

Inspiron 5590

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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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.

-  **NOTE:** Before working inside your computer, read the safety information that shipped with your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.
-  **NOTE:** Disconnect 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 to the electrical outlet.
-  **CAUTION:** To avoid damaging the computer, ensure that the work surface is flat and clean.
-  **CAUTION:** Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a processor by its edges, not by its pins.
-  **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 shipped with the product or at www.dell.com/regulatory_compliance.
-  **CAUTION:** Before touching anything inside your computer, ground yourself by using a wrist grounding strap or by periodically 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 on its connector or on its pull tab, not on the cable itself. Some cables have connectors with locking tabs or thumb-screws that you must disengage before disconnecting the cable. When disconnecting cables, keep them evenly aligned to avoid bending any connector pins. When connecting cables, ensure that the ports and connectors are correctly oriented and aligned.
-  **CAUTION:** Press and eject any installed card from the media-card reader.
-  **NOTE:** The color of your computer and certain components may appear differently than shown in this document.

Topics:


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

Before working inside your computer

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

Before you begin

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.
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.

Lifting equipment

Adhere to the following guidelines when lifting heavy weight equipment:

 **CAUTION:** Do not lift greater than 50 pounds. Always obtain additional resources or use a mechanical lifting device.

1. Get a firm balanced footing. Keep your feet apart for a stable base, and point your toes out.
2. Tighten stomach muscles. Abdominal muscles support your spine when you lift, offsetting the force of the load.
3. Lift with your legs, not your back.
4. Keep the load close. The closer it is to your spine, the less force it exerts on your back.
5. Keep your back upright, whether lifting or setting down the load. Do not add the weight of your body to the load. Avoid twisting your body and back.
6. Follow the same techniques in reverse to set the load down.

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

Recommended tools

The procedures in this document may require the following tools:

- 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	Secured to	Screw type	Quantity	Screw image
Base cover	Palm-rest and keyboard assembly	M2x5	7	
Battery	Palm-rest and keyboard assembly	M2x3	4	
Fan	Palm-rest and keyboard assembly	M2x3	2	
Hard-drive assembly	Palm-rest and keyboard assembly	M2x3	4	
Hard-drive bracket	Hard drive	M3x3	4	
Display hinge	Palm-rest and keyboard assembly	M2.5x5	4	
Display hinge	Palm-rest and keyboard assembly	M2x4	2	
Display hinge	Display back-cover	M2.5x2.5	4	
Display hinge	Display back-cover	M2.5x3	2	
I/O board	Palm-rest and keyboard assembly	M2x3	2	
Power-adaptor port	Palm-rest and keyboard assembly	M2x3	1	

Component	Secured to	Screw type	Quantity	Screw image
Solid-state drive/Intel Optane/Intel Optane Memory H10 with solid-state storage	Palm-rest and keyboard assembly	M2x3	1	
System board	Palm-rest and keyboard assembly	M2x2	5	
System board	Palm-rest and keyboard assembly	M2x3	2	
Touchpad bracket	Palm-rest and keyboard assembly	M2x2	3	
Touchpad	Palm-rest and keyboard assembly	M2x2	4	
Wireless-card bracket	System board	M2x3	1	
Power-button board/ Fingerprint-reader board bracket	Palm-rest and keyboard assembly	M2x2	2	
Power-button board/ Fingerprint-reader board	Palm-rest and keyboard assembly	M2x3	2	

Base cover

Removing the base cover

Prerequisites

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

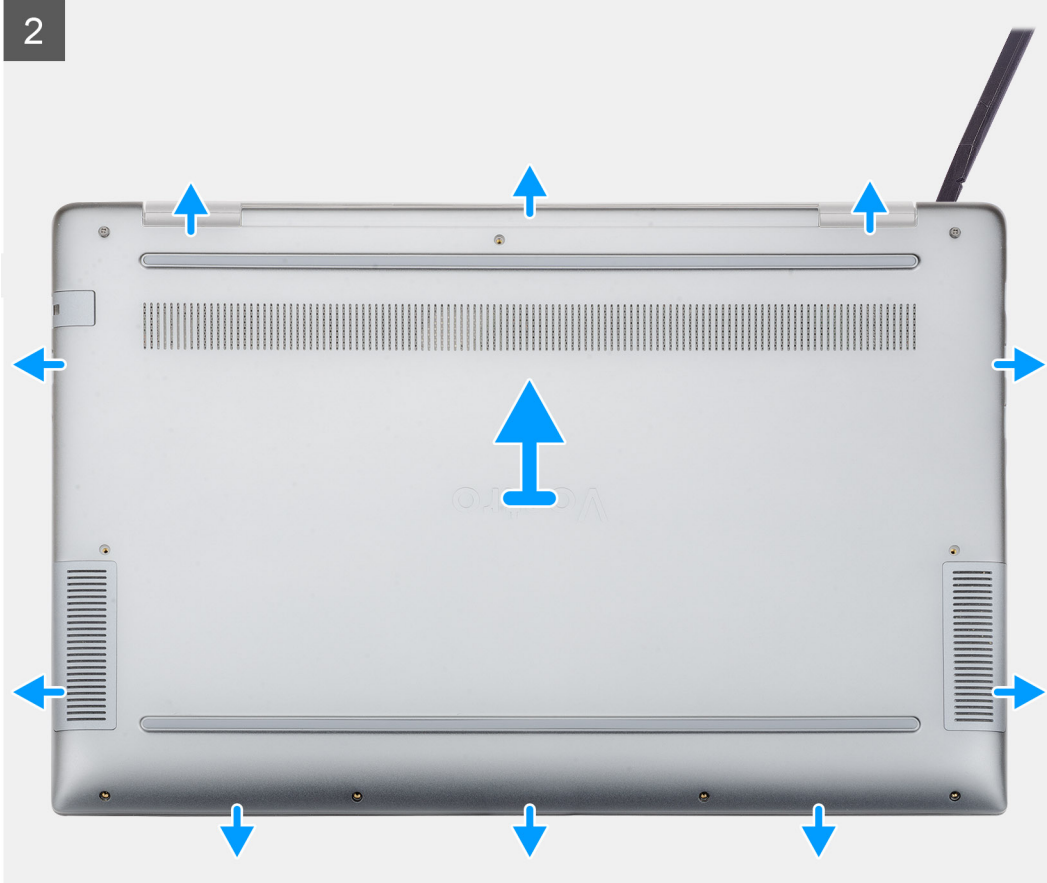
About this task

The following image indicates the location of the base cover and provides a visual representation of the removal procedure.



1





Steps

1. Loosen the two captive screws and remove the seven screws (M2x5) that secure the base cover to the palm-rest and keyboard assembly.
2. Pry the base cover starting from the right hinge and work your way around.
3. Lift the base cover off the palm-rest and keyboard assembly.
4. Peel off the tape that secures the battery cable to the system board.
5. Disconnect the battery cable from the system board.
6. Press and hold the power button for five seconds to ground the computer and drain the flea power.

Installing the base cover

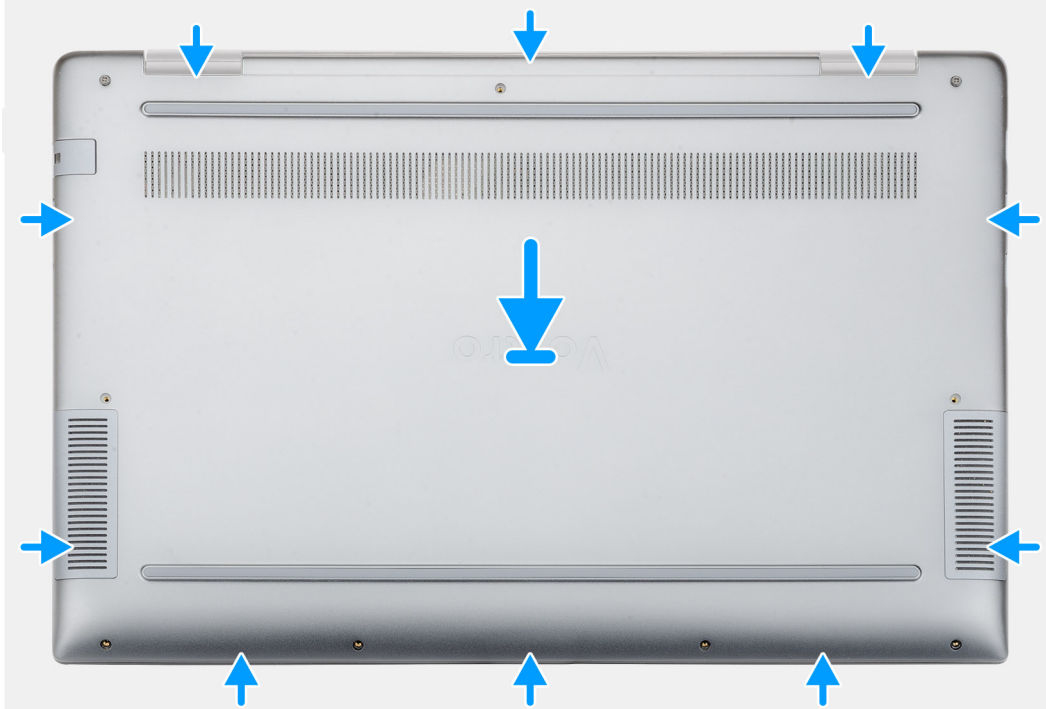
Prerequisites

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

About this task

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

1





2



Steps

1. Connect the battery cable to the system board, if applicable.
2. Adhere the tape that secures the battery connector to the system board.
3. Place the base cover on the palm-rest and keyboard assembly, and snap the base cover into place.
4. Replace the seven screws (M2x5) and tighten the two captive screws to secure the base cover to the palm-rest and keyboard assembly.

Next steps

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

Battery

Lithium-ion battery precautions

⚠ CAUTION:

- Exercise caution when handling Lithium-ion batteries.
- Discharge the battery as much as possible before removing it from the system. This can be done by disconnecting the AC adapter from the system to allow the battery to drain.
- 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 a battery gets stuck in a device as a result of swelling, do not try to free it as puncturing, bending, or crushing a Lithium-ion battery can be dangerous. In such an instance, contact for assistance and further instructions.
- 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.

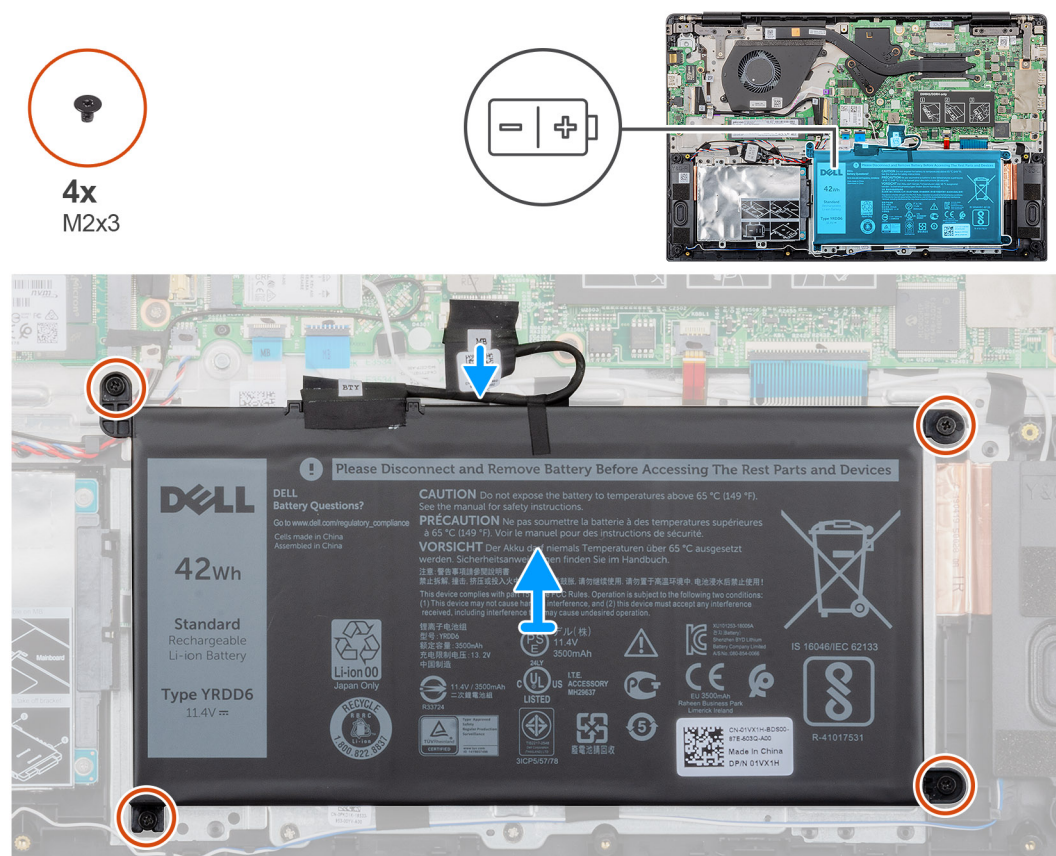
Removing the battery

Prerequisites

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

About this task

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



Steps

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

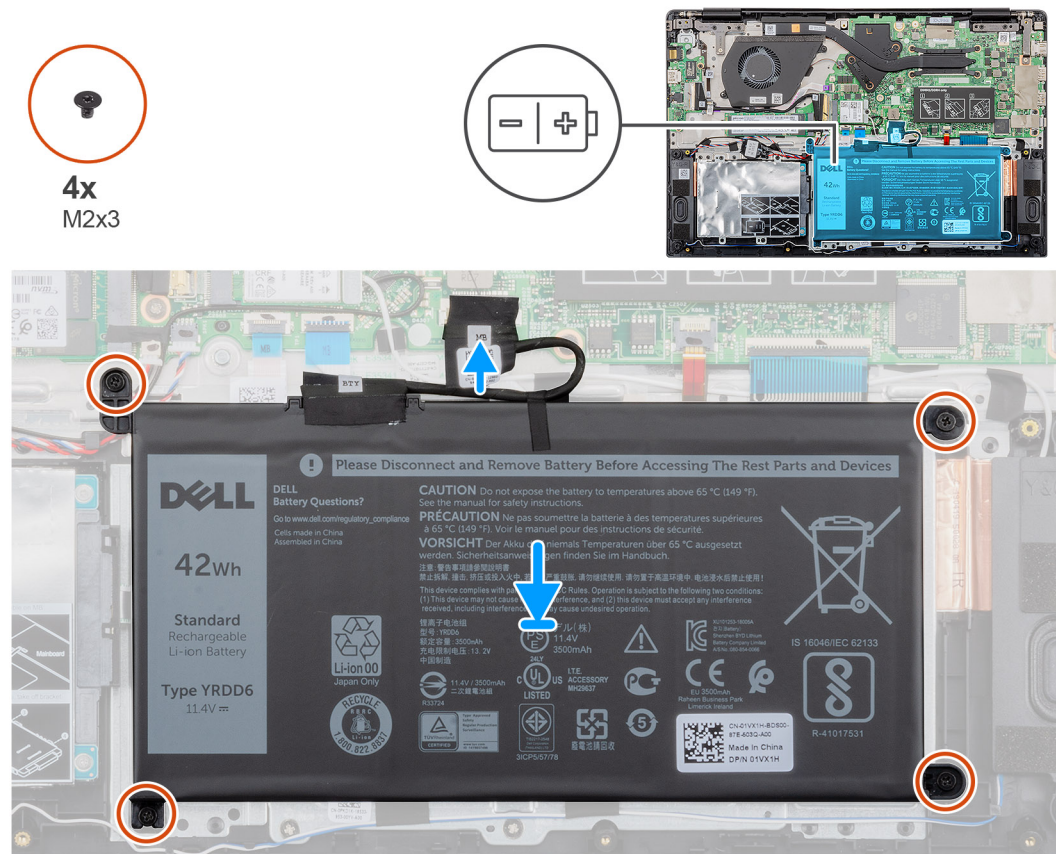
Installing the battery

Prerequisites

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

About this task

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



Steps

1. Align the screw holes on the battery with the screw holes on the palm-rest and keyboard assembly and place the battery on the palm-rest and keyboard assembly.
2. Replace the four screws (M2x3) that secure the battery to the palm-rest and keyboard assembly.
3. Connect the battery cable to the connector on the system board.

Next steps

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

Memory module

Removing the memory module

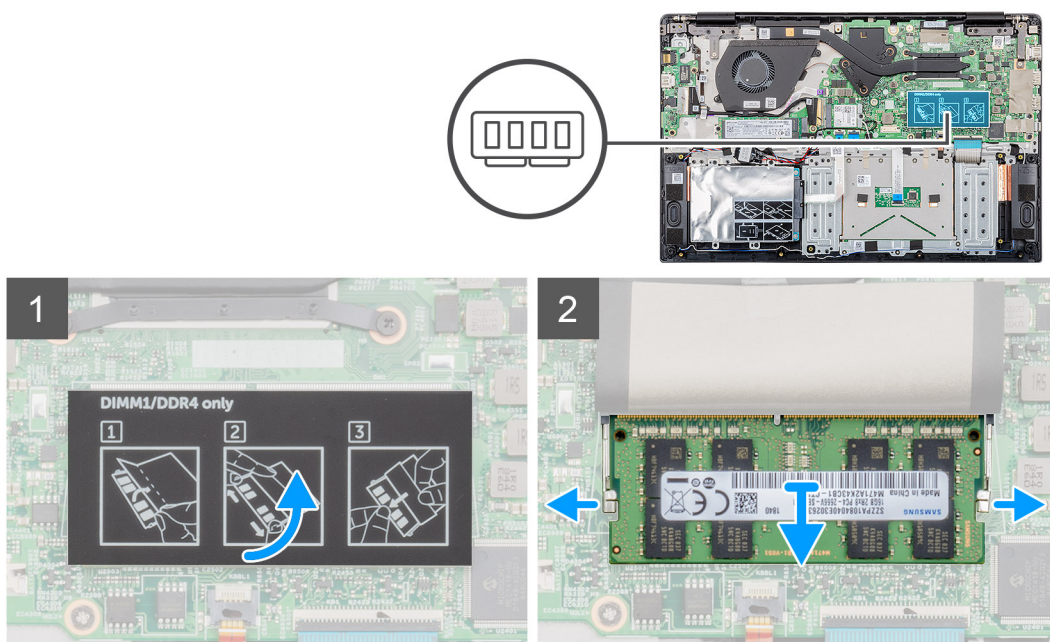
Prerequisites

NOTE: The primary memory module is integrated into the system board. This procedure is for removing the secondary memory module.

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

About this task

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



Steps

1. Lift the Mylar to reveal the memory module.
2. With the memory module visible, use your fingertips to spread apart the securing clips on the memory-module slot until the memory module pops up.
3. Slide and remove the memory module from the memory-module slot.

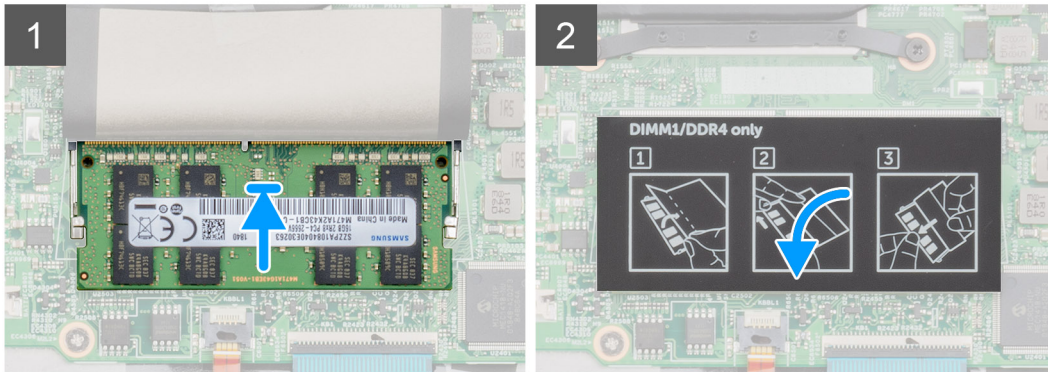
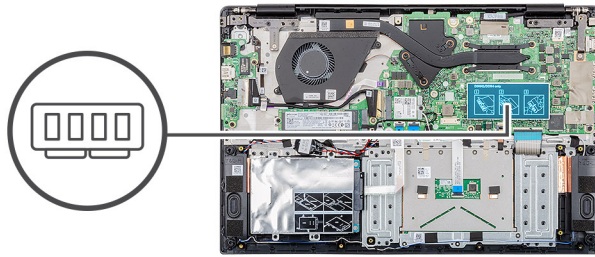
Installing the memory module

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 memory module and provides a visual representation of the installation procedure.



Steps

1. Align the notch on the memory module with the tab on the memory-module slot.
2. Slide the memory module firmly into the slot at an angle and press the memory module down until it clicks into place.
NOTE: If you do not hear the click, remove the memory module and reinstall it.
3. Cover the memory module with the Mylar.

