


## Supervisor password

The supervisor password protects the system information stored in UEFI BIOS. When entering the UEFI

BIOS menu, enter the correct supervisor password when you are prompted by the icon . You also can press Enter to skip the password prompt. However, you cannot change most of the system configuration options in UEFI BIOS.


If you have set both the supervisor password and power-on password, you can use the supervisor password to access your computer when you turn it on. The supervisor password overrides the power-on password.

## System management password

The system management password can also protect the system information stored in UEFI BIOS like a supervisor password, but it has lower authority by default. The system management password can be set through the UEFI BIOS menu or through Windows Management Instrumentation (WMI) with the Lenovo client-management interface.

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. Enter the UEFI BIOS menu. See “Enter the UEFI BIOS menu” on page 49.

**Note:** When you are prompted by the icon , enter the correct supervisor password if a supervisor password has been set, or enter the correct system management password if no supervisor password has been set. Otherwise, you cannot change the configurations in the following steps.

2. Select **Security → Password → 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. If you have set both the system management password and the power-on password, the system management password overrides the power-on password.

## Hard disk passwords

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

To set the hard disk password, select one of the following types:

- **User hard disk password only**

When a user hard disk password is set without a master hard disk password, the user must enter the user hard disk password to access files and applications on the storage drive.

- **Master hard disk password + User hard disk password**

The master hard disk password is set and used by a system administrator. It enables the administrator to access any storage drive in a system or any computer connected in the same network. The administrator can also assign a user hard disk password for each computer in the network. The user of the computer can change the user hard disk password as desired, but only the administrator can remove the user hard disk password.

When prompted to enter a hard disk password, press F1 to switch between the master hard disk password



and user hard disk password



**Note:** The hard disk password is not available in the following situations:

- A Trusted Computing Group (TCG) Opal-compliant storage drive and a TCG Opal management software program are installed in the computer, and the TCG Opal management software program is activated.
- An eDrive storage drive is installed in the computer preinstalled with the Windows 10 operating system.

## Set, change, and remove a password

Before you start, print these instructions.

1. Restart the computer. When the logo screen is displayed, press F1 to enter the UEFI BIOS menu.
2. Select **Security** → **Password** by using the arrow keys.
3. Select the password type. Then, follow the on-screen instructions to set, change, or remove a password.

You should record all your passwords and store them in a safe place. If you forget any of your passwords, any potential repair actions required are not covered under warranty.

### What to do if you forget your power-on password

If you forget your power-on password, do the following to remove the power-on password:

- If you have set a supervisor password and remember it:
  1. Restart the computer. When the logo screen is displayed, immediately press F1.
  2. Type the supervisor password to enter the UEFI BIOS menu.
  3. Select **Security** → **Password** → **Power-On Password** by using the arrow keys.
  4. Type the current supervisor password in the **Enter Current Password** field. Then, leave the **Enter New Password** field blank, and press Enter twice.
  5. In the Changes have been saved window, press Enter.
  6. Press F10 to save changes and exit the UEFI BIOS menu.
- If you have not set a supervisor password, contact a Lenovo authorized service provider to have the power-on password removed.

### What to do if you forget your hard disk password

If you forget your user hard disk password or both user and master hard disk passwords, Lenovo cannot reset your passwords or recover data from the storage drive. You can contact a Lenovo authorized service provider to have the storage drive replaced. A fee will be charged for parts and service. If the storage drive is a CRU (Customer Replaceable Unit), you can also contact Lenovo to purchase a new storage drive to replace the old one by yourself. To check whether the storage drive is a CRU and the relevant replacement procedure, see Chapter 7 “CRU replacement” on page 55.

### What to do if you forget your supervisor password

If you forget your supervisor password, there is no service procedure to remove the password. You have to contact a Lenovo authorized service provider to have the system board replaced. A fee will be charged for parts and service.

### What to do if you forget your system management password

If you forget your system management password, do the following to remove the system management password:

- If you have set a supervisor password and remember it:
  1. Restart the computer. When the logo screen is displayed, immediately press F1.
  2. Type the supervisor password to enter the UEFI BIOS menu.
  3. Select **Security** → **Password** → **System Management Password** by using the arrow keys.
  4. Type the current supervisor password in the **Enter Current Password** field. Then, leave the **Enter New Password** field blank, and press Enter twice.
  5. In the Changes have been saved window, press Enter.
  6. Press F10 to save changes and exit the UEFI BIOS menu.
- If you have not set a supervisor password, contact a Lenovo authorized service provider to have the system management password removed.

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## Use Power Loss Protection function (for selected models)

For models shipped with an NVMe (Non-Volatile Memory express) M.2 solid-state drive, the M.2 solid-state drive features the Lenovo-unique PLP (Power Loss Protection) function to avoid data loss or damage. On very rare occasions, your computer is not responding and you might have to shut down your computer by pressing and holding the power button for about seven seconds. In this case, the PLP function enables key data of your computer to be saved timely. However, there is no guarantee that all data is saved in any situation. To check the type of your M.2 solid-state drive:

1. Restart the computer. When the logo screen is displayed, press F10 to enter the Lenovo diagnostics window.
2. On the TOOLS tab, select **SYSTEM INFORMATION** → **STORAGE** using the arrow keys.
3. Locate the **Device Type** section to check the information.

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## Use the fingerprint reader (for selected models)

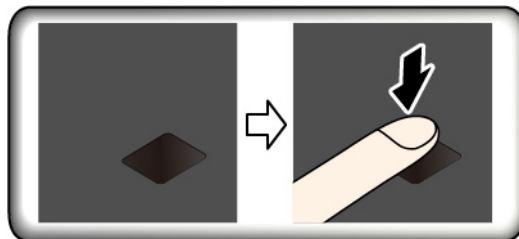
If your computer comes with a fingerprint reader, you can use it to enroll your fingerprints. After enrollment, you can tap your finger on the fingerprint reader to log in to Windows.

### Enroll your fingerprints

Open the **Start** menu and then click **Settings** → **Accounts** → **Sign-in options**. Then, follow the on-screen instructions to finish the enrollment.

During the enrollment, the fingerprints are associated with the Windows password automatically. It is recommended that you enroll more than one fingerprint in case of any injuries to your fingers.

### Log in with your fingerprint



### Maintain the fingerprint reader

To ensure that the fingerprint reader works correctly, do not:

- Scratch the surface of the reader with anything hard.

- Use or touch the reader with a wet, dirty, wrinkled, or injured finger.

**Attention:** If you always use your fingerprint to log in to the computer, you might forget your passwords. Write down your passwords, and keep them in a safe place.

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## Use face authentication (for selected models)

If your computer comes with a Windows Hello-compatible infrared camera, you can unlock your computer by scanning your face instead of using a password.

Slide ThinkShutter to the right to uncover the camera lens before using the Windows Hello face recognition.

### Create face ID

1. Open the **Start** menu and click **Settings → Accounts → Sign-in options**.
2. Scroll down to the **Password** section and click **Add** to create a password.
3. Follow the on-screen instructions to create a Personal Identification Number (PIN).
4. Locate the **Windows Hello** section and click **Set up** under **Face Recognition**. Then, click **Get Started**.
5. Enter the PIN you have set earlier. The camera preview starts.
6. Follow the on-screen instructions to complete the setup.
7. Click **Improve Recognition** to improve the image so that **Windows Hello** can recognize you in different light conditions or when your appearance changes.

### Log in with face authentication

1. On the Windows lock screen, select the smiling face icon 😊 from the sign-in options.
2. Follow the on-screen instructions and ensure that you are centered and looking directly at the camera. When the program recognizes your face, it automatically unlocks the screen and signs you in to the Windows operating system.

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## Use firewalls and antivirus programs

Your computer might be preinstalled with a firewall program. The firewall protects against computer Internet security threats, unauthorized access, intrusions, and Internet attacks. It also protects your privacy.

A full version of antivirus program is provided with a free 30-day subscription. After 30 days, you must renew the license to continue receiving the antivirus program updates.

For more information, see the help system of the program.



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## Chapter 6. Configure advanced settings

This chapter provides information about UEFI BIOS, RAID, recovery, operating system installation, and system management.

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### UEFI BIOS

This section introduces what is UEFI BIOS and the operations you can perform in UEFI BIOS.

