

Dell Latitude 3400

Service Manual

Notes, cautions, and warnings

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

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

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

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Working on your computer

Safety instructions

Prerequisites

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

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

About this task

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

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.


Turning off your computer — Windows 10

About this task

CAUTION: To avoid losing data, save and close all open files and exit all open programs before you turn off your computer or remove the side cover.

Steps

1. Click or tap .
2. Click or tap  and then click or tap **Shut down**.

 **NOTE:** Ensure that the computer and all attached devices are turned off. If your computer and attached devices did not automatically turn off when you shut down your operating system, press and hold the power button for about 6 seconds to turn them off.

Before working inside your computer

About this task


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

Steps

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

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

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

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

After working inside your computer

About this task

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

Steps

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

 **CAUTION:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.

2. Connect your computer and all attached devices to their electrical outlets.
3. Turn on your computer.
4. If required, verify that the computer works correctly by running **ePSA diagnostics**.

Technology and components

DDR4

DDR4 (double data rate fourth generation) memory is a higher-speed successor to the DDR2 and DDR3 technologies and allows up to 512 GB in capacity, compared to the DDR3's maximum of 128 GB per DIMM. DDR4 synchronous dynamic random-access memory is keyed differently from both SDRAM and DDR to prevent the user from installing the wrong type of memory into the system.

DDR4 needs 20 percent less or just 1.2 volts, compared to DDR3 which requires 1.5 volts of electrical power to operate. DDR4 also supports a new, deep power-down mode that allows the host device to go into standby without needing to refresh its memory. Deep power-down mode is expected to reduce standby power consumption by 40 to 50 percent.

DDR4 Details

There are subtle differences between DDR3 and DDR4 memory modules, as listed below.

Key notch difference

The key notch on a DDR4 module is in a different location from the key notch on a DDR3 module. Both notches are on the insertion edge but the notch location on the DDR4 is slightly different, to prevent the module from being installed into an incompatible board or platform.

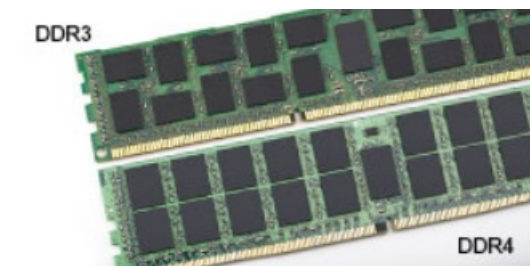


Figure 1. Notch difference

Increased thickness

DDR4 modules are slightly thicker than DDR3, to accommodate more signal layers.

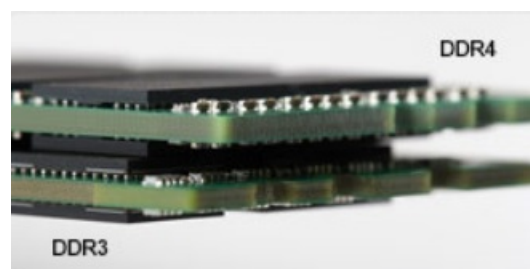


Figure 2. Thickness difference

Curved edge

DDR4 modules feature a curved edge to help with insertion and alleviate stress on the PCB during memory installation.

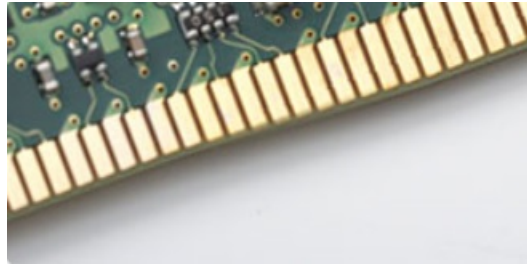


Figure 3. Curved edge

Memory Errors

Memory errors on the system display the new ON-FLASH-FLASH or ON-FLASH-ON failure code. If all memory fails, the LCD does not turn on. Troubleshoot for possible memory failure by trying known good memory modules in the memory connectors on the bottom of the system or under the keyboard, as in some portable systems.

NOTE: The DDR4 memory is imbedded in board and not a replaceable DIMM as shown and referred.

USB features

Universal Serial Bus, or USB, was introduced in 1996. It dramatically simplified the connection between host computers and peripheral devices like mice, keyboards, external drives, and printers.

Let's take a quick look on the USB evolution referencing to the table below.

Table 1. USB evolution

Type	Data Transfer Rate	Category	Introduction Year
USB 2.0	480 Mbps	High Speed	2000
USB 3.0/USB 3.1 Gen 1	5 Gbps	Super Speed	2010
USB 3.1 Gen 2	10 Gbps	Super Speed	2013

USB 3.0/USB 3.1 Gen 1 (SuperSpeed USB)

For years, the USB 2.0 has been firmly entrenched as the de facto interface standard in the PC world with about 6 billion devices sold, and yet the need for more speed grows by ever faster computing hardware and ever greater bandwidth demands. The USB 3.0/USB 3.1 Gen 1 finally has the answer to the consumers' demands with a theoretically 10 times faster than its predecessor. In a nutshell, USB 3.1 Gen 1 features are as follows:

- Higher transfer rates (up to 5 Gbps)
- Increased maximum bus power and increased device current draw to better accommodate power-hungry devices
- New power management features
- Full-duplex data transfers and support for new transfer types
- Backward USB 2.0 compatibility
- New connectors and cable

The topics below cover some of the most commonly asked questions regarding USB 3.0/USB 3.1 Gen 1.



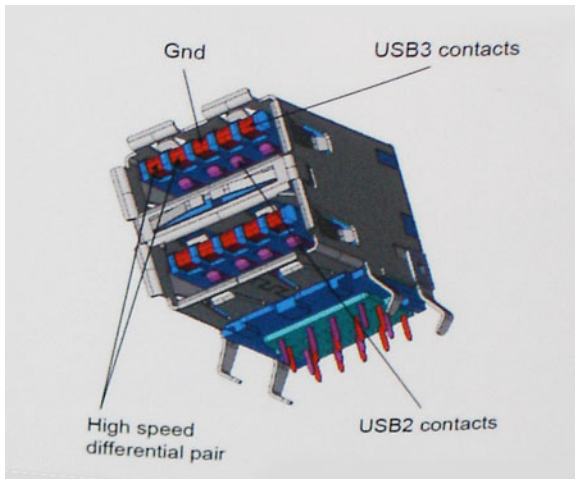
Speed

Currently, there are 3 speed modes defined by the latest USB 3.0/USB 3.1 Gen 1 specification. They are Super-Speed, Hi-Speed and Full-Speed. The new SuperSpeed mode has a transfer rate of 4.8Gbps. While the specification retains Hi-Speed, and Full-Speed USB mode,

commonly known as USB 2.0 and 1.1 respectively, the slower modes still operate at 480Mbps and 12Mbps respectively and are kept to maintain backward compatibility.

USB 3.0/USB 3.1 Gen 1 achieves the much higher performance by the technical changes below:

- An additional physical bus that is added in parallel with the existing USB 2.0 bus (refer to the picture below).
- USB 2.0 previously had four wires (power, ground, and a pair for differential data); USB 3.0/USB 3.1 Gen 1 adds four more for two pairs of differential signals (receive and transmit) for a combined total of eight connections in the connectors and cabling.
- USB 3.0/USB 3.1 Gen 1 utilizes the bidirectional data interface, rather than USB 2.0's half-duplex arrangement. This gives a 10-fold increase in theoretical bandwidth.



With today's ever increasing demands placed on data transfers with high-definition video content, terabyte storage devices, high megapixel count digital cameras etc., USB 2.0 may not be fast enough. Furthermore, no USB 2.0 connection could ever come close to the 480Mbps theoretical maximum throughput, making data transfer at around 320Mbps (40MB/s) — the actual real-world maximum. Similarly, USB 3.0/USB 3.1 Gen 1 connections will never achieve 4.8Gbps. We will likely see a real-world maximum rate of 400MB/s with overheads. At this speed, USB 3.0/USB 3.1 Gen 1 is a 10x improvement over USB 2.0.

Applications

USB 3.0/USB 3.1 Gen 1 opens up the laneways and provides more headroom for devices to deliver a better overall experience. Where USB video was barely tolerable previously (both from a maximum resolution, latency, and video compression perspective), it's easy to imagine that with 5-10 times the bandwidth available, USB video solutions should work that much better. Single-link DVI requires almost 2Gbps throughput. Where 480Mbps was limiting, 5Gbps is more than promising. With its promised 4.8Gbps speed, the standard will find its way into some products that previously weren't USB territory, like external RAID storage systems.

Listed below are some of the available SuperSpeed USB 3.0/USB 3.1 Gen 1 products:

- External Desktop USB 3.0/USB 3.1 Gen 1 Hard Drives
- Portable USB 3.0/USB 3.1 Gen 1 Hard Drives
- USB 3.0/USB 3.1 Gen 1 Drive Docks & Adapters
- USB 3.0/USB 3.1 Gen 1 Flash Drives & Readers
- USB 3.0/USB 3.1 Gen 1 Solid-state Drives
- USB 3.0/USB 3.1 Gen 1 RAIDs
- Optical Media Drives
- Multimedia Devices
- Networking
- USB 3.0/USB 3.1 Gen 1 Adapter Cards & Hubs

Compatibility

The good news is that USB 3.0/USB 3.1 Gen 1 has been carefully planned from the start to peacefully co-exist with USB 2.0. First of all, while USB 3.0/USB 3.1 Gen 1 specifies new physical connections and thus new cables to take advantage of the higher speed capability of the new protocol, the connector itself remains the same rectangular shape with the four USB 2.0 contacts in the exact same location as before. Five new connections to carry receive and transmitted data independently are present on USB 3.0/USB 3.1 Gen 1 cables and only come into contact when connected to a proper SuperSpeed USB connection.

USB Type-C

USB Type-C is a new, tiny physical connector. The connector itself can support various exciting new USB standard like USB 3.1 and USB power delivery (USB PD).

Alternate Mode

USB Type-C is a new connector standard that's very small. It's about a third the size of an old USB Type-A plug. This is a single connector standard that every device should be able to use. USB Type-C ports can support a variety of different protocols using "alternate modes," which allows you to have adapters that can output HDMI, VGA, DisplayPort, or other types of connections from that single USB port

USB Power Delivery

The USB PD specification is also closely intertwined with USB Type-C. Currently, smartphones, tablets, and other mobile devices often use a USB connection to charge. A USB 2.0 connection provides up to 2.5 watts of power — that'll charge your phone, but that's about it. A laptop might require up to 60 watts, for example. The USB Power Delivery specification ups this power delivery to 100 watts. It's bi-directional, so a device can either send or receive power. And this power can be transferred at the same time the device is transmitting data across the connection.

This could spell the end of all those proprietary laptop charging cables, with everything charging via a standard USB connection. You could charge your laptop from one of those portable battery packs you charge your smartphones and other portable devices from today. You could plug your laptop into an external display connected to a power cable, and that external display would charge your laptop as you used it as an external display — all via the one little USB Type-C connection. To use this, the device and the cable have to support USB Power Delivery. Just having a USB Type-C connection doesn't necessarily mean they do.

USB Type-C and USB 3.1

USB 3.1 is a new USB standard. USB 3's theoretical bandwidth is 5 Gbps, while USB 3.1 Gen2 is 10Gbps. That's double the bandwidth, as fast as a first-generation Thunderbolt connector. USB Type-C isn't the same thing as USB 3.1. USB Type-C is just a connector shape, and the underlying technology could just be USB 2 or USB 3.0. In fact, Nokia's N1 Android tablet uses a USB Type-C connector, but underneath it's all USB 2.0 — not even USB 3.0. However, these technologies are closely related.

Intel Optane memory

Intel Optane memory functions only as a storage accelerator. It neither replaces nor adds to the memory (RAM) installed on your computer.

NOTE: Intel Optane memory is supported on computers that meet the following requirements:


- 7th Generation or higher Intel Core i3/i5/i7 processor
- Windows 10 64-bit version or higher
- Intel Rapid Storage Technology driver version 15.9.1.1018 or higher

Table 2. Intel Optane memory specifications

Feature	Specifications
Interface	PCIe 3x2 NVMe 1.1
Connector	M.2 card slot (2230/2280)
Configurations supported	<ul style="list-style-type: none">• 7th Generation or higher Intel Core i3/i5/i7 processor• Windows 10 64-bit version or higher• Intel Rapid Storage Technology driver version 15.9.1.1018 or higher
Capacity	32 GB or 64 GB



Enabling Intel Optane memory

Steps

1. On the taskbar, click the search box, and type **"Intel Rapid Storage Technology"**.
 2. Click **Intel Rapid Storage Technology**.
 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 enable the Intel Optane memory.
-  **NOTE:** Applications may take up to three subsequent launches after enablement to see the full performance benefits.

Disabling Intel Optane memory

About this task

-  **CAUTION:** After disabling Intel Optane memory, do not uninstall the driver for Intel Rapid Storage Technology as it will result in a blue screen error. The Intel Rapid Storage Technology user interface can be removed without uninstalling the driver.
-  **NOTE:** Disabling Intel Optane memory is required before removing the SATA storage device, accelerated by the Intel Optane memory module, from the computer.

Steps

1. On the taskbar, click the search box, and then type **"Intel Rapid Storage Technology"**.
2. Click **Intel Rapid Storage Technology**. The **Intel Rapid Storage Technology** window is displayed.
3. On the **Intel Optane memory** tab, click **Disable** to disable the Intel Optane memory.
4. Click **Yes** if you accept the warning.
The disabling progress is displayed.
5. Click **Reboot** to complete disabling Intel Optane memory and restart your computer.

Intel UHD Graphics 620

Table 3. Intel UHD Graphics 620 specifications

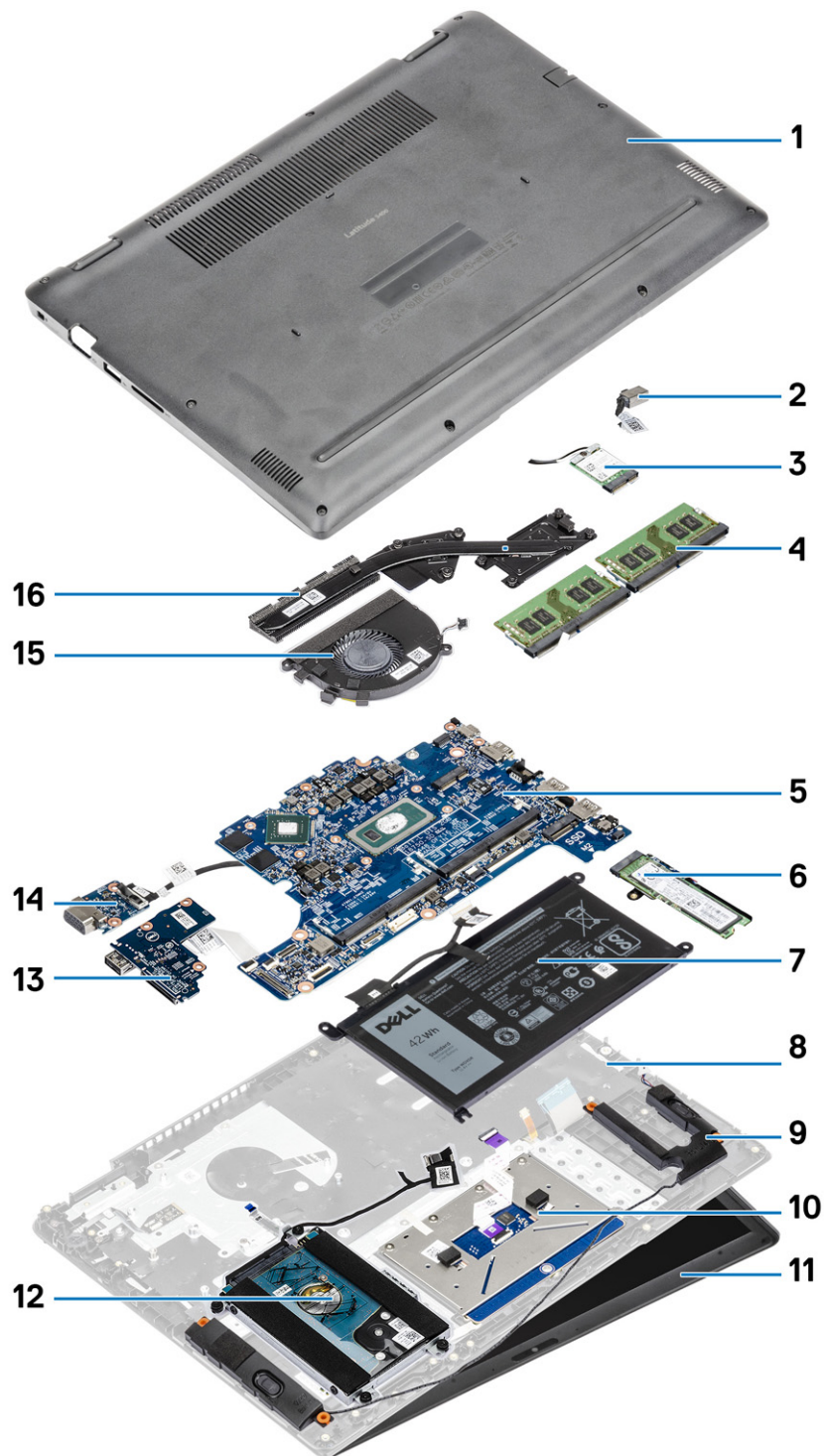
Intel UHD Graphics 620	
Bus Type	Integrated
Memory Type	LPDDR3
Graphics Level	i3/i5/i7: G T2 (UHD 620)
Estimated Maximum Power Consumption (TDP)	15 W (included in the CPU power)
Overlay Planes	Yes
Operating Systems Graphics/ Video API Support	DirectX 12 (Windows 10), OpenGL 4.5
Maximum Vertical Refresh Rate	Up to 85 Hz depending on resolution
Multiple Display Support	On System: eDP (internal), HDMI Via Optional USB Type-C Port: VGA, DisplayPort
External Connectors	HDMI 1.4b USB Type-C port

Nvidia GeForce MX130 equivalent

Table 4. Nvidia GeForce MX130 specifications


Feature	Specifications
Graphics memory	2 GB GDDR5
Bus type	PCI Express 3.0
Memory Interface	GDDR5
Clock Speeds	1122 - 1242 (Boost) MHz
Maximum Color Depth	N/A
Maximum Vertical Refresh Rate	N/A
Operating Systems Graphics/ Video API Support	Windows 10/ DX 12/ OGL4.5
Supported Resolutions and Max Refresh Rates (Hz)	N/A
Numbers of Display Support	No display output from MX130

Major components of your system



1. Base cover
2. Power adapter port

3. WLAN card
4. Memory modules
5. System board
6. M.2 Solid-state drive or Intel Optane memory—Optional
7. Battery
8. Palmrest assembly
9. Speakers
10. Touchpad assembly
11. Display assembly
12. Hard drive assembly
13. IO board
14. VGA daughterboard
15. System fan
16. Heatsink

 **NOTE:** Dell provides a list of components and their part numbers for the original system configuration purchased. These parts are available according to warranty coverages purchased by the customer. Contact your Dell sales representative for purchase options.

Removing and installing components

Recommended tools

The procedures in this document require the following tools:

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

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

Secure Digital Card

Removing the Secure Digital card

Prerequisites

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

Steps

1. Push the secure digital card to release it from the computer.
2. Slide the secure digital card out of the computer.



Installing the Secure Digital card

Steps

1. Slide the secure digital into the slot until it clicks into place.
2. Follow the procedures in [After working inside your computer](#).



Base cover

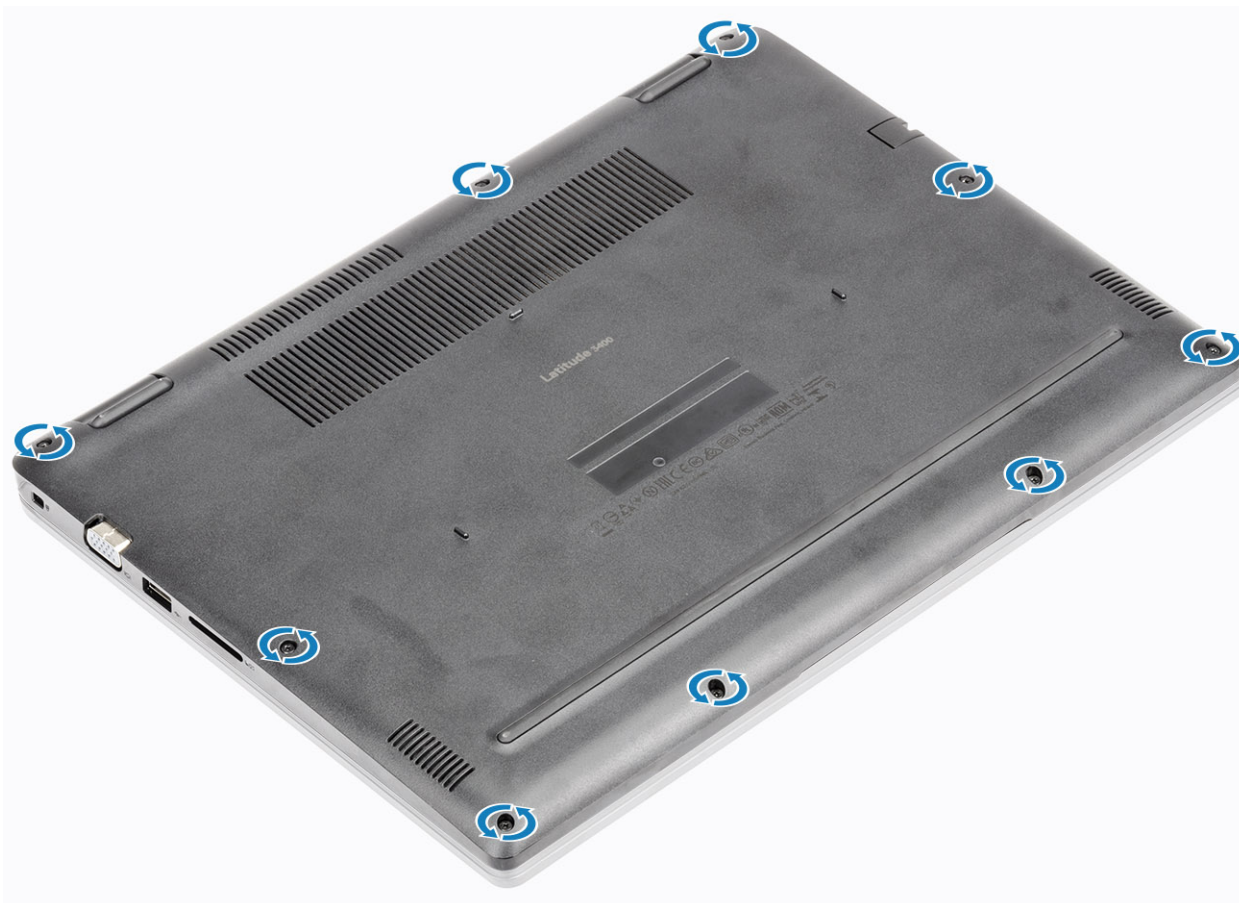
Removing the base cover

Prerequisites

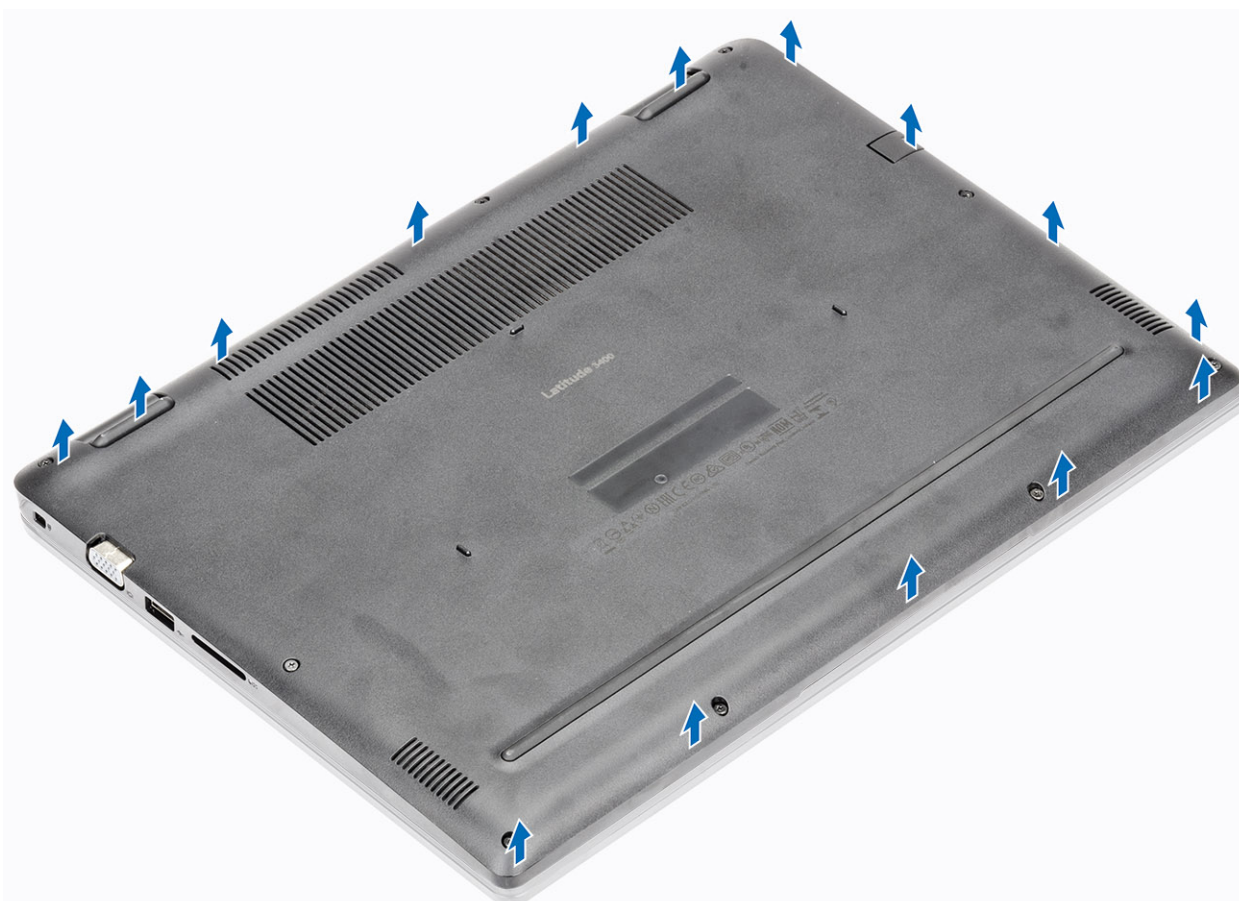
1. Follow the procedure in [before working inside your computer](#)
2. Remove the [SD memory card](#)

Steps

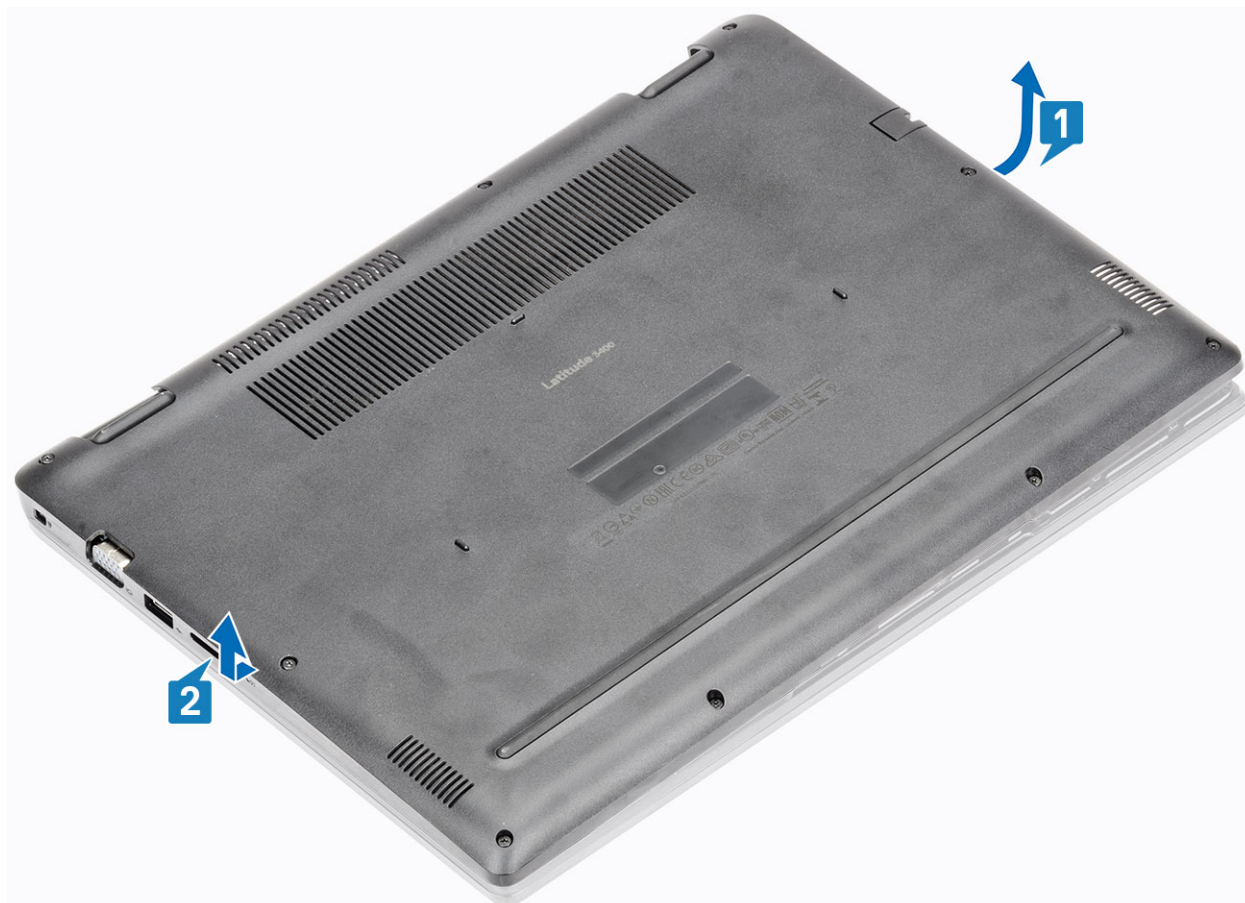
1. Loosen the nine captive screws that secure the base cover to the palmrest and keyboard assembly.



2. Pry the base cover and continue to open the right side of the base cover.



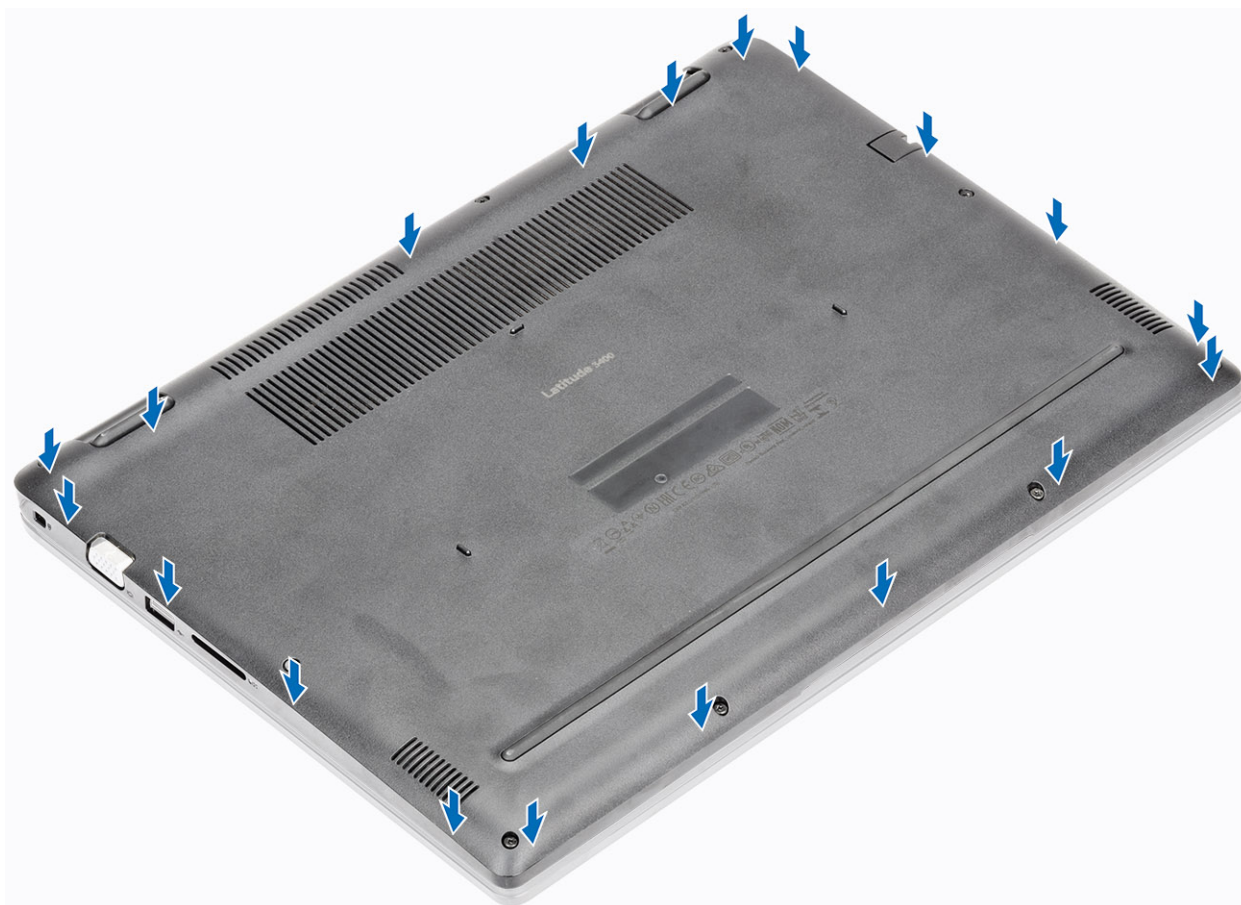
3. Lift the right side of the base cover [1], and remove it off the palmrest and keyboard assembly [2].



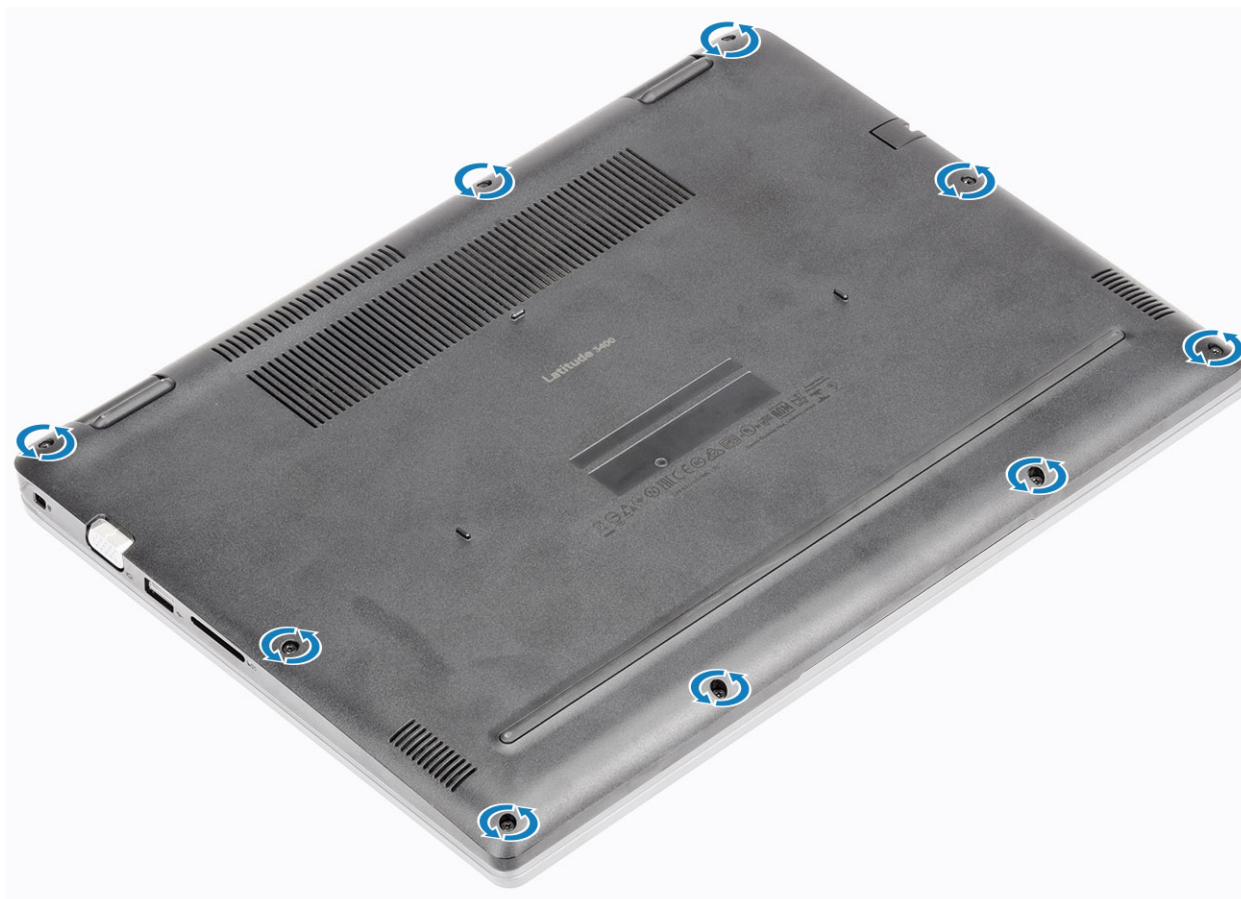
Installing the base cover

Steps

1. Place the base cover on the palmrest and keyboard assembly [1].



2. Tighten the nine captive screws that secure the base cover to the palmrest and keyboard assembly.



Next steps

1. Replace the [SD memory card](#)
2. Follow the procedure in [after working inside your computer](#)

Battery

Lithium-ion battery precautions



CAUTION:

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

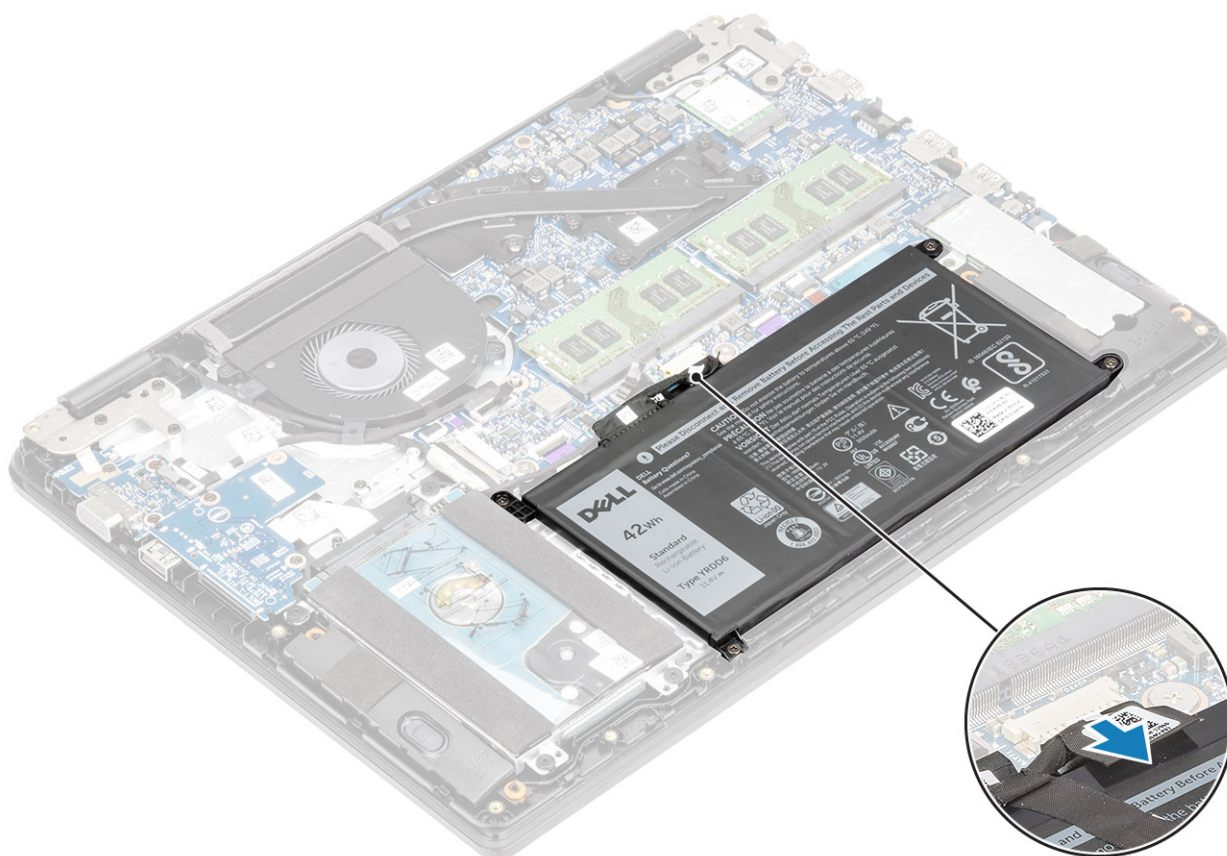
Removing the battery

Prerequisites

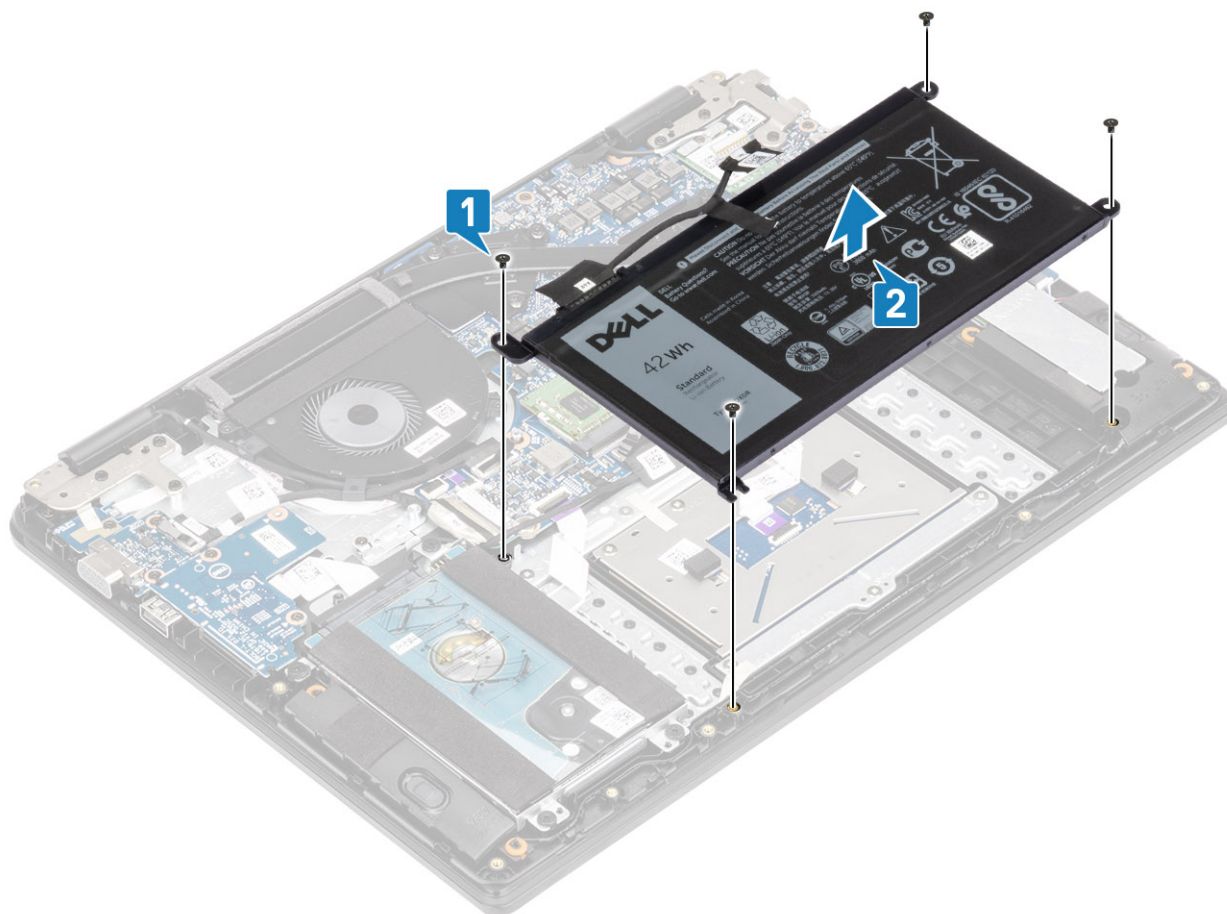
1. Follow the procedure in [before working inside your computer](#)
2. Remove the [SD memory card](#)
3. Remove the [base cover](#)

Steps

1. Disconnect the battery cable from the system board.



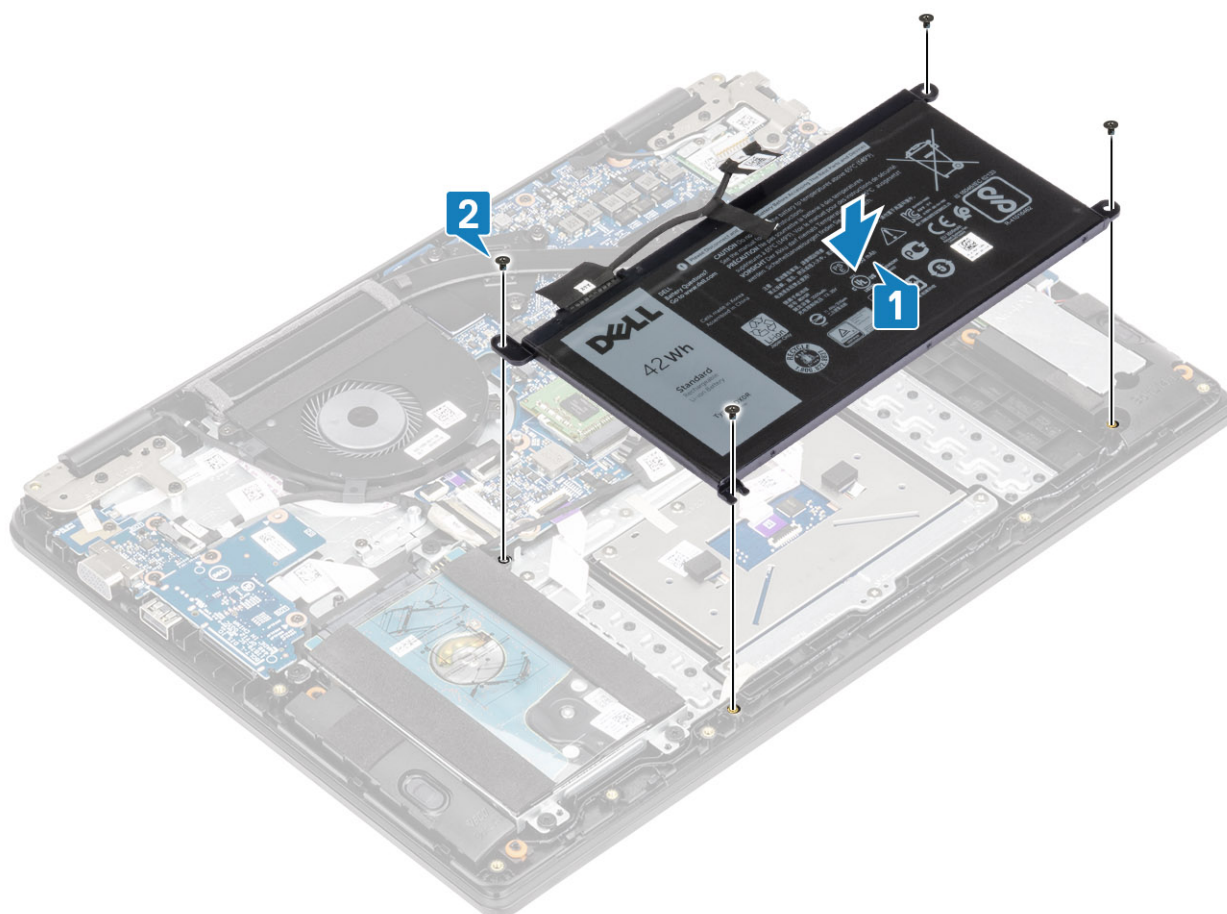
2. Remove the four (M2x3) screws that secure the battery to the palmrest and keyboard assembly [1].
3. Lift the battery off the palmrest and keyboard assembly [2].



