ThinkStation P320 Tiny
User Guide and Hardware Maintenance Manual

**Machine Types (MTs):** 30C1 (Energy Star), 30C2 (Energy Star), and 30C3 (Energy Star)
Note: Before using this information and the product it supports, be sure to read and understand the Important Product Information Guide.
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### Appendix A. Notices

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Chapter 1. Product overview

This chapter provides information about the following topics:

- “Front view” on page 1
- “Rear view” on page 2
- “System board” on page 3
- “Machine type and model label” on page 4

Front view

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

1. Power indicator
2. Power button
3. Storage drive activity indicator
4. Microphone connector
5. Headset connector
6. USB 3.0 connector
7. Always On USB 3.0 connector
8. Illuminated red dot

- **Always On USB 3.0 connector**
  
  Used to connect a device that requires a USB 2.0 or USB 3.0 connection, such as a keyboard, a mouse, a scanner, a printer, or a personal digital assistant (PDA). With the power adapter connected, you can charge the automatically detected device even when the computer is in hibernation mode or turned off.

- **Headset connector**
  
  Used to connect a headset or headphones to your computer.

- **Illuminated red dot**
  
  This indicator is on when the computer is powered on.
• **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.

• **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.

• **Power indicator**
  This indicator is on when the computer is on.

• **Storage drive activity indicator**
  This indicator is on when the storage drive is in use.

• **USB 3.0 connector**
  Used to connect a USB-compatible device, such as a USB keyboard, mouse, scanner, printer, or personal digital assistant (PDA). For optimal data transfer, connect a USB 3.0 device to a USB 3.0 connector instead of a USB 2.0 connector.

---

**Rear view**

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

![Rear view of the computer](image)

*Figure 1. Rear view*

<p>| | |</p>
<table>
<thead>
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<td>DisplayPort connector</td>
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</table>
• **DisplayPort connector**
  Used to send or receive audio and video signals. You can attach a compatible audio or video device to this connector, such as a high-performance monitor.

• **Ethernet connector**
  Used to connect an Ethernet cable for network access.

• **Mini DisplayPort connector**
  Used to send or receive audio and video signals. You can attach a compatible audio or video device to this connector, such as a high-performance monitor. Depending on the computer model, the connector might vary.

• **Power adapter connector**
  Used to connect the power adapter to your computer for power supply.

• **Security-lock slot**
  Used to secure a Kensington-style cable lock.

• **USB 3.0 connector**
  Used to connect a device that requires a USB 2.0 or USB 3.0 connection.

• **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.

---

**System board**

**Note:** See “Front view” on page 1 or “Rear view” on page 2 for additional component descriptions.

---

**Figure 2. Parts on the system board**

<p>| 1 | Serial connector 1 |
| 2 | Serial connector 2 |
| 3 | USB 3.0 connector |
| 4 | Storage drive fan connector |
| 5 | Microprocessor socket |
| 6 | Coin-cell battery |</p>
<table>
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<th></th>
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<td>Memory slot (DIMM2)</td>
</tr>
<tr>
<td>16</td>
<td>M.2 storage drive slot 2</td>
</tr>
<tr>
<td>17</td>
<td>M.2 storage drive slot 1</td>
</tr>
</tbody>
</table>

**Machine type and model label**

The machine type and model label identifies your computer. When you contact Lenovo for help, the machine type and model information helps support technicians to identify your computer and provide faster service.

The machine type and model label is attached on the side of your computer as shown.

![Machine type and model label](image)

*Figure 3. Machine type and model label*
Chapter 2. I/O box

Overview

Note: Depending on your computer model, the I/O box might be optional.

Figure 4. I/O box overview

| 1 | USB 2.0 connectors (2) | 2 | Serial connector (optional) |
| 3 | USB 2.0 connectors (2) | 4 | USB 3.0 connectors (2) |
| 5 | USB 3.0 connector (for connecting to the computer) |

Using the I/O box

When you use the I/O box with the ThinkStation® tiny computer, note the following:

- The I/O box supports a maximum current rating of 5 A. It is recommended that you connect low-current devices to the I/O box and connect high-current devices directly to the ThinkStation tiny computer to ensure the best performance of the devices.

