

Vostro 15 5515

Service Manual



Notes, cautions, and warnings

 **NOTE:** A NOTE indicates important information that helps you make better use of your product.

 **CAUTION:** A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

 **WARNING:** A WARNING indicates a potential for property damage, personal injury, or death.

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Working inside your computer


Topics:

- [Before working inside your computer](#)
- [Safety instructions](#)
- [Electrostatic discharge—ESD protection](#)
- [ESD field service kit](#)
- [After working inside your computer](#)

Before working inside your computer

 **NOTE:** The images in this document may differ from your computer depending on the configuration you ordered.

1. Save and close all open files and exit all open applications.
2. Shut down your computer. Click **Start** >  **Power** > **Shut down**.

 **NOTE:** If you are using a different operating system, see the documentation of your operating system for shut-down instructions.


3. Disconnect your computer and all attached devices from their electrical outlets.
4. Disconnect all attached network devices and peripherals, such as keyboard, mouse, and monitor from your computer.


 **CAUTION:** To disconnect a network cable, first unplug the cable from your computer and then unplug the cable from the network device.

5. Remove any media card and optical disc from your computer, if applicable.


Safety instructions


Use the following safety guidelines to protect your computer from potential damage and to ensure your personal safety. Unless otherwise noted, each procedure included in this document assumes that you have read the safety information that shipped with your computer.

 **WARNING:** Before working inside your computer, read the safety information that is shipped with your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.

 **WARNING:** Disconnect your computer from all power sources before opening the computer cover or panels. After you finish working inside the computer, replace all covers, panels, and screws before connecting your computer to an electrical outlet.

 **CAUTION:** To avoid damaging the computer, ensure that the work surface is flat, dry, and clean.

 **CAUTION:** To avoid damaging the components and cards, handle them by their edges, and avoid touching the pins and the contacts.

 **CAUTION:** You should only perform troubleshooting and repairs as authorized or directed by the Dell technical assistance team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. See the safety instructions that is shipped with the product or at www.dell.com/regulatory_compliance.

CAUTION: Before touching anything inside your computer, ground yourself by touching an unpainted metal surface, such as the metal at the back of the computer. While you work, periodically touch an unpainted metal surface to dissipate static electricity which could harm internal components.

CAUTION: When you disconnect a cable, pull it by its connector or its pull tab, not the cable itself. Some cables have connectors with locking tabs or thumbscrews that you must disengage before disconnecting the cable. When disconnecting cables, keep them evenly aligned to avoid bending the connector pins. When connecting cables, ensure that the ports and the connectors are correctly oriented and aligned.

CAUTION: Press and eject any installed card from the media-card reader.

CAUTION: Exercise caution when handling Lithium-ion batteries in laptops. Swollen batteries should not be used and should be replaced and disposed properly.

NOTE: The color of your computer and certain components may appear differently than shown in this document.

Radiation Exposure Statement

This device meets the government's requirements for exposure to radio waves. This device is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission of the U.S. Government.

The exposure standard for wireless device employs a unit of measurement known as the Specific Absorption Rate, or SAR. The SAR limit set by the FCC is 1,6 W/kg.

NOTE: Tests for SAR are conducted using standard operating positions accepted by the FCC with the device transmitting at its highest certified power level in all tested frequency bands.

Electrostatic discharge—ESD protection

ESD is a major concern when you handle electronic components, especially sensitive components such as expansion cards, processors, memory DIMMs, and system boards. Very slight charges can damage circuits in ways that may not be obvious, such as intermittent problems or a shortened product life span. As the industry pushes for lower power requirements and increased density, ESD protection is an increasing concern.

Due to the increased density of semiconductors used in recent Dell products, the sensitivity to static damage is now higher than in previous Dell products. For this reason, some previously approved methods of handling parts are no longer applicable.

Two recognized types of ESD damage are catastrophic and intermittent failures.

- **Catastrophic** – Catastrophic failures represent approximately 20 percent of ESD-related failures. The damage causes an immediate and complete loss of device functionality. An example of catastrophic failure is a memory DIMM that has received a static shock and immediately generates a "No POST/No Video" symptom with a beep code emitted for missing or nonfunctional memory.
- **Intermittent** – Intermittent failures represent approximately 80 percent of ESD-related failures. The high rate of intermittent failures means that most of the time when damage occurs, it is not immediately recognizable. The DIMM receives a static shock, but the tracing is merely weakened and does not immediately produce outward symptoms related to the damage. The weakened trace may take weeks or months to melt, and in the meantime may cause degradation of memory integrity, intermittent memory errors, etc.

The more difficult type of damage to recognize and troubleshoot is the intermittent (also called latent or "walking wounded") failure.

Perform the following steps to prevent ESD damage:

- Use a wired ESD wrist strap that is properly grounded. The use of wireless anti-static straps is no longer allowed; they do not provide adequate protection. Touching the chassis before handling parts does not ensure adequate ESD protection on parts with increased sensitivity to ESD damage.
- Handle all static-sensitive components in a static-safe area. If possible, use anti-static floor pads and workbench pads.
- When unpacking a static-sensitive component from its shipping carton, do not remove the component from the anti-static packing material until you are ready to install the component. Before unwrapping the anti-static packaging, ensure that you discharge static electricity from your body.
- Before transporting a static-sensitive component, place it in an anti-static container or packaging.

ESD field service kit

The unmonitored Field Service kit is the most commonly used service kit. Each Field Service kit includes three main components: anti-static mat, wrist strap, and bonding wire.

Components of an ESD field service kit

The components of an ESD field service kit are:

- **Anti-Static Mat** – The anti-static mat is dissipative and parts can be placed on it during service procedures. When using an anti-static mat, your wrist strap should be snug and the bonding wire should be connected to the mat and to any bare metal on the system being worked on. Once deployed properly, service parts can be removed from the ESD bag and placed directly on the mat. ESD-sensitive items are safe in your hand, on the ESD mat, in the system, or inside a bag.
- **Wrist Strap and Bonding Wire** – The wrist strap and bonding wire can be either directly connected between your wrist and bare metal on the hardware if the ESD mat is not required, or connected to the anti-static mat to protect hardware that is temporarily placed on the mat. The physical connection of the wrist strap and bonding wire between your skin, the ESD mat, and the hardware is known as bonding. Use only Field Service kits with a wrist strap, mat, and bonding wire. Never use wireless wrist straps. Always be aware that the internal wires of a wrist strap are prone to damage from normal wear and tear, and must be checked regularly with a wrist strap tester in order to avoid accidental ESD hardware damage. It is recommended to test the wrist strap and bonding wire at least once per week.
- **ESD Wrist Strap Tester** – The wires inside of an ESD strap are prone to damage over time. When using an unmonitored kit, it is a best practice to regularly test the strap prior to each service call, and at a minimum, test once per week. A wrist strap tester is the best method for doing this test. If you do not have your own wrist strap tester, check with your regional office to find out if they have one. To perform the test, plug the wrist-strap's bonding-wire into the tester while it is strapped to your wrist and push the button to test. A green LED is lit if the test is successful; a red LED is lit and an alarm sounds if the test fails.
- **Insulator Elements** – It is critical to keep ESD sensitive devices, such as plastic heat sink casings, away from internal parts that are insulators and often highly charged.
- **Working Environment** – Before deploying the ESD Field Service kit, assess the situation at the customer location. For example, deploying the kit for a server environment is different than for a desktop or portable environment. Servers are typically installed in a rack within a data center; desktops or portables are typically placed on office desks or cubicles. Always look for a large open flat work area that is free of clutter and large enough to deploy the ESD kit with additional space to accommodate the type of system that is being repaired. The workspace should also be free of insulators that can cause an ESD event. On the work area, insulators such as Styrofoam and other plastics should always be moved at least 12 inches or 30 centimeters away from sensitive parts before physically handling any hardware components.
- **ESD Packaging** – All ESD-sensitive devices must be shipped and received in static-safe packaging. Metal, static-shielded bags are preferred. However, you should always return the damaged part using the same ESD bag and packaging that the new part arrived in. The ESD bag should be folded over and taped shut and all the same foam packing material should be used in the original box that the new part arrived in. ESD-sensitive devices should be removed from packaging only at an ESD-protected work surface, and parts should never be placed on top of the ESD bag because only the inside of the bag is shielded. Always place parts in your hand, on the ESD mat, in the system, or inside an anti-static bag.
- **Transporting Sensitive Components** – When transporting ESD sensitive components such as replacement parts or parts to be returned to Dell, it is critical to place these parts in anti-static bags for safe transport.

ESD protection summary

It is recommended that all field service technicians use the traditional wired ESD grounding wrist strap and protective anti-static mat at all times when servicing Dell products. In addition, it is critical that technicians keep sensitive parts separate from all insulator parts while performing service and that they use anti-static bags for transporting sensitive components.

After working inside your computer

 **CAUTION: Leaving stray or loose screws inside your computer may severely damage your computer.**

1. Replace all screws and ensure that no stray screws remain inside your computer.
2. Connect any external devices, peripherals, or cables you removed before working on your computer.
3. Replace any media cards, discs, or any other parts that you removed before working on your computer.
4. Connect your computer and all attached devices to their electrical outlets.

5. Turn on your computer.

Removing and installing components

NOTE: The images in this document may differ from your computer depending on the configuration you ordered.

Topics:

- Recommended tools
- Screw list
- Major components of Vostro 15 5515
- Base cover
- Battery
- Battery cable
- Memory
- Solid-state drive—M.2 slot one
- Solid-state drive—M.2 slot two
- Wireless card
- Fan
- Coin-cell battery
- Heat sink
- Network-port bracket
- I/O board
- Speakers
- Touchpad
- Display assembly
- Power button with optional fingerprint reader
- Power-adaptor port
- System board
- Palm-rest and keyboard assembly

Recommended tools

The procedures in this document may require the following tools:

- Phillips screwdriver #0
- Phillips screwdriver #1
- Plastic scribe
















Screw list

NOTE: When removing screws from a component, it is recommended to note the screw type, the quantity of screws, and then place them in a screw storage box. This is to ensure that the correct number of screws and correct screw type is restored when the component is replaced.

NOTE: Some computers have magnetic surfaces. Ensure that the screws are not left attached to such surface when replacing a component.

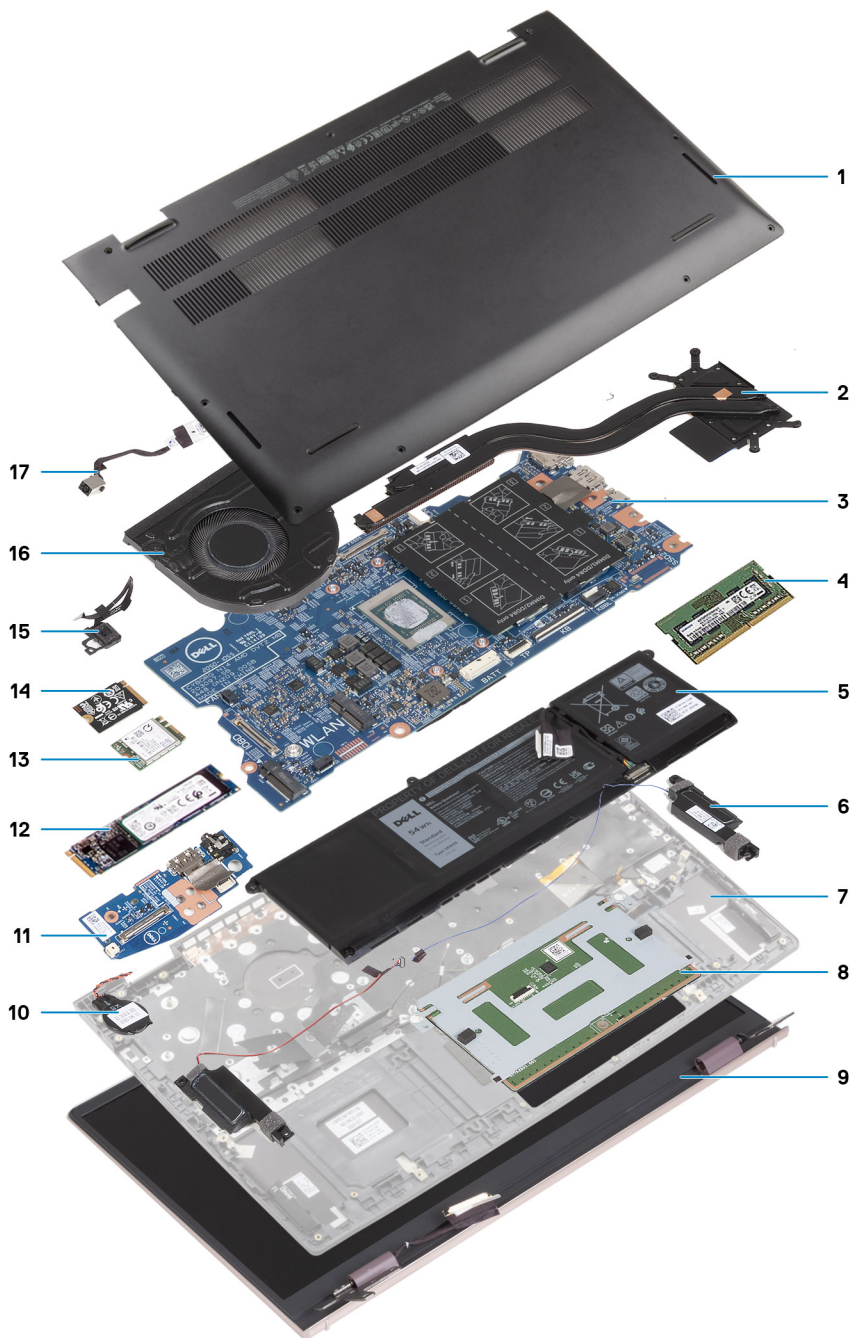
NOTE: Screw color may vary with the configuration ordered.

Table 1. Screw list

Component	Screw type	Quantity	Screw image
Base cover	<ul style="list-style-type: none"> Captive screws - M2x7.5 M2x4 	<ul style="list-style-type: none"> 2 7 	
3-cell battery	M2x3	3	
4-cell battery	M2x3	4	
Wireless card	M2x3	1	
Solid-state drive - Slot 1	M2x3	1	
Solid-state drive - Slot 2	M2x3	1	
Fan	M2x3	2	
Heat sink	Captive screws	4	
System board	M2x2	3	
USB Type-C bracket	M2x4	2	
Power button with fingerprint reader	M2x3	1	
Network-port bracket	M2x5	2	
I/O board	M2x2	1	
Touchpad	M1.6x2 M2x1.8	3 2	
Power-adaptor port	M2.5x4.5	3	
Display assembly	M2.5x4.5	6	

Major components of Vostro 15 5515

The following image shows the major components of Vostro 15 5515.



1. Base cover
2. Heat sink
3. System board
4. Memory
5. Battery
6. Right speaker
7. Palm-rest and keyboard assembly
8. Touchpad
9. Display assembly
10. Coin-cell battery
11. I/O board
12. M.2 2280 solid-state drive, if installed
13. Wireless card
14. M.2 2230 solid-state drive, if installed
15. Power-button with optional fingerprint-reader

- 16. Fan
- 17. Power-adaptor port

i **NOTE:** Dell provides a list of components and their part numbers for the original system configuration purchased. These parts are available according to warranty coverages purchased by the customer. Contact your Dell sales representative for purchase options.

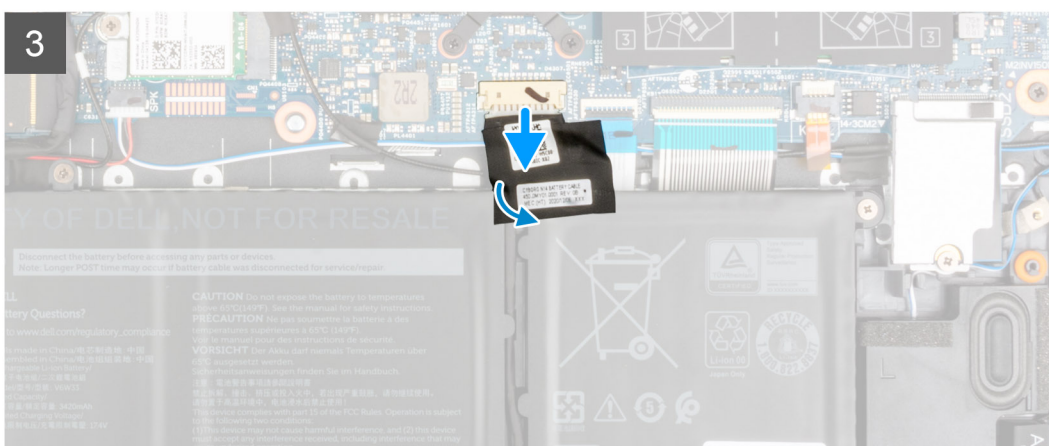
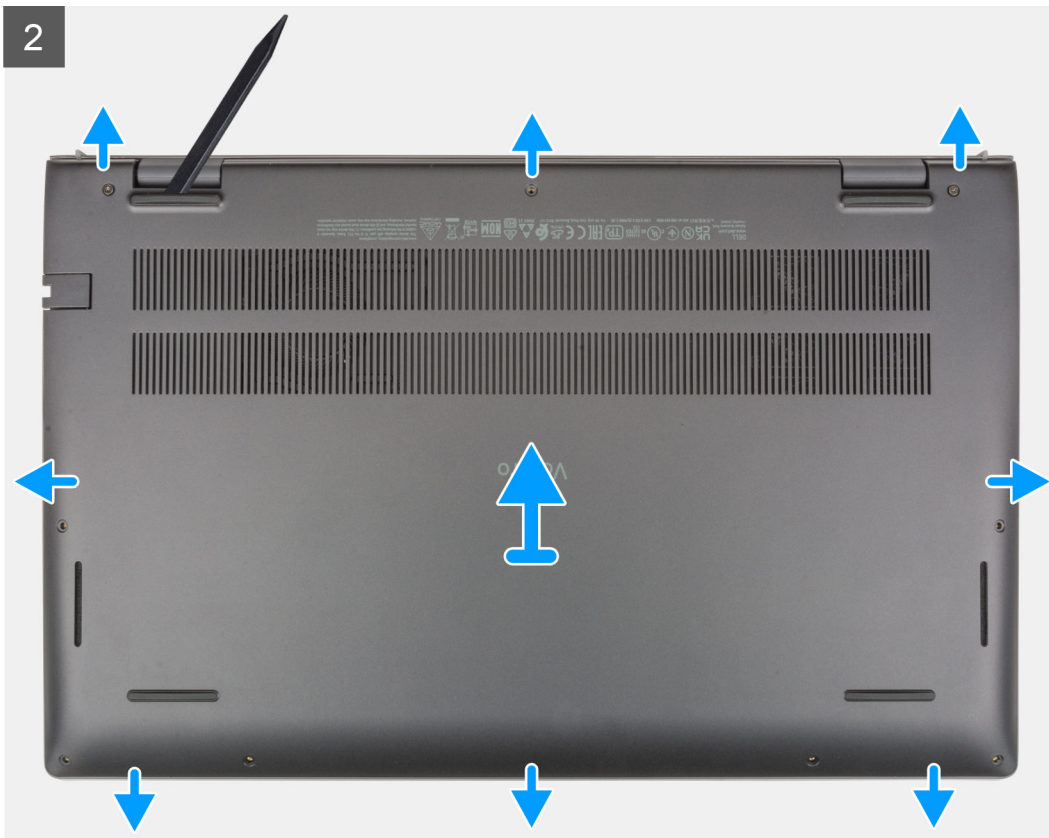
Base cover

Removing the base cover

1. Follow the procedure in [Before working inside your computer](#).

The following images indicate the location of the base cover and provide a visual representation of the removal procedure.





1. Loosen the two (M2x7.5) captive screws that secure the base cover to the palm-rest and keyboard assembly.
2. Remove the seven (M2x4) screws that secure the base cover to the palm-rest and keyboard assembly.
3. Using a plastic scribe, pry the base cover from the U-shaped indents at the top edge of the base cover and continue to work on the sides to release the base cover from the palm-rest and keyboard assembly.
4. Lift the base cover off the palm-rest and keyboard assembly.
5. Peel the tape that secures the battery cable to the battery and palm-rest and keyboard assembly.
6. Disconnect the battery cable from the system board.

7. Press and hold the power button for 20 seconds to ground the computer and drain the flea power.

Installing the base cover

If you are replacing a component, remove the existing component before performing the installation procedure.

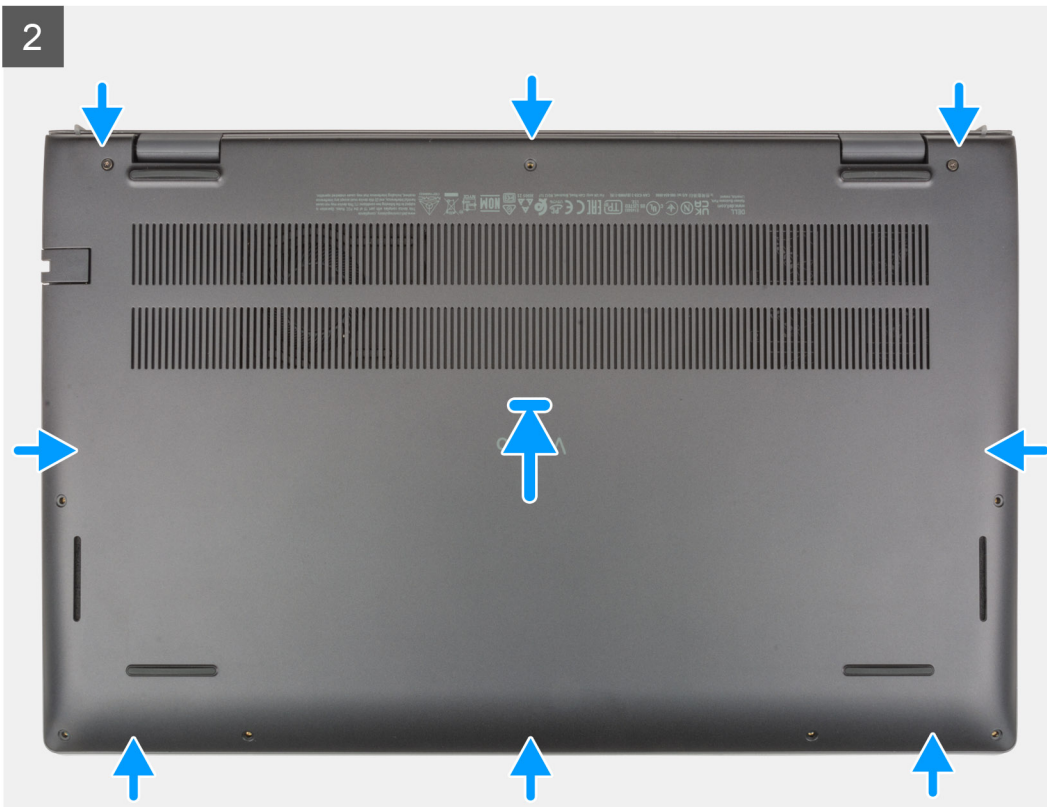
The following images indicate the location of the base cover and provide a visual representation of the installation procedure.



7x
M2x4



2x
M2x7.5



3



1. Connect the battery cable to the system board.
2. Adhere the tape to secure the battery cable.
3. Place the base cover on top of the palm-rest and keyboard assembly.
4. Align the screw holes on the base cover with the screw holes on the palm-rest and keyboard assembly, and then snap the base cover into place.
5. Tighten the two (M2x7.5) captive screws that secure the base cover to the palm-rest and keyboard assembly.
6. Replace the seven (M2x4) screws that secure the base cover to the palm-rest and keyboard assembly.
1. Follow the procedure in [After working inside your computer](#).

