

ThinkCentre®

M720q User Guide and Hardware Maintenance Manual

Think

Lenovo

Energy Star Machine Types: 10T7, 10T8, 10T9, 10TA, 10TC, 10U8,
10U9, and 10UA

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 59.

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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.

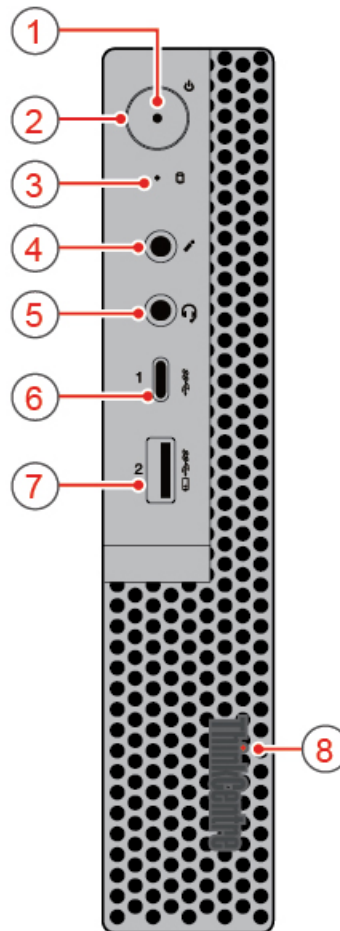


Figure 1. Front view

1 Power indicator	2 Power button
3 Storage drive status indicator	4 Microphone connector
5 Headset connector	6 USB-C™ connector
7 Always On USB 3.1 Gen 1 connector	8 Illuminated red dot

1 Power indicator

This indicator is on when the computer is on.

2 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.

3 Storage drive status indicator

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

4 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.

5 Headset connector

Used to connect a headset or headphones to your computer.

6 USB-C connector

Use the connector to transfer data (USB 3.1 Gen 1, 5.0Gbps), charge your device (5V/0.9A), or connect to USB-C accessories to help expand your computer functionality.

7 Always On 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.

8 Illuminated red dot

This indicator is on when the computer is on.

Rear view

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

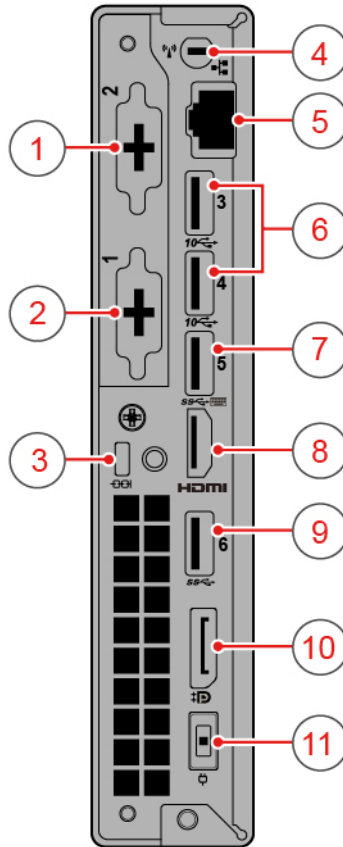


Figure 2. Rear view

1 Optional connector 2	2 Optional connector 1
3 Security-lock slot	4 Wi-Fi antenna slot
5 Ethernet connector	6 USB 3.1 Gen 2 connectors (2)
7 USB 3.1 Gen 1 connector	8 HDMI™ 1.4 out connector
9 USB 3.1 Gen 1 connector	10 DisplayPort® 1.2 out connector
11 Power adapter connector	

1 Optional connector 2

Depending on the computer model, the connector might vary.

2 Optional connector 1

Depending on the computer model, the connector might vary.

3 Security-lock slot

Used to secure a Kensington-style cable lock.

4 Wi-Fi antenna slot

Used to install the rear Wi-Fi antenna cable connector that is available only on some models. The rear Wi-Fi antenna is installed on the rear Wi-Fi antenna cable connector.

5 Ethernet connector

Used to connect an Ethernet cable for network access.

6 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.

7 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.

8 HDMI 1.4 out connector

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

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 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.

11 Power adapter connector

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

System board

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

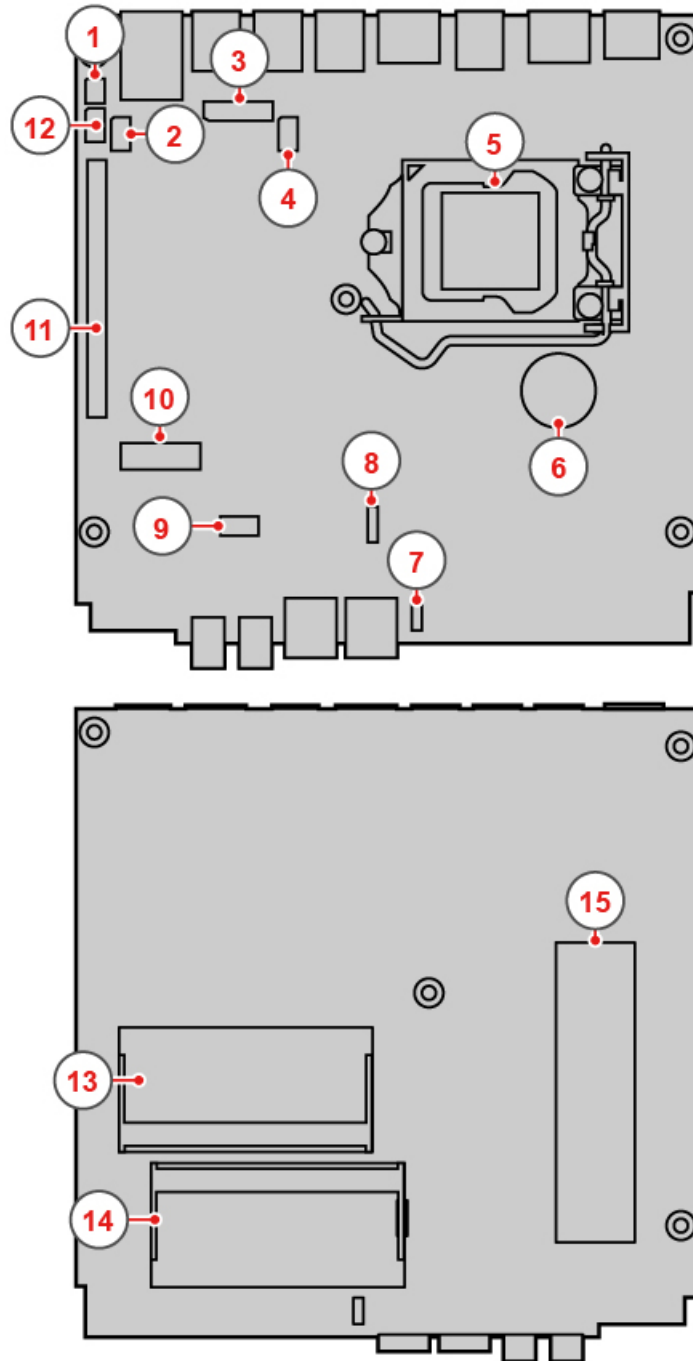


Figure 3. System board

1 Clear CMOS (Complementary Metal Oxide Semiconductor) / Recovery jumper	2 Thunderbolt connector
3 Board to board connector	4 DC connector
5 Microprocessor	6 Coin-cell battery
7 Internal speaker or advanced speaker connector	8 System fan connector
9 Storage drive slot	10 M.2 Wi-Fi card slot

11 PCI Express card slot	12 Serial connector
13 Memory slot 1 (DIMM1)	14 Memory slot 2 (DIMM2)
15 M.2 solid-state drive slot	

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.

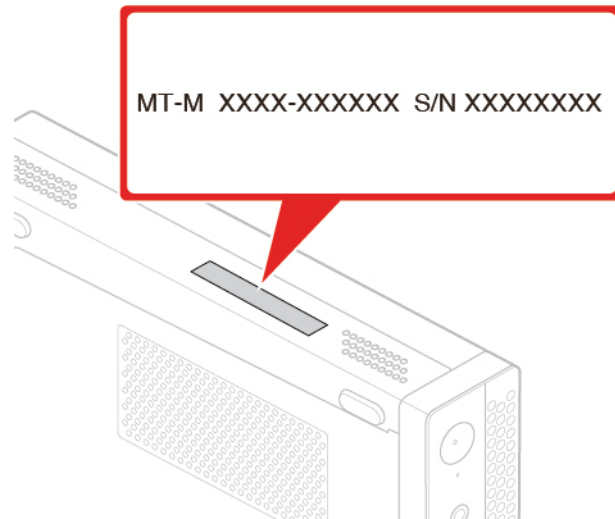


Figure 4. Machine type and model label

Chapter 2. Specifications

Power supply

- 65-watt automatic voltage-sensing power supply (optional)
- 90-watt automatic voltage-sensing power supply (optional)
- 135-watt automatic voltage-sensing power supply (optional)

Storage drives

- 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
 - HDMI 1.4 out connector

Audio features

- The integrated audio card supports the following:
 - Advanced speaker (optional)
 - Headset connector
 - Internal speaker (optional)
 - Microphone connector

Input/Output (I/O) features

- Audio connectors (headset and microphone)
- DisplayPort 1.2 out connector
- Ethernet connector
- HDMI 1.4 out connector
- Serial connector (optional)
- Type-C USB connector
- USB connector

Expansion

- External optical drive box (optional)
- Memory slots
- M.2 solid-state drive slot
- PCI Express graphics card slot

Network features

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

Physical dimensions

- Width: 37 mm (1.5 inches)
- Height: 179 mm (7.0 inches)
- Depth: 183 mm (7.2 inches)

Weight (without the package)

Maximum configuration as shipped: 1.3 kg (2.9 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. Tips on using the computer

This chapter provides tips on using the computer.

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>

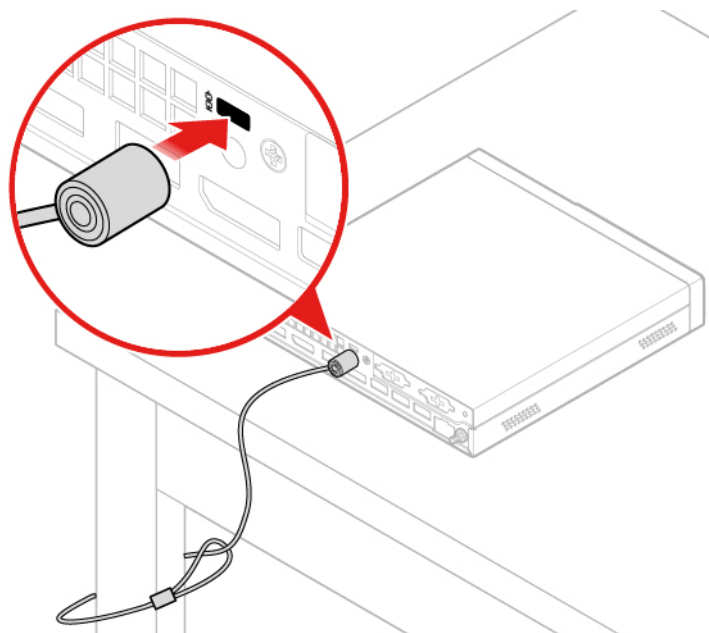


Figure 5. Attaching a Kensington-style cable lock

Installing the computer into the TIO monitor

1. For the Tiny-in-One 23 monitor (MT: 10DQ), remove the rear Wi-Fi antenna cover before installing the computer. See “Replacing the Wi-Fi antennas” on page 44.
2. Connect the computer either to the power adapter shipped with the TIO monitor or to the adapter shipped with the computer that has higher power rating.

Chapter 4. Replacing hardware

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

Before replacing hardware

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

Notes before replacing hardware

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

Handling static-sensitive devices

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

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

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

Knowing FRUs (including CRUs)

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

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

Before replacing FRUs

Before replacing any FRU, read the following:

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

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

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

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

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

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

- Only replace a defective FRU.

Locating FRUs (including CRUs)

Notes:

- Some of the 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/serviceparts-lookup>

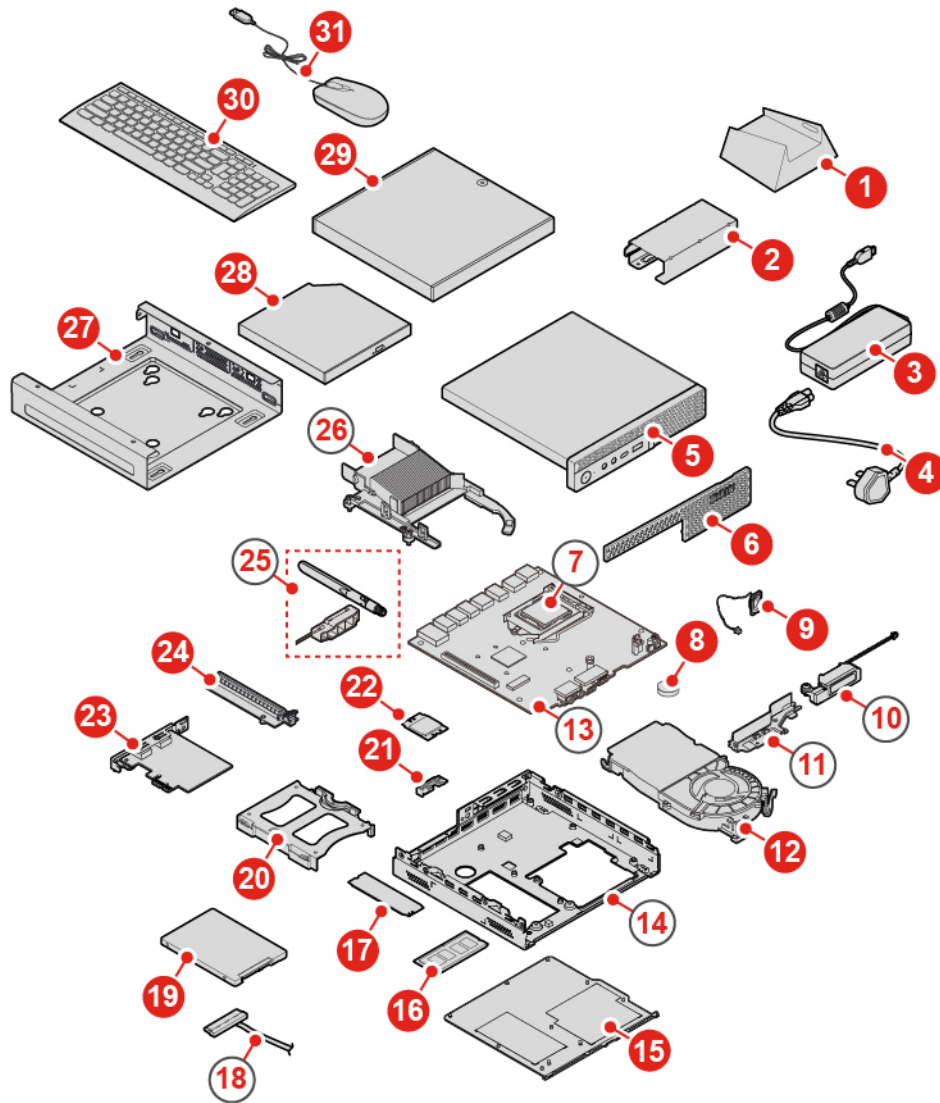


Figure 6. Locating FRUs (including CRUs)

Self-service CRUs	Optional-service CRUs	Non-CRUs
1 Vertical stand	8 Coin-cell battery	7 Microprocessor
2 Power adapter bracket	12 System fan	10 Advanced speaker
3 Power adapter	19 Storage drive	11 Antenna bracket
4 Power cord	20 Storage drive bracket	13 System board
5 Computer cover	21 Wi-Fi card shield	14 Chassis
6 Dust shield	22 Wi-Fi card	18 Storage drive cable
9 Internal speaker	23 PCI Express card	25 Wi-Fi antennas
15 Bottom cover	24 PCI Express card adapter	26 Heat sink

Self-service CRUs	Optional-service CRUs	Non-CRUs
<ul style="list-style-type: none"> 16 Memory module 17 M.2 solid-state drive 27 VESA® mount bracket 28 External optical drive 29 External optical drive box 30 Keyboard 31 Mouse 		

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.