#### What is 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 UEFI BIOS menu

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

**Note:** If you have set the supervisor password, enter the correct password when prompted. You also can press Enter to skip the password prompt and enter the UEFI BIOS menu. However, you cannot change the system configurations that are protected by the supervisor password.

#### Navigate in the UEFI BIOS interface

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

You can navigate in the UEFI BIOS interface by pressing the following keys:

F1	Display the General Help screen.
F9	Restore to the default settings.
F10	Save your configuration and exit.
F5 / -	Change to a lower value.
F6 / +	Change to a higher value.
↑ ↓	Locate an item.
← →	Select a tab.
Esc	Exit the submenu and return to the parent menu.
Enter	Enter the selected tab or submenu.

#### Change the startup sequence

1. Restart the computer. When the logo screen is displayed, press F1.
2. Select **Startup** → **Boot**. Then, press Enter. The default device order list is displayed.

**Note:** No bootable device is displayed if the computer cannot start from any devices or the operating system cannot be found.

3. Set the startup sequence as desired.

4. Press F10 to save the changes and exit.

To change the startup sequence temporarily:

1. Restart the computer. When the logo screen is displayed, press F12.
2. Select the device that you want the computer to start from and press Enter.

## Set the system date and time

1. Restart the computer. When the logo screen is displayed, press F1.
2. Select **Date/Time** and set the system date and time as desired.
3. Press F10 to save changes and exit.

## Update UEFI BIOS

When you install a new program, device driver, or hardware component, you might need to update UEFI BIOS.

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

- Open Lenovo Vantage 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.
- Go to <https://pcsupport.lenovo.com> and select the entry for your computer. Then, follow the on-screen instructions to download and install the latest UEFI BIOS update package.

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## Recovery information

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

**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 **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 at least 16 GB of storage capacity. 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

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.
5. Click **Troubleshoot** to display optional recovery solutions.
6. Select a recovery solution as desired. Then, follow the on-screen instructions to complete the process.



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## Install Windows 10 and drivers

This section provides instructions on installing a Windows 10 operating system and device drivers.

### Install a Windows 10 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>.

#### Attention:

- It is recommended that you update your operating system through official channels. Any unofficial update might cause security risks.
  - The process of installing a new operating system deletes all the data on your internal storage drive, including the data stored in a hidden folder.
  - For computer models that are installed with hybrid solid-state drive (with Intel Optane memory), ensure that you do not install the operating system into Optane memory.
1. If you are using the Windows BitLocker Drive Encryption feature and your computer has a Trusted Platform Module, ensure that you have disabled the feature.
  2. Ensure that the security chip is set to **Active**.
    - a. Restart the computer. When the logo screen is displayed, press F1 to enter the UEFI BIOS menu.
    - b. Select **Security → Security Chip** and press Enter. The **Security Chip** submenu opens.
    - c. Ensure that the security chip for TPM 2.0 is set to **Active**.
    - d. Press F10 to save the settings and exit.
  3. For computer models that are installed with hybrid solid-state drive (with Intel Optane memory), enter the UEFI BIOS menu and select **Config → Storage → Controller mode**. Ensure that **RST mode** is selected.
  4. Connect the drive that contains the operating system installation program to the computer.
  5. Restart the computer. When the logo screen is displayed, press F1 to enter the UEFI BIOS menu.
  6. Select **Startup → Boot** to display the **Boot Priority Order** submenu.
  7. Select the drive that contains the operating system installation program, for example, **USB HDD**. Then, press Esc.

**Attention:** After you change the startup sequence, ensure that you select the correct device during a copy, a save, or a format operation. If you select the wrong device, the data on that device might be erased or overwritten.

8. Select **Restart** and ensure that **OS Optimized Defaults** is enabled. Then, press F10 to save the settings and exit.
9. Follow the on-screen instructions to install the device drivers and necessary programs.
10. After installing the device drivers, apply Windows Update to get the latest updates, for example the security patches.
11. Go to Microsoft Store to download and install the latest version of Lenovo Vantage.

**Note:** After installing the operating system, do not change the initial **UEFI/Legacy Boot** setting in the UEFI BIOS menu. Otherwise, the operating system will not start correctly.

For computer models that are installed with hybrid solid-state drive (with Intel Optane memory), continue to enable the Intel Optane memory by doing the following:

1. Go to <https://pcsupport.lenovo.com>. Download and install the Intel Rapid Storage Technology (IRST) Driver on your computer.
2. Go to Microsoft Store to download and install **Intel Optane Memory and Storage Management** program.
3. Launch the program. Click **Intel Optane Memory → Enable Intel Optane Memory**, and then follow the instructions on the screen to enable it.

### **Install device drivers**

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:

- Open Lenovo Vantage to check the available update packages. Select the update packages you want, and then follow the on-screen instructions to download and install the packages.
- 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.



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## Chapter 7. CRU replacement

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### What are CRUs

Customer Replaceable Units (CRUs) are parts that can be upgraded or replaced by the customer. The 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 a 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](https://www.lenovo.com/warranty/llw_02).

Refer to the following CRU list for your computer.

#### Self-service CRUs

- ac power adapter
- Base cover assembly
- M.2 solid-state drive\*
- Nano-SIM-card tray\*
- Pen charger (for X1 Yoga Gen 5 only)
- Power cord
- ThinkPad Pen Pro (for X1 Yoga Gen 5 only)
- Wireless WAN card\*

\* for selected models

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### Disable Fast Startup and the built-in battery

Before replacing any CRU, ensure that you disable Fast Startup first and then disable the built-in battery.

To disable Fast Startup:

1. Go to **Control Panel** and view by Large icons or Small icons.
2. Click **Power Options**, and then click **Choose what the power buttons do** on the left pane.
3. Click **Change settings that are currently unavailable** at the top.
4. If prompted by User Account Control (UAC), click **Yes**.
5. Clear the **Turn on fast startup** check box, and then click **Save changes**.

To disable the built-in battery:

1. Restart your computer. When the logo screen is displayed, immediately press F1 to enter the UEFI BIOS menu.
2. Select **Config → Power**. The **Power** submenu is displayed.
3. Select **Disable Built-in Battery** and press Enter.
4. Select **Yes** in the Setup Confirmation window. The built-in battery is disabled and the computer turns off automatically. Wait three to five minutes to let the computer cool.

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## Replace a CRU

Follow the replacement procedure to replace a CRU.

### Base cover assembly

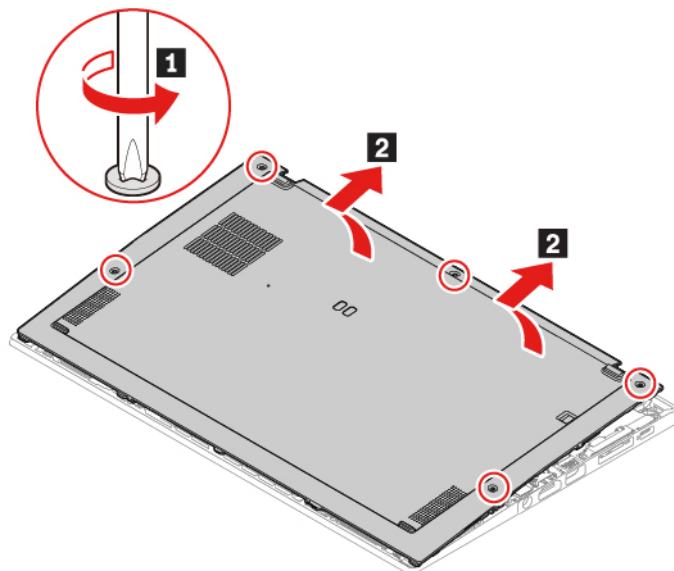
#### Prerequisite

Before you start, read Appendix A “Important safety information” on page 69 and print the following instructions.

