

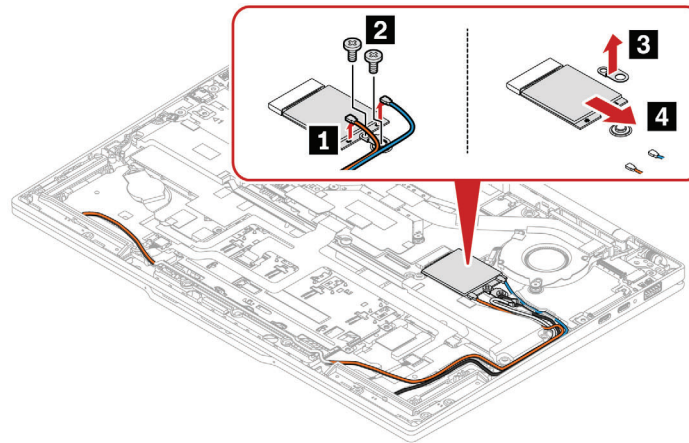
3. Close the computer display and turn over the computer.
4. Remove the base cover assembly. See “Base cover assembly” on page 56.

Step 1. Remove the Wireless WAN module as shown below

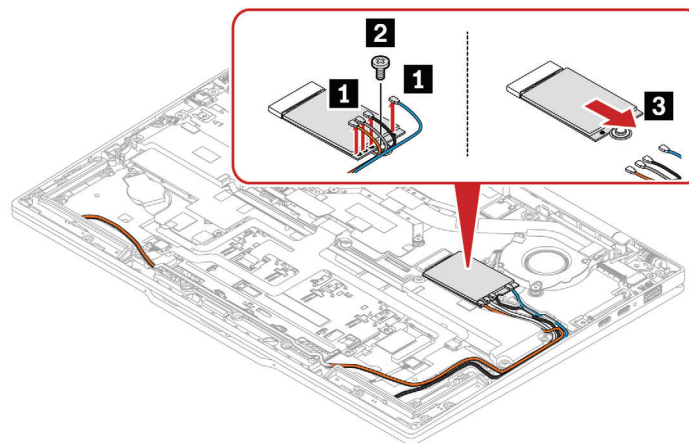
**Note:** A Mylar film might cover the wireless WAN module. To access the wireless WAN module, peel off the film first.

#### Type one – Models with 4G wireless WAN module

**Note:** Depending on the model, the 4G wireless WAN module might be either 4 connectors or 2 connectors.

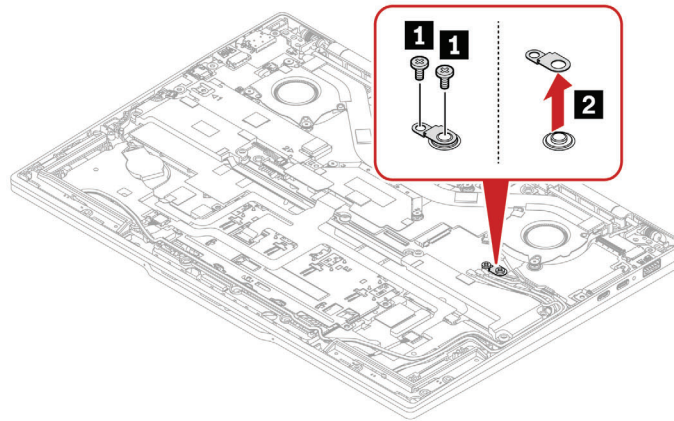


#### Type two – Models with 5G wireless WAN module



#### Type three – Models with wireless WAN module bracket only

**Note:** Wireless WAN module bracket is needed for 4G models only.

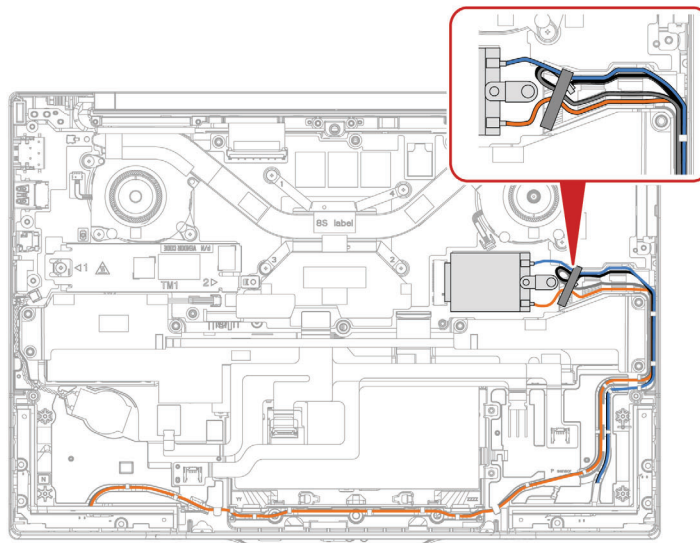


Step 2. Install the Wireless WAN module in reverse order.

