Vostro 7590

Service Manual

Regulatory Model: P83F
Regulatory Type: P83F001

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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1

Working on your computer

Safety instructions

Prerequisite

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 the following conditions exist:

- You have read the safety information that shipped with your computer.
- A component can be replaced or, if purchased separately, installed by performing the removal procedure in reverse order.

About this task

WARNING: 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 power source.

WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

CAUTION: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface at the same time as touching a connector on the back of the computer.

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: 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; if you are disconnecting this type of cable, press in on the locking tabs before you disconnect the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, ensure that both connectors are correctly oriented and aligned.

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

Before working inside your computer

About this task

To avoid damaging your computer, perform the following steps before you begin working inside the computer.

Steps

1 Ensure that you follow the Safety Instruction.
2 Ensure that your work surface is flat and clean to prevent the computer cover from being scratched.
3 Turn off your computer.
4 Disconnect all network cables from the computer.

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

5 Disconnect your computer and all attached devices from their electrical outlets.
6 Press and hold the power button while the computer is unplugged to ground the system board.

NOTE: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface at the same time as touching a connector on the back of the computer.

Safety precautions

The safety precautions chapter details the primary steps to be taken before performing any disassembly instructions.

Observe the following safety precautions before you perform any installation or break/fix procedures involving disassembly or reassembly:

- Turn off the system and all attached peripherals.
- Disconnect the system and all attached peripherals from AC power.
- Disconnect all network cables, telephone, and telecommunications lines from the system.
- Use an ESD field service kit when working inside any notebook to avoid electrostatic discharge (ESD) damage.
- After removing any system component, carefully place the removed component on an anti-static mat.
- Wear shoes with non-conductive rubber soles to reduce the chance of getting electrocuted.

Standby power

Dell products with standby power must be unplugged before you open the case. Systems that incorporate standby power are essentially powered while turned off. The internal power enables the system to be remotely turned on (wake on LAN) and suspended into a sleep mode and has other advanced power management features.

Unplugging, pressing and holding the power button for 15 seconds should discharge residual power in the system board. notebooks.

Bonding

Bonding is a method for connecting two or more grounding conductors to the same electrical potential. This is done through the use of a field service electrostatic discharge (ESD) kit. When connecting a bonding wire, ensure that it is connected to bare metal and never to a painted or non-metal surface. The wrist strap should be secure and in full contact with your skin, and ensure that you remove all jewelry such as watches, bracelets, or rings prior to bonding yourself and the equipment.

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

After you complete any replacement procedure, ensure that you connect any external devices, cards, and cables before turning on your computer.

Steps

1. Connect any telephone or network cables to your computer.

   CAUTION: To connect a network cable, first plug the cable into the network device and then plug it into the computer.
2. Connect your computer and all attached devices to their electrical outlets.
3. Turn on your computer.
4. If required, verify that the computer works correctly by running **ePSA diagnostics**.

2

Disassembly and reassembly

Recommended tools

The procedures in this document require the following tools:

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

NOTE: The #0 screw driver is for screws 0-1 and the #1 screw driver is for screws 2-4

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	5	
Base cover	Palm-rest and keyboard assembly	M2x5	3	
6-Cell Battery	Palm-rest and keyboard assembly	M2x4	7	
3-Cell battery	Palm-rest and keyboard assembly	M2x4	4	
Hard drive bracket **NOTE: Hard drive is available in computers shipped with 3-cell battery.**	Palm-rest and keyboard assembly	M2x4	3	
Hard drive	Hard drive bracket	M3x3	4	
Display assembly	Palm-rest and keyboard assembly	M2.5x5	6	

Component	Secured to	Screw type	Quantity	Screw image
Heat sink - UMA	System board	M2x4	4	
Heat sink - Discrete	System board	M2x4	7	
I/O board	Palm-rest and keyboard assembly	M2x3	3	
CPU fan	Palm-rest and keyboard assembly	M2x4	2	
Power-adapter port	Palm-rest and keyboard assembly	M2x4	1	
Power button and optional fingerprint reader	Palm-rest and keyboard assembly	M1.2x2	2	
GPU fan	Palm-rest and keyboard assembly	M2x4	2	
M.2 2280 PCIe solid-state drive	System board	M2x4	1	
M.2 2230 solid-state drive	Palm-rest and keyboard assembly	M2x4	1	
M.2 2280 solid-state drive	Palm-rest and keyboard assembly	M2x4	2	
USB Type-C bracket	System board	M2x5	2	
Touchpad bracket	Palm-rest and keyboard assembly	M2x3	3	
Touchpad	Palm rest and keyboard assembly	M1.6x2	2	
Wireless-card bracket	System board	M2x4	1	
System board	Palm rest and keyboard assembly	M2x4	6	

Base cover

Removing the base cover

Prerequisite

1 Follow the procedure in Before working inside your computer.

About this task

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

5x
M2x5

Steps

1 Loosen the three captive screws that secure the base cover to the palm-rest and keyboard assembly.
2 Remove the five screws (M2x5) that secure the base cover to the palm-rest and keyboard assembly.
3 Pry open the base cover from the top-center edge of the palm-rest and keyboard assembly.
4 Lift the base cover off the palm-rest and keyboard assembly.

Installing the base cover

Prerequisite

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

About this task

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

5x
M2x5

Steps

1 Place the base cover on the palm-rest and keyboard assembly, and snap the base cover into place.
2 Replace the five screws (M2x5) that secure the base cover to the palm-rest and keyboard assembly.
3 Tighten the three captive screws that secure the base cover to the palm-rest and keyboard assembly.

Next step

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, the entire system should be replaced. Contact https://www.dell.com/support for assistance and further instructions.
- Always purchase genuine batteries from https://www.dell.com or authorized Dell partners and resellers.

Removing the 6-cell battery

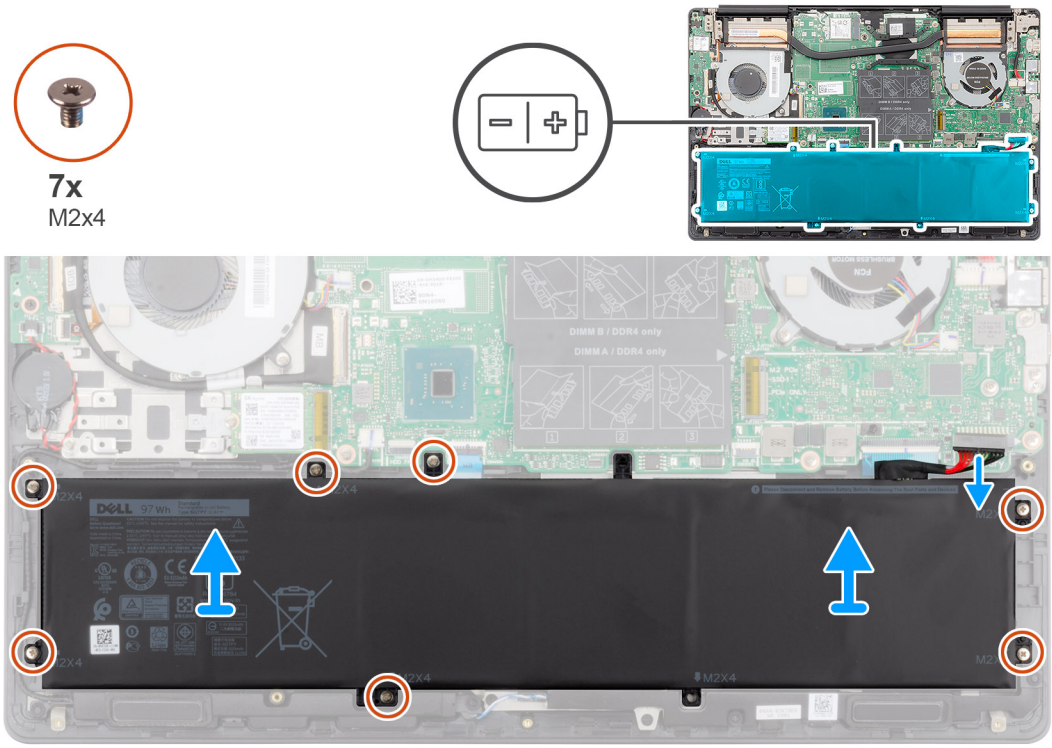
NOTE: The battery type in your computer varies depending on the configuration ordered.

Prerequisite

1 Follow the procedure in Before working inside your computer.
2 Remove the base cover.

About this task

The figure 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 seven screws (M2x4) that secure the battery to the palm-rest and keyboard assembly.

3 Lift the battery off the palm-rest and keyboard assembly.

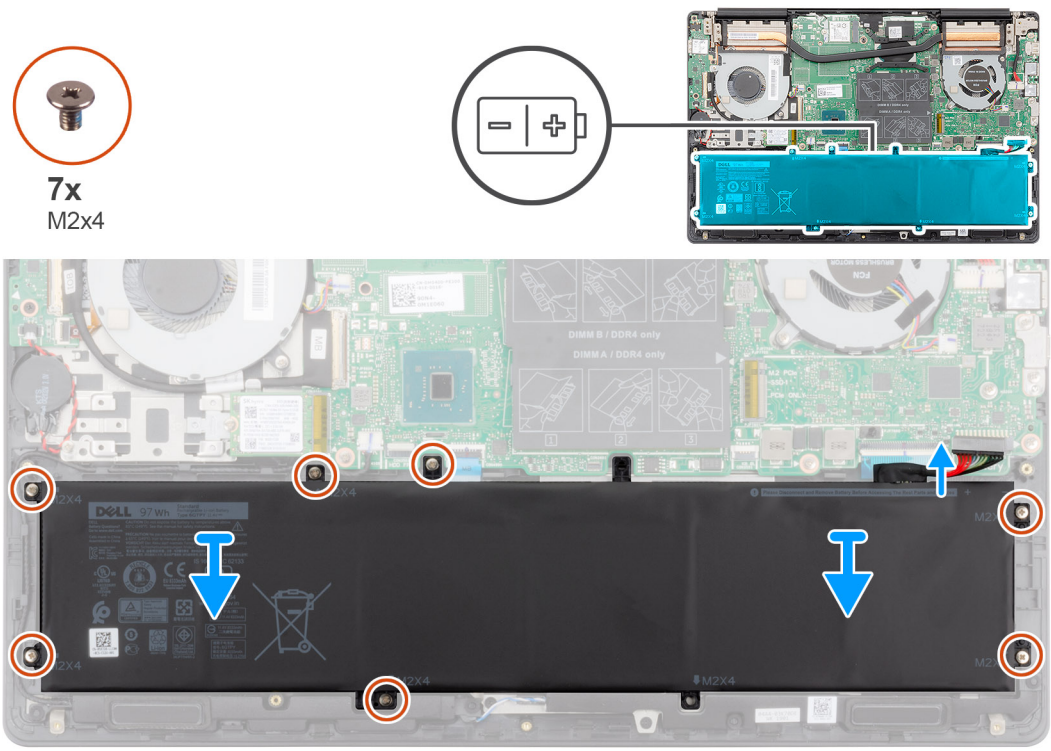
Installing the 6-cell battery

Prerequisite

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

About this task

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



Steps

1 Place the battery on the palm-rest and keyboard assembly and align the screw holes on the battery with the screw holes on the palm-rest and keyboard assembly.

2 Replace the seven screws (M2x4) to secure the battery to the system board and palm-rest and keyboard assembly.

3 Connect the battery cable to the system board.

Next steps

1 Install the base cover.

2 Follow the procedure in After working inside your computer.

Removing the 3-cell battery

NOTE: The battery type in your computer varies depending on the configuration ordered.

Prerequisite

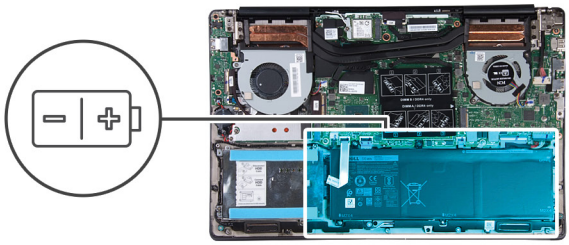
1 Follow the procedure in Before working inside your computer.

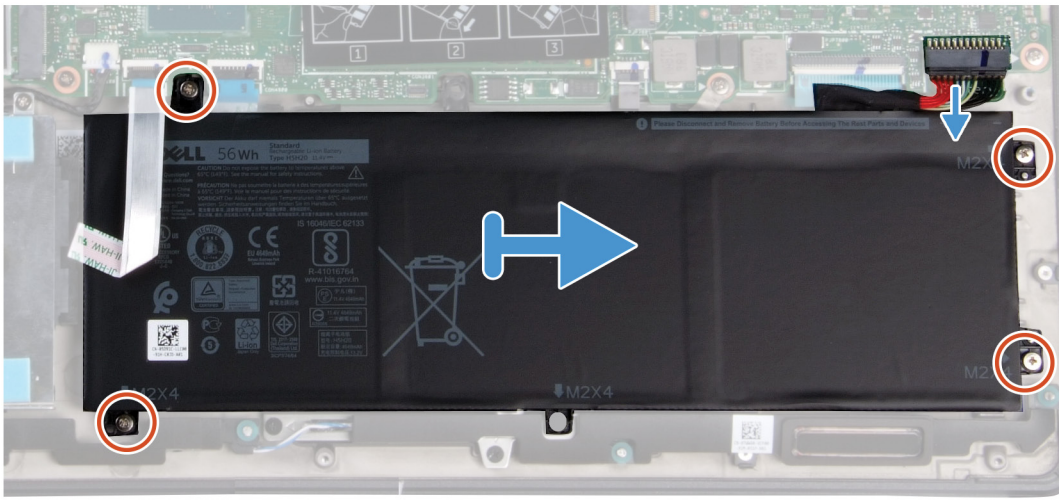
2 Remove the base cover.

About this task

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

4x
M2x4





Steps

1 Disconnect the battery cable from the system board.
2 Remove the four screws (M2x4) that secure the battery to the palm-rest and keyboard assembly.
3 Lift the battery off the palm-rest and keyboard assembly.

Installing the 3-cell battery

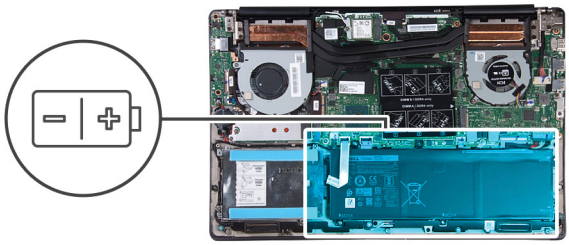
Prerequisite

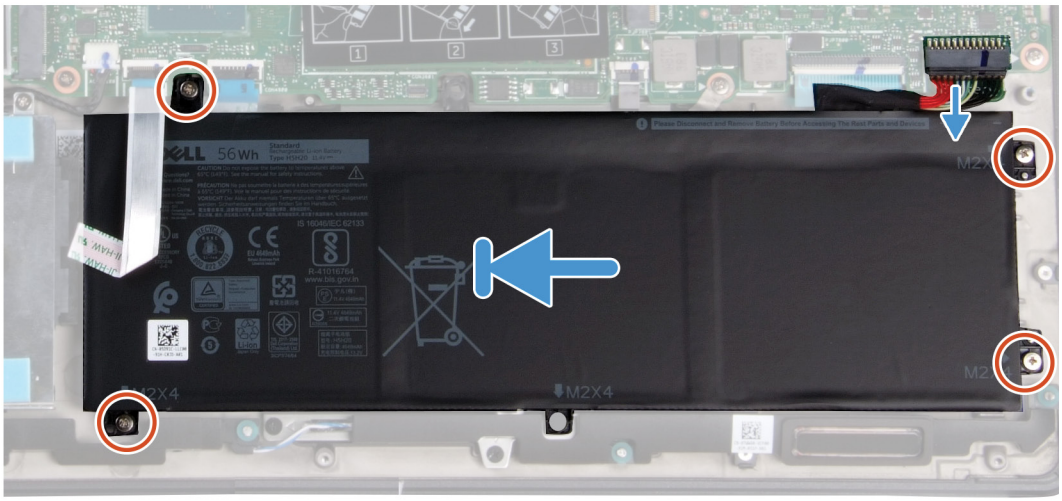
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

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

5x
M2x4





Steps

1 Place the battery on the palm-rest and keyboard assembly and align the screw holes on the battery with the screw holes on the palm-rest and keyboard assembly.

2 Install the four screws (M2x4) that secure the battery to the system board and palm-rest and keyboard assembly.

3 Connect the battery cable to the system board.

Next steps

1 Install the base cover.

2 Follow the procedure in After working inside your computer.

WLAN card

Removing the WLAN card

Prerequisites

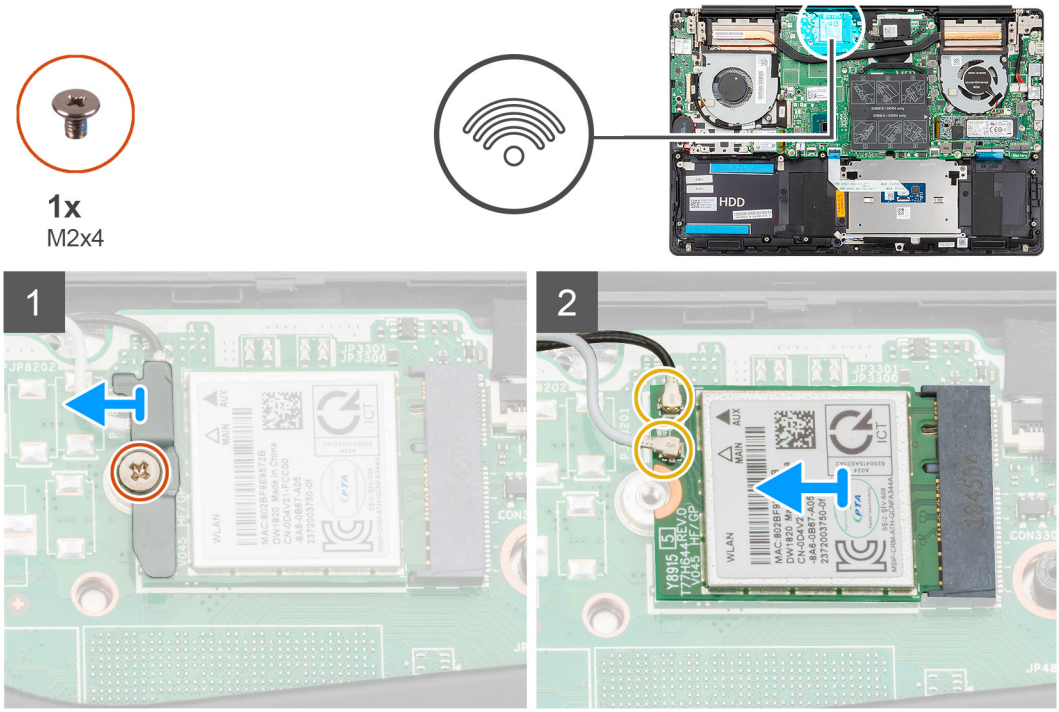
1 Follow the procedure in Before working inside your computer.

2 Remove the base cover.

3 Remove the battery.

About this task

The figure indicates the location of the WLAN card and provides a visual representation of the removal procedure.



Steps

1 Remove the screw (M2x4) that secures the WLAN card bracket to the WLAN card.
2 Remove the WLAN card bracket from the WLAN card.
3 Disconnect the antenna cables from the WLAN card.
4 Slide and remove the WLAN card from the WLAN card slot.

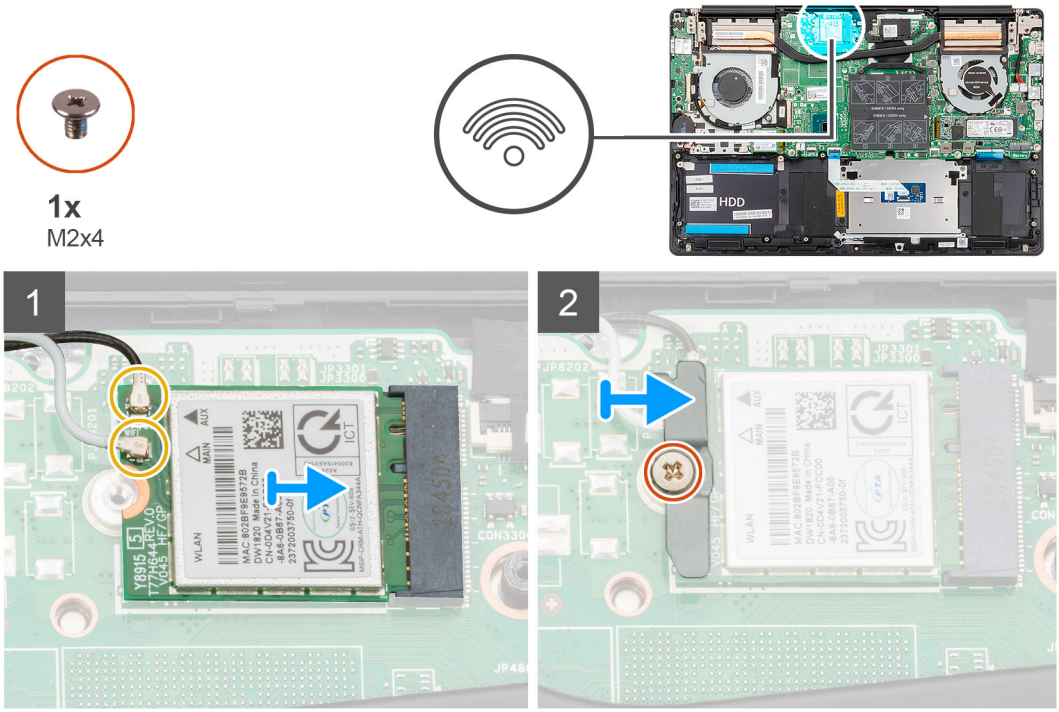
Installing the WLAN card

Prerequisite

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

About this task

The figure indicates the location of the WLAN card and provides a visual representation of the installation procedure.



Steps

1 Align the notch on the WLAN card with the tab on the WLAN card slot and insert the WLAN card at an angle into the WLAN card slot.
2 Connect the antenna cables to the WLAN card.
3 Align and place the WLAN card bracket on the WLAN card.
4 Replace the screw (M2x4) to secure the WLAN card bracket to the WLAN card.

Next step

1 Install the battery.
2 Install the base cover.
3 Follow the procedure in After working inside your computer.

Memory modules

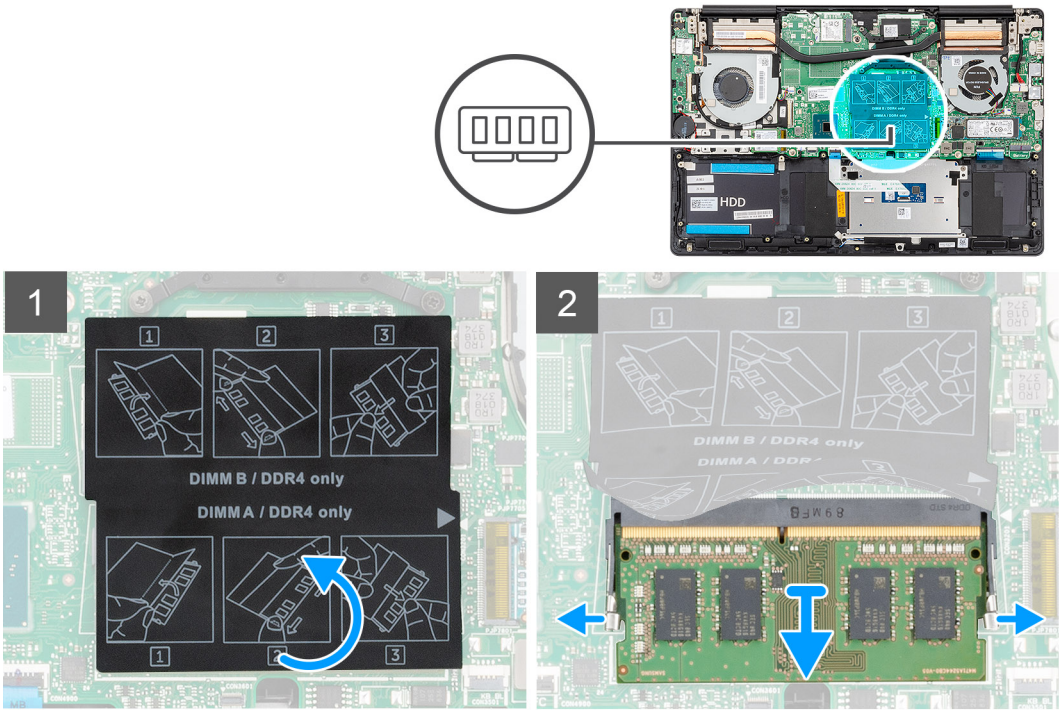
Removing the memory modules

Prerequisites

1 Follow the procedure in Before working inside your computer.
2 Remove the base cover.
3 Disconnect the battery cable.

About this task

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



Steps

1 Lift the mylar and use your fingertips to carefully spread apart the securing-clips on each end of the memory-module slot until the memory module pops up.

