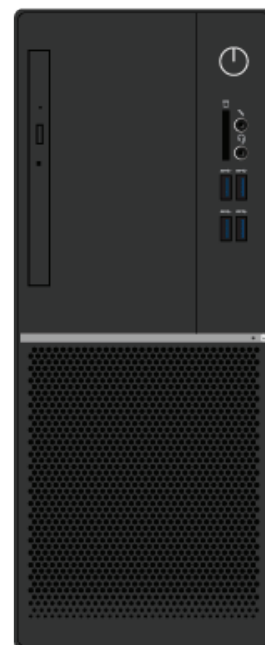


Lenovo

V520

User Guide and Hardware Maintenance Manual



Machine Type (MT):

10NK, 10NL

Energy Star MT:

10NK, 10NL

Overview



Locations of indicators, connectors, and controls provided on your computer



Specifications



Specifications of your computer



Computer locks



Locking devices for your computer



Replaceable parts



Locations of the replaceable parts on your computer



Replacing CRUs



Replacing instructions for Customer Replaceable Units (CRUs)



Replacing FRUs



Replacing instructions for Field Replaceable Units (FRUs) (for technicians only)



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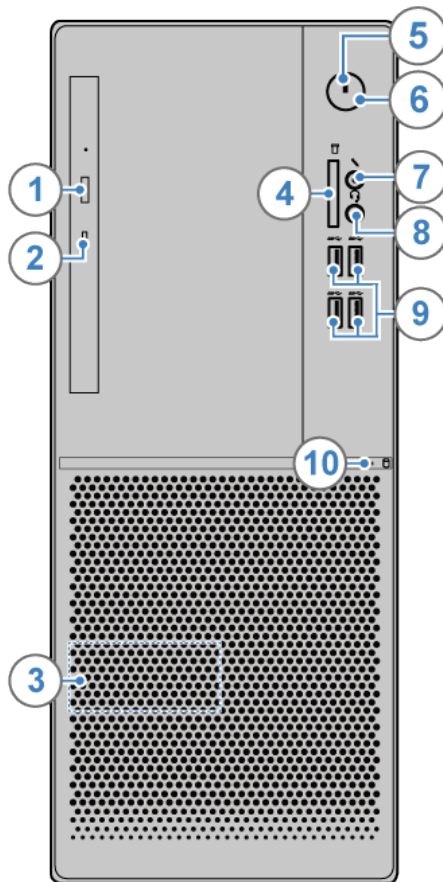
Overview

Front view



Note

Your computer model might look slightly different from the illustration.



- 1 Optical drive eject/close button**

Used to eject the tray of the optical drive. After you insert a disc into the tray, press the eject/close button to close the tray.
- 2 Optical drive status indicator**

This indicator is on when the optical drive is in use.
- 3 Internal speaker (optional)**

Used to listen to the sounds from your computer without using a headset or headphones.
- 4 Card reader slot (optional)**

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. You can use the microphone to record sounds or interact with the computer using speech-recognition software.
- 8 Headphone connector**

Used to connect headphones to your computer.
- 9 USB 3.0 connectors (4)**

Used to connect a USB-compatible device. For optimal data transfer, connect a USB 3.0 device to a USB 3.0 connector instead of a USB 2.0 connector.
- 10 Storage drive status indicator**

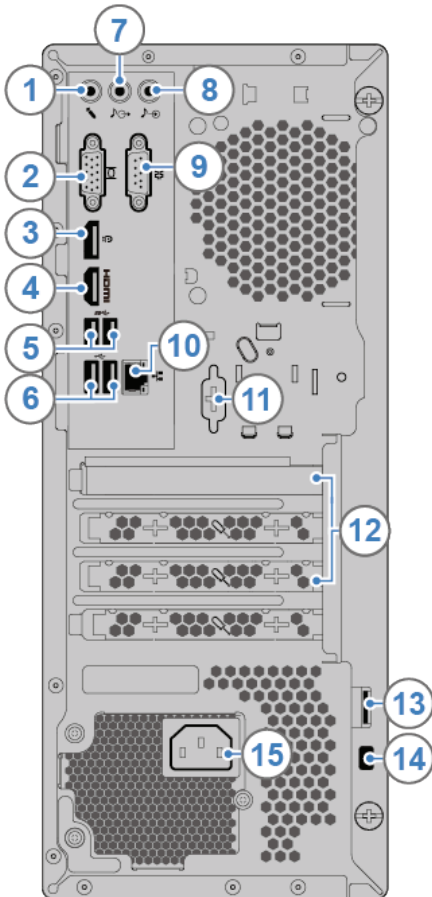
This indicator is on when the storage drive is in use.

Rear view



Note

Your computer model might look slightly different from the illustration.



- 1 Microphone connector**

Used to connect a microphone to your computer when you want to record sound or use 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®-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™-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 3.0 connectors (2)**

Used to connect a USB-compatible device. For optimal data transfer, connect a USB 3.0 device to a USB 3.1 or USB 3.0 connector instead of a USB 2.0 connector.
- 6 USB 2.0 connectors (2)**

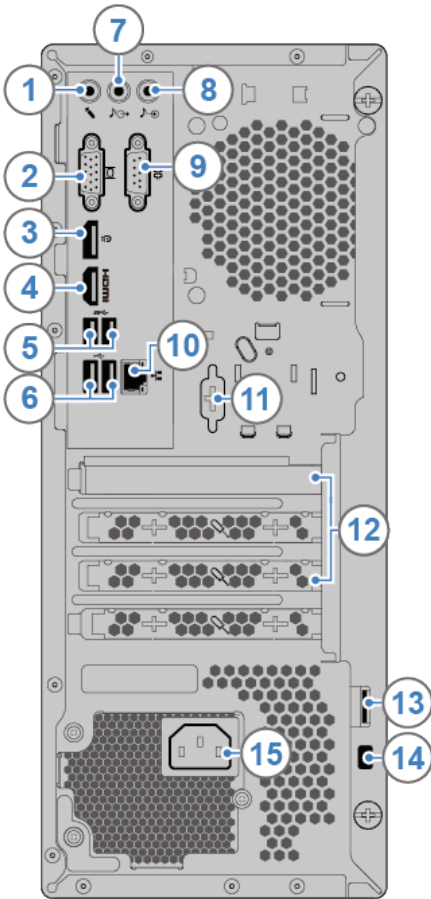
Used to connect a device that requires a USB 2.0 connection.
- 7 Audio line-out connector**

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.



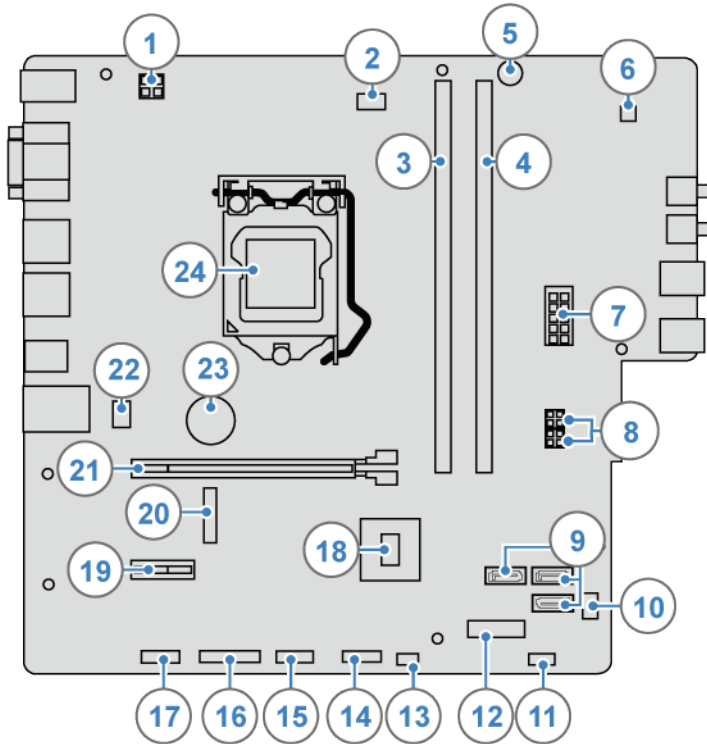
-
- 8 Audio line-in connector**
Used to receive audio signals from an external audio device, such as a stereo system. To attach an external audio device, connect a cable between the audio line-out connector of the device and the audio line-in connector of the computer.
-
- 9 Serial connector**
Used to connect an external modem, a serial printer, or other devices that use a serial connector.
-
- 10 Ethernet connector**
Used to connect an Ethernet cable for network access.
-
- 11 Serial connector (optional)**
Used to connect an external modem, a serial printer, or other devices that use a serial connector.
-
- 12 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.
-
- 13 Padlock loop**
Used to secure a padlock.
-
- 14 Security-lock slot**
Used to secure a Kensington-style cable lock.
-
- 15 Power cord connector**
Used to connect the power cord to your computer for power supply.
-

System board

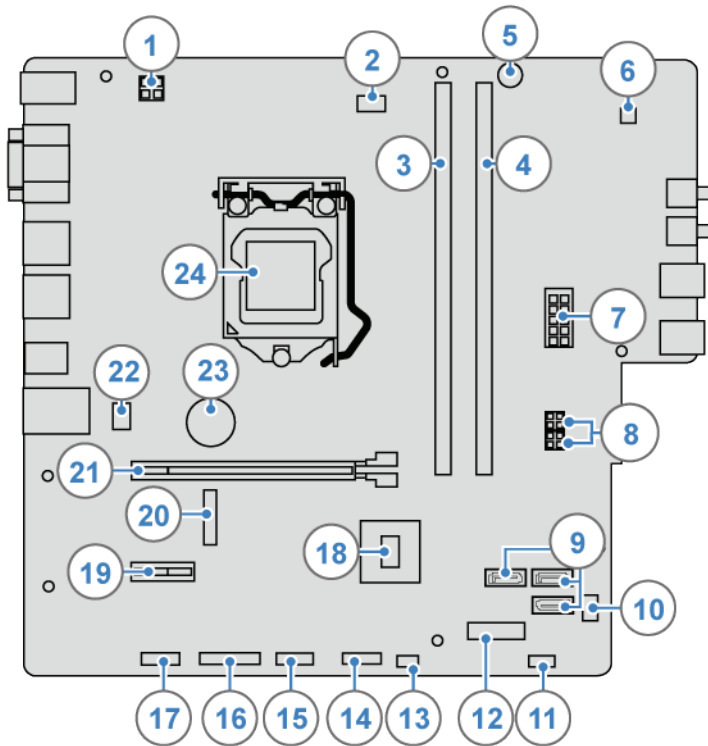


Note

See [Front view](#) or [Rear view](#) for additional component descriptions.



