Inspiron 7591

Service Manual

Computer Model: Inspiron 7591
Regulatory Model: P83F
Regulatory Type: P83F001

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Status	Released

Notes, cautions, and warnings

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

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

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

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Identifier	GUID-9821EDD0-9810-4752-8B3C-
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Safety instructions

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

WARNING: Disconnect all power sources before opening the computer cover or panels. After you finish working inside the computer, replace all covers, panels, and screws before connecting to the power source.

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

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

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

CAUTION: Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a processor by its edges, not by its pins.

CAUTION: When you disconnect a cable, pull on its connector or on its pull-tab, not on the cable itself. Some cables have connectors with locking tabs; if you are disconnecting this type of cable, press in on the locking tabs before you disconnect the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, ensure that both connectors are correctly oriented and aligned.

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

Identifier	GUID-92E4FD49-297C-4AEB-87E0-294DC0B5C9E3
Status	Released

Before working inside your computer

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

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.

Identifier	GUID-B2521C24-A407-4ABB-8022-6D88B53F0B94
Status	Released

Before you begin

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.

Identifier	GUID-E1EAA29F-F785-45A4-A7F8-3E717B40D541
Status	Released

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.

Identifier	GUID-A48EDCBD-2D76-4460-B709-223F43658255
Status	Released

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.

Identifier	GUID-0332D293-B3CC-4042-8A0D-795B07BE277E
Status	Released

Transporting sensitive components

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

Lifting equipment

Adhere to the following guidelines when lifting heavy weight equipment:

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

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

Identifier	GUID-366AB999-5E41-42BD-9CA4-652438BA7BEE
Status	Released

After working inside your computer

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

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**.

Identifier	GUID-7FBB11D7-9820-47BB-AFAA
Status	Released

Removing and installing components

Identifier	GUID-EA979CC8-84EC-4827-86C4-C80A8C31F4BF
Status	Released

Recommended tools

The procedures in this document may require the following tools:

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

Identifier	GUID-CC648B28-FBF9-4A6F-BB11-4C6C2FA3D08A
Status	Released

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	
Hard drive	Palm-rest and keyboard assembly	M2x4	3	

Component	Secured to	Screw type	Quantity	Screw image
NOTE: The hard drive is available only in computers shipped with 3-cell battery.				
Hard drive bracket	Hard drive	M3x3	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	
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	

Identifier	GUID-011AA877-0F90-479B-BF50-6CDFB72AD6D8
Status	Released

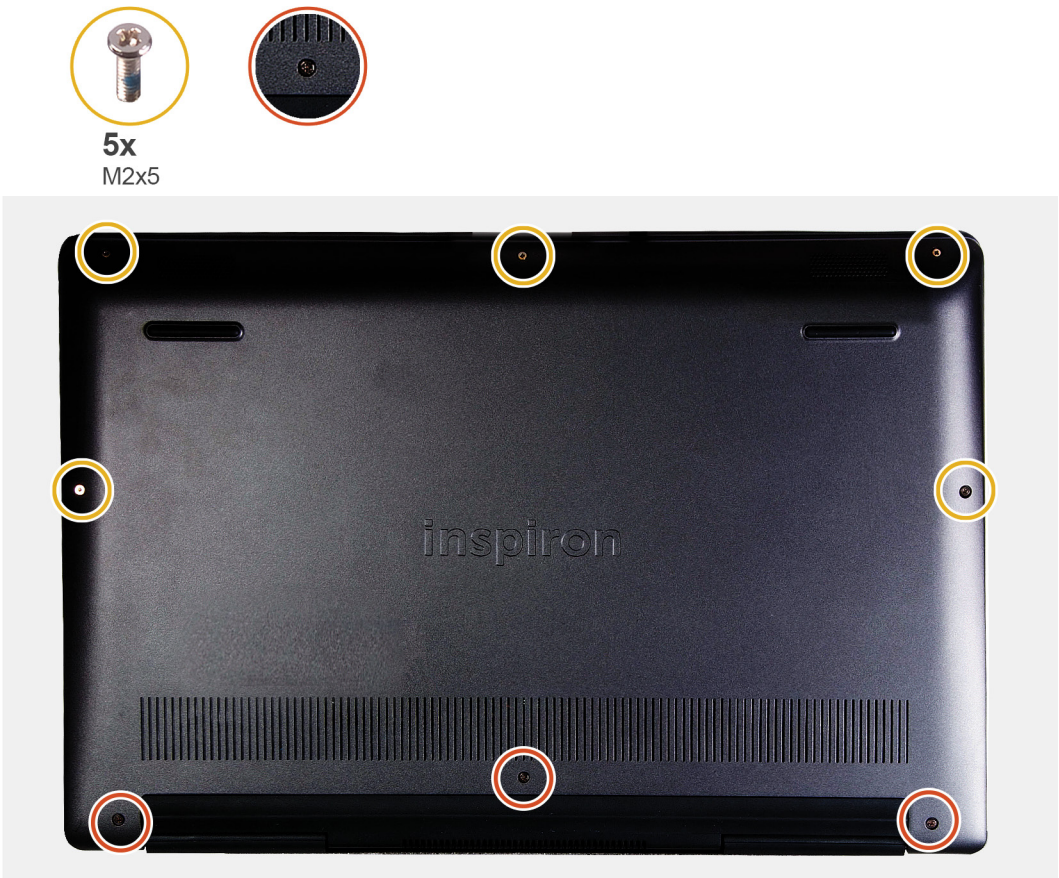
Base cover

Identifier	GUID-D4B28FD5-04FF-4C0A-B69F-259398594152
Status	Released

Removing the base cover

1 Follow the procedure in Before working inside your computer.

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



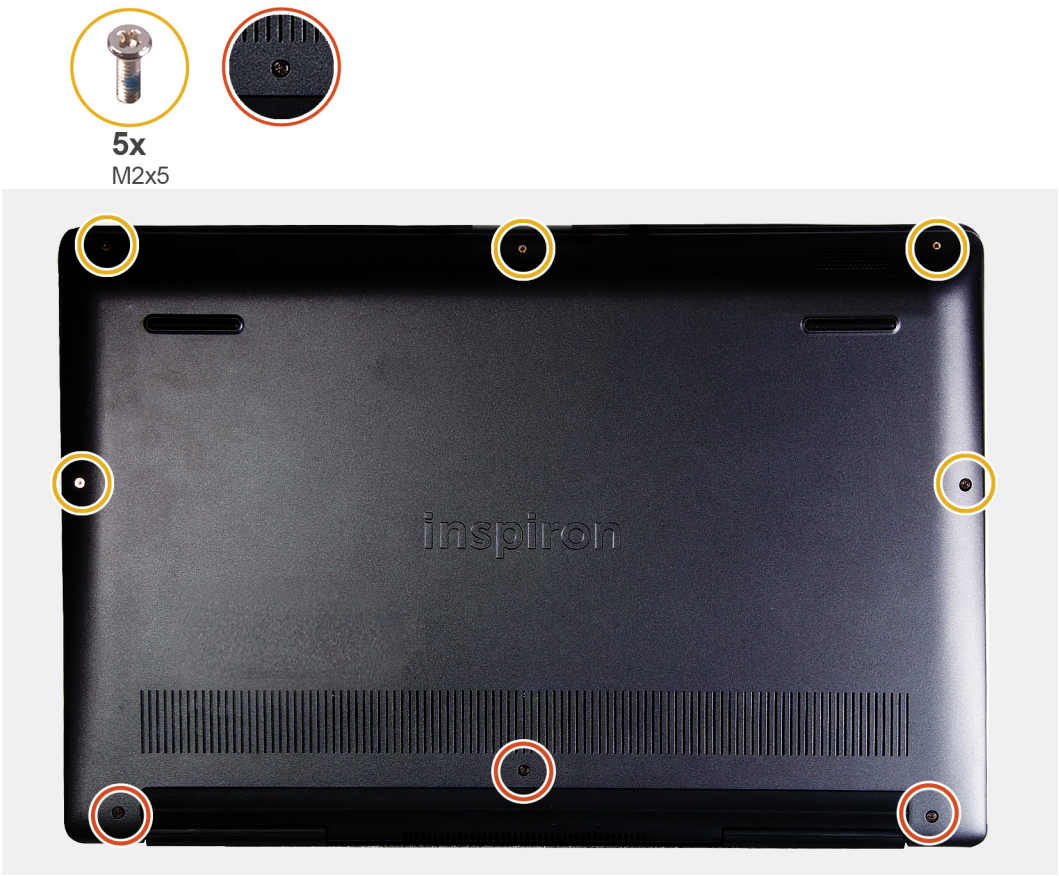
1 Loosen the three captive screws that secure the base cover to the palm-rest and keyboard assembly.
2 Remove the five screws (M2x5) that secure the base cover to the palm-rest and keyboard assembly.
3 Pry open the base cover from the top-center edge of the palm-rest and keyboard assembly.
4 Lift the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

Identifier	GUID-4ABBCFAA-F257-4340-BF2D-E7B8EB125D6A
Status	Released

Installing the base cover

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

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



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

1 Follow the procedure in After working inside your computer.

Identifier	GUID-F65273B2-AF5E-4C69-B895-7CEF2148F79D
Status	Released

Battery

Identifier	GUID-22C7DCB3-8D29-41D7-8D51-D90ABC7C2D63
Status	Released

Lithium-ion battery precautions

CAUTION:

- Exercise caution when handling Lithium-ion batteries.
- Discharge the battery as much as possible before removing it from the system. This can be done by disconnecting the AC adapter from the system to allow the battery to drain.
- Do not crush, drop, mutilate, or penetrate the battery with foreign objects.
- Do not expose the battery to high temperatures, or disassemble battery packs and cells.
- Do not apply pressure to the surface of the battery.
- Do not bend the battery.
- Do not use tools of any kind to pry on or against the battery.
- Ensure any screws during the servicing of this product are not lost or misplaced, to prevent accidental puncture or damage to the battery and other system components.
- If a battery gets stuck in a device as a result of swelling, do not try to free it as puncturing, bending, or crushing a Lithium-ion battery can be dangerous. In such an instance, the entire system should be replaced. Contact https://www.dell.com/support for assistance and further instructions.
- Always purchase genuine batteries from https://www.dell.com or authorized Dell partners and resellers.

Identifier	GUID-B947CA21-FEBC-4498-8F27-0436417D1CF9
Status	Released

Removing the 3-cell battery

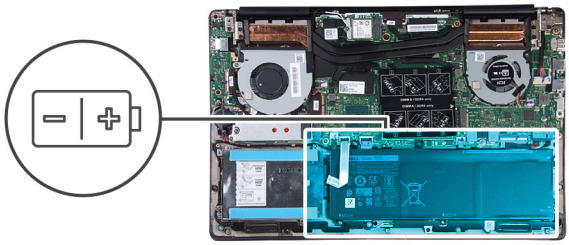
NOTE: The battery type in your computer varies depending on the configuration ordered.

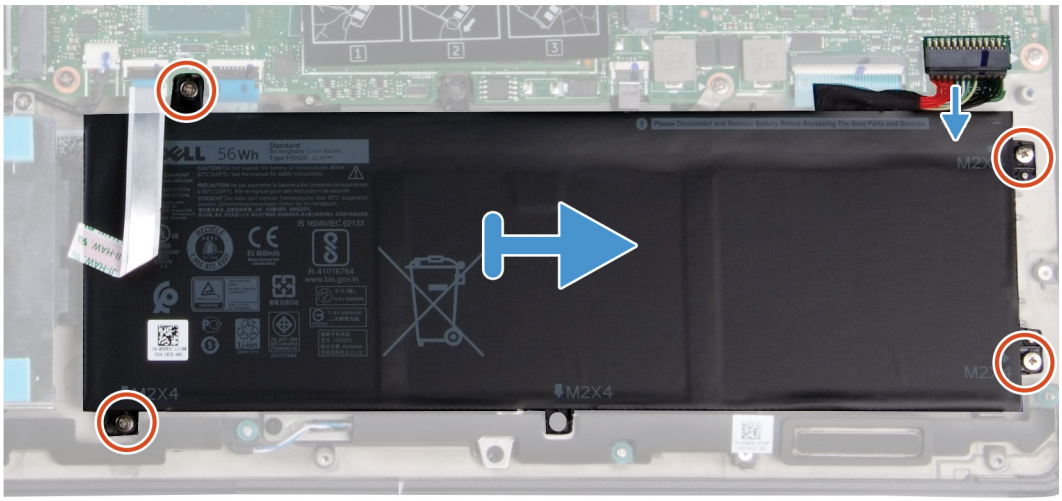
1 Follow the procedure in Before working inside your computer.

2 Remove the base cover.

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

4x
M2x4





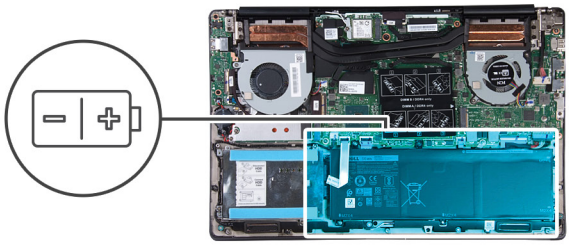
1 Disconnect the battery cable from the system board.
2 Remove the four screws (M2x4) that secure the battery to the palm-rest and keyboard assembly.
3 Lift the battery off the palm-rest and keyboard assembly.

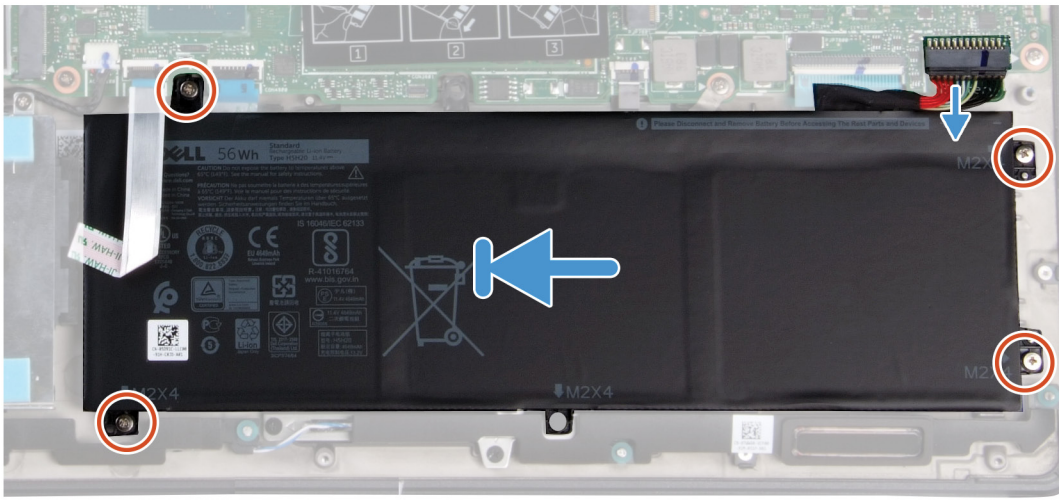
Identifier	**GUID-D60E5DE1-C2E0-4816-923C-31E8847AA52A**
Status	**Released**

Installing the 3-cell battery

If you are replacing a component, remove the existing component before performing the installation procedure.
The figure indicates the location of the battery and provides a visual representation of the installation procedure.

5x
M2x4





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.

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

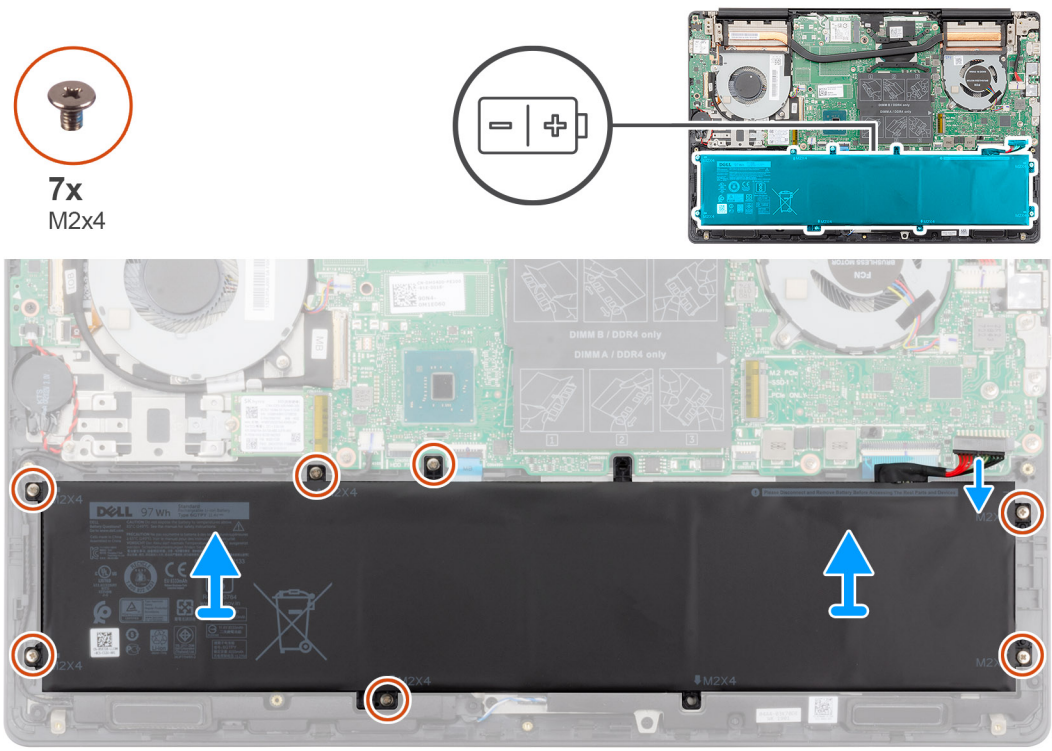
Identifier	**GUID-77663152-F01D-4BA9-8BA9-C80B3C5BCE7A**
Status	**Released**

Removing the 6-cell battery

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

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

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

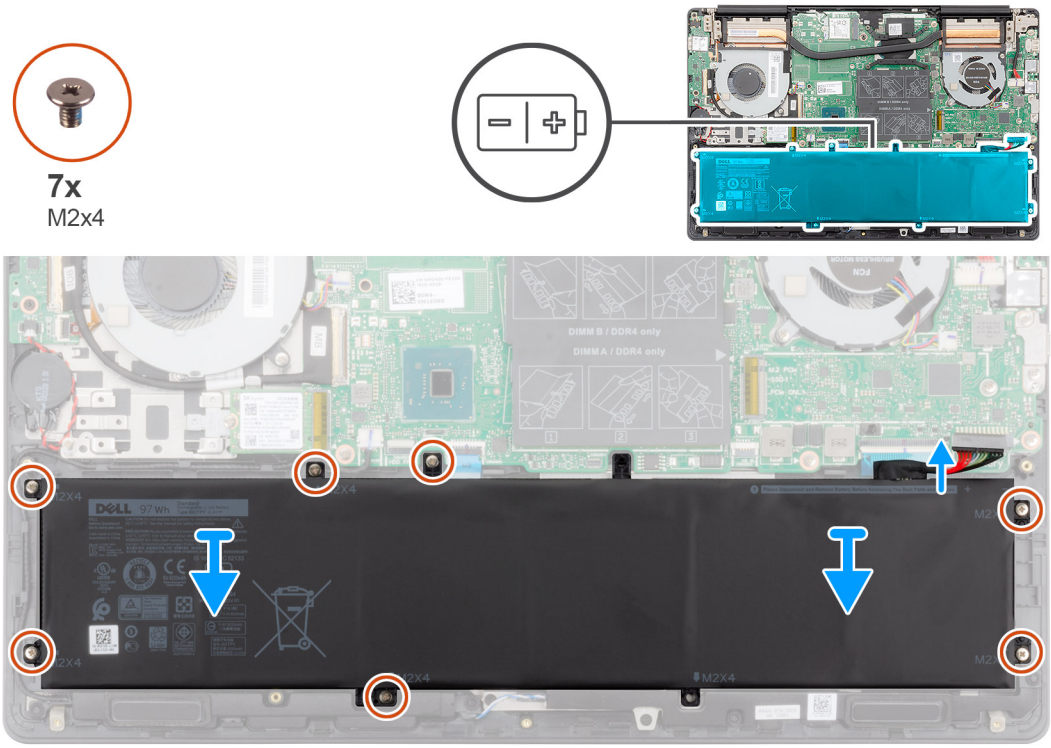


1 Disconnect the battery cable from the system board.
2 Remove the seven screws (M2x4) that secure the battery to the palm-rest and keyboard assembly.
3 Lift the battery off the palm-rest and keyboard assembly.

Identifier	GUID-DFC02E81-CCDA-4AF1-AB93-98EFA11EE2F9
Status	Released

Installing the 6-cell battery

If you are replacing a component, remove the existing component before performing the installation procedure.
The figure indicates the location of the battery and provides a visual representation of the installation procedure.



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.

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

Identifier	GUID-2A6DAE1B-1FBE-40F9-8D46-40E8C3FBD267
Status	Released

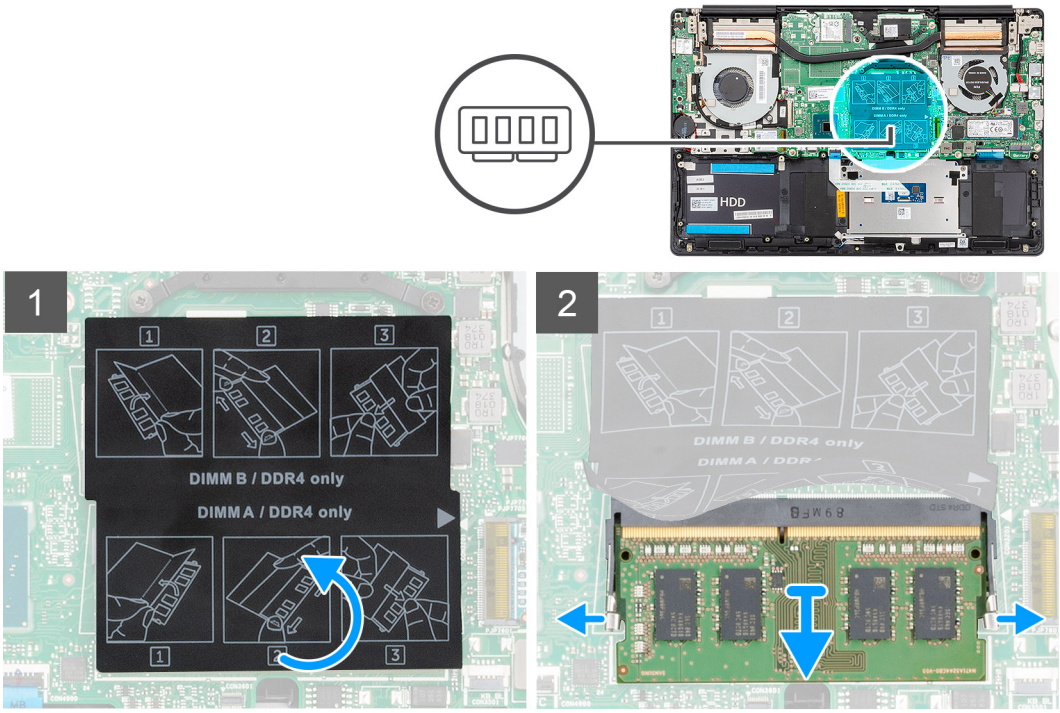
Memory modules

Identifier	GUID-50648059-E516-4514-9047-E09A7177BE5E
Status	Released

Removing the memory modules

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

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



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.