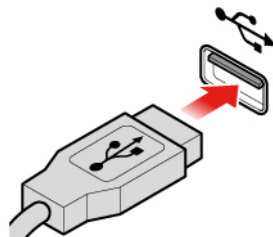


Figure 7. Replacing the keyboard

Replacing the wireless keyboard

1. 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.

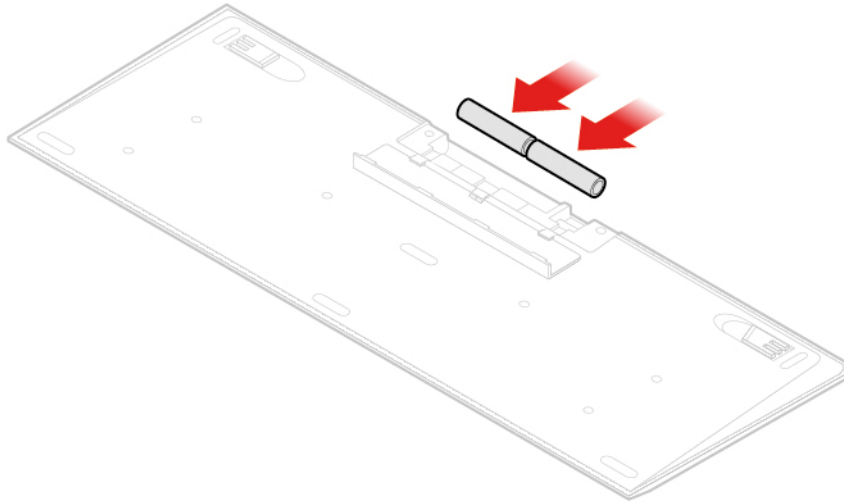


Figure 8. Replacing the wireless keyboard

4. Remove 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.

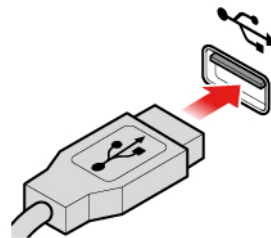


Figure 9. Replacing the mouse

Replacing the wireless mouse

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

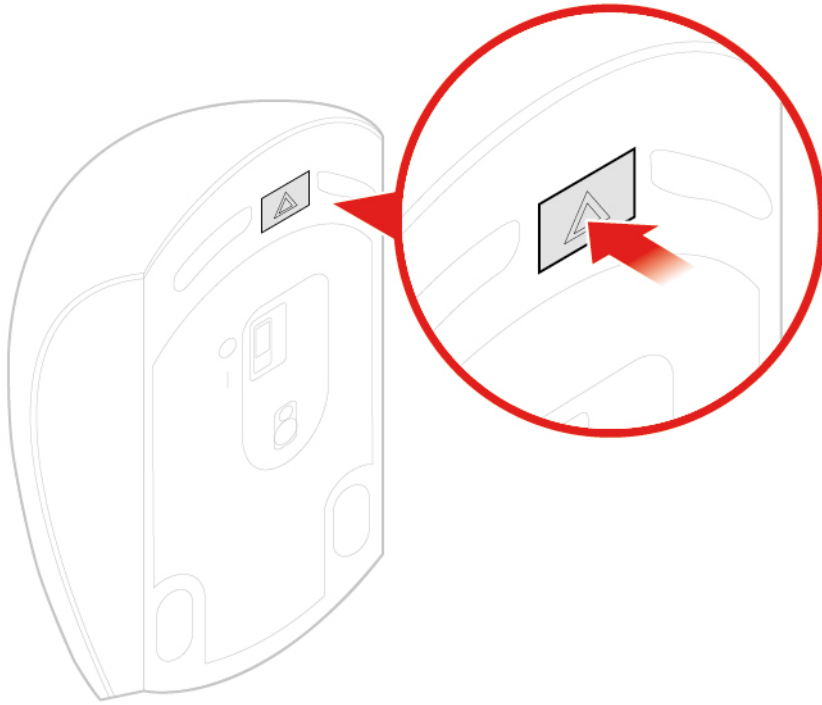


Figure 10. Opening the battery compartment

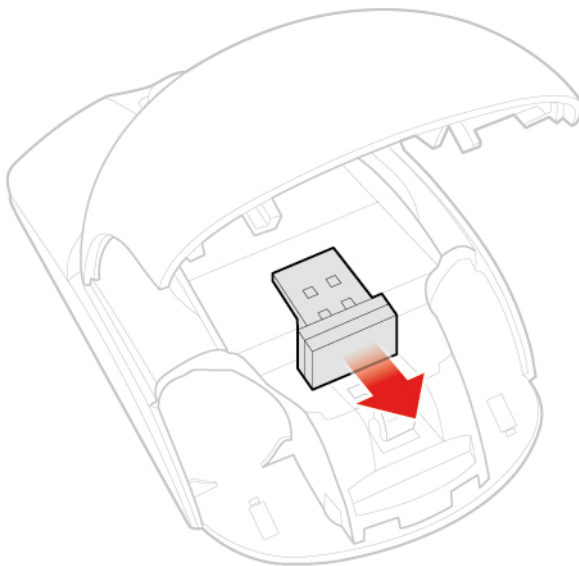


Figure 11. Taking out the USB dongle

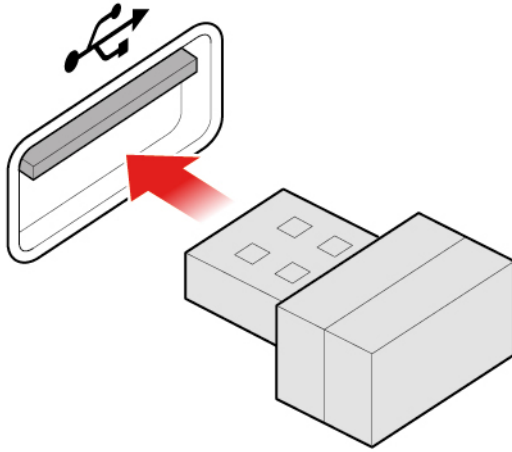


Figure 12. Connecting the USB dongle to a USB connector

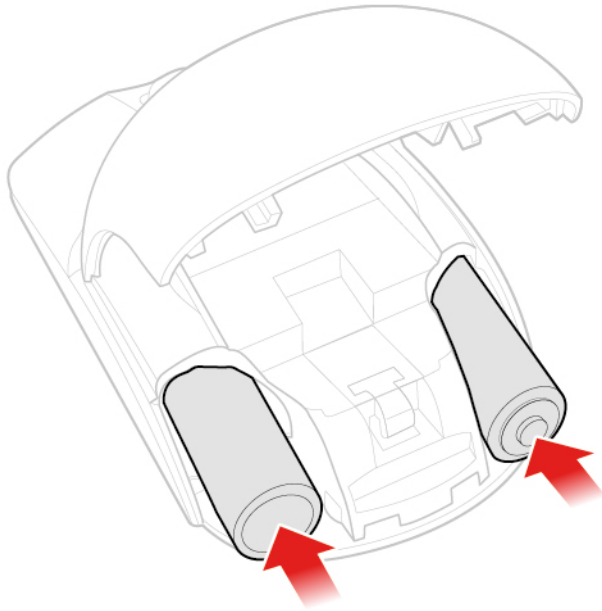


Figure 13. Installing the mouse batteries

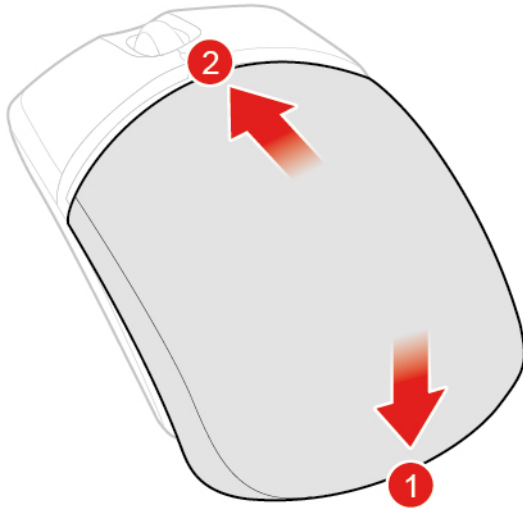


Figure 14. Closing the battery compartment cover

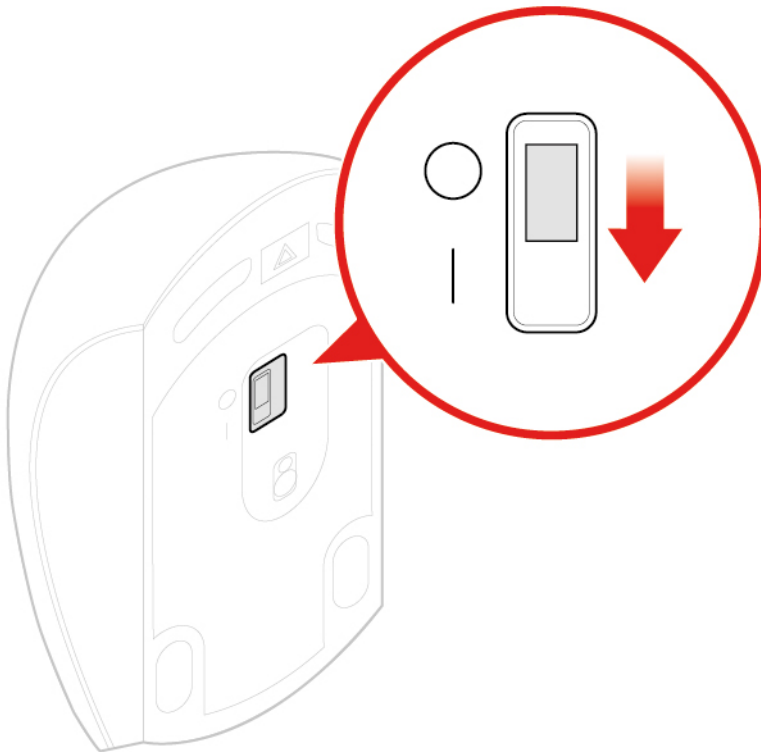


Figure 15. Pushing the power switch to the on position

Notes:

- The green LED indicates that the mouse is ready for use.
- The flashing amber LED indicates a low battery level.
- Push 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 adapter

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 adapter.

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

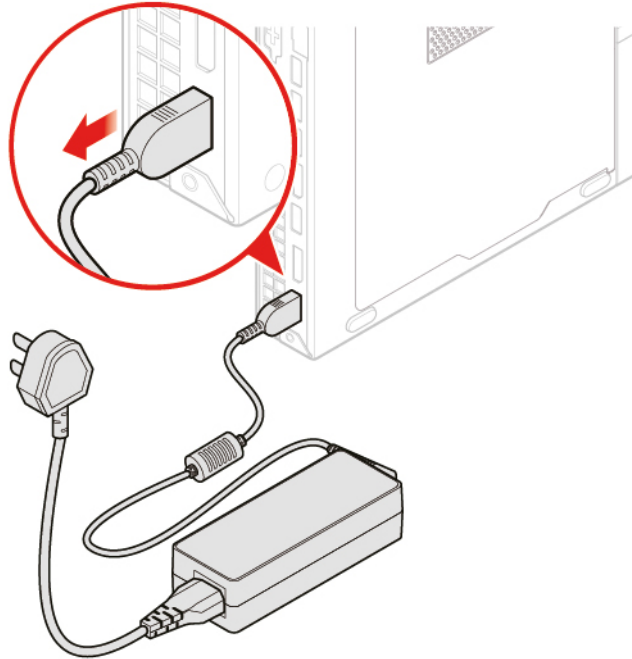


Figure 16. Removing the power adapter

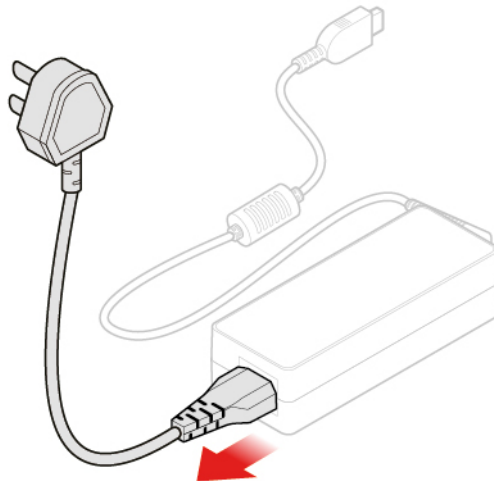


Figure 17. Removing the power cord

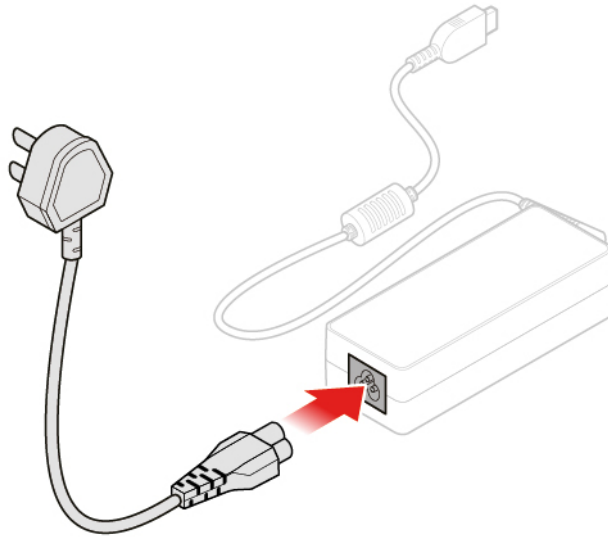


Figure 18. Installing the power cord

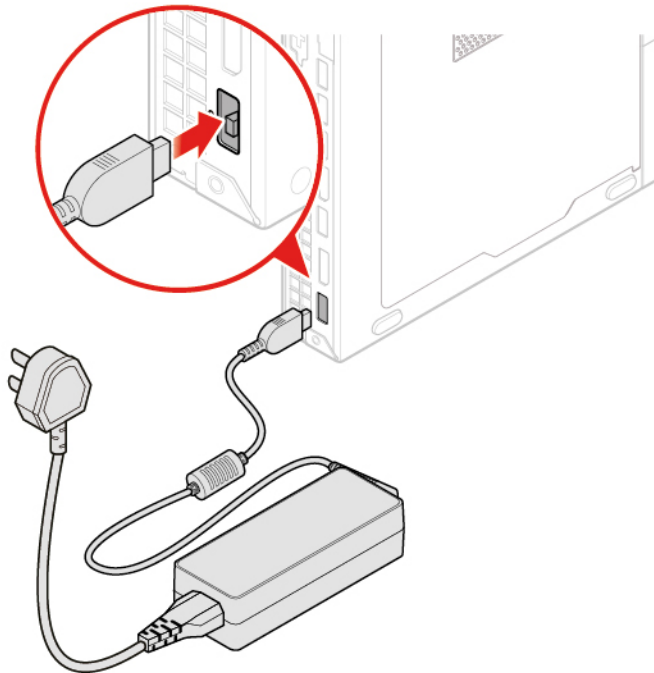


Figure 19. Installing the power adapter

Replacing the vertical stand

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.

