

V50t Gen 2

User Guide

V50t Gen 2

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*

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Discover your Lenovo computer

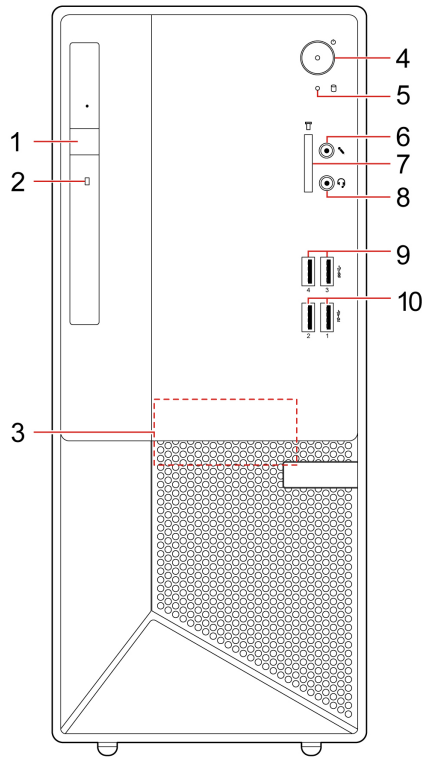
Thank you for choosing a Lenovo® computer! We are dedicated to delivering the best solution to you.

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



1. Optical drive eject button*	2. Optical drive activity indicator*
3. Internal speaker*	4. Power button
5. Storage drive activity indicator	6. Microphone connector
7. SD-card slot*	8. Headset connector
9. USB 3.2 connectors Gen 1	10. USB 3.2 connectors Gen 2

* for selected models

Power indicator

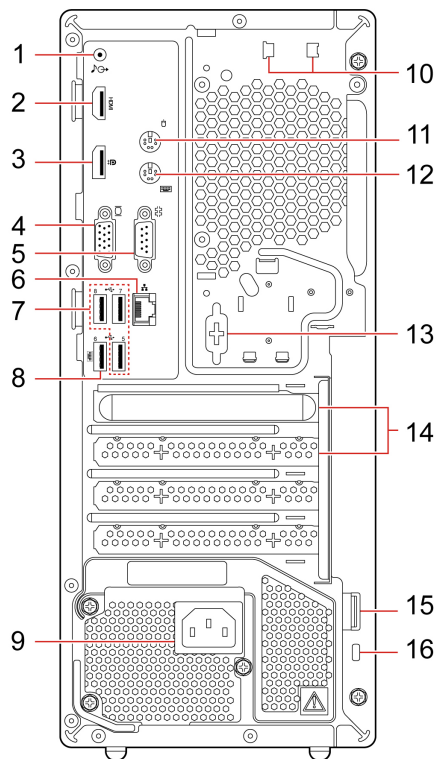
Show the system status of your computer.

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

Related topics

- “Use the optical drive (for selected models)” on page 10.
- “Use a media card (for selected models)” on page 11.
- “USB specifications” on page 5.

Rear



1. Audio line-out connector	2. HDMI™ out connector
3. DisplayPort™ out connector	4. VGA-out connector
5. Serial connector	6. Ethernet connector
7. USB 2.0 connectors	8. USB 2.0 connector (with smart power-on feature)
9. Power cord connector	10. Smart cable clip slots*
11. PS/2 mouse connector*	12. PS/2 keyboard connector*
13. Serial connector*	14. PCI Express card area
15. Padlock loop*	16. Security-lock slot*

* for selected models

Serial connector

Connect an external modem, a serial printer, or other devices that use a serial connector.

Related topics

- “Lock the computer” on page 13.
- “Connect an external display” on page 7.
- “USB specifications” on page 5.
- “Enable or disable the smart power-on feature (for selected models)” on page 21.

Features and specifications

For detailed specifications of your computer, go to <https://psref.lenovo.com>.

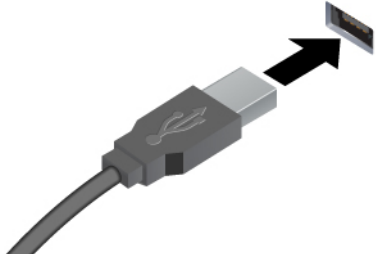



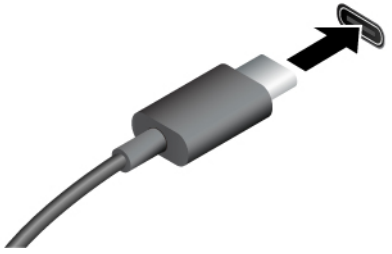




Dimensions	<ul style="list-style-type: none">• Width: 145.0 mm (5.7 inches)• Height: 340.0 mm (13.3 inches)• Depth: 278.0 mm (10.9 inches)
Weight (without packaging)	Maximum configuration as shipped: 5.9 kg (13 lb)
Hardware configuration	<ol style="list-style-type: none">1. Right-click the Start button to open the Start context menu.2. Click Device Manager. Type the administrator password or provide confirmation if prompted.
Power supply	<ul style="list-style-type: none">• 180-watt automatic voltage-sensing power supply• 260-watt automatic voltage-sensing power supply• 310-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
Microprocessor	To view the microprocessor information of your computer, right-click the Start button and then click System .
Memory	<p>Up to two double data rate 4 (DDR4) unbuffered dual in-line memory modules (UDIMMs)</p> <p>Maximum memory capacity: 32 GB</p>
Storage device	<ul style="list-style-type: none">• 3.5-inch form factor, 7-mm (0.28-inch) height hard disk drive*• M.2 solid-state drive*• Intel® Optane™ memory* <p>To view the storage drive capacity of your computer, right-click the Start button to open the Start context menu and then click Disk Management.</p> <p>Note: The storage drive capacity indicated by the system is less than the nominal capacity.</p>
Video features	<ul style="list-style-type: none">• The integrated graphics card supports the following:<ul style="list-style-type: none">– DisplayPort out connector– HDMI out connector– VGA-out connector• The optional discrete graphics card provides an enhanced video experience and extended capabilities.

Expansion	• Card reader*
	• Memory slots
	• M.2 solid-state drive slot
	• Optical drive*
	• PCI Express slots
	• Storage drive bay
Network features	• Bluetooth*
	• Ethernet LAN
	• Wireless LAN*

* for selected models

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"> •  USB 2.0 connector •  USB 3.2 connector Gen 1 •  USB 3.2 connector Gen 2 	<p>Connect USB-compatible devices, such as a USB keyboard, USB mouse, USB storage device, or USB printer.</p>
	
<ul style="list-style-type: none"> •  USB-C (3.2 Gen 1) connector •  USB-C (3.2 Gen 2) connector •  USB-C (Thunderbolt 3) connector •  USB-C (Thunderbolt 4) connector 	<ul style="list-style-type: none"> • Charge USB-C compatible devices with the output voltage and current of 5 V and 3 A. • Connect to an external display: <ul style="list-style-type: none"> – USB-C to VGA: 1900 x 1200 pixels, 60 Hz – USB-C to DP: 3840 x 2160 pixels, 60 Hz • Connect to USB-C accessories to help expand your computer functionality. To purchase USB-C accessories, go to https://www.lenovo.com/accessories.

Statement on USB transfer rate

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

USB device	Data rate (Gbit/s)
3.2 Gen 1 / 3.1 Gen 1	5
3.2 Gen 2 / 3.1 Gen 2	10
3.2 Gen 2 × 2	20
Thunderbolt 3	40
Thunderbolt 4	40

Chapter 2. Get started with your computer

Access networks

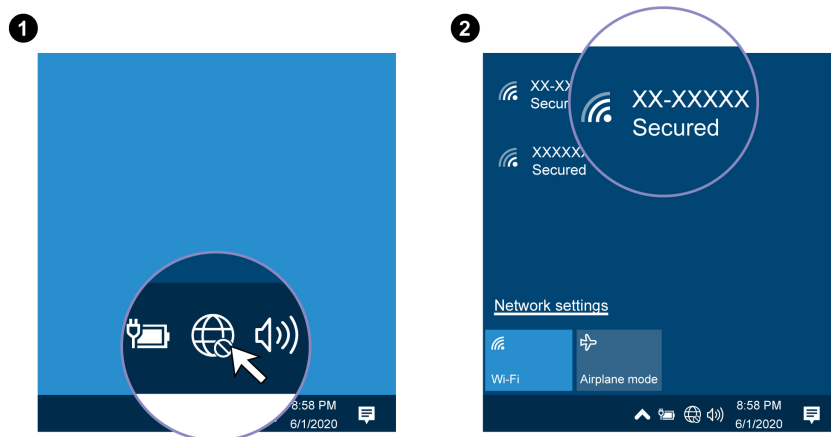
This section helps you access networks through connecting to a wired or wireless network.

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 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  +  and then select a wireless display to connect.

