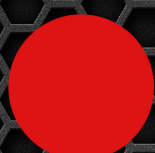


ThinkStation P3 Ultra User Guide

Lenovo
ThinkStation



Lenovo

Read this first

Before using this documentation and the product it supports, ensure that you read and understand the following:

- *Safety and Warranty Guide*
- *Generic Safety and Compliance Notices*
- *Setup Guide*

First Edition (June 2023)

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Discover your Lenovo computer

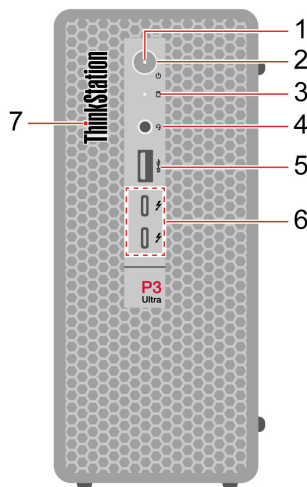
Thank you for choosing a Lenovo® computer! We are dedicated to delivering the best solution to you.

Before starting your tour, please read the following information:

- Illustrations in this documentation might look different from your product.
- Depending on the model, some optional accessories, features, software programs, and user interface instructions might not be applicable to your computer.
- Documentation content is subject to change without notice. To get the latest documentation, go to <https://pcsupport.lenovo.com>.

Chapter 1. Meet your computer

Front



Item	Description	Item	Description
1.	Power indicator	2.	Power button
3.	Storage drive activity indicator	4.	Headset connector
5.	USB-A 3.2 Gen 2 connector	6.	USB-C® (Thunderbolt™ 4) connectors
7	ThinkStation® LED		

Statement on USB transfer rate

Depending on many factors such as the processing capability of the host and peripheral devices, file attributes, and other factors related to system configuration and operating environments, the actual transfer rate using the various USB connectors on this device will vary and will be slower than the data rate listed below for each corresponding device.

Note: Depending on the model, some USB connectors might not be available on your computer.

USB device	Data rate (Gbit/s)
3.2 Gen 1	5
3.2 Gen 2	10
3.2 Gen 2 × 2	20
Thunderbolt 3	40
Thunderbolt 4	40

Power indicator

Show the system status of your computer.

- **On:** The computer is starting up or working.
- **Off:** The computer is off or in hibernation mode.
- **Blinking:** The computer is in sleep mode.

Headset connector

The headset connector is compatible with:

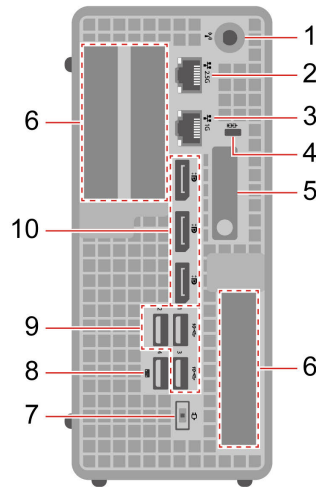
- Headphones or earphones with a 3.5mm (0.14 inch), TRS (3-pole) plug
- Headsets with a 3.5mm (0.14 inch), CTIA-compliant TRRS (4-pole) plug

Note: This headset connector does not support standalone external microphones with a TRS (3-pole) plug or headsets with an OMTP-compliant TRRS (4-pole) plug.

Related topics

- “USB specifications” on page 7.
- “Transfer data” on page 12.

Rear



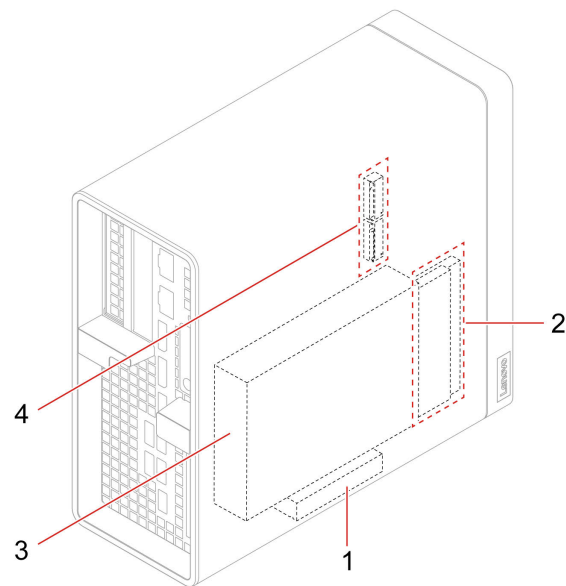
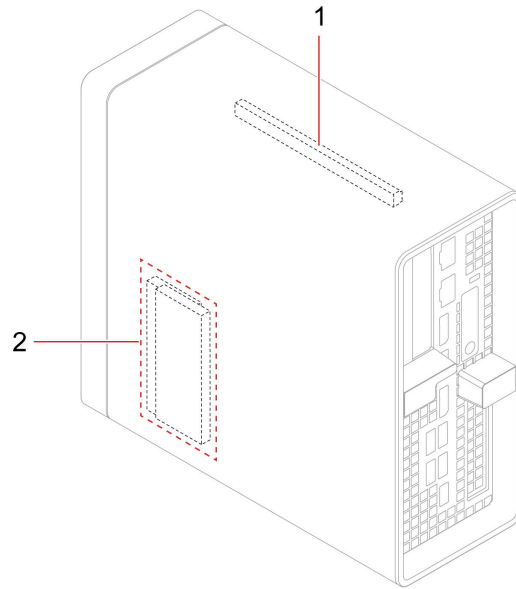
Item	Description	Item	Description
1.	Wi-Fi® antenna slot	2.	Ethernet connector (2.5 GbE)
3.	Ethernet connector (1 GbE)	4.	Security-lock slot
5.	Chassis latch	6.	PCI-Express card area
7.	Power cord connector	8.	USB-A 3.2 Gen 2 connector (smart power on)
9.	USB-A 3.2 Gen 2 connectors	10.	DisplayPort™ out connectors

Related topics

- “USB specifications” on page 7.
- “Lock the computer” on page 11.
- “Connect an external display” on page 11.
- “Enable or disable the smart power-on feature (for selected models)” on page 20.

Expand your computer

Internal storage drives are devices that your computer uses to read and store data. You can add drives to your computer to increase storage capacity and enable your computer to read other types of media.



Item	Description
1. PCI-Express card slots	<p>You can install the following compatible PCI-Express cards in the PCI-Express card slots:</p> <ul style="list-style-type: none"> • The integrated graphics card: <ul style="list-style-type: none"> – DisplayPort out connectors (2) – Mini DisplayPort out connectors (3) – Mini DisplayPort out connectors (4) • Two-port USB-A 3.2 Gen 1 expansion card • Two-port USB-C (3.2 Gen 2) expansion card • Two-port Ethernet expansion card • Four-port Ethernet expansion card • Four-port Serial expansion card <p>Notes:</p> <ul style="list-style-type: none"> • The PCI-Express x16 card slot is the primary slot which supports the integrated graphics card only. • The PCI-Express x8 card slot is the secondary slot. You can install the integrated graphics card here when the PCI-Express x16 card slot is occupied.
2. Memory slots	You can install up to four memory cards in the memory slots.
3. 2.5-inch storage drive bay*	You can install one 2.5-inch hard disk drive in the storage drive bay.
4. M.2 solid-state drive slots	You can install one or two M.2 solid-state drives in the M.2 solid-state drive slots.

* for selected models

Related topics

- “PCI-Express card” on page 49
- “Memory module” on page 45
- “M.2 solid-state drive” on page 34
- “2.5-inch hard disk drive” on page 36

Specifications

Specification	Description
Dimensions	<ul style="list-style-type: none">• Width: 87 mm (3.43 inches)• Height: 202 mm (7.95 inches)• Depth: 223 mm (8.78 inches)
Weight (without packaging)	Maximum configuration as shipped: 3.6 kg (7.94 lb)
Hardware configuration	Type Device Manager in the Windows search box and then press Enter. Type the administrator password or provide confirmation, if prompted.
Power supply	<ul style="list-style-type: none">• 170-watt automatic voltage-sensing power supply• 230-watt automatic voltage-sensing power supply• 300-watt automatic voltage-sensing power supply
Electrical input	<ul style="list-style-type: none">• Input voltage: From 100 V ac to 240 V ac• Input frequency: 50/60 Hz
Memory	Up to four double data rate 5 (DDR5) small outline dual in-line memory module (SODIMM) Maximum memory capacity: 128 GB
Storage device	<ul style="list-style-type: none">• 2.5-inch hard disk drive*• Up to two M.2 solid-state drives <p>To view the storage drive capacity of your computer, type Disk Management in the Windows search box and then press Enter.</p> <p>Note: The storage drive capacity indicated by the system is less than the nominal capacity.</p>
Network features	<ul style="list-style-type: none">• Bluetooth*• Ethernet LAN• Wireless LAN*

* for selected models

Operating environment

Maximum altitude (without pressurization)

- Operating: From 0 m (0 ft) to 3048 m (10 000 ft)
- Storage: From 0 m (0 ft) to 12192 m (40 000 ft)

Temperature

- Operating: From 5°C (41°F) to 35°C (95°F)
- Storage: From -40°C (-40°F) to 60°C (140°F)

Relative humidity

- Operating: 20%-80% (non-condensing)

- Storage: 10%–90% (non-condensing)

System memory speed

The Intel Xeon® or Intel Core™ microprocessor families compatible with this ThinkStation computer feature an integrated memory controller. The memory controller provides the microprocessor with direct access to the system memory. Therefore, the system memory speed will be determined by the memory module type, frequency, size (capacity), the number of memory modules installed, and the microprocessor model.

Notes:

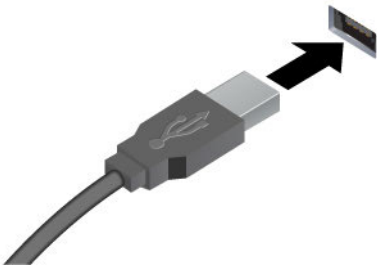



- The actual system memory speed of the memory modules varies depending on the microprocessor model. For example, your computer comes with 4800 MT/s memory modules, but the microprocessor only supports up to 4000 MT/s memory modules. Then the system memory speed will be no faster than 4000 MT/s.
- The microprocessor models supported in your computer might vary. For a list of supported microprocessor models, contact the Lenovo Customer Support Center.
- The ECC memory modules are not supported on the computer models with Intel Core i5 13400T or i3-13100 microprocessors..

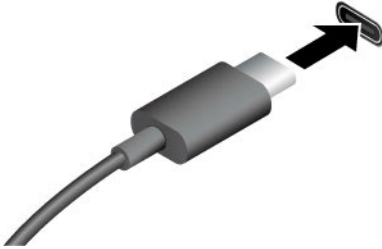




Refer to the following information about the system memory speed:

- **Memory module types:**
 - DDR5 ECC 4800 SoDIMMs, DDR5 ECC 5600 SoDIMMs
 - DDR5 non-ECC 4800 SoDIMMs, DDR5 non-ECC 5600 SoDIMMs
- **Memory module operating voltage:** 1.2 V
- **Memory module speed:**
 - 4800 MT/s
 - 5600 MT/s

USB specifications

Note: Depending on the model, some USB connectors might not be available on your computer.

Connector name	Description
 <ul style="list-style-type: none"> <li data-bbox="168 558 488 585">•  USB-A 2.0 connector <li data-bbox="168 600 560 627">•  USB-A 3.2 Gen 1 connector <li data-bbox="168 642 560 669">•  USB-A 3.2 Gen 2 connector 	<p>Connect USB-A compatible devices, such as a USB-A keyboard, USB-A mouse, USB-A storage device, or USB-A printer.</p>

 <ul style="list-style-type: none"> <li data-bbox="168 1010 573 1037">•  USB-C (3.2 Gen 1) connector <li data-bbox="168 1058 573 1085">•  USB-C (3.2 Gen 2) connector <li data-bbox="168 1106 618 1134">•  USB-C (Thunderbolt 3) connector <li data-bbox="168 1155 618 1182">•  USB-C (Thunderbolt 4) connector 	<ul style="list-style-type: none"> <li data-bbox="808 808 1373 863">• Charge USB-C compatible devices with the output voltage and current of 5 V and 3 A. <li data-bbox="808 877 1308 984">• Connect to an external display: <ul style="list-style-type: none"> <li data-bbox="834 919 1308 947">– USB-C to VGA: 1920 x 1200 pixels, 60 Hz <li data-bbox="834 961 1292 989">– USB-C to DP: 3840 x 2160 pixels, 60 Hz <li data-bbox="808 999 1419 1083">• Connect to USB-C accessories to help expand your computer functionality. To purchase USB-C accessories, go to https://www.lenovo.com/accessories.
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The Vantage app

The preinstalled Vantage app is a customized one-stop solution to help you maintain your computer with automated updates and fixes, configure hardware settings, and get personalized support.

To access the Vantage app, type Vantage in the Windows search box.

Key features

The Vantage app enables you to:

- Know the device status easily and customize device settings.
- Download and install UEFI BIOS, firmware and driver updates to keep your computer up-to-date.
- Monitor your computer health, and secure your computer against outside threats.
- Scan your computer hardware and diagnose hardware problems.
- Look up warranty status (online).
- Access *User Guide* and helpful articles.

Notes:

- The available features vary depending on the computer model.

- The Vantage app makes periodic updates of the features to keep improving your experience with your computer. The description of features might be different from that on your actual user interface.

Chapter 2. Get started with your computer

Connect an external display

Connect a projector or a monitor to your computer to give presentations or expand your workspace.

Connect a wireless display

Ensure that both your computer and the wireless display support Miracast®.

Press Windows logo key + K and then select a wireless display to connect.

Change display settings

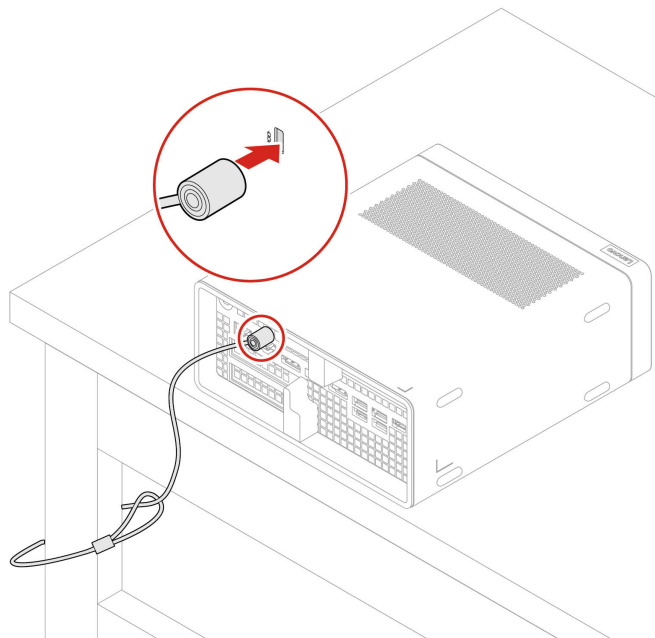
1. Right-click a blank area on the desktop and select display settings.
2. Select the display that you want to configure and change display settings of your preference.

Lock the computer

Note: Lenovo makes no comments, judgments, or warranties about the function, quality, or performance of the locking device and security feature. You can purchase computer locks from Lenovo.

