Dell Latitude 5310 2-in-1

Service Manual

Regulatory Model: P96G
Regulatory Type: P96G003

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Notes, cautions, and warnings

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

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

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

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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

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

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

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

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

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

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

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

Before working inside your computer

About this task

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

Steps

1. Ensure that you follow the safety precautions.
2. Ensure that your work surface is flat and clean to prevent the computer cover from being scratched.
3. Turn off your computer.
4. Disconnect all network cables from the computer.

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

5. Disconnect your computer and all attached devices from their electrical outlets.

6. Press and hold the power button while the computer is unplugged to ground the system board.

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

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 notebook 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 15 seconds should discharge residual power in the system board. Remove the battery from 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.

After working inside your computer

About this task

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

Steps

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

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

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

2

Technology and components

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

Topics:

- USB features
- USB Type-C
- HDMI 1.4
- 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 3.2 Gen 1 (previously USB 3.0/USB 3.1 Gen 1)	5 Gbps	SuperSpeed	2010
USB 3.1 Gen 2	10 Gbps	SuperSpeed Plus	2013

USB 3.2 Gen 1 (SuperSpeed USB)

For years, the USB 2.0 has been firmly entrenched as the de facto interface standard in the personal computer 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 3.2 Gen 1 features are as follows:

- Higher transfer rates (up to 20 Gbps).
- Increased multilane operation of 10 Gbps each.
- 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 compatibility with USB 3.1/3.0 and USB 2.0.
- New connectors and cable.

The topics below cover some of the most commonly asked questions regarding USB 3.0/USB 3.2 Gen 1.

Speed

Currently, there are five speed modes that are defined by the latest USB 3.0/USB 3.1 Gen 1 specification. Based on USB data transfer, they are categorized as Low Speed, Full Speed, High Speed (from version 2.0 of the specification), SuperSpeed (from version 3.0), and SuperSpeed+ (from version 3.1). The new SuperSpeed+ mode has a transfer rate of 20 Gbps. The USB 3.2 standard is backward compatible with USB 3.1/3.0 and USB 2.0.

USB 3.2 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 (see the figure below).
- USB 2.0 previously had four wires (power, ground, and a pair for differential data); 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 3.2 Gen 1 uses the bi-directional data interface, rather than USB 2.0's half-duplex arrangement. This gives a 10-fold increase in theoretical bandwidth.

Applications

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 is easy to imagine that with 5 to 10 times the bandwidth available, USB video solutions should work that much better. Single-link DVI requires almost 2 Gbps throughput. Where 480 Mbps was limiting, 5 Gbps is more than promising. With its promised 4.8 Gbps speed, the standard finds its way into some products that previously were not 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 3.2 Gen 1 Hard Drives
- Portable USB 3.2 Gen 1 Hard Drives
- USB 3.2 Gen 1 Drive Docks and Adapters
- USB 3.2 Gen 1 Flash Drives and Readers
- USB 3.2 Gen 1 Solid-state Drives
- USB 3.2 Gen 1 RAIDs
- Optical Media Drives
- Multimedia Devices
- Networking
- USB 3.2 Gen 1 Adapter Cards and Hubs

Compatibility

The good news is that USB 3.2 Gen 1 has been carefully planned from the start to peacefully co-exist with USB 2.0. First of all, while USB 3.2 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 receive and transmit data independently are present on USB 3.0/USB 3.2 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 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 1. Thunderbolt Iconography Variations

HDMI 1.4

This topic explains the HDMI 1.4 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 1.4 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

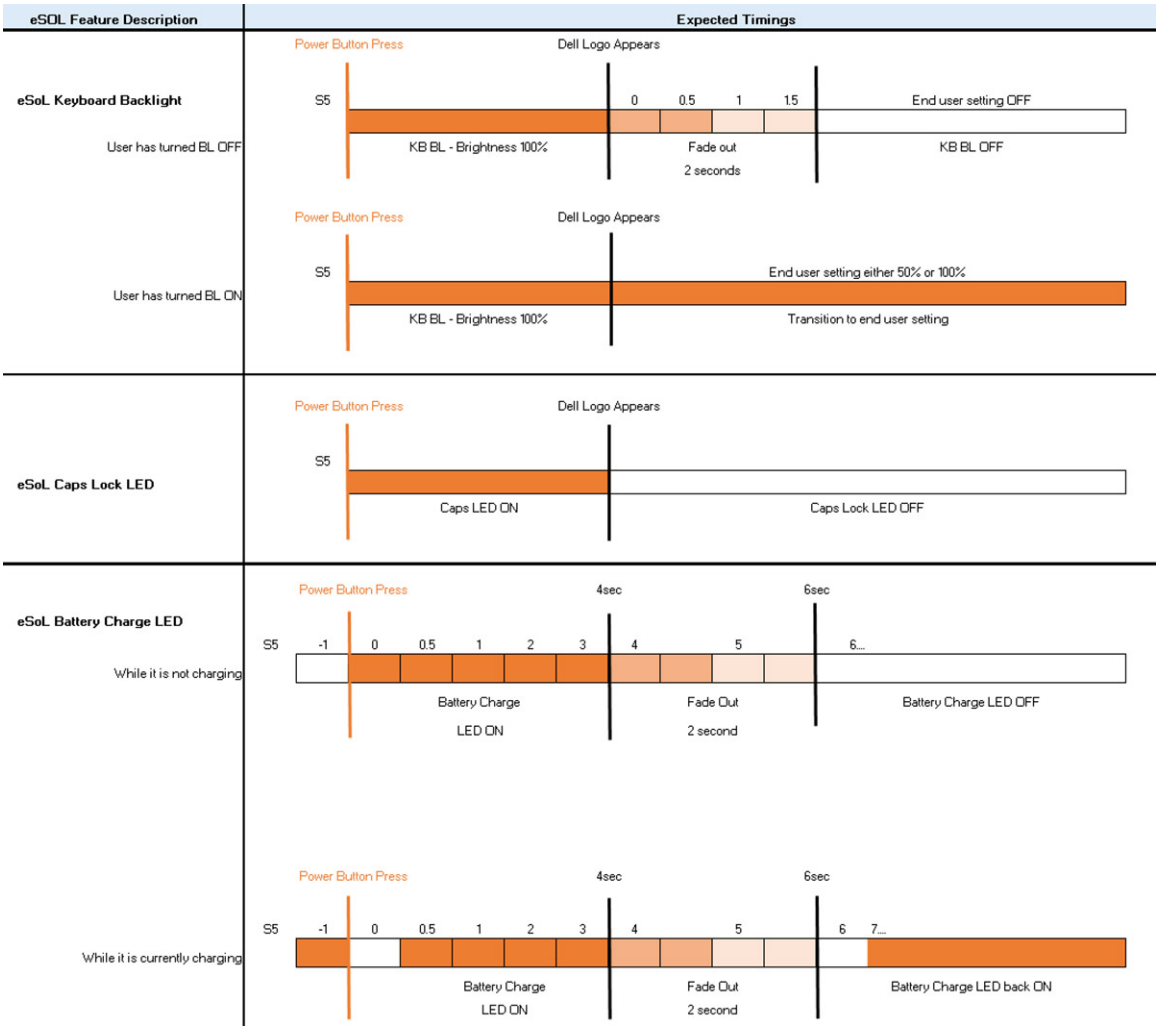
On certain Dell Latitude systems, the power button LED is used to provide an indication of the system status, and as a result the power button illuminates when pressed. The systems with the optional power button/fingerprint reader will have no LED under the power button and hence will apply the available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

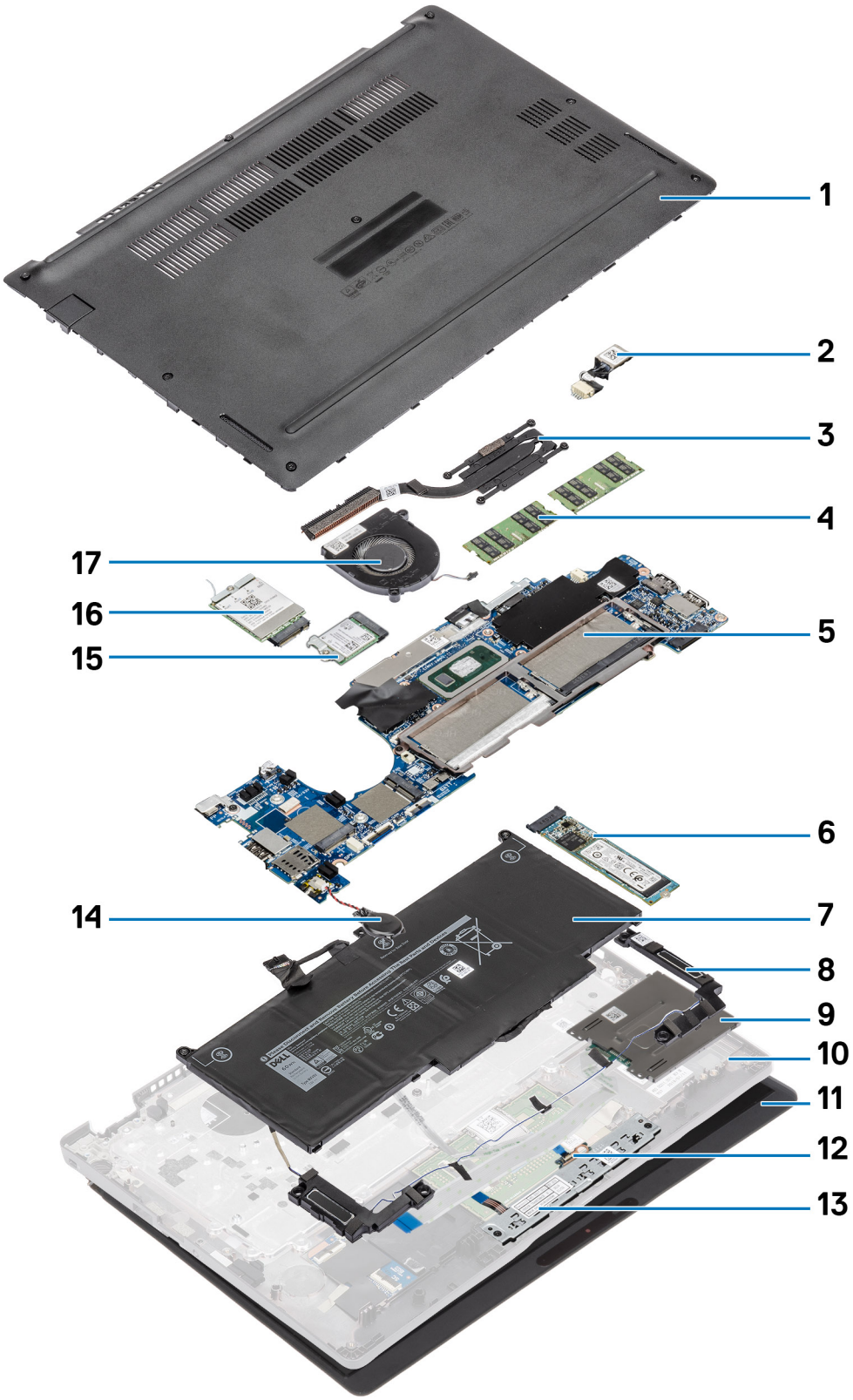


Power button with fingerprint reader will have no LED and will leverage the available LED's in the system to provide indication of the system status

- **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.

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: Some of the images used in this manual are leveraged from its predecessor model for illustration purpose and may slightly vary from the actual system. The images are still applicable to convey the service procedures accurately.

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

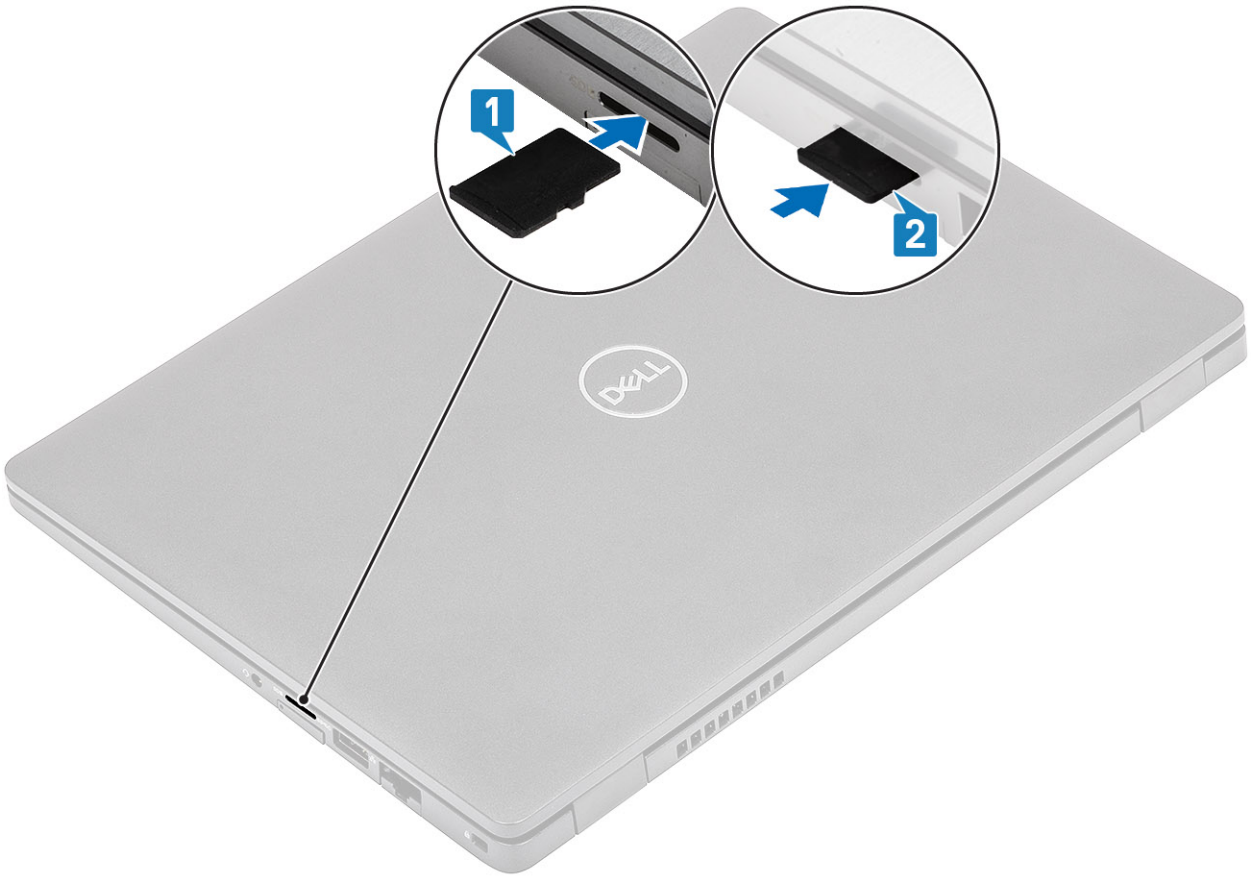
Steps

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

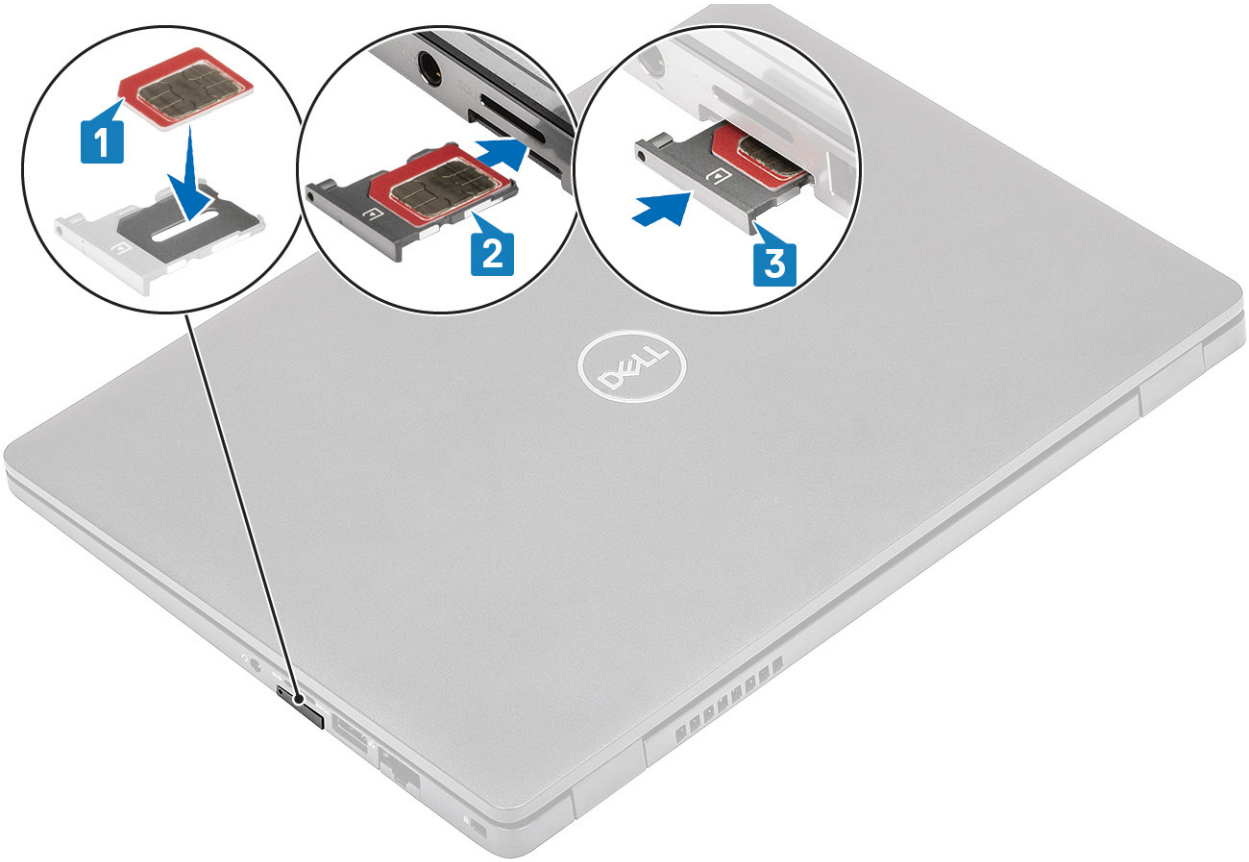
Steps

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

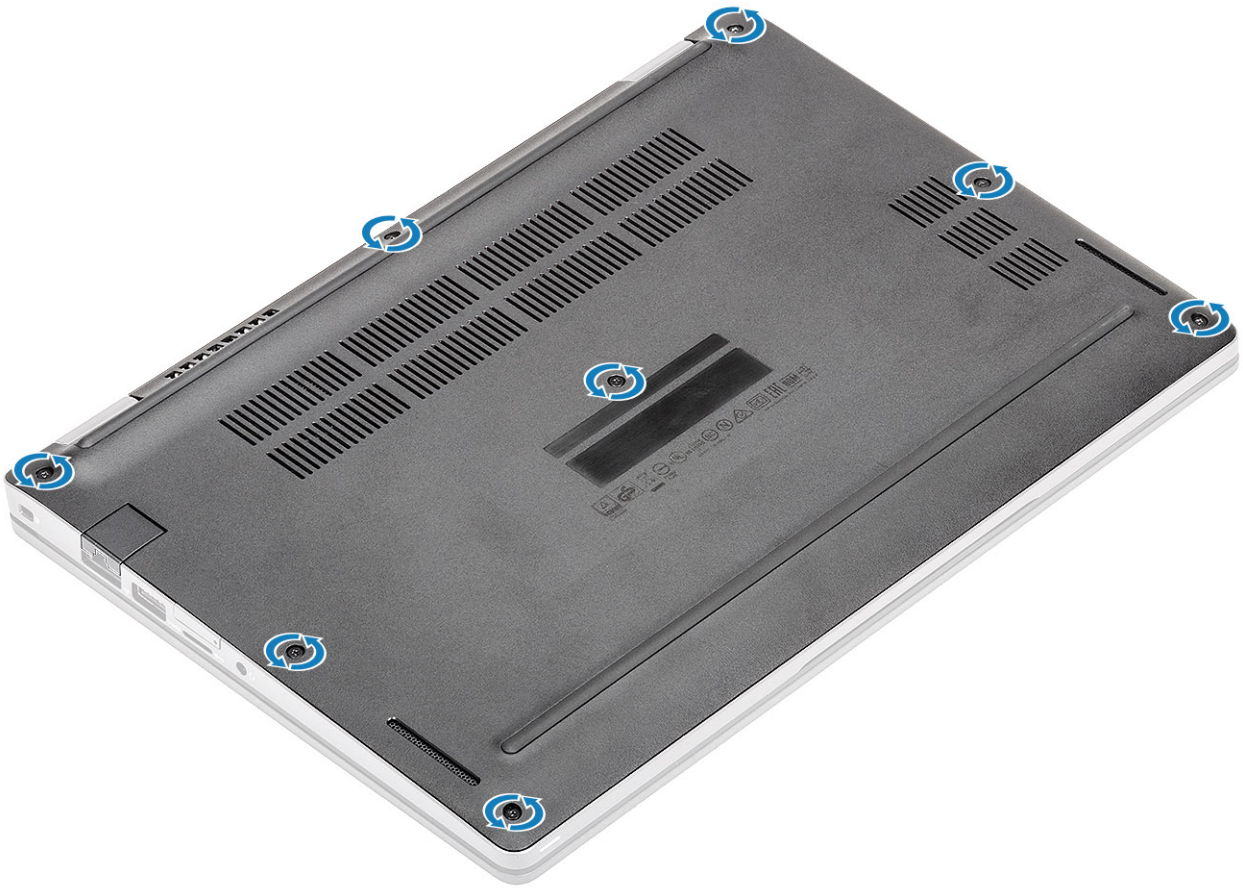
Removing the base cover

Prerequisites

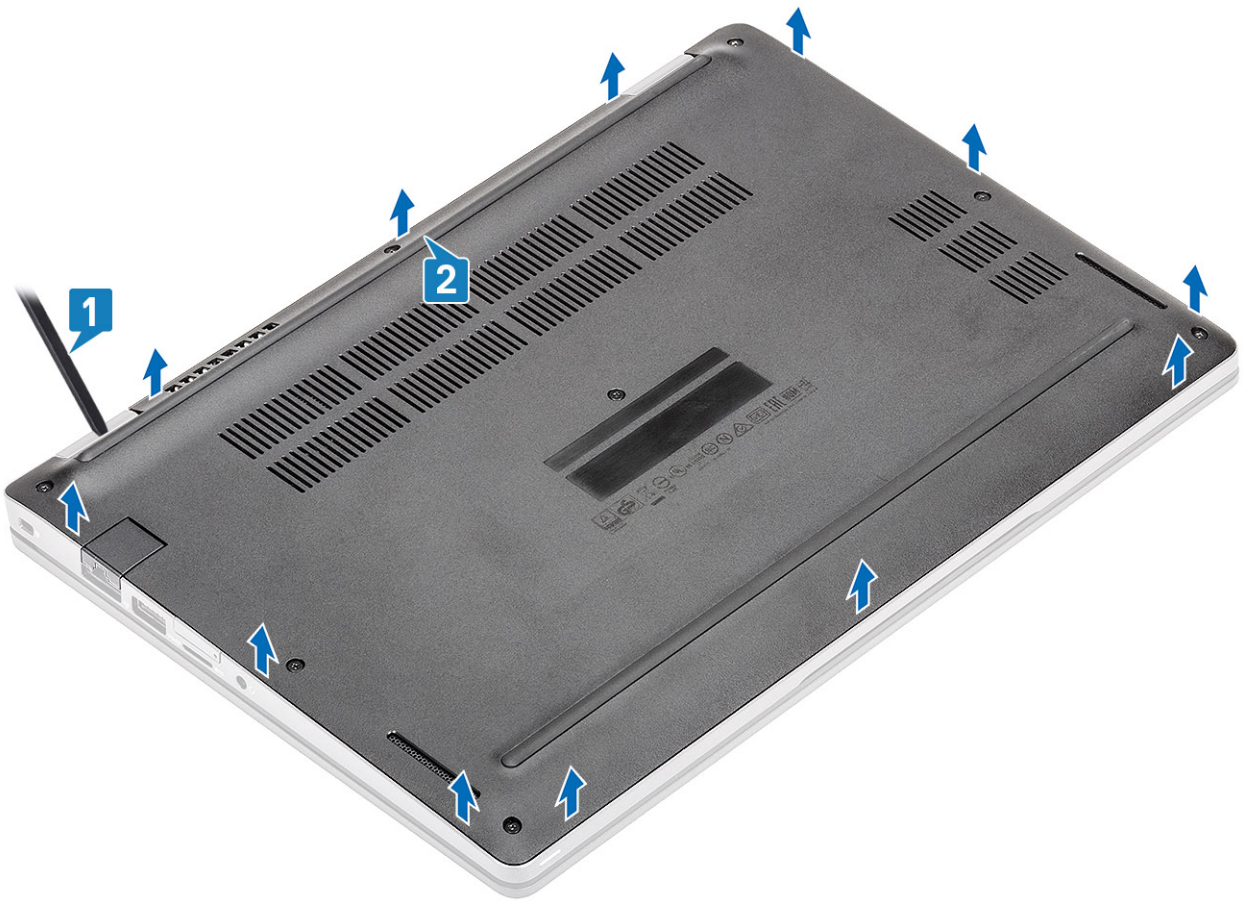
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.

Steps

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

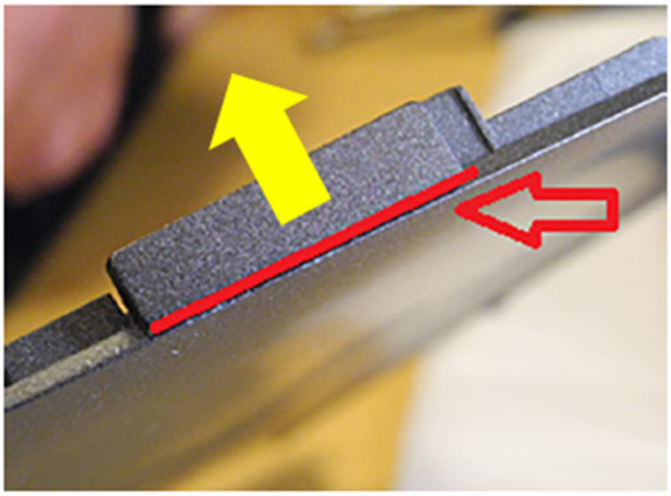


2. Using a plastic scribe [1], pry the base cover from the top-left corner and continue to work on the sides to open the base cover [2].



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.

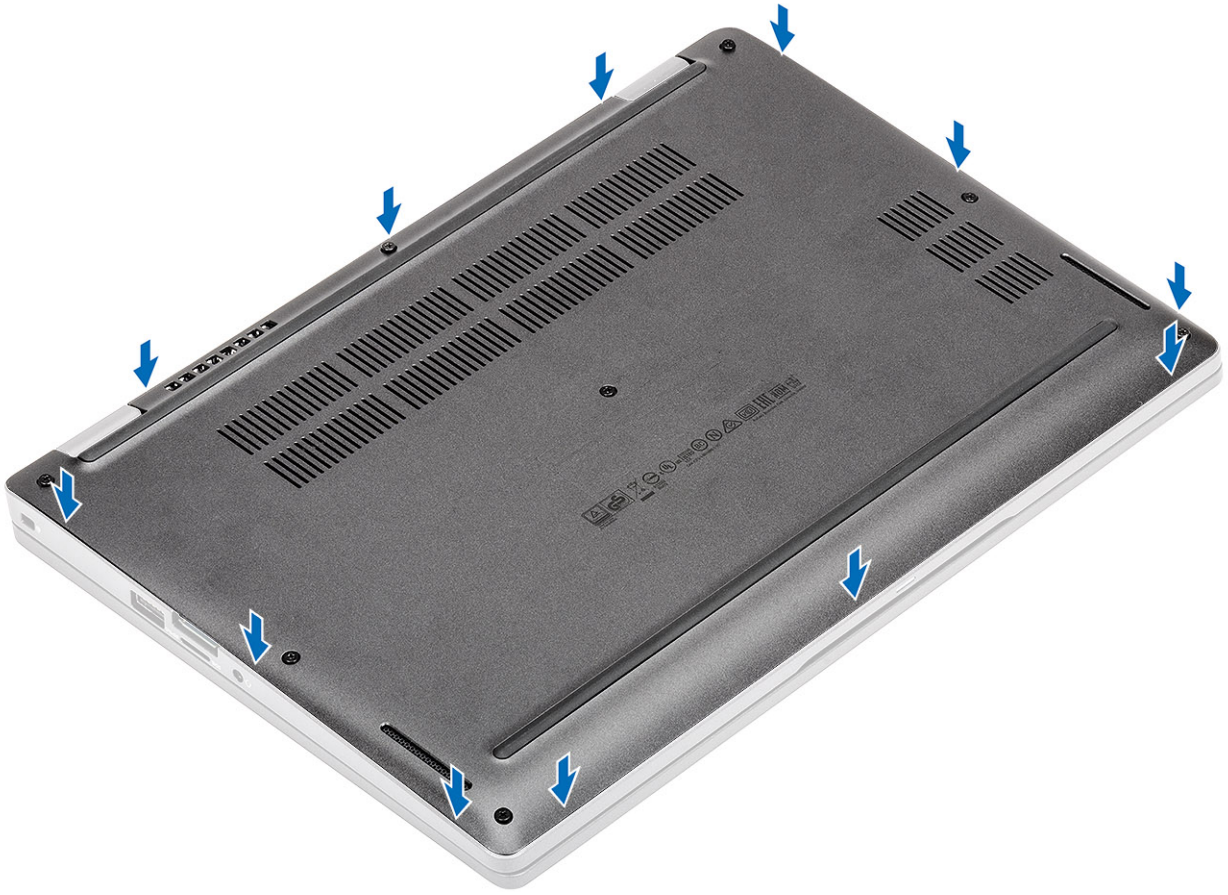


Installing the base cover

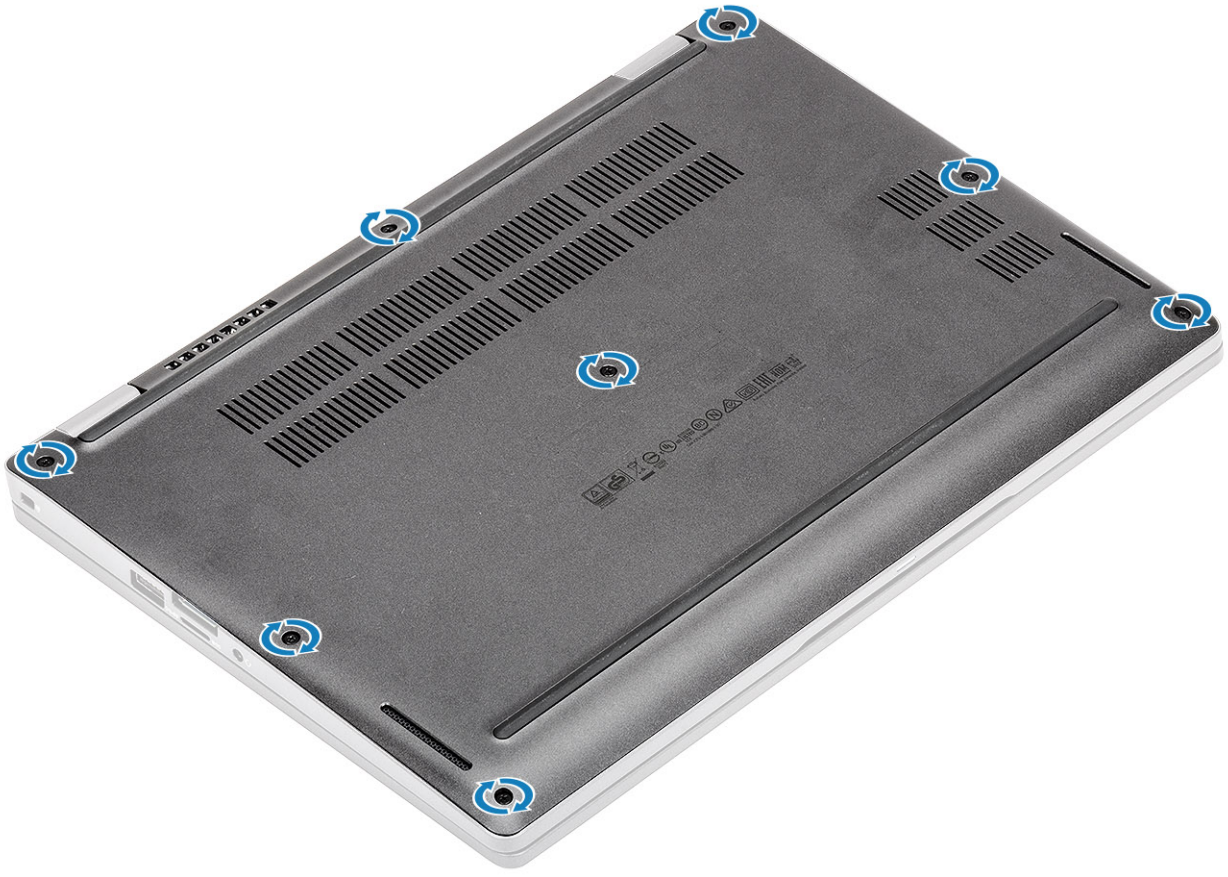
Steps

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

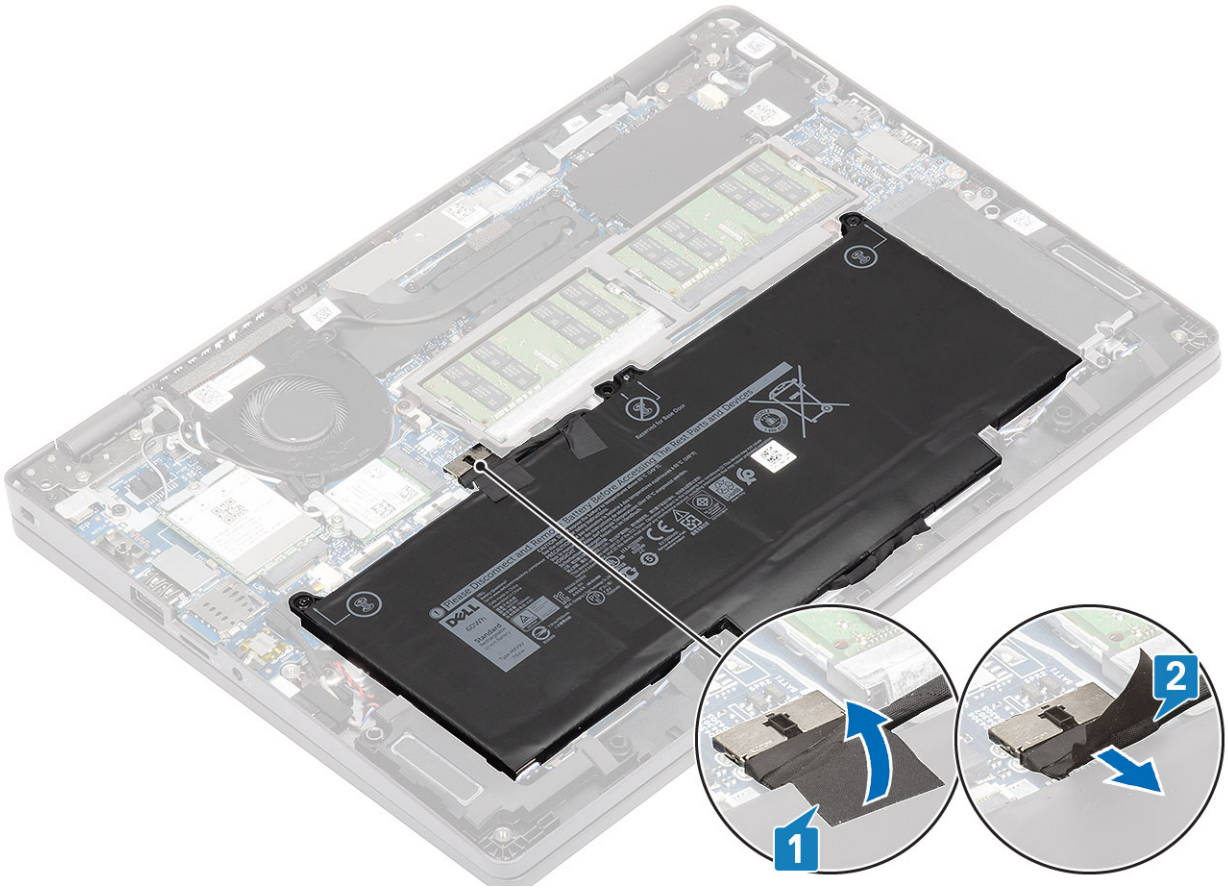
Removing the battery

Prerequisites

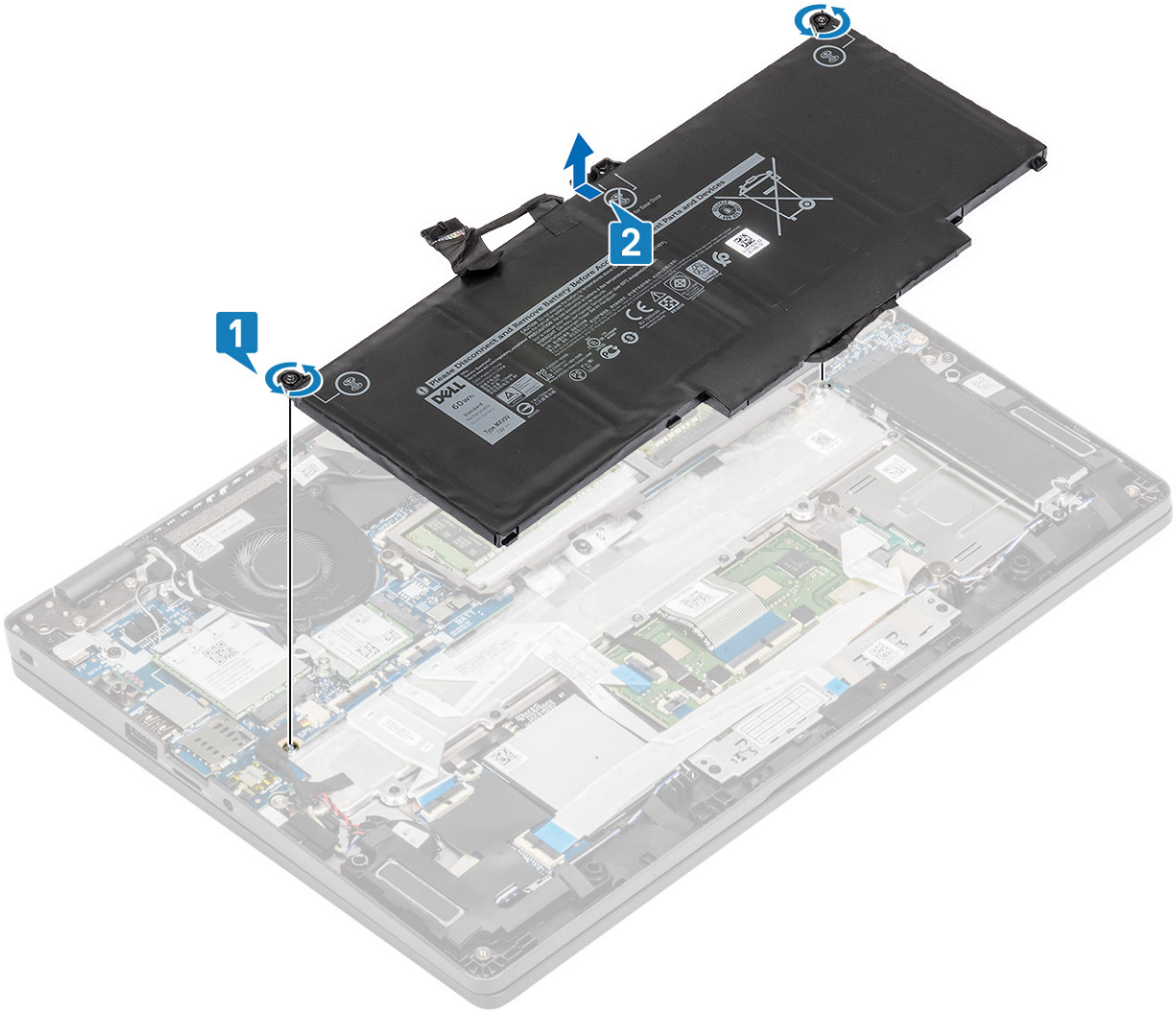
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.

