

Vostro 15 7510

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 on your computer


Topics:

- [Safety instructions](#)


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.


Working inside your computer

Before working inside your computer

About this task

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

Steps

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.

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.

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.


Entering Service Mode

Service Mode allows users to immediately cut off electricity from the computer and conduct repairs without disconnecting the battery cable from the system board.

To enter **Service Mode**:

1. Shut down your computer and disconnect the AC adapter.
2. Hold **** key on the keyboard and press the power button for 3 seconds or until the Dell logo appears on the screen.
3. Press any key to continue.

 **NOTE:** If the power adapter has not been disconnected, a message prompting you to remove the AC adapter appears on the screen. Remove the AC adapter and then press any key to continue the **Service Mode** procedure.

 **NOTE:** The **Service Mode** procedure automatically skips the following step if the **Owner Tag** of the computer is not set up in advance by the manufacturer.

4. When the ready-to-proceed message appears on the screen, press any key to proceed. The computer emits three short beeps and shuts down immediately.

Once the computer shuts down, you may perform the replacement procedures without disconnecting the battery cable from the system board.

Exiting Service Mode


Service Mode allows users to immediately cut off electricity from the computer and conduct repairs without disconnecting the battery cable from the system board.

To exit **Service Mode**:

1. Connect the AC adapter to the power-adapter port on your computer.
2. Press the power button to turn on the computer. Your computer will automatically return to normal functioning mode.

After working inside your computer


About this task

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

Steps

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 your system](#)
- [Base cover](#)
- [Battery](#)
- [Battery cable](#)
- [Memory](#)
- [Solid-state drive—M.2 slot one](#)
- [Solid-state drive—M.2 slot two](#)
- [Wireless card](#)
- [GPU fan](#)
- [System fan](#)
- [Heat sink](#)
- [I/O board](#)
- [Speakers](#)
- [Touchpad](#)
- [Display assembly](#)
- [Power-button board with fingerprint reader](#)
- [Power button with optional fingerprint reader](#)
- [Power button with 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.

















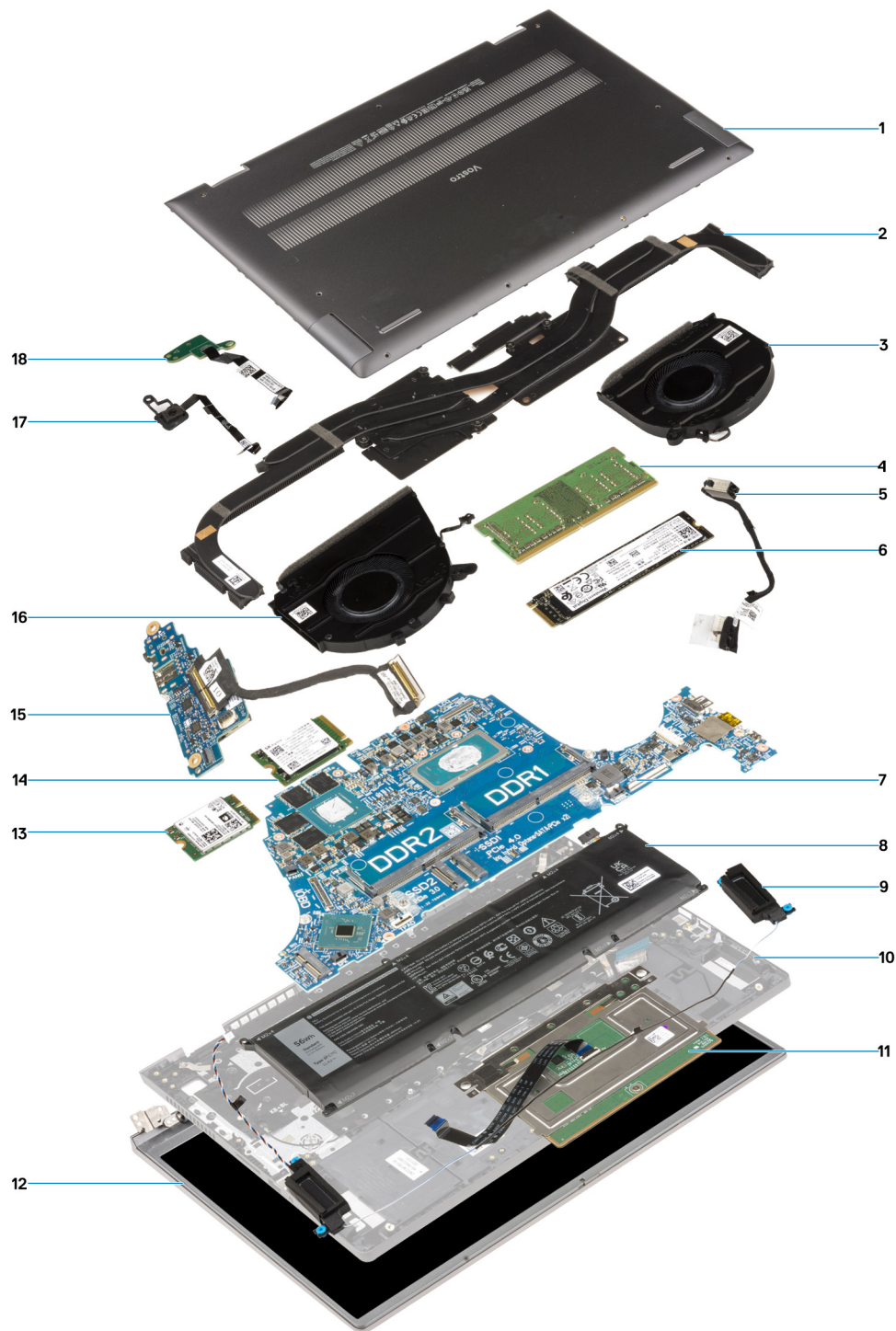
 **NOTE:** Screw color may vary with the configuration ordered.

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 	
Battery	M2x3	5	
Wireless card	M2x4	1	
Solid-state drive - Slot 1	M2x4	1	
Solid-state drive - Slot 2	M2x4	1	
GPU Fan	M2x4	2	
System Fan	M2x4	2	
Heat sink	Captive screws	7	
System board	<ul style="list-style-type: none"> M2x2 M2x4 	<ul style="list-style-type: none"> 2 1 	
USB Type-C bracket	M2x5	2	
Power button	M2x4	1	
Power button with fingerprint reader	M2x4	1	
I/O board	M2x4	2	
Touchpad	<ul style="list-style-type: none"> M2x1.8 M2x3 	<ul style="list-style-type: none"> 5 2 	
Power-adaptor port	M2.5x5	2	
Display assembly	M2.5x5	4	

Major components of your system



1. Base cover
2. Heat sink
3. System fan
4. Memory module
5. Power-adaptor port
6. M.2 2280 SSD card
7. System board

8. Battery
9. Speakers
10. Palm-rest and keyboard assembly
11. Touchpad
12. Display assembly
13. WLAN
14. M.2 2230 SSD card
15. I/O board
16. GPU fan
17. Power button
18. Power button with fingerprint reader

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

Prerequisites

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

About this task

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



7x
M2x4

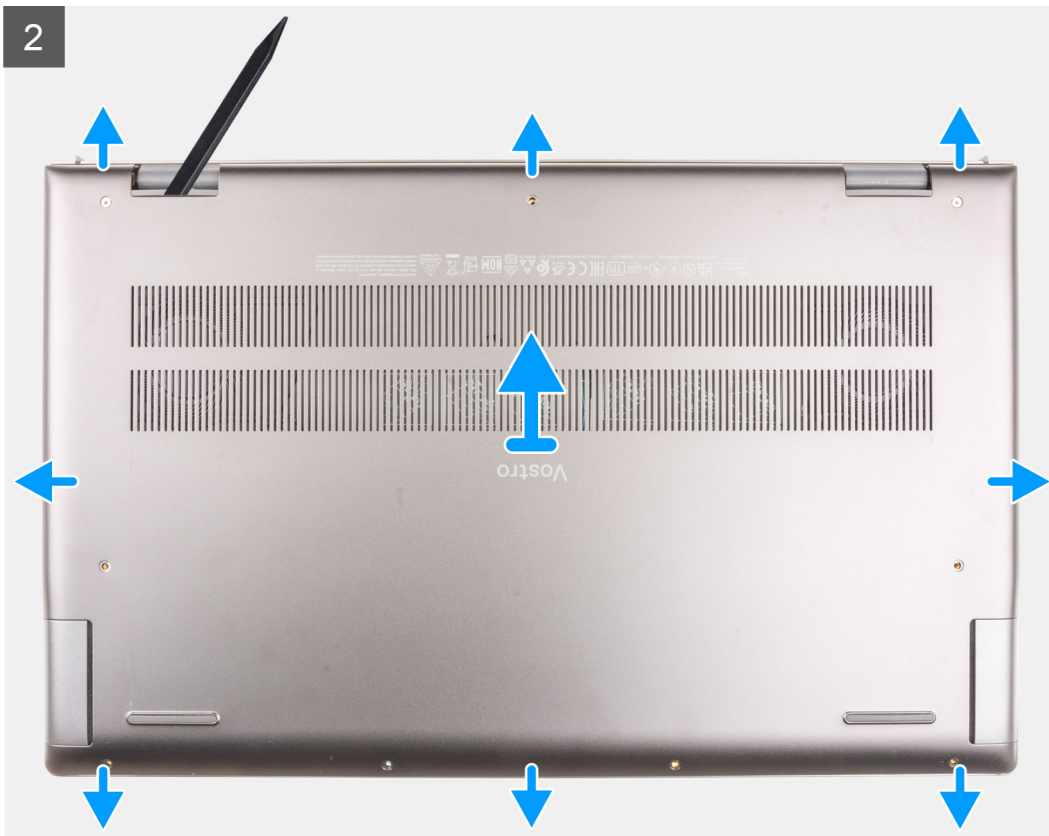


2x
M2x7.5

1



2



Steps

1. Remove the seven (M2x4) screws that secure the base cover to the palm-rest and keyboard assembly.
2. Loosen the two (M2x7.5) captive 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.

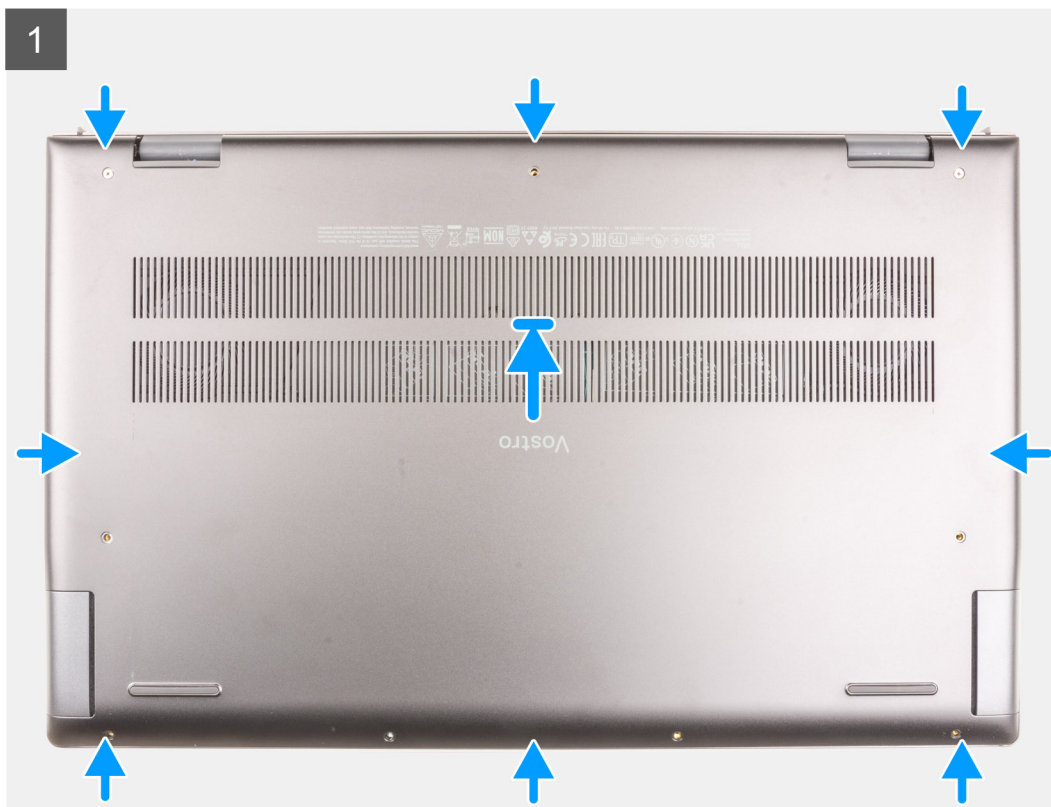
Installing the base cover

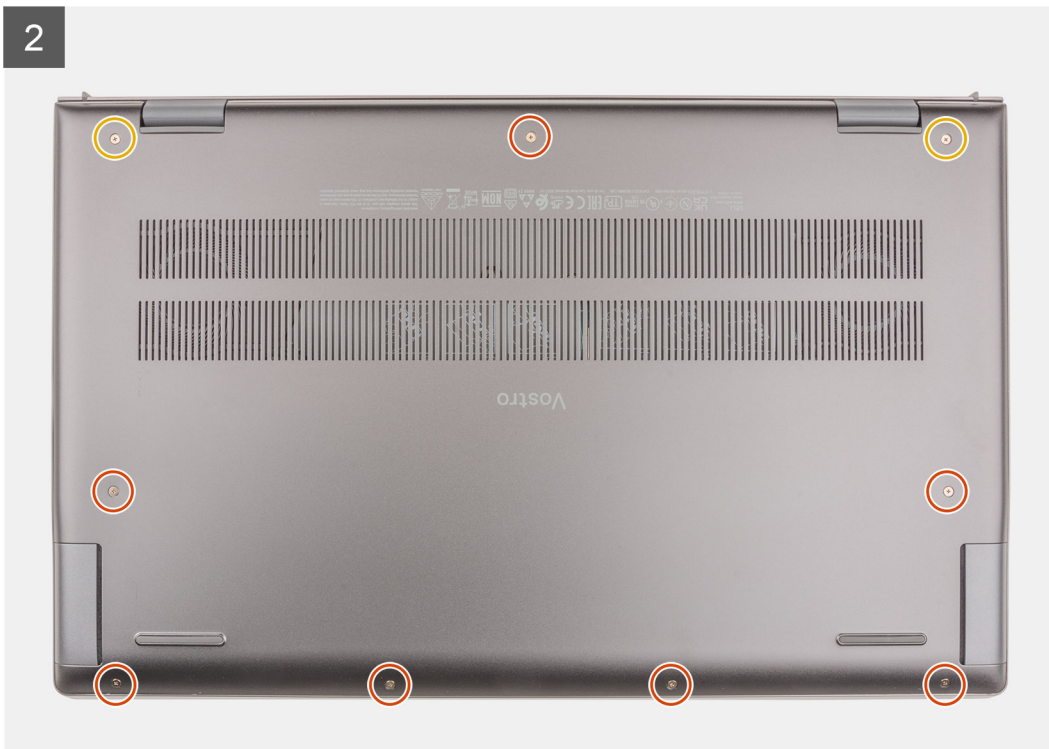
Prerequisites

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

About this task

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





Steps

1. Place the base cover on top of the palm-rest and keyboard assembly.
2. 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.
3. Tighten the two (M2x7.5) captive screws that secure the base cover to the palm-rest and keyboard assembly.
4. Replace the seven (M2x4) screws that secure the base cover to the palm-rest and keyboard assembly.

Next steps

1. Exit [Service Mode](#).
2. 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 battery

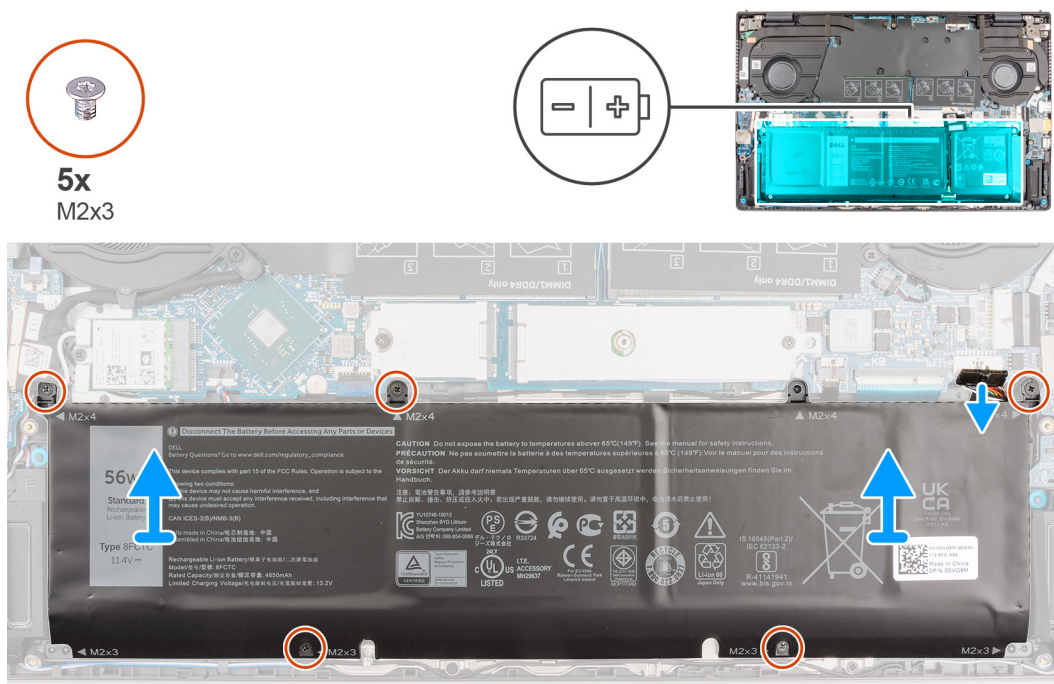
Prerequisites

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

About this task

NOTE: Vostro 15 7510 also supports 6-cell (86 Wh) battery.

The following image indicates the location of the 3-cell (56 Wh) battery and provides a visual representation of the removal procedure.



Steps

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

Installing the battery

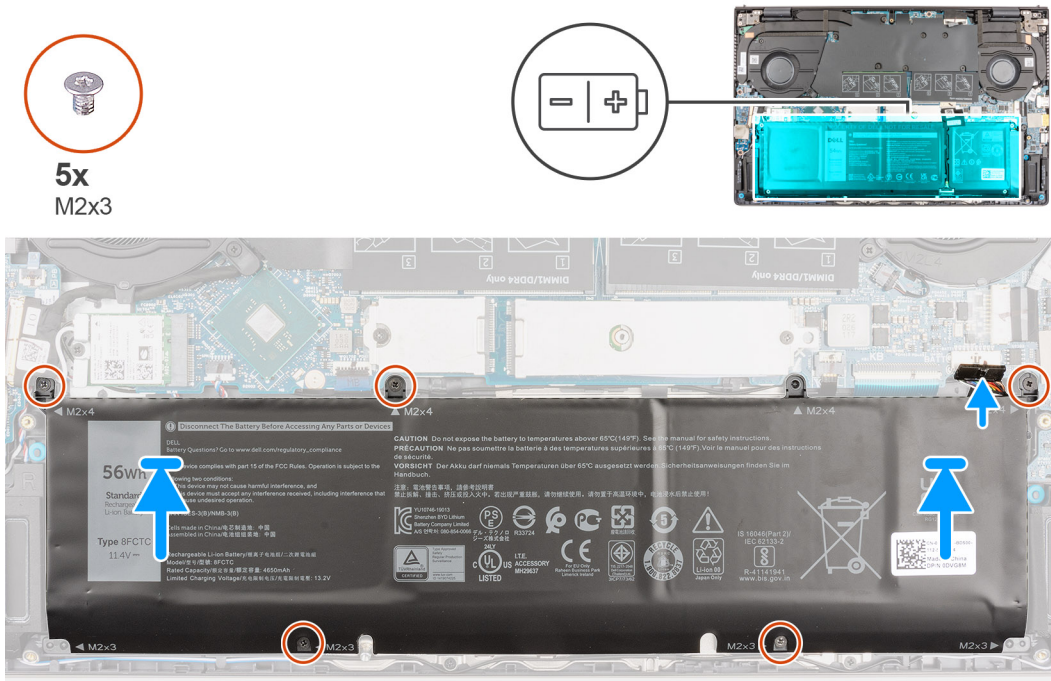
Prerequisites

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

About this task

NOTE: Vostro 15 7510 also supports 6-cell (86 Wh) battery.

The following image indicates the location of the 3-cell (56 Wh) battery and provides a visual representation of the installation procedure.



Steps

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 five (M2x3) screws that secure the 3-cell battery to the palm-rest and keyboard assembly.
4. Connect the battery cable to the system board.