Security lock

Lock your computer to a desk, table, or other fixtures through a security lock.



Access networks

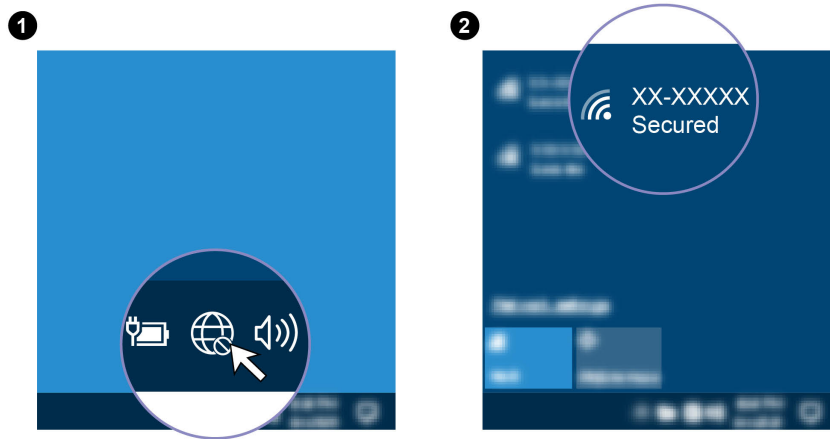
This section helps you access networks through connecting to a wired or wireless network.

Connect to the wired Ethernet

Connect your computer to a local network through the Ethernet connector on your computer with an Ethernet cable.

Connect to Wi-Fi networks (for selected models)

Click the network icon in the Windows® notification area, and then select a network for connection. Provide required information, if needed.



Connect to a Bluetooth-enabled device (for selected models)

You can connect all types of Bluetooth-enabled devices to your computer, such as a keyboard, a mouse, a smartphone, or speakers. Place the device that you are attempting to connect to less than 10 meters (33 feet) from the computer.



1. Type Bluetooth in the Windows search box and then press Enter.
2. Turn on Bluetooth, if it is off.
3. Select a Bluetooth device, and then follow the on-screen instructions.

Diagnostics

Use diagnostic solutions to test hardware components and report operating-system-controlled settings that interfere with the correct operation of your computer.

Lenovo diagnostic tools

For information about Lenovo diagnostic tools, go to:
<https://pcsupport.lenovo.com/lenovodiagnosicsolutions>

For more information, go to:

- <https://pcsupport.lenovo.com/lenovodiagnosicsolutions>
- <https://www.thinkworkstationsoftware.com/diags>

The Vantage app

The Vantage app is preinstalled on your computer. To diagnose problems with the Vantage app:

1. Type Vantage in the Windows search box and press Enter.
2. Follow the on-screen instructions and run a hardware scan.

If you are unable to isolate and resolve the problem after running the Vantage app, save and print the log files created by the program. You might need the log files when you speak to a Lenovo technical support representative.

Troubleshooting and FAQs

This section lists online access to troubleshoot your computer and to frequently asked questions in Lenovo forums. For more information, go to: <https://www.lenovo.com/tips>, or <https://forums.lenovo.com>.

Recovery

Use the following recovery options to reset or restore your computer when your computer comes with issues.

- Use Lenovo recovery options.
 1. Go to <https://support.lenovo.com/HowToCreateLenovoRecovery>.
 2. Follow the on-screen instructions.
- Use Windows recovery options.
 1. Go to <https://pcsupport.lenovo.com>.
 2. Detect your computer or manually select your computer model.
 3. Navigate to the troubleshooting menu to diagnose the operating system for recovery instructions.

Chapter 3. Advanced configurations

Set the power plan

For ENERGY STAR® compliant computers, the following power plan takes effect when your computers have been idle for a specified duration:

- Turn off the display: After 10 minutes
- Put the computer to sleep: After 25 minutes

To awaken the computer from Sleep mode, press any key on your keyboard.

To reset the power plan:

1. Type **Power Options** in the Windows search box and then press **Enter**.
2. Choose or customize a power plan of your preference.

Use software security solutions

The following software solutions help secure your computer and information.

- **Windows Security**

Windows Security is a software built-in to the operating system. It continually scans for malicious software, viruses, and other security threats. Besides, Windows updates are downloaded automatically to help keep your computer safe. Windows Security also enables you to manage tools including firewall, account protection, application and browser control, and so on.

- **Antivirus programs**

Lenovo preinstalls a full-version antivirus software on selected models of computer. It helps defend the computer against viruses, safeguard your identity, and keep your personal information secured.

- **Absolute Persistence**

Absolute Persistence technology is embedded in firmware. It detects changes that happen on the hardware, software, or the call-in location. It keeps you always knowing what condition the computer is in. To activate the technology, you have to purchase a subscription to Absolute.

Note: For more information about how to use these software solutions, refer to their help systems respectively.

Use BIOS security solutions

This section provides BIOS solutions to secure your computer and information.

Wipe the storage drive data

It is recommended that you wipe the storage drive data before recycling the storage drive or the computer.

To wipe the storage drive data:

1. Restart the computer. When the logo screen is displayed, press **F1** or **Fn+F1**.
2. Select **Security** → **secure wipe** → **Enabled**.
3. Press **F10** or **Fn+F10** to save the changes and exit.
4. Restart the computer. When the logo screen is displayed, press **F12** or **Fn+F12**.

5. Select **App Menu** → **secure wipe** and press Enter.
6. Select the storage drive you will wipe and click **NEXT**.
7. Select the entire storage drive or partition to wipe as desired.
8. Select the method as desired and click **NEXT**.
9. Click **Yes** to confirm your option when the prompting window is displayed.
10. If you have set a hard disk password for the storage drive, enter the password. Otherwise, set a temporary password following the on-screen instructions. Then, click **NEXT**. The wiping process begins.

Note: Duration of the wiping process varies depending on the storage drive capacity.

11. Click **Reboot** when you are prompted to reset the system, and then one of the following will happen:
 - If the system storage drive data is wiped, you will be prompted that no operating system is found.
 - If the non-system storage drive data is wiped, the computer restarts automatically.

Cover presence switch

The cover presence switch prevents the computer from logging in to the operating system when the computer cover is not properly installed or closed.

To enable the cover presence switch connector on the system board:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Security** → **Cover Tamper Detected** and press Enter.
3. Select **Enabled** and press Enter.
4. Press F10 or Fn+F10 to save the changes and exit.

If the cover presence switch is enabled and the computer cover is not correctly installed or closed, an error message will be displayed when you turn on the computer. To bypass the error message and log in to the operating system:

1. Properly install or close the computer cover.
2. Enter the BIOS menu, save and then exit.

Intel BIOS guard

The Intel® BIOS Guard module cryptographically verifies all BIOS updates. This hardware-based security helps prevent software and malware attacks on the computers BIOS.

Smart USB Protection

The Smart USB Protection function is a security function that helps prevent data from being copied from the computer to USB storage devices connected to the computer. You can set the Smart USB Protection function to one of the following modes:

- **Disabled** (default setting): You can use the USB storage devices without limitation.
- **Read Only**: You cannot copy data from the computer to the USB storage devices. However, you can access data on the USB storage devices.
- **No Access**: You cannot access the USB storage devices from the computer.

To configure the Smart USB Protection function:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Security** → **Smart USB Protection** and press Enter.
3. Select the desired setting and press Enter.

4. Press F10 or Fn+F10 to save the changes and exit.

UEFI BIOS passwords

You can set passwords in UEFI (Unified Extensible Firmware Interface) BIOS (Basic Input/Output System) to strengthen the security of your computer.

Password types

You can set a power-on password, supervisor password, system management password, or hard disk password in UEFI BIOS to prevent unauthorized access to your computer. However, you are not prompted to enter any UEFI BIOS password when your computer resumes from sleep mode.

- Power-on password

When a power-on password is set, you are prompted to enter a valid password each time the computer is turned on.

- Supervisor password

Setting a supervisor password deters unauthorized users from changing configuration settings. If you are responsible for maintaining the configuration settings of several computers, you might want to set a supervisor password.

When a supervisor password is set, you are prompted to enter a valid password each time you try to enter the BIOS menu.

If both the power-on password and supervisor password are set, you can enter either password. However, you must use your supervisor password to change any configuration settings.

- Hard disk password

Setting a hard disk password prevents unauthorized access to the data on the storage drive. When a hard disk password is set, you are prompted to enter a valid password each time you try to access the storage drive.

Note: After you set a hard disk password, your data on the storage drive is protected even if the storage drive is removed from one computer and installed in another.

- System management password (for selected models)

You can enable the system management password to have the same authority as the supervisor password to control security related features. To customize the authority of the system management password through the UEFI BIOS menu:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Security** → **System Management Password Access Control**.
3. Follow the on-screen instructions.

If you have set both the supervisor password and the system management password, the supervisor password overrides the system management password.

Set, change, and remove a password

Before you start, print these instructions.

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Security**.
3. Depending on the password type, select **Set Supervisor Password**, **Set Power-On Password**, **Set System Management Password**, or **Hard Disk Password** and press Enter.
4. Follow the on-screen instructions to set, change, or remove a password.
5. Press F10 or Fn+F10 to save the changes and exit.

You should record your passwords and store them in a safe place. If you forget the passwords, contact a Lenovo-authorized service provider to have the passwords removed.

Note: If the hard disk password is forgotten, Lenovo cannot remove the password or recover data from the storage drive.

What is UEFI BIOS

Note: The operating system settings might override any similar settings in UEFI BIOS.

UEFI BIOS is the first program that the computer runs when the computer is turned on. UEFI BIOS initializes the hardware components and loads the operating system and other programs. Your computer comes with a setup program with which you can change UEFI BIOS settings.

Enter the BIOS menu

Restart the computer. When the logo screen is displayed, press F1 or Fn+F1 to enter the BIOS menu.

Note: If you have set BIOS passwords, enter the correct passwords when prompted. You also can select **No** or press Esc to skip the password prompt and enter the BIOS menu. However, you cannot change the system configurations that are protected by passwords.

Navigate in the BIOS interface

Attention: The default configurations are already optimized for you in **boldface**. Improper change of the configurations might cause unexpected results.

Depending on your keyboard, you can navigate in the BIOS interface by pressing the following keys, or combinations of Fn and the following keys:

Key	Function
F1 or Fn+F1	General Help
Esc or Fn+Esc	Exit the submenu
↑ ↓ or Fn+↑ ↓	Locate an item
← → or Fn+← →	Move keyboard focus
+/- or Fn++/-	Change value
Enter	Enter the submenu
F9 or Fn+F9	Setup Defaults
F10 or Fn+F10	Save and exit

Change the display language of UEFI BIOS

UEFI BIOS supports three or four display languages: English, French, simplified Chinese, and Russian (for selected models).

To change the display language of UEFI BIOS:

1. Select **Main → Language** and press Enter.
2. Set the display language as desired.

Change the display mode of UEFI BIOS (for selected models)

You can use UEFI BIOS in the graphic mode or the text mode according to your needs.

The keys on the keyboard used to perform various tasks are displayed at the bottom of the screen. In addition to the keyboard, you also can use the mouse to make selections.

To change the display mode of UEFI BIOS:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Main → Setup Mode Select** and press Enter.
3. Set the display mode as desired.

Set the system date and time

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Main → System Time & Date** and press Enter.
3. Set the system date and time as desired.
4. Press F10 or Fn+F10 to save the changes and exit.

Change the priority boot order

If the computer does not boot from a device as expected, you can change the boot priority order permanently or select a temporary boot device.

Change the priority boot order permanently

1. Depending on the type of the storage device, do one of the following:
 - If the storage device is internal, go to step 2.
 - If the storage device is a disc, ensure that the computer is on or turn on the computer. Then, insert the disc into the optical drive.
 - If the storage device is an external device other than a disc, connect the storage device to the computer.
2. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
3. Select **Startup → Priority Boot Order**, and then follow the on-screen instructions to change the boot priority order.
4. You can also select the first priority device group by selecting **Startup → First Boot Device**, and then follow the on-screen instructions to select the first boot device within this group. Your computer will boot from the first boot device before trying the boot priority order you set in the previous step.
5. Press F10 or Fn+F10 to save the changes and exit.

Select a temporary boot device

Note: Not all discs and storage drives are bootable.

1. Depending on the type of the storage device, do one of the following:
 - If the storage device is internal, go to step 2.
 - If the storage device is a disc, ensure that the computer is on or turn on the computer. Then, insert the disc into the optical drive.
 - If the storage device is an external device other than a disc, connect the storage device to the computer.

2. Restart the computer. When the logo screen is displayed, press F12 or Fn+F12.
3. Select the storage device as desired and press Enter.

If you want to change the boot priority order permanently, select **Enter Setup** on Startup Device Menu and press Enter to enter the BIOS menu.

Enable or disable the configuration change detection feature

If you enable configuration change detection, when the POST detects configuration changes of some hardware devices (such as storage drives or memory modules), an error message will be displayed when you turn on the computer.

To enable or disable the configuration change detection feature:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Security → Configuration Change Detection** and press Enter.
3. Enable or disable the feature as desired.
4. Press F10 or Fn+F10 to save the changes and exit.

To bypass the error message and log in to the operating system, press F2 or Fn+F2. To clear the error message, enter the BIOS menu, save and then exit.

Enable or disable the automatic power-on feature

The Automatic Power On item in UEFI BIOS provides various options for you to make your computer start up automatically.

To enable or disable the automatic power-on feature:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Power → Automatic Power On** and press Enter.
3. Select the feature as desired and press Enter.
4. Enable or disable the feature as desired.
5. Press F10 or Fn+F10 to save the changes and exit.

Enable or disable the smart power-on feature (for selected models)

Ensure that the keyboard is connected to a USB connector supporting the smart power-on feature. With the smart power-on feature enabled, you can start up or wake up the computer from the hibernation mode by pressing Alt+P.

To enable or disable the smart power-on feature:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Power → Smart Power On** and press Enter.
3. Enable or disable the feature as desired.
4. Press F10 or Fn+F10 to save the changes and exit.

Change BIOS settings before installing a new operating system

BIOS settings vary by operating system. Change the BIOS settings before installing a new operating system.

Microsoft constantly makes updates to the Windows operating system. Before installing a particular Windows version, check the compatibility list for the Windows version. For details, go to: <https://support.lenovo.com/us/en/solutions/windows-support>

To change the BIOS settings:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. From the main interface, select **Security** → **Secure Boot** and press Enter.
3. Depending on the operating system to be installed, do one of the following:
 - To install a Windows operating system that supports secure boot, select **Enabled** for **Secure Boot**.
 - To install an operating system that does not support secure boot, such as some Linux operating systems, select **Disabled** for **Secure Boot**.
4. Press F10 or Fn+F10 to save the changes and exit.

Update UEFI BIOS

When you install a new program, device driver, or hardware component, you might need to update UEFI BIOS. You can update the BIOS from your operating system or a flash update disc (supported only on selected models).

Download and install the latest UEFI BIOS update package by one of the following methods:

- From the Vantage app:

Open the Vantage app to check the available update packages. If the latest UEFI BIOS update package is available, follow the on-screen instructions to download and install the package.
- From the Lenovo Support Web site:
 1. Go to <https://pcsupport.lenovo.com>.
 2. Download the flash BIOS update driver for the operating system version or the ISO image version (used to create a flash update disc). Then, download the installation instructions for the flash BIOS update driver you have downloaded.
 3. Print the installation instructions and follow the instructions to update the BIOS.