Battery

Lithium-ion battery precautions

⚠ CAUTION:

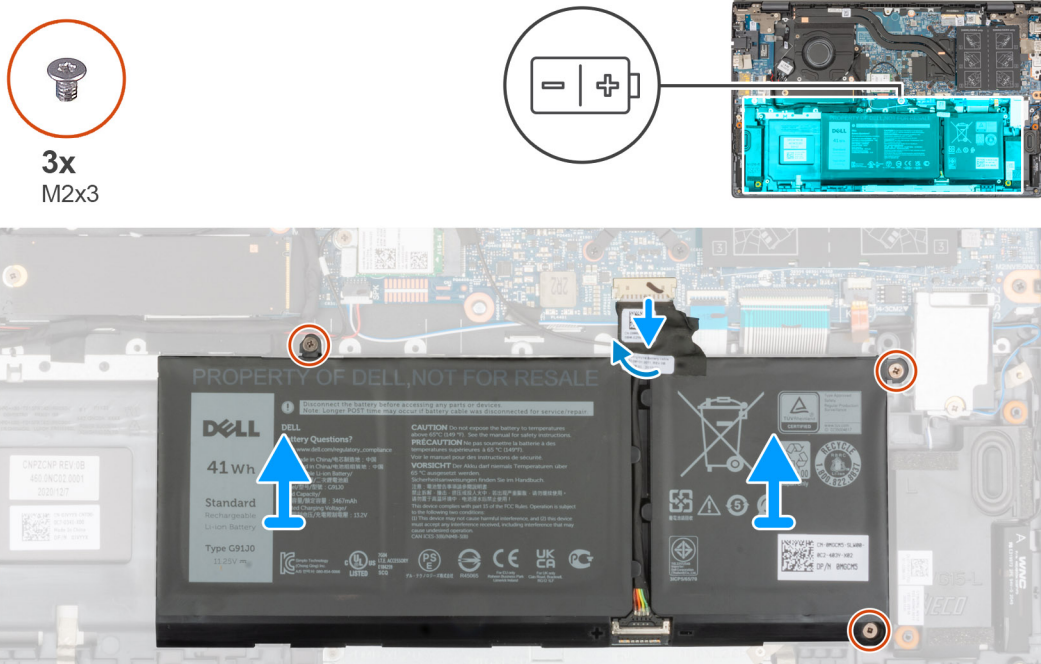
- Exercise caution when handling Lithium-ion batteries.
- Discharge the battery completely before removing it. Disconnect the AC power adapter from the system and operate the computer solely on battery power—the battery is fully discharged when the computer no longer turns on when the power button is pressed.
- Do not crush, drop, mutilate, or penetrate the battery with foreign objects.
- Do not expose the battery to high temperatures, or disassemble battery packs and cells.
- Do not apply pressure to the surface of the battery.
- Do not bend the battery.
- Do not use tools of any kind to pry on or against the battery.
- Ensure any screws during the servicing of this product are not lost or misplaced, to prevent accidental puncture or damage to the battery and other system components.
- If the battery gets stuck inside your computer as a result of swelling, do not try to release it as puncturing, bending, or crushing a lithium-ion battery can be dangerous. In such an instance, contact Dell technical support for assistance. See www.dell.com/contactdell.

- Always purchase genuine batteries from www.dell.com or authorized Dell partners and resellers.
- Swollen batteries should not be used and should be replaced and disposed properly. For guidelines on how to handle and replace swollen Lithium-ion batteries, see [Handling swollen Lithium-ion batteries](#).

Removing the 3-cell battery

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

The following image indicates the location of the 3-cell (41 Wh) battery and provides a visual representation of the removal procedure.



1. Peel the tape that secures the battery cable to the system board.
2. Disconnect the battery cable from the system board.
3. Remove the three (M2x3) screws that secure the 3-cell battery to the palm-rest and keyboard assembly.
4. Lift the 3-cell battery, along with its cable, off the palm-rest and keyboard assembly.

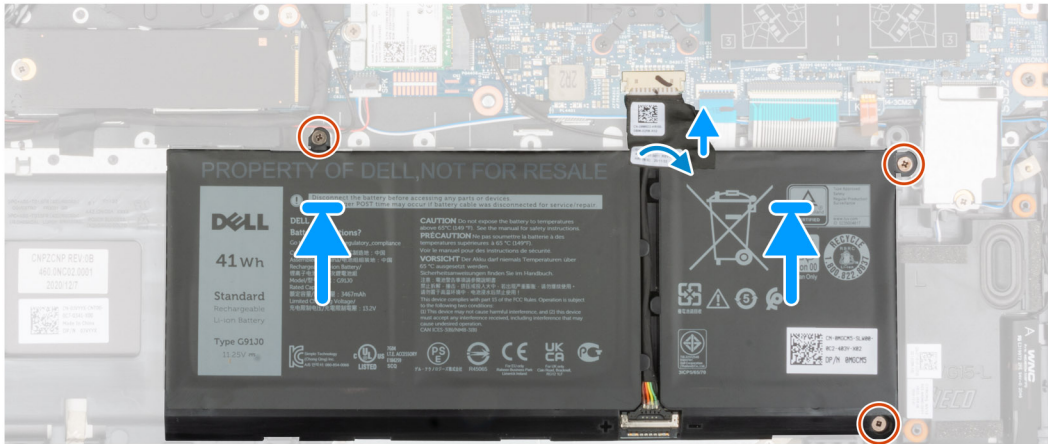
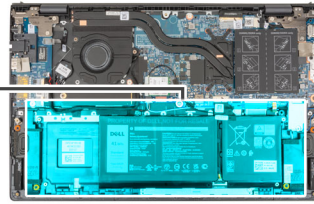
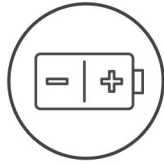
Installing the 3-cell battery

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the 3-cell (41 Wh) battery and provides a visual representation of the installation procedure.



3x
M2x3



1. Using the alignment posts, place the 3-cell battery on the palm-rest and keyboard assembly.
 2. Align the screw holes on the 3-cell battery with the screw holes on the palm-rest and keyboard assembly.
 3. Replace the three (M2x3) screws that secure the 3-cell battery to the palm-rest and keyboard assembly.
 4. Connect the battery cable to the system board.
 5. Adhere the tape that secures the battery cable to the system board.
1. Install the [base cover](#).
 2. Follow the procedure in [After working on your computer](#).

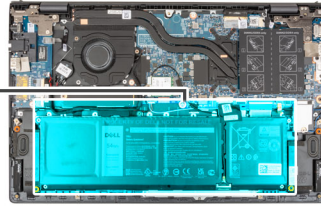
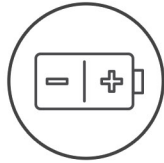
Removing the 4-cell battery

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

The following image indicates the location of the 4-cell (54 Wh) battery and provides a visual representation of the removal procedure.



4x
M2x3



1. Peel the tape that secures the battery cable to the system board.
2. Disconnect the battery cable from the system board.
3. Remove the four (M2x3) screws that secure the 4-cell battery to the palm-rest and keyboard assembly.
4. Lift the 4-cell battery, along with its cable, off the palm-rest and keyboard assembly.

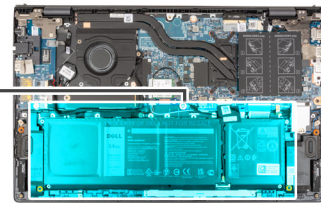
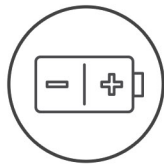
Installing the 4-cell battery

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the 4-cell (54 Wh) battery and provides a visual representation of the installation procedure.



4x
M2x3



1. Using the alignment posts, place the 4-cell battery on the palm-rest and keyboard assembly.
2. Align the screw holes on the 4-cell battery with the screw holes on the palm-rest and keyboard assembly.
3. Replace the four (M2x3) screws that secure the 4-cell battery to the palm-rest and keyboard assembly.
4. Connect the battery cable to the system board.
5. Adhere the tape that secures the battery cable to the system board.

1. Install the [base cover](#).
2. Follow the procedure in [After working on your computer](#).

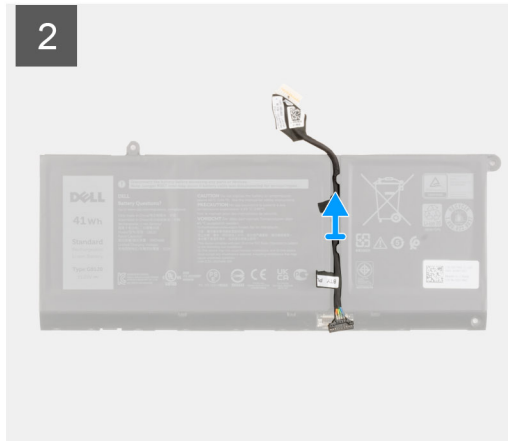
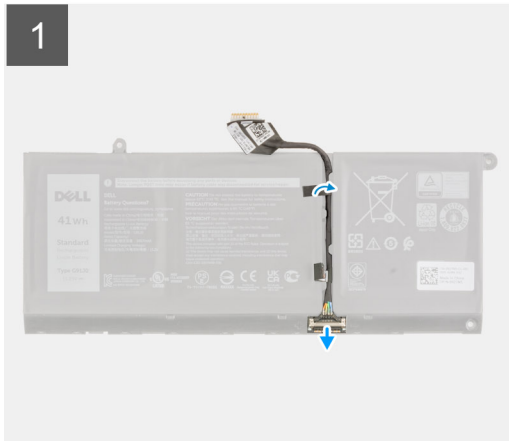
Battery cable

Removing the battery cable

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [3-cell battery](#) or [4-cell battery](#), whichever applicable.

NOTE: If battery is disconnected from system board for service, then there is a delay during system boot as the system undergoes RTC battery reset.

The following images indicate the location of the battery cable and provide a visual representation of the removal procedure.

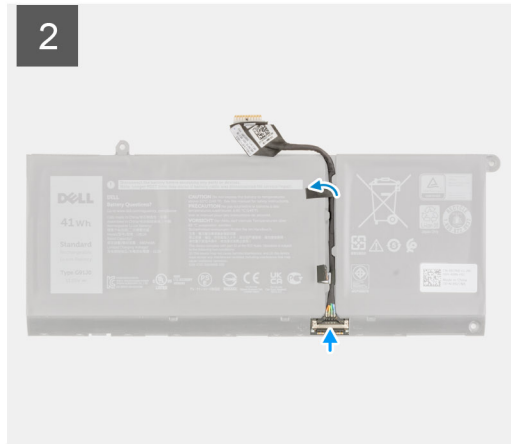
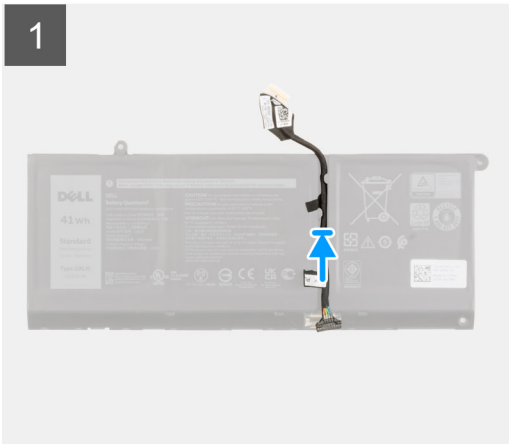


1. Flip the battery and remove the battery cable from the routing guides on the battery.
2. Disconnect the battery cable from the connector on the battery.
3. Lift the battery cable off the battery.

Installing the battery cable

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the battery cable and provides a visual representation of the installation procedure.



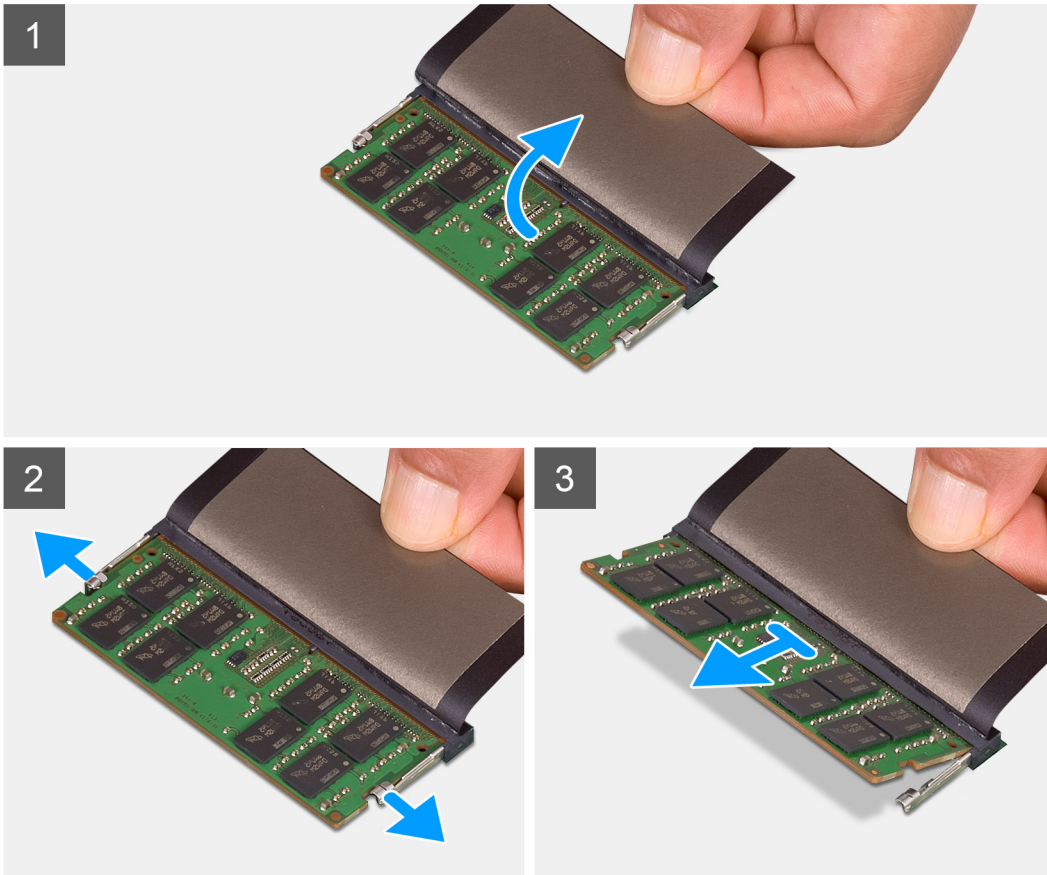
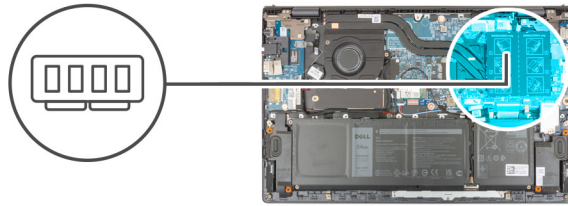
1. Align and place the battery cable on the battery.
 2. Route the battery cable through the routing guides on the battery.
 3. Connect the battery cable to the connector on the battery.
1. Install the [3-cell battery](#) or [4-cell battery](#), whichever applicable.
 2. Install the [base cover](#).
 3. Follow the procedure in [After working on your computer](#).

Memory

Removing the memory module

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

The following images indicate the location of the memory module and provide a visual representation of the removal procedure.



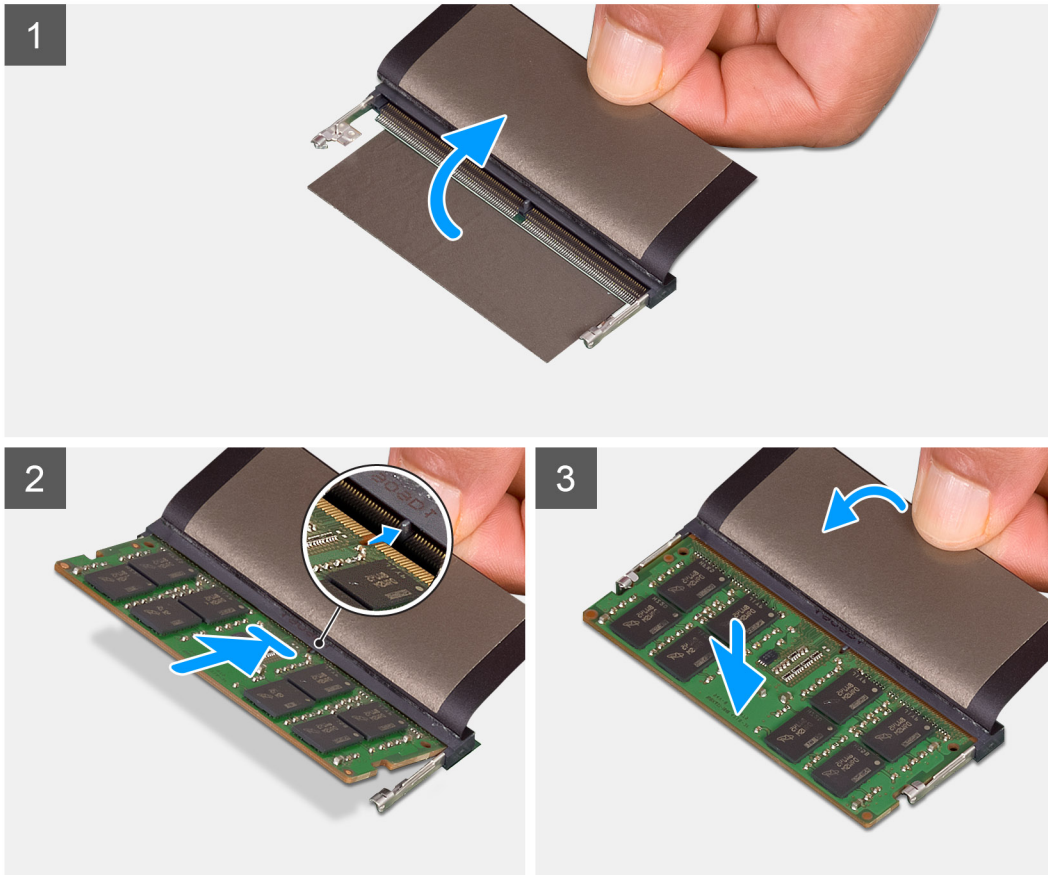
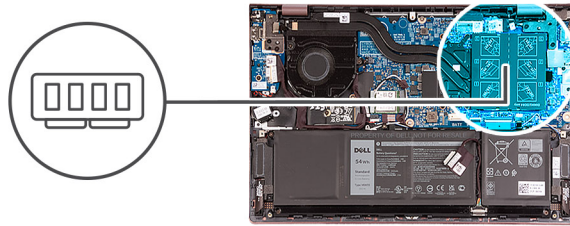
1. Lift the Mylar to access the memory module.
2. Use your fingertips to pull the securing clips from both sides of the memory module until the memory module pops-up.
3. Remove the memory module from the memory-module slot.

NOTE: Repeat step 1 to step 3 to remove any other memory modules installed in your computer.

Installing the memory module

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the memory module and provides a visual representation of the installation procedure.



1. Lift the Mylar to access the memory-module slot.
2. Align the notch on the memory module with the tab on the memory-module slot.
3. Slide the memory module firmly at an angle, into the memory-module slot.
4. Press the memory module down until it clicks into place.

NOTE: If you do not hear the click, remove the memory module and reinstall it.

NOTE: Repeat step 1 to step 4 to install any other memory modules in your computer.

1. Install the [base cover](#).
2. Follow the procedure in [After working inside your computer](#).

Solid-state drive—M.2 slot one

Removing the 2230 solid-state drive from M.2 slot one

1. Follow the procedure in [Before working inside your computer](#).

NOTE: Solid-state drives are fragile. Exercise care when handling the solid-state drive.

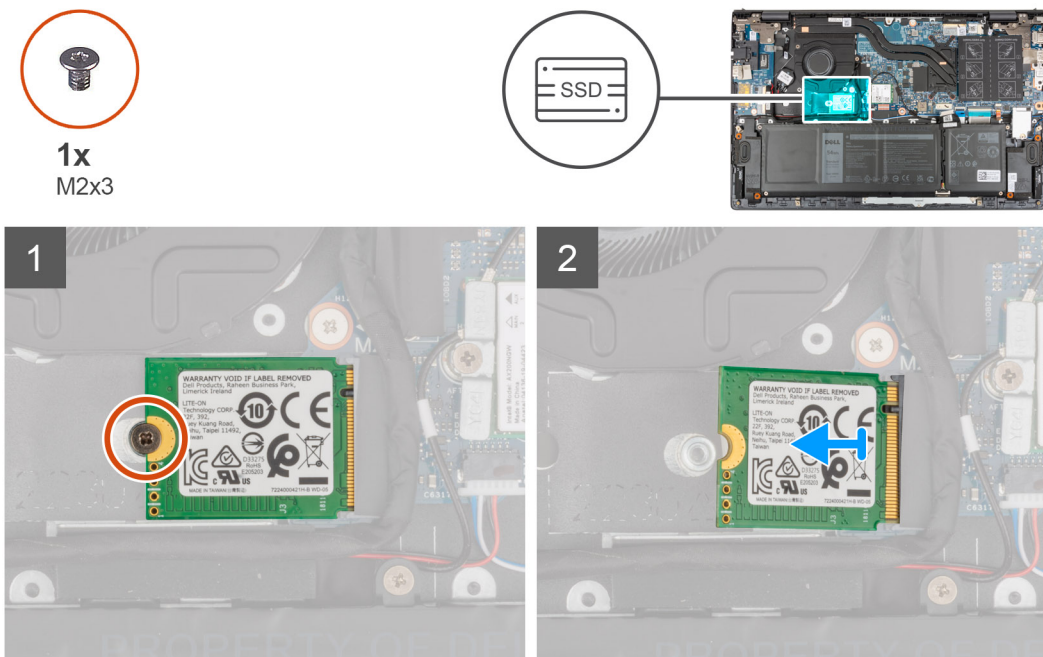
NOTE: To avoid data loss, do not remove the solid-state drive while the computer is in sleep or on state.

2. Remove the [base cover](#).

NOTE: Depending on the configuration ordered, your computer may support a 2230 solid-state drive, or a 2280 solid-state drive in M.2 slot one.

NOTE: This procedure applies only to computers shipped with a 2230 solid-state drive installed in M.2 slot one.

The following image indicates the location of the 2230 solid-state drive that is installed in M.2 slot one and provides a visual representation of the removal procedure.



1. Remove the screw (M2x3) that secures the 2230 solid-state drive to the palm-rest and keyboard assembly.
2. Slide and remove the solid-state drive from the M.2 slot one.

Installing the 2230 solid-state drive in M.2 slot one

If you are replacing a component, remove the existing component before performing the installation procedure.

NOTE: Solid-state drives are fragile. Exercise care when handling the solid-state drive.

NOTE: Depending on the configuration ordered, your computer may support a 2230 solid-state drive, or a 2280 solid-state drive in M.2 slot one.