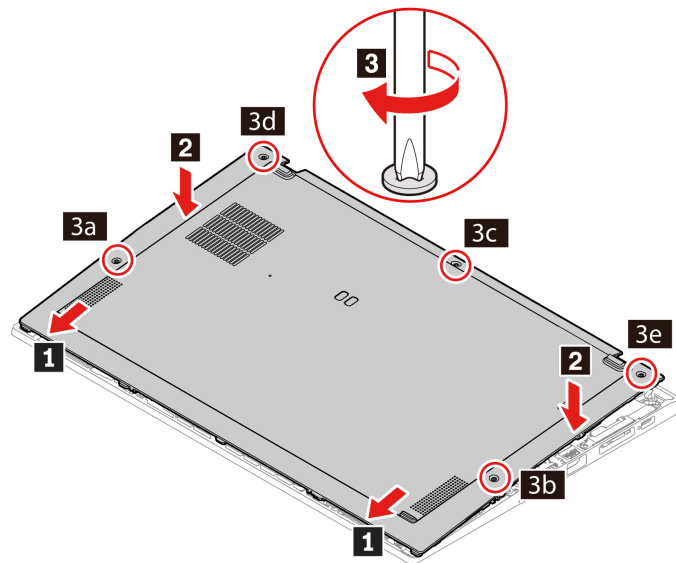
**Note:** Do not remove the base cover assembly when your computer is connected to ac power. Otherwise, there might be a risk of short circuits.

#### Replacement procedure

1. Disable the built-in battery. See “Disable Fast Startup and the built-in battery” on page 55.
2. Turn off the computer and disconnect the computer from ac power and all connected cables.
3. Close the computer display and turn over the computer.
4. Loosen the screws that secure the base cover assembly **1**. Then, pry up the latches and remove the base cover assembly **2**.



5. Install the new base cover assembly in place **1** **2**. Ensure that the latches of the base cover assembly are secured under the base cover assembly. Then, tighten the screws in ascending alphabetical order (a to e) to secure the base cover assembly **3**.



6. Turn over the computer. Connect the ac power adapter and all disconnected cables to the computer.

### Troubleshooting

If the computer does not start up after you reinstall the base cover assembly, disconnect the ac power adapter and then reconnect it to the computer.

## Wireless-WAN card (for selected models)

The following information is only for the computer with user-installable modules. Ensure that you use only a Lenovo-authorized wireless module specifically tested for this computer model. Otherwise, the computer will generate an error-code beep sequence when you turn on the computer.

### Prerequisite

Before you start, read Appendix A “Important safety information” on page 69 and print the following instructions.

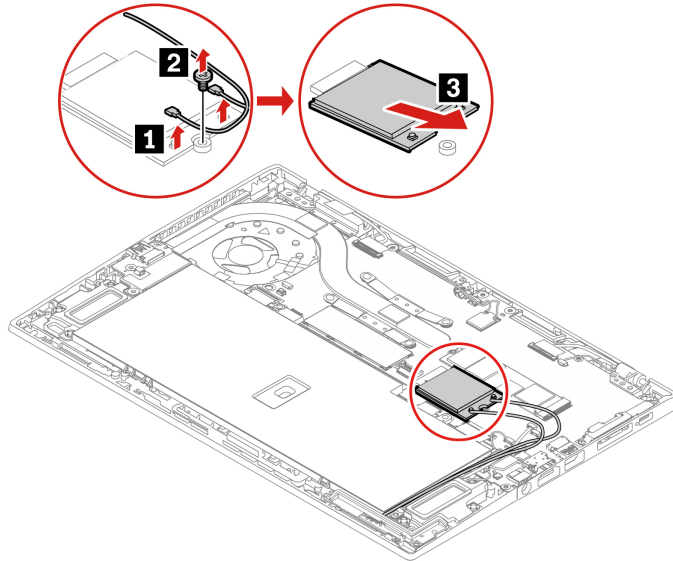
**Attention:** Do not touch the contact edge of the wireless-WAN card. Otherwise, the wireless-WAN card might get damaged.

### Replacement procedure

1. Disable the built-in battery. See “Disable Fast Startup and the built-in battery” on page 55.
2. Turn off the computer and disconnect the computer from ac power and all connected cables.
3. Close the computer display and turn over the computer.
4. Remove the base cover assembly. See “Base cover assembly” on page 56.

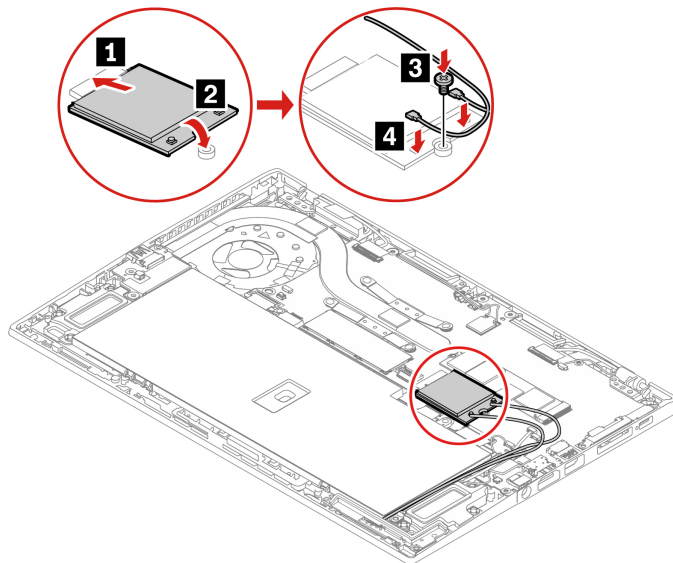
5. Remove the wireless-WAN card:

- a. Gently disconnect the wireless cable connectors with your fingers **1**. Then, remove the screw that secures the wireless-WAN card **2** and the card pops up.
- b. Carefully remove the wireless-WAN card out of the slot **3**.



6. Install a new wireless-WAN card:

- a. Align the contact edge of the new wireless-WAN card with the key in the slot. Then, carefully insert the card into the slot at an angle of about 20 degrees **1** and pivot the card downward **2**.
- b. Install the screw to secure the wireless-WAN card in place **3**. Connect the wireless cable connectors to the card **4**. Ensure that you connect the orange cable to the main connector on the card, and the blue cable to the auxiliary connector on the card.



7. Reinstall the base cover assembly.

8. Turn over the computer. Connect the ac power adapter and all disconnected cables to the computer.

## M.2 solid-state drive

### Prerequisite

Before you start, read Appendix A “Important safety information” on page 69 and print the following instructions.

**Attention:** If you install a new solid-state drive, you need to install a new operating system. For details, see “Install Windows 10 and drivers” on page 52.

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 apply pressure to the M.2 solid-state drive.
- Do not touch the contact edge or circuit board of the M.2 solid-state drive. Otherwise, the M.2 solid-state drive might get damaged.
- 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.

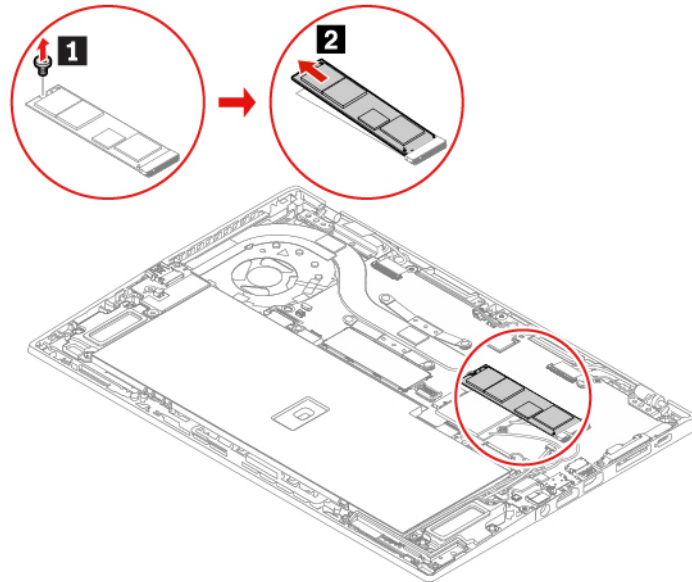
### Replacement procedure

1. If you are going to replace a hybrid solid-state drive (with Intel Optane memory), disable the Intel Optane memory by doing the following:
  - a. Restart the computer. When the logo screen is displayed, press F1.  
  
**Note:** If a supervisor password has been set, enter the correct password when prompted. You also can press Enter to skip the password prompt and enter the BIOS menu. However, you cannot change the system configurations that are protected by the supervisor password.
  - b. Select **Config → Storage → Intel (R) Rapid Storage Technology → Intel Optane → Disable**.
  - c. Select to preserve user data and select **Yes** to confirm your operation.
  - d. Select **Disable** and wait for the process to complete.  
  
