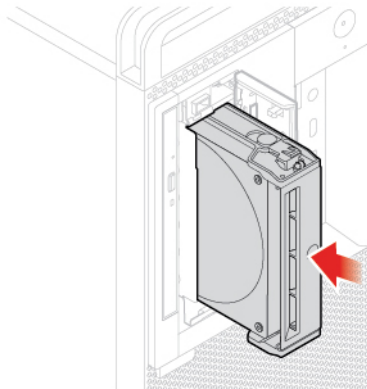


Figure 51. Installing the inner storage drive bracket

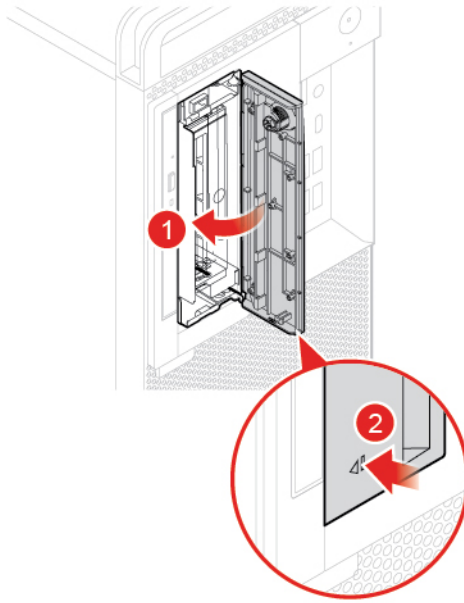


Figure 52. Installing the front-access storage enclosure

Replacing the 2.5-inch storage drive in the storage converter

1. Remove the storage converter with the 2.5-inch storage drive. See “Replacing the 3.5-inch storage drive in the primary or secondary drive bay” or “Replacing the 3.5-inch storage drive in the front-access storage enclosure”.
2. Replace the 2.5-inch storage drive in the storage converter.

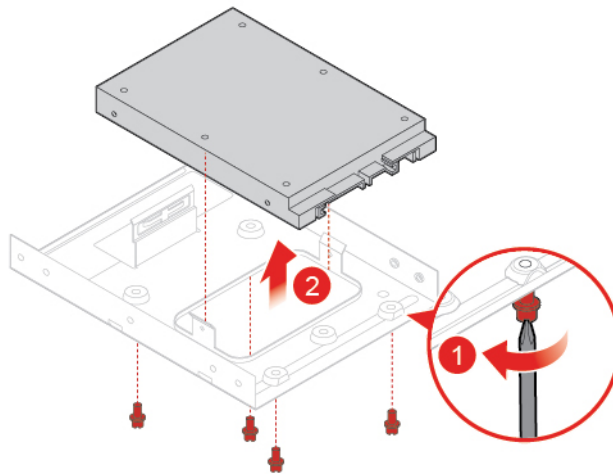


Figure 53. Removing the storage drive

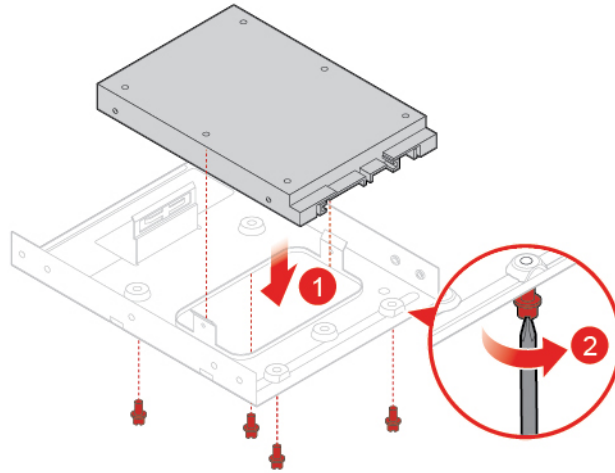


Figure 54. Installing the storage drive

3. Reinstall the storage converter with the 2.5-inch storage drive. See “Replacing the 3.5-inch storage drive in the primary or secondary drive bay” or “Replacing the 3.5-inch storage drive in the front-access storage enclosure”.

Replacing the 2.5-inch storage drive in the tertiary drive bay

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.
4. If you are replacing the 3.5-inch storage drive in the secondary drive bay, pivot the drive bay assembly outward. See “Pivoting the drive bay assembly upward and downward” on page 19.
5. Disconnect the signal cable and the power cable from the storage drive.
6. Replace the 2.5-inch storage drive in the tertiary drive bay.