Next steps

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

Hard-drive assembly

Removing the hard-drive assembly

Prerequisites

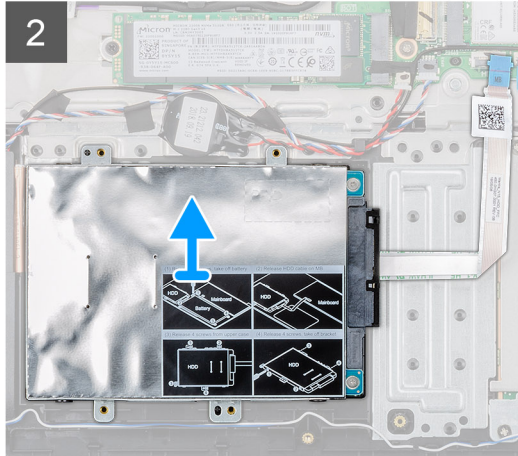
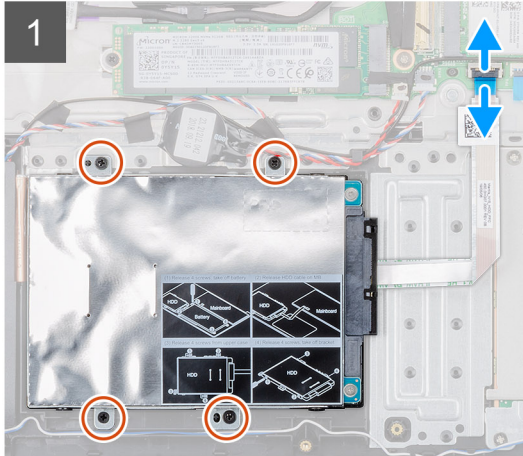
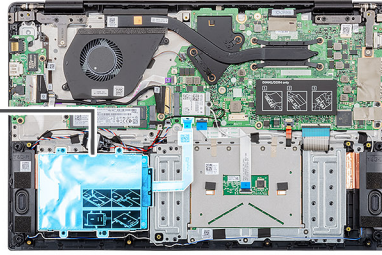
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).

About this task

The following image indicates the location of the hard-drive assembly and provides a visual representation of the removal procedure.



4x
M2x3



Steps

1. Open the latch and disconnect the hard-drive cable from the system board.
2. Remove the four screws (M2x3) that secure the hard-drive assembly to the palm-rest and keyboard assembly.
3. Lift the hard-drive assembly along with its cable off the palm-rest and keyboard assembly.

Installing the hard-drive assembly

Prerequisites

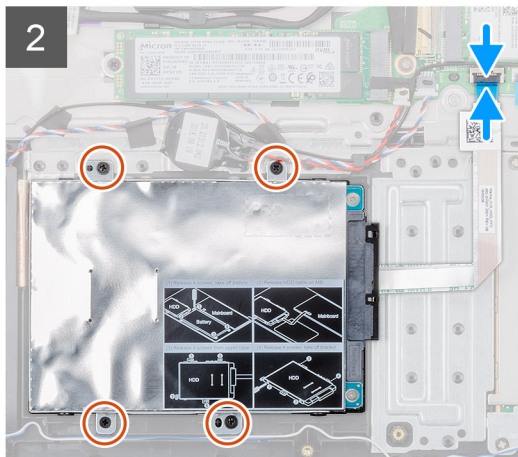
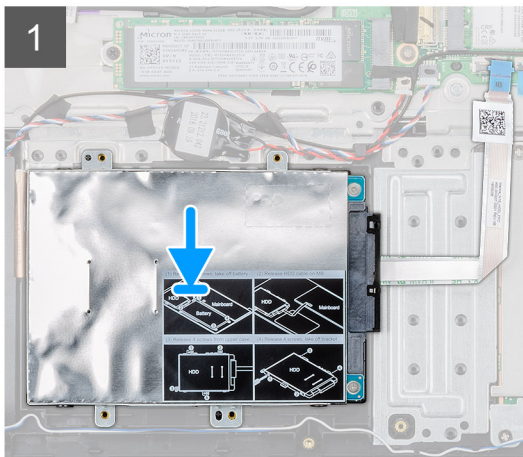
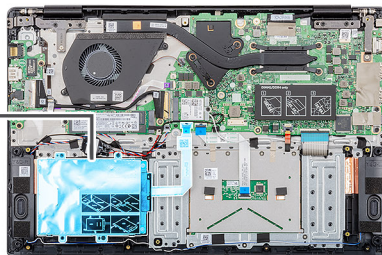
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

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



4x
M2x3



Steps

1. Align the screw holes on the hard-drive assembly with the screw holes on the palm-rest and keyboard assembly.
2. Replace the four screws (M2x3) to secure the hard-drive assembly to the palm-rest and keyboard assembly.
3. Connect the hard-drive cable to the system board and close the latch to secure the cable.

Next steps

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

Solid-state drive/Intel Optane

Removing the solid-state drive

Prerequisites

If your computer is using a SATA storage device accelerated by Intel Optane memory, disable Intel Optane before removing the SATA storage device. For more information about disabling the Intel Optane, see [Disabling Intel Optane](#).

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

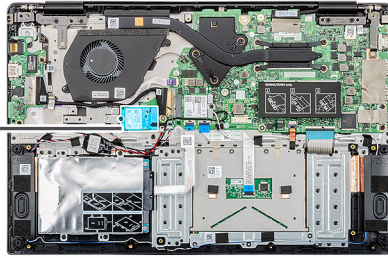
About this task

The following image indicates the location of the solid-state drive and provides a visual representation of the removal procedure.

M.2 2230 solid-state drive



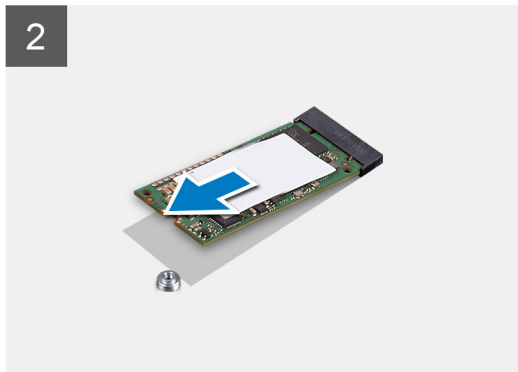
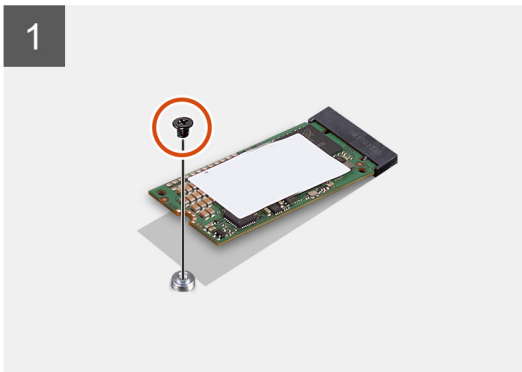
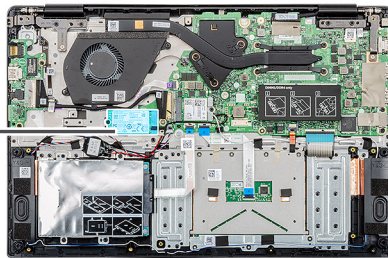
1x
M2x3



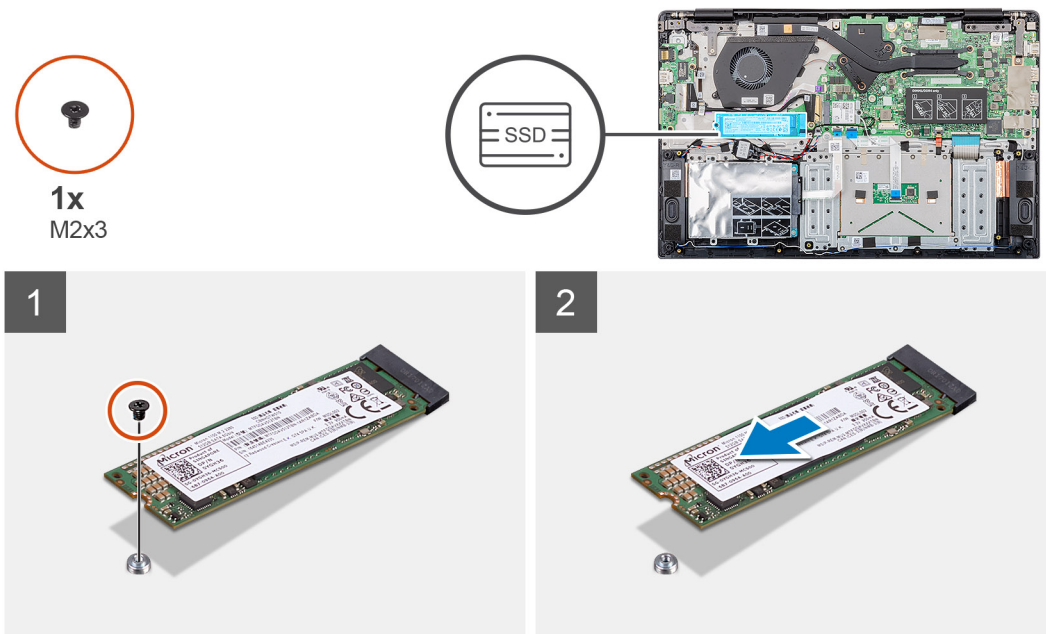
M.2 2242 solid-state drive



1x
M2x3



M.2 2280 solid-state drive



Steps

1. Remove the screw (M2x3) that secures the solid-state drive to the system board.
2. Slide and remove the solid-state drive from the solid-state drive slot on the system board.

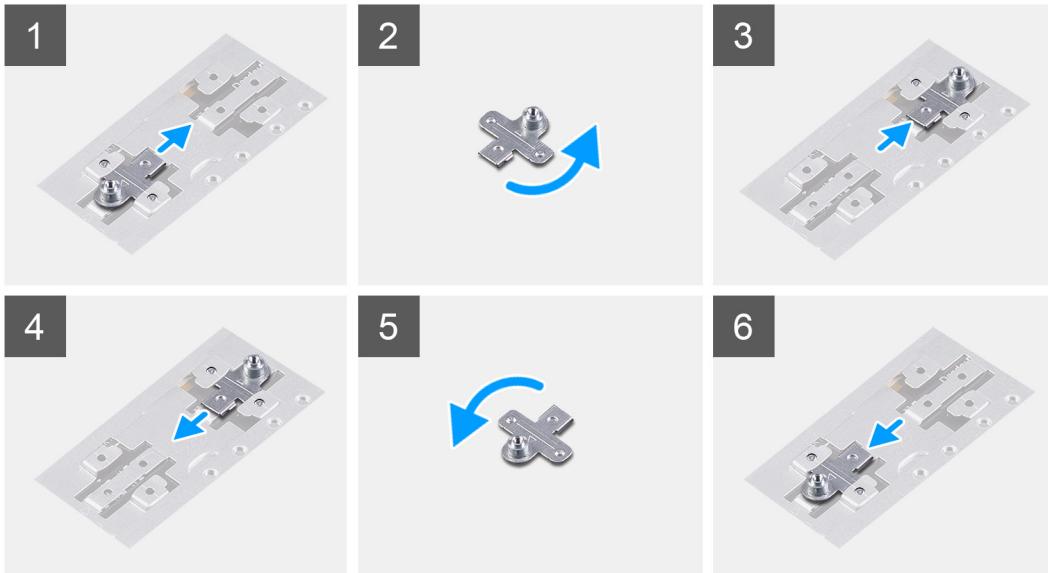
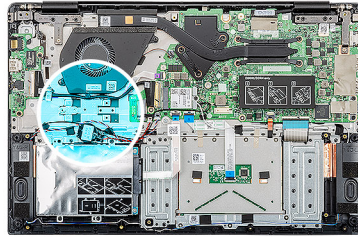
Moving the solid-state drive screw mount

Prerequisites

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

About this task

The following image indicates the location of the solid-state drive screw mount and provides a visual representation of the procedure to move the screw mount to another location that accommodates the form factor.



Steps

1. Slide the screw mount out of the screw-mount slot on the palm-rest and keyboard assembly.
2. Turn the screw mount 180 degrees.
3. Insert the screw mount into the other screw-mount slot on the palm-rest and keyboard assembly.
4. To move the screw mount to the screw-mount slot where it had originated from, reverse the steps.

Installing the solid-state drive

Prerequisites

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

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

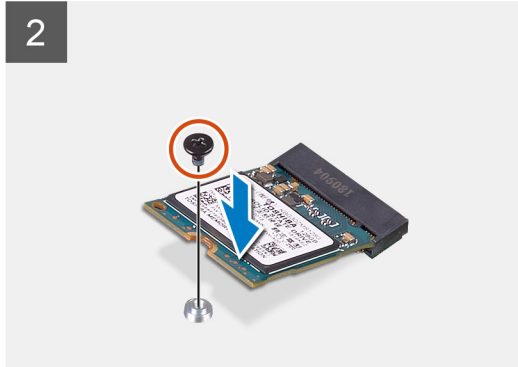
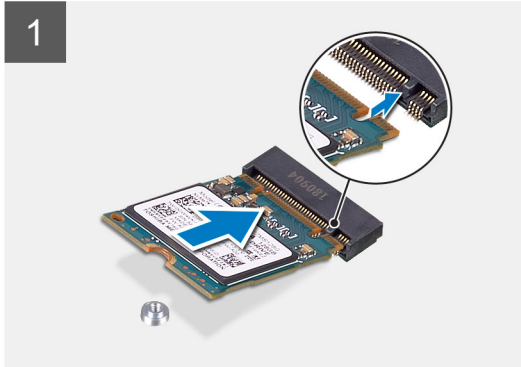
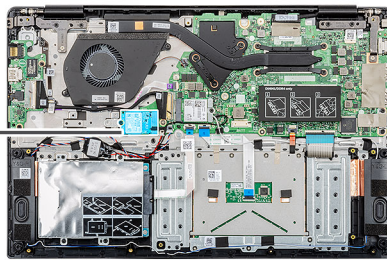
About this task

The following image indicates the location of the solid-state drive and provides a visual representation of the installation procedure.

M.2 2230 solid-state drive



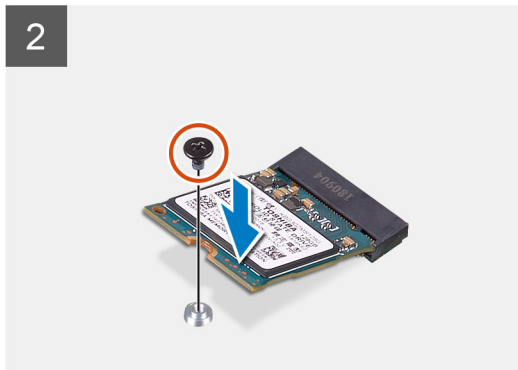
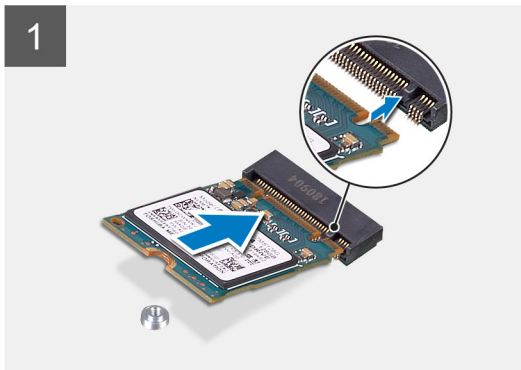
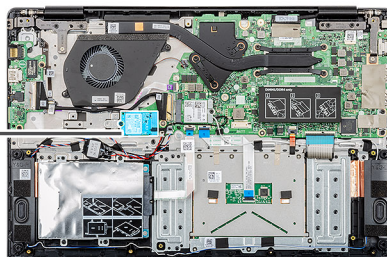
1x
M2x3



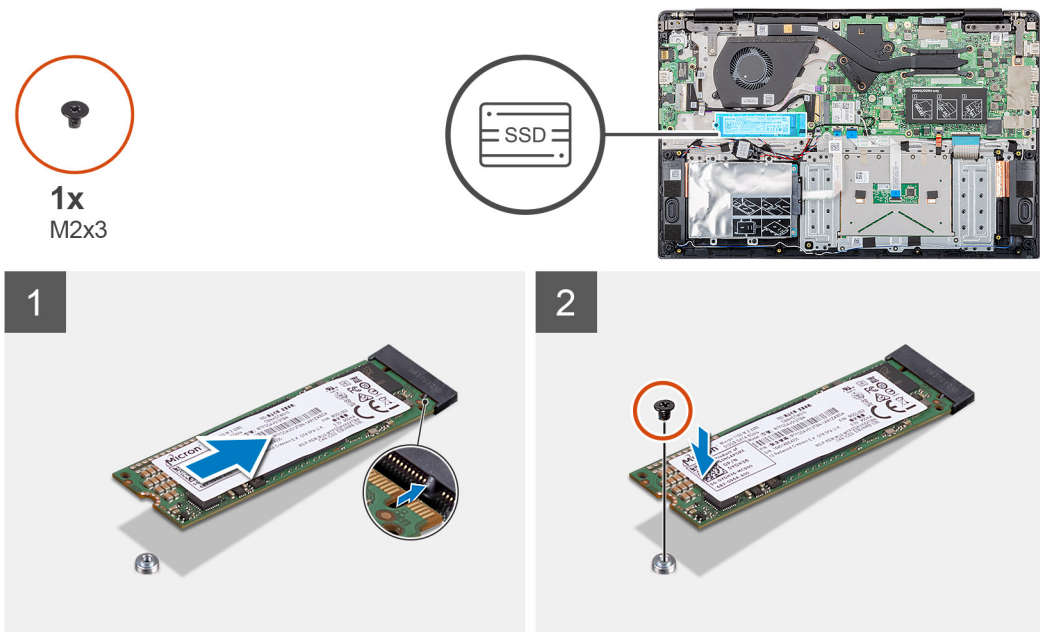
M.2 2242 solid-state drive



1x
M2x3



M.2 2280 solid-state drive



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 into the solid-state slot on the system board.
3. Replace the screw (M2x3) that secures the solid-state drive to the system board.

Next steps

1. Install the [battery](#).
2. Install the [base cover](#).
3. Follow the procedure in [After working inside your computer](#).
4. If you have installed an Intel Optane memory, enable the Intel Optane memory. For more information about enabling the Intel Optane memory, see [Enabling Intel Optane memory](#).

Wireless card

Removing the wireless card

Prerequisites

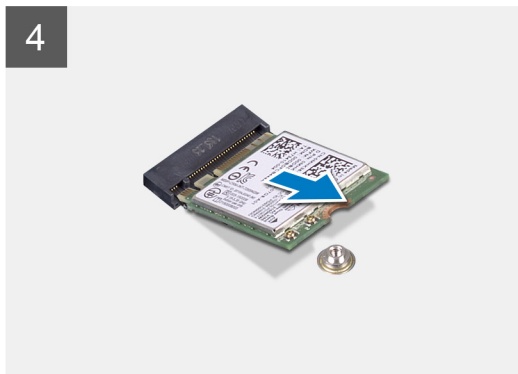
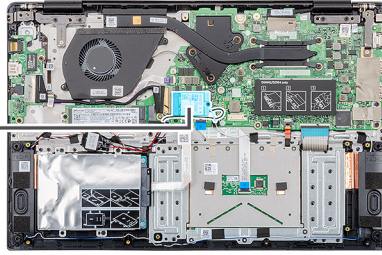
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).

About this task

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



1x
M2x3



Steps

1. Remove the screw (M2x3) that secures the wireless-card bracket to the wireless card.
2. Remove the wireless-card bracket off 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.

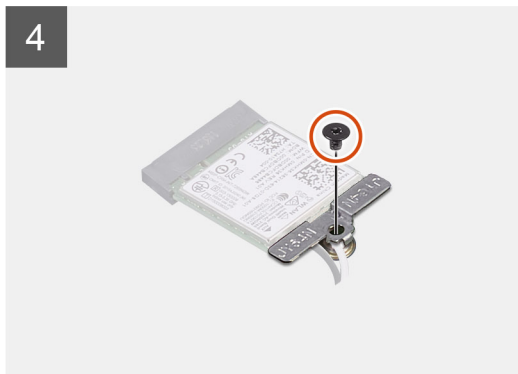
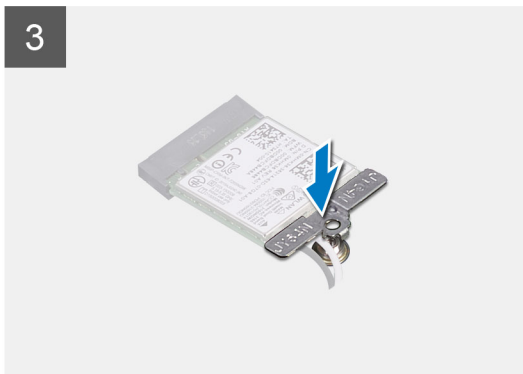
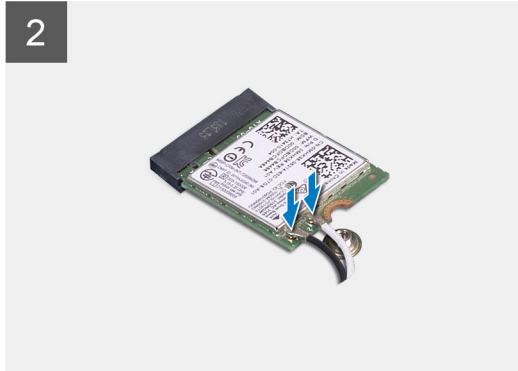
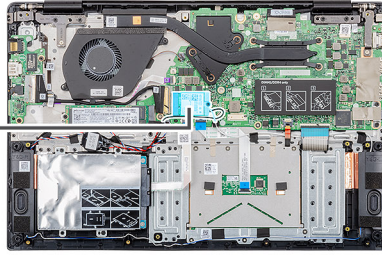
CAUTION: To avoid damage to the wireless card, do not place any cables under it.

