

# Dell Precision 3540

## Service Manual



## Notes, cautions, and warnings

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

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

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

**© 2018 - 2019 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

<b>1 Working on your computer.....</b>	<b>6</b>
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.....	8
After working inside your computer.....	9
<b>2 Technology and components.....</b>	<b>10</b>
USB features.....	10
USB Type-C.....	12
HDMI 1.4a.....	13
Power button LED behavior.....	14
<b>3 Major components of your system.....</b>	<b>16</b>
<b>4 Disassembly and reassembly.....</b>	<b>18</b>
microSD card.....	18
Removing microSD card.....	18
Installing microSD card.....	18
Base cover.....	19
Removing the base cover.....	19
Installing the base cover.....	21
Battery.....	24
Lithium-ion battery precautions.....	24
Removing the battery.....	24
Installing the battery.....	26
Memory modules.....	28
Removing the memory.....	28
Installing the memory.....	29
WLAN card.....	30
Removing the wireless card.....	30
Installing the wireless card.....	31
Solid state drive.....	32
Removing the Solid state drive.....	32
Installing the solid state drive.....	33
Solid state drive bracket.....	34
Removing the solid state drive bracket.....	34
Installing the solid state drive bracket.....	35
Palmrest bracket.....	36
Removing the palmrest bracket.....	36
Installing the palmrest bracket.....	38
Speaker.....	40

Removing the speakers.....	40
Installing the speakers.....	42
Heat sink.....	44
Removing the Heatsink.....	44
Installing the Heatsink.....	46
System fan.....	48
Removing the system fan.....	48
Installing the system fan.....	50
Power-adapter 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.....	61
Removing the touchpad button.....	61
Installing the touchpad buttons board.....	63
System board.....	65
Removing the system board.....	65
Installing the system board.....	68
Coin-cell battery.....	71
Removing the coin cell battery.....	71
Installing the coin cell battery.....	72
Display assembly.....	73
Removing the LCD assembly.....	73
Installing the LCD assembly.....	75
Keyboard lattice and Keyboard.....	78
Removing the keyboard.....	78
Installing the keyboard.....	80
Keyboard bracket.....	82
Removing the keyboard bracket.....	82
Installing the keyboard bracket.....	83
Smart card reader board.....	85
Removing the smart card reader.....	85
Installing the smart card reader.....	86
Display bezel.....	88
Removing the display bezel.....	88
Installing the display bezel .....	90
Hinge caps.....	92
Removing hinge caps.....	92
Installing hinge caps.....	93
Display hinges.....	94
Removing display hinge.....	94
Installing display hinge .....	95
Display panel.....	96
Removing display panel.....	96
Installing display panel .....	99
Camera.....	101
Removing camera.....	101
Installing the camera.....	102

Display (eDP) cable.....	103
Removing display cable.....	103
Installing display cable.....	104
Display back cover assembly.....	105
Replacing the display back cover.....	105
Palmrest assembly.....	106
Replacing the palmrest and keyboard assembly.....	106
<b>5 Troubleshooting.....</b>	<b>109</b>
Enhanced Pre-Boot System Assessment (ePSA) diagnostics.....	109
Running the ePSA diagnostics.....	109
System diagnostic lights.....	109
WiFi power cycle.....	110
<b>6 Getting help.....</b>	<b>111</b>
Contacting Dell.....	111

# 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 Instruction](#).
2. Ensure that your work surface is flat and clean to prevent the computer cover from being scratched.
3. Turn off your computer.
4. Disconnect all network cables from the computer.
-  **CAUTION:** To disconnect a network cable, first unplug the cable from your computer and then unplug the cable from the network device.
5. Disconnect your computer and all attached devices from their electrical outlets.

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

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

## 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 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. .

### 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

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

### Steps

1. Connect any telephone or network cables to your computer.  
 **CAUTION:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.
2. Connect your computer and all attached devices to their electrical outlets.
3. Turn on your computer.
4. If required, verify that the computer works correctly by running **ePSA diagnostics**.

# Technology and components

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 drives, and printers.

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

**Table 1. USB evolution**

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

### USB 3.0/USB 3.1 Gen 1 (SuperSpeed USB)

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

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

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



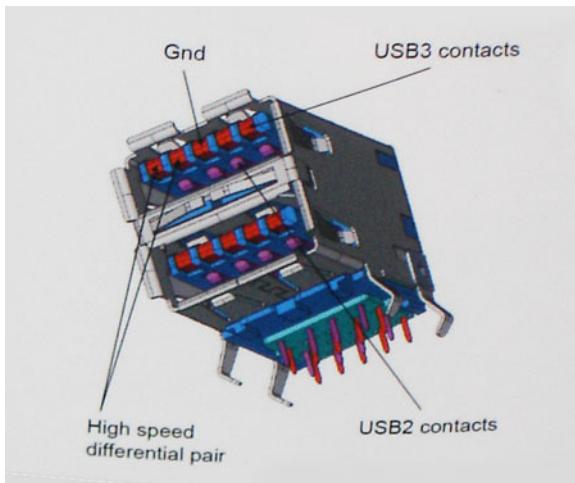
### Speed

Currently, there are 3 speed modes defined by the latest USB 3.0/USB 3.1 Gen 1 specification. They are Super-Speed, Hi-Speed and Full-Speed. The new SuperSpeed mode has a transfer rate of 4.8Gbps. While the specification retains Hi-Speed, and Full-Speed USB mode, commonly known as USB 2.0 and 1.1 respectively, the slower modes still operate at 480Mbps and 12Mbps respectively and are kept to maintain backward compatibility.

