

V530-15ICB User Guide and Hardware Maintenance Manual

Lenovo

Energy Star Machine Types: 10TV, 10TW, 10XS, and 10XT

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 57.

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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.

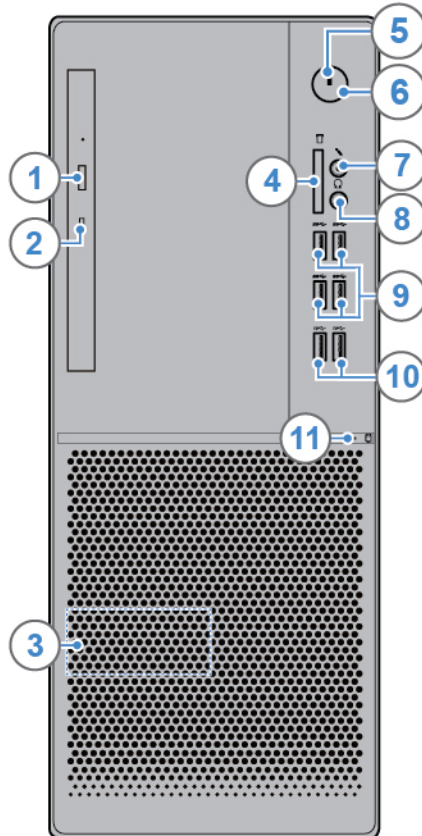


Figure 1. Front view

1 Optical drive eject/close button	2 Optical drive activity indicator
3 Internal speaker (optional)	4 Card reader slot (optional)
5 Power indicator	6 Power button
7 Microphone connector	8 Headphone connector
9 USB 3.1 Gen 1 connectors (4)	10 USB 3.1 Gen 2 connectors (2)
11 Storage drive activity indicator	

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 activity indicator

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

3 Internal speaker

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

4 Card reader slot

Used to read data from a supported memory card.

5 Power indicator

This indicator is on when the computer is on.

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 Microphone connector

Used to connect a microphone to your computer when you want to record sound or interact with the computer using speech recognition software.

8 Headphone connector

Used to connect headphones to your computer.

9 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.

10 USB 3.1 Gen 2 connector

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.

11 Storage drive activity indicator

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

Rear view

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

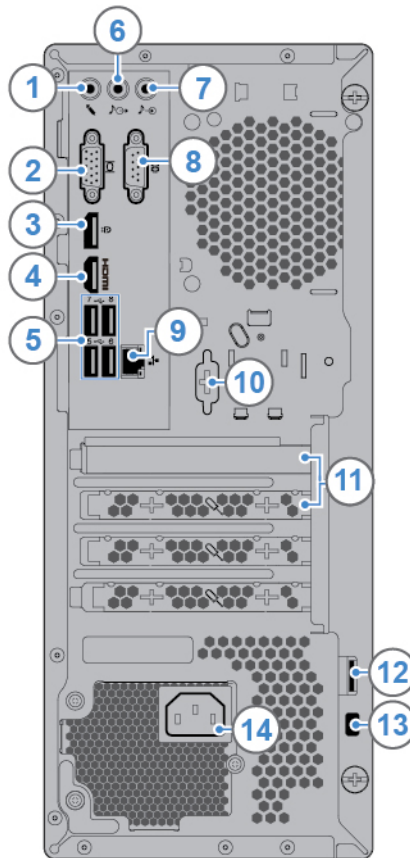


Figure 2. Rear view

1 Microphone connector	2 VGA-out connector
3 DisplayPort® 1.2 out connector	4 HDMI™ 1.4 out connector
5 USB 2.0 connectors (4)	6 Audio line-out connector
7 Audio line-in connector	8 Serial connector
9 Ethernet connector	10 Serial connector (optional)
11 PCI-Express card area	12 Padlock loop
13 Security-lock slot	14 Power cord connector

1 Microphone connector

Used to connect a microphone to your computer when you want to record sound or interact with the computer using speech recognition software.

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 HDMI 1.4 out connector

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

5 USB 2.0 connector

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

6 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.

7 Audio line-in connector

Used to receive audio signals from an external audio device, such as a stereo system. To connect an external audio device, connect a cable between the audio line-out connector of the device and the audio line-in connector of the computer.

8 Serial connector

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

9 Ethernet connector

Used to connect an Ethernet cable for network access.

10 Serial connector (optional)

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

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 Padlock loop

Used to secure a padlock.

13 Security-lock slot

Used to secure a Kensington-style cable lock.

14 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.

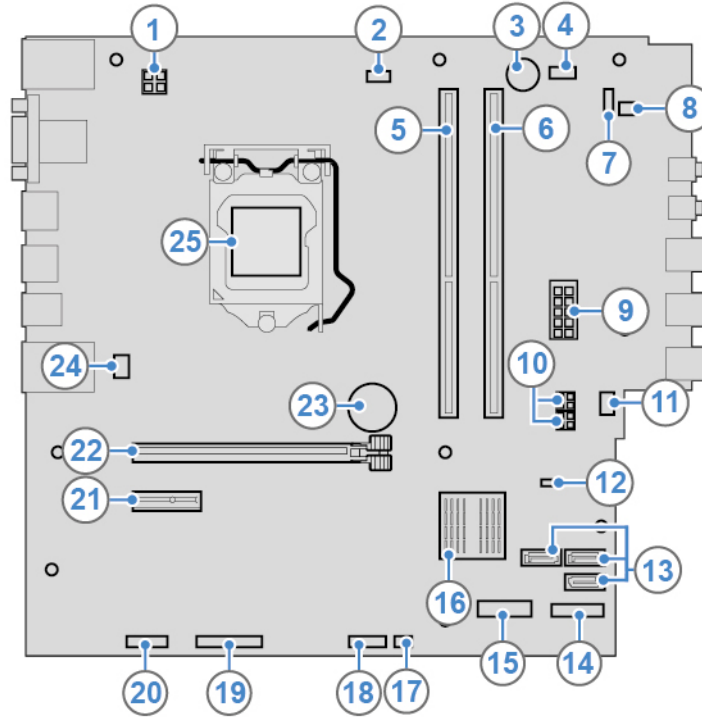


Figure 3. System board

1 4-pin power connector	2 Microprocessor fan connector
3 Buzzer	4 Auxiliary fan connector 2
5 Memory slot (DIMM2)	6 Memory slot (DIMM4)
7 Power button board connector	8 Internal speaker connector
9 10-pin power connector	10 SATA power connectors (2)
11 Auxiliary fan connector 1	12 Clear CMOS /Recovery jumper
13 SATA 3.0 connectors (3)	14 M.2 solid-state drive slot
15 M.2 Wi-Fi card slot	16 PCH
17 Thermal sensor connector	18 Front USB 2.0 connector 1 (card reader connector)
19 Parallel connector	20 Serial (COM2) connector
21 PCI Express x1 card slot	22 PCI Express x16 graphics card slot
23 Coin-cell battery	24 System fan connector
25 Microprocessor socket	

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.

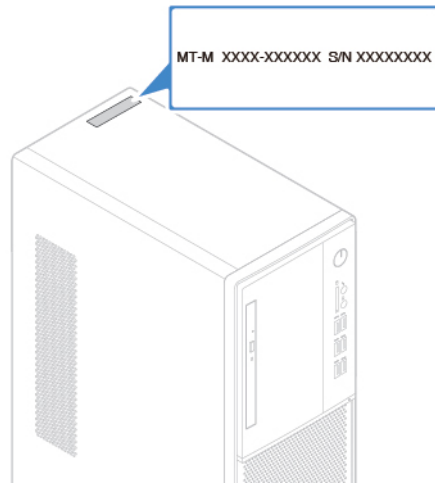


Figure 4. Machine type and model label

Chapter 2. Specifications

Power supply

180-watt automatic voltage-sensing power supply

Storage drives

- 3.5-inch storage drive
- 2.5-inch storage drive
- M.2 solid-state drive

Video features

- The integrated graphics card supports the following:
 - DisplayPort 1.2 out connector
 - HDMI 1.4 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-in connector
 - Audio line-out connector
 - Headphone connector
 - Internal speaker (optional)
 - Microphone connector
- The optional discrete audio card provides an enhanced audio experience and extended capabilities.

Input/Output (I/O) features

- Audio connectors (audio line-in, audio line-out, headphone, and microphone)
- Card reader slot (optional)
- Display connectors (DisplayPort 1.2 out, HDMI 1.4 out, and VGA-out)
- Ethernet connector
- Serial connector
- USB connector

Expansion

- Card reader (optional)
- Memory slot
- M.2 solid-state drive slot
- Optical drive
- 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: 145.0 mm (5.7 inches)
- Height: 366.0 mm (14.4 inches)
- Depth: 276.0 mm (10.9 inches)

Weight (without the package)

Maximum configuration as shipped: 6.2 kg (13.7 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.

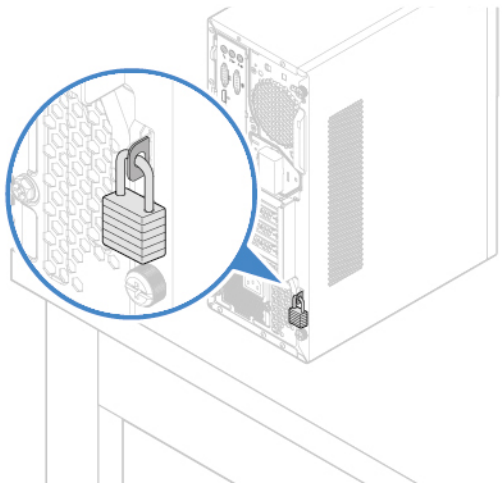


Figure 5. Locking the computer cover

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 a 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>

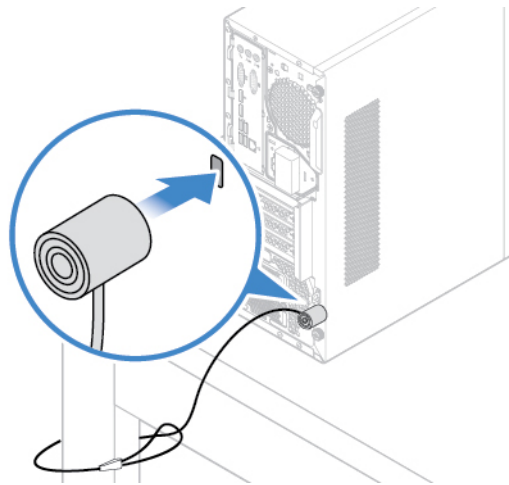


Figure 6. Attaching a Kensington-style cable lock

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:

- Self-service CRUs: **1, 6, 8, 10, 11, 19, 20, 21, 22, 23, 24, 25, 27, 28, 32**
- Optional-service CRUs: **2, 4, 5, 30**
- 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>

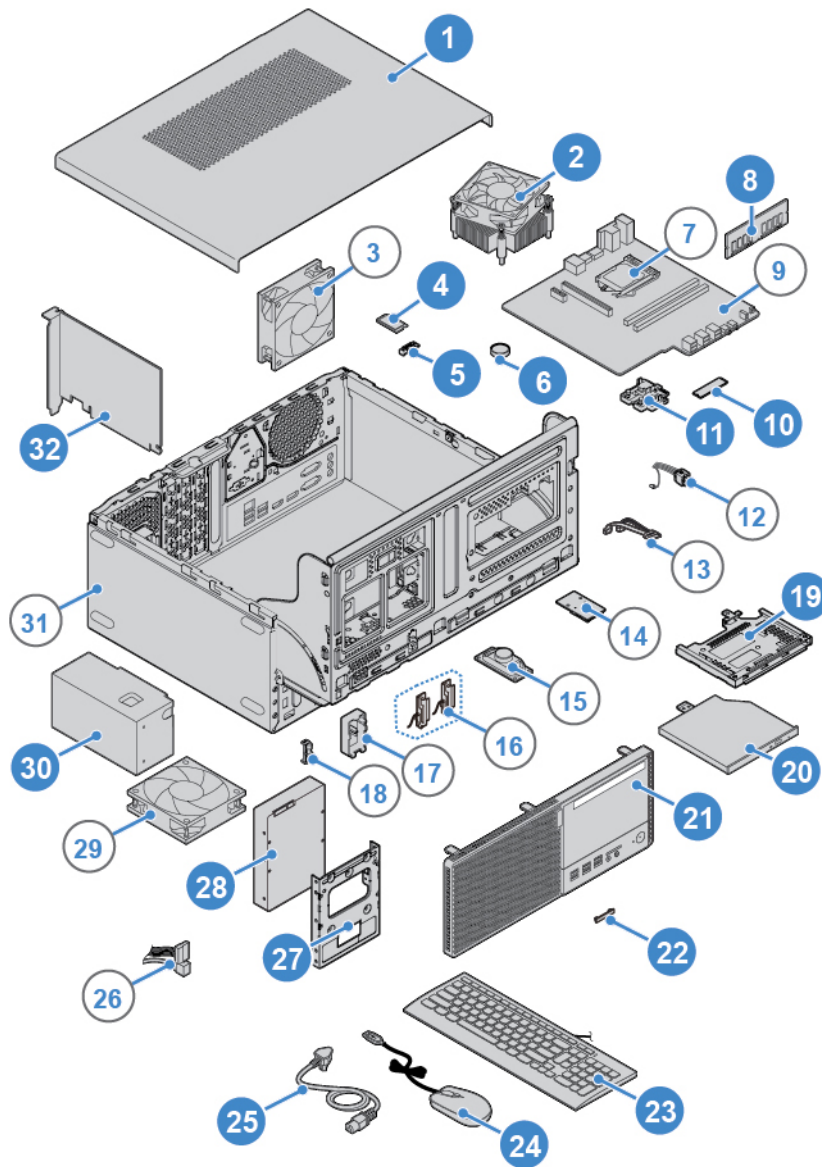


Figure 7. Locating FRUs (including CRUs)