About this task

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



1x
M2x3



Steps

1. Slide the wireless card at an angle into the wireless-card slot.
2. Connect the antenna cables to the wireless card.

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

Table 2. Antenna-cable color scheme

Connectors on the wireless card	Antenna-cable color
Main (white triangle)	White
Auxiliary (black triangle)	Black

3. Place the wireless-card bracket on the wireless card.
4. Replace the screw (M2x3) that secures the wireless-card bracket to the wireless card.

Next steps

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

I/O board

Removing the I/O board

Prerequisites

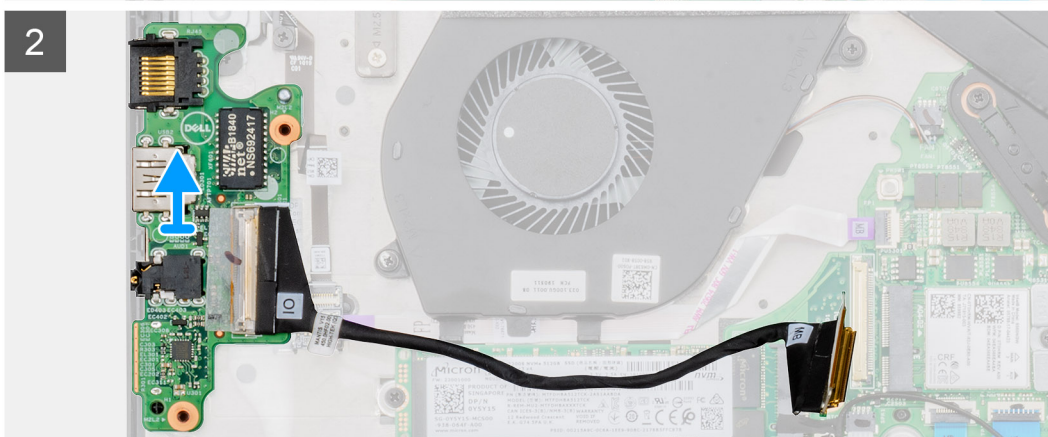
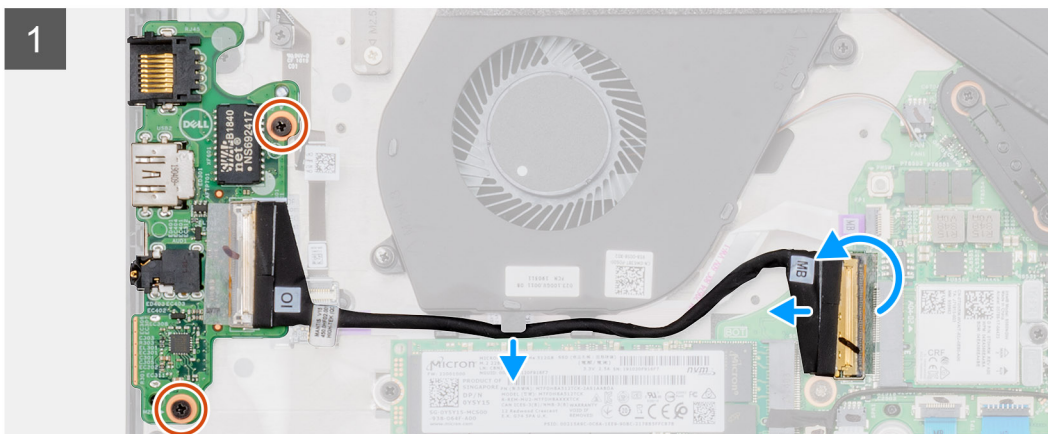
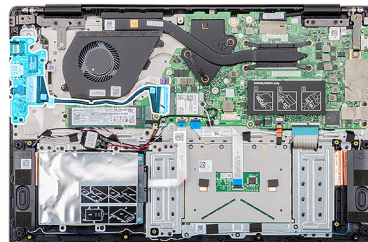
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).

About this task

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



2x
M2x3



Steps

1. Peel the tape off the I/O-board cable connector.
2. Open the latch and disconnect the I/O-board cable from the I/O board.
3. Remove the I/O-board cable from the routing guides on the fan.
4. Remove the two screws (M2x3) that secure the I/O board to the palm-rest and keyboard assembly.

5. Lift the I/O board off the palm-rest and keyboard assembly.

Installing the I/O board

Prerequisites

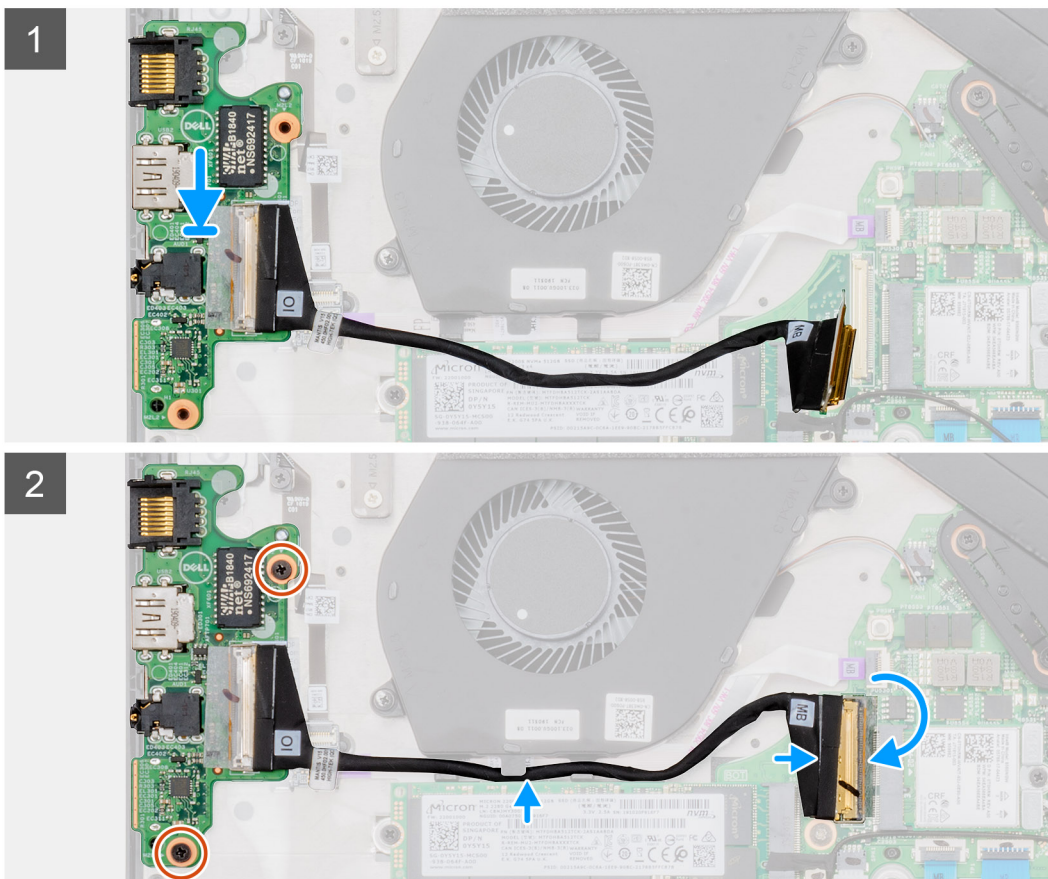
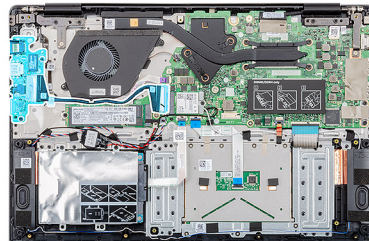
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

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



2x
M2x3



Steps

1. Using the alignment posts, place the I/O board on the palm-rest and keyboard assembly.
2. Route the I/O-board cable through the routing guides on the fan.
3. Replace the two screws (M2x3) that secure the I/O board to the palm-rest and keyboard assembly.
4. Connect the I/O-board cable to the I/O board and close the latch to secure the cable connector.
5. Adhere the tape that secures the I/O-board cable connector to the I/O board.

Next steps

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

Heat sink

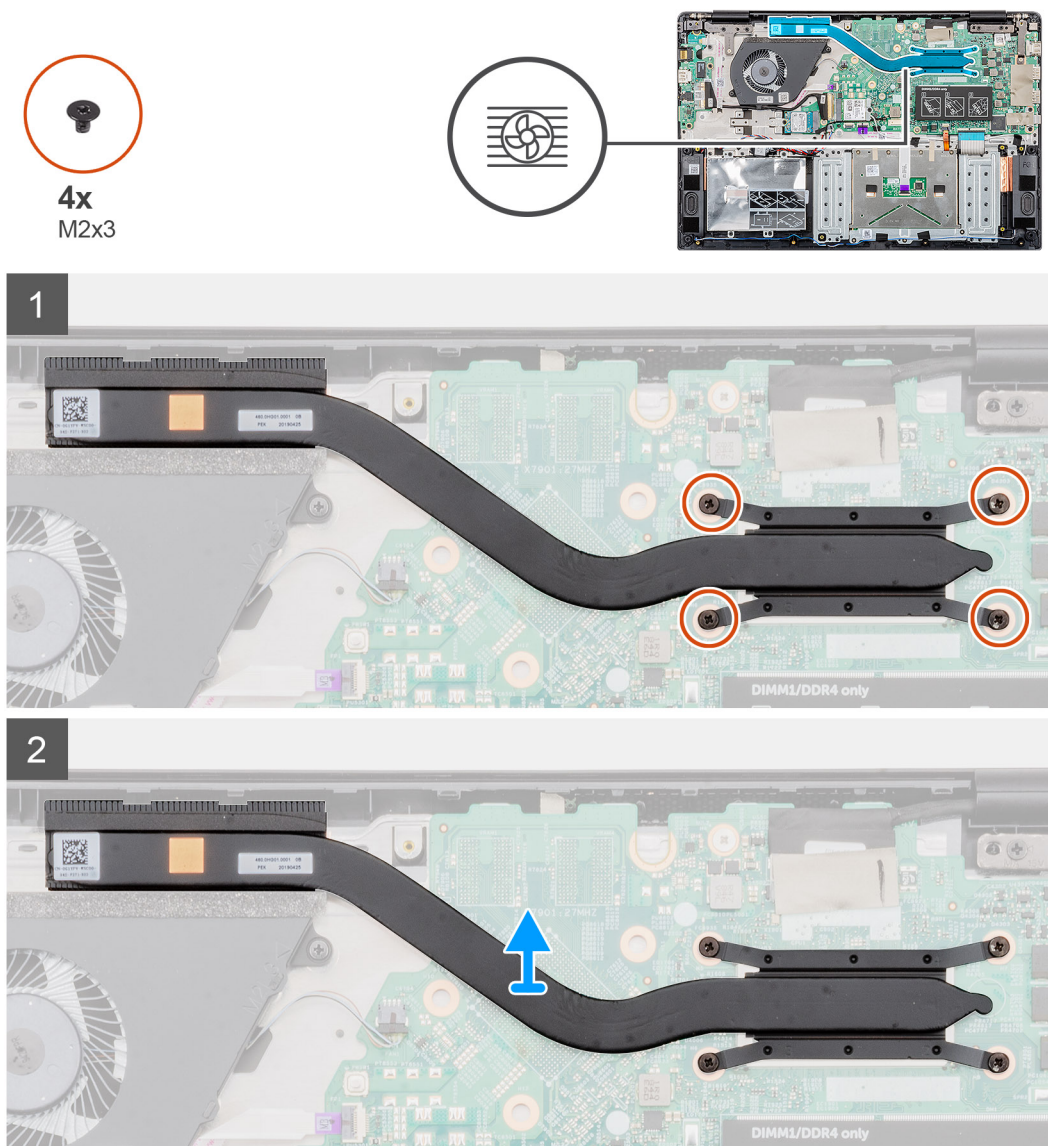
Removing the heat sink (integrated graphics)

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 image indicates the location of the heat sink (on systems with the integrated graphics option) and provides a visual representation of the removal procedure.



Steps

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

Installing the heat sink (integrated graphics)

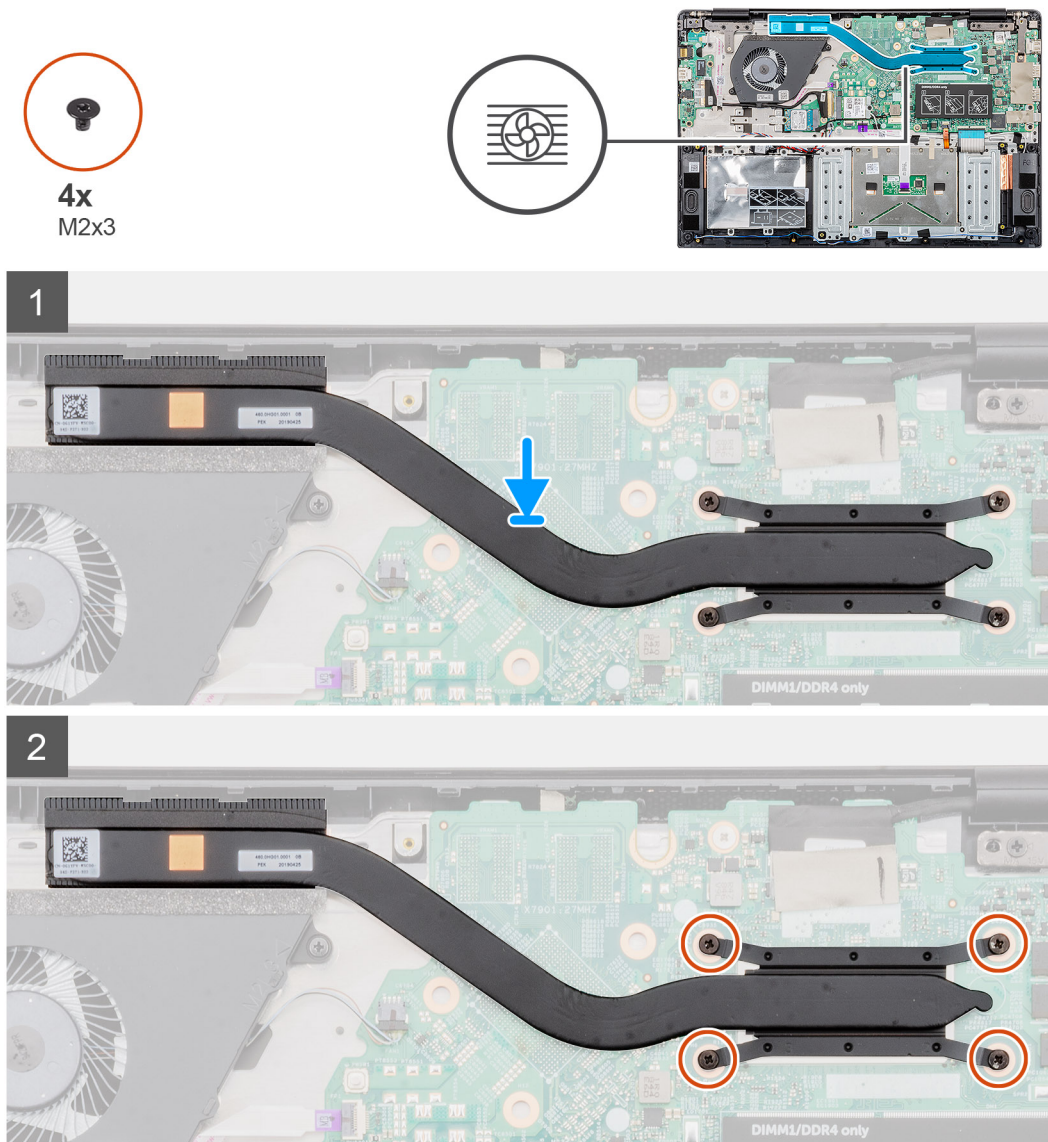
Prerequisites

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

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 (on systems with the integrated graphics option) and provides a visual representation of the installation procedure.



Steps

1. Align the screw holes on the heat sink with the screw holes on the system board.

2. In sequential order (indicated on the heat sink), tighten the four captive screws that secure the heat sink to the system board.

Next steps

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

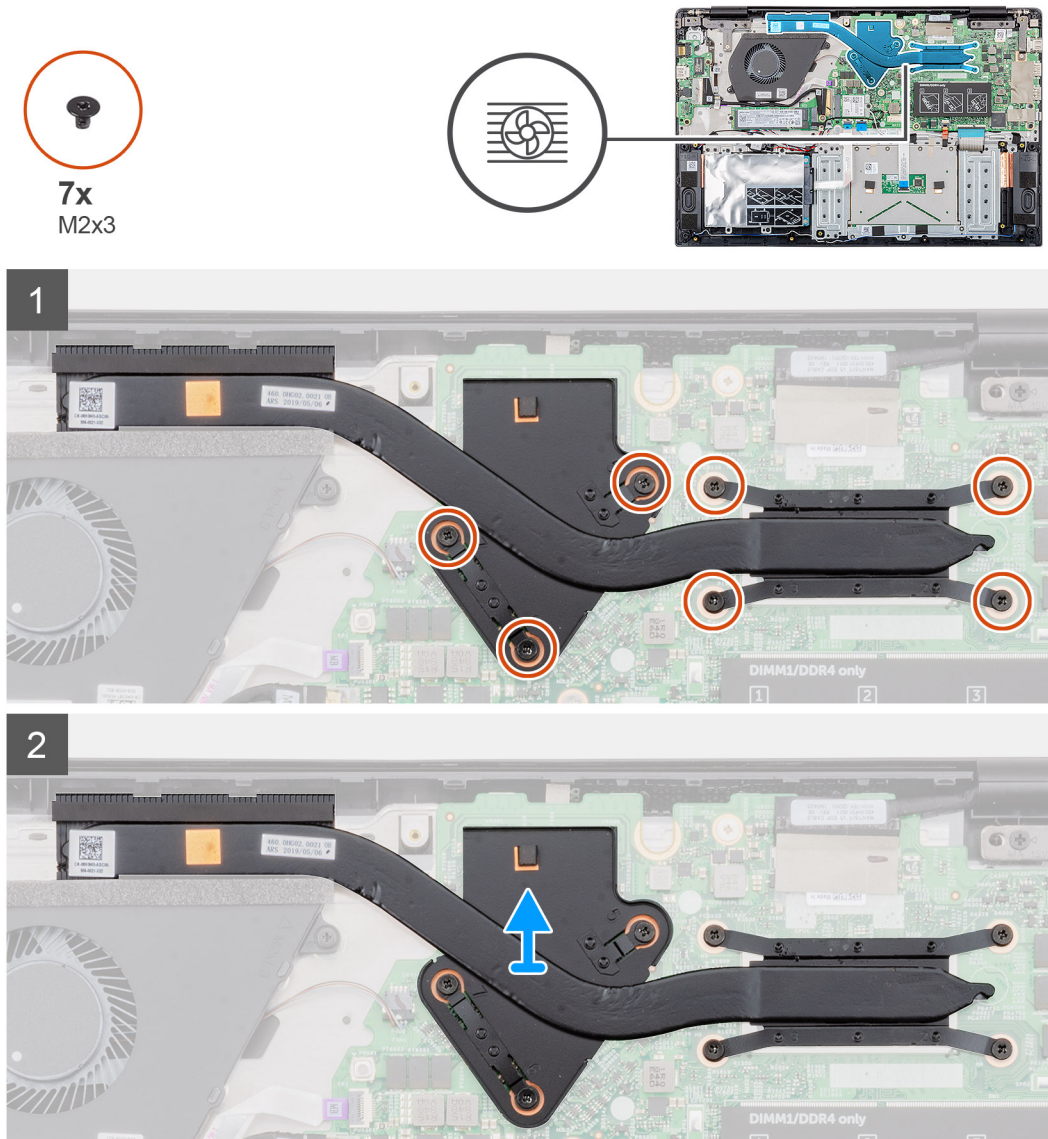
Removing the heat sink (discrete graphics)

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 image indicates the location of the heat sink (on systems with the discrete graphics option) and provides a visual representation of the removal procedure.