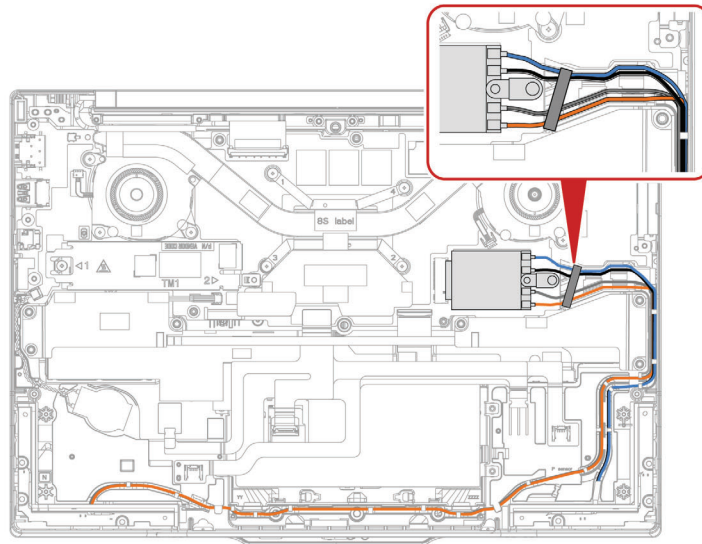
#### **Antenna cable routing**

The cable routing is different for 4G wireless WAN module and 5G wireless WAN module. Ensure that the antenna cables are installed appropriately when installing a wireless WWAN module.

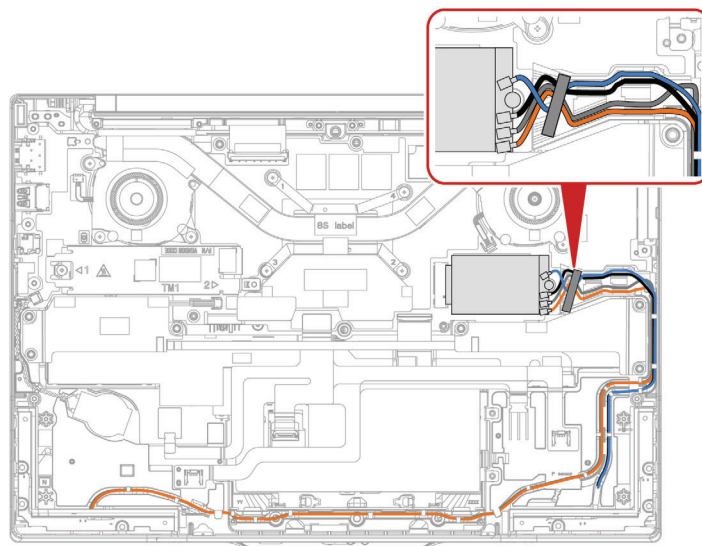
#### **Type one – 4G wireless WAN module with 2 connectors**



#### **Type two – 4G wireless WAN module with 4 connectors**

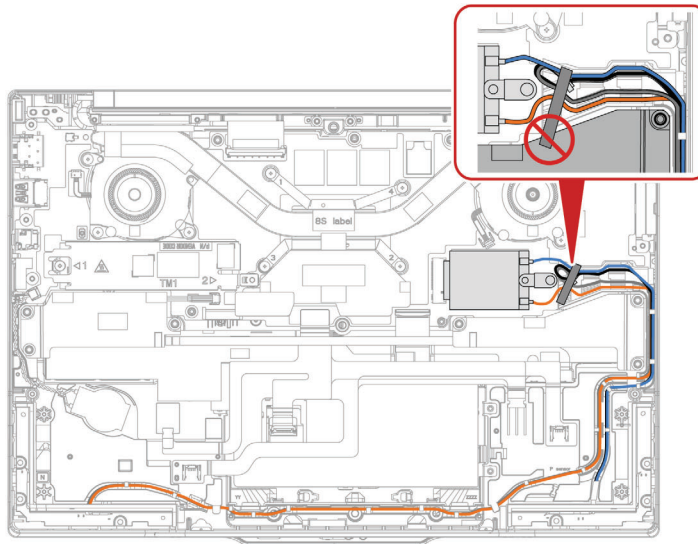


### Type three – 5G wireless WAN module

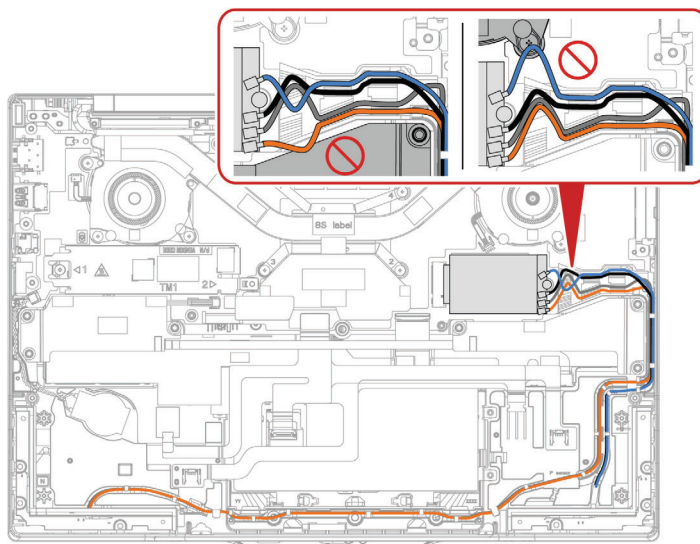


### Notes:

- Keep the tape attached away from the speaker.



- Ensure that the orange cable does not touch the speaker.
- Ensure that the blue cable does not touch the thermal fan.