Steps

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



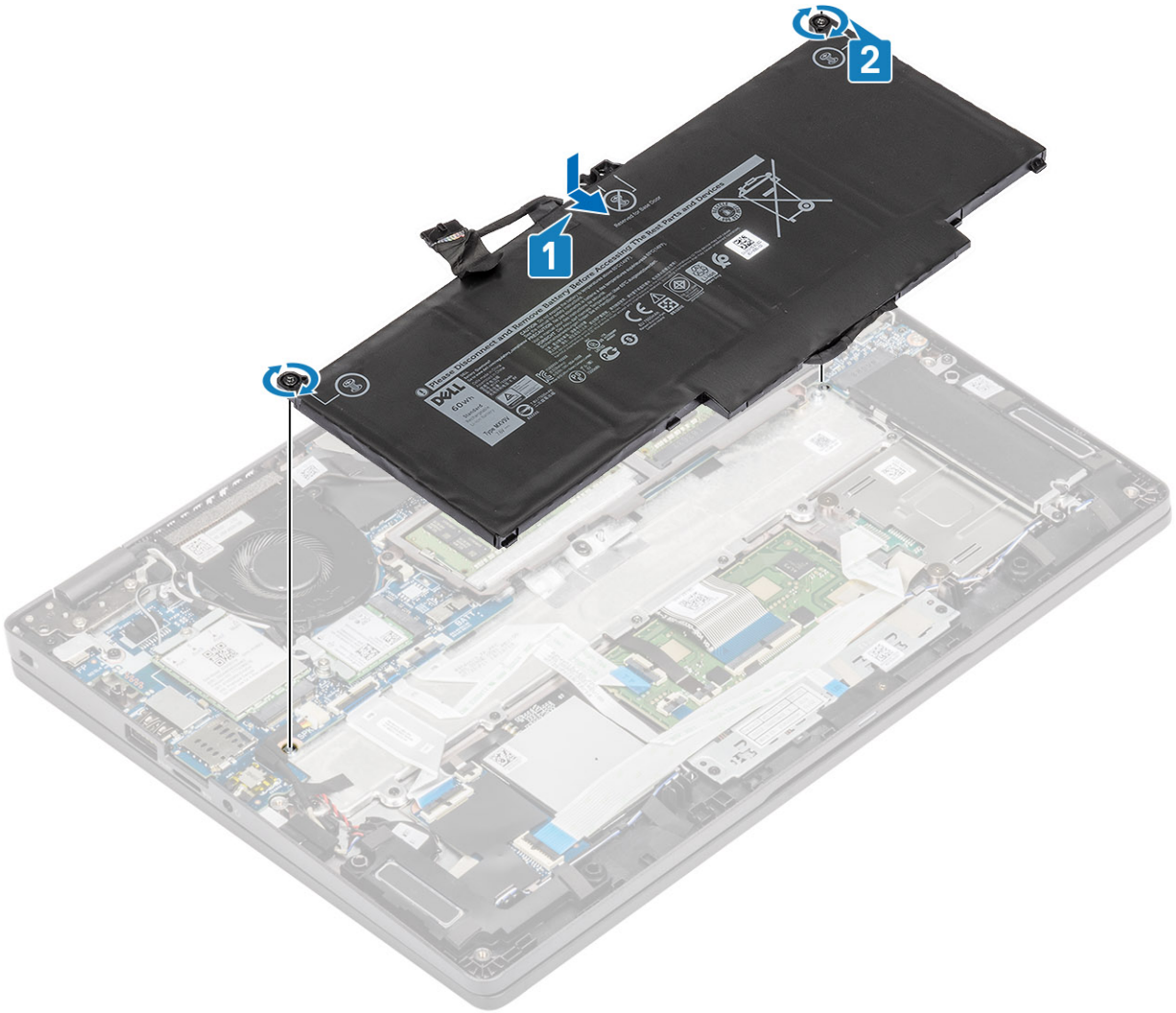
3. Loosen the two captive screws that secure the battery to the palm rest assembly [1].
4. Lift and slide the battery away from the palm rest assembly. [2].



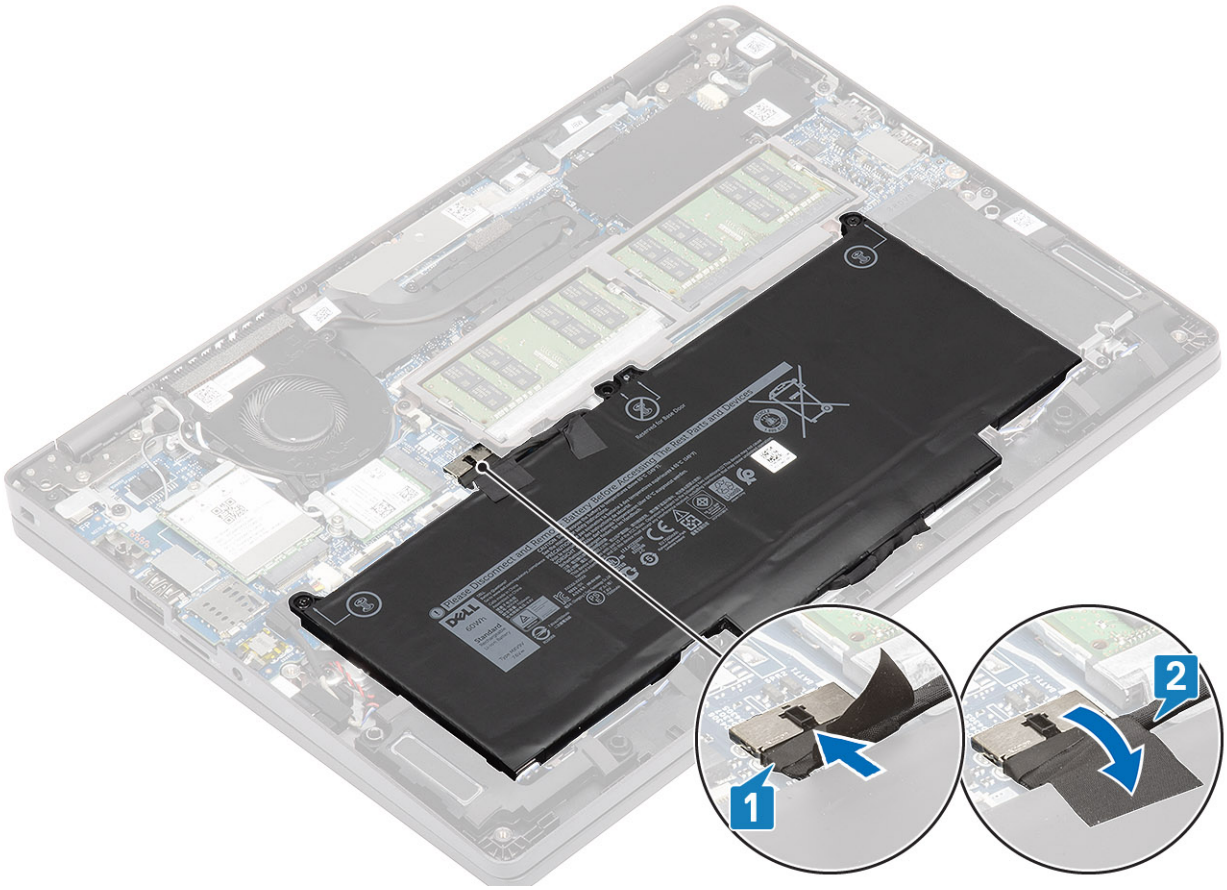
Installing the battery

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

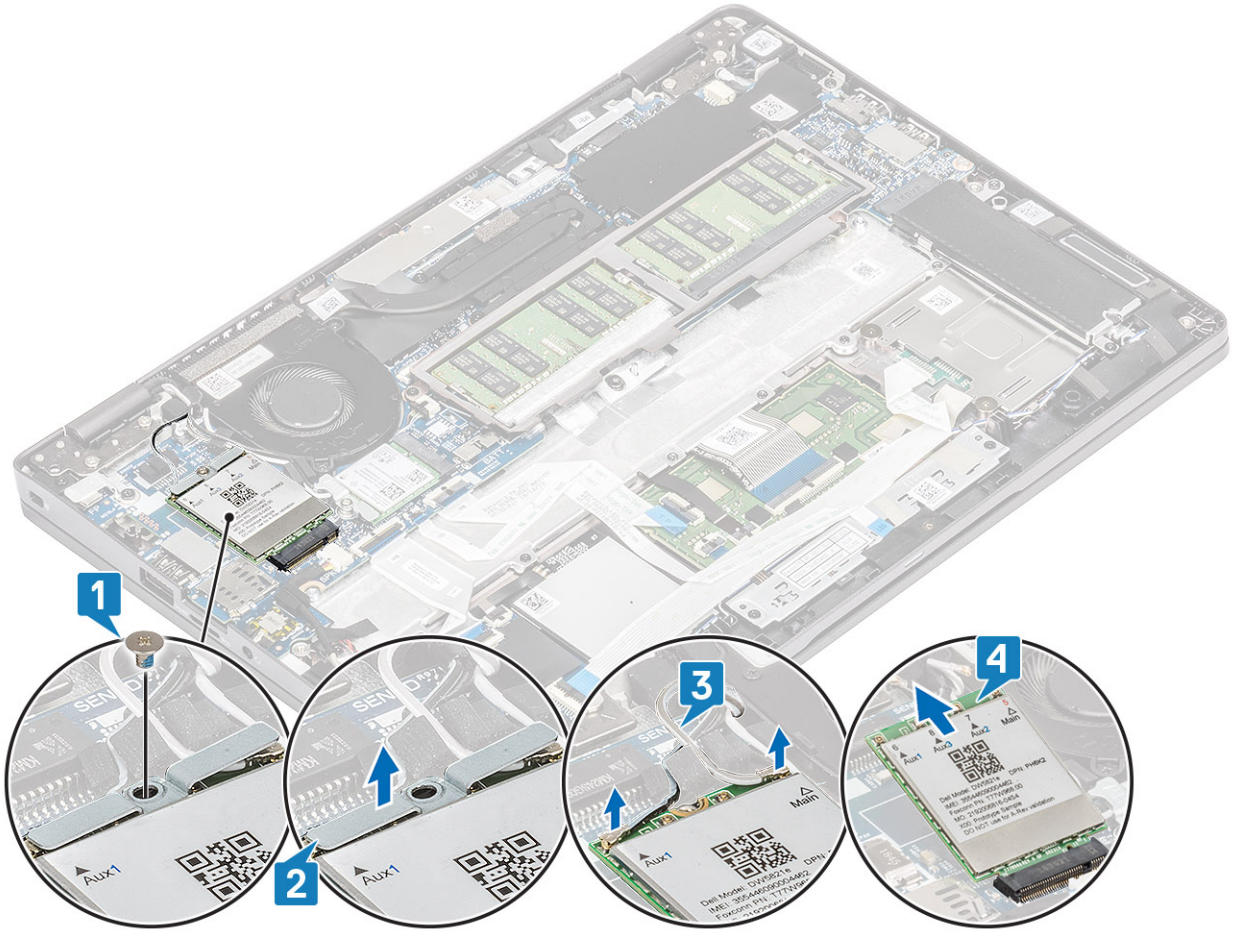
Removing the WWAN card

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.

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].



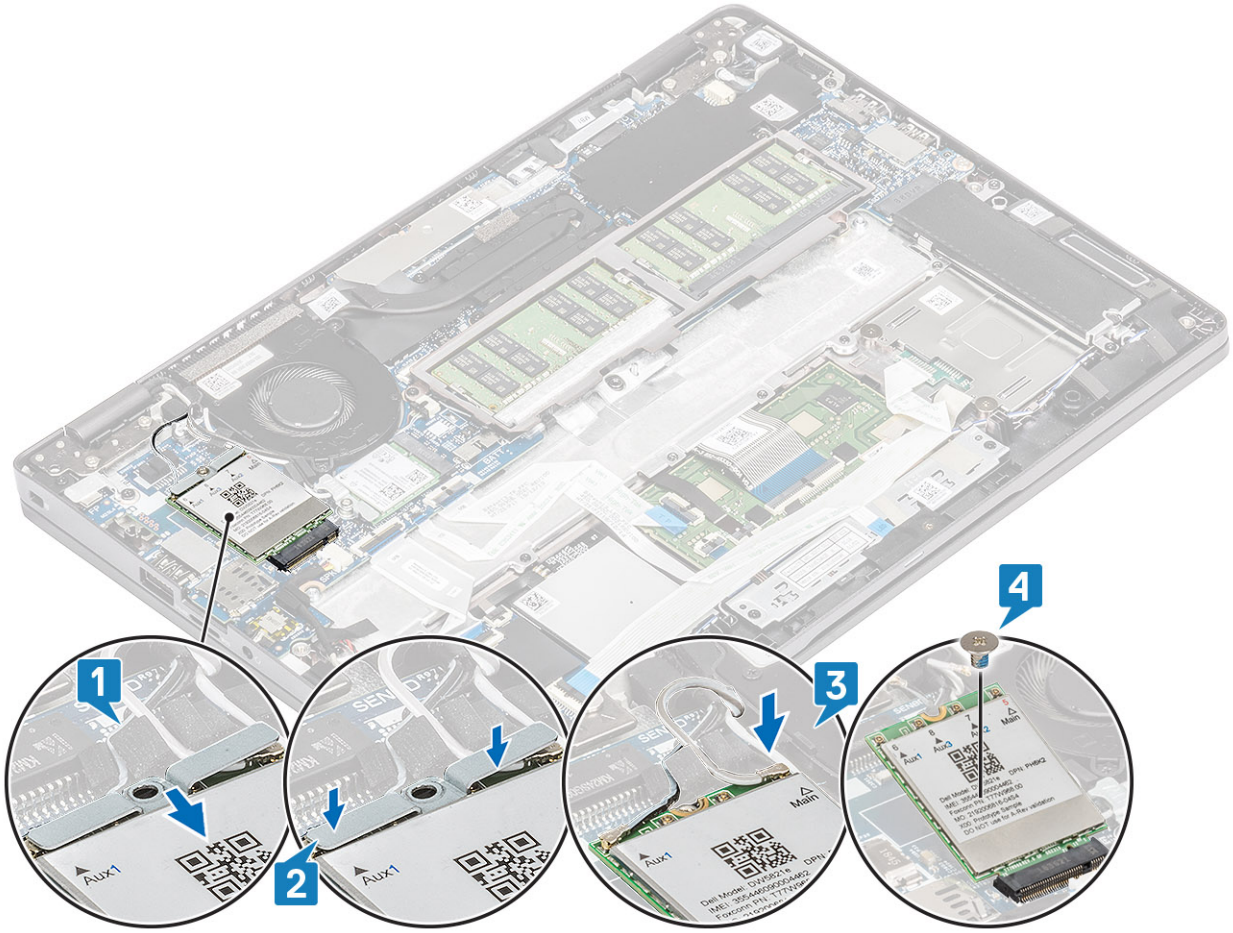
Installing the WWAN card

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

WLAN card

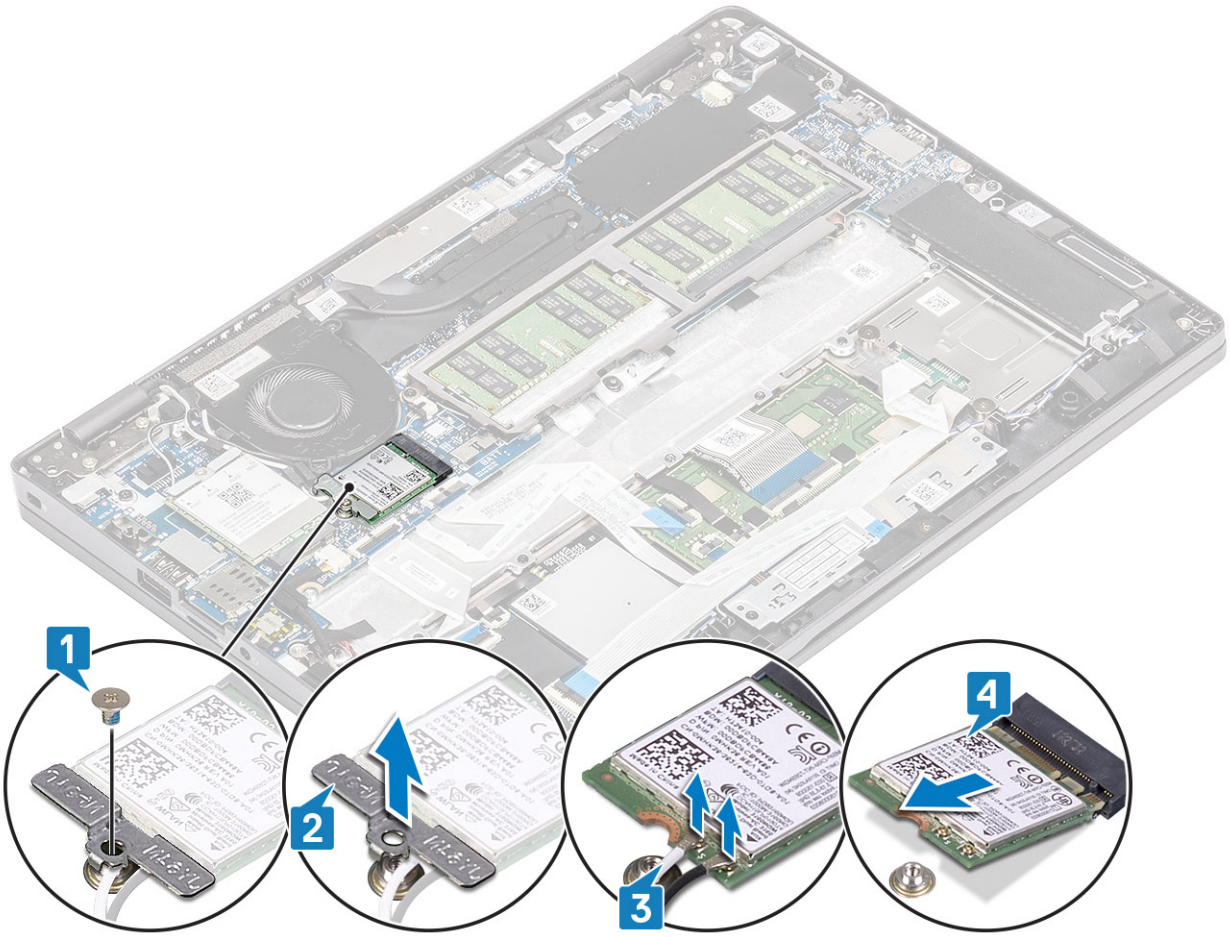
Removing the WLAN card

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.

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].



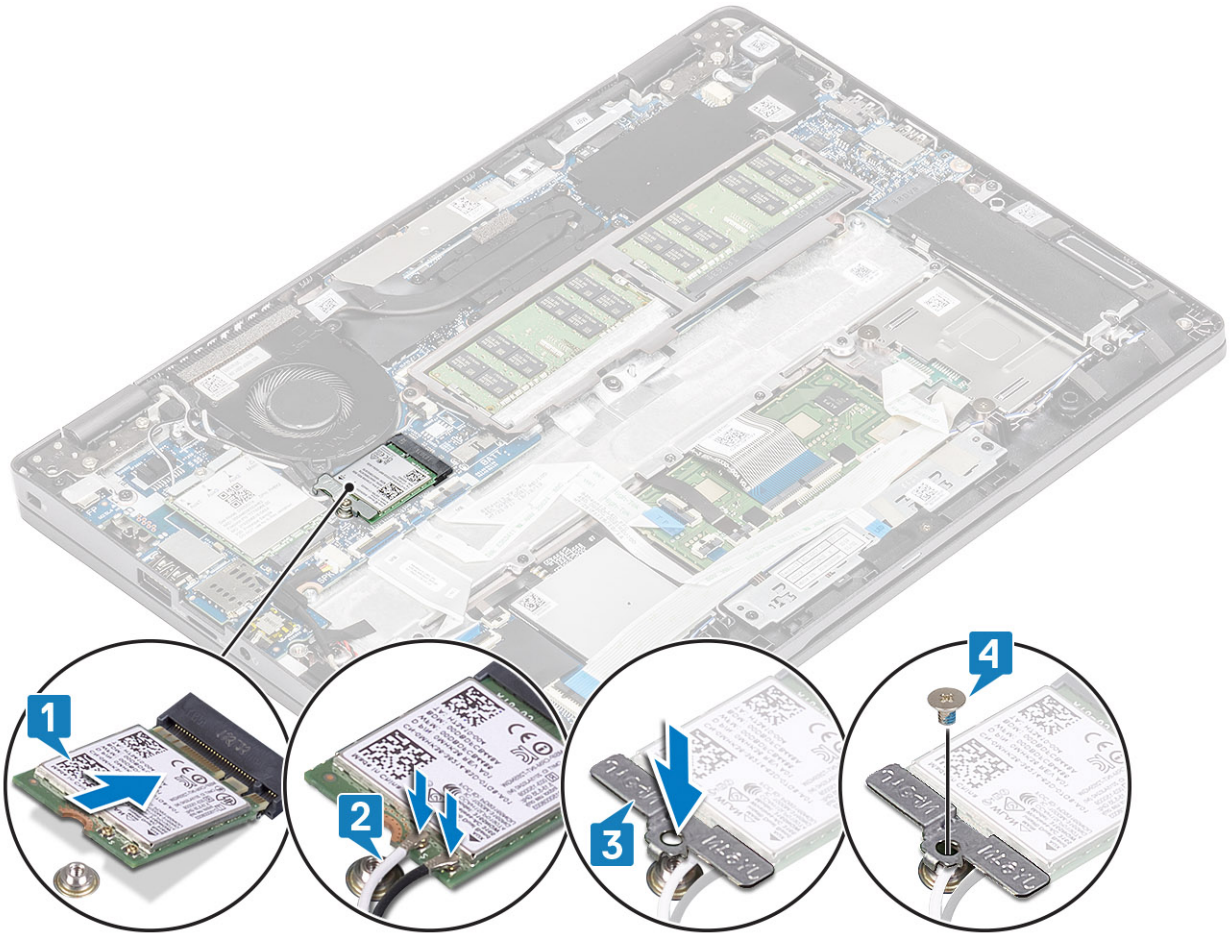
Installing the WLAN card

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

Memory modules

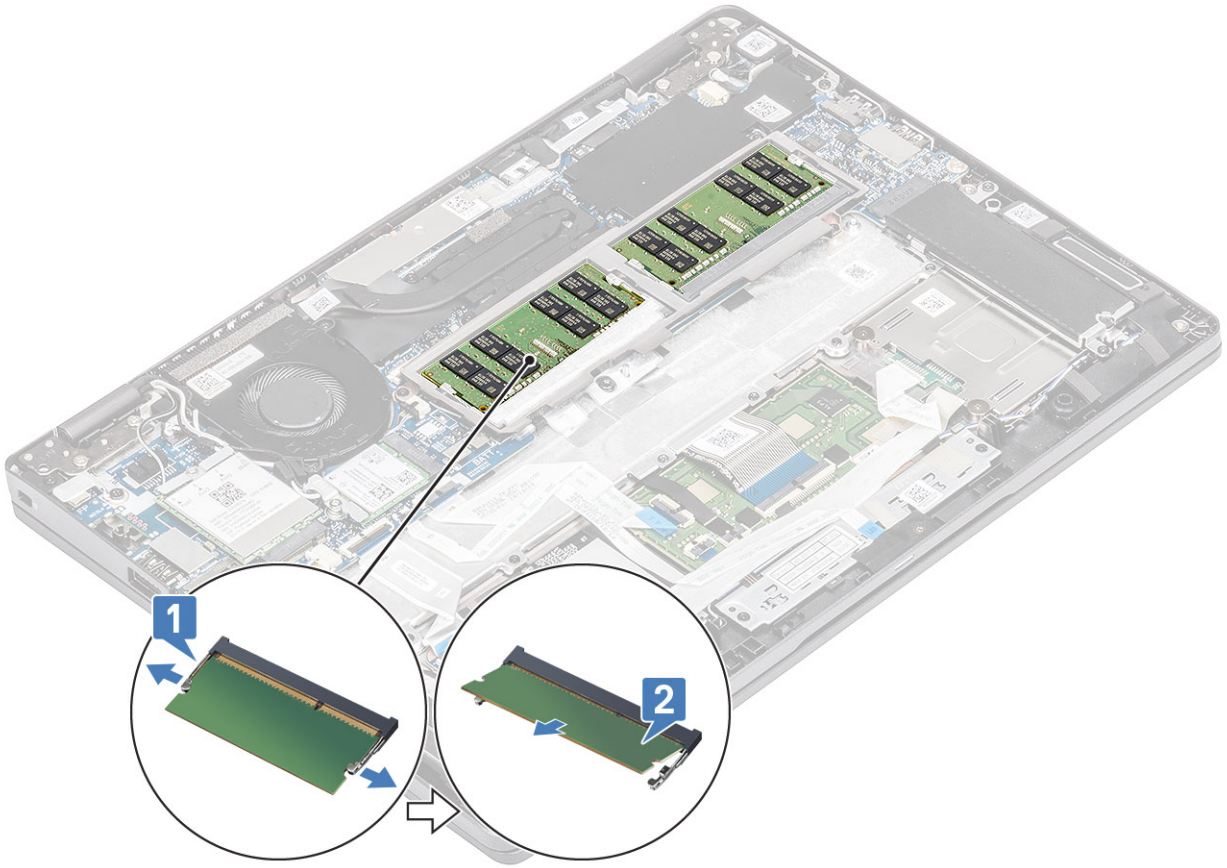
Removing the memory module

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.

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].

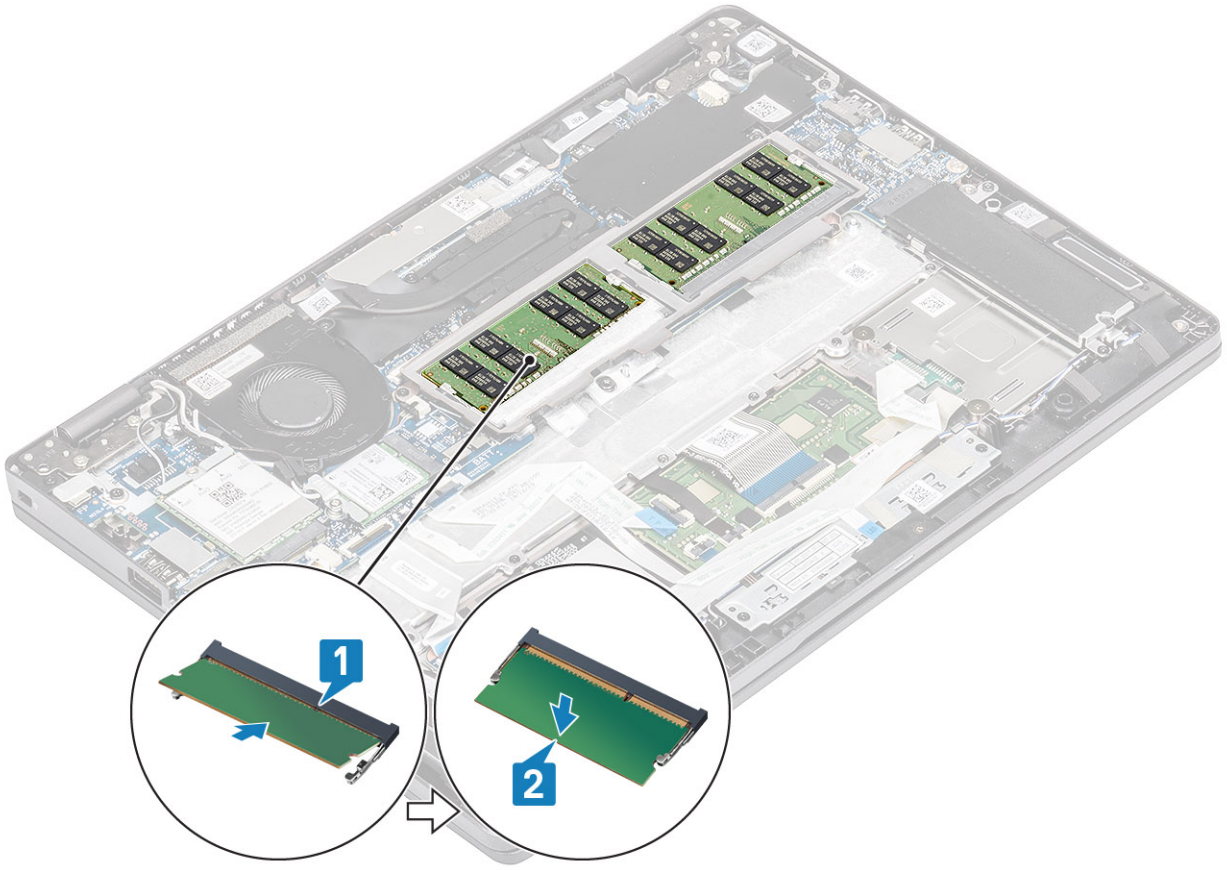


Installing the memory module

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.
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

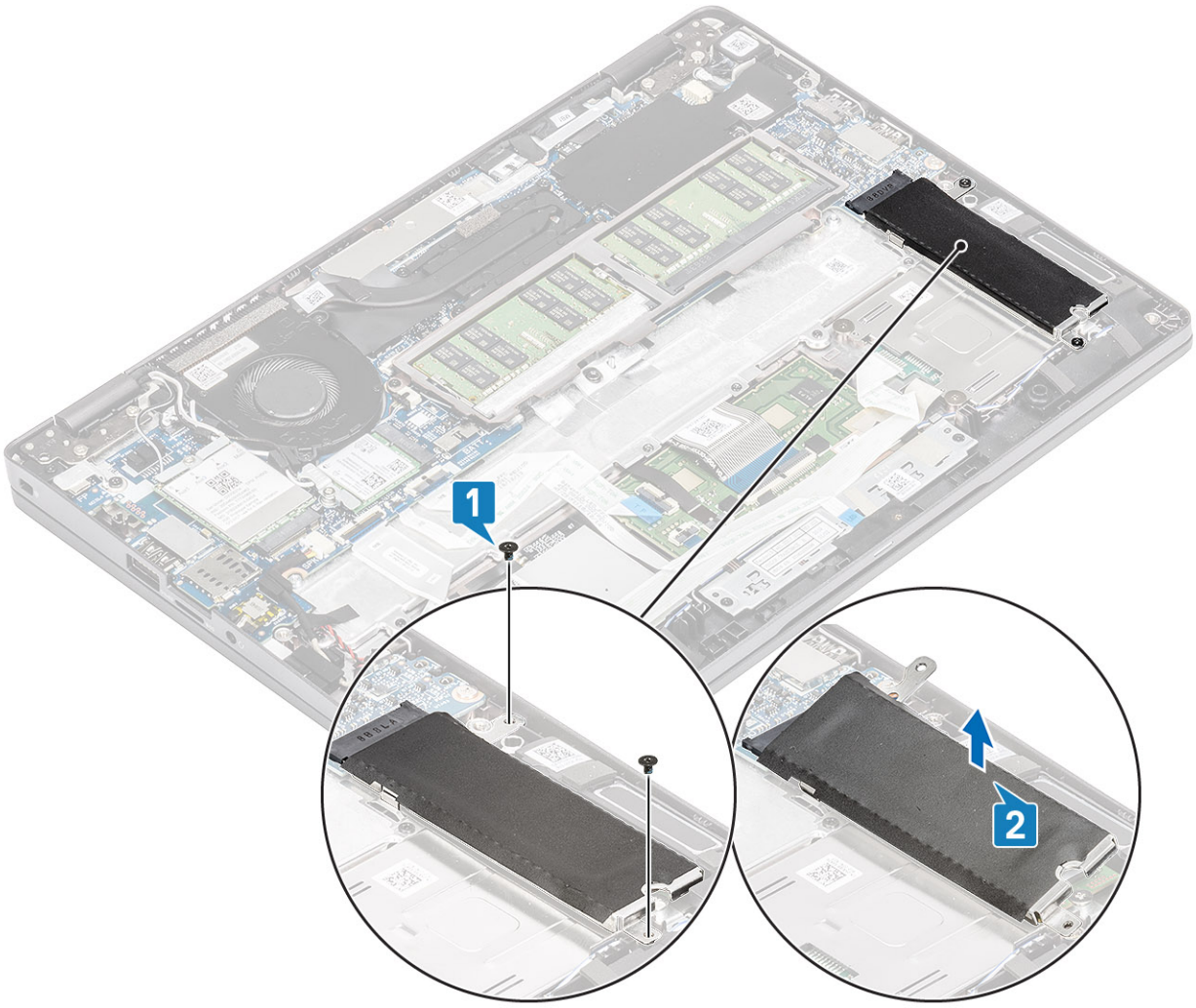
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Disconnect the battery cable.