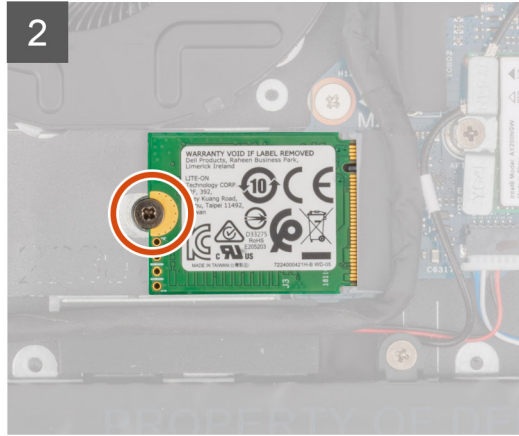
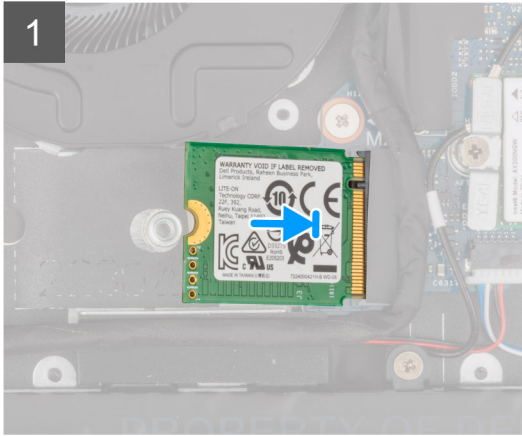
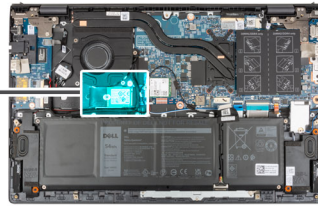
NOTE: This procedure applies only if you are installing a 2230 solid-state drive in M.2 slot one.

NOTE: Before installing your 2230 or 2280 solid-state drive, ensure that the mounting bracket is in the correct location. For more information, see [Installing the solid-state drive mounting bracket](#).

The following image indicates the location of the 2230 solid-state drive that is installed in M.2 slot one and provides a visual representation of the installation procedure.



1x
M2x3





1. Align the notch on the 2230 solid-state drive with the tab on the solid-state drive slot.
2. Slide the 2230 solid-state drive firmly into the solid-state drive slot at an angle.
3. Align the screw hole on the solid-state drive with the screw hole on the palm-rest and keyboard assembly.
4. Replace the screw (M2x3) that secures the 2230 solid-state drive to the palm-rest and keyboard assembly.

1. Install the [base cover](#).
2. Follow the procedure in [After working inside your computer](#).


Removing the 2280 solid-state drive from M.2 slot one


1. Follow the procedure in [Before working inside your computer](#).

 **NOTE:** Solid-state drives are fragile. Exercise care when handling the solid-state drive.

 **NOTE:** To avoid data loss, do not remove the solid-state drive while the computer is in sleep or on state.

2. Remove the [base cover](#).

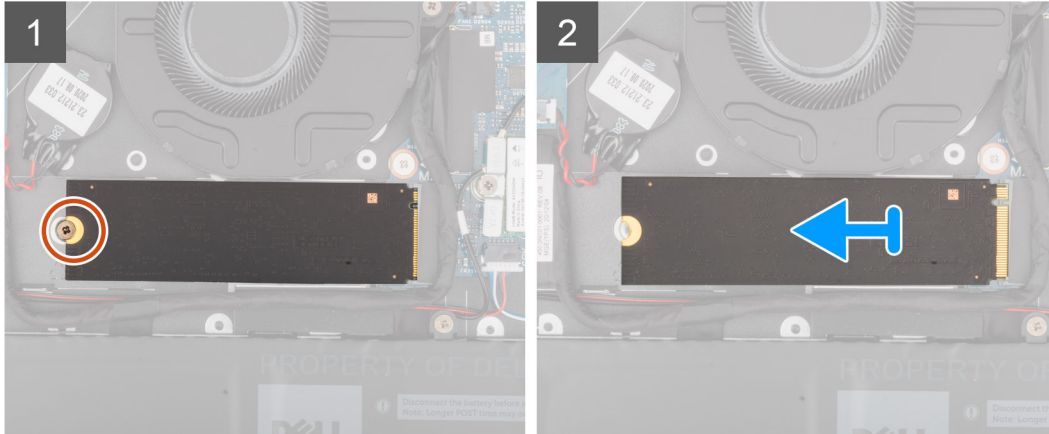
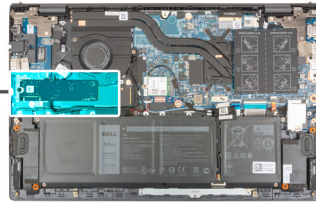
 **NOTE:** Depending on the configuration ordered, your computer may support a 2280 solid-state drive, or a 2230 solid-state drive in M.2 slot one.

 **NOTE:** This procedure applies only to computers shipped with a 2280 solid-state drive installed in M.2 slot one.

The following image indicates the location of the 2280 solid-state drive that is installed in M.2 slot one and provides a visual representation of the removal procedure.



1x
M2x3



1. Remove the screw (M2x3) that secures the solid-state drive to the palm-rest and keyboard assembly.
2. Slide and lift the 2280 solid-state drive off the M.2 solid-state drive slot one on the system board.

Installing the 2280 solid-state drive in M.2 slot one

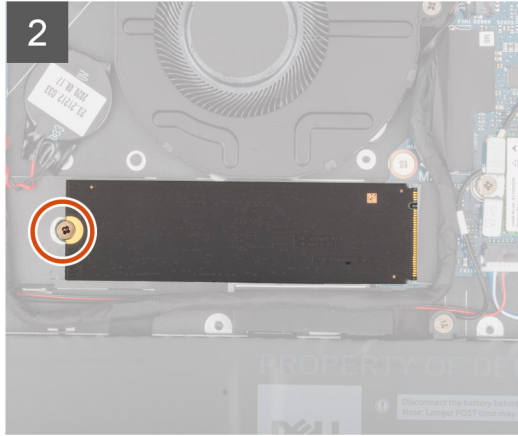
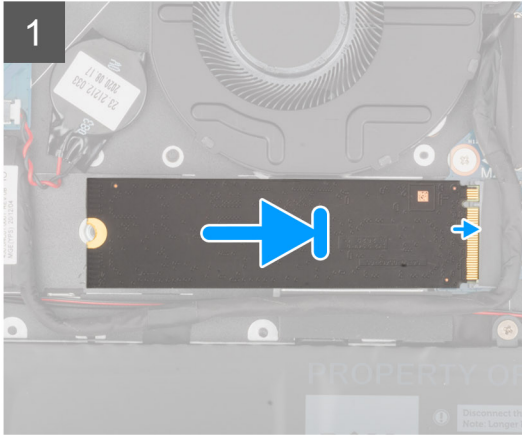
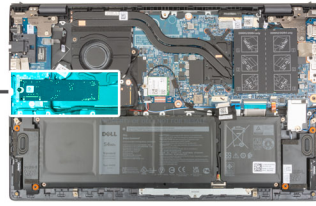
If you are replacing a component, remove the existing component before performing the installation procedure.

- NOTE:** Solid-state drives are fragile. Exercise care when handling the solid-state drive.
- NOTE:** Depending on the configuration ordered, the computer one may support a 2280 solid-state drive, or a 2230 solid-state drive in M.2 slot one.
- NOTE:** This procedure is applicable if you are installing a 2280 solid-state drive in M.2 slot one.
- NOTE:** Before installing your 2230 or 2280 solid-state drive, ensure that the mounting bracket is in the correct location. For more information, see [Installing the solid-state drive mounting bracket](#).

The following image indicates the location of the 2280 solid-state drive that is installed in M.2 slot one and provides a visual representation of the installation procedure.



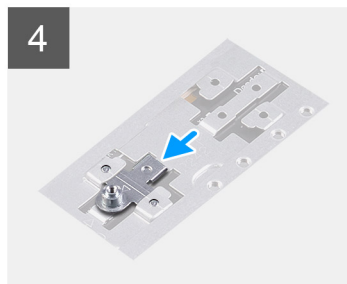
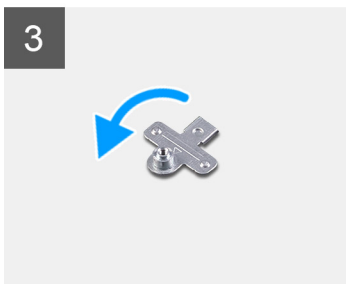
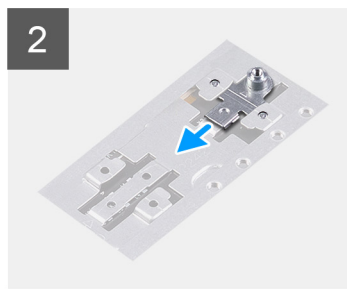
1x
M2x3



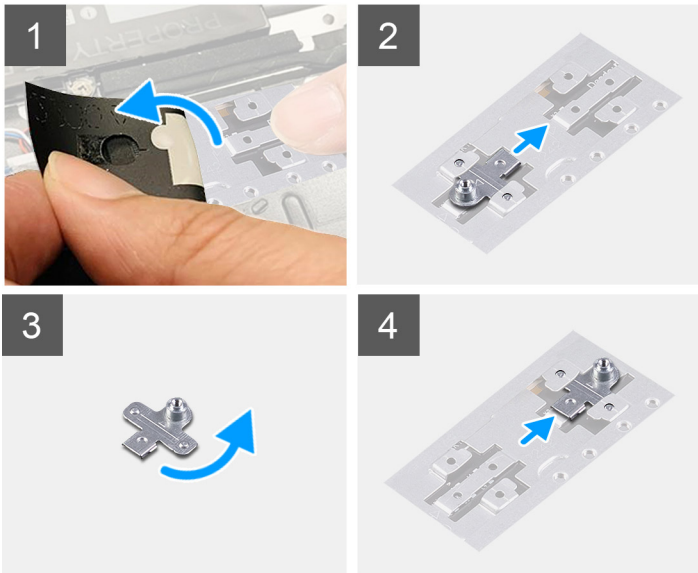
1. Align the notch on the 2280 solid-state drive with the tab on the solid-state drive slot.
 2. Slide the 2280 solid-state drive firmly into the solid-state drive slot at an angle.
 3. Align the screw hole on the solid-state drive with the screw hole on the palm-rest and keyboard assembly.
 4. Replace the screw (M2x3) that secures the 2280 solid-state drive to the palm-rest and keyboard assembly.
1. Install the [base cover](#).
 2. Follow the procedure in [After working inside your computer](#).

Installing the solid-state drive mounting bracket on M.2 slot one

The following image provides a visual representation of the procedure to install the solid-state drive mounting bracket when replacing M.2 2230 solid-state drive with M.2 2280 solid-state drive in M.2 slot one.



The following image provides a visual representation of the procedure to install the solid-state drive mounting bracket when replacing M.2 2280 solid-state drive with M.2 2230 solid-state drive in M.2 slot one.



1. Slide and remove the solid-state drive mounting bracket from the mounting bracket slot on the palm-rest and keyboard assembly.
2. Rotate the solid-state drive mounting bracket to 180 degrees.
3. Slide the solid-state mounting bracket into the mounting slot on the palm-rest and keyboard assembly.
4. Install the [2230 solid-state drive](#) or [2280 solid-state drive](#), whichever applicable.

Solid-state drive—M.2 slot two

Removing the 2230 solid-state drive from M.2 slot two

NOTE: M.2 slot two supports only 2230 solid-state drive.

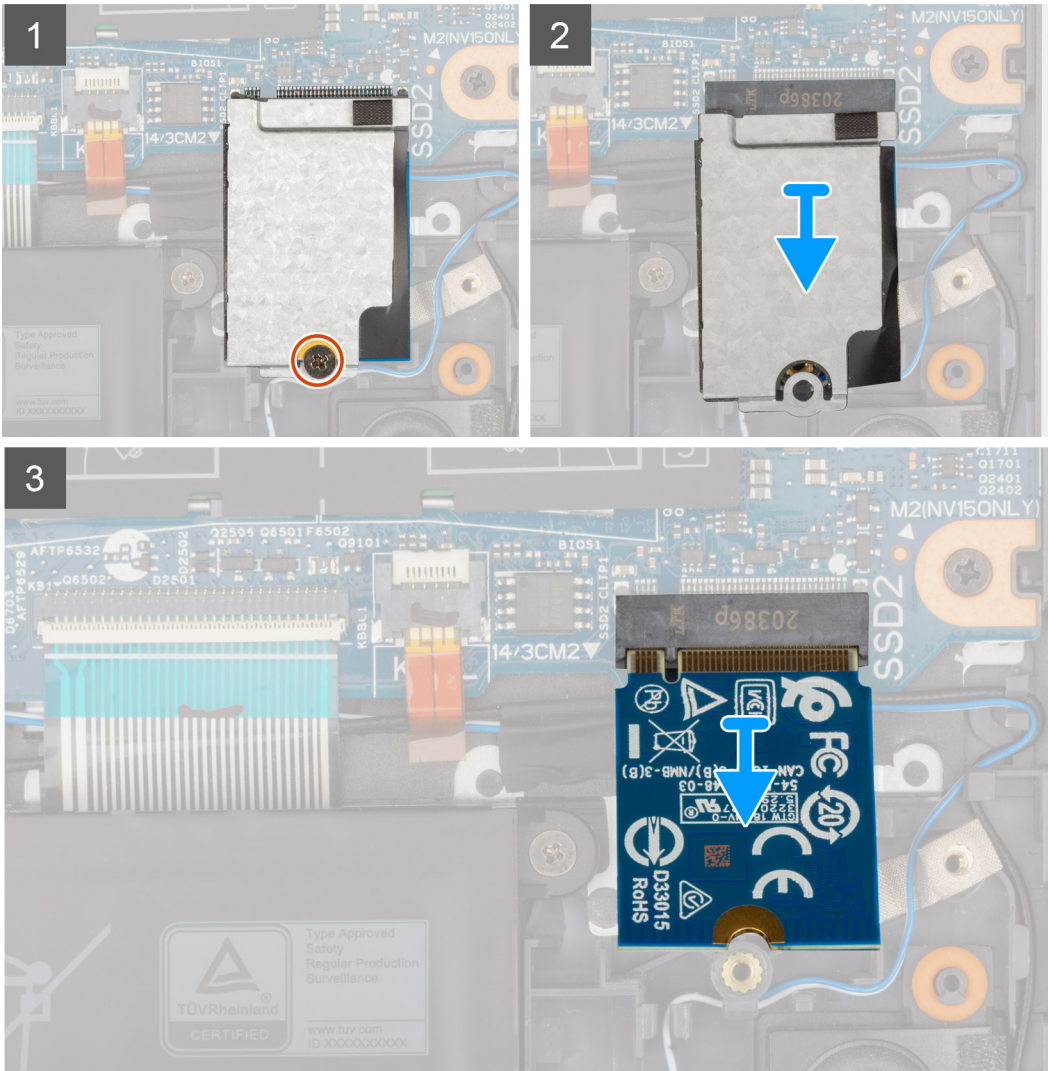
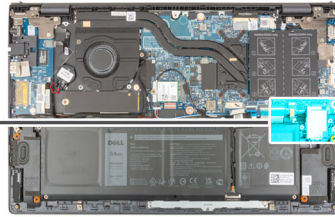
NOTE: This procedure applies only to computers shipped with a 2230 solid-state drive installed in M.2 slot two.

1. Follow the procedure in [Before working inside your computer](#).
 - NOTE:** Solid-state drives are fragile. Exercise care when handling the solid-state drive.
 - NOTE:** To avoid data loss, do not remove the solid-state drive while the computer is in sleep or on state.
2. Remove the [base cover](#).

The following image indicates the location of the 2230 solid-state drive that is installed in M.2 slot two and provides a visual representation of the removal procedure.



1x
M2x3



1. Remove the screw (M2x3) that secures the solid-state drive thermal shield and the solid-state drive to the palm-rest and keyboard assembly.
2. Slide and lift the solid-state drive thermal shield off the solid-state drive.
3. Slide and remove the solid-state drive from the M.2 slot two.

Installing the 2230 solid-state drive in M.2 slot two

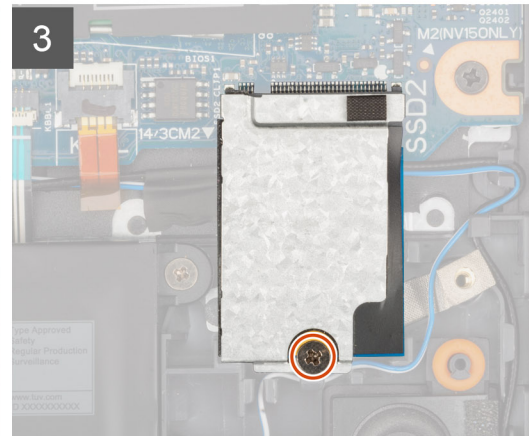
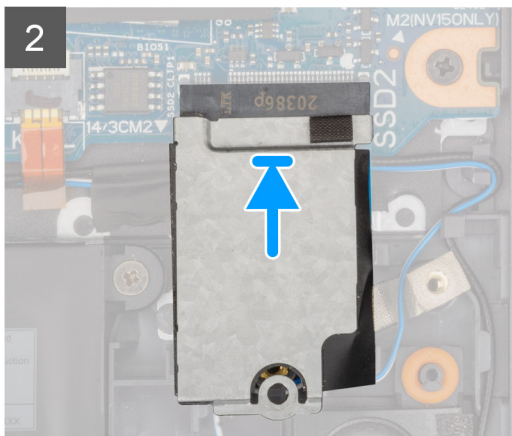
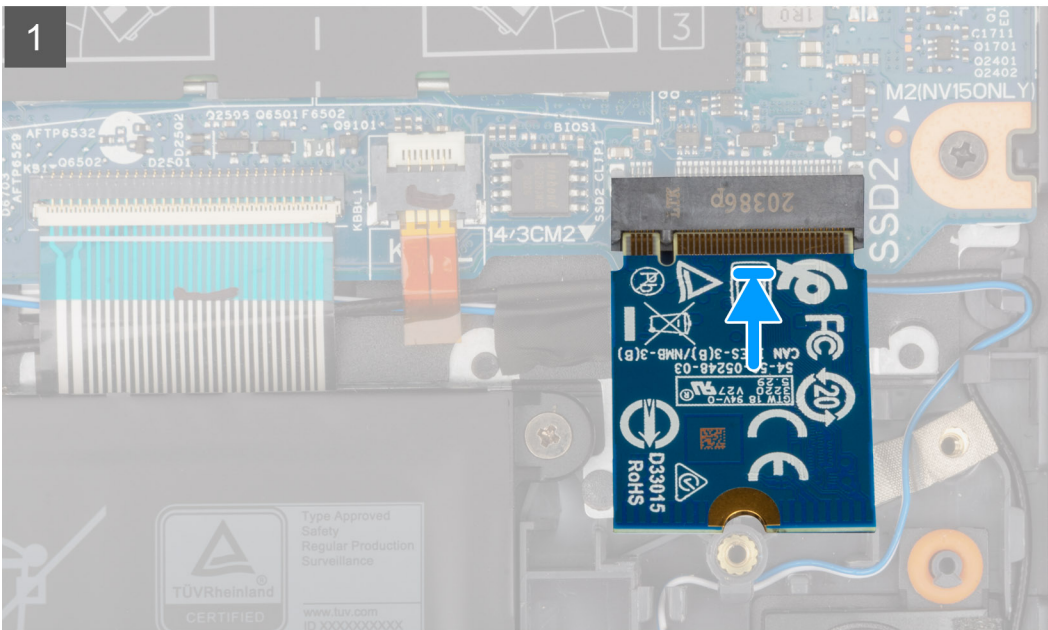
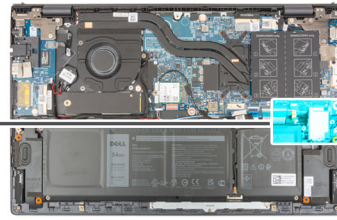
If you are replacing a component, remove the existing component before performing the installation procedure.

- NOTE:** Solid-state drives are fragile. Exercise care when handling the solid-state drive.
- NOTE:** M.2 slot two supports only 2230 solid-state drive.
- NOTE:** This procedure applies only to computers shipped with a 2230 solid-state drive installed in M.2 slot two.

The following image indicates the location of the 2230 solid-state drive that is installed in M.2 slot two and provides a visual representation of the installation procedure.



1x
M2x3



1. Align the notch on the 2230 solid-state drive with the tab on M.2 slot two on the system board.
 2. Slide the 2230 solid-state drive into M.2 slot two on the system board.
 3. Place the solid-state drive thermal shield on the solid-state drive.
 4. Align the screw hole on the solid-state drive thermal shield with the screw hole on the palm-rest and keyboard assembly.
 5. Replace the screw (M2x3) that secures the solid-state drive thermal shield and solid-state drive to the palm-rest and keyboard assembly.
1. Install the [base cover](#).
 2. Follow the procedure in [After working inside your computer](#).

Wireless card

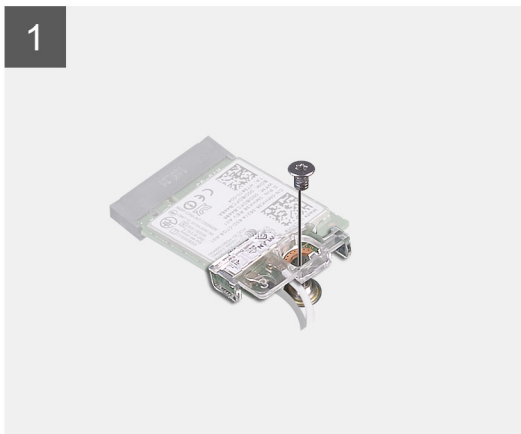
Removing the wireless card

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

The following images indicate the location of the wireless card and provide a visual representation of the removal procedure.



1x
M2x3



1. Remove the screw (M2x3) that secures the wireless-card bracket to the wireless card and system board.
2. Remove the wireless-card bracket from the wireless card.
3. Disconnect the antenna cables from the wireless card.
4. Slide and remove the wireless card from the wireless-card slot.

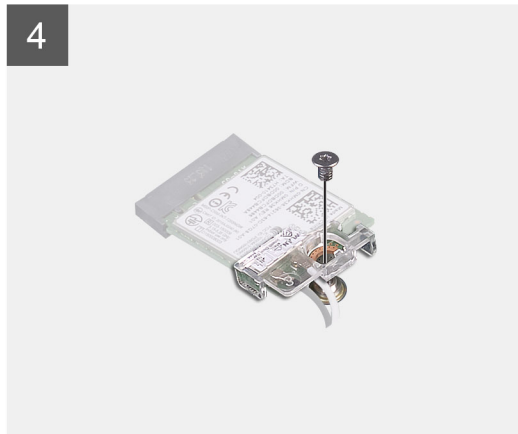
Installing the wireless card

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the wireless card and provides a visual representation of the installation procedure.



1x
M2x3



1. Connect the antenna cables to the wireless card.

The following table provides the antenna-cable color scheme for the wireless card that is supported by your computer.

