X390 Yoga
User Guide

Read this first

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

- Appendix A “Important safety information” on page 65
- *Safety and Warranty Guide*
- *Setup Guide*

First Edition (April 2019)

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About this documentation

- Illustrations in this documentation might look different from your product.
- Depending on the model, some optional accessories, features, and software programs might not be available on your computer.
- Depending on the version of operating systems, some user interface instructions might not be applicable to your computer.
- Documentation content is subject to change without notice. Lenovo makes constant improvements on the documentation of your computer, including this *User Guide*. To get the latest documentation, go to https://support.lenovo.com.
- Microsoft® makes periodic feature changes to the Windows® operating system through Windows Update. As a result, some information in this documentation might become outdated. Refer to Microsoft resources for the latest information.

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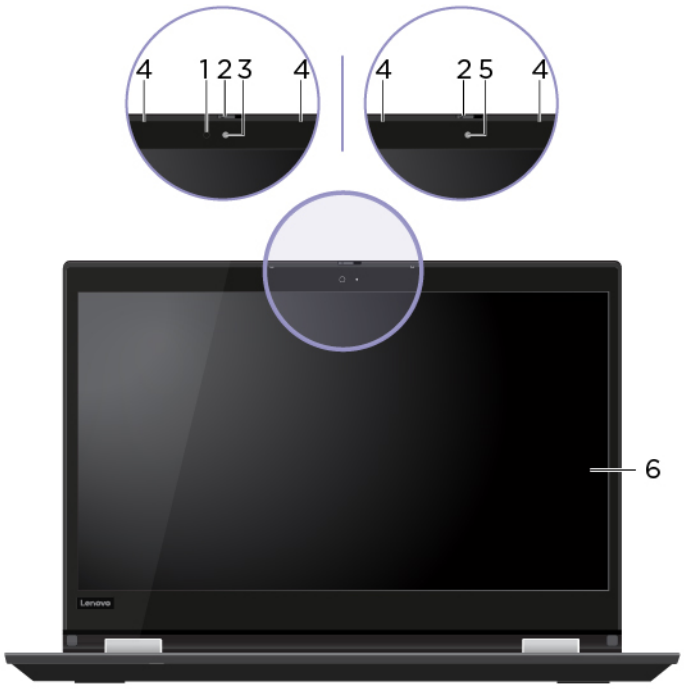
Chapter 1. Meet your computer

Front



1. Infrared LED*	Emit infrared (IR) light. Normally the infrared light is invisible to the naked eyes. **Note:** Do not block the IR light-emitting diode (LED). Otherwise, the IR function might not work.
2. ThinkShutter	Slide ThinkShutter to cover or uncover the camera lens. It is designed to protect your privacy.
3. Camera with IR function*	Log in to your computer with face authentication. See “Use face authentication (for selected models)” on page 42.
4. Microphones	Capture or record sound.
5. Camera	Take pictures or record videos by clicking **Camera** from the Start menu. The indicator next to the camera is on when the camera is in use. If you use other apps that support photographing, video chatting, and video conference, the camera starts automatically when you enable the camera-required feature from the app.
6. Multi-touch screen	Enable you to use your computer with simple touch gestures. See “Use the multi-touch screen” on page 20.

* for selected models

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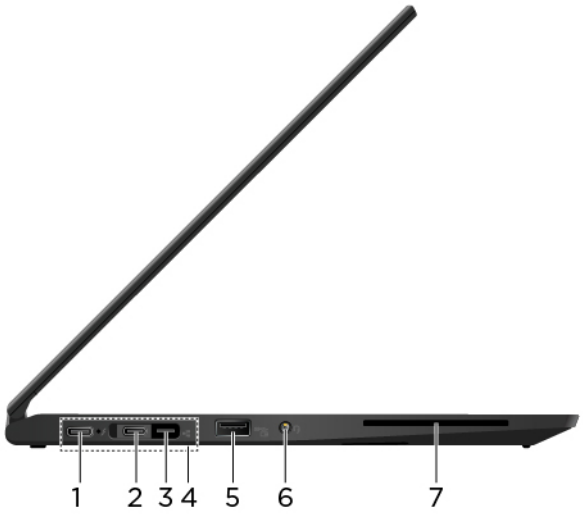
Base

1. Fingerprint reader	Log in to your computer with enrolled fingerprints. See “Use the fingerprint reader ” on page 41.
2. Trackpad	Perform finger touch and all the functions of a traditional mouse. See “Use the trackpad” on page 19.
3. NFC mark*	Your computer supports NFC (near field communication). You can share information with another NFC-enabled device. See “Set up a NFC connection (for selected models)” on page 31.
4. TrackPoint® pointing device	Perform all the functions of a traditional mouse. See “Use the TrackPoint pointing device” on page 17.

* for selected models

Left



1. USB-C™ connector (USB 3.1 Gen 1)	• Charge your computer. • Charge USB-C compatible devices with the output voltage and current of 5 V and 1.5 A. • Transfer data at USB 3.1 speed, up to 5 Gbps. • Connect to an external display: – USB-C to VGA: 1920 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. • Supply power to another computer using P-to-P (Peer to Peer) 2.0 charging function. See “Use P-to-P 2.0 charging function” on page 29. **Note:** When the battery power is below 10%, the connected USB-C accessories might not work correctly.
2. Thunderbolt™ 3 connector (USB-C)	• Charge your computer. • Charge USB-C compatible devices with the output voltage and current of 5 V and 1.5 A. • Transfer data at Thunderbolt 3 speed, up to 40 Gbps. • Connect to an external display: – USB-C to VGA: 1920 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. • Supply power to another computer using P-to-P (Peer to Peer) 2.0 charging function. See “Use P-to-P 2.0 charging function” on page 29. **Note:** When the battery power is below 10%, the connected USB-C accessories might not work correctly.

3. Ethernet extension connector Gen 2	Make your computer thinner than the ones with a standard Ethernet connector. Use a ThinkPad Ethernet Extension Adapter Gen 2 to connect your computer to a local area network (LAN) through this connector. The ThinkPad Ethernet Extension Adapter Gen 2 is available as an option and shipped with some computer models only. You can purchase a ThinkPad Ethernet Extension Adapter Gen 2 from Lenovo at: https://www.lenovo.com/accessories.
4. Docking-station connector	Connect the computer to one of the following supported docks to extend the computer capabilities: • ThinkPad Basic Docking Station • ThinkPad Pro Docking Station • ThinkPad Ultra Docking Station
5. Always On USB 3.1 connector Gen 1	With the Always On USB feature enabled, the Always On USB 3.1 connector Gen 1 can charge a USB-compatible device when the computer is on, off, in sleep mode, or in hibernation mode. **Notes:** • By default, **Always On USB** is enabled and **Charge in Battery Mode** is disabled in UEFI BIOS. • When the computer is off or in hibernation mode, and **Charge in Battery Mode** is disabled in UEFI BIOS, ensure that you have connected the computer to ac power. To enable the Always On USB feature, do the following: 1. Enter the UEFI BIOS menu. See “Enter the UEFI BIOS menu” on page 43. 2. Click **Config → USB → Always On USB** to enable the Always On USB feature.
6. Audio connector	Connect headphones or a headset with a 3.5-mm (0.14-inch) and 4-pole plug to listen to the sound from the computer. **Note:** The conventional microphone is not supported.
7. Smart-card slot*	Use smart cards for authentication, data storage, and application processing. Within large organizations, you might also use smart cards for strong security authentication of single sign-on (SSO). See “Use a microSD card or a smart card ” on page 31.

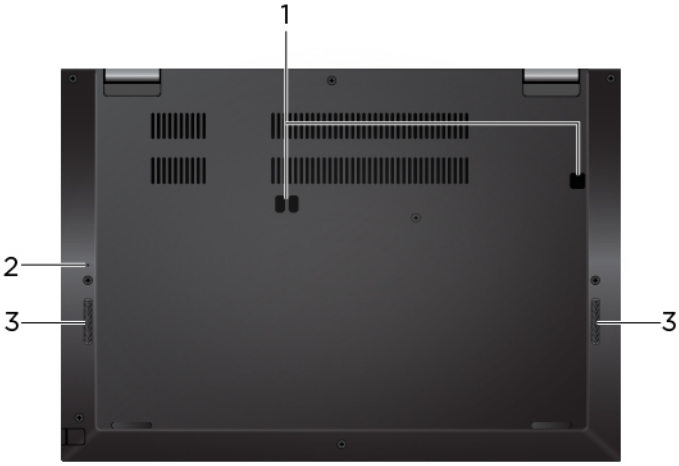
* for selected models

Right

1. ThinkPad Pen Pro	See “Use ThinkPad Pen Pro ” on page 26.
2. Power button	Press to turn on the computer or put the computer to sleep mode. To turn off the computer, open the Start menu, click ⏻ **Power**, and then select **Shut down**. The indicator in the power button shows the system status of your computer. • **Blinking for three times:** The computer is initially connected to power. • **On:** The computer is on. • **Off:** The computer is off or in hibernation mode. • **Blinking rapidly:** The computer is entering sleep or hibernation mode. • **Blinking slowly:** The computer is in sleep mode.
3. microSD card slot	Insert a microSD card for data access or storage. See “Use a microSD card or a smart card ” on page 31.
4. Nano-SIM card slot*	Use the Nano Subscriber Identity Module (SIM) card to connect to a wireless-WAN network. See “Connect to a cellular network” on page 13.
5. USB 3.1 connector Gen 1	Connect a USB-compatible device, such as a USB keyboard, USB mouse, USB storage device, or USB printer.
6. HDMI™ connector	Connect to a compatible digital audio device or video monitor, such as an HDTV.
7. Security-lock slot	Lock your computer to a desk, table, or other fixtures through a compatible security cable lock. See “Lock the computer” on page 39.

* for selected models

Bottom



1. Docking-station hook holes	Use the docking-station hook holes to secure a supported docking station.
2. Emergency-reset hole	If the computer stops responding and you cannot turn it off by pressing the power button, reset your computer: 1. Disconnect your computer from ac power. 2. Insert a straightened paper clip into the hole to cut off power supply temporarily. 3. Connect your computer to ac power and then turn on your computer.
3. Speakers	Enable you to experience high-quality sound.

