Inspiron 7590

Service Manual

Notes, cautions, and warnings

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

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

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

Contents

Safety instructions

Prerequisites

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: 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:** 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.

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

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

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.

Before you begin

Steps

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

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

3. Disconnect your computer and all attached devices from their electrical outlets.
4. Disconnect all attached network devices and peripherals, such as keyboard, mouse, and monitor from your computer.
5. Remove any media card and optical disc from your computer, if applicable.

Electrostatic discharge—ESD protection

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

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 For this reason, some previously approved methods of handling parts are no longer applicable.

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

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

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

Perform the following steps to prevent ESD damage:

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

ESD field service kit

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

Components of an ESD field service kit

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

ESD protection summary

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

Transporting sensitive components

When transporting ESD sensitive components such as replacement parts or parts to be returned to Dell, it is critical to place these parts in anti-static bags for safe transport.

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**.

Removing and installing components

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

Recommended tools

The procedures in this document may require the following tools:

● Phillips screwdriver #1
● Flat-head screwdriver
● Plastic scribe

Screw list

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

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

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

Table 1. Screw list

Component	Secured to	Screw type	Quantity	Screw image
Base cover	Palm-rest and keyboard assembly	M2x5	5	
6-Cell battery	Palm-rest and keyboard assembly	M2x4	7	
3-Cell battery	Palm-rest and keyboard assembly	M2x4	4	
Display hinges	Palm-rest and keyboard assembly	M2.5x5	6	
Display assembly	Palm-rest and keyboard assembly	M2x4	6	
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	M1.2x2	1	
Power button and optional fingerprint reader	Palm-rest and keyboard assembly	M1.6x2	2	

Table 1. Screw list (continued)

Component	Secured to	Screw type	Quantity	Screw image
GPU fan	Palm-rest and keyboard assembly	M2x4	2	
M.2 2280 Solid-state drive	System board	M2x4	2	
M.2 2230 Solid-state drive	Palm-rest and keyboard assembly	M2x4	1	
USB Type-C bracket	System board	M2x4	2	
Touchpad bracket	Palm-rest and keyboard assembly	M2x3	3	
Touchpad	Palm rest and keyboard assembly	M1.6x2	2	
WLAN card bracket	WLAN card	M2x4	1	
System board	Palm-rest and keyboard assembly	M2x4	6	
Keyboard bracket	Palm rest	M1.2x2	39	

Base cover

Removing the base cover

Prerequisites

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. Remove the five screws (M2x5) that secure the base cover to the palm-rest and keyboard assembly.
2. Loosen the three captive screws that secure the base cover to the palm-rest and keyboard assembly.
3. Pry open the base cover starting from the top-center edge of the palm-rest and keyboard assembly and follow the "guidance line" indicated in the image to remove the base cover.

4. Lift the base cover off the palm-rest and keyboard assembly.

Installing the base cover

Prerequisites

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

About this task

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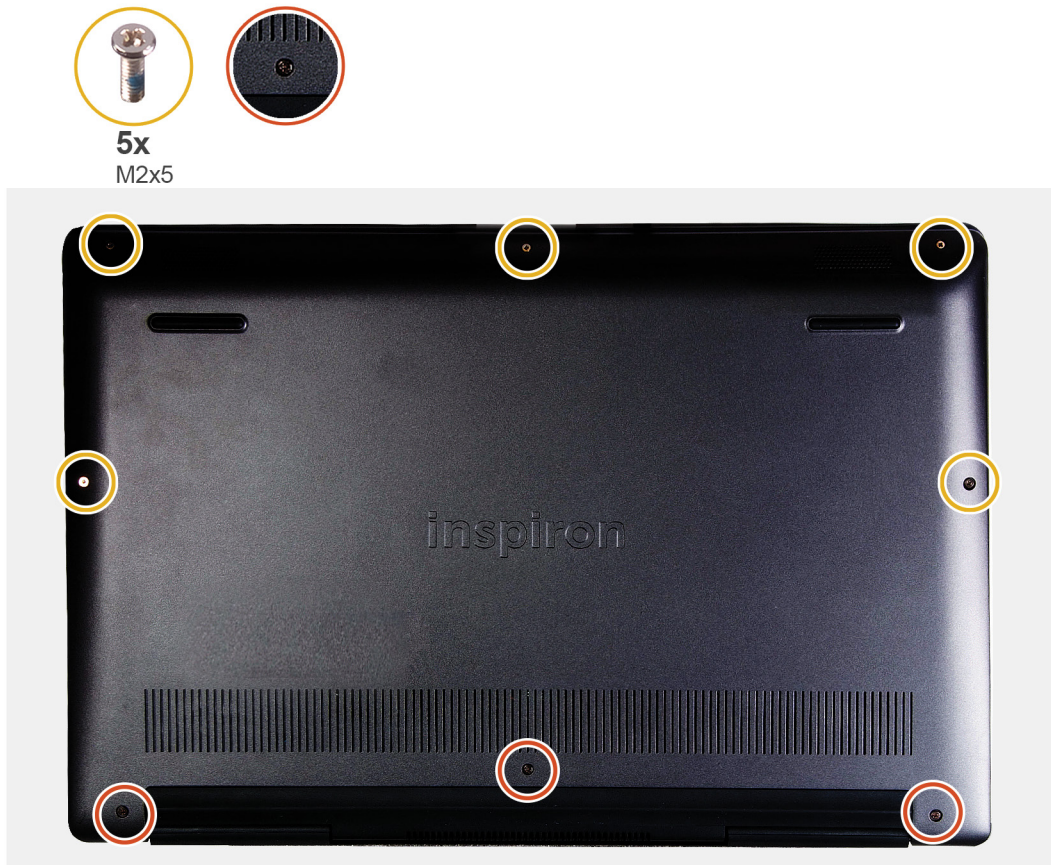
Steps

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

Next steps

1. Follow the procedure in After working inside your computer.

Battery

Lithium-ion battery precautions

⚠️ **CAUTION:**

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

Removing the 3-cell battery

ⓘ **NOTE:** The battery 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.

About this task

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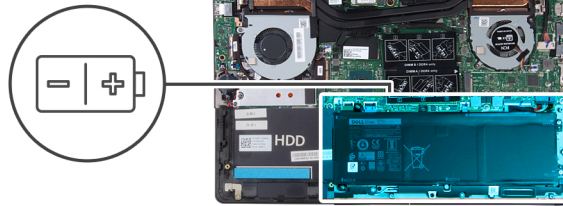
Steps

1. Disconnect the battery cable from the system board.
2. Remove the 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

Prerequisites

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

About this task

The figure indicates the location of the 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. 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.

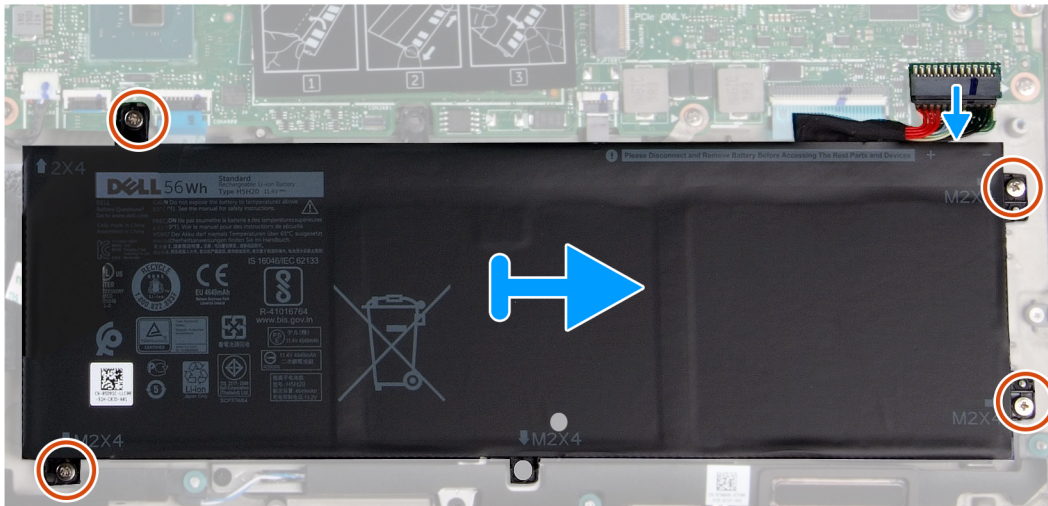# Removing the 6-cell battery

ⓘ **NOTE:** The battery 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.

About this task

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

7x
M2x4
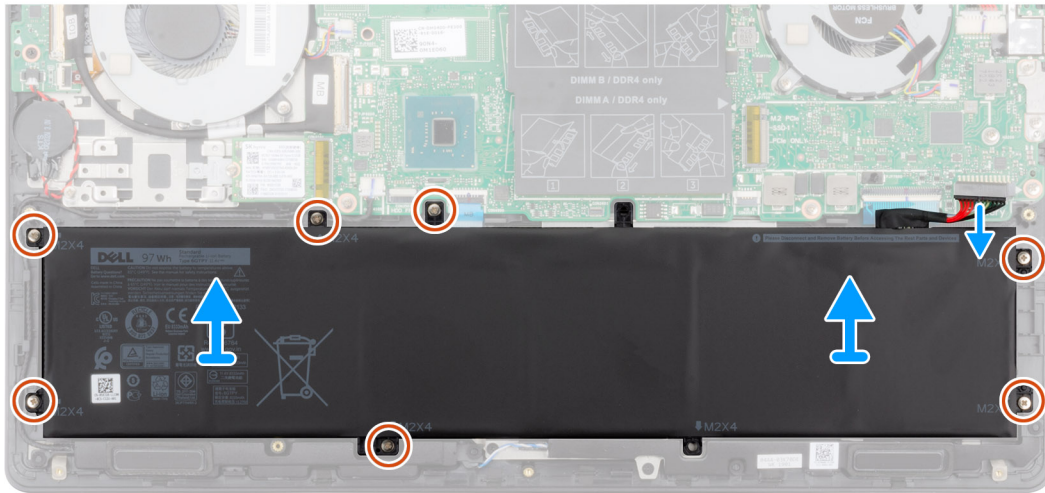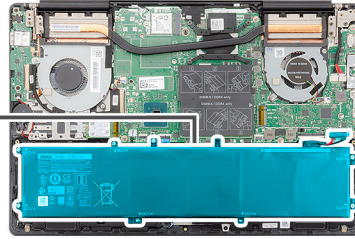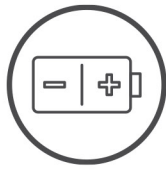
Steps

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

Prerequisites

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

About this task

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

7x
M2x4
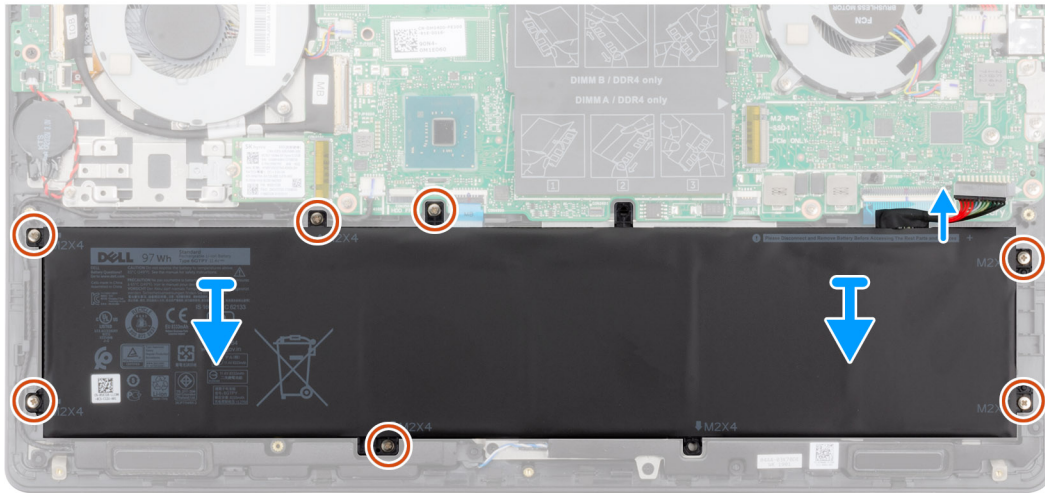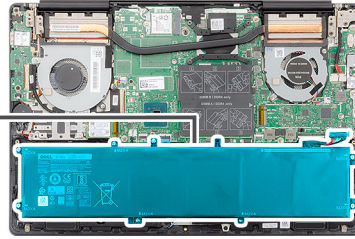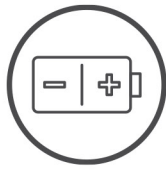
Steps

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. 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.
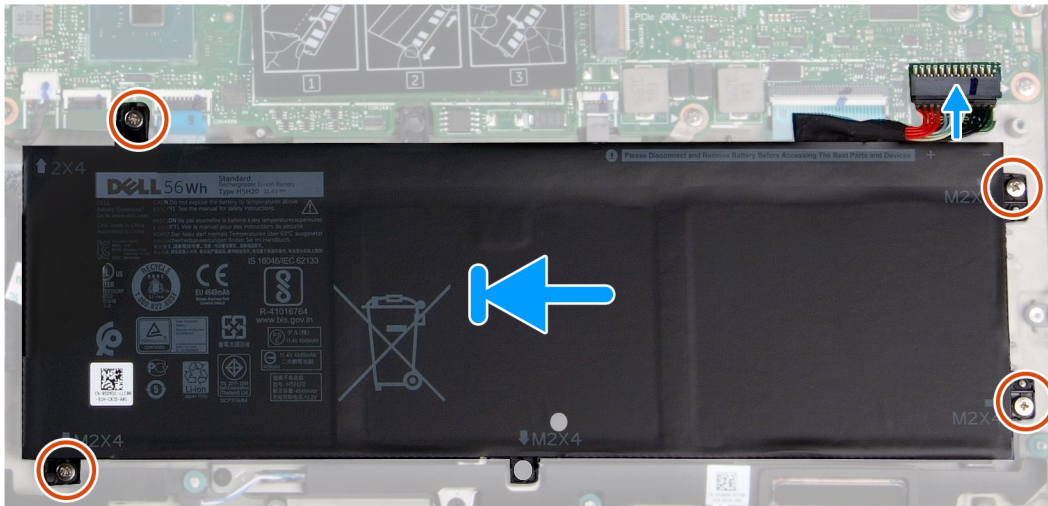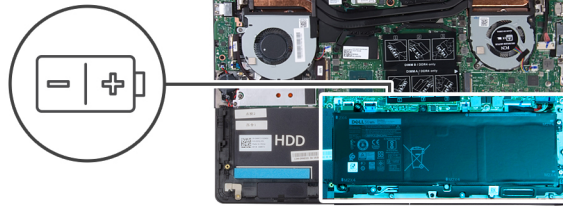2. Follow the procedure in After working inside your computer.

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.
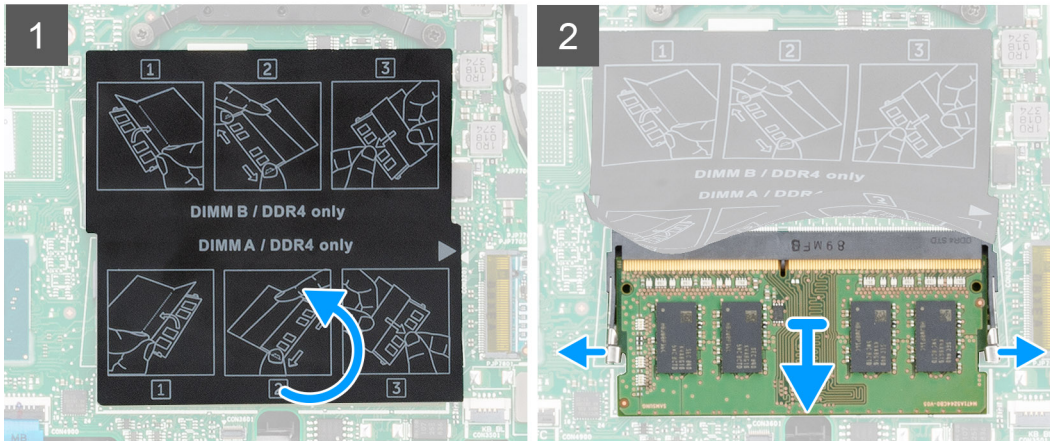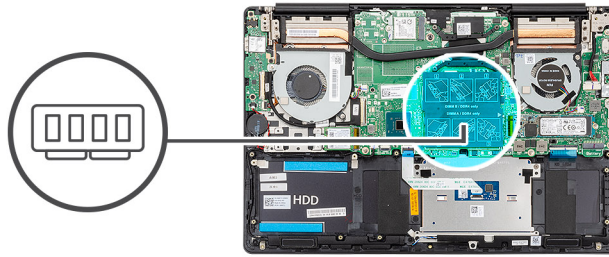
Steps

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

Prerequisites

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

About this task

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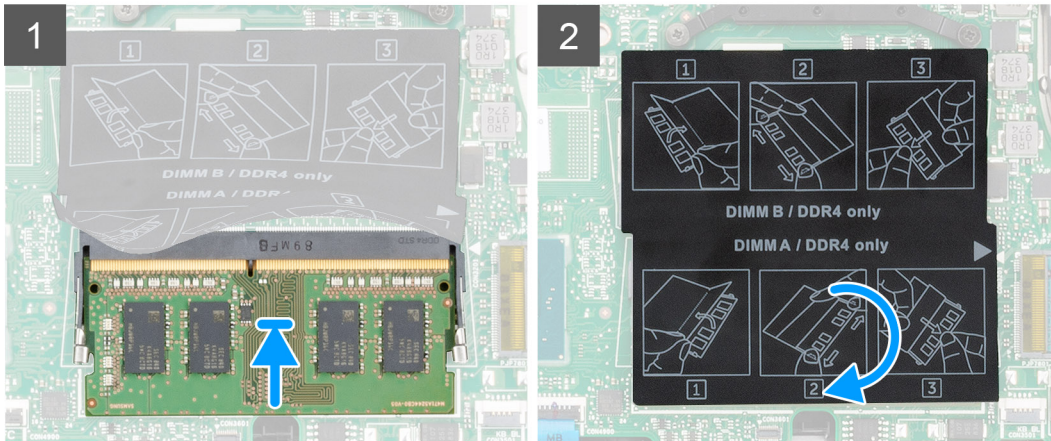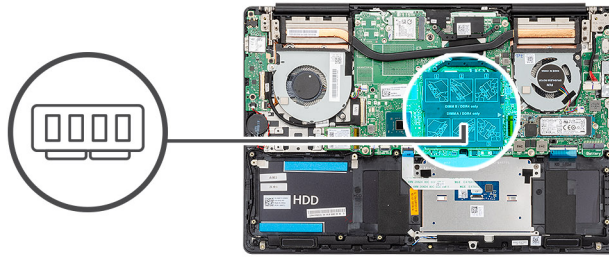
Steps

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.