Steps

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

Installing the heat sink (discrete graphics)

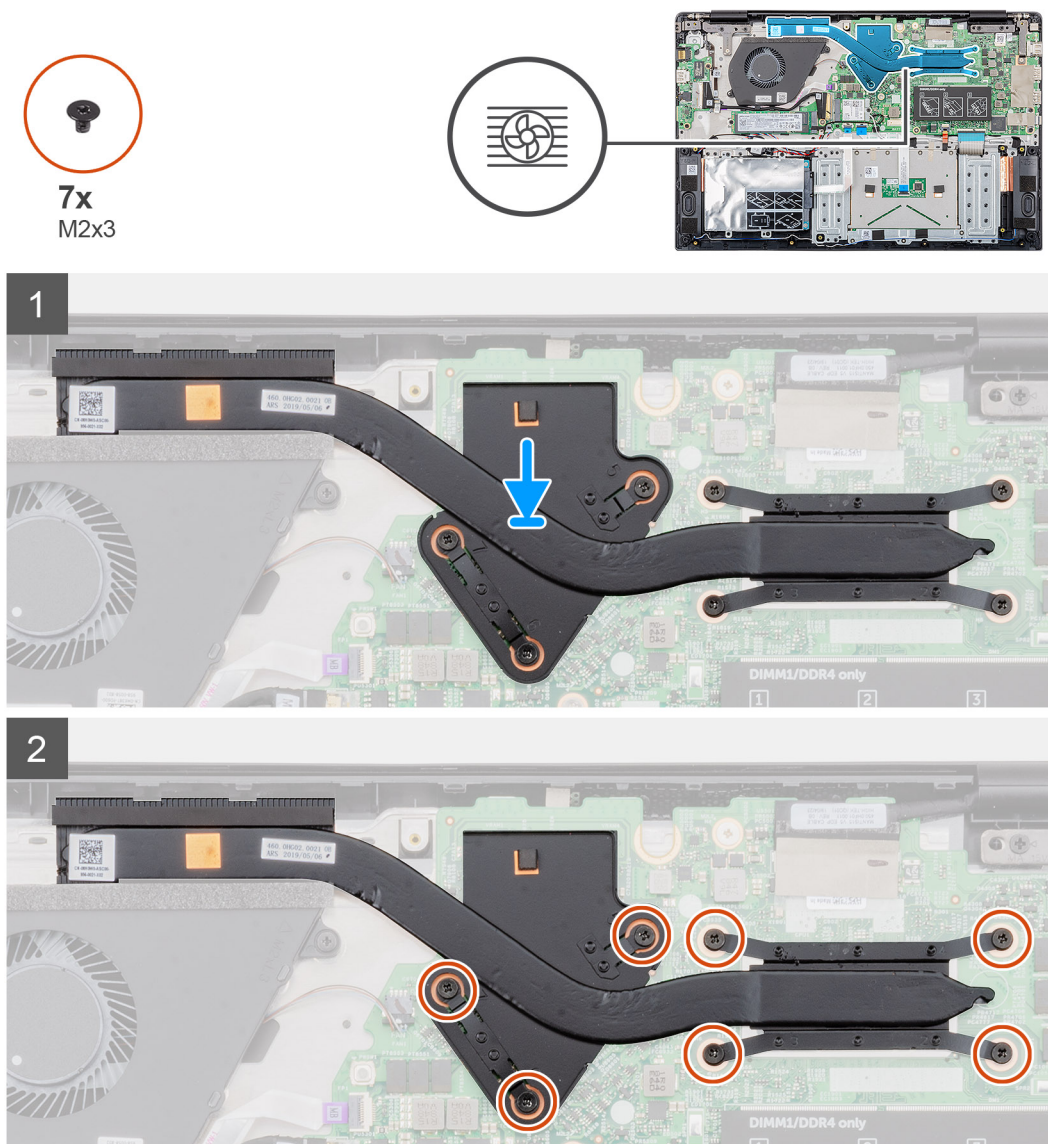
Prerequisites

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

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 (on systems with the discrete graphics option) and provides a visual representation of the installation procedure.



Steps

1. Align the screw holes on the heat sink with the screw holes on the system board.

2. In sequential order (indicated on the heat sink), tighten the seven captive screws that secure the heat sink to the system board.

Next steps

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

Touchpad

Removing the touchpad

Prerequisites

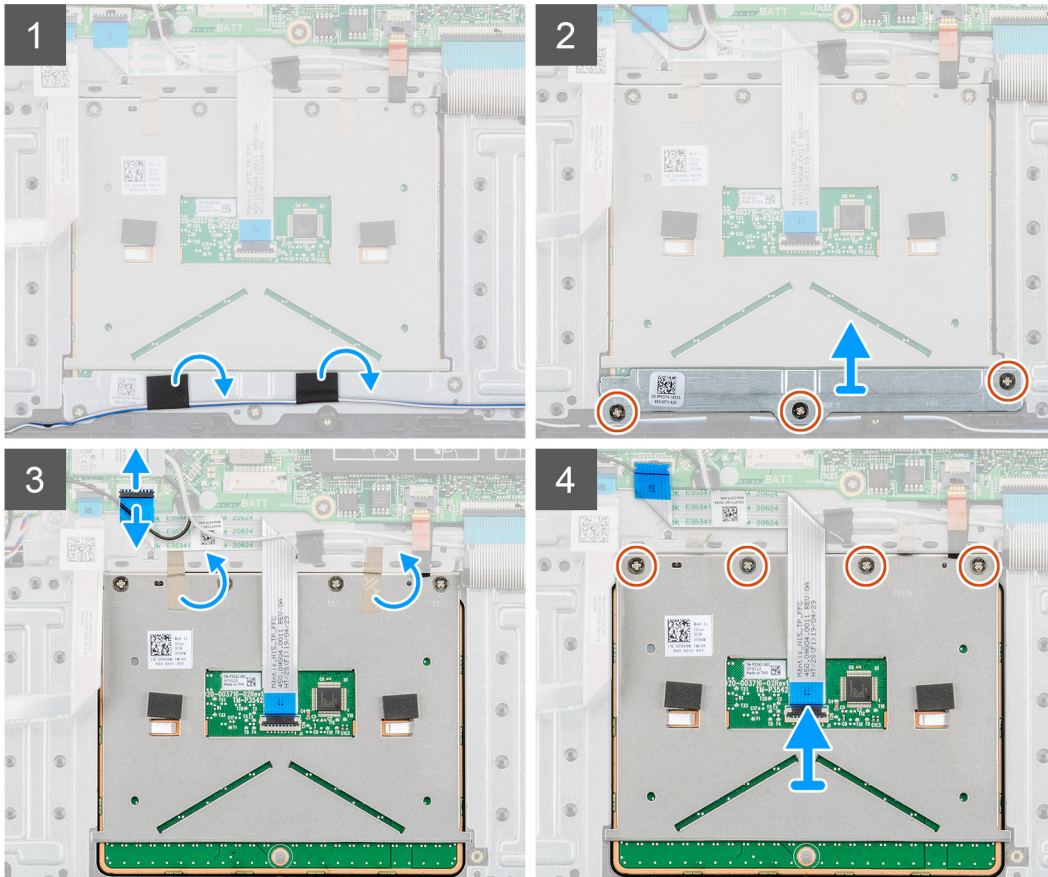
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [speakers](#).

About this task

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



7x
M2x2



Steps

1. Peel the tapes that secure the antenna cables to the palm-rest and keyboard assembly.
2. Open the latch and disconnect the touchpad cable from the system board.
3. Gently slide the touchpad-cable connector under the antenna cables so that the touchpad cable is over the antenna cables.
4. Peel the tapes that secure the touchpad to the palm-rest and keyboard assembly.
5. Remove the three screws (M2x2) that secure the touchpad bracket to the palm-rest and keyboard assembly.
6. Lift the touchpad bracket off the palm-rest and keyboard assembly.
7. Remove the four screws (M2x2) that secure the touchpad to the palm-rest and keyboard assembly.
8. Lift the touchpad, along with the cable, off the palm-rest and keyboard assembly.

Installing the touchpad

Prerequisites

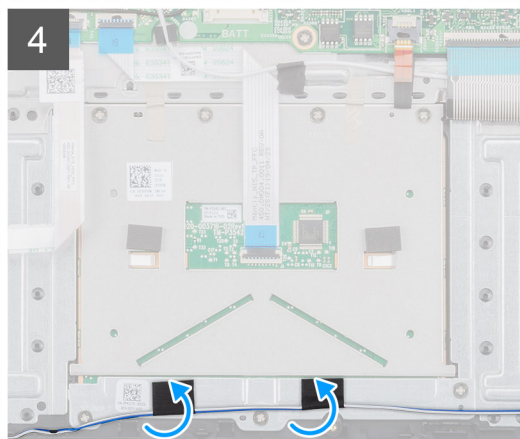
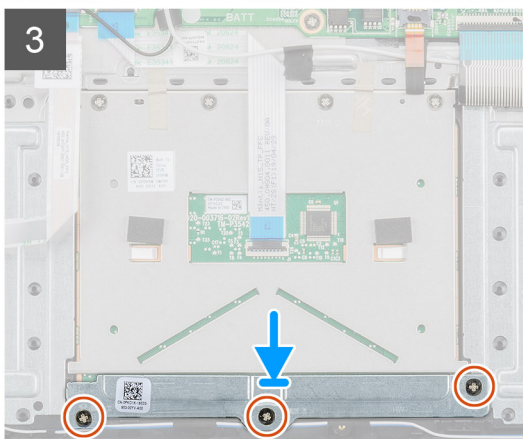
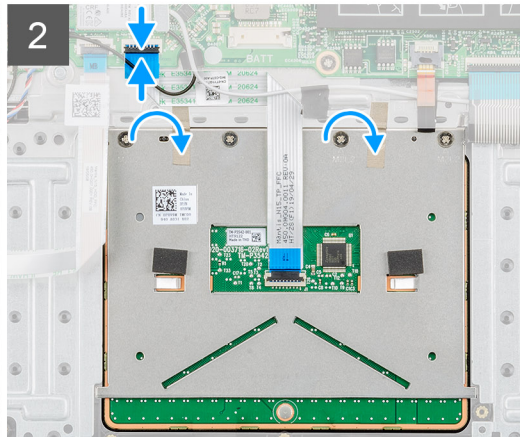
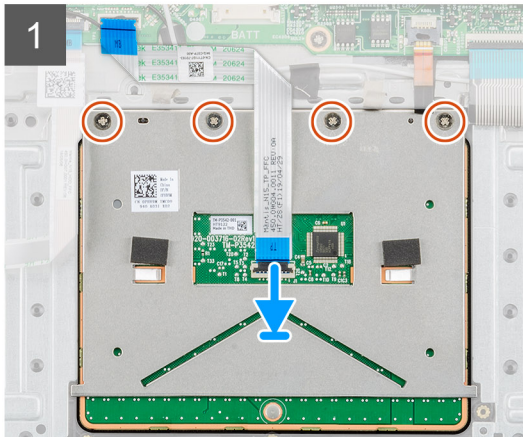
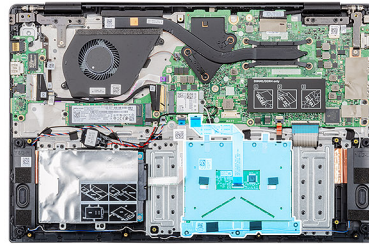
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

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



7x
M2x2



Steps

1. Align and place the touchpad into the slot on the palm-rest and keyboard assembly.
2. Replace the four screws that (M2x2) secure the touchpad to the palm-rest and keyboard assembly.
3. Align and place the touchpad bracket into the slot on the palm-rest and keyboard assembly.
4. Replace the three screws (M2x2) that secure the touchpad bracket to the palm-rest and keyboard assembly.
5. Gently slide the touchpad-cable connector under the antenna cable so that the touchpad cable is under the antenna cable.
6. Slide the touchpad cable into its connector on the system board and close the latch to secure the cable.
7. Adhere the tapes that secure the touchpad to the palm-rest and keyboard assembly.
8. Adhere the tapes that secure the antenna cables to the palm-rest and keyboard assembly.

Next steps

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

Fan

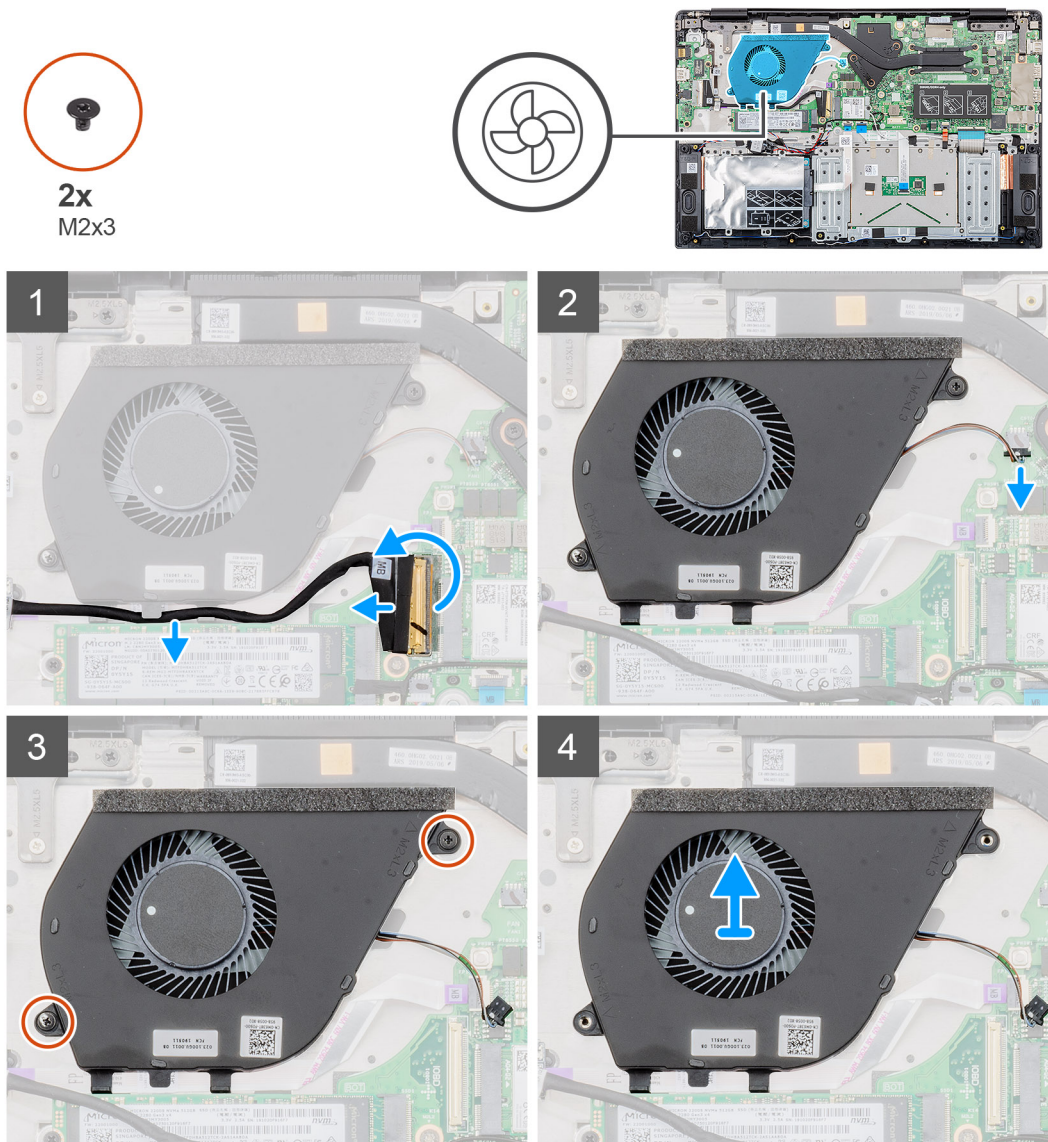
Removing the fan

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 image indicates the location of the fan and provides a visual representation of the removal procedure.



Steps

1. Peel the tape off the I/O-board cable connector.
2. Lift the latch and disconnect the I/O-board cable from the I/O board.
3. Remove the I/O-board cable from the routing guides on the fan.
4. Remove the two screws (M2x3) that secure the fan to the system board.

5. Disconnect the fan cable from the system board.
6. Lift the fan off the palm-rest and keyboard assembly.

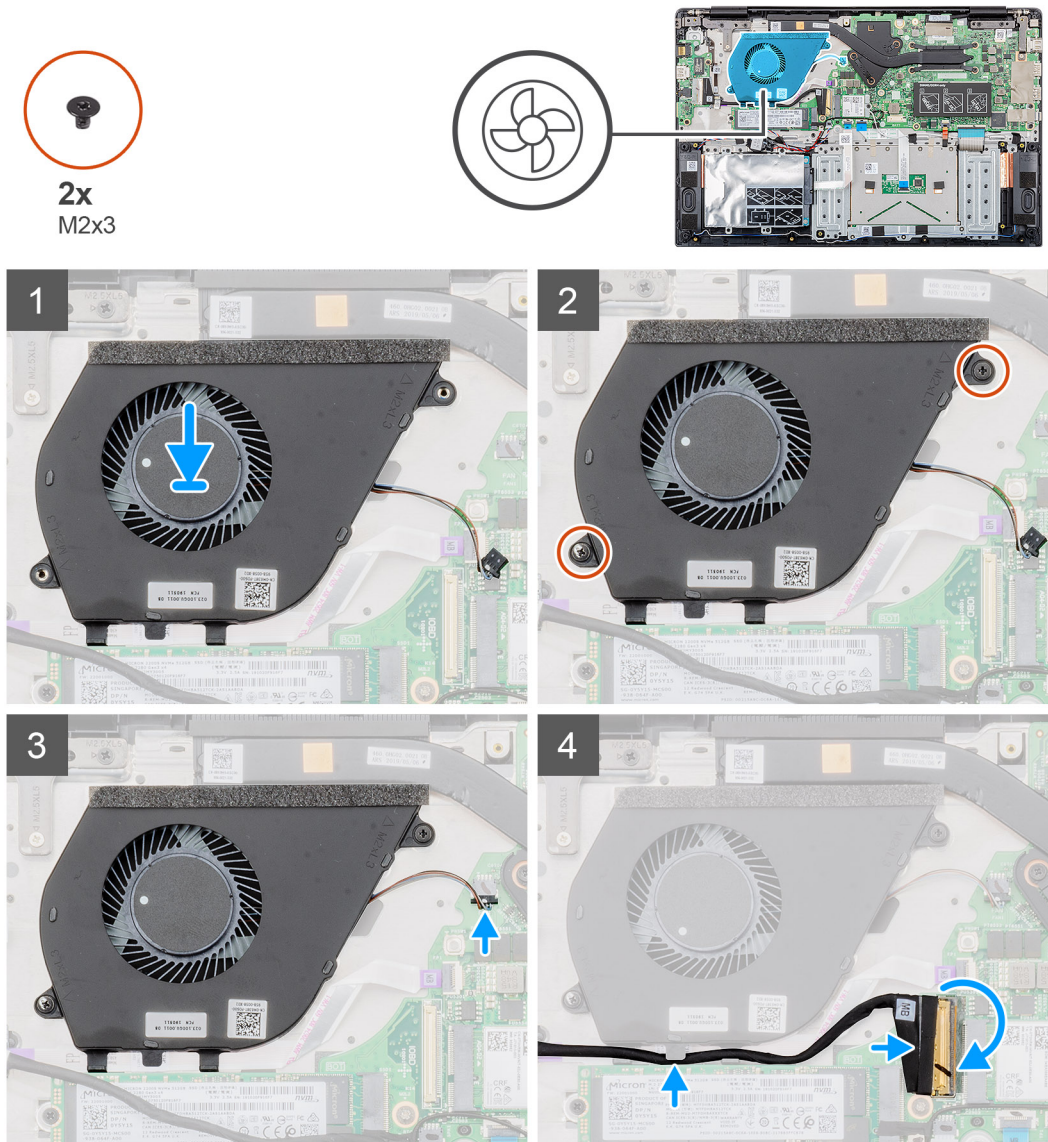
Installing the fan

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.



Steps

1. Connect the fan cable to the system board.
2. Align the screw holes on the fan with the screw holes on the palm-rest and keyboard assembly.
3. Replace the two screws (M2x3) that secure the fan to the palm-rest and keyboard assembly.
4. Connect the I/O-board cable to the system board and I/O board.
5. Route the I/O-board cable through the routing guides on the fan.
6. Reconnect the I/O-board cable to the I/O board and close the latch.