2 Slide and remove the memory module off the memory module slot on the system board.

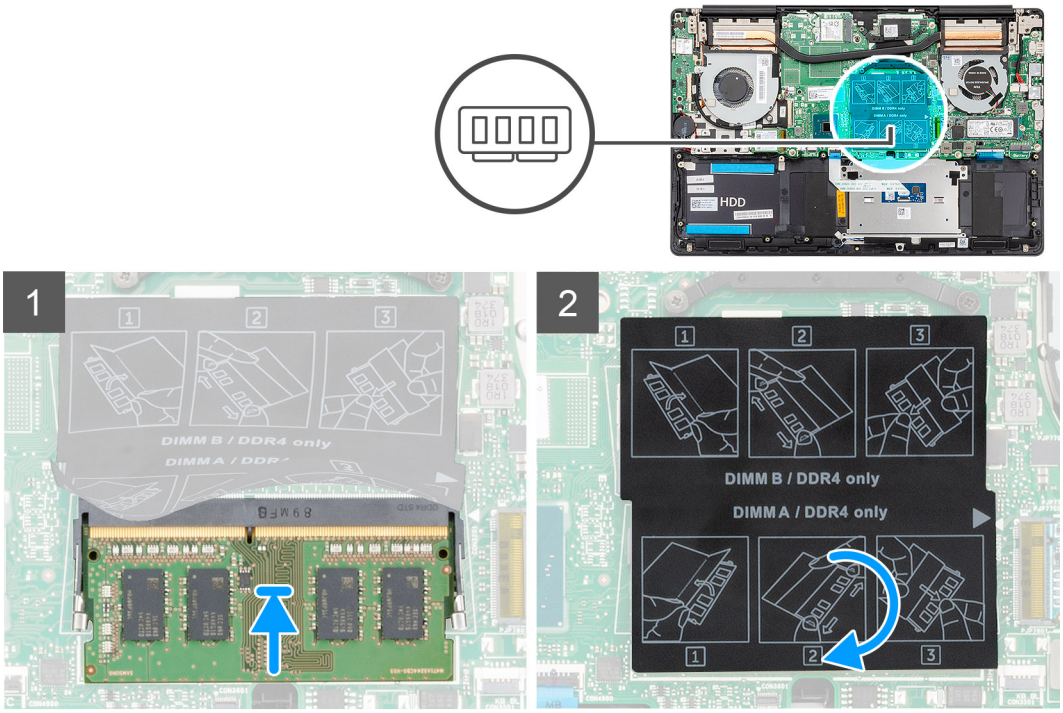
Installing the memory modules

Prerequisite

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

About this task

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



Steps

1 Lift the mylar and 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.
3 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.

Next step

1 Connect the battery cable.
2 Install the base cover.
3 Follow the procedure in After working inside your computer.

Solid-state drive

Removing the M.2 2280 solid-state drive

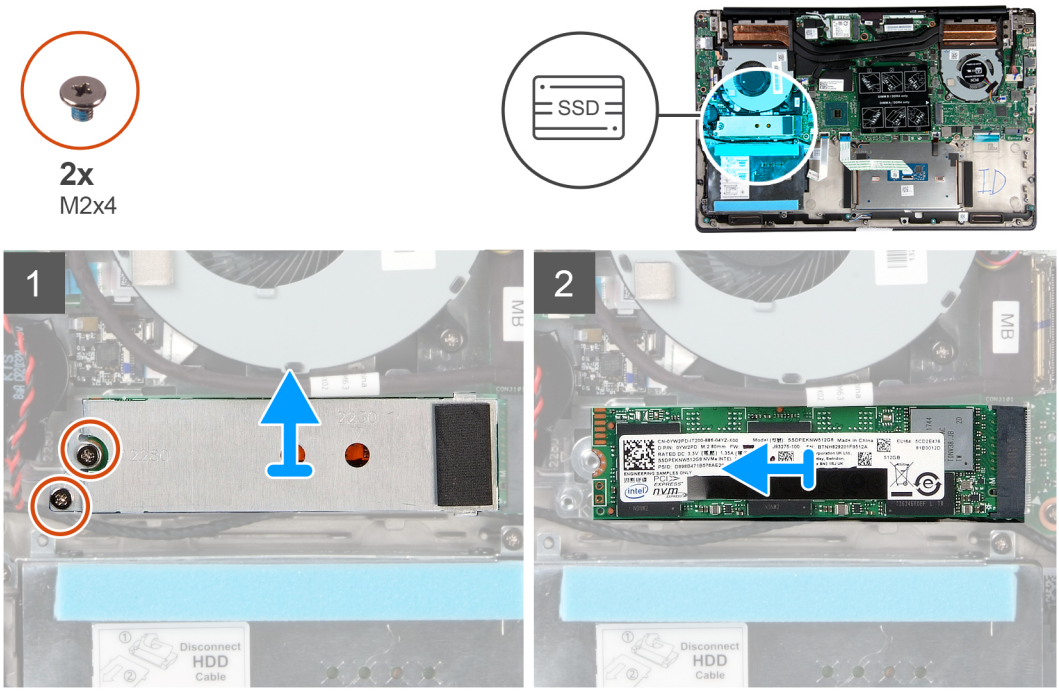
Prerequisites

1 Follow the procedure in Before working inside your computer.
2 Remove the base cover.
3 Disconnect the battery cable.

About this task

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

NOTE: The computer is shipped with solid-state drive shield only if the solid-state drive capacity is more than 512 GB.



Steps

1 Remove the two screws (M2x4) that secure the solid-state drive module shield to the palm-rest and keyboard assembly.

2 Slide and remove the solid-state drive module shield from the solid-state drive slot.

3 Slide and remove the solid-state drive module from the solid-state drive slot.

Installing the M.2 2280 solid-state drive

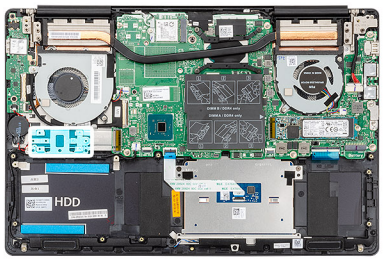
Prerequisite

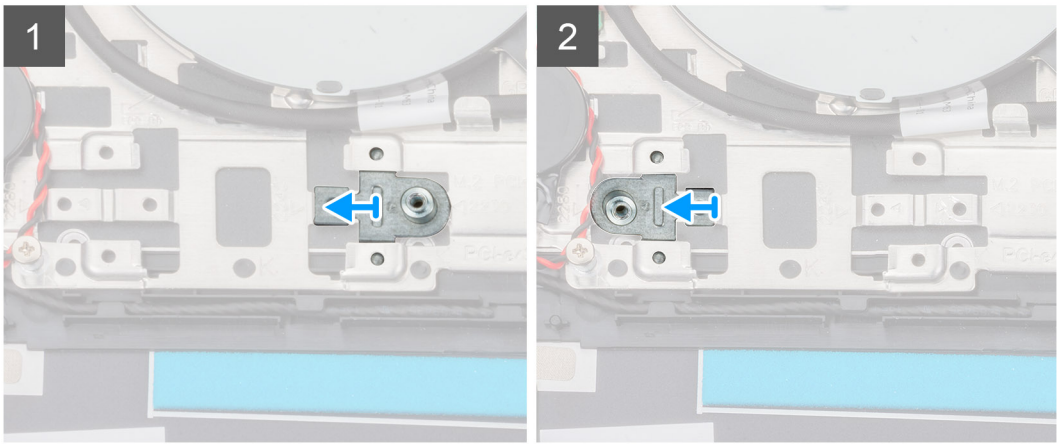
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

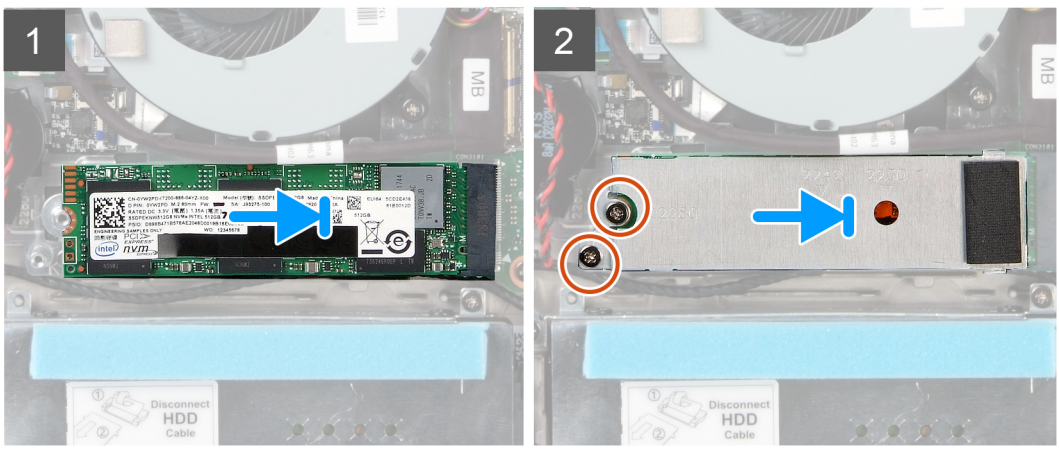
The figure indicates the location of the solid-state drive bracket and provides a visual representation of the bracket alignment procedure to accommodate the M.2 2280 solid-state drive.

NOTE: The computer is shipped with solid-state drive shield, only if the solid-state drive capacity is more than 512 GB.





The figure indicates the location of the solid-state drive and provides a visual representation of the installation procedure:



Steps

1 If required, align the solid-state drive bracket to accommodate the M.2 2280 solid-state drive.
2 Align the notch on the solid-state drive module with the tab on the solid-state drive slot.
3 Slide the solid-state drive module firmly into the solid-state drive slot at an angle.
4 Secure the tab on the solid-state drive slot with the slot on the solid-state drive bracket.
5 Replace the two screws (M2x4) that secure the solid-state drive module shield to the palm-rest and keyboard assembly.

Next step

1 Connect the battery cable.
2 Install the base cover.
3 Follow the procedure in After working inside your computer.

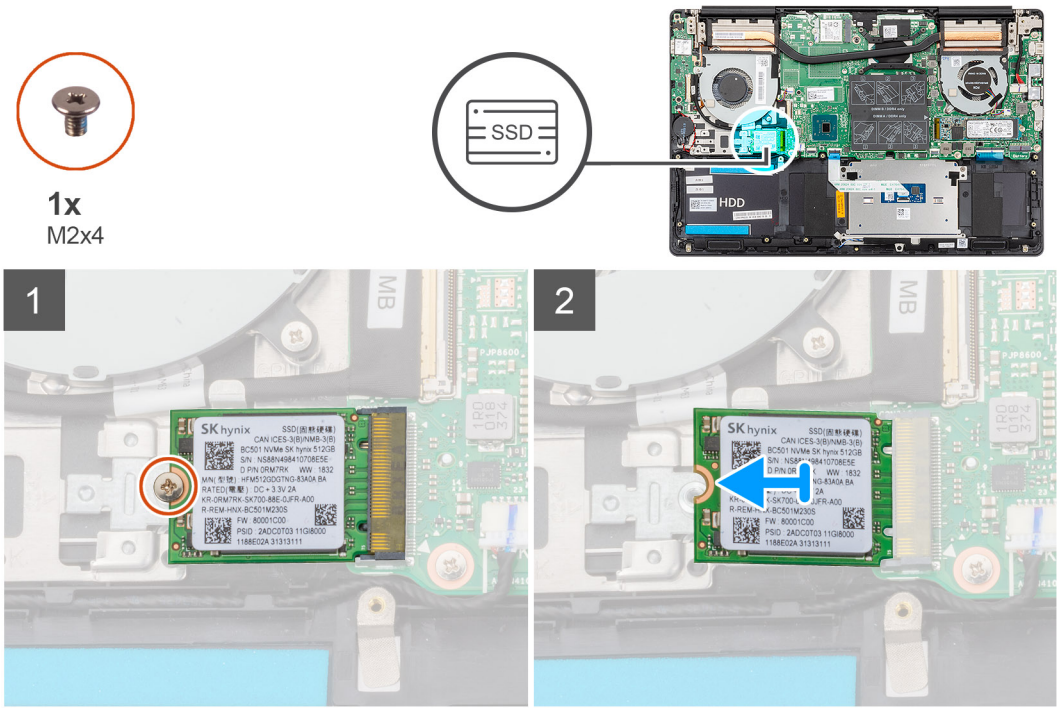
Removing the M.2 2230 solid-state drive

Prerequisites

1 Follow the procedure in Before working inside your computer.
2 Remove the base cover.
3 Disconnect the battery cable.

About this task

The figure indicates the location of the M.2 2230 solid-state drive and provides a visual representation of the removal procedure.



Steps

1 Remove the screw (M2x4) that secures the solid-state drive to the palm-rest and keyboard assembly.
2 Slide and remove the solid-state drive module from the solid-state drive slot on the system board.

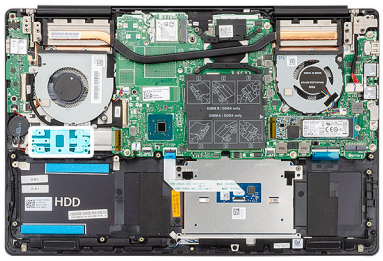
Installing the M.2 2230 solid-state drive

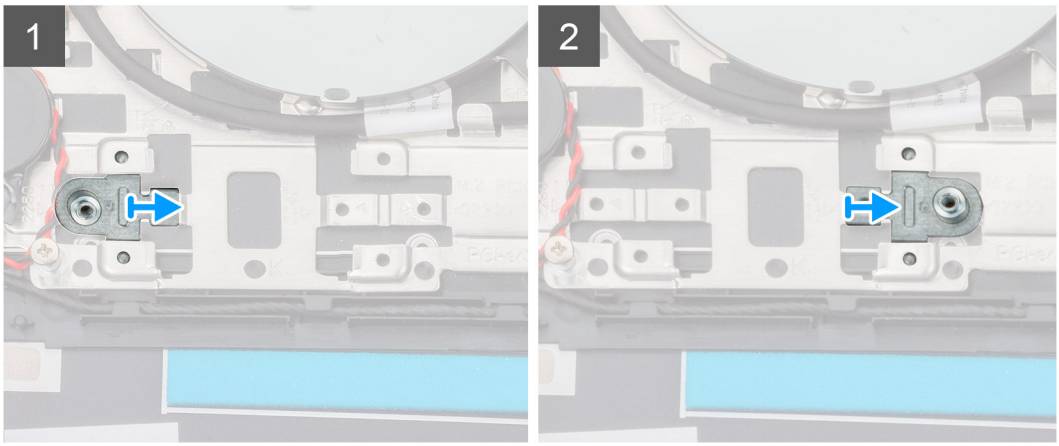
Prerequisite

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

About this task

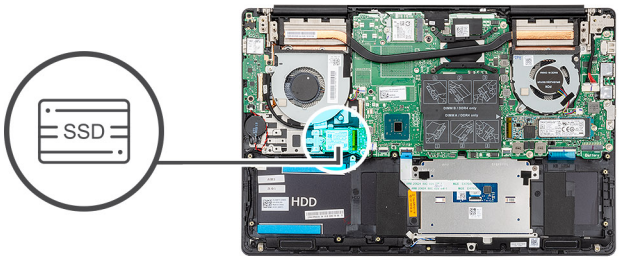
The figure indicates the location of the solid-state drive bracket and provides a visual representation of the bracket alignment procedure to accommodate the M.2 2230 solid-state drive.

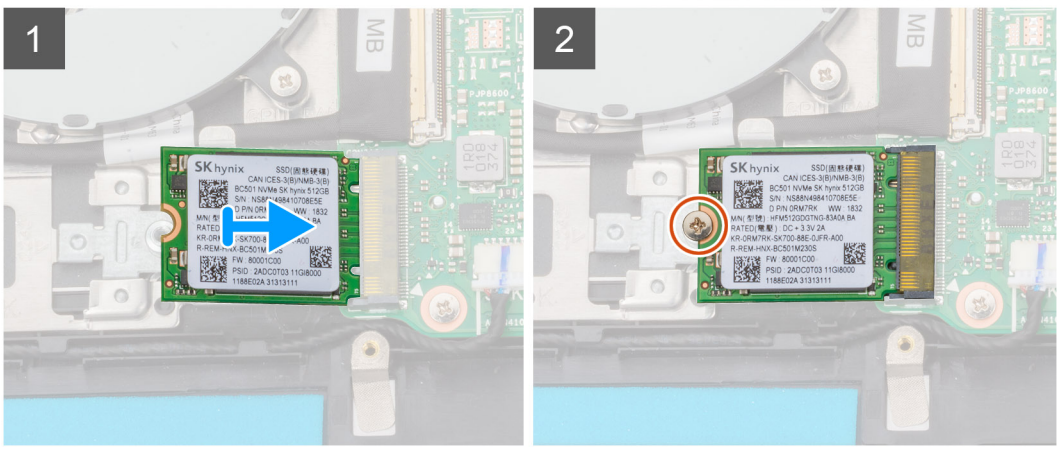




The figure indicates the location of the M.2 2230 solid-state drive and provides a visual representation of the installation procedure:

1x
M2x4





Steps

1 If required, align the solid-state drive bracket to accommodate the M.2 2230 solid-state drive.
2 Align the notch on the solid-state drive module with the tab on the solid-state drive slot.
3 Slide the solid-state drive module firmly into the solid-state drive slot at an angle.
4 Replace the screw (M2x4) that secures the solid-state drive module to the palm-rest and keyboard assembly.

Next step

1 Connect the battery cable.
2 Install the base cover.
3 Follow the procedure in After working inside your computer.

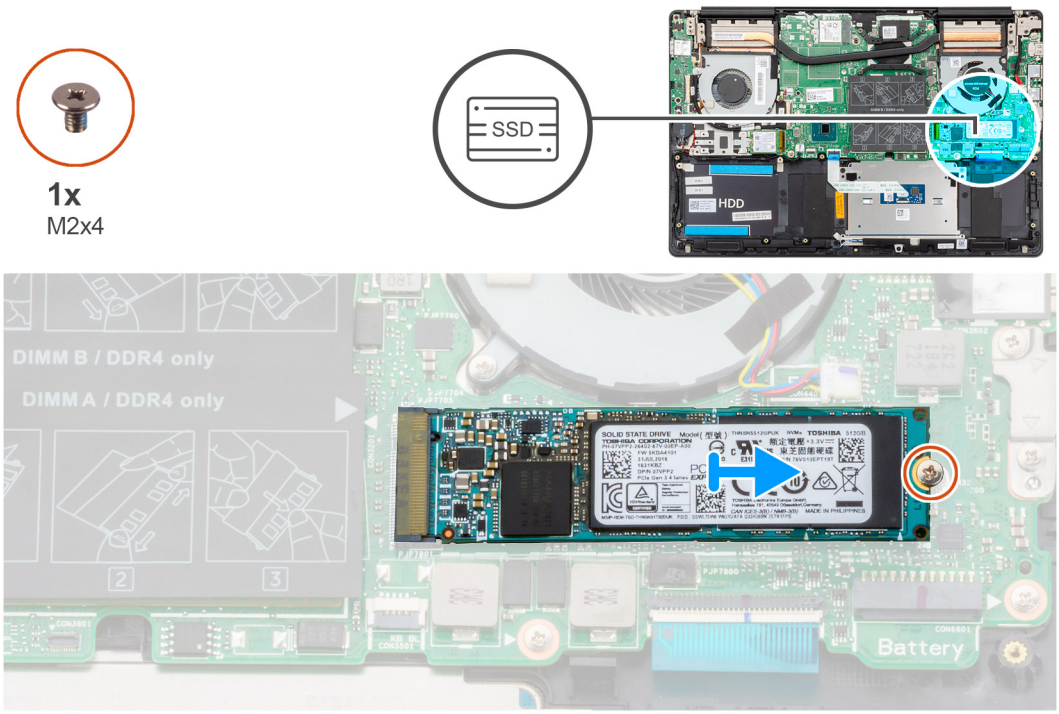
Removing the M.2 2280 PCIe solid-state drive

Prerequisites

1 Follow the procedure in Before working inside your computer.
2 Remove the base cover.
3 Disconnect the battery cable.

About this task

The figure indicates the location of the M.2 2280 PCIe solid-state drive and provides a visual representation of the removal procedure.



Steps

1 Remove the screw (M2x4) that secures the solid-state drive to the system board.
2 Slide and remove the solid-state drive module from the solid-state drive slot on the system board.

Installing the M.2 2280 PCIe solid-state drive

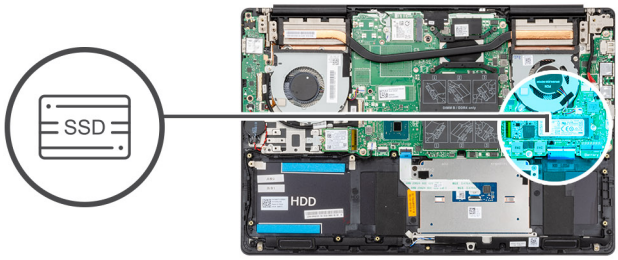
Prerequisite

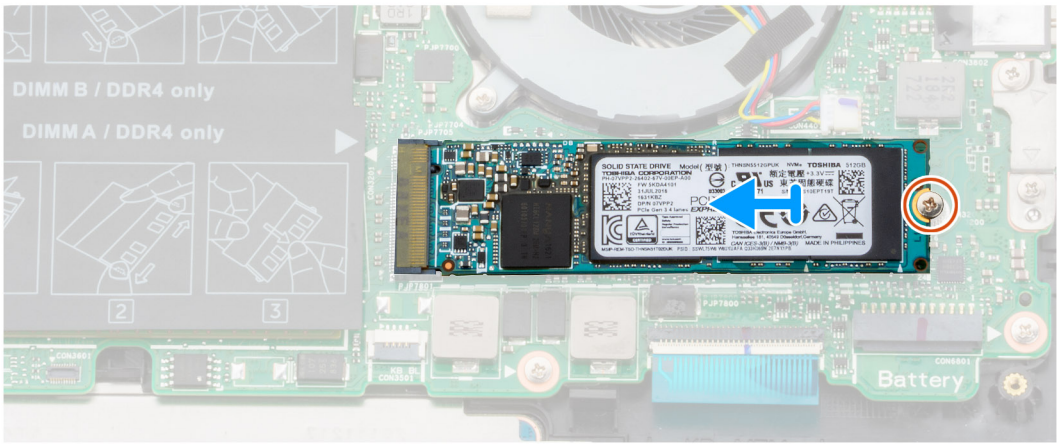
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The figure indicates the location of the M.2 2280 PCIe solid-state drive and provides a visual representation of the installation procedure:

1x
M2x4





Steps

1 Align the notch on the solid-state drive module with the tab on the solid-state drive slot.
2 Slide the solid-state drive module firmly into the solid-state drive slot at an angle.
3 Replace the screw (M2x4) that secures the solid-state drive module to the system board.