Table 2. Antenna-cable color scheme

Connectors on the wireless card	Antenna-cable color	Silkscreen marking	
Main	White	MAIN	△ (white triangle)
Auxiliary	Black	AUX	▲ (black triangle)

2. Align the notch on the wireless card with the tab on the wireless-card slot on the system board.

3. Slide and insert the wireless card at an angle into the wireless-card slot on the system board.

4. Align the screw hole on the wireless-card bracket to the screw hole on the wireless card and system board.

5. Replace the screw (M2x3) that secures the wireless-card bracket to the wireless card and the system board.

1. Install the [base cover](#).

2. Follow the procedure in [After working inside your computer](#).

Fan

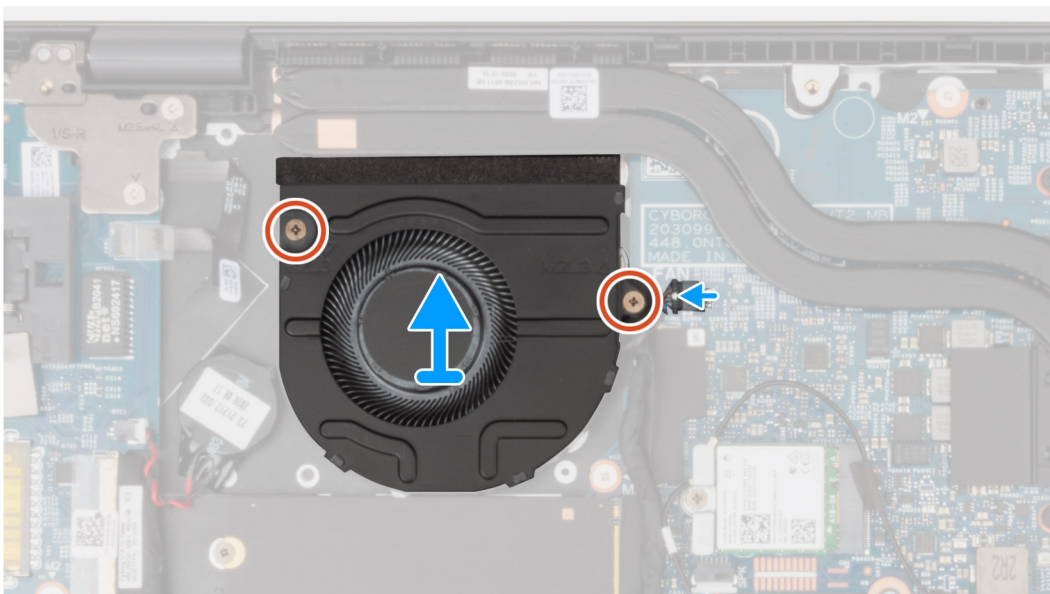
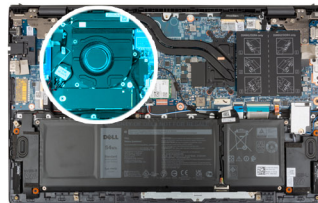
Removing the fan

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

The following images indicate the location of the fan and provide a visual representation of the removal procedure.



2x
M2x3



1. Disconnect the fan cable from the system board.
2. Remove the two (M2x3) screws that secure the fan to the palm-rest and keyboard assembly.
3. Lift the fan off the palm-rest and keyboard assembly.

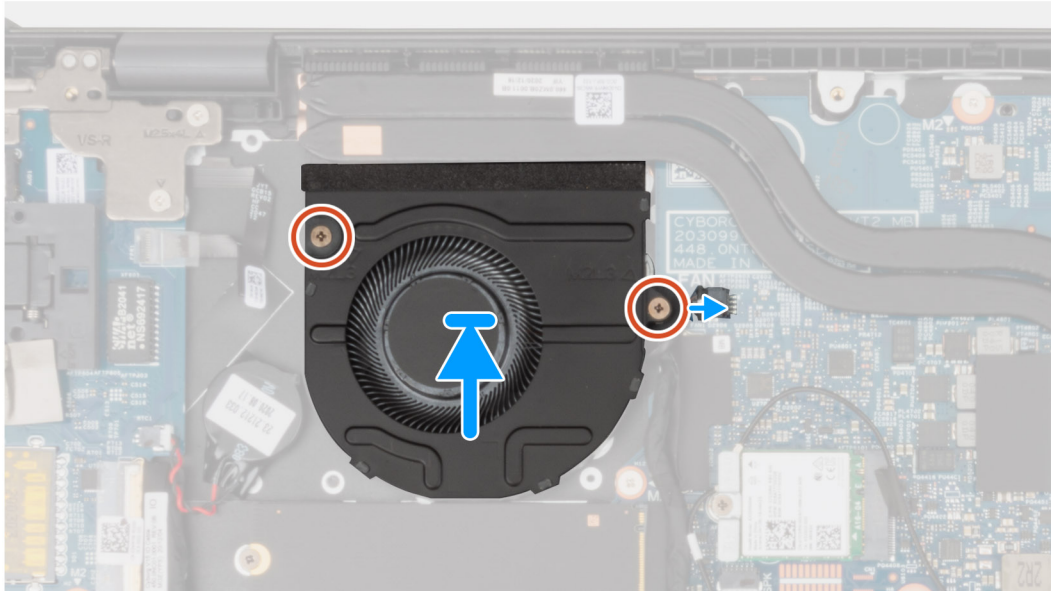
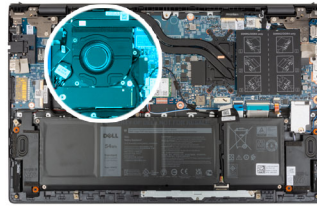
Installing the fan

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the fan and provides a visual representation of the installation procedure.




2x
M2x3



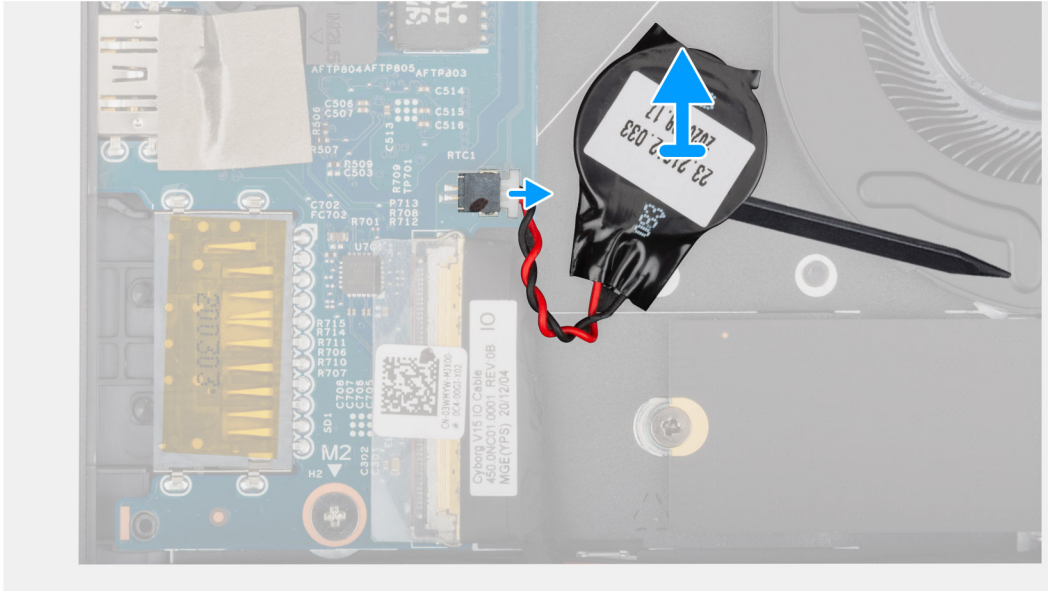
1. Using the alignment posts, place the fan on the palm-rest and keyboard assembly.
 2. Replace the two (M2x3) screws to secure the fan to the palm-rest and keyboard assembly.
 3. Connect the fan cable to the system board.
1. Install the [base cover](#).
 2. Follow the procedure in [After working inside your computer](#).

Coin-cell battery

Removing the coin-cell battery

1. Follow the procedure in [Before working inside your computer](#).
 **CAUTION: Removing the coin-cell battery resets the BIOS setup program's settings to default. It is recommended that you note the BIOS setup program's settings before removing the coin-cell battery.**
2. Remove the [base cover](#).

The following images indicate the location of the coin-cell battery and provide a visual representation of the removal procedure.

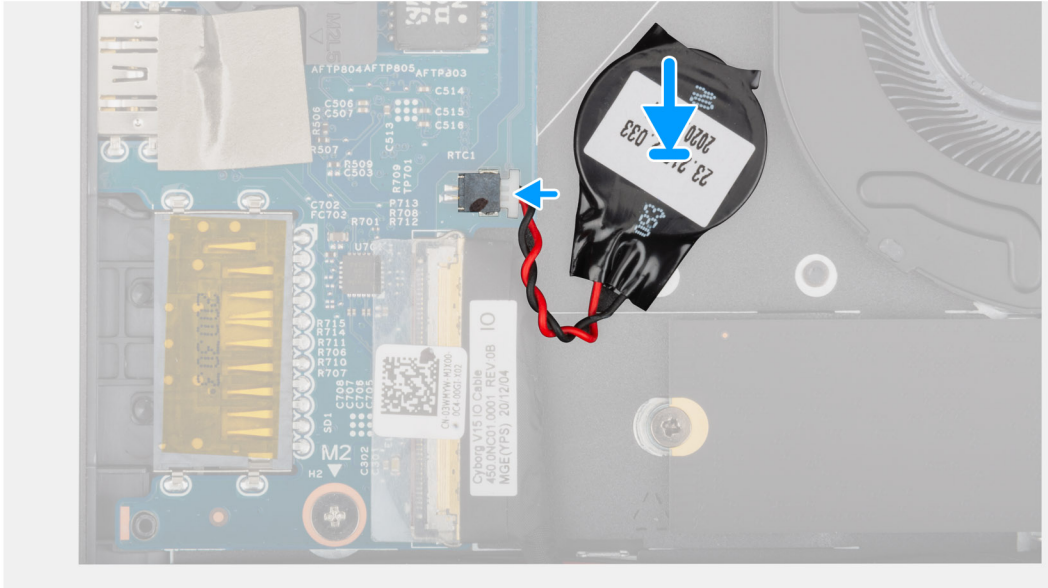


1. Disconnect the coin-cell battery cable from the I/O board.
2. Using the flat-end of a plastic scribe, peel the coin-cell battery from the palm-rest and keyboard assembly.

Installing the coin-cell battery

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the coin-cell battery and provides a visual representation of the installation procedure.



1. Adhere the coin-cell battery to the slot on the palm-rest and keyboard assembly.
2. Connect the coin-cell battery cable to the I/O board.
1. Install the [base cover](#).
2. Follow the procedure in [After working inside your computer](#).

Heat sink

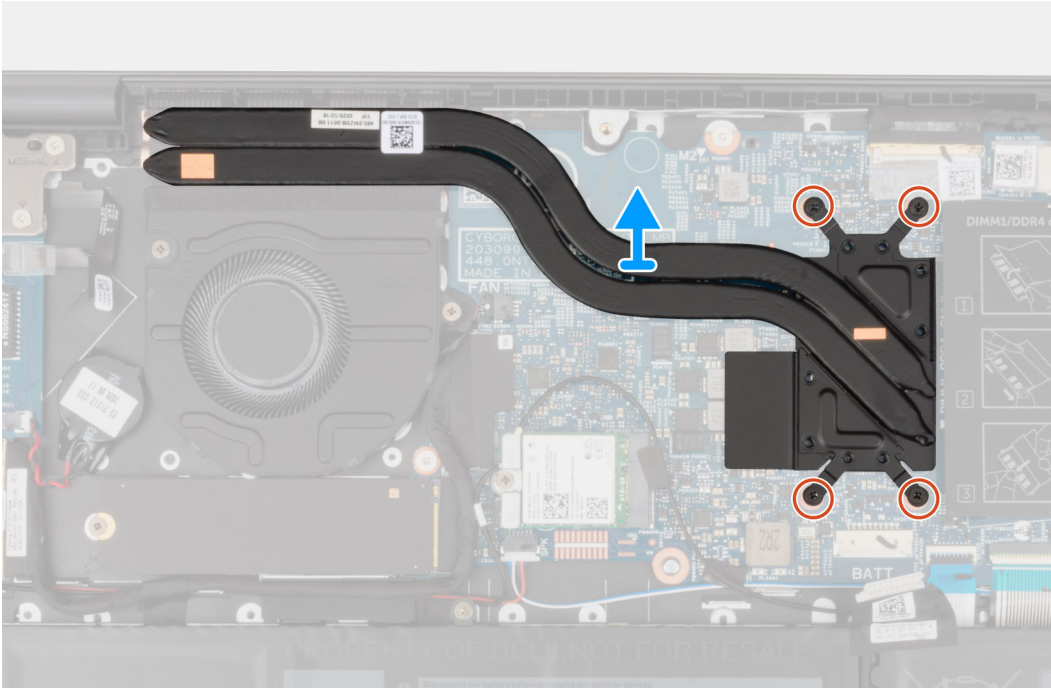
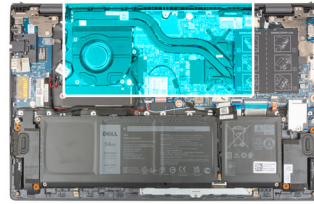
Removing the heatsink

1. Follow the procedure in [Before working inside your computer](#).
 - CAUTION:** For maximum cooling of the processor, do not touch the heat transfer areas on the heat sink. The oils in your skin can reduce the heat transfer capability of the thermal grease.
 - NOTE:** The heat sink may become hot during normal operation. Allow sufficient time for the heat sink to cool before you touch it.
2. Remove the [base cover](#).

The following images indicate the location of the heatsink and provide a visual representation of the removal procedure.



4x



1. In reverse sequential order (as indicated on the heat sink), loosen the four captive screws that secure the heat sink to the system board.
2. Lift the heat sink off the system board.

Installing the heatsink

If you are replacing a component, remove the existing component before performing the installation procedure.

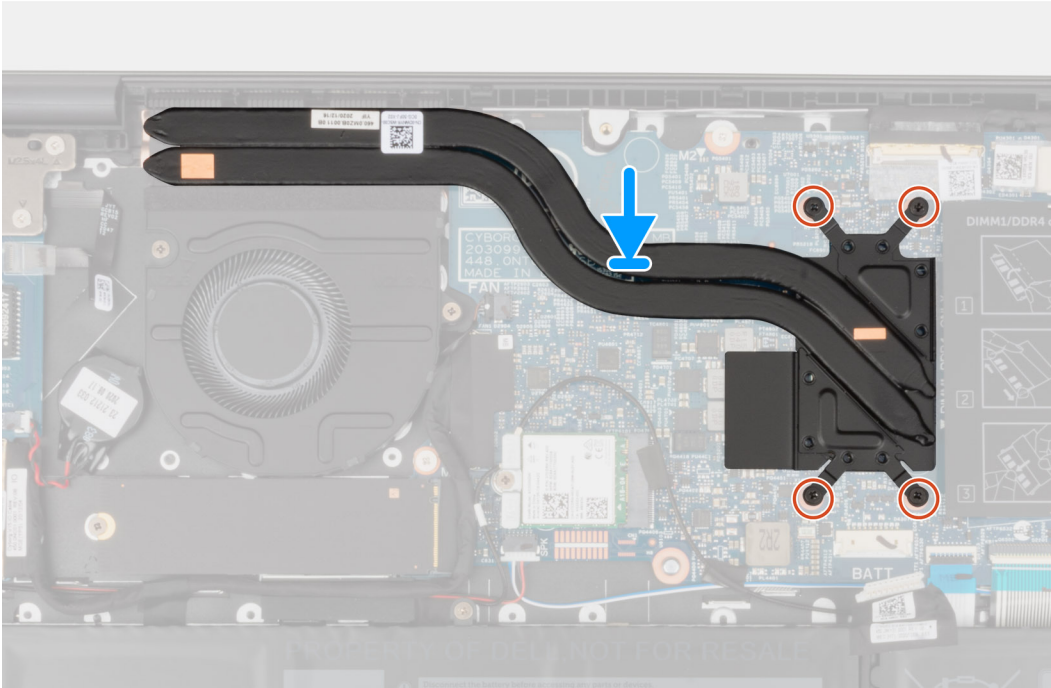
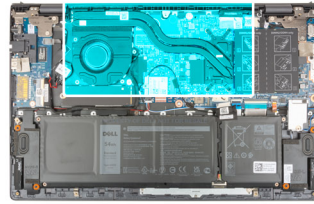
⚠ CAUTION: Incorrect alignment of the heat sink can damage the system board and processor.

i NOTE: If either the system board or the heat sink is replaced, use the thermal pad/paste provided in the kit to ensure that thermal conductivity is achieved.

The following image indicates the location of the heatsink and provides a visual representation of the installation procedure.



4x



1. Align the screw holes on the heat sink with the screw holes on the system board.
 2. In sequential order (as indicated on the heat sink), tighten the four captive screws that secure the heat sink to the system board.
1. Install the [base cover](#).
 2. Follow the procedure in [After working inside your computer](#).

Network-port bracket

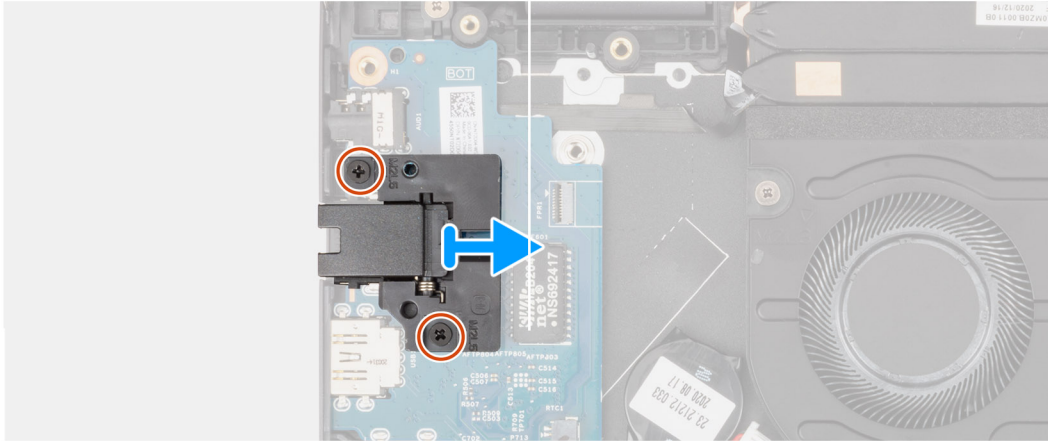
Removing the network-port bracket

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

The following image(s) indicate the location of the network-port bracket and provide a visual representation of the removal procedure.



2x
M2x5



1. Remove the two (M2x5) screws that secure the network-port bracket to the I/O board.
2. Lift the network-port bracket off the I/O board.

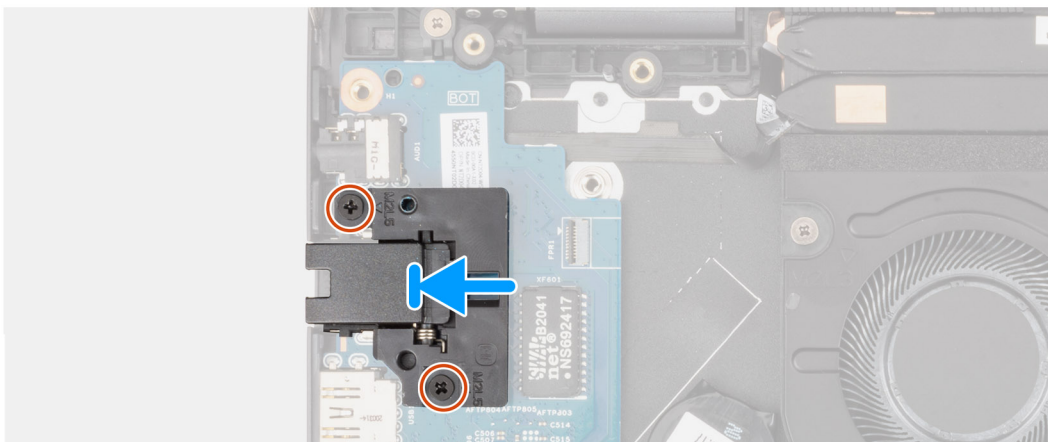
Installing the network-port bracket

If you are replacing a component, remove the existing component before performing the installation process.

The following image(s) indicate the location of the network-port bracket and provide a visual representation of the installation procedure.



2x
M2x5



1. Place the network-port bracket on the I/O board.
2. Align the screw holes on the network-port bracket to the screw holes on the I/O board.

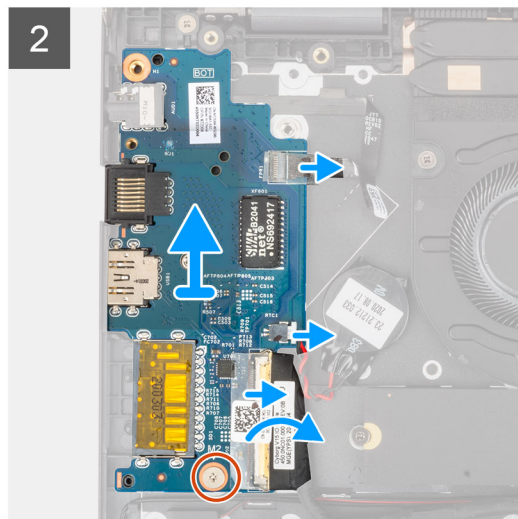
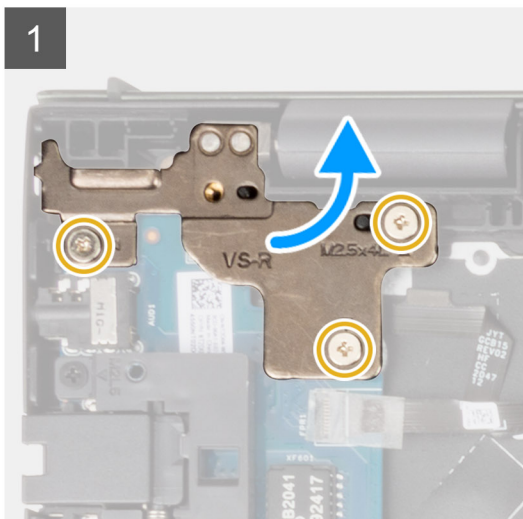
3. Replace the two (M2x5) screws that secure the network-port bracket to the I/O board.
1. Install the [base cover](#).
2. Follow the procedure in [After working inside your computer](#).

I/O board

Removing the I/O board

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [network-port bracket](#).

The following images indicate the location of the I/O board and provide a visual representation of the removal procedure.

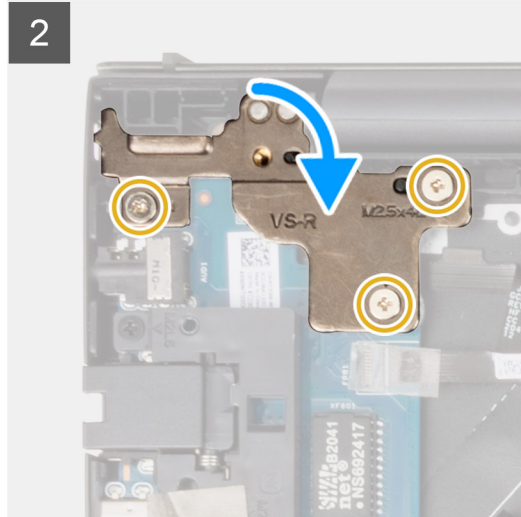
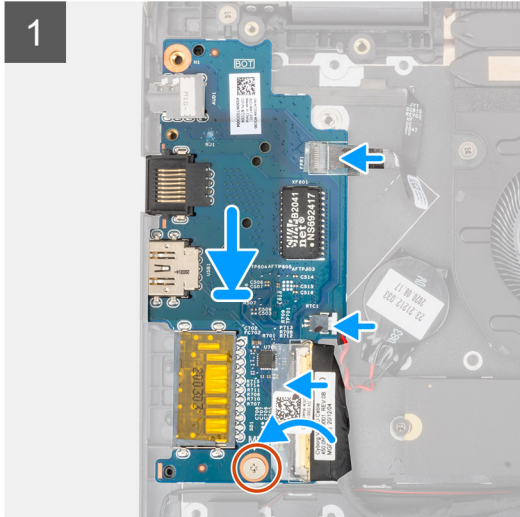


1. Remove the three (M2.5x4.5) screws that secure the left hinge to the palm-rest and keyboard assembly.
2. Open the display hinge at an angle of 90 degrees.
3. Open the latch, and disconnect the power button with optional fingerprint reader cable from the I/O board.
4. Disconnect the coin-cell battery cable from the I/O board.
5. Peel the tape that secures the I/O-board cable to the I/O board.
6. Open the latch and disconnect the I/O-board cable from the I/O board.
7. Remove the screw (M2x2) that secures the I/O board to the palm-rest and keyboard assembly.
8. Lift the I/O board off the palm-rest and keyboard assembly.

Installing the I/O board

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the I/O board and provides a visual representation of the installation procedure.