7. Adhere the tape that secures the I/O-board cable connector to the I/O board.

Next steps

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

Display assembly

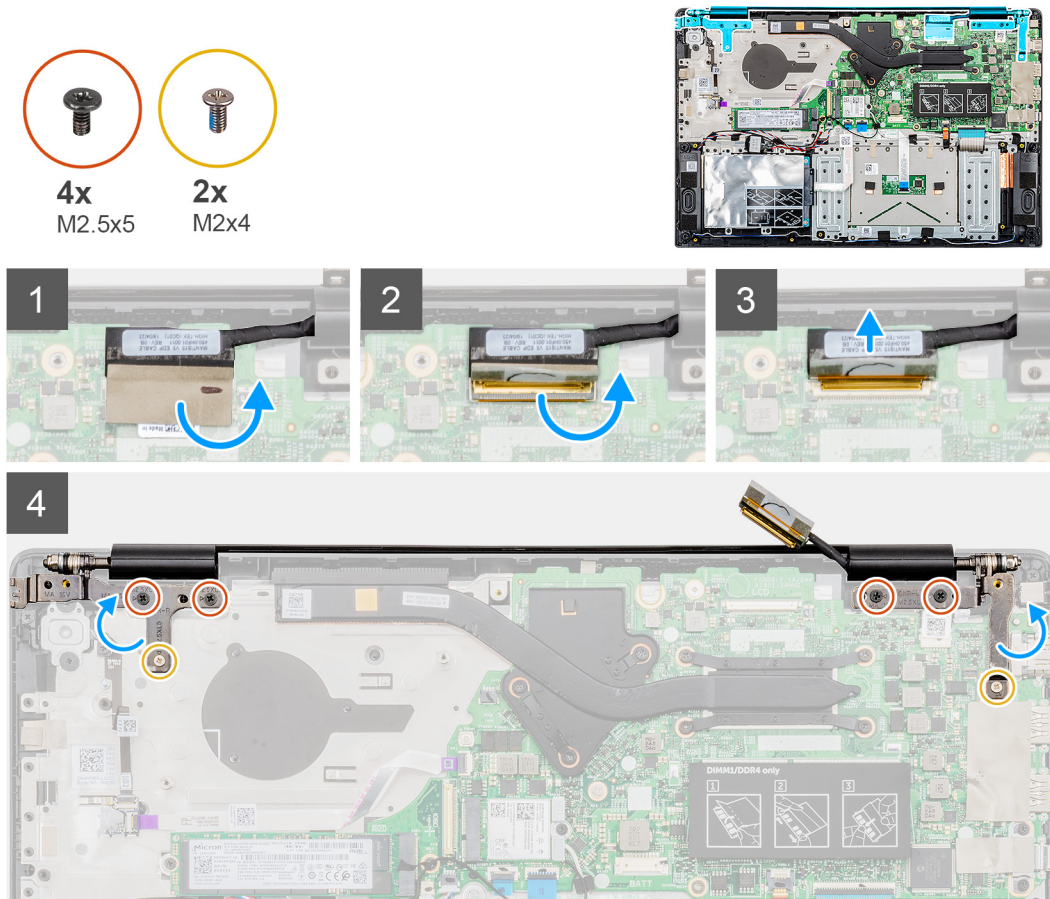
Removing the display assembly

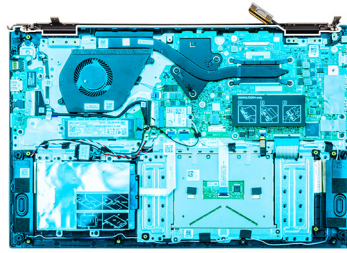
Prerequisites

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

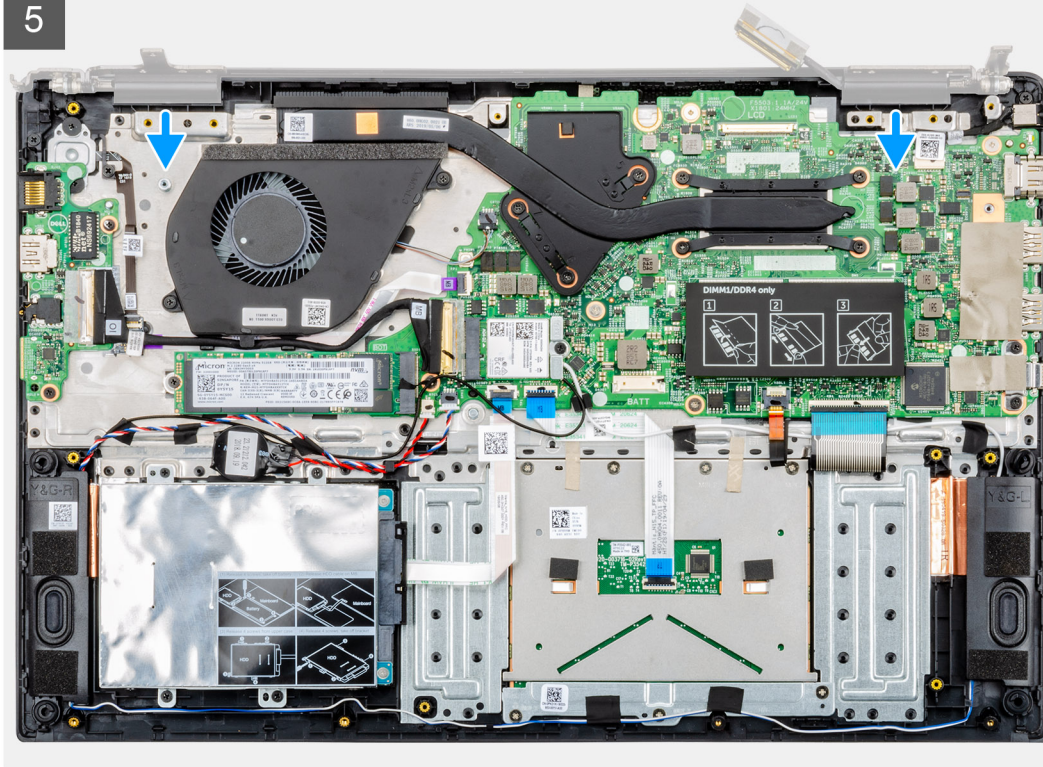
About this task

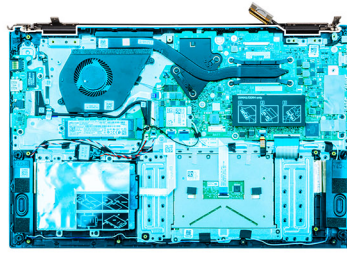
The following image indicates the location of the display assembly and provides a visual representation of the removal procedure.



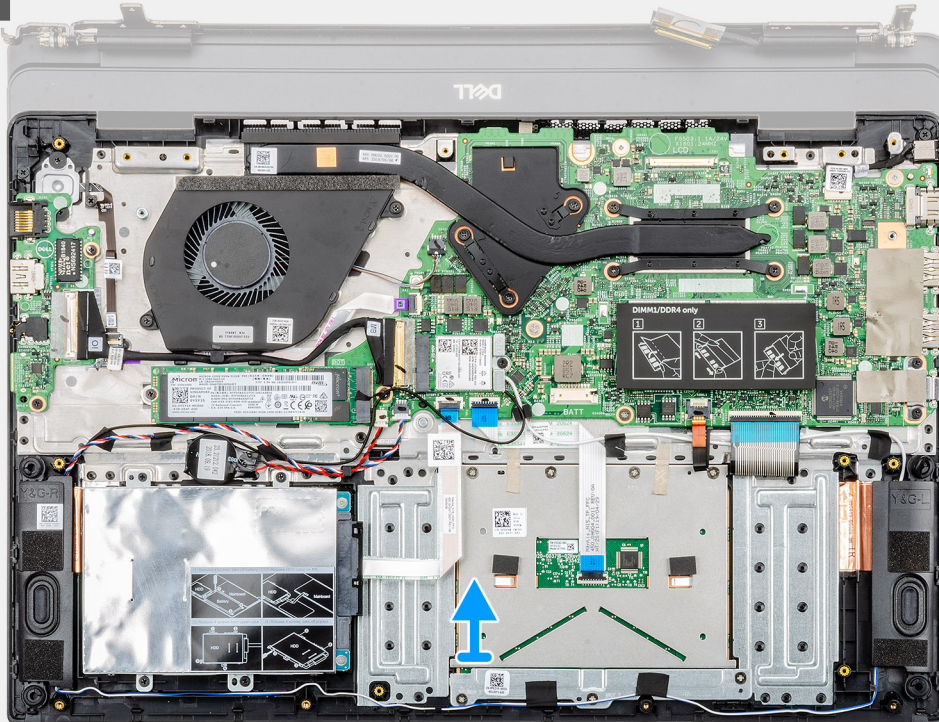


5





6



7



Steps

1. Peel the tape that secures the display-cable connector to the system board.
2. Open the latch and disconnect the display cable from the system board.
3. Remove the four screws (M2.5x5) and the two screws (M2x4) that secure the left and the right display hinges to the palm-rest and keyboard assembly.
4. Open the display hinges at an angle of 90 degrees.
5. Gently slide and lift 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.

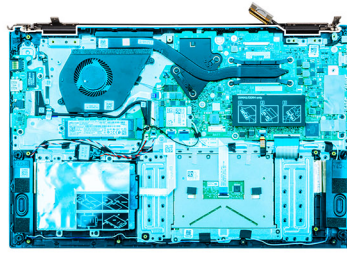
About this task

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

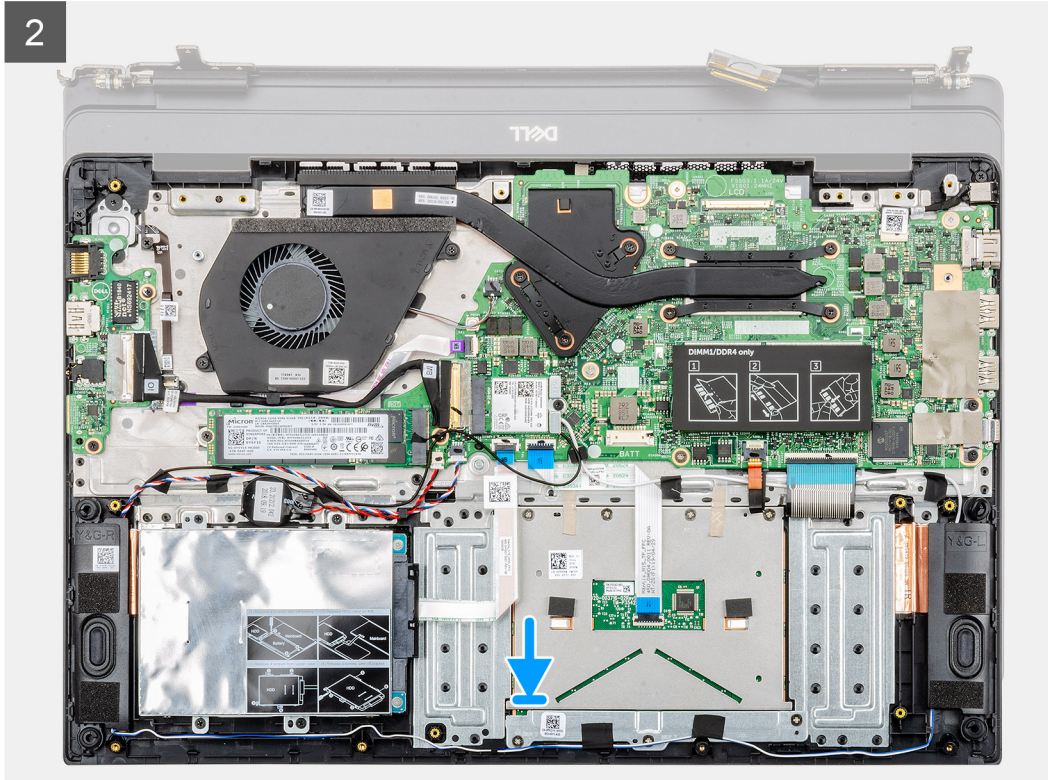


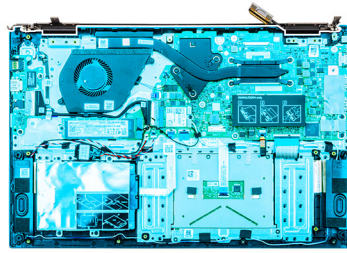
1



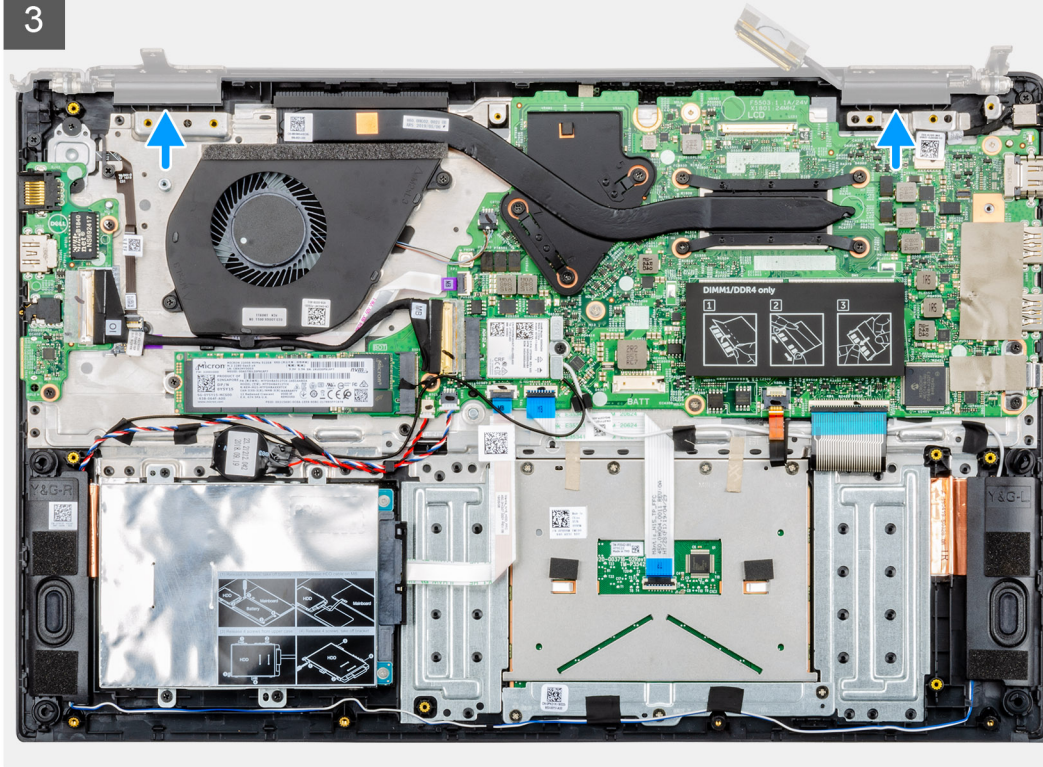


2



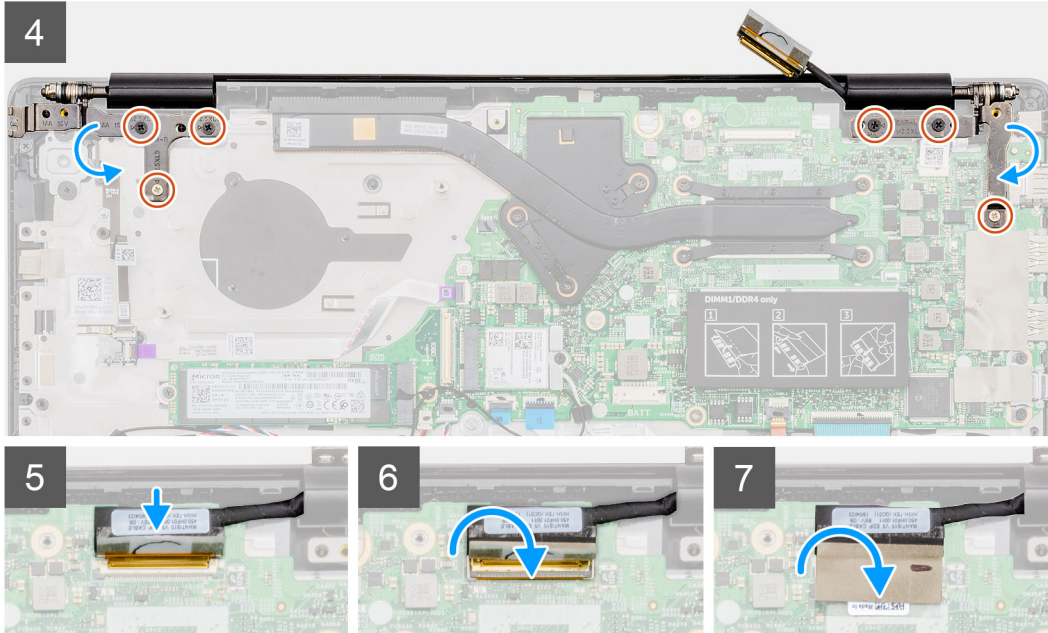
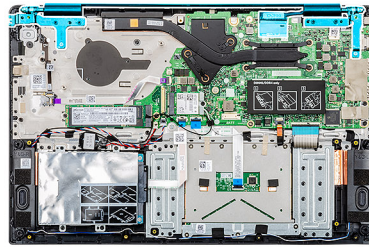


3





6x
M2.5x5



Steps

1. Place the display assembly on a clean and flat surface.
2. Align and slide the palm-rest and keyboard assembly on the display assembly.
3. Using the alignment posts, close the left and the right display hinges.
4. Replace the four screws (M2.5x5) and the two screws (M2x4) that secure the left and the right display hinges to the palm-rest and keyboard assembly.
5. Connect the display cable to the system board and adhere the tape that secures the display-cable connector.

Next steps

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

Coin-cell battery

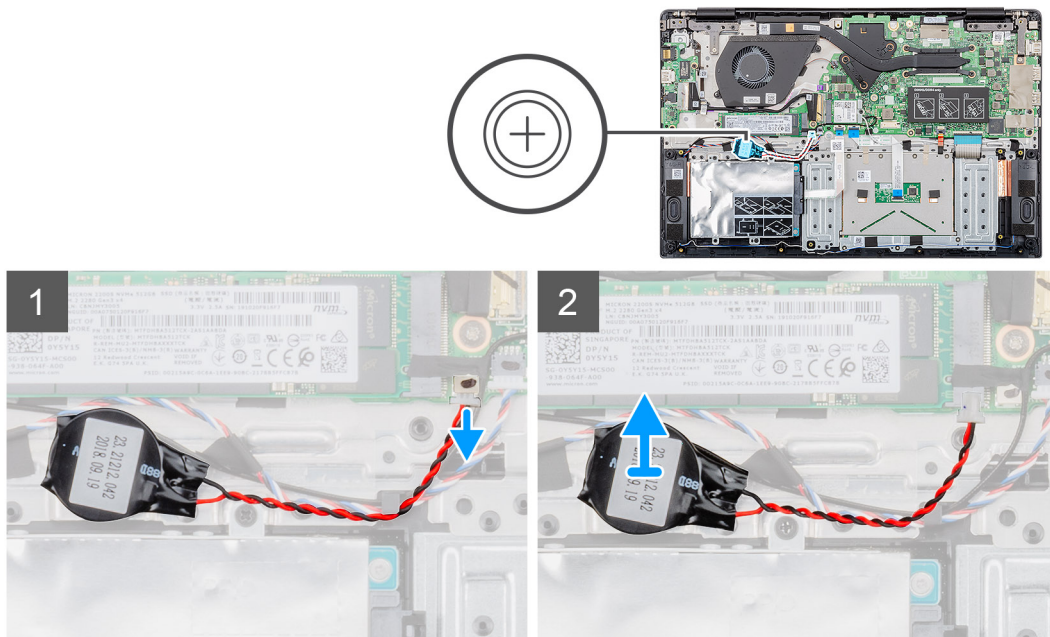
Removing the coin-cell battery

Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [wireless card](#).
5. Remove the [solid-state drive/Intel Optane memory](#).

About this task

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



Steps

1. Disconnect the speaker cable from the system board.
2. Peel off the tape that secures the speaker cable to the system board.
3. Note the speaker-cable routing and remove the speaker cable from the routing guides.
4. Disconnect the coin-cell battery cable from the system board.
5. Remove the coin-cell battery cable from the routing guides.

NOTE: Depending on the configuration ordered, you may need to peel-off additional tape that adheres the coin-cell battery cable to the palm-rest and keyboard assembly. You may also need to temporarily remove the speaker cable, which routes through the same guides.

6. Pry the coin-cell battery off the palm-rest and keyboard assembly.

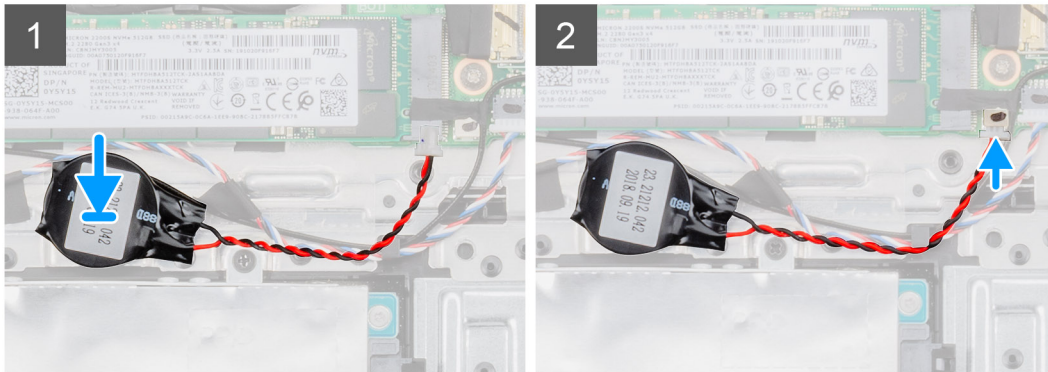
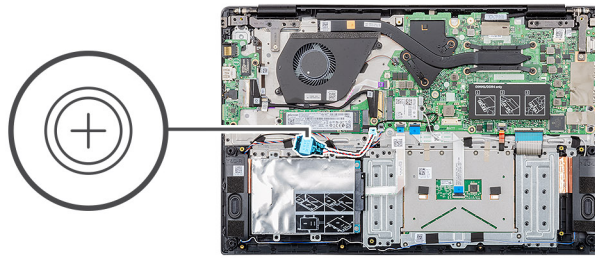
Installing the coin-cell battery

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 coin-cell battery and provides a visual representation of the installation procedure.



Steps

1. Adhere the coin-cell battery to the palm-rest and keyboard assembly.
2. Route the coin-cell battery cable through the routing guides.



NOTE: Depending on the configuration ordered, you may need to re-route the speaker cable through the same guides and re-apply the tape which adheres the coin-cell battery cable to the palm-rest and keyboard assembly.

3. Connect the coin-cell battery cable to the system board.
4. Route the speaker cable through the routing guides on the system board.
5. Adhere the tape that secures the speaker cable to the system board.
6. Connect the speaker cable to the system board.

Next steps

1. Install the [solid-state drive/Intel Optane memory](#).
2. Install the [wireless card](#).
3. Install the [battery](#).
4. Install the [base cover](#).
5. Follow the procedure in [After working inside your computer](#).

Speakers

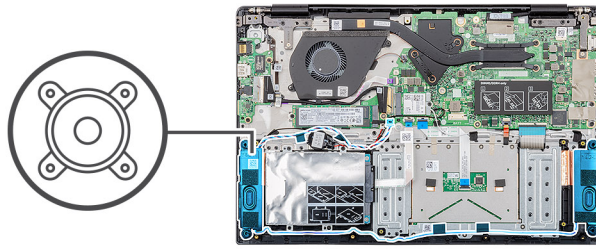
Removing the speakers

Prerequisites

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

About this task

The following image indicates the location of the speakers and provides a visual representation of the removal procedure.