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

Next steps

1. Connect the battery cable.
2. Install the base cover.
3. 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.

1x
M2x4
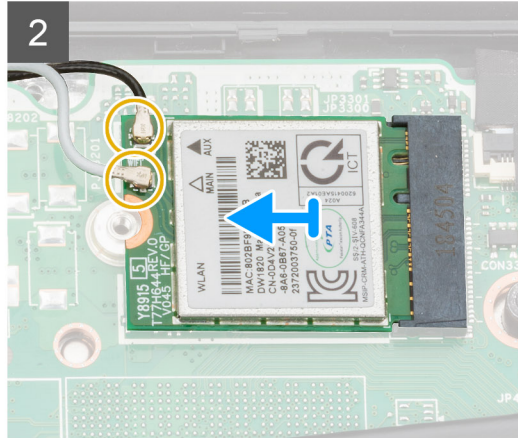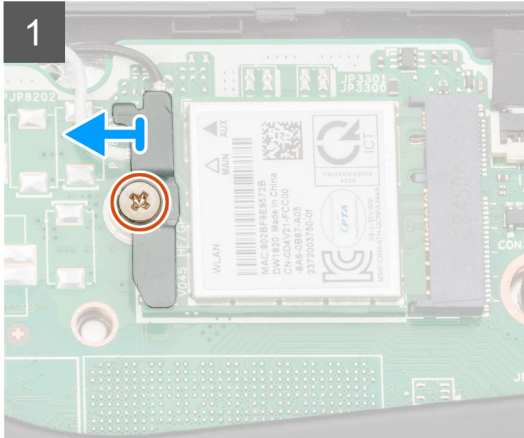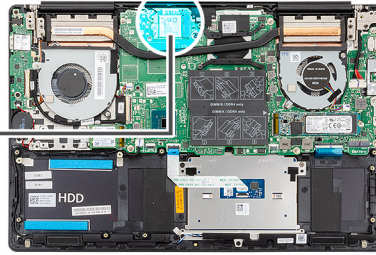
Steps

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

Prerequisites

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

About this task

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

1x
M2x4
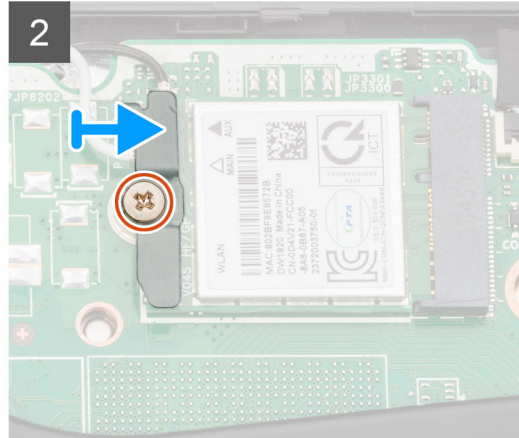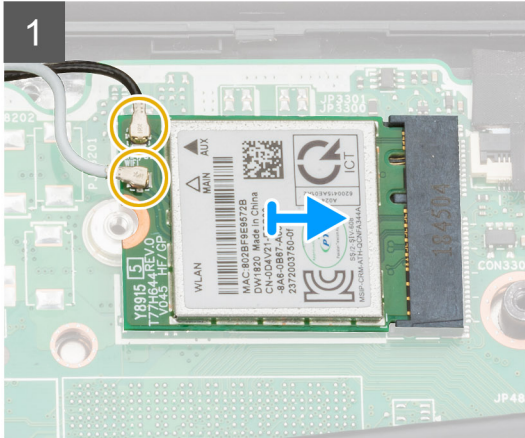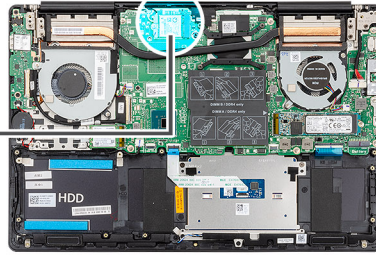
Steps

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 steps

1. Install the battery.
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.

(i) **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

Prerequisites

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

About this task

The figure indicates the location of the 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:
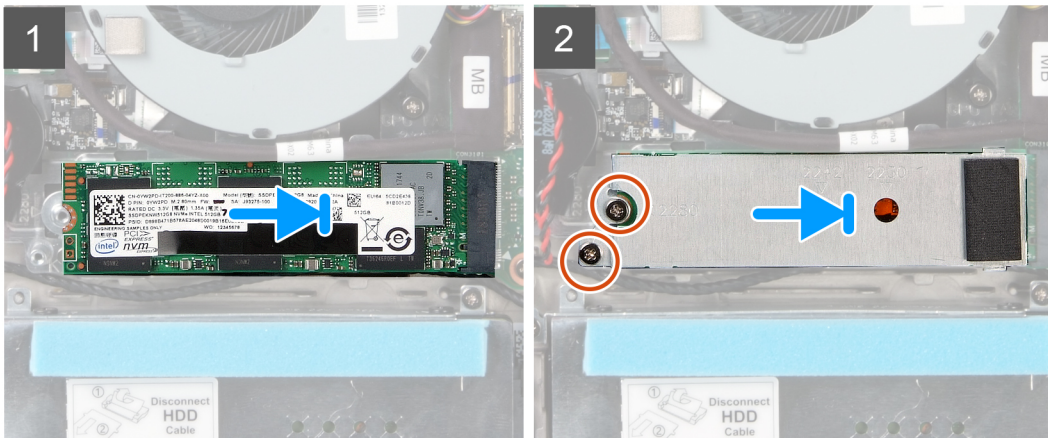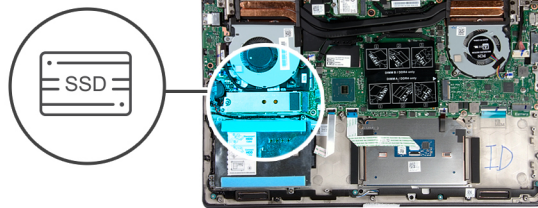
Steps

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 steps

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.
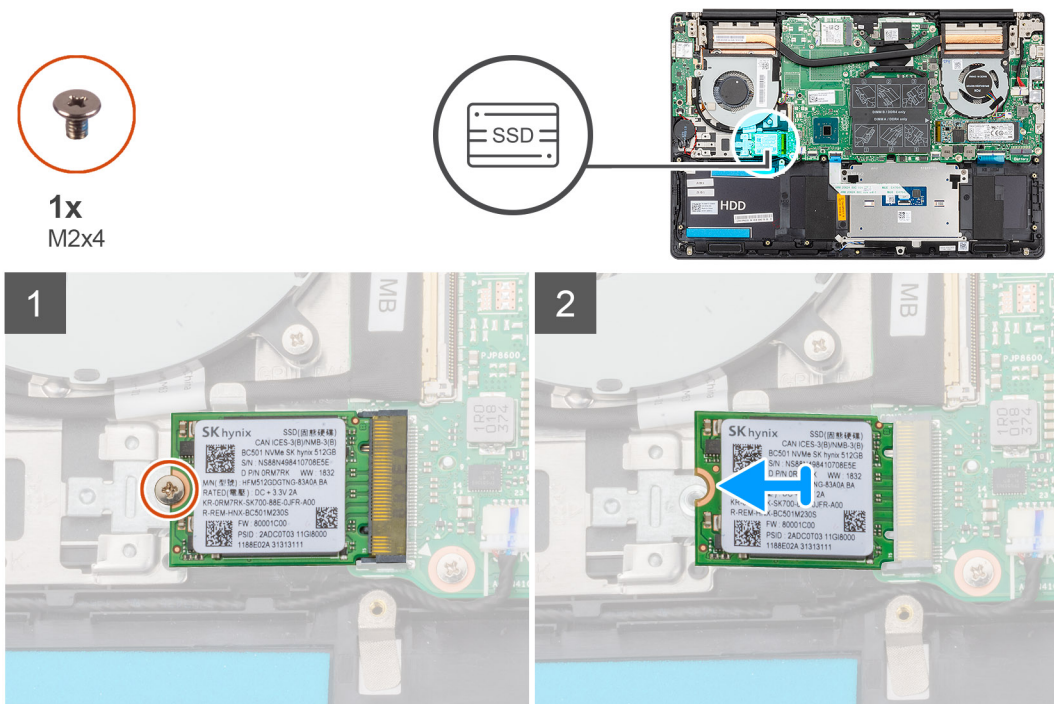
Steps

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

Prerequisites

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

About this task

The figure indicates the location of the 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:
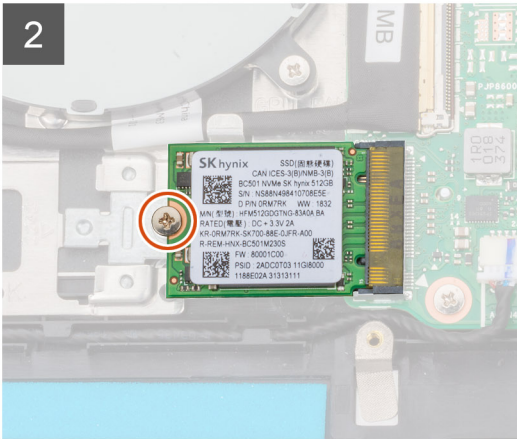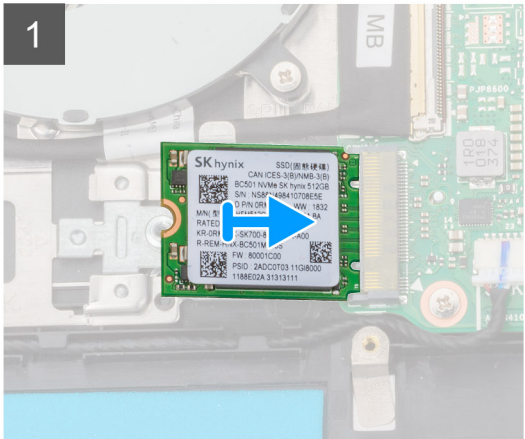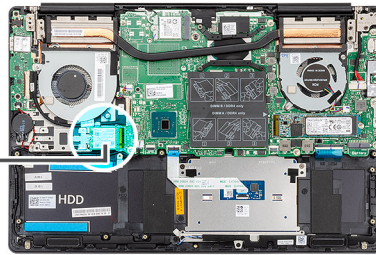
Steps

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 steps

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

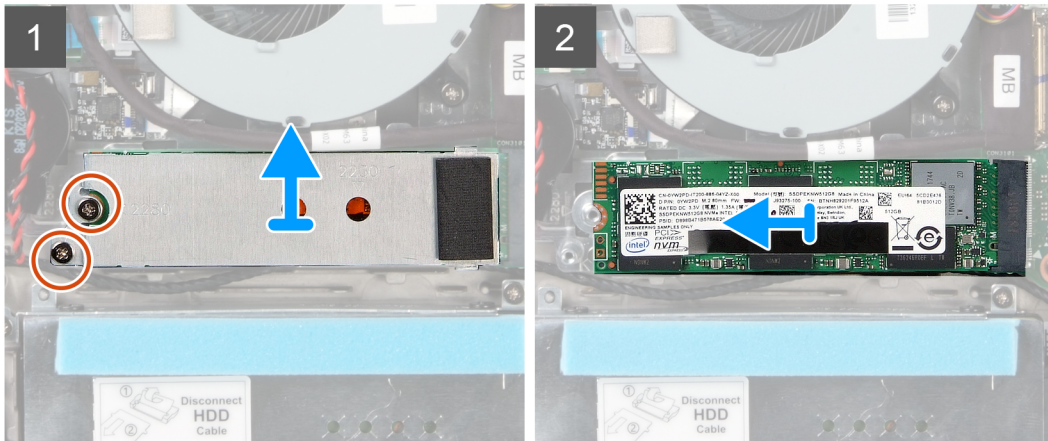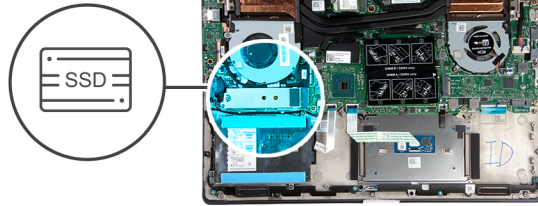**Prerequisites**

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.
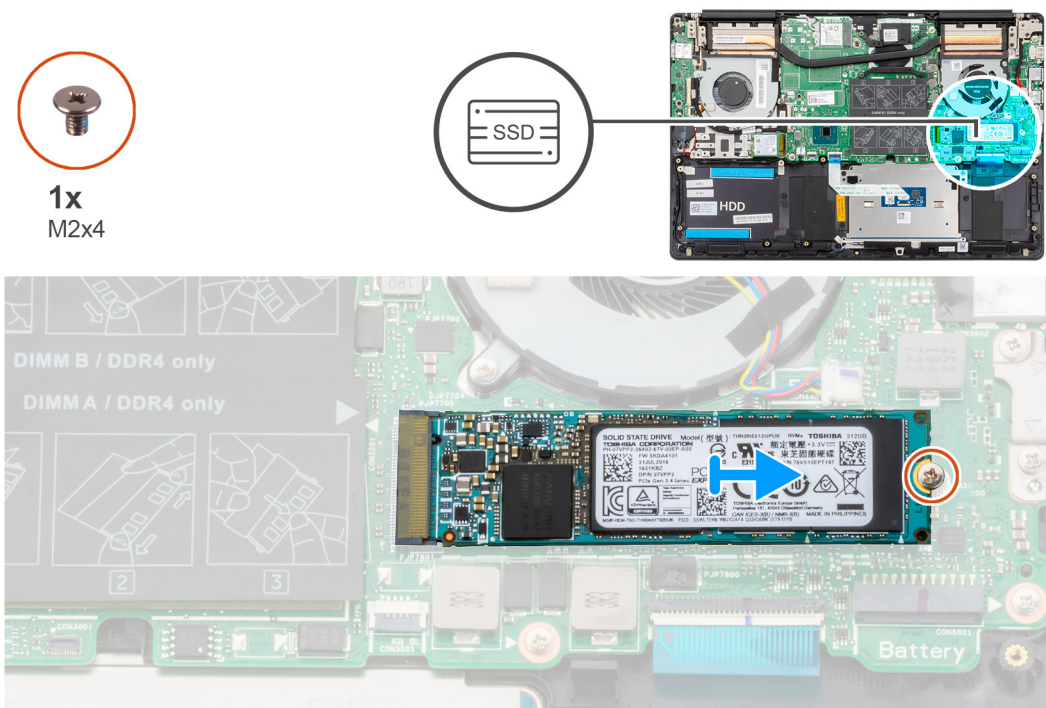
Steps

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.

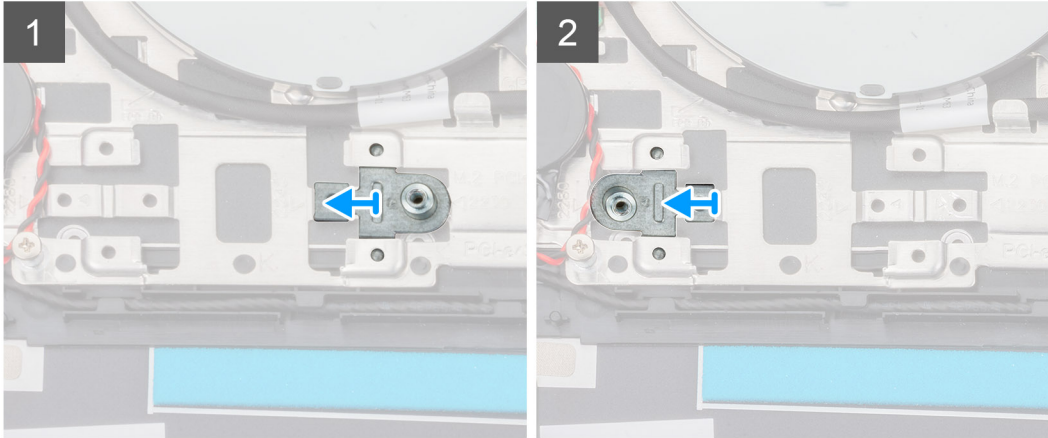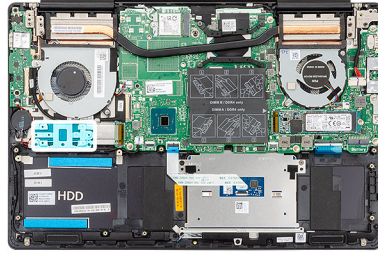# Installing the M.2 2280 PCIe solid-state drive

Prerequisites

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

**About this task**

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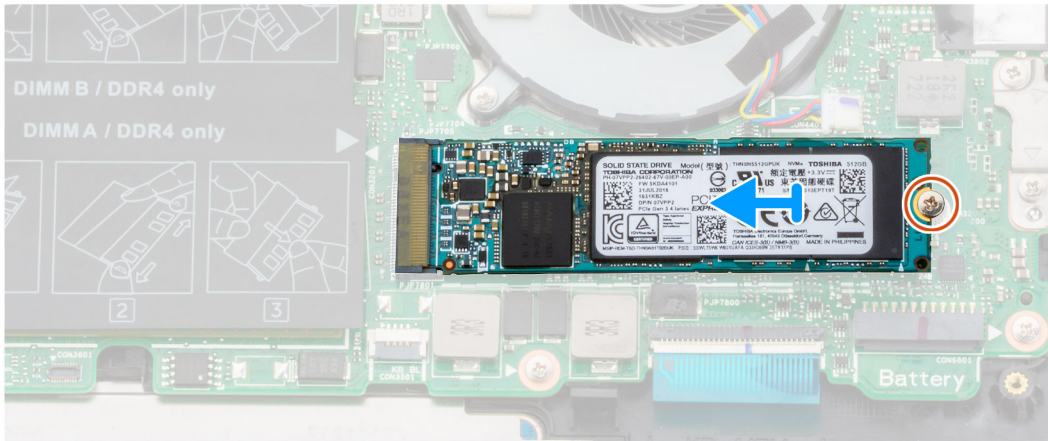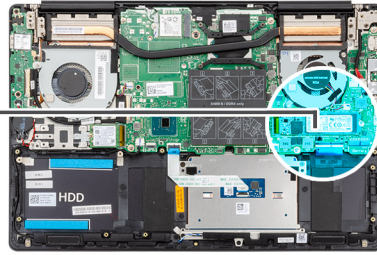
Steps

