

ThinkCentre®

M720s User Guide and Hardware Maintenance Manual

Think

Lenovo

Energy Star Machine Types: 10ST, 10SU, 10SV, 10TR, 10U6, and
10U7

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.

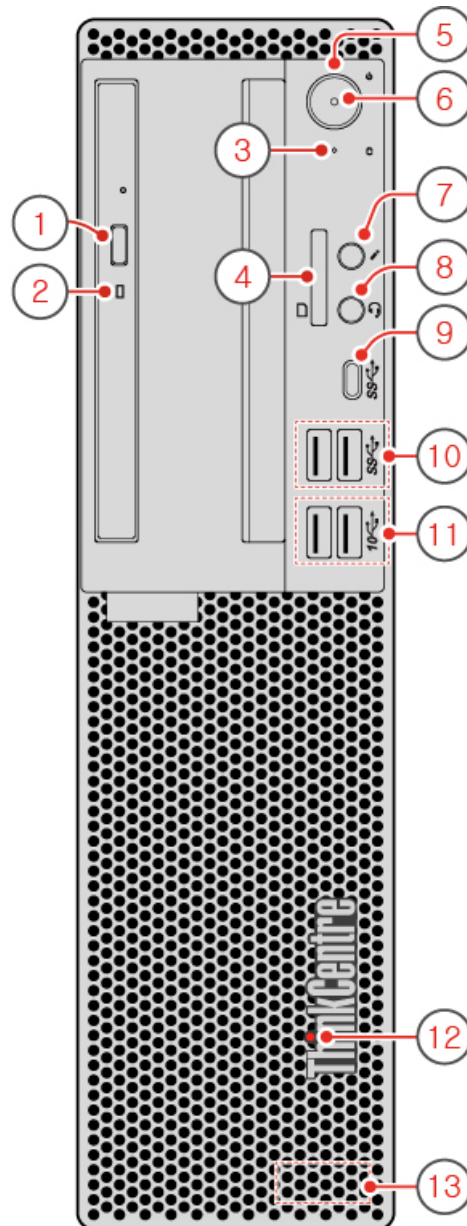


Figure 1. Front view

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

1 Optical drive eject/close button (optional)

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 activity indicator (optional)

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

3 Storage drive activity indicator

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

4 Card reader slot (optional)

Used to read data from a supported memory card.

5 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.

6 Power indicator

This indicator is on when the computer is on.

7 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.

8 Headset connector

Used to connect a headset or headphones to your computer.

9 USB-C connector

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.

10 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.

11 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.

12 Illuminated red dot

This indicator is on when the computer is on.

13 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.

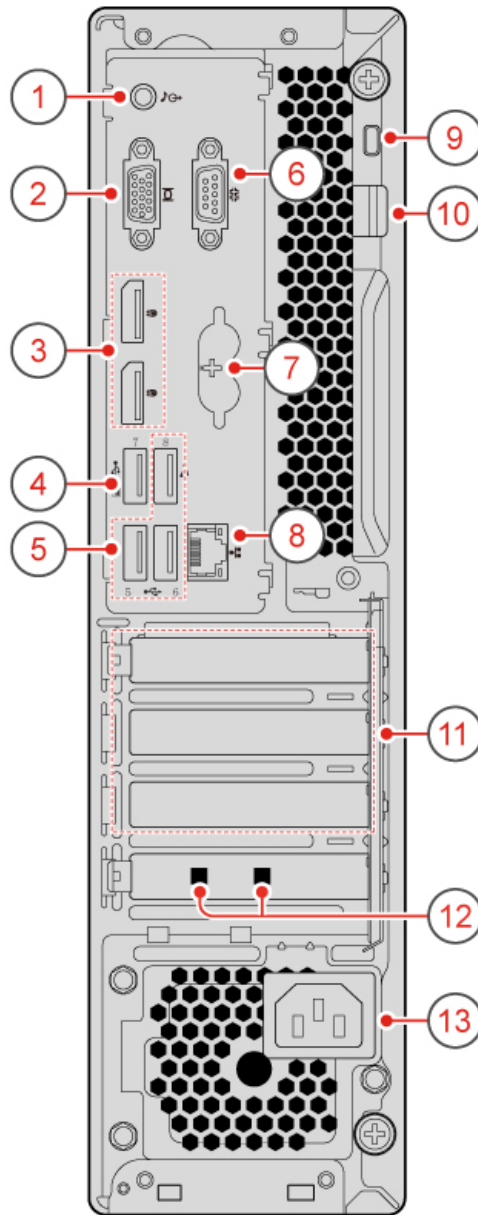


Figure 2. Rear view

1 Audio line-out connector	2 VGA-out connector
3 DisplayPort® 1.2 out connectors (2)	4 USB 2.0 connector
5 USB 2.0 connectors (3)	6 Serial connector
7 PS/2 keyboard and mouse connectors (optional)	8 Ethernet connector
9 Security-lock slot	10 Padlock loop
11 PCI Express card area	12 Smart cable clip slots (2) (optional)
13 Power cord connector	

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 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 connectors

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

4 USB 2.0 connector

Used to connect a device that requires a USB 2.0 connection.

Note: The USB 2.0 connector supports the smart power on feature. If you connect a Lenovo-recommended USB 1.1 keyboard to this connector, you can power on the computer or wake it up from S4 hibernation mode by pressing Alt+P on the keyboard. Ensure that you use a Lenovo-recommended keyboard that supports the smart power on feature.

5 USB 2.0 connectors

Used to connect a device that requires a USB 2.0 connection.

6 Serial connector

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

7 PS/2 keyboard and mouse connectors (optional)

Used to connect a keyboard, a mouse, or trackball, or other pointing devices that uses a Personal System/2 (PS/2) connector.

8 Ethernet connector

Used to connect an Ethernet cable for network access.

9 Security-lock slot

Used to secure a Kensington-style cable lock.

10 Padlock loop

Used to secure a padlock.

11 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.

12 Smart cable clip slots (optional)

Used to secure a smart cable clip.

13 Power cord connector

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

System board

Note: See “Front view” and “Rear view” for additional component descriptions.

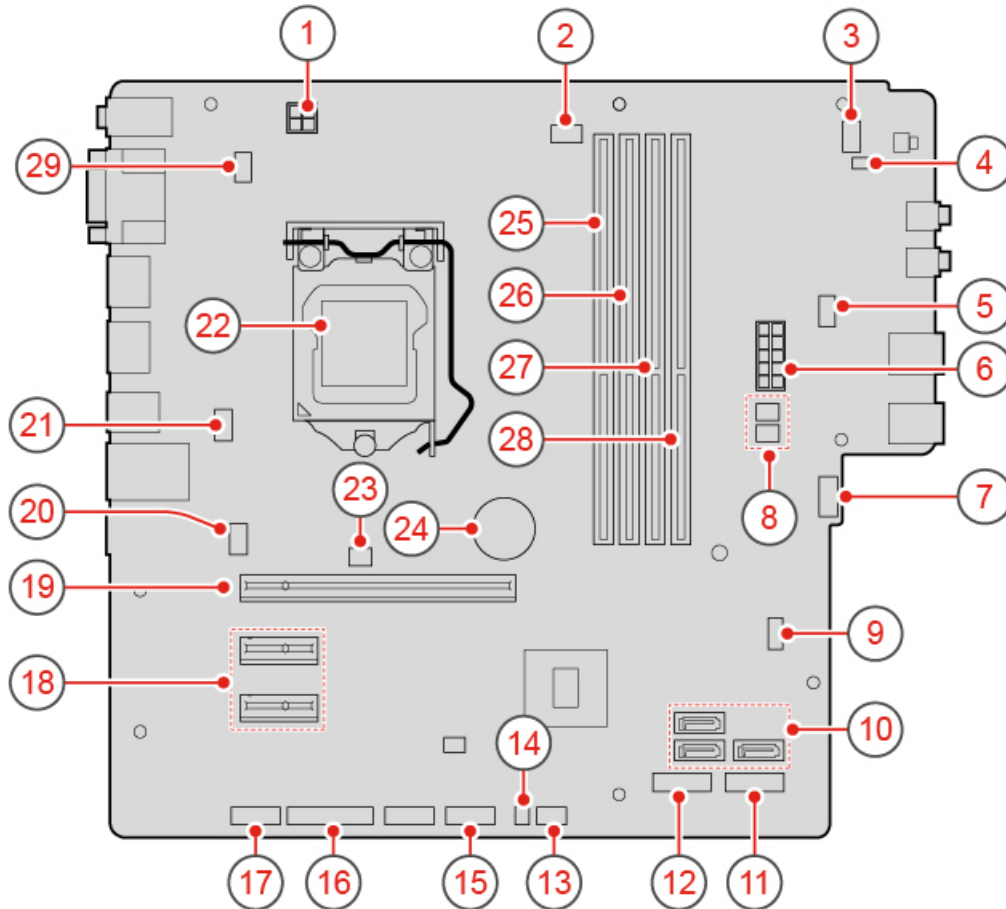


Figure 3. System board

1 4-pin power connector	2 Microprocessor fan connector
3 Power button connector	4 Internal speaker connector
5 Auxiliary fan connector 2	6 10-pin power connector
7 Auxiliary fan connector 1	8 SATA power connectors (2)
9 Clear CMOS (Complementary Metal Oxide Semiconductor) / Recovery jumper	10 SATA 3.0 connectors (3)
11 M.2 solid-state drive slot	12 M.2 Wi-Fi card slot

13 Thermal sensor connector	14 Illuminated red dot connector
15 Front USB 2.0 connector	16 Parallel connector
17 Serial (COM2) connector	18 PCI Express x1 card slots (2)
19 PCI Express x16 graphics card slot	20 System fan connector
21 E-lock connector	22 Microprocessor socket
23 Cover presence switch connector (Intrusion switch connector)	24 Coin-cell battery
25 Memory slot (DIMM1)	26 Memory slot (DIMM2)
27 Memory slot (DIMM3)	28 Memory slot (DIMM4)
29 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 computer as shown.

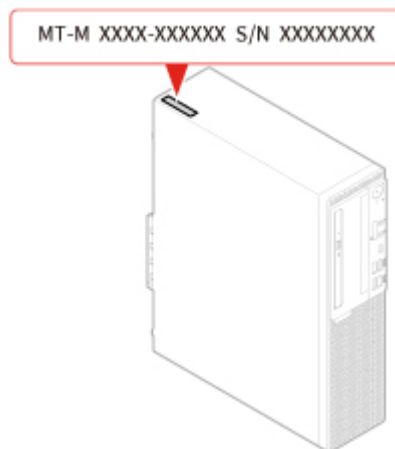


Figure 4. Machine type and model label

Chapter 2. Specifications

Power supply

- 180-watt automatic voltage-sensing power supply
- 210-watt automatic voltage-sensing power supply
- 260-watt automatic voltage-sensing power supply

Storage drives

- 3.5-inch storage drive (optional)
- 2.5-inch storage drive (optional)
- M.2 solid-state drive (optional)

Video features

The integrated graphics card supports the following:

- DisplayPort 1.2 out connector
- VGA-out connector

Audio features

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

Input/Output (I/O) features

- Audio connectors (audio line-out, headset, and microphone)
- Card reader slot (optional)
- VGA-out connector
- Ethernet connector
- PS/2 keyboard connector (optional)
- PS/2 mouse connector (optional)
- Serial connectors
- USB connectors (USB 2.0, USB 3.1, and Type-C USB 3.1)
- VGA-out connector

Expansion

- Card reader (optional)
- Memory slots
- M.2 solid-state drive slot
- Optical drive (optional)
- PCI Express x1 card slots

- PCI Express x16 graphics card slot
- Storage drive bay

Network features

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

Physical dimensions

- Width: 92.5 mm (3.6 inches)
- Height: 343.5 mm (13.5 inches)
- Depth: 290.5 mm (11.4 inches)

Weight (without the package)

Maximum configuration as shipped: 6 kg (13.2 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.

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.

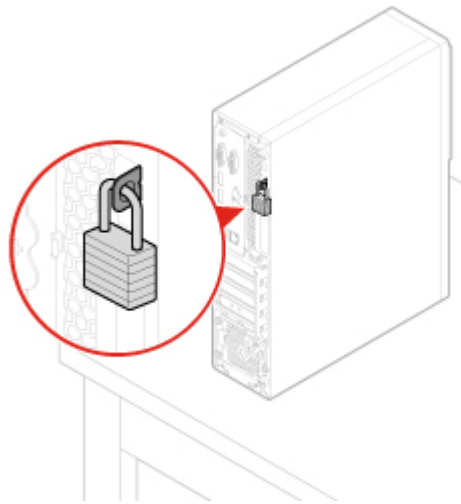


Figure 5. Locking the computer cover

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.

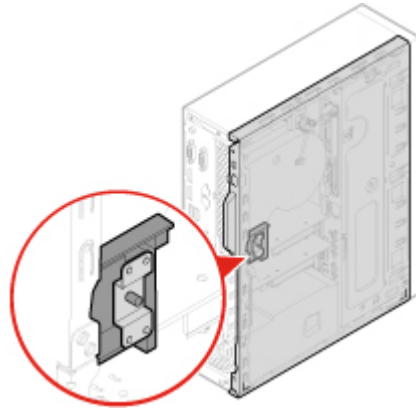


Figure 6. Enabling or disabling the E-lock

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>

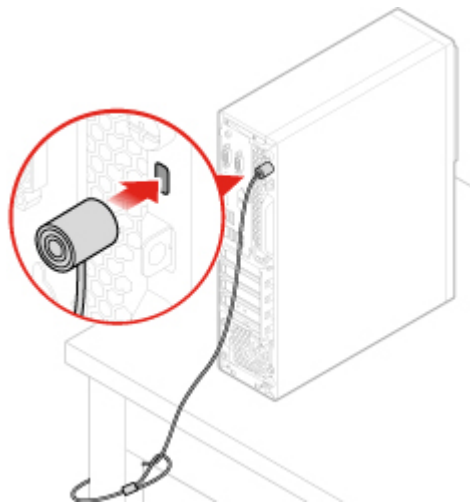


Figure 7. Attaching a Kensington-style cable lock

Attaching a smart cable clip

A smart cable clip can be used to secure devices, such as the keyboard and the mouse, by locking the device cables to the computer. The smart cable clip connects to the cable-lock slots on the rear of the computer. To install a smart cable clip, 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 smart cable clip.
3. Press the clip **2** into the cable-lock slot **3** until it snaps into position.