1 Computer cover	2 Heat sink and fan assembly
3 Rear fan	4 Wi-Fi card
5 Wi-Fi card shield	6 Coin-cell battery
7 Microprocessor	8 Memory module
9 System board	10 M.2 solid-state drive
11 M.2 solid-state drive bracket	12 Power button board
13 Optical drive cable	14 Card reader
15 Internal speaker	16 Wi-Fi antennas (2)
17 Rear Wi-Fi antenna cover	18 Thermal sensor

19 Optical drive bracket	20 Optical drive
21 Front bezel	22 Card reader slot cover
23 Keyboard	24 Mouse
25 Power cord	26 Storage drive cable
27 Storage converter	28 Primary or secondary storage drive (a 2.5-inch or 3.5-inch storage drive)
29 Front fan	30 Power supply assembly
31 Chassis	32 PCI Express card

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.
2. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
3. Unlock any locking device that secures the computer cover.
4. Remove the computer cover.

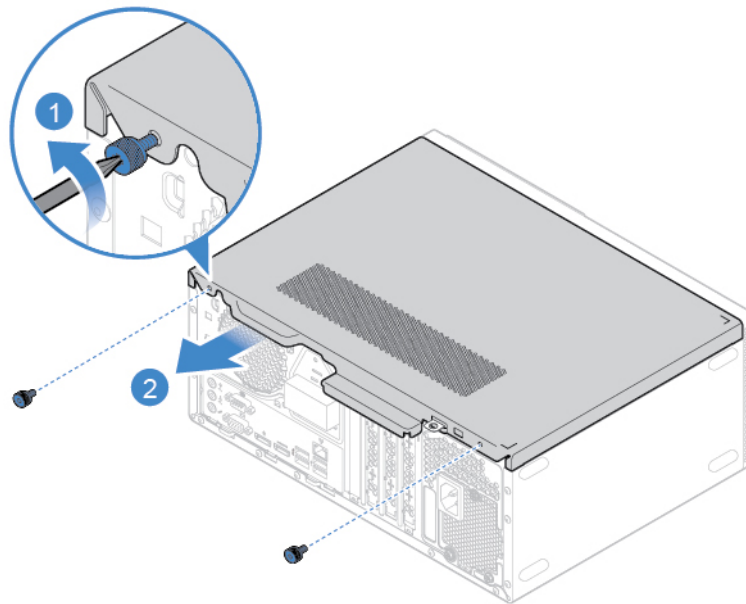


Figure 8. Removing the computer cover

5. Complete the replacement. See “Completing the parts replacement” on page 55.

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 14.
2. Replace the front bezel.

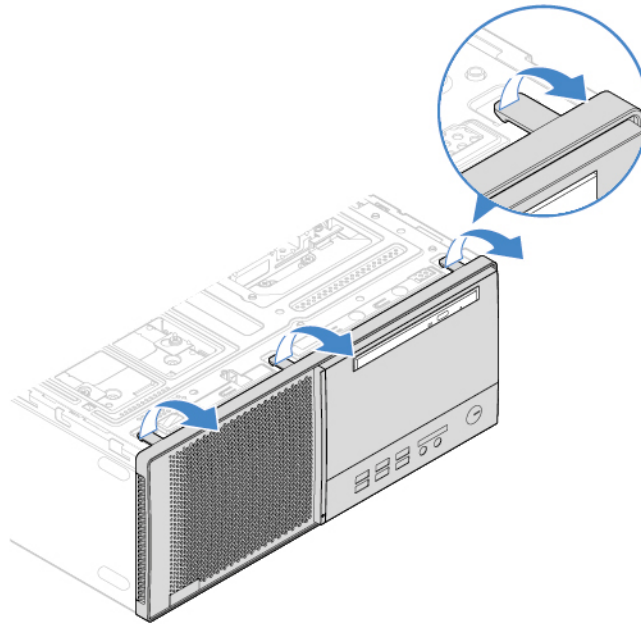


Figure 9. Removing the front bezel

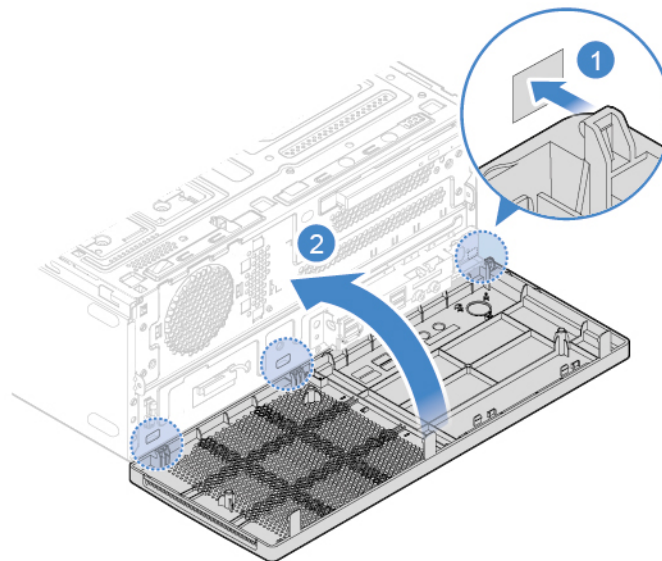


Figure 10. Installing the front bezel

3. Complete the replacement. See “Completing the parts replacement” on page 55.

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 14.
2. Remove the front bezel. See “Replacing the front bezel” on page 15.
3. Disconnect the signal cable and the power cable from the optical drive.
4. Replace the optical drive.

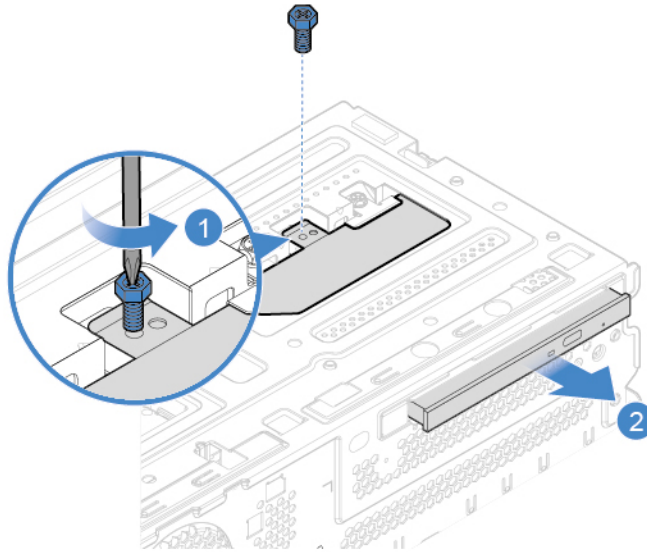


Figure 11. Removing the optical drive

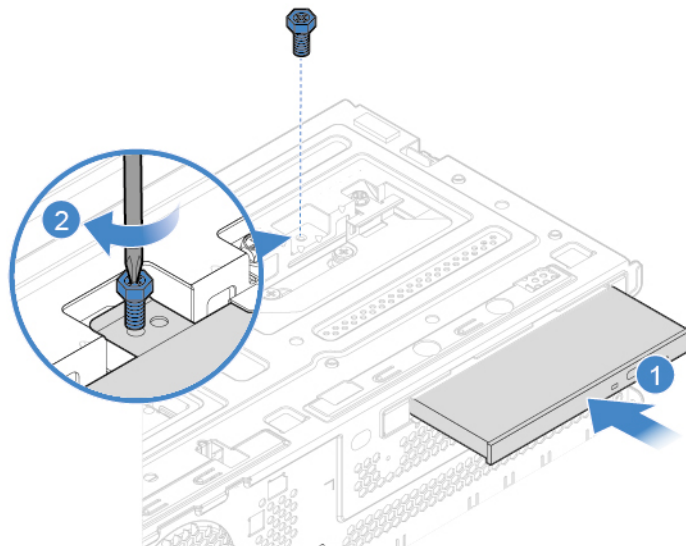


Figure 12. Installing the optical drive

5. Connect the signal cable and the power cable to the new optical drive.

6. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

Replacing the optical 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 14.
2. Remove the front bezel. See “Replacing the front bezel” on page 15.
3. Remove the optical drive. See “Replacing the optical drive” on page 16.
4. Replace the optical drive bracket.

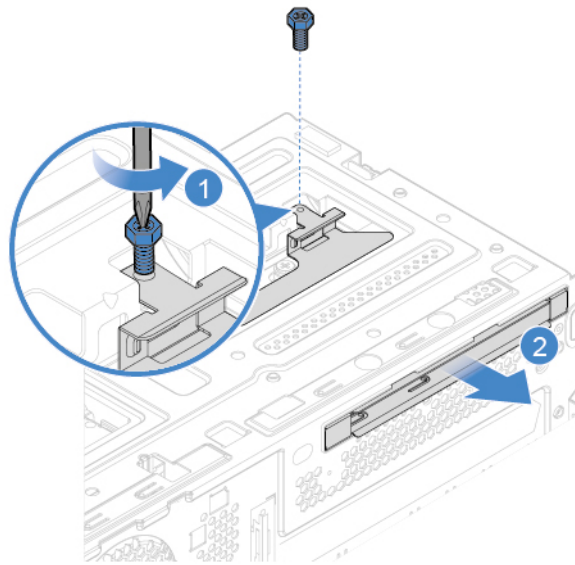


Figure 13. Removing the optical drive bracket

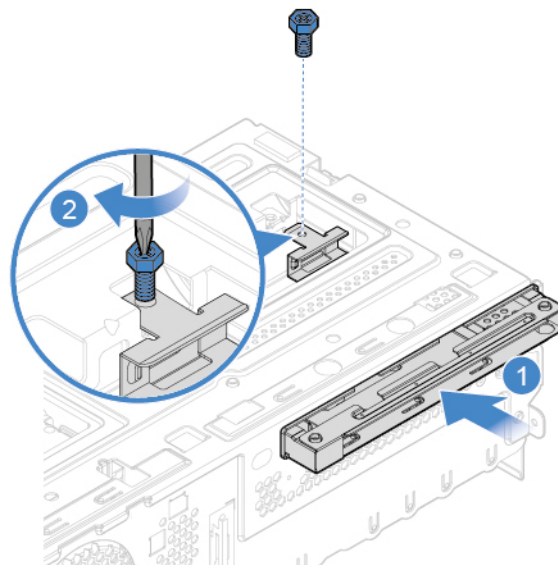


Figure 14. Installing the optical drive bracket

5. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

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 the computer cover. See “Removing the computer cover” on page 14.
2. Remove the front bezel. See “Replacing the front bezel” on page 15.
3. Pivot the drive bay assembly upward and downward.