- Do not remove the plastic cover from new antenna connectors until you install the new antennas.



## M.2 solid-state drive

Follow the instructions to replace the M.2 solid-state drive.

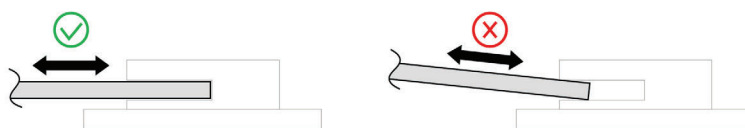
Before you start, read [Generic Safety and Compliance Notices](#) and print the following instructions.

### Attention:

- If you replace a M.2 solid-state drive, you might need to install a new operating system. For details on how to install a new operating system, see “Install a Windows operating system and drivers” on page 53.

The M.2 solid-state drive is sensitive. Inappropriate handling might cause damage and permanent loss of data.

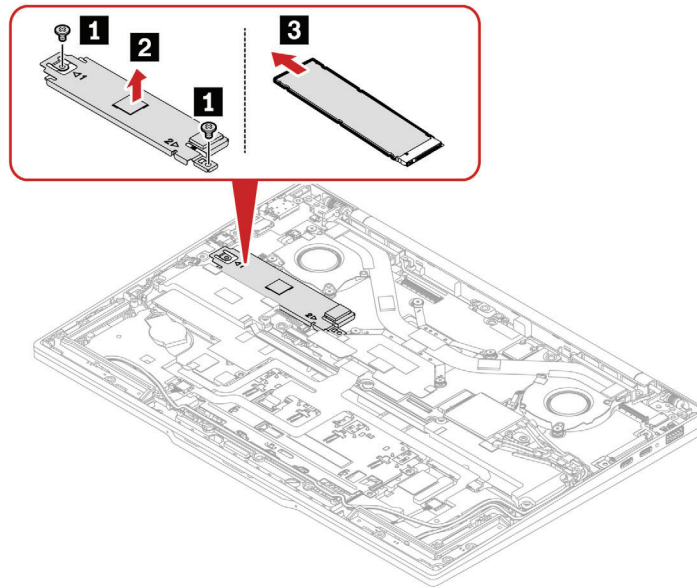
When handling the M.2 solid-state drive, remove or insert the M.2 solid-state drive horizontally. Otherwise the slot might get damaged.



When handling the M.2 solid-state drive, observe the following guidelines:

- Replace the M.2 solid-state drive only for 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 subject the M.2 solid-state drive to physical shocks or vibration. Put the M.2 solid-state drive on a soft material, such as cloth, to absorb physical shocks.
1. Disable the built-in battery. See “Disable the built-in battery” on page 56.
  2. Turn off the computer and disconnect the computer from ac power and all connected cables.
  3. Close the computer display and turn over the computer.
  4. Remove the base cover assembly. See “Base cover assembly” on page 56.

Step 1. Remove the M.2 solid-state drive as shown below.



Step 2. Install the M.2 solid-state drive in reverse order.



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## Chapter 7. Help and support

This chapter provides solutions to some hardware and software issues.

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### Find your service QR code and serial number

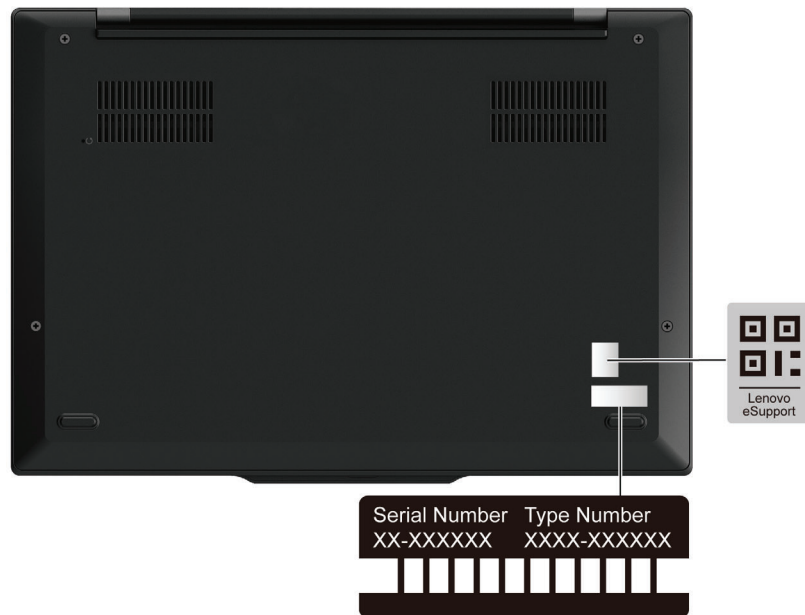
This topic helps you find service QR code and serial number.

Scan the QR code on the base cover assembly to view the following information:

- Your product information and warranty status
- The latest Lenovo-verified drivers and software
- Troubleshooting and diagnosing solutions when hardware or software issue is encountered
- Customer support center and e-ticket entry for professional support

You can find your serial number via:


- **Dashboard** or **Device** in the **Vantage** app
- Serial-number label of your computer (shown as below illustration)



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### Frequently asked questions

Browse through these FAQs to find answers to commonly raised questions.