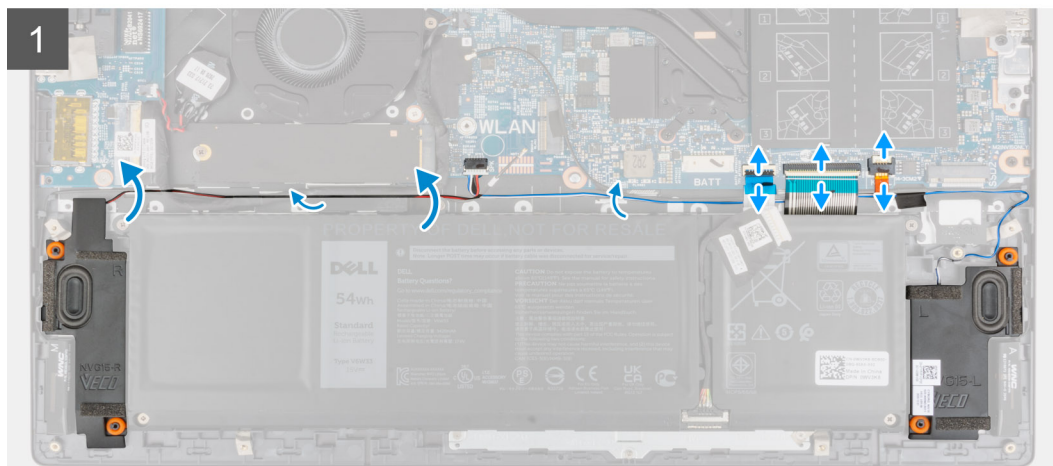
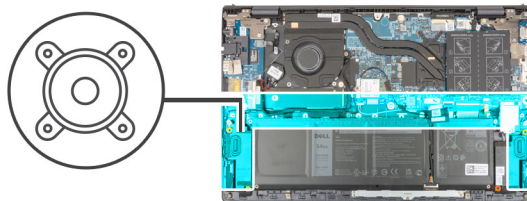
1. Slide the I/O board into the slots on the palm-rest and keyboard assembly.
 2. Align the screw hole on the I/O board with the screw hole on the palm-rest and keyboard assembly.
 3. Replace the screw (M2x2) that secures the I/O board to the palm-rest and keyboard assembly.
 4. Connect the power-button with optional fingerprint reader cable into the connector on the I/O board and close the latch to secure the cable.
 5. Connect the coin-cell battery cable to the I/O board.
 6. Connect the I/O-board cable to the I/O board and close the latch to secure the cable.
 7. Adhere the tape that secures the I/O-board cable to the I/O board.
 8. Close the left display hinge.
 9. Replace the three (M2.5x4.5) screws that secure the left display hinge to the palm-rest and keyboard assembly.
1. Install the [network-port bracket](#).
 2. Install the [base cover](#).
 3. Follow the procedure in [After working inside your computer](#).

Speakers

Removing the speakers

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

The following images indicate the location of the speakers and provide a visual representation of the removal procedure.

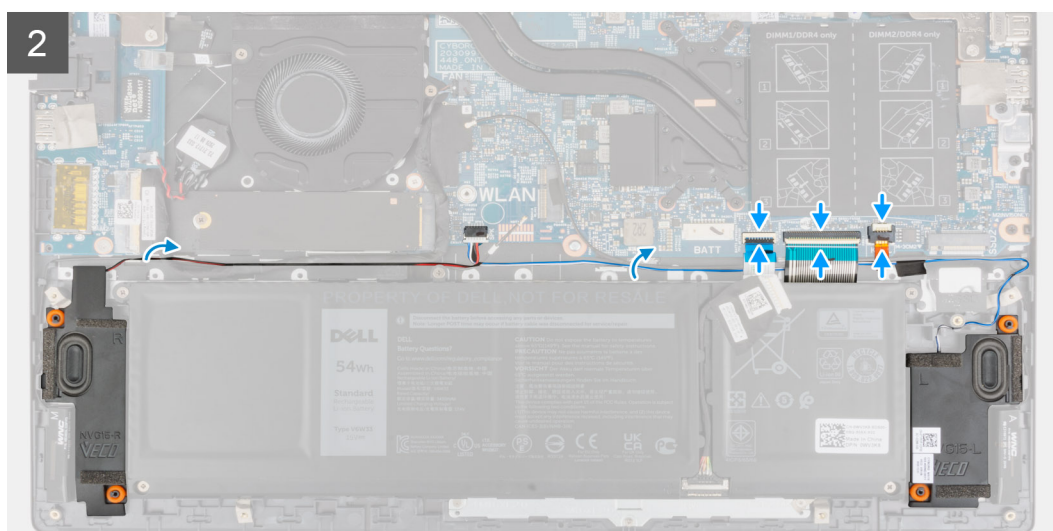
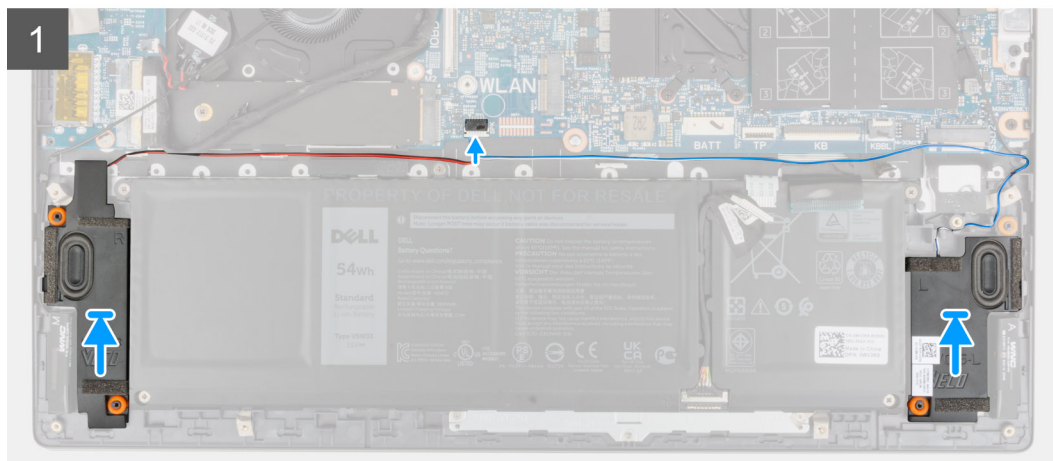
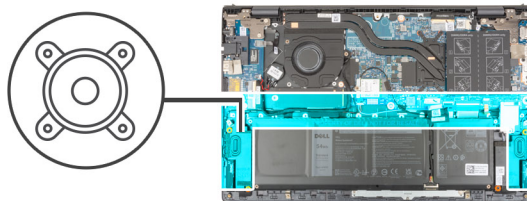


1. Open the latch and disconnect the keyboard backlit cable, keyboard cable, and the touchpad cable from the system board.
2. Note the speaker cable routing, and remove the speaker cable from the routing guides on the palm-rest and keyboard assembly.
3. Peel the tape that secures the speaker cable to the palm-rest and keyboard assembly.
4. Disconnect the speaker cable from the system board.
5. Lift the speakers, along with the cable, off the palm-rest and keyboard assembly.

Installing the speakers

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the speaker and provides a visual representation of the installation procedure.



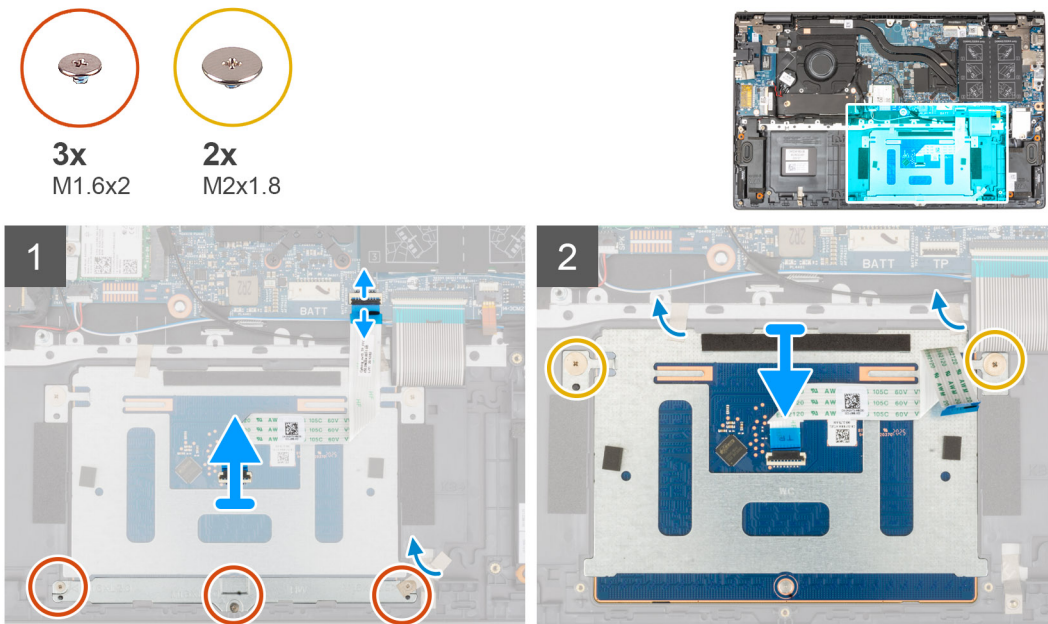
1. Using the alignment posts and rubber grommets, place the speakers on the slots of the palm-rest and keyboard assembly.
 2. Connect the speaker cable to the system board.
 3. Route the speaker cable through the routing guides on the palm-rest and keyboard assembly.
 4. Connect the keyboard backlit cable, keyboard cable, and the touchpad cable to its connectors on the system board and close the latch to secure the cable.
1. Install the [base cover](#).
 2. Follow the procedure in [After working inside your computer](#).

Touchpad

Removing the touchpad

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).

The following images indicate the location of the touchpad and provide a visual representation of the removal procedure.

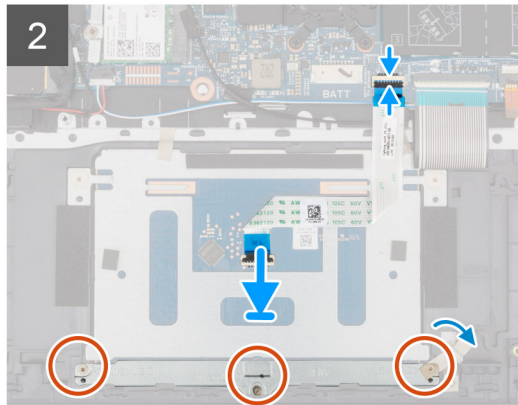
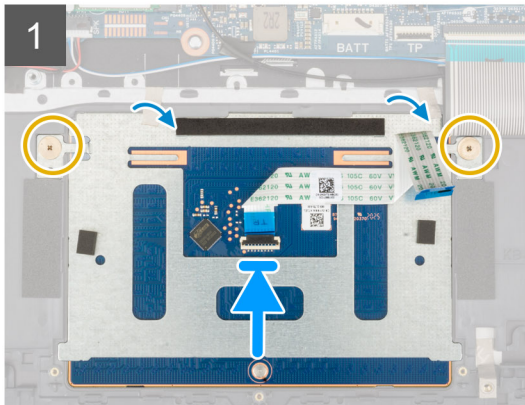
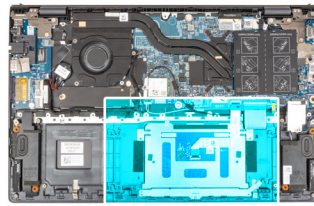
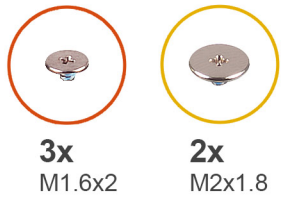


1. Open the latch and disconnect the touchpad cable from the system board.
2. Remove the three (M1.6x2) screws that secure the touchpad bracket to the palm-rest and keyboard assembly.
3. Peel the tape that secures the touchpad bracket to the palm-rest and keyboard assembly.
4. Lift the touchpad bracket off the palm-rest and keyboard assembly.
5. Remove the two (M2x1.8) screws that secure the touchpad to the palm-rest and keyboard assembly.
6. Peel the tapes that secure the touchpad to the palm-rest and keyboard assembly.
7. Lift the touchpad, along with the touchpad cable, off the palm-rest and keyboard assembly.

Installing the touchpad

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the touchpad and provides a visual representation of the installation procedure.



1. Slide the touchpad into the slot on the palm-rest and keyboard assembly.

NOTE: Turn the computer over and open the display. Ensure that the touchpad is equally aligned along all four sides.



2. Replace the two (M2x1.8) screws that secure the touchpad to the palm-rest and keyboard assembly.
 3. Adhere the tapes that secure the touchpad to the palm-rest and keyboard assembly.
 4. Align the screw holes on the touchpad bracket with the screw holes on the palm-rest and keyboard assembly.
 5. Replace the three (M1.6x2) screws that secure the touchpad bracket to the palm-rest and keyboard assembly.
 6. Adhere the tape that secures the touchpad bracket to the palm-rest and keyboard assembly.
 7. Slide the touchpad cable into the connector on the touchpad and close the latch to secure the cable.
1. Install the [3-cell battery](#) or [4-cell battery](#), whichever applicable.
 2. Install the [base cover](#).
 3. Follow the procedure in [After working inside your computer](#).

Display assembly

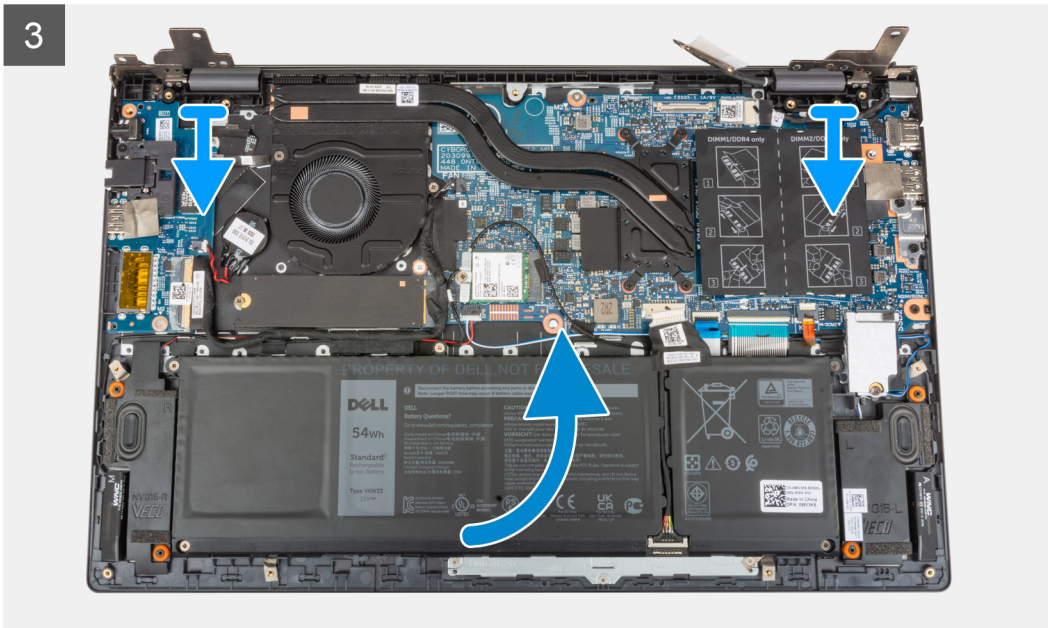
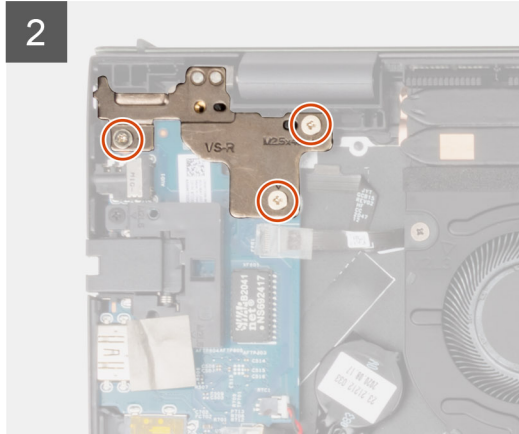
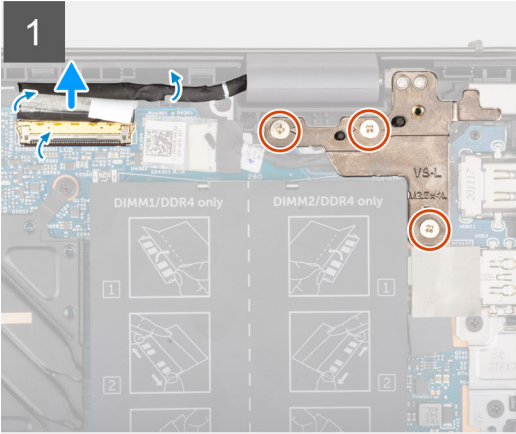
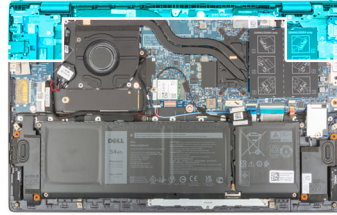
Removing the display assembly

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

The following images indicate the location of the display assembly and provide a visual representation of the removal procedure.



6x
M2.5x4.5





1. Peel the tape that secures the display cable to the system board.
2. Open the latch and disconnect the display cable from the system board.
3. Remove the three (M2.5x4.5) screws that secure the left-display hinge to the system board.
4. Remove the three (M2.5x4.5) screws that secure the right-display hinge to the system board.
5. Open the display hinges at an angle of 90 degrees.
6. Gently slide the palm-rest and keyboard assembly off the display assembly.

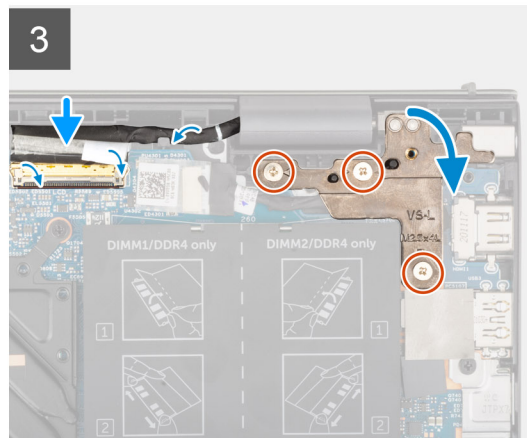
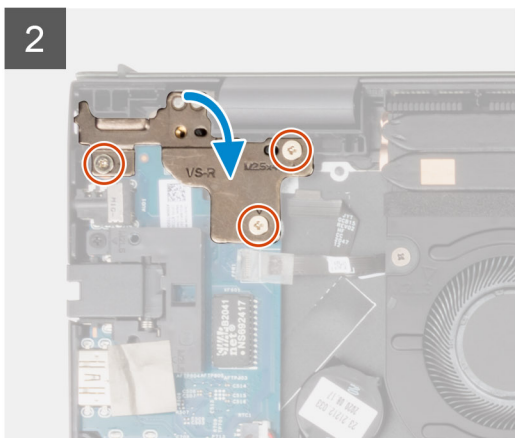
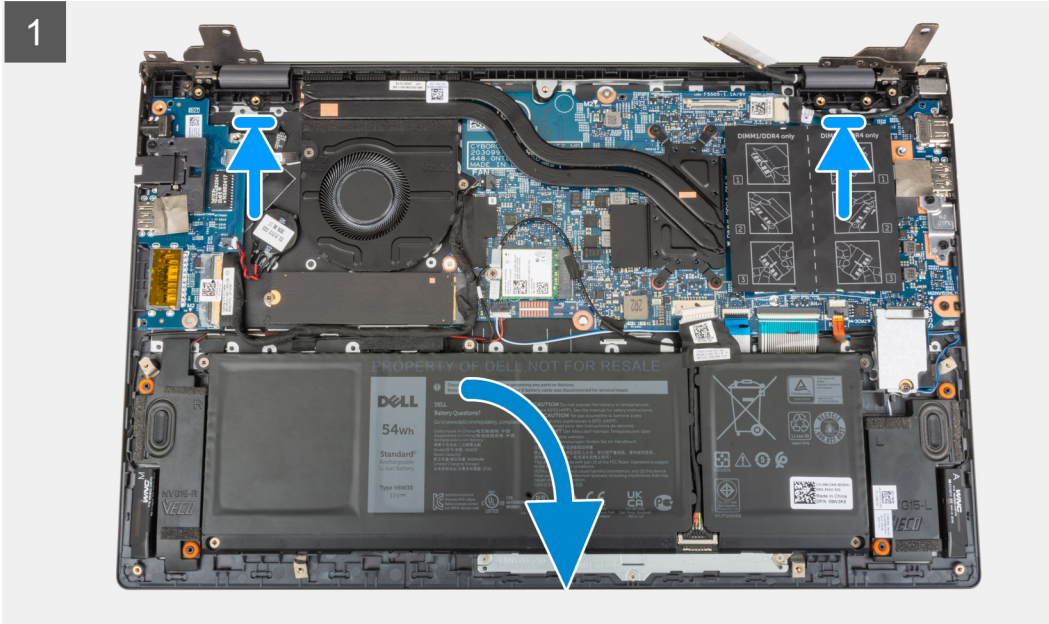
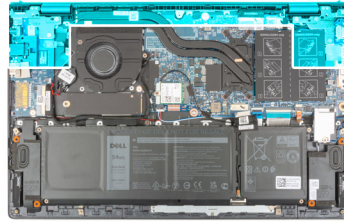
Installing the display assembly

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the display assembly and provides a visual representation of the installation procedure.



6x
M2.5x4.5



1. Slide the display assembly at an angle, and place the display assembly on the palm-rest and keyboard assembly.
 2. Using the alignment posts, close the display hinges.
 3. Replace the three (M2.5x4.5) screws that secure the right-display hinge to the system board.
 4. Replace the three (M2.5x4.5) screws that secure the left-display hinge to the system board.
 5. Slide the display cable into the connector on the system board and close the latch to secure the cable.
 6. Adhere the tape that secures the display cable to the system board.
1. Install the [base cover](#).
 2. Follow the procedure in [After working inside your computer](#).

Power button with optional fingerprint reader

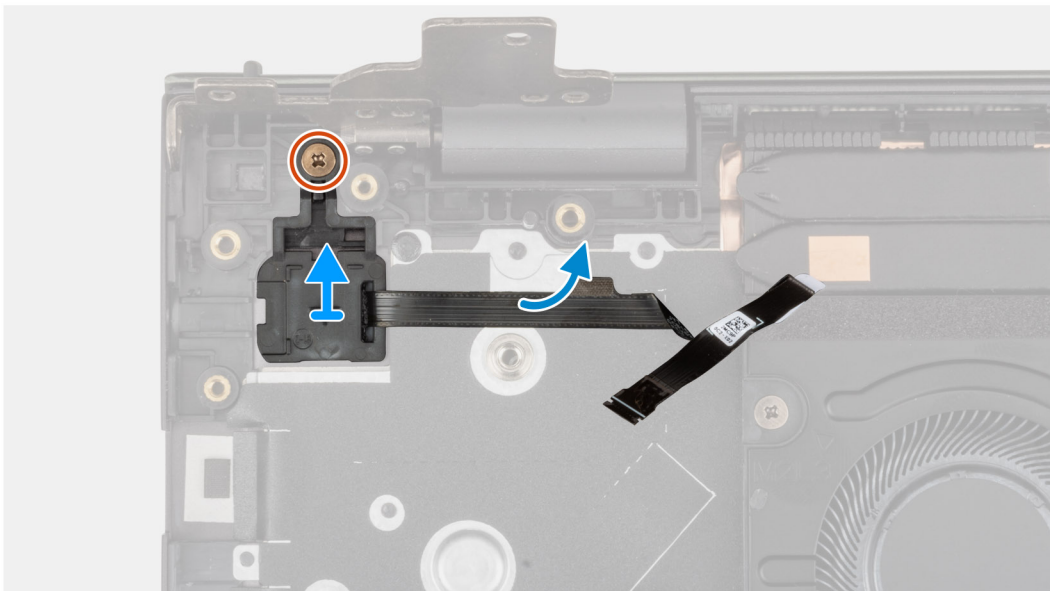
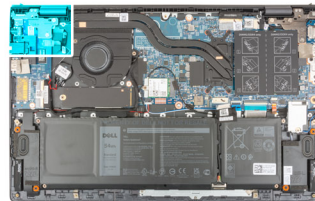
Removing the power button with optional fingerprint reader

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [I/O board](#).