Next steps

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

Battery cable

Removing the battery cable

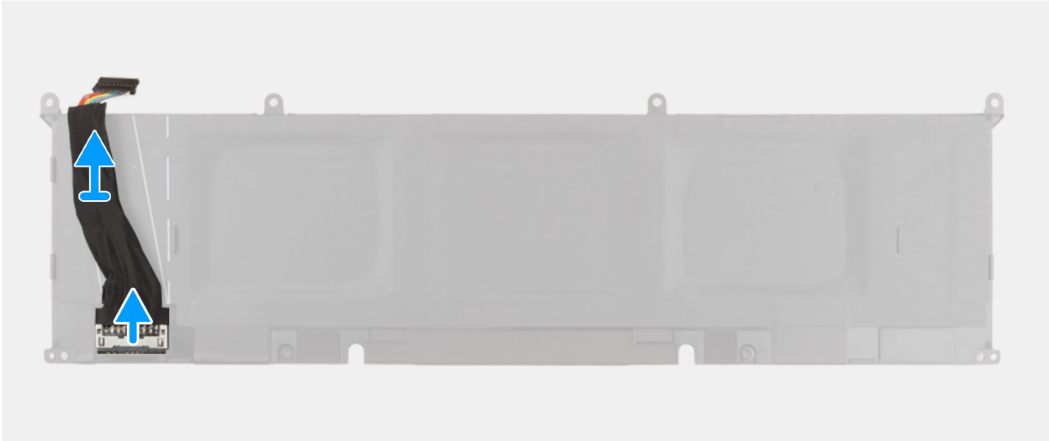
Prerequisites

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

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.

About this task

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



Steps

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.

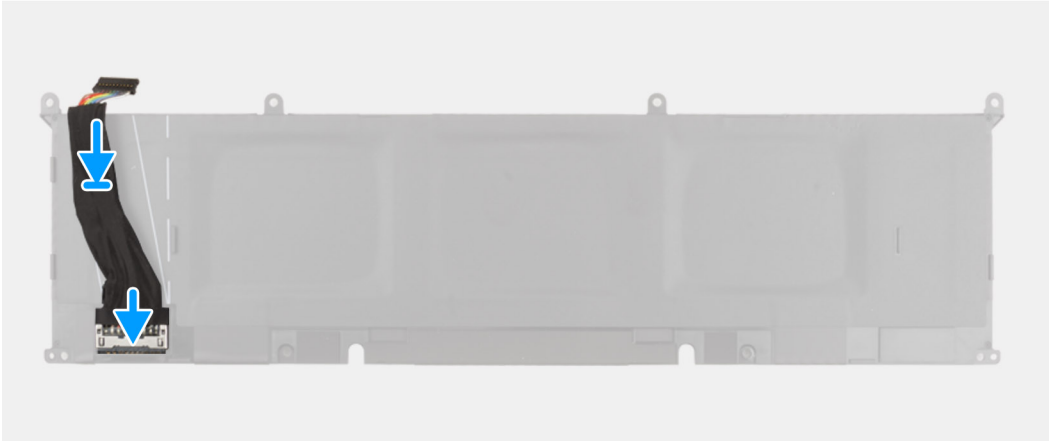
Installing the battery cable

Prerequisites

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

About this task

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



Steps

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.

Next steps

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


Memory

Removing the memory module

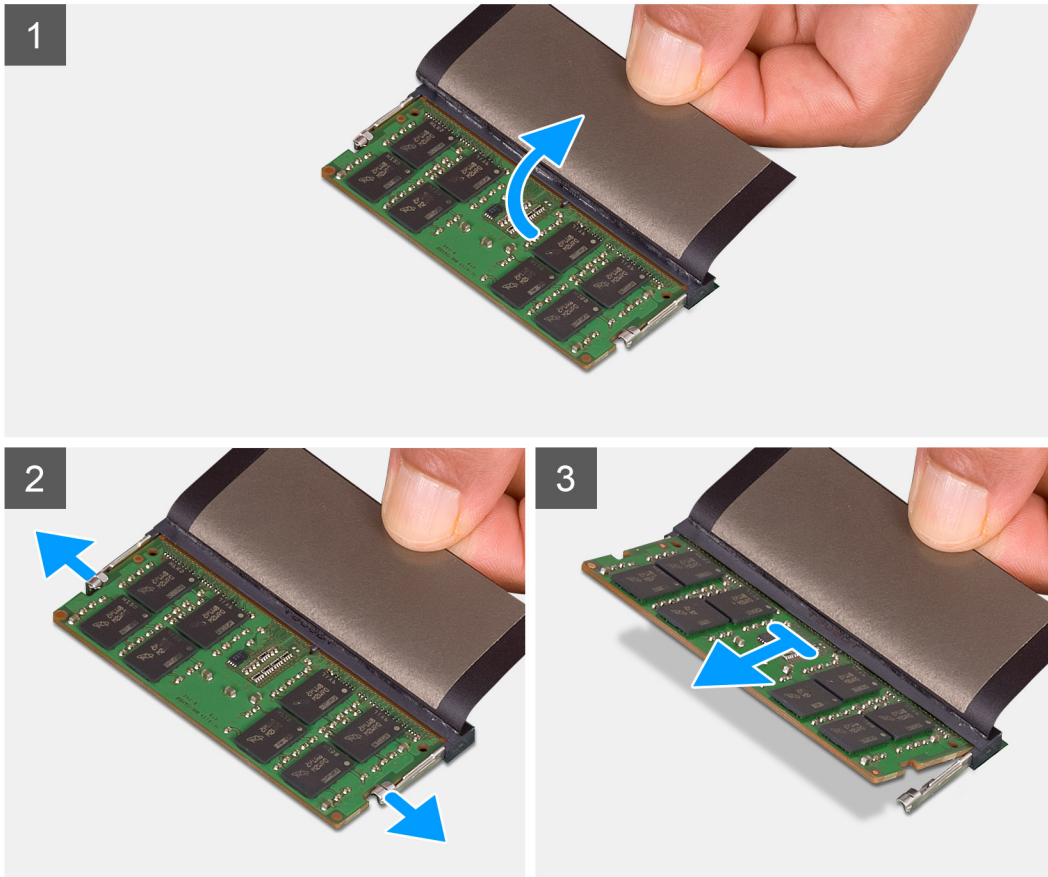
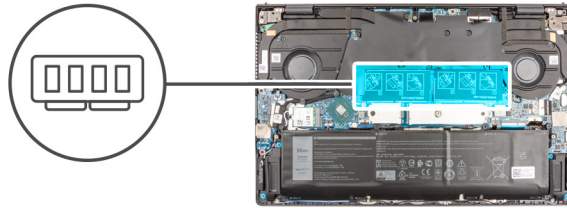
Prerequisites

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

About this task

 **NOTE:** Vostro 15 7510 supports two memory slots.

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



Steps

1. Lift the Mylar to access the memory module.
2. Pry the retention clips securing the memory module until the memory module pops-up.
3. Remove the memory module from the memory-module slot.

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

Installing the memory module

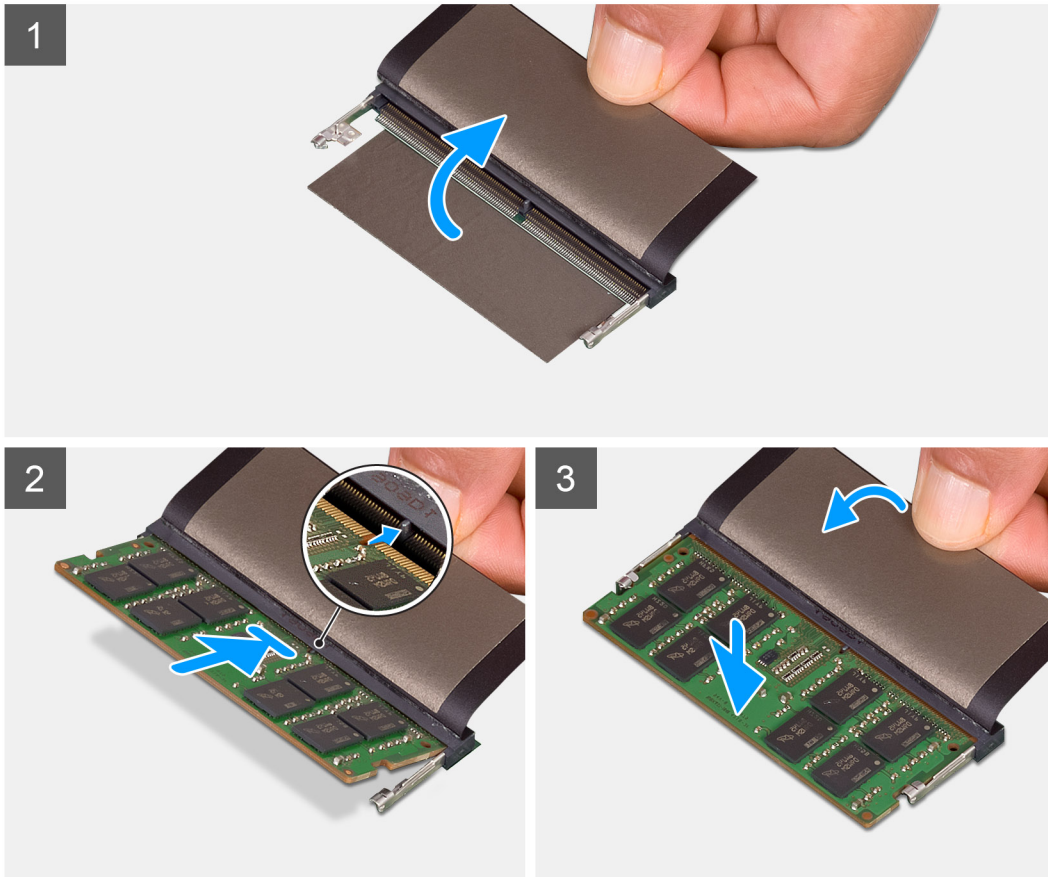
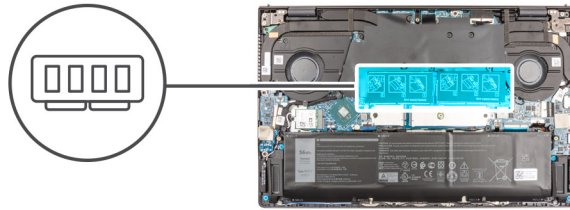
Prerequisites

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

About this task

i NOTE: Vostro 15 7510 supports two memory slots.

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



Steps

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.

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

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

Next steps

1. Install the [base cover](#).
2. Exit [Service Mode](#).
3. 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

Prerequisites

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. Enter [Service Mode](#).
3. Remove the [base cover](#).

About this task

NOTE: The M.2 card installed on M.2 slot one depends on the configuration ordered. Supported card configurations on M.2 slot one:

- M.2 2230 solid-state drive + M.2 2230 bracket
- M.2 2280 solid-state drive

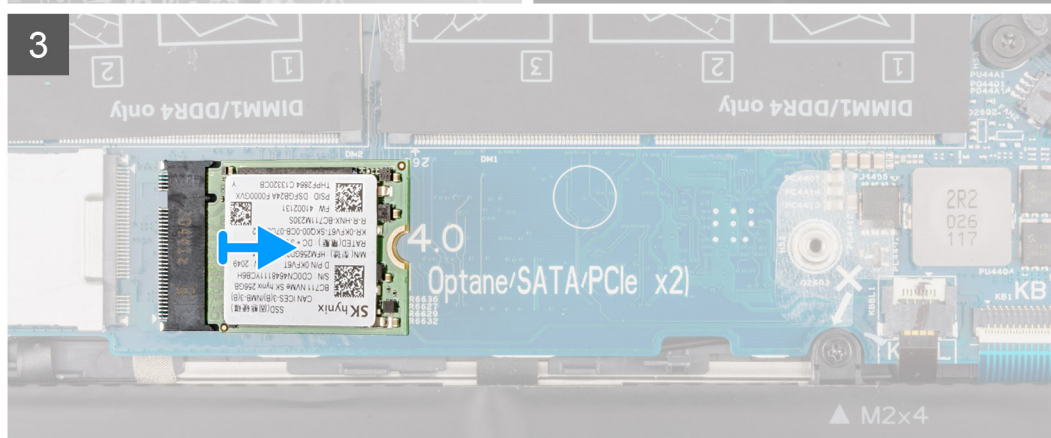
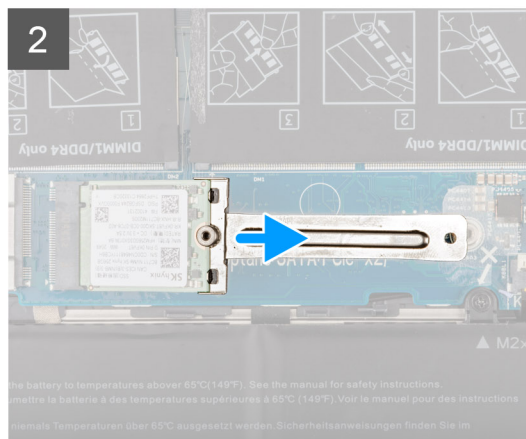
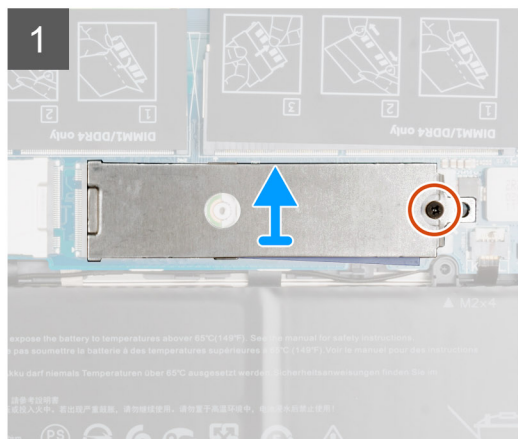
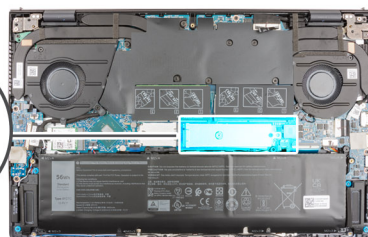
NOTE: If you have ordered a system with M.2 2280 solid-state drive in M.2 slot one and want to replace it with a M.2 2230 solid-state drive, you will need a bracket (sold separately, please contact Dell support).

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.



1x
M2x4



Steps

1. Remove the screw (M2x4) 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 bracket from the M.2 slot one.
4. Slide and remove the solid-state drive from the M.2 slot one.

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

Prerequisites

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

About this task

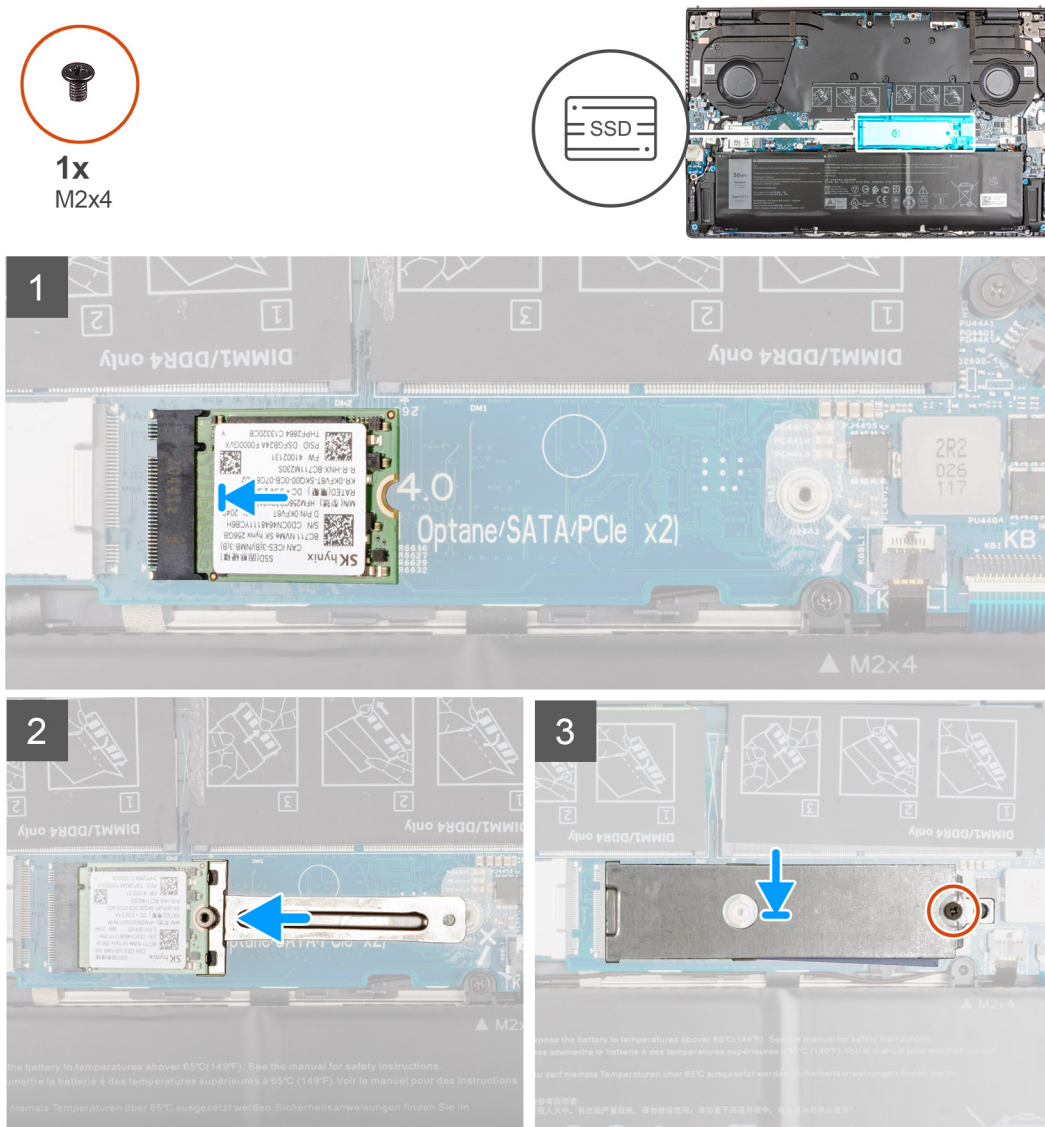
- NOTE:** Solid-state drives are fragile. Exercise care when handling the solid-state drive.
- NOTE:** The M.2 card installed on M.2 slot one depends on the configuration ordered. Supported card configurations on M.2 slot one:
 - M.2 2230 solid-state drive + M.2 2230 bracket

- M.2 2280 solid-state drive

NOTE: If you have ordered a system with M.2 2280 solid-state drive in M.2 slot one and want to replace it with a M.2 2230 solid-state drive, you may need a bracket (sold separately, please contact Dell support).

NOTE: This procedure applies only if you are installing a 2230 solid-state drive 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 installation procedure.



Steps

1. Align the notch on the solid-state drive with the tab on the solid-state drive slot.
2. Slide the solid-state drive firmly into the solid-state drive slot at an angle.
3. Align the notch on the solid-state drive with the securing peg on the bracket and clamp the solid-state drive in place.
4. Place the solid-state drive thermal shield on the solid-state drive.
5. Replace the screw (M2x4) that secures the solid-state drive thermal shield and solid-state drive to the palm-rest and keyboard assembly.

Next steps

1. Install the [base cover](#).
2. Exit [Service Mode](#).

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

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

Prerequisites

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. Enter [Service Mode](#).
3. Remove the [base cover](#).

About this task

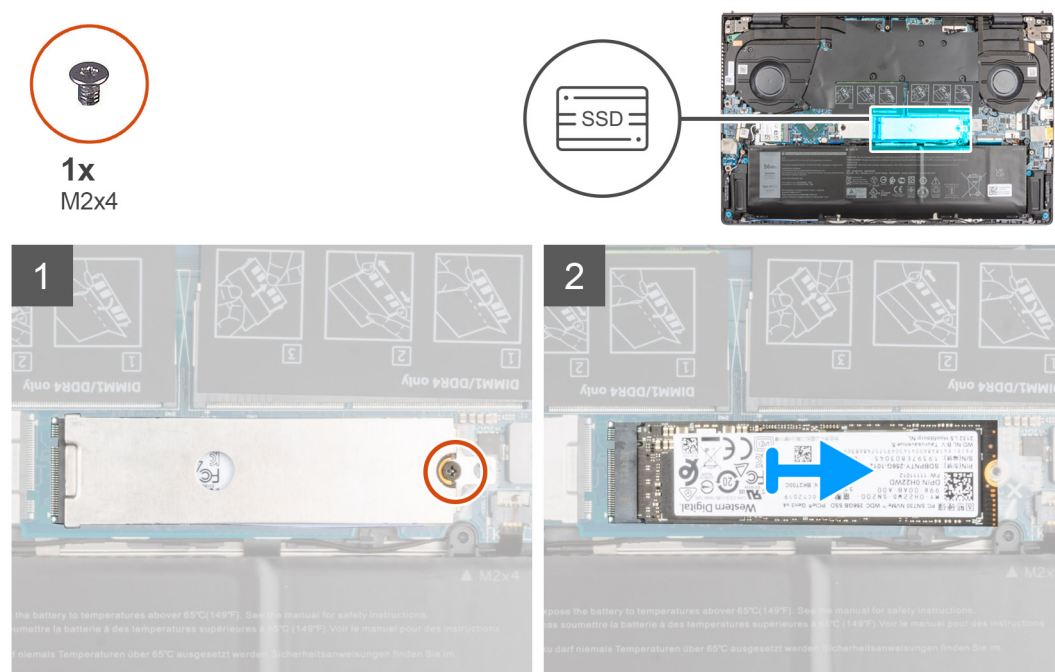
NOTE: The M.2 card installed on M.2 slot one depends on the configuration ordered. Supported card configurations on M.2 slot one:

- M.2 2230 solid-state drive + M.2 2230 mounting bracket
- M.2 2280 solid-state drive

NOTE: If you have ordered a system with M.2 2280 solid-state drive in M.2 slot one and want to replace it with a M.2 2230 solid-state drive, you will need a mounting bracket (sold separately, please contact Dell support).