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

- An additional physical bus that is added in parallel with the existing USB 2.0 bus (refer to the picture below).
- USB 2.0 previously had four wires (power, ground, and a pair for differential data); USB 3.0/USB 3.1 Gen 1 adds four more for two pairs of differential signals (receive and transmit) for a combined total of eight connections in the connectors and cabling.

- USB 3.0/USB 3.1 Gen 1 utilizes the bidirectional data interface, rather than USB 2.0's half-duplex arrangement. This gives a 10-fold increase in theoretical bandwidth.



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

## Applications

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

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

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

## Compatibility

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

Windows 8/10 will be bringing native support for USB 3.1 Gen 1 controllers. This is in contrast to previous versions of Windows, which continue to require separate drivers for USB 3.0/USB 3.1 Gen 1 controllers.

Microsoft announced that Windows 7 would have USB 3.1 Gen 1 support, perhaps not on its immediate release, but in a subsequent Service Pack or update. It is not out of the question to think that following a successful release of USB 3.0/USB 3.1 Gen 1 support in Windows 7, SuperSpeed support would trickle down to Vista. Microsoft has confirmed this by stating that most of their partners share the opinion that Vista should also support USB 3.0/USB 3.1 Gen 1.

# 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 1.2 – 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 intended applications for HDMI TVs, and DVD players. 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

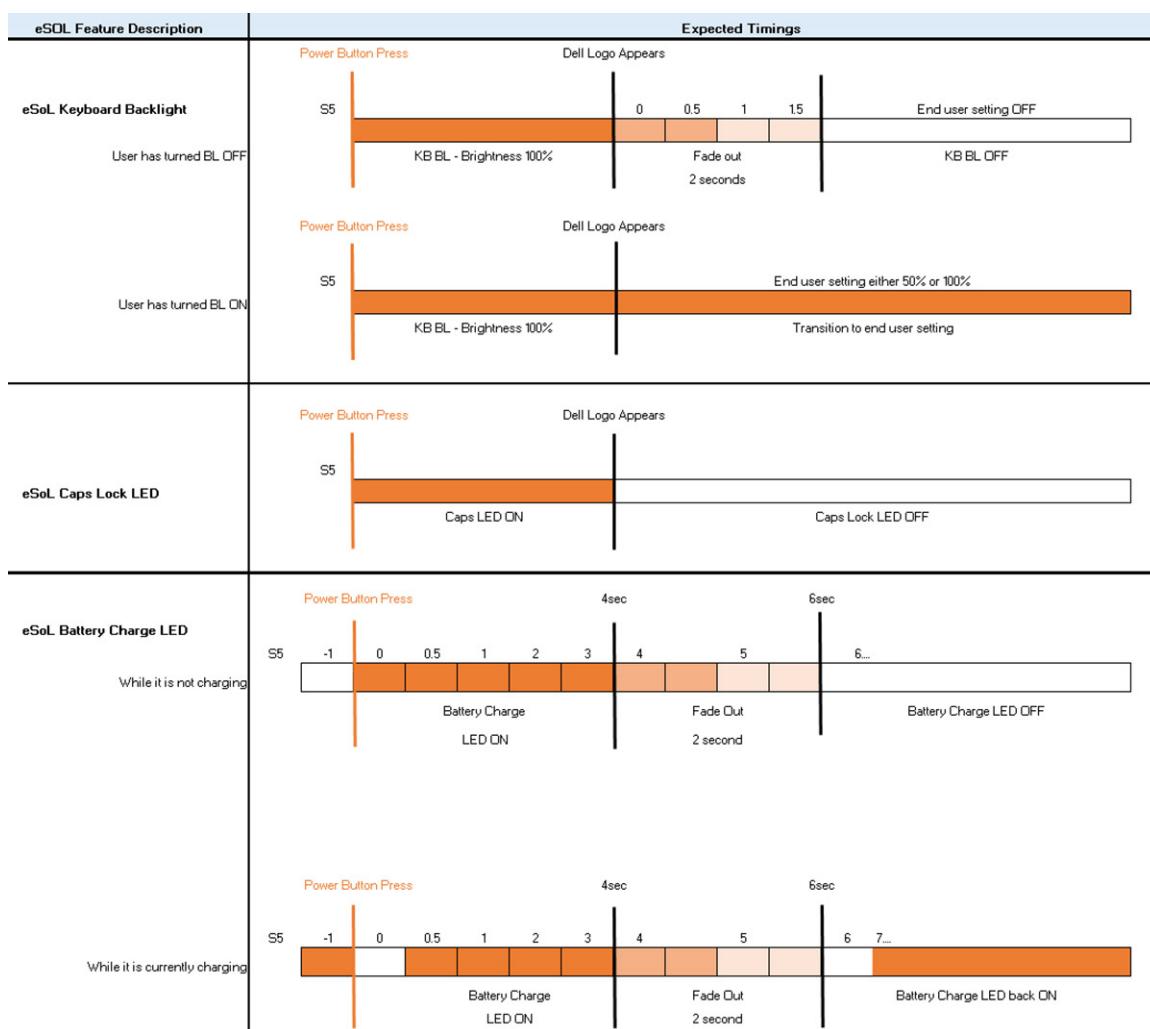
On certain Dell Latitude systems, the power button LED is used to provide an indication of the system status, and as a result the power button illuminates when pressed. The systems with the optional power button/fingerprint reader will have no LED under the power button and hence will apply the available 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, S0ix) = 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:

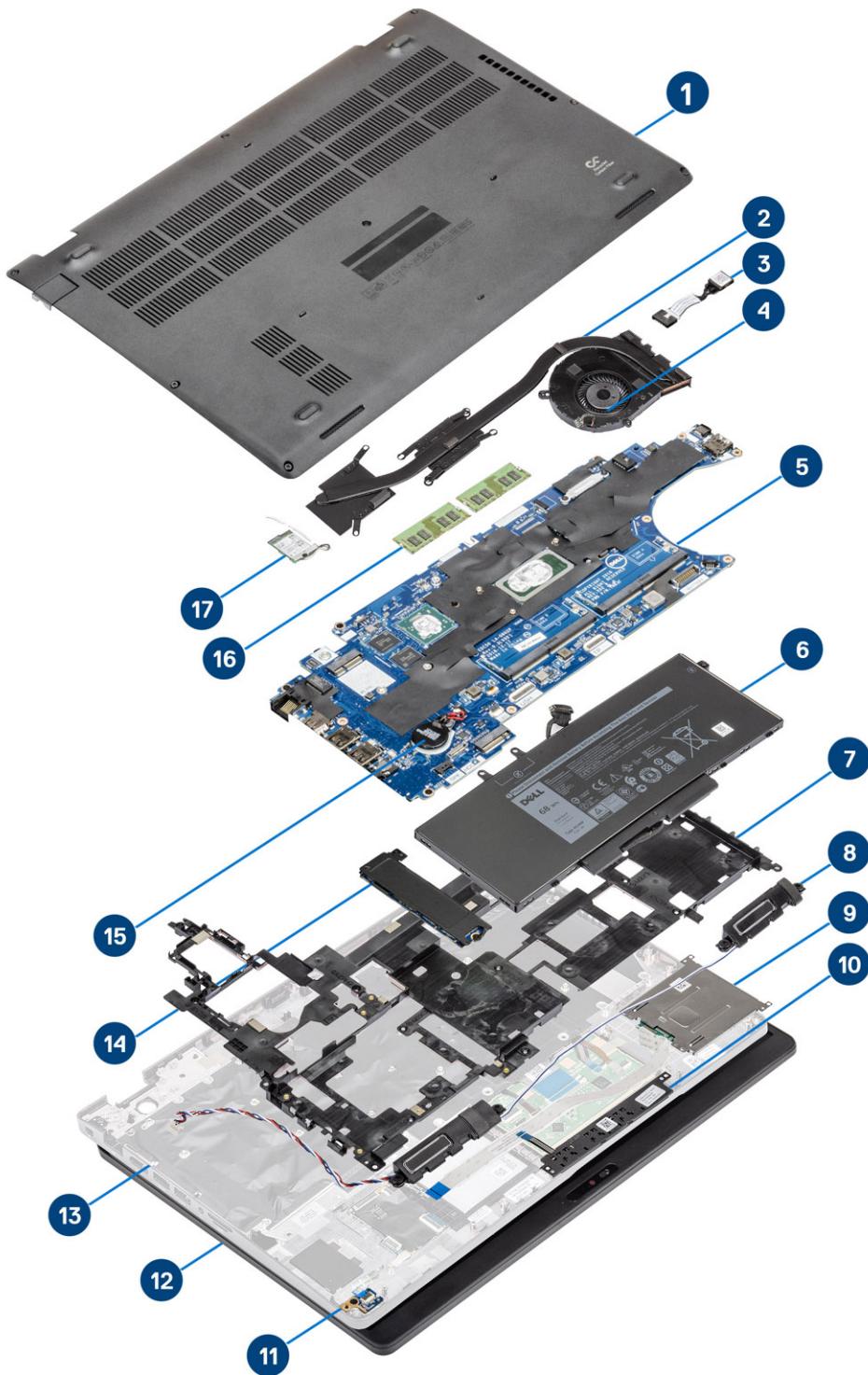


Power button with fingerprint reader will have no LED and will leverage the available LED's in the system to provide indication of the system status

- **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

## Major components of your system



1. Base cover
2. Heatsink

3. Power-adapter port
4. System fan
5. System board
6. Battery
7. Palmrest bracket
8. Speakers
9. Smart card reader
10. Touchpad button board
11. LED board
12. Display assembly
13. Palmrest assembly
14. Solid state drive
15. Coin cell
16. Memory modules
17. WLAN card