Recover from a BIOS update failure

1. Remove all media from the drives and turn off all connected devices.
2. Insert the BIOS update disc into the optical drive, and then turn off the computer.
3. Disconnect all power cords from electrical outlets. Then, remove any parts that impede access to the Clear CMOS/Recovery jumper.
4. Move the jumper from the standard position to the maintenance position.
5. Reconnect the power cords for the computer and the monitor to electrical outlets.
6. Turn on the computer and the monitor. When the computer beeps, the recovery process begins.
7. After the recovery process is completed, the computer will be turned off automatically.

Note: Depending on the computer model, the recovery process will take two to three minutes.
8. Disconnect all power cords from electrical outlets.
9. Move the jumper back to the standard position.
10. Reinstall all the parts that have been removed. Then, reconnect the power cords for the computer and the monitor to electrical outlets.
11. Turn on the computer and the monitor. When the logo screen is displayed, press F1 or Fn+F1.

12. To prevent data loss, ensure that BIOS settings are restored to an earlier point.
-

Clear CMOS

1. Remove all media from the drives and turn off all connected devices and the computer.
2. Disconnect all power cords from electrical outlets. Then, remove any parts that impede access to the Clear CMOS/Recovery jumper.
3. Move the jumper from the standard position to the maintenance position.
4. Reconnect the power cords for the computer and the monitor to electrical outlets.
5. Turn on the computer and the monitor. When the computer beeps, wait for approximately 10 seconds.
6. Turn off the computer by holding the power button for approximately four seconds.
7. Disconnect all power cords from electrical outlets.
8. Move the jumper back to the standard position.
9. Reinstall all the parts that have been removed. Then, reconnect the power cords for the computer and the monitor to electrical outlets.
10. Turn on the computer and the monitor. When the logo screen is displayed, press F1 or Fn+F1.
11. To prevent data loss, ensure that BIOS settings are restored to an earlier point.

Chapter 4. RAID

What is RAID

Redundant Array of Independent Disks (RAID) is a technology that provides increased storage functions and reliability through redundancy. It also can improve data storage reliability and fault tolerance compared with single-drive storage systems. Data loss resulting from a drive failure can be prevented by reconstructing missing data from the remaining drives.

When a group of independent physical storage drives is set up to use RAID technology, they are in a RAID array. This array distributes data across multiple storage drives, but the array appears to the host computer as one single storage unit. Creating and using RAID arrays provides high performance, such as the expedited I/O performance, because several drives can be accessed simultaneously.

RAID Level

Your computer must have the minimum number of storage drives installed for the supported level of RAID below:

- RAID 0: striped disk array
 - Consists of at least two storage drives
 - Supported strip size: 4 KB, 8 KB, 16 KB, 32 KB, 64 KB, or 128 KB
 - Better performance without fault tolerance
- RAID 1: mirrored disk array
 - Consists of two storage drives
 - Improved reading performance and 100% redundancy

Configure the system BIOS to enable Storage RAID functionality

To enable Storage RAID functionality:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Devices** → **Storage Setup** and press Enter.
3. Select **Configure Storage as** and press Enter.
4. Select **RAID** and press Enter.
5. Press F10 or Fn+F10 to save the changes and exit.

Configure RAID in UEFI mode

This section provides instructions on how to configure RAID in UEFI mode.

Create RAID volumes in UEFI mode

Attention: All the existing data stored on the selected drives will be erased while the RAID volume is being created.

To create RAID volumes:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Devices** → **Storage Setup** and press Enter.

3. Select **Intel (R) Rapid Storage Technology** and press Enter.
4. Select **Create RAID Volume** and press Enter.
5. Select **Name** and press Enter. When prompted, type a proper RAID Volume name in the field.
6. Select **RAID Level** and press Enter. When prompted, select a RAID level in the field.
7. Use the arrow keys and the space key to mark individual physical storage drives to be added in the RAID volume.
8. Select **Strip Size** and press Enter. When prompted, select a strip size in the field.
9. Select **Capacity** and type a volume size in the field.
10. Select **Create Volume** and press Enter to initiate volume creation.

Delete RAID volumes in UEFI mode

Attention: All the existing data stored on the selected drives will be erased after you delete RAID volumes.

To delete RAID volumes:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Devices → Storage Setup** and press Enter.
3. Select **Intel (R) Rapid Storage Technology** and press Enter.
4. Select the RAID volume to be deleted and press Enter.
5. Select **Delete** and press Enter.
6. Select **Yes** to confirm the deletion of the selected RAID volume. Deleting a RAID volume will reset the storage drives to non-RAID.

Reset storage drives to non-RAID in UEFI mode

To reset your storage drives to non-RAID:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Devices → Storage Setup** and press Enter.
3. Select **Intel (R) Rapid Storage Technology** and press Enter.
4. Select the RAID volumes and press Enter to view the detailed information. Select the storage drives you want to reset to non-RAID and then press Enter.
5. Select **Reset to Non-RAID** and press Enter.
6. Select **Yes** to reset the storage drives to non-RAID.

Chapter 5. CRU replacement

Customer Replaceable Units (CRUs) are parts that can be replaced by the customer. Lenovo computers contain the following types of CRUs:

- **Self-service CRUs:** Refer to parts that can be replaced easily by customer themselves or by trained service technicians at an additional cost.
- **Optional-service CRUs:** Refer to parts that can be replaced by customers with a greater skill level. Trained service technicians can also provide service to replace the parts under the type of warranty designated for the customer's machine.

If you intend on installing the CRU, Lenovo will ship the CRU to you. CRU information and replacement instructions are shipped with your product and are available from Lenovo at any time upon request. You might be required to return the defective part that is replaced by the CRU. When return is required: (1) return instructions, a prepaid shipping label, and a container will be included with the replacement CRU; and (2) you might be charged for the replacement CRU if Lenovo does not receive the defective CRU within thirty (30) days of your receipt of the replacement CRU. For full details, see the Lenovo Limited Warranty documentation at:

https://www.lenovo.com/warranty/llw_02

CRU list

The following is the CRU list of your computer.

Self-service CRUs

- 2.5-inch hard disk drive*
- 2.5-inch hard disk drive bracket*
- 2.5-inch hard disk drive cable*
- ac power adapter
- Chassis
- Dust filter*
- External antenna
- Keyboard*
- Memory
- Mouse*
- M.2 solid-state drive
- M.2 solid-state drive thermal kit with thermal pad
- PCI-Express card bracket
- Power cord

Optional-service CRUs

- LED cable
- LED cable holder
- PCI-Express card
- PCI-Express card holder*
- PCI-Express card converter

- Rear USB 3.2 Gen 2x2 Type-C PCI-Express x4 adapter
- System fan and heat sink

* for selected models

System board

Note: The system board might look slightly different from the illustration.

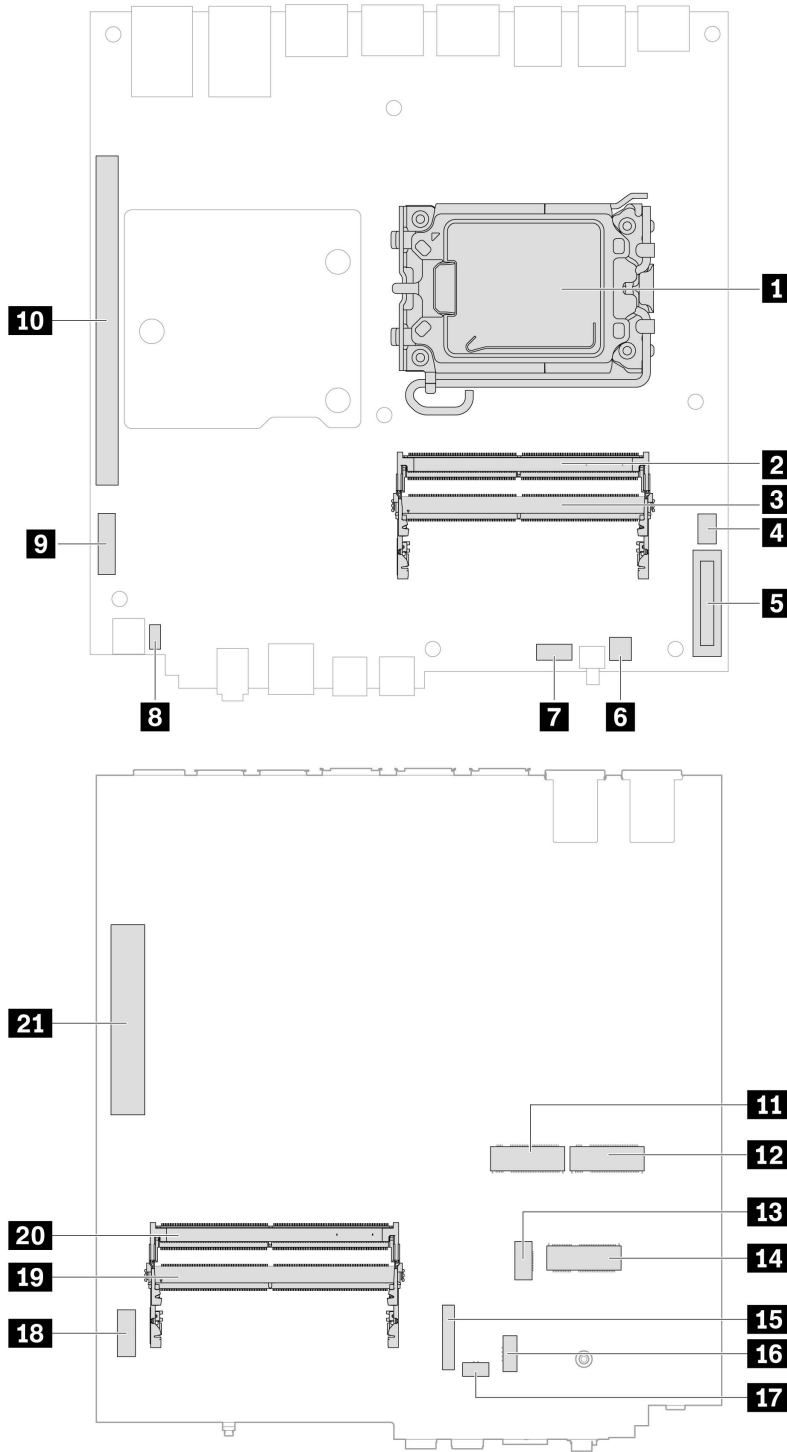


Figure 1. System board part locations

Item	Item
1 Microprocessor	2 Memory slot (SODIMM 1)
3 Memory slot (SODIMM 3)	4 System fan connector

Item	Item
5 Coin-cell battery	6 Clear CMOS/Recovery jumper
7 Auxiliary fan connector 1	8 Internal speaker connector
9 Power connector for PCI-Express x16 card	10 PCI-Express x16 card slot
11 M.2 solid-state drive slot 2	12 M.2 solid-state drive slot 1
13 M.2 fan connector	14 M.2 Wi-Fi card slot
15 BMC connector	16 Auxiliary fan connector 2
17 ThinkStation LED connector	18 5G HDR connector
19 Memory slot (SODIMM 4)	20 Memory slot (SODIMM 2)
21 PCI-Express x8 card slot	

Power adapter and power cord

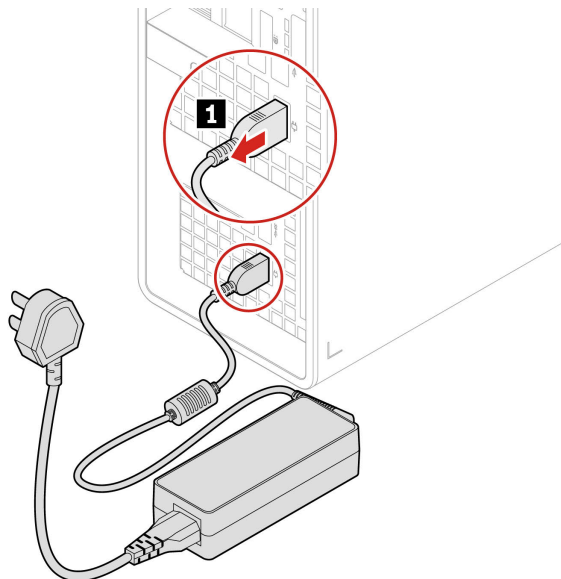
Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

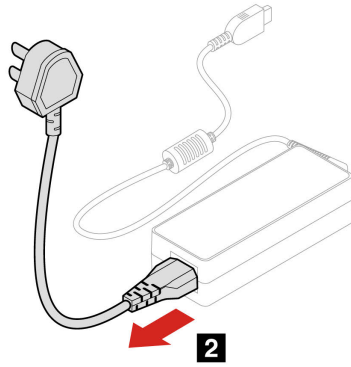
For access, turn off the computer and remove all connected devices and cables.

Removal steps

1. Remove the power adapter.



2. Remove the power cord.



Dust filter

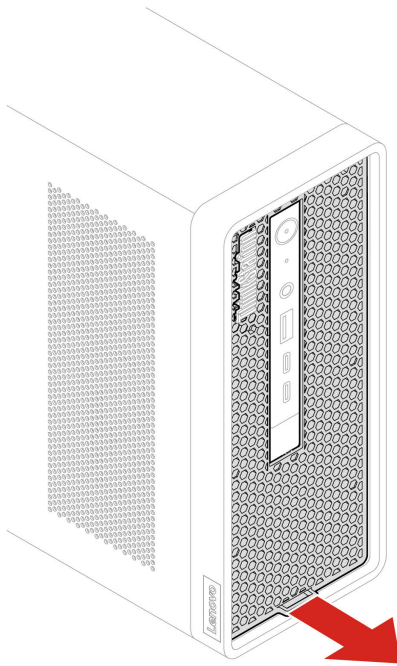
Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

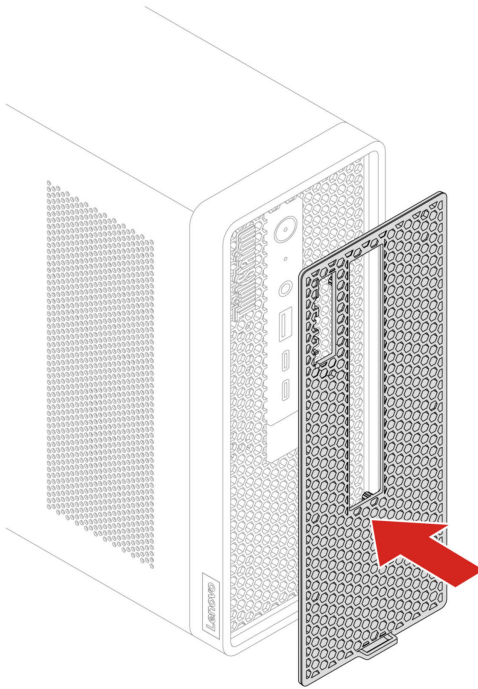
For access, turn off the computer and remove all cables and devices connected to the front bezel.