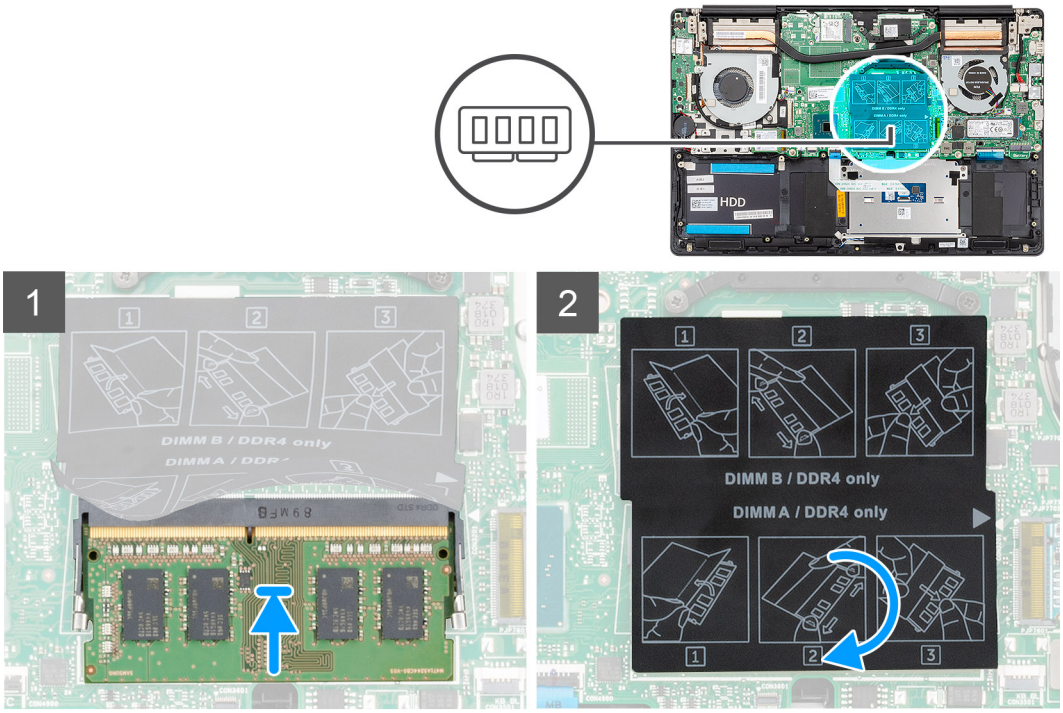
2 Slide and remove the memory module off the memory module slot on the system board.

Identifier	GUID-96E003C1-0FCE-47FC-82B2-3B50C56FBCF1
Status	Released

Installing the memory modules

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

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



1 Lift the mylar and align the notch on the memory module with the tab on the memory-module slot.
2 Slide the memory module firmly into the slot at an angle.
3 Press the memory module down until it clicks into place.

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

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

Identifier	GUID-F6A4309E-A10E-4E7F-903C-3FFAE07278CD
Status	Released

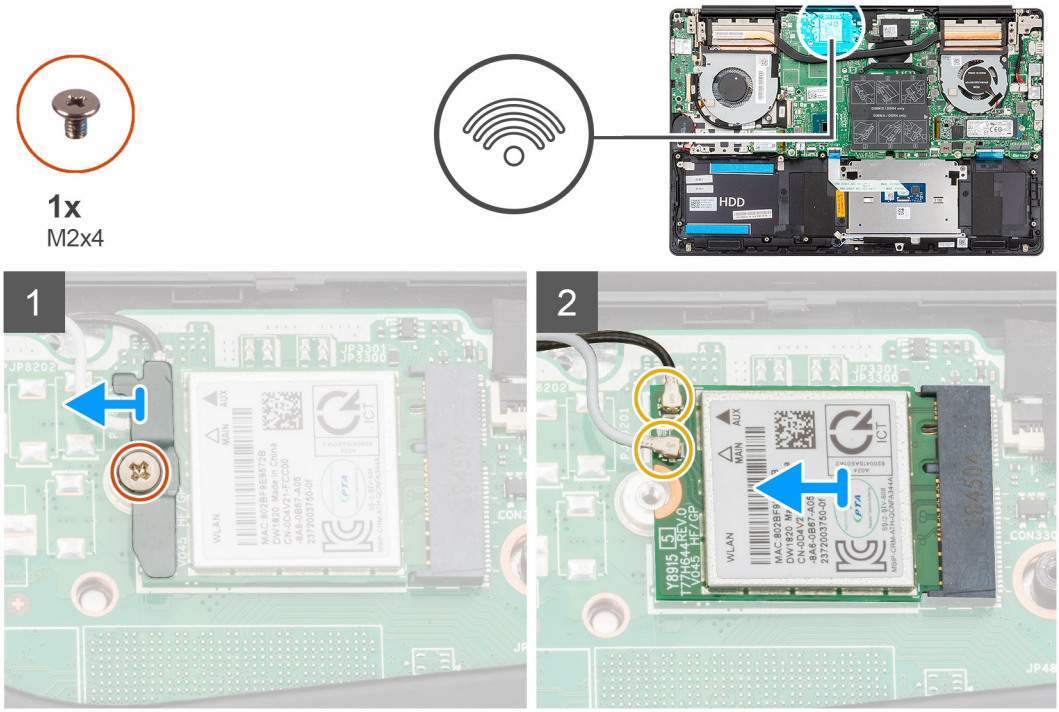
WLAN card

Identifier	GUID-8BE6C2C4-01AE-4297-B205-DF44FA2B66F0
Status	Released

Removing the WLAN card

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

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

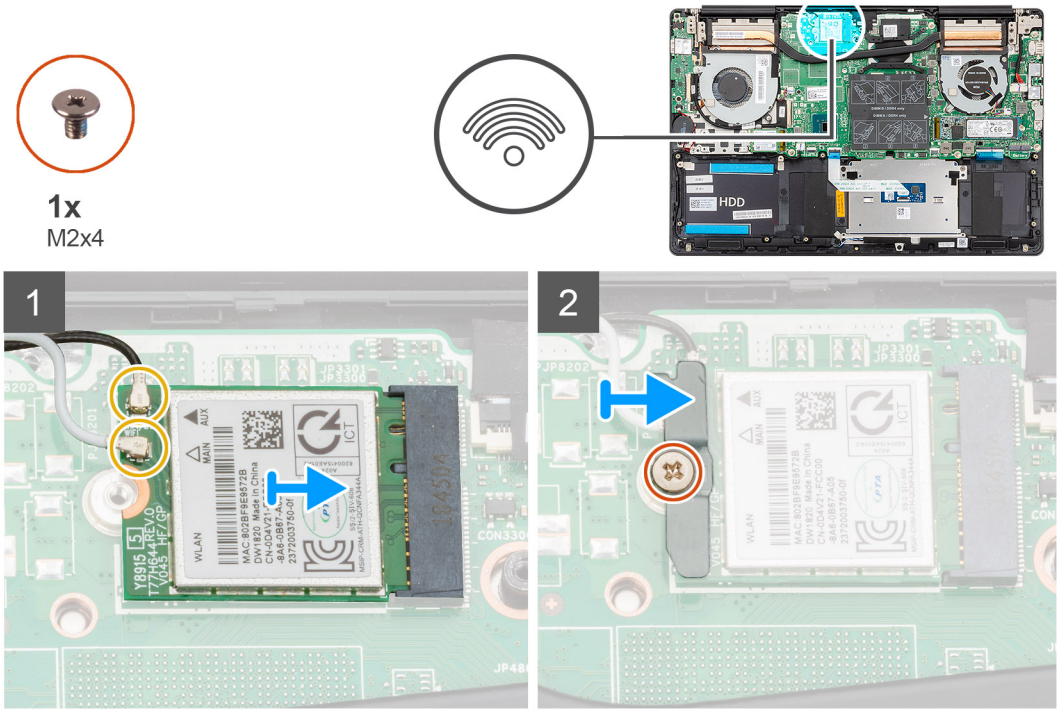


1 Remove the screw (M2x4) that secures the WLAN card bracket to the WLAN card.
2 Remove the WLAN card bracket from the WLAN card.
3 Disconnect the antenna cables from the WLAN card.
4 Slide and remove the WLAN card from the WLAN card slot.

Identifier	GUID-A7645047-C1E6-44EE-A640-3823056D401F
Status	Released

Installing the WLAN card

If you are replacing a component, remove the existing component before performing the installation procedure.
The figure indicates the location of the WLAN card and provides a visual representation of the installation procedure.



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.

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

Identifier	GUID-42A997F5-329D-4712-8018-6C6114C5255F
Status	Released

Solid-state drive

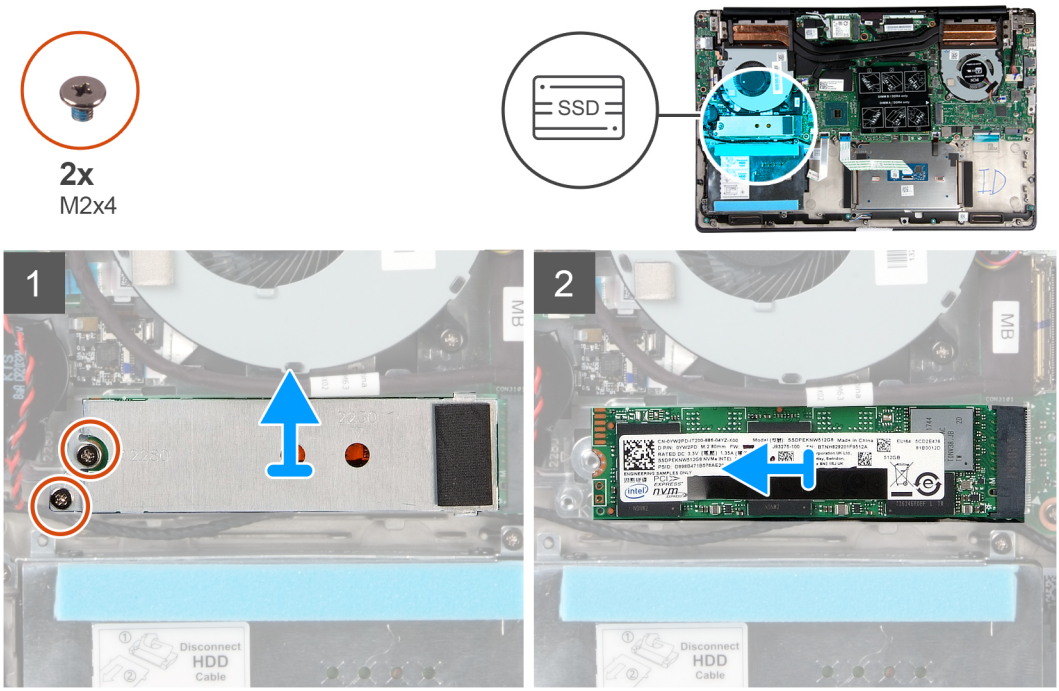
Identifier	GUID-99765FAA-2E0F-4ACC-B5E4-59DE5E926ABE
Status	Released

Removing the M.2 2280 solid-state drive

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

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

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



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.

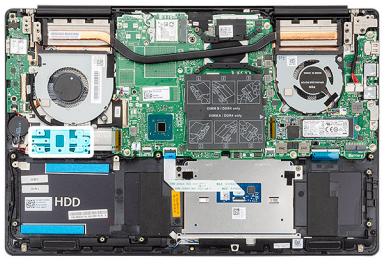
Identifier	GUID-72B85F90-AB87-45F7-9550-B0FA499FF92F
Status	Released

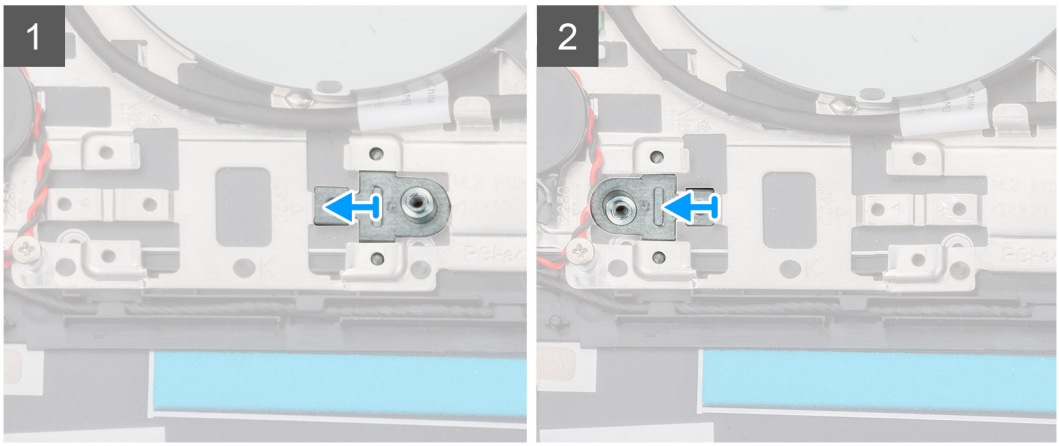
Installing the M.2 2280 solid-state drive

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

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.

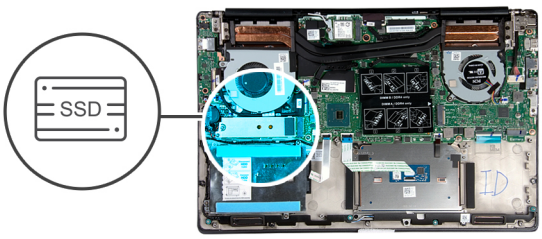
NOTE: The computer is shipped with solid-state drive shield, only if the solid-state drive capacity is more than 512 GB.

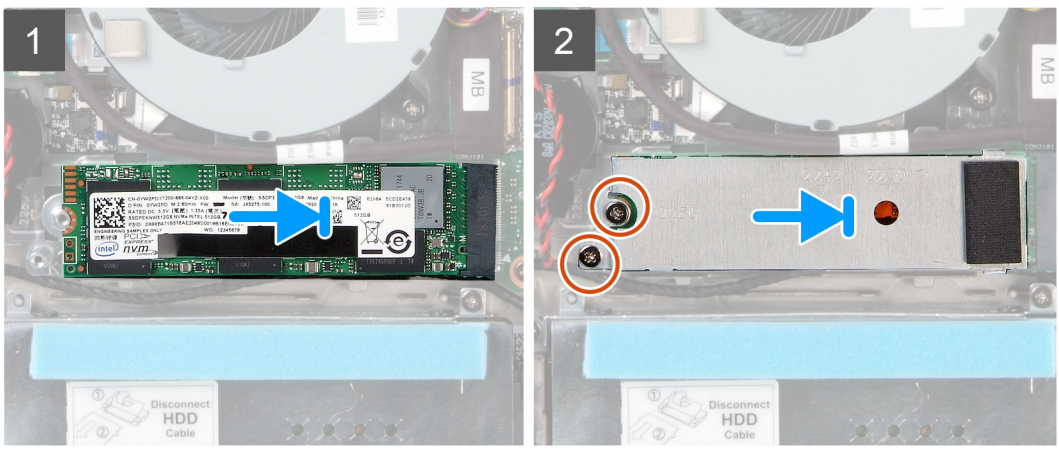




The figure indicates the location of the solid-state drive and provides a visual representation of the installation procedure:

2x
M2x4





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.

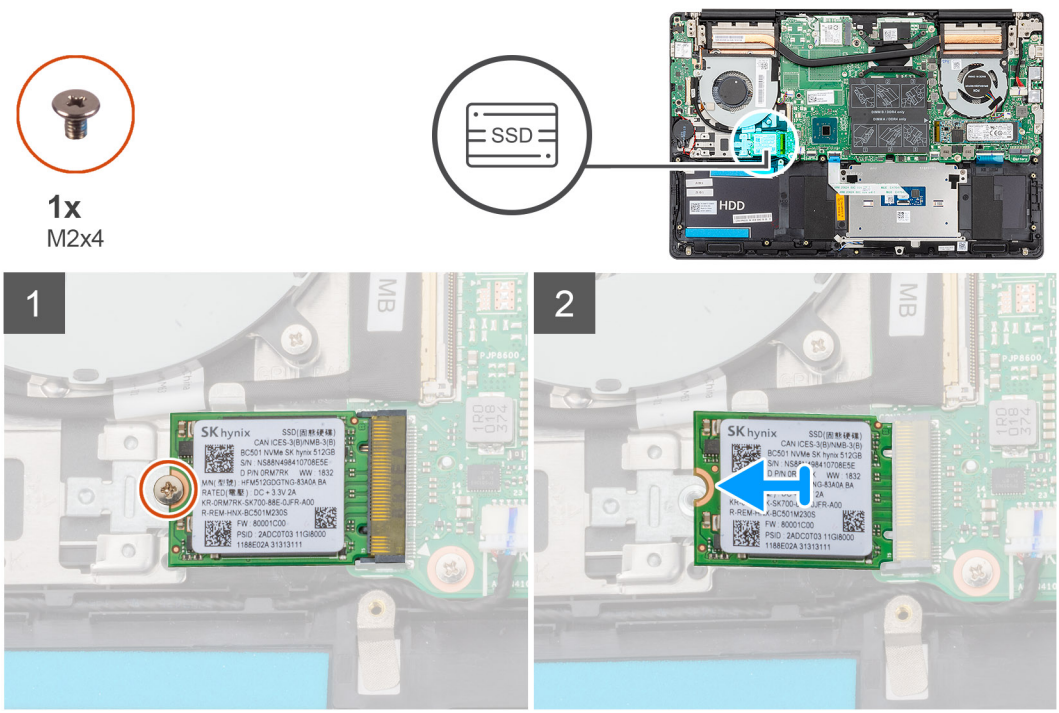
1 Connect the battery cable.
2 Install the base cover.
3 Follow the procedure in After working inside your computer.

Identifier	GUID-6720E9BC-1CAE-4A00-83DF-1FA8A2743D7E
Status	Released

Removing the M.2 2230 solid-state drive

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

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



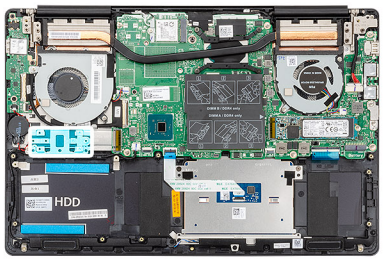
1 Remove the screw (M2x4) that secures the solid-state drive to the palm-rest and keyboard assembly.
2 Slide and remove the solid-state drive module from the solid-state drive slot on the system board.

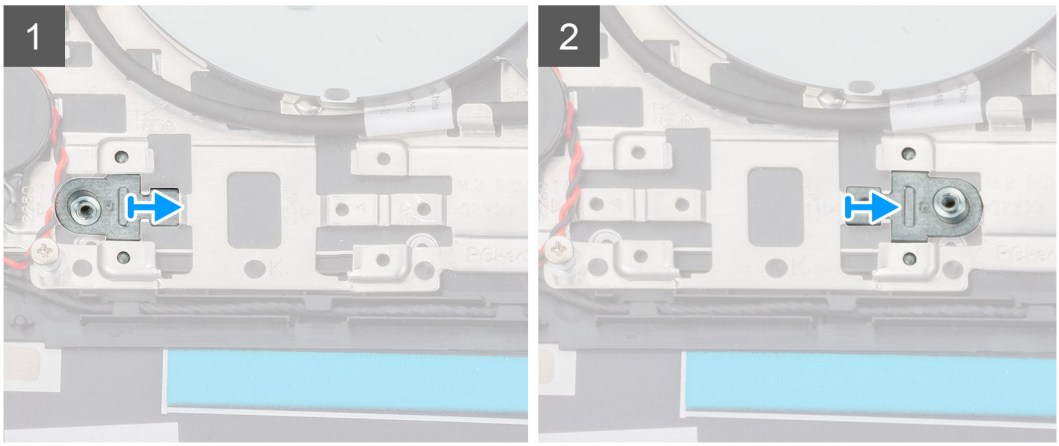
Identifier	GUID-2E2578C7-C522-4984-9348-3A8C9BEE22A0
Status	Released

Installing the M.2 2230 solid-state drive

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

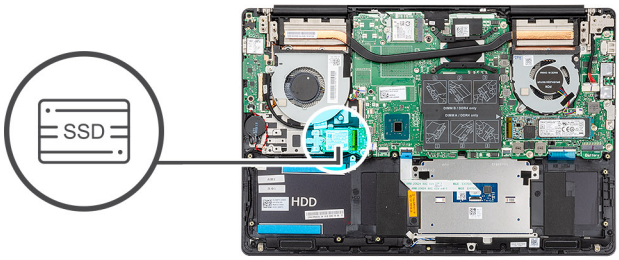
The figure indicates the location of the solid-state drive bracket and provides a visual representation of the bracket alignment procedure to accommodate the M.2 2230 solid-state drive.

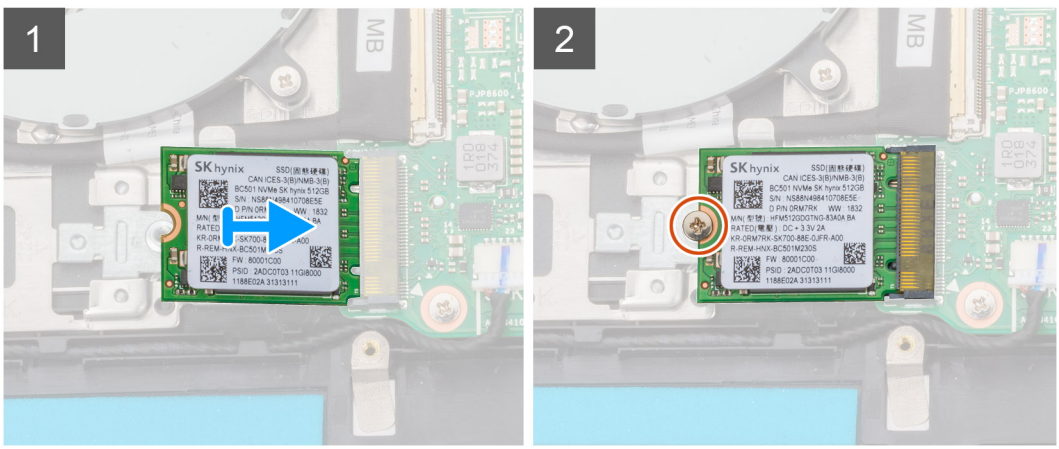




The figure indicates the location of the M.2 2230 solid-state drive and provides a visual representation of the installation procedure:

1x
M2x4





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.