Features and specifications

Dimensions	• Width: 310.4 mm (12.22 inches) • Depth: 219 mm (8.62 inches) • Thickness: 15.95 mm (0.63 inches)
Maximum heat output (depending on the model)	• 45 W (154 Btu/hr) • 65 W (222 Btu/hr)
Power source (ac power adapter)	• Sine-wave input at 50 Hz to 60 Hz • Input rating of the ac power adapter: 100 V to 240 V ac, 50 Hz to 60 Hz
Microprocessor	To view the microprocessor information of your computer, right-click the **Start** button and then click **System**.
Memory	Double data rate 4 (DDR4) onboard memory module
Storage device	• Hybrid solid-state drive (with Intel® Optane™ memory)* • M.2 solid-state drive (without Intel Optane memory)*
Display	• Brightness control • Color display with In-Plane Switching (IPS) technology • Display size: 337.82 mm (13.3 inches) • Display resolution: 1920 x 1080 pixels • Multi-touch technology
Keyboard	• Function keys • Six-row keyboard or six-row keyboard with backlight • Trackpad • TrackPoint pointing device
Connectors and slots	• Audio connector • Ethernet extension connector Gen 2 • Two USB 3.1 connectors Gen 1 (including one Always On USB 3.1 connector Gen 1) • HDMI connector • microSD card slot • Nano-SIM-card slot* • Smart card slot* • Thunderbolt 3 connector (USB-C) • USB-C connectors (USB 3.1 Gen 1)
Security features	• Face authentication* • Fingerprint reader • Password • Security-lock slot • Trusted Platform Module (TPM)*

Wireless features	• Bluetooth • Global Positioning System (GPS) satellite receiver (available on models with wireless WAN)* • Wireless LAN • Wireless WAN* • Near field communication (NFC)*
Others	• Camera • Microphones

* for selected models

Chapter 2. Get started with your computer

Get started with Windows 10

Learn the basics of Windows 10 and start working with it right away. For more information about Windows 10, see the Windows help information.

Windows account

To use the Windows operating system, a user account is required. It can either be a Windows user account or a Microsoft account.

Windows user account

When you start Windows for the first time, you are prompted to create a Windows user account. This first account you created is of the “Administrator” type. With an Administrator account, you can create additional user accounts or change account types by doing the following:

1. Open the Start menu and select **Settings → Accounts → Other people**.
2. Follow the on-screen instructions.

Microsoft account

You can also log in to the Windows operating system with a Microsoft account.

To create a Microsoft account, go to the Microsoft sign-up page at https://signup.live.com and follow the on-screen instructions.

With a Microsoft account, you can:

- Enjoy one-time signing in if you are using other Microsoft services, such as OneDrive, Skype, and Outlook.com.
- Sync personalized settings across other Windows-based devices.

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Windows user interface

1. **Account**	Change account settings, lock the computer, or sign out from the current account.
2. **Settings**	Launch Settings.
3. **Power**	Shut down, restart, or put the computer into sleep.
4. **Start button**	Open the Start menu.
5. **Windows Search**	Type what you are looking for in the search box and get search results from your computer and the Web.
6. **Task View**	Display all opened apps and switch among them.
7. **Windows notification area**	Display notifications and status of some features.
8. **Battery status icon**	Display power status and change battery or power settings. When your computer is not connected to ac power, the icon changes to .
9. **Network icon**	Connect to an available wireless network and display the network status. When connected to a wired network, the icon changes to .
10. **Action center**	Display the latest notifications from apps and provide quick access to some features.

Open the Start menu

- Click the **Start** button.
- Press the Windows logo key on the keyboard.

Access Control Panel

- Open the Start menu and click **Windows System → Control Panel**.
- Use Windows Search.

Launch an app

- Open the Start menu and select the app you want to launch.
- Use Windows Search.

Windows label

Your computer might have a Windows 10 Genuine Microsoft label affixed to its cover depending on the following factors:

- Your geographic location
- Edition of Windows 10 that is preinstalled

Go to https://www.microsoft.com/en-us/howtotell/Hardware.aspx for illustrations of the various types of Genuine Microsoft labels.

- In the People's Republic of China, the Genuine Microsoft label is required on all computer models preinstalled with any version of Windows 10.
- In other countries and regions, the Genuine Microsoft label is required only on computer models licensed for Windows 10 Pro.

The absence of a Genuine Microsoft label does not indicate that the preinstalled Windows version is not genuine. For details on how to tell whether your preinstalled Windows product is genuine, refer to the information provided by Microsoft at https://www.microsoft.com/en-us/howtotell/default.aspx.

There are no external, visual indicators of the Product ID or Windows version for which the computer is licensed. Instead, the Product ID is recorded in the computer firmware. Whenever a Windows 10 product is installed, the installation program checks the computer firmware for a valid, matching Product ID to complete the activation.

In some cases, an earlier Windows version might be preinstalled under the terms of the Windows 10 Pro license downgrade rights.

Connect to networks

Your computer helps you connect to the world through a wired or wireless network.

Connect to the wired Ethernet

Connect your computer to a local network through the Ethernet extension connector Gen 2 on your computer with a ThinkPad Ethernet Extension Adapter Gen 2.

The Ethernet extension adapter is available as an option and shipped with some computer models. You can purchase one from Lenovo at https://www.lenovo.com/accessories.

Connect to Wi-Fi networks

1. Click the network icon in the Windows notification area. A list of available wireless networks is displayed.
2. Select a network to connect to. Provide required information if needed.

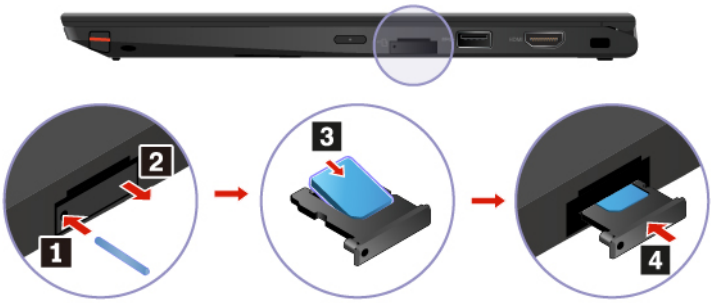
Connect to a cellular network

If your computer has a wireless wide area network (WAN) card and a nano-SIM card installed, you can connect to a cellular data network and get online using the cellular signal.

Note: The cellular service is provided by authorized mobile service carriers in some countries or regions. You must have a cellular plan from a service carrier to connect to the cellular network.

To establish cellular connection:

1. Locate the nano-SIM card slot.
2. Insert a straightened paper clip into the hole in the tray. The tray ejects. Install a new nano-SIM card into the tray with the metal contacts facing upward. Insert the tray into the nano-SIM-card slot until you hear a click. If your computer has a nano-SIM card installed, skip this step.



3. Click the network icon in the Windows notification area, and then select the cellular network icon from the list.
4. Provide required information if needed.

Use Lenovo Vantage

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

Access Lenovo Vantage

Open the Start menu and click **Lenovo Vantage**. You also can type `Lenovo Vantage` in the search box.

To download the latest version of Lenovo Vantage, go to Microsoft Store and search by the app name.

Key features

Lenovo Vantage makes periodic updates of the features to keep improving your experience with your computer.

Note: The available features vary depending on the computer model.

- **System Update**

  Download and install firmware and driver updates to keep your computer up-to-date. You can configure the options to install updates automatically when available.
- **Hardware Settings**

  Configure intelligent settings of the following hardware to make your computer smarter to use:

  – Always On USB

  – Battery

  - Camera
  - Computer display
  - Keyboard
  - Microphone
  - Speakers
  - Trackpad
  - TrackPoint
- **Health & Support**

  Monitor your computer health and get personalized support of your computer. You can:
  - Scan the computer hardware and diagnose hardware problems.
  - Look up computer warranty status (online).
  - Access *User Guide.*
  - Read tips and tricks articles customized for your computer.
- **Lenovo Wi-Fi Security**

  Protect your computer from malicious Wi-Fi networks.

Interact with your computer

Your computer provides you various ways to navigate the screen.

Use the keyboard shortcuts

The special keys on the keyboard help you work more easily and effectively.

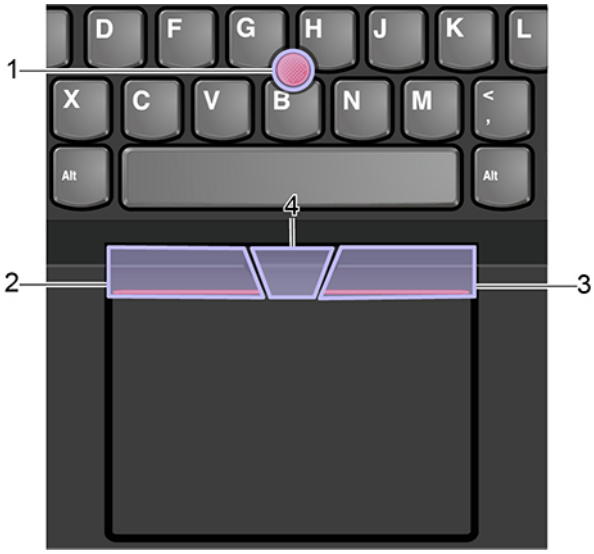
1. Windows logo key	Open the Start menu. For information about using this key with other keys, see the Windows help information.
2. Caps Lock key	Switch the letter case between the upper case and lower case. When the key indicator is on, you can type uppercase letters.
3. F1–F12 function keys	Invoke the special function printed as an icon on each key or standard function. To choose whether to invoke the special function or standard function: 1. Go to Control Panel and view by Large icons or Small icons. 2. Click **Keyboard** or **Lenovo - Keyboard Manager** and select the option of your preference.
Fn + Esc FnLock	Switch the function of the F1–F12 keys between the standard function and special function printed as an icon on each key. When the Fn Lock indicator is on: • Press F1-F12 to use the standard function. • Press Fn+F1-F12 to use the special function. When the Fn Lock indicator is off: • Press Fn+F1-F12 to use the standard function. • Press F1-F12 to use the special function.
F1	Mute or unmute the speakers. When the key indicator is on, the speakers are muted. If you mute the speakers and turn off your computer, the speakers remain muted when you turn on your computer.
F2	Decrease the speaker volume.
F3	Increase the speaker volume.