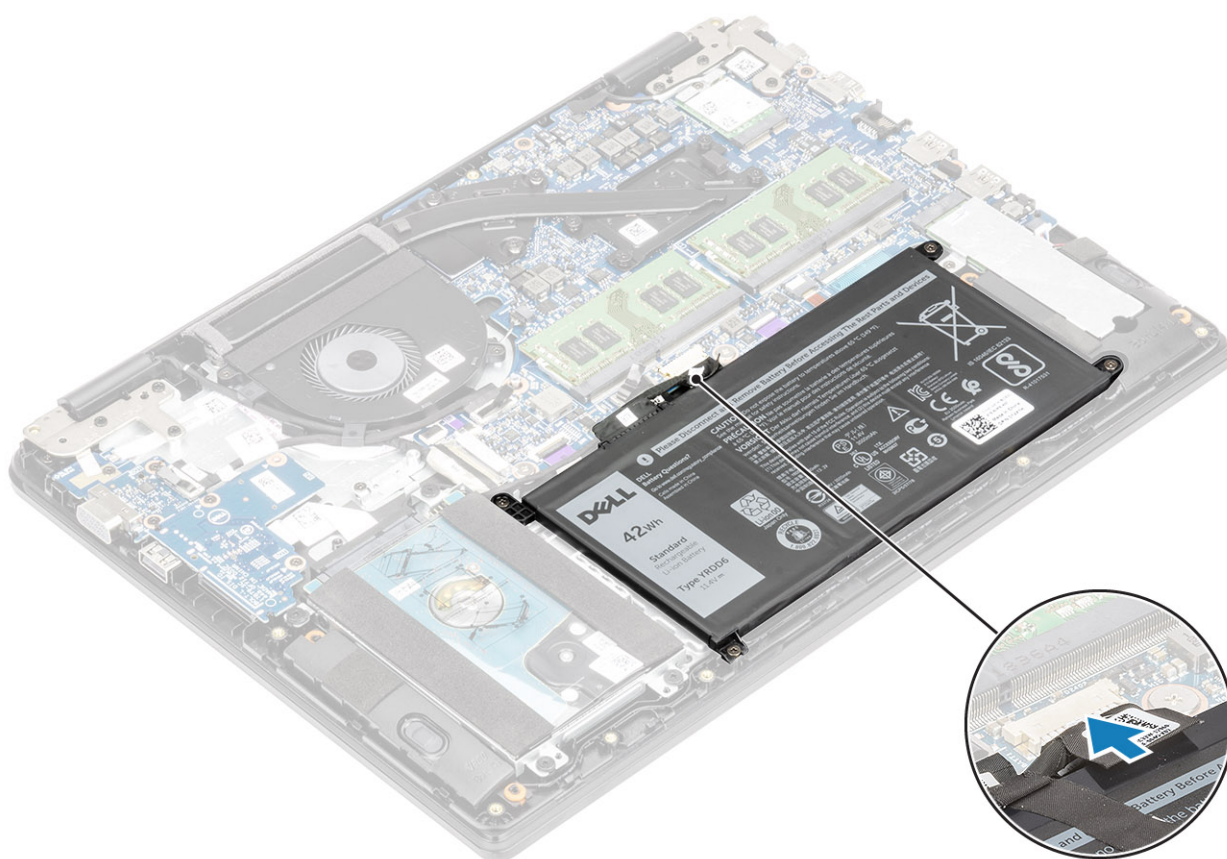
Installing the battery

Steps

1. Align the screw holes on the battery with the screw holes on the palmrest and keyboard assembly [1].
2. Replace the four (M2x3) screws that secure the battery to the palmrest and keyboard assembly [2].



3. Connect the battery cable to the system board.



Next steps

1. Replace the [base cover](#)
2. Replace the [SD memory card](#)
3. Follow the procedure in [after working inside your computer](#)

Hard drive

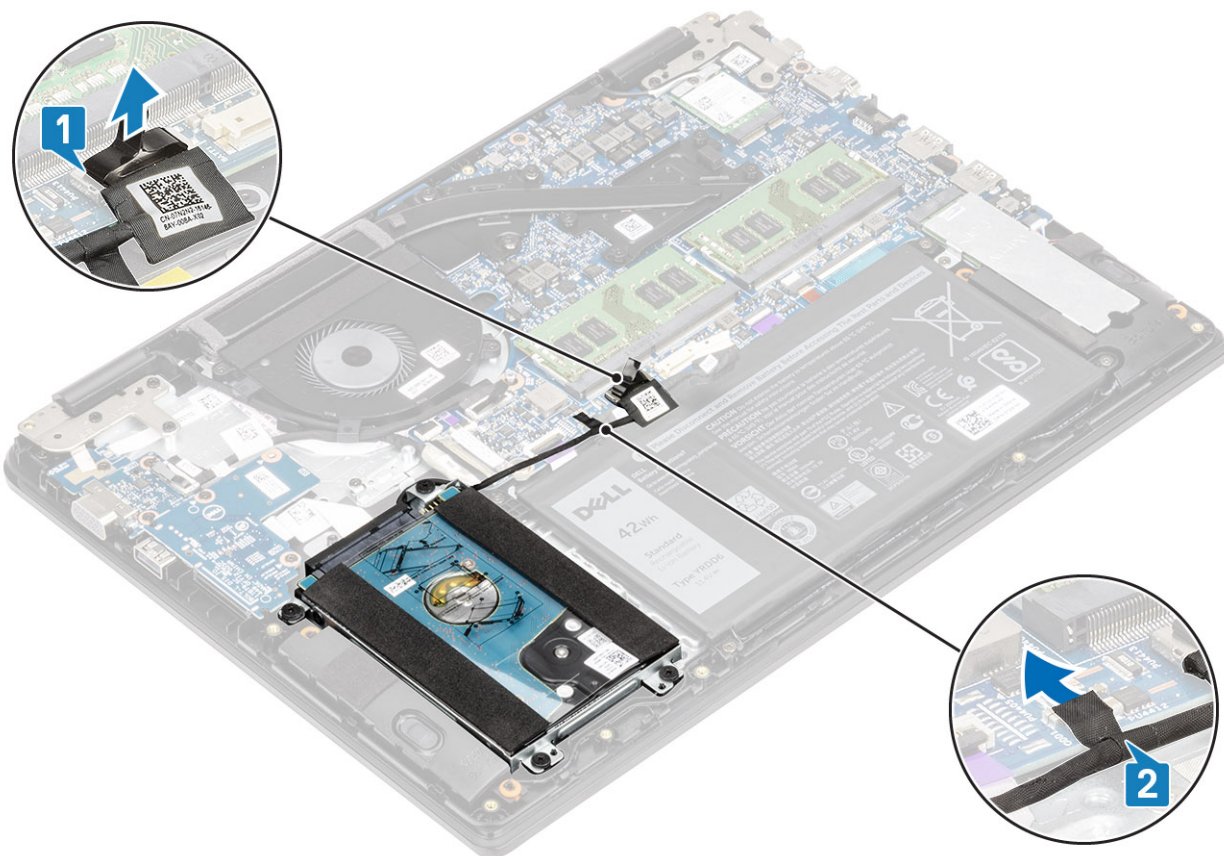
Removing the hard drive assembly

Prerequisites

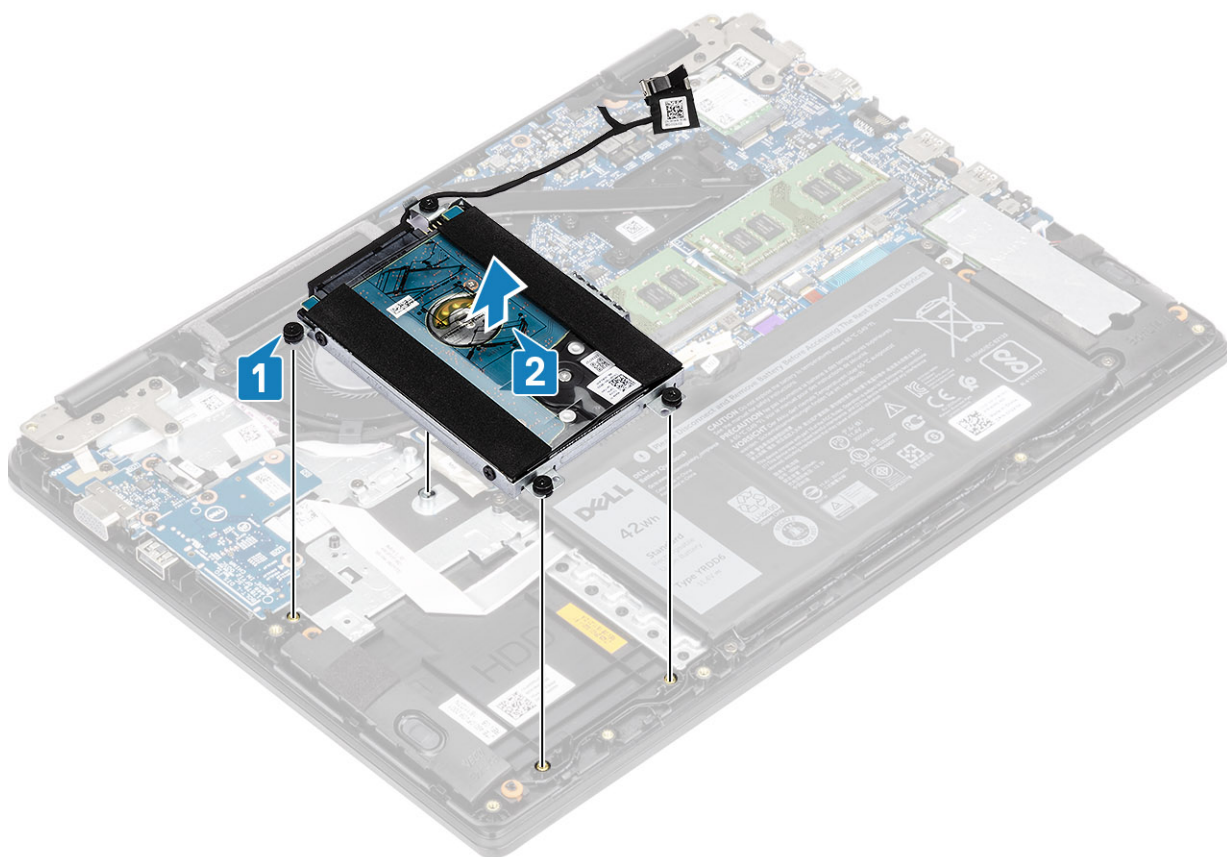
1. Follow the procedure in [before working inside your computer](#)
2. Remove the [SD memory card](#)
3. Remove the [base cover](#)
4. Disconnect the [battery](#) cable.

Steps

1. Disconnect the hard drive cable from the system board [1].
2. Peel the tape that secures the hard drive cable to the system board [2].



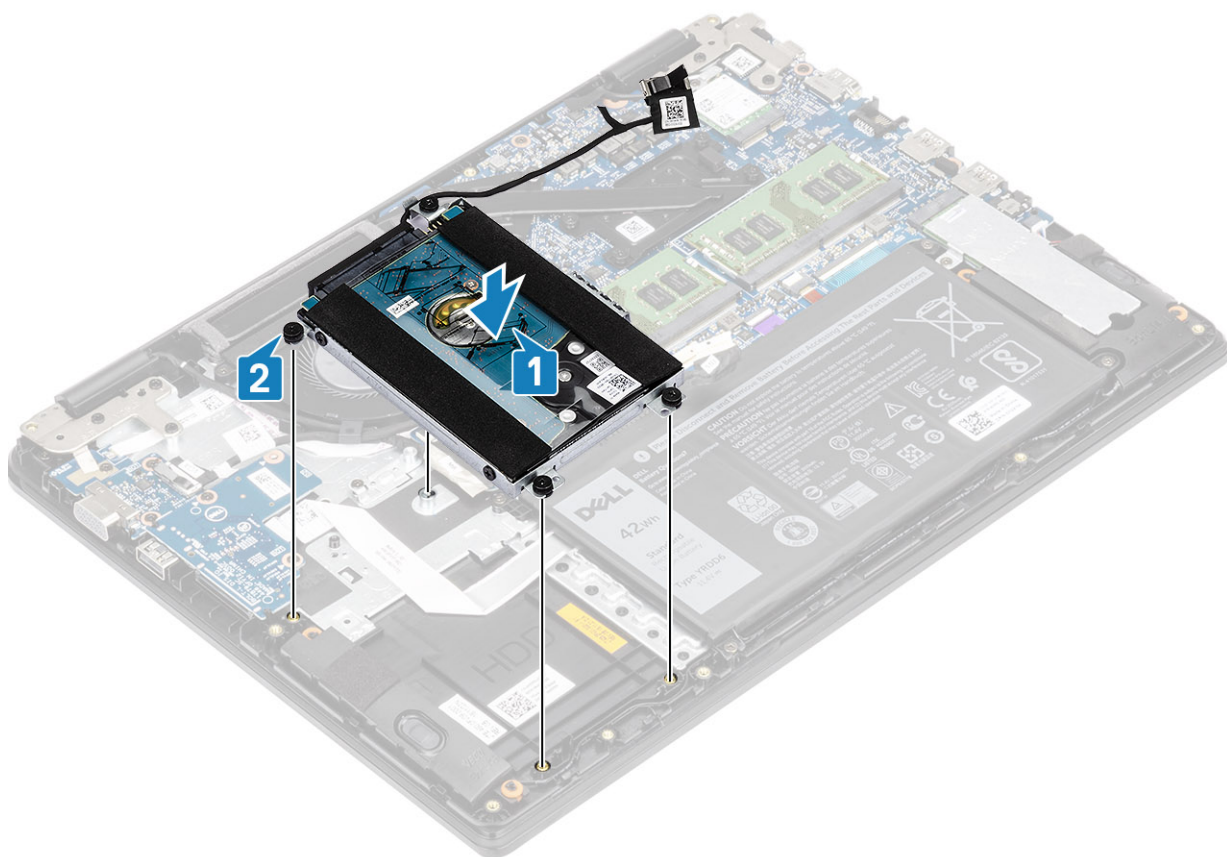
3. Remove the four (M2x4.5) screws that secure the hard drive assembly to the palmrest and keyboard assembly [1].
4. Lift the hard drive from the slot on the palmrest and keyboard assembly [2].



Installing the hard drive assembly

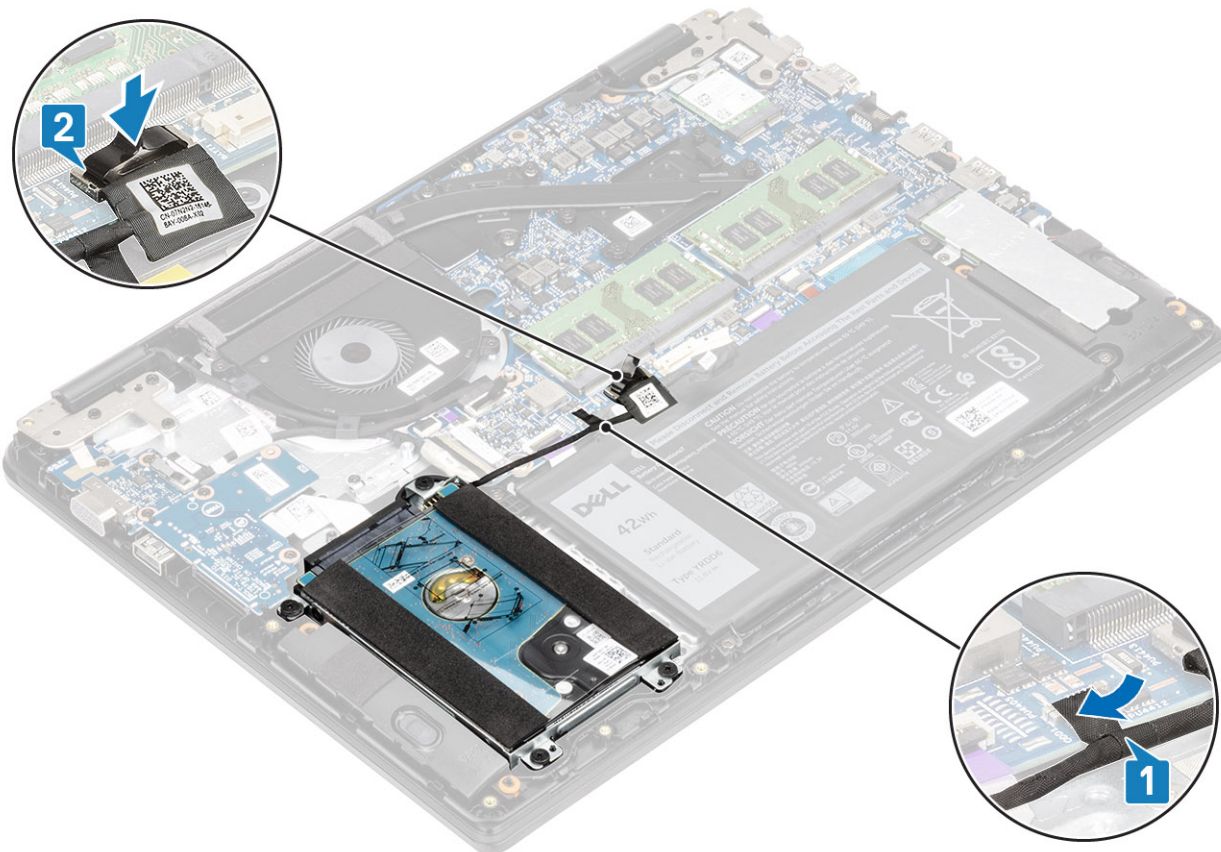
Steps

1. Align the screw holes on the hard drive assembly with the screw holes on the palm rest and keyboard assembly [1].
2. Replace the four (M2x4.5) screws that secure the hard drive assembly to the palm rest and keyboard assembly [2].



3. Adhere the tape that secures the hard drive cable to the system board [1].

4. Connect the hard drive cable to the system board [2].



Next steps

1. Replace the [battery cable](#).
2. Replace the [base cover](#)
3. Replace the [SD memory card](#)
4. Follow the procedure in [after working inside your computer](#)

IO board

Removing the IO board

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [SD memory card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [hard drive assembly](#).

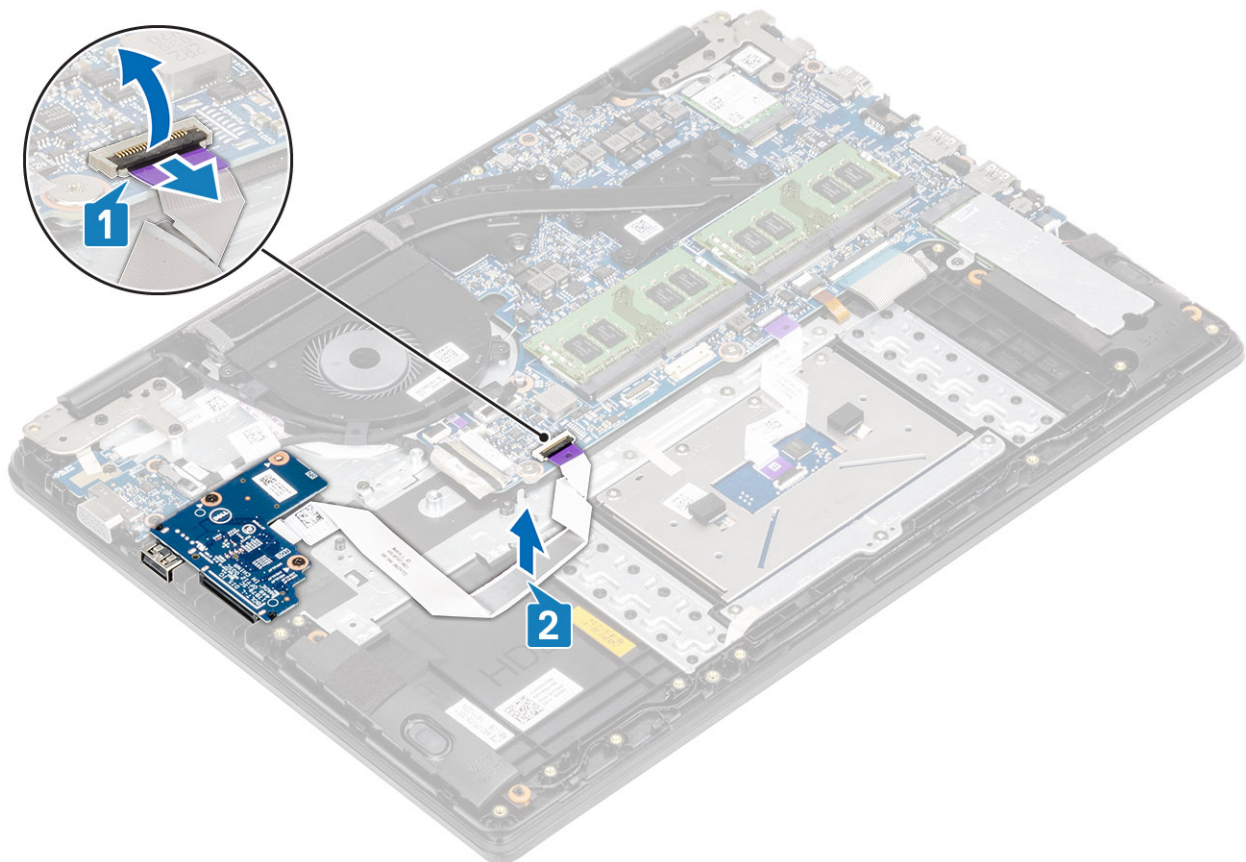
 **NOTE:** Required for systems with 42 Whr battery

Steps

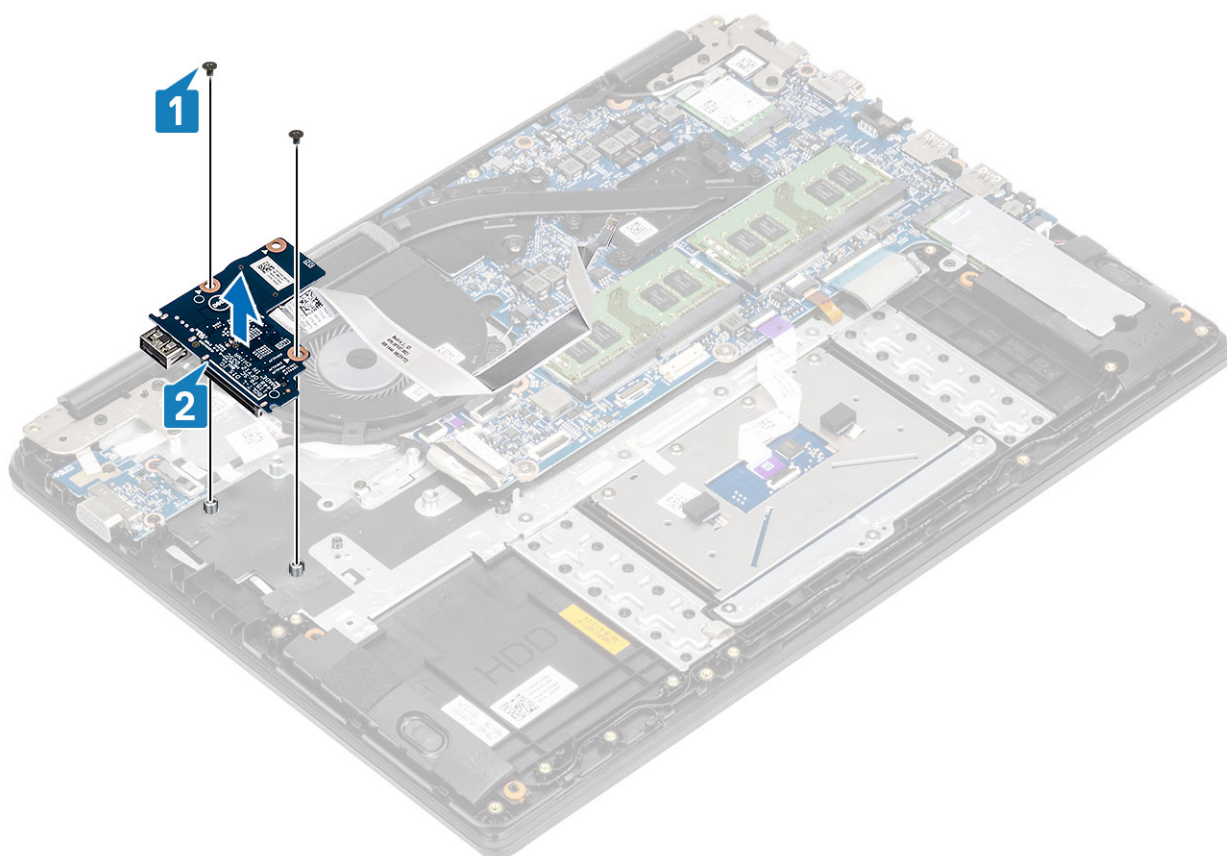
1.  **NOTE:** Removing the I/O board also removes the coin-cell battery which resets the CMOS settings.

Open the latch and disconnect the I/O board cable from the system board [1].

2. Peel the I/O-board cable from the palm rest and keyboard assembly [2].



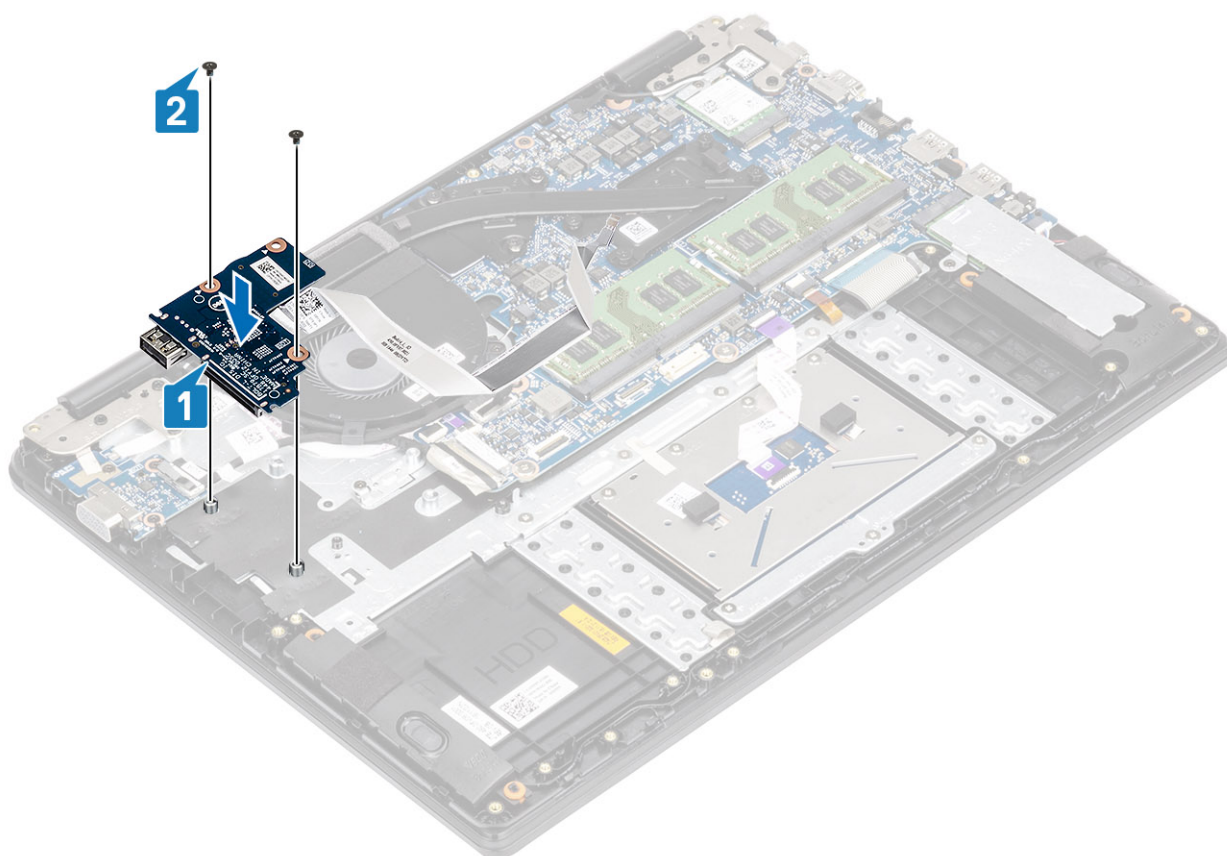
3. Remove the two (M2x3) screws that secure the I/O board to the palm rest and keyboard assembly [1].
4. Lift the I/O board, along with the cable, off the palm rest and keyboard assembly [2].



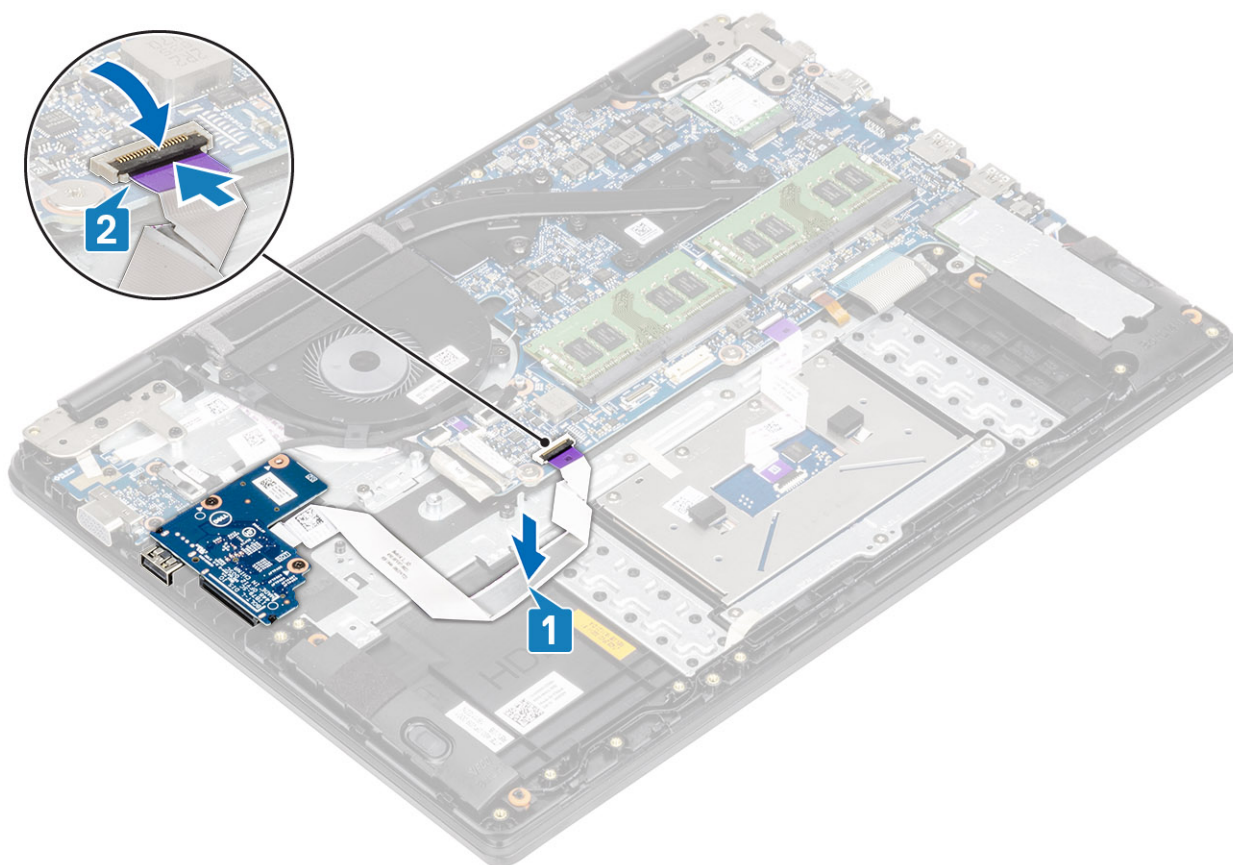
Installing the IO board

Steps


1. Using the alignment posts, place the I/O board on the palm rest and keyboard assembly [1].
2. Replace the two (M2x3) screws that secure the I/O board to the palm rest and keyboard assembly [2].



3. Adhere the I/O board cable to the palm rest and keyboard assembly [1].
4. Connect the I/O board cable to the system board and close the latch to secure the cable [2].



Next steps

1. Replace the [hard drive assembly](#).
1.  **NOTE:** Required for systems with 42 Whr battery
2. Replace the [battery](#).
3. Replace the [base cover](#).
4. Replace the [SD memory card](#).
5. Follow the procedure in [after working inside your computer](#).

Touchpad

Removing the touchpad assembly

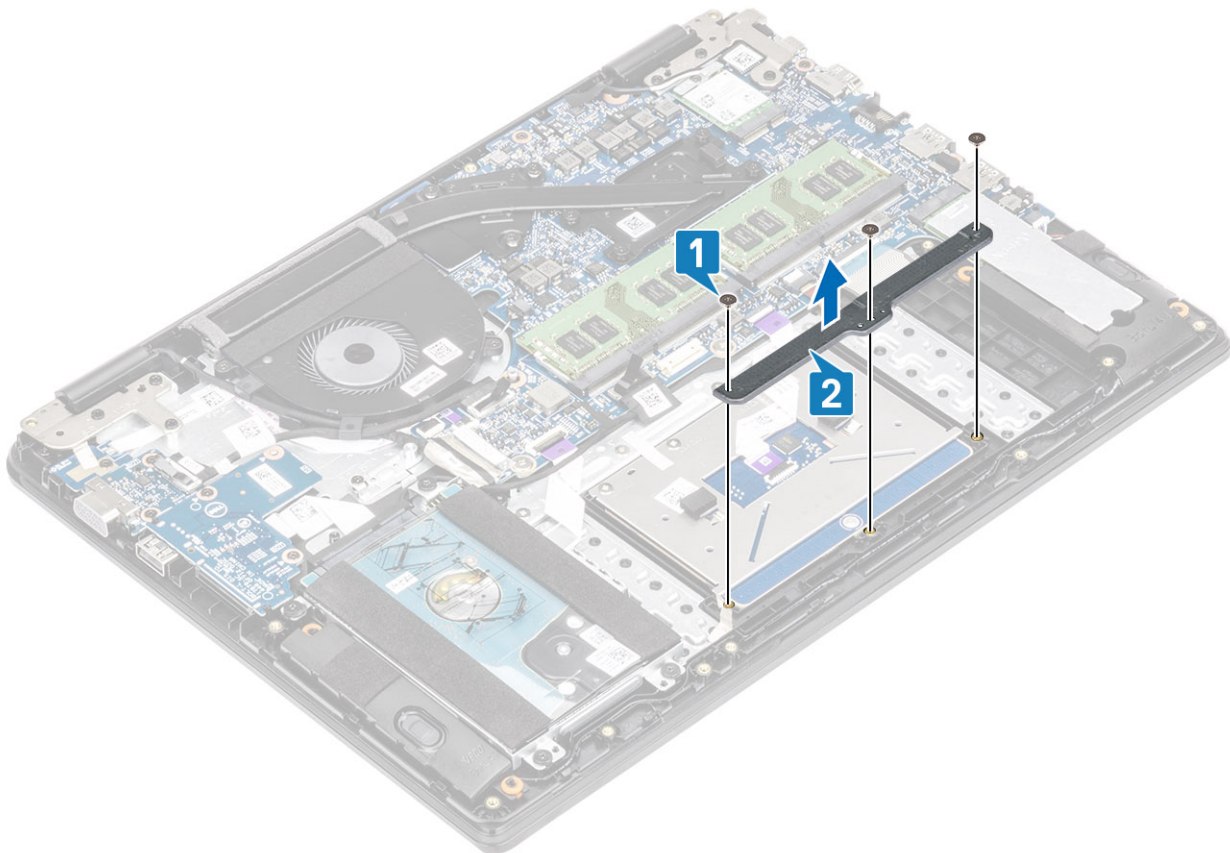
Prerequisites

-  **NOTE:** For information only, touchpad is included with the palmrest assembly.

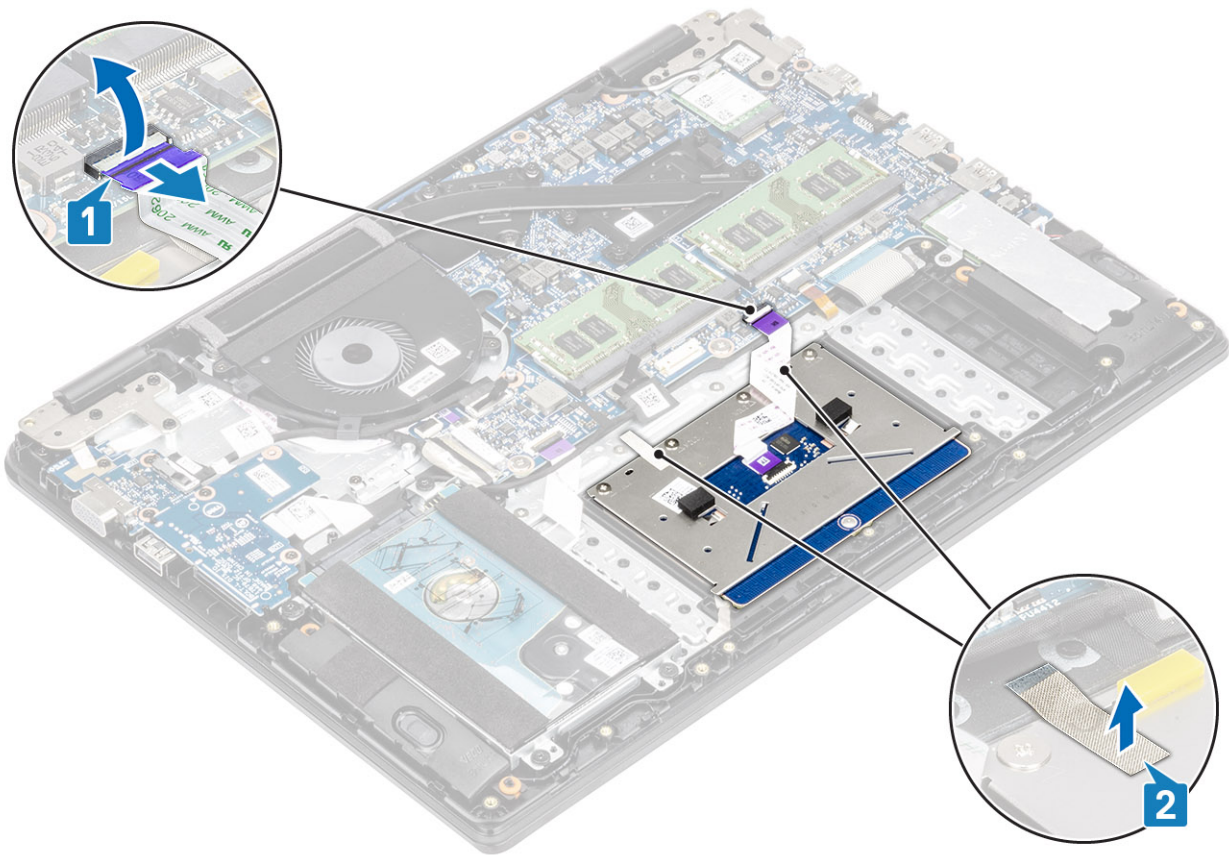
1. Follow the procedure in [before working inside your computer](#).
2. Remove the [SD memory card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).

