Latitude 5300 2-in-1

Service Manual

Regulatory Model: P96G
Regulatory Type: P96G001
August 2021
Rev. A03

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.

© 2016 - 2020 Dell Inc. or its subsidiaries. All rights reserved. Dell, EMC, and other trademarks are trademarks of Dell Inc. or its subsidiaries. Other trademarks may be trademarks of their respective owners.

Contents

Chapter 1: Working on your computer 6
Safety instructions 6
Before working inside your computer 6
Safety precautions 7
Electrostatic discharge—ESD protection 7
ESD field service kit 8
Transporting sensitive components 9
After working inside your computer 9

Chapter 2: Technology and components 10
USB features 10
USB Type-C 12
HDMI 1.4a 13
Power button LED behavior 14

Chapter 3: Major components of your system 16

Chapter 4: Disassembly and reassembly 18
MicroSD card 18
Removing the microSD card 18
Installing the microSD card 19
SIM card tray 20
Removing the SIM card tray 20
Installing the SIM card tray 21
Base cover 22
Removing the base cover 22
Installing the base cover 25
Battery 26
Lithium-ion battery precautions 26
Removing the battery 26
Installing the battery 28
WWAN card 30
Removing the WWAN card 30
Installing the WWAN card 31
WLAN card 32
Removing the WLAN card 32
Installing the WLAN card 33
Memory modules 34
Removing the memory module 34
Installing the memory module 35
Solid-state drive 36
Removing the M.2 SSD 36
Installing the M.2 SSD 38
Speakers 40

Removing the speakers....40
Installing the speakers....43
System fan....46
Removing the system fan....46
Installing the system fan....48
Heat sink....50
Removing the heatsink....50
Installing the heatsink....51
DC-in port....52
Removing the DC-in port....52
Installing the DC-in port....54
LED board....56
Removing the LED board....56
Installing the LED board....59
Touchpad button board....62
Removing the touchpad button board....62
Installing the touchpad button board....64
System board....66
Removing the system board....66
Installing the system board....72
Coin-cell battery....79
Removing the coin-cell battery....79
Installing the coin-cell battery....79
Display assembly....80
Removing the display assembly....80
Installing the display assembly....83
Keyboard....86
Removing the keyboard....86
Installing the keyboard....89
Smart card reader board....92
Removing the smart card reader board....92
Installing the smart card reader board....94
Palmrest assembly....96
Replacing the palmrest and keyboard assembly....96

Chapter 5: Troubleshooting....98
Handling swollen Lithium-ion batteries....98
Dell SupportAssist Pre-boot System Performance Check diagnostics....99
Running the SupportAssist Pre-Boot System Performance Check....99
Built-in self-test (BIST)....99
M-BIST....99
LCD Power rail test (L-BIST)....100
LCD Built-in Self Test (BIST)....100
System-diagnostic lights....101
Recovering the operating system....101
Backup media and recovery options....102
WiFi power cycle....102
Drain residual flea power (perform hard reset)....102

Chapter 6: Getting help..... 104
Contacting Dell.....104

1

Working on your computer

Topics:

- Safety instructions

Safety instructions

Prerequisites

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

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

About this task

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

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

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

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

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

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

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

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

Before working inside your computer

Steps

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

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

3. Disconnect your computer and all attached devices from their electrical outlets.
4. Disconnect all attached network devices and peripherals, such as keyboard, mouse, and monitor from your computer.
5. Remove any media card and optical disc from your computer, if applicable.
6. After the computer is unplugged, press and hold the power button for 5 seconds to ground the system board.

   CAUTION: Place the computer on a flat, soft, and clean surface to avoid scratches on the display.

7. Place the computer face down.

Safety precautions

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

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

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

Standby power

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

Unplugging, pressing and holding the power button for 20 seconds should discharge residual power in the system board. Remove the battery from tablets.notebooks.

Bonding

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

Electrostatic discharge—ESD protection

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

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

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

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

the damage. The weakened trace may take weeks or months to melt, and in the meantime may cause degradation of memory integrity, intermittent memory errors, etc.

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

Perform the following steps to prevent ESD damage:

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

ESD field service kit

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

Components of an ESD field service kit

The components of an ESD field service kit are:

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

ESD protection summary

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

Transporting sensitive components

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

Lifting equipment

Adhere to the following guidelines when lifting heavy weight equipment:

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

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

After working inside your computer

About this task

NOTE: 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.

2

Technology and components

This chapter details the technology and components available in the system.

Topics:

- USB features
- USB Type-C
- HDMI 1.4a
- Power button LED behavior

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 1. USB evolution

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

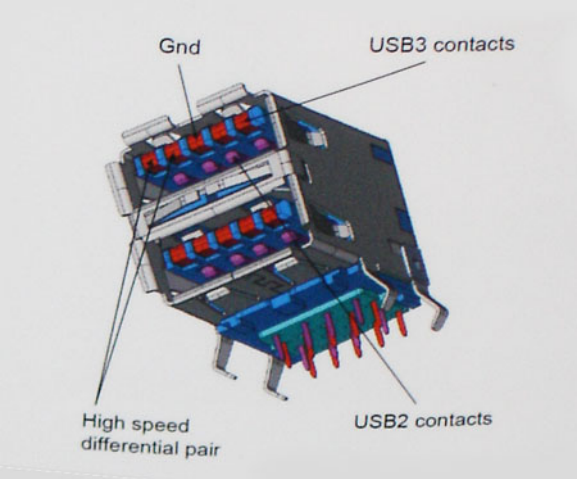
The topics below cover some of the most commonly asked questions regarding USB 3.0/USB 3.1 Gen 1.

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 standards like USB 3.1 and USB power delivery (USB PD).

Alternate Mode

USB Type-C is a new connector standard that is very small. It is 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's is 10 Gbps. 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.

Thunderbolt over USB Type-C

Thunderbolt is a hardware interface that combines data, video, audio, and power in a single connection. Thunderbolt combines PCI Express (PCIe) and DisplayPort (DP) into one serial signal, and additionally provides DC power, all in one cable. Thunderbolt 1 and Thunderbolt 2 use the same connector as miniDP (DisplayPort) to connect to peripherals, while Thunderbolt 3 uses a USB Type-C connector.

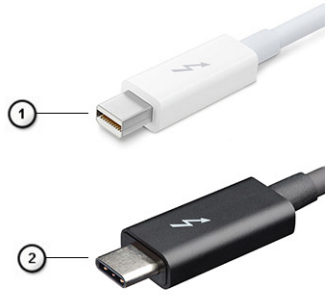


Figure 1. Thunderbolt 1 and Thunderbolt 3

1. Thunderbolt 1 and Thunderbolt 2 (using a miniDP connector)
2. Thunderbolt 3 (using a USB Type-C connector)

Thunderbolt 3 over USB Type-C

Thunderbolt 3 brings Thunderbolt to USB Type-C at speeds up to 40 Gbps, creating one compact port that does it all - delivering the fastest, most versatile connection to any dock, display or data device like an external hard drive. Thunderbolt 3 uses a USB Type-C connector/port to connect to supported peripherals.

1. Thunderbolt 3 uses USB Type-C connector and cables - It is compact and reversible
2. Thunderbolt 3 supports speed up to 40 Gbps
3. DisplayPort 1.4 – compatible with existing DisplayPort monitors, devices and cables
4. USB Power Delivery - Up to 130W on supported computers

Key Features of Thunderbolt 3 over USB Type-C

1. Thunderbolt, USB, DisplayPort and power on USB Type-C on a single cable (features vary between different products)
2. USB Type-C connector and cables which are compact and reversible
3. Supports Thunderbolt Networking (*varies between different products)
4. Supports up to 4K displays
5. Up to 40 Gbps

NOTE: Data transfer speed may vary between different devices.

Thunderbolt Icons

Protocol	USB Type-A	USB Type-C	Notes
Thunderbolt	Not Applicable		Will use industry standard icon regardless of port style (i.e., mDP or USB Type-C)
Thunderbolt w/ Power Delivery	Not Applicable		Up to 130 Watts via USB Type-C

Figure 2. Thunderbolt Iconography Variations

HDMI 1.4a

This topic explains the HDMI 1.4a and its features along with the advantages.

HDMI (High-Definition Multimedia Interface) is an industry-supported, uncompressed, all-digital audio/video interface. HDMI provides an interface between any compatible digital audio/video source, such as a DVD player, or A/V receiver and a compatible digital audio and/or video monitor, such as a digital TV (DTV). The primary advantage is cable reduction and content protection provisions. HDMI supports standard, enhanced, or high-definition video, plus multichannel digital audio on a single cable.

HDMI 1.4a Features

- **HDMI Ethernet Channel** - Adds high-speed networking to an HDMI link, allowing users to take full advantage of their IP-enabled devices without a separate Ethernet cable.
- **Audio Return Channel** - Allows an HDMI-connected TV with a built-in tuner to send audio data "upstream" to a surround audio system, eliminating the need for a separate audio cable.
- **3D** - Defines input/output protocols for major 3D video formats, paving the way for true 3D gaming and 3D home theater applications.
- **Content Type** - Real-time signaling of content types between display and source devices, enabling a TV to optimize picture settings based on content type.
- **Additional Color Spaces** - Adds support for additional color models used in digital photography and computer graphics.
- **4K Support** - Enables video resolutions far beyond 1080p, supporting next-generation displays that will rival the Digital Cinema systems used in many commercial movie theaters.
- **HDMI Micro Connector** - A new, smaller connector for phones and other portable devices, supporting video resolutions up to 1080p.

- **Automotive Connection System** - New cables and connectors for automotive video systems, designed to meet the unique demands of the motoring environment while delivering true HD quality.

Advantages of HDMI

- Quality HDMI transfers uncompressed digital audio and video for the highest, crispest image quality.
- Low-cost HDMI provides the quality and functionality of a digital interface while also supporting uncompressed video formats in a simple, cost-effective manner.
- Audio HDMI supports multiple audio formats from standard stereo to multichannel surround sound.
- HDMI combines video and multichannel audio into a single cable, eliminating the cost, complexity, and confusion of multiple cables currently used in A/V systems.
- HDMI supports communication between the video source (such as a DVD player) and the DTV, enabling new functionality.

Power button LED behavior

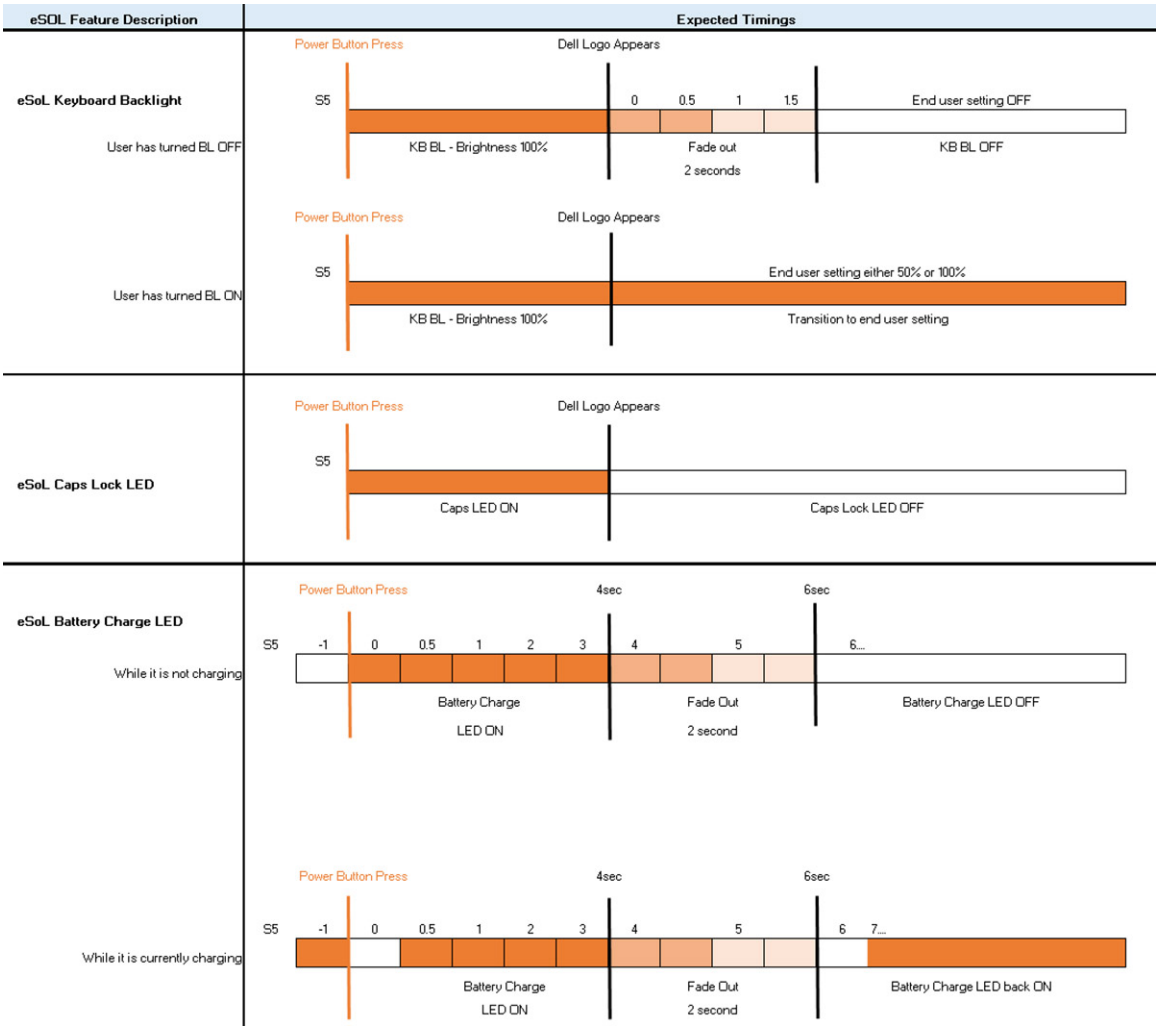
On certain Dell Latitude systems, the power button LED is used to provide an indication of the system status, and as a result the power button illuminates when pressed. The systems with the optional power button/fingerprint reader will have no LED under the power button and hence will apply the available LED's in the system to provide an indication of the system status.

Power button LED behavior without Fingerprint reader

- System is ON (S0) = LED illuminates solid white.
- System in Sleep/Standby (S3, SOix) = LED is off
- System is Off/Hibernating (S4/S5) = LED is off

Power On and LED behavior with Fingerprint reader

- Pressing the power button for a duration between 50 msec to 2 sec turns on the device.
- Power button does not register additional presses until the SOL (Sign-Of-Life) has been provided to the user.
- System LED's illuminates upon pressing the power button.
- All the available LED's (Keyboard backlit/ Keyboard caps lock LED/ Battery Charge LED) illuminates and displays specified behavior.
- The auditory tone is Off by default. It can be enabled in the BIOS setup.
- Safeguards do not time out if the device gets hung during the logon process.
- Dell logo: Turns on within 2 secs after pressing the power button.
- Full boot: Within 22 secs after pressing the power button.
- Below is the example timelines:



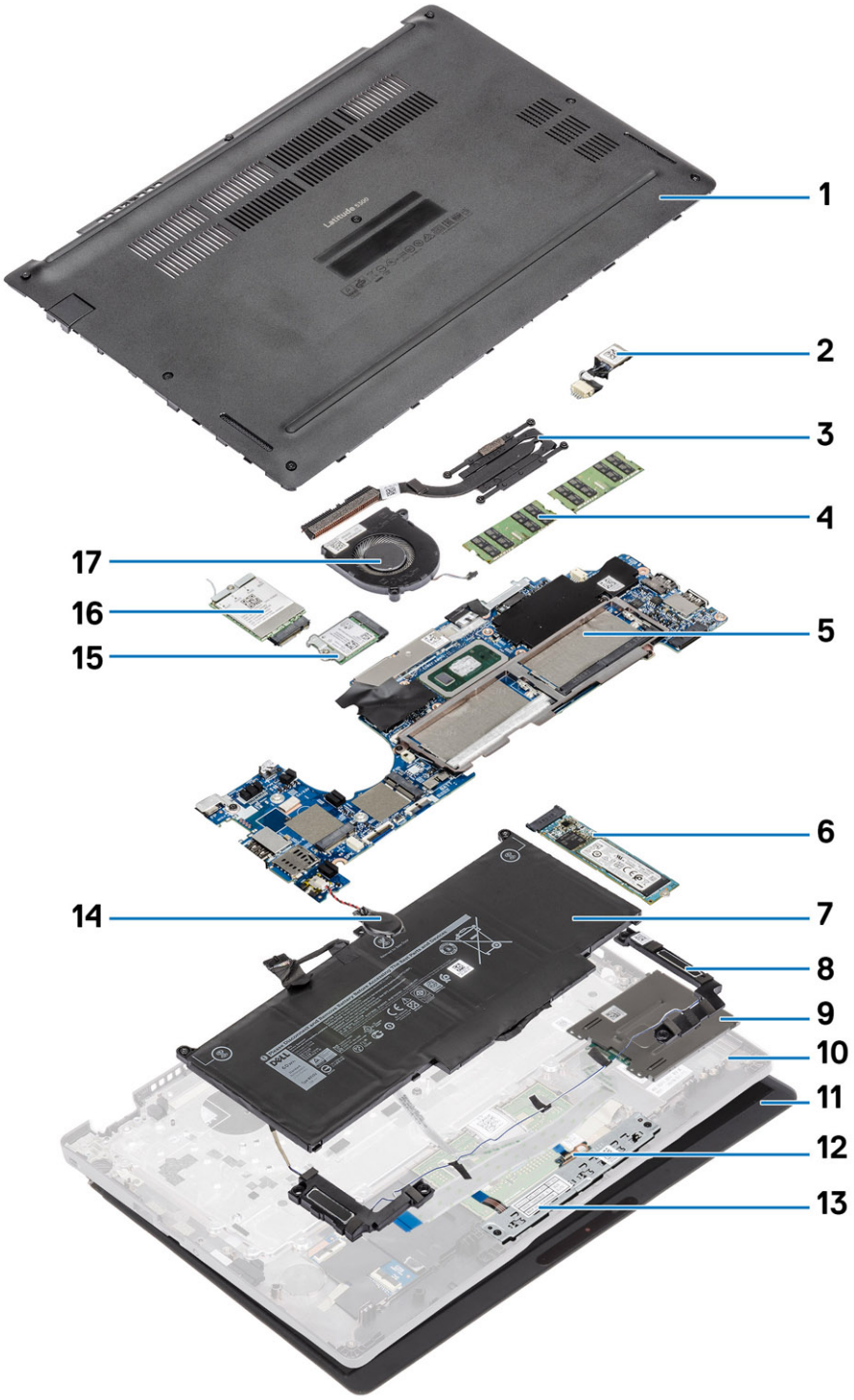
Power button with fingerprint reader will have no LED and will leverage the available LED's in the system to provide indication of the system status

- **Power Adapter LED:**
  - The LED on Power adapter connector illuminates white when power is supplied from electrical outlet.
- **Battery Indicator LED:**
  - If the computer is connected to an electrical outlet, the battery light operates as follows:
    1. Solid white -the battery is charging. When the charge is complete the LED turns off.
  - If the computer is running on a battery, the battery light operates as follows:
    1. Off -the battery is adequately charged (or the computer is turned off).
    2. Solid amber -the battery charge is critically low. A low battery state is approximately 30 minutes or less of battery life remaining.
- **Camera LED**
  - White LED activates when camera is on.
- **Mic Mute LED:**
  - When activated (muted), the mic mute LED on the F4 Key should illuminate WHITE.
- **RJ45 LEDs:**
  - **Table 2. LED on either side of RJ45 port**

Link speed indicator (LHS)	Activity indicator (RHS)
Green	Amber

3

Major components of your system



1. Base cover
2. DC-in port

3. Heatsink
4. Memory modules
5. System board
6. Solid state drive
7. Battery
8. Speaker
9. Smart card reader board
10. Palmrest
11. Display assembly
12. LED board
13. Touchpad button board
14. Coin cell battery
15. WLAN card
16. WWAN card
17. System fan

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

Disassembly and reassembly

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

Topics:

- MicroSD card
- SIM card tray
- Base cover
- Battery
- WWAN card
- WLAN card
- Memory modules
- Solid-state drive
- Speakers
- System fan
- Heat sink
- DC-in port
- LED board
- Touchpad button board
- System board
- Coin-cell battery
- Display assembly
- Keyboard
- Smart card reader board
- Palmrest assembly

MicroSD card

Removing the microSD card

Prerequisites

Follow the procedure in Before working inside your computer

Steps

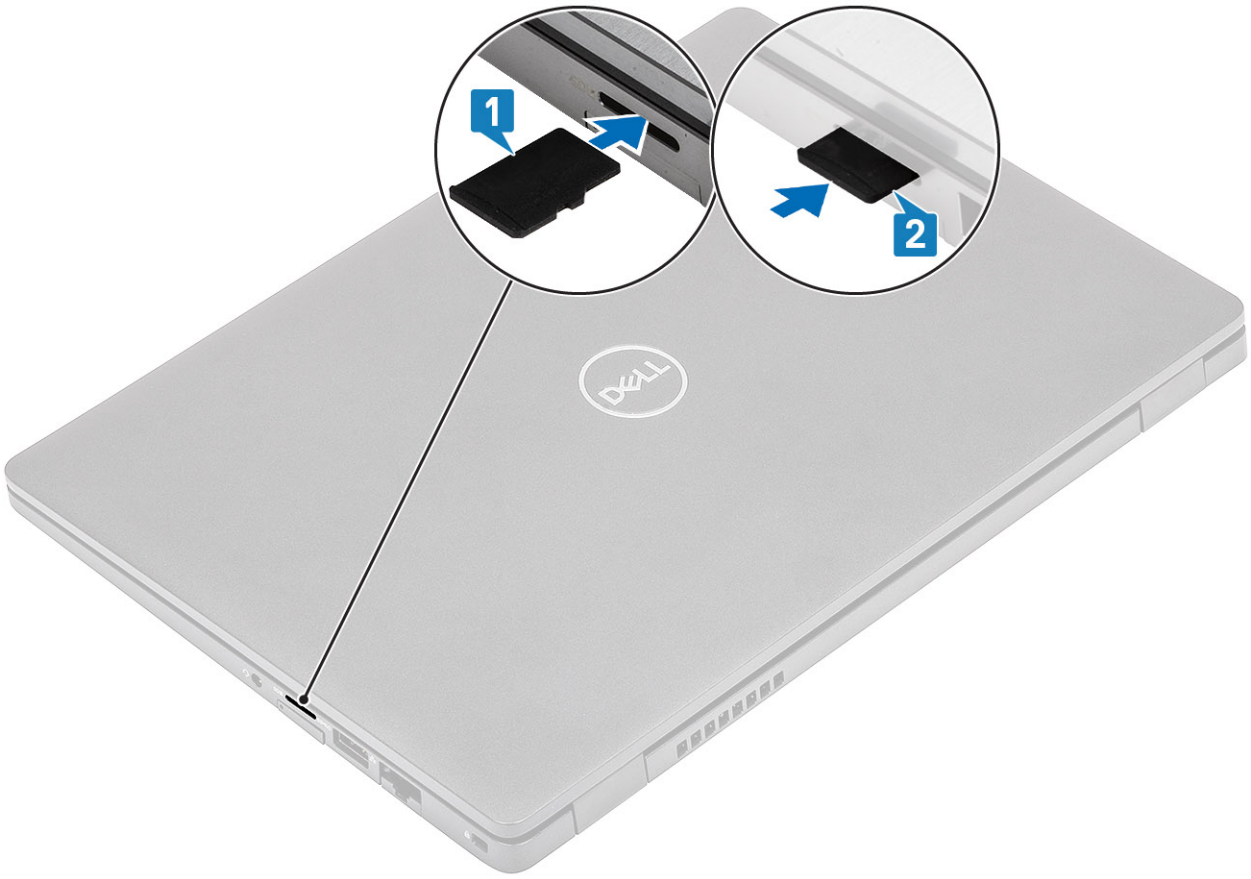
1. Push the microSD card to release it from the computer [1].
2. Slide the microSD card out of the computer [2].



Installing the microSD card

Steps

1. Align the microSD card to its slot on the computer [1].
2. Slide the microSD card into the slot until it clicks into place [2].



Next steps

Follow the procedures in After working inside your computer.

SIM card tray

Removing the SIM card tray

Prerequisites

Follow the procedure in Before working inside your computer

Steps

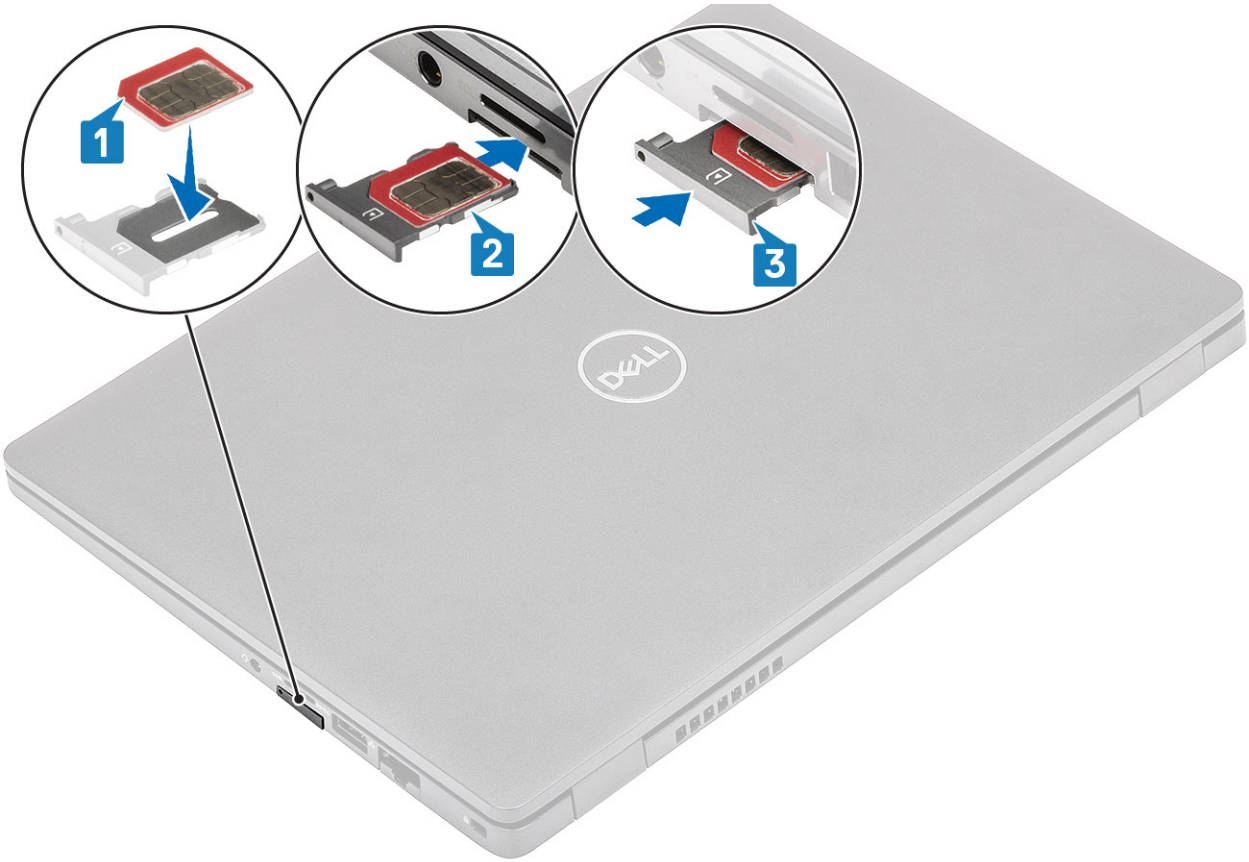
1. Insert a pin into the hole of the SIM card tray and push inward until the tray is released [1, 2].
2. Slide the SIM card tray out of the computer [3].



Installing the SIM card tray

Steps

1. Place the SIM card into the SIM card tray with the metallic contact facing up [1].
2. Align the SIM card tray with the slot on the computer and carefully slide it in [2].
3. Slide the SIM card tray into the slot, until it clicks into place [3].



Next steps

Follow the procedures in After working inside your computer

Base cover

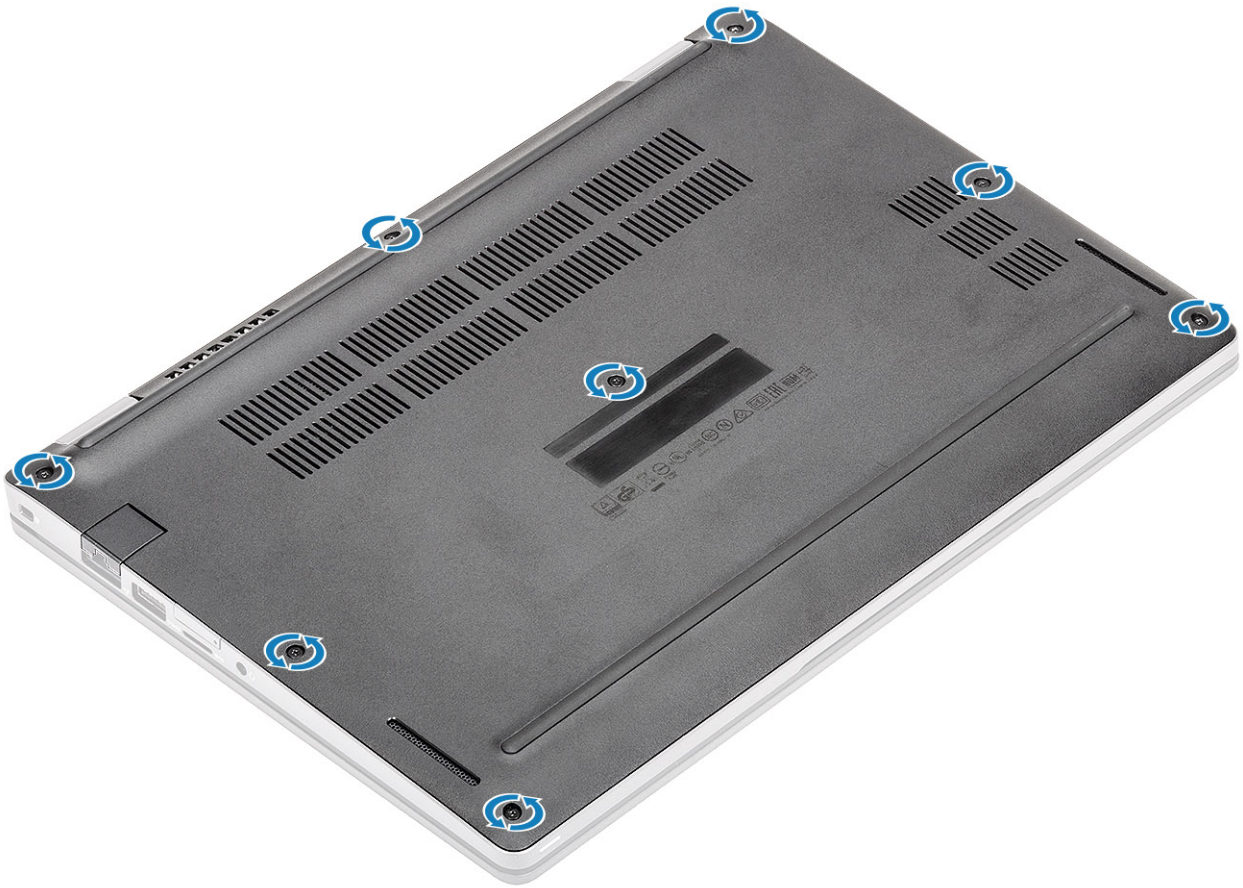
Removing the base cover

Prerequisites

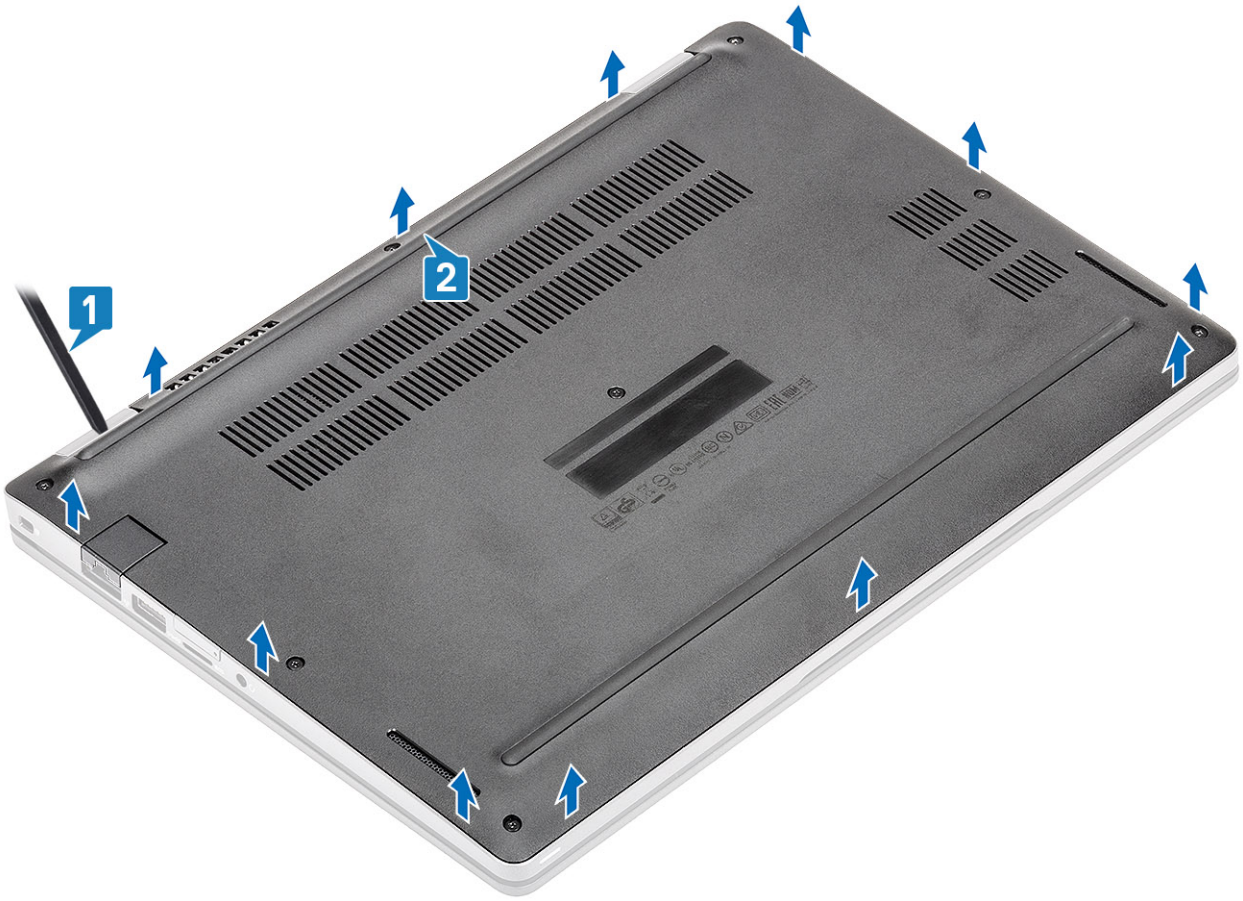
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.

Steps

1. Loosen the eight captive screws that secure the base cover to the computer.



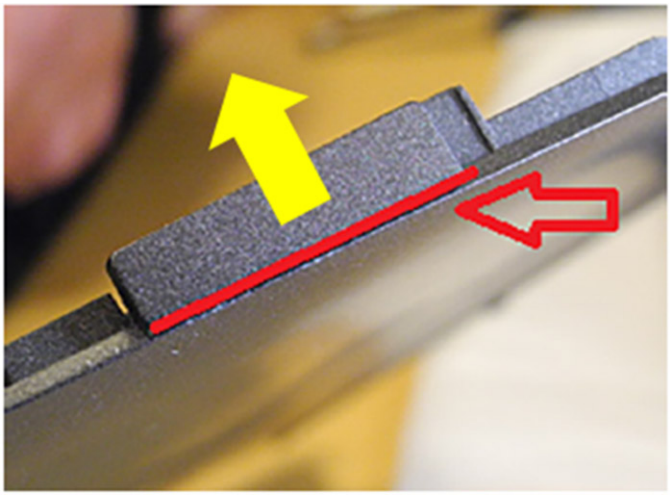
2. Using a plastic scribe [1], pry the base cover from the top-left corner and continue to work on the sides to open the base cover [2].



3. Lift and remove the base cover away from the computer.



4. After removing the base cover, remove the SIM cover. To remove the SIM cover pry the dummy SIM card upwards from the recess point which is the area between the dummy SIM card and system chassis.



Installing the base cover

Steps

1. Transfer the SIM cover to the new base cover.
2. Align and place the base cover on the computer.
3. Press the edges and sides of the base cover until it snaps into place.