Next step

1 Connect the battery cable.
2 Install the base cover.
3 Follow the procedure in After working inside your computer.

Hard drive

Removing the hard drive

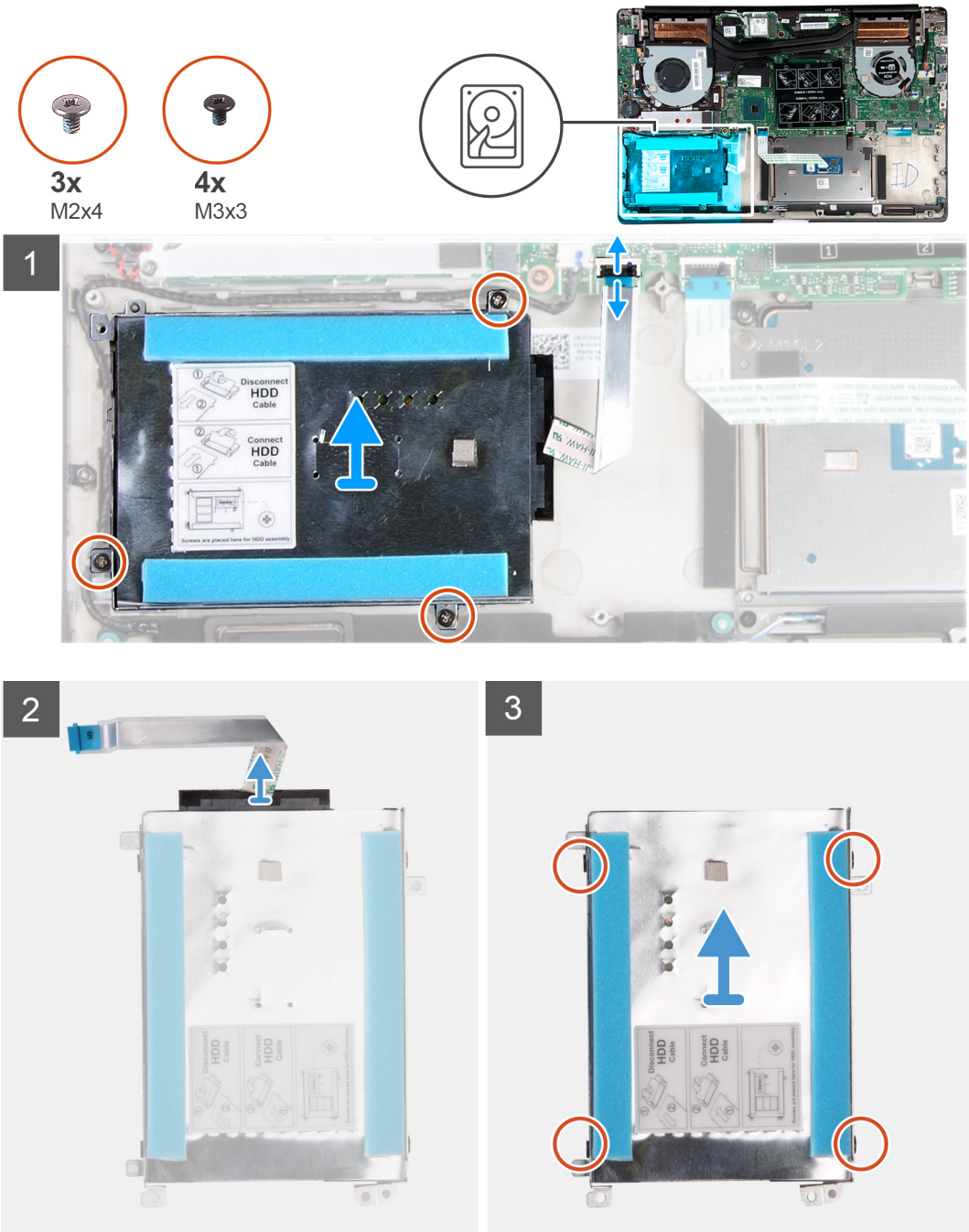
Prerequisites

1 Follow the procedure in Before working inside your computer.
2 Remove the base cover.
3 Disconnect the battery cable.

About this task

The figure indicates the location of the hard drive and provides a visual representation of the removal procedure.

NOTE: The hard drive is available only in computers shipped with 3-cell battery.



Steps

1 Open the latch and disconnect the hard-drive cable from the system board.
2 Remove the three screws (M2x4) that secure the hard-drive bracket to the palm-rest and keyboard assembly.
3 Lift the hard-drive assembly, along with its cable, off the palm-rest and keyboard assembly.
4 Disconnect the interposer from the hard-drive assembly.
5 Remove the four screws (M3x3) that secure the hard-drive bracket to the hard drive.
6 Lift the hard drive off of the hard-drive bracket.

Installing the hard drive

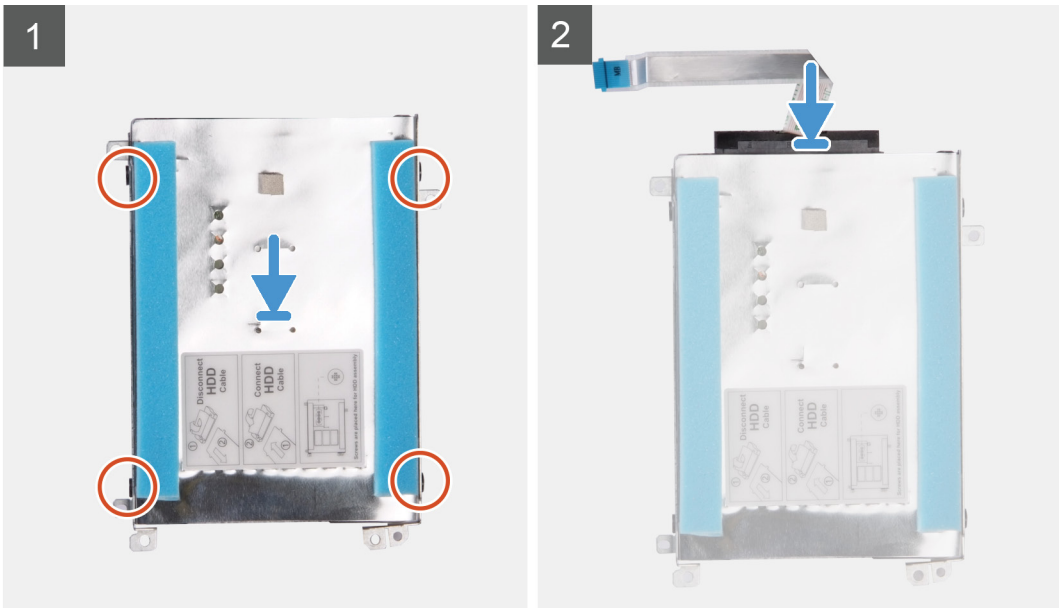
Prerequisite

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

About this task

The figure indicates the location of the hard drive and provides a visual representation of the installation procedure.

NOTE: The hard drive is available only in computers shipped with 3-cell battery.



Steps

1 Place the hard drive into the hard-drive bracket.
2 Align the screw holes on the hard-drive bracket with the screw holes on the hard drive, and then replace the four screws (M3x3) that secure the hard-drive bracket to the hard drive.
3 Connect the interposer to the hard-drive assembly.
4 Align the screw holes on the hard-drive assembly with the screw holes on the palm-rest and keyboard assembly.
5 Replace the three screws (M2x4) that secure the hard-drive assembly to the palm-rest and keyboard assembly.
6 Connect the hard-drive cable to the system board.

Next steps

1 Connect the battery cable.
2 Install the base cover.
3 Follow the procedure in After working inside your computer.

Speakers

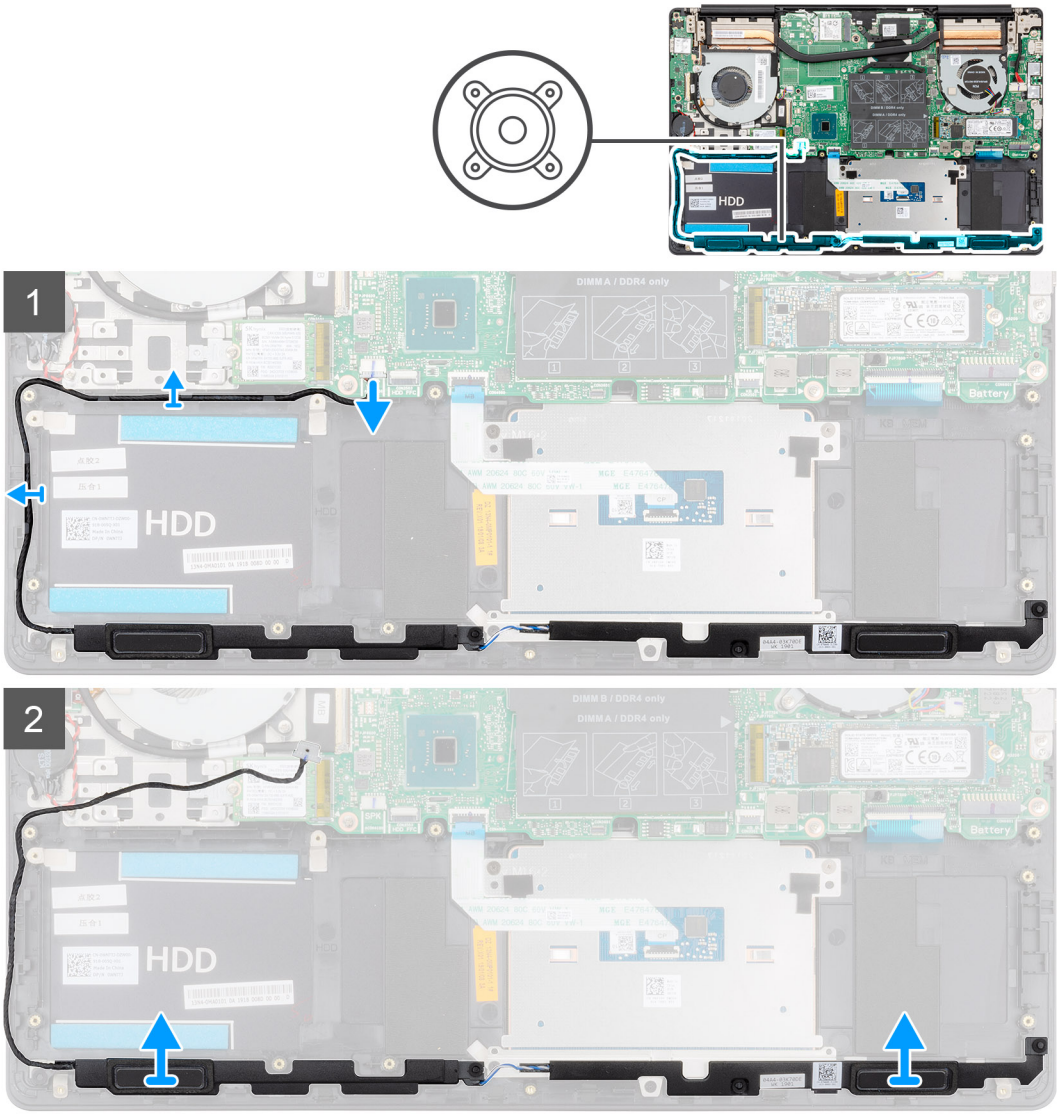
Removing the speakers

Prerequisites

1 Follow the procedure in Before working inside your computer.
2 Remove the base cover.
3 Remove the battery.

About this task

The figure 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 Note the routing of the speaker cable and remove the speaker cable from the routing guides on the palm-rest and keyboard assembly.

NOTE: Note the position of the rubber grommets before lifting the speakers.

3 Lift the speakers, along with the cable, off the palm-rest and keyboard assembly.

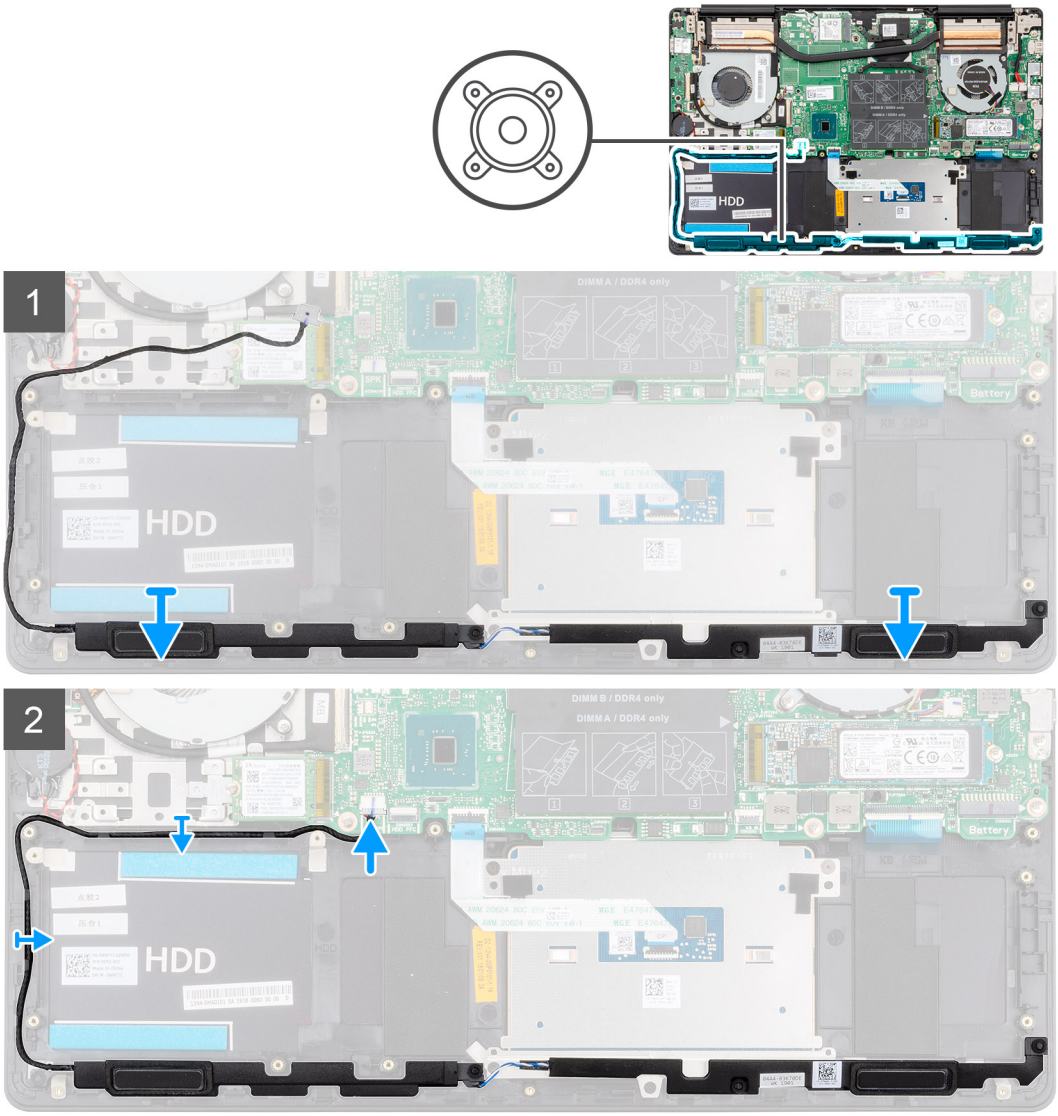
Installing the speakers

Prerequisite

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

About this task

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



Steps

1 Using the alignment posts and rubber grommets, place the speakers in the slots on the palm-rest and keyboard assembly.
2 Route the speaker cable through the routing guides on the palm-rest and keyboard assembly.
3 Connect the speaker cable to the system board.

Next step

1 Install the battery.
2 Install the base cover.
3 Follow the procedure in After working inside your computer.

Graphics Processing Unit (GPU) fan

Removing the GPU fan

Prerequisites

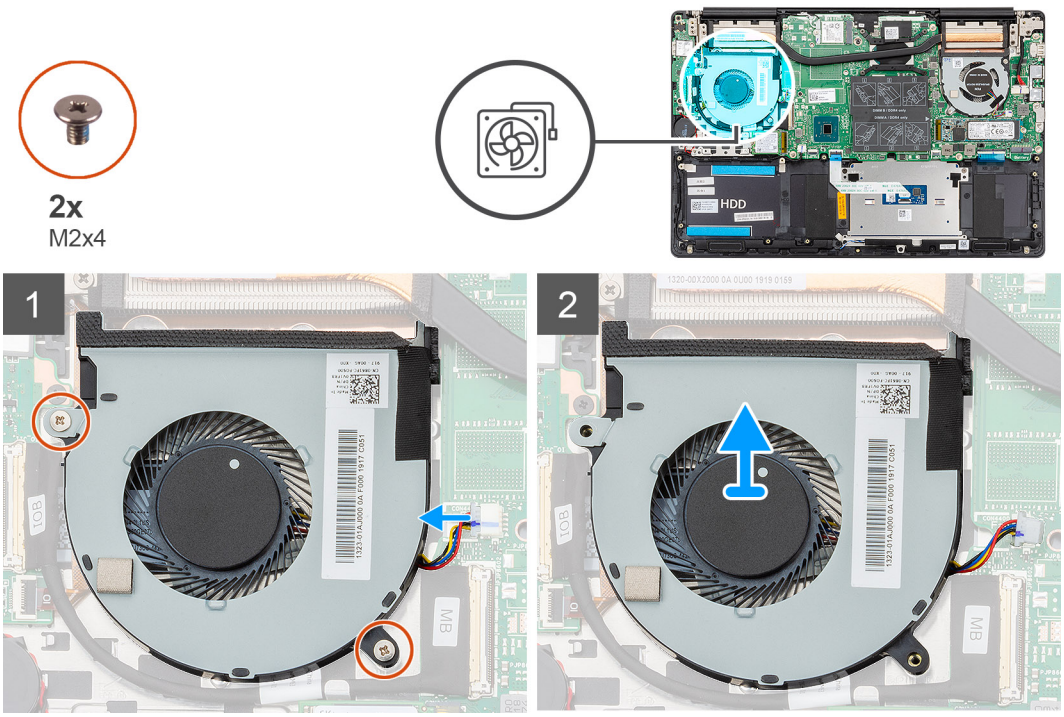
1 Follow the procedure in Before working inside your computer.

2 Remove the base cover.

3 Remove the battery.

About this task

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



Steps

1 Remove the two (M2x4) screws that secure the GPU fan to the palm-rest and keyboard assembly.

2 Disconnect the GPU fan cable from the system board.

3 Slide and lift the GPU fan off the palm-rest and keyboard assembly.

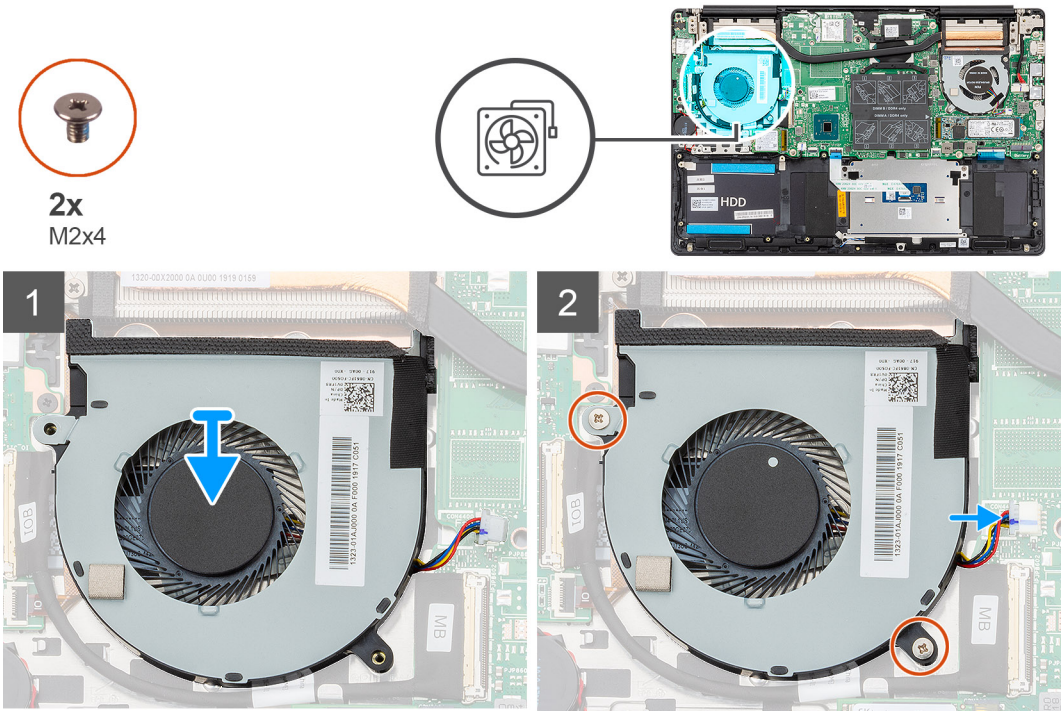
Installing the GPU fan

Prerequisite

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

About this task

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



Steps

1 Slide and place the GPU fan on the palm-rest and keyboard assembly.
2 Align the screw holes on the GPU fan with the screw holes on the palm-rest and keyboard assembly.
3 Replace the two (M2x4) screws to secure the GPU fan to the palm-rest and keyboard assembly.
4 Connect the GPU fan cable to the system board.

Next step

1 Install the battery.
2 Install the base cover.
3 Follow the procedure in After working inside your computer.

CPU fan

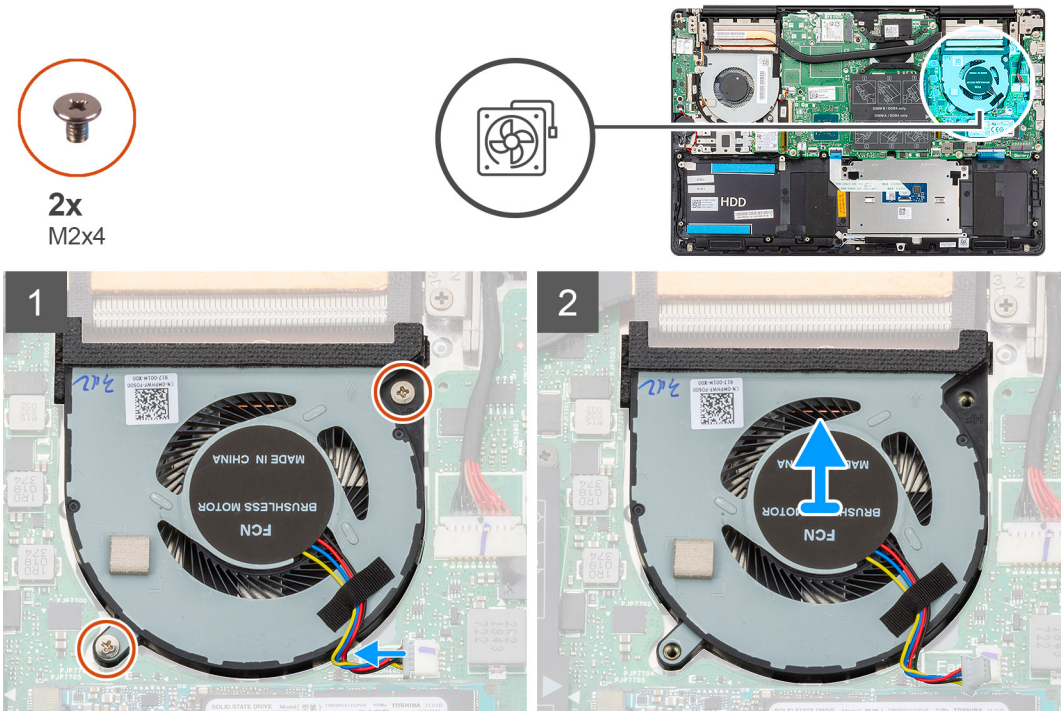
Removing the CPU fan

Prerequisites

1 Follow the procedure in Before working inside your computer.
2 Remove the base cover.
3 Remove the battery.

About this task

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



Steps

1 Remove the two (M2x4) screws that secure the CPU fan to the palm-rest and keyboard assembly.

2 Disconnect the CPU fan cable from the system board.

3 Slide and lift the CPU fan off the palm-rest and keyboard assembly.

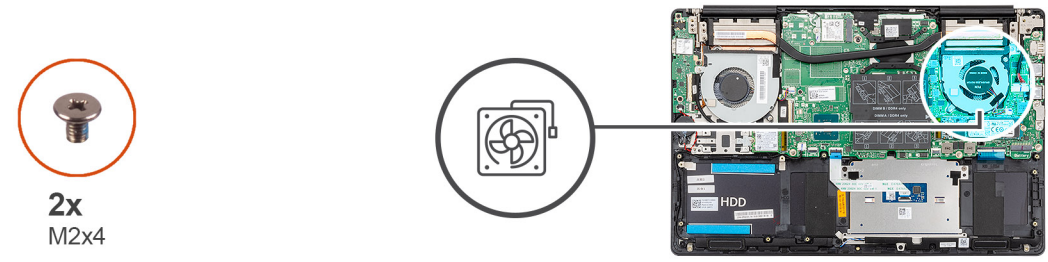
Installing the CPU fan

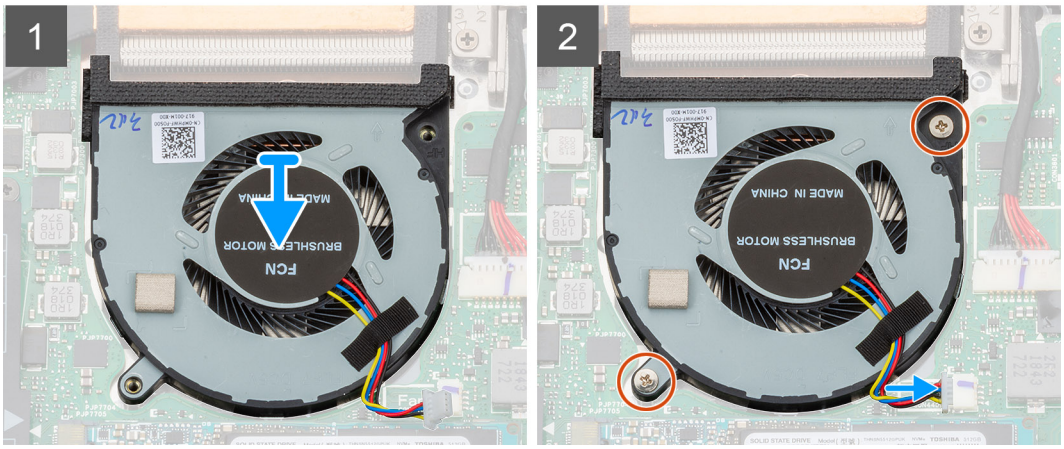
Prerequisite

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

About this task

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





Steps

1 Slide and place the CPU fan on the palm-rest and keyboard assembly.
2 Align the screw holes on the CPU fan with the screw holes on the palm-rest and keyboard assembly.
3 Replace the two (M2x4) screws to secure the CPU fan to the palm-rest and keyboard assembly.
4 Connect the CPU fan cable to the system board.