1 Connect the battery cable.

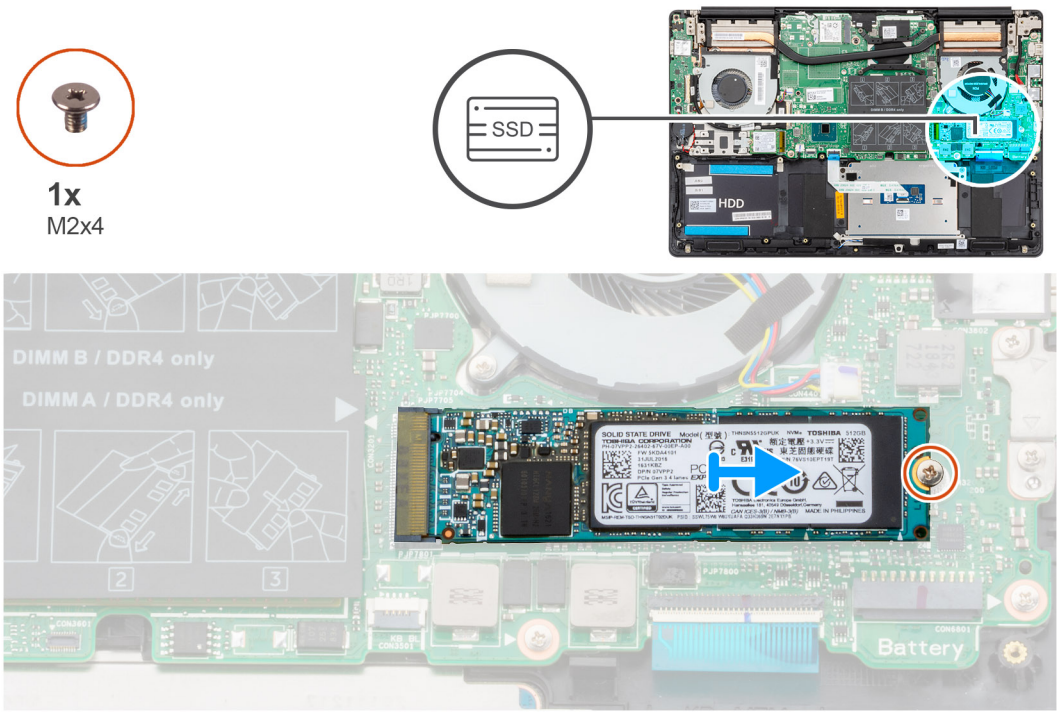
2 Install the base cover.
3 Follow the procedure in After working inside your computer.

Identifier	GUID-DC5E3948-2A91-4E64-AB57-5E8BD315309D
Status	Released

Removing the M.2 2280 PCIe solid-state drive

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

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



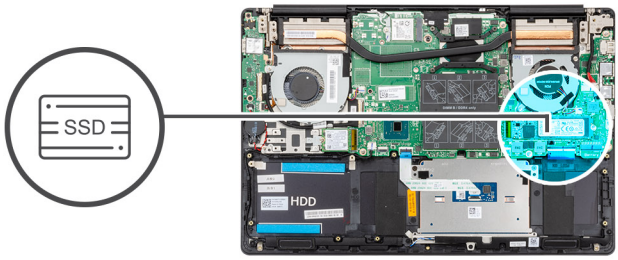
1 Remove the screw (M2x4) that secures the solid-state drive to the system board.
2 Slide and remove the solid-state drive module from the solid-state drive slot on the system board.

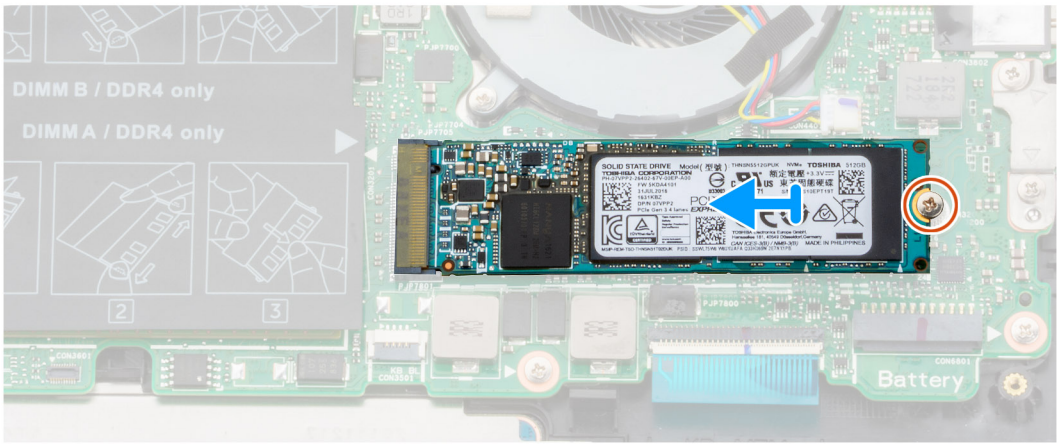
Identifier	GUID-5D47B3D5-7734-4C2A-8F67-1EA00BCB3192
Status	Released

Installing the M.2 2280 PCIe solid-state drive

If you are replacing a component, remove the existing component before performing the installation procedure.
The figure indicates the location of the M.2 2280 PCIe solid-state drive and provides a visual representation of the installation procedure:

1x
M2x4





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.

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

Identifier	GUID-2CFF108D-02DC-40AF-BD5A-C4C22584A457
Status	Released

Hard drive

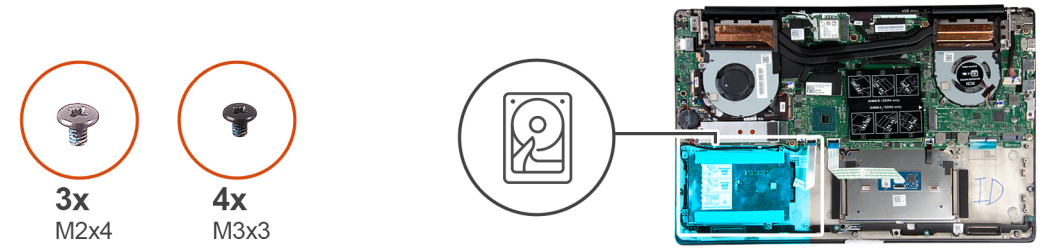
Identifier	GUID-AAB65B37-1C30-41B3-B7C5-53D31B5A55AC
Status	Released

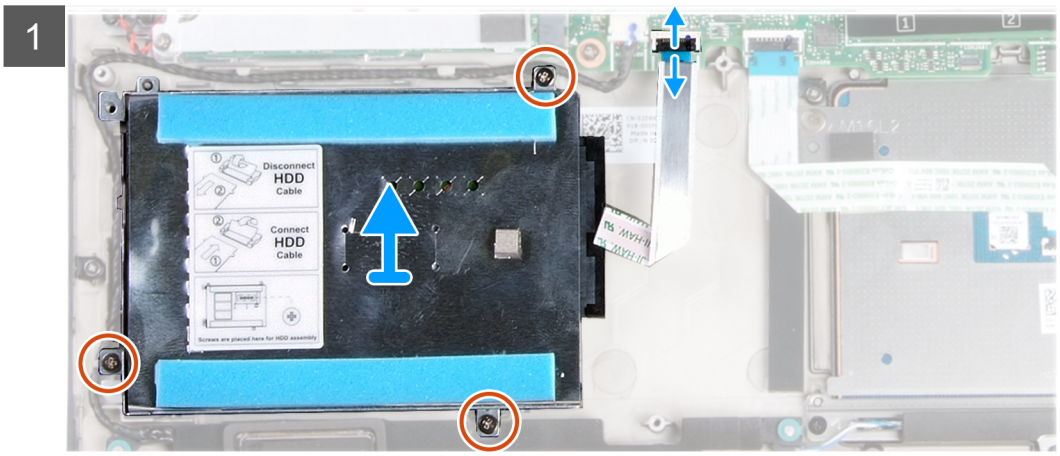
Removing the hard drive

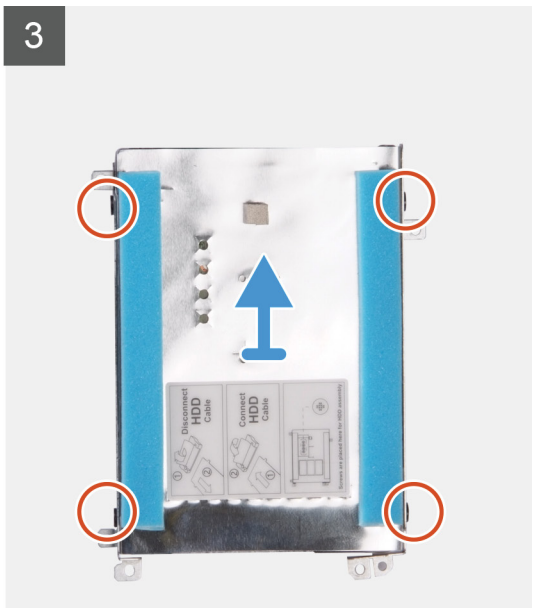
1 Follow the procedure in Before working inside your computer.
2 Remove the base cover.
3 Disconnect the battery cable.

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

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







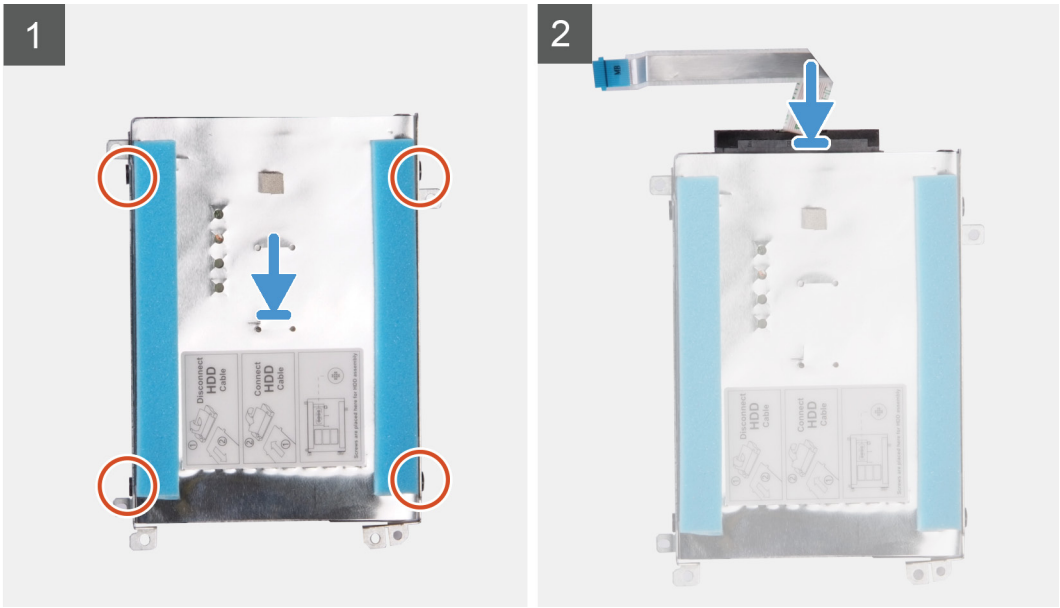
1 Open the latch and disconnect the hard-drive cable from the system board.
2 Remove the three screws (M2x4) that secure the hard-drive bracket to the palm-rest and keyboard assembly.
3 Lift the hard-drive assembly, along with its cable, off the palm-rest and keyboard assembly.
4 Disconnect the interposer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

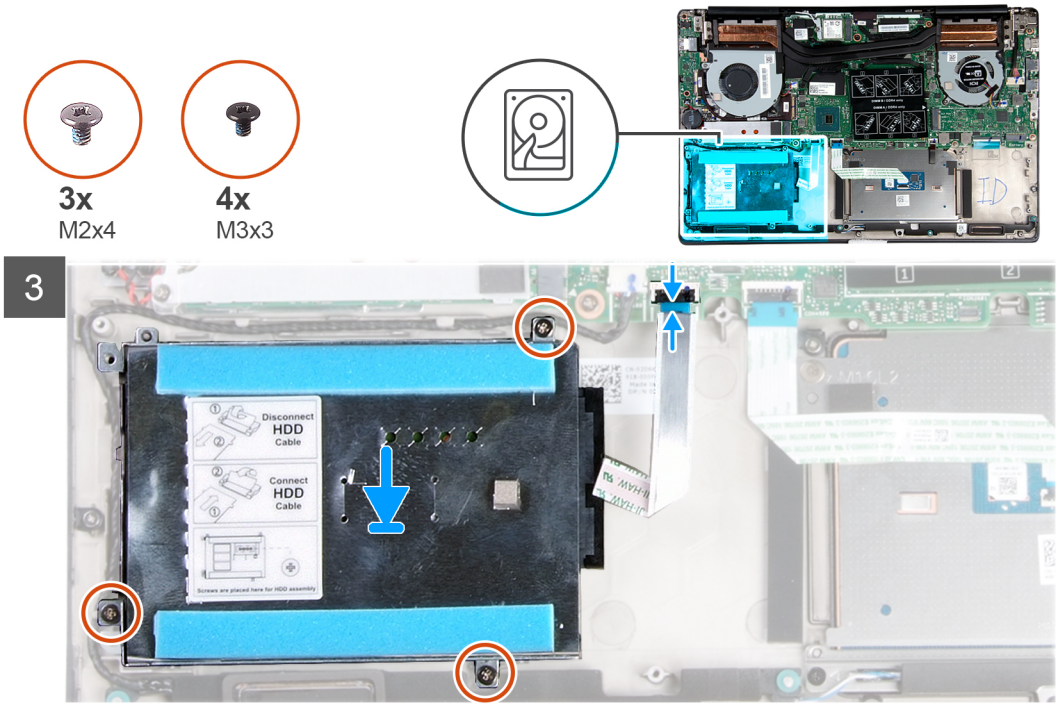
Identifier	GUID-239F8EA7-B03A-4054-8D1D-9C98EC5152C5
Status	Released

Installing the hard drive

If you are replacing a component, remove the existing component before performing the installation procedure.
The figure indicates the location of the hard drive and provides a visual representation of the installation procedure.

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





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

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

Identifier	**GUID-A6445DA5-405C-4BDA-A929-FE53DC4A83F6**
Status	**Released**

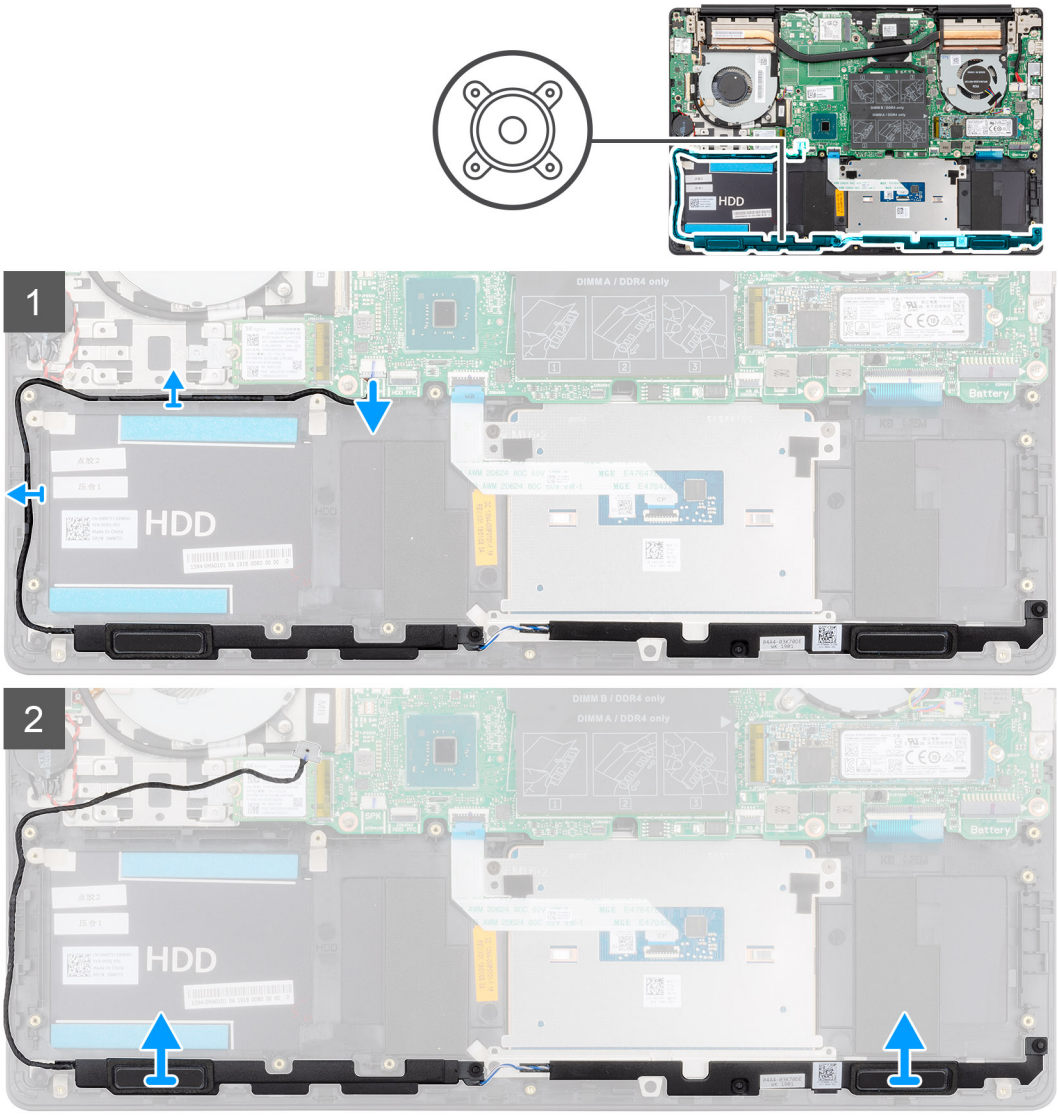
Speakers

Identifier	**GUID-124D4A88-697B-42FC-AB82-3B95E94BC13B**
Status	**Released**

Removing the speakers

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

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



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.

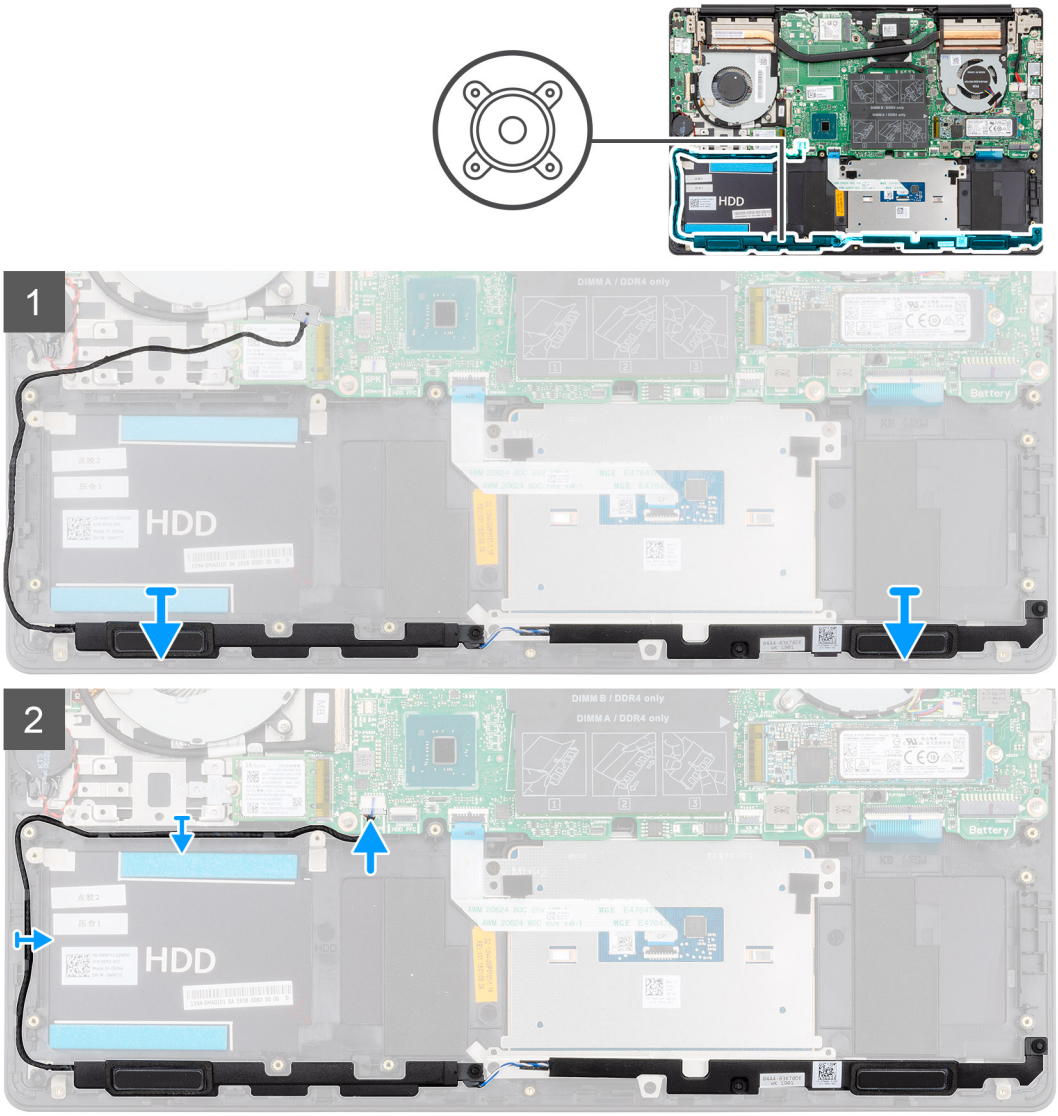
3 Lift the speakers, along with the cable, off the palm-rest and keyboard assembly.