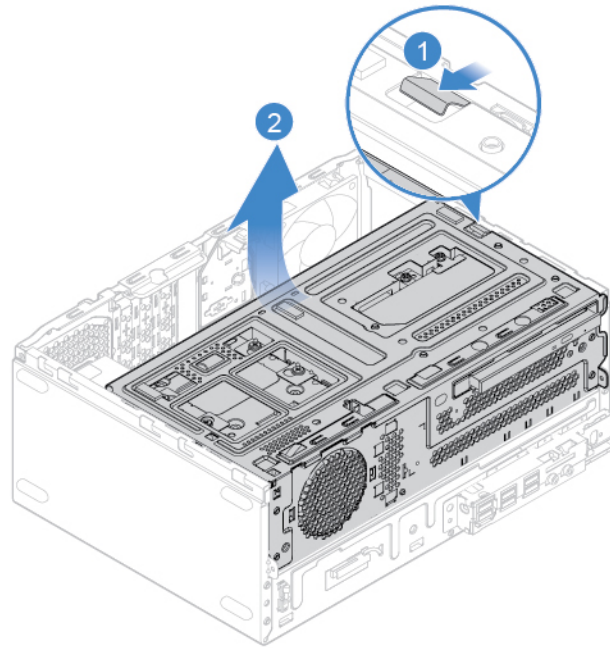


Figure 15. Pivoting the drive bay assembly upward

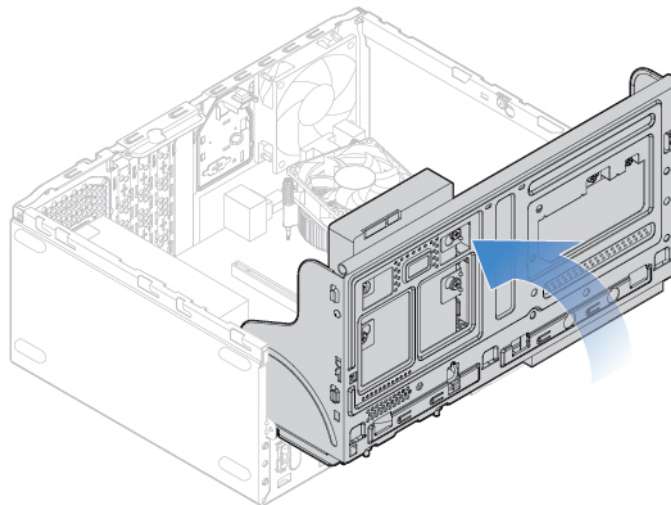


Figure 16. Pivoting the drive bay assembly downward

4. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

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

1. Remove the computer cover. See “Removing the computer cover” on page 14.
2. Remove the front bezel. See “Replacing the front bezel” on page 15.
3. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 18.
4. Disconnect the signal cable and the power cable from the 3.5-inch storage drive.
5. Refer to the following to replace the 3.5-inch storage drive.
 - 3.5-inch primary storage drive

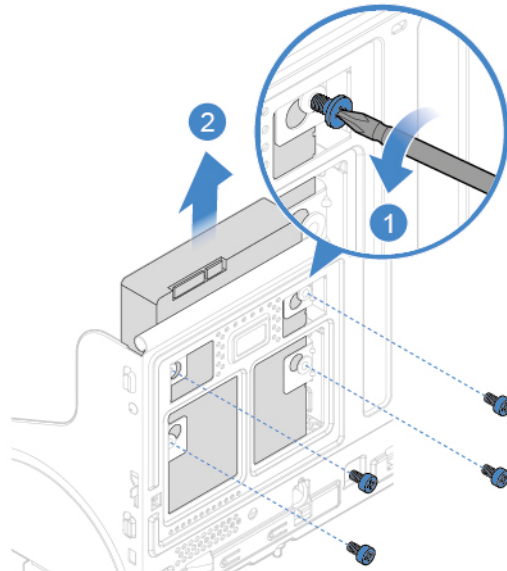


Figure 17. Removing the 3.5-inch primary storage drive

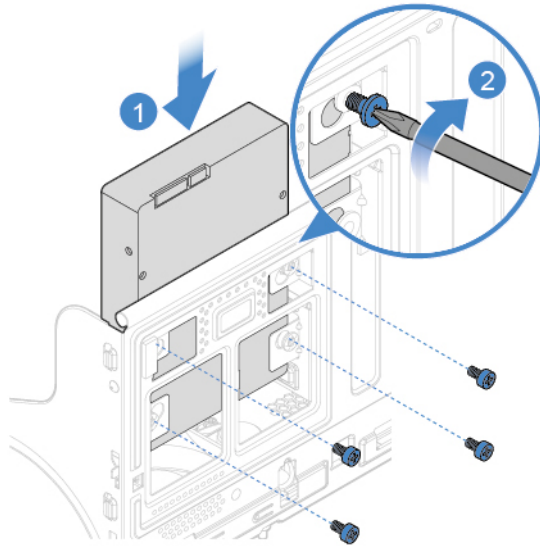


Figure 18. Installing the 3.5-inch primary storage drive

- 3.5-inch secondary storage drive

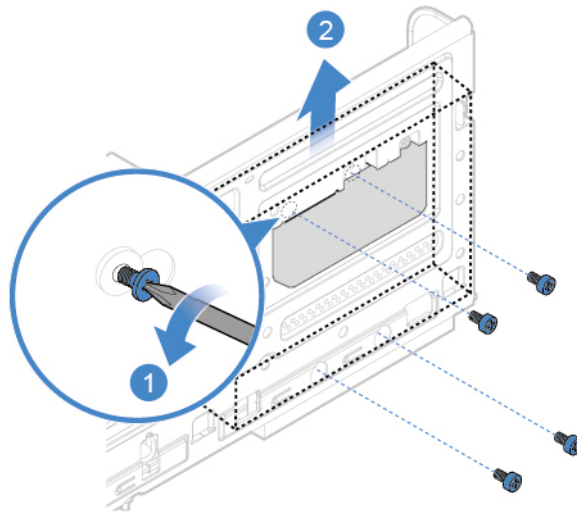


Figure 19. Removing the 3.5-inch secondary storage drive

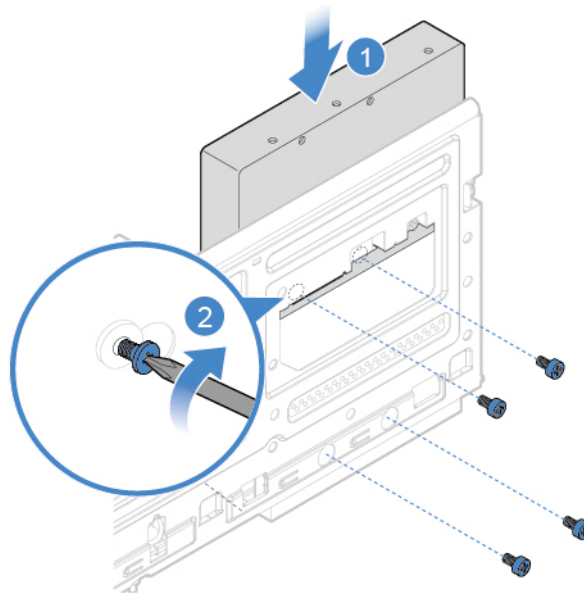


Figure 20. Installing the 3.5-inch secondary storage drive

6. Connect the signal cable and the power cable to the new 3.5-inch storage drive.
7. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

Replacing the 2.5-inch storage drive

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

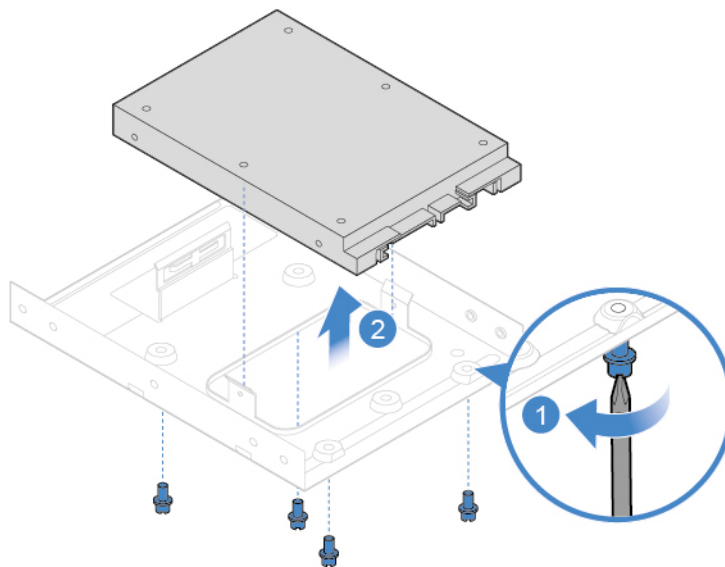


Figure 21. Removing the 2.5-inch storage drive from the storage converter

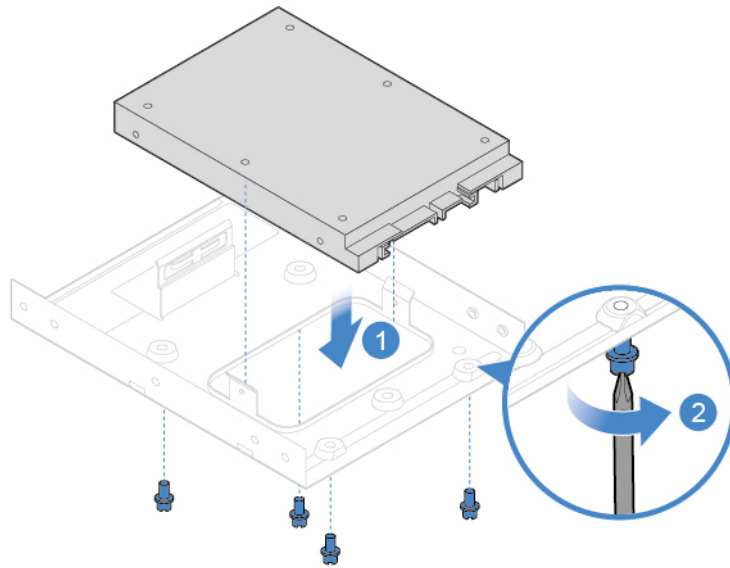


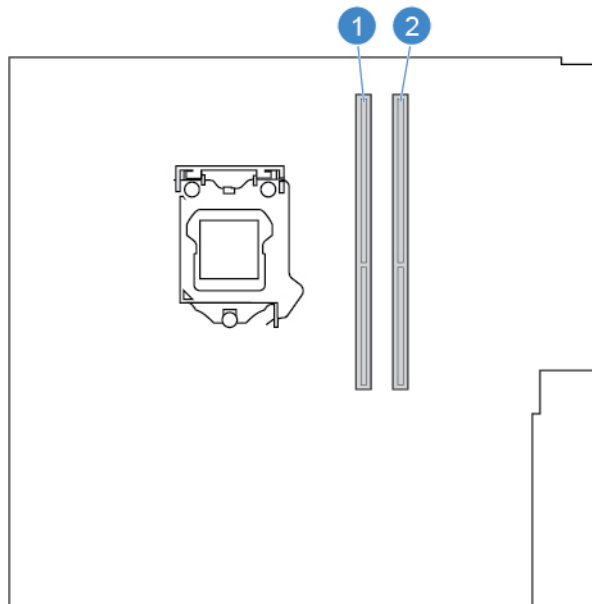
Figure 22. Installing the 2.5-inch storage drive into the storage converter

3. Reinstall the storage converter with the 2.5-inch storage drive. See “Replacing the 3.5-inch storage drive”.

Replacing a memory module

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

Ensure that you follow the installation order for memory modules shown in the following figure.



1. Remove the computer cover. See “Removing the computer cover” on page 14.
2. Remove the front bezel. See “Replacing the front bezel” on page 15.

3. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 18.
4. Replace a memory module.

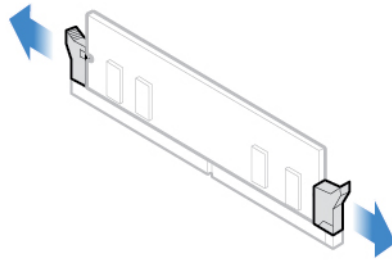


Figure 23. Disengaging the latches

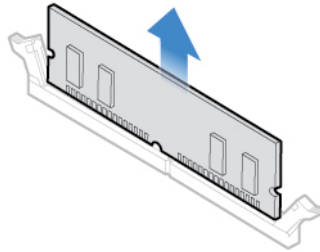


Figure 24. Removing a memory module

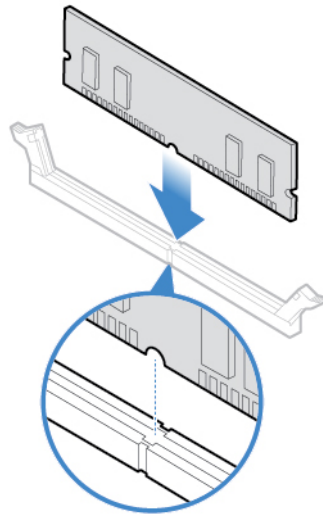


Figure 25. Installing a memory module

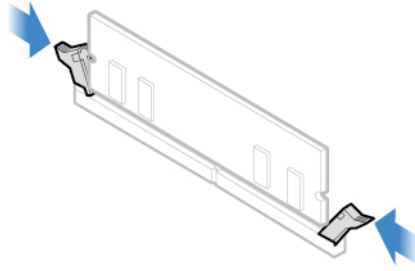


Figure 26. Securing a memory module with the latches

5. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

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 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 14.
2. Remove the front bezel. See “Replacing the front bezel” on page 15.
3. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 18.
4. Disconnect the microprocessor fan cable from the system board.
5. Replace the heat sink and fan assembly.