**Note:** It might take a couple of minutes or even hours to complete the disabling process. Do not restart the computer until the process is completed.
  - e. Press F10 to save changes and exit.
2. Disable the built-in battery. See “Disable Fast Startup and the built-in battery” on page 55.
3. Turn off the computer and disconnect the computer from ac power and all connected cables.
4. Close and computer display and turn over the computer.
5. Remove the base cover assembly. See “Base cover assembly” on page 56.



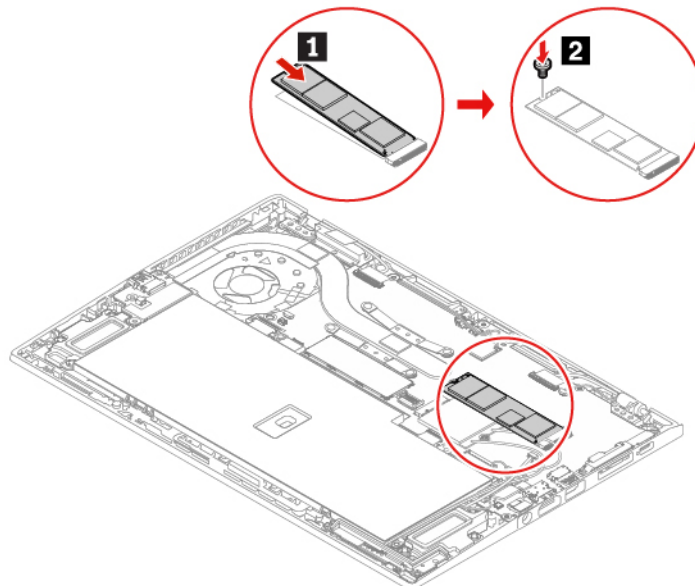
6. Remove the M.2 solid-state drive

- a. Remove the screw that secures the M.2 solid-state drive **1**. The M.2 solid-state drive is released from the secured position and pivots upward.
- b. Carefully remove the drive out of the slot **2**.



7. Install a new M.2 solid-state drive

- a. Align the contact edge of the M.2 solid-state drive with the key in the slot. Then, carefully insert the drive into the slot at an angle of about 20 degrees and pivot the M.2 solid-state drive downward **2**.
- b. Install the screw to secure the M.2 solid-state drive **3**.



8. Reinstall the base cover assembly.

9. Turn over the computer. Connect the ac power adapter and all disconnected cables to the computer.

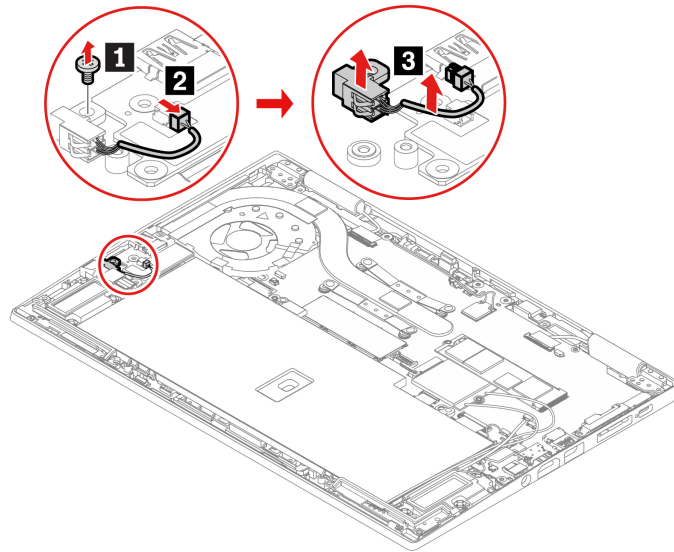
## Pen charger (for X1 Yoga Gen 5 only)

### Prerequisite

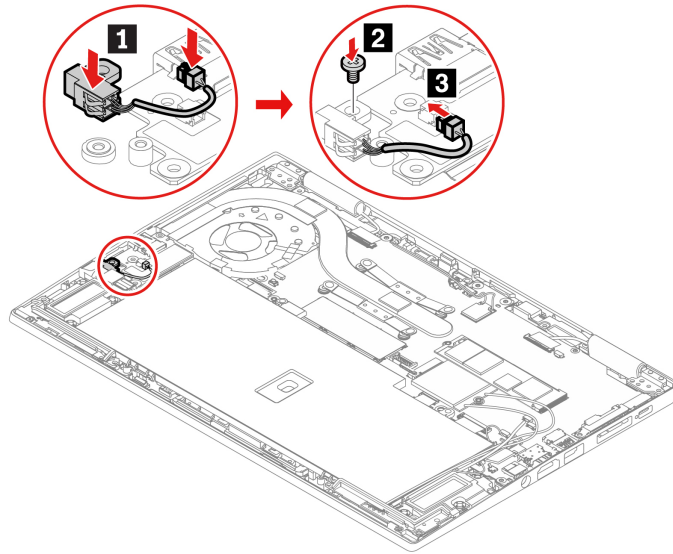
Before you start, read Appendix A “Important safety information” on page 69 and print the following instructions.

### Replacement procedure

1. Disable the built-in battery. See “Disable Fast Startup and the built-in battery” on page 55.
2. Turn off the computer and disconnect the computer from ac power and all connected cables.
3. Close and computer display and turn over the computer.
4. Remove the base cover assembly. See “Base cover assembly” on page 56.
5. Remove the screw that secures the pen charger **1** and detach the connector **2**. Then, remove the pen charger **3**.



6. Install a new pen charger in place **1**. Install the screw to secure the pen charger **2** and attach the connector **3**.



7. Reinstall the base cover assembly.
8. Turn over the computer. Connect the ac power adapter and all disconnected cables to the computer.


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## Chapter 8. Help and support

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### Frequently asked questions

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How do I access <b>Control Panel</b> ?	<ul style="list-style-type: none"><li>• Open the <b>Start</b> menu and click <b>Windows System → Control Panel</b>.</li><li>• Use Windows Search.</li></ul>
How do I turn off my computer?	Open the <b>Start</b> menu and click  <b>Power</b> . Then, click <b>Shut down</b> .
How do I partition my storage drive?	<a href="https://support.lenovo.com/solutions/ht503851">https://support.lenovo.com/solutions/ht503851</a>
What do I do if my computer stops responding.	<ol style="list-style-type: none"><li>1. Press and hold the power button until the computer turns off. Then, restart the computer.</li><li>2. If step 1 does not work:<ul style="list-style-type: none"><li>• For models with an emergency reset hole: Insert a straightened paper clip into the emergency reset hole to cut off power supply temporarily. Then, restart the computer with ac power connected.</li><li>• For models without an emergency reset hole:<ul style="list-style-type: none"><li>– For models with the removable battery, remove the removable battery and disconnect all power sources. Then, reconnect to ac power and restart the computer.</li><li>– For models with the built-in battery, disconnect all power sources. Press and hold the power button for about seven seconds. Then, reconnect to ac power and restart the computer.</li></ul></li></ul></li></ol>
What do I do if I spill liquid on the computer?	<ol style="list-style-type: none"><li>1. Carefully unplug the ac power adapter and turn off the computer immediately. The more quickly you stop the current from passing through the computer the more likely you will reduce damage from short circuits.  <b>Attention:</b> Although you might lose some data or work by turning off the computer immediately, leaving the computer on might make your computer unusable.</li><li>2. Do not try to drain out the liquid by turning over the computer. If your computer has keyboard drainage holes on the bottom, the liquid will be drained out through the holes.</li><li>3. Wait until you are certain that all the liquid is dry before turning on your computer.</li></ol>
How do I enter the UEFI BIOS menu?	Restart the computer. When the logo screen is displayed, press F1 to enter the UEFI BIOS menu.
How do I disable my trackpad?	<ol style="list-style-type: none"><li>1. Open the <b>Start</b> menu, and then click <b>Settings → Devices → Touchpad</b>.</li><li>2. In the Touchpad section, turn off the <b>Touchpad</b> control.</li></ol>
Where can I get the latest device drivers and UEFI BIOS?	<ul style="list-style-type: none"><li>• From Lenovo Vantage. See “Install Windows 10 and drivers” on page 52 and “Update UEFI BIOS” on page 50.</li><li>• Download from Lenovo Support Web site at <a href="https://pcsupport.lenovo.com">https://pcsupport.lenovo.com</a>.</li></ul>

## Error messages

If you see a message that is not included in the following table, record the error message first, then shut down the computer and call Lenovo for help. See “Lenovo Customer Support Center” on page 67.