4. Tighten the eight captive screws to secure the base cover to the computer.

Next steps

1. Replace the microSD card.
2. Follow the procedure in after working inside your computer.

Battery

Lithium-ion battery precautions

CAUTION:

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

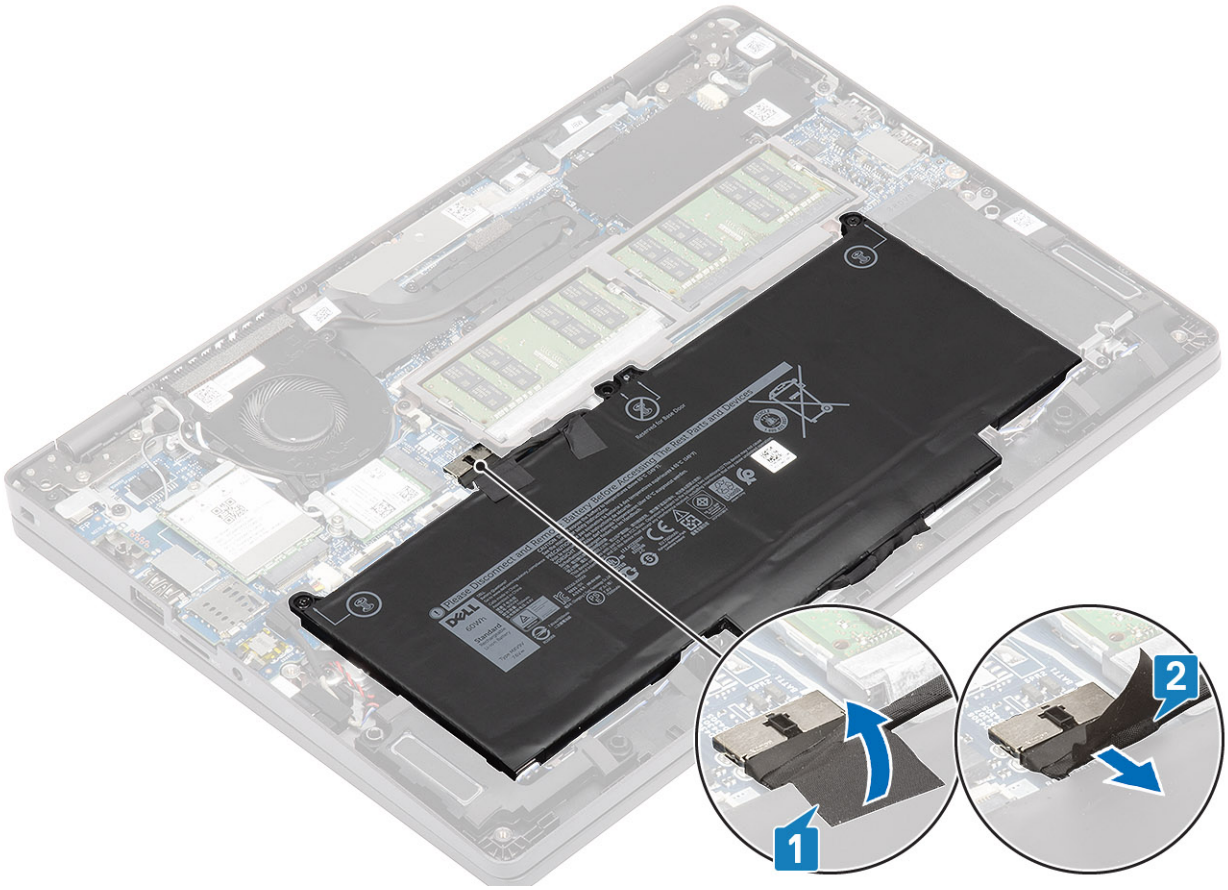
Removing the battery

Prerequisites

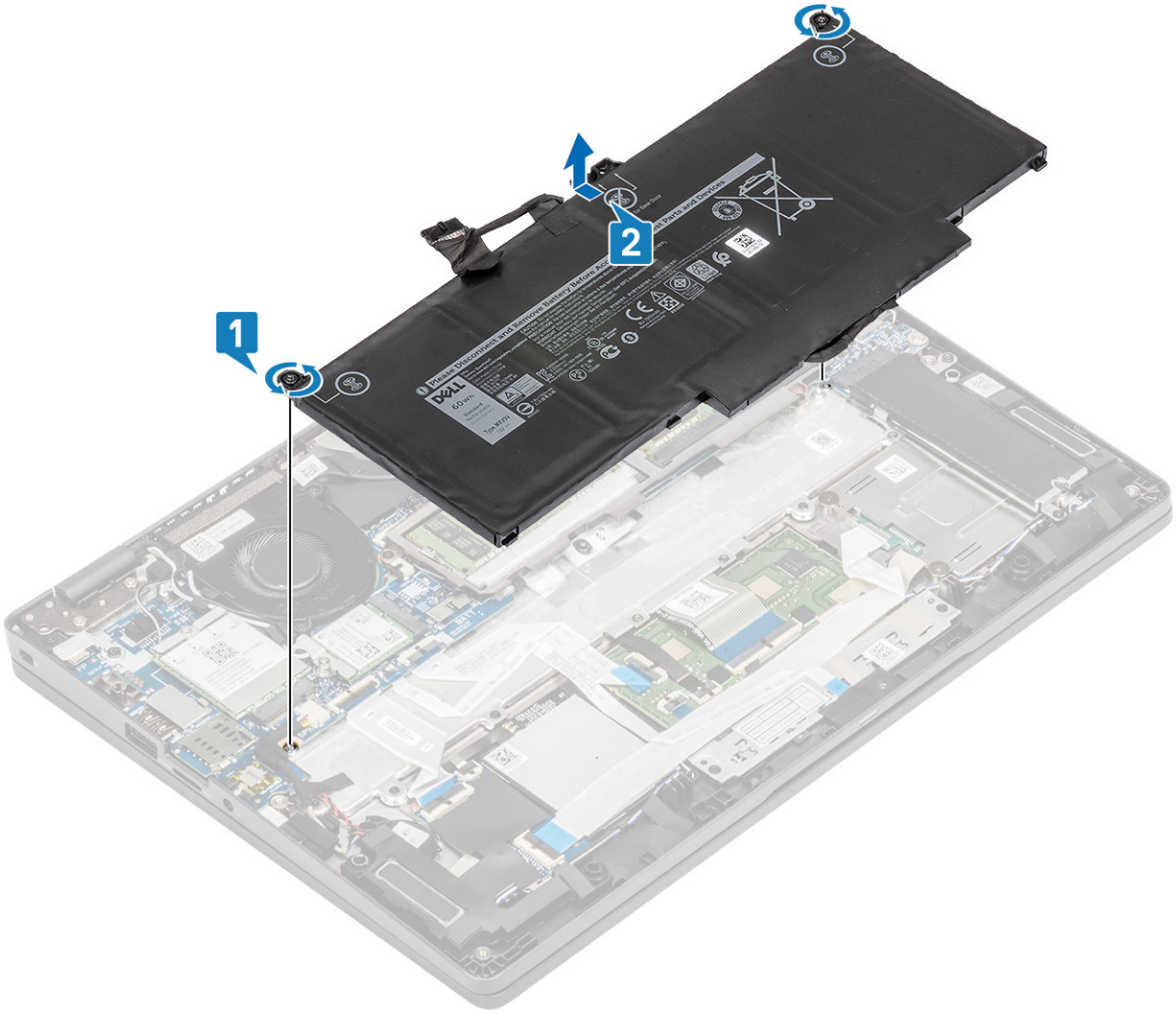
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.

Steps

1. Peel the adhesive tape from the battery [1].
2. Disconnect the battery cable from the connector on the system board [2].



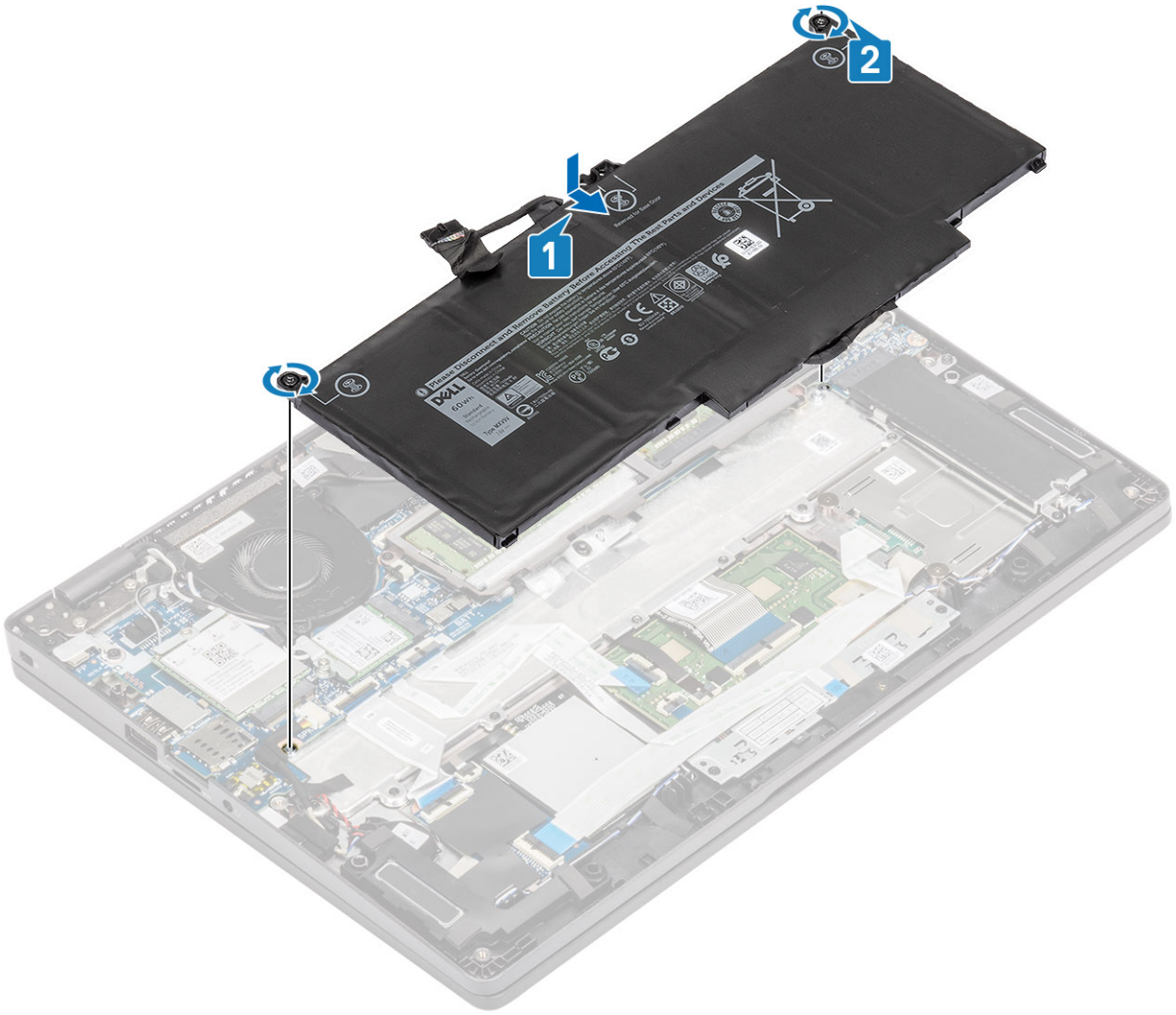
3. Loosen the two captive screws that secure the battery to the palm rest assembly [1].
4. Lift and slide the battery away from the palm rest assembly. [2].



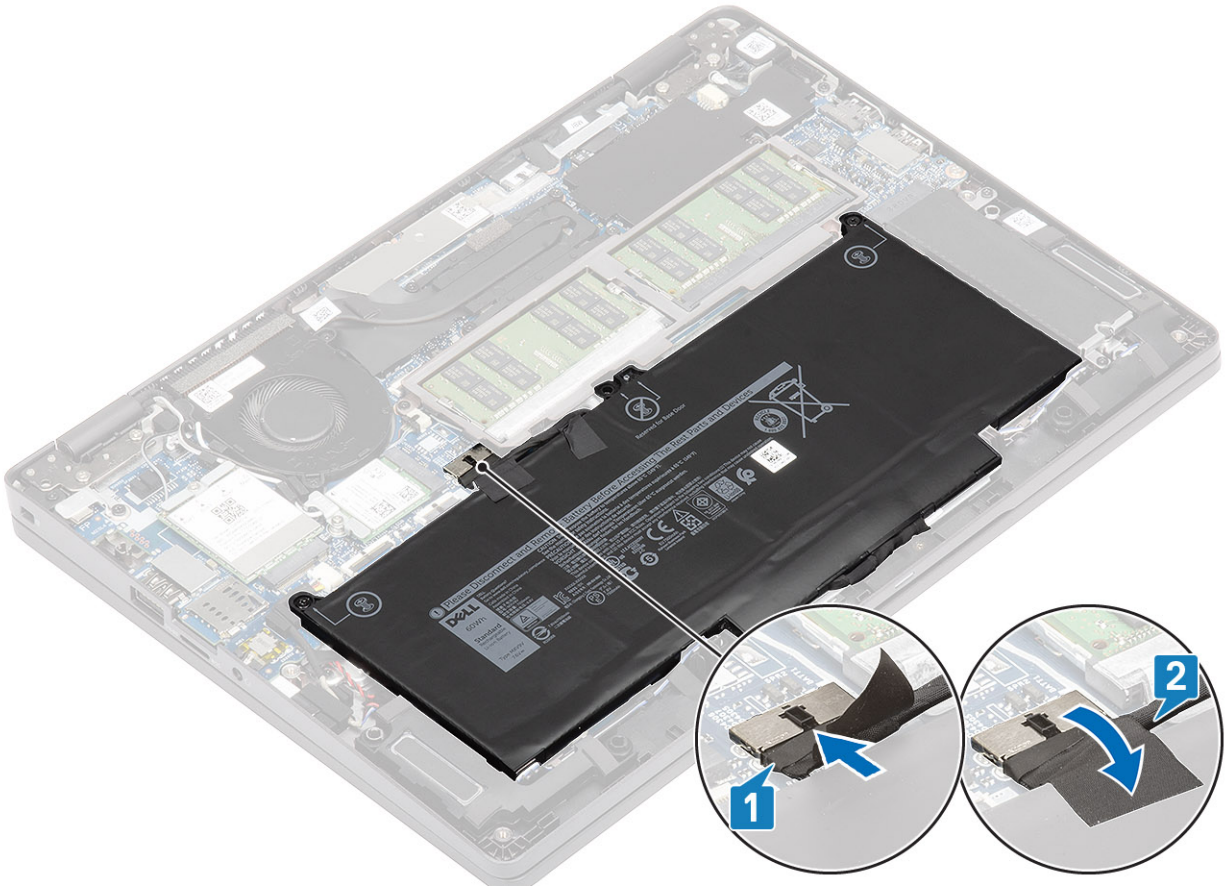
Installing the battery

Steps

1. Align the tabs on the battery with the slots on the palm rest assembly [1].
2. Place the battery in the battery bay.
3. Tighten the two captive screws to secure the battery to the palmrest [2].



4. Connect the battery cable to the connector on the system board [1].
5. Affix the adhesive tapes on the battery [2].



Next steps

1. Replace the base cover.
2. Replace the microSD card.
3. Follow the procedure in after working inside your computer

WWAN card

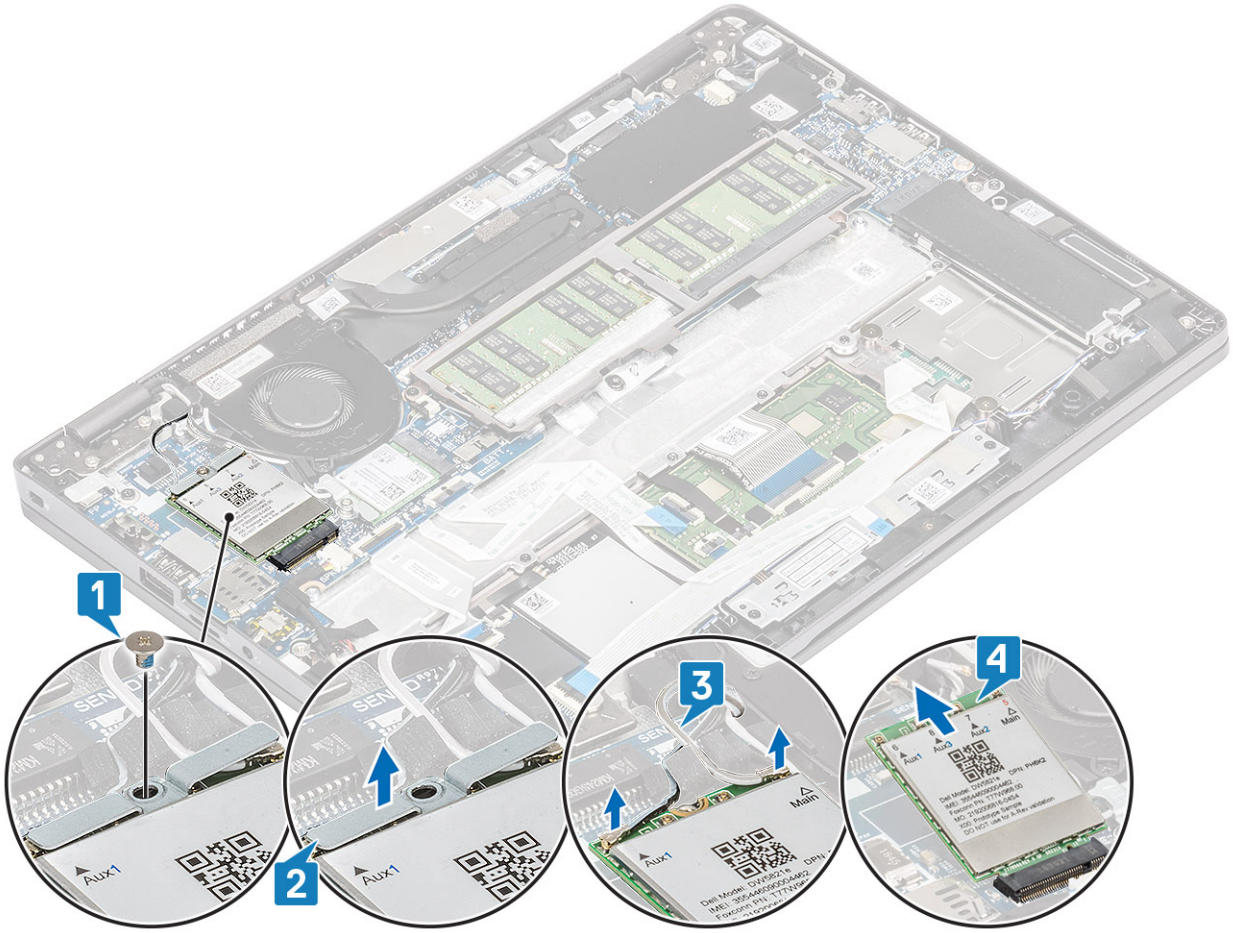
Removing the WWAN card

Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Disconnect the battery cable from the connector on the system board.

Steps

1. Remove the single (M2x3) screw that secures the WWAN card bracket to the WWAN card [1].
2. Remove the WWAN card bracket from the WWAN card [2].
3. Disconnect the antenna cables from the WWAN card [3].
4. Slide and remove the WWAN card from the WWAN card slot. [4].



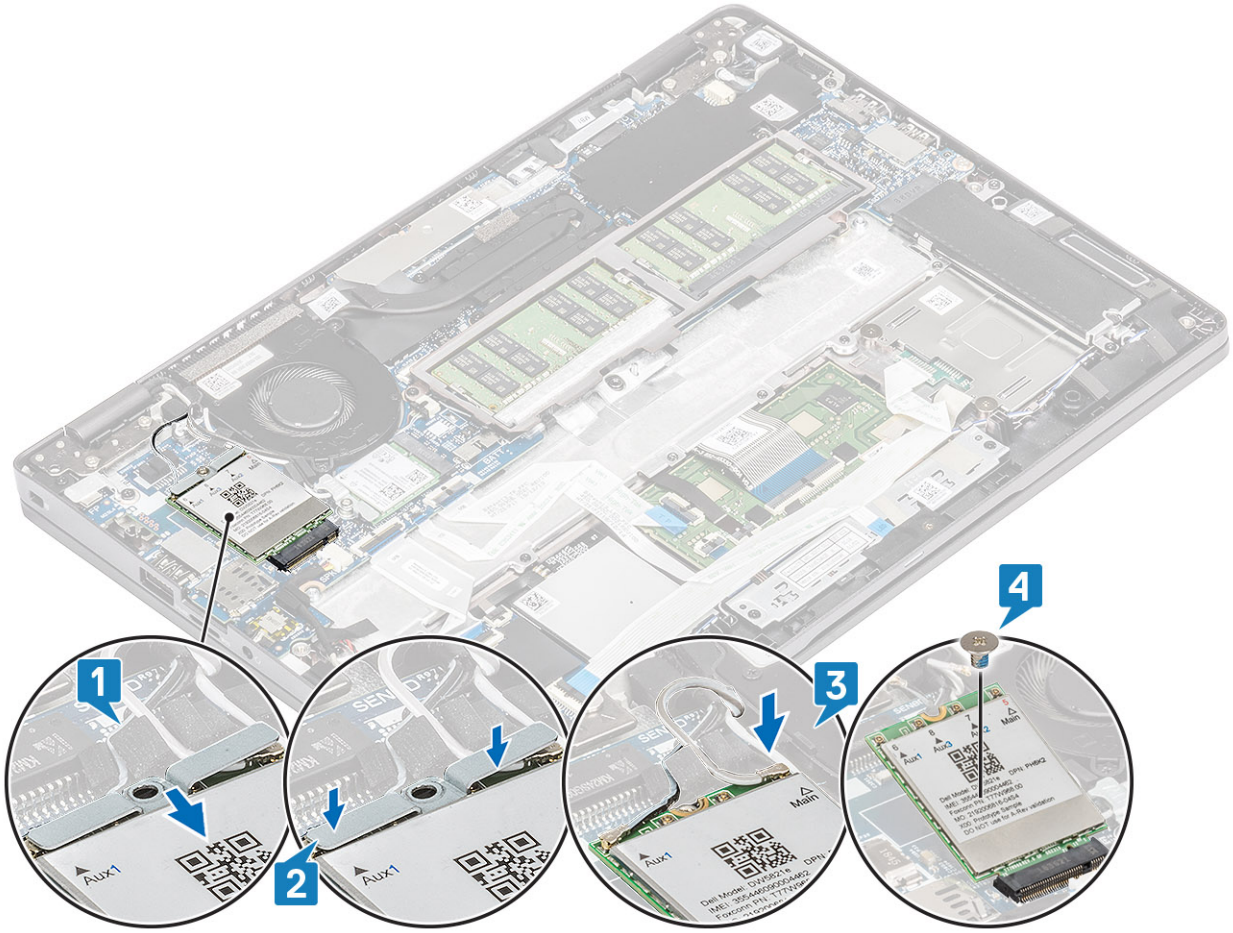
Installing the WWAN card

About this task

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

Steps

1. Align the notch on the WWAN card with the tab on the WWAN card slot and insert the WWAN card at an angle into the WWAN card slot [1].
2. Connect the antenna cables to the WWAN card [2].
3. Place the WWAN card bracket on the WWAN card [3].
4. Replace the single (M2x3) screw to secure the WWAN card bracket to the WWAN card [4].



Next steps

1. Connect the battery cable to the connector on the system board.
2. Replace the base cover.
3. Replace the microSD card.
4. Follow the procedure in after working inside your computer.

WLAN card

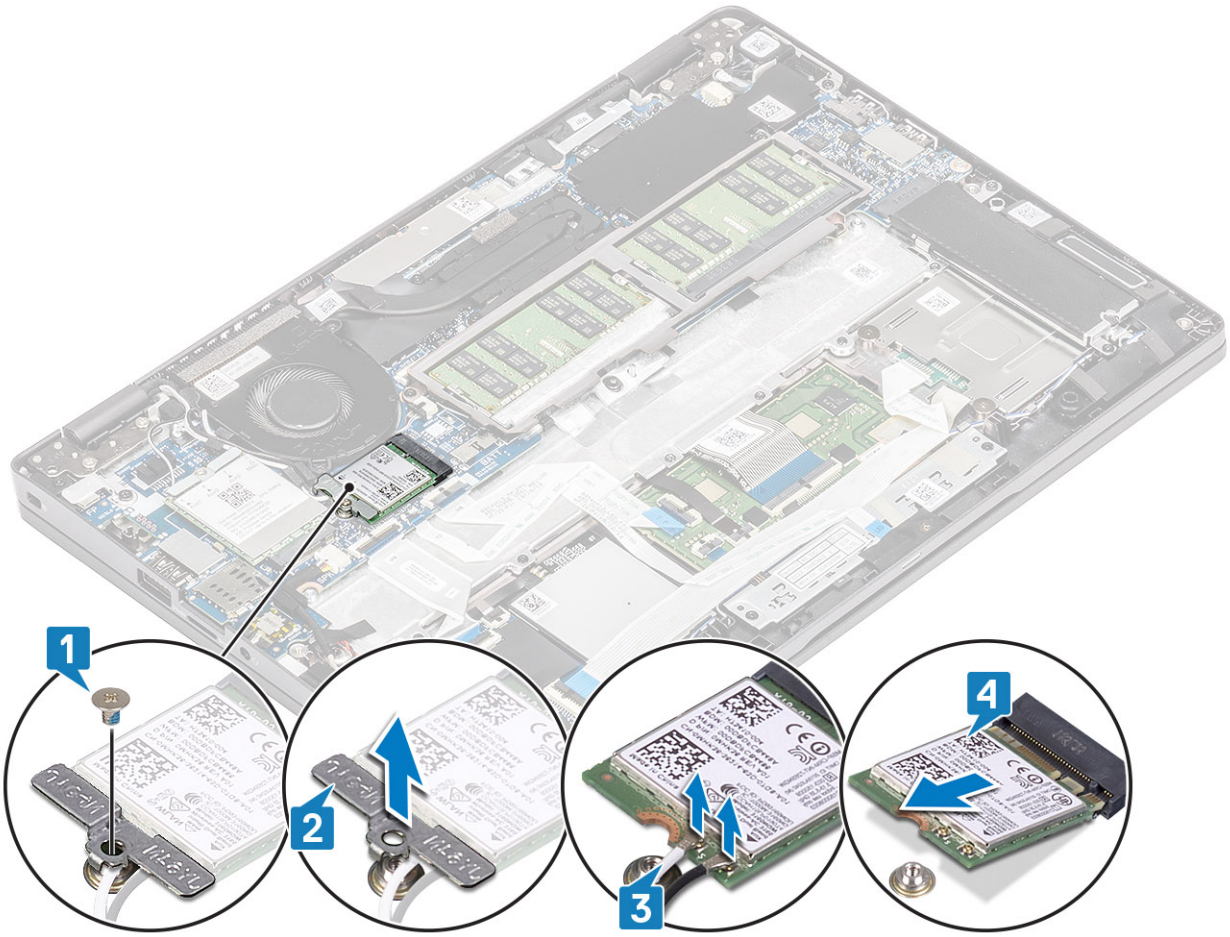
Removing the WLAN card

Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Disconnect the battery cable from the connector on the system board.

Steps

1. Remove the single (M2x2) screw that secures the WLAN card bracket to the system board [1].
2. Remove the WLAN card bracket that secures the WLAN antenna cables [2].
3. Disconnect the WLAN antenna cables from the connectors on the WLAN card [3].
4. Slide and lift the WLAN card away from the connector on the system board [4].



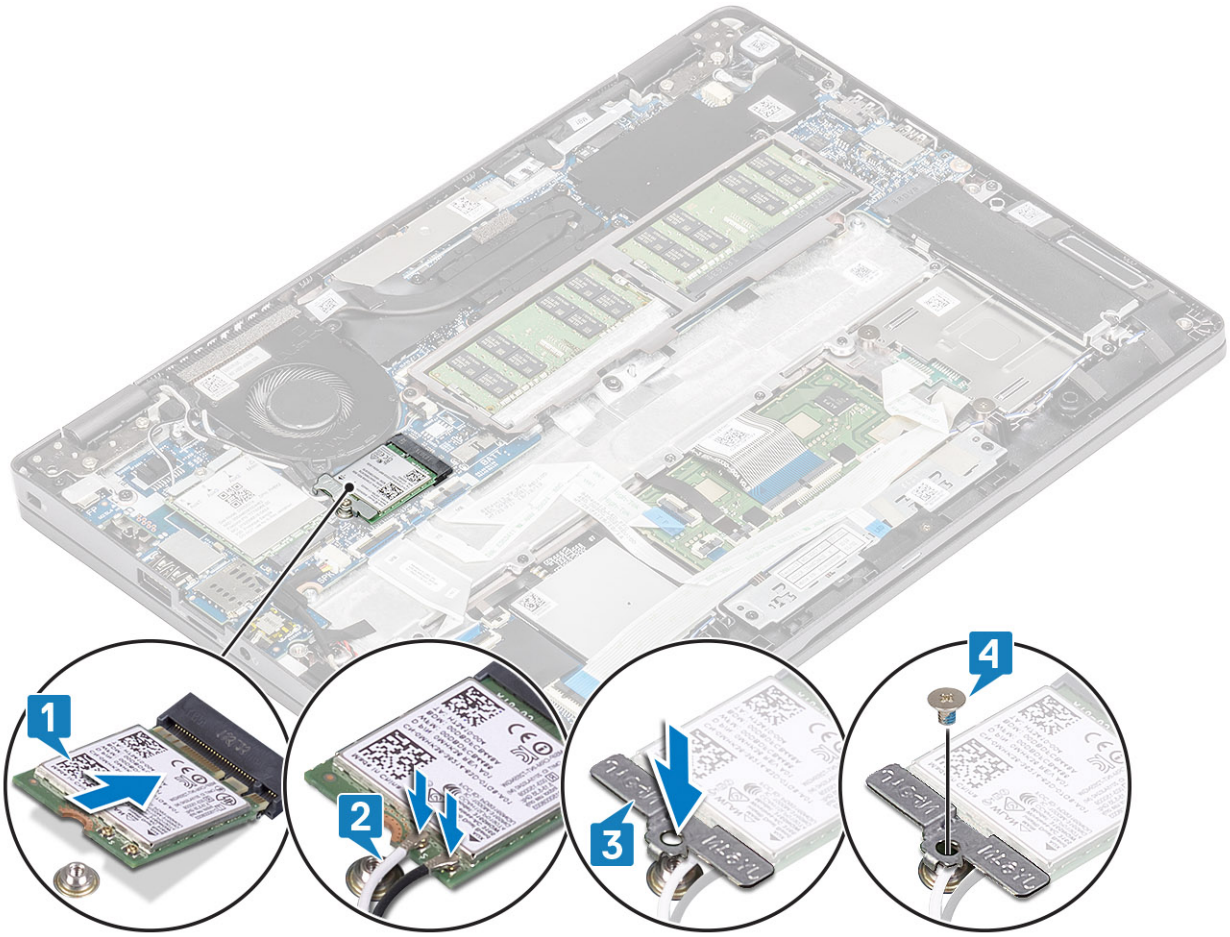
Installing the WLAN card

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 antenna cables to the connectors on the WLAN card [2].
3. Place the WLAN card bracket to secure the WLAN antenna cables to the WLAN card [3].
4. Replace the single (M2x3) screw to secure the WLAN card bracket to the WLAN card [4].



Next steps

1. Connect the battery cable to the connector on the system board.
2. Replace the base cover.
3. Replace the microSD card.
4. Follow the procedure in after working inside your computer.

Memory modules

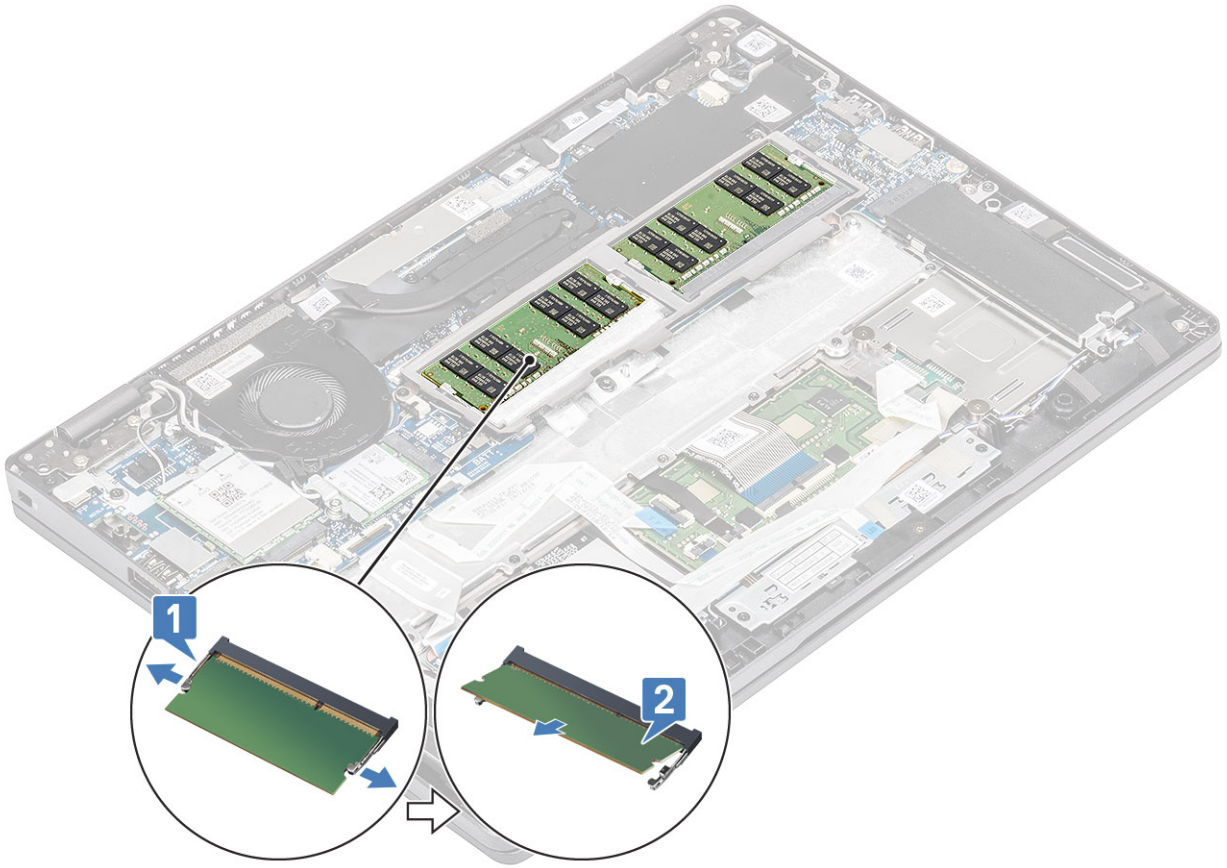
Removing the memory module

Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Disconnect the battery cable from the connector on the system board.

Steps

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

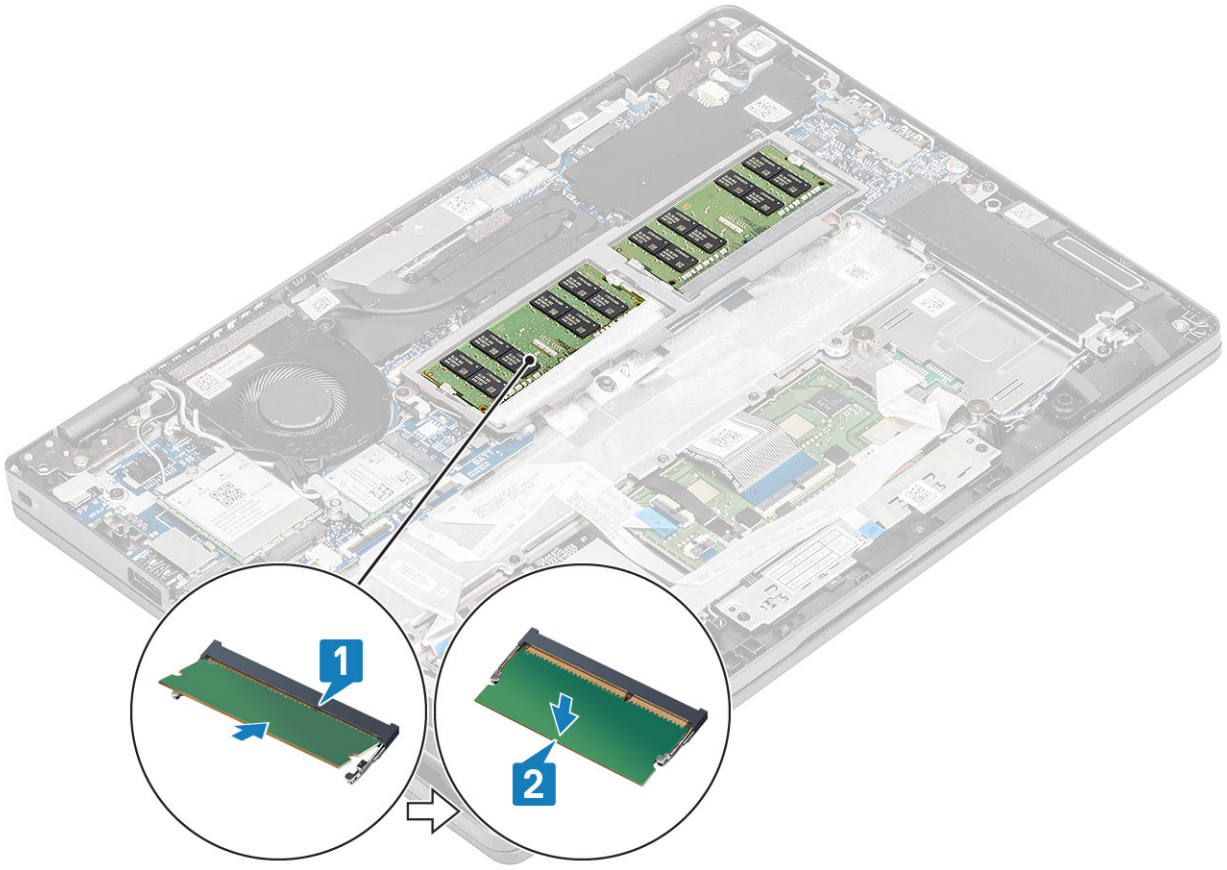


Installing the memory module

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. Connect the battery cable to the connector on the system board.
2. Replace the base cover.
3. Replace the microSD card.
4. Follow the procedure in after working inside your computer.