- The USB 2.0 connectors and USB 3.0 connectors on the I/O box provide a current of 500 mA and 900 mA current, respectively. When you connect a high-current storage drive to only one USB connector, the system might not recognize the device. You can connect the storage drive to two USB connectors on the I/O box.

- The serial connector does not support hot swapping. Do not connect a device to the connector or remove a device from the connector while the system is running.

- The connectors on the I/O box cannot be enabled or disabled individually. To enable or disable any of the connectors on the I/O box, enable or disable the USB connectors on the rear of the computer.
• The I/O box enables you to wake up the computer from standby mode through operations on devices connected to the I/O box connectors.
Chapter 3. Computer locks

Attaching a Kensington-style cable lock

You can use a Kensington-style cable lock to secure your computer to a desk, table, or other non-permanent 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. Kensington-style cable lock
Chapter 4. Features

Power supply
- 135 watt automatic voltage-sensing power supply

Storage drives
- Up to three storage drives

**Note:** If your computer comes with a discrete graphics card, the computer can support up to two storage drives only.

Video features
The integrated graphics card supports the following:
- DisplayPort connectors

The optional discrete graphics card supports the following and provides enhanced display capability and experience:
- Mini DisplayPort connectors

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

Input/Output (I/O) features
- Audio connectors (headset and microphone)
- DisplayPort connectors
- Ethernet connector
- Serial connectors (optional)
- USB connectors

Expansion
- External I/O box (optional)
- External optical drive box (optional)
- Memory slots
- M.2 storage drive slots
- PCI Express graphics card slot

Network features
- Ethernet LAN
- Wireless LAN (optional)
- Bluetooth (optional)
Physical dimensions

- Width: 35 mm (1.4 inches)
- Height: 183 mm (7.2 inches)
- Depth: 179 mm (7.1 inches)

Weight (without the package)

- Maximum configuration as shipped: 1.3 kg (2.9 lb)
Chapter 5. Replacing hardware

This chapter provides information about the following topics:

- “Before replacing hardware” on page 11
- “Handling static-sensitive devices” on page 11
- “Knowing replaceable parts” on page 12
- “Replacing CRUs” on page 14
- “Replacing FRUs” on page 41

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 (Customer Replaceable Units). 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.

**Notes:**
- Some of the following parts might look different from the one illustrated.
• Some of the following parts are optional on some models.

**Figure 6. CRUs and FRUs**

<table>
<thead>
<tr>
<th>Number</th>
<th>FRU description</th>
<th>Self-service CRU</th>
<th>Optional-service CRU</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vertical stand</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>Power adapter bracket</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>Power adapter</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>Power cord</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Number</td>
<td>FRU description</td>
<td>Self-service CRU</td>
<td>Optional-service CRU</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------</td>
<td>------------------</td>
<td>----------------------</td>
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<tr>
<td>5</td>
<td>Computer cover</td>
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<tr>
<td>6</td>
<td>Microprocessor</td>
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<td>No</td>
</tr>
<tr>
<td>7</td>
<td>Coin-cell battery</td>
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<td>No</td>
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<tr>
<td>8</td>
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<td>Yes</td>
</tr>
<tr>
<td>9</td>
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<td>10</td>
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<td>Wi-Fi antennas</td>
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<td>26</td>
<td>Heat sink</td>
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<td>VESA® mount bracket</td>
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<td>External optical drive</td>
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<tr>
<td>31</td>
<td>Keyboard or wireless keyboard</td>
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</tr>
<tr>
<td>32</td>
<td>Mouse or wireless mouse</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

**Replacing CRUs**

**Before replacing CRUs**

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

To check the locations of CRUs, see “Knowing replaceable parts” on page 12.

**Note:** To replace other parts except the CRUs mentioned in the following sections, contact a Lenovo service technician. The support phone numbers are available at http://www.lenovo.com/support/phone.
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](image)

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](image)
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.
a. Open the battery compartment.