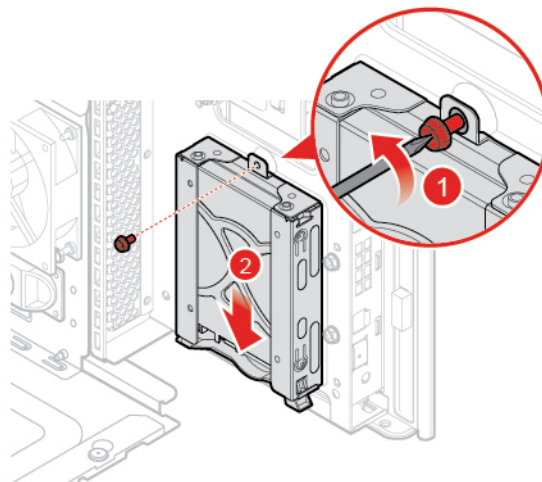


Figure 55. Removing the outer storage drive bracket

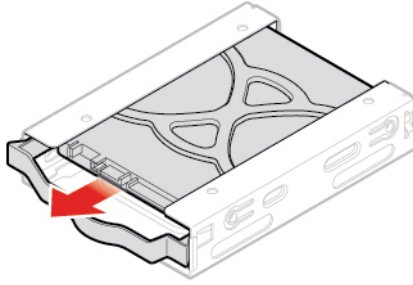


Figure 56. Removing the inner storage drive bracket

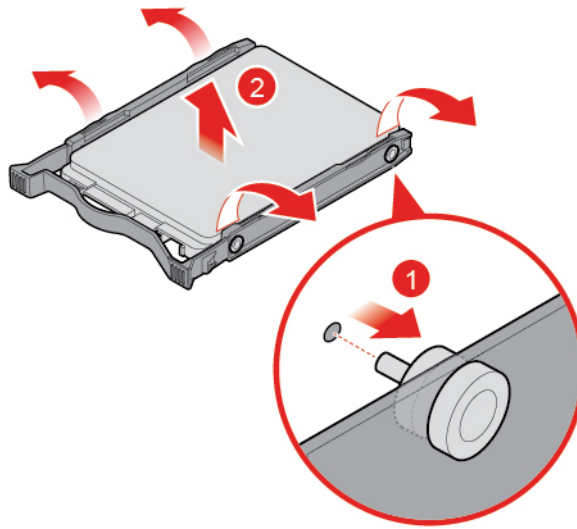


Figure 57. Removing the storage drive

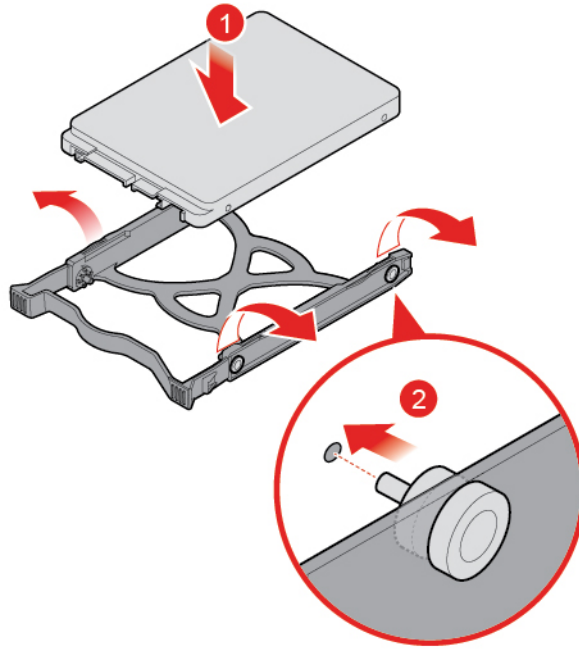


Figure 58. Installing the storage drive

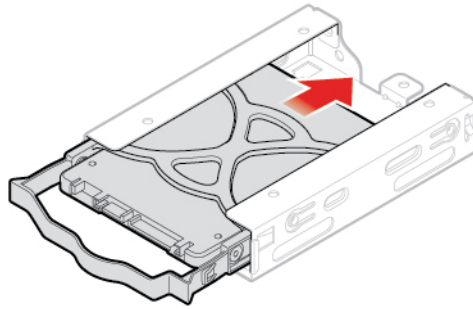


Figure 59. Installing the inner storage drive bracket

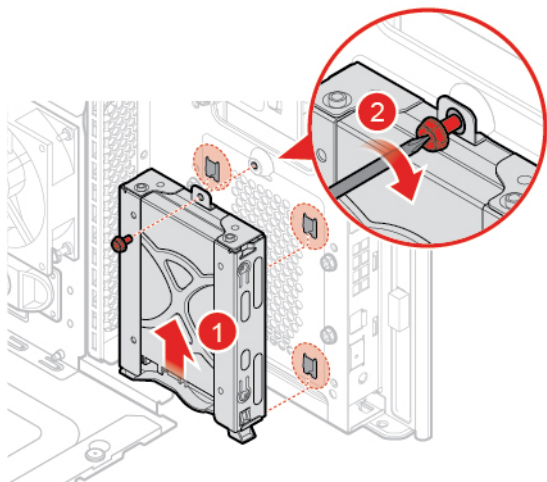


Figure 60. Installing the outer storage drive bracket

7. Connect the signal cable and the power cable to the new 2.5-inch storage drive.
8. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the memory module

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

Ensure that you follow the order of installing memory modules shown in the following figure.

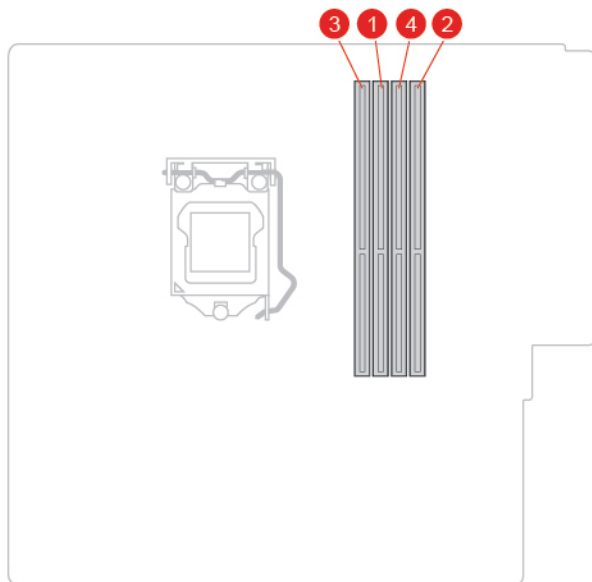


Figure 61. The order of installing memory modules

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.

2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.
4. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 19.
5. Replace the memory module.

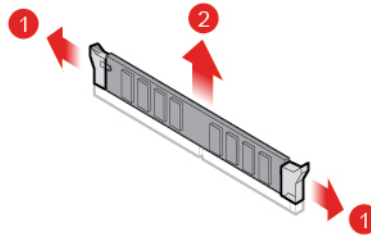


Figure 62. Removing the memory module

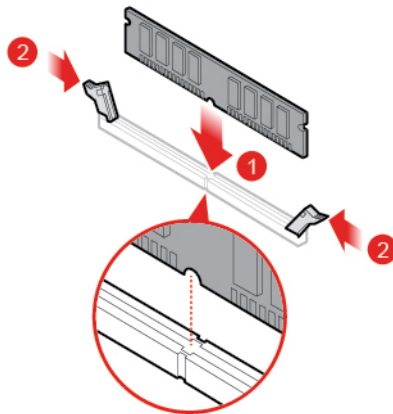


Figure 63. Installing the memory module

6. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the coin-cell battery

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

Your computer has a special type of memory that maintains the date, time, and settings for built-in features, such as parallel connector assignments (configurations). A coin-cell battery keeps this information active when you turn off the computer.

The coin-cell battery normally requires no charging or maintenance throughout its life; however, no coin-cell battery lasts forever. If the coin-cell battery fails, the date, time, and configuration information (including passwords) are lost. An error message is displayed when you turn on the computer.

To replace the coin-cell battery,

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.

2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.
4. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 19.
5. Replace the coin-cell battery.



Figure 64. Removing the coin-cell battery

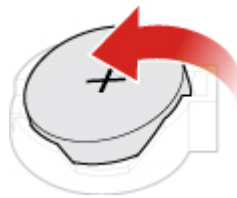


Figure 65. Removing the coin-cell battery



Figure 66. Installing the coin-cell battery

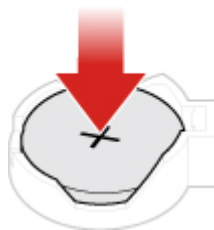


Figure 67. Installing the coin-cell battery

6. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

To dispose of the coin-cell battery, refer to *Lithium coin-cell battery notice* in the Safety and Warranty Guide.

Replacing a PCI Express card

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.
4. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 19.
5. Replace a PCI Express card.

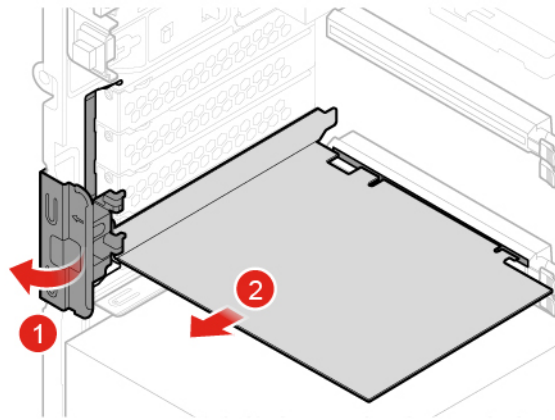
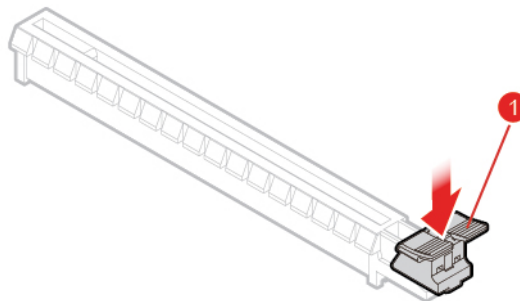


Figure 68. Removing a PCI Express card

Note: If the card is held in place by a retaining latch, press the latch **1** as shown to disengage the latch. Then, gently remove the card from the slot.