Solid-state drive

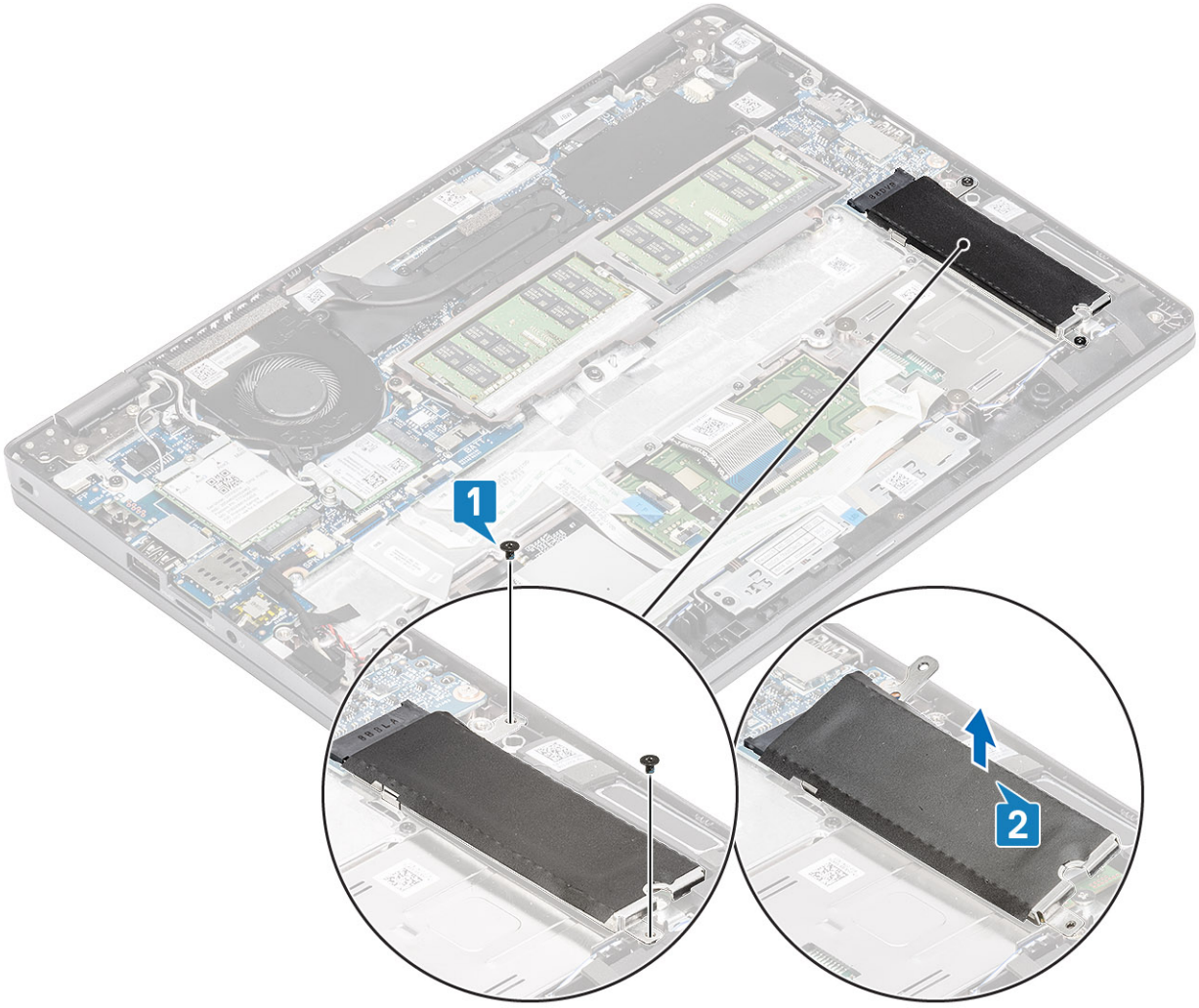
Removing the M.2 SSD

Prerequisites

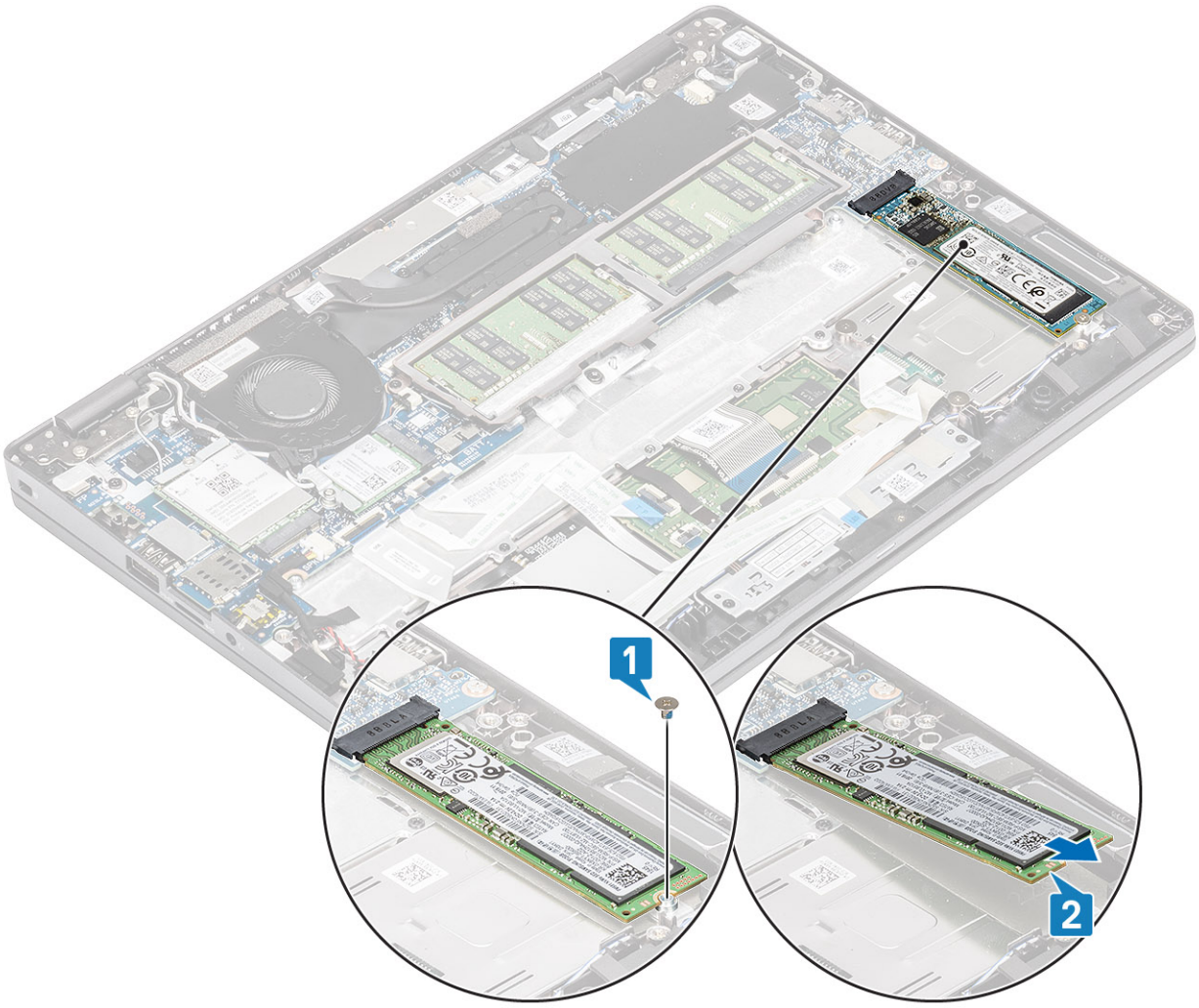
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Disconnect the battery cable from the connector on the system board.

Steps

1. Remove the two (M2x3) screws that secure the M.2 SSD support bracket to the palmrest [1].
2. Slightly turn and remove the SSD support bracket from the M.2 SSD slot [2].



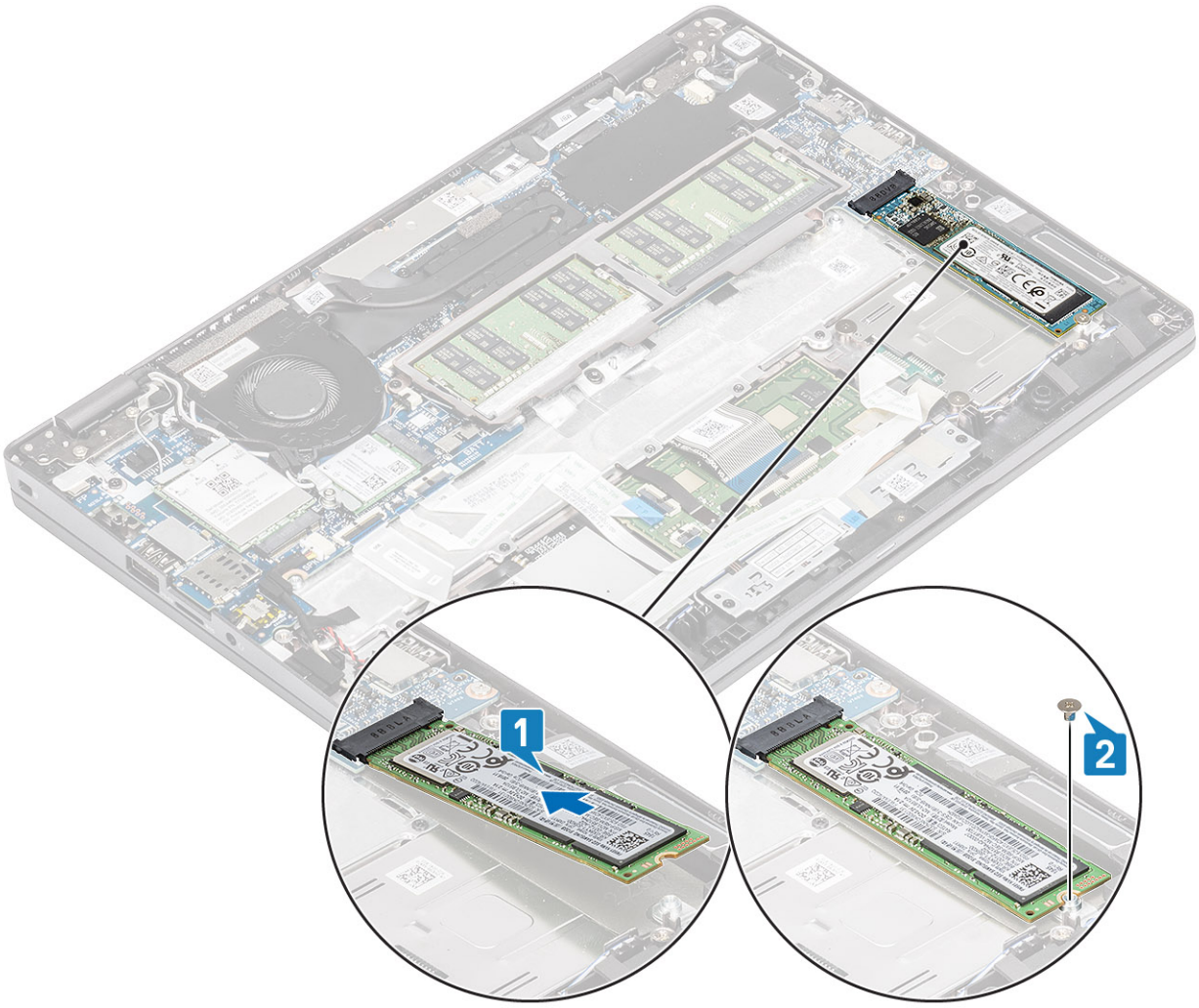
3. Remove the single (M2x2) screw that secures the M.2 SSD to the palmrest [1].
4. Lift the M.2 SSD away from the computer [2].



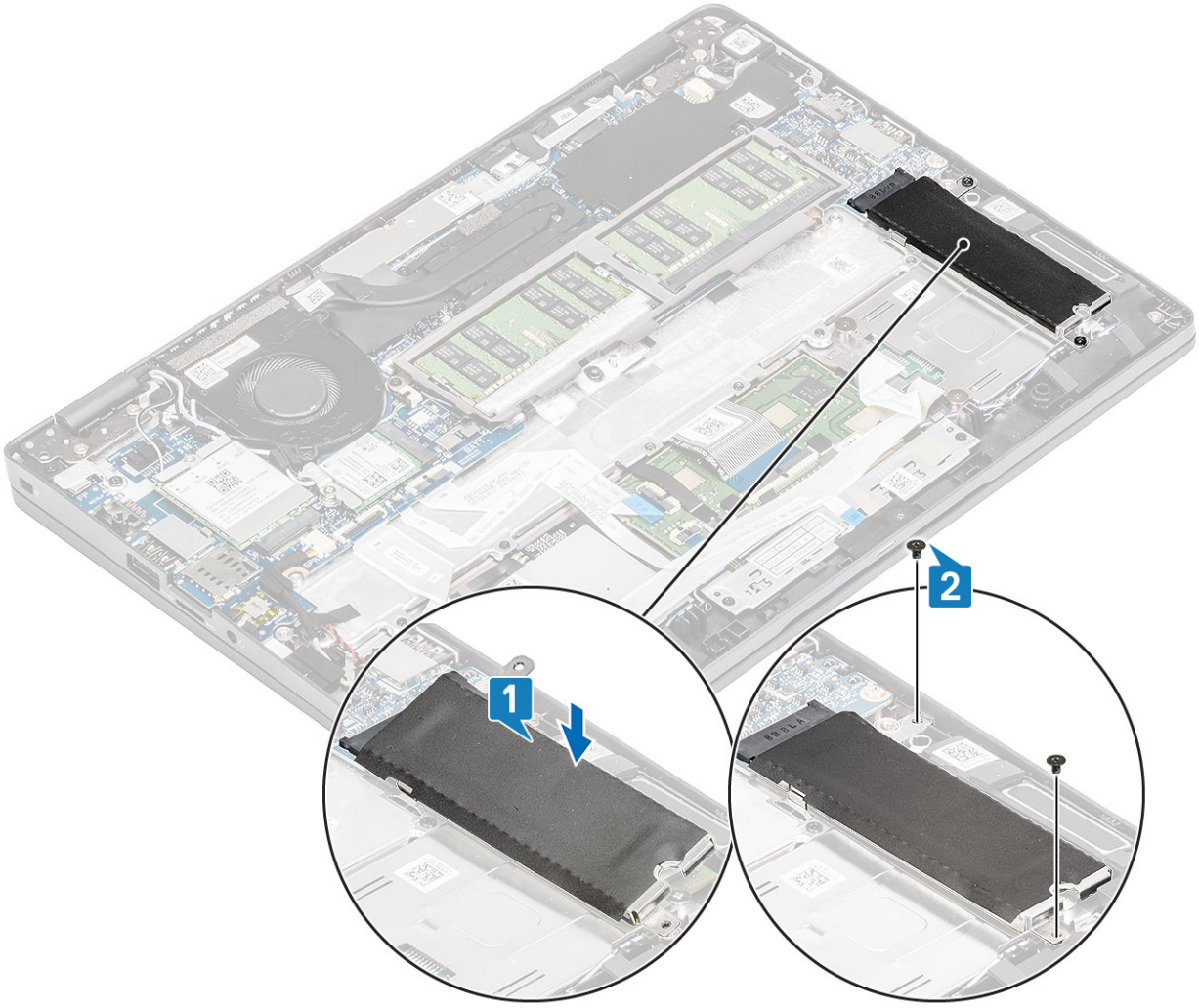
Installing the M.2 SSD

Steps

1. Place the M.2 SSD into the slot on the palmrest [1].
2. Replace the single (M2x2) screw to secure the M.2 SSD to the palmrest [2].



3. Align and place the SSD support bracket above the M.2 SSD [1].
4. Replace the two (M2x3) screws to secure the SSD support bracket to the palmrest [2].



Next steps

1. Connect the battery cable to the connector on the system board.
2. Replace the base cover.
3. Replace the microSD card.
4. Follow the procedure in after working inside your computer.

Speakers

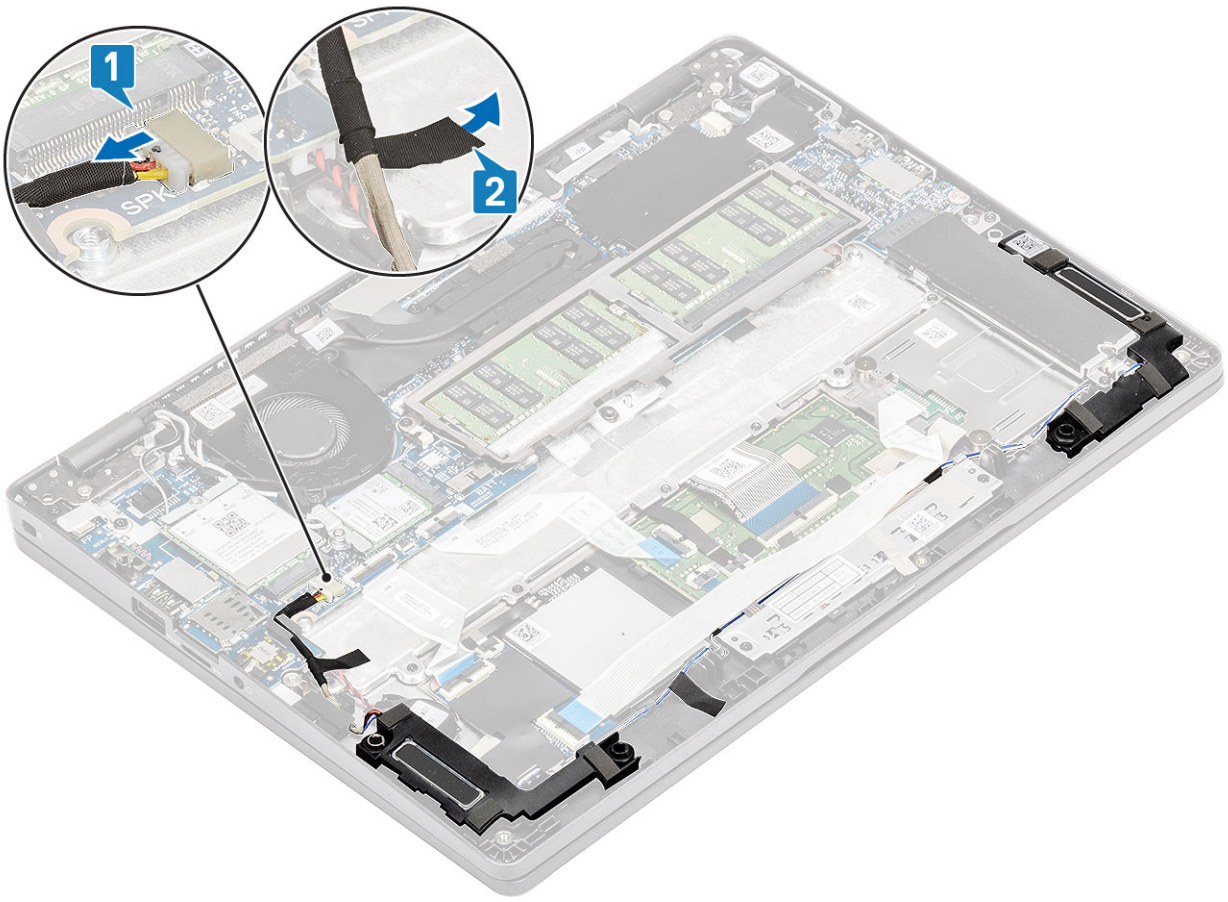
Removing the speakers

Prerequisites

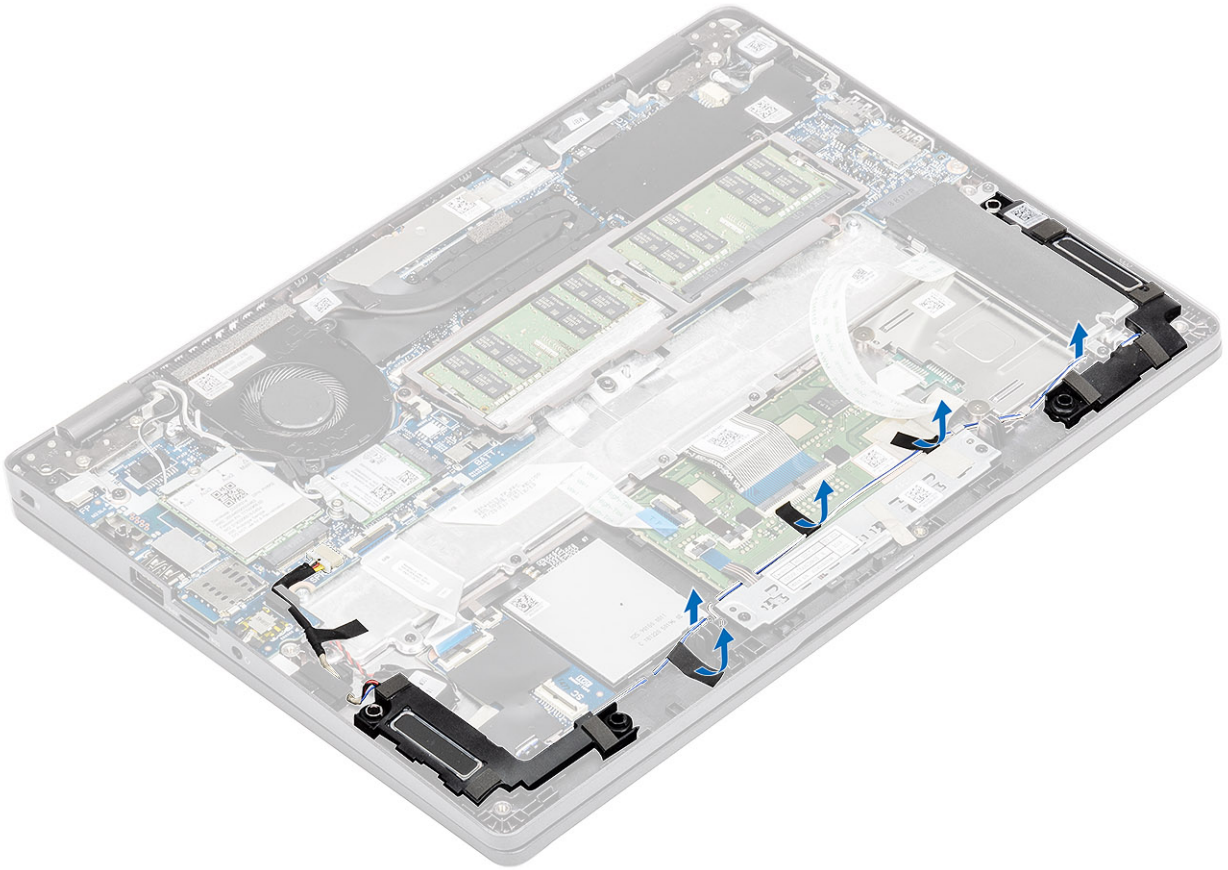
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Remove the battery.

Steps

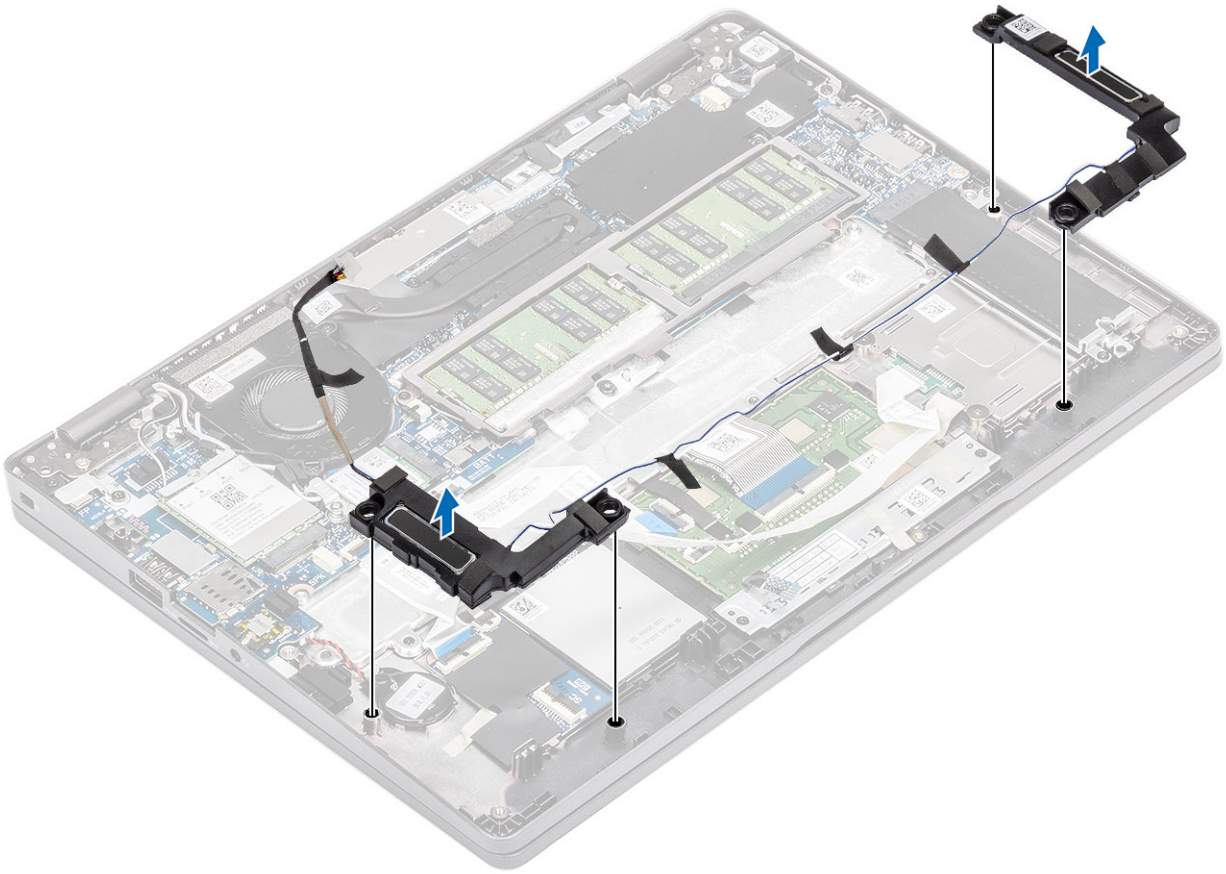
1. Disconnect the speaker cable from the connector on the system board [1].
2. Peel the adhesive tape that secures the speaker cable to the palmrest [2].



3. Disconnect the touchpad cable from the connector on the daughter board.
4. Peel the adhesive tapes and unroute the speaker cable.



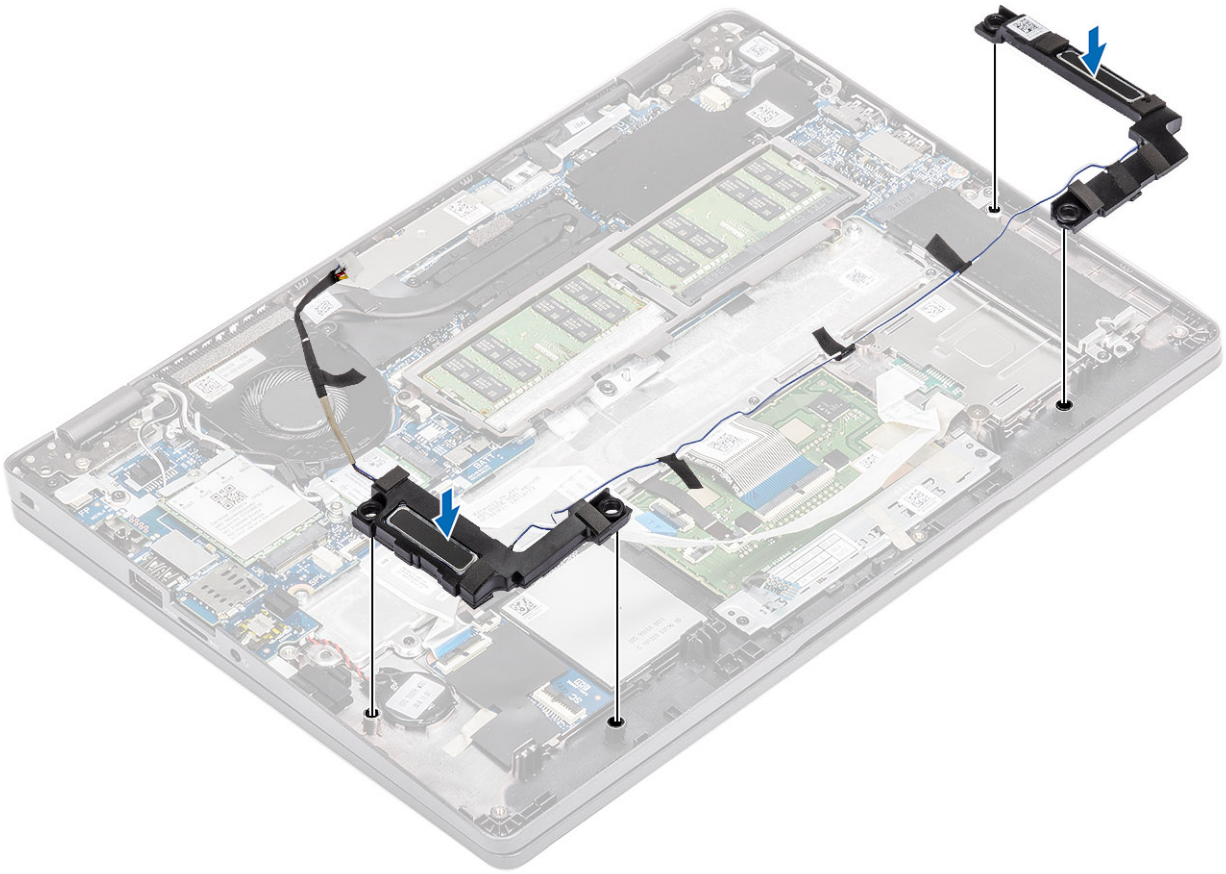
5. Lift and remove the speakers away from the palmrest.



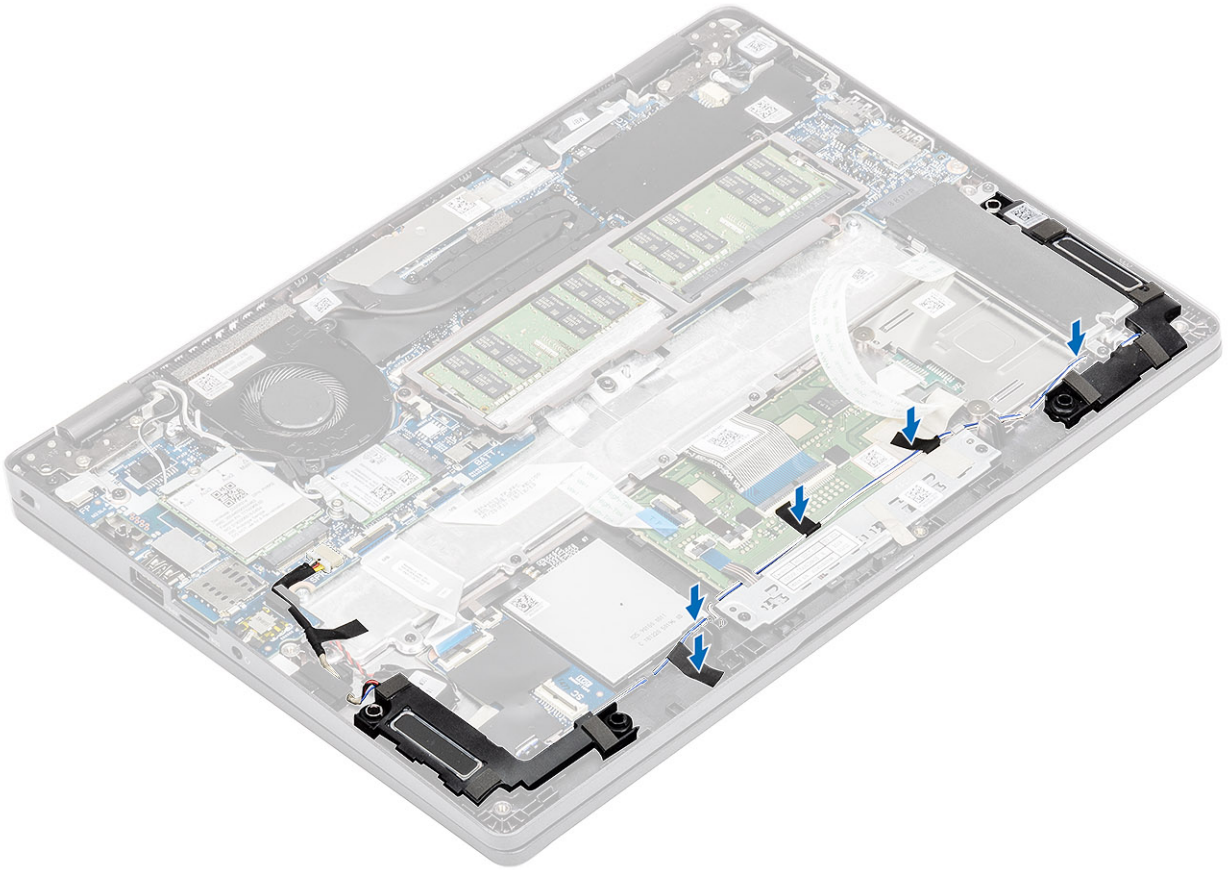
Installing the speakers

Steps

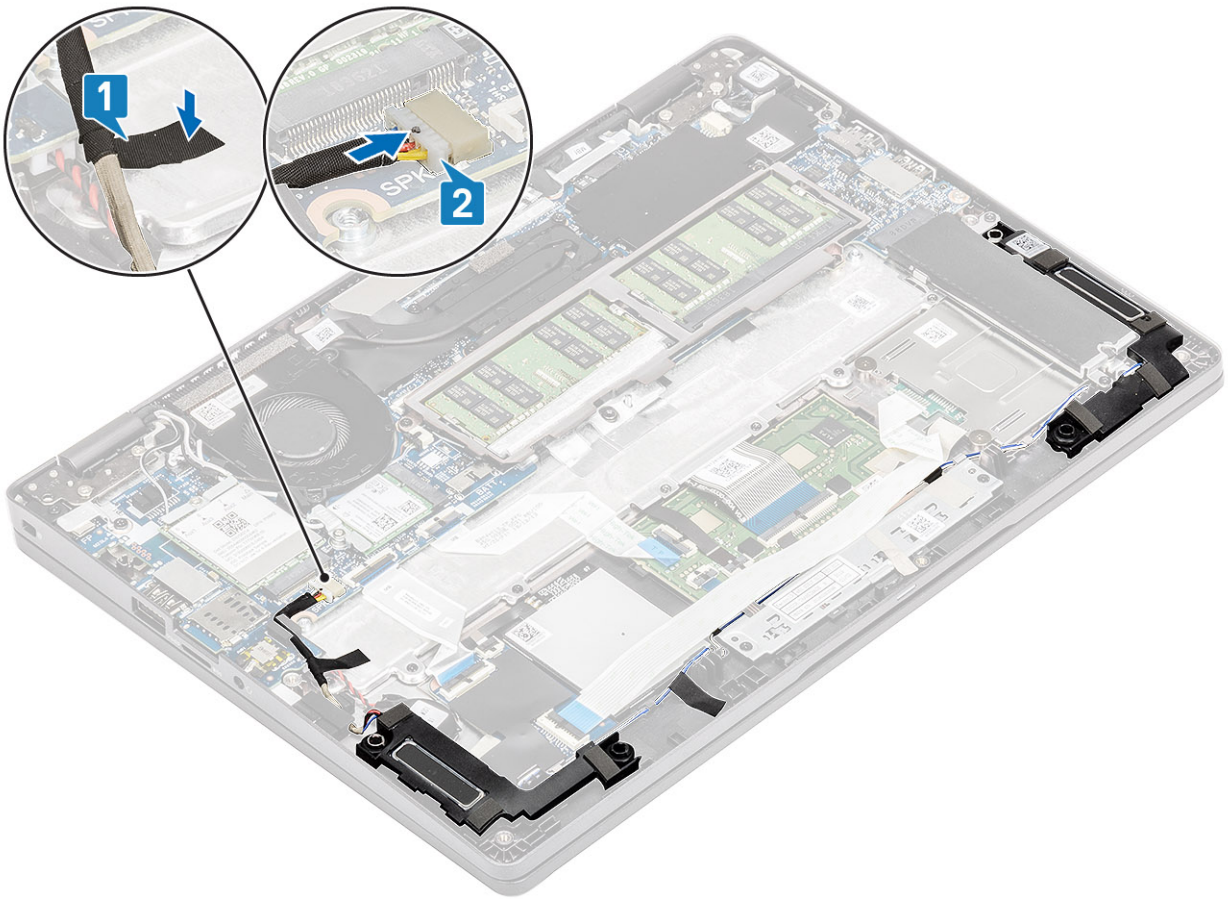
1. Using the alignment posts and rubber grommets, place the speakers in their slots on the palmrest.



2. Route the speaker cable through the routing guides.



3. Affix the adhesive tape to secure the speaker cable to the palmrest [1].
4. Connect the speaker cable to the connector on the system board [2].



Next steps

1. Replace the battery.
2. Replace the base cover.
3. Replace the microSD card.
4. Follow the procedure in after working inside your computer.