About this task

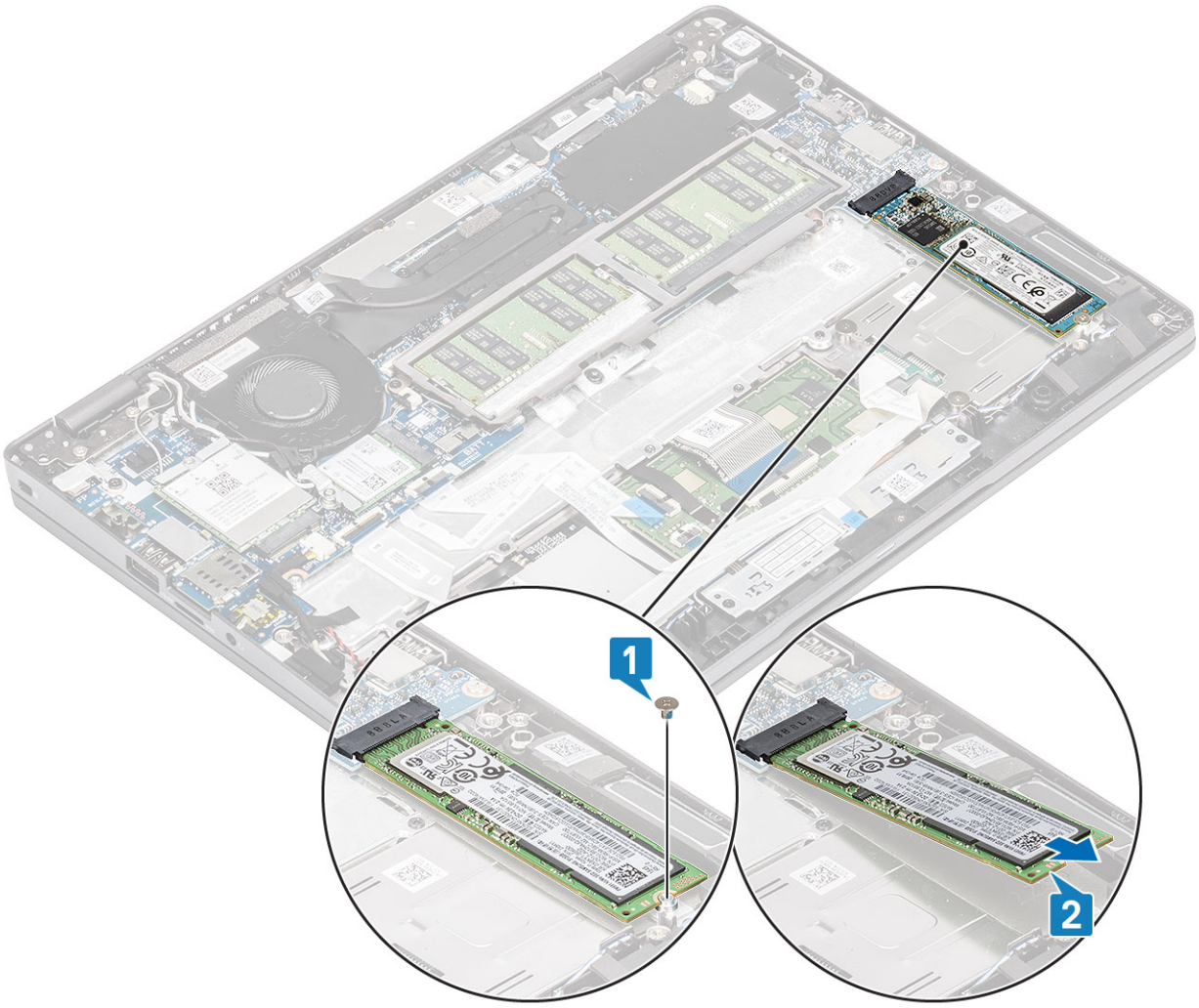
NOTE: The computer supports one M.2 2230 solid-state drive or one M.2 2280 solid-state drive at a time. The following instructions indicates the steps to remove only one M.2 SSD card as both the cards utilizes the same slot.

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].



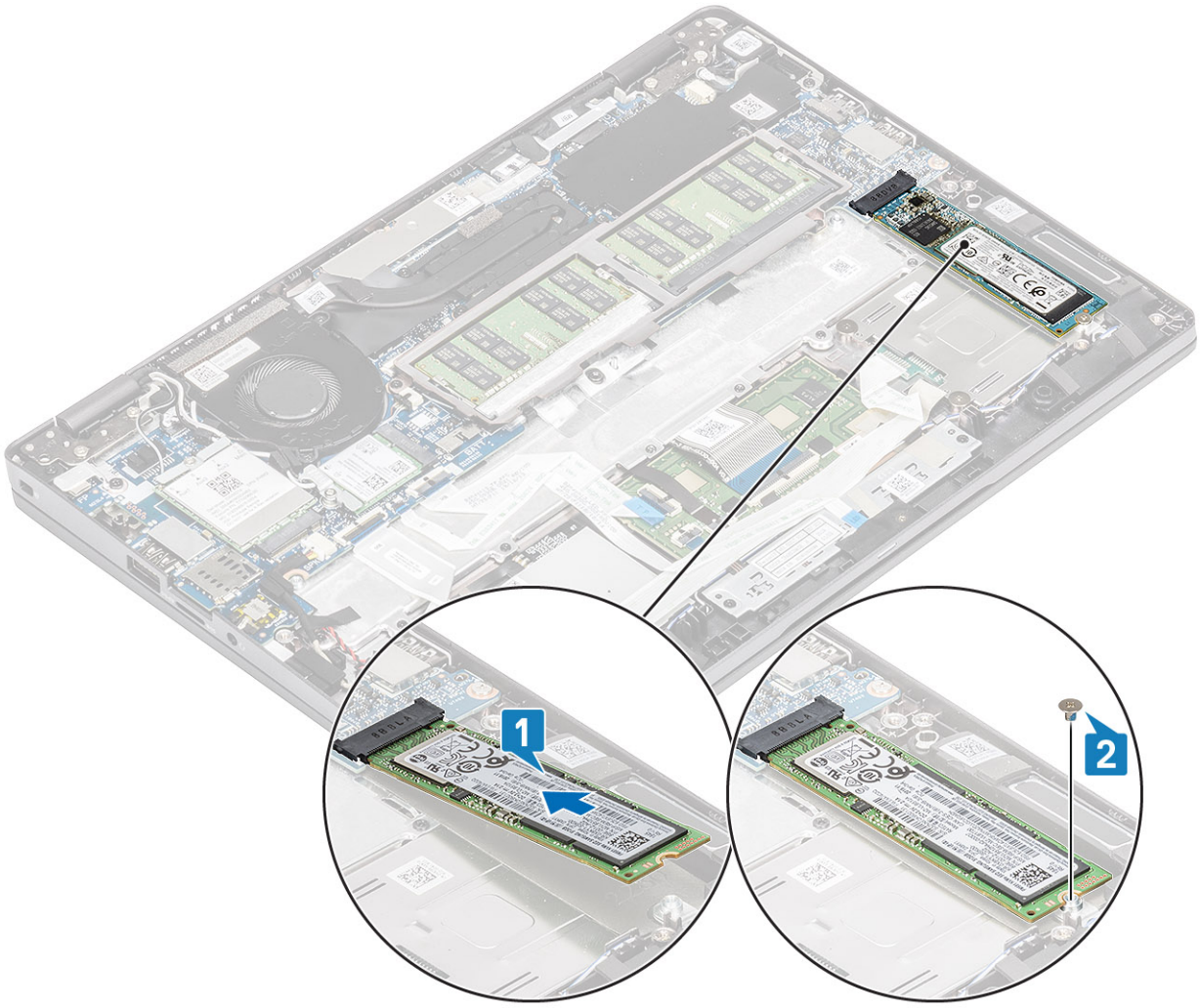
Installing the M.2 SSD

About this task

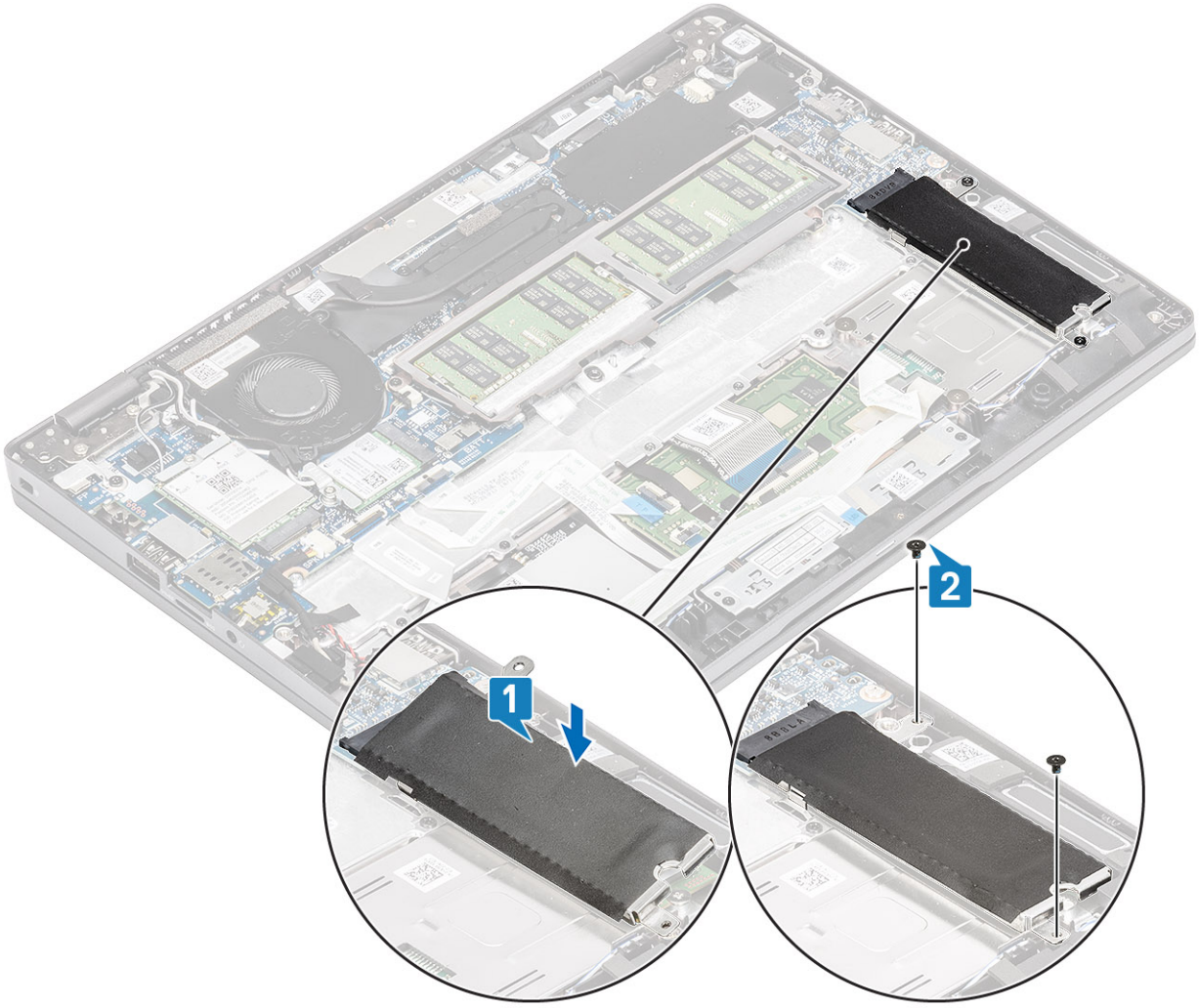
NOTE: The computer supports one M.2 2230 solid-state drive or one M.2 2280 solid-state drive at a time. The following instructions indicates the steps to install only one M.2 SSD card as both the cards utilizes the same slot.

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

Speakers

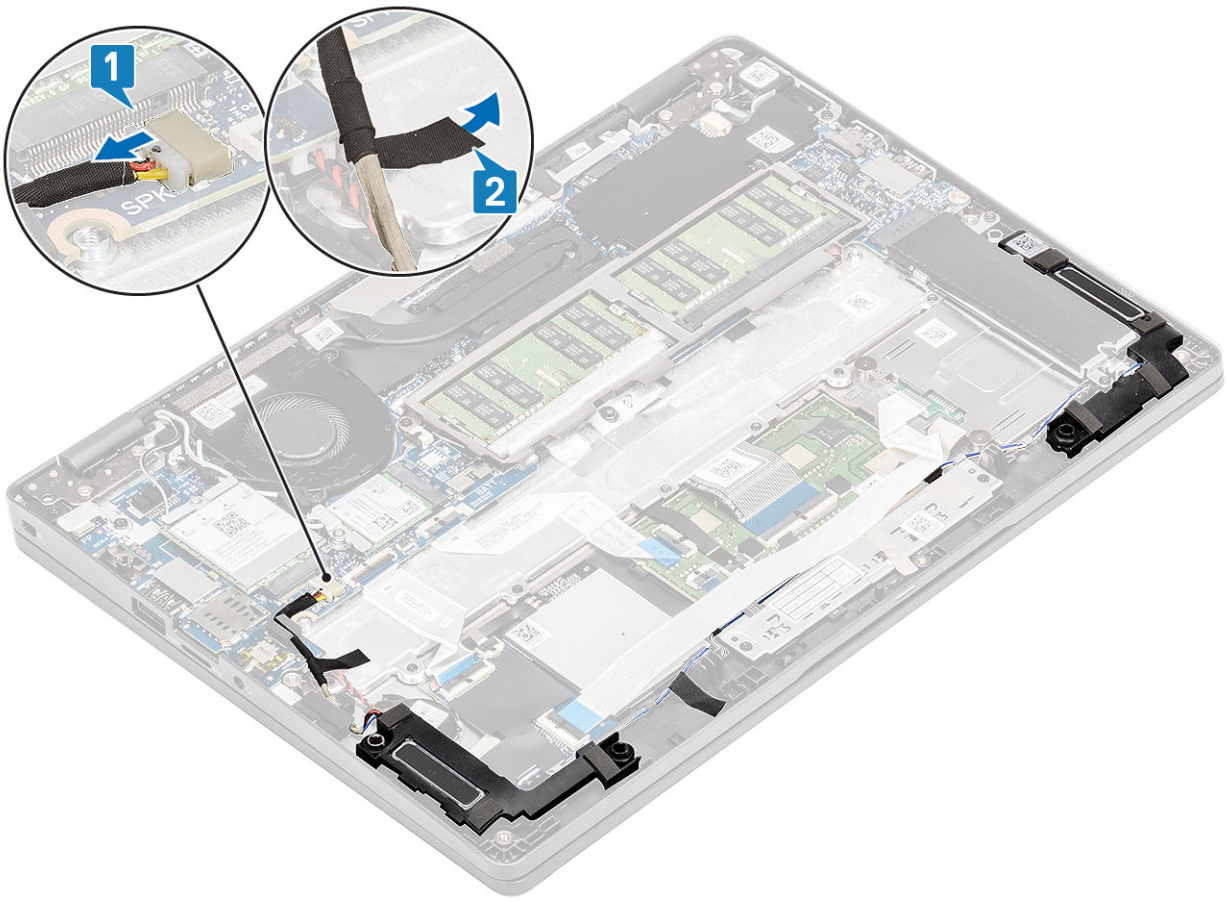
Removing the speakers

Prerequisites

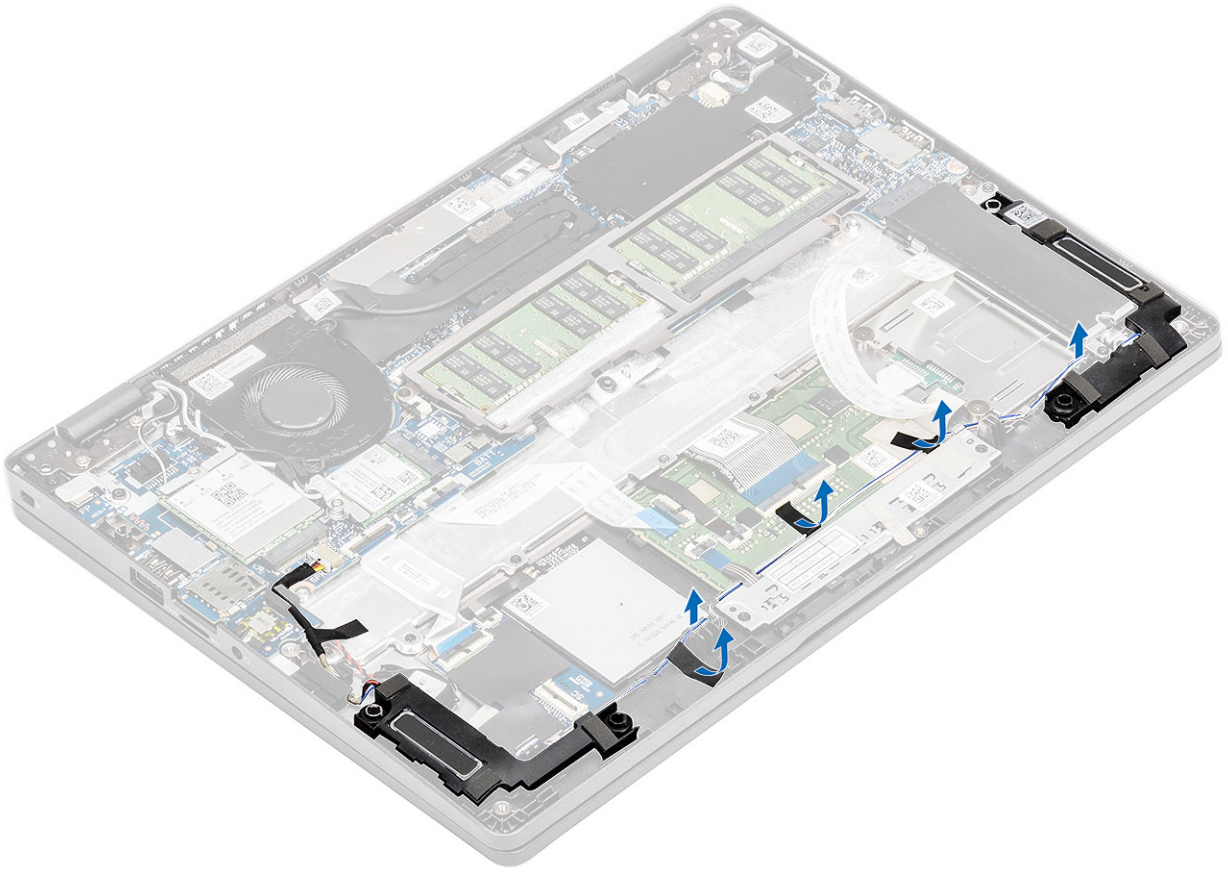
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Remove the battery.

Steps

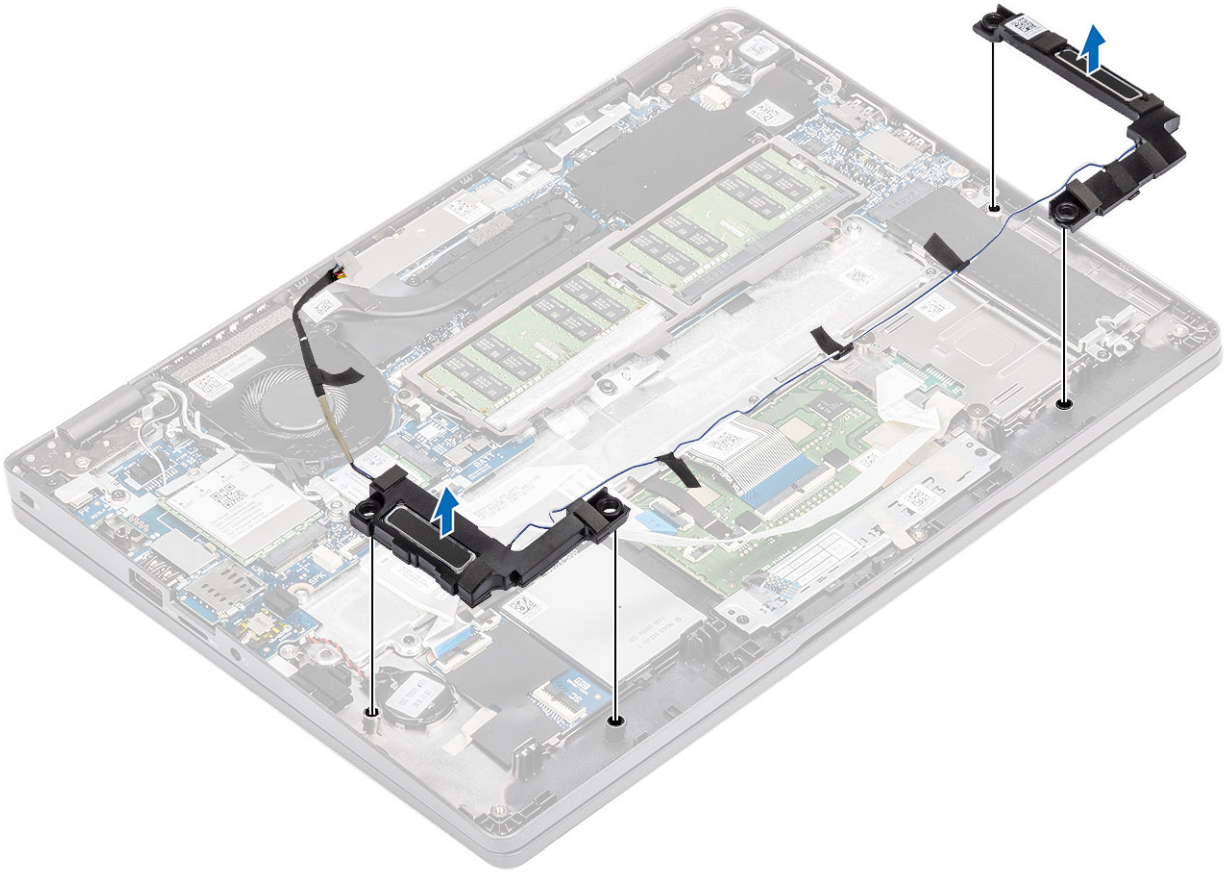
1. Disconnect the speaker cable from the connector on the system board [1].
2. Peel the adhesive tape that secures the speaker cable to the palmrest [2].



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



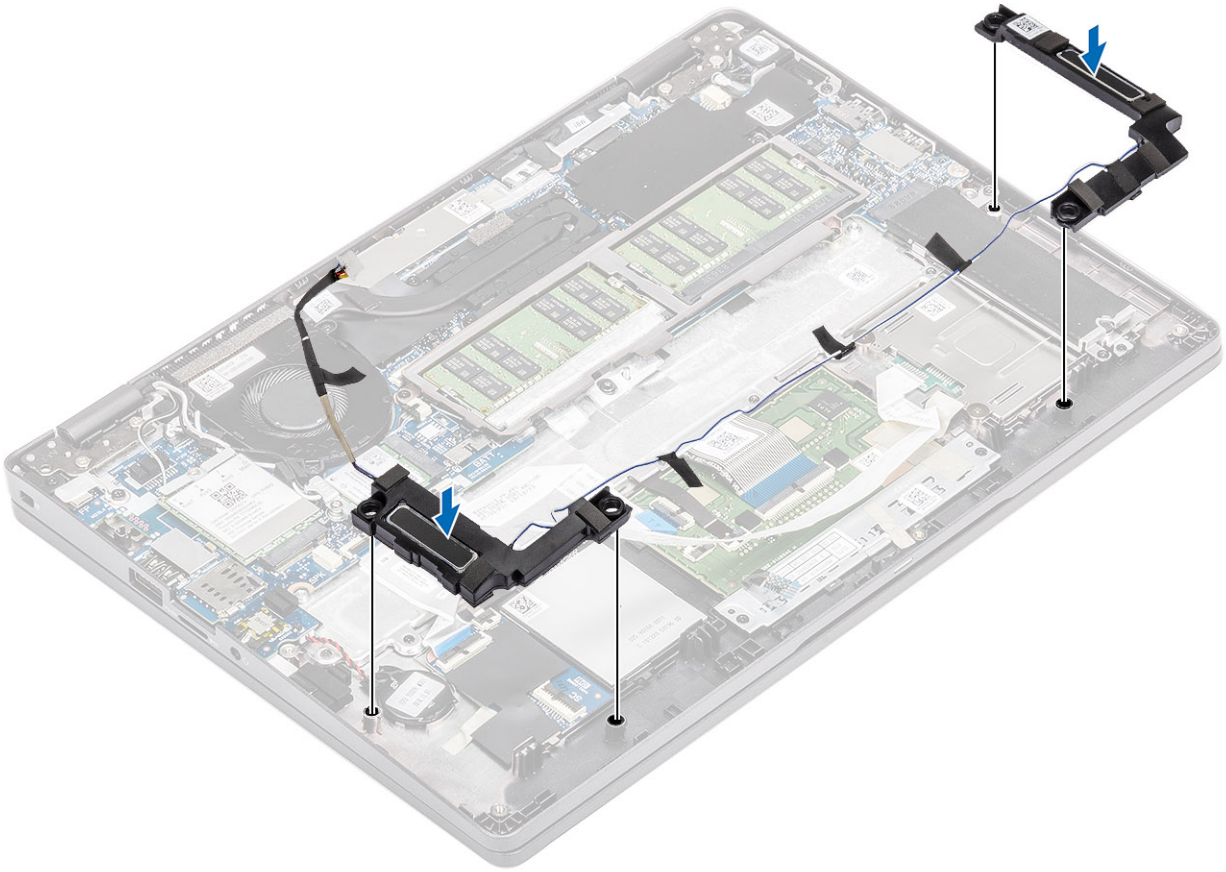
5. Lift and remove the speakers away from the palmrest.



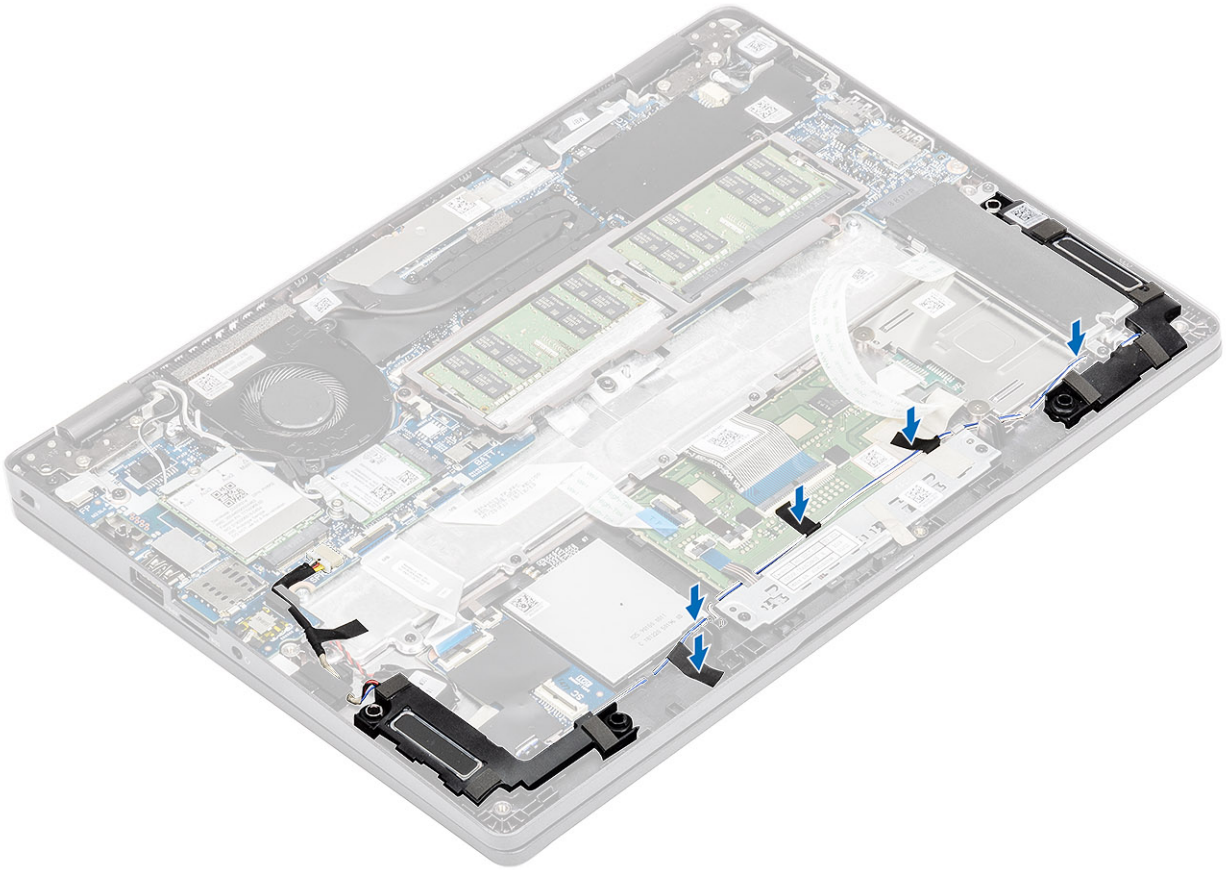
Installing the speakers

Steps

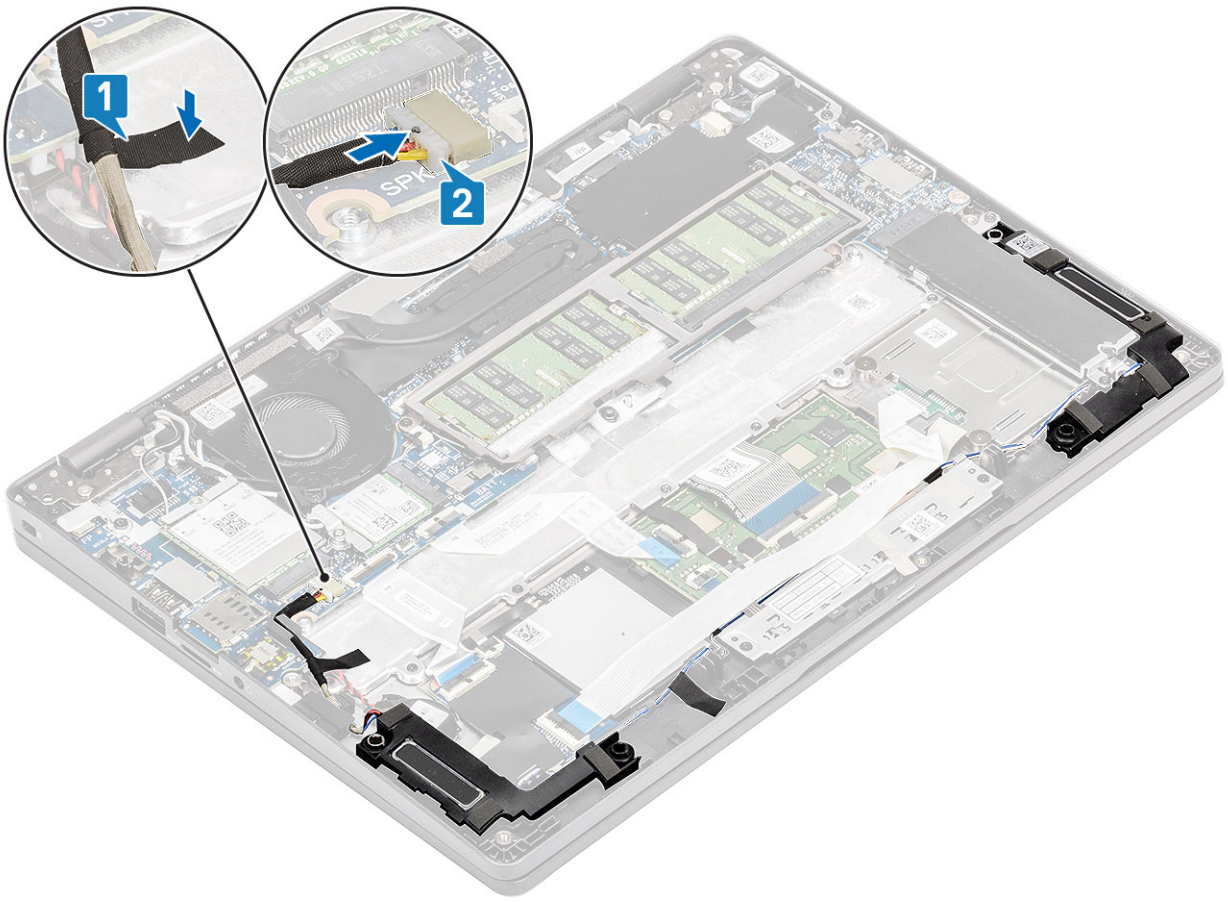
1. Using the alignment posts and rubber grommets, place the speakers in their slots on the palmrest.



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

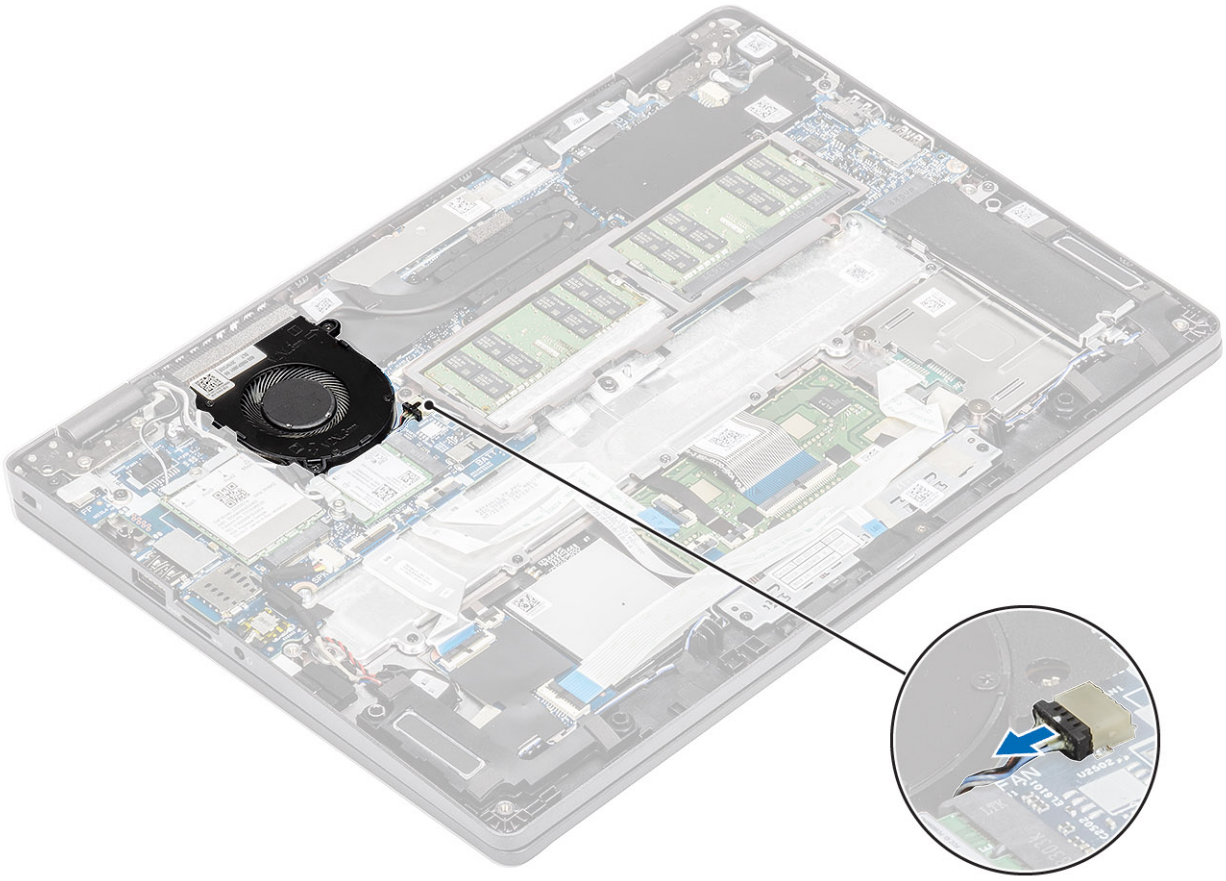
Removing the system fan

Prerequisites

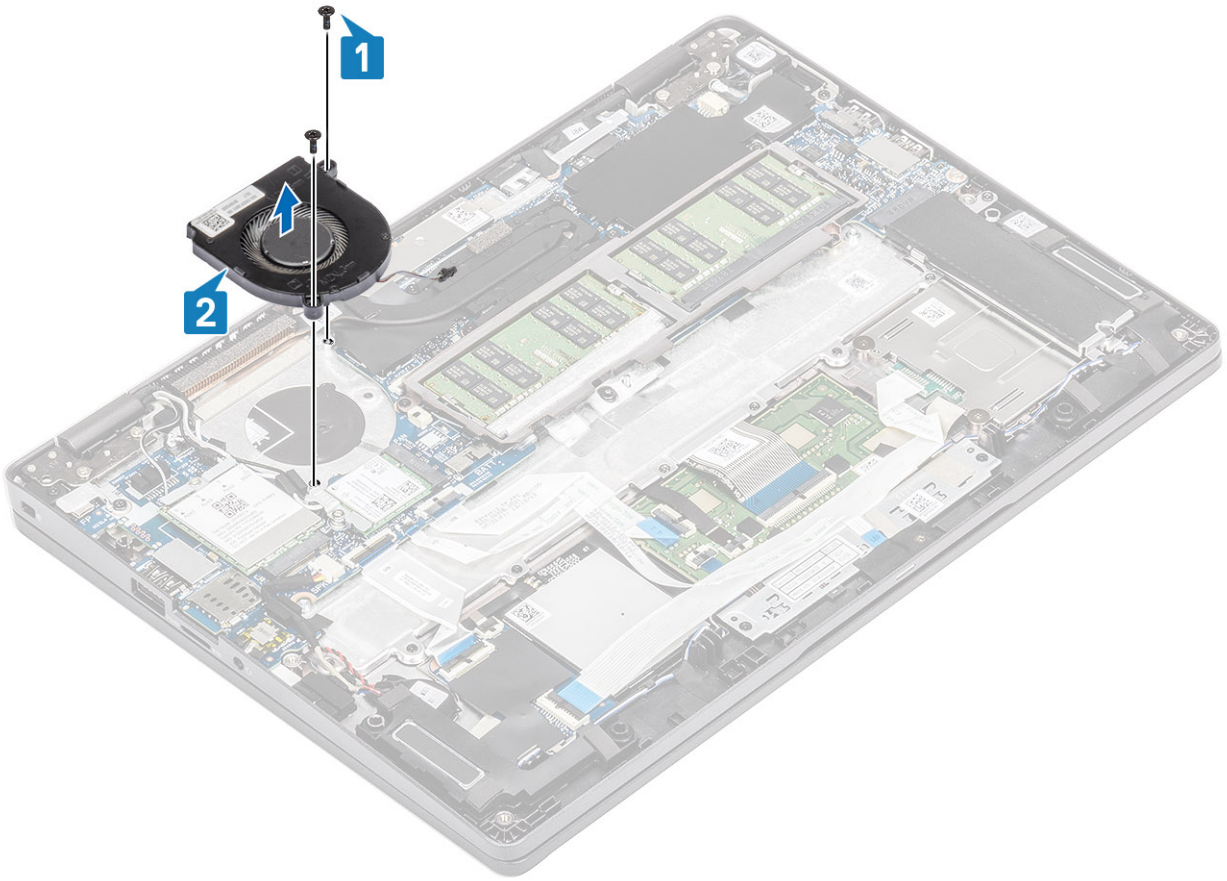
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Remove the battery.