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.



Steps

1. Remove the screw (M2x4) 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 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

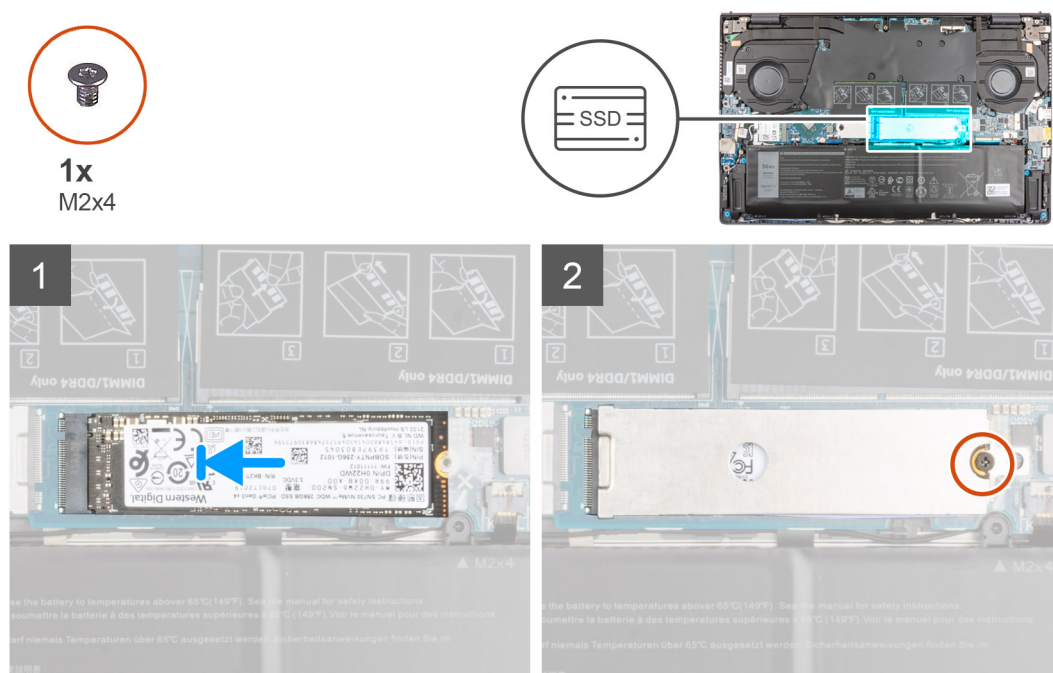
Prerequisites

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

About this task

- NOTE:** Solid-state drives are fragile. Exercise care when handling the solid-state drive.
- NOTE:** The M.2 card installed on M.2 slot one depends on the configuration ordered. Supported card configurations on M.2 slot one:
 - M.2 2230 solid-state drive + M.2 2230 mounting bracket
 - M.2 2280 solid-state drive
- NOTE:** If you have ordered a system with M.2 2280 solid-state drive in M.2 slot one and want to replace it with a M.2 2230 solid-state drive, you will need a mounting bracket (sold separately, please contact Dell support).
- NOTE:** This procedure is applicable if you are installing a 2280 solid-state drive in M.2 slot one.
- NOTE:** When installing a M.2 2280 NVMe Gen4.0 x4 solid-state drive, you may order a copper thermal shield from Dell support for better thermal performance.

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.



Steps

- Align the notch on the 2280 solid-state drive with the tab on the solid-state drive slot.
- Slide the solid-state drive firmly into the solid-state drive slot at an angle.
- Place the solid-state drive thermal shield on the solid-state drive.
- Align the screw hole on the solid-state drive thermal shield with the screw hole on the palm-rest and keyboard assembly.
- Replace the screw (M2x4) that secures the solid-state drive thermal shield and solid-state drive to the palm-rest and keyboard assembly.





Next steps

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

Solid-state drive—M.2 slot two

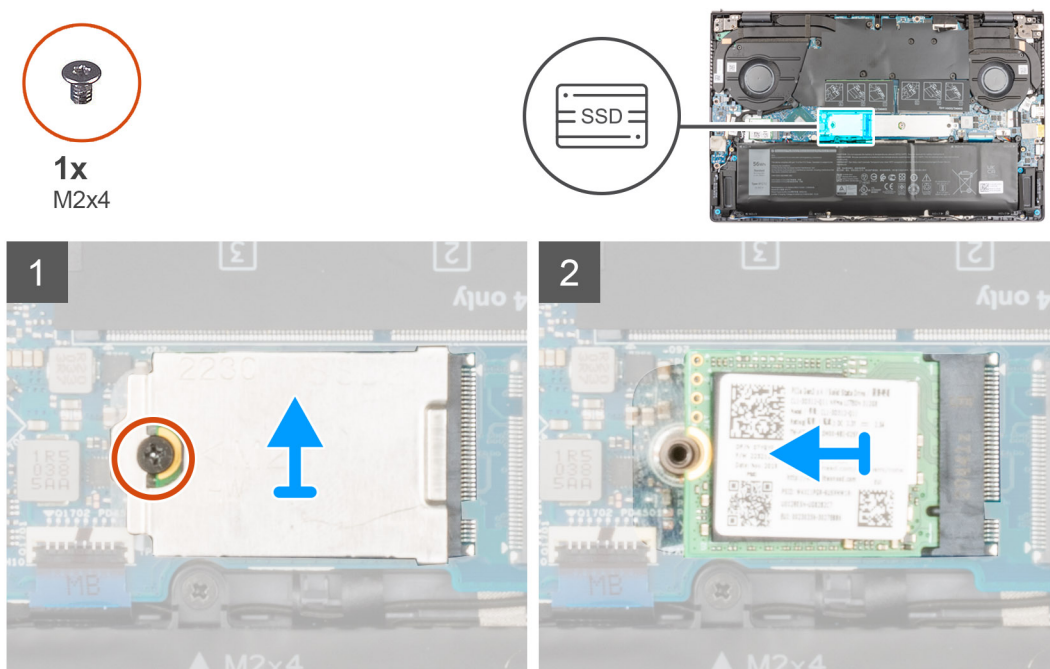
Removing the 2230 solid-state drive from M.2 slot two

Prerequisites

-  **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. Enter [Service Mode](#).
 3. Remove the [base cover](#).

About this task

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.



Steps

1. Remove the screw (M2x4) 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

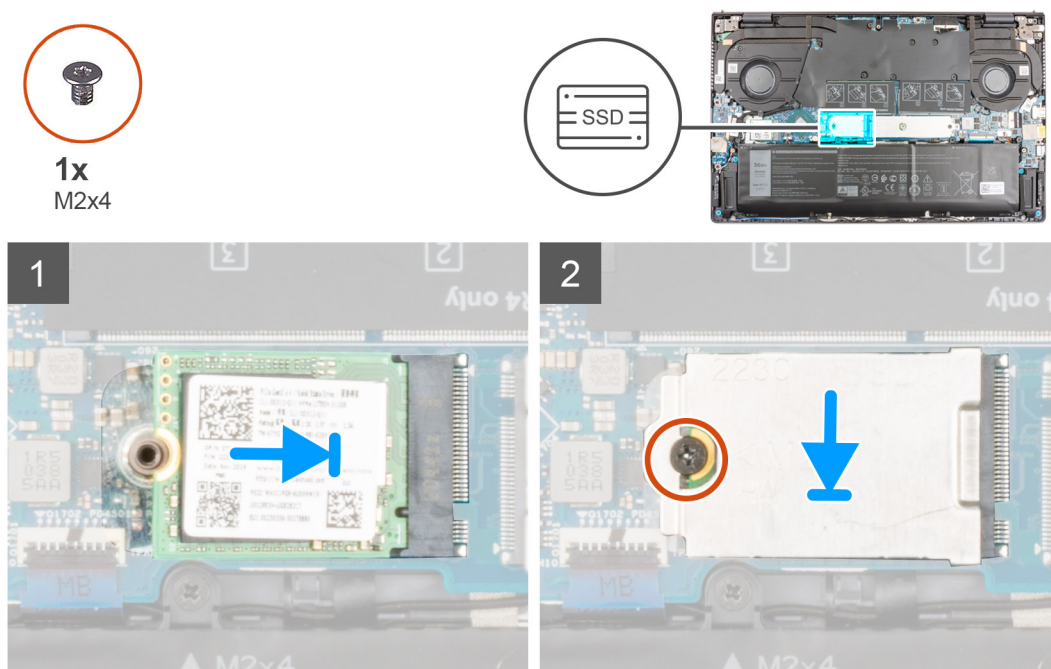
Prerequisites

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

About this task

- 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.



Steps

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 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 (M2x4) that secures the solid-state drive thermal shield and solid-state drive to the palm-rest and keyboard assembly.

Next steps

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

Wireless card

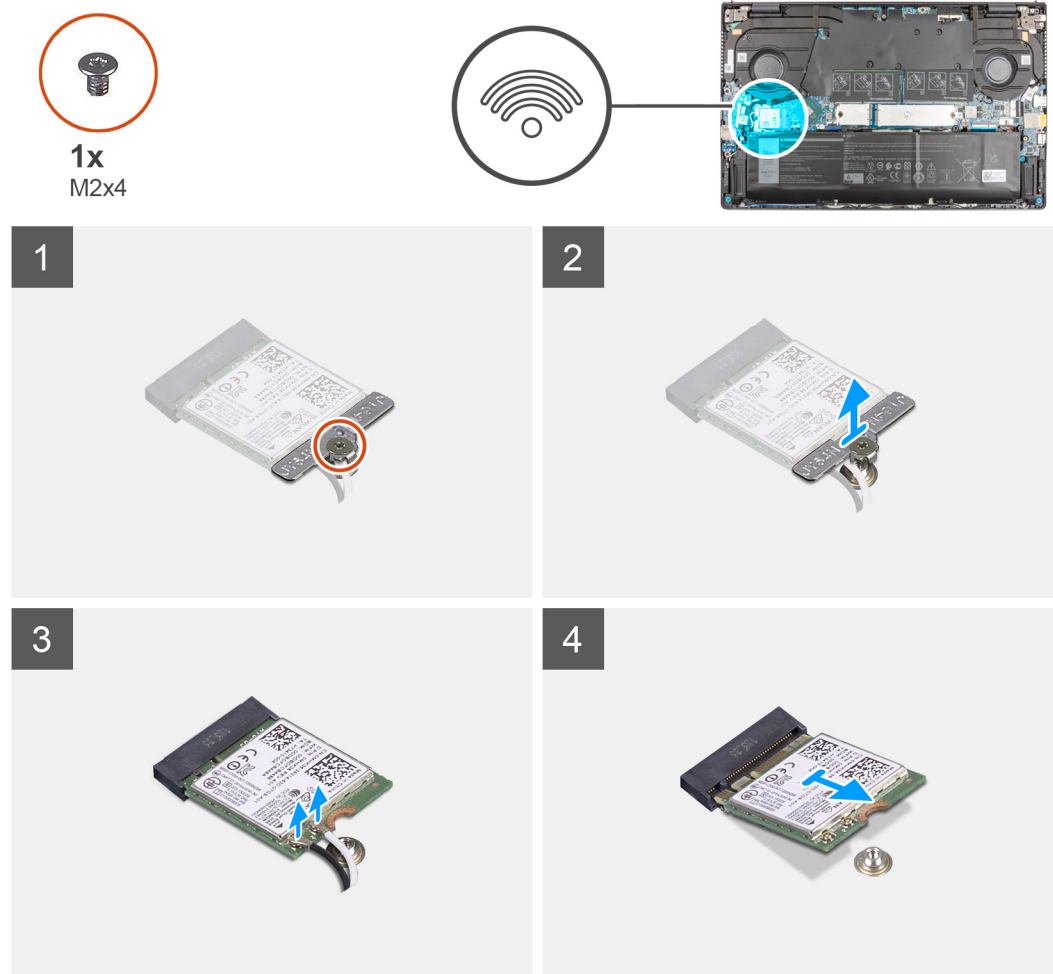
Removing the wireless card

Prerequisites

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

About this task

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



Steps

1. Remove the screw (M2x4) 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.

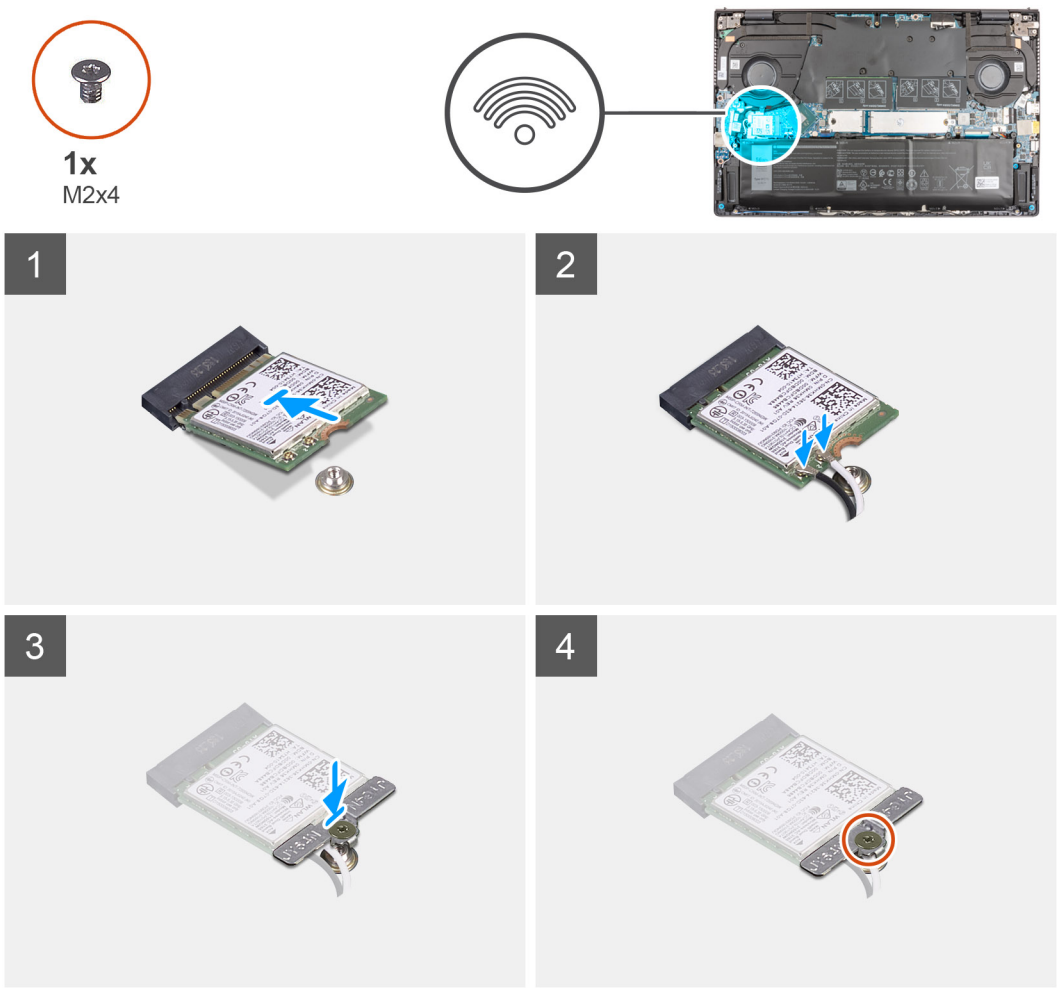
Installing the wireless card

Prerequisites

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

About this task

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



Steps

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 (M2x4) that secures the wireless-card bracket to the wireless card and the system board.

Next steps

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

GPU fan

Removing the GPU fan

Prerequisites

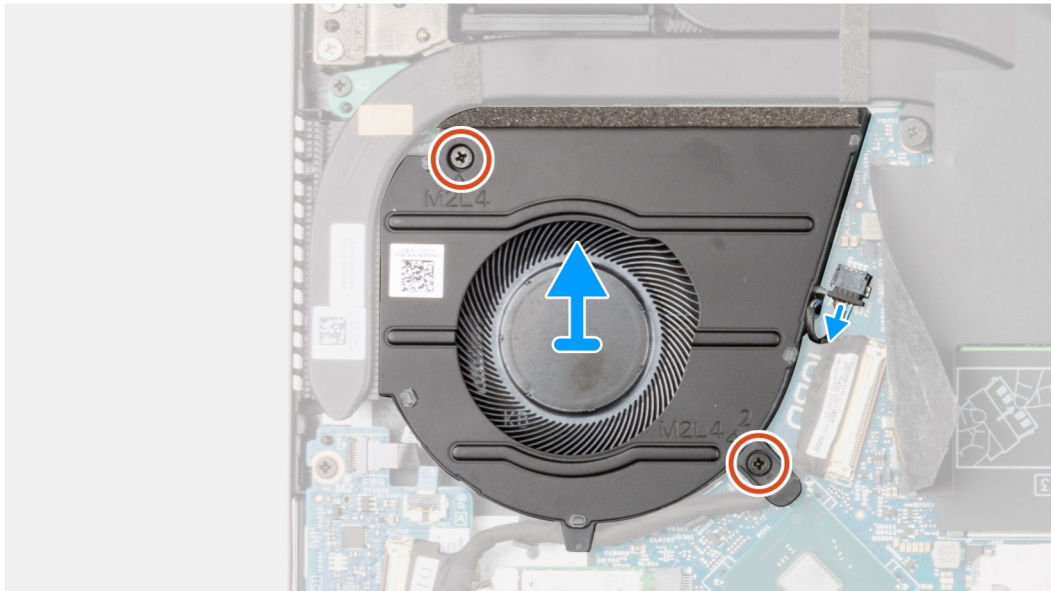
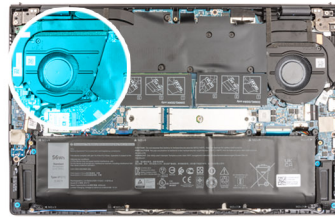
1. Follow the procedure in [Before working inside your computer](#).
2. Enter [Service Mode](#).
3. Remove the [base cover](#).

About this task

The figure indicates the location of the GPU fan and provides a visual representation of the removal procedure.



2x
M2x4



Steps

1. Flip the Mylar cover open.
2. Disconnect the GPU fan cable from the system board.
3. Remove the two (M2x4) screws that secure the GPU fan to the palm-rest and keyboard assembly.
4. Unroute the I/O cable from routing guides underneath the GPU fan.
5. Slide and lift the GPU fan off the palm-rest and keyboard assembly.

Installing the GPU fan

Prerequisites

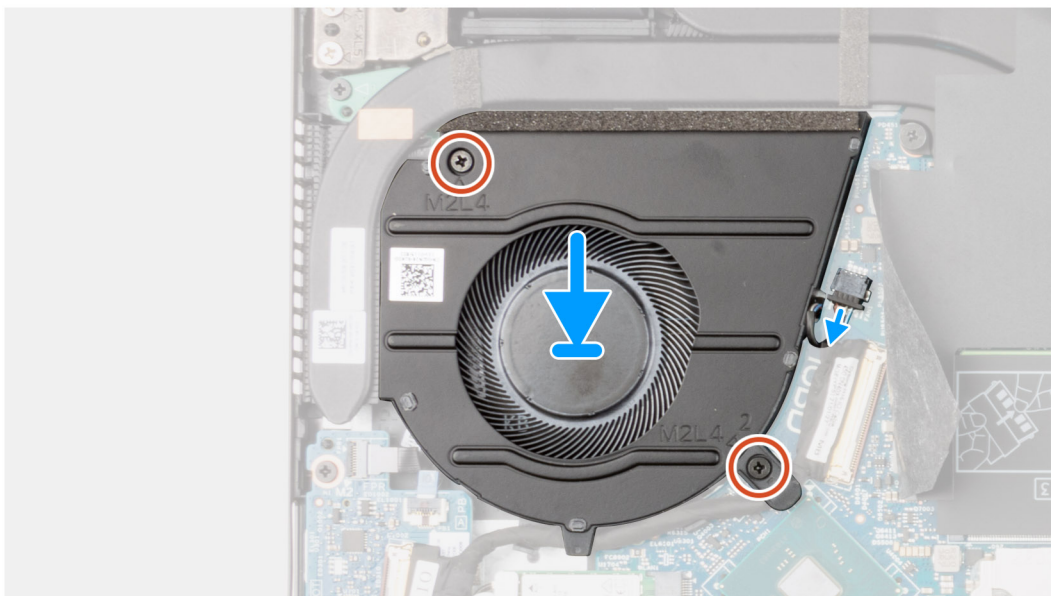
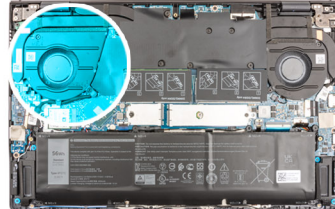
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The figure indicates the location of the GPU fan and provides a visual representation of the installation procedure.



2x
M2x4



Steps

1. Lift the Mylar cover to access the cable connector.
2. Route the I/O cable through the routing guides underneath the GPU fan.
3. Slide and place the GPU fan on the palm-rest and keyboard assembly.
4. Align the screw holes on the GPU fan with the screw holes on the palm-rest and keyboard assembly.
5. Replace the two (M2x4) screws to secure the GPU fan to the palm-rest and keyboard assembly.
6. Connect the GPU fan cable to the system board.