Steps

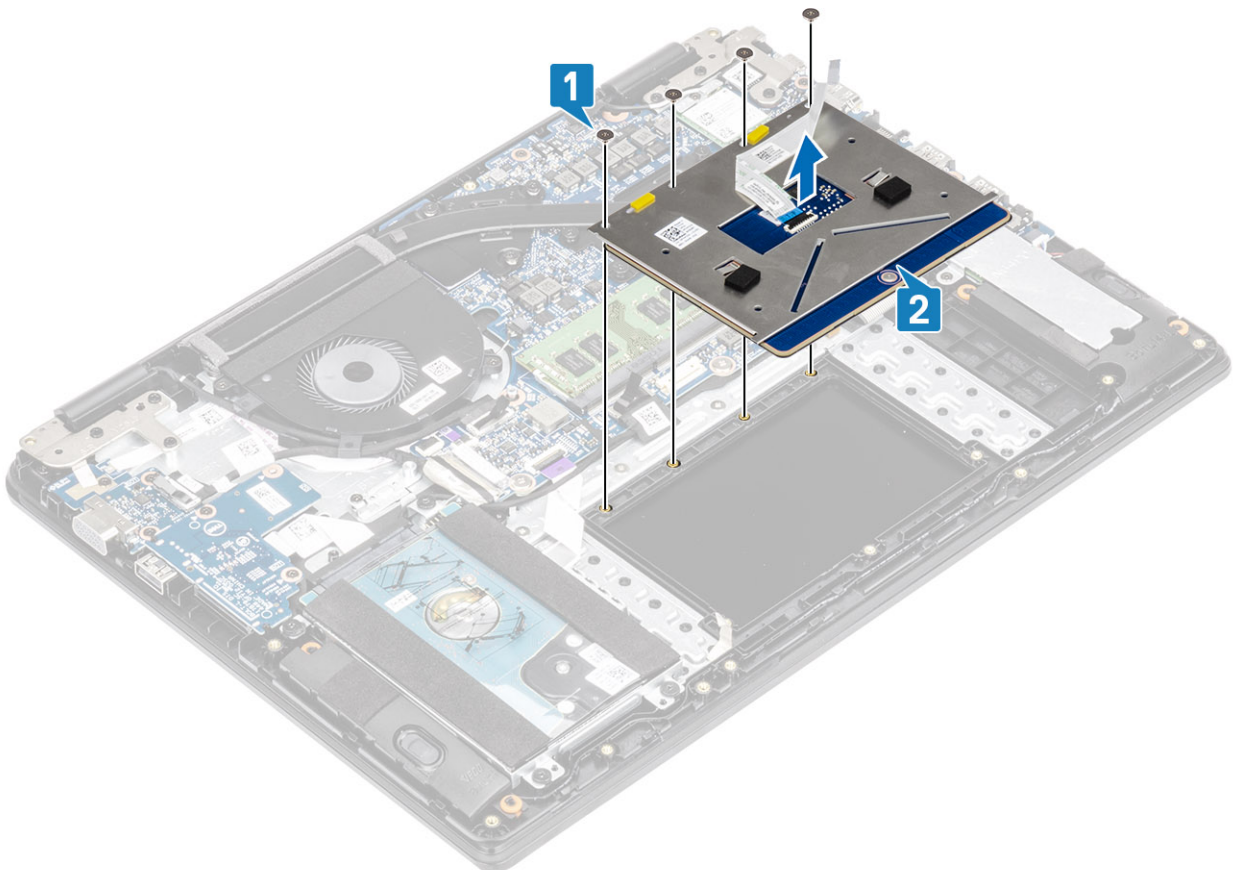
1. Remove the three (M2x2) screws that secure the touchpad bracket to the palmrest and keyboard assembly [1].
2. Lift the touchpad bracket off the palmrest and keyboard assembly [2], and peel the tape that secures the bracket to the palmrest.



3. Open the latch and disconnect the touchpad cable from the system board [1].
4. Peel the tape that secures the touchpad to the palmrest and keyboard assembly [2].



5. Remove the four (M2x2) screws that secure the touchpad to the palmrest and keyboard assembly [1].
6. Lift the touchpad off the palmrest and keyboard assembly [2].



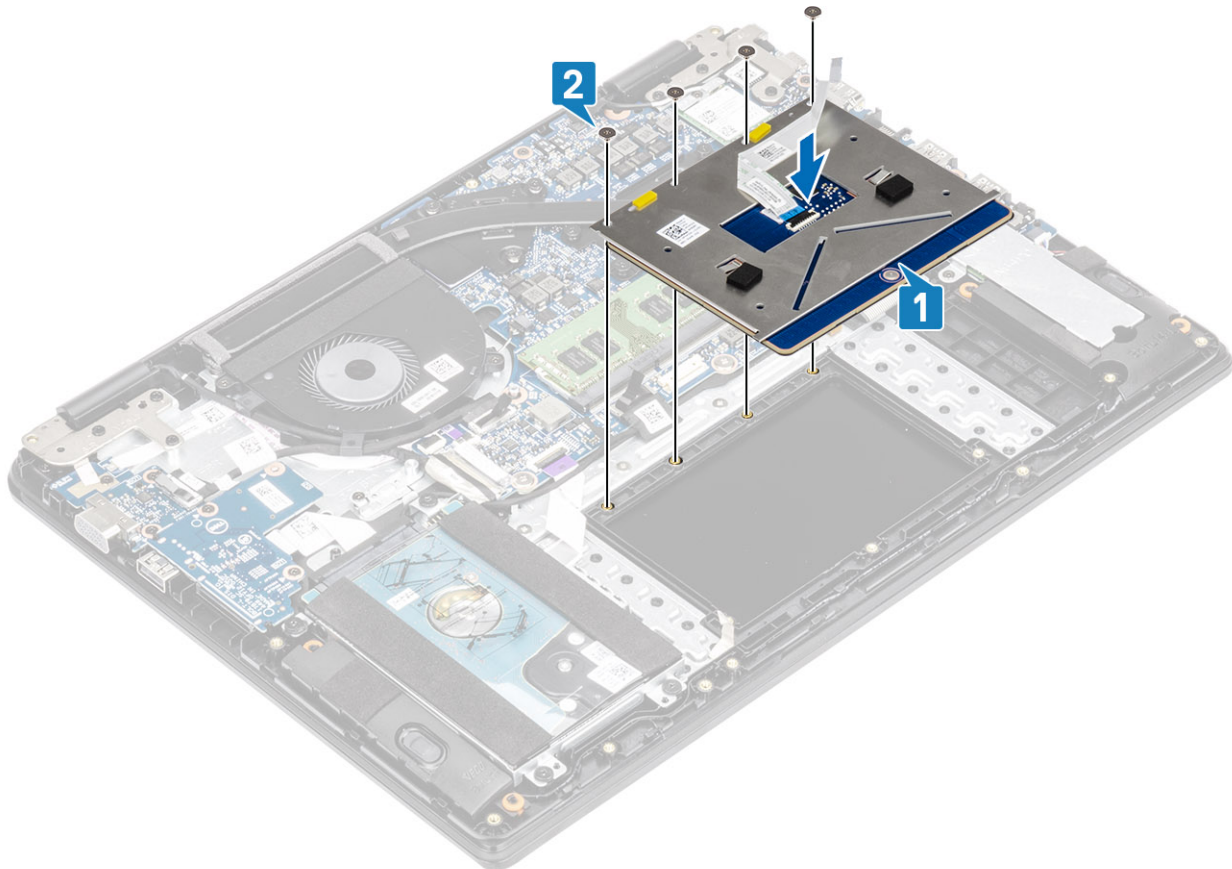
Installing the touch pad assembly

About this task

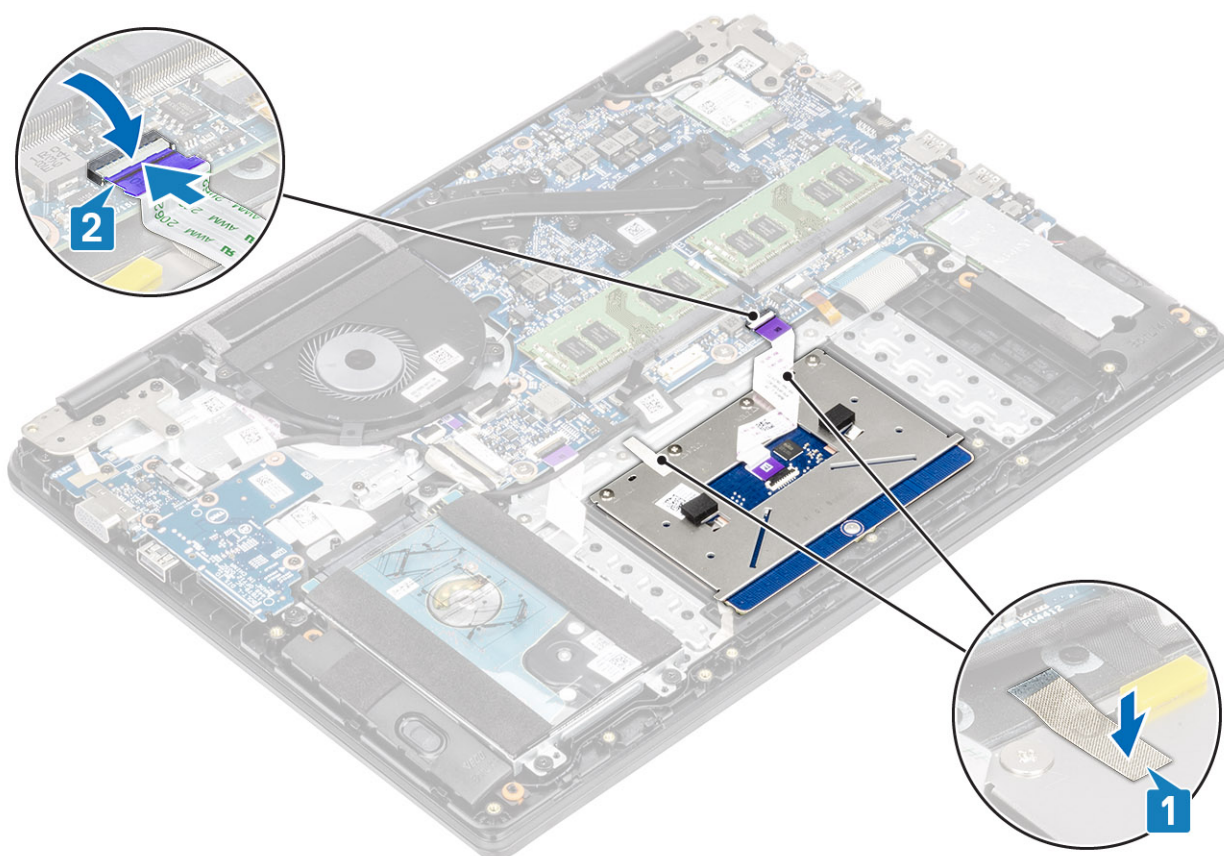
NOTE: Ensure that the touch pad is aligned with the guides available on the palm-rest and keyboard assembly, and the gap on either sides of the touch pad is equal.

Steps

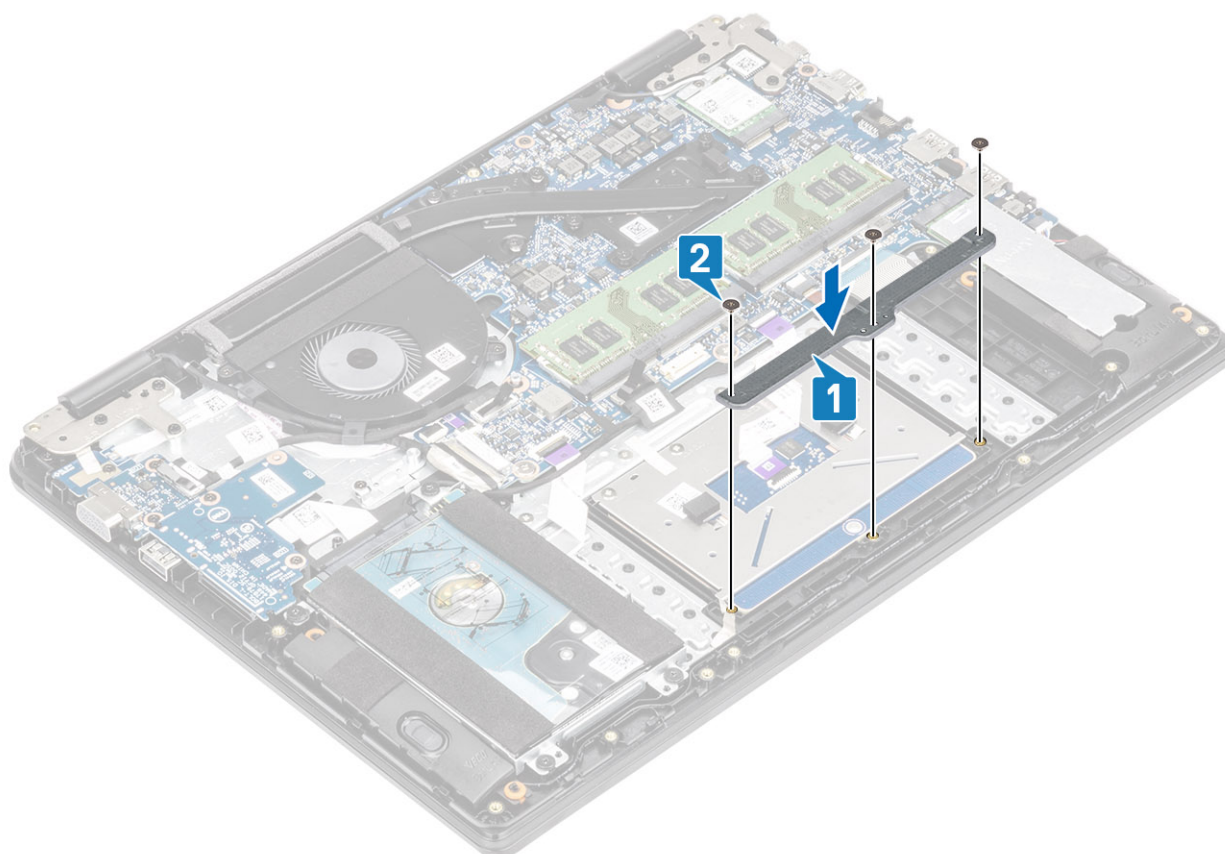
1. Place the touch pad into the slot on the palmrest and keyboard assembly [1].
2. Replace the four (M2x2) screws that secure the touch pad to the palmrest and keyboard assembly [2].



3. Adhere the tape that secures the touch pad to the palmrest and keyboard assembly [1].
4. Slide the touch pad cable into its connector on the system board and close the latch to secure the cable [2].



5. Place the touch pad bracket into the slot on the palmrest and keyboard assembly [1].
6. Replace the three screws (M2x2) that secure the touch pad bracket to the palmrest and keyboard assembly [2], and adhere the tape that secures the bracket to the palmrest.



Next steps

1. Replace the [battery](#)
2. Replace the [base cover](#)
3. Replace the [SD memory card](#)
4. Follow the procedure in [after working inside your computer](#)

Memory modules

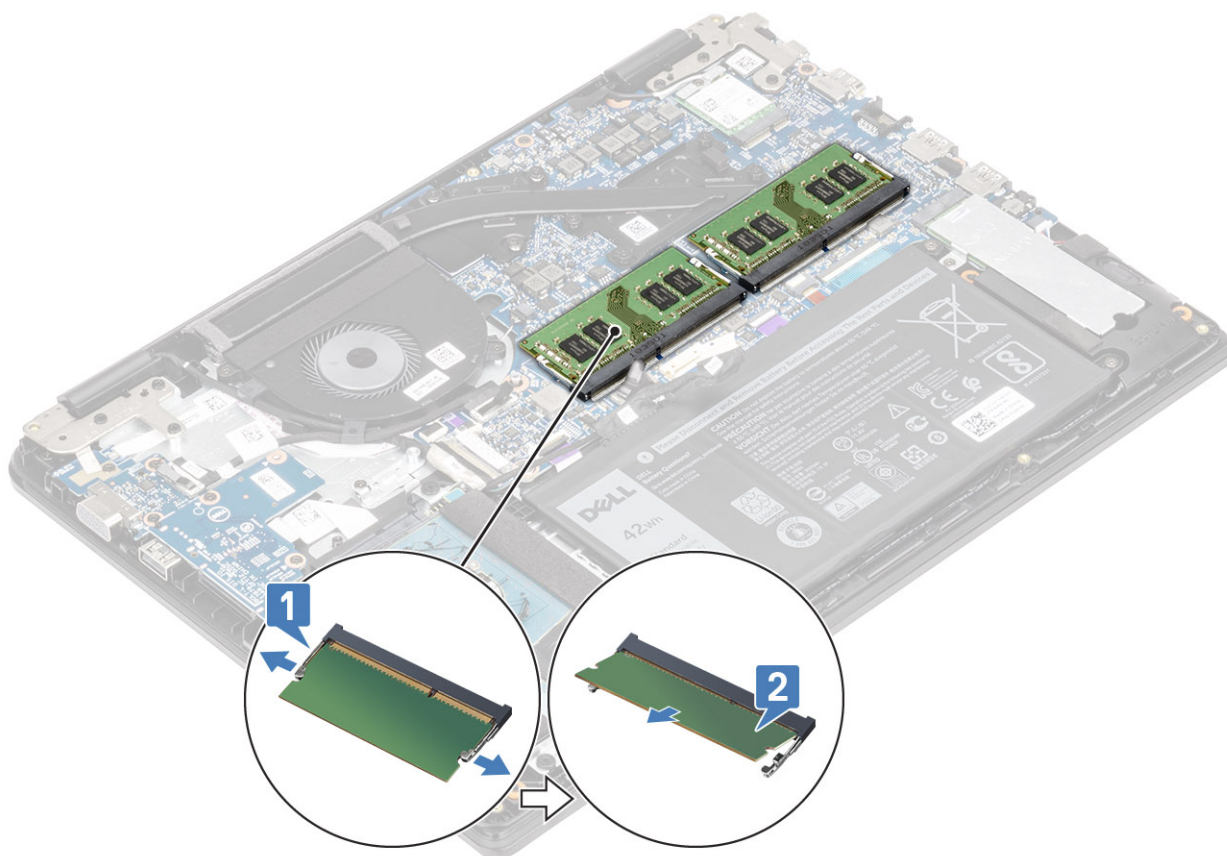
Removing the memory module

Prerequisites

1. Follow the procedure in [before working inside your computer](#)
2. Remove the [SD memory card](#)
3. Remove the [base cover](#)
4. Disconnect the [battery](#) cable.

Steps

1. Pry the clips securing the memory module until the memory module pops-up [1].
2. Remove the memory module from the memory module slot [2].

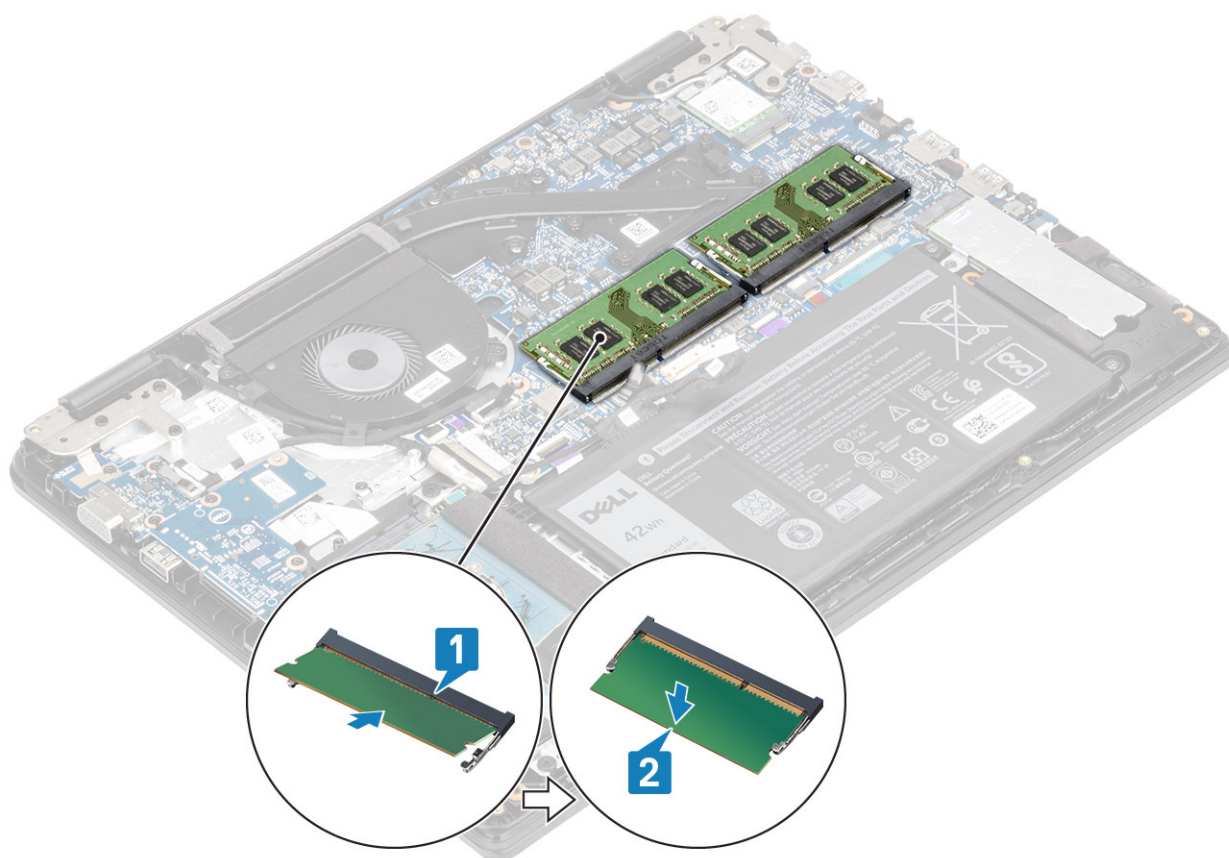


Installing the memory module

Steps

1. Align the notch on the memory module with the tab on the memory-module slot.
2. Slide the memory module firmly into the slot at an angle [1].
3. Press the memory module down until the clips secure it [2].

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



Next steps

1. Replace the [battery cable](#).
2. Replace the [base cover](#)
3. Replace the [SD memory card](#)
4. Follow the procedure in [after working inside your computer](#)

SIM Card

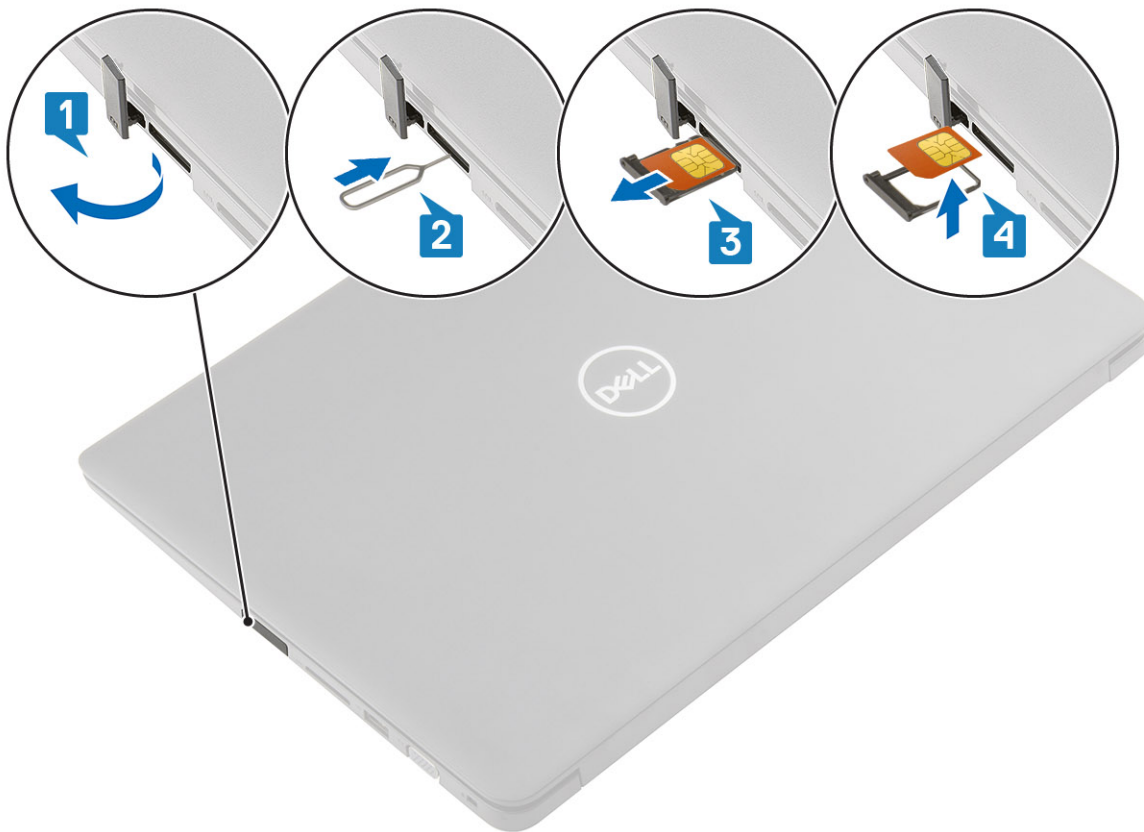
Removing the SIM card

Prerequisites

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

Steps

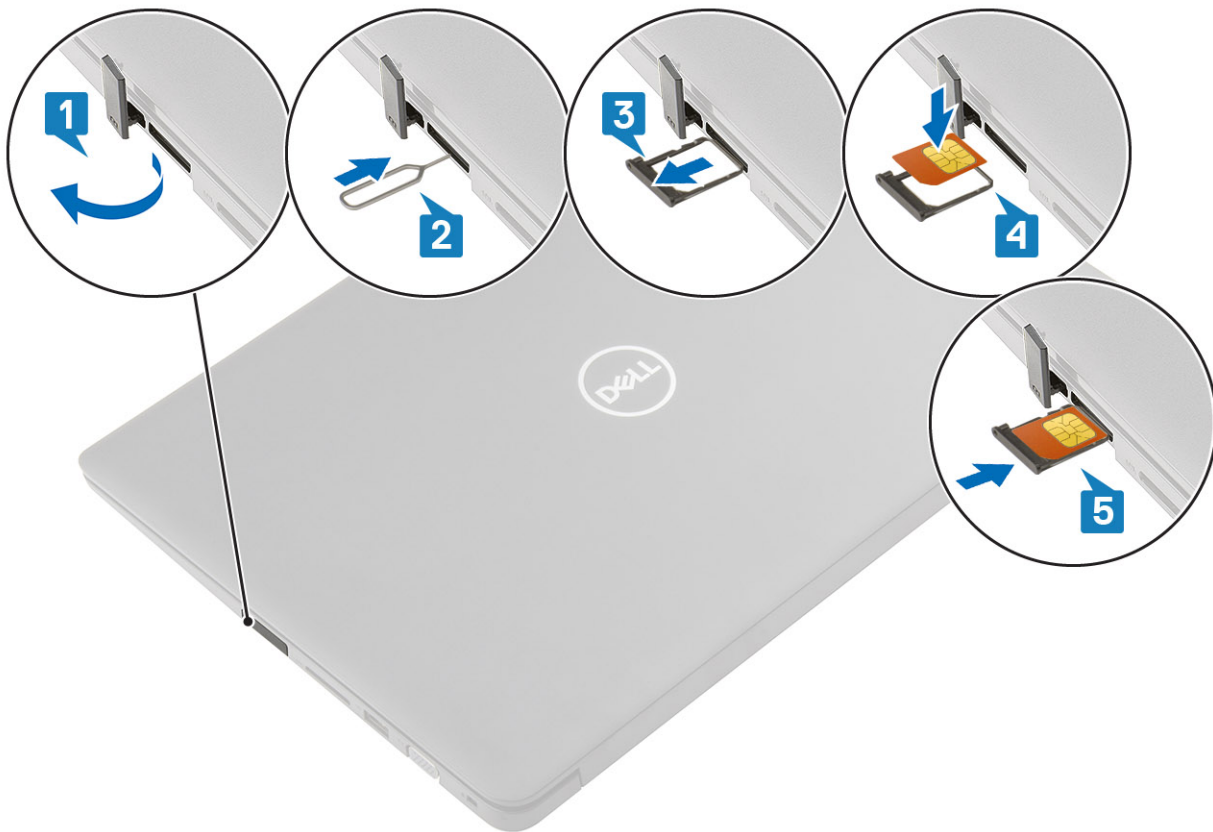
1. Open the latch that covers the SIM card slot to release it from the system [1].
2. Insert a needle in the slot and push it to eject the SIM card tray [2].
3. Pull the SIM card tray and remove the SIM card from the SIM card tray [3] and [4].



Installing the SIM card

Steps

1. Open the latch that covers the SIM card slot to release it from the system [1].
2. Insert a needle in the slot and push it to eject the SIM card tray [2].
3. Pull the SIM card tray and place the SIM card on the SIM card tray [3] and [4].
4. Slide the SIM card tray into the slot until it clicks into place.



5. Follow the procedures in [After working inside your computer](#).

WLAN card

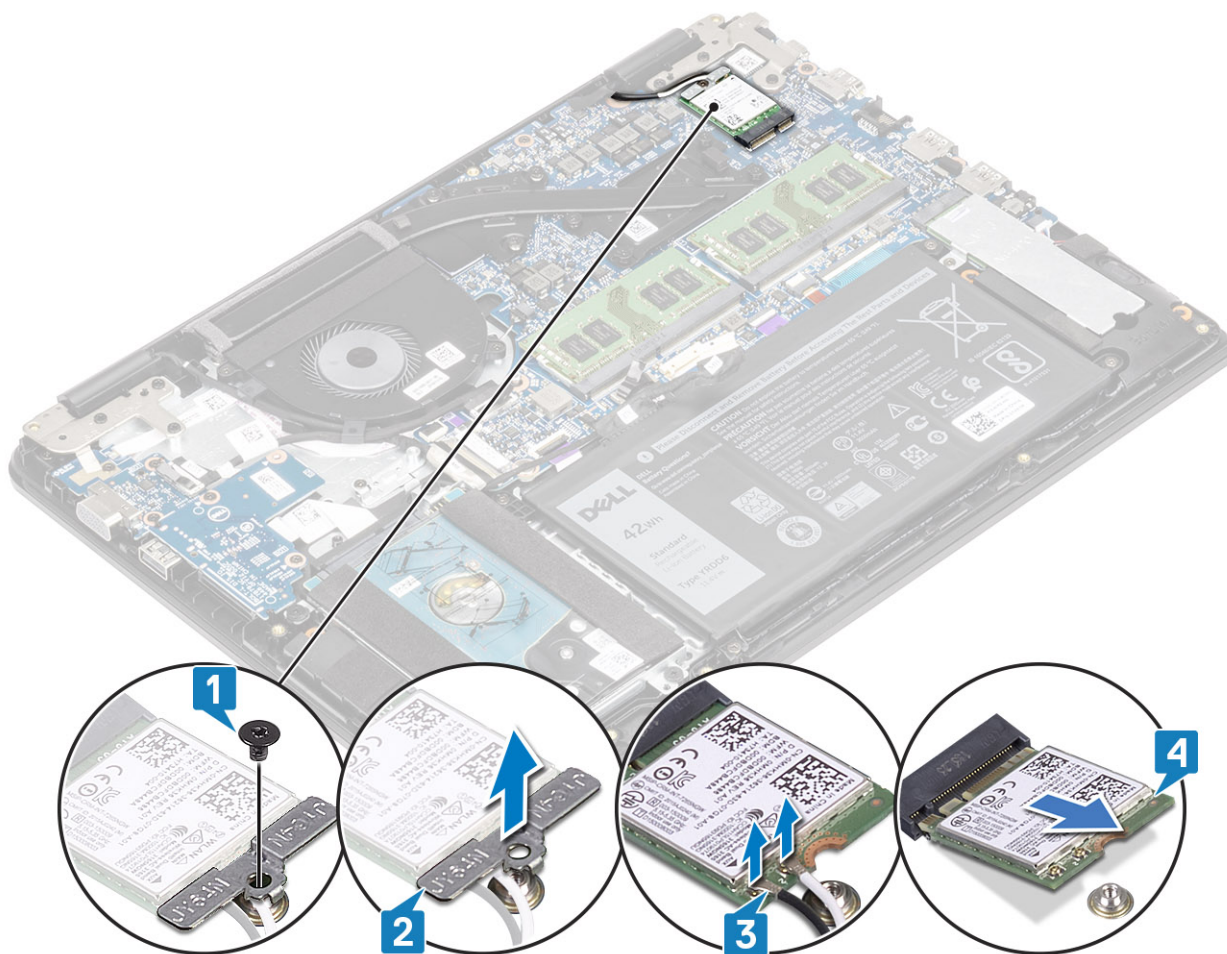
Removing the WLAN card

Prerequisites

1. Follow the procedure in [before working inside your computer](#)
2. Remove the [SD memory card](#)
3. Remove the [base cover](#)
4. Disconnect the [battery](#) cable.

Steps

1. Remove the single (M2x3) screw that secures the WLAN card bracket to the system board [1].
2. Slide and remove the WLAN card bracket that secures the WLAN cables [2].
3. Disconnect the WLAN cables from the connectors on the WLAN card [3].
4. Lift the WLAN card away from the connector [4].



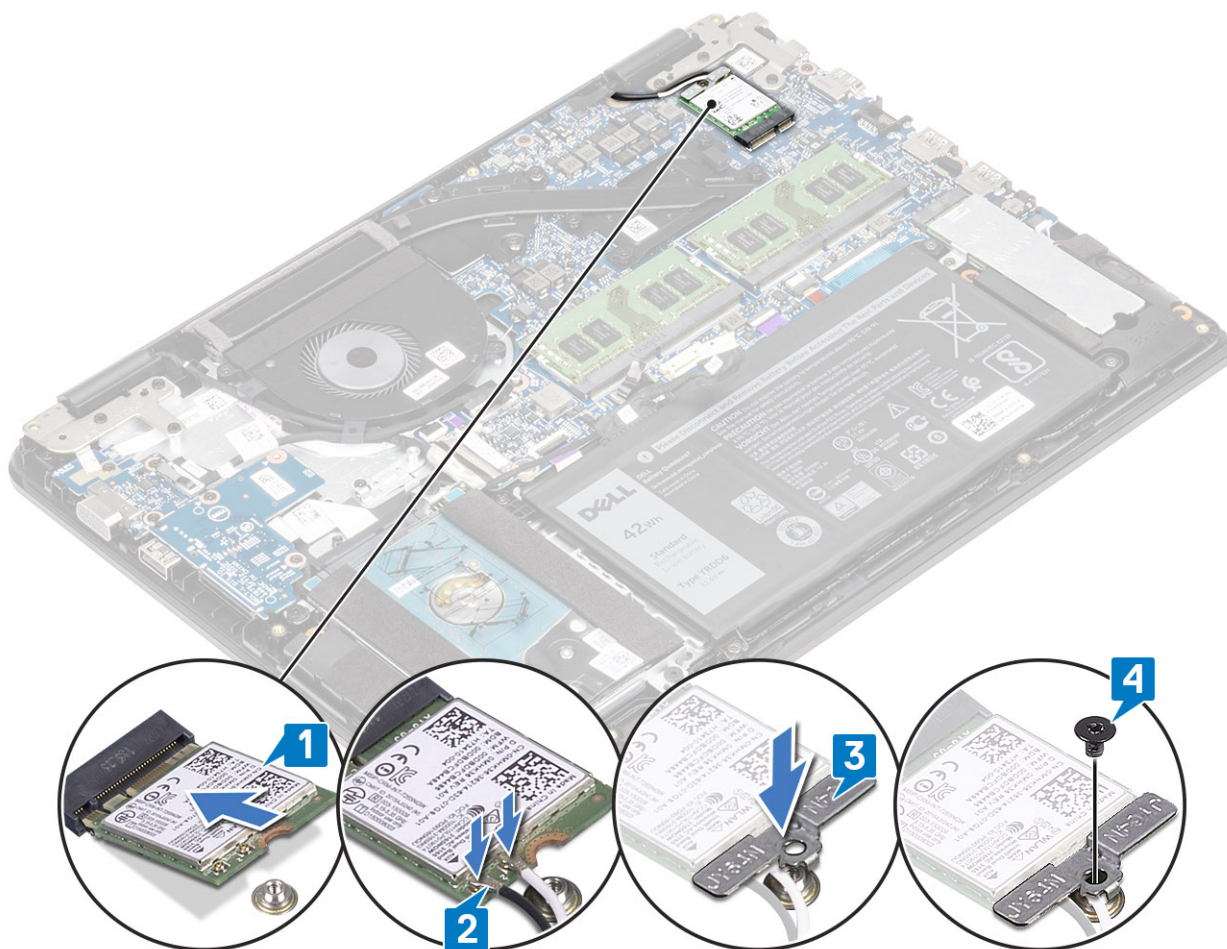
Installing the WLAN card

About this task

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

Steps

1. Insert the WLAN card into the connector on the system board [1].
2. Connect the WLAN cables to the connectors on the WLAN card [2].
3. Place the WLAN card bracket to secure the WLAN cables to the WLAN card [3].
4. Replace the single (M2x3) screw to secure the WLAN bracket to the WLAN card [4].



Next steps

1. Disconnect the [battery](#) cable.
2. Replace the [base cover](#).
3. Replace the [SD memory card](#).
4. Follow the procedure in [after working inside your computer](#).

Solid-state drive/Intel Optane memory module

Removing the M.2 2280 Solid-state drive or Intel Optane memory—Optional

Prerequisites

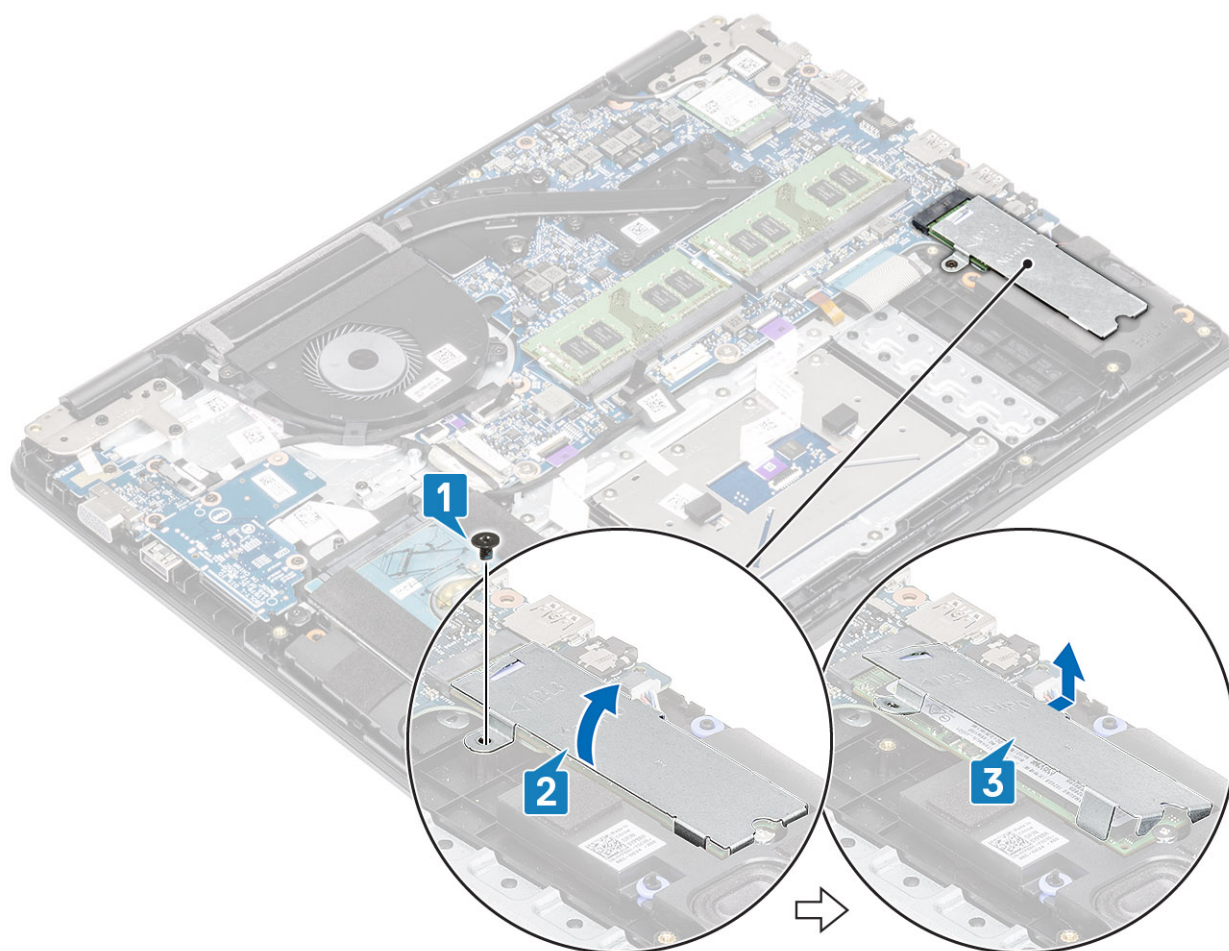
NOTE: Disable the Intel Optane memory before removing the Intel Optane memory module from your computer. For more information about disabling the Intel Optane memory, see [disabling Intel Optane memory](#)

1. Follow the procedure in [before working inside your computer](#)
2. Remove the [SD memory card](#)
3. Remove the [base cover](#)
4. Disconnect the [battery](#) cable.

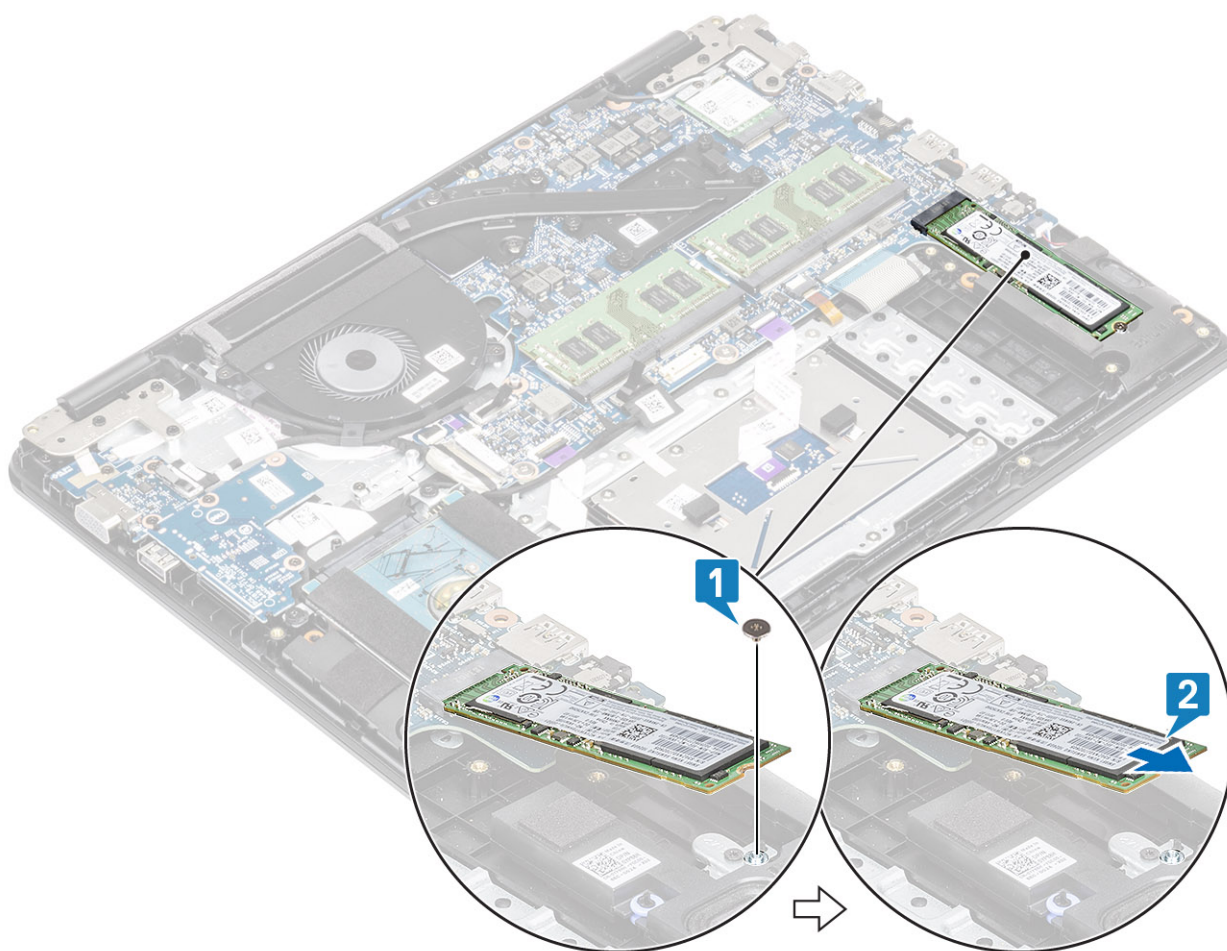
Steps

1. Remove the single (M2x3) screw that secures the thermal plate to the palmrest and keyboard assembly [1].
2. Turn the thermal plate over [2].