Next step

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—UMA

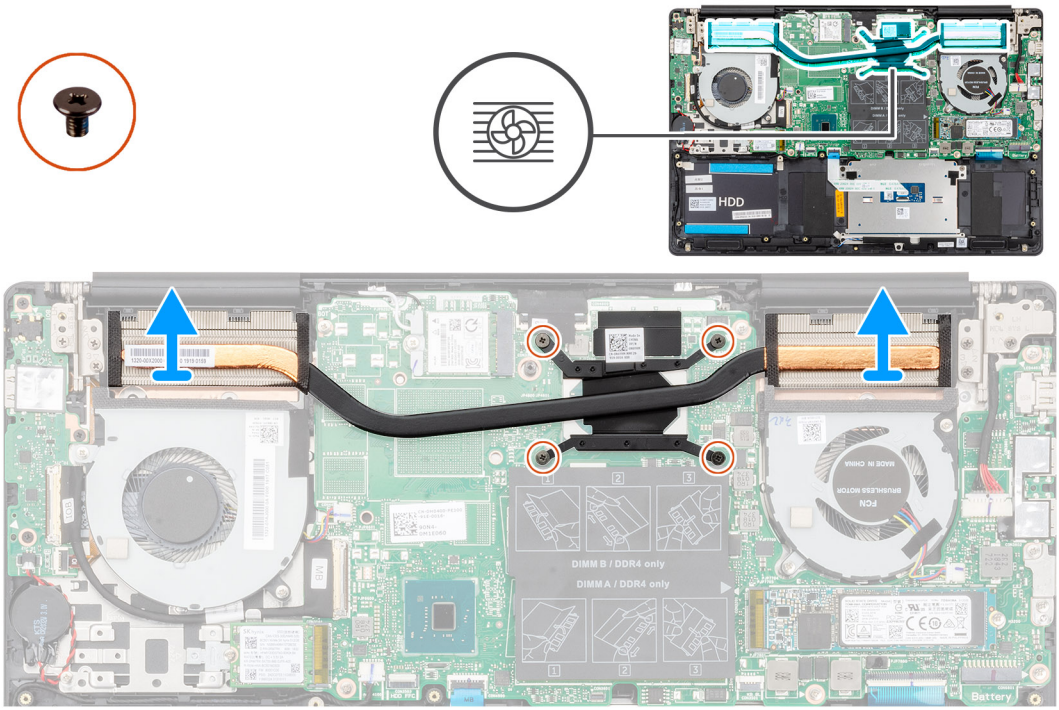
NOTE: The heat sink type in your computer varies depending on the configuration ordered.

Prerequisites

1 Follow the procedure in Before working inside your computer.
2 Remove the base cover.
3 Remove the battery.
4 Remove the GPU fan.
5 Remove the CPU fan.

About this task

The figure indicates the location of the heat sink and provides a visual representation of the removal procedure.



Steps

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

2 Lift and remove the heat sink off the palm-rest and keyboard assembly.

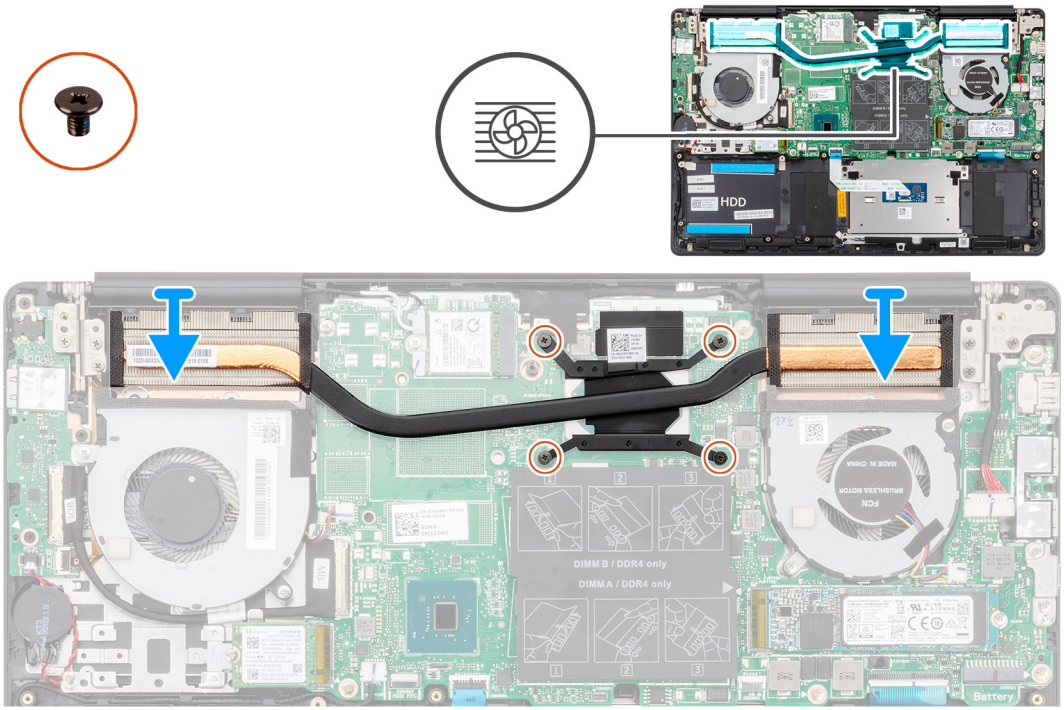
Installing the heat sink—UMA

Prerequisite

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

About this task

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



Steps

1 Place the heat sink on the system board and align the screw holes on the heat sink with the screw holes on the system board.

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

Next step

1 Install the CPU fan.

2 Install the GPU fan.

3 Install the battery.

4 Install the base cover.

5 Follow the procedure in After working inside your computer.

Removing the heat sink—discrete

NOTE: The heat sink type in your computer varies depending on the configuration ordered.

Prerequisites

1 Follow the procedure in Before working inside your computer.

2 Remove the base cover.

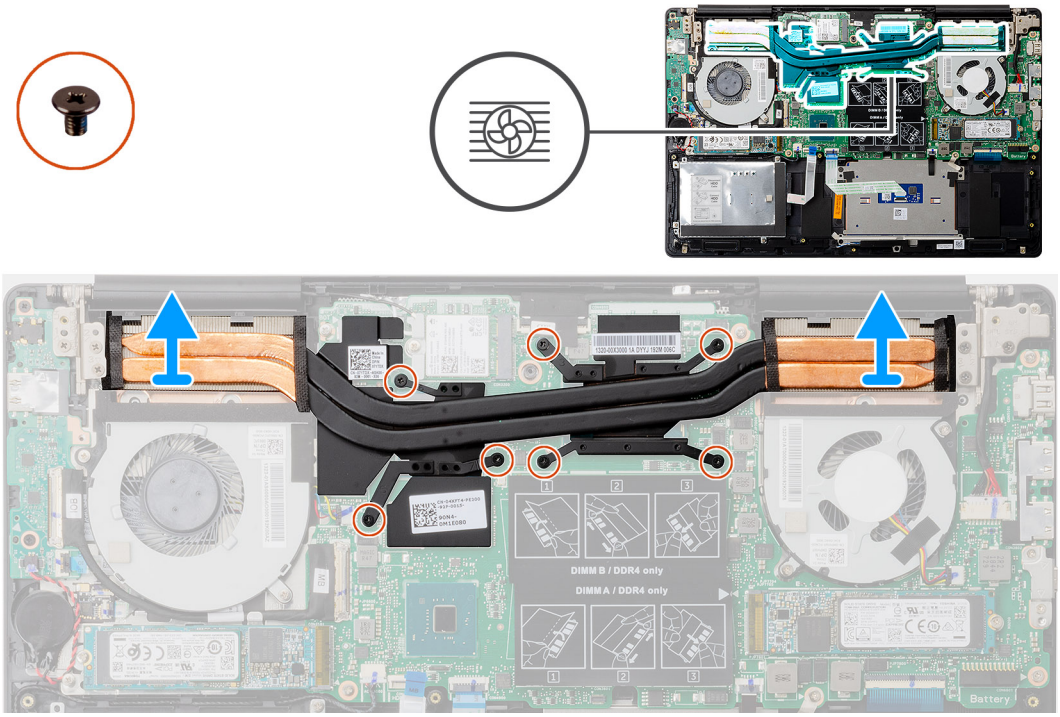
3 Remove the battery.

4 Remove the GPU fan.

5 Remove the CPU fan.

About this task

The figure indicates the location of the heat sink and provides a visual representation of the removal procedure.



Steps

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

2 Lift and remove the heat sink off the system board.

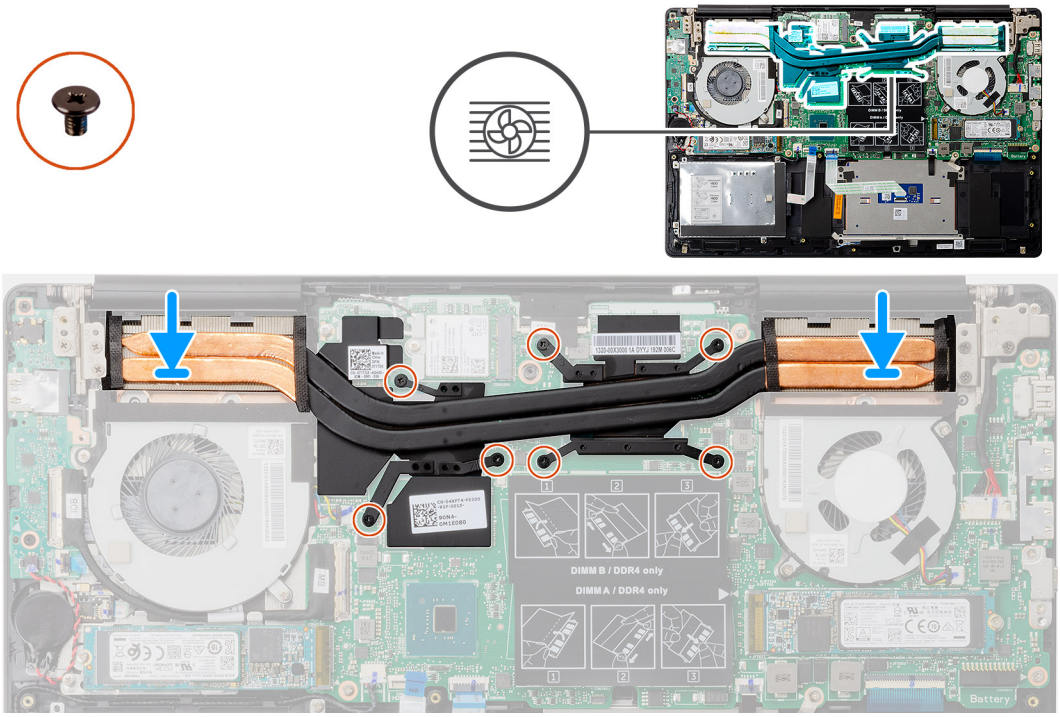
Installing the heat sink—discrete

Prerequisite

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

About this task

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



Steps

1 Place the heat sink on the system board and align the screw holes on the heat sink with the screw holes on the system board.

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

Next step

1 Install the CPU fan.

2 Install the GPU fan.

3 Install the battery.

4 Install the base cover.

5 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.

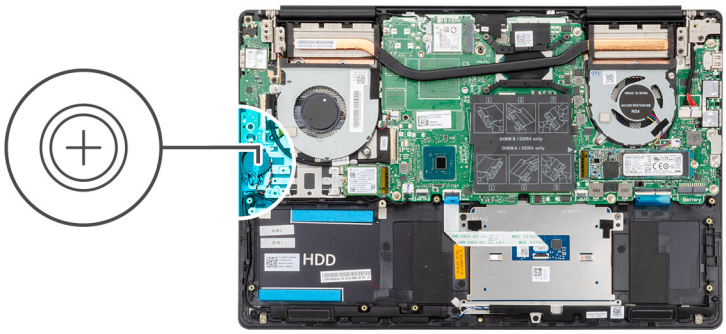
2 Remove the base cover.

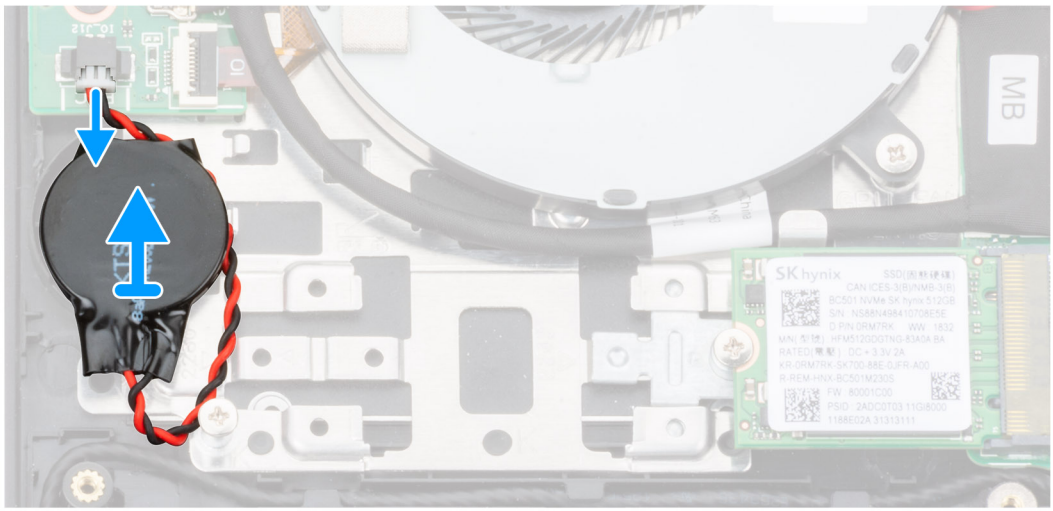
3 Remove the battery.

NOTE: Removing the coin-cell battery resets the BIOS setup program's settings to default. It is recommended that you note the BIOS setup program's settings before removing the coin-cell battery.

About this task

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





Steps

1 Disconnect the coin-cell battery cable from the I/O board.

2 Peel the coin-cell battery off the palm-rest and keyboard assembly.

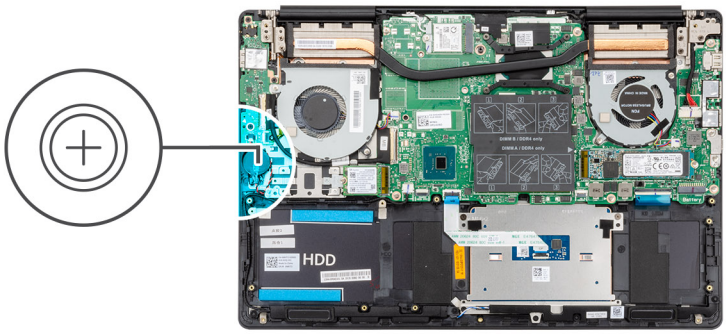
Installing the coin-cell battery

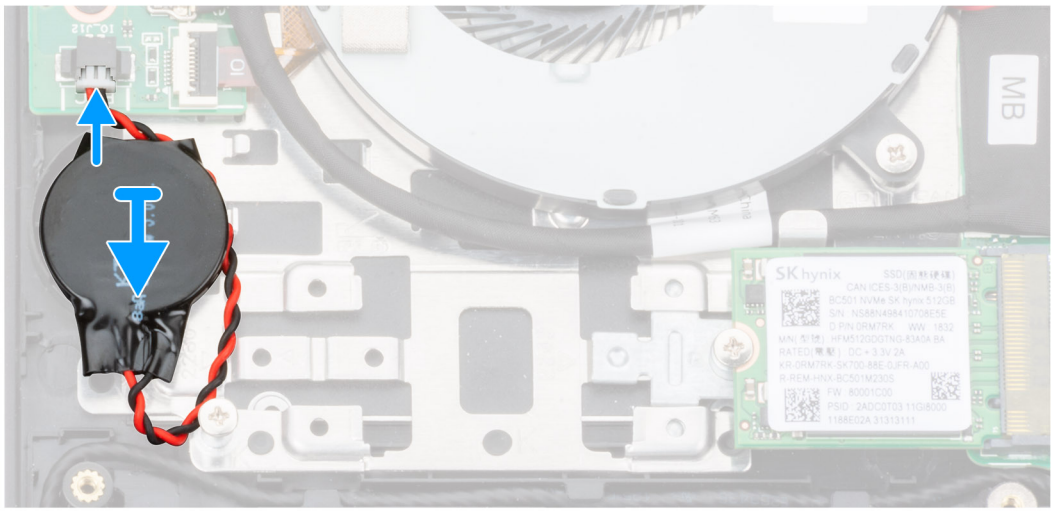
Prerequisite

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

About this task

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





Steps

1 Adhere the coin-cell battery to the slot on the palm-rest and keyboard assembly.

2 Route the coin-cell battery cable as illustrated and connect it to the I/O board.

Next step

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.

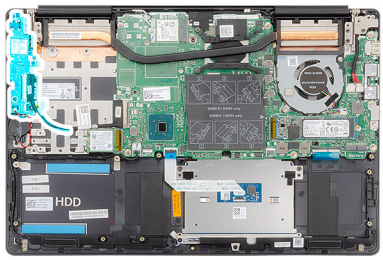
3 Remove the battery.

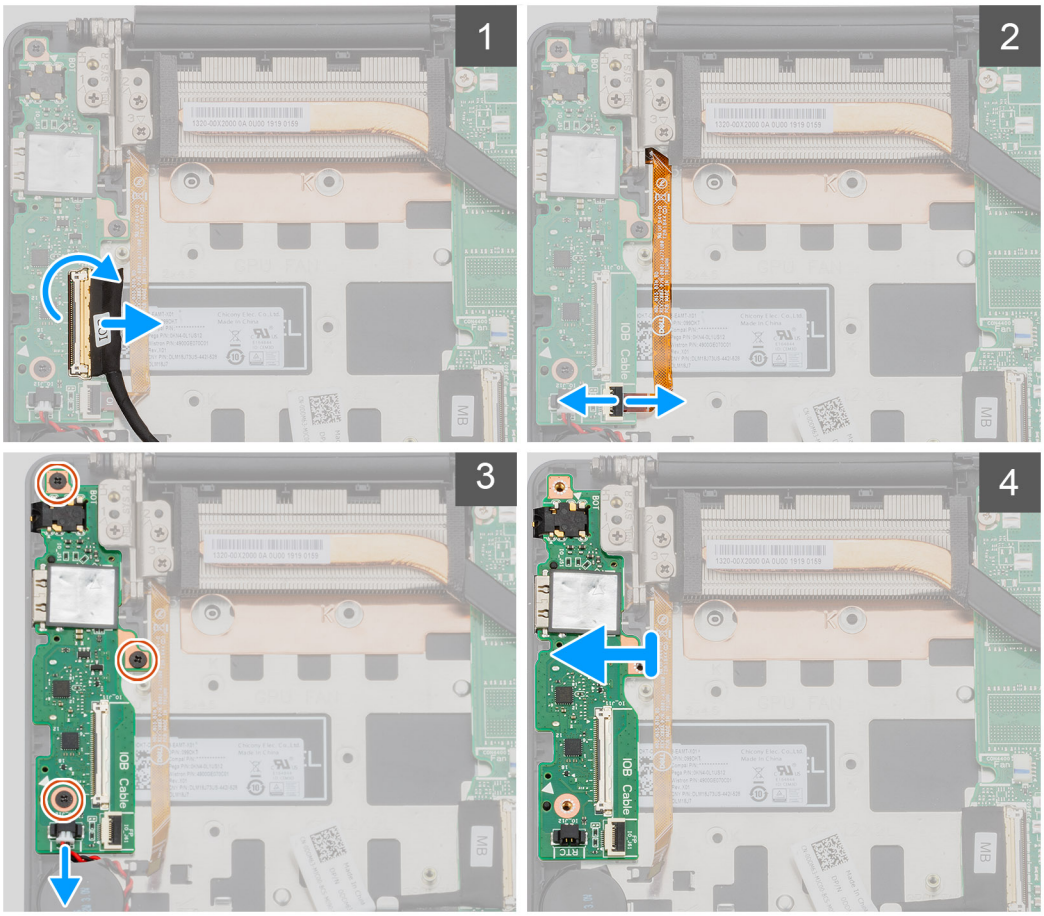
4 Remove the GPU fan.

