Dell Latitude 3500

Service Manual

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DELL Technologies

Notes, cautions, and warnings

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

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

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

Contents

Chapter 1: Working on your computer 6
Safety instructions 6
Turning off your computer — Windows 10 6
Before working inside your computer 7
After working inside your computer 7
Screw list 7

Chapter 2: Technology and components 9
DDR4 9
USB features 10
USB Type-C 12
Intel Optane memory 12
Enabling Intel Optane memory 13
Disabling Intel Optane memory 13
Intel UHD Graphics 620 13
Nvidia GeForce MX130 equivalent 14

Chapter 3: Major components of your system 15

Chapter 4: Removing and installing components 17
Recommended tools 17
Secure Digital Card 17
Removing the Secure Digital card 17
Installing the Secure Digital card 18
SIM Card 18
Removing the SIM card 18
Installing the SIM card 19
Base cover 20
Removing the base cover 20
Installing the base cover 23
Memory modules 25
Removing the memory module 25
Installing the memory module 26
WLAN card 27
Removing the WLAN card 27
Installing the WLAN card 28
WWAN card 29
Removing the WWAN card 29
Installing the WWAN card 30
WWAN daughterboard 31
Removing the WWAN daughterboard 31
Installing the WWAN daughterboard 33
Hard drive 35
Removing the hard drive assembly 35

Installing the hard drive assembly....36
Coin-cell battery....38
Removing the coin cell battery....38
Installing the coin cell battery....39
Battery....39
Rechargeable Li-ion battery precautions....39
Removing the battery....40
Installing the battery....41
Speakers....43
Removing the speakers....43
Installing the speakers....44
Solid-state drive/Intel Optane memory module....46
Removing the M.2 2280 Solid-state drive or Intel Optane memory—Optional....46
Installing the M.2 2280 Solid-state drive or Intel Optane memory - Optional....48
Removing the M.2 Solid-state drive bracket....49
Installing the Solid-state drive bracket....50
Removing the M.2 2230 Solid-state drive....51
Installing the M.2 2230 Solid-state drive....53
IO board....55
Removing the IO board....55
Installing the IO board....57
Touchpad....59
Removing the touchpad assembly....59
Installing the touch pad assembly....61
System fan....64
Removing the system fan....64
Installing the system fan....66
Heat sink....68
Removing the heatsink—UMA....68
Installing the heatsink—UMA....68
Removing the heatsink—discrete....69
Installing the heatsink—discrete....70
VGA daughterboard....71
Removing the VGA daughterboard....71
Installing the VGA daughterboard....73
Power-button board....75
Removing the power button board with optional fingerprint reader....75
Installing the power button board with optional fingerprint reader....77
System board....78
Removing the system board....78
Installing the system board....81
Display assembly....84
Removing the display assembly....84
Installing the display assembly....89
Display bezel....93
Removing the display bezel....93
Installing the display bezel....95
Display panel....97
Removing the display panel....97
Installing the display panel....99

Display hinges....102
Removing the display hinges....102
Installing the display hinges....103
Display cable....104
Removing the display cable....104
Installing the display cable....106
Camera....108
Removing the camera....108
Installing the camera....110
Keyboard....112
Removing the keyboard....112
Installing the keyboard....113
Palmrest....114
Removing the palmrest....114

Chapter 5: Troubleshooting....116
Handling swollen rechargeable Li-ion batteries....116
Dell SupportAssist Pre-boot System Performance Check diagnostics....116
Running the SupportAssist Pre-Boot System Performance Check....117
Built-in self-test (BIST)....117
M-BIST....117
LCD Power rail test (L-BIST)....118
LCD Built-in Self-Test (BIST)....118
Diagnostic LED....118
Battery status LED....119
Recovering the operating system....120
Real-Time Clock (RTC Reset)....120
Backup media and recovery options....120
Wi-Fi power cycle....120
Drain residual flea power (perform hard reset)....120

Chapter 6: Getting help....122
Contacting Dell....122

1

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

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

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

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

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

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

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

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

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

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

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

Steps

1. Save and close all open files and exit all open applications.
2. Shut down your computer. For Windows operating system, 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.

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

5. Remove any media card and optical disc from your computer, if applicable.

After working inside your computer

About this task

CAUTION: Leaving stray or loose screws inside your computer may severely damage your computer.

Steps

1. Replace all screws and ensure that no stray screws remain inside your computer.
2. Connect any external devices, peripherals, or cables you removed before working on your computer.
3. Replace any media cards, discs, or any other parts that you removed before working on your computer.
4. Connect your computer and all attached devices to their electrical outlets.
5. Turn on your computer.

Screw list

The table provides the list of screws that are used for securing different components.

NOTE: Screw color may vary depending on the configuration ordered.

Table 1. Screw list

Component	Screw type	Quantity	Screw image
Base cover	M2.5x5 (captive) M2.5x7.5 (captive) M2.5x8.5 (captive)	4 4 2	

Table 1. Screw list (continued)

Component	Screw type	Quantity	Screw image
Battery	M2x3	4	
Hard drive	M2x4.5	4	
I/O board	M2x3	2	
Touchpad	M2x2	7	
WLAN	M2x3	1	
WWAN	M2x3	1	
WWAN daughterboard	M2x3	2	
Solid-state drive thermal plate	M2x3	1	
M.2 Solid-state drive bracket	M2x2	1	
System Fan	M2x3	2	
Heat sink	Captive screws	4	NA
VGA daughterboard	M2x3	2	
Power button board	M2x3	2	
System board	M2x3 M2x2	2 2	 
Display assembly	M2.5x5	4	
Display panel	M2x2.5	4	
Display hinges	M2x2.5 M2.5x2.5	2 6	 

2

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.

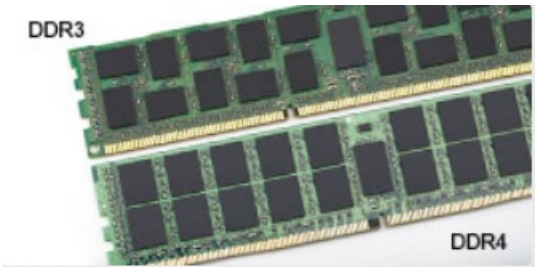


Figure 1. Notch difference

Increased thickness

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

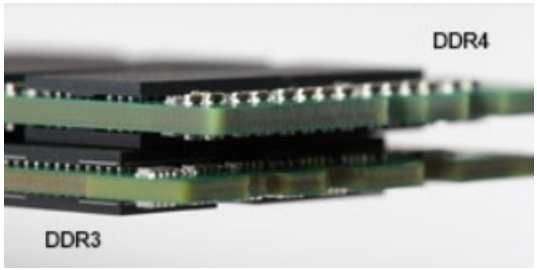


Figure 2. Thickness difference

Curved edge

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

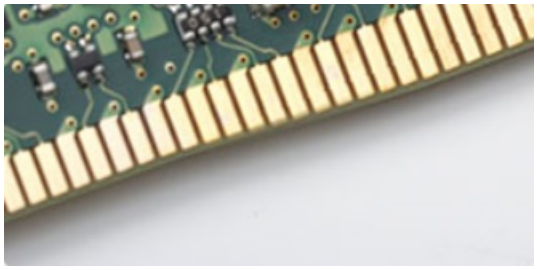


Figure 3. Curved edge

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.

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 drivers, and printers.

Table 2. 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	SuperSpeed	2010
USB 3.1 Gen 2	10 Gbps	SuperSpeed	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.

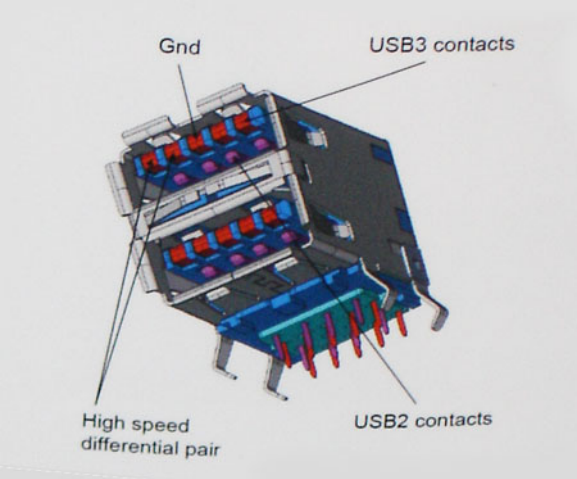
Speed

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 4.8 Gbps. 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 480 Mbps and 12 Mbps 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 320 Mbps (40 MB/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 is10Gbps . 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 3. Intel Optane memory specifications

Feature	Specifications
Interface	PCIe 3x2 NVMe 1.1
Connector	M.2 card slot (2230/2280)
Configurations supported	• 7th Generation or higher Intel Core i3/i5/i7 processor • Windows 10 64-bit version or higher

Table 3. Intel Optane memory specifications (continued)

Feature	Specifications
	• 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 PCIe 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 4. 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

Table 4. Intel UHD Graphics 620 specifications (continued)

Intel UHD Graphics 620	
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

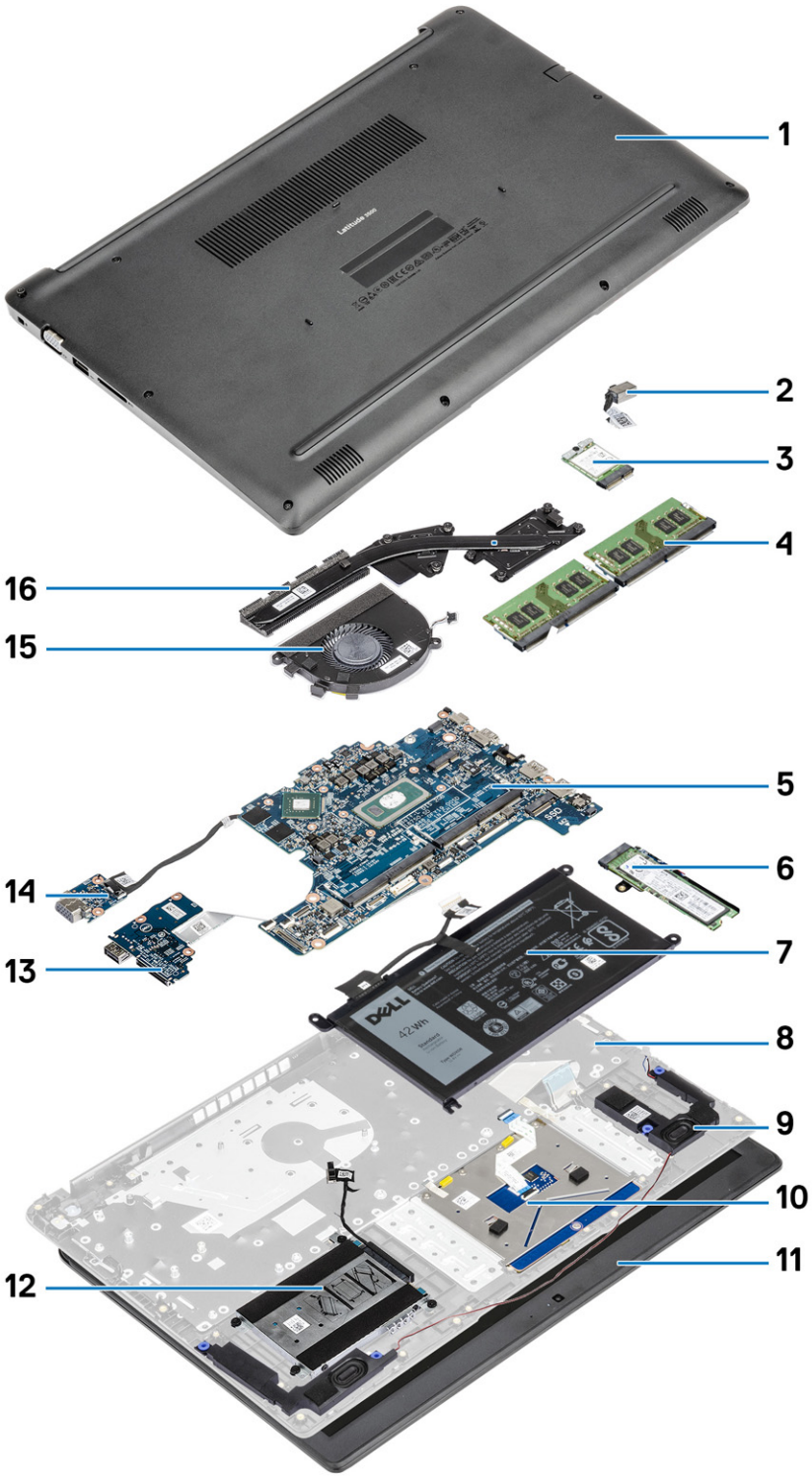
Nvidia GeForce MX130 equivalent

Table 5. 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

3

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.

4

Removing and installing components

Recommended tools

The procedures in this document may require the following tools:

- Phillips #0 screwdriver
- Phillips #1 screwdriver
- Plastic scribe-Recommended for field technician

Secure Digital Card

Removing the Secure Digital card

Prerequisites

1. Follow the procedure in Before working inside your computer

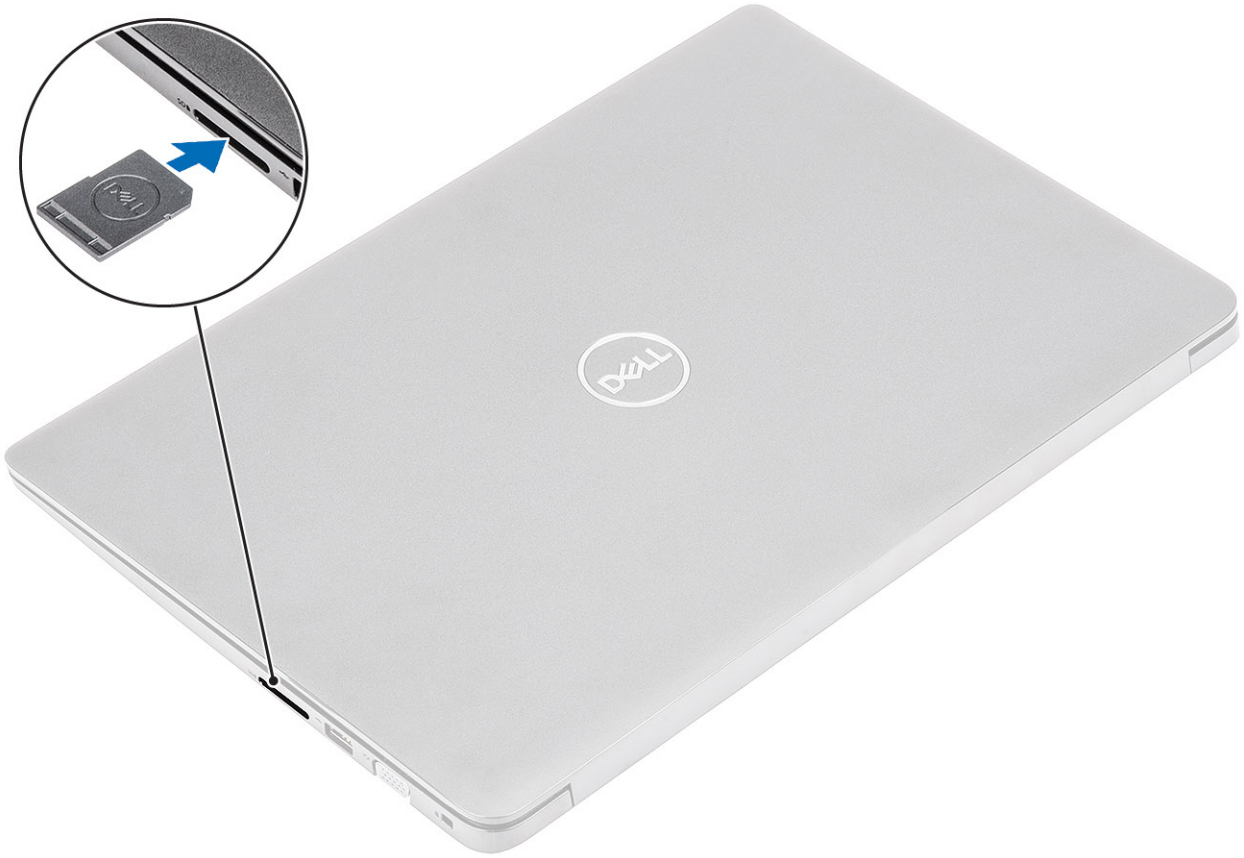
Steps

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.



SIM Card

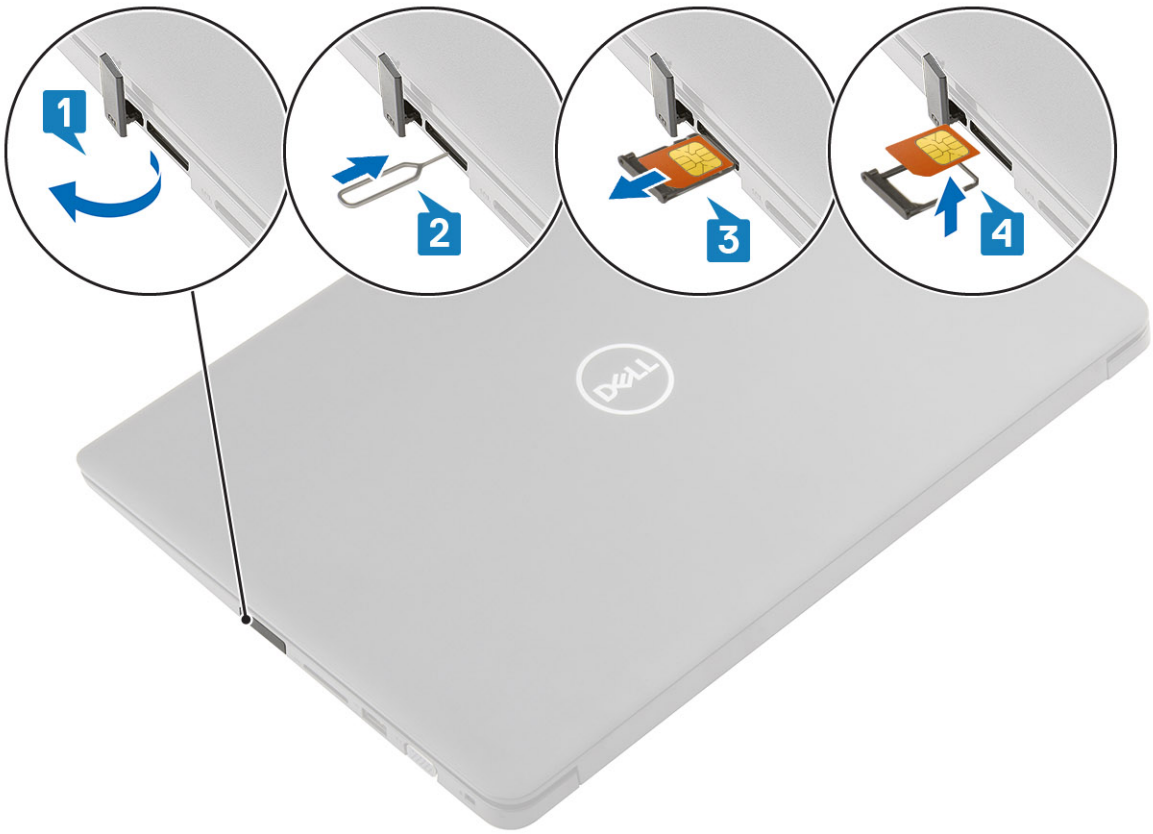
Removing the SIM card

Prerequisites

1. Follow the procedure in Before working inside your computer

Steps

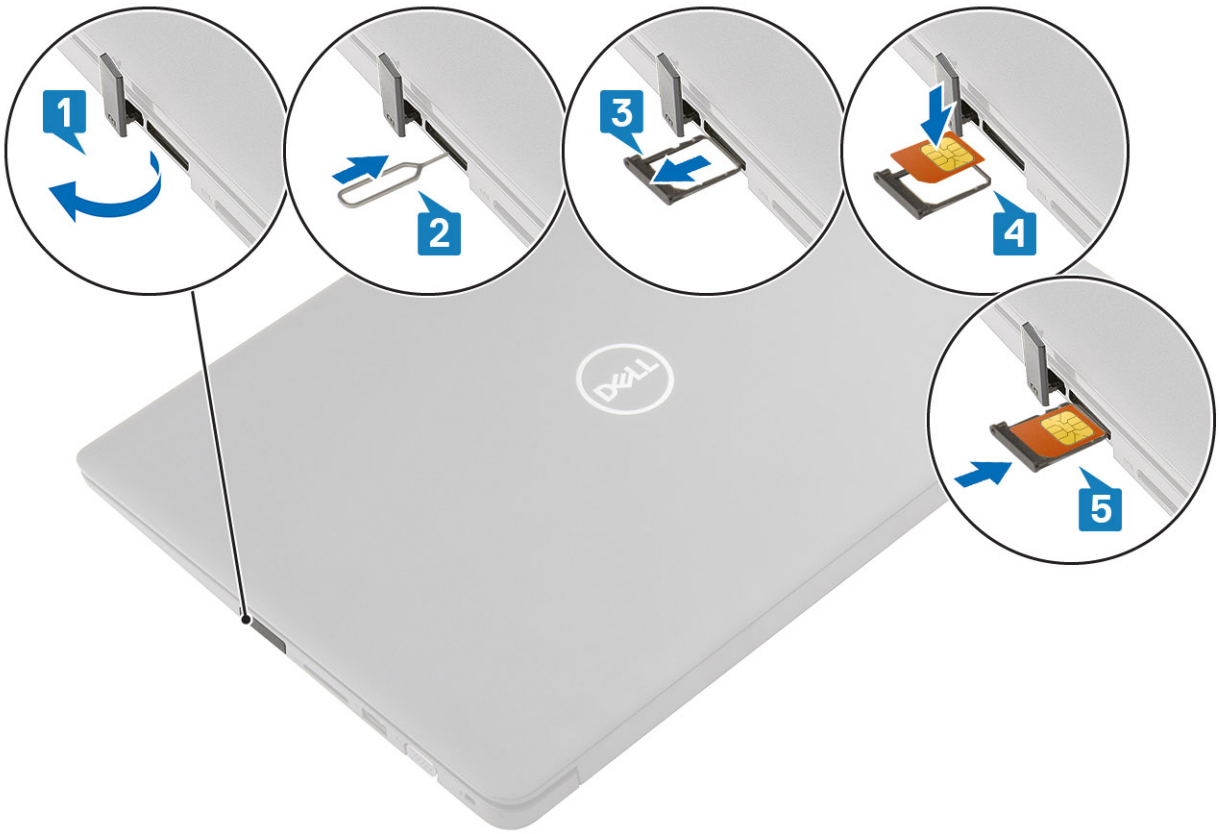
1. Open the latch that covers the SIM card slot to release it from the system [1].
2. Insert a needle in the slot and push it to eject the SIM card tray [2].
3. Pull the SIM card try and remove the SIM card from the SIM card tray [3] and [4].



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 try and place the SIM card on the SIM cad 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.

Base cover

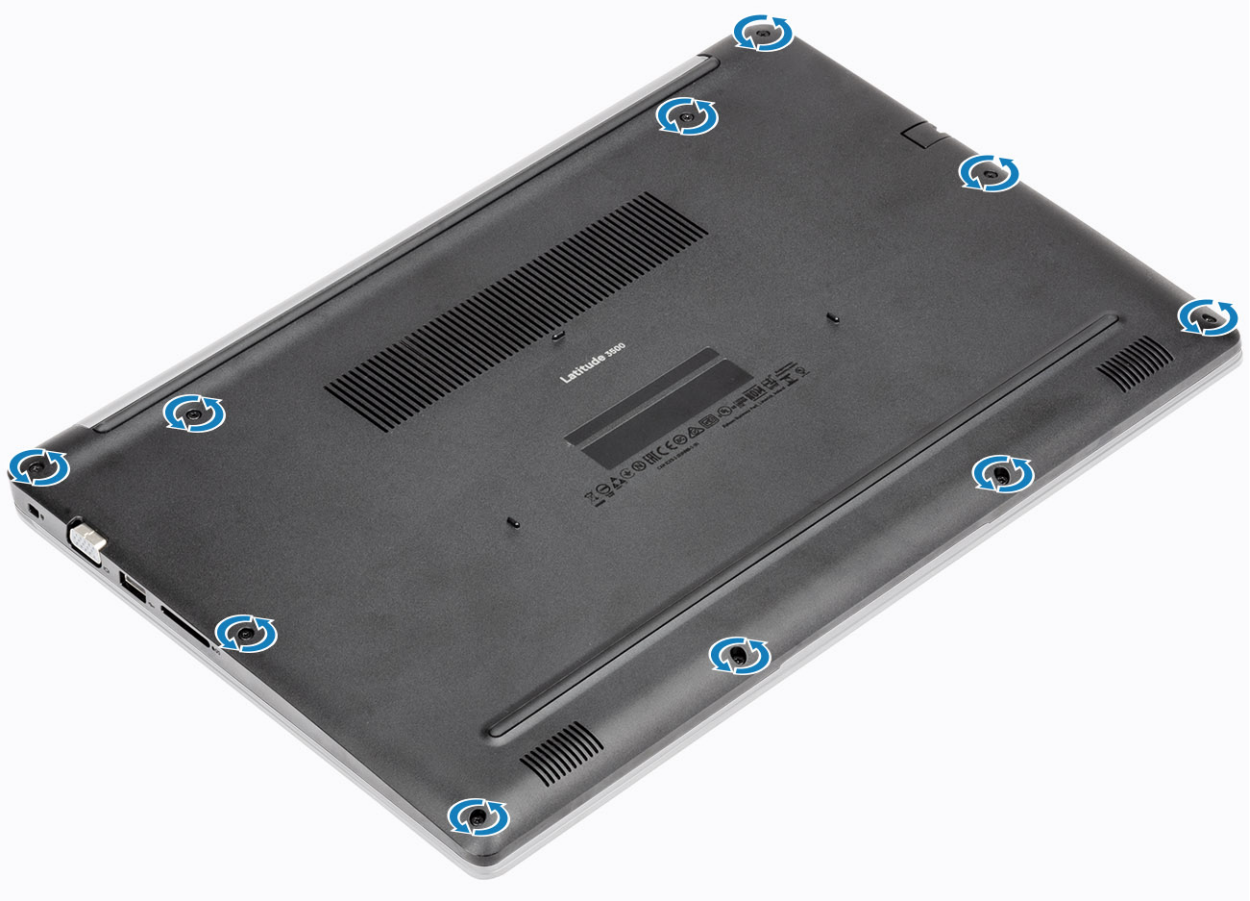
Removing the base cover

Prerequisites

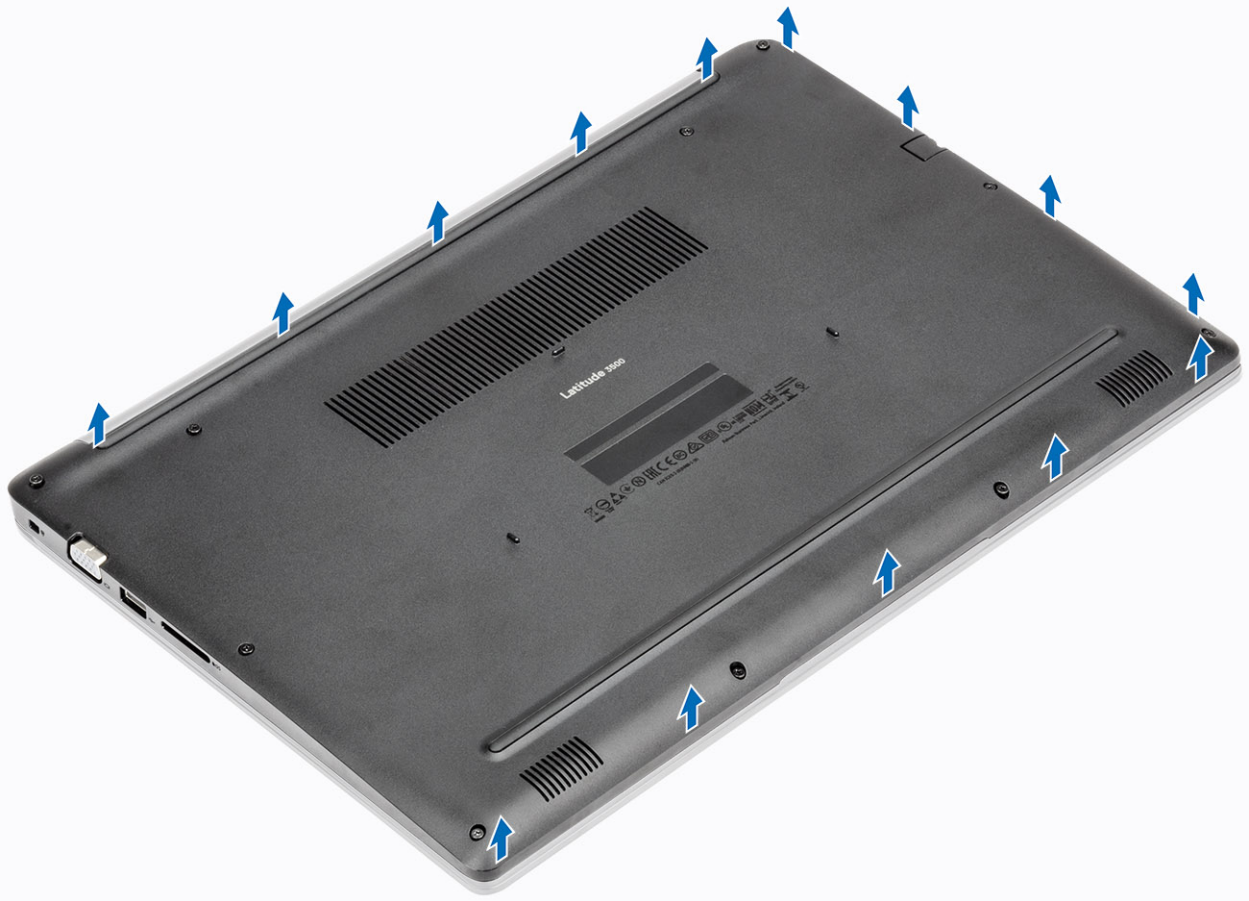
1. Follow the procedure in before working inside your computer
2. Remove the SD memory card

Steps

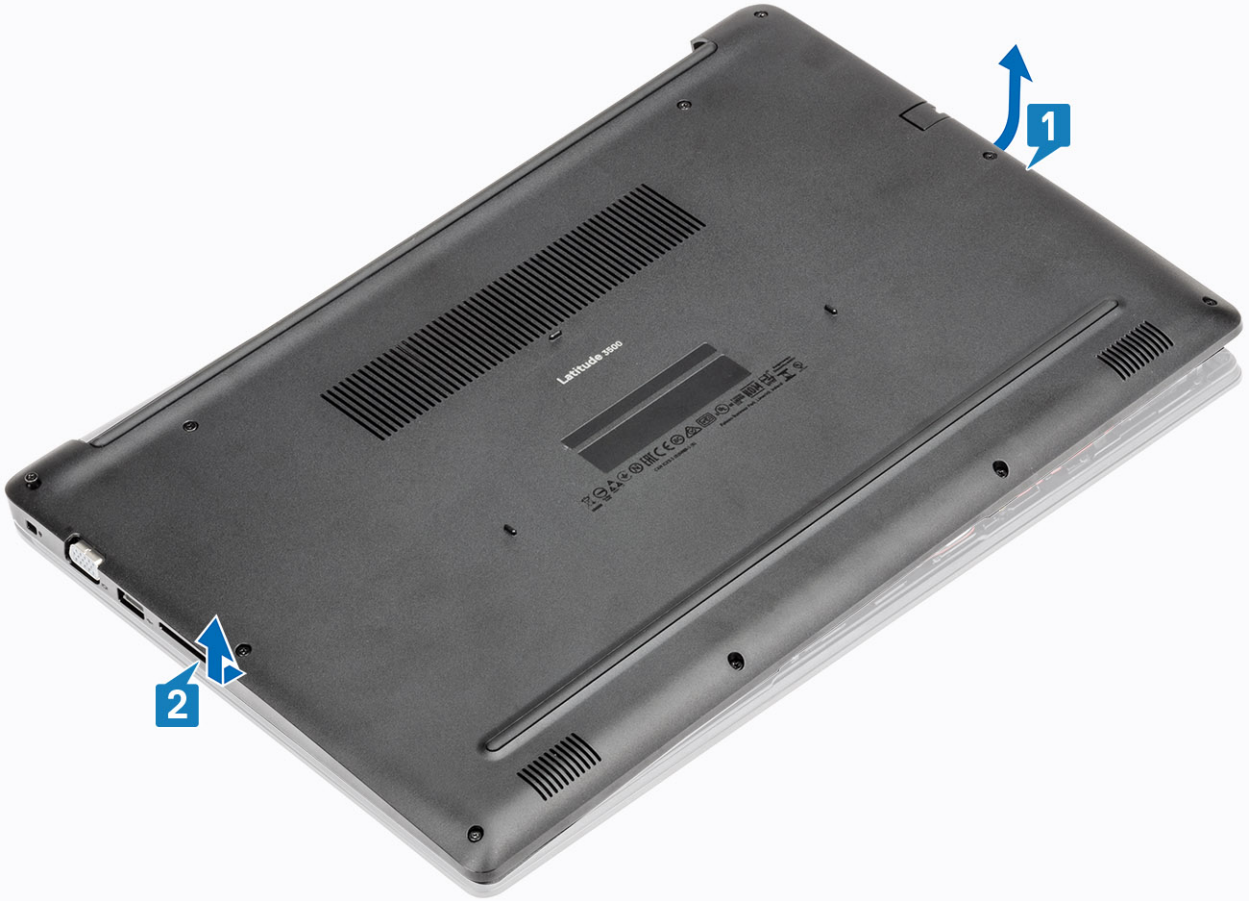
1. Loosen the ten captive screws that secure the base cover to the palmrest and keyboard assembly.



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



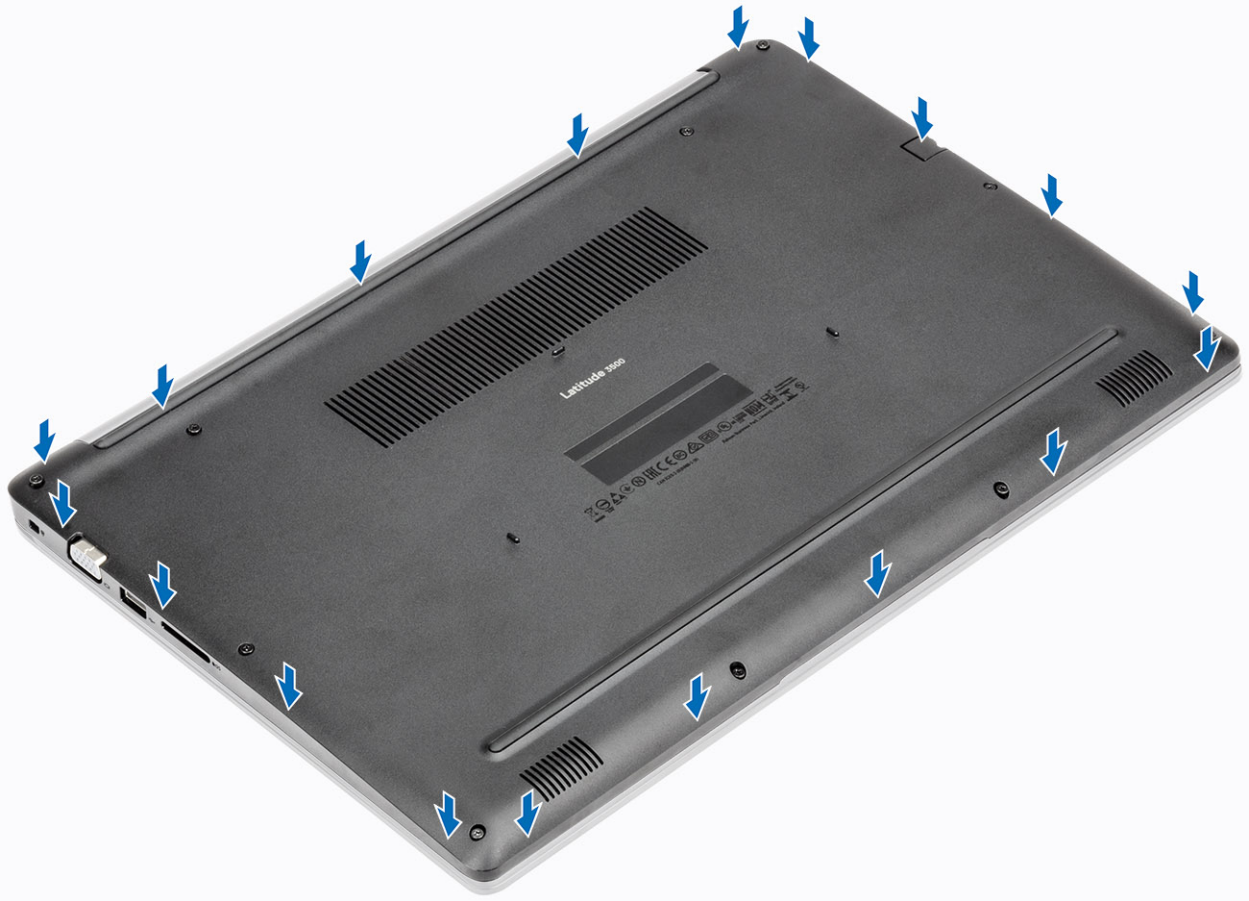
3. Lift the right side of the base cover [1], and remove it off the palmrest and keyboard assembly [2].



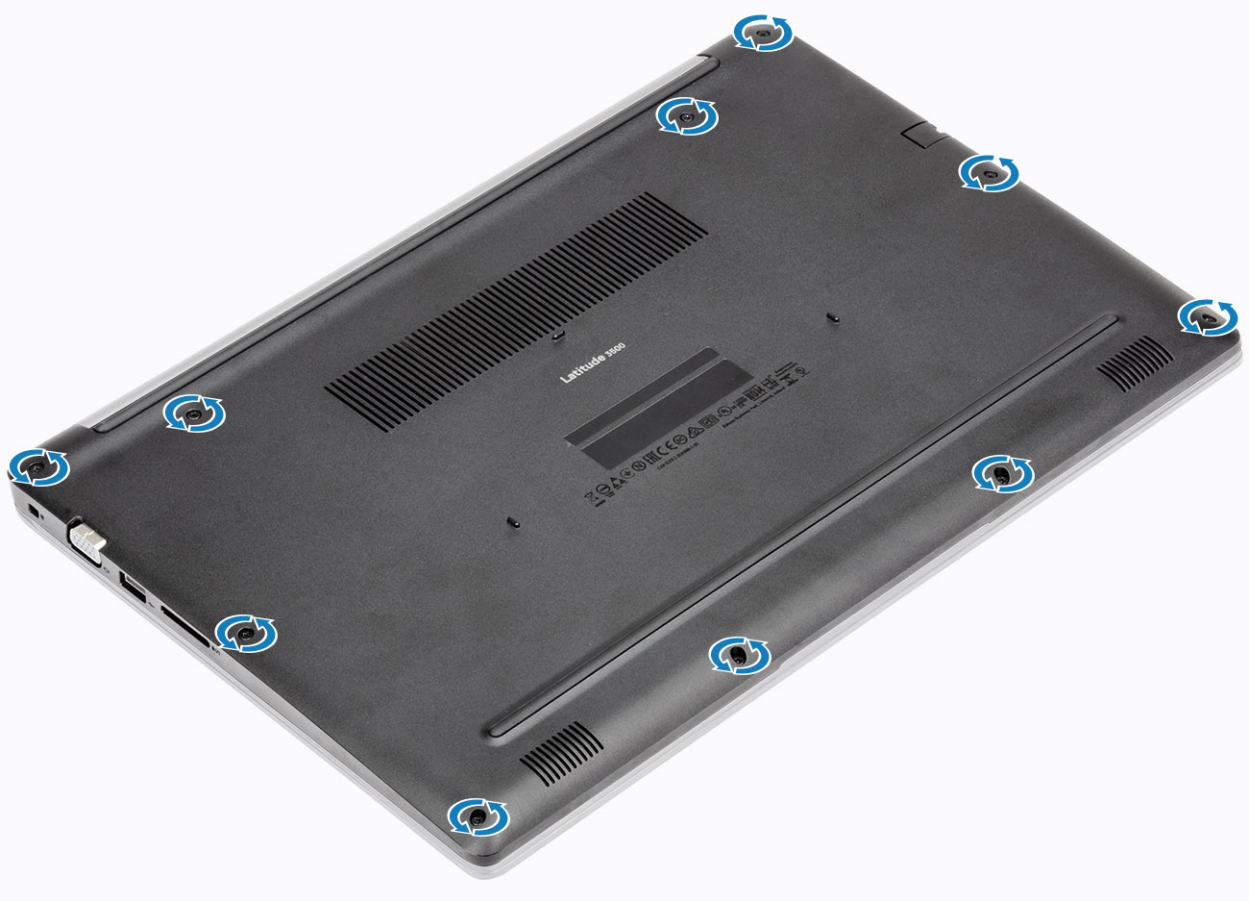
Installing the base cover

Steps

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



2. Tighten the ten 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

Memory modules

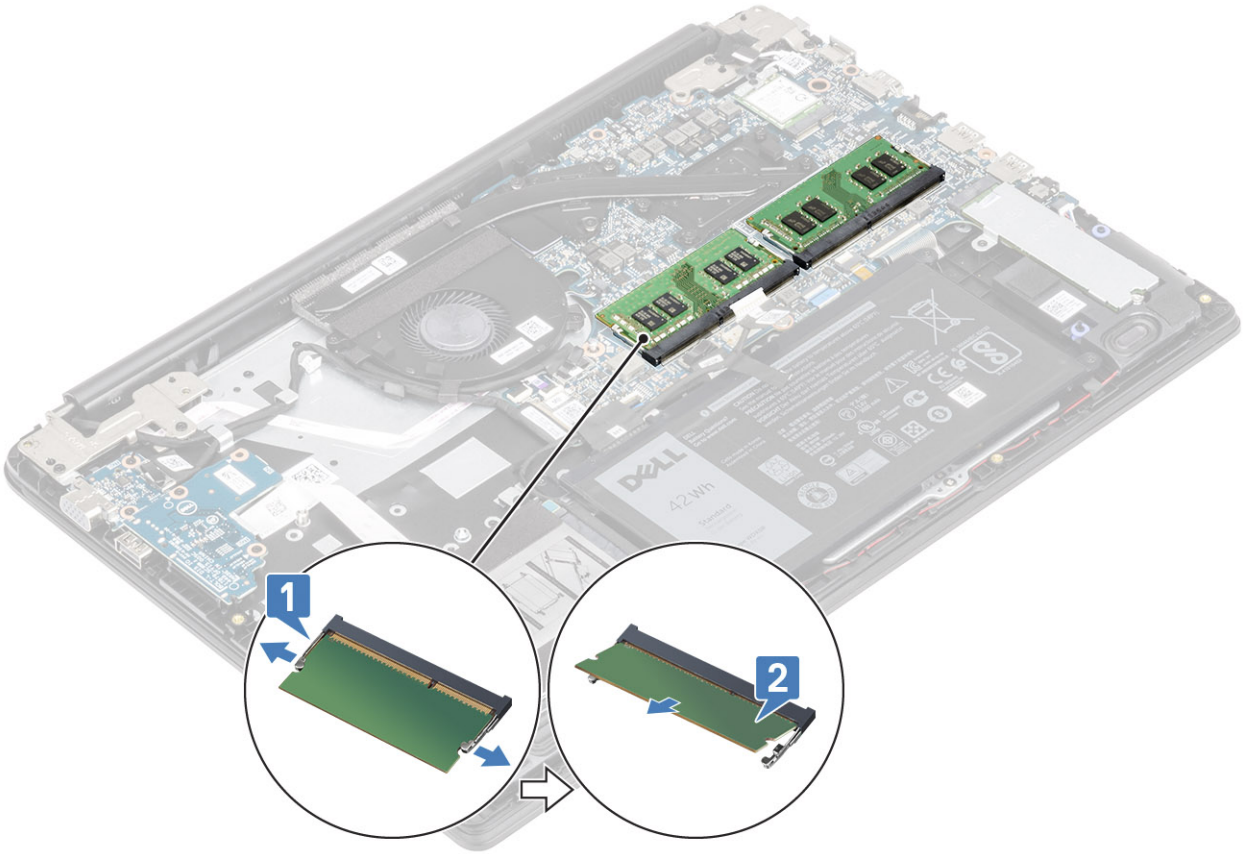
Removing the memory module

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].

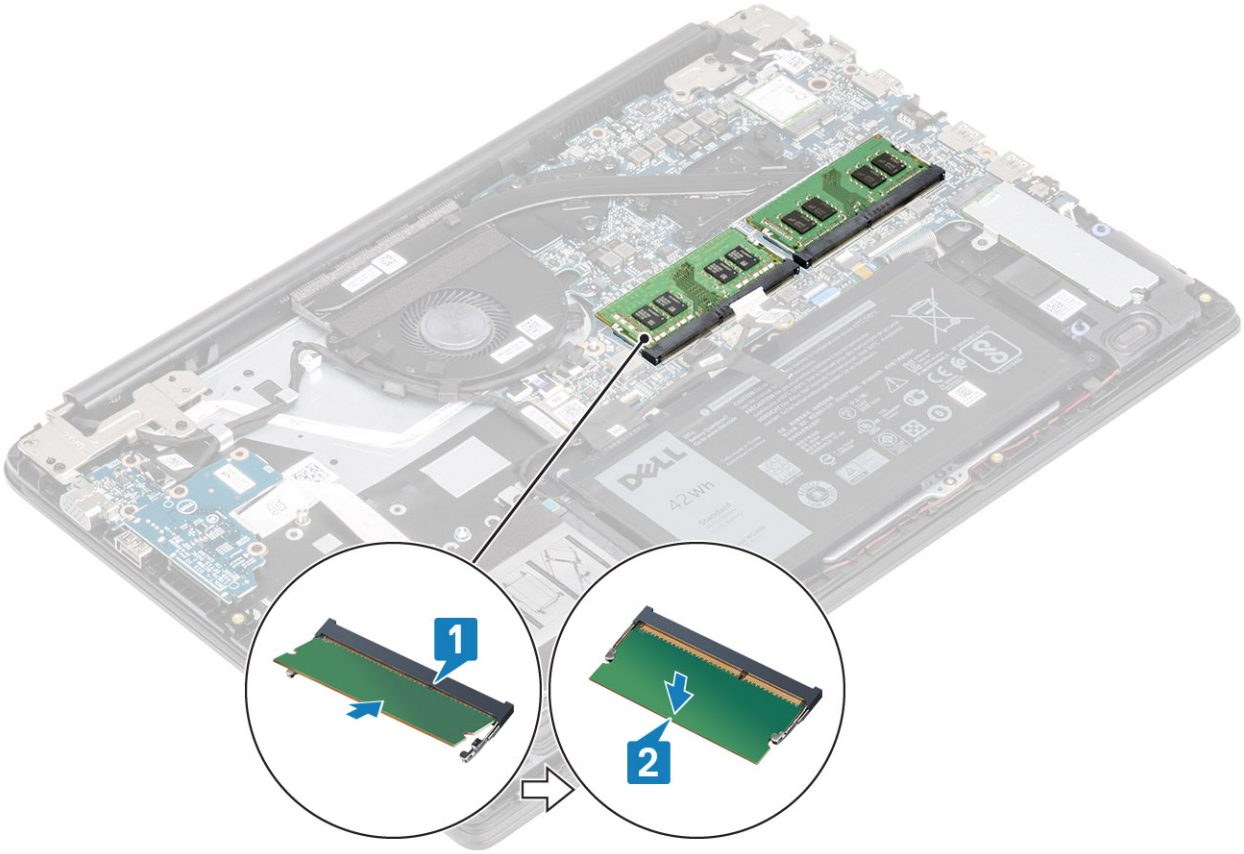


Installing the memory module

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. Reconnect the battery cable.
2. Replace the base cover
3. Replace the SD memory card
4. Follow the procedure in after working inside your computer

WLAN card

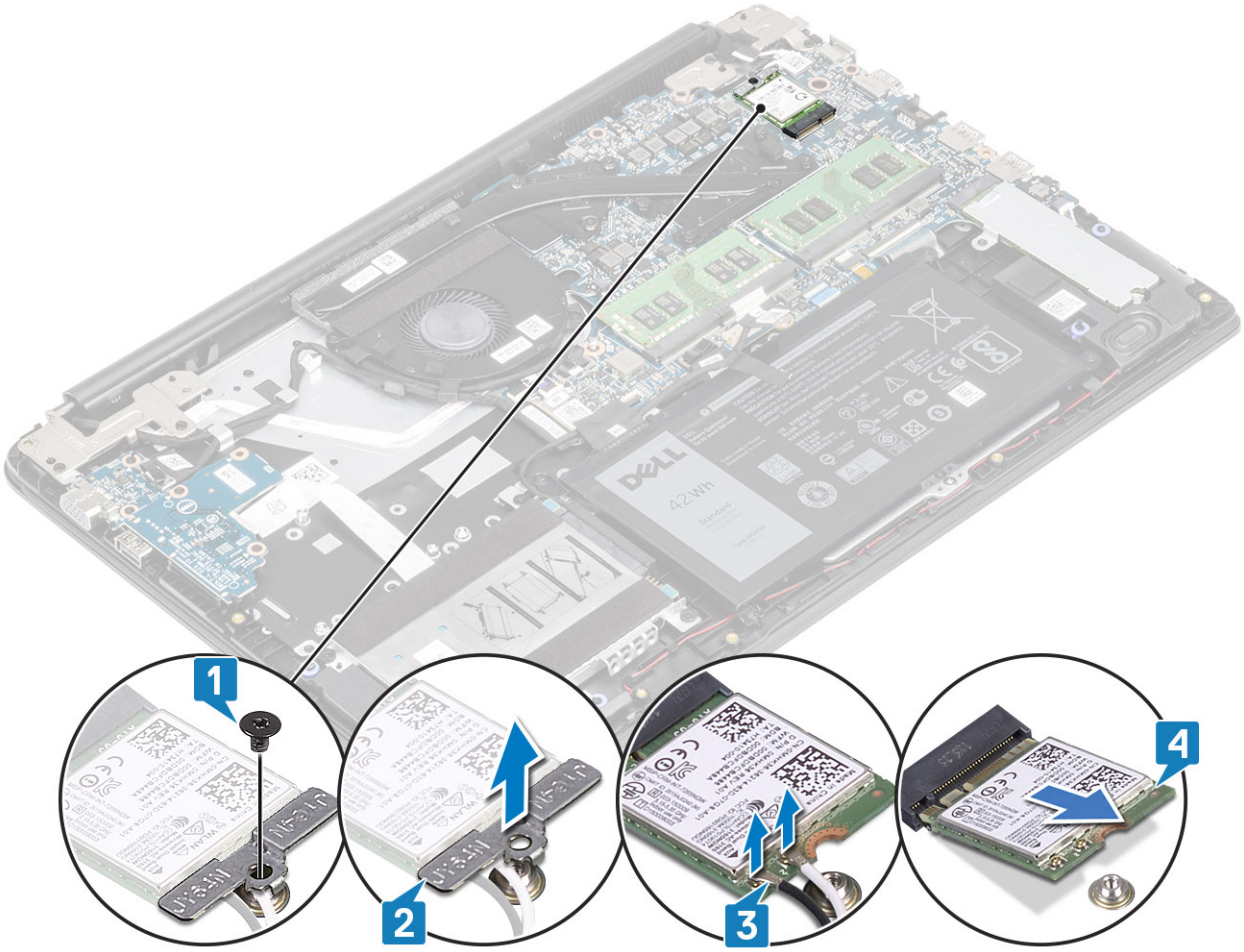
Removing the WLAN card

Prerequisites

1. Follow the procedure in before working inside your computer
2. Remove the 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].