The following images indicate the location of the power-button with optional fingerprint reader and provide a visual representation of the removal procedure.



1x
M2x3



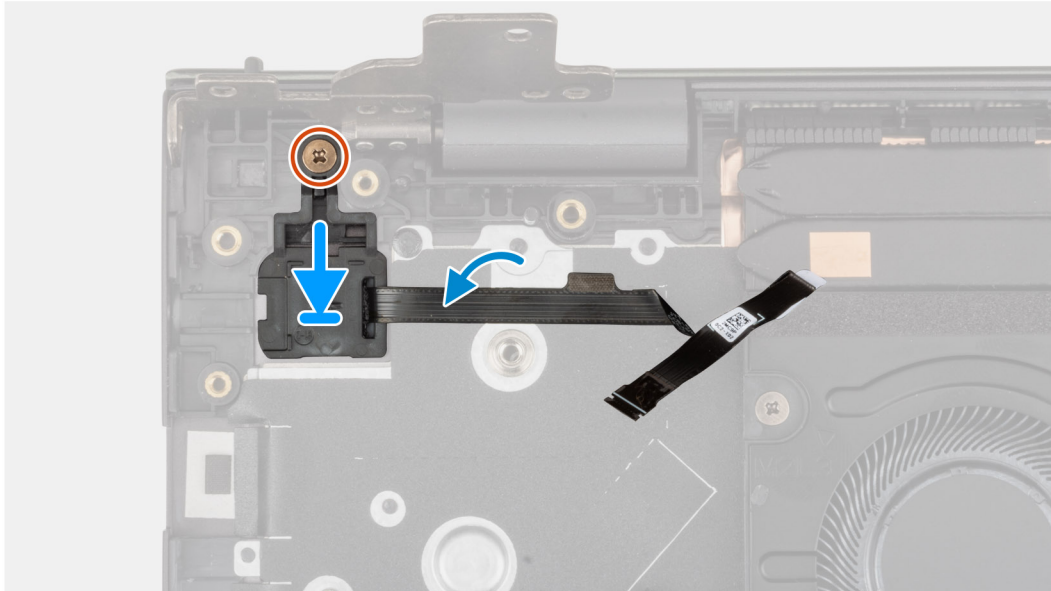
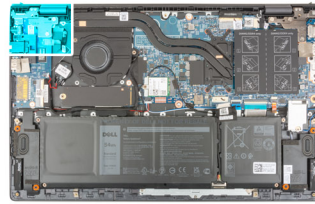
1. Remove the screw (M2x3) that secures the power button with optional fingerprint reader to the palm-rest and keyboard assembly.
2. Lift the power button with optional fingerprint reader off the palm-rest and keyboard assembly.

Installing the power button with optional fingerprint reader

The following images indicate the location of the power button with optional fingerprint reader and provide a visual representation of the installation procedure.



1x
M2x3



1. Align and place the power button with optional fingerprint reader on the palm-rest and keyboard assembly.
 2. Replace the screw (M2x3) that secures the power button with optional fingerprint reader to the palm-rest and keyboard assembly.
1. Install the [I/O board](#).
 2. Install the [base cover](#).
 3. Follow the procedure in [After working inside your computer](#).

Power-adapter port

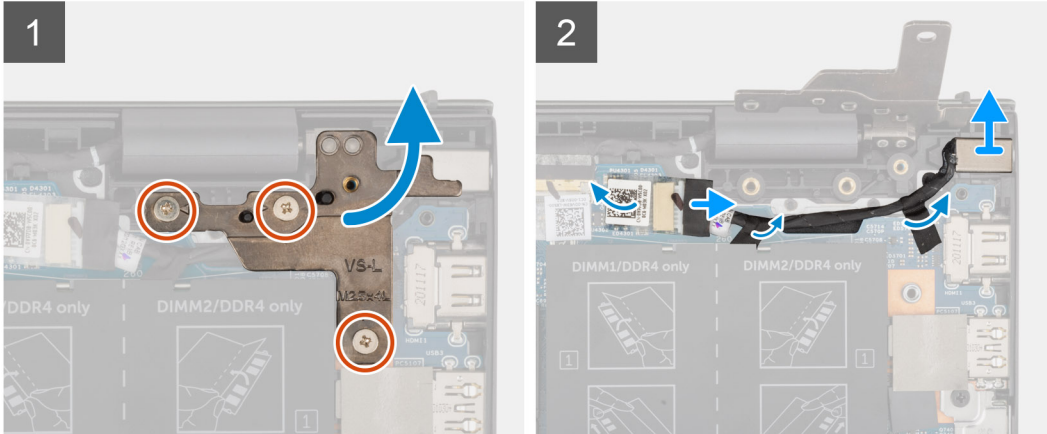
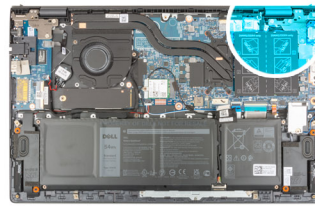
Removing the power-adapter port

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

The following images indicate the location of the power-adapter port and provide a visual representation of the removal procedure.



3x
M2.5x4.5



1. Remove the three (M2.5x4.5) screws that secure the right display-hinge to the system board.
2. Open the display hinge at an angle of 90 degrees.
3. Disconnect the power-adapter port cable from the system board.
4. Peel the tape that secures the power-adapter port cable to the system board.
5. Remove the power-adapter port cable from the routing guide on the palm-rest and keyboard assembly.
6. Lift the power-adapter port, along with its cable, off the palm-rest and keyboard assembly.

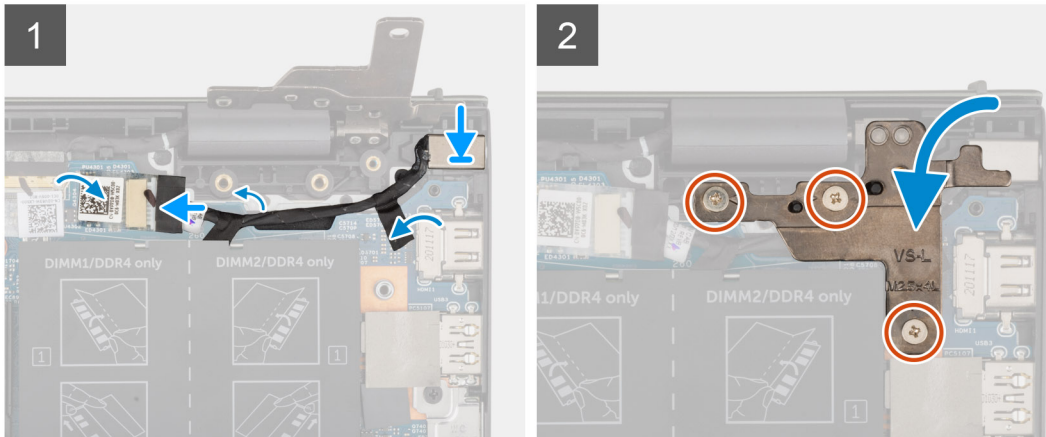
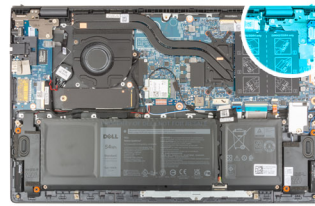
Installing the power-adapter port

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the power-adapter port and provides a visual representation of the installation procedure.



3x
M2.5x4.5



1. Place the power-adapter port, along with its cable, into the slot on the palm-rest and keyboard assembly.
 2. Route the power-adapter port cable through the routing guide on the palm-rest and keyboard assembly.
 3. Adhere the tape that secures the power-adapter port cable to the system board.
 4. Connect the power-adapter port cable to the system board.
 5. Close the right display-hinge and align the screw holes on the right display-hinge with the screw holes on the system board and palm-rest and keyboard assembly.
 6. Replace the three (M2.5x4.5) screws that secure the right display-hinge to the system board and palm-rest and keyboard assembly.
1. Install the [base cover](#).
 2. Follow the procedure in [After working inside your computer](#).

System board

Removing the system board

1. Follow the procedure in [Before working inside your computer](#).
 - i** **NOTE:** Your computer's Service Tag is stored in the system board. You must enter the Service Tag in the BIOS setup program after you replace the system board.
 - i** **NOTE:** Replacing the system board removes any changes that you have made to the BIOS using the BIOS setup program. You must make the appropriate changes again after you replace the system board.
 - i** **NOTE:** Before disconnecting the cables from the system board, note the location of the connectors so that you can reconnect the cables correctly after you replace the system board.
2. Remove the [base cover](#).
3. Remove the [3-cell battery](#) or [4-cell battery](#), whichever applicable.
4. Remove the [memory module](#).
5. Remove the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#) from M.2 slot one, whichever applicable.
6. Remove the [M.2 2230 solid-state drive](#) from M.2 slot two, if applicable.
7. Remove the [wireless card](#).
8. Remove the [fan](#).
9. Remove the [heat sink](#).

NOTE: When removing the system board to replace/access other parts, the system board can be removed and installed with the heat sink attached in order to simplify the procedure and preserve the thermal bond between the system board and heat-sink.

The following image indicates the connectors on your system board.

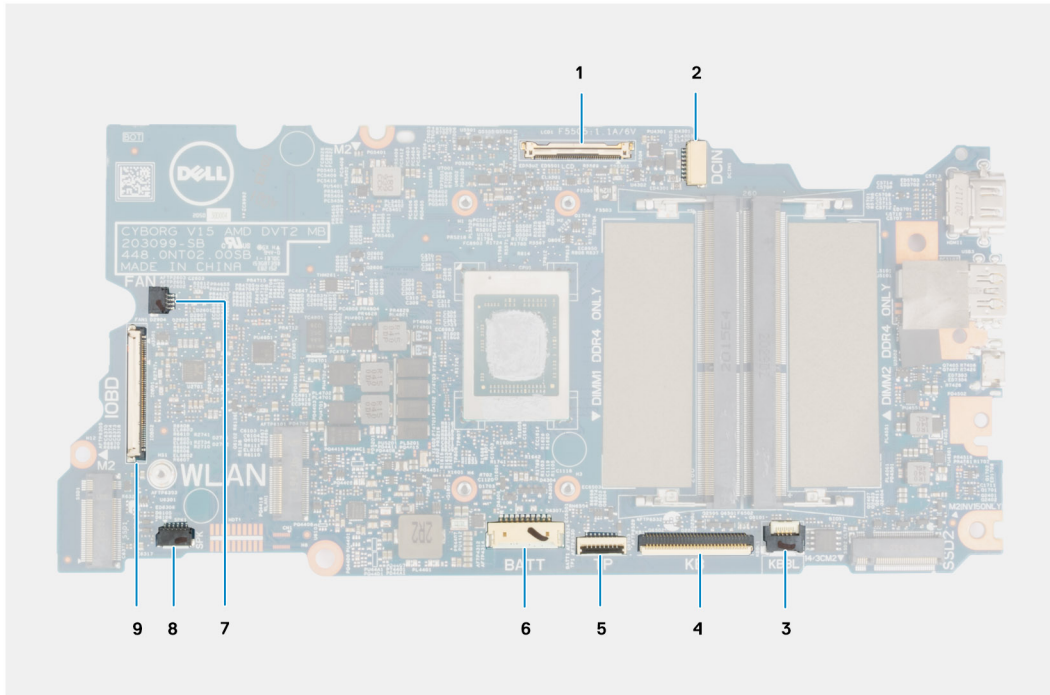
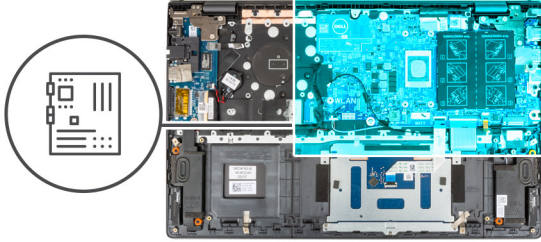
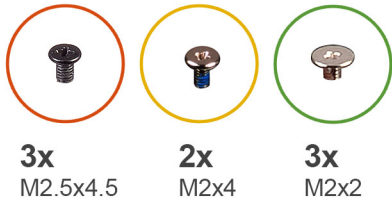


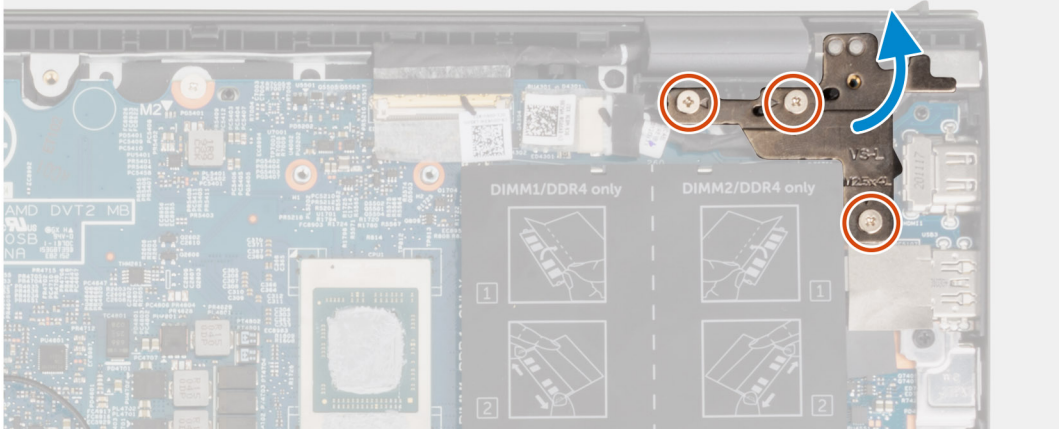
Figure 1. System board connectors

1. Display cable connector
2. Power-adapter port cable connector
3. Keyboard backlit cable connector
4. Keyboard cable connector
5. Touchpad cable connector
6. Battery cable connector
7. Fan cable connector
8. Speaker cable connector
9. I/O-board cable connector

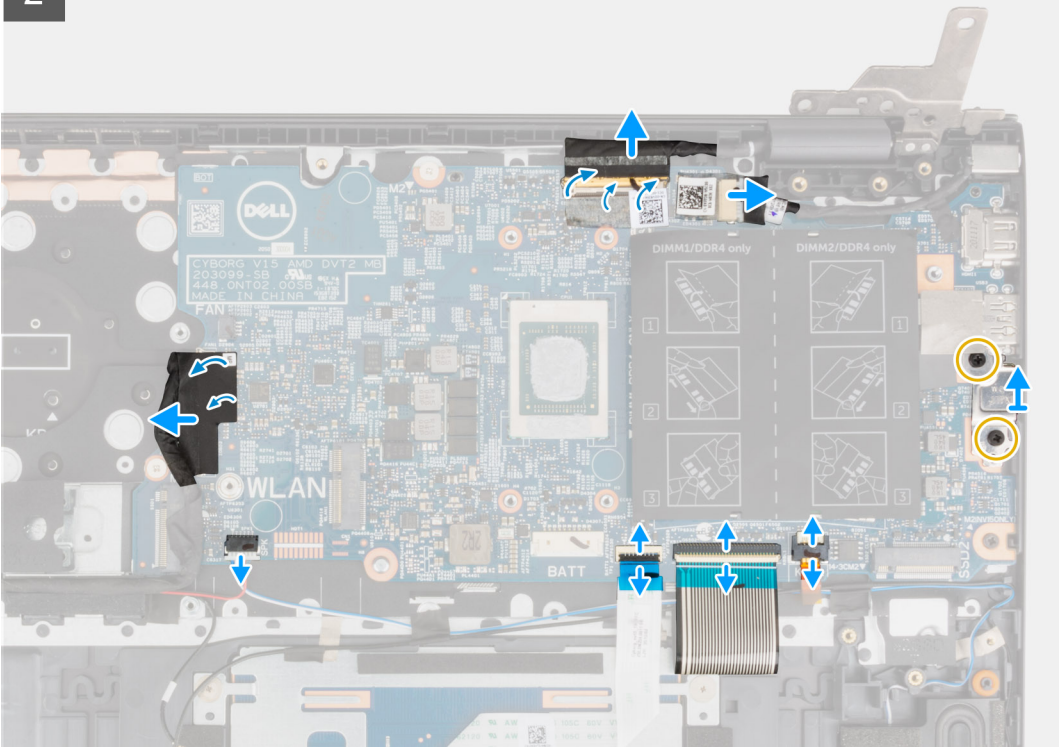
The following images indicate the location of the system board and provide a visual representation of the removal procedure.

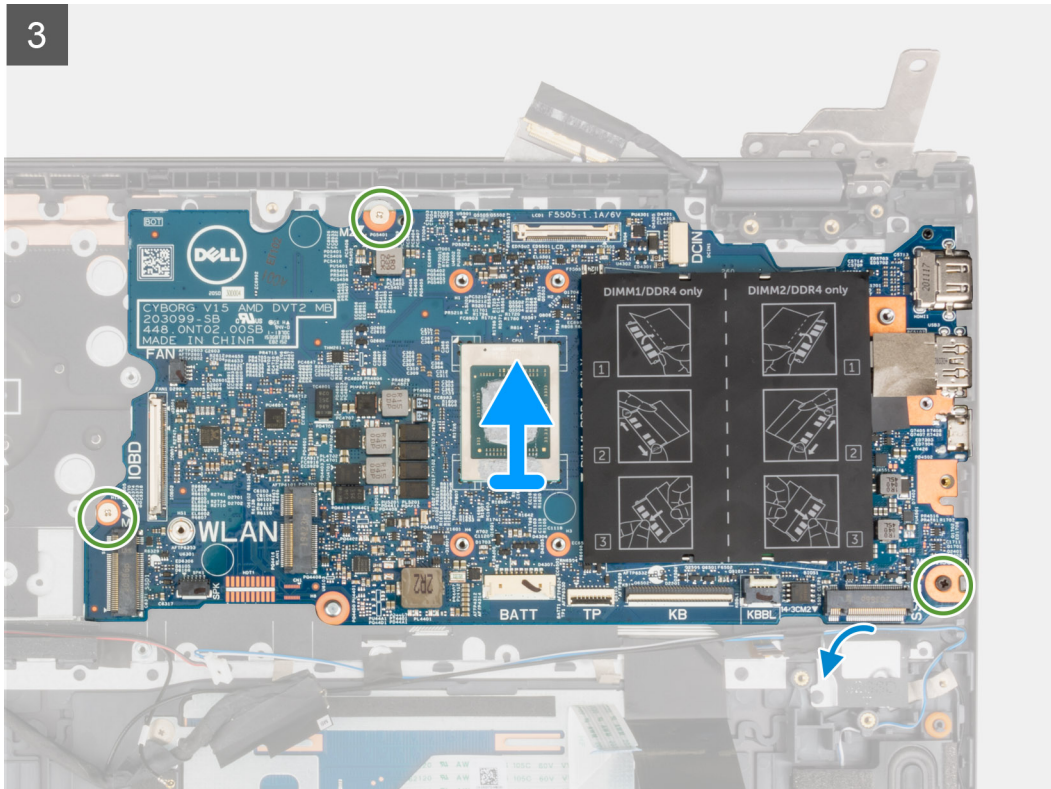


1



2





1. Remove the three (M2.5x4.5) screws that secure the right display hinge to the palm-rest and keyboard assembly.
2. Open the right display hinge at an angle of 90 degrees.
3. Peel the tape that secures the display cable to the system board.
4. Open the latch and disconnect the display cable from the system board.
5. Peel the tape and disconnect the power-adaptor port cable from the system board.
6. Remove the two (M2x4) screws that secure the USB Type-C bracket to the system board.
7. Open the latch, and disconnect the keyboard backlit cable from the system board.
8. Open the latch, and disconnect the keyboard cable from the system board.
9. Open the latch, and disconnect the touchpad cable from the system board.
10. Disconnect the speaker cable from the system board.
11. Peel the tape and disconnect the I/O-board cable from the system board.
12. Remove the three (M2x2) screws that secure the system board to the palm-rest and keyboard assembly.
13. Lift the system board off the palm-rest and keyboard assembly.

Installing the system board

If you are replacing a component, remove the existing component before performing the installation procedure.

- i** **NOTE:** When replacing/accessing other parts, the system board can be installed with the heat sink attached in order to simplify the procedure and preserve the thermal bond between the system board and heat-sink.
- i** **NOTE:** Your computer's Service Tag is stored in the system board. You must enter the Service Tag in the BIOS setup program after you replace the system board.
- i** **NOTE:** Replacing the system board removes any changes you have made to the BIOS using the BIOS setup program. You must make the appropriate changes again after you replace the system board.

The following image indicates the connectors on your system board.

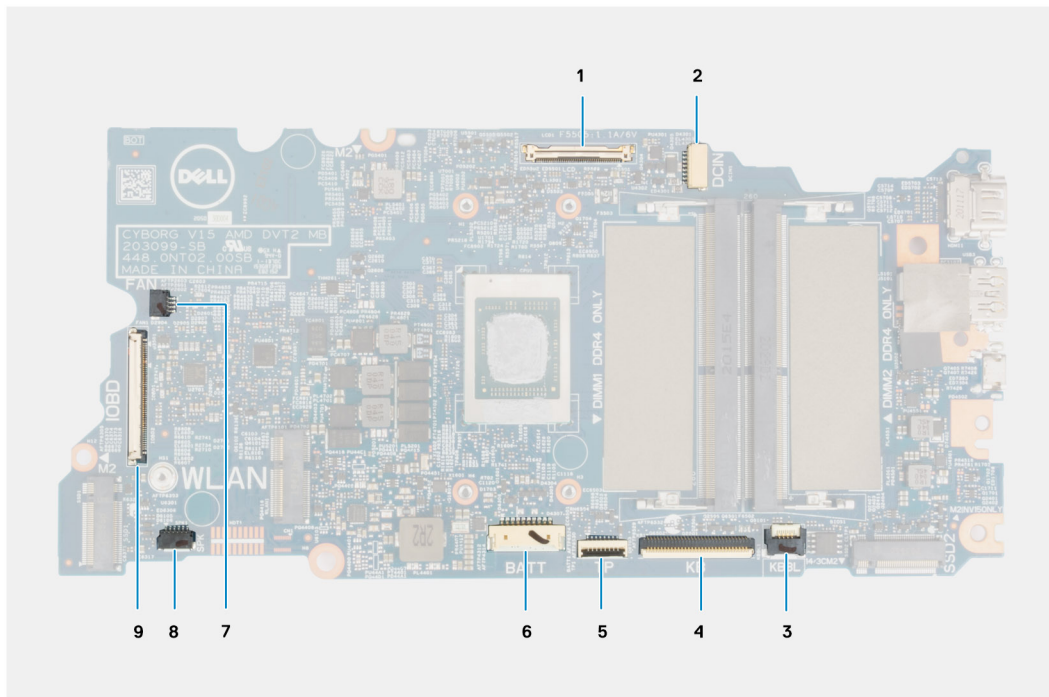


Figure 2. System board connectors

1. Display cable connector
2. Power-adaptor port cable connector
3. Keyboard backlit cable connector
4. Keyboard cable connector
5. Touchpad cable connector
6. Battery cable connector
7. Fan cable connector
8. Speaker cable connector
9. I/O-board cable connector

The following image indicates the location of the system board and provides a visual representation of the installation procedure.