About this task

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

3x
M2x3





Steps

1 Open the latch and disconnect the I/O-board cable from the I/O board.
2 Open the latch and disconnect the fingerprint reader cable from the I/O board.
3 Disconnect the coin-cell battery cable from the I/O board.
4 Remove the three 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

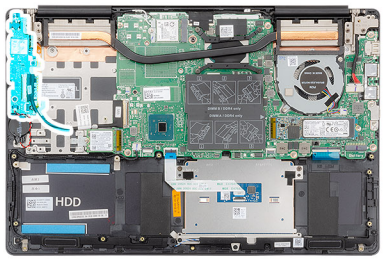
Prerequisite

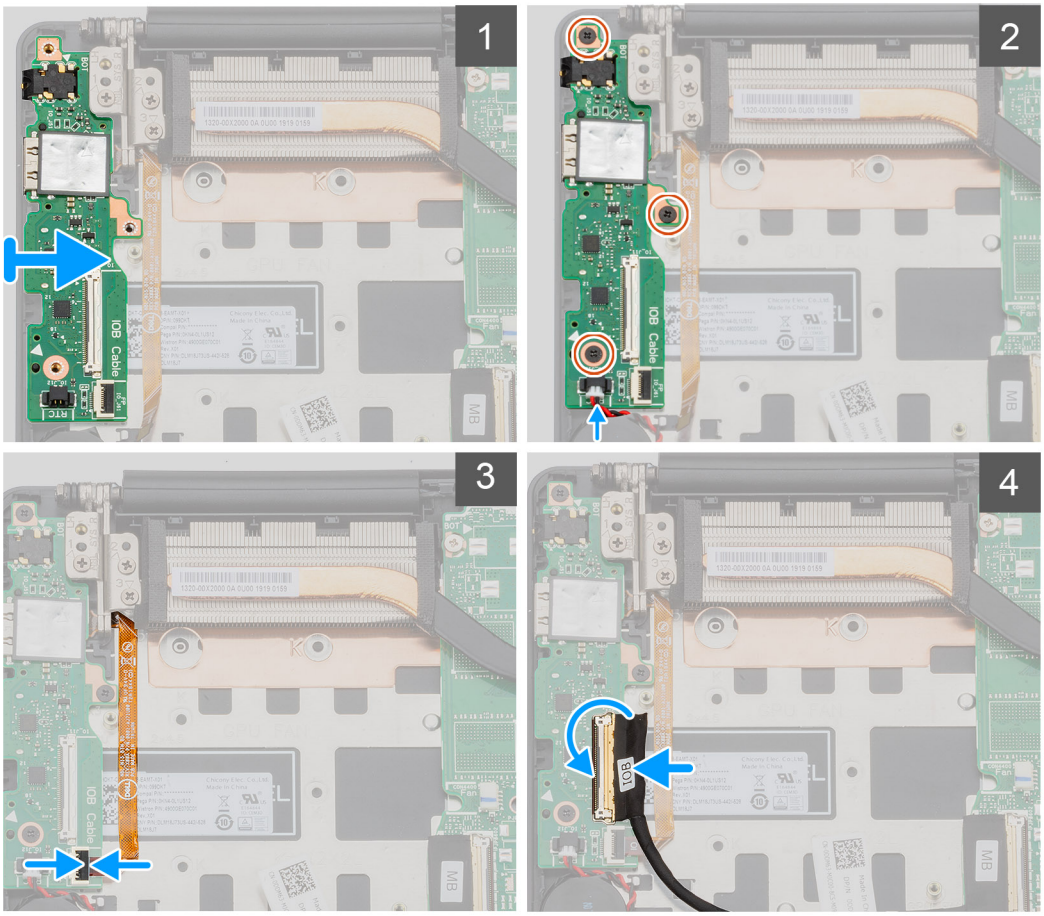
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

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

3x
M2x3





Steps

1 Place the I/O board on the palm-rest and keyboard assembly.
2 Align the screw holes on the I/O board with the screw holes on the palm-rest and keyboard assembly.
3 Replace the three screws (M2x3) that secure the I/O board to the palm-rest and keyboard assembly.
4 Connect the coin-cell battery cable to the I/O board.
5 Connect the fingerprint reader cable to the I/O board and close the latch to secure the cable.
6 Connect the I/O-board cable to the I/O board and close the latch to secure the cable.

Next step

1 Install the GPU fan.
2 Install the battery.
3 Install the base cover.
4 Follow the procedure in After working inside your computer.

Power button with optional fingerprint reader

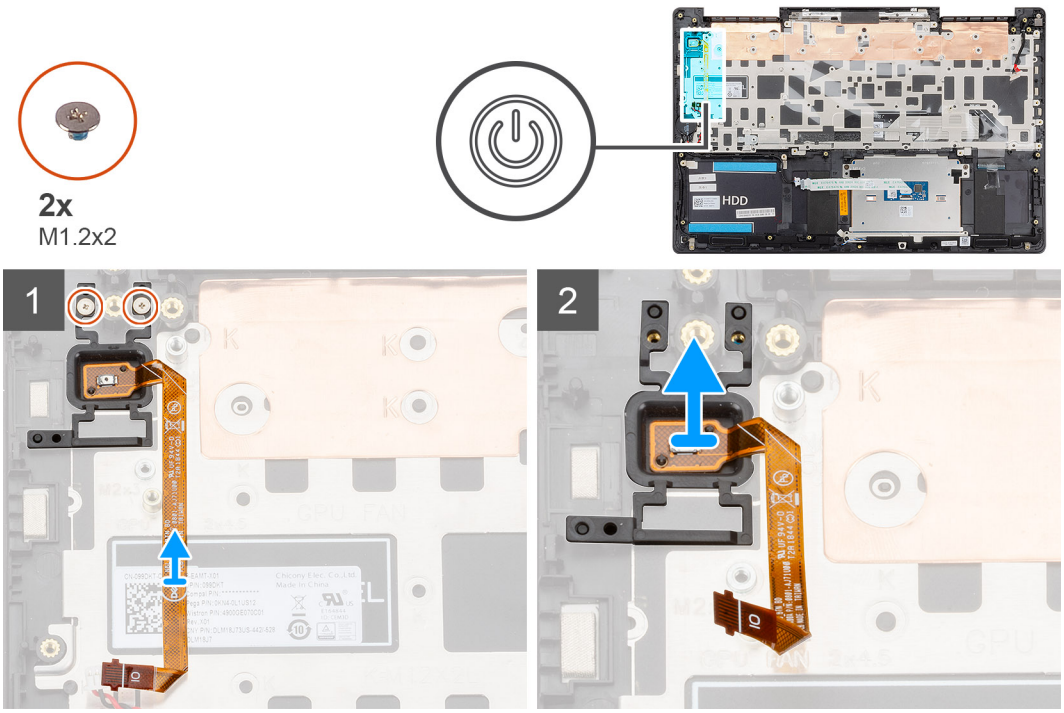
Removing the power button and optional fingerprint reader

Prerequisites

1 Follow the procedure in Before working inside your computer.
2 Remove the base cover.
3 Remove the battery.
4 Remove the WLAN card.
5 Remove the GPU fan.
6 Remove the I/O board.

About this task

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



Steps

1 Remove the two screws (M1.2x2) that secure the power button with optional fingerprint reader to the palm-rest and keyboard assembly.
2 Lift the power button with optional fingerprint-reader, along with the fingerprint reader cable, off the palm-rest and keyboard assembly.

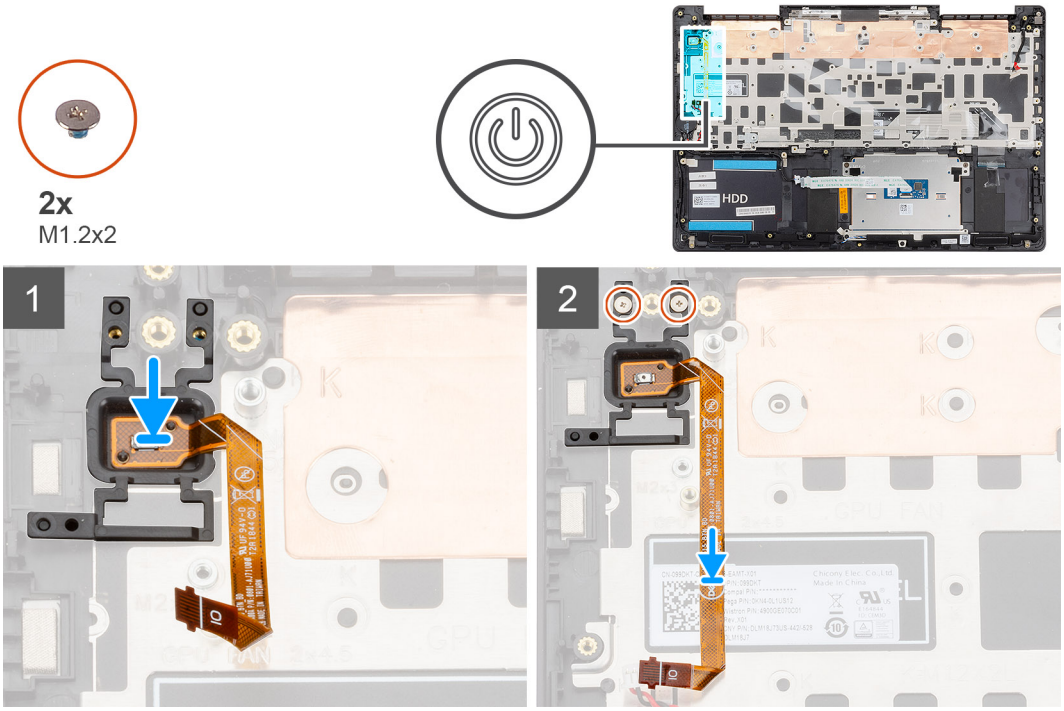
Installing the power button with optional fingerprint reader

Prerequisite

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

About this task

The figure indicates the location of the power button with fingerprint reader and provides a visual representation of the installation procedure.



Steps

1 Using the alignment post, place the power button with optional fingerprint reader on the palm-rest and keyboard assembly.

2 Replace the two screws (M1.2x2) to secure the power button with optional fingerprint reader to the palm-rest and keyboard assembly.

Next step

1 Install the I/O board.

2 Install the GPU fan.

3 Install the WLAN card.

4 Install the battery.

5 Install the base cover.

6 Follow the procedure in After working inside your computer.

Power-adapter port

Removing the power-adapter port

Prerequisites

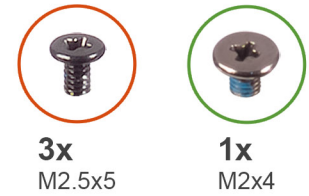
1 Follow the procedure in Before working inside your computer.

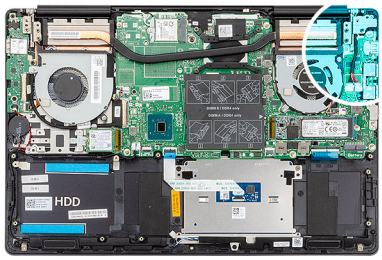
2 Remove the base cover.

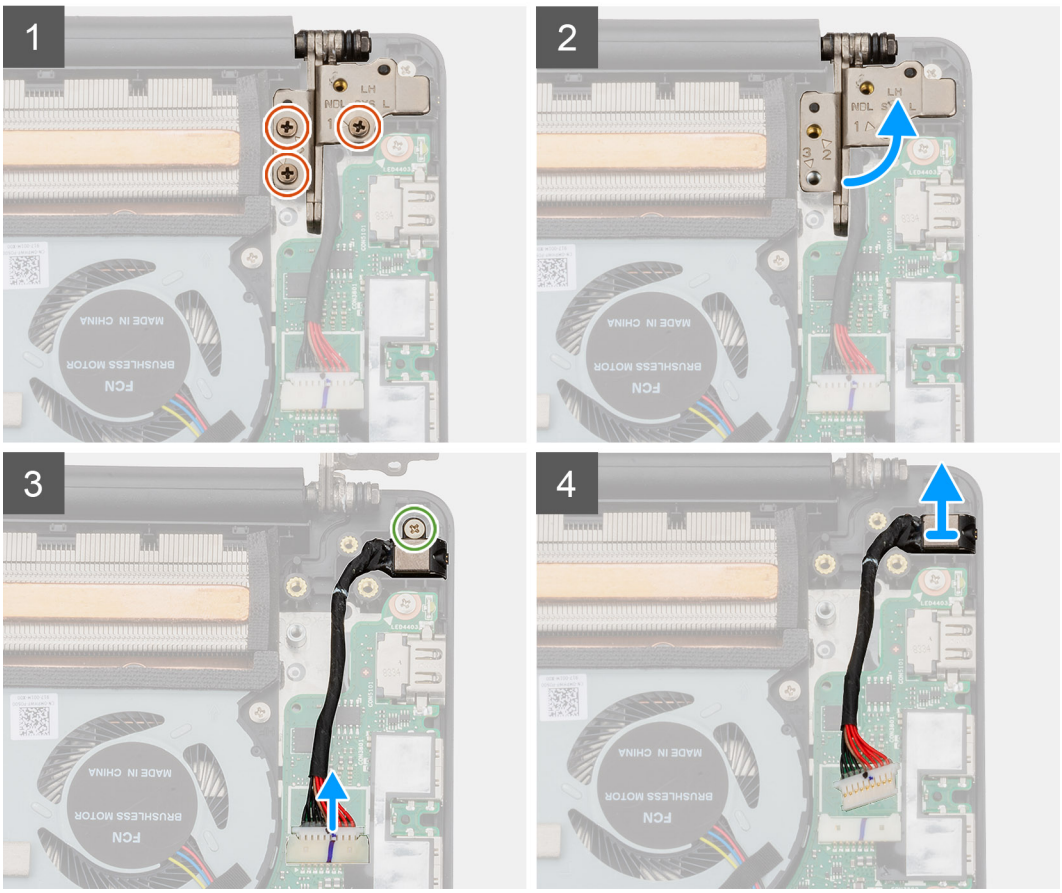
3 Remove the battery.

About this task

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







Steps

1 Remove the three screws (M2.5x5) that secure the left display hinge to the palm-rest and keyboard assembly.
2 Open the display hinges at an angle of 90 degrees.
3 Remove the screw (M2x4) that secures the power-adapter port to the palm-rest and keyboard assembly.
4 Disconnect the power-adapter port cable from the system board.
5 Lift the power-adapter port, along with its cable, off the palm-rest and keyboard assembly.

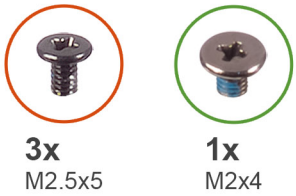
Installing the power-adapter port

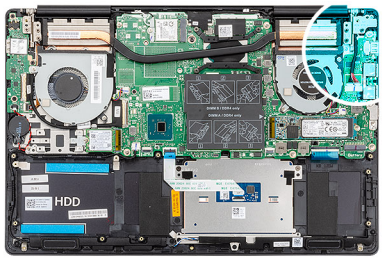
Prerequisite

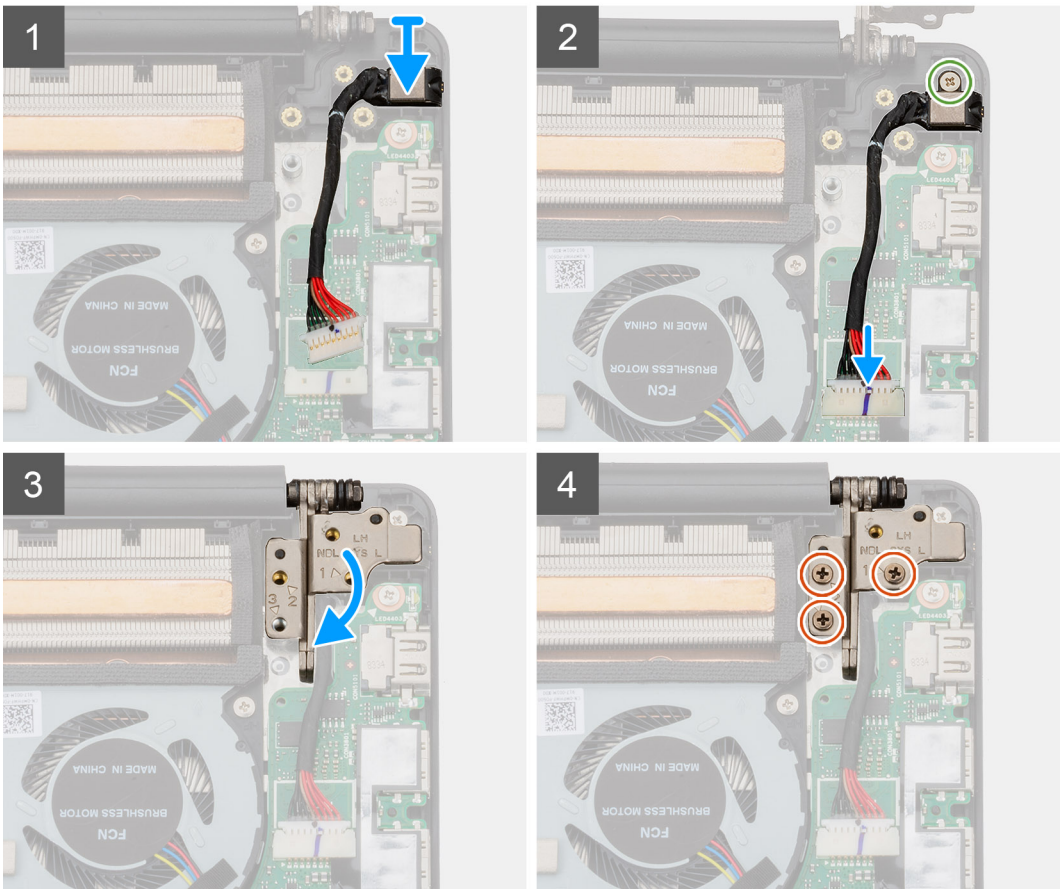
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

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







Steps

1 Connect the power-adapter port cable to the system board.
2 Replace the screw (M2x4) that secures the power-adapter port to the palm-rest and keyboard assembly.
3 Using the alignment posts, close the display hinges.
4 Replace the three screws (M2.5x5) that secure the left display hinge to the system board.

Next step

1 Install the battery.
2 Install the base cover.
3 Follow the procedure in After working inside your computer.

Touchpad

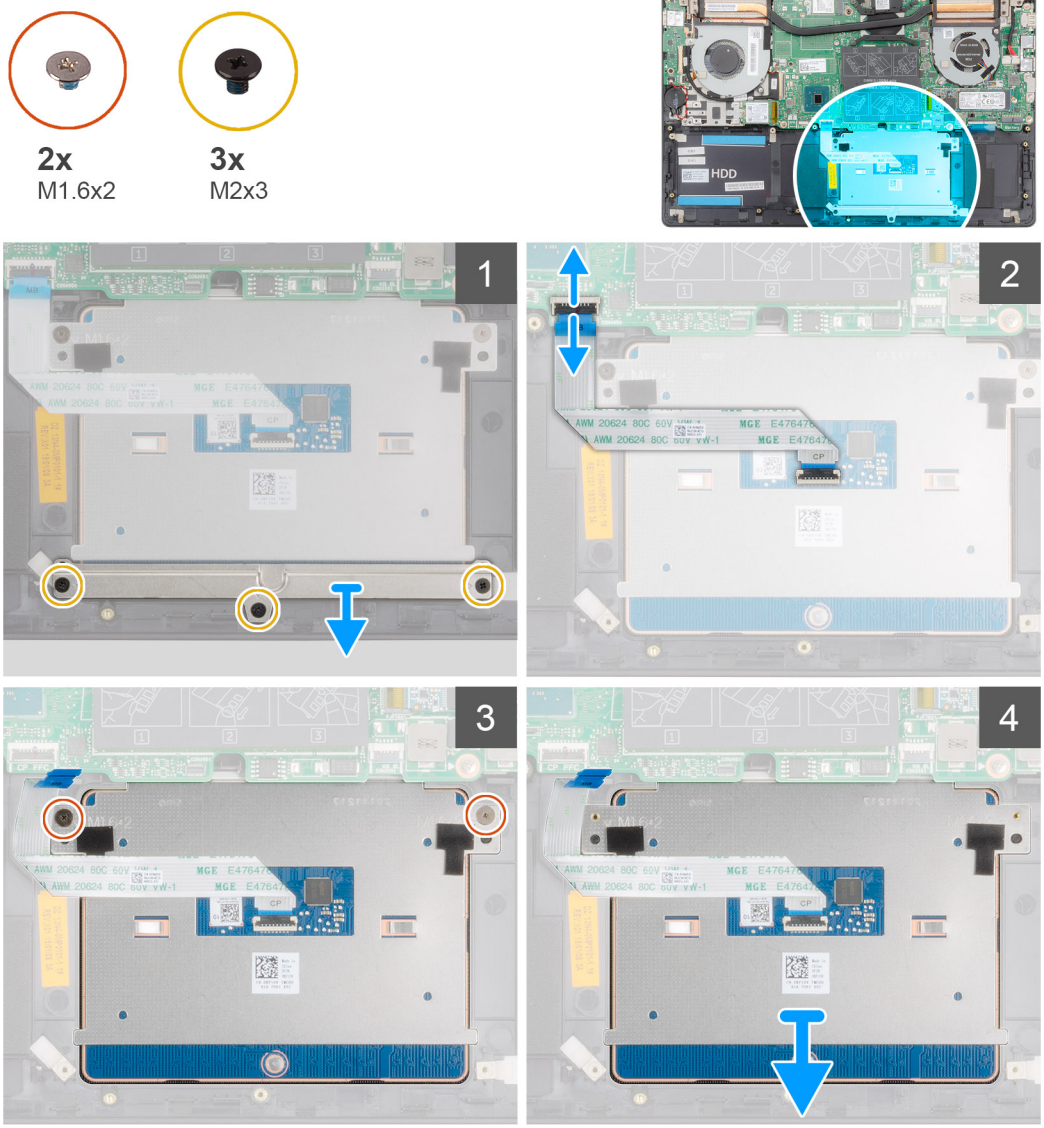
Removing the touchpad

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 figure indicates the location of the touchpad and provides a visual representation of the removal procedure.



Steps

1 Remove the three (M2x3) screws that secure the touchpad bracket to the palm-rest and keyboard assembly.
2 Lift the touchpad bracket off the palm-rest and keyboard assembly.
3 Open the latch and disconnect the touchpad cable from the system board.
4 Remove the two (M1.6x2) screws that secure the touchpad to the palm-rest and keyboard assembly.
5 Lift the touchpad, along with the cable, off the palm-rest and keyboard assembly.

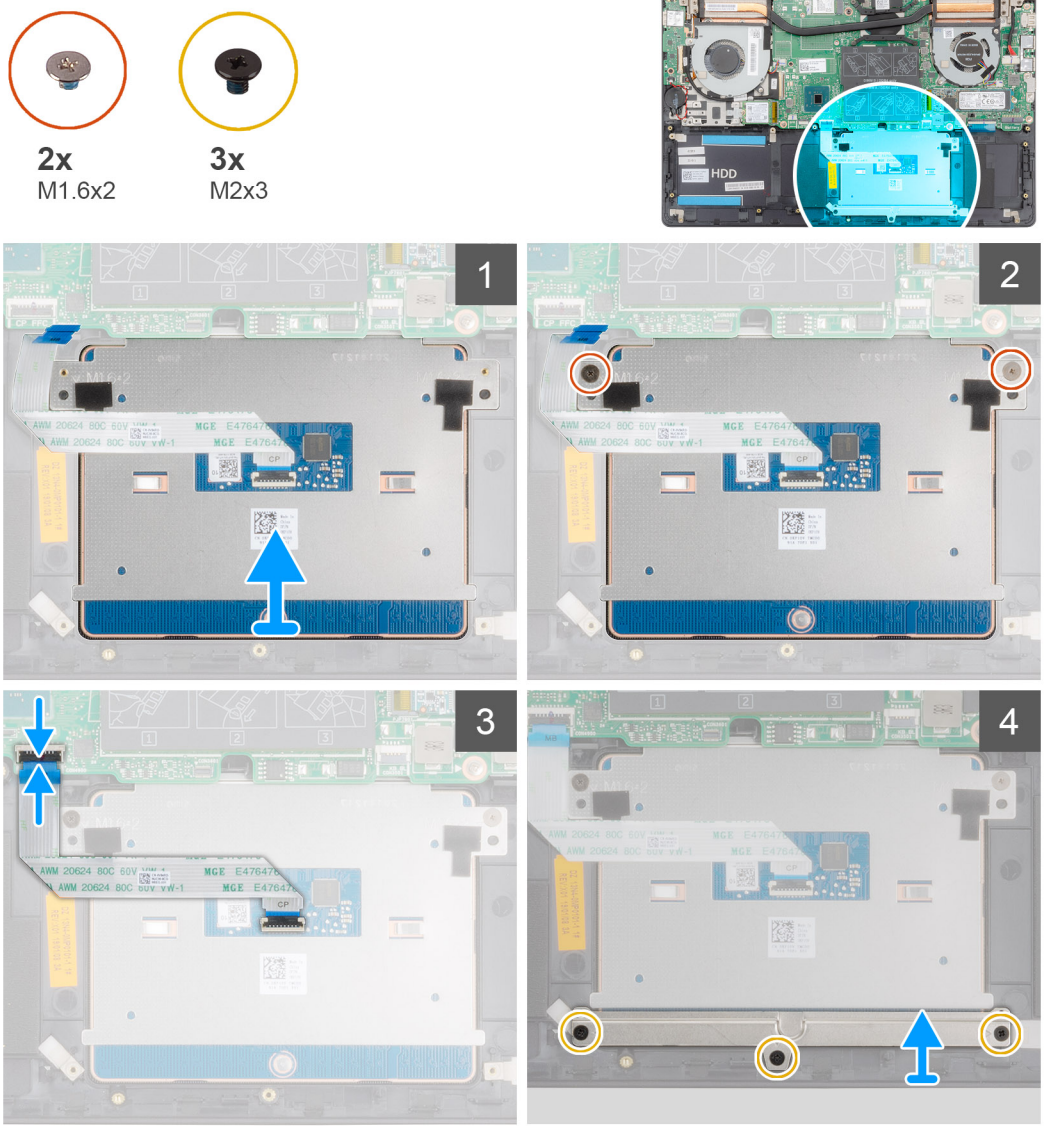
Installing the touchpad

Prerequisite

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

About this task

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



Steps

1 Align and place the touchpad into the slot on the palm-rest and keyboard assembly.
2 Replace the two (M1.6x2) screws that secure the touchpad to the palm-rest and keyboard assembly.
3 Slide the touchpad cable onto its connector on the system board and close the latch to secure the cable.
4 Align and place the touchpad bracket into the slot on the palm-rest and keyboard assembly.
5 Replace the three (M2x3) screws that secure the touchpad bracket to the palm-rest and keyboard assembly.