Message	Solution
0190: Critical low-battery error	The computer turned off because the battery power is low. Connect the ac power adapter to the computer and charge the batteries.
0191: System Security - Invalid remote change requested	The system configuration change has failed. Confirm the operation and try again.
0199: System Security - Security password retry count exceeded.	This message is displayed when you enter a wrong supervisor password more than three times. Confirm the supervisor password and try again.
0271: Check Date and Time settings.	The date or the time is not set in the computer. Enter the UEFI BIOS menu and set the date and time.
210x/211x: Detection/Read error on HDDx/SSDx	The storage drive is not working. Reinstall the storage drive. If the problem still exists, replace the storage drive.
Error: The non-volatile system UEFI variable storage is nearly full.	<p><b>Note:</b> This error indicates that the operating system or programs cannot create, modify, or delete data in the non-volatile system UEFI variable storage due to insufficient storage space after POST.</p> <p>The non-volatile system UEFI variable storage is used by the UEFI BIOS and by the operating system or programs. This error occurs when the operating system or programs store large amounts of data in the variable storage. All data needed for POST, such as UEFI BIOS setup settings, chipset, or platform configuration data, are stored in a separate UEFI variable storage. Press F1 after the error message is displayed to enter the UEFI BIOS menu. A dialog asks for confirmation to clean up the storage. If you select “Yes”, all data that were created by the operating system or programs will be deleted except global variables defined by the Unified Extensible Firmware Interface Specification. If you select “No”, all data will be kept, but the operating system or programs will not be able to create, modify, or delete data in the storage.</p> <p>If this error happens at a service center, Lenovo authorized service personnel will clean up the non-volatile system UEFI variable storage using the preceding solution.</p>
Fan error. Press ESC to startup with limited performance	The thermal fan does not work correctly. After the error message is displayed, press ESC within five seconds to start up the computer with limited performance. Otherwise, the computer will be shut down immediately.

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## Beep errors

Lenovo SmartBeep technology enables you to decode beep errors with your smartphone when a black screen occurs with beeps from your computer. To decode the beep error with Lenovo SmartBeep technology:

1. Go to <https://support.lenovo.com/smartbeep> or scan the following QR Code.



2. Download the proper diagnostic app and install it on your smartphone.
3. Run the diagnostic app and place the smartphone near the computer.
4. Press Fn on your computer to emit the beep again. The diagnostic app decodes the beep error and shows possible solutions on the smartphone.

**Note:** Do not attempt to service a product yourself unless instructed to do so by the Customer Support Center or product documentation. Only use a Lenovo-authorized service provider to repair your product.

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## Self-help resources

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

Resources	How to access?
Use Lenovo Vantage to: <ul style="list-style-type: none"><li>• Configure device settings.</li><li>• Download and install UEFI BIOS, drivers, and firmware updates.</li><li>• Secure your computer from outside threats.</li><li>• Check the computer warranty status.</li><li>• Access <i>User Guide</i> and helpful articles.</li></ul>	<ul style="list-style-type: none"><li>• Open the Start menu and click <b>Lenovo Vantage</b>.</li><li>• Use Windows Search.</li></ul>
Product documentation: <ul style="list-style-type: none"><li>• <i>Safety and Warranty Guide</i></li><li>• <i>Setup Guide</i></li><li>• This <i>User Guide</i></li><li>• <i>Regulatory Notice</i></li></ul>	Go to <a href="https://pcsupport.lenovo.com">https://pcsupport.lenovo.com</a> . Then, follow the on-screen instructions to filter out the documentation you want.
Lenovo Support Web site with the latest support information of the following: <ul style="list-style-type: none"><li>• Drivers and software</li><li>• Diagnostic solutions</li><li>• Product and service warranty</li><li>• Product and parts details</li><li>• Knowledge base and frequently asked questions</li></ul>	<a href="https://pcsupport.lenovo.com">https://pcsupport.lenovo.com</a>
Windows help information	<ul style="list-style-type: none"><li>• Open the Start menu and click <b>Get Help</b> or <b>Tips</b>.</li><li>• Use Windows Search or the Cortana® personal assistant.</li><li>• Microsoft support Web site: <a href="https://support.microsoft.com">https://support.microsoft.com</a></li></ul>

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## Call Lenovo

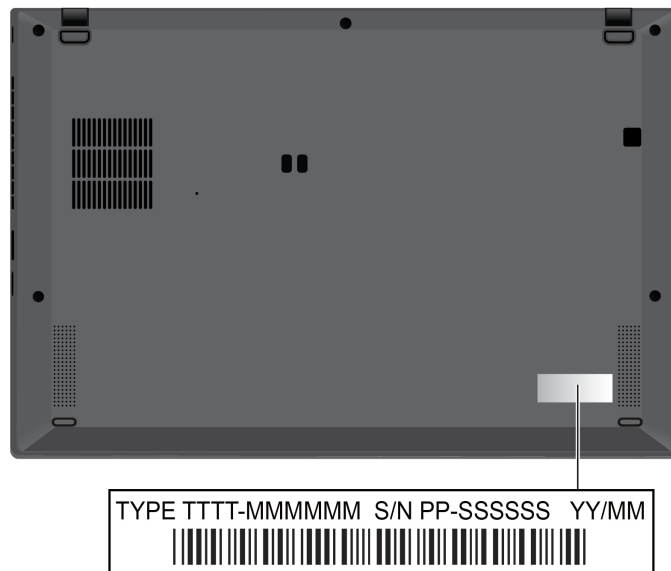
If you have tried to correct the problem yourself and still need help, you can call Lenovo Customer Support Center.

## 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> for the latest phone numbers.

**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 “Warranty information” in the *Safety and Warranty Guide* that comes with your computer.

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## **Purchase additional services**

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

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

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## Appendix A. Important safety information

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### Safety notices

This information can help you safely use your computer. Follow and retain all information included with your computer. The information in this document does not alter the terms of your purchase agreement or the Limited Warranty. For more information, see "Warranty Information" in the *Safety and Warranty Guide* that comes with your computer.

Customer safety is important. Our products are developed to be safe and effective. However, personal computers are electronic devices. Power cords, power adapters, and other features can create potential safety risks that can result in physical injury or property damage, especially if misused. To reduce these risks, follow the instructions included with your product, observe all warnings on the product and in the operating instructions, and review the information included in this document carefully. By carefully following the information contained in this document and provided with your product, you can help protect yourself from hazards and create a safer computer work environment.

**Note:** This information includes references to power adapters and batteries. In addition, some products (such as speakers and monitors) ship with external power adapters. If you have such a product, this information applies to your product. In addition, computer products contain a coin-sized internal battery that provides power to the system clock even when the computer is unplugged, so the battery safety information applies to all computer products.

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### Important information about using your computer

Ensure that you follow the important tips given here to get the most use and enjoyment out of your computer. Failure to do so might lead to discomfort or injury, or cause the computer to fail.

#### Protect yourself from the heat that your computer generates.



When your computer is turned on or the battery is charging, the base, the palm rest, and some other parts may become hot. The temperature they reach depends on the amount of system activity and the level of charge in the battery.

Extended contact with your body, even through clothing, could cause discomfort or even a skin burn.

- Avoid keeping your hands, your lap, or any other part of your body in contact with a hot section of the computer for any extended time.
- Periodically take your hands away from the keyboard by lifting your hands from the palm rest.

### Protect yourself from the heat generated by the ac power adapter.



When the ac power adapter is connected to an electrical outlet and your computer, it generates heat.

Extended contact with your body, even through clothing, may cause a skin burn.

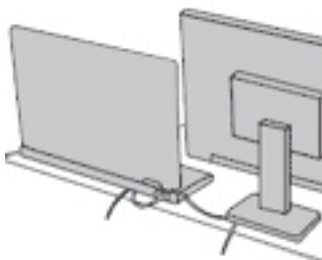
- Do not place the ac power adapter in contact with any part of your body while it is in use.
- Never use it to warm your body.
- Do not wrap the cords around the ac power adapter while in use.