System fan

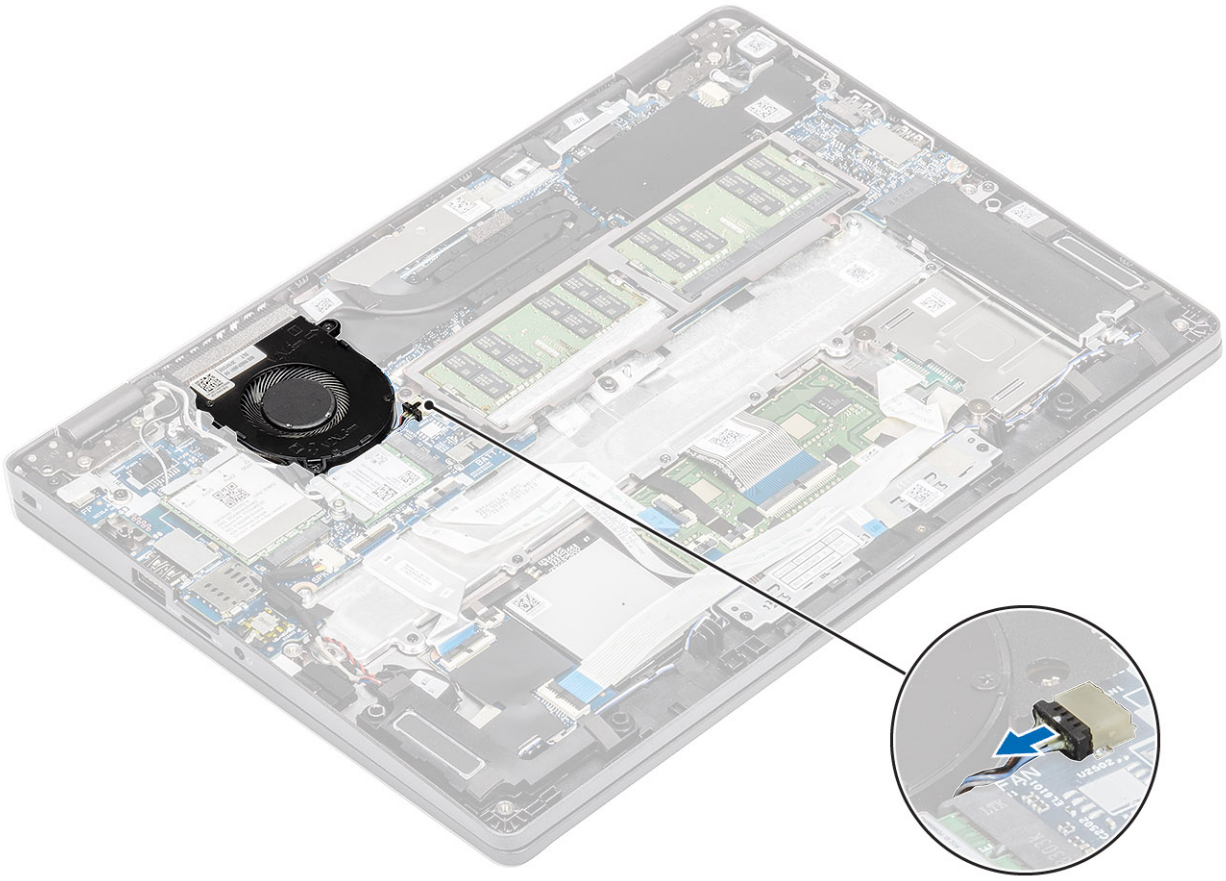
Removing the system fan

Prerequisites

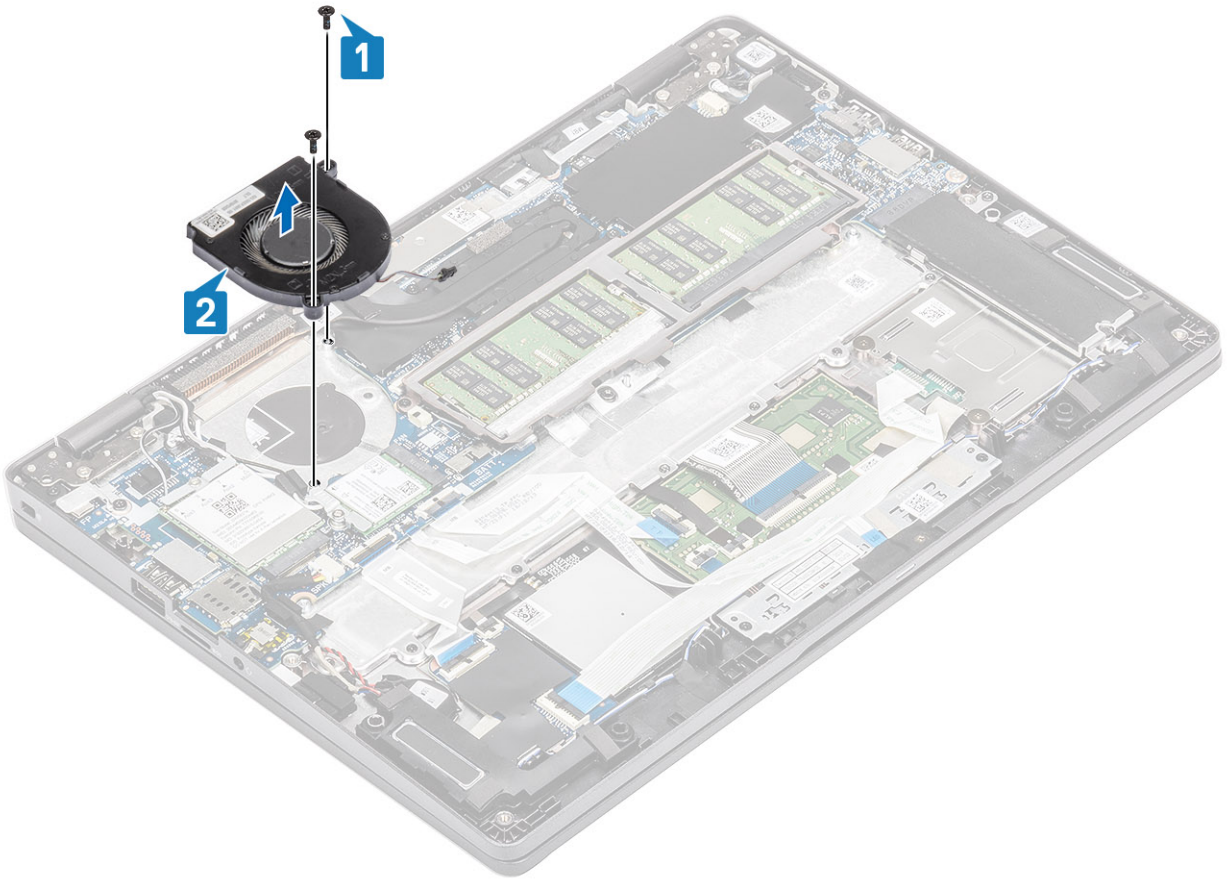
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Remove the battery.

Steps

1. Disconnect the system fan cable from the connector on the system board.



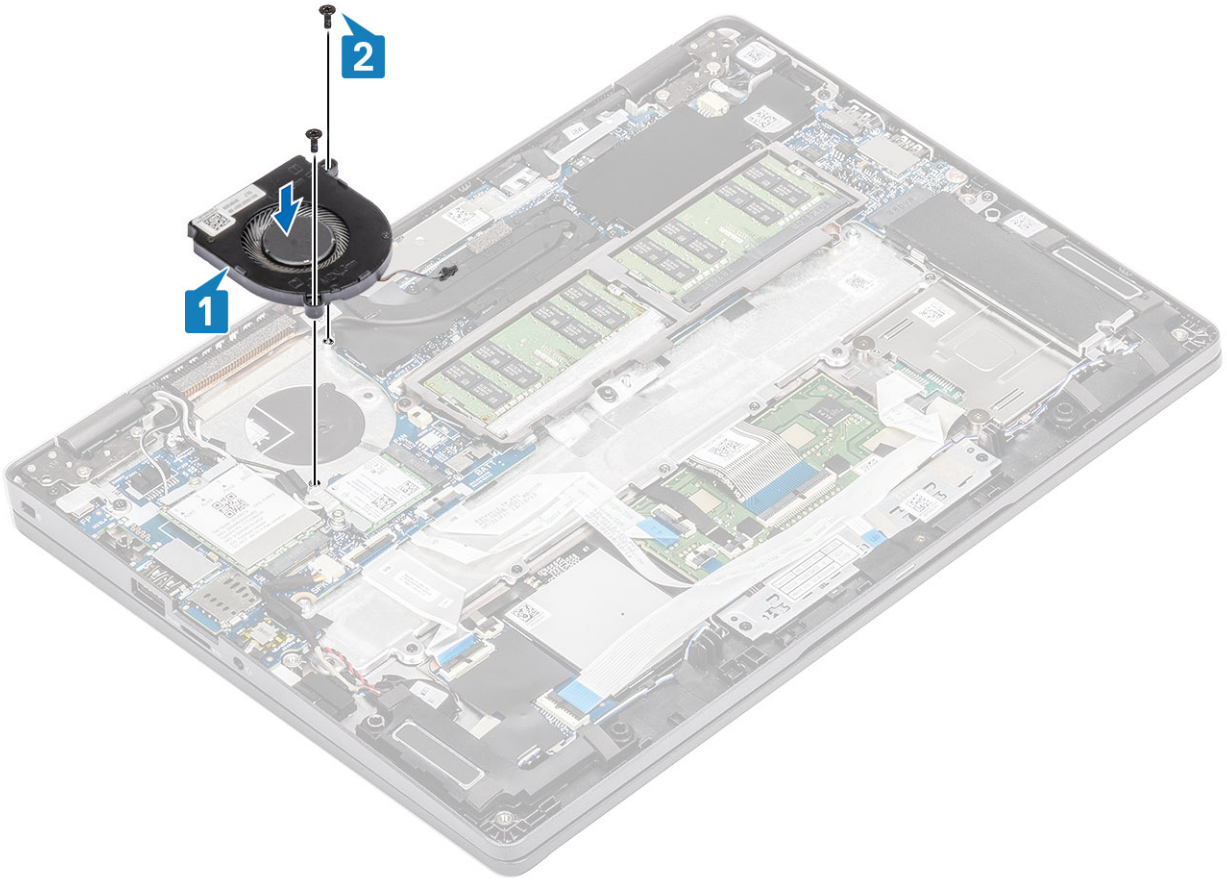
2. Remove the two (M2x5) screws that secure the system fan to the palmrest [1].
3. Lift the system fan away from the computer [2].



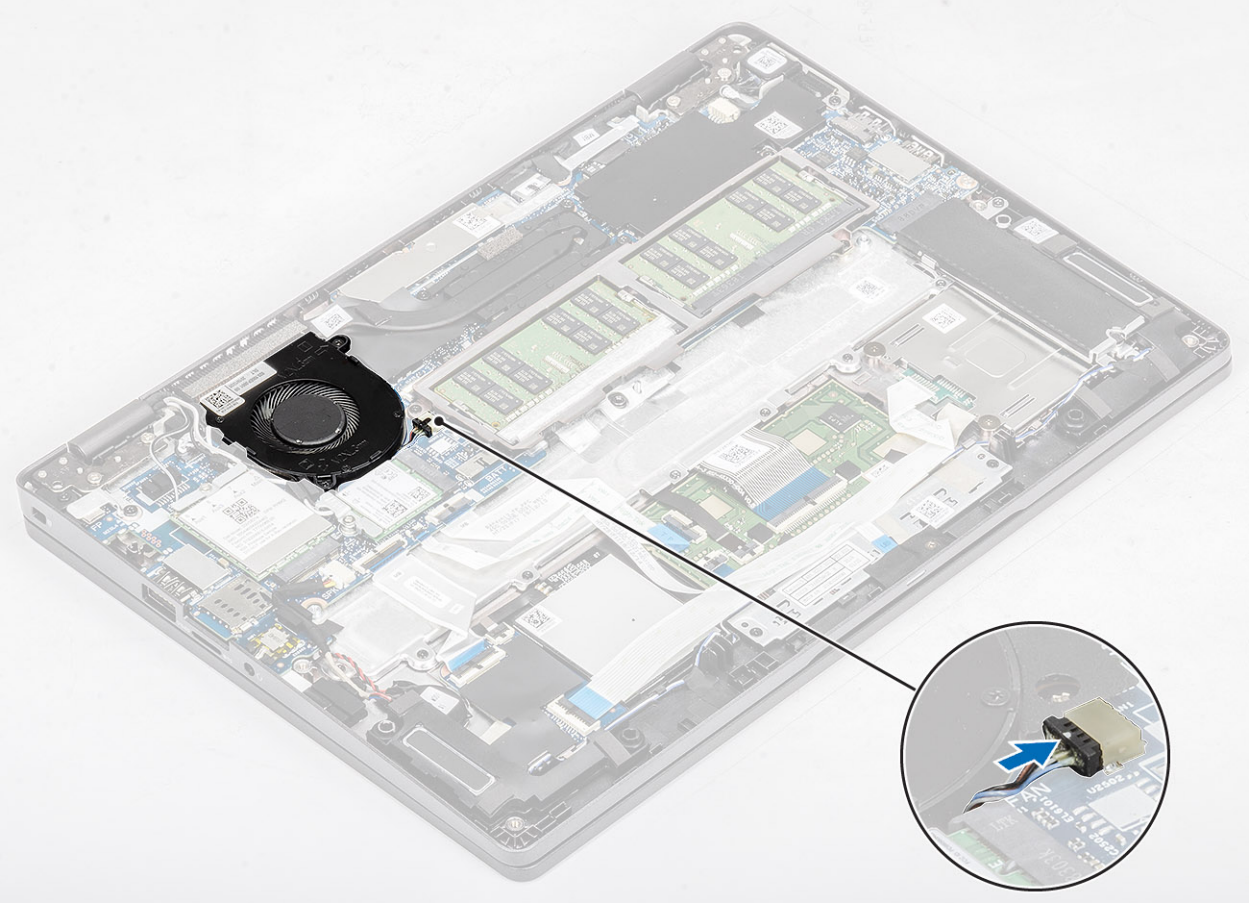
Installing the system fan

Steps

1. Place and align the screw holes on the system fan with the screw holes on to the palmrest [1].
2. Replace the two (M2x5) screws to secure the system fan to the palmrest [2].



3. Connect the system fan cable to the connector on the system board.



Next steps

1. Replace the battery.
2. Replace the base cover.
3. Replace the microSD card.
4. Follow the procedure in after working inside your computer.

Heat sink

Removing the heatsink

Prerequisites

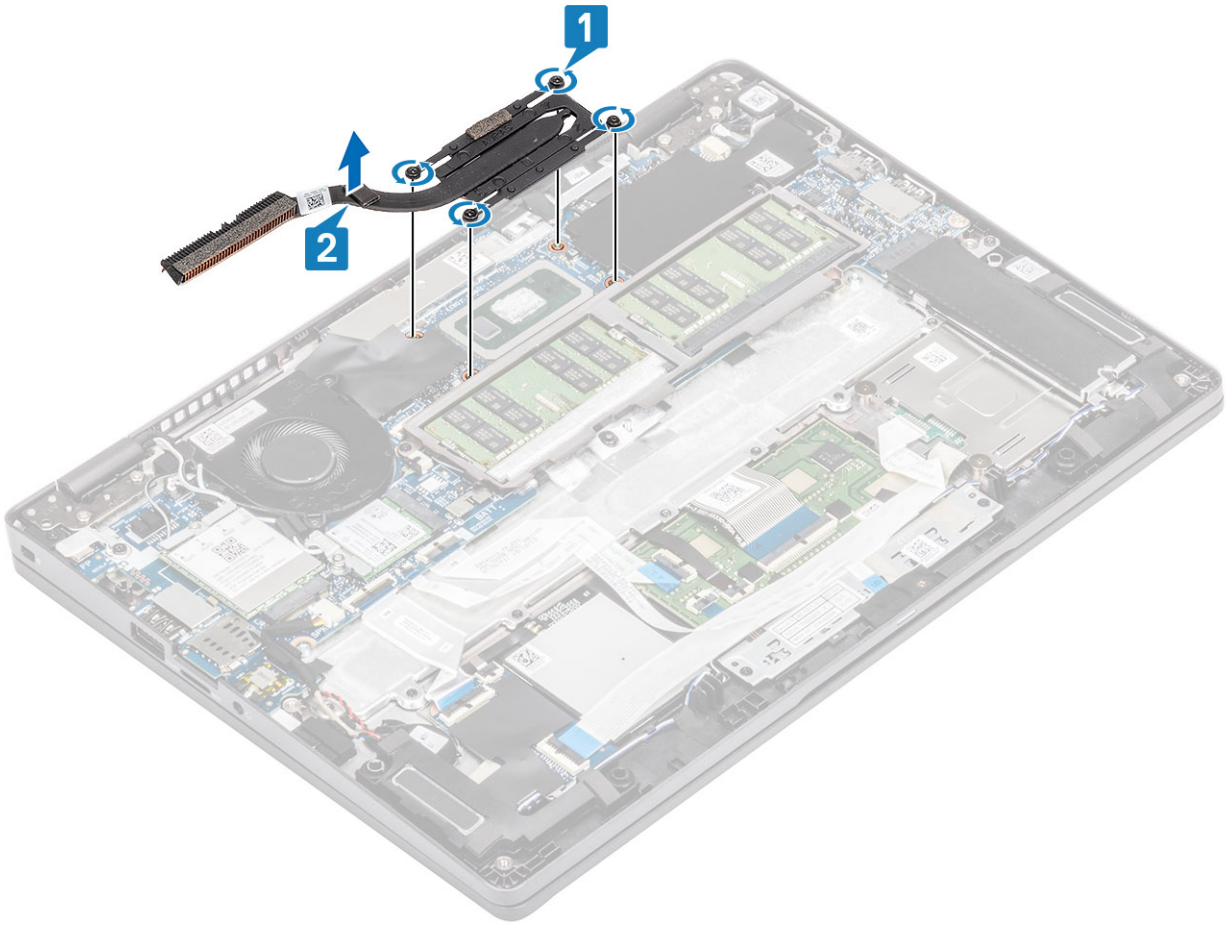
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Remove the battery.

Steps

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

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

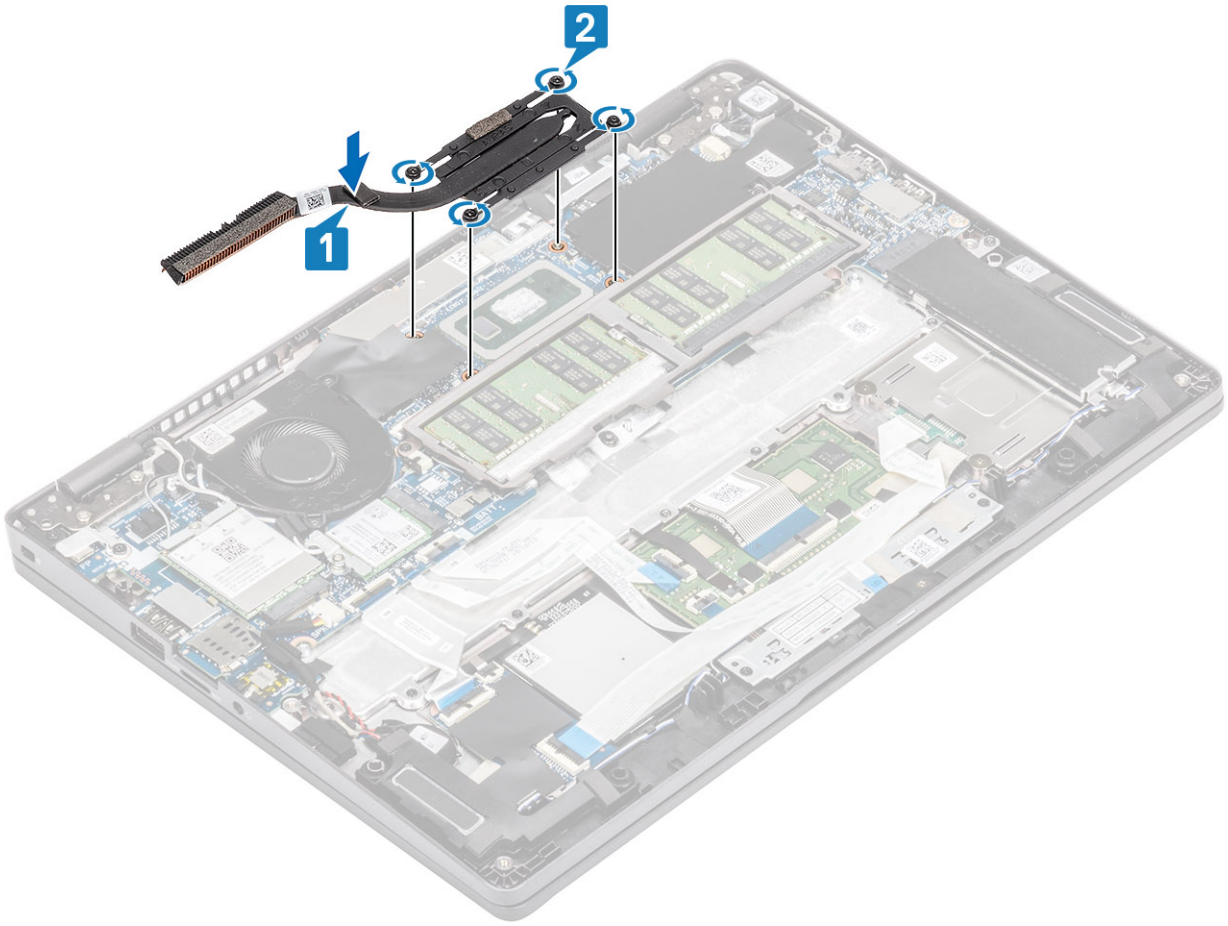
2. Lift the heatsink away from the system board [2].



Installing the heatsink

Steps

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



Next steps

1. Replace the battery.
2. Replace the base cover.
3. Replace the microSD card.
4. Follow the procedure in after working inside your computer.

DC-in port

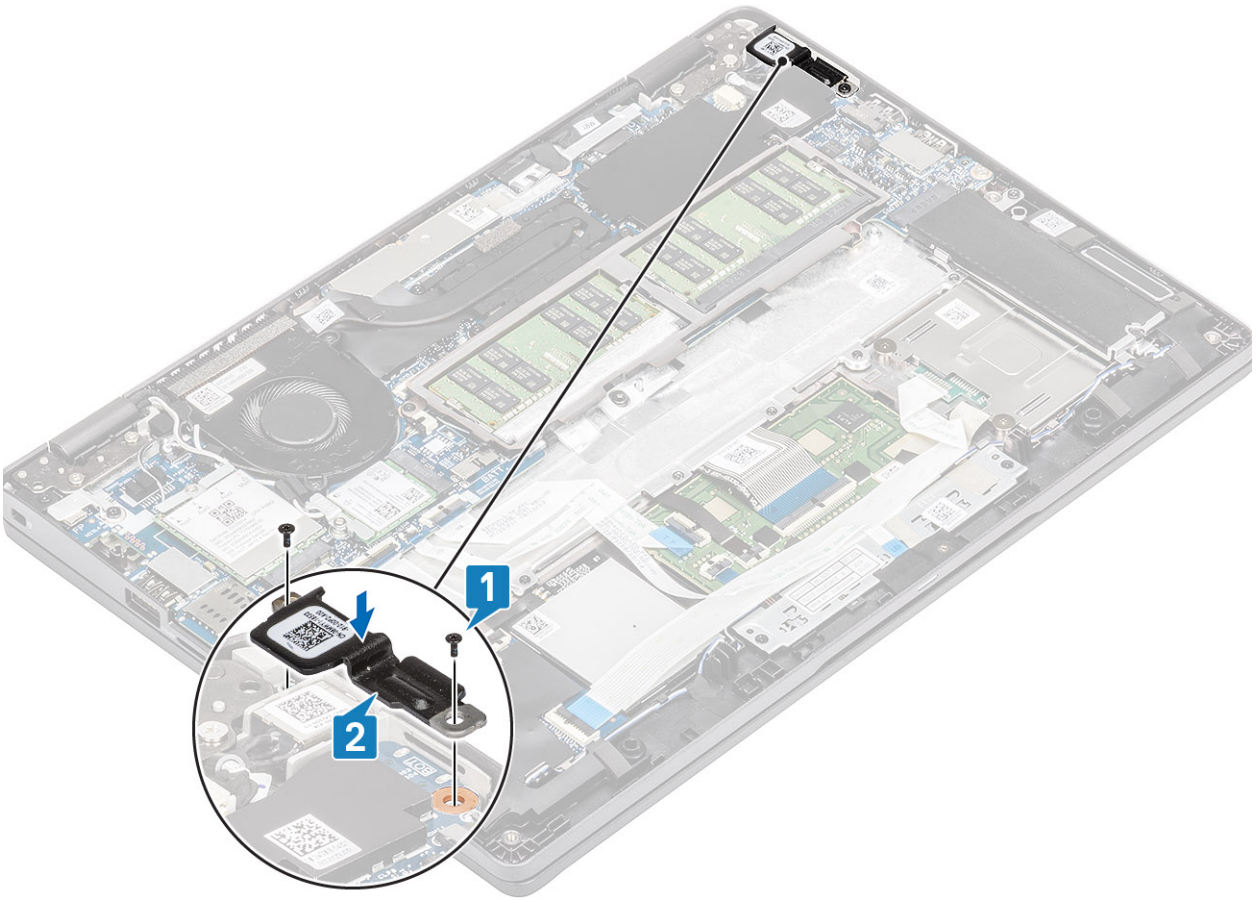
Removing the DC-in port

Prerequisites

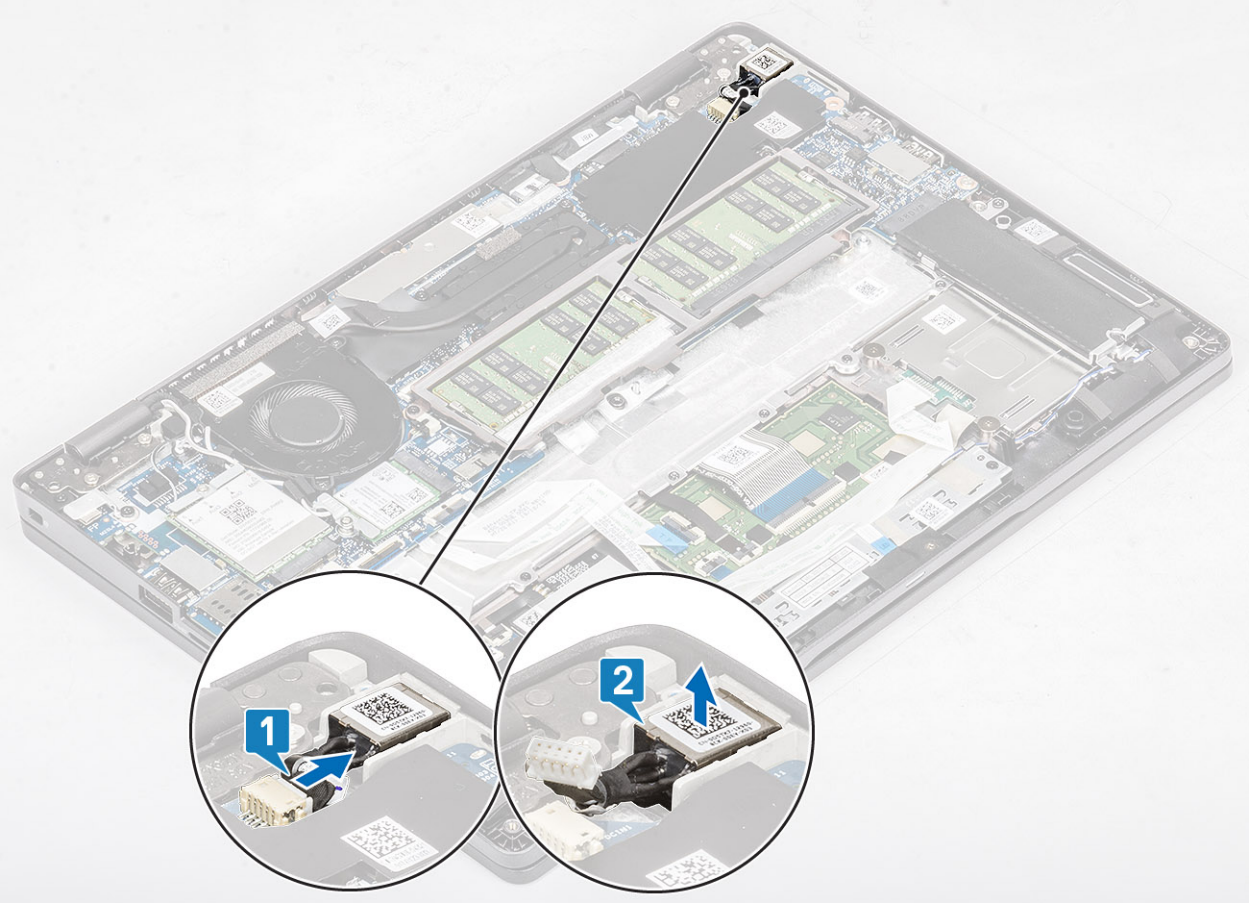
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Remove the battery.

Steps

1. Remove the two (M2x4) screws that secure the Type-C bracket to the system board [1].
2. Lift the Type-C bracket away from the computer [2].



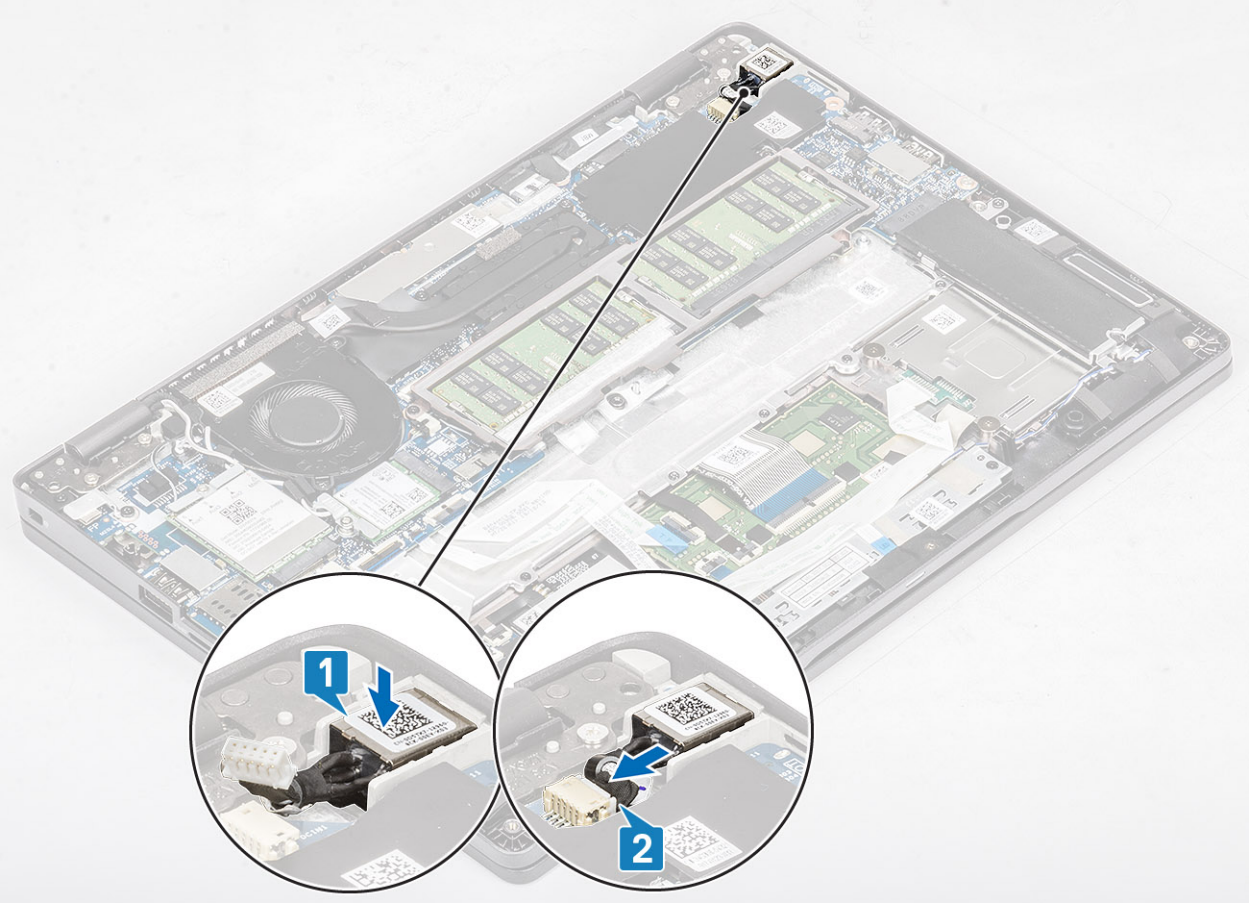
3. Press the DC-in port cable and then pull the cable horizontally to disconnect the DC-in port cable from the connector on the system board [1]. Lift the DC-in port away from the computer [2].



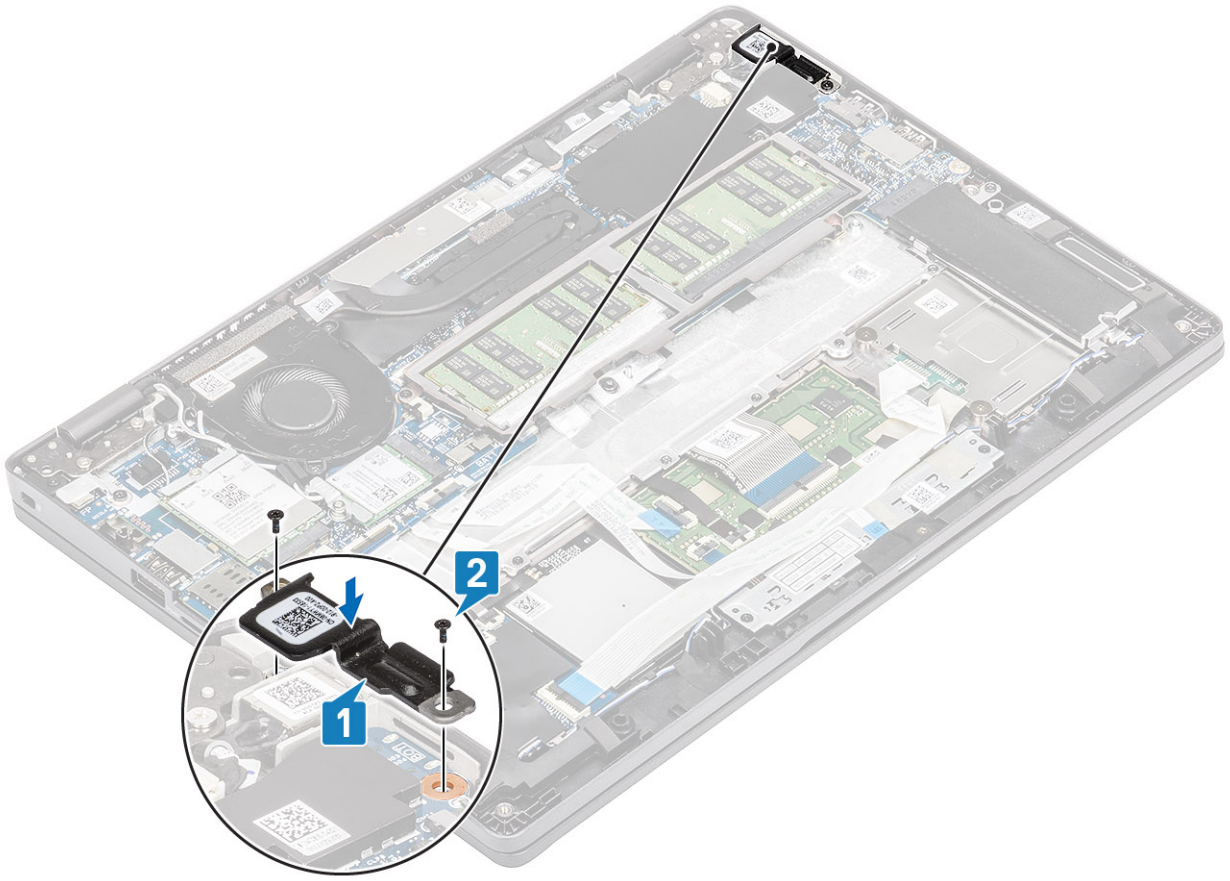
Installing the DC-in port

Steps

1. Place the DC-in port to its slot on the computer [1].
2. Connect the DC-in port cable to the connector on the system board [2].



3. Place the Type-C bracket on its slot on the computer [1].
4. Replace the two (M2x4) screws to secure the Type-C bracket to the palmrest [2].



Next steps

1. Replace the battery.
2. Replace the base cover.
3. Replace the microSD card.
4. Follow the procedure in after working inside your computer.