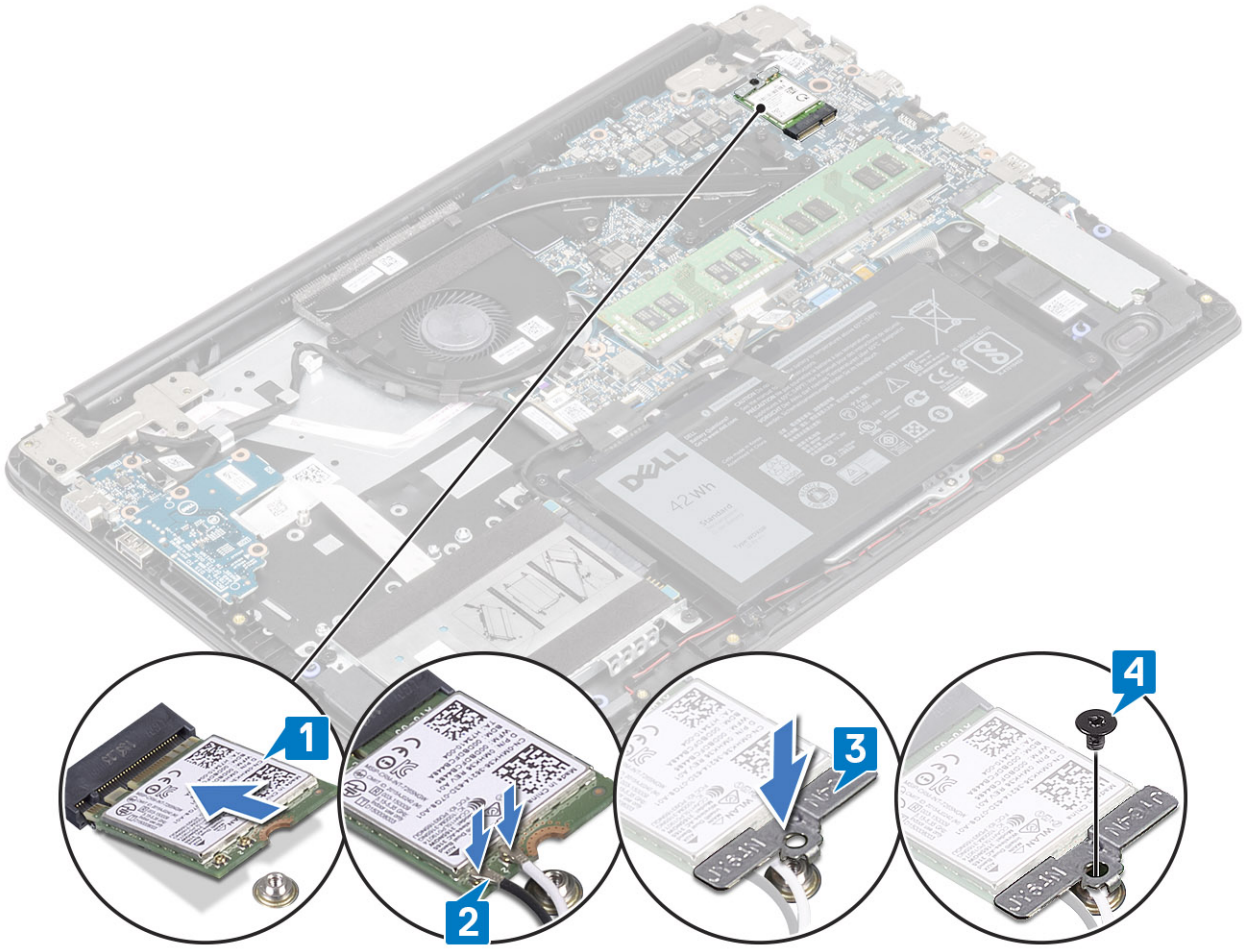
Installing the WLAN card

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. Reconnect the battery cable.
2. Replace the base cover.
3. Replace the SD memory card.
4. Follow the procedure in after working inside your computer.

WWAN card

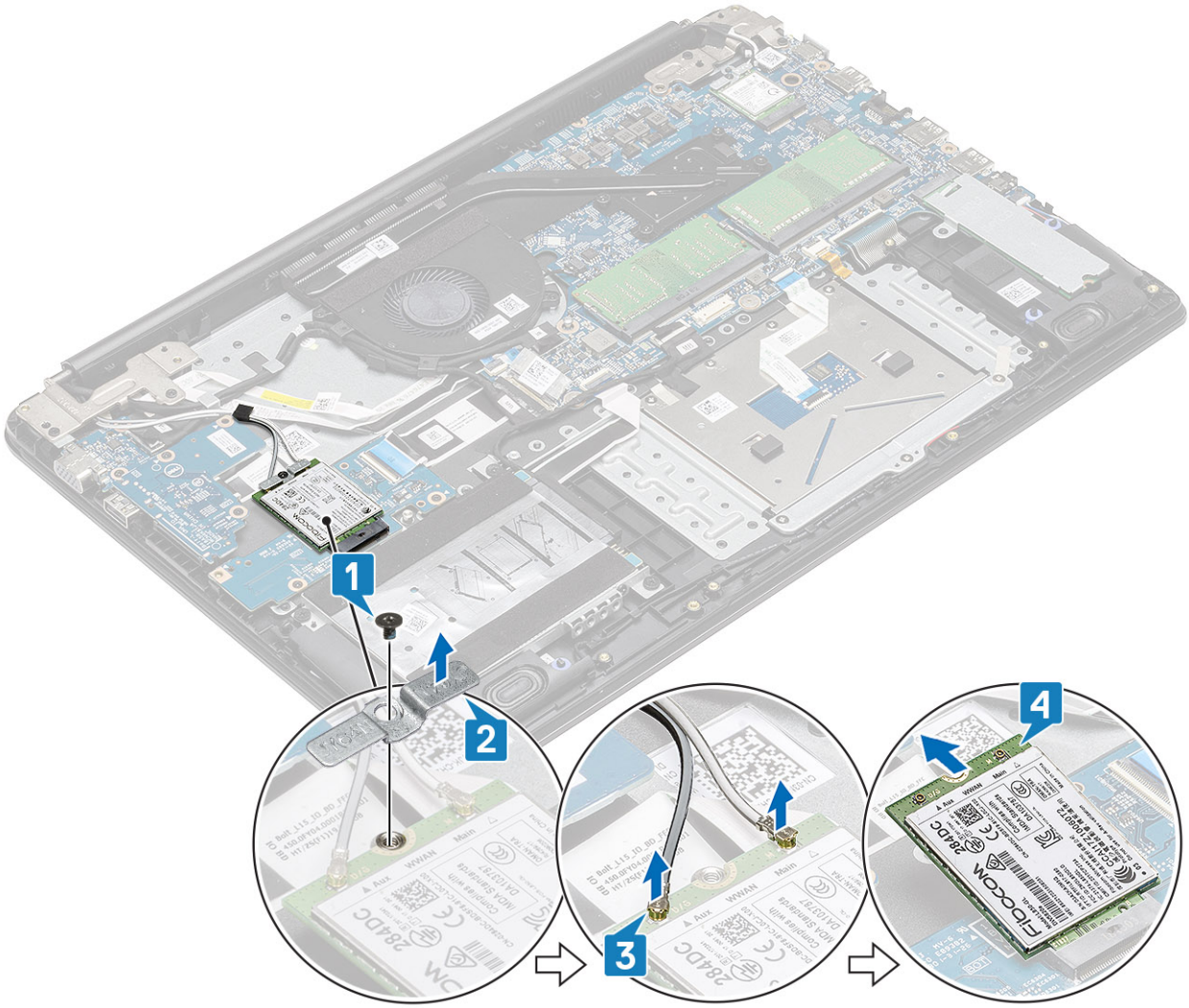
Removing the WWAN card

Prerequisites

1. Follow the procedure in before working inside your computer
2. Remove the SD memory card
3. Remove the SIM card.
4. Remove the base cover
5. Disconnect the battery cable.

Steps

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



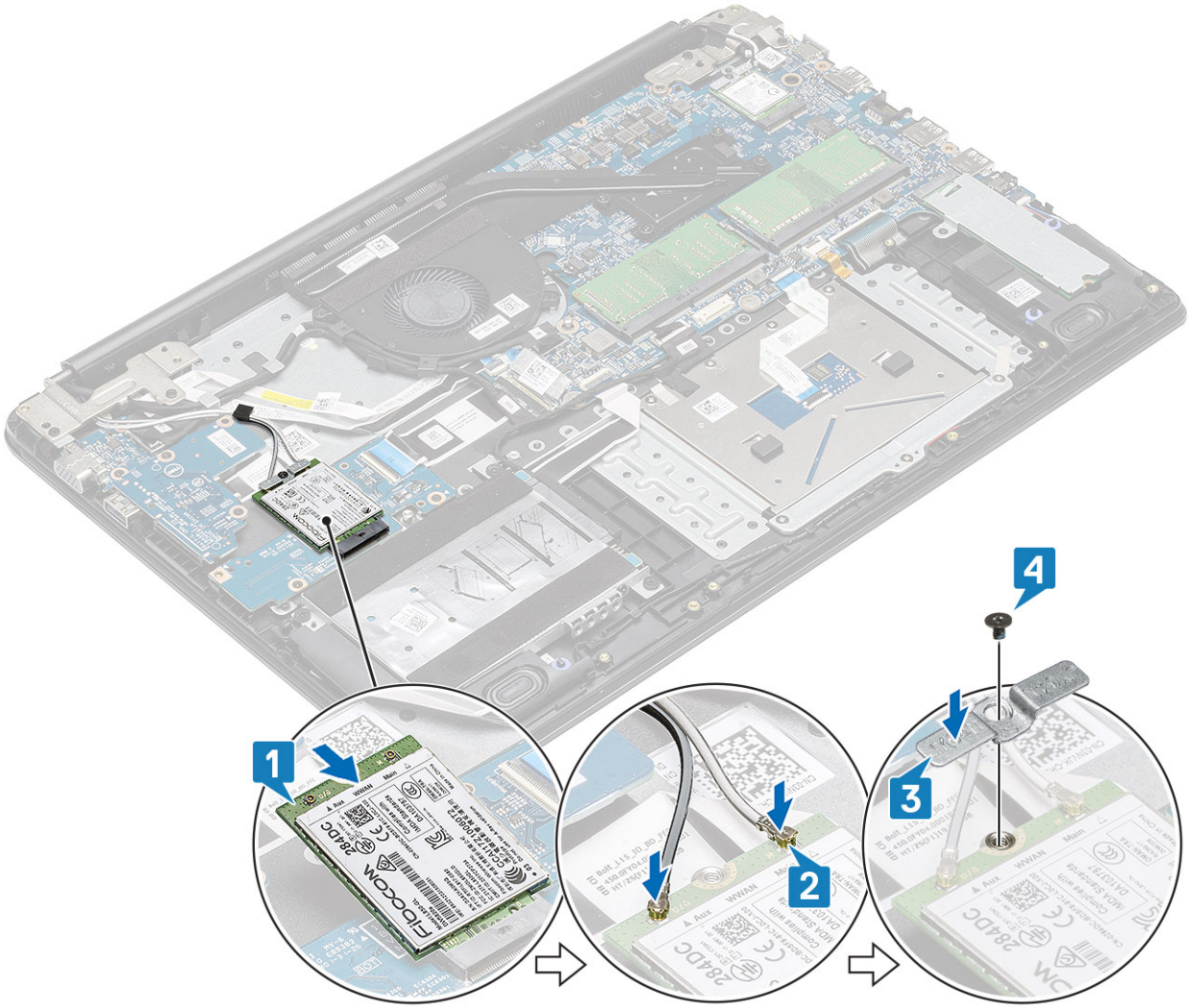
Installing the WWAN card

About this task

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

Steps

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



Next steps

1. Reconnect the battery cable.
2. Replace the base cover.
3. Replace the SIM card
4. Replace the SD memory card.
5. Follow the procedure in after working inside your computer.

WWAN daughterboard

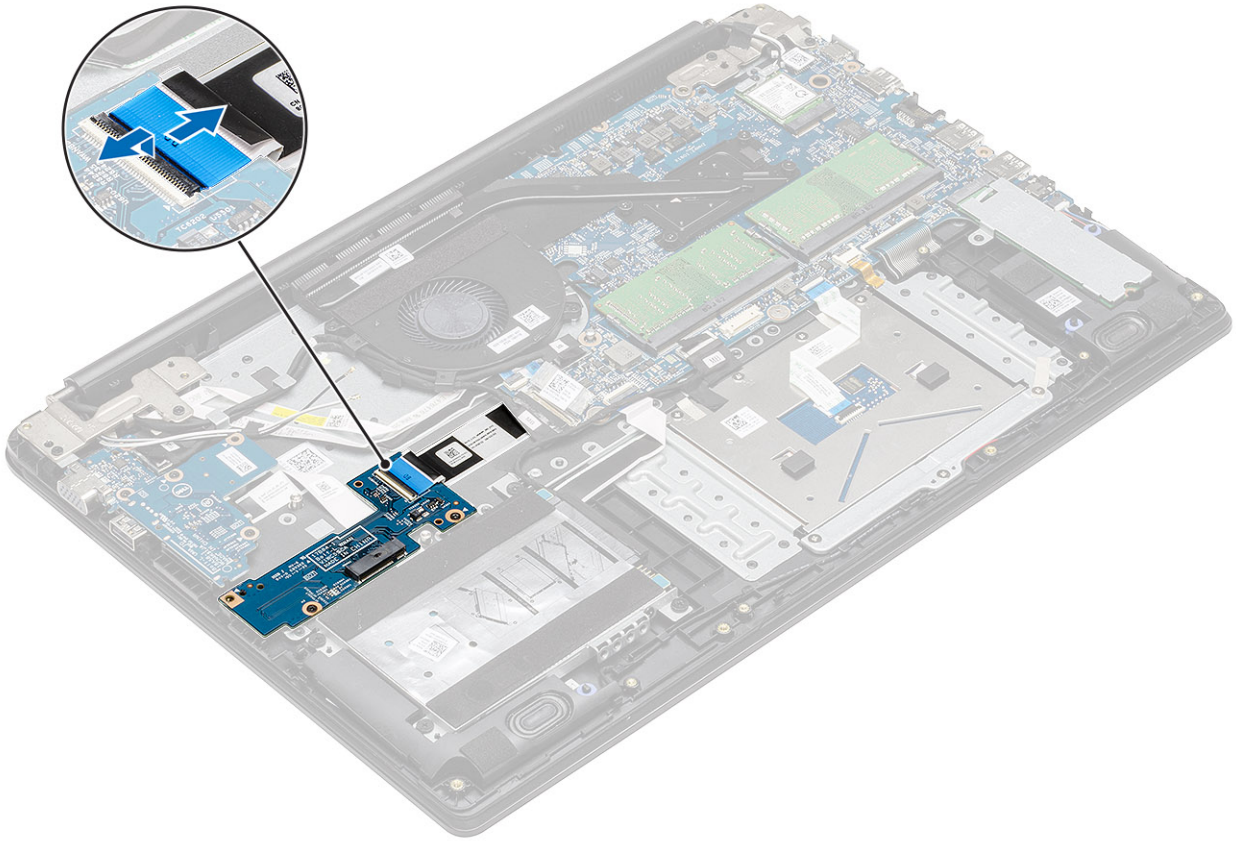
Removing the WWAN daughterboard

Prerequisites

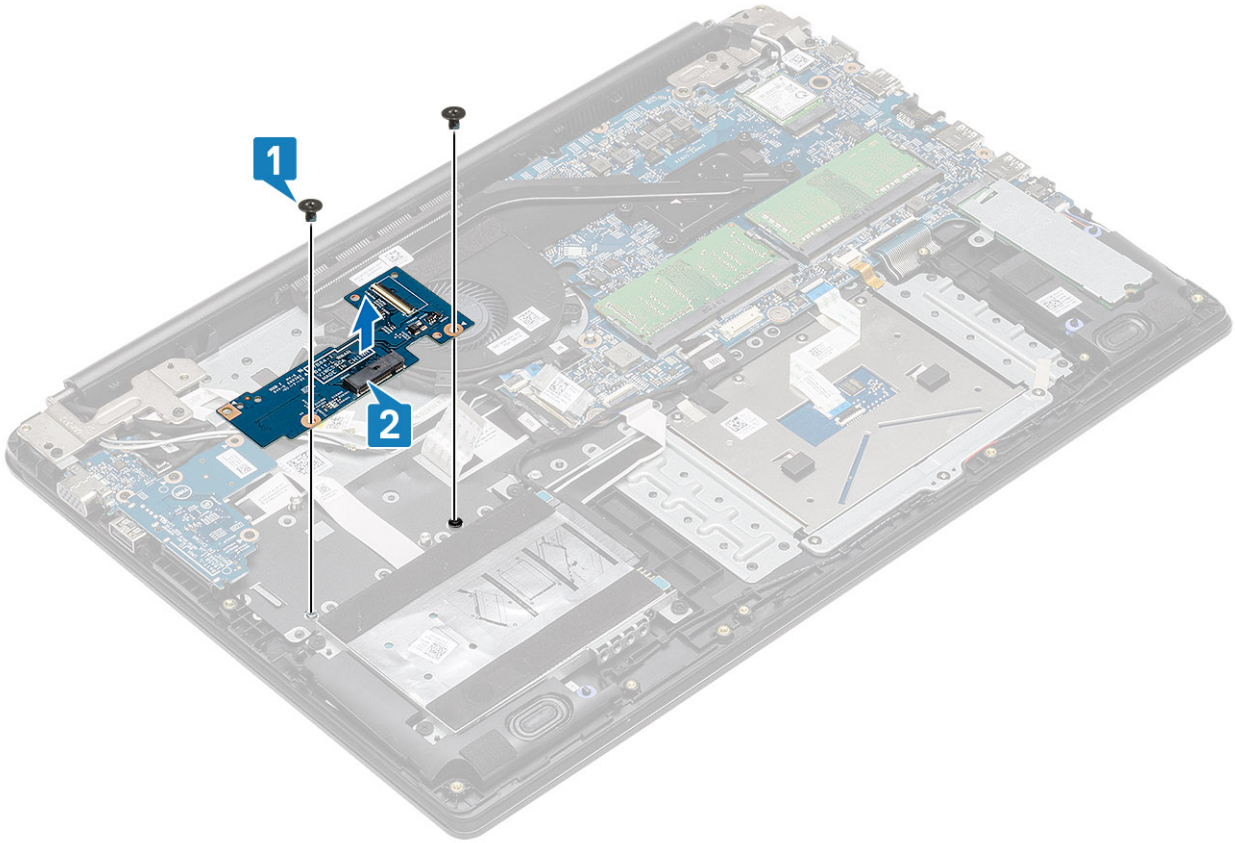
1. Follow the procedure in before working inside your computer.
2. Remove the SD memory card.
3. Remove the SIM card.
4. Remove the base cover.
5. Disconnect the battery cable.
6. Remove the WWAN card.

Steps

1. Open the latch and disconnect the WWAN daughterboard cable from the WWAN daughterboard.



2. Remove two (M2x3) screws that secure the WWAN daughterboard to the palm rest and keyboard assembly [1] and then lift the WWAN daughterboard card away from the palm rest and keyboard assembly [2].



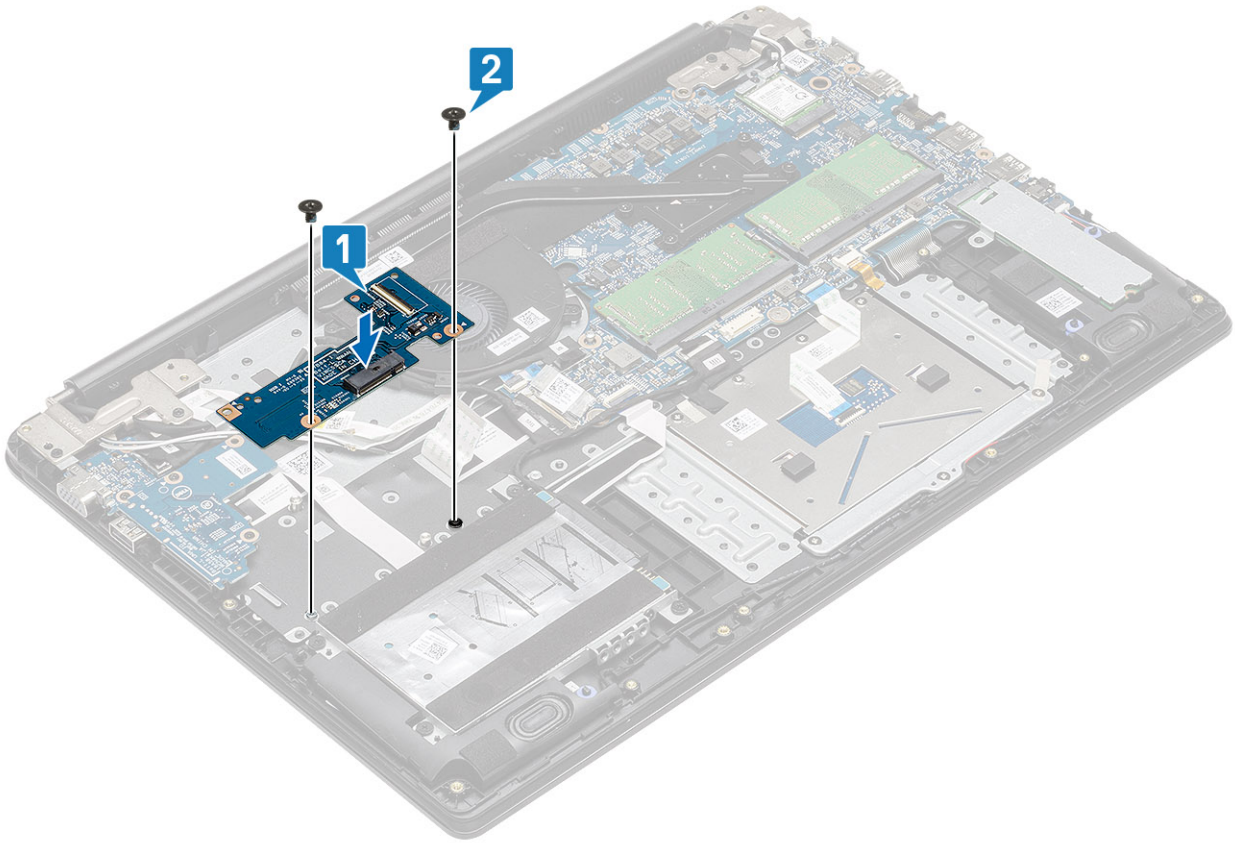
Installing the WWAN daughterboard

About this task

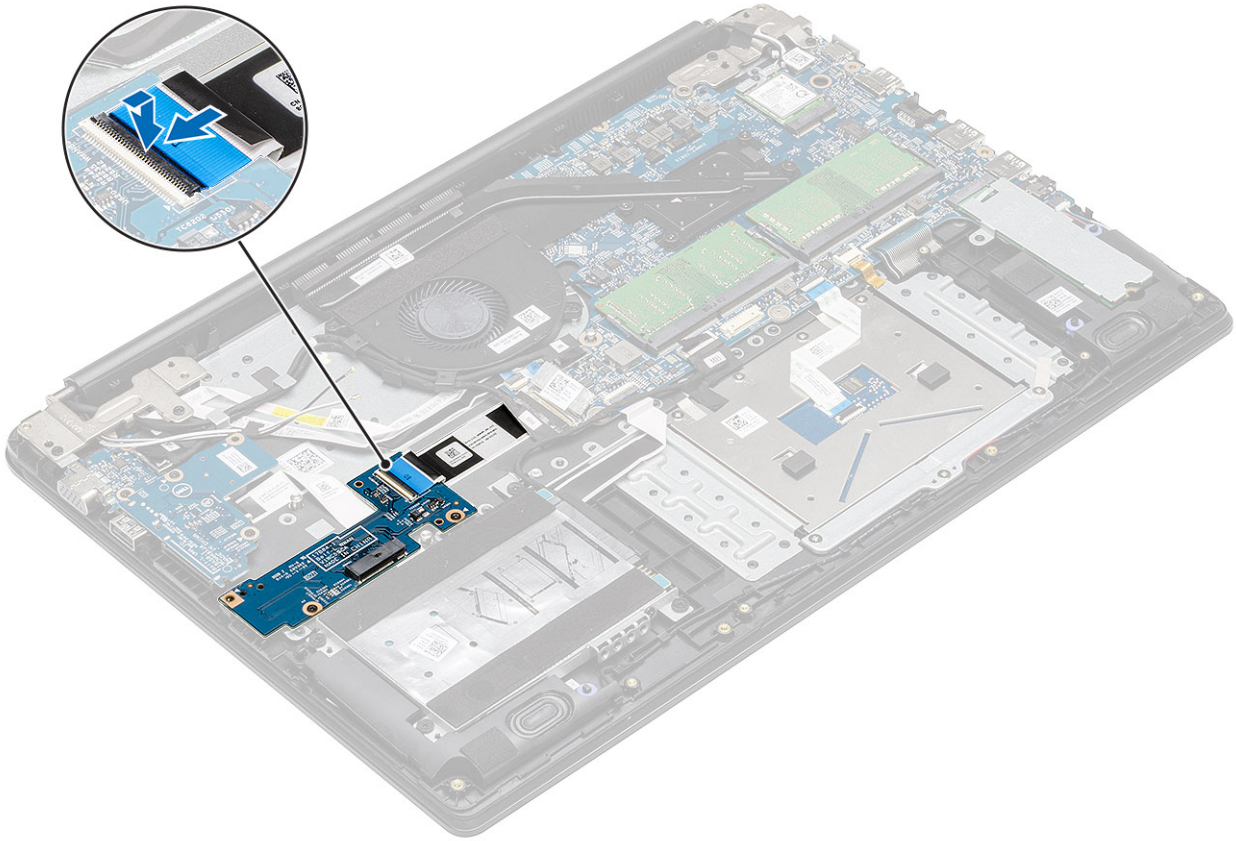
CAUTION: To avoid damage to the WWAN card, do not place any cables under it.

Steps

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



3. Connect the WWAN daughterboard cable to the connector on the WWAN daughterboard and close the latch to secure the



cable [1].

Next steps

1. Replace the WWAN card
2. Reconnect the battery cable.
3. Replace the base cover.
4. Replace the SIM card
5. Replace the SD memory card.
6. Follow the procedure in after working inside your computer.

Hard drive

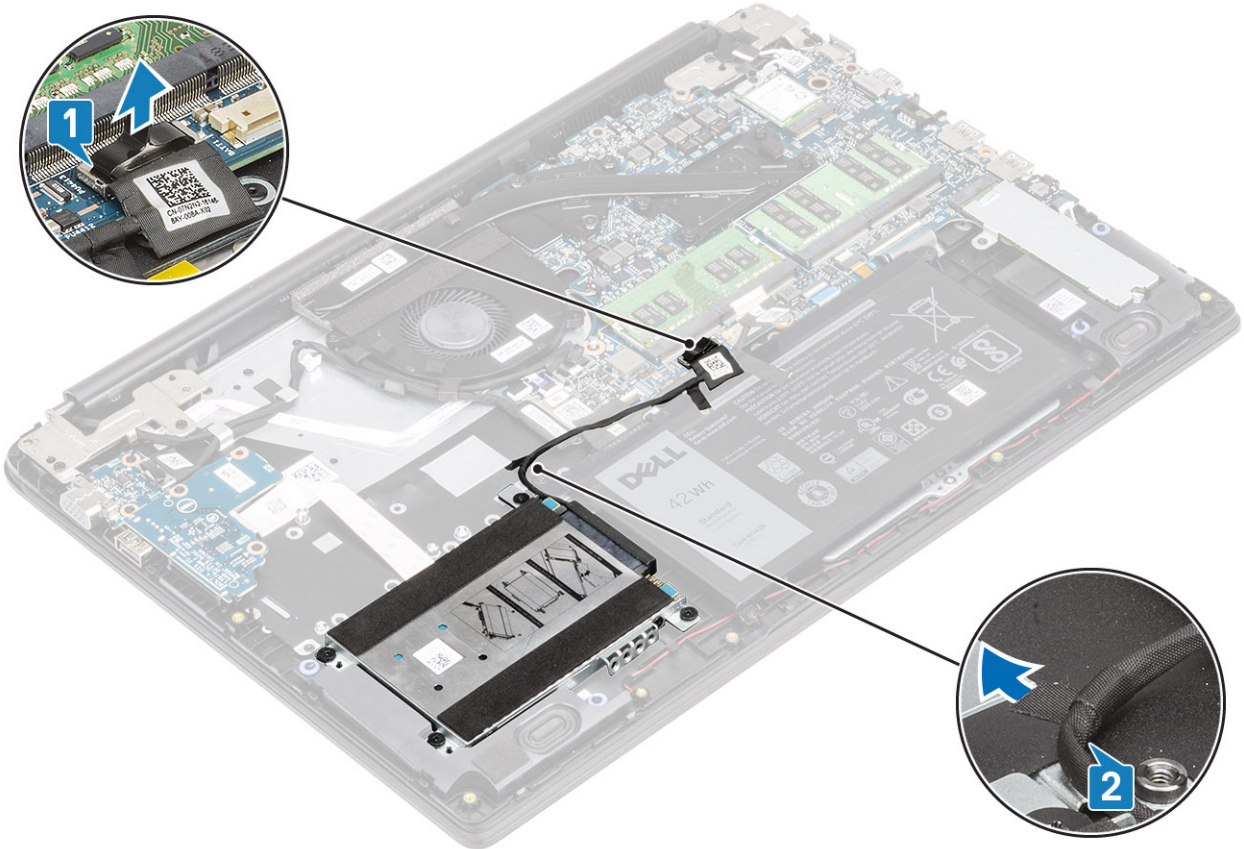
Removing the hard drive assembly

Prerequisites

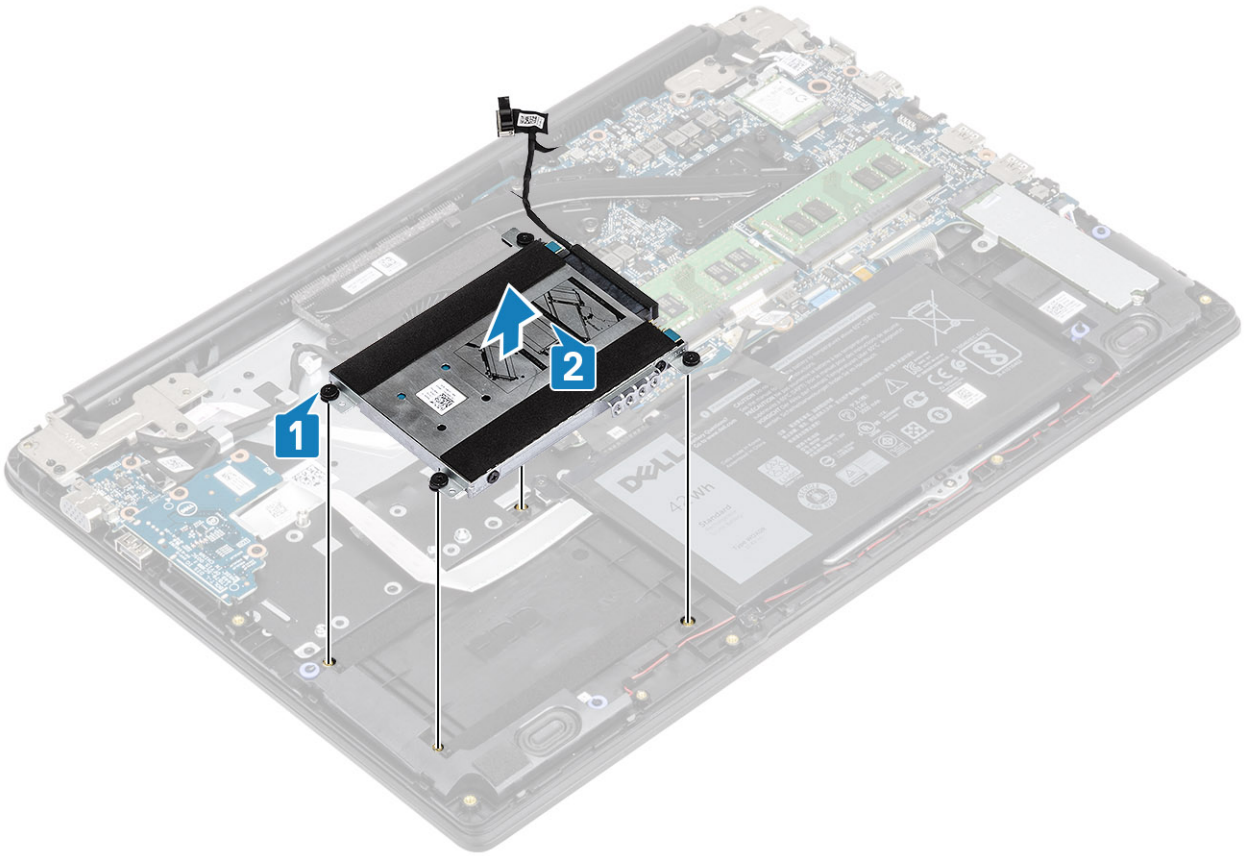
1. Follow the procedure in before working inside your computer
2. Remove the SD memory card
3. Remove the base cover
4. Disconnect the battery cable.

Steps

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



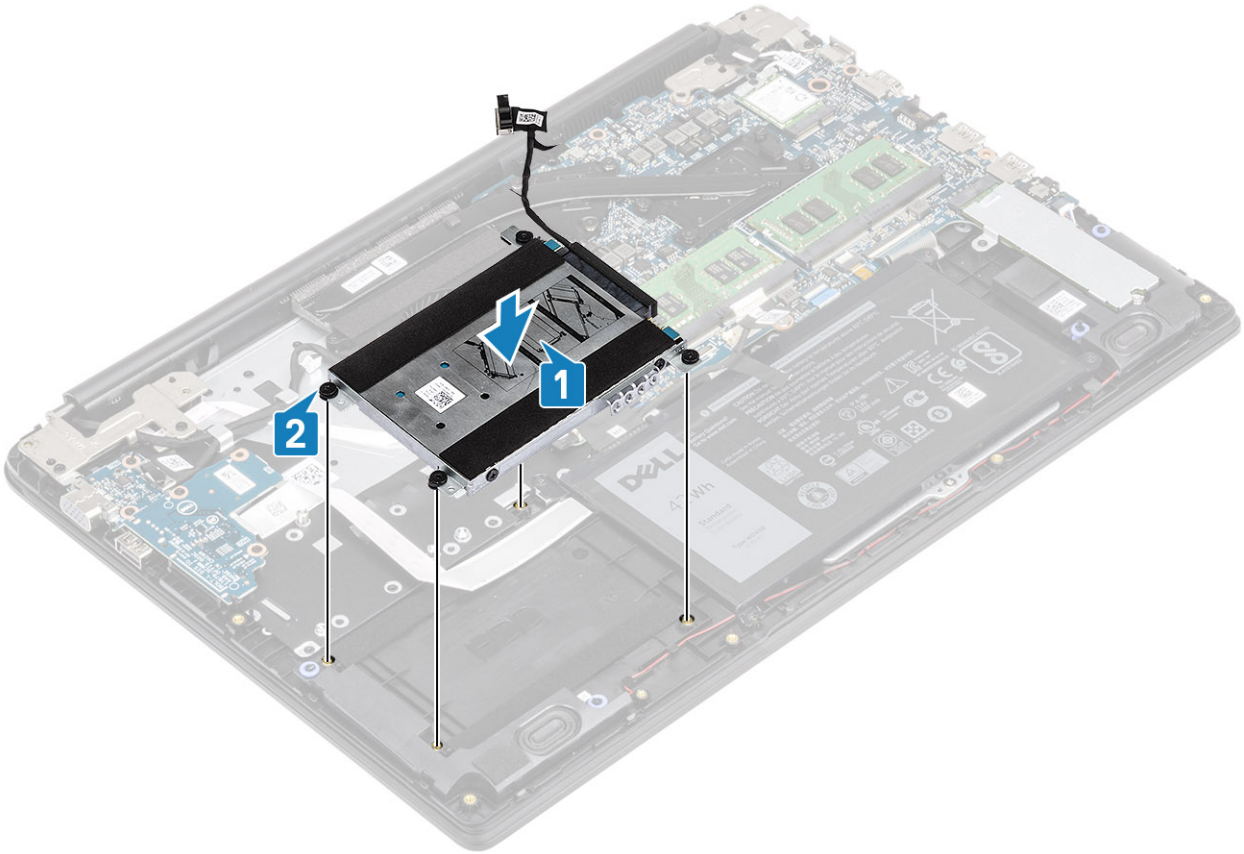
3. Remove the four (M2x4.5) screws that secure the hard drive assembly to the palmrest and keyboard assembly [1].
4. Lift the hard drive from the slot on the palmrest and keyboard assembly [2].



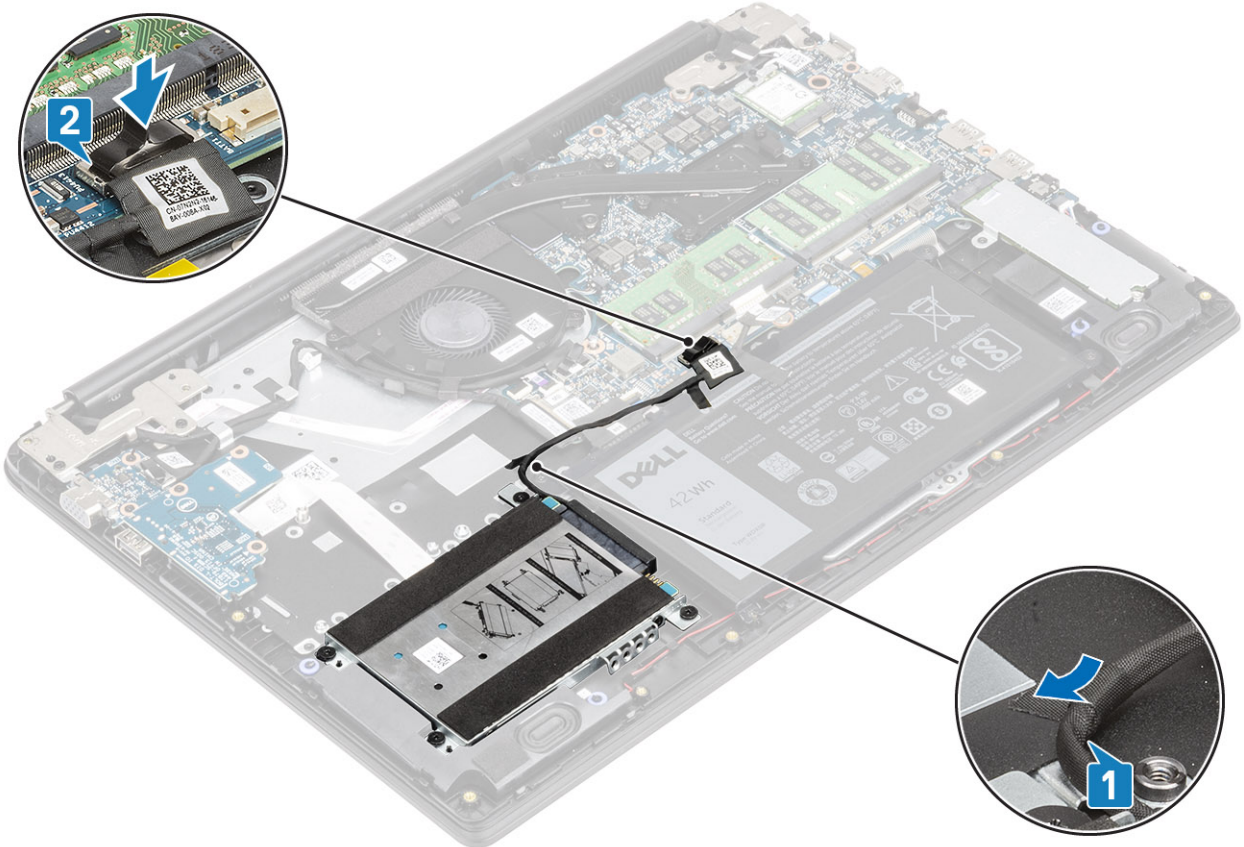
Installing the hard drive assembly

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 palmrest and keyboard assembly [1].
4. Connect the hard drive cable to the system board [2].



Next steps

1. Reconnect the battery cable.
2. Replace the base cover
3. Replace the SD memory card
4. Follow the procedure in after working inside your computer

Coin-cell battery

Removing the coin cell battery

Prerequisites

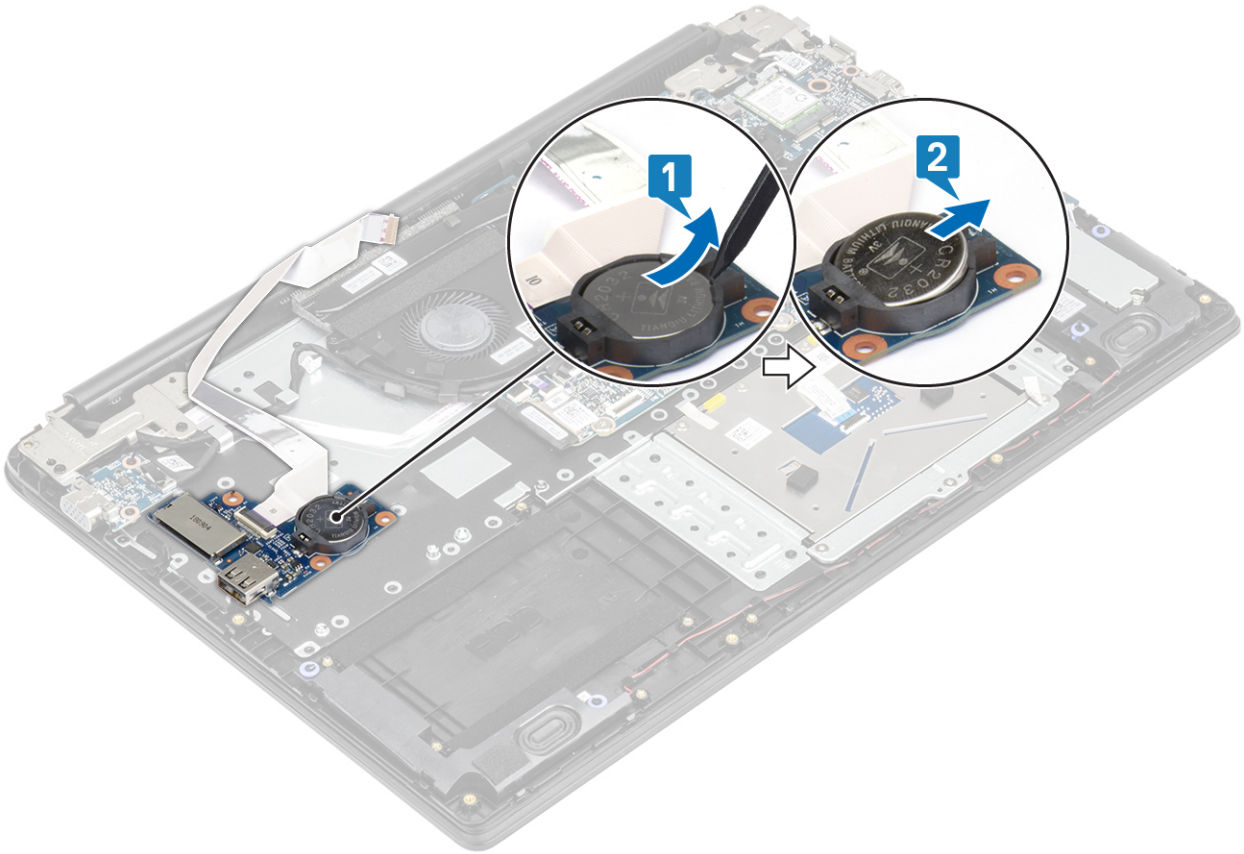
1. Follow the procedure in before working inside your computer.
2. Remove the SD memory card.
3. Remove the base cover.
4. Disconnect the battery cable.
5. Remove the hard drive assembly.

NOTE: Required for systems with 42 Whr battery

6. Remove the IO board.

Steps

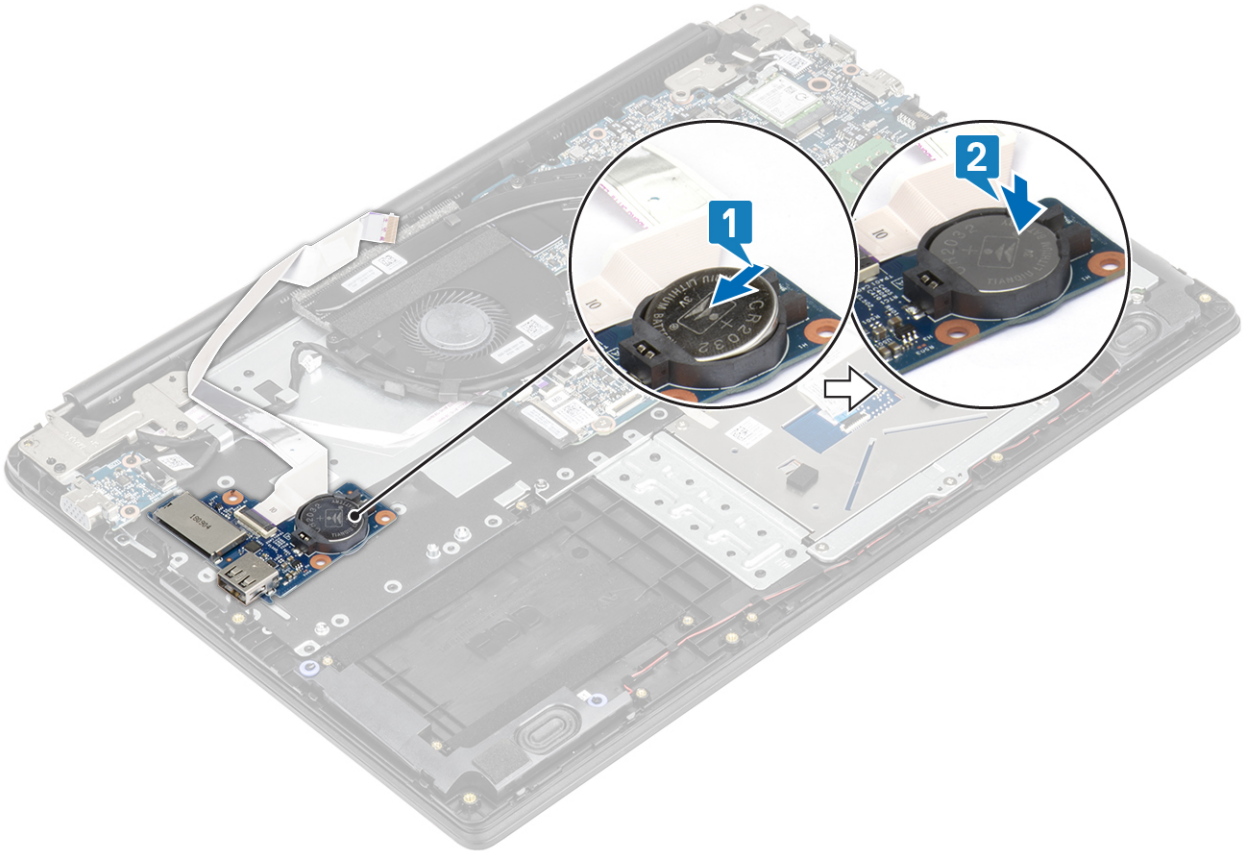
1. Flip the I/O board.
2. Using a plastic scribe, gently pry the coin cell battery out of the slot on the I/O board [1].
3. Remove the coin cell battery away from the computer [2].