F4	Mute or unmute the microphones. When the key indicator is on, the microphones are muted.
F5	Darken the computer display.
F6	Brighten the computer display.
F7	Manage external displays.
F8	Enable or disable the built-in wireless features.
F9	Open the Settings window.
F10	Enable or disable the built-in Bluetooth features.
F11	Open a keyboard setting page.
F12	Invoke the function defined by yourself: 1. Open the Start menu and click **Lenovo Vantage**. 2. Click **Hardware Settings** and then click **Input**. 3. Locate the **Keyboard: User-defined Key** section and follow the on-screen instructions to complete the setting. On this setting page, you can also define different functions for the key combinations with F12, such as Shift+F12, Alt+F12, or Ctrl+F12.
Fn + Backspace	Put your computer to sleep mode.
Fn + PrtSc	Open the Snipping Tool program.
Fn+Spacebar	Switch between different keyboard backlight statuses if your computer supports keyboard backlight.
Fn+B	Equal the Break key on a conventional external keyboard.
Fn+K	Equal the ScrLK or Scroll Lock key on a conventional external keyboard.
Fn+P	Equal the Pause key on a conventional external keyboard.
Fn+S	Equal the SysRq key on a conventional external keyboard.
Fn+4	Put the computer to sleep mode. To wake up the computer, press Fn or the power button.
Fn+Left arrow key	Equal the Home key.
Fn+Right arrow key	Equal the End key.

Use the TrackPoint pointing device

The TrackPoint pointing device enables you to perform all the functions of a traditional mouse, such as pointing, clicking, and scrolling.

Use the TrackPoint pointing device



1. **Pointing stick**

Use your index finger or middle finger to apply pressure to the pointing-stick nonslip cap in any direction parallel to the keyboard. The pointer on the screen moves accordingly but the pointing stick itself does not move. The higher the pressure applied, the faster the pointer moves.

2. **Left-click button**

Press to select or open an item.

3. **Right-click button**

Press to display a shortcut menu.

4. **Scroll bar**

Press and hold the dotted scroll bar while applying pressure to the pointing stick in the vertical or horizontal direction. Then, you can scroll through the document, Web site, or apps.

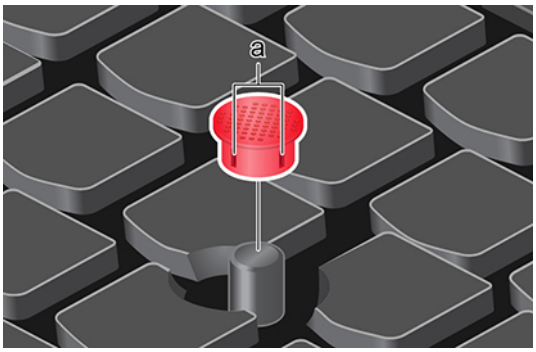
Disable the TrackPoint pointing device

The TrackPoint pointing device is active by default. To disable the device:

1. Go to Control Panel and view by Large icons or Small icons.
2. Click **Mouse**. Then, follow the on-screen instructions to complete the setting.

Replace the pointing-stick nonslip cap

Note: Ensure that the new cap has grooves **a**.



Use the trackpad

The entire trackpad surface is sensitive to finger touch and movement. You can use the trackpad to perform all the pointing, clicking, and scrolling functions of a traditional mouse.

Use the trackpad

1. **Left-click zone**

Press to select or open an item.

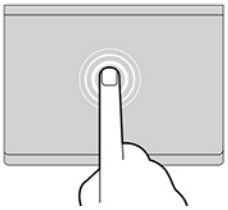
You also can tap anywhere on the surface of the trackpad with one finger to perform the left-click action.

2. **Right-click zone**

Press to display a shortcut menu.

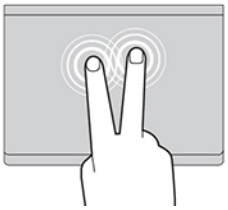
You also can tap anywhere on the surface of the trackpad with two fingers to perform the right-click action.

Use the touch gestures



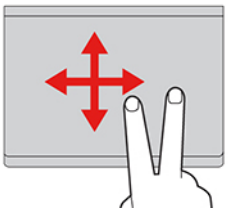
Tap

Tap anywhere on the trackpad with one finger to select or open an item.



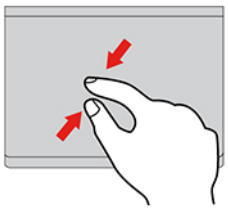
Two-finger tap

Tap anywhere on the trackpad with two fingers to display a shortcut menu.



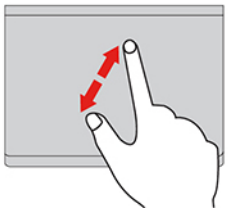
Two-finger scroll

Put two fingers on the trackpad and move them in the vertical or horizontal direction. This action enables you to scroll through the document, Web site, or apps.



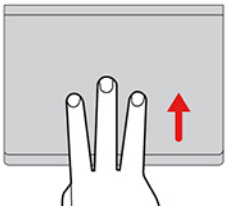
Two-finger zoom out

Put two fingers on the trackpad and move them closer together to zoom out.



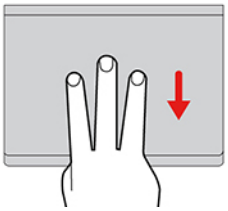
Two-finger zoom in

Put two fingers on the trackpad and move them farther apart to zoom in.



Swipe three fingers up

Put three fingers on the trackpad and move them up to open the task view to see all your open windows.



Swipe three fingers down

Put three fingers on the trackpad and move them down to show the desktop.

Notes:

- When using two or more fingers, ensure that you position your fingers slightly apart.
- Some gestures are not available if the last action was done from the TrackPoint pointing device.
- Some gestures are only available when you are using certain apps.
- If the trackpad surface is stained with oil, turn off the computer first. Then, gently wipe the trackpad surface with a soft and lint-free cloth moistened with lukewarm water or computer cleaner.

For more gestures, see the help information of the pointing device.

Disable the trackpad

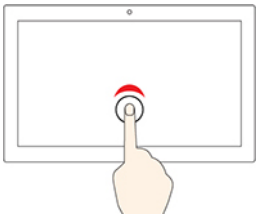
The trackpad is active by default. To disable the device:

1. Go to Control Panel and view by Large icons or Small icons.
2. Click **Mouse**. Then, follow the on-screen instructions to complete the setting.

Use the multi-touch screen

If your computer display supports the multi-touch function, you can navigate the screen with simple touch gestures.

Note: Some gestures might not be available depending on the app you use.

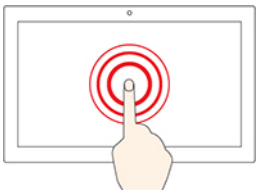


Tap once

- From the Start menu: Open an app or item.
- From the desktop: Select an app or item.
- In an open app: Perform an action such as **Copy**, **Save**, and **Delete**, depending on the app.

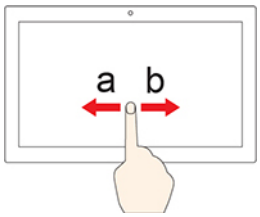
Tap twice quickly

Open an app or item from the desktop.



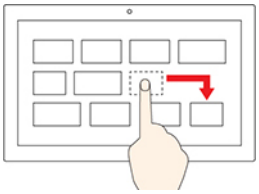
Tap and hold

Open a shortcut menu.



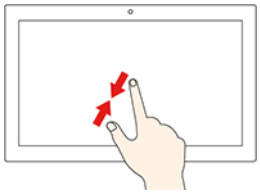
Slide

Scroll through items, such as lists, pages, and photos.



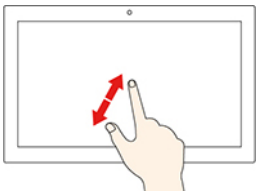
Drag an item to the location you want

Move an object.



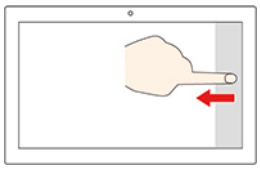
Move two fingers closer together

Zoom out.



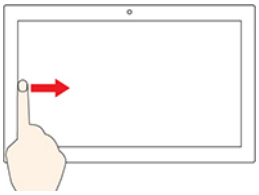
Move two fingers farther apart

Zoom in.



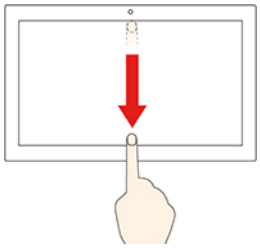
Swipe in from the right edge

Open the action center to see your notifications and quick actions.



Swipe in from the left edge

View all your open windows in task view.



- **Swipe downwards shortly from the top edge (for full-screened app or when your computer is in the tablet mode)**

  Show a hidden title bar.
- **Swipe in from the top edge to the bottom edge (when your computer is in the tablet mode)**

  Close the current app.

Tips

- Turn off the computer before cleaning the multi-touch screen.
- Use a dry, soft, and lint-free cloth or a piece of absorbent cotton to remove fingerprints or dust from the multi-touch screen. Do not apply solvents to the cloth.

- The multi-touch screen is a glass panel covered with surface coating. Do not apply pressure or place any metallic object on the screen, which might damage the touch panel or cause it to malfunction.
- Do not use fingernails, gloved fingers, or inanimate objects for input on the screen.
- Regularly calibrate the accuracy of the finger input to avoid a discrepancy.

Use multimedia

Use your computer for business or entertainment with the built-in components (camera, speakers, and audio features) or connected external devices (an external projector, monitor, and HDTV).

Use audio

To enhance your listening experience, connect speakers, headphones, or a headset with a 3.5-mm (0.14-inch), 4-pole plug to the audio connector.

Adjust the speaker volume

Press F3 to increase the speaker volume or press F2 to decrease the speaker volume.

Change the sound settings

1. Go to Control Panel and view by category.
2. Click **Hardware and Sound** → **Sound**.
3. Change the settings as you prefer.

Protect your hearing

Smart audio helps protect against hearing loss. The feature limits the computer's maximum volume to 130 mV when a headset or headphone is connected. To change the setting:

1. Go to Control Panel and view by large icons.
2. Click **SmartAudio**. In the window displayed, click the **Disable Headphone Limiter** icon. Then, follow the on-screen instructions.

Use the camera

You can use the built-in camera to take photos or record videos. The indicator next to the camera turns on when the camera is in use.

To take photos or record a video:

1. Slide the ThinkShutter to unveil the camera.
2. Open the Start menu and click **Camera**.
3. To take a photo, click the camera icon. If you want to record video, click the video icon to switch to video mode.

If you use other programs that provide features such as photographing, video capturing, and video conference, the camera starts automatically when you enable the camera-required feature.

To configure the camera settings:

1. Open the Start menu and click **Lenovo Vantage** → **Hardware Settings** → **Audio/Visual**.
2. Locate the **Camera** section and then follow the on-screen instructions.