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 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.
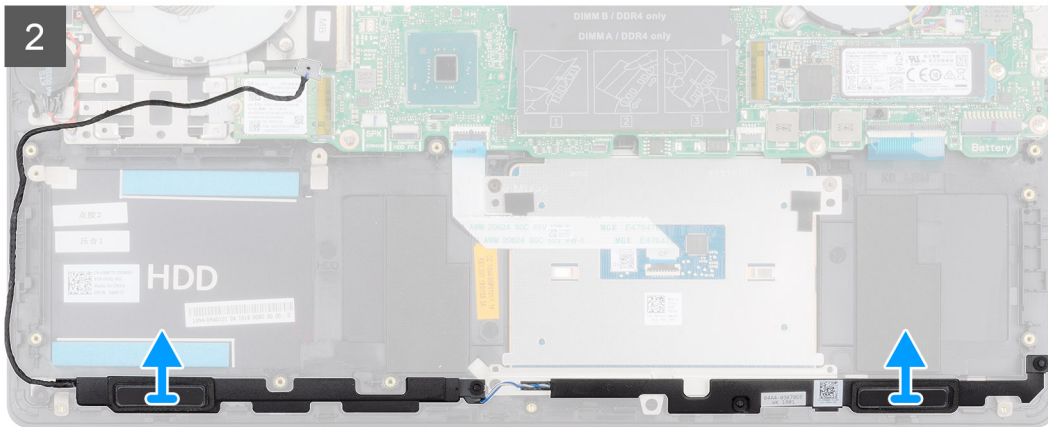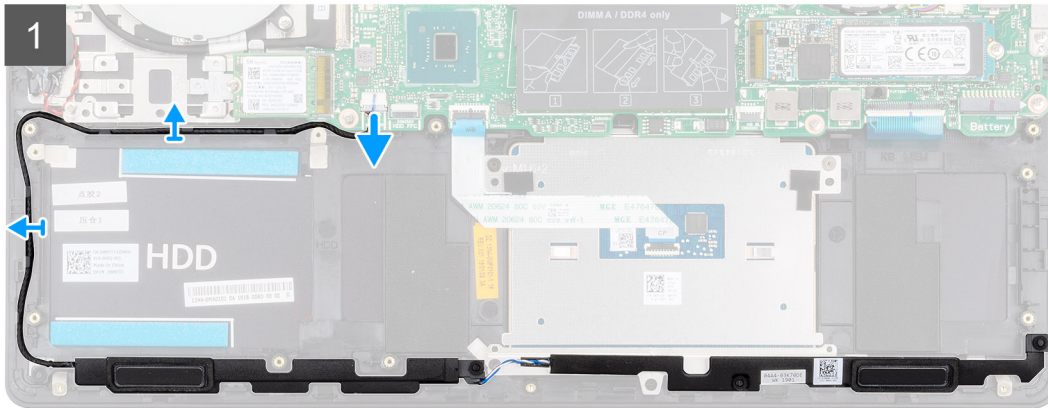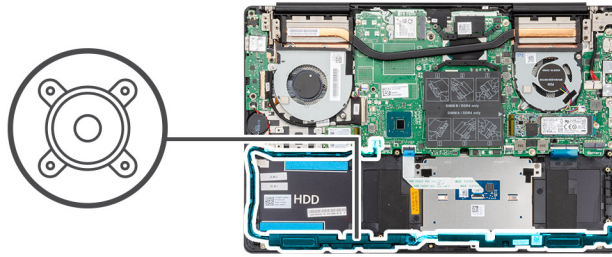
Steps

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

Prerequisites

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

About this task

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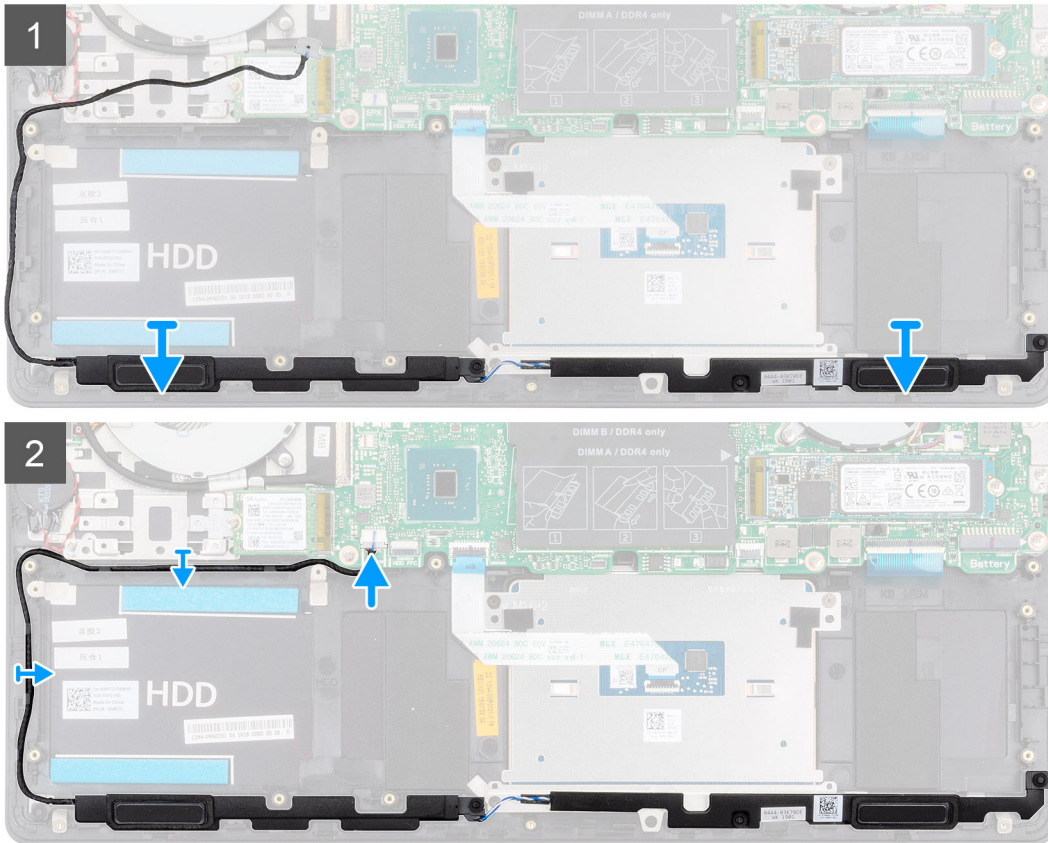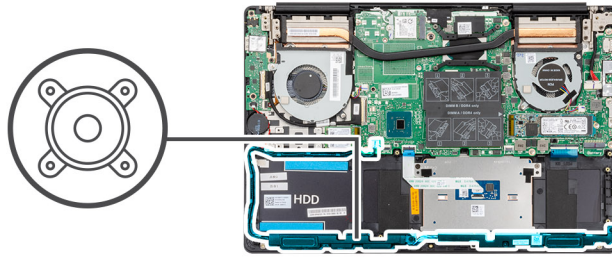
Steps

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 steps

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

Prerequisites

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

About this task

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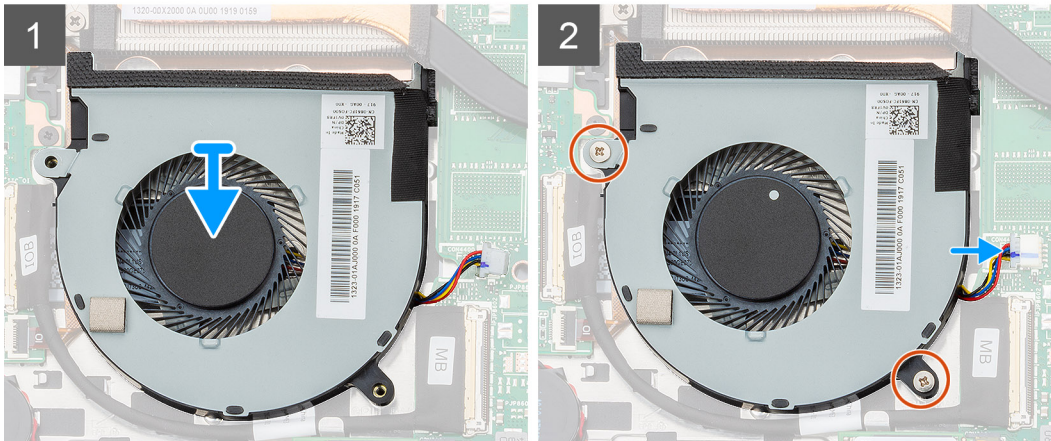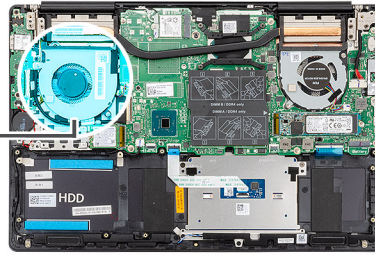
Steps

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 steps

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.
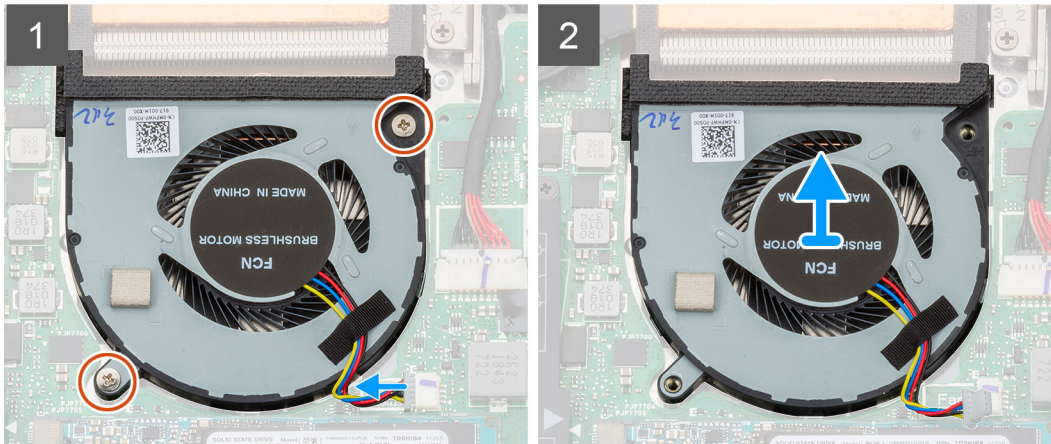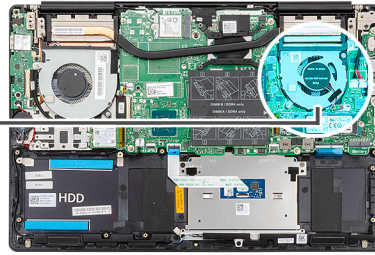
Steps

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

Prerequisites

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

About this task

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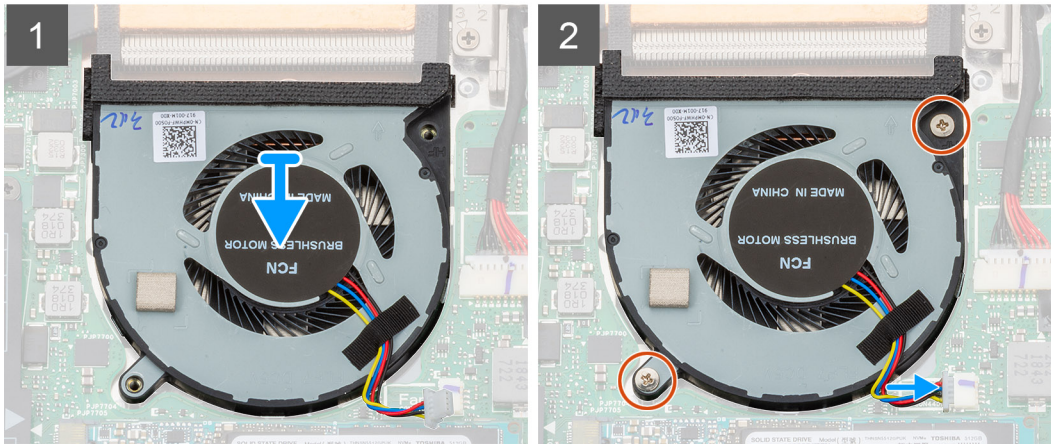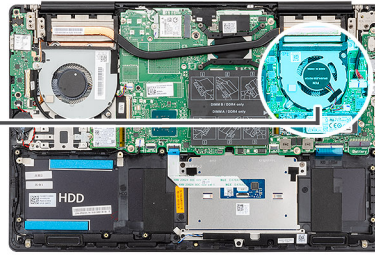
Steps

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 steps

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

Heat sink

Removing the heat sink—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.
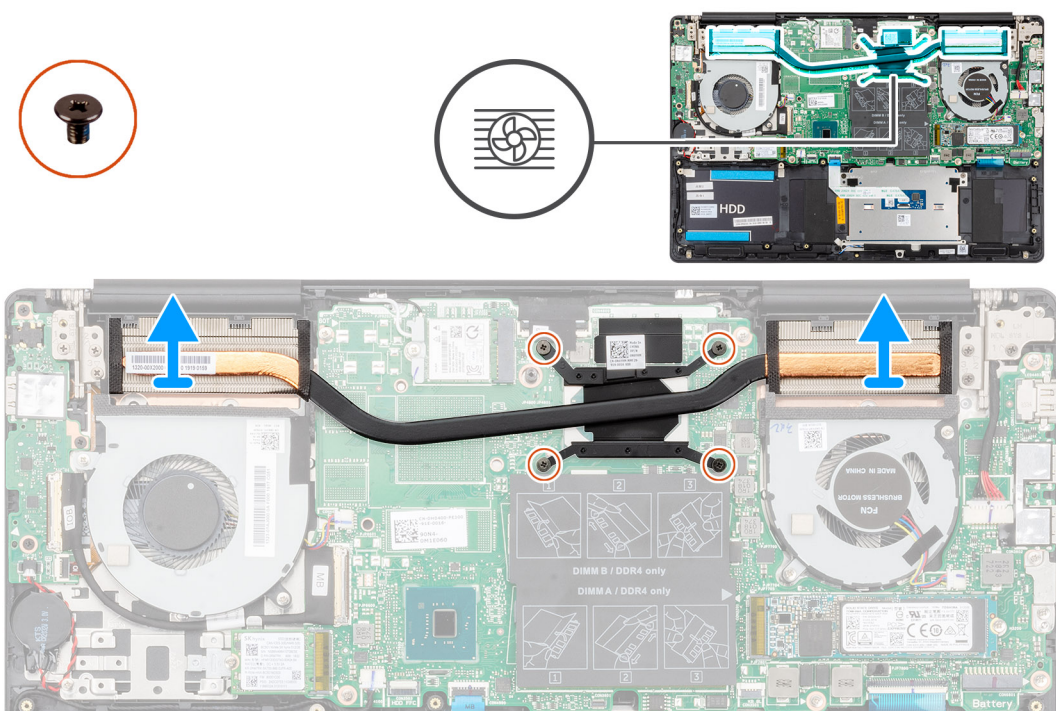
Steps

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

Prerequisites

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

About this task

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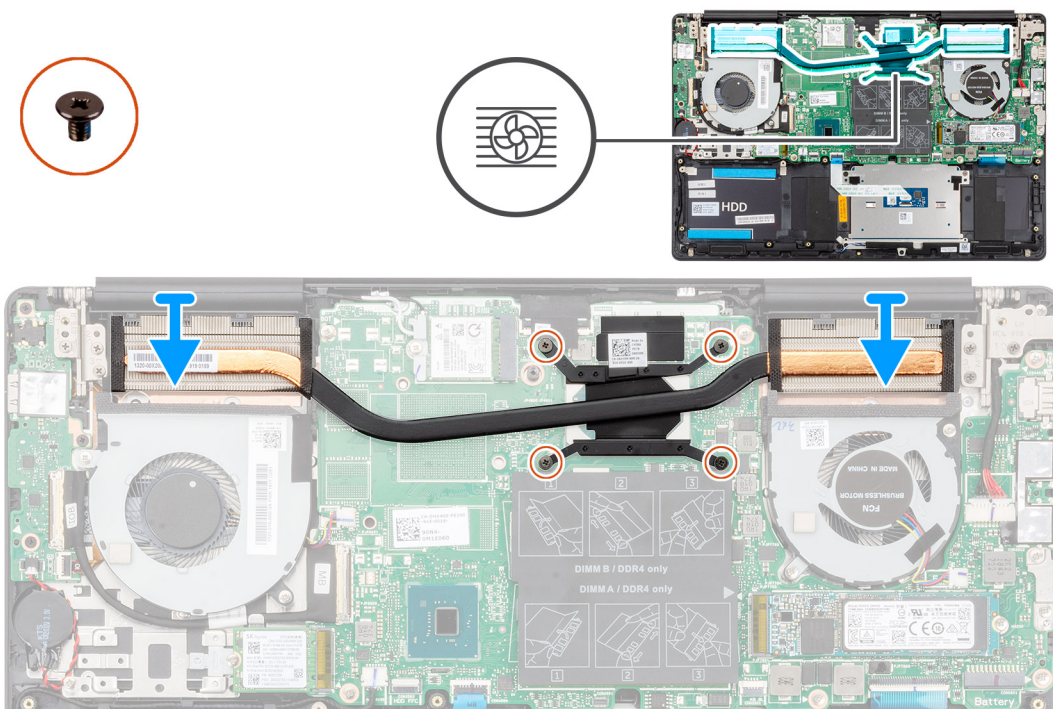
Steps