Installing the coin cell battery

Steps

1. With the positive-side facing up, insert the coin cell battery into the battery socket on the I/O board [1].
2. Press the battery until it clicks into place [2].



Next steps

1. Replace the IO board
2. Replace the hard drive assembly
3. Reconnect the battery cable.
4. Replace the base cover
5. Replace the SD memory card
6. Follow the procedure in after working inside your computer

Battery

Rechargeable Li-ion battery precautions

CAUTION:

- **Exercise caution when handling rechargeable Li-ion batteries.**
- **Discharge the battery completely before removing it. Disconnect the AC power adapter from the computer and operate the computer solely on battery power—the battery is fully discharged when the computer no longer turns on when the power button is pressed.**
- **Do not crush, drop, mutilate, or penetrate the battery with foreign objects.**
- **Do not expose the battery to high temperatures, or disassemble battery packs and cells.**

- **Do not apply pressure to the surface of the battery.**
- **Do not bend the battery.**
- **Do not use tools of any kind to pry on or against the battery.**
- **Ensure any screws during the servicing of this product are not lost or misplaced, to prevent accidental puncture or damage to the battery and other computer components.**
- **If the battery gets stuck inside your computer as a result of swelling, do not try to release it as puncturing, bending, or crushing a rechargeable Li-ion battery can be dangerous. In such an instance, contact Dell technical support for assistance. See Contact Support at Dell Support Site.**
- **Always purchase genuine batteries from Dell Site or authorized Dell partners and resellers.**
- **Swollen batteries should not be used and should be replaced and disposed properly. For guidelines on how to handle and replace swollen rechargeable Li-ion batteries, see Handling swollen rechargeable Li-ion batteries.**

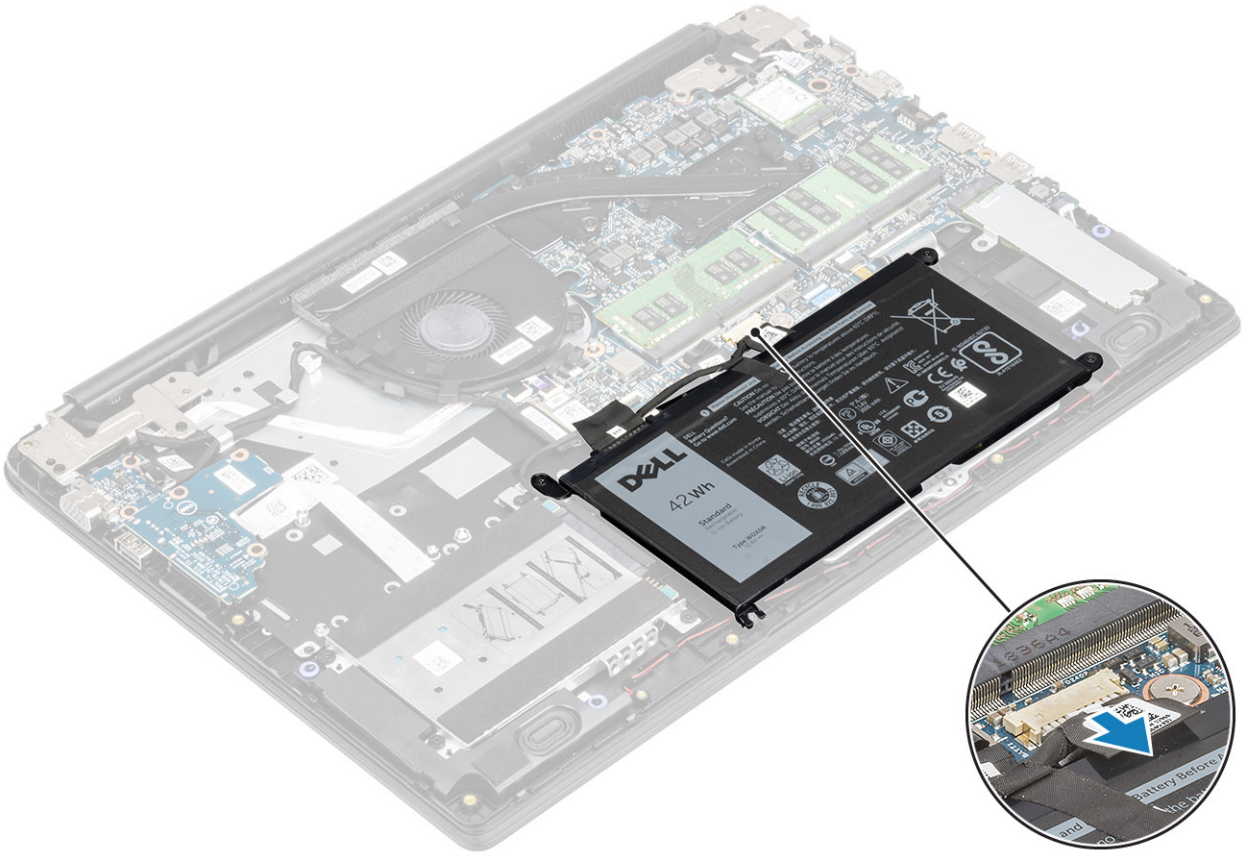
Removing the battery

Prerequisites

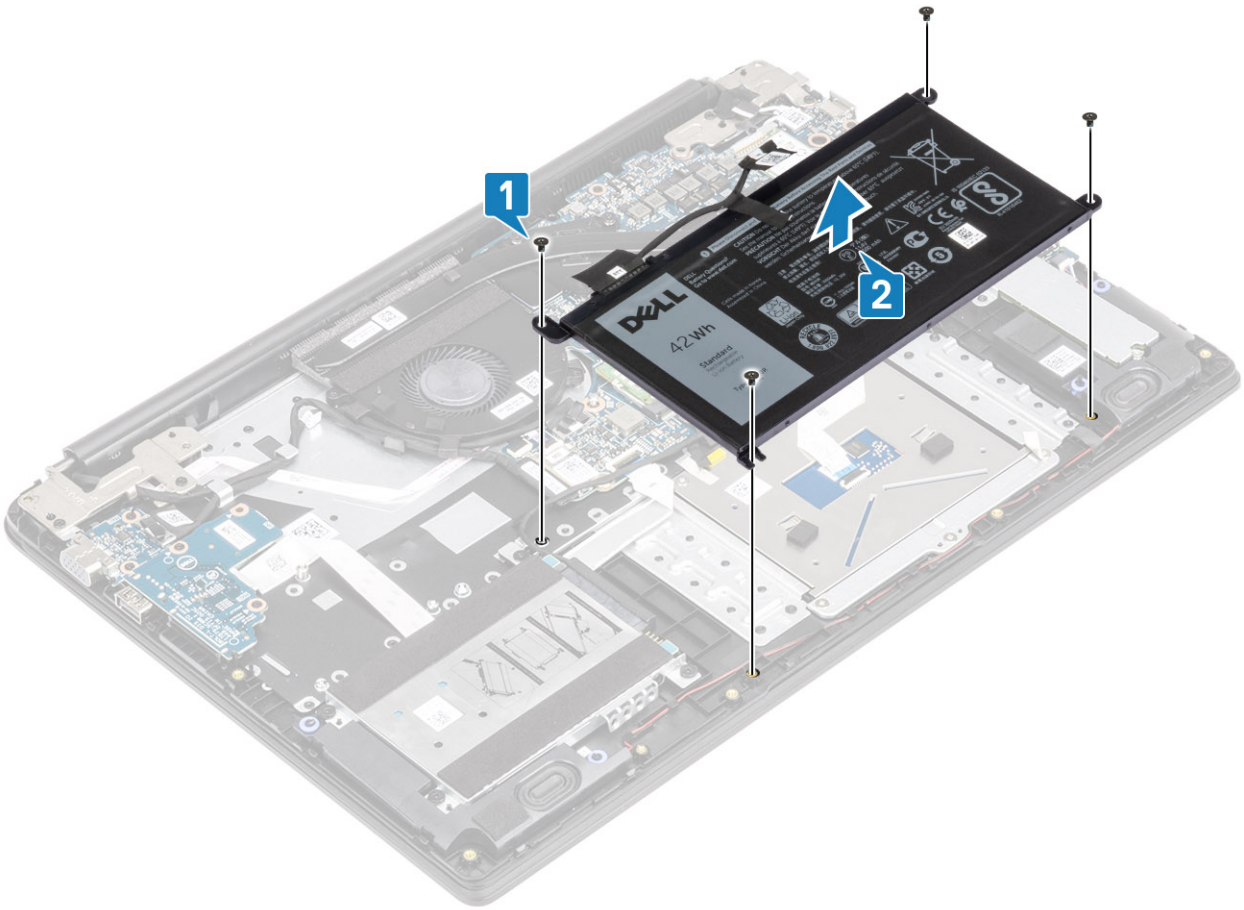
1. Follow the procedure in before working inside your computer
2. Remove the SD memory card
3. Remove the base cover

Steps

1. Disconnect the battery cable from the system board.



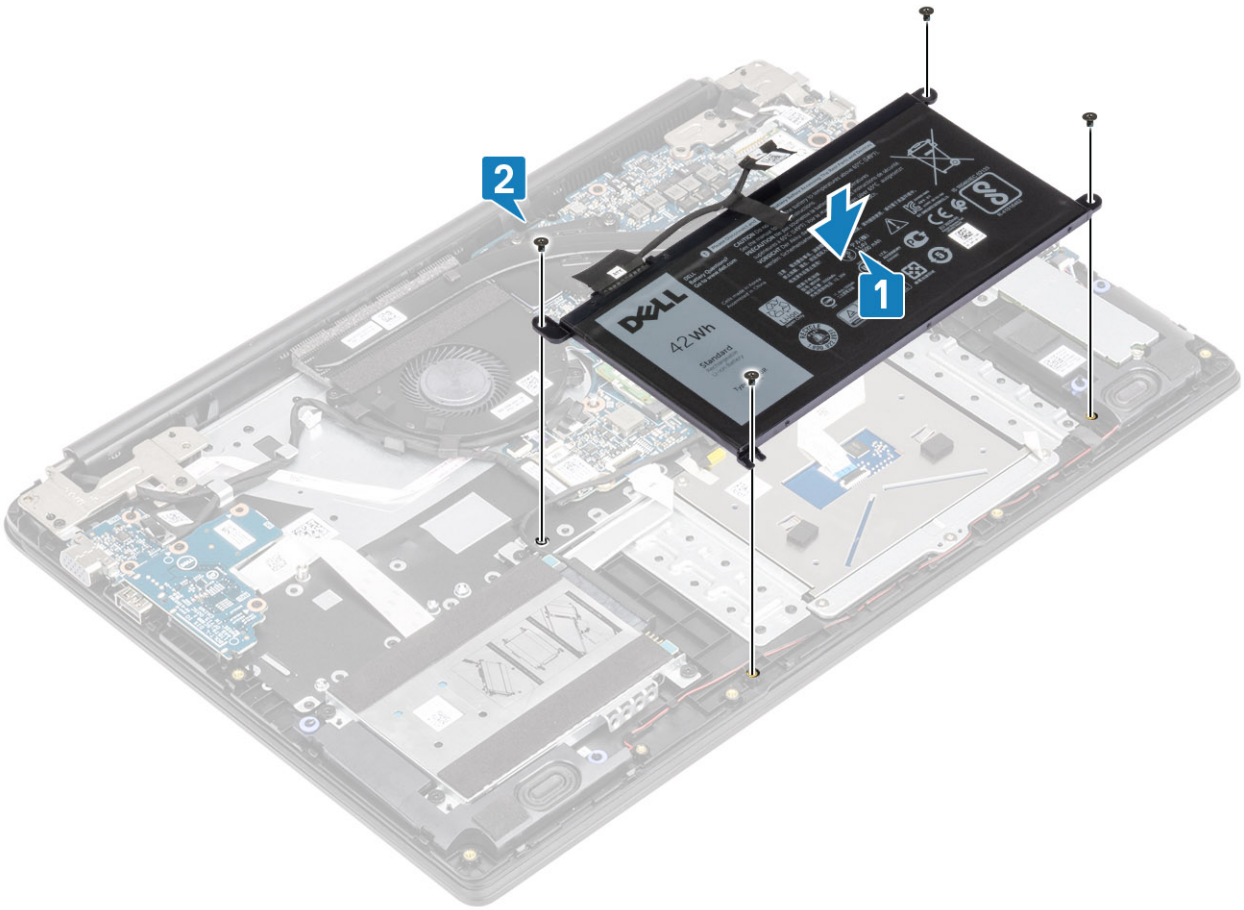
2. Remove the four (M2x3) screws that secure the battery to the palmrest and keyboard assembly [1].
3. Lift the battery off the palmrest and keyboard assembly [2].



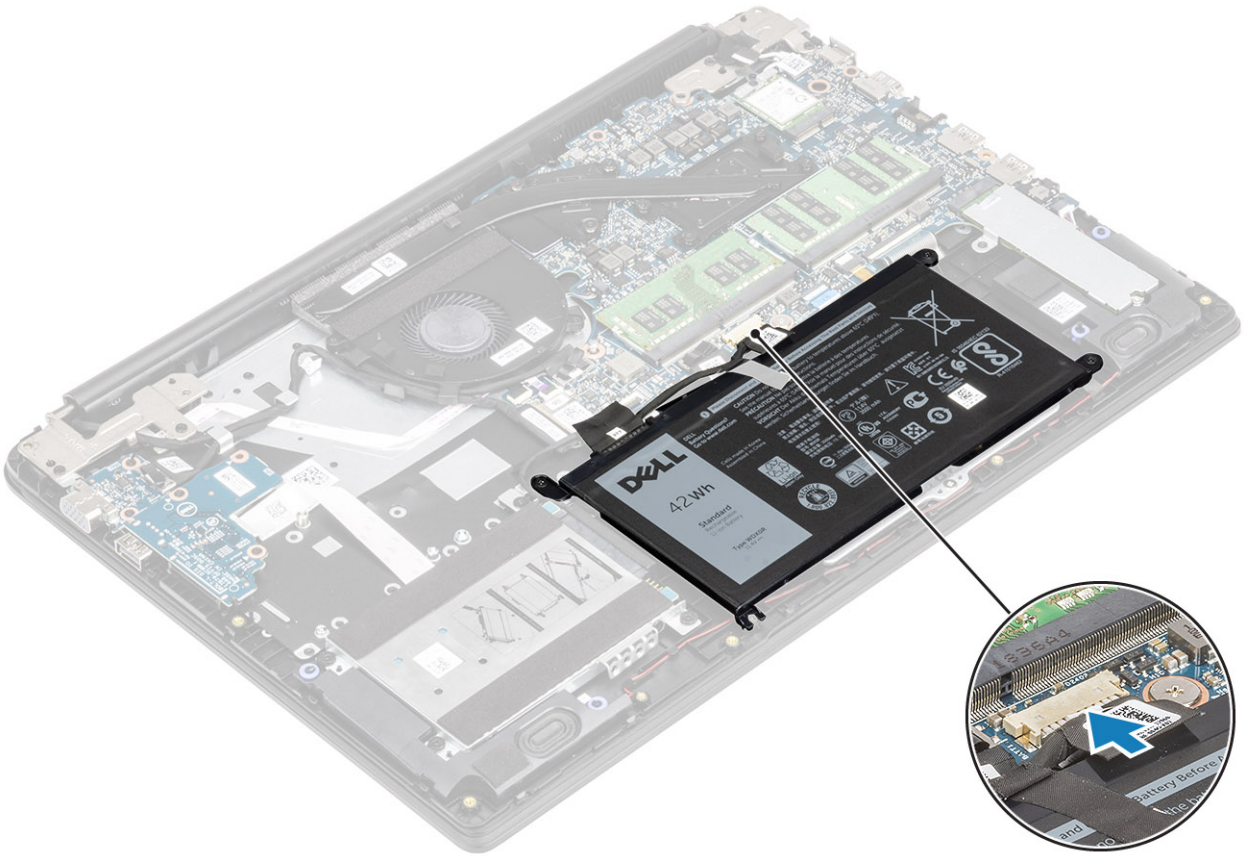
Installing the battery

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

Speakers

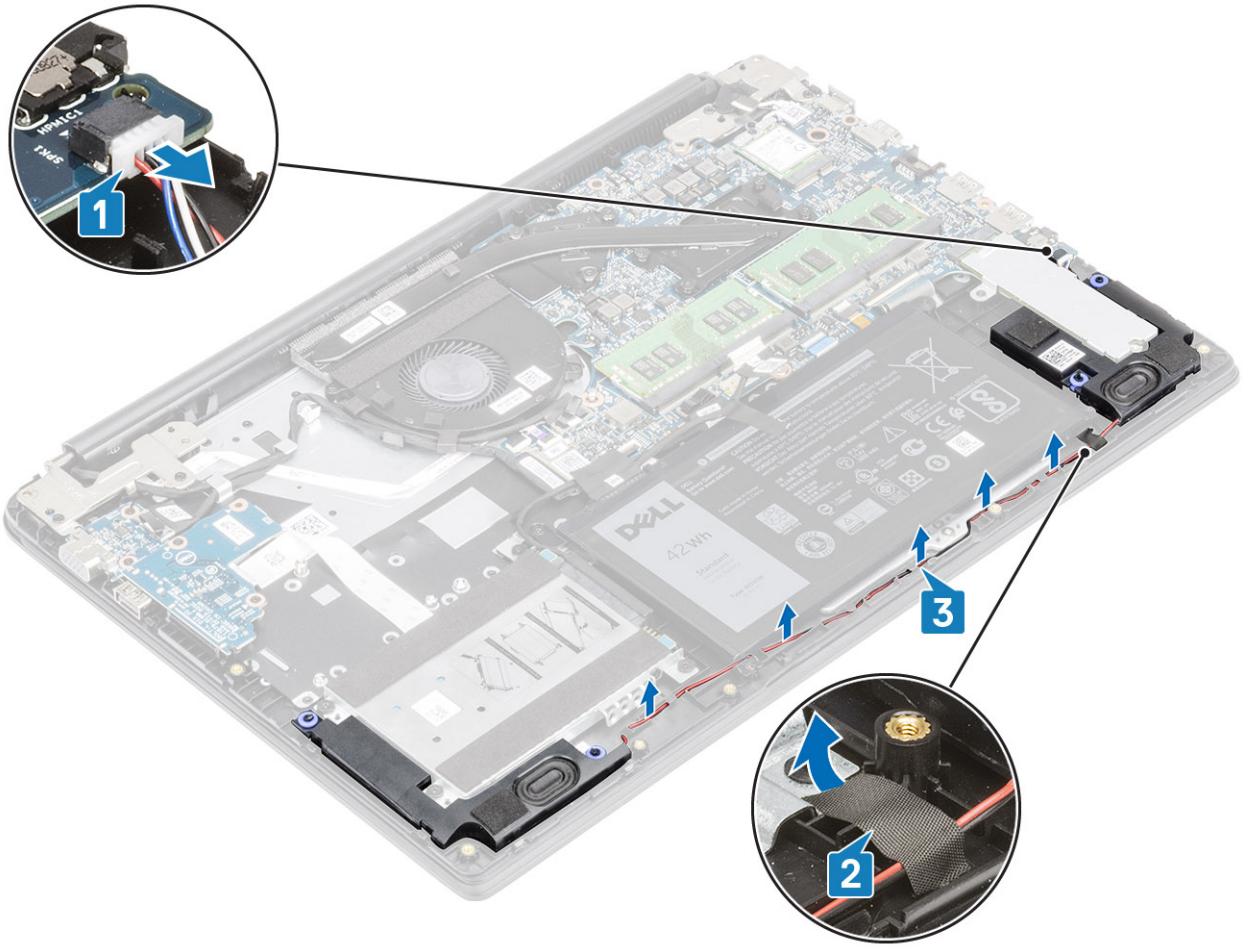
Removing the speakers

Prerequisites

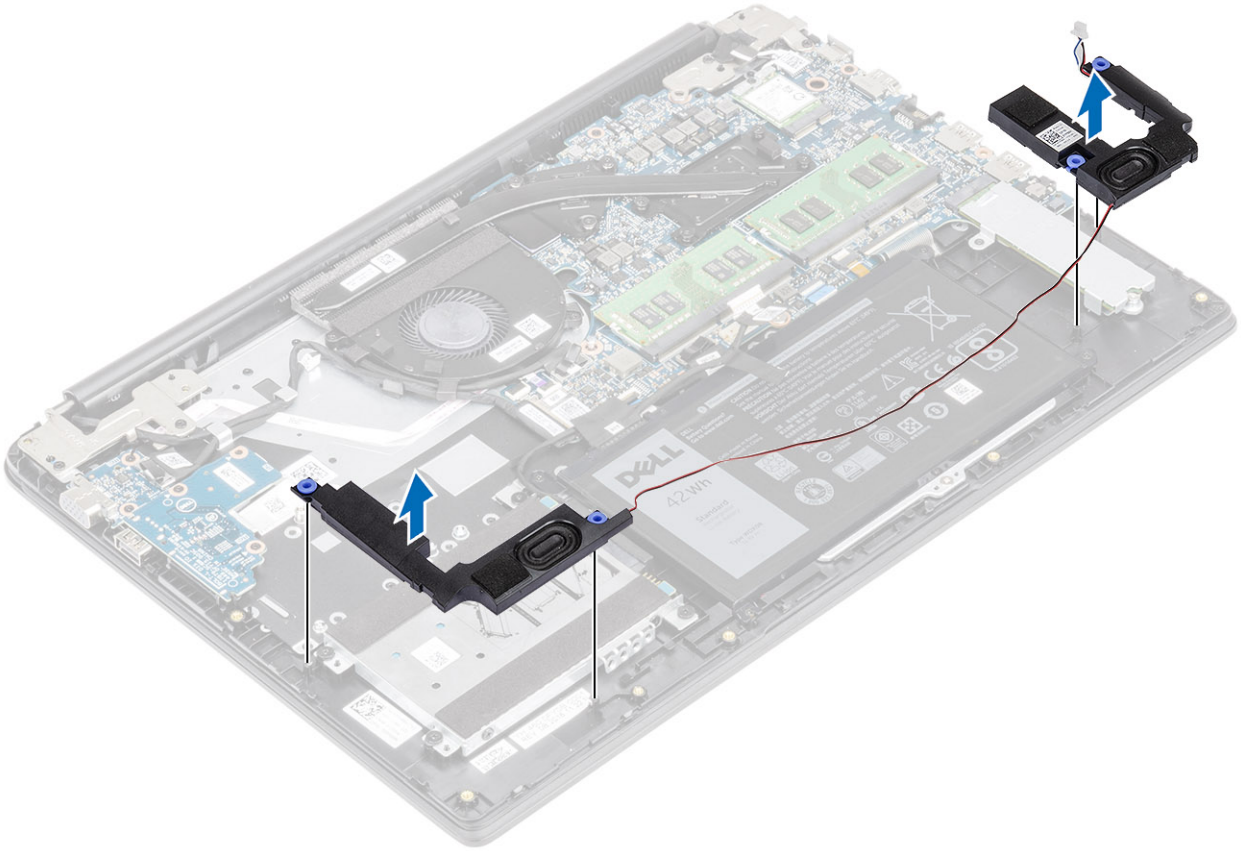
1. Follow the procedure in before working inside your computer
2. Remove the SD memory card
3. Remove the base cover
4. Disconnect the battery cable.

Steps

1. Disconnect the speaker cable from the system board [1].
2. Peel the tape that secures the speaker cables to the palm rest and keyboard assembly [2].
3. Unroute and remove the speaker cable from the routing guides on palm rest and keyboard assembly [3].



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



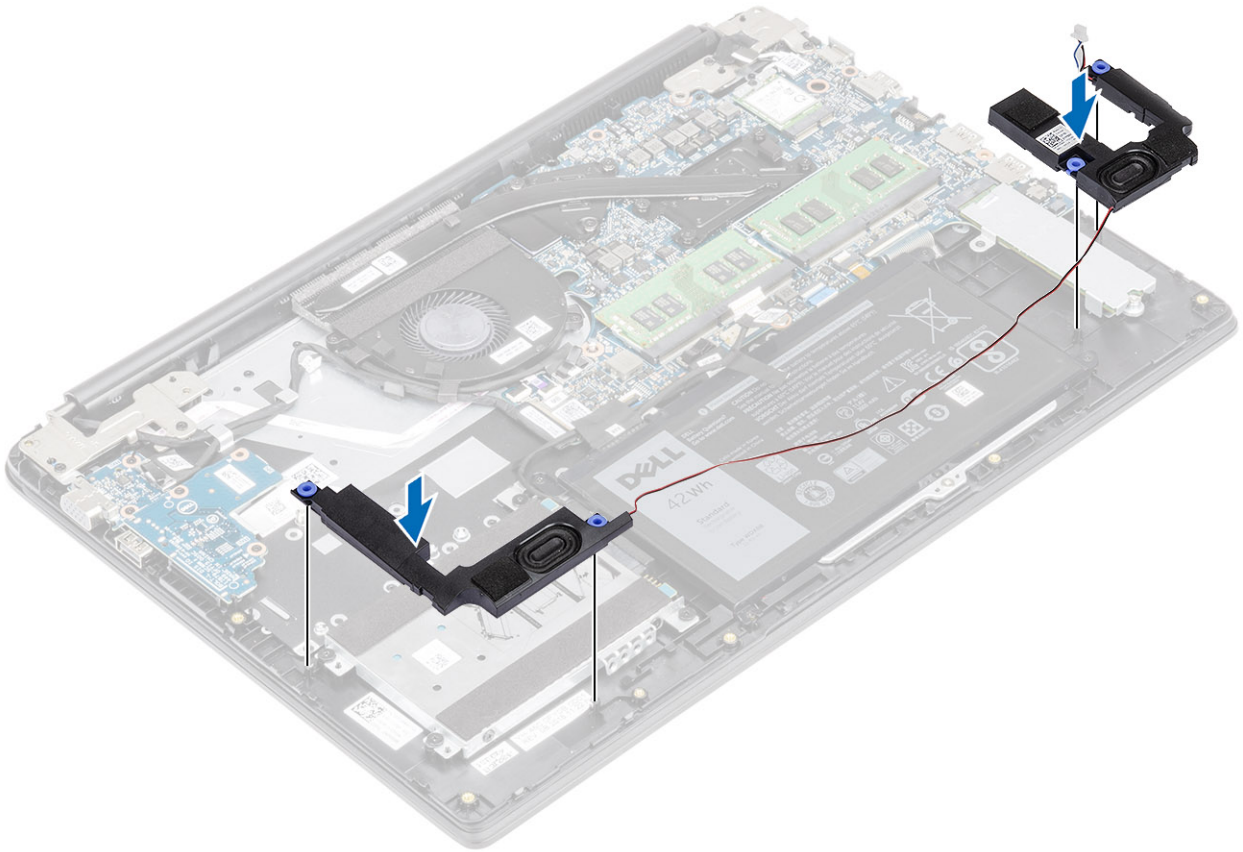
Installing the speakers

About this task

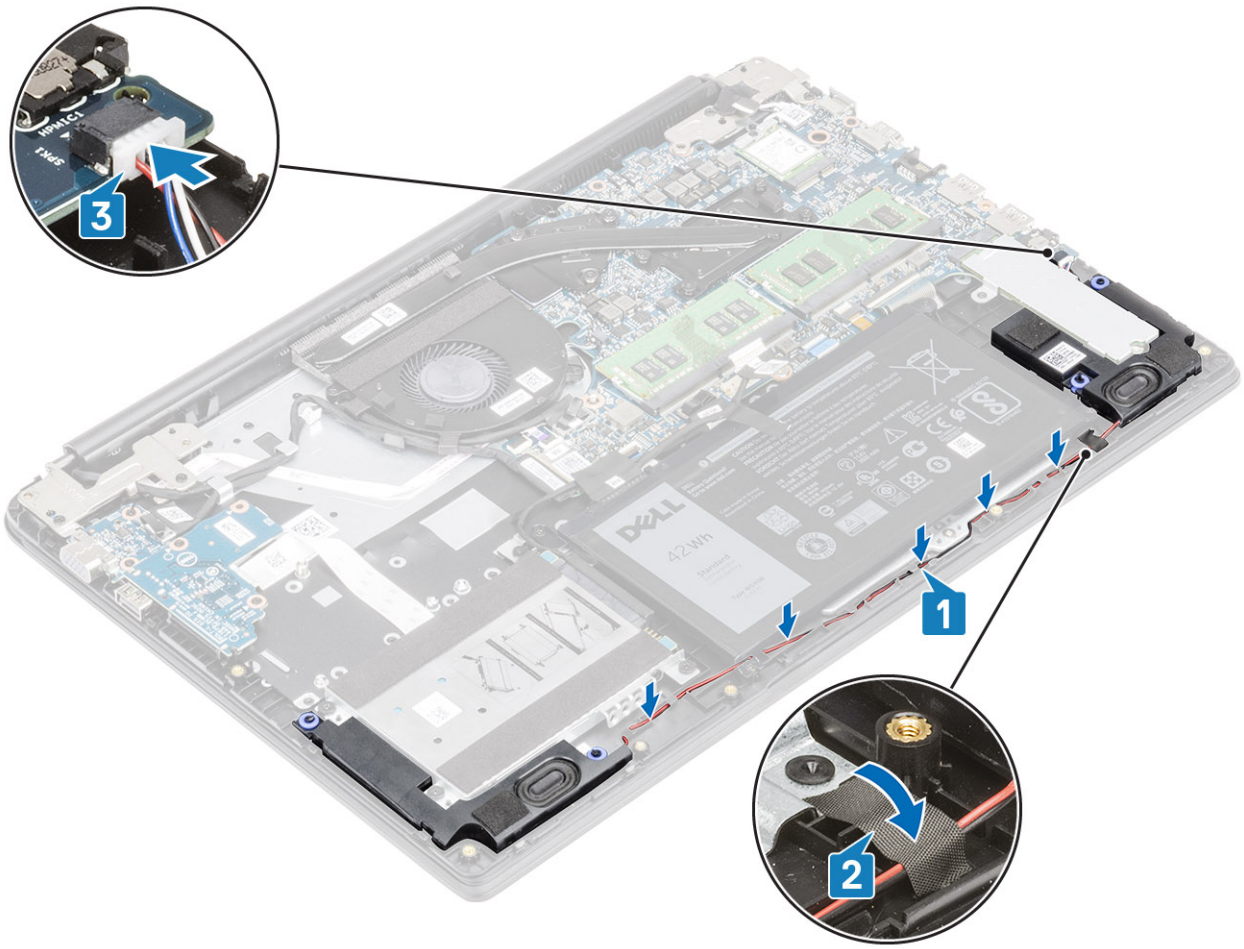
NOTE: If the rubber grommets are pushed out when removing the speakers, push them back in before replacing the speakers.

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. Adhere the tape that secures the speaker cables to the palm rest and keyboard assembly [2].
4. Connect the speaker cable to the system board [3].



Next steps

1. Reconnect 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

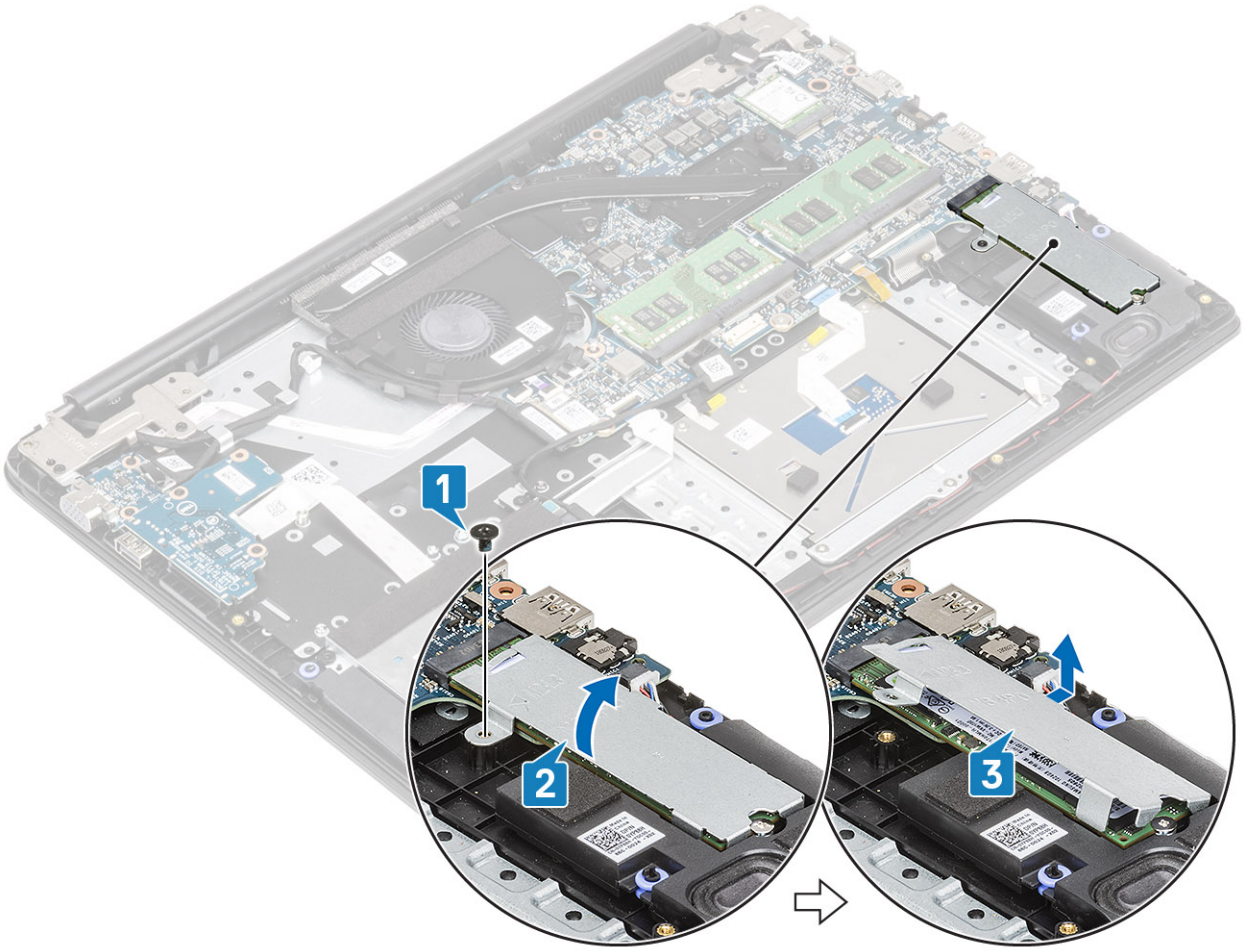
NOTE: Disable the Intel Optane memory before removing the Intel Optane memory module from your computer. For more information about disabling the Intel Optane memory, see disabling Intel Optane memory

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.

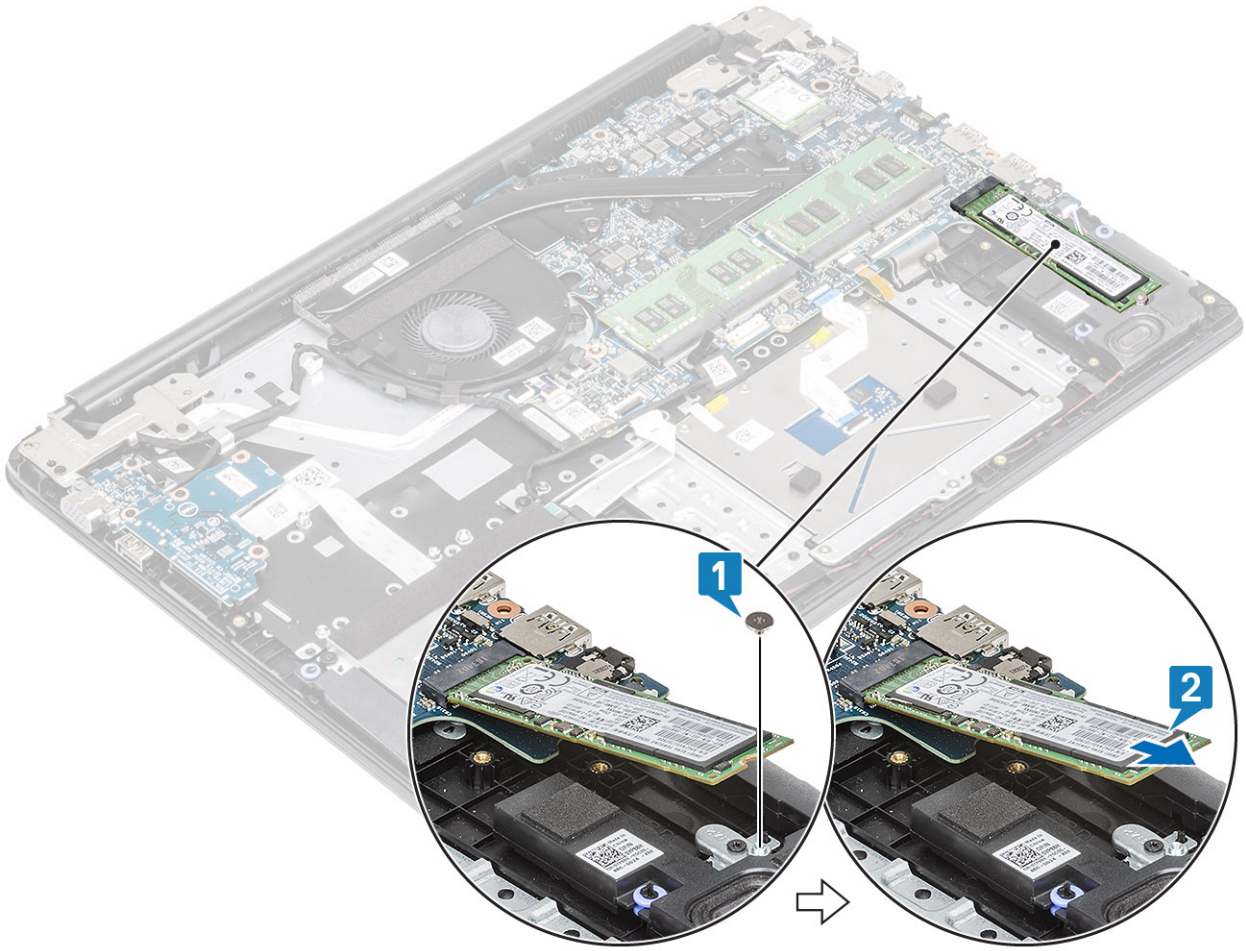
Steps

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].



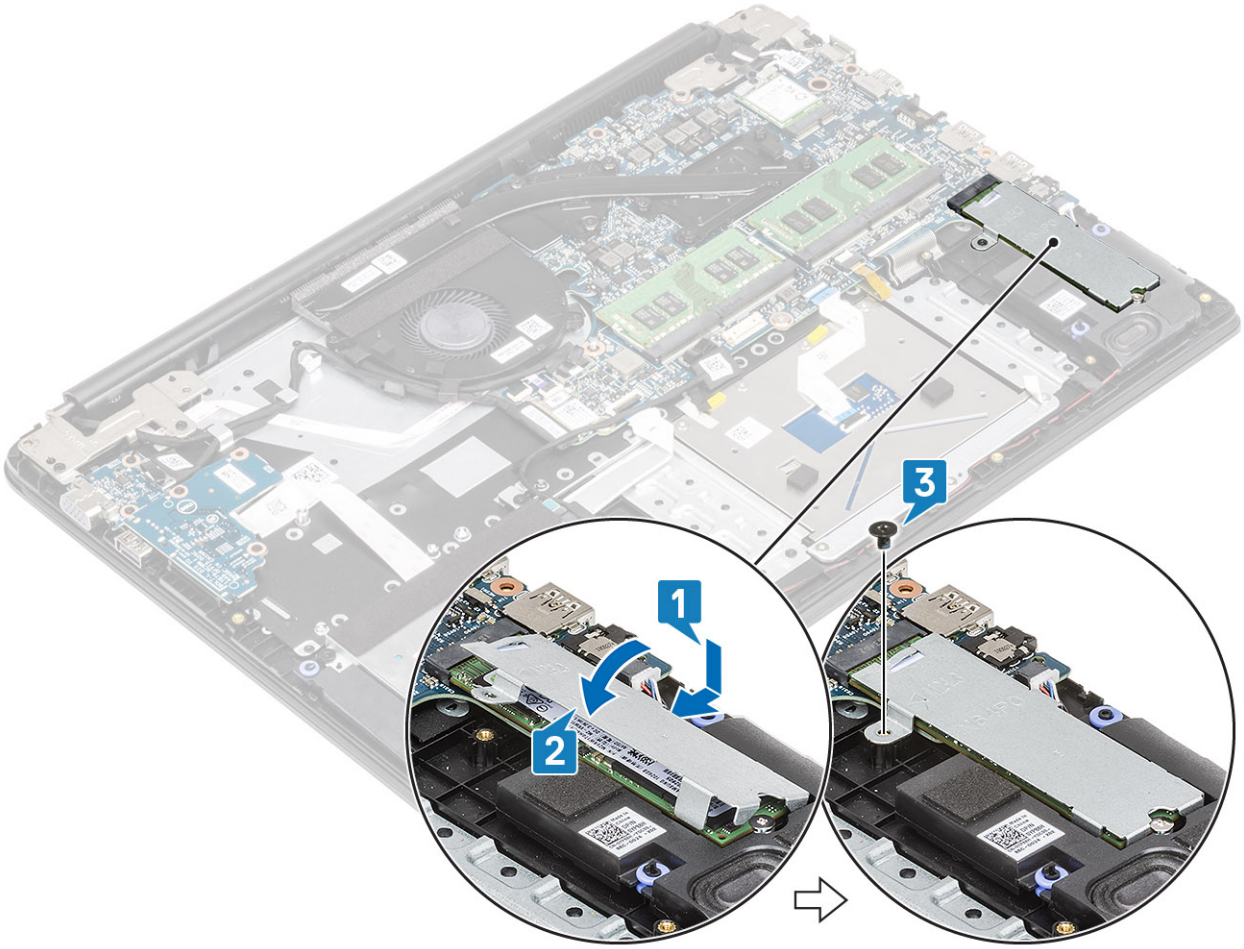
4. Remove the single (M2x2) screw that secures the solid-state drive/Intel Optane card to the palmrest and keyboard assembly [1].
5. Slide and lift the solid-state drive/Intel Optane card off the palmrest and keyboard assembly [2].



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. Reconnect the battery cable.
2. Replace the base cover
3. Replace the SD memory card
4. Follow the procedure in after working inside your computer

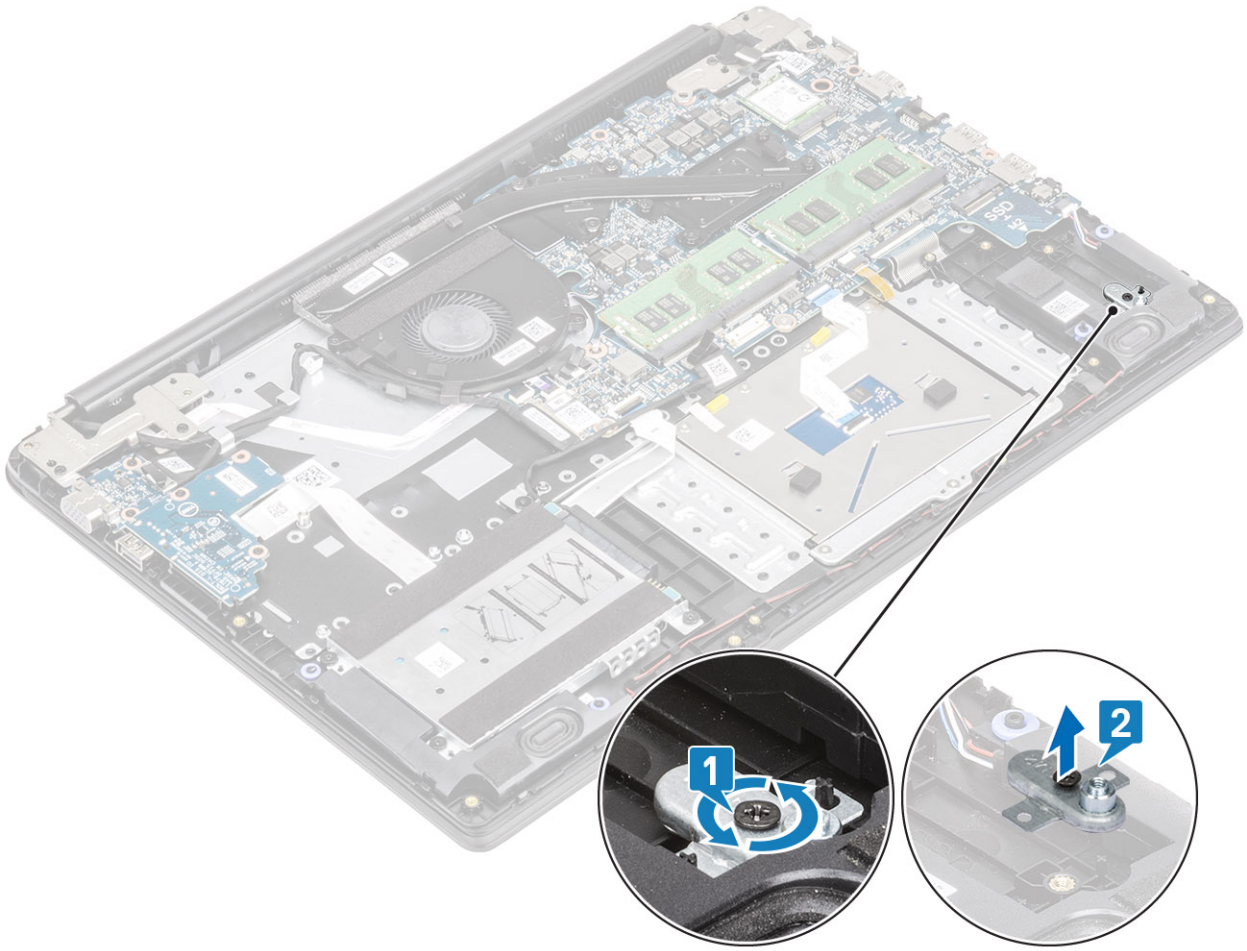
Removing the M.2 Solid-state drive bracket

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

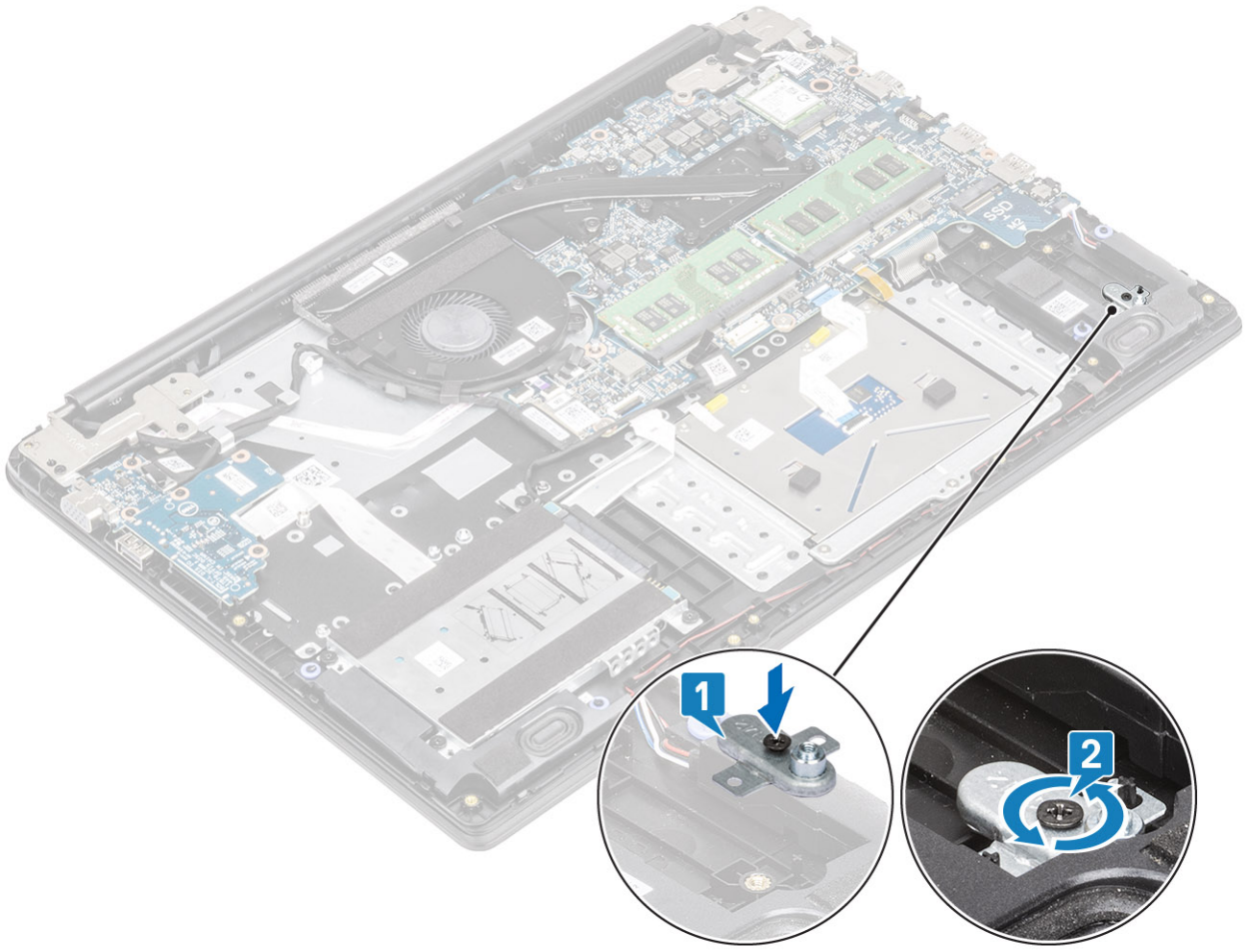
1. Remove the single (M2x3) screw that secures the solid-state drive bracket to the palmrest and keyboard assembly [1].
2. Remove the solid-state drive bracket from the palmrest and keyboard assembly [2].