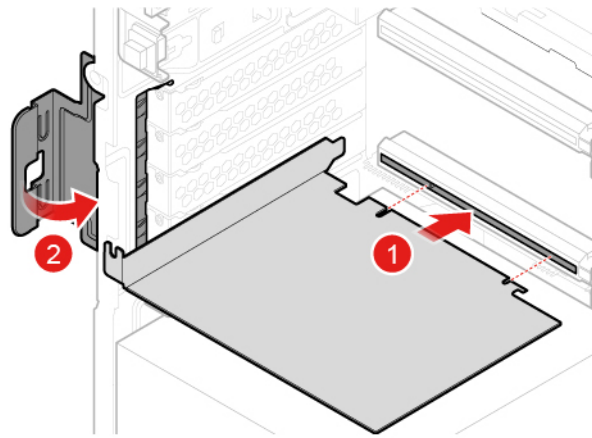


Figure 69. Installing a PCI Express card

6. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the M.2 storage drive

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.
4. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 19.
5. Replace the M.2 storage drive.
 - Type 1

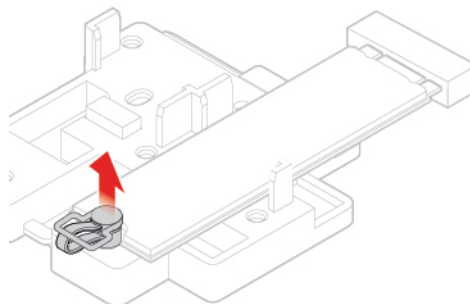


Figure 70. Pulling out the plastic fastener

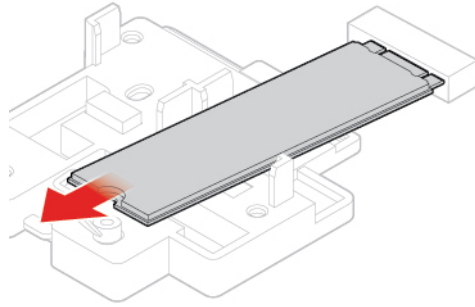


Figure 71. Removing the optical drive retainer

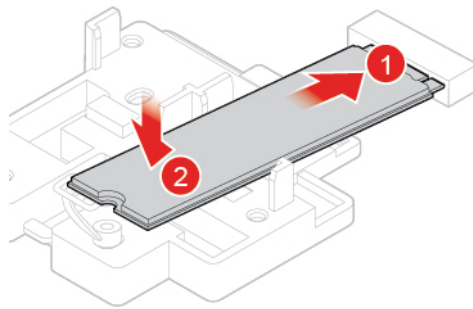


Figure 72. Installing the optical drive retainer

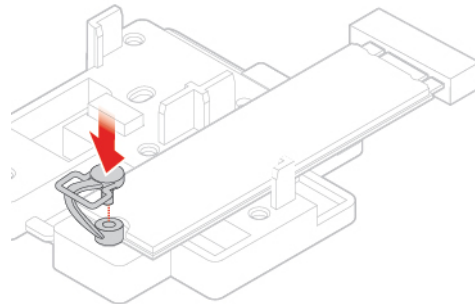


Figure 73. Installing the optical drive

- Type 2

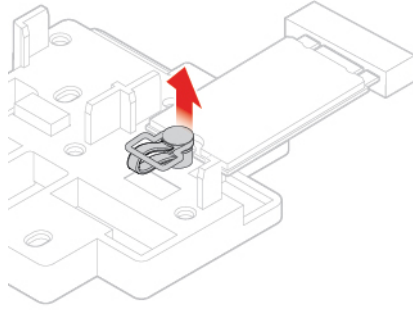


Figure 74. Pulling out the plastic fastener

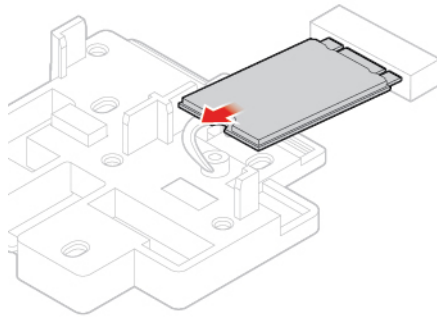


Figure 75. Removing the optical drive bracket

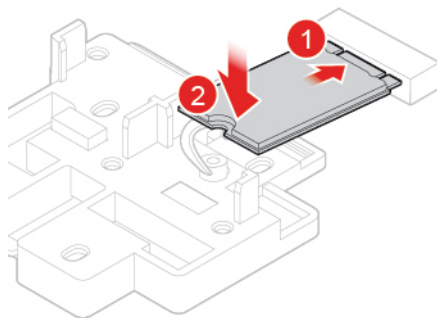


Figure 76. Installing the optical drive bracket

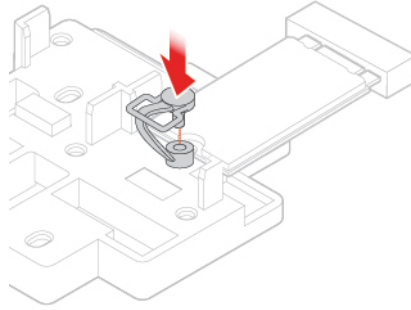


Figure 77. Installing the optical drive

6. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the M.2 storage drive bracket

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.
4. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 19.
5. Remove the M.2 storage drive.
6. Replace the M.2 storage drive bracket.