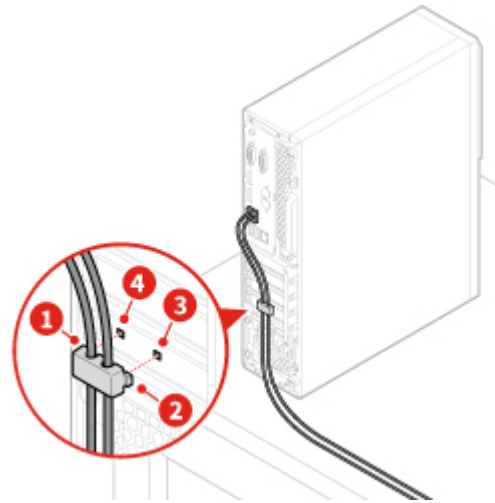


Figure 8. Attaching a smart cable clip

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, and 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 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>

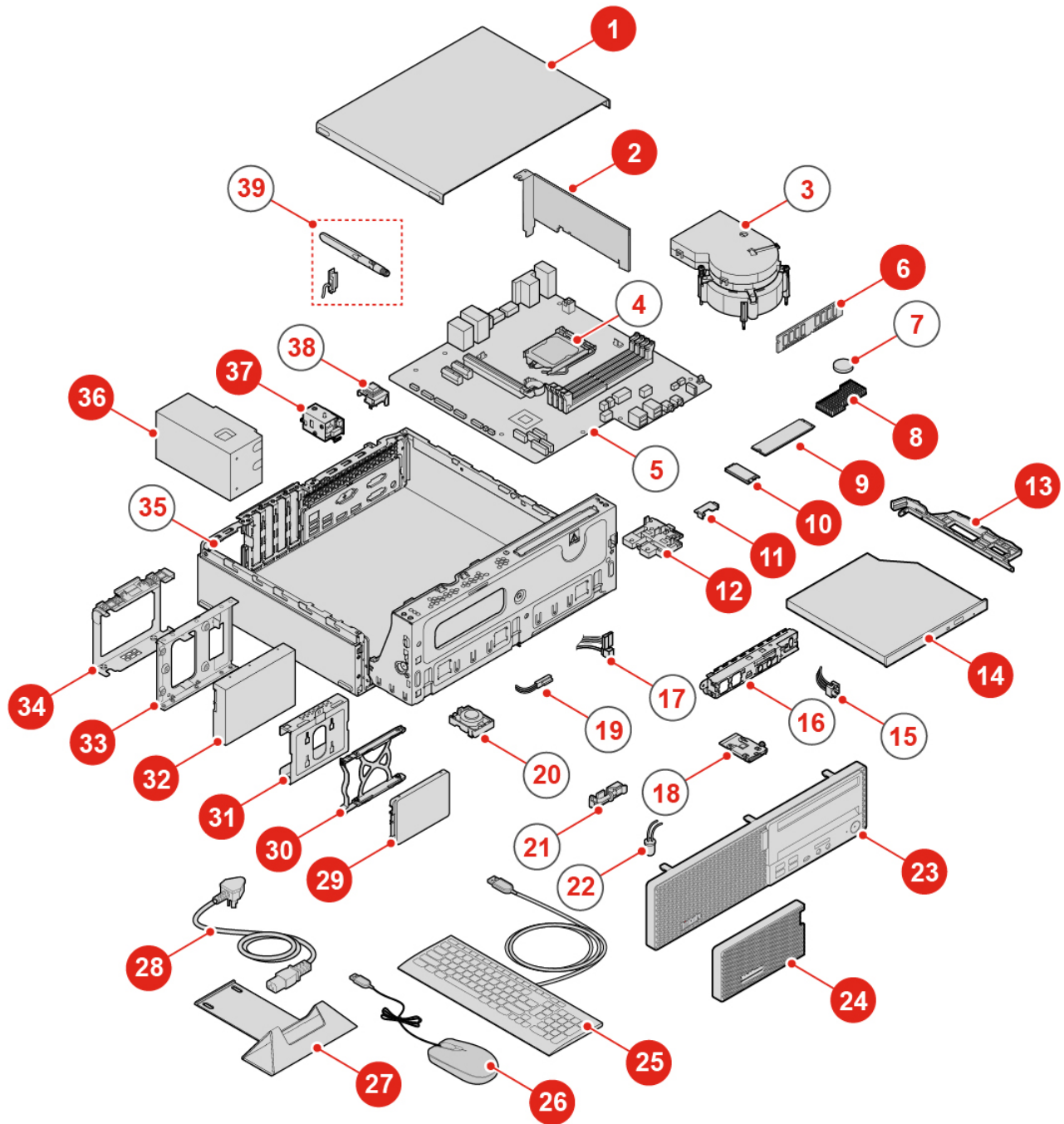


Figure 9. Locating FRUs

Self-service CRUs	Optional-service CRUs	Non-CRUs
1 Computer cover	10 Wi-Fi card	3 Heat sink and fan assembly
2 PCI Express card	11 Wi-Fi card shield	4 Microprocessor
6 Memory module	36 Power supply assembly	5 System board
8 M.2 solid-state drive heat sink	37 E-lock	7 Coin-cell battery
9 M.2 solid-state drive		15 Power button

Self-service CRUs	Optional-service CRUs	Non-CRUs
<ul style="list-style-type: none"> 12 M.2 solid-state drive bracket 13 Optical drive bracket 14 Optical drive 23 Front bezel 24 Dust shield 25 Keyboard 26 Mouse 27 Vertical stand 28 Power cord 29 Secondary storage drive 30 Secondary storage drive bezel 31 Secondary storage drive bracket 32 Primary storage drive 33 Storage converter 34 Primary storage drive bracket 		<ul style="list-style-type: none"> 16 Front I/O bracket 17 Storage drive cable 18 Card reader 19 Optical drive cable 20 Internal speaker 21 Thermal sensor 22 Illuminated red dot cable 35 Chassis 38 Cover presence switch (intrusion switch) 39 Wi-Fi antennas

Replacing the keyboard or wireless keyboard

Note: The wireless keyboard is available only on some models.

Replacing the keyboard

1. Turn off the computer and disconnect all power cords from electrical outlets.
2. Disconnect the old keyboard cable from the computer.
3. Connect a new keyboard to the appropriate connector on the computer.

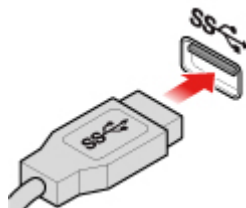


Figure 10. Replacing the keyboard

Replacing the wireless keyboard

1. Disconnect the USB dongle from your computer and remove your old wireless keyboard.
2. Take out the new wireless keyboard from the package.
3. Open the battery compartment cover, and install two AAA batteries according to the polarity indicators.

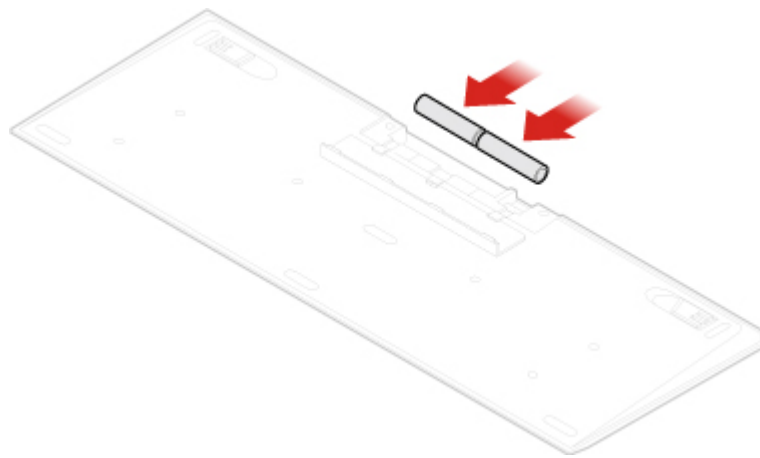


Figure 11. Replacing the wireless keyboard

4. Take out the USB dongle from the keyboard compartment or from the wireless mouse compartment and connect it to an available USB connector on the computer.
5. Close the compartment cover. The keyboard is ready for use.

Replacing the mouse or wireless mouse

Note: The wireless mouse is available only on some models.

Replacing the mouse

1. Turn off the computer and disconnect all power cords from electrical outlets.
2. Disconnect the old mouse cable from the computer.
3. Connect a new mouse to the appropriate connector on the computer.

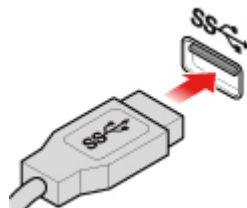


Figure 12. Replacing the mouse

Replacing the wireless mouse

1. Disconnect the USB dongle from your computer. Then, remove your old wireless mouse.
2. Take out the new wireless mouse from the package.
3. Open the battery compartment cover, and install two AAA batteries according to the polarity indicators.

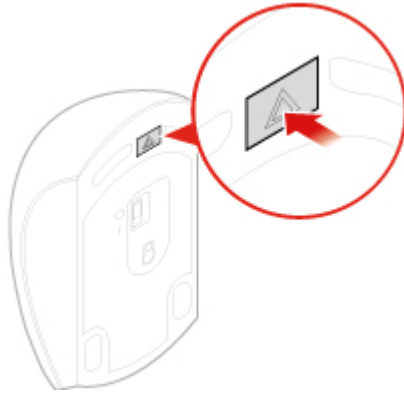


Figure 13. Opening the battery compartment

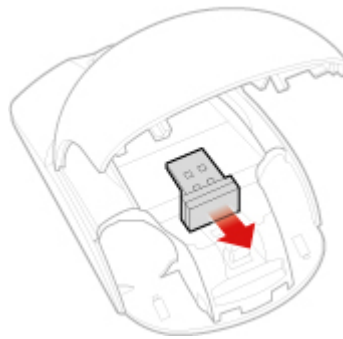


Figure 14. Taking out the USB dongle

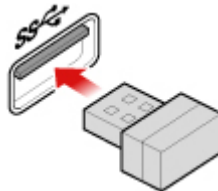


Figure 15. Connecting the USB dongle to a USB connector

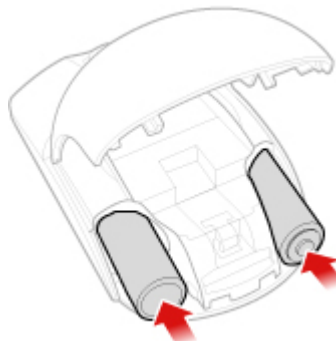


Figure 16. Installing the mouse batteries

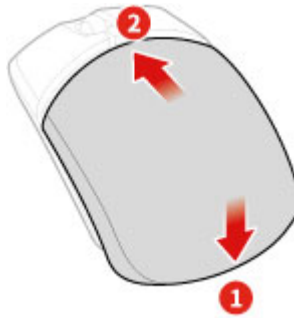


Figure 17. Closing the battery compartment cover

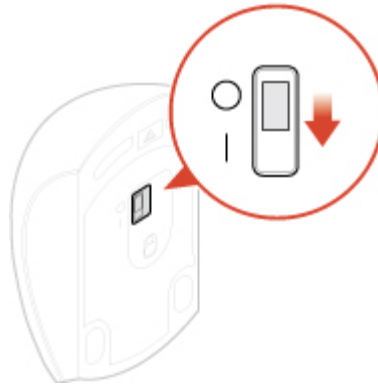


Figure 18. Pushing the power switch to the ON position

Notes:

- The green LED indicates that the mouse is ready for use.
- The flashing amber LED indicates a low battery level.
- Slide the power switch to the OFF position when you are not using the mouse to extend the battery life.
- After disconnecting the USB dongle from your computer, store it in the wireless mouse compartment or in the wireless keyboard compartment.

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.
2. Disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.
3. Replace the power cord.

Note: Your power cord might look different from the one illustrated.

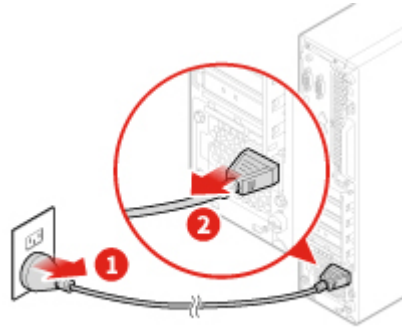


Figure 19. Removing the power cord

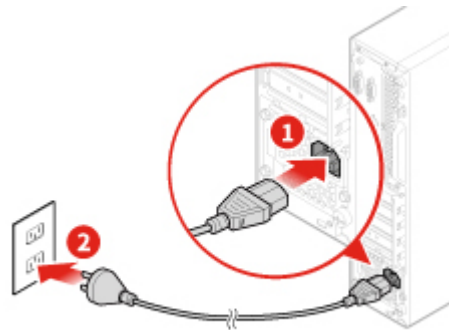


Figure 20. Installing the power cord

Replacing the dust shield

Note: The dust shield is optional.

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.
2. Disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.
3. Replace the dust shield.