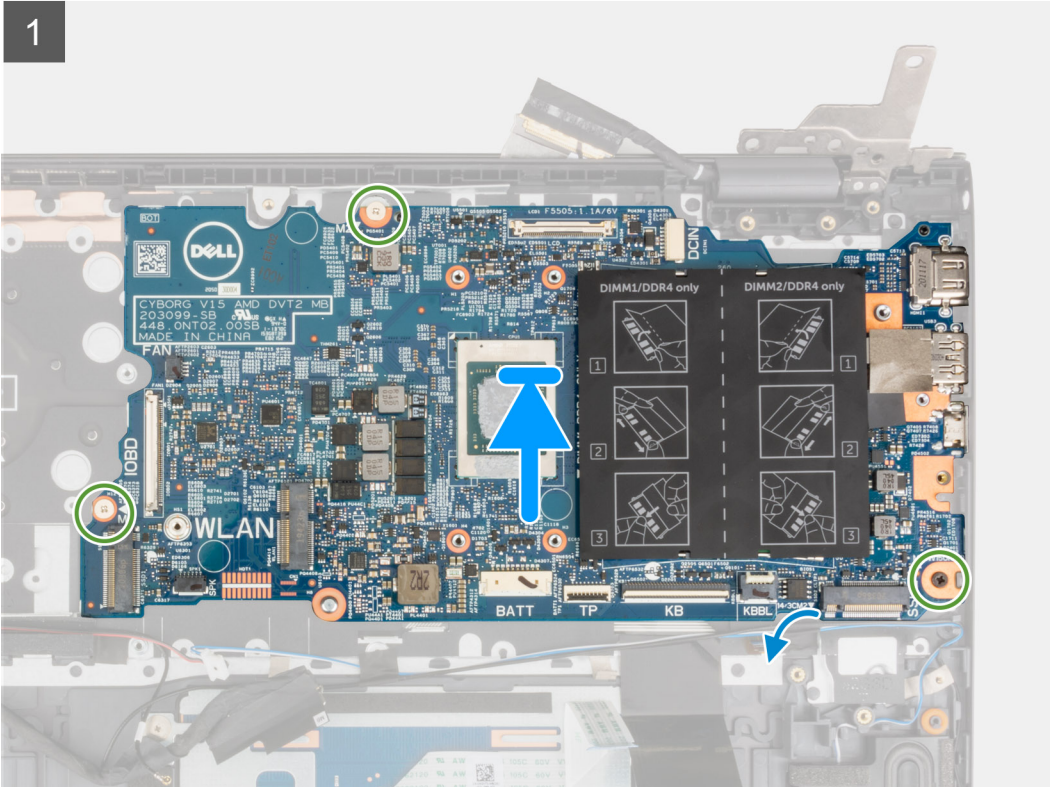
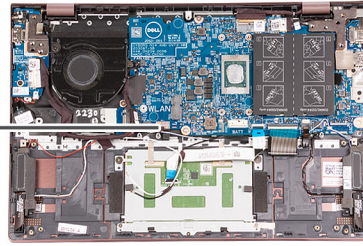
3x
M2.5x4.5



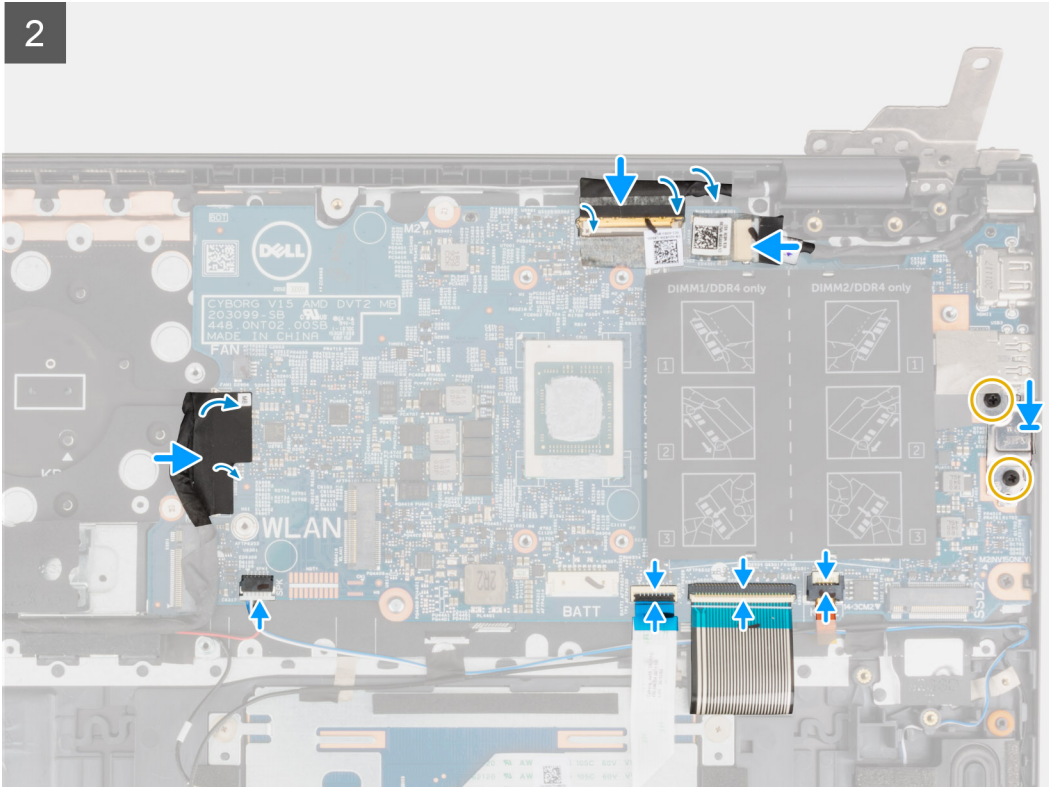
2x
M2x4



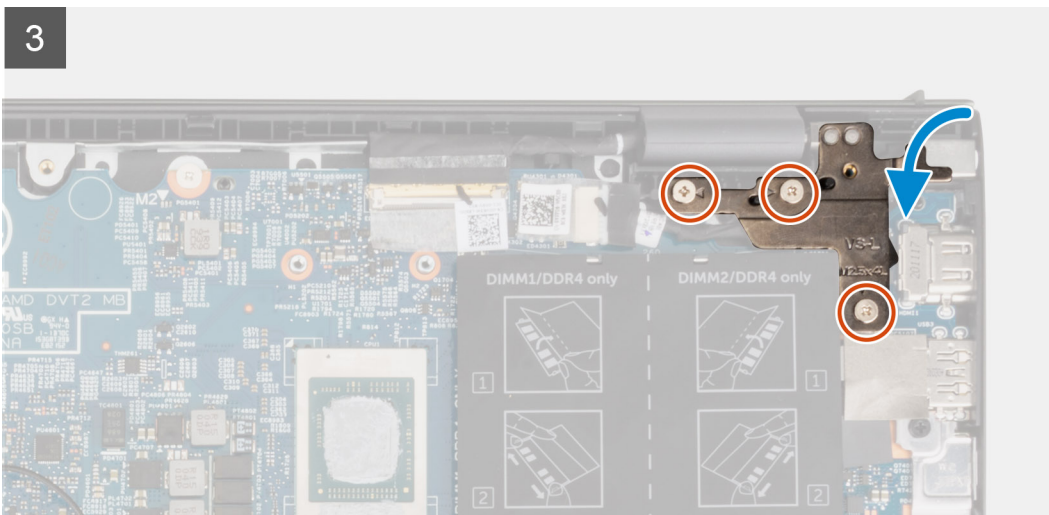
3x
M2x2



2



3




1. Align and place the system board on the palm-rest and keyboard assembly.
2. Replace the three (M2x2) screws that secure the system board to the palm-rest and keyboard assembly.
3. Connect the display cable to the system board and close the latch to secure the cable.
4. Adhere the tape that secures the display cable to the system board.
5. Connect the power-adapter port cable to the system board.
6. Adhere the tape that secures the power-adapter port cable to the system board.
7. Align the screw holes on the USB Type-C port bracket with the screw holes on the system board.
8. Replace the two (M2x4) screws that secure the USB Type-C port bracket to the system board.
9. Connect the keyboard backlit cable to the system board and close the latch to secure the cable.
10. Connect the keyboard cable to the system board and close the latch to secure the cable.
11. Connect the touchpad cable to the system board and close the latch to secure the cable.
12. Connect the speaker cable to the system board.
13. Connect the I/O-board cable to the system board.
14. Adhere the tape that secures the I/O-board cable to the system board.

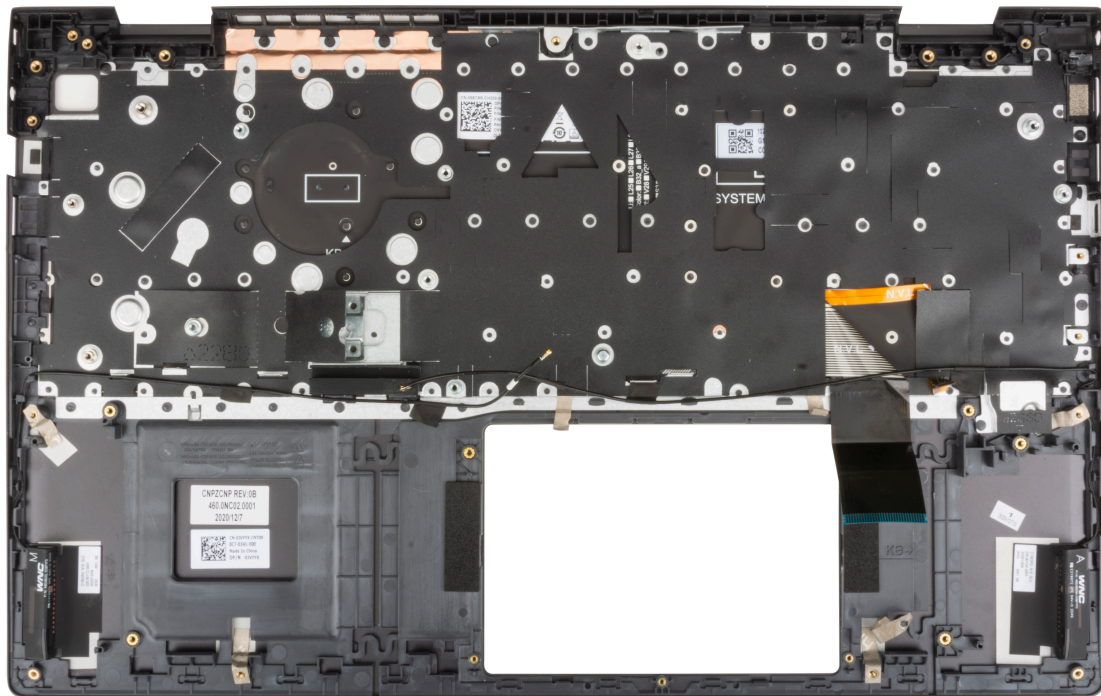
15. Close the right display hinge.
 16. Replace the three (M2.5x4.5) screws that secure the right display-hinge to the palm-rest and keyboard assembly.
1. Install the [heat sink](#).
 2. Install the [fan](#).
 3. Install the [wireless card](#).
 4. Install the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#) in M.2 slot one, whichever applicable.
 5. Install the [M.2 2230 solid-state drive](#) in M.2 slot two, if applicable.
 6. Install the [memory module](#).
 7. Install the [3-cell battery](#) or [4-cell battery](#), whichever applicable.
 8. Install the [base cover](#).
 9. Follow the procedure in [After working inside your computer](#).

Palm-rest and keyboard assembly

Removing the palm-rest and keyboard assembly

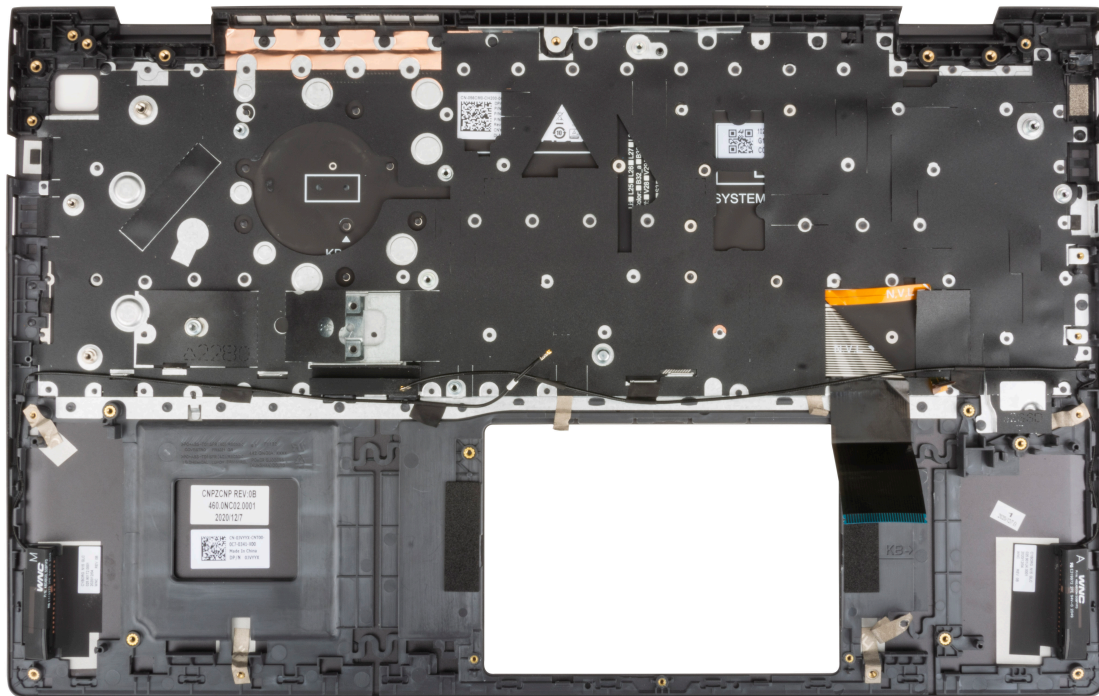
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [3-cell battery](#) or [4-cell battery](#), whichever applicable.
4. Remove the [memory module](#).
5. Remove the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#) from M.2 slot one, whichever applicable.
6. Remove the [M.2 2230 solid-state drive](#) from M.2 slot two, if applicable.
7. Remove the [wireless card](#).
8. Remove the [fan](#).
9. Remove the [coin-cell battery](#).
10. Remove the [I/O board](#).
11. Remove the [system board](#).
 **NOTE:** The system board can be removed along with the heat sink.
12. Remove the [power-button with optional fingerprint reader](#).
13. Remove the [power-adapter port](#).
14. Remove the [speakers](#).
15. Remove the [touchpad](#).
16. Remove the [display assembly](#).

After performing the steps in the pre-requisites, you are left with the palm-rest and keyboard assembly.



Installing the palm-rest and keyboard assembly

If you are replacing a component, remove the existing component before performing the installation procedure. Place the palm-rest and keyboard assembly on a flat surface.



1. Install the [display assembly](#).
2. Install the [touchpad](#).
3. Install the [speakers](#).
4. Install the [power-adapter port](#).
5. Install the [power-button with optional fingerprint reader](#).
6. Install the [system board](#).
 - i** **NOTE:** The system board can be installed along with the heat sink.
7. Install the [I/O board](#).
8. Install the [fan](#).
9. Install the [coin-cell battery](#).
10. Install the [wireless card](#).
11. Install the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#) in M.2 slot one, whichever applicable.
12. Install the [M.2 2230 solid-state drive](#) in M.2 slot two, if applicable.
13. Install the [memory module](#).
14. Install the [3-cell battery](#) or [4-cell battery](#), whichever applicable.
15. Install the [base cover](#).
16. Follow the procedure in [After working inside your computer](#).

Drivers and downloads

When troubleshooting, downloading or installing drivers it is recommended that you read the Dell Knowledge Based article, Drivers and Downloads FAQ [000123347](#).

System setup

CAUTION: Unless you are an expert computer user, do not change the settings in the BIOS Setup program. Certain changes can make your computer work incorrectly.

NOTE: Before you change BIOS Setup program, it is recommended that you write down the BIOS Setup program screen information for future reference.

Use the BIOS Setup program for the following purposes:

- Get information about the hardware installed in your computer, such as the amount of RAM and the size of the hard drive.
- Change the system configuration information.
- Set or change a user-selectable option, such as the user password, type of hard drive installed, and enabling or disabling base devices.

Topics:

- [BIOS overview](#)
- [Entering BIOS setup program](#)
- [Navigation keys](#)
- [Boot Sequence](#)
- [System setup options](#)
- [Updating the BIOS](#)
- [System and setup password](#)
- [Clearing BIOS \(System Setup\) and System passwords](#)

BIOS overview

The BIOS manages data flow between the computer's operating system and attached devices such as hard disk, video adapter, keyboard, mouse, and printer.

Entering BIOS setup program

Turn on (or restart) your computer and press F2 immediately.

Navigation keys

NOTE: For most of the System Setup options, changes that you make are recorded but do not take effect until you restart the system.

Keys	Navigation
Up arrow	Moves to the previous field.
Down arrow	Moves to the next field.
Enter	Selects a value in the selected field (if applicable) or follow the link in the field.
Spacebar	Expands or collapses a drop-down list, if applicable.
Tab	Moves to the next focus area.
Esc	Moves to the previous page until you view the main screen. Pressing Esc in the main screen displays a message that prompts you to save any unsaved changes and restarts the system.

Boot Sequence

Boot sequence enables you to bypass the System Setup–defined boot device order and boot directly to a specific device (for example: optical drive or hard drive). During the Power-on Self-Test (POST), when the Dell logo appears, you can:

- Access System Setup by pressing F2 key
- Bring up the one-time boot menu by pressing F12 key.

The one-time boot menu displays the devices that you can boot from including the diagnostic option. The boot menu options are:

UEFI only:

- Windows Boot Manager
- UEFI RST KXG60ZNV512G NVMe KIOXIA 512 GB 40NA83SKJ81L

The boot sequence screen also displays the option to access the System Setup screen.

System setup options

NOTE: Depending on this computer and its installed devices, the items that are listed in this section may or may not be displayed.

Table 3. System setup options—Main menu

Main	
System Time	Displays the current system time of the computer in HH/MM/SS format.
System Date	Displays the ownership date of the computer in MM/DD/YYYY format.
BIOS Version	Displays the BIOS version of the computer.
Product Name	Displays the system model name of the computer.
Service Tag	Displays the service tag of the computer.
Asset Tag	Displays the asset tag of the computer.
CPU Type	Displays the processor type.
CPU Speed	Displays the maximum processor clock speed.
CPU ID	Displays the processor identification code.
CPU Cache	
L1 Cache	Displays the processor L1 Cache size.
L2 Cache	Displays the processor L2 Cache size.
L3 Cache	Displays the processor L3 Cache size.
M.2 PCIe SSD	Displays the PCIe SSD information connected to the M.2 slot.
AC Adapter Type	Displays whether an AC adapter is installed.
System Memory	Displays the total computer memory installed.
Memory Speed	Displays the memory speed.
Keyboard Type	Displays the type of the keyboard (option could be backlit or non-backlit).

Table 4. System setup options—Advance menu

Advance	
Virtualization	Specify whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by Onboard Virtualization Technology. Options are:

Table 4. System setup options—Advance menu (continued)

Advance	
Integrated NIC	<ul style="list-style-type: none"> ● Enabled (Default) ● Disabled <p>Allows pre-OS and early OS networking features to use any enabled NICs.</p> <p>Options are:</p> <ul style="list-style-type: none"> ● Enabled (Default) ● Disabled
USB Emulation	<p>Allows to enable USB emulation.</p> <p>Options are:</p> <ul style="list-style-type: none"> ● Enabled (Default) ● Disabled
SATA Operation	<p>Allows to select the SATA mode of the computer. Option is set to AHCI.</p>
Adapter Warnings	<p>Displays Adapter Warning during the POST when Battery Level is Critically low.</p> <p>Options are:</p> <ul style="list-style-type: none"> ● Enabled (Default) ● Disabled
Function Key Behavior	<p>Allows to reverse Function Key Primary behavior with secondary.</p> <p>Options are:</p> <ul style="list-style-type: none"> ● Multimedia Key(Default) ● Function Key
Keyboard Illumination	<p>Allows to Switch-on/switch-off the Keyboard backlight.</p> <p>Options are:</p> <ul style="list-style-type: none"> ● Disable ● Dim ● Bright (Default)
Keyboard Backlight with AC	<p>Allows to permanently turn off/turn-on the Keyboard backlight without the AC adapter.</p> <p>Options are from 5 Seconds to 15 Minutes. Default option is set to 1 Minute.</p>
Keyboard Backlight with Battery	<p>Allows to permanently turn off/turn-on the Keyboard backlight without the AC adapter.</p> <p>Options are from 5 Seconds to 15 Minutes. Default option is set to 1 Minute.</p>
Battery Health	<p>Shows Battery Health and Charge Status.</p>
External USB Ports	<p>Allows to turn off the External USB ports in the Operating System.</p> <p>Options are:</p> <ul style="list-style-type: none"> ● Enabled (Default) ● Disabled
Microphone	<p>Allows to Switch-on/switch-off the microphone.</p> <p>Options are:</p> <ul style="list-style-type: none"> ● Enabled (Default) ● Disabled
Camera	<p>Allows to Switch-on/switch-off the Camera.</p> <p>Options are:</p> <ul style="list-style-type: none"> ● Enabled (Default) ● Disabled

Table 4. System setup options—Advance menu (continued)

Advance	
Internal Bluetooth	Allows to Switch-on/switch-off the Bluetooth. Options are: <ul style="list-style-type: none"> ● Enabled (Default) ● Disabled
Internal WLAN	Allows to Switch-on/switch-off the Wireless Card. Options are: <ul style="list-style-type: none"> ● Enabled (Default) ● Disabled
Media Card Reader	Allows to enable/disable the Media Card reader. Options are: <ul style="list-style-type: none"> ● Enabled (Default) ● Disabled
Fingerprint Reader	Allows to enable/disable the Fingerprint reader. Options are: <ul style="list-style-type: none"> ● Enabled (Default) ● Disabled
Boot Disable	Disable the automatic Boot. Options are: <ul style="list-style-type: none"> ● Enabled ● Disabled (Default)
Battery Charge Configuration	Displays the Battery Charge configuration. Options are: <ul style="list-style-type: none"> ● Adaptive (Default) ● Standard ● ExpressCharge™ ● Primarily AC Use ● Custom
Advanced Battery Charge Configuration	Displays the Advanced Charge configuration. Options are: <ul style="list-style-type: none"> ● Enabled ● Disabled (Default)
Power on LID open	Controls the Power function on LID open action. Options are: <ul style="list-style-type: none"> ● Enabled (Default) ● Disabled
Maintenance	Maintenance information.
Data Wipe on next boot	Performs Data wipe on next boot. Options are: <ul style="list-style-type: none"> ● Disabled (Default) ● Enabled
BIOS Recovery from Hard Drive	Performs reset of firmware to the factory image saved on the secondary storage. Options are: <ul style="list-style-type: none"> ● Enabled (Default) ● Disabled
BIOS Auto Recovery	Performs auto firmware reset when corrupted BIOS is detected. Options are:

Table 4. System setup options—Advance menu (continued)