Steps

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



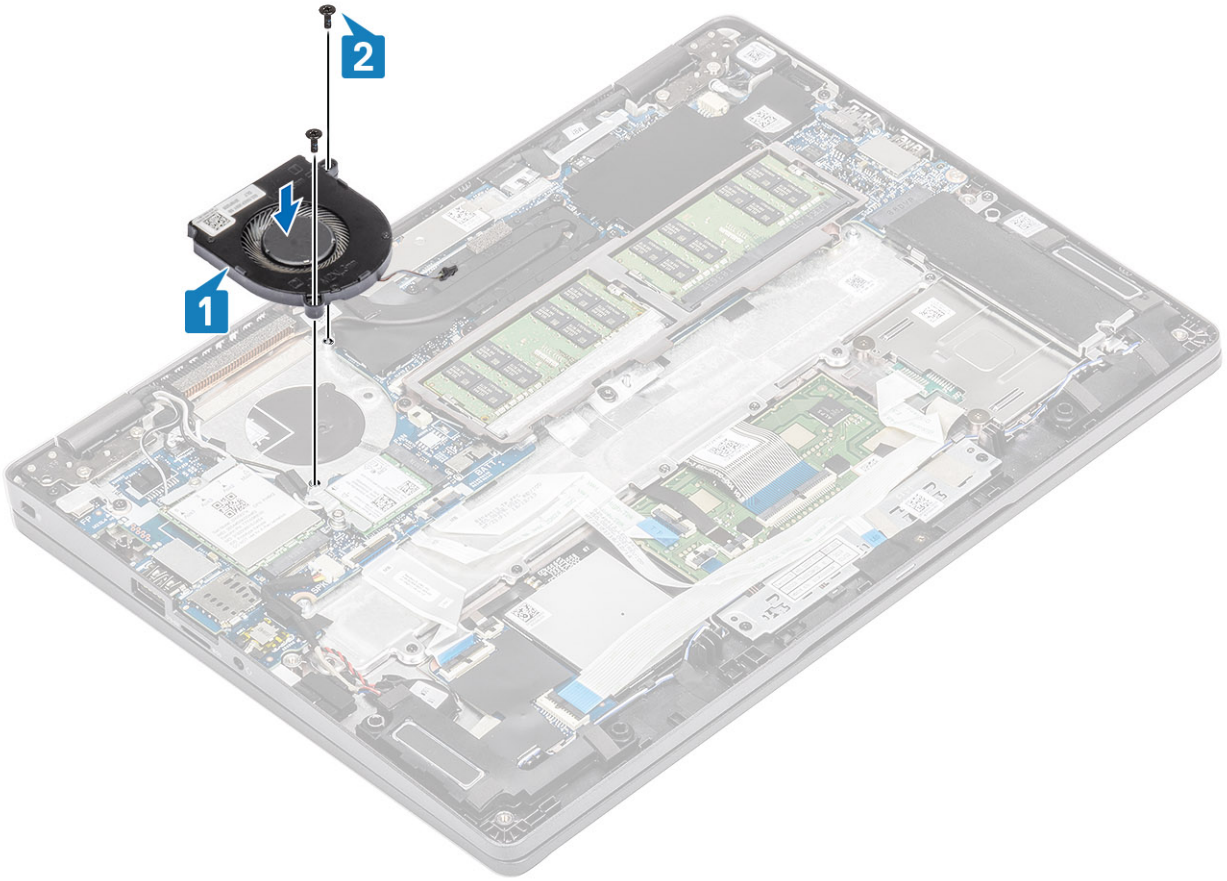
2. Remove the two (M2x5) screws that secure the system fan to the palmrest [1].
3. Lift the system fan away from the computer [2].



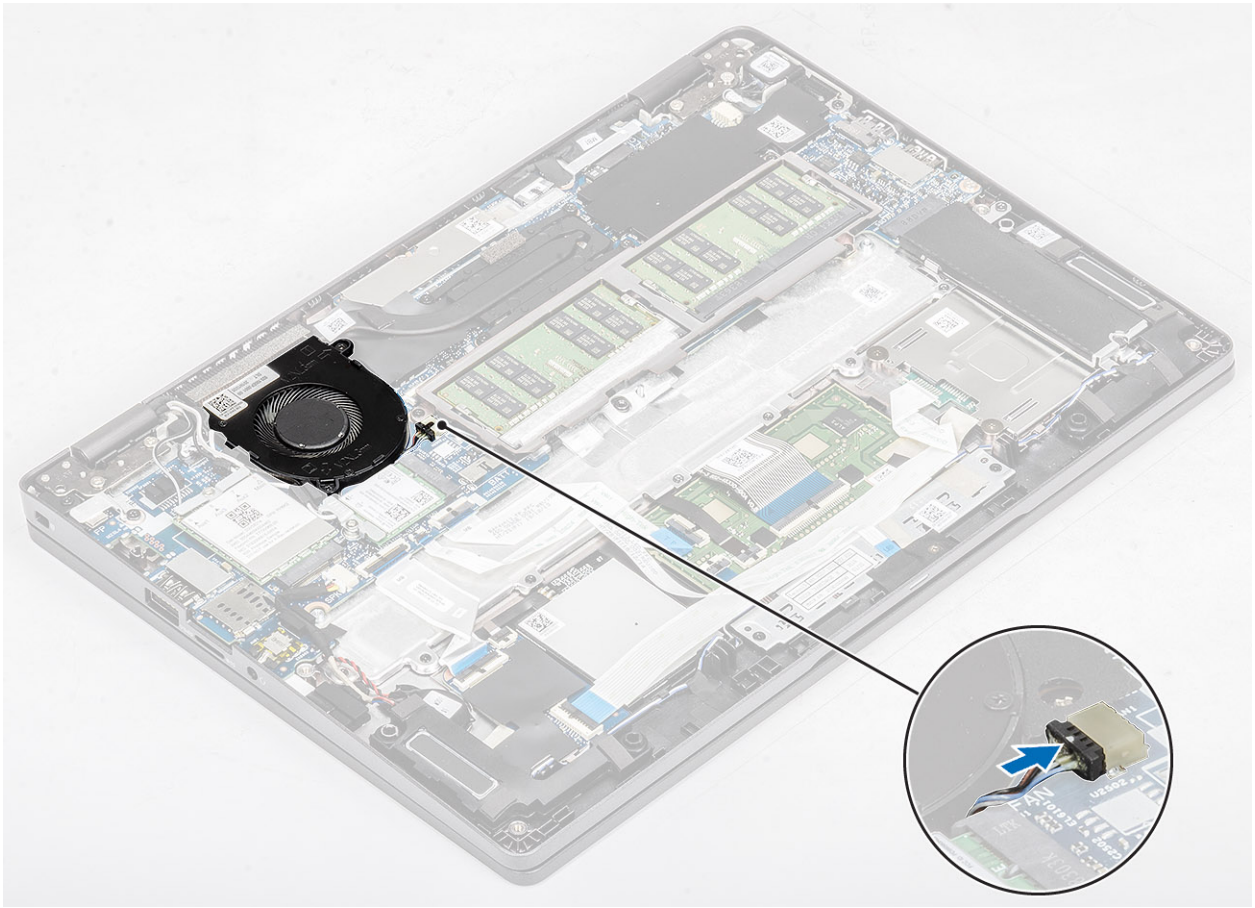
Installing the system fan

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

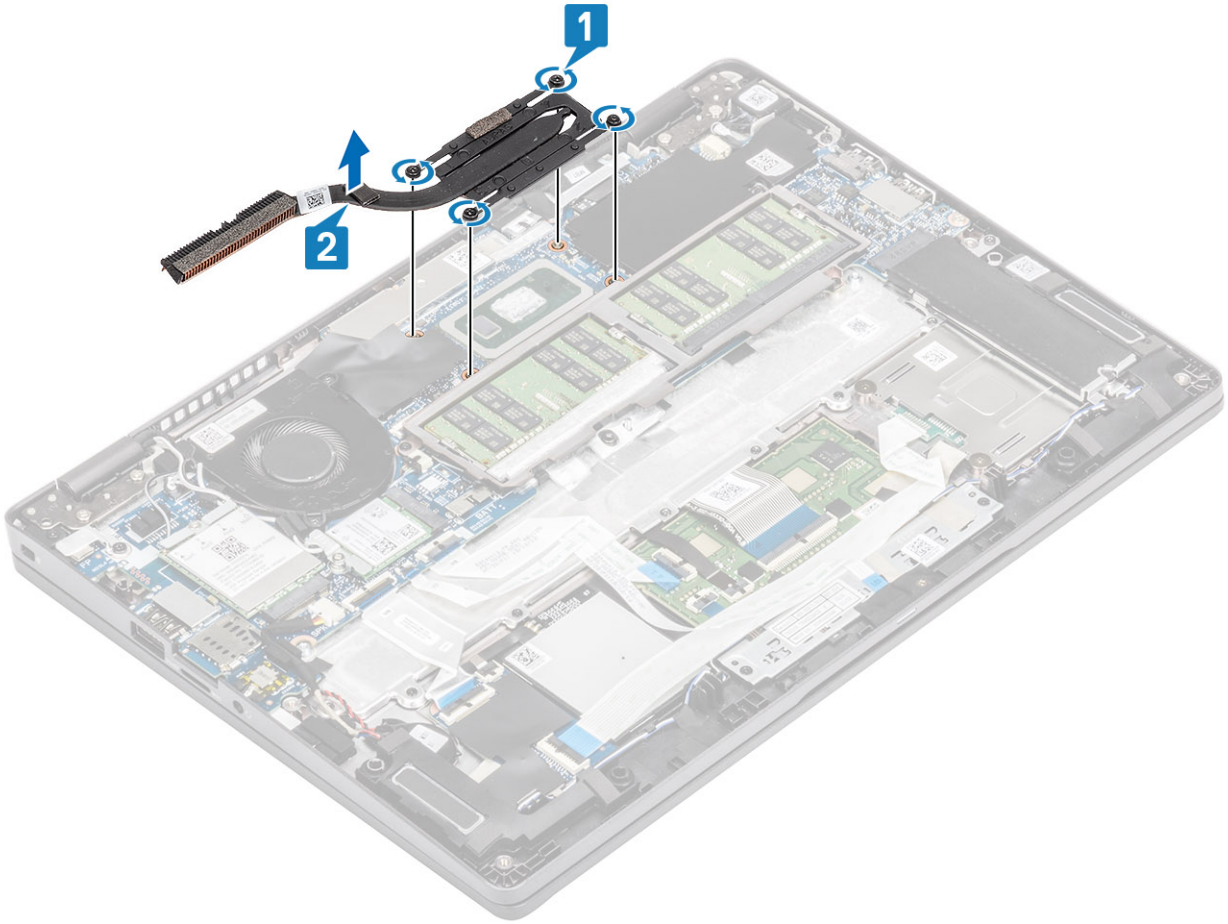
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Remove the battery.

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.

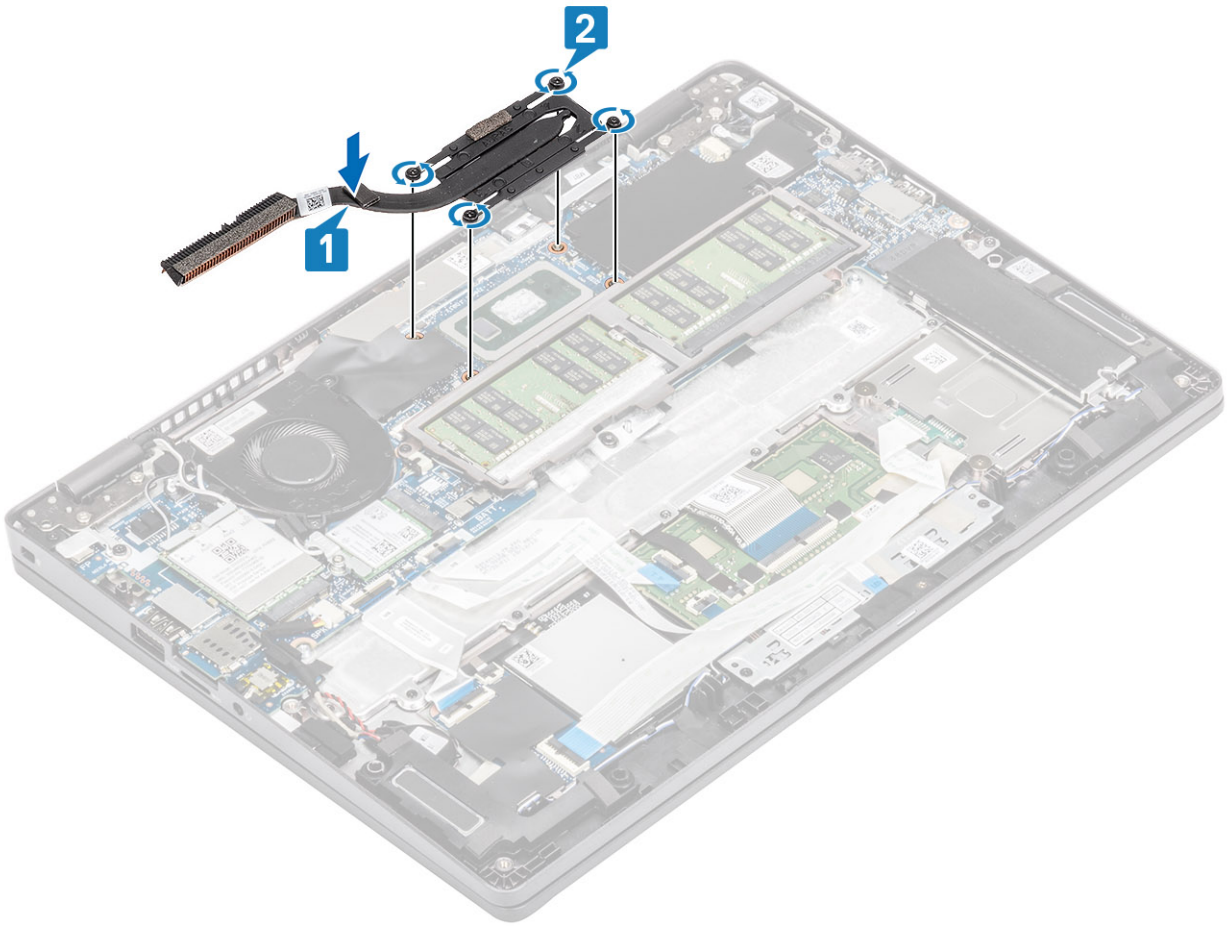
2. Lift the heatsink away from the system board [2].



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

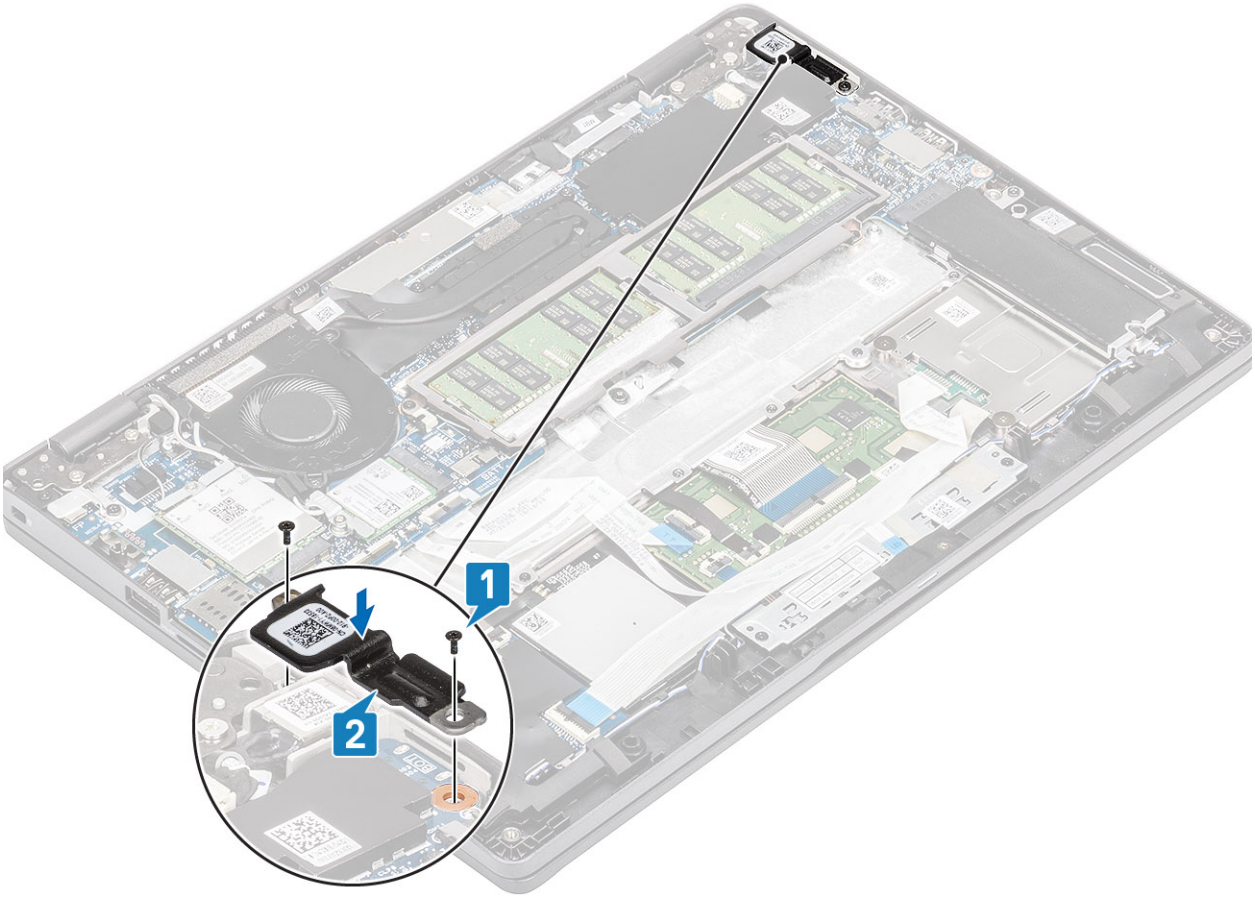
Removing the DC-in port

Prerequisites

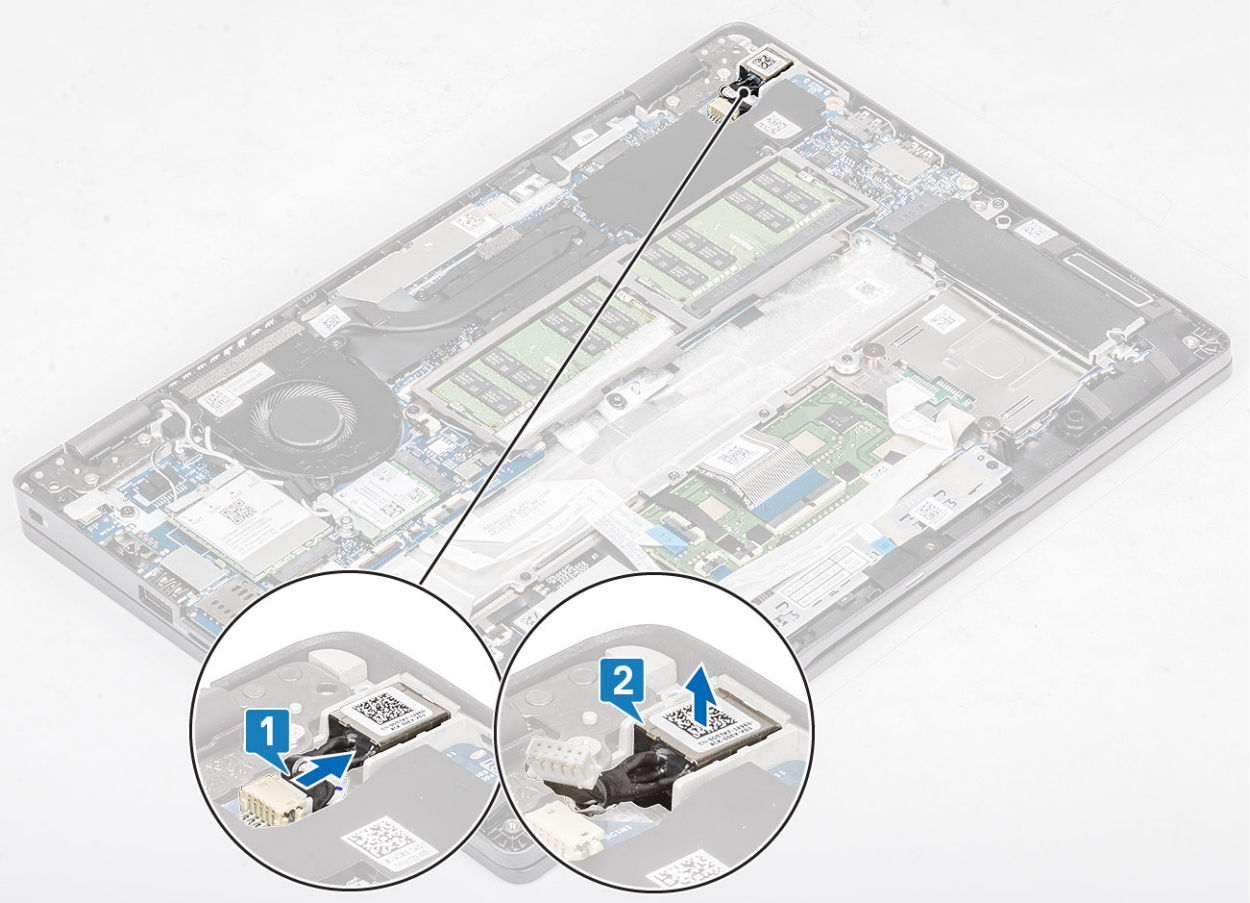
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Remove the battery.

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].



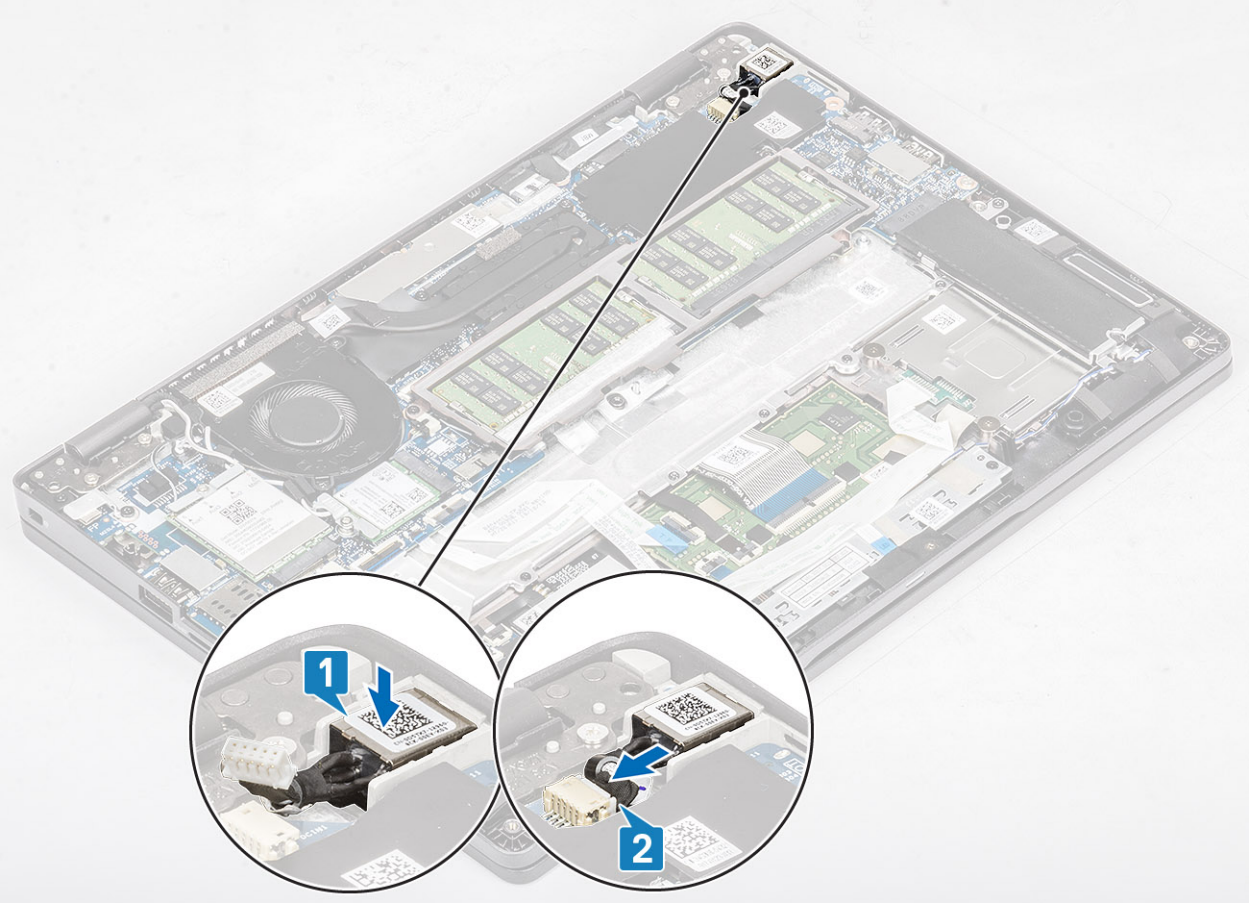
3. Press the DC-in port cable and then pull the cable horizontally to disconnect the DC-in port cable from the connector on the system board [1]. Lift the DC-in port away from the computer [2].



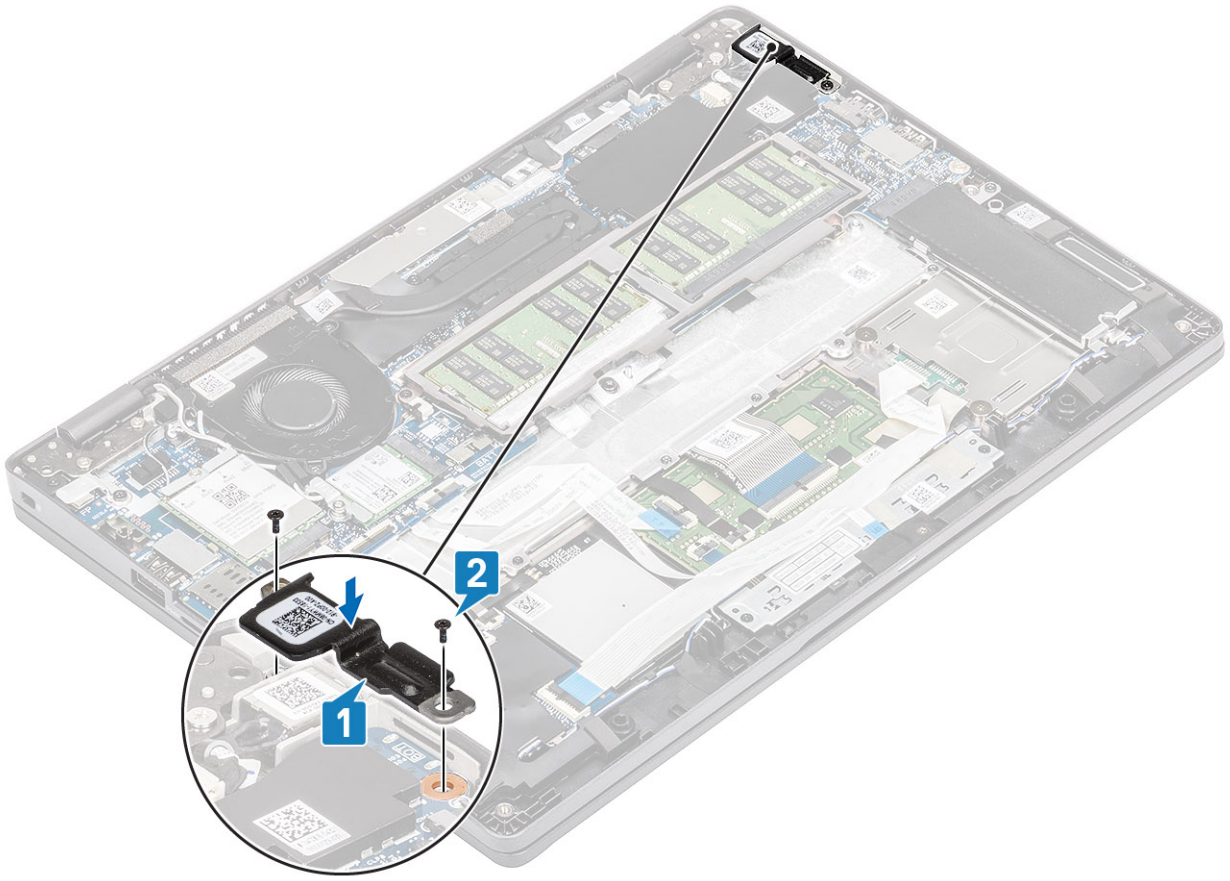
Installing the DC-in port

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

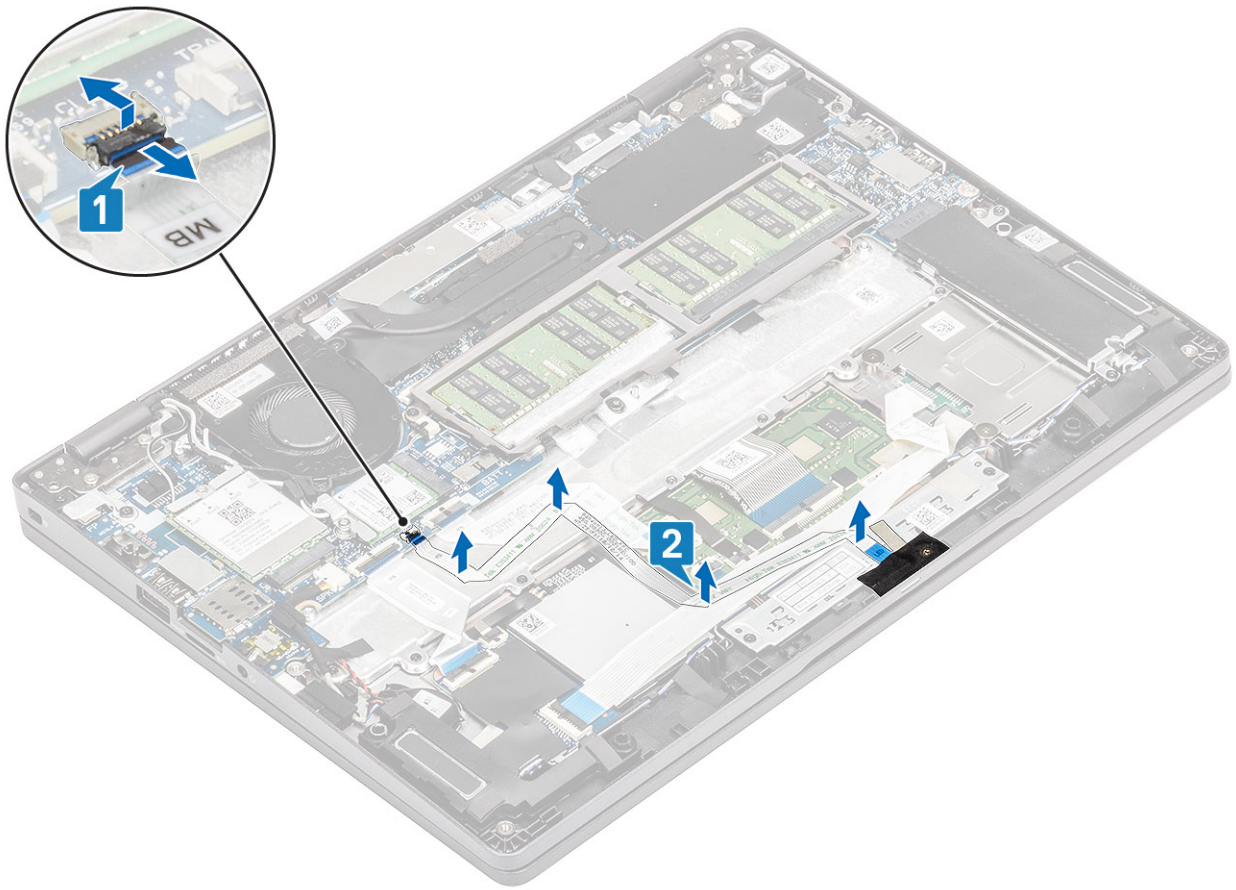
Removing the LED board

Prerequisites

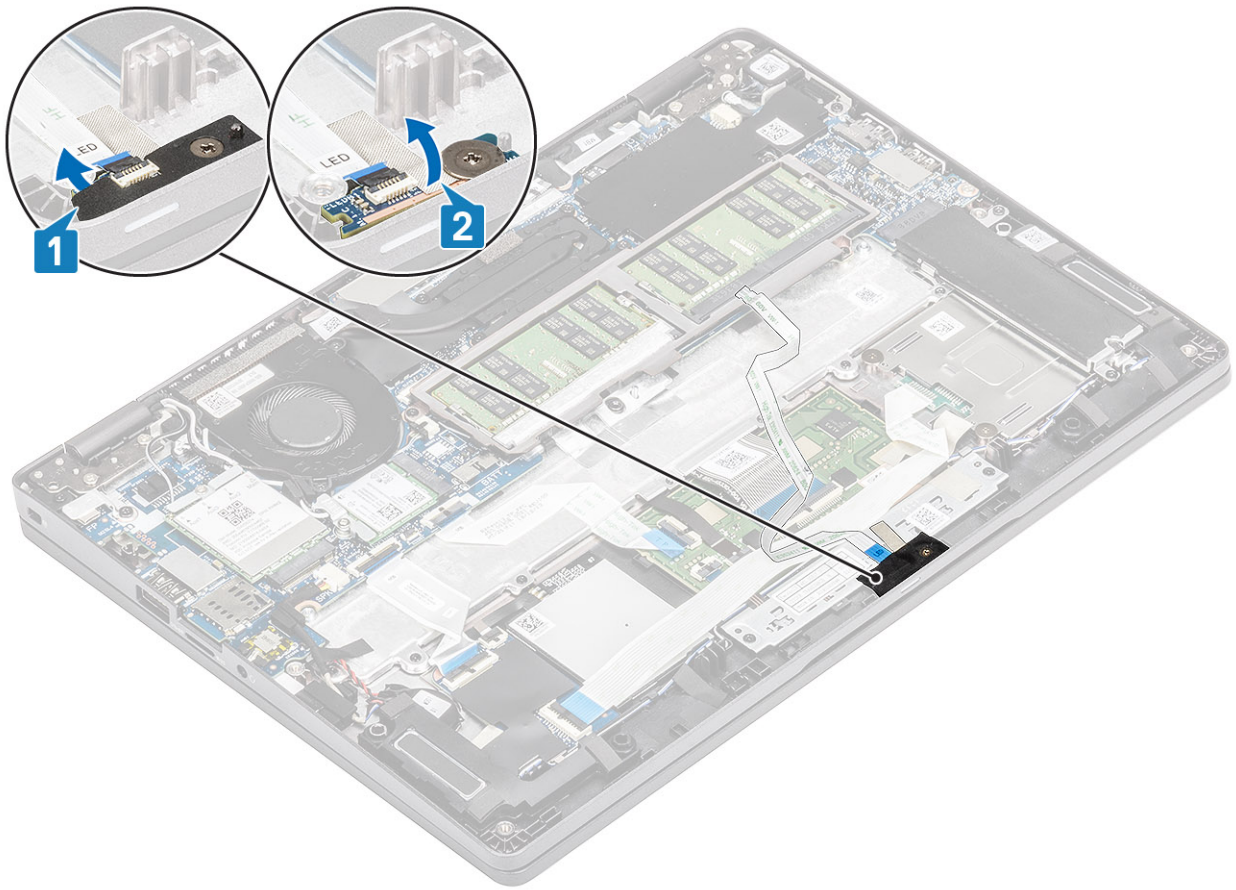
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Remove the battery.