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 steps

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.
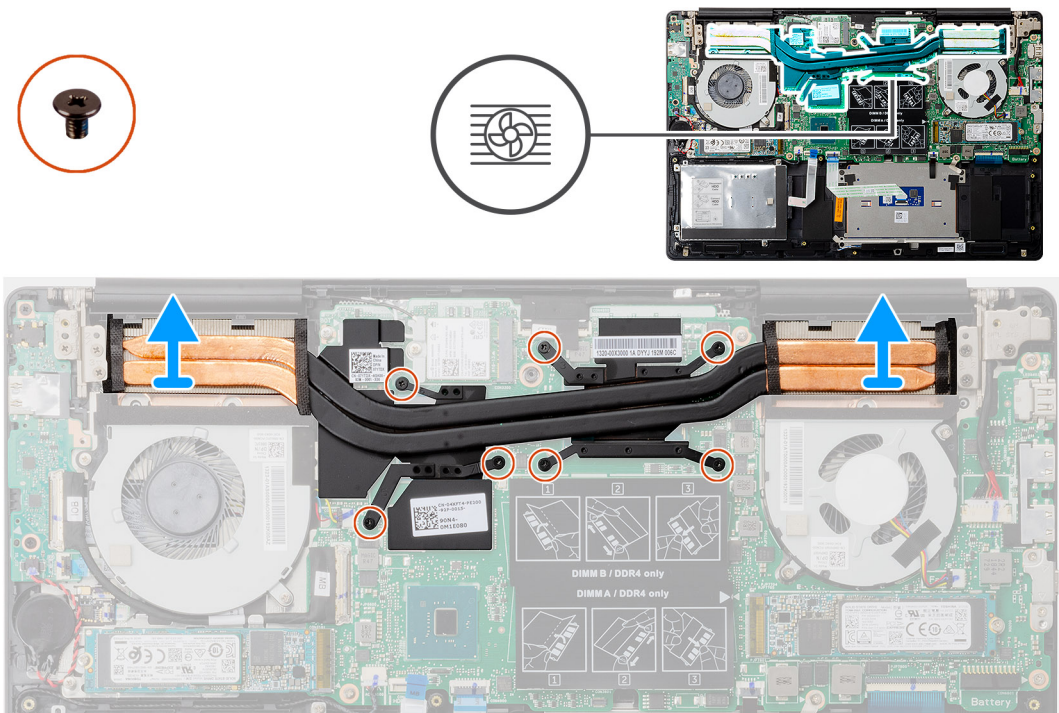
Steps

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
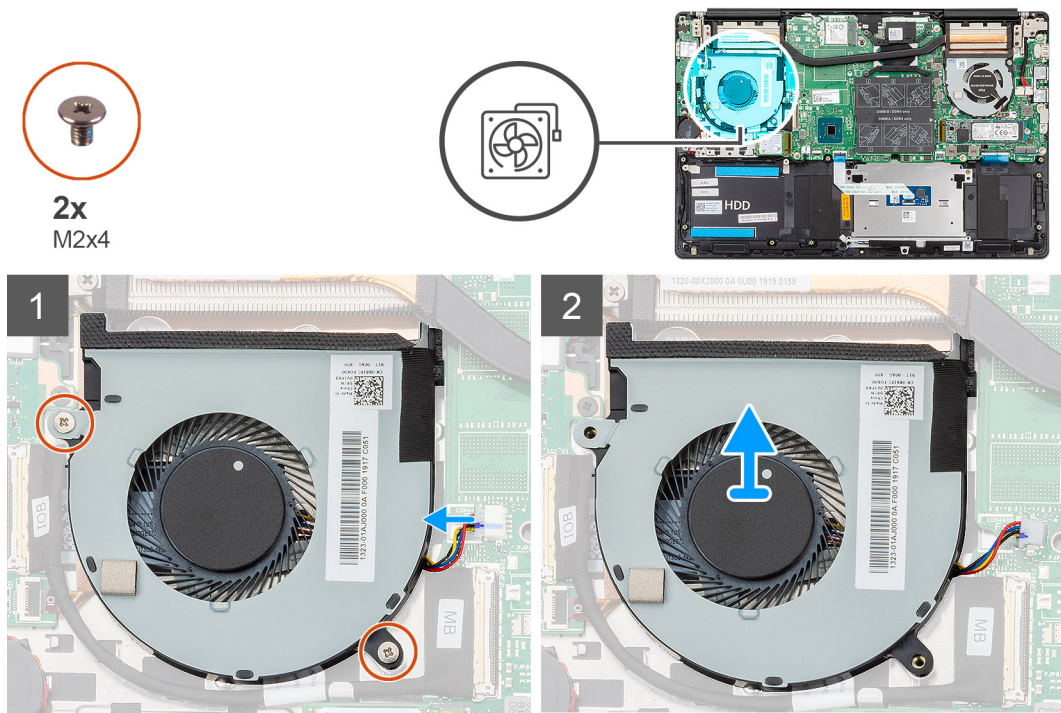
Prerequisites

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

About this task

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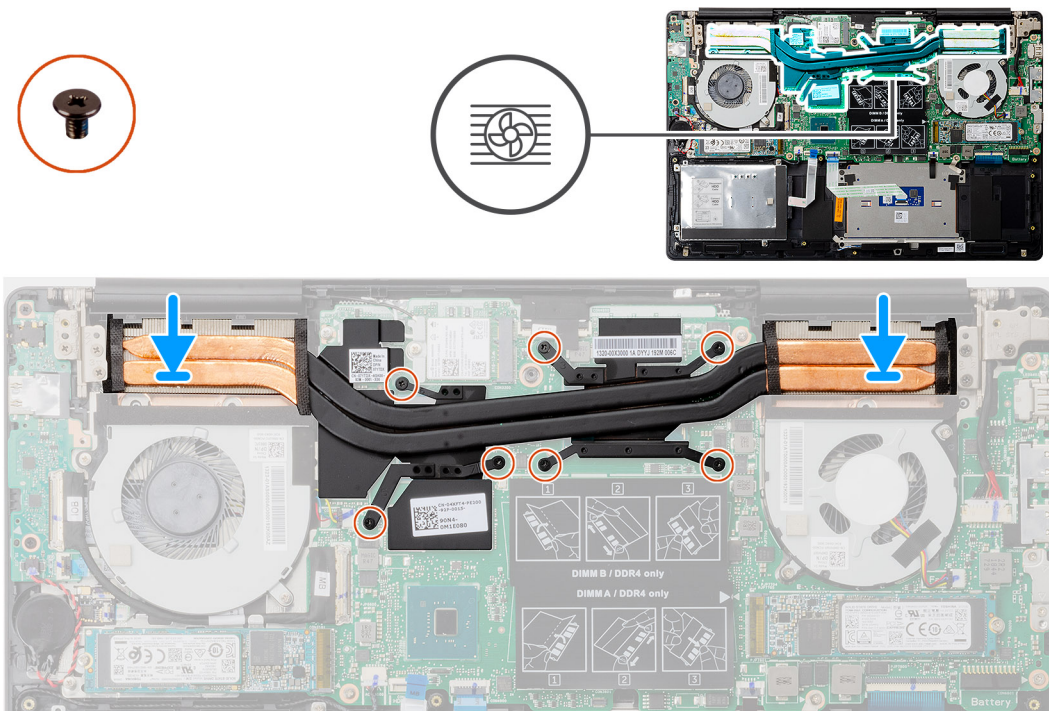
Steps

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 steps

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

Prerequisites

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

About this task

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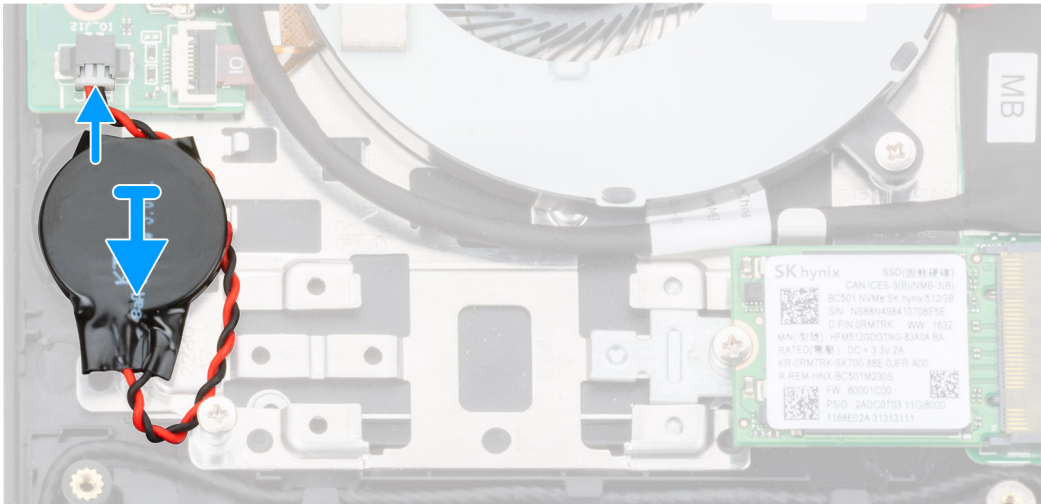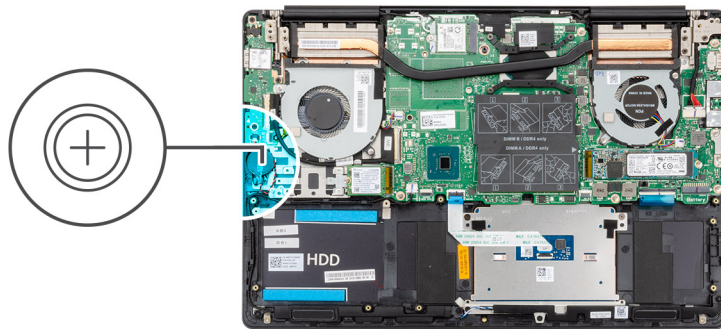
Steps

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 steps

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

I/O board

Removing the I/O board

Prerequisites

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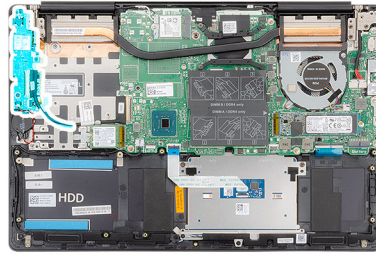
Steps

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

Prerequisites

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

About this task

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

3x
M2x3
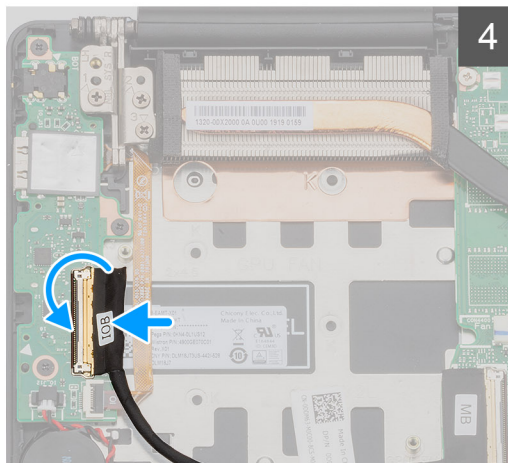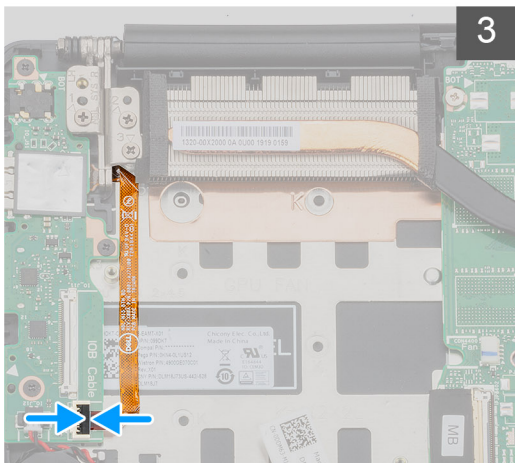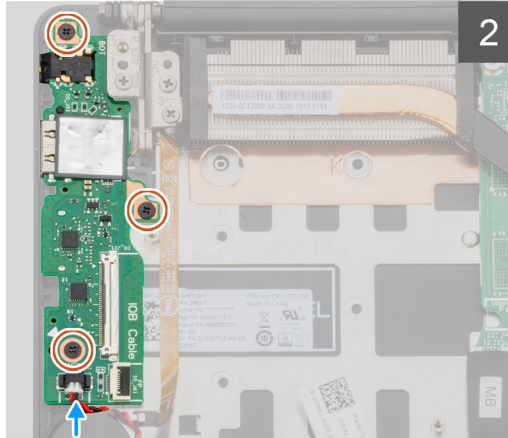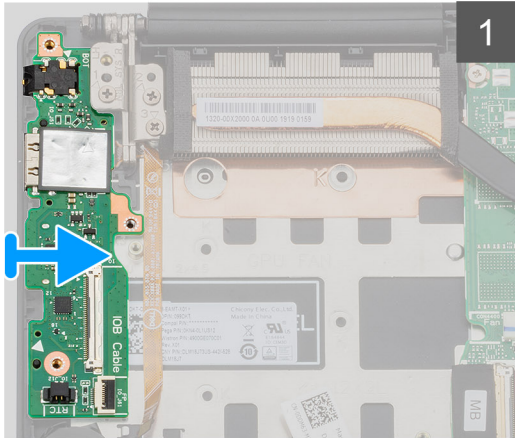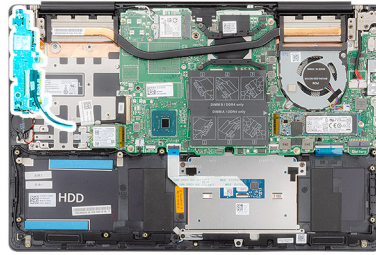
Steps

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 steps

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.
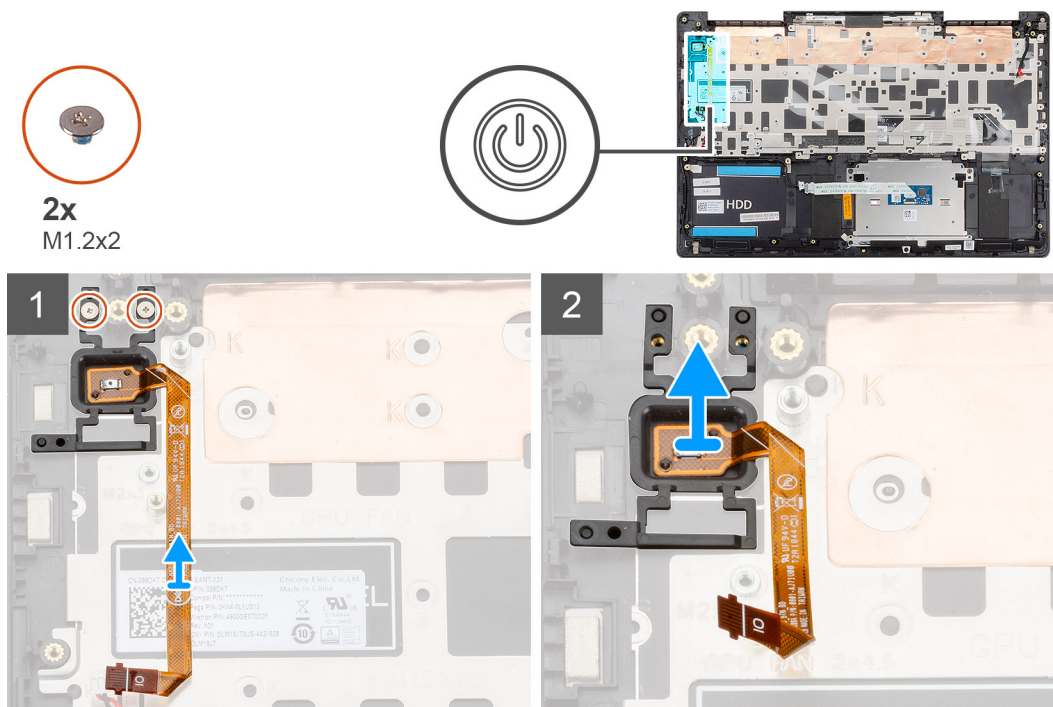
Steps

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

Prerequisites

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

About this task

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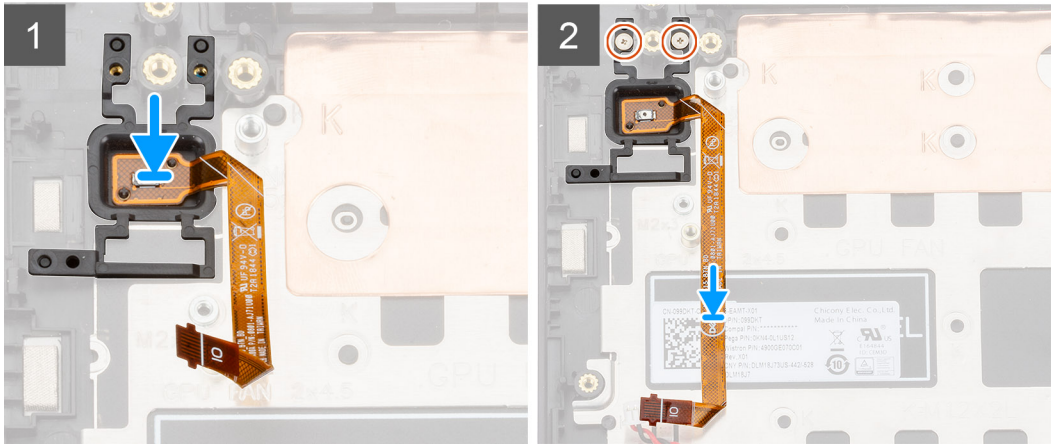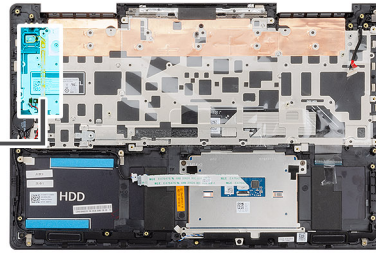
Steps