- 1 4-pin power connector
- 2 Microprocessor fan connector
- 3 Memory slot (DIMM2)
- 4 Memory slot (DIMM4)
- 5 Buzzer
- 6 Internal speaker connector
- 7 10-pin power connector
- 8 SATA power connectors (2)
- 9 SATA 3.0 connectors (3)
- 10 Auxiliary fan connector 1
- 11 Power button board connector
- 12 M.2 solid-state drive slot
- 13 Thermal sensor connector



- 14 Front USB 2.0 connector 2
(Card reader connector)

- 15 Front USB 2.0 connector 1

- 16 Parallel connector

- 17 Serial (COM2) connector

- 18 PCH

- 19 PCI Express x1 card slot

- 20 M.2 Wi-Fi card slot

- 21 PCI Express x16 graphics card slot

- 22 System fan connector

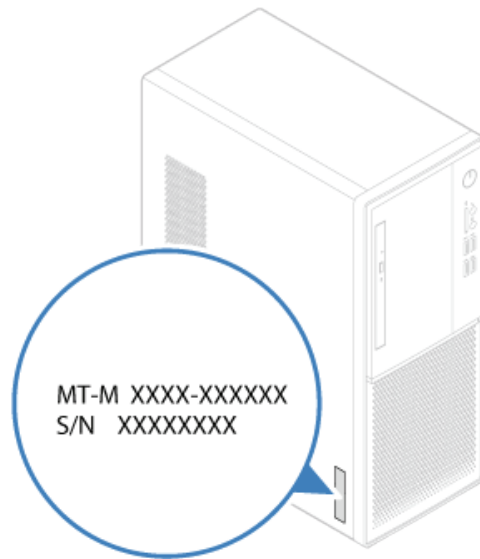
- 23 Coin-cell battery

- 24 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 side of the computer as shown.



Specifications

Power supply	180 watt automatic voltage-sensing power supply
Storage drives	<ul style="list-style-type: none">• 3.5-inch storage drive• 2.5-inch storage drive• M.2 solid-state drive
Video features	<p>The integrated graphics card supports the following:</p> <ul style="list-style-type: none">• DisplayPort-out connector• HDMI-out connector• VGA-out connector
Audio features	<p>The integrated audio card supports the following:</p> <ul style="list-style-type: none">• Audio line-in connector• Audio line-out connector• Headphone connector• Internal speaker (optional)• Microphone connector <p>The optional discrete audio card provides an enhanced audio experience and extended capabilities.</p>
Input/Output (I/O) features	<ul style="list-style-type: none">• Audio connectors (audio line-in, audio line-out, headphone, and microphone)• Card reader slot (optional)• Display connectors (DisplayPort-out, HDMI-out, and VGA-out)• Ethernet connector• Serial connector• USB connector

Expansion

- Card reader (optional)
- Memory 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

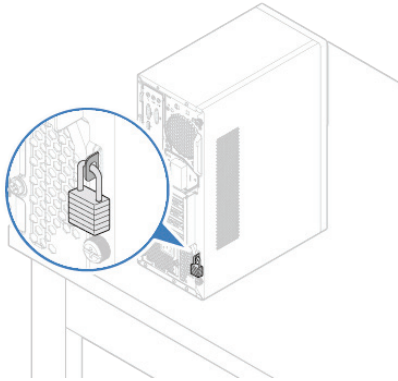
- Width: 145.0 mm (5.7 inches)
- Height: 366.0 mm (14.4 inches)
- Depth: 293.2 mm (11.5 inches)

Weight (without the package)

Maximum configuration as shipped: 5.7 kg (12.6 lb)

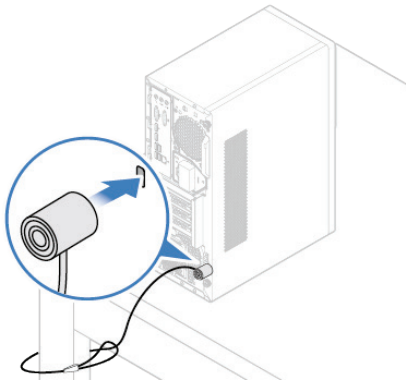
Computer locks

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.

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>.

Replacing hardware

Before replacing hardware



Attention

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

Read these notes before replacing hardware:

- Some of the hardware components explained in this manual are optional.
- 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 component until the defective component has been removed and you are ready to install the new component. Static electricity, although harmless to you, can seriously damage computer components.

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

- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle parts and other computer components carefully. Handle PCI/PCI-Express cards, memory modules, system boards, and microprocessors by the edges. Never touch any exposed circuitry.
- Prevent others from touching the parts 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 that the part came in 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 replaceable parts

Customer Replaceable Units (CRUs)

CRUs are computer parts that a user can upgrade or replace. There are two types of CRUs: self-service and optional-service.

Self-service CRUs

You can install self-service CRUs easily. These CRUs might be standalone, latched, or secured by up to two screws.

Examples of self-service CRUs include the keyboard, mouse, any USB device, and the power cord. Other self-service CRUs might include memory modules, adapter cards, hard disk drives, and optical drives.



Note

Users 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.

Field Replaceable Units (FRUs)

FRUs are computer parts that a trained technician can upgrade or replace.

For detailed FRU information, such as the FRU part numbers and supported computer models, go to: <http://www.lenovo.com/serviceparts-lookup>

CRUs and FRUs locations

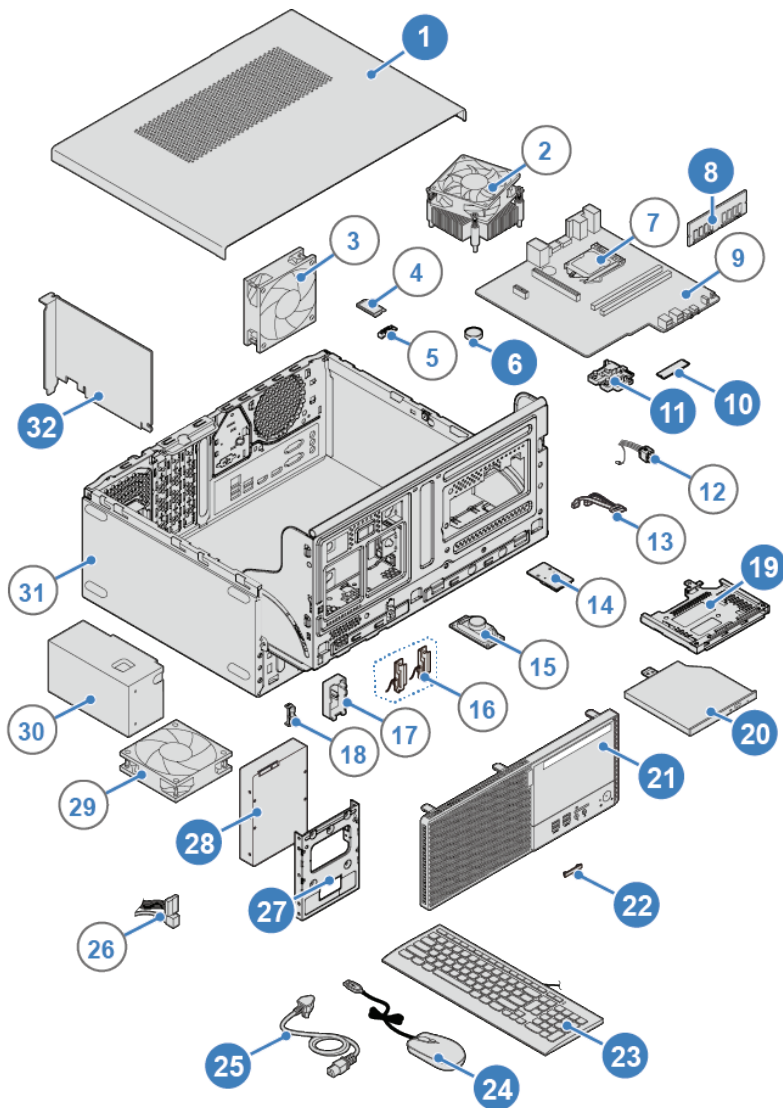
Refer to the following illustrations to check the locations of CRUs and FRUs within the computer.