3. Slide and remove the thermal plate from the solid-state drive/Intel Optane card slot [3].



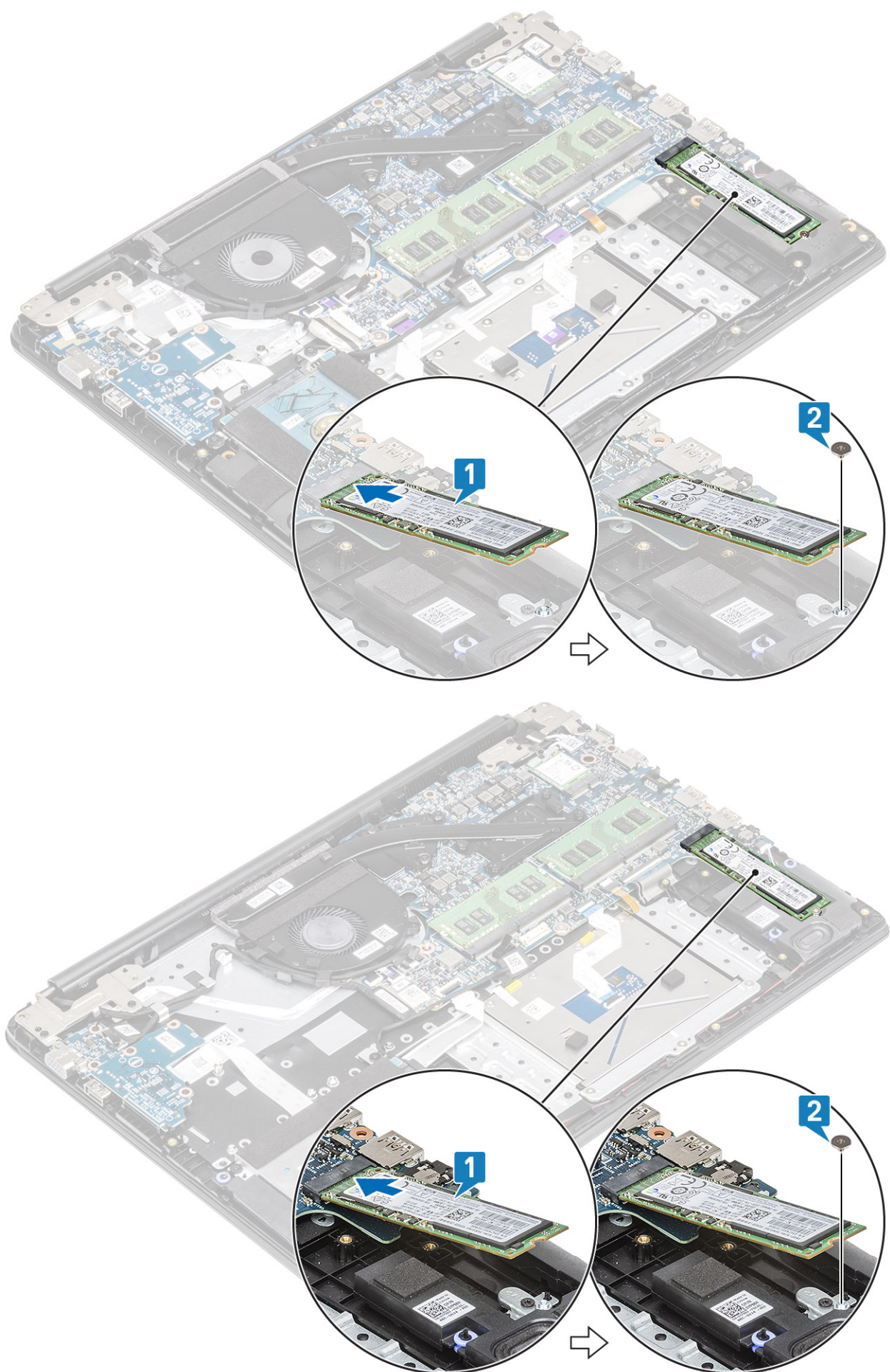
4. Remove the single (M2x2) screw that secures the solid-state drive/Intel Optane card to the palmrest and keyboard assembly [1].
5. Slide and lift the solid-state drive/Intel Optane card off the palmrest and keyboard assembly [2].



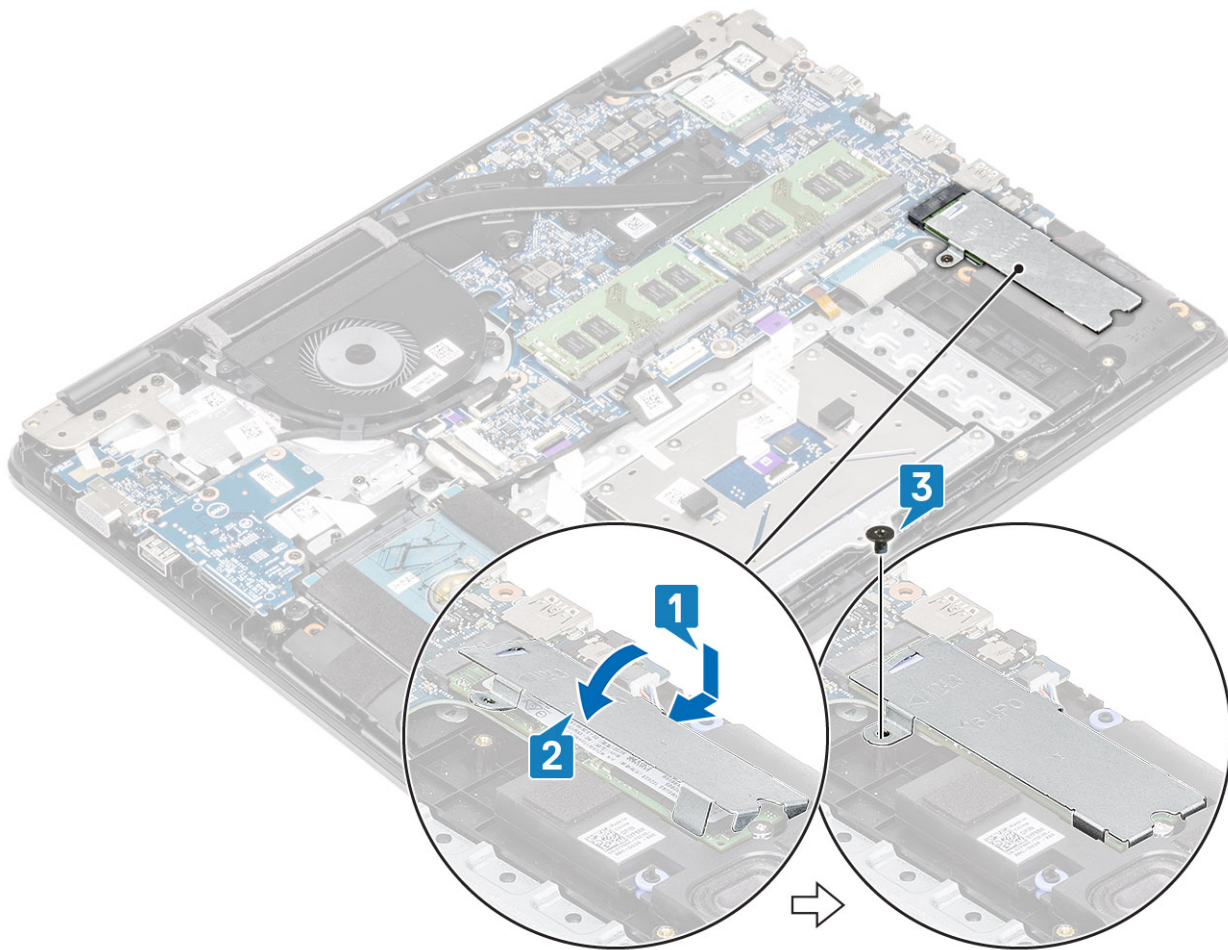
Installing the M.2 2280 Solid-state drive or Intel Optane memory - Optional

Steps

1. Slide and insert the tab solid-state drive/Intel Optane card into the solid-state drive/Intel Optane card slot [1].
2. Replace the single (M2x2) screw that secures the solid-state drive/Intel Optane card to the palmrest and keyboard assembly [2].



3. Align and replace the thermal plate on the solid-state drive/Intel Optane card slot [1,2].
4. Replace the single (M2x3) screw that secures the thermal plate to the palmrest and keyboard assembly [3].



Next steps

1. Replace the [battery cable](#).
2. Replace the [base cover](#)
3. Replace the [SD memory card](#)
4. Follow the procedure in [after working inside your computer](#)

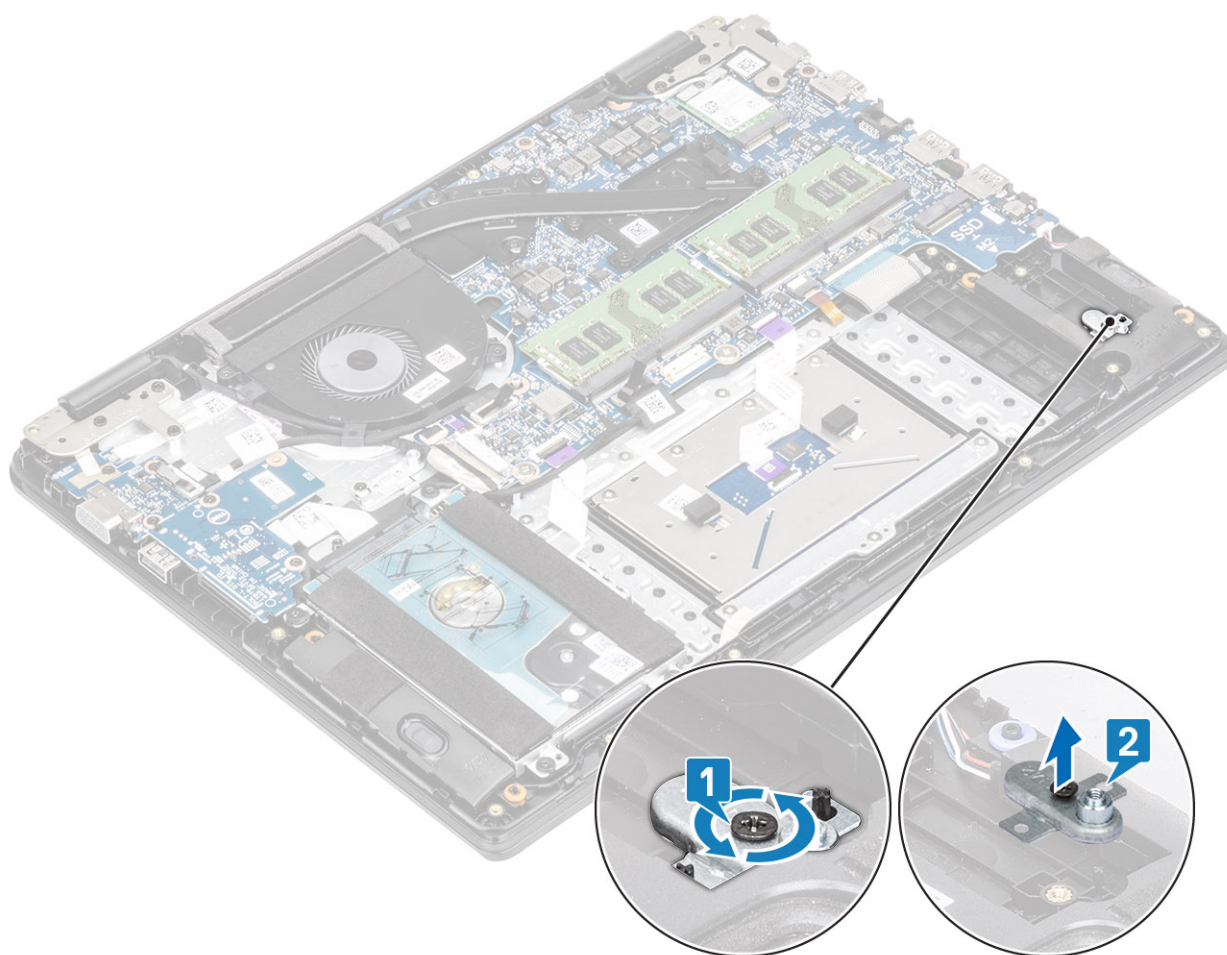
Removing the M.2 Solid-state drive bracket

Prerequisites

1. Follow the procedure in [before working inside your computer](#)
2. Remove the [SD memory card](#)
3. Remove the [base cover](#)
4. Disconnect the [battery cable](#)

Steps

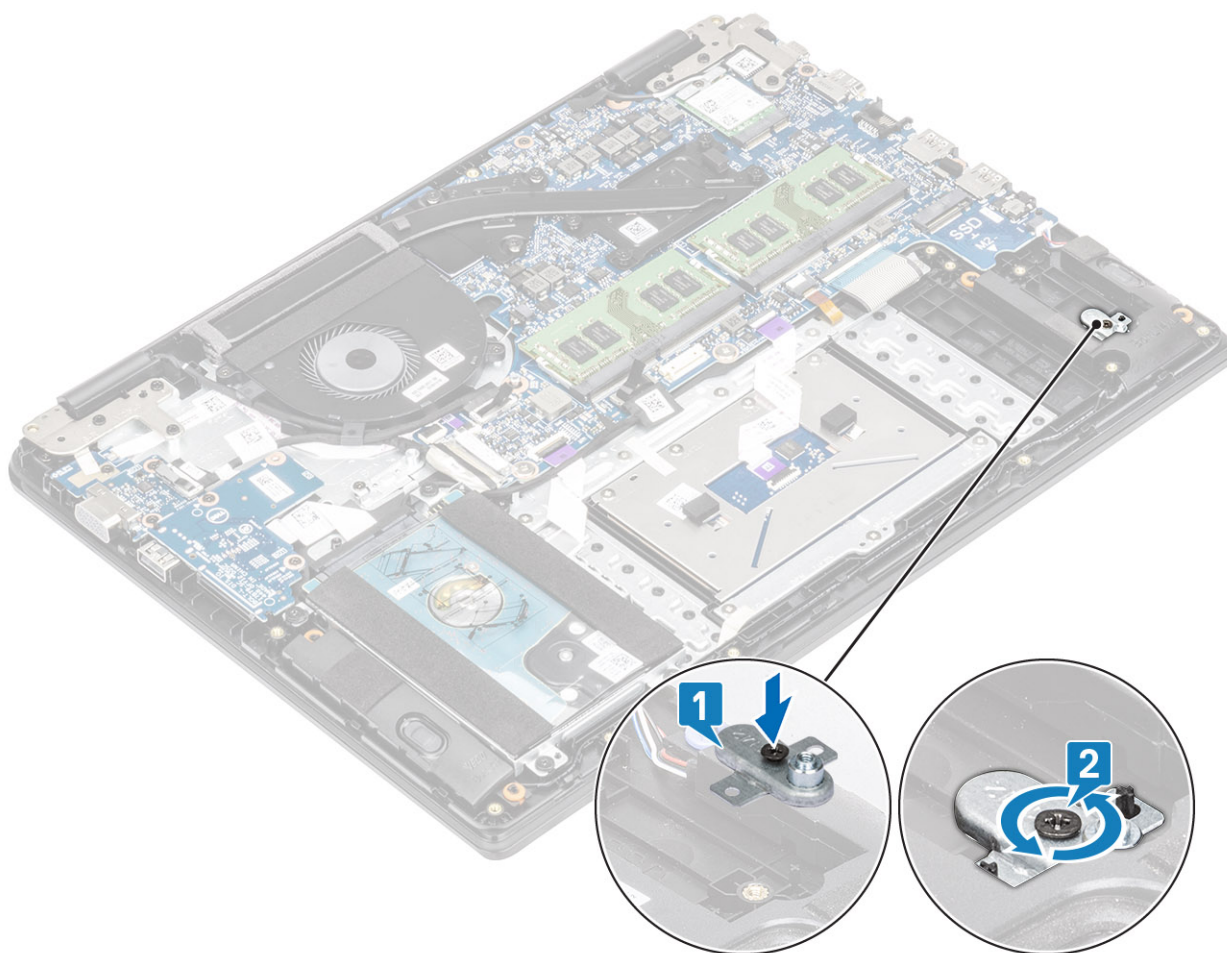
1. Remove the single (M2x3) screw that secures the solid-state drive bracket to the palmrest and keyboard assembly [1].
2. Remove the solid-state drive bracket from the palmrest and keyboard assembly [2].



Installing the Solid-state drive bracket

Steps

1. Align and replace the solid-state drive bracket on the palmrest and keyboard assembly [1].
2. Replace the single (M2x3) screw that secures the solid-state drive bracket to the palmrest and keyboard assembly [2].



Next steps

1. Replace the [battery](#) cable.
2. Replace the [base cover](#)
3. Replace the [SD memory card](#)
4. Follow the procedure in [after working inside your computer](#)

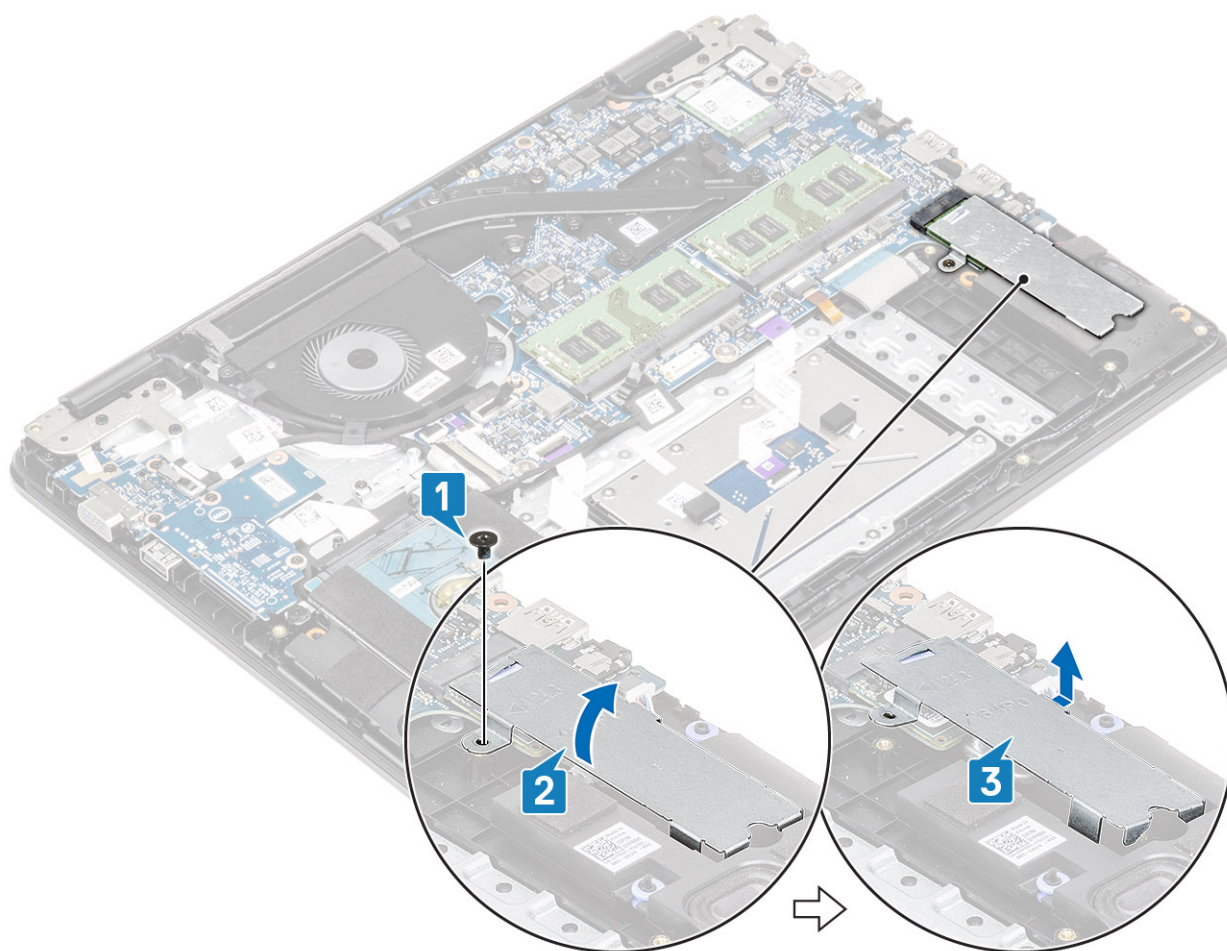
Removing the M.2 2230 Solid-state drive

Prerequisites

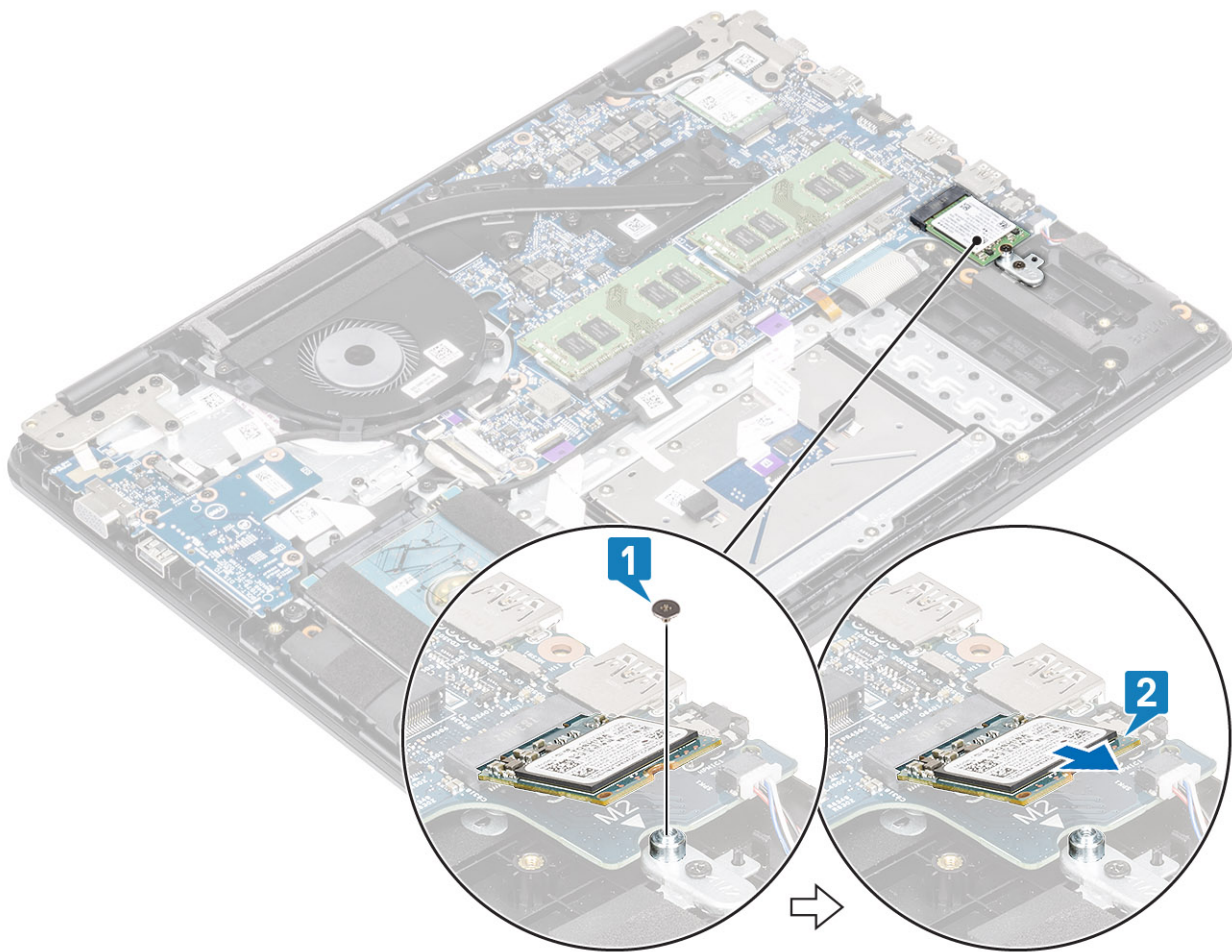
1. Follow the procedure in [before working inside your computer](#)
2. Remove the [SD memory card](#)
3. Remove the [base cover](#)
4. Disconnect the [battery](#) cable

Steps

1. Remove the single (M2x3) screw that secures the thermal plate to the palmrest and keyboard assembly [1].
2. Turn the thermal plate over [2].
3. Slide and remove the thermal plate from the solid-state drive slot [3].



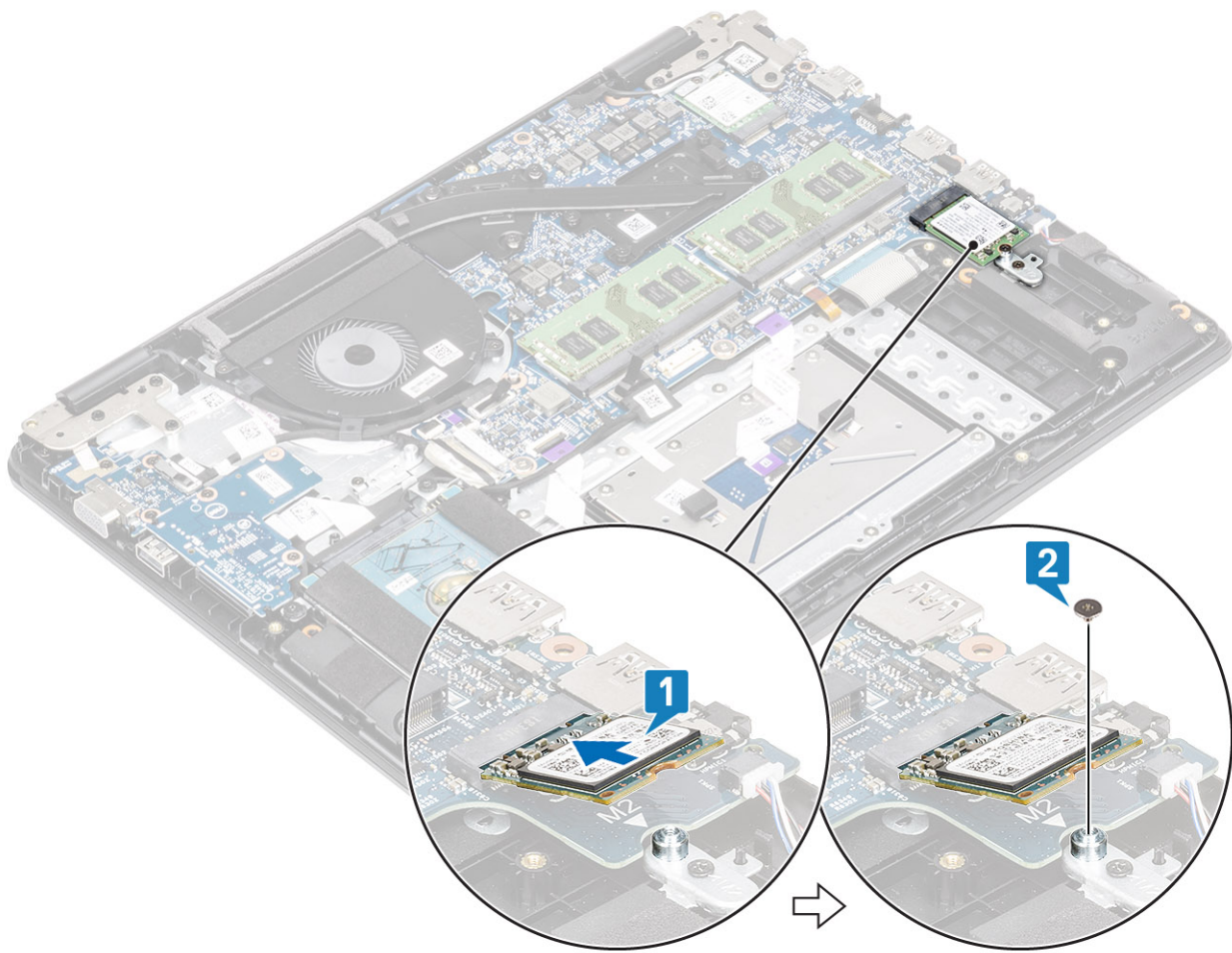
4. Remove the single (M2x2) screw that secures the solid-state drive to the solid-state drive bracket [1].
5. Slide and remove the solid-state drive off the solid-state drive slot [2].



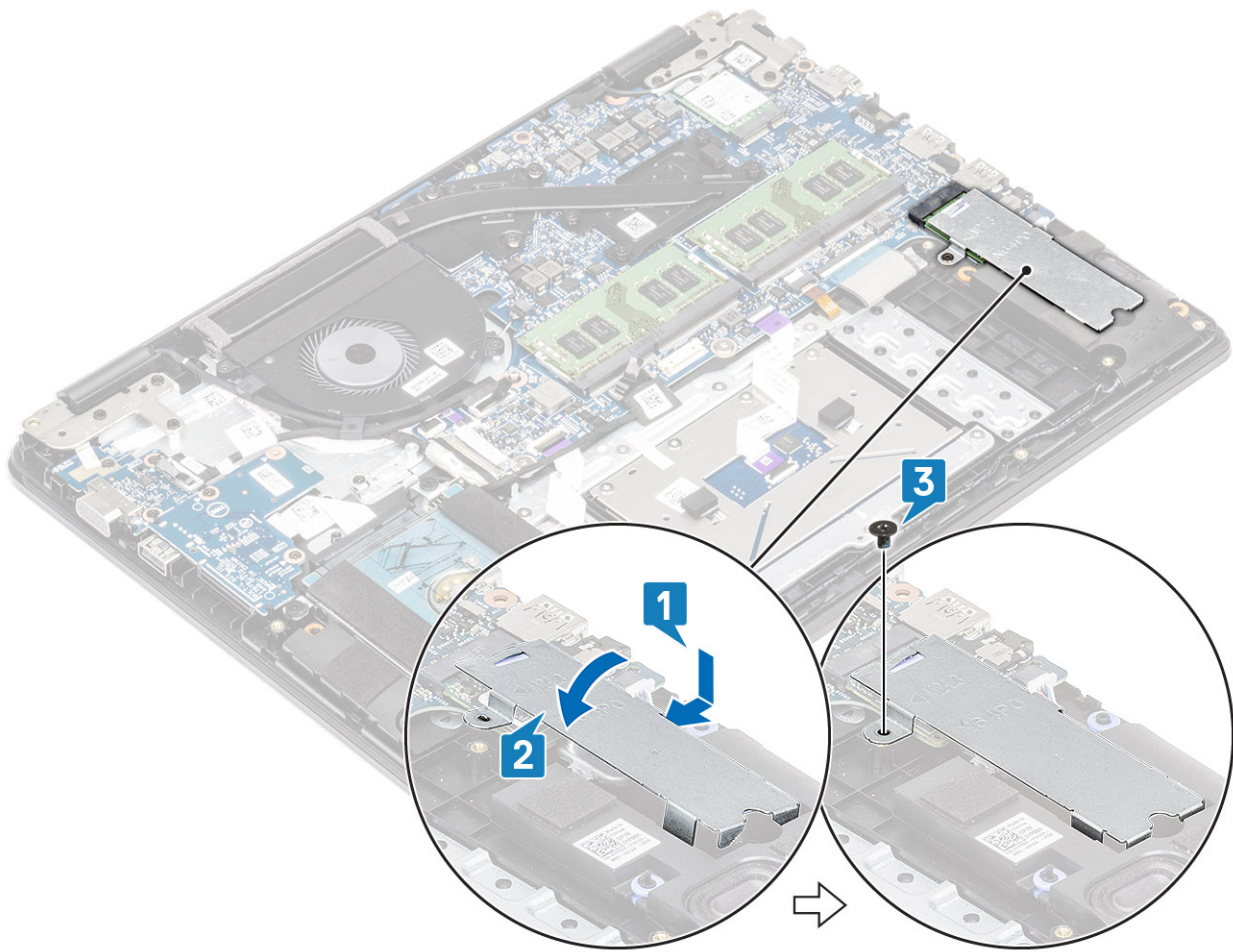
Installing the M.2 2230 Solid-state drive

Steps

1. Insert the solid-state drive into the solid-state drive slot on the system board [1].
2. Replace the single (M2x3) screw that secures the solid-state drive to the solid-state drive bracket [2].



3. Align and replace the thermal plate on the solid-state drive [1,2].
4. Replace the single (M2x3) screw that secures the thermal plate to the palmrest and keyboard assembly [3].



Next steps

1. Replace the [battery cable](#).
2. Replace the [base cover](#)
3. Replace the [SD memory card](#)
4. Follow the procedure in [after working inside your computer](#)

Speakers

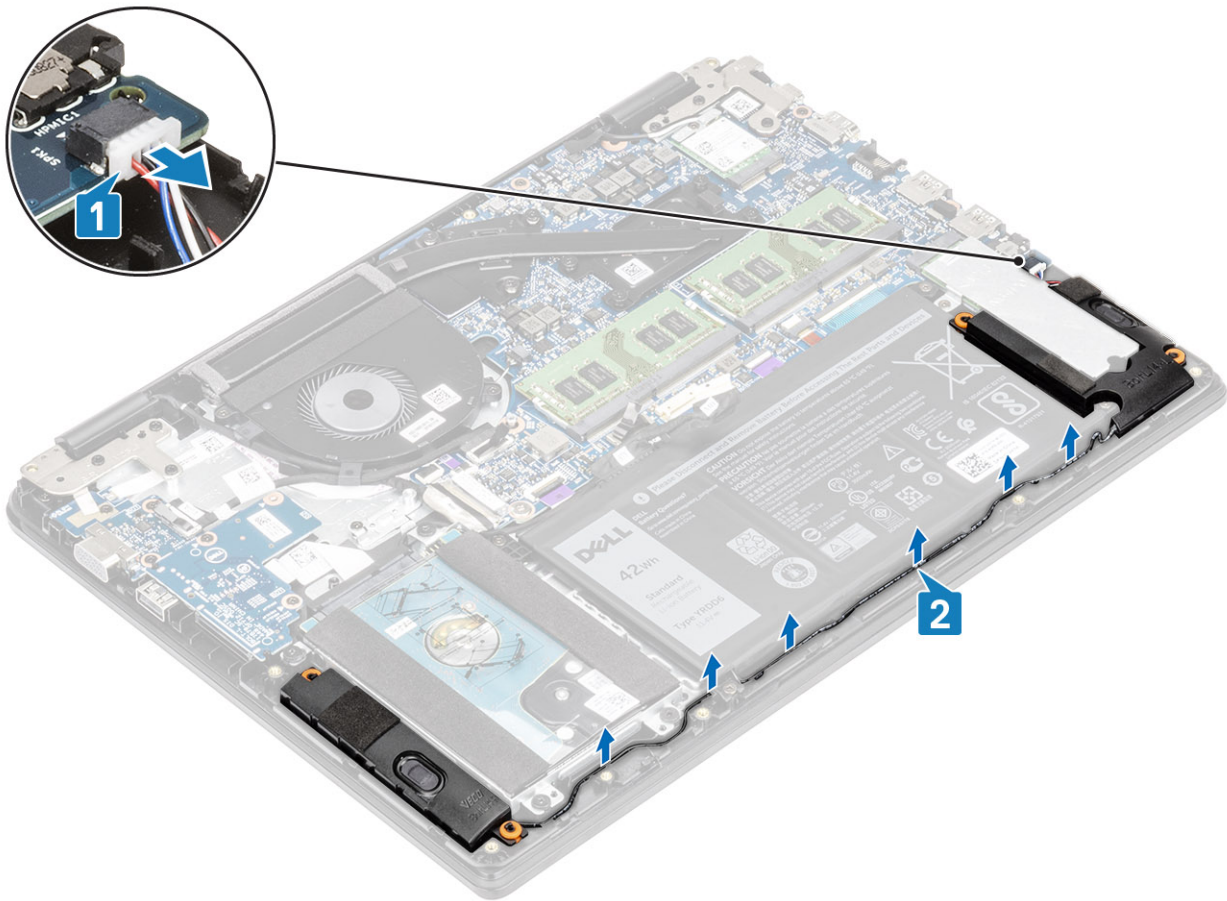
Removing the speakers

Prerequisites

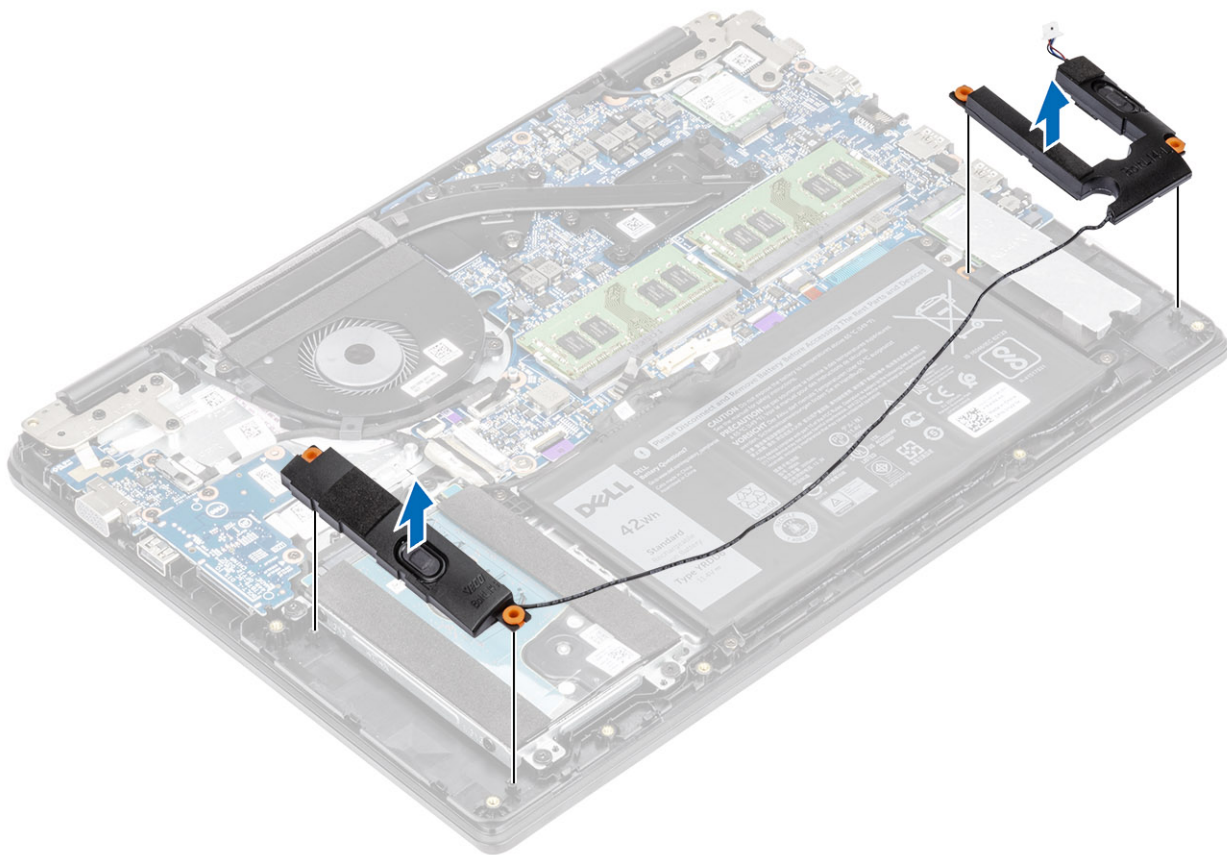
1. Follow the procedure in [before working inside your computer](#)
2. Remove the [SD memory card](#)
3. Remove the [base cover](#)
4. Disconnect the [battery cable](#).

Steps

1. Disconnect the speaker cable from the system board [1].
2. Unroute and remove the speaker cable from the routing guides on palm rest and keyboard assembly [2].



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



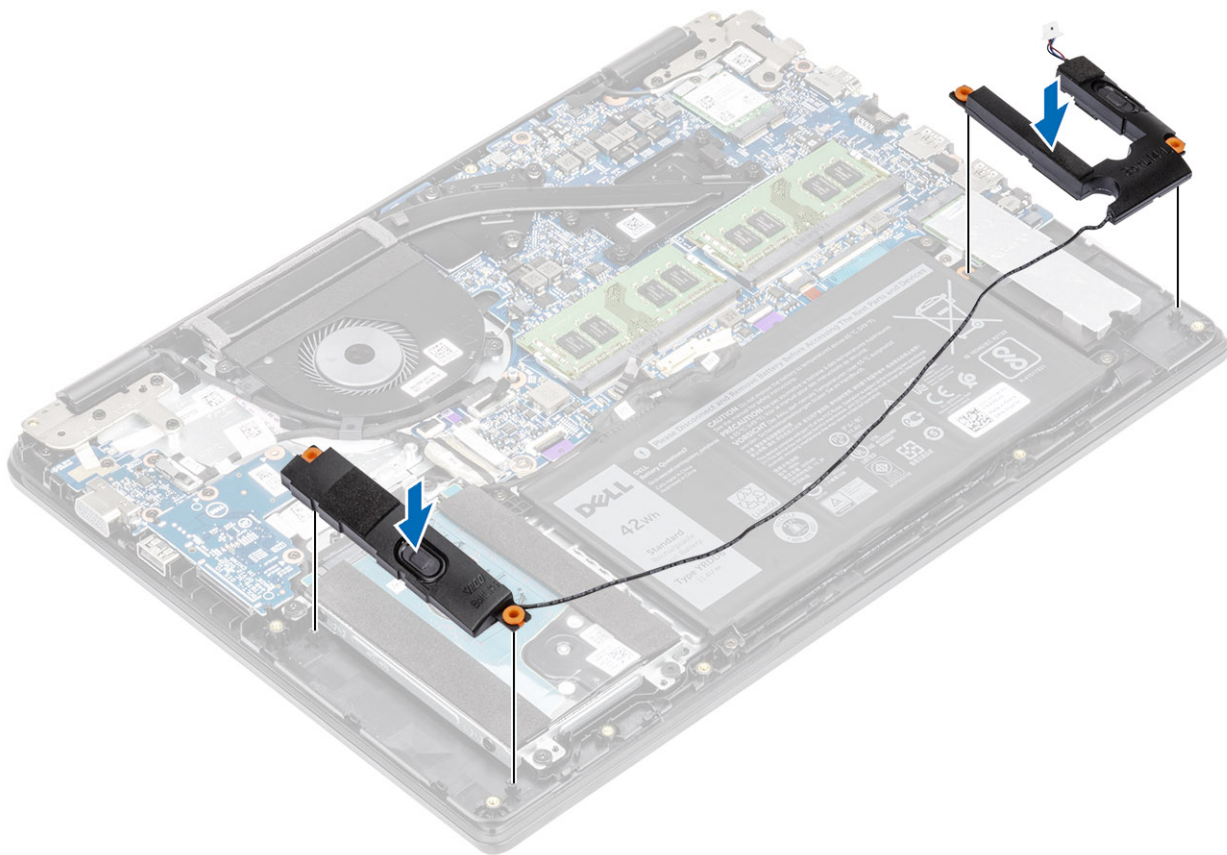
Installing the speakers

About this task

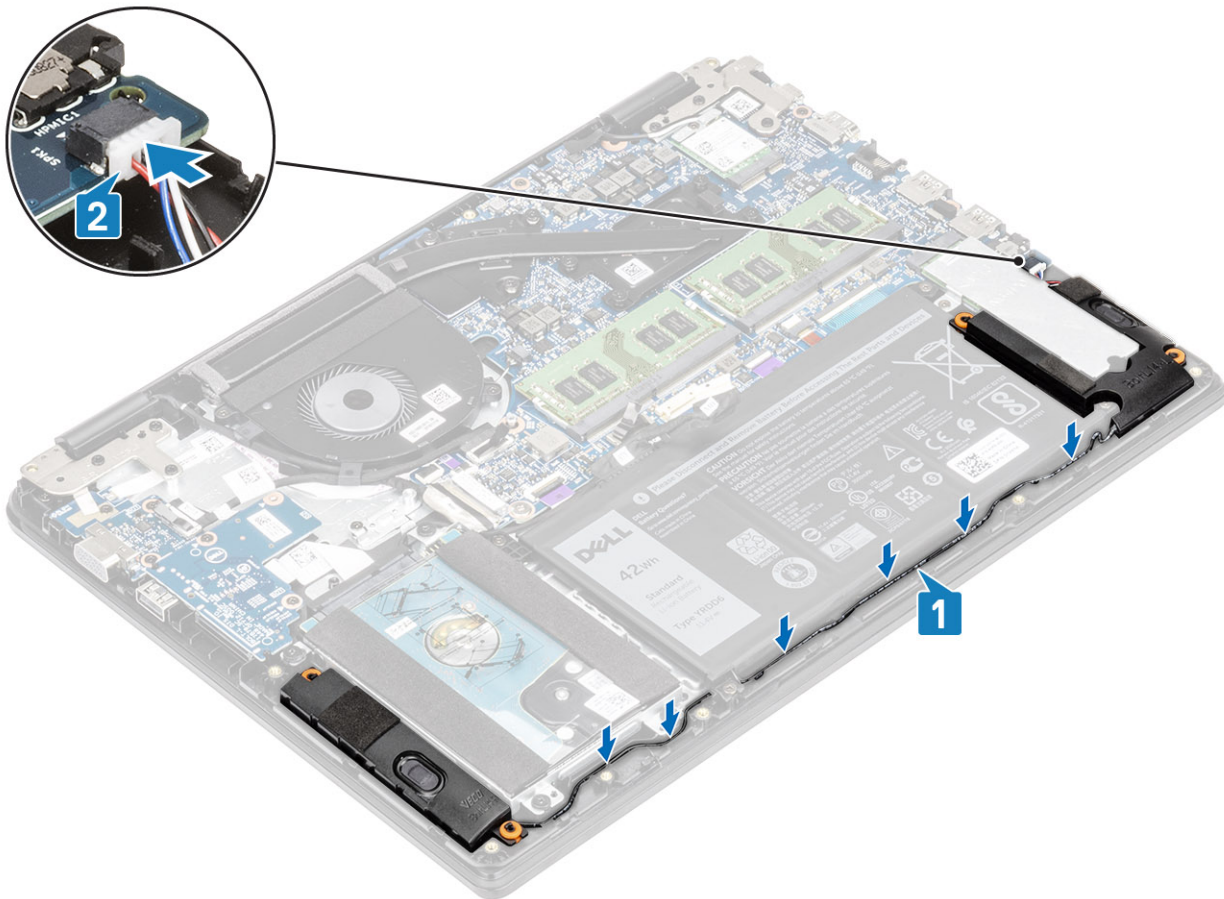
NOTE: If the rubber grommets are pushed out when removing the speakers, push them back in before replacing the speakers.