Replacement steps

1. Remove the dust filter.



2. Install the dust filter.



External antenna

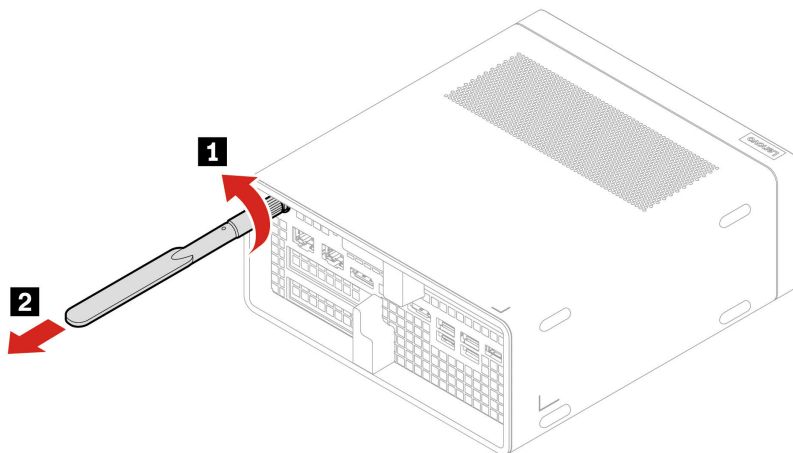
Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

For access, turn off the computer and remove all connected devices and cables.

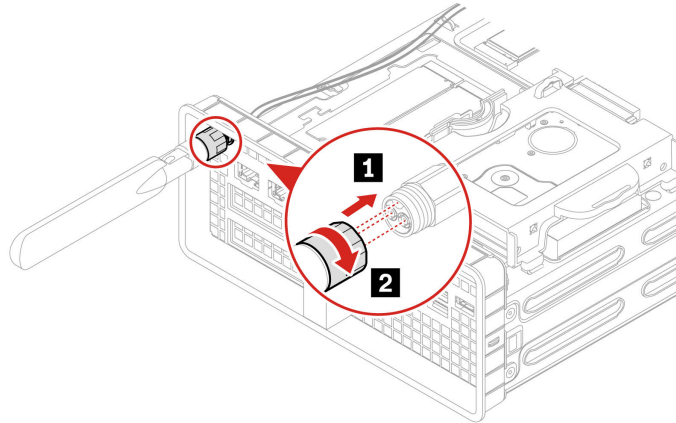
Replacement steps

1. Remove the antenna.



2. Install the antenna.

Note: Once the Wi-Fi antenna is installed, you can turn the antenna clockwise or counter-clockwise to 90° maximum.



Chassis

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.



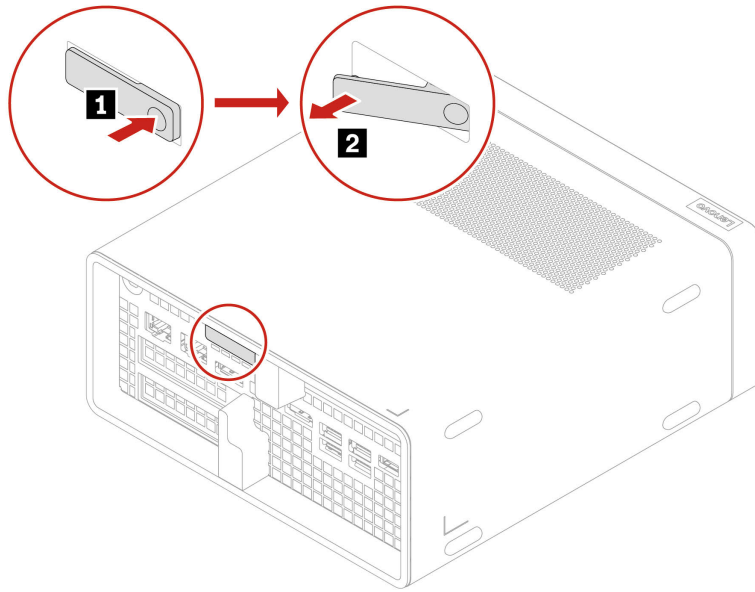
Before you remove the chassis, turn off the computer and wait several minutes until the computer is cool.

For access, do the following:

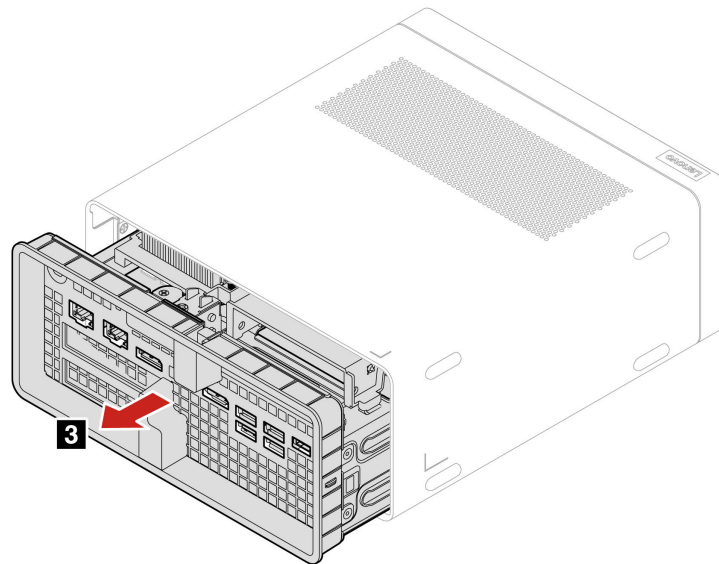
1. Turn off the computer and remove all connected devices and cables.
2. Disconnect the computer from ac power and all connected cables.
3. Unlock any locking device that secures the chassis.

Replacement steps

1. Push and open the chassis latches.

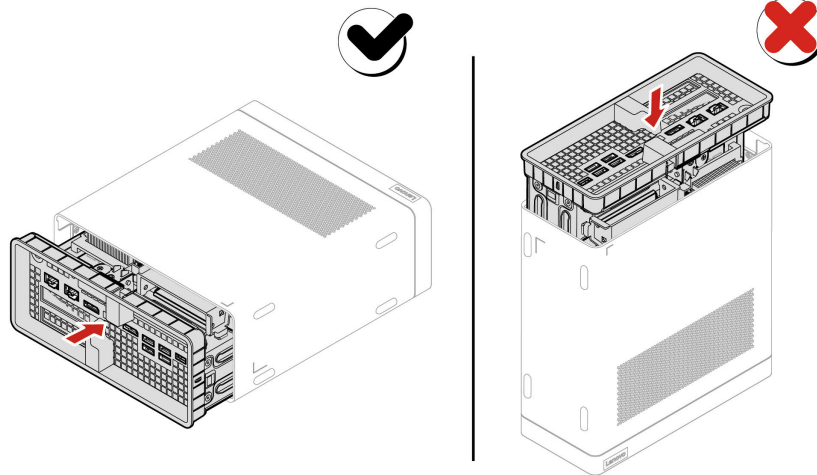


2. Remove the chassis.



3. Install the chassis.

Note: Push the parts into place until you hear a clicking sound.



M.2 solid-state drive thermal kit

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.



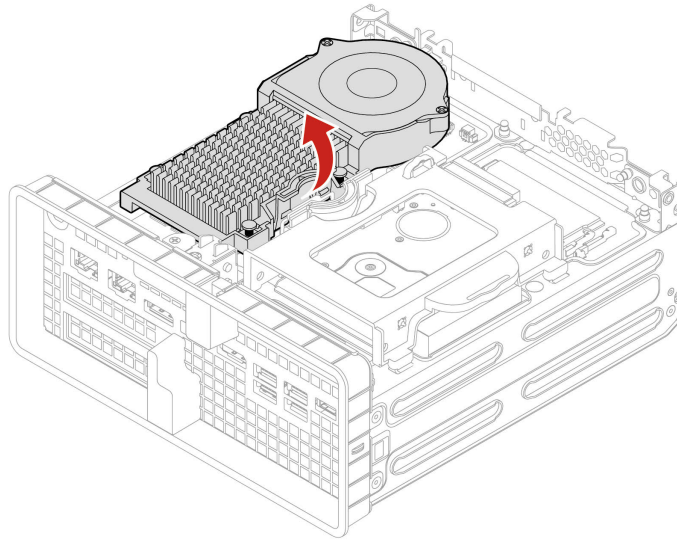
The thermal kit might be very hot. Before you open the chassis, turn off the computer and wait several minutes until the computer is cool.

For access, do the following:

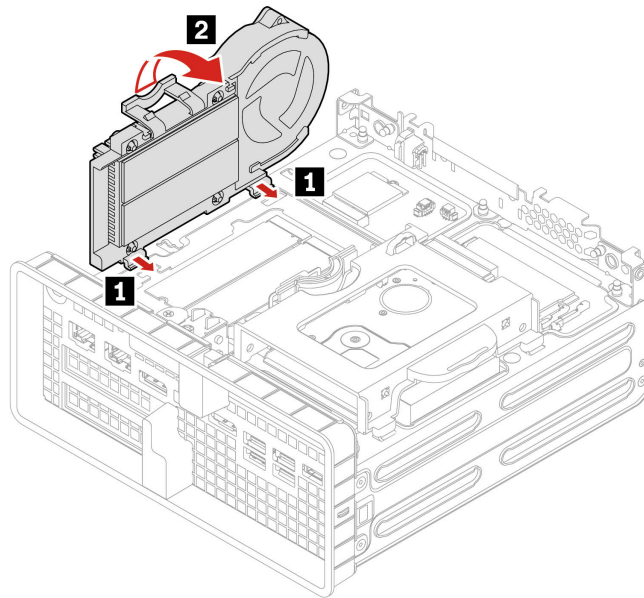
1. Remove the power adapter and cord. See “Power adapter and power cord” on page 28.
2. Remove the computer cover. See “Chassis” on page 31.
3. Disconnect the power cable from the thermal kit.

Replacement steps

1. Remove the M.2 solid-state drive thermal kit.



2. Install the M.2 solid-state drive thermal kit.



M.2 solid-state drive

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.



The thermal kit might be very hot. Before you open the chassis, turn off the computer and wait several minutes until the computer is cool.

Attention:

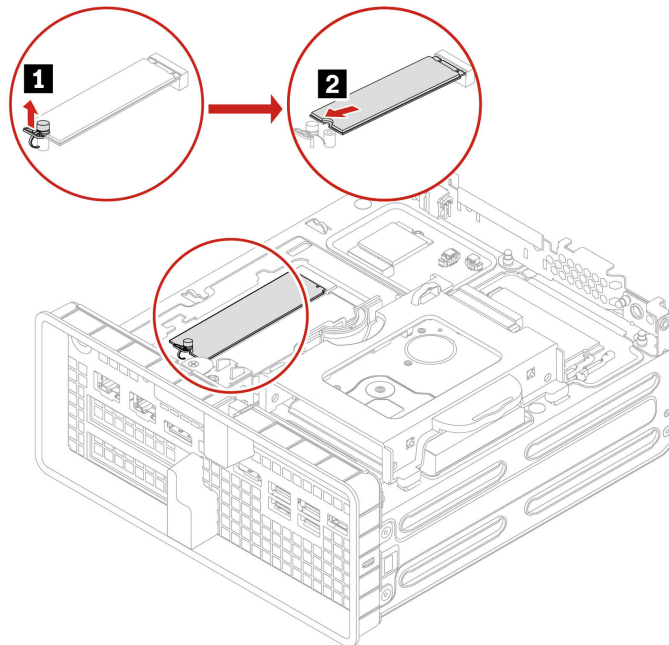
- To replace the Intel Optane memory, go to https://support.lenovo.com/docs/tg_ssd.
- Do not attempt to replace the Intel Optane memory in the M.2 solid-state drive slot. Replacement of the Intel Optane memory must be done by a Lenovo-authorized repair facility or technician.
- The internal storage drive is sensitive. Inappropriate handling might cause damage and permanent loss of data. When handling the internal storage drive, observe the following guidelines:
 - Replace the internal storage drive only for repair. The internal storage drive is not designed for frequent changes or replacement.
 - Before replacing the internal storage drive, make a backup copy of all the data that you want to keep.
 - Do not touch the contact edge of the internal storage drive. Otherwise, the internal storage drive might get damaged.
 - Do not apply pressure to the internal storage drive.
 - Do not make the internal storage drive subject to physical shocks or vibration. Put the internal storage drive on a soft material, such as cloth, to absorb physical shocks.

For access, remove these

1. Remove the power adapter and cord. See “Power adapter and power cord” on page 28.
2. Remove the computer cover. See “Chassis” on page 31.
3. Remove the M.2 solid-state drive thermal kit with thermal pad. See “M.2 solid-state drive thermal kit” on page 33.

Removal steps

1. Remove the M.2 solid-state drive.



2.5-inch hard disk drive

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

Attention: The internal storage drive is sensitive. Inappropriate handling might cause damage and permanent loss of data. When handling the internal storage drive, observe the following guidelines:

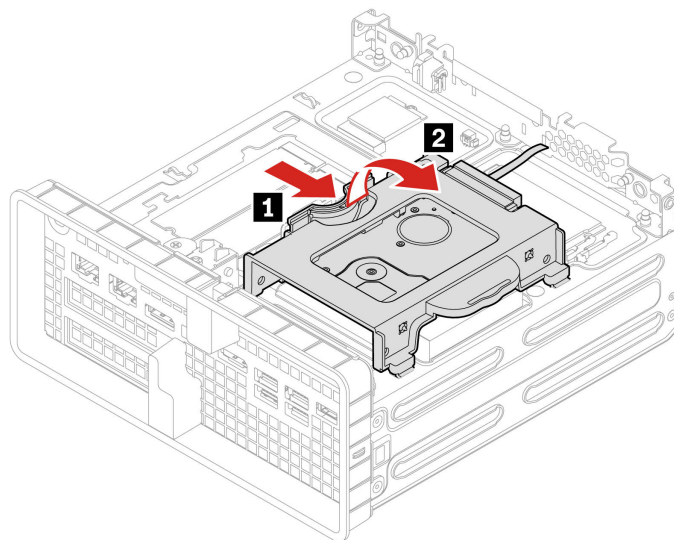
- Replace the internal storage drive only for repair. The internal storage drive is not designed for frequent changes or replacement.
- Before replacing the internal storage drive, make a backup copy of all the data that you want to keep.
- Do not touch the contact edge of the internal storage drive. Otherwise, the internal storage drive might get damaged.
- Do not apply pressure to the internal storage drive.
- Do not make the internal storage drive subject to physical shocks or vibration. Put the internal storage drive on a soft material, such as cloth, to absorb physical shocks.

For access, do the following:

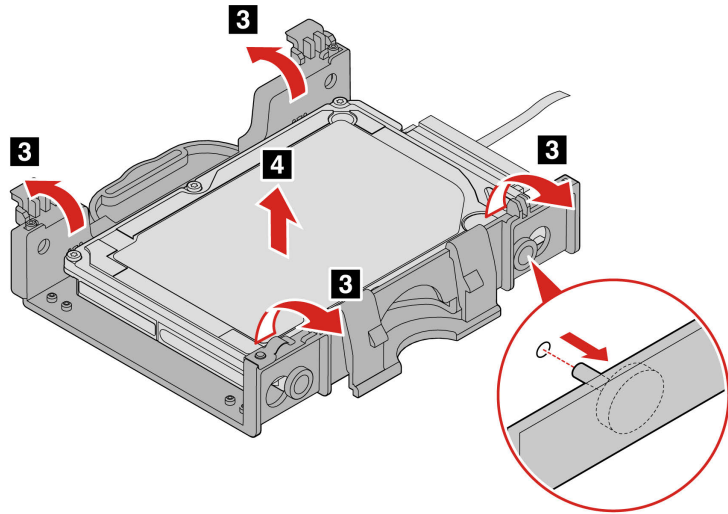
1. Remove the power adapter and cord. See “Power adapter and power cord” on page 28.
2. Remove the computer cover. See “Chassis” on page 31.
3. Remove the M.2 solid-state drive thermal kit with thermal pad. See “M.2 solid-state drive thermal kit” on page 33.
4. Disconnect the signal cable and the power cable from the storage drive.