Note

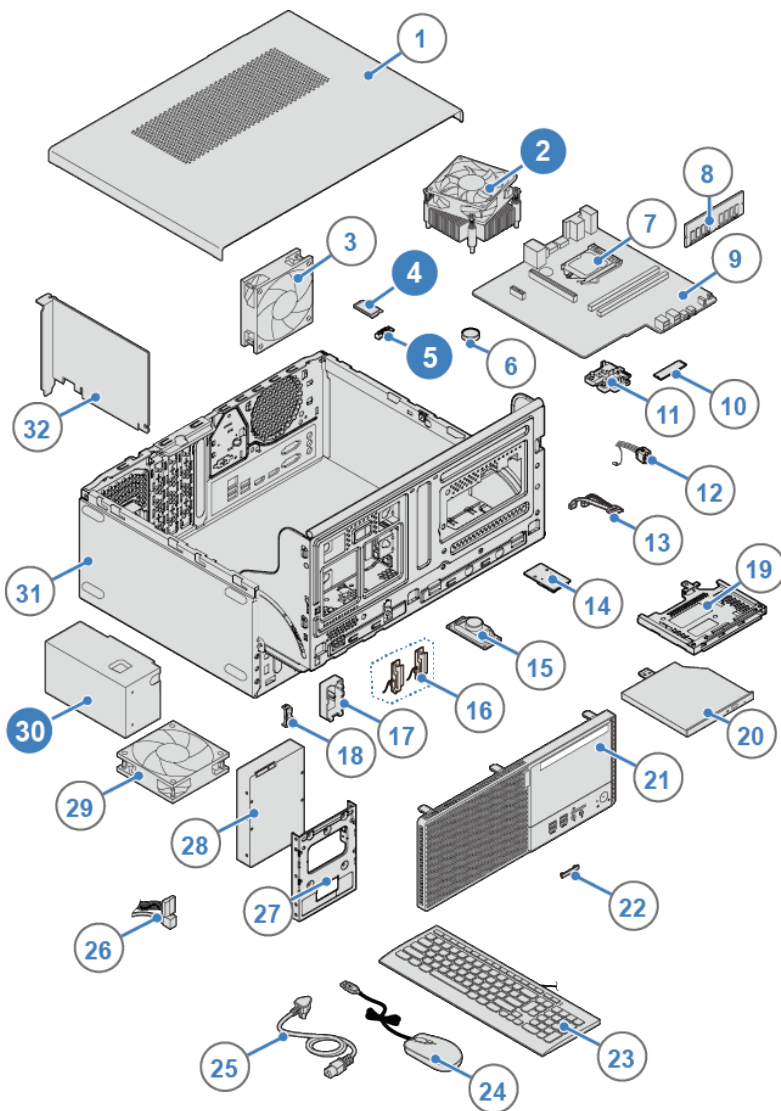
Some of the following parts are optional on some models.

Self-service CRU



- 1 Computer cover [p. 19](#)
- 6 Coin-cell battery [p. 29](#)
- 8 Memory module [p. 26](#)
- 10 M.2 solid-state drive [p. 33](#)
- 11 M.2 solid-state drive bracket [p. 35](#)
- 19 Optical drive bracket [p. 22](#)
- 20 Optical drive [p. 21](#)
- 21 Front bezel [p. 20](#)
- 22 Card reader slot cover
- 23 Keyboard
- 24 Mouse
- 25 Power cord
- 27 Storage converter [p. 25](#)
- 28 Primary or secondary storage drive (a 2.5-inch or 3.5-inch storage drive) [p. 24](#)
- 32 PCI Express card [p. 30](#)

Optional-service CRU

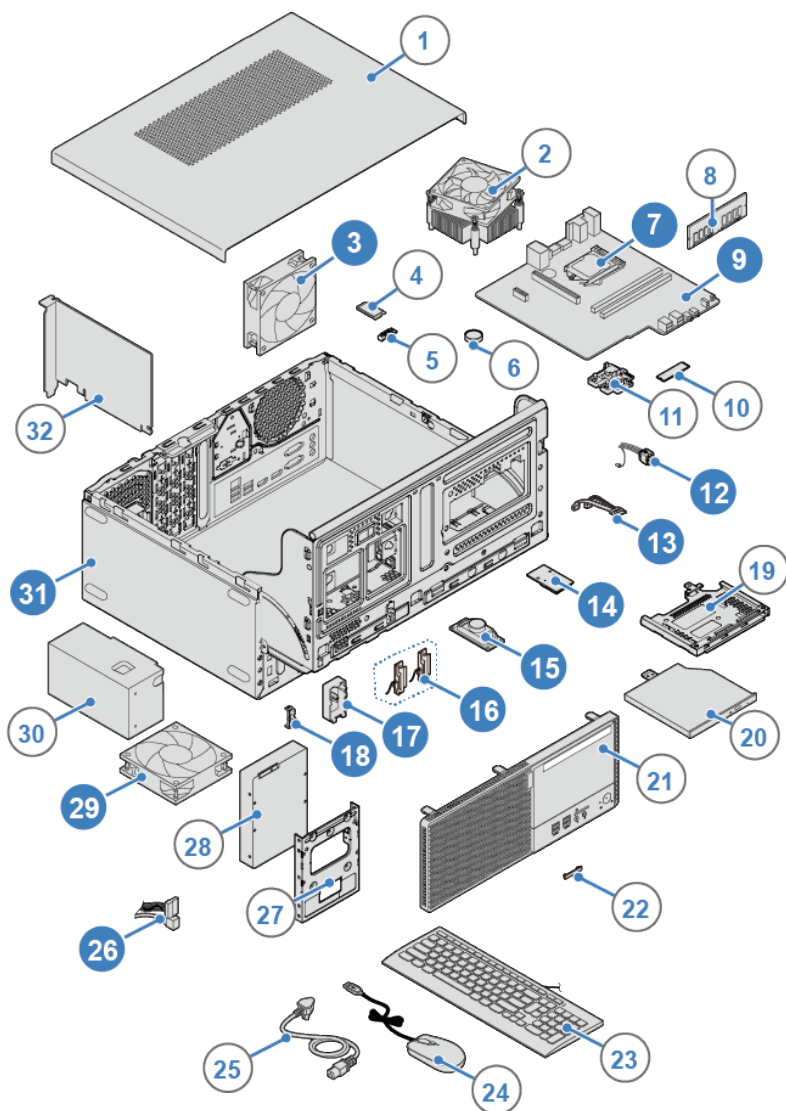


2 Heat sink and fan assembly [p. 28](#)

4 Wi-Fi card [p. 31](#)

5 Wi-Fi card shield [p. 31](#)

30 Power supply assembly [p. 36](#)



- 3 Rear fan [p. 50](#)

- 7 Microprocessor [p. 48](#)

- 9 System board [p. 51](#)

- 12 Power button board [p. 45](#)

- 13 Optical drive cable

- 14 Card reader [p. 47](#)

- 15 Internal speaker [p. 40](#)

- 16 Wi-Fi antennas (2) [p. 43](#)

- 17 Rear Wi-Fi antenna cover [p. 43](#)

- 18 Thermal sensor [p. 42](#)

- 26 Storage drive cable

- 29 Front fan [p. 41](#)

- 31 Chassis

Replacing CRUs

Before replacing CRUs

To check the locations of CRUs, see [CRUs and FRUs locations](#).

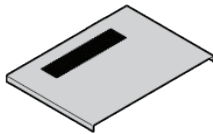


Attention

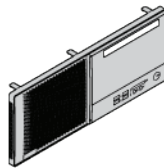
Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

Before replacing a CRU, click the illustration of the part to check the brief procedures.

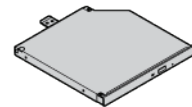
Computer cover



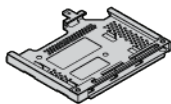
Front bezel



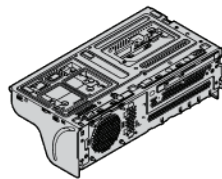
Optical drive



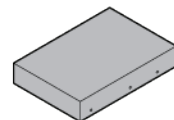
Optical drive bracket



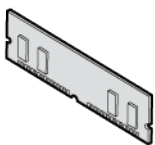
Drive bay assembly



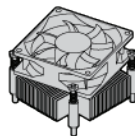
Storage drive



Memory module



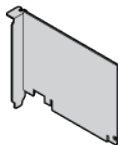
Heat sink and fan assembly



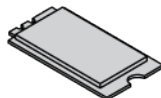
Coin-cell battery



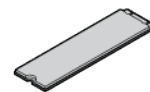
PCI Express card



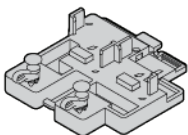
Wi-Fi card



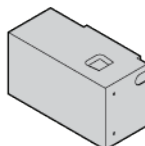
M.2 solid-state drive



M.2 solid-state drive
bracket



Power supply assembly



Note

To replace a component that is not in the list above, contact a Lenovo service technician. The support phone numbers are available at: <http://www.lenovo.com/support/phone>

Removing the computer cover



Attention

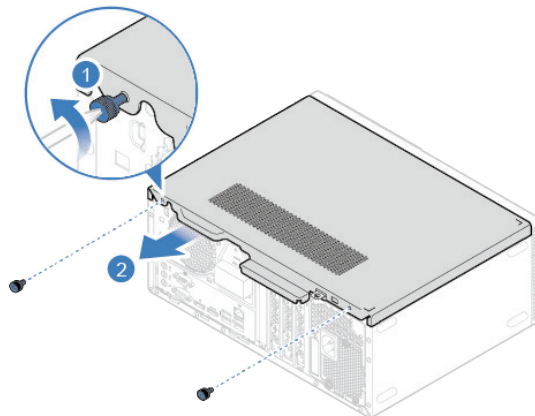
Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.