Connect to an external display

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

Connect to a wired display

1. Connect the external display to an appropriate video connector on your computer, such as the HDMI connector, USB-C connector (USB 3.1 Gen 1), or Thunderbolt 3 connector (USB-C).
2. Connect the external display to an electrical outlet.
3. Turn on the external display.

If your computer cannot detect the external display, right-click a blank area on the desktop, and then click **Display settings → Detect**.

Do not connect external displays to the USB-C connector (USB 3.1 Gen 1) 1 and the HDMI connector 2 at the same time. Otherwise, only the external display connected to the USB-C connector (USB 3.1 Gen 1) 1 will work by default. You can change the priority between the USB-C connector (USB 3.1 Gen 1) and the HDMI connector from the UEFI BIOS menu. To enter the UEFI BIOS menu, see “Enter the UEFI BIOS menu” on page 43, and then select **Display → Shared Display Priority**. Then, follow the instructions on the screen.

Supported resolution

The following table lists the supported maximum resolution of the external display.

Connect the external display to	Supported resolution
the USB-C connector (USB 3.1 Gen 1)	Up to 4096 x 2304 pixels / 60 Hz
Thunderbolt 3 connector (USB-C)	Up to 4096 x 2304 pixels / 60 Hz
the HDMI connector	Up to 4096 x 2160 pixels / 30 Hz

Connect to a wireless display

To use a wireless display, ensure that both your computer and the external display support the Miracast® feature.

- Open the Start menu, and then click **Settings → Devices → Bluetooth & other devices → Add Bluetooth or other device**. In the Add a device window, click **Wireless display or dock**. Then, follow the instructions on the screen.
- Click the action center icon in the Windows notification area and click **Connect**. Select the wireless display and follow the on-screen instructions.

Set the display mode

Press F7 or Fn + F7 and then select a display mode of your preference.

- **PC screen only**: Displays the video output only on your computer screen.

  Note: Depending on the situation, you might see **Disconnect**, **PC screen only**, **Computer only**, or **Disconnect projector**.
- **Duplicate**: Displays the same video output on both your computer screen and an external display.
- **Extend**: Extends the video output from your computer display to an external display. You can drag and move items between the two displays.
- **Second screen only**: Displays the video output only on an external display.

  Note: Depending on the situation, you might see **Projector only** or **Second screen only**.

If you show programs using DirectDraw or Direct3D® in full-screen mode, only the main display shows the video output.

Change display settings

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

You can change the settings for both the computer display and the external display. For example, you can define which one is the main display and which one is the secondary display. You also can change the resolution and orientation.

Note: If you set a higher resolution for the computer display than the external display, only part of the screen can be displayed on the external display.

Get to know YOGA modes

Your computer display can be rotated to any angle up to 360 degrees.

Attention: Do not rotate the computer display with too much force, or apply too much force to the upper-right or upper-left corner of the computer display. Otherwise the computer display or hinges might get damaged.

Your computer features the following four YOGA modes. You can switch among different modes according to your preference.

Note: The keyboard and the pointing devices are automatically disabled in the stand mode, tent mode, and tablet mode. Use the touch screen to control your computer instead.

Notebook mode

Stand mode

Tent mode

Tablet mode

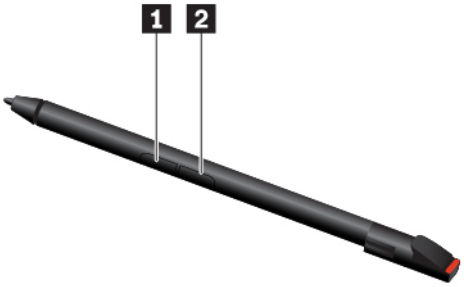
Use ThinkPad Pen Pro

The ThinkPad Pen Pro is an electronic pen stored in the pen slot. To use the pen, slide it out of the slot.

Notes:

- The ThinkPad Pen Pro is not waterproof. Keep the pen away from water and excessive moisture.
- To purchase the ThinkPad Pen Pro, go to https://www.lenovo.com/accessories.

Use the ThinkPad Pen Pro



1 Eraser button

2 Click button

You can perform the following operations with the ThinkPad Pen Pro:

- To click or make a selection, tap the display once.
- To double-click, tap twice without pausing.
- To right-click, tap the display and hold the pen there for one second. Alternatively, you can press and hold the click button 2 and tap the display.
- To erase ink, press and hold the eraser button 1, tap the display, and drag the pen across the ink you want to erase.

Charge the ThinkPad Pen Pro

1. Ensure that your computer is on or in sleep mode.
2. Insert the pen back into the pen slot. The pen is 80% charged in about 15 seconds and 100% charged in about five minutes.

Chapter 3. Explore your computer

Manage power

Use the information in this section to achieve the best balance between performance and power efficiency.

Check the battery status

The battery status icon or is in the Windows notification area. You can check the battery status, view the current power plan, and access battery settings quickly.

Click the battery status icon to display the percentage of battery power remaining and change the power mode. A warning message is displayed when the battery is low.

Charge the computer

Use ac power

When the battery power is low, charge your battery by connecting your computer to ac power.

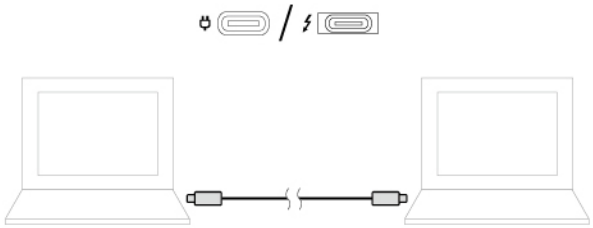
The battery is fully charged in about four to eight hours. If the power adapter shipped with your computer supports the rapid charge function, the battery is 80% charged in about one hour when the computer is turned off. The actual charging time depends on the battery size, the physical environment, and whether you are using the computer.

Battery charging is also affected by the battery temperature. The recommended battery temperature range for charging the battery is between 10°C (50°F) and 35°C (95°F).

Note: To maximize the life of the battery, the computer does not recharge the battery if the remaining power is greater than 95%.

Use P-to-P 2.0 charging function

Both the USB-C connector (USB 3.1 Gen 1) and the Thunderbolt 3 connector (USB-C) on the computer feature the Lenovo-unique P-to-P 2.0 charging function, which enables one computer (A) to supply power to another computer (B) through a USB-C to USB-C cable when no ac power is available.



To use the function, ensure that:

- The selected connectors support the P-to-P 2.0 charging function and power delivery function.
- The battery power remaining of computer A is at least 30% and is 3% higher than that of computer B. In this situation, computer A work as the power supply. Once the battery power remaining of computer A is lower than 30%, it stops supplying power to computer B. To check the battery status, see “Check the battery status” on page 29.

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Check the battery temperature

1. Open the Start menu and click **Lenovo Vantage**.
2. Click **Hardware Settings → Power**.
3. Locate the **Power Status** section and then click **Show Details** to view the battery temperature.

Maximize the battery life

- Lower the brightness of the computer display.
- Turn off the wireless features when not in use.
- Use the battery until the charge is depleted.
- Recharge the battery completely before using it.

Set power button behaviors

You can define what the power button does according to your preference. For example, by pressing the power button, you can turn off the computer or put the computer to sleep or hibernation mode.

To change what the power button does:

1. Right-click the battery status icon in the Windows notification area.
2. Click **Power Options → Choose what the power button does**.
3. Change the settings as you prefer.

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:

Table 1. Default power plan (when plugged into ac power)

• Turn off the display: After 10 minutes • Put the computer to sleep: After 30 minutes

To reset the power plan to achieve the best balance between performance and power saving:

1. Right-click the battery status icon and select **Power Options**.
2. Choose or customize a power plan of your preference.

Transfer data

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

Connect to a Bluetooth-enabled device

You can connect all types of Bluetooth-enabled device to your computer, such as a keyboard, a mouse, a smartphone, or speakers. The devices must be within a short distance, usually 10 meters (33 feet), from the computer.

1. Turn on Bluetooth on the computer.
   - Press F10 or Fn + F10.

- Open the Start menu, and then click **Settings → Devices → Bluetooth & other devices**. Turn on the **Bluetooth** switch.

2. Click **Add Bluetooth or other device → Bluetooth**.
3. Select a Bluetooth device, and then follow the on-screen instructions.

Your Bluetooth-enabled device and computer will automatically connect the next time if the two devices are in range of each other with Bluetooth turned on. You can use Bluetooth for data transfer or remote control and communication.

Set up a NFC connection (for selected models)

If your computer supports NFC, you will see an NFC mark or label around the trackpad area.

NFC is a high-frequency and short-range wireless communication technology. By using NFC, you can simply tap and connect your computer and another NFC-enabled device over a few centimeters or inches.

Turn on NFC

1. Open the Start menu and click **Settings → Network & Internet → Airplane mode**.
2. Turn off the Airplane mode.
3. Turn on the NFC function.

Pair with an NFC card or NFC-enabled smartphone

Before you start, ensure that:

- The card is in NFC Data Exchange Format (NDEF), otherwise the card cannot be detected.
- The smartphone screen is facing upward.

To pair with an NFC card or smartphone:

1. Tap the card or smartphone closely above the NFC mark or label on your computer.
2. Slowly move the card or smartphone around the NFC mark or label until you are prompted that the device has been successfully detected.

   Attention: During the data transfer, do not put your computer to sleep mode or lock the smartphone; otherwise, your data might get damaged.

Use a microSD card or a smart card

If your computer has a microSD card or a smart-card slot, read the following information.

Supported microSD card

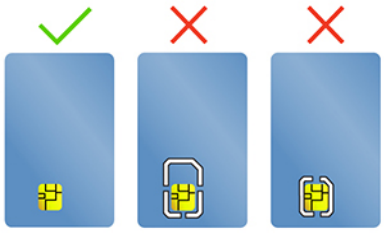
Note: Your computer does not support the content protection for recordable media (CPRM) feature for the microSD card.

- Secure Digital (SD) card
- Secure Digital eXtended-Capacity (SDXC) card
- Secure Digital High-Capacity (SDHC) card

Supported smart card

Supported smart card specifications: 85.60 mm (3.37 inches) x 53.98 mm (2.13 inches)

Attention: Smart cards with slits are not supported. Do not insert such a smart card into the smart-card reader of your computer. Otherwise the reader might get damaged.



Install the card

1. Locate the card slot. See “Left” on page 3.
2. Insert the card firmly into the card slot until it is secured in place.

   Notes:

   - For the microSD card, ensure that the metal contacts are facing down and pointing toward the card slot.
   - For the smart card, ensure that the metal contacts are facing upward and pointing toward the card slot.