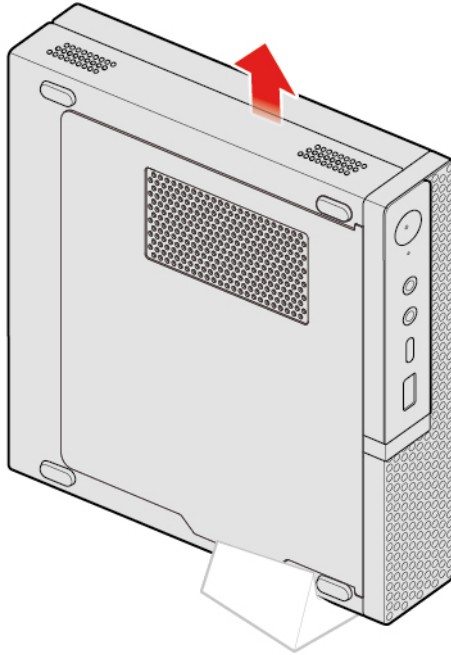


Figure 20. Removing the vertical stand

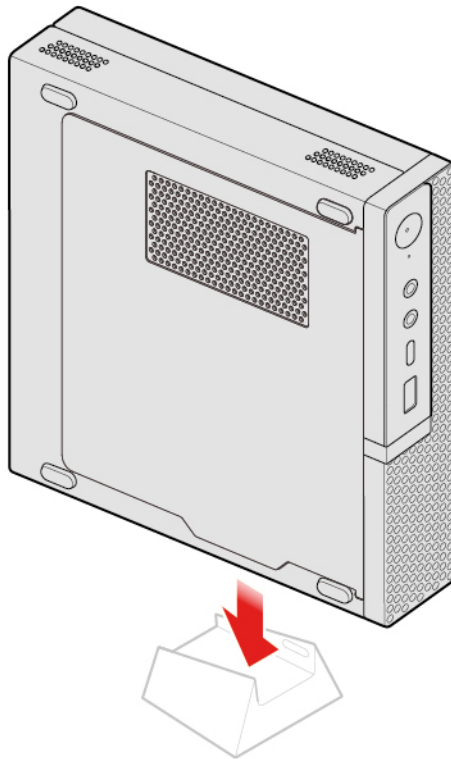


Figure 21. Installing the vertical stand

Replacing the VESA mount bracket

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

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

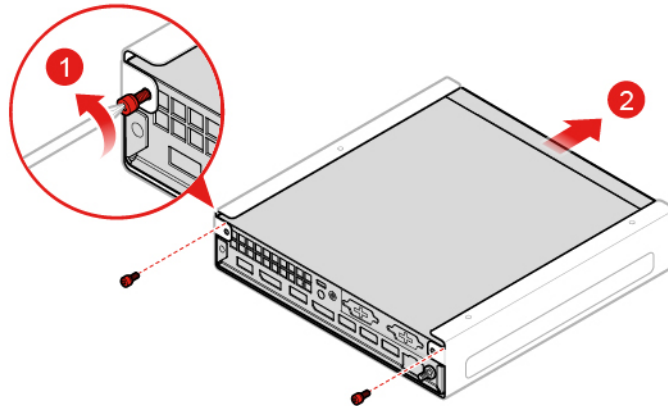


Figure 22. Removing the VESA mount bracket

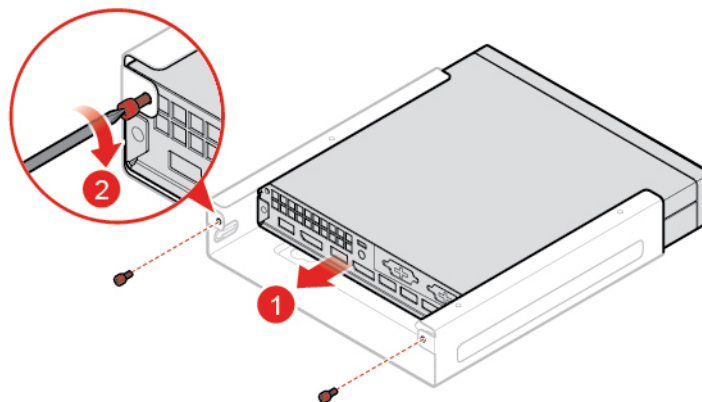


Figure 23. Installing the VESA mount bracket

Replacing the external optical drive

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

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

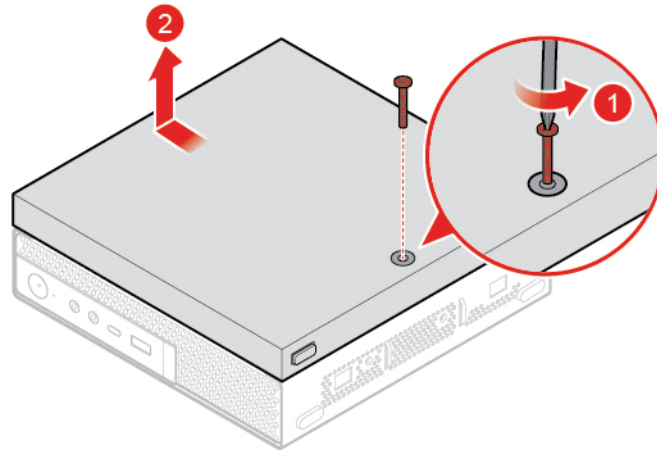


Figure 24. Removing the external optical drive box

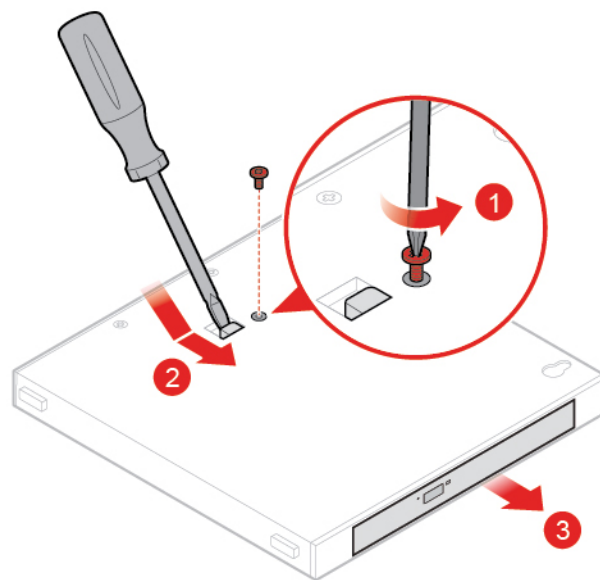


Figure 25. Removing the external optical drive

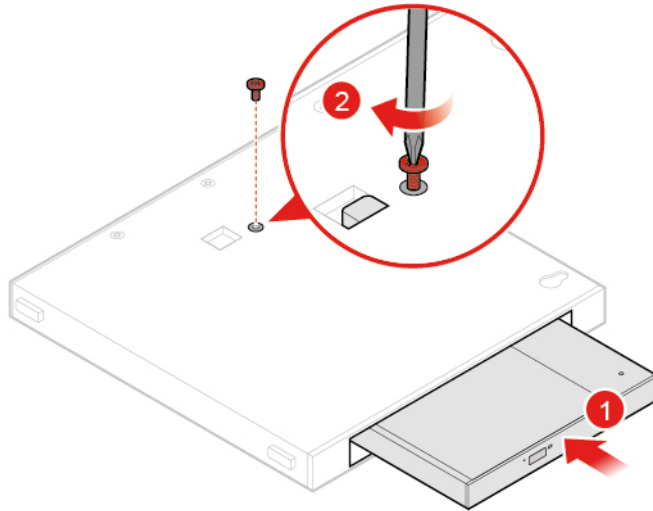


Figure 26. Installing the external optical drive

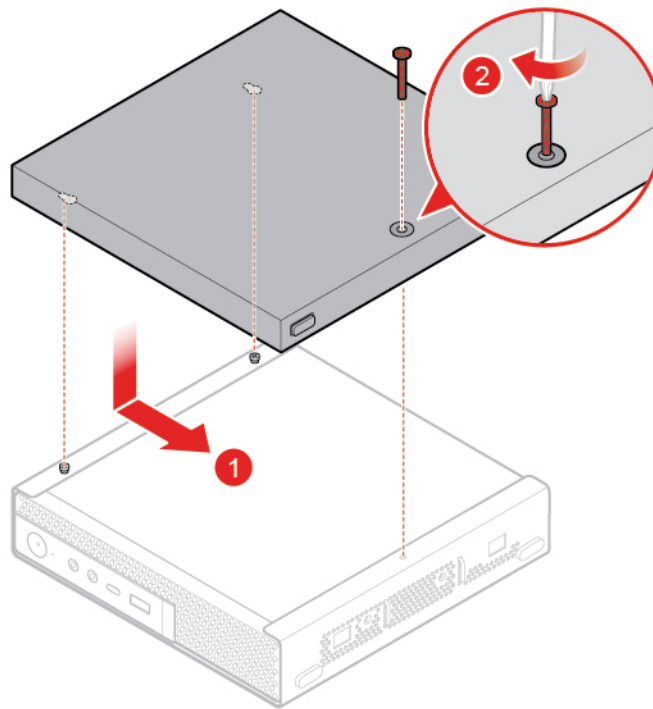


Figure 27. Installing the external optical drive box

Replacing the power adapter bracket

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

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

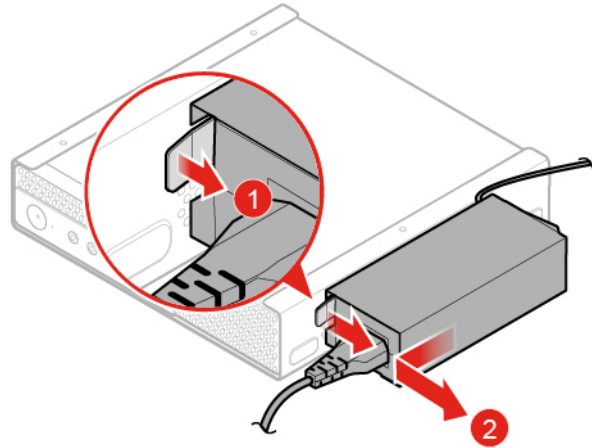


Figure 28. Removing the power adapter bracket

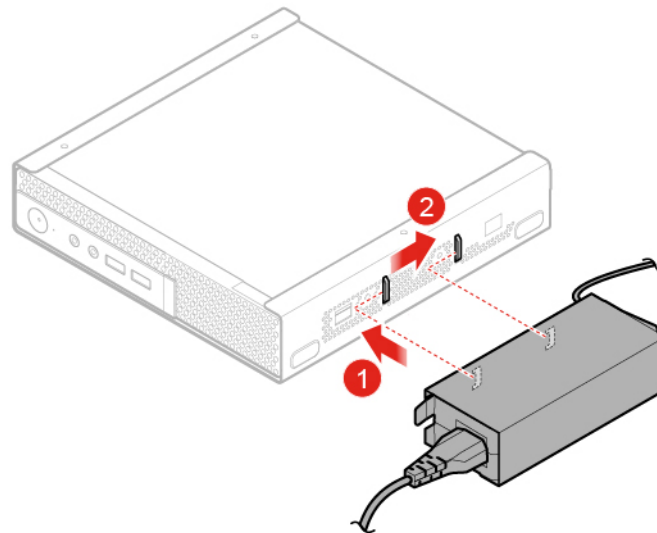


Figure 29. Installing the power adapter bracket

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 that are connected to the computer.
3. Remove computer cover.

Note: The dust shield is optional.

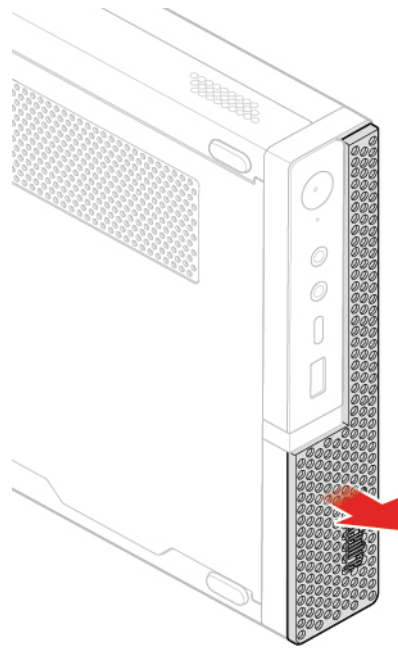


Figure 30. Removing the dust shield

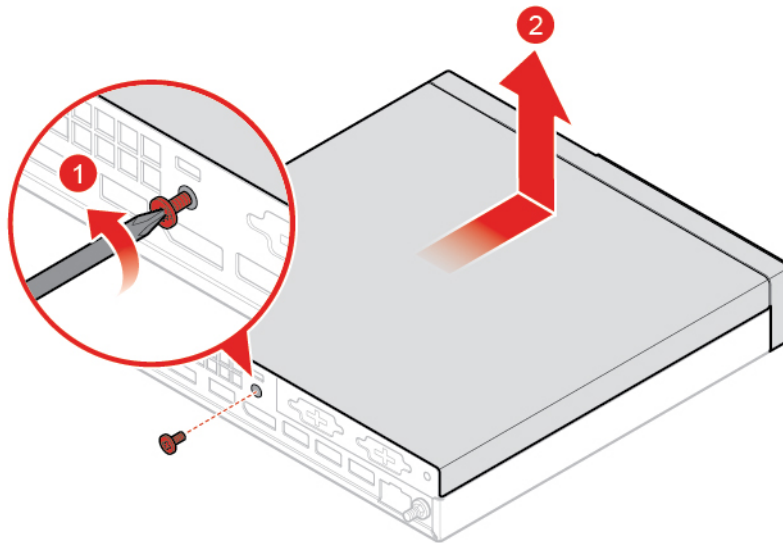


Figure 31. Removing the computer cover

Replacing the storage drive

Note: The storage drive is optional.

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 25.
2. Disconnect the storage drive cable from the system board.
3. Replace the storage drive.