Question	Solution
How do I check my repair status?	<ol style="list-style-type: none"> <li>1. Go to Lenovo Support Web site at <a href="https://pcsupport.lenovo.com">https://pcsupport.lenovo.com</a>.</li> <li>2. Search by the product name, and navigate to the <b>Repair Status</b> section.</li> <li>3. Enter the serial number to check the repair status.</li> </ol>
How do I check my warranty status?	<ul style="list-style-type: none"> <li>• Go to Lenovo Support Web site at <a href="https://pcsupport.lenovo.com/warrantylookup#/">https://pcsupport.lenovo.com/warrantylookup#/</a>.</li> <li>• From the Vantage app.</li> </ul>
How do I access <b>Control Panel</b> ?	Type <b>Control Panel</b> in the Windows search box and then press Enter.
How do I turn off my computer?	Open the <b>Start</b> menu and click  <b>Power</b> . Then, click <b>Shut down</b> .
How do I partition my storage drive?	<a href="https://support.lenovo.com/solutions/ht503851">https://support.lenovo.com/solutions/ht503851</a>
What do I do if my computer stops responding?	<ol style="list-style-type: none"> <li>1. Press and hold the power button until the computer turns off. Then, restart the computer.</li> <li>2. If step 1 does not work: <ul style="list-style-type: none"> <li>• For models with an emergency reset hole: Insert a straightened paper clip into the emergency reset hole to cut off power supply temporarily. Then, restart the computer with ac power connected.</li> <li>• For models without an emergency reset hole: <ul style="list-style-type: none"> <li>– For models with the removable battery, remove the removable battery and disconnect all power sources. Then, reconnect to ac power and restart the computer.</li> <li>– For models with the built-in battery, disconnect all power sources. Press and hold the power button for about seven seconds. Then, reconnect to ac power and restart the computer.</li> </ul> </li> </ul> </li> </ol>
What do I do if I spill liquid on the computer?	<ol style="list-style-type: none"> <li>1. Carefully unplug the ac power adapter and turn off the computer immediately. The more quickly you stop the current from passing through the computer the more likely you will reduce damage from short circuits.   <b>Attention:</b> Although you might lose some data or work by turning off the computer immediately, leaving the computer on might make your computer unusable.</li> <li>2. Wait until you are certain that all the liquid is dry before turning on your computer.   <b>CAUTION:</b>  <b>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.</b> </li> </ol>
How do I enter the UEFI BIOS menu?	Restart the computer. When the logo screen is displayed, press F1 to enter the UEFI BIOS menu.

Question	Solution
Where can I get the latest device drivers and the UEFI BIOS?	<ul style="list-style-type: none"> <li>• From the Vantage app: Open the Vantage app, and then click <b>Device → System Update</b>.</li> <li>• From the Lenovo support Web site: <ol style="list-style-type: none"> <li>1. Go to <a href="https://pcsupport.lenovo.com">https://pcsupport.lenovo.com</a> and select the entry for your computer.</li> <li>2. Click <b>Driver &amp; Software → Manual Update</b>.</li> </ol> </li> <li>• From the Windows Update: <ol style="list-style-type: none"> <li>1. Type <b>Settings</b> in the Windows search box and press Enter.</li> <li>2. Click <b>Windows Update → Check for updates</b>.</li> </ol> </li> </ul> <p>If update package is available, follow the on-screen instructions to download and install the package.</p>
What do I do if the LCD goes black when I turn on the computer?	<ol style="list-style-type: none"> <li>1. Run the LCD Self-Test. <ol style="list-style-type: none"> <li>a. Ensure that the computer is connected to the ac power adapter.</li> <li>b. Press the power button for about seven seconds to turn off the computer.</li> <li>c. Press Fn, left Ctrl, and the power button at the same time.</li> <li>d. Check if the computer displays five solid colors in sequence across the entire screen: <ul style="list-style-type: none"> <li>• If yes, the LCD functions normally.</li> <li>• If no, the LCD malfunctions.</li> </ul> </li> <li>e. The test lasts for about 20 seconds and then exits automatically. You also can press the power button to exit the test.</li> </ol> </li> <li>2. Contact Lenovo for support and provide the test result. See “Call Lenovo” on page 74.</li> </ol>

## Error messages

An error message is displayed for each error detected in POST or system operation. Refer to the error messages in the table below to solve your computer problems.

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 75.







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

## Battery-charge LED indicator diagnosis

The battery-charge LED indicator (hereafter referred to as LED indicator) blinks to help you diagnose and solve some computer problems.



























## Indicator blinking patterns






The LED indicator blinks amber first and then white continually, consisting of different blinking patterns. Each blinking pattern corresponds to an error code. For example, when the LED indicator blinks amber once  and then blinks white twice  , the blinking pattern    corresponds to error code 0001.

### Notes:

- The LED indicator blinks automatically only when the error in the following table occurs.
- The LED indicator blinks continually until the computer turns off. If you need to interrupt the process, press power button for a few seconds.
- We recommend that you speak to our Customer Support Center before attempting to service the computer yourself so that you can be directed to the correct documentation and repair information. It might be recommended to have a Lenovo-authorized service provider repair your computer depending on the complexity of the error or fault.

Refer to the blinking patterns and error codes in the table below to solve your computer problems.