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.



- 5 Complete the replacement. For details, see **Completing the parts replacement.**

Replacing the front bezel



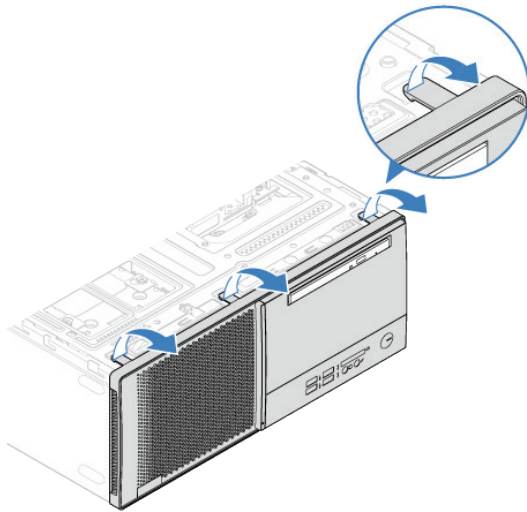
Attention

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

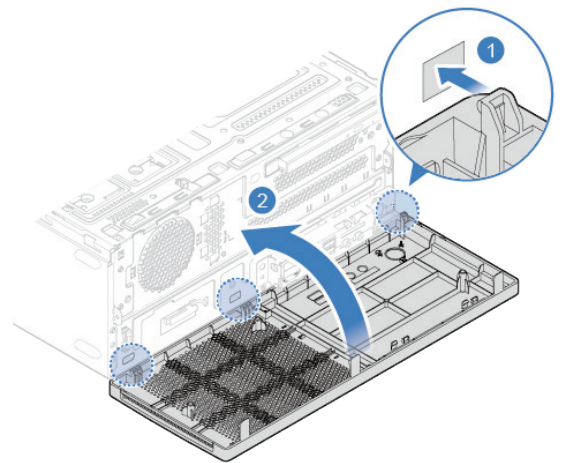
1 Remove the computer cover. For details, see [Removing the computer cover](#).

2 Replace the front bezel.

1



2



3 Complete the replacement. For details, see [Completing the parts replacement](#).

Replacing the optical drive

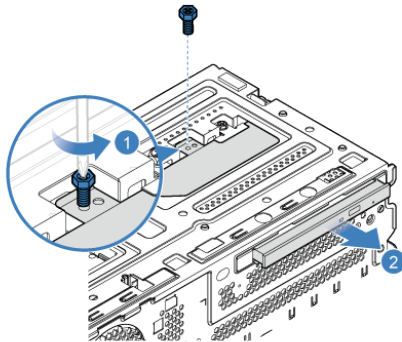


Attention

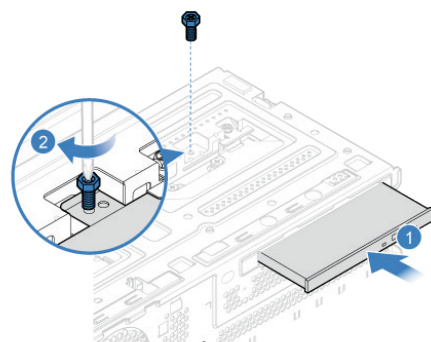
Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

- 1 Remove the computer cover. For details, see **Removing the computer cover.**
- 2 Remove the front bezel. For details, see **Replacing the front bezel.**
- 3 Disconnect the signal cable and the power cable from the optical drive.
- 4 Replace the optical drive.

1



2



- 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.**

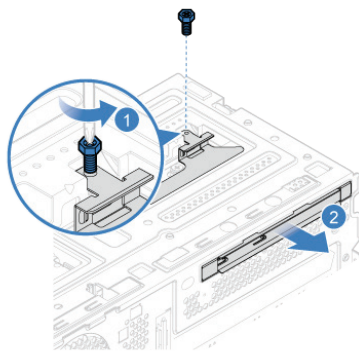
Replacing the optical drive bracket

Attention

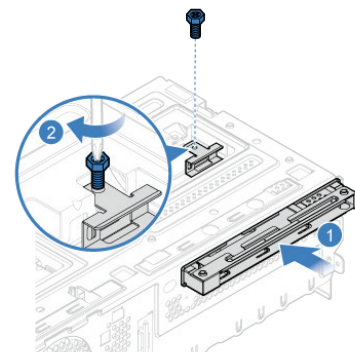
Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

- 1 Remove the computer cover. For details, see [Removing the computer cover](#).
- 2 Remove the front bezel. For details, see [Replacing the front bezel](#).
- 3 Remove the optical drive. For details, see [Replacing the optical drive](#).
- 4 Replace the optical drive bracket.

1



2



- 5 Reinstall the removed parts. To complete the replacement, see [Completing the parts replacement](#).

Pivoting the drive bay assembly upward and downward

Attention

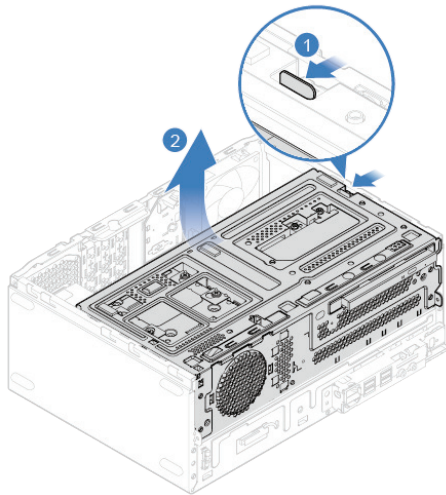
Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

1 Remove the computer cover. For details, see [Removing the computer cover](#).

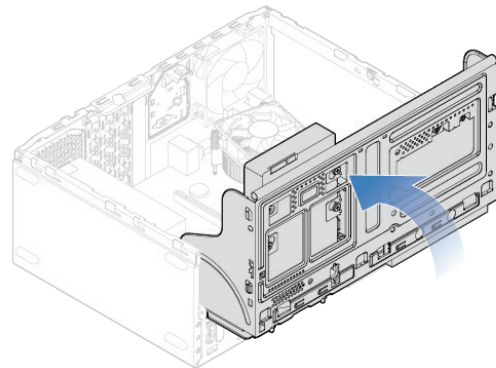
2 Remove the front bezel. For details, see [Replacing the front bezel](#).

3 Pivot the drive bay assembly upward and downward.

1



2



4 Reinstall the removed parts. To complete the replacement, see [Completing the parts replacement](#).

Replacing the storage drive



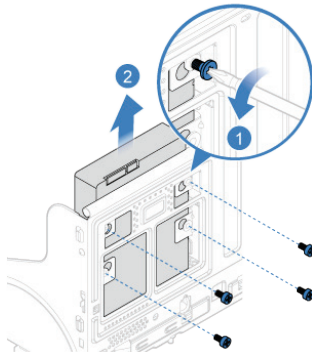
Attention

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

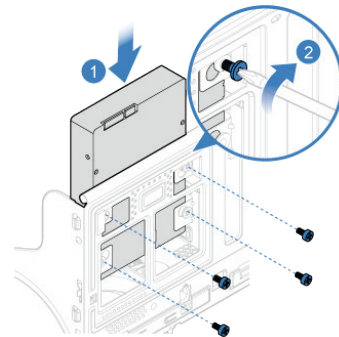
Replacing the 3.5-inch storage drive

- 1 Remove the computer cover. For details, see [Removing the computer cover](#).
- 2 Remove the front bezel. For details, see [Replacing the front bezel](#).
- 3 Pivot the drive bay assembly upward. For details, see [Pivoting the drive bay assembly upward and downward](#).
- 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

1

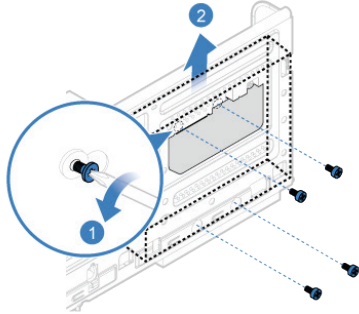


2

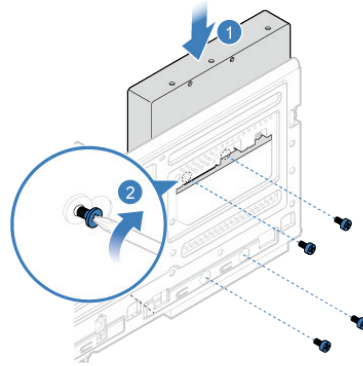


- 3.5-inch secondary storage drive

1



2

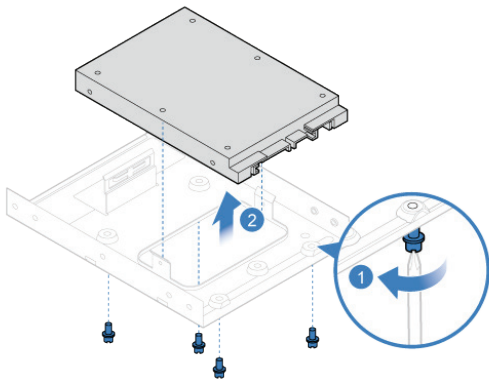


- 6 Connect the signal cable and the power cable to the new 3.5-inch storage drive.
- 7 Reinstall the removed parts. To complete the replacement, see **Completing the parts replacement.**

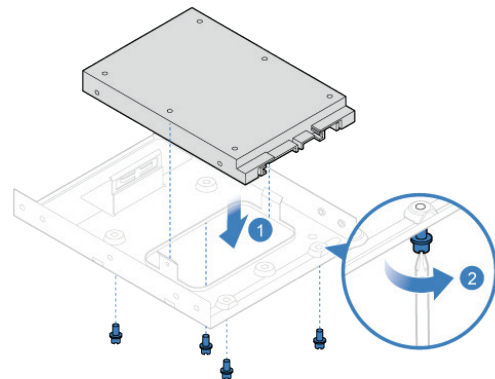
Replacing the 2.5-inch storage drive

- 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.