***(i) 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.***

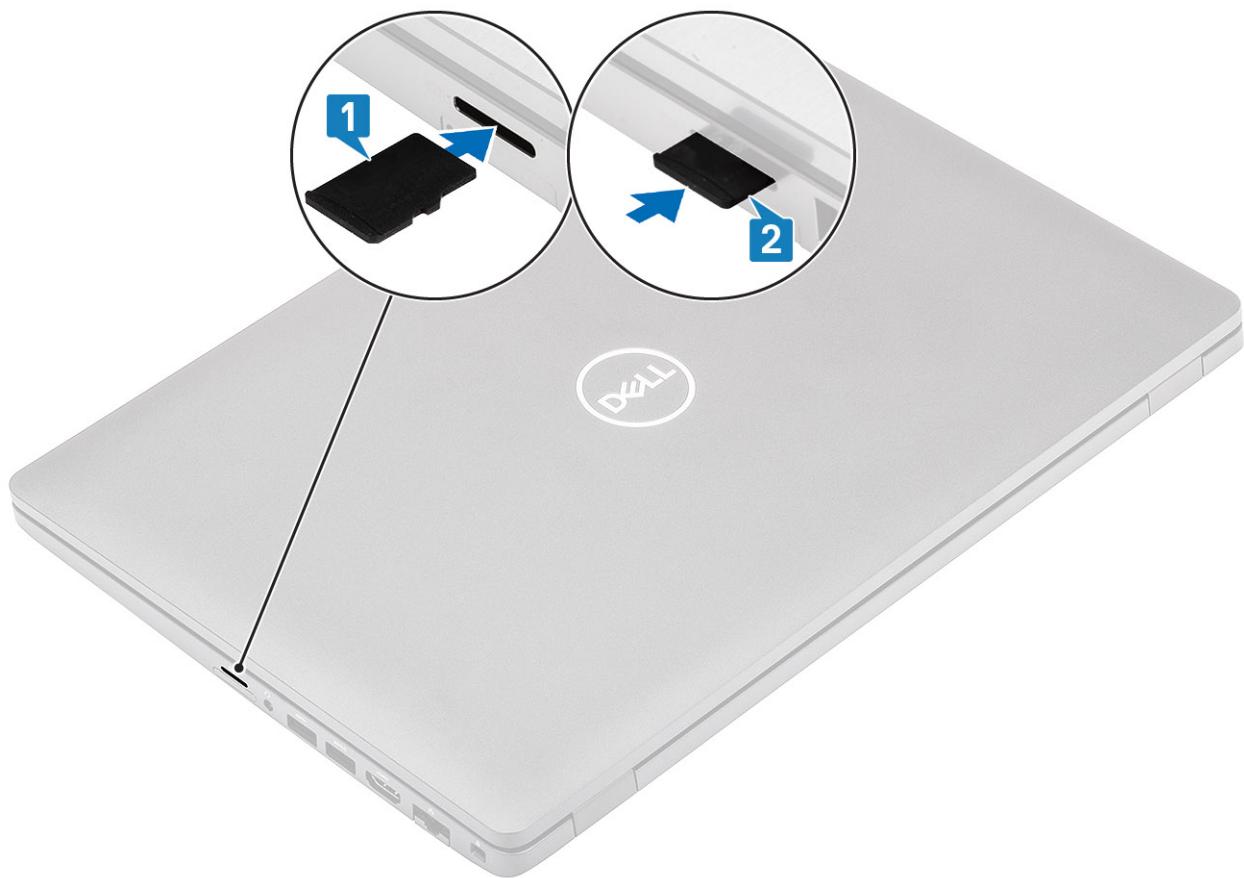
## Disassembly and reassembly

### microSD card

#### Removing microSD card

##### Steps

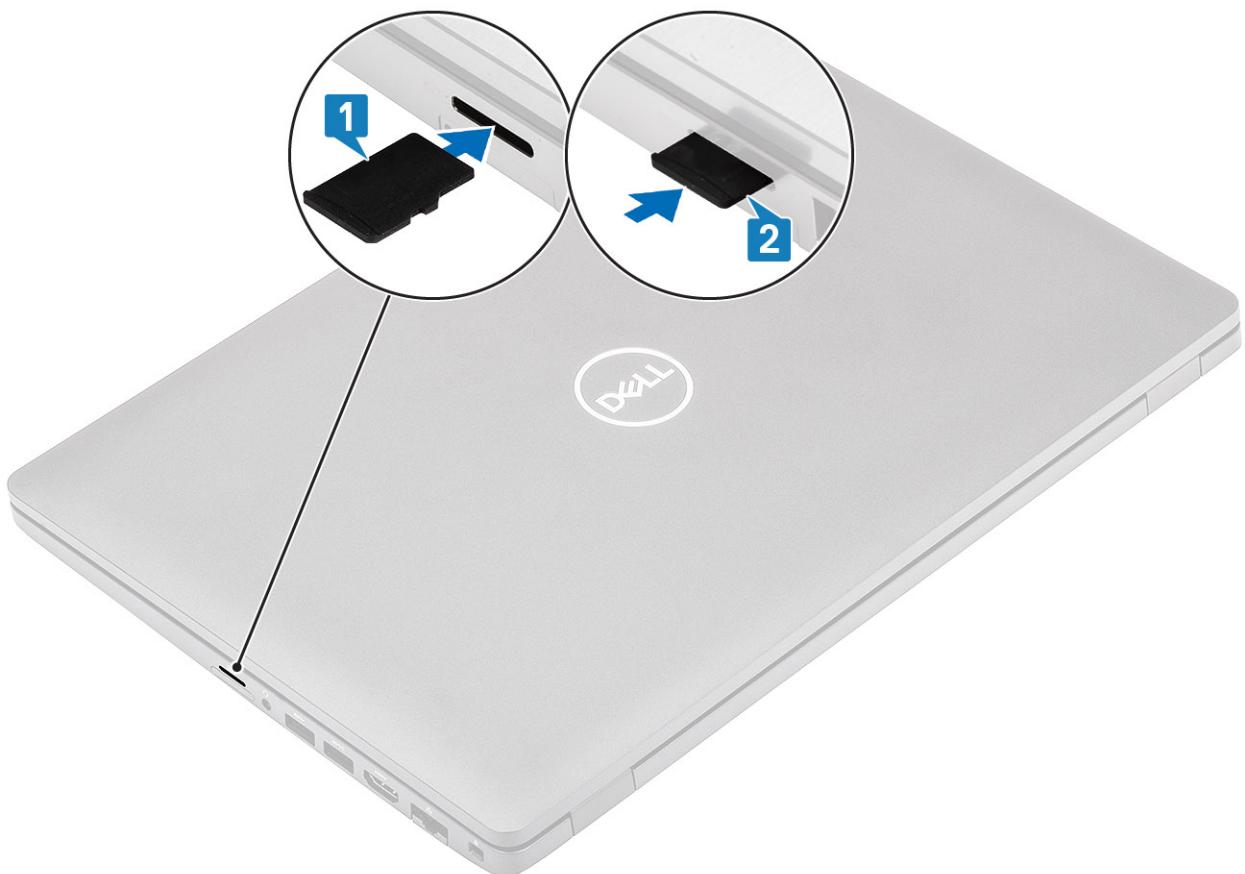
1. Follow the procedure in [Before working inside your computer](#).
2. Press in on the microSD card [1] and remove it from the computer [2].