Steps

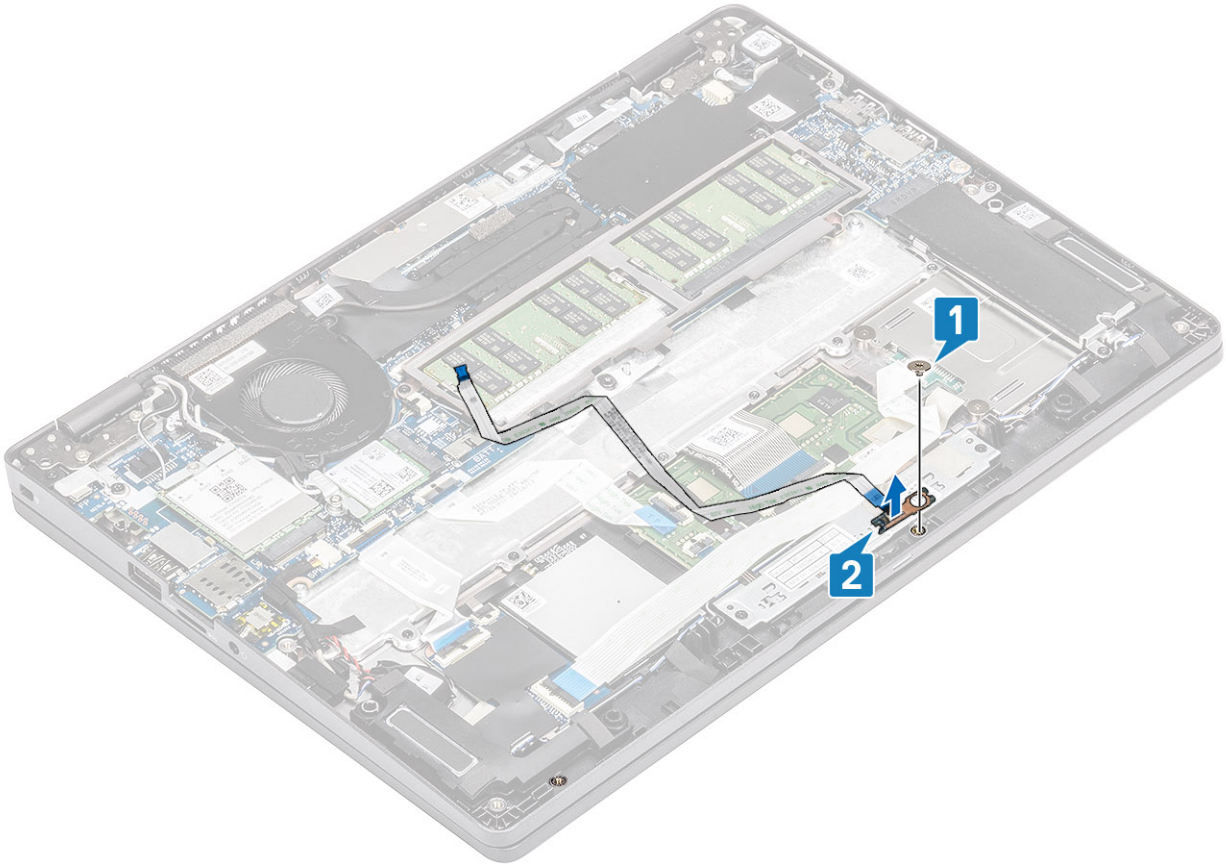
1. Disconnect the LED board cable from the connector on the system board [1].
2. Unroute the LED board cable [2].



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].



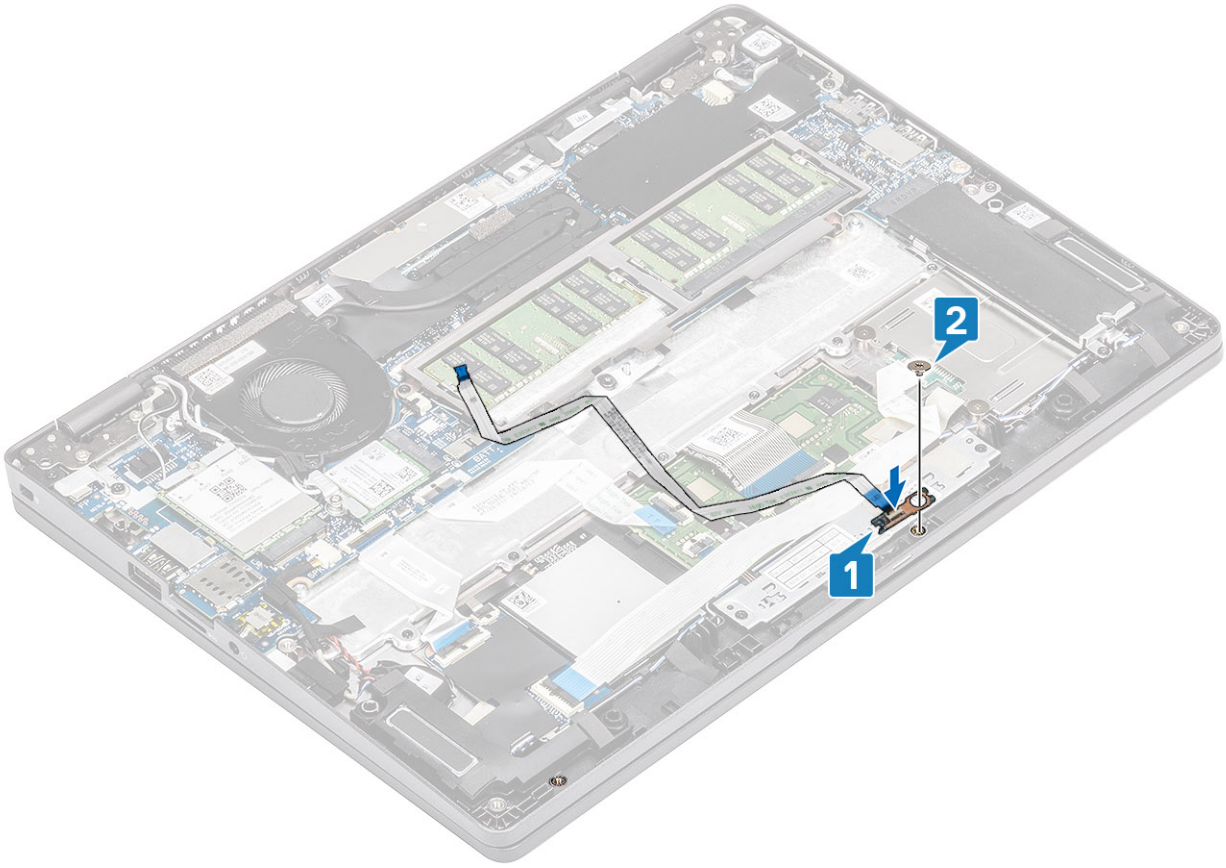
5. Remove the single (M2x2.5) screw that secures the LED board to the palmrest [1].
6. Lift the LED board away from the computer [2].



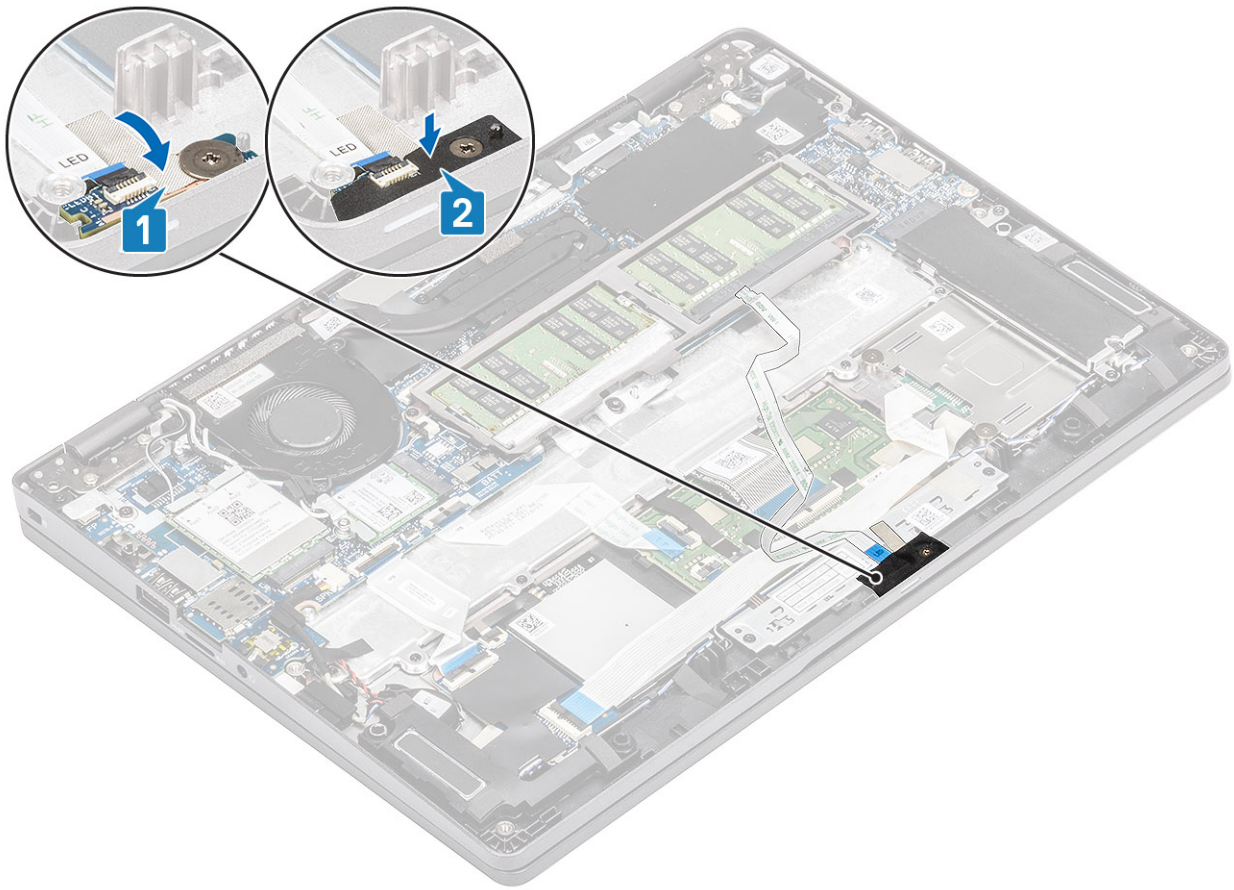
Installing the LED board

Steps

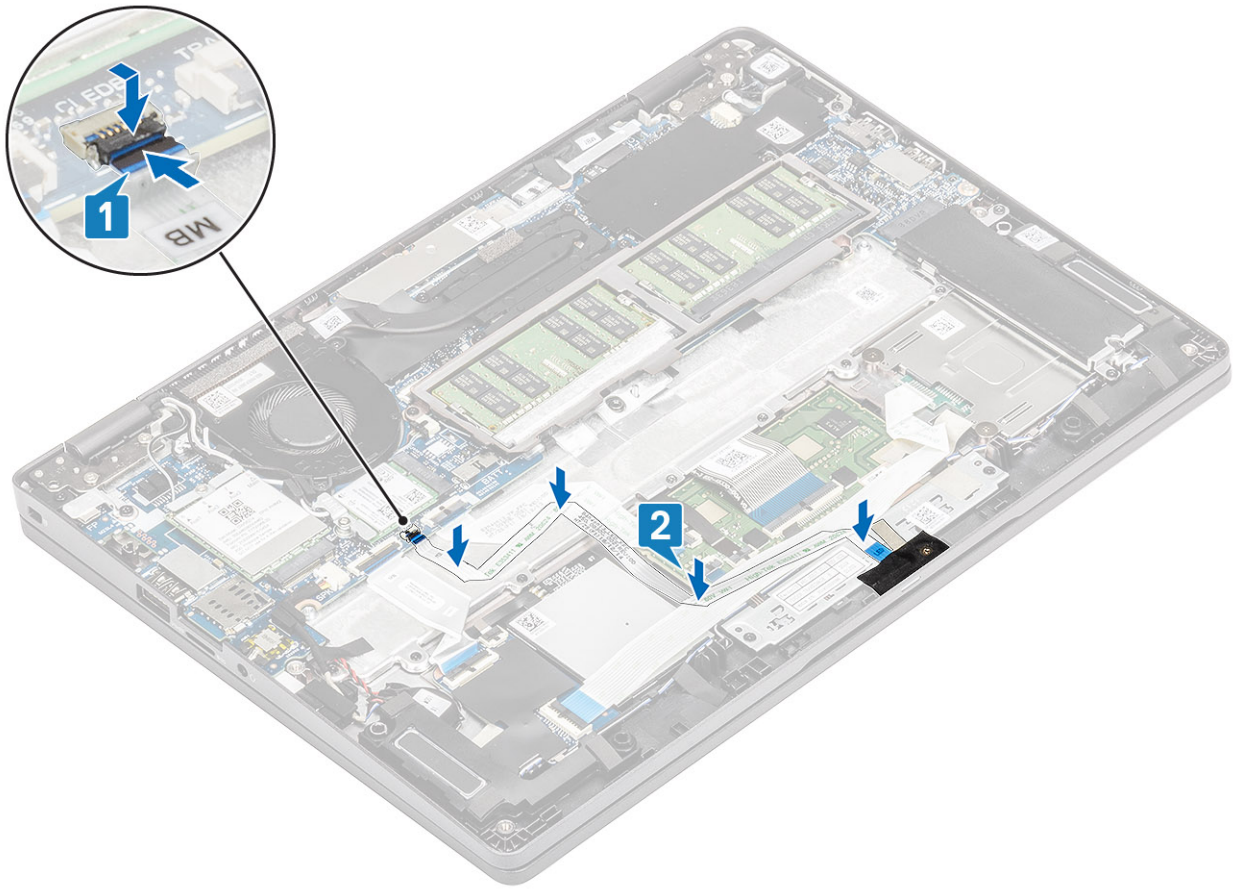
1. Place the LED board and align the screw hole on the LED board with the screw hole on the palmrest [1].
2. Replace the single (M2x2.5) screw to secure the LED board to the palmrest [2].



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

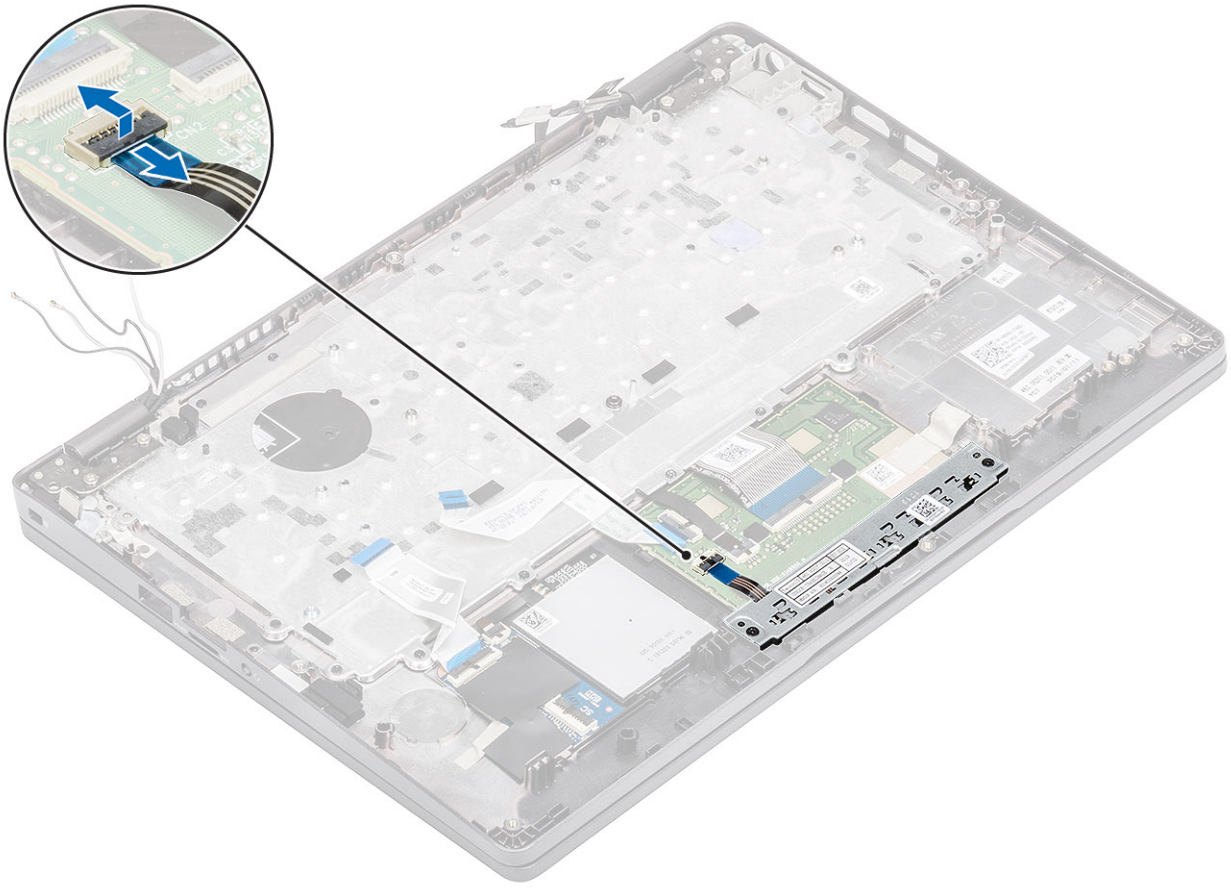
Prerequisites

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.

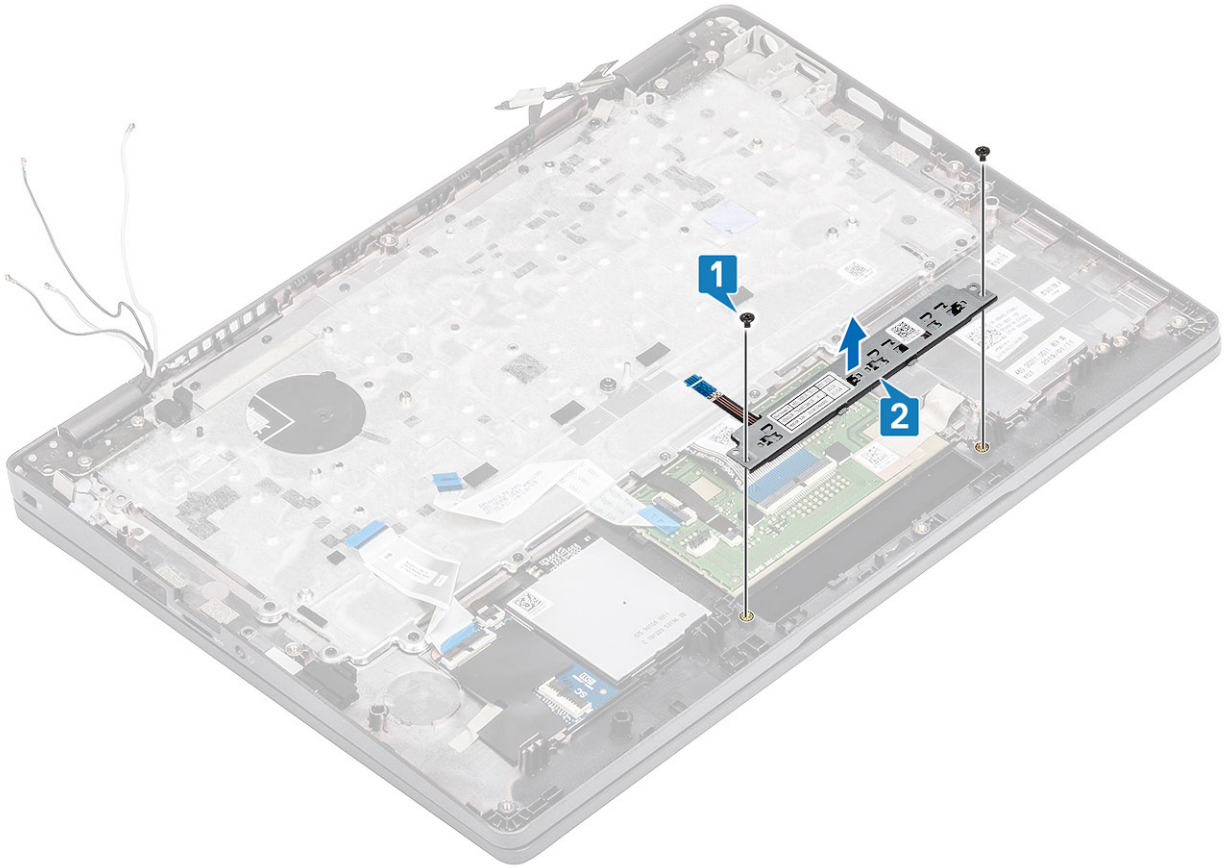
NOTE: Removal of system board and heatsink are not required to remove the touchpad button board.

Steps

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



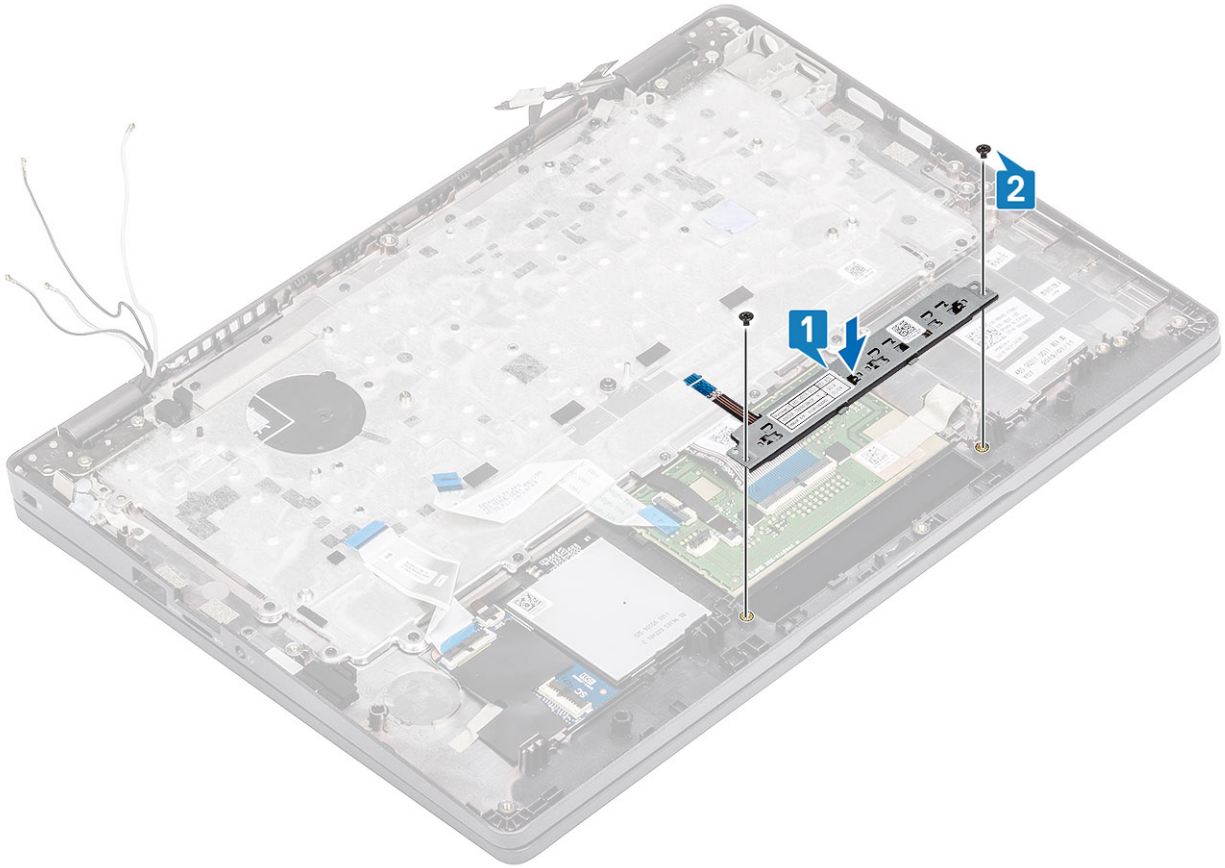
2. Remove the two (M2x3) screws that secure the touchpad button bracket to the palmrest [1].
3. Lift the touchpad button board bracket away from the computer [2].



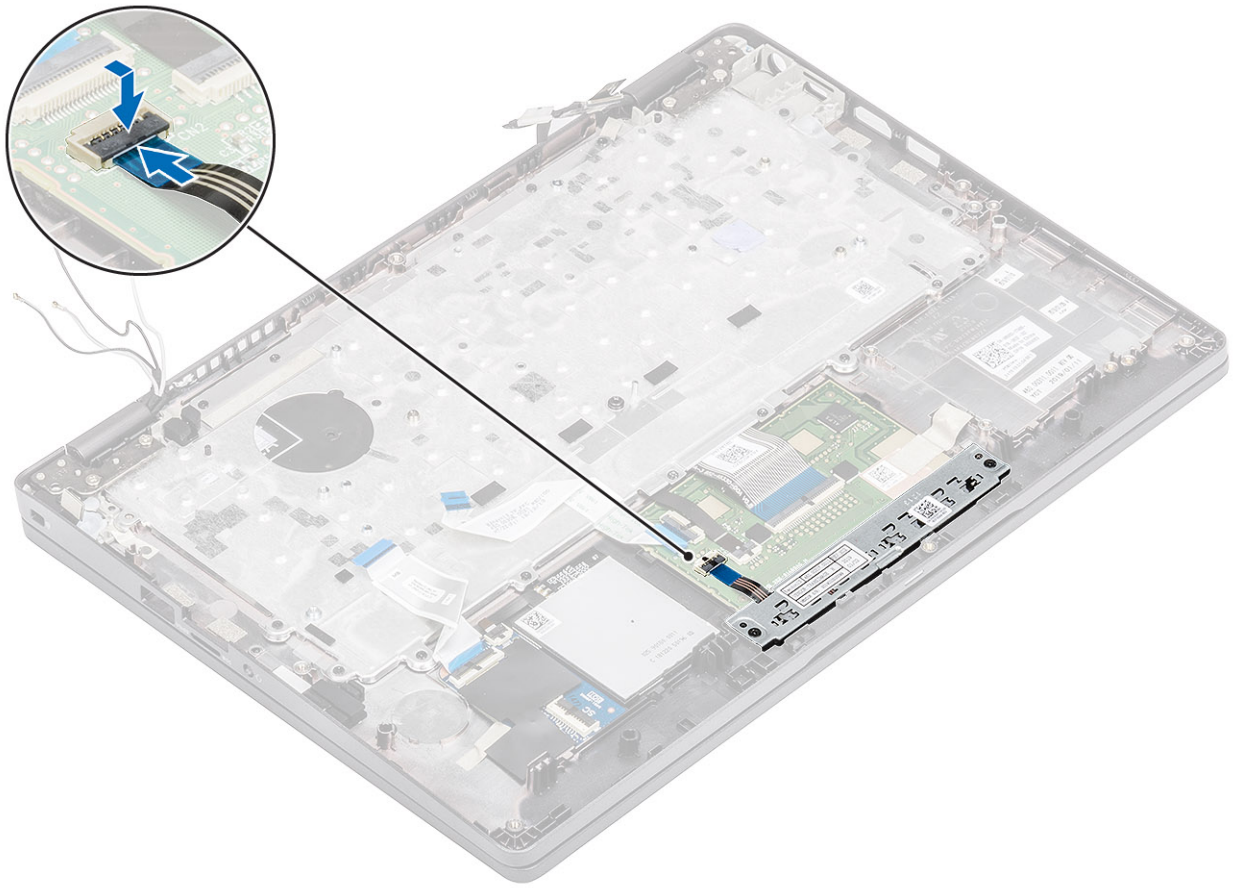
Installing the touchpad button board

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

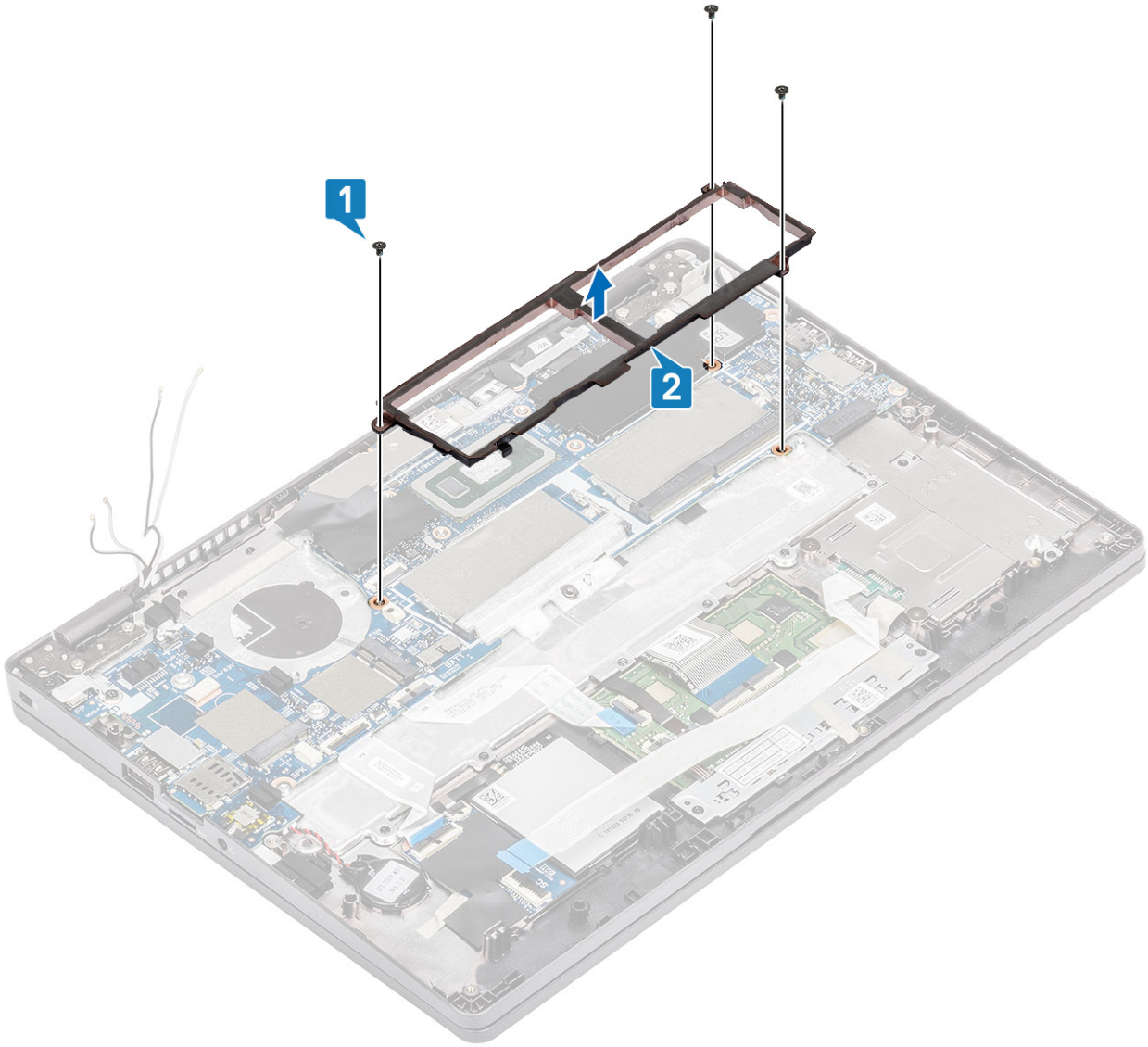
Removing the system board

Prerequisites

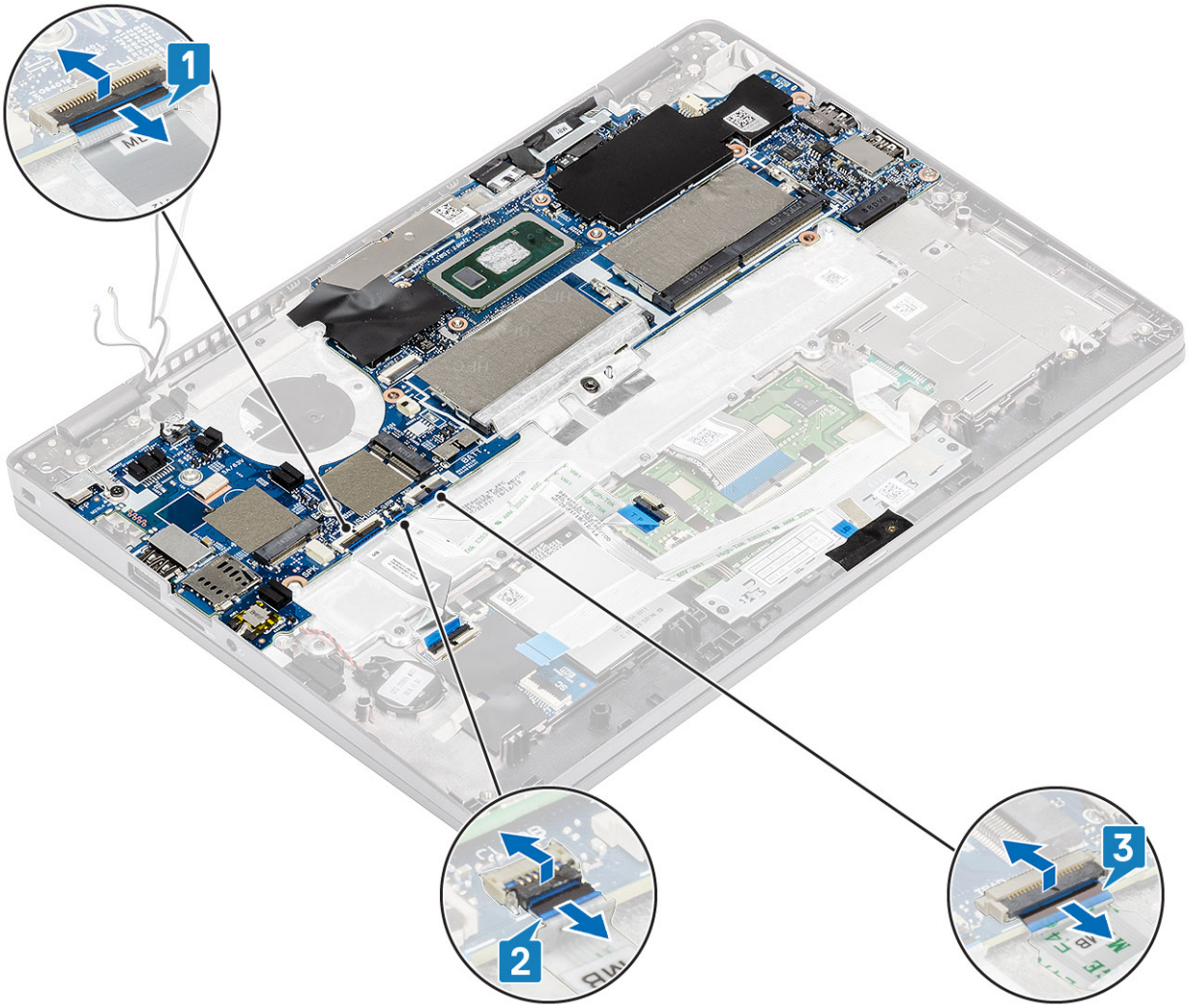
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Remove the battery.
5. Remove the speaker.
6. Remove the heatsink.
7. Remove the memory module.
8. Remove the system fan.
9. Remove the DC-in.
10. Remove the WLAN card.
11. Remove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

Steps

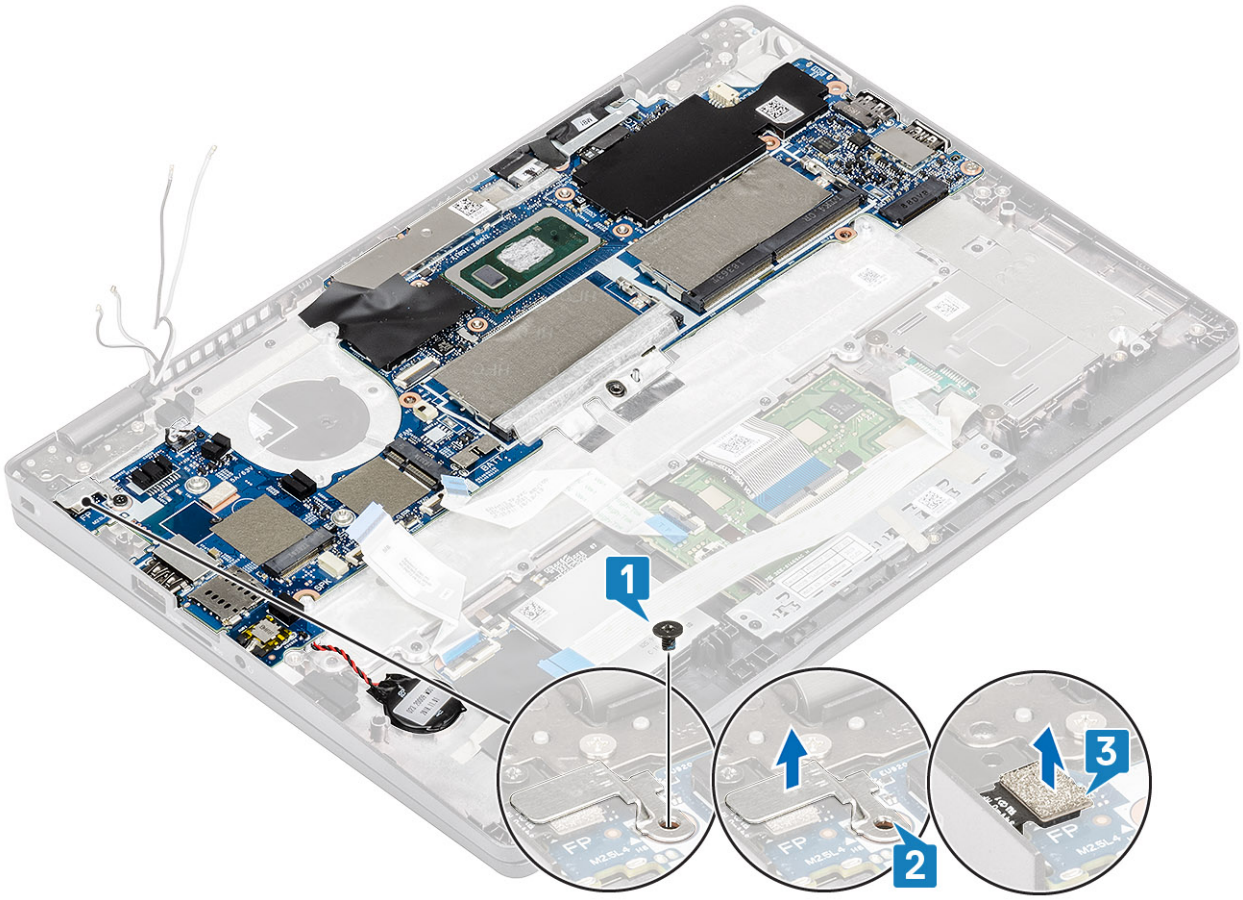
1. Remove the three (M2x3) screws that secure the memory module frame to the system board [1].
2. Remove the memory module frame away from the computer [2].