*Figure 10. Opening the battery compartment*

b. Take out the USB dongle.

*Figure 11. Taking out the USB dongle*
c. Connect the USB dongle to a USB connector.

![Connecting the USB dongle to a USB connector](image1.jpg)

*Figure 12. Connecting the USB dongle to a USB connector*

d. Install the mouse batteries.

![Installing the mouse batteries](image2.jpg)

*Figure 13. Installing the mouse batteries*
e. Close the battery compartment cover.

![Image of closing the battery compartment cover]

*Figure 14. Closing the battery compartment cover*

f. Push the power switch to the on position.

![Image of pushing the power switch to the on position]

*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.

a. Remove the power adapter.

*Figure 16. Removing the power adapter*
b. Remove the power cord.

![Figure 17. Removing the power cord](image17)

c. Install the power cord.

![Figure 18. Installing the power cord](image18)
d. Install the power adapter.

![Image of power adapter installation](image)

*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.
a. Remove the vertical stand.

![Figure 20. Removing the vertical stand](image)

b. Install the vertical stand.

![Figure 21. Installing the vertical stand](image)

**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.
   a. Remove the VESA mount bracket.

   Figure 22. Removing the VESA mount bracket

b. Install 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.
   a. Remove the external optical drive box.

*Figure 24. Removing the external optical drive box*
b. Remove the external optical drive.

Figure 25. Removing the external optical drive

c. Install the external optical drive.

Figure 26. Installing the external optical drive
d. Install the external optical drive box.

![Figure 27. Installing the external optical drive box](image)

**Replacing the external I/O box**

**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 and the external I/O box.
3. Replace the external I/O box.
a. Remove the external I/O box.

Figure 28. Removing the external I/O box

b. Install the external I/O box.

Figure 29. Installing the external I/O 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.
   a. Remove the power adapter bracket.

![Figure 30. Removing the power adapter bracket](image)

b. Install the power adapter bracket.

![Figure 31. Installing the power adapter bracket](image)
Removing the computer cover

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. Remove the computer cover.

![Removing the computer cover](image)

Figure 32. Removing the computer cover

Replacing the storage drive

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

1. Remove any media from the drives and turn off all connected devices and the computer.
2. Disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.
3. Remove the computer cover. For details, see “Removing the computer cover” on page 30.
4. Disconnect the storage drive cables from the system board. See “System board” on page 3.
5. Replace the storage drive.
a. Remove the storage drive.

Figure 33. Removing the storage drive

b. Remove the storage drive bracket.

Figure 34. Removing the storage drive bracket
c. Install the storage drive bracket.

**Figure 35. Installing the storage drive bracket**

d. Install the storage drive.

**Figure 36. Installing the storage drive**

6. Connect the storage drive cables to the system board. See “System board” on page 3.
7. Reinstall the computer cover and reconnect the cables. For details, see “Completing the parts replacement” on page 40.

**Replacing the internal speaker**

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

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

3. Remove the computer cover. For details, see “Removing the computer cover” on page 30.

4. Disconnect the internal speaker cable from the internal speaker connector on the system board. See “System board” on page 3.

5. Replace the internal speaker.
   a. Remove the internal speaker.

   ![Figure 37. Removing the internal speaker](image)

   b. Install the internal speaker.

   ![Figure 38. Installing the internal speaker](image)

6. Connect the internal speaker cable to the internal speaker connector on the system board. See “System board” on page 3.
7. Reinstall the computer cover and reconnect the cables. For details, see “Completing the parts replacement” on page 40.

**Replacing the bottom cover**

*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. Remove the computer cover. For details, see “Removing the computer cover” on page 30.
4. Replace the bottom cover.
   a. Remove the bottom cover.

*Figure 39. Removing the bottom cover*
b. Install the bottom cover.

Figure 40. Installing the bottom cover

5. Reinstall the computer cover and reconnect the cables. For details, see “Completing the parts replacement” on page 40.

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. See “System board” on page 3 for the locations of the slots.