Identifier	GUID-6D7F53A2-4F43-4A76-8CD4-0E5A94523454
Status	Released

Installing the speakers

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

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



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.

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

Identifier	GUID-C2632C9B-FAEC-455F-9746-177634B54CCD
Status	Released

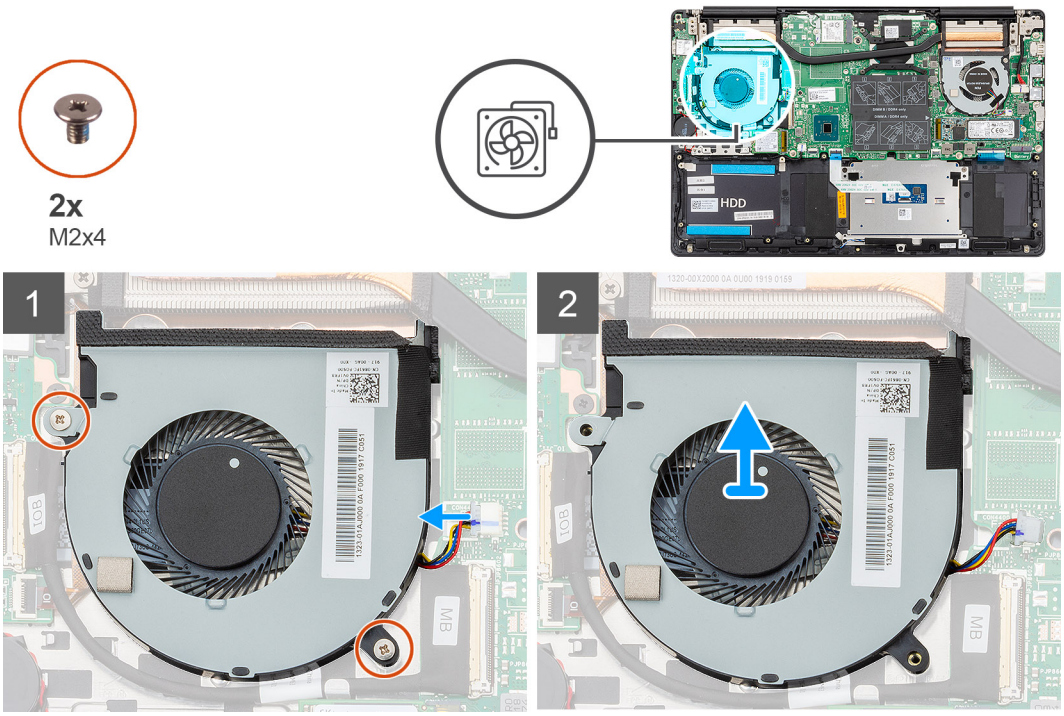
Graphics Processing Unit (GPU) fan

Identifier	GUID-038A9056-2D20-4F45-8CBC-D6C0A33AF315
Status	Released

Removing the GPU fan

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

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



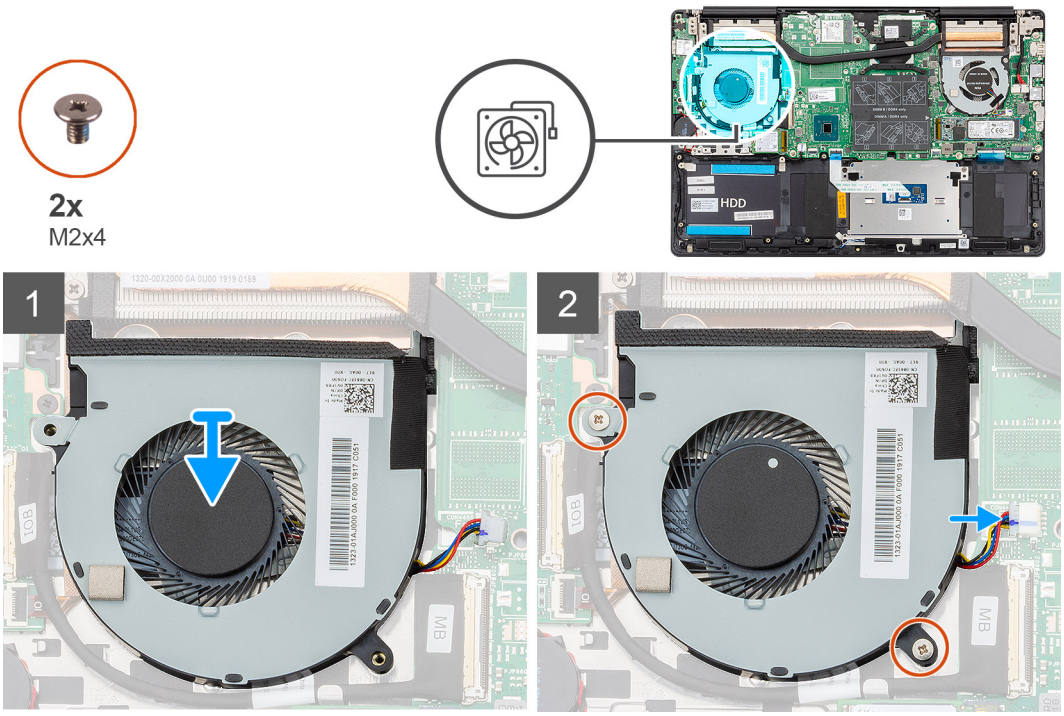
1 Remove the two (M2x4) screws that secure the GPU fan to the palm-rest and keyboard assembly.
2 Disconnect the GPU fan cable from the system board.
3 Slide and lift the GPU fan off the palm-rest and keyboard assembly.

Identifier	GUID-EF0A6129-9F68-4EB9-8287-C047B6C9A0E7
Status	Released

Installing the GPU fan

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

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



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.

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

Identifier	GUID-EC123E9D-DD9D-42A6-BFAF-E5744B612B45
Status	Released

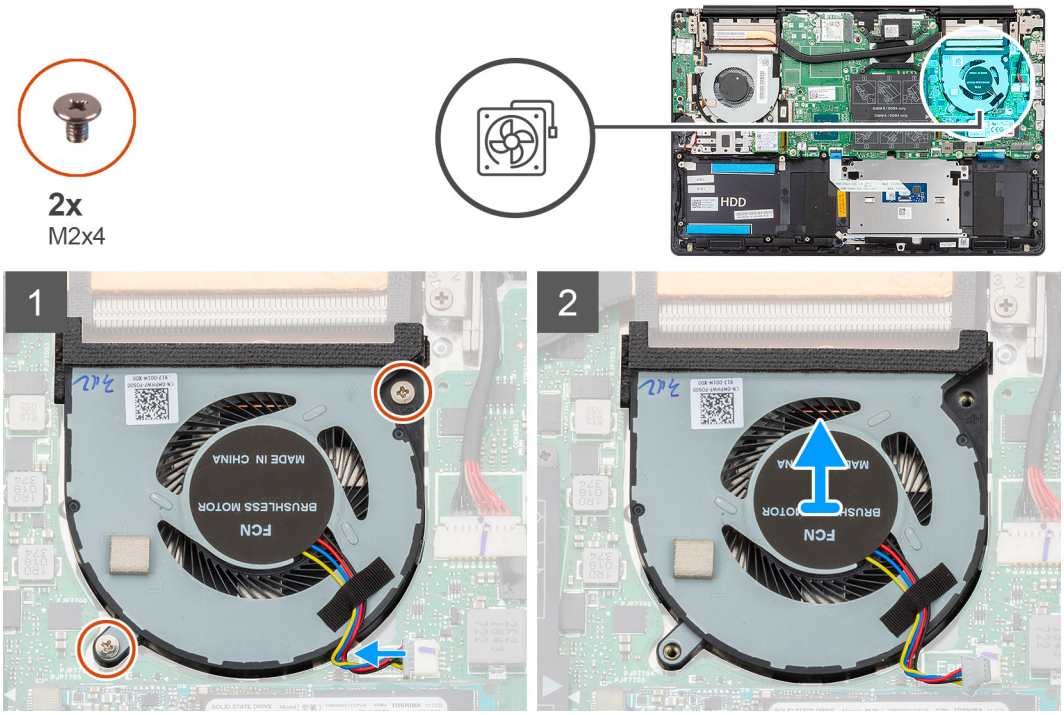
CPU fan

Identifier	GUID-DC01490C-58B4-4EB9-970B-EDE296F80115
Status	Released

Removing the CPU fan

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

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

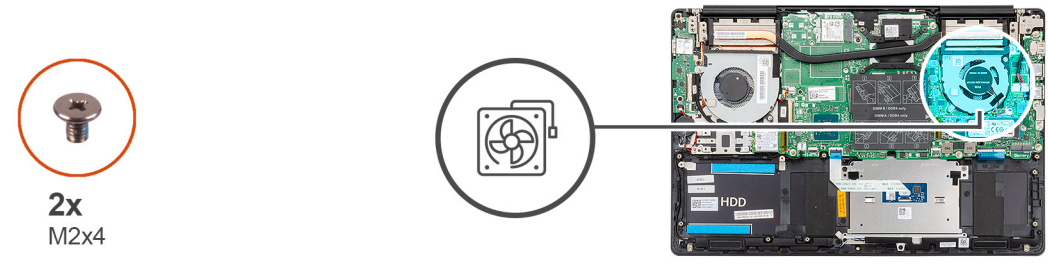


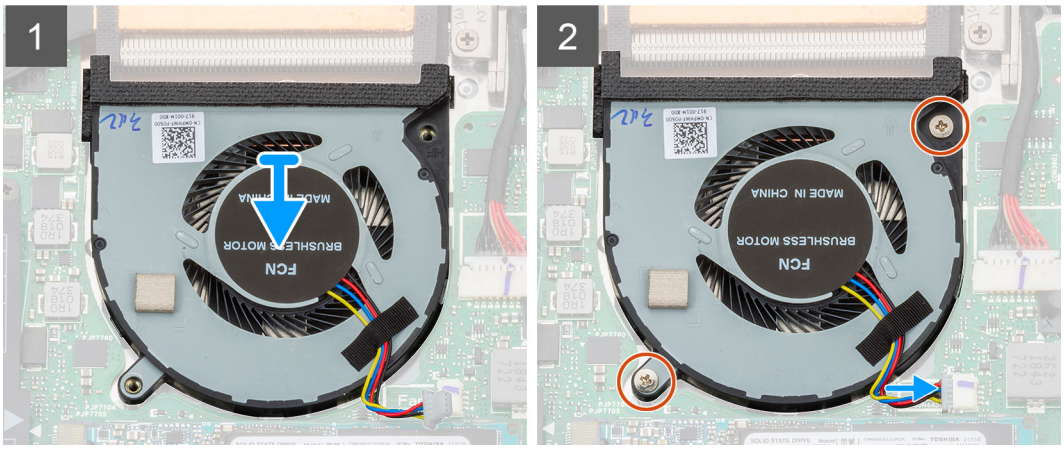
1 Remove the two (M2x4) screws that secure the CPU fan to the palm-rest and keyboard assembly.
2 Disconnect the CPU fan cable from the system board.
3 Slide and lift the CPU fan off the palm-rest and keyboard assembly.

Identifier	GUID-9497A15C-AEBA-49B5-9EED-41D3A2343165
Status	Released

Installing the CPU fan

If you are replacing a component, remove the existing component before performing the installation procedure.
The figure indicates the location of the CPU fan and provides a visual representation of the installation procedure.





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.

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

Identifier	GUID-4DA6FA84-FF63-4D31-A148-125AAD9F4B2B
Status	Released

Heat sink

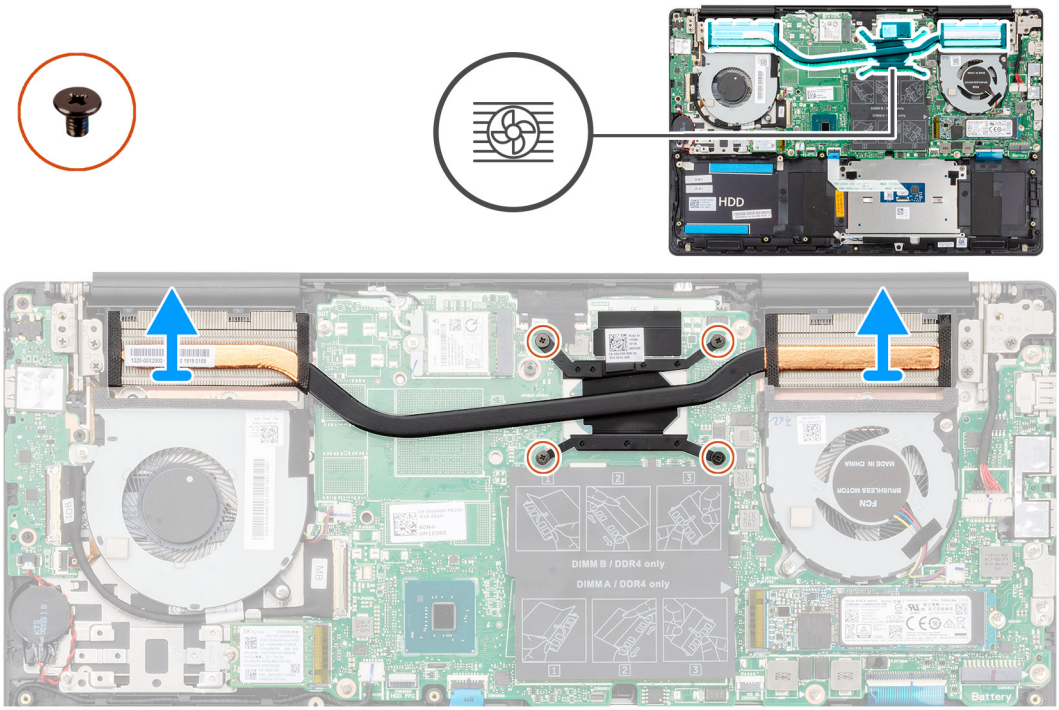
Identifier	GUID-298AC45E-D502-4807-B646-2A4550732A71
Status	Released

Removing the heat sink—UMA

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

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.

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

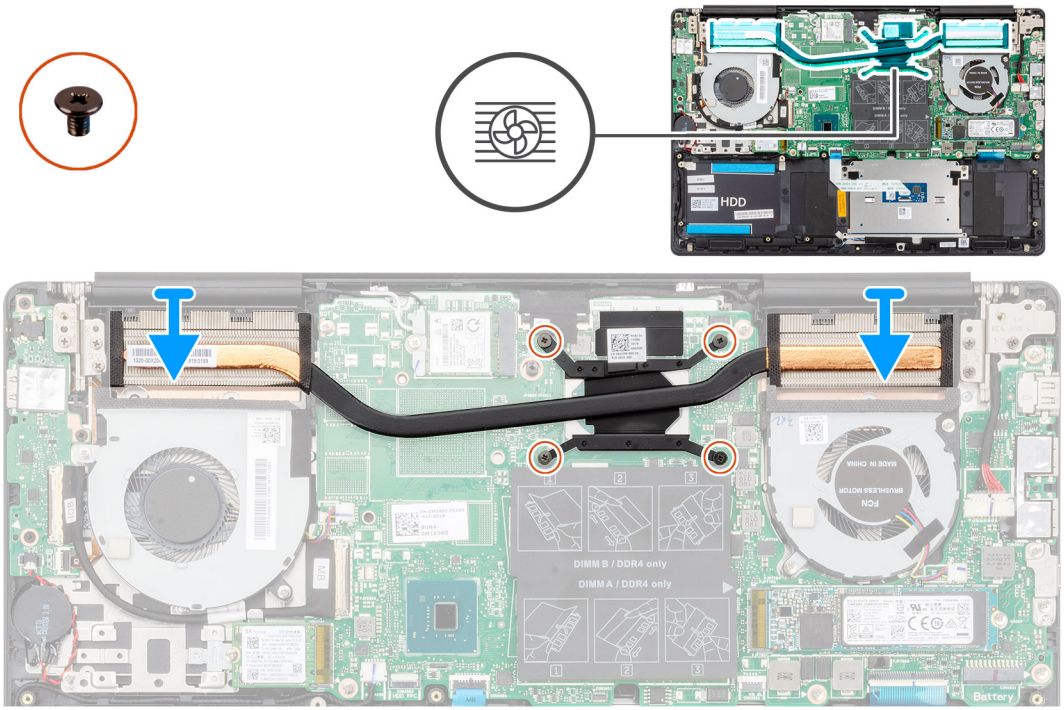


1 In sequential order (as indicated on the heat sink), loosen the four captive screws that secure the heat sink to the system board.
2 Lift and remove the heat sink off the palm-rest and keyboard assembly.

Identifier	GUID-BCA5ACB2-BA52-4728-B1EB-AE523D6BD3F0
Status	Released

Installing the heat sink—UMA

If you are replacing a component, remove the existing component before performing the installation procedure.
The figure indicates the location of the heat sink and provides a visual representation of the installation procedure.



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.

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.

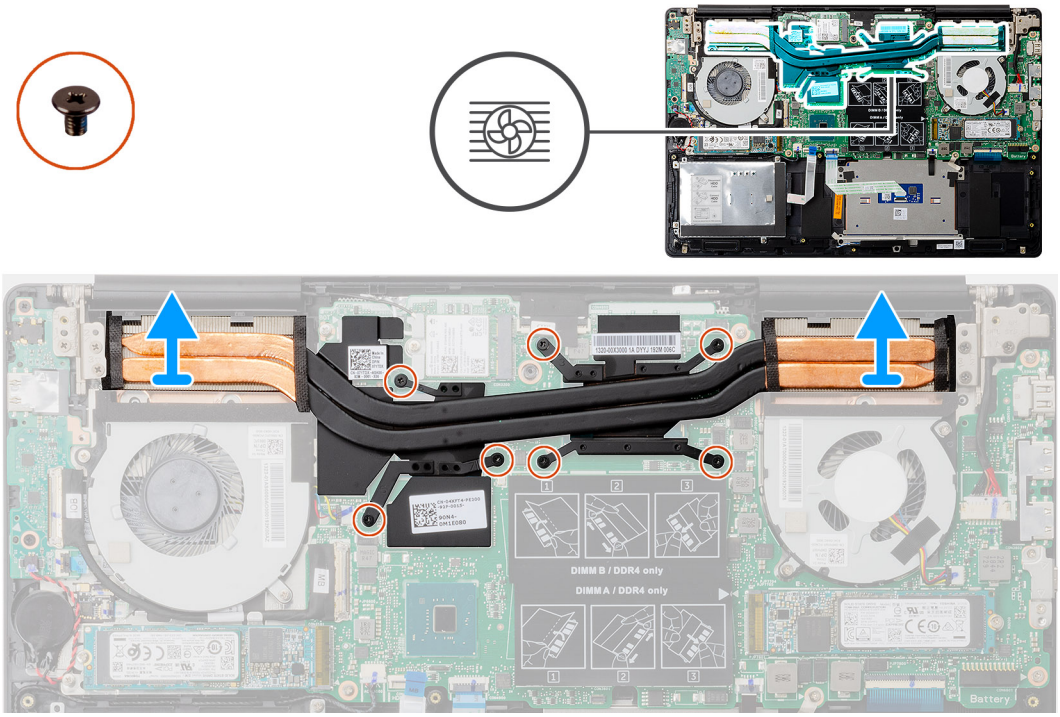
Identifier	**GUID-8B132033-26C3-4E6E-A63E-768D6C3BE68B**
Status	**Released**

Removing the heat sink—discrete

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

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.

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

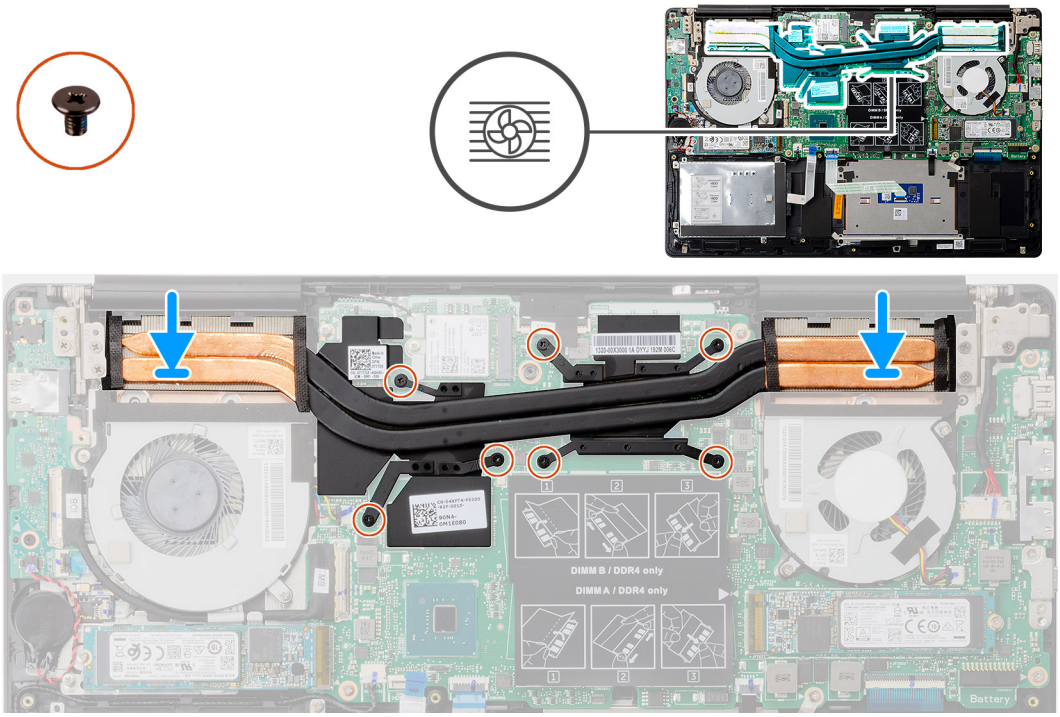


1 In sequential order (as indicated on the heat sink), loosen the seven captive screws that secure the heat sink to the system board.
2 Lift and remove the heat sink off the system board.

Identifier	GUID-1F0CD3FC-14BD-4B54-ADC1-3C306F05C929
Status	Released

Installing the heat sink—discrete

If you are replacing a component, remove the existing component before performing the installation procedure.
The figure indicates the location of the heat sink and provides a visual representation of the installation procedure.



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.

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.