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 steps

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

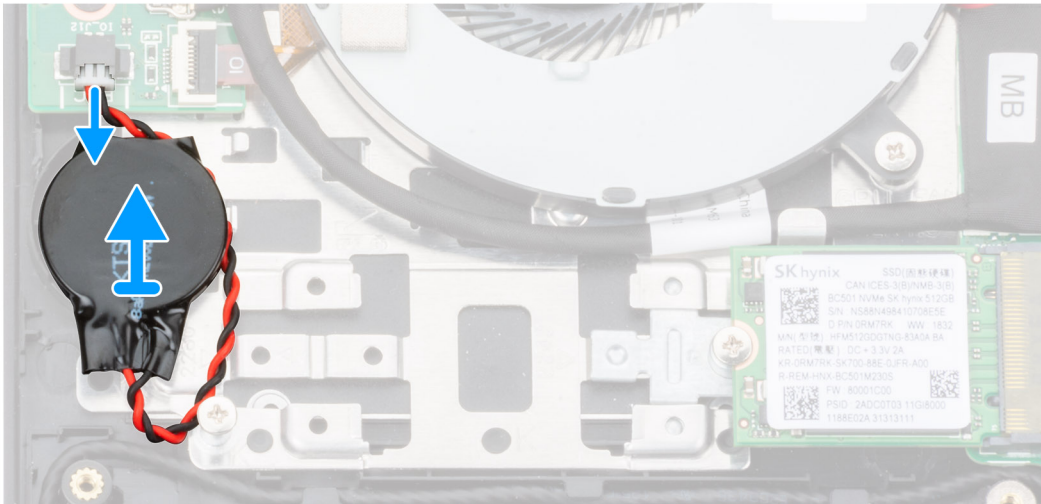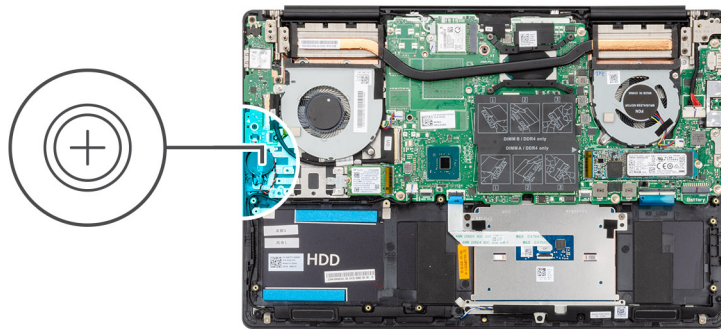**Prerequisites**

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

Prerequisites

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

About this task

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

3x M2.5x5　**1x** M2x4
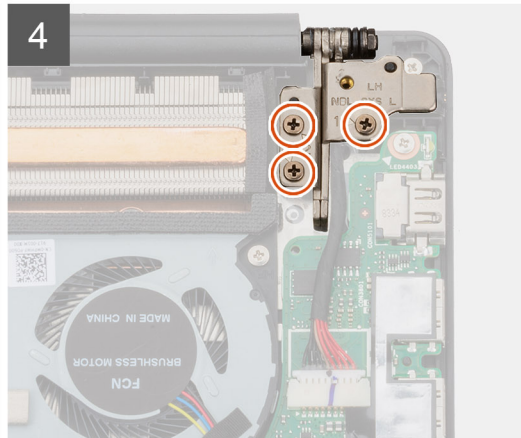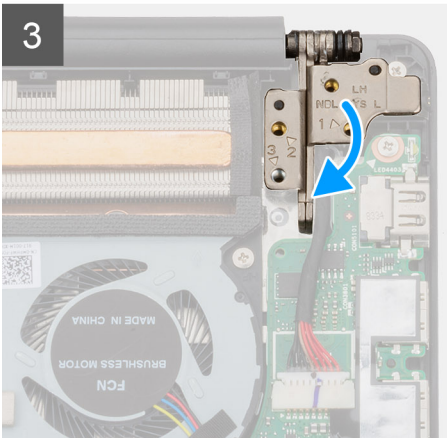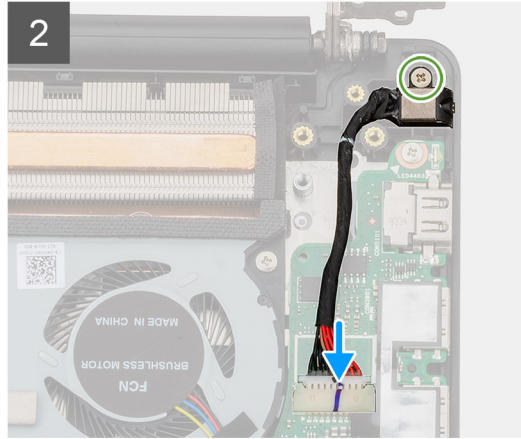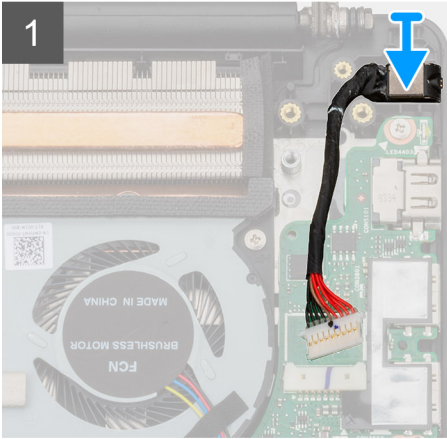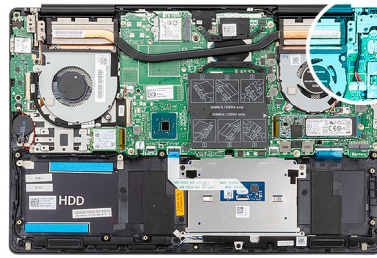
Steps

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 steps

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

Touchpad

Removing the touchpad

Prerequisites

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

About this task

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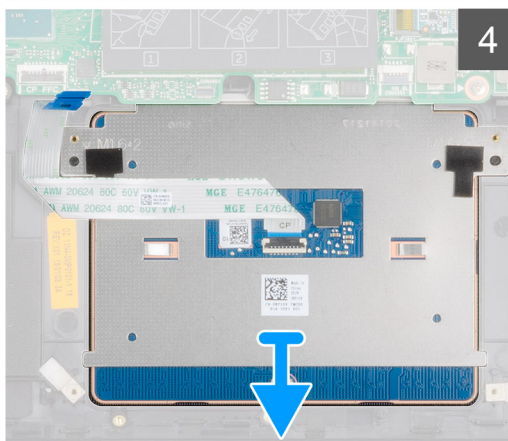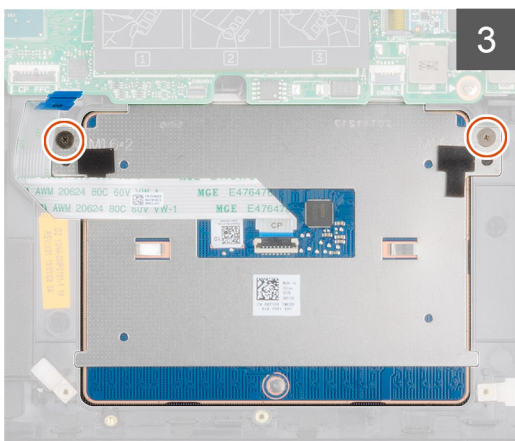
Steps

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

Prerequisites

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

About this task

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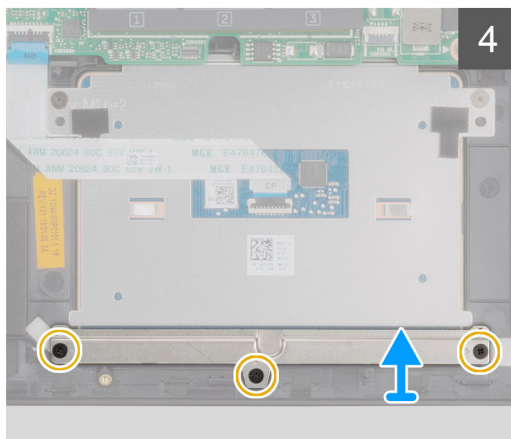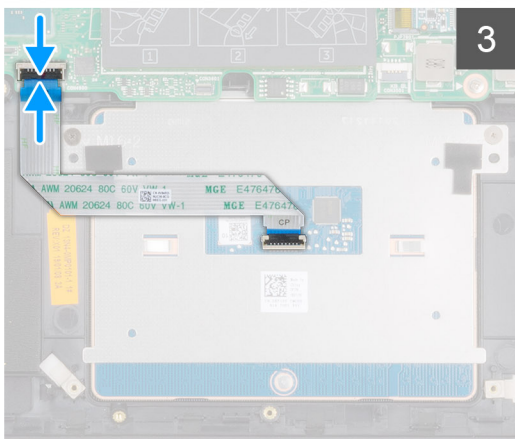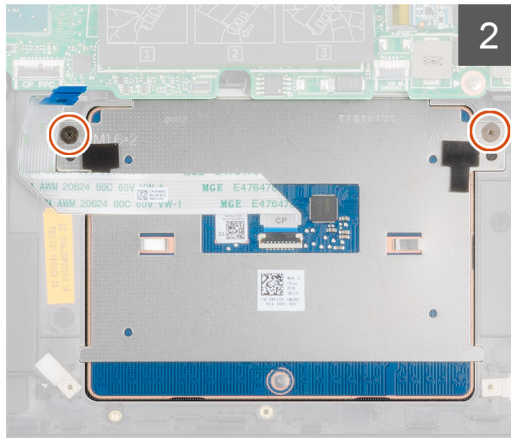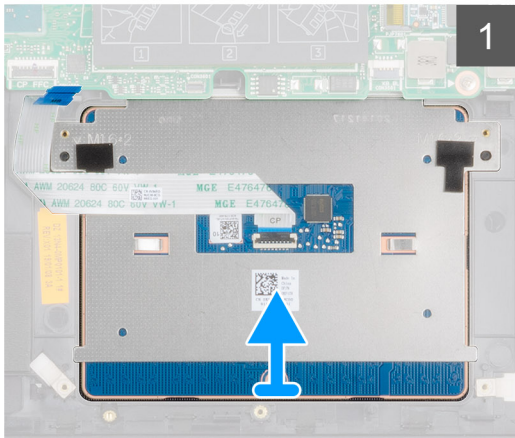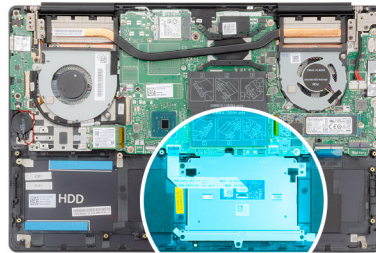
Steps

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 steps

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
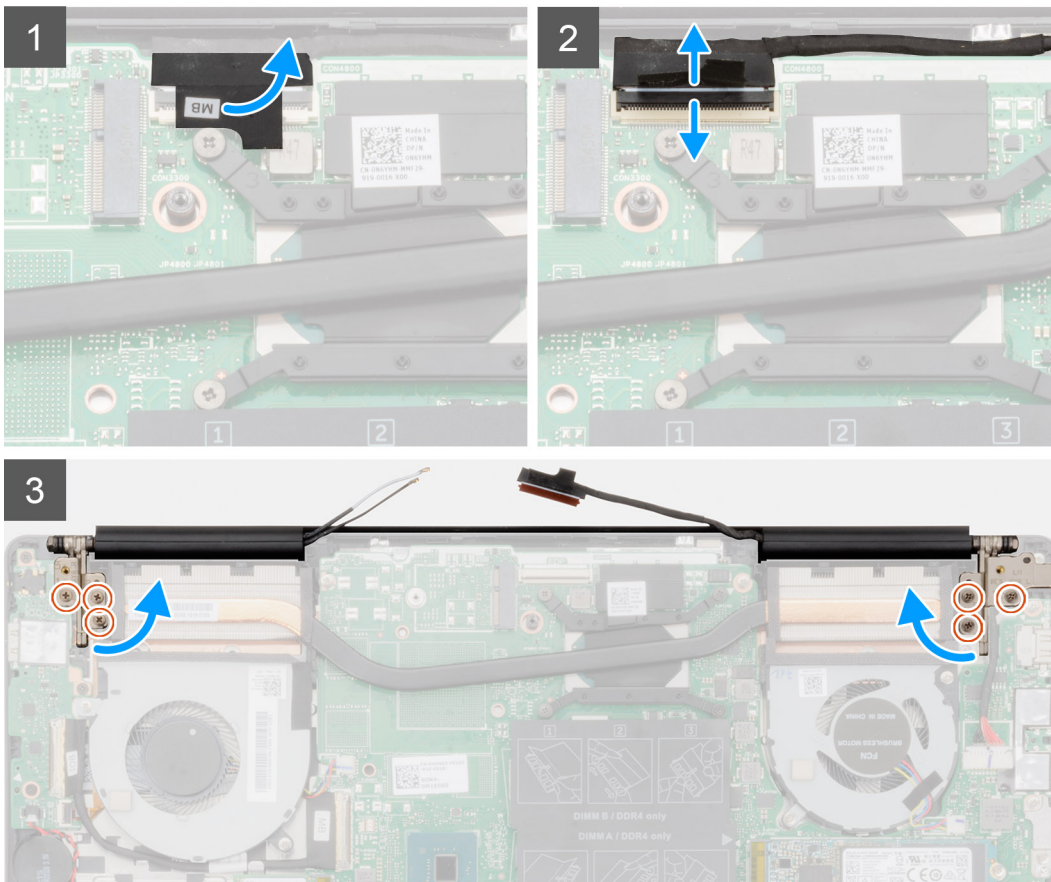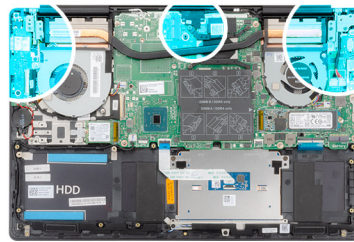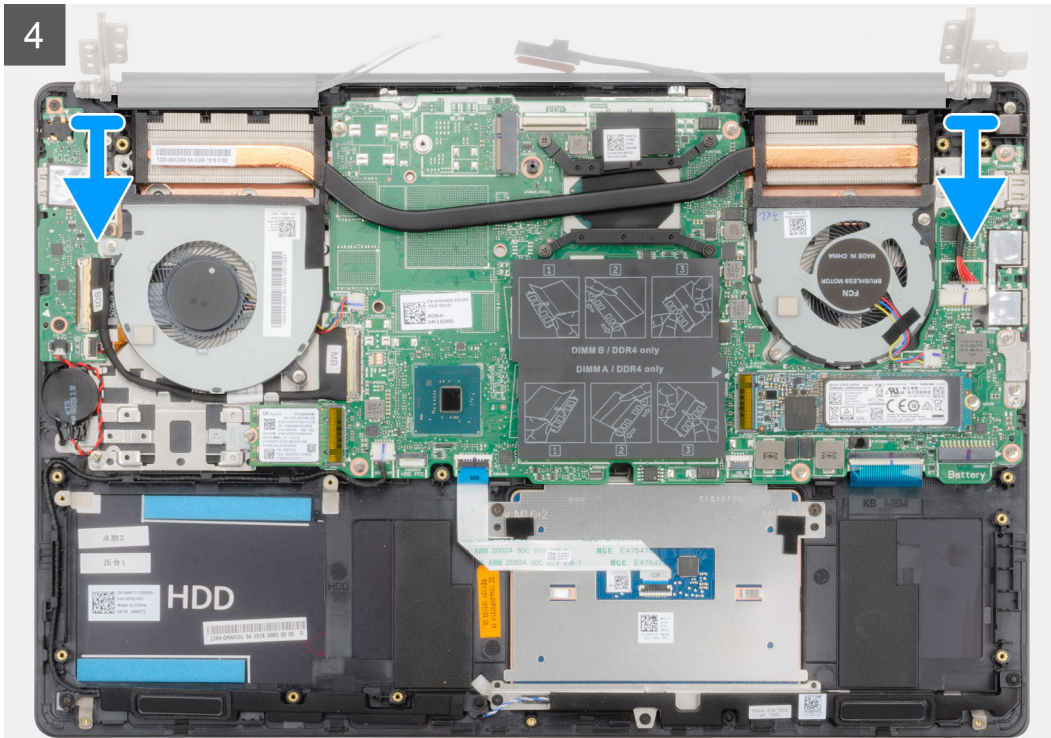
Steps