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. Reconnect the battery cable.
2. Replace the base cover
3. Replace the SD memory card
4. Follow the procedure in after working inside your computer

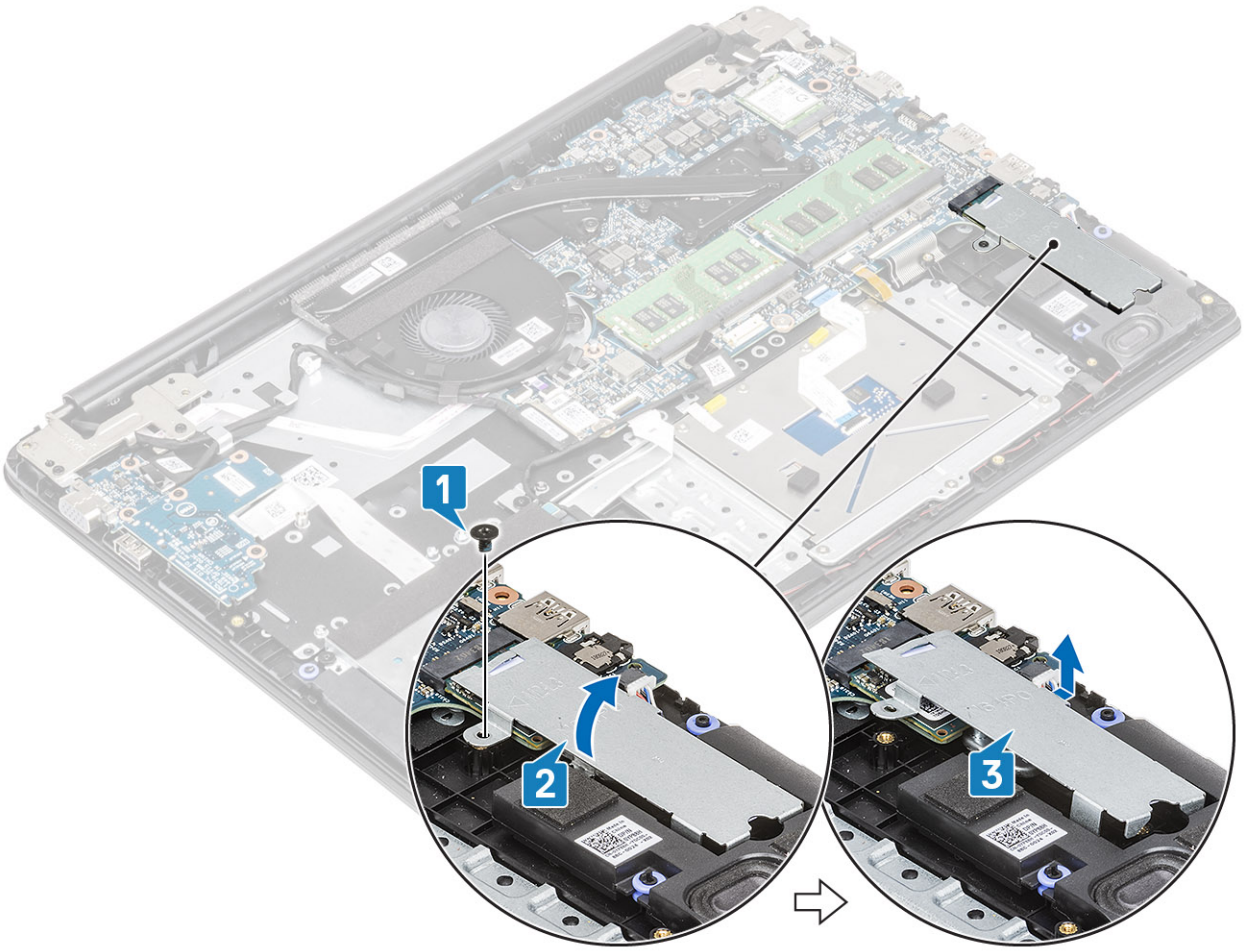
Removing the M.2 2230 Solid-state drive

Prerequisites

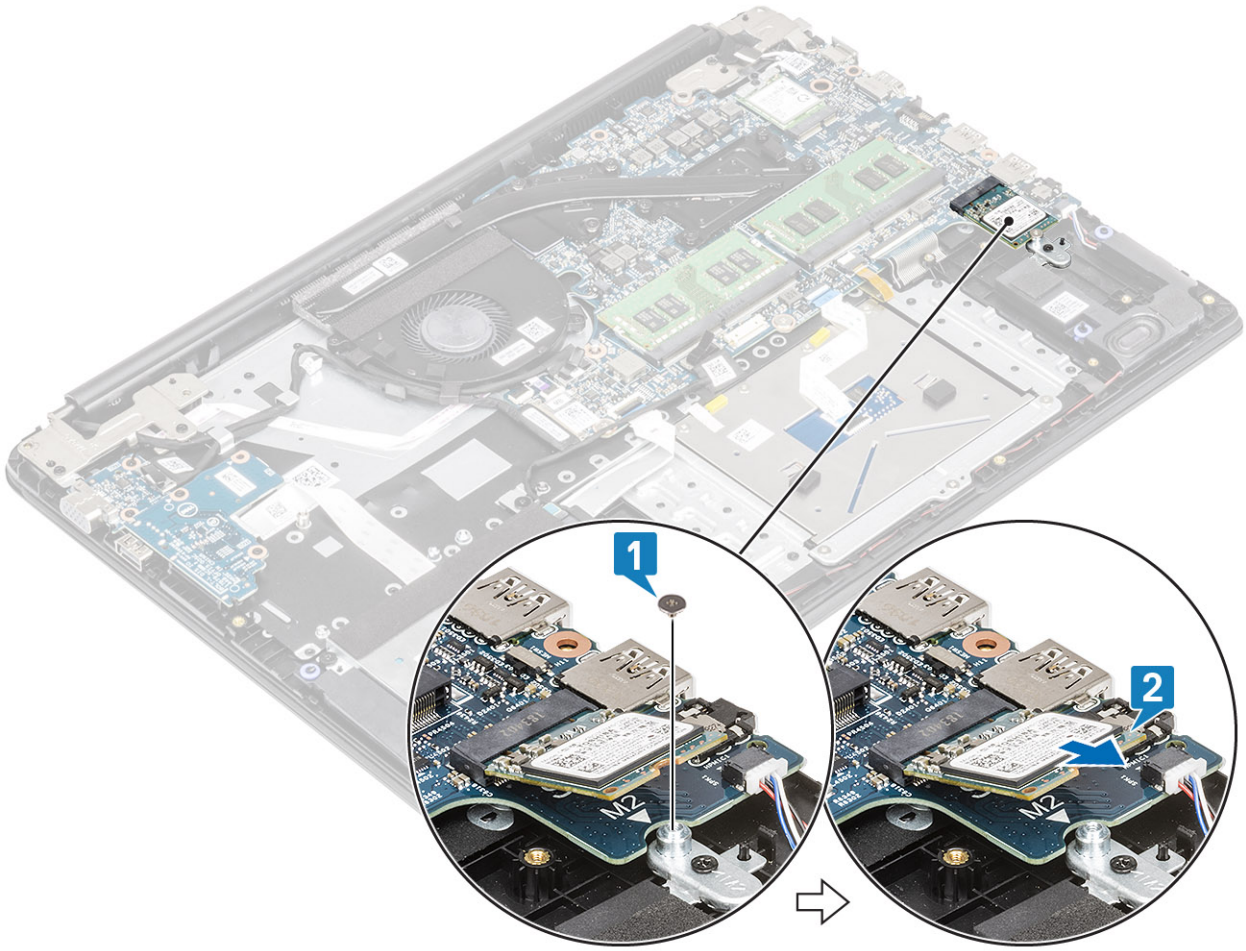
1. Follow the procedure in before working inside your computer
2. Remove the SD memory card
3. Remove the base cover
4. Disconnect the battery cable

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].



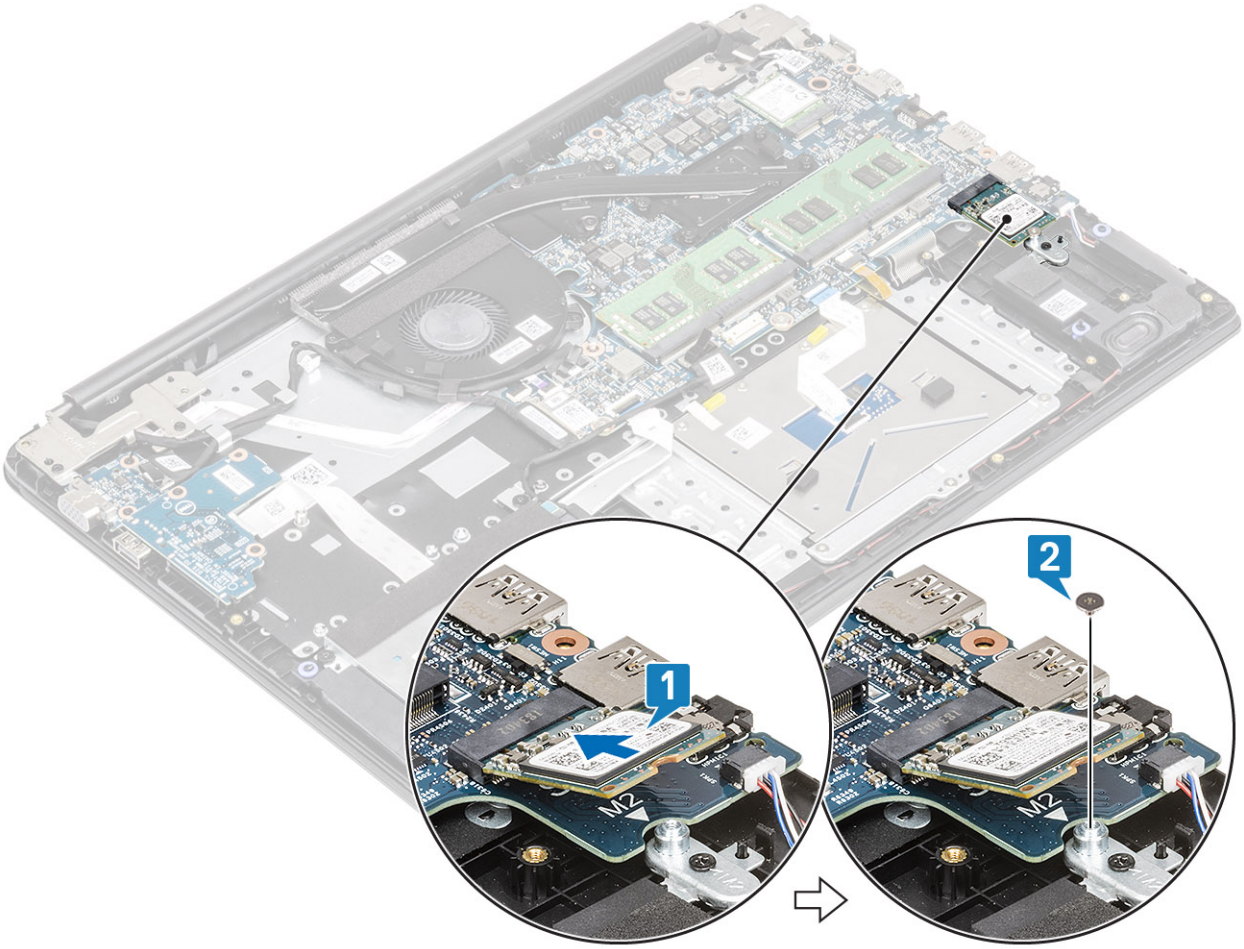
4. Remove the single (M2x2) screw that secures the solid-state drive to the solid-state drive bracket [1].
5. Slide and remove the solid-state drive off the solid-state drive slot [2].



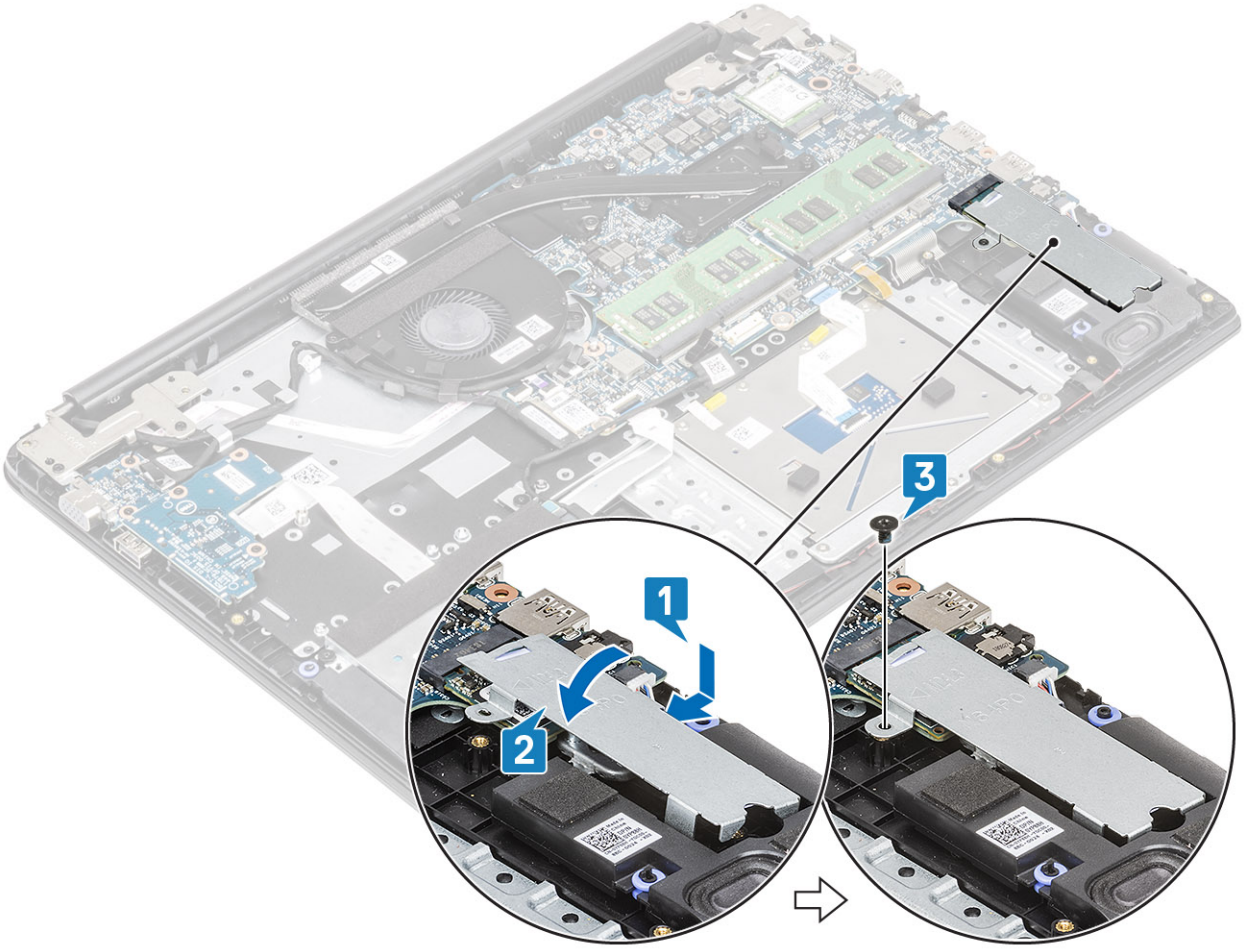
Installing the M.2 2230 Solid-state drive

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. Reconnect 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. Disconnect the battery.
5. Remove the hard drive assembly.

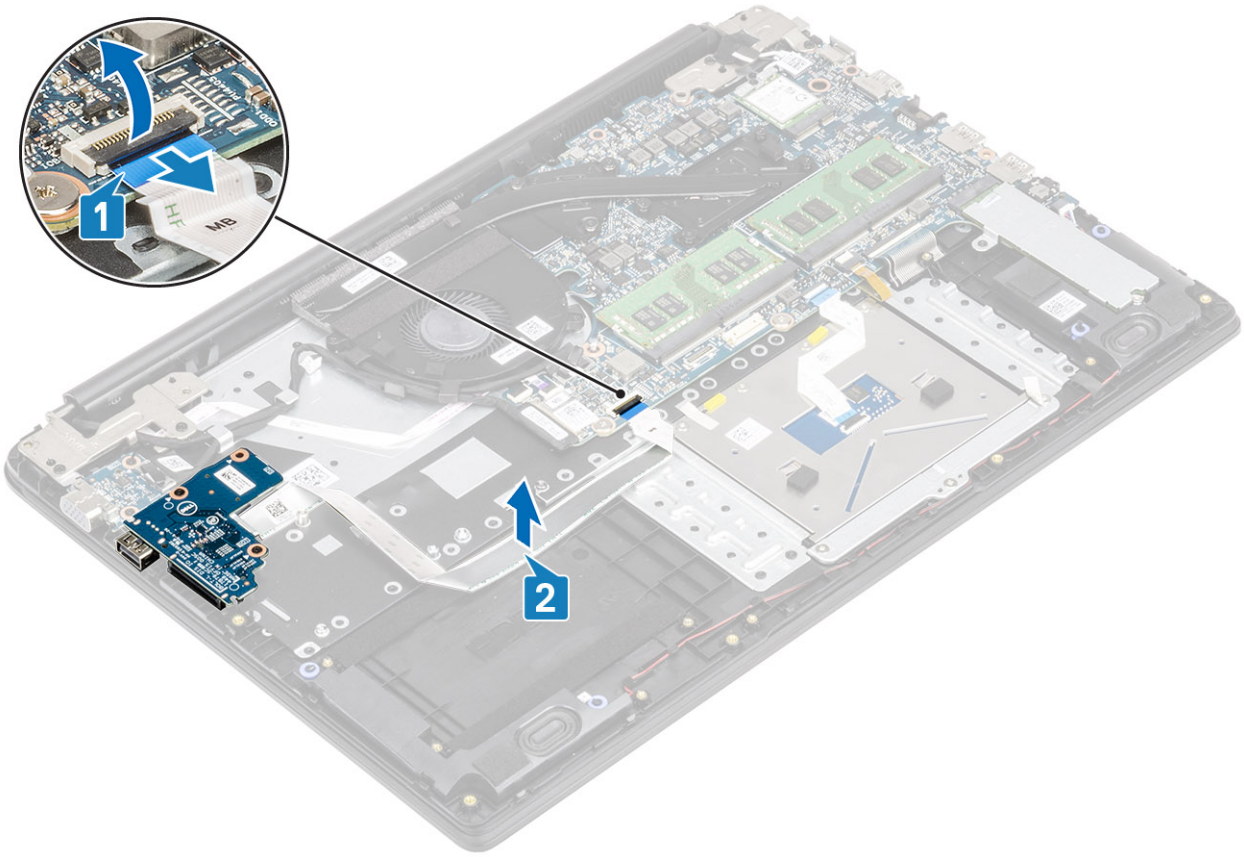
NOTE: Required for systems with 42 Whr battery

Steps

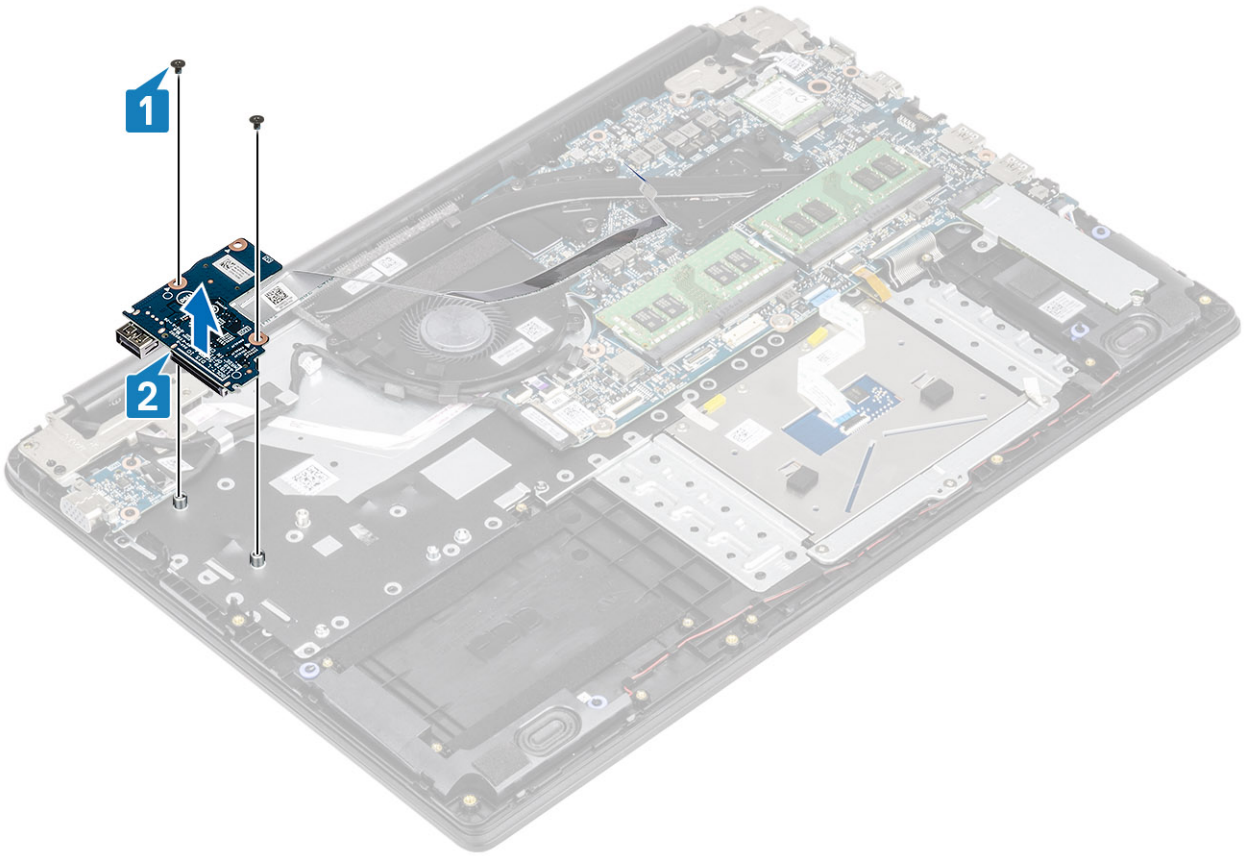
1. **NOTE:** Removing the I/O board also removes the coin-cell battery which resets the CMOS settings.

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].



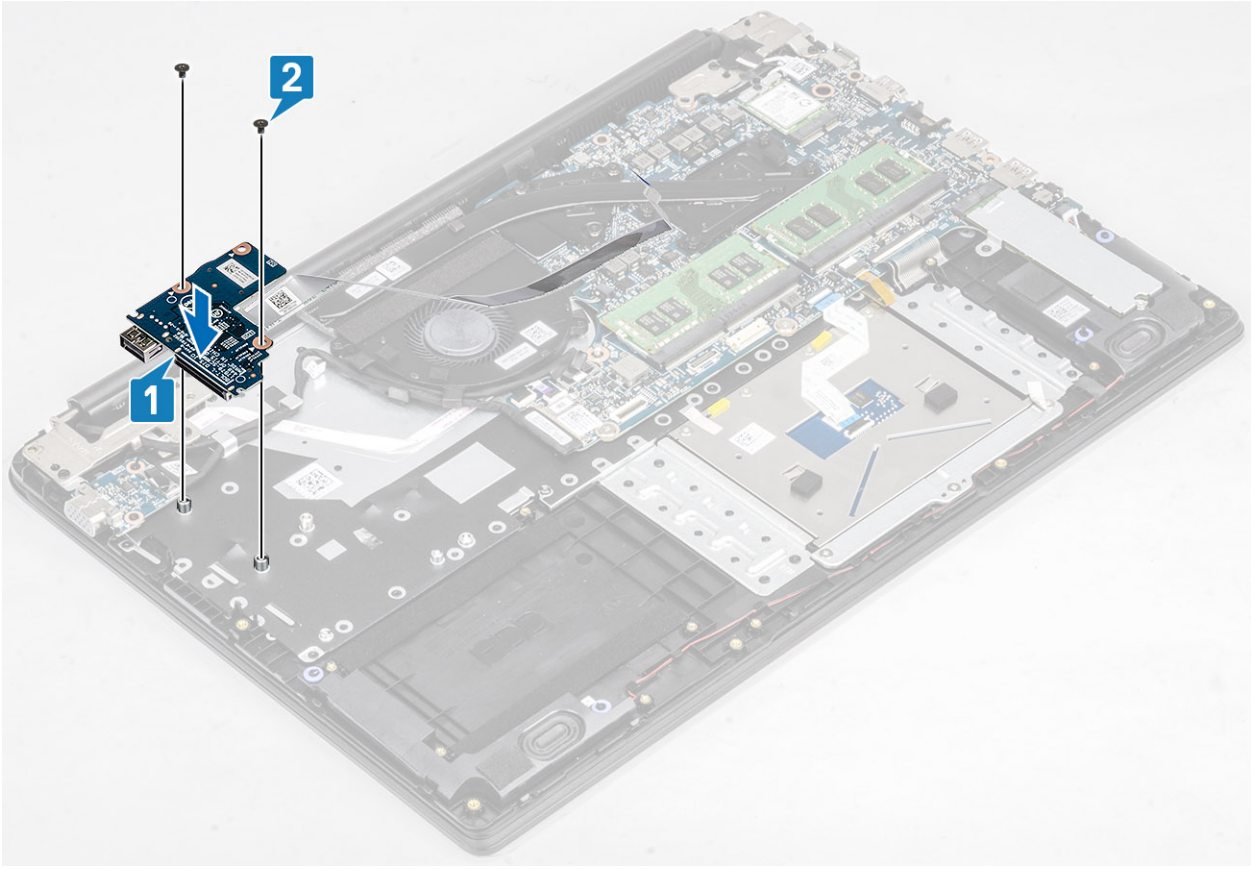
3. Remove the two (M2x3) screws that secure the I/O board to the palm rest and keyboard assembly [1].
4. Lift the I/O board, along with the cable, off the palm rest and keyboard assembly [2].



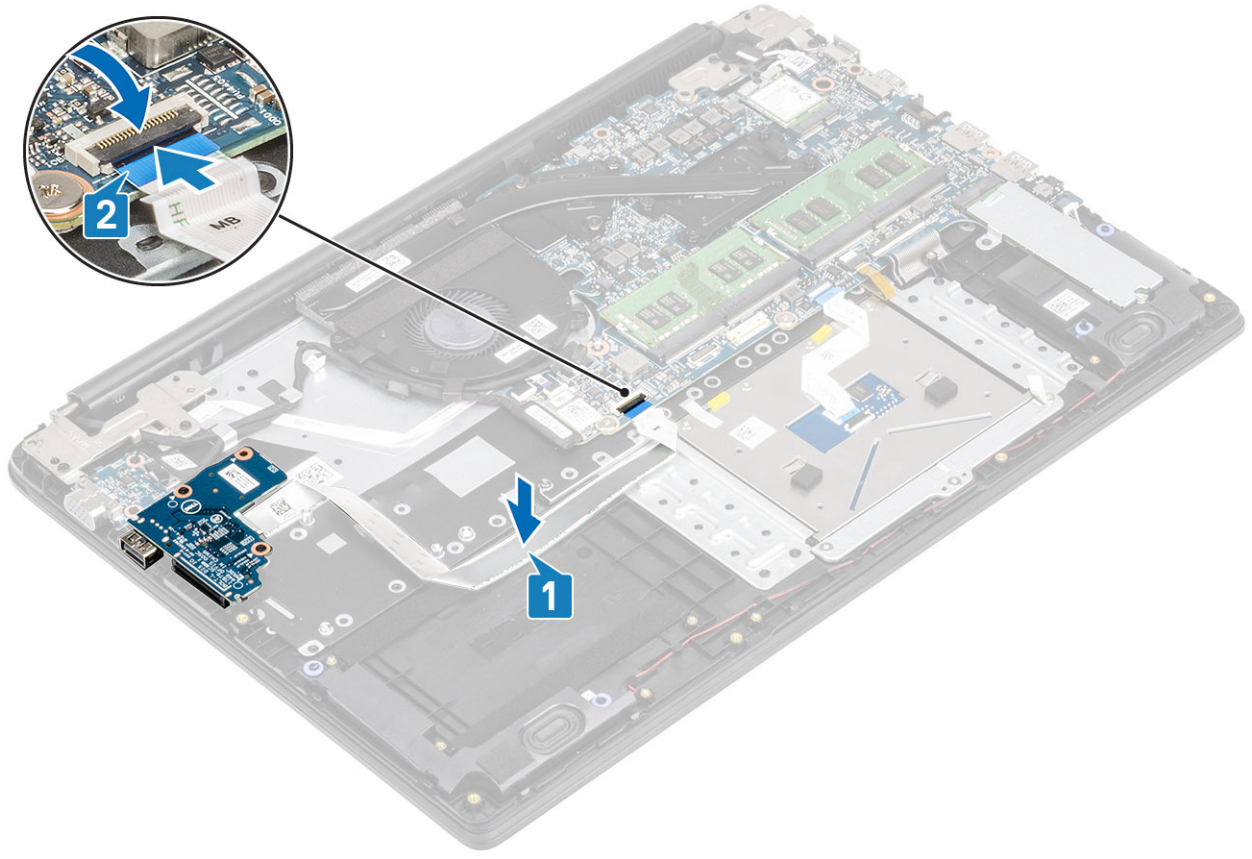
Installing the IO board

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.

   NOTE: Required for systems with 42 Whr battery

2. Reconnect 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

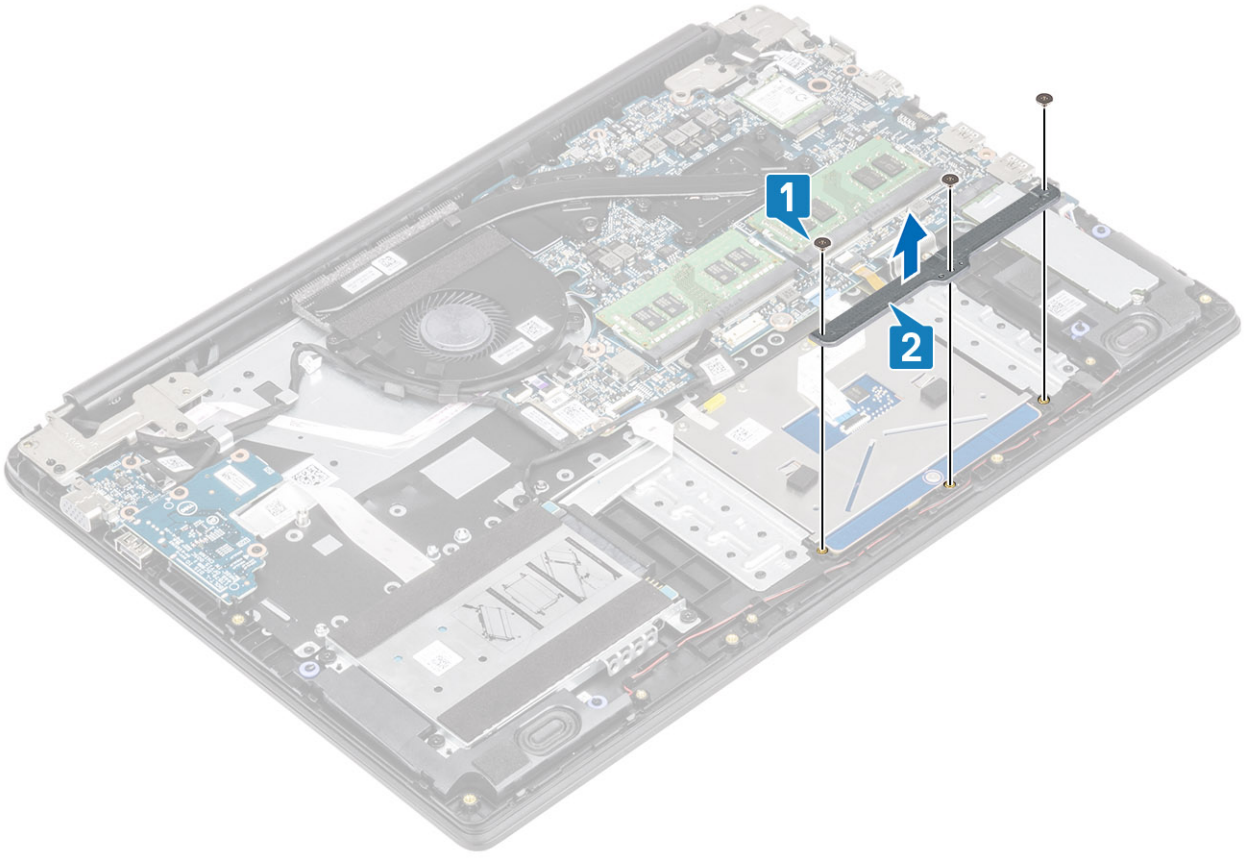
Prerequisites

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. Disconnect the battery.

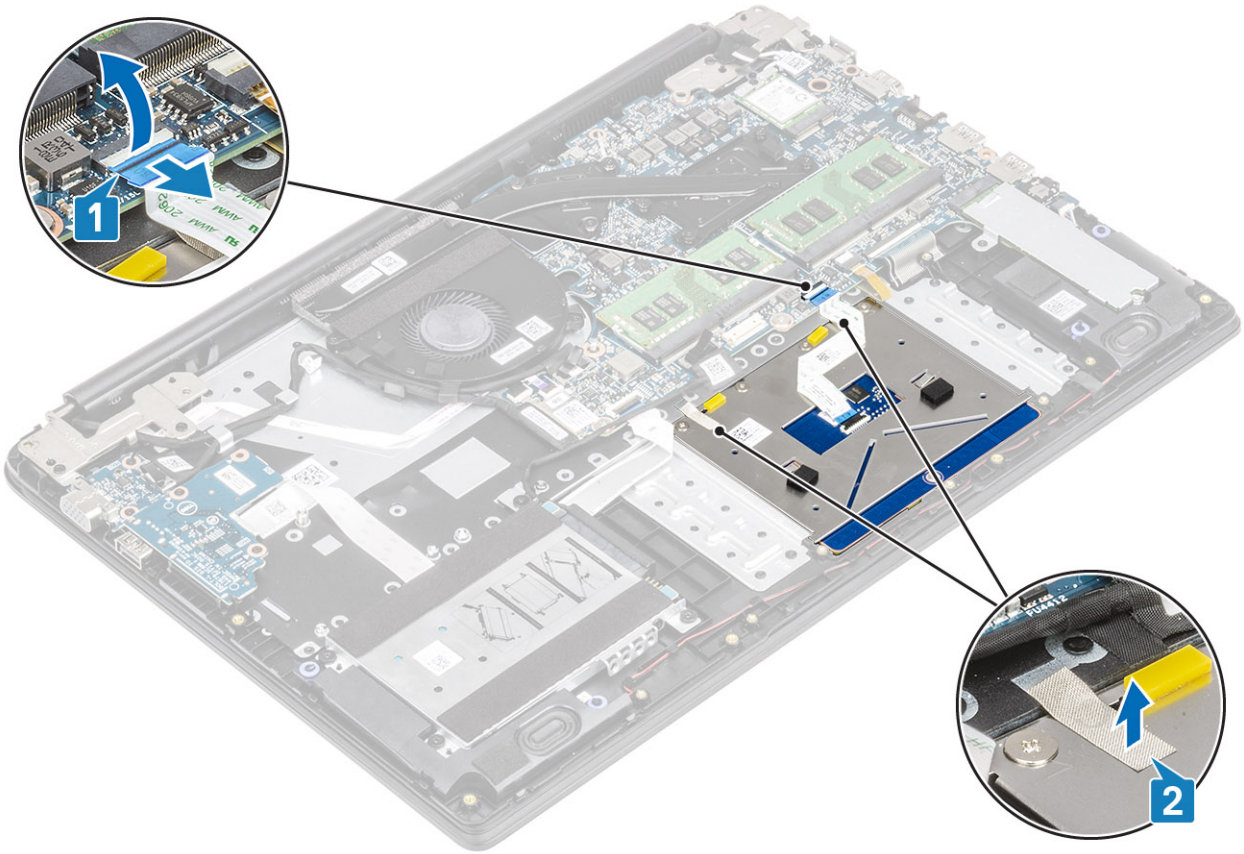
Steps

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.

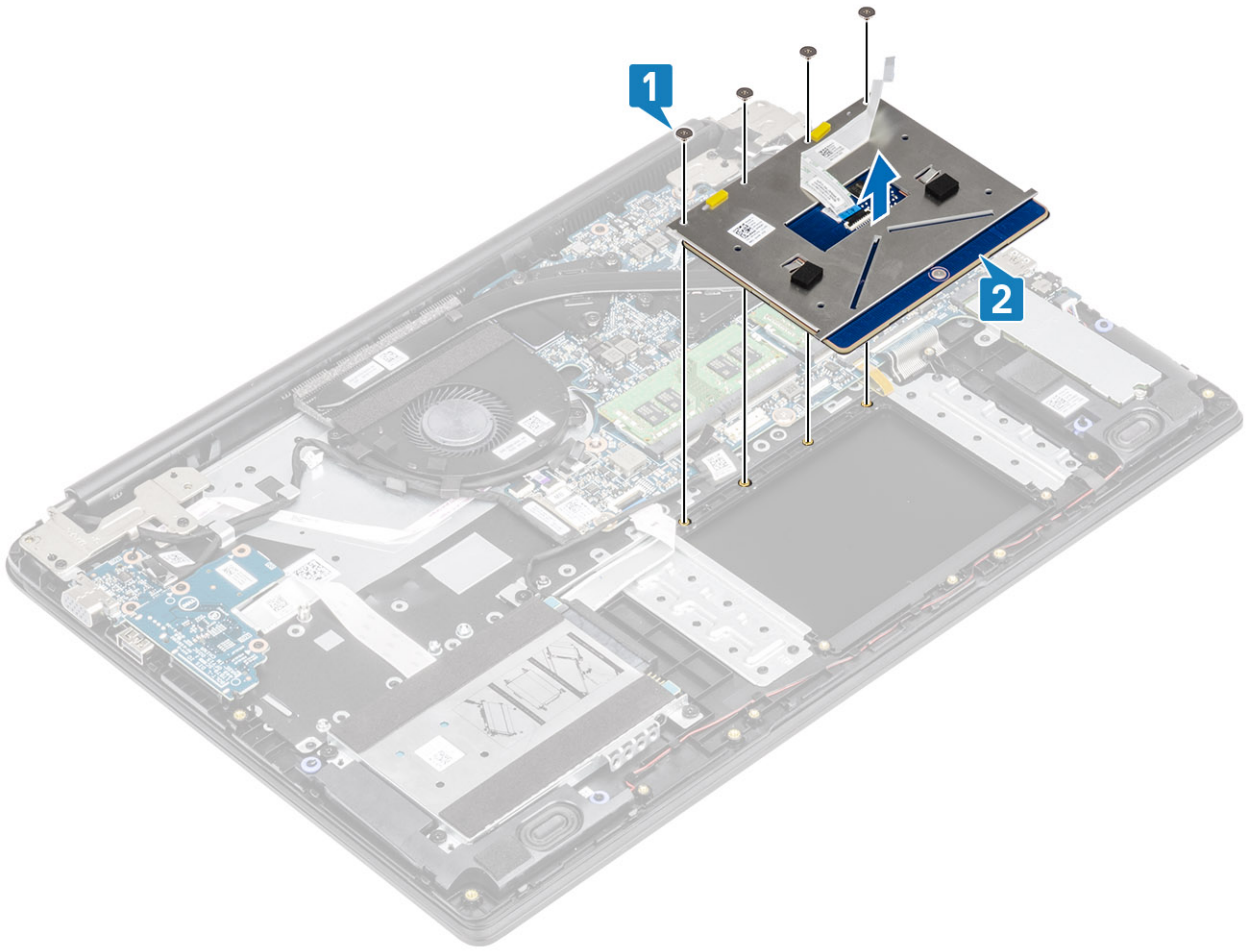


3. Open the latch and disconnect the touchpad cable from the system board [1].

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].



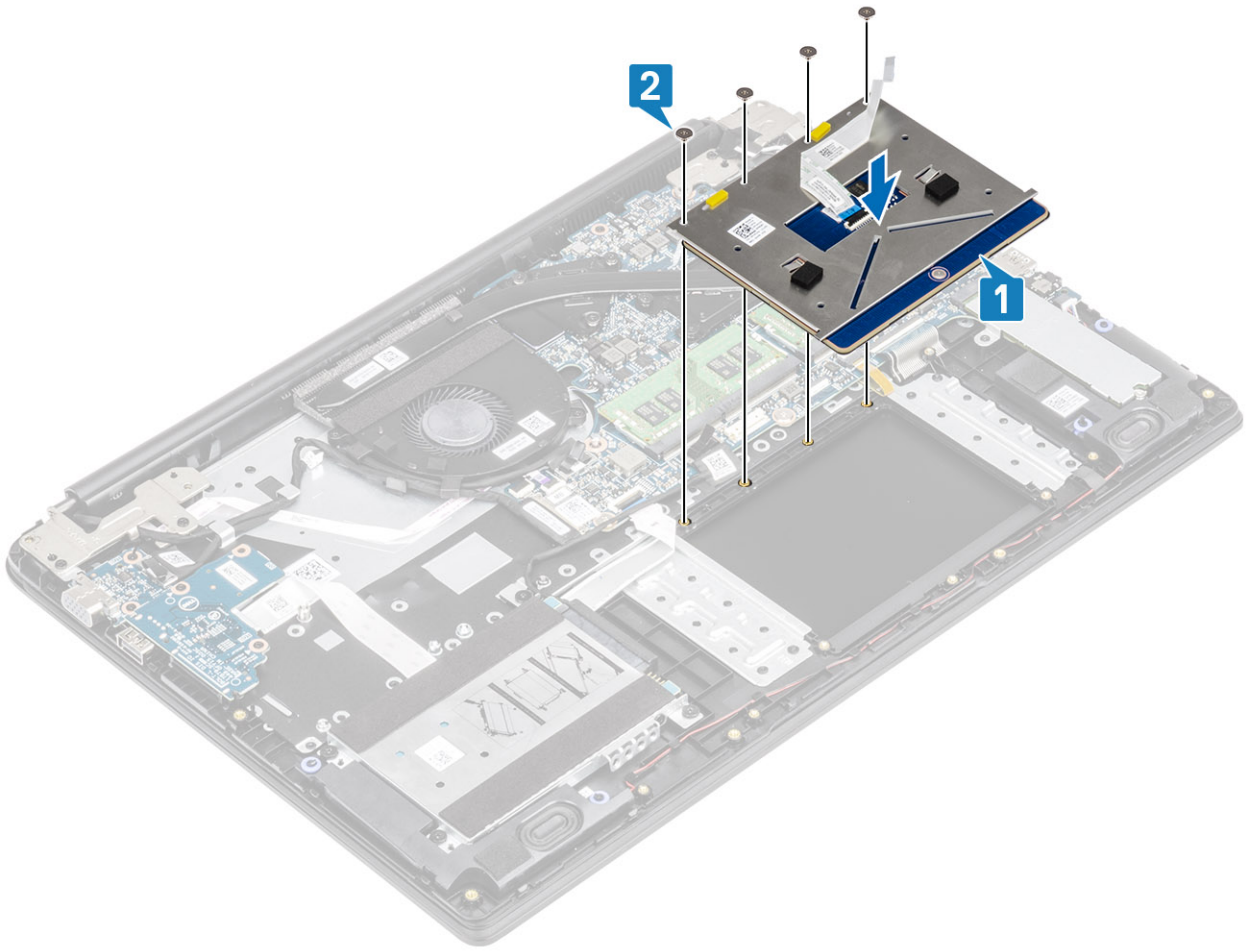
Installing the touch pad assembly

About this task

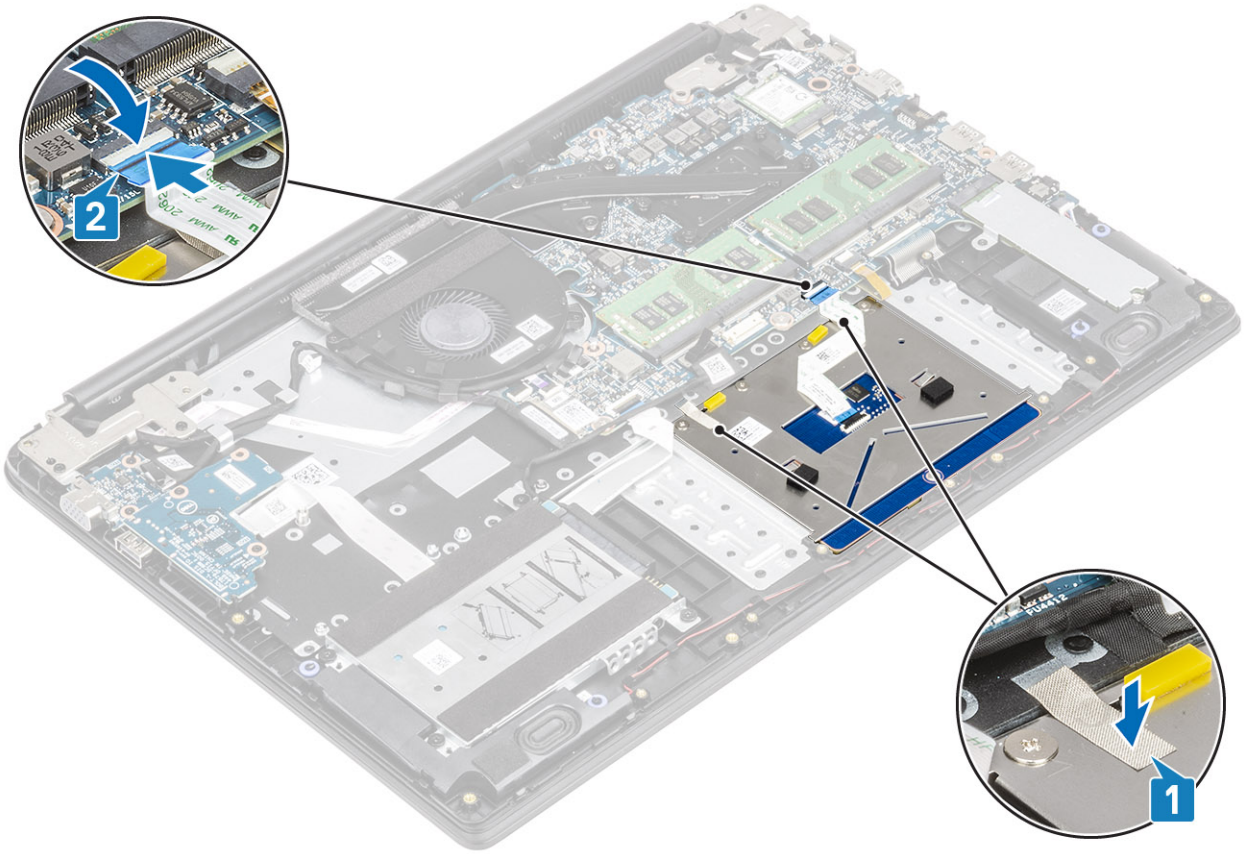
NOTE: Ensure that the touch pad is aligned with the guides available on the palm-rest and keyboard assembly, and the gap on either sides of the touch pad is equal.