Next step

1 Install the speakers.
2 Install the battery.
3 Install the base cover.
4 Follow the procedure in After working inside your computer.

Display assembly

Removing the display assembly

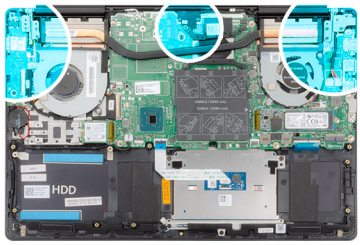
Prerequisites

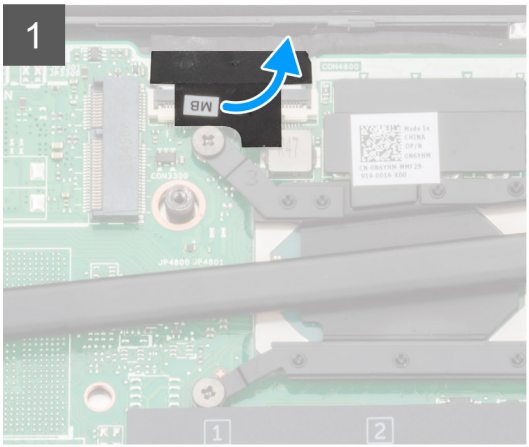
1 Follow the procedure in Before working inside your computer.
2 Remove the base cover.
3 Remove the battery.
4 Remove the WLAN card.

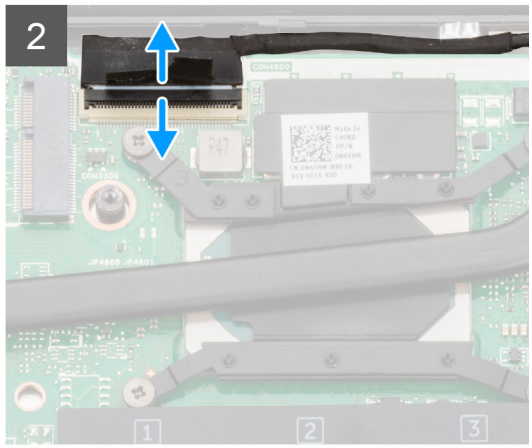
About this task

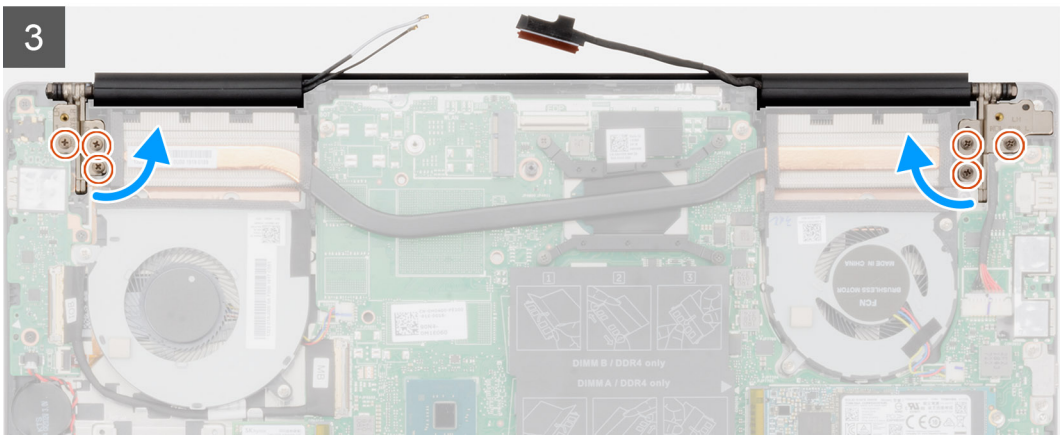
The figure indicates the location of the display assembly and provides a visual representation of the removal procedure.

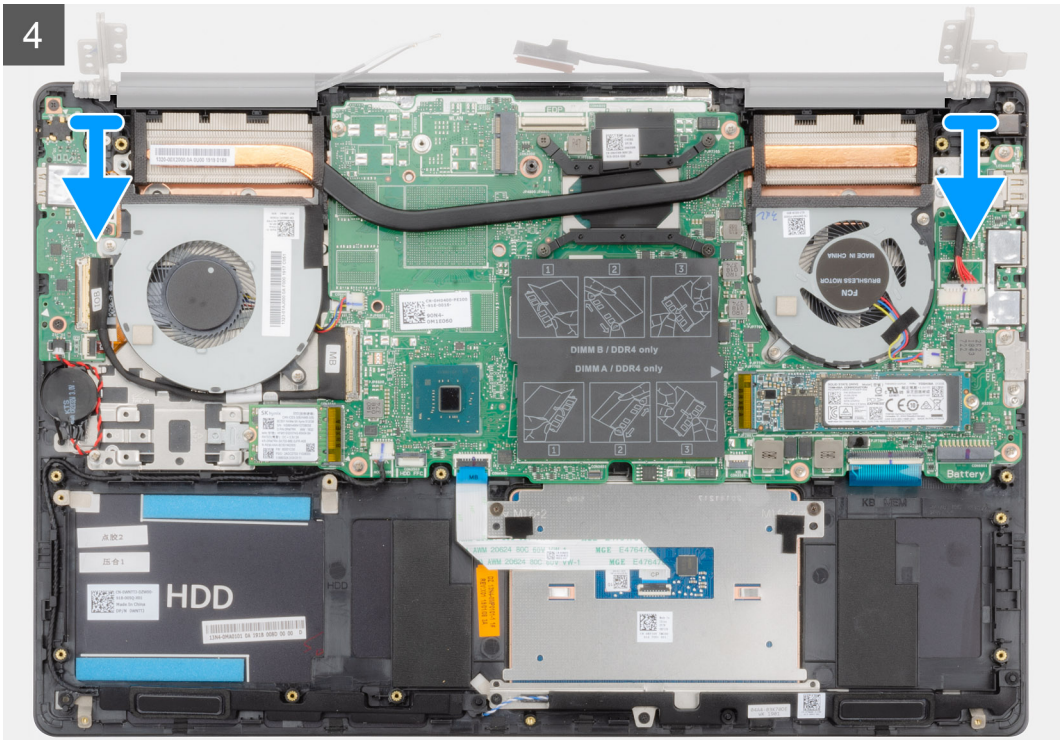
6x
M2.5x5











Steps

1 Locate the display cable and display hinges on your computer.
2 Peel the tape that secures the display cable to the system board.
3 Open the latch and disconnect the display cable from the system board.
4 Remove the three screws (M2.5x5) that secure the left-display hinge to the system board.
5 Remove the three screws (M2.5x5) that secure the right-display hinge to the system board.
6 Open the display hinges at an angle of 90 degrees.

7 Remove the palm-rest and keyboard assembly off the display assembly.

Installing the display assembly

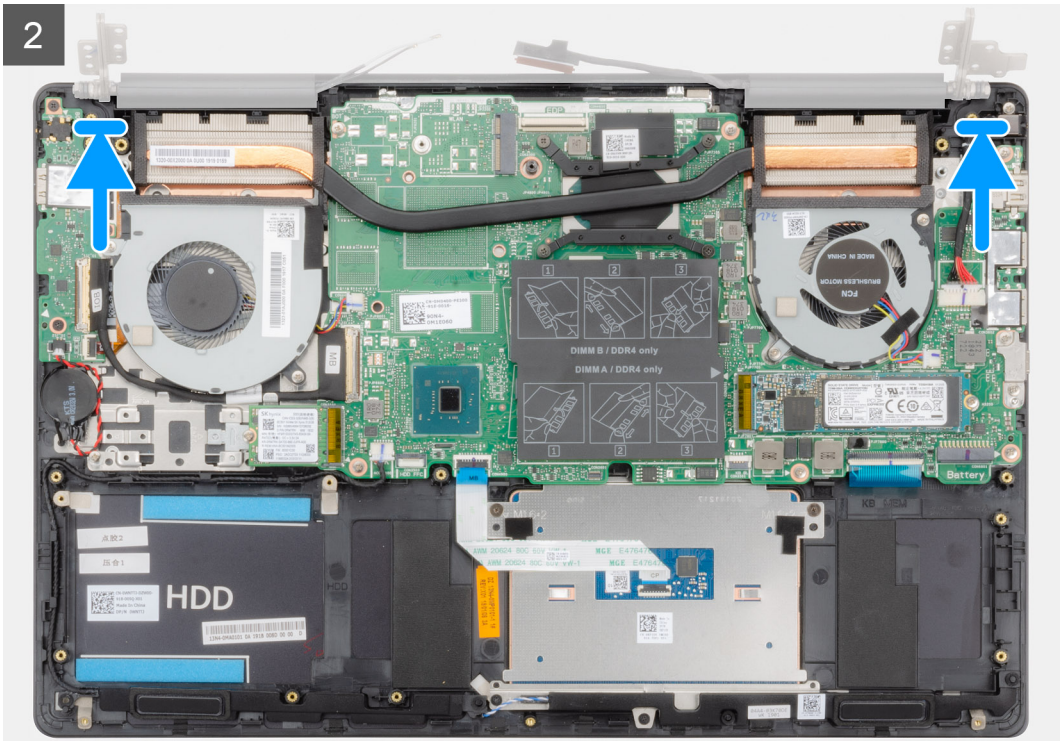
Prerequisite

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

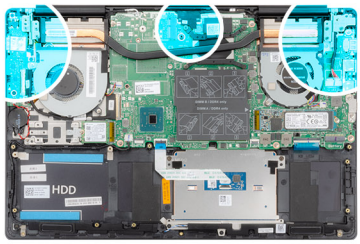
About this task

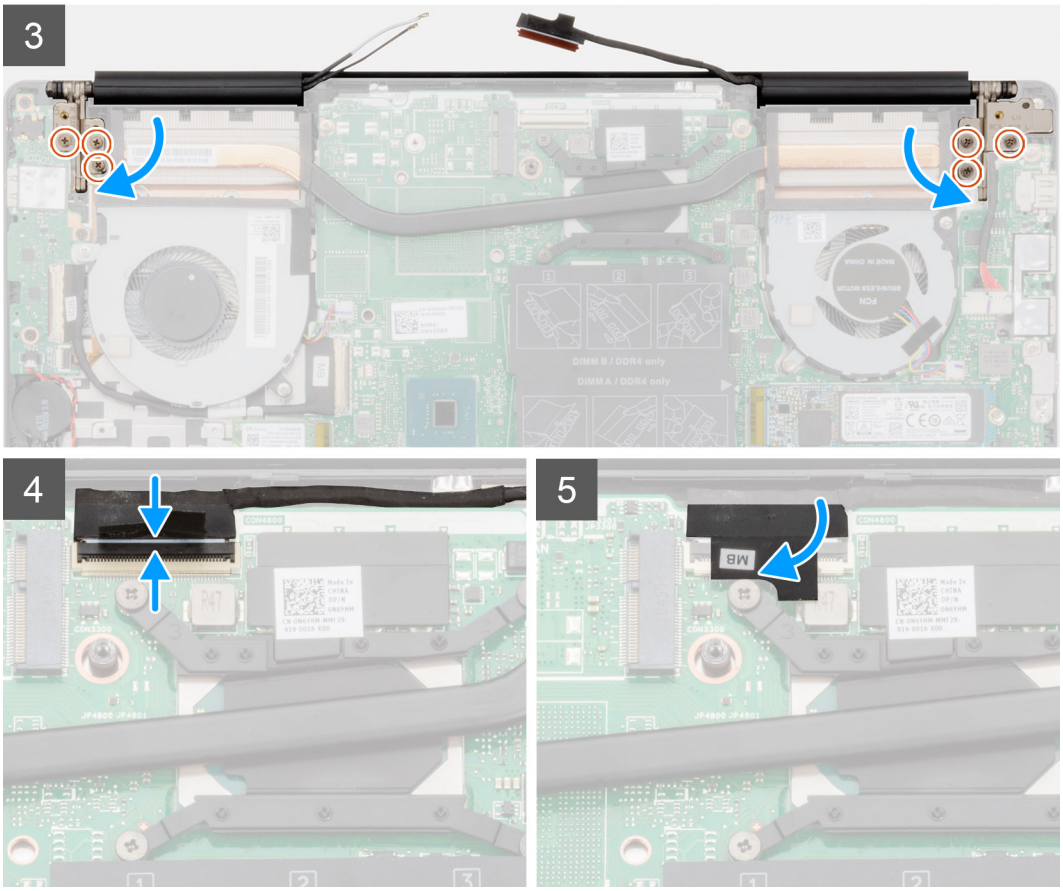
The figure indicates the location of the component and provides a visual representation of the installation procedure.

2



6x
M2.5x5





Steps

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

Next step

1 Install the WLAN card.
2 Install the battery.
3 Install the base cover.
4 Follow the procedure in After working inside your computer.

Display bezel

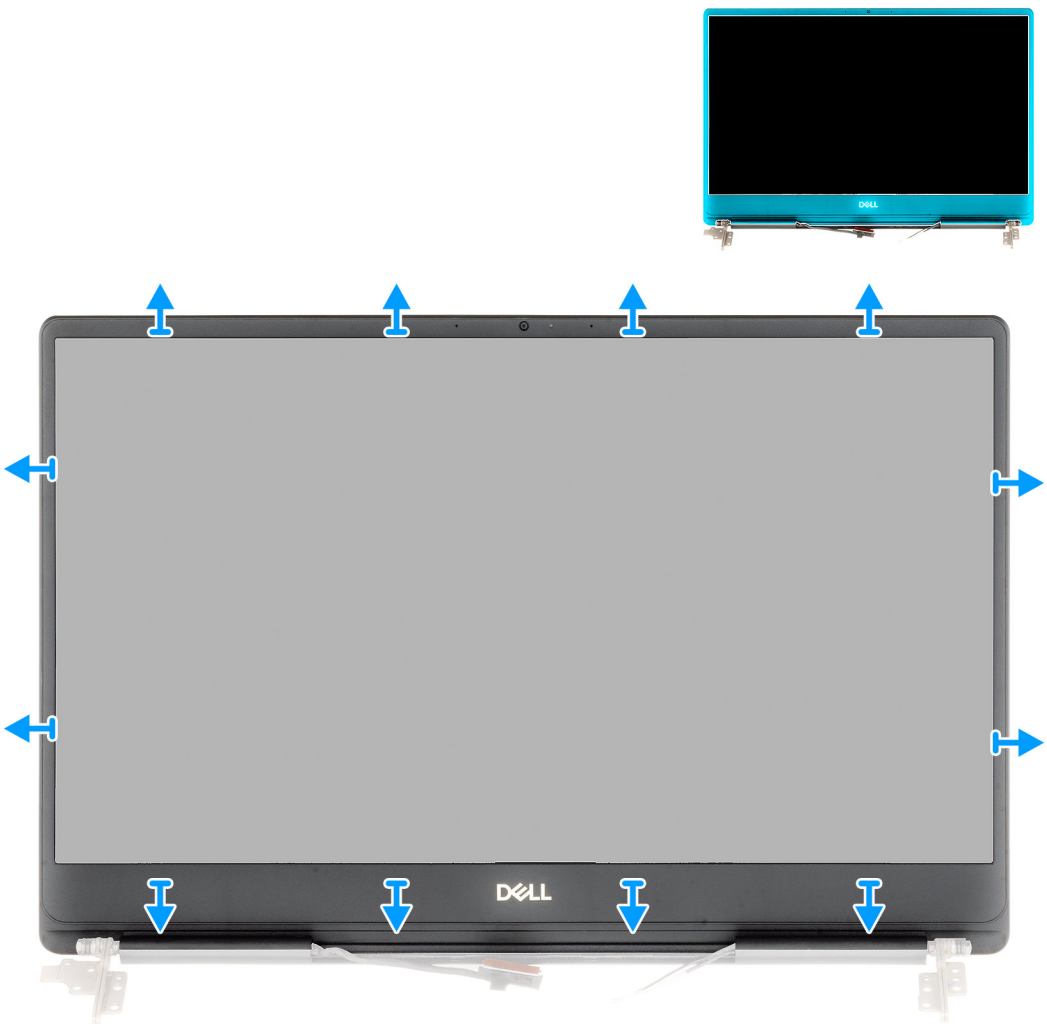
Removing the display bezel

Prerequisites

1 Follow the procedure in Before working inside your computer.
2 Remove the base cover.
3 Remove the battery.
4 Remove the WLAN card.
5 Remove the display assembly.

About this task

The figure indicates the location of the display bezel and provides a visual representation of the removal procedure.



Steps

1 Carefully pry the edges of the display bezel off the display back-cover and antenna assembly.
2 Remove the display bezel off the display back-cover and antenna assembly.

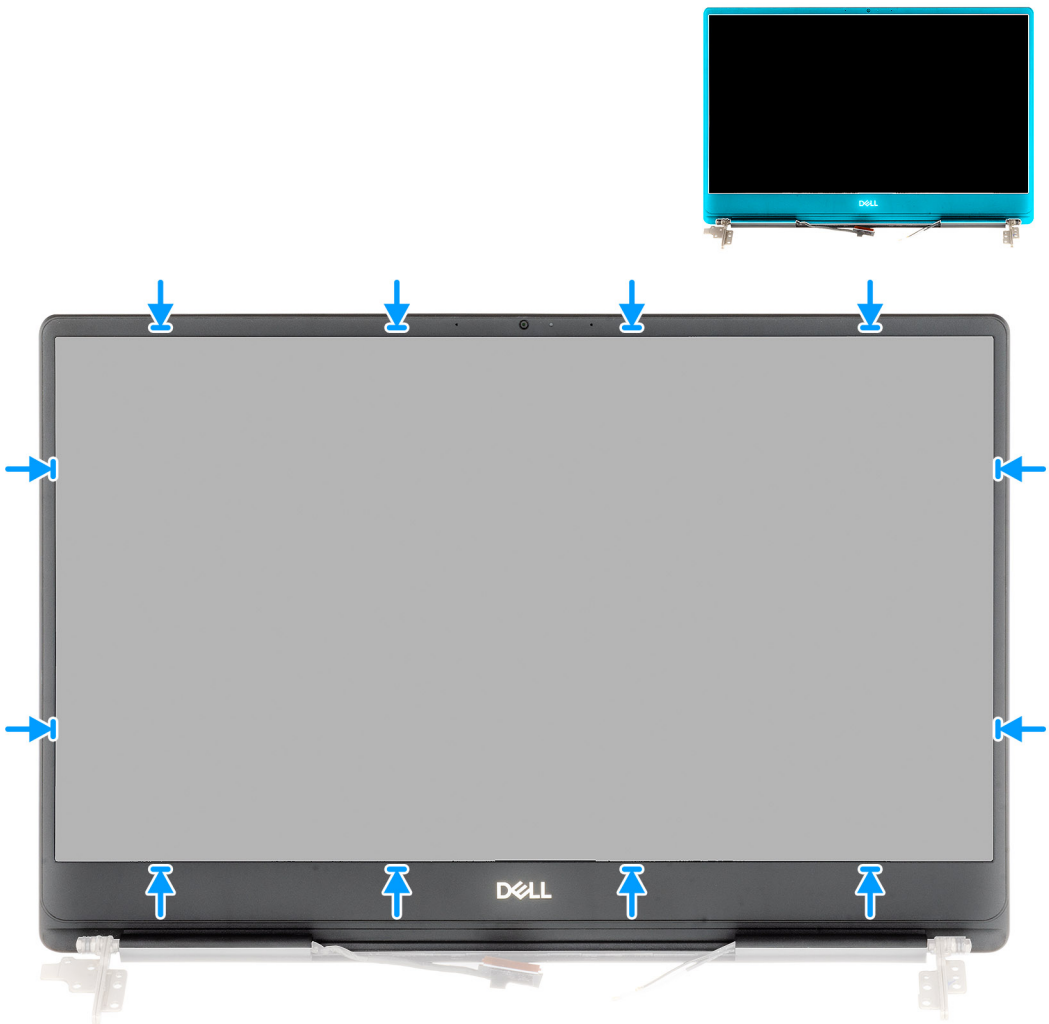
Installing the display bezel

Prerequisite

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

About this task

The figure indicates the location of the display bezel and provides a visual representation of the installation procedure.



Step

Align the display bezel with the display back-cover and antenna assembly, and gently snap the display bezel into place.

Next step

1. Install the display assembly.
2. Install the WLAN card.
3. Install the battery.
4. Install the base cover.
5. Follow the procedure in After working inside your computer.

System board

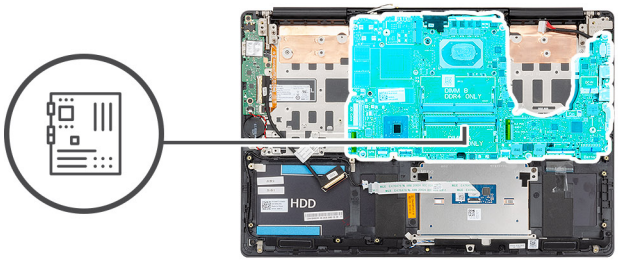
Removing the system board

Prerequisites

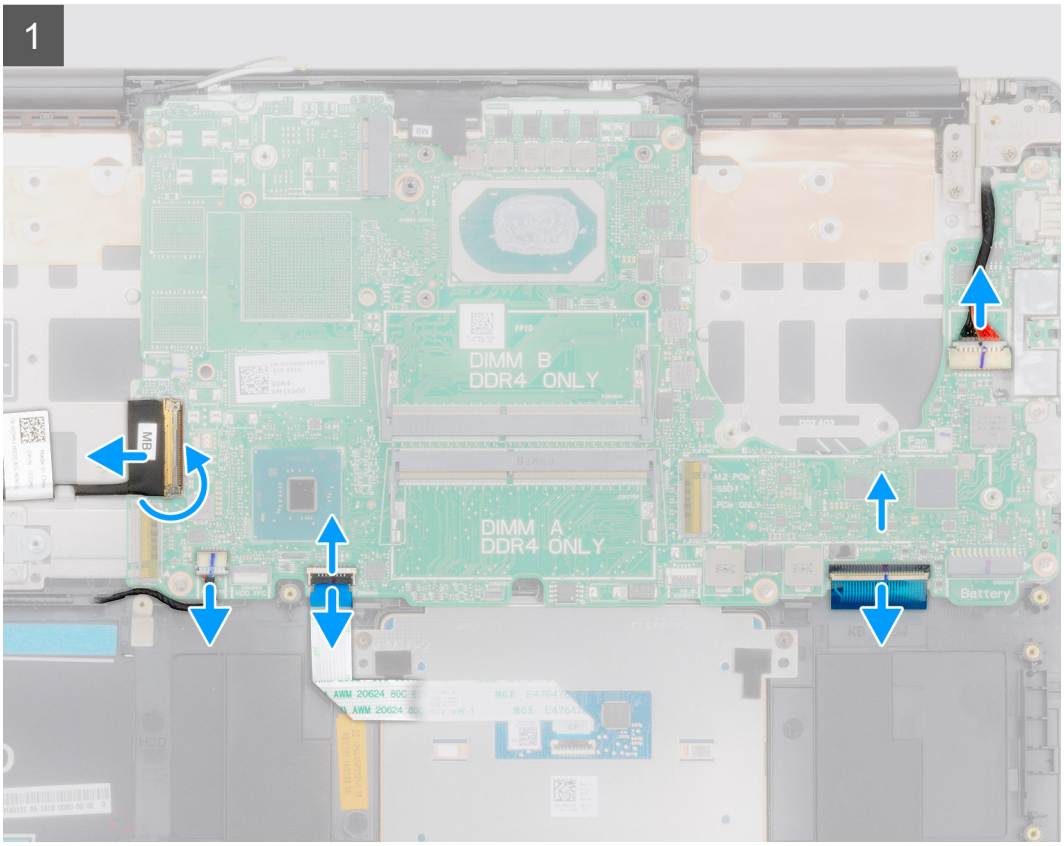
1 Follow the procedure in Before working inside your computer.
2 Remove the base cover.
3 Remove the battery.
4 Remove the M.2 2280 solid-state drive.
5 Remove the M.2 2230 solid-state drive.
6 Remove the WLAN card.
7 Remove the GPU fan.
8 Remove the CPU fan.
9 Remove the heat sink.
10 Remove the memory module.
11 Remove the display assembly.