Next steps

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

System fan

Removing the system fan

Prerequisites

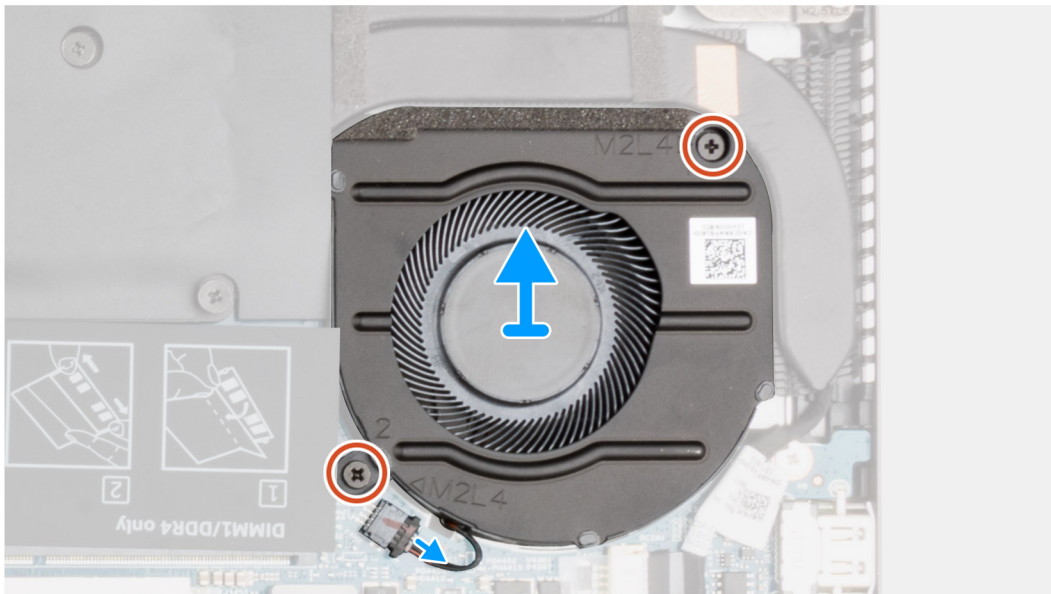
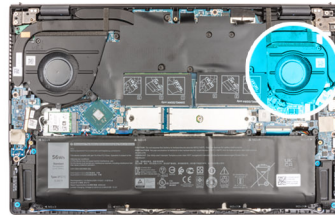
1. Follow the procedure in [Before working inside your computer](#).
2. Enter [Service Mode](#).
3. Remove the [base cover](#).

About this task

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



2x
M2x4



Steps

1. Disconnect the fan cable from the system board.
2. Remove the two (M2x4) 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 system fan

Prerequisites

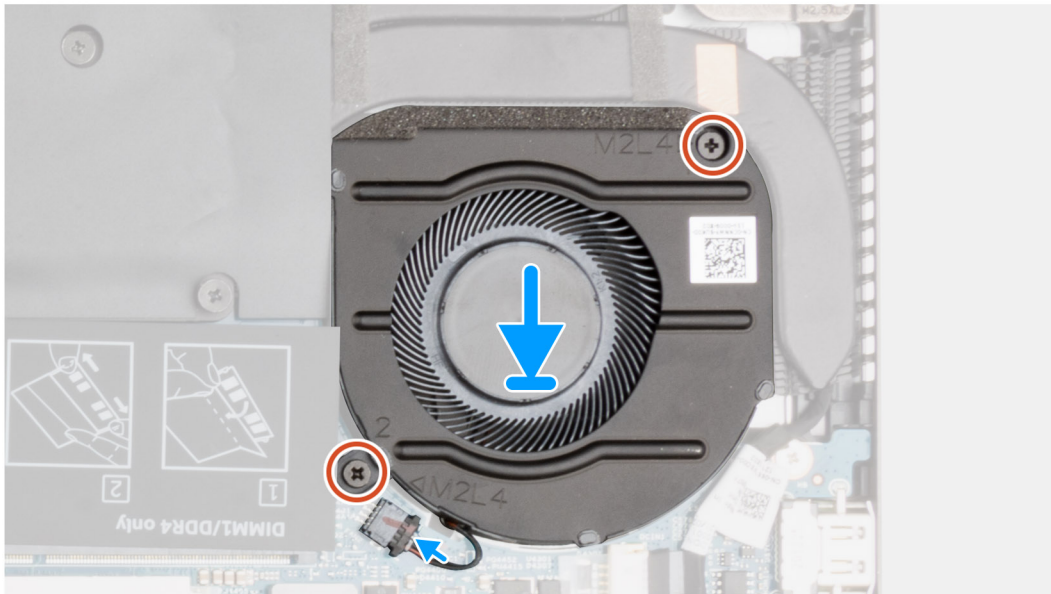
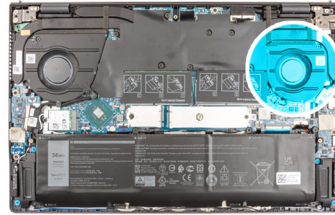
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

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



2x
M2x4



Steps

1. Using the alignment posts, place the fan on the palm-rest and keyboard assembly.
2. Replace the two (M2x4) screws to secure the fan to the palm-rest and keyboard assembly.
3. Connect the fan cable to the system board.

Next steps


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


Heat sink

Removing the heat sink

Prerequisites

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

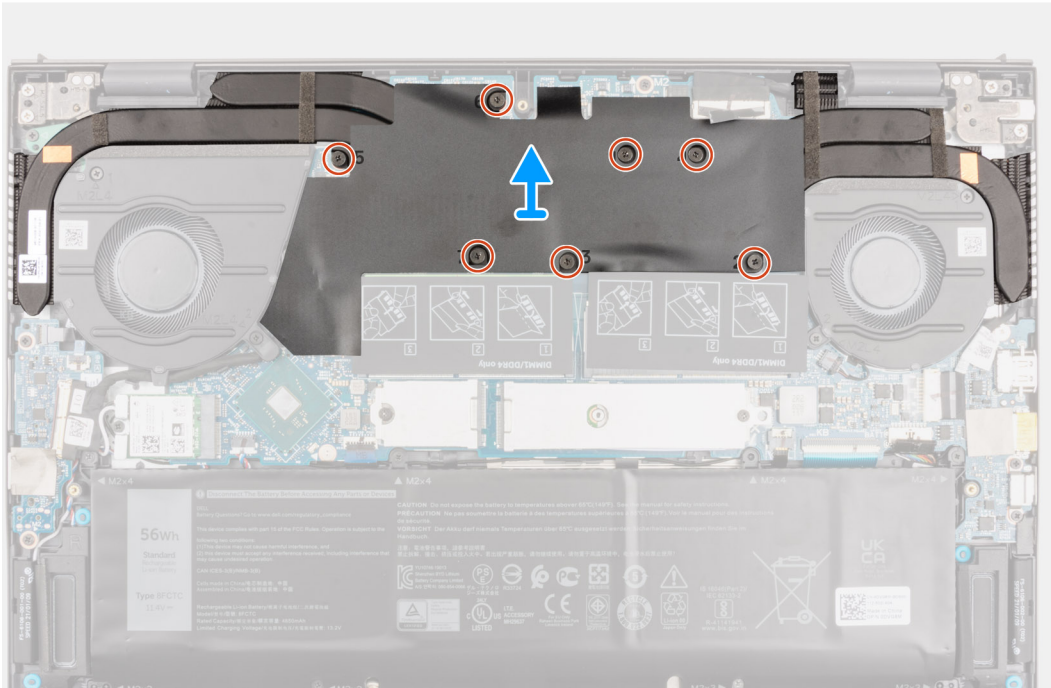
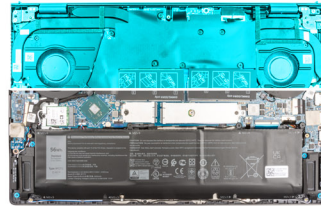
 **CAUTION:** For maximum cooling of the processor, do not touch the heat transfer areas on the heat sink. The oils in your skin can reduce the heat transfer capability of the thermal grease.

 **NOTE:** The heat sink may become hot during normal operation. Allow sufficient time for the heat sink to cool before you touch it.

2. Enter [Service Mode](#).
3. Remove the [base cover](#).

About this task

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



Steps

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

Installing the heat sink

Prerequisites

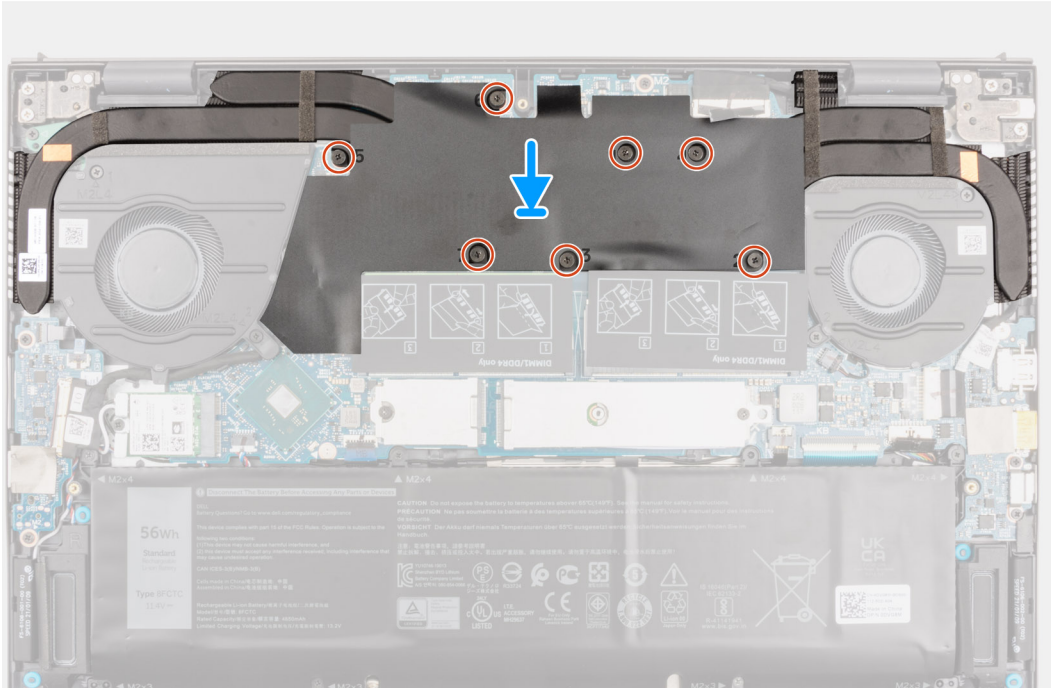
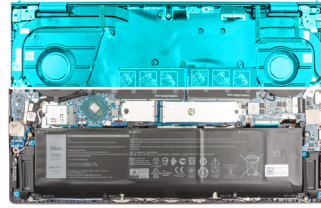
If you are replacing a component, remove the existing component before performing the installation procedure.

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

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.

About this task

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



Steps

1. Align the screw holes on the heat sink and Mylar cover with the screw holes on the system board.
2. In sequential order (as indicated on the Mylar cover), tighten the seven captive screws that secure the heat sink to the system board.

Next steps

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

I/O board

Removing the I/O board

Prerequisites

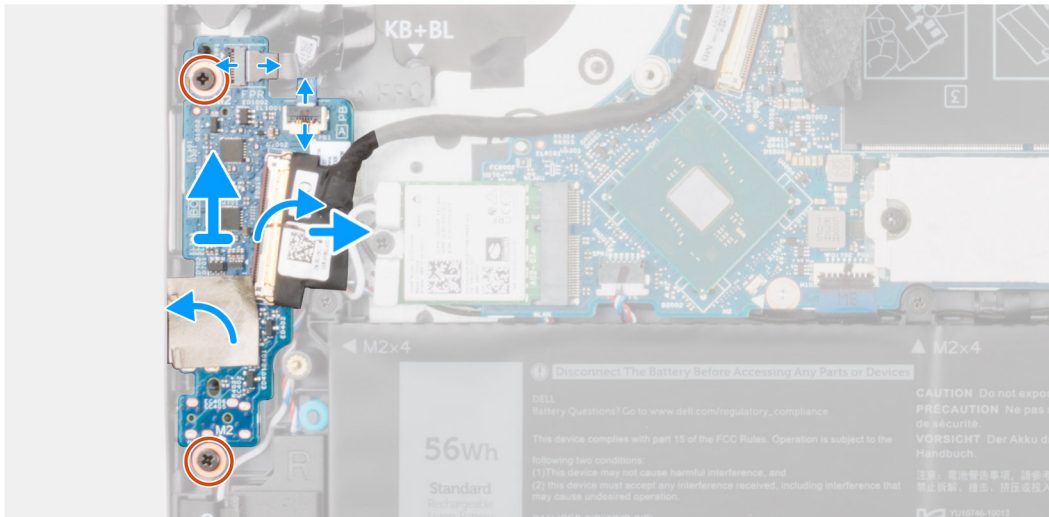
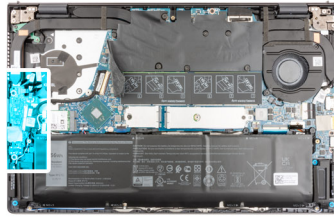
1. Follow the procedure in [Before working inside your computer](#).
2. Enter [Service Mode](#).
3. Remove the [base cover](#).
4. Remove the [GPU fan](#).

About this task

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



2x
M2x4



Steps

1. Open the latch, and disconnect the power button with fingerprint reader cable from the I/O board.
2. Open the latch, and disconnect the power button cable from the I/O board.
3. Peel the tape that secures the I/O-board cable to the I/O board.
4. Open the latch and disconnect the I/O-board cable from the I/O board.
5. Peel the adhesive tape securing the I/O board to the palm-rest and keyboard assembly.
6. Remove the two (M2x4) screws that secure the I/O board to the palm-rest and keyboard assembly.
7. Lift the I/O board off the palm-rest and keyboard assembly.

Installing the I/O board

Prerequisites

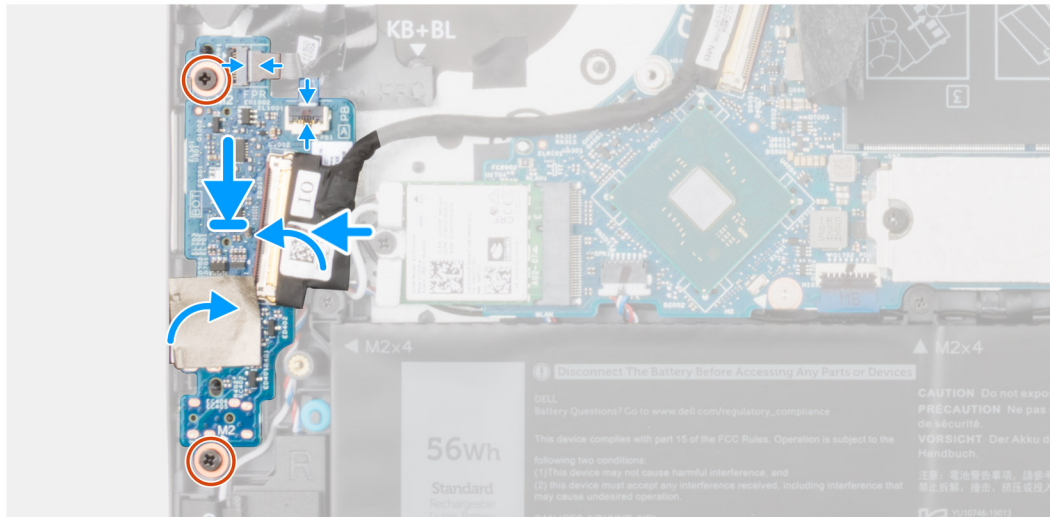
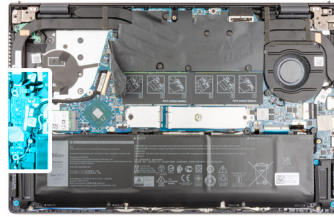
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

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



2x
M2x4



Steps

1. Slide the I/O board into the slot on the palm-rest and keyboard assembly.
2. Align the screw holes on the I/O board with the screw holes on the palm-rest and keyboard assembly.
3. Replace the two (M2x4) screws that secure the I/O board to the palm-rest and keyboard assembly.
4. Connect the power button with fingerprint reader cable into the connector on the I/O board and close the latch to secure the cable.
5. Connect the power button 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. Adhere the adhesive tape that secures the I/O board to the palm-rest and keyboard assembly.

Next steps

1. Install the [GPU fan](#).
2. Install the [base cover](#).
3. Exit [Service Mode](#).
4. Follow the procedure in [After working inside your computer](#).

Speakers

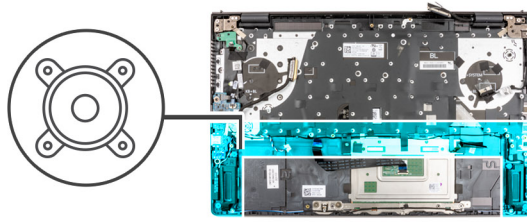
Removing the speakers

Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Enter [Service Mode](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [system board](#).

About this task

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



Steps

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

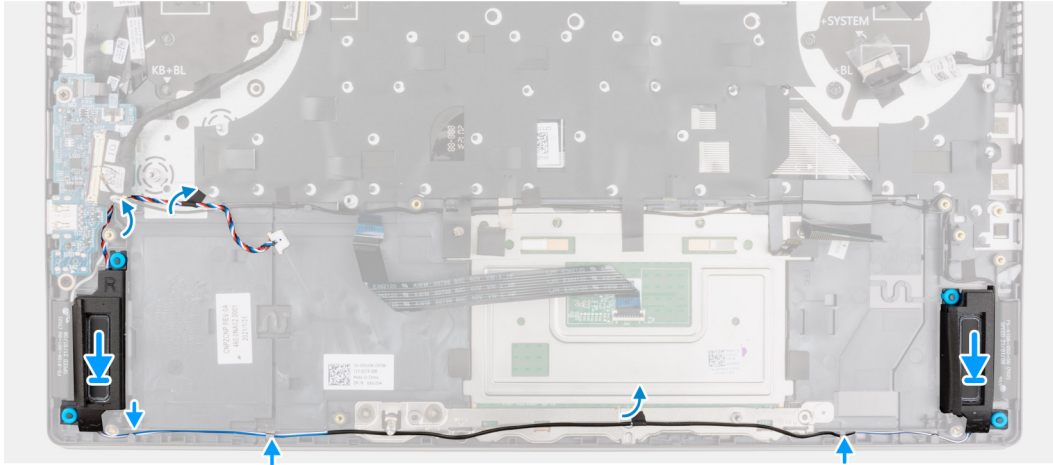
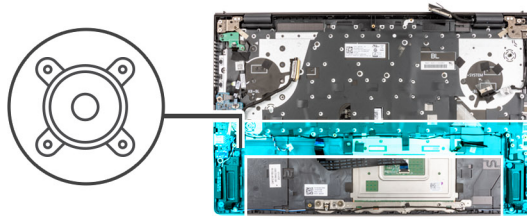
Installing the speakers

Prerequisites

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

About this task

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



Steps

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. Adhere the tape that secures the speaker cable to the palm-rest and keyboard assembly.

Next steps

1. Install the [system board](#).
2. Install the [battery](#).
3. Install the [base cover](#).
4. Exit [Service Mode](#).
5. Follow the procedure in [After working inside your computer](#).

Touchpad

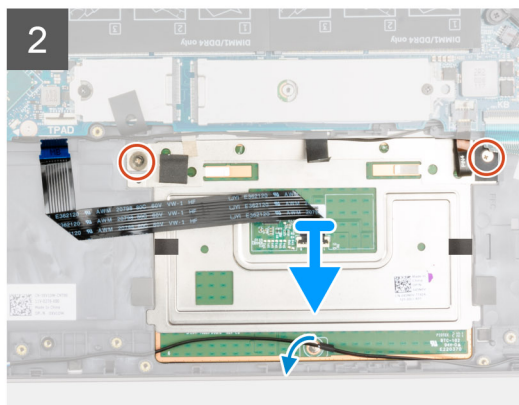
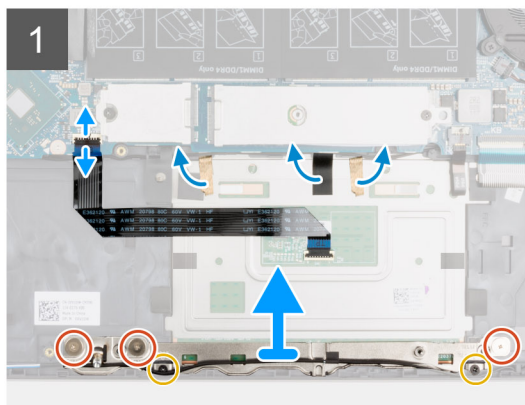
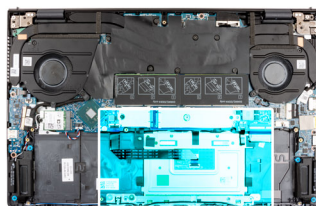
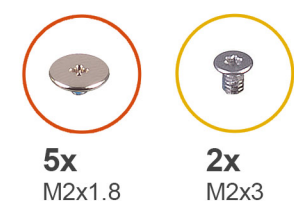
Removing the touchpad

Prerequisites

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

About this task

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



Steps

1. Open the latch and disconnect the touchpad cable from the system board.
2. Peel the tape that secures the touchpad bracket to the palm-rest and keyboard assembly.
3. Remove the three (M2x1.8) and the two (M2x3) screws that secure 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 tape that secures the speaker cable to the touchpad bracket.
7. Lift the touchpad, along with the touchpad cable, off the palm-rest and keyboard assembly.