Advance	
	<ul style="list-style-type: none"> • Disabled (Default) • Enabled
SupportAssist System Resolution	Onboard Diagnostics
Auto OS Recovery Threshold	Performs SupportAssist OS recovery after the set value failed boot attempts. Options are: <ul style="list-style-type: none"> • Off • 1 • 2 (Default) • 3
Support Assist OS Recovery	Enabled Support Assist OS recovery on failed boot attempts. Options are: <ul style="list-style-type: none"> • Disabled • Enabled (Default)

Table 5. System setup options—Security menu

Security	
Admin Password	Displays the Status of the administrator password.
System Password	Displays the Status of the computer password.
Asset Tag	Displays and allows to edit the Asset Tag of the computer.
Admin Password	Set, change, or delete the administrator password.
System Password	Set, change, or delete the computer password.
Password Change	Set the status to allow User to set the System Password. The options are: <ul style="list-style-type: none"> • Permitted (Default) • Disabled
Password Bypass	Set the status to allow User to bypass System Password. The options are: <ul style="list-style-type: none"> • Disable (Default) • Reboot Bypass
Absolute®	Set the Status of the Absolute Module on the computer. The options are: <ul style="list-style-type: none"> • Activate • Deactivate
Absolute® Status	Displays the Status of the Absolute Module on the computer. The options are: <ul style="list-style-type: none"> • Disabled • Enabled (Default) • Permanently Disabled
Firmware TPM	Enable or disable TPM 2.0 security options.
TPM Security	TPM 2.0 Security options.
TPM On	Turn On/Off TPM security option. The options are: <ul style="list-style-type: none"> • On • Off
PPI Bypass for Enable Commands	Controls the TPM Physical Presence Interface(PPI). When enabled, this setting allows the OS to skip BIOS PPI user prompts when issuing TPM PPI enable and activate commands. The Options are: <ul style="list-style-type: none"> • Enabled • Disabled (Default)
PPI Bypass for Disable Commands	Controls the TPM Physical Presence Interface(PPI). When enabled, this setting will allow the OS to skip BIOS PPI user prompts when issuing TPM PPI disable and deactivate commands(#2, 4, 7, 9, & 11). The options are:

Table 5. System setup options—Security menu (continued)

Security	
	<ul style="list-style-type: none"> • Disabled (Default) • Enabled
Attestation Enable	<p>Provides for the user to control whether the TPM Endorsement Hierarchy is available to the OS. The options are:</p> <ul style="list-style-type: none"> • Disabled • Enabled (Default)
Key Storage Enable	<p>Provides for the user to control whether TPM Storage Hierarchy is available to the operating system. The options are:</p> <ul style="list-style-type: none"> • Disabled • Enabled (Default)
SHA-256	<p>Provides the BIOS and the TPM to use the SHA-256 hash algorithm to extend measurements into the TPM PCRs during BIOS boot. The options are:</p> <ul style="list-style-type: none"> • Disabled • Enabled (Default)
Clear	<p>Clears the TPM owner information, and returns the TPM to the default state. The options are:</p> <ul style="list-style-type: none"> • Disabled (Default) • Enabled
PPI Bypass for Clear Commands	<p>Controls the TPM Physical Presence Interface(PPI). When enabled, this setting will allow the OS to skip BIOS PPI user prompts when issuing the Clear command. The options are:</p> <ul style="list-style-type: none"> • Disabled (Default) • Enabled
TPM Status	<p>Displays the Status of the TPM Module on the computer. The options are:</p> <ul style="list-style-type: none"> • Disabled • Enabled (Default)
UEFI Firmware Capsule Updates	<p>Enable or disable BIOS updates through UEFI capsule update packages. By default, the option is enabled.</p>
Secure Boot	<p>Ensures the system boots using only to validated boot software.</p>

Table 6. System setup options—Boot menu




Boot	
File Browser Add Boot Option	
Windows Boot Manager:	<p>Displays the Default UEFI Boot Path of the computer Operating System and allows to navigate and select the EFI file.</p> <p> NOTE: Option may differ with the Linux Operating System.</p>
File Browser Del Boot Option	
Windows Boot Manager:	<p>Displays the Dell Boot Path of the Default Boot Option..</p> <p> NOTE: Option may differ with the Linux Operating System.</p>
UEFI BOOT	
HDD1- Windows Boot Manager	<p>Displays the Device ID of the Secondary Storage of the computer.</p>
UEFI Onboard LAN IPv4	<p>Displays the Device ID of the UEFI enabled Onboard IPv4 LAN controller.</p>
UEFI Onboard LAN IPv6	<p>Displays the Device ID of the UEFI enabled Onboard IPv6 LAN controller.</p>

Table 7. System setup options—Exit menu

Exit	
Exit Saving Changes	Exit the System Setup saving the changes made to the Setup Options.
Save Change Without Exit	Save the Changes made to the System Setup and continue the Setup.
Exit Discarding Changes	Exit the System Setup without saving the changes made to the Setup Options.
Load Optional Defaults	Load the Factory Defaults in the System Setup Options.
Discard Changes	Discard any changes made to the System Setup and continue the Setup.

Updating the BIOS

Updating the BIOS in Windows

1. Go to www.dell.com/support.
2. Click **Product support**. In the **Search support** box, enter the Service Tag of your computer, and then click **Search**.
 **NOTE:** If you do not have the Service Tag, use the SupportAssist feature to automatically identify your computer. You can also use the product ID or manually browse for your computer model.
3. Click **Drivers & Downloads**. Expand **Find drivers**.
4. Select the operating system installed on your computer.
5. In the **Category** drop-down list, select **BIOS**.
6. Select the latest version of BIOS, and click **Download** to download the BIOS file for your computer.
7. After the download is complete, browse the folder where you saved the BIOS update file.
8. Double-click the BIOS update file icon and follow the on-screen instructions.
For more information, see knowledge base article [000124211](https://www.dell.com/support/000124211) at www.dell.com/support.

Updating the BIOS in Linux and Ubuntu

To update the system BIOS on a computer that is installed with Linux or Ubuntu, see the knowledge base article [000131486](https://www.dell.com/support/000131486) at www.dell.com/support.

Updating the BIOS using the USB drive in Windows

1. Follow the procedure from step 1 to step 6 in [Updating the BIOS in Windows](#) to download the latest BIOS setup program file.
2. Create a bootable USB drive. For more information, see the knowledge base article [000145519](https://www.dell.com/support/000145519) at www.dell.com/support.
3. Copy the BIOS setup program file to the bootable USB drive.
4. Connect the bootable USB drive to the computer that needs the BIOS update.
5. Restart the computer and press **F12**.
6. Select the USB drive from the **One Time Boot Menu**.
7. Type the BIOS setup program filename and press **Enter**.
The **BIOS Update Utility** appears.
8. Follow the on-screen instructions to complete the BIOS update.

Updating the BIOS from the F12 One-Time boot menu

Update your computer BIOS using the BIOS update.exe file that is copied to a FAT32 USB drive and booting from the F12 One-Time boot menu.

BIOS Update

You can run the BIOS update file from Windows using a bootable USB drive or you can also update the BIOS from the F12 One-Time boot menu on the computer.

Most of the Dell computers built after 2012 have this capability, and you can confirm by booting your computer to the F12 One-Time Boot Menu to see if BIOS FLASH UPDATE is listed as a boot option for your computer. If the option is listed, then the BIOS supports this BIOS update option.

 **NOTE:** Only computers with BIOS Flash Update option in the F12 One-Time boot menu can use this function.

Updating from the One-Time boot menu

To update your BIOS from the F12 One-Time boot menu, you need the following:

- USB drive formatted to the FAT32 file system (key does not have to be bootable)
- BIOS executable file that you downloaded from the Dell Support website and copied to the root of the USB drive
- AC power adapter that is connected to the computer
- Functional computer battery to flash the BIOS

Perform the following steps to perform the BIOS update flash process from the F12 menu:

 **CAUTION:** Do not turn off the computer during the BIOS update process. The computer may not boot if you turn off your computer.

1. From a turn off state, insert the USB drive where you copied the flash into a USB port of the computer.
2. Turn on the computer and press F12 to access the One-Time Boot Menu, select BIOS Update using the mouse or arrow keys then press Enter.
The flash BIOS menu is displayed.
3. Click **Flash from file**.
4. Select external USB device.
5. Select the file and double-click the flash target file, and then click **Submit**.
6. Click **Update BIOS**. The computer restarts to flash the BIOS.
7. The computer will restart after the BIOS update is completed.

System and setup password


Table 8. System and setup password

Password type	Description
System password	Password that you must enter to log in to your system.
Setup password	Password that you must enter to access and make changes to the BIOS settings of your computer.

You can create a system password and a setup password to secure your computer.

 **CAUTION:** The password features provide a basic level of security for the data on your computer.

 **CAUTION:** Anyone can access the data that is stored on your computer if it is not locked and left unattended.

 **NOTE:** System and setup password feature is disabled.

Assigning a system setup password

You can assign a new **System or Admin Password** only when the status is in **Not Set**.

To enter the system setup, press F12 immediately after a power-on or reboot.

1. In the **System BIOS** or **System Setup** screen, select **Security** and press Enter.
The **Security** screen is displayed.
2. Select **System/Admin Password** and create a password in the **Enter the new password** field.
Use the following guidelines to assign the system password:
 - A password can have up to 32 characters.


- At least one special character: ! " # \$ % & ' () * + , - . / : ; < = > ? @ [\] ^ _ ` { | }
 - Numbers 0 through 9.
 - Upper case letters from A to Z.
 - Lower case letters from a to z.
3. Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.
 4. Press Esc and save the changes as prompted by the pop-up message.
 5. Press Y to save the changes.
The computer restarts.

Deleting or changing an existing system setup password

Ensure that the **Password Status** is Unlocked (in the System Setup) before attempting to delete or change the existing System and/or Setup password. You cannot delete or change an existing System or Setup password, if the **Password Status** is Locked.

To enter the System Setup, press F12 immediately after a power-on or reboot.


1. In the **System BIOS** or **System Setup** screen, select **System Security** and press Enter.
The **System Security** screen is displayed.
2. In the **System Security** screen, verify that **Password Status** is **Unlocked**.
3. Select **System Password**, update, or delete the existing system password, and press Enter or Tab.
4. Select **Setup Password**, update, or delete the existing setup password, and press Enter or Tab.

 **NOTE:** If you change the System and/or Setup password, reenter the new password when prompted. If you delete the System and/or Setup password, confirm the deletion when prompted.

5. Press Esc and a message prompts you to save the changes.
6. Press Y to save the changes and exit from System Setup.
The computer restarts.

Clearing BIOS (System Setup) and System passwords

To clear the system or BIOS passwords, contact Dell technical support as described at www.dell.com/contactdell.

 **NOTE:** For information on how to reset Windows or application passwords, refer to the documentation accompanying Windows or your application.

Troubleshooting

Topics:

- [Handling swollen Lithium-ion batteries](#)
- [Dell SupportAssist Pre-boot System Performance Check diagnostics](#)
- [System diagnostic lights](#)
- [Recovering the operating system](#)
- [Updating the BIOS using the USB drive in Windows](#)
- [Updating the BIOS in Windows](#)
- [Backup media and recovery options](#)
- [M-BIST](#)
- [LCD Built-in Self Test \(BIST\)](#)
- [WiFi power cycle](#)
- [Flea power release](#)

Handling swollen Lithium-ion batteries

Like most laptops, Dell laptops use lithium-ion batteries. One type of lithium-ion battery is the lithium-ion polymer battery. Lithium-ion polymer batteries have increased in popularity in recent years and have become standard in the electronics industry due to customer preferences for a slim form factor (especially with newer ultra-thin laptops) and long battery life. Inherent to lithium-ion polymer battery technology is the potential for swelling of the battery cells.

Swollen battery may impact the performance of the laptop. To prevent possible further damage to the device enclosure or internal components leading to malfunction, discontinue the use of the laptop and discharge it by disconnecting the AC adapter and letting the battery drain.

Swollen batteries should not be used and should be replaced and disposed of properly. We recommend contacting Dell product support for options to replace a swollen battery under the terms of the applicable warranty or service contract, including options for replacement by a Dell authorized service technician.

The guidelines for handling and replacing Lithium-ion batteries are as follows:

- Exercise caution when handling Lithium-ion batteries.
- Discharge the battery before removing it from the system. To discharge the battery, unplug the AC adapter from the system and operate the system only on battery power. When the system will no longer power on when the power button is pressed, the battery is fully discharged.
- Do not crush, drop, mutilate, or penetrate the battery with foreign objects.
- Do not expose the battery to high temperatures, or disassemble battery packs and cells.
- Do not apply pressure to the surface of the battery.
- Do not bend the battery.
- Do not use tools of any type to pry on or against the battery.
- If a battery gets stuck in a device as a result of swelling, do not try to free it as puncturing, bending, or crushing a battery can be dangerous.
- Do not attempt to reassemble a damaged or swollen battery into a laptop.
- Swollen batteries that are covered under warranty should be returned to Dell in an approved shipping container (provided by Dell)—this is to comply with transportation regulations. Swollen batteries that are not covered under warranty should be disposed of at an approved recycling center. Contact Dell product support at <https://www.dell.com/support> for assistance and further instructions.
- Using a non-Dell or incompatible battery may increase the risk of fire or explosion. Replace the battery only with a compatible battery purchased from Dell that is designed to work with your Dell computer. Do not use a battery from other computers with your computer. Always purchase genuine batteries from <https://www.dell.com> or otherwise directly from Dell.

Lithium-ion batteries can swell for various reasons such as age, number of charge cycles, or exposure to high heat. For more information on how to improve the performance and lifespan of the laptop battery and to minimize the possibility of occurrence of the issue, see [Dell Laptop Battery - Frequently Asked Questions](#).

Dell SupportAssist Pre-boot System Performance Check diagnostics

SupportAssist diagnostics (also known as system diagnostics) performs a complete check of your hardware. The Dell SupportAssist Pre-boot System Performance Check diagnostics is embedded with the BIOS and is launched by the BIOS internally. The embedded system diagnostics provides a set of options for particular devices or device groups allowing you to:

- Run tests automatically or in an interactive mode
- Repeat tests
- Display or save test results
- Run thorough tests to introduce additional test options to provide extra information about the failed device(s)
- View status messages that inform you if tests are completed successfully
- View error messages that inform you of problems encountered during testing

NOTE: Some tests for specific devices require user interaction. Always ensure that you are present at the computer terminal when the diagnostic tests are performed.

For more information, see <https://www.dell.com/support/kbdoc/000180971>.

Running the SupportAssist Pre-Boot System Performance Check

1. Turn on your computer.
2. As the computer boots, press the F12 key as the Dell logo appears.
3. On the boot menu screen, select the **Diagnostics** option.
4. Click the arrow at the bottom left corner.
Diagnostics front page is displayed.
5. Click the arrow in the lower-right corner to go to the page listing.
The items detected are listed.
6. To run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
7. Select the device from the left pane and click **Run Tests**.
8. If there are any issues, error codes are displayed.
Note the error code and validation number and contact Dell.

System diagnostic lights

Battery-status light

Indicates the power and battery-charge status.

Solid white — Power adapter is connected and the battery has more than 5 percent charge.

Amber — Computer is running on battery and the battery has less than 5 percent charge.

Off — Discharging or other power states

- Power adapter is connected and the battery is fully charged.
- Computer is running on battery and the battery has more than 5 percent charge.
- Computer is in sleep state, hibernation, discharging, or turned off.

The power and battery-status light blinks amber along with beep codes indicating failures.

For example, the power and battery-status light blinks amber two times followed by a pause, and then blinks white three times followed by a pause. This 2,3 pattern continues until the computer is turned off indicating no memory or RAM is detected.

The following table shows different power and battery-status light patterns and associated problems.

Blinking Pattern		Problem description	Suggested resolution
2	1	CPU failure	Run the Intel CPU diagnostics tools. If problem persists, replace the system board.
2	2	System Board failure (included BIOS corruption or ROM error)	Flash latest BIOS version. If problem persists, replace the system board.
2	3	No Memory / RAM detected	Confirm that the memory module is installed properly. If problem persists, replace the memory module.
2	4	Memory / RAM failure	Reset and swap memory modules amongst the slots. If problem persists, replace the memory module.
2	5	Invalid memory installed	Reset and swap memory modules amongst the slots. If problem persists, replace the memory module.
2	6	System board / Chipset Error	Replace the system board.
2	7	LCD failure (SBIOS message)	Replace the LCD module.
2	8	LCD failure (EC detection of power rail failure)	Replace the system board.
3	1	CMOS battery failure	Reset the CMOS battery connection. If problem persists, replace the RTC battery.
3	2	PCI or Video card/chip failure	Replace the system board.
3	3	BIOS recovery image not found	Flash latest BIOS version. If problem persists, replace the system board.
3	4	BIOS recovery image found but invalid	Flash latest BIOS version. If problem persists, replace the system board.
3	5	Power rail failure	Replace the system board.
3	6	Flash corruption detected by SBIOS.	Replace the system board.

Camera status light: Indicates whether the camera is in use.

- Solid white — Camera is in use.
- Off — Camera is not in use.

Caps Lock status light: Indicates whether Caps Lock is enabled or disabled.

- Solid white — Caps Lock enabled.
- Off — Caps Lock disabled.

Recovering the operating system

When your computer is unable to boot to the operating system even after repeated attempts, it automatically starts Dell SupportAssist OS Recovery.

Dell SupportAssist OS Recovery is a standalone tool that is preinstalled in all Dell computers installed with Windows operating system. It consists of tools to diagnose and troubleshoot issues that may occur before your computer boots to the operating

system. It enables you to diagnose hardware issues, repair your computer, back up your files, or restore your computer to its factory state.


You can also download it from the Dell Support website to troubleshoot and fix your computer when it fails to boot into their primary operating system due to software or hardware failures.

For more information about the Dell SupportAssist OS Recovery, see *Dell SupportAssist OS Recovery User's Guide* at www.dell.com/serviceabilitytools. Click **SupportAssist** and then, click **SupportAssist OS Recovery**.

Updating the BIOS using the USB drive in Windows

1. Follow the procedure from step 1 to step 6 in [Updating the BIOS in Windows](#) to download the latest BIOS setup program file.
2. Create a bootable USB drive. For more information, see the knowledge base article [000145519](http://www.dell.com/support) at www.dell.com/support.
3. Copy the BIOS setup program file to the bootable USB drive.
4. Connect the bootable USB drive to the computer that needs the BIOS update.
5. Restart the computer and press **F12**.
6. Select the USB drive from the **One Time Boot Menu**.
7. Type the BIOS setup program filename and press **Enter**.
The **BIOS Update Utility** appears.
8. Follow the on-screen instructions to complete the BIOS update.

Updating the BIOS in Windows


1. Go to www.dell.com/support.
2. Click **Product support**. In the **Search support** box, enter the Service Tag of your computer, and then click **Search**.
 **NOTE:** If you do not have the Service Tag, use the SupportAssist feature to automatically identify your computer. You can also use the product ID or manually browse for your computer model.
3. Click **Drivers & Downloads**. Expand **Find drivers**.
4. Select the operating system installed on your computer.
5. In the **Category** drop-down list, select **BIOS**.
6. Select the latest version of BIOS, and click **Download** to download the BIOS file for your computer.
7. After the download is complete, browse the folder where you saved the BIOS update file.
8. Double-click the BIOS update file icon and follow the on-screen instructions.
For more information, see knowledge base article [000124211](http://www.dell.com/support) at www.dell.com/support.

Backup media and recovery options


It is recommended to create a recovery drive to troubleshoot and fix problems that may occur with Windows. Dell proposes multiple options for recovering Windows operating system on your Dell PC. For more information, see [Dell Windows Backup Media and Recovery Options](#).

M-BIST

M-BIST (Built In Self-Test) diagnostics tool, featuring improved accuracy in system board failures.

 **NOTE:** M-BIST can be manually initiated before POST (Power On Self Test).

How to run M-BIST

 **NOTE:** M-BIST must be initiated on the system from a power-off state either connected to AC power or with battery only.

1. Press and hold both the **M** key on the keyboard and the **power button** to initiate M-BIST.
2. With both the **M** key and the **power button** held down, the battery indicator LED may exhibit two states:
 - a. OFF: No fault detected with the system board
 - b. AMBER: Indicates a problem with the system board


LCD Built-in Self Test (BIST)

Dell laptops have a built-in diagnostic tool that helps you determine if the screen abnormality you are experiencing is an inherent problem with the LCD (screen) of the Dell laptop or with the video card (GPU) and PC settings.

When you notice screen abnormalities like flickering, distortion, clarity issues, fuzzy or blurry image, horizontal or vertical lines, color fade etc., it is always a good practice to isolate the LCD (screen) by running the Built-In Self Test (BIST).

How to invoke LCD BIST Test

1. Power off the Dell laptop.
2. Disconnect any peripherals that are connected to the laptop. Connect only the AC adapter (charger) to the laptop.
3. Ensure that the LCD (screen) is clean (no dust particles on the surface of the screen).
4. Press and hold **D** key and **Power on** the laptop to enter LCD built-in self test (BIST) mode. Continue to hold the D key, until you see color bars on the LCD (screen).
5. The screen will display multiple color bars and change colors on the entire screen to red, green, and blue.
6. Carefully inspect the screen for abnormalities.
7. Press **Esc** key to exit.

 **NOTE:** Dell SupportAssist Pre-boot diagnostics upon launch, initiates an LCD BIST first, expecting a user intervention confirm functionality of the LCD.

WiFi power cycle

If your computer is unable to access the internet due to WiFi connectivity issues a WiFi power cycle procedure may be performed. The following procedure provides the instructions on how to conduct a WiFi power cycle:

 **NOTE:** Some ISPs (Internet Service Providers) provide a modem/router combo device.

1. Turn off your computer.
2. Turn off the modem.
3. Turn off the wireless router.
4. Wait for 30 seconds.
5. Turn on the wireless router.
6. Turn on the modem.
7. Turn on your computer.

Flea power release

Flea power is the residual static electricity that remains on the computer even after it has been powered off and the battery has been removed. The following procedure provides the instructions on how to conduct flea power release:



1. Turn off your computer.
2. Disconnect the power adapter from your computer.
3. Press and hold the power button for 15 seconds to drain the flea power.
4. Connect the power adapter to your computer.
5. Turn on your computer.

Getting help and contacting Dell

Self-help resources


You can get information and help on Dell products and services using these self-help resources:


Table 9. Self-help resources

Self-help resources	Resource location
Information about Dell products and services	www.dell.com
My Dell app	
Tips	
Contact Support	In Windows search, type <code>Contact Support</code> , and press Enter.
Online help for operating system	www.dell.com/support/windows www.dell.com/support/linux
Access top solutions, diagnostics, drivers and downloads, and learn more about your computer through videos, manuals and documents.	Your Dell computer is uniquely identified by a Service Tag or Express Service Code. To view relevant support resources for your Dell computer, enter the Service Tag or Express Service Code at www.dell.com/support . For more information on how to find the Service Tag for your computer, see Locate the Service Tag on your computer .
Dell knowledge base articles for a variety of computer concerns	<ol style="list-style-type: none"> 1. Go to www.dell.com/support. 2. On the menu bar at the top of the Support page, select Support > Knowledge Base. 3. In the Search field on the Knowledge Base page, type the keyword, topic, or model number, and then click or tap the search icon to view the related articles.

Contacting Dell

To contact Dell for sales, technical support, or customer service issues, see www.dell.com/contactdell.


 **NOTE:** Availability varies by country/region and product, and some services may not be available in your country/region.

 **NOTE:** If you do not have an active Internet connection, you can find contact information about your purchase invoice, packing slip, bill, or Dell product catalog.

Topics:

- [Contacting Dell](#)

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Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical support, or customer service issues:

1. Go to **Dell.com/support**.
2. Select your support category.
3. Verify your country or region in the **Choose a Country/Region** drop-down list at the bottom of the page.
4. Select the appropriate service or support link based on your need.