Change display settings

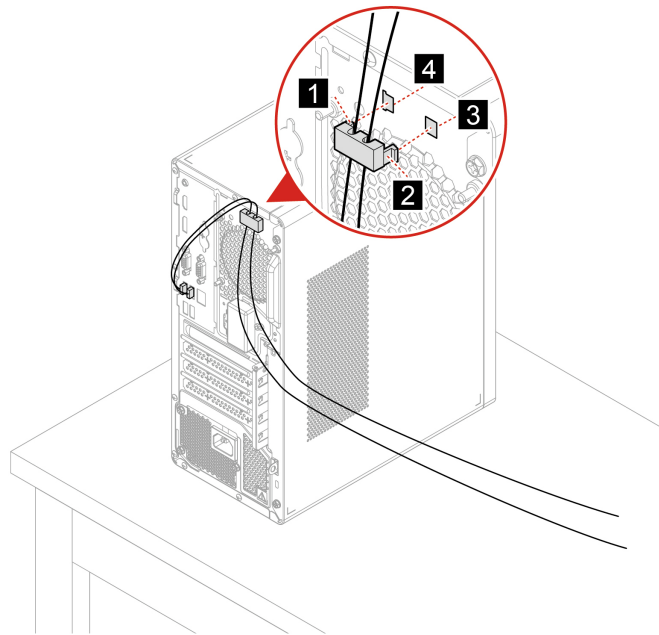
Right-click a blank area on the desktop and select **Display settings**. Then, you can change display settings as you prefer.

Manage cables with a smart cable clip

Note: You can purchase a smart cable clip from Lenovo.

To manage cables of devices (such as the keyboard and the mouse) with a smart cable clip:

1. Pull the cables through the dents in the clip.
2. Install the clip as shown.



Chapter 3. Explore your computer

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 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.

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 to achieve the best balance between performance and power saving:

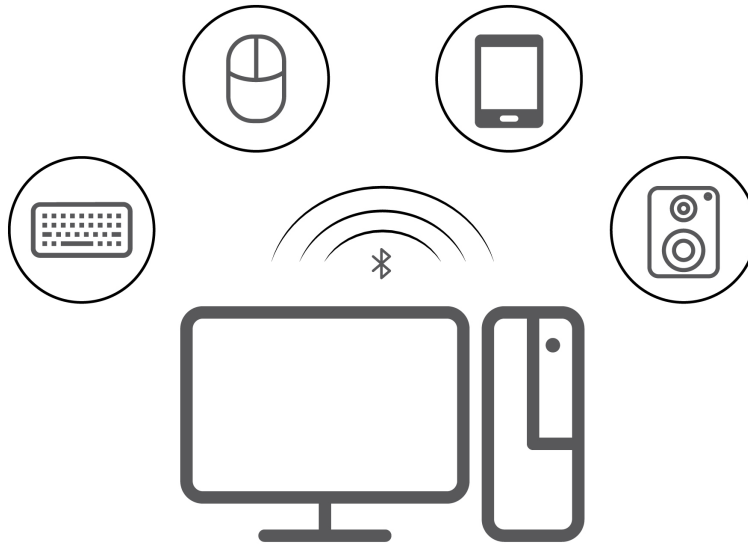
1. Go to **Control Panel** and view by large icons or small icons.
2. Click **Power Options**, and then choose or customize a power plan of your preference.


Transfer data

Quickly share your files using the built-in Bluetooth technology among devices with the same features. You also can install a disc or media card to transfer data.

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. Click the action center icon  in the Windows notification area, and enable the **Bluetooth** feature.
2. Right-click the **Bluetooth** icon.
3. Select **Go To Settings → Add Bluetooth or other device → Bluetooth**.
4. Select a Bluetooth device, and then follow the on-screen instructions.

Use the optical drive (for selected models)

If your computer has an optical drive, read the following information.

Know the type of your optical drive

1. Right-click the **Start** button to open the **Start** context menu.
2. Click **Device Manager**. Type the administrator password or provide confirmation, if prompted.

Install or remove a disc

1. With the computer on, press the eject button on the optical drive. The tray slides out of the drive.
2. Insert a disc into the tray or remove a disc from the tray, and then push the tray back into the drive.

Note: If the tray does not slide out of the drive when you press the eject button, turn off the computer. Then, insert a straightened paper clip into the emergency-eject hole adjacent to the eject button. Use the emergency eject only in an emergency.

Record a disc

1. Insert a recordable disc into the optical drive that supports recording.
2. Do one of the following:
 - Open the **Start** menu, and then click **Settings → Devices → AutoPlay**. Select or turn on **Use AutoPlay for all media and devices**.
 - Open Windows Media Player.
 - Double-click the ISO file.
3. Follow the on-screen instructions.

Use a media card (for selected models)

If your computer has a SD-card slot, read the following information.

Install a media card

1. Locate the SD-card slot.
2. Ensure that the metal contacts on the card are facing the ones in the SD-card slot. Insert the card firmly into the SD-card slot until it is secured in place.

Remove a media card

Attention: Before removing a media card, eject the card from the Windows operating system first. Otherwise, data on the card might get corrupted or lost.

1. Click the triangular icon in the Windows notification area to show hidden icons. Then, right-click the **Safely Remove Hardware and Eject Media** icon.
2. Select the corresponding item to eject the card from the Windows operating system.
3. Press the card and remove it from your computer. Store the card safely for future use.

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>.

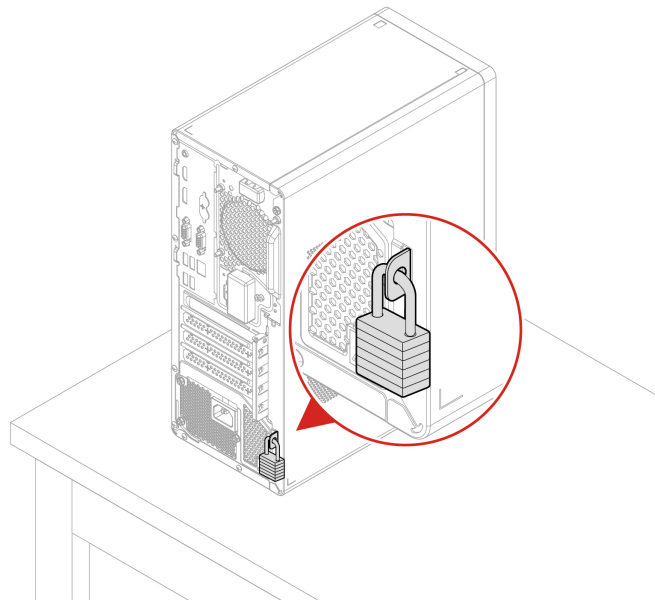
Chapter 4. Secure your computer and information

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.

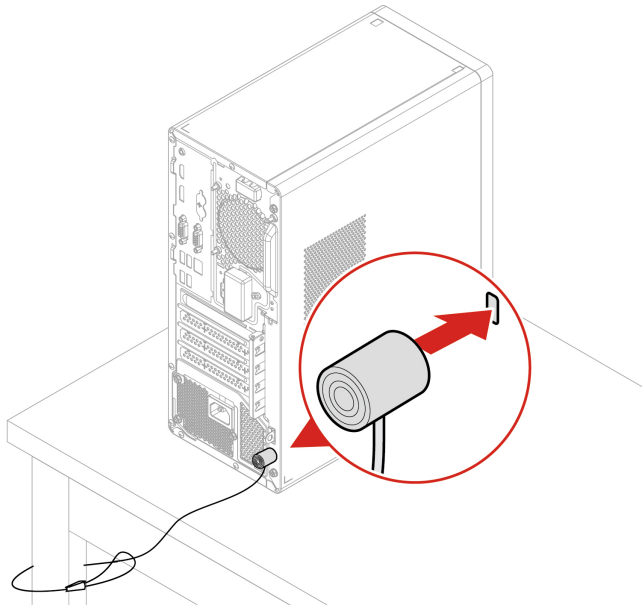
Padlock

Locking the computer cover through a padlock prevents unauthorized access to the inside of your computer.



Kensington-style cable lock

Lock your computer to a desk, table, or other fixtures through a Kensington-style cable lock.



Log in to your computer securely

This section provides secure ways to log in to your computer with a password or your face.

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.

Use software security solutions

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

Windows firewalls

A firewall can be hardware, software, or a combination of both depending on the level of security required. Firewalls work on a set of rules to determine which inbound and outbound connections are authorized. If the computer is preinstalled with a firewall program, it helps protect against computer Internet security threats, unauthorized access, intrusions, and Internet attacks. It also protects your privacy. For more information about how to use the firewall program, refer to the help system of your firewall program.

To use Windows firewalls:

1. Go to **Control Panel** and view by large icons or small icons.
2. Click **Windows Defender Firewall**, and then follow the on-screen instructions.

Antivirus programs

The computer is preinstalled with an antivirus program to help you guard against, detect, and eliminate viruses.

Lenovo provides a full version of antivirus software on the computer with a free 30-day subscription. After 30 days, you must renew the license to continue receiving the antivirus software updates.

Note: Virus definition files must be kept up-to-date to guard against new viruses.

For more information about how to use your antivirus software, refer to the help system of your antivirus software.

Computrace Agent software embedded in firmware (for selected models)

The Computrace Agent software is an IT asset management and computer theft recovery solution. The software detects if changes have been made on the computer, such as hardware, software, or the computer call-in location. You might have to purchase a subscription to activate the Computrace Agent software.

Use BIOS security solutions

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

Erase all storage drive data

It is recommended that you erase all storage drive data before recycling a storage drive or the computer.