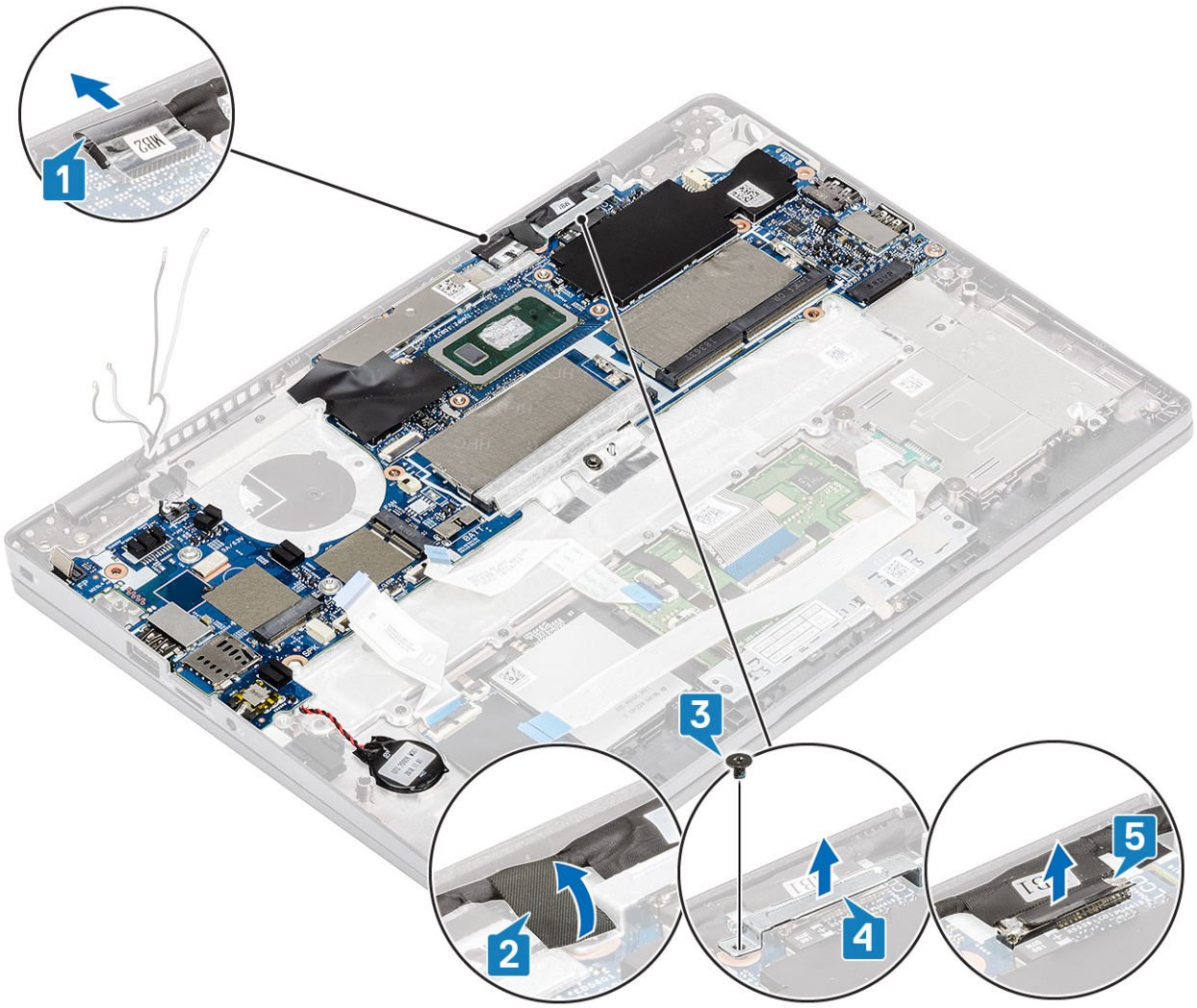
3. Disconnect the following cables:
   a. USH cable [1].
   b. LED board cable [2].
   c. touchpad cable [3].



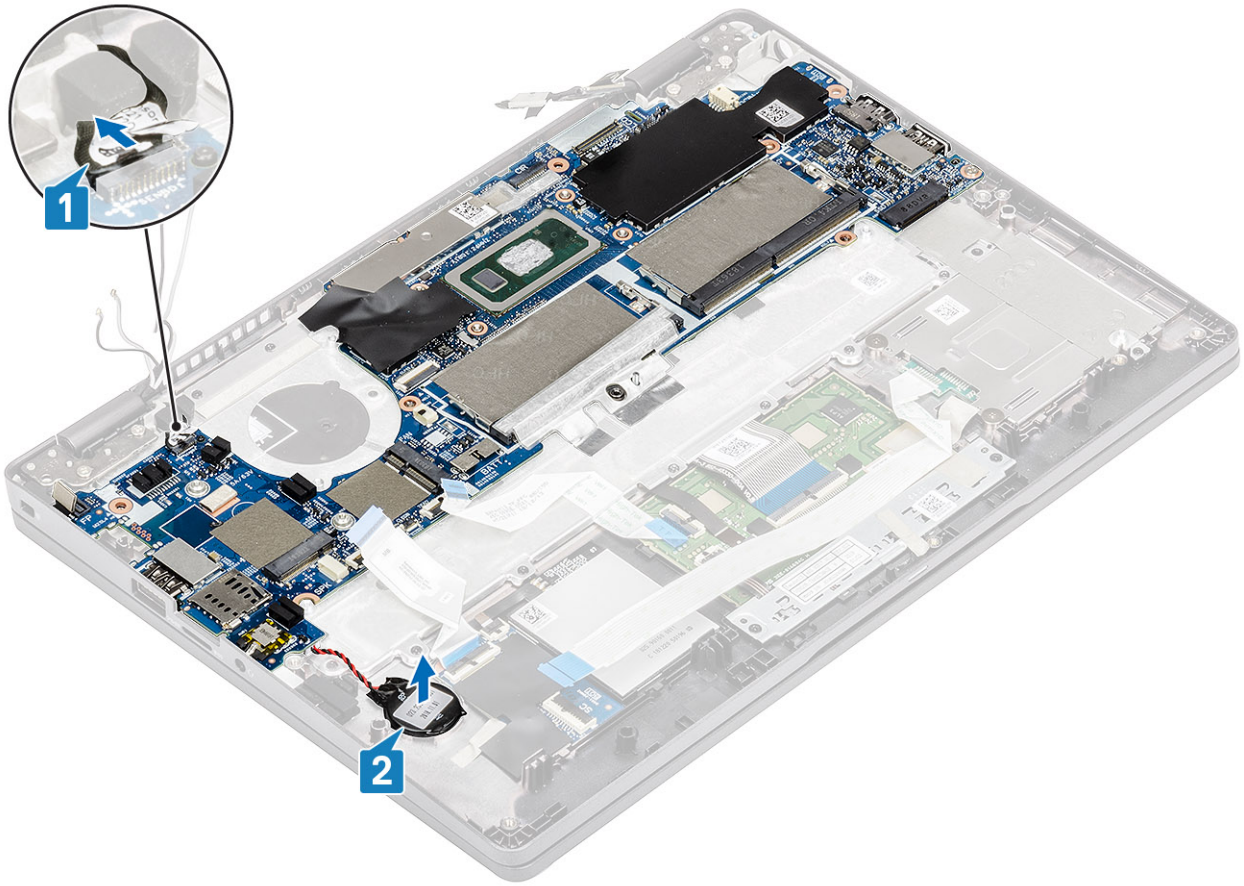
4. Remove the single (M2.5x4) screw that secures the fingerprint support bracket to the system board [1].
5. Lift the fingerprint support bracket away from the computer [2].
6. Disconnect the fingerprint port [3].



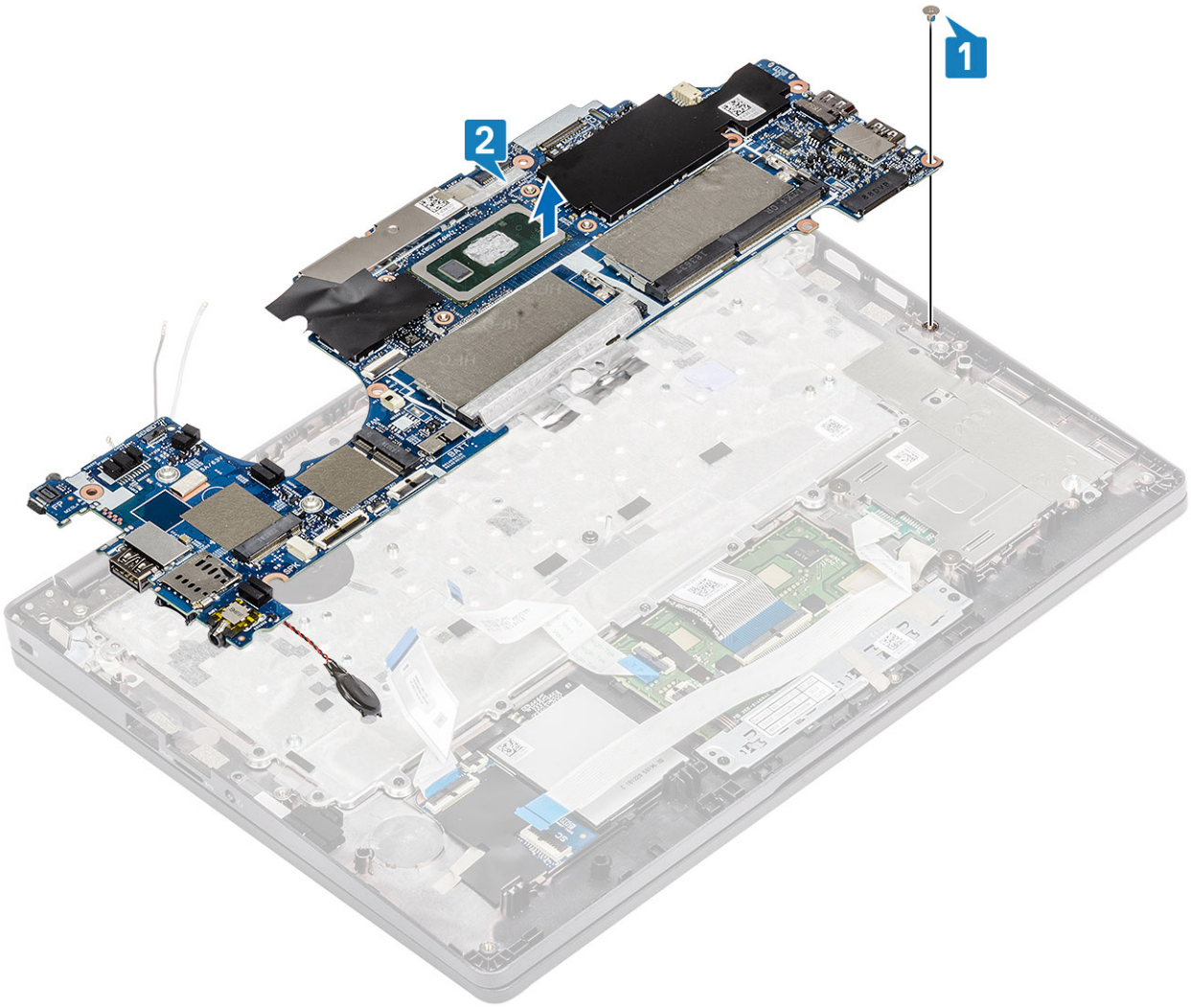
7. Peel the adhesive tape and disconnect the cable from the connector on the system board [1].
8. Peel the adhesive tape that secures the eDP bracket [2].
9. Remove the single (M2x4) screw that secures the eDP bracket to the system board [3].
10. Remove the eDP bracket away from the computer [4].
11.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



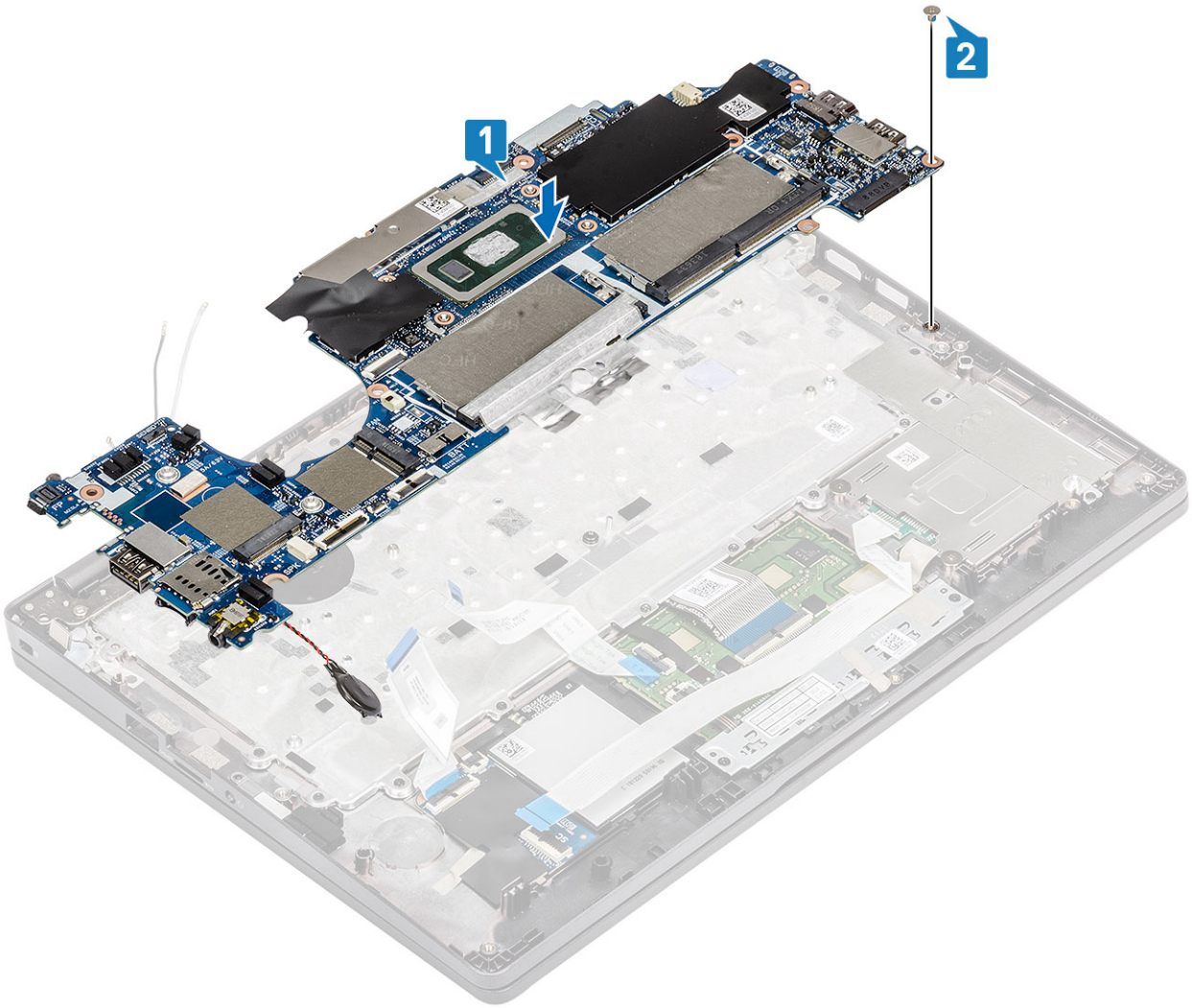
14. Remove the single (M2.5x4) screw that secures the system board to the palmrest [1].
15. Lift the system board away from the computer [2].



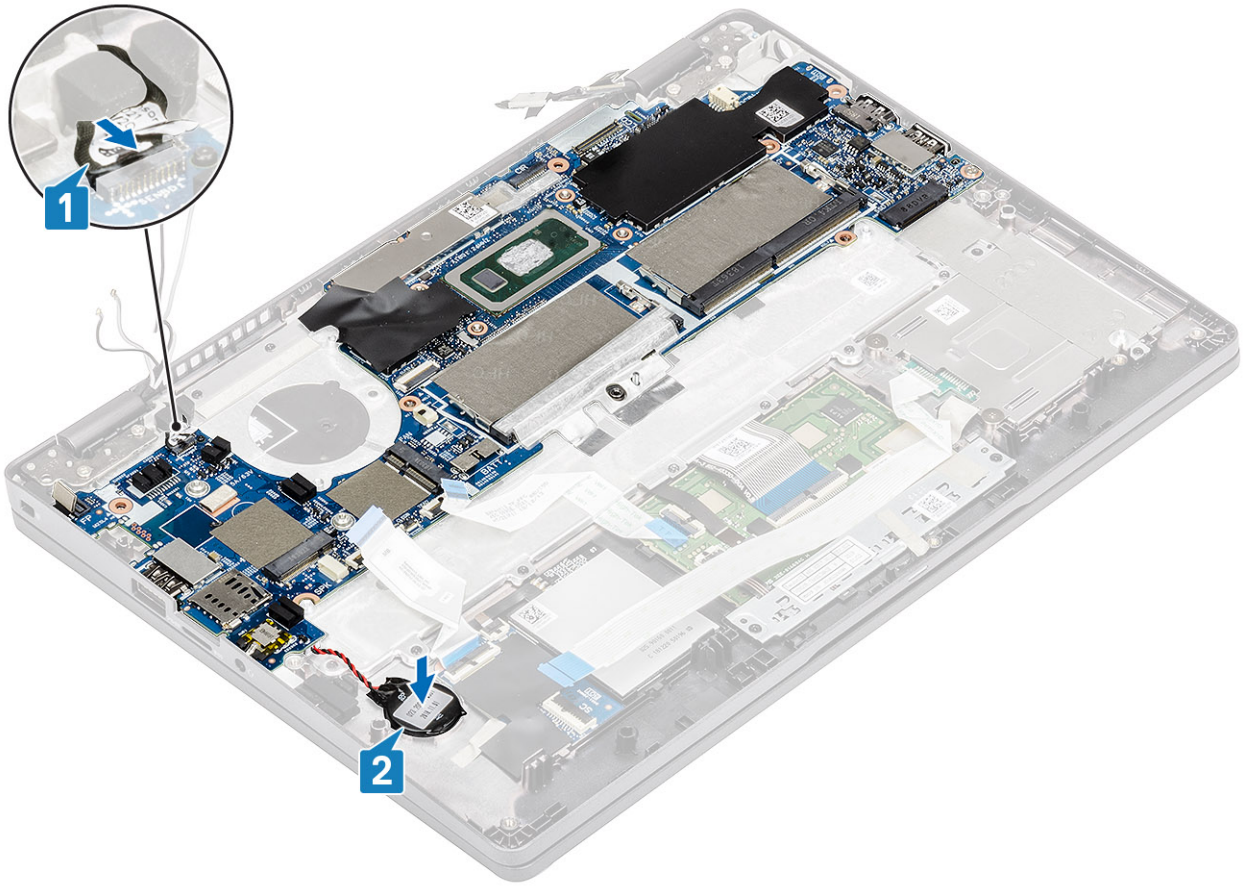
Installing the system board

Steps

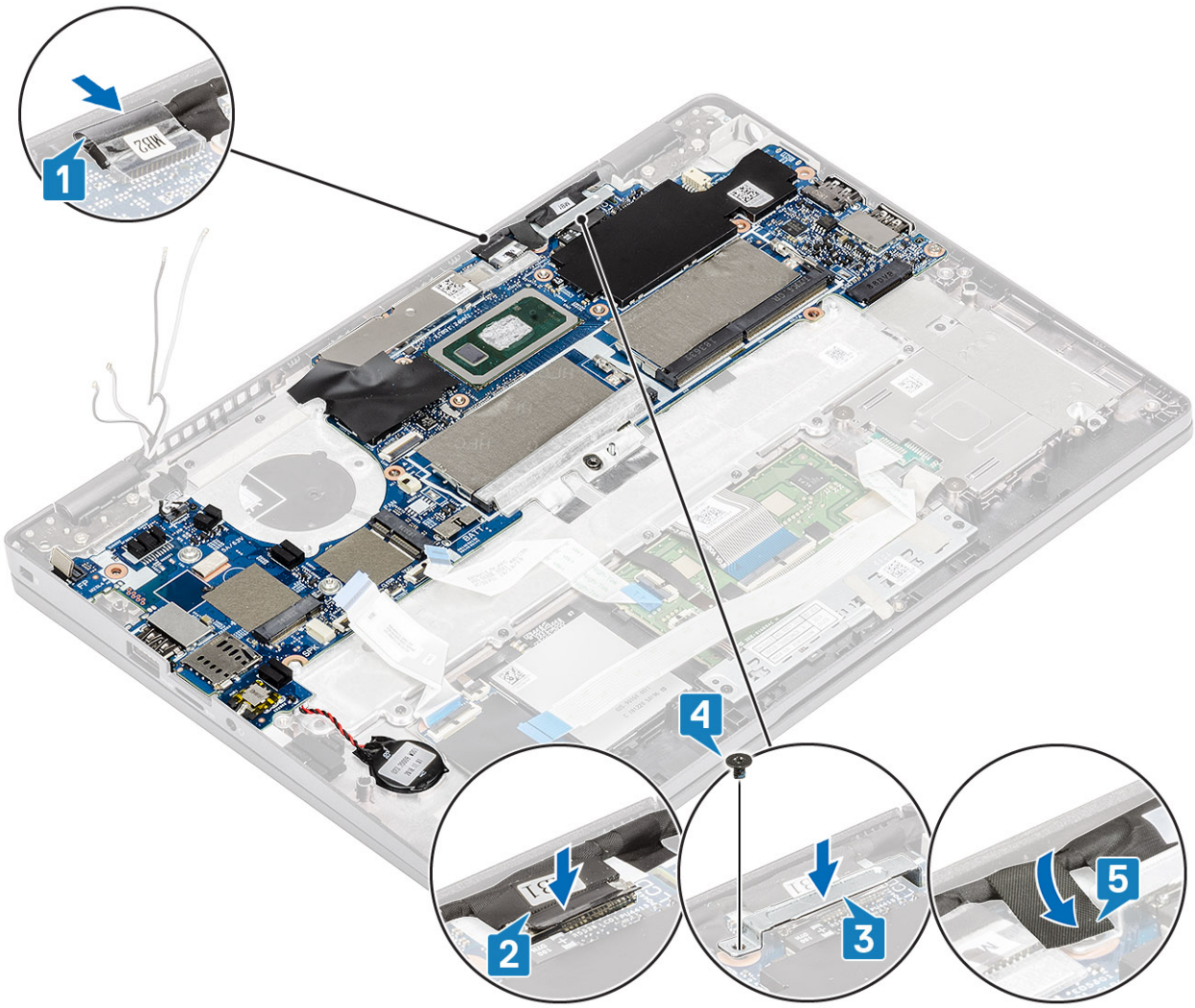
1. Align and place the system board to the palmrest [1].
2. Replace the single (M2.5x4) screw to secure the system board to the palmrest [2].



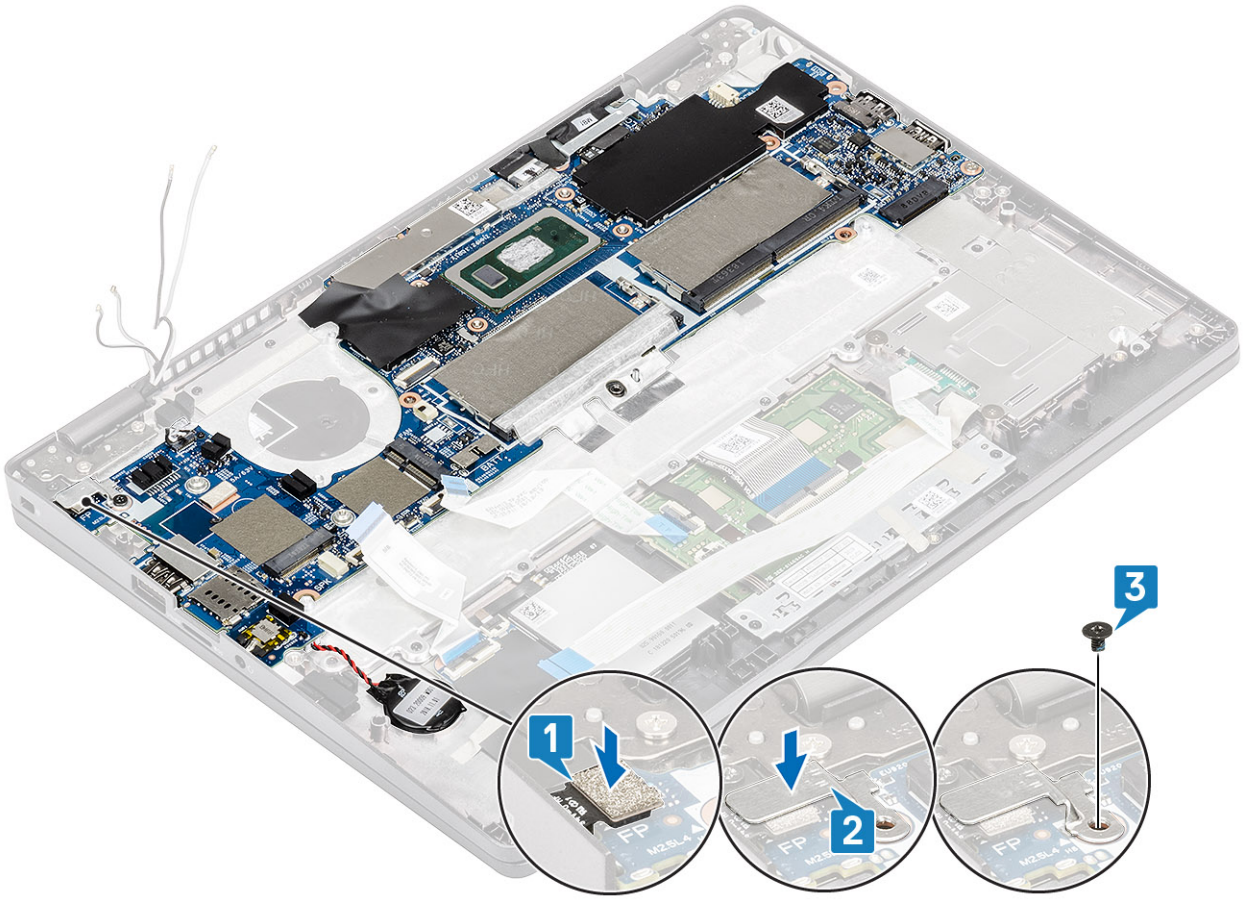
3. Connect the sensor cable to the connector on the system board [1].
4. Place the coin cell battery into its slot on the plamrest [2].



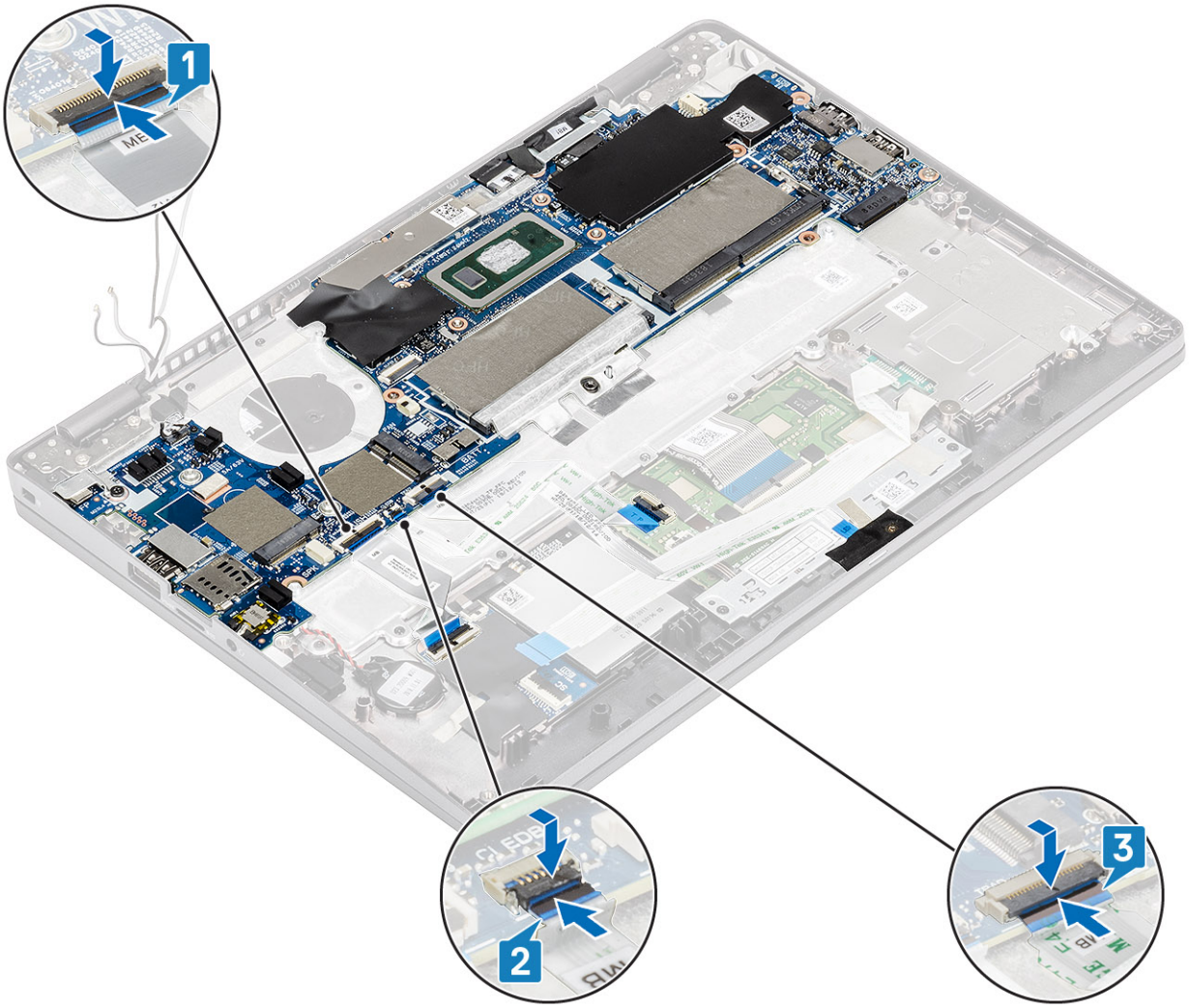
5. Connect the cable to the connector on the system board and adhere the adhesive tape [1].
6. Connect the eDP cable to the connector on the system board [2].
7. Place the eDP support bracket above the eDP connector [3].
8. Replace the single (M2x4) screw to secure the eDP bracket to the system board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



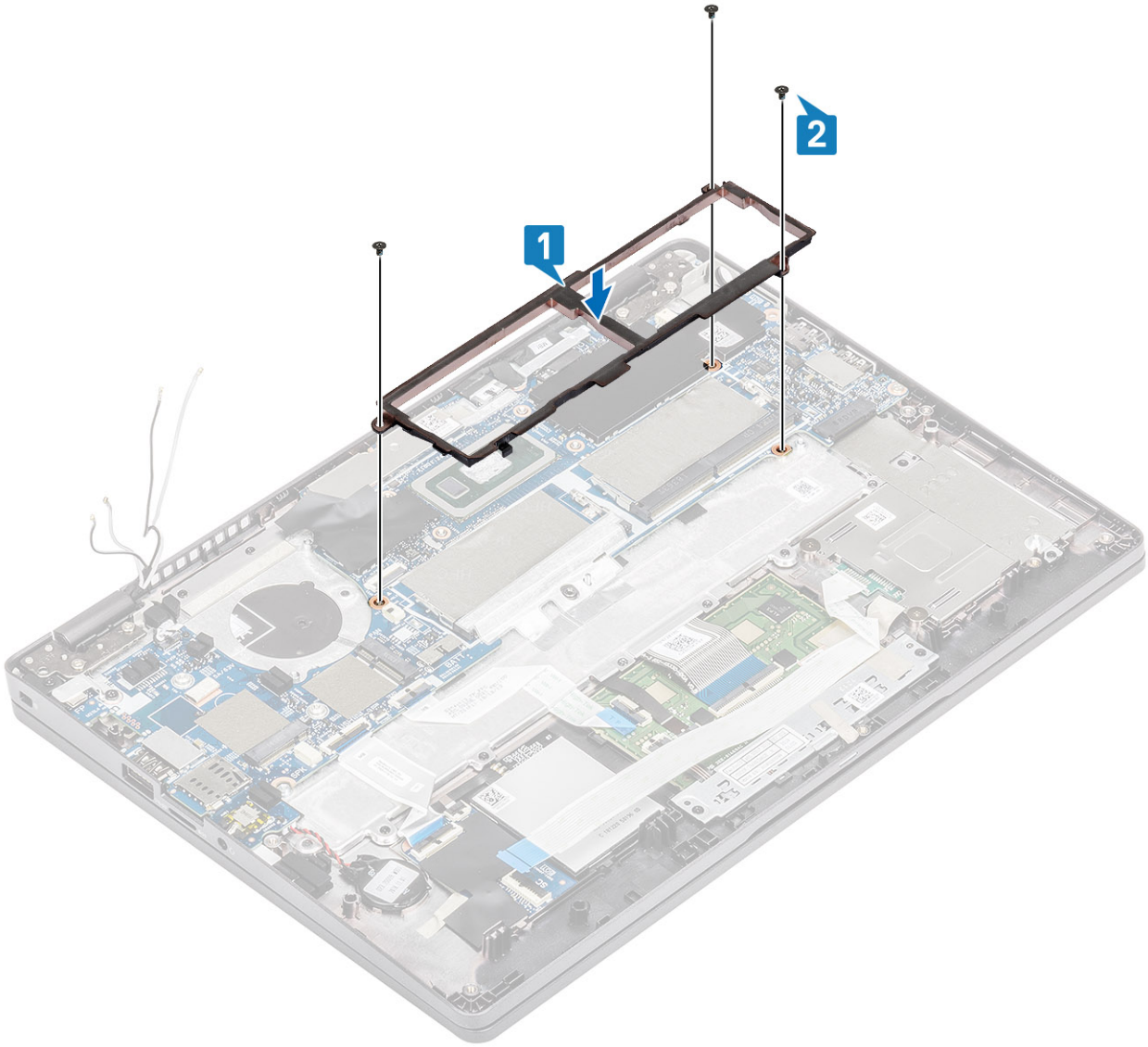
10. Connect the fingerprint cable to the connector on the system board [1].
11. Place the fingerprint support bracket [2].
12. Replace the single (M2.5x4) screw to secure the fingerprint support bracket to the system board [3].