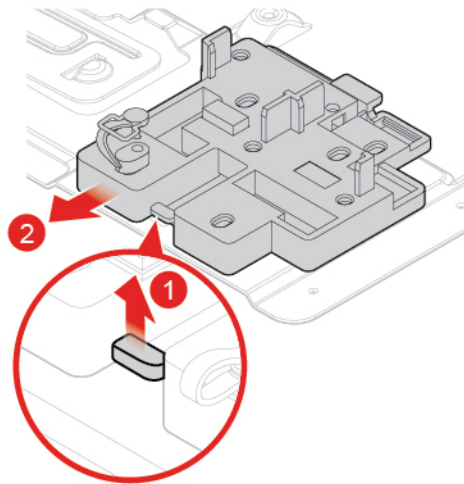


Figure 78. Removing the M.2 storage drive bracket

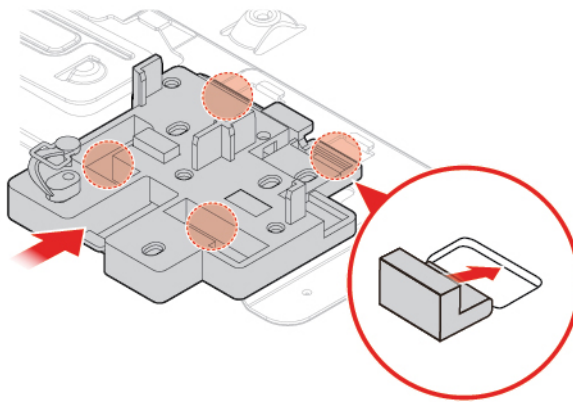


Figure 79. Installing the M.2 storage drive bracket

7. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the Wi-Fi card

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.
4. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 19.
5. Replace the Wi-Fi card.
 - Type 1