#### Installing microSD card

##### Steps

Slide the SD card into its slot until it clicks into place [1, 2].



#### Next steps

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

## Base cover

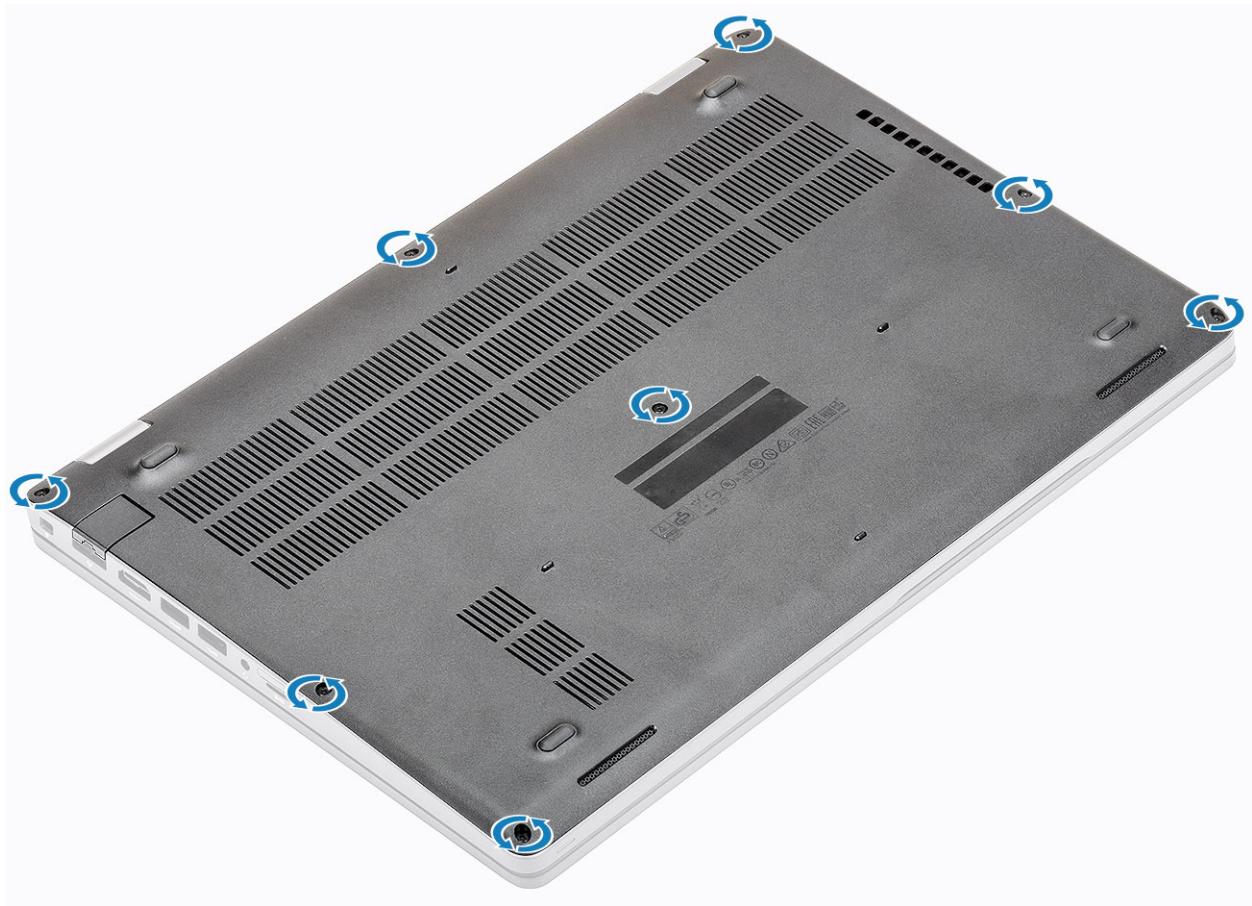
### Removing the base cover

#### Prerequisites

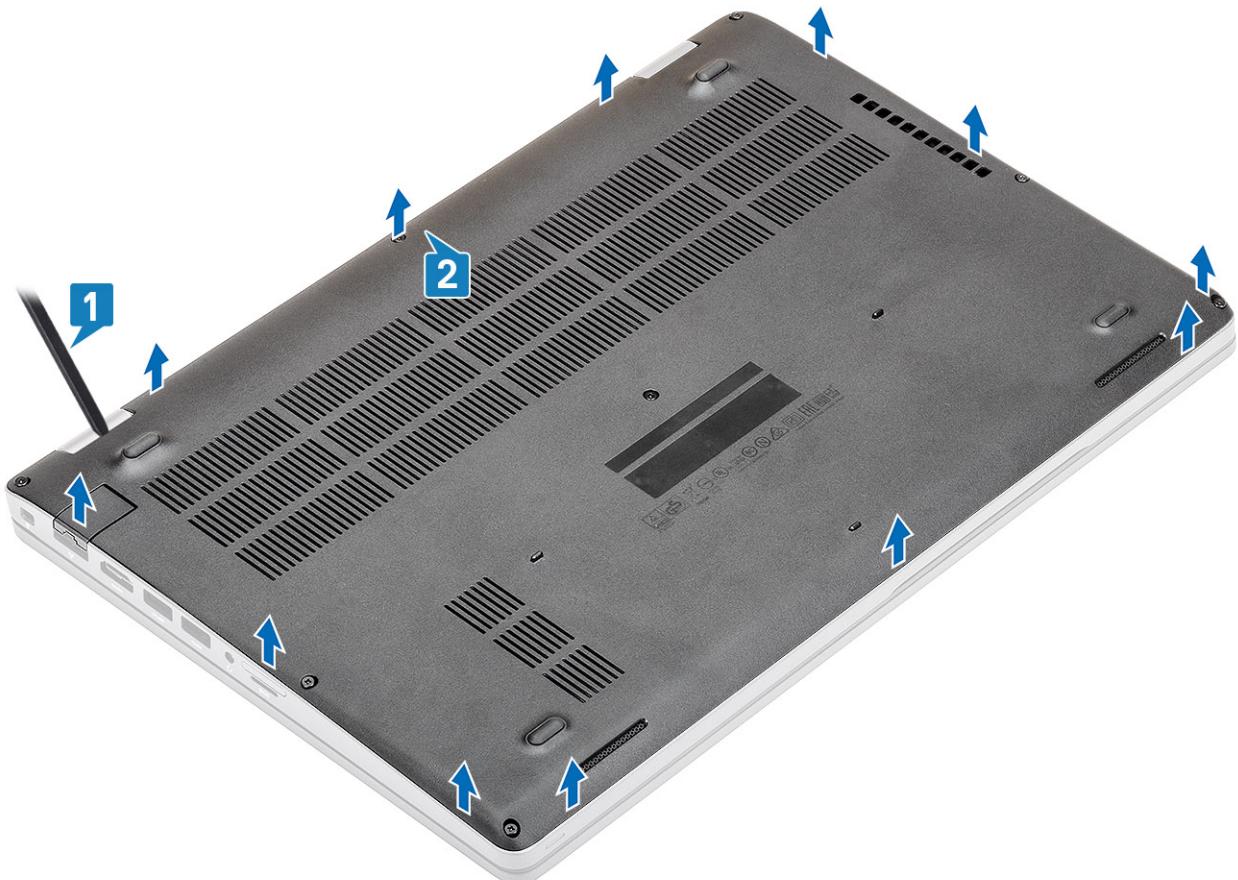
1. Follow the procedure in [before working inside your computer](#).
2. Remove the [microSD card](#).

#### Steps

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



2. Pry the base cover from the edge using a plastic scribe [1, 2].



**NOTE:** While removing the base cover, on-site technicians must take care to remove the base cover carefully. There are prying recess points next to the left and right hinges which ease the disassembly procedure. With the help of a plastic scribe, pry open from the top left side of the base cover, continue working your way around the left and right side of the base cover, then remove the base cover from the system.