Replacement steps

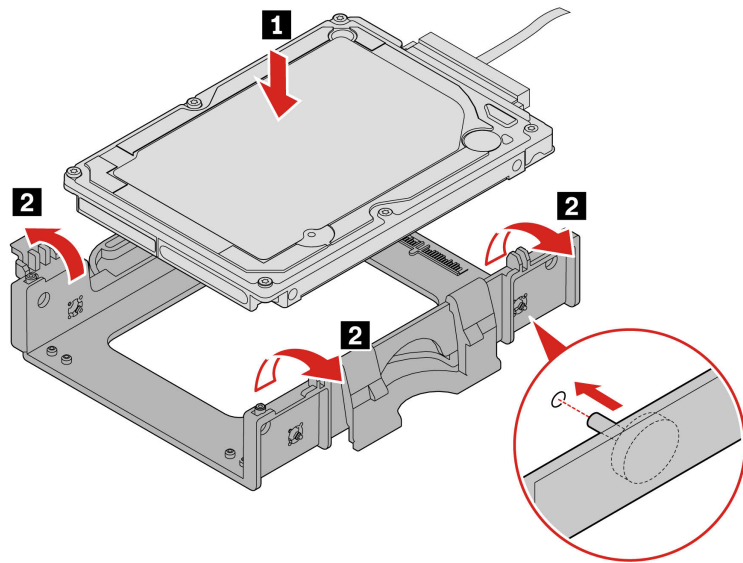
1. Remove the storage drive and the bracket.



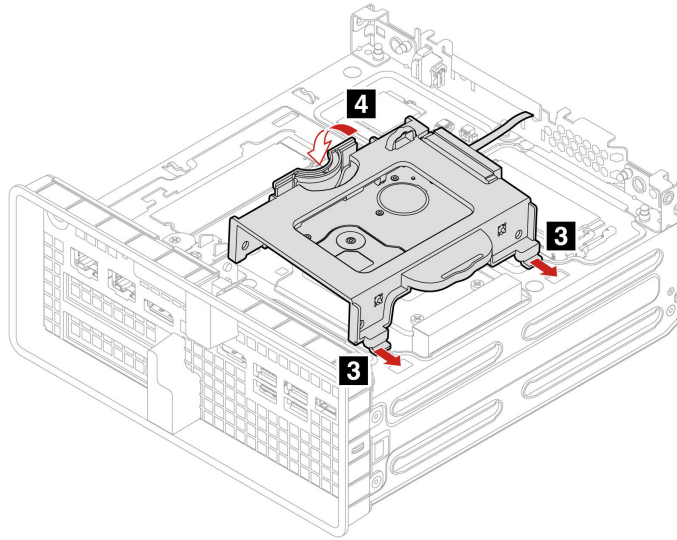
2. Remove the storage drive from the bracket.



3. Install the storage drive to the bracket.



4. Install the storage drive and the bracket.



LED cable and holder

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.



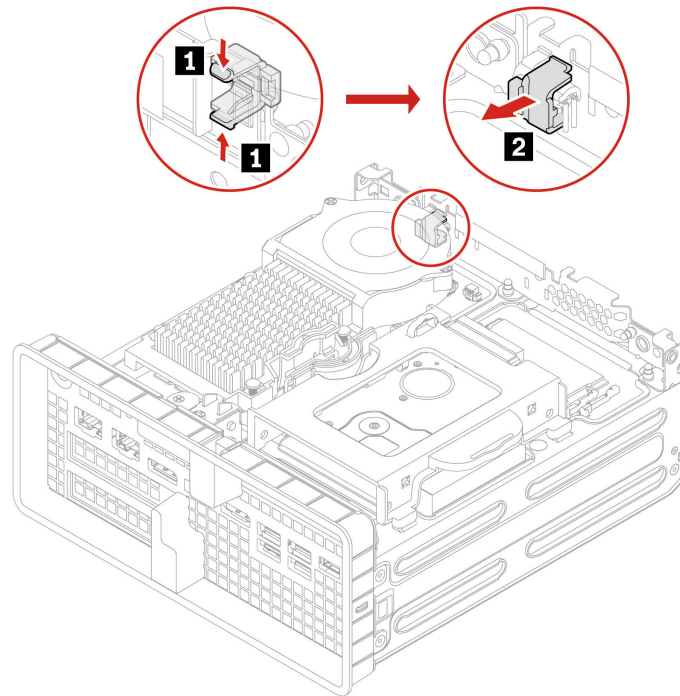
The LED cable and holder be very hot. Before you open the chassis, turn off the computer and wait several minutes until the computer is cool.

For access, do the following:

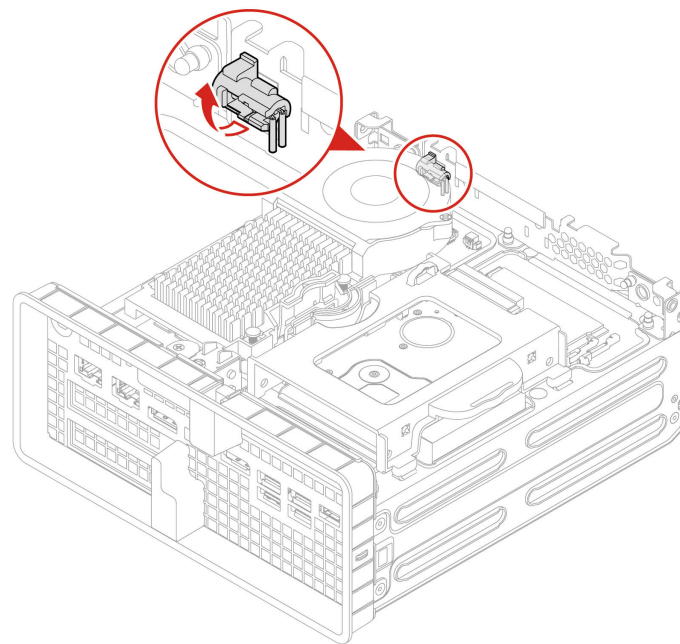
1. Remove the power adapter and cord. See “Power adapter and power cord” on page 28.
2. Remove the computer cover. See “Chassis” on page 31.

Removal steps

1. Remove the LED holder.



2. Remove the LED cable.



System fan and heat sink

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.



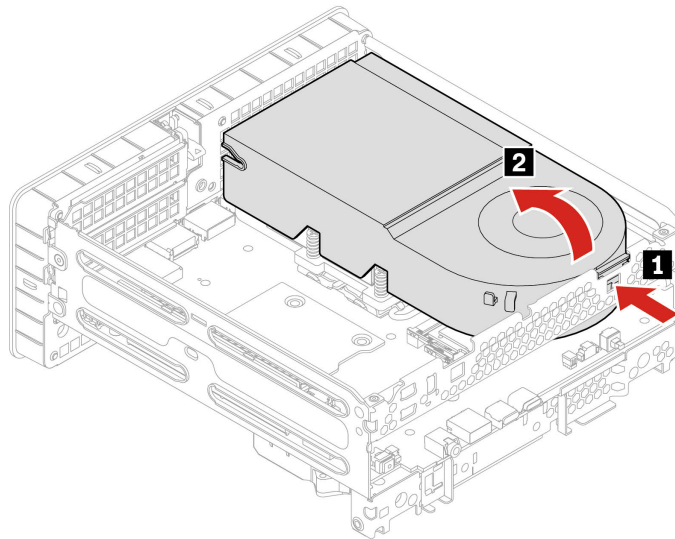
The system fan and heat sink be very hot. Before you open the chassis, turn off the computer and wait several minutes until the computer is cool.

For access, do the following:

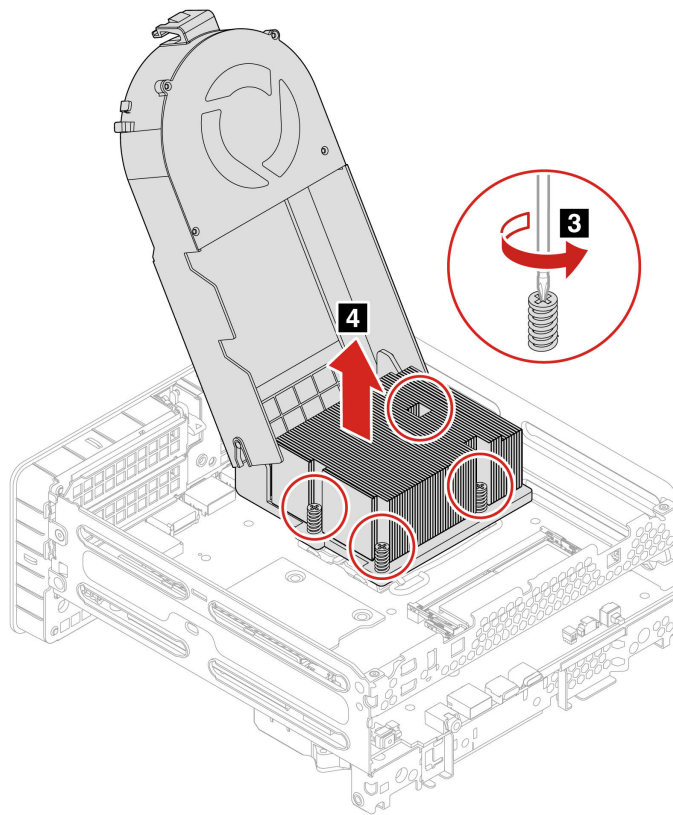
1. Remove the power adapter and cord. See “Power adapter and power cord” on page 28.
2. Remove the computer cover. See “Chassis” on page 31.
3. Disconnect the power cable from the system board.

Replacement steps

- 65-watt system fan
 1. Release the system fan latch and lift the system fan up.

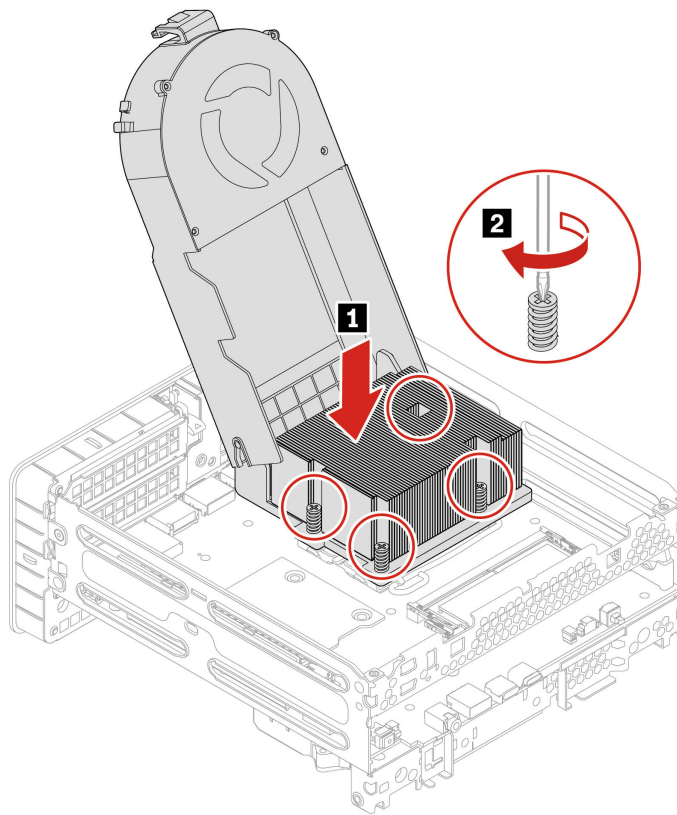


2. Loosen the heat sink screws and remove the heat sink with system fan.

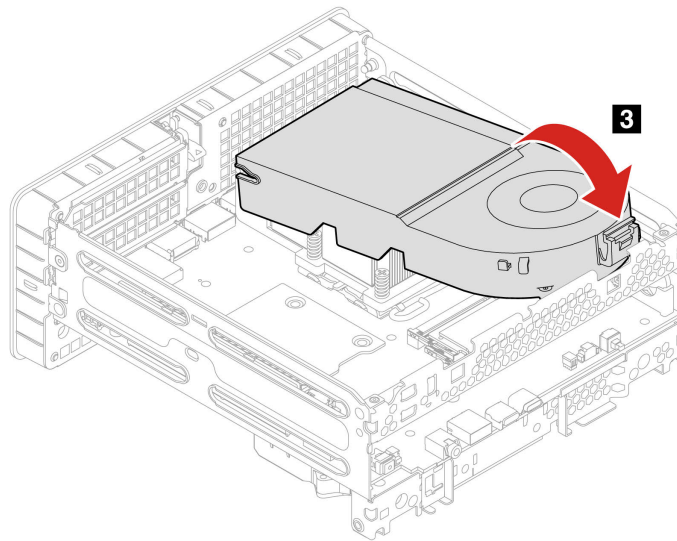


Step	Screw (quantity)	Color	Torque
3	M3 x L17.8 mm, flat-head (4)	Bright Ni	3.0±0.1 in-lbs

3. Secure the heat sink screws.

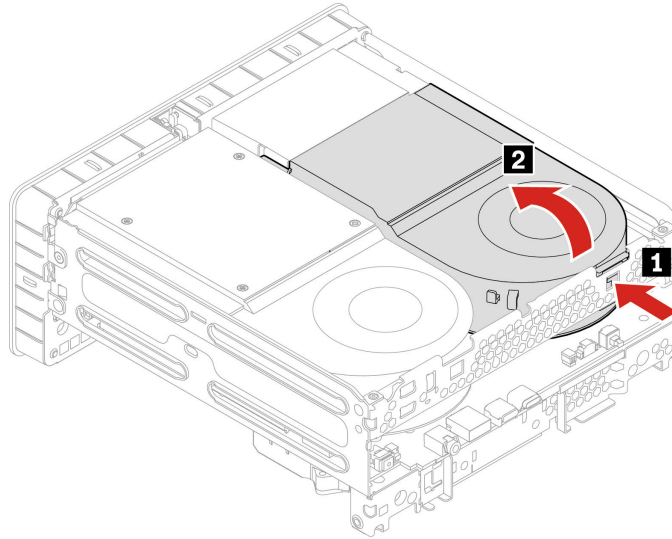


4. Install the system fan.

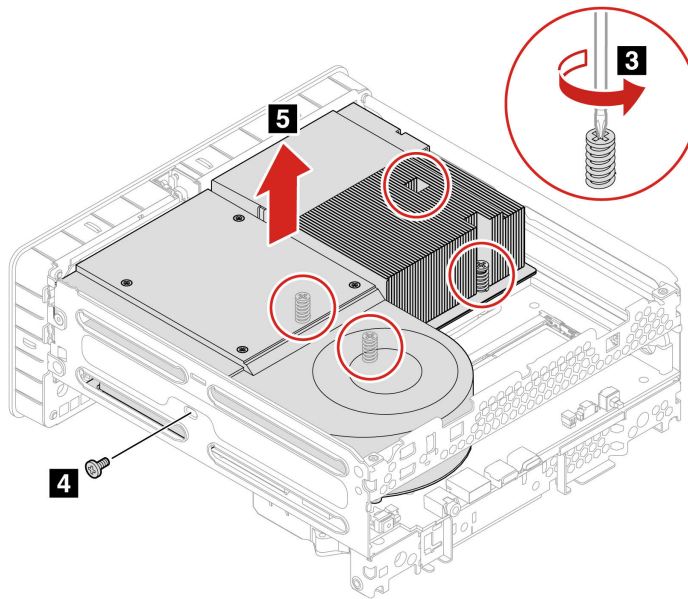


Step	Screw (quantity)	Color	Torque
2	M3 x L17.8 mm, flat-head (4)	Bright Ni	3.0±0.1 in-lbs

- 125-watt system fan
 1. Release the system fan latch and remove the system fan.