1



2



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

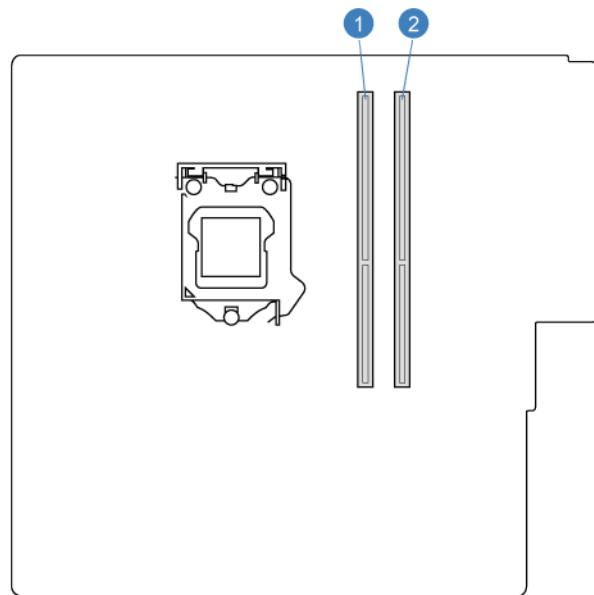
Replacing a memory module



Attention

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

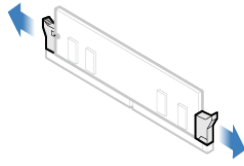
Ensure that you follow the installation order for memory modules shown in the following figure.



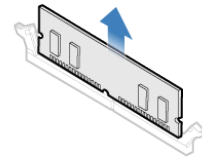
- 1 Remove the computer cover. For details, see [Removing the computer cover](#).
- 2 Remove the front bezel. For details, see [Replacing the front bezel](#).
- 3 Pivot the drive bay assembly upward. For details, see [Pivoting the drive bay assembly upward and downward](#).

4 Replace a memory module.

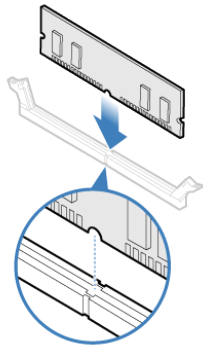
1



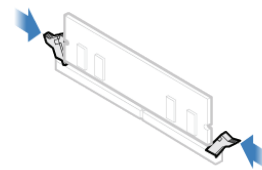
2



3



4



5 Reinstall the removed parts. To complete the replacement, see **Completing the parts replacement.**

Replacing the heat sink and fan assembly

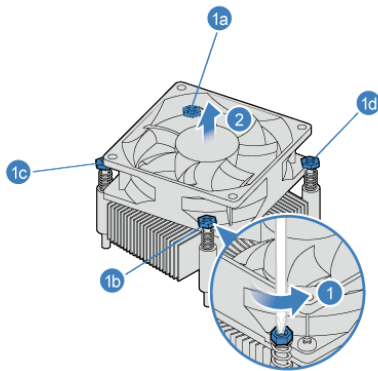


Attention

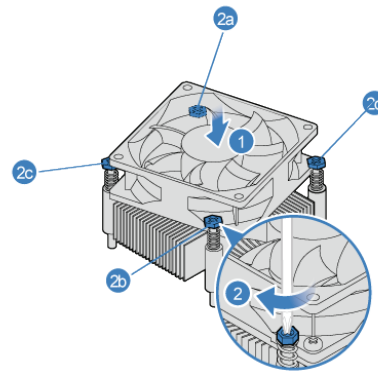
Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

- 1 Remove the computer cover. For details, see [Removing the computer cover](#).
- 2 Remove the front bezel. For details, see [Replacing the front bezel](#).
- 3 Pivot the drive bay assembly upward. For details, see [Pivoting the drive bay assembly upward and downward](#).
- 4 Replace the heat sink and fan assembly.

1



2



- 5 Reinstall the removed parts. To complete the replacement, see [Completing the parts replacement](#).

Replacing the coin-cell battery



Attention

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

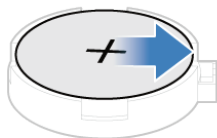
Your computer has a special type of memory that maintains the date, time, and settings for built-in features, such as parallel connector assignments (configurations). A coin-cell battery keeps this information active when you turn off the computer.

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

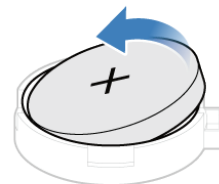
To replace the coin-cell battery,

- 1 Remove the computer cover. For details, see [Removing the computer cover](#).
- 2 Remove the front bezel. For details, see [Replacing the front bezel](#).
- 3 Pivot the drive bay assembly upward. For details, see [Pivoting the drive bay assembly upward and downward](#).
- 4 Replace the coin-cell battery.

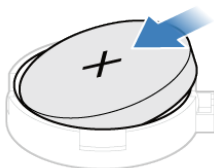
1



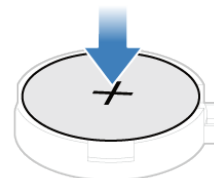
2



3



4



- 5 Reinstall the removed parts. To complete the replacement, see [Completing the parts replacement](#).

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

Replacing a PCI Express card

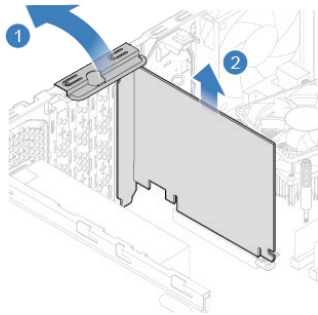


Attention

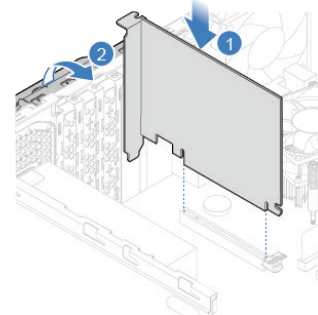
Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

- 1 Remove the computer cover. For details, see [Removing the computer cover](#).
- 2 Remove the front bezel. For details, see [Replacing the front bezel](#).
- 3 Pivot the drive bay assembly upward. For details, see [Pivoting the drive bay assembly upward and downward](#).
- 4 Replace a PCI Express card.

1

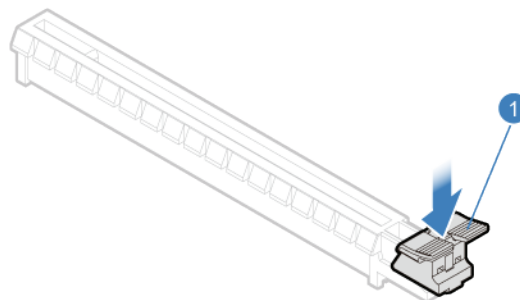


2



Note

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



- 5 Reinstall the removed parts. To complete the replacement, see [Completing the parts replacement](#).

Replacing the Wi-Fi card

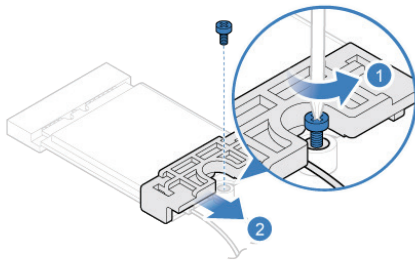
! Attention

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

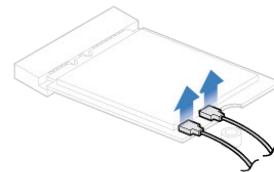
- 1 Remove the computer cover. For details, see [Removing the computer cover](#).
- 2 Remove the front bezel. For details, see [Replacing the front bezel](#).
- 3 Pivot the drive bay assembly upward. For details, see [Pivoting the drive bay assembly upward and downward](#).
- 4 Depending on your computer model, refer to one of the following to replace the Wi-Fi card.