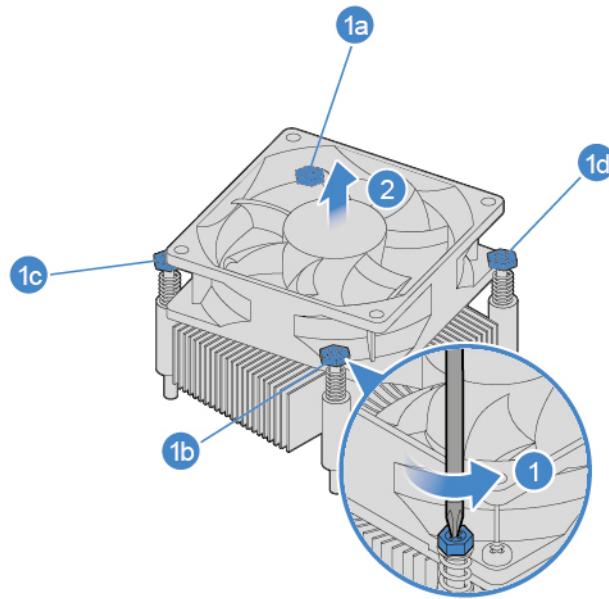


Figure 27. Removing the heat sink and fan assembly

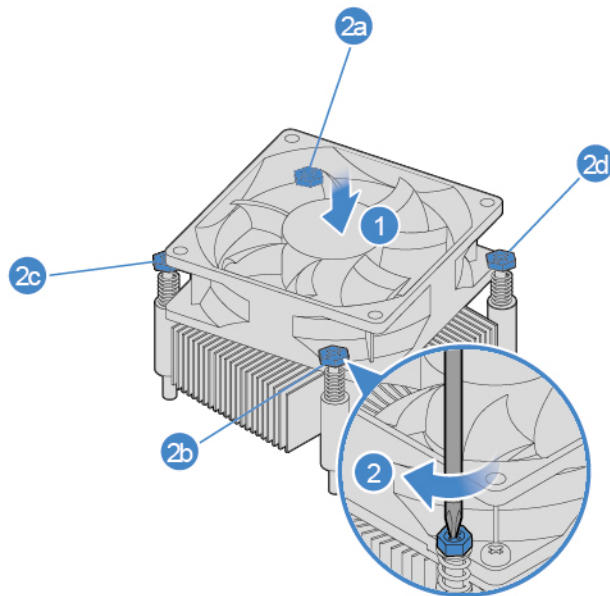


Figure 28. Installing the heat sink and fan assembly

6. Connect the new microprocessor fan cable to the system board.
7. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

Replacing the coin-cell battery

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

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

1. Remove the computer cover. See “Removing the computer cover” on page 14.
2. Remove the front bezel. See “Replacing the front bezel” on page 15.
3. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 18.
4. Replace the coin-cell battery.

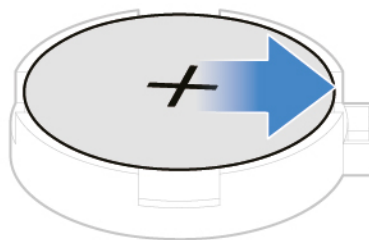


Figure 29. Disengaging the latch

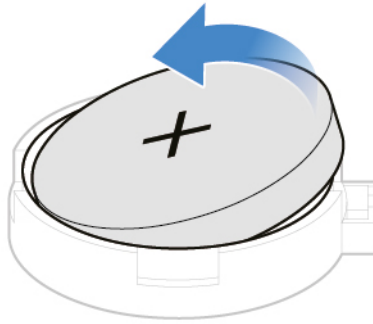


Figure 30. Removing the coin-cell battery

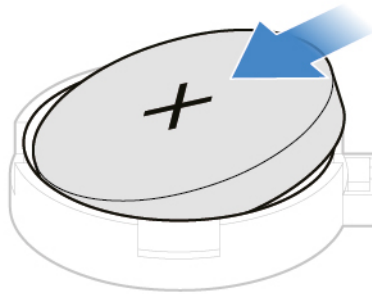


Figure 31. Installing the coin-cell battery

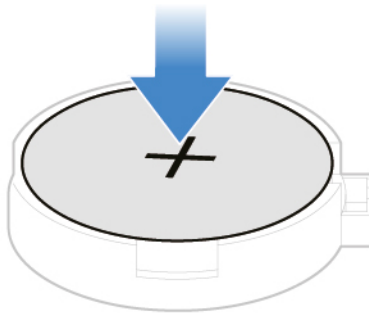


Figure 32. Securing the coin-cell battery with the latch

5. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

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 14.
2. Remove the front bezel. See “Replacing the front bezel” on page 15.
3. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 18.
4. Replace a PCI Express card.

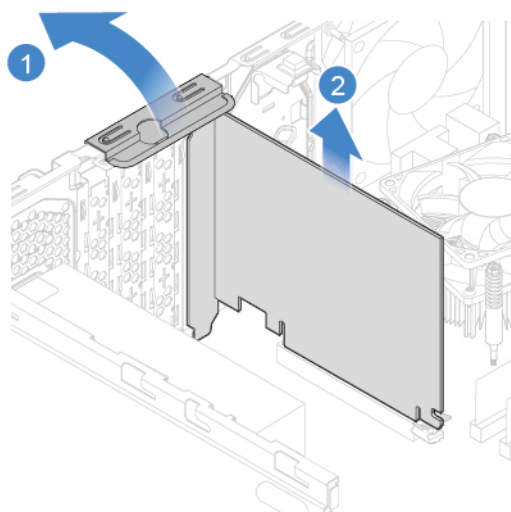


Figure 33. Removing a PCI Express card

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

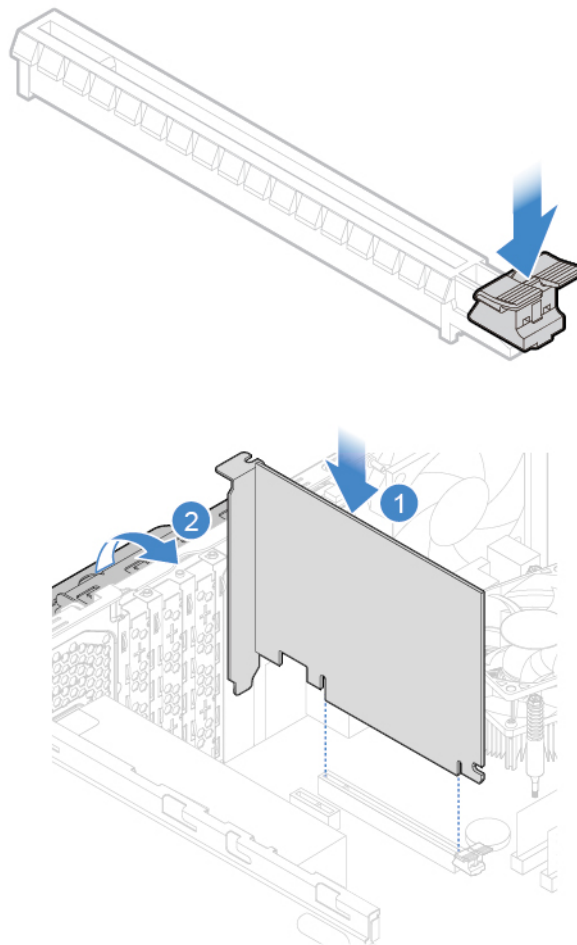


Figure 34. Installing a PCI Express card

5. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

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 14.
2. Remove the front bezel. See “Replacing the front bezel” on page 15.
3. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 18.
4. Depending on your computer model, refer to one of the following to replace the Wi-Fi card.
 - Type 1