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 the computer cover. For details, see “Removing the computer cover” on page 30.
4. Remove the bottom cover. For details, see “Replacing the bottom cover” on page 34.
5. Replace the memory module.
a. Open the memory module retainer.

Figure 41. Opening the memory module retainer

b. Remove the memory module.

Figure 42. Removing the memory module
c. Install the memory module.

![Image of installing the memory module]

*Figure 43. Installing the memory module*

d. Close the memory module retainer.

![Image of closing the memory module retainer]

*Figure 44. Closing the memory module retainer*

6. Reinstall the computer cover and reconnect the cables. For details, see “Completing the parts replacement” on page 40.

**Replacing the M.2 storage drive**

**Attention:** Do not open your computer or attempt any repairs before reading the *Important Product Information Guide.*
If your computer supports one M.2 storage drive, install the drive into the M.2 storage drive slot 1. If your computer supports two M.2 storage drives, install one drive into the M.2 storage drive slot 1 first and then install the other into the slot 2. See “System board” on page 3 for the locations of the slots.

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 the computer cover. For details, see “Removing the computer cover” on page 30.
4. Remove the bottom cover. For details, see “Replacing the bottom cover” on page 34.
5. Replace the M.2 storage drive.
   a. Unlock the M.2 storage drive clip.
b. Remove the M.2 storage drive.

![Figure 46. Removing the M.2 storage drive](image)

c. Install the M.2 storage drive.

![Figure 47. Installing the M.2 storage drive](image)
d. Lock the M.2 storage drive clip.

6. Reinstall the computer cover and reconnect the cables. For details, see “Completing the parts replacement” on page 40.

**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” on page 3 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. Install the computer cover.

 Figure 49. Installing the computer cover

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. See Chapter 3 “Computer locks” on page 7.
7. Reconnect the external cables and power cords to the corresponding connectors on the computer.
   See “Front view” on page 1 or “Rear view” on page 2 for the locations of various components in your computer.

## Replacing FRUs

### Before replacing FRUs

Before replacing any Field Replaceable Units (FRUs), 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, unrepeatable 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 “Knowing replaceable parts” on page 12.
Attention: Do not open your computer or attempt any repair before reading the Important Product Information Guide.

Replacing the system fan

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 the computer cover. For details, see “Removing the computer cover” on page 30.
4. Remove the storage drive. For details, see “Replacing the storage drive” on page 30.
5. Remove the internal speaker. For details, see “Replacing the internal speaker” on page 32.
6. Release the illuminated red dot cable from the system fan.
7. Disconnect the system fan cable from the system fan connector on the system board. See “System board” on page 3.
8. Replace the system fan.
   a. Remove the system fan.

Figure 50. Removing the system fan
b. Install the system fan.

9. Connect the system fan cable to the system fan connector on the system board. See “System board” on page 3.

10. Install the illuminated red dot cable to the new system fan.

11. Reinstall the computer cover and reconnect the cables. For details, see “Completing the parts replacement” on page 40.

**Replacing the illuminated red dot cable**

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

1. Remove the computer cover. For details, see “Removing the computer cover” on page 30.

2. Disconnect the illuminated red dot cable from the system board. See “System board” on page 3.

3. Replace the illuminated red dot cable.
a. Remove the illuminated red dot cable.

![Figure 52. Removing the illuminated red dot cable](image)

b. Install the illuminated red dot cable.

![Figure 53. Installing the illuminated red dot cable](image)

4. Connect the illuminated red dot cable to the system board. See “System board” on page 3.

5. Reinstall the computer cover and reconnect the cables. For details, see “Completing the parts replacement” on page 40.

**Replacing the advanced 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” on page 30.
2. Remove the storage drive. For details, see “Replacing the storage drive” on page 30.
3. Remove the system fan. For details, see “Replacing the system fan” on page 42.
4. Remove the PCI Express card. For details, see “Replacing the PCI Express card and PCI Express card adapter” on page 53.
5. Disconnect the advanced speaker cable from the advanced speaker connector on the system board. See “System board” on page 3.
6. Replace the advanced speaker.
   a. Remove the advanced speaker.