- Type 1

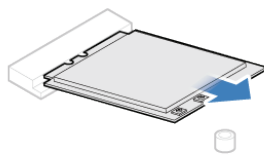
1



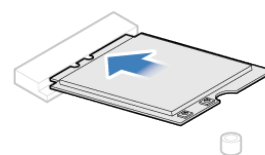
2



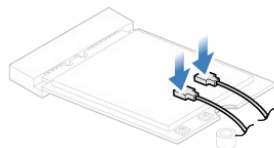
3



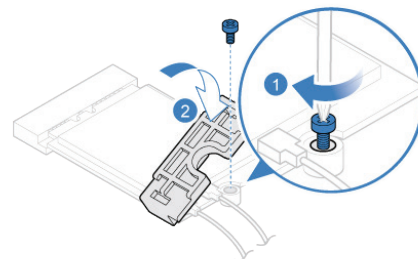
4



5

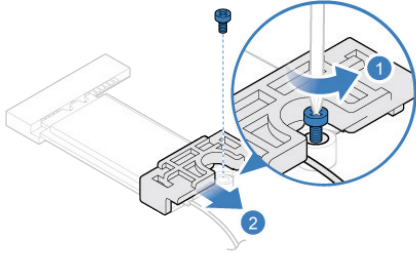


6

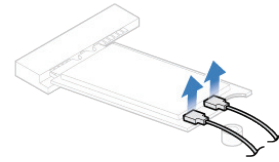


• Type 2

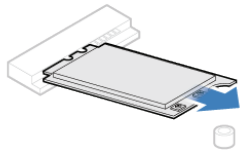
1



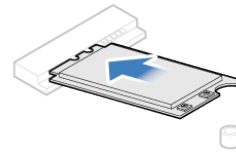
2



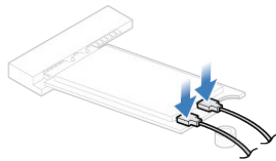
3



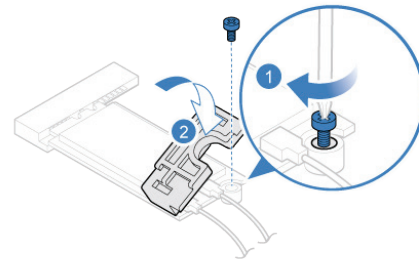
4



5



6



5 Reinstall the removed parts. To complete the replacement, see **Completing the parts replacement.**

Replacing the M.2 solid-state drive



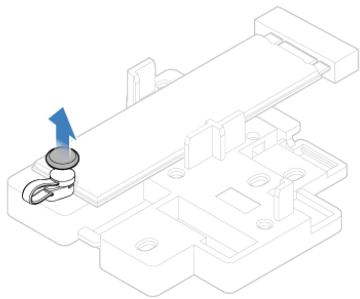
Attention

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

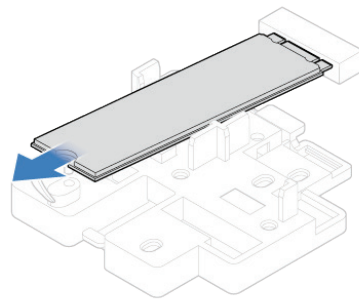
- 1 Remove the computer cover. For details, see [Removing the computer cover](#).
- 2 Remove the front bezel. For details, see [Replacing the front bezel](#).
- 3 Pivot the drive bay assembly upward. For details, see [Pivoting the drive bay assembly upward and downward](#).
- 4 Depending on your computer model, refer to one of the following to replace the M.2 solid-state drive.

- Type 1

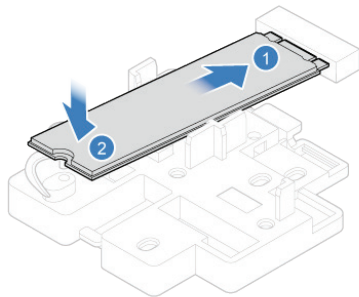
1



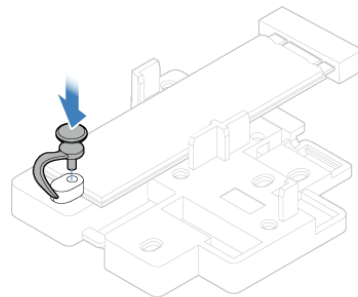
2



3

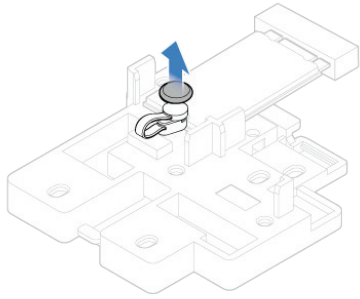


4

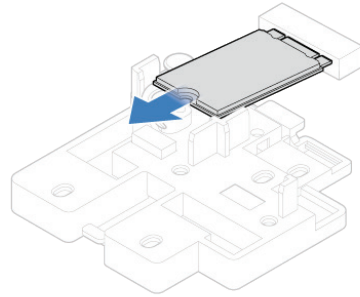


• Type 2

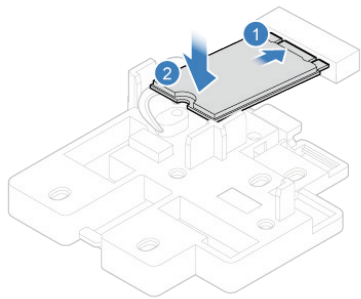
1



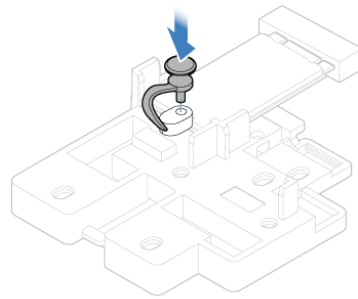
2



3



4



5 Reinstall the removed parts. To complete the replacement, see **Completing the parts replacement.**

Replacing the M.2 solid-state drive bracket

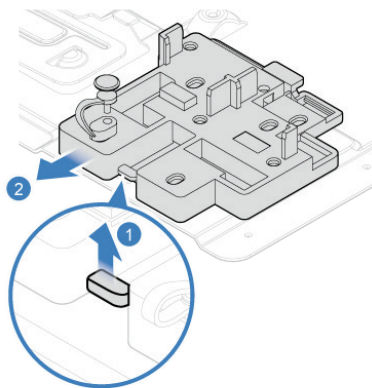


Attention

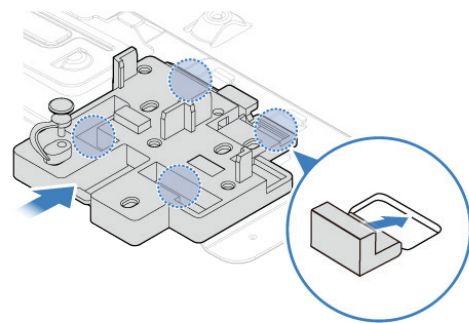
Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

- 1 Remove the computer cover. For details, see [Removing the computer cover.](#)
- 2 Remove the front bezel. For details, see [Replacing the front bezel.](#)
- 3 Pivot the drive bay assembly upward. For details, see [Pivoting the drive bay assembly upward and downward.](#)
- 4 Remove the M.2 solid-state drive. For details, see [Replacing the M.2 solid-state drive.](#)
- 5 Replace the M.2 solid-state drive bracket.

1



2



- 6 Reinstall the removed parts. To complete the replacement, see [Completing the parts replacement.](#)

Replacing the power supply assembly

ⓘ Attention

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

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

⚠ Caution

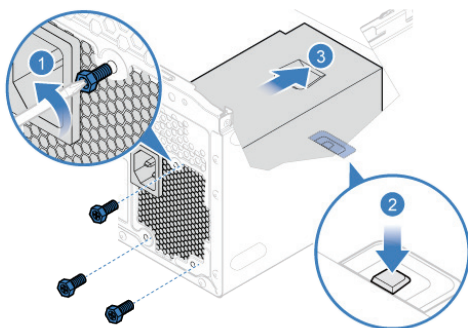
Never remove the cover on a power supply or any part that has the following label attached.



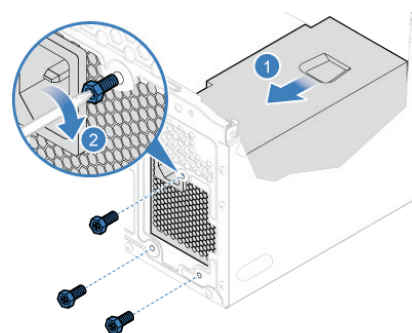
Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

- 1 Remove the computer cover. For details, see [Removing the computer cover](#).
- 2 Remove the front bezel. For details, see [Replacing the front bezel](#).
- 3 Pivot the drive bay assembly upward. For details, see [Pivoting the drive bay assembly upward and downward](#).
- 4 Disconnect the power supply assembly cables from the system board.
- 5 Replace the power supply assembly.

①



②



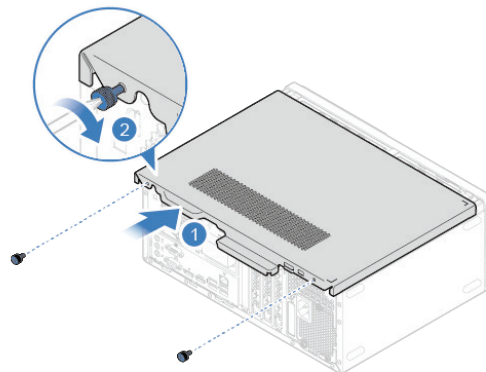
- 6 Connect the new power supply assembly cables to the system board.
- 7 Reinstall the removed parts. To complete the replacement, see [Completing the parts replacement](#).

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. See **System board** for the locations of various components in 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.



- 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. See **Front view** or **Rear view** for the locations of various components in your computer.

Replacing FRUs

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 by referring to the website <http://www.lenovo.com/serviceparts-lookup>.
- **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.**

To check the locations of FRUs, see [CRUs and FRUs locations](#).

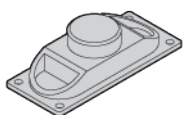


Attention

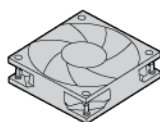
Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

Before replacing an FRU, click the illustration of the part to check the brief procedures.