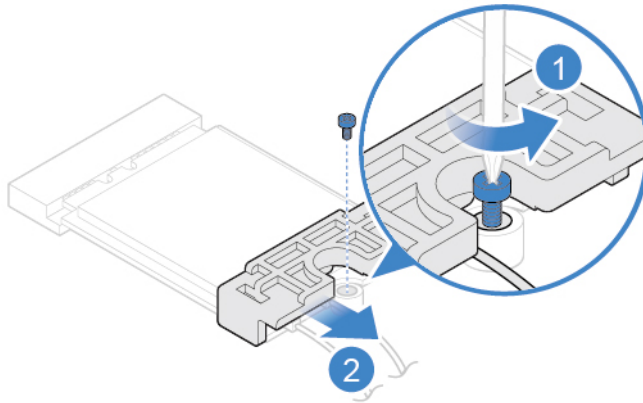


Figure 35. Removing the Wi-Fi card shield

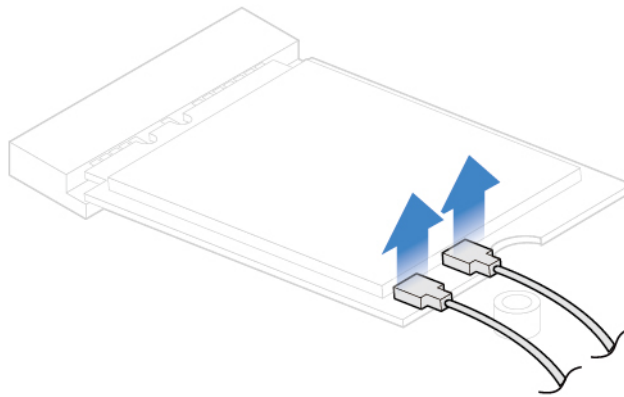


Figure 36. Disconnecting the Wi-Fi antenna cables

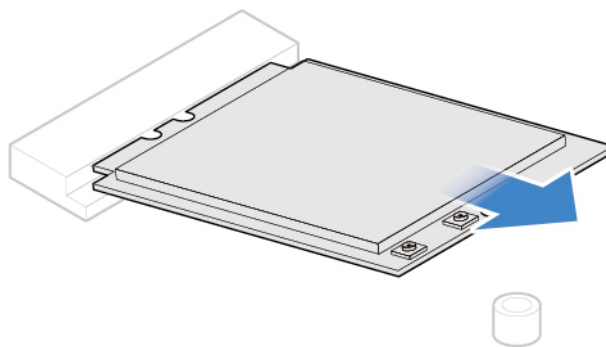


Figure 37. Removing the Wi-Fi card

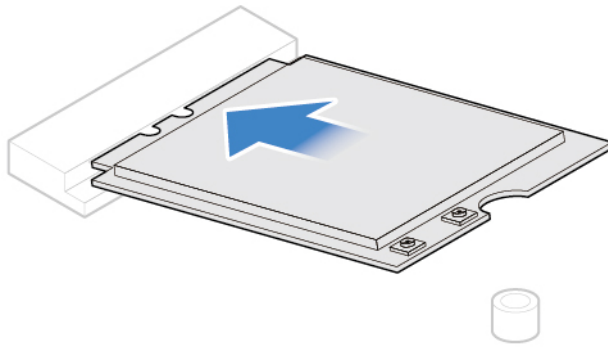


Figure 38. Installing the Wi-Fi card

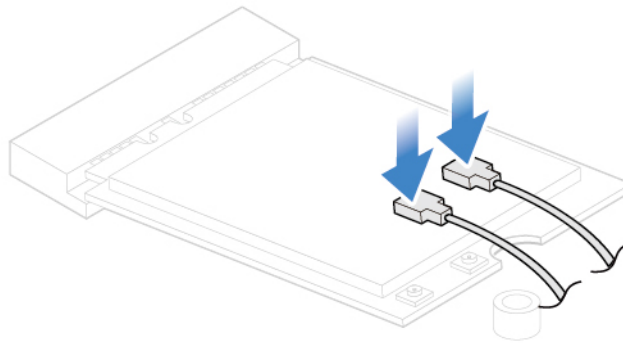


Figure 39. Connecting the Wi-Fi antenna cables

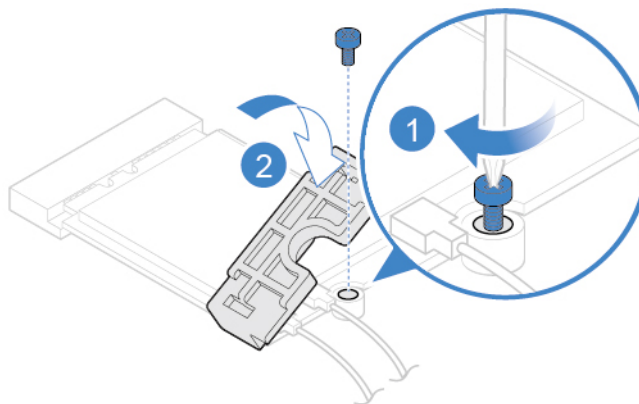


Figure 40. Installing the Wi-Fi card shield

- Type 2

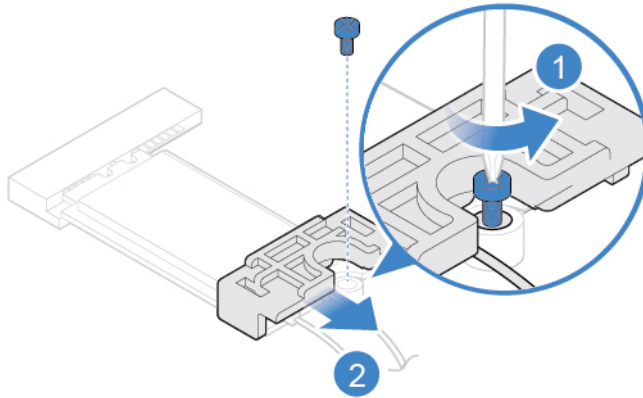


Figure 41. Removing the Wi-Fi card shield

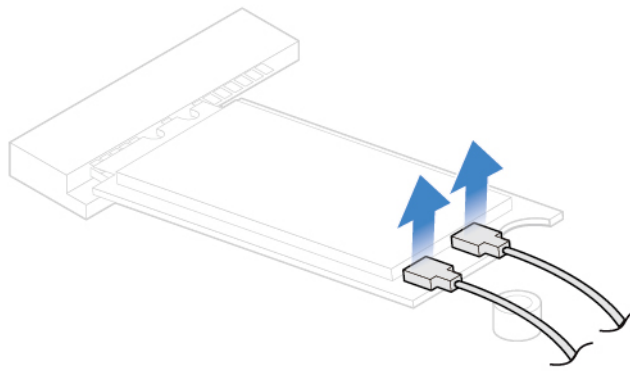


Figure 42. Disconnecting the Wi-Fi antenna cables

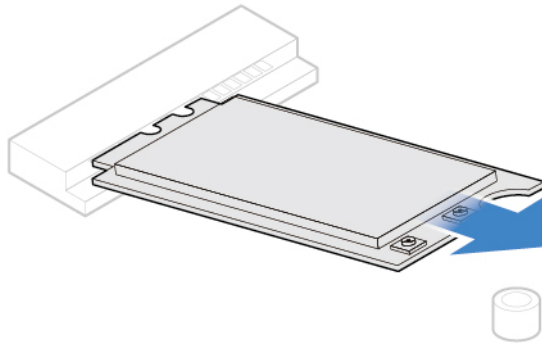


Figure 43. Removing the Wi-Fi card

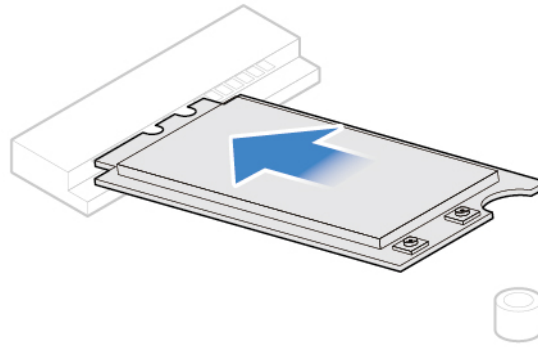


Figure 44. Installing the Wi-Fi card

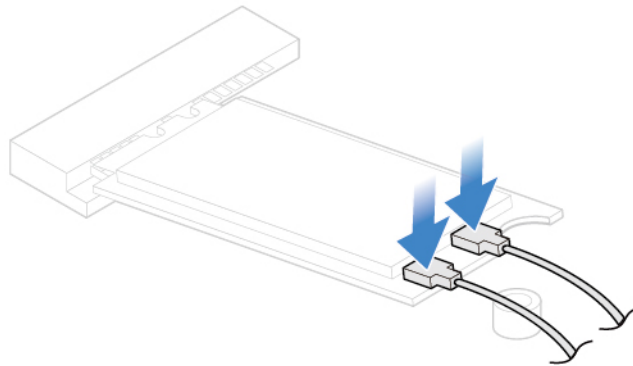


Figure 45. Connecting the Wi-Fi antenna cables

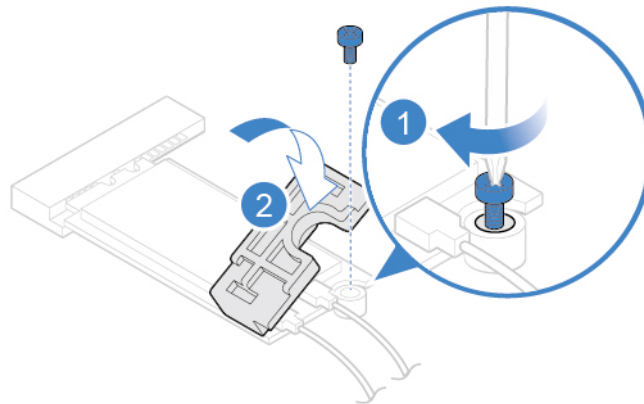


Figure 46. Installing the Wi-Fi card shield

5. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

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 14.

2. Remove the front bezel. See “Replacing the front bezel” on page 15.
3. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 18.
4. Depending on your computer model, refer to one of the following to replace the M.2 solid-state drive.
 - Type 1

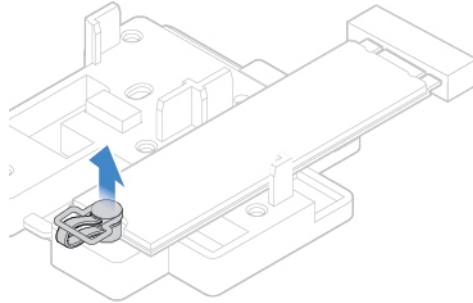


Figure 47. Pulling out the stopper

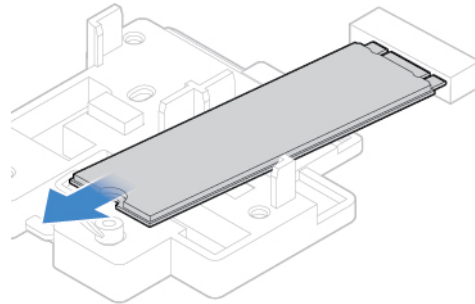


Figure 48. Removing the M.2 solid-state drive

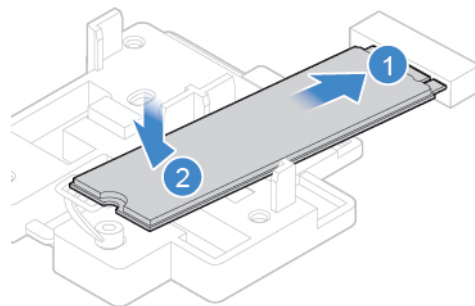


Figure 49. Installing the M.2 solid-state drive

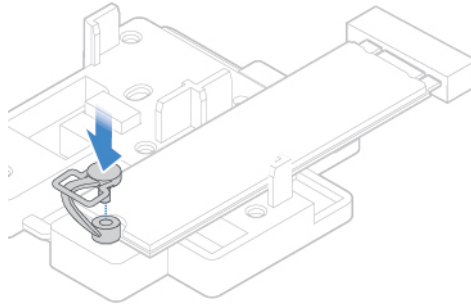


Figure 50. Inserting the stopper

- Type 2

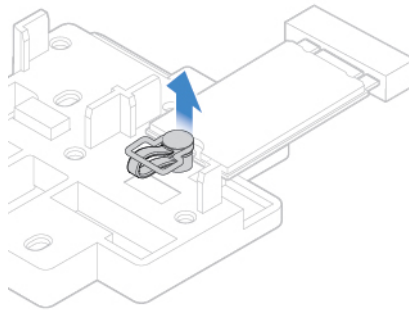


Figure 51. Pulling out the stopper

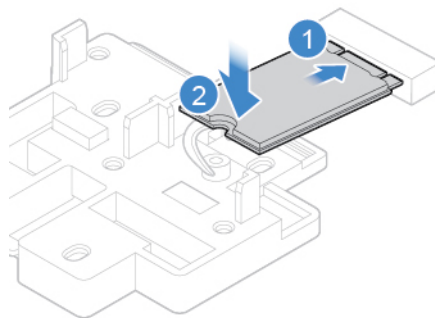


Figure 52. Removing the M.2 solid-state drive

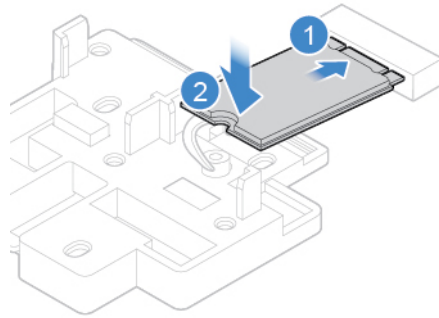


Figure 53. Installing the M.2 solid-state drive

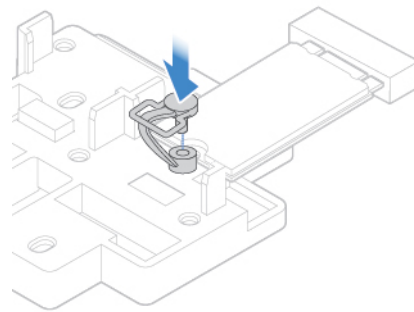


Figure 54. Inserting the stopper

5. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

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 14.
2. Remove the front bezel. See “Replacing the front bezel” on page 15.
3. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 18.
4. Remove the M.2 solid-state drive. See “Replacing the M.2 solid-state drive” on page 33.
5. Replace the M.2 solid-state drive bracket.

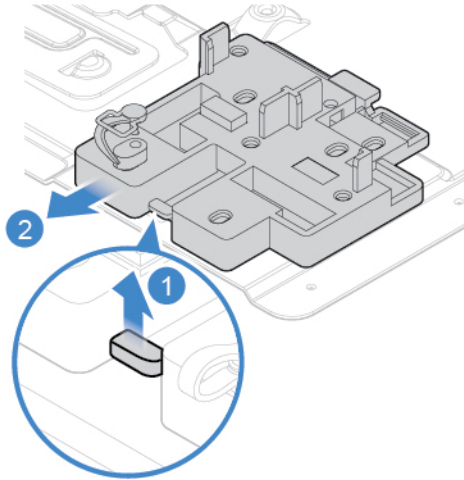


Figure 55. Removing the M.2 solid-state drive bracket

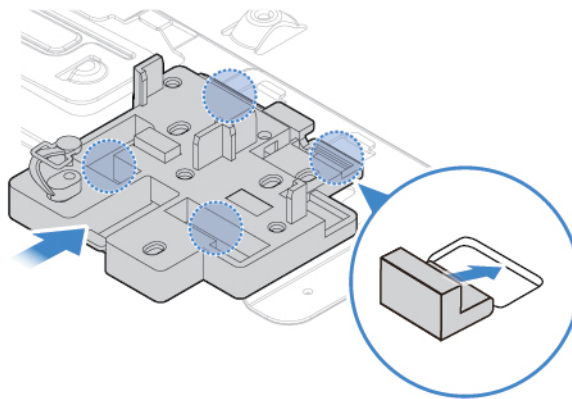


Figure 56. Installing the M.2 solid-state drive bracket

6. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

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 the 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 14.
2. Remove the front bezel. See “Replacing the front bezel” on page 15.
3. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 18.
4. Disconnect the power supply assembly cables from the system board.
5. Replace the power supply assembly.

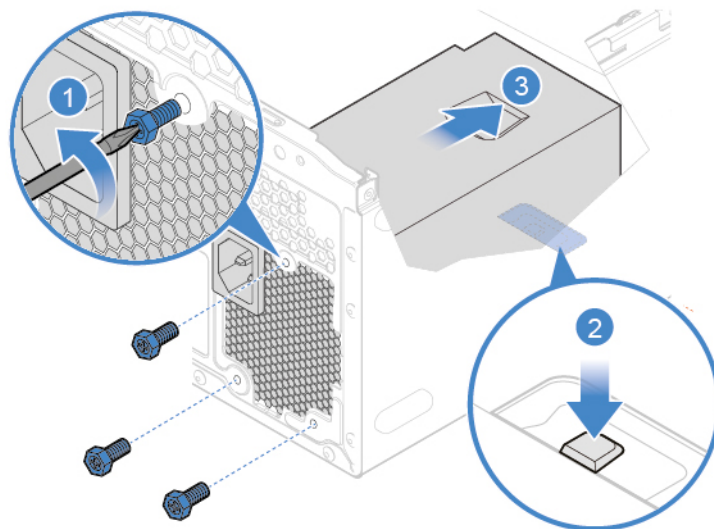


Figure 57. Removing the power supply assembly

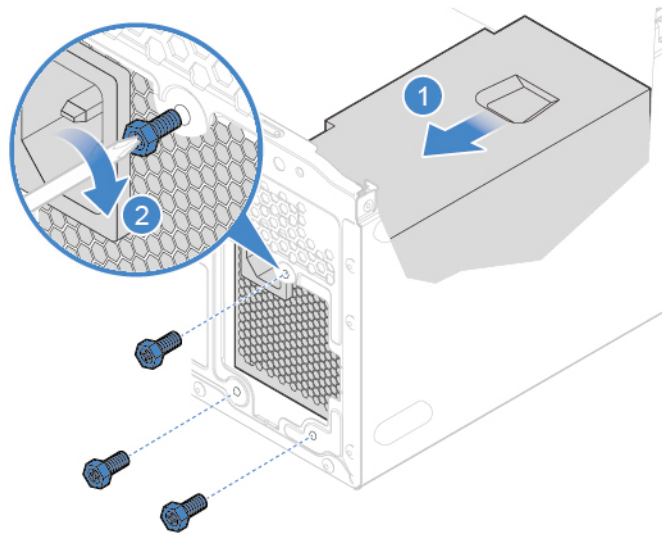


Figure 58. Installing the power supply assembly

6. Connect the new power supply assembly cables to the system board.
7. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

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 14.
2. Remove the front bezel. See “Replacing the front bezel” on page 15.
3. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 18.
4. Disconnect the internal speaker cable from the system board.
5. Replace the internal speaker.