![Figure 54. Removing the advanced speaker](image)

b. Install the advanced speaker.

![Figure 55. Installing the advanced speaker](image)
7. Connect the advanced speaker cable to the advanced speaker connector on the system board. See “System board” on page 3.
8. Reinstall the computer cover and reconnect the cables. For details, see “Completing the parts replacement” on page 40.

**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. For details, see “Removing the computer cover” on page 30.
2. Remove the storage drive. For details, see “Replacing the storage drive” on page 30.
3. Remove the system fan. For details, see “Replacing the system fan” on page 42.
4. Remove the PCI Express card. For details, see “Replacing the PCI Express card and PCI Express card adapter” on page 53.
5. Replace the front Wi-Fi antenna.
   a. Disconnect the front Wi-Fi antenna cable.

*Figure 56. Disconnecting the front Wi-Fi antenna cable*
b. Remove the front Wi-Fi antenna.

Figure 57. Removing the front Wi-Fi antenna

c. Install the front Wi-Fi antenna.

Figure 58. Installing the front Wi-Fi antenna
d. Connect the front Wi-Fi antenna cable to the Wi-Fi card.

![Image](image.png)

*Figure 59. Connecting the front Wi-Fi antenna cable to the Wi-Fi card*

6. Reinstall the computer cover and reconnect the cables. For details, see “Completing the parts replacement” on page 40.

**Replacing the rear Wi-Fi antenna**

1. Remove the computer cover. For details, see “Removing the computer cover” on page 30.
2. Remove the storage drive. For details, see “Replacing the storage drive” on page 30.
3. Remove the system fan. For details, see “Replacing the system fan” on page 42.
4. Remove the PCI Express card. For details, see “Replacing the PCI Express card and PCI Express card adapter” on page 53.
5. Remove the PCI Express card. For details, see “Replacing the PCI Express card and PCI Express card adapter” on page 53.
6. Disconnect the rear Wi-Fi antenna cable from the Wi-Fi card.
7. Replace the rear Wi-Fi antenna.

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

Figure 60. Removing the rear Wi-Fi antenna

b. Remove the screw cover that secures the rear Wi-Fi antenna cable.

Figure 61. Removing the screw cover that secures the rear Wi-Fi antenna cable
c. Remove the rear Wi-Fi antenna cable.

Figure 62. Removing the rear Wi-Fi antenna cable

d. Install the rear Wi-Fi antenna cable.

Figure 63. Installing the rear Wi-Fi antenna cable
e. Install the screw cover to secure the rear Wi-Fi antenna cable.

![Figure 64. Installing the screw cover to secure the rear Wi-Fi antenna cable](image)

f. Install the rear Wi-Fi antenna.

![Figure 65. Installing the rear Wi-Fi antenna](image)

8. Connect the rear Wi-Fi antenna cable to the Wi-Fi card.
9. Reinstall the computer cover and reconnect the cables. For details, see “Completing the parts replacement” on page 40.

**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. For details, see “Removing the computer cover” on page 30.
2. Remove the storage drive. For details, see “Replacing the storage drive” on page 30.
3. Replace the storage drive cable.
   a. Remove the storage drive cable.

![Image of storage drive cable removal](image1.png)

*Figure 66. Removing the storage drive cable*

b. Install the storage drive cable.

![Image of storage drive cable installation](image2.png)

*Figure 67. Installing the storage drive cable*

4. Reinstall the computer cover and reconnect the cables. For details, see “Completing the parts replacement” on page 40.
Replacing the PCI Express card and PCI Express card 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. Remove the computer cover. For details, see “Removing the computer cover” on page 30.
4. Remove the internal speaker. For details, see “Replacing the internal speaker” on page 32.
5. Remove the system fan. For details, see “Replacing the system fan” on page 42.
6. Replace the PCI Express card and PCI Express card adapter.
   a. Remove the PCI Express card.

*Figure 68. Removing the PCI Express card*
b. Remove the PCI Express card adapter.

Figure 69. Removing the PCI Express card adapter

c. Install the PCI Express card adapter.

Figure 70. Installing the PCI Express card adapter
d. Install the PCI Express card.