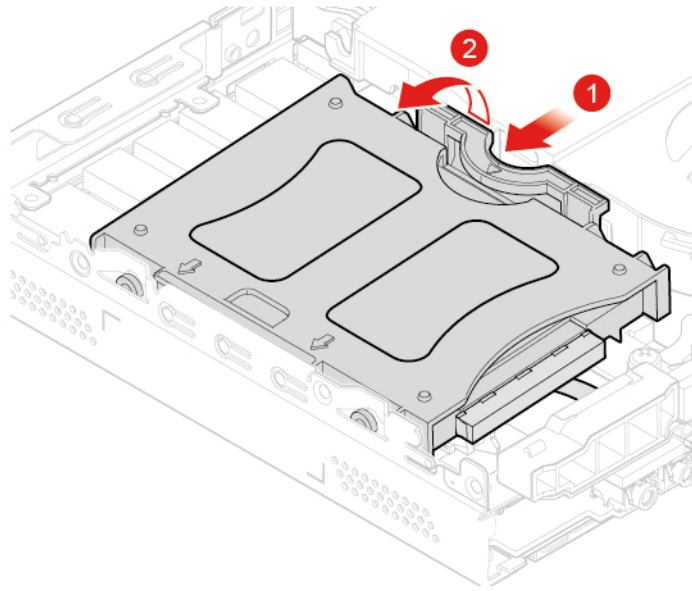


Figure 32. Removing the storage drive bracket

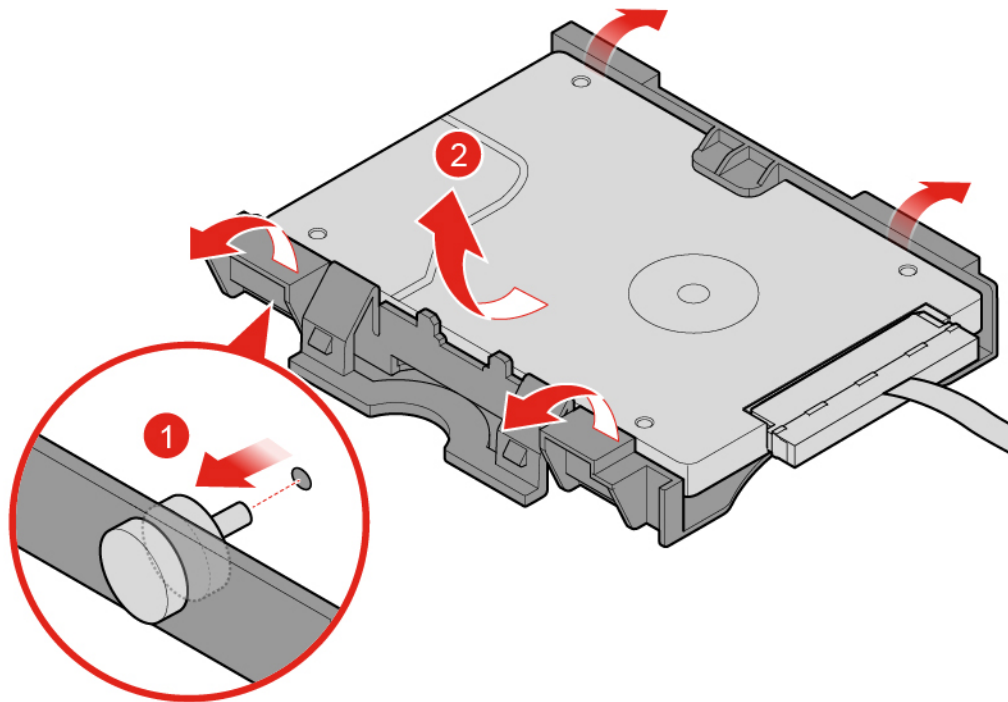


Figure 33. Removing the storage drive

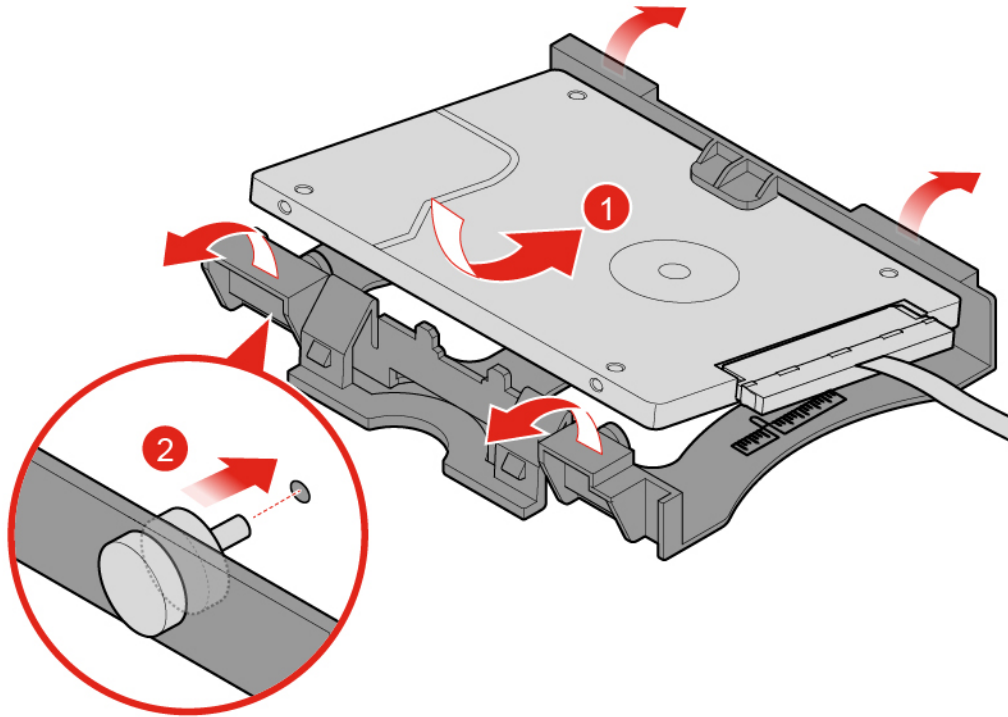


Figure 34. Installing the storage drive

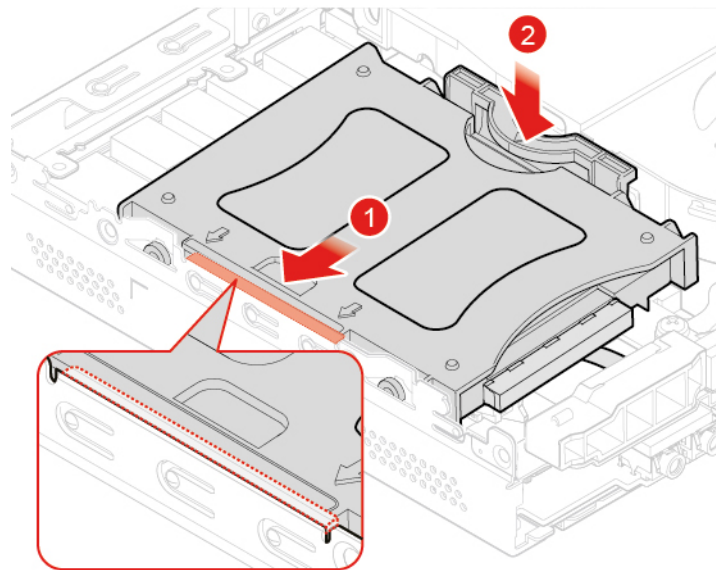


Figure 35. Installing the storage drive bracket

4. Connect the storage drive cable to the system board.
5. Complete the replacement. See “Completing the parts replacement” on page 56.

Replacing the storage drive 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 25.
2. Remove the storage drive. See “Replacing the storage drive” on page 26.
3. Replace the storage drive cable.

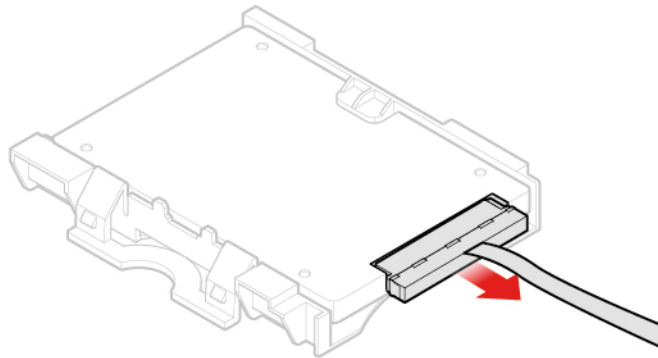


Figure 36. Removing the storage drive cable

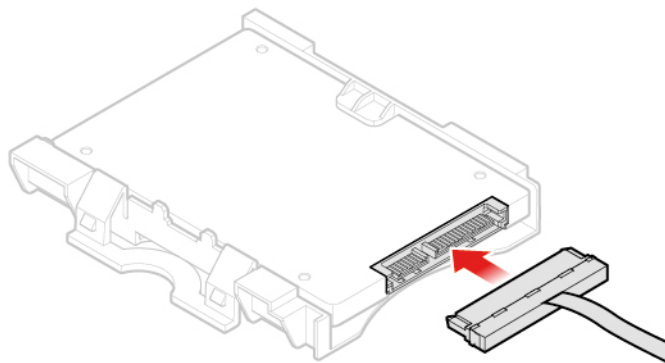


Figure 37. Installing the storage drive cable

4. Complete the replacement. See “Completing the parts replacement” on page 56.

Replacing the PCI Express card and PCI Express card adapter

Note: The PCI Express card is optional.

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 25.
2. Replace the PCI Express card and PCI Express card adapter.

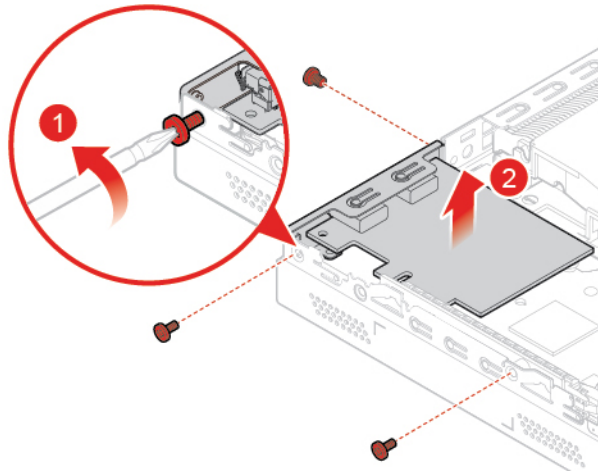


Figure 38. Removing the PCI Express card

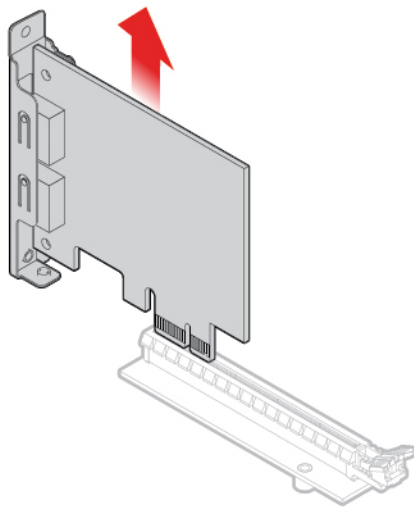


Figure 39. Removing the PCI Express card adapter

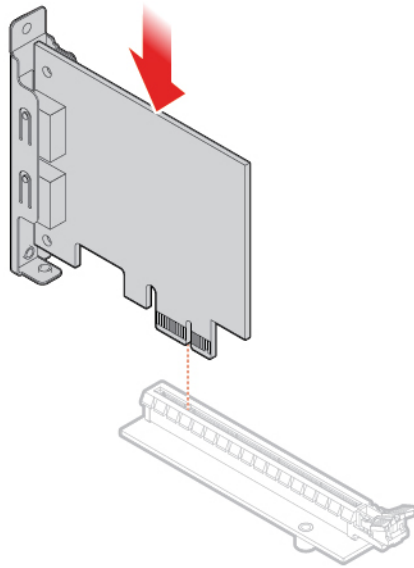


Figure 40. Installing the PCI Express card adapter

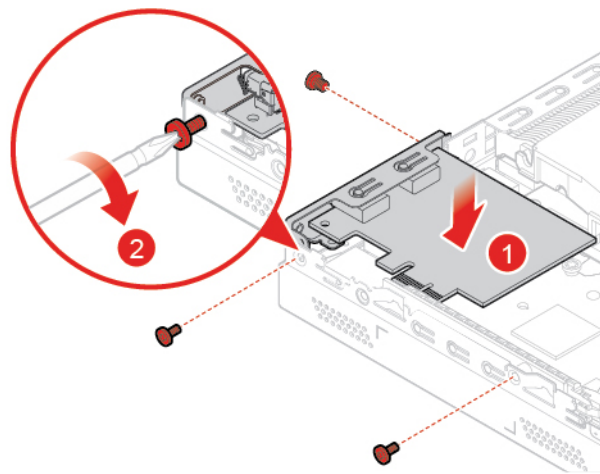


Figure 41. Installing the PCI Express card

3. Complete the replacement. See “Completing the parts replacement” on page 56.

Replacing the internal speaker

Note: The internal speaker is optional.

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 25.
2. Disconnect the internal speaker cable from the internal speaker connector on the system board.
3. Replace the internal speaker.

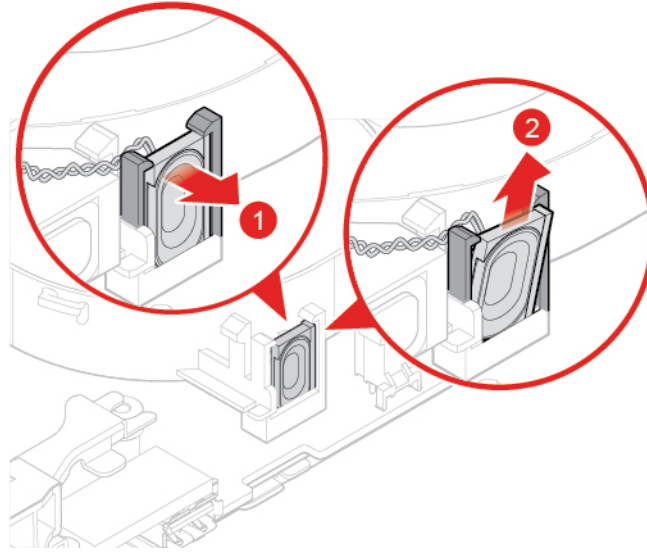


Figure 42. Removing the internal speaker

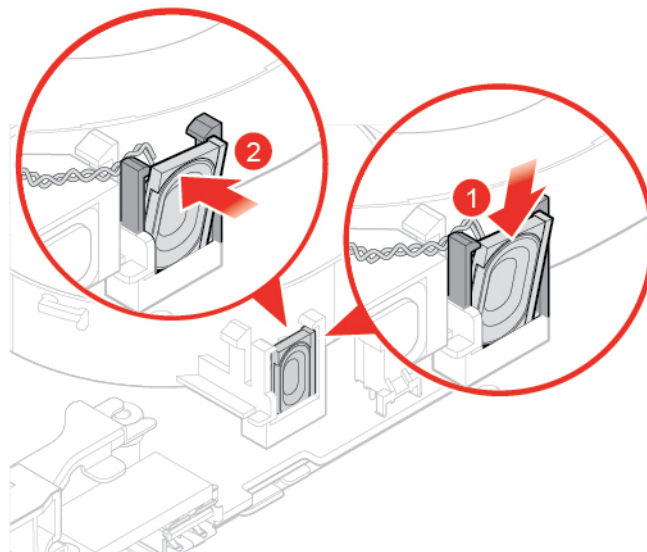


Figure 43. Installing the internal speaker

4. Connect the internal speaker cable to the internal speaker connector on the system board.
5. Complete the replacement. See “Completing the parts replacement” on page 56.

Replacing the advanced speaker

Note: The advanced speaker is optional.

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 25.
2. Replace the advanced speaker.

Note: Ensure that you disconnect or connect the advanced speaker cable during the replacement.