To erase all storage drive data:

1. Set a hard disk password for the storage drive you will recycle. See “UEFI BIOS passwords” on page 14.
2. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
3. Select **Security → Hard Disk Password → Security Erase HDD Data** and press Enter.
4. Select the storage drive you will recycle and press Enter.
5. A message is displayed, prompting you to confirm the operation. Select **Yes** and press Enter. The erasing process begins.

Note: During the erasing process, the power button and the keyboard are disabled.

6. After the erasing process is completed, a message is displayed, prompting you to reset the system. Select **Continue**.

Note: Depending on the storage drive capacity, the erasing process will take half an hour to three hours.

7. After the resetting process is completed, one of the following will happen:
 - If the data on the system storage drive is erased, you will be prompted that no operating system is available.
 - If the data on the non-system storage drive is erased, 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 or modify 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.

Chapter 5. UEFI BIOS

This chapter provides information about configuring and updating UEFI BIOS, and clearing CMOS.

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.

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 boot priority 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 boot priority 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 → Boot Priority 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.

Enable or disable the ErP LPS compliance mode

Lenovo computers meet the eco-design requirements of the ErP Lot 3 regulation. For more information, go to:

<https://www.lenovo.com/us/en/compliance/eco-declaration>

You can enable the ErP LPS compliance mode to reduce the consumption of electricity when the computer is off or in sleep mode.

To enable or disable the ErP LPS compliance mode:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Power → Enhanced Power Saving Mode** and press Enter.
3. Depending on whether you select **Enabled** or **Disabled**, do one of the following:
 - If you select **Enabled**, press Enter. Then, select **Power → Automatic Power On** and press Enter. Check whether the Wake on LAN feature is disabled automatically. If no, disable it.

- If you select **Disabled**, press Enter. Then, go to the next step.
4. Press F10 or Fn+F10 to save the changes and exit.

When the ErP LPS compliance mode is enabled, you can wake up the computer by doing one of the following:

- Press the power button.
- Enable the Wake Up on Alarm feature to make the computer wake up at a set time.

To meet the off mode requirement of ErP compliance, you need to disable the Fast Startup function.

1. Go to **Control Panel** and view by large icons or small icons.
2. Click **Power Options → Choose what the power buttons do → Change settings that are currently unavailable**.
3. Clear the **Turn on fast startup (recommended)** option from the **Shutdown settings** list.

Change the ITS performance mode

You can adjust the acoustic and thermal performance of your computer by changing the ITS performance mode. Three choices are available:

- **Best Performance** (default setting): The computer works at the best system performance with normal acoustic level.
- **Best Experience**: The computer works at the best experience with balanced noise and better performance.
- **Full Speed**: All fans in the computer will run at full speed.

To change the ITS performance mode:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Power → Intelligent Cooling** and press Enter.
3. Select **Performance Mode** and press Enter.
4. Set the performance mode as desired.
5. 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 10 operating system. Before installing a particular Windows 10 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 the Windows 10 (64-bit) operating system, 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. For BIOS configurations, see Chapter 5 “UEFI BIOS” on page 19.

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. For BIOS configurations, see Chapter 5 “UEFI BIOS” on page 19.

Chapter 6. Troubleshooting, diagnostics, and recovery

This chapter provides solutions to resolve computer problems. Use the basic procedure as a starting point for resolving computer problems.

Basic procedure for resolving computer problems

Prerequisite

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

1. Check that:
 - a. The cables for all connected devices are connected correctly and securely.
 - b. All components have been reassembled correctly.
 - c. All connected devices that require ac power are connected to properly grounded and working electrical outlets.
 - d. All connected devices are enabled in UEFI BIOS.
2. Use an antivirus program (if any) to see if the computer has been infected by a virus. If the program detects a virus, remove the virus.
3. See Chapter 6 “Troubleshooting, diagnostics, and recovery” on page 25 to resolve the problem you are experiencing, run the diagnostic program, and recover your operating system.
4. If the problem persists, contact Lenovo. See Chapter 8 “Help and support” on page 49.

Troubleshooting

Use the troubleshooting information to find solutions to problems that have definite symptoms.

Startup problems

Problem	Solution
The computer does not start up when you press the power button.	<ul style="list-style-type: none">• Ensure that the power cord is correctly connected to the rear of the computer and to a working electrical outlet.• If the computer has a secondary power switch on the rear of the computer, ensure that it is switched on.• The power indicator on the front of the computer is on.• The computer voltage matches the voltage available at the electrical outlet for your country or region.
The operating system does not start up from the correct storage drive or fails to start up	<ul style="list-style-type: none">• Ensure that all storage drive signal cables and power cables are connected correctly.• Ensure that the storage drive the computer starts up from is listed as the first startup device in UEFI BIOS.• In rare cases, the storage drive with the operating system might get corrupted or damaged. In such cases, you might need to replace the storage drive.• If the computer is installed with an Optane memory:<ul style="list-style-type: none">– Ensure that the Optane memory is not removed.– Ensure that the Optane memory is not damaged. Check the Optane memory using diagnostic tools.
The computer beeps multiple times before the operating system starts up.	Ensure that no keys are stuck.

Audio problems

Problem	Solution
The audio cannot be heard on the Windows operating system.	<ul style="list-style-type: none">• If you are using powered external speakers that have an On/Off control, ensure that:<ul style="list-style-type: none">– The On/Off control is set to the On position.– The speaker power cable is connected to a properly grounded, functional ac electrical outlet.• If your external speakers have a volume control, ensure that the volume is not set too low.• Click the volume icon in the Windows notification area on the taskbar. Check the speaker and volume settings. Do not mute the speaker or set the volume at a very low level.• If your computer has a front audio panel, ensure that the volume is not set too low.• Ensure that your external speakers (and headphones, if used) are connected to the correct audio connector on the computer. Most speaker cables are color-coded to match the audio connector. <p>Note: When external-speaker or headphone cables are connected to the audio connector, the internal speaker, if present, is disabled. In most cases, if an audio adapter is installed in one of the expansion slots, the audio function built into the system board is disabled. Therefore, you must use the audio connectors on the audio adapter.</p> <ul style="list-style-type: none">• Ensure that the program you are running is designed for use in the Microsoft Windows operating system. If the program is designed to run in DOS, the program does not use the Windows sound feature. The program must be configured to use SoundBlaster Pro or SoundBlaster emulation.• Ensure that the audio device drivers are correctly installed.
The sound does not come from the headset or headphones.	Select the headset or headphones as the default audio output device in advanced sound settings.
The sound comes from one of the external speakers.	<ul style="list-style-type: none">• Ensure that the speaker cable is inserted completely into the connector on the computer.• Ensure that the cable that connects the left speaker to the right speaker is securely connected.• Ensure that the balance settings are set correctly.<ol style="list-style-type: none">1. Right-click the volume icon in the Windows notification area on the taskbar. Then, click Open Volume Mixer and select the desired speaker.2. Click the speaker icon on top of the volume control, and then click the Levels tab.

Network problems

Note: The Wi-Fi and Bluetooth features are optional.

Problem	Solution
The computer cannot connect to an Ethernet LAN.	<ul style="list-style-type: none"> • Connect the cable from the Ethernet connector to the RJ45 connector of the hub. • Enable the Ethernet LAN feature in UEFI BIOS. • Enable the Ethernet LAN adapter. <ol style="list-style-type: none"> 1. Go to Control Panel and view by large icons or small icons. 2. Click Network and Sharing Center → Change adapter settings. 3. Right-click the Ethernet LAN adapter icon and click Enable. • Update or reinstall the Ethernet LAN driver. • Install all networking software that is necessary for your network environment. Check with your LAN administrator for the necessary networking software. • Set the same duplex for the switch port and the adapter. If you configured the adapter for full duplex, ensure that the switch port is also configured for full duplex. Setting a wrong duplex mode might degrade performance, cause data loss, or result in lost connections.
When a Gigabit Ethernet model computer is used at a speed of 1000 Mbps, the Ethernet LAN connection fails or errors occur.	Connect the network cable to the Ethernet connector using Category 5 wiring and a 100 BASE-T hub/switch (not 100 BASE-X).
The Wake On LAN (WOL) feature does not work.	Enable the Wake On LAN feature in UEFI BIOS.
The Wi-Fi feature does not work.	<ul style="list-style-type: none"> • Enable the Wi-Fi feature in UEFI BIOS. • Enable all Wi-Fi devices. <ol style="list-style-type: none"> 1. Right-click the Start button to open the Start context menu. 2. Click Device Manager. Type the administrator password or provide confirmation, if prompted. 3. Expand Network adapters to display all network devices. 4. Right-click each Wi-Fi device, and then click Enable device. • Enable the Wi-Fi feature in Windows Settings. <ol style="list-style-type: none"> 1. Open the Start menu. 2. Click Settings → Network & Internet → Wi-Fi. 3. Enable the Wi-Fi feature. • Update or reinstall the Wi-Fi driver.