Blinking patterns	Error codes	Solutions
  	0001: Reset error (platform reset not de-asserted)	<ol style="list-style-type: none"><li>1. Remove the ac power adapter and the removable battery if your computer has one. Then, reset the computer by doing one of the following:<ul style="list-style-type: none"><li>• For models with the emergency-reset hole, insert a straightened paper clip into the emergency reset hole to cut off power supply temporarily. Then, restart the computer with ac power connected.</li><li>• For models without the emergency-reset hole, press and hold the power button for about seven seconds. Then, reconnect to all power resources and restart the computer.</li></ul></li><li>2. If step 1 does not work, replace the system board (service provider only).</li></ol>
   	0002: Internal bus error	Replace the system board (service provider only).
    	0003: Non-Volatile Memory programming error in system power circuit	Replace the system board (service provider only).
  	0282: Memory module error	<ol style="list-style-type: none"><li>1. Reinstall or replace the memory module.</li><li>2. If step 1 does not work, replace the system board (service provider only).</li></ol>
   	0283: PCI resource error	<ol style="list-style-type: none"><li>1. Remove PCIe devices (the M.2 card, PCIe card, and so on) (service provider only).</li><li>2. If step 1 does not work, replace the system board (service provider only).</li></ol>
    	0284: TCG-compliant functionality-related error (might be the BIOS code validation failure)	Replace the system board (service provider only).

Blinking patterns	Error codes	Solutions
	0285: TCG-compliant functionality-related error (might be the TPM initialization failure)	Replace the system board (service provider only).
	0286: Integrated graphics error	Replace the system board (service provider only).
	0287: Discrete graphics error	<ol style="list-style-type: none"> <li>1. Reinstall or replace the discrete graphics card (service provider only).</li> <li>2. If step 1 does not work, replace the system board (service provider only).</li> </ol>
	0288: Computer display error	<ol style="list-style-type: none"> <li>1. Reconnect the display cable on both the system board side and the computer display side (service provider only) and check the LCD panel.</li> <li>2. If step 1 does not work, connect an external display to your computer and check the status (customer or service provider). <ul style="list-style-type: none"> <li>• If the external display works, replace the LCD panel (service provider only).</li> <li>• If the external display does not work, replace the system board (service provider only).</li> </ul> </li> </ol>
	0281: General embedded controller error	Replace the system board (service provider only).

## Lenovo Memory Self Repair (for Intel models only)

Lenovo Memory Self Repair (hereafter referred to as repair tool) enables you to repair memory single-bit or single-row failure with internal redundant resources.

It is recommended that you use the repair tool in the following situations:

- The operating system is unstable, such as having blue screen error or system crash.
- Any application operates abnormally, such as crashing or quitting unexpectedly.
- Any test result indicates memory-related errors.

**Note:** The repair tool can be used only when your computer can be turned on normally.

Step 1. Restart the computer.

Step 2. When the logo screen is displayed, trigger the repair tool by one of the following methods:

- Press F4.
- Press Enter to enter **Startup Interrupt Menu**, and then press F4.
- Press F12 to enter **App Menu**, and then select **Lenovo Memory Self Repair**.

Step 3. Read through the important information in the displayed window and click **Yes** to run the tool.

Step 4. Check the repair result on the pop-up dialog box. There are three types of results.

- **Memory Repaired:** it means that the memory failure is detected and repaired.
- **Memory failure detected but repair was unsuccessful:** it means that the memory failure is detected but cannot be repaired.

- **No failure detected:** it means that no memory failure is detected.

If the issue persists, you can try again or contact Lenovo for additional support.

Step 5. Click **Continue** to turn on the computer.

### Related topics

“Call Lenovo” on page 74

## Diagnose and troubleshoot your computer

This section provides introduction to a set of diagnostics and troubleshooting tools at Lenovo Support Web site, the Vantage app, and in your computer. They can help you diagnose common software and hardware issues.

The following table lists these diagnostics tools and the recommended conditions for each tool.

Diagnostics tool	Recommended scenario
Troubleshoot and diagnose at Lenovo Support Web site	You want to have an online troubleshooting or scan of hardware and drivers on your computer.
Hardware scan	<ul style="list-style-type: none"> <li>• Your computer is installed with the Vantage app.</li> <li>• You want to perform basic examinations of the hardware components.</li> </ul>
UEFI Diagnostics tool	<ul style="list-style-type: none"> <li>• You cannot log in to the operating system.</li> <li>• Your computer cannot connect to the network.</li> </ul>

## Troubleshoot and diagnose at Lenovo Support Web site

Lenovo provides two different diagnosing options to help you identify and resolve problems on your computer.

Step 1. Go to <https://www.pcsupport.lenovo.com/> and enter your product name in the search box.

Step 2. Click **Troubleshoot & Diagnose** and select from the following two options depending on your needs.

If you are unsure of the problem with your computer, it is recommended that you select **Easy** and follow on-screen instructions to get your firmware updated and obtain the hardware status.

If you have identified the problem on your computer, you can select **Custom** and follow on-screen instructions to resolve the problem.

### Notes:

- Before launching any automatic diagnosing process, a pop-up window will prompt you to install Lenovo Service Bridge. Lenovo Service Bridge helps to connect your computer with Lenovo diagnosing tools.
- Lenovo Support Web site makes periodic updates of the sections to keep improving your experience with your computer. The Web site interface and descriptions of sections might be different from that on your actual interface.