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

Prerequisites

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

About this task

The figure indicates the location of the component and provides a visual representation of the installation procedure.
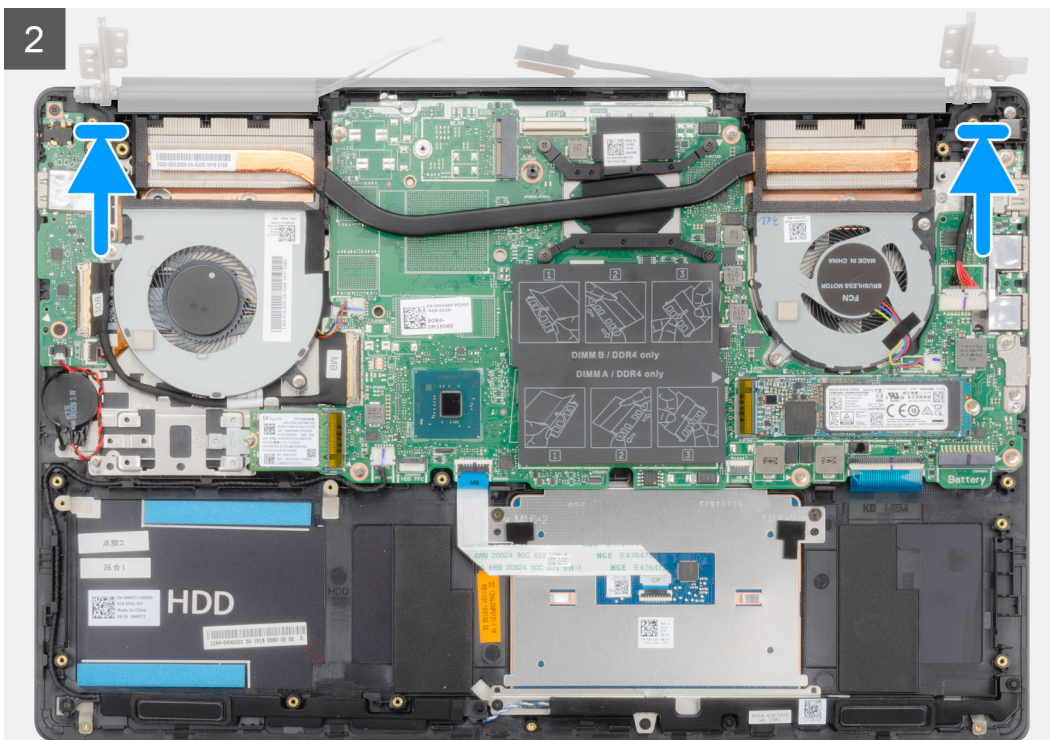
6x
M2.5x5
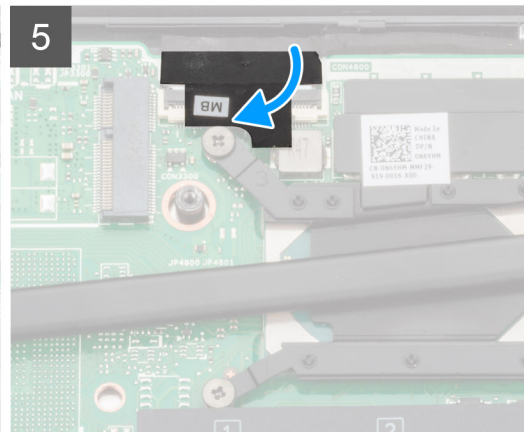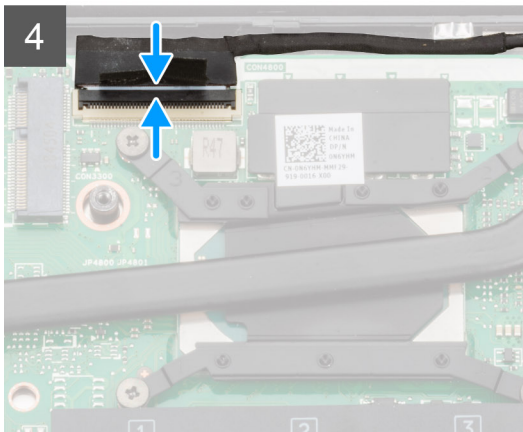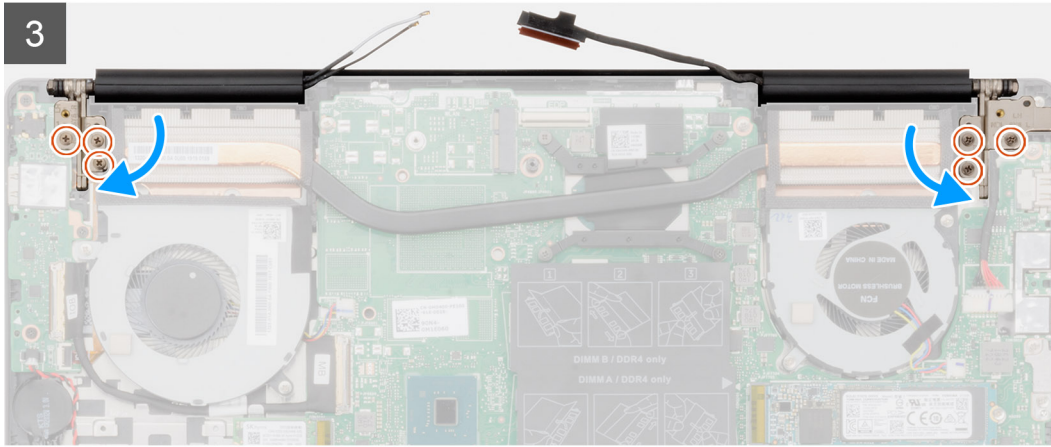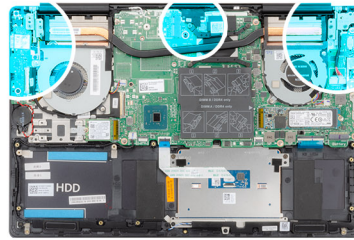
Steps

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 steps

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

System board

Removing the system board

Prerequisites

1. Follow the procedure in Before working inside your computer.
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.

2x
M2x5
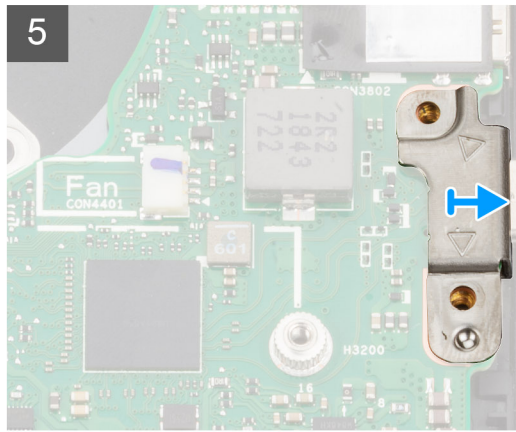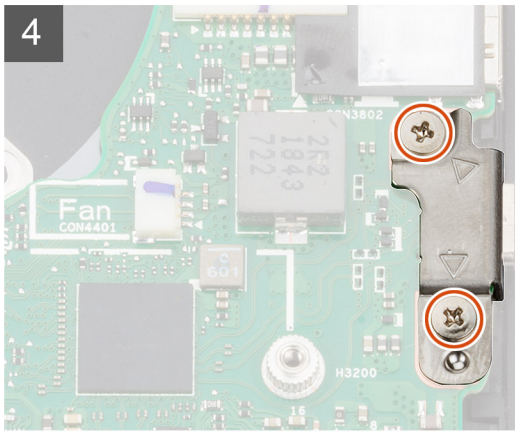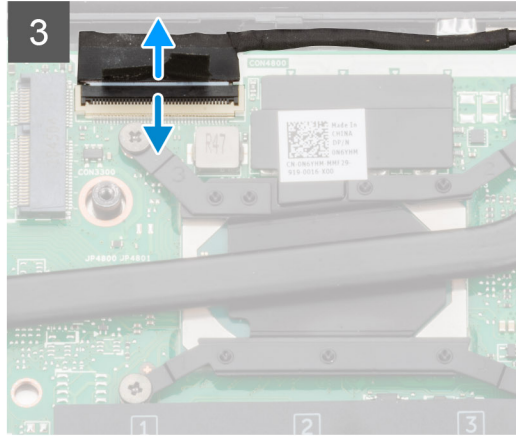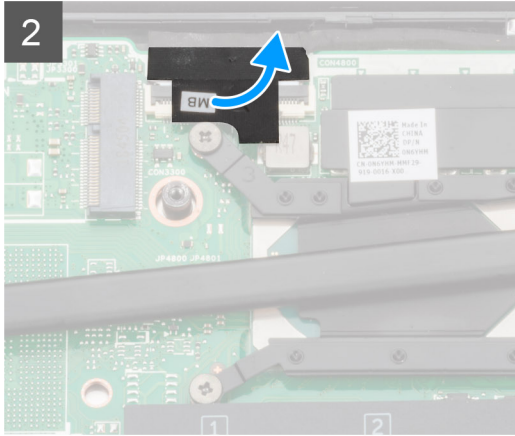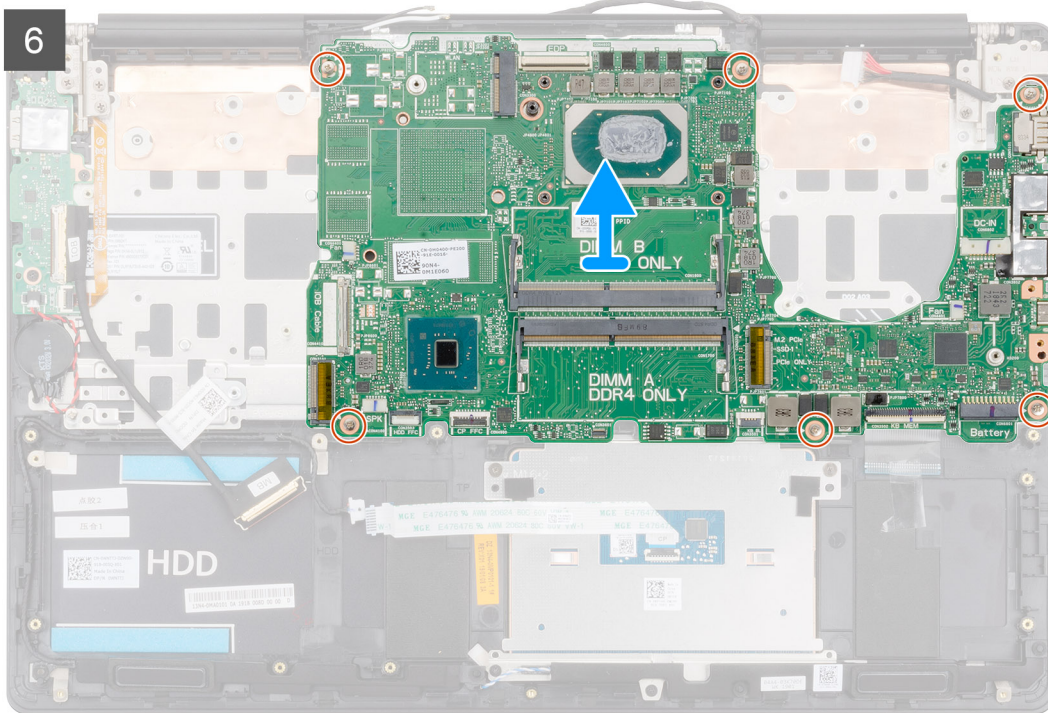
Steps

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.
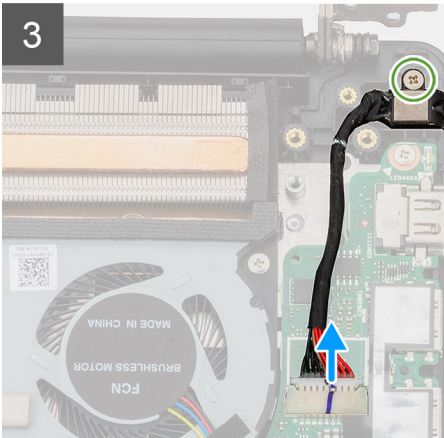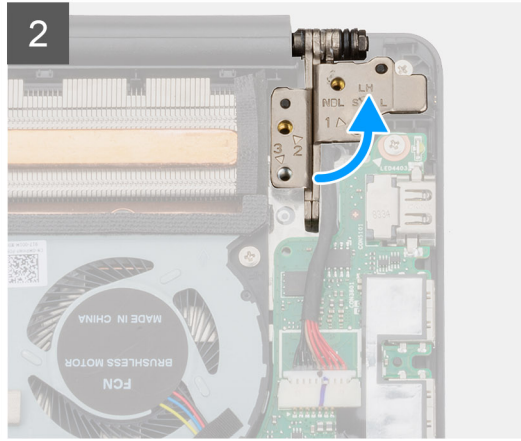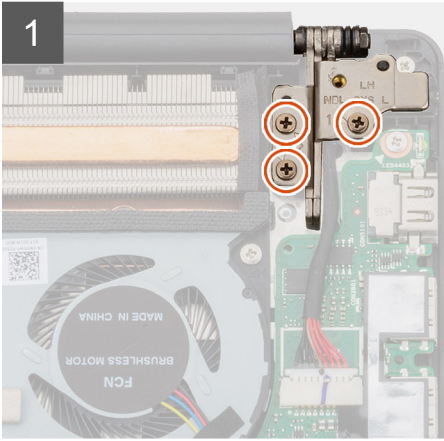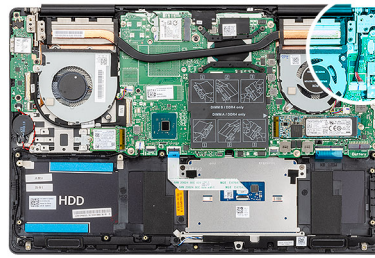3. Disconnect the speaker cable from the system board.
4. Open the latch and disconnect the touchpad cable from the system board.
5. Open the latch and disconnect the keyboard-backlight cable from the system board.
6. Remove the Mylar on the keyboard connector.
7. Open the latch and disconnect the keyboard cable from the system board.
8. Peel the tape that secures the display cable to the system board.
9. Open the latch and disconnect the display cable from the system board.
10. Remove the two screws (M2x5) that secure the USB Type-C port bracket to the system board.
11. Remove the six screws (M2x4) that secure the system board to the palm-rest and keyboard assembly.
12. 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

Prerequisites

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

About this task

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

6x
M2x4

2x
M2x5
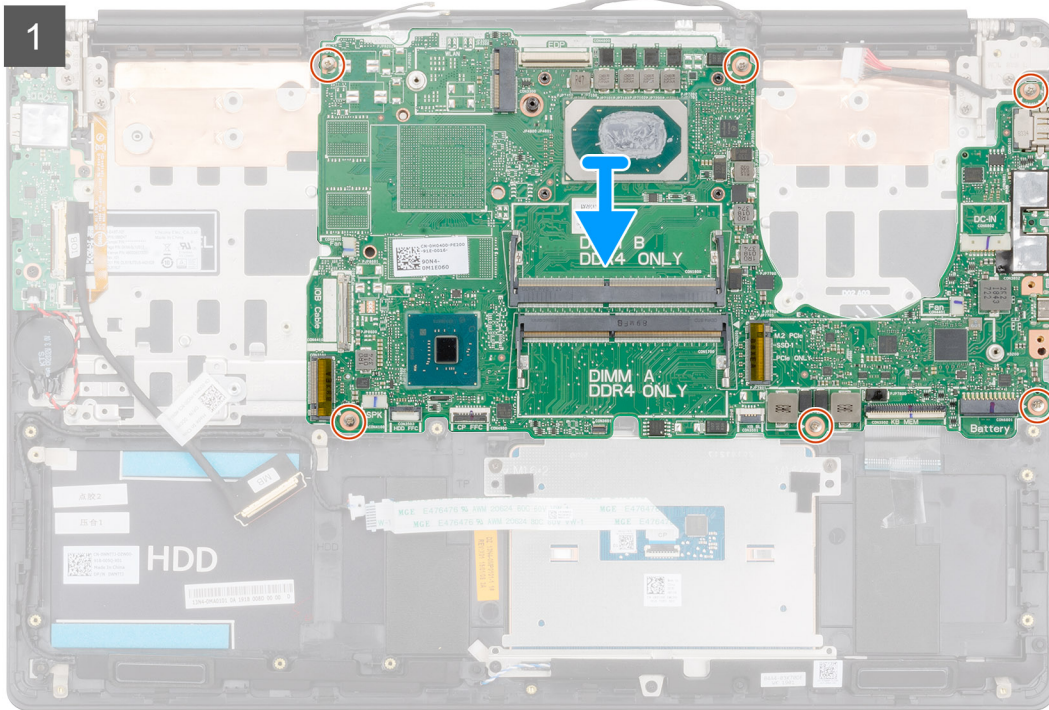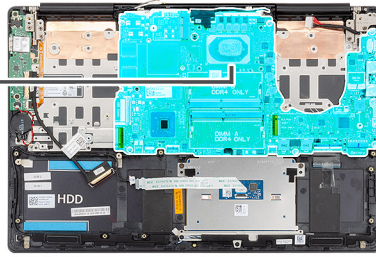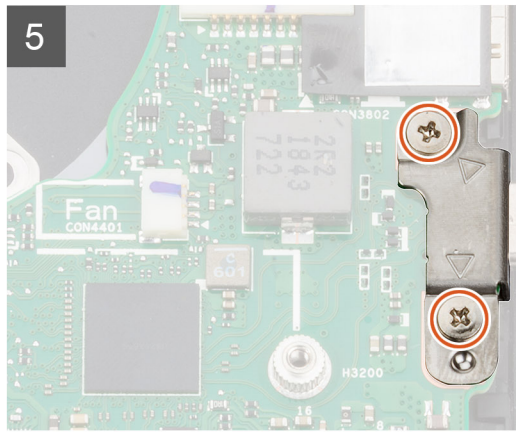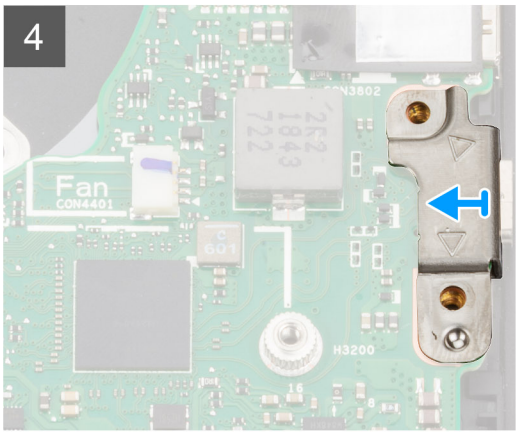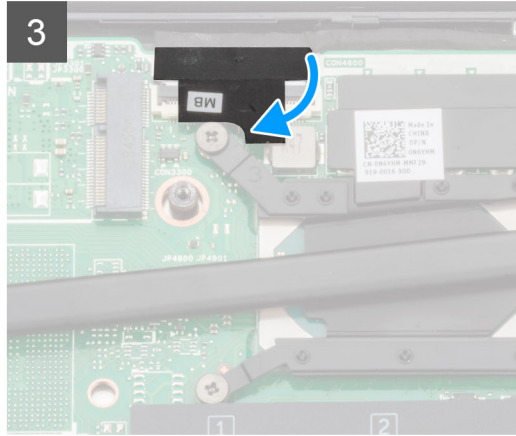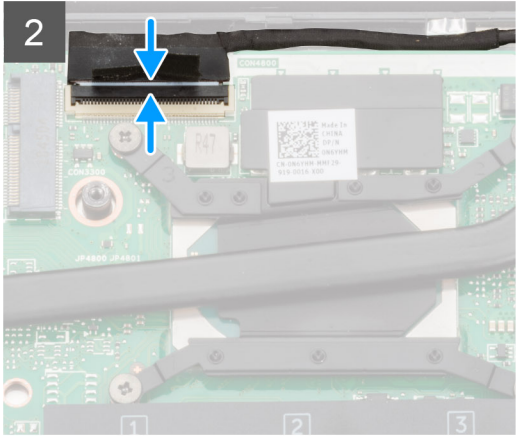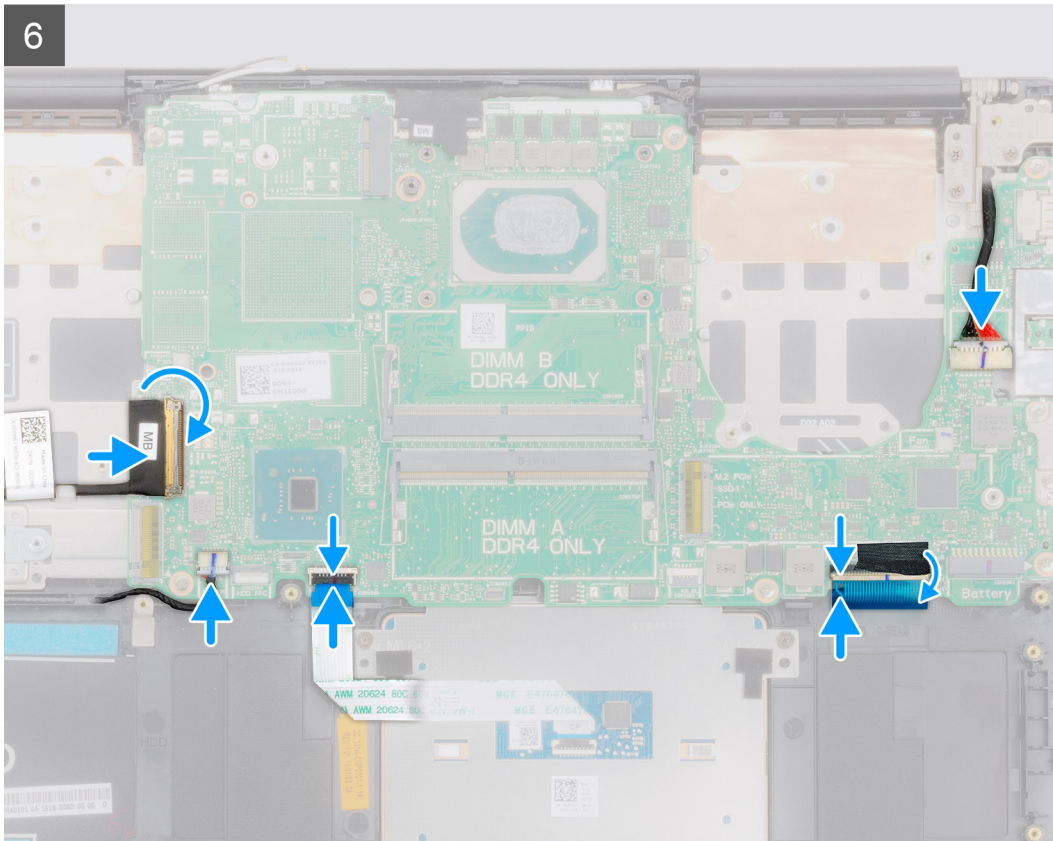
Steps