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

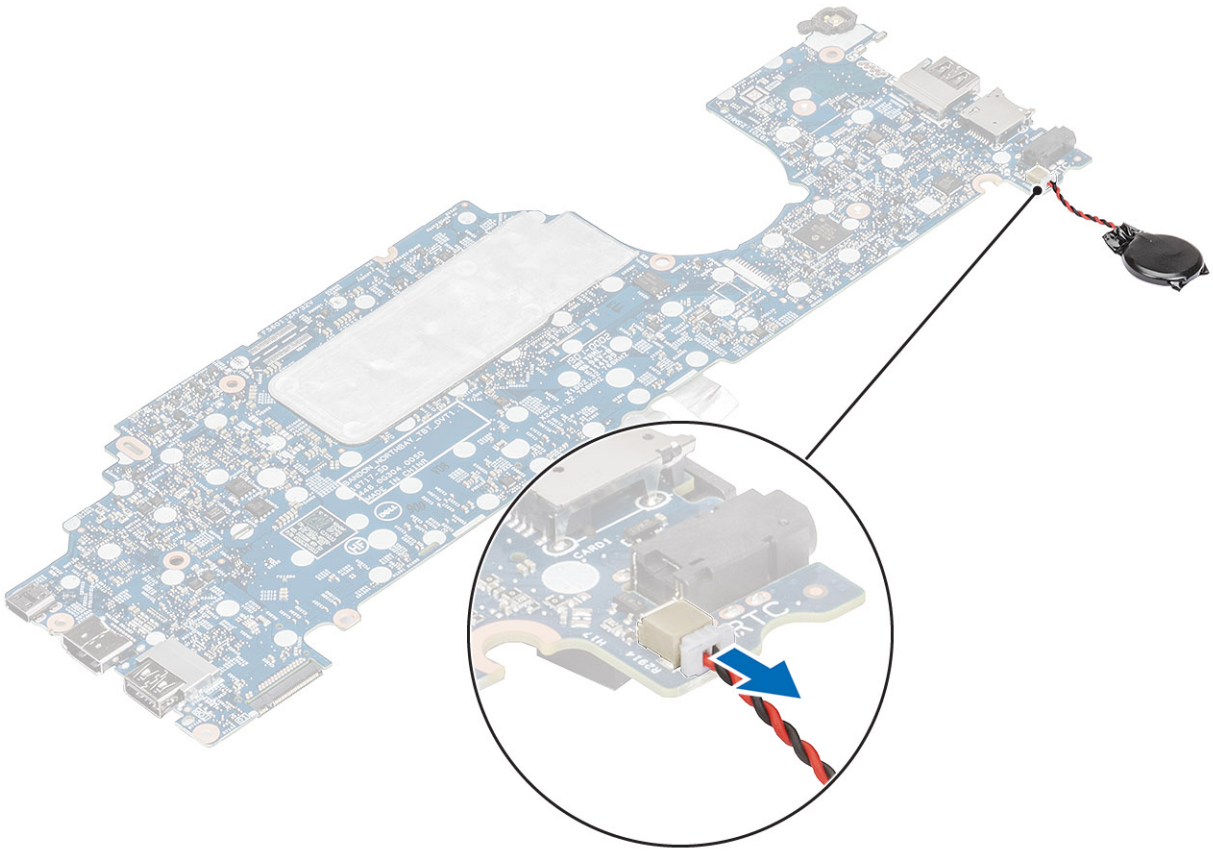
Removing the coin-cell battery

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

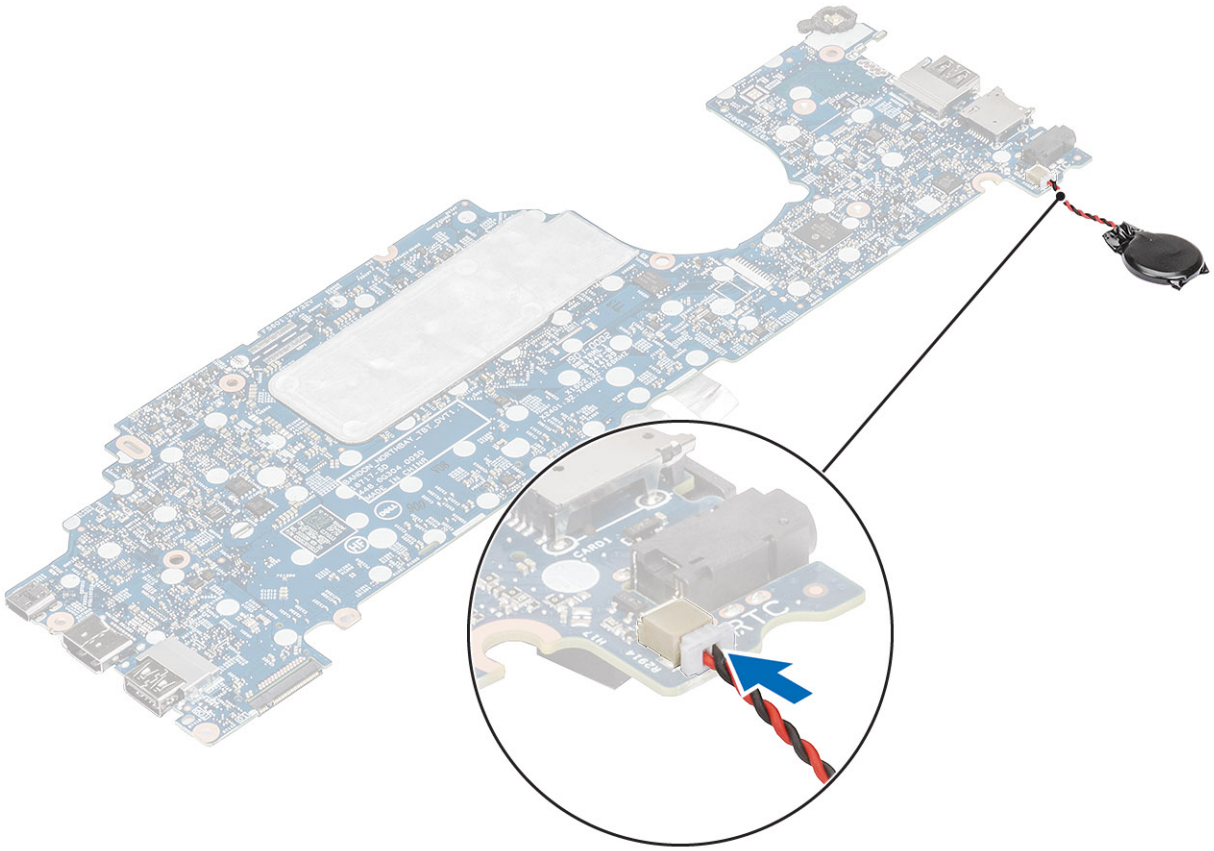
Turn the system board and disconnect the coin cell battery cable from the connector on the system board.



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

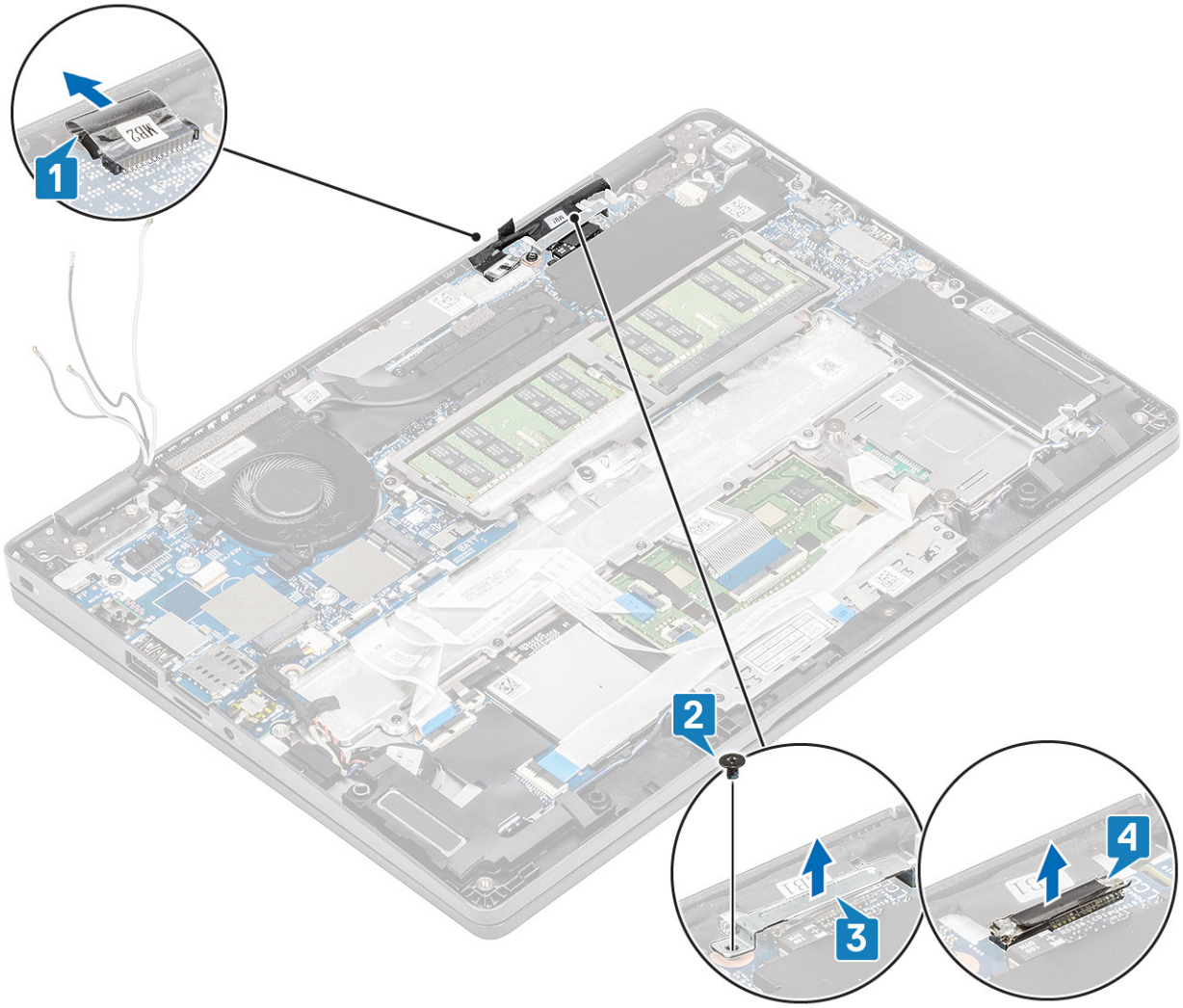
Removing the display assembly

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.

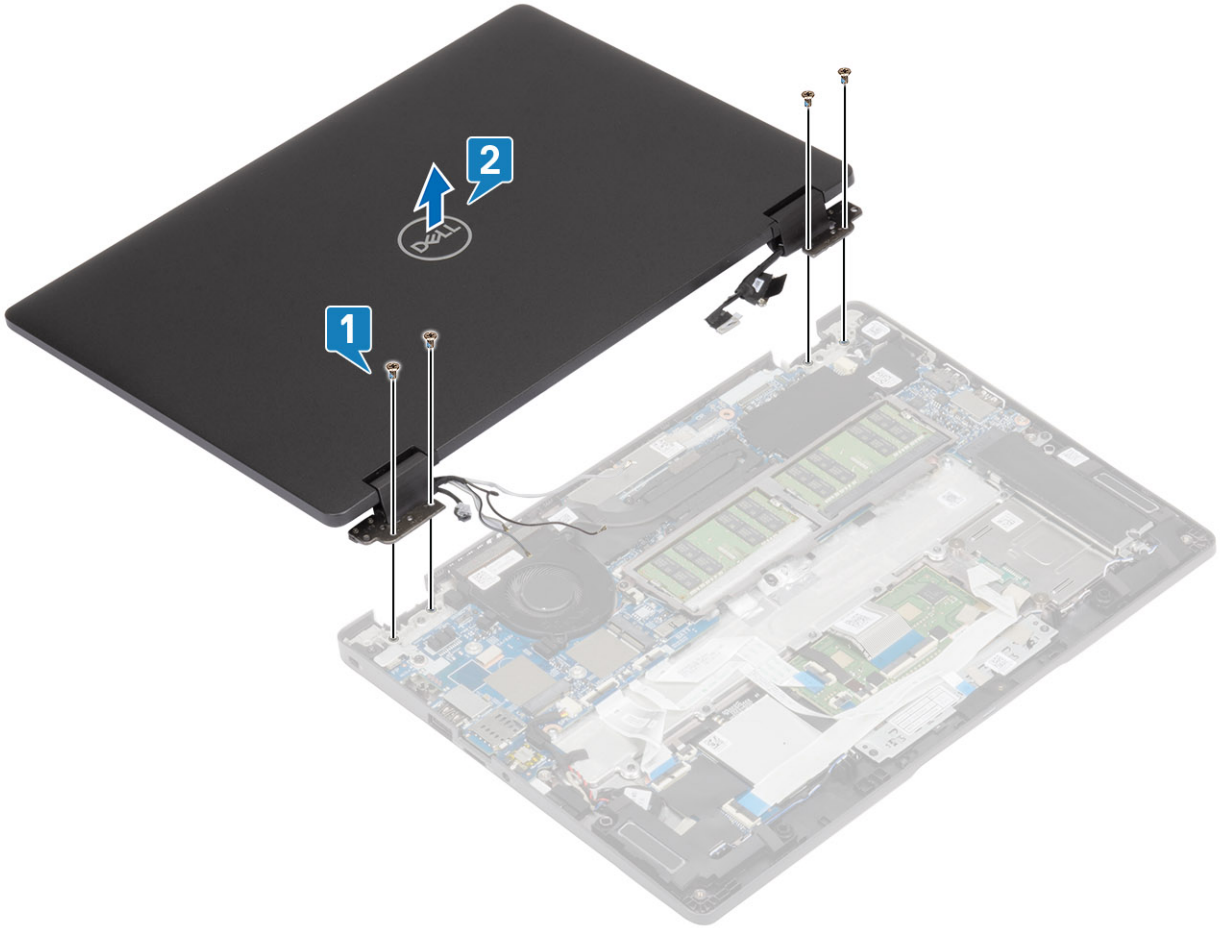
Steps

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].



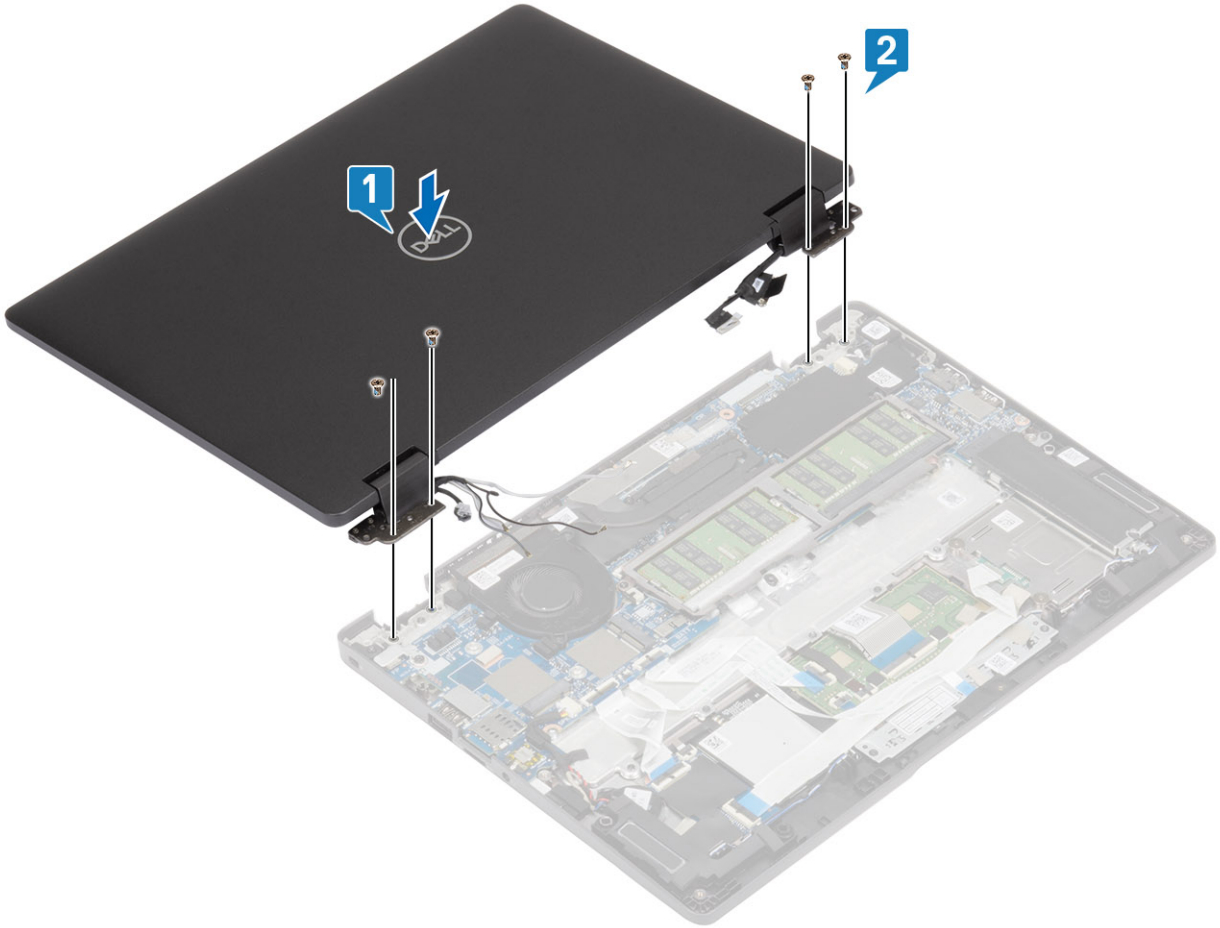
Installing the display assembly

About this task

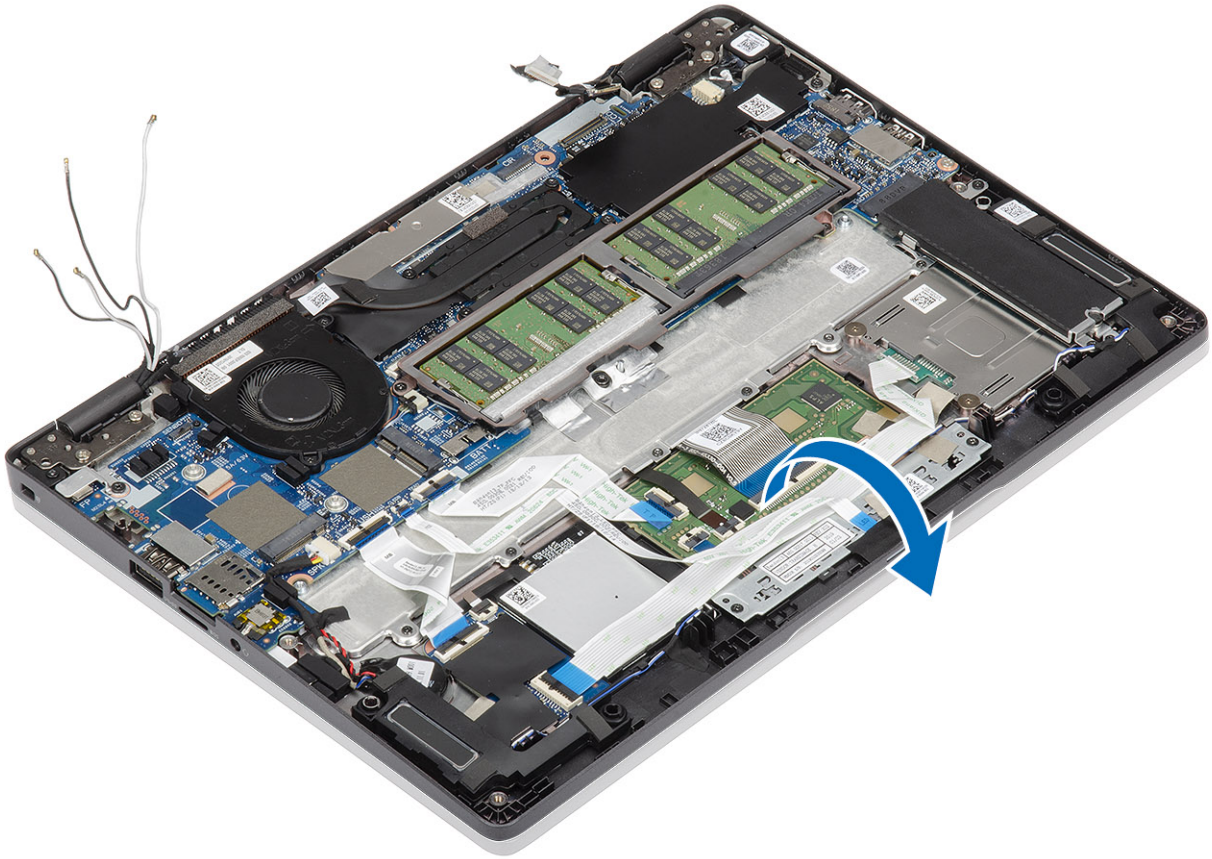
NOTE: Ensure that the hinges are opened to the maximum before replacing the display assembly on the palmrest and keyboard assembly.

Steps

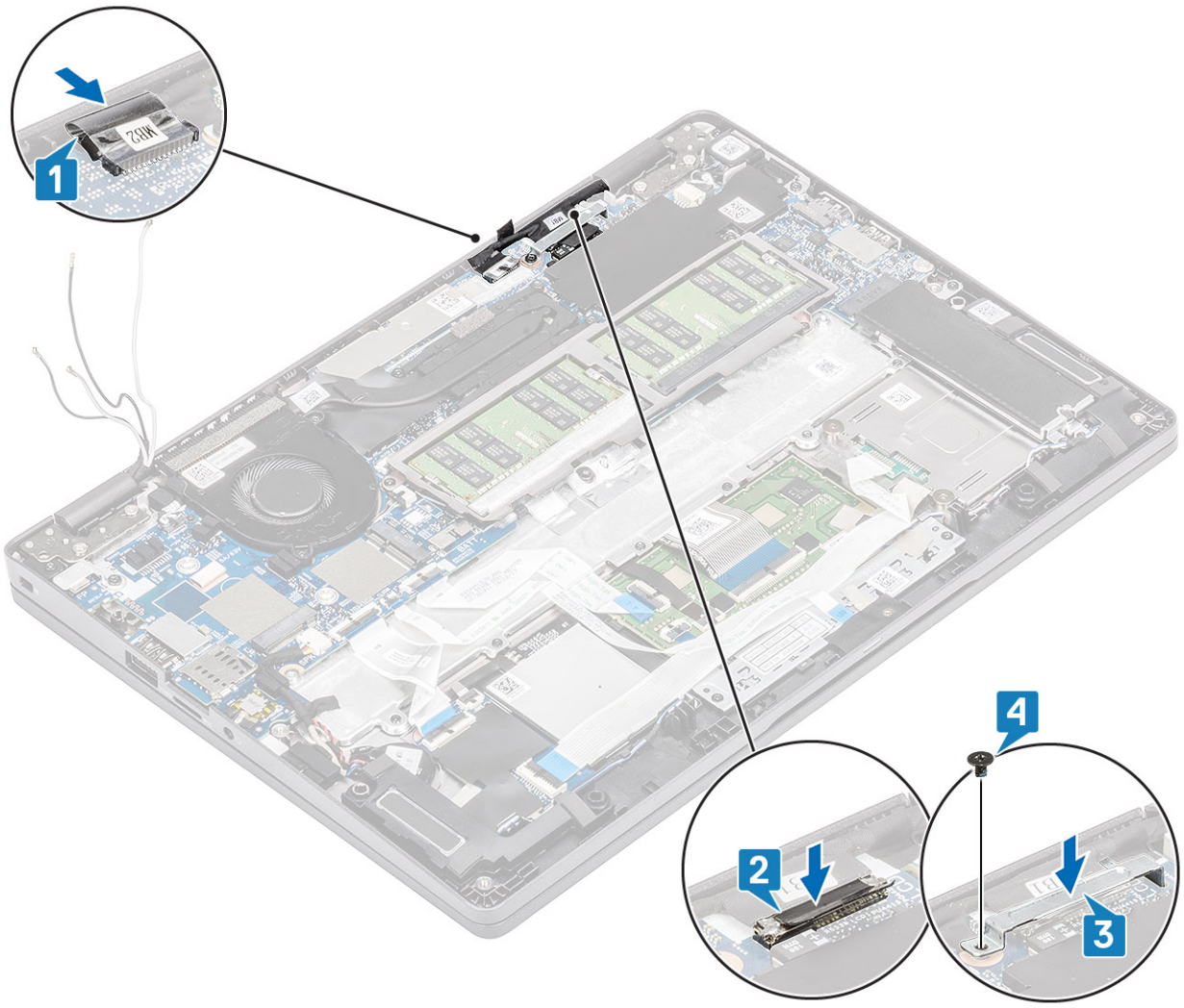
1. Align and place the system chassis under the hinges of the display assembly [1].
2. Replace the four (M2.5x4) screws that secure the display assembly to the system chassis [2].



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

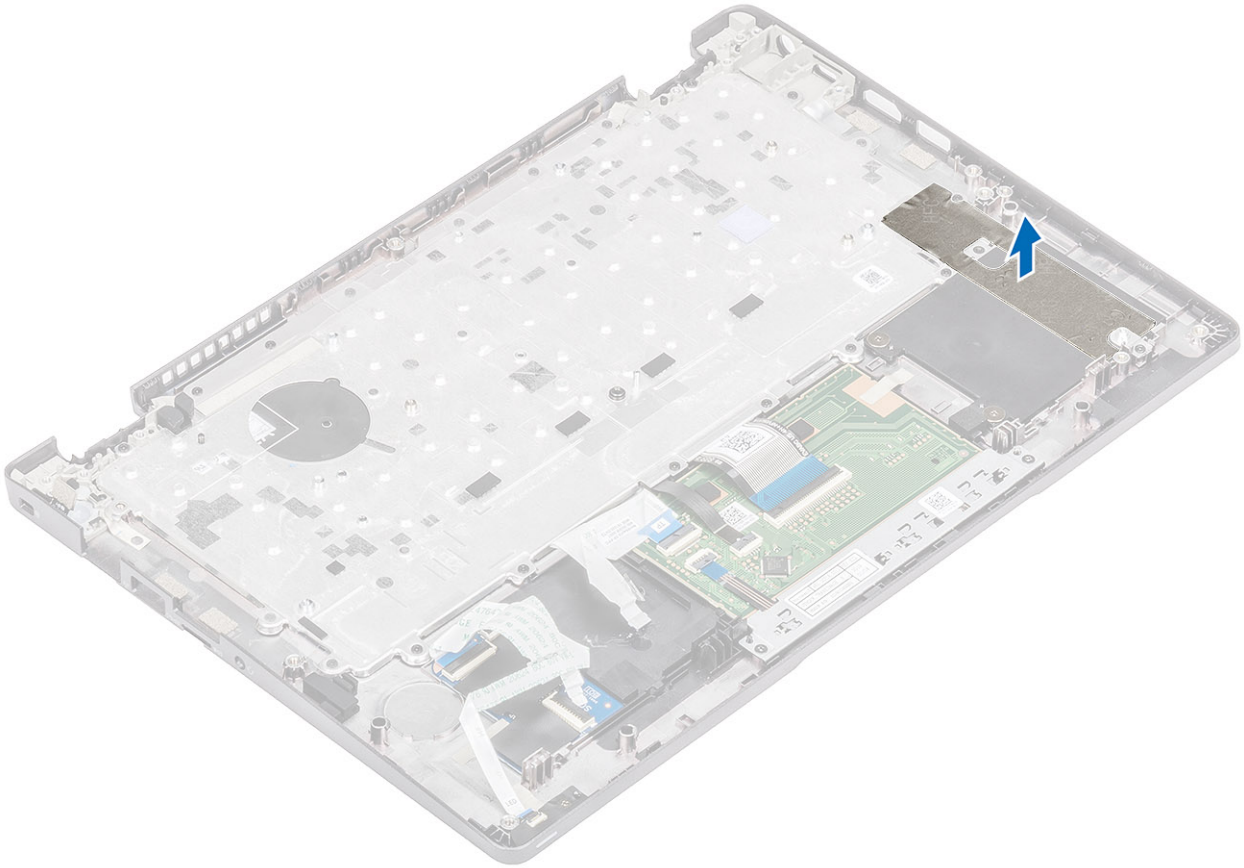
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Remove the battery.
5. Remove the speaker.
6. Remove the memory module.
7. Remove the system fan.
8. Remove the DC-in .
9. Remove the WLAN card.

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

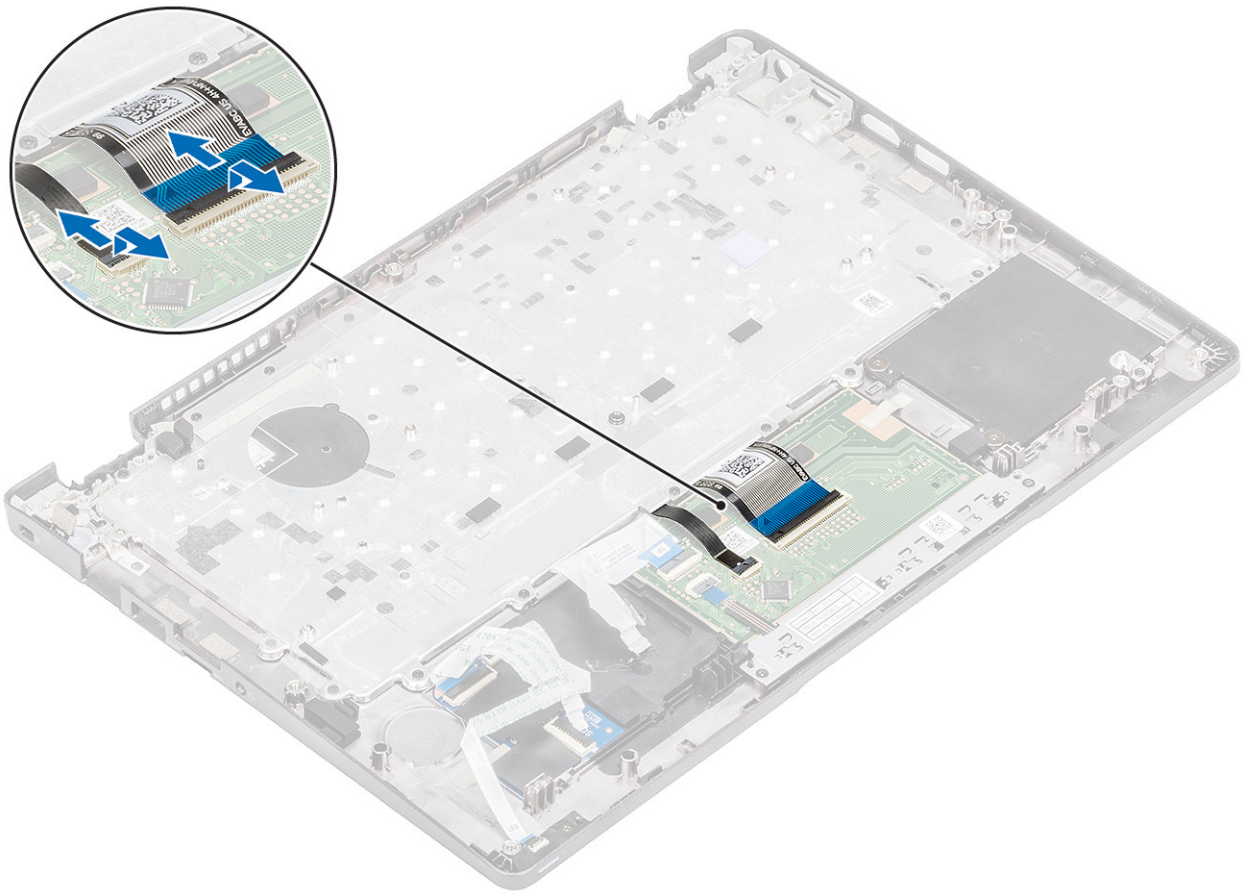
    NOTE: System board can be removed with heatsink attached.
12. Remove the coin cell battery.

Steps

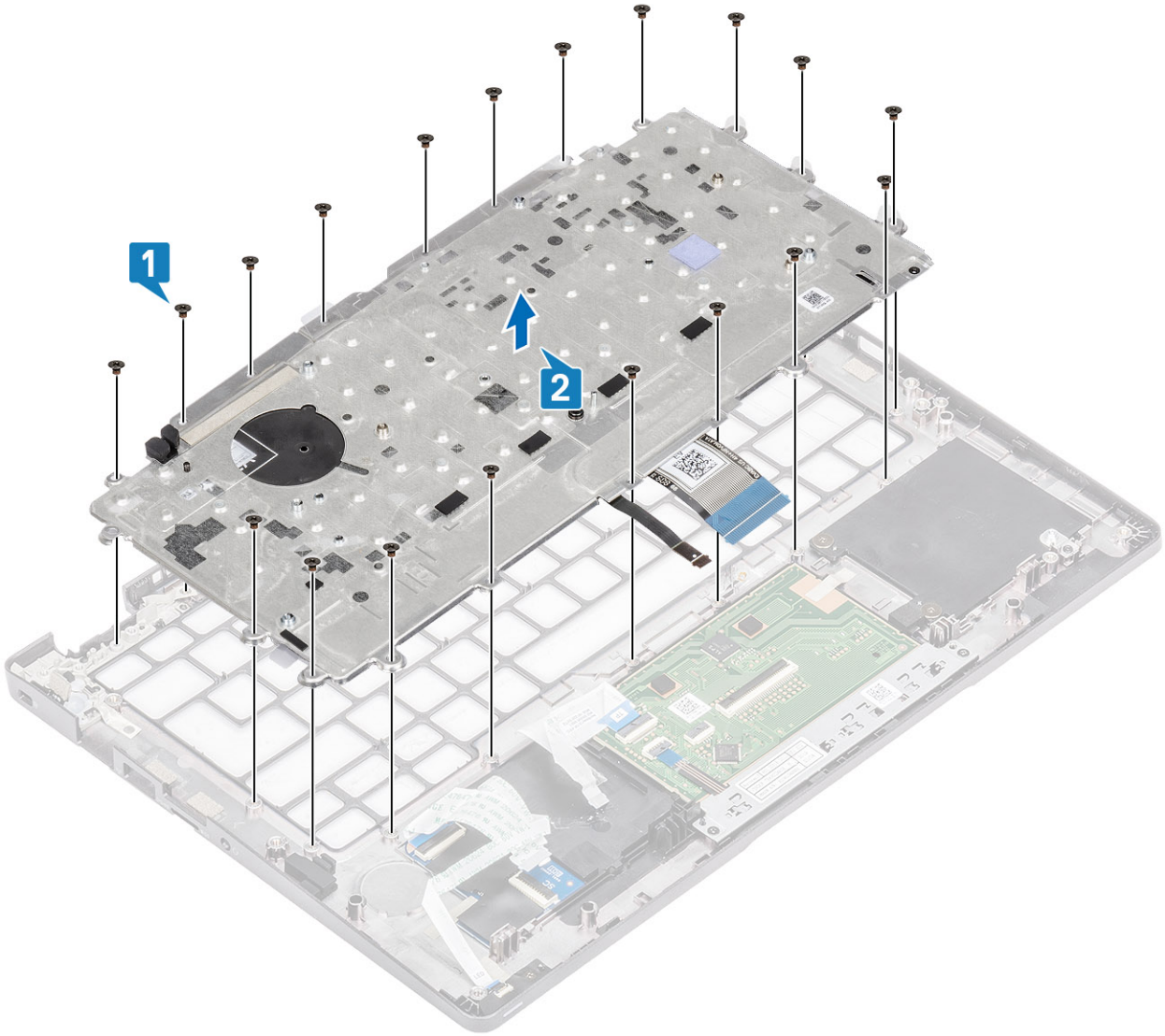
1. Peel the adhesive tape securing the keyboard and the smartcard reader.