Steps

1. Using the alignment posts and rubber grommets, place the speakers in the slots on the palm rest and keyboard assembly.



2. Route the speaker cable through the routing guides on the palm rest and keyboard assembly [1].
3. Connect the speaker cable to the system board [2].



Next steps

1. Replace the [battery cable](#).
2. Replace the [base cover](#)
3. Replace the [SD memory card](#)
4. Follow the procedure in [after working inside your computer](#)

System fan

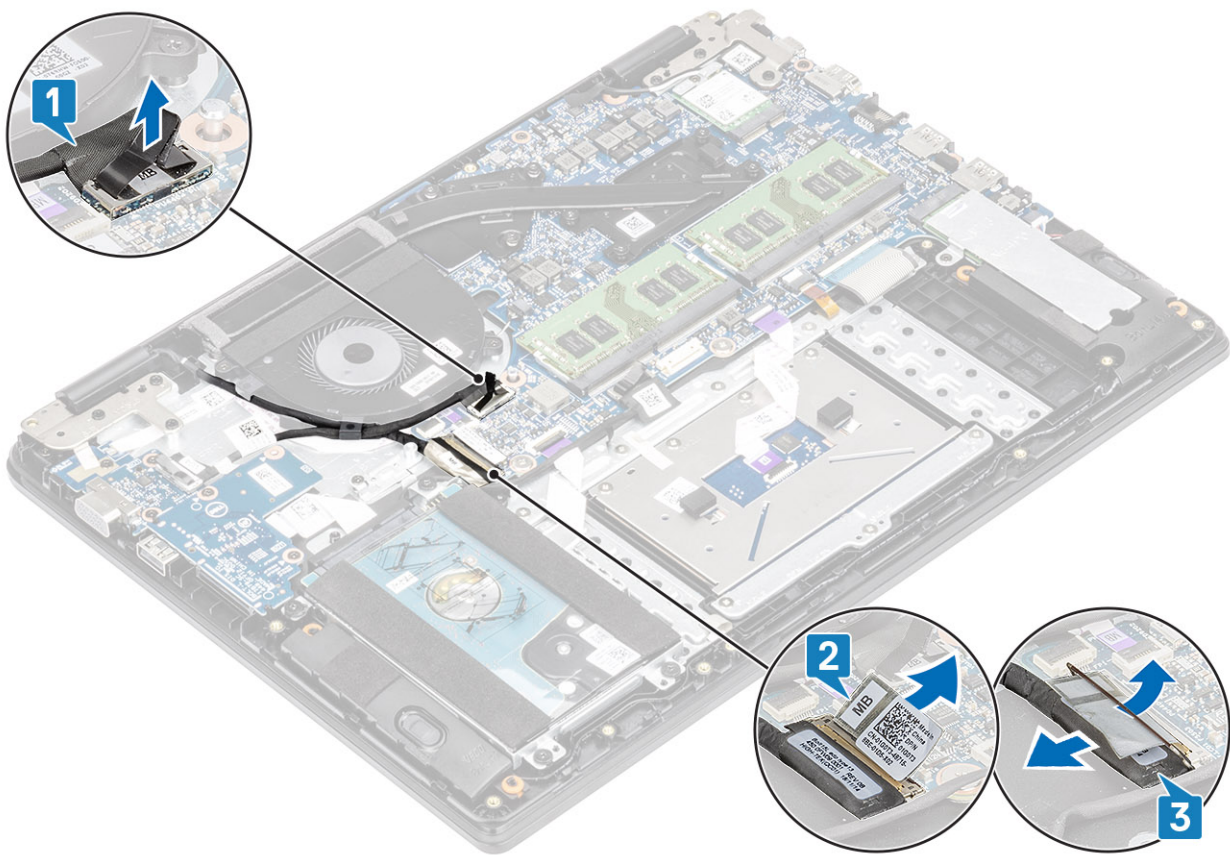
Removing the system fan

Prerequisites

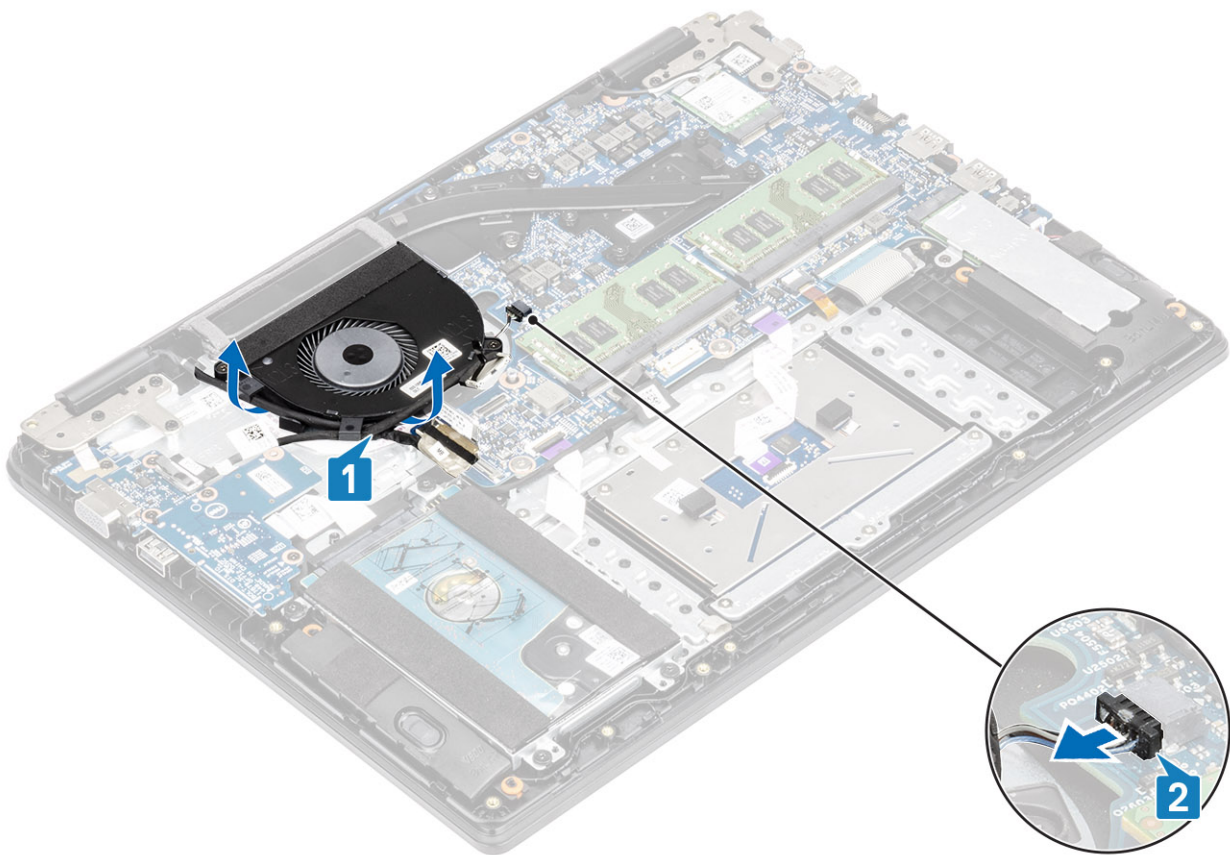
1. Follow the procedure in [before working inside your computer](#).
2. Remove the [SD memory card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).

Steps

1. Disconnect the VGA board cable [1], and the display cable [2, 3] from the system board .

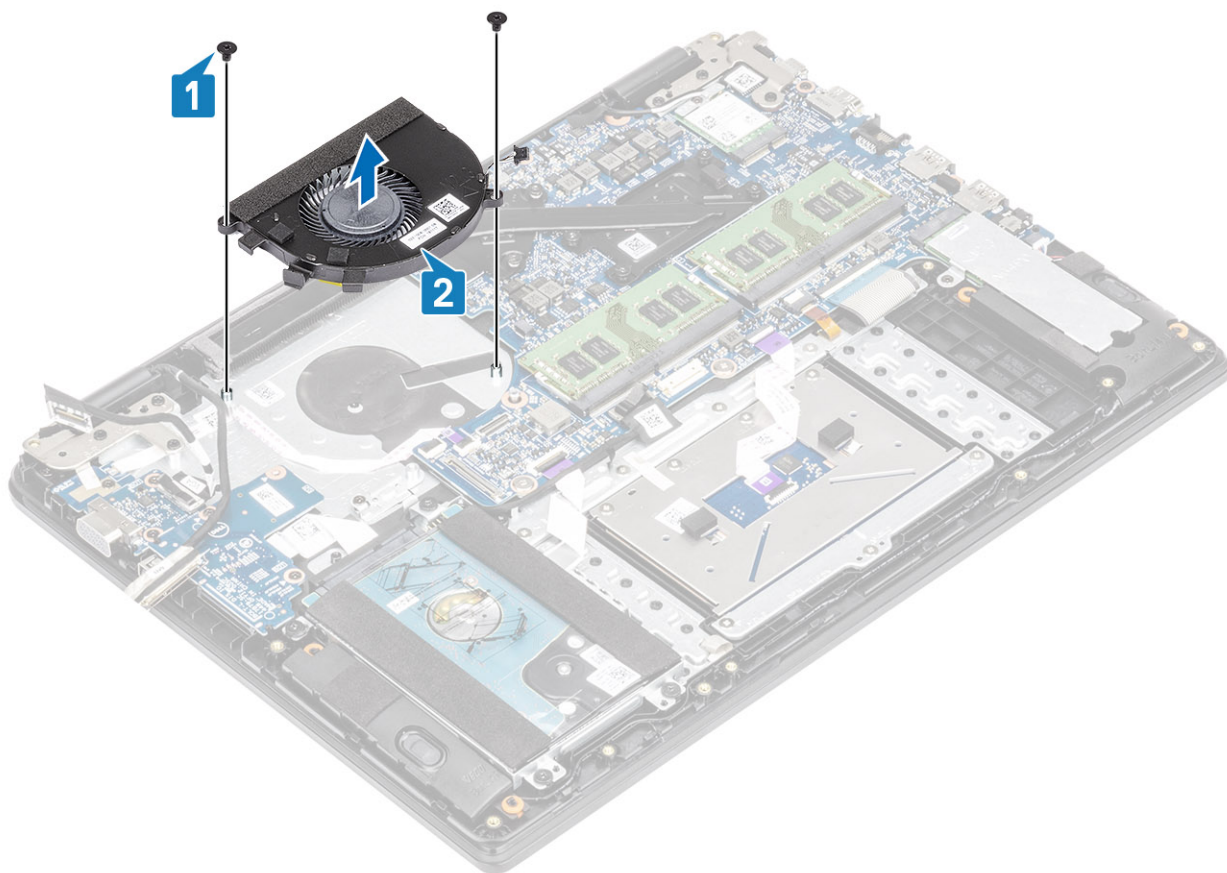


2. Unroute the VGA board cable and the display cable from the routing guides on the fan [1].
3. Disconnect the fan cable from the system board [2].



4. Remove the two (M2x3) screws that secure the fan to the palmrest and keyboard board assembly [1].

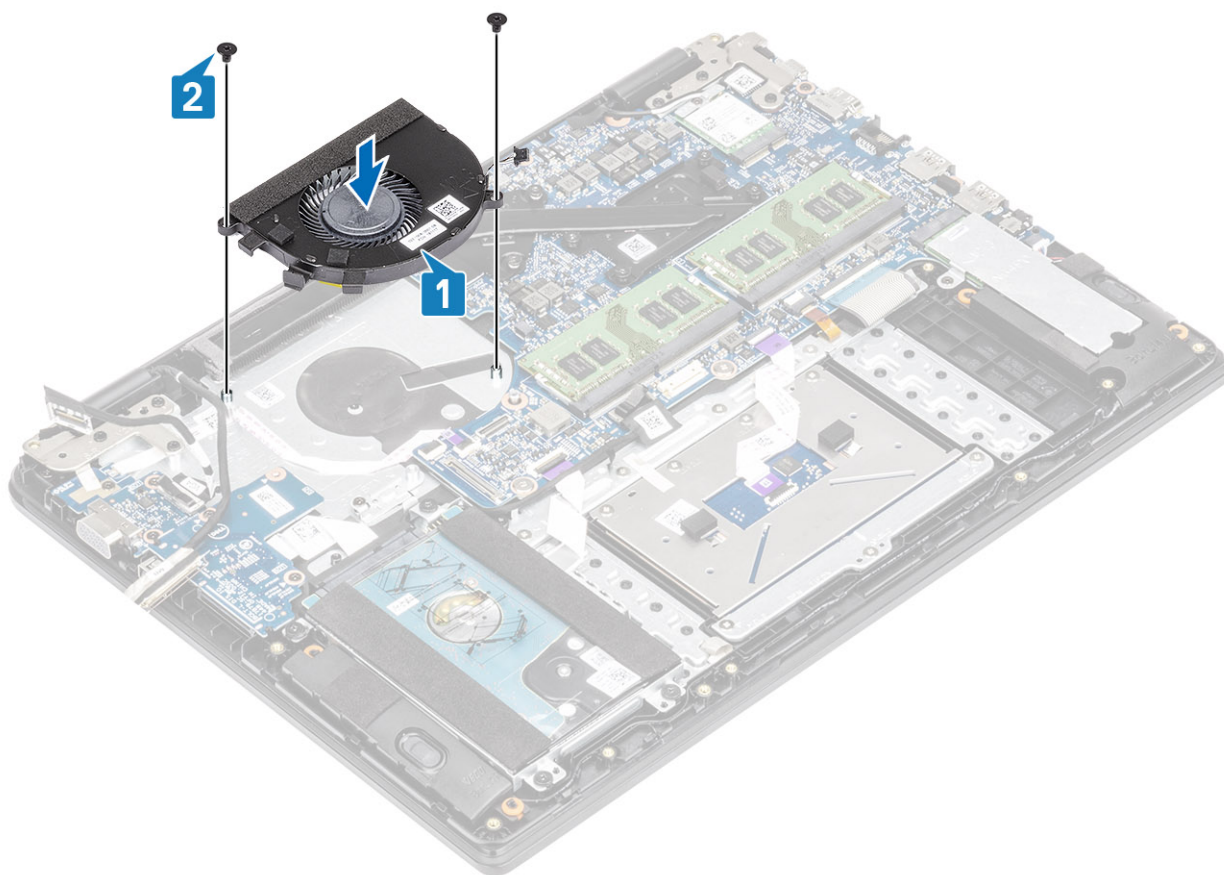
5. Lift the fan off the palmrest and keyboard board assembly [2].



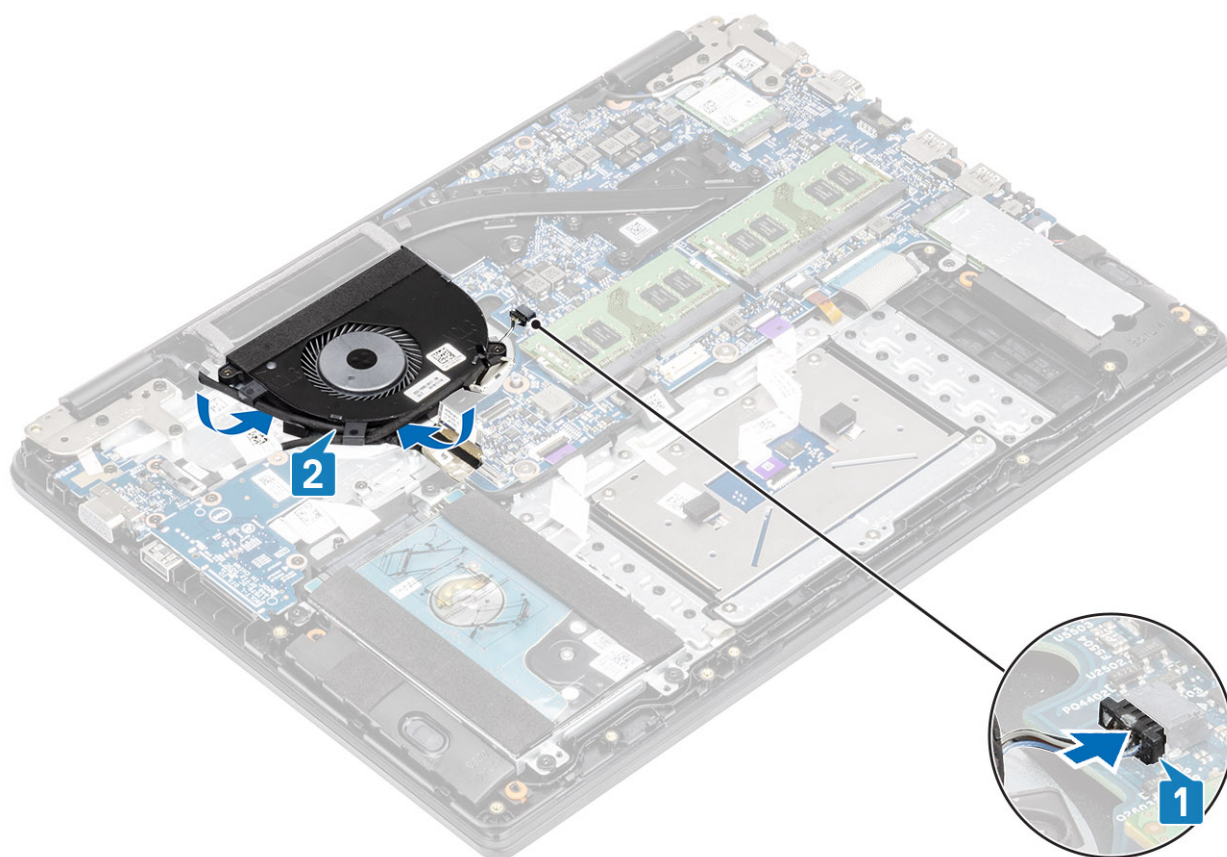
Installing the system fan

Steps

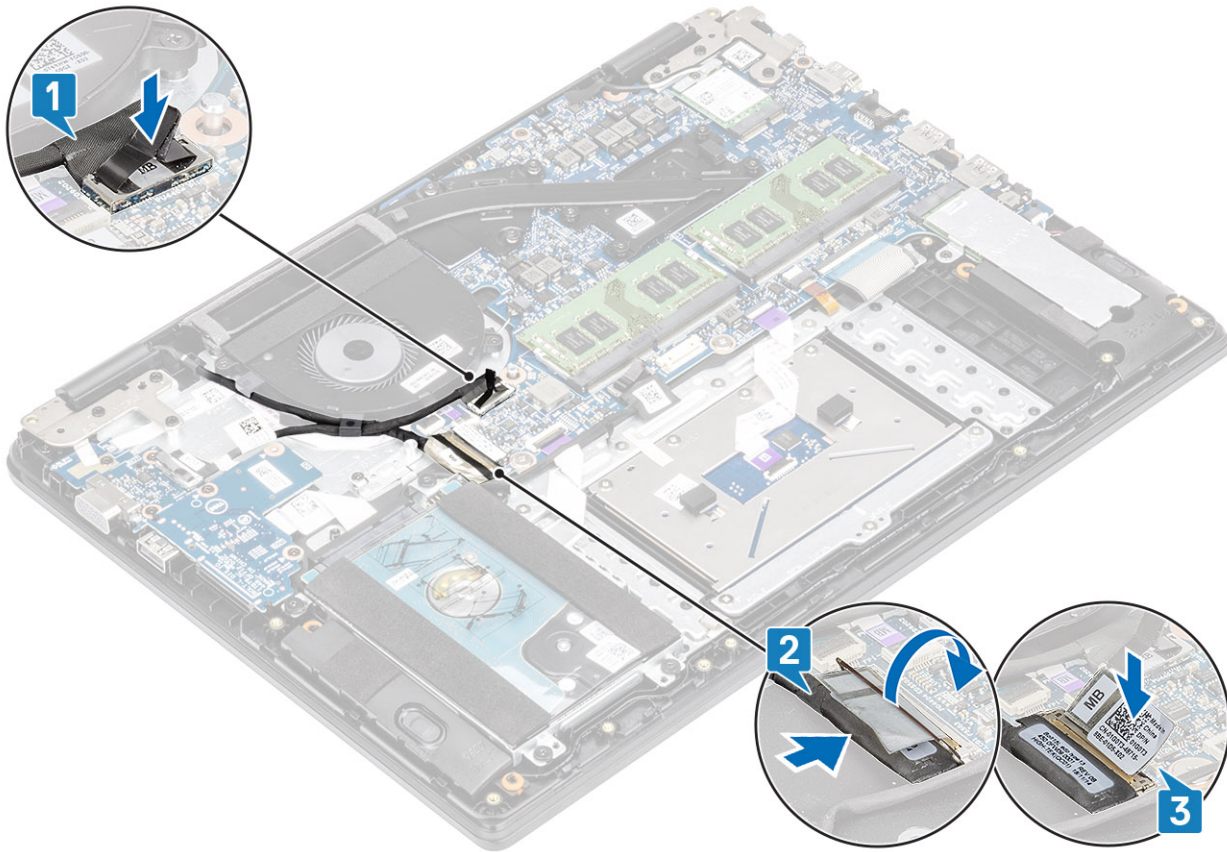
1. Align the screw holes on the fan with the screw holes on to the palm rest and keyboard board assembly [1].
2. Replace the two (M2x3) screws that secure the fan to the palm rest and keyboard board assembly [2].



3. Connect the fan cable to the system board [1].
4. Route the VGA board cable and the display cable through the routing guides on the fan [2].



5. Connect the VGA board cable [1], and the display cable [2, 3] to the system board.



Next steps

1. Replace the [battery](#).
2. Replace the [base cover](#).
3. Replace the [SD memory card](#).
4. Follow the procedure in [after working inside your computer](#).

Heat sink

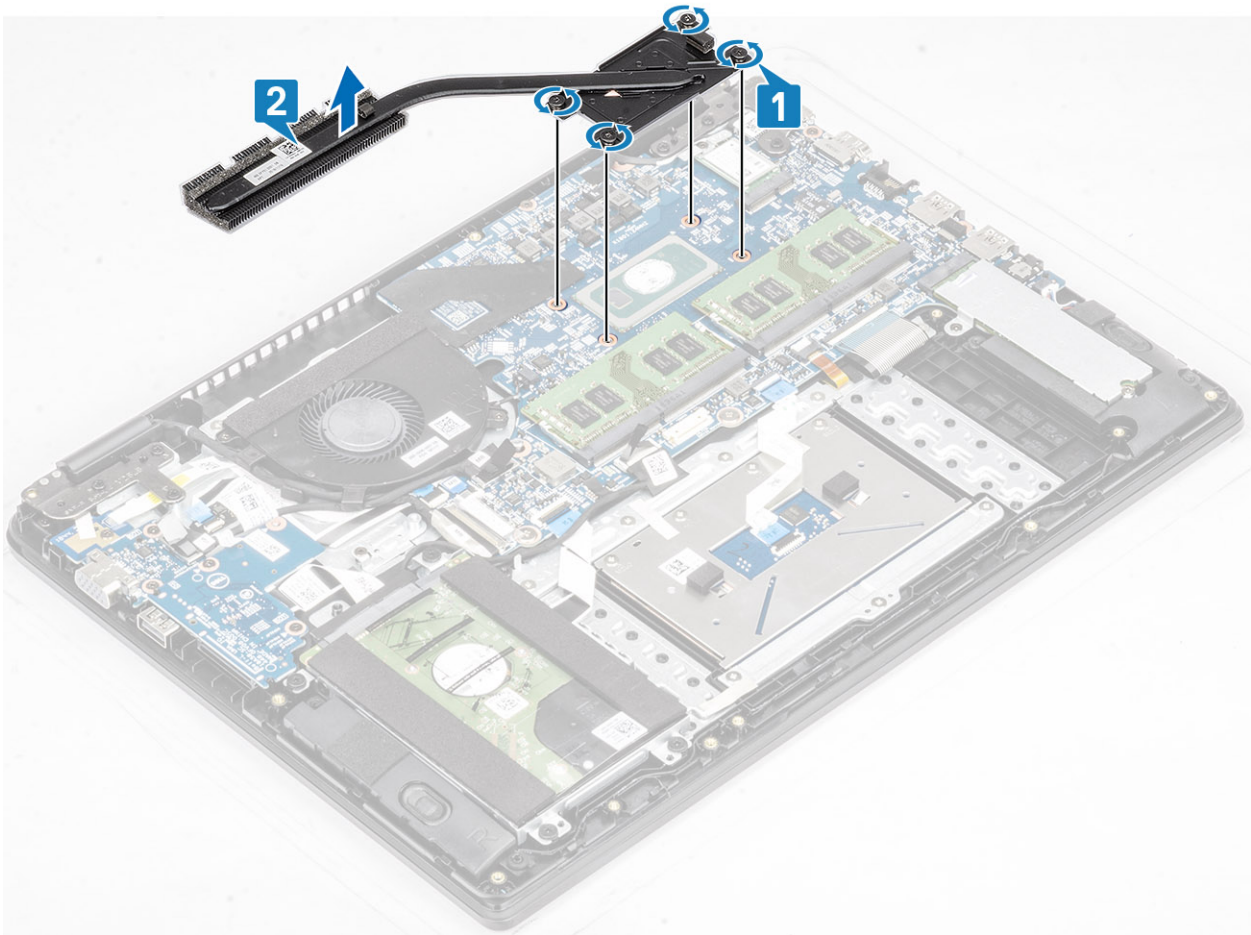
Removing the heatsink—UMA

Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [SD memory card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).

Steps

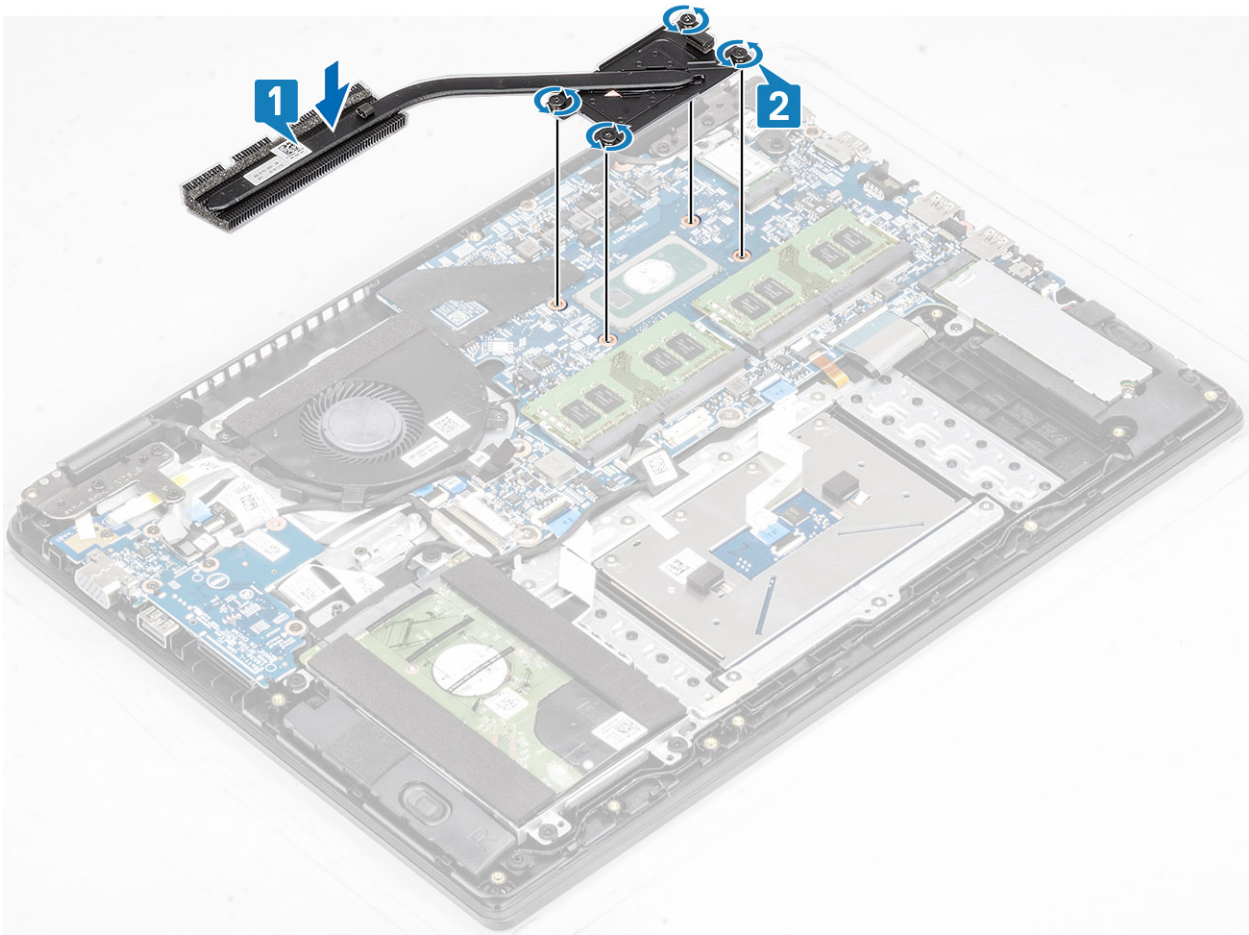
1. Loosen the four captive screws that secure the heatsink to the system board [1].
NOTE: Loosen the screws in the order of the callout numbers [1, 2, 3, 4] as indicated on the heatsink.
2. Lift the heatsink off the system board [2].



Installing the heatsink—UMA

Steps

1. Place the heatsink on the system board and align the screw holes on the heatsink with the screw holes on the system board [1].
2. In sequential order (as indicated on the heatsink), tighten the four captive screws that secure the heatsink to the system board [2].



Next steps

1. Replace the [battery](#)
2. Replace the [base cover](#)
3. Replace the [SD memory card](#)
4. Follow the procedure in [after working inside your computer](#)

Removing the heatsink—discrete

Prerequisites

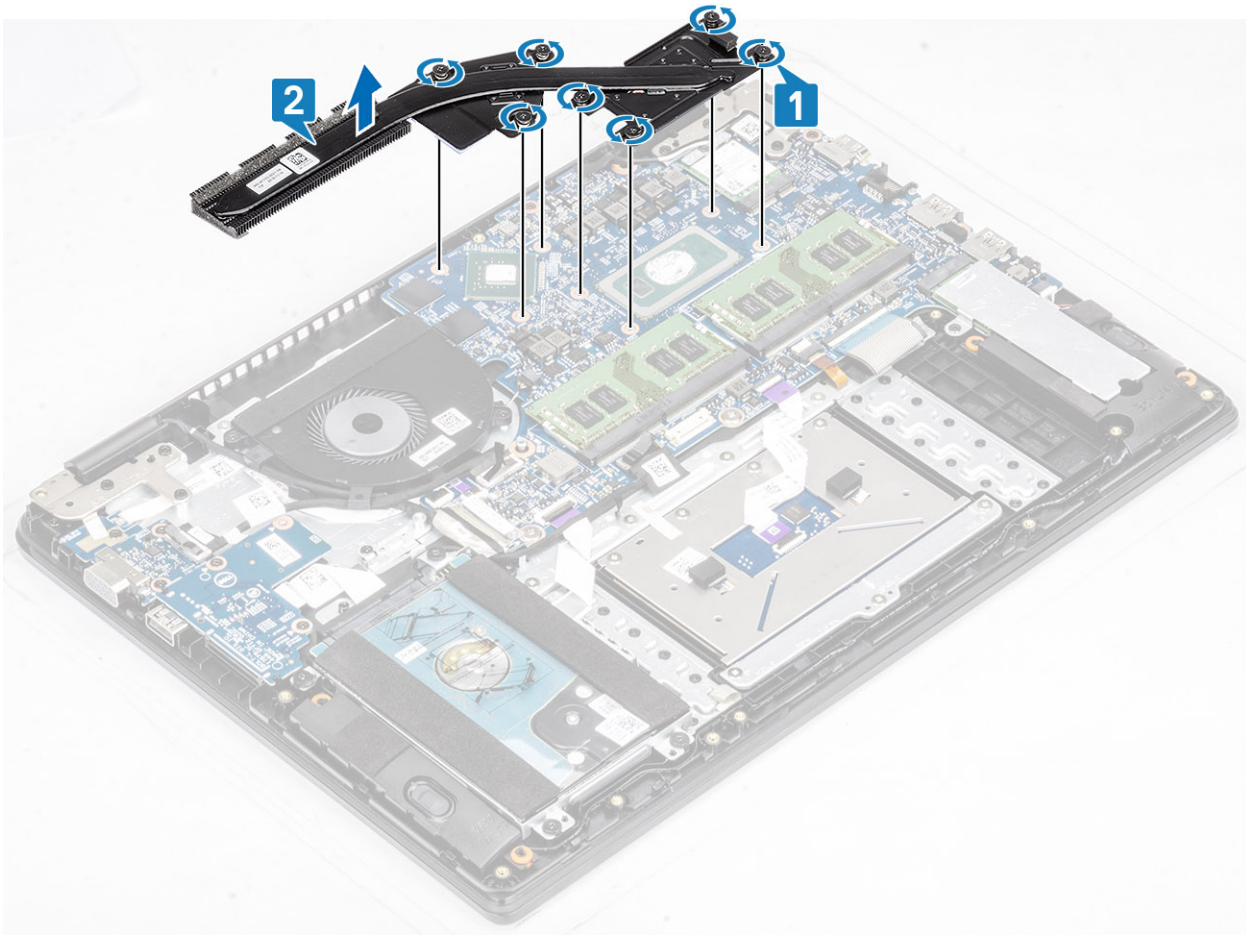
1. Follow the procedure in [before working inside your computer](#)
2. Remove the [SD memory card](#)
3. Remove the [base cover](#)
4. Remove the [battery](#)

Steps

1. Loosen the seven captive screws that secure the heatsink to the system board [1].

NOTE: Loosen the screws in the order of the callout numbers [1, 2, 3, 4, 5, 6, 7] as indicated on the heatsink.

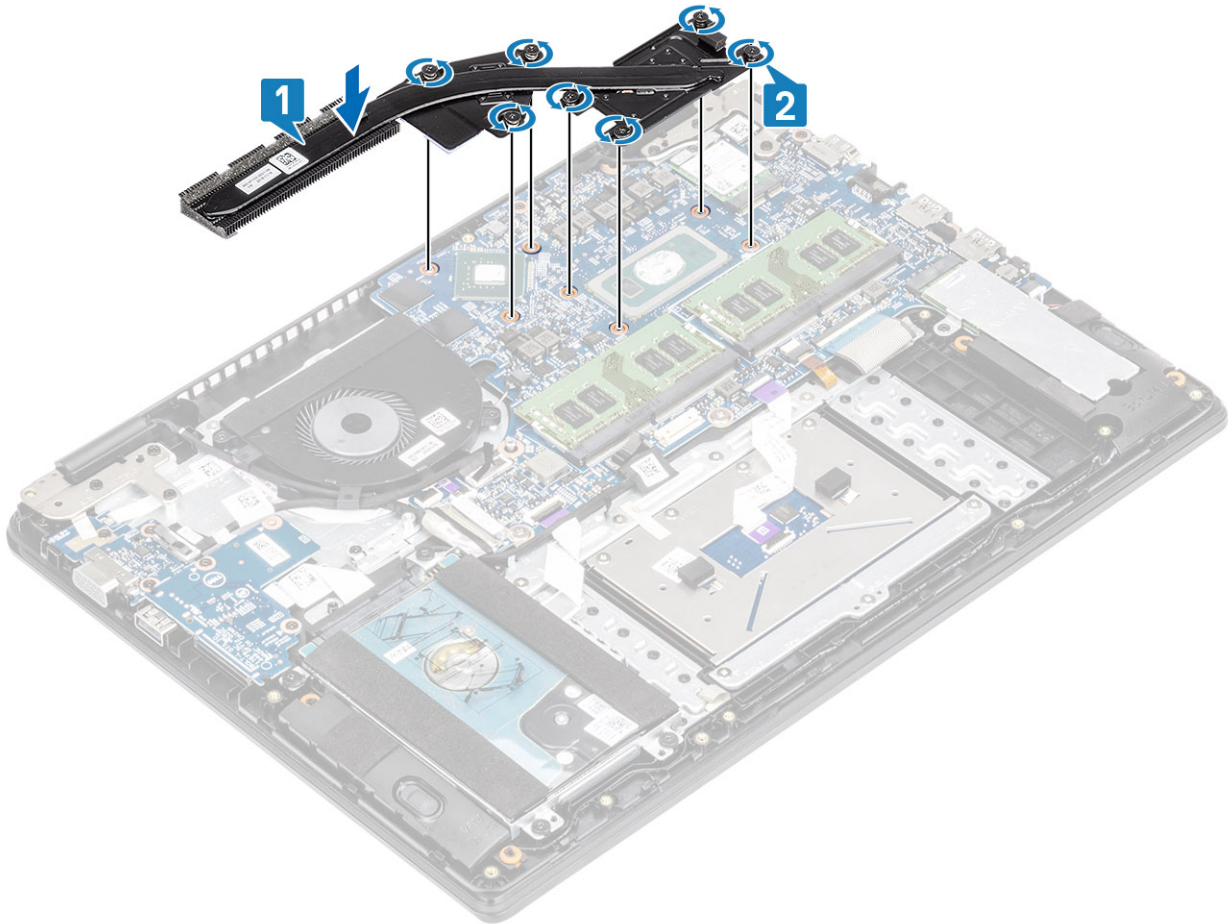
2. Lift the heatsink off the system board [2].



Installing the heatsink—discrete

Steps

1. Place the heatsink on the system board and align the screw holes on the heatsink with the screw holes on the system board [1].
2. In sequential order (as indicated on the heatsink), tighten the seven captive screws that secure the heatsink to the system board [2].