LED board

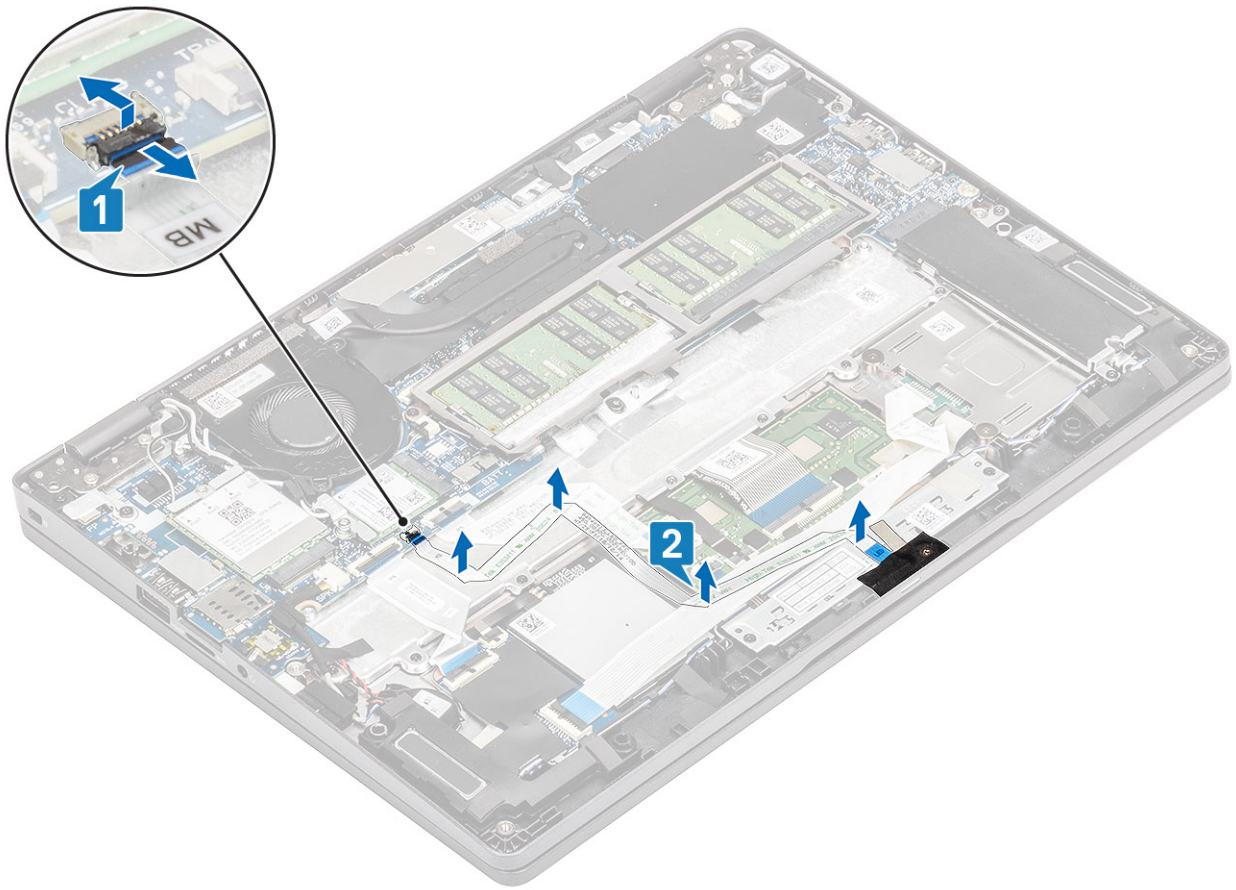
Removing the LED board

Prerequisites

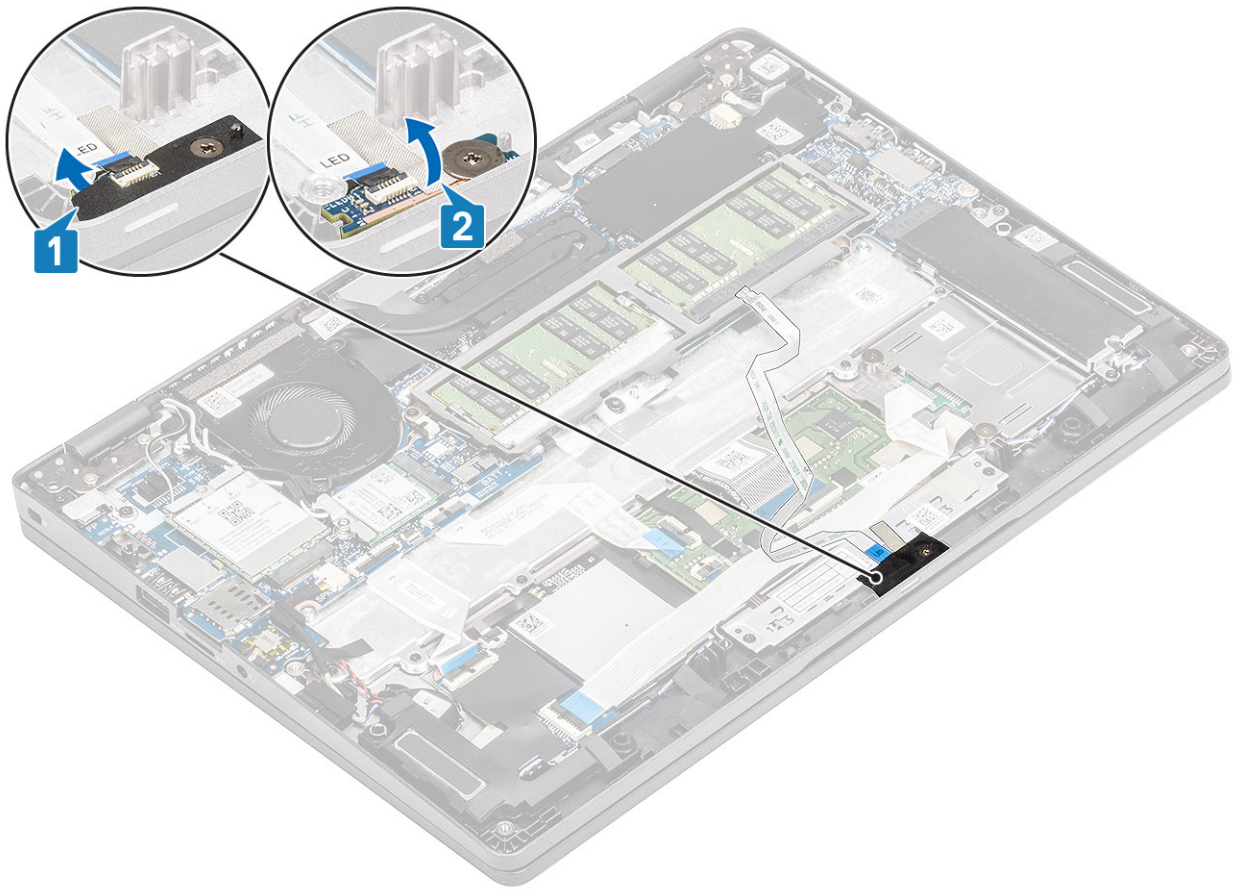
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Remove the battery.

Steps

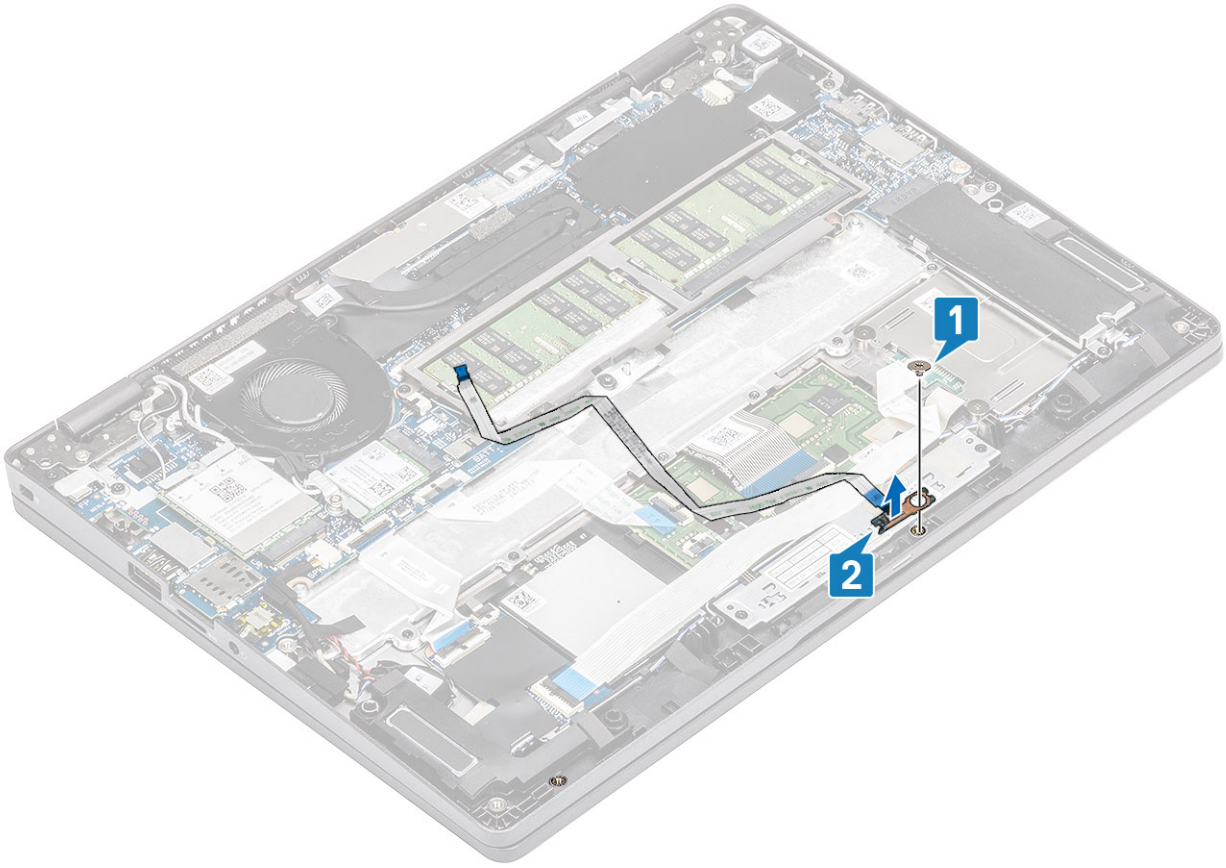
1. Disconnect the LED board cable from the connector on the system board [1].
2. Unroute the LED board cable [2].



3. Peel the adhesive tape that secures the LED board cable connector to the LED board [1].
4. Peel the grey adhesive tape that secures the LED board [2].



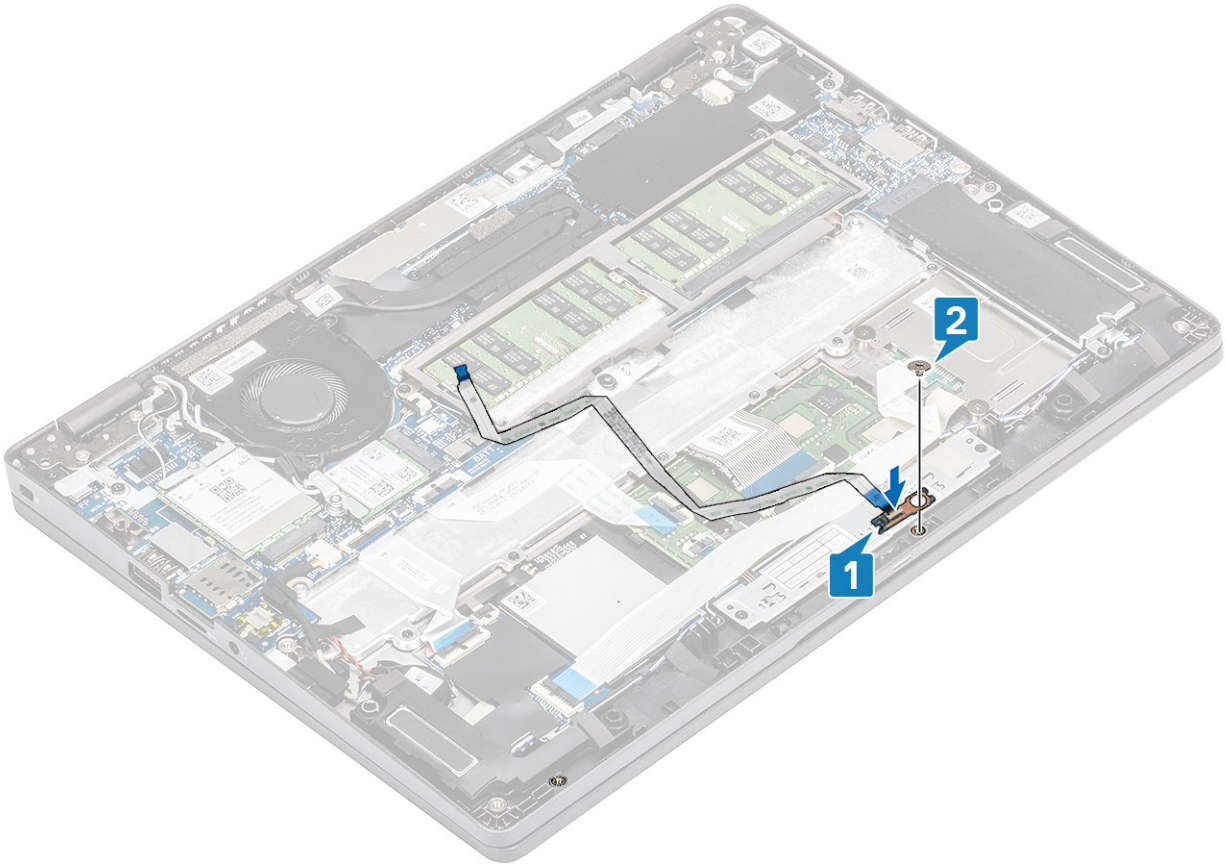
5. Remove the single (M2x2.5) screw that secures the LED board to the palmrest [1].
6. Lift the LED board away from the computer [2].



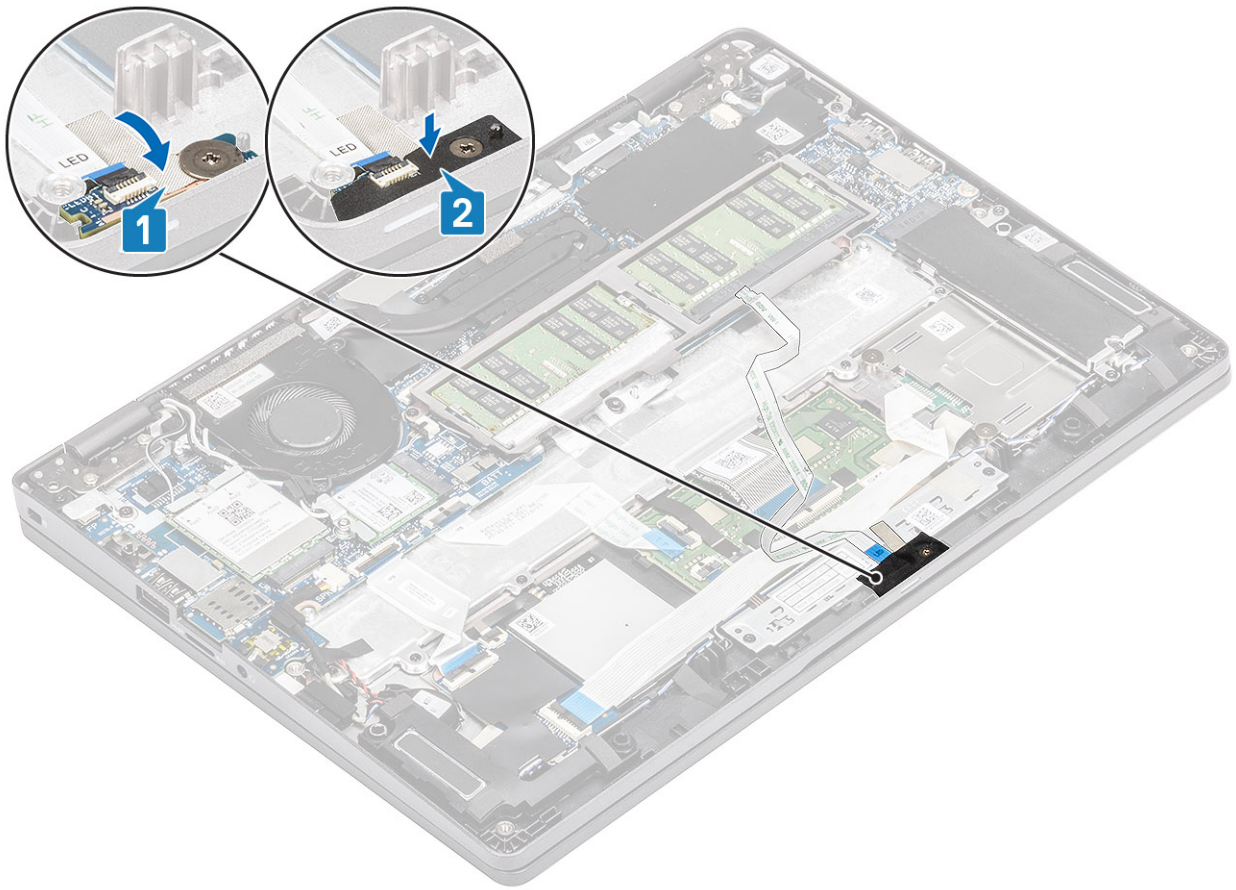
Installing the LED board

Steps

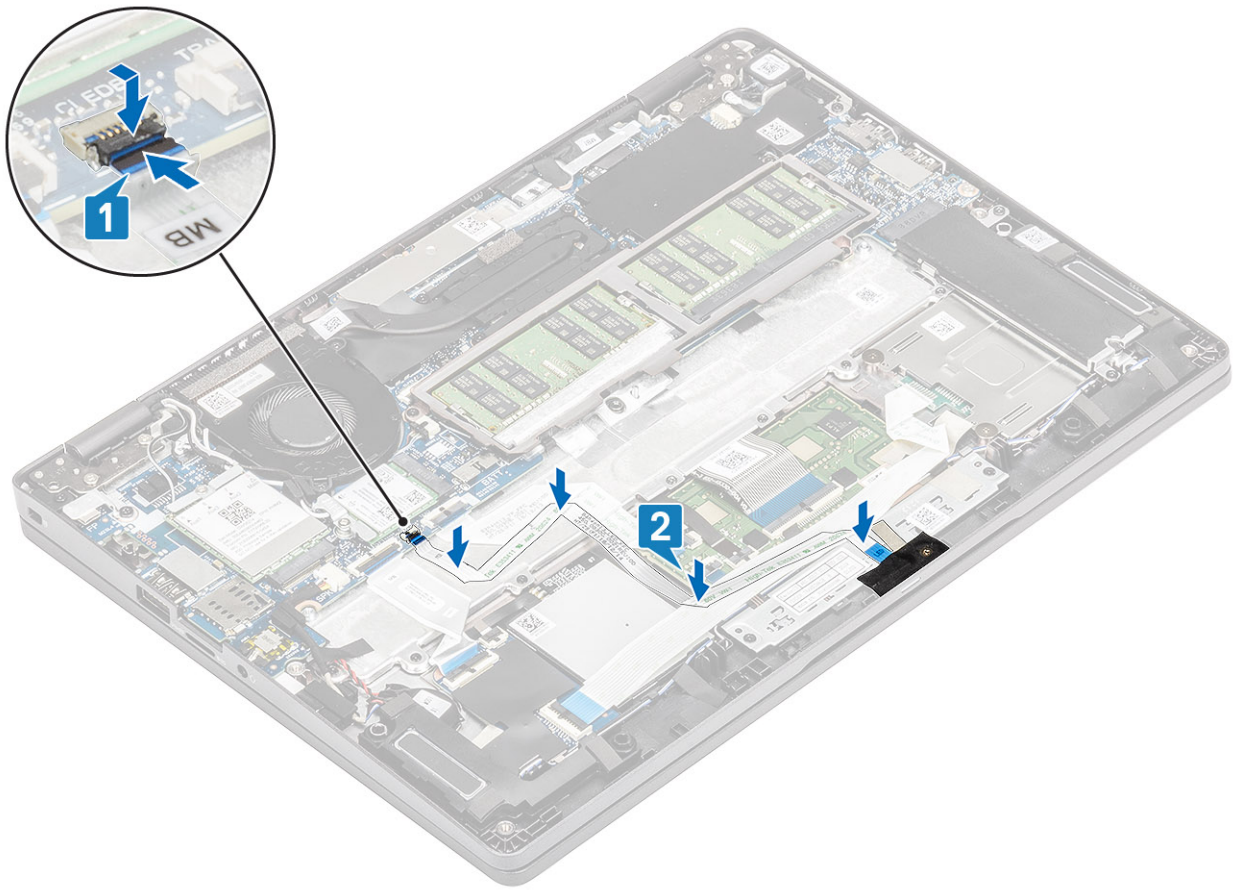
1. Place the LED board and align the screw hole on the LED board with the screw hole on the palmrest [1].
2. Replace the single (M2x2.5) screw to secure the LED board to the palmrest [2].



3. Affix the grey adhesive tape to secure the LED board [1].
4. Affix the adhesive tape to secure the LED board [2].



5. Connect the LED board cable to the connector on the system board and route the LED board cable [1, 2].



Next steps

1. Replace the battery.
2. Replace the base cover.
3. Replace the microSD card.
4. Follow the procedure in after working inside your computer.

Touchpad button board

Removing the touchpad button board

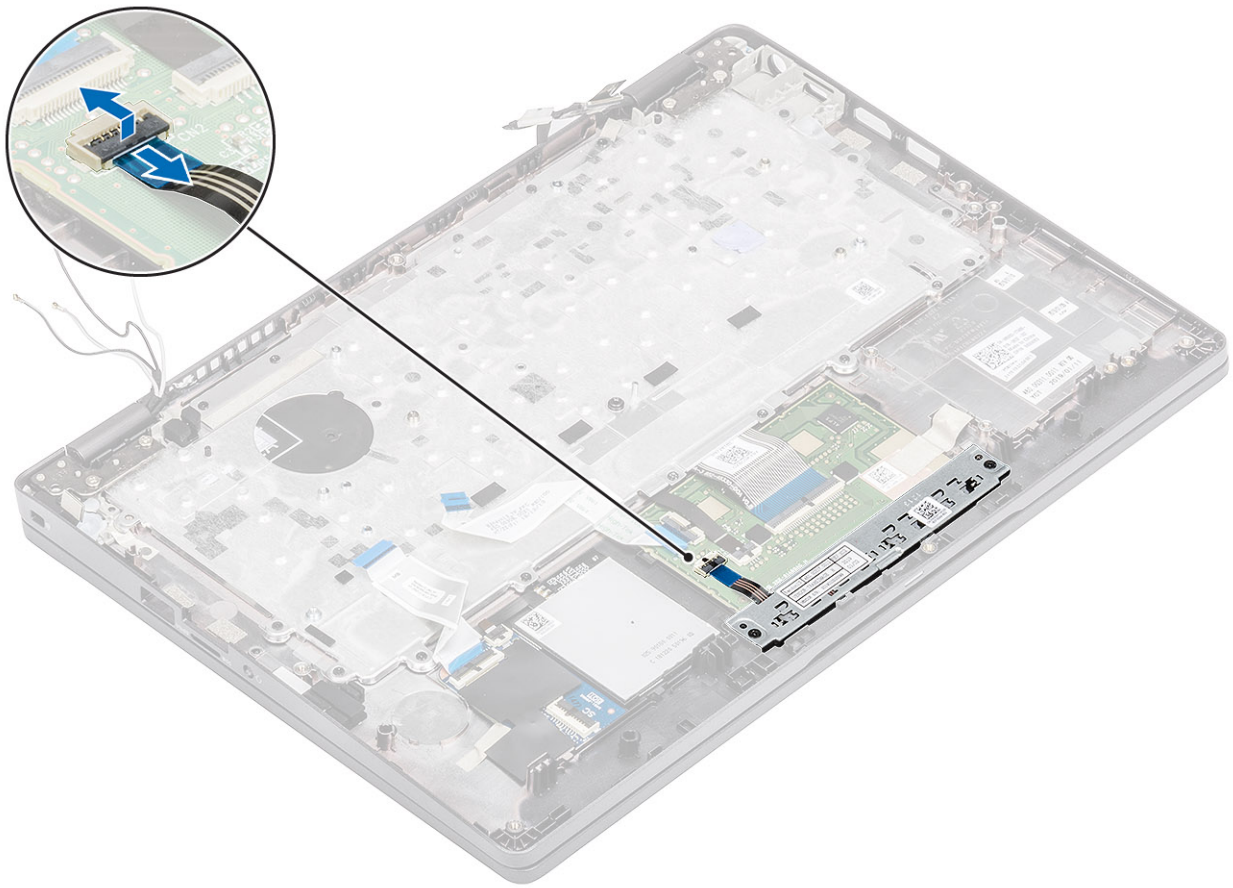
Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Remove the battery.
5. Remove the speaker.
6. Remove the LED board.

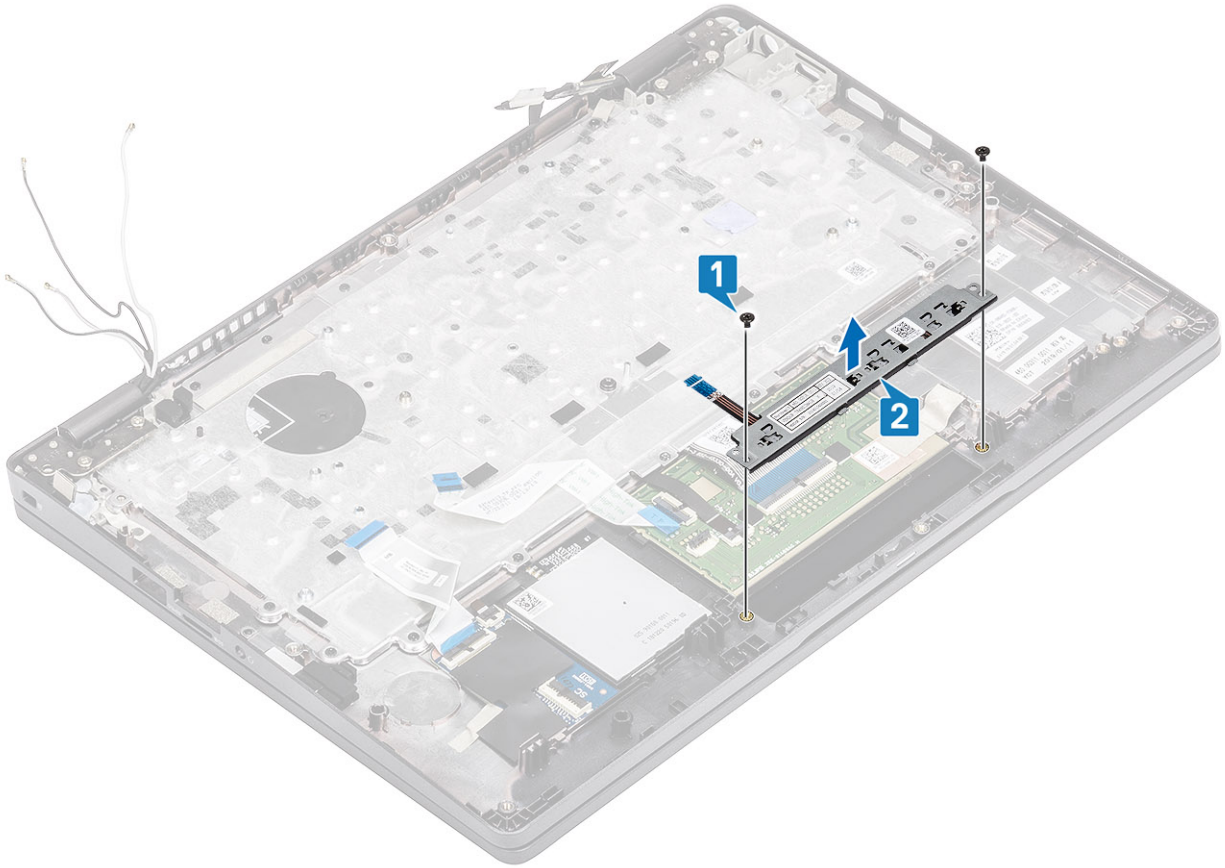
NOTE: Removal of system board and heatsink are not required to remove the touchpad button board.

Steps

1. Open the latch and disconnect the touchpad button board cable from the connector on the touchpad board.



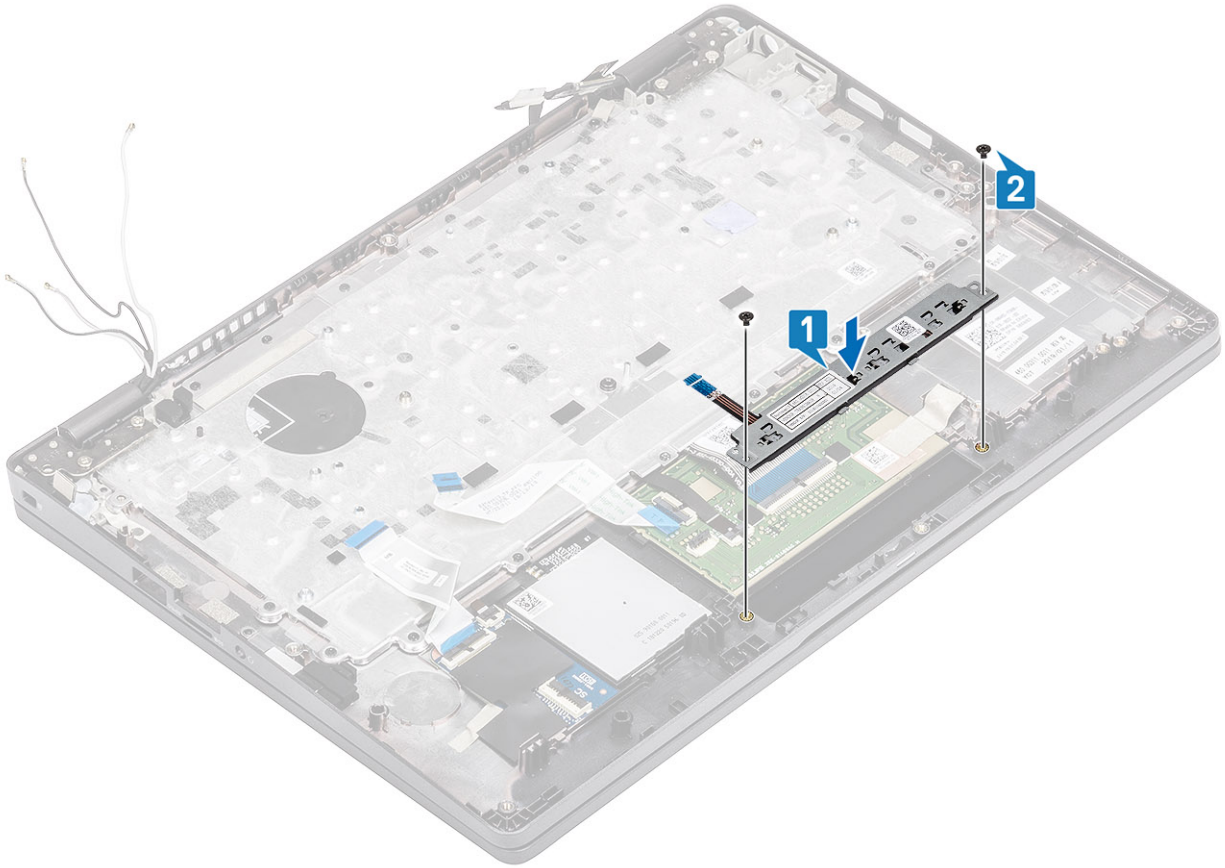
2. Remove the two (M2x3) screws that secure the touchpad button bracket to the palmrest [1].
3. Lift the touchpad button board bracket away from the computer [2].



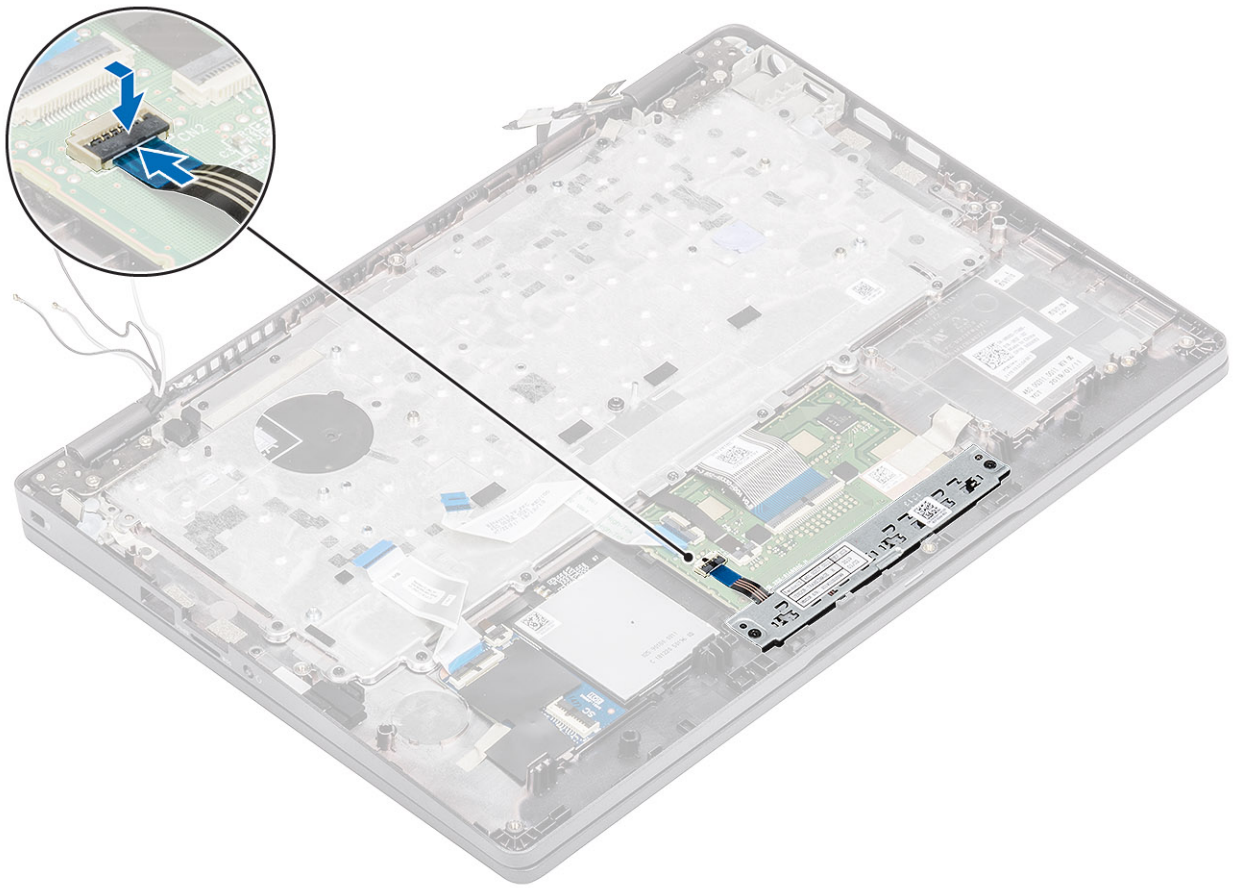
Installing the touchpad button board

Steps

1. Place the touchpad button board into the slot on the palmrest [1].
2. Replace the two (M2x3) screws to secure the touchpad button board to the palmrest [2].



3. Connect the touchpad button board cable to the connector on the touchpad board.



Next steps

1. Replace the LED board.
2. Replace the speaker.
3. Replace the battery.
4. Replace the base cover.
5. Replace the microSD card.
6. Follow the procedure in after working inside your computer.