Steps

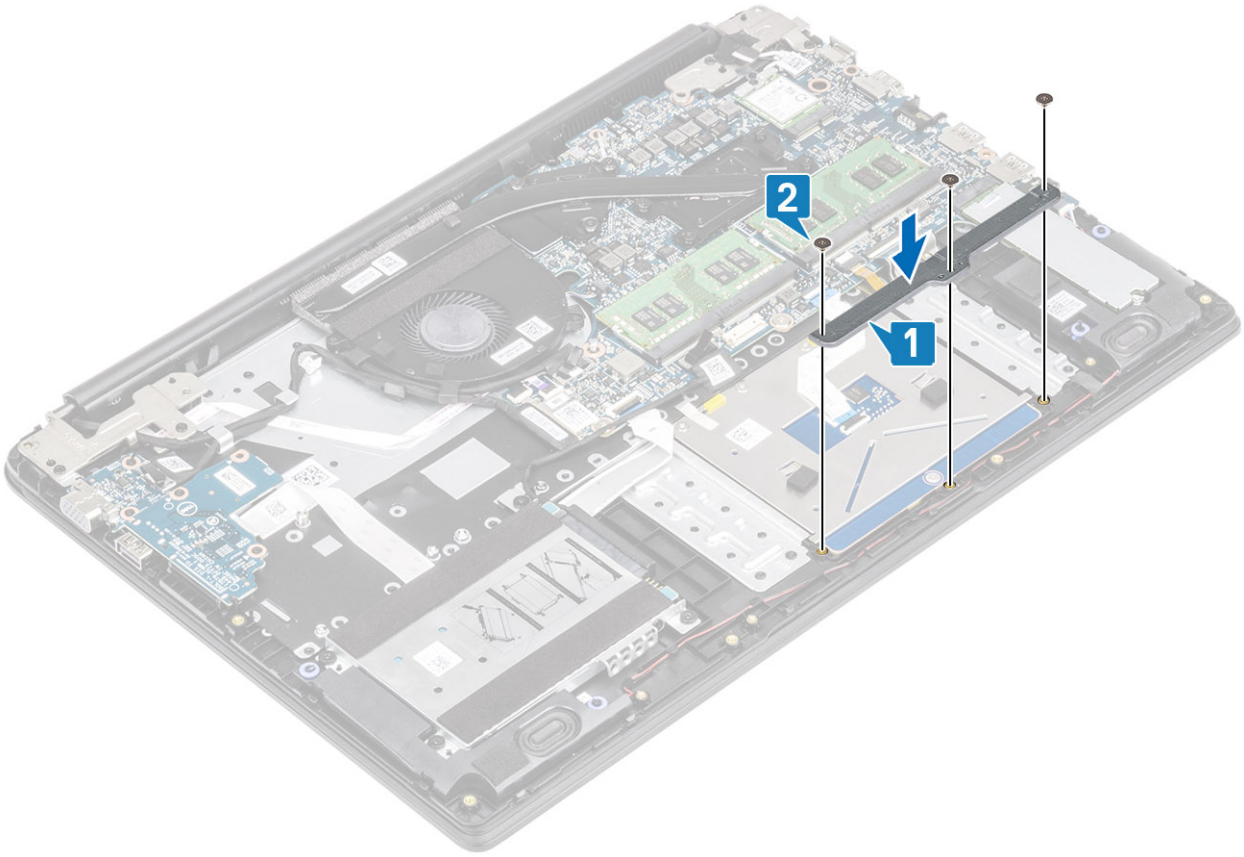
1. Place the touch pad into the slot on the palmrest and keyboard assembly [1].
2. Replace the four (M2x2) screws that secure the touch pad to the palmrest and keyboard assembly [2].



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. Reconnect the battery
2. Replace the base cover
3. Replace the SD memory card
4. Follow the procedure in after working inside your computer

System fan

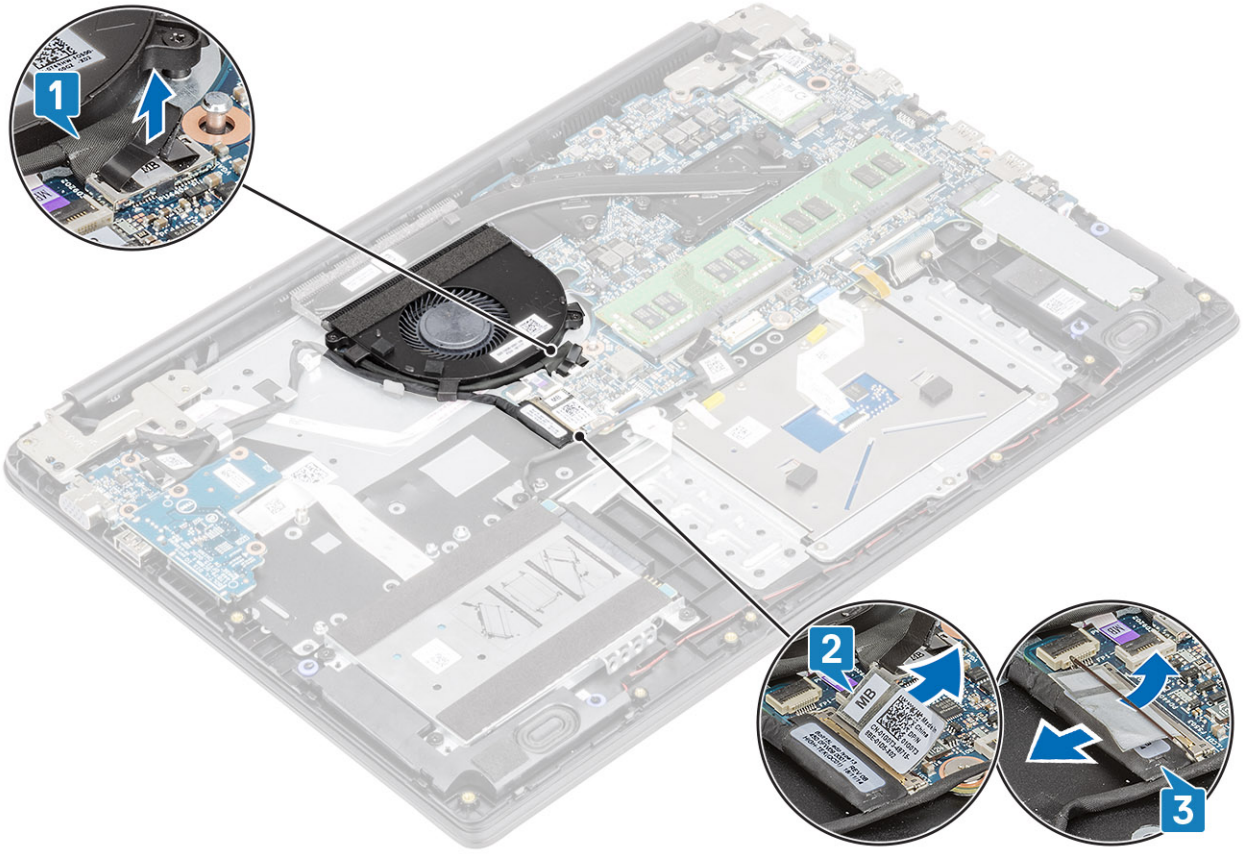
Removing the system fan

Prerequisites

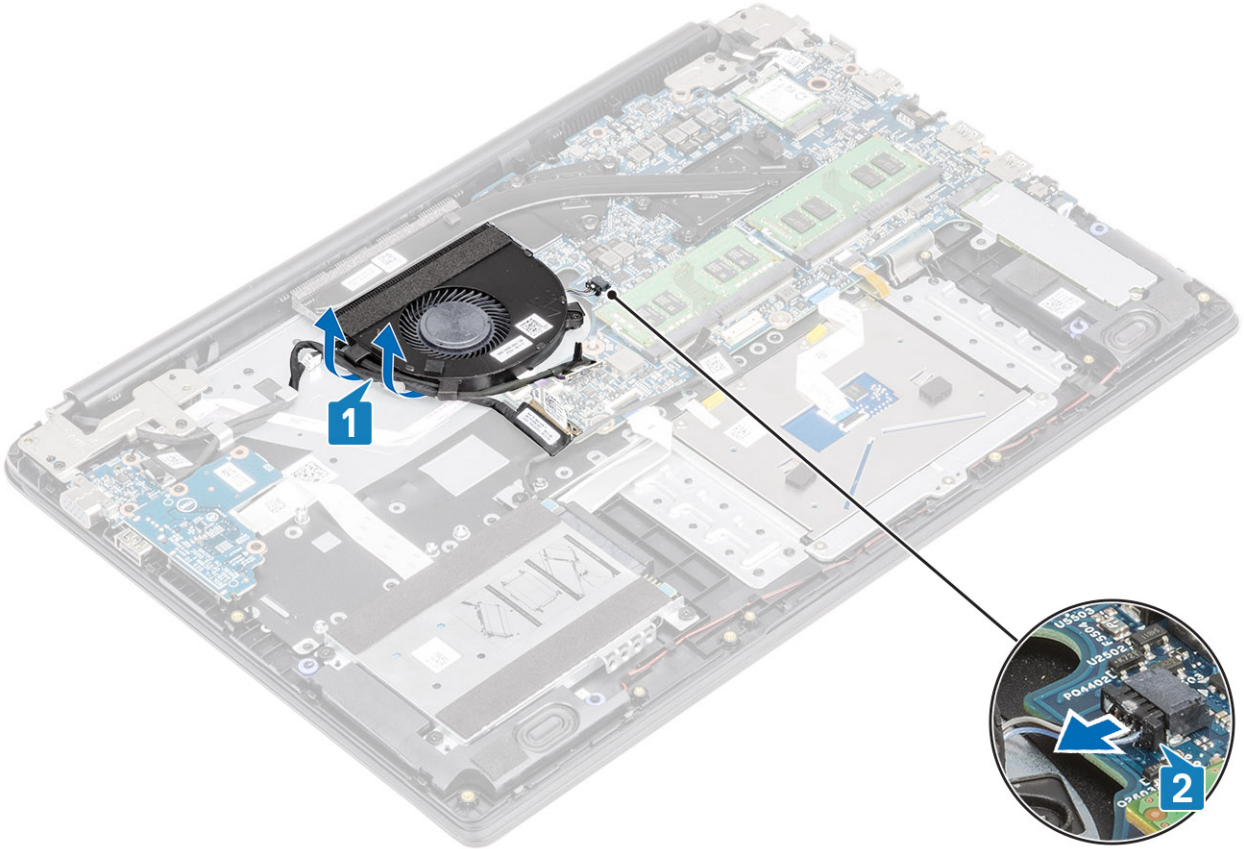
1. Follow the procedure in before working inside your computer.
2. Remove the SD memory card.
3. Remove the base cover.
4. Remove the battery.

Steps

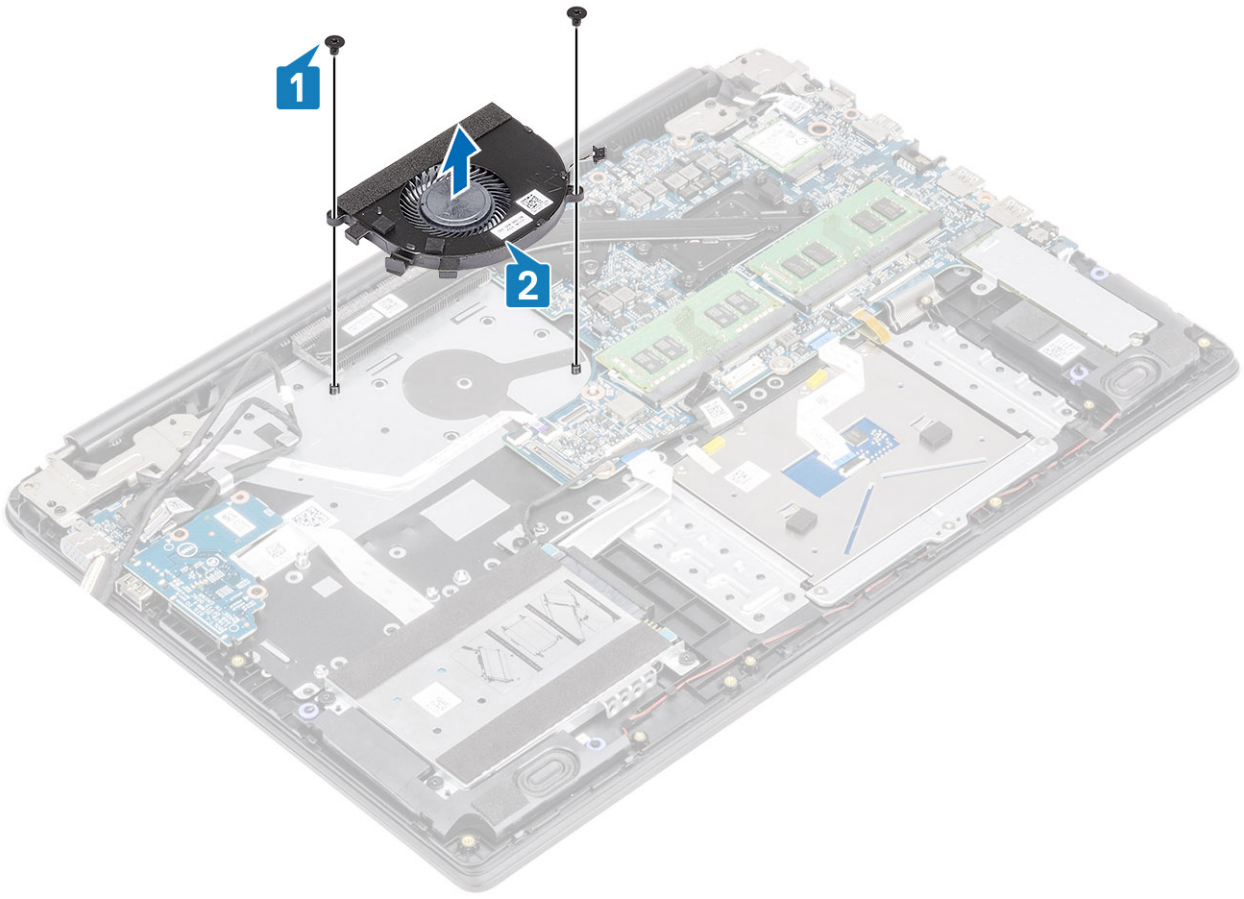
1. Disconnect the VGA board cable [1], and the display cable [2, 3] from the system board .



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].



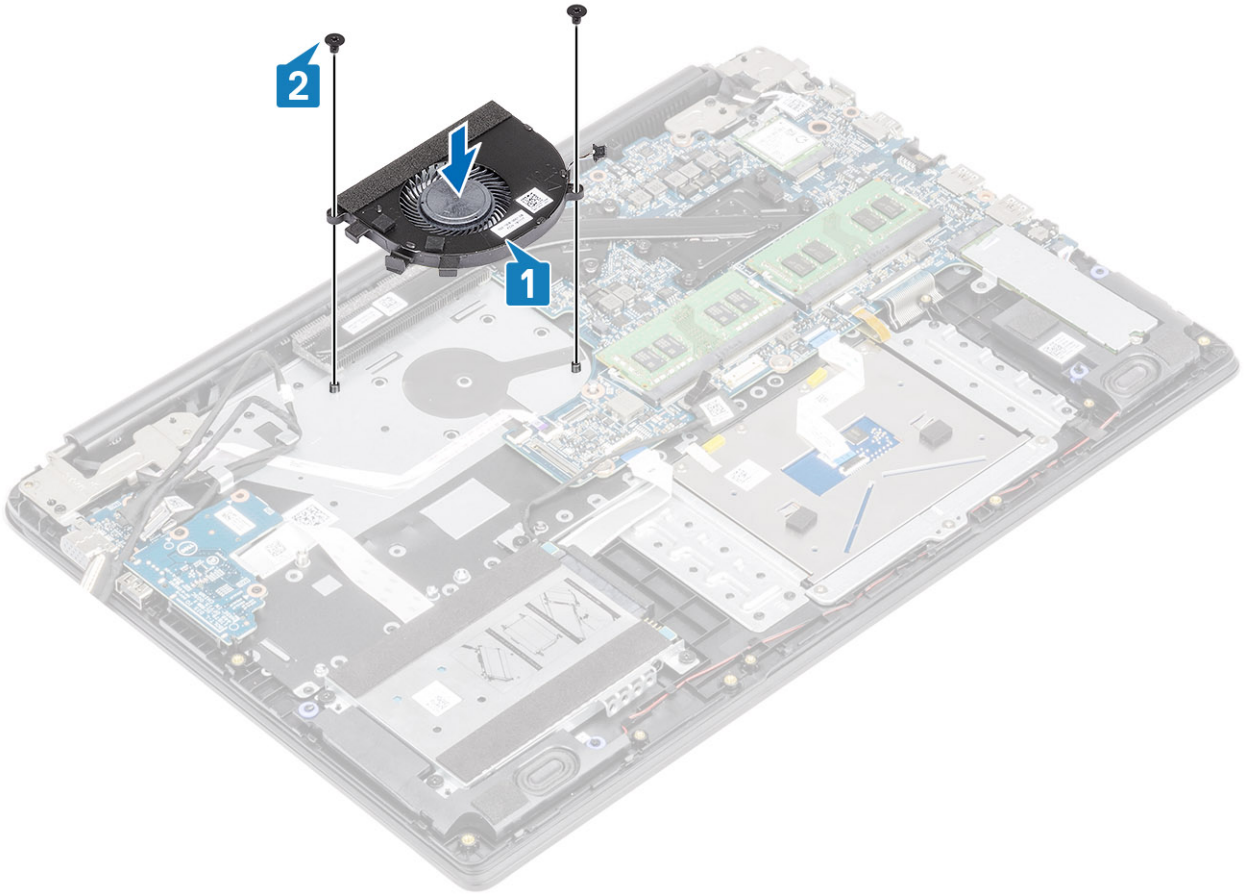
4. Remove the two (M2x3) screws that secure the fan to the palmrest and keyboard board assembly [1].
5. Lift the fan off the palmrest and keyboard board assembly [2].



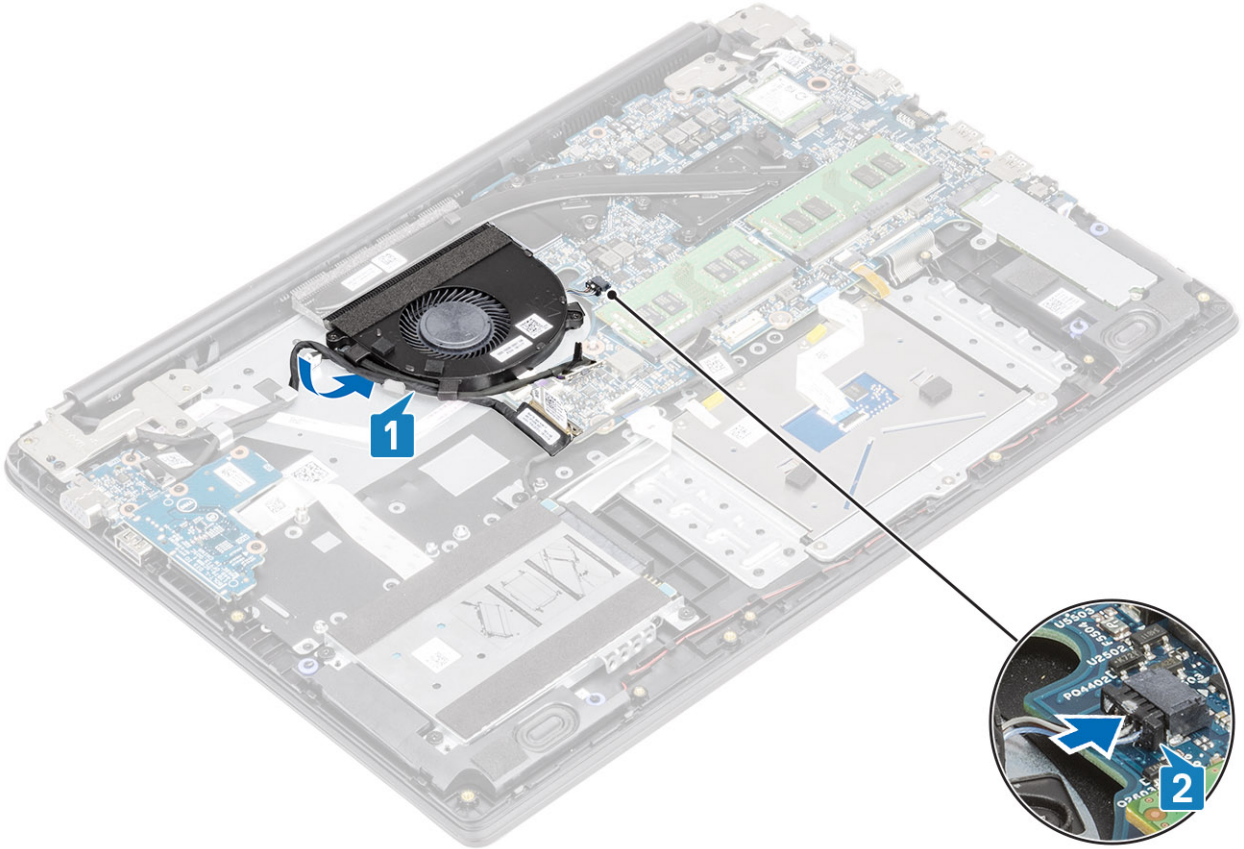
Installing the system fan

Steps

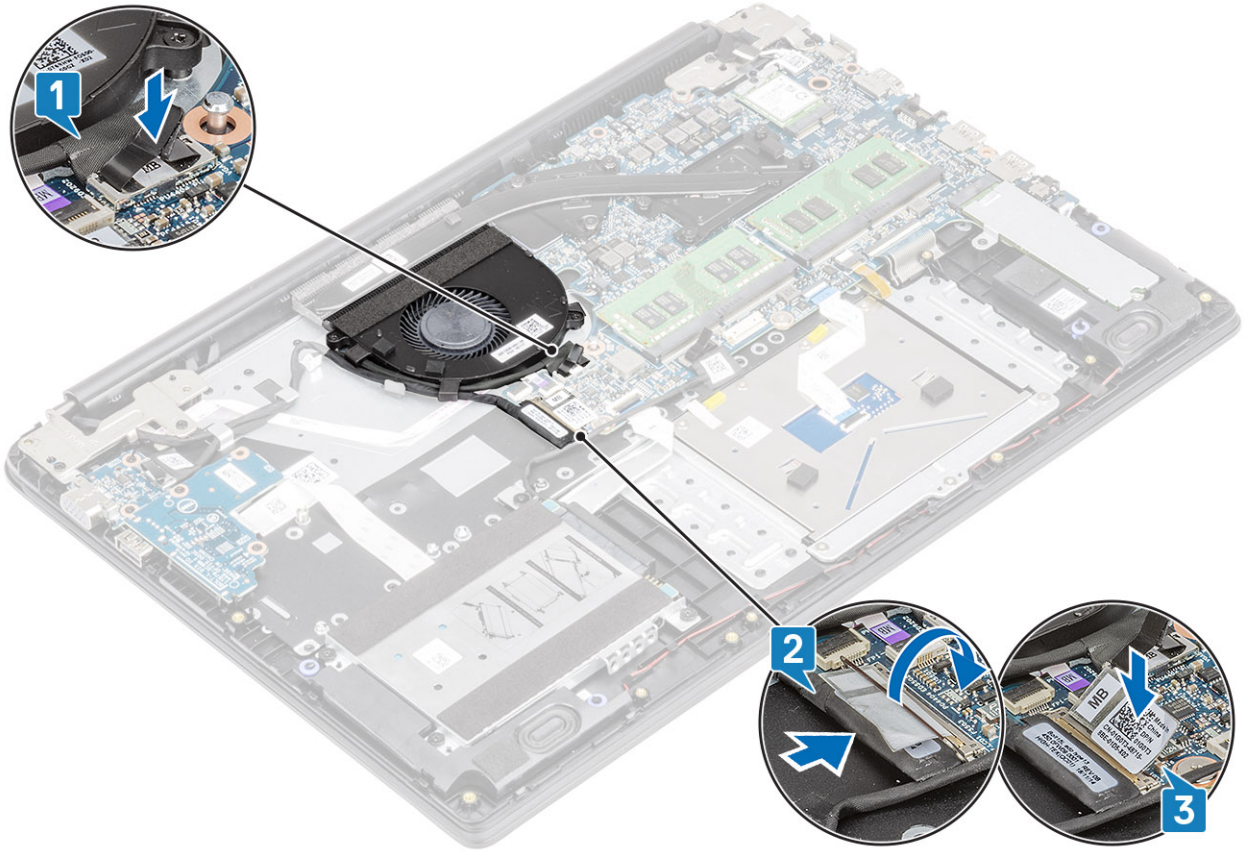
1. Align the screw holes on the fan with the screw holes on to the palm rest and keyboard board assembly [1].
2. Replace the two (M2x3) screws that secure the fan to the palm rest and keyboard board assembly [2].



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

Steps

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

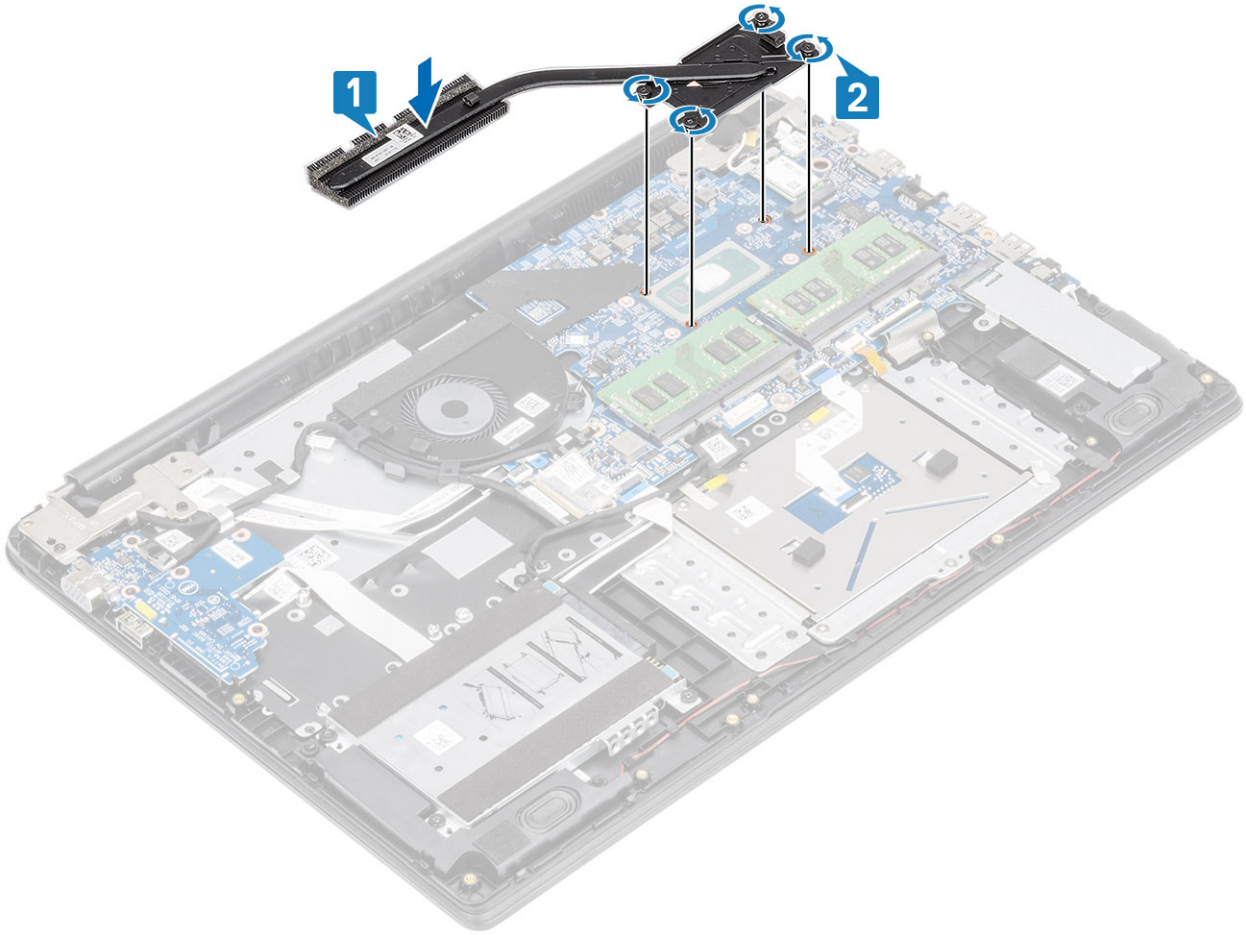
   NOTE: Loosen the screws in the order of the callout numbers [1, 2, 3, 4] as indicated on the heatsink.

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. Reconnect 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

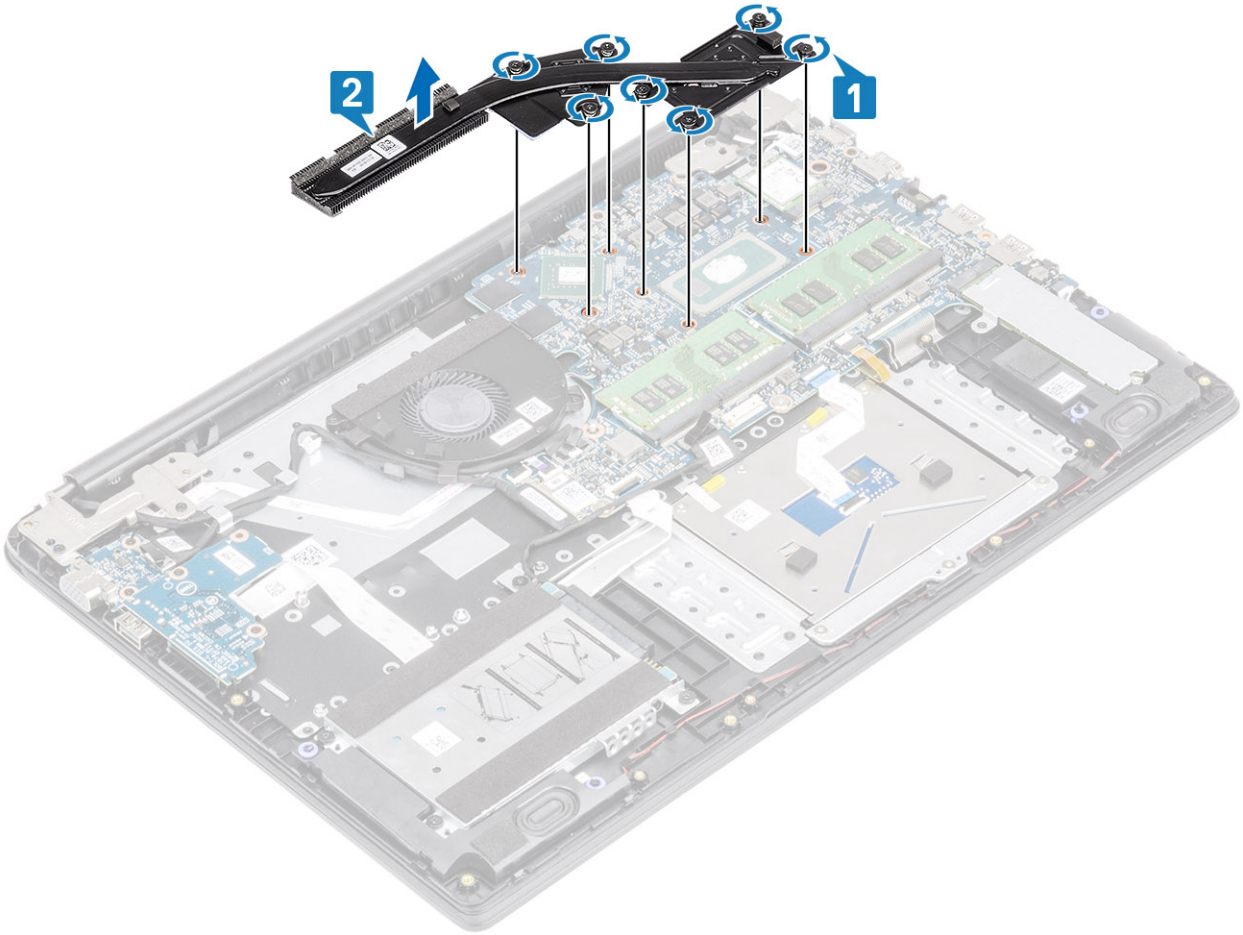
1. Follow the procedure in before working inside your computer
2. Remove the SD memory card
3. Remove the base cover
4. Disconnect the battery

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.

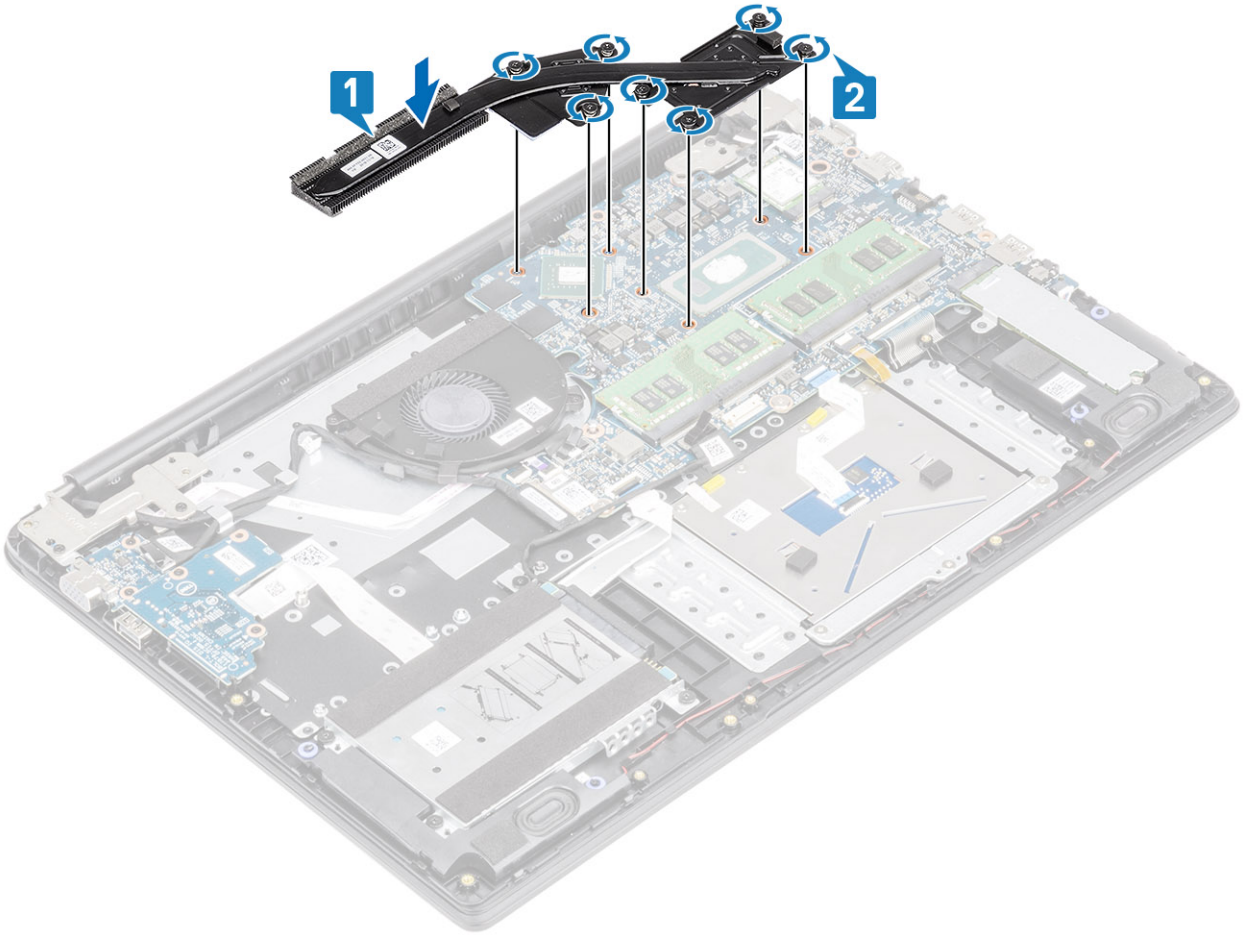
2. Lift the heatsink off the system board [2].



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. Reconnect 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

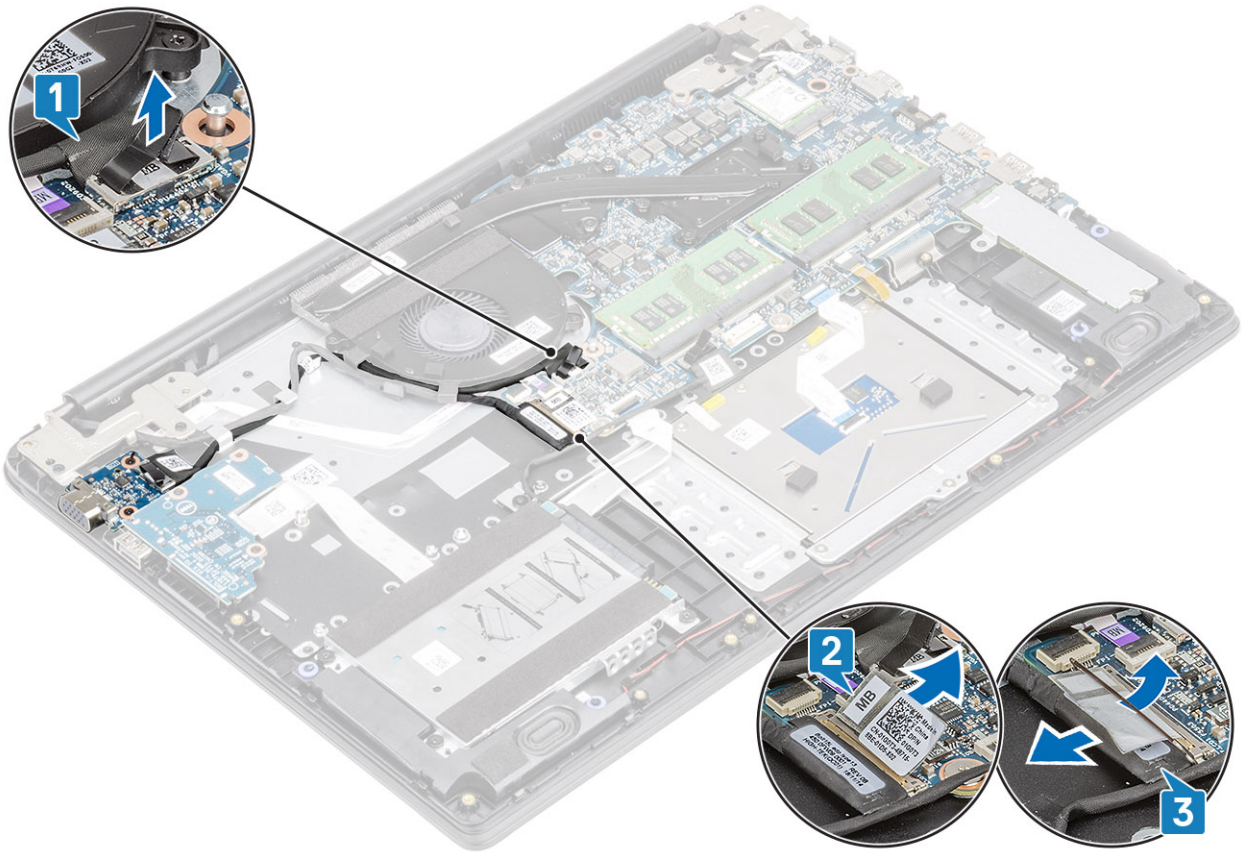
Removing the VGA daughterboard

Prerequisites

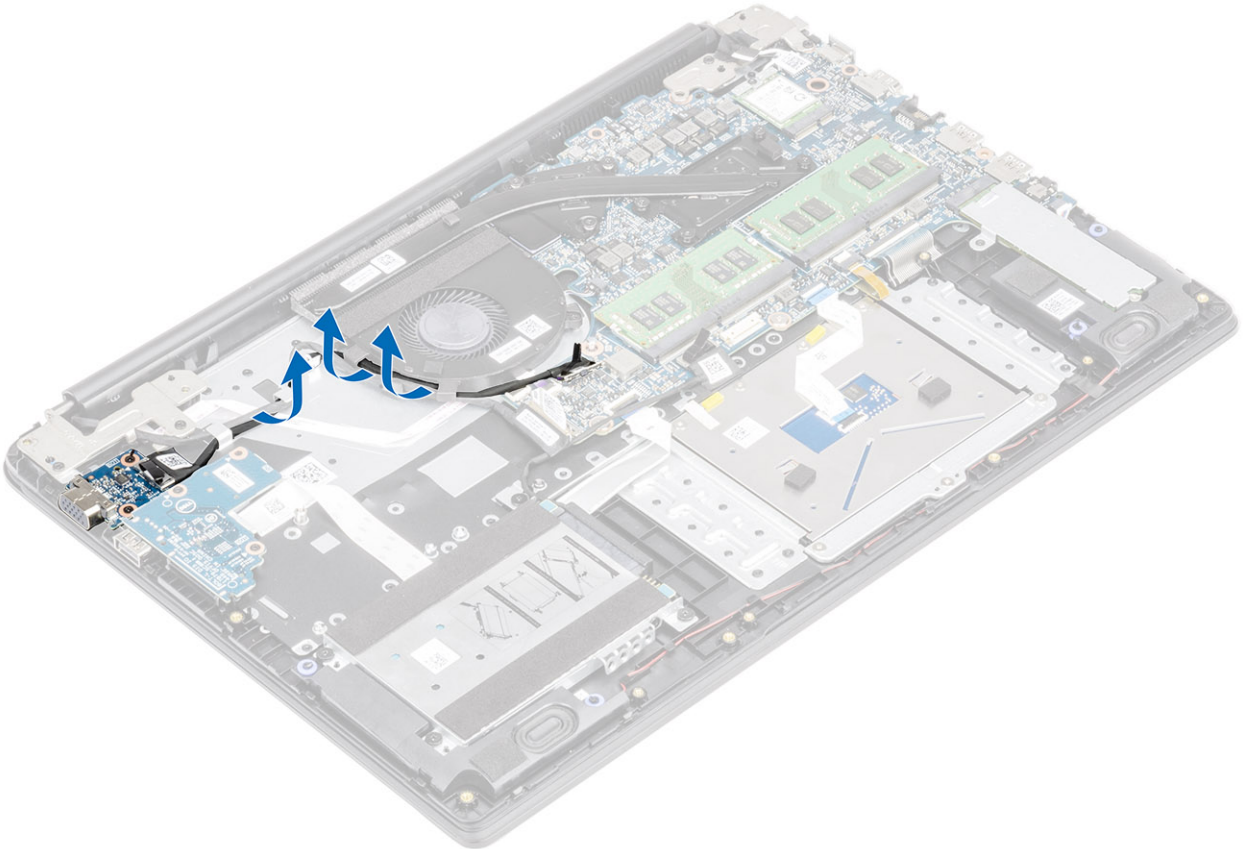
1. Follow the procedure in before working inside your computer.
2. Remove the SD memory card.
3. Remove the base cover.
4. Disconnect the battery.

Steps

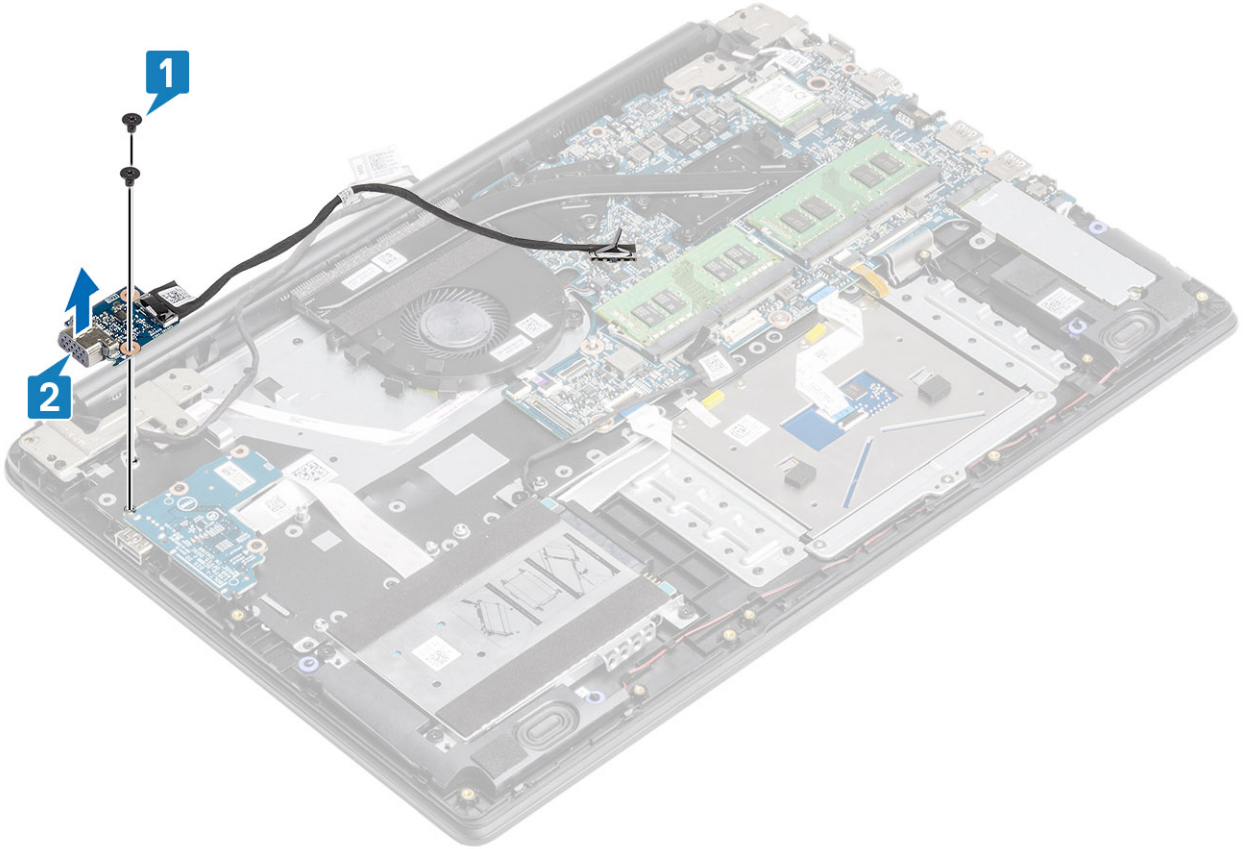
1. Disconnect the VGA daughterboard cable [1], and the display cable from the system board [2, 3].



2. Unroute the VGA board cable and the display cable from the routing guides on the fan.



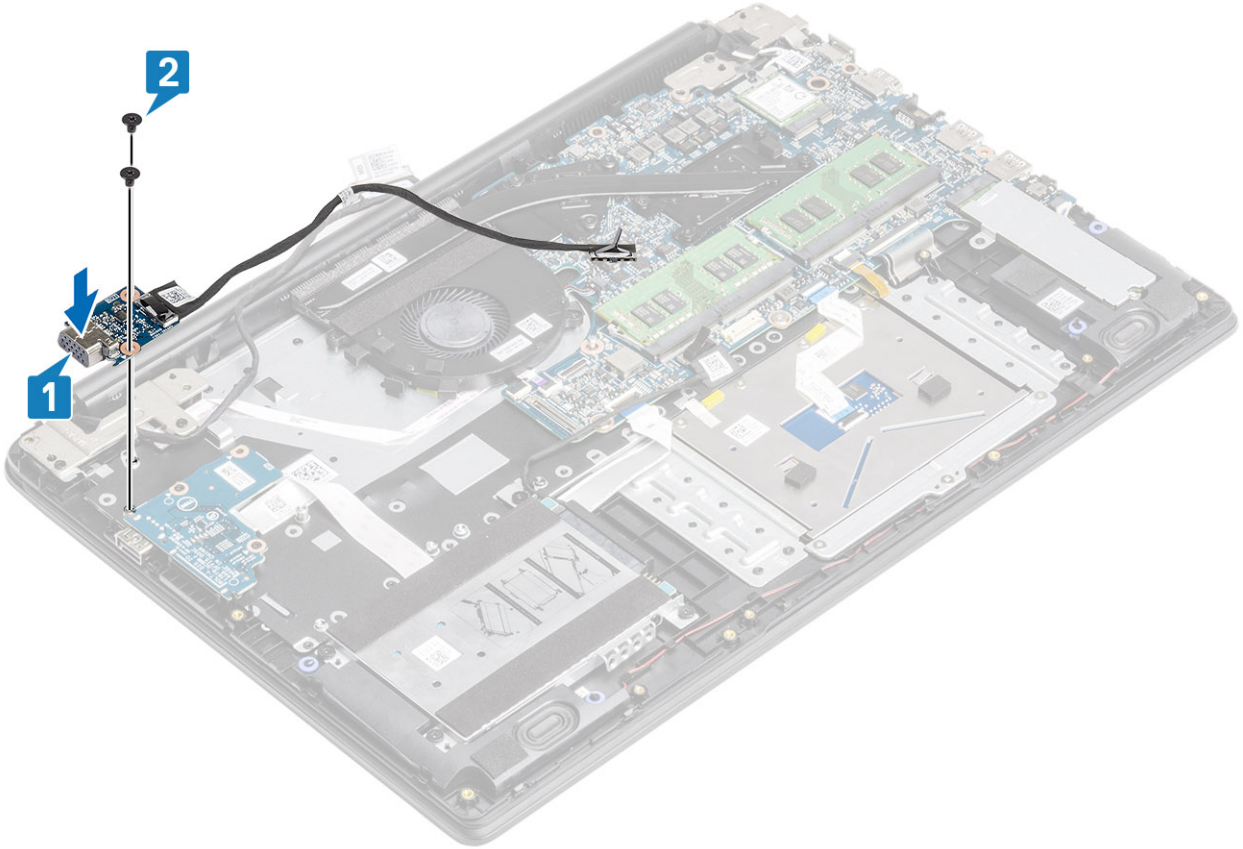
3. Remove the two (M2x3) screws that secure the VGA daughterboard to the palmrest and keyboard assembly [1].
4. Lift the VGA daughterboard away from the system [2].