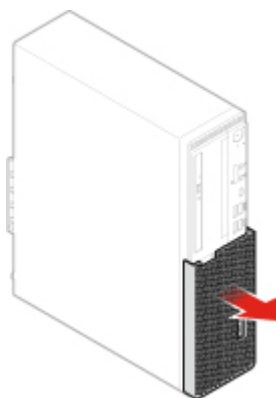


Figure 21. Removing the dust shield

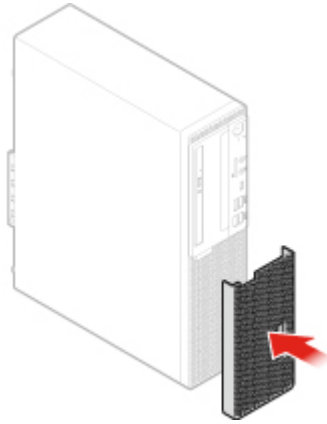


Figure 22. Installing the dust shield

Replacing the vertical stand

Note: The vertical stand is available only on some models.

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.
2. Disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.
3. Replace the vertical stand.

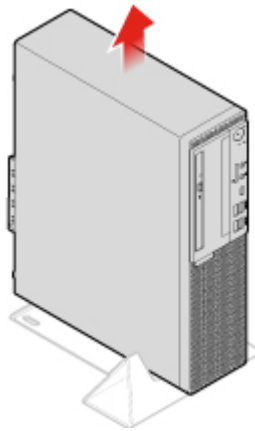


Figure 23. Removing the vertical stand

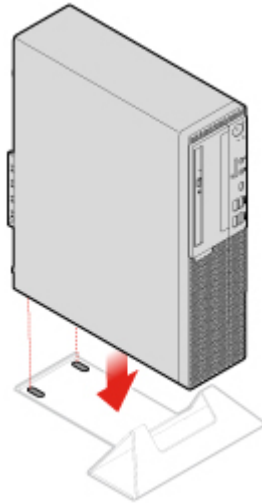


Figure 24. Installing the vertical stand

Removing the computer cover

Note: Before you open the computer cover, ensure that the E-lock has been unlocked in the Setup Utility program. See “Computer locks”.

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 cooled down.

1. Remove any media from the drives and turn off all connected devices and the computer.
2. Disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.
3. Unlock any locking device that secures the computer cover.
4. Remove the dust shield. See “Replacing the dust shield” on page 22.
5. Remove the computer cover.

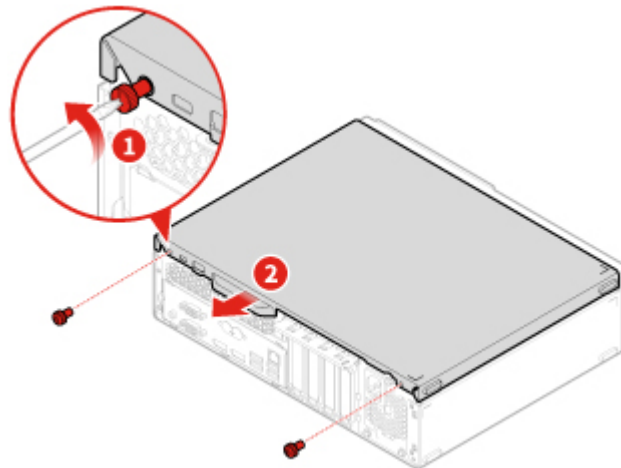


Figure 25. Removing the computer cover

6. 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 the computer cover. See “Removing the computer cover” on page 24.
2. Replace the front bezel.

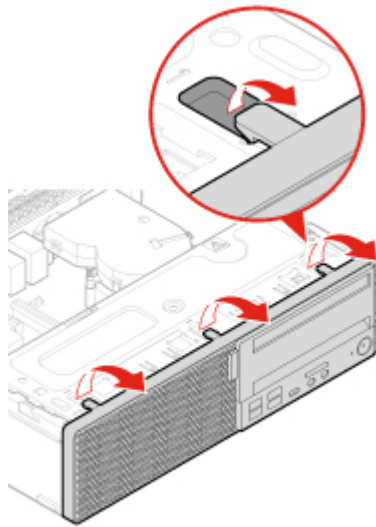


Figure 26. Removing the front bezel

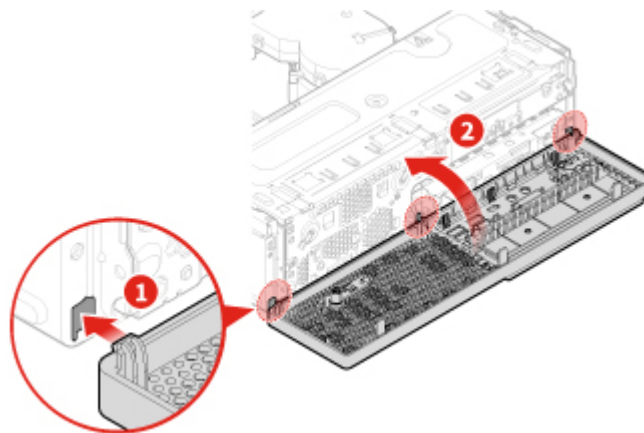


Figure 27. Installing the front bezel

3. 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 the computer cover. See “Removing the computer cover” on page 24.
2. Remove the front bezel. See “Replacing the front bezel” on page 25.

3. Disconnect the signal and power connector from the optical drive.
4. Replace the optical drive.

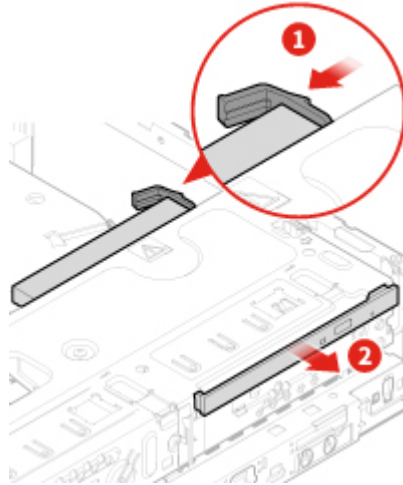


Figure 28. Removing the optical drive assembly

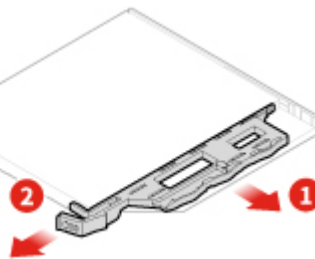


Figure 29. Removing the optical drive bracket

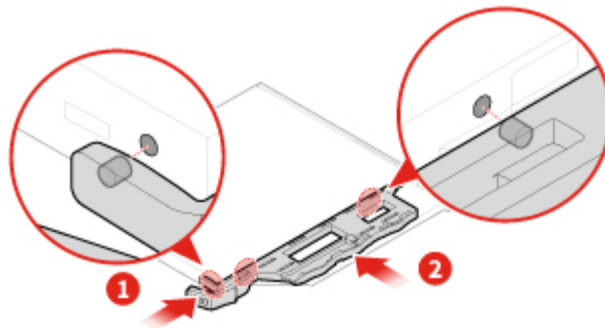


Figure 30. Installing the optical drive bracket

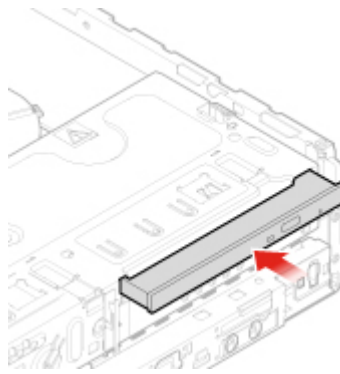


Figure 31. Installing the optical drive assembly

5. Connect the signal and power connector to the new optical drive.
6. 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 primary storage drive

1. Remove the computer cover. See “Removing the computer cover” on page 24.
2. Remove the front bezel. See “Replacing the front bezel” on page 25.
3. Disconnect the storage drive cables from the system board.
4. Replace the 3.5-inch primary storage drive.

Note: Ensure that you disconnect or reconnect the storage drive cables during the replacement.

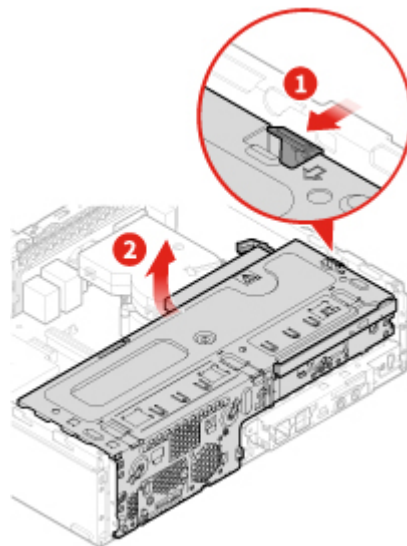


Figure 32. Opening the drive bay

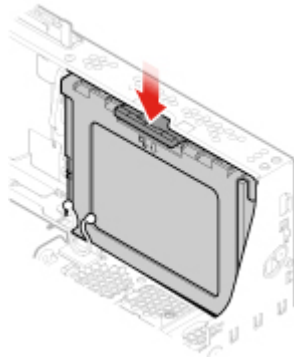


Figure 33. Removing the 3.5-inch primary storage drive

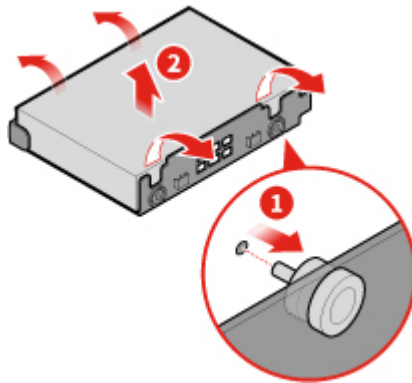


Figure 34. Removing the 3.5-inch primary storage drive bracket

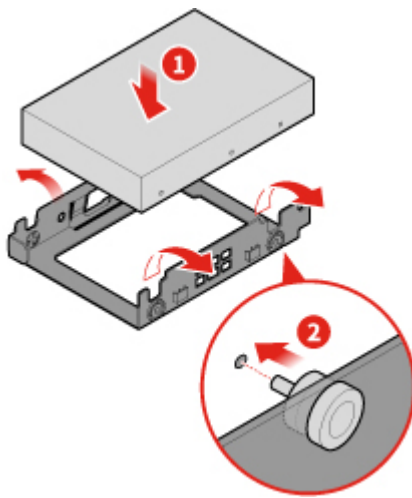


Figure 35. Installing the 3.5-inch primary storage drive bracket

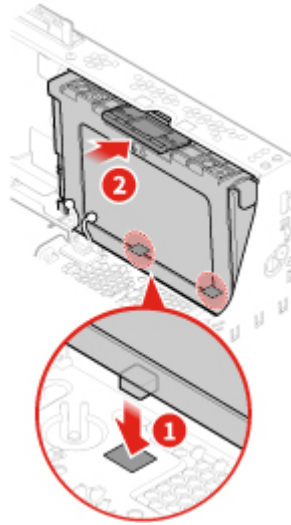


Figure 36. Installing the 3.5-inch primary storage drive

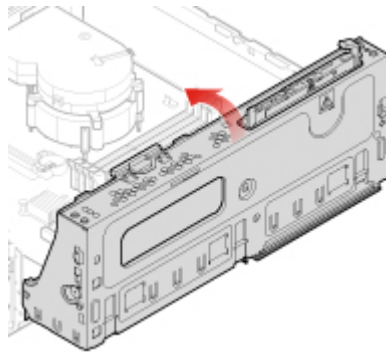


Figure 37. Closing the drive bay

5. Connect the storage drive cables to the system board.
6. Complete the replacement. See “Completing the parts replacement” on page 68.

Replacing the 2.5-inch primary storage drive

1. Remove the storage converter with the 2.5-inch primary storage drive. See “Replacing the 3.5-inch primary storage drive”.
2. Replace the 2.5-inch primary storage drive in the storage converter.

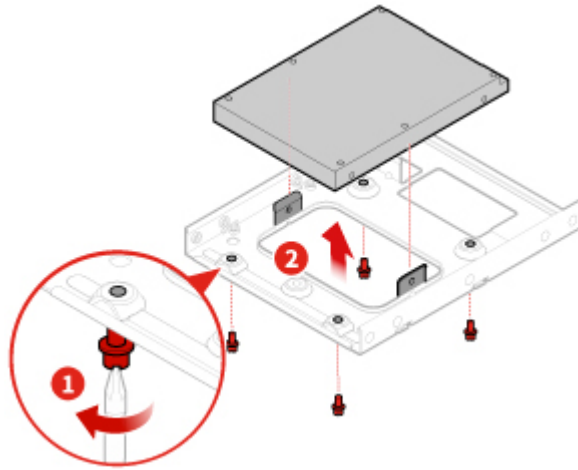


Figure 38. Removing the 2.5-inch primary storage drive from the storage converter

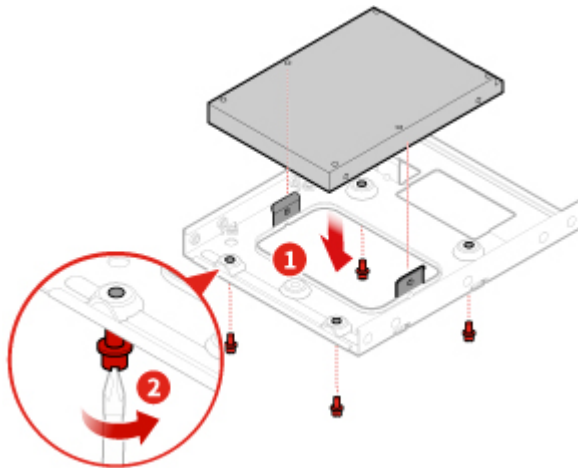


Figure 39. Installing the new 2.5-inch primary storage drive to the storage converter

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

Replacing the 2.5-inch secondary storage drive

1. Remove the computer cover. See “Removing the computer cover” on page 24.
2. Remove the front bezel. See “Replacing the front bezel” on page 25.
3. Replace the 2.5-inch secondary storage drive.