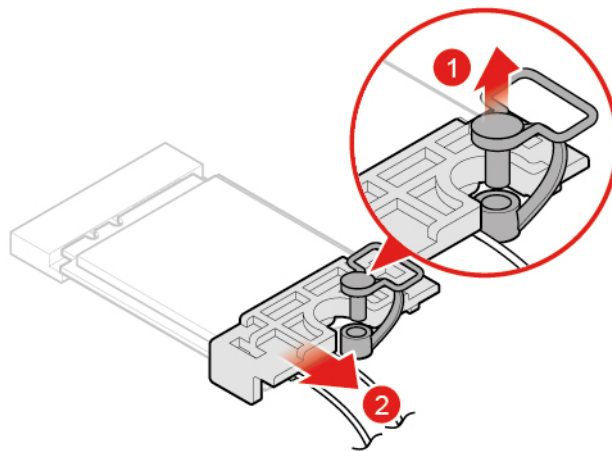


Figure 80. Removing the Wi-Fi card shield

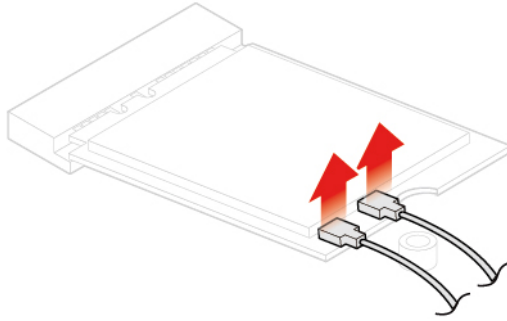


Figure 81. Disconnecting the antennas

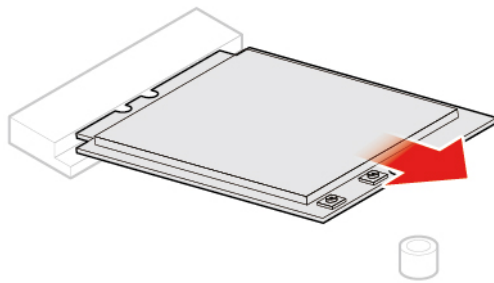


Figure 82. Removing the Wi-Fi card

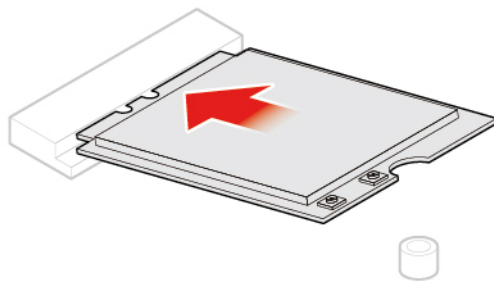


Figure 83. Installing the Wi-Fi card

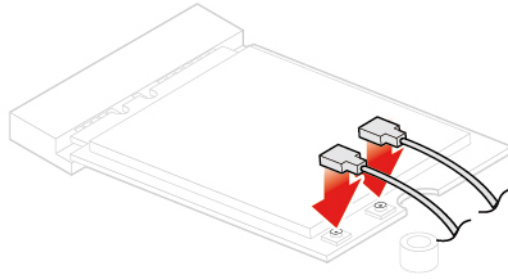


Figure 84. Connecting the antennas

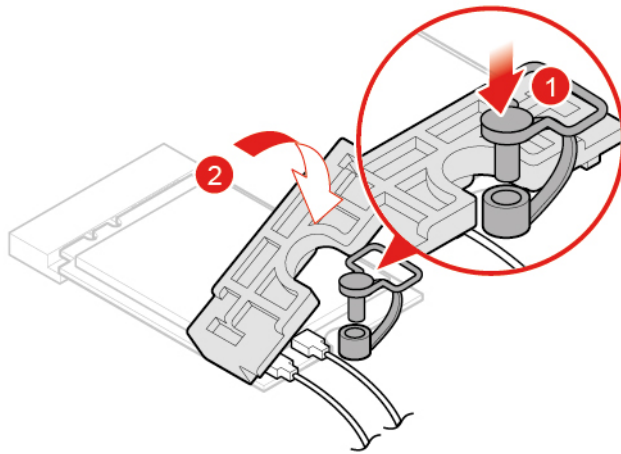


Figure 85. Installing the Wi-Fi card shield

- Type 2

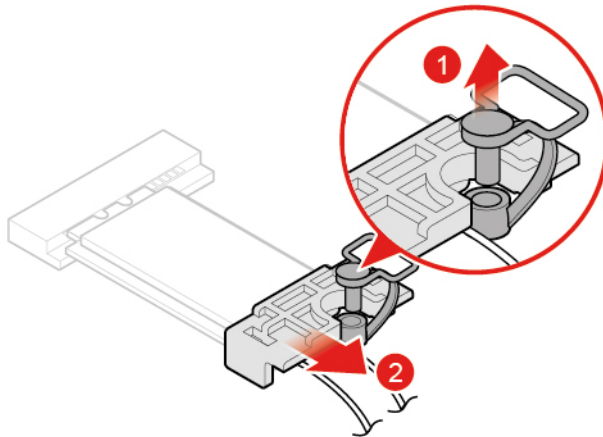


Figure 86. Removing the Wi-Fi card shield

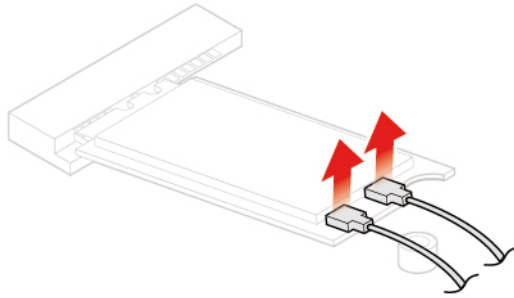


Figure 87. Disconnecting the antennas

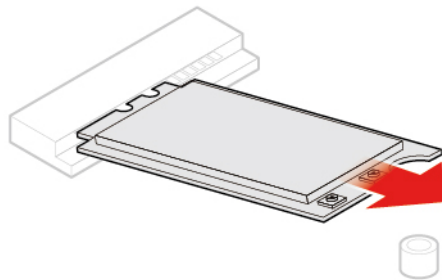


Figure 88. Removing the Wi-Fi card

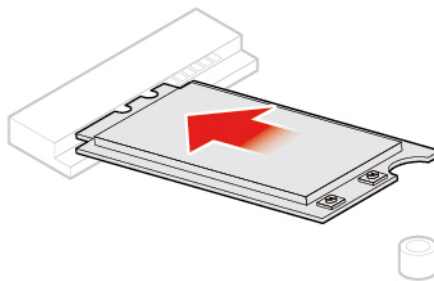


Figure 89. Installing the Wi-Fi card

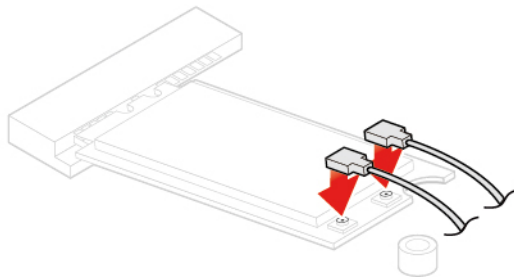


Figure 90. Connecting the antennas

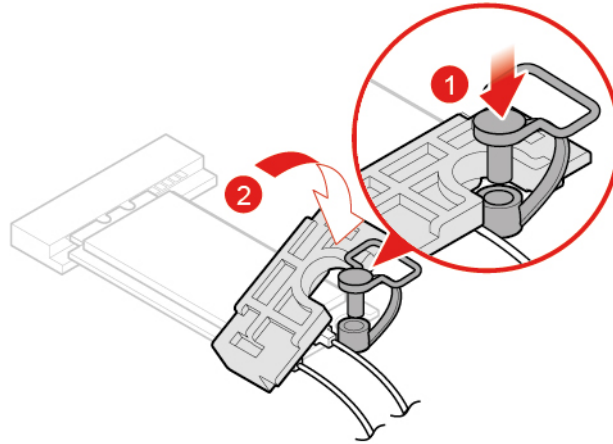


Figure 91. Installing the Wi-Fi card shield

6. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the Wi-Fi antennas

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.
4. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 19.
5. Disconnect the antenna cables from the Wi-Fi card.
6. Replace the Wi-Fi antennas.
 - Front Wi-Fi antenna

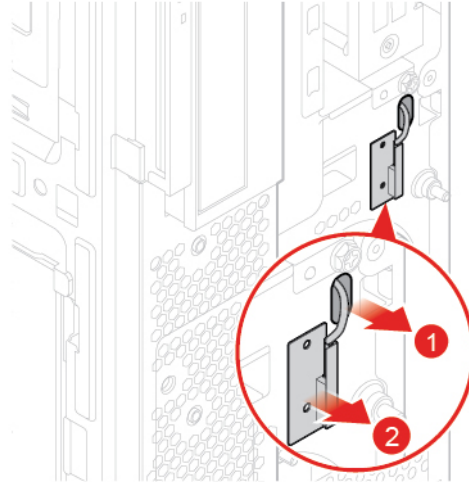


Figure 92. Removing the Wi-Fi antenna

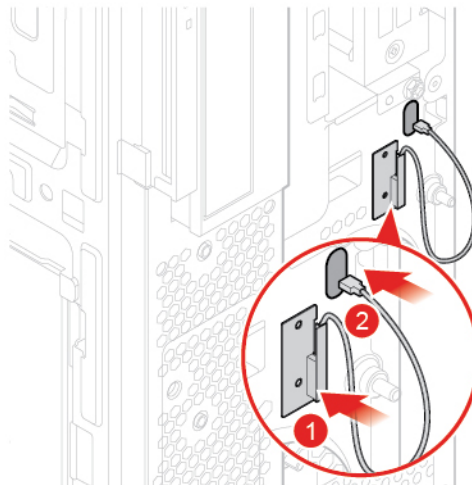


Figure 93. Installing the Wi-Fi antenna

- Rear Wi-Fi antenna

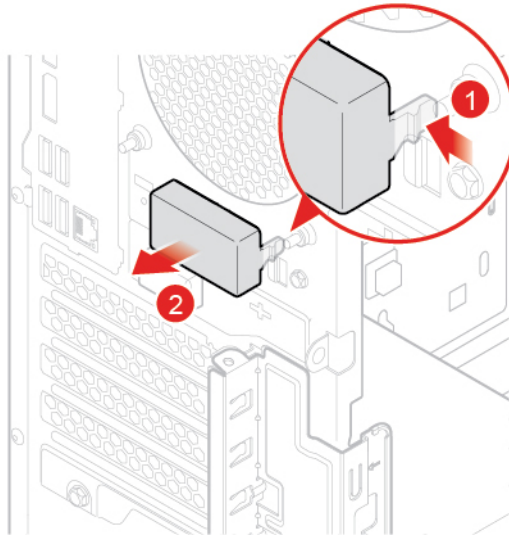


Figure 94. Removing the rear Wi-Fi antenna cover

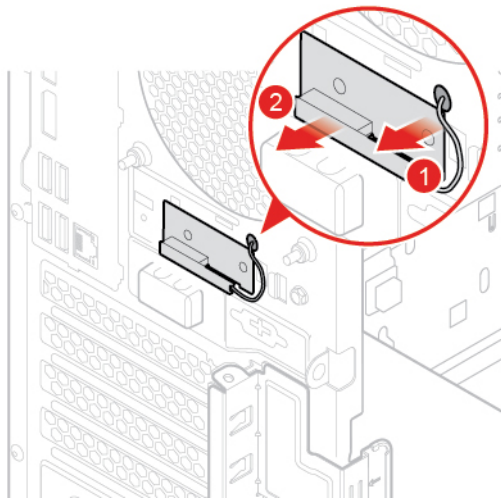


Figure 95. Removing the Wi-Fi antenna

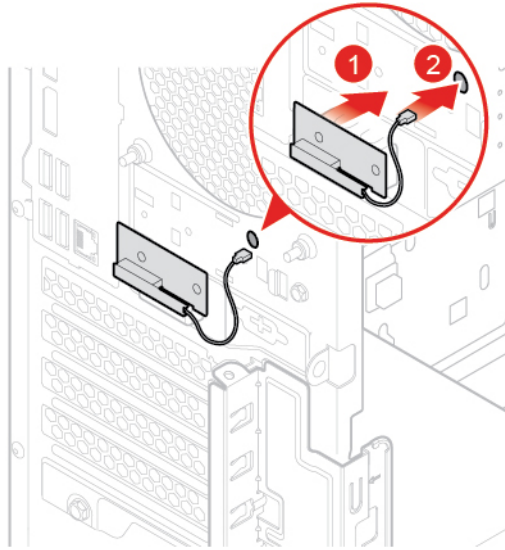


Figure 96. Installing the Wi-Fi antenna

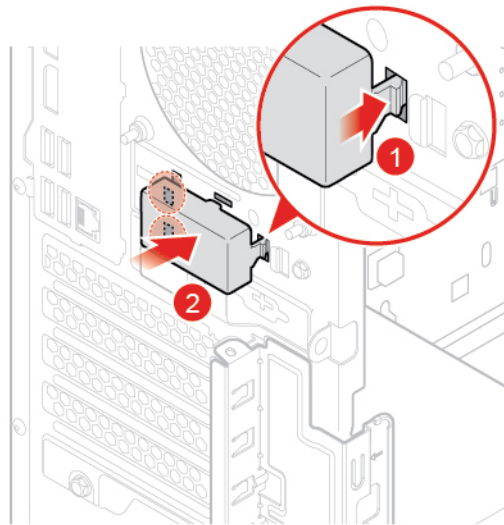


Figure 97. Installing the rear Wi-Fi antenna cover

7. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the heat sink and fan assembly

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

CAUTION:



The heat sink and fan assembly might be very hot. Before you open the computer cover, turn off the computer and wait several minutes until the computer is cool.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.
4. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 19.
5. Disconnect the heat sink and fan assembly cable from the system board.
6. Replace the heat sink and fan assembly.