### Prevent your computer from getting wet.



To avoid spills and the danger of electrical shock, keep liquids away from your computer.

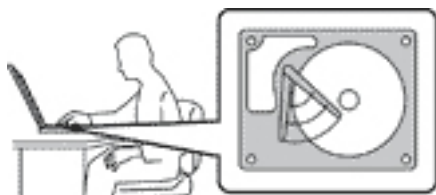
### Protect the cables from being damaged.



Applying strong force to cables may damage or break them.

Route communication lines, or the cables of an ac power adapter, a mouse, a keyboard, a printer, or any other electronic device, so that they cannot be walked on, tripped over, pinched by your computer or other objects, or in any way subject to treatment that could interfere with the operation of your computer.

### Protect your computer and data when moving it.



Before moving a computer equipped with a storage drive, do one of the following:

- Turn it off.
- Put it in sleep mode.
- Put it in hibernation mode.

This helps to prevent damage to the computer, and possible loss of data.

### Handle your computer gently.



Do not drop, bump, scratch, twist, hit, vibrate, push, or place heavy objects on your computer, display, or external devices.

### Carry your computer carefully.



- Use a quality carrying case that provides adequate cushioning and protection.
- Do not pack your computer in a tightly packed suitcase or bag.
- Before putting your computer in a carrying case, make sure that it is off, in sleep mode, or in hibernation mode. Do not put a computer in a carrying case while it is turned on.

---

## Conditions that require immediate action

Products can become damaged due to misuse or neglect. Some product damage is serious enough that the product should not be used again until it has been inspected and, if necessary, repaired by an authorized servicer.

As with any electronic device, pay close attention to the product when it is turned on.

On very rare occasions, you might notice an odor or see a puff of smoke or sparks vent from your product. You might also hear sounds like popping, cracking, or hissing. These might merely mean that an internal electronic component has failed in a safe and controlled manner. Or, they might indicate a potential safety issue. Do not take risks or attempt to diagnose the situation yourself. Contact the Customer Support Center for further guidance. For a list of Service and Support phone numbers, see the following Web site:

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

Frequently inspect your computer and its components for damage, wear, or signs of danger. If you have any question about the condition of a component, do not use the product. Contact the Customer Support Center or the product manufacturer for instructions on how to inspect the product and have it repaired, if necessary.

In the unlikely event that you notice any of the following conditions, or if you have any safety concerns with your product, stop using the product and unplug it from the power source and telecommunication lines until you can speak to the Customer Support Center for further guidance.

- Power cords, plugs, power adapters, extension cords, surge protectors, or power supplies that are cracked, broken, or damaged.
- Signs of overheating, smoke, sparks, or fire.
- Damage to a battery (such as cracks, dents, or creases), discharge from a battery, or a buildup of foreign substances on the battery.
- A cracking, hissing, or popping sound, or strong odor that comes from the product.
- Signs that liquid has been spilled or an object has fallen onto the computer product, the power cord, or power adapter.
- The computer product, power cord, or power adapter has been exposed to water.
- The product has been dropped or damaged in any way.
- The product does not operate normally when you follow the operating instructions.

**Note:** If you notice these conditions with a product (such as an extension cord) that is not manufactured for or by Lenovo, stop using that product until you can contact the product manufacturer for further instructions, or until you get a suitable replacement.

---

## Service and upgrades

Do not attempt to service a product yourself unless instructed to do so by the Customer Support Center or your documentation. Only use a Service Provider who is approved to repair your particular product.

**Note:** Some computer parts can be upgraded or replaced by the customer. Upgrades typically are referred to as options. Replacement parts approved for customer installation are referred to as Customer Replaceable Units, or CRUs. Lenovo provides documentation with instructions when it is appropriate for customers to install options or replace CRUs. You must closely follow all instructions when installing or replacing parts. The Off state of a power indicator does not necessarily mean that voltage levels inside a product are zero. Before you remove the covers from a product equipped with a power cord, always ensure that the power is turned off and that the product is unplugged from any power source. If you have any questions or concerns, contact the Customer Support Center.

Although there are no moving parts in your 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.



Avoid contact with hot components inside the computer. During operation, some components become hot enough to burn the skin. Before you open the computer cover, turn off the computer, disconnect power, and wait approximately 10 minutes for the components to cool.



After replacing a CRU, reinstall all protective covers, including the computer cover, before connecting power and operating the computer. This action is important to help prevent unexpected electrical shock and help ensure the containment of an unexpected fire that could happen under extremely rare conditions.



When replacing CRUs, be cautious of sharp edges or corners that might cause injury. If you suffer an injury, seek medical care immediately.

---

## Power cords and power adapters



### **DANGER**

**Use only the power cords and power adapters supplied by the product manufacturer.**

**The power cords shall be safety approved. For Germany, it shall be H03VV-F, 3G, 0.75 mm<sup>2</sup>, or better. For other countries, the suitable types shall be used accordingly.**

**Never wrap a power cord around a power adapter or other object. Doing so can stress the cord in ways that can cause the cord to fray, crack, or crimp. This can present a safety hazard.**

**Always route power cords so that they will not be walked on, tripped over, or pinched by objects.**

**Protect power cords and power adapters from liquids. For instance, do not leave your power cord or power adapter near sinks, tubs, toilets, or on floors that are cleaned with liquid cleansers. Liquids can cause a short circuit, particularly if the power cord or power adapter has been stressed by misuse. Liquids also can cause gradual corrosion of power cord terminals and/or the connector terminals on a power adapter, which can eventually result in overheating.**

**Ensure that all power cord connectors are securely and completely plugged into receptacles.**

**Do not use any power adapter that shows corrosion at the ac input pins or shows signs of overheating (such as deformed plastic) at the ac input pins or anywhere on the power adapter.**

**Do not use any power cords where the electrical contacts on either end show signs of corrosion or overheating or where the power cord appears to have been damaged in any way.**

**To prevent possible overheating, do not cover the power adapter with clothing or other objects when the power adapter is plugged into an electrical outlet.**

---

## Extension cords and related devices

Ensure that extension cords, surge protectors, uninterruptible power supplies, and power strips that you use are rated to handle the electrical requirements of the product. Never overload these devices. If power strips are used, the load should not exceed the power strip input rating. Consult an electrician for more information if you have questions about power loads, power requirements, and input ratings.

---

## Plugs and outlets



If a receptacle (power outlet) that you intend to use with your computer equipment appears to be damaged or corroded, do not use the outlet until it is replaced by a qualified electrician.

Do not bend or modify the plug. If the plug is damaged, contact the manufacturer to obtain a replacement.

Do not share an electrical outlet with other home or commercial appliances that draw large amounts of electricity; otherwise, unstable voltage might damage your computer, data, or attached devices.

Some products are equipped with a three-pronged plug. This plug fits only into a grounded electrical outlet. This is a safety feature. Do not defeat this safety feature by trying to insert it into a non-grounded outlet. If you cannot insert the plug into the outlet, contact an electrician for an approved outlet adapter or to replace the outlet with one that enables this safety feature. Never overload an electrical outlet. The overall system load should not exceed 80 percent of the branch circuit rating. Consult an electrician for more information if you have questions about power loads and branch circuit ratings.

Be sure that the power outlet you are using is properly wired, easily accessible, and located close to the equipment. Do not fully extend power cords in a way that will stress the cords.

Be sure that the power outlet provides the correct voltage and current for the product you are installing.

Carefully connect and disconnect the equipment from the electrical outlet.

---

## Power supply statement

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.

---

## External devices

### CAUTION:

Do not connect or disconnect any external device cables other than Universal Serial Bus (USB) and 1394 cables while the computer power is on; otherwise, you might damage your computer. To avoid possible damage to attached devices, wait at least five seconds after the computer is shut down to disconnect external devices.

---

## General battery notice



Batteries supplied by Lenovo for use with your product have been tested for compatibility and should only be replaced with approved parts. A battery other than the one specified by Lenovo, or a disassembled or modified battery is not covered by the warranty.