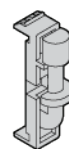
Internal speaker



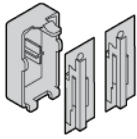
Front fan



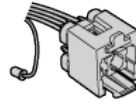
Thermal sensor



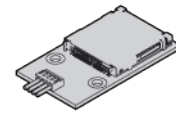
Wi-Fi antennas



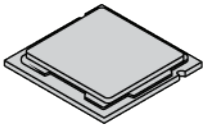
Power button board



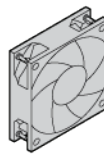
Card reader



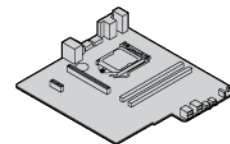
Microprocessor



Rear fan



System board



Note

To replace a component that is not in the list above, contact a Lenovo service technician. The support phone numbers are available at: <http://www.lenovo.com/support/phone>

Replacing the internal speaker

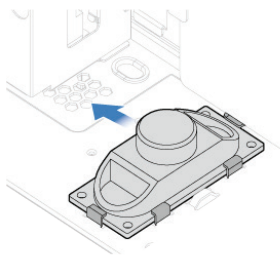


Attention

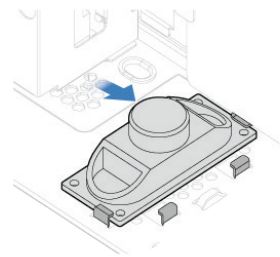
Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

- 1 Remove the computer cover. For details, see **Removing the computer cover.**
- 2 Remove the front bezel. For details, see **Replacing the front bezel.**
- 3 Pivot the drive bay assembly upward. For details, see **Pivoting the drive bay assembly upward and downward.**
- 4 Disconnect the internal speaker cable from the system board.
- 5 Replace the internal speaker.

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- 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.**

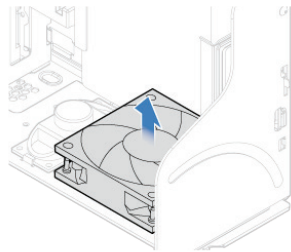
Replacing the front fan

Attention

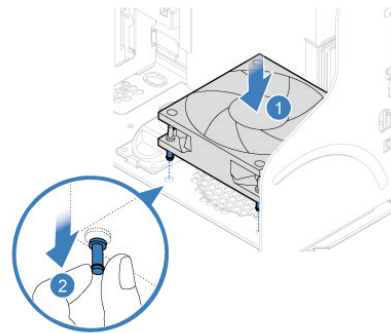
Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

- 1 Remove the computer cover. For details, see [Removing the computer cover](#).
- 2 Remove the front bezel. For details, see [Replacing the front bezel](#).
- 3 Pivot the drive bay assembly upward. For details, see [Pivoting the drive bay assembly upward and downward](#).
- 4 Disconnect the front fan cable from the system board.
- 5 Replace the front fan.

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- 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](#).

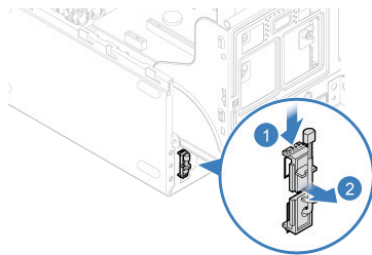
Replacing the thermal sensor

Attention

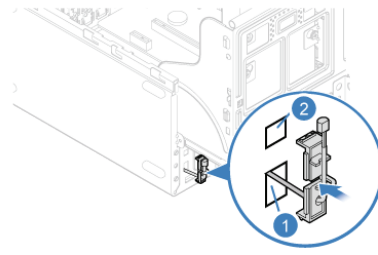
Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

- 1 Remove the computer cover. For details, see [Removing the computer cover](#).
- 2 Remove the front bezel. For details, see [Replacing the front bezel](#).
- 3 Pivot the drive bay assembly upward. For details, see [Pivoting the drive bay assembly upward and downward](#).
- 4 Disconnect the thermal sensor cable from the system board.
- 5 Replace the thermal sensor.

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- 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](#).

Replacing the Wi-Fi antennas



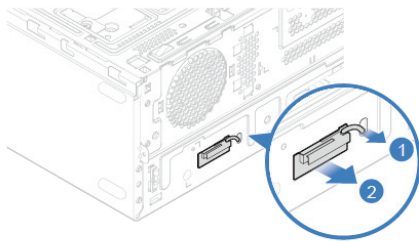
Attention

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

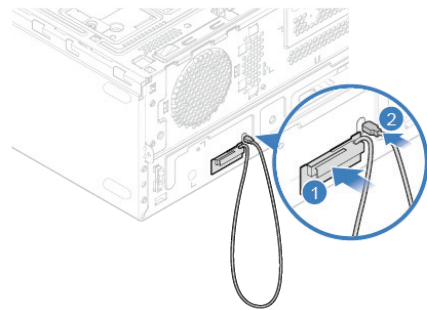
- 1 Remove the computer cover. For details, see [Removing the computer cover](#).
- 2 Remove the front bezel. For details, see [Replacing the front bezel](#).
- 3 Disconnect the Wi-Fi antenna cables from the Wi-Fi card. For details, see [Replacing the Wi-Fi card](#).
- 4 Refer to the following to replace the Wi-Fi antennas.

- Front Wi-Fi antenna

1

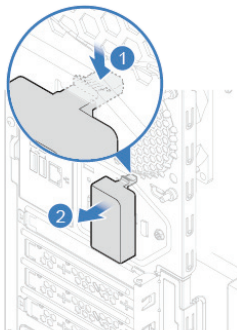


2

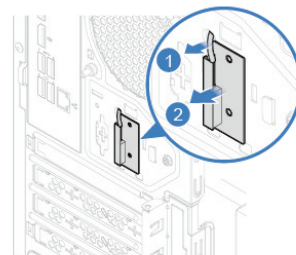


- Rear Wi-Fi antenna

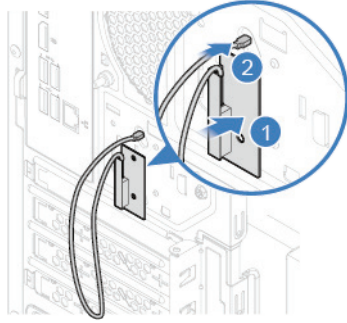
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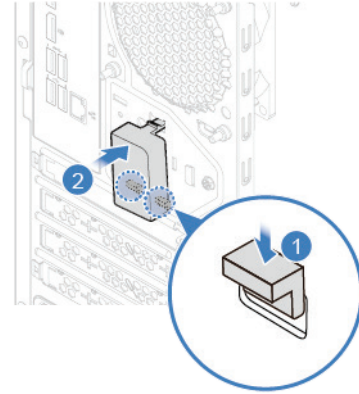
2



3



4



- 5 Connect the new Wi-Fi antenna cables to the Wi-Fi card. For details, see [Replacing the Wi-Fi card.](#)
- 6 Reinstall the removed parts. To complete the replacement, see [Completing the parts replacement.](#)

Replacing the power button board

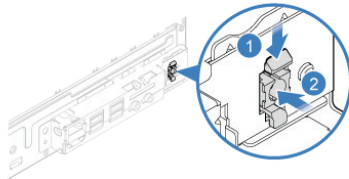


Attention

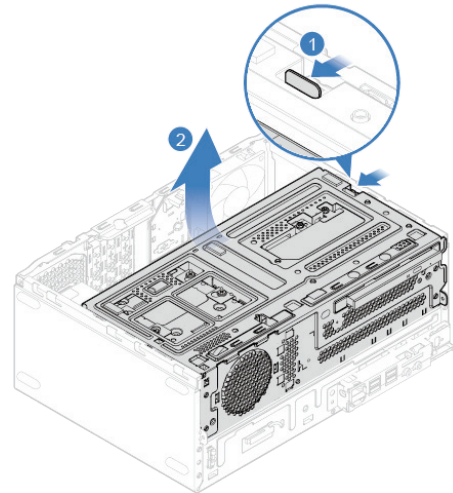
Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

- 1 Remove the computer cover. For details, see [Removing the computer cover](#).
- 2 Remove the front bezel. For details, see [Replacing the front bezel](#).
- 3 Disconnect the power button board cable from the system board.
- 4 Replace the power button board.