About this task

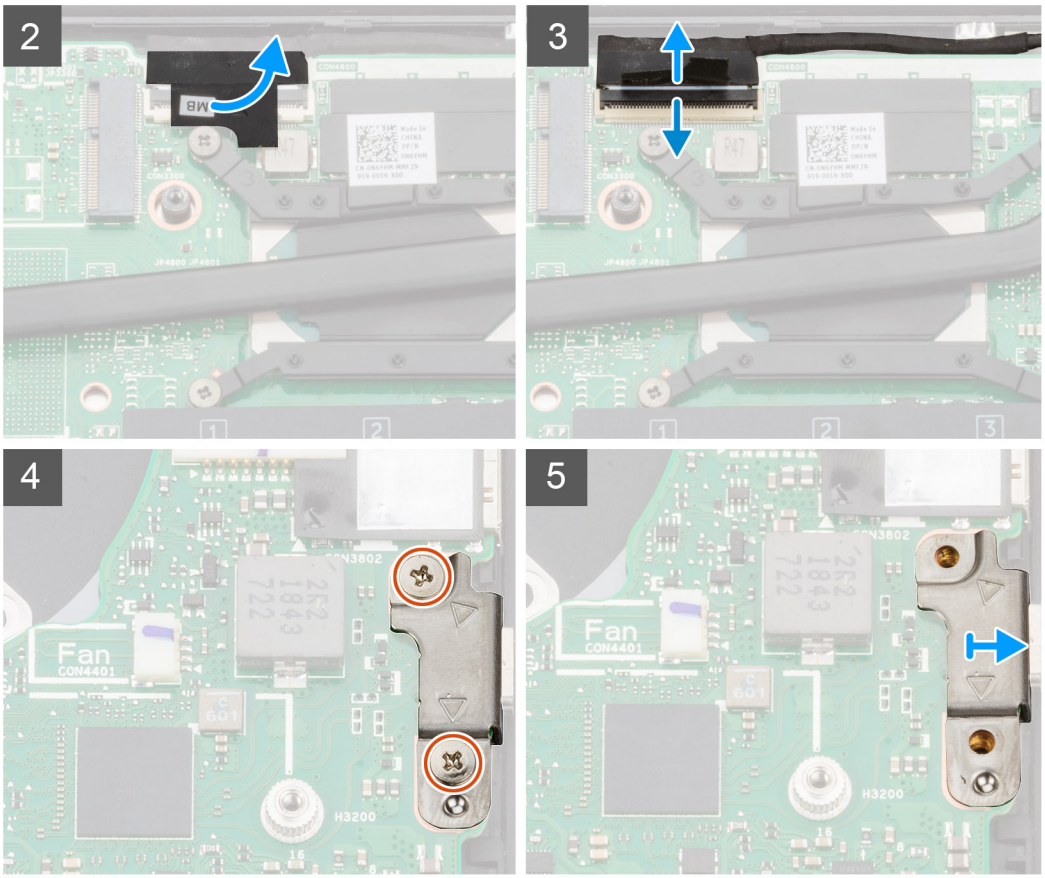
The figure indicates the location of the system board and provides a visual representation of the removal procedure.



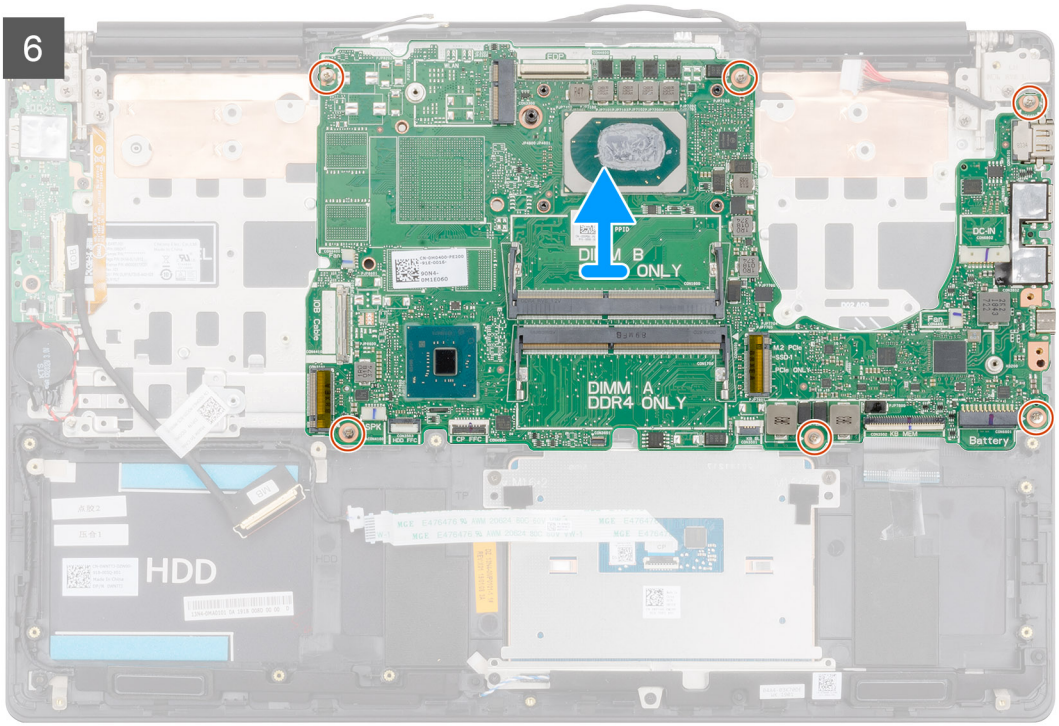
1



2x
M2x5



6x
M2x4



Steps

1 Open the latch and disconnect the I/O-board cable from the system board.
2 Disconnect the power-adapter cable from the system board.
3 Disconnect the speaker cable from the system board.
4 Open the latch and disconnect the touchpad cable from the system board.
5 Open the latch and disconnect the keyboard-backlight cable from the system board.
6 Peel the tape that secures the display cable to the system board.
7 Open the latch and disconnect the display cable from the system board.
8 Remove the two screws (M2x5) that secure the USB Type-C port bracket to the system board.
9 Remove the six screws (M2x4) that secure the system board to the palm-rest and keyboard assembly.
10 Gently release the ports on the system board from the slots on the palm-rest and keyboard assembly and lift the system board off the palm-rest and keyboard assembly.

Installing the system board

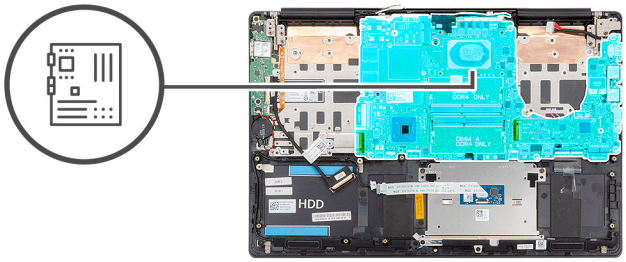
Prerequisite

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

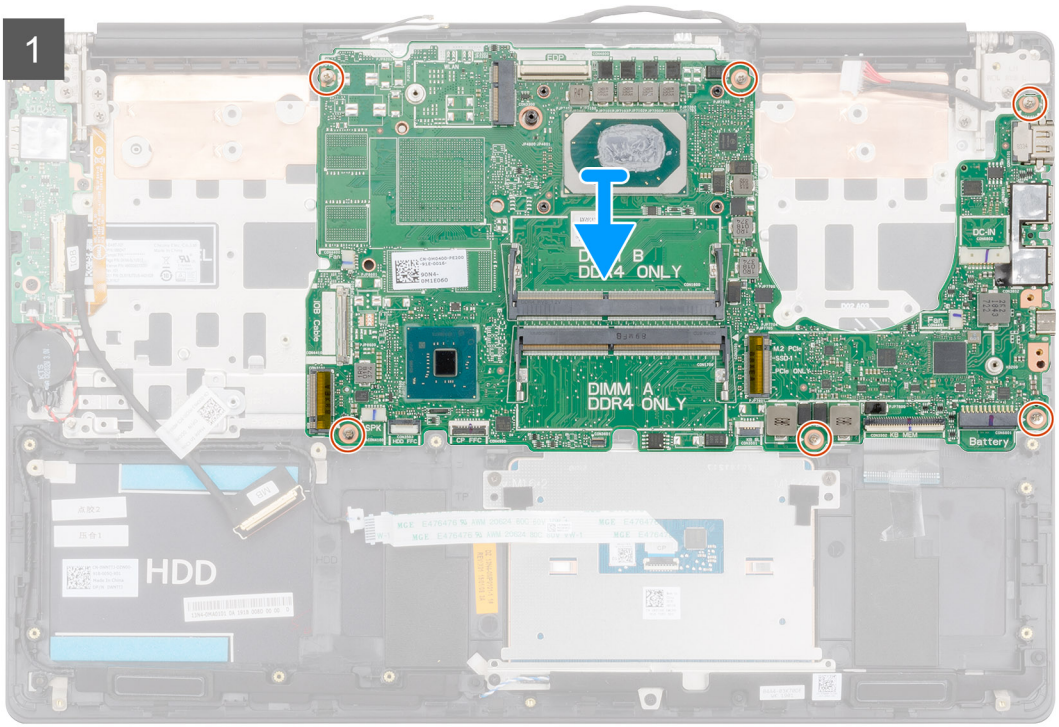
About this task

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

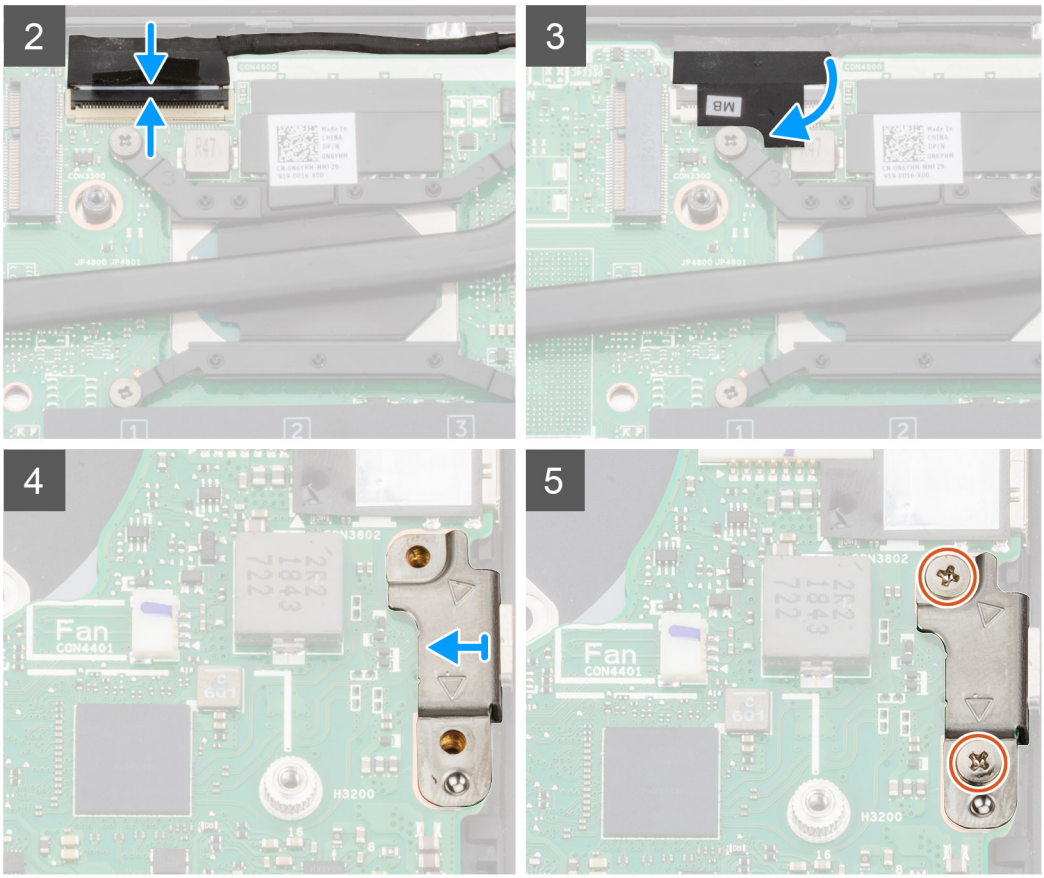
6x
M2x4

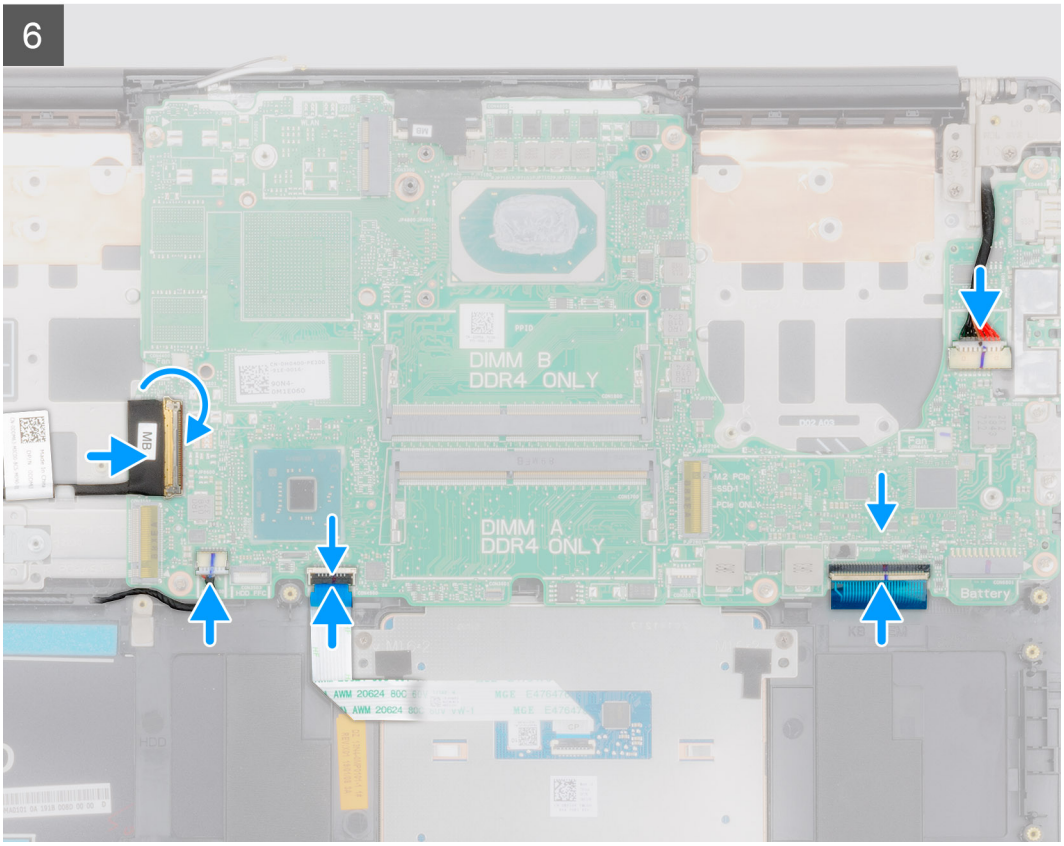


1



2x
M2x5





Steps

1 Slide the ports on the system board into the slots on the palm-rest and keyboard assembly and align the screw holes on the system board with the screw holes on the palm-rest and keyboard assembly.
2 Replace the six screws (M2x4) that secure the system board to the palm-rest and keyboard assembly.
3 Connect the display cable on to the connector on the system board.
4 Adhere the tape that secures the display cable to the system board.
5 Replace the two screws (M2x5) that secure the USB Type-C port bracket to the system board.
6 Connect the keyboard-backlight cable to the system board and close the latch to secure the cable.
7 Connect the touchpad cable to the system board and close the latch to secure the cable.
8 Connect the speaker cable to the system board.
9 Connect the power-adapter cable to the system board.
10 Connect the I/O-board cable to the system board and close the latch to secure the cable.

Next step

1 Install the display assembly.
2 Install the memory module.
3 Install the heat sink.
4 Install the left-side fan.
5 Install the right-side fan.
6 Install the WLAN card.
7 Install the M.2 2230 solid-state drive.
8 Install the M.2 2280 solid-state drive.
9 Install the battery.
10 Install the base cover.

11 Follow the procedure in After working inside your computer.

Palmrest assembly

Removing the palm-rest and keyboard assembly

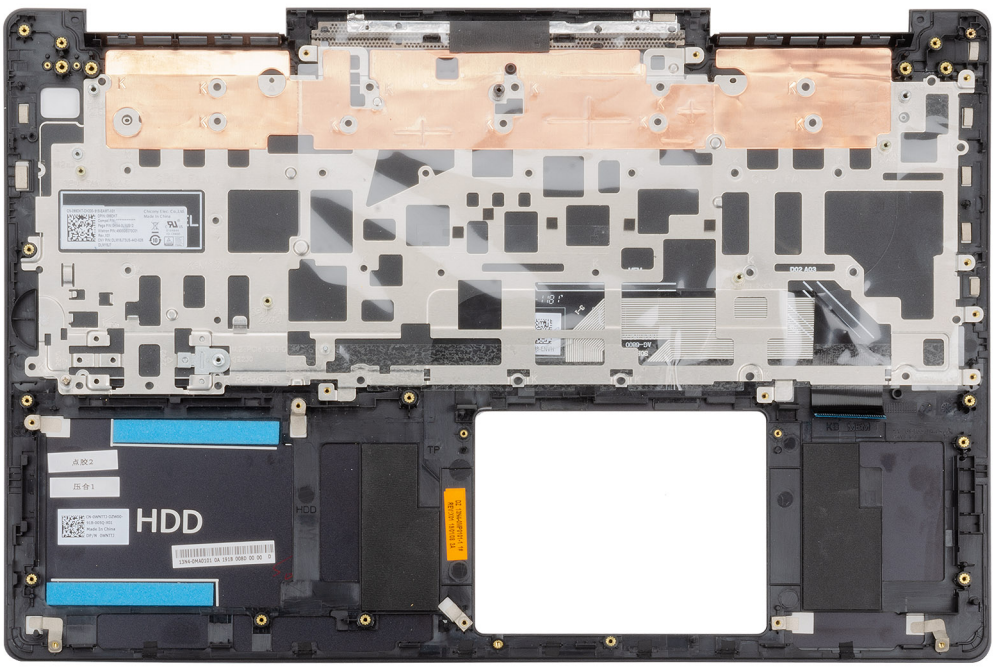
Prerequisites

1 Follow the procedure in Before working inside your computer.
2 Remove the base cover.
3 Remove the battery.
4 Remove the WLAN card.
5 Remove the hard drive.
6 Remove the GPU fan.
7 Remove the CPU fan.
8 Remove the speakers.
9 Remove the display assembly.
10 Remove the I/O board.
11 Remove the power button with fingerprint reader.
12 Remove the power-adapter port.
13 Remove the touchpad.
14 Remove the system board.

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

About this task

The figure indicates the location of the palm-rest and keyboard assembly and provides a visual representation of the removal procedure.



Step

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

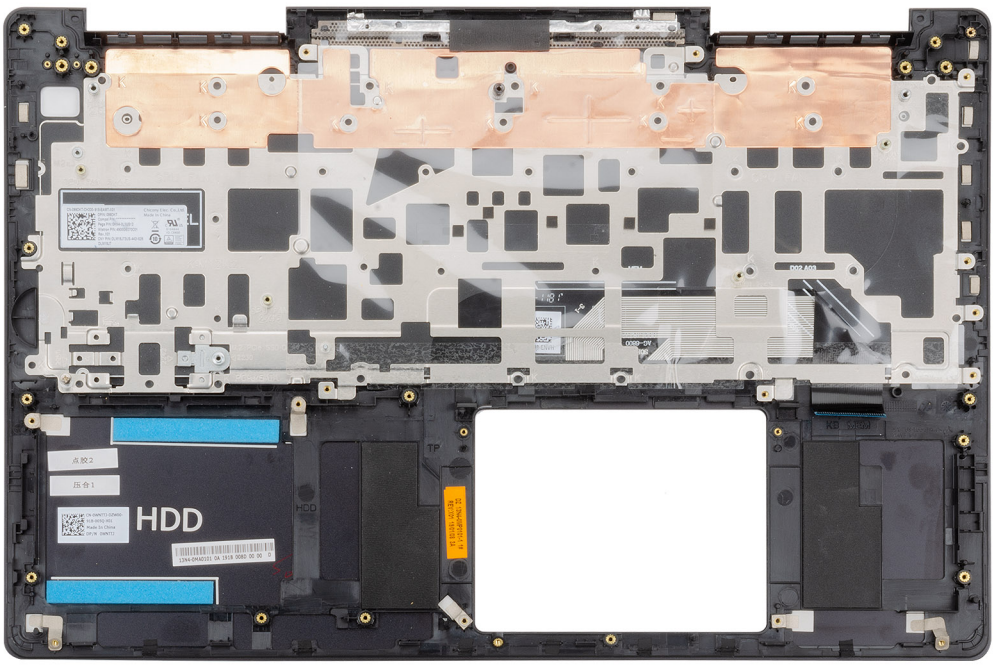
Installing the palm-rest and keyboard assembly

Prerequisite

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

About this task

The figure indicates the location of the palm-rest and keyboard assembly and provides a visual representation of the installation procedure.



Step

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

Next step

1. Install the system board.
2. Install the touchpad.
3. Install the power-adapter port.
4. Install the power button with fingerprint reader.
5. Install the I/O board.
6. Install the display assembly.
7. Install the speakers.
8. Install the CPU fan.
9. Install the GPU fan.
10. Install the hard drive.
11. Install the WLAN card.
12. Install the battery.
13. Install the base cover.
14. Follow the procedure in After working inside your computer.

3

Software

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

Downloading drivers

1 Turn on the notebook.
2 Go to **Dell.com/support**.
3 Click **Product Support**, enter the Service Tag of your notebook, and then click **Submit**.

ⓘ **NOTE: If you do not have the Service Tag, use the auto detect feature or manually browse for your notebook model.**

4 Click **Drivers and Downloads**.
5 Select the operating system installed on your notebook.
6 Scroll down the page and select the driver to install.
7 Click **Download File** to download the driver for your notebook.
8 After the download is complete, navigate to the folder where you saved the driver file.
9 Double-click the driver file icon and follow the instructions on the screen.

4

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:

- Boot menu
- Navigation keys
- Boot Sequence
- System setup options
- Updating the BIOS in Windows
- System and setup password

Boot menu

Press <F12> when the Dell logo appears to initiate a one-time boot menu with a list of the valid boot devices for the system. Diagnostics and BIOS Setup options are also included in this menu. The devices listed on the boot menu depend on the bootable devices in the system. This menu is useful when you are attempting to boot to a particular device or to bring up the diagnostics for the system. Using the boot menu does not make any changes to the boot order stored in the BIOS.

The options are:

- **UEFI Boot**:
  - Windows Boot Manager
- **Other Options**:
  - BIOS Setup
  - Device Configuration
  - BIOS Flash Update
  - Diagnostics
  - SupportAssist OS Recovery
  - Exit Boot Menu and Continue

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.

Keys	Navigation
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

  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 the laptop and its installed devices, the items listed in this section may or may not appear.

General options

Table 2. General options

Option	Description
System Information	This section lists the primary hardware features of your computer. The options are: • **System Information** • **Memory Configuration** • **Processor Information** • **Device Information**
Battery Information	Displays the battery status and the type of AC adapter connected to the computer.