System board

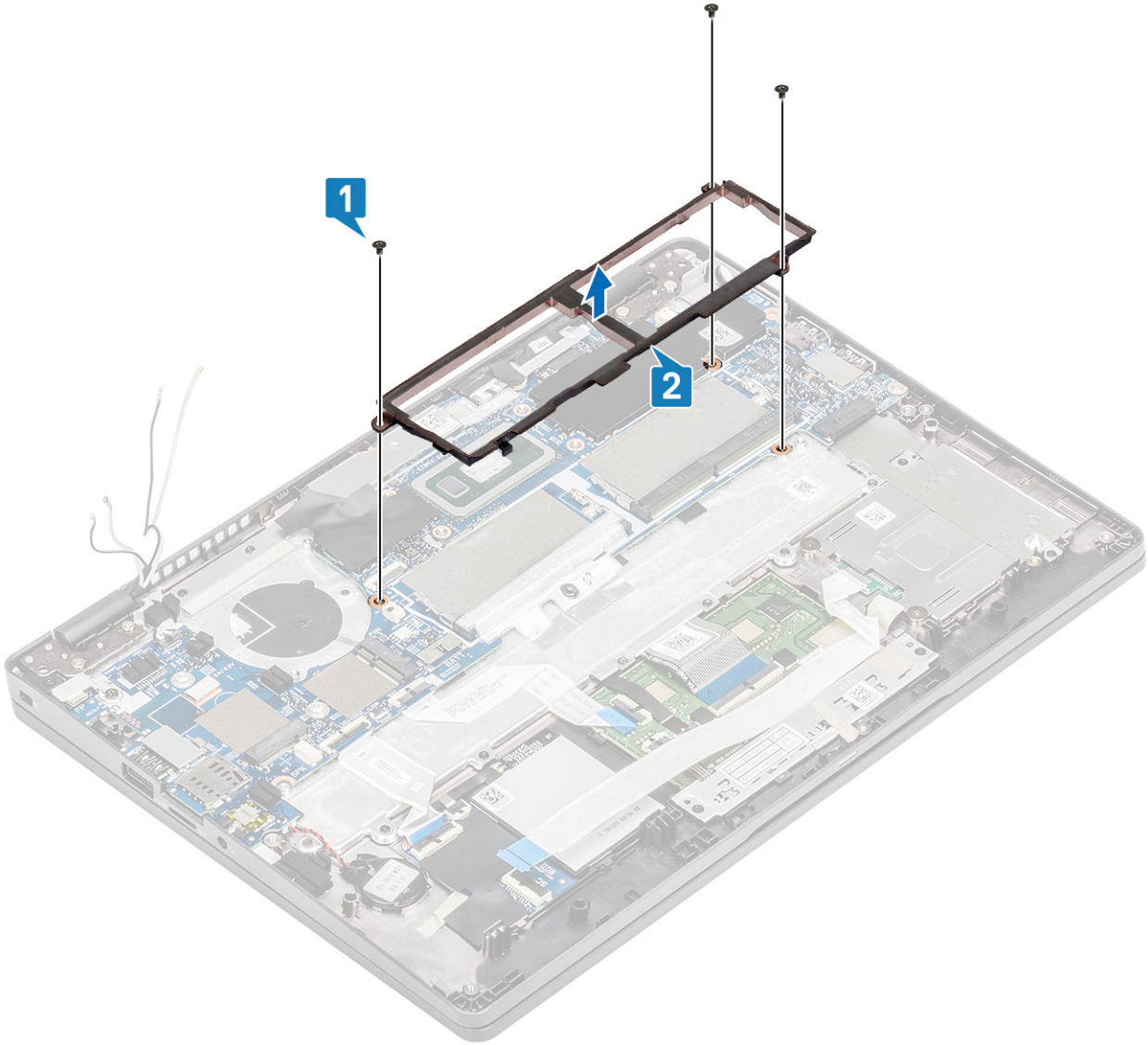
Removing the system board

Prerequisites

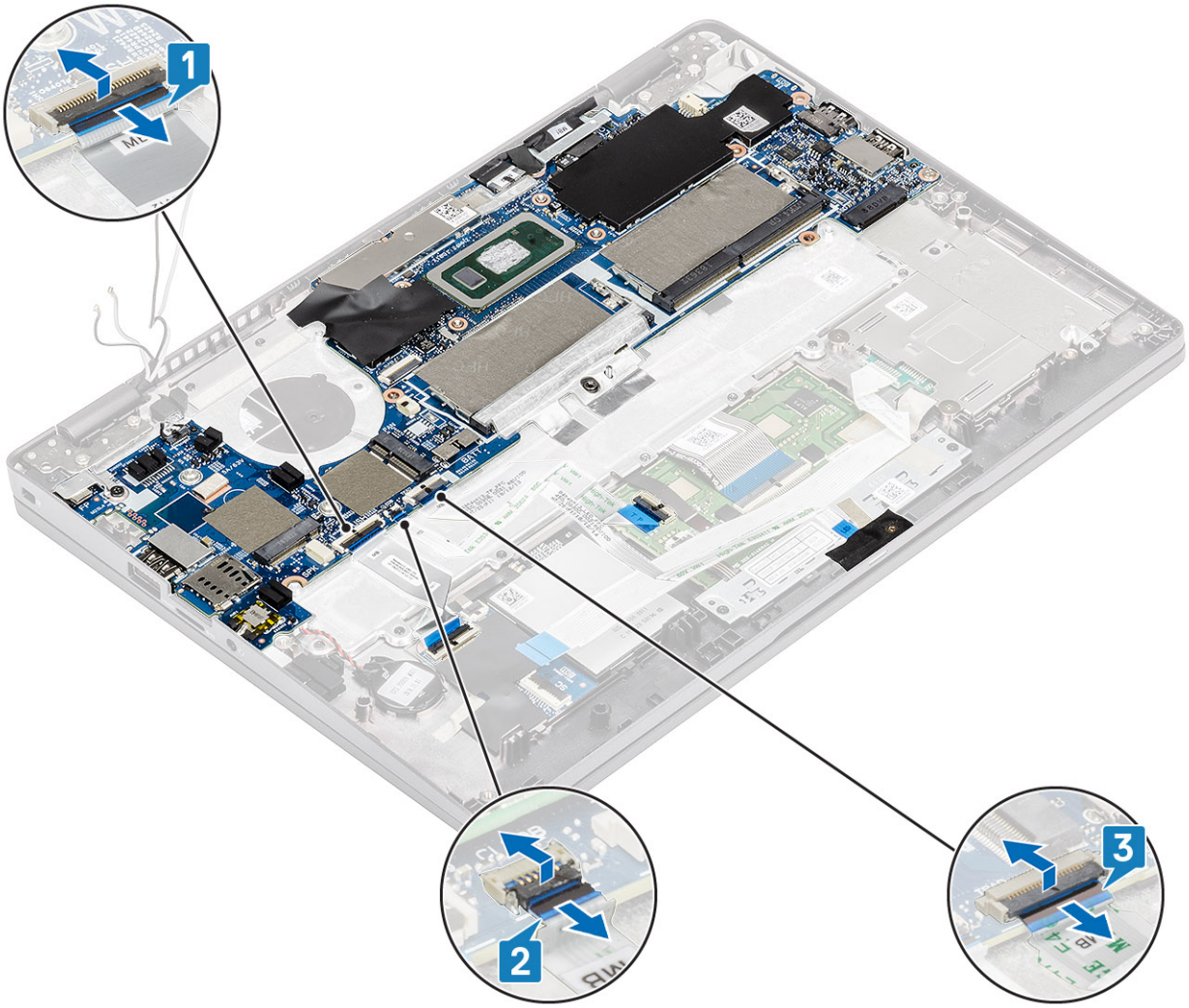
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Remove the battery.
5. Remove the speaker.
6. Remove the heatsink.
7. Remove the memory module.
8. Remove the system fan.
9. Remove the DC-in.
10. Remove the WLAN card.
11. Remove the WWAN card.

Steps

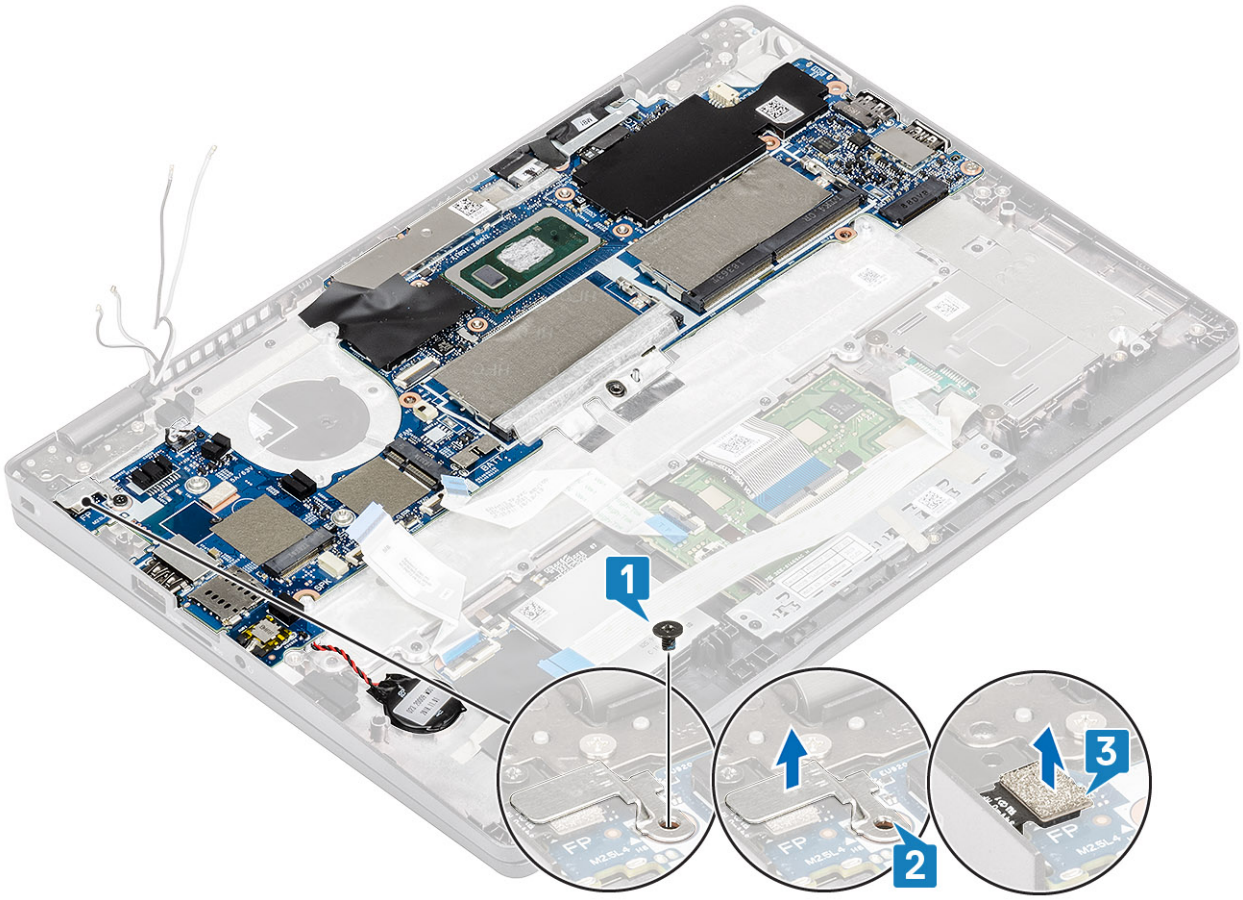
1. Remove the three (M2x3) screws that secure the memory module frame to the system board [1].
2. Remove the memory module frame away from the computer [2].



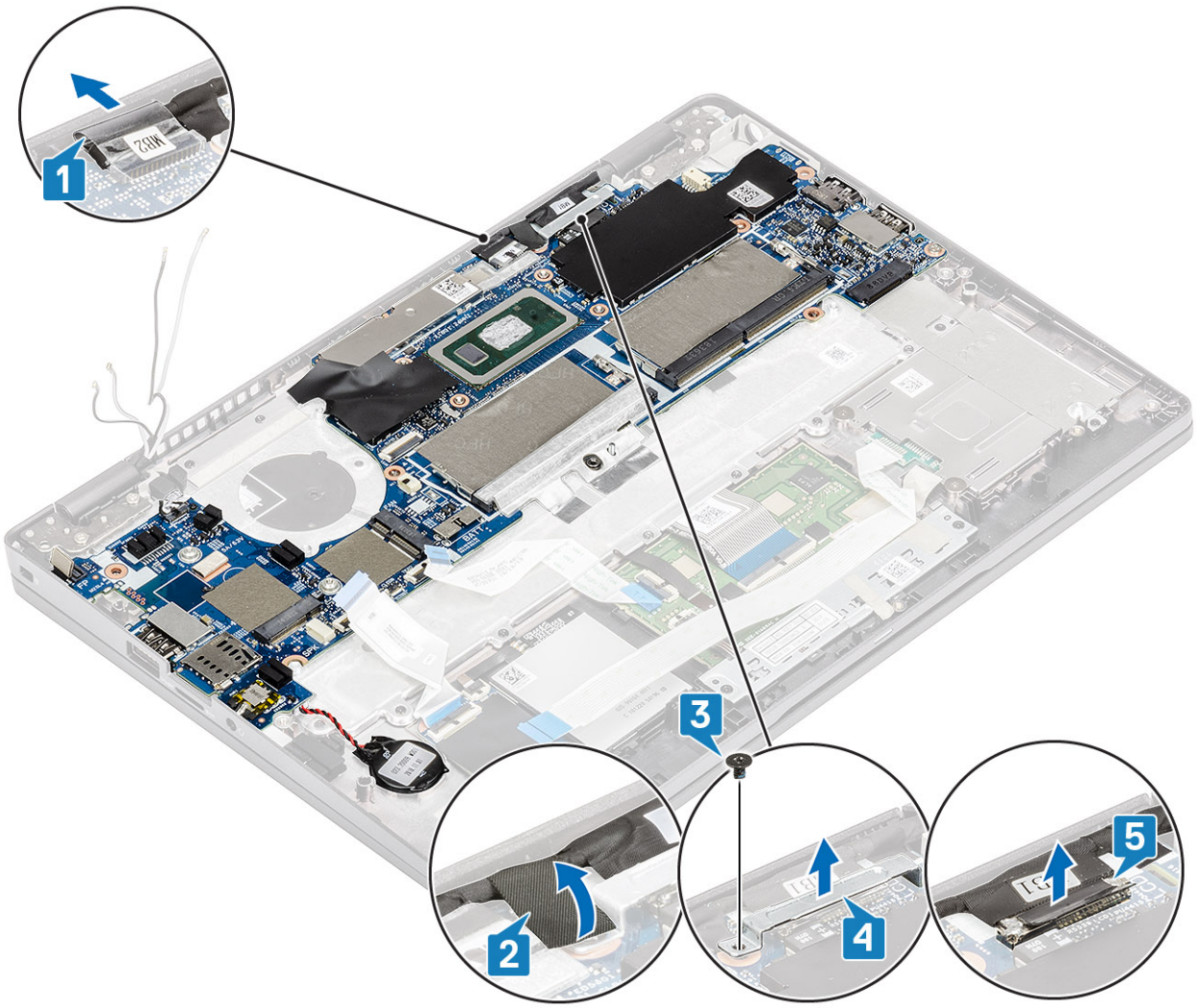
3. Disconnect the following cables:
   a. USH cable [1].
   b. LED board cable [2].
   c. touchpad cable [3].



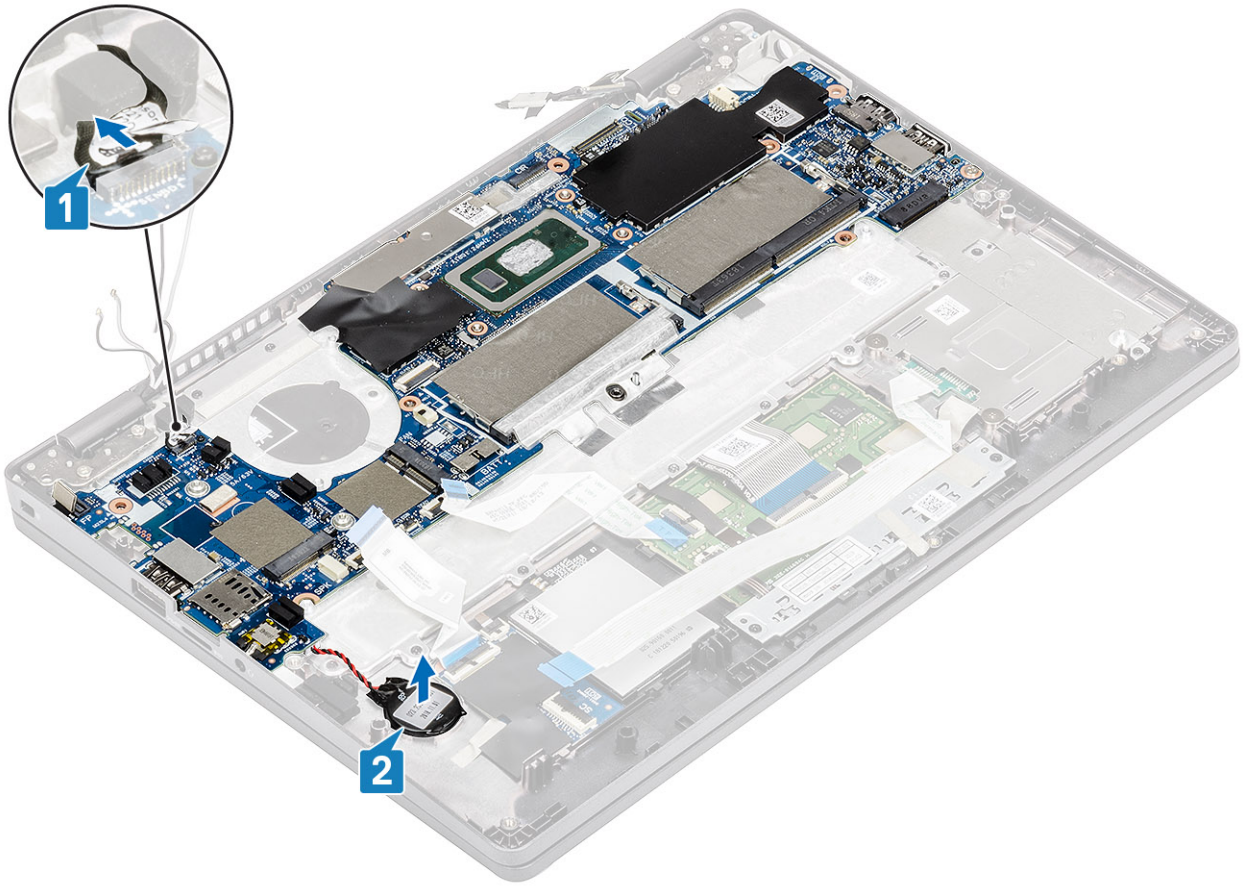
4. Remove the single (M2.5x4) screw that secures the fingerprint support bracket to the system board [1].
5. Lift the fingerprint support bracket away from the computer [2].
6. Disconnect the fingerprint port [3].



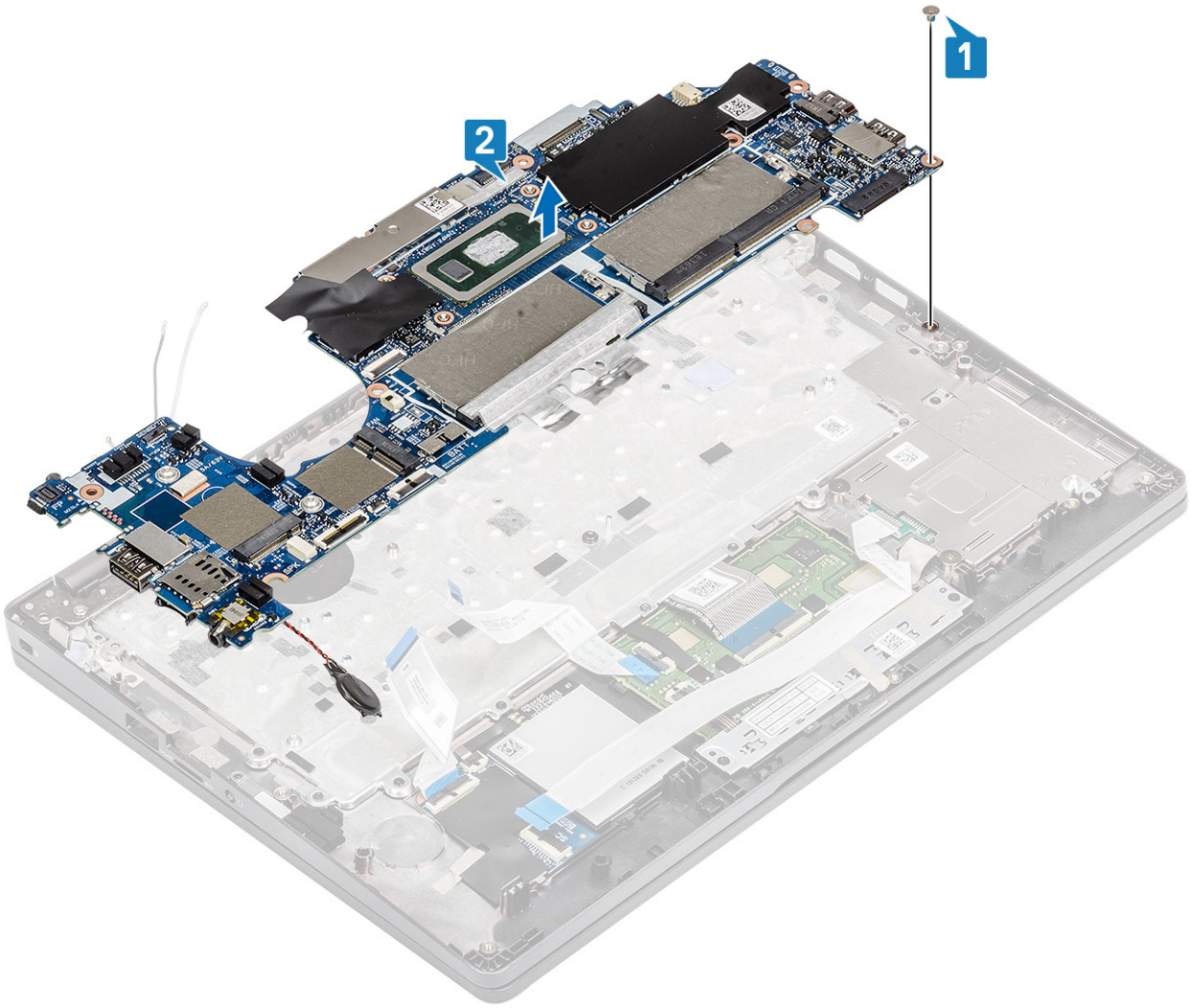
7. Peel the adhesive tape and disconnect the cable from the connector on the system board [1].
8. Peel the adhesive tape that secures the eDP bracket [2].
9. Remove the single (M2x4) screw that secures the eDP bracket to the system board [3].
10. Remove the eDP bracket away from the computer [4].
11. Lift the latch and disconnect the eDP cable from the connector on the system board [5].



12. Disconnect the sensor board cable from the connector on the system board [1].
13. Release the coin cell battery from the palmrest [2].



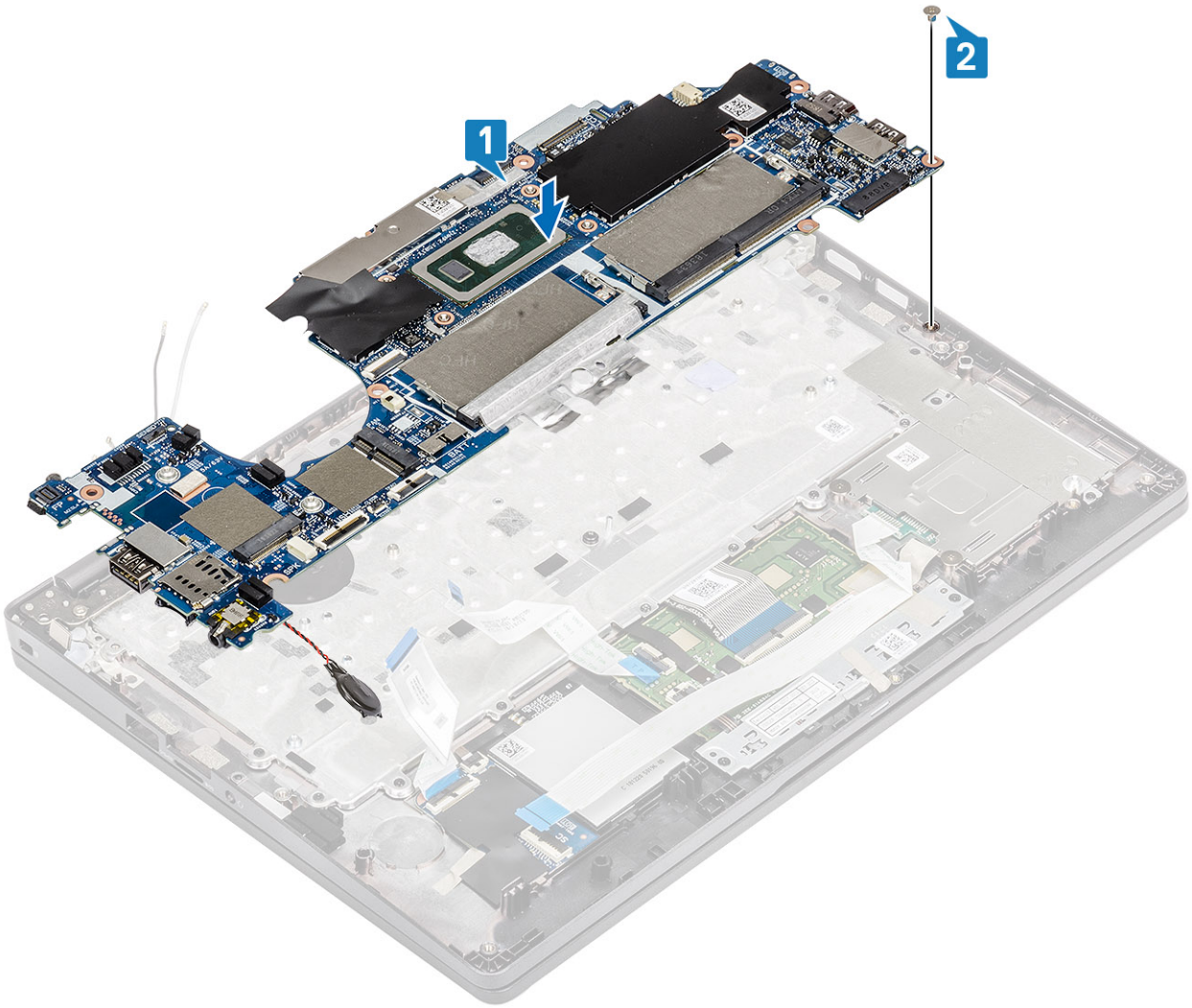
14. Remove the single (M2.5x4) screw that secures the system board to the palmrest [1].
15. Lift the system board away from the computer [2].



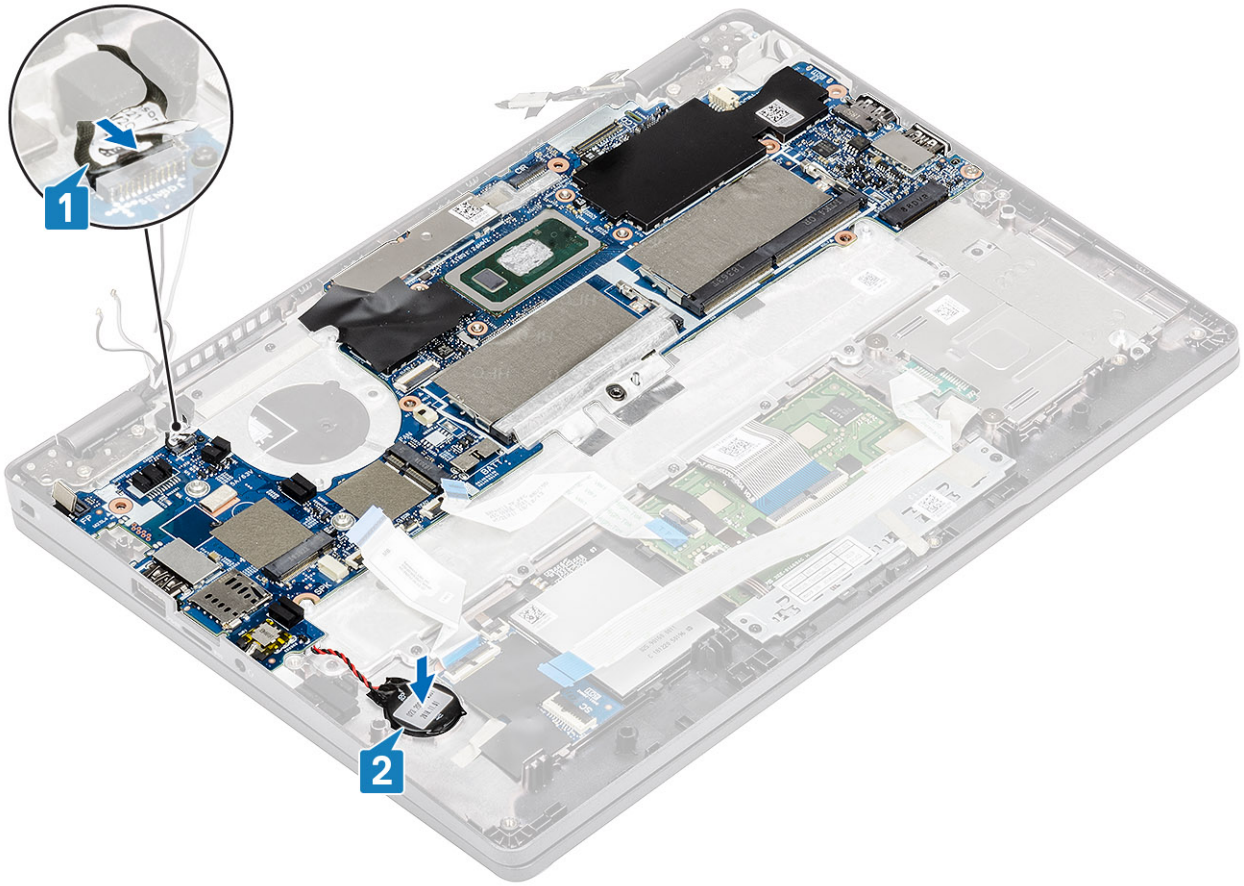
Installing the system board

Steps

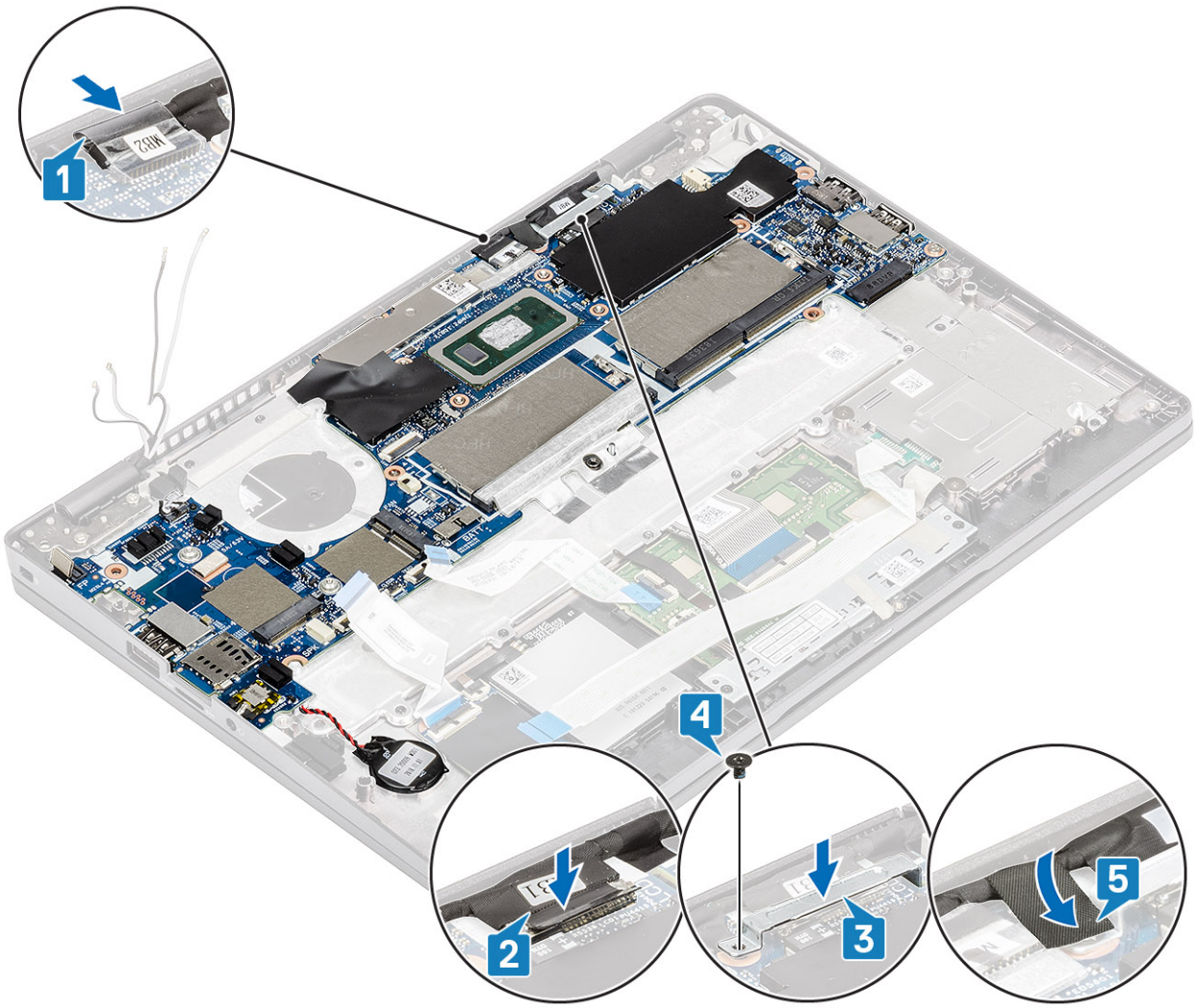
1. Align and place the system board to the palmrest [1].
2. Replace the single (M2.5x4) screw to secure the system board to the palmrest [2].



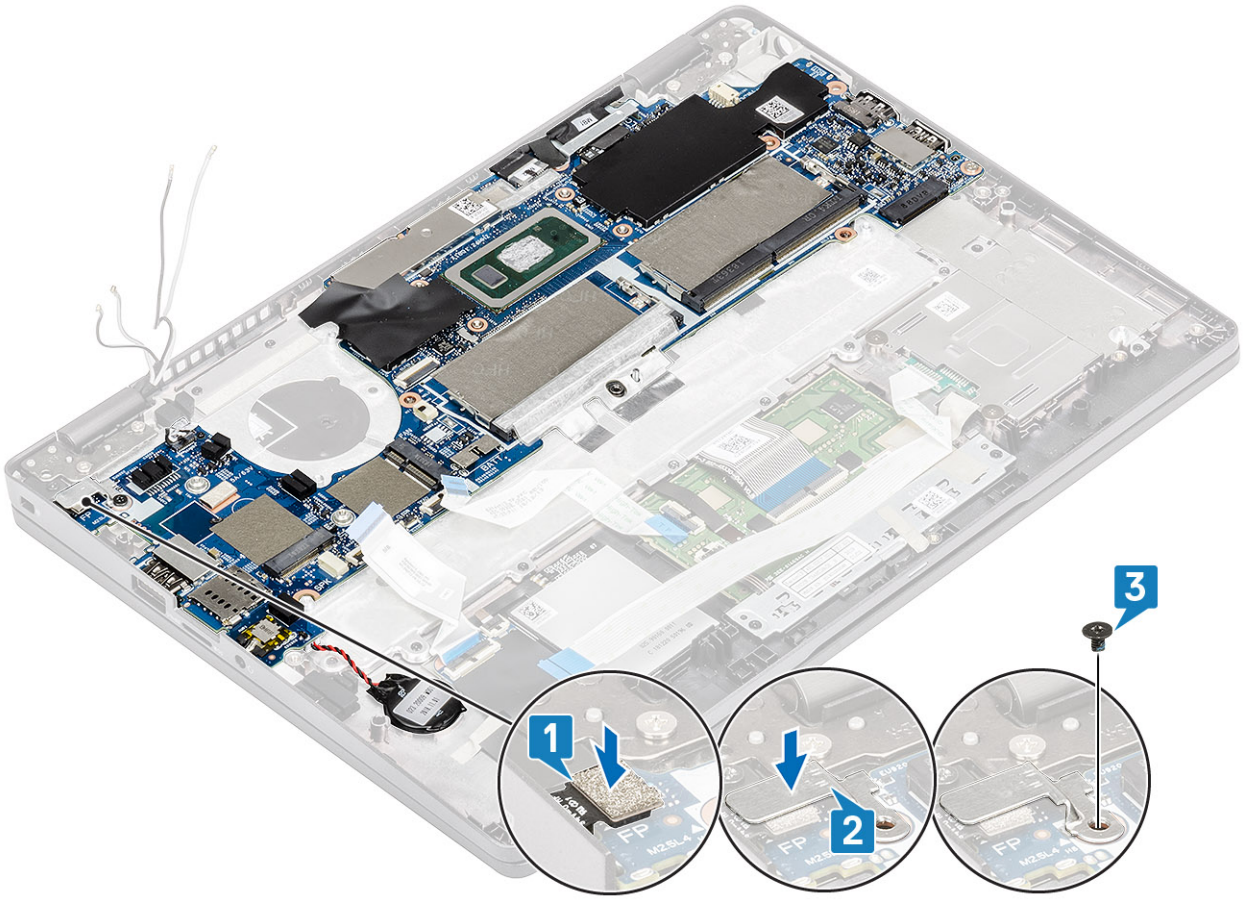
3. Connect the sensor cable to the connector on the system board [1].
4. Place the coin cell battery into its slot on the plamrest [2].



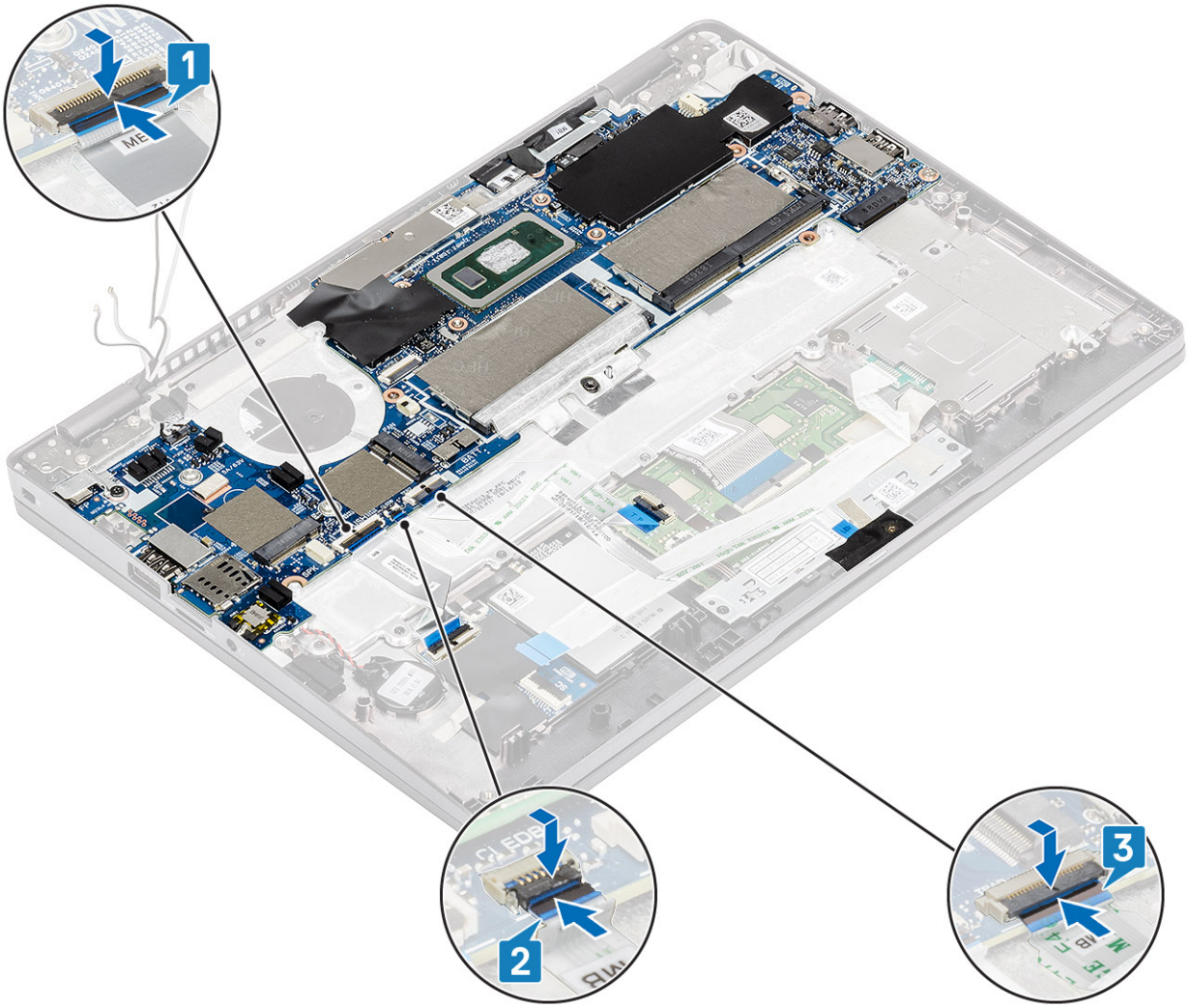
5. Connect the cable to the connector on the system board and adhere the adhesive tape [1].
6. Connect the eDP cable to the connector on the system board [2].
7. Place the eDP support bracket above the eDP connector [3].
8. Replace the single (M2x4) screw to secure the eDP bracket to the system board [4].
9. Adhere the adhesive tape to secure the eDP support bracket [5].