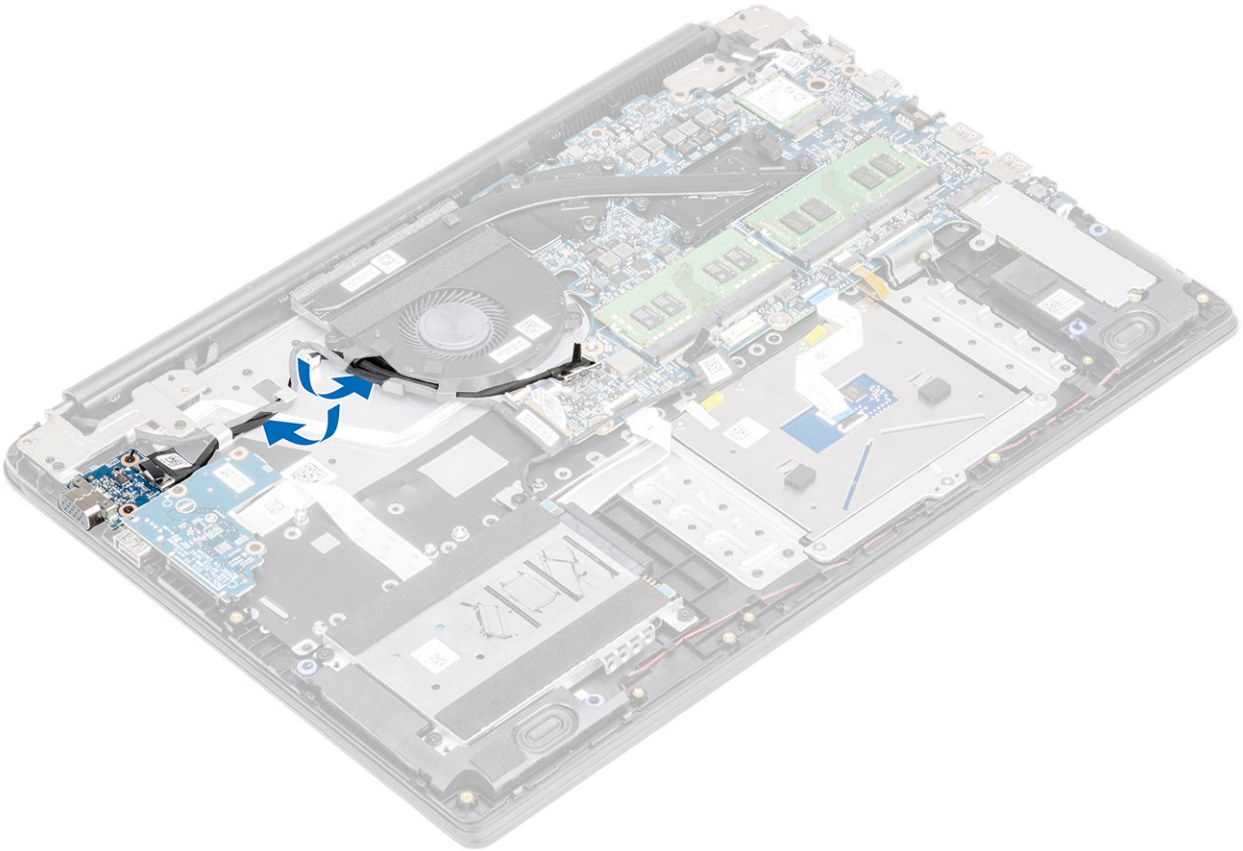
Installing the VGA daughterboard

Steps

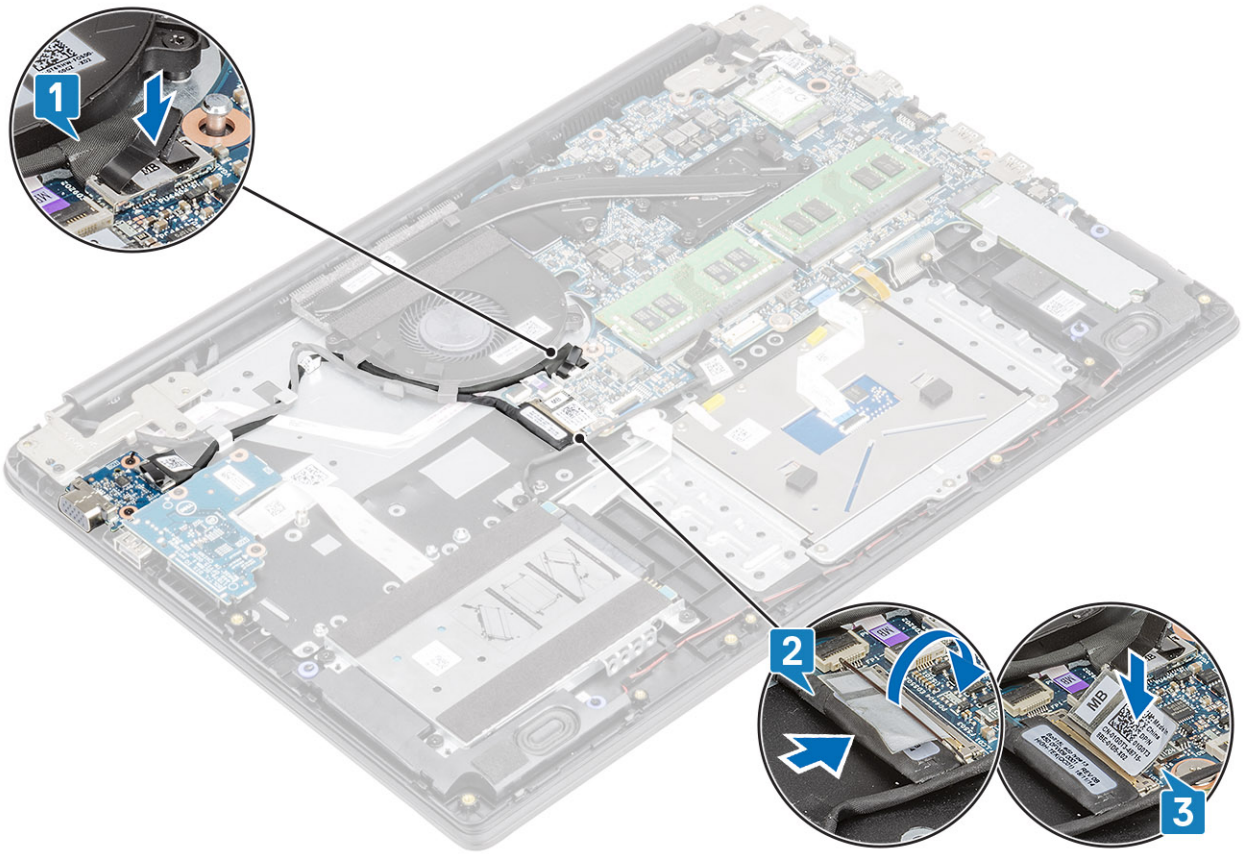
1. Place the VGA daughterboard and align the screw holes on the VGA daughterboard with the screw holes on the palmrest and keyboard assembly [1].
2. Replace the two (M2x3) screws that secure the VGA daughterboard on the palmrest and keyboard assembly [2].



3. Route the VGA board cable and the display cable through the routing guides on the fan.



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



Next steps

1. Reconnect 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

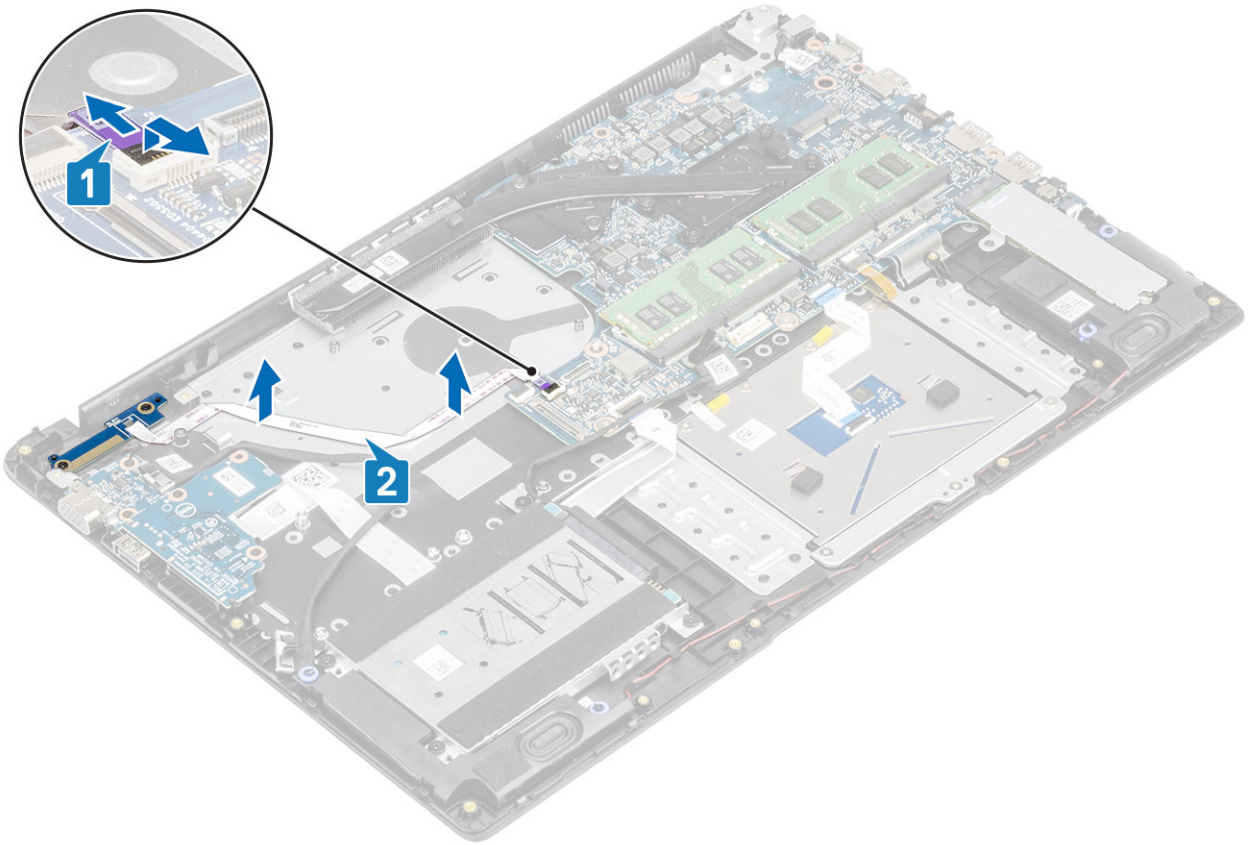
Removing the power button board with optional fingerprint reader

Prerequisites

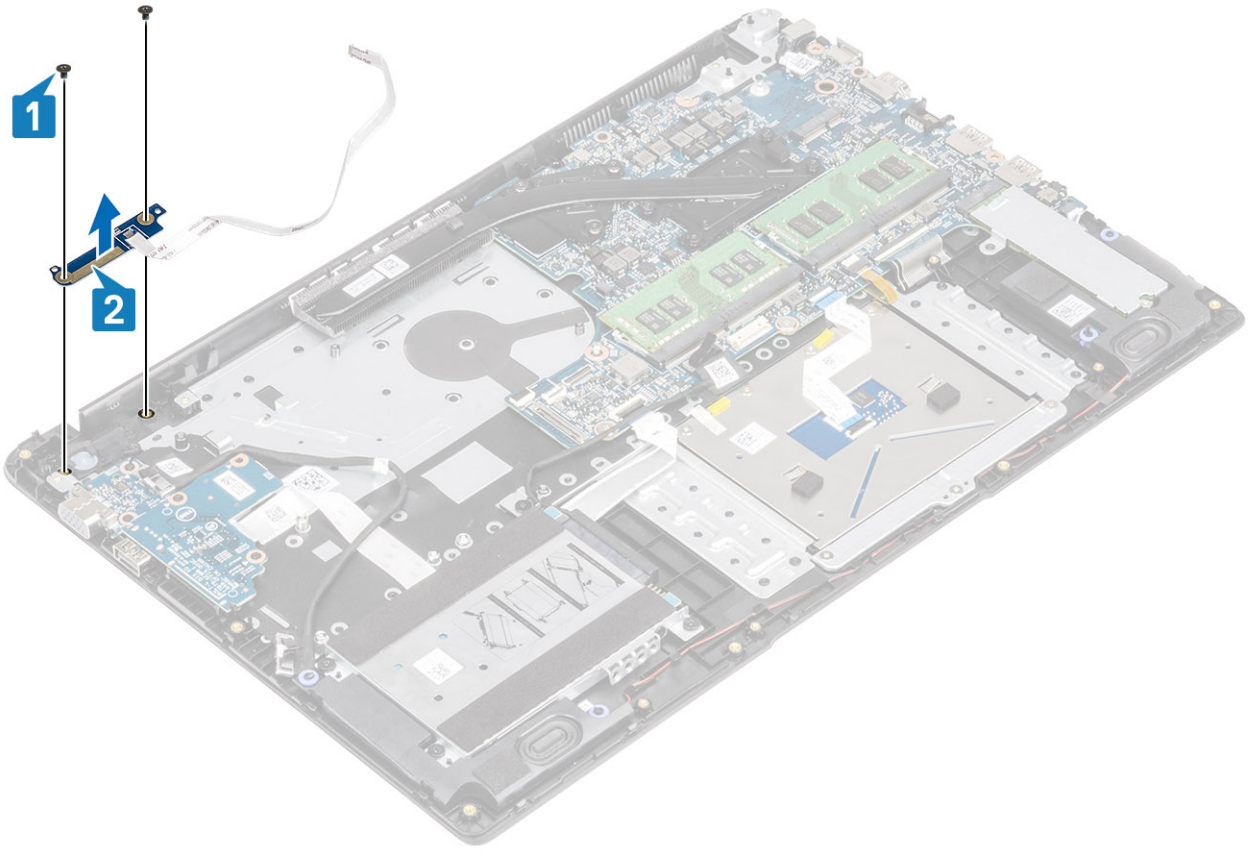
1. Follow the procedure in before working inside your computer.
2. Remove the SD memory card.
3. Remove the base cover.
4. Disconnect the battery.
5. Remove the system fan.
6. Remove the display assembly.

Steps

1. Open the latch, and disconnect the power button board cable and fingerprint cable from the system [1].
2. Peel the conductive tape off the power button board [2].



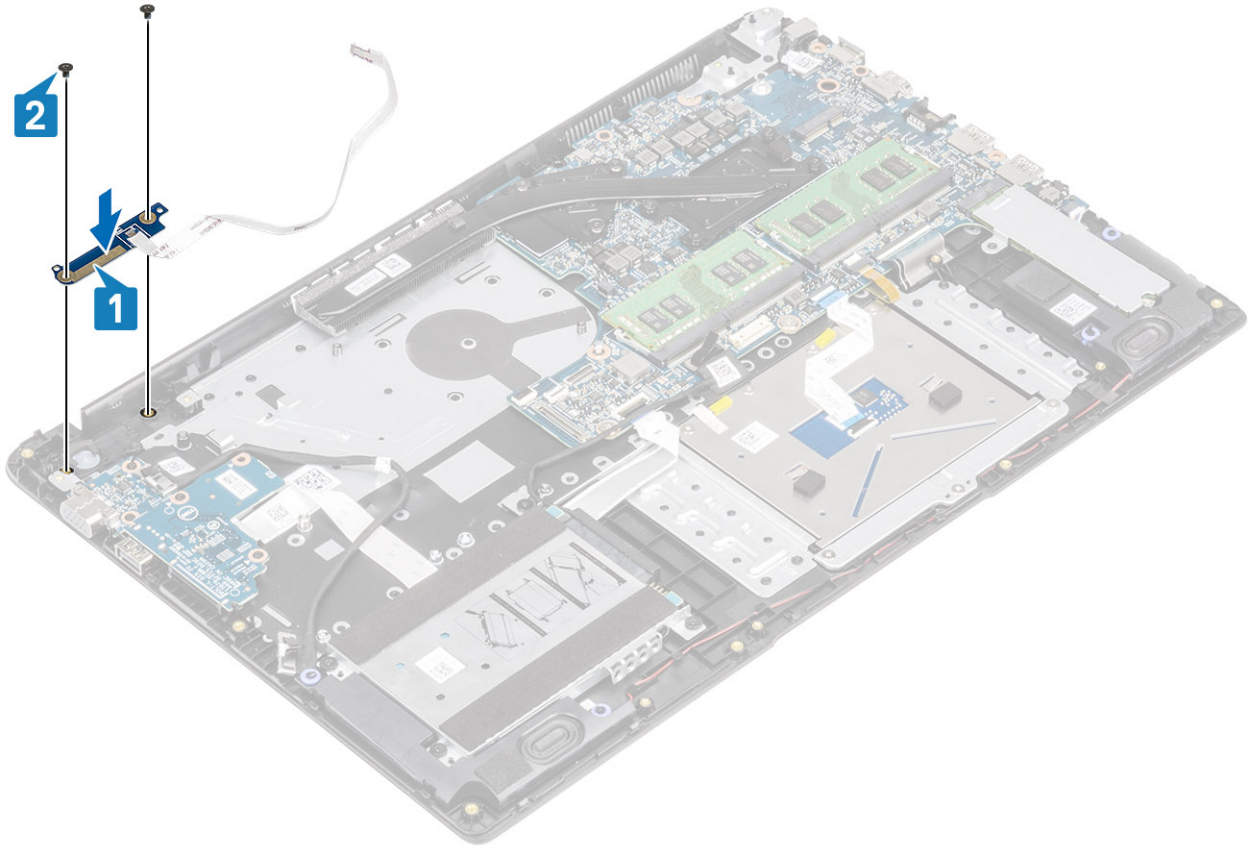
3. Remove the two (M2x3) screws that secure the power button board to the palmrest and keyboard assembly [1].
4. Lift the power button board, along with the cable off the palmrest and keyboard assembly [2].



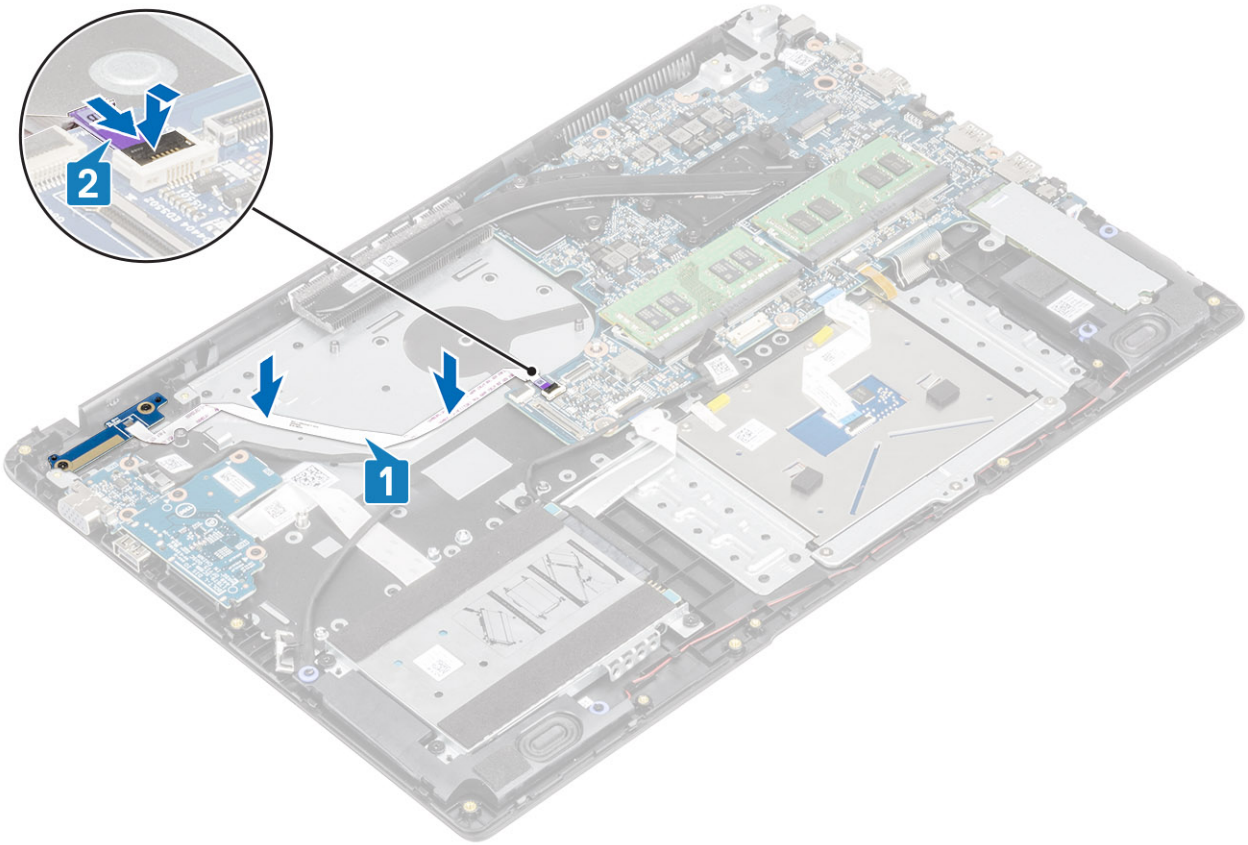
Installing the power button board with optional fingerprint reader

Steps

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



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



Next steps

1. Replace the display assembly.
2. Replace the system fan.
3. Reconnect 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

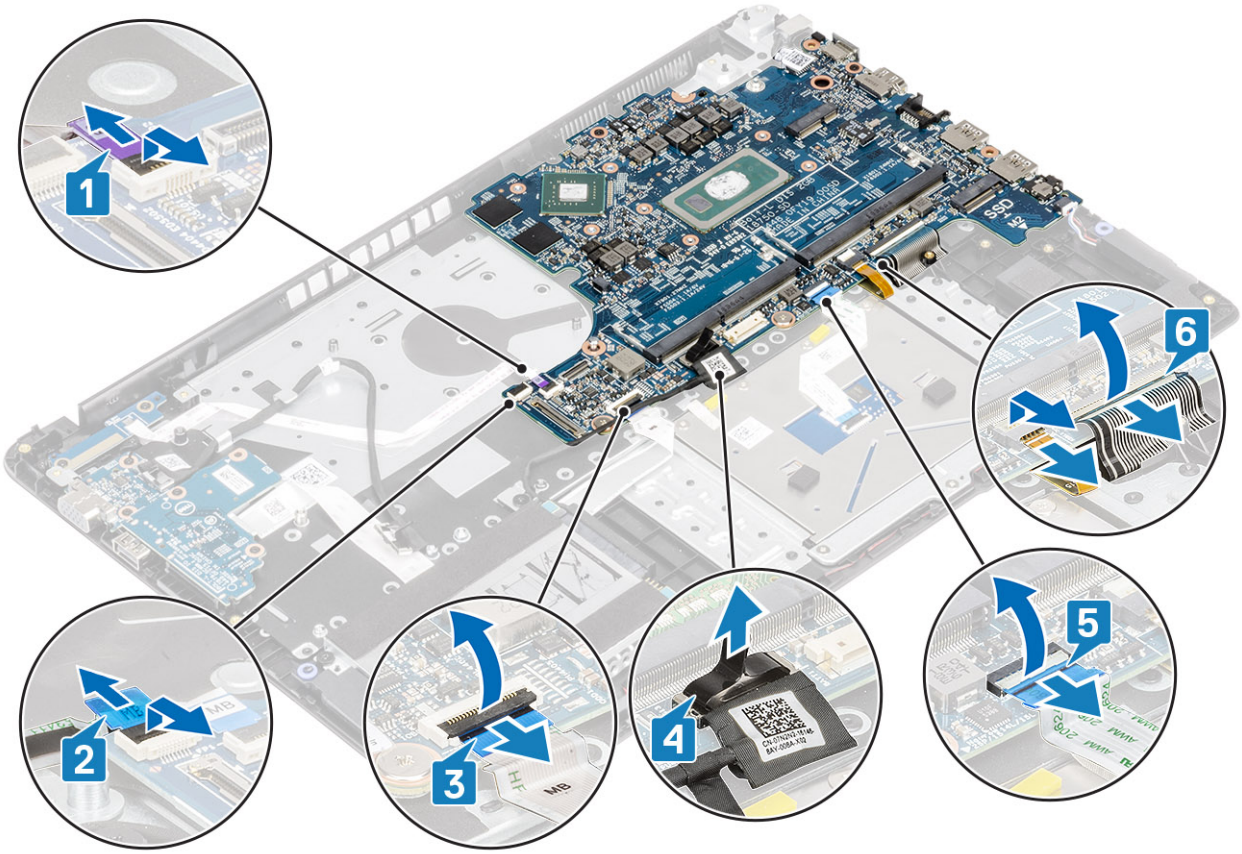
Removing the system board

Prerequisites

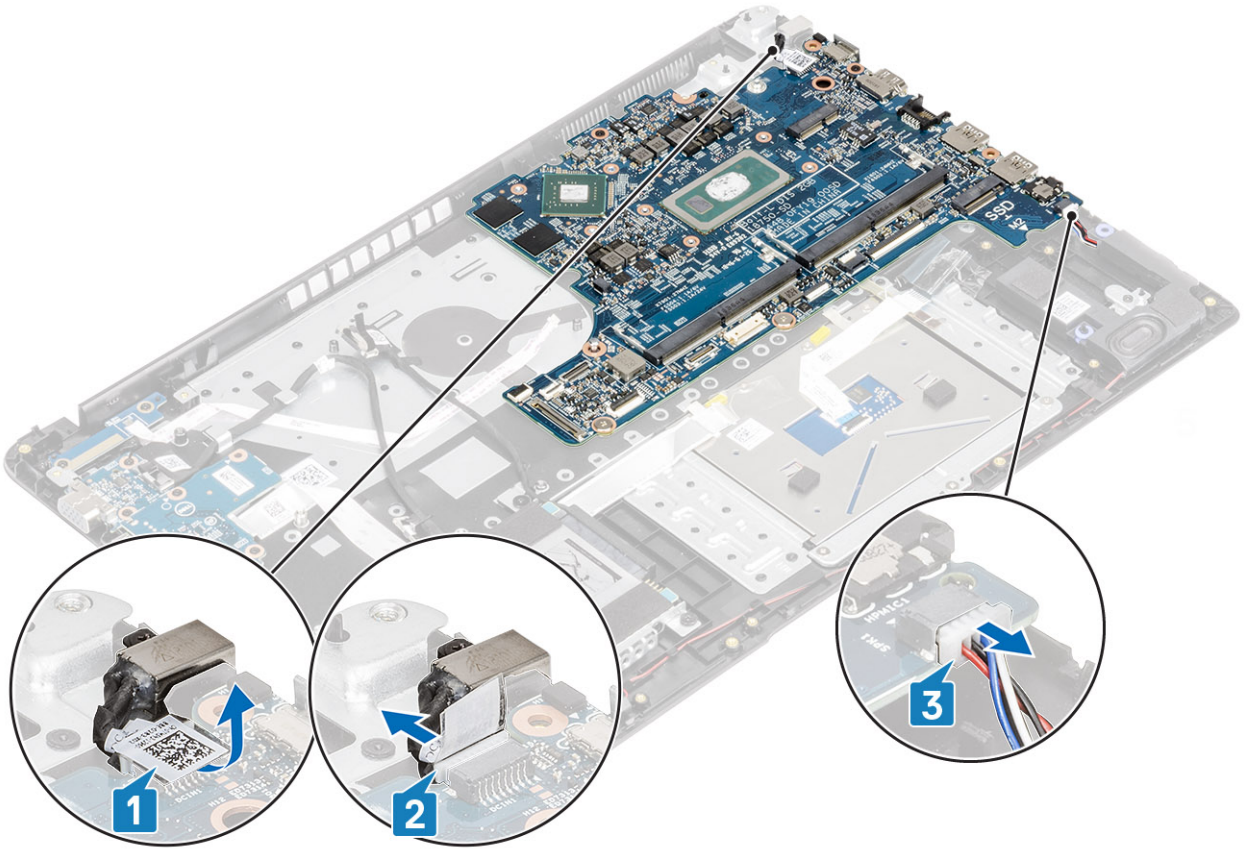
1. Follow the procedure in before working inside your computer.
2. Remove the SD memory card.
3. Remove the base cover.
4. Disconnect the battery.
5. Remove the WLAN.
6. Remove the Memory.
7. Remove the SSD.
8. Remove the system fan.
9. Remove the heatsink.
10. Remove the display assembly.

Steps

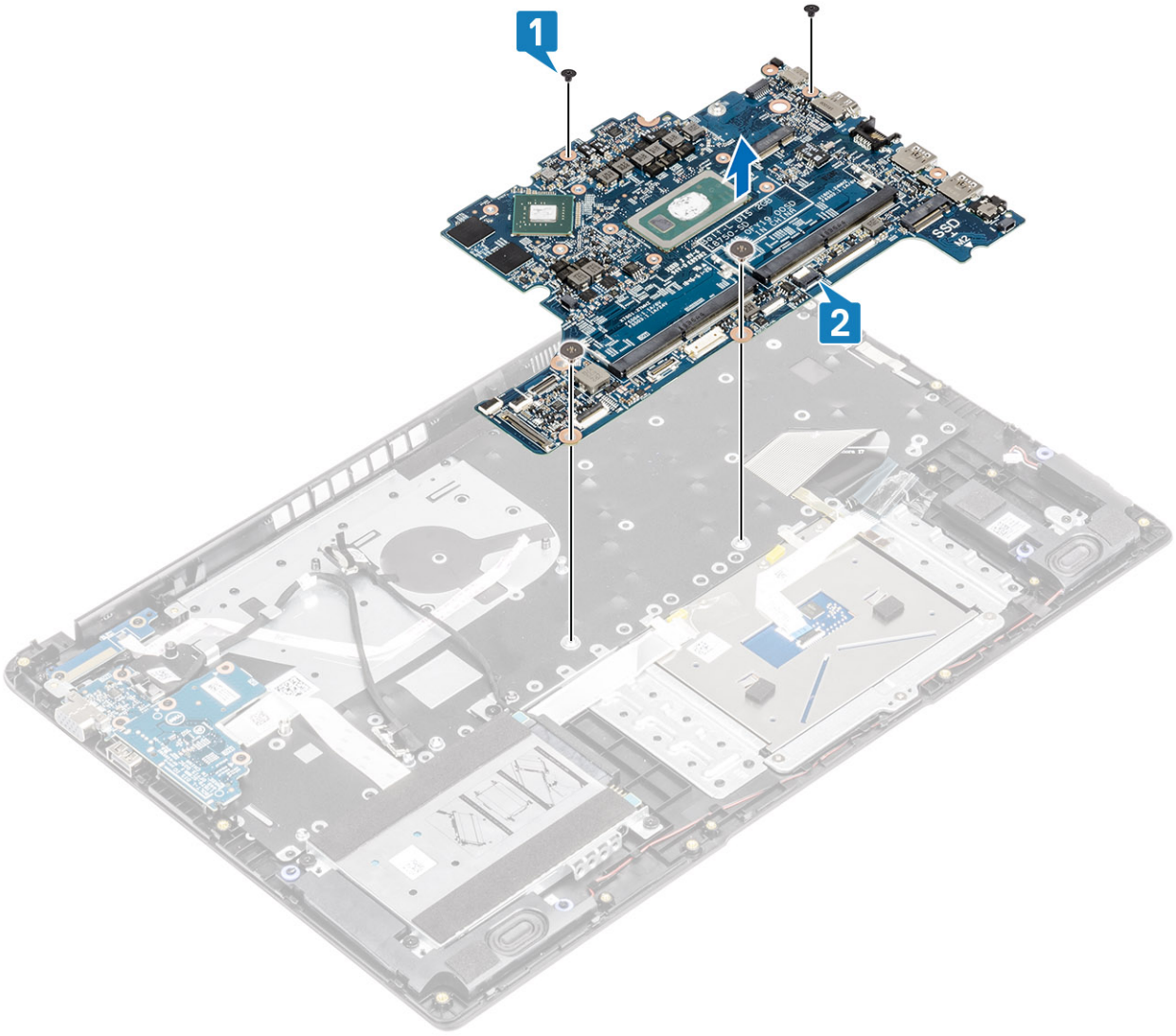
1. Disconnect the following cables from the system board:
   a. Power button board [1].
   b. Fingerprint reader (optional) [2].
   c. IO board [3].
   d. HDD [4].
   e. Touchpad [5].
   f. Keyboard [6].



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



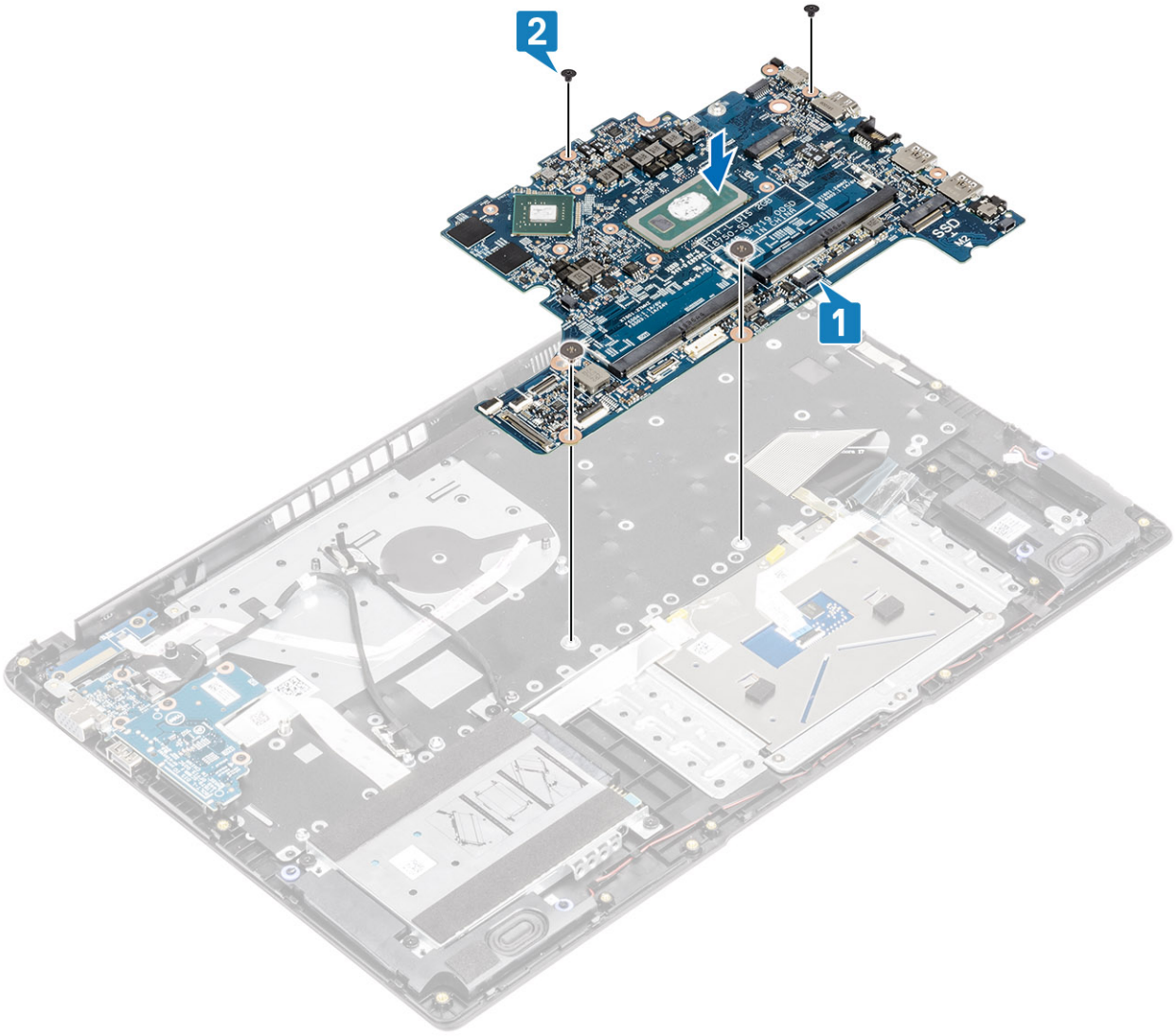
3. Remove the two (M2x3) and two (M2x2) screws that secure the system board to the palmrest and keyboard assembly [1].
4. Lift the system board off the palm-rest and keyboard assembly [2].



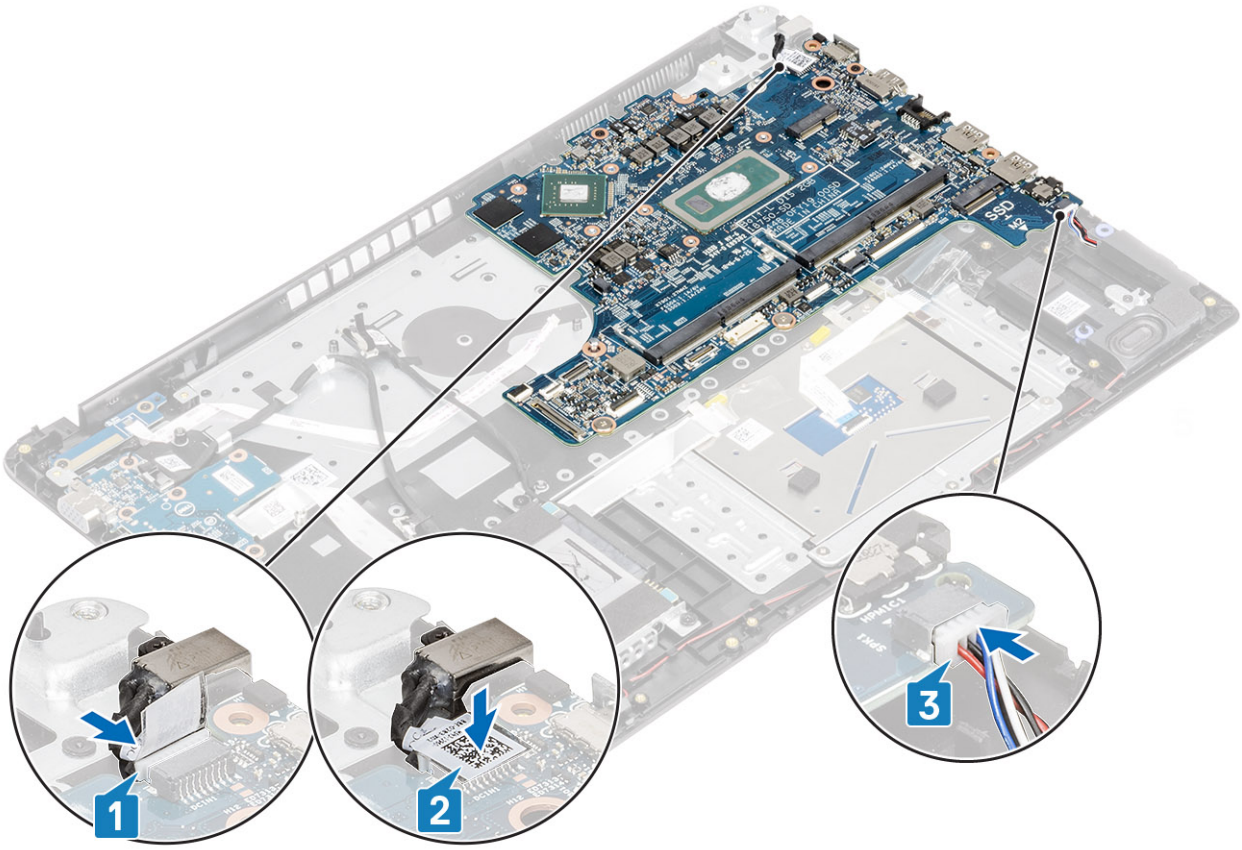
Installing the system board

Steps

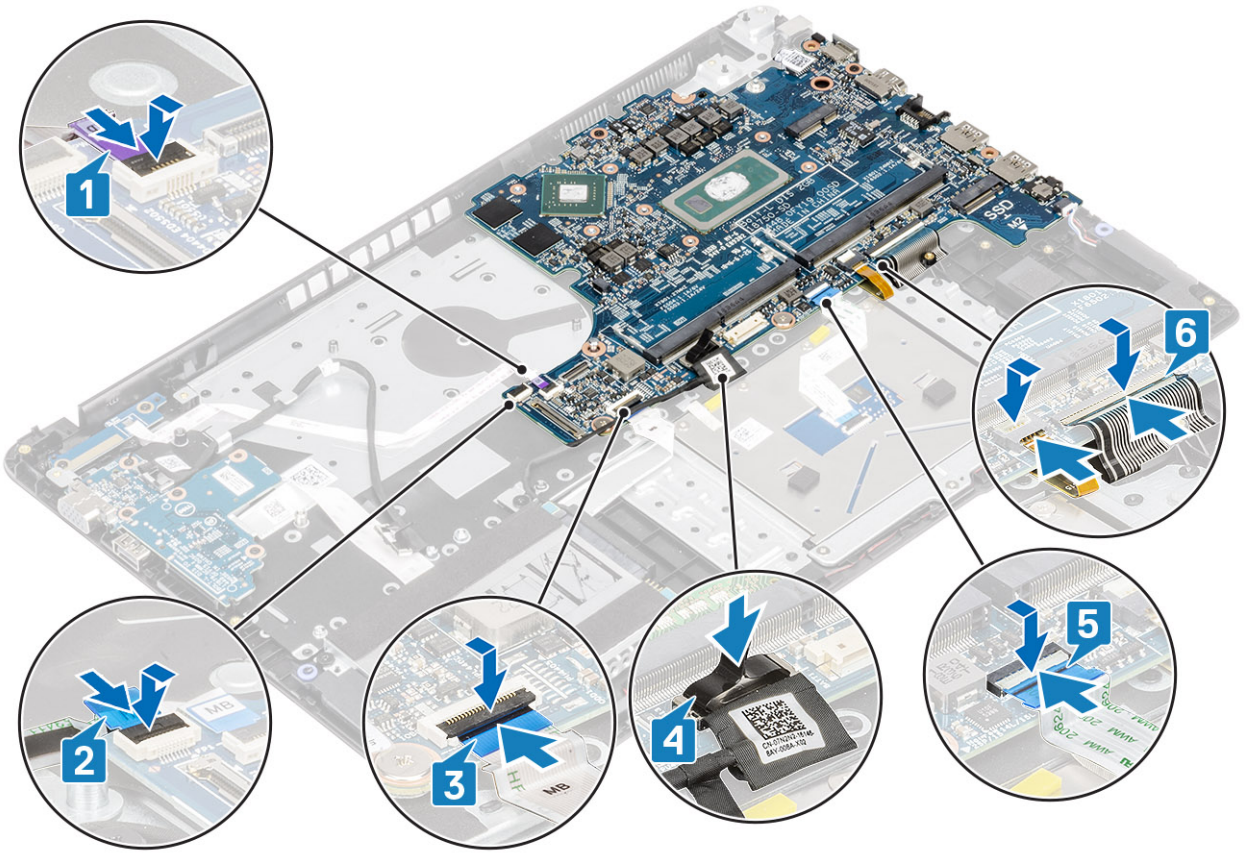
1. Align the screw hole on the system board with the screw hole on the palmrest and keyboard assembly [1].
2. Replace the two (M2x3) and two (M2x2) screws that secure the system board to the palmrest and keyboard assembly [2].



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. HDD [4].
   e. Touchpad [5].
   f. Keyboard [6].



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. Reconnect 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

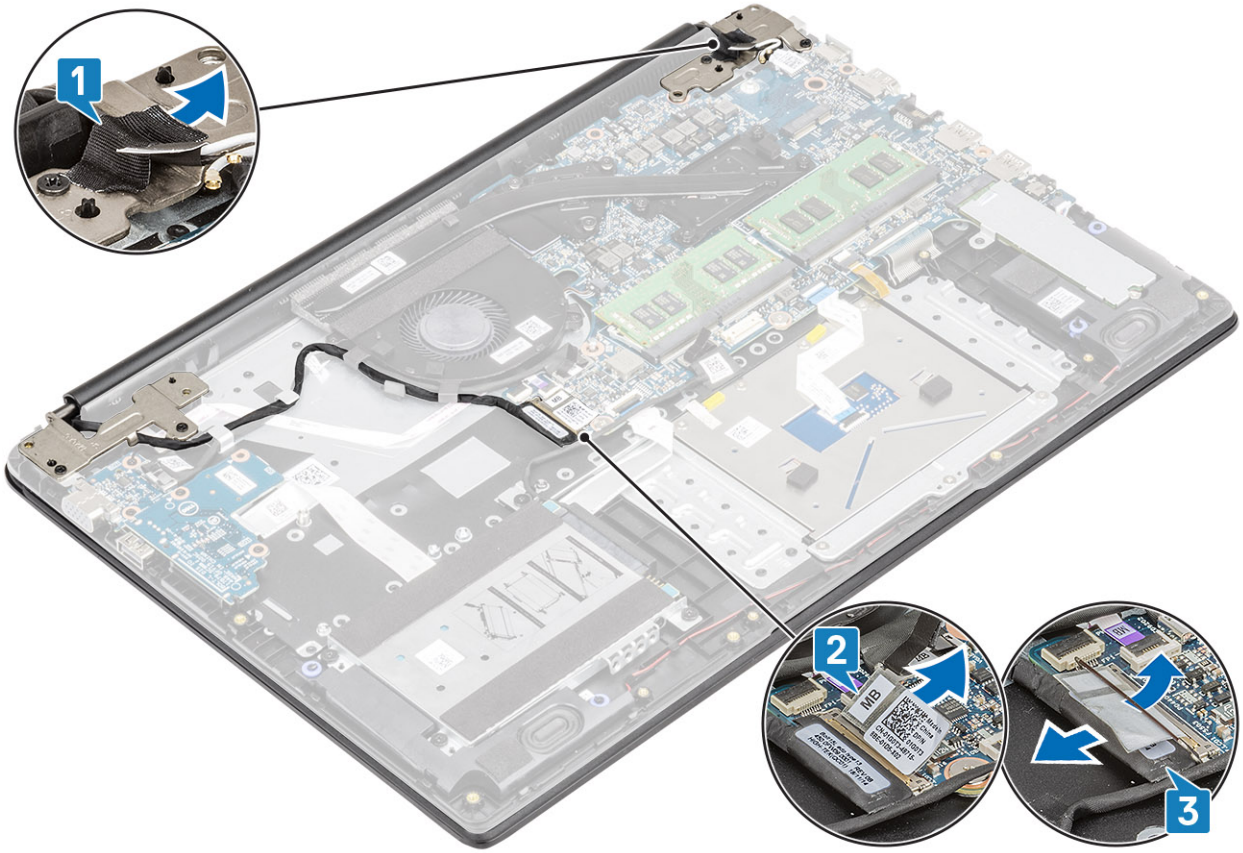
Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the SD memory card.
3. Remove the base cover.
4. Disconnect the battery.
5. Remove the WLAN.

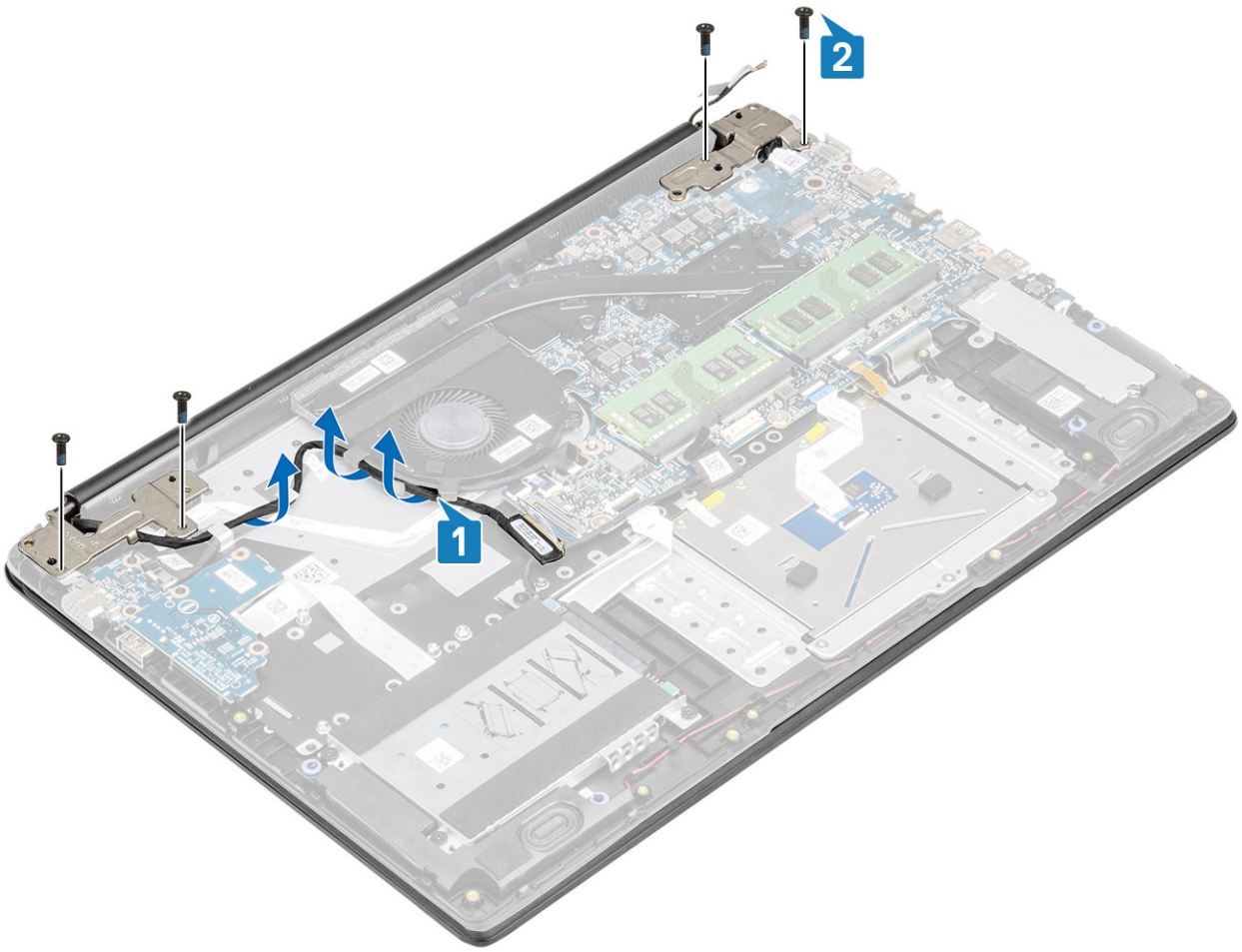
Steps

1. Peel off the tape securing the wireless antenna, and disconnect the antennas from the system board [1].

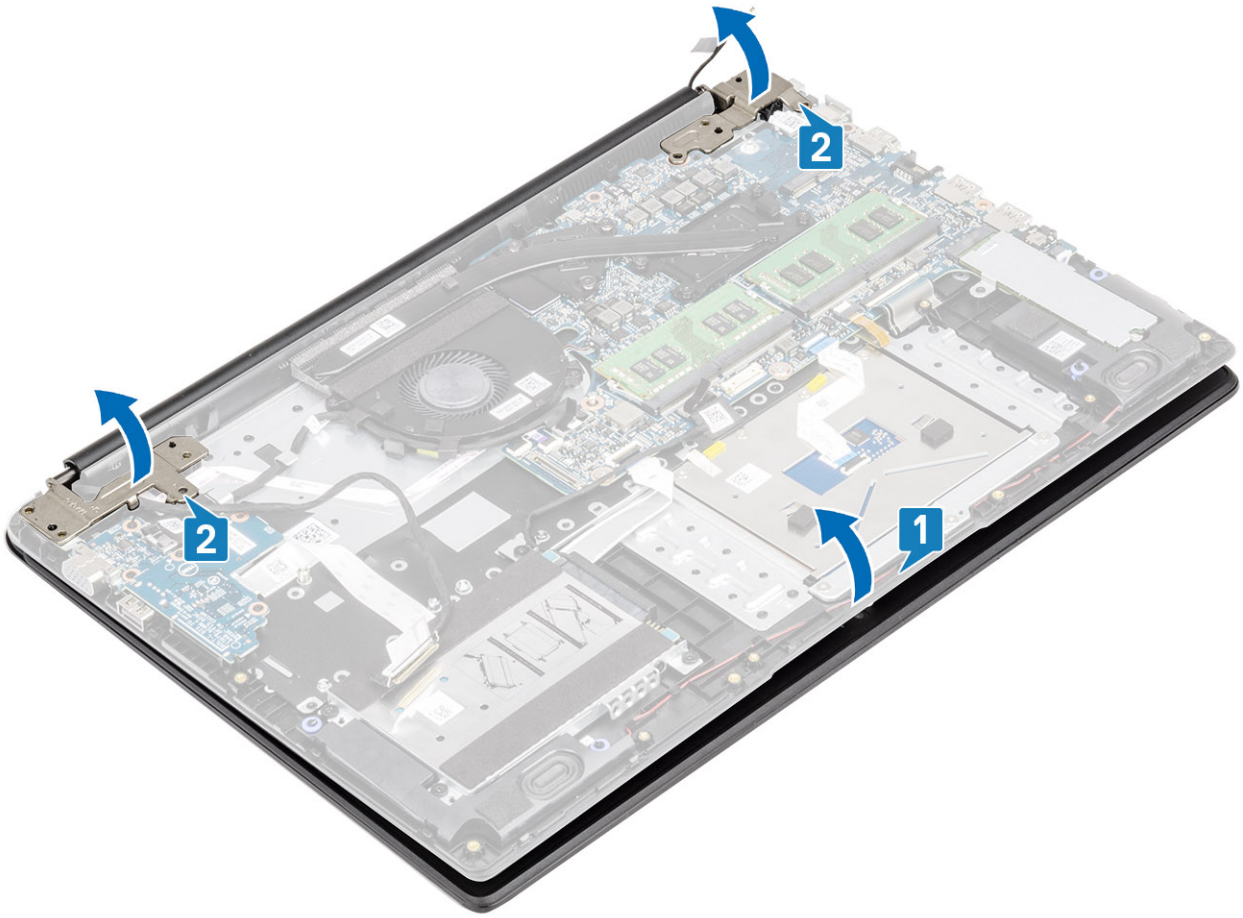
2. Disconnect the display cable from the connector on the system board [2, 3].