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 cable to the system board and close the latch to secure the cable.
7. Replace the Mylar on the keyboard connector.
8. Connect the keyboard-backlight cable to the system board and close the latch to secure the cable.
9. Connect the touchpad cable to the system board and close the latch to secure the cable.
10. Connect the speaker cable to the system board.
11. Connect the power-adapter cable to the system board.
12. Connect the I/O-board cable to the system board and close the latch to secure the cable.

Next steps

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.
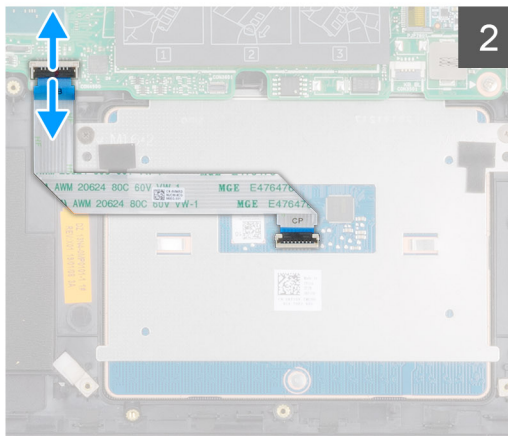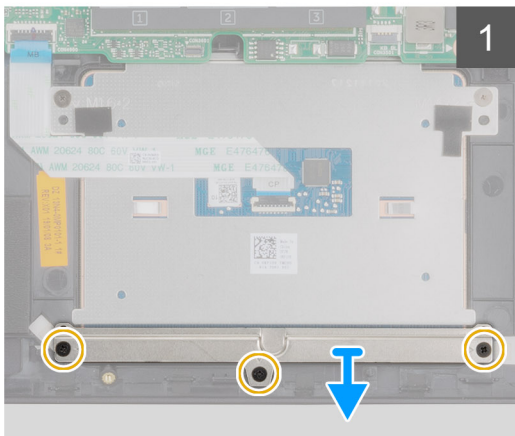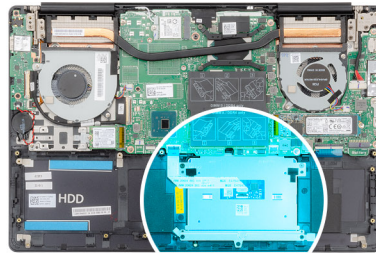
Keyboard bracket

Removing the keyboard bracket

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 CPU fan.
7. Remove the display assembly.
8. Remove the I/O board.
9. Remove the power button with fingerprint reader.
10. Remove the power-adapter port.
11. Remove the system board.

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

About this task

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

39x
M1.2x2
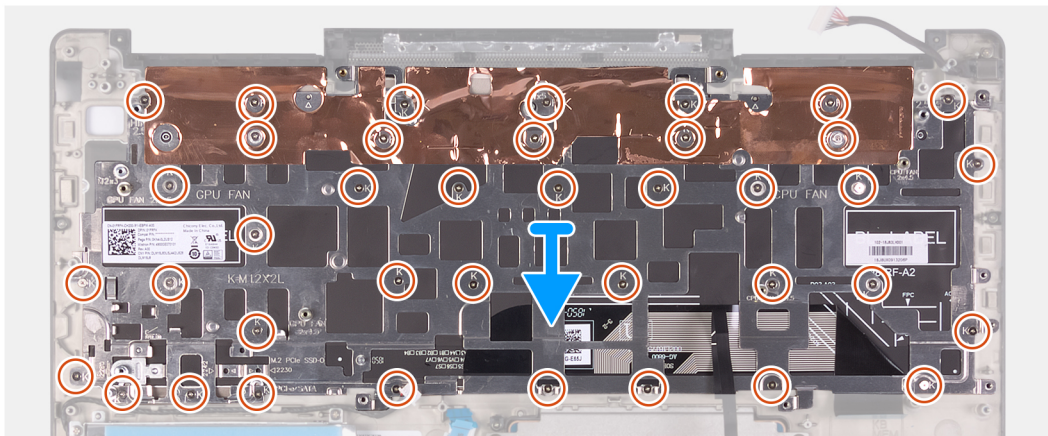
Steps

1. Remove the 39 screws (M1.2x2) that secure the keyboard bracket to the keyboard and palm-rest assembly.
2. Lift the keyboard bracket off the keyboard and palm-rest assembly.

Installing the keyboard bracket

Prerequisites

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

About this task

The figure indicates the location of the keyboard bracket and provides a visual representation of the installation procedure.
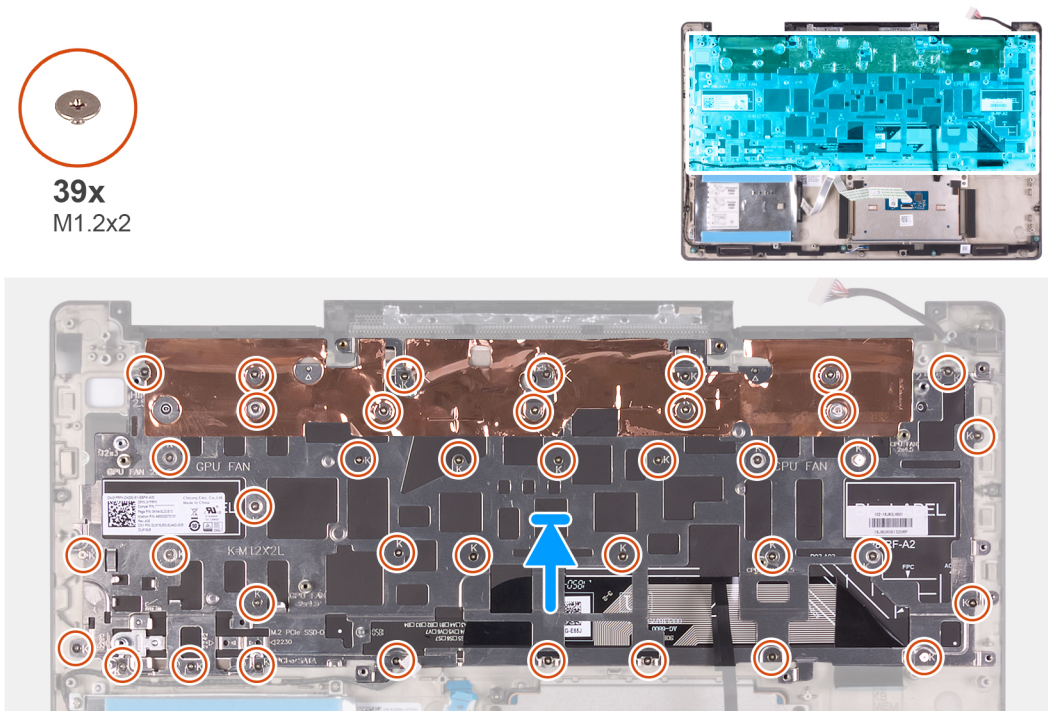
Steps

1. Align the screw holes on the keyboard bracket with the screw holes on the keyboard and palm-rest assembly.
2. Replace the 39 screws (M1.2x2) that secure the keyboard bracket to the keyboard and palm-rest assembly.

Next steps

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

Keyboard

Removing the keyboard

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 CPU fan.
7. Remove the display assembly.
8. Remove the I/O board.
9. Remove the power button with fingerprint reader.
10. Remove the power-adapter port.
11. Remove the system board.
   (i) **NOTE:** The system board can be removed along with the heat sink.
12. Remove the keyboard bracket.

About this task

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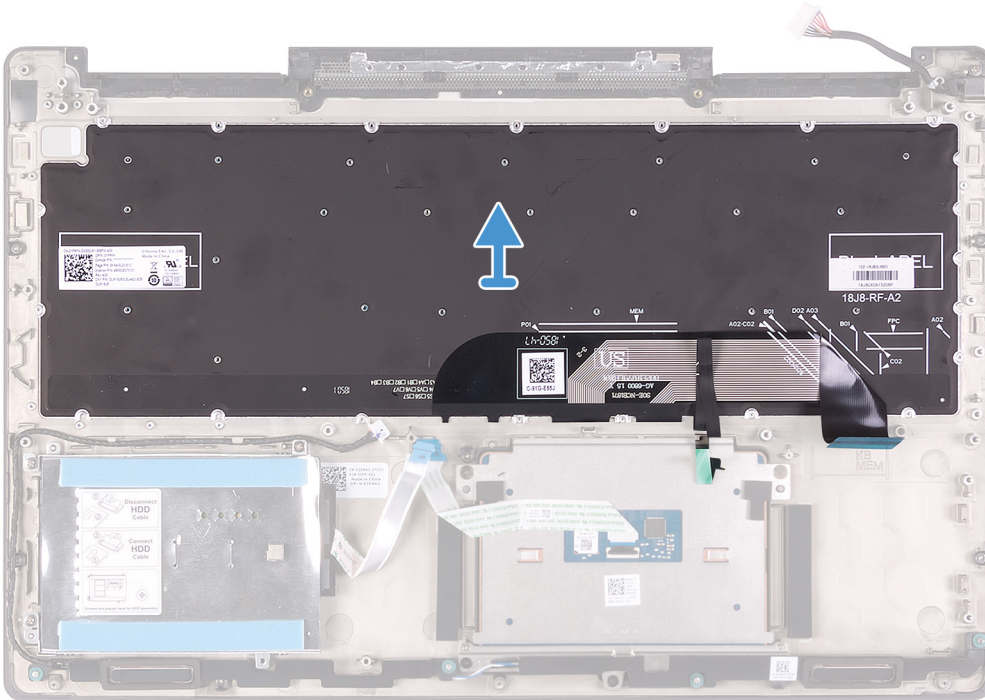
Steps

After performing the steps in the pre-requisites, lift the keyboard, along with the cables, off the palm-rest assembly.

Installing the keyboard

Prerequisites

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

About this task

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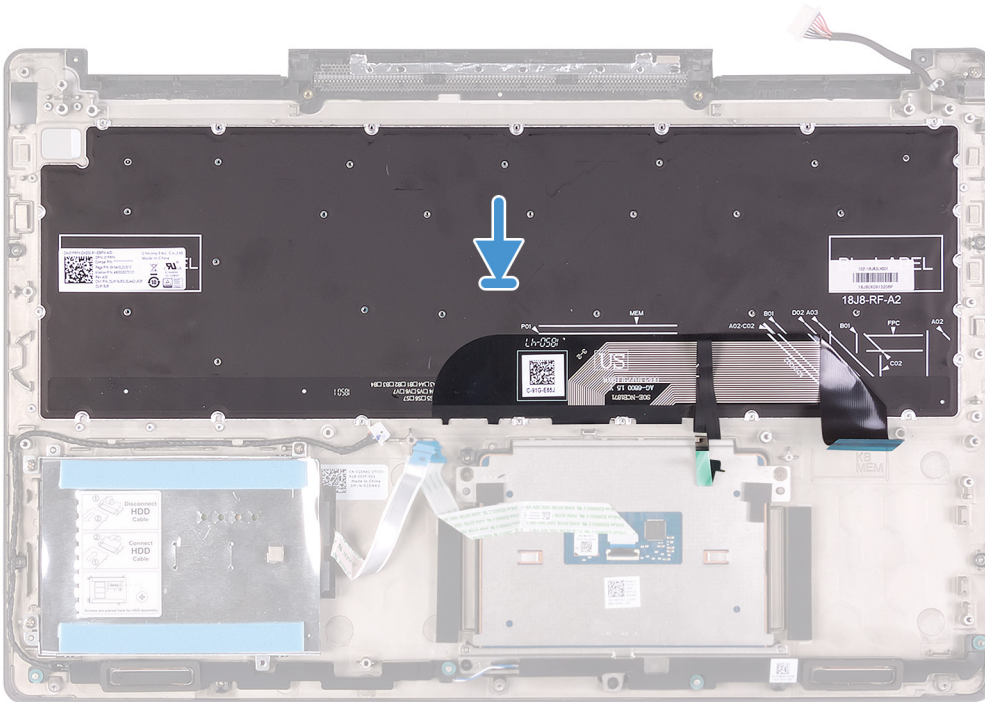
Steps

Align the keyboard on the palm-rest assembly.

Next steps

1. Install the keyboard bracket.
2. Install the system board.
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 CPU fan.
8. Install the GPU fan.
9. Install the WLAN card.
10. Install the battery.
11. Install the base cover.
12. Follow the procedure in After working inside your computer.

Palm rest

Removing the palm rest

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 CPU fan.
7. Remove the speakers.

8. Remove the display assembly.
9. Remove the I/O board.
10. Remove the power button with fingerprint reader.
11. Remove the power-adapter port.
12. Remove the touchpad.
13. Remove the system board.

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

14. Remove the keyboard bracket.
15. Remove the keyboard.

About this task

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

Steps

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

Installing the palm-rest and keyboard assembly

Prerequisites

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

About this task

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

Steps

Place the palm rest on a flat surface.

Next steps

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

Device drivers

Intel Chipset Software Installation Utility

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

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

Video drivers

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

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

Intel Serial IO driver

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

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

Intel Trusted Execution Engine Interface

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

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

Intel Virtual Button driver

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

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

Wireless and Bluetooth drivers

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

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

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

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

System setup

(i) **NOTE:** Depending on the computer and its installed devices, the items listed in this section may or may not be displayed.

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.**

(i) **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.

Entering BIOS setup program

Steps

1. Turn on (or restart) your computer.
2. During POST, when the DELL logo is displayed, watch for the F2 prompt to appear, and then press F2 immediately.

   (i) **NOTE:** The F2 prompt indicates that the keyboard is initialized. This prompt can appear very quickly, so you must watch for it, and then press F2. If you press F2 before the F2 prompt, this keystroke is lost. If you wait too long and the operating system logo appears, continue to wait until you see the desktop. Then, turn off your computer and try again.

Navigation keys

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

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

Boot Sequence

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

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

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

- Removable Drive (if available)
- STXXXX Drive
  - (i) **NOTE:** XXX denotes the SATA drive number.
- Optical Drive (if available)
- SATA Hard Drive (if available)
- Diagnostics
  - (i) **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

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

Table 2. System setup options—System Information menu

General	
System Information	
BIOS version	Displays the BIOS version number.
Service Tag	Displays the Service Tag of the computer.
Asset Tag	Displays the Asset Tag of the computer.
Ownership Tag	Displays the ownership tag of the computer.
Manufacture Date	Displays the manufacture date of the computer.
Ownership Date	Displays the ownership date of the computer.
Express Service Code	Displays the express service code of the computer.
Signed Firmware Update	Displays whether the signed firmware update is enabled.
Memory Information	
Memory Installed	Displays the total computer memory installed.
Memory Available	Displays the total computer memory available.
Memory Speed	Displays the memory speed.
Memory Channel Mode	Displays single or dual channel mode.
Memory Technology	Displays the technology that is used for the memory.
DIMM A Size	Displays the DIMM A memory size.
DIMM B Size	Displays the DIMM B memory size.
Processor Information	
Processor Type	Displays the processor type.
Core Count	Displays the number of cores on the processor.
Processor ID	Displays the processor identification code.