Problem	Solution
The Bluetooth feature does not work.	<ul style="list-style-type: none"> • Enable the Bluetooth feature in UEFI BIOS. • Enable all Bluetooth devices. <ol style="list-style-type: none"> 1. Right-click the Start button to open the Start context menu. 2. Click Device Manager. Type the administrator password or provide confirmation if prompted. 3. Expand Bluetooth to display all Bluetooth devices. Right-click each Bluetooth device, and then click Enable device. 4. Expand Network adapters to display all network devices. Right-click each Bluetooth device, and then click Enable device. • Turn on the Bluetooth radio. <ol style="list-style-type: none"> 1. Open the Start menu. 2. Click Settings → Devices → Bluetooth & other devices. 3. Turn on the Bluetooth switch to enable the Bluetooth feature. • Update or reinstall the Bluetooth driver.
Sound does not come from the Bluetooth headset or headphones.	Select the Bluetooth headset or headphones as the default audio output device in advanced sound settings.

Performance problems

Problem	Solution
Excessive fragmented files exist on the storage drives.	<p>Note: Depending on the volume of the storage drives and amount of data stored on the storage drives, the disk-defragmentation process might take up to several hours.</p> <ol style="list-style-type: none">1. Close any open programs and windows.2. Open the Start menu.3. Click Windows System → File Explorer → This PC.4. Right-click your C drive and then click Properties.5. Click the Tools tab.6. Click Optimize. Select the drive as desired, and then click Optimize.7. Follow the on-screen instructions.
The free storage drive space is insufficient.	<ul style="list-style-type: none">• Clean out your Inbox, Sent Items, and Deleted Items folders from your e-mail application.• Clean up your C drive.<ol style="list-style-type: none">1. Open the Start menu.2. Click Windows System → File Explorer → This PC.3. Right-click your C drive and then click Properties.4. Check the amount of free space, and then click Disk Cleanup.5. A list of unnecessary file categories is displayed. Select the category you want to delete, and then click OK.• Disable some Windows features or remove some unnecessary programs.<ol style="list-style-type: none">1. Go to Control Panel and view by large icons or small icons.2. Click Programs and Features.3. Do one of the following:<ul style="list-style-type: none">– To disable some Windows features, click Turn Windows features on or off. Follow the on-screen instructions.– To remove some unnecessary programs, select the program you want to remove, and then click Uninstall/Change or Uninstall.
The free memory space is insufficient.	<ul style="list-style-type: none">• Right-click a blank area on the taskbar and open Task Manager. Then, end some tasks you are not performing.• Install additional memory modules.

Storage drive problems

Problem	Solution
Some or all storage drives are missing from the BIOS menu.	<ul style="list-style-type: none">• Ensure that the signal cables and power cables for all the storage drives are connected correctly.• Ensure that the computer is configured correctly to support the storage drives.<ul style="list-style-type: none">– If the computer is installed with SATA storage drives, ensure that the SATA storage drive enablement module (one to five storage drives) is installed.– If the computer is installed with SAS storage drives, ensure that the SAS storage drive enablement module (one to five storage drives) or the LSI MegaRAID SAS adapter is installed.

CD or DVD problems

Problem	Solution
A CD or DVD does not work.	<ul style="list-style-type: none">• Ensure that the optical drive supports the CD or DVD.• Ensure that the disc is inserted correctly, with its label up.• Ensure that the disc you are using is clean. To remove dust or fingerprints, wipe the disc clean with a soft cloth from the center to the outside. Wiping a disc in a circular motion might cause loss of data.• Ensure that the power cable and signal cable are securely connected to the drive.• Ensure that the disc you are using is not scratched or damaged. Try inserting another disc that you know works.• If you have multiple CD or DVD drives installed (or a combination of CD and DVD drives), try inserting the disc into the other drive. In some cases, only one of the drives is connected to the audio subsystem.
A bootable recovery medium, such as the Product Recovery CD, cannot be used to start your computer.	<p>Ensure that the CD or DVD drive is set as the top priority of the boot priority order in UEFI BIOS.</p> <p>Note: On some computer models, the startup sequence is permanently set and cannot be changed.</p>
A black screen is displayed instead of the DVD video.	<ul style="list-style-type: none">• Restart the DVD player program.• Try a lower screen resolution or color depth.• Close any open files, and then restart the computer.
A DVD movie does not play.	<ul style="list-style-type: none">• Ensure that the disc surface is clean and not scratched.• Check the disc or packaging for regional coding. You might need to purchase a disc with coding for the region where you are using the computer.
No audio or only an intermittent audio comes out while a DVD movie is playing.	<ul style="list-style-type: none">• Check the volume control settings on the computer and on your speakers.• Ensure that the disc surface is clean and not scratched.• Check all cable connections to and from the speakers.• Use the DVD menu for the video to select a different audio track.

Problem	Solution
The playback is slow or choppy.	<ul style="list-style-type: none"> • Disable any background programs, such as AntiVirus or Desktop Themes. • Ensure that video resolution is less than 1152 x 864 pixels.
A message indicating invalid disc or no disc found is displayed.	<ul style="list-style-type: none"> • Ensure that the disc is in the drive with the shiny side of the disc facing down. • Ensure that video resolution is less than 1152 x 864 pixels. • Ensure that the DVD or CD is inserted into an appropriate optical drive. For example, do not insert a DVD into a CD-only drive.

Serial connector problems

Problem	Solution
The serial connector cannot be accessed.	<ul style="list-style-type: none"> • Connect the serial cable from the serial connector on the computer to the serial device. If the serial device has its own power cord, connect the power cord to a grounded electrical outlet. • Turn on the serial device and keep the device online. • Install any programs supplied with the serial device. Refer to the documentation that comes with the serial device for more information. • If you added one serial-connector adapter, ensure that the adapter is installed correctly.

USB device problems

Problem	Solution
A USB device cannot be accessed.	<ul style="list-style-type: none"> • Connect the USB cable from the USB connector to the USB device. If the USB device has its own power cord, connect the power cord to a grounded electrical outlet. • Turn on the USB device and keep the device online. • Install any device drivers or programs supplied with the USB device. Refer to the documentation that comes with the USB device for more information. • Disconnect and reconnect the USB connector to reset the USB device. • Ensure that the Smart USB Protection function is disabled in UEFI BIOS.

Software problems

Problem	Solution
Some programs do not work as expected.	<ol style="list-style-type: none">1. Check whether the problem is caused by a program.<ol style="list-style-type: none">a. Ensure that the software is compatible with the computer. Refer to the information supplied with the software for more information.b. Verify that other software works correctly on the computer.c. Verify that the software you are using works on another computer.2. If the problem is caused by a program:<ul style="list-style-type: none">• Refer to the printed documentation that comes with the program or the help system of the program.• Update the program.• Uninstall the program and then reinstall it. To download a program that is preinstalled on your computer, go to https://pcsupport.lenovo.com and 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>

The Vantage app

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

1. Type Vantage in the search box.
2. Open the Vantage app.
3. 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.

Recovery

This section introduces the recovery information of the Windows 10 operating system. Ensure that you read and follow the on-screen recovery instructions. The data on your computer might be deleted during the recovery process. To avoid data loss, make a backup copy of all the data that you want to keep.

Restore system files and settings to an earlier point

1. Go to **Control Panel** and view by large icons or small icons.
2. Click **Recovery** → **Open System Restore**. Then, follow the on-screen instructions.

Restore your files from a backup

Note: If you use the File History tool to restore your files from a backup, ensure that you backed up your data earlier with the tool.

1. Go to **Control Panel** and view by large icons or small icons.
2. Click **File History → Restore personal files**. Then, follow the on-screen instructions.

Reset your computer

In the resetting process, you can choose to keep your files or remove them when you reinstall the operating system.

Note: The items in the graphical user interface (GUI) might change without notice.

1. Open the **Start** menu, and then click **Settings → Update & Security → Recovery**.
2. In the **Reset this PC** section, click **Get started**.
3. Follow the on-screen instructions to reset your computer.

Use advanced options

1. Open the **Start** menu, and then click **Settings → Update & Security → Recovery**.
2. In the **Advanced startup** section, click **Restart now → Troubleshoot → Advanced options**.
3. Select a preferred option, and then follow the on-screen instructions.

Windows automatic recovery

Note: Ensure that your computer is connected to ac power during the recovery process.

The Windows recovery environment on your computer operates independently from the Windows 10 operating system. It enables you to recover or repair the operating system even if the Windows 10 operating system fails to start.

After two consecutive failed boot attempts, the Windows recovery environment starts automatically. Then, you can choose repair and recovery options by following the on-screen instructions.

Create and use a recovery USB device

It is recommended that you create a recovery USB drive as early as possible as a backup for the Windows recovery programs. With the recovery USB drive, you can troubleshoot and fix the problems even if the preinstalled Windows recovery programs are damaged. If you did not create a recovery USB drive as a precautionary measure, you can contact Lenovo Customer Support Center and purchase one from Lenovo. For a list of the Lenovo Support phone numbers for your country or region, go to:

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

Create a recovery USB drive

Attention: The creation process deletes anything stored on the USB drive. To avoid data loss, make a backup copy of all the data that you want to keep.

1. Ensure that your computer is connected to ac power.
2. Prepare a USB drive with capacity of at least 16 GB. The actual USB capacity required depends on the size of the recovery image.
3. Connect the prepared USB drive to the computer.
4. Type **recovery** in the search box. Then, click **Create a recovery drive**.
5. Click **Yes** in the User Account Control window to allow the Recovery Media Creator program to start.