Note: Ensure that you disconnect or reconnect the storage drive cables during the replacement.

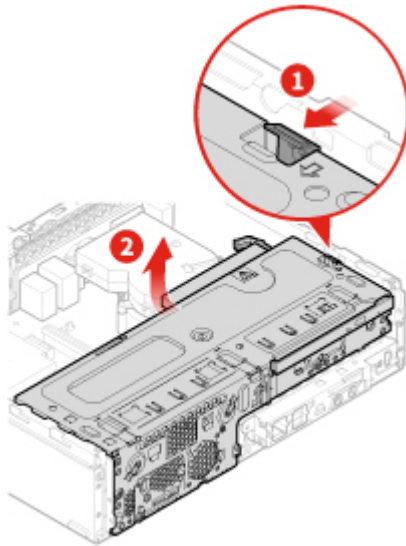


Figure 40. Opening the drive bay

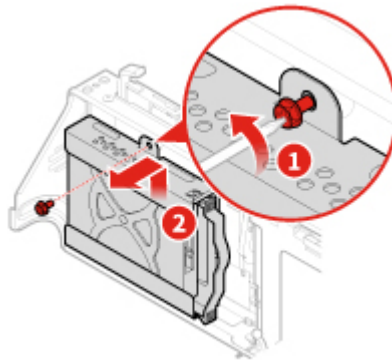


Figure 41. Removing the 2.5-inch secondary storage drive



Figure 42. Removing the 2.5-inch secondary storage drive bracket

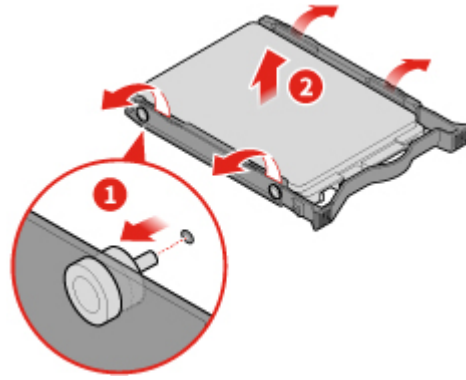


Figure 43. Removing the 2.5-inch secondary storage drive bezel

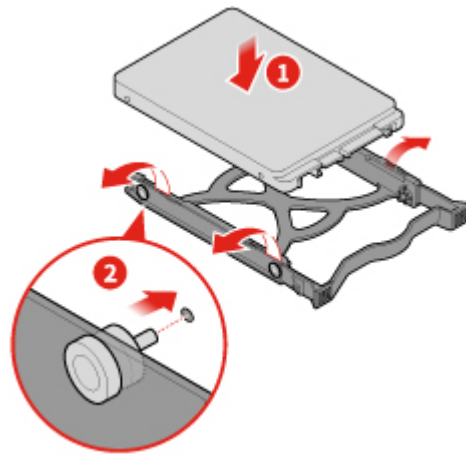


Figure 44. Installing the 2.5-inch secondary storage drive bezel

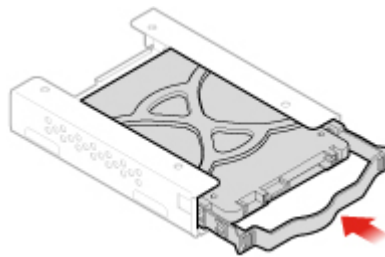


Figure 45. Installing the 2.5-inch secondary storage drive bracket

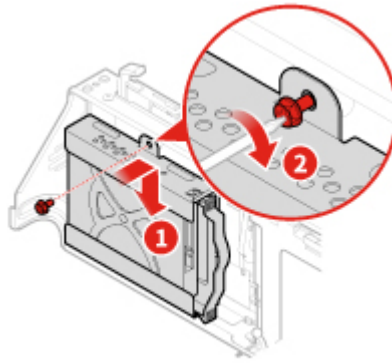


Figure 46. Installing the 2.5-inch secondary storage drive

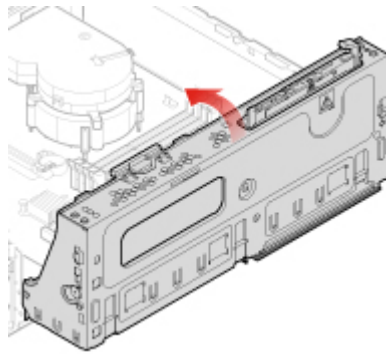


Figure 47. Closing the drive bay

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

Replacing a memory module

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

Notes:

- Before the installation, ensure that the memory slot latches are open.
- During the installation, ensure that you follow the installation order for memory modules shown in the following figure.

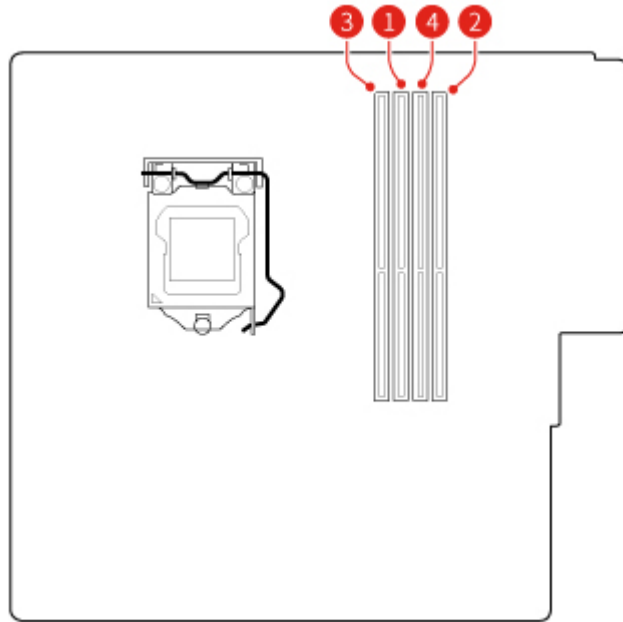


Figure 48. Installation order for memory modules

1. Remove the computer cover. See “Removing the computer cover” on page 24.
2. Remove the front bezel. See “Replacing the front bezel” on page 25.
3. Replace a memory module.

Note: During the installation, ensure that you align the memory module to the slot and press down on both ends until the latches are fully engaged with a click.

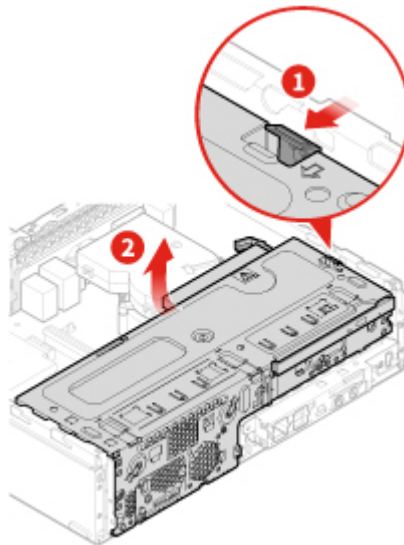


Figure 49. Opening the drive bay

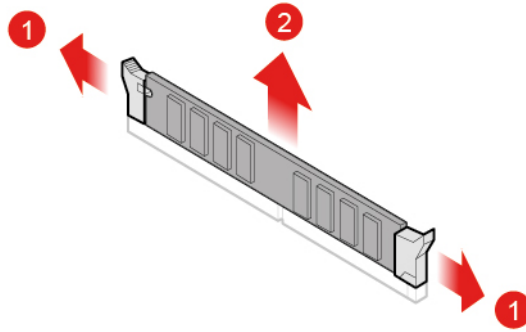


Figure 50. Removing the memory module

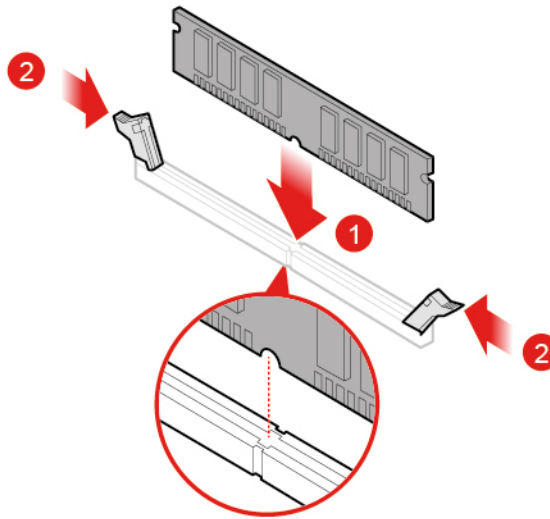


Figure 51. Installing the memory module

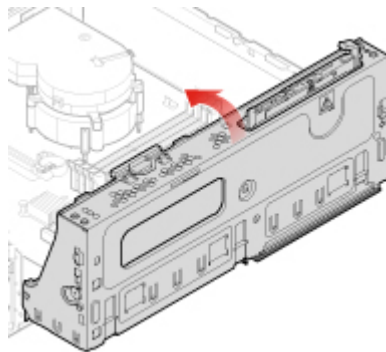


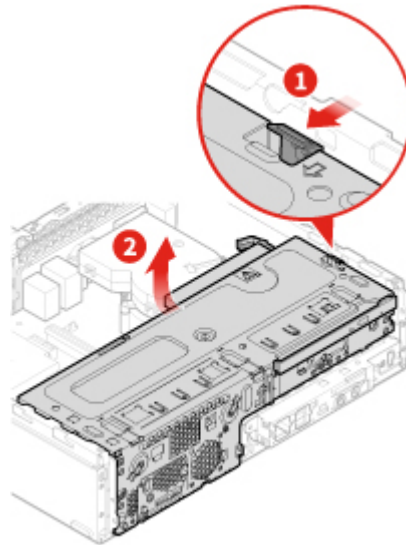
Figure 52. Closing the drive bay

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

Replacing a PCI Express card

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

1. Remove the computer cover. See “Removing the computer cover” on page 24.
2. Remove the front bezel. See “Replacing the front bezel” on page 25.
3. Replace a PCI Express card.



Note: When you remove the PCI Express card, press the latch to disengage it from the slot. Then, gently remove the card from the slot.

Figure 53. Opening the drive bay

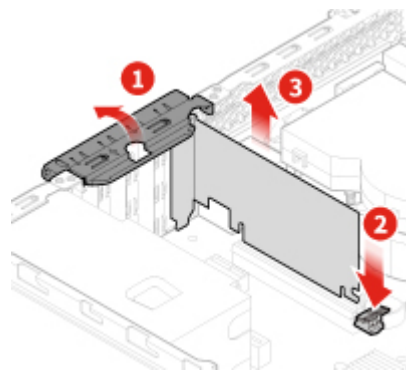


Figure 54. Removing the PCI Express card

Note: When you install the PCI Express card, press down on the rear end of the card until the latch is engaged with a click.

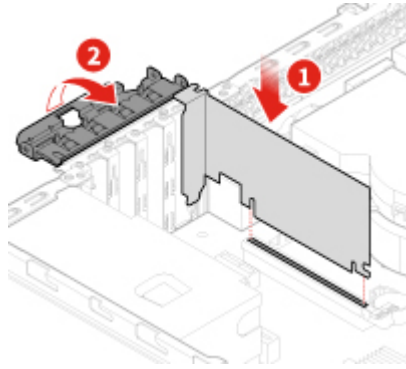


Figure 55. Installing the PCI Express card

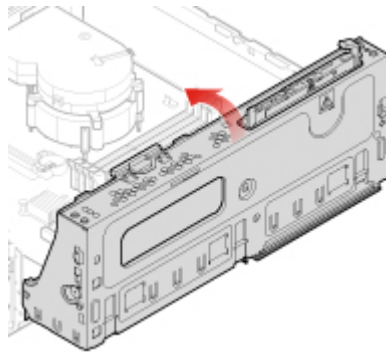


Figure 56. Closing the drive bay

4. 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 the computer cover. See “Removing the computer cover” on page 24.
2. Remove the front bezel. See “Replacing the front bezel” on page 25.
3. Replace the Wi-Fi card.