3. Lift the base cover from the computer.



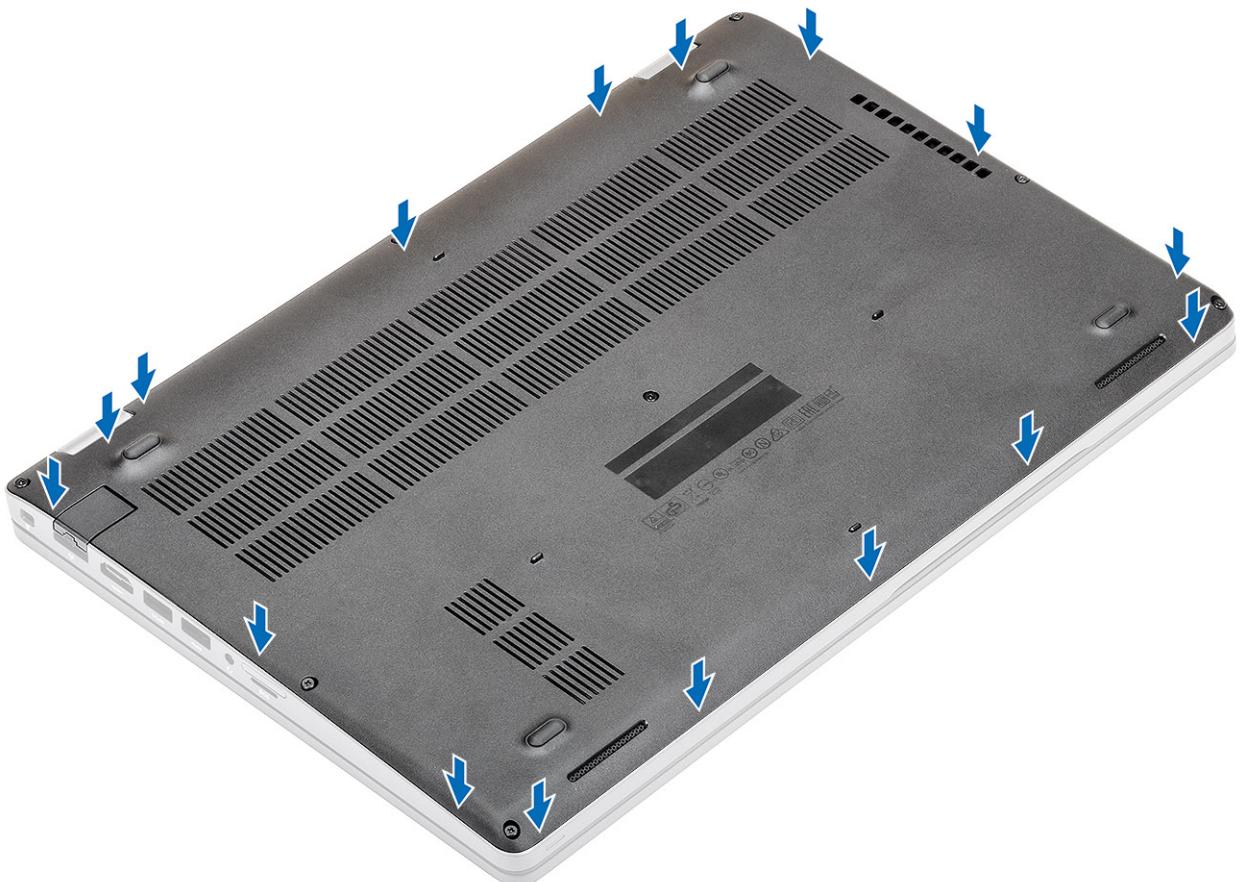
## Installing the base cover

### Steps

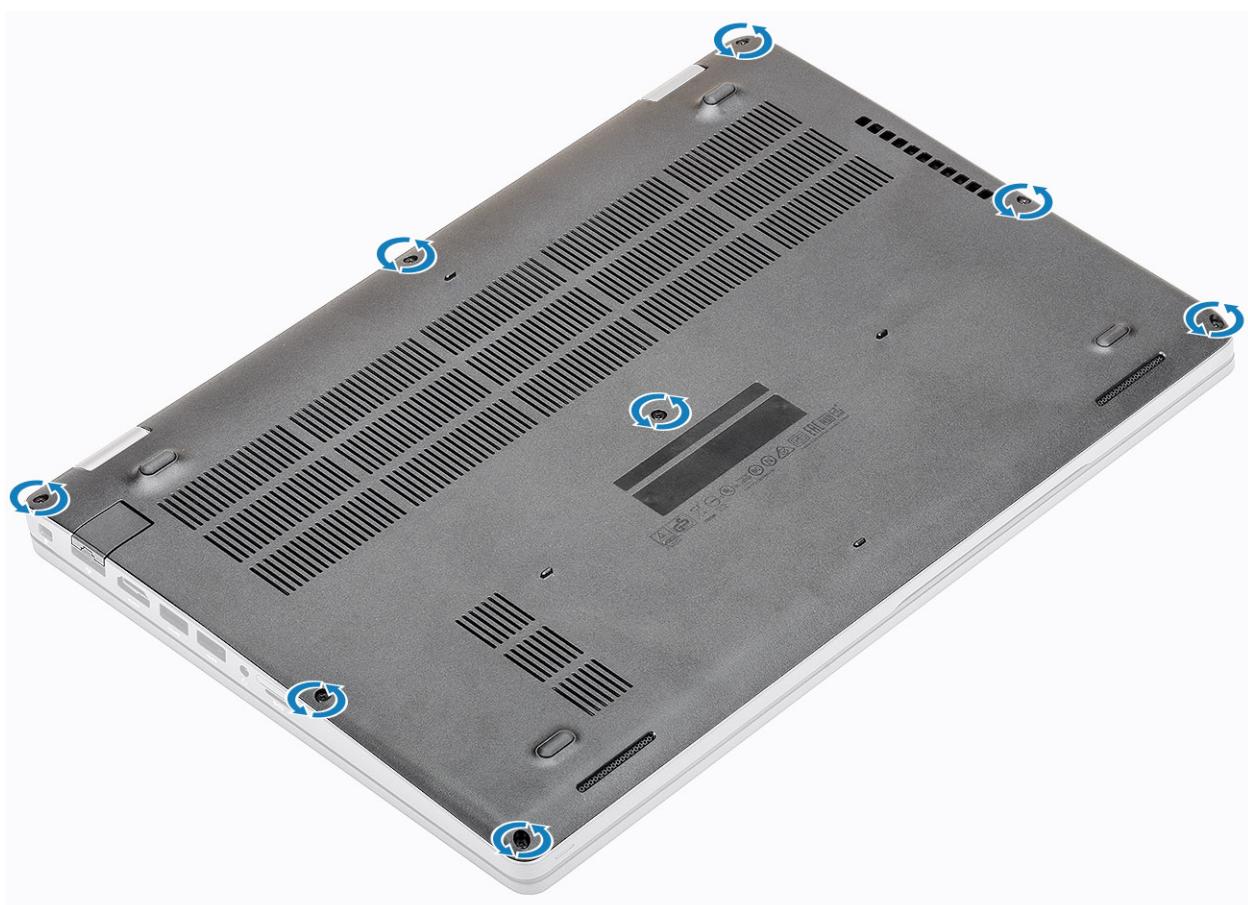
1. Align the base cover on the computer and press the edges of the cover until it clicks into place.