6. In the Recovery Drive window, follow the on-screen instructions to create a recovery USB drive.

Use the recovery USB drive

If your computer cannot be started, go to Chapter 8 “Help and support” on page 49 first to try to solve the problem by yourself. If the problem persists, use the recovery USB drive to recover your computer.

1. Ensure that your computer is connected to ac power.
2. Connect the recovery USB drive to the computer.
3. Turn on or restart the computer. When the logo screen is displayed, press F12. The Boot Menu window opens.
4. Select the recovery USB drive as the boot device. Then, follow the on-screen instructions to complete the process.

Update the device driver

Attention: Reinstalling device drivers will change the current configuration of the computer.

You should download the latest driver for a component when you notice poor performance from that component or when you added a component. This action might eliminate the driver as the potential cause of a problem. Download and install the latest driver 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:

Go to <https://pcsupport.lenovo.com> and select the entry for your computer. Then, follow the on-screen instructions to download and install necessary drivers and software.

Chapter 7. CRU replacement

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

- **Self-service CRUs:** Refer to parts that can be installed or replaced easily by customer themselves or by trained service technicians at an additional cost.
- **Optional-service CRUs:** Refer to parts that can be installed or replaced by customers with a greater skill level. Trained service technicians can also provide service to install or 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

- Computer cover
- Front bezel
- Hard disk drive*
- Keyboard*
- M.2 solid-state drive*
- Memory module
- Mouse*
- Optical drive*
- Optical drive bracket*
- PCI Express card*
- Power cord
- Smart cable clip*

Optional-service CRUs

- Coin-cell battery
- Power supply assembly

* for selected models

Remove or replace a CRU

This section provides instructions on how to remove or replace a CRU.

Computer cover

Prerequisite

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

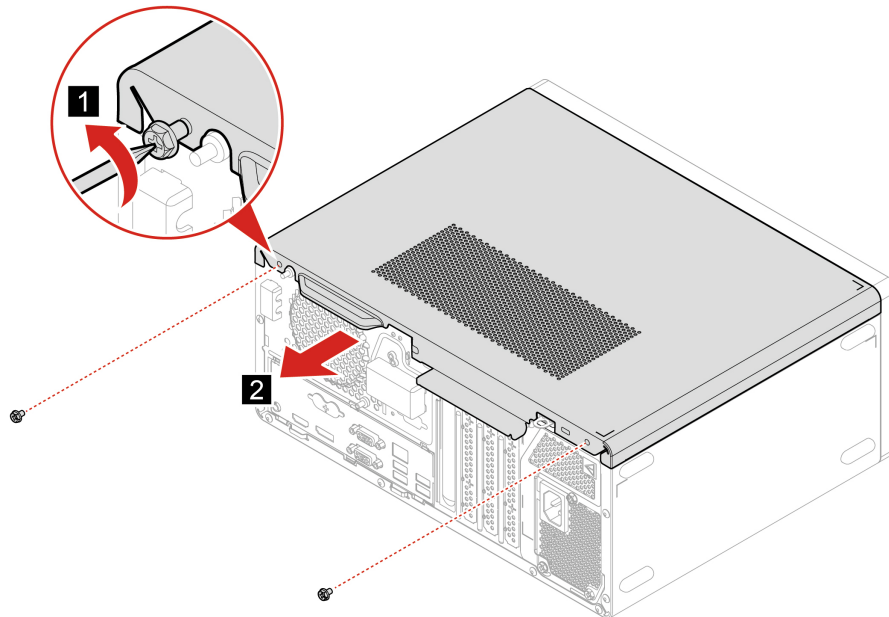


Before you open the computer cover, turn off the computer and wait several minutes until the computer is cool.

For access, do the following:

1. Turn off the computer and remove all connected devices and cables.
2. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
3. Unlock any locking device that secures the computer cover.

Removal steps



Front bezel

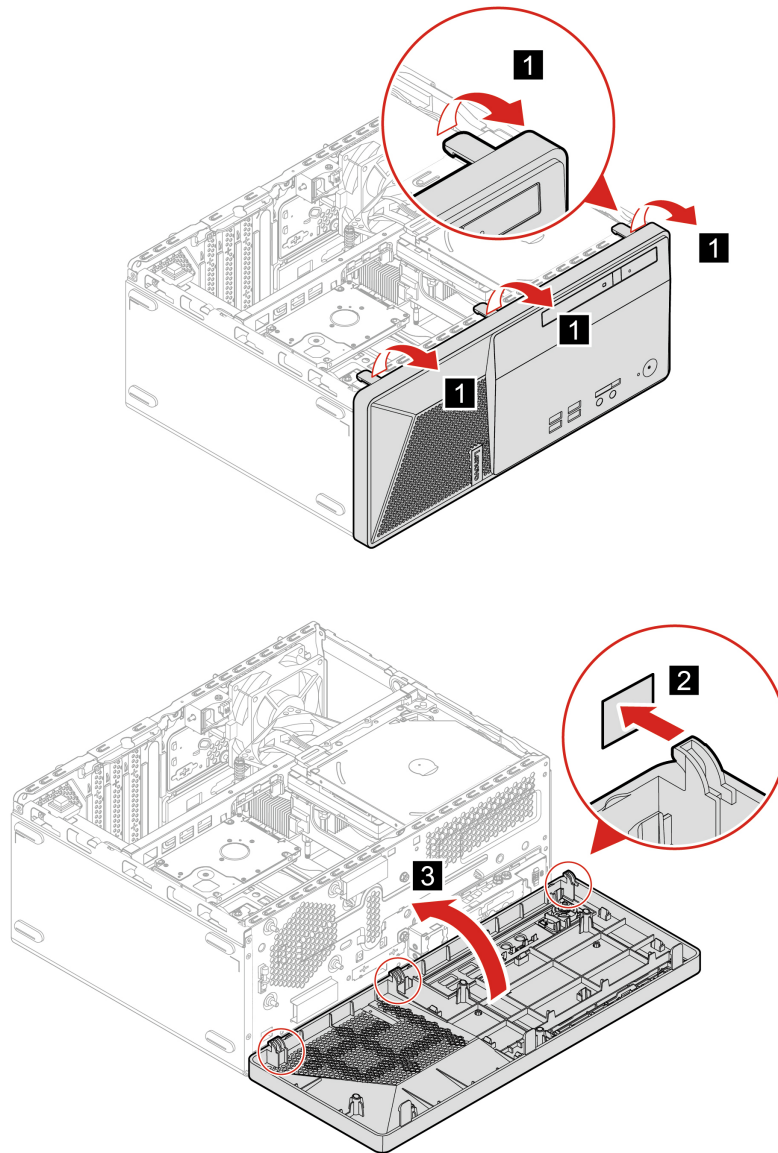
Prerequisite

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

For access, do the following:

1. Remove the computer cover. See “Computer cover” on page 38.

Replacing steps



Optical drive

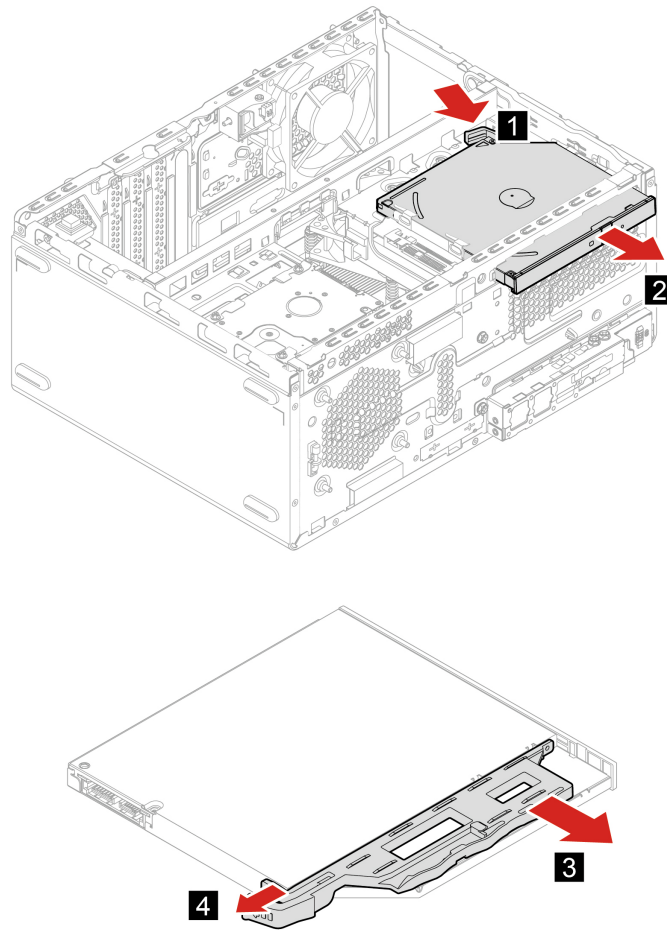
Prerequisite

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

For access, do the following:

1. Remove the computer cover. See “Computer cover” on page 38.
2. Remove the front bezel. See “Front bezel” on page 38.
3. Disconnect the signal cable and the power cable from the optical drive.