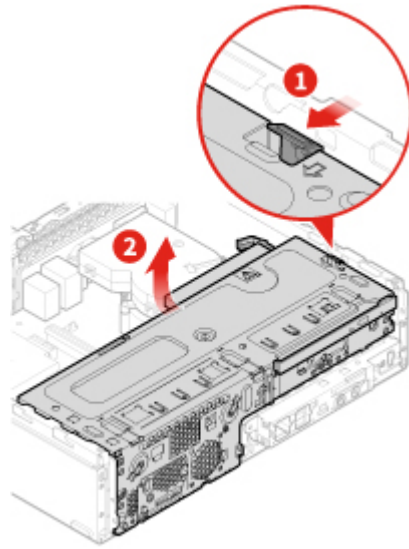


Figure 57. Opening the drive bay

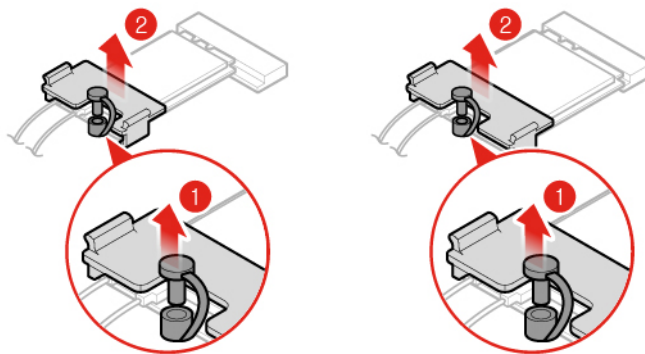


Figure 58. Removing the Wi-Fi card shield (type 1 and type 2)

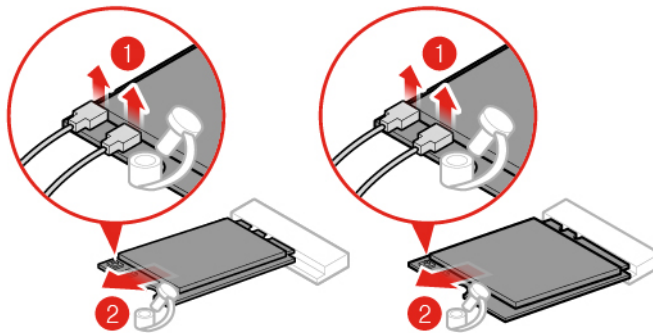


Figure 59. Disconnecting the Wi-Fi antennas and removing the Wi-Fi card (type 1 and type 2)

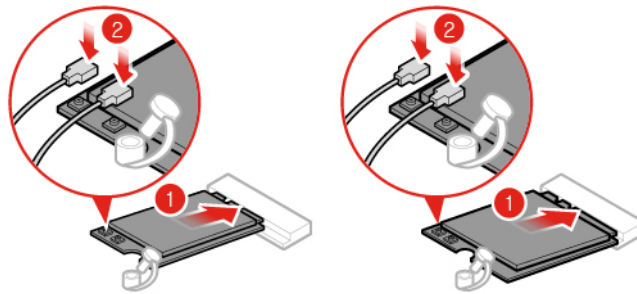


Figure 60. Installing the Wi-Fi card and connecting the Wi-Fi antennas (type 1 and type 2)

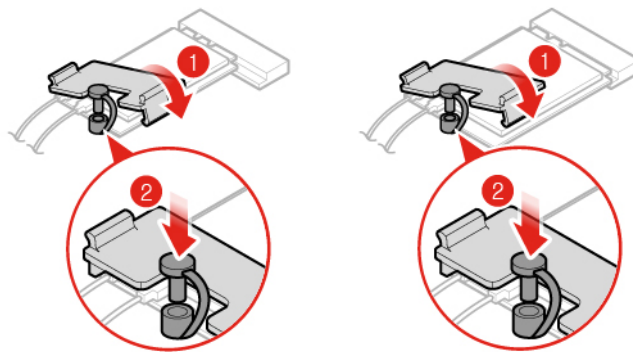


Figure 61. Installing the Wi-Fi card shield (type 1 and type 2)

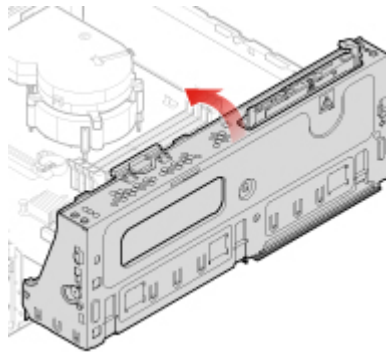


Figure 62. Closing the drive bay

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

Replacing the M.2 solid-state drive

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

1. Remove the computer cover. See “Removing the computer cover” on page 24.
2. Remove the front bezel. See “Replacing the front bezel” on page 25.
3. Depending on your computer model, refer to one of the following to replace the M.2 solid-state drive.
 - Type 1

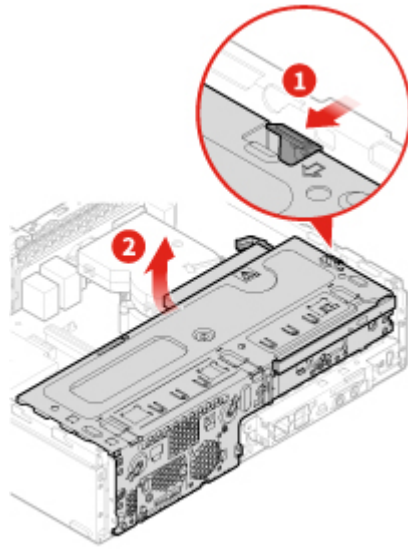


Figure 63. Opening the drive bay

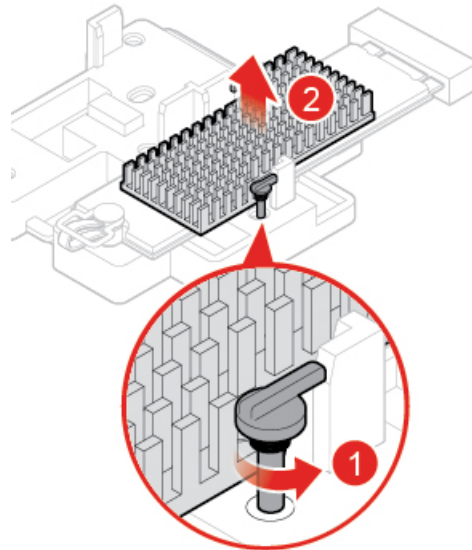


Figure 64. Removing the M.2 solid-state drive heat sink

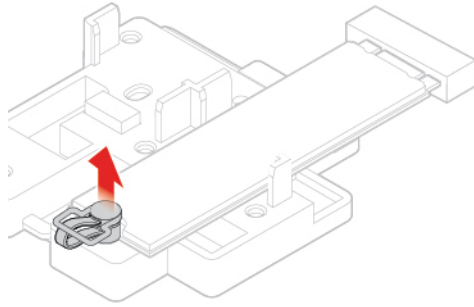


Figure 65. Unlocking the M.2 solid-state drive clip

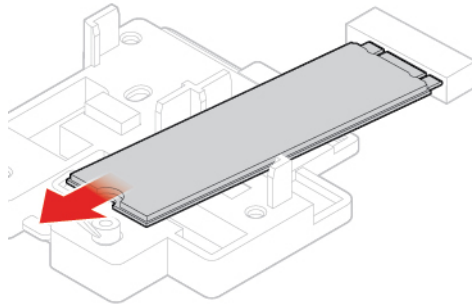


Figure 66. Removing the M.2 solid-state drive

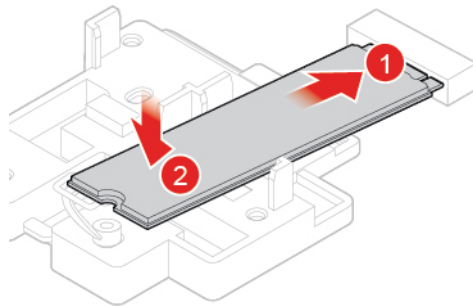


Figure 67. Installing the M.2 solid-state drive

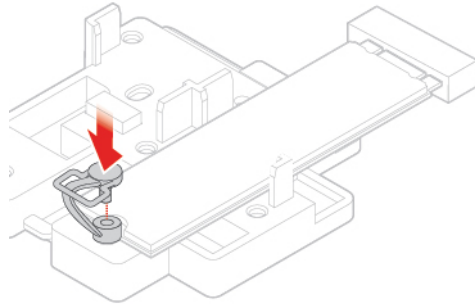


Figure 68. Locking the M.2 solid-state drive clip

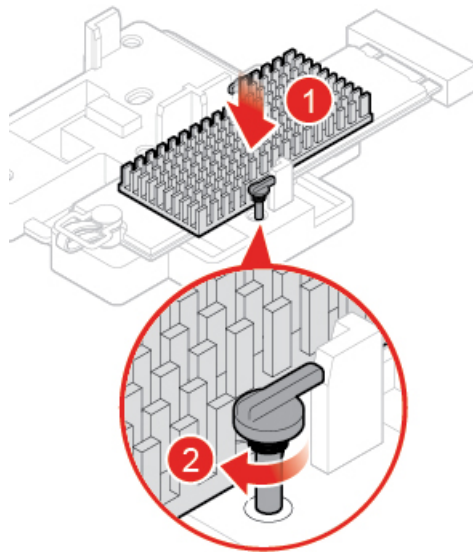


Figure 69. Installing the M.2 solid-state drive heat sink

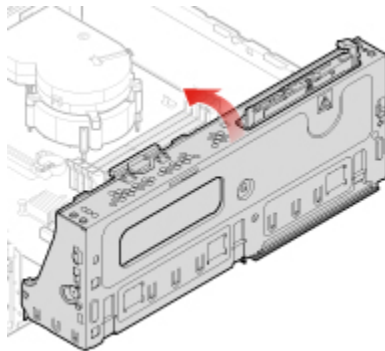


Figure 70. Closing the drive bay

- Type 2

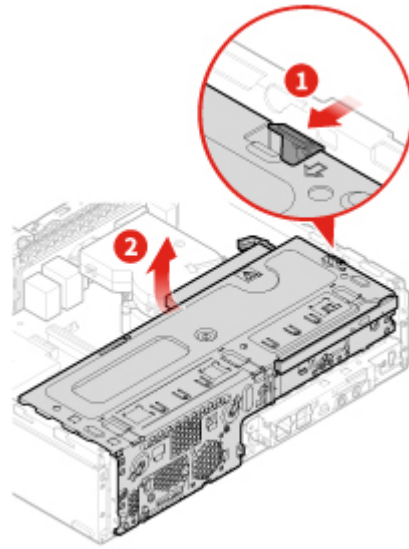


Figure 71. Opening the drive bay

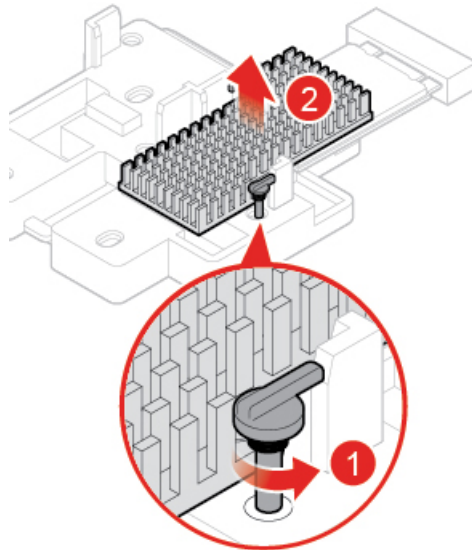


Figure 72. Removing the M.2 solid-state drive heat sink

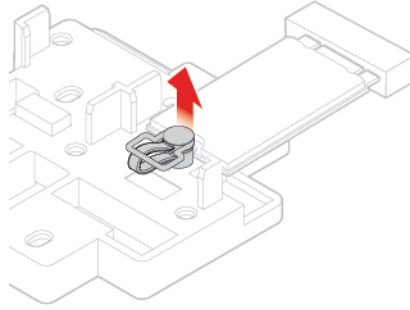


Figure 73. Unlocking the M.2 solid-state drive clip

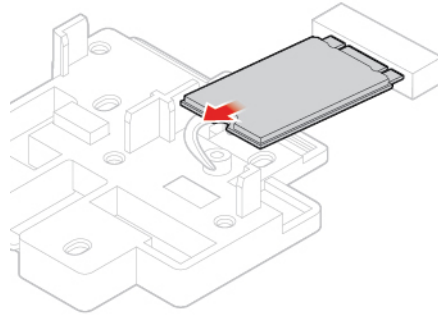


Figure 74. Removing the M.2 solid-state drive

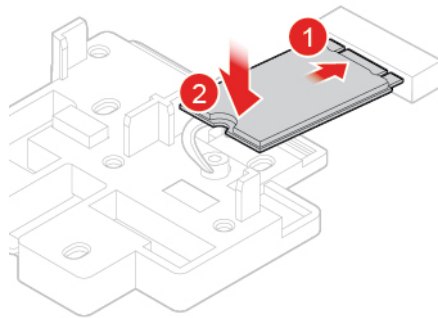


Figure 75. Installing the M.2 solid-state drive

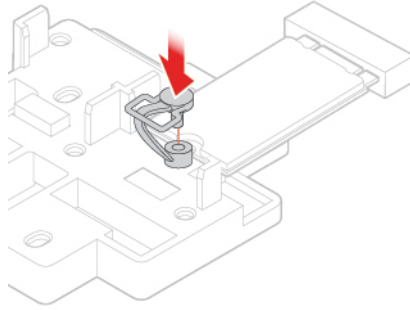


Figure 76. Locking the M.2 solid-state drive clip

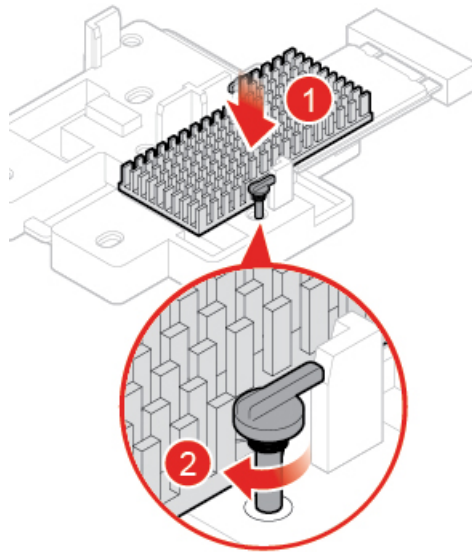


Figure 77. Installing the M.2 solid-state drive heat sink

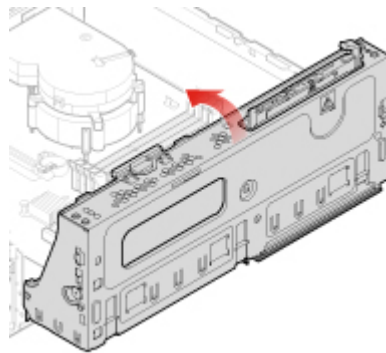


Figure 78. Closing the drive bay

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

Replacing the M.2 solid-state drive bracket

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

1. Remove the computer cover. See “Removing the computer cover” on page 24.
2. Remove the front bezel. See “Replacing the front bezel” on page 25.
3. Remove the M.2 solid-state drive. See “Replacing the M.2 solid-state drive” on page 39.
4. Replace the M.2 solid-state drive bracket.