If solutions cannot resolve problems on your computer, you can follow on-screen instructions to submit an e-ticket or contact Lenovo for professional assistance.

## Hardware scan

Hardware scan is an effective hardware testing tool to help you identify existing hardware issues.

To run the Hardware scan:

- Step 1. Type **Vantage** in the Windows search box and then press Enter.
- Step 2. Click **Hardware scan** or **Support → Hardware scan**.
- Step 3. Select **QUICK SCAN** or **CUSTOMIZE** and then follow the on-screen instructions to run the hardware scan.

### Notes:

- The Quick Scan tool contains a pre-selected suite of tests that performs basic examinations of the hardware components found in the system. The Customize tool enables you to select one or several hardware components to perform the examinations.
- Before selecting **QUICK SCAN**, click **Refresh Modules** to ensure that the list of hardware components is the components currently available for the computer.

- Step 4. If any hardware failure is detected, the result varies depending on the warranty status and varies by country or region. Follow the on-screen instructions to resolve the issue.

## UEFI Diagnostics tool

UEFI Diagnostics tool enables you to view system information and identify hardware issues when you cannot log in to the operating system, or the computer cannot connect to the network.

To use the UEFI Diagnostics tool:

- Step 1. Connect your computer to ac power.
- Step 2. Turn on your computer, and press F10 immediately to enter the UEFI Diagnostics tool.
- Step 3. Follow the on-screen instructions to run the test.
- Step 4. Press Esc to exit the tool. Your computer will restart immediately.
- Step 5. If any hardware failure is detected and you are unable to locate and resolve the problem, you can call Lenovo Customer Support Center. See “Call Lenovo” on page 74.

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## Recover your Windows operating system

When you encounter some unexpected issues with your operating system, you can choose to recover your operating system by yourself or call Lenovo Customer Support Center.

**Note:** Microsoft constantly makes updates to the Windows operating system. Before installing a particular Windows version, check the compatibility list for the Windows version. For details, go to <https://support.lenovo.com/solutions/ht512575>.

The following table lists these options and the recommended scenarios for each option.

Option	Recommended scenario
Microsoft Connected System Recovery (for selected models)	You want to recover your Windows operating system from Cloud.
Lenovo recovery option	You want to recover your Windows operating system from the Lenovo Support Web site.

## Microsoft Connected System Recovery (for selected models)

This feature enables you to remove all user files on your computer and restore the Windows operating system from Cloud (Connected System Recovery). Before using this feature, read the following information.

### Notes:

- This feature will restore your Windows operating system to factory defaults. Do not use this feature if a customized operating system is installed on your computer, otherwise the customized functions or applications cannot be restored.
- This feature only works with wired network (connected via the Ethernet connector on your computer) and wireless network (WPA2 personal only).

## Restore the Windows operating system from Cloud

Follow the instructions to restore the Windows operating system.

- Step 1. Restart the computer. When the logo screen is displayed, press F1 to enter the UEFI BIOS menu.
- Step 2. Select **Config → Reinstall Windows from Cloud**. Follow the on-screen instructions to enable this feature.
- Step 3. Press F10 to save changes and exit.
- Step 4. The computer will restart automatically. When the logo screen is displayed, press F12.
- Step 5. Select **App Menu → Reinstall Windows from Cloud**, and then follow the on-screen instructions.

## Lenovo recovery option

The following table lists Lenovo recovery options and recommended scenarios for each option.

To recover your operating system to...	See...
Factory defaults	Refer to the instructions in <a href="https://support.lenovo.com/HowToCreateLenovoRecovery">https://support.lenovo.com/HowToCreateLenovoRecovery</a>
A previous system point	Refer to the instructions in Popular Topics: <a href="https://support.lenovo.com/solutions/ht118590">https://support.lenovo.com/solutions/ht118590</a>

## Recover your Windows operating system

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To recover your operating system to...	See...
Factory defaults	Refer to the instructions in <a href="https://support.lenovo.com/HowToCreateLenovoRecovery">https://support.lenovo.com/HowToCreateLenovoRecovery</a>
A previous system point	Refer to the instructions in Popular Topics: <a href="https://support.lenovo.com/solutions/ht118590">https://support.lenovo.com/solutions/ht118590</a>

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## Self-help resources

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

Resources	How to access?
Lenovo Support Web Site	<a href="https://pcsupport.lenovo.com">https://pcsupport.lenovo.com</a>
Tips	<a href="https://www.lenovo.com/tips">https://www.lenovo.com/tips</a>
Lenovo Community	<a href="https://forums.lenovo.com">https://forums.lenovo.com</a>
Accessibility information	<a href="https://www.lenovo.com/accessibility">https://www.lenovo.com/accessibility</a>
Windows help information	<ul style="list-style-type: none"><li>• Open the Start menu and click <b>Get Help</b>.</li><li>• Use Windows Search or the Cortana® personal assistant.</li><li>• Microsoft support Web site: <a href="https://support.microsoft.com">https://support.microsoft.com</a></li></ul>

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## Windows label

Windows Genuine Microsoft label indicates the edition of Windows preinstalled on your computer and whether the device is preinstalled with or licensed for genuine Windows.

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

- Your geographic location
- Edition of Windows that is preinstalled

Go to <https://www.microsoft.com/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 edition of the Windows operating system.
- In other countries and regions, the Genuine Microsoft label is required only on computer models licensed for Windows Pro editions.