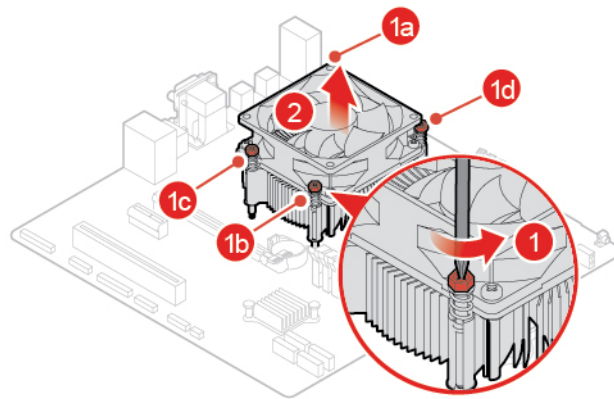


Figure 98. Removing the heat sink and fan assembly

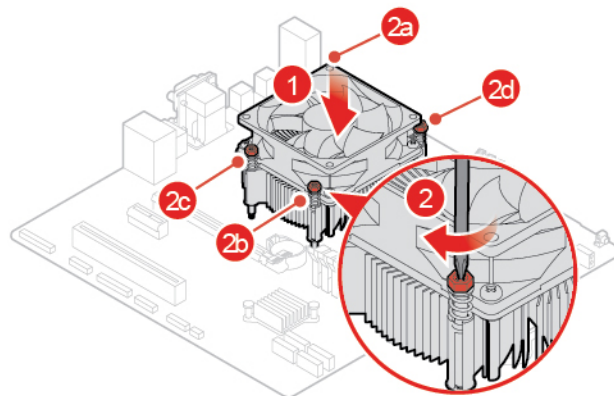


Figure 99. Installing the heat sink and fan assembly

7. Connect the new heat sink and fan assembly cable to the system board.
8. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the power supply assembly

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

Although there are no moving parts in your computer after the power cord has been disconnected, the following warnings are required for your safety and proper Underwriters Laboratories (UL) certification.

CAUTION:

Never remove the cover on a power supply or any part that has the following label attached.



Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

1. Remove the computer cover. See “Removing the computer cover” on page 17.
2. Remove the front bezel. See “Replacing the front bezel” on page 18.
3. Remove the optical drive. See “Replacing the optical drive” on page 22.
4. Remove the storage drive bracket. See “Replacing the storage drive” on page 31.
5. Disconnect the power supply assembly cable from the system board.
6. Replace the power supply assembly.

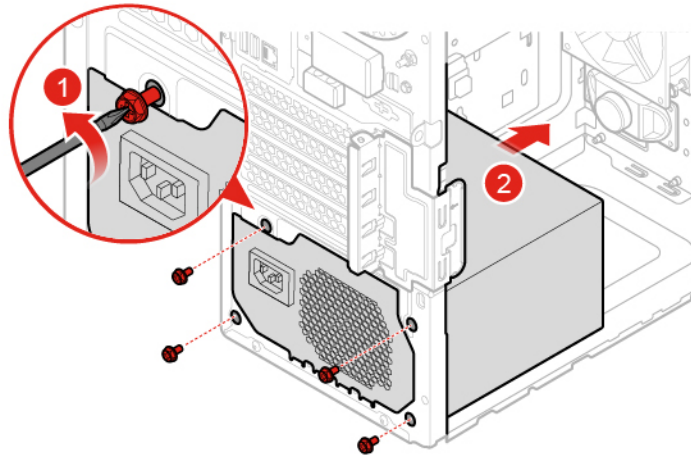


Figure 100. Removing the power supply assembly

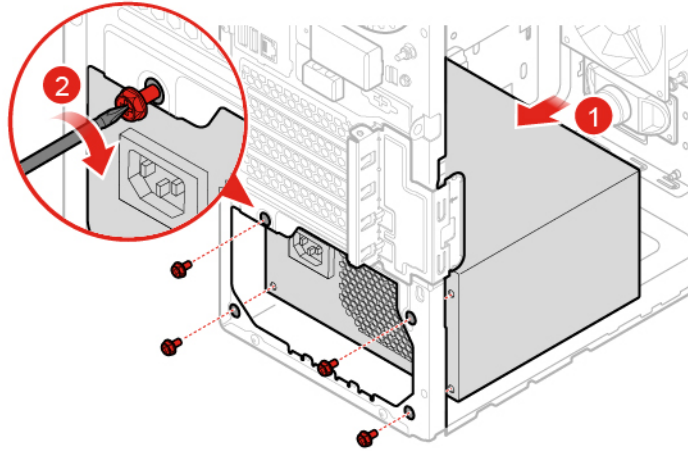


Figure 101. Installing the power supply assembly

7. Connect the new power supply assembly cable to the system board.
8. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the microprocessor

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

CAUTION:

The heat sink and microprocessor might be very hot. Before you open the computer cover, turn off the computer and wait several minutes until the computer is cool.

1. Remove the computer cover. See “Removing the computer cover” on page 17.
2. Remove the front bezel. See “Replacing the front bezel” on page 18.
3. Pivot the drive bay assembly outward. See “Pivoting the drive bay assembly upward and downward” on page 19.
4. Remove the heat sink and fan assembly. See “Replacing the heat sink and fan assembly” on page 58.
5. Disconnect all cables connected to the system board.
6. Replace the microprocessor.

Notes:

- Your microprocessor and socket might look different from the one illustrated.
- Touch only the edges of the microprocessor. Do not touch the gold contacts on the bottom.
- Do not drop anything onto the microprocessor socket while it is exposed. The socket pins must be kept as clean as possible.