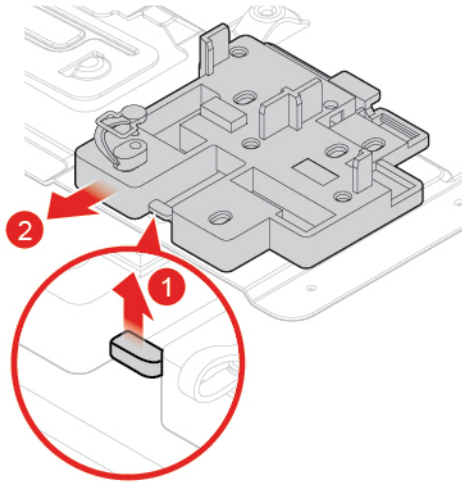


Figure 79. Removing the M.2 solid-state drive bracket

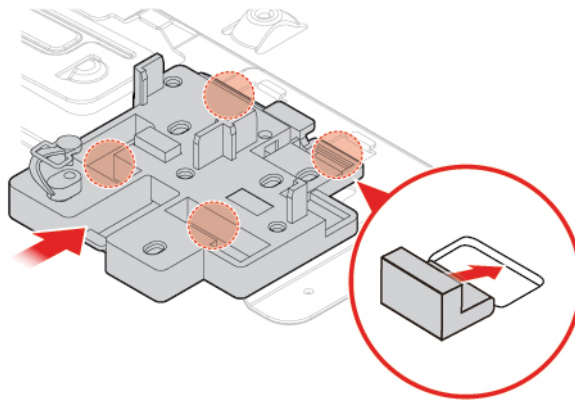


Figure 80. Installing the M.2 solid-state drive bracket

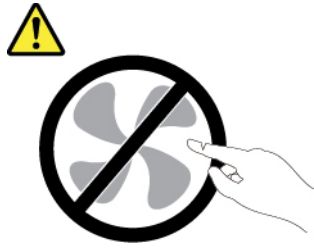
5. Complete the replacement. See “Completing the parts replacement” on page 68.

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:



Hazardous moving parts. Keep fingers and other body parts away.

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 24.
2. Remove the front bezel. See “Replacing the front bezel” on page 25.
3. Replace the power supply assembly.

Note: Ensure that you disconnect or reconnect the power supply assembly cables during the replacement.

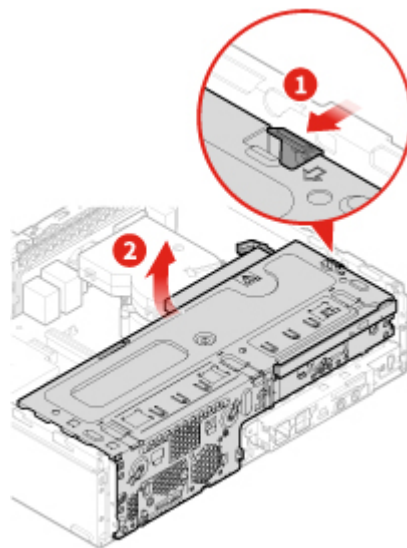


Figure 81. Opening the drive bay

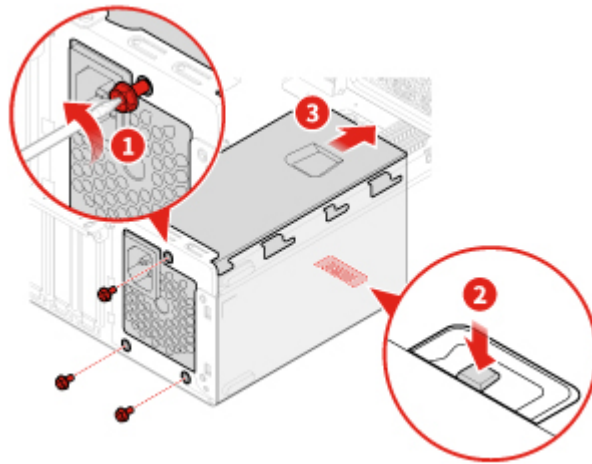


Figure 82. Removing the power supply assembly

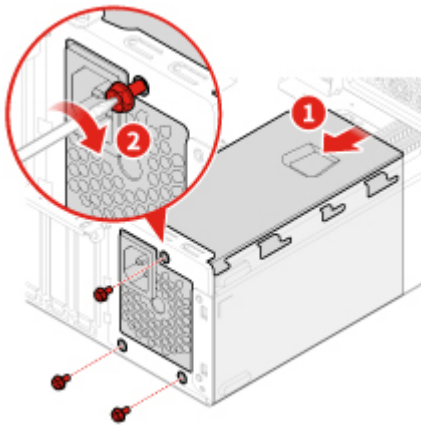


Figure 83. Installing the power supply assembly

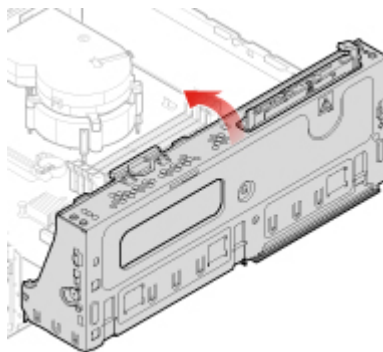


Figure 84. Closing the drive bay

4. 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*.

Replacing the front Wi-Fi antenna

1. Remove the computer cover. See “Removing the computer cover” on page 24.
2. Remove the front bezel. See “Replacing the front bezel” on page 25.
3. Remove the storage drive if necessary. See “Replacing the storage drive” on page 27.
4. Replace the front Wi-Fi antenna.

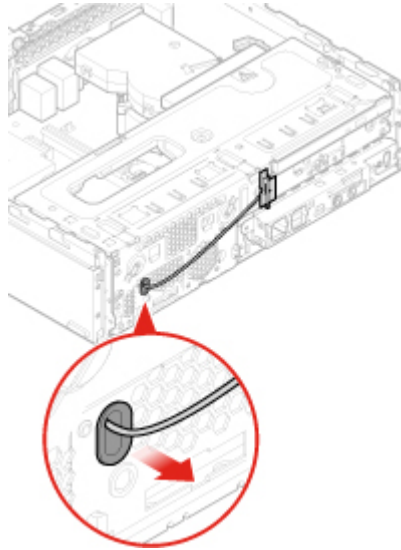


Figure 85. Removing the front Wi-Fi antenna

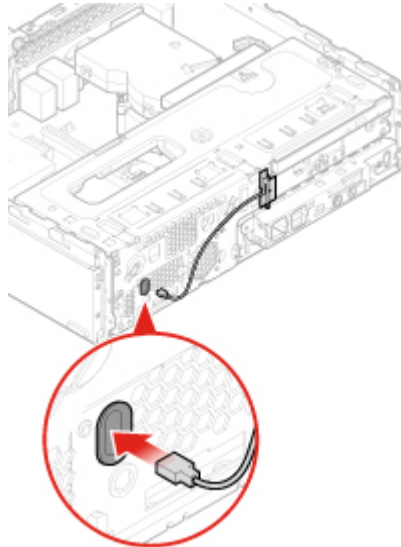


Figure 86. Installing the front Wi-Fi antenna

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

Replacing the rear Wi-Fi antenna

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

3. Replace the rear Wi-Fi antenna.

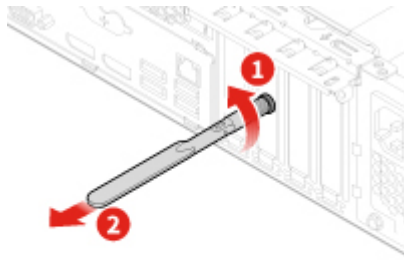


Figure 87. Removing the rear Wi-Fi antenna

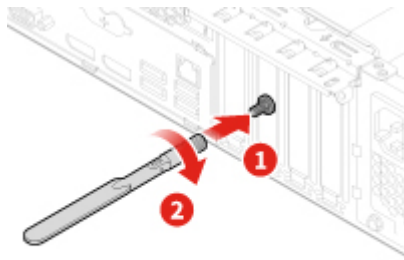


Figure 88. Installing the rear Wi-Fi antenna

Replacing the internal speaker

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

1. Remove the computer cover. See “Removing the computer cover” on page 24.
2. Remove the front bezel. See “Replacing the front bezel” on page 25.
3. Disconnect the internal speaker cable from the system board.
4. Replace the internal speaker.

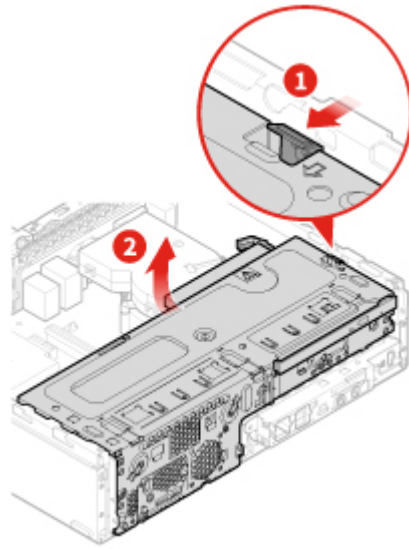


Figure 89. Opening the drive bay

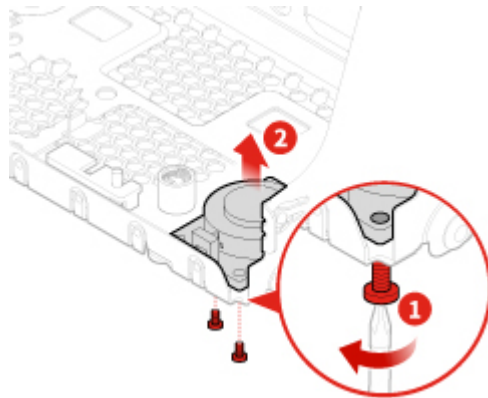


Figure 90. Removing the internal speaker

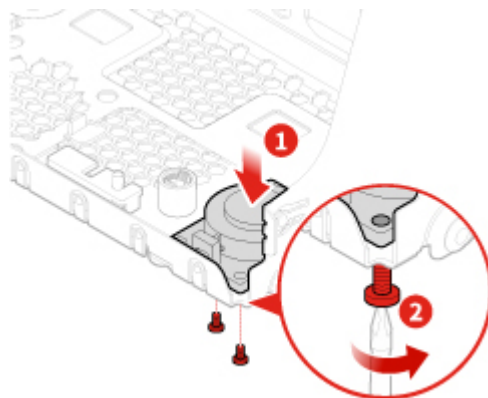


Figure 91. Installing the internal speaker

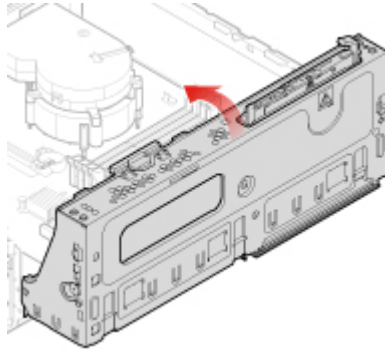


Figure 92. Closing the drive bay

5. Connect the internal speaker cable to the system board.
6. Complete the replacement. See “Completing the parts replacement” on page 68.

Replacing the illuminated red dot cable

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

1. Remove the computer cover. See “Removing the computer cover” on page 24.
2. Remove the front bezel. See “Replacing the front bezel” on page 25.
3. Disconnect the illuminated red dot cable from the system board.
4. Replace the illuminated red dot.

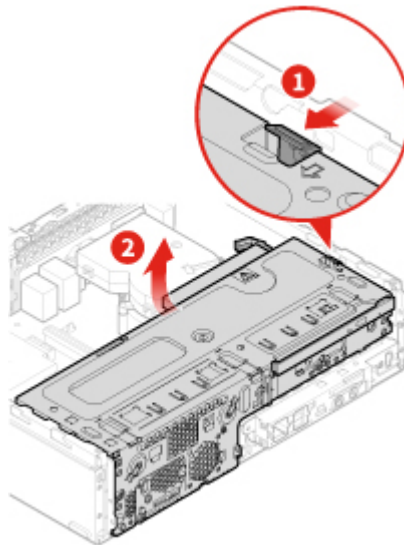


Figure 93. Opening the drive bay

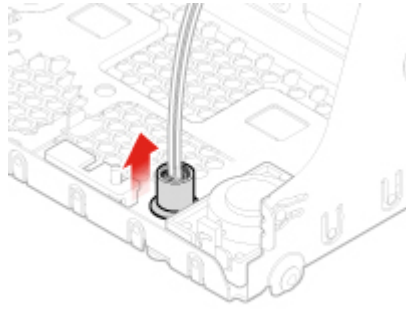


Figure 94. Removing the sleeve

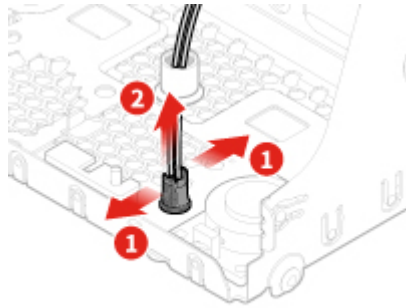


Figure 95. Removing the illuminated red dot cable

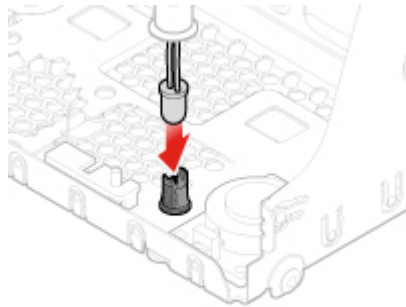


Figure 96. Installing the illuminated red dot cable

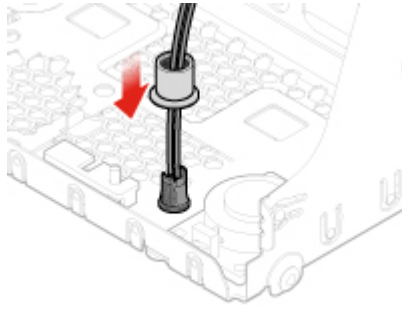


Figure 97. Installing the sleeve

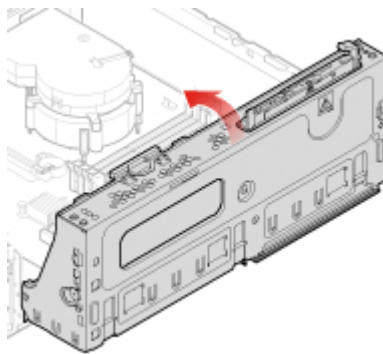


Figure 98. Closing the drive bay

5. Connect the new illuminated red dot cable to the system board.
6. 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 the computer cover. See “Removing the computer cover” on page 24.
2. Remove the front bezel. See “Replacing the front bezel” on page 25.
3. Disconnect the thermal sensor cable from the system board.
4. Replace the thermal sensor.