2. Press down on the edges pf the base cover till clicks in place.



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



## Next steps

1. Install 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 a battery gets stuck in a device as a result of swelling, do not try to free it as puncturing, bending, or crushing a Lithium-ion battery can be dangerous. In such an instance, contact for assistance and further instructions.
- If the battery gets stuck inside your computer as a result of swelling, do not try to release it as puncturing, bending, or crushing a lithium-ion battery can be dangerous. In such an instance, contact Dell technical support for assistance. See [www.dell.com/contactdell](http://www.dell.com/contactdell).
- Always purchase genuine batteries from [www.dell.com](http://www.dell.com) or authorized Dell partners and resellers.

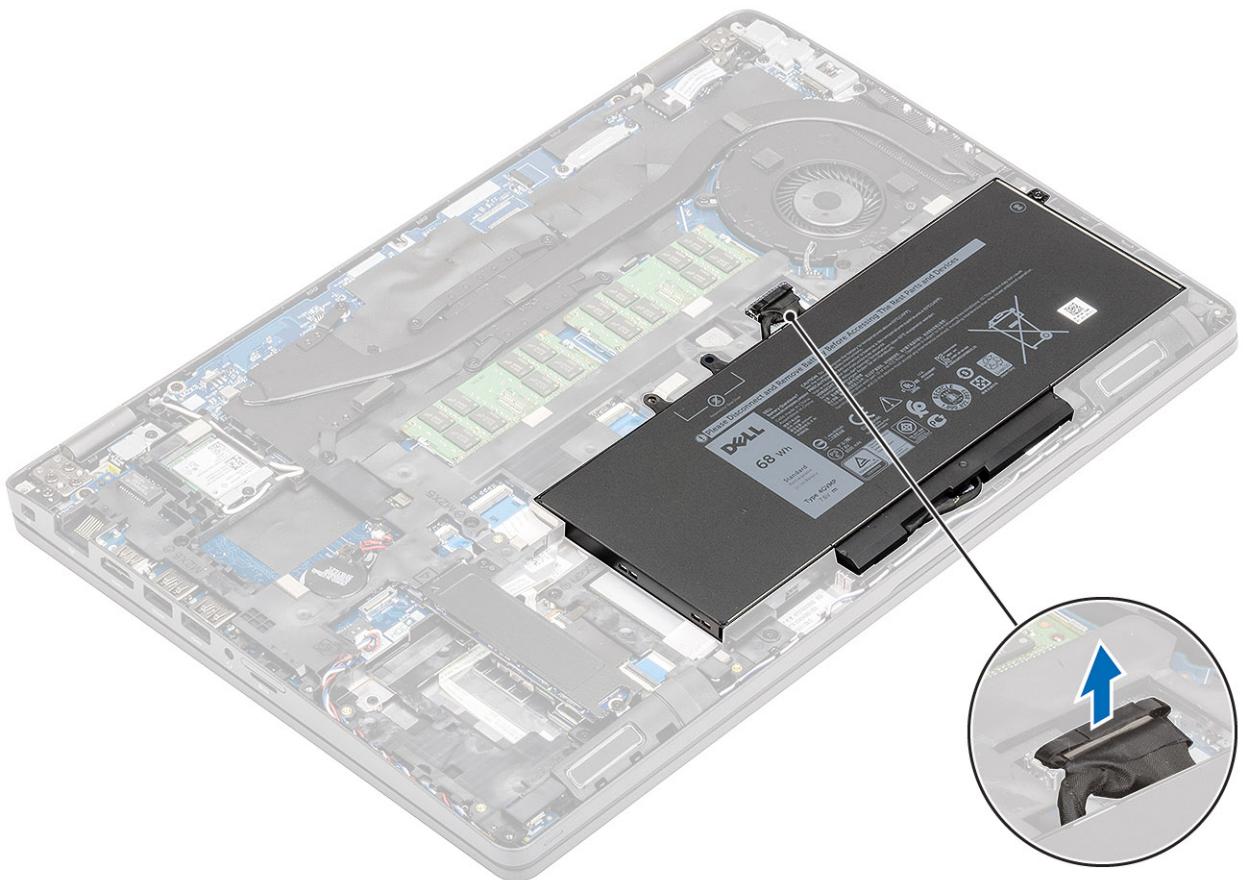
## Removing the battery

### Prerequisites