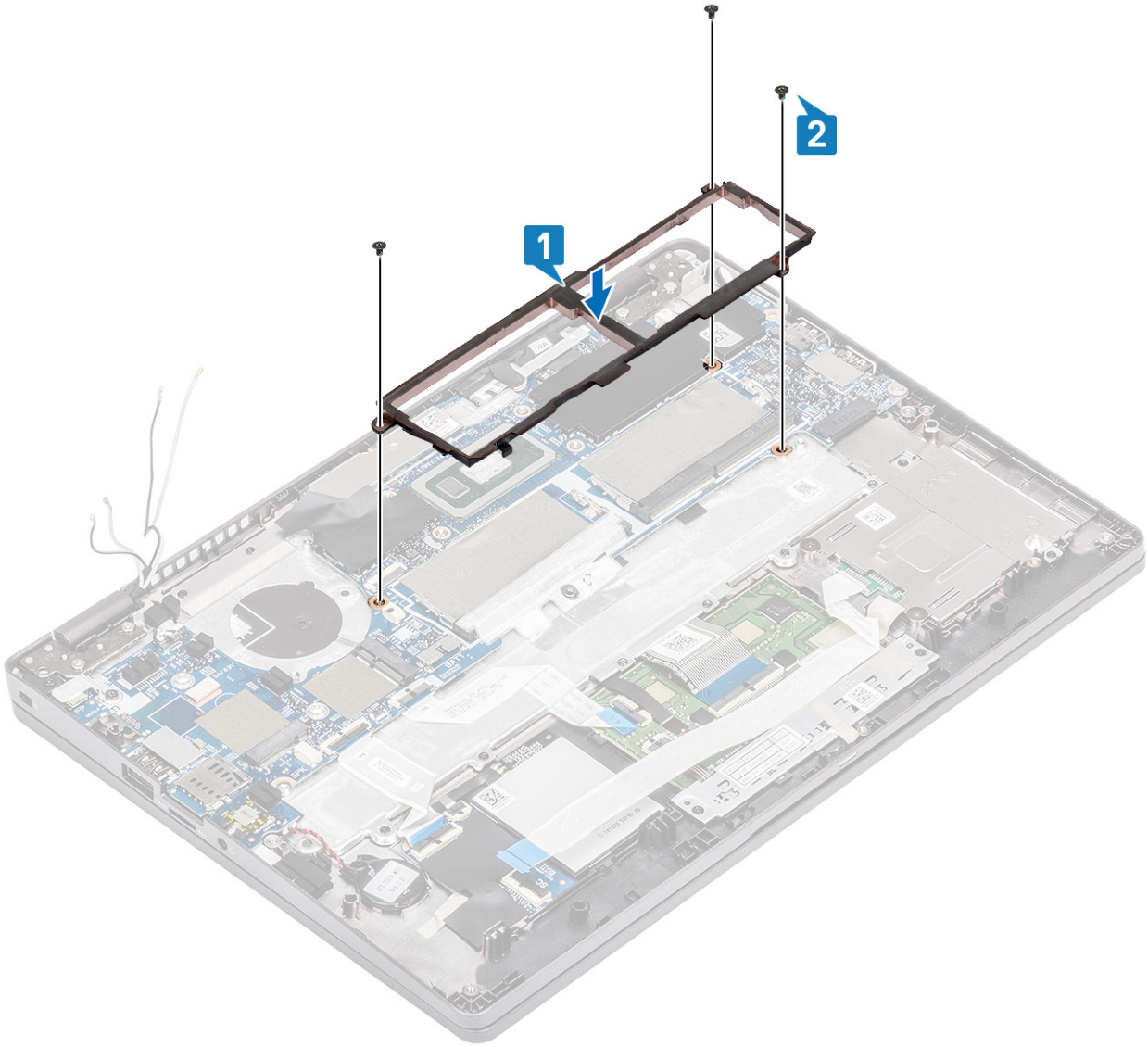
10. Connect the fingerprint cable to the connector on the system board [1].
11. Place the fingerprint support bracket [2].
12. Replace the single (M2.5x4) screw to secure the fingerprint support bracket to the system board [3].



13. Connect the following cables:
    a. USH cable [1].
    b. LED board cable [2].
    c. touchpad cable [3].



14. Align and place the memory module frame in its slot on the system board [1].
15. Replace the three (M2x3) screws to secure the memory module frame to the system board [2].



Next steps

1. Replace the WWAN card.
2. Replace the WLAN card.
3. Replace the Dc-in.
4. Replace the memory module.
5. Replace the system fan.
6. Replace the heatsink.
7. Replace the speaker.
8. Replace the battery.
9. Replace the base cover.
10. Replace the microSD card.
11. Follow the procedure in after working inside your computer.

Coin-cell battery

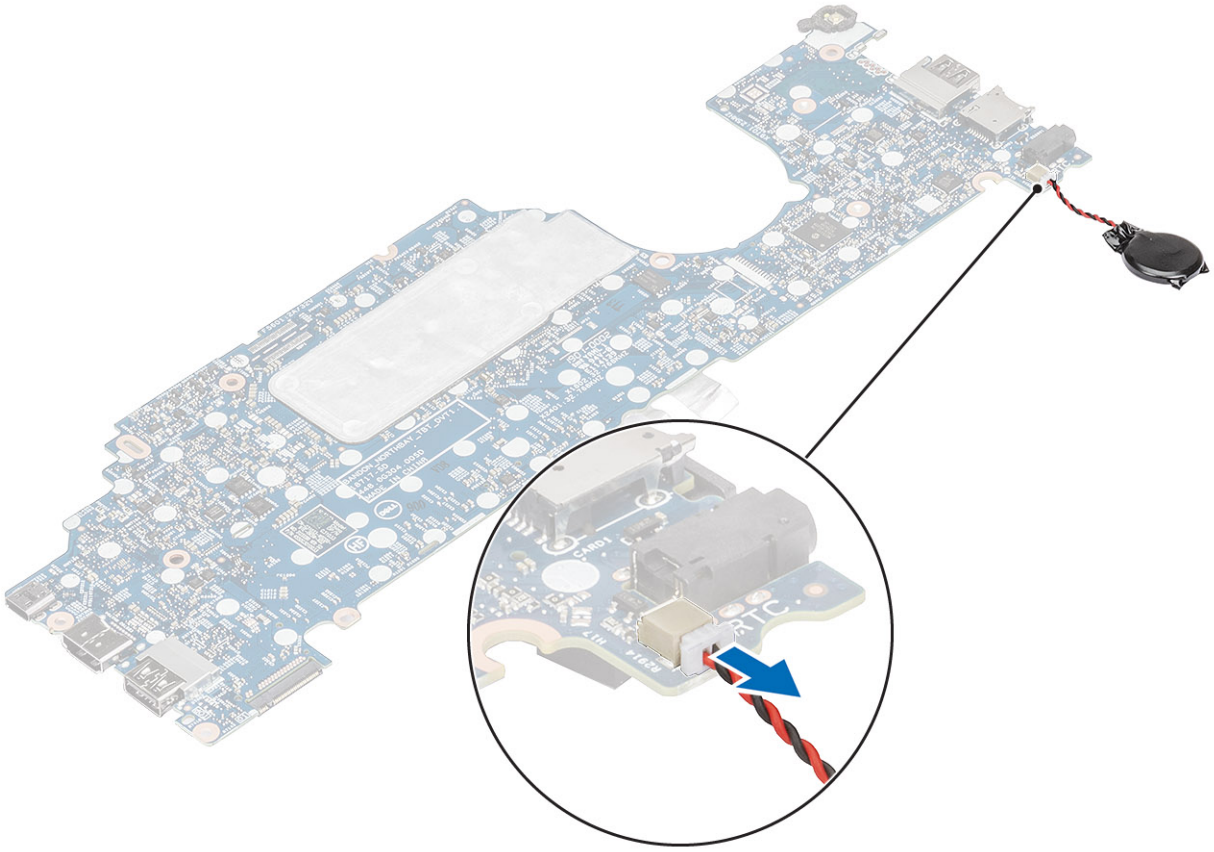
Removing the coin-cell battery

Prerequisites

1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Remove the battery.
5. Remove the speaker.
6. Remove the heatsink.
7. Remove the memory module.
8. Remove the system fan.
9. Remove the DC-in .
10. Remove the WLAN card.
11. Remove the WWAN card.
12. Remove the system board.

Steps

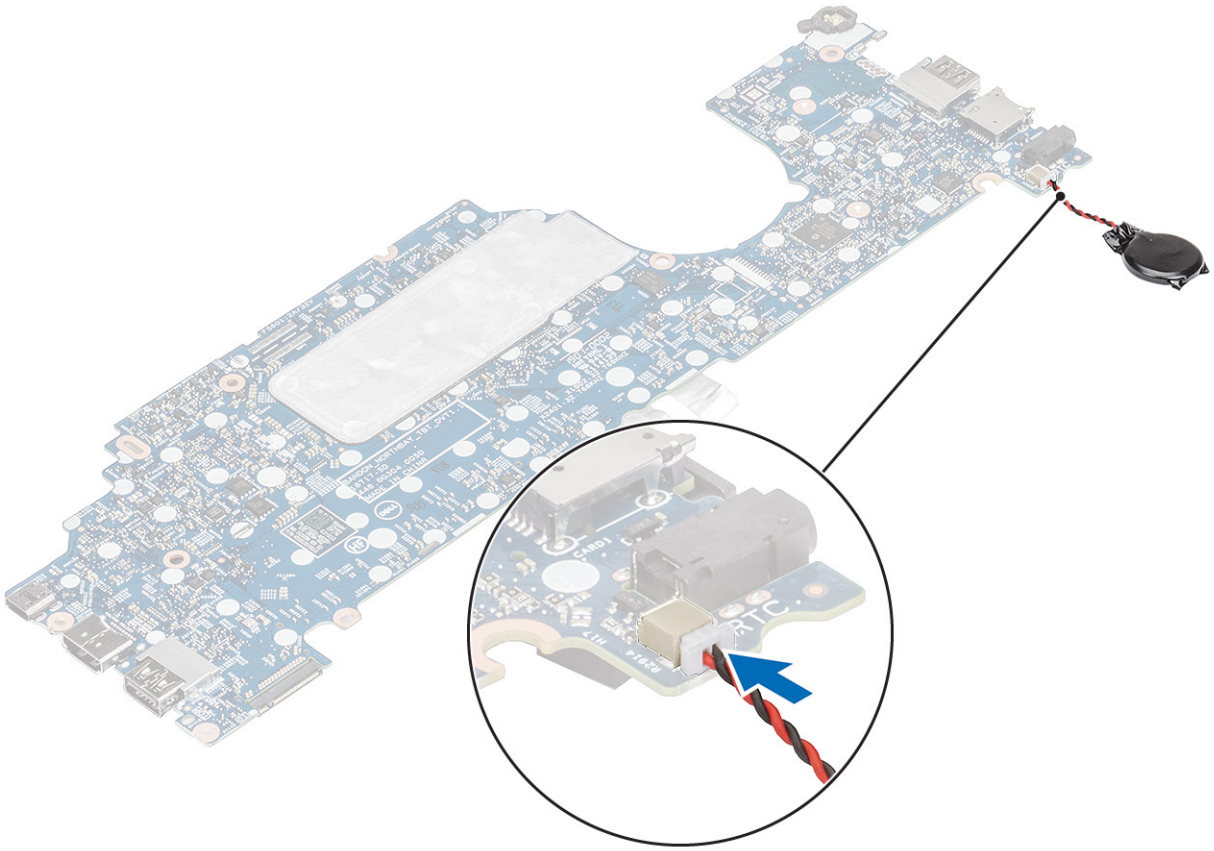
Turn the system board and disconnect the coin cell battery cable from the connector on the system board.



Installing the coin-cell battery

Steps

Turn the system board and connect the coin cell battery cable to the connector on the system board.



Next steps

1. Replace the system board.
2. Replace the WWAN card.
3. Replace the WLAN card.
4. Replace the DC-in.
5. Replace the memory module.
6. Replace the system fan.
7. Replace the heatsink.
8. Replace the speaker.
9. Replace the battery.
10. Replace the base cover.
11. Replace the microSD card.
12. Follow the procedure in after working inside your computer.

Display assembly

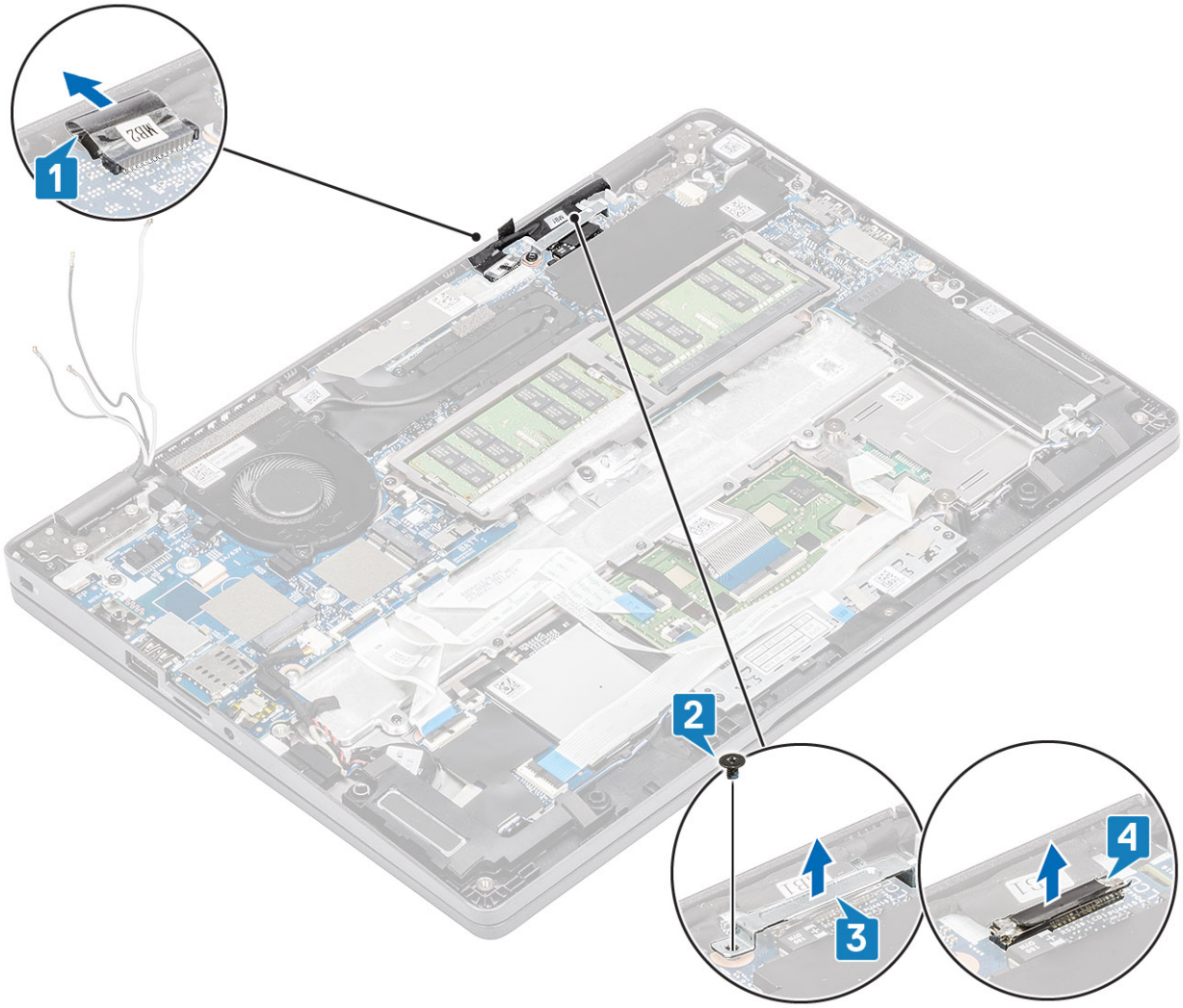
Removing the display assembly

Prerequisites

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

Steps

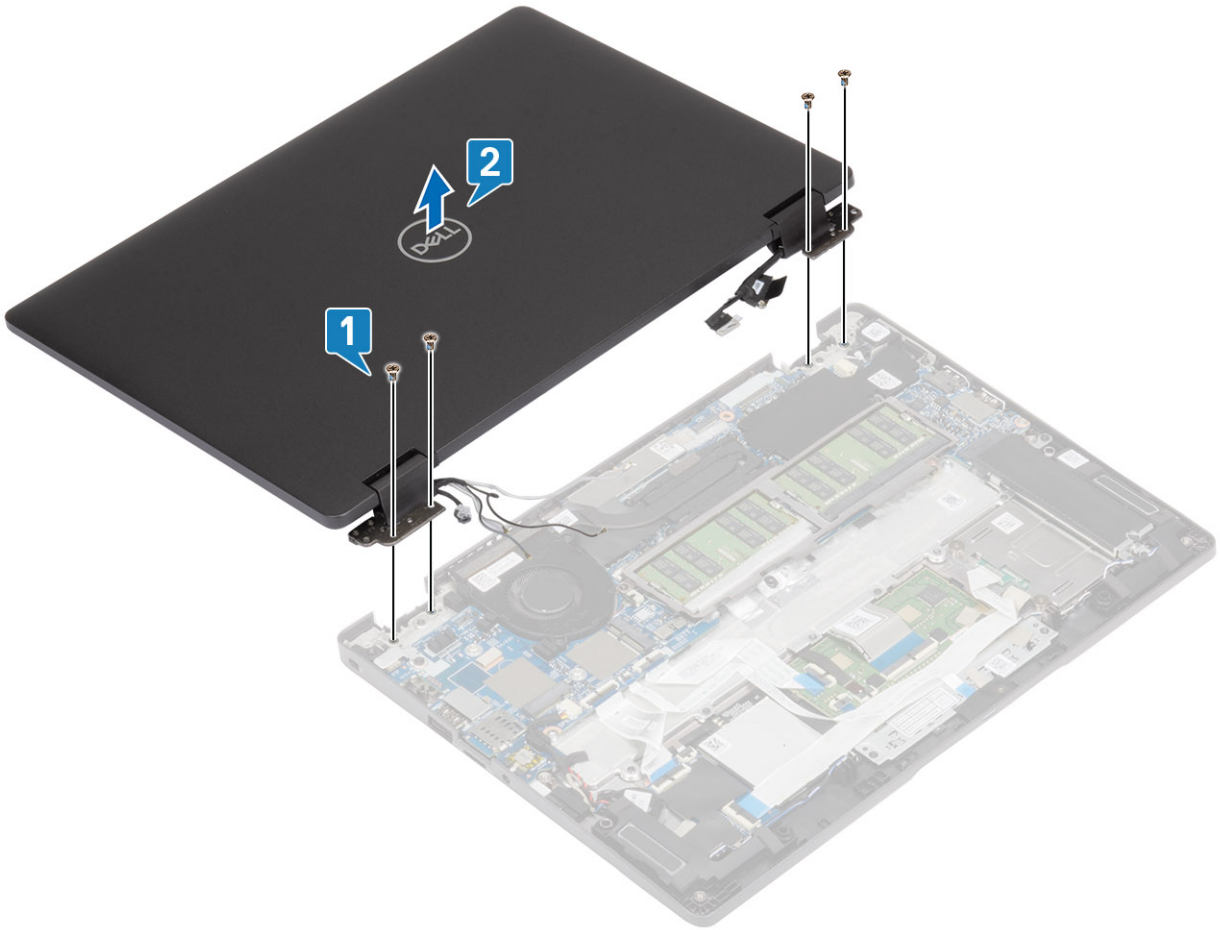
1. Peel the adhesive tape and disconnect the cable from the connector on the system board [1].
2. Remove the single (M2x4) screw that secures the eDP cable bracket to the system board [2].
3. Lift the eDP cable bracket from the system board [3].
4. Disconnect and unroute the eDP cable [4].



5. Open the display assembly to a 180-degree angle and flip over the system, and then place the system on a flat surface.



6. Remove the four (M2.5x4) screws that secure the display assembly to the system chassis [1].
7. Remove the display assembly from the system [2].



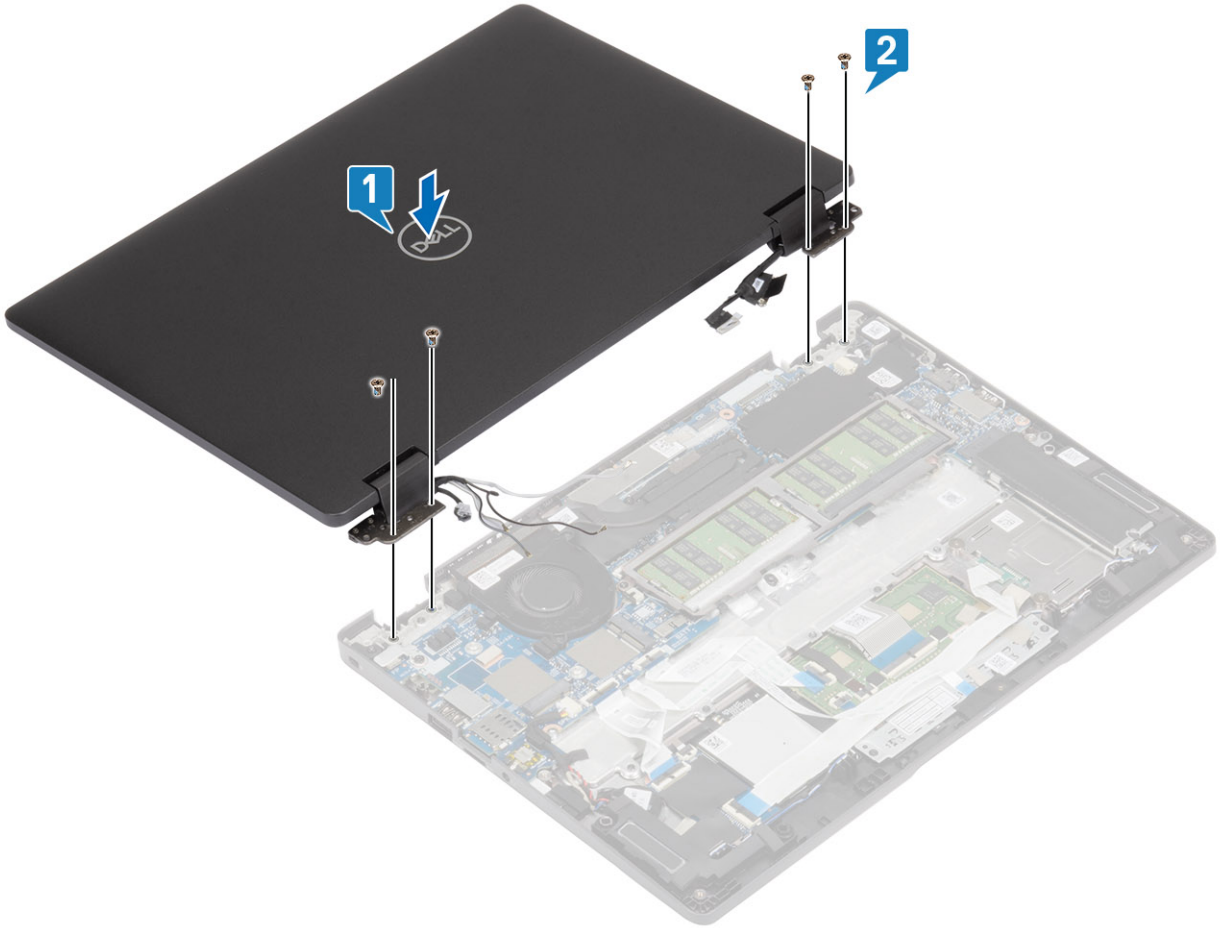
Installing the display assembly

About this task

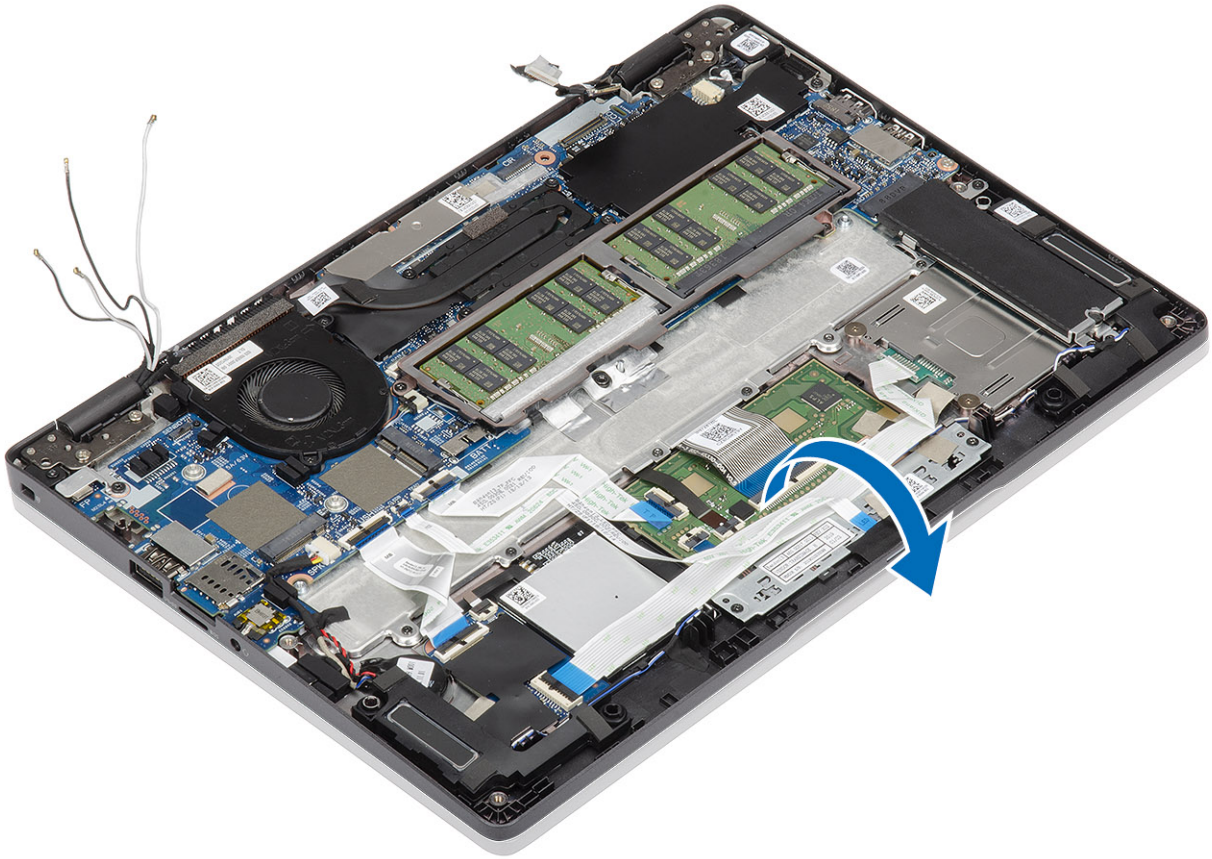
NOTE: Ensure that the hinges are opened to the maximum before replacing the display assembly on the palmrest and keyboard assembly.

Steps

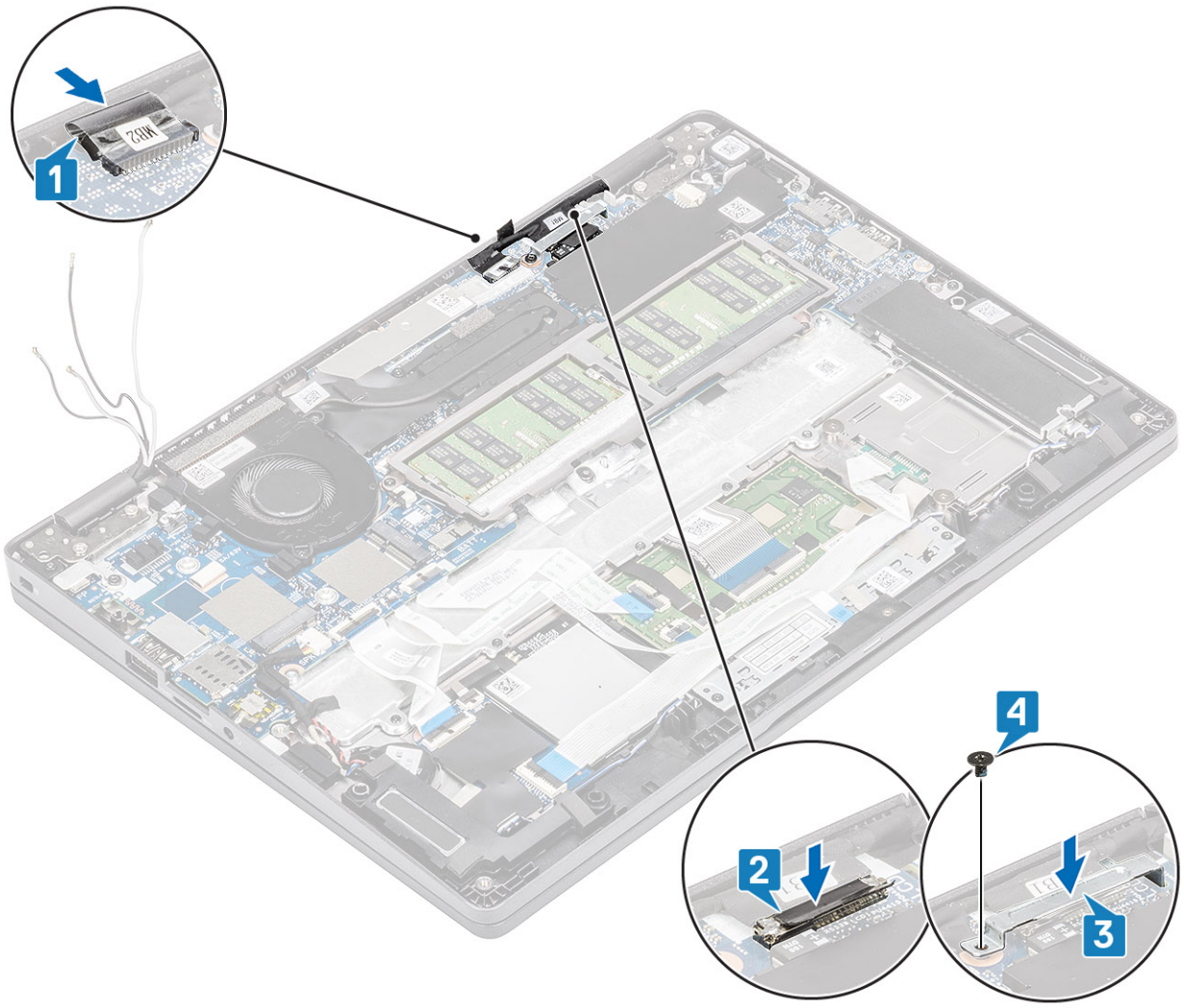
1. Align and place the system chassis under the hinges of the display assembly [1].
2. Replace the four (M2.5x4) screws that secure the display assembly to the system chassis [2].



3. Seat the system chassis on the display assembly.



4. Connect the cable to the connector on the system board and adhere the adhesive tape [1].
5. Reroute the eDP cable and connect it to the eDP connector [2].
6. Place the eDP cable bracket on the system board [3].
7. Replace the single (M2x4) screw that secures the eDP cable bracket to the system board [4].



Next steps

1. Replace the battery.
2. Replace the base cover.
3. Replace the microSD card.
4. Follow the procedure in after working inside your computer.

Keyboard

Removing the keyboard

Prerequisites

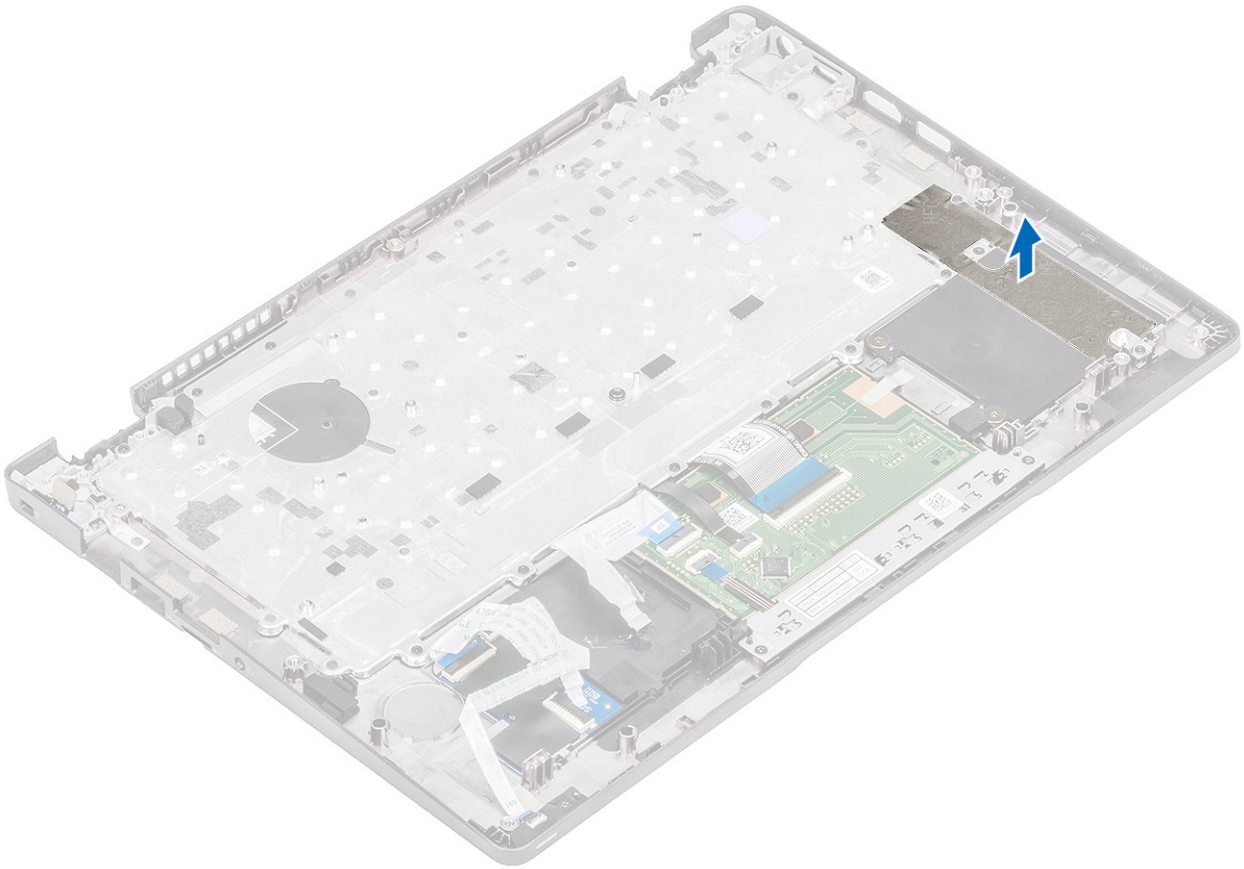
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Remove the battery.
5. Remove the speaker.
6. Remove the memory module.
7. Remove the system fan.
8. Remove the DC-in .
9. Remove the WLAN card.