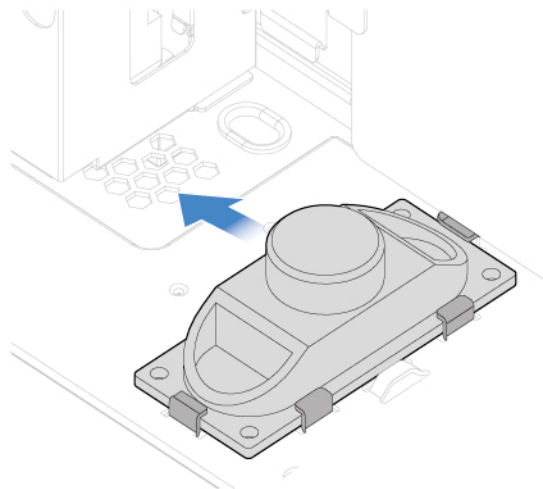


Figure 59. Removing the internal speaker

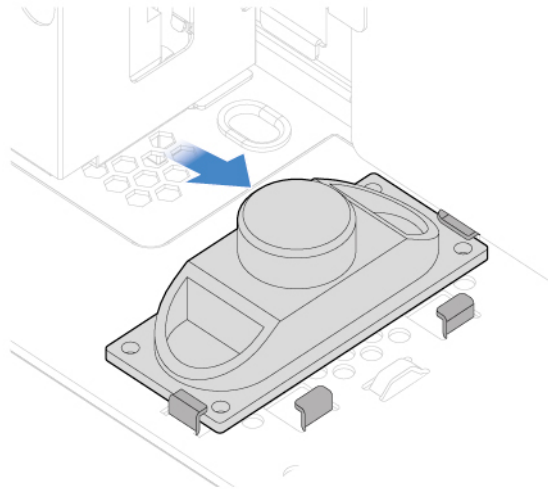


Figure 60. Installing the internal speaker

6. Connect the new internal speaker cable to the system board.
7. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

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 14.
2. Remove the front bezel. See “Replacing the front bezel” on page 15.
3. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 18.
4. Disconnect the thermal sensor cable from the system board.
5. Replace the thermal sensor.

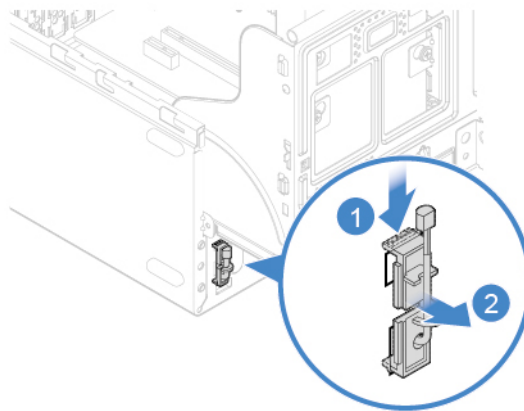


Figure 61. Removing the thermal sensor

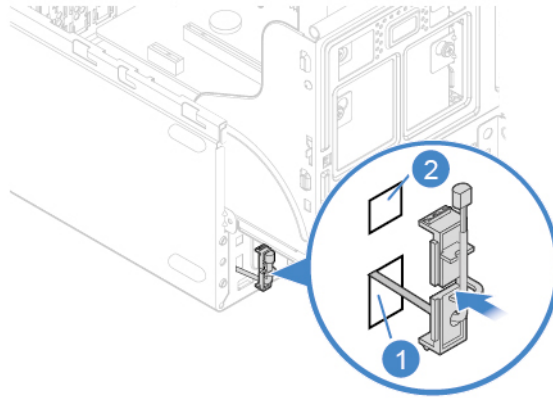


Figure 62. Installing the thermal sensor

6. Connect the new thermal sensor cable to the system board.
7. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

Replacing the front fan

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 14.
2. Remove the front bezel. See “Replacing the front bezel” on page 15.
3. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 18.
4. Disconnect the front fan cable from the system board.
5. Replace the front fan.

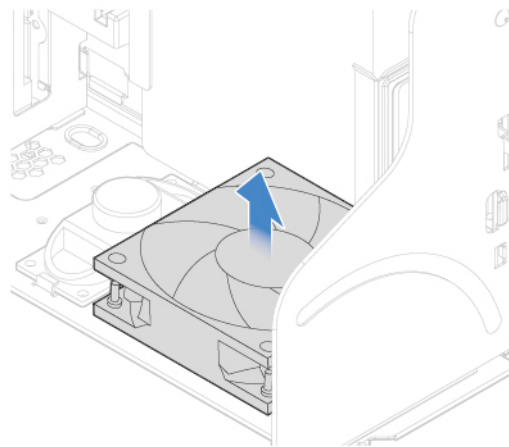


Figure 63. Removing the front fan

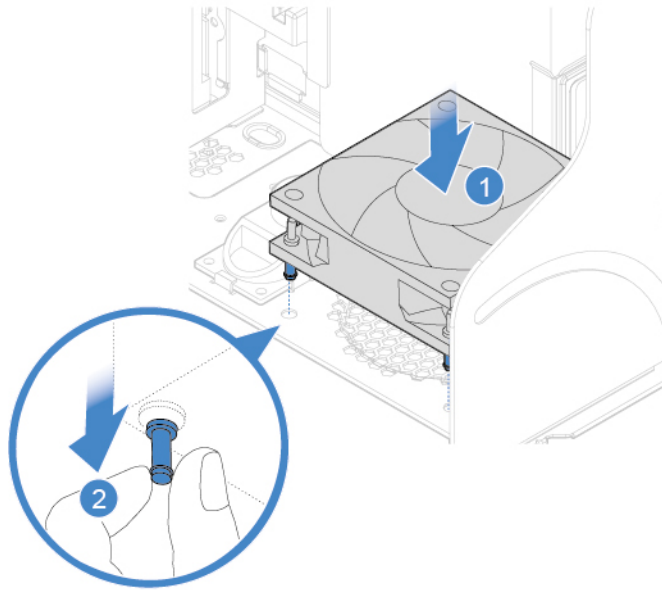


Figure 64. Installing the front fan

6. Connect the new front fan cable to the system board.
7. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

Replacing the Wi-Fi antennas

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 14.
2. Remove the front bezel. See “Replacing the front bezel” on page 15.
3. Disconnect the Wi-Fi antenna cables from the Wi-Fi card. See “Replacing the Wi-Fi card” on page 29.
4. Refer to the following to replace the Wi-Fi antennas.
 - Front Wi-Fi antenna

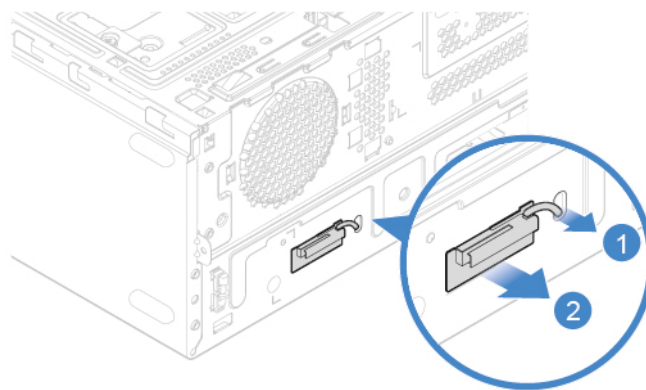


Figure 65. Removing the front Wi-Fi antenna

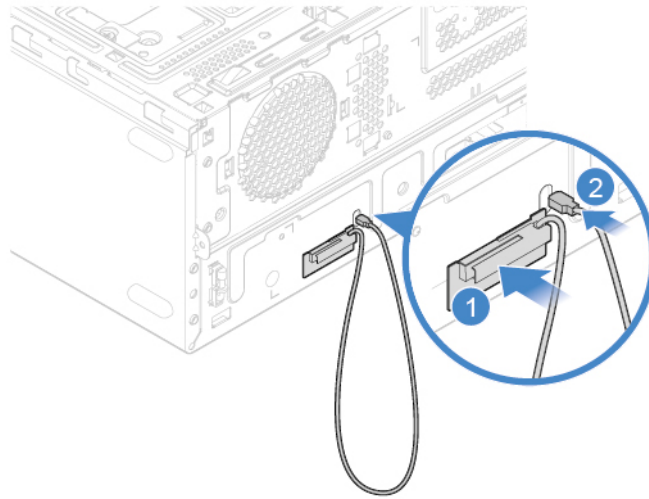


Figure 66. Installing the front Wi-Fi antenna

- Rear Wi-Fi antenna

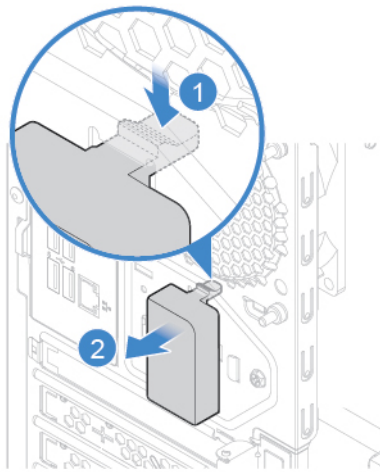


Figure 67. Removing the rear Wi-Fi antenna cover

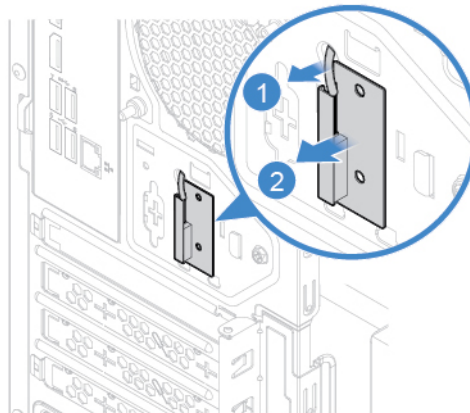


Figure 68. Removing the rear Wi-Fi antenna

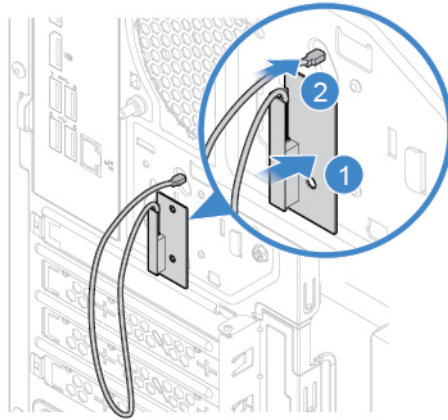


Figure 69. Installing the rear Wi-Fi antenna

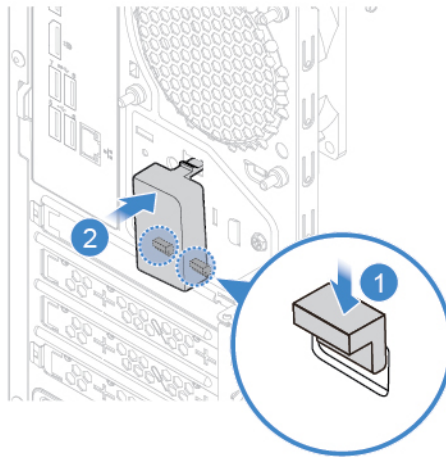


Figure 70. Installing the rear Wi-Fi antenna cover

5. Connect the new Wi-Fi antenna cables to the Wi-Fi card.
6. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

Replacing the power button 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 14.
2. Remove the front bezel. See “Replacing the front bezel” on page 15.
3. Disconnect the power button board cable from the system board.
4. Replace the power button board.