Remove the card

Attention: Before removing a 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.

Airplane mode

When the Airplane mode is enabled, all wireless features are disabled.

To enable or disable the Airplane mode:

1. Open the Start menu.
2. Click **Settings** → **Network & Internet** → **Airplane mode**.
3. Turn on or turn off the **Airplane mode** switch.

Chapter 4. Accessories

This chapter provides instructions on how to use hardware accessories to expand your computer capabilities.

Purchase options

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, port replicators or docking stations, batteries, power adapters, keyboards, mice, and more.

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

Docking station

You can use the following docking stations to extend the capacity of your computer:

- ThinkPad Basic Docking Station
- ThinkPad Pro Docking Station
- ThinkPad Ultra Docking Station

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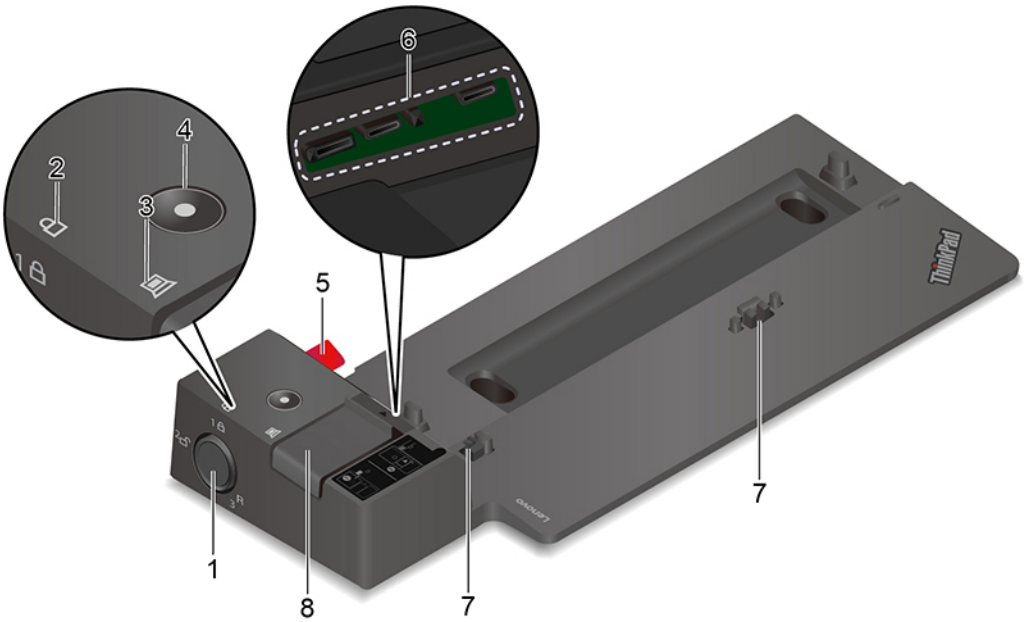
Front view

Note: The following illustration is based on ThinkPad Basic Docking Station. The ThinkPad Pro Docking Station and ThinkPad Ultra Docking Station might look slightly different.



1. System lock	Use the system lock in the following ways: • Locked position 1🔒: The latch is locked, and you cannot attach or detach your computer. • Unlocked position 2🔓: The latch is unlocked, and you can attach or detach your computer. • Removal position 3R: You can remove the system lock from the system-lock slot. **Note:** The ThinkPad Basic Docking Station does not ship with a system lock installed. You can contact Lenovo sales to purchase a system lock with the option part number 4XE0Q56388.
2. Key lock indicator	This indicator turns on when the system lock key is in the locked position.
3. Docking status indicator	This indicator turns on when your computer is successfully connected to the docking station.
4. Power button	Press the power button to turn on or turn off the computer attached to the docking station.
5. Guide post	Use the guide post to help you position your computer properly when you attach the computer to the docking station.
6. Docking-station connector	Connect the computer to the docking station.
7. Hooks	Hold and secure the computer to the docking station.
8. Latch	Slide the latch to attach or detach the computer.

Rear view

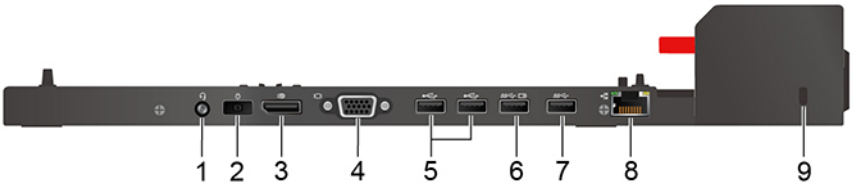


Figure 1. ThinkPad Basic Docking Station

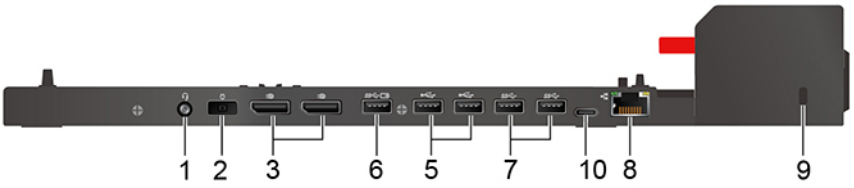


Figure 2. ThinkPad Pro Docking Station

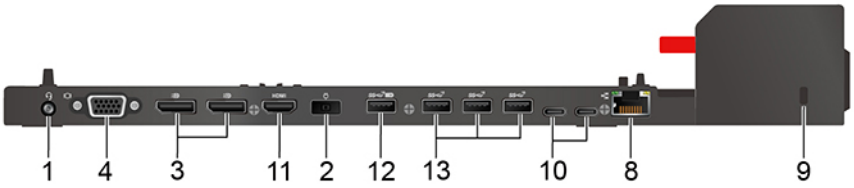


Figure 3. ThinkPad Ultra Docking Station

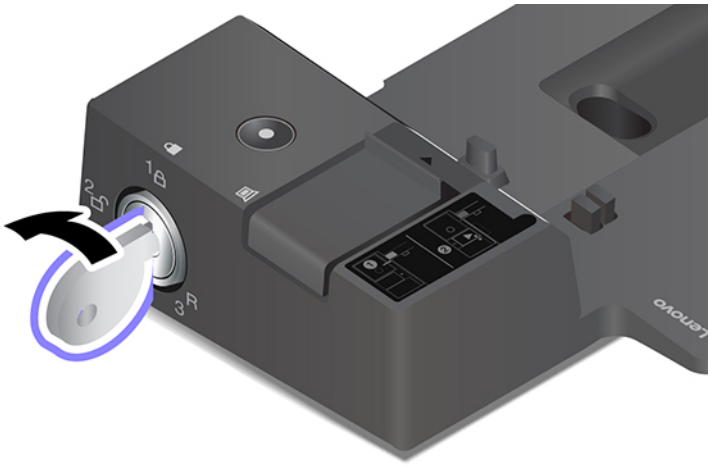
Connectors	ThinkPad Basic Docking Station	ThinkPad Pro Docking Station	ThinkPad Ultra Docking Station
1. Audio connector	√	√	√
2. ac power connector	√	√	√
3. DisplayPort® connector	√	√	√
4. VGA connector	√		√
5. USB 2.0 connector	√	√	
6. Always On USB 3.1 connector Gen 1	√	√	
7. USB 3.1 connector Gen 1	√	√	
8. Ethernet connector	√	√	√
9. Security-lock slot	√	√	√
10. USB-C connector		√	√
11. HDMI connector			√
12. Always On USB 3.1 connector Gen 2			√
13. USB 3.1 connector Gen 2			√

Attach a docking station

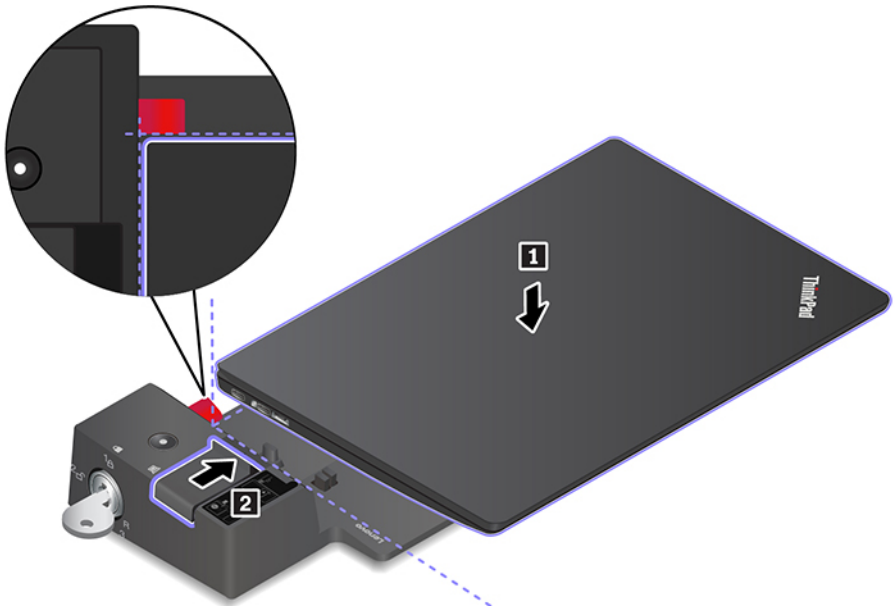
Notes:

- The ThinkPad Basic Docking Station does not ship with a system lock installed. If you do not purchase and install a system lock, skip step 4 and step 7 in the following instruction.
- If you do not connect the docking station to ac power, the computer attached runs on battery power.

1. Connect the docking station to ac power.
2. Disconnect the cables and devices from the left side of the computer.
3. Turn the system lock key to the unlocked position (2🔓).



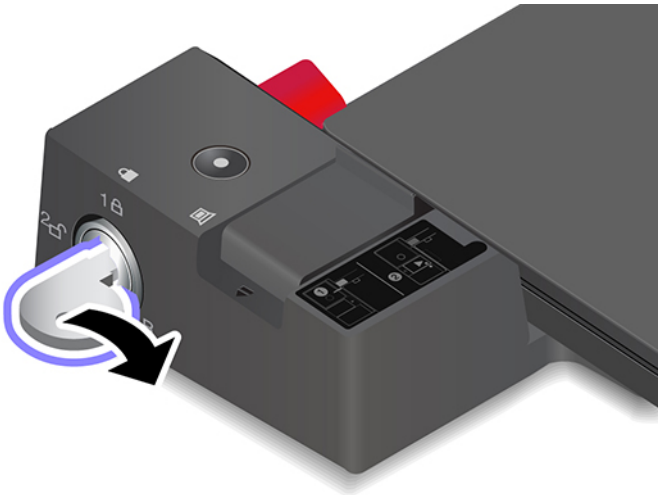
4. Align the top-left corner of the computer with the guide post of the docking station. Attach your computer to the docking station as shown **1** until you hear a click. Slide the latch in the direction as shown **2**.