Steps

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

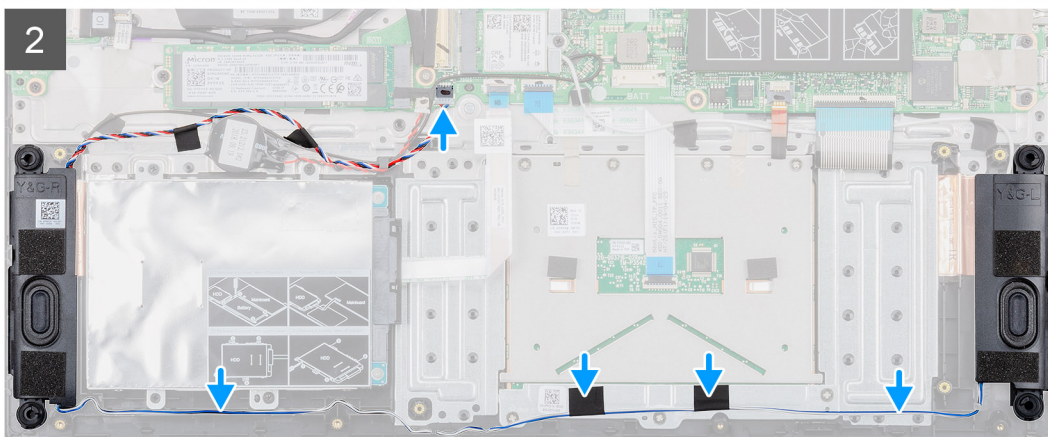
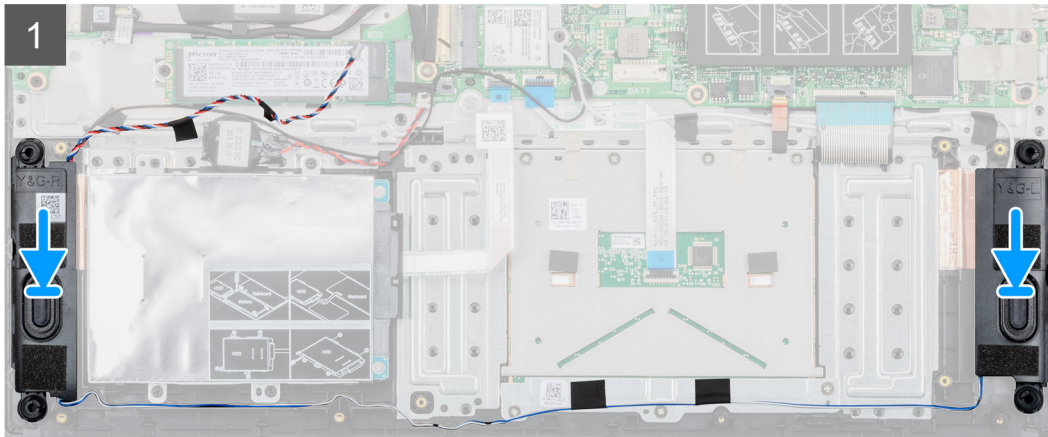
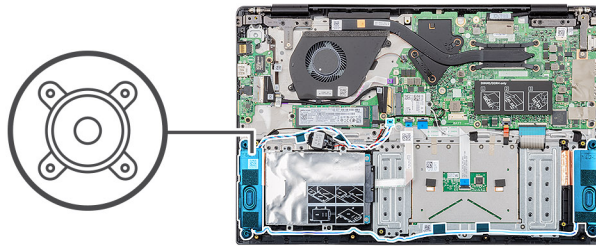
Installing the speakers

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 speakers and provides a visual representation of the installation procedure.



Steps

1. Using the alignment posts, place the speakers on the palm-rest and keyboard assembly.
2. Route the speaker cables through the routing guides on the palm-rest and keyboard assembly.
3. Adhere the tape that secures the speaker cable to the system board.
4. Connect the speaker cable to the system board.

Next steps

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

Power-adapter port

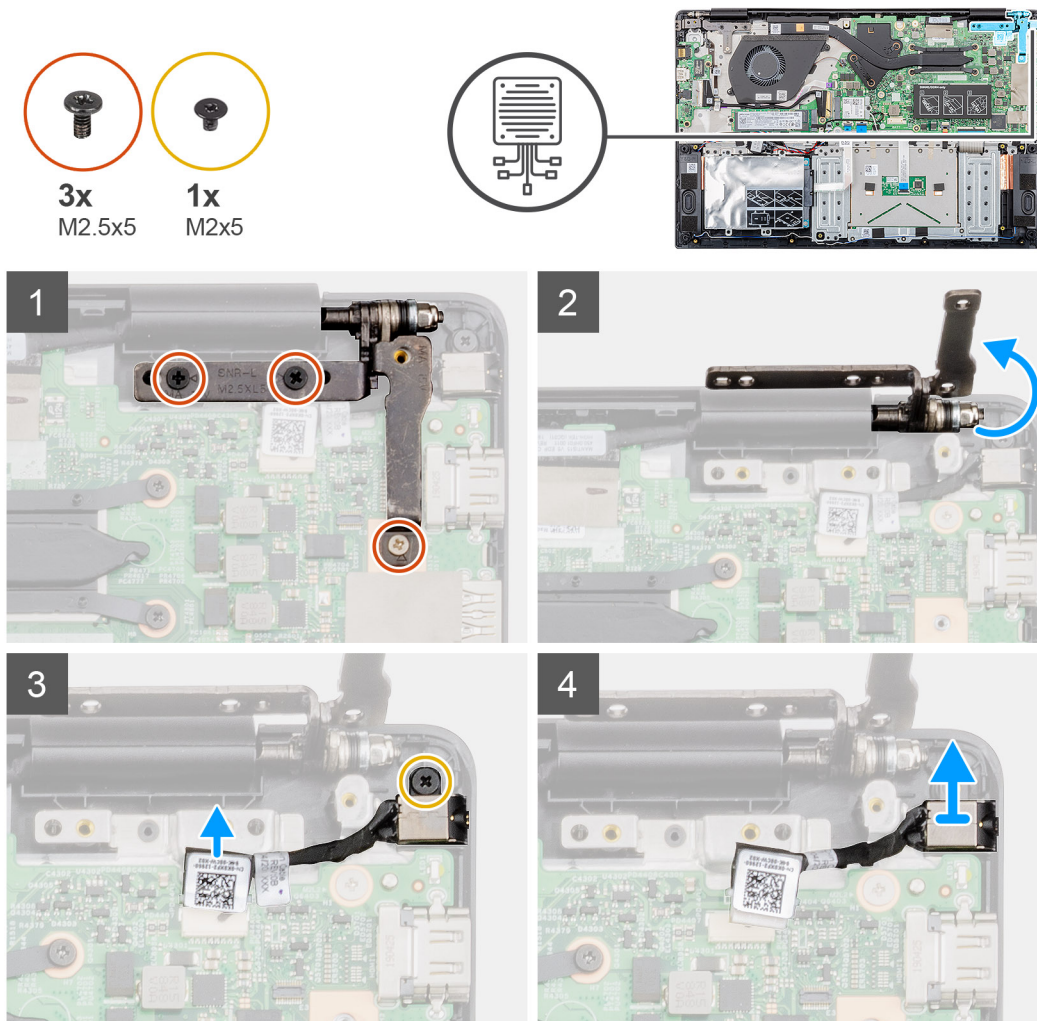
Removing the power-adapter port

Prerequisites

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

About this task

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



Steps

1. Disconnect the power-adapter port cable from the system board.
2. Remove the screw (M2x3) that secures the power-adapter port to the palm-rest and keyboard assembly.
3. Lift the power-adapter port, along with its cable, off the palm-rest and keyboard assembly.

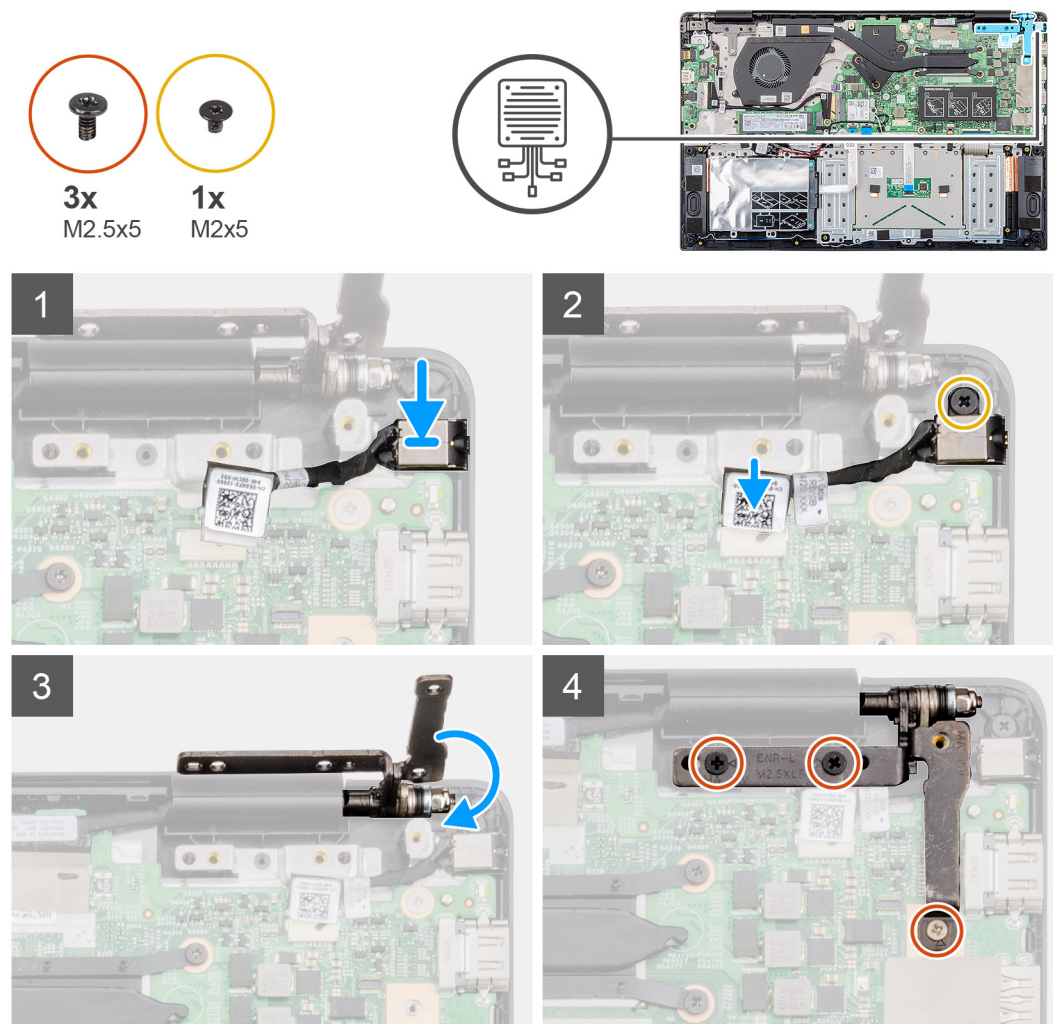
Installing the power-adapter port

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 power-adapter port and provides a visual representation of the installation procedure.



Steps

1. Place the power-adapter port into the slot on the palm-rest and keyboard assembly.
2. Replace the screw (M2x3) that secures the power-adapter port to the palm-rest and keyboard assembly.
3. Connect the power-adapter cable to the connector on the system board.

Next steps

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

Power button

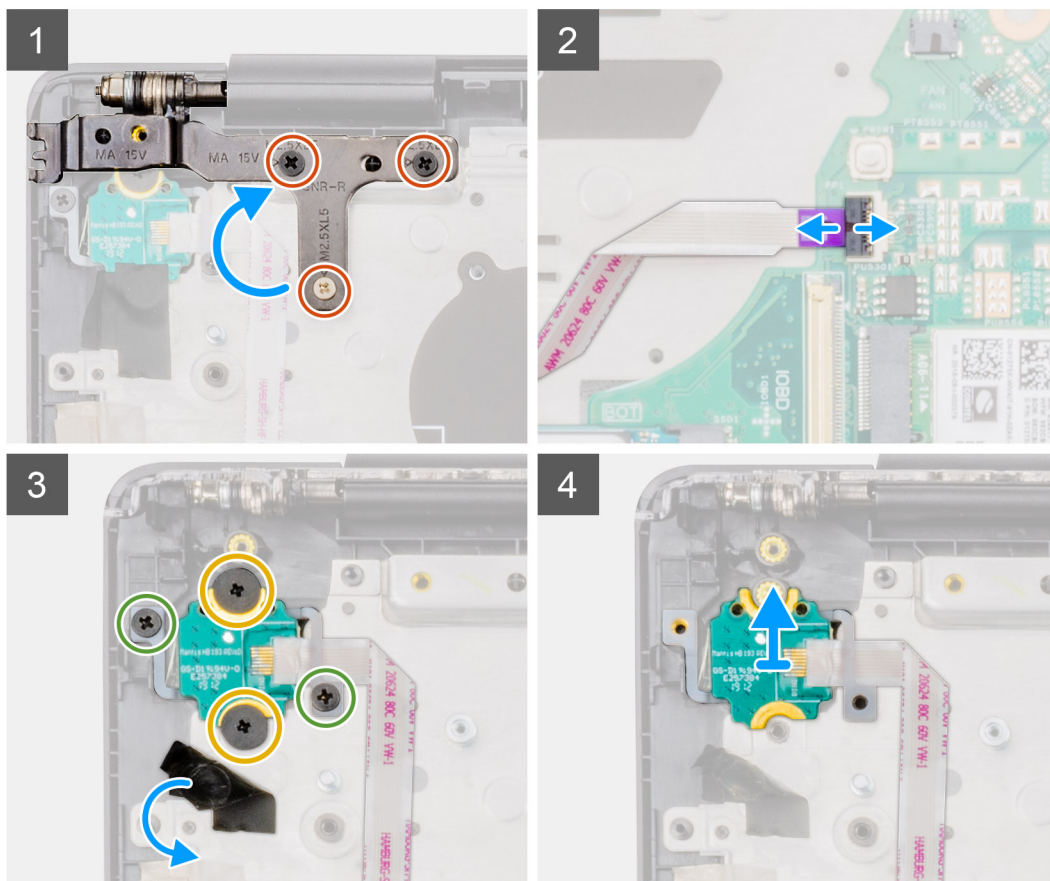
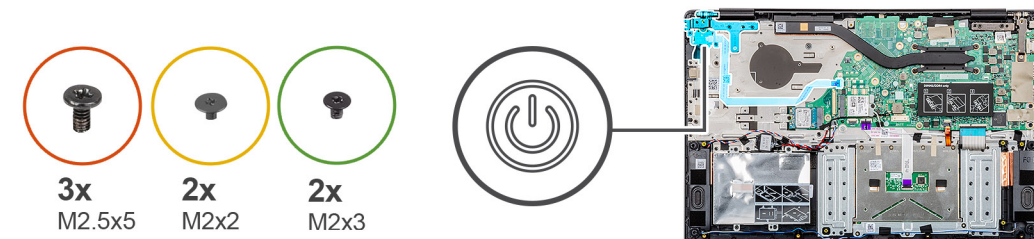
Removing the power-button board

Prerequisites

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

About this task

The following image indicates the location of power button and provides a visual representation of the removal procedure.



Steps

1. Remove the three screws (M2.5x5) that secure the right display hinge to the palm-rest and keyboard assembly.
2. Lift the right display hinge.
3. Lift the latch and disconnect the power-button cable from the system board.
4. Peel the adhesive tape above the power-button board.
5. Remove the two screws (M2x2) and the two screws (M2x3) that secure the power-button board to the palm-rest and keyboard assembly.

6. Lift the power-button board off the palm-rest and keyboard assembly.

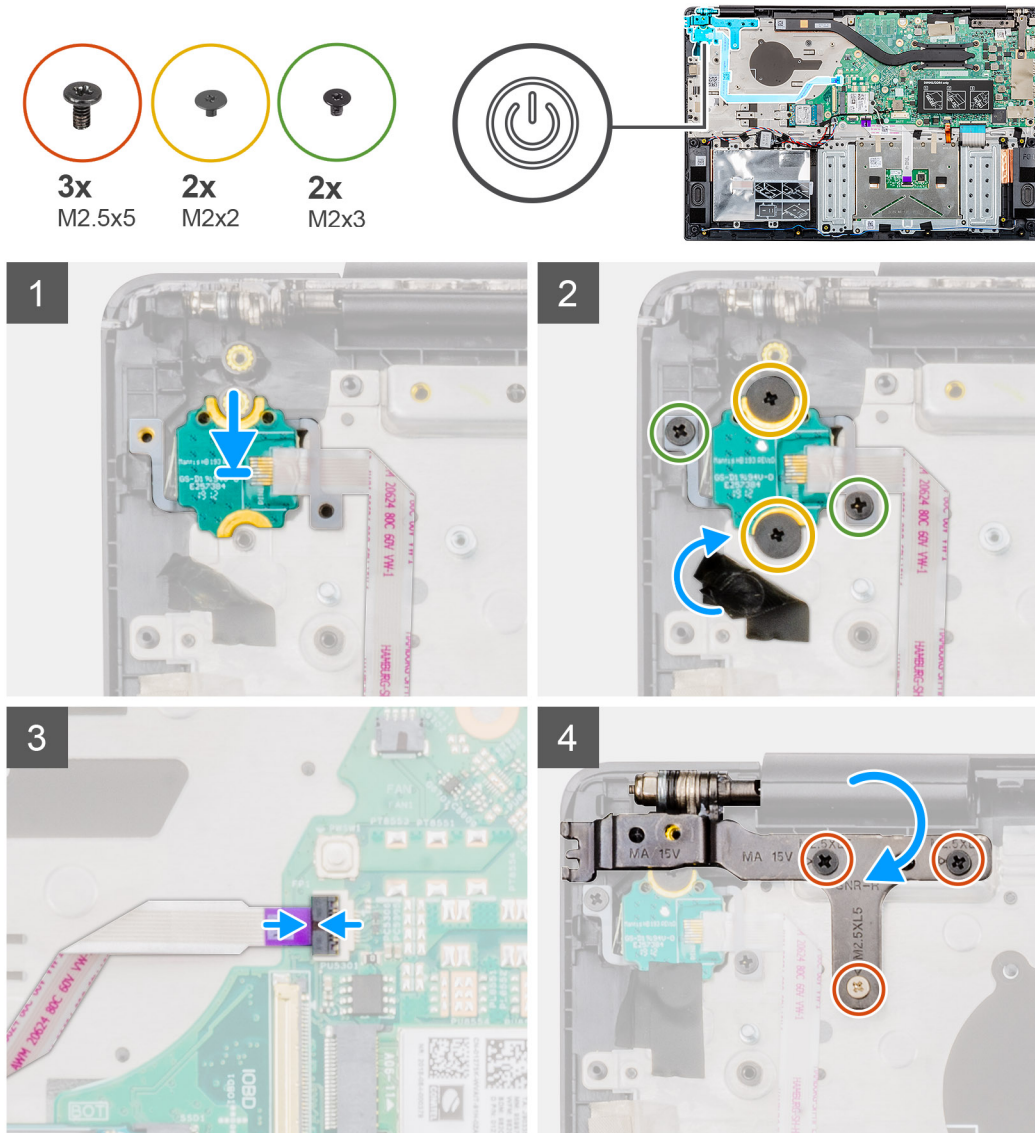
Installing the power-button board

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 power button and provides a visual representation of the installation procedure.



Steps

1. Align and place the power-button board into the slot on the palm-rest and keyboard assembly.
2. Replace the two screws (M2x2) and the two screws (M2x3) that secure the power-button board to the palm-rest and keyboard assembly.
3. Adhere the adhesive tape above the power-button board.
4. Connect the power-button cable to the connector on the system board and close the latch.
5. Close the right display hinge and replace the three screws (M2.5x5) that secure the right display hinge to the palm-rest and keyboard assembly.