Next steps

1. Replace the [battery](#)
2. Replace the [base cover](#)
3. Replace the [SD memory card](#)
4. Follow the procedure in [after working inside your computer](#)

VGA daughterboard

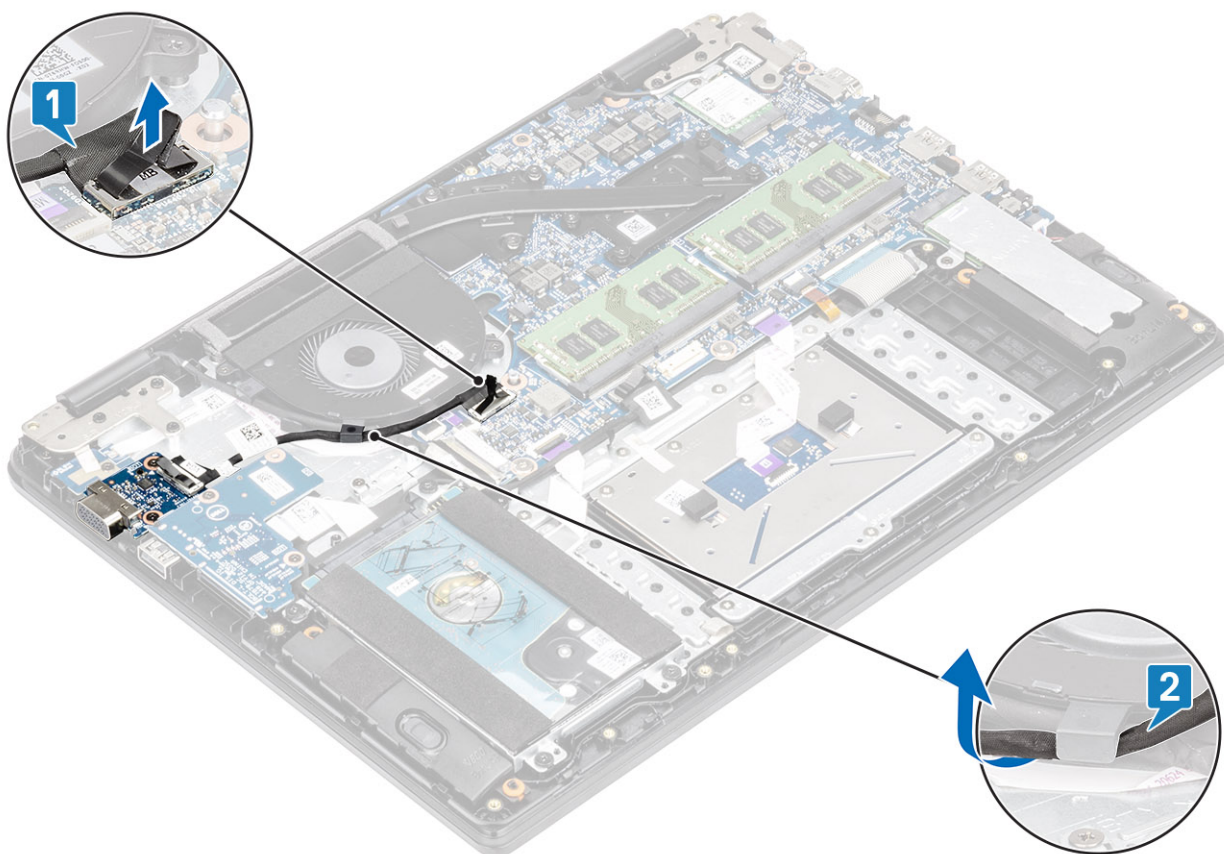
Removing the VGA daughterboard

Prerequisites

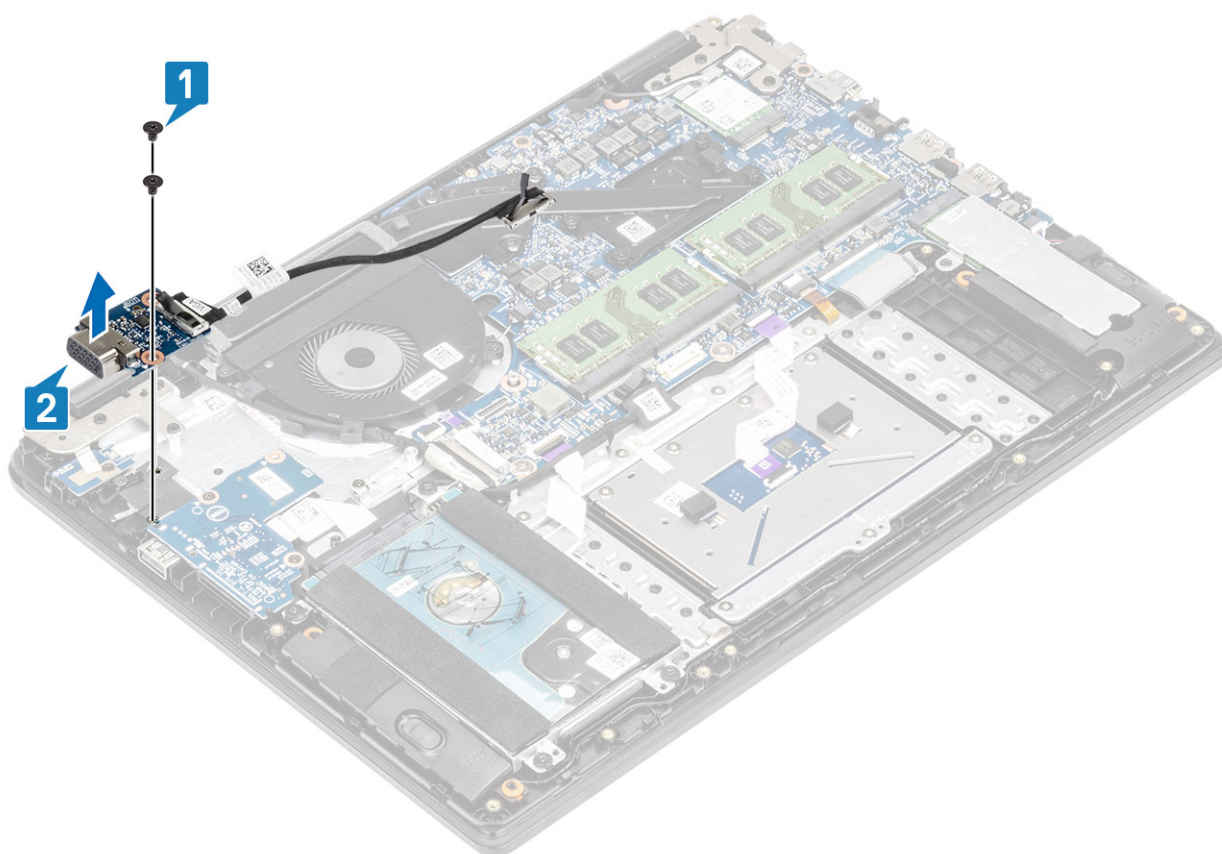
1. Follow the procedure in [before working inside your computer](#).
2. Remove the [SD memory card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).

Steps

1. Disconnect the VGA daughterboard cable from the system board [1].
2. Unroute the VGA board cable from the routing guides on the fan [2].



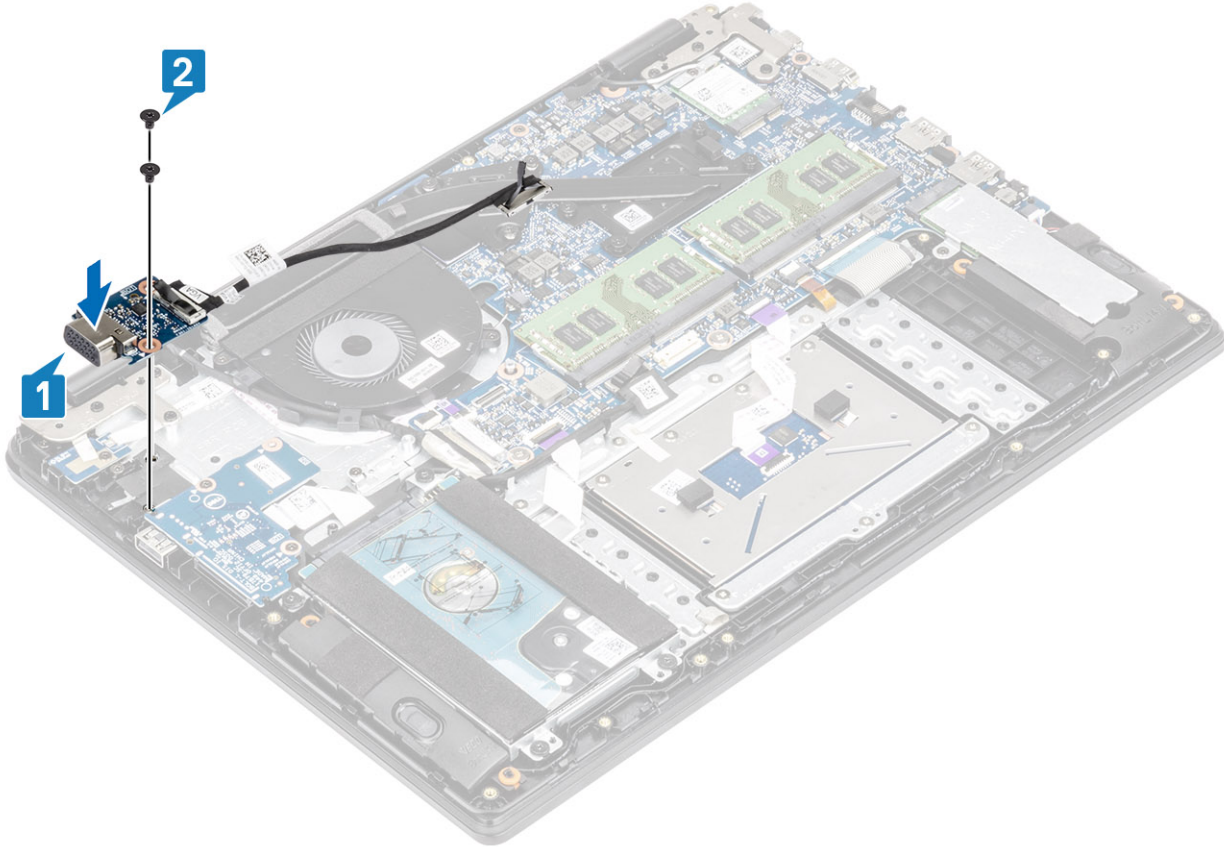
3. Remove the two (M2x3) screws that secure the VGA daughterboard to the palmrest and keyboard assembly [1].
4. Lift the VGA daughterboard away from the system [2].



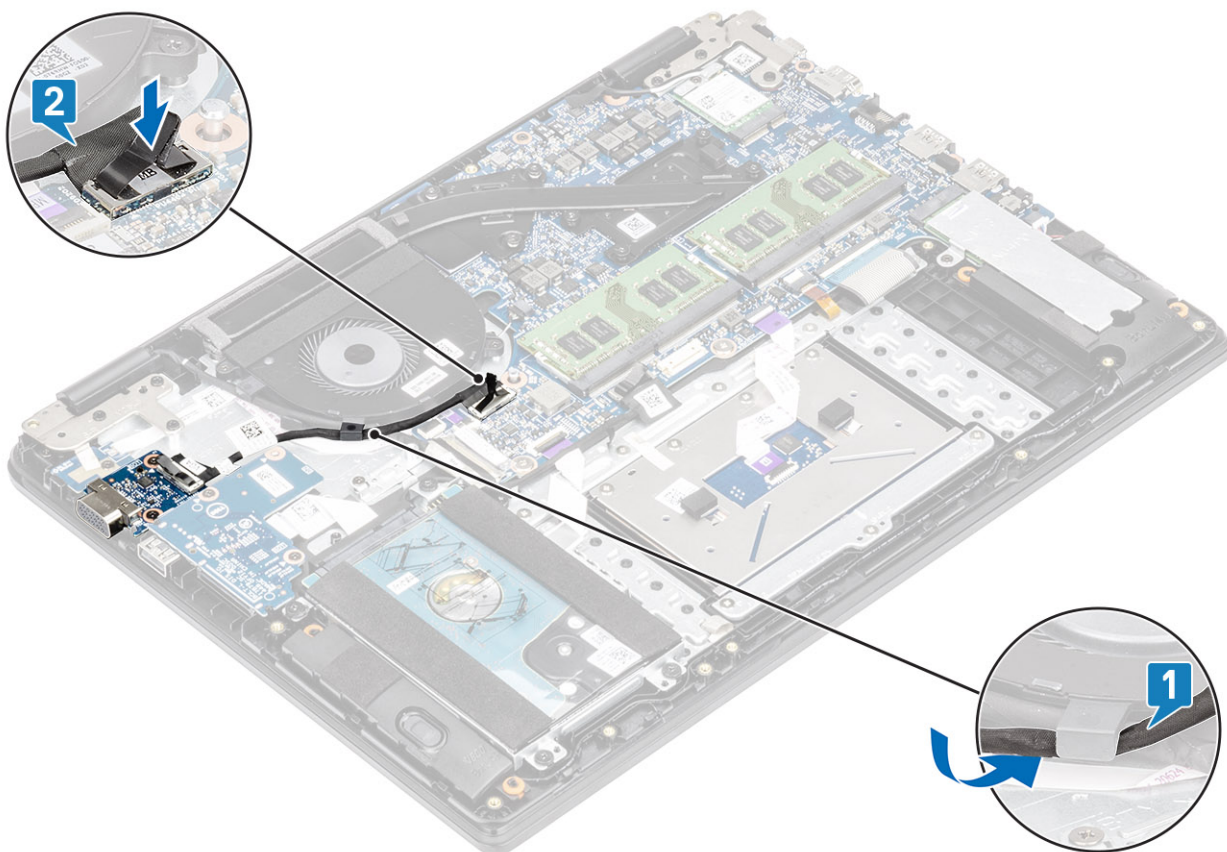
Installing the VGA daughterboard

Steps

1. Place the VGA daughterboard and align the screw holes on the VGA daughterboard with the screw holes on the palmrest and keyboard assembly [1].
2. Replace the two (M2x3) screws that secure the VGA daughterboard on the palmrest and keyboard assembly [2].



3. Route the VGA board cable through the routing guides on the fan [1], and then connect the VGA daughterboard cable to the system board [2].



Next steps

1. Replace the [battery](#)
2. Replace the [base cover](#)
3. Replace the [SD memory card](#)
4. Follow the procedure in [after working inside your computer](#)

Power-button board

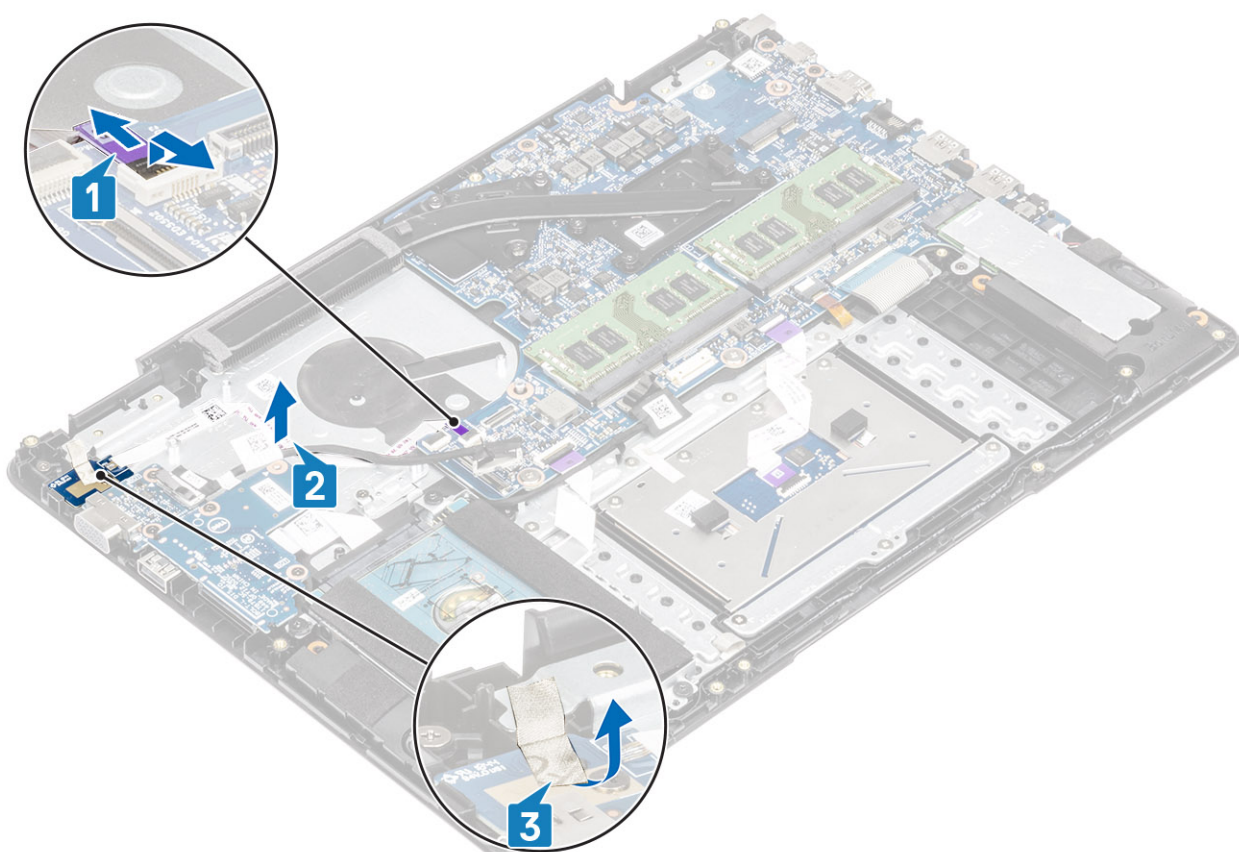
Removing the power button board with optional fingerprint reader

Prerequisites

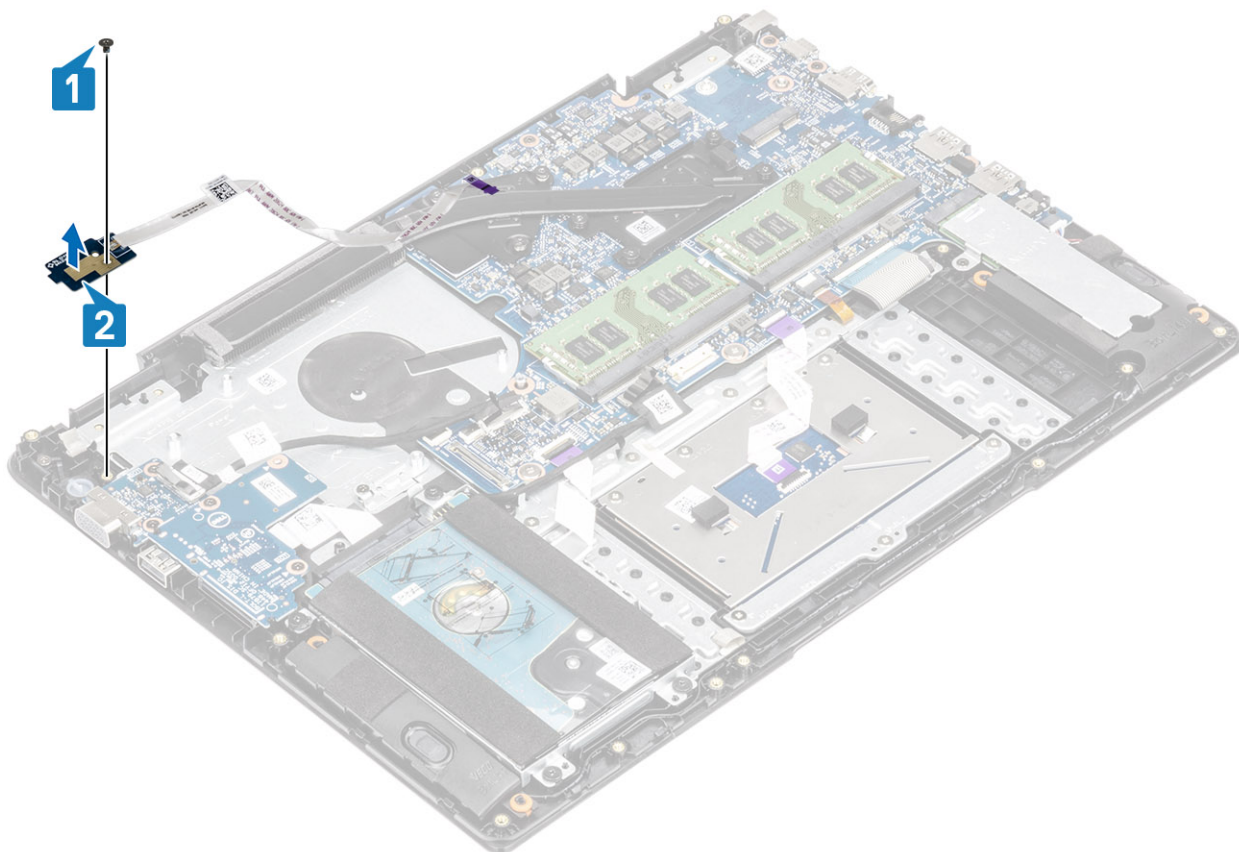
1. Follow the procedure in [before working inside your computer](#).
2. Remove the [SD memory card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [system fan](#).
6. Remove the [display assembly](#).

Steps

1. Open the latch, and disconnect the power button board cable and fingerprint cable from the system [1].
2. Unroute the cables from the palmrest and keyboard assembly [2].
3. Peel the conductive tape off the power button board [3].



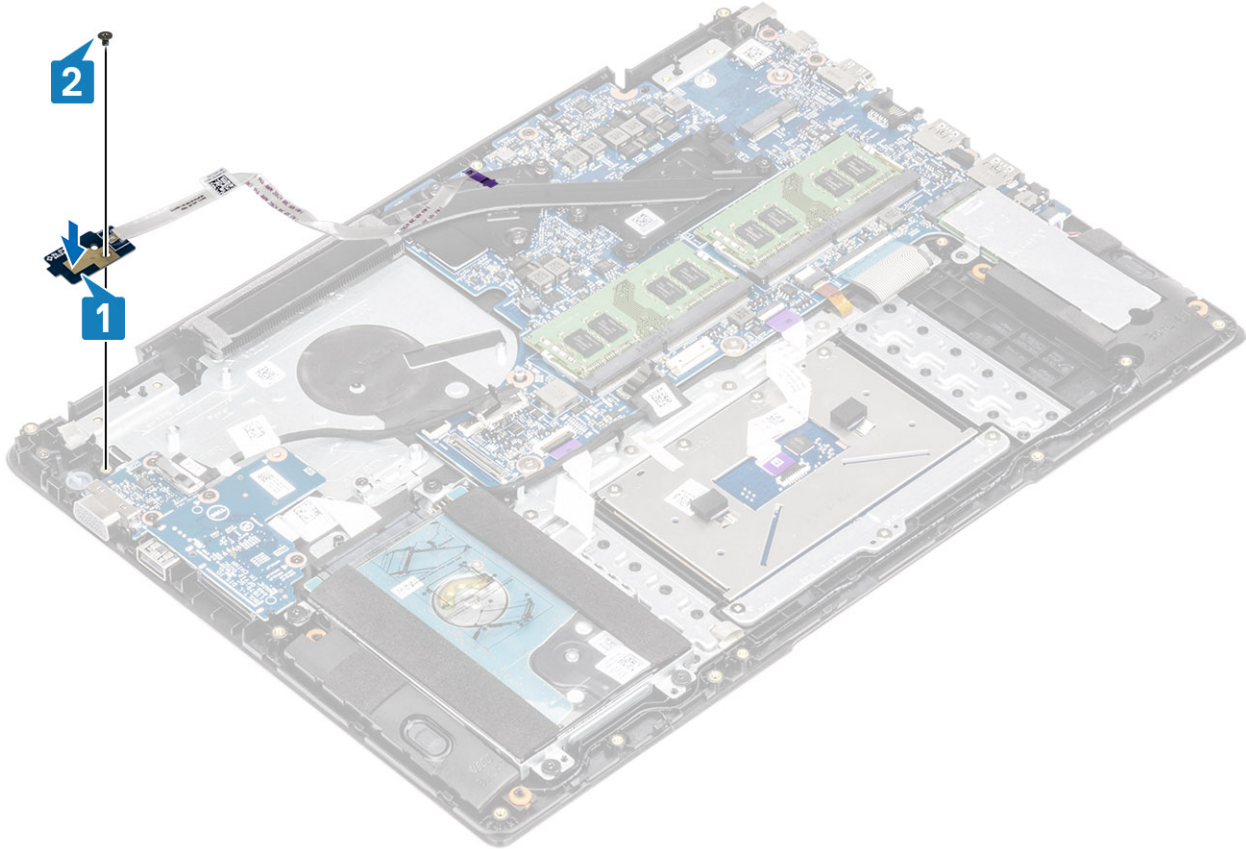
4. Remove the single (M2x3) screw that secures the power button board to the palmrest and keyboard assembly [1].
5. Lift the power button board, along with the cable off the palmrest and keyboard assembly [2].



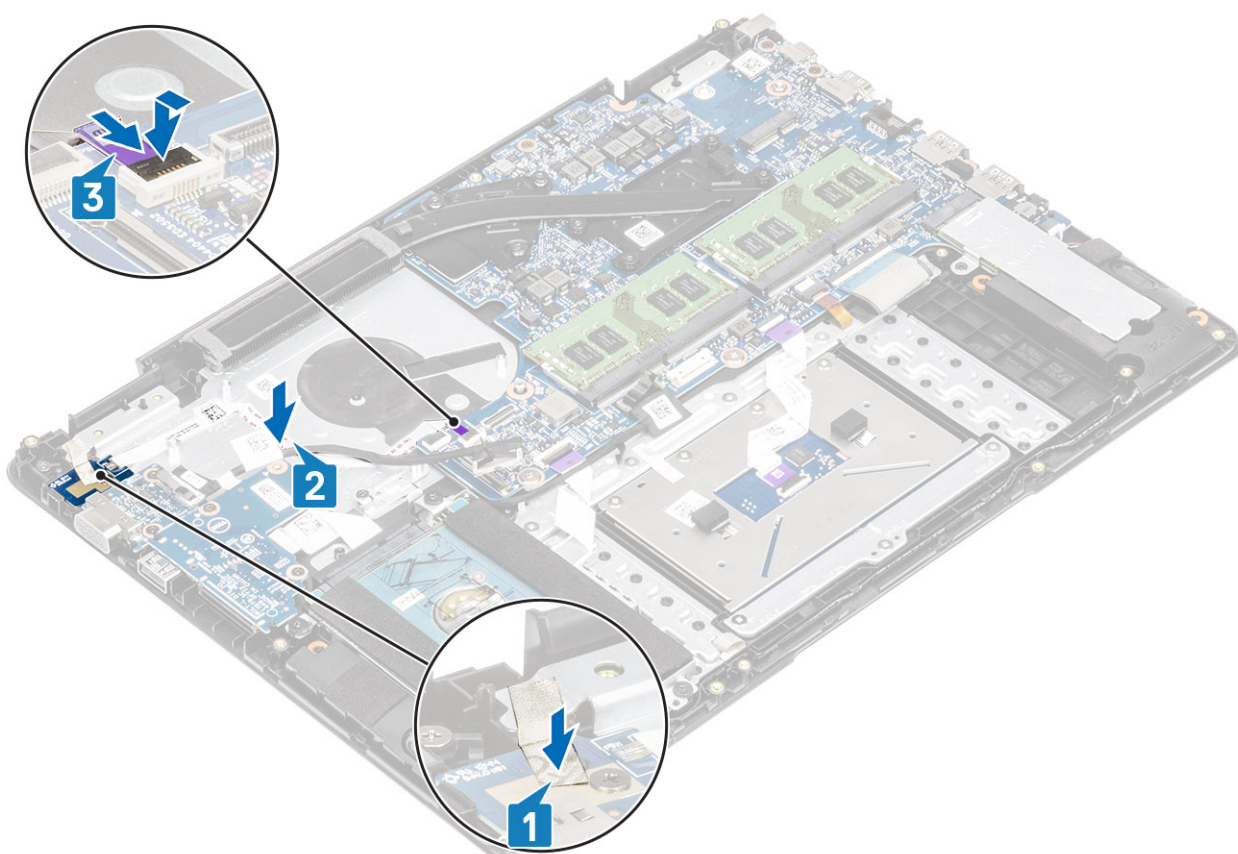
Installing the power button board with optional fingerprint reader

Steps

1. Place the power-button board into the slot on the palmrest and keyboard assembly [1].
2. Replace the single (M2x3) screw that secures the power button board to the palmrest and keyboard assembly [2].



3. Affix the conductive tape to the power button board [1].
4. Affix the power button cable to the palmrest and keyboard assembly [2].
5. Slide the power button cable and fingerprint reader cable to the system board and close the latch to secure the cable [3].



Next steps

1. Replace the [display assembly](#).
2. Replace the [system fan](#).
3. Replace the [battery](#).
4. Replace the [base cover](#).
5. Replace the [SD memory card](#).
6. Follow the procedure in [after working inside your computer](#).

System board

Removing the system board

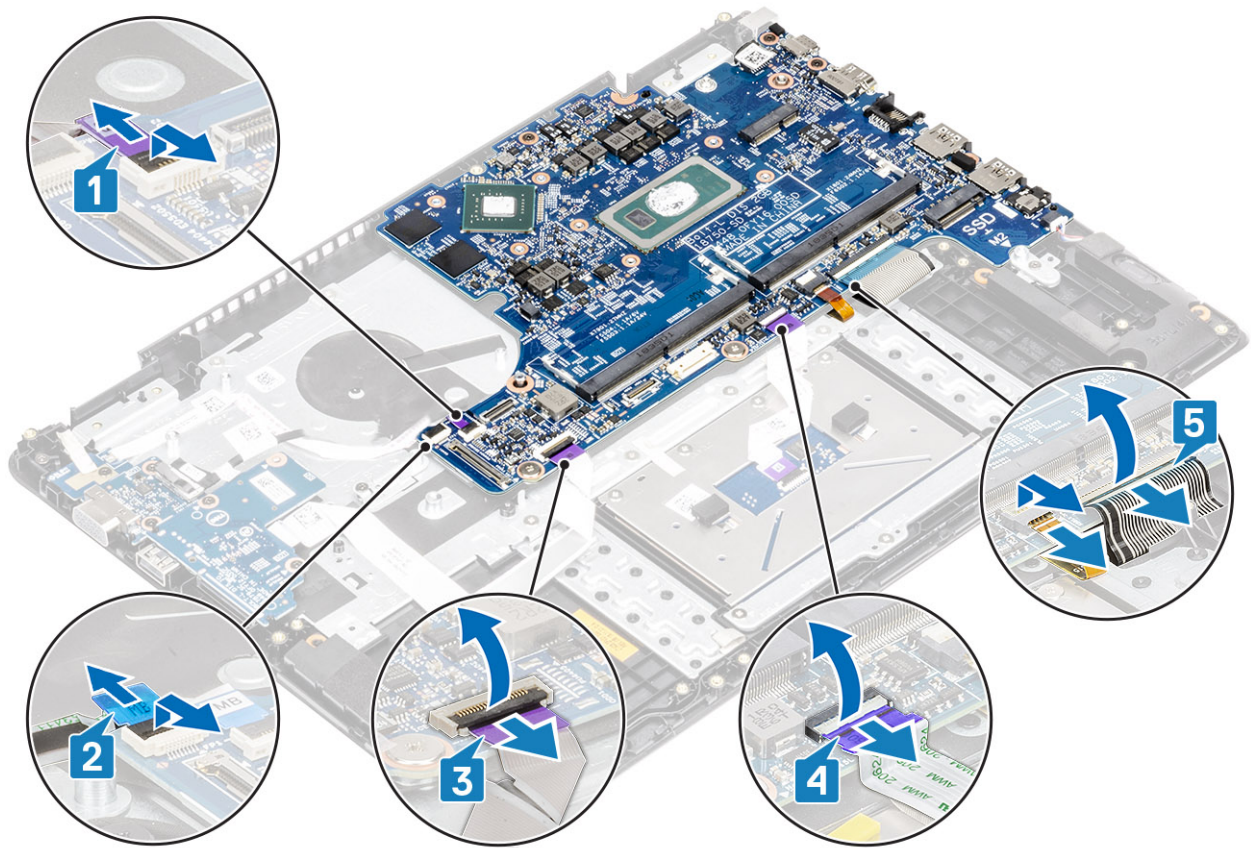
Prerequisites

1. Follow the procedure in [before working inside your computer](#).
2. Remove the [SD memory card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [WLAN](#).
6. Remove the [Memory](#).
7. Remove the [SSD](#).
8. Remove the [system fan](#).
9. Remove the [heatsink](#).
10. Remove the [display assembly](#).

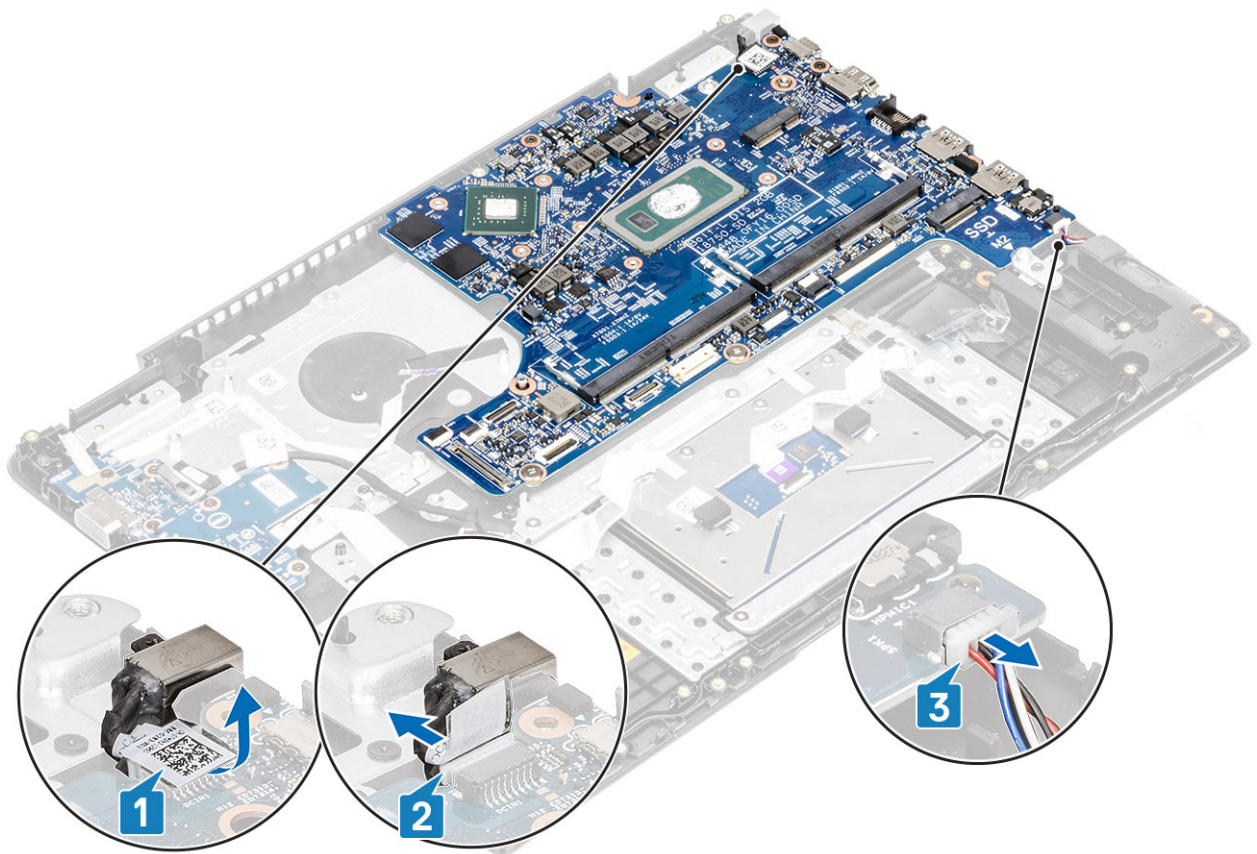
Steps

1. Disconnect the following cables from the system board:

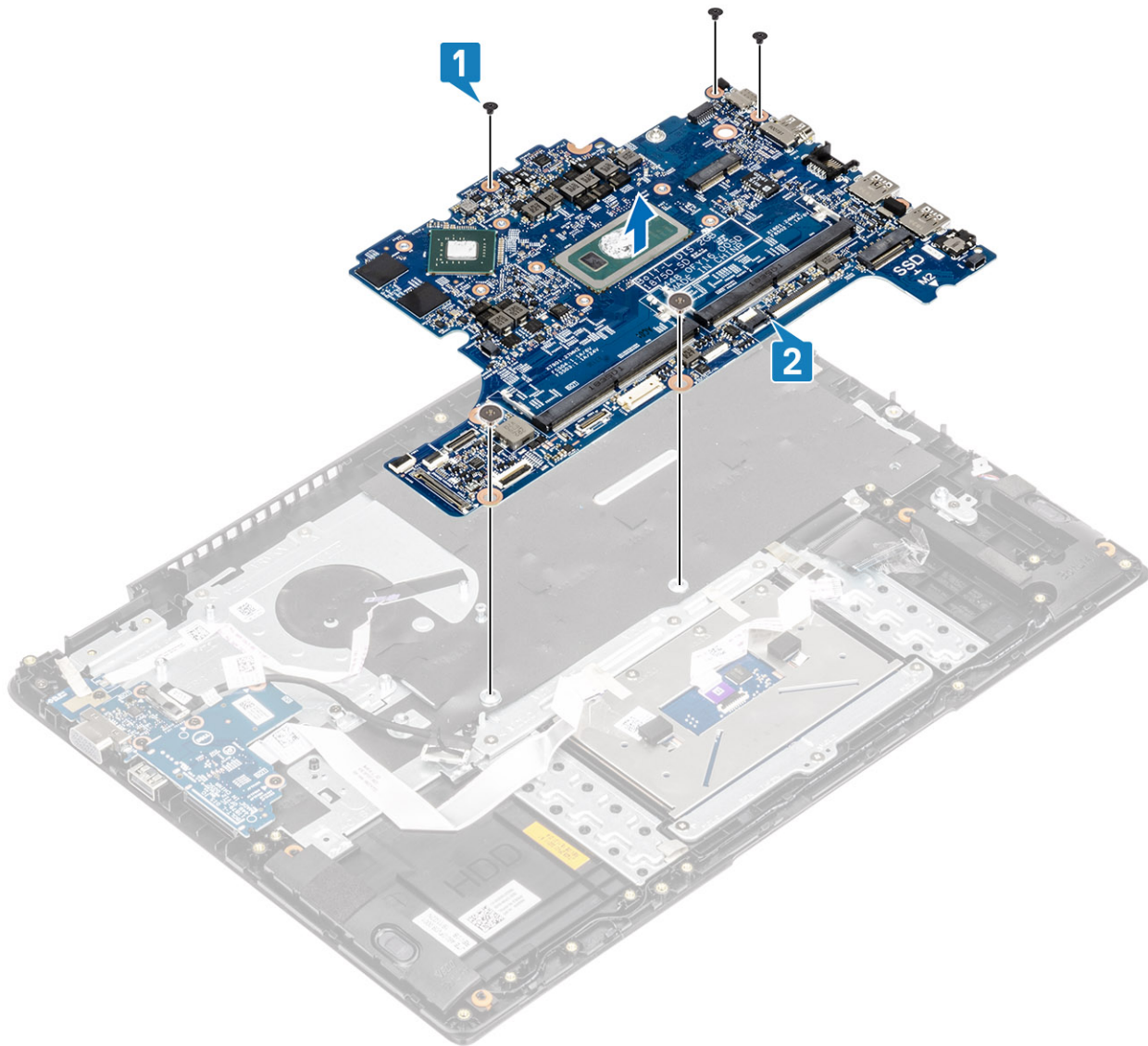
- a) Power button board [1].
- b) Fingerprint reader (optional) [2].
- c) IO board [3].
- d) Touchpad [4].
- e) Keyboard [5].



2. Disconnect the following cables from the system board:
- a) DC-in [1, 2].
 - b) Speaker [3].



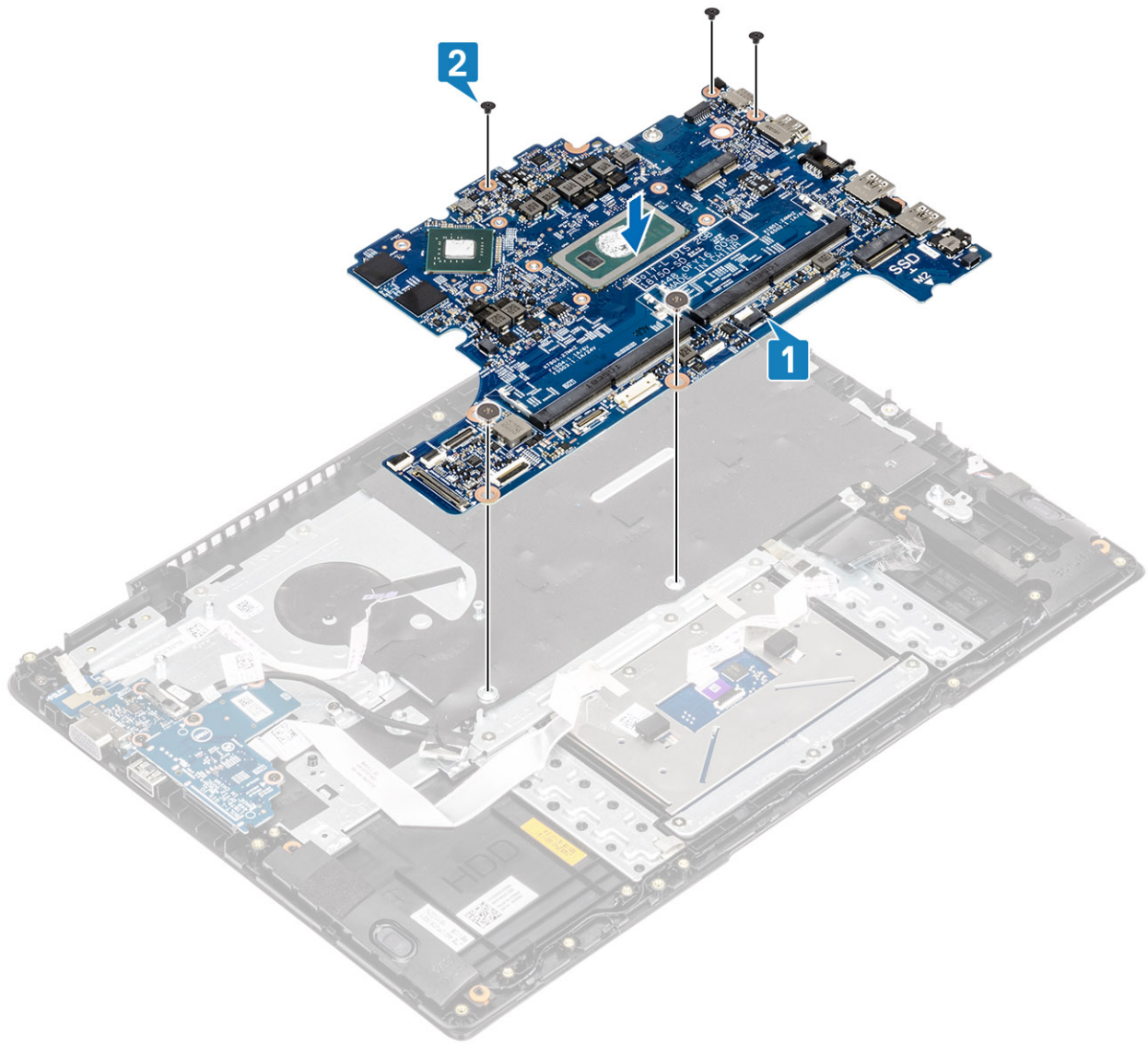
3. Remove the three (M2x3) screws and two (M2x2) screws that secure the system board to the palmrest and keyboard assembly [1].
4. Lift the system board off the palm-rest and keyboard assembly [2].



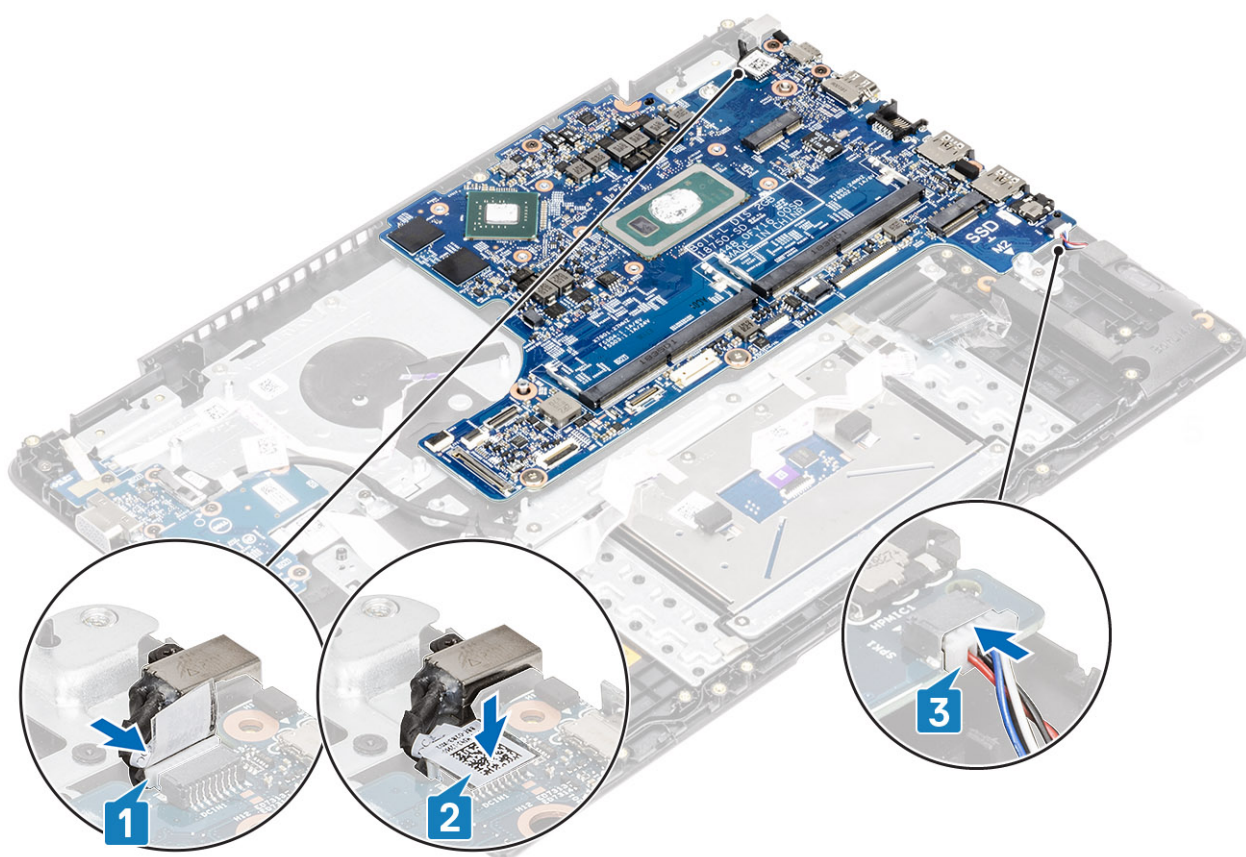
Installing the system board

Steps

1. Align the screw hole on the system board with the screw hole on the palmrest and keyboard assembly [1].
2. Replace the three (M2x3) screws and two (M2x2) screws that secure the system board to the palmrest and keyboard assembly [2].