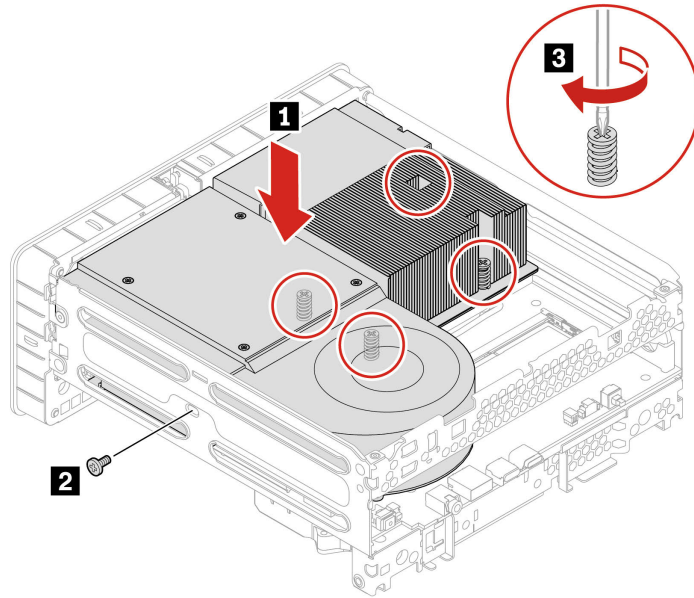
2. Loosen the heat sink screws and remove the heat sink.



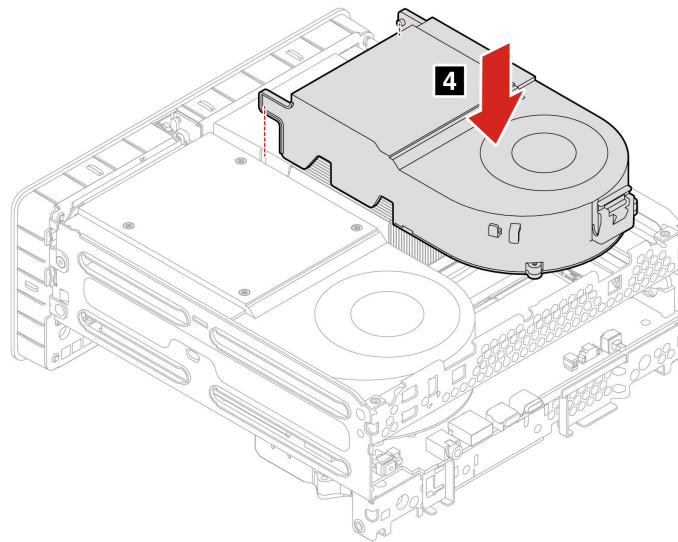
Attention: Use the screws provided by Lenovo to avoid any unpredictable damage to your computer.

Step	Screw (quantity)	Color	Torque
3	M3 x L17.4 mm, flat-head (4)	Bright Ni	3.0±0.1 in-lbs
4	M3 x L5 mm, countersunk screw (1)	Blue Zn	5.0±0.1 in-lbs

3. Secure the system fan screw.



4. Install the system fan.



Attention: Use the screws provided by Lenovo to avoid any unpredictable damage to your computer.

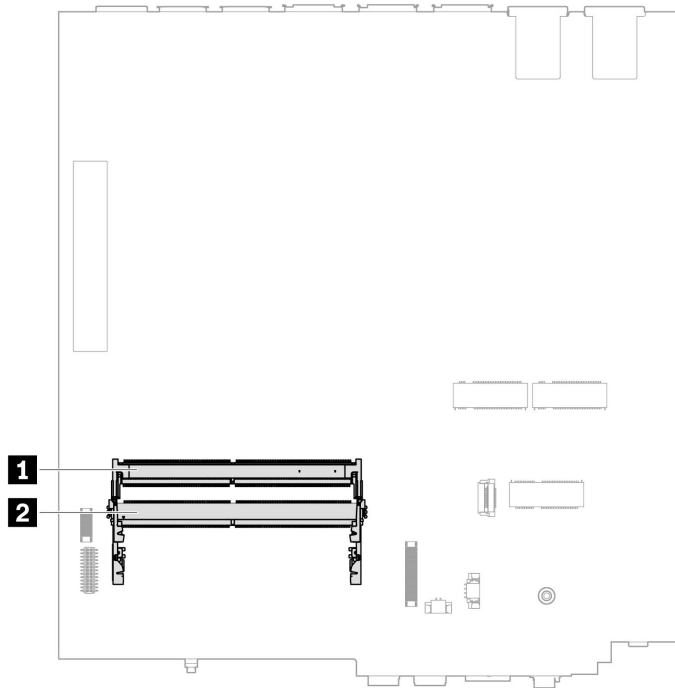
Step	Screw (quantity)	Color	Torque
2	M3 x L5 mm, countersunk screw (1)	Blue Zn	5.0±0.1 in-lbs
3	M3 x L17.4 mm, flat-head (4)	Bright Ni	3.0±0.1 in-lbs

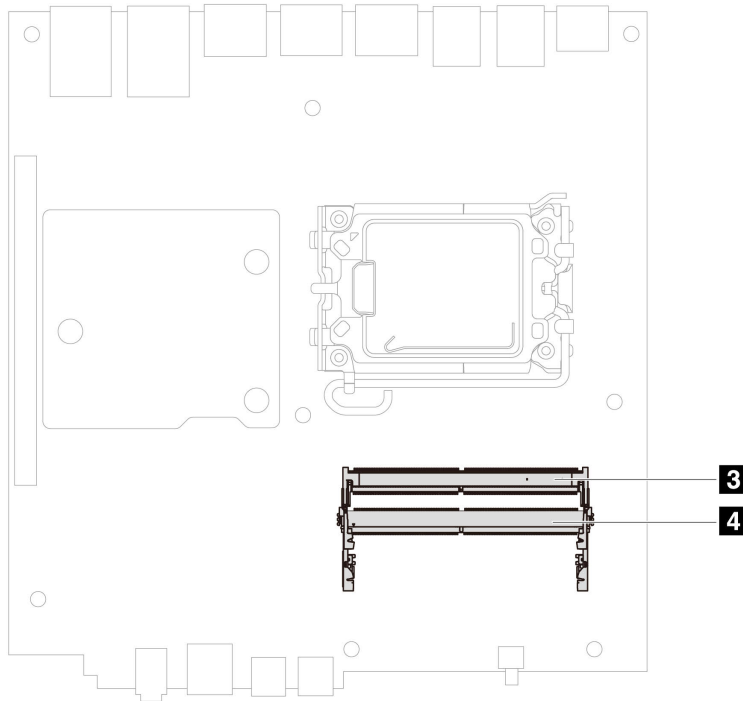
Memory module

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

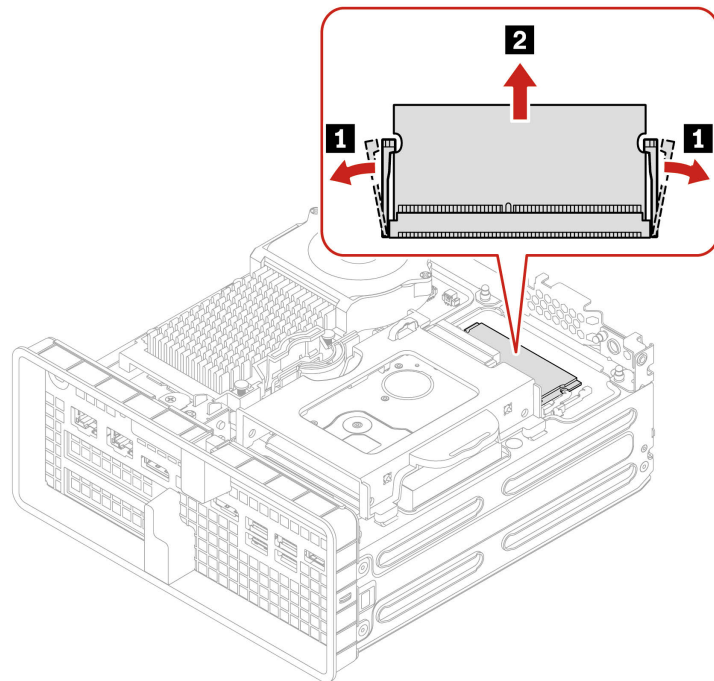
Ensure that you follow the installation order for memory modules shown in the following illustration.



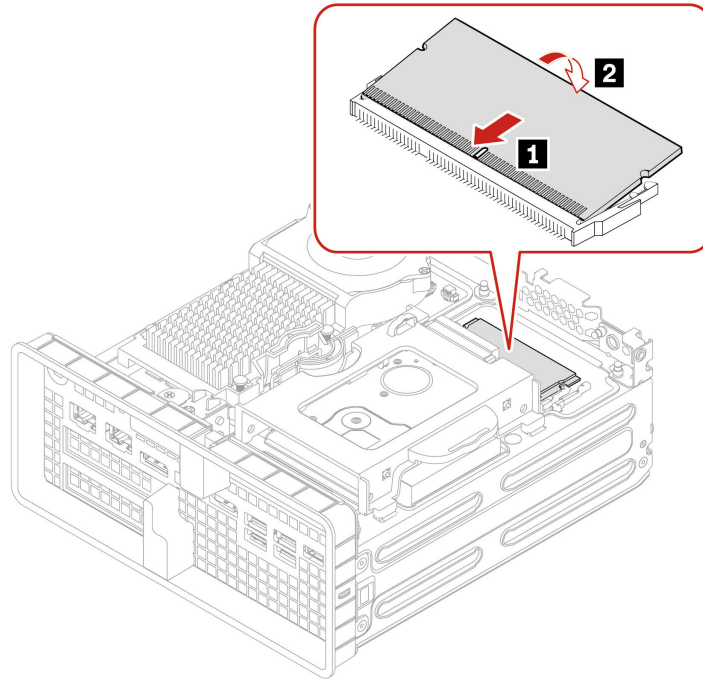


Replacement steps

- Type 1
 1. Remove the power adapter and power cord. See “Power adapter and power cord” on page 28.
 2. Remove the computer cover. See “Chassis” on page 31.
 3. Remove the memory module.

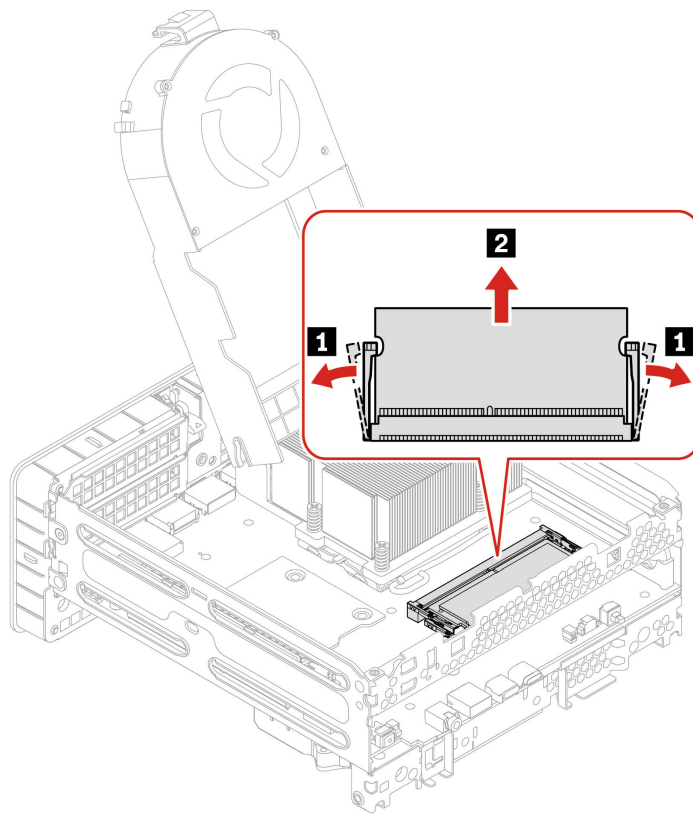


4. Install the memory.

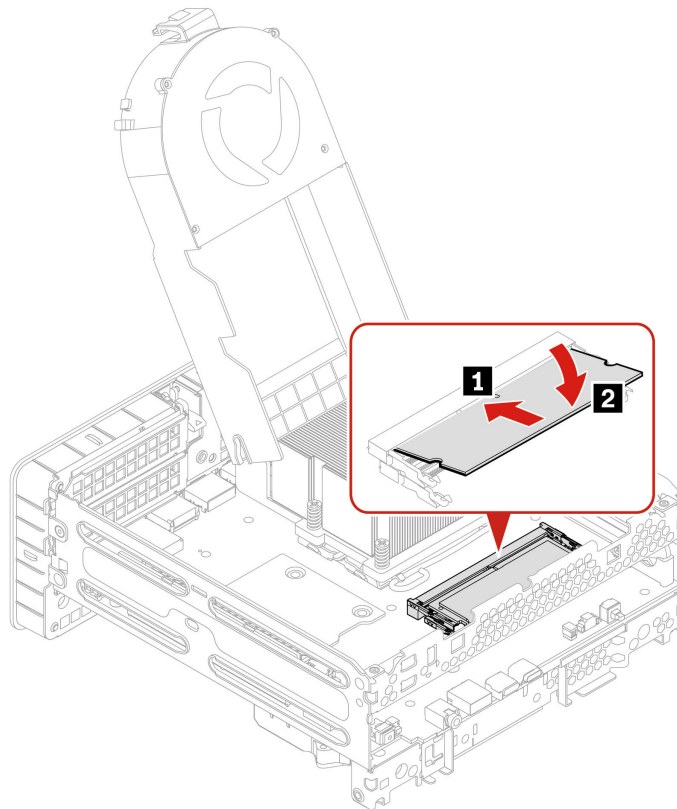


- Type 2

1. Remove the power adapter and power cord. See “Power adapter and power cord” on page 28.
2. Remove the computer cover. See “Chassis” on page 31.
3. Disconnect the system fan cable from the system board, and lift the system fan. See “System fan and heat sink” on page 39.
4. Remove the memory.



5. Install the memory.



PCI-Express card

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.



The system fan and heat sink be very hot. Before you open the chassis, turn off the computer and wait several minutes until the computer is cool.