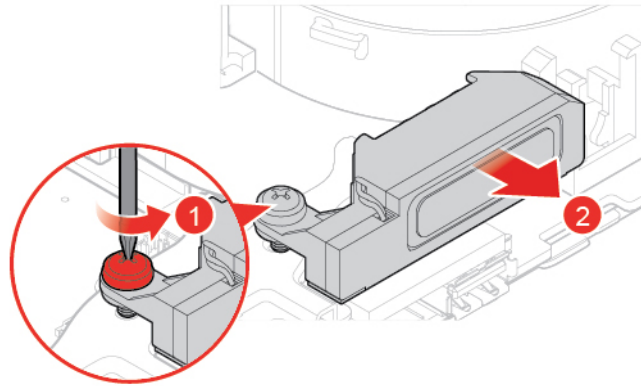


Figure 44. Removing the advanced speaker

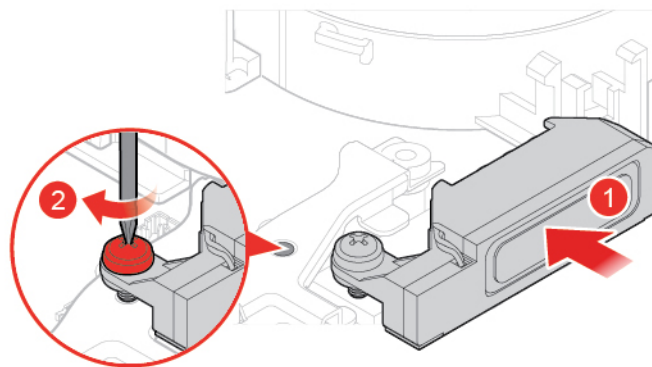


Figure 45. Installing the advanced speaker

3. Complete the replacement. See “Completing the parts replacement” on page 56.

Replacing the system 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 25.
2. Remove the storage drive or PCI Express card. See “Replacing the storage drive” on page 26 or “Replacing the PCI Express card and PCI Express card adapter” on page 29.
3. Remove the internal speaker if necessary. See “Replacing the internal speaker” on page 31.
4. Disconnect the system fan cable from the system fan connector on the system board.
5. Replace the system fan.

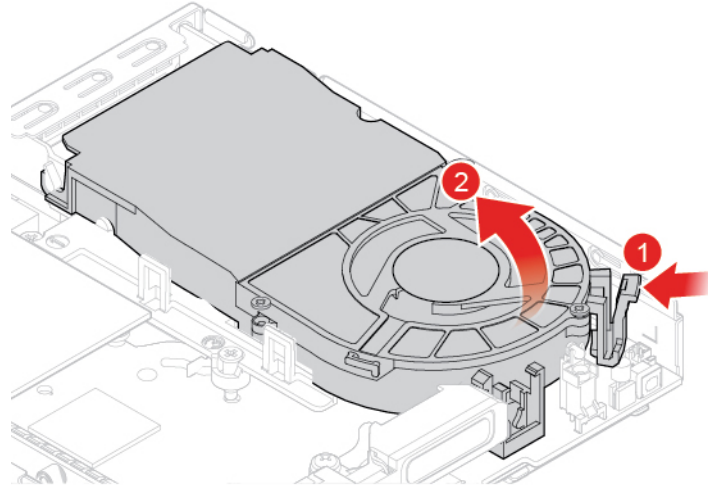


Figure 46. Removing the system fan

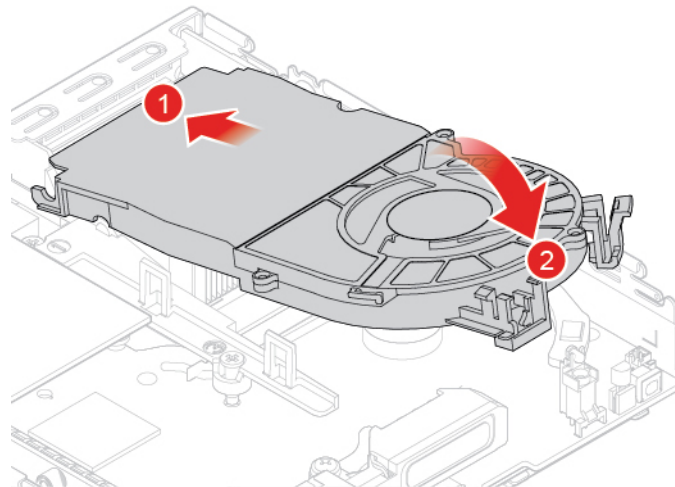


Figure 47. Installing the system fan

6. Connect the system fan cable to the system fan connector on the system board.
7. Complete the replacement. See “Completing the parts replacement” on page 56.

Replacing the heat sink

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

CAUTION:



The heat sink 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 25.
2. Remove the storage drive or PCI Express card. See “Replacing the storage drive” on page 26 or “Replacing the PCI Express card and PCI Express card adapter” on page 29.
3. Remove the internal speaker if necessary. See “Replacing the internal speaker” on page 31.

4. Remove the system fan. See “Replacing the system fan” on page 33.
5. Replace the heat sink.

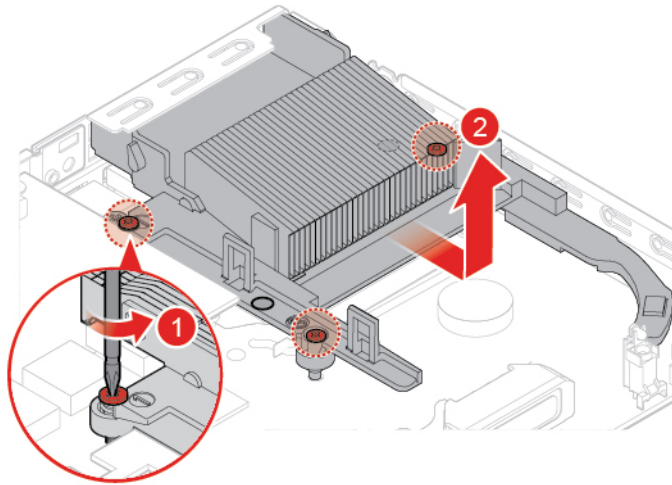


Figure 48. Removing the heat sink

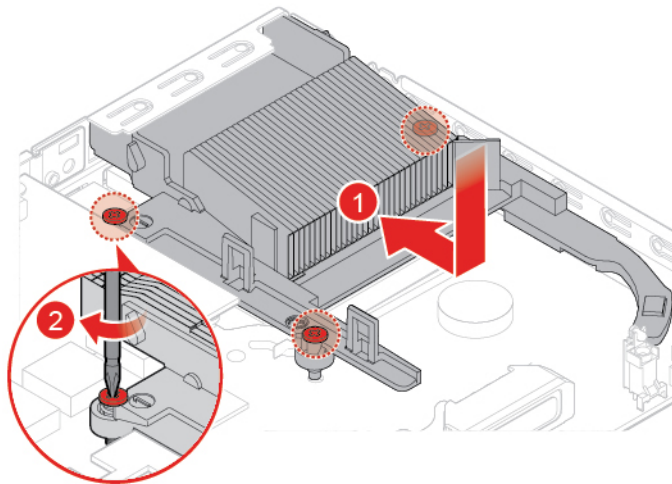


Figure 49. Installing the heat sink

6. Complete the replacement. See “Completing the parts replacement” on page 56.

Replacing the coin-cell battery

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

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

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

1. Remove the computer cover. See “Removing the computer cover” on page 25.
2. Remove the storage drive or PCI Express card. See “Replacing the storage drive” on page 26 or “Replacing the PCI Express card and PCI Express card adapter” on page 29.
3. Remove the internal speaker if necessary. See “Replacing the internal speaker” on page 31.
4. Remove the system fan. See “Replacing the system fan” on page 33.
5. Replace the coin-cell battery.

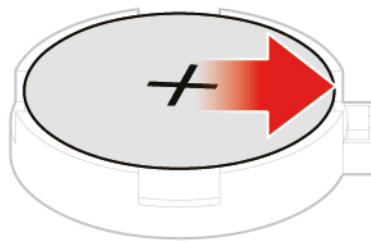


Figure 50. Pressing the metallic tab

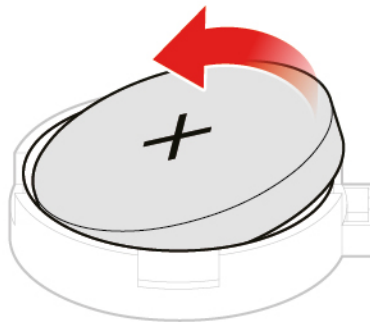


Figure 51. Removing the coin-cell battery

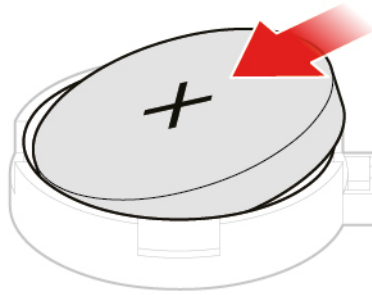


Figure 52. Installing the coin-cell battery

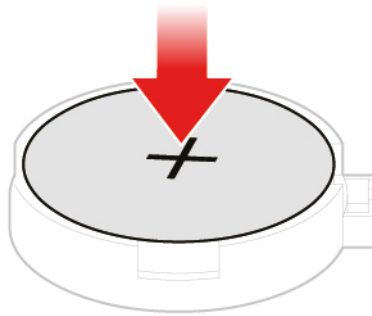


Figure 53. Pressing the coin-cell battery downward

6. Complete the replacement. See “Completing the parts replacement” on page 56.

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

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 25.

2. Remove the storage drive or PCI Express card. See “Replacing the storage drive” on page 26 or “Replacing the PCI Express card and PCI Express card adapter” on page 29.
3. Remove the internal speaker if necessary. See “Replacing the internal speaker” on page 31.
4. Remove the system fan. See “Replacing the system fan” on page 33.
5. Remove the heat sink. See “Replacing the heat sink” on page 34.
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.

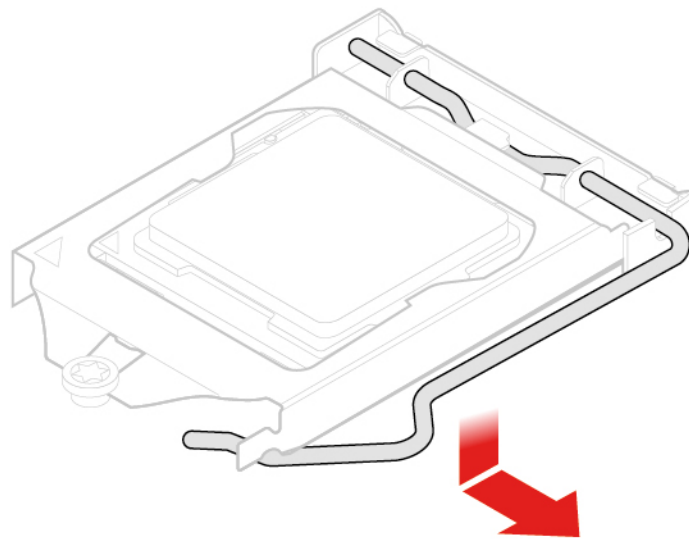


Figure 54. Unlocking the microprocessor socket retainer

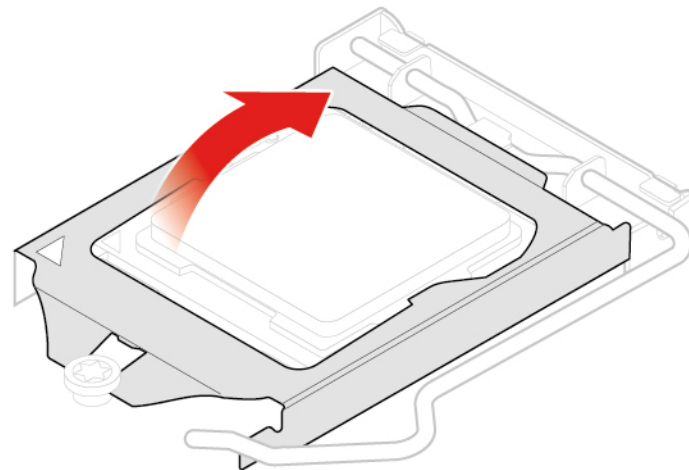


Figure 55. Pivoting the microprocessor socket upward

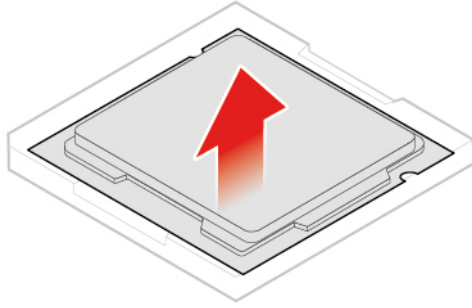


Figure 56. Removing the microprocessor

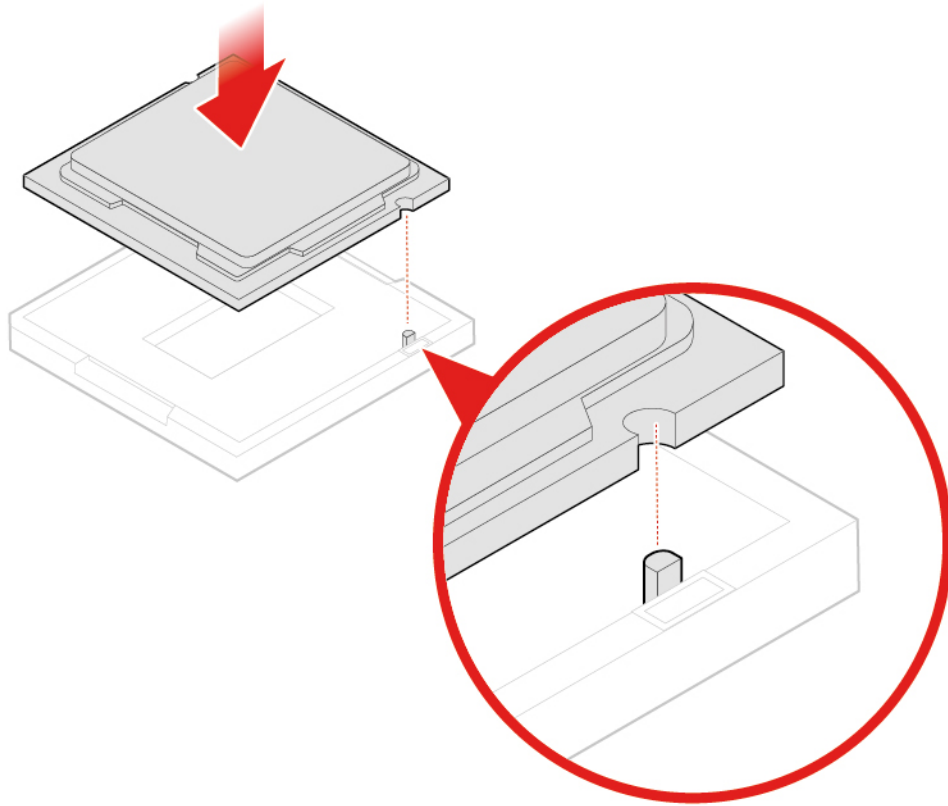


Figure 57. Installing the microprocessor

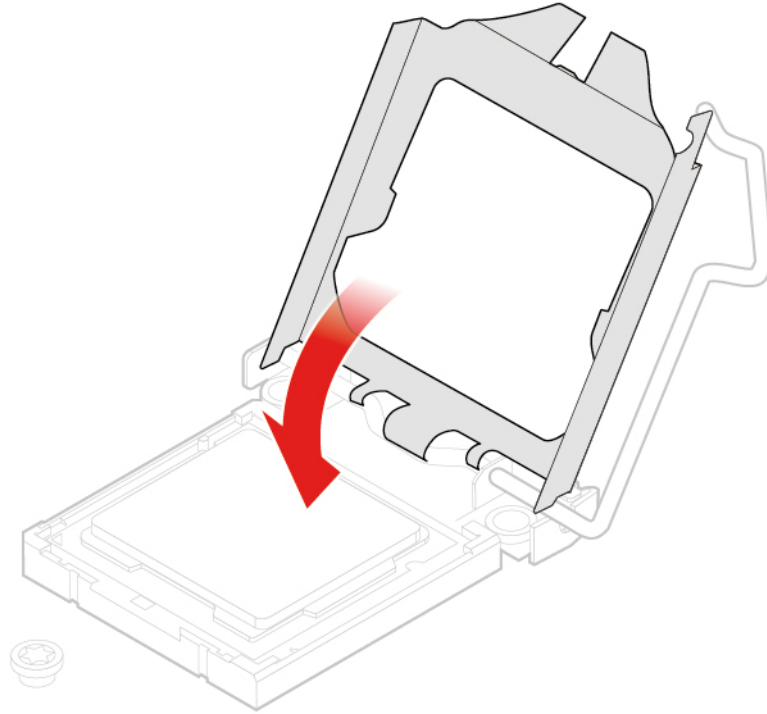


Figure 58. Pivoting the microprocessor socket downward

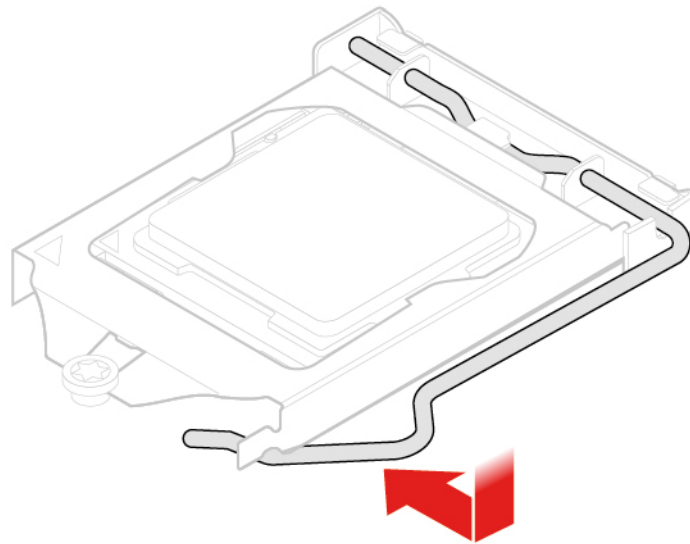


Figure 59. Locking the microprocessor socket retainer

7. Complete the replacement. See “Completing the parts replacement” on page 56.

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 25.