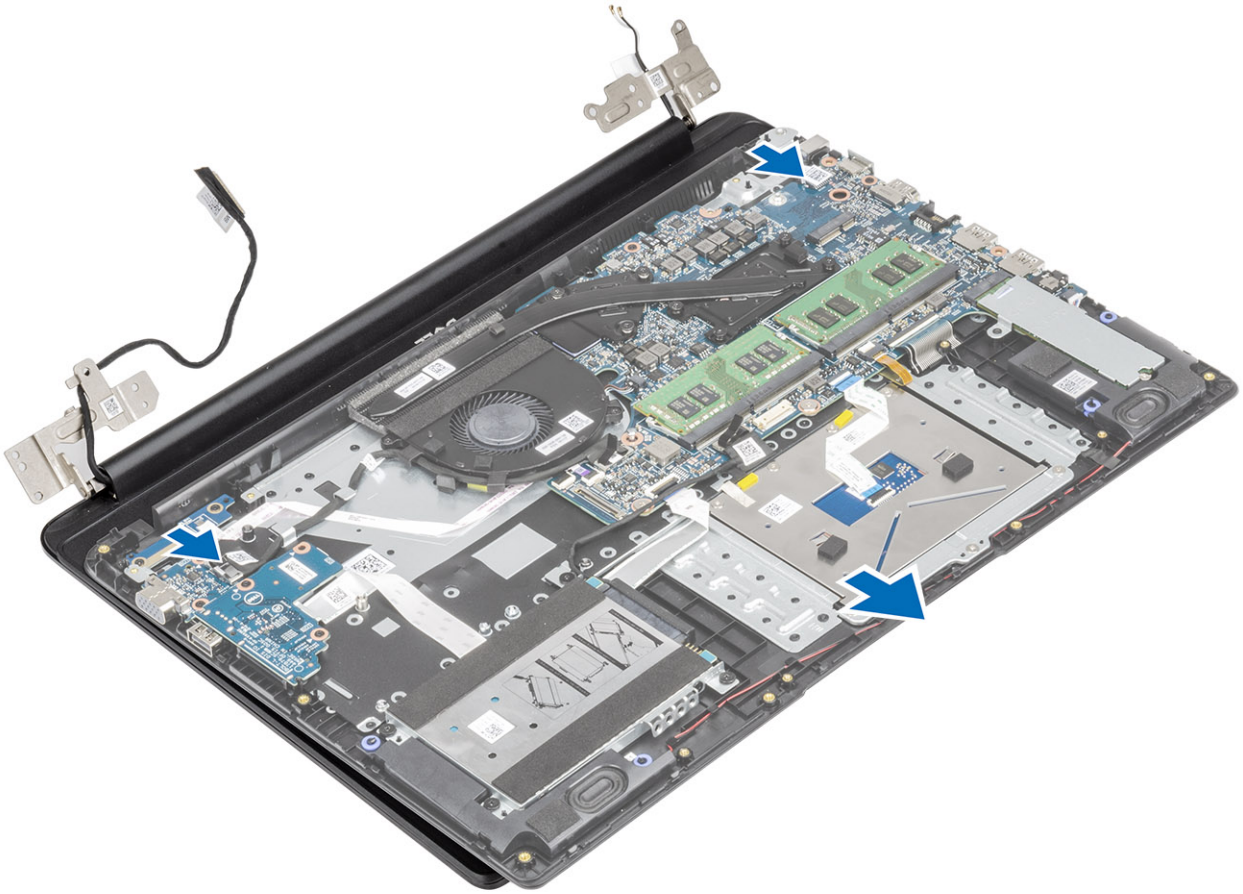
3. Unroute the display cable from the routing guides on the palmrest and keyboard assembly [1].
4. Remove the four (M2.5x5) screws that secure the left and right hinges to the system board, and palmrest and keyboard assembly [2].



5. Lift the palmrest and keyboard assembly at an angle [1].
   Note: Do not open the display assembly beyond 135 degrees to avoid damage to the display hinges.
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.

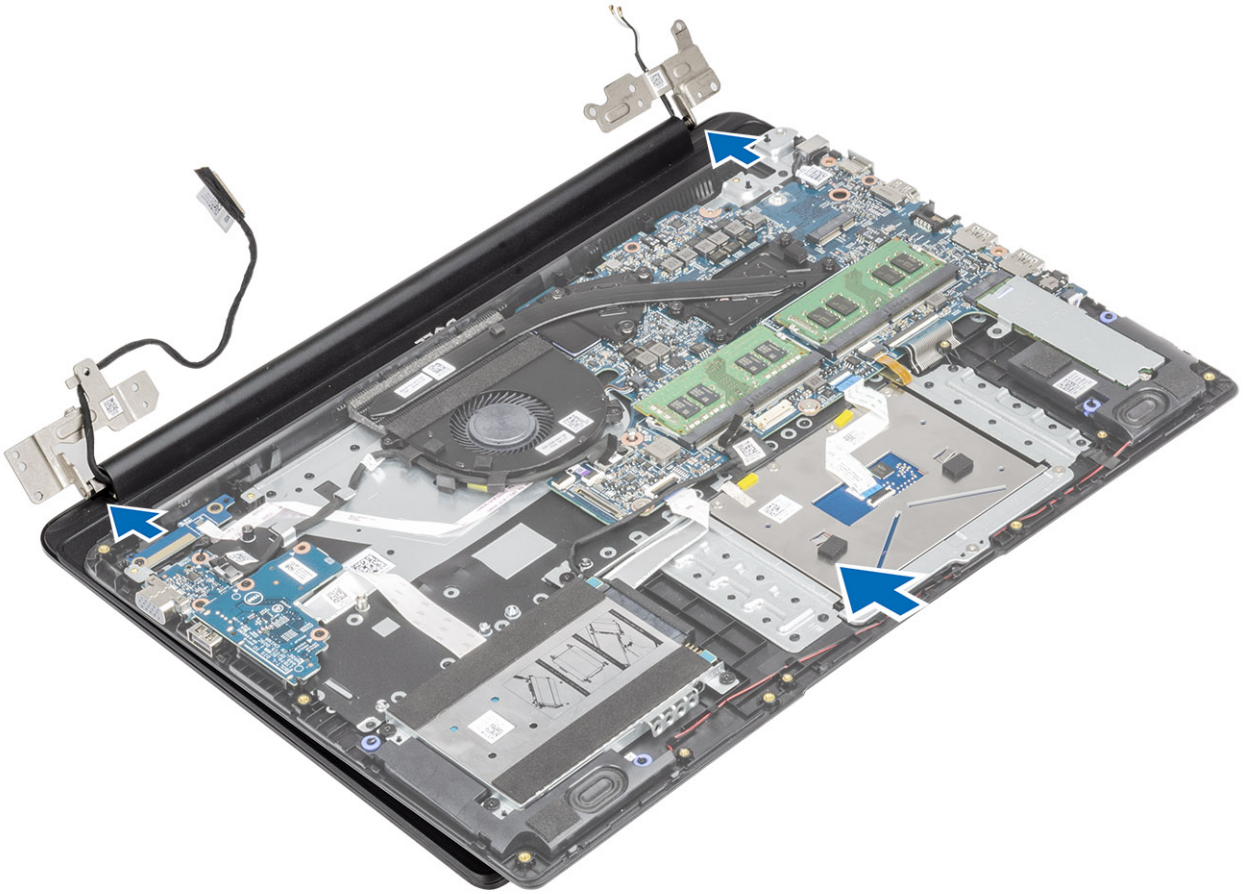
Installing the display assembly

About this task

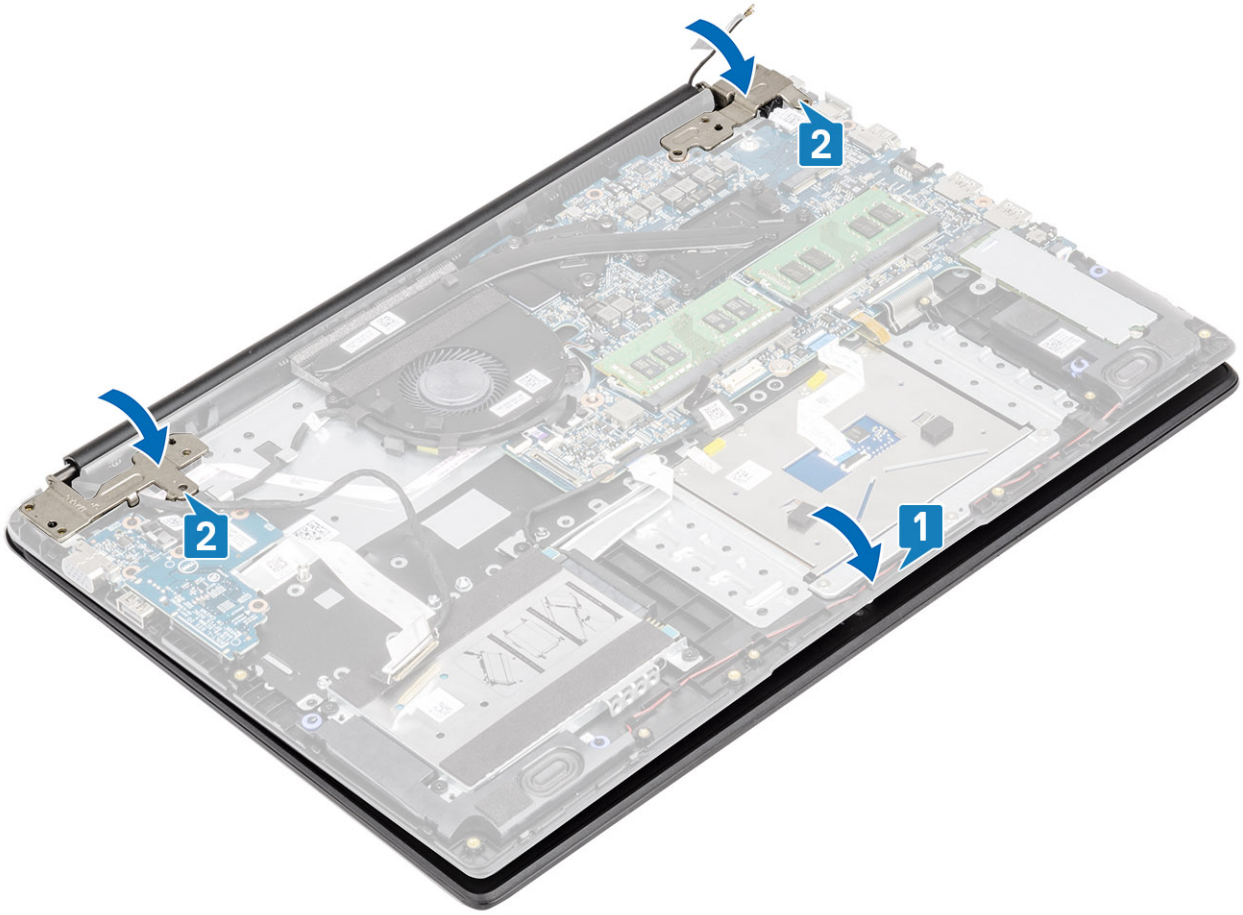
NOTE: Ensure that the hinges are opened to the maximum before replacing the display assembly on the palmrest and keyboard assembly.

Steps

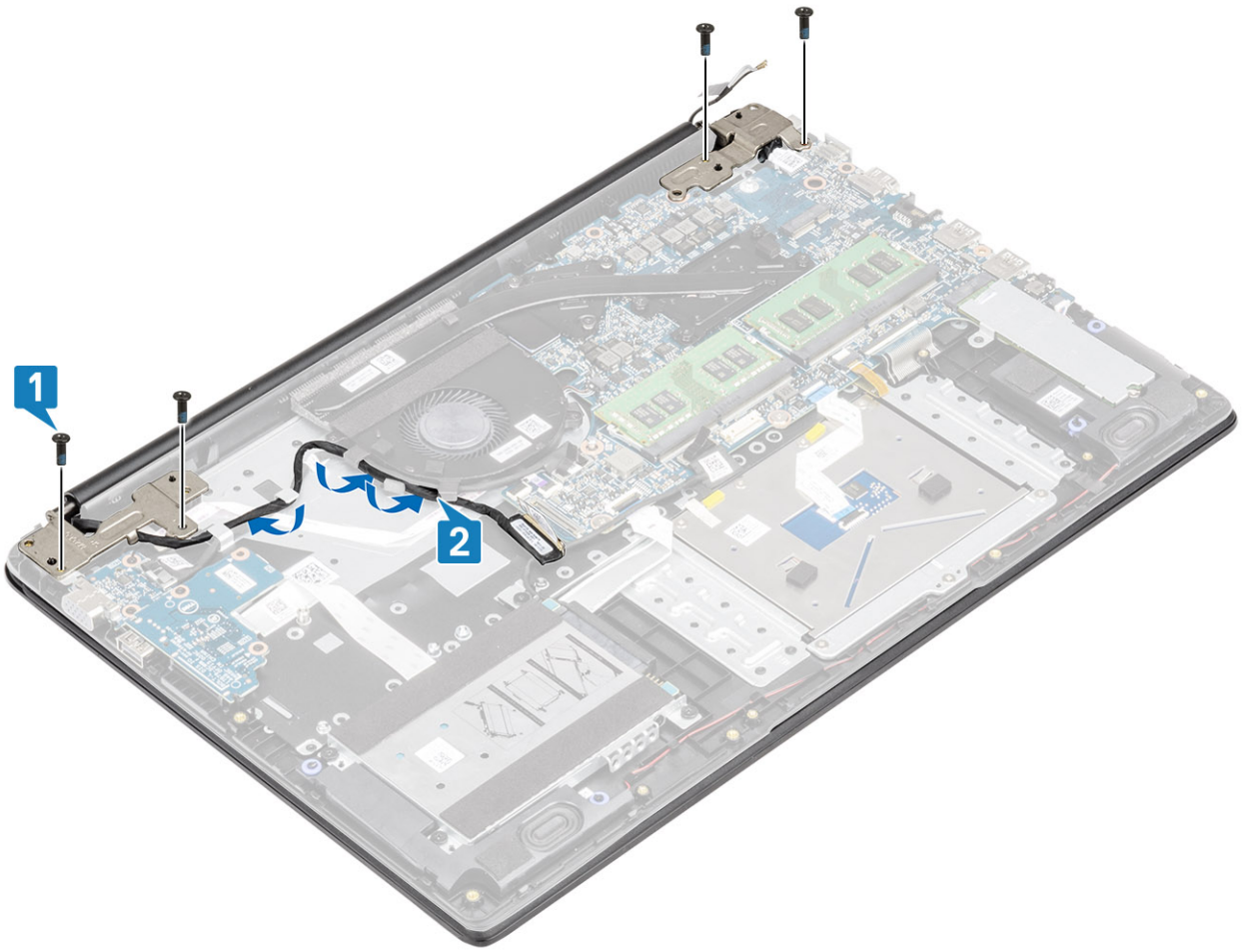
1. Align and place the palmrest and keyboard assembly under the hinges on the display assembly.



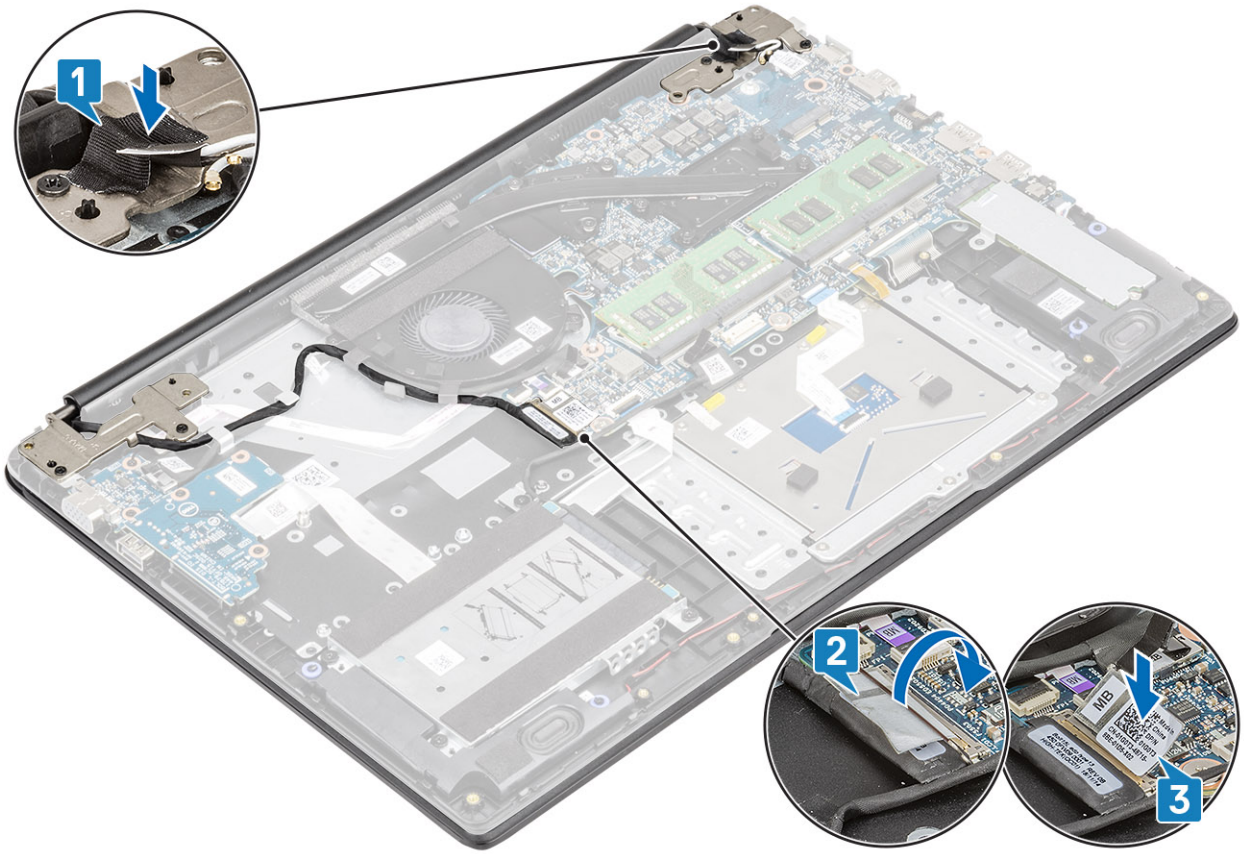
2. Seat the palmrest and keyboard assembly on the display assembly [1].
3. Press the hinges down on the system board, and palmrest and keyboard assembly [2].



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



6. Connect the wireless antenna cables and affix the tape that secures it to the system board [1].
7. Connect the display cable to the connector on the system board [2, 3].



Next steps

1. Replace the WLAN.
2. Reconnect 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. Disconnect the battery
5. Remove the WLAN
6. Remove the display assembly

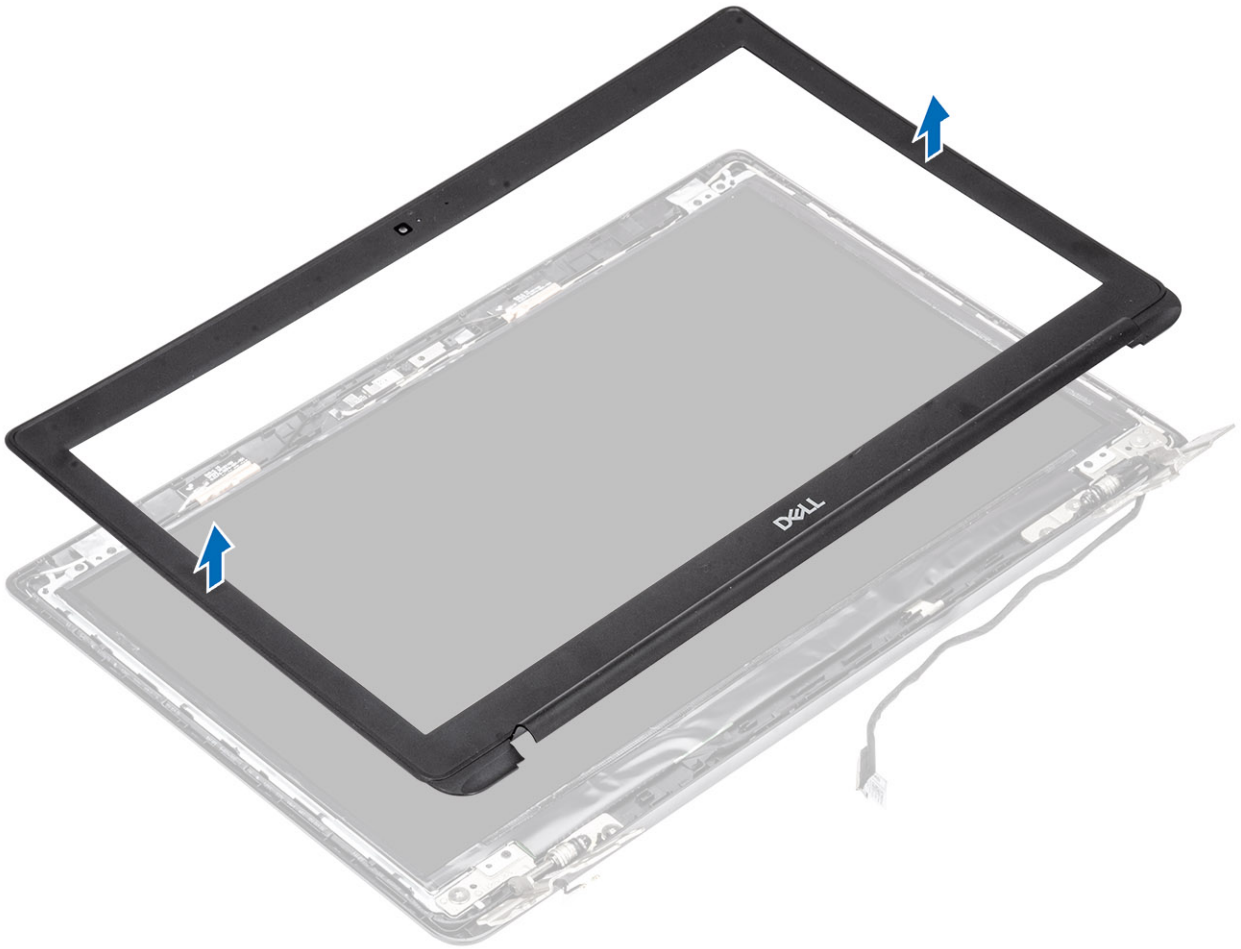
Steps

1. Push both sides of the display-hinge cover and lift it from the display back-cover.
2. Use a plastic scribe to carefully pry open the recesses near the left and right hinges on the bottom edge of the display bezel.

NOTE: When prying open the display bezel, ensure to pry along the outside edge of the display bezel using your hands or plastic scribe. Using a screw driver or other sharp objects may damage the display cover.

CAUTION: Lift the bezel carefully, as it is attached to the display assembly with a strong adhesive.

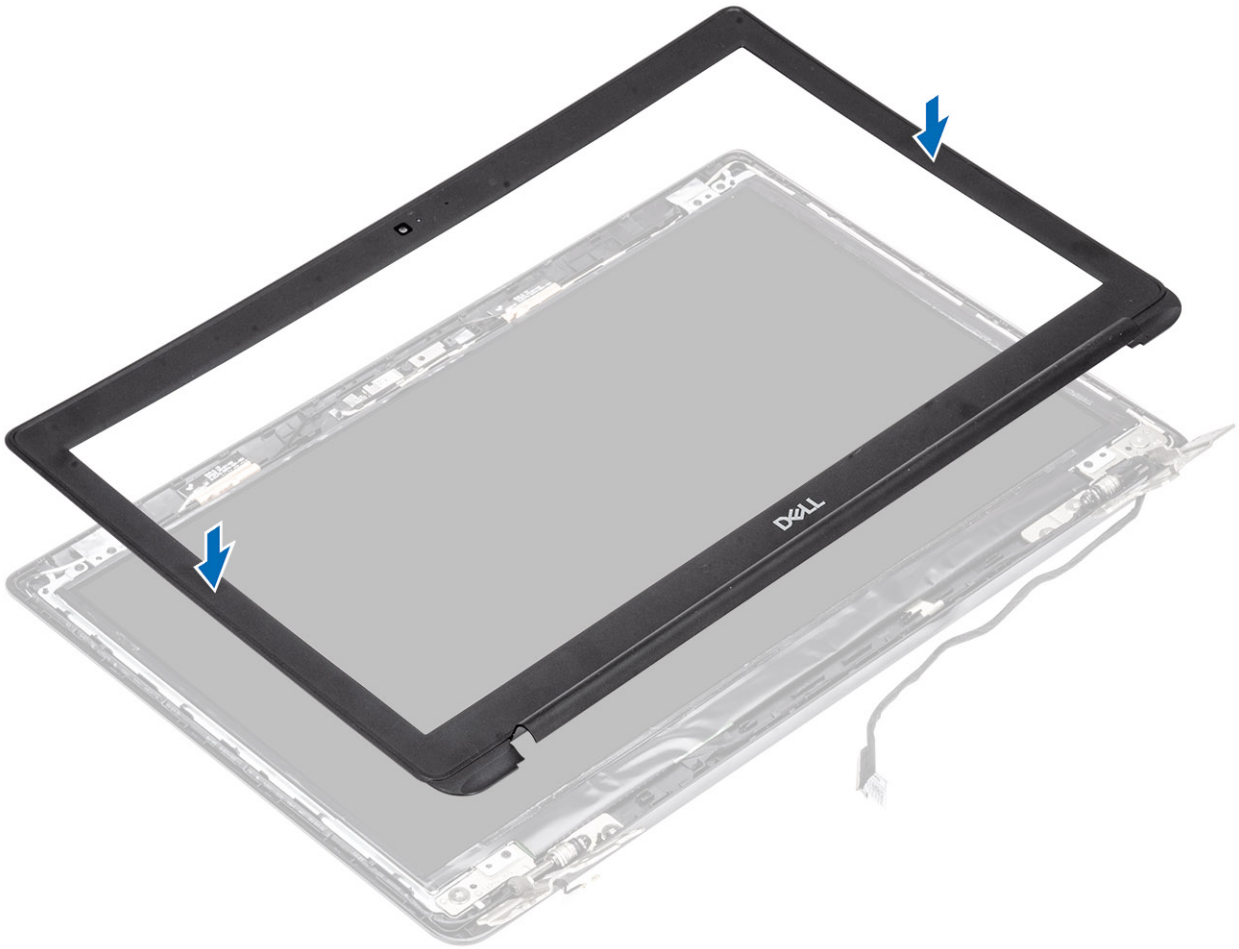
3. Lift the bezel off the display assembly.



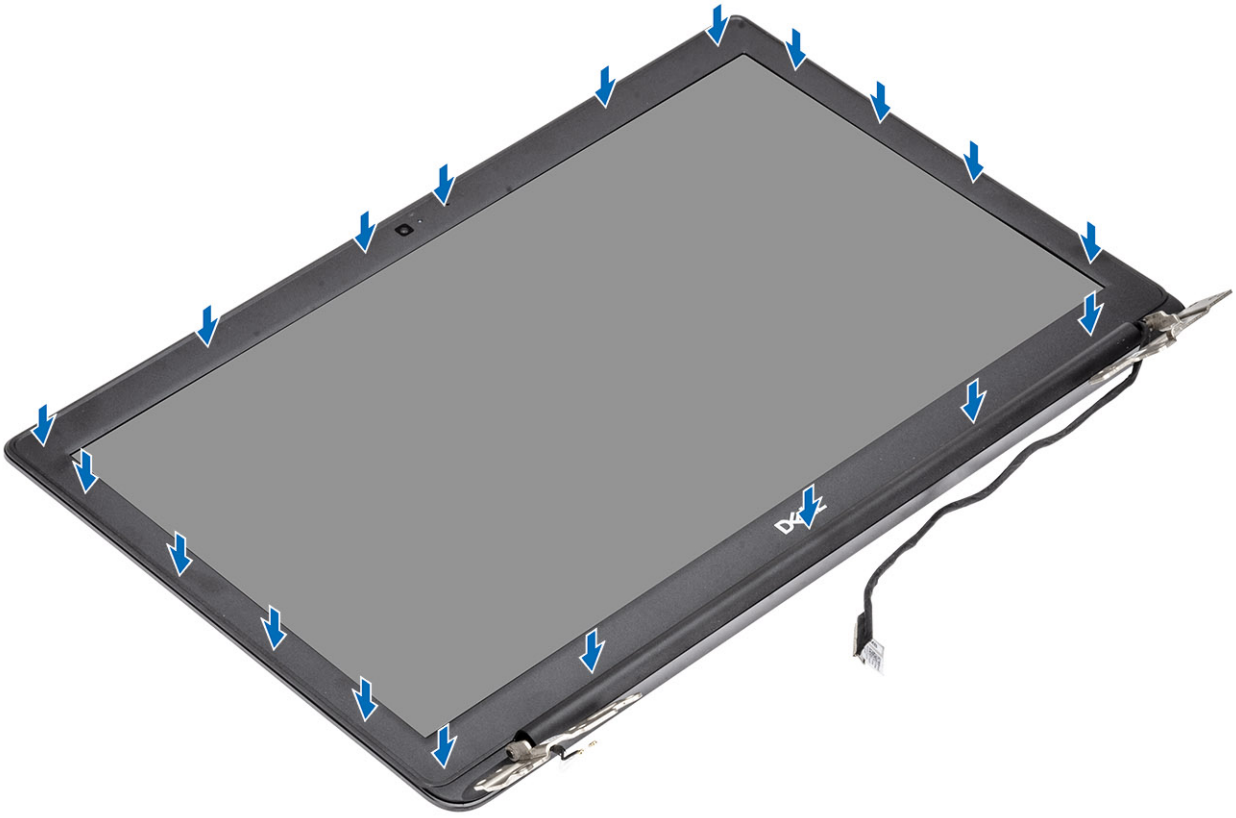
Installing the display bezel

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. Reconnect 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

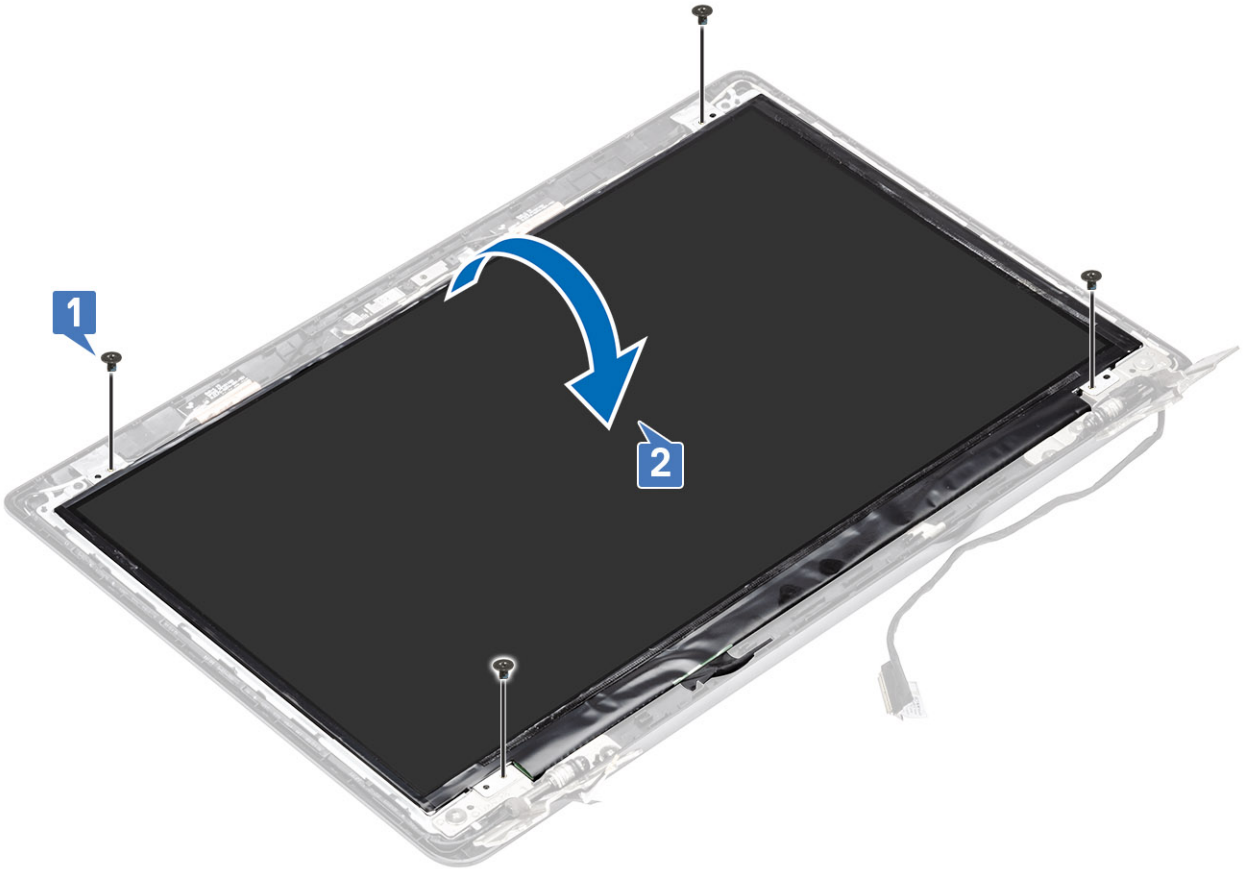
Removing the display panel

Prerequisites

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

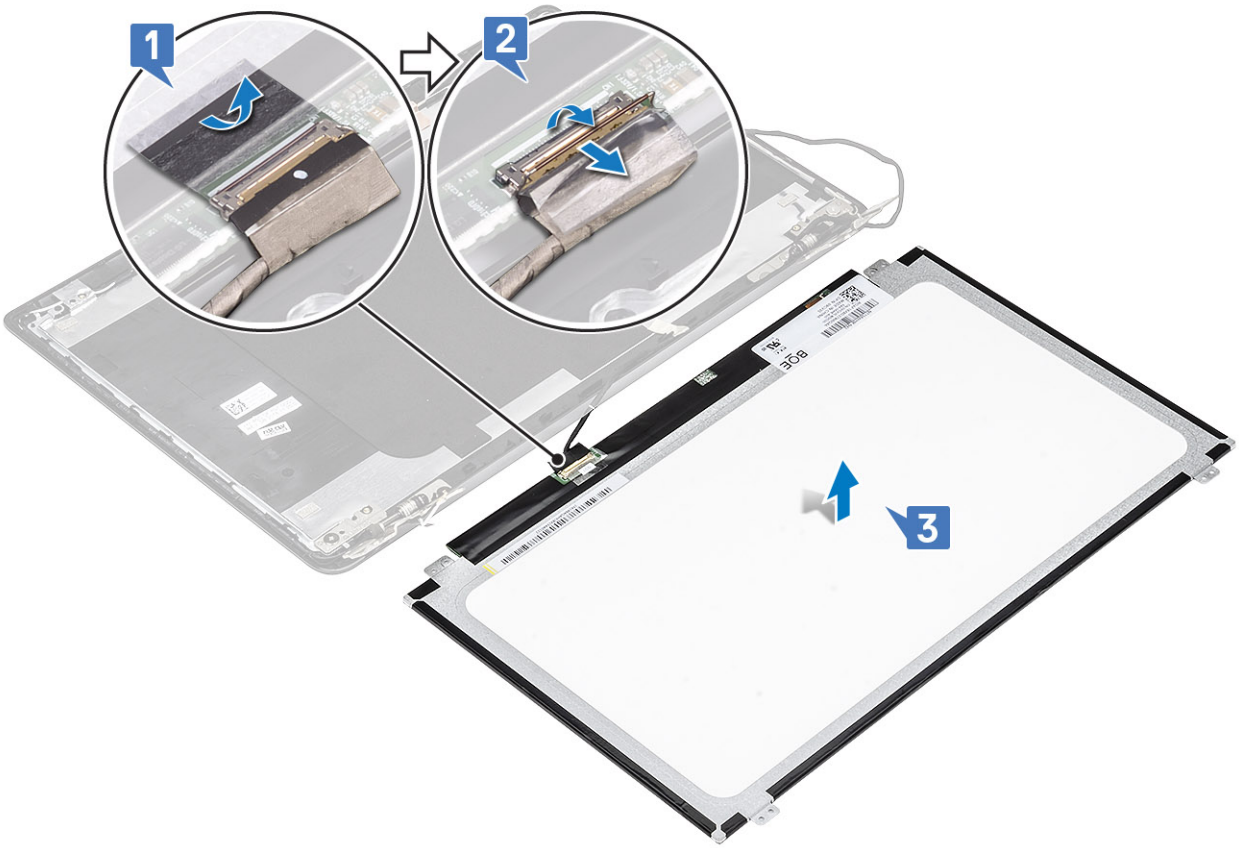
Steps

1. Remove the four (M2x2.5) 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.

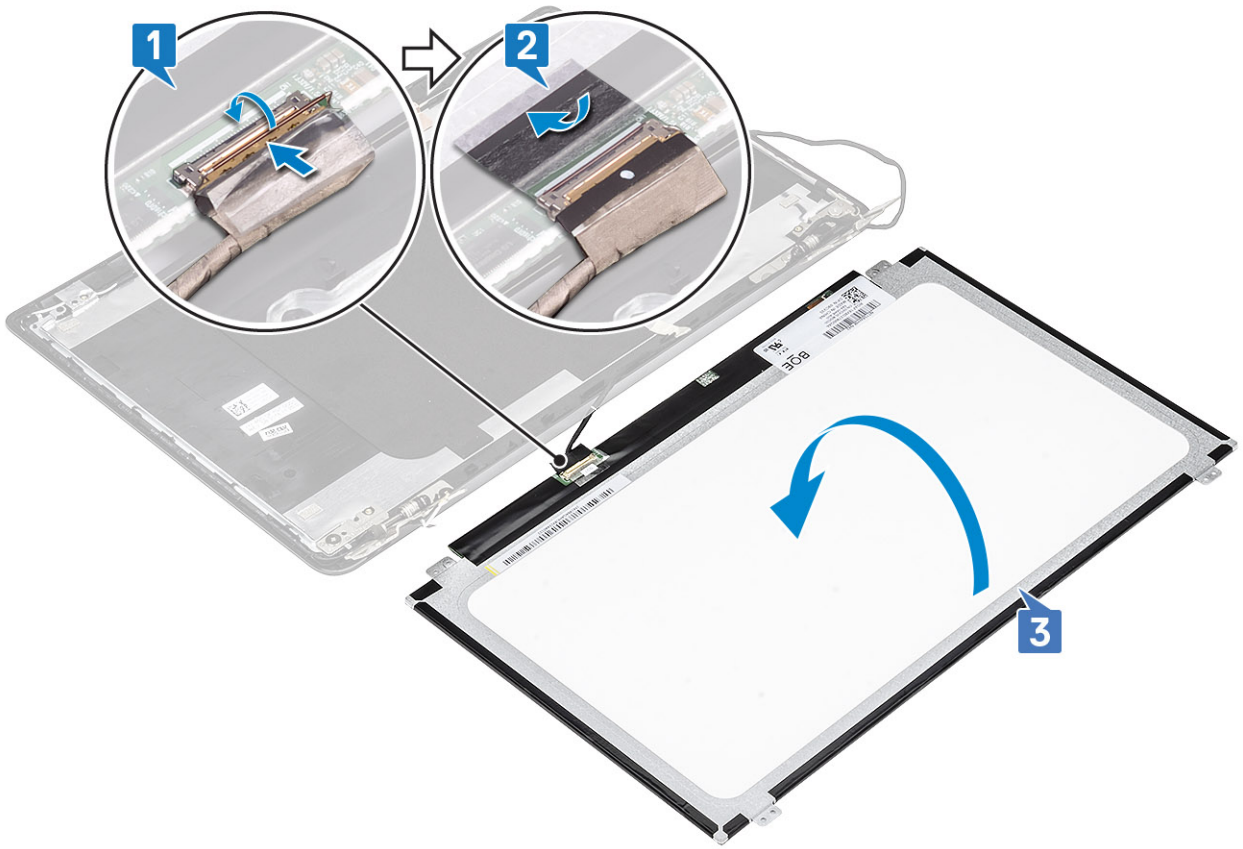
6. After performing all the preceding steps, you are left with the display panel.

Installing the display panel

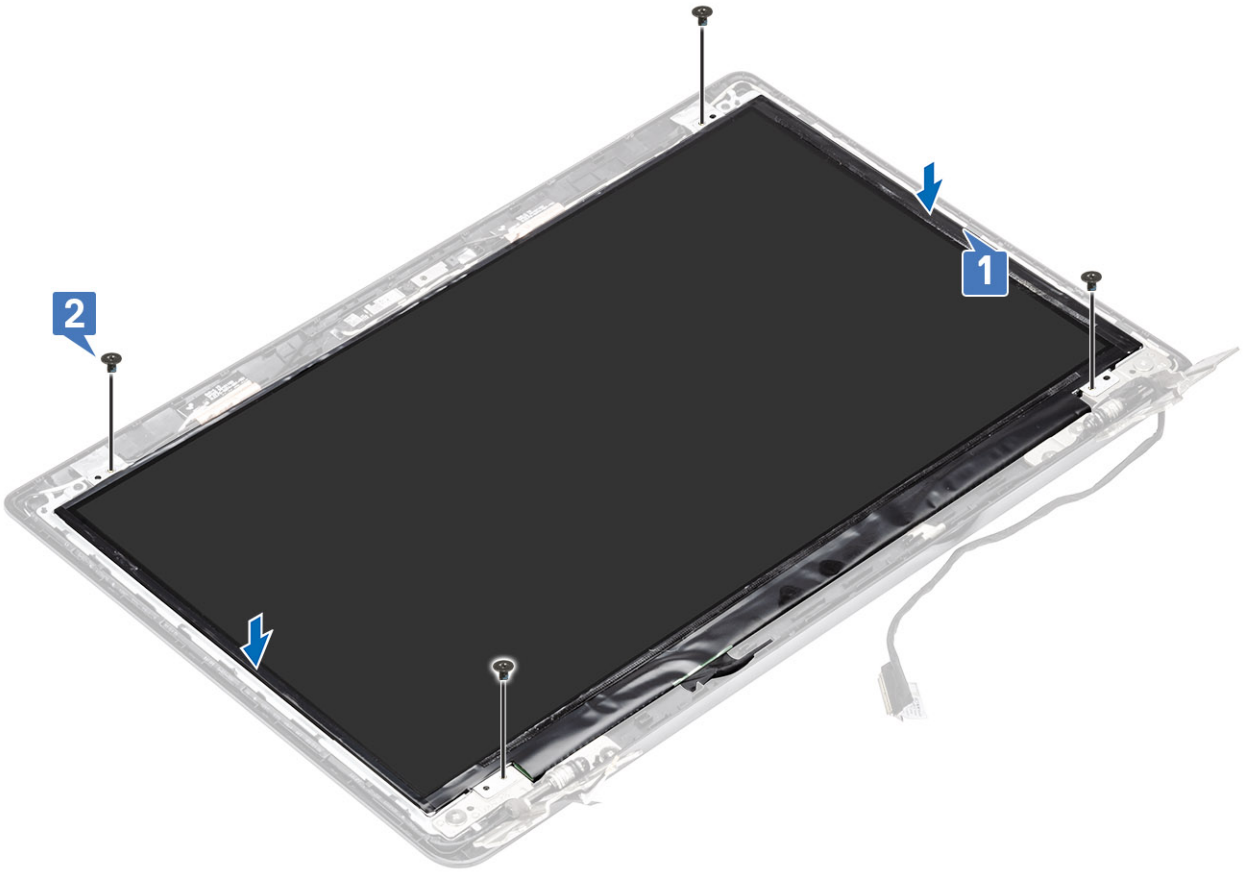
Steps

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 four (M2x2.5) 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. Reconnect the battery
5. Replace the base cover
6. Replace the SD memory card
7. Follow the procedure in after working inside your computer

Display hinges

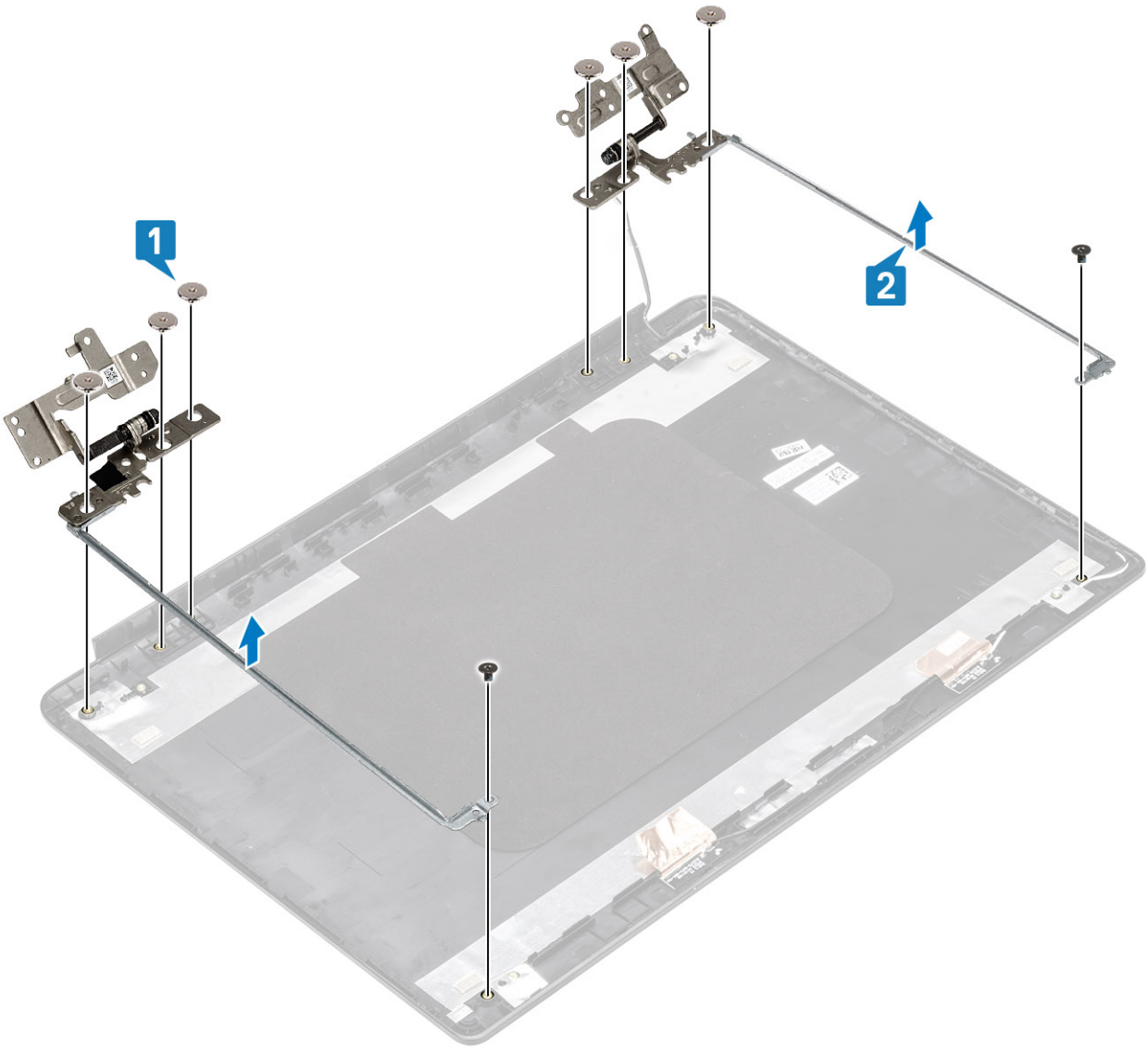
Removing the display hinges

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
5. Remove the WLAN
6. Remove the display assembly
7. Remove the display bezel
8. Remove the display panel

Steps

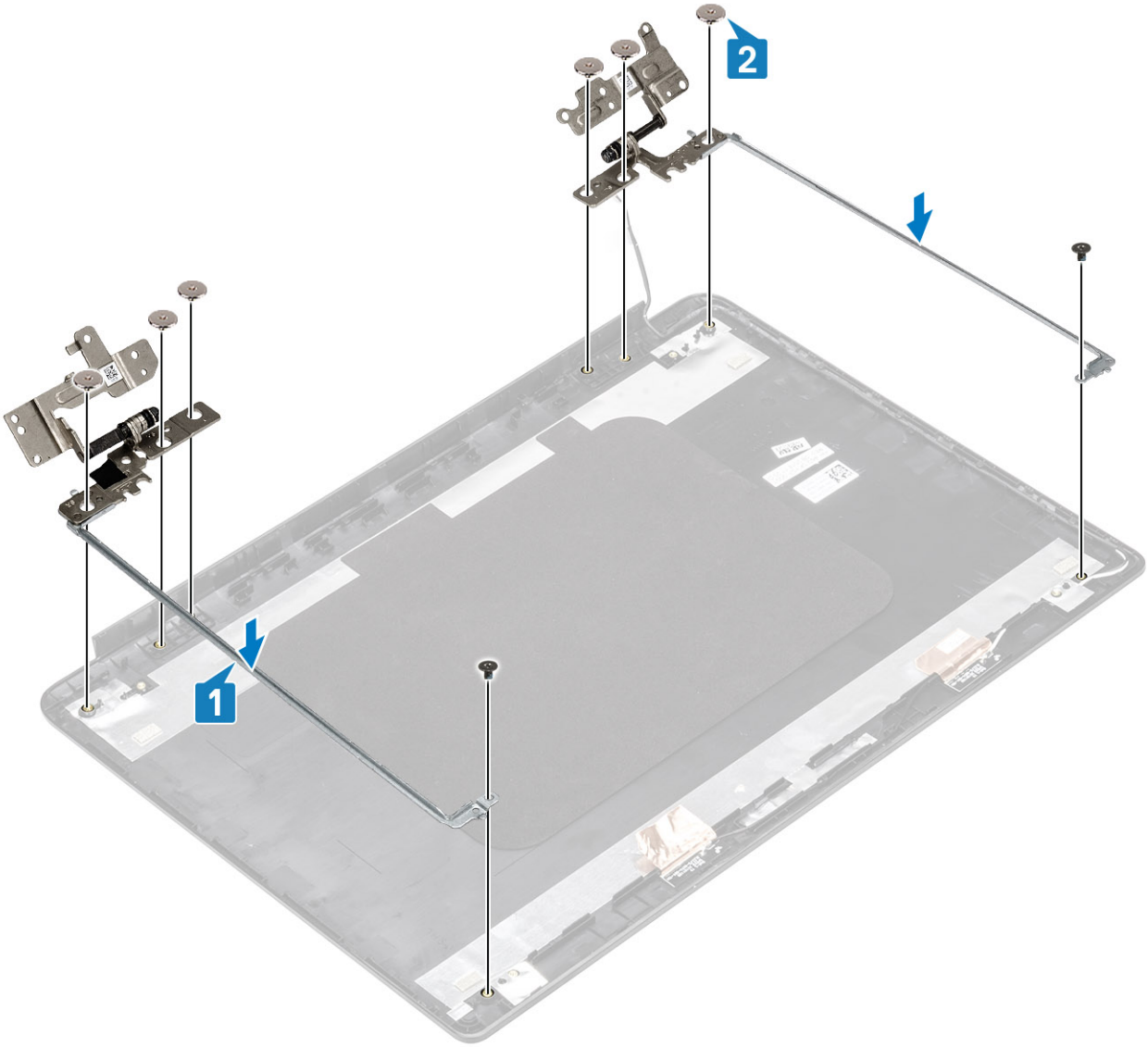
1. Remove the six (M2.5x2.5) screws and two (M2x2.5) screws that secure the hinges to the display back-cover [1].
2. Lift the hinges and brackets off the display back-cover [2].