Removal steps



Drive bay assembly

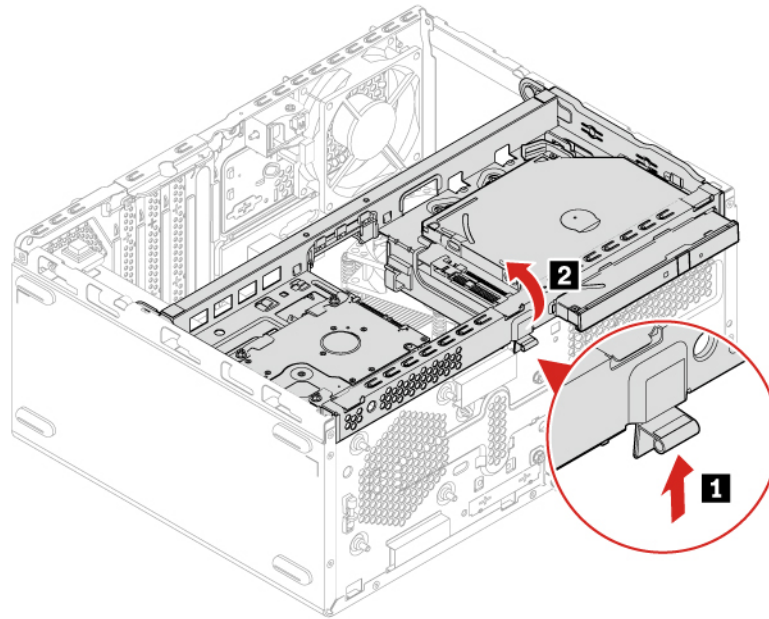
Prerequisite

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

For access, do the following:

1. Remove the computer cover. See “Computer cover” on page 38.
2. Remove the front bezel. See “Front bezel” on page 38.

Removal steps



Hard disk drive

Prerequisite

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

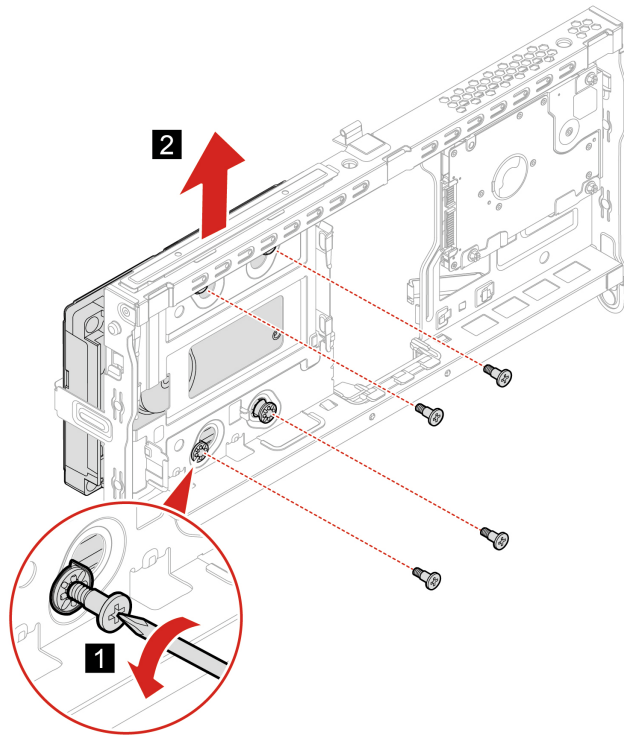
Attention: The internal storage drive is sensitive. Inappropriate handling might cause damage and permanent loss of data. When handling the internal storage drive, observe the following guidelines:

- Replace the internal storage drive only for upgrade or 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 computer cover. See “Computer cover” on page 38.
2. Remove the front bezel. See “Front bezel” on page 38.
3. Remove the optical drive, if any. See “Optical drive” on page 39.
4. Remove the drive bay assembly. See “Drive bay assembly” on page 40.
5. Disconnect the signal cable and the power cable from the hard disk drive.

Removal steps

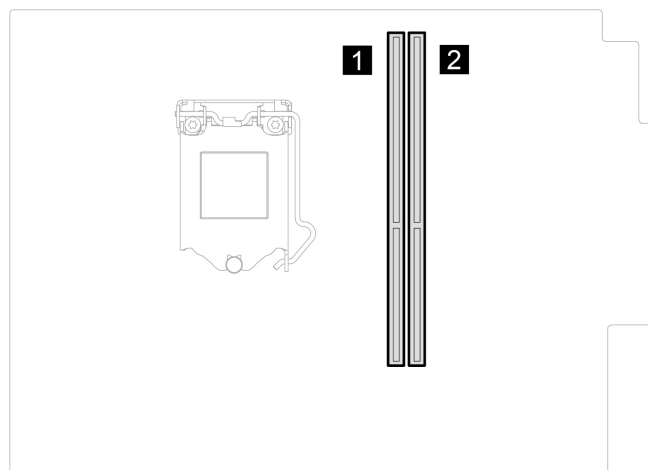


Memory module

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.

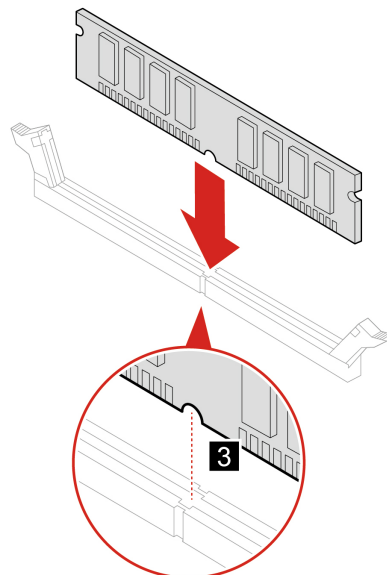
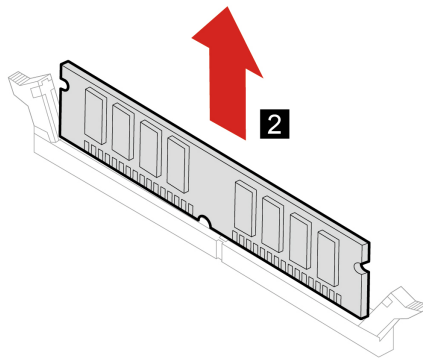
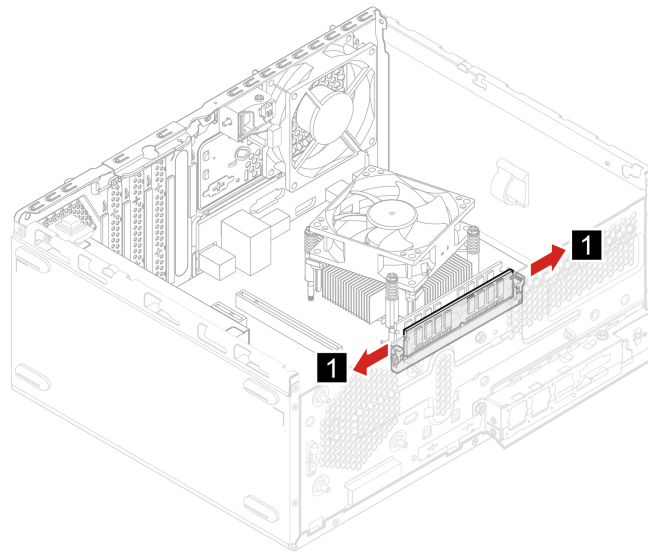


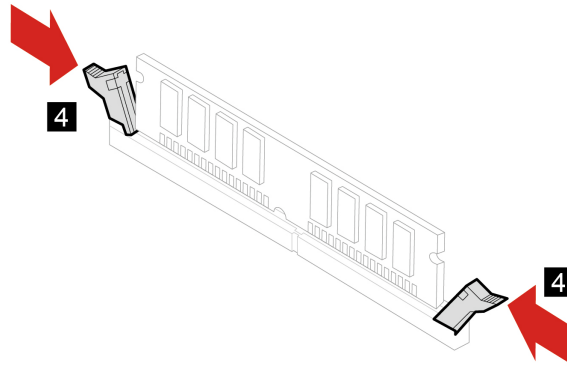
For access, do the following:

1. Remove the computer cover. See “Computer cover” on page 38.
2. Remove the front bezel. See “Front bezel” on page 38.

3. Remove the drive bay assembly. See “Drive bay assembly” on page 40.

Replacement steps





Coin-cell battery

Prerequisite

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

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.

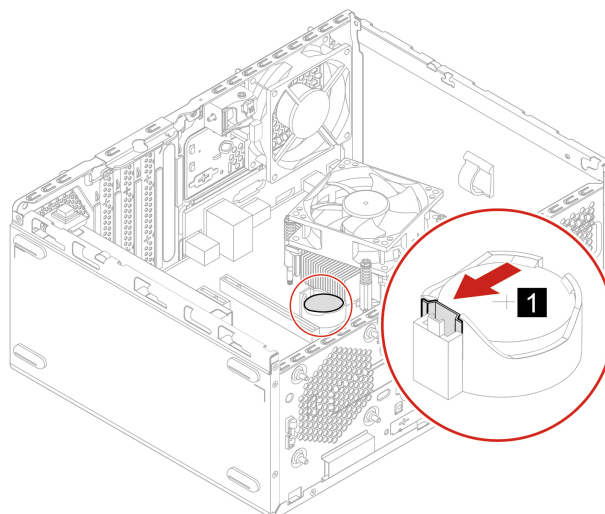
The coin-cell battery normally requires no charging or maintenance throughout its life; however, no coin-cell battery lasts forever. If the coin-cell battery fails, the date and time information is lost. An error message is displayed when you turn on the computer.