2. Remove the storage drive or PCI Express card. See “Replacing the storage drive” on page 26 or “Replacing the PCI Express card and PCI Express card adapter” on page 29.
3. Depending on your computer model, refer to one of the following to replace the Wi-Fi card.
 - Type 1

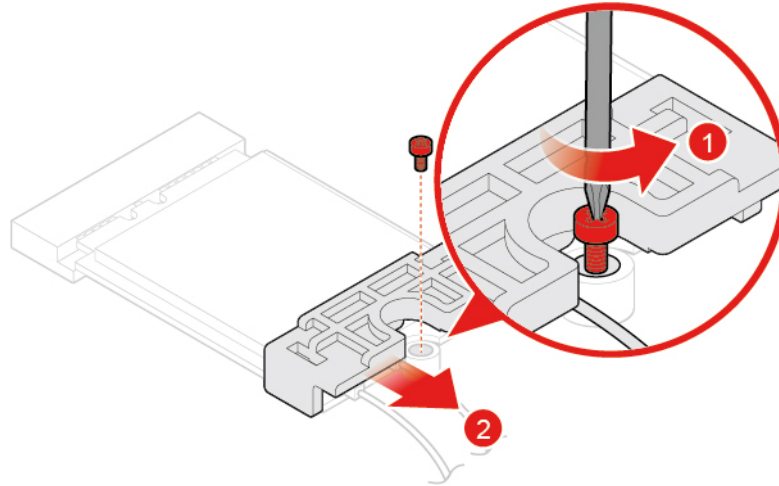


Figure 60. Removing the Wi-Fi card shield

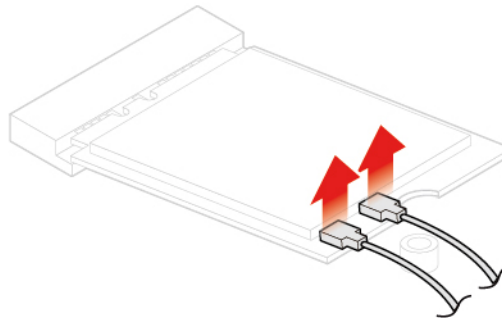


Figure 61. Disconnecting the Wi-Fi antennas

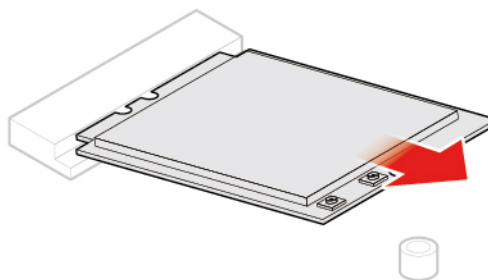


Figure 62. Removing the Wi-Fi card

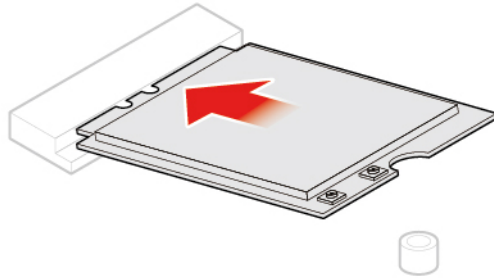


Figure 63. Installing the Wi-Fi card

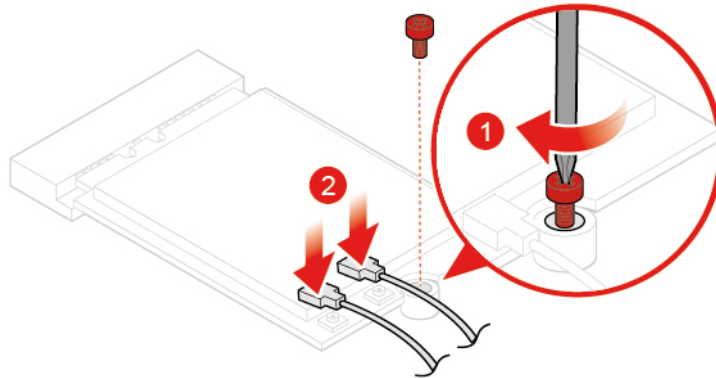


Figure 64. Connecting the Wi-Fi antennas

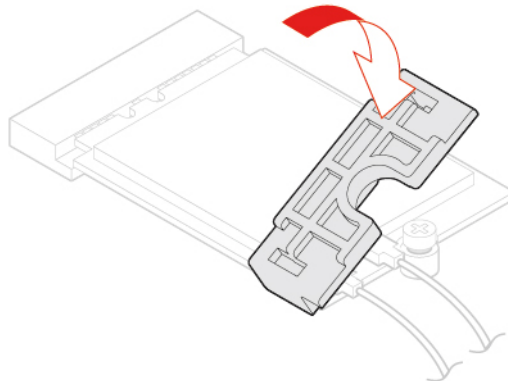


Figure 65. Installing the Wi-Fi card shield

- Type 2

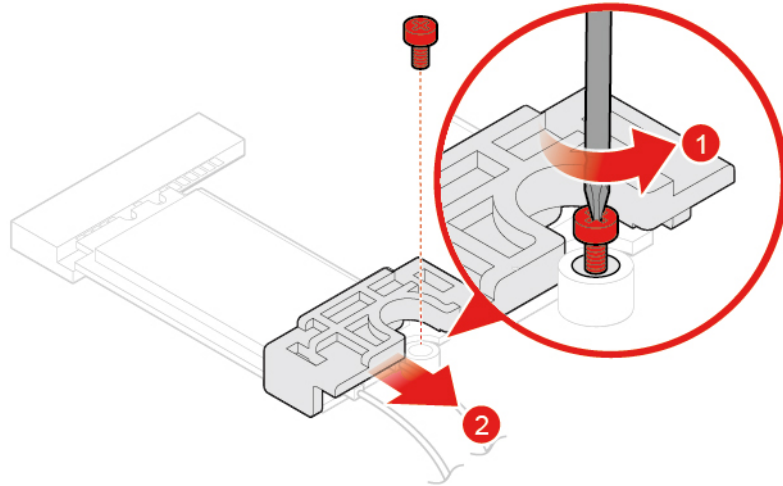


Figure 66. Removing the Wi-Fi card shield

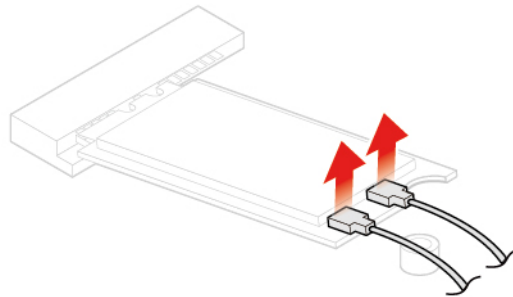


Figure 67. Disconnecting the Wi-Fi antennas

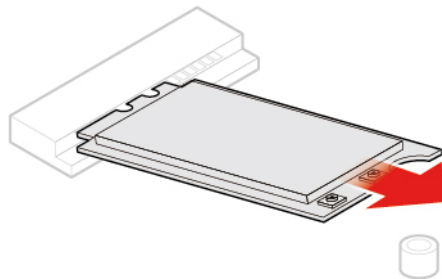


Figure 68. Removing the Wi-Fi card

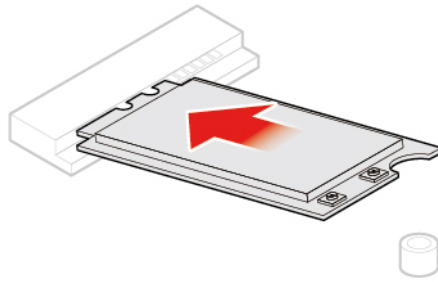


Figure 69. Installing the Wi-Fi card

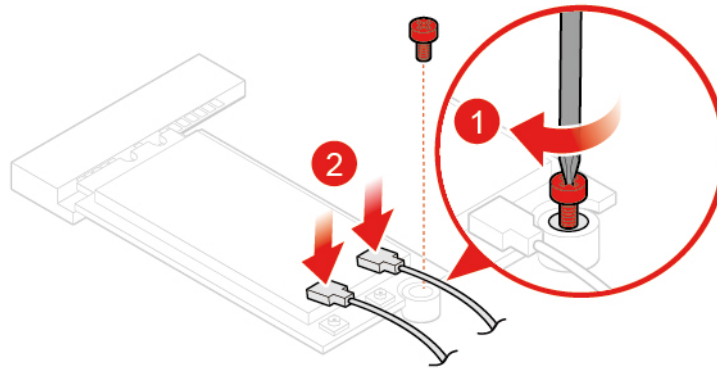


Figure 70. Connecting the Wi-Fi antennas

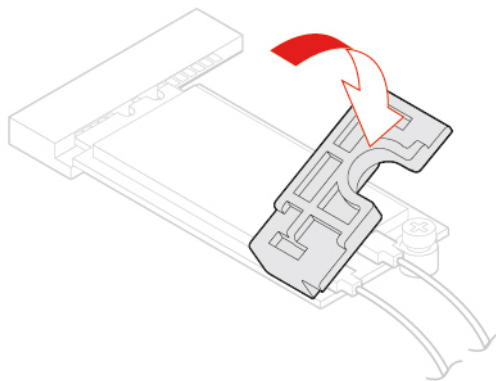


Figure 71. Installing the Wi-Fi card shield

4. Complete the replacement. See “Completing the parts replacement” on page 56.

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 25.

2. Remove the storage drive or PCI Express card. See “Replacing the storage drive” on page 26 or “Replacing the PCI Express card and PCI Express card adapter” on page 29.
3. Replace the front Wi-Fi antenna.

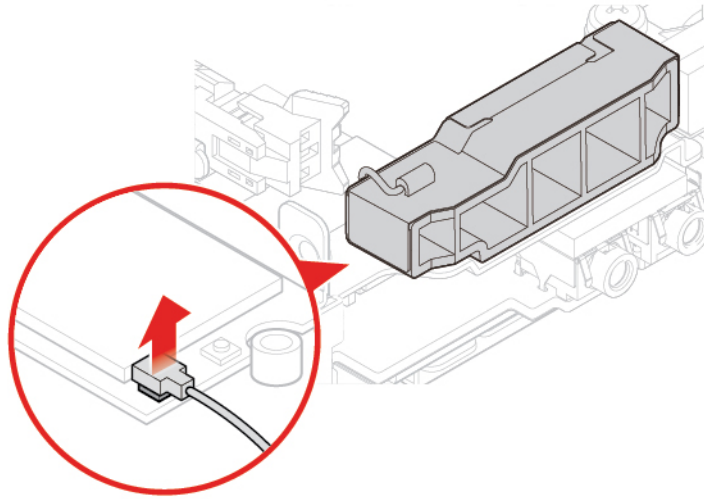


Figure 72. Disconnecting the front Wi-Fi antenna cable from the Wi-Fi card

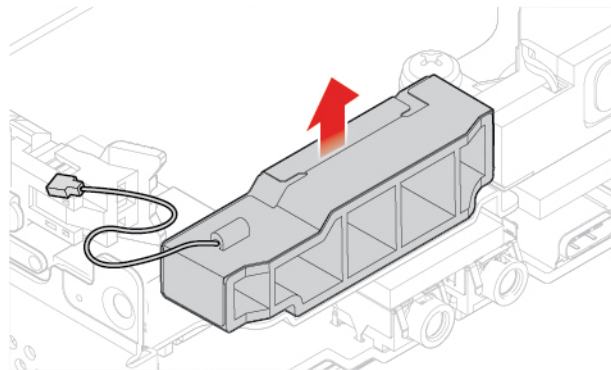


Figure 73. Removing the front Wi-Fi antenna

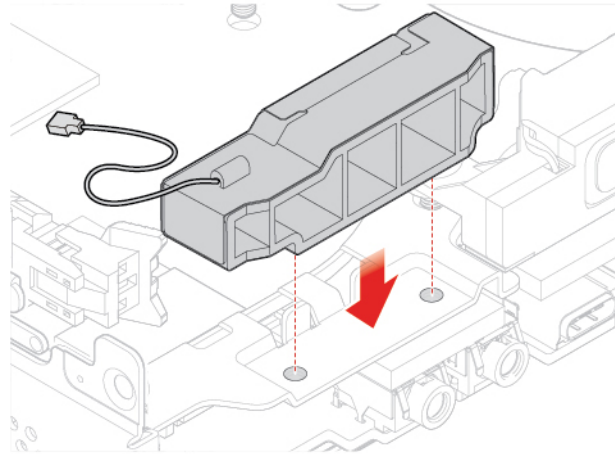


Figure 74. Installing the front Wi-Fi antenna

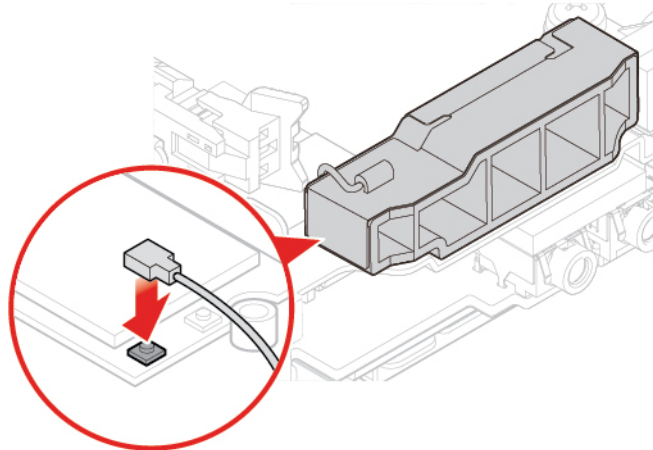


Figure 75. Connecting the front Wi-Fi antenna cable to the Wi-Fi card

4. Complete the replacement. See “Completing the parts replacement” on page 56.

Replacing the rear Wi-Fi antenna

1. Remove the computer cover. See “Removing the computer cover” on page 25.
2. Remove the storage drive or PCI Express card. See “Replacing the storage drive” on page 26 or “Replacing the PCI Express card and PCI Express card adapter” on page 29.
3. Disconnect the rear Wi-Fi antenna cable from the Wi-Fi card.
4. Replace the rear Wi-Fi antenna.