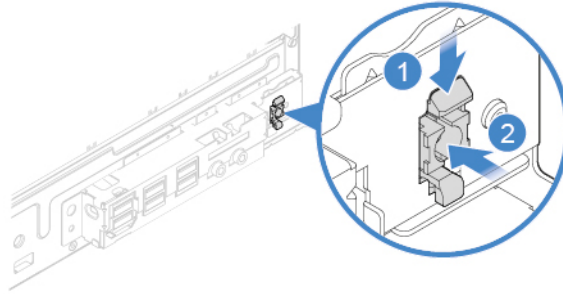


Figure 71. Pressing the tabs

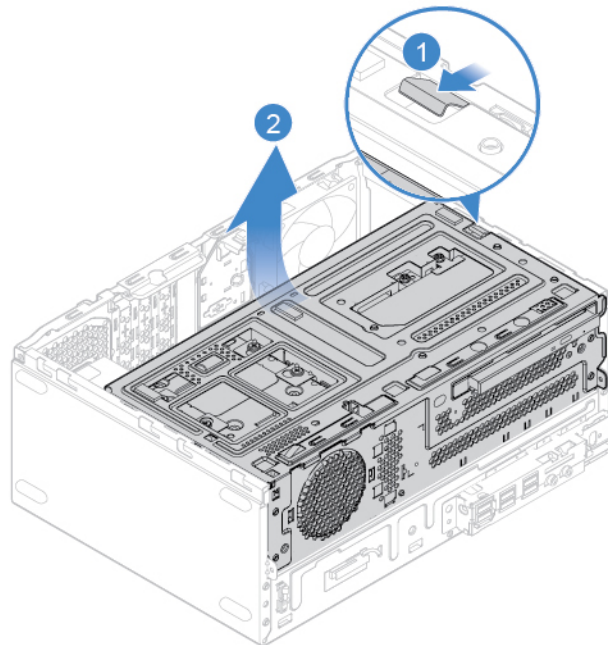


Figure 72. Pivoting the drive bay assembly upward

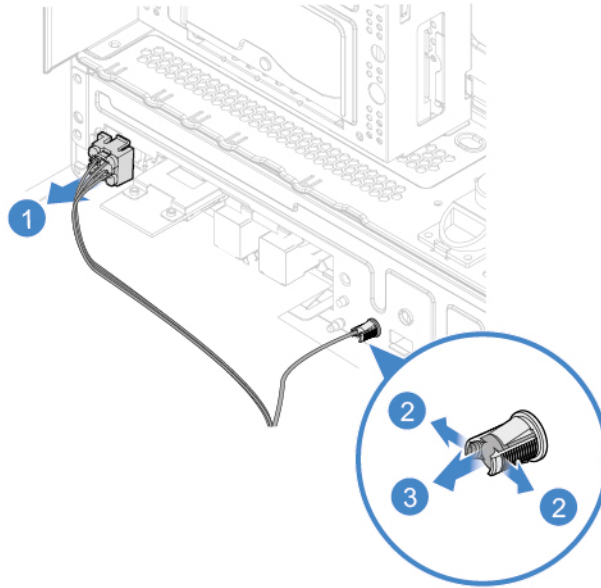


Figure 73. Removing the power button board

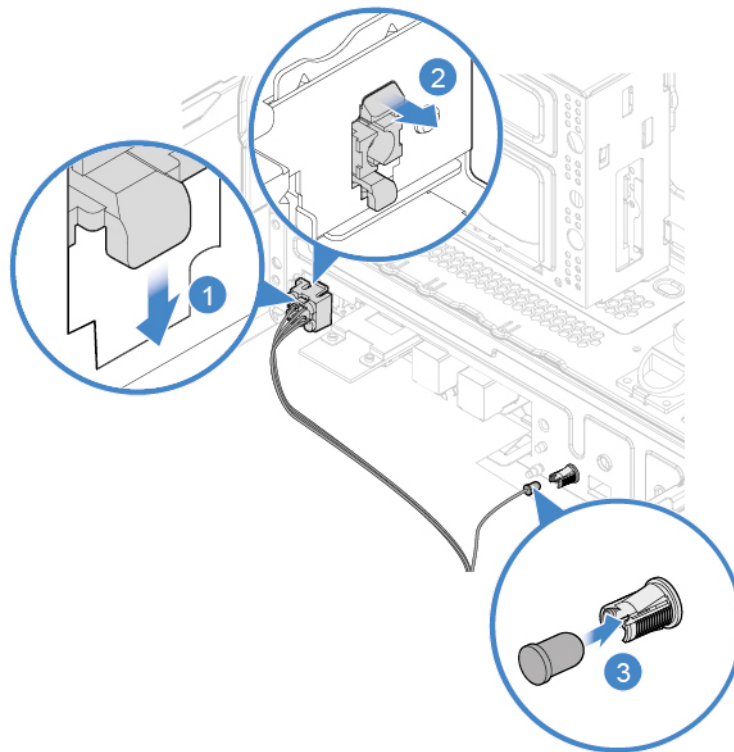


Figure 74. Installing the power button board

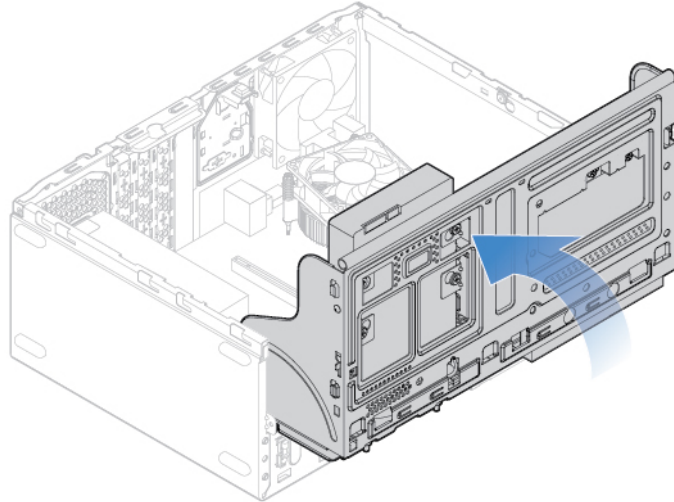


Figure 75. Pivoting the drive bay assembly downward

5. Connect the new power button board cable to the system board.
6. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

Replacing the card reader

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 14.
2. Remove the front bezel. See “Replacing the front bezel” on page 15.
3. Remove the power button board. See “Replacing the power button board” on page 44.
4. Disconnect the card reader cable from the system board.
5. Replace the card reader.

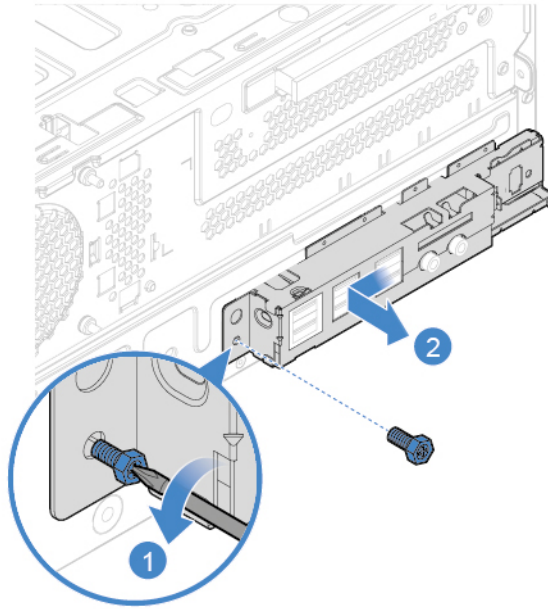


Figure 76. Removing the front I/O bracket

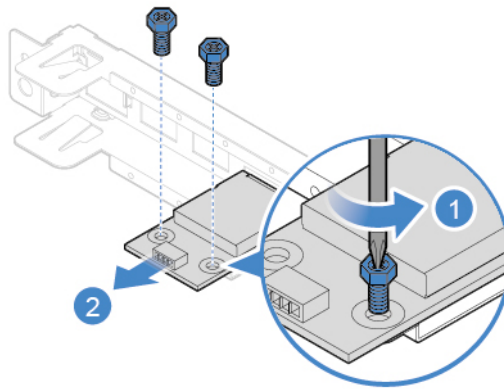


Figure 77. Removing the card reader

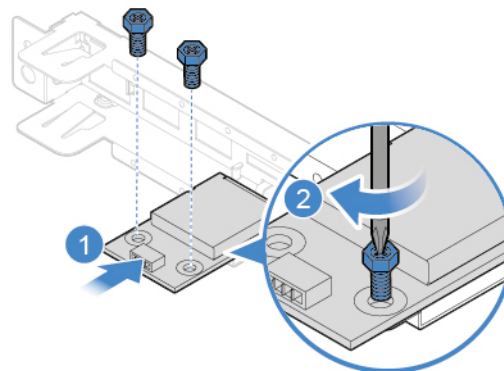


Figure 78. Installing the card reader

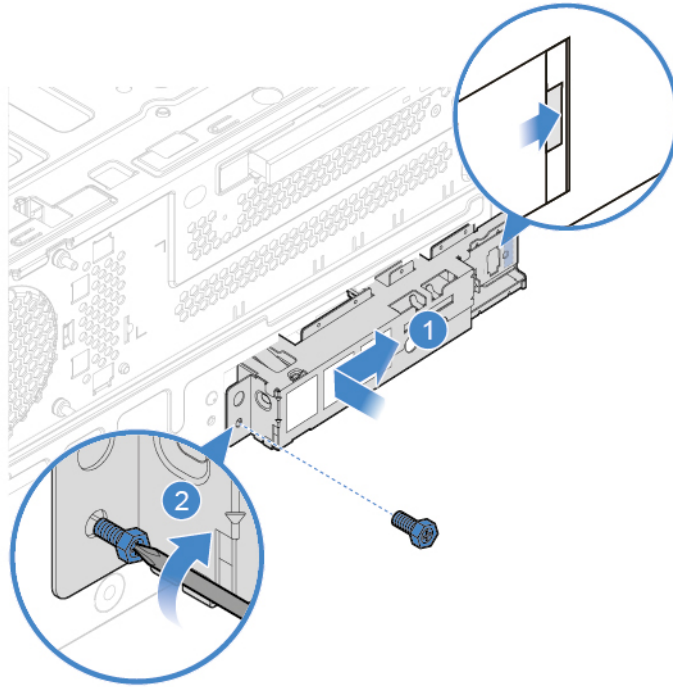


Figure 79. Installing the front I/O bracket

6. Connect the new card reader cable to the system board.
7. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

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 14.
2. Remove the front bezel. See “Replacing the front bezel” on page 15.
3. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 18.
4. Remove the heat sink and fan assembly. See “Replacing the heat sink and fan assembly” on page 24.
5. Record the cable routing and cable connections, and then disconnect all cables from the system board. See “System board” on page 5.
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.