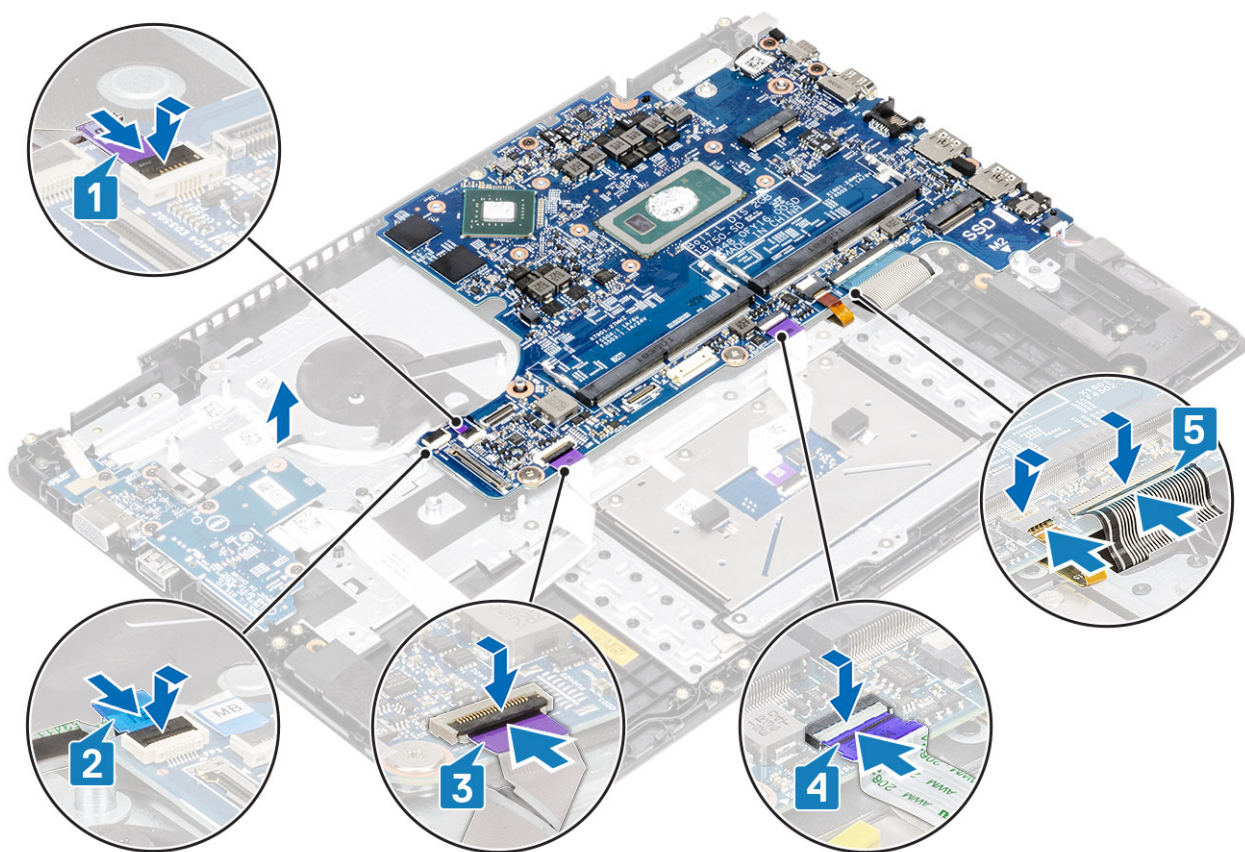


3. Connect the following cables to the system board:
- a) DC-in [1, 2].
 - b) Speaker [3].



4. Connect the following cables to the system board:

- a) Power button board [1].
- b) Fingerprint reader (optional) [2].
- c) IO board [3].
- d) Touchpad [4].
- e) Keyboard [5].



Next steps

1. Replace the [display assembly](#).
2. Replace the [heatsink](#).
3. Replace the [system fan](#).
4. Replace the [SSD](#).
5. Replace the [Memory](#).
6. Replace the [WLAN](#).
7. Replace the [battery](#).
8. Replace the [base cover](#).
9. Replace the [SD memory card](#).
10. Follow the procedure in [after working inside your computer](#).

Display assembly

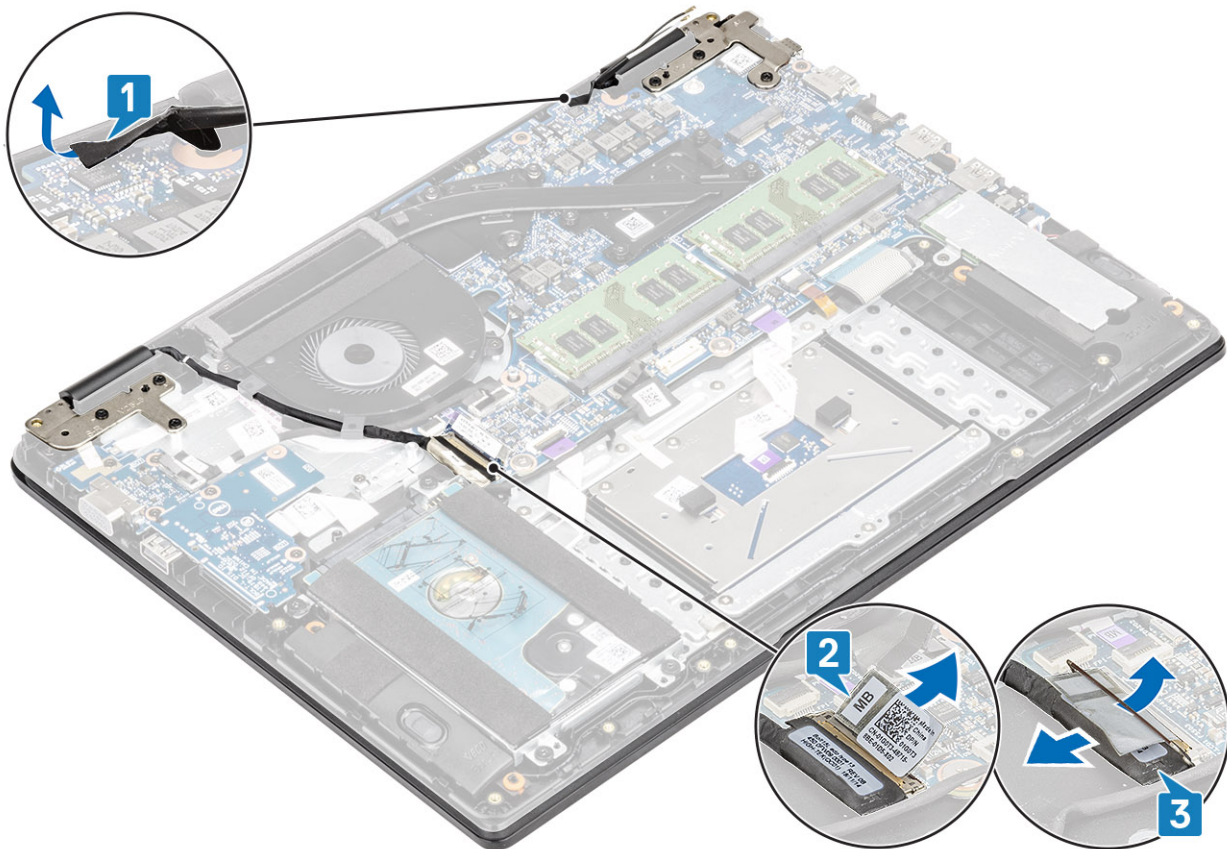
Removing the display assembly

Prerequisites

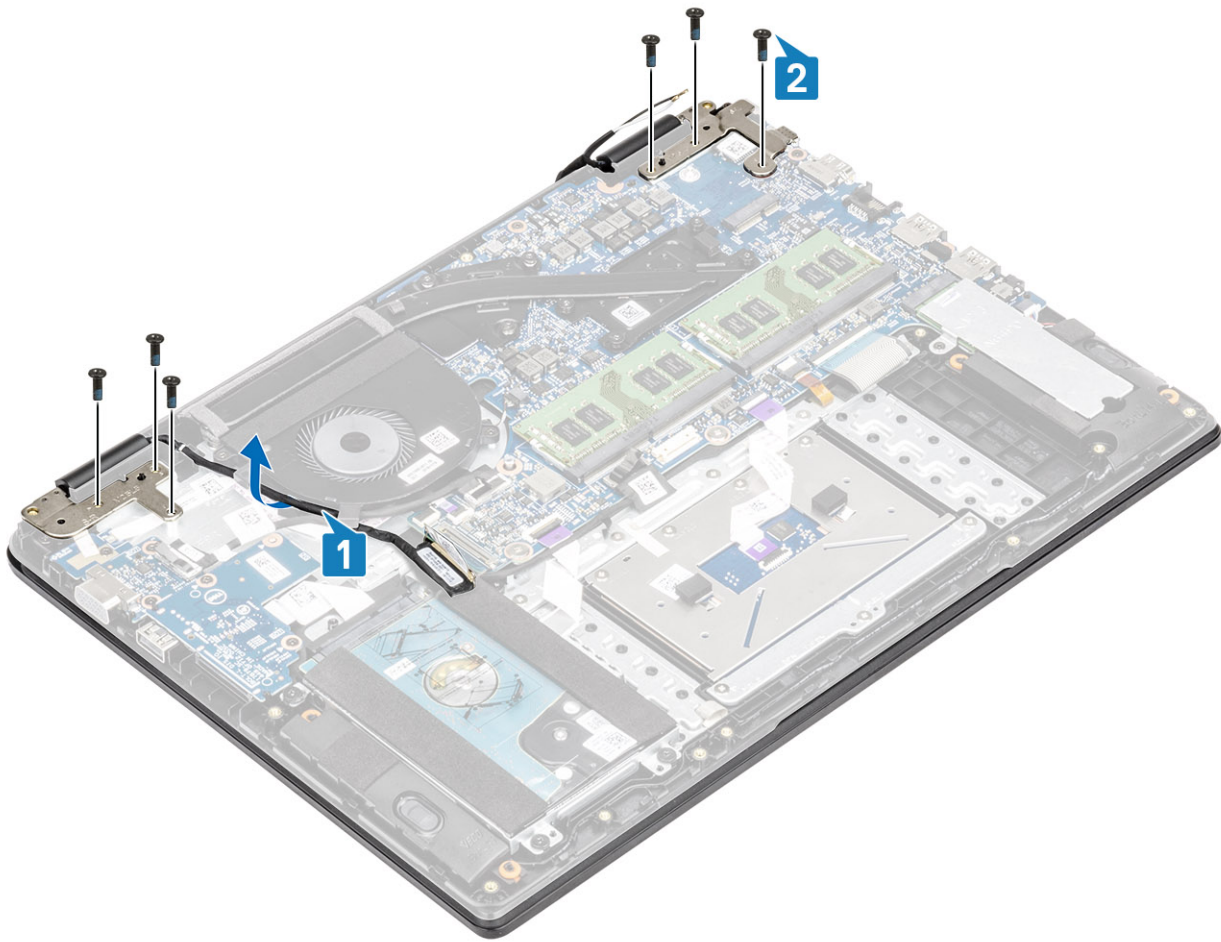
1. Follow the procedure in [before working inside your computer](#).
2. Remove the [SD memory card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [WLAN](#).

Steps

1. Peel off the tape securing the wireless antenna from the system board [1].
2. Disconnect the display cable from the connector on the system board [2, 3].



3. Unroute the display cable from the routing guides on the palmrest and keyboard assembly [1].
4. Remove the six (M2.5x5) screws that secure the left and right hinges to the system board, and palmrest and keyboard assembly [2].



5. Lift the palmrest and keyboard assembly at an angle [1].
6. Continue to lift the palmrest and keyboard assembly until it separates from the hinges [2].



7. Slide and remove the palmrest and keyboard assembly off the display assembly.



8. After performing all the preceding steps, you are left with display assembly.



Installing the display assembly

About this task

- NOTE:** Ensure that the hinges are opened to the maximum before replacing the display assembly on the palmrest and keyboard assembly.

Steps

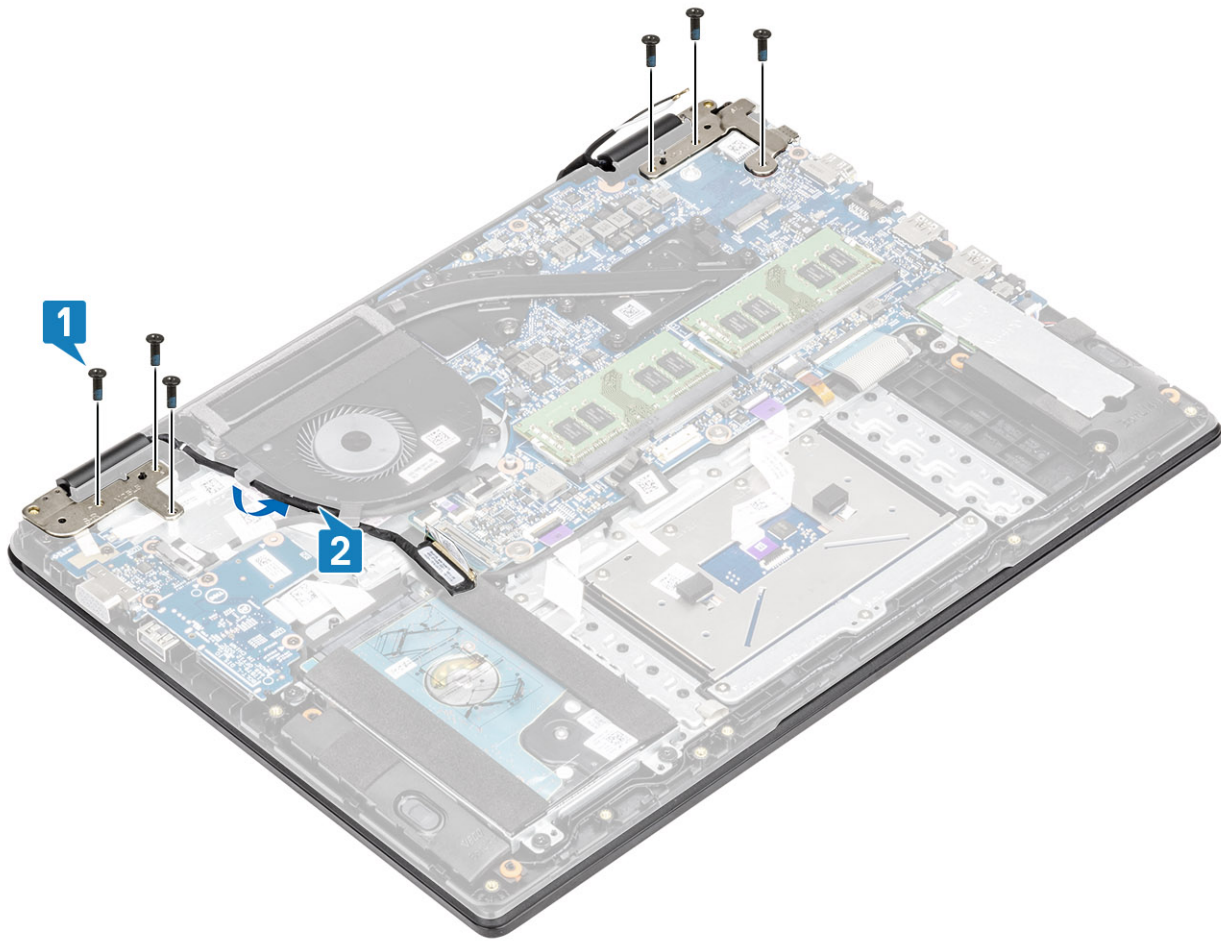
1. Align and place the palmrest and keyboard assembly under the hinges on the display assembly.



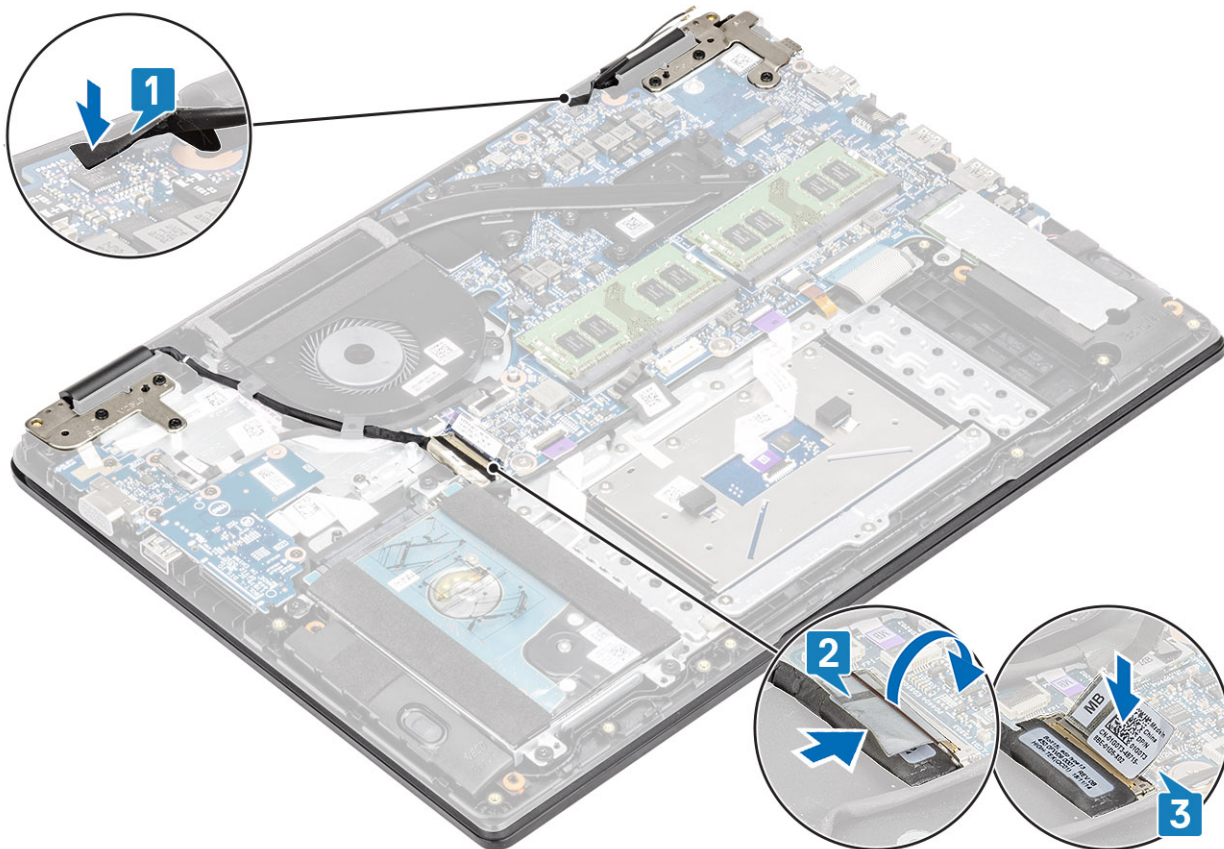
2. Press the hinges down on the system board, and palmrest and keyboard assembly [1].
3. Seat the palmrest and keyboard assembly on the display assembly [2].



4. Replace the six (M2.5x5) screws that secure the left and right hinges to the system board, and palmrest and keyboard assembly [1].
5. Route the display cable through the routing guides on the palmrest and keyboard assembly [2].



6. Affix the antenna cables to the system board [1].
7. Connect the display cable to the connector on the system board [2].



Next steps

1. Replace the [WLAN](#).
2. Replace the [battery](#).
3. Replace the [base cover](#).
4. Replace the [SD memory card](#).
5. Follow the procedure in [after working inside your computer](#).

Display bezel

Removing the display bezel

Prerequisites

1. Follow the procedure in [before working inside your computer](#)
2. Remove the [SD memory card](#)
3. Remove the [base cover](#)
4. Remove the [battery](#)
5. Remove the [WLAN](#)
6. Remove the [display assembly](#)

Steps

1. Push both sides of the display-hinge cover and lift it from the display back-cover.
2. Pry the inner edges of the display bezel.



3. Lift the bezel off the display assembly.



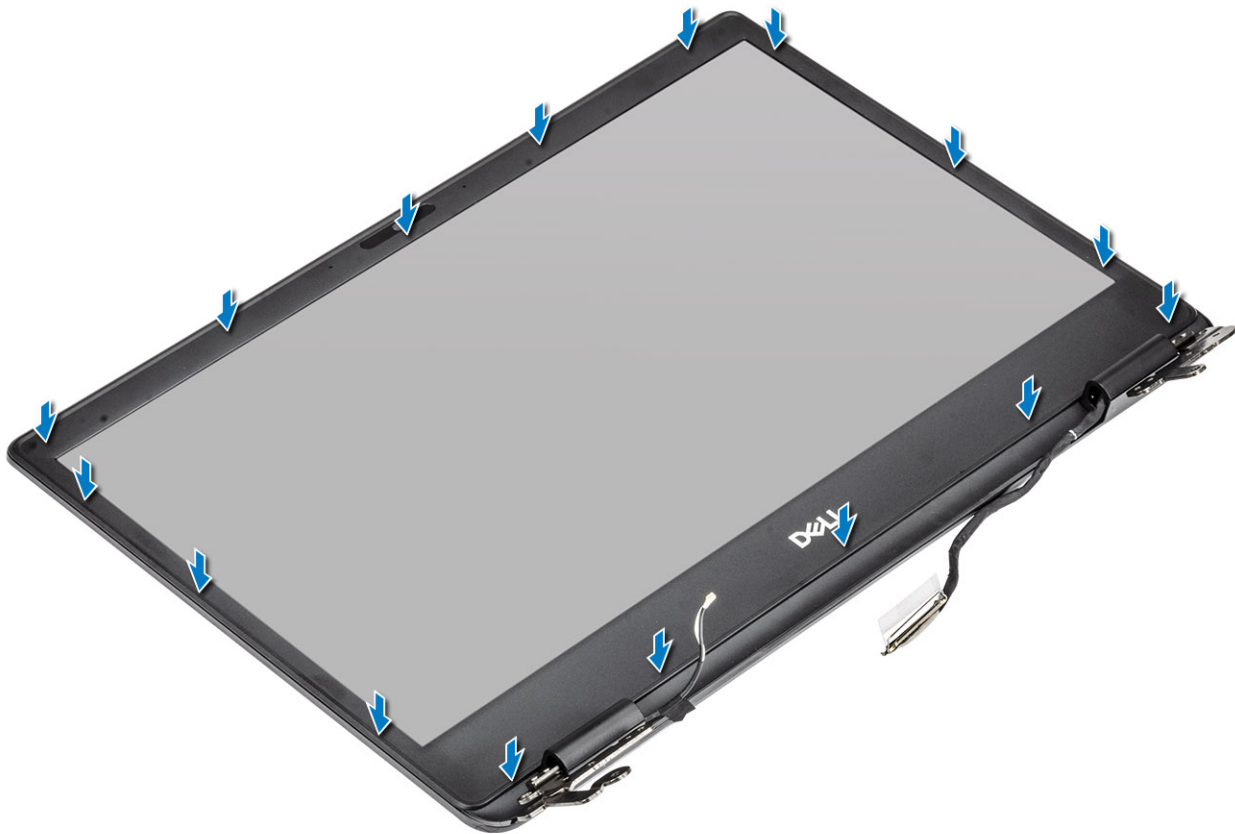
Installing the display bezel

Steps

1. Align the display bezel with the display back-cover.



2. Gently snap the display bezel into place.



Next steps

1. Replace the [display assembly](#)
2. Replace the [WLAN](#)
3. Replace the [battery](#)
4. Replace the [base cover](#)
5. Replace the [SD memory card](#)
6. Follow the procedure in [after working inside your computer](#)

Display panel

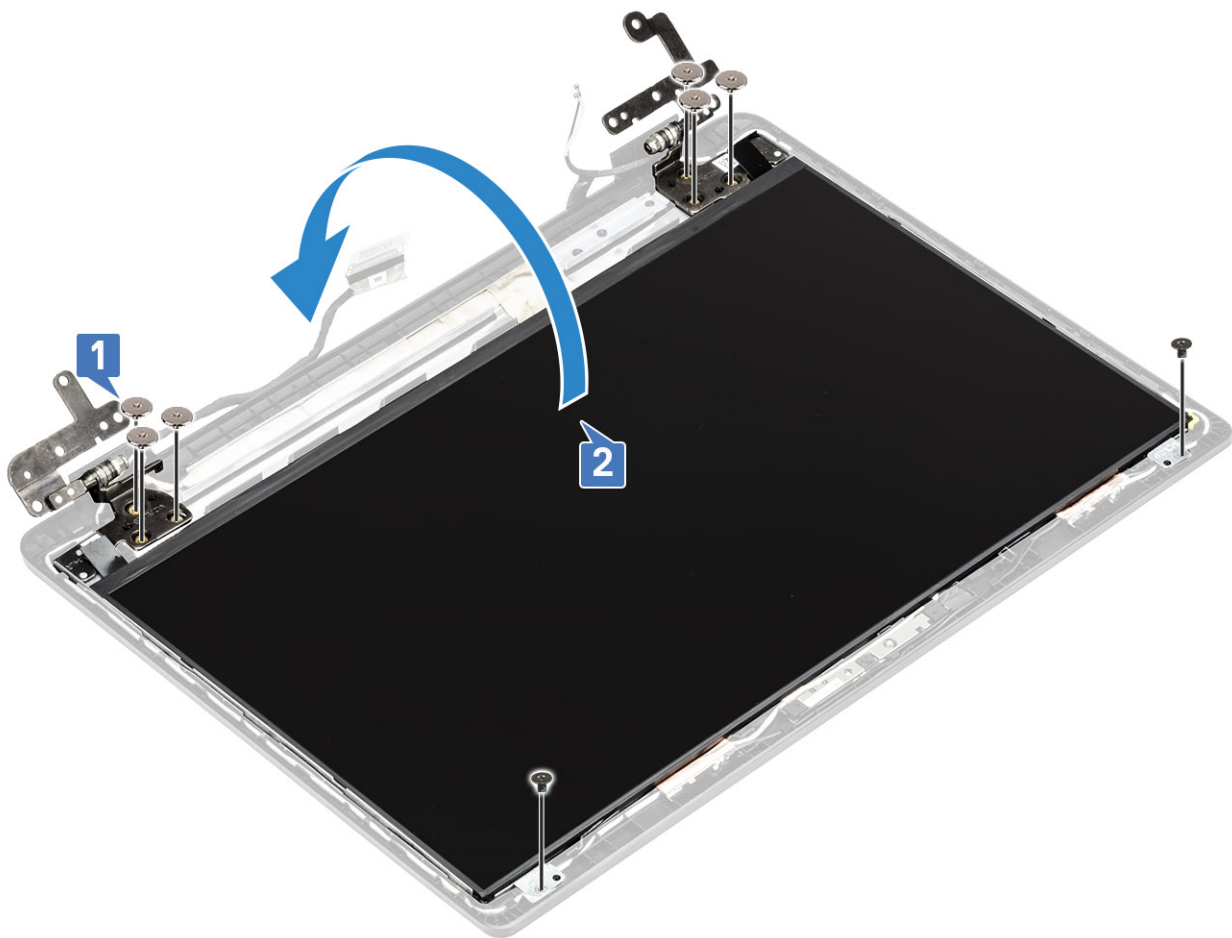
Removing the display panel

Prerequisites

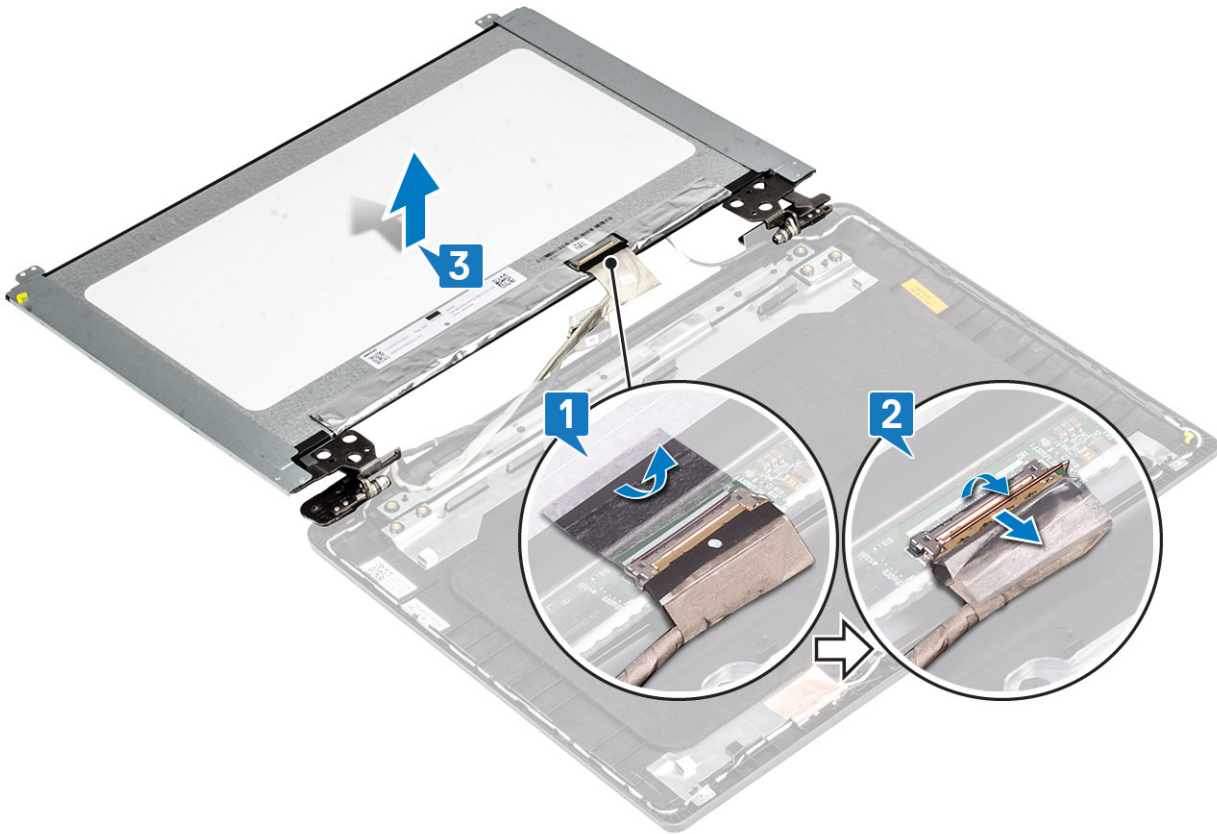
1. Follow the procedure in [before working inside your computer](#)
2. Remove the [SD memory card](#)
3. Remove the [base cover](#)
4. Remove the [battery](#)
5. Remove the [WLAN](#)
6. Remove the [display assembly](#)
7. Remove the [display bezel](#)

Steps

1. Remove the six (M2x2) and two (M2x3) screws that secure the display panel to the display back-cover [1].
2. Lift the display panel and turn it over [2].



3. Peel the tape that secures the display cable to the back of the display panel [1].
4. Lift the latch and disconnect the display cable from the display-panel cable connector [2].
5. Lift the display panel away from the display back-cover [3].



NOTE: Do not pull and release the Stretch (SR) Tapes from the display panel. There is no need to separate the brackets from the display panel.

6. After performing all the preceding steps, you are left with the display panel.



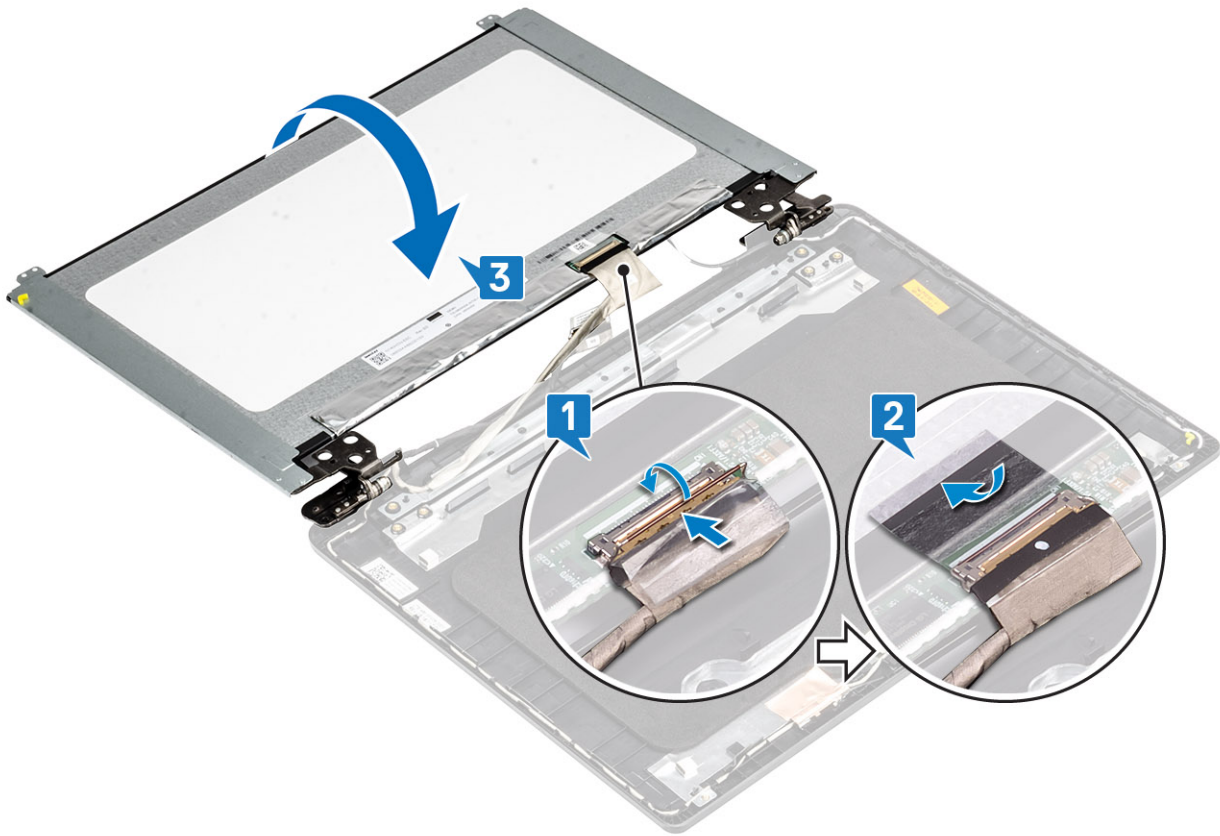
Installing the display panel

Steps

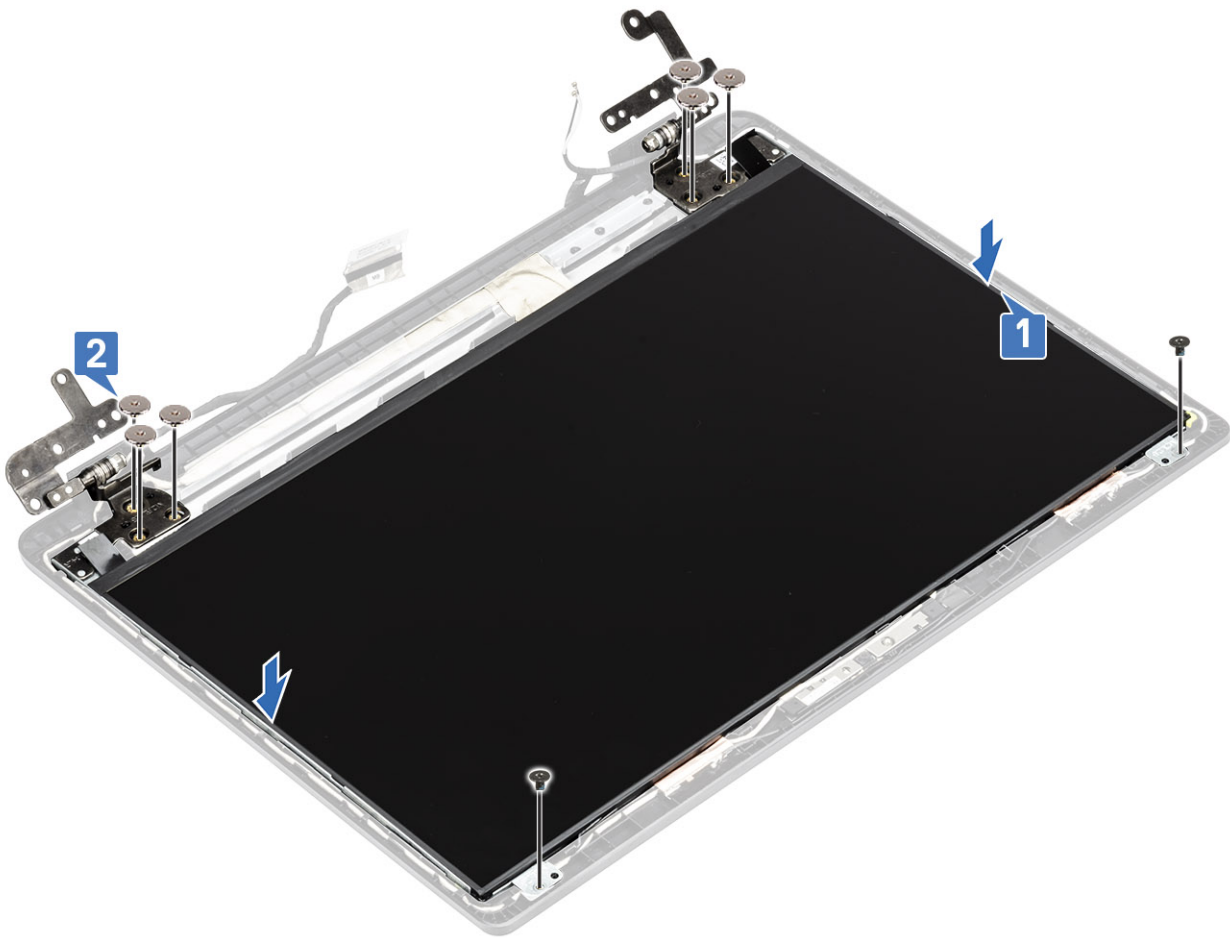
1. Place the display panel on a flat and clean surface.



2. Connect the display cable to the connector at the back of the display panel and close the latch to secure the cable [1].
3. Adhere the tape that secures the display cable to the back of the display panel [2].
4. Turn the display panel over and place it on the display back-cover [3].



5. Align the screw holes on the display panel with the screw holes on the display back-cover [1].
6. Replace the six (M2x2) and two (M2x3) screws that secure the display panel to the display back-cover [2].



Next steps

1. Replace the [display bezel](#)
2. Replace the [display assembly](#)
3. Replace the [WLAN](#)
4. Replace the [battery](#)
5. Replace the [base cover](#)
6. Replace the [SD memory card](#)
7. Follow the procedure in [after working inside your computer](#)

Display cable

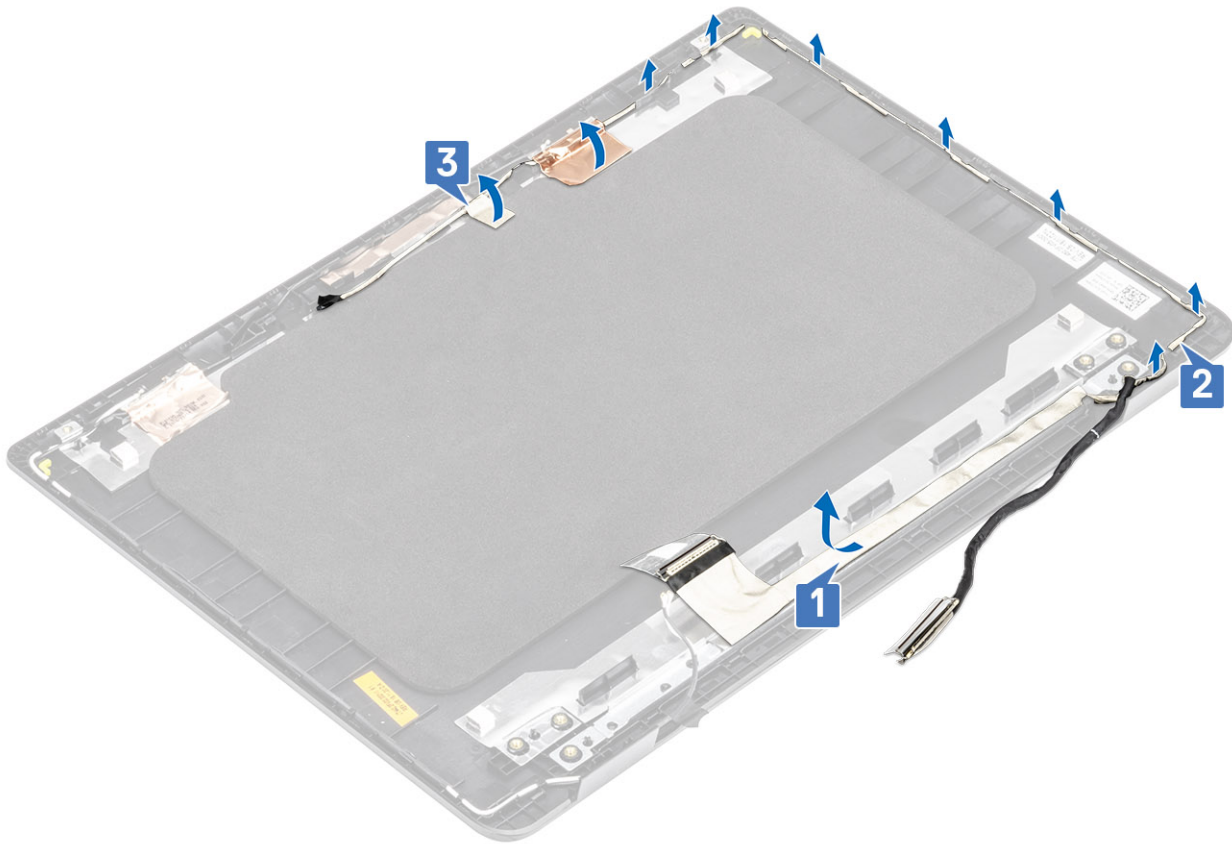
Removing the display cable

Prerequisites

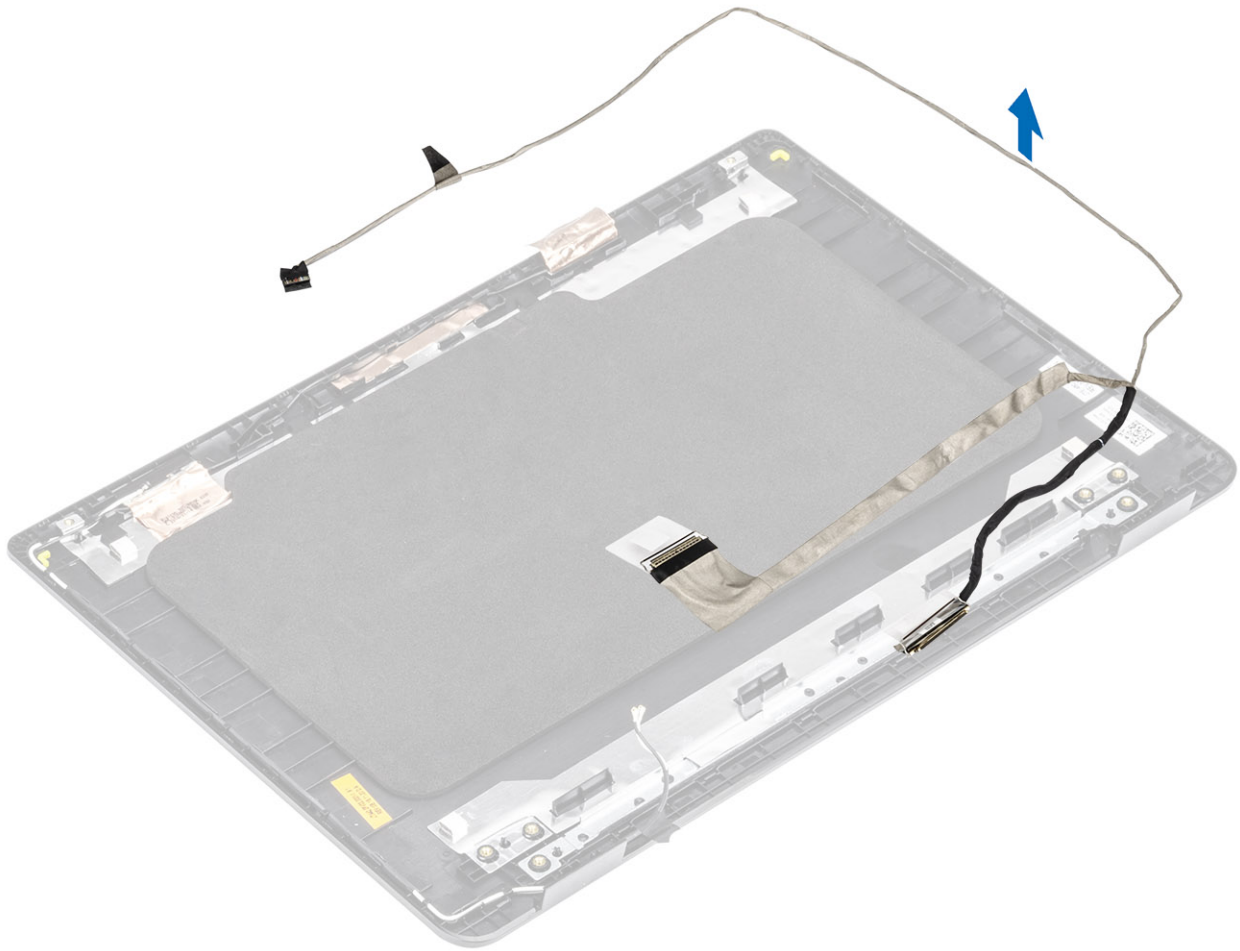
1. Follow the procedure in [before working inside your computer](#)
2. Remove the [SD memory card](#)
3. Remove the [base cover](#)
4. Remove the [battery](#)
5. Remove the [WLAN](#)
6. Remove the [display assembly](#)
7. Remove the [display bezel](#)
8. Remove the [display panel](#)

Steps

1. Remove the camera cable and the display cable from the routing guides on the display back-cover [1,2].
2. Peel the adhesive that secures the camera cable [3].