10. Remove the WWAN card.
11. Remove the system board.

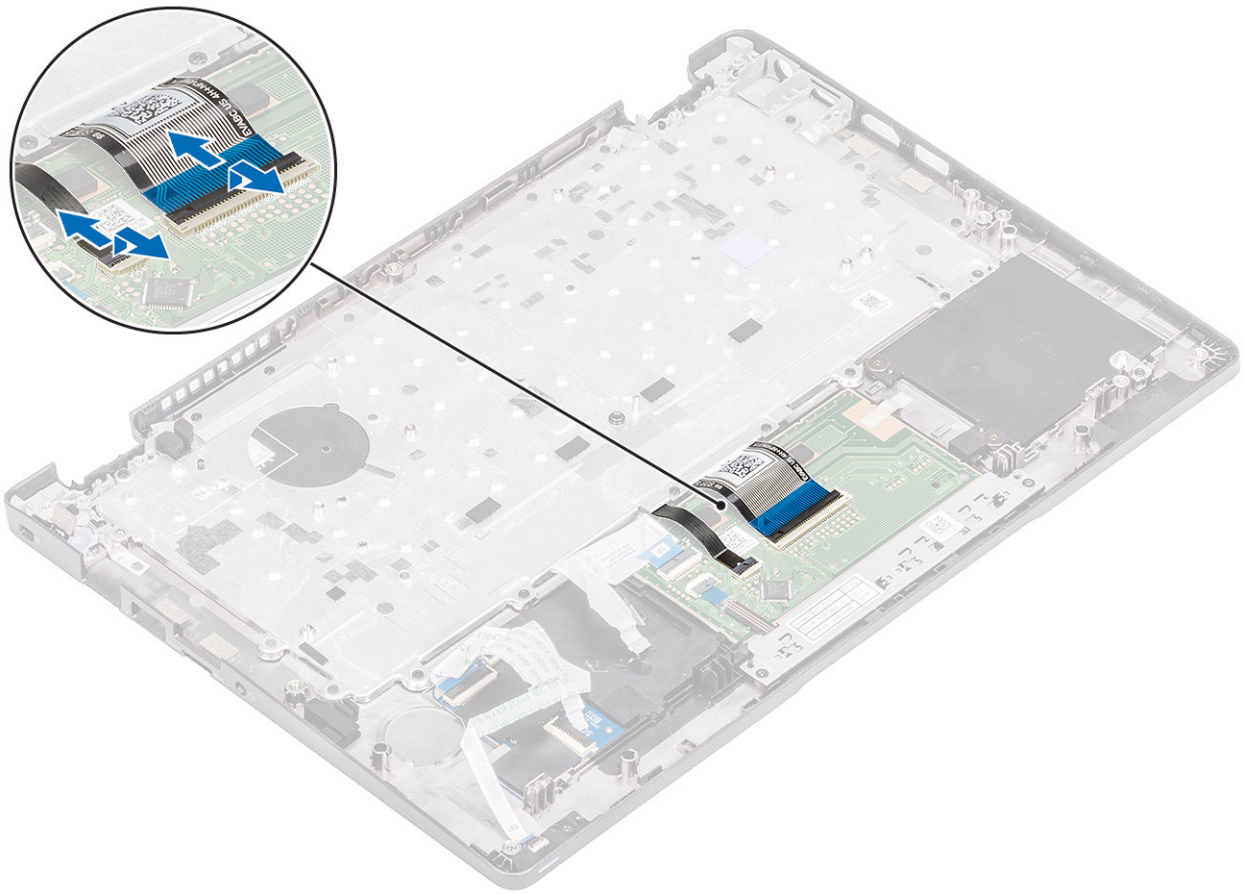
    NOTE: System board can be removed with heatsink attached.
12. Remove the coin cell battery.

Steps

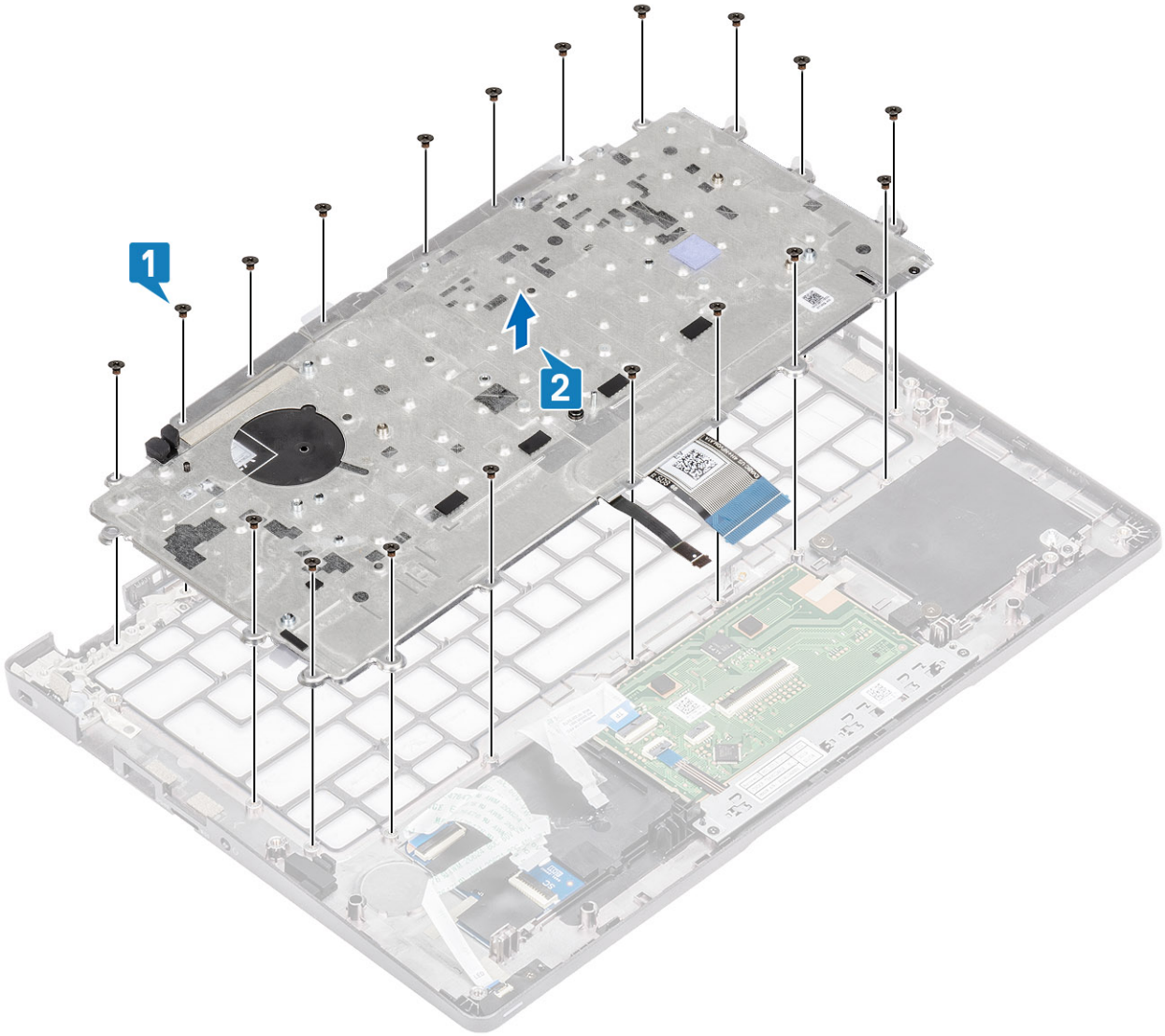
1. Peel the adhesive tape securing the keyboard and the smartcard reader.



2. Lift the latch and disconnect the backlit cable and the keyboard cables from the connectors on the touchpad.



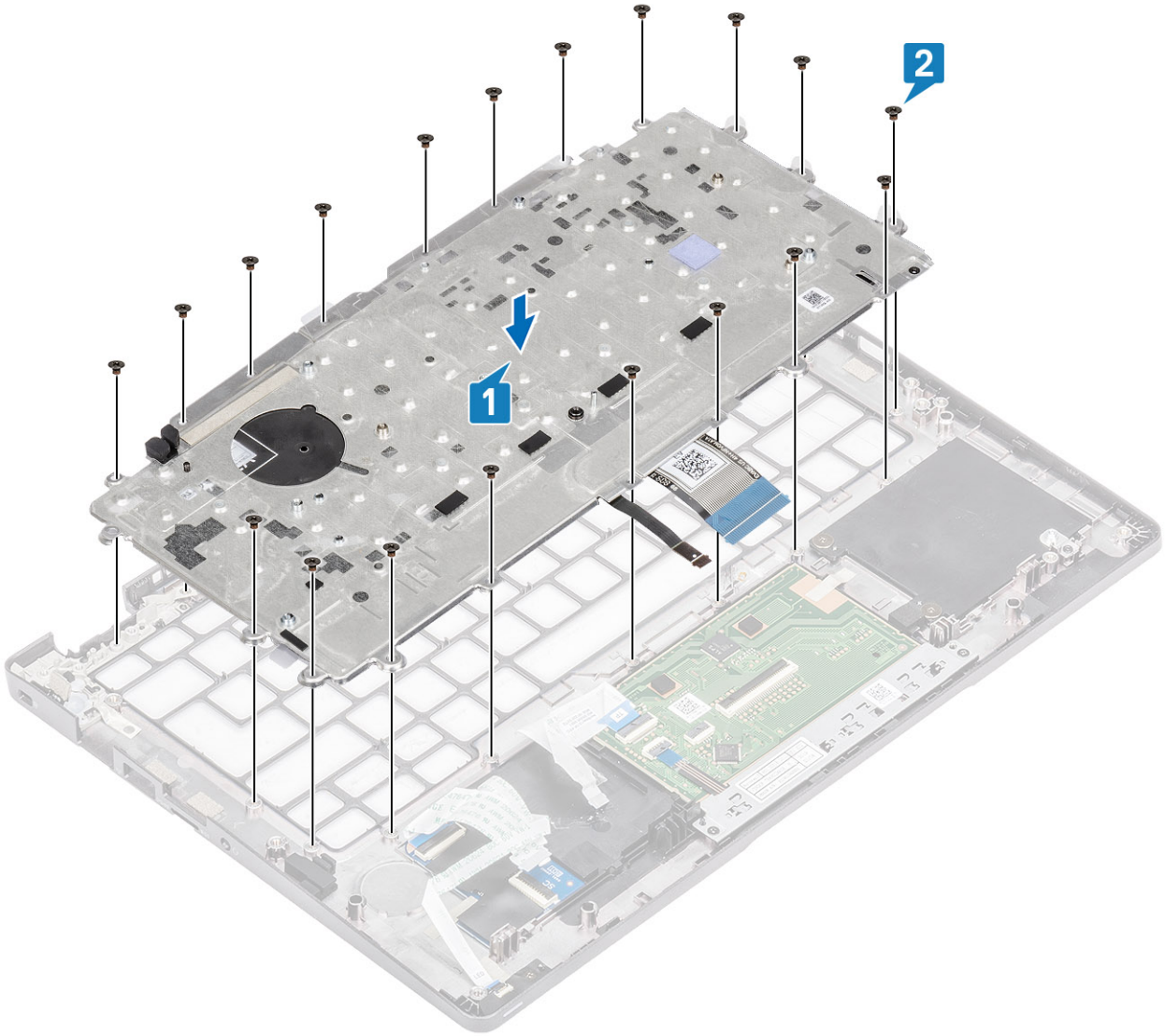
3. Remove the 19 (M2x2) screws that secure the keyboard to the palmrest [1].
4. Remove the keyboard away from the computer [2].



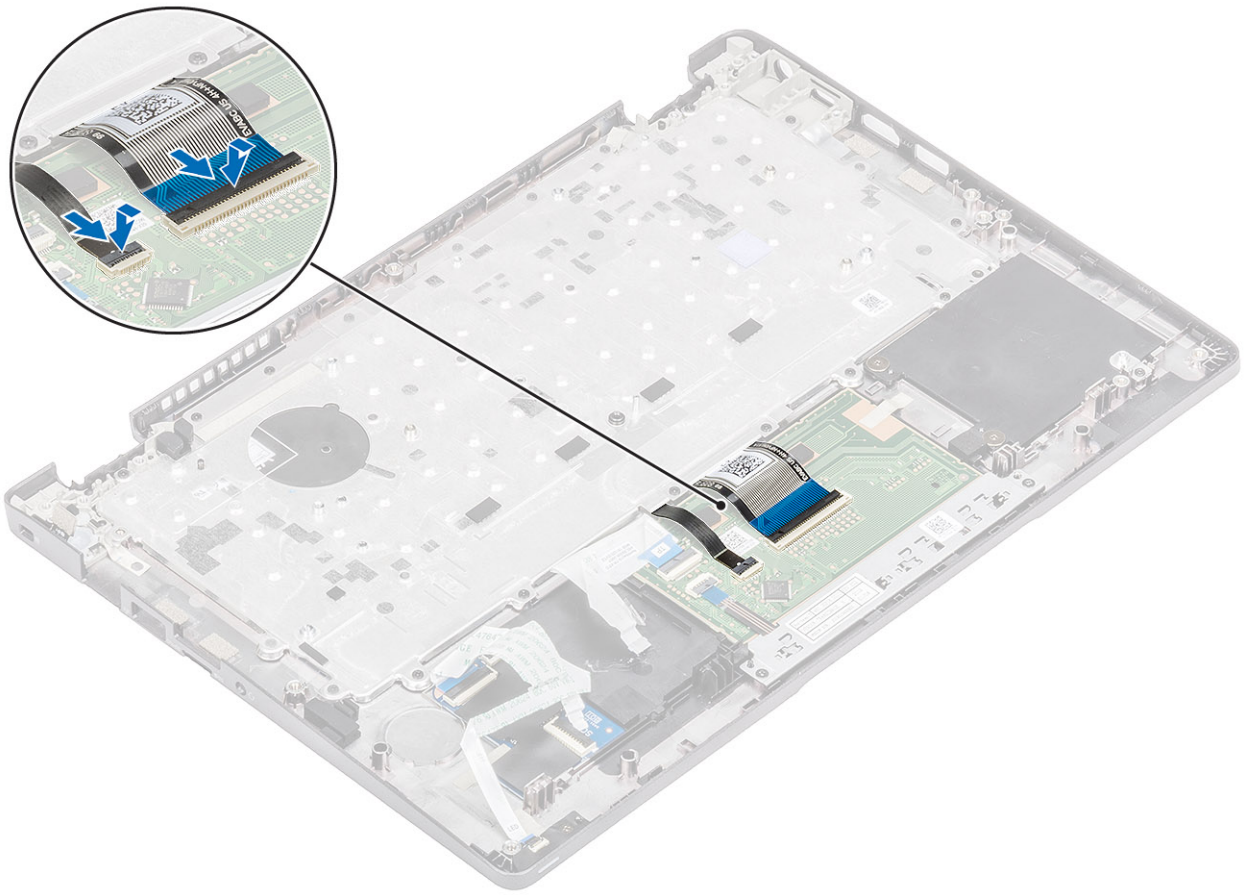
Installing the keyboard

Steps

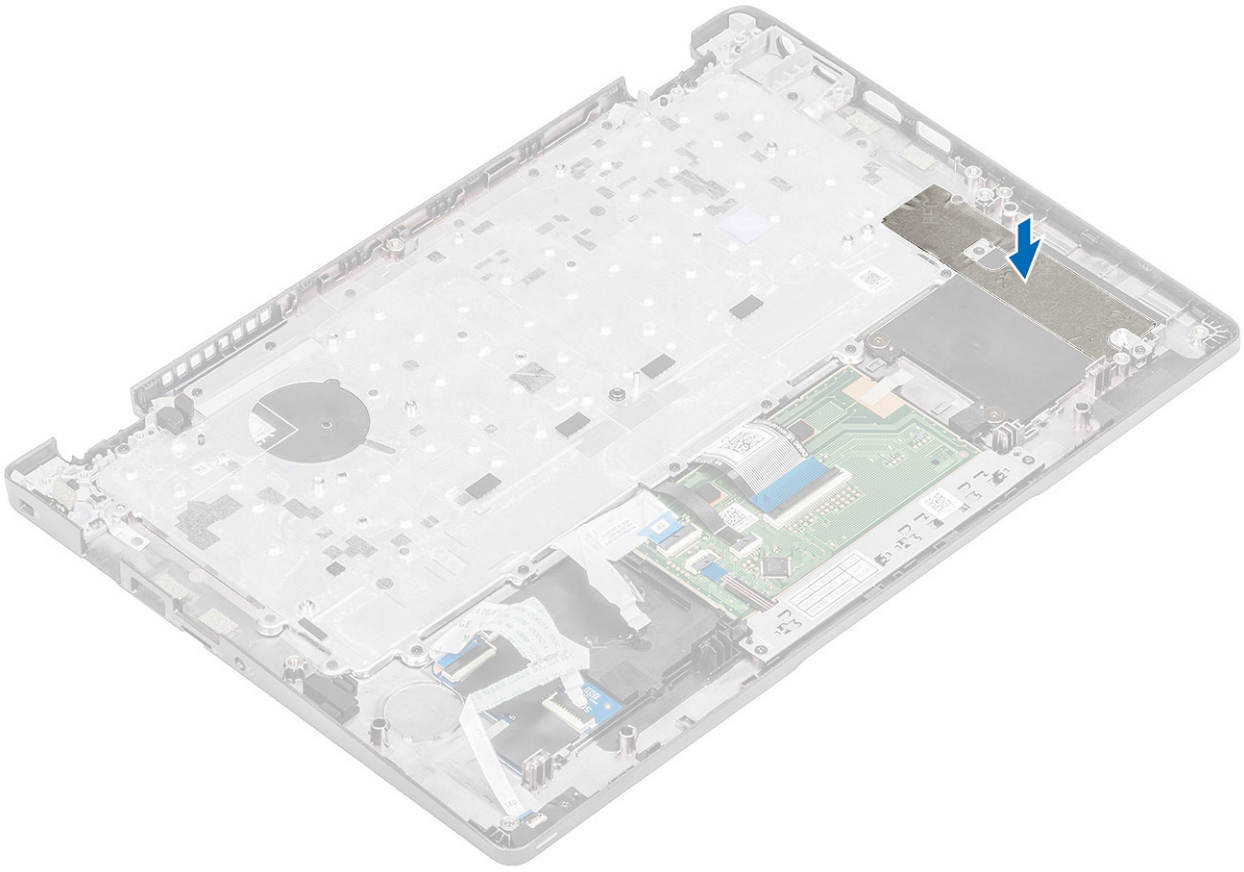
1. Align and place the keyboard on the palmrest [1].
2. Replace the 19 (M2x2) screws to secure the keyboard to the palmrest [2].



3. Connect the backlit cable and the keyboard cables to the connectors on the touchpad.



4. Adhere the adhesive tape securing the keyboard and the smartcard board.



Next steps

1. Replace the coin cell battery.
2. Replace the system board.

   NOTE: System board can be replaced with heatsink attached.
3. Replace the WWAN card.
4. Replace the WLAN card.
5. Replace the DC-in.
6. Replace the system fan.
7. Replace the memory module.
8. Replace the speaker.
9. Replace the battery.
10. Replace the base cover.
11. Replace the microSD card.
12. Follow the procedure in after working inside your computer.

Smart card reader board

Removing the smart card reader board

Prerequisites

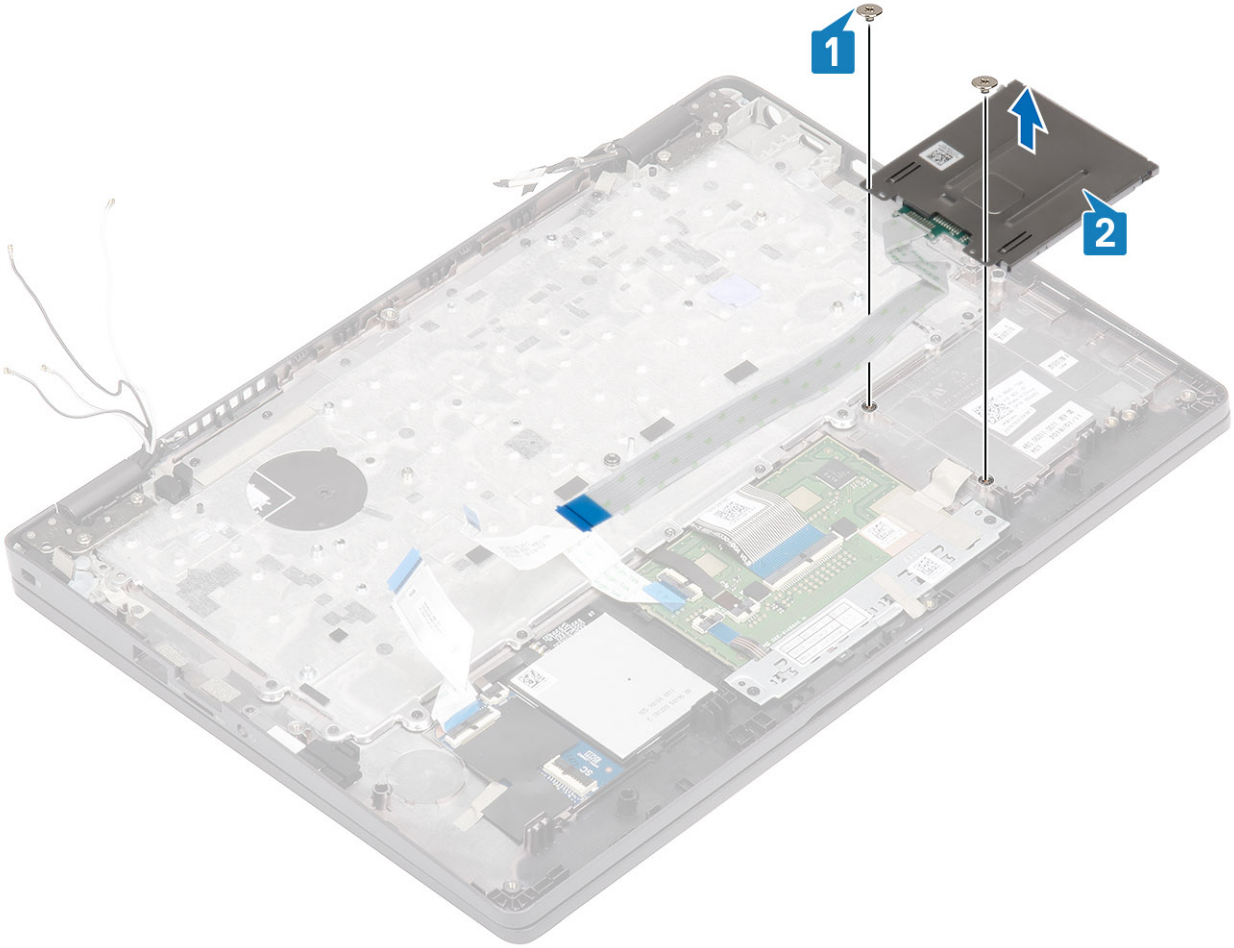
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Remove the battery.
5. Remove the speaker.
6. Remove the memory module.
7. Remove the system fan.
8. Remove the DC-in .
9. Remove the WLAN card.
10. Remove the WWAN card.
11. Remove the system board.
12. Remove the coin cell battery.

Steps

1. Unroute the smart card reader board cable.



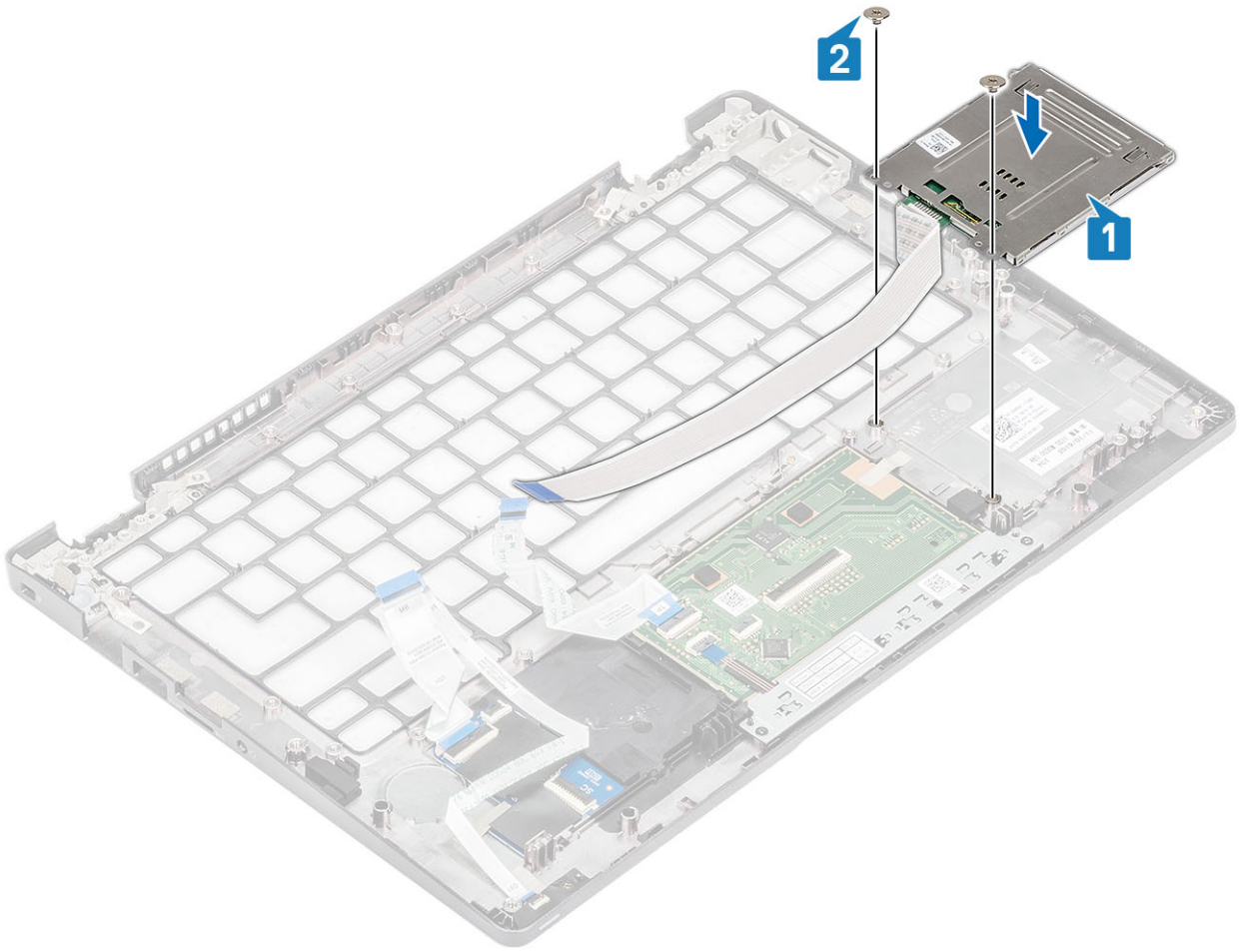
2. Remove the two (M2x2.5) screws that secure the smart card reader to the palmrest [1].
3. Lift the smart card reader board away from the computer [2].



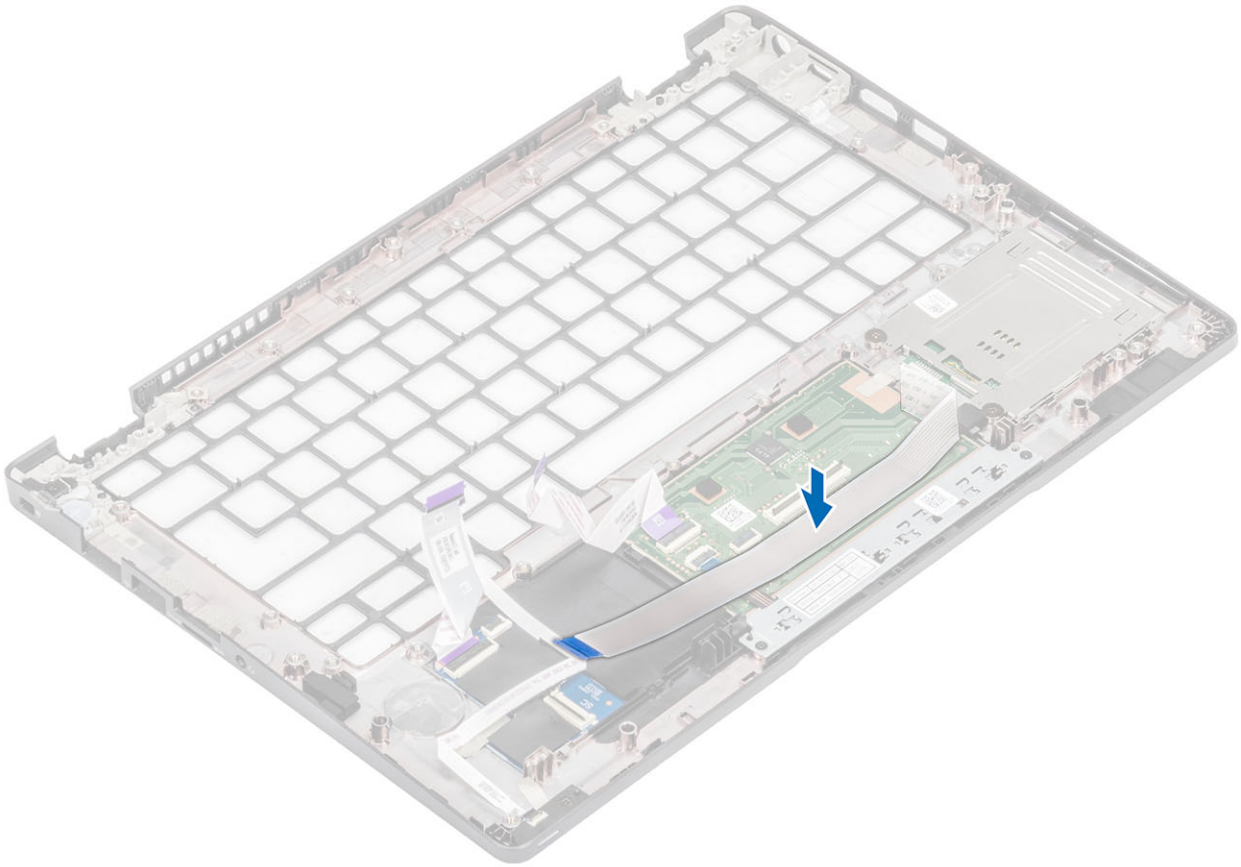
Installing the smart card reader board

Steps

1. Align and place the smart card reader board on the palmrest [1].
2. Replace the two (M2x2.5) screws to secure the smart card reader board to the palmrest [2].



3. Reroute the smart card reader cable.



Next steps

1. Replace the coin cell battery.
2. Replace the system board.
3. Replace the WWAN card.
4. Replace the WLAN card.
5. Replace the Dc-in.
6. Replace the memory module.
7. Replace the system fan.
8. Replace the speaker.
9. Replace the battery.
10. Replace the base cover.
11. Replace the microSD card.
12. Follow the procedure in after working inside your computer.

Palmrest assembly

Replacing the palmrest and keyboard assembly

Prerequisites

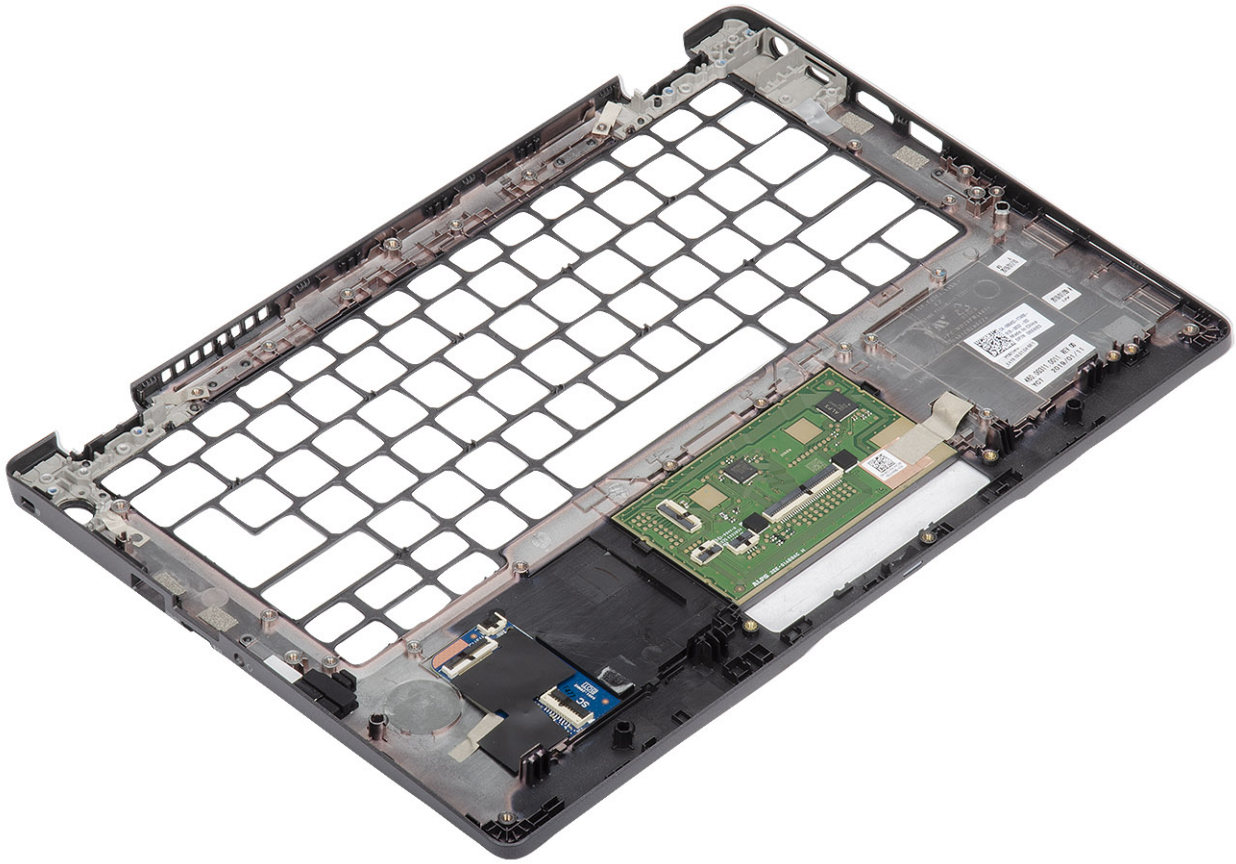
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Remove the battery.
5. Remove the speaker.
6. Remove the memory module.

7. Remove the system fan.
8. Remove the DC-in .
9. Remove the WLAN card.
10. Remove the WWAN card.
11. Remove the system board.

    NOTE: System board can be removed with heatsink attached.
12. Remove the coin cell battery.
13. Remove the SmartCard reader board.

About this task

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



Next steps

1. Replace the SmartCard reader board.
2. Replace the coin cell battery.
3. Replace the system board.

    NOTE: System board can be replaced with heatsink attached.
4. Replace the WWAN card.
5. Replace the WLAN card.
6. Replace the DC-in.
7. Replace the memory module.
8. Replace the system fan.
9. Replace the speaker.
10. Replace the battery.
11. Replace the base cover.
12. Replace the microSD card.
13. Follow the procedure in after working inside your computer.

5

Troubleshooting

Topics:

- Handling swollen Lithium-ion batteries
- Dell SupportAssist Pre-boot System Performance Check diagnostics
- Built-in self-test (BIST)
- System-diagnostic lights
- Recovering the operating system
- Backup media and recovery options
- WiFi power cycle
- Drain residual flea power (perform hard reset)

Handling swollen Lithium-ion batteries

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

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

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

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

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

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

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 is launched by the BIOS internally. The embedded system diagnostics provides a set of options for particular devices or device groups allowing you to:

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

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

For more information, see https://www.dell.com/support/kbdoc/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 front page is displayed.
5. Click the arrow in the lower-right corner to go to the page listing.
   The items detected are listed.
6. To run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
7. Select the device from the left pane and click **Run Tests**.
8. If there are any issues, error codes are displayed.
   Note the error code and validation number and contact Dell.

Built-in self-test (BIST)

M-BIST

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

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

How to run M-BIST

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

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

Table 3. LED error codes

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

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

LCD 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 (i.e., the L-BIST circuit fails), the battery status LED will flash 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 L-BIST Test:

1. Press the power button to start the system.
2. If the system does not start up normally, look at the battery status LED:
   - If the battery status LED flashes an error code [2,7], 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 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 PC settings.

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

How to invoke LCD BIST Test

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

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

System-diagnostic lights

Power and battery-status light

The power and battery status light indicates the power and battery status of the computer. These are the power states:

Solid white: Power adapter is connected and the battery has more than 5% charge.

Amber: Computer is running on battery and the battery has less than 5% charge.

Off:

- Power adapter is connected, and the battery is fully charged.
- Computer is running on battery, and the battery has more than 5% charge.
- Computer is in sleep state, hibernation, or turned off.

The power and battery-status light may blink amber or white according to pre-defined "beep codes" indicating various failures.

For example, the power and battery-status light blinks amber two times followed by a pause, and then blinks white three times followed by a pause. This 2,3 pattern continues until the computer is turned off, indicating no memory or RAM is detected.

The following table shows different power and battery-status light patterns and associated problems.

NOTE: The following diagnostic light codes and recommended solutions are intended for Dell service technicians to troubleshoot problems. You should only perform troubleshooting and repairs as authorized or directed by the Dell technical assistance team. Damage due to servicing that is not authorized by Dell is not covered by your warranty.

Table 4. Diagnostic-light LED codes

Diagnostic light codes (Amber,White)	Problem description
2,1	Processor failure
2,2	System board: BIOS or ROM (Read-Only Memory) failure
2,3	No memory or RAM (Random-Access Memory) detected
2,4	Memory or RAM (Random-Access Memory) failure
2,5	Invalid memory installed
2,6	System-board or chipset error
2,7	Display failure - SBIOS message
3,1	Coin-cell battery failure
3,2	PCI, video card/chip failure
3,3	Recovery image not found
3,4	Recovery image found but invalid
3,5	Power-rail failure
3,6	System BIOS Flash incomplete
3,7	Management Engine (ME) error

Recovering the operating system

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

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

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

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

Backup media and recovery options

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

WiFi power cycle

About this task

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

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

Steps

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

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 are requested to 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 power on or boot into the operating system.

To drain residual flea power (perform a hard reset)

Steps

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

NOTE: For more information about performing a hard reset, see the knowledge base article 000130881 at www.dell.com/support.

6

Getting help

Topics:

- Contacting Dell

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.