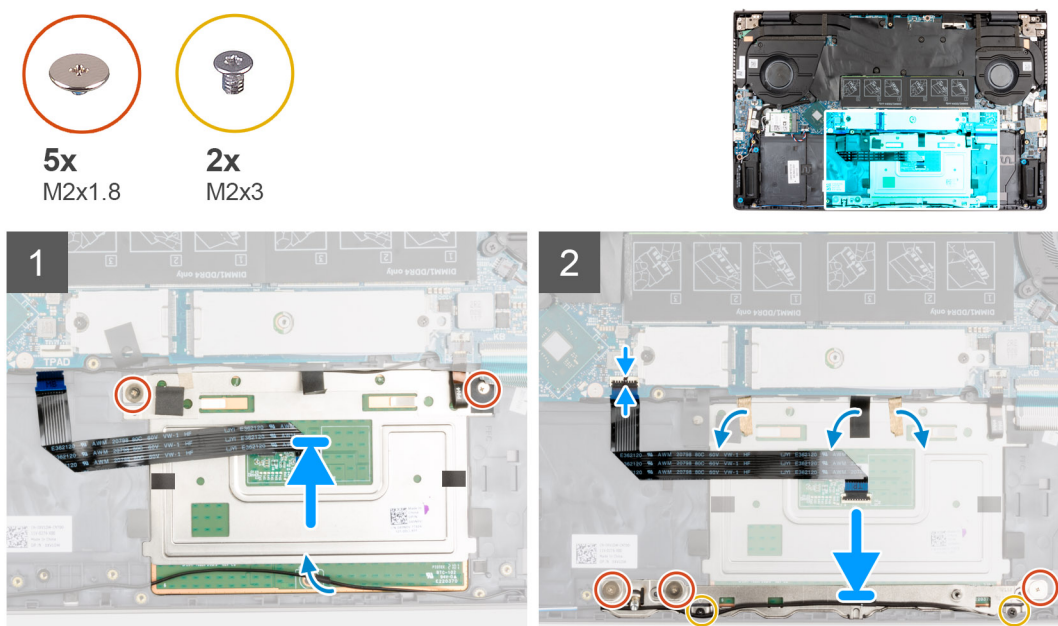
Installing the touchpad

Prerequisites

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

About this task

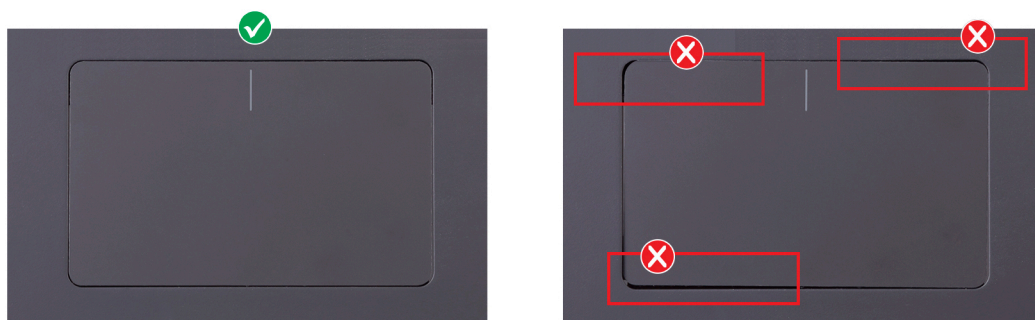
The following image indicates the location of the touchpad and provides a visual representation of the installation procedure.



Steps

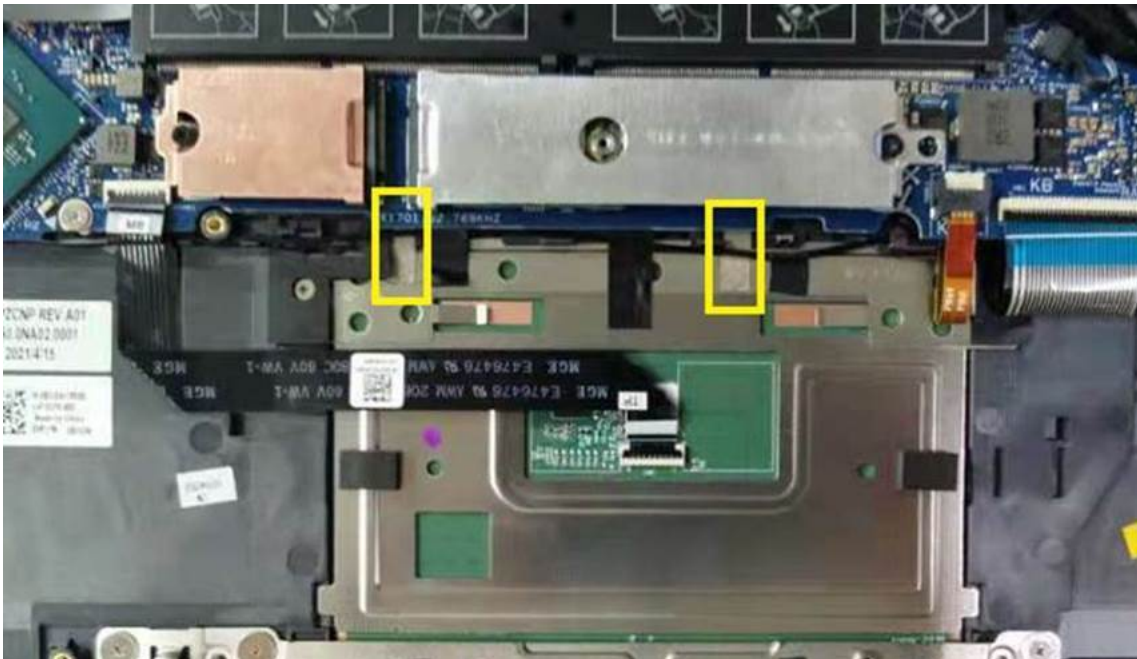
1. Slide the touchpad into the slot on the palm-rest and keyboard assembly.

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.

NOTE: Adhere the tapes back to its original position so that it runs across touchpad and palmrest.



4. Align the screw holes on the touchpad bracket with the screw holes on the palm-rest and keyboard assembly.
5. Replace the three (M2x1.8) and two (M2x3) screws that secure the touchpad bracket to the palm-rest and keyboard assembly.
6. Slide the touchpad cable into the connector on the touchpad and close the latch to secure the cable.
7. Adhere the tape that secures the touchpad bracket to the palm-rest and keyboard assembly.
8. Adhere the tape that secures the speaker cable to the touchpad.

Next steps

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

Display assembly

Removing the display assembly

Prerequisites

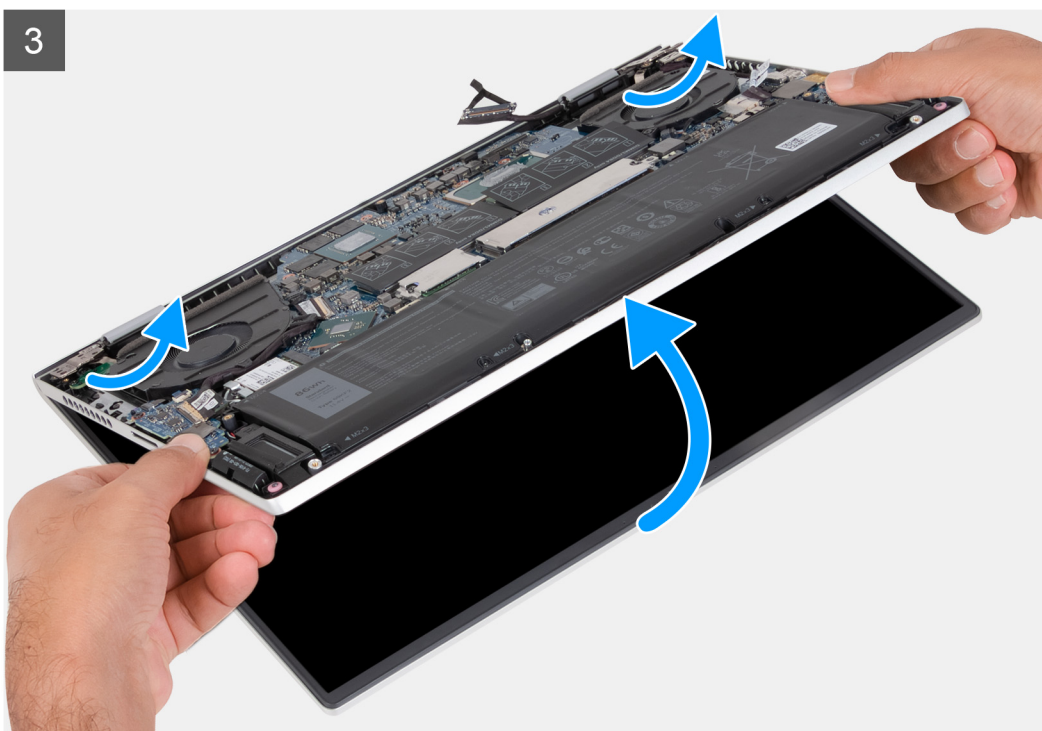
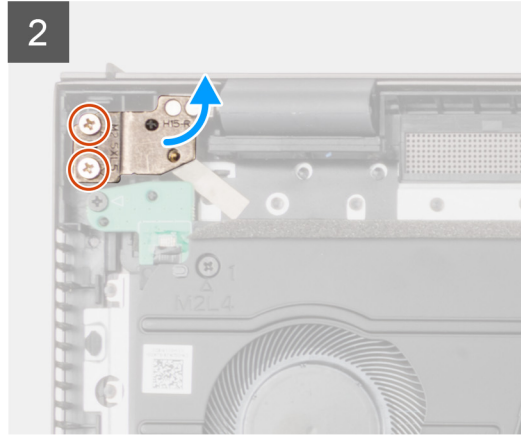
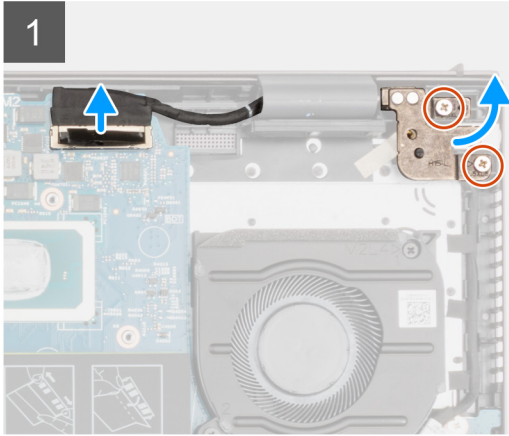
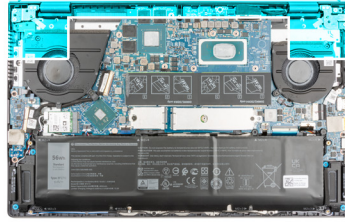
1. Follow the procedure in [Before working inside your computer](#).
2. Enter [Service Mode](#).
3. Remove the [base cover](#).
4. Remove the [heat sink](#).

About this task

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



4x
M2.5x5





Steps

1. Disconnect the display cable from its connector on the system board.
2. Remove the two (M2.5x5) screws that secure the left-display hinge to the system board.
3. Remove the two (M2.5x5) screws that secure the right-display hinge to the system board.
4. Open the display hinges at an angle of 90 degrees.
5. Gently slide the palm-rest and keyboard assembly off the display assembly.

Installing the display assembly

Prerequisites

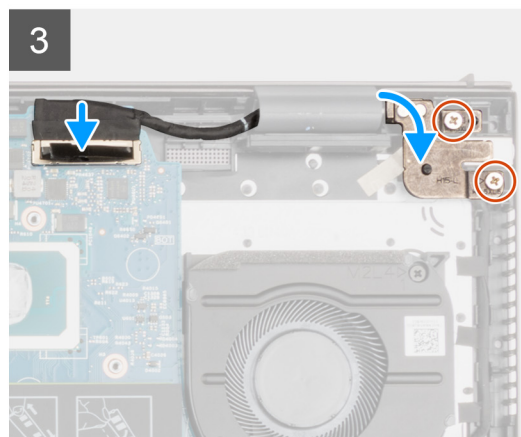
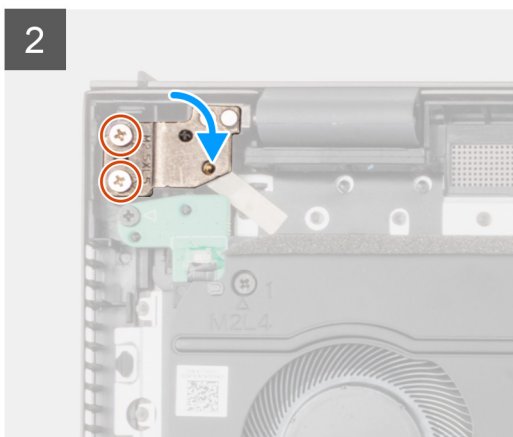
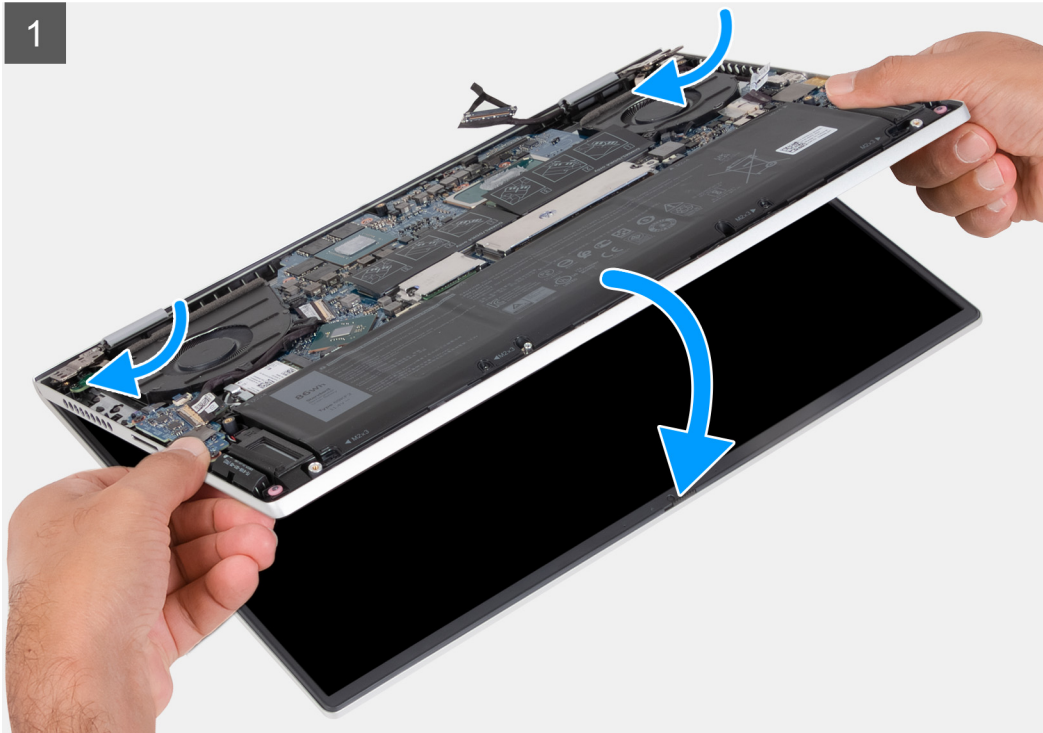
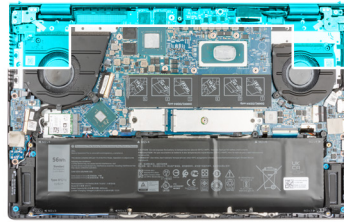
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

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



4x
M2.5x5



Steps

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 two (M2.5x5) screws that secure the right-display hinge to the system board.
4. Replace the two (M2.5x5) screws that secure the left-display hinge to the system board.
5. Slide the display cable into the connector on the system board.

Next steps

1. Install the [heat sink](#).
2. Install the [base cover](#).

3. Exit [Service Mode](#).
4. Follow the procedure in [After working inside your computer](#).

Power-button board with fingerprint reader

Removing the power-button board

Prerequisites

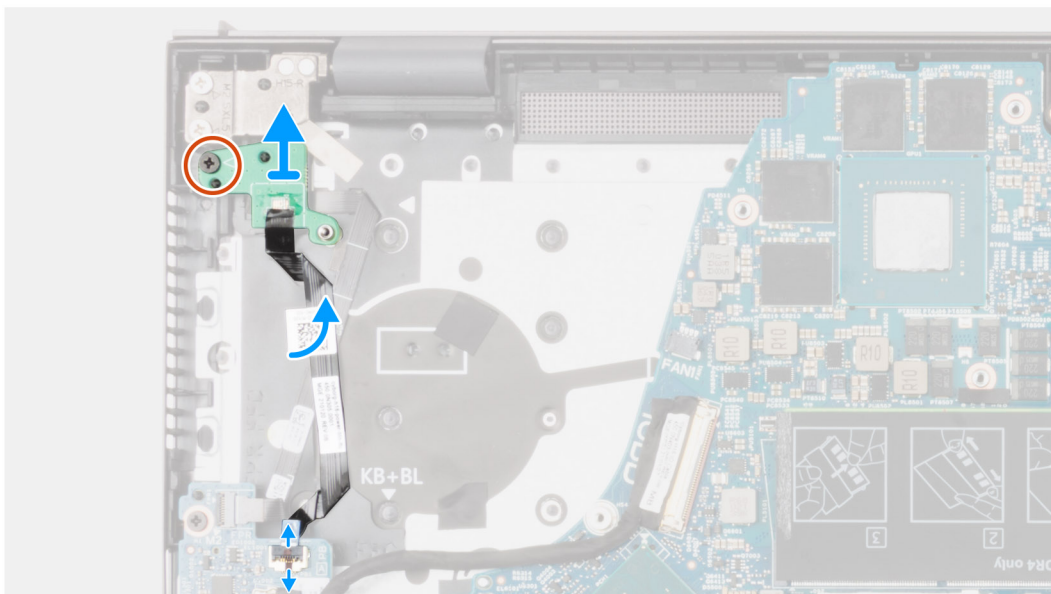
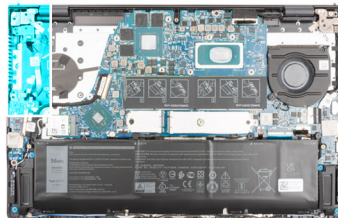
1. Follow the procedure in [Before working inside your computer](#).
2. Enter [Service Mode](#).
3. Remove the [base cover](#).
4. Remove the [GPU fan](#).
5. Remove the [heat sink](#).

About this task

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



1x
M2x4



Steps

1. Disconnect the power-button cable from the I/O board.
2. Peel the adhesive tape securing the power-button cable to palm-rest and keyboard assembly.
3. Remove the screw (M2x4) that secures the power-button board with the cable to the palm-rest and keyboard assembly.
4. Lift the power-button board with the cable off the palm-rest and keyboard assembly.

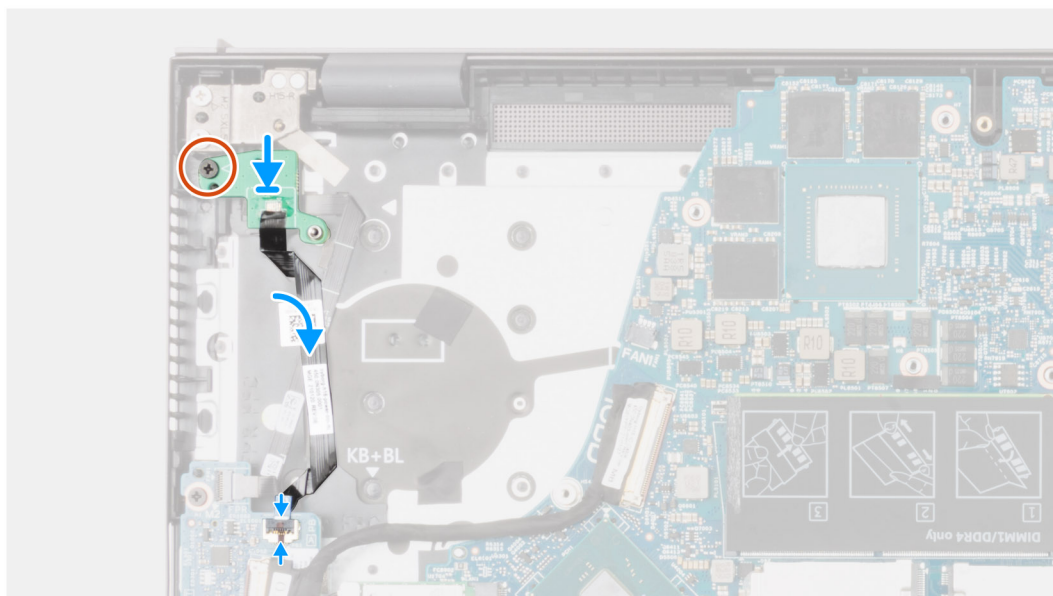
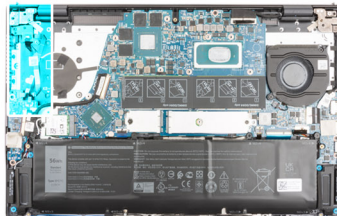
Installing the power-button board

About this task

The following images indicate the location of the power-button board and provide a visual representation of the installation procedure.