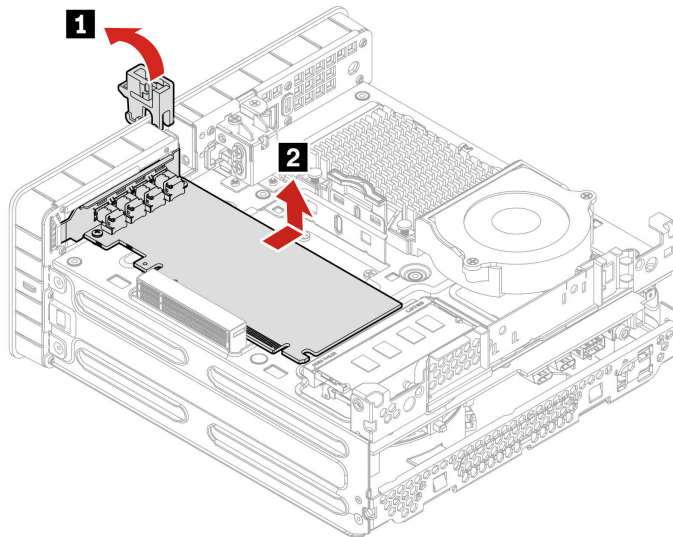
For access, do the following:

1. Remove the power adapter and cord. See “Power adapter and power cord” on page 28.
2. Remove the computer cover. See “Chassis” on page 31.

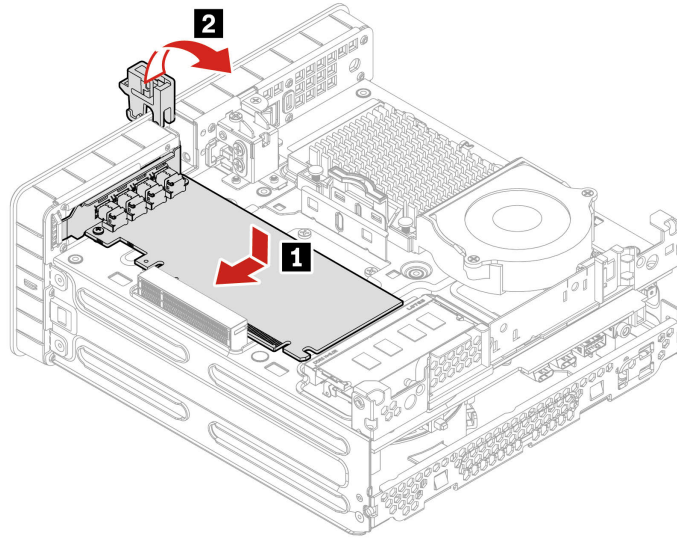
Note: Before installing a new PCI-Express card, remove any PCI-Express connector cables that impede the installation.

Replacement steps

- Type 1
 1. Remove the PCI-Express card.

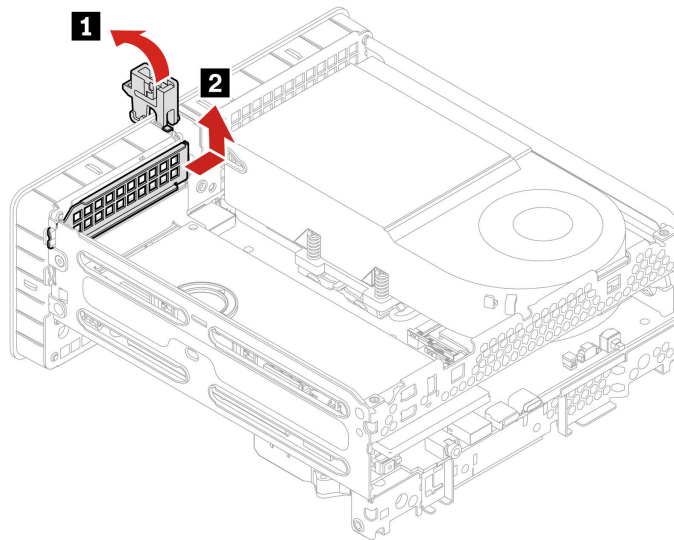


2. Install the PCI-Express card.

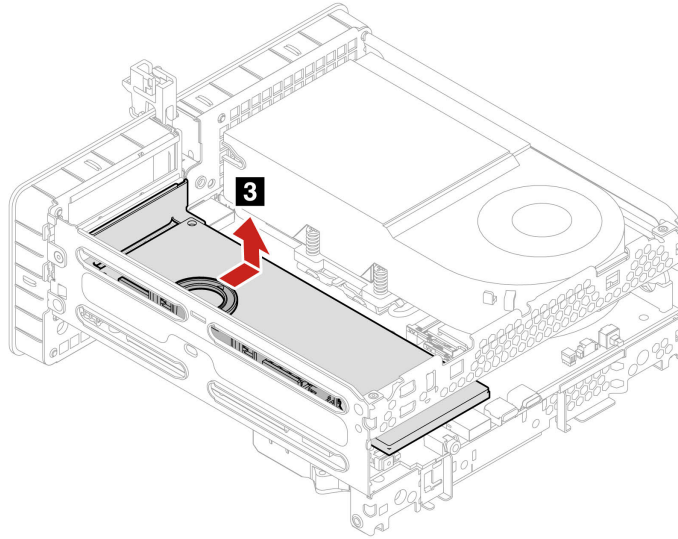


- Type 2

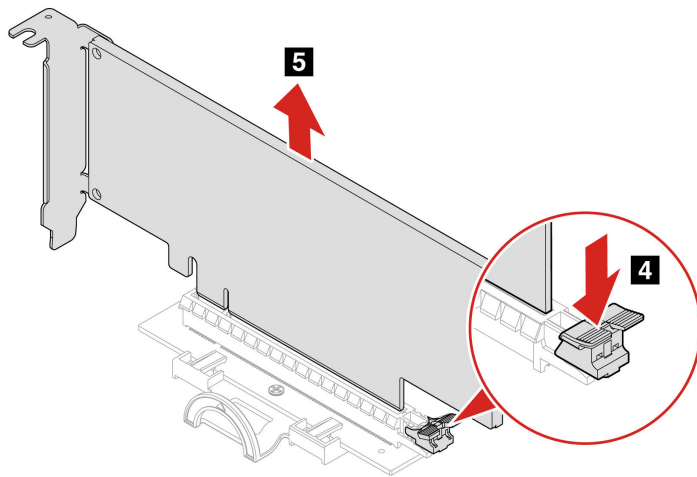
1. Remove the PCI-Express card bracket.



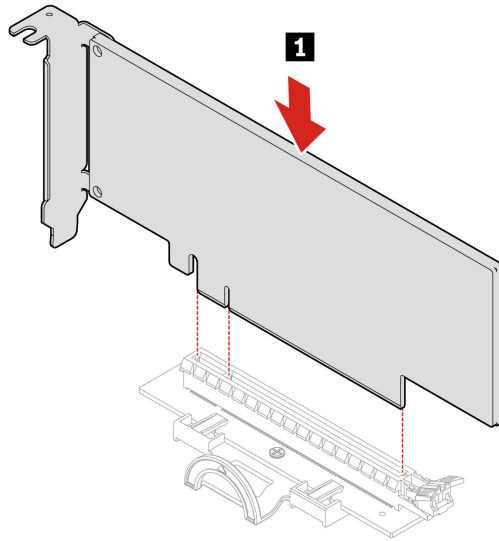
2. Remove the PCI-Express card.



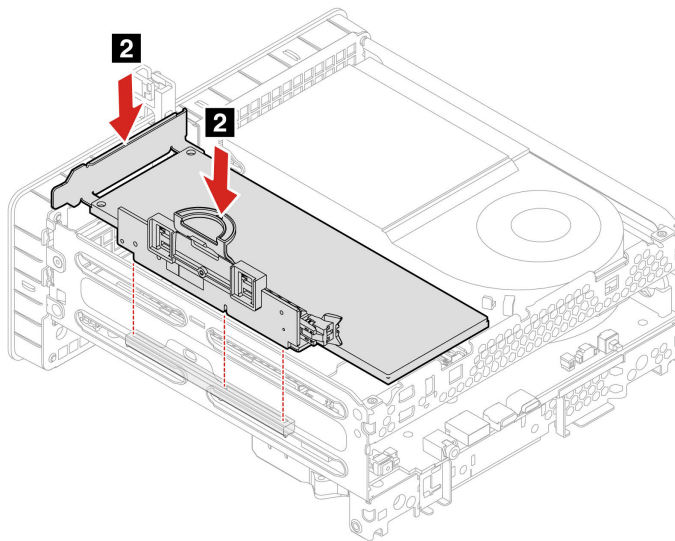
3. Remove the PCI-Express card from the converter.



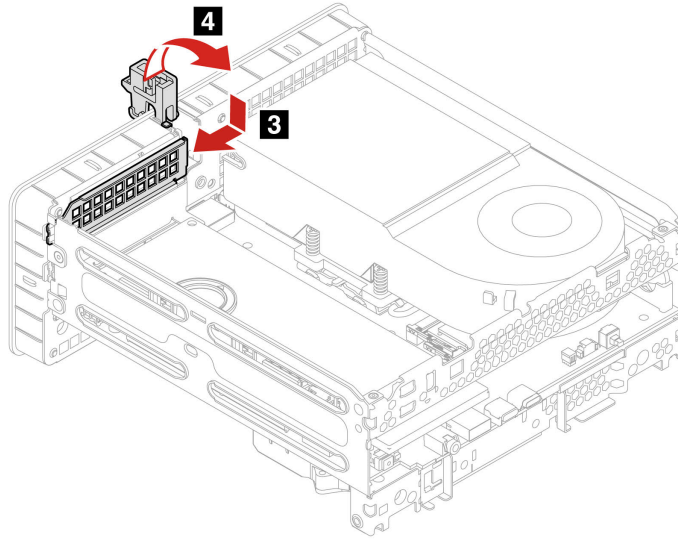
4. Install the PCI-Express card to the converter.



5. Install the PCI-Express card and converter.

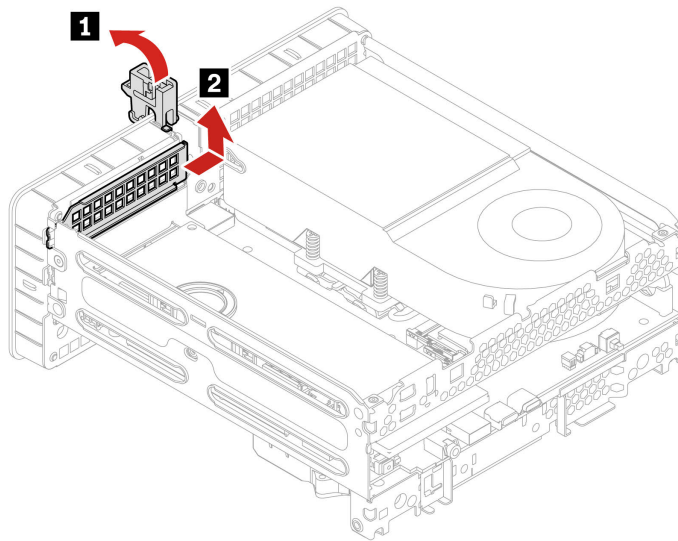


6. Install the PCI-Express card bracket.

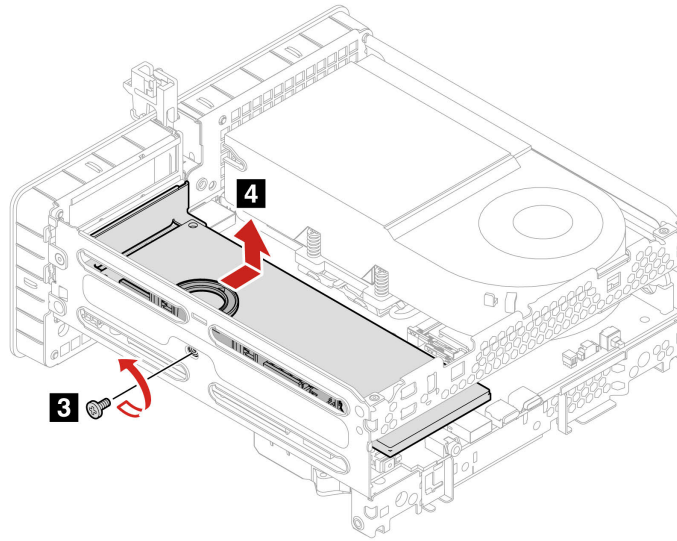


- Type 3

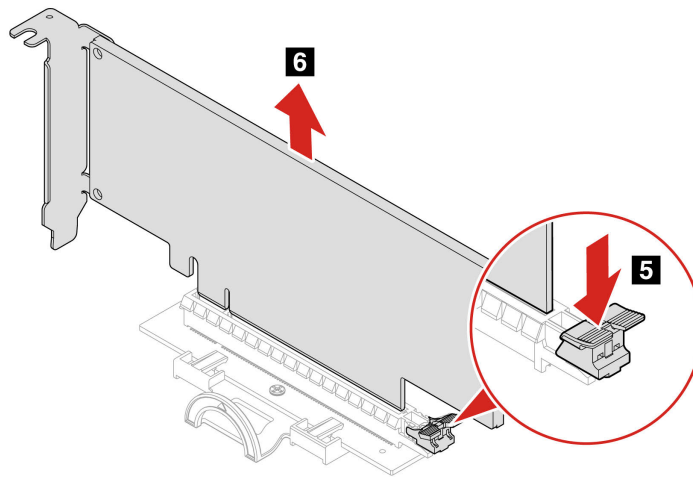
1. Remove the PCI-Express card bracket.



2. Remove one screw and remove the PCI-Express card.



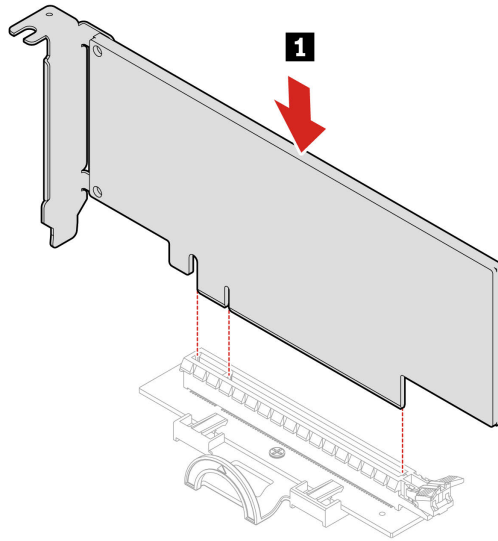
3. Remove the PCI-Express card from the converter.



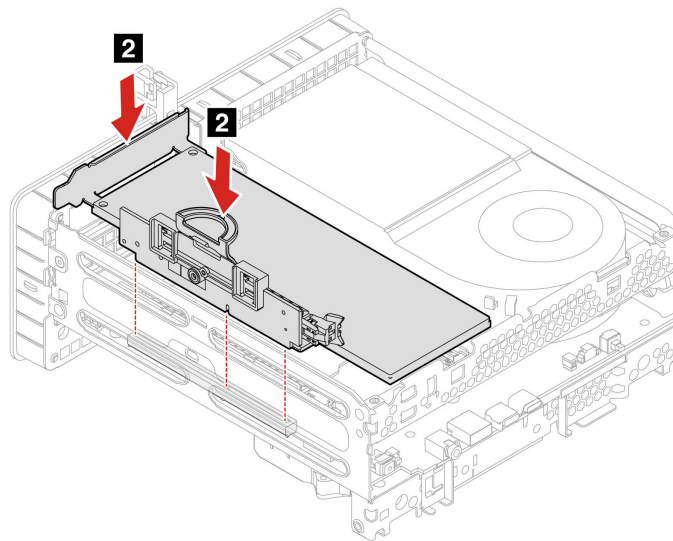
Attention: Use the screws provided by Lenovo to avoid any unpredictable damage to your computer.