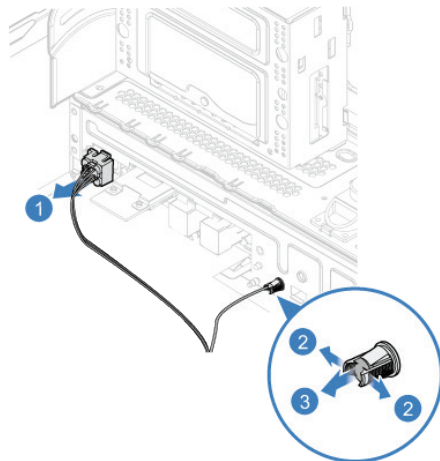
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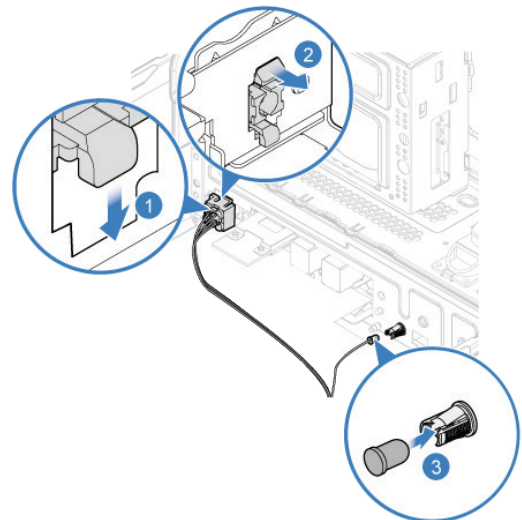
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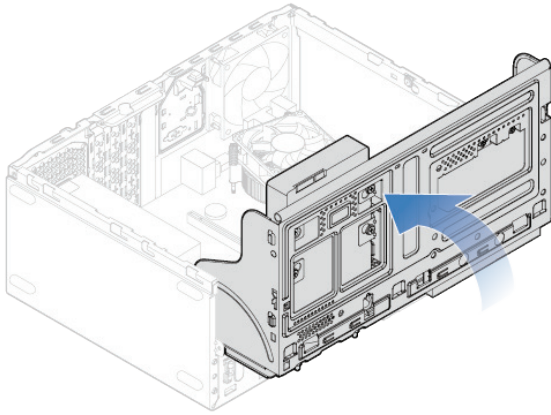
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4



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- 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.**

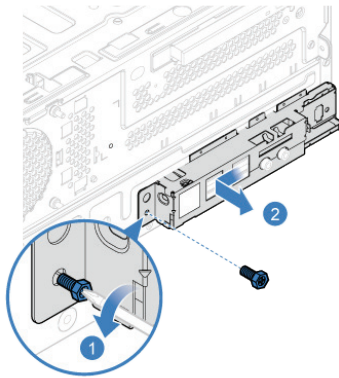
Replacing the card reader

! Attention

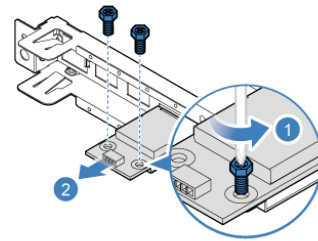
Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

- 1 Remove the computer cover. For details, see [Removing the computer cover](#).
- 2 Remove the front bezel. For details, see [Replacing the front bezel](#).
- 3 Remove the power button board. For details, see [Replacing the power button board](#).
- 4 Disconnect the card reader cable from the system board.
- 5 Replace the card reader.

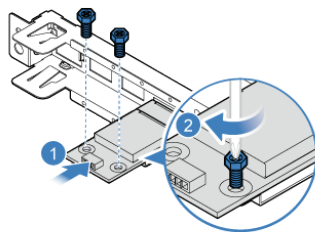
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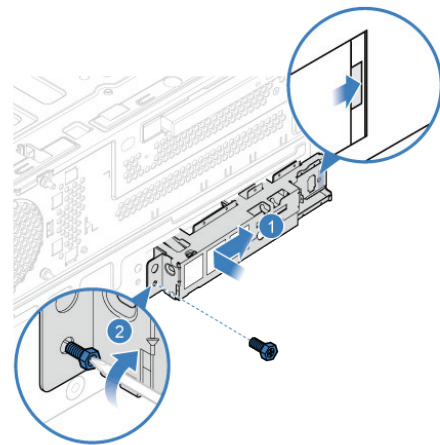
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3



4



- 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](#).

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.

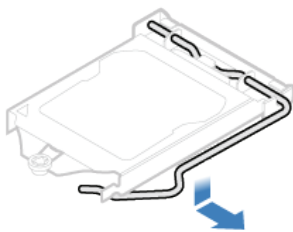
- 1 Remove the computer cover. For details, see [Removing the computer cover](#).
- 2 Remove the front bezel. For details, see [Replacing the front bezel](#).
- 3 Pivot the drive bay assembly upward. For details, see [Pivoting the drive bay assembly upward and downward](#).
- 4 Remove the heat sink and fan assembly. For details, see [Replacing the heat sink and fan assembly](#).
- 5 Record the cable routing and cable connections, and then disconnect all cables from the system board. See [System board](#).
- 6 Replace the microprocessor.



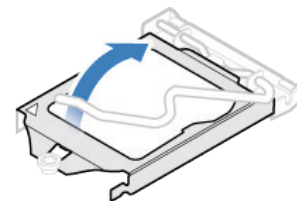
Note

- 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.

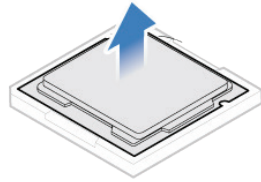
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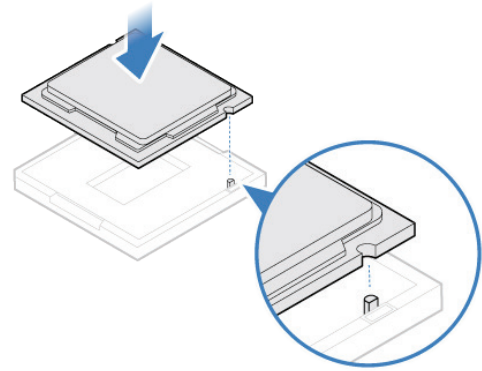
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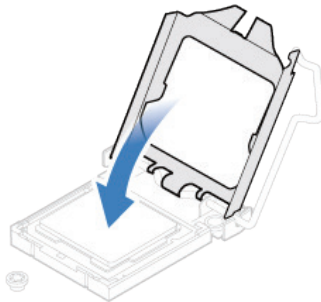
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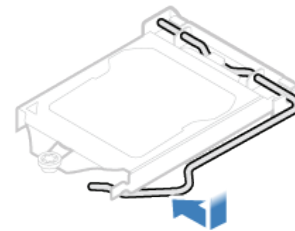
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5



6



- 7 Route all the cables that you disconnected from the system board, and then reconnect the cables to the system board. See **System board.**
- 8 Reinstall the removed parts. To complete the replacement, see **Completing the parts replacement.**

Replacing the rear fan

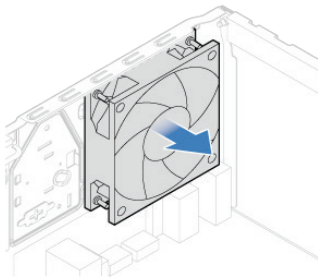


Attention

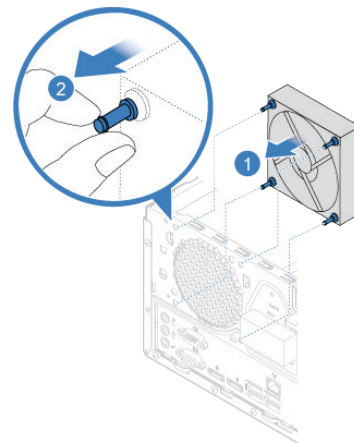
Do not open your computer or attempt any repairs before reading the *Important Product Information Guide*.

- 1 Remove the computer cover. For details, see [Removing the computer cover](#).
- 2 Remove the front bezel. For details, see [Replacing the front bezel](#).
- 3 Pivot the drive bay assembly upward. For details, see [Pivoting the drive bay assembly upward and downward](#).
- 4 Replace the rear fan.

1



2



- 5 Reinstall the removed parts. To complete the replacement, see [Completing the parts replacement](#).

Replacing the system board



Attention

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

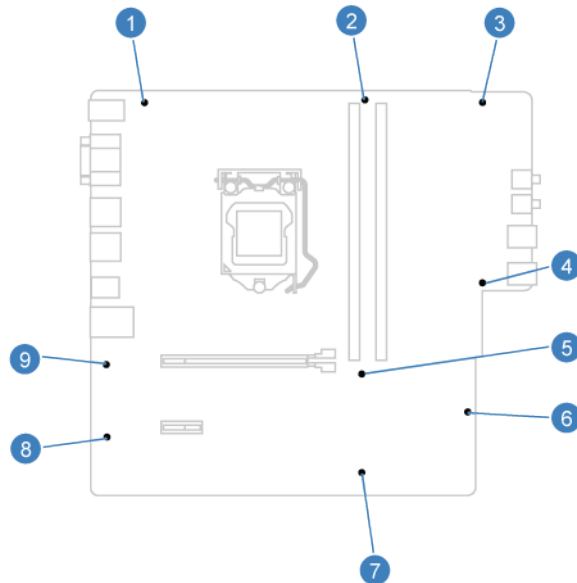
- 1 Remove the computer cover. For details, see [Removing the computer cover](#).
- 2 Remove the front bezel. For details, see [Replacing the front bezel](#).
- 3 Remove the front I/O bracket. For details, see [Replacing the card reader](#).
- 4 Pivot the drive bay assembly upward. For details, see [Pivoting the drive bay assembly upward and downward](#).
- 5 Remove all memory modules. For details, see [Replacing a memory module](#).
- 6 Remove the heat sink and fan assembly. For details, see [Replacing the heat sink and fan assembly](#).
- 7 Remove the Microprocessor. For details, see [Replacing the microprocessor](#).
- 8 Remove all PCI Express cards. For details, see [Replacing a PCI Express card](#).
- 9 Remove the Wi-Fi card. For details, see [Replacing the Wi-Fi card](#).
- 10 Remove the M.2 solid-state drive. For details, see [Replacing the M.2 solid-state drive](#).
- 11 Record the cable routing and cable connections, and then disconnect all cables from the system board. See [System board](#).

12 Replace the system board.



Note

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



13 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.**

14 Reinstall the removed parts. To complete the replacement, see **Completing the parts replacement.**

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