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/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 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 Pro edition license downgrade rights.

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## Call Lenovo

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

## Before you contact Lenovo

Prepare the needed information 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” on page 65.

## Lenovo Customer Support Center

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

### Telephone numbers

For a list of the Lenovo Support phone numbers for your country or region, go to <https://pcsupport.lenovo.com/supportphonenumberlist> for the latest phone numbers.

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

### Services available during the warranty period

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

### Services not covered

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

For the terms and conditions of the Lenovo Limited Warranty that apply to your Lenovo hardware product, go to:

- [https://www.lenovo.com/warranty/llw\\_02](https://www.lenovo.com/warranty/llw_02)
- <https://pcsupport.lenovo.com/warrantylookup>

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## Purchase accessories or additional services

This topic provides instructions on how to purchase accessories or additional services.

### Accessories

Lenovo has a number of hardware accessories and upgrades to help expand the functionality of your computer. Accessories include memory modules, storage devices, network cards, power adapters, keyboards, mice, and so on. You can purchase Lenovo accessories at <https://www.lenovo.com/accessories>.

### Additional services

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

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

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## Accessibility features

Lenovo is committed to making information technology accessible to everyone, including those with hearing, vision, or mobility limitations. Lenovo supports accessibility features in the following ways to help all users better engage with Lenovo products.

### Accessible documentation

Lenovo documentation is designed to meet users' accessibility needs. Users can read the documentation with assistance as needed. For example:

- Text and images are in high contrast. Color contrast can enhance the visual experience. In this mode, all contents are highlighted to be more visible.
- Text is logical and readable. Images are also readable with alternative text provided. A screen reader can enhance the hearing or listening experience. In this mode, all contents are clearer and easier to understand.
- Text is large and clear, making it easier to read. A magnifier can enlarge the text to improve readability.

For more information, watch the video at:

[https://support.lenovo.com/docs/pc\\_pub\\_accessibility](https://support.lenovo.com/docs/pc_pub_accessibility)

### Accessible product design

Lenovo product design also supports accessibility features.

**Note:** The accessibility features vary by product. Depending on the product model, some accessibility features listed below might not be applicable to the product. To get the most up-to-date accessibility information for the product, go to <https://www.lenovo.com/accessibility>. For additional support from Lenovo, users can find phone numbers for their country or region from <https://support.lenovo.com/supportphonenumberlist>.

- **Keyboards**

Lenovo keyboards support various accessibility features. For example:

- Tactile markings on some keys for easier identification

Tactile markings provide all users with a way to find keys without looking at the keyboard. Lenovo provides bumps for the following keys:

- Function keys: F2 and F3
- Control keys: Fn and Insert

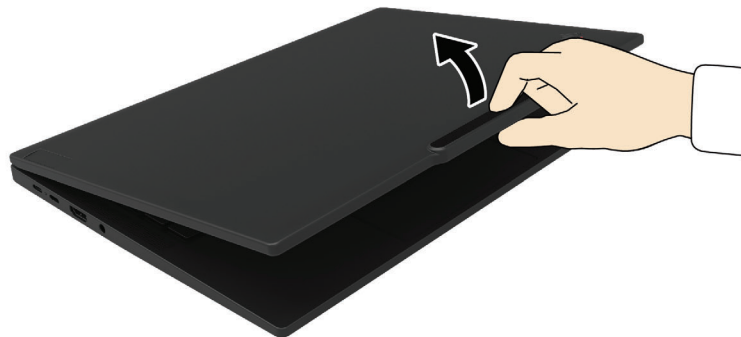
- Typing keys: F, J, and Enter
- Navigation key: Down arrow



- Consistent layout of keyboards for easier use
- Appropriate spacing between keys for typing efficiency
- Sufficient contrast of keys, controls, and labels for better visibility
- On-screen notification or lighted notification for some keys for ease of use
- Keys and controls that can be reached and operated using one hand and require minimal dexterity for ease of use

- **Prominent Communication Bar**

As a welcome addition to your computer, the communication bar incorporates front facing camera options and microphone with 360-degree coverage. It helps you orient computer and open laptop easily.



- **Alternative TrackPoint pointing device**

The TrackPoint pointing device comes with TrackPoint pointing stick and TrackPoint Three Buttons. It's a useful alternative for users to interact with the computer without using a traditional mouse. To learn how to use the TrackPoint pointing device, see “Use the TrackPoint pointing device” on page 15

- **Industry-standard connectors**

The industry-standard connectors on Lenovo products enable better compatibility with peripheral devices.

- **Operating systems**

The accessibility features of the operating systems can be configured to assist users in the following ways:

- Vision features, such as text size and visual effect settings, make the screen contents easier to see.
- Hearing features, such as audio and caption settings, make the screen contents easier to hear.
- Interaction features, such as speech and eye-control settings, make the product easier to control.

To access the accessibility features of the Windows 11 operating system, go to **Start → Settings → Accessibility**.

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## Appendix A. Compliance information

This chapter provides the compliance information of your computer.

For compliance information, refer to *Regulatory Notice* at <https://pcsupport.lenovo.com> and *Generic Safety and Compliance Notices* at [https://pcsupport.lenovo.com/docs/generic\\_notices](https://pcsupport.lenovo.com/docs/generic_notices).