Note: Record the cable routing before removing the rear Wi-Fi antenna cable.

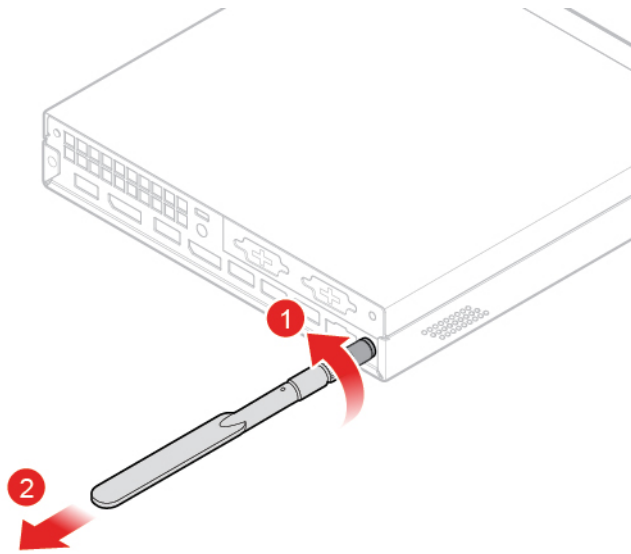


Figure 76. Removing the rear Wi-Fi antenna

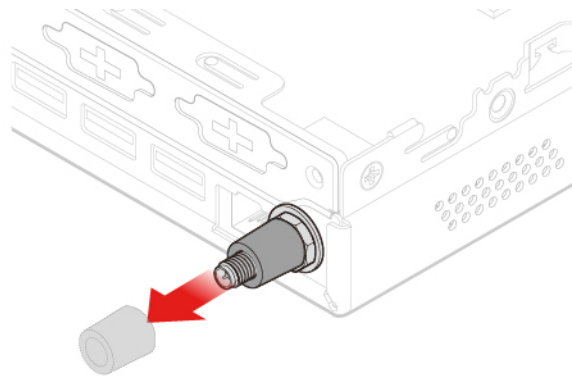


Figure 77. Removing the antenna cover that secures the rear Wi-Fi antenna cable

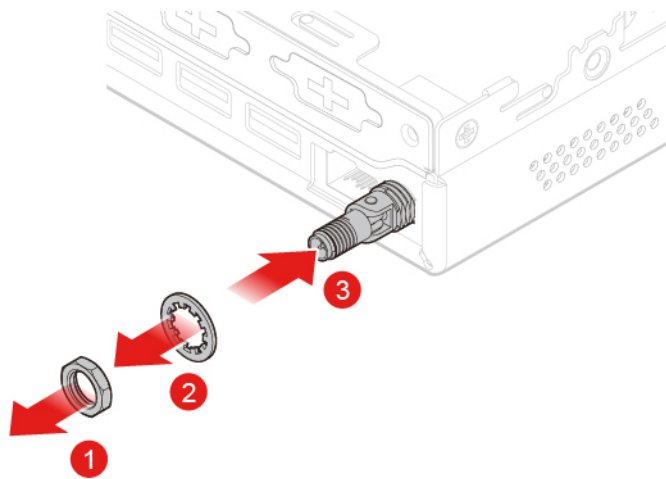


Figure 78. Removing the rear Wi-Fi antenna cable

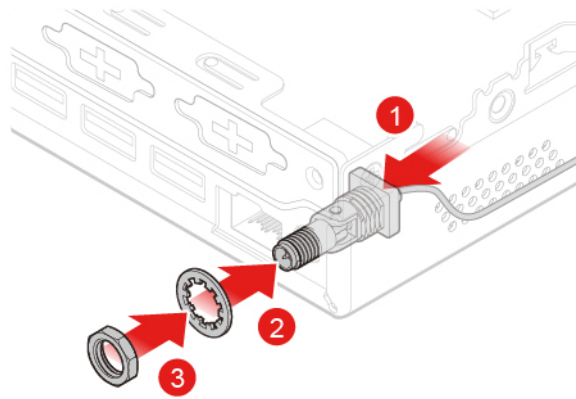


Figure 79. Installing the rear Wi-Fi antenna cable

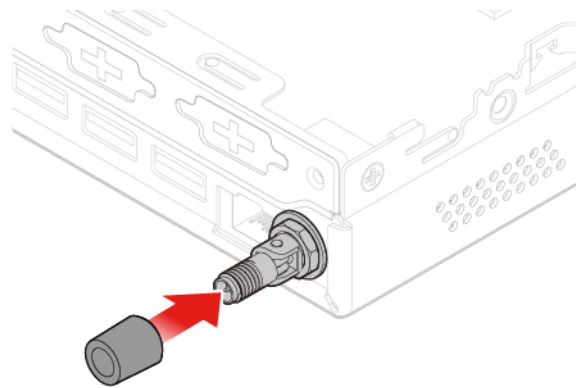


Figure 80. Installing the antenna cover to secure the rear Wi-Fi antenna cable

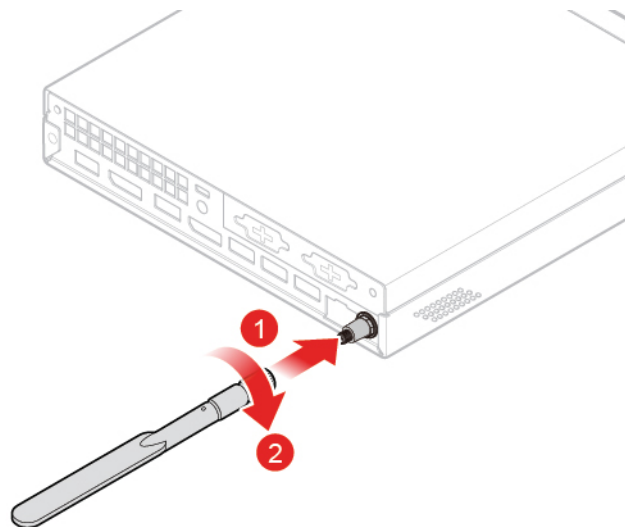


Figure 81. Installing the rear Wi-Fi antenna

5. Connect the rear Wi-Fi antenna cable to the Wi-Fi card.
6. Complete the replacement. See “Completing the parts replacement” on page 56.

Replacing the antenna 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 25.
2. Remove the storage drive if necessary. See “Replacing the storage drive” on page 26.
3. Remove the advanced speaker if necessary. See “Replacing the advanced speaker” on page 32.
4. Remove the front Wi-Fi antenna. See “Replacing the Wi-Fi antennas” on page 44.
5. Replace the antenna bracket.

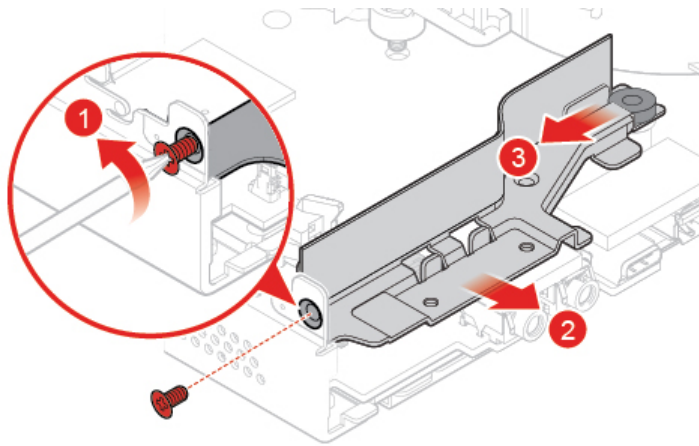


Figure 82. Removing the antenna bracket

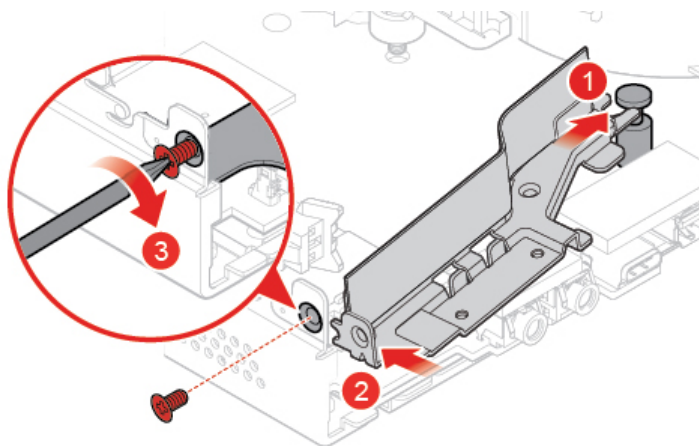


Figure 83. Installing the antenna bracket

6. Complete the replacement. See “Completing the parts replacement” on page 56.

Replacing the bottom cover

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 25.

2. Replace the bottom cover.

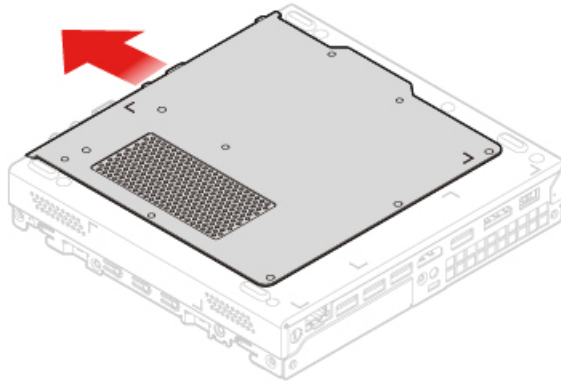


Figure 84. Removing the bottom cover

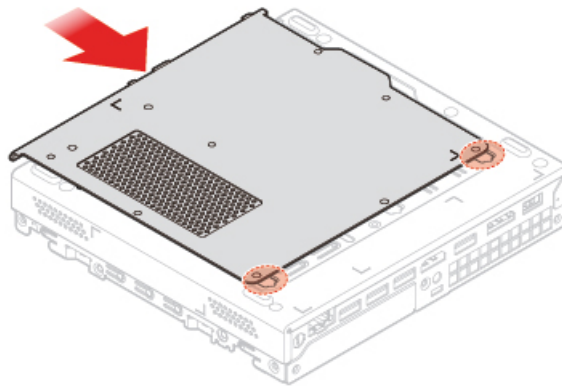


Figure 85. Installing the bottom cover

3. Complete the replacement. See “Completing the parts replacement” on page 56.

Replacing the memory module

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

If your computer supports one memory module, install the module into the DIMM 1 slot. If your computer supports two memory modules, install one memory module into the DIMM 1 slot first and then install the other into the DIMM 2 slot.

1. Remove the computer cover. See “Removing the computer cover” on page 25.
2. Remove the bottom cover. See “Replacing the bottom cover” on page 49.
3. Replace the memory module.

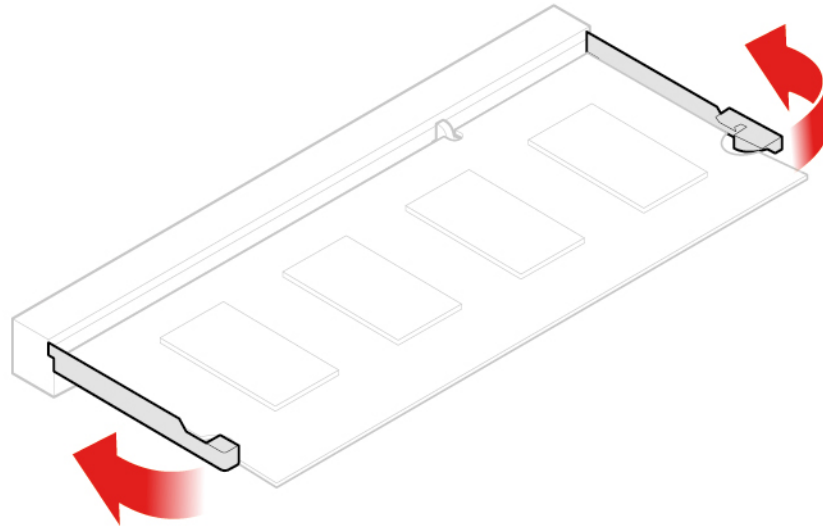


Figure 86. Opening the memory module retainer

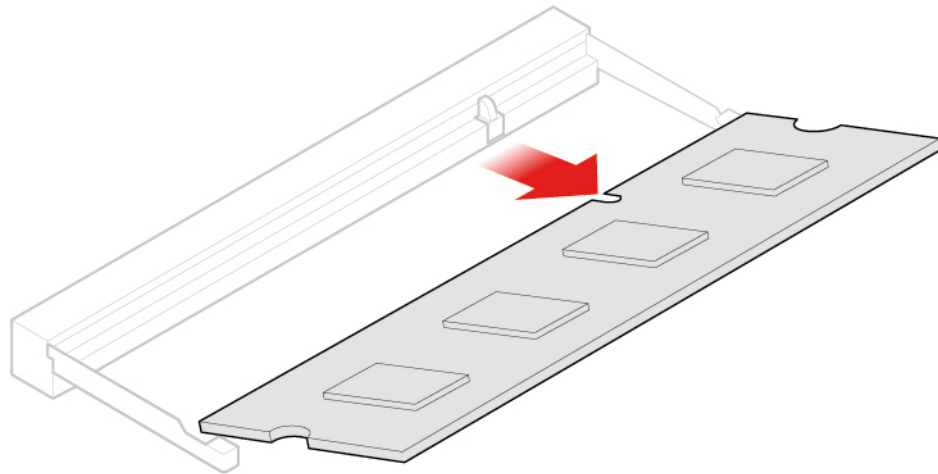


Figure 87. Removing the memory module

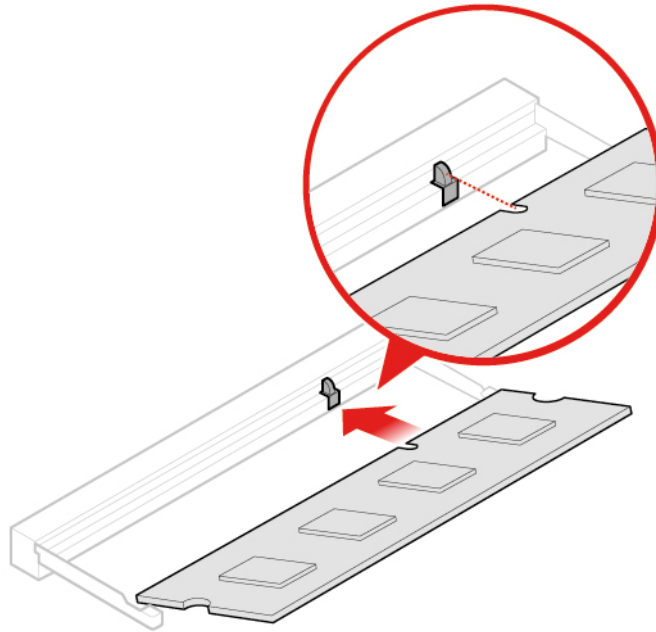


Figure 88. Installing the memory module

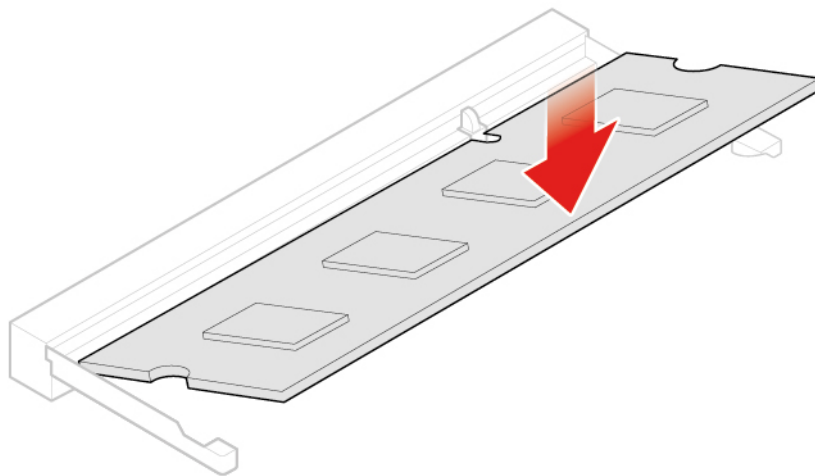


Figure 89. Closing the memory module retainer

4. Complete the replacement. See “Completing the parts replacement” on page 56.

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 25.
2. Remove the bottom cover. See “Replacing the bottom cover” on page 49.
3. Replace the M.2 solid-state drive.