1x
M2x4



Steps

1. Align and place the power-button board along with the cable on the palm-rest and keyboard assembly.
2. Replace the screw (M2x4) that secures the power-button board with the cable to the palm-rest and keyboard assembly.
3. Connect the power-button cable to the I/O board.

Next steps

1. Install the [heat sink](#).
2. Install the [GPU fan](#).
3. Install the [base cover](#).
4. Exit [Service Mode](#).
5. Follow the procedure in [After working inside your computer](#).

Power button with optional fingerprint reader

Removing the power-button with optional fingerprint reader

Prerequisites

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

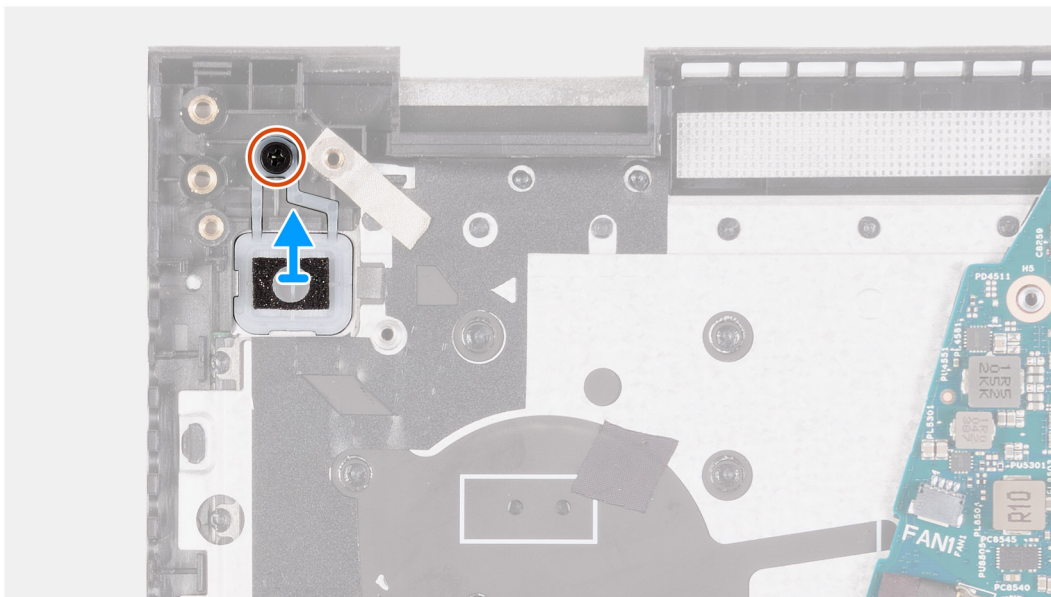
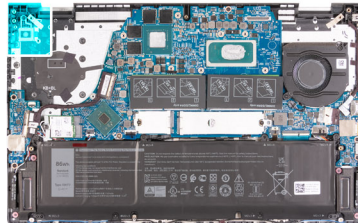
3. Remove the [battery](#).
4. Remove the [heat sink](#).
5. Remove the [GPU fan](#).
6. Remove the [power-button board](#).

About this task

The following image indicates the location of the power-button with optional fingerprint reader and provides a visual representation of the removal procedure.



1x
M2x4



Steps

1. Remove the screw (M2x4) 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

Prerequisites

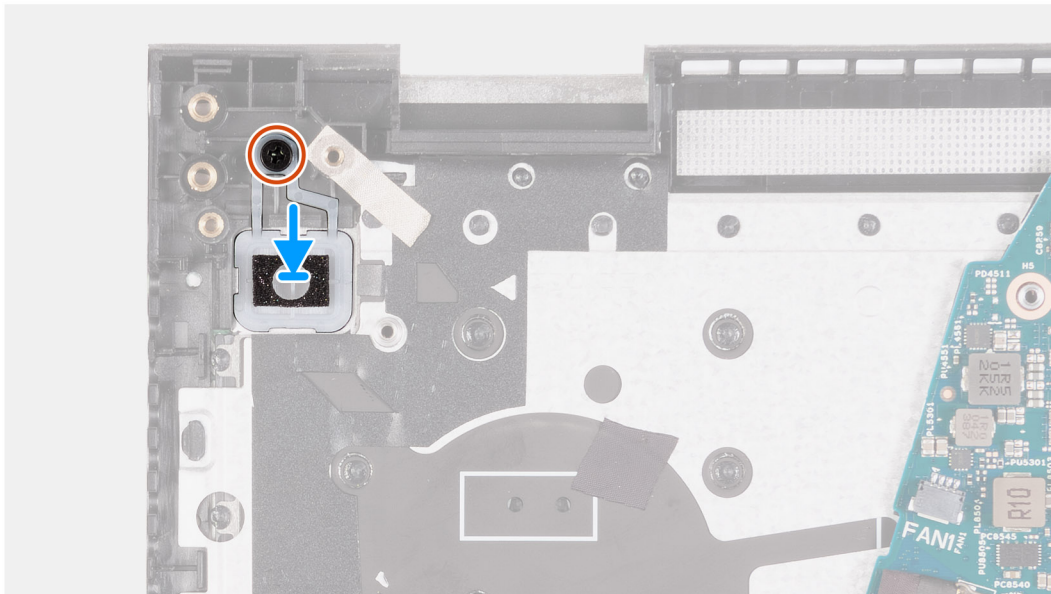
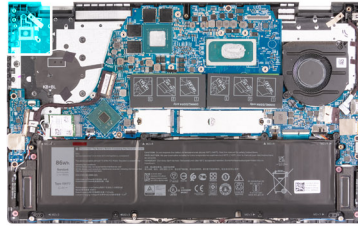
If you are replacing a component, remove the existing component before performing the installation process.

About this task

The following image indicates the location of the power-button with optional fingerprint reader and provides a visual representation of the installation procedure.



1x
M2x4



Steps

1. Using the alignment posts, place the power-button with optional fingerprint reader into its slot on the palm-rest and keyboard assembly.
2. Replace the screw (M2x4) that secures the power-button with optional fingerprint reader to the palm-rest and keyboard assembly.

Next steps

1. Install the [power-button board](#).
2. Install the [heat sink](#).
3. Install the [GPU fan](#).
4. Install the [base cover](#).
5. Exit [Service Mode](#).
6. Follow the procedure in [After working inside your computer](#).

Power button with fingerprint reader

Removing the power button with fingerprint reader

Prerequisites

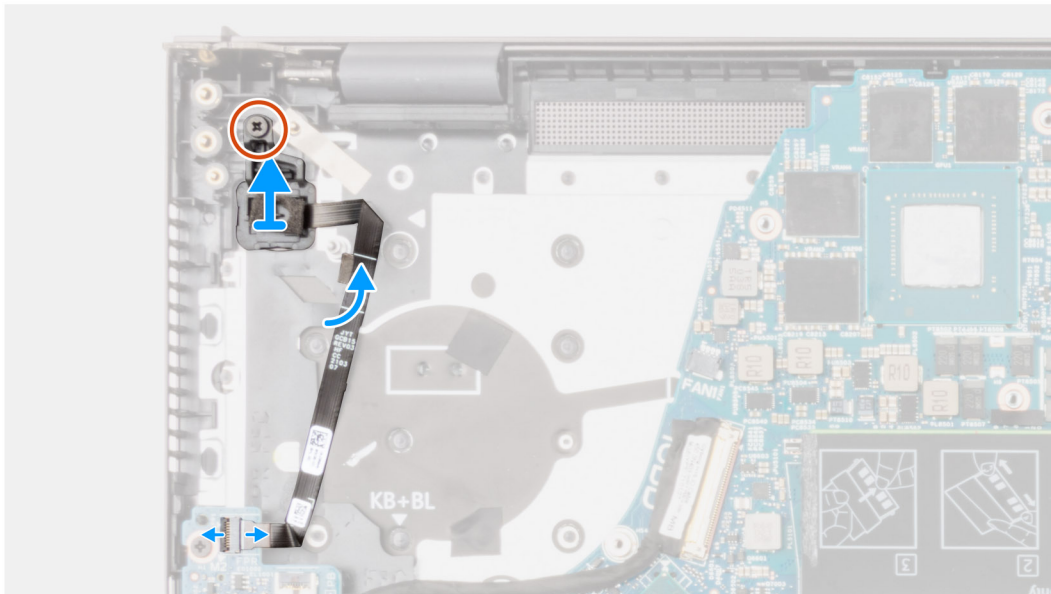
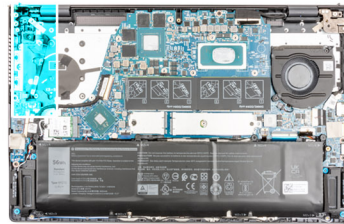
1. Follow the procedure in [Before working inside your computer](#).
2. Enter [Service Mode](#).
3. Remove the [base cover](#).
4. Remove the [heat sink](#).
5. Remove the [GPU fan](#).
6. Remove the [power-button board](#).

About this task

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



1x
M2x4



Steps

1. Disconnect the power button with fingerprint reader cable from the I/O board.
2. Remove the screw (M2x4) that secures the power button with fingerprint reader to the palm-rest and keyboard assembly.
3. Lift the power button with fingerprint reader along with the cable off the palm-rest and keyboard assembly.

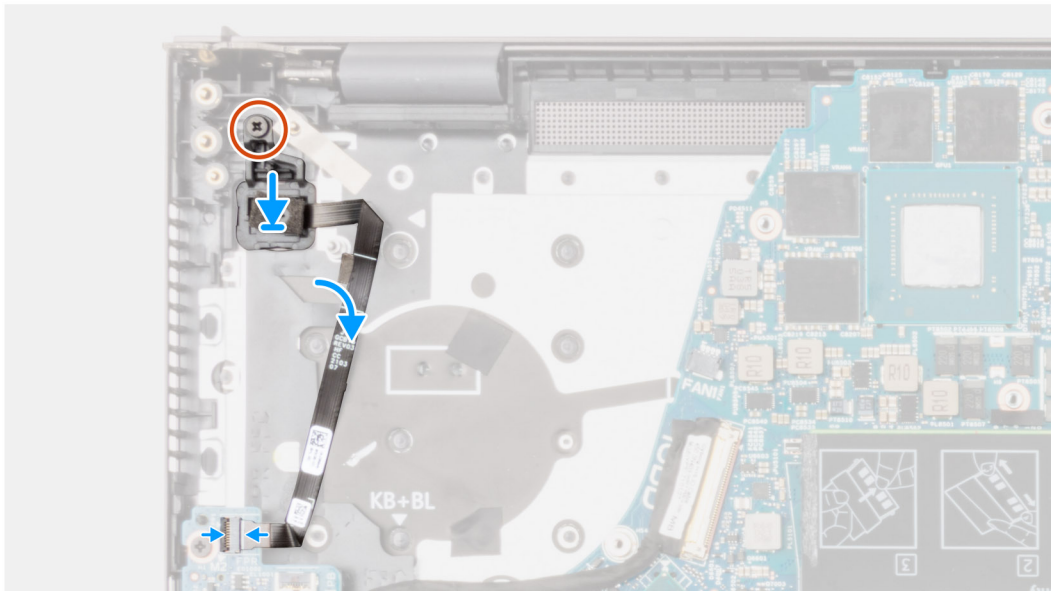
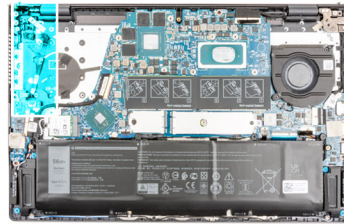
Installing the power button with fingerprint reader

About this task

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



1x
M2x4



Steps

1. Align and place the power button with fingerprint reader along with the cable on the palm-rest and keyboard assembly.
2. Replace the screw (M2x4) that secures the power button with fingerprint reader to the palm-rest and keyboard assembly.
3. Connect the power button with fingerprint reader cable to the I/O board.

Next steps

1. Install the [power-button board](#).
2. Install the [heat sink](#).
3. Install the [GPU fan](#).
4. Install the [base cover](#).
5. Exit [Service Mode](#).
6. Follow the procedure in [After working inside your computer](#).

Power-adapter port

Removing the power-adapter port

Prerequisites

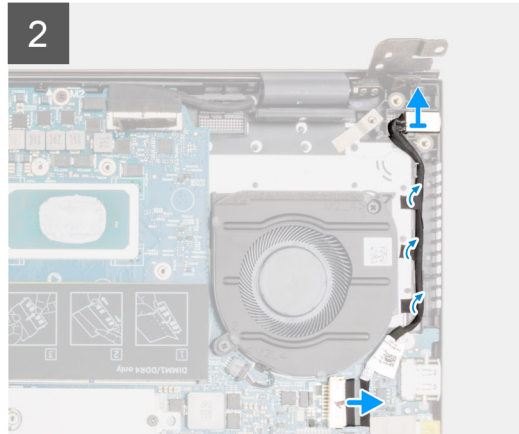
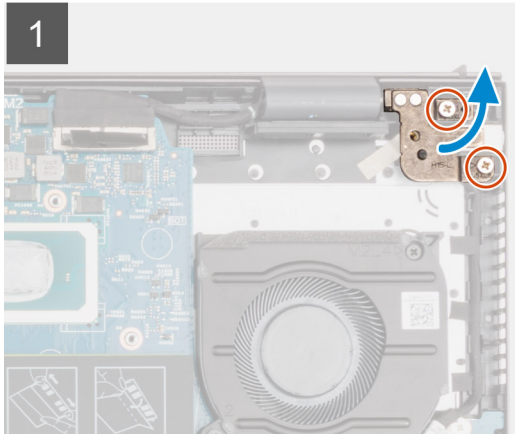
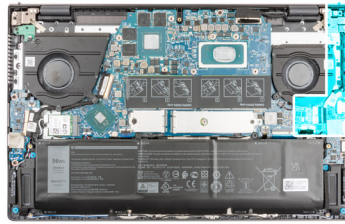
1. Follow the procedure in [Before working inside your computer](#).
2. Enter [Service Mode](#).
3. Remove the [base cover](#).
4. Remove the [heat sink](#).

About this task

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



2x
M2.5x5



Steps

1. Remove the two (M2.5x5) 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 tapes that secure 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

Prerequisites

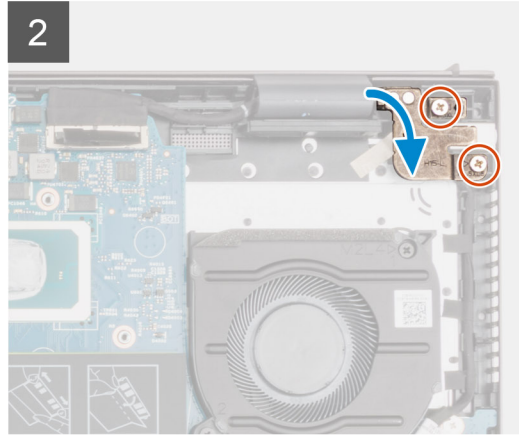
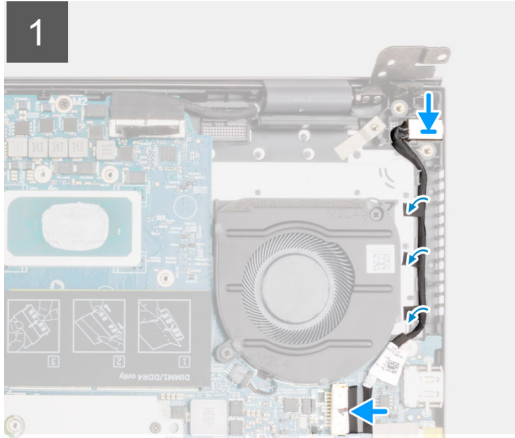
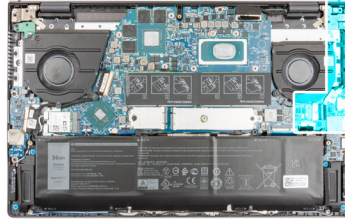
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

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



2x
M2.5x5



Steps

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 tapes that secure 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 two (M2.5x5) screws that secure the right display-hinge to the system board and palm-rest and keyboard assembly.

Next steps

1. Install the [heat sink](#).
2. Install the [base cover](#).
3. Exit [Service Mode](#).
4. Follow the procedure in [After working inside your computer](#).

System board

Removing the system board

Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
 - 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.
 - 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.
 - 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 [battery](#).
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 [GPU fan](#).
9. Remove the [system fan](#).
10. Remove the [heat sink](#).

About this task

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.

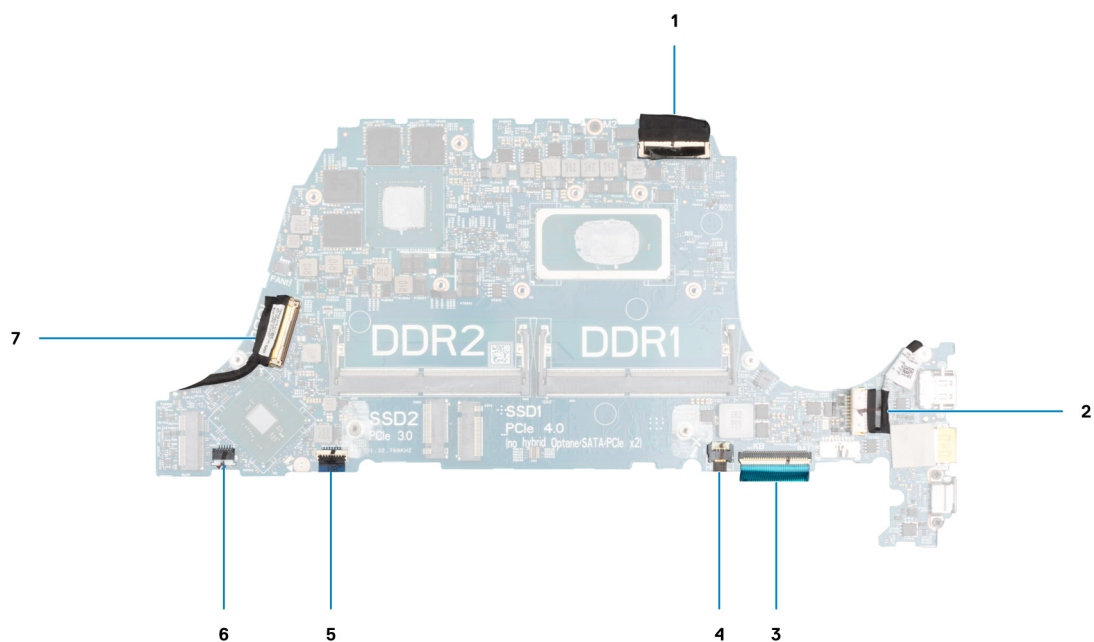
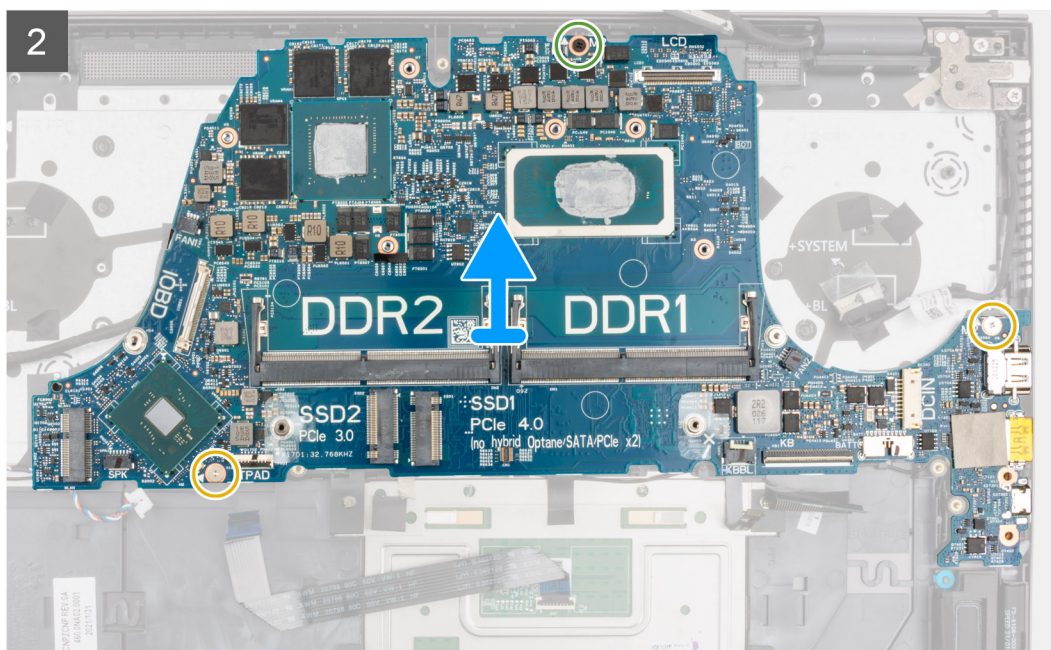
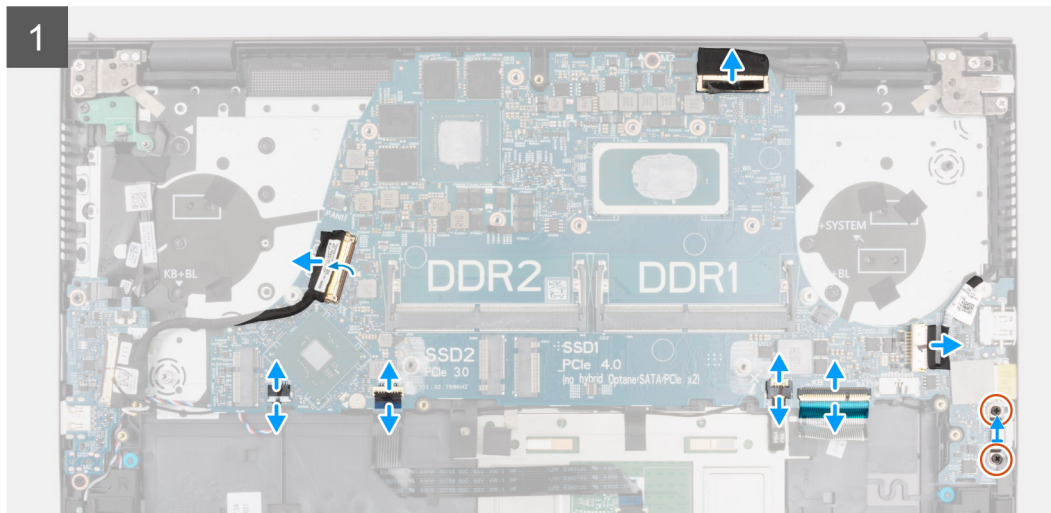
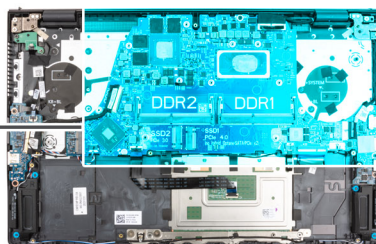
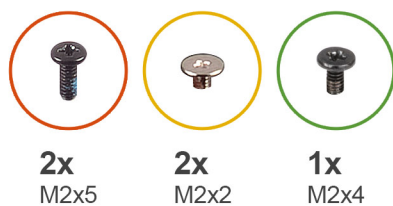


Figure 1. System board connectors

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

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



Steps

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. Peel the tape and disconnect the I/O-board cable from the system board.
4. Disconnect the speaker cable from the system board.
5. Open the latch, and disconnect the touchpad cable from the system board.
6. Open the latch, and disconnect the keyboard backlit cable from the system board.
7. Open the latch, and disconnect the keyboard cable from the system board.
8. Peel the tape and disconnect the power-adapter port cable from the system board.