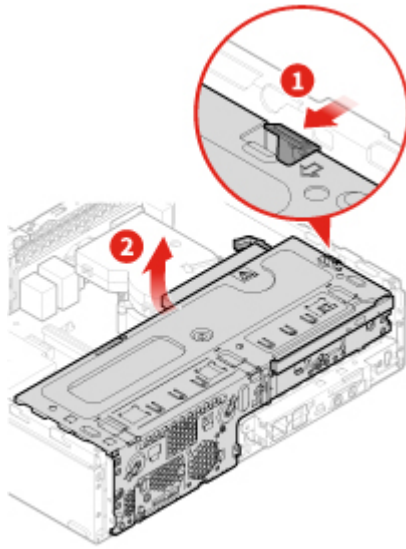


Figure 99. Opening the drive bay

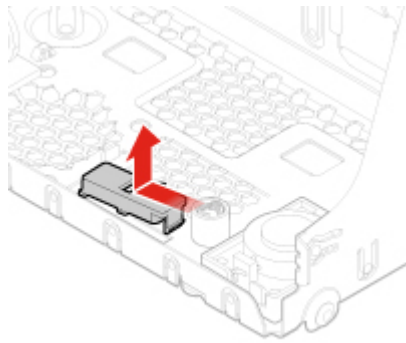


Figure 100. Removing the thermal sensor

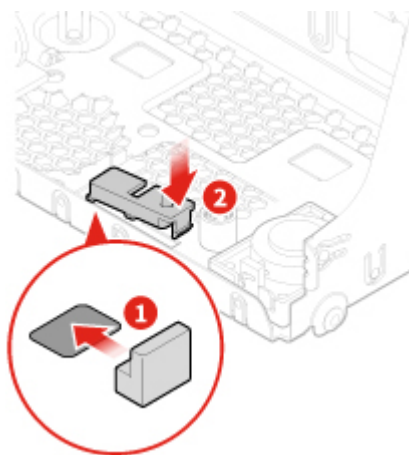


Figure 101. Installing the thermal sensor

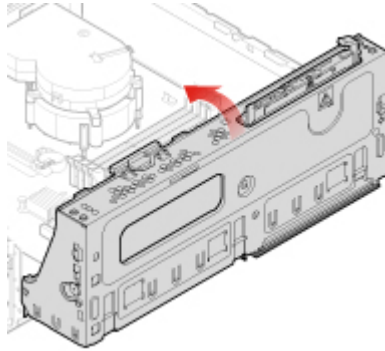


Figure 102. Closing the drive bay

5. Connect the new thermal sensor cable to the system board.
6. 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 the computer cover. See “Removing the computer cover” on page 24.
2. Remove the front bezel. See “Replacing the front bezel” on page 25.
3. Disconnect the power button cable and the card reader cable from the system board.
4. Replace the front I/O bracket.

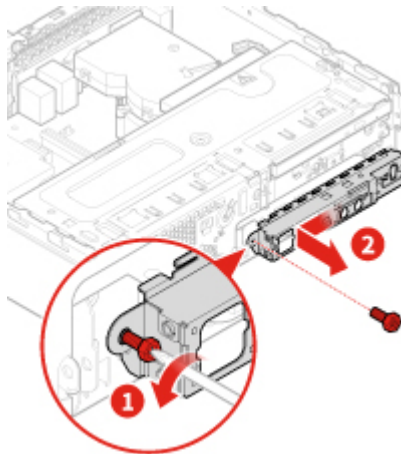


Figure 103. Removing the front I/O bracket

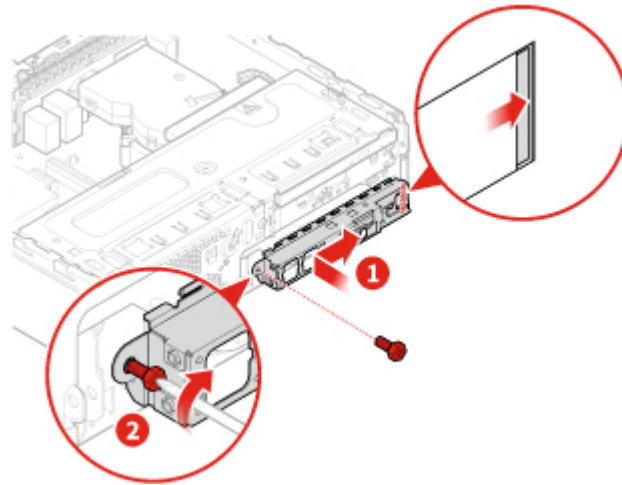


Figure 104. Installing the front I/O bracket

5. Connect the power button cable and the card reader cable to the system board.
6. 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 the computer cover. See “Removing the computer cover” on page 24.
2. Remove the front bezel. See “Replacing the front bezel” on page 25.
3. Remove the front I/O bracket. See “Replacing the front I/O bracket” on page 56.
4. Replace the power button.

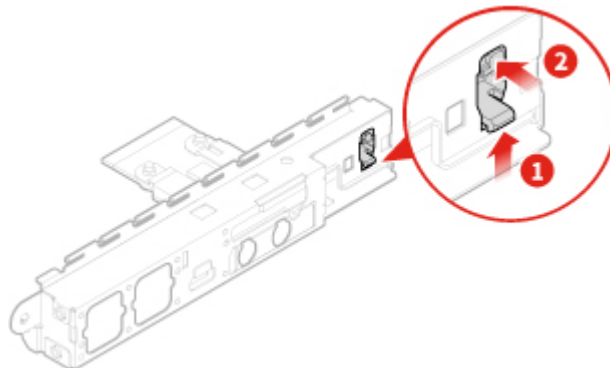


Figure 105. Removing the power button

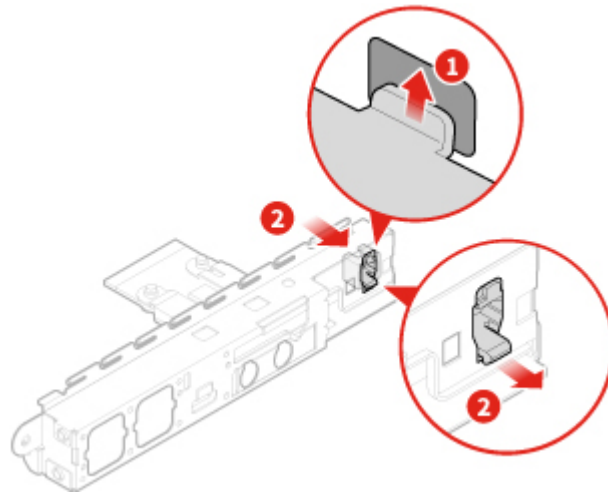


Figure 106. Installing the power button

5. Connect the power button cable to the system board.
6. Complete the replacement. See “Completing the parts replacement” on page 68.

Replacing the card reader board

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

1. Remove the computer cover. See “Removing the computer cover” on page 24.
2. Remove the front bezel. See “Replacing the front bezel” on page 25.
3. Remove the front I/O bracket. See “Replacing the front I/O bracket” on page 56.
4. Replace the card reader board.

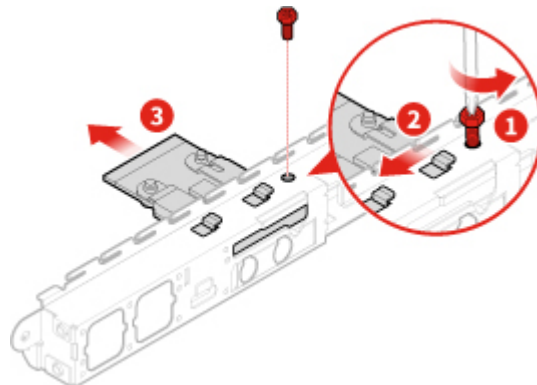


Figure 107. Removing the card reader

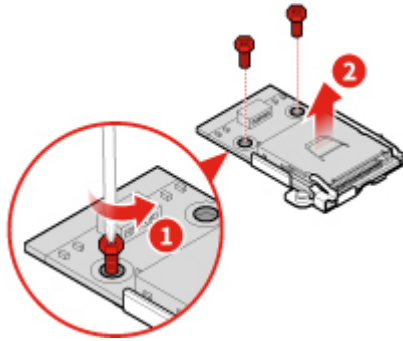


Figure 108. Removing the card reader board

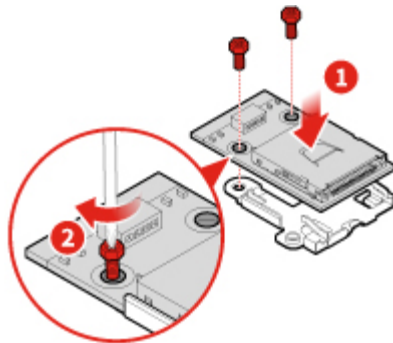


Figure 109. Installing the card reader board

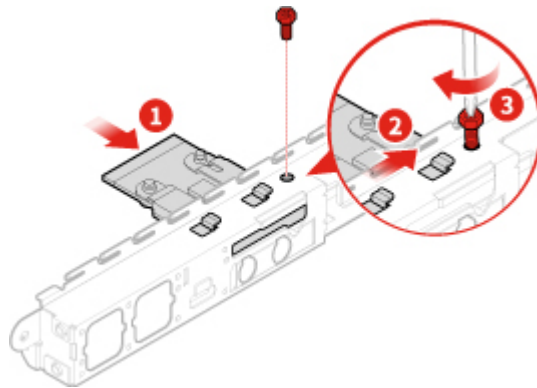


Figure 110. Installing the card reader

5. Connect the card reader cable to the system board.
6. 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. Turn off the computer and wait three to five minutes to let the computer cool before removing the computer cover.

1. Remove the computer cover. See “Removing the computer cover” on page 24.
2. Remove the front bezel. See “Replacing the front bezel” on page 25.
3. Disconnect the microprocessor fan cable from the system board.
4. Replace the heat sink and fan assembly.

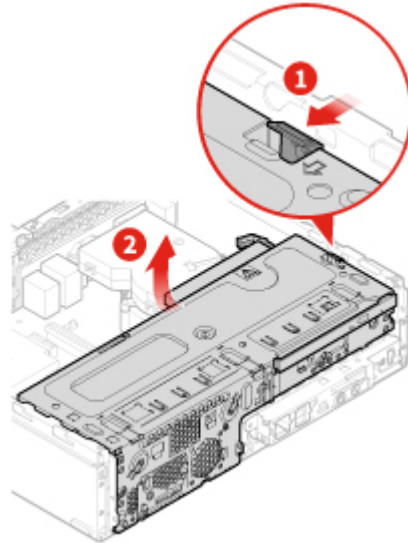


Figure 111. Opening the drive bay

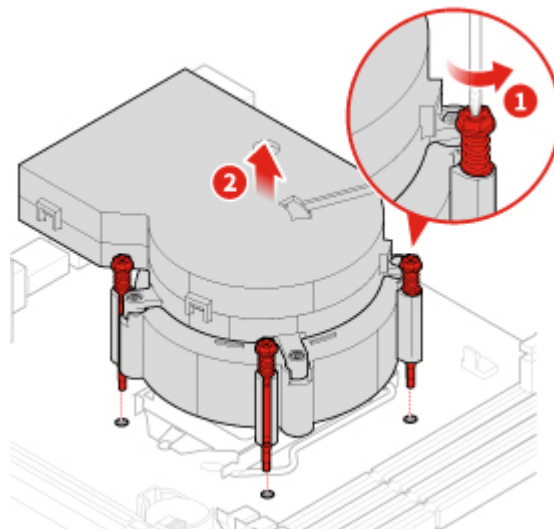


Figure 112. Removing the heat sink and fan assembly

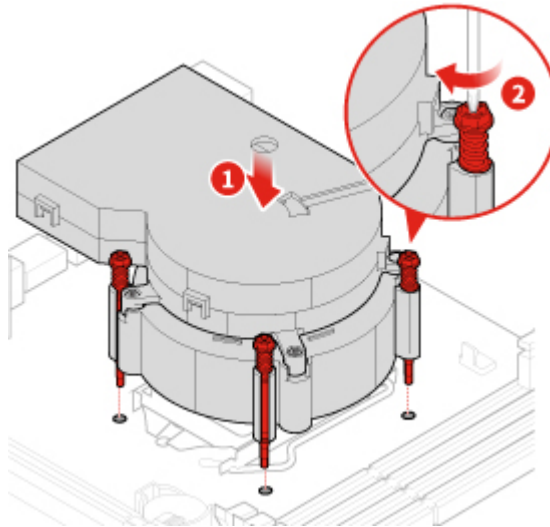


Figure 113. Installing the heat sink and fan assembly

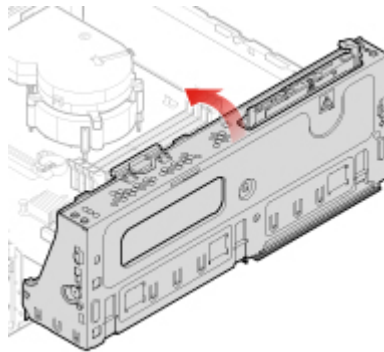


Figure 114. Closing the drive bay

5. Connect the microprocessor fan cable to the system board.
6. 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 24.
2. Remove the front bezel. See “Replacing the front bezel” on page 25.
3. Disconnect the E-lock cable from the system board if necessary.
4. 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.