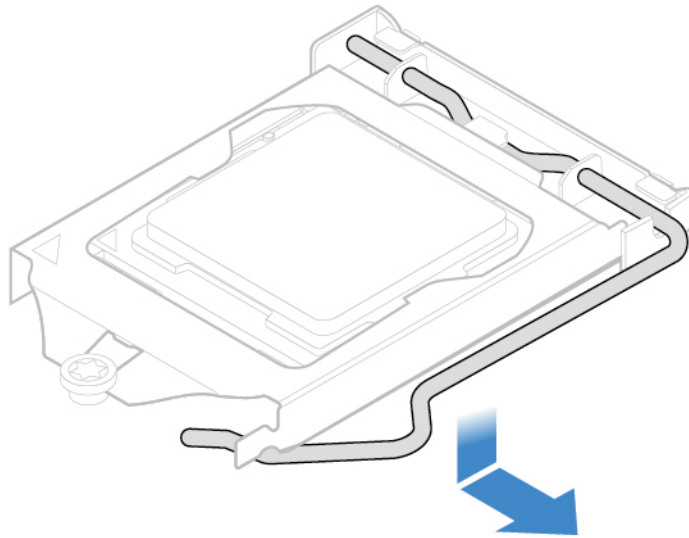


Figure 80. Releasing the handle

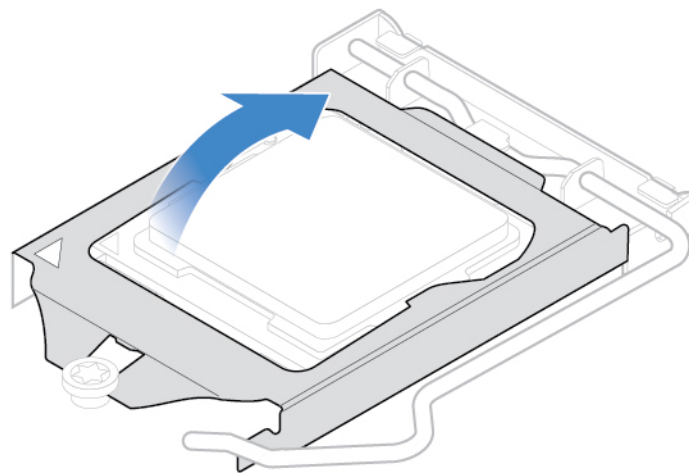


Figure 81. Opening the retainer

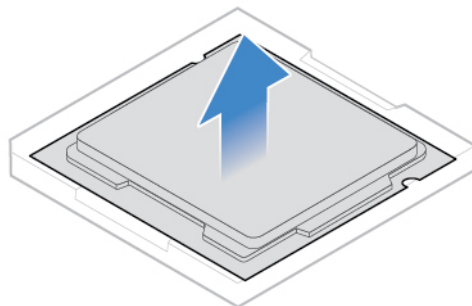


Figure 82. Removing the microprocessor

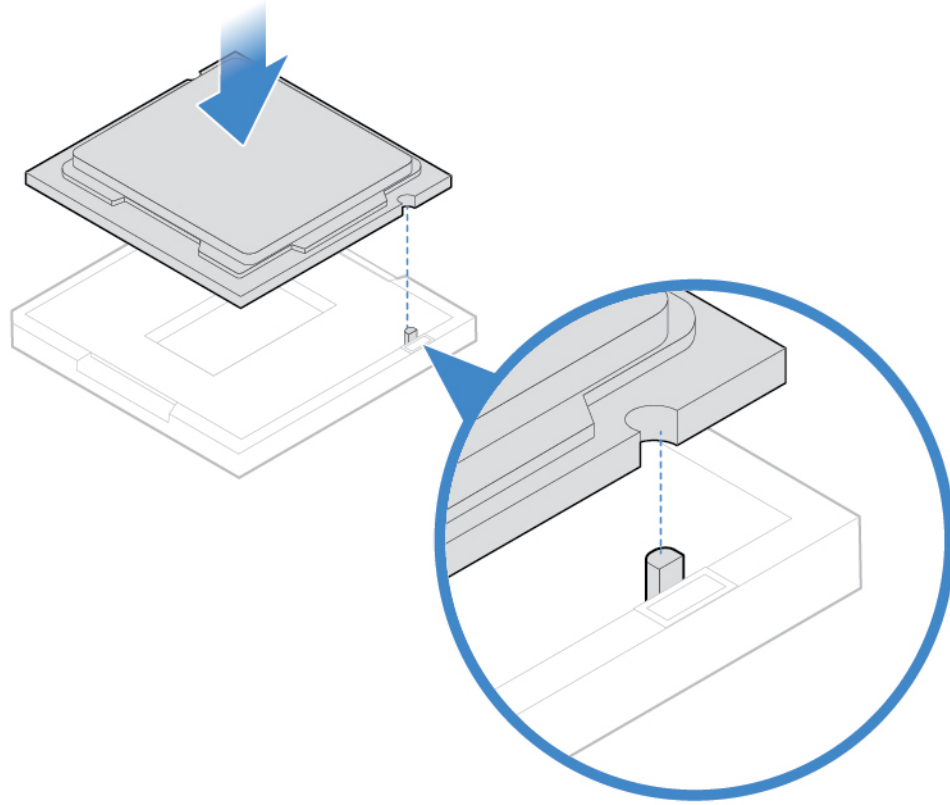


Figure 83. Installing the microprocessor

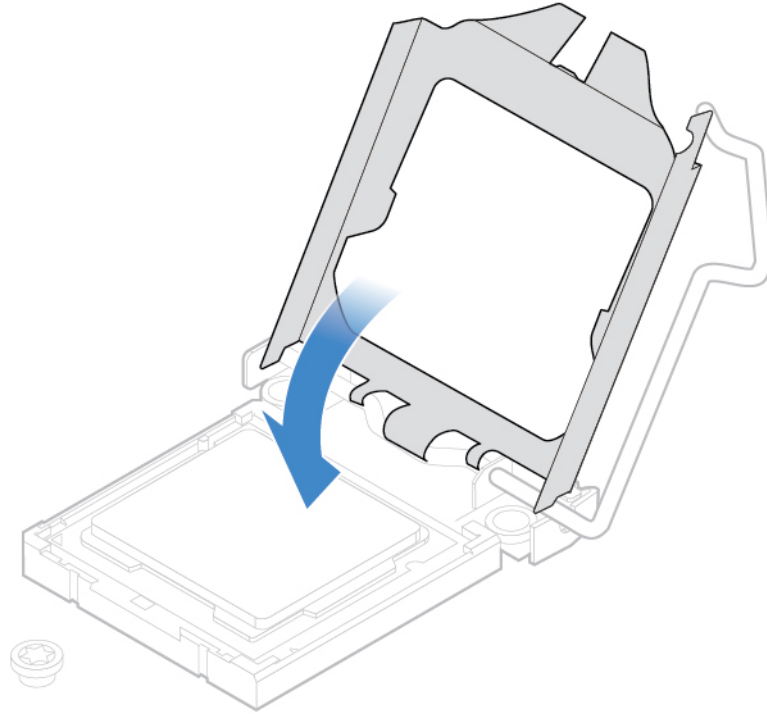


Figure 84. Closing the retainer

7.

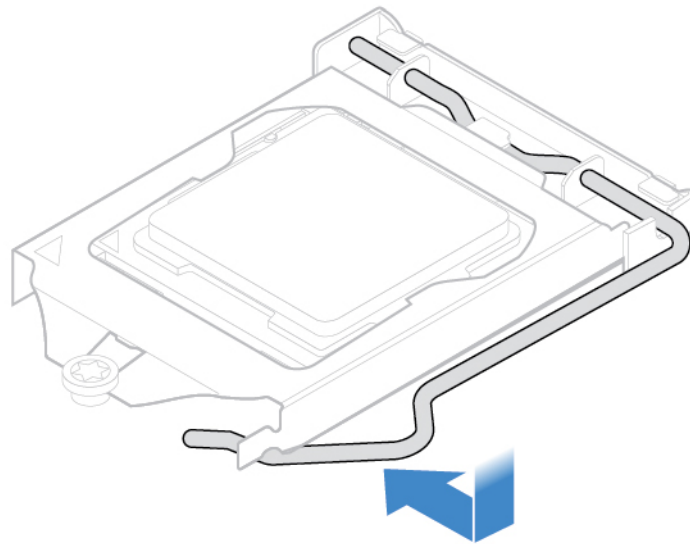


Figure 85. Securing the retainer with the handle

8. Route all the cables that you disconnected from the system board, and then reconnect the cables to the system board.
9. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

Replacing the rear fan

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 14.
2. Remove the front bezel. See “Replacing the front bezel” on page 15.
3. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 18.
4. Disconnect the rear fan cable from the system board.
5. Replace the rear fan.

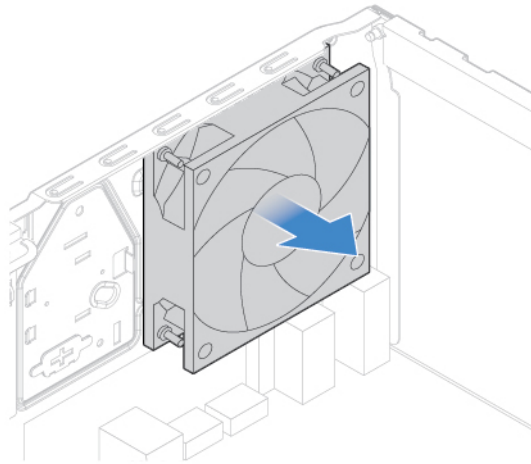


Figure 86. Removing the rear fan

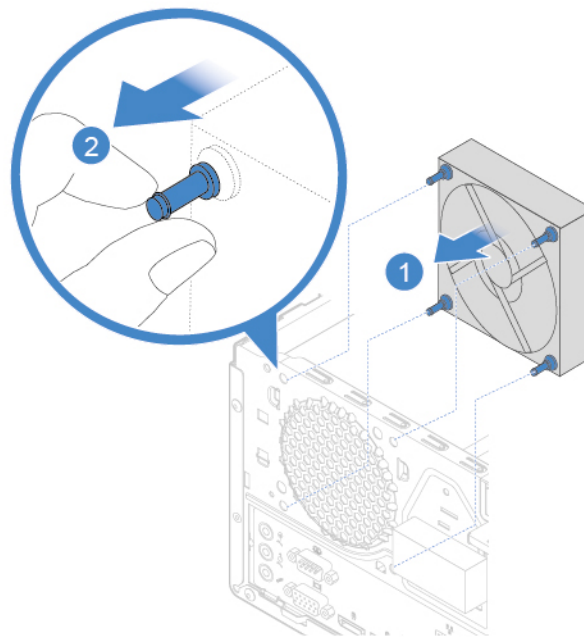


Figure 87. Installing the rear fan

6. Connect the new rear fan cable to the system board.
7. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

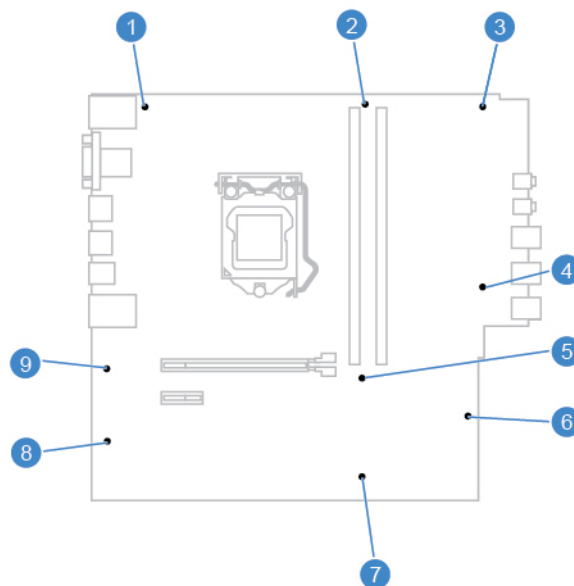
Replacing the system board

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 14.
2. Remove the front bezel. See “Replacing the front bezel” on page 15.
3. Remove the front I/O bracket and the card reader. See “Replacing the card reader” on page 47.
4. Pivot the drive bay assembly upward. See “Pivoting the drive bay assembly upward and downward” on page 18.
5. Remove all memory modules. See “Replacing a memory module” on page 22.
6. Remove the heat sink and fan assembly. See “Replacing the heat sink and fan assembly” on page 24.
7. Remove the microprocessor. See “Replacing the microprocessor” on page 49.
8. Remove all PCI Express cards. See “Replacing a PCI Express card” on page 28.
9. Remove the Wi-Fi card. See “Replacing the Wi-Fi card” on page 29.
10. Remove the M.2 solid-state drive. See “Replacing the M.2 solid-state drive” on page 33.
11. Record the cable routing and cable connections, and then disconnect all cables from the system board. See “System board” on page 5.
12. Replace the system board.

Notes:

- The numbers in the following figure show the locations of the screws instead of a specific order for removing and reinstalling the screws.
- Handle the system board carefully by its edges.
- The failing system board must be returned with a microprocessor socket cover to protect the pins during shipping and handling.



13. Route and connect all the cables to the new system board.

14. Reinstall the removed parts. To complete the replacement, see “Completing the parts replacement” on page 55.

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.

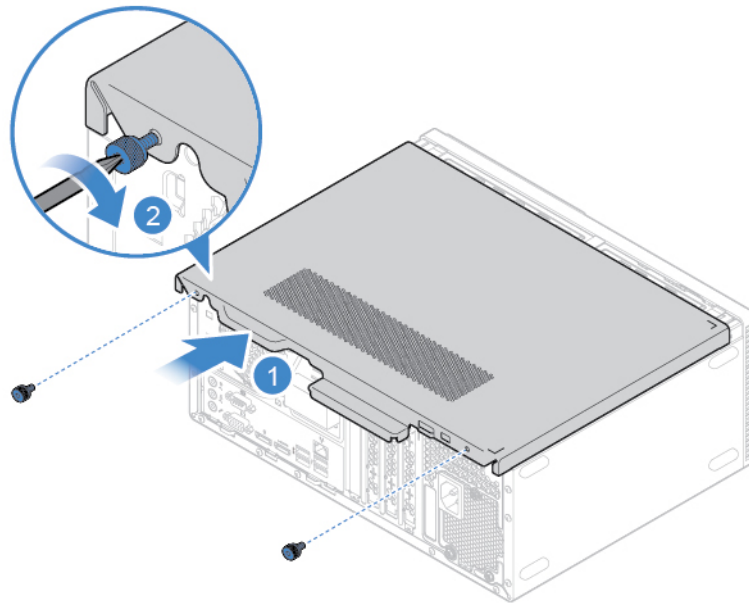


Figure 88. Reinstalling the computer cover

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

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