Step	Screw (quantity)	Color	Torque
3	M3 x L5 mm, countersunk screw (1)	Blue Zn	5.0±0.1 in-lbs

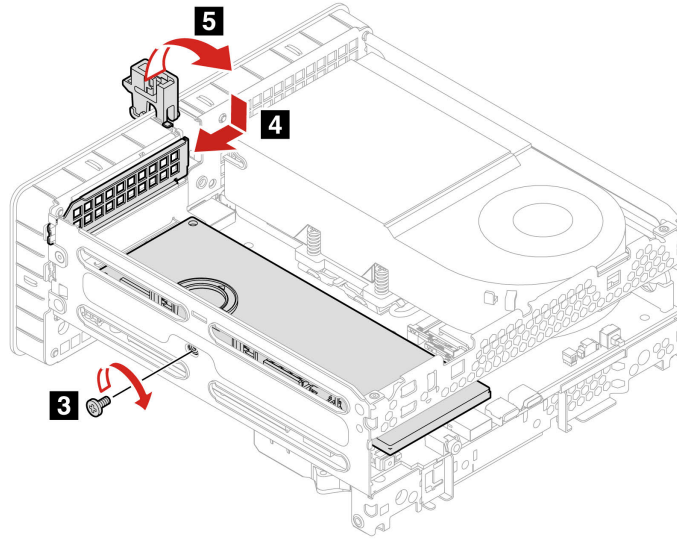
4. Install the PCI-Express card to the converter.



5. Install the PCI-Express card.



6. Install one screw and the PCI-Express card converter.

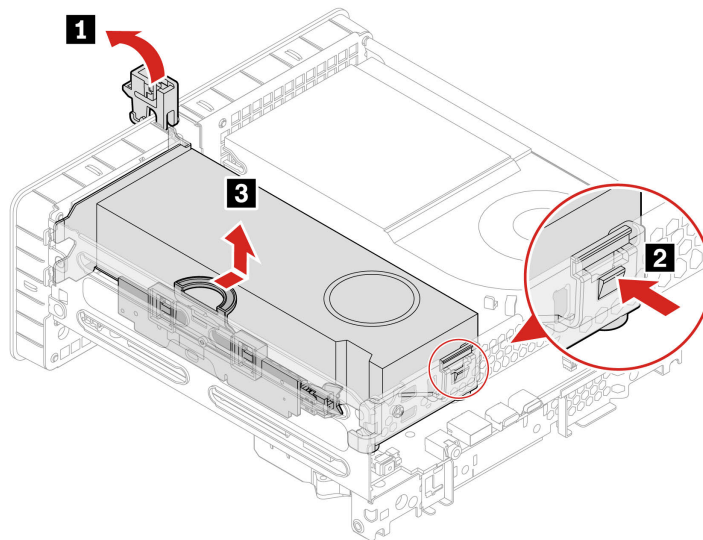


Attention: Use the screws provided by Lenovo to avoid any unpredictable damage to your computer.

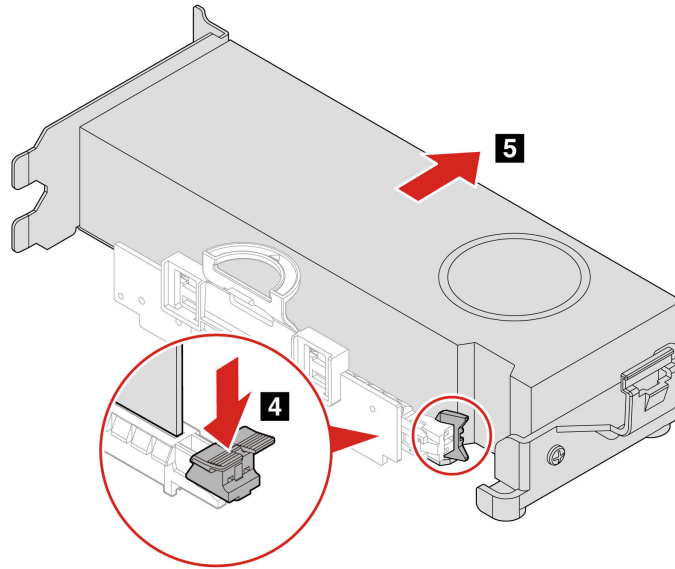
Step	Screw (quantity)	Color	Torque
3	M3 x L5 mm, countersunk screw (1)	Blue Zn	5.0±0.1 in-lbs

- Type 4

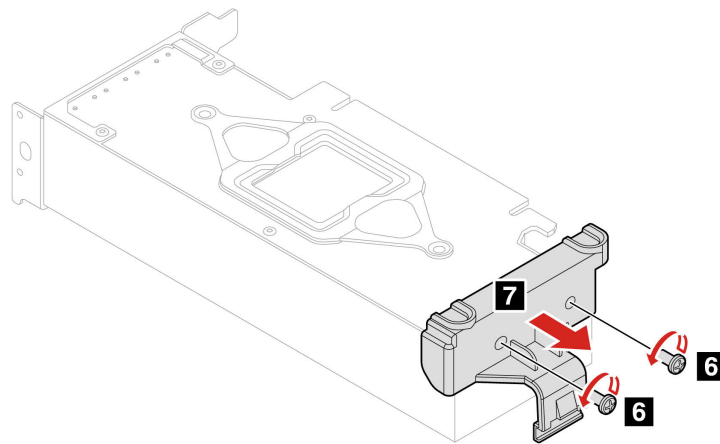
1. Remove the PCI-Express card and converter.



2. Remove the PCI-Express card from the converter.



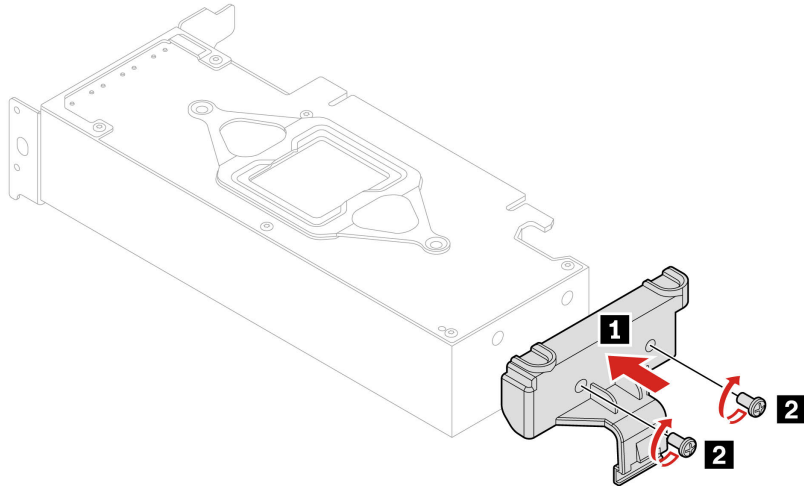
3. Remove the PCI-Express card holder.



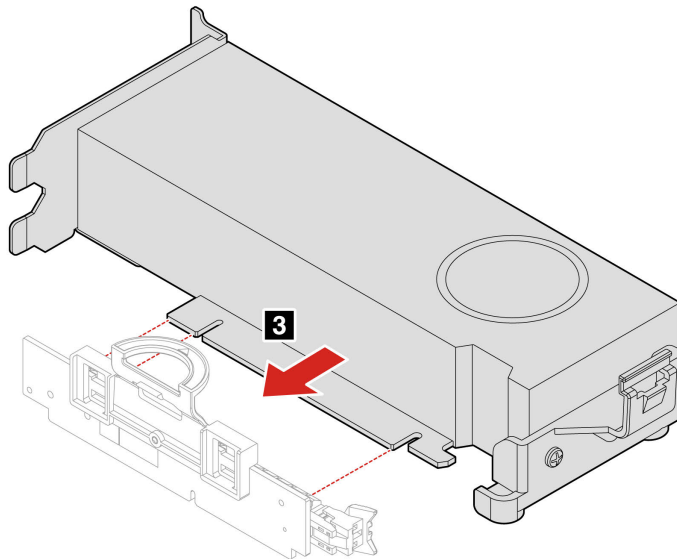
Attention: Use the screws provided by Lenovo to avoid any unpredictable damage to your computer.

Step	Screw (quantity)	Color	Torque
6	M3 x L5 mm, hex screw (2)	Black Ni	5.0±0.1 in-lbs

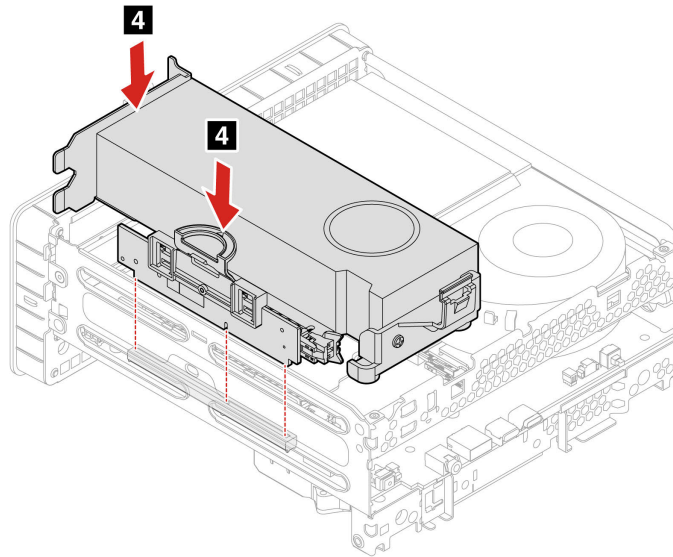
4. Install the PCI-Express card holder.



5. Install the PCI-Express card holder.



6. Install the PCI-Express card.



Attention: Use the screws provided by Lenovo to avoid any unpredictable damage to your computer.

Step	Screw (quantity)	Color	Torque
2	M3 x L5 mm, hex screw (2)	Black Ni	5.0±0.1 in-lbs

Chapter 6. Help and support

Self-help resources

Use the following self-help resources to learn more about the computer and troubleshoot problems.

Resources	How to access?
Troubleshooting and frequently asked questions	<ul style="list-style-type: none">• https://www.lenovo.com/tips• https://forums.lenovo.com
Accessibility information	https://www.lenovo.com/accessibility
Reset or restore Windows	<ul style="list-style-type: none">• Use Lenovo recovery options.<ol style="list-style-type: none">1. Go to https://support.lenovo.com/HowToCreateLenovoRecovery.2. Follow the on-screen instructions.• Use Windows recovery options.<ol style="list-style-type: none">1. Go to https://pcsupport.lenovo.com.2. Detect your computer or manually select your computer model.3. Navigate to the troubleshooting menu to diagnose the operating system for recovery instructions.
Use the Vantage app to:	
<ul style="list-style-type: none">• Configure device settings.• Download and install UEFI BIOS, drivers and firmware updates.• Secure your computer from outside threats.• Diagnose hardware problems.• Check the computer warranty status.• Access <i>User Guide</i> and helpful articles.	Type Vantage in the Windows search box.
Note: The available features vary depending on the computer model.	
Product documentation:	
<ul style="list-style-type: none">• <i>Safety and Warranty Guide</i>• <i>Generic Safety and Compliance Notices</i>• <i>Setup Guide</i>• <i>This User Guide</i>• <i>Regulatory Notice</i>	Go to https://pcsupport.lenovo.com . Then, follow the on-screen instructions to filter out the documentation you want.

Resources	How to access?
Lenovo Support Web site with the latest support information of the following:	
<ul style="list-style-type: none"> • Drivers and software • Diagnostic solutions • Product and service warranty • Product and parts details • Knowledge base and frequently asked questions 	https://pcsupport.lenovo.com
Windows help information	<ul style="list-style-type: none"> • Type Get Help or Tips in the Windows search box. • Use Windows Search or the Cortana® personal assistant. • Microsoft support Web site: https://support.microsoft.com

Call Lenovo

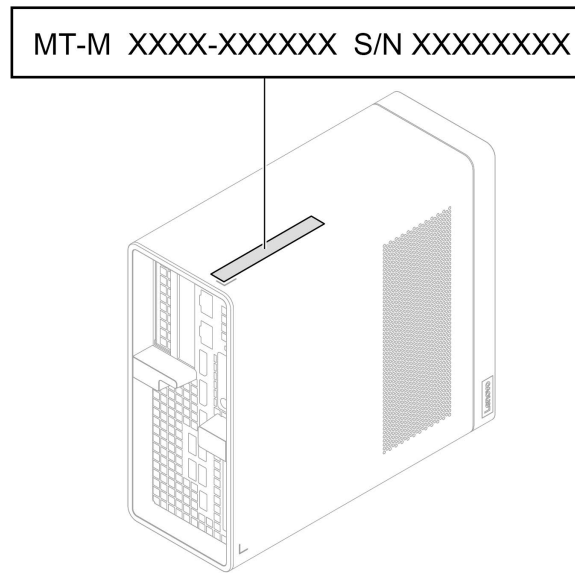
If you have tried to correct the problem yourself and still need help, you can call Lenovo Customer Support Center.

Before you contact Lenovo

Prepare the following before you contact Lenovo:

1. Record the problem symptoms and details:
 - What is the problem? Is it continuous or intermittent?
 - Any error message or error code?
 - What operating system are you using? Which version?
 - Which software applications were running at the time of the problem?
 - Can the problem be reproduced? If so, how?
2. Record the system information:
 - Product name
 - Machine type and serial number

The following illustration shows where to find the machine type and serial number of your computer.



Lenovo Customer Support Center

During the warranty period, you can call Lenovo Customer Support Center for help.

Telephone numbers

For a list of the Lenovo Support phone numbers for your country or region, go to:

<https://pcsupport.lenovo.com/supportphonenumberlist>

Note: Phone numbers are subject to change without notice. If the number for your country or region is not provided, contact your Lenovo reseller or Lenovo marketing representative.

Certification-related information

Product name: ThinkStation P3 Ultra

Machine types: 30HB and 30HA

Further compliance information related to your product is available at <https://www.lenovo.com/compliance>.

Compliance information

For more compliance information, refer to *Regulatory Notice* at <https://pcsupport.lenovo.com> and *Generic Safety and Compliance Notices* at https://pcsupport.lenovo.com/docs/generic_notices.

Purchase accessories

Lenovo has a number of hardware accessories and upgrades to help expand the capabilities of your computer. Options include memory modules, storage devices, network cards, power adapters, keyboards, mice, and more.

To shop at Lenovo, go to <https://www.lenovo.com/accessories>.

Purchase additional services

During and after the warranty period, you can purchase additional services from Lenovo at:
<https://pcsupport.lenovo.com/warrantyupgrade>

Service availability and service name might vary by country or region.

Appendix A. Notices and trademarks

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<https://pcsupport.lenovo.com>

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