5. Check the docking status indicator. The docking status indicator turns on when the computer is successfully docked.

Note: If the indicator is off, your computer is not attached to the docking station successfully. To solve the problem, detach and reattach the computer.

6. Turn the system lock key to the locked position (1🔒).

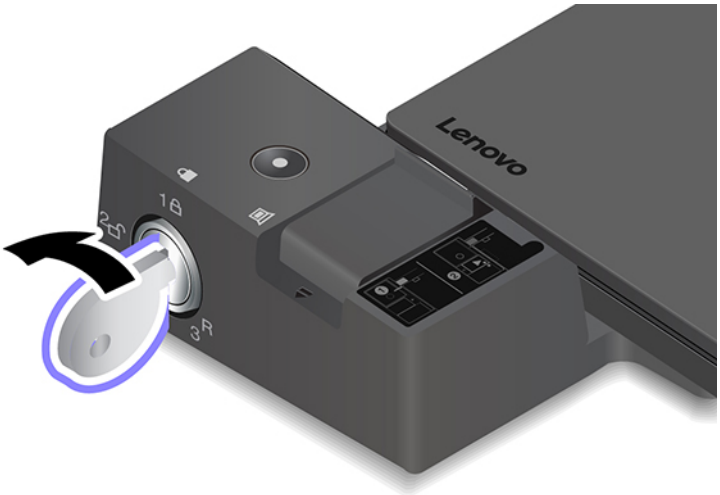


Attention: When the computer is attached to a docking station, always hold the whole assembly when you need to move your computer. Otherwise the docking station might drop down.

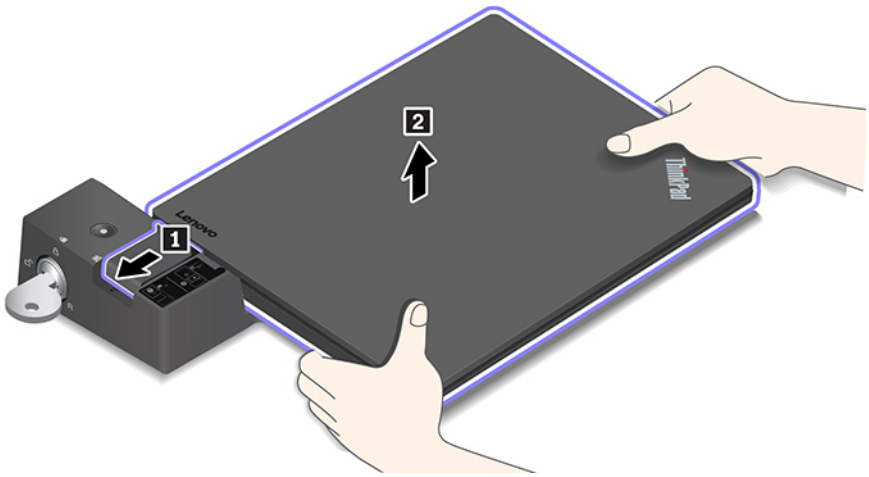
Detach a docking station

Note: The ThinkPad Basic Docking Station does not ship with a system lock installed. If you do not purchase and install a system lock, skip step 1 in the following instruction.

1. Turn the system lock key to the unlocked position (2🔓).



2. Slide the latch in the direction as shown 1 to release the computer, and then grasp both sides of the computer to remove it 2.



Connect multiple external displays

You can connect multiple external displays to a supported docking station. To ensure that the multiple displays work correctly, observe the following guidelines and connect the external displays to the appropriate connectors.

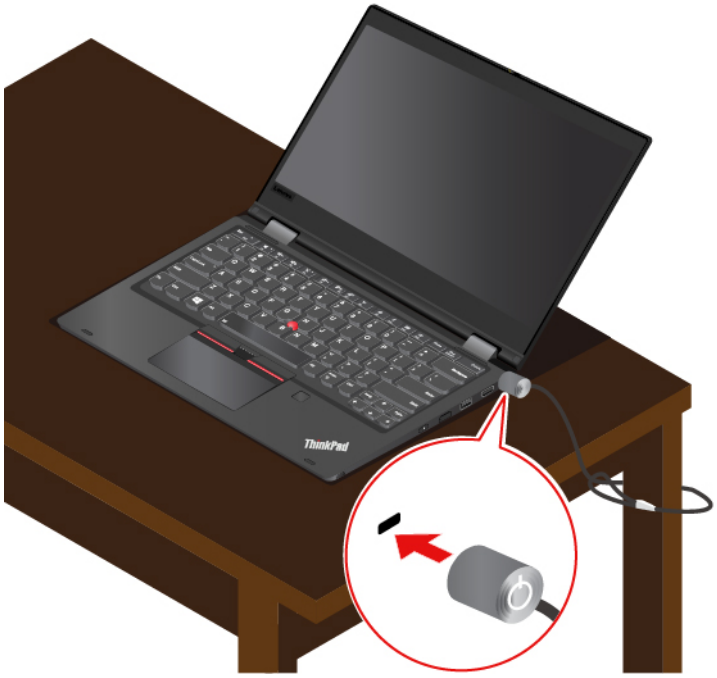
Docking station	Supported external displays	Video connectors
ThinkPad Basic Docking Station	Up to two	DisplayPort VGA
ThinkPad Pro Docking Station	Up to two	DisplayPort (x2)
ThinkPad Ultra Docking Station	Up to three	DisplayPort (x2) HDMI VGA

Chapter 5. Secure your computer and information

Lock the computer

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

Note: You are responsible for evaluating, selecting, and implementing the locking device and security feature. Lenovo makes no comments, judgments, or warranties about the function, quality, or performance of the locking device and security feature. Cable locks for your product are available from Lenovo at https://www.lenovoquickpick.com.



Use passwords

This section introduces types of passwords in UEFI (Unified Extensible Firmware Interface) BIOS (Basic Input/Output System) and how to set, change, and remove a password.

Password types

You can set a power-on password, supervisor 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

If you set a power-on password, the icon is displayed on the screen when you turn on the computer. Enter the correct password to use the computer.

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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.

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 .

Attention: Record your hard disk password and store it in a safe place. If you forget the hard disk password, Lenovo cannot reset your passwords or recover data from the storage drive. You must take your computer to a Lenovo reseller or a marketing representative to have the storage drive replaced. Proof of purchase is required, and a fee will be charged for parts and service.

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 might want to record your password and store it in a safe place. Otherwise, if you forget the password, you have to take your computer to a Lenovo reseller or a marketing representative to have the password

canceled. However, if you forget the hard disk password, Lenovo cannot reset your passwords or recover data from the storage drive.

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, do the following:

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** by using the arrow keys.
3. Locate the **Device Type** section to check the information.

Use the fingerprint reader

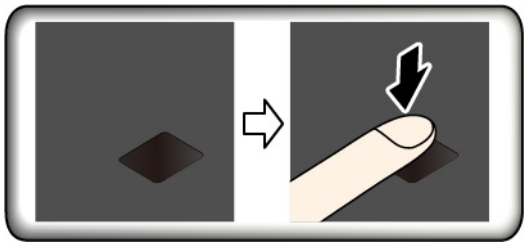
If your computer comes with a fingerprint reader, you can use it to enroll your fingerprints. After enrollment, you can tap your finger on the fingerprint reader to log in to Windows.

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



If the fingerprint reader indicator blinks in amber, the authentication is not successful.

Associate your fingerprints with your power-on password and hard disk password

1. Turn off and then turn on the computer.
2. When prompted, scan your finger on the fingerprint reader.
3. Enter your power-on password, hard disk password, or both as required. The connection is created.

When you start the computer again, you can use your fingerprints to log in to the computer without entering your Windows password, power-on password, or hard disk password. To change the settings, go to the UEFI BIOS menu.

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.

- If you forget your power-on password, take your computer to a Lenovo-authorized servicer or a marketing representative to have the password canceled.
- If you forget your hard disk password, Lenovo cannot reset your password or recover data from the storage drive. Take your computer to a Lenovo-authorized servicer or a marketing representative to have the storage drive replaced. Proof of purchase is required, and a fee will be charged for parts and service.

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.

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.

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.

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.

Chapter 6. Configure advanced settings

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

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: The **Boot** menu is displayed if the computer cannot start from any devices or the operating system cannot be found.
3. Set the startup sequence as desired.

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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:

- From Lenovo Vantage:
  1. Open the Start menu and click **Lenovo Vantage**.
  2. Click **System Update**. In the **Lenovo System Update** section, click **Check For Updates**. The available update packages are displayed and categorized by critical, recommended, or optional.
  3. If the latest UEFI BIOS update package is available, select the package and click **Install selected**. Then, the update package will be downloaded and installed automatically.
- From the Lenovo Support Web site:

  Go to https://support.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.

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 from the following list, and then follow the on-screen instructions.
   - Restore the Windows operating system from a restore point recorded on your computer
   - Restore the Windows operating system from a specific system image
   - Fix problems that prevent the Windows operating system from loading
   - Use the Command Prompt for advanced troubleshooting
   - Change the UEFI firmware settings on your computer
   - Change the startup settings of the Windows operating system
   - Go back to the previous build

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/supportphonelist

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.

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.

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 support the 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 support Intel Optane memory, continue to enable the Intel Optane memory by doing the following:

1. Go to https://support.lenovo.com. Download and install the Intel Rapid Storage Technology (iRST) Console with Device Driver on your computer.
2. Run the iRST Console with Device Driver.
3. Click **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:

- From Lenovo Vantage:
  1. Open the Start menu and click **Lenovo Vantage**.
  2. Click **System Update**. In the **Lenovo System Update** section, click **Check For Updates**. The available update packages are displayed and categorized by critical, recommended, or optionael.
  3. Select the update packages you want and click **Install selected**. Then, the update packages will be downloaded and installed automatically.
- From the Lenovo Support Web site:

  Go to https://support.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

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.

Refer to the following CRU list for your computer.