7. Reinstall the computer cover and reconnect the cables. For details, see “Completing the parts replacement” on page 40.

Replacing the Wi-Fi card

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

1. Remove any media from the drives and turn off all connected devices and the computer.
2. Disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.
3. Remove the computer cover. For details, see “Removing the computer cover” on page 30.
4. Remove the storage drive. For details, see “Replacing the storage drive” on page 30.
5. Remove the system fan. For details, see “Replacing the system fan” on page 42.
6. Remove the PCI Express card. For details, see “Replacing the PCI Express card and PCI Express card adapter” on page 53.
7. Depending on your computer model, refer to one of the following to replace the Wi-Fi card.
   - Type 1
     a. Remove the Wi-Fi card shield.
Figure 72. Removing the Wi-Fi card shield

a. Disconnect the Wi-Fi antenna cables.

Figure 73. Disconnecting the Wi-Fi antenna cables
a. Remove the Wi-Fi card.

Figure 74. Removing the Wi-Fi card

a. Install the Wi-Fi card.
Figure 75. Installing the Wi-Fi card

a. Connect the Wi-Fi antenna cables.
a. Install the Wi-Fi card shield.

Figure 77. Installing the Wi-Fi card shield

- Type 2
  a. Remove the Wi-Fi card shield.
Figure 78. Removing the Wi-Fi card shield

a. Disconnect the Wi-Fi antenna cables.
Figure 79. Disconnecting the Wi-Fi antenna cables

a. Remove the Wi-Fi card.
Figure 80. Removing the Wi-Fi card

a. Install the Wi-Fi card.
Figure 81. Installing the Wi-Fi card

a. Connect the Wi-Fi antenna cables.

Figure 82. Connecting the Wi-Fi antenna cables
a. Install the Wi-Fi card shield.

8. Reinstall the computer cover and reconnect the cables. For details, see “Completing the parts replacement” on page 40.

**Replacing the heat sink**

**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” on page 30.
2. Remove the storage drive. For details, see “Replacing the storage drive” on page 30.
3. Remove the internal speaker. For details, see “Replacing the internal speaker” on page 32.
4. Remove the system fan. For details, see “Replacing the system fan” on page 42.
5. Remove the PCI Express card. For details, see “Replacing the PCI Express card and PCI Express card adapter” on page 53.
6. Replace the heat sink.
a. Loosen the screws that secure the heat sink.

Figure 84. Loosening the screws that secure the heat sink

b. Remove the heat sink.

Figure 85. Removing the heat sink
c. Install the heat sink.

Figure 86. Installing the heat sink

d. Tighten the screws to secure the heat sink.

Figure 87. Tightening the screws to secure the heat sink

7. Reinstall the computer cover and reconnect the cables. For details, see “Completing the parts replacement” on page 40.

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” on page 30.
2. Remove the storage drive. For details, see “Replacing the storage drive” on page 30.
3. Remove the internal speaker. For details, see “Replacing the internal speaker” on page 32.
4. Remove the system fan. For details, see “Replacing the system fan” on page 42.
5. Remove the PCI Express card. For details, see “Replacing the PCI Express card and PCI Express card adapter” on page 53.
6. Remove the heat sink. For details, see “Replacing the heat sink” on page 64.
7. 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.

a. Unlock the microprocessor socket retainer.

b. Pivot the microprocessor socket upward.

Figure 88. Unlocking the microprocessor socket retainer
c. Remove the microprocessor.
d. Install the microprocessor.

Figure 91. Installing the microprocessor

e. Pivot the microprocessor socket downward.

Figure 92. Pivoting the microprocessor socket downward
f. Lock the microprocessor socket retainer.

8. Reinstall the computer cover and reconnect the cables. For details, see “Completing the parts replacement” on page 40.