9. Remove the two (M2x5) screws that secure the USB Type-C bracket to the system board.
10. Remove the two (M2x2) screws and one (M2x4) screw that secures the system board to the palm-rest and keyboard assembly.
11. Lift the system board off the palm-rest and keyboard assembly.

Installing the system board

Prerequisites

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

About this task

- 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.
- 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.
- 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.

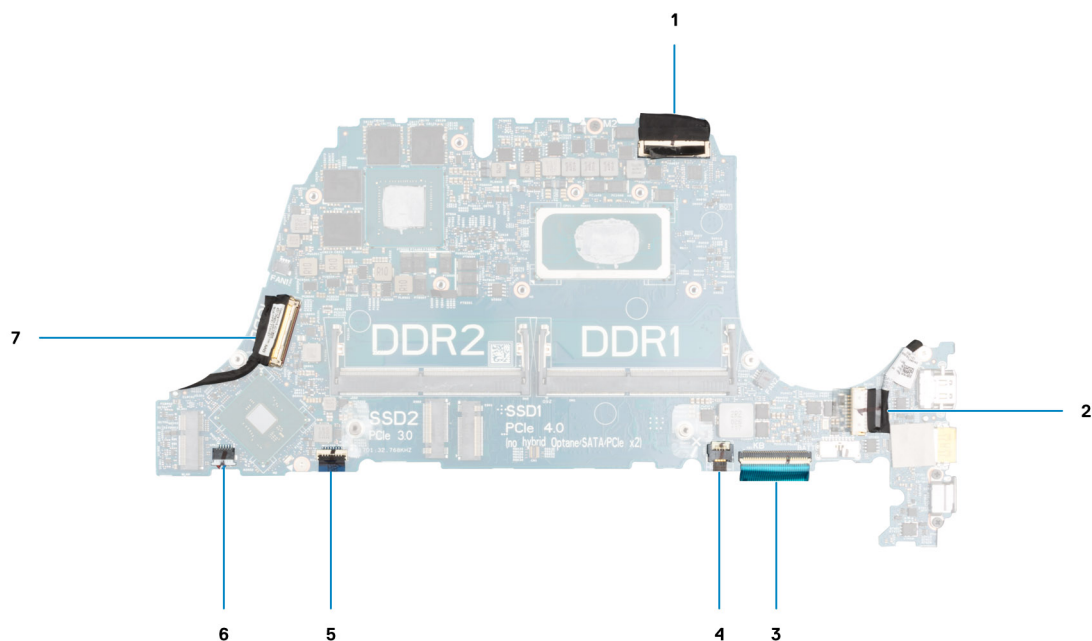
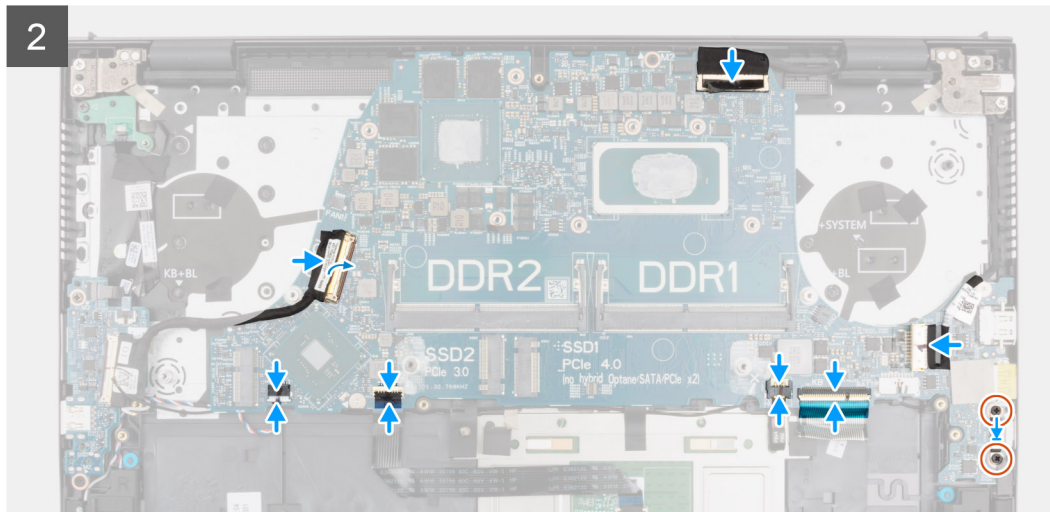
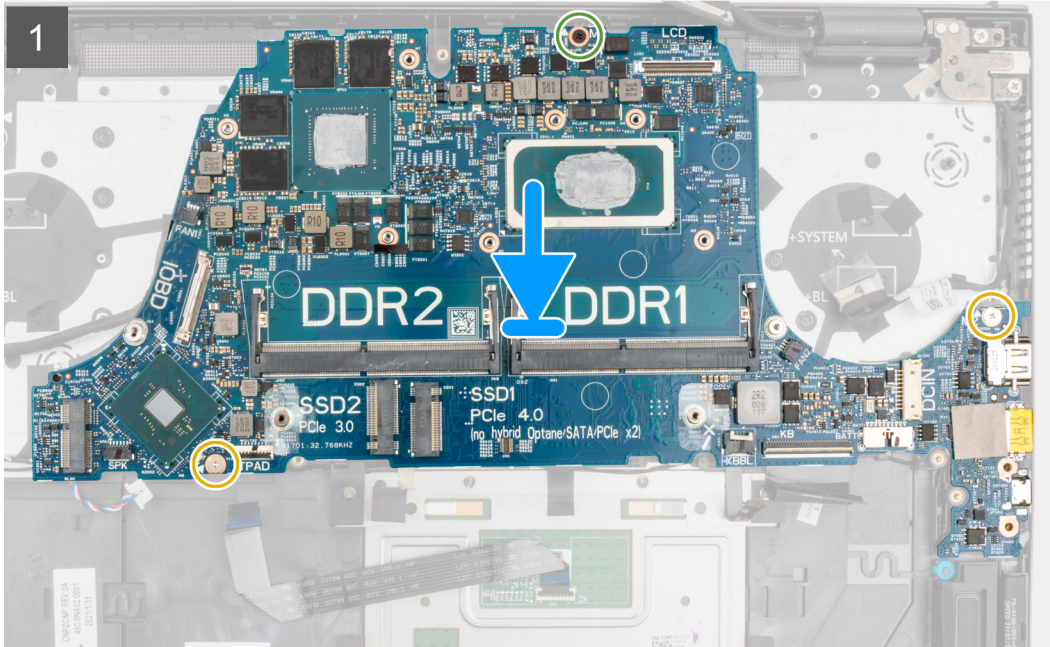
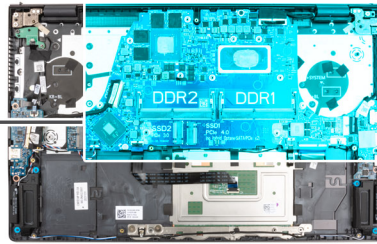
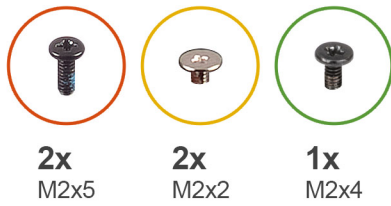


Figure 2. System board connectors

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

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



Steps

1. Align and place the system board on the palm-rest and keyboard assembly.
2. Replace the two (M2x2) screws and one (M2x4) screw 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-adaptor port cable to the system board.
6. Adhere the tape that secures the power-adaptor 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 (M2x5) screws that secure the USB Type-C port bracket to the system board.

9. Connect the keyboard cable to the system board and close the latch to secure the cable.
10. Connect the keyboard backlit 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.

Next steps


1. Install the [heat sink](#).
2. Install the [GPU fan](#).
3. Install the [system fan](#).
4. Install the [wireless card](#).
5. Install the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#) in M.2 slot one, whichever applicable.
6. Install the [M.2 2230 solid-state drive](#) in M.2 slot two, if applicable.
7. Install the [memory module](#).
8. Install the [battery](#).
9. Install the [base cover](#).
10. Follow the procedure in [After working inside your computer](#).

Palm-rest and keyboard assembly

Removing the palm-rest and keyboard assembly

Prerequisites

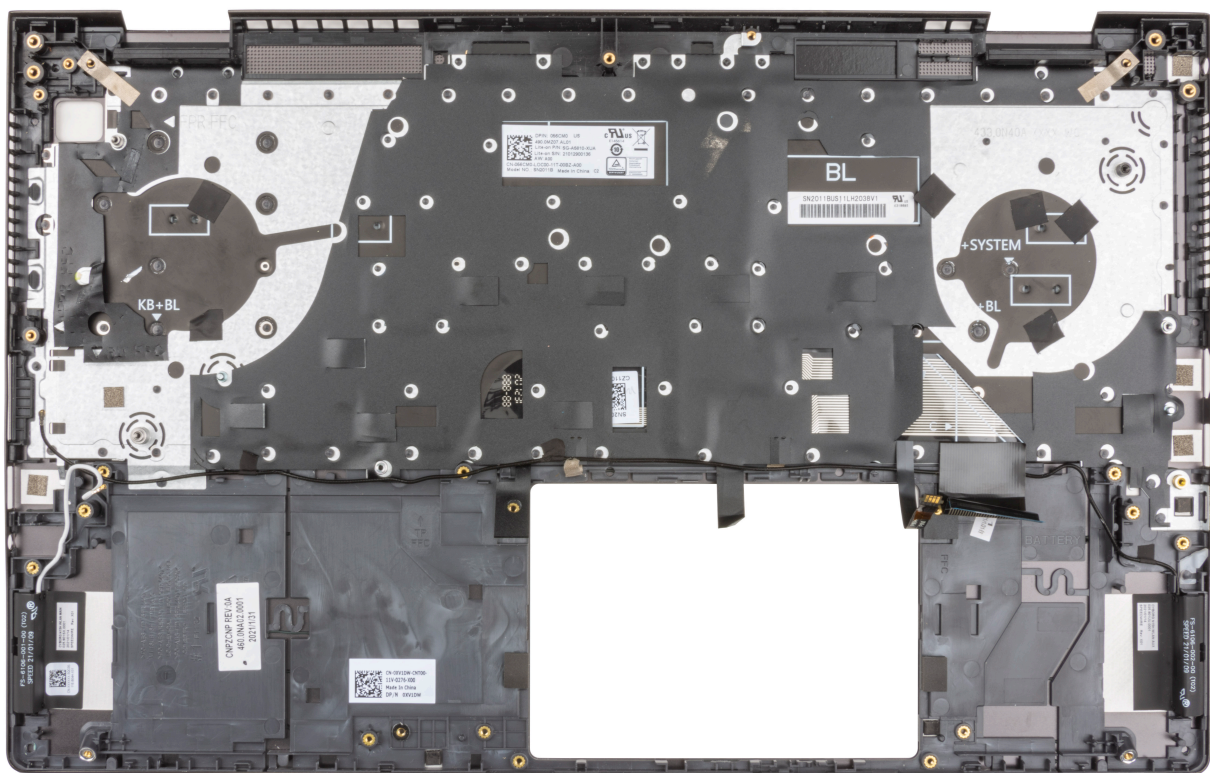
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [memory module](#).
5. Remove the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#) from M.2 slot one, whichever applicable.
6. Remove the [M.2 2230 solid-state drive](#) from M.2 slot two, if applicable.
7. Remove the [wireless card](#).
8. Remove the [GPU fan](#).
9. Remove the [system fan](#).
10. Remove the [heat sink](#).
11. Remove the [I/O board](#).
12. Remove the [system board](#).

 **NOTE:** The system board can be removed along with the heat sink.

13. Remove the [power-button board](#).
14. Remove the [power button with optional fingerprint reader](#) based on the system configuration.
15. Remove the [power button with fingerprint reader](#) based on the system configuration.
16. Remove the [power-adaptor port](#).
17. Remove the [speakers](#).
18. Remove the [touchpad](#).
19. Remove the [display assembly](#).

About this task

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



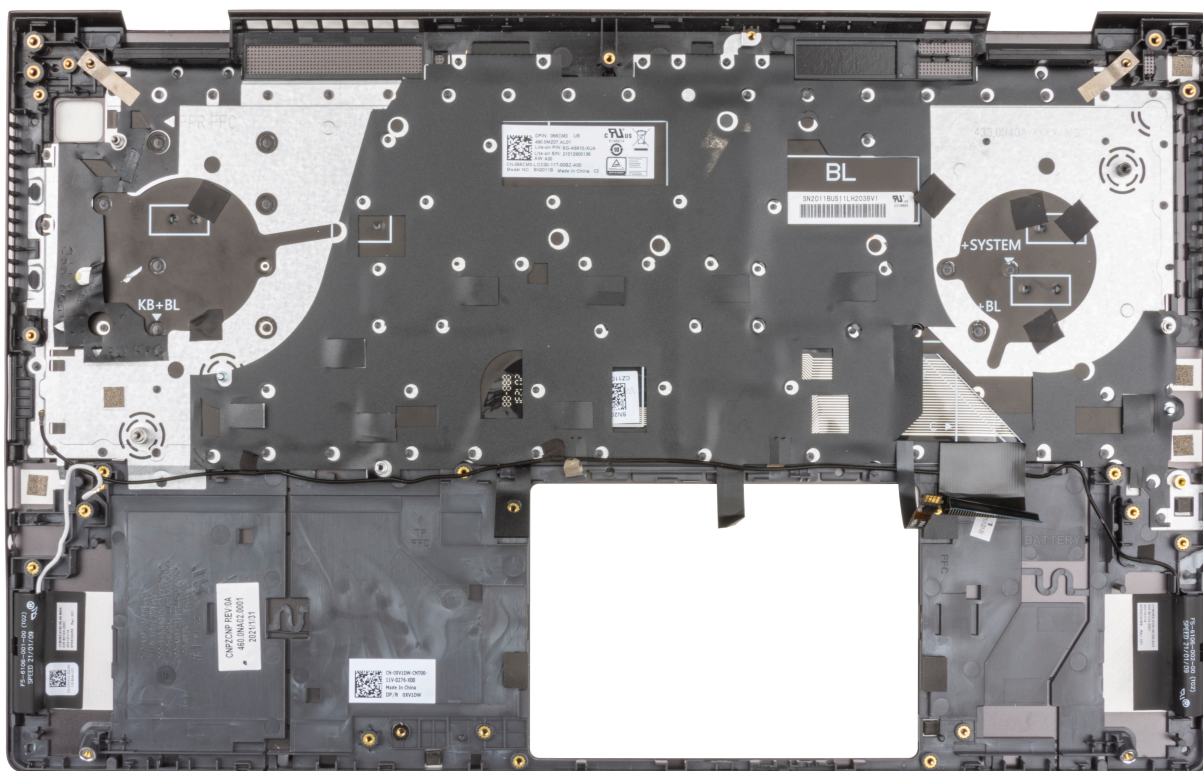
Installing the palm-rest and keyboard assembly

Prerequisites

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

About this task

Place the palm-rest and keyboard assembly on a flat surface.



Next steps

1. Install the [display assembly](#).
2. Install the [touchpad](#).
3. Install the [speakers](#).
4. Install the [power-adaptor port](#).
5. Install the [power button with fingerprint reader](#) based on system configuration.
6. Install the [power button with optional fingerprint reader](#) based on system configuration.
7. Install the [power-button board](#).
8. Install the [system board](#).

NOTE: The system board can be installed along with the heat sink.
9. Install the [I/O board](#).
10. Install the [heat sink](#).
11. Install the [GPU fan](#).
12. Install the [system fan](#).
13. Install the [wireless card](#).
14. Install the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#) in M.2 slot one, whichever applicable.
15. Install the [M.2 2230 solid-state drive](#) in M.2 slot two, if applicable.
16. Install the [memory module](#).
17. Install the [battery](#).
18. Install the [base cover](#).
19. Follow the procedure in [After working inside your computer](#).

Drivers and downloads




This chapter details the supported operating systems along with instructions on how to install the drivers.

Topics:


- [Downloading the drivers](#)


Downloading the drivers

Steps

1. Turn on your computer.
2. Go to www.dell.com/support.
3. Enter the Service Tag of your computer, and then click **Submit**.
 **NOTE:** If you do not have the Service Tag, use the auto-detect feature or manually browse for your computer model.
4. Click **Drivers & downloads**.
5. Click the **Detect Drivers** button.
6. Review and agree to the Terms and Conditions to use **SupportAssist**, then click **Continue**.
7. If necessary, your computer starts to download and install **SupportAssist**.
 **NOTE:** Review on-screen instructions for browser-specific instructions.
8. Click **View Drivers for My System**.
9. Click **Download and Install** to download and install all driver updates detected for your computer.
10. Select a location to save the files.
11. If prompted, approve requests from **User Account Control** to make changes on the system.
12. The application installs all drivers and updates identified.
 **NOTE:** Not all files can be installed automatically. Review the installation summary to identify if manual installation is necessary.
13. For manual download and installation, click **Category**.
14. From the drop-down list, select the preferred driver.
15. Click **Download** to download the driver for your computer.
16. After the download is complete, navigate to the folder where you saved the driver file.
17. Double-click the driver file icon and follow the instructions on the screen to install the driver.

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](#)
- [Advanced or Engineering configurations](#)
- [SupportAssist system resolution](#)
- [Updating the BIOS in Windows](#)
- [System and setup password](#)

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

About this task

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.

Keys

Navigation

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:

- Windows Boot Manager
- UEFI HTTPs Boot
- UEFI RST BC711 NVMe SK hynix 256 GB N09Q728610109O4Z

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—System information menu

Overview	
BIOS Version	Displays the BIOS version number.
Service Tag	Displays the Service Tag of the computer.
Asset Tag	Displays the Asset Tag of the computer.
Ownership Tag	Displays the ownership tag of the computer.
Manufacture Date	Displays the manufacture date of the computer.
Ownership Date	Displays the ownership date of the computer.
Express Service Code	Displays the express service code of the computer.
Ownership Tag	Displays the ownership tag of the computer.
Signed Firmware Update	Displays whether the signed firmware update is enabled.
Battery	Displays the battery health information.
Primary	Displays the primary battery.
Battery Level	Displays the battery level.
Battery State	Displays the battery state.
Health	Displays the battery health.
AC Adapter	Displays whether an AC adapter is installed.
Processor Information	
Processor Type	Displays the processor type.
Maximum Clock Speed	Displays the maximum processor clock speed.
Core Count	Displays the number of cores on the processor.
Processor L2 Cache	Displays the processor L2 Cache size.