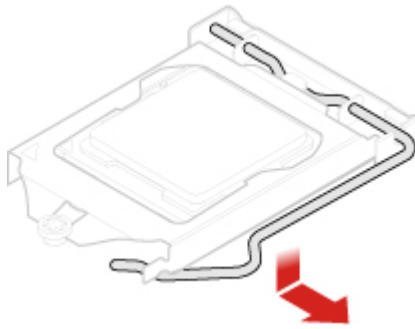


Figure 115. Unlocking the microprocessor socket retainer

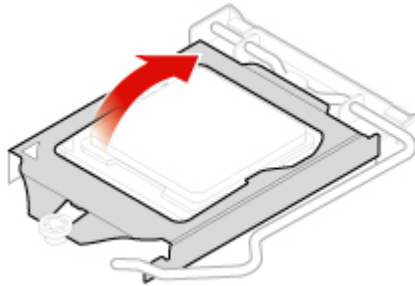


Figure 116. Pivoting the microprocessor socket upward



Figure 117. Removing the microprocessor

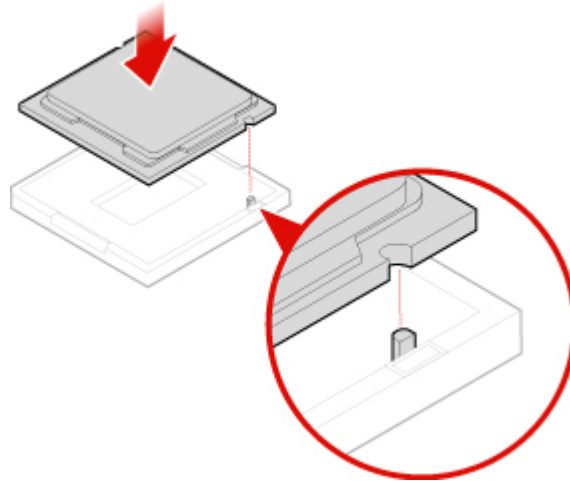


Figure 118. Installing the microprocessor

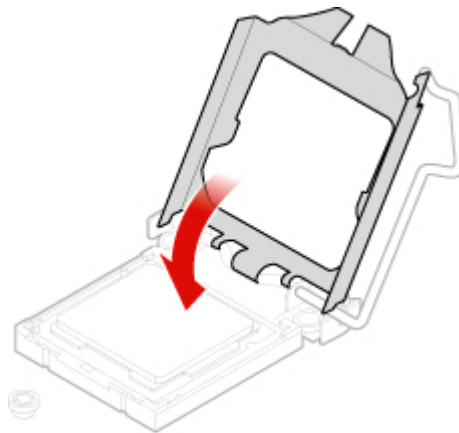


Figure 119. Pivoting the microprocessor socket downward

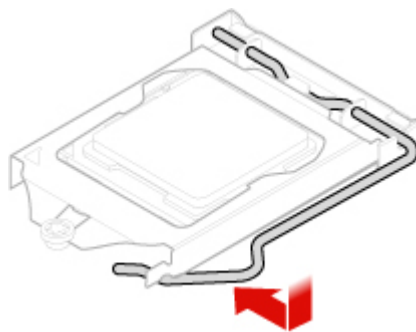


Figure 120. Locking the microprocessor socket retainer

5. 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*.

Note: 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 are lost. An error message is displayed when you turn on the computer.

To replace the coin-cell battery,

1. Remove the computer cover. See “Removing the computer cover” on page 24.
2. Remove the front bezel. See “Replacing the front bezel” on page 25.
3. Replace the coin-cell battery.

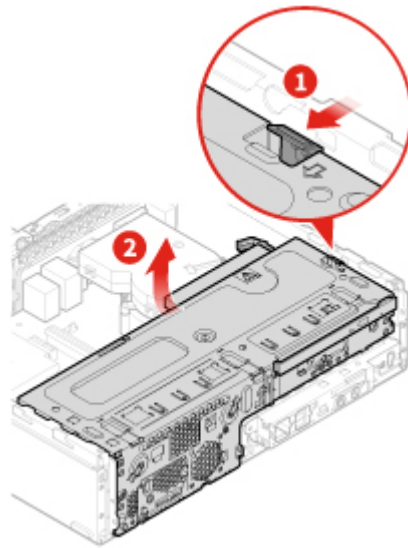


Figure 121. Opening the drive bay



Figure 122. Pressing the metallic tab using a driver



Figure 123. Removing the coin-cell battery

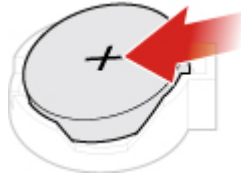


Figure 124. Placing the coin-cell battery

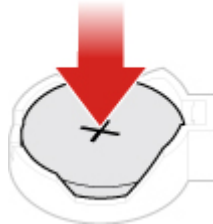


Figure 125. Pressing the coin-cell battery downward until it is fully engaged with a click

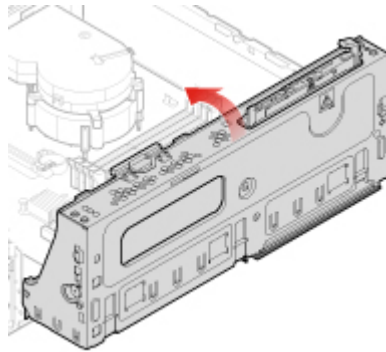


Figure 126. Closing the drive bay

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

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

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 the computer cover. See “Removing the computer cover” on page 24.
2. Disconnect the E-lock cable from the system board.
3. Replace the E-lock.

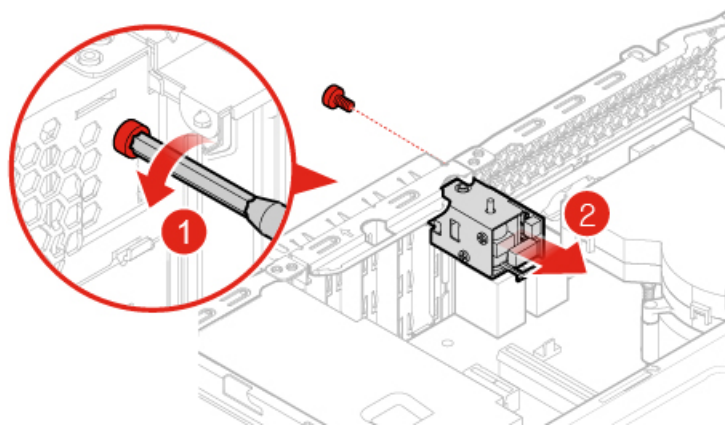


Figure 127. Removing the E-lock

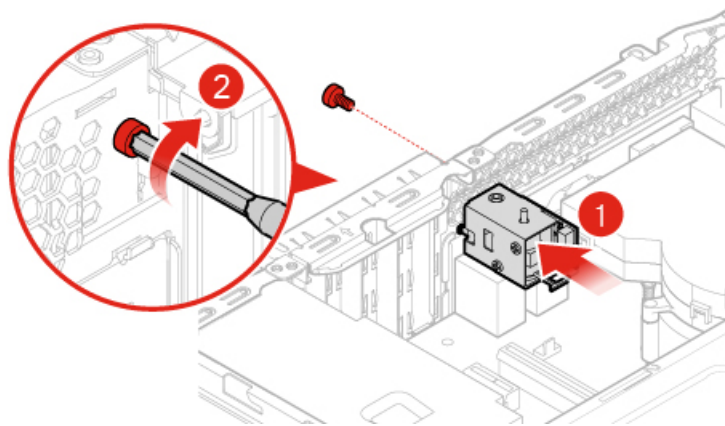


Figure 128. Installing the E-lock

4. Connect the E-lock cable to the system board.
5. 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 the computer cover. See “Removing the computer cover” on page 24.
2. Disconnect the cover presence switch cable from the system board.
3. Replace the cover presence switch.

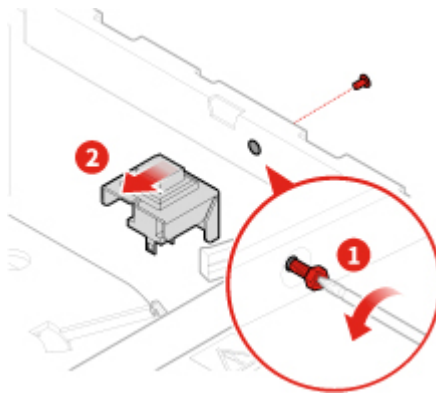


Figure 129. Removing the cover presence switch

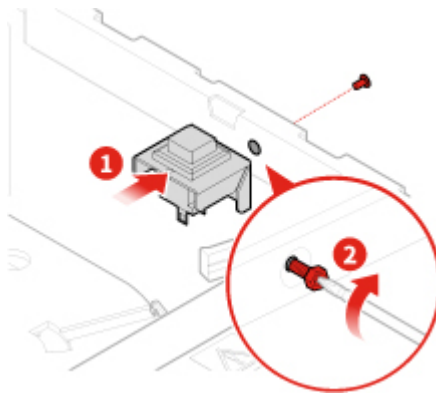


Figure 130. Installing the cover presence switch

4. Connect the new cover presence switch cable to the system board.
5. Complete the replacement. See “Completing the parts replacement” on page 68.

Replacing the system board and chassis

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

1. Remove the computer cover. See “Removing the computer cover” on page 24.
2. Remove the front bezel. See “Replacing the front bezel” on page 25.
3. Remove the front I/O bracket. See “Replacing the front I/O bracket” on page 56.
4. Remove all memory modules. See “Replacing a memory module” on page 33.
5. Remove the heat sink and fan assembly. See “Replacing the heat sink and fan assembly” on page 59.
6. Remove the microprocessor. See “Replacing the microprocessor” on page 61.
7. Remove all PCI Express cards. See “Replacing a PCI Express card” on page 35.
8. Remove the Wi-Fi card. See “Replacing the Wi-Fi card” on page 37.
9. Remove the M.2 solid-state drive. See “Replacing the M.2 solid-state drive” on page 39.
10. Record the cable routing and cable connections, and then disconnect all cables from the system board. See “System board” on page 6.
11. Replace the system board and chassis.

Note: Carefully handle the system board by its edges.

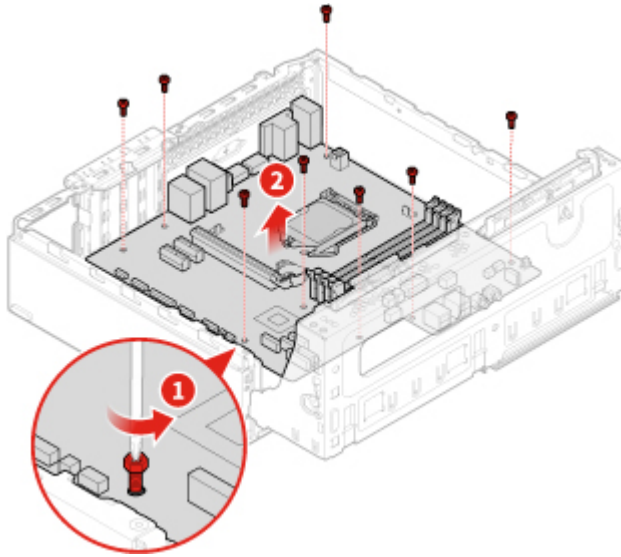


Figure 131. Removing the system board

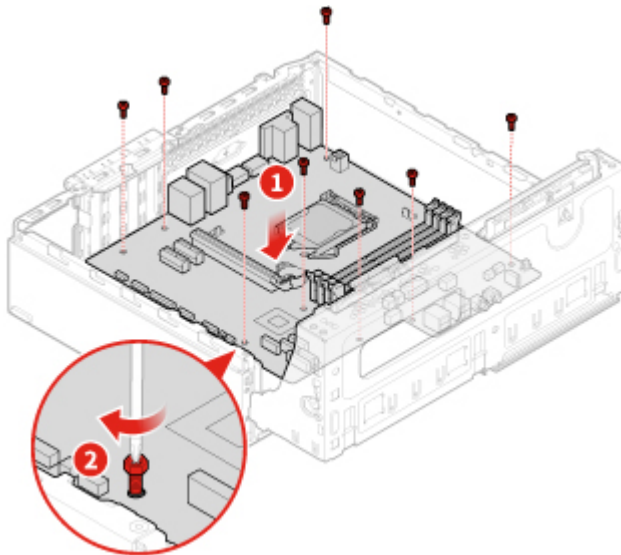


Figure 132. Installing the system board

12. Route all the cables that you disconnected from the failing system board, and then reconnect the cables to the new system board.
13. 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.

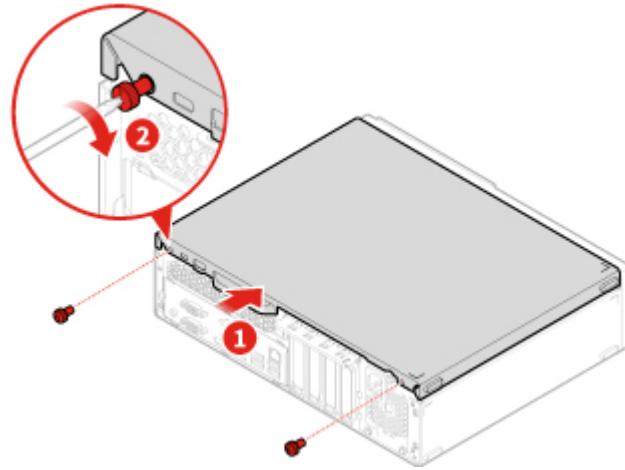


Figure 133. Reinstalling the computer cover

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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