Identifier	GUID-D99D5F9B-0FF3-406B-A51F-FFA061BB89EA
Status	Released

Coin-cell battery

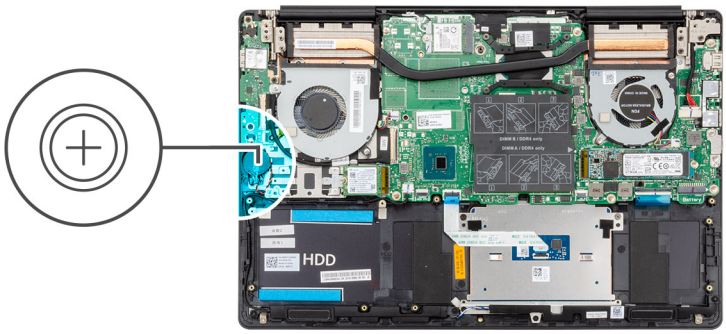
Identifier	GUID-8855616C-7A35-41EA-948C-9369B49A26FF
Status	Released

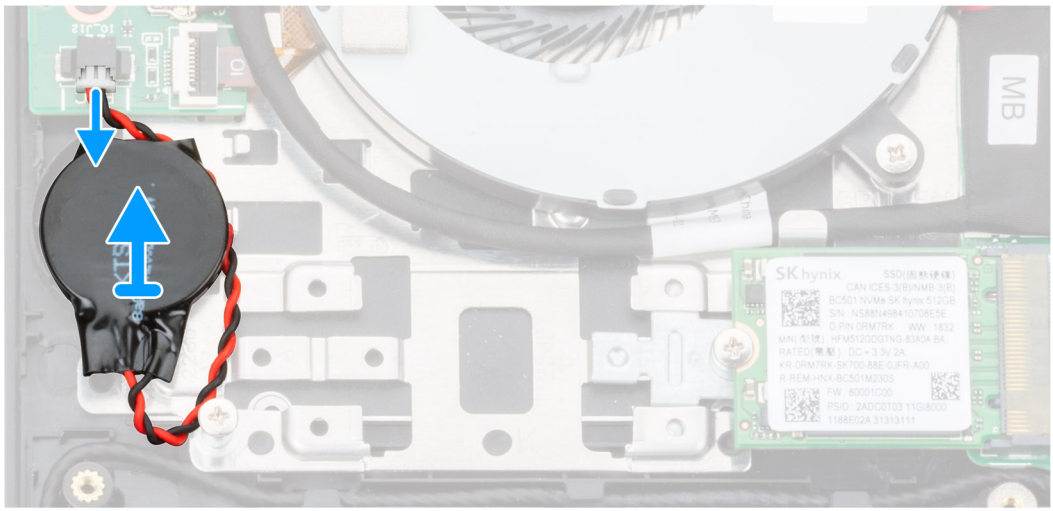
Removing the coin-cell battery

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.

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



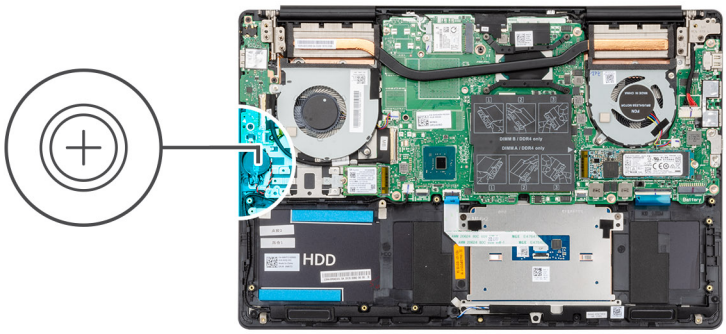


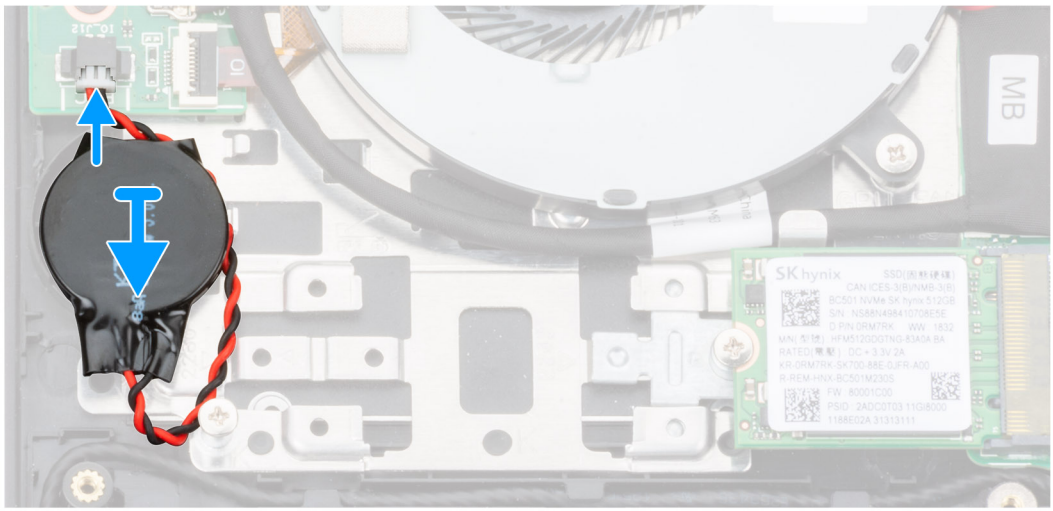
1 Disconnect the coin-cell battery cable from the I/O board.
2 Peel the coin-cell battery off the palm-rest and keyboard assembly.

Identifier	GUID-AE6EE6C1-1915-4A3C-8F77-9DF69463433D
Status	Released

Installing the coin-cell battery

If you are replacing a component, remove the existing component before performing the installation procedure.
The figure indicates the location of the coin-cell battery and provides a visual representation of the installation procedure.





1 Adhere the coin-cell battery to the slot on the palm-rest and keyboard assembly.
2 Route the coin-cell battery cable as illustrated and connect it to the I/O board.

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

Identifier	**GUID-A4EB1B18-E790-4DC7-A6B0-85015144D8CE**
Status	**Released**

I/O board

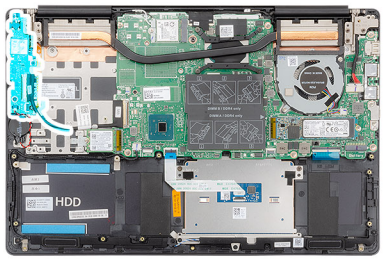
Identifier	**GUID-77C052E5-D8C7-4B41-843F-731EF07FFBAA**
Status	**Released**

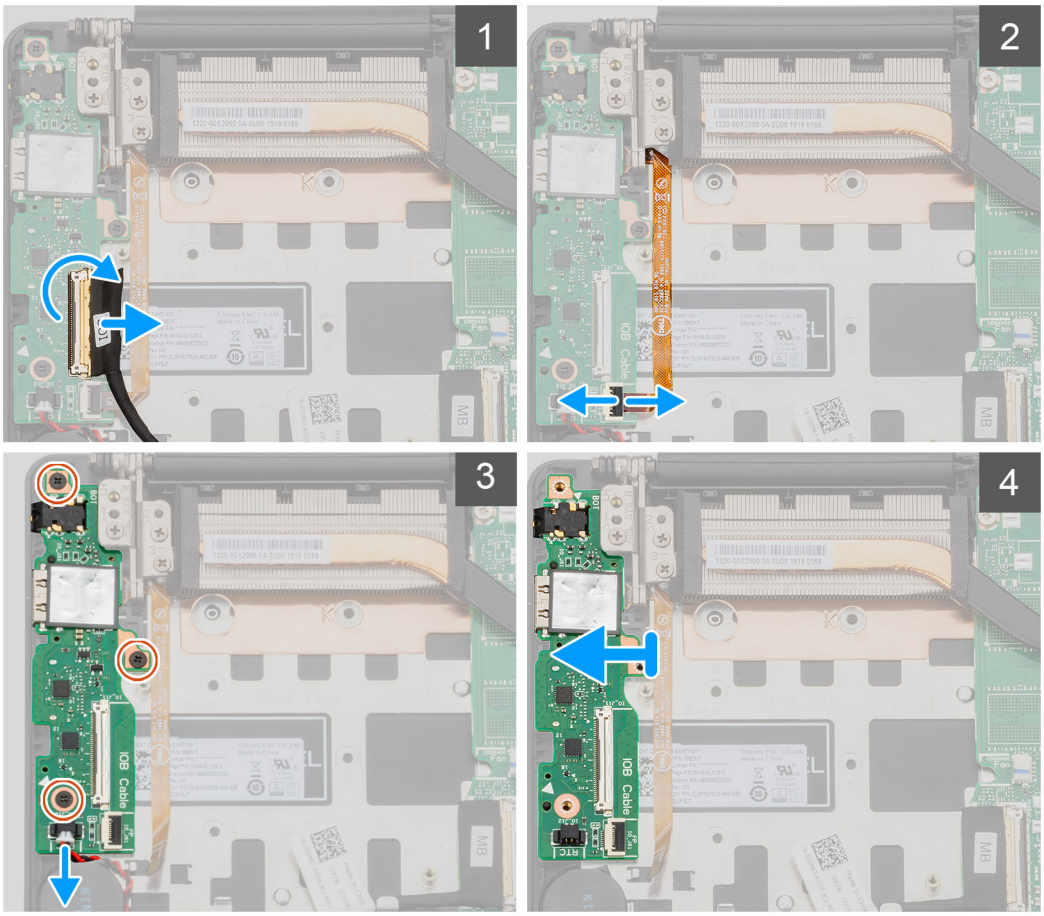
Removing the I/O board

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

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

3x
M2x3





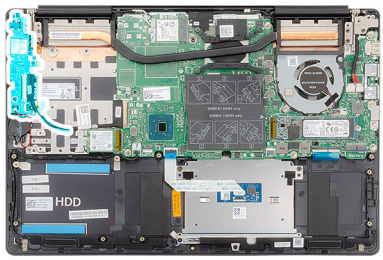
1 Open the latch and disconnect the I/O-board cable from the I/O board.
2 Open the latch and disconnect the fingerprint reader cable from the I/O board.
3 Disconnect the coin-cell battery cable from the I/O board.
4 Remove the three screws (M2x3) that secure the I/O board to the palm-rest and keyboard assembly.
5 Lift the I/O board off the palm-rest and keyboard assembly.

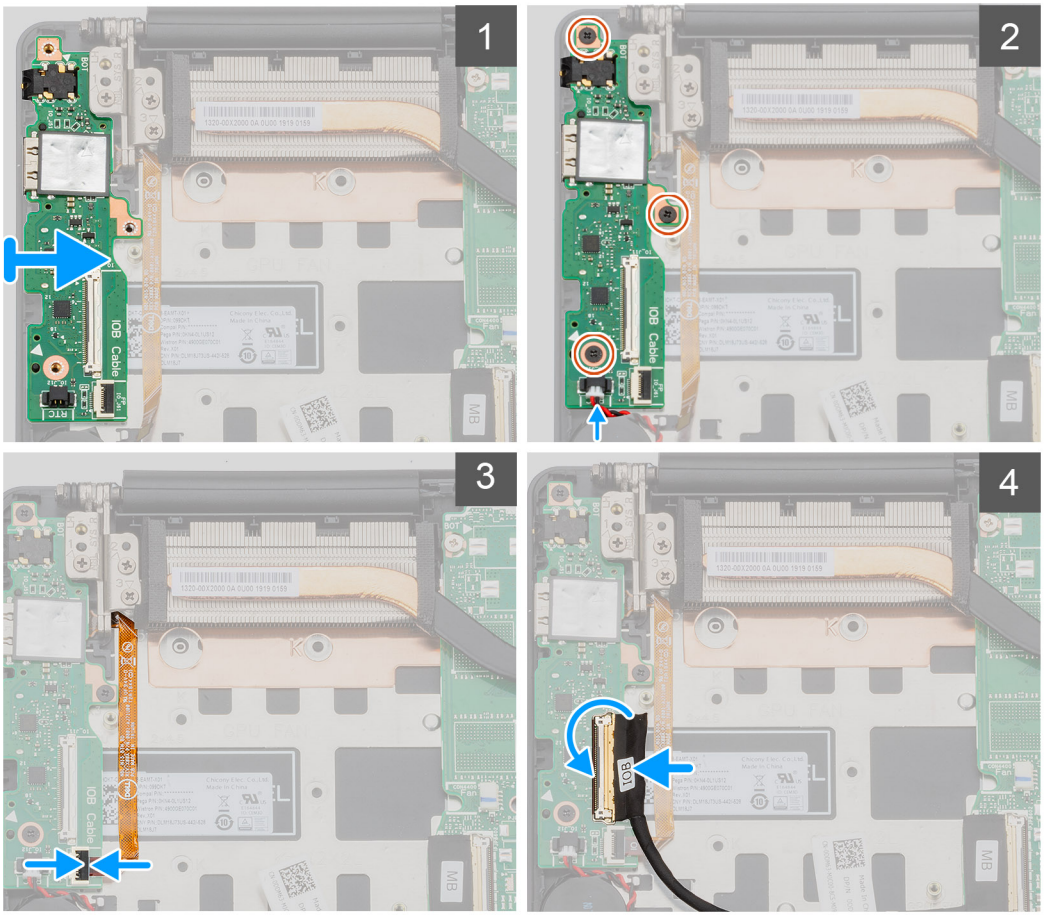
Identifier	GUID-02CAA2CA-4688-4C60-945D-140C7FAEA2AE
Status	Released

Installing the I/O board

If you are replacing a component, remove the existing component before performing the installation procedure.
The figure indicates the location of the I/O board and provides a visual representation of the installation procedure.

3x
M2x3





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.

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

Identifier	GUID-7EF4A650-663E-4297-A6B0-A426B5D7AC7C
Status	Released

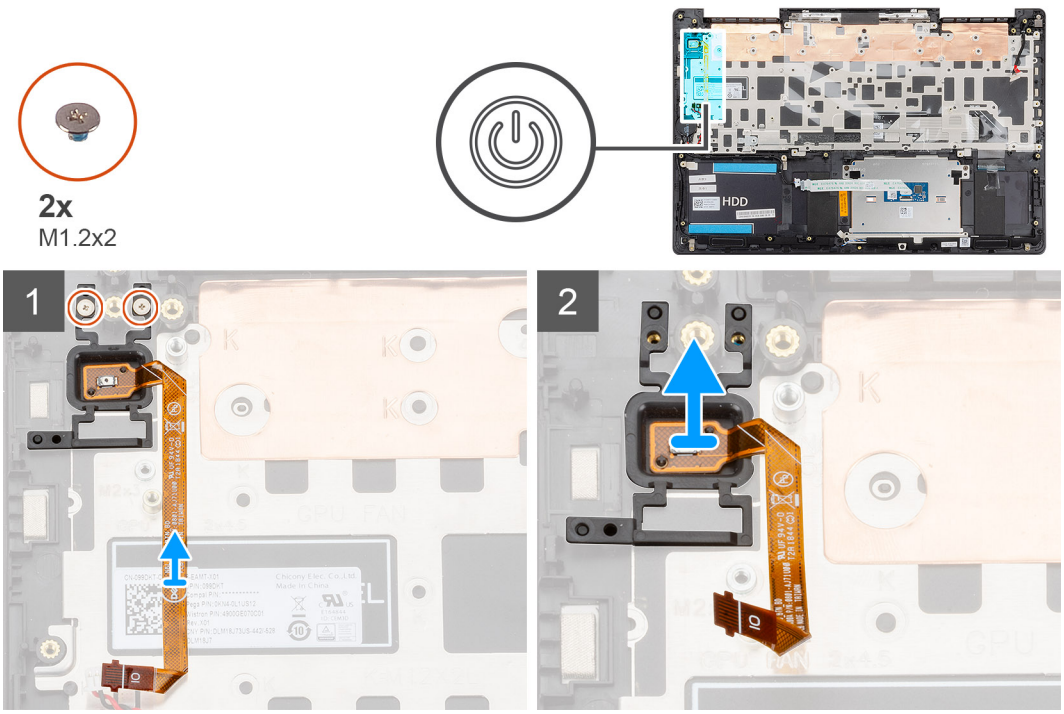
Power button with optional fingerprint reader

Identifier	GUID-A84C6BCE-AD86-4BDF-858C-A60853719178
Status	Released

Removing the power button and optional fingerprint reader

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.

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



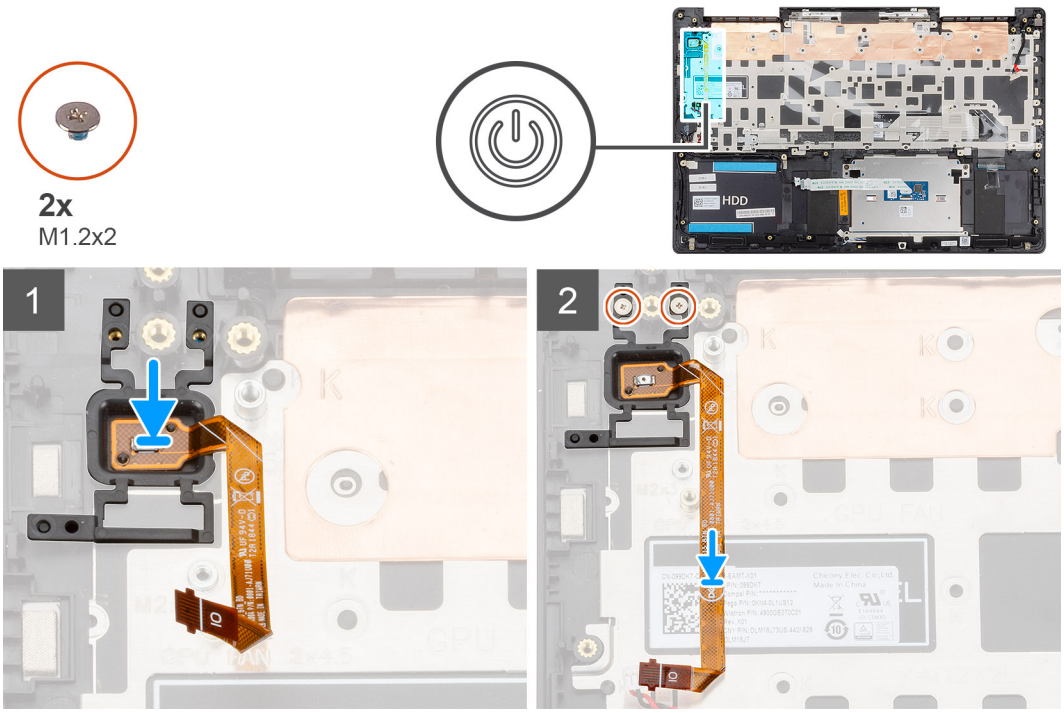
1 Remove the two screws (M1.2x2) that secure the power button with optional fingerprint reader to the palm-rest and keyboard assembly.
2 Lift the power button with optional fingerprint-reader, along with the fingerprint reader cable, off the palm-rest and keyboard assembly.

Identifier	GUID-98CD293E-8B34-4BA8-BC74-286FA5607513
Status	Released

Installing the power button with optional fingerprint reader

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

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



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.

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.