Table 3. System setup options—System information menu (continued)

Overview	
Processor ID	Displays the processor identification code.
Processor L3 Cache	Displays the processor L3 Cache size.
Current Clock Speed	Displays the current processor clock speed.
Minimum Clock Speed	Displays the minimum processor clock speed.
Microcode Version	Displays the microcode version.
Intel Hyper-Threading Capable	Displays whether the processor is Hyper-Threading (HT) capable.
64-Bit Technology	Displays whether 64-bit technology is used.
Memory Information	
Memory Installed	Displays the total computer memory installed.
Memory Available	Displays the total computer memory available.
Memory Speed	Displays the memory speed.
Memory Channel Mode	Displays single or dual channel mode.
Memory Technology	Displays the technology that is used for the memory.
DIMM_SLOT 1	Displays capacity of the memory installed in the first DIMM slot.
DIMM_SLOT 2	Displays capacity of the memory installed in the second DIMM slot.
Device Information	
Panel Type	Displays the Panel Type of the computer.
Video Controller	Displays the graphics information of the computer.
Video Memory	Displays the video memory information of the computer.
Video BIOS Version	Displays the video BIOS version of the computer.
Native Resolution	Native Resolution
Audio Controller	Audio Controller
Wi-Fi Device	Wi-Fi Device
Bluetooth Device	Bluetooth Device
dGPU Video Controller	Displays the discrete graphic card used in the computer

Table 4. System setup options—Boot Configuration menu

Boot options	
Boot Sequence	
Boot Mode: UEFI only	Displays the boot mode of this computer.
Boot Sequence	Displays the boot sequence.
Secure Boot	
Enable Secure Boot	Ensures the system boots using only to validated boot software.
Secure Boot Mode	Changes to Secure Boot operation mode modifies the behavior of the Secure Boot to allow evaluation of UEFI driver signatures. <ul style="list-style-type: none"> ● Deployed Mode - Default: ON ● Audit Mode - Default: OFF
Expert Key Management	
Enable Custom Mode	Enables or disables the PK, KEK, db and dbx security key databases to be manipulated. Default: OFF.

Table 4. System setup options—Boot Configuration menu (continued)

Boot options	
Custom Mode Key Management	Default: PK.
Advanced Boot Options	
Enable UEFI Network Stack	Enables or disables UEFI Network Stack. Default: PK

Table 5. System setup options—Integrated Devices menu

System Configuration	
HDD Fans	Configures which HDD fans are populated in the sytem.
Date/Time	
Date	Sets the computer date in MM/DD/YYYY format. Changes to the date take effect immediately.
Time	Sets the computer time in HH/MM/SS 24-hour format. You can switch between 12-hour and 24-hour clock. Changes to the time take effect immediately.
Camera	Enables or disables the camera
Enable Camera	Default: ON.
Enable Audio	Enables or disables all integrated audio controller. Default: ON.
Enable Microphone	Enables or disables microphone. Default: ON.
Enable Internal Speaker	Enables or disables internal speaker. Default: ON.
USB/Thunderbolt Configuration	
Enable External USB Ports	Enables or disables USB ports to be functional in an operating system environment. Default: ON.
Enable USB Boot Support	Enables or disables booting from USB mass storage devices such as external hard drive, optical drive, and USB drive. Default: ON.
Enable Thunderbolt Boot Support	Enables or disables the Thunderbolt features during preboot. Default: OFF.
Enable Thunderbolt (and PCIE behind TBT) pre-boot modules	Enables or disables the PCIE devices connected through a Thunderbolt adapter to execute the PCle device's UEFI option ROM(s) present during preboot. Default: OFF.
Video/Power only on Type-C Ports	Limits Type-C port functionality to video or power only. Default: OFF.
SATA Operation	Configures operating mode of the integrated SATA hard drive controller. Default: RAID. SATA is configured to support RAID (Intel Rapid Restore Technology).
Drives	Enables or disables various onboard drives.

Table 5. System setup options—Integrated Devices menu (continued)

System Configuration	
M.2 PCIe SSD-0/SATA-2	Default: ON.
SATA-0	Default: ON.
Drive Information	Displays the information of various onboard drives.

Table 6. System setup options—Storage menu

Storage	
Storage Interface	
Port Enablement	Enables or disables onboard drives Default: ON.
SMART Reporting	
Enable SMART Reporting	Enables or disables the S.M.A.R.T.(Self-Monitoring, Analysis, and Reporting Technology) option on the system. Default: OFF.
Drive Information	
M.2 PCIe SSD-1	Provides information about the type and device on the computer.

Table 7. System setup options—Display menu

Storage	
Display Brightness	
Brightness on battery power	Sets the screen brightness when the computer is running on battery power.
Brightness on AC power	Sets the screen brightness when the computer is running on AC power.
Full-Screen Logo	Displays full screen logo if the image matches screen resolution. Default: OFF.

Table 8. System setup options—Connection menu


Connection	
Wireless Device Enable	
WLAN	Enable or disable internal WLAN/Bluetooth devices. Default: ON.
Bluetooth	Default: ON.
Enable UEFI Network Stack	Allows pre-OS and early OS networking features to use any enabled NICs. This may be used without the PXE turned on. Default: Selective Enabled.
HTTP(s) Boot Feature	
HTTP(s) Boot	This platform has HTTP(s) Boot capabilities. Default: ON.
 NOTE: Provisioning of the Certificate is necessary to connect to HTTPs Boot server.	

Table 9. System setup options—Power Management menu

Power Management	
Battery Configuration	<p>Enables the computer to run on battery during peak power usage hours. Use the below options to prevent AC power usage between certain times of each day.</p> <p>Default: Adaptive. Battery settings are adaptively optimized based on your typical battery usage pattern.</p>
Enable Advanced Battery Charge Configuration	<p>Enables Advanced Battery Charge Configuration from the beginning of the day to a specified work period. Advanced Battery Charged maximizes battery health while still supporting heavy use during the work day.</p> <p>Default: OFF.</p>
Enable Peak Shift	<p>Enables the system to run on battery during peak power usage hours.</p> <p>Default: OFF.</p>
Thermal Management	<p>Allows for cooling fan and processor heat management to adjust system performance, noise, and temperature.</p> <p>Default: Optimized.</p>
Enable USB Wake Support	<p>Enables the USB devices to wake the computer from Standby mode, Hibernation and Power Off.</p> <p>Default: OFF.</p>
Enable on Dell USB-C Dock	<p>Enables the Dell USB-C Dock when connected to wake the computer from Standby mode, Hibernation and Power Off.</p> <p>Default: ON.</p>
Block Sleep	<p>Blocks the computer from entering Sleep (S3) mode in the operating system.</p> <p>Default: OFF.</p> <p>NOTE: If enabled, the computer will not go to sleep, Intel Rapid Start will be disabled automatically, and the operating system power option will be blank if it was set to Sleep.</p>
Lid Switch	
Enable Lid Switch	<p>Enables or disables lid switch.</p> <p>Default: ON.</p>
Power On Lid Open	<p>Enables the computer to power up from the off state whenever the lid is opened.</p> <p>Default: ON.</p>
Intel Speed Shift Technology	<p>Enables or disables Intel Speed Shift Technology support which enables the operating system to select the appropriate processor performance automatically.</p> <p>Default: ON.</p>

Table 10. System setup options—Security menu

Security	
TPM 2.0 Security	
TPM 2.0 Security On	<p>Enable or disable TPM 2.0 security options.</p> <p>By default, the TPM 2.0 Security On option is enabled.</p>
Attestation Enable	<p>Enables to control whether the Trusted Platform Module (TPM) Endorsement Hierarchy is available to the operating system.</p>

Table 10. System setup options—Security menu (continued)

Security	
	By default, the Attestation Enable option is enabled.
Key Storage Enable	Enables to control whether the Trusted Platform Module (TPM) Storage Hierarchy is available to the operating system. By default, the Key Storage Enable option is enabled.
SHA-256	BIOS and the TPM will use the SHA-256 hash algorithm to extend measurements into the TPM PCRs during BIOS boot. By default, the SHA-256 option is enabled.
Clear	Enables to clear the TPM owner information and returns the TPM to the default state. By default, the Clear option is disabled.
PPI ByPass for Clear Commands	Controls the TPM Physical Presence Interface (PPI). By default, the PPI ByPass for clear Commands option is disabled.
SMM Security Mitigation	Enable or disable SMM Security Mitigation. By default, the option is disabled.
Data Wipe on Next Boot	
Start Data Wipe	Enable or disable the data wipe on next boot. By default, the option is disabled.
Absolute	Enable or disable or permanently disable the BIOS module interface of the optional Absolute Persistence Module service from Absolute software. By default, the Enable Absolute option is enabled.
UEFI Boot Path Security	Controls whether or not the computer will prompt the user to enter the admin password (if set) when booting to a UEFI boot device from the F12 boot menu. By default, the Always Except Internal HDD option is enabled.

Table 11. System setup options—Passwords menu

Passwords	
Admin Password	Set, change, or delete the administrator password.
System Password	Set, change, or delete the computer password.
M.2 PCIe SSD-1	Set, change, or delete the M.2 PCIe SSD-1 password.
Password Configuration	
Upper Case Letter	Reinforces password must have at least one upper case letter. By default, the option is disabled.
Lower Case Letter	Reinforces password must have at least one lower case letter. By default, the option is disabled.
Digit	Reinforces password must have at least one digit. By default, the option is disabled.
Special Character	Reinforces password must have at least one special character. By default, the option is disabled.
Minimum Characters	Set the minimum characters allowed for password - 4 is minimum.

Table 11. System setup options—Passwords menu (continued)

Passwords	
<p>Password Bypass</p> <p>When enabled, this always prompts for computer and internal hard drive passwords when powered on from the off state.</p> <p>By default, the Disabled option is enabled.</p> <p>Password Changes</p> <p>Enable Non-Admin Password Changes</p> <p>Enable or disable to change computer and hard drive password without the need for admin password.</p> <p>By default, the option is enabled.</p>	
Admin Setup Lockout	
<p>Enable Admin Setup Lockout</p> <p>Enables administrators control over how their users can or cannot access BIOS setup.</p> <p>By default, the option is disabled.</p>	
Master Password Lockout	
<p>Enable Master Password Lockout</p> <p>When enabled, this will disable the master password support.</p> <p>By default, the option is disabled.</p>	
Allow Non-Admin PSID Revert	
<p>Enable Allow Non-Admin PSID Revert</p> <p>Controls access to the Physical Security ID (PSID) revert of NVMe hard-drives from the Dell Security Manager prompt.</p> <p>By default, the option is disabled.</p>	

Table 12. System setup options—Update, Recovery menu

Update, Recovery	
<p>UEFI Capsule Firmware Updates</p> <p>Enable or disable BIOS updates through UEFI capsule update packages.</p> <p>By default, the option is enabled.</p> <p>BIOS Recovery from Hard Drive</p> <p>Enables the user to recover from certain corrupted BIOS conditions from a recovery file on the user primary hard drive or an external USB key.</p> <p>By default, the option is enabled.</p> <p>BIOS Downgrade</p> <p>Allow BIOS Downgrade</p> <p>Enable or disable the flashing of the computer firmware to previous revision is blocked.</p> <p>By default, the option is enabled.</p> <p>SupportAssist OS Recovery</p> <p>Enable or disable the boot flow for SupportAssist OS Recovery tool in the event of certain computer errors.</p> <p>By default, the option is enabled.</p> <p>BIOSConnect</p> <p>Enable or disable cloud Service OS recovery if the main operating system fails to boot with the number of failures equal to or greater than the value specified by the Auto OS Recovery Threshold setup option and local Service OS does not boot or is not installed.</p> <p>By default, the option is enabled.</p> <p>Dell Auto OS Recovery Threshold</p> <p>Controls the automatic boot flow for SupportAssist System Resolution Console and for Dell OS Recovery Tool.</p> <p>By default, the threshold value is set to 2.</p>	

Table 13. System setup options—System Management menu

System Management	
Service Tag	Displays the Service Tag of the computer.
Asset Tag	Create a computer Asset Tag.
AC Behavior	
Wake on AC	Enable or disable the wake on AC option. By default, the option is enabled.
Auto on Time	Enable to set the computer to turn on automatically every day or on a preselected date and time. This option can be configured only if the Auto On Time is set to Everyday, Weekdays, or Selected Days. By default, the option is disabled.
First Power On Date	Allows you to set ownership date. By default, the option is disabled.

Table 14. System setup options—Keyboard menu

Keyboard	
Numlock Enable	Enable or disable the Numlock function when the computer boots. By default, the option is enabled.
Fn Lock Options	By default, the Fn lock option is enabled.
Lock Mode	<ul style="list-style-type: none"> • Lock Mode Standard - Traditional F1-F12 functions • Lock Mode Secondary - Enables secondary functions on the Fn keys.
Keyboard illumination	Allows you to set Keyboard illumination settings. By default, the Bright option is enabled.
Keyboard Backlight Timeout on AC	Defines the timeout value for keyboard backlight when AC adapter is plugged into the system. By default, the option 1 minute is enabled.
Keyboard Backlight Timeout on Battery	Defines the timeout value for keyboard backlight when the system is running only on system power. By default, the option 1 minute is enabled.

Table 15. System setup options—Pre-boot Behavior menu

Pre-boot Behavior	
Adapter Warnings	
Enable Adapter Warnings	Enable or disable the warning messages during boot when the adapters with less power capacity are detected. By default, the option is enabled.
Warnings and Errors	Enable or disable the action to be done when a warning or error is encountered. By default, the Prompt on Warnings and Errors option is enabled.
USB-C Warnings	Enable or disable dock warning messages. By default, the Enable Dock Warning Messages option is enabled.
Fastboot	Enable to set the speed of the boot process. By default, the Thorough option is enabled.
Extend BIOS POST Time	Set the BIOS POST time.

Table 15. System setup options—Pre-boot Behavior menu (continued)

Pre-boot Behavior	
By default, the 0 seconds option is enabled.	

Table 16. System setup options—Virtualization menu

Virtualization	
Intel Virtualization Technology	
Enable Intel Virtualization Technology (VT)	Specify whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by Intel Virtualization Technology. By default, the option is enabled.
VT for Direct I/O	Specify whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by Intel Virtualization Technology for Direct I/O. By default, the option is enabled.

Table 17. System setup options—Performance menu

Performance	
Multi Core Support	
Active Cores	Enables to change the number of CPU cores available to the operating system. By default, the All Cores options is enabled.
Intel SpeedStep	
Enable Intel SpeedStep Technology	Enables the computer to dynamically adjust processor voltage and core frequency, decreasing average power consumption and heat production. By default, the option is enabled.
C-States Control	
Enable C-State Control	Enable or disable additional processor sleep states. By default, the option is enabled.
Enable Adaptive C-States for Discrete Graphics	Adaptive C-states will allow for the system to dynamically detect high usage of discrete graphics and adjust system parameters during that time period. By default, the option is enabled.
Intel Turbo Boost Technology	
Enable Intel Turbo Boost Technology	Enable or disable Intel TurboBoost mode of the processor. By default, the option is enabled.
Intel Hyper-Threading Technology	
Enable Intel Hyper-Threading Technology	Enable or disable Hyper-Threading in the processor. By default, the option is enabled.
Enable Dynamic Tuning:Machine Learning	Enable or disable OS capability to enhance dynamic power tuning capabilities based on detected workloads. By default, the option is disabled.

Table 18. System setup options—System Logs menu

System Logs	
BIOS Event Log	
Clear Bios Event Log	Display BIOS events.

Table 18. System setup options—System Logs menu (continued)

System Logs	
	By default, the Keep Log option is enabled.
Thermal Event Log	
Clear Thermal Event Log	Display Thermal events.
	By default, the Keep Log option is enabled.
Power Event Log	
Clear Power Event Log	Display power events.
	By default, the Keep Log option is enabled.
License Information	Displays the license information of the computer.

Advanced or Engineering configurations

Table 19. Advanced or Engineering configurations

Option	Description
ASPM	<ul style="list-style-type: none"> • Auto—Default • L1 Only • Disabled • L0s and L1 • L0s Only
Pcie LinkSpeed	<ul style="list-style-type: none"> • Auto—Default • Gen 1 • Gen 2 • Gen 3

SupportAssist system resolution

Table 20. SupportAssist System Resolution


Option	Description
Auto OS Recovery Threshold	<p>The Auto OS Recovery Threshold setup option controls the automatic boot flow for Support Assist System Resolution Console and Dell OS Recovery tool.</p> <p>Choose one of the following options:</p> <ul style="list-style-type: none"> • OFF • 1 • 2—Default • 3
SupportAssist OS Recovery	Allows you to recover the SupportAssist OS Recovery (Disabled by default).


Updating the BIOS in Windows

Prerequisites

It is recommended to update your BIOS (System Setup) when you replace the system board or if an update is available. For laptops, ensure that your computer battery is fully charged and connected to a power before initiating a BIOS update.


About this task

 **NOTE:** If BitLocker is enabled, it must be suspended prior to updating the system BIOS, and then re enabled after the BIOS update is completed.


 **CAUTION:** If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, see Knowledge Base Article: <https://www.dell.com/support/kbdoc/000134415/>.

Steps

1. Restart the computer.
2. Go to **Dell.com/support**.
 - Enter the **Service Tag** or **Express Service Code** and click **Submit**.
 - Click **Detect Product** and follow the instructions on screen.
3. If you are unable to detect or find the Service Tag, click **Choose from all products**.
4. Choose the **Products** category from the list.

 **NOTE:** Choose the appropriate category to reach the product page.
5. Select your computer model and the **Product Support** page of your computer appears.
6. Click **Get drivers** and click **Drivers and Downloads**.
The Drivers and Downloads section opens.
7. Click **Find it myself**.
8. Click **BIOS** to view the BIOS versions.
9. Identify the latest BIOS file and click **Download**.
10. Select your preferred download method in the **Please select your download method below** window, click **Download File**.
The **File Download** window appears.
11. Click **Save** to save the file on your computer.
12. Click **Run** to install the updated BIOS settings on your computer.
Follow the instructions on the screen.

Updating BIOS on systems with BitLocker enabled

 **CAUTION:** If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known, this can result in data loss or an unnecessary operating system reinstall. For more information about this subject, see Knowledge Article: [Updating the BIOS on Dell Systems With BitLocker Enabled](#)

Updating BIOS using USB flash drive

About this task

If the system cannot load into Windows but there is still a need to update the BIOS, download the BIOS file using another system and save it to a bootable USB Flash Drive.

Steps

1. Download the BIOS update .EXE file to another system.
2. Copy the file Example: O9010A12.exe onto the bootable USB Flash drive.
3. Insert the USB Flash drive into the system that requires the BIOS update.
4. Restart the system and press F12 when the Dell logo appears to display the boot menu.
5. Using arrow keys, select USB Storage Device and press Return.

6. The system will boot to a Diag C:\> prompt
7. Run the file by typing the full filename Example: O9010A12.exe and hit Return,
8. The BIOS Update Utility will load, follow the instructions on screen.


System and setup password


Table 21. System and setup password

Password type	Description
System password	Password that you must enter to log on 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 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

Prerequisites

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

About this task

To enter the system setup, press F2 immediately after a power-on or reboot.

Steps

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.
 - The password can contain the numbers 0 through 9.
 - Only lower case letters are valid, upper case letters are not allowed.
 - Only the following special characters are allowed: space, ("), (+), (.), (-), (.), (/), (:), ([], (\), (]), (`).
3. Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.
4. Press **Esc** and a message prompts you to save the changes.
5. Press **Y** to save the changes.
The computer reboots.

Deleting or changing an existing system setup password

Prerequisites

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

About this task

To enter the System Setup, press **F2** immediately after a power-on or reboot.

Steps

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**, alter or delete the existing system password and press **Enter** or **Tab**.
4. Select **Setup Password**, alter or delete the existing setup password and press **Enter** or **Tab**.



NOTE: If you change the System and/or Setup password, re enter the new password when prompted. If you delete the System and 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.

Troubleshooting

Topics:

- [Handling swollen Lithium-ion batteries](#)
- [Dell SupportAssist Pre-boot System Performance Check diagnostics](#)
- [System diagnostic lights](#)
- [Recovering the operating system](#)
- [Real-Time Clock \(RTC Reset\)](#)
- [Updating the BIOS using the USB drive in Windows](#)
- [Updating the BIOS in Windows](#)
- [Backup media and recovery options](#)
- [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

About this task

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

Steps

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

- 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, 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
1	1	TPM detection failure	Replace the system board.
1	2	Unrecoverable SPI flash failure	Replace the system board.
1	3	Short in hinge cable tripped OCP1	Check if the display cable (EDP) is seated properly or pinched at the hinges. If problem persists, replace either display cable (EDP) or display assembly (LCD).
1	4	Short in hinge cable tripped OCP2	Check if the display cable (EDP) is seated properly or pinched at the hinges. If problem persists, replace either display cable (EDP) or display assembly (LCD)
1	5	EC unable to program i-Fuse	Replace the system board.
1	6	Generic catch-all for ungraceful EC code flow errors	Disconnect all power source (AC, battery, coin cell) and drain flea power by pressing & holding down power button.
2	1	Processor 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.
3	7	Timeout waiting on ME to reply to HECI message.	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**.

Real-Time Clock (RTC Reset)

The Real Time Clock (RTC) reset function allows you or the service technician to recover Dell systems from No POST/No Power/No Boot situations. The legacy jumper enabled RTC reset has been retired on these models.

Start the RTC reset with the system powered off and connected to AC power. Press and hold the power button for twenty five (25) seconds. The system RTC Reset occurs after you release the power button.


Updating the BIOS using the USB drive in Windows

Steps

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](#) 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

Steps

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](#) 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](#).

WiFi power cycle

About this task

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.

Steps

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

About this task

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:

Steps

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

Topics:

- [Contacting Dell](#)

Contacting Dell

Prerequisites

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

About this task

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:

Steps

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.