Installing the display hinges

Steps

1. Align the screw holes on the hinges and brackets with the screw holes on the display back-cover[1].
2. Replace the six (M2.5x2.5) screws and two (M2x2.5) screws that secure the hinges to 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. Reconnect the battery
6. Replace the base cover
7. Replace the SD memory card
8. Follow the procedure in after working inside your computer

Display cable

Removing the display cable

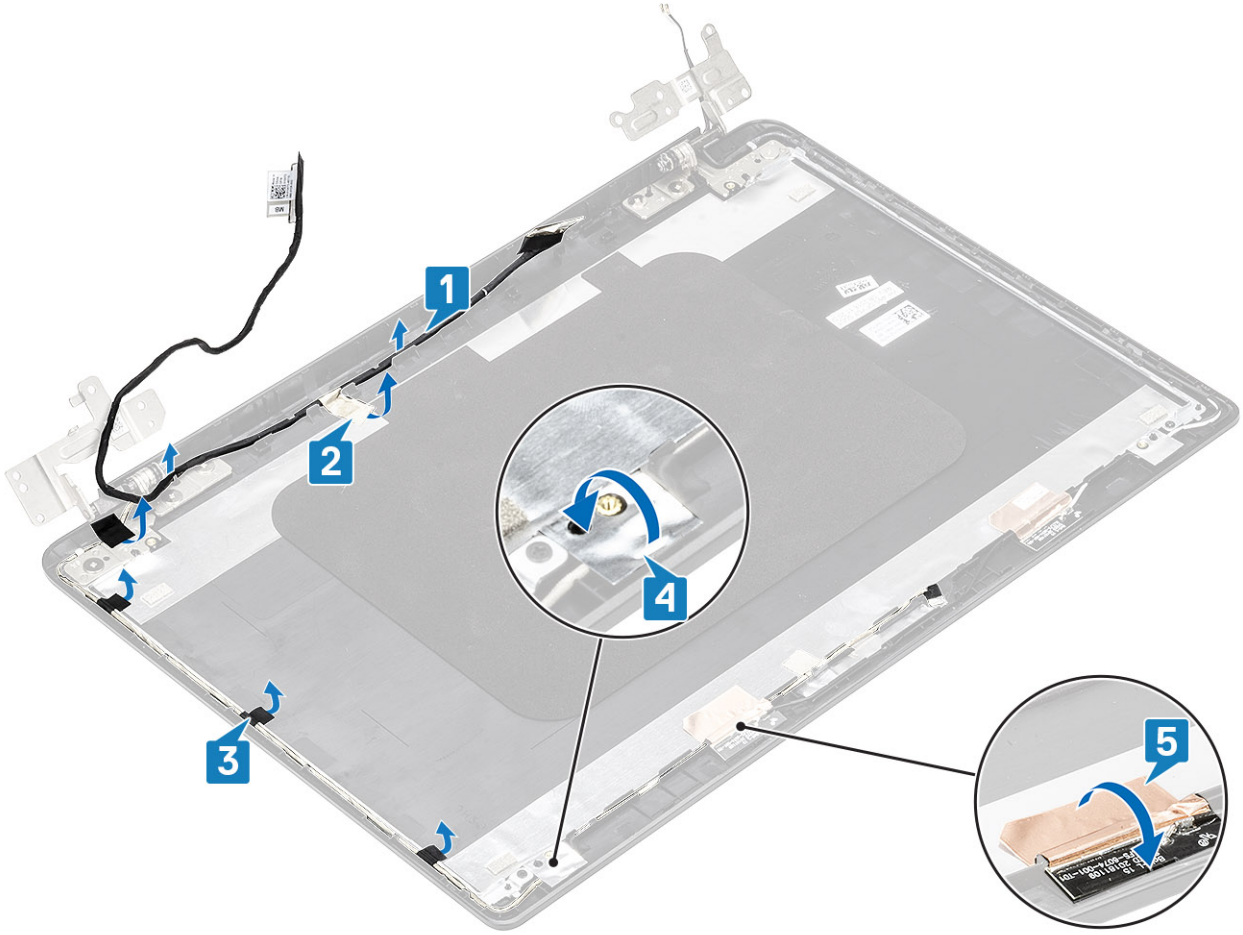
Prerequisites

1. Follow the procedure in before working inside your computer
2. Remove the SD memory card

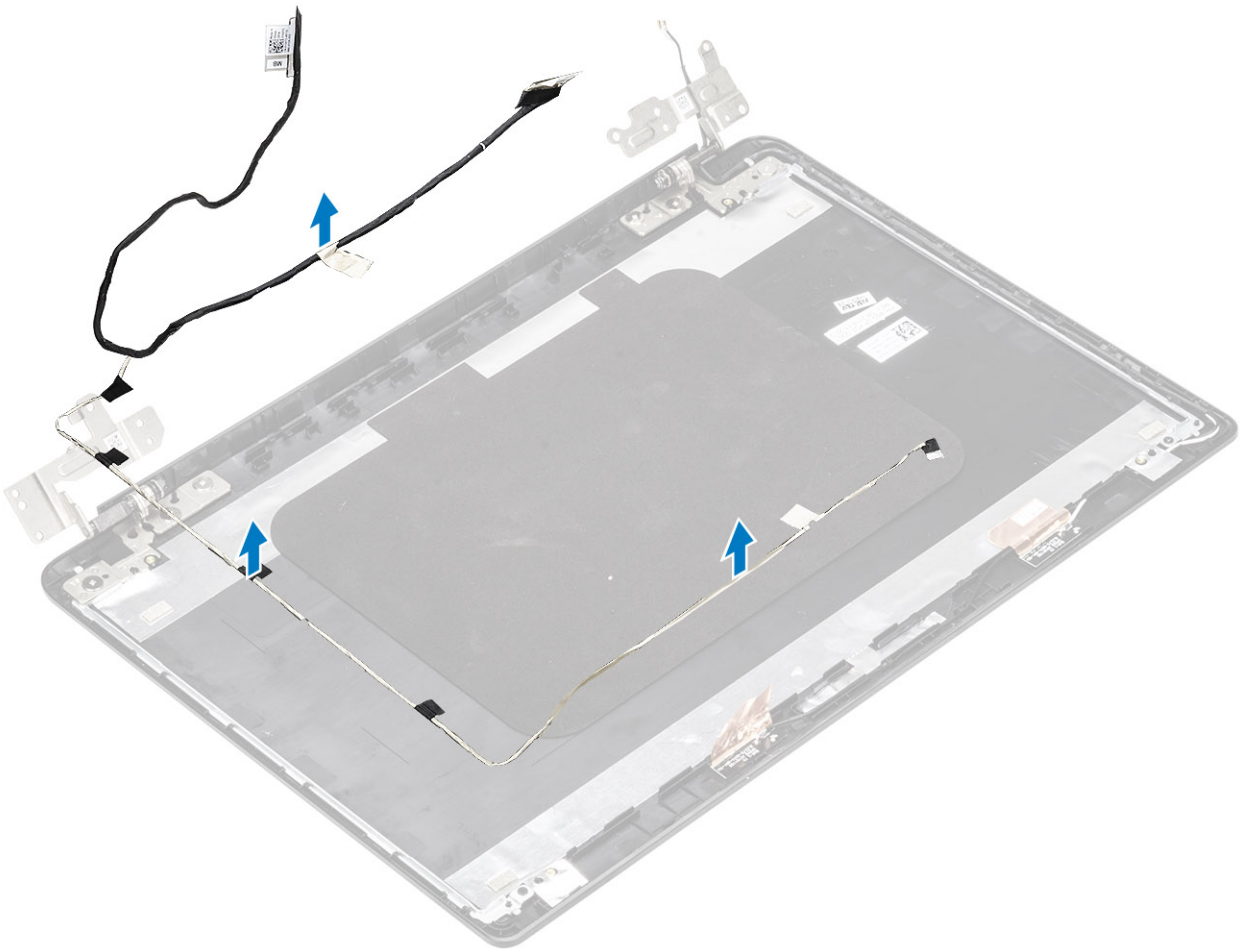
3. Remove the base cover
4. Disconnect the battery
5. Remove the WLAN
6. Remove the display assembly
7. Remove the display bezel
8. Remove the display panel

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 3,4,5.



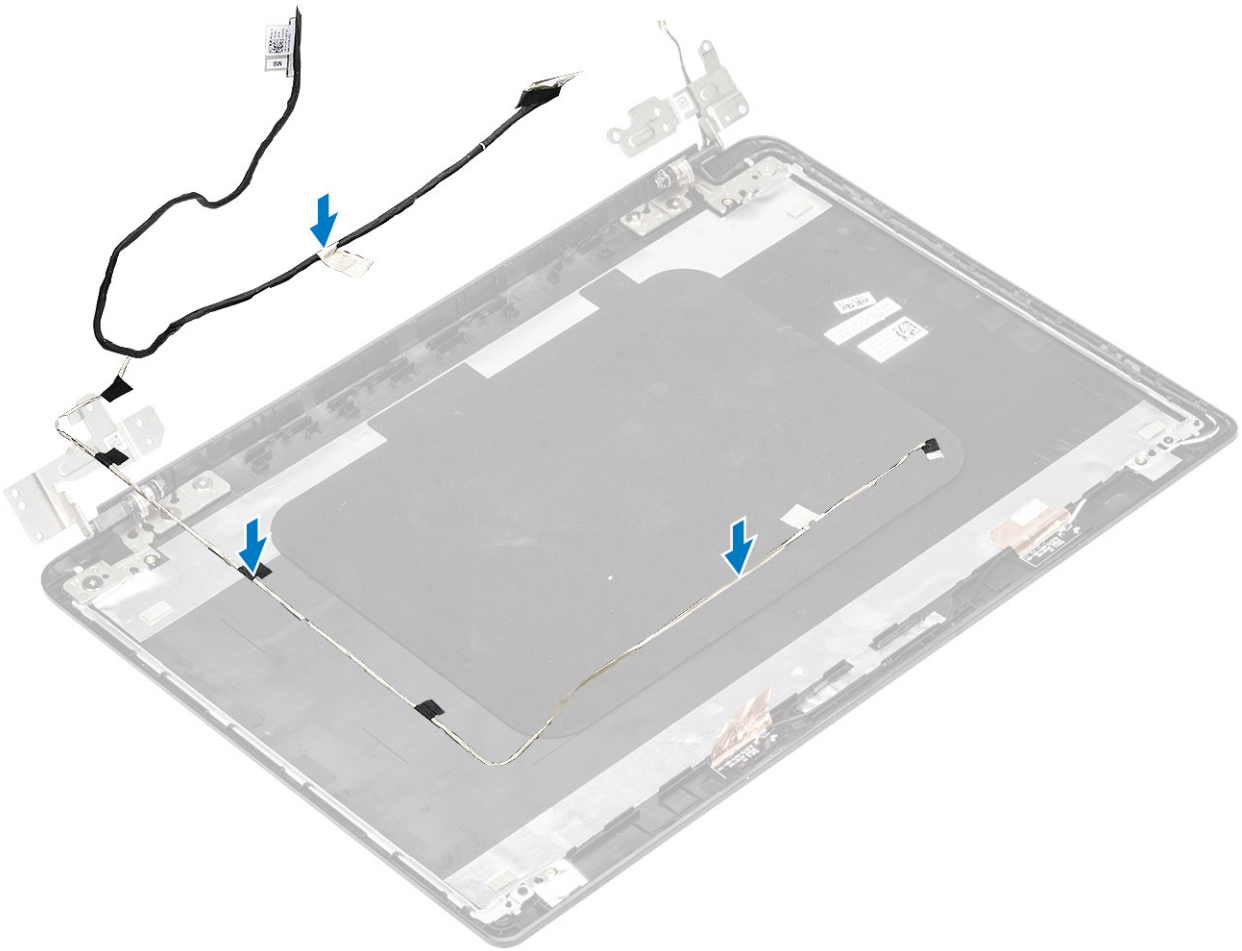
3. Lift the camera cable and the display cable off the display back-cover.



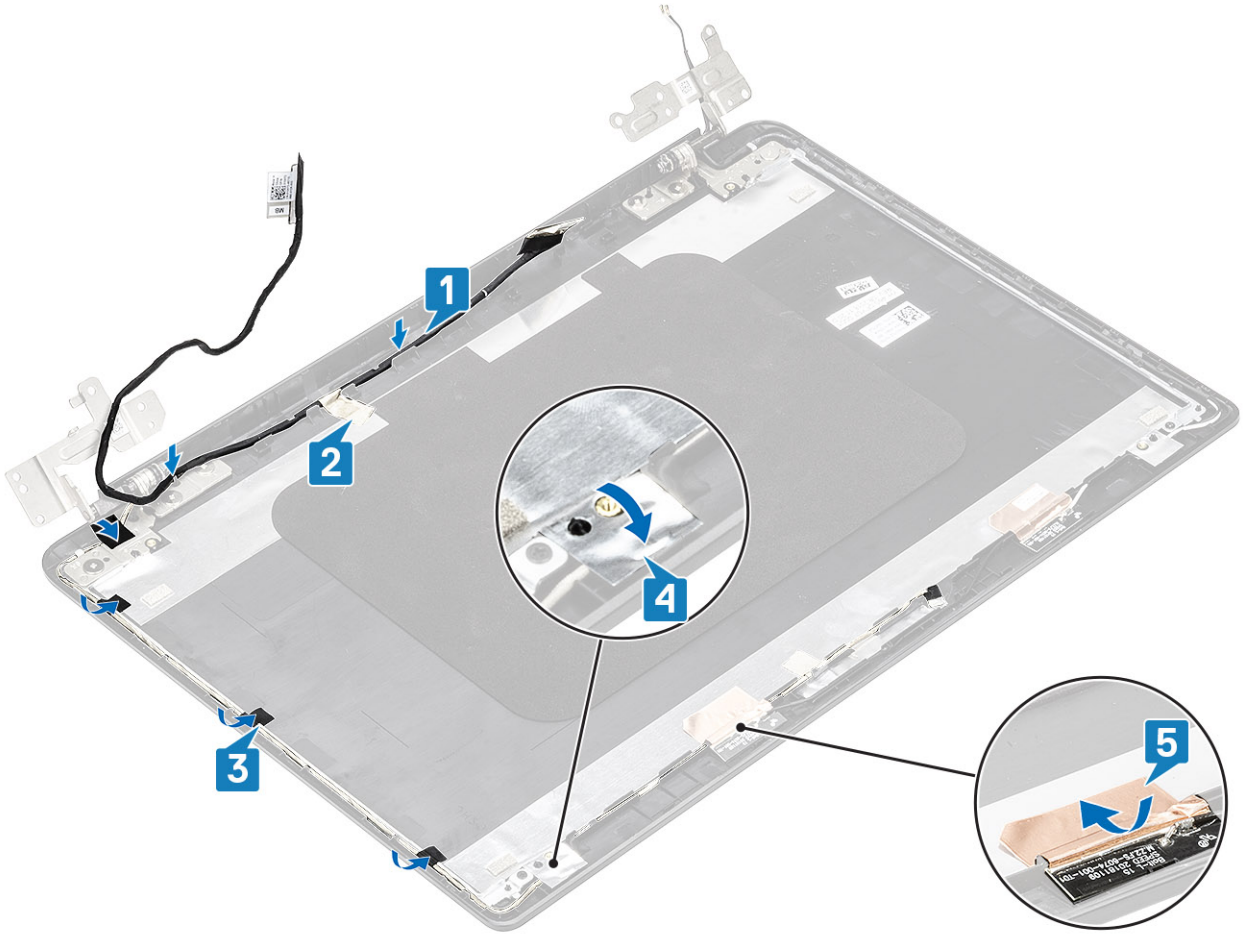
Installing the display cable

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 [3,4,5].



Next steps

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

Camera

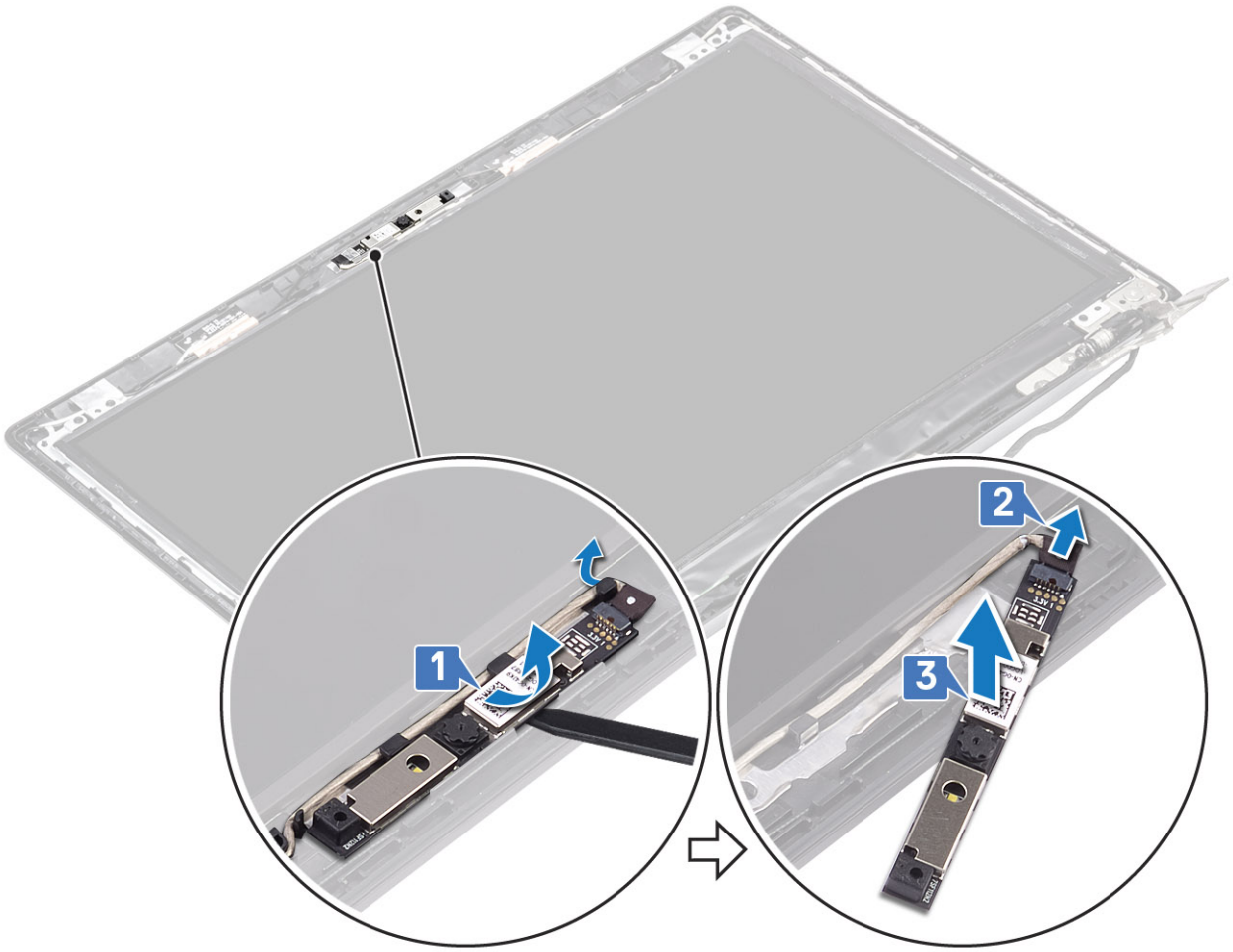
Removing the camera

Prerequisites

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

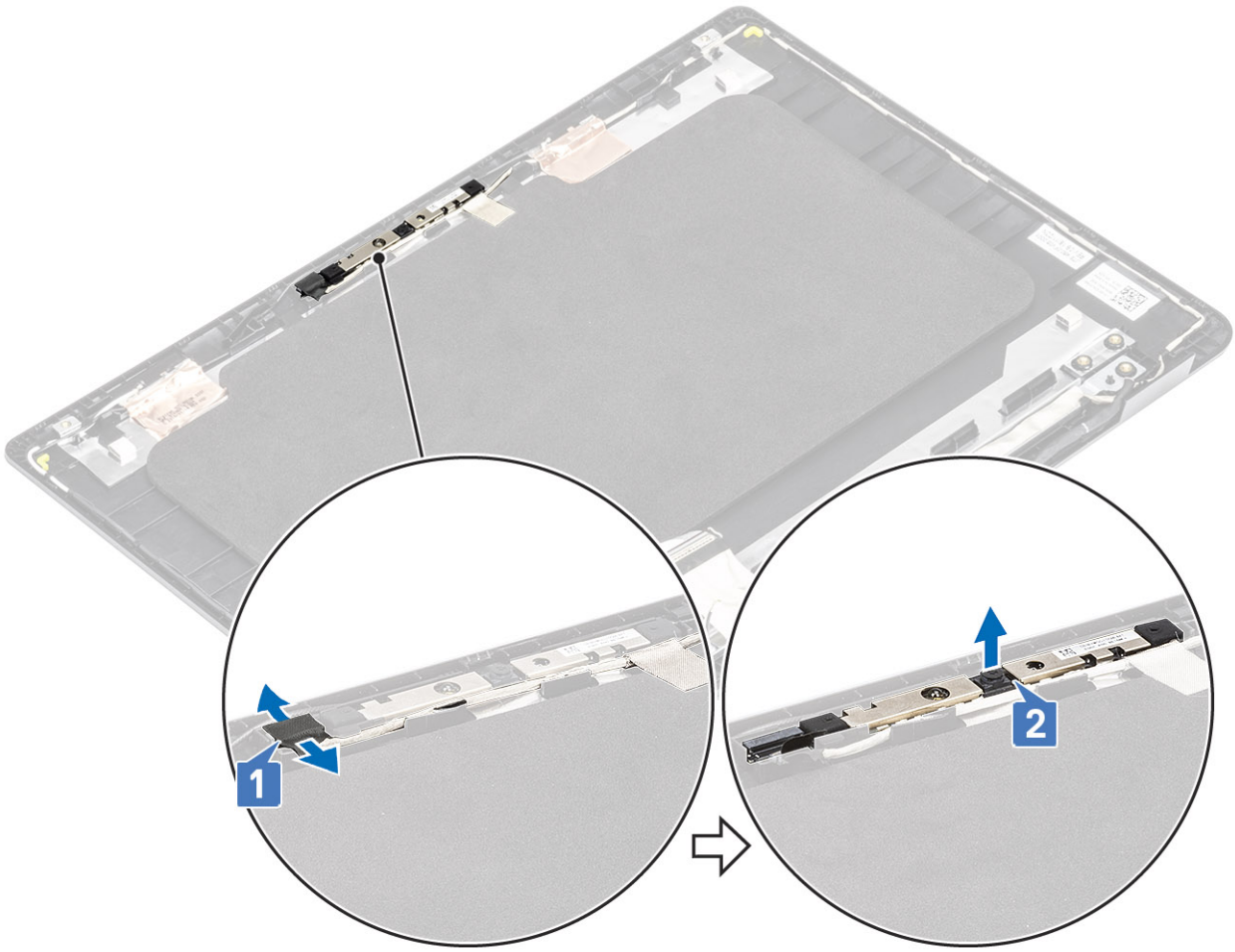
Steps

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.

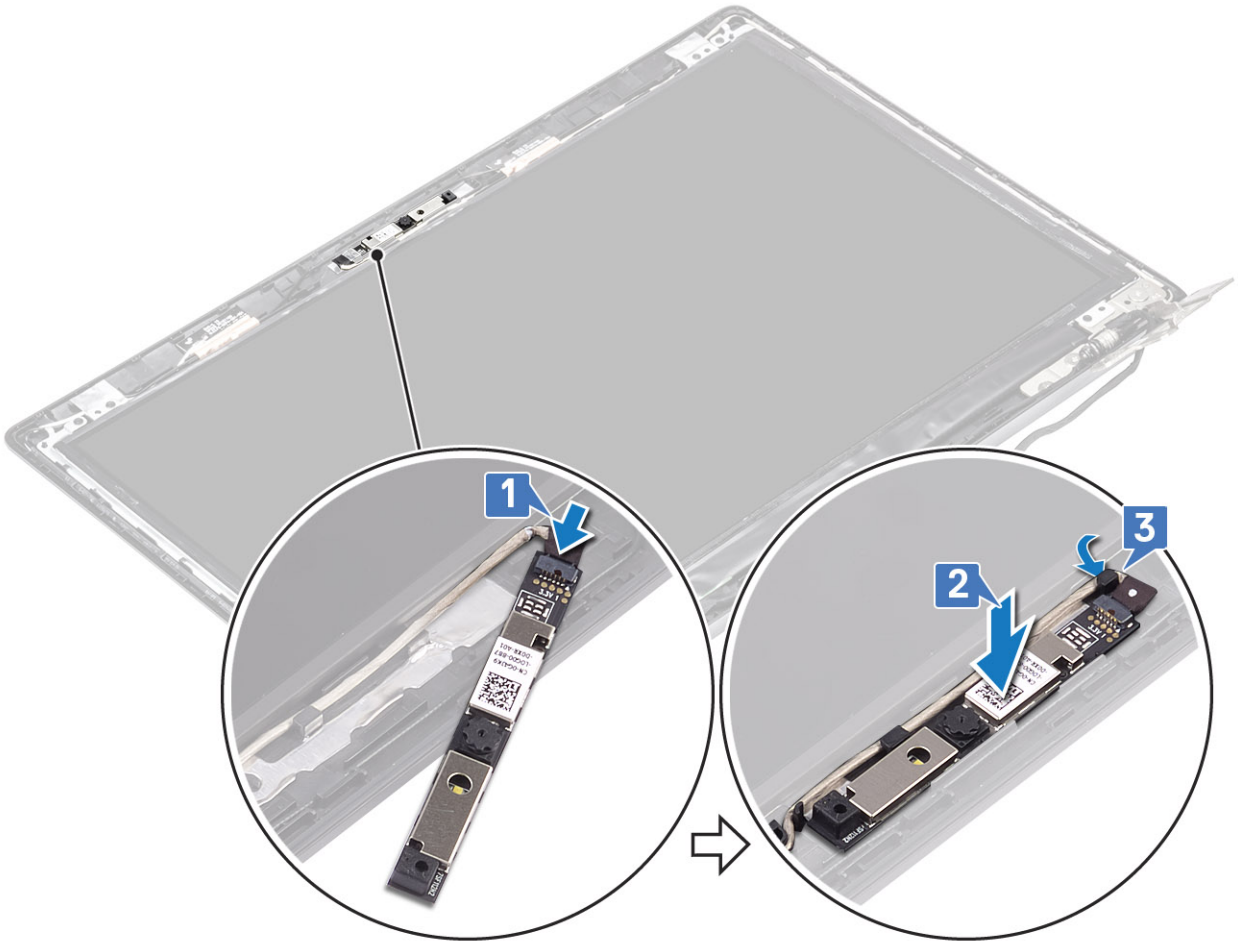
4. Peel the tape that secures the camera off the display back-cover [1].
5. Lift the camera module from the display back-cover [2].



Installing the camera

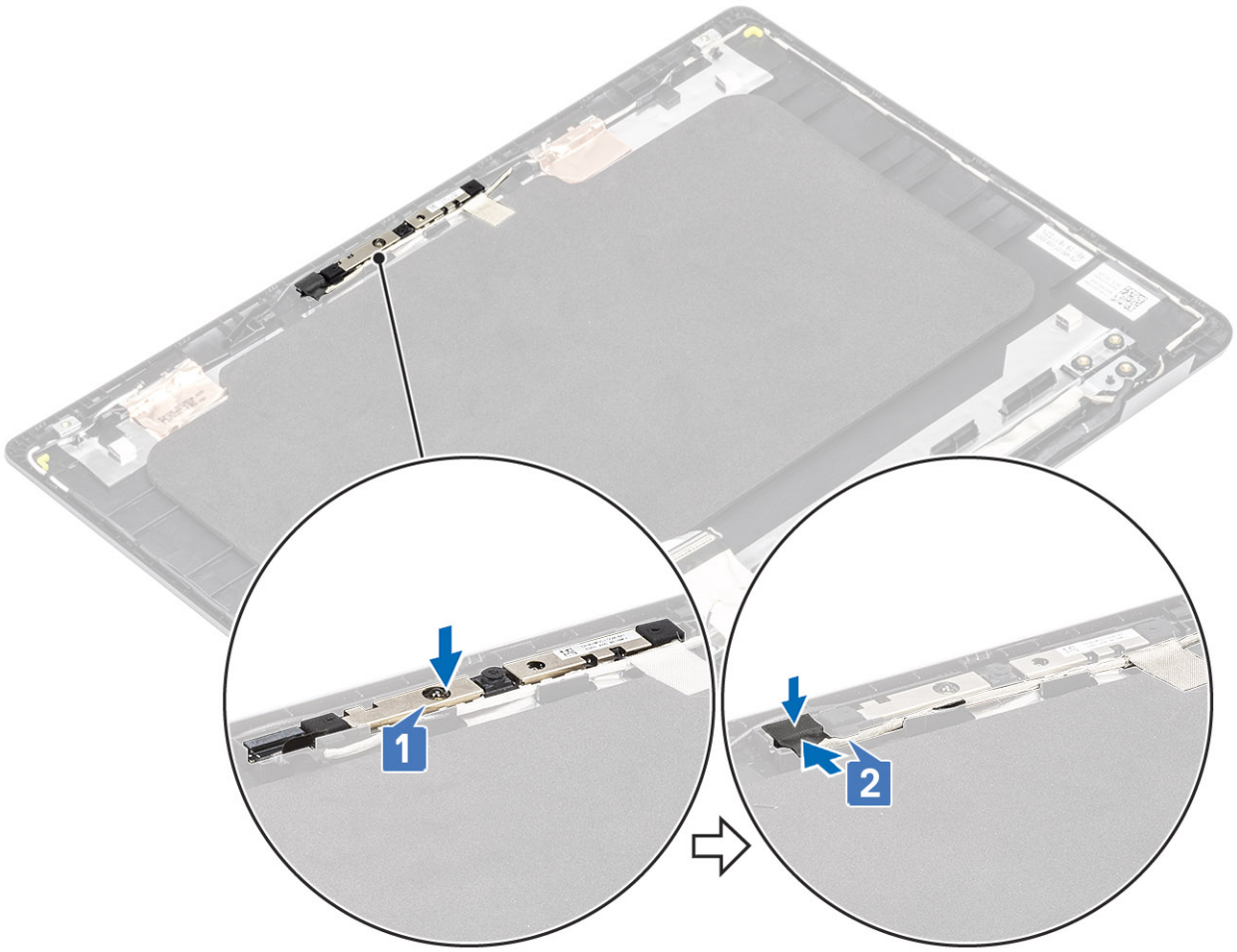
Steps

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. Reconnect the battery.
6. Replace the base cover.
7. Replace the SD memory card.
8. Follow the procedure in after working inside your computer.

Keyboard

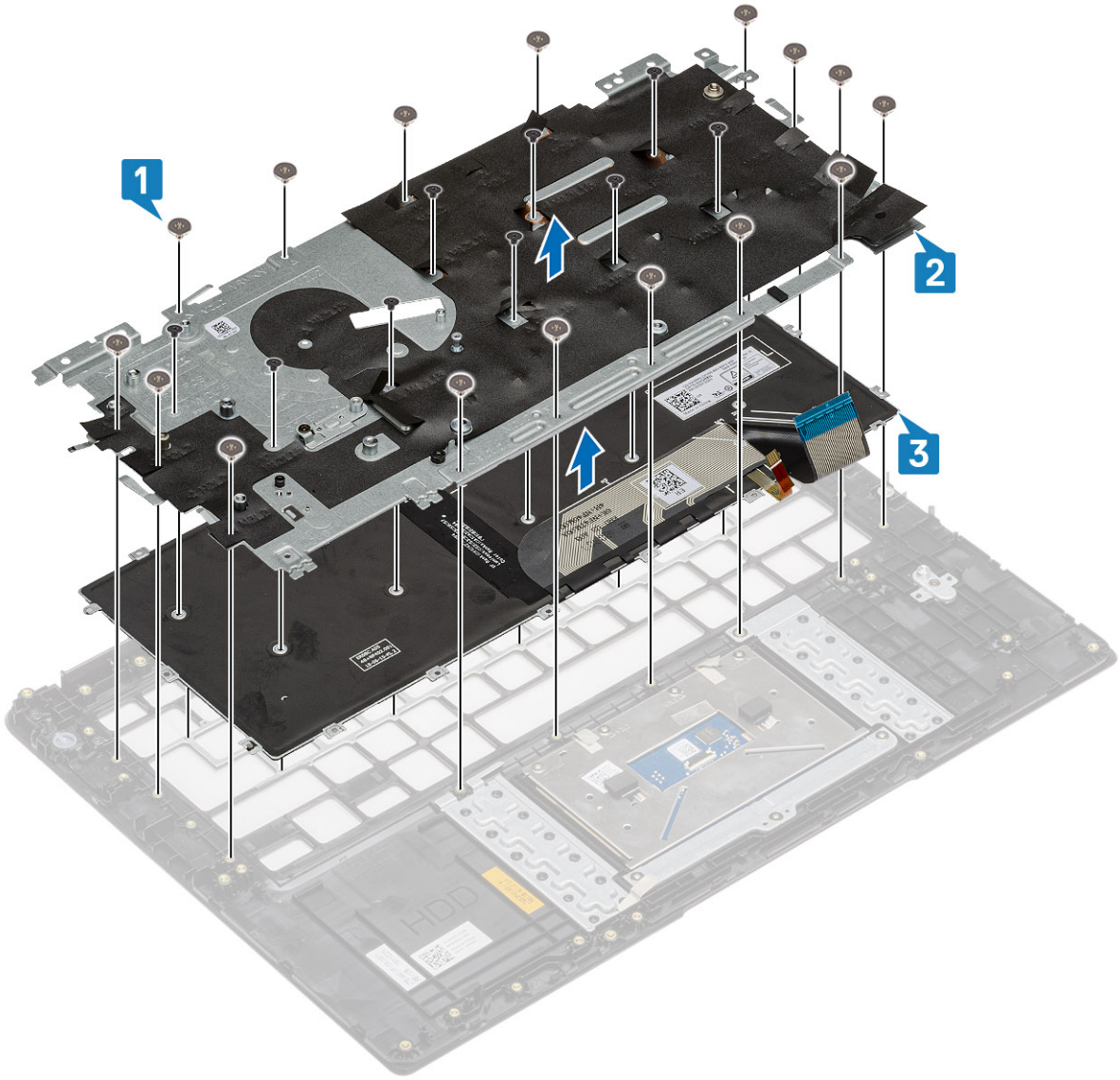
Removing the keyboard

Prerequisites

1. Follow the procedure in before working inside your computer
2. Remove the 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

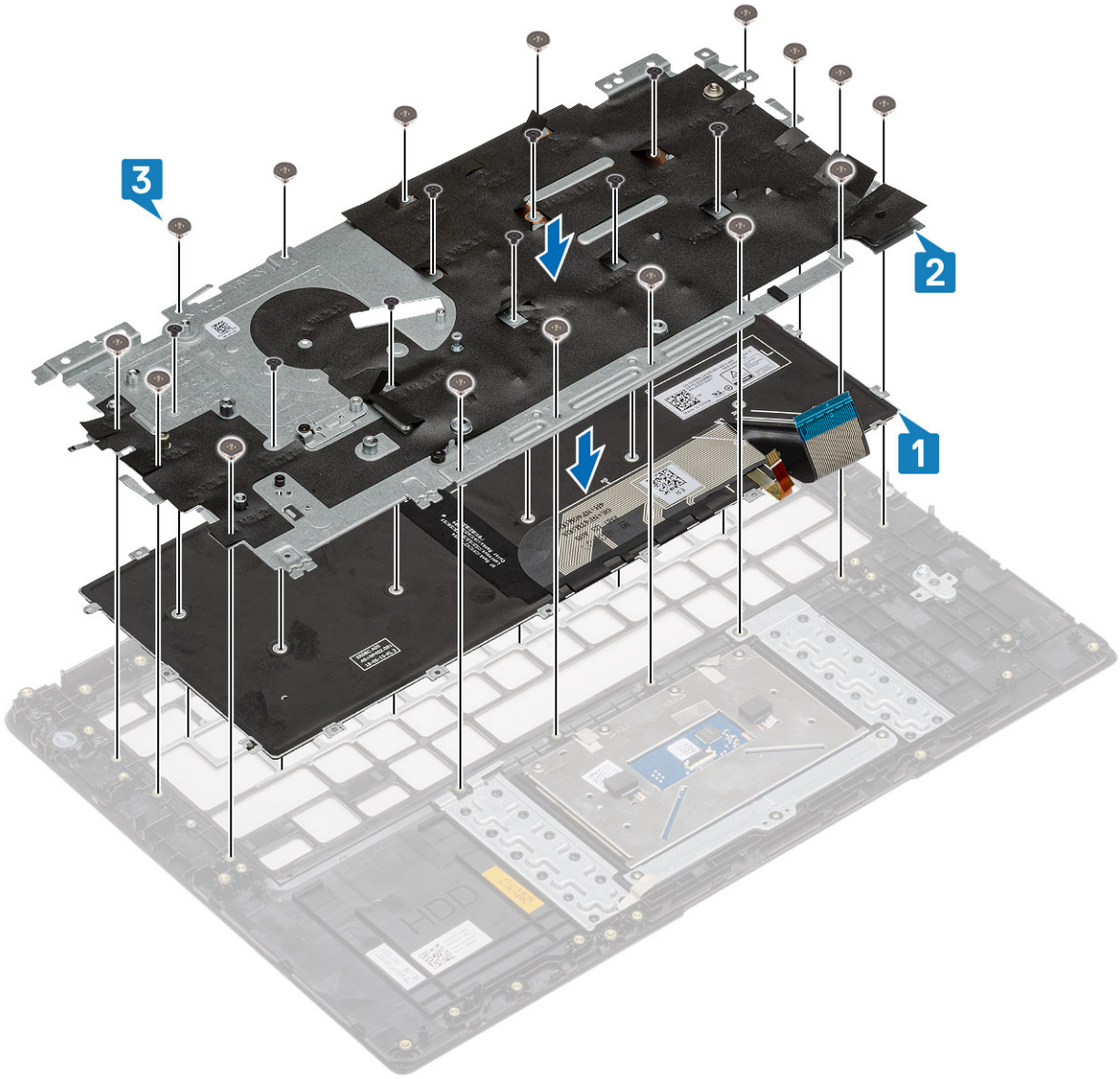
1. Remove the 16 (M2x2) and nine (M2x2.5) screws that secure the metal bracket and keyboard to the palmrest [1].
2. Lift the metal bracket from the palmrest [2].
3. Lift the keyboard from the palmrest [3].



Installing the keyboard

Steps

1. Place the keyboard on the palmrest [1].
2. Place the metal bracket on the keyboard and palmrest [2].
3. Replace the 16 (M2x2) and nine (M2x2.5) screws that secure the metal bracket to the keyboard and palmrest [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.

Palmrest

Removing the palmrest

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
18. Remove the Keyboard

About this task

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

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.

5

Troubleshooting

Handling swollen rechargeable Li-ion batteries

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

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

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

The guidelines for handling and replacing rechargeable Li-ion batteries are as follows:

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

Rechargeable Li-ion batteries can swell for various reasons such as age, number of charge cycles, or exposure to high heat. For more information about how to improve the performance and lifespan of the laptop battery and to minimize the possibility of occurrence of the issue, search Dell laptop battery in the Knowledge Base Resource at Dell Support Site.

Dell SupportAssist Pre-boot System Performance Check diagnostics

About this task

SupportAssist diagnostics (also known as system diagnostics) performs a complete check of your hardware. The Dell SupportAssist Pre-boot System Performance Check diagnostics is embedded with the BIOS and launched by the BIOS internally. The embedded system diagnostics provides options for particular devices or device groups allowing you to:

- Run tests automatically or in an interactive mode.
- Repeat the tests.
- Display or save test results.
- Run thorough tests to introduce additional test options to provide extra information about one or more failed devices.

- View status messages that inform you the 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 when the diagnostic tests are performed.

For more information, see the knowledge base article 000180971.

Running the SupportAssist Pre-Boot System Performance Check

Steps

1. Turn on your computer.
2. As the computer boots, press the F12 key as the Dell logo appears.
3. On the boot menu screen, select the **Diagnostics** option.
4. Click the arrow at the bottom left corner.
   Diagnostics page is displayed.
5. Click the arrow in the lower-right corner to go to the page listing.
   The items that are 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.

Built-in self-test (BIST)

M-BIST

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

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

How to run M-BIST

NOTE: Before initiating M-BIST, ensure that the computer is in a power-off state.

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

Table 6. LED error codes

Blinking Pattern		Possible Problem
Amber	**White**	
2	1	CPU Failure
2	8	LCD Power Rail Failure
1	1	TPM Detection Failure
2	4	Memory/RAM failure

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

LCD Power rail test (L-BIST)

L-BIST 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 (that is if the L-BIST circuit fails), the battery status LED flashes either an error code [2,8] or an error code [2,7].

NOTE: If L-BIST fails, LCD-BIST cannot function as no power will be supplied to the LCD.

How to invoke the L-BIST

1. Turn on your computer computer.
2. If the computer does not start up normally, look at the battery status LED:
   - If the battery status LED flashes an error code [2,7], the display cable may not be connected properly.
   - 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 that is supplied to the LCD.
3. For cases, when a [2,7] error code is shown, check to see if the display cable is properly connected.
4. For cases when a [2,8] error code is shown, replace the system board.

LCD Built-in Self-Test (BIST)

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

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

How to invoke the LCD BIST

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

NOTE: Dell SupportAssist Preboot diagnostics upon launch initiates an LCD BIST first, expecting a user intervention to confirm functionality of the LCD.

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 7. 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 communication failure	Replace the LVDS (Low-Voltage Differential Signaling) component.
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 8. 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.

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 stand-alone tool that is preinstalled in Dell computers running Windows operating system. It consists of tools to diagnose and troubleshoot issues that may occur before your computer boots to the operating system. It enables you to diagnose hardware issues, repair your computer, back up your files, or restore your computer to its factory state.

You can also download it from the Dell Support website to troubleshoot and fix your computer when it fails to boot into the 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 Serviceability Tools at the Dell Support Site. Click **SupportAssist** and then, click **SupportAssist OS Recovery**.

Real-Time Clock (RTC Reset)

The Real Time Clock (RTC) reset function allows you or the service technician to recover Dell systems from No POST/No Power/No Boot situations. The legacy jumper enabled RTC reset has been retired on these models.

Start the RTC reset with the system powered off and connected to AC power. Press and hold the power button for 20 seconds. The system RTC Reset occurs after you release the power button.

Backup media and recovery options

It is recommended to create a recovery drive to troubleshoot and fix problems that may occur with Windows. Dell provides multiple options for recovering the Windows operating system on your Dell computer. For more information, see Dell Windows Backup Media and Recovery Options.

Wi-Fi power cycle

About this task

If your computer is unable to access the Internet due to Wi-Fi connectivity issues, reset your Wi-Fi device by performing the following steps:

Steps

1. Turn off the computer.
2. Turn off the modem.

   NOTE: Some Internet service providers (ISPs) provide a modem and router combo device.
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 the computer.

Drain residual flea power (perform hard reset)

About this task

Flea power is the residual static electricity that remains in the computer even after it has been powered off and the battery is removed.

For your safety, and to protect the sensitive electronic components in your computer, you must drain residual flea power before removing or replacing any components in your computer.

Draining residual flea power, also known as a performing a "hard reset," is also a common troubleshooting step if your computer does not turn on or boot into the operating system.

Perform the following steps to drain the residual flea power:

Steps

1. Turn off the computer.
2. Disconnect the power adapter from the computer.
3. Remove the base cover.
4. Remove the battery.

   CAUTION: The battery is a Field Replaceable Unit (FRU) and the removal and installation procedures are intended for authorized service technicians only.

5. Press and hold the power button for 20 seconds to drain the flea power.
6. Install the battery.
7. Install the base cover.
8. Connect the power adapter to the computer.
9. Turn on the computer.

   NOTE: For more information about performing a hard reset, search in the Knowledge Base Resource at the Dell Support Site.

6

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.