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



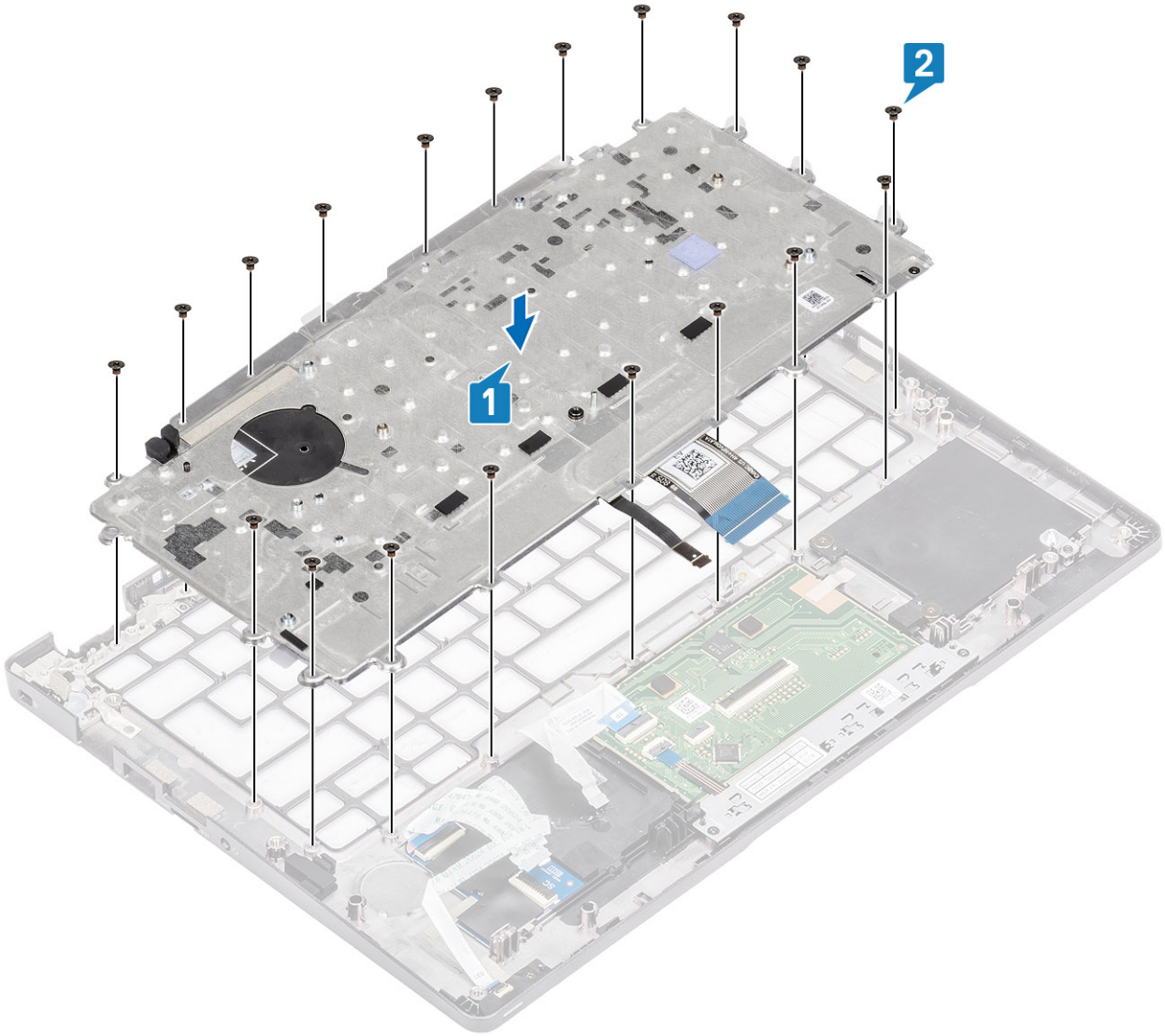
3. Remove the 19 (M2x2) screws that secure the keyboard to the palmrest [1].
4. Remove the keyboard away from the computer [2].



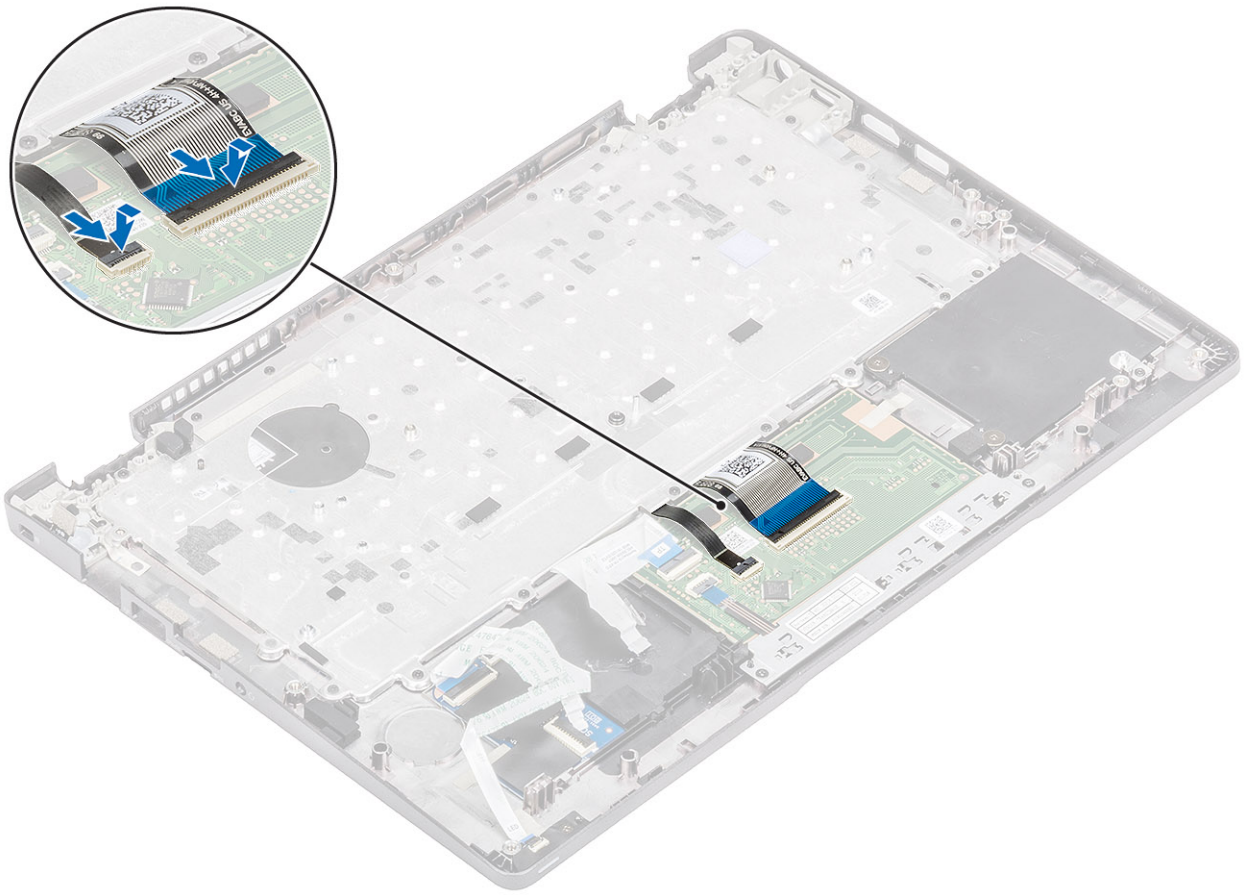
Installing the keyboard

Steps

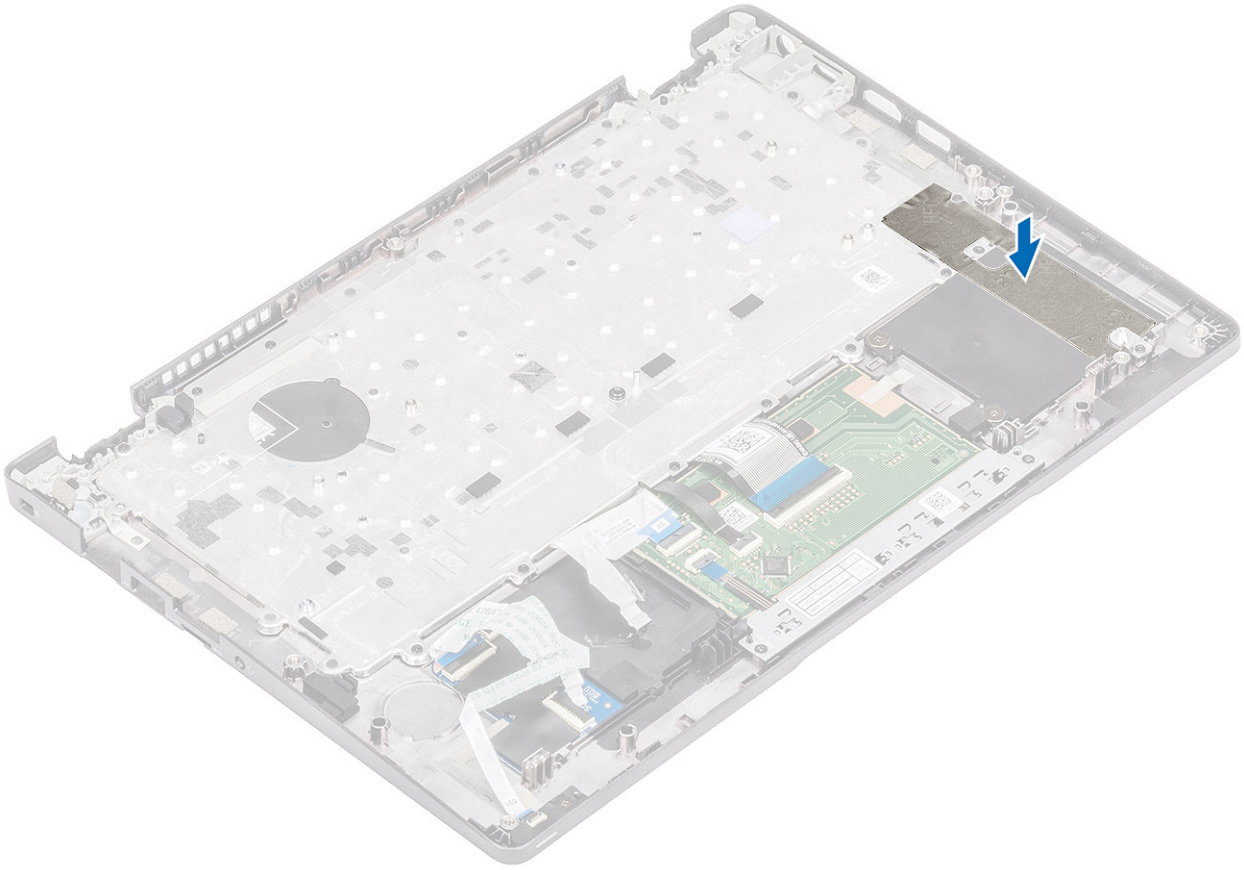
1. Align and place the keyboard on the palmrest [1].
2. Replace the 19 (M2x2) screws to secure the keyboard to the palmrest [2].



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

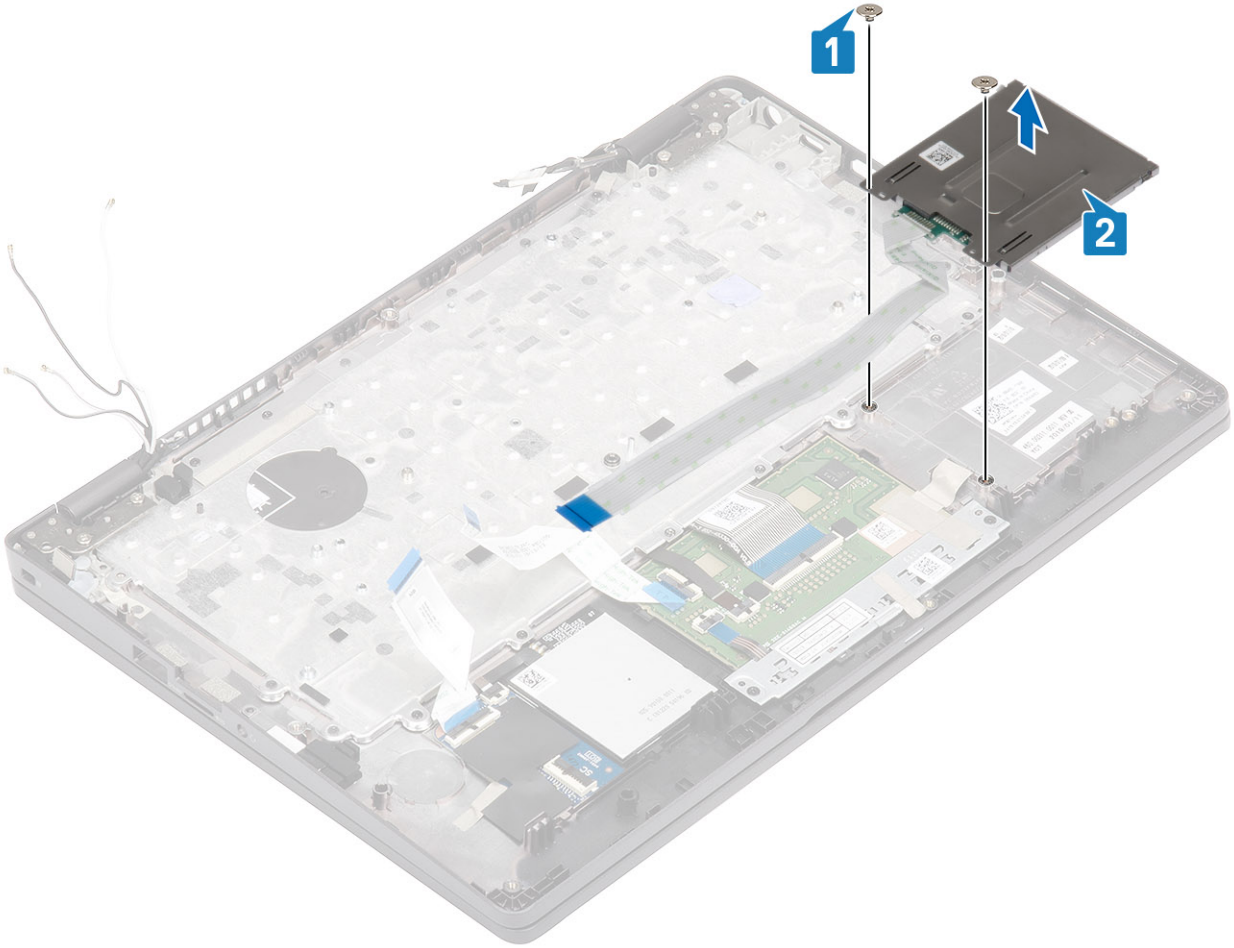
Prerequisites

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.

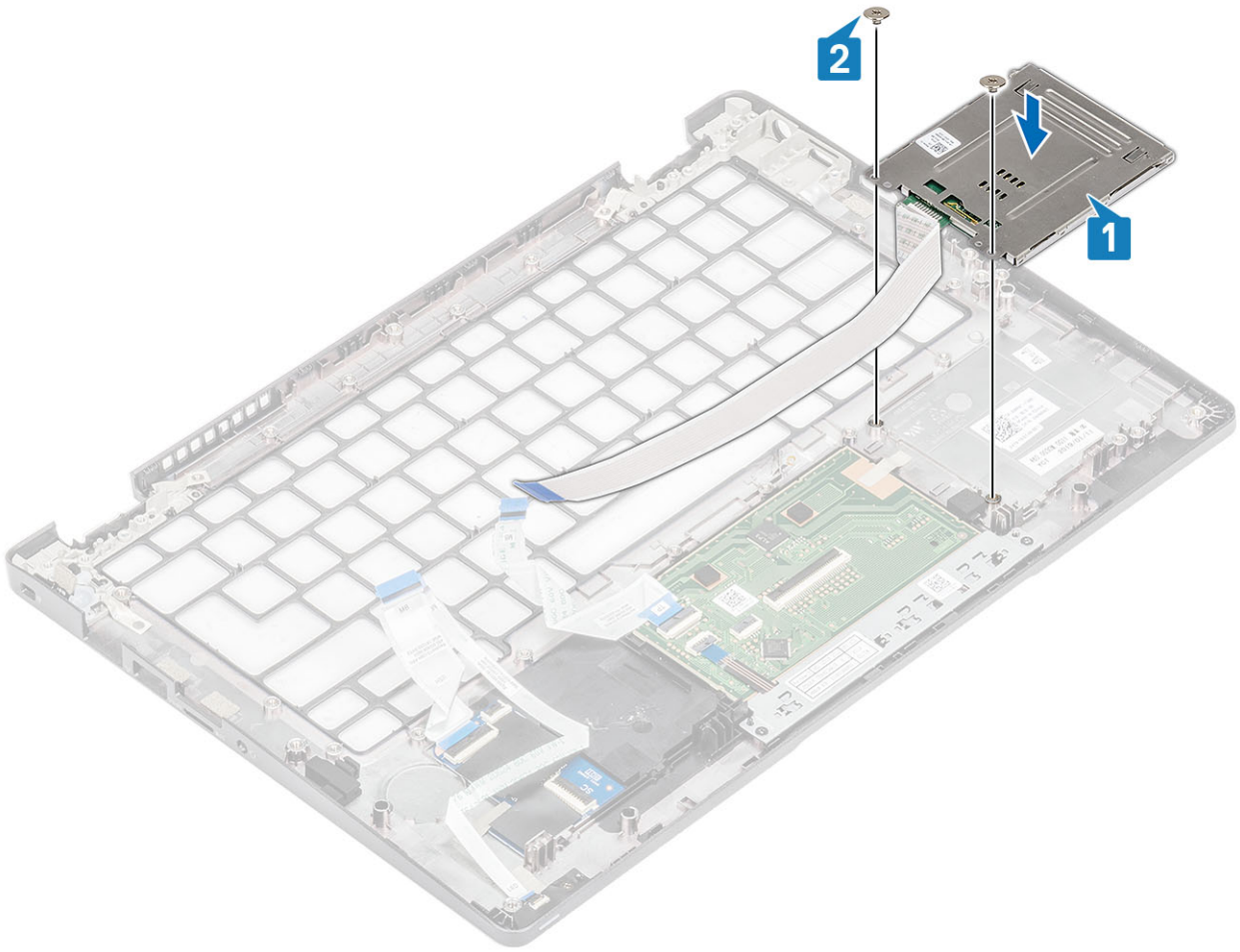
2. Remove the two (M2x2.5) screws that secure the smart card reader to the palmrest [1].
3. Lift the smart card reader board away from the computer [2].



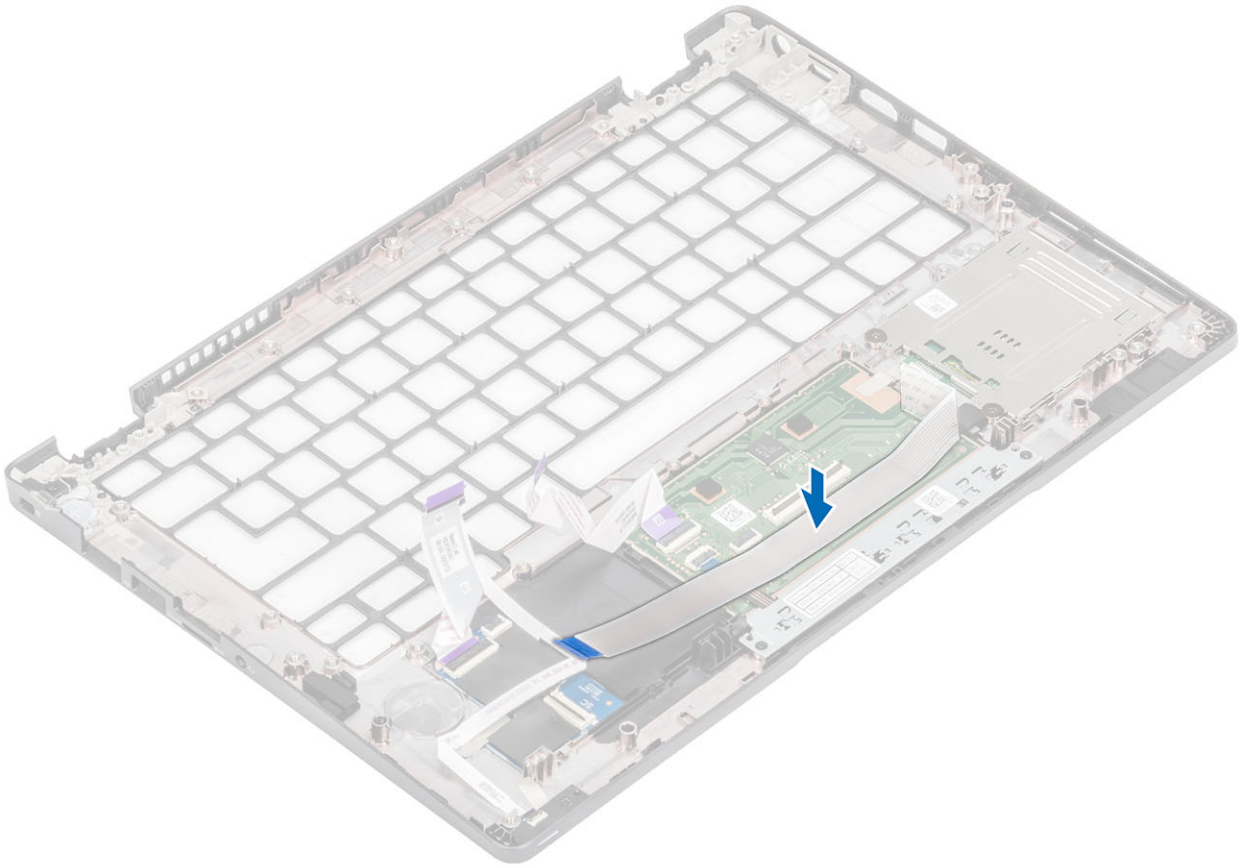
Installing the smart card reader board

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

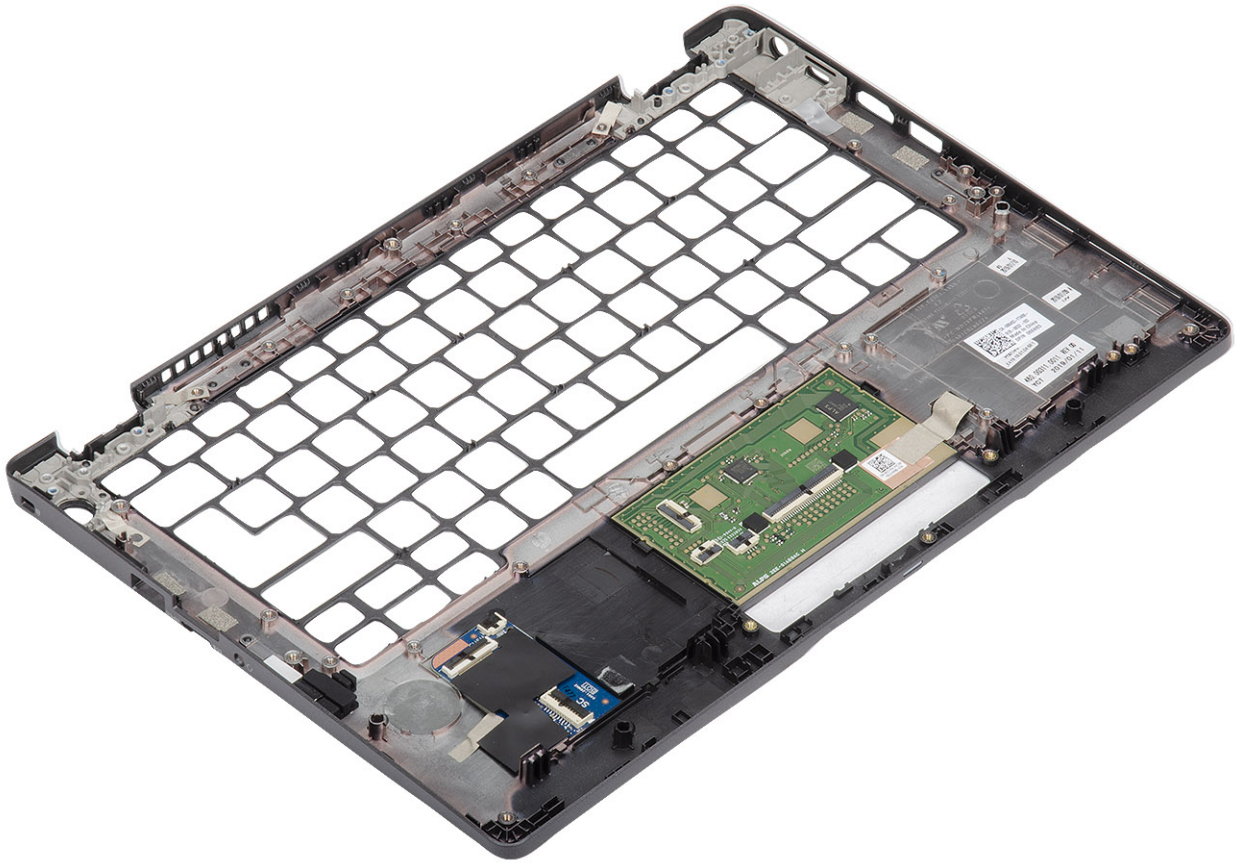
1. Follow the procedure in before working inside your computer.
2. Remove the microSD card.
3. Remove the base cover.
4. Remove the battery.
5. Remove the speaker.
6. Remove the memory module.

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

SupportAssist Diagnostics

The SupportAssist diagnostics (also known as system diagnostics) performs a complete check of your hardware. The SupportAssist 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 devices
- View status messages that inform you if tests are completed successfully
- View error messages that inform you of problems encountered during testing

NOTE: The SupportAssist window displays, listing all devices detected in the computer. The diagnostics starts running the tests on all the detected devices.

Running SupportAssist diagnostics

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

- Tap F12 key on keyboard, as the Dell splash screen appears, until you get the message Diagnostic Boot Selected.
- On the one-time boot menu screen, use the Up/Down arrow key to select the **Diagnostics** option and then press **Enter**.
- Press and Hold Function (Fn) key on the keyboard and press the **Power button** to power on the system.

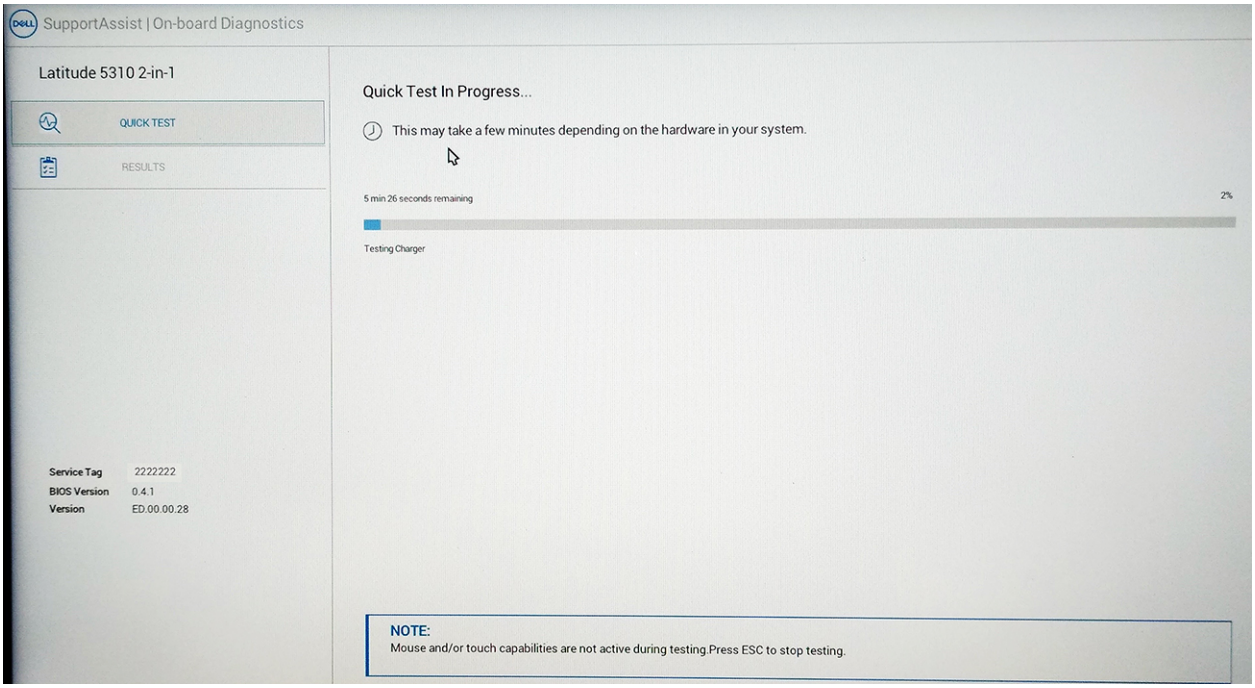
SupportAssist diagnostic User Interface

This section contains information on SupportAssist-Basic and Advanced Screen.

SupportAssist opens the basic screen on start. You can switch to the advanced screen using the icon at the bottom left of the screen. The advanced screen shows detected devices in a tiled format. Specific tests can be included or excluded only in the advanced mode.

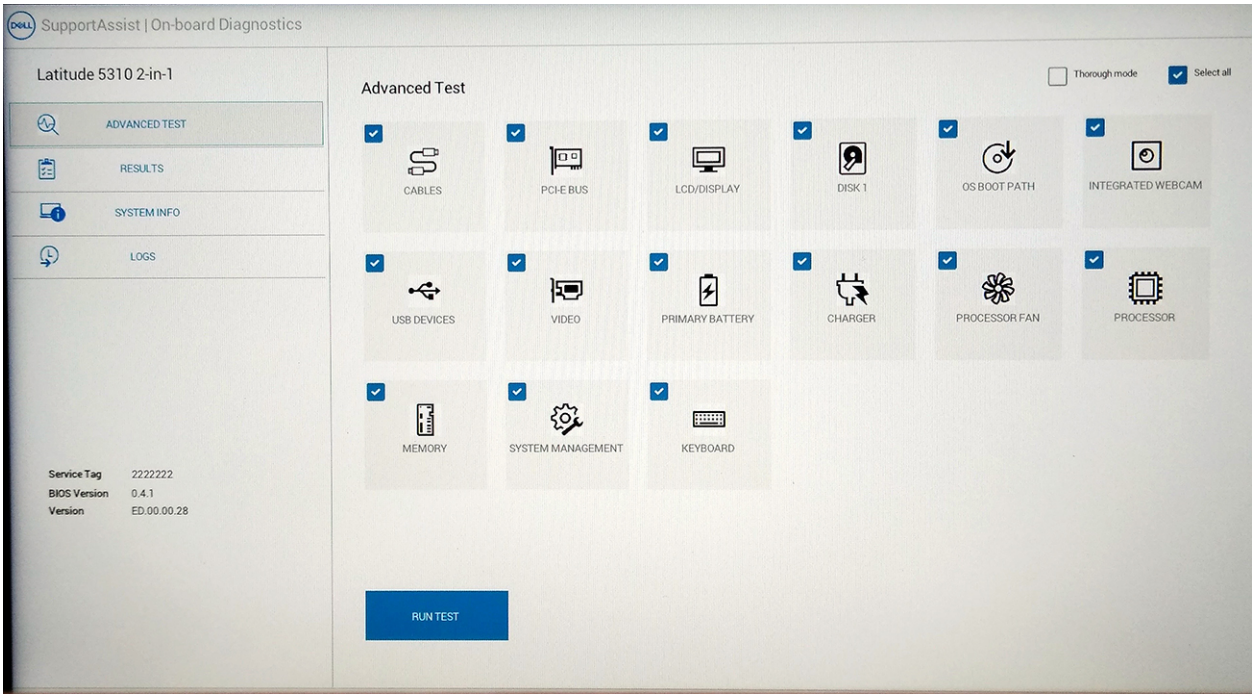
SupportAssist Basic Screen

The Basic Screen has minimal controls which allows easy navigation for the user to start or stop the diagnostics.



SupportAssist Advanced Screen

The advanced screen allows more directed testing and contains more detailed information about the overall health of the system. The user can get to this screen by simply swiping a finger to the left on touchscreen systems or clicking the next page button on the lower left-hand side of the basic screen.

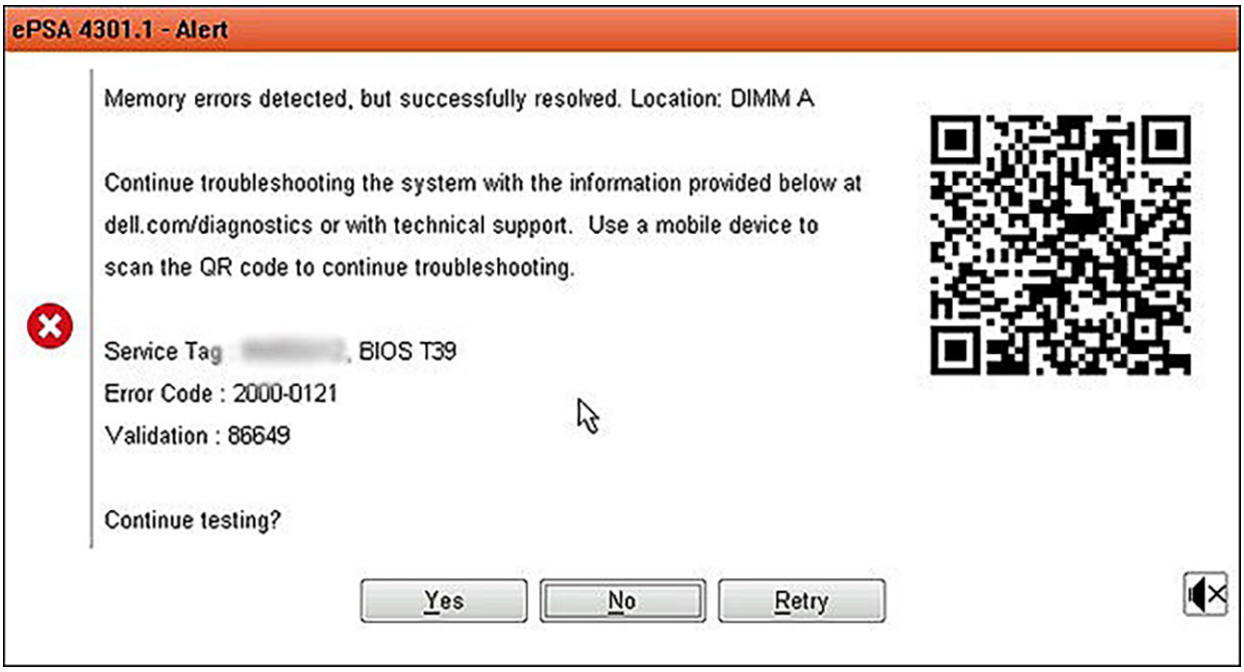


To run the test on specific device or run a specific test

1. To run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
2. Select the device from the using the checkbox in the top left of the test tile and click **Run Tests** or use **Thorough Option** check run more intensive tests.

SupportAssist Error Messages

When the Dell SupportAssist Diagnostic detects an error while running, it will pause the test and the following window is displayed:



- By responding Yes, the diagnostic will continue testing the next device and the error details will be available in the summary report.
- By responding No, the diagnostic will stop testing the remaining untested device.
- By responding Retry, the diagnostic will ignore the error and rerun the last test.

Capture the error code with Validation code or Scan QR code and Contact Dell.

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

System diagnostic lights

Battery-status light

Indicates the power and battery-charge status.

Solid white — Power adapter is connected and the battery has more than 5 percent charge.

Amber — Computer is running on battery and the battery has less than 5 percent charge.

Off

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

The power and battery-status light blinks amber along with beep codes indicating failures.

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

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

Table 2. LED codes

Diagnostic light codes	Problem description
2,1	Processor failure
2,2	System board: BIOS or ROM (Read-Only Memory) failure
2,3	No memory or RAM (Random-Access Memory) detected

Table 2. LED codes(continued)

Diagnostic light codes	Problem description
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
2,8	LCD power rail failure. Replace system board
3,1	Coin-cell battery failure
3,2	PCI, video card/chip failure
3,3	Recovery image not found
3,4	Recovery image found but invalid
3,5	Power-rail failure
3,6	System BIOS Flash incomplete
3,7	Management Engine (ME) error

Camera status light: Indicates whether the camera is in use.

- Solid white — Camera is in use.
- Off — Camera is not in use.

Caps Lock status light: Indicates whether Caps Lock is enabled or disabled.

- Solid white — Caps Lock enabled.
- Off — Caps Lock disabled.

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.

6

Getting help and contacting Dell

Self-help resources

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

Table 3. Self-help resources

Self-help resources	Resource location
Information about Dell products and services	www.dell.com
Dell Help and Support app	
Accessing help	In Windows search, type `Help and Support`, and press Enter.
Online help for operating system	www.dell.com/support/windows
Troubleshooting information, user manuals, set up instructions, product specifications, technical help blogs, drivers, software updates, and so on.	www.dell.com/support
Dell knowledge base articles for various computer concerns	1. Go to www.dell.com/support. 2. Type the subject or keyword in the **Search** box. 3. Click **Search** to retrieve the related articles.
Learn and know the following information about your product: · Product specifications · Operating system · Setting up and using your product · Data backup · Troubleshooting and diagnostics · Factory and system restore · BIOS information	See *Me and My Dell* at www.dell.com/support/manuals. To locate the *Me and My Dell* relevant to your product, identify your product through one of the following: · Select **Detect Product**. · Locate your product through the drop-down menu under **View Products**. · Enter the **Service Tag number** or **Product ID** in the search bar.

Contacting Dell

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

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

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