Identifier	GUID-FCFD0001-7CDA-44E5-ACBB-F3DB60FC0CFF
Status	Released

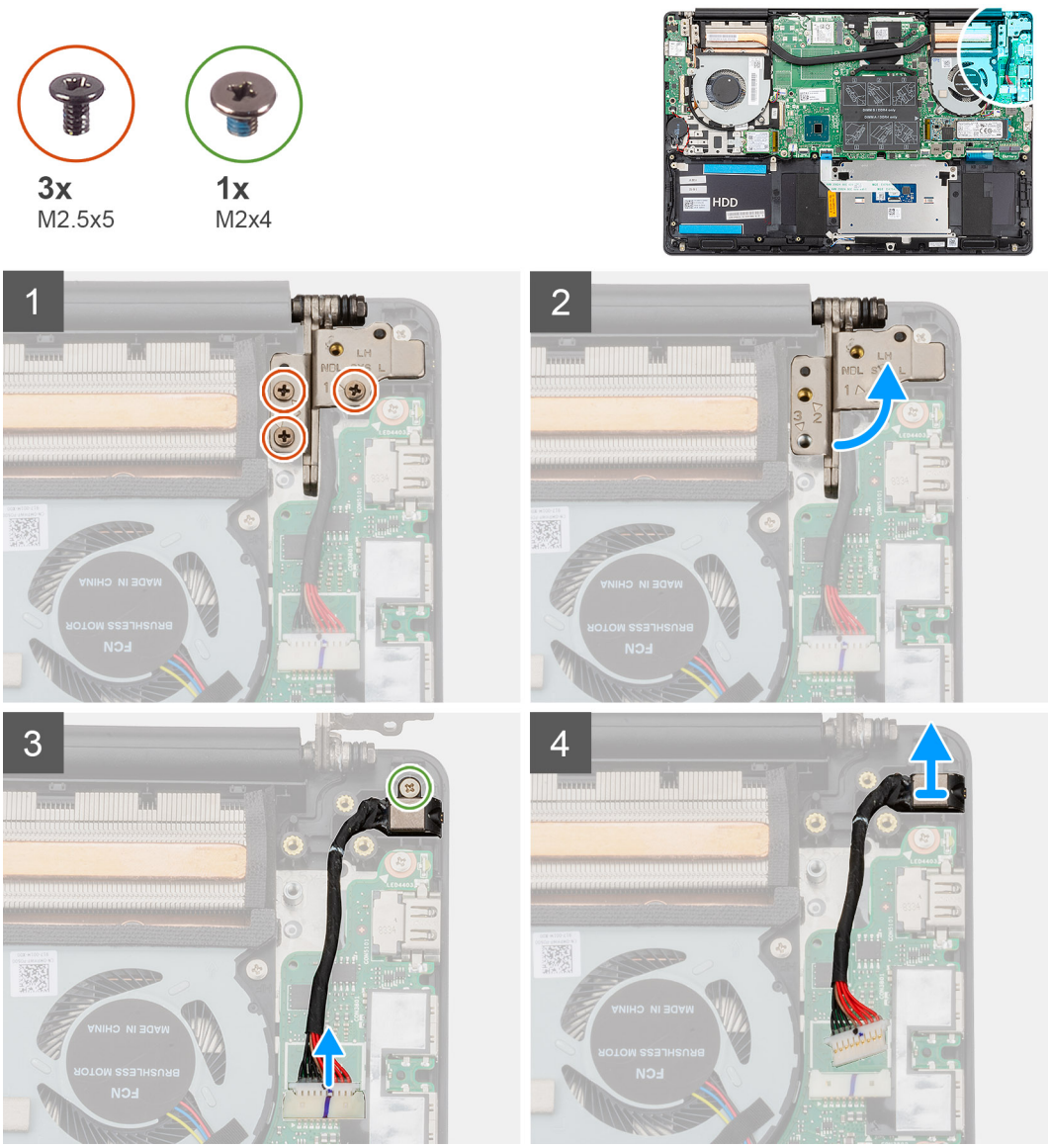
Power-adapter port

Identifier	GUID-4EFEA945-DE97-45F2-B9DF-CCAB4A4C6765
Status	Released

Removing the power-adapter port

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

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



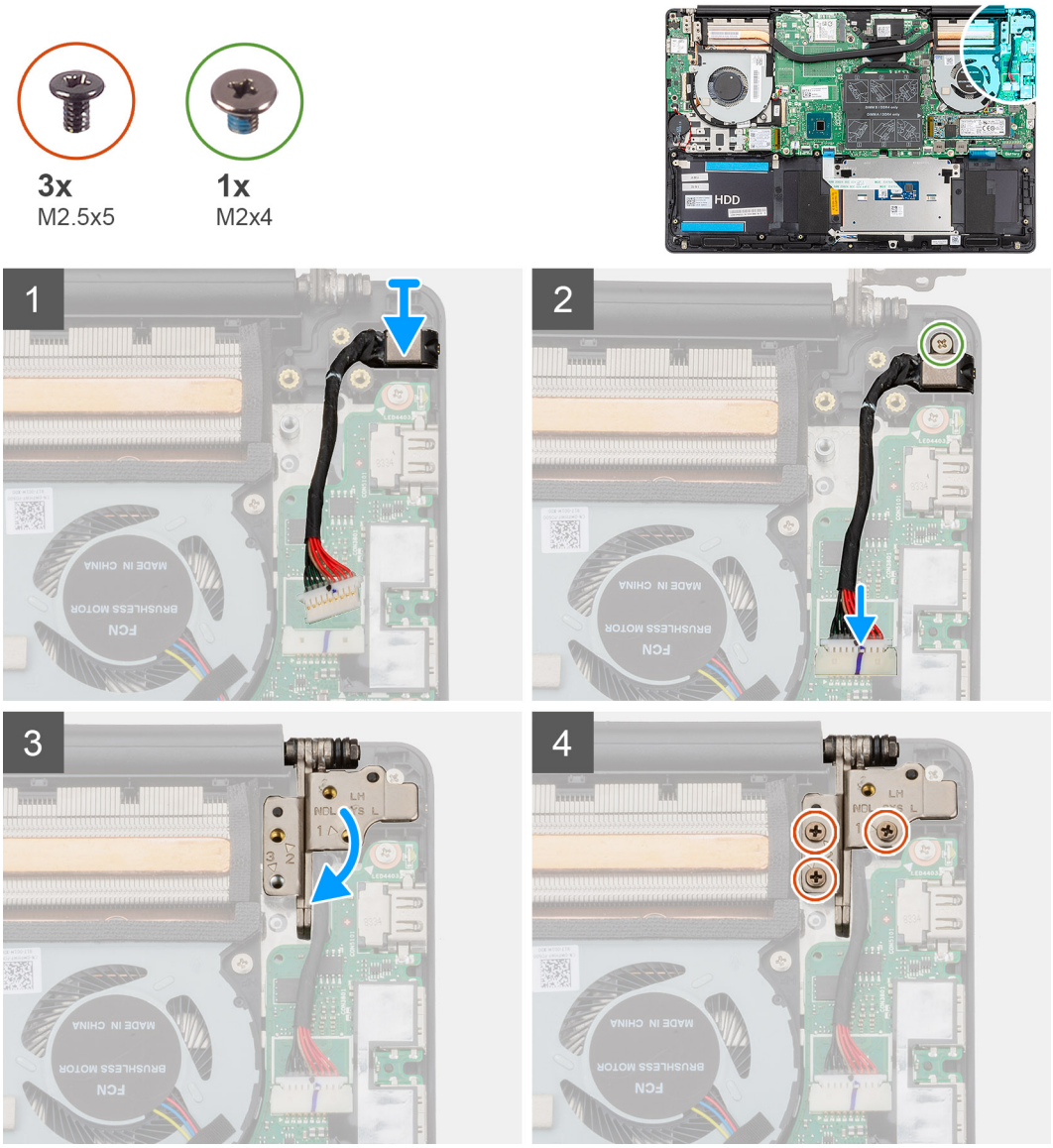
1 Remove the three screws (M2.5x5) that secure the left display hinge to the palm-rest and keyboard assembly.
2 Open the display hinges at an angle of 90 degrees.
3 Remove the screw (M2x4) that secures the power-adapter port to the palm-rest and keyboard assembly.
4 Disconnect the power-adapter port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

Identifier	GUID-3AA79376-BCEB-475E-8C86-61F72EFABC95
Status	Released

Installing the power-adapter port

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

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



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.

1 Install the battery.
2 Install the base cover.

3 Follow the procedure in After working inside your computer.

Identifier	GUID-775EE71A-A503-47AD-AC10-E85111BEF34A
Status	Released

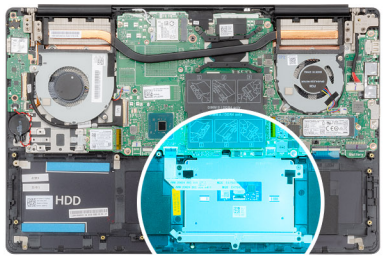
Touchpad

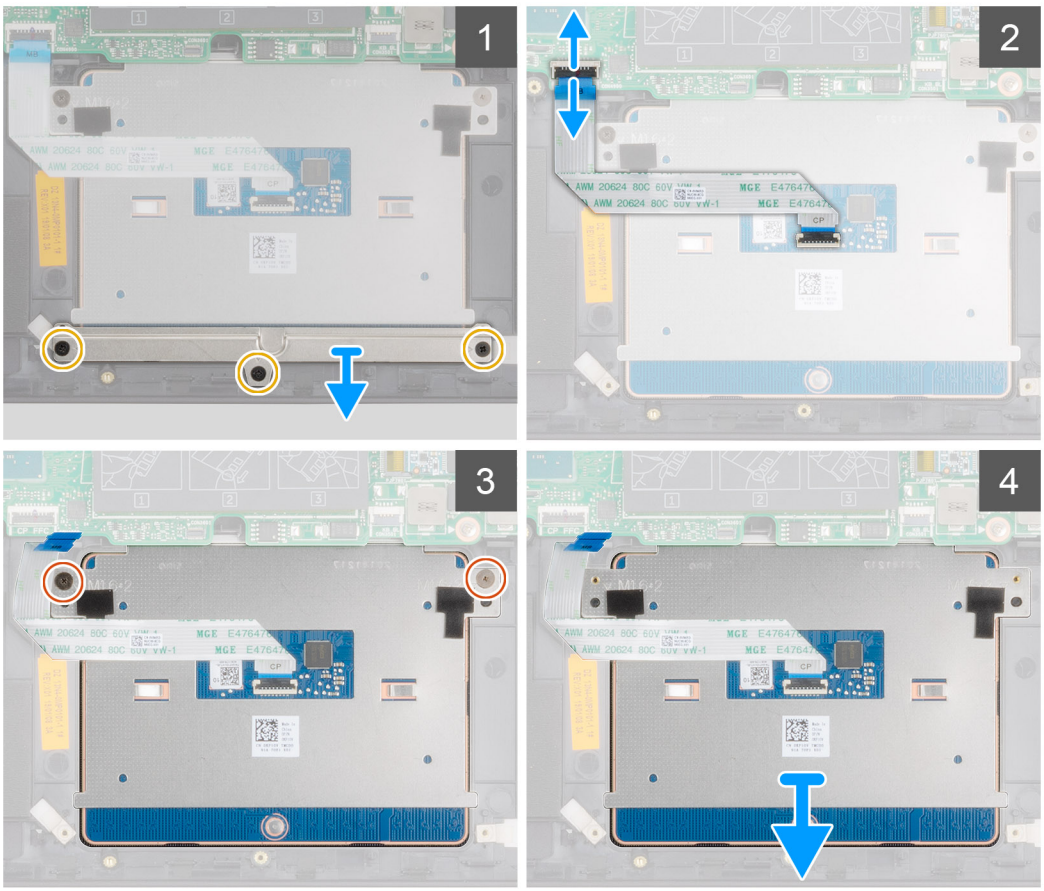
Identifier	GUID-DEDE8ADB-1375-413B-B083-E12ACCC29A33
Status	Released

Removing the touchpad

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

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



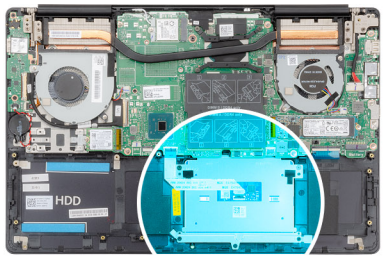


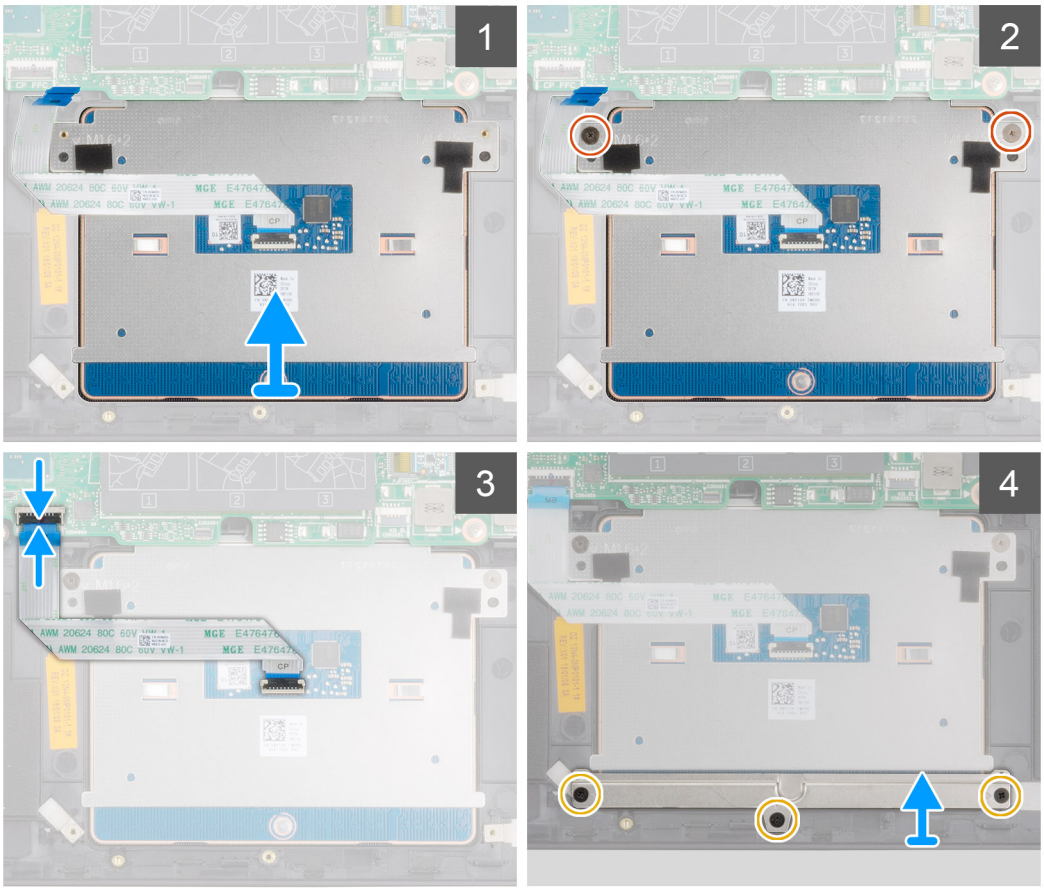
1 Remove the three (M2x3) screws that secure the touchpad bracket to the palm-rest and keyboard assembly.
2 Lift the touchpad bracket off the palm-rest and keyboard assembly.
3 Open the latch and disconnect the touchpad cable from the system board.
4 Remove the two (M1.6x2) screws that secure the touchpad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

Identifier	GUID-30C8A467-1B61-445E-89EC-0F5E5B4AC59D
Status	Released

Installing the touchpad

If you are replacing a component, remove the existing component before performing the installation procedure.
The figure indicates the location of the component and provides a visual representation of the installation procedure.





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.

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

Identifier	GUID-E641BD48-9062-46FE-8F5A-723887A0921D
Status	Released

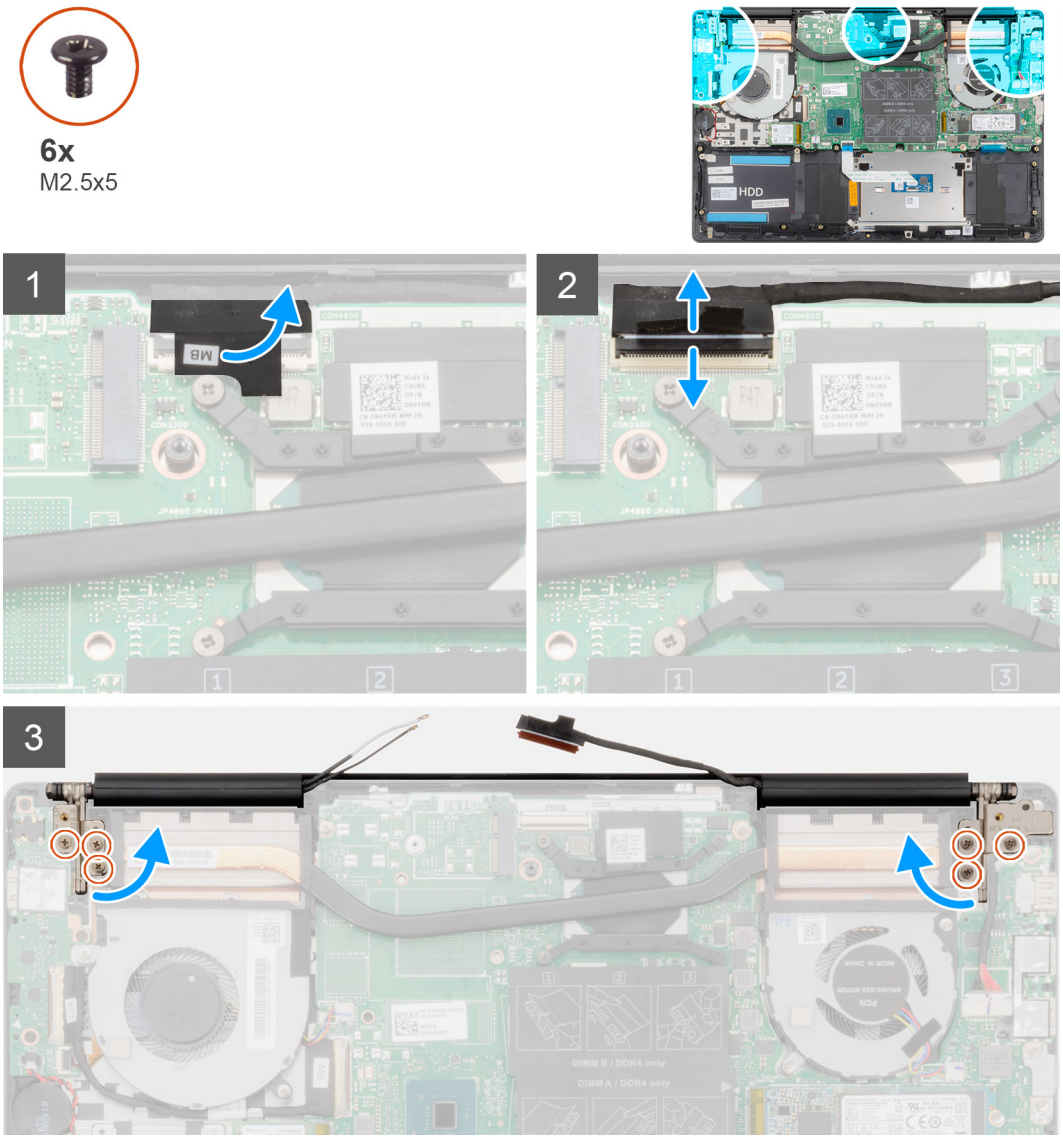
Display assembly

Identifier	GUID-ECEFBDAF-9F3B-4216-8520-0023D94FA558
Status	Released

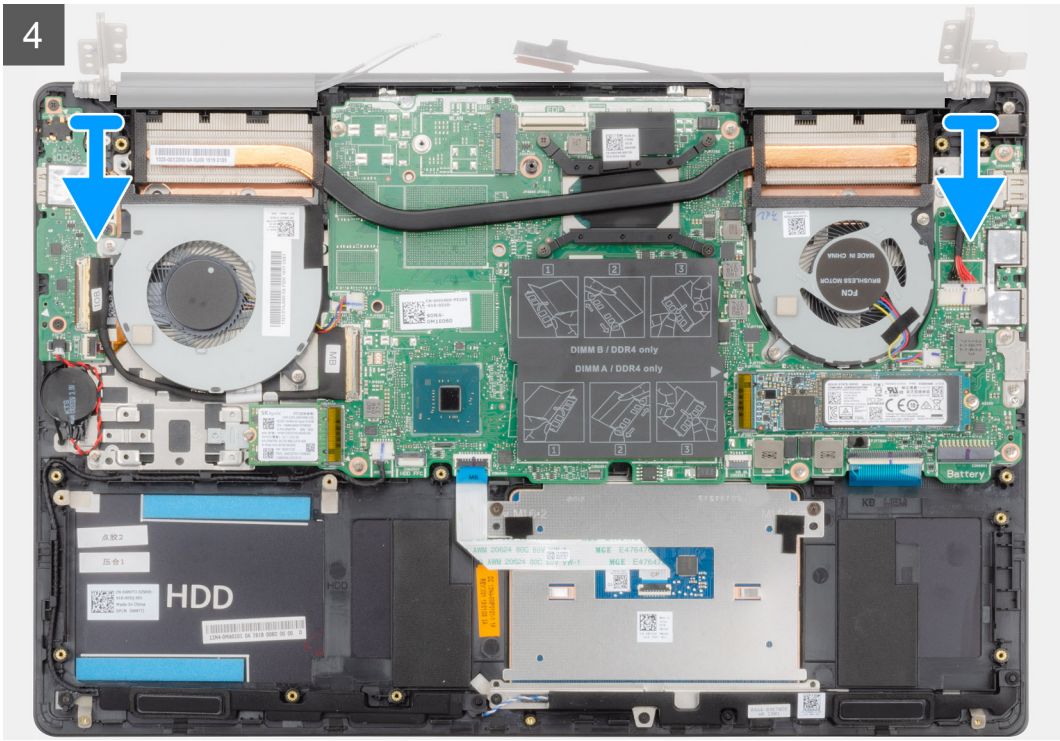
Removing the display assembly

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

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



4



5

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.

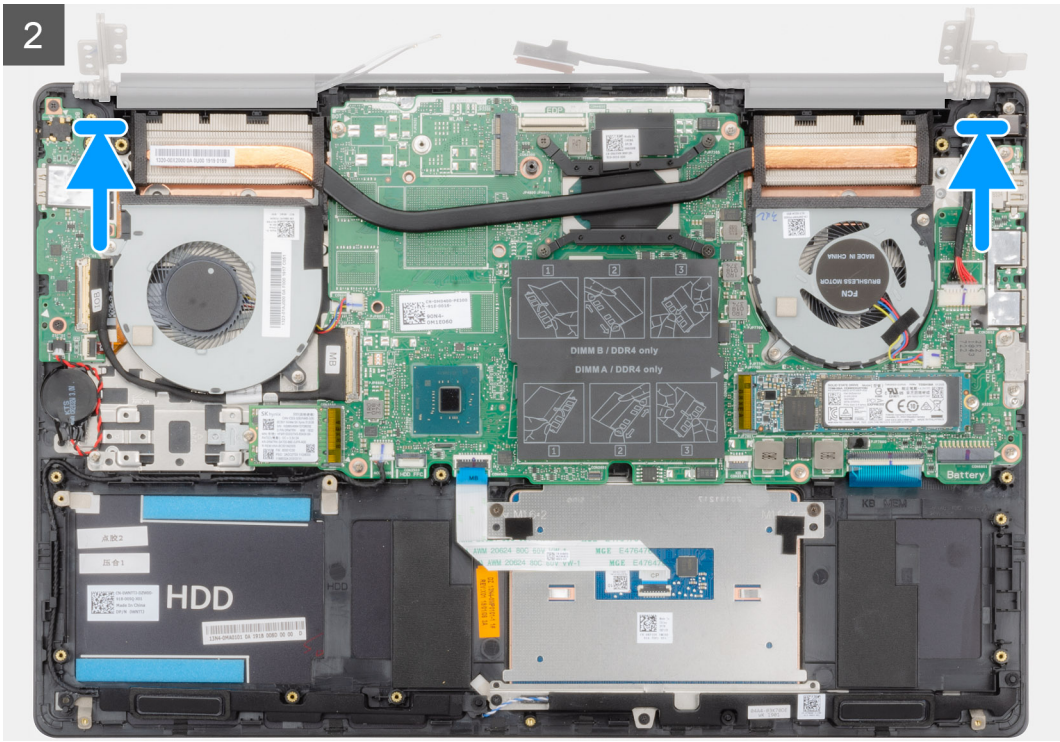
Identifier	GUID-ABA81C6B-9C4A-4CB2-8D21-998E227EC98A
Status	Released

Installing the display assembly

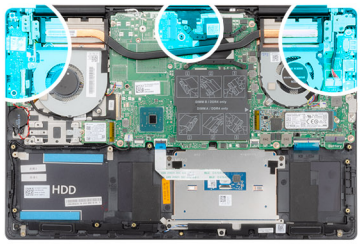
If you are replacing a component, remove the existing component before performing the installation procedure.

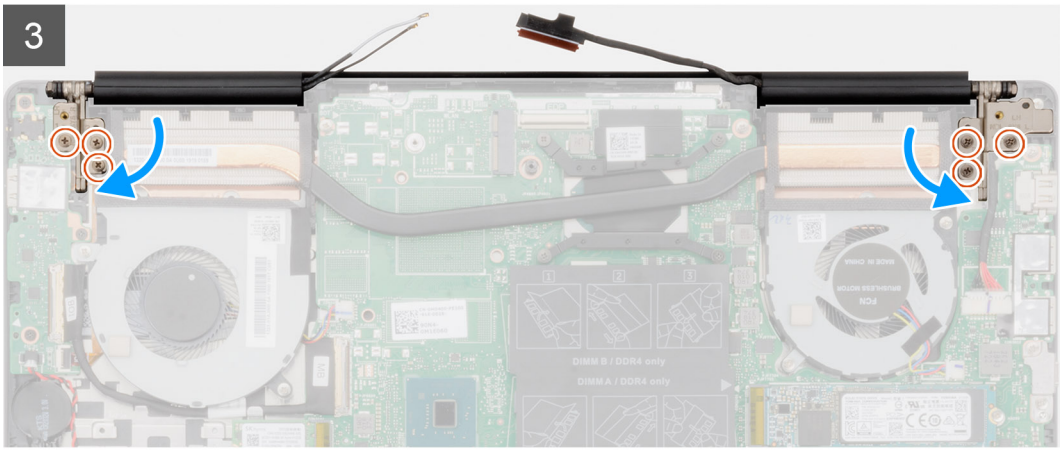
The figure indicates the location of the component and provides a visual representation of the installation procedure.