Next steps

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

Power button with fingerprint reader (optional)

Removing the power button with fingerprint reader (optional)

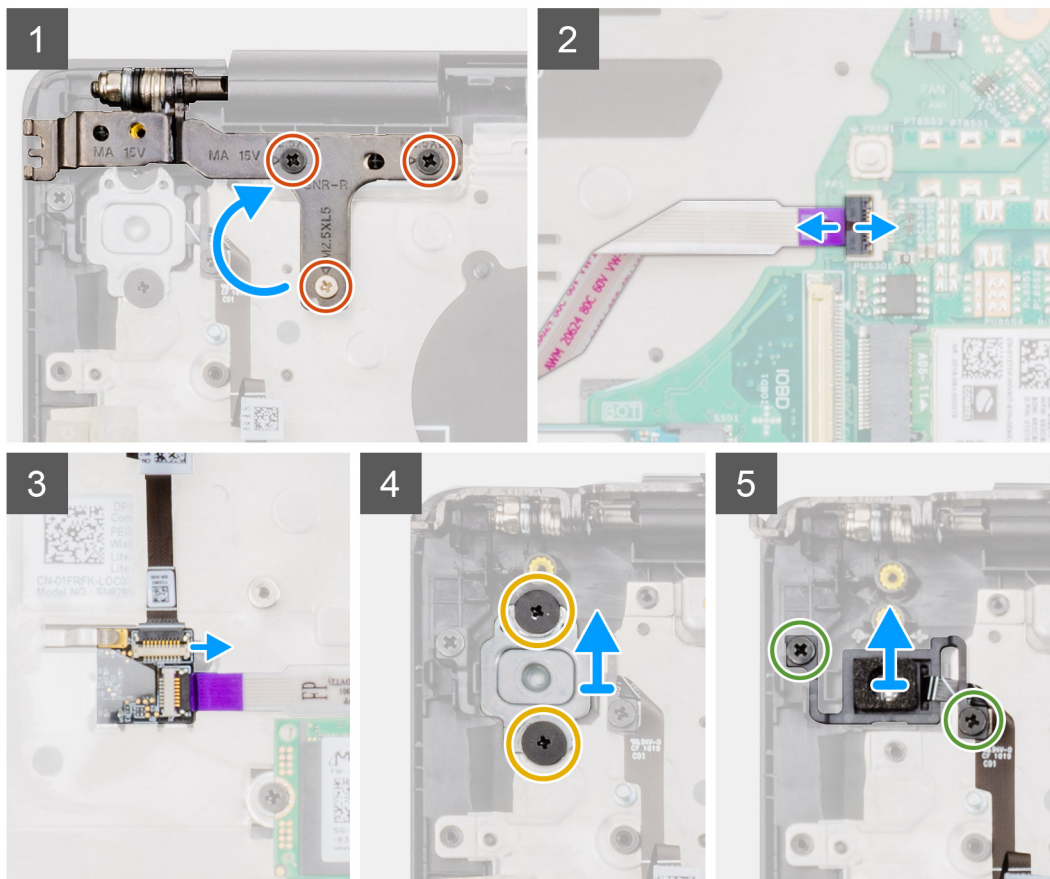
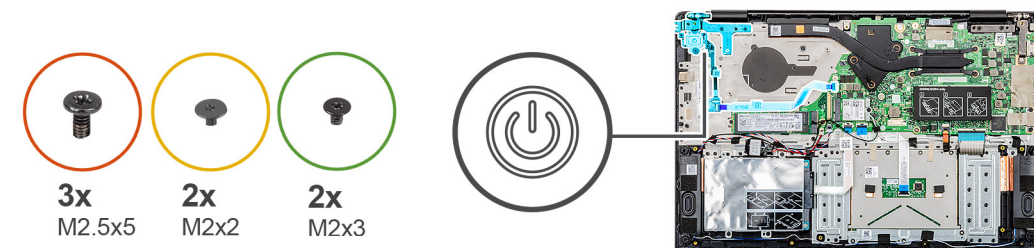
Prerequisites

 **NOTE:** This procedure is only applicable to computers shipped with a power button with fingerprint reader.

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

About this task

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



Steps

1. Remove the three screws (M2.5x5) that secure the right display hinge to the palm-rest and keyboard assembly.
2. Lift the right display hinge.
3. Open the latch and disconnect the power-button cable from the connector on the system board.
4. Disconnect the fingerprint-reader cable from the connector on the power-button board.
5. Remove the two screws (M2x2) that secure the power-button bracket to the palm-rest and keyboard assembly.
6. Remove the two screws (M2x3) that secure the power button to the palm-rest and keyboard assembly
7. Lift the power button with fingerprint reader off the palm-rest and keyboard assembly.

Installing the power button with fingerprint reader (optional)

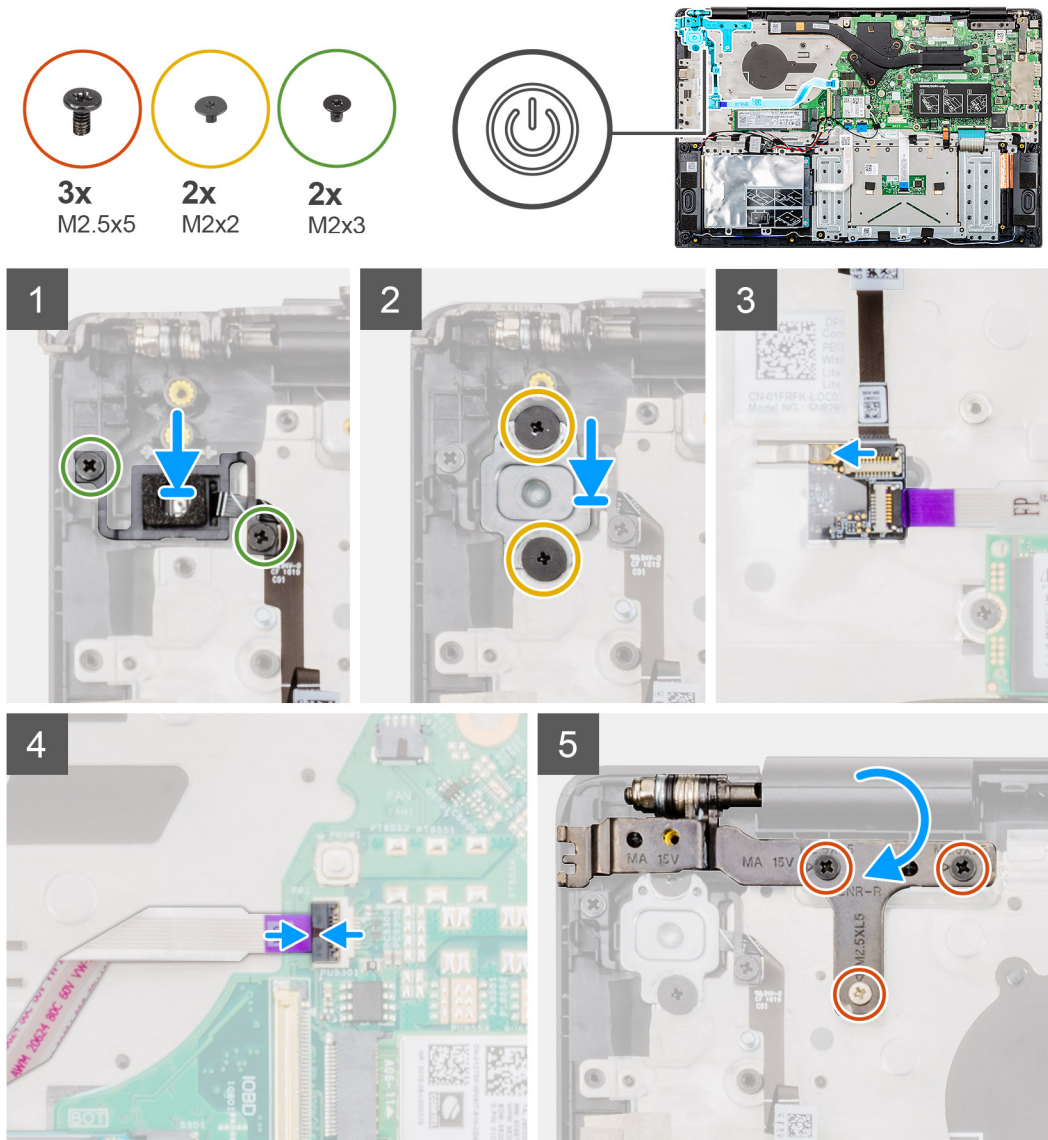
Prerequisites

NOTE: This procedure is only applicable to computers shipped with a power button with fingerprint reader.

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 button with fingerprint reader and provides a visual representation of the installation procedure.



Steps

1. Align and place the power button with fingerprint reader into the slot on the palm-rest and keyboard assembly.
2. Replace the two screws (M2x3) that secure the power button with fingerprint reader to the palm-rest and keyboard assembly.
3. Replace the two screws (M2x2) that secure the power button with fingerprint-reader bracket to the palm-rest and keyboard assembly.
4. Connect the fingerprint-reader cable to the connector on the power-button board.
5. Connect the power-button cable to the connector on the system board.
6. Close the right-display hinge and replace the three screws (M2.5x5) to secure the right display hinge to the palm-rest and keyboard assembly.

Next steps

1. Install the [I/O board](#).
2. Install the [fan](#).
3. Install the [battery](#).
4. Install the [base cover](#).
5. Follow the procedure in [After working inside your computer](#).

System board

Removing the system board

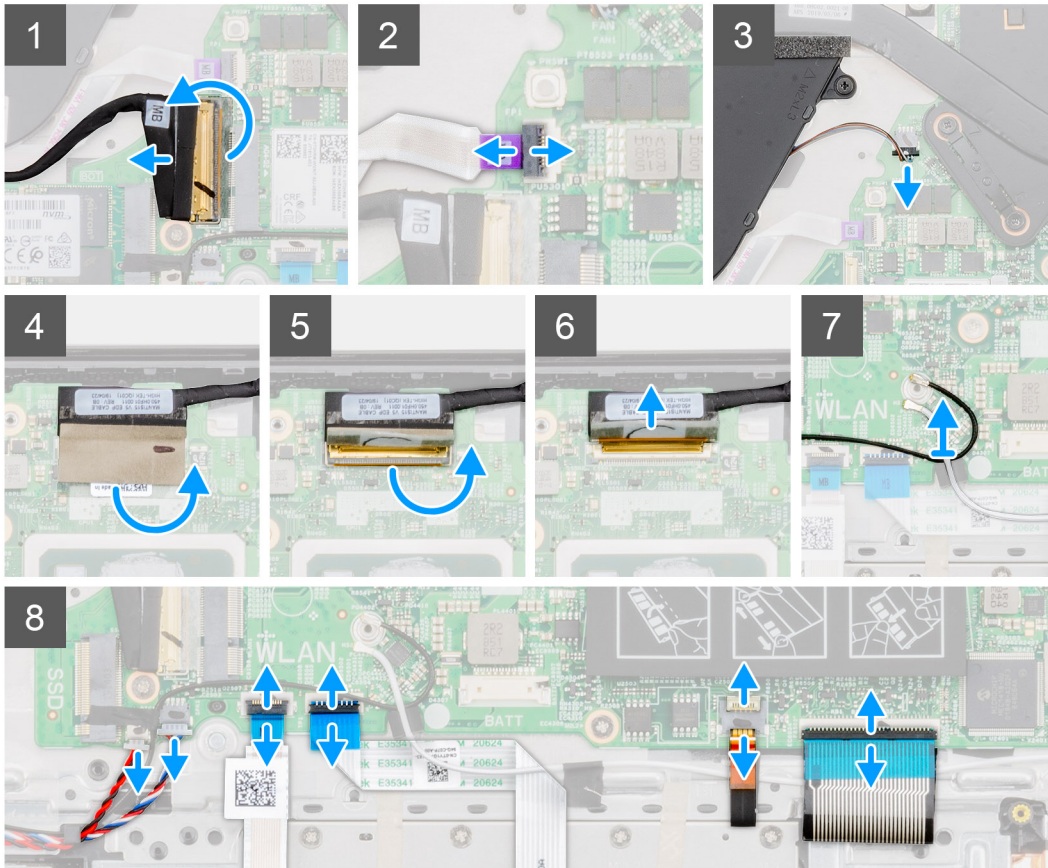
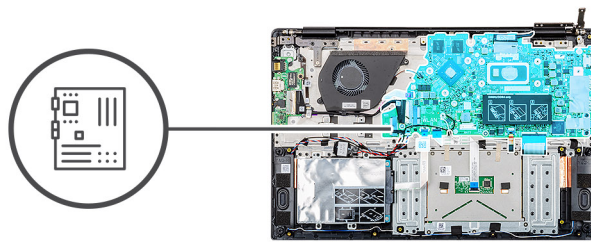
Prerequisites

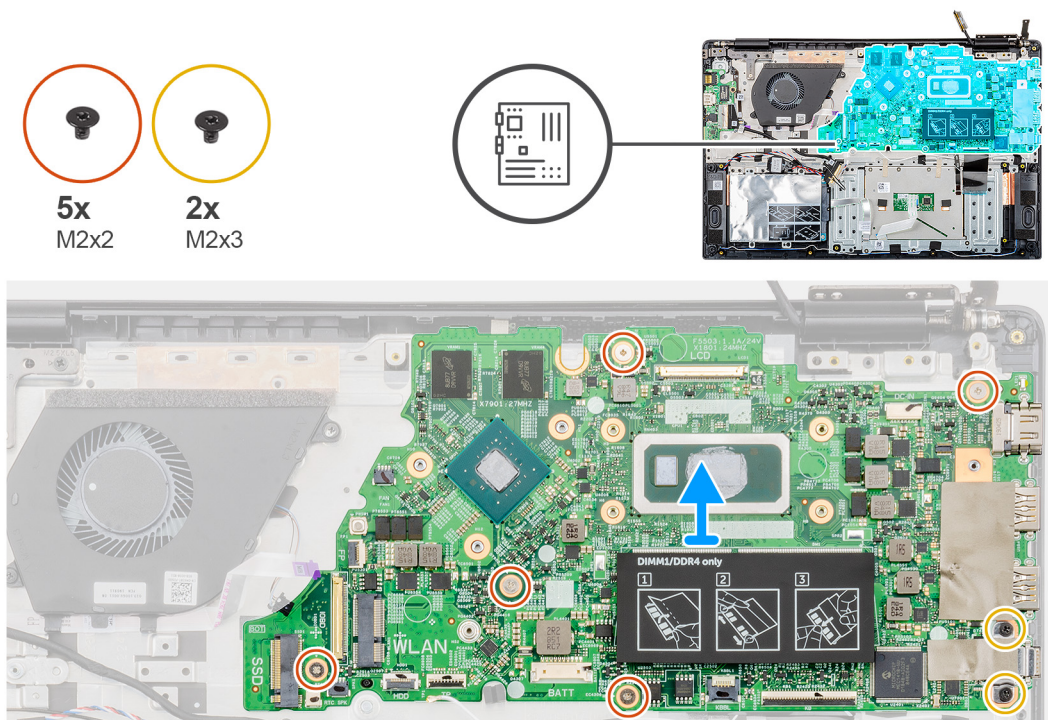
NOTE: The system board is removed and installed with the heat sink attached, when replacing the palm-rest and keyboard assembly. This simplifies the procedure and avoids breaking the thermal bond between system board and the heat sink.

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [solid-state drive/Intel Optane memory](#).
5. Remove the [memory module](#).
6. Remove the [wireless card](#).
7. Remove the [heat sink \(for integrated graphics\)](#) or the [heat sink \(for discrete graphics\)](#).
8. Remove the [display assembly](#).

About this task

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





Steps

1. Open the latch and disconnect the I/O-board cable from the system board.
2. Open the latch and disconnect the power-adaptor port cable from the system board.
3. Disconnect the coin-cell battery cable and the speaker cable from the system board.
4. Open the respective latches and disconnect the hard-drive cable, the touchpad cable, the keyboard-backlight cable, and the keyboard cable from their connectors on the system board.
5. Remove the five screws (M2x2) and the two screws (M2x3) that secure the system board to the palm-rest and keyboard assembly.
6. Lift the system board off the palm-rest and keyboard assembly.

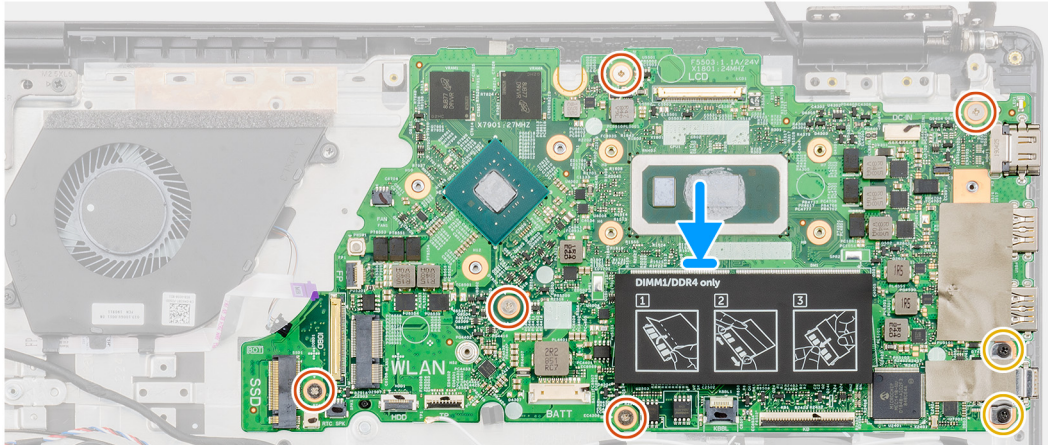
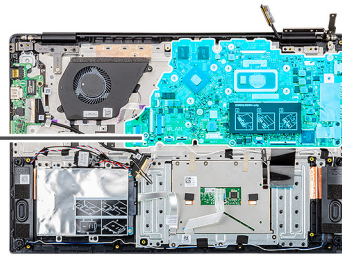
Installing the system board

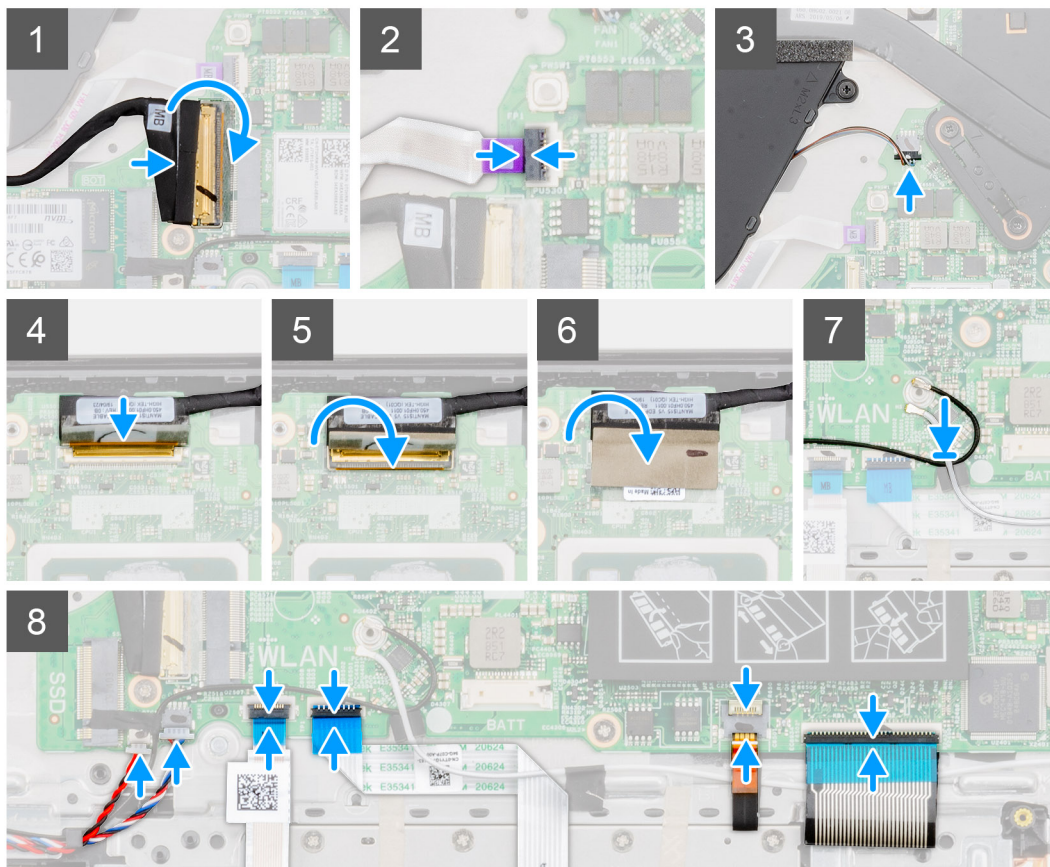
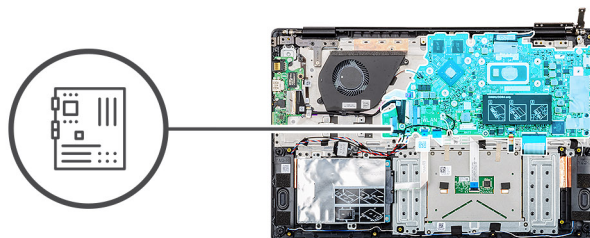
Prerequisites

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

About this task

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





Steps

1. Align the screw holes on the system board with the screw holes on the palm-rest and keyboard assembly.
2. Replace the five screws (M2x2) and the two screws (M2x3) that secure the system board to the palm-rest and keyboard assembly.
3. Connect the hard-drive cable, the touchpad cable, the keyboard-backlight cable, and the keyboard cable to their respective connectors on the system board and close the respective latches.
4. Connect the coin-cell battery cable and the speaker cable to the connectors on the system board.
5. Connect the power-adaptor port cable to the system board and close the latch.
6. Connect the I/O-board cable to the system board and close the latch.

Next steps

1. Install the [display assembly](#).
2. Install the [heat sink \(for integrated graphics\)](#) or the [heat sink \(for discrete graphics\)](#).
3. Install the [wireless card](#).
4. Install the [memory module](#).
5. Install the [solid-state drive/Intel Optane memory](#).
6. Install the [battery](#).
7. Install the [base cover](#).
8. Follow the procedure in [After working inside your computer](#).