Option	Description
Boot Sequence	Allows you to change the order in which the computer attempts to find an operating system. The options are: · **Windows Boot Manager**—Enable or disable the Windows Boot Manager option. · **Boot List Option**—You can add, delete, and view the boot options.
Advanced Boot Options	Enable or disable the UEFI Network Stack option.
UEFI Boot Path Security	Allows you to control whether the system prompts the user to enter the Admin password when booting to a UEFI boot path. Click one of the following options: · **Always, Except Internal HDD**—Default · **Always** · **Never**
Date/Time	Allows you to set the date and time. The change to the system date and time takes effect immediately.

System configuration

Table 3. System Configuration options

Option	Description
SATA Operation	Allows you to configure the operating mode of the integrated SATA hard-drive controller. The options are: · **Disabled** · **AHCI** · **RAID On**—By default, the RAID On option is enabled. **NOTE: SATA is configured to support RAID mode.**
Drives	Allows you to enable or disable various drives on board. The options are: · **SATA-0** · **SATA–1** · **M.2 PCIe SSD-0** · **M.2 PCIe SSD-1** By default, all the options are enabled.
SMART Reporting	This field controls whether hard drive errors for integrated drives are reported during system startup. This technology is part of the SMART (Self Monitoring Analysis and Reporting Technology) specification. By default, the **Enable SMART Reporting** option is disabled .

Option	Description
USB Configuration	Allows you to enable or disable the internal/integrated USB configuration. The options are: · **Enable USB Boot Support** · **Enable External USB Port** By default, all the options are enabled. **NOTE: USB keyboard and mouse always work in the BIOS setup irrespective of these settings.**
Thunderbolt Adapter Configuration	Allows you to configure the Thunderbolt adapter security settings within the operating system. The options are: · **Thunderbolt**—This option is enabled by default. · **Enable Thunderbolt Support** · **Enable Thunderbolt (and PCIe behind TBT) Pre-boot Modules** · **No Security** · **User Authorization**—This option is enabled by default. · **Secure Connect** · **Display Port and USB Only**
Thunderbolt Auto Switch	Allows you to configure the method used by the Thunderbolt controller to perform the PCIe device enumeration. By default, the **Auto switch** option is enabled. The options are: · **Native Enumeration** · **BIOS Assist Enumeration**
Audio	Allows you to enable or disable the integrated audio controller. By default, the **Enable Audio** option is selected. The options are: · **Enable Microphone** · **Enable Internal Speaker** By default, all the options are enabled.
Fingerprint Reader	Enables or disables the fingerprint reader device. The options are: · Enable Fingerprint Reader Device · Enable Finger Reader Single Sign On By default, both the options are enabled.
Miscellaneous devices	Allows you to enable or disable the following devices: · **Enable Camera** · **Enable Hard Drive Free Fall Protection** · **WiFi Radio** · **Enable Secure Digital (SD) Card** By default, all the options are enabled.

Video screen options

Table 4. Video

Option	Description
LCD Brightness	Allows you to set the display brightness depending upon the power source. By default, Brightness On Battery is 50% and Brightness On AC is 100%.

Security

Table 5. Security

Option	Description
Admin Password	Allows you to set, change, or delete the administrator (admin) password. The entries to set password are: · **Enter the old password:** · **Enter the new password:** · **Confirm new password:** Click **OK** once you set the password. **NOTE: By default, the Enter the old password field is marked as Not set. Hence, password has to be set for the first time you login and then you can change or delete the password.**
System Password	Allows you to set, change, or delete the system password. The entries to set password are: · **Enter the old password:** · **Enter the new password:** · **Confirm new password:** Click **OK** once you set the password. **NOTE: By default, the Enter the old password field is marked as Not set. Hence, password has to be set for the first time you login and then you can change or delete the password.**
Strong Password	Allows you to enforce the option to always set strong password. · **Enable Strong Password** By default, this option is disabled.
Password Configuration	You can define the length of your password. Min = 4, Max = 32
Password Bypass	Allows you to bypass the System password and the Internal HDD password, when it is set, during a system restart. The options are: · **Disabled**—This option is enabled by default. · **Reboot bypass**

Option	Description
Password Change	Allows you to change the system password when the administrator password is set. • **Allow Non-Admin Password Changes** By default, this option is enabled.
Non-Admin Setup Changes	Allows you to determine whether changes to the setup options are allowed when an administrator password is set. If disabled the setup options are locked by the admin password. • **Allow Wireless Switch Changes** By default, this option is disabled.
UEFI Capsule Firmware Updates	Allows you to update the system BIOS through UEFI capsule update packages. • **Enable UEFI Capsule Firmware Updates** By default, this option is enabled.
TPM 2.0 Security	Allows you to enable or disable the Trusted Platform Module (TPM) during POST. The options are: • **TPM On**—This option is enabled by default. • **Clear** • **PPI Bypass for Enable Commands** • **PPI Bypass for Disbale Commands** • **PPI Bypass for Clear Command** • **Attestation Enable**—This option is enabled by default. • **Key Storage Enable**—This option is enabled by default. • **SHA-256**—This option is enabled by default.
Absolute®	This field lets you Enable, Disable, or Permanently Disable the BIOS module interface of the optional Absolute Persistence Module service from Absolute® Software.
Admin Setup Lockout	Allows you to prevent users from entering Setup when an administrator password is set. • **Enable Admin Setup Lockout** By default, this option is disabled.
Master Password Lockout	Allows you to disable master password support. • **Enable Master Password Lockout** By default, this option is disabled. **NOTE: Hard Disk password should be cleared before the settings can be changed.**
SMM Security Mitigation	Allows you to enable or disable additional UEFI SMM Security Mitigation protection. • **SMM Security Mitigation** By default, this option is enabled.

Secure boot

Table 6. Secure Boot

Option	Description
Secure Boot Enable	Allows you to enable or disable the Secure Boot Feature. • **Secure Boot Enable**—By default, this option is disabled.
Secure Boot Mode	Changes to the Secure Boot operation mode modifies the behavior of Secure Boot to allow evaluation of UEFI driver signatures. This options are: • **Deployed Mode**—By default, this option is enabled. • **Audit Mode**
Expert Key Management	Allows you to enable or disable Expert Key Management. • **Enable Custom Mode**—By default, this option is disabled. The Custom Mode Key Management options are: • **PK**—By default, this option is disabled. • **KEK** • **db** • **dbx**

Intel Software Guard Extensions options

Table 7. Intel Software Guard Extensions

Option	Description
Intel SGX Enable	This field specifies you to provide a secured environment for running code/storing sensitive information in the context of the main OS. Click one of the following options: • **Disabled** • **Enabled** • **Software controlled**—Default
Enclave Memory Size	This option sets **SGX Enclave Reserve Memory Size** Click one of the following options: • **32 MB** • **64 MB** • **128 MB**—Default

Performance

Table 8. Performance

Option	Description
Multi Core Support	This field specifies whether the process has one or all cores enabled. The performance of some applications improves with the additional cores. · **All**—Default · **1** · **2** · **3**
Intel SpeedStep	Allows you to enable or disable the Intel SpeedStep mode of processor. · **Enable Intel SpeedStep** This option is set by default.
C-States Control	Allows you to enable or disable the additional processor sleep states. · **C states** This option is set by default.
Intel® TurboBoost™	This option enables or disables the Intel® TurboBoost™ mode of the processor
Hyper-Thread Control	Allows you to enable or disable the HyperThreading in the processor. · **Disabled** · **Enabled**—Default

Power management

Table 9. Power Management

Option	Description
Lid Switch	Allows you to disable the lid switch. The options are: · **Enable Lid Switch**—enabled by default · **Power On Lid Open**—enabled by default
AC Behavior	Allows you to enable or disable the computer from turning on automatically when an AC adapter is connected. · **Wake on AC** By default, this option is disabled.

Option	Description
Enable Intel Speed Shift technology	Allows you to enable or disable the Intel Speed Shift Technology option. By default, this option is enabled.
Auto On Time	Allows you to set the time at which the computer must turn on automatically. The options are: • **Disabled**—enabled by default • **Every Day** • **Weekdays** • **Select Days**
USB Wake Support	Allows you to enable USB devices to wake the system from standby. By default, the option **Enable USB Wake Support** is disabled.
Block Sleep	This option enables you to block entering to sleep in operating system environment. By default, the **Block Sleep** option is disabled.
Advanced Battery Charge Configuration	This option enables you to maximize the battery health. When you enable this option, your system uses the standard charging algorithm and other techniques, during the nonwork hours to improve the battery health. By default, the **Enable Advanced Battery Charge Mode** option is disabled.
Primary Battery Charge Configuration	Allows you to select the charging mode for the battery. The options are: • **Adaptive**—enabled by default • **Standard** • **ExpressCharge** • **Primarily AC use** • **Custom** If Custom Charge is selected, you can also configure Custom Charge Start and Custom Charge Stop. **NOTE: All charging mode may not be available for all the batteries.**
Type-C Connector Power	Allows you to set the maximum power that can be drawn from the type-c connector. The options are: • 7.5 Watts—enabled by default • 15 Watts

Post behavior

Table 10. POST Behavior

Option	Description
Adapter Warnings	Allows you to enable or disable the system setup (BIOS) warning messages when you use certain power adapters. • **Enable Adapter Warnings**—enabled by default
Keypad (embedded)	Allows you to choose one of two methods to enable the keyboard that is embedded in the internal keyboard. The options are: • **Fn Key Only**—enabled by default • **By Numlock**

Option	Description
Numlock Enable	Allows you to enable or disable the Numlock function when the system boots. • **Enable Numlock**—enabled by default
Fn Lock Options	Allows you to let hot key combinations Fn + Esc toggle the primary behavior of F1–F12, between their standard and secondary functions. If you disable this option, you cannot toggle dynamically the primary behavior of these keys. By default, the **Fn Lock** option is enabled. Select one of the following options: • **Lock Mode Disable/Standard** • **Lock Mode Enable/Secondary**—enabled by default
Fastboot	Allows you to speed up the boot process by bypassing some of the compatibility steps. Select one of the following options: • **Minimal**—enabled by default • **Thorough** • **Auto**
Extended BIOS POST Time	Allows you to create an additional preboot delay. Select one of the following options: • **0 seconds**—enabled by default • **5 seconds** • **10 seconds**
Full Screen Logo	Allows you to display full screen logo, when your image matches screen resolution. By default, the **Enable Full Screen Logo** option is disabled.
Warnings and Errors	Allows you to select different options to either stop, prompt and wait for user input, continue when warnings are detected but pause on errors, or continue when either warnings or errors are detected during the POST process. Select one of the following options: • **Prompt on Warnings and Errors**—enabled by default • **Continue on Warnings** • **Continue on Warnings and Errors**

Virtualization support

Table 11. Virtualization Support

Option	Description
Virtualization	This option specifies whether a Virtual Machine Monitor (VMM) can use the additional hardware capabilities that are provided by the Intel Virtualization technology. By default, the **Enable Intel Virtualization Technology** option is enabled.
VT for Direct I/O	Enables or disables the Virtual Machine Monitor (VMM) from using the additional hardware capabilities that are provided by the Intel Virtualization technology for direct I/O. By default, the **Enable VT for Direct I/O** option is enabled.

Wireless options

Table 12. Wireless

Option	Description
Wireless Switch	Allows to set the wireless devices that can be controlled by the wireless switch. The options are: · **WLAN** · **Bluetooth®** All the options are enabled by default.
Wireless Device Enable	Allows you to enable or disable the internal wireless devices. The options are: · **WLAN** · **Bluetooth®** All the options are enabled by default.

Maintenance

Table 13. Maintenance

Option	Description
Service Tag	Displays the service tag of your computer.
Asset Tag	Allows you to create a system asset tag if an asset tag is not already set. This option is not set by default.
BIOS Downgrade	Allows you to flash previous revisions of the system firmware. · **Allow BIOS Downgrade** This option is set by default.
Data Wipe	Allows you to securely erase data from all internal storage devices. · **Wipe on Next Boot** This option is not set by default.
Bios Recovery	**BIOS Recovery from Hard Drive**—By default, this option is enabled. Allows you to recover the corrupted BIOS from a recovery file on the HDD or an external USB key. **BIOS Auto-Recovery**— Allows you to recover the BIOS automatically.

System logs

Table 14. System Logs

Option	Description
BIOS events	Allows you to view and clear the System Setup (BIOS) POST events.
Thermal Events	Allows you to view and clear the System Setup (Thermal) events.
Power Events	Allows you to view and clear the System Setup (Power) events.

SupportAssist system resolution

Table 15. SupportAssit System Resolution

Option	Description
Auto OS Recovery Threshold	The **Auto OS Recovery Threshold** setup option controls the automatic boot flow for Support Assist System Resolution Console and Dell OS Recovery tool. Click one of the following options: · **OFF** · **1** · **2**—enabled by default · **3**
SupportAssist OS Recovery	Allows you to recover the SupportAssist OS Recovery (Disabled by default). By default, this option is enabled.

Updating the BIOS in Windows

Prerequisite

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

About this task

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

Steps

1 Restart the computer.

2 Go to **Dell.com/support**.

- Enter the **Service Tag** or **Express Service Code** and click **Submit**.
- Click **Detect Product** and follow the instructions on screen.

3 If you are unable to detect or find the Service Tag, click **Choose from all products**.

4 Choose the **Products** category from the list.

NOTE: Choose the appropriate category to reach the product page

5 Select your computer model and the **Product Support** page of your computer appears.

6 Click **Get drivers** and click **Drivers and Downloads**.

The Drivers and Downloads section opens.

7 Click **Find it myself**.

8 Click **BIOS** to view the BIOS versions.

9 Identify the latest BIOS file and click **Download**.

10 Select your preferred download method in the **Please select your download method below** window, click **Download File**.
The **File Download** window appears.

11 Click **Save** to save the file on your computer.

12 Click **Run** to install the updated BIOS settings on your computer.
Follow the instructions on the screen.

Updating BIOS on systems with BitLocker enabled

△ **CAUTION: If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, see Knowledge Article: https://www.dell.com/support/article/sln153694**

Updating your system BIOS using a USB flash drive

About this task

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

ⓘ **NOTE: You will need to use a bootable USB Flash drive. Please refer to the following article for further details: https://www.dell.com/support/article/us/en/19/sln143196/**

Steps

1 Download the BIOS update .EXE file to another system.

2 Copy the file e.g. O9010A12.EXE onto the bootable USB Flash drive.

3 Insert the USB Flash drive into the system that requires the BIOS update.

4 Restart the system and press F12 when the Dell Splash logo appears to display the One Time Boot Menu.

5 Using arrow keys, select **USB Storage Device** and click Return.

6 The system will boot to a Diag C:\> prompt.

7 Run the file by typing the full filename e.g. O9010A12.exe and press Return.

8 The BIOS Update Utility will load, follow the instructions on screen.

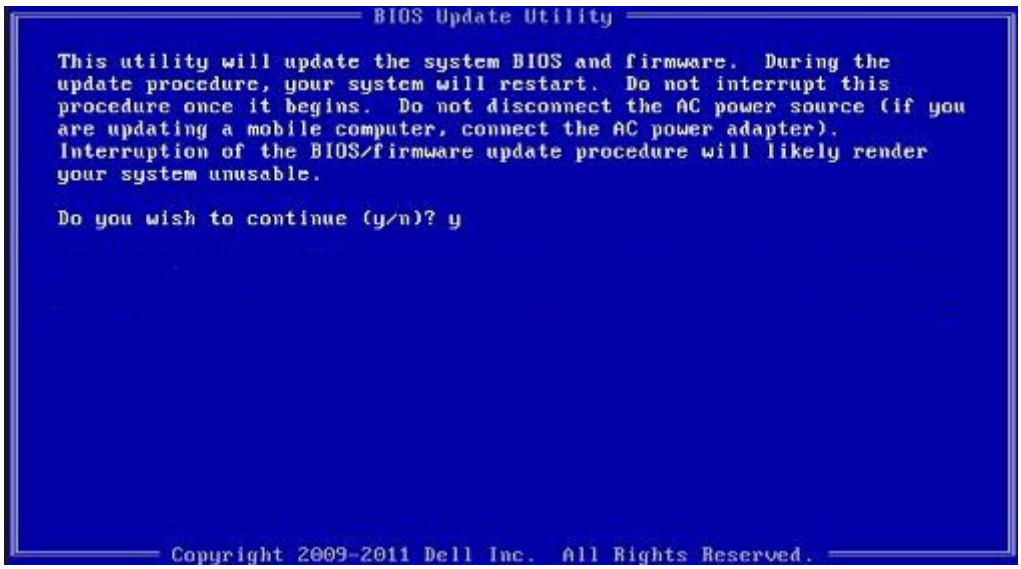


Figure 1. DOS BIOS Update Screen

Updating the Dell BIOS in Linux and Ubuntu environments

If you want to update the system BIOS in a Linux environment such as Ubuntu, see https://www.dell.com/support/article/us/en/19/sln171755/.

Flashing the BIOS from the F12 One-Time boot menu

Updating your system BIOS using a BIOS update .exe file copied to a FAT32 USB key and booting from the F12 one time boot menu.

About this task

BIOS Update

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

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

NOTE: Only systems with BIOS Flash Update option in the F12 One-Time Boot Menu can use this function.

Updating from the One-Time Boot Menu

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

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

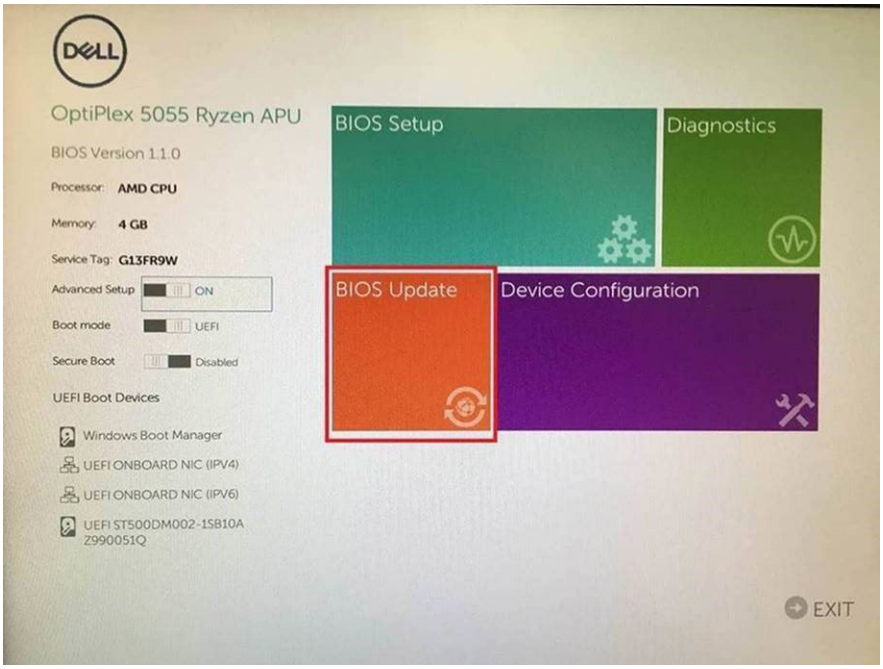
Perform the following steps to execute the BIOS update flash process from the F12 menu:

CAUTION: Do not power off the system during the BIOS update process. Powering off the system could make the system fail to boot.

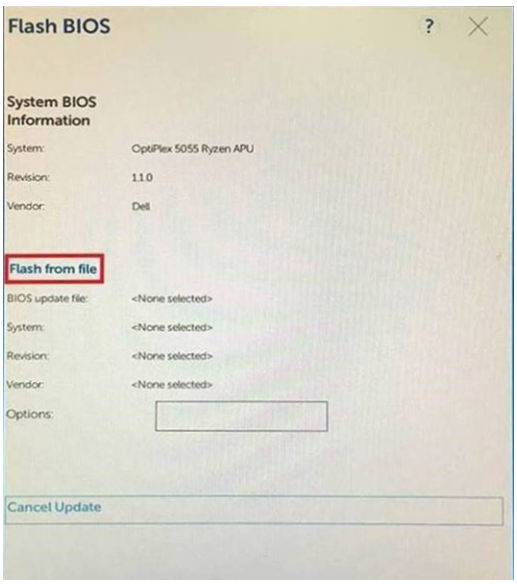
Steps

1 From a power off state, insert the USB key where you copied the flash into a USB port of the system .

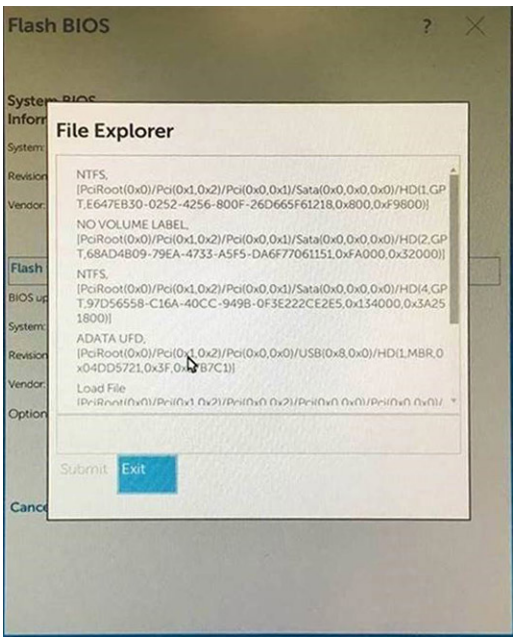
2 Power on the system and press the F12 key to access the One-Time Boot Menu, Highlight BIOS Update using the mouse or arrow keys then press **Enter**.



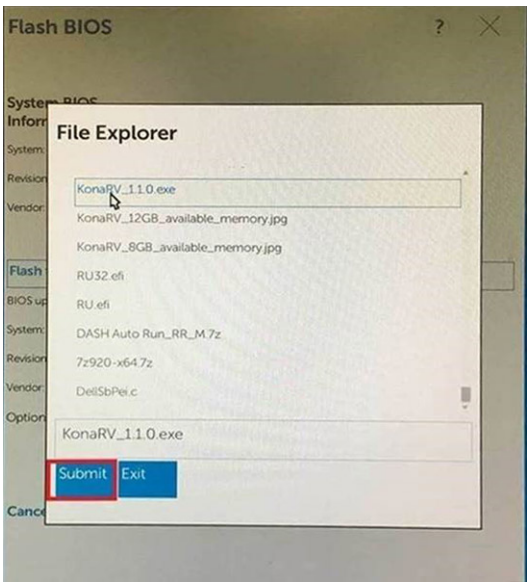
3 The Bios flash menu will open then click the **Flash from file**.



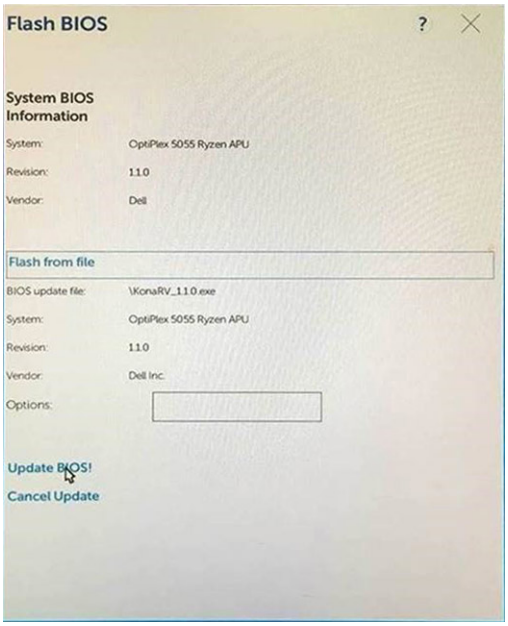
4 Select external USB device



5 Once the file is selected, Double click the flash target file, then press submit .



6 Click the **Update BIOS** then system will reboot to flash the BIOS.



7 Once complete, the system will reboot and the BIOS update process is completed.

System and setup password

Table 16. 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

Prerequisite

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

Prerequisite

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.

5

Troubleshooting

Enhanced Pre-Boot System Assessment (ePSA) diagnostics

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

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 17. 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
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 site 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.

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.

6

Getting help

Contacting Dell

Prerequisite

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

About this task

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

Steps

1 Go to **Dell.com/support.**

2 Select your support category.

3 Verify your country or region in the **Choose a Country/Region** drop-down list at the bottom of the page.

4 Select the appropriate service or support link based on your need.