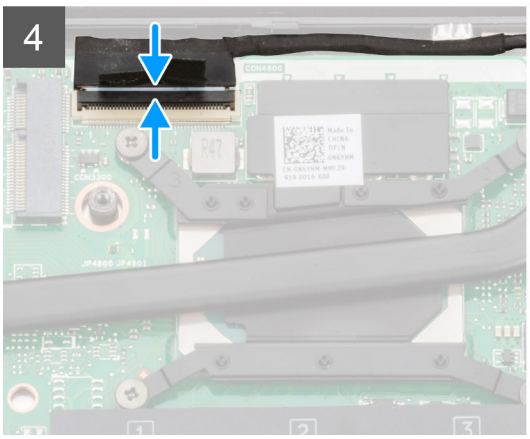
2

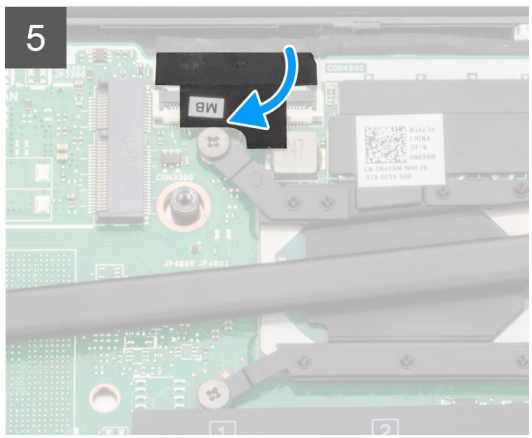


6x
M2.5x5









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.

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

Identifier	GUID-00515E4D-657E-4F38-9C17-9C710680C719
Status	Released

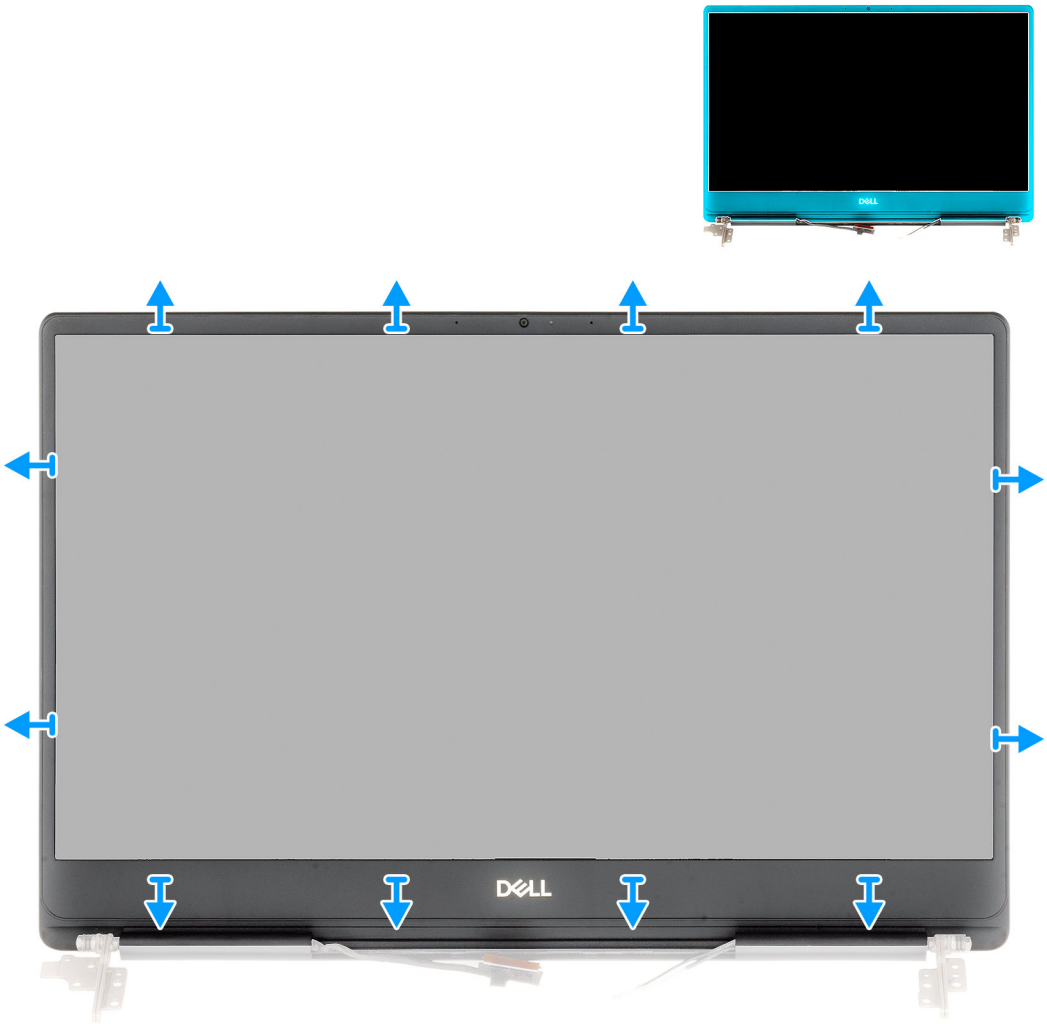
Display bezel

Identifier	GUID-FEB0B785-4201-42F1-9F47-5BDD098E7631
Status	Released

Removing the display bezel

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

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

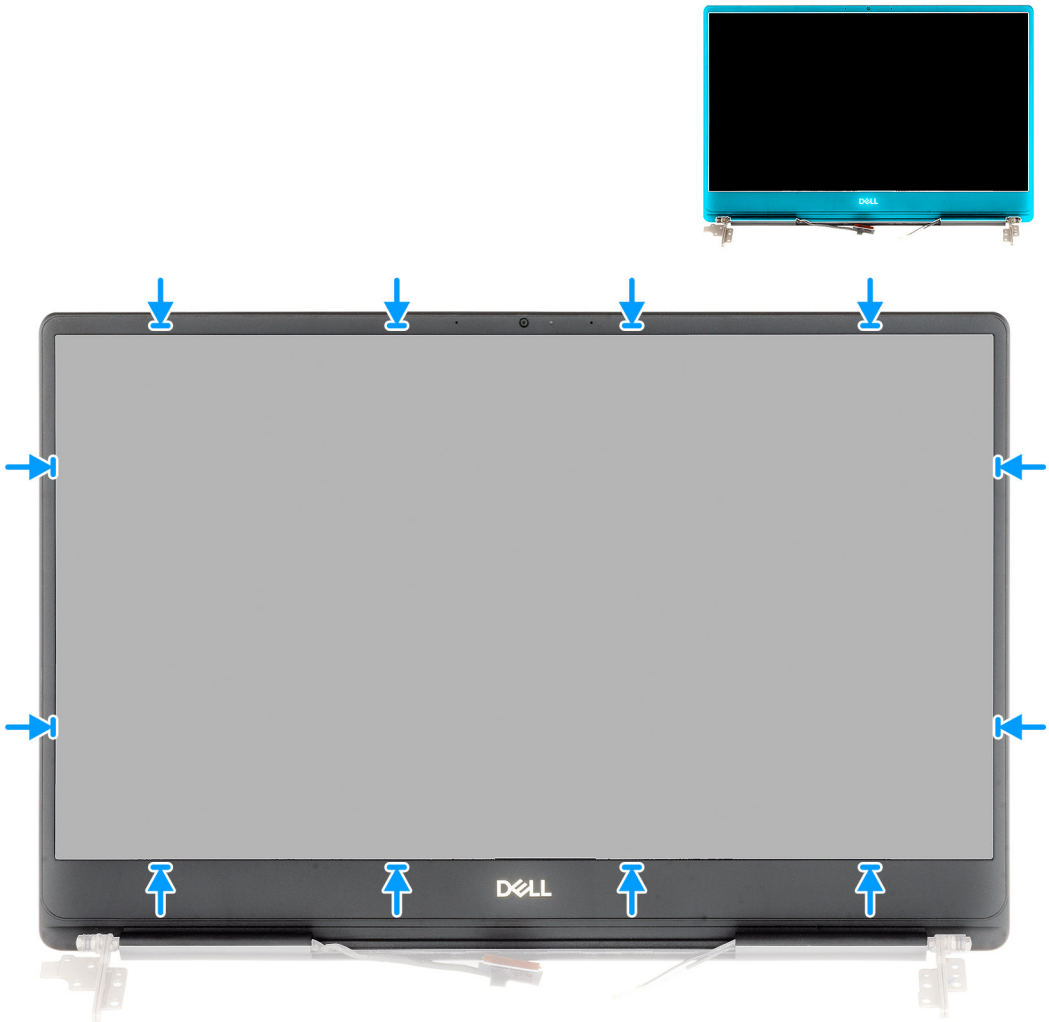


1 Carefully pry the edges of the display bezel off the display back-cover and antenna assembly.
2 Remove the display bezel off the display back-cover and antenna assembly.

Identifier	GUID-EAD6C9DA-46EC-402E-B8C1-55FBBFBACD1A
Status	Released

Installing the display bezel

If you are replacing a component, remove the existing component before performing the installation procedure.
The figure indicates the location of the display bezel and provides a visual representation of the installation procedure.



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

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

Identifier	GUID-46B53388-5C4F-4861-92E0-6AE357EE9CBF
Status	Released

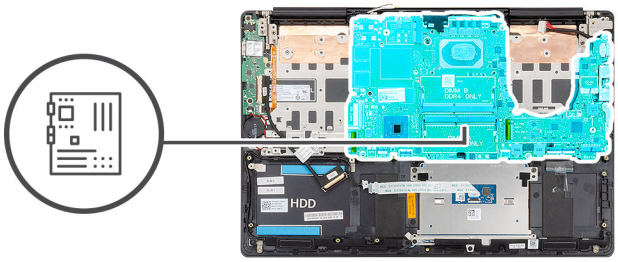
System board

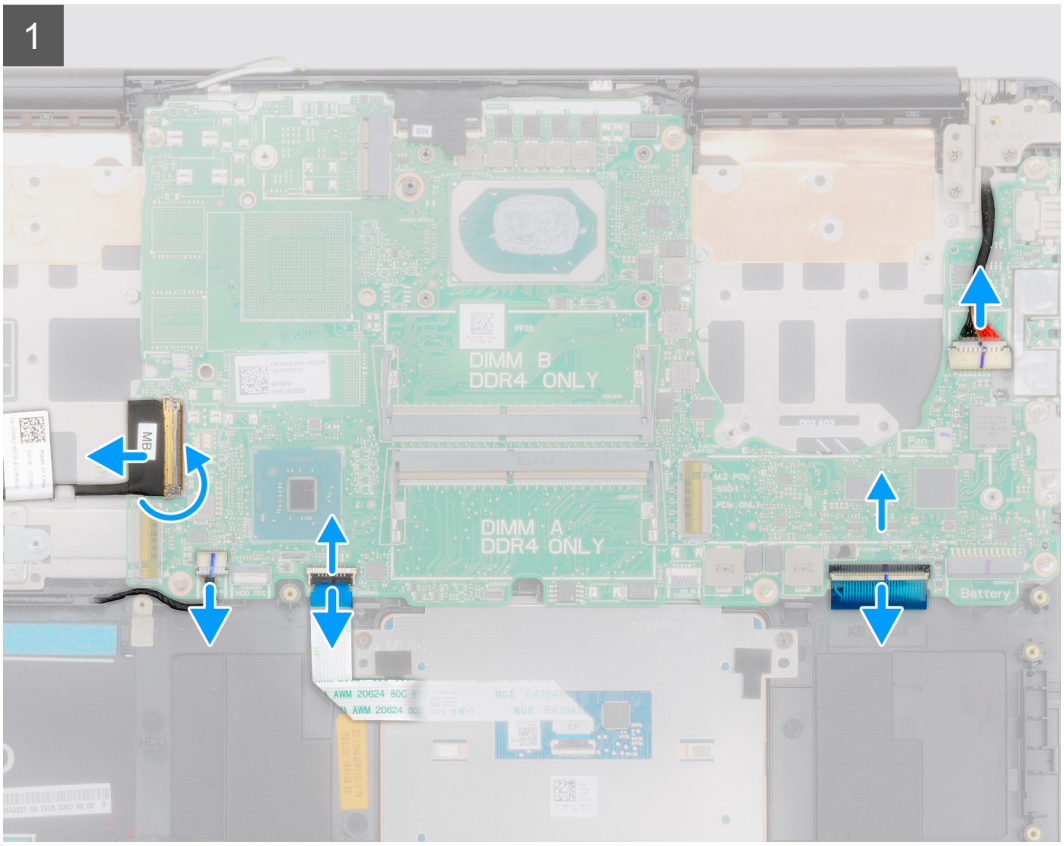
Identifier	GUID-EB074DFB-222B-496F-8CD9-E4FEE5E14774
Status	Released

Removing the system board

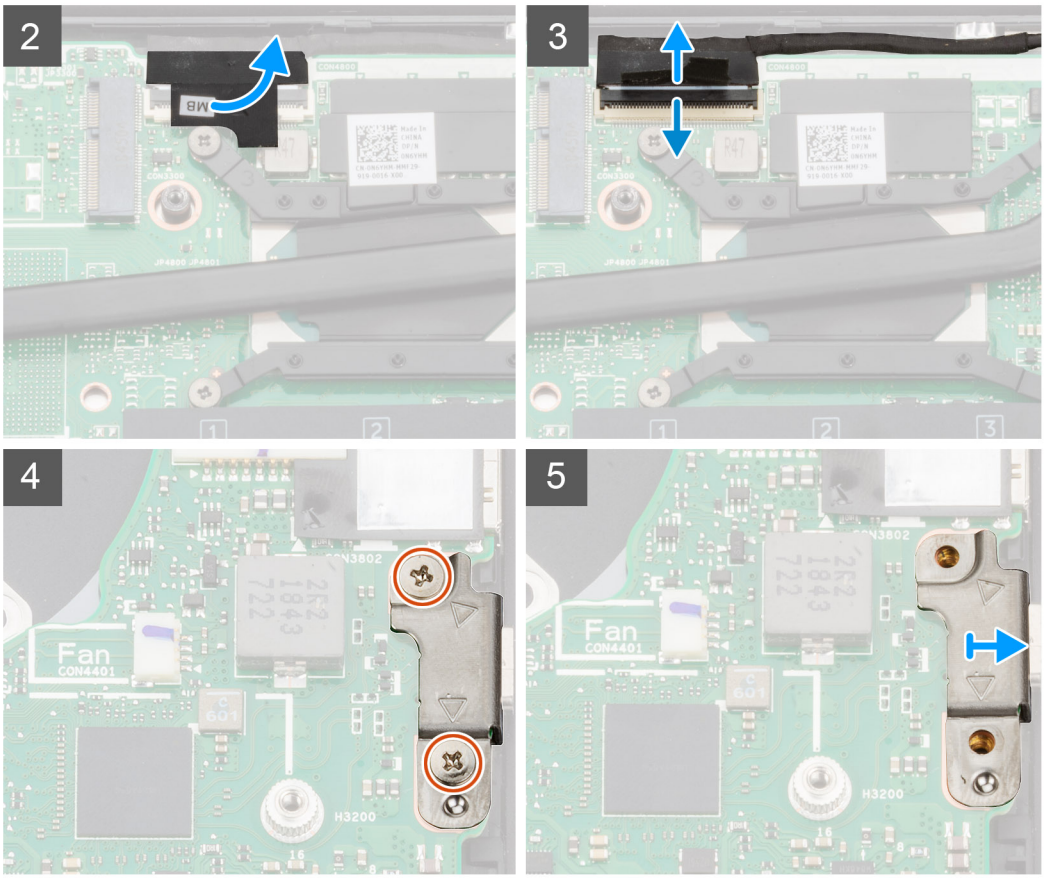
1 Follow the procedure in Before working inside your computer.
2 Remove the base cover.
3 Remove the battery.
4 Remove the M.2 2280 solid-state drive.
5 Remove the M.2 2230 solid-state drive.
6 Remove the WLAN card.
7 Remove the GPU fan.
8 Remove the CPU fan.
9 Remove the heat sink.
10 Remove the memory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

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

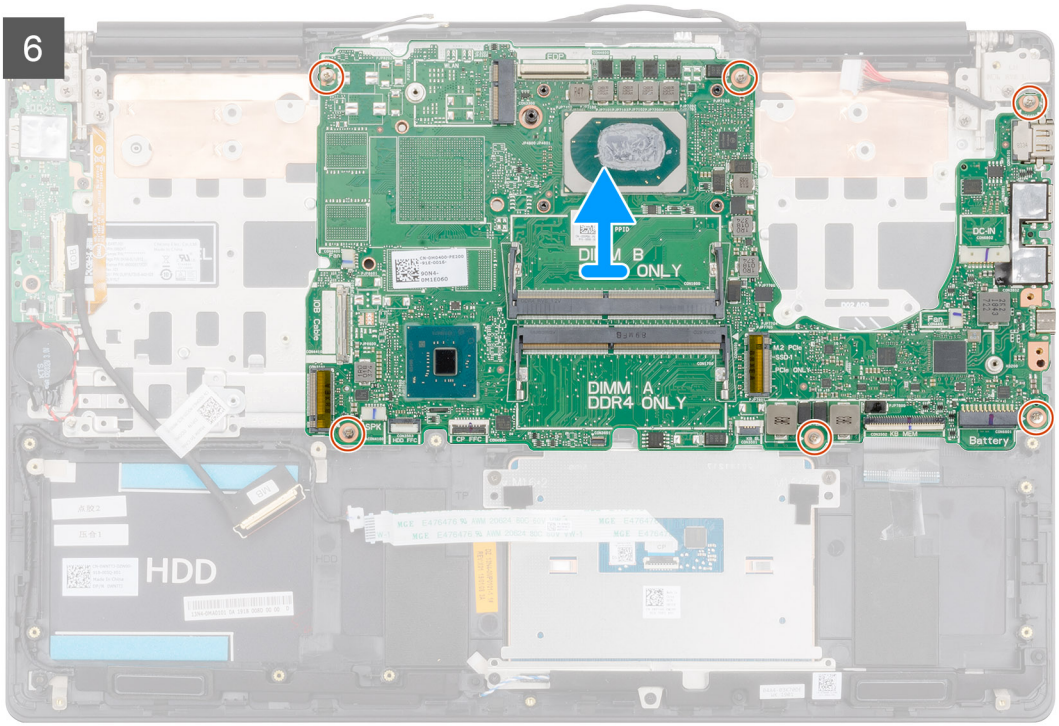

HDD


1
DIMM B
DDR4 ONLY
DIMM A
DDR4 ONLY
Battery

2x
M2x5



6x
M2x4



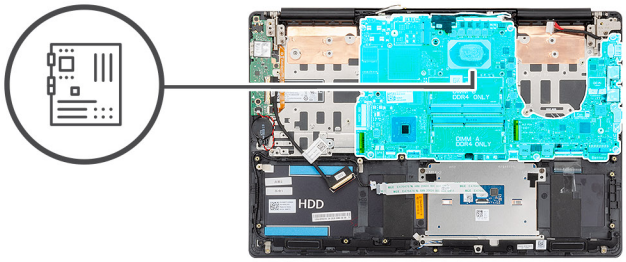
1 Open the latch and disconnect the I/O-board cable from the system board.
2 Disconnect the power-adapter cable from the system board.
3 Disconnect the speaker cable from the system board.
4 Open the latch and disconnect the touchpad cable from the system board.
5 Open the latch and disconnect the keyboard-backlight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

Identifier	**GUID-A1FFB242-2C71-4720-8286-656D945D790D**
Status	**Released**

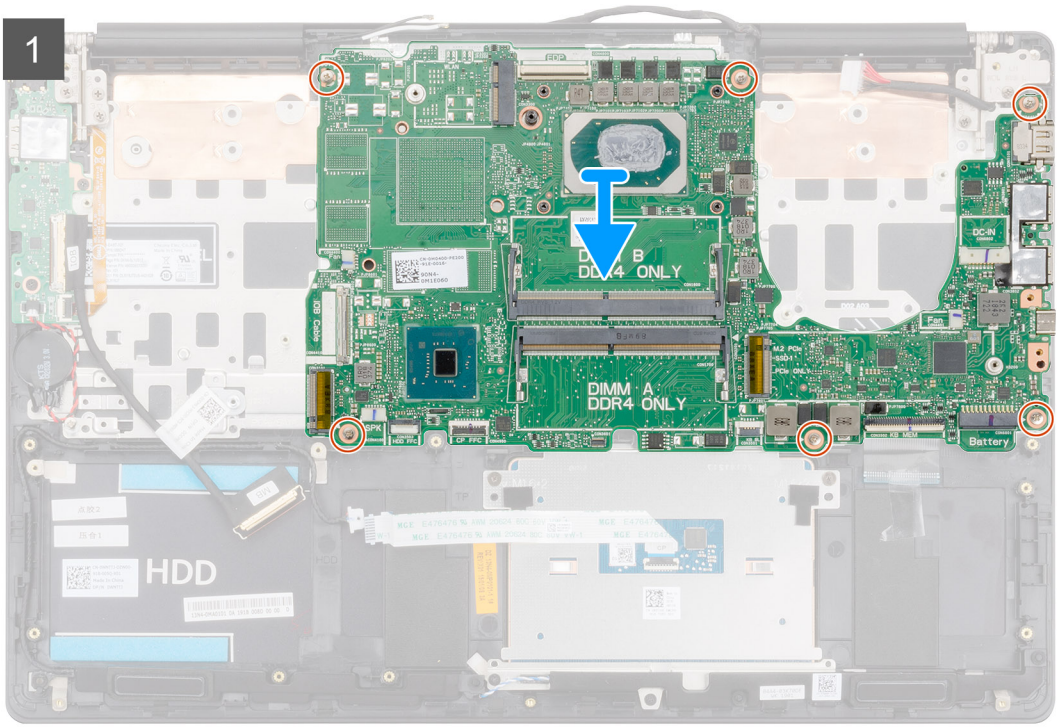
Installing the system board

If you are replacing a component, remove the existing component before performing the installation procedure.
The figure indicates the location of the system board and provides a visual representation of the installation procedure.