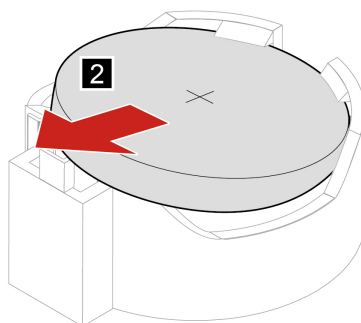
To dispose of the coin-cell battery, refer to the “Lithium coin-cell battery notice” in the *Safety and Warranty Guide*.

For access, do the following:

1. Remove the computer cover. See “Computer cover” on page 38.
2. Remove the front bezel. See “Front bezel” on page 38.
3. Remove the drive bay assembly. See “Drive bay assembly” on page 40.

Removal steps





Note: After installing a new coin-cell battery, reset the system date and time in the UEFI BIOS menu.

PCI Express card

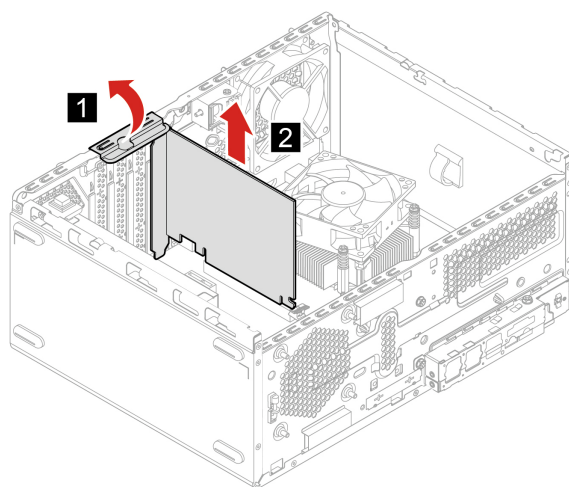
Prerequisite

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

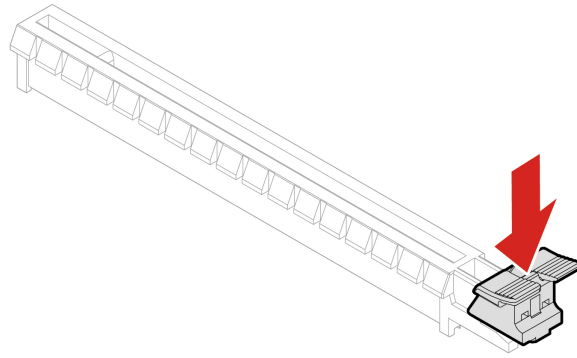
For access, do the following:

1. Remove the computer cover. See “Computer cover” on page 38.
2. Remove the front bezel. See “Front bezel” on page 38.
3. Remove the drive bay assembly. See “Drive bay assembly” on page 40.

Removal steps



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



M.2 solid-state drive

Prerequisite

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

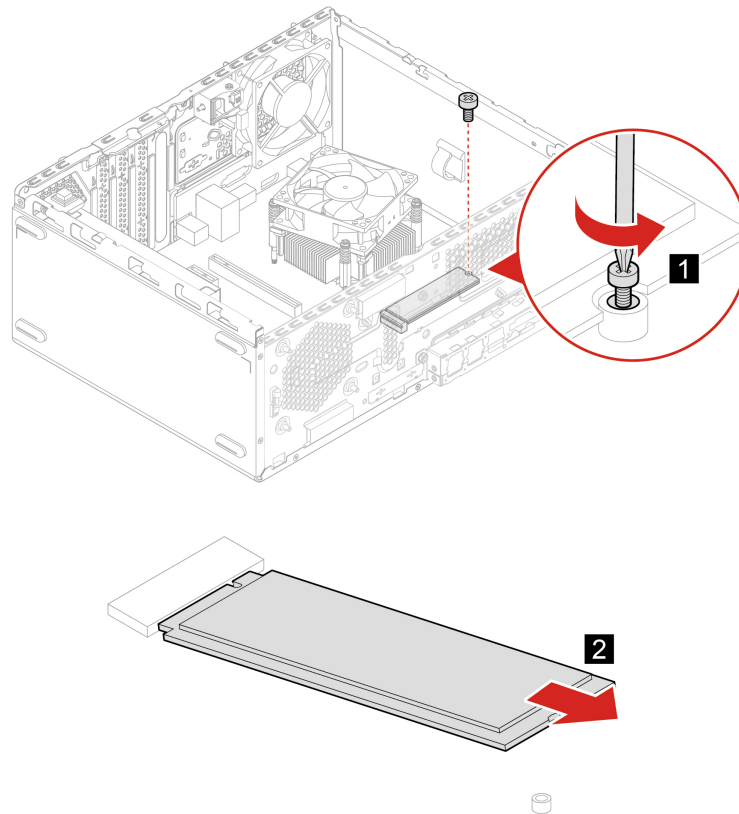
Attention:

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

For access, do the following:

1. Remove the computer cover. See “Computer cover” on page 38.
2. Remove the front bezel. See “Front bezel” on page 38.
3. Remove the drive bay assembly. See “Drive bay assembly” on page 40.

Removal steps



Power supply assembly

Prerequisite

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

Although there are no moving parts in the computer after the power cord has been disconnected, the following warnings are required for your safety.



Keep fingers and other parts of your body away from hazardous, moving parts. If you suffer an injury, seek medical care immediately. Never remove the cover on a power supply or any part that has the following label attached.



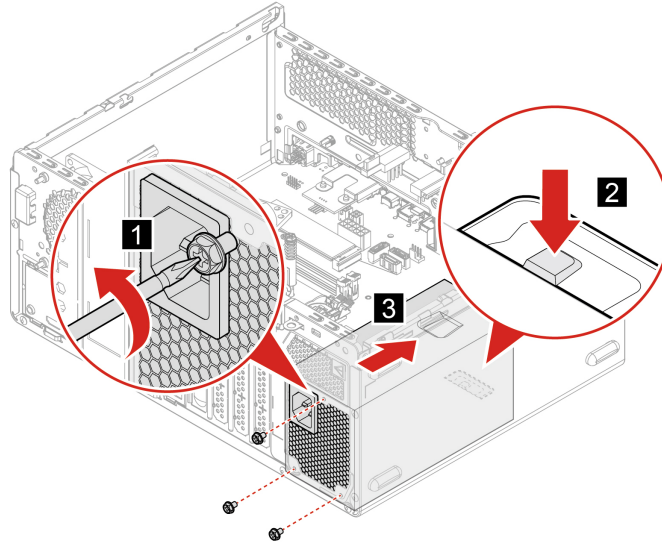
Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

For access, do the following:

1. Remove the computer cover. See “Computer cover” on page 38.

2. Remove the front bezel. See “Front bezel” on page 38.
3. Remove the drive bay assembly. See “Drive bay assembly” on page 40.
4. Disconnect the power supply assembly cables from the system board.

Removal steps



Chapter 8. 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?
<p>Use the Vantage app to:</p> <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. <p>Note: The available features vary depending on the computer model.</p>	Type Vantage in the search box.
<p>Product documentation:</p> <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.
<p>Lenovo Support Web site with the latest support information of the following:</p> <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">• Open the Start menu and click Get Help or Tips.• Use Windows Search or the Cortana® personal assistant.• Microsoft support Web site: https://support.microsoft.com

Call Lenovo

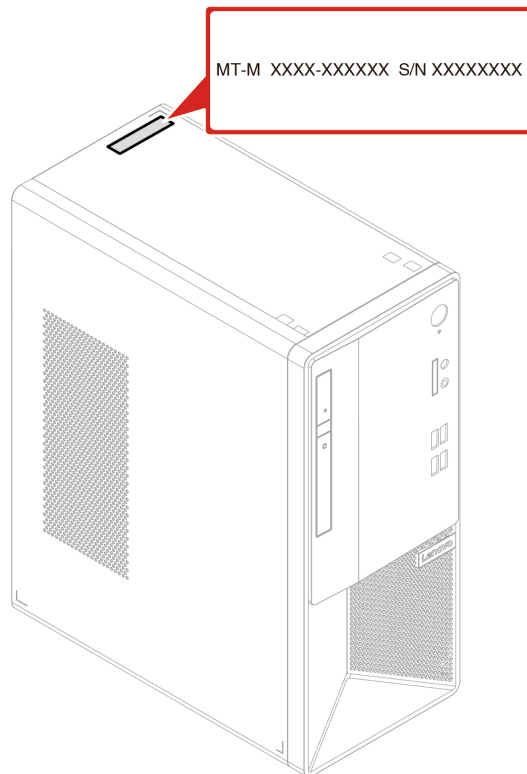
If you have tried to correct the problem yourself and still need help, you can call Lenovo Customer Support Center.