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### Certification-related information

This section provides certification-related information, such as product name and machine type.

Product name	Compliance ID	Machine type(s)
<ul style="list-style-type: none"><li>ThinkPad X1 Carbon Gen 13</li><li>ThinkPad X1 Carbon Gen 13 CAT4<sup>1</sup></li><li>ThinkPad X1 Carbon Gen 13 5G<sup>1</sup></li></ul>	TP00150B	21NC and 21NT
<ul style="list-style-type: none"><li>ThinkPad X1 2-in-1 Gen 10</li></ul>	TP001501B	21NU and 21NV

<sup>1</sup> for mainland China only / <sup>2</sup> for India only

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

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### Locate the UltraConnect wireless antennas

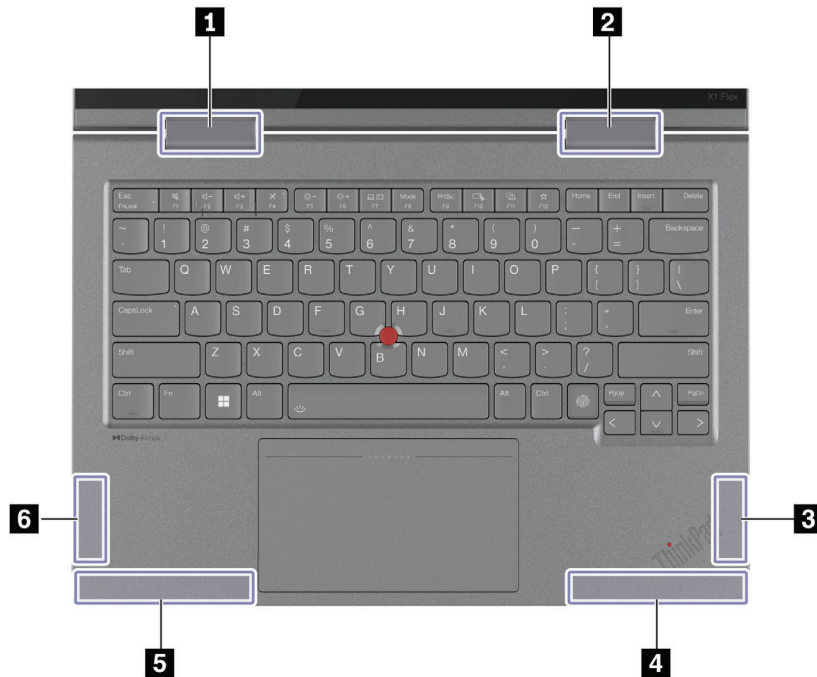
Your computer has an UltraConnect™ wireless antenna system. You can enable wireless communication wherever you are.

The following illustration shows the antenna locations on ThinkPad X1 Carbon Gen 12:



- 1** Wireless LAN antenna (main and auxiliary)
- 2** Wireless WAN antenna (MIMO1)\*
- 3** Wireless WAN antenna (main)\*
- 4** Wireless WAN antenna (auxiliary)\*
- 5** Wireless WAN antenna (MIMO2)\*

The following illustration shows the antenna locations on ThinkPad X1 2-in-1 Gen 9:



- 1 Wireless LAN antenna (auxiliary)
- 2 Wireless LAN antenna (main)
- 3 Wireless WAN antenna (MIMO1)\*
- 4 Wireless WAN antenna (main)\*
- 5 Wireless WAN antenna (auxiliary)\*
- 6 Wireless WAN antenna (MIMO2)\*

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## Operating environment

This section provides information about the operating environment of your computer.

### Maximum altitude (without pressurization)

3048 m (10 000 ft)

### Temperature

- Operating: 5°C to 35°C (41°F to 95°F)
- Storage and transportation in original shipping packaging: -20°C to 60°C (-4°F to 140°F)
- Storage without packaging: 5°C to 43°C (41°F to 109°F)

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

### Relative humidity

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



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## Appendix B. Notice for USB connector name update

The USB Implementers Forum published a revision of the guideline for USB connector names in September, 2022. Lenovo follows the revised guideline and updates USB connector names accordingly. You can refer to the table below for naming update details.

Current name	Previous name
USB-A connector (Hi-Speed USB)	USB-A 2.0 connector
USB-A connector (USB 5Gbps)	USB-A 3.2 Gen 1 connector
USB-A connector (USB 10Gbps)	USB-A 3.2 Gen 2 connector
USB-A connector (USB 5Gbps, Always On USB)	Always on USB-A 3.2 Gen 1 connector
USB-A connector (USB 10Gbps, Always On USB)	Always on USB-A 3.2 Gen 2 connector
USB-C connector (USB 5Gbps)	USB-C (3.2 Gen 1) connector
USB-C connector (USB 10Gbps)	USB-C (3.2 Gen 2) connector
USB-C connector (USB 20Gbps)	USB 3.2 Gen 2x2
USB-C connector (USB4 20Gbps)	USB 4 Gen 2x2
USB-C connector (USB4 40Gbps)	USB-C (USB 4) connector
USB-C connector (Thunderbolt 3)	USB-C (Thunderbolt 3) connector
USB-C connector (Thunderbolt 4)	USB-C (Thunderbolt 4) connector



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## Appendix C. Notices and trademarks

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