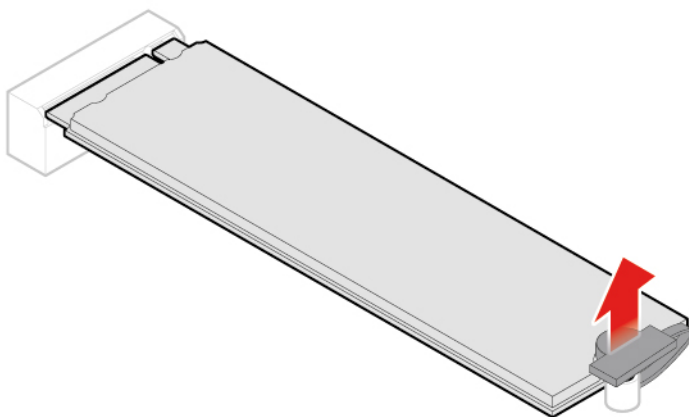


Figure 90. Unlocking the M.2 solid-state drive clip

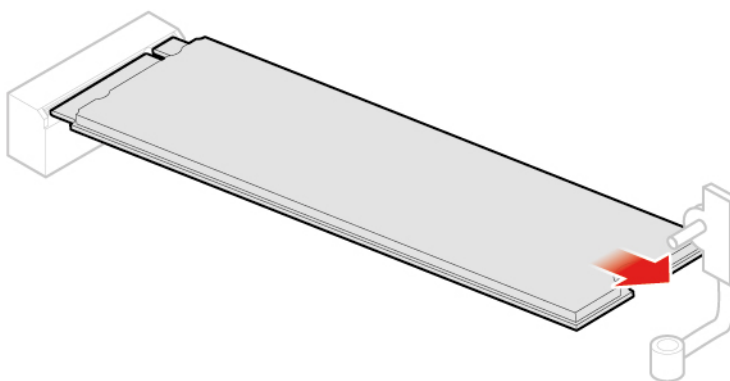


Figure 91. Removing the M.2 solid-state drive

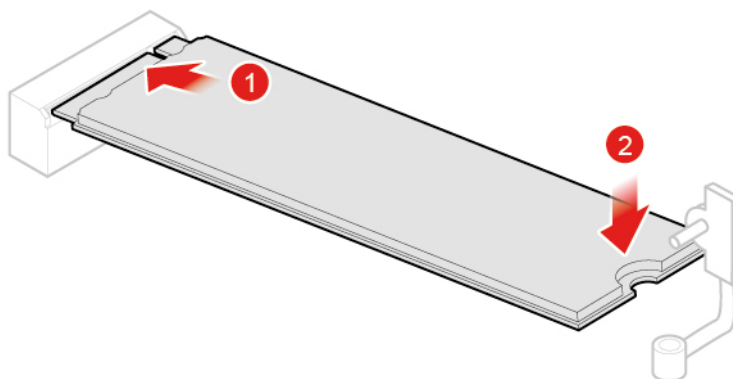


Figure 92. Installing the M.2 solid-state drive

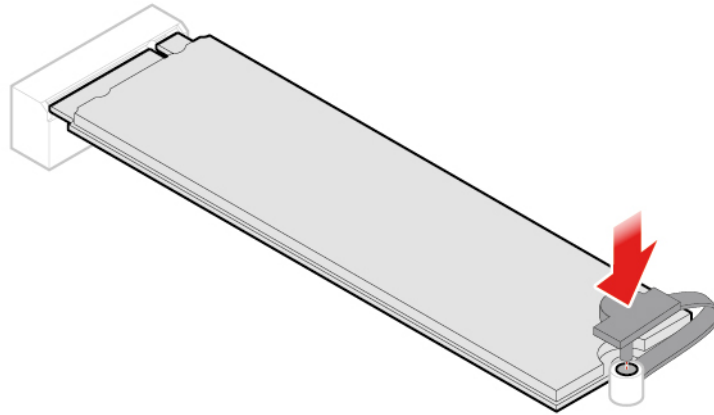


Figure 93. Locking the M.2 solid-state drive clip

4. Complete the replacement. See “Completing the parts replacement” on page 56.

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 25.
2. Remove the storage drive or PCI Express card. See “Replacing the storage drive” on page 26 or “Replacing the PCI Express card and PCI Express card adapter” on page 29.
3. Remove the internal speaker if necessary. See “Replacing the internal speaker” on page 31.
4. Remove the system fan. See “Replacing the system fan” on page 33.
5. Remove the heat sink. See “Replacing the heat sink” on page 34.
6. Remove the microprocessor. See “Replacing the microprocessor” on page 37.
7. Remove the advanced speaker if necessary. See “Replacing the advanced speaker” on page 32.
8. Remove the Wi-Fi antennas. See “Replacing the Wi-Fi antennas” on page 44.
9. Remove the antenna bracket. See “Replacing the antenna bracket” on page 49.
10. Remove the Wi-Fi card. See “Replacing the Wi-Fi card” on page 40.
11. Remove the bottom cover. See “Replacing the bottom cover” on page 49.
12. Remove the memory module. See “Replacing the memory module” on page 50.
13. Remove the M.2 solid-state drive. See “Replacing the M.2 solid-state drive” on page 52.
14. Record the cable routing and cable connections, and then disconnect all cables from the system board. See “System board” on page 4.
15. Replace the system board and chassis.

Note: Carefully handle the system board by its edges.

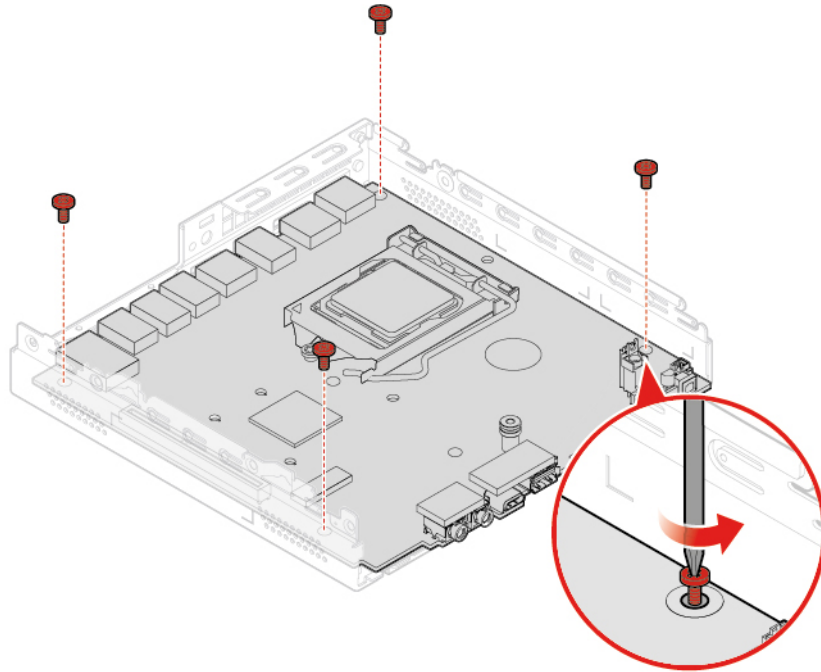


Figure 94. Removing the screws that secure the system board

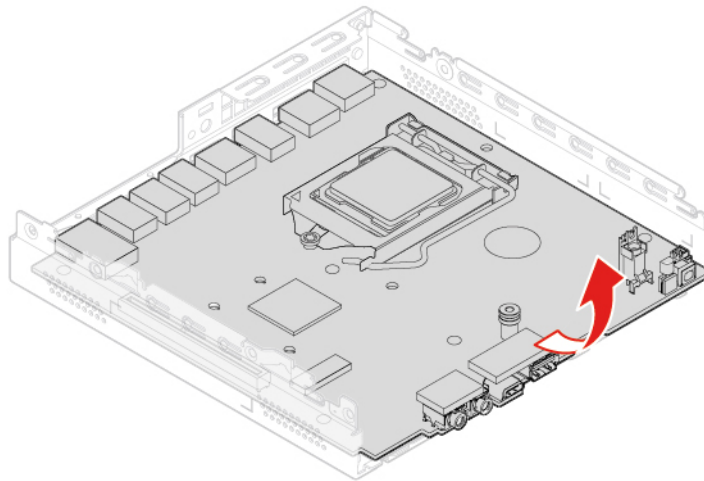


Figure 95. Removing the system board

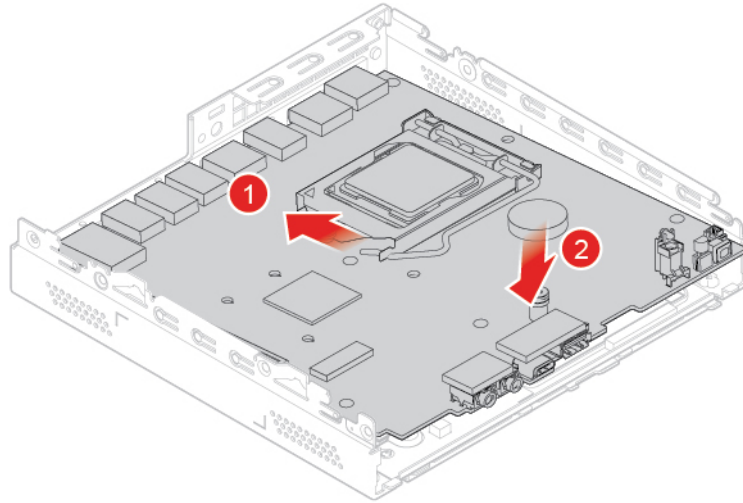


Figure 96. Installing the system board

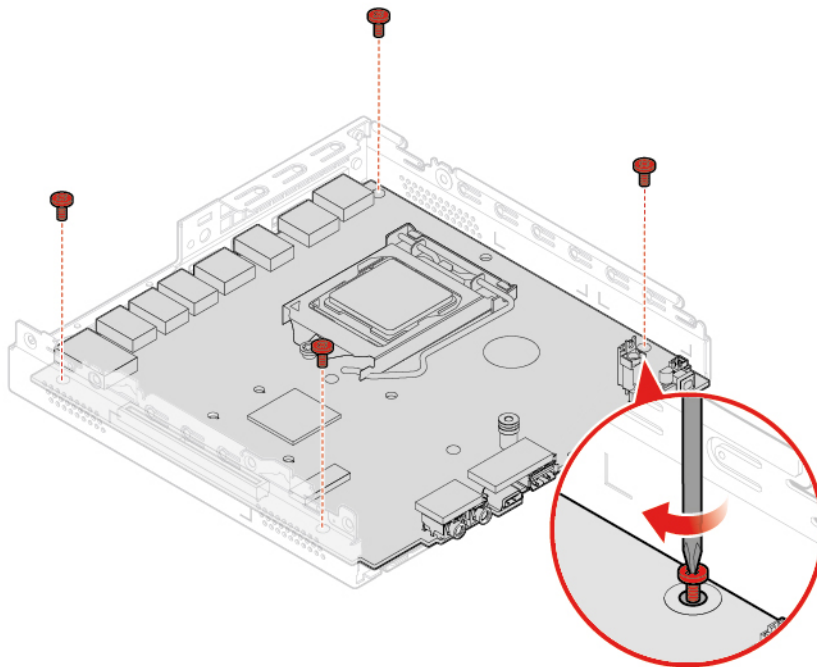


Figure 97. Installing the screws to secure the system board

16. Route all the cables that you disconnected from the failing system board, and then reconnect the cables to the new system board. See “System board” on page 4.
17. Complete the replacement. See “Completing the parts replacement” on page 56.

Completing the parts replacement

After completing the installation or replacement for all parts, Complete the replacement.

To Complete the replacement 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.

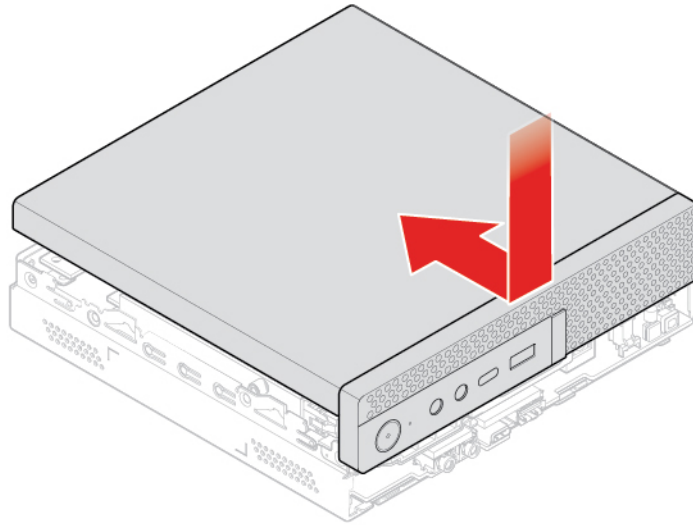


Figure 98. Reinstalling the computer cover

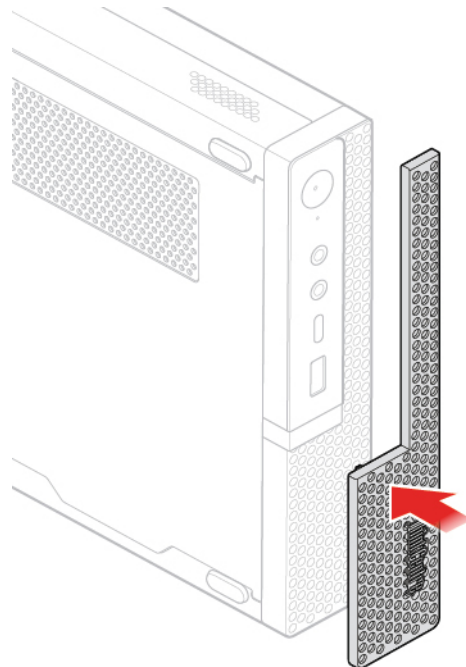


Figure 99. Reinstalling the dust shield

4. Install the screw to secure the computer cover.
5. Place the computer in an upright position.

6. If a locking device is available, use it to lock the computer.
7. Reconnect the external cables and power cords to the corresponding connectors on the computer.

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