Self-service CRUs

- ac power adapter
- Power cord
- Nano-SIM card tray*
- ThinkPad Pen Pro
- TrackPoint pointing-stick nonslip cap

Optional-service CRUs

- Base cover assembly
- M.2 solid-state drive
- M.2 solid-state drive bracket*
- Wireless WAN card*
- Wireless LAN card

  Note: The wireless LAN card in your computer is preinstalled by Lenovo, and you are prohibited from replacing it with another wireless module or removing it. If the device requires replacement due to some problem during warranty, it must be serviced by a Lenovo authorized service personnel.

* for selected models

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:

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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.

Replace a CRU

Follow the replacement procedure to replace a CRU.

Base cover assembly

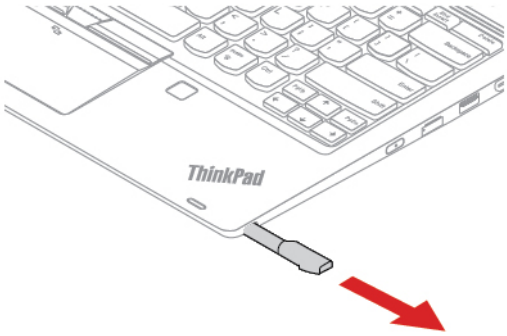
Prerequisite

Before you start, read Appendix A “Important safety information” on page 65 and print the following instructions.

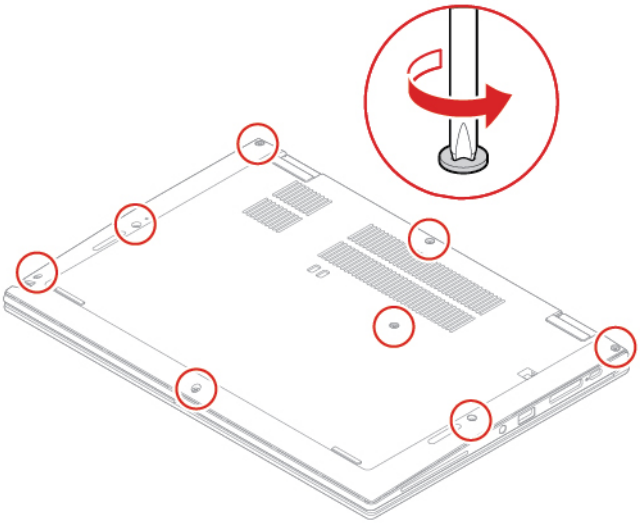
Note: Do not remove the base cover assembly when your computer is connected to ac power. Otherwise, there might be a risk of short circuits.

Replacement procedure

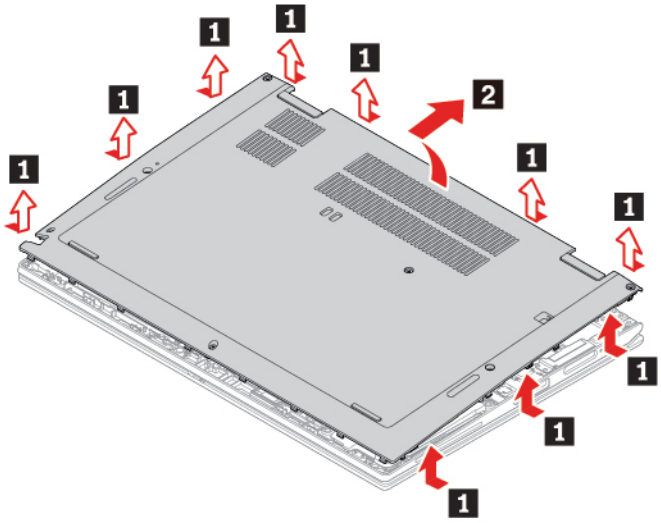
1. Disable the built-in battery. See “Disable Fast Startup and the built-in battery” on page 49.
2. Turn off the computer and disconnect the computer from ac power and all connected cables.
3. Remove the pen from the pen slot.



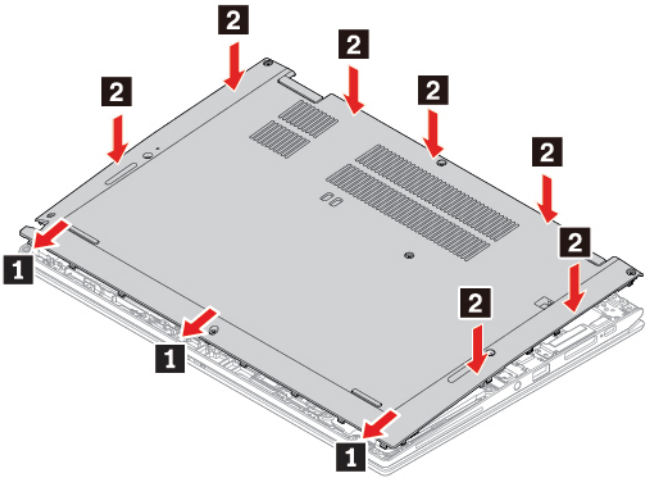
4. Loosen the screws that secure the base cover assembly.



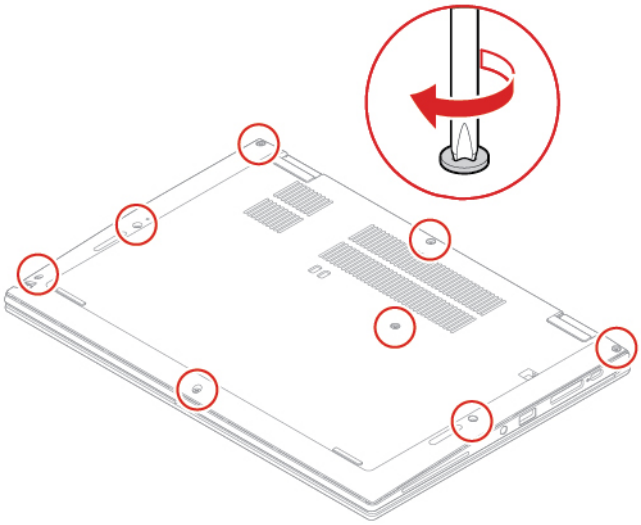
5. Pry up the latches and remove the base cover assembly.



6. Install the new base cover assembly in place. Ensure that the latches of the base cover assembly are secured under the base cover assembly.



7. Tighten the screws to secure the base cover assembly.



8. Turn the computer over. Connect the ac power adapter and all disconnected cables to the computer.
9. Install the pen back into the pen slot.

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.

WWAN card (for selected models)

The following information is only for the computer with user-installable modules.

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 65 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.

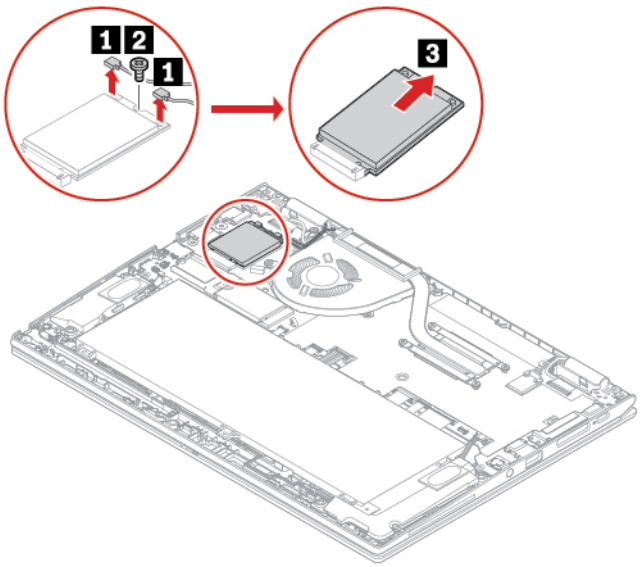
Replacement procedure

1. Disable the built-in battery. See “Disable Fast Startup and the built-in battery” on page 49.
2. Turn off the computer and disconnect the computer from ac power and all connected cables.
3. Close the computer display and turn the computer over.
4. Remove the base cover assembly. See “Base cover assembly” on page 50.
5. Remove the wireless-WAN card by doing the following:

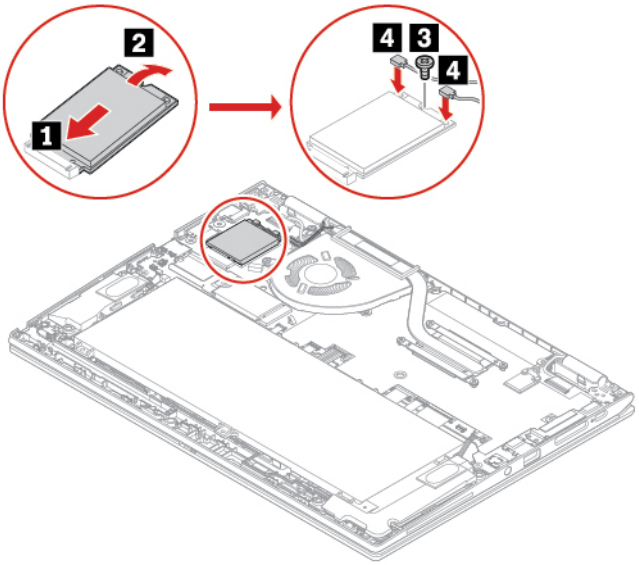
   Note: A Mylar film might cover the wireless-WAN card. To access the wireless-WAN card, open the film first.

   a. Hold the cable connector with your fingers and gently disconnect each cable from the wireless-WAN card 1. Then, remove the screw that secures the wireless-WAN card 2. The card is released from the secured position and pivots upward.

   b. Carefully remove the wireless-WAN card out of the slot 3.



6. Install a new wireless-WAN card by doing the following:
   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. Pivot the card downward 2.
   b. Install the screw to secure the wireless-WAN card in place 3. Connect the antenna cables 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 the computer over. 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 65 and print the following instructions.

Attention: 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.

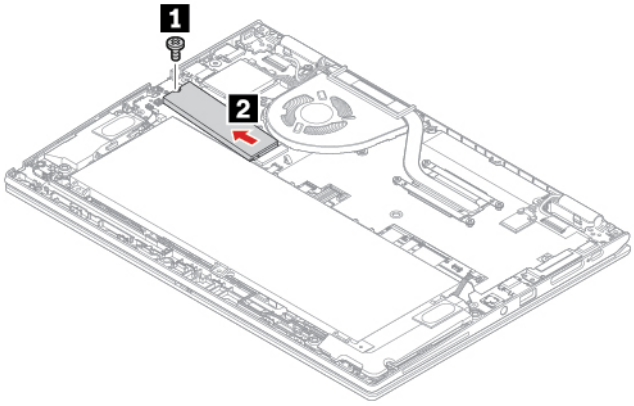
Replacement procedure for the long M.2 solid-state drive

1. If you are going to replace a hybrid solid-state drive (with Intel Optane memory), disable Intel Optane memory by doing the following:

a. Run the iRST Console with Device Driver.

b. Click **Intel Optane Memory** and then follow the instructions on the screen to disable it.