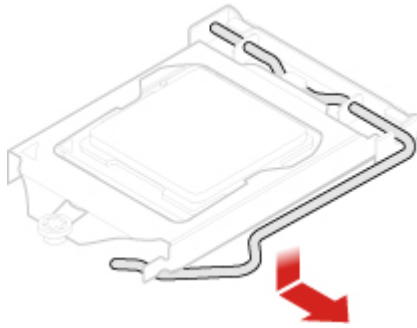


Figure 102. Releasing the holder

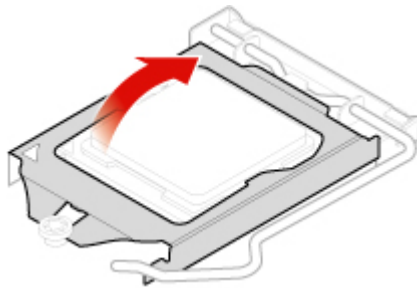


Figure 103. Pivoting up the socket



Figure 104. Removing the microprocessor

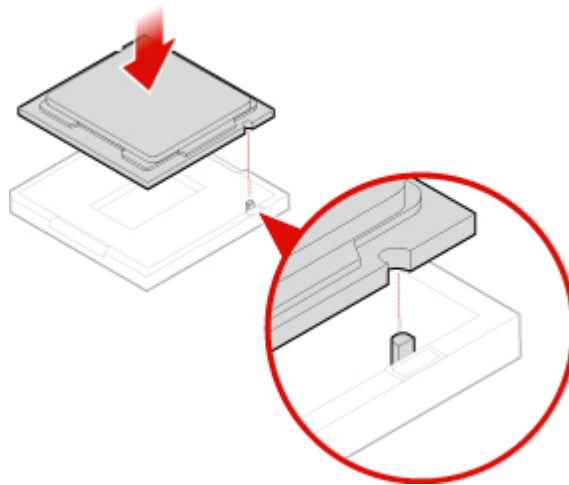


Figure 105. Installing the microprocessor

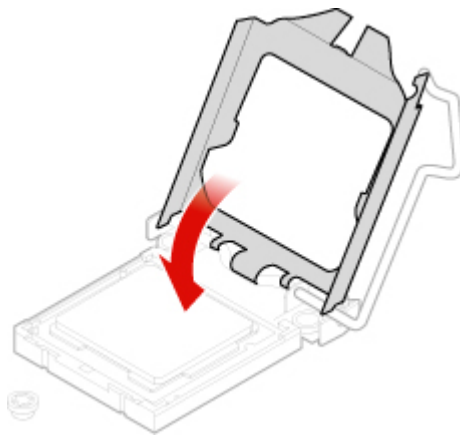


Figure 106. Pivoting the socket downward

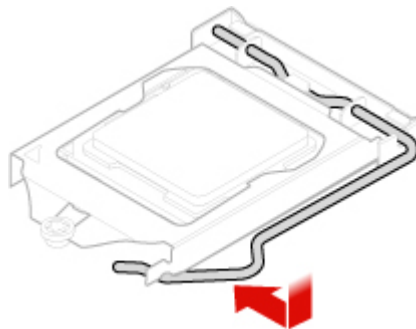


Figure 107. Securing the holder

7. Reconnect all cables that were disconnected from the system board.
8. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the E-lock

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

Note: To remove the screws, you need a special tool (T15 star wrench).

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Disconnect the E-lock cable from the system board.
4. Replace the E-lock.

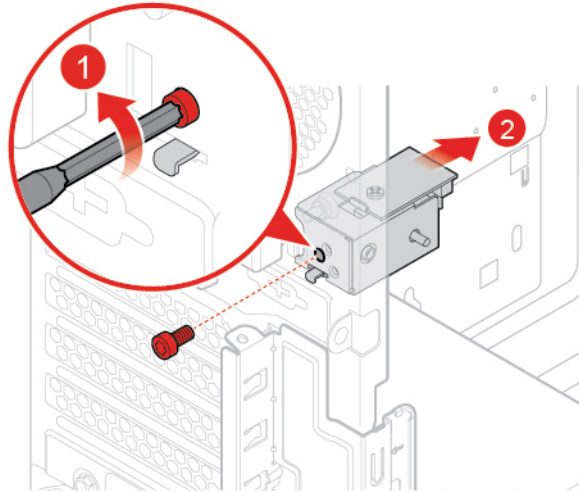


Figure 108. Removing the E-lock

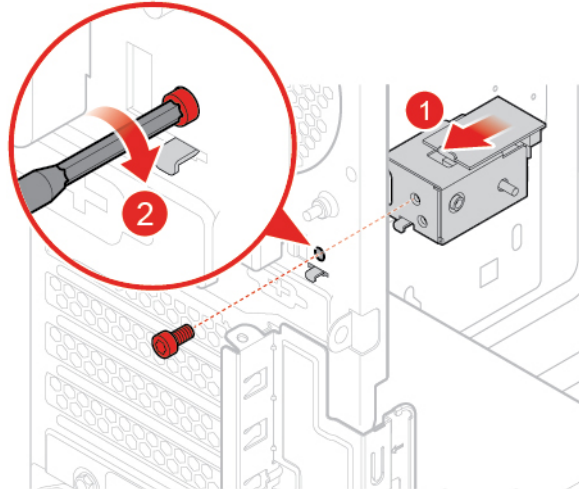


Figure 109. Installing the E-lock

5. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the cover presence switch

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.
4. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 19.
5. Disconnect the cover presence switch cable from the system board.
6. Replace the cover presence switch.

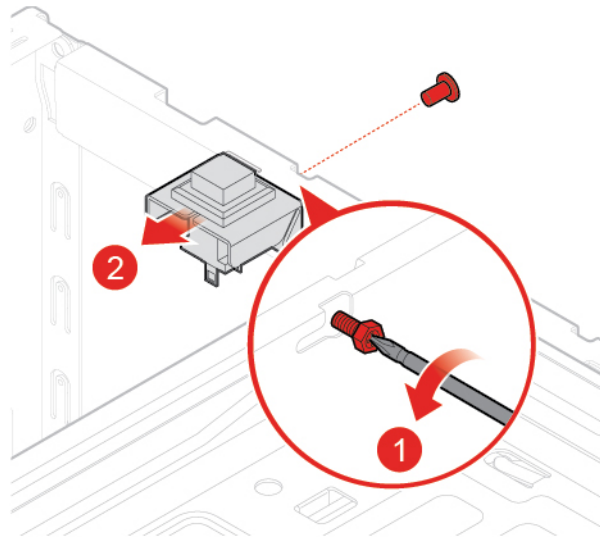


Figure 110. Removing the cover presence switch

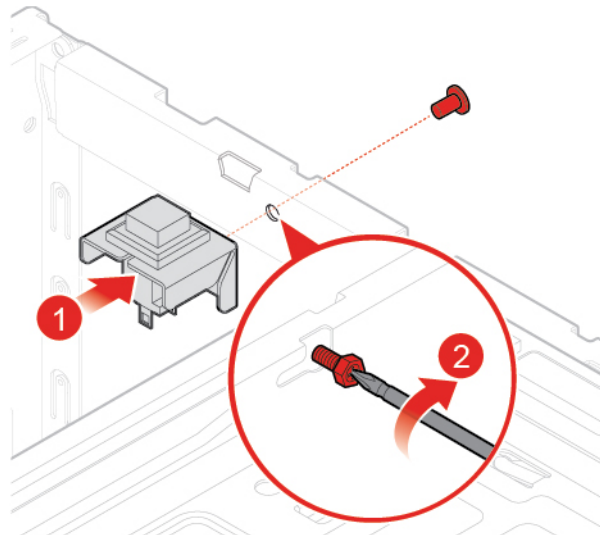


Figure 111. Installing the cover presence switch

7. Connect the new cover presence switch cable to the system board.
8. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the rear fan

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.

4. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 19.
5. Disconnect the rear fan cable from the system board.
6. Replace the rear fan.

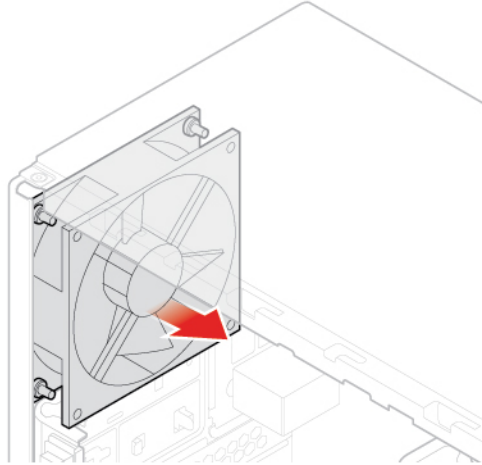


Figure 112. Removing the rear fan

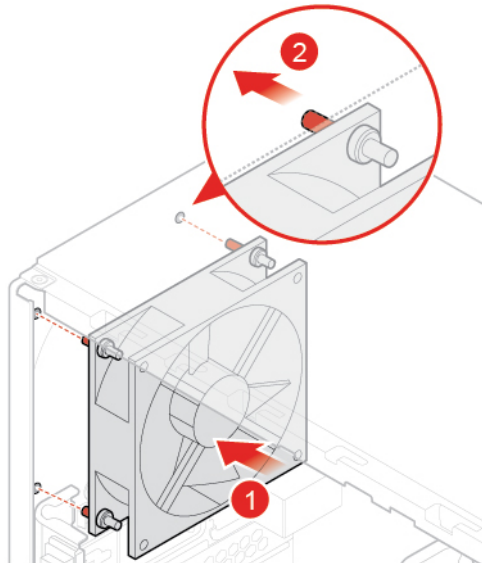


Figure 113. Installing the rear fan

7. Connect the new rear fan cable to the system board.
8. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Replacing the system board

Attention: Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1. Remove any media from the drives and turn off all connected devices and the computer. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
2. Remove the computer cover. See “Removing the computer cover” on page 17.
3. Remove the front bezel. See “Replacing the front bezel” on page 18.
4. Remove the power button. See “Replacing the power button” on page 23.
5. Remove the front I/O bracket. See “Replacing the front I/O bracket” on page 26.
6. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 19.
7. Remove all memory modules. See “Replacing the memory module” on page 43.
8. Remove the heat sink and fan assembly. See “Replacing the heat sink and fan assembly” on page 58.
9. Remove the microprocessor. See “Replacing the microprocessor” on page 61.
10. Remove all PCI Express cards. See “Replacing a PCI Express card” on page 46.
11. Remove the Wi-Fi card. See “Replacing the Wi-Fi card” on page 51.
12. Remove the M.2 storage drive. See “Replacing the M.2 storage drive” on page 47.
13. Record the cable routing and cable connections, and then disconnect all cables from the system board. See “System board” on page 5.

14. Replace the system board.

Notes:

- The numbers in the following figure show the locations of the screws instead of the removing and reinstalling order of the screws.
- Handle the system board carefully by its edges.

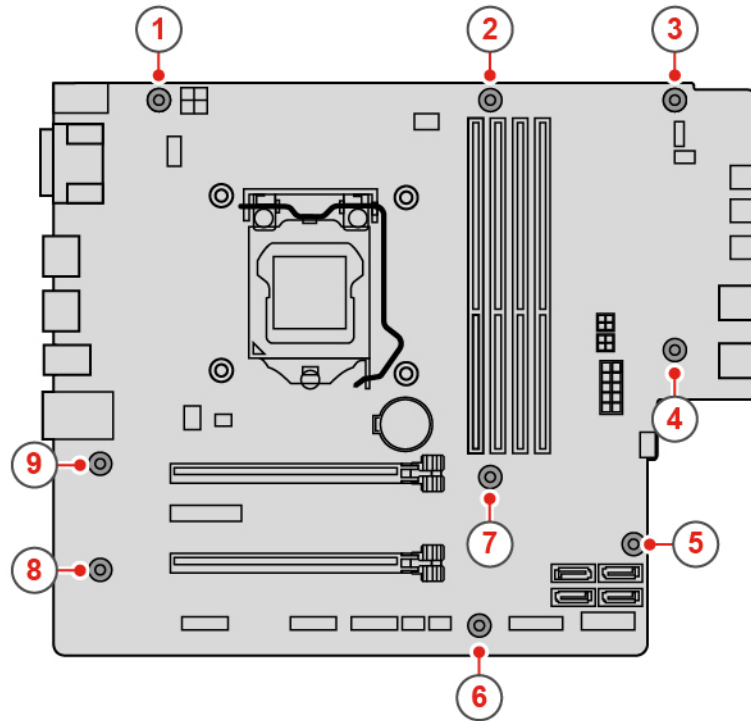


Figure 114. Removing the system board

15. Route all the cables that you disconnected from the failing system board, and then reconnect the cables to the new system board. See “System board” on page 5.
16. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 68.

Completing the parts replacement

After completing the installation or replacement for all parts, reinstall the computer cover and reconnect the cables.

To reinstall the computer cover and reconnect the cables to your computer, do the following:

1. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside your computer.
2. Ensure that the cables are routed correctly before reinstalling the computer cover. Keep cables clear of the hinges and sides of the computer chassis to avoid interference when reinstalling the computer cover.

3. Reinstall the computer cover.

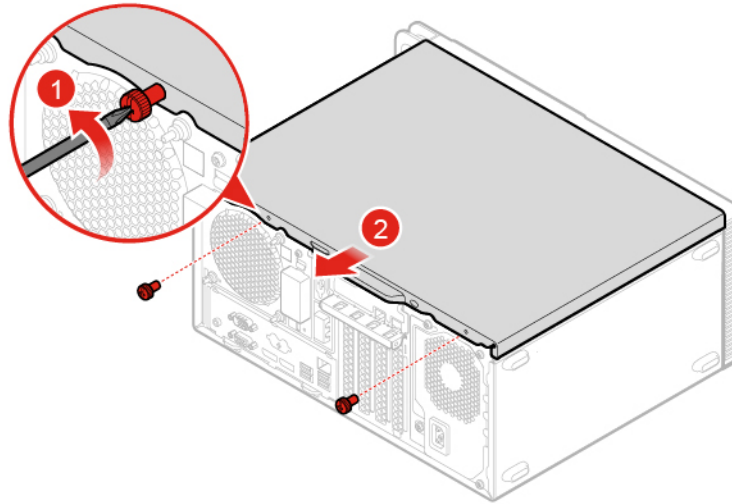


Figure 115. Reinstalling the computer cover

4. Place the computer in an upright position.
5. If a locking device is available, use it to lock the computer.
6. Reconnect the external cables and power cords to the corresponding connectors on the computer.

Appendix A. Notices

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