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. For details, see “Removing the computer cover” on page 30.
2. Remove the storage drive. For details, see “Replacing the storage drive” on page 30.
3. Remove the internal speaker. For details, see “Replacing the internal speaker” on page 32.
4. Remove the system fan. For details, see “Replacing the system fan” on page 42.
5. Remove the PCI Express card. For details, see “Replacing the PCI Express card and PCI Express card adapter” on page 53.
6. Remove the heat sink. For details, see “Replacing the heat sink” on page 64.
7. Replace the coin-cell battery.
a. Release the coin-cell battery.

Figure 94. Releasing the coin-cell battery

b. Remove the coin-cell battery.

Figure 95. Removing the coin-cell battery

c. Install the coin-cell battery.

Figure 96. Installing the coin-cell battery
d. Press the coin-cell battery downward until it snaps into position.

![Image](image.png)

**Figure 97. Pressing the coin-cell battery downward until it snaps into position**

8. Reinstall the computer cover and reconnect the cables. For details, see “Completing the parts replacement” on page 40.

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

**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. For details, see “Removing the computer cover” on page 30.
2. Remove the storage drive. For details, see “Replacing the storage drive” on page 30.
3. Remove the internal speaker. For details, see “Replacing the internal speaker” on page 32.
4. Remove the system fan. For details, see “Replacing the system fan” on page 42.
5. Remove the PCI Express card. For details, see “Replacing the PCI Express card and PCI Express card adapter” on page 53.
6. Remove the heat sink. For details, see “Replacing the heat sink” on page 64.
7. Remove the Wi-Fi card. For details, see “Replacing the Wi-Fi card” on page 55.
8. Remove the Wi-Fi antennas. For details, see “Replacing the Wi-Fi antennas” on page 46.
9. Remove the microprocessor. For details, see “Replacing the microprocessor” on page 66.
10. Remove the bottom cover. For details, see “Replacing the bottom cover” on page 34.
11. Remove the memory module. For details, see “Replacing the memory module” on page 35.
12. Remove the M.2 storage drive. For details, see “Replacing the M.2 storage drive” on page 37.
13. Remove the antenna bracket. For details, see “Replacing the antenna bracket” on page 3.
14. Record the cable routing and cable connections, and then disconnect all cables from the system board. See “System board” on page 3.
15. Replace the antenna bracket.
a. Remove the antenna bracket.

Figure 98. Removing the antenna bracket

b. Install the antenna bracket.

Figure 99. Installing the antenna bracket

16. Reinstall the computer cover and reconnect the cables. For details, see “Completing the parts replacement” on page 40.

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. For details, see “Removing the computer cover” on page 30.
2. Remove the storage drive. For details, see “Replacing the storage drive” on page 30.
3. Remove the internal speaker. For details, see “Replacing the internal speaker” on page 32.
4. Remove the system fan. For details, see “Replacing the system fan” on page 42.
5. Remove the PCI Express card. For details, see “Replacing the PCI Express card and PCI Express card adapter” on page 53.
6. Remove the heat sink. For details, see “Replacing the heat sink” on page 64.
7. Remove the Wi-Fi card. For details, see “Replacing the Wi-Fi card” on page 55.
8. Remove the Wi-Fi antennas. For details, see “Replacing the Wi-Fi antennas” on page 46.
9. Remove the microprocessor. For details, see “Replacing the microprocessor” on page 66.
10. Remove the bottom cover. For details, see “Replacing the bottom cover” on page 34.
11. Remove the memory module. For details, see “Replacing the memory module” on page 35.
12. Remove the M.2 storage drive. For details, see “Replacing the M.2 storage drive” on page 37.
13. Remove the antenna bracket. For details, see “Replacing the system board and chassis” on page 72.
14. Record the cable routing and cable connections, and then disconnect all cables from the system board. See “System board” on page 3.
15. Replace the system board and chassis.

**Note:** Carefully handle the system board by its edges.

a. Remove the screws that secure the system board.

*Figure 100. Removing the screws that secure the system board*
b. Remove the system board.

Figure 101. Removing the system board

c. Install the system board.

Figure 102. Installing the system board
d. Install the screws to secure the system board.

Figure 103. 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 3.

17. Reinstall the computer cover and reconnect the cables. For details, see “Completing the parts replacement” on page 40.
Appendix A. Notices

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