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.

Services available during the warranty period

- Problem determination - Trained personnel are available to assist you with determining if you have a hardware problem and deciding what action is necessary to fix the problem.
- Lenovo hardware repair - If the problem is determined to be caused by Lenovo hardware under warranty, trained service personnel are available to provide the applicable level of service.
- Engineering change management - Occasionally, there might be changes that are required after a product has been sold. Lenovo or your reseller, if authorized by Lenovo, will make selected Engineering Changes (ECs) that apply to your hardware available.

Services not covered

- Replacement or use of parts not manufactured for or by Lenovo or nonwarranted parts
- Identification of software problem sources
- Configuration of UEFI BIOS as part of an installation or upgrade
- Changes, modifications, or upgrades to device drivers
- Installation and maintenance of network operating systems (NOS)
- Installation and maintenance of programs

For the terms and conditions of the Lenovo Limited Warranty that apply to your Lenovo hardware product, see *Safety and Warranty Guide* that comes with your computer.

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. Accessibility and ergonomic information

This chapter provides information about accessibility and ergonomics.

Accessibility information

Lenovo is committed to providing users who have hearing, vision, and mobility limitations with greater access to information and technology. This section provides information about the ways these users can get the most out of their computer experience. You also can get the most up-to-date accessibility information from the following Web site:

<https://www.lenovo.com/accessibility>

Keyboard shortcuts

The following list contains keyboard shortcuts that can help make your computer easier to use.

Note: Depending on your keyboard, some of the following keyboard shortcuts might not be available.

- **Windows logo key + U:** Open Ease of Access Center
- **Right Shift for eight seconds:** Turn on or turn off Filter Keys
- **Shift five times:** Turn on or turn off Sticky Keys
- **Num Lock for five seconds:** Turn on or turn off Toggle Keys
- **Left Alt+Left Shift+Num Lock:** Turn on or turn off Mouse Keys
- **Left Alt+Left Shift+PrtScn (or PrtSc):** Turn on or turn off High Contrast

For more information, go to <https://windows.microsoft.com>, and then search using any of the following keywords: keyboard shortcuts, key combinations, shortcut keys.

Ease of Access Center

Ease of Access Center on the Windows operating system enables you to configure your computers to suit their physical and cognitive needs.

To access Ease of Access Center:

1. Go to **Control Panel** and view by Category.
2. Click **Ease of Access → Ease of Access Center**.
3. Choose the appropriate tool by following the on-screen instructions.

Ease of Access Center mainly includes the following tools:

- **Magnifier**

Magnifier is a useful utility that enlarges the entire screen or part of the screen so that you can see the items better.

- **Narrator**

Narrator is a screen reader that reads what is displayed on the screen aloud and describes events such as error messages.

- **On-Screen Keyboard**

If you prefer to type or enter data into your computer using a mouse, joystick, or other pointing device instead of a physical keyboard, you can use On-Screen Keyboard. On-Screen Keyboard displays a visual

keyboard with all the standard keys. You can select keys using the mouse or another pointing device, or you can tap to select the keys if your computer supports multi-touch screen.

- **High Contrast**

High Contrast is a feature that heightens the color contrast of some text and images on your screen. As a result, those items are more distinct and easier to identify.

- **Personalized keyboard**

Adjust keyboard settings to make your keyboard easier to use. For example, you can use your keyboard to control the pointer and make the keyboard easier to type certain key combinations.

- **Personalized mouse**

Adjust mouse settings to make your mouse easier to use. For example, you can change the pointer appearance and make your mouse easier to manage windows.

Speech Recognition

Speech Recognition enables you to control your computer by voice.

You can use verbal instructions to control the keyboard and mouse. With verbal instructions, you can start programs, open menus, click objects on the screen, dictate text into documents, and write and send e-mails.

To use Speech Recognition:

1. Go to **Control Panel** and view by Category.
2. Click **Ease of Access → Speech Recognition**.
3. Follow the on-screen instructions.

Screen-reader technologies

Screen-reader technologies are primarily focused on software program interfaces, help systems, and various online documents. For additional information about screen readers, see the following:

- Use PDFs with screen readers:
<https://www.adobe.com/accessibility.html?promoid=DJGVE>
- Use the JAWS screen reader:
<https://www.freedomscientific.com/Products/Blindness/JAWS>
- Use the NVDA screen reader:
<https://www.nvaccess.org/>

Screen resolution

You can make the text and images on your screen easier to read by adjusting the screen resolution of your computer.

To adjust the screen resolution:

1. Right-click an empty area of the desktop and then click **Display settings → Display**.
2. Follow the on-screen instructions.

Note: Setting a resolution too low might prevent some items from fitting on the screen.

Customizable item size

You can make the items on your screen easier to read by changing the item size.

- To change the item size temporarily, use the Magnifier tool in Ease of Access Center.
- To change the item size permanently:

- Change the size of all the items on your screen.
 1. Right-click an empty area of the desktop and then click **Display settings → Display**.
 2. Change the item size by following the on-screen instructions. For some applications, your configuration might not take effect until you sign out and then sign in again.
- Change the size of the items on a Web page.
Press and hold Ctrl, and then press the plus-sign key (+) to enlarge or the minus-sign key (–) to reduce the text size.
- Change the size of the items on the desktop or a window.

Note: This function might not work on some windows.

If your mouse has a wheel, press and hold Ctrl, and then scroll the wheel to change the item size.

Industry-standard connectors

Your computer provides industry-standard connectors that enable you to connect assistive devices.

Documentation in accessible formats

Lenovo provides electronic documentation in accessible formats, such as properly tagged PDF files or HyperText Markup Language (HTML) files. Lenovo electronic documentation is developed to ensure that visually impaired users can read the documentation through a screen reader. Each image in the documentation also includes adequate alternative text so that visually impaired users can understand the image when they use a screen reader.

Ergonomic information

Good ergonomic practice is important to get the most from your personal computer and to avoid discomfort. Arrange your workplace and the equipment you use to suit your individual needs and the kind of work that you perform. In addition, use healthy work habits to maximize your performance and comfort when using your computer.

Working in the virtual office might mean adapting to frequent changes in your environment. Adapting to the surrounding light sources, active seating, and the placement of your computer hardware, can help you improve your performance and achieve greater comfort.

This example shows someone in a conventional setting. Even when not in such a setting, you can follow many of these tips. Develop good habits, and they will serve you well.



General posture: Make minor modifications in your working posture to deter the onset of discomfort caused by long periods of working in the same position. Frequent short breaks from your work also help to prevent minor discomfort associated with your working posture.

Display: Position the display to maintain a comfortable viewing distance of 510 mm to 760 mm (20 inches to 30 inches). Avoid glare or reflections on the display from overhead lighting or outside sources of light. Keep the display screen clean and set the brightness to levels that enable you to see the screen clearly. Press the brightness control keys to adjust display brightness.

Head position: Keep your head and neck in a comfortable and neutral (vertical, or upright) position.

Chair: Use a chair that gives you good back support and seat height adjustment. Use chair adjustments to best suit your comfort posture.

Arm and hand position: If available, use chair arm rests or an area on your working surface to provide weight support for your arms. Keep your forearms, wrists, and hands in a relaxed and neutral (horizontal) position. Type with a soft touch without pounding the keys.

Leg position: Keep your thighs parallel to the floor and your feet flat on the floor or on a footrest.

Appendix B. Compliance information

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

Certification-related information

Product name: Lenovo V50t Gen 2

Machine types: 11QB, 11QC, 11QD and 11QE

The latest compliance information is available at:
<https://www.lenovo.com/us/en/compliance>

Federal Communications Commission (FCC) Supplier's Declaration of Conformity

The following information refers to Lenovo V50t Gen 2, machine types: 11QB, 11QC, 11QD and 11QE.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an authorized dealer or service representative for help.

Lenovo is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Responsible Party:
Lenovo (United States) Incorporated
7001 Development Drive
Morrisville, NC 27560
Email: FCC@lenovo.com



Operating environment

Maximum altitude (without pressurization)

- Operating: From -15.2 m (-50 ft) to 3048 m (10 000 ft)
- Storage: From -15.2 m (-50 ft) to 10 668 m (35 000 ft)

Temperature

- Operating: From 10°C (50°F) to 35°C (95°F)
- Storage in original shipping packaging:
 - For common desktop computers: From -40°C (-40°F) to 60°C (140°F)
 - For all-in-one desktop computers: From -20°C (-4°F) to 60°C (140°F)
- Storage without packaging: From -10°C (14°F) to 60°C (140°F)

Note: If your computer is stored or transported in temperatures less than 10°C (50°F), allow the computer to rise slowly to an optimal operating temperature before use. This process might take up to two hours. Using the computer in a lower operating temperature might result in irreparable damage to your computer.

Relative humidity

- Operating: 20%-80% (non-condensing)
- Storage: 20%–90% (non-condensing)

Korea SAR statement

무선설비 전파 혼신 (사용주파수 2400~2483.5 , 5725~5825 무선제품해당)

해당 무선설비가 전파혼신 가능성이 있으므로 인명안전과 관련된 서비스는 할 수 없음

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*Lenovo (United States), Inc.
8001 Development Drive
Morrisville, NC 27560
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