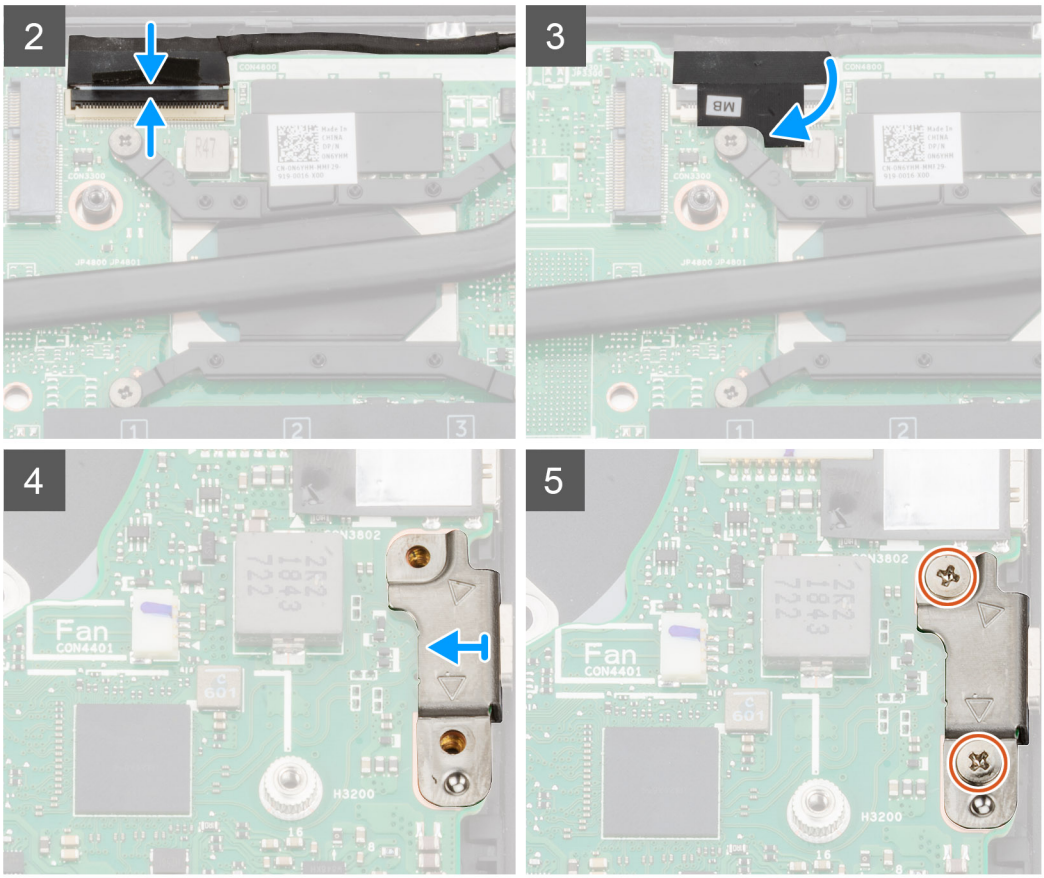
6x
M2x4

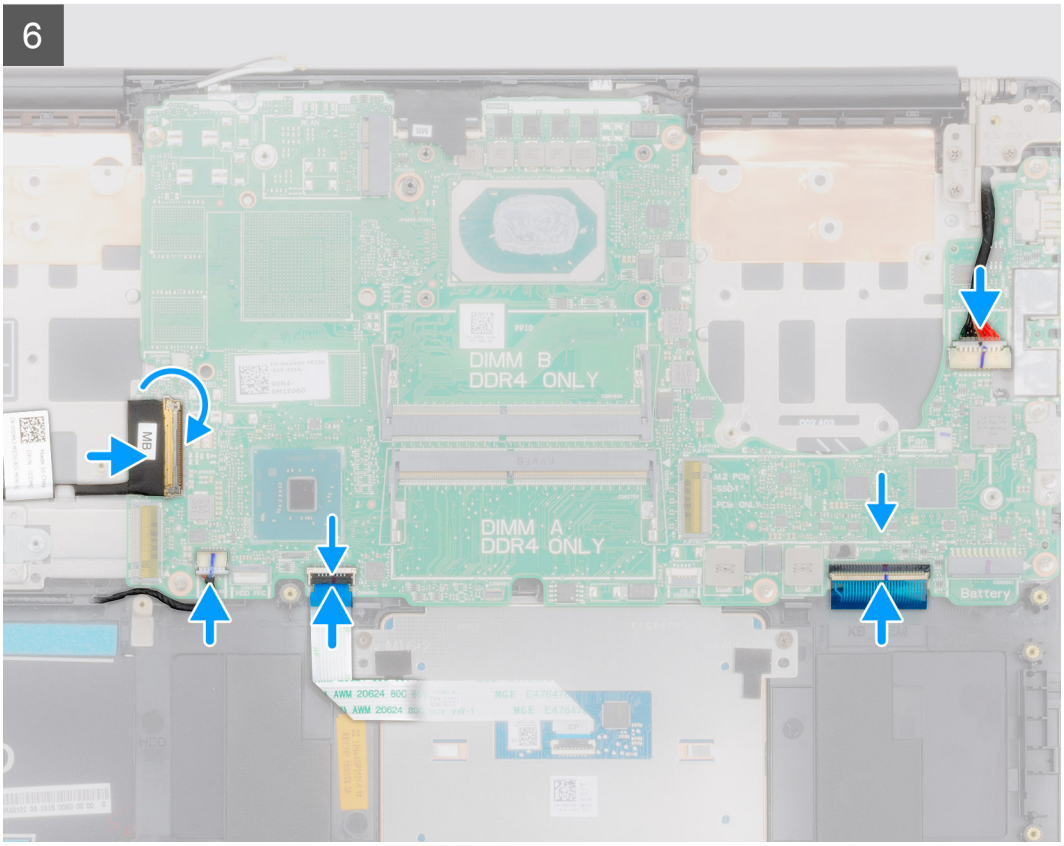


1



2x
M2x5





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

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.

Identifier	GUID-4AAEA62D-3F30-4E6E-ADEC-AD46B79B8EA6
Status	Released

Palm-rest and keyboard assembly

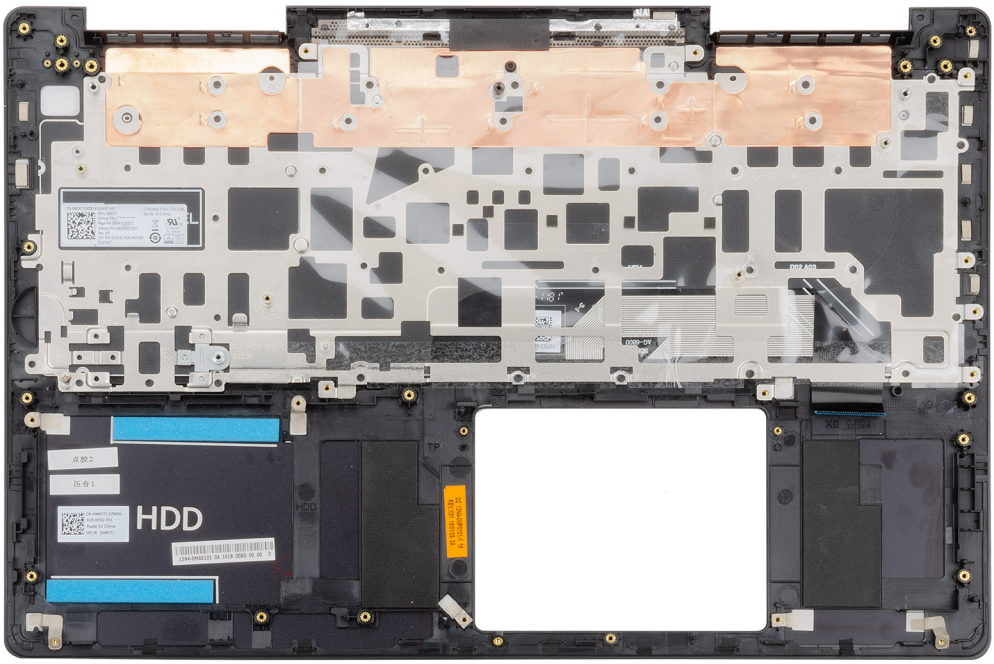
Identifier	GUID-93F507D7-3120-4B53-BD8E-14D15AA58FCD
Status	Released

Removing the palm-rest and keyboard assembly

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

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

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



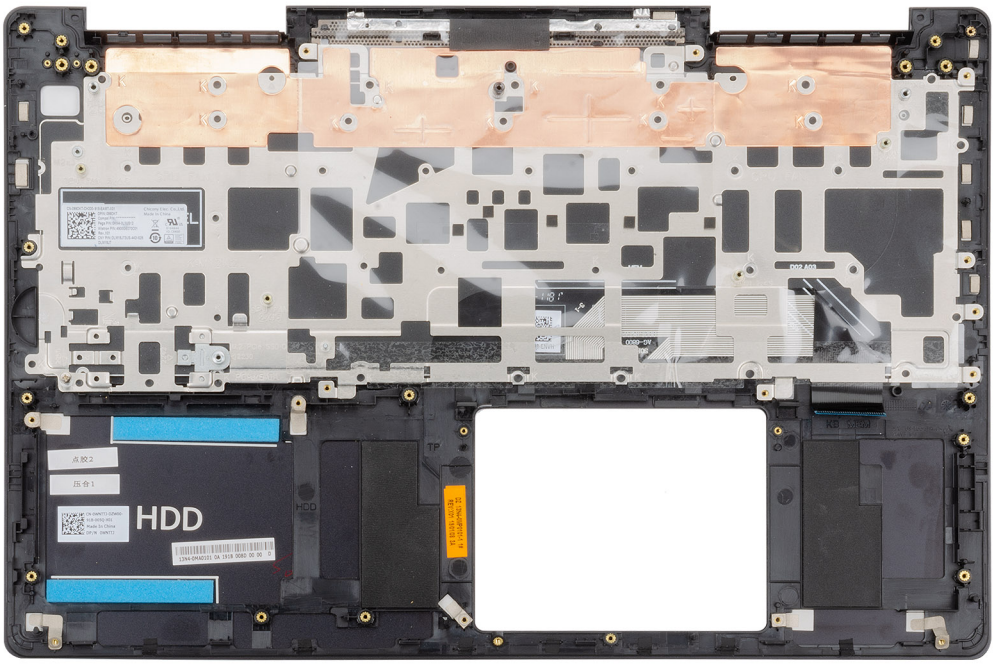
After performing the steps in the pre-requisites, we are left with the palm-rest and keyboard assembly.

Identifier	GUID-D5458232-27EA-433B-83F2-D04690449200
Status	Released

Installing the palm-rest and keyboard assembly

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

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



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

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

Identifier	GUID-B7285CF1-FC18-4DE7-8A89-
Status	Released

Device drivers

Identifier	GUID-C959B142-CF42-4306-A9EA-A640C509AB98
Status	Released

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.

Identifier	GUID-925A39C4-0B26-40F8-9404-94B0BFCC4742
Status	Released

Video drivers

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

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

Identifier	GUID-43531ABB-B77D-45B5-AFBA-B90BDF782CFC
Status	Released

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.

Identifier	GUID-B021278B-5FB5-429E-B0B5-BF580C34D140
Status	Released

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.

Identifier	GUID-E13FC788-9CE7-4370-AFF0-51C6169ADAC3
Status	Released

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.

Identifier	GUID-543661C6-4009-4F1B-BB4F-6CF5FF28149D
Status	Released

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.

Identifier	GUID-4D6759B1-4017-4F54-87E6-9
Status	Released

System setup

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

Identifier	GUID-E8E05C46-BC9D-4CF1-AC84-34B87FDCCFB7
Status	Released

System setup

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

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

Use the BIOS Setup program for the following purposes:

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

Identifier	GUID-1432A924-49E9-4080-961D-2AFBDAF42039
Status	Released

Entering BIOS setup program

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.

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.

Identifier	GUID-7A7EB30A-4A48-422B-AE30-B8DC236A1790
Status	Released

Navigation keys

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

Keys	Navigation
Up arrow	Moves to the previous field.

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

Identifier	GUID-C50BED7F-226B-4768-AB61-9725153DF132
Status	Released

Boot Sequence

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

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

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

- Removable Drive (if available)
- STXXXX Drive

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

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

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

Identifier	GUID-59511486-0C55-4CFC-BE8C-F4E53D76CF6F
Status	Released

System setup options

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

Table 2. System setup options—System information menu

General-System Information	
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.

General-System Information	
Ownership Date	Displays the ownership date of the computer.
Express Service Code	Displays the express service code of the computer.
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 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.
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	
M.2 SATA	Displays the M.2 SATA SSD device information of the computer.
M.2 PCIe SSD-0	Displays the M.2 PCIe SSD information of the computer.
Video Controller	Displays the video controller type 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.
Bluetooth Device	Displays the bluetooth device information of the computer.
Battery Information	Displays the battery health information.
Boot Sequence	
Boot Sequence	Displays the boot sequence.
Boot List Option	Displays the available boot options.
Advanced Boot Options	
Enable Legacy Option ROMs	Enable or disable the Legacy Option ROMs.

General-System Information	
Enable Attempt Legacy Boot	Enable or disable Legacy Boot.
UEFI Boot Path Security	Enable or disable the system to prompt the user to enter the Admin password when booting a UEFI boot path from the F12 boot menu.
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	Configure operating mode of the integrated SATA hard drive controller.
Drives	Enable or disable various drives on board.
SMART Reporting	Enable or disable SMART Reporting during system startup.
USB Configuration	
Enable USB Boot Support	Enable or disable booting from USB mass storage devices such as external hard drive, optical drive, and USB drive.
Enable External USB Port	Enable or disable booting from USB mass storage devices connected to external USB port.
Audio	Enable or disable the integrated audio controller.
Keyboard Illumination	Enables you to choose the operating mode of the keyboard illumination feature.
Keyboard Backlight with AC Power	When the backlight is enabled, if Fn+F10 keys are pressed to disable the backlight, the backlight stays off regardless of AC state.
Miscellaneous Devices	Enable or disable various onboard devices.
Enable Camera	Enable or disable the camera.

Table 4. System setup options—Video menu

Video	
LCD Brightness	Set the panel brightness independently for Battery and 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.
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	Determines whether changes to the setup option are permitted when an administrator password is set.
UEFI Capsule Firmware Updates	Enable or disable BIOS updates through UEFI capsule update packages.
PTT Security	Enable or disable Platform Trust Technology (PTT) visibility to the operating system.

Security	
Computrace(R)	Enable or disable the BIOS module interface of the optional Computrace(R) Service from Absolute Software.
CPU XD Support	Enable or disable the Execute Disable mode of the Processor.
Admin Setup Lockout	Enable to prevent users from entering Setup when an Admin Password is set.
Master Password Lockout	Disables the master password support. Hard Disk passwords need to be cleared before changing the setting.

Table 6. System setup options—Secure Boot menu

Secure Boot	
Secure Boot Enable	Enable or disable the secure boot feature.
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.
Performance	
Multi Core Support	Enable multiple cores. Default: Enabled.
Intel SpeedStep	Enable or disable Intel Speedstep Technology. Default: Enabled. **NOTE: If enabled, the processor clock speed and core voltage are adjusted dynamically based on the processor load.**
C-States Control	Enable or disable additional processor sleep states. Default: Enabled.
Intel TurboBoost	Enable or disable Intel TurboBoost mode of the processor. Default: Enabled.
HyperThread control	Enable or disable HyperThreading in the processor. Default: Enabled.
Power Management	
AC Behavior	Enables the system to turn on automatically, when AC power is supplied.
Enable Intel Speed Shift Technology	Enable or disable Intel Speed Shift Technology.
Auto On Time	Enable to set the computer to turn on automatically every day or on a preselected date and time. This option can be configured only if the Auto On Time is set to Everyday, Weekdays or Selected Days. Default: Disabled.
USB Wake Support	Enable the USB devices to wake the computer from Standby.
Peak Shift	Enable or disable the minimal usage of AC power at times of peak demand.

Intel Software Guard Extensions	
Primary Battery Charge Configuration	Set the primary battery charge settings with a preselected custom charge start and stop. Default: Adaptive.
POST Behavior	
Adapter Warnings	Enable adapter warnings. Default: Enabled.
Fn Lock Options	Enable or disable the Fn lock mode.
Fastboot	Enable to set the speed of the boot process. Default: Thorough.
Extend BIOS POST Time	Configure additional pre-boot delay.
Full Screen Logo	Enable or disable to display full screen logo.
Warnings and Errors	Configure the Warnings and Errors options which causes the boot process to pause when warnings or errors are detected, rather then stop, prompt and wait for user input.
Prompt on Warnings and Errors	Enable or disable Prompt on Warnings and Errors
Continue on Warnings	Enable or disable Continue on Warnings
Continue on Warnings and Errors	Enable or disable Continue on Warnings and Errors

Table 8. System setup options—Virtualization Support menu

Virtualization Support	
Virtualization	Specify whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by Intel Virtualization Technology.
VT for Direct I/O	Specify whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by Intel Virtualization Technology for Direct I/O.

Table 9. System setup options—Wireless menu

Wireless	
Wireless Switch	Determine which wireless devices can be controlled by the Wireless Switch.
Wireless Device Enable	Enable or disable internal wireless devices.

Table 10. System setup options—Maintenance menu

Maintenance	
Service Tag	Display the system's Service Tag.
Asset Tag	Create a system Asset Tag.
BIOS Downgrade	Control flashing of the system firmware to previous revisions.
BIOS Recovery	Enable the user to recover from certain corrupted BIOS conditions from a recovery file on the user primary hard drive or an external USB key.

Table 11. System setup options—System Logs menu

System Logs	
BIOS Events	Display BIOS events.
Thermal Events	Display Thermal events.
Power Events	Display Power events.

Table 12. System setup options—SupportAssist System Resolution menu

SupportAssist System Resolution	
Auto OS Recovery Threshold	Control the automatic boot flow for SupportAssist System Resolution Console and for Dell OS Recovery tool.
SupportAssist OS Recovery	Enable or disable the boot flow for SupportAssist OS Recovery tool in the even of certain system errors.

Identifier	GUID-B070C789-77E0-4887-9880-9AE63401EC2C
Status	Released

Clearing CMOS settings

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

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.

Identifier	GUID-5941E06E-ABCB-4468-ACE5-D51EF6AAA083
Status	Released

Clearing BIOS (System Setup) and System passwords

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

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

Identifier	GUID-F93F7E34-BE30-464B-886E-
Status	Released

Troubleshooting

Identifier	GUID-D75C4F0A-CC06-4C3C-9C4B-7250CA2DCDAC
Status	Released

Enhanced Pre-Boot System Assessment (ePSA) diagnostics

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

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

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

Identifier	GUID-0B893EED-EFBC-4831-A9C4-7298A7A9F619
Status	Released

Running the ePSA diagnostics

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

Identifier	GUID-F7E24B39-9988-47A8-8C7B-4F85BA0CF5DD
Status	Released

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 13. 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.

Identifier	GUID-2492FF0C-5409-4E99-9C6A-F40516F1A256
Status	Released

Recovering the operating system

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

Dell SupportAssist OS Recovery is a standalone tool that is preinstalled in all Dell computers installed with Windows 10 operating system. It consists of tools to diagnose and troubleshoot issues that may occur before your computer boots to the operating system. It enables you to diagnose hardware issues, repair your computer, back up your files, or restore your computer to its factory state.

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

For more information about the Dell SupportAssist OS Recovery, see *Dell SupportAssist OS Recovery User's Guide* at www.dell.com/support.

Identifier	GUID-FE39A314-6129-4A79-A5FA-B69617360582
Status	Released

Enabling Intel Optane memory

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

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

Identifier	GUID-CD2E8B90-160E-43C9-BA9D-F0F6C6BAA458
Status	Released

Disabling Intel Optane memory

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

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

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

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

4 Click **Yes** if you accept the warning.

The disabling progress is displayed.

5 Click **Reboot** to complete disabling your Intel Optane memory and restart your computer.

Identifier	GUID-060D210F-C287-462B-AC38-81183D440A9D
Status	Released

Flashing BIOS (USB key)

1 Follow the procedure from step 1 to step 7 in "Flashing the BIOS" to download the latest BIOS setup program file.
2 Create a bootable USB drive. For more information see the knowledge base article SLN143196 at www.dell.com/support.
3 Copy the BIOS setup program file to the bootable USB drive.
4 Connect the bootable USB drive to the computer that needs the BIOS update.
5 Restart the computer and press **F12** when the Dell logo is displayed on the screen.
6 Boot to the USB drive from the **One Time Boot Menu**.
7 Type the BIOS setup program filename and press **Enter**.
8 The **BIOS Update Utility** appears. Follow the instructions on the screen to complete the BIOS update.

Identifier	GUID-F5899359-C2E1-41C0-9663-4C79969506EB
Status	Released

Flashing the BIOS

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

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

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

4 Click **Drivers & downloads** > **Find it myself**.
5 Select the operating system installed on your computer.
6 Scroll down the page and expand **BIOS**.
7 Click **Download** to download the latest version of the BIOS for your computer.
8 After the download is complete, navigate to the folder where you saved the BIOS update file.
9 Double-click the BIOS update file icon and follow the instructions on the screen.

Identifier	GUID-3504984E-6348-45D0-8B4D-BD002195DEDA
Status	Released

Flea power release

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

1 Turn off your computer.
2 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.

Identifier	GUID-7D2143EA-2C62-498E-97AF-DCEF3DA56624
Status	Released

Wi-Fi power cycle

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:

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

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

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 14. 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
Troubleshooting information, user manuals, setup instructions, product specifications, technical help blogs, drivers, software updates, and so on.	www.dell.com/support
Dell knowledge base articles for a variety of computer concerns.	1 Go to www.dell.com/support. 2 Type the subject or keyword in the **Search** box. 3 Click **Search** to retrieve the related articles.
Learn and know the following information about your product: • Product specifications • Operating system • Setting up and using your product • Data backup • Troubleshooting and diagnostics • Factory and system restore • BIOS information	See *Me and My Dell* at www.dell.com/support/manuals. To locate the *Me and My Dell* relevant to your product, identify your product through one of the following: • Select **Detect Product**. • Locate your product through the drop-down menu under **View Products**. • Enter the **Service Tag number** or **Product ID** in the search bar.

Contacting Dell

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

NOTE: Availability varies by country/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 on your purchase invoice, packing slip, bill, or Dell product catalog.