Palm-rest and keyboard assembly

Removing the palm-rest and keyboard assembly

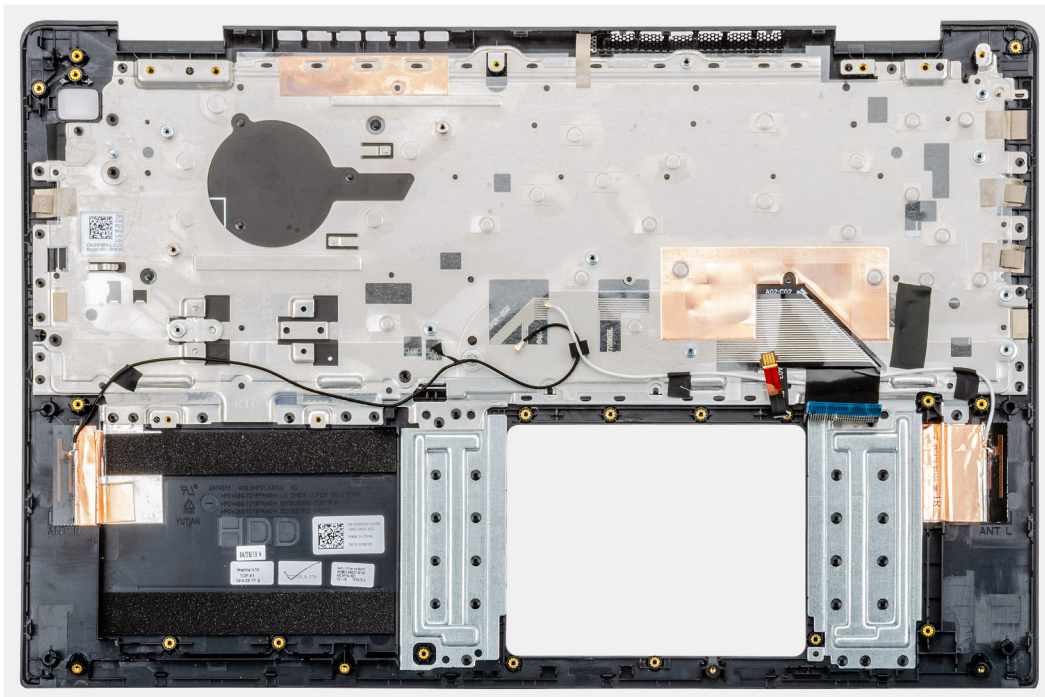
Prerequisites

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 [hard-drive assembly](#).
6. Remove the [solid-state drive/Intel Optane memory](#).
7. Remove the [wireless card](#).
8. Remove the [I/O board](#).
9. Remove the [touchpad](#).
10. Remove the [fan](#).
11. Remove the [display assembly](#).
12. Remove the [coin-cell battery](#).
13. Remove the [speakers](#).
14. Remove the [power-adapter port](#).
15. Remove the [power-button board](#) or the [power-button with fingerprint reader](#).
16. Remove the [system board](#).

NOTE: The system board is removed and installed with the heat sink attached, when replacing the palm-rest and keyboard assembly. This simplifies the procedure and avoids breaking the thermal bond between system board and the heat sink.

About this task

After performing the preceding steps, 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 [system board](#).



NOTE: The system board is removed and installed with the heat sink attached, when replacing the palm-rest and keyboard assembly. This simplifies the procedure and avoids breaking the thermal bond between system board and the heat sink.

2. Install the [power-button board](#) or the [power-button with fingerprint reader](#).
3. Install the [power-adapter port](#).
4. Install the [speakers](#).
5. Install the [coin-cell battery](#).
6. Install the [display assembly](#).
7. Install the [fan](#).
8. Install the [touchpad](#).
9. Install the [I/O board](#).
10. Install the [wireless card](#).
11. Install the [solid-state drive/Intel Optane memory](#).
12. Install the [hard-drive assembly](#).
13. Install the [memory module](#).
14. Install the [battery](#).
15. Install the [base cover](#).
16. Follow the procedure in [After working inside your computer](#).

Device drivers

Intel Chipset Software Installation Utility

In the Device Manager, check if the chipset driver is installed.

Install the Intel chipset updates from www.dell.com/support.

Video drivers

In the Device Manager, check if the video driver is installed.

Install the video driver update from www.dell.com/support.

Intel Serial IO driver

In the Device Manager, check if the Intel Serial IO driver is installed.

Install the driver updates from www.dell.com/support.

Intel Trusted Execution Engine Interface

In the Device Manager, check if the Intel Trusted Execution Engine Interface driver is installed.

Install the driver update from www.dell.com/support.

Intel Virtual Button driver

In the Device Manager, check if the Intel Virtual Button driver is installed.

Install the driver updates from www.dell.com/support.

Wireless and Bluetooth drivers

In the Device Manager, check if the network card driver is installed.

Install the driver updates from www.dell.com/support.

In the Device Manager, check if the Bluetooth driver is installed.

Install the driver updates from www.dell.com/support.

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](#)
- [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.
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 allows 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:

- Removable Drive (if available)
- STXXXX Drive (if available)

 **NOTE: XXX denotes the SATA drive number.**

- Optical Drive (if available)
- SATA Hard Drive (if available)
- Diagnostics

 **NOTE: Choosing Diagnostics, will display the ePSA diagnostics screen.**

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	
Inspiron 5590	
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.
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	
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	
Processor Type	Displays the processor type.
Maximum Clock Speed	Displays the maximum processor clock speed.
Minimum Clock Speed	Displays the minimum processor clock speed.
Current Clock Speed	Displays the current processor clock speed.
Core Count	Displays the number of cores on the processor.

Overview

Processor ID	Displays the processor identification code.
Processor L2 Cache	Displays the processor L2 Cache size.
Processor L3 Cache	Displays the processor L3 Cache size.
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	
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 the memory size and the type of the memory module in memory-module slot 1.
DIMM_SLOT 2	Displays the memory size and the type of the memory module in memory-module slot 2.
DEVICES	
Panel Type	Displays the Panel Type of the computer.
Video Controller	Displays the integrate graphics information of the computer.
Video Memory	Displays the video memory information of the computer.
Wi-Fi Device	Displays the wireless device information of the computer.
Native Resolution	Displays the native resolution of the computer.
Video BIOS Version	Displays the video BIOS version of the computer.
Audio Controller	Displays the audio controller information of the computer.
Bluetooth Device	Displays the Bluetooth device information of the computer.

Table 4. System setup options—Boot options menu

Boot Options

Boot Mode	
Boot Mode: UEFI only	Displays the boot mode of this computer.
Enable Boot Devices	Enables or disables boot devices for this computer.
Boot Sequence	Displays the boot sequence.
Advanced Boot Options	
Enable UEFI Network Stack	Enables or disables UEFI Network Stack. Default: OFF
UEFI Boot Path Security	Enables or disables the system to prompt the user to enter the Admin password when booting a UEFI boot path from the F12 boot menu. Default: Always Except Internal HDD
BIOS Setup Advanced Mode	Enables or disables advanced BIOS settings. Default: ON

Table 5. System setup options—System Configuration menu

System Configuration	
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.
Storage Interface	
Port Enablement	Enables or disables the SATA-0 and the M.2 PCIe SSD-0/SATA-2 drives. Default (SATA-0): ON Default (M.2 PCIe SSD-0/SATA-2): ON
SATA Operation	Configures operating mode of the integrated SATA hard drive controller (only for computers shipped with hard drive). Default: RAID. SATA is configured to support RAID (Intel Rapid Restore Technology).
Drive Information	Displays the information of various onboard drives.
Enable SMART Reporting	Enables or disables SMART (Self-Monitoring, Analysis, and Reporting Technology) during computer startup to report hard drive errors (only for computers shipped with hard drive). Default: OFF
Enable Audio	Enables or disables all integrated audio controller. Default: ON
USB Configuration	
Enable Boot Support	Enables or disables booting from USB mass storage devices such as external hard drive, optical drive, and USB drive.
Enable External USB Ports	Enables or disables USB ports to be functional in an operating system environment.
Miscellaneous Devices	
Enable Camera	Enables or disables the camera. Default: ON
Keyboard Illumination	Configures the operating mode of the keyboard illumination feature. Default: Disabled. The keyboard illumination will always be off.
Keyboard Backlight Timeout on AC	Configures the timeout value for the keyboard when an AC adapter is connected to the computer. The keyboard backlight timeout value is only effect when the backlight is enabled. Default: 10 seconds
Keyboard Backlight Timeout on Battery	Configures the timeout value for the keyboard when the computer is running on battery. The keyboard backlight timeout value is only effect when the backlight is enabled. Default: 10 seconds

Table 6. System setup options—Video menu

Video	
LCD 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.

Table 7. System setup options—Security menu

Security

Enable Admin Setup Lockout	Enables or disables the user from entering BIOS Setup when an Admin Password is set. Default: OFF
Password Bypass	Bypass the System (Boot) Password and the internal hard drive password prompts during a system restart (only for computers shipped with hard drive). Default: Disabled
Enable Non-Admin Password Changes	Enables or disables the user to change the system and hard drive password without the need for admin password. Default: ON
Non-Admin Setup Changes	
Allow Wireless Switch Changes	Enables or disables changes to the setup option when an Administrator password is set. Default: OFF.
Enable UEFI Capsule Firmware Updates	Enables or disables BIOS updates through UEFI capsule update packages.
Absolute	Enables, disables, or permanently disables the BIOS module interface of the optional Absolute Persistence Module service from Absolute Software. Default: Enable Absolute
SMM Security Mitigation	Enables or disables additional UEFI SMM Security Mitigation protections. Default: OFF NOTE: This feature may cause compatibility issues or loss of functionality with some legacy tools and applications.
Enable Strong Passwords	Enables or disables strong passwords. Default: OFF
Intel Platform Trust Technology On	Enables or disables Platform Trust Technology (PTT) visibility to the operating system. Default: ON
PPI Bypass for Clear Commands	Enables or disables the operating system to skip BIOS Physical Presence Interface (PPI) user prompts when issuing the Clear command. Default: OFF
Clear	Enables or disables the computer to clear the PTT owner information, and returns the PTT to the default state. Default: OFF
Intel SGX	Enables or disables the Intel Software Guard Extensions (SGX) to provide a secured environment for running code/storing sensitive information. Default: Software Control

Table 8. System setup options—Secure Boot menu

Secure Boot

Secure Boot

Secure Boot

Enable Secure Boot	Enables or disables the computer to boot using only validated boot software. Default: OFF NOTE: For Secure Boot to be enabled, the computer needs to be in UEFI boot mode and the Enable Legacy Option ROMs option needs to be turned off.
Secure Boot Mode	Selects the Secure Boot operation mode. Default: Deployed Mode NOTE: Deployed Mode should be selected for normal operation of Secure Boot.

Table 9. System setup options—Expert Key Management menu

Expert Key Management

Expert Key Management	
Enable Custom Mode	Enables or disables the keys in the PK, KEK, db, and dbx security key databases to be modified. Default: OFF
Custom Mode Key Management	Selects the custom values for expert key management. Default: PK

Table 10. System setup options—Performance menu

Performance

Multi-Core Support	
Active Cores	Changes the number of CPU cores available to the operating system. The default value is set to the maximum number of cores. Default: All Cores
Intel SpeedStep	
Enable Intel SpeedStep Technology	Enables or disables the Intel SpeedStep Technology to dynamically adjust processor voltage and core frequency, decreasing average power consumption and heat production. Default: ON
Enable C-State Control	Enables or disables the CPU's ability to enter and exit low-power states. Default: ON
Intel TurboBoost Technology	
Enable Intel Turbo Boost Technology	Enables or disables the Intel TurboBoost mode of the processor. If enabled, the Intel TurboBoost driver increases the performance of the CPU or graphics processor. Default: ON
Intel Hyper-Threading Technology	
Enable Intel Hyper-Threading Technology	Enables or disables the Intel Hyper-Threading Technology to use processor resources more efficiently. Default: ON

Table 11. System setup options—Power Management menu

Power Management	
Wake on AC	Enables the computer to turn on and go to boot when AC power is supplied to the computer. Default: OFF
Enable USB Wake Support	Enables the USB devices to wake the computer from Standby mode. Default: OFF
Wake on Dell USB-C Dock	Enables the computer to wake from Standby when it is connected to a Dell USB-C dock. Default: ON
Auto On Time	Enables the computer to automatically power on for defined days and times. Default: Disabled. The system will not automatically power up.
Block Sleep	Blocks the computer from entering Sleep (S3) mode in the operating system. Default: OFF 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.
Battery Charge Configuration	Enables the computer to run on battery during power usage hours. Use the below options to prevent AC power usage between certain times of each day. Default: Adaptive. Battery settings are adaptively optimized based on your typical battery usage pattern.
Enable Advanced Battery Charge Configuration	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. Default: OFF
Enable Intel Speed Shift Technology	Enables or disables Intel Speed Shift Technology support which enables the operating system to select the appropriate processor performance automatically. Default: ON
Lid Behavior	
System input while lid closed (Keyboard, Touchpad)	Enables or disables system input while the lid is closed (to prevent accidental input from the keyboard or the touchpad when the lid is closed). Default: OFF
Power On Lid Open	Enables the computer to power up from the off state whenever the lid is opened. Default: ON

Table 12. System setup options—Wireless menu

Wireless	
Wireless Device Enable	Enables or disables internal WLAN/Bluetooth devices.
WLAN	Default: ON
Bluetooth	Default: ON

Table 13. System setup options—POST Behavior menu

POST Behavior


Enable Adapter Warnings	Enables the computer to display adapter warning messages during boot. Default: ON
Fastboot	Configures the speed of the UEFI boot process. Default: Thorough. Performs complete hardware and configuration initialization during boot.
Extend BIOS POST Time	Configures the BIOS POST (Power-On Self-Test) load time. Default: 0 seconds
Full Screen Logo	Enabled or disabled the computer to display full screen logo if the image match screen resolution. Default: OFF
Numlock Enable	
Numlock Enable	Enables or disables Numlock when the computer boots. Default: ON
Fn Lock	Enables or disables the Fn lock mode. Default: ON
Lock Mode	Default: Lock Mode Secondary. Lock Mode Secondary = If this option is selected, the F1-F12 keys scan the code for their secondary functions.
Warnings and Errors	Selects an action on encountering a warning or error during boot. Default: Prompt on Warnings and Errors. Stop, prompt and wait for user input when warnings or errors are detected.
 NOTE: Errors deemed critical to the operation of the computer hardware will always halt the computer.	

Table 14. System setup options—Virtualization menu

Virtualization

Intel Virtualization Technology	
Enable Intel Virtualization Technology (VT)	Enables or disables the computer to run a virtual machine monitor (VMM). Default: ON
VT for Direct I/O	Enables the computer to perform Virtualization Technology for Direct I/O (VT-d). VT-d is an Intel method that provides virtualization for memory map I/O. Default: ON

Table 15. System setup options—Maintenance menu

Maintenance

Asset Tag	
Asset Tag	Creates a system Asset Tag that can be used by an IT administrator to uniquely identify a particular system. Once set in BIOS, the Asset Tag cannot be changed.
Service Tag	Displays the Service Tag of the computer.

Maintenance

BIOS Recovery from Hard Drive	Enables the computer to recover from a bad BIOS image, as long as the Boot Block portion is intact and functioning. Default: ON NOTE: BIOS recovery is designed to fix the main BIOS block and cannot work if the Boot Block is damaged. In addition, this feature cannot work in the event of EC corruption, ME corruption, or a hardware issue. The recovery image must exist on an unencrypted partition on the drive (only for computers shipped with hard drive).
BIOS Auto-Recovery	Enables the computer to automatically recover the BIOS without user actions. This feature requires BIOS Recovery from Hard Drive to be set to Enabled. Default: OFF
Start Data Wipe	CAUTION: This Secure Wipe Operation will delete information in a way that it cannot be reconstructed. If enabled, the BIOS will queue up a data wipe cycle for storage devices that are connected to the motherboard on the next reboot. Default: OFF
Allow BIOS Downgrade	Controls flashing of the system firmware to previous revisions. Default: ON

Table 16. System setup options—System Logs menu

System Logs

Power Event Log	
Clear POWER Event Log	Selects an option to keep or clear the POWER Event log. Default: Keep
BIOS Event Log	
Clear Bios Event Log	Selects an option to keep or clear the Bios Event log. Default: Keep
Thermal Event Log	
Clear Thermal Event Log	Selects an option to keep or clear the Thermal Event log. Default: Keep

Table 17. System setup options—SupportAssist menu

SupportAssist

Dell Auto operating system Recovery Threshold	Controls the automatic boot flow for SupportAssist System Resolution Console and for Dell operating system Recovery tool. Default: 2
SupportAssist OS Recovery	Enables or disables the boot flow for SupportAssist operating system Recovery tool in the even of certain system errors. Default: ON
BIOSConnect	Enables or disables attempting cloud Service OS recovery. Default: ON


System and setup password

Table 18. 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 re-boot.

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/or 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/or Setup password, confirm the deletion when prompted.
5. Press Esc and a message prompts you to save the changes.
6. Press Y to save the changes and exit from System Setup.
The computer reboot.

Clearing CMOS settings

About this task

 **CAUTION:** Clearing CMOS settings will reset the BIOS settings on your computer.


Steps

1. Remove the [base cover](#).
2. Disconnect the battery cable from the system board.
3. Remove the [coin-cell battery](#).
4. Wait for one minute.
5. Replace the [coin-cell battery](#).
6. Connect the battery cable to the system board.
7. Replace the [base cover](#).

Clearing BIOS (System Setup) and System passwords

About this task

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

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

Troubleshooting

Enhanced Pre-Boot System Assessment (ePSA) diagnostics

About this task

The ePSA diagnostics (also known as system diagnostics) performs a complete check of your hardware. The ePSA 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.

Running the ePSA diagnostics

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.

Table 19. LED codes

Diagnostic light codes	Problem description
2,1	Processor failure
2,2	System board: BIOS or ROM (Read-Only Memory) failure
2,3	No memory or RAM (Random-Access Memory) detected
2,4	Memory or RAM (Random-Access Memory) failure
2,5	Invalid memory installed
2,6	System-board or chipset error
2,7	Display failure
2,8	LCD power rail failure. Replace the system board.
3,1	Coin-cell battery failure
3,2	PCI, video card/chip failure
3,3	Recovery image not found
3,4	Recovery image found but invalid
3,5	Power-rail failure
3,6	System BIOS Flash incomplete
3,7	Management Engine (ME) error

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 10 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/support.

Flashing BIOS (USB key)

Steps

1. Follow the procedure from step 1 to step 7 in "[Flashing the BIOS](#)" to download the latest BIOS setup program file.
2. Create a bootable USB drive. For more information see the knowledge base article [SLN143196](#) 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** when the Dell logo is displayed on the screen.
6. Boot to the USB drive from the **One Time Boot Menu**.
7. Type the BIOS setup program filename and press **Enter**.
8. The **BIOS Update Utility** appears. Follow the instructions on the screen to complete the BIOS update.


Flashing the BIOS

About this task

You may need to flash (update) the BIOS when an update is available or when you replace the system board.


Follow these steps to flash the BIOS:

Steps

1. Turn on your computer.
2. Go to www.dell.com/support.
3. Click **Product support**, 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 > Find it myself**.
5. Select the operating system installed on your computer.
6. Scroll down the page and expand **BIOS**.
7. Click **Download** to download the latest version of the BIOS for your computer.
8. After the download is complete, navigate to the folder where you saved the BIOS update file.
9. Double-click the BIOS update file icon and follow the instructions on the screen.

Enabling Intel Optane memory

Steps

1. On the taskbar, click the search box, and then type `Intel Rapid Storage Technology`.
2. Click **Intel Rapid Storage Technology**.
The **Intel Rapid Storage Technology** window is displayed.
3. On the **Status** tab, click **Enable** to enable the Intel Optane memory.
4. On the warning screen, select a compatible fast drive, and then click **Yes** to continue enabling Intel Optane memory.
5. Click **Intel Optane memory > Reboot** to complete enabling your Intel Optane memory.
 **NOTE:** Applications may take up to three subsequent launches after enablement to see the full performance benefits.

Disabling Intel Optane memory


About this task

 **CAUTION:** After disabling Intel Optane memory, do not uninstall the driver for Intel Rapid Storage Technology as it will result in a blue screen error. The Intel Rapid Storage Technology user interface can be removed without uninstalling the driver.

 **NOTE:** Disabling Intel Optane memory is required before removing the SATA storage device accelerated by the Intel Optane memory module from the computer.

Steps

1. On the taskbar, click the search box, and then type `Intel Rapid Storage Technology`.

2. Click **Intel Rapid Storage Technology**.
The **Intel Rapid Storage Technology** window is displayed.
3. On the **Intel Optane memory** tab, click **Disable** to disable the Intel Optane memory.
 **NOTE:** For computers in which Intel Optane memory acts as a primary storage, do not disable the Intel Optane memory. The Disable option will be grayed out.
4. Click **Yes** if you accept the warning.
The disabling progress is displayed.
5. Click **Reboot** to complete disabling your Intel Optane memory and restart your computer.

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 and contacting Dell

Self-help resources


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


Table 20. Self-help resources

Self-help resources	Resource location
Information about Dell products and services	www.dell.com
Tips	
Dell Help & Support app  NOTE: Availability varies by country.	
My Dell app  NOTE: Availability varies by country.	
Accessing help  NOTE: Availability varies by country.	In Windows search, type Help & Support, and press Enter.
Contact Support  NOTE: Availability varies by country.	In Windows search, type Contact Support, and press Enter.
Online help for operating system	www.dell.com/support/windows
Troubleshooting information, user manuals, setup instructions, product specifications, technical help blogs, drivers, software updates, and so on.	www.dell.com/support
Dell knowledge base articles for a variety of computer concerns.	<ol style="list-style-type: none"> 1. Go to www.dell.com/support. 2. Type the subject or keyword in the Search box. 3. Click Search to retrieve the related articles.
Learn and know the following information about your product: <ul style="list-style-type: none"> • Product specifications • Operating system • Setting up and using your product • Data backup • Troubleshooting and diagnostics • Factory and system restore • BIOS information 	<p>See <i>Me and My Dell</i> at www.dell.com/support/manuals.</p> <p>To locate the <i>Me and My Dell</i> relevant to your product, identify your product through one of the following:</p> <ul style="list-style-type: none"> • Select Detect Product. • Locate your product through the drop-down menu under View Products. • Enter the Service Tag number or Product ID in the search bar.

Contacting Dell

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

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

 **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.**