Battery abuse or mishandling can cause overheating, liquid leakage, or an explosion. To avoid possible injury:

- Do not open, disassemble, or service any battery.
- Do not crush or puncture the battery.
- Do not short-circuit the battery, or expose it to water or other liquids.
- Keep the battery away from children.
- Keep the battery away from fire.

Stop using the battery if it is damaged, or if you notice any discharge or the buildup of foreign materials on the battery leads.

Store the rechargeable batteries or products containing the rechargeable batteries at room temperature, charged to approximately 30 to 50% of capacity. We recommend that the batteries be charged about once per year to prevent overdischarge.

Do not put the battery in trash that is disposed of in landfills. When disposing of the battery, comply with local ordinances or regulations.

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## Notice for built-in rechargeable battery



Do not attempt to remove or replace the built-in rechargeable battery. Replacement of the battery must be done by a Lenovo-authorized repair facility or technician.

Only recharge the battery strictly according to instructions included in the product documentation.

The Lenovo-authorized repair facilities or technicians recycle Lenovo batteries according to local laws and regulations.

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## Lithium coin-cell battery notice



Danger of explosion if battery is incorrectly replaced.

If the coin-cell battery is not a CRU, do not attempt to replace the coin-cell battery. Replacement of the battery must be done by a Lenovo-authorized repair facility or technician.



**The Lenovo-authorized repair facilities or technicians recycle Lenovo batteries according to local laws and regulations.**



When replacing the lithium coin-cell battery, use only the same type or equivalent type that is recommended by the manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of. Swallowing the lithium coin-cell battery will cause choking or severe internal burns in just two hours and might even result in death.

Keep batteries away from children. If the lithium coin-cell battery is swallowed or placed inside any part of the body, seek medical care immediately.

**Do not:**

- Throw or immerse into water
- Heat to more than 100 °C (212°F)
- Repair or disassemble
- Leave in an extremely low air pressure environment
- Leave in an extremely high-temperature environment
- Crush, puncture, cut, or incinerate

Dispose of the battery as required by local ordinances or regulations.

The following statement applies to users in the state of California, U.S.A.

California Perchlorate Information:

Products containing manganese dioxide lithium coin-cell batteries may contain perchlorate.

Perchlorate Material - special handling may apply, see <https://www.dtsc.ca.gov/hazardouswaste/perchlorate/>.

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## Heat and product ventilation



Computers, ac power adapters, and many accessories can generate heat when turned on and when batteries are charging. Notebook computers can generate a significant amount of heat due to their compact size. Always follow these basic precautions:

- When your computer is turned on or the battery is charging, the base, the palm rest, and some other parts may become hot. Avoid keeping your hands, your lap, or any other part of your body in contact with a hot section of the computer for any extended length of time. When you use the keyboard, avoid keeping your palms on the palm rest for a prolonged period of time. Your computer generates some heat during normal operation. The amount of heat depends on the amount of system activity and the battery charge level. Extended contact with your body, even through clothing, could cause discomfort or even a skin burn. Periodically take breaks from using the keyboard by lifting your hands from the palm rest; and be careful not to use the keyboard for any extended length of time.
- Do not operate your computer or charge the battery near flammable materials or in explosive environments.
- Ventilation slots, fans and/or heat sinks are provided with the product for safety, comfort, and reliable operation. These features might inadvertently become blocked by placing the product on a bed, sofa, carpet, or other flexible surface. Never block, cover, or disable these features.
- When the ac power adapter is connected to an electrical outlet and your computer, it generates heat. Do not place the adapter in contact with any part of your body while using it. Never use the ac power adapter to warm your body. Extended contact with your body, even through clothing, may cause a skin burn.

For your safety, always follow these basic precautions with your computer:

- Keep the cover closed whenever the computer is plugged in.
- Regularly inspect the outside of the computer for dust accumulation.
- Remove dust from vents and any perforations in the bezel. More frequent cleanings might be required for computers in dusty or high-traffic areas.
- Do not restrict or block any ventilation openings.
- Do not operate your computer inside furniture, as this might increase the risk of overheating.
- Airflow temperatures into the computer should not exceed 35°C (95°F).

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## Electrical current safety information



Electric current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

- Do not use your computer during a lightning storm.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- Connect all power cords to a properly wired and grounded electrical outlet.
- Connect properly wired outlets to any equipment that will be attached to this product.
- Whenever possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, battery, and all the cables before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Do not use your computer until all internal parts enclosures are fastened into place. Never use the computer when internal parts and circuits are exposed.



Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

**To connect:**

1. Turn everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlets.
5. Turn devices ON.

**To disconnect:**

1. Turn everything OFF.
2. First, remove power cords from outlets.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

The power cord must be disconnected from the wall outlet or receptacle before installing all other electrical cables connected to the computer.

The power cord may be reconnected to the wall outlet or receptacle only after all other electrical cables have been connected to the computer.



During electrical storms, do not perform any replacement and do not connect the telephone cable to or disconnect it from the telephone outlet on the wall.

---

## Liquid crystal display (LCD) notice

### CAUTION:

The liquid crystal display (LCD) is made of glass, and rough handling or dropping the computer can cause the LCD to break. If the LCD breaks and the internal fluid gets into your eyes or on your hands, immediately wash the affected areas with water for at least 15 minutes; if any symptoms are present after washing, get medical care.

**Note:** For products with mercury-containing fluorescent lamps (for example, non-LED), the fluorescent lamp in the liquid crystal display (LCD) contains mercury; dispose of according to local, state, or federal laws.

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## Use earphones, headphones, or a headset



Excessive sound pressure from earphones and headphones can cause hearing loss. Adjustment of the equalizer to maximum increases the earphone and headphone output voltage and the sound pressure level. Therefore, to protect your hearing, adjust the equalizer to an appropriate level.

Excessive use of headphones or earphones for a long period of time at high volume can be dangerous if the output of the headphone or earphone connectors do not comply with specifications of EN 50332-2. The headphone output connector of your computer complies with EN 50332-2 Sub clause 7. This specification limits the computer's maximum wide band true RMS output voltage to 150 mV. To help protect against hearing loss, ensure that the headphones or earphones you use also comply with EN 50332-2 (Clause 7 limits) for a wide band characteristic voltage of 75 mV. Using headphones that do not comply with EN 50332-2 can be dangerous due to excessive sound pressure levels.

If your Lenovo computer came with headphones or earphones in the package, as a set, the combination of the headphones or earphones and the computer already complies with the specifications of EN 50332-1. If different headphones or earphones are used, ensure that they comply with EN 50332-1 (Clause 6.5 Limitation Values). Using headphones that do not comply with EN 50332-1 can be dangerous due to excessive sound pressure levels.

---

## Choking hazard notice



CHOKING HAZARD – Product contains small parts.

Keep away from children under three years.

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## Plastic bag notice



<p><b>Plastic bags can be dangerous. Keep plastic bags away from babies and children to avoid danger of suffocation.</b></p>
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## Glass parts notice

### CAUTION:

Some parts of your product may be made of glass. This glass could break if the product is dropped on a hard surface or receives a substantial impact. If glass breaks, do not touch or attempt to remove it. Stop using your product until the glass is replaced by trained service personnel.

---

## Static electricity prevention

Static electricity, although harmless to you, can seriously damage computer components and options. Improper handling of static-sensitive parts can damage the part. When you unpack an option or CRU, do not open the static-protective package containing the part until the instructions direct you to install it.

When you handle options or CRUs, or perform any work inside the computer, take the following precautions to avoid static-electricity damage:

- Limit your movement. Movement can cause static electricity to build up around you.
  - Always handle components carefully. Handle adapters, memory modules, and other circuit boards by the edges. Never touch exposed circuitry.
  - Prevent others from touching components.
  - When you install a static-sensitive option or CRU, touch the static-protective package containing the part to a metal expansion-slot cover or other unpainted metal surface on the computer for at least two seconds. This reduces static electricity in the package and your body.
  - When possible, remove the static-sensitive part from the static-protective packaging and install the part without setting it down. When this is not possible, place the static-protective packaging on a smooth, level surface and place the part on it.
  - Do not place the part on the computer cover or other metal surface.
- 

## Operating environment

### Maximum altitude (without pressurization)

3048 m (10 000 ft)

### Temperature

- At altitudes up to 2438 m (8000 ft)
  - Operating: 5°C to 35°C (41°F to 95°F)
  - Storage and transportation in original shipping package: -20°C to 60°C (-4°F to 140°F)
  - Storage without package: 5°C to 43°C (41°F to 109°F)
- At altitudes above 2438 m (8000 ft)
  - Maximum temperature when operating under the unpressurized condition: 31.3°C (88°F)

**Note:** When you charge the battery, its temperature must be no lower than 10°C (50°F).

### Relative humidity

- Operating: 8% to 95% at wet-bulb temperature 23°C (73°F)
- Storage and transportation: 5% to 95% at wet-bulb temperature 27°C (81°F)

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## Cleaning and maintenance

With appropriate care and maintenance, your computer will serve you reliably. The following topics offer information to help you keep your computer working with best performance.