Table 2. System setup options—System Information menu (continued)

General	
Current Clock Speed	Displays the current processor clock speed.
Minimum Clock Speed	Displays the minimum processor clock speed.
Maximum Clock Speed	Displays the maximum processor clock speed.
Processor L2 Cache	Displays the processor L2 Cache size.
Processor L3 Cache	Displays the processor L3 Cache size.
HT Capable	Displays whether the processor is HyperThreading (HT) capable.
64-Bit Technology	Displays whether 64-bit technology is used.
Device Information	
Primary HDD	Displays the hard drive information.
M.2 SATA	Displays the SATA0 device information of the computer.
M.2 PCIe SSD-0	Displays the M.2 PCIe SSD information of the computer.
M.2 PCIe SSD-1	Displays the M.2 PCIe SSD information of the computer.
Video Controller	Displays the integrate graphics information of the computer.
dGPU Video Controller	Displays the discrete graphics information of the computer.
Video BIOS Version	Displays the video BIOS version of the computer.
Video Memory	Displays the video memory information of the computer.
Panel Type	Displays the Panel Type of the computer.
Native Resolution	Displays the native resolution of the computer.
Audio Controller	Displays the audio controller information of the computer.
Wi-Fi Device	Displays the wireless device information of the computer.
Cellular Device	Displays the Cellular device information of the computer.
Bluetooth Device	Displays the Bluetooth device information of the computer.
Battery Information	Displays the battery health information.
Primary	Displays the primary battery.
Battery Level	Displays the battery level.
Battery State	Displays the battery state.
Health	Displays the battery health.
AC Adapter	Displays whether an AC adapter is installed.
Boot Sequence	
Boot Sequence	Displays the boot sequence.
Boot List Option	Displays the available boot options.
Advanced Boot Options	
Enable UEFI Network Stack	Enable or disable the UEFI Network Stack.
UEFI Boot Path Security	Controls the security level for booting a UEFI boot path.
Date/Time	Displays the current date in MM/DD/YY format and current time in HH:MM:SS AM/PM format.

Table 3. System setup options—System Configuration menu

System Configuration	
SATA Operation	Configures operating mode of the integrated SATA hard drive controller.

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

System Configuration	
Drives	Enable or disable various drives on board.
SMART Reporting	Enable or disable SMART Reporting during system startup.
USB Configuration	
Enable USB Boot Support	Enables or disables booting from USB mass storage devices such as external hard drive, optical drive, and USB drive.
Enable External USB Port	Enables or disables USB ports to be functional in an operating system environment.
Thunderbolt Adapter Configuration	Allows you to enable or disable the Thunderbolt adapter security settings within the operating system.
Thunderbolt Auto Switch	Enable or disable Thunderbolt controller to perform PCIe device enumeration.
Audio	Enable or disable the integrated audio controller.
Keyboard Illumination	Configures the operating mode of the keyboard illumination feature.
	Default: Disabled. The keyboard illumination will always be off.
Keyboard Backlight Timeout on AC	Configures the timeout value for the keyboard when an AC adapter is connected to the computer. The keyboard backlight timeout value is only effect when the backlight is enabled.
	Default: 10 seconds.
Keyboard Backlight Timeout on Battery	Configures the timeout value for the keyboard when the computer is running on battery. The keyboard backlight timeout value is only effect when the backlight is enabled.
	Default: 10 seconds.
Fingerprint Reader	Enable or disable the fingerprint reader device.
Miscellaneous Devices	Enables or disables various onboard devices.
Enable Camera	Enables or disables the camera.
	Default: ON.
Enable Hard Drive Free Fall Protection	Enable or disable the Hard Drive Free Fall Protection.
WiFi Radio	Enable or disable the WiFi radio.
Enable Secure Digital (SD) Card	Enable or disable the SD card.

Table 4. System setup options—Video menu

Video	
LCD Brightness	
Brightness on battery power	Sets the screen brightness when the computer is running on battery power.
Brightness on AC power	Sets the screen brightness when the computer is running on AC power.

Table 5. System setup options—Security menu

Security	
Admin Password	Set, change, or delete the administrator password.
System Password	Set, change, or delete the system password.
Strong Password	Enable or disable strong passwords.
Password Configuration	Control the minimum and maximum number of characters allowed for Admin and System passwords.

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

Security	
Password Bypass	Bypass the System (Boot) Password and the internal HDD password prompts during a system restart.
Password Change	Enable or disable changes to the System and Hard Disk passwords when an administrator password is set.
Non-Admin Setup Changes	Enable or disable changes to the setup options when an administrator password is set.
UEFI Capsule Firmware Updates	Enable or disable BIOS updates through UEFI capsule update packages.
TPM 2.0 Security	Enables you to control whether the Trusted platform Module (TPM) must be visible to the operating system.
Absolute	Enable or disable the BIOS module interface of the optional Absolute Persistence Module service from
Admin Setup Lockout	Enable to prevent users from entering Setup when an Admin Password is set.
Master Password Lockout	Enable to disable master password support. (i) **NOTE:** Hard Disk passwords need to be cleared before the setting can be changed.
SMM Security Mitigation	Enables or disables additional UEFI SMM Security Mitigation protections.

Table 6. System setup options—Secure Boot menu

Secure Boot	
Secure Boot Enable	Enables or disables the computer to boot using only validated boot software. Default: OFF. (i) **NOTE:** For Secure Boot to be enabled, the computer needs to be in UEFI boot mode and the Enable Legacy Option ROMs option needs to be turned off.
Secure Boot Mode	Selects the Secure Boot operation mode. Default: Deployed Mode. (i) **NOTE:** Deployed Mode should be selected for normal operation of Secure Boot.
Expert Key Management	
Expert Key Management	Enable or disable Expert Key Management.
Custom Mode Key Management	Select the custom values for Expert Key Management.

Table 7. System setup options—Intel Software Guard Extensions menu

Intel Software Guard Extensions	
Intel SGX Enable	Enable or disable Intel Software Guard Extensions.
Enclave Memory Size	Set the Intel Software Guard Extensions Enclave Reserve Memory Size.

Table 8. System setup options—Performance menu

Performance	
Multi-Core Support	Changes the number of CPU cores available to the operating system. The default value is set to the maximum number of cores. Default: All Cores.
Intel SpeedStep	Enables or disables the Intel SpeedStep Technology to dynamically adjust processor voltage and core frequency, decreasing average power consumption and heat production.

Table 8. System setup options—Performance menu (continued)

Performance

	Default: ON.
C-States Control	Enables or disables the CPU's ability to enter and exit low-power states.
	Default: ON.
Intel TurboBoost Technology	Enabled or disabled the Intel TurboBoost mode of the processor. If enabled, the Intel TurboBoost driver increases the performance of the CPU or graphics processor.
	Default: ON.
HyperThread Control	Enables or disables the Intel Hyper-Threading Technology to use processor resources more efficiently.
	Default: ON.

Table 9. System setup options—Power Management menu

Power Management

Lid Switch	Enables the computer to power up from the off state whenever the lid is opened.
	Default: ON.
AC Behavior	Enables the system to turn on automatically, when AC power is supplied.
Enable Intel Speed Shift Technology	Enables or disables Intel Speed Shift Technology support which enables the operating system to select the appropriate processor performance automatically.
	Default: ON.
Auto On Time	Enables the computer to automatically power on for defined days and times.
	Default: Disabled. The system will not automatically power up.
USB Wake Support	Enables the USB devices to wake the computer from Standby mode.
	Default: OFF.
Block Sleep	Blocks the computer from entering Sleep (S3) mode in the operating system.
	Default: OFF.
	ⓘ **NOTE:** If enabled, the computer will not go to sleep, Intel Rapid Start will be disabled automatically, and the operating system power option will be blank if it was set to Sleep.
Advanced Battery Charge Configuration	Enables Advanced Battery Charge Configuration from the beginning of the day to a specified work period. Advanced Battery Charged maximizes battery health while still supporting heavy use during the work day.
	Default: OFF.
Primary Battery Charge Configuration	Enables the computer to run on battery during power usage hours. Use the below options to prevent AC power usage between certain times of each day.
	Default: Adaptive. Battery settings are adaptively optimized based on your typical battery usage pattern.

Table 10. System setup options—POST Behavior menu

POST Behavior

Adapter Warnings	Enables the computer to display adapter warning messages during boot.
	Default: ON.

Table 10. System setup options—POST Behavior menu (continued)

POST Behavior

Keypad (Embedded)	Enables you to choose one of the two methods to enable the keypad that is embedded in the internal keyboard.
Numlock Enable	Enables or disables Numlock when the computer boots.
	Default: ON.
Fn Lock Options	Enables or disables the Fn lock mode.
	Default: ON.
Fastboot	Configures the speed of the UEFI boot process.
	Default: Thorough. Performs complete hardware and configuration initialization during boot.
Extend BIOS POST Time	Configures the BIOS POST (Power-On Self-Test) load time.
	Default: 0 seconds.
Full Screen Logo	Enabled or disabled the computer to display full screen logo if the image match screen resolution.
	Default: OFF.
Warnings and Errors	Selects an action on encountering a warning or error during boot.
	Default: Prompt on Warnings and Errors. Stop, prompt and wait for user input when warnings or errors are detected.
	(i) **NOTE:** Errors deemed critical to the operation of the computer hardware will always halt the computer.

Table 11. System setup options—Virtualization Support menu

Virtualization

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

Table 12. System setup options—Wireless menu

Wireless

Wireless Switch	Determines which wireless devices can be controlled by the Wireless Switch. For Windows 8 systems, this is controlled by an operating system drive directly. As a result, the setting does not affect the Wireless Switch behavior. (i) **NOTE:** When both WLAN and WiGig are present, enable/disable controls are tied together. Thus, they cannot be enabled or disabled independently.
WLAN	Default: ON.
Bluetooth	Default: ON.
Wireless Device Enable	Enable or disable internal WLAN/Bluetooth devices.
WLAN	Default: ON.
Bluetooth	Default: ON.

Table 13. System setup options—Maintenance menu

Maintenance	
Service Tag	Displays the Service Tag of the computer.
Asset Tag	Creates a system Asset Tag that can be used by an IT administrator to uniquely identify a particular system. Once set in BIOS, the Asset Tag cannot be changed.
BIOS Downgrade	Controls flashing of the system firmware to previous revisions.
	Default: ON.
Data Wipe	⚠ CAUTION: **This Secure Wipe Operation will delete information in a way that it cannot be reconstructed.**
	If enabled, the BIOS will queue up a data wipe cycle for storage devices that are connected to the motherboard on the next reboot.
	Default: OFF.
BIOS Recovery	Enables the computer to recover from a bad BIOS image, as long as the Boot Block portion is intact and functioning.
	Default: ON.
	ⓘ NOTE: BIOS recovery is designed to fix the main BIOS block and cannot work if the Boot Block is damaged. In addition, this feature cannot work in the event of EC corruption, ME corruption, or a hardware issue. The recovery image must exist on an unencrypted partition on the drive.

Table 14. System setup options—System Logs menu

System Logs	
BIOS Events	Displays BIOS events.
	Default: Keep.
Thermal Events	Displays Thermal events.
	Default: Keep.
Power Events	Displays Power events.
	Default: Keep.

Table 15. System setup options—SupportAssist System Resolution menu

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

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.

Table 16. System and setup password (continued)

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

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

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

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

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

Assigning a system setup password

Prerequisites

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

About this task

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

Steps

1. In the **System BIOS** or **System Setup** screen, select **Security** and press **Enter**.
   The **Security** screen is displayed.
2. Select **System/Admin Password** and create a password in the **Enter the new password** field.
   Use the following guidelines to assign the system password:
   ● A password can have up to 32 characters.
   ● The password can contain the numbers 0 through 9.
   ● Only lower case letters are valid, upper case letters are not allowed.
   ● Only the following special characters are allowed: space, ("), (+), (,), (-), (.), (/), (;), ([), (\), (]), (`).
3. Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.
4. Press **Esc** and a message prompts you to save the changes.
5. Press **Y** to save the changes.
   The computer reboots.

Deleting or changing an existing system setup password

Prerequisites

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

About this task

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

Steps

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

> (i) **NOTE:** If you change the System and/or Setup password, re enter the new password when prompted. If you delete the System and Setup password, confirm the deletion when prompted.

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

Clearing CMOS settings

About this task

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

Steps

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

Clearing BIOS (System Setup) and System passwords

About this task

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

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

Updating the BIOS

Updating the BIOS in Windows environment

About this task

Follow these steps to update the BIOS:

Steps

1. Turn on your computer.
2. Go to www.dell.com/support.
3. Click **Product support**. In the **Search support** box, enter the Service Tag of your computer, and then click **Search**.

   > (i) **NOTE:** If you do not have the Service Tag, use the product ID or manually browse for your computer model.

4. Click **Drivers & Downloads**. Expand **Find drivers**.
5. Select the operating system installed on your computer.
6. Scroll down the page and expand **BIOS**.
7. In the **Category** drop-down list, select **BIOS**.
   The latest version of BIOS is displayed.
8. Select the update and click **Download** to download the latest version of the BIOS for your computer.
9. After the download is complete, browse the folder where you saved the BIOS update file.

10. Double-click the BIOS update file icon and follow the on-screen instructions.

Updating the BIOS using the USB drive in Windows

Steps

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

Updating the BIOS in Linux and Ubuntu

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

Updating the BIOS from the F12 One-Time boot menu

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

About this task

BIOS Update

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

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

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

Updating from the One-Time boot menu

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

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

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

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

Steps

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

5. Select the file and double-click the flash target file, and then click **Submit**.
6. Click **Update BIOS**. The computer restarts to flash the BIOS.
7. The computer will restart after the BIOS update is completed.

5

Troubleshooting

Handling swollen Lithium-ion batteries

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

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

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

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

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

SupportAssist diagnostics

About this task

The SupportAssist diagnostics (previously known as ePSA diagnostics) performs a complete check of your hardware. The SupportAssist diagnostics is embedded in the BIOS and is launched by it internally. The SupportAssist diagnostics provides a set of options for particular devices or device groups. It allows 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 and provide extra information about the failed device(s)
- View status messages that indicate if the tests are completed successfully
- View error messages that indicate if problems were encountered during the test

(i) **NOTE:** Some tests are meant for specific devices and require user interaction. Ensure that you are present in front of the computer when the diagnostic tests are performed.

For more information, see SupportAssist Pre-Boot System Performance Check.

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.

Built-in self-test (BIST)

M-BIST

M-BIST (Built In Self-Test) is the system board's built-in self-test diagnostics tool that improves the diagnostics accuracy of system board embedded controller (EC) failures.

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

How to run M-BIST

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

1. Press and hold both the **M** key on the keyboard and the **power button** to initiate M-BIST.
2. With both the **M** key and the **power button** held down, the battery indicator LED may exhibit two states:
   a. OFF: No fault detected with the system board
   b. AMBER: Indicates a problem with the system board
3. If there is a failure with the system board, the battery status LED will flash one of the following error codes for 30 seconds:

Table 18. LED error codes

Blinking Pattern		Possible Problem
Amber	White	
2	1	CPU Failure
2	8	LCD Power Rail Failure
1	1	TPM Detection Failure
2	4	Unrecoverable SPI Failure

4. If there is no failure with the system board, the LCD will cycle through the solid color screens described in the LCD-BIST section for 30 seconds and then power off.

LCD Built-in Self Test (BIST)

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

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

How to invoke LCD BIST Test

1. Power off the Dell laptop.
2. Disconnect any peripherals that are connected to the laptop. Connect only the AC adapter (charger) to the laptop.
3. Ensure that the LCD (screen) is clean (no dust particles on the surface of the screen).
4. Press and hold **D** key and **Power on** the laptop to enter LCD built-in self test (BIST) mode. Continue to hold the D key, until the system boots up.
5. The screen will display solid colors and change colors on the entire screen to white, black, red, green, and blue twice.
6. Then it will display the colors white, black and red.
7. Carefully inspect the screen for abnormalities (any lines, fuzzy color or distortion on the screen).
8. At the end of the last solid color (red), the system will shut down.

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

Recovering the operating system

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

Dell SupportAssist OS Recovery is a standalone tool that is preinstalled in all Dell computers installed with Windows operating system. It consists of tools to diagnose and troubleshoot issues that may occur before your computer boots to the operating system. It enables you to diagnose hardware issues, repair your computer, back up your files, or restore your computer to its factory state.

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

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

Enabling Intel Optane memory

Steps

1. On the taskbar, click the search box, and then type `Intel Rapid Storage Technology`.
2. Click **Intel Rapid Storage Technology**.
   The **Intel Rapid Storage Technology** window is displayed.
3. On the **Status** tab, click **Enable** to enable the Intel Optane memory.
4. On the warning screen, select a compatible fast drive, and then click **Yes** to continue enabling Intel Optane memory.
5. Click **Intel Optane memory** > **Reboot** to complete enabling your Intel Optane memory.

   (i) **NOTE:** Applications may take up to three subsequent launches after enablement to see the full performance benefits.

Disabling Intel Optane memory

About this task

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

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

Steps

1. On the taskbar, click the search box, and then type `Intel Rapid Storage Technology`.
2. Click **Intel Rapid Storage Technology**.
   The **Intel Rapid Storage Technology** window is displayed.
3. On the **Intel Optane memory** tab, click **Disable** to disable the Intel Optane memory.

   (i) **NOTE:** For computers in which Intel Optane memory acts as a primary storage, do not disable the Intel Optane memory. The **Disable** option will be grayed out.

4. Click **Yes** if you accept the warning.
   The disabling progress is displayed.
5. Click **Reboot** to complete disabling your Intel Optane memory and restart your computer.

Flea power release

About this task

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

Steps

1. Turn off your computer.
2. Remove the base cover.
3. Remove the battery.
4. Press and hold the power button for 15 seconds to drain the flea power.
5. Replace the battery.
6. Replace the base cover.
7. Turn on your computer.

Wi-Fi power cycle

About this task

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

(i) **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.

Getting help and contacting Dell

Self-help resources

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

Table 19. Self-help resources

Self-help resources	Resource location
Information about Dell products and services	www.dell.com
My Dell	
Tips	
Contact Support	In Windows search, type `Contact Support`, and press Enter.
Online help for operating system	www.dell.com/support/windows www.dell.com/support/linux
Access top solutions, diagnostics, drivers and downloads, and learn more about your computer through videos, manuals and documents.	Your Dell computer is uniquely identified by a Service Tag or Express Service Code. To view relevant support resources for your Dell computer, enter the Service Tag or Express Service Code at www.dell.com/support. For more information on how to find the Service Tag for your computer, see Locate the Service Tag on your computer.
Dell knowledge base articles for a variety of computer concerns	1. Go to www.dell.com/support. 2. On the menu bar at the top of the Support page, select **Support** > **Knowledge Base**. 3. In the Search field on the Knowledge Base page, type the keyword, topic, or model number, and then click or tap the search icon to view the related articles.

Contacting Dell

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

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

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