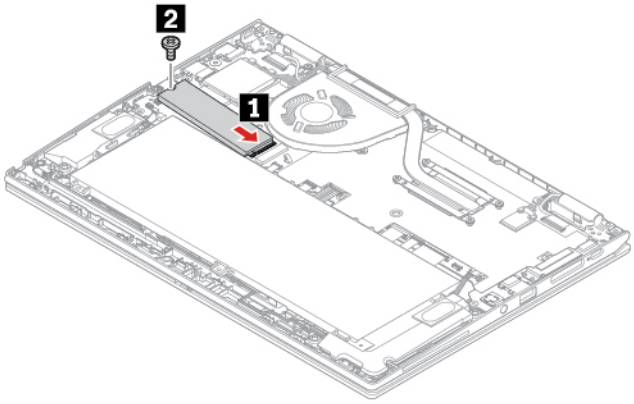
2. Disable the built-in battery. See “Disable Fast Startup and the built-in battery” on page 49.
3. Turn off the computer and disconnect the computer from ac power and all connected cables.
4. Close the computer display and turn the computer over.
5. Remove the base cover assembly. See “Base cover assembly” on page 50.
6. 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. Then, remove the M.2 solid-state drive out of the slot 2.



7. Install a new M.2 solid-state drive by doing the following:

   a. Align the contact edge of the new 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 1.

   b. Pivot the M.2 solid-state drive downward and install the screw to secure the M.2 solid-state drive 2.



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

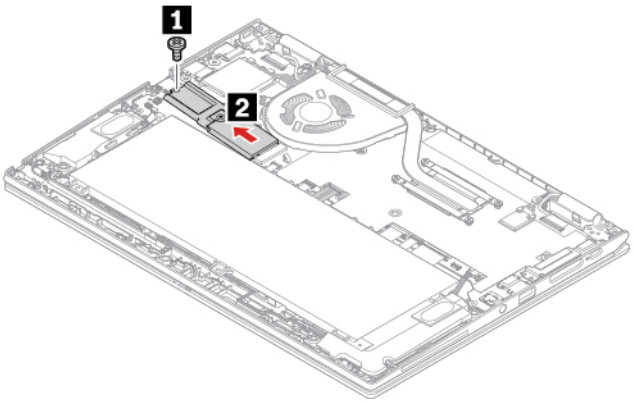
Notes: If you install a new hybrid solid-state drive (with Intel Optane memory), enable Intel Optane memory by doing the following:

1. Restart your computer. When the logo screen is displayed, immediately press F1 to enter the UEFI BIOS menu.
2. Select **Config → Storage → Controller mode**. Ensure that **RST mode** is selected.
3. Go to https://support.lenovo.com. Download and install the Intel Rapid Storage Technology (iRST) Console with Device Driver on your computer.

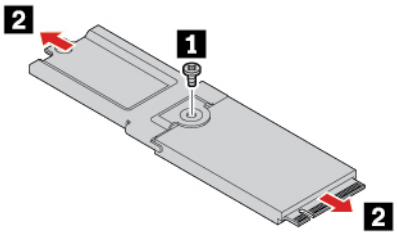
4. Run the iRST Console with Device Driver.
5. Click **Intel Optane Memory** and then follow the instructions on the screen to enable it.

Replacement procedure for the short M.2 solid-state drive

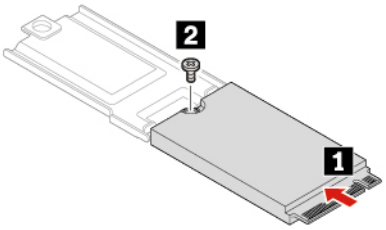
1. Disable the built-in battery. See “Disable Fast Startup and the built-in battery” on page 49.
2. Turn off the computer and disconnect the computer from ac power and all connected cables.
3. Close the computer display and turn the computer over.
4. Remove the base cover assembly. See “Base cover assembly” on page 50.
5. Remove the screw 1, and then remove the M.2 solid-state drive with the bracket 2.



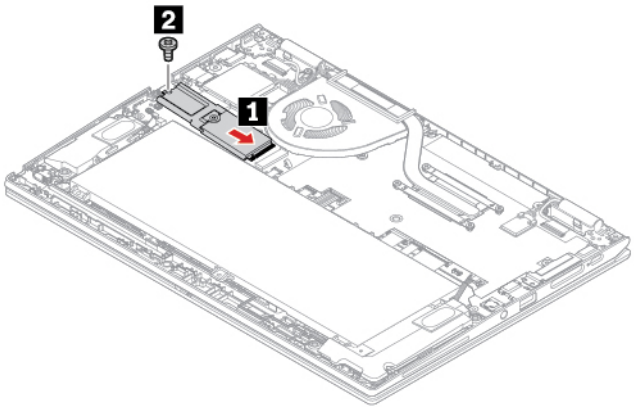
6. Turn over the M.2 solid-state drive. Remove the screw 1, and then separate the M.2 solid-state drive from the bracket 2.



7. Install the new M.2 solid-state drive to the bracket 1 and tighten the screw 2.



8. Align the contact edge of the new M.2 solid-state drive with the key in the slot. Then, carefully insert the drive with the bracket into the slot 1. Tighten the screw 2.



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

Chapter 8. Help and support

Frequently asked questions

How do I access Control Panel?	• Open the Start menu and click **Windows System** → **Control Panel**. • Use Windows Search.
How do I turn off my computer?	Open the Start menu and click ⏻ **Power**. Then, click **Shut down**.
How do I partition my storage drive?	https://support.lenovo.com/solutions/ht503851
What do I do if my computer stops responding.	1. Press and hold the power button until the computer turns off. Then, restart the computer. 2. If step 1 does not work: • 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. • For models without an emergency reset hole: – For models with the removable battery, remove the removable battery and disconnect all power sources. Then, reconnect to ac power and restart the computer. – 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.
What do I do if I spill liquid on the computer?	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. **Attention:** Although you might lose some data or work by turning off the computer immediately, leaving the computer on might make your computer unusable. 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. 3. Wait until you are certain that all the liquid is dry before turning on your computer.
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?	1. Go to Control Panel and view by Large icons or Small icons. 2. Click **Mouse**. The Mouse Properties window is displayed. 3. Follow the on-screen instructions to complete the setting.
Where can I get the latest device drivers and UEFI BIOS?	• From Lenovo Vantage. See “Install Windows 10 and drivers” on page 46 and “Update UEFI BIOS” on page 44. • Download from Lenovo Support Web site at https://support.lenovo.com.

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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 63.

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.
1802: Unauthorized network card is plugged in - Power off and remove the network card.	The wireless network card is not supported on this computer. Replace with a supported wireless network card.
2110: Detection/Read error on SSD	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.	**Note:** 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. 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. 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.

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.

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: • Download and install the latest drivers and firmware. • Configure hardware settings. • Diagnose computer hardware problems. • Check the computer warranty status. • Protect you computer from malicious Wi-Fi networks.	• Open the Start menu and click **Lenovo Vantage**. • Use Windows Search.
Product documentation: • *Safety and Warranty Guide* • *Setup Guide* • This *User Guide* • *Regulatory Notice*	1. Go to https://support.lenovo.com. 2. Detect your computer or select computer model manually. 3. Select **Documentation** and filter out the documentation you want.
Lenovo Support Web site with the latest support information of the following: • Drivers and software • Diagnostic solutions • Product and service warranty • Product and parts details • Knowledge base and frequently asked questions	https://support.lenovo.com
Windows help information	• 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

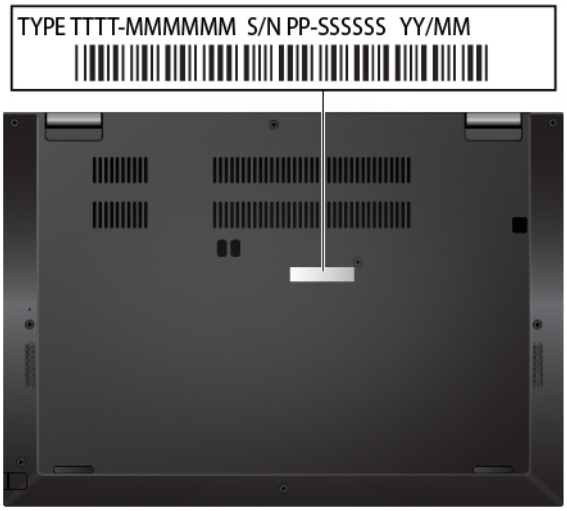
If you have tried to correct the problem yourself and still need help, you can call Lenovo Customer Support Center.

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/supportphonelist for the latest phone numbers.
- Refer to the *Safety and Warranty Guide* that comes with your computer.

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.

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.

Appendix A. Important safety information

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.

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 hands from using the keyboard by lifting your hands from the palm rest.

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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.

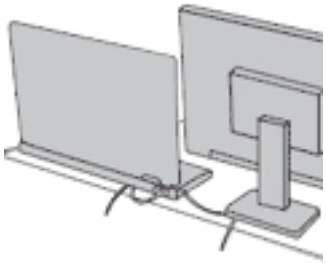
Extended contact with your body, even through clothing, may cause a skin burn.

- 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.

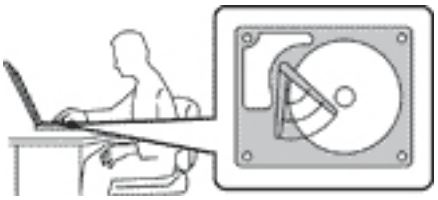
Protect the cables from being damaged.



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. Or you might 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 or 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^2, 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

DANGER

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

DANGER

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 overheat, liquid leakage, or an explosion. To avoid possible injury, do the following:

- **Do not open, dissemble, 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.

Notice for built-in rechargeable battery

DANGER

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.

Lithium coin-cell battery notice

DANGER

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 chocking 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/.

Heat and product ventilation

DANGER

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).**

Electrical current safety information

DANGER

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.**

DANGER

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.

DANGER

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.

Use headphones or earphones

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.

Plastic bag notice

DANGER

Plastic bags can be dangerous. Keep plastic bags away from babies and children to avoid danger of suffocation.

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: 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: 5% to 95% at wet-bulb temperature 27°C (81°F)

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.

Appendix B. 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

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