### Basic maintenance tips

Here are some basic points about keeping your computer functioning properly:

- If possible, place your computer in a well-ventilated and dry area without direct exposure to sunshine.
- Store packing materials safely out of the reach of children to prevent the risk of suffocation from plastic bags.
- Keep your computer away from magnets, activated cellular phones, electrical appliances, or speakers (more than 13 cm or 5 inches).
- Avoid subjecting your computer to extreme temperatures (below 5°C/41°F or above 35°C/95°F).
- Avoid placing any objects (including paper) between the display and the keyboard or the palm rest.
- Computer display might be designed to be opened and used at a certain angle. Do not open the display with force. Otherwise, the computer hinge might get damaged.
- Do not turn your computer over when the ac power adapter is plugged in, otherwise, it could break the adapter plug.
- Before moving your computer, be sure to remove any media, turn off attached devices, and disconnect cords and cables.
- When picking up your open computer, hold it by the bottom. Do not pick up or hold your computer by the display.
- Only an authorized Lenovo repair technician should disassemble and repair your computer.
- Do not modify or tape the latches to keep the display open or closed.
- Avoid directly exposing your computer and peripherals to the air from an appliance that can produce negative ions. Wherever possible, ground your computer to facilitate safe electrostatic discharge.

### Clean your computer

It is a good practice to clean your computer periodically to protect the surfaces and ensure trouble-free operation.

**Clean the computer cover:** Wipe it with a lint-free cloth dampened in mild soap and water. Avoid applying liquids directly to the cover.

**Clean the keyboard:** Wipe the keys one by one with a lint-free cloth dampened in mild soap and water. If you wipe several keys at a time, the cloth might hook onto an adjacent key and possibly damage it. Avoid spraying cleaner directly onto the keyboard. To remove any crumbs or dust from beneath the keys, you can use a camera blower with a brush or use cool air from a hair dryer.

**Clean the computer screen:** Scratches, oil, dust, chemicals, and ultraviolet light can affect the performance of your computer screen. Use a dry, soft lint-free cloth to wipe the screen gently. If you see a scratchlike mark on your screen, it might be a stain. Wipe or dust the stain gently with a soft, dry cloth. If the stain remains, moisten a soft, lint-free cloth with water or eyeglass cleaner, but do not apply liquids directly to your computer screen. Ensure that the computer screen is dry before closing it.



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## Appendix B. Accessibility and ergonomic information

This chapter provides information about accessibility and ergonomics.

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### 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 a blank area on 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 a blank area on 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.

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## 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.

### **What if you are traveling?**

It might not be possible to observe the best ergonomic practices when you are using your computer while on the move or in a casual setting. Regardless of the setting, try to observe as many of the tips as possible. Sitting properly and using adequate lighting, for example, helps you maintain desirable levels of comfort and performance. If your work area is not in an office setting, ensure to take special note of employing active sitting and taking work breaks. Many product solutions are available to help you modify and expand your computer to best suit your needs. You can find some of these options at <https://www.lenovo.com/accessories>. Explore your options for docking solutions and external products that provide the adjustability and features that you want.

### **Questions about vision?**

The visual display screens of notebook computers are designed to meet the highest standards. These visual display screens provide you with clear, crisp images and large, bright displays that are easy to see, yet easy on the eyes. Any concentrated and sustained visual activity can be tiring. If you have questions on eye fatigue or visual discomfort, consult a vision-care specialist for advice.

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## Appendix C. Supplemental information about the Linux operating system

In limited countries or regions, Lenovo offers customers an option to order computers with the preinstalled Linux® operating system.

If the Linux operating system is available on your computer, read the following information before you use the computer. Ignore any information related to Windows-based programs, utilities, and Lenovo preinstalled applications in this documentation.

### Access the Lenovo Limited Warranty

This product is covered by the terms of the Lenovo Limited Warranty (LLW), version L505-0010-02 08/2011. You can view the LLW in a number of languages from the following Web site. Read the Lenovo Limited Warranty at:

[https://www.lenovo.com/warranty/llw\\_02](https://www.lenovo.com/warranty/llw_02)

The LLW also is preinstalled on the computer. To access the LLW, go to the following directory:

```
/usr/share/doc/lenovo-doc
```

If you cannot view the LLW either from the Web site or from your computer, contact your local Lenovo office or reseller to obtain a printed version of the LLW.

### Access Linux distributions

Linux is an open-source operating system, and popular Linux distributions include Ubuntu® and Fedora®.

To learn more about the Ubuntu operating system, go to:

<https://www.ubuntu.com>

To learn more about the Fedora operating system, go to:

<https://getfedora.org/>

### Get support information

If you need help, service, technical assistance, or more information about the Linux operating system or other applications, contact the provider of the Linux operating system or the provider of the application. If you need the service and support for hardware components shipped with your computer, contact Lenovo. For more information about how to contact Lenovo, refer to the *User Guide* and *Safety and Warranty Guide*.

To access the latest *User Guide* and *Safety and Warranty Guide*, go to:

<https://pcsupport.lenovo.com>



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## Appendix D. Compliance information

This chapter provides regulatory, environmental, RoHS, and ENERGY STAR information about Lenovo products.

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### Radio frequency compliance statements

Computer models equipped with wireless communications comply with the radio frequency and safety standards of any country or region in which it has been approved for wireless use.

Besides this document, ensure that you read the *Regulatory Notice* for your country or region before using the wireless devices contained in your computer.

### Wireless-related information

This topic provides wireless-related information about Lenovo products.

#### Wireless interoperability

Wireless-LAN card is designed to be interoperable with any wireless-LAN product that is based on Direct Sequence Spread Spectrum (DSSS), Complementary Code Keying (CCK), and/or Orthogonal Frequency Division Multiplexing (OFDM) radio technology, and is compliant to:

- The 802.11b/g Standard, 802.11a/b/g, 802.11n, or 802.11ac on wireless-LANs, as defined and approved by the Institute of Electrical and Electronics Engineers.
- The Wireless Fidelity (Wi-Fi®) certification as defined by the Wi-Fi Alliance®.

#### Usage environment and your health

This computer contains integrated wireless cards that operate within the guidelines identified by radio frequency (RF) safety standards and recommendations; therefore, Lenovo believes that this product is safe for use by consumers. These standards and recommendations reflect the consensus of the worldwide scientific community, and result from deliberations of panels and committees of scientists, who continually review and interpret the extensive research literature.

In some situations or environments, the use of wireless devices might be restricted by the proprietor of a building or responsible representatives of an organization. For example, these situations and areas might include the following:

- On board of airplanes, in hospitals or near petrol stations, blasting areas (with electro-explosive devices), medical implants or body-worn electronic medical devices, such as pace makers.
- In any other environment where the risk of interference to other devices or services is perceived or identified as harmful.

If you are uncertain of the policy that applies to the use of wireless devices in a specific area (such as an airport or hospital), you are encouraged to ask for authorization to use a wireless device prior to turning on the computer.

#### Locate the UltraConnect wireless antennas

Your computer has an UltraConnect™ wireless antenna system. You can enable wireless communication wherever you are.

The following illustration shows the antenna locations on your computer:

### X1 Yoga Gen 5



### X1 Carbon Gen 8



1. Wireless-LAN antenna (auxiliary)
2. Wireless-LAN antenna (main)
3. Wireless-WAN antenna (auxiliary, for selected models)
4. Wireless-WAN antenna (main, for selected models)

### Locate wireless regulatory notices

For more information about the wireless regulatory notices, refer to the *Regulatory Notice* at <https://support.lenovo.com>.