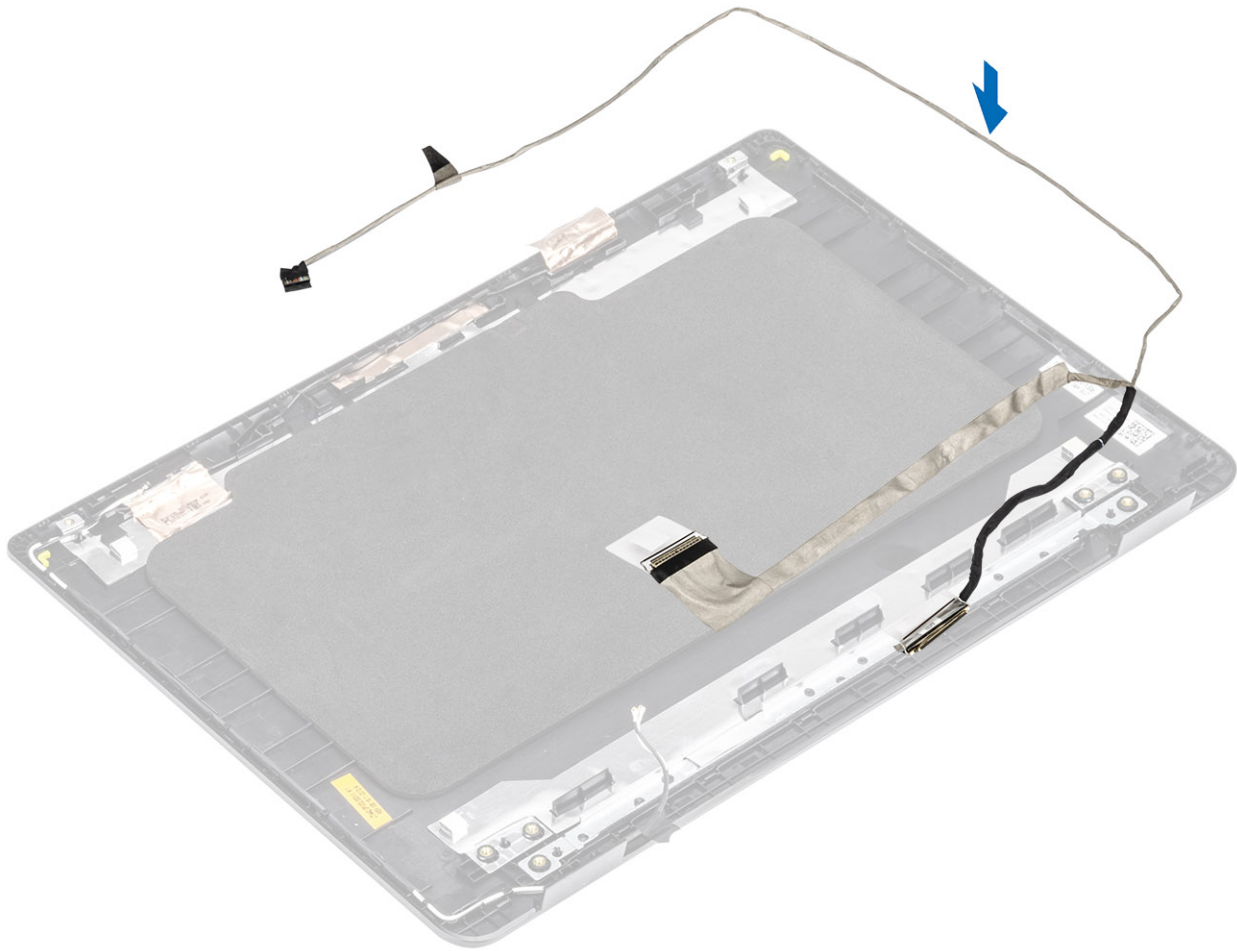
3. Lift the camera cable and the display cable off the display back-cover.



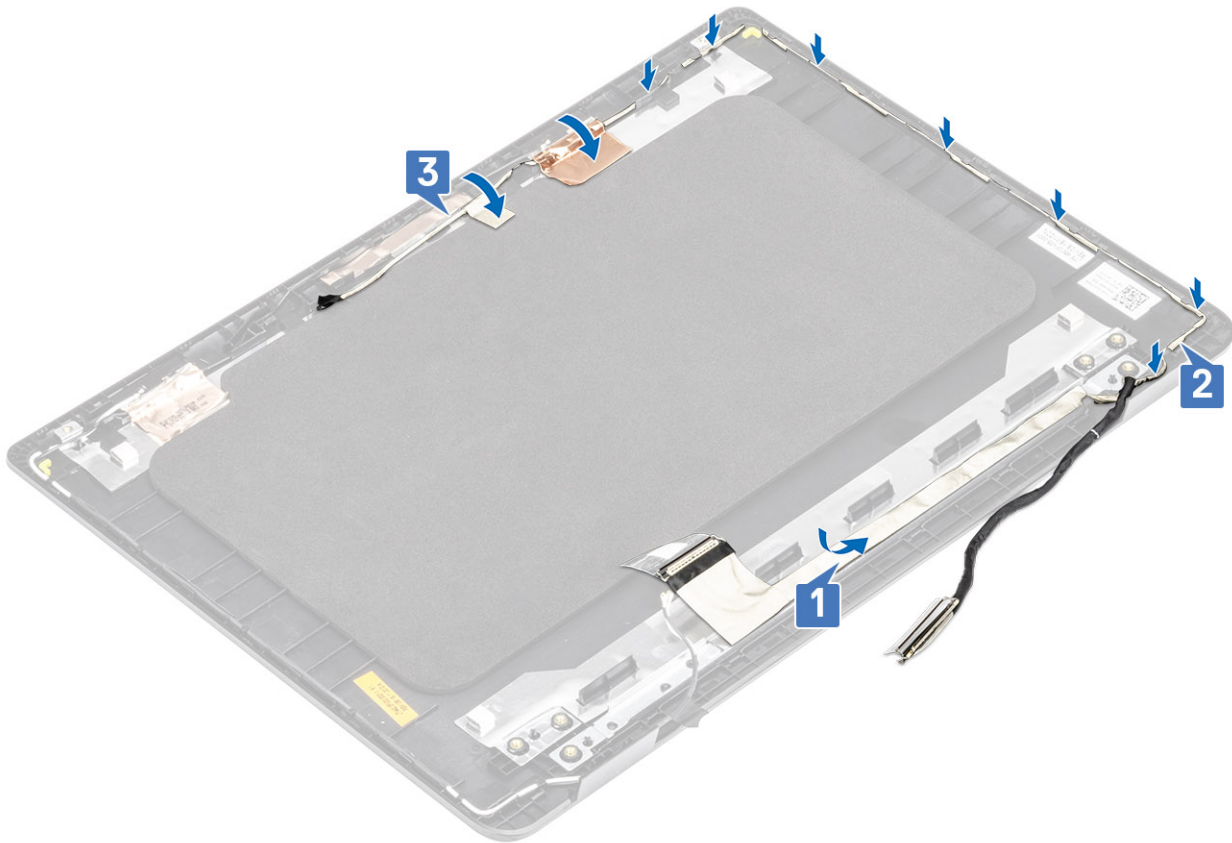
Installing the display cable

Steps

1. Place the display cable and camera cable on the display back-cover.



2. Route the display cable and camera cable through the routing guides on the display back-cover and antenna assembly [1,2].
3. Affix the adhesive that secures the camera cable [3].



Next steps

1. Replace the [display panel](#)
2. Replace the [display bezel](#)
3. Replace the [display assembly](#)
4. Replace the [WLAN](#)
5. Replace the [battery](#)
6. Replace the [base cover](#)
7. Replace the [SD memory card](#)
8. Follow the procedure in [after working inside your computer](#)

Power-adapter port

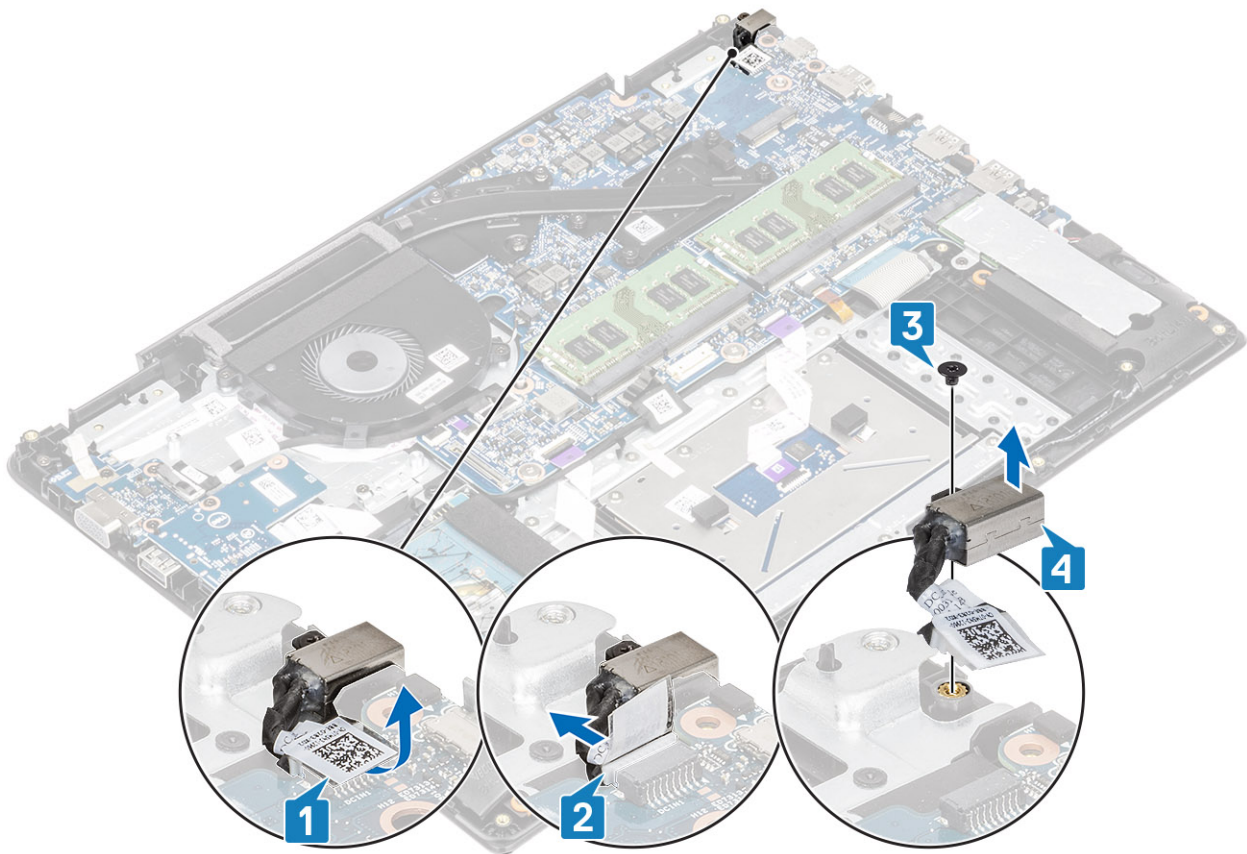
Removing the power adapter port

Prerequisites

1. Follow the procedure in [before working inside your computer](#)
2. Remove the [SD memory card](#)
3. Remove the [base cover](#)
4. Remove the [battery](#)
5. Remove the [WLAN](#)

Steps

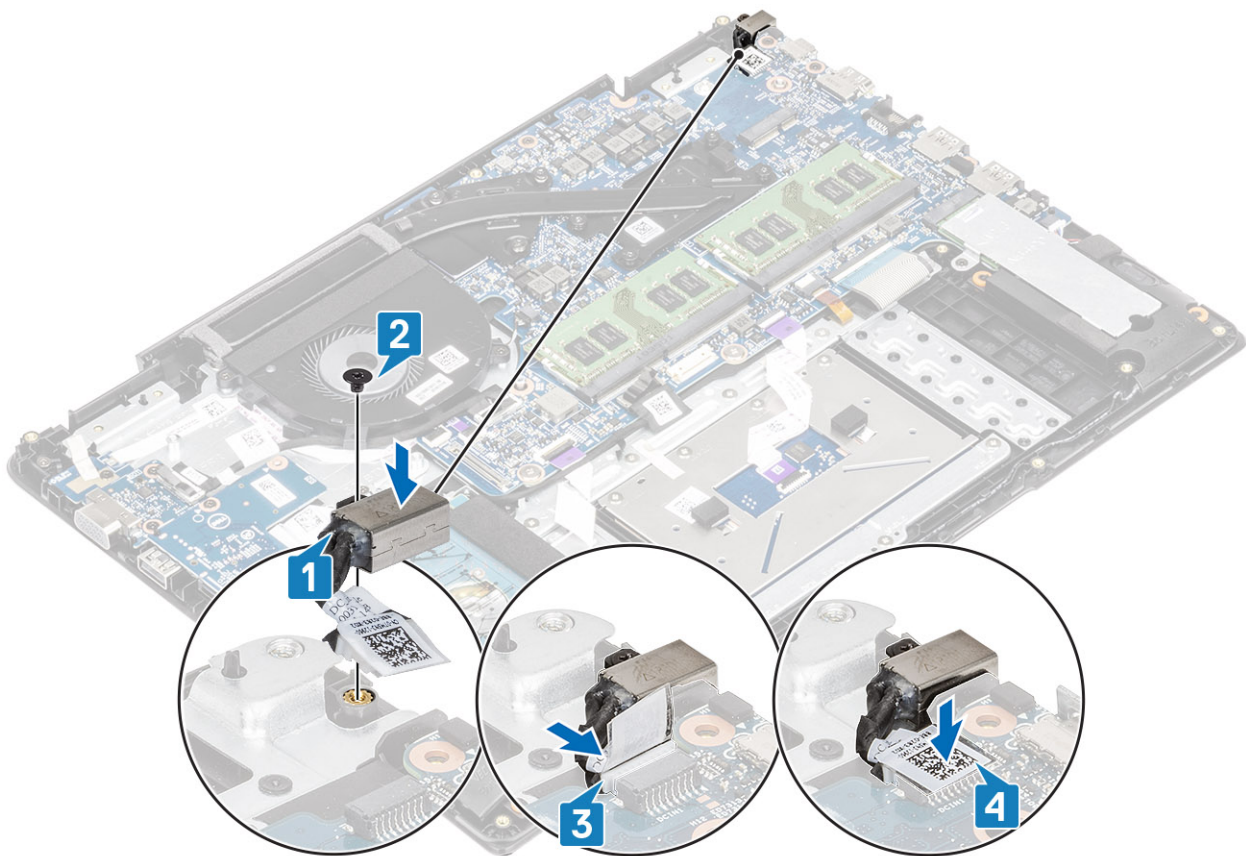
1. Disconnect and route the power adapter cable from the system board [1, 2].
2. Remove the single (M2x3) screw that secures the power adapter port to the palmrest and keyboard assembly [3].
3. Lift the power adapter port, along with its cable, off the palmrest and keyboard assembly [4].



Installing the power adapter port

Steps

1. Place the power adapter port into the slot on the palmrest and keyboard assembly [1].
2. Replace the single (M2x3) screw that secures the power adapter port to the palmrest and keyboard assembly [2].
3. Connect the power adapter cable to the system board [3, 4].



Next steps

1. Replace the [WLAN](#)
2. Replace the [battery](#)
3. Replace the [base cover](#)
4. Replace the [SD memory card](#)
5. Follow the procedure in [after working inside your computer](#)

Camera

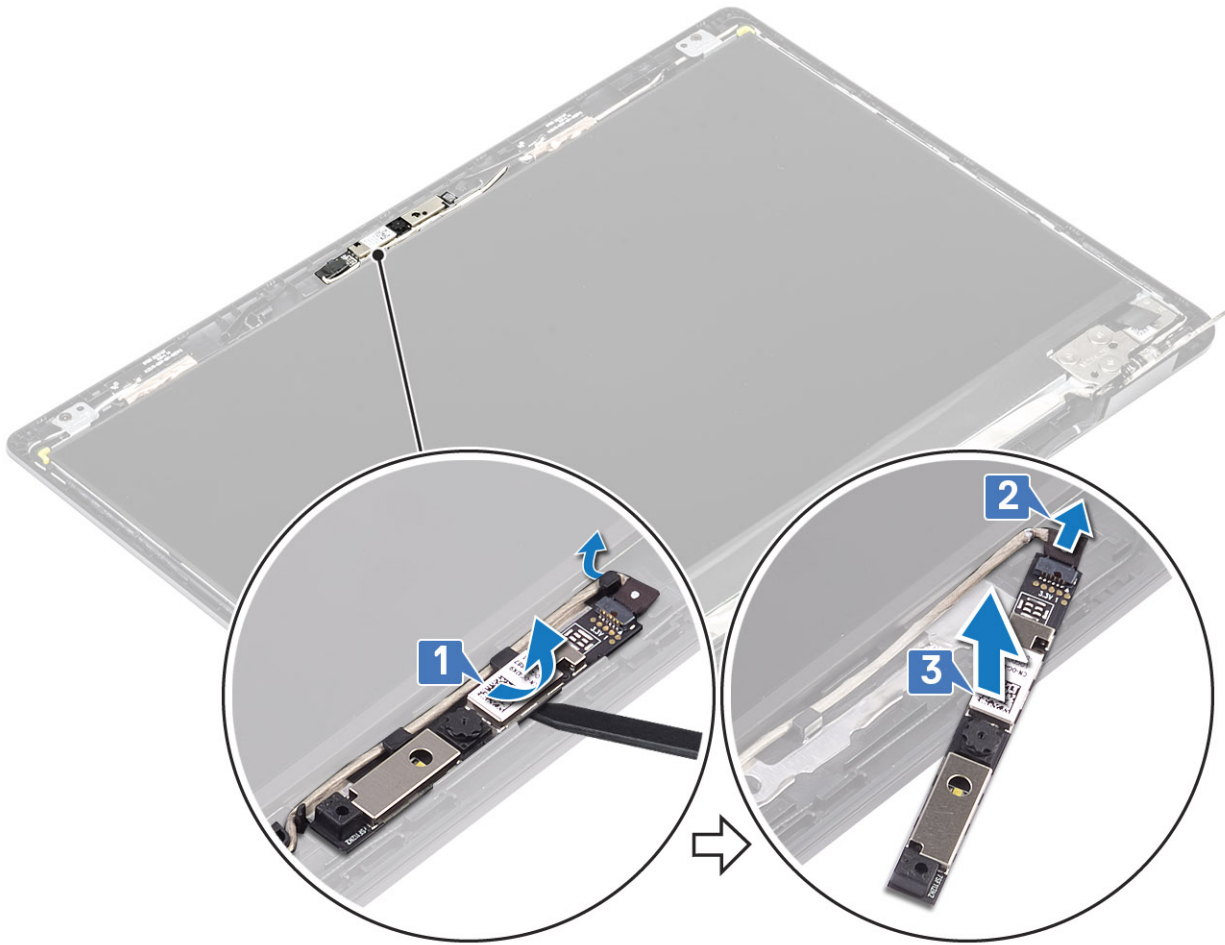
Removing the camera

Prerequisites

1. Follow the procedure in [before working inside your computer](#)
2. Remove the [SD memory card](#)
3. Remove the [base cover](#)
4. Remove the [battery](#)
5. Remove the [WLAN](#)
6. Remove the [display assembly](#)
7. Remove the [display bezel](#)
8. Remove the [display panel](#)

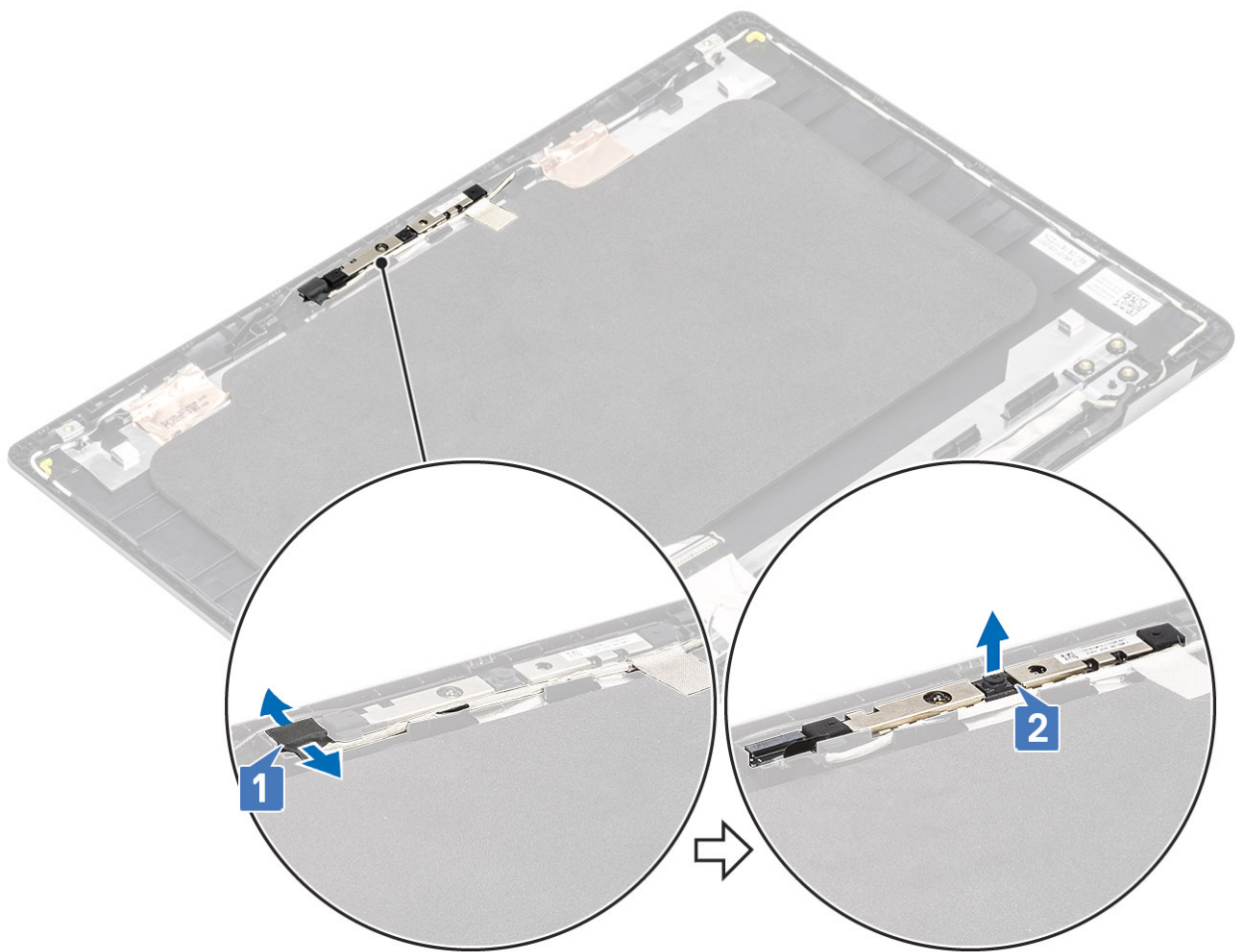
Steps

1. Using a plastic scribe, gently pry the camera off the display back-cover [1].
2. Disconnect the camera cable from the camera module [2].
3. Lift the camera module from the display back-cover [3].



Follow the below procedure to remove the camera in systems with the Touch functionality.

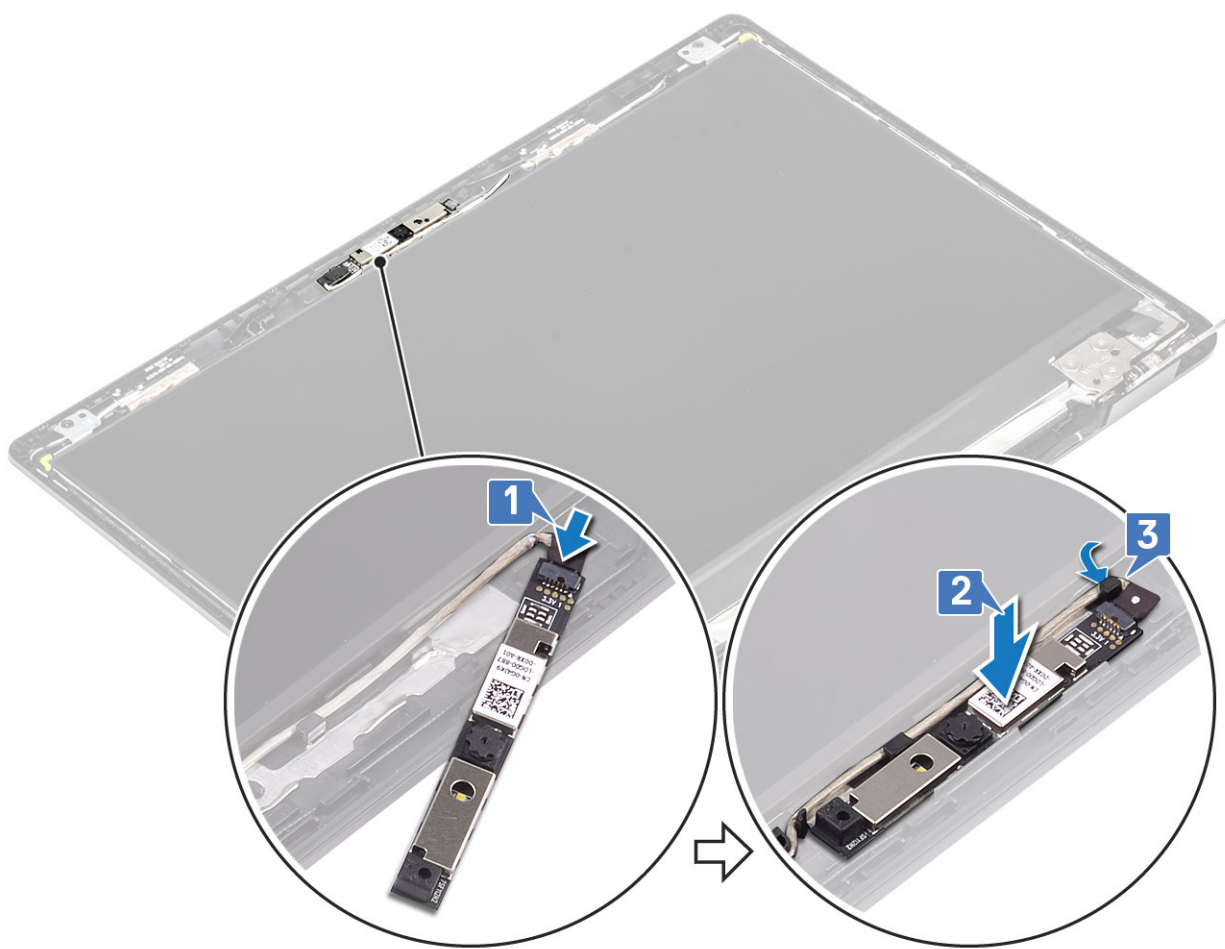
4. Peel the tape that secures the camera off the display back-cover [1].
5. Lift the camera module from the display back-cover [2].



Installing the camera

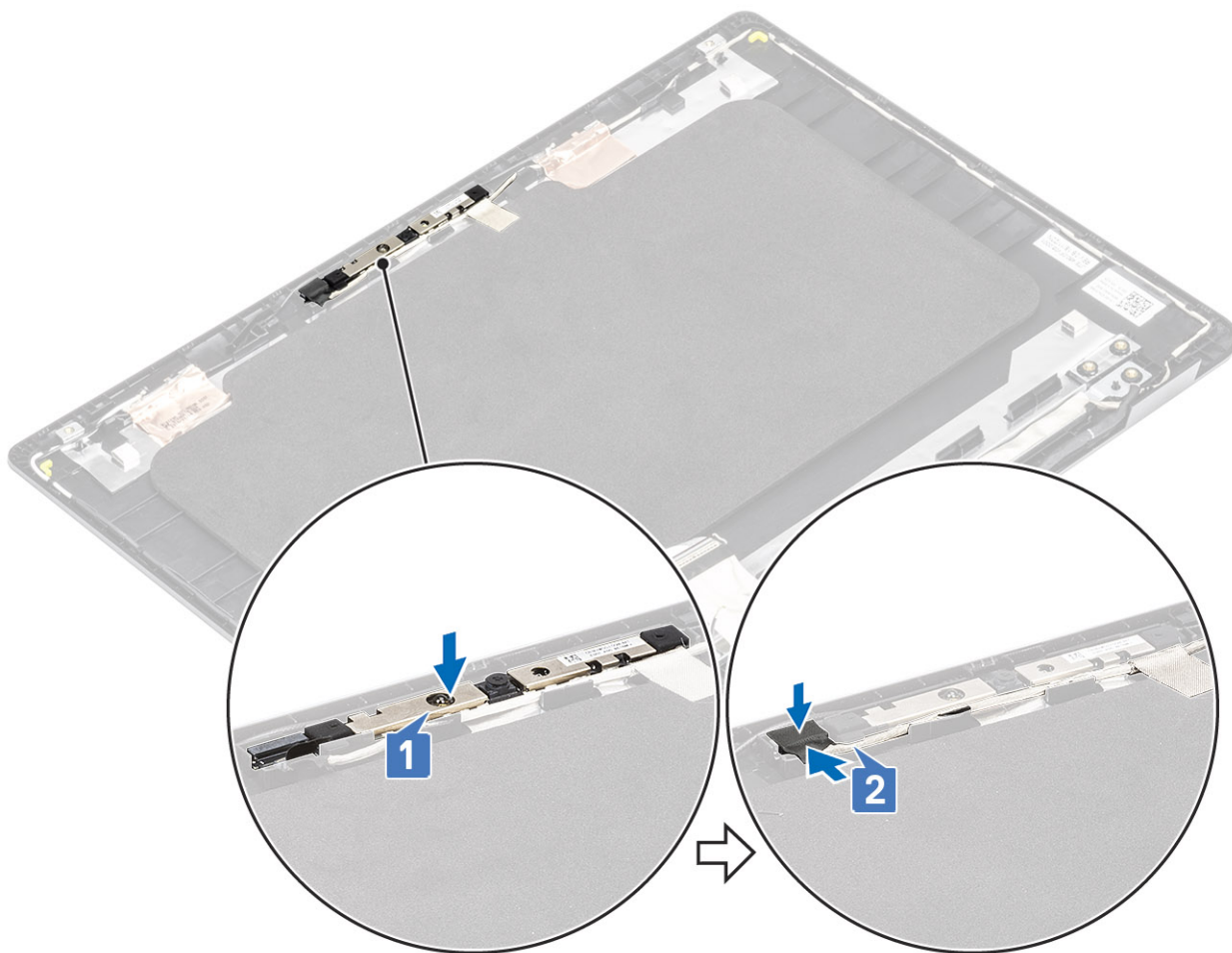
Steps

1. Connect the camera cable to the camera module [1].
2. Route the camera cable through the routing channels [2].
3. Using the alignment post, adhere the camera module on the display back-cover [3].



Following is the procedure to install the camera in systems with the Touch functionality.

4. Align and replace the camera module on the display back-cover [1].
5. Adhere the tape that secures the camera off the display back-cover [2].



Next steps

1. Replace the [display panel](#).
2. Replace the [display bezel](#).
3. Replace the [display assembly](#).
4. Replace the [WLAN](#).
5. Replace the [battery](#).
6. Replace the [base cover](#).
7. Replace the [SD memory card](#).
8. Follow the procedure in [after working inside your computer](#).

Palm-rest and keyboard assembly

Removing the palmrest and keyboard assembly

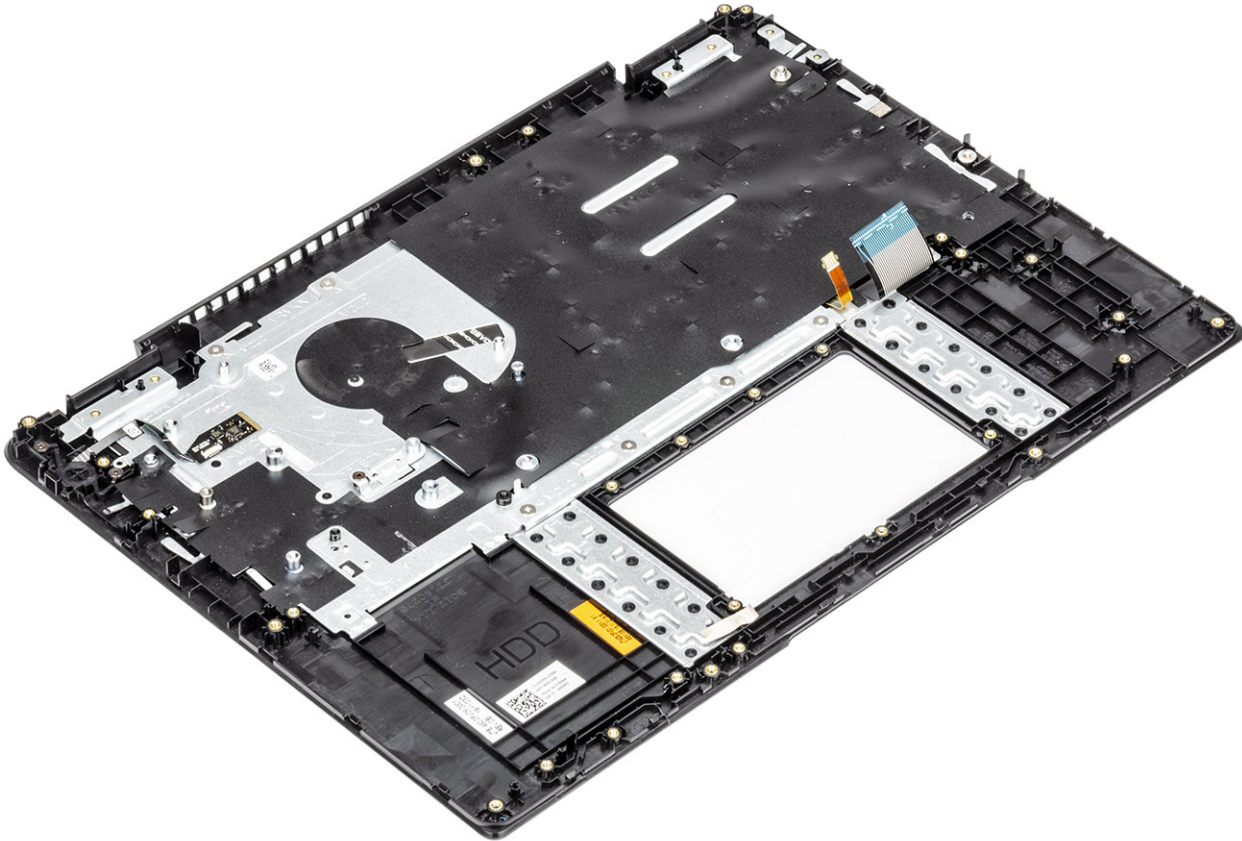
Prerequisites

1. Follow the procedure in [before working inside your computer](#)
2. Remove the [SD memory card](#)
3. Remove the [base cover](#)
4. Remove the [battery](#)
5. Remove the [WLAN](#)
6. Remove the [Memory](#)
7. Remove the [SSD](#)
8. Remove the [hard drive assembly](#)
9. Remove the [IO board](#)

10. Remove the [touch pad assembly](#)
11. Remove the [VGA daughter board](#)
12. Remove the [power button board](#)
13. Remove the [speakers](#)
14. Remove the [system fan](#)
15. Remove the [heatsink](#)
16. Remove the [system board](#)
17. Remove the [display assembly](#)

About this task

After performing the preceding steps, you are left with the palmrest and keyboard assembly.



NOTE: The power button board is not included with the service replacement palmrest assembly. Ensure the power button board is replaced onto the service replacement palmrest assembly.

Troubleshooting

Enhanced Pre-Boot System Assessment — ePSA diagnostics

About this task

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

The ePSA diagnostics can be initiated by the FN+PWR buttons while powering on the computer.

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

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

Running the ePSA Diagnostics

About this task

Invoke diagnostics boot by either of the methods that are suggested below:

Steps

1. Power on the computer.
2. As the computer boots, press the F12 key when the Dell logo is displayed.
3. In the boot menu screen, use Up/Down arrow key to select the **Diagnostics** option and then press **Enter**.

 **NOTE:** The Enhanced Pre-boot System Assessment window displays, listing all devices detected in the computer. The diagnostics starts running the tests on all the detected devices.

4. Press the arrow in the lower-right corner to go to the page listing.
The detected items are listed and tested.
5. To run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
6. Select the device from the left pane and click **Run Tests**.
7. If there are any issues, error codes are displayed.
Note the error code and contact Dell.
or
8. Shut down the computer.
9. Press and hold the Fn key, while pressing the power button, and then release both.
10. Repeat steps 3–7 above.

Diagnostics

Table 5. Diagnostics

	M-BIST	L-BIST
Purpose of diagnostic tool	Evaluates the health condition of the system board to have further resolution on "No Power", "No Post", and "No Video" symptom and reduce repeated dispatches.	Checks if the system board is supplying power to the LCD display by performing an LCD Power Rail test, which allows for isolation of "No Video" symptom to Mainboard, LCD or Cable.
Trigger	Pressing M key and Power button	Integrated into the single LED error code diagnostic. Automatically initiated during POST.
Indicator of fault	Battery LED light with "Solid Amber"	Battery indicator LED blink error code [Amber, White] = [2,8]
Repair instruction	Indicates a problem with the system board.	Indicates a problem with the system board.

M-BIST

M-BIST is the system board's built-in self-test diagnostics tool that improves the diagnostics accuracy of system board embedded controller (EC) failures. M-BIST can be manually initiated before POST.

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

How to run M-BIST?

M-BIST must be initiated on the system from a power-off state that is either connected to AC power or with battery only.

1. Press and hold both the **M** key on the keyboard and the **power button** to initiate M-BIST.
2. With both the **M** key and the **power button** that is held down, the battery indicator LED may exhibit two states.
 - a. **OFF:** No fault detected with the system board.
 - b. **SOLID AMBER:** Indicates a problem with the system board.

L-BIST

L-BIST (LCD Power Rail Test) is an enhancement to the single LED error code diagnostics and is automatically initiated during POST. L-BIST will check the LCD power rail. If there is no power being supplied to the LCD (i.e., the L-BIST circuit fails), the battery status LED will flash an error code [2,8].

NOTE: If L-BIST fails, LCD-BIST cannot function as there is no power being supplied to the LCD.

Running the L-BIST

1. Press the power button to start up the system.
2. If the system does not start up normally, look at the battery status LED. If the battery status LED flashes an error code [2,8], there is a failure on the LCD power rail of the system board, hence there is no power supplied to the LCD.
3. Replace the system board in this case.

Diagnostic LED

This section details the diagnostic features of the battery LED.

Instead of beep codes, errors are indicated through the bicolor Battery Charge/Status LED. A specific blink pattern is followed by flashing a pattern of flashes in amber, followed by white. The pattern then repeats.

NOTE: The diagnostic pattern consists of a two-digit number being represented by a first group of LED blinks (1–9) in amber, followed by a 1.5 s pause with the LED off, and then a second group of LED blinks (1–9) in white. This is then followed by a three second pause, with the LED off, before repeating over again. Each LED blink takes 0.5 s.

The system will not shut down when displaying the Diagnostic Error Codes.

Diagnostic Error Codes always supersede any other use of the LED. For instance, on Notebooks, battery codes for Low Battery or Battery Failure situations will not be displayed when Diagnostic Error Codes are being displayed.

Table 6. Diagnostic LED

Blinking Pattern		Possible Problem	Suggested Resolution
Amber	White		
2	1	CPU failure	Replace the system board.
2	2	System Board failure (included BIOS corruption or ROM error)	Flash latest BIOS version. If problem persists, replace the system board.
2	3	No Memory/ RAM detected	Confirm that the memory module.. is installed properly. If problem persists, replace the memory module
2	4	Memory/RAM failure	Replace the memory module.
2	5	Invalid memory installed	Replace the memory module.
2	6	System board/Chipset Error/Clock failure/Gate A20 failure/Super I/O failure/Keyboard controller failure	Replace the system board.
2	7	LCD failure	Replace the LCD.
2	8	No power supply to the LCD due to LCD power rail failure	Replace the system board.
3	1	RTC power failure	Replace the CMOS battery.
3	2	PCI or Video card/chip failure	Replace the system board.
3	3	BIOS Recovery image not found	Flash latest BIOS version. If problem persists, replace the system board.
3	4	BIOS Recovery image found but invalid	Flash latest BIOS version. If problem persists, replace the system board.
3	5	EC ran into power sequencing failure.	Flash latest BIOS version. If problem persists, replace the system board.
3	6	Flash corruption detected by SBIOS	Flash latest BIOS version. If problem persists, replace the system board.
3	7	Timeout waiting on ME to reply to HECI message	Flash latest BIOS version. If problem persists, replace the system board.

Battery status LED

Table 7. Battery status LED


Power Source	LED behavior	System Power State	Battery Charge Level
AC Adapter	Solid White	S0	0-100%
AC Adapter	Solid White	S4/S5	< Fully Charged
AC Adapter	Off	S4/S5	Fully Charged
Battery	Amber	S0	< = 10%
Battery	Off	S0	> 10%
Battery	Off	S4/S5	0-100%

- **S0 (ON)** — System is turned on.
- **S4** — The system consumes the least power compared to all other sleep states. The system is almost at an OFF state, expect for a trickle power. The context data is written to hard drive.
- **S5 (OFF)** — The system is in a shutdown state.

Getting help

Contacting Dell

Prerequisites

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

About this task

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

Steps

1. Go to **Dell.com/support**.
2. Select your support category.
3. Verify your country or region in the **Choose a Country/Region** drop-down list at the bottom of the page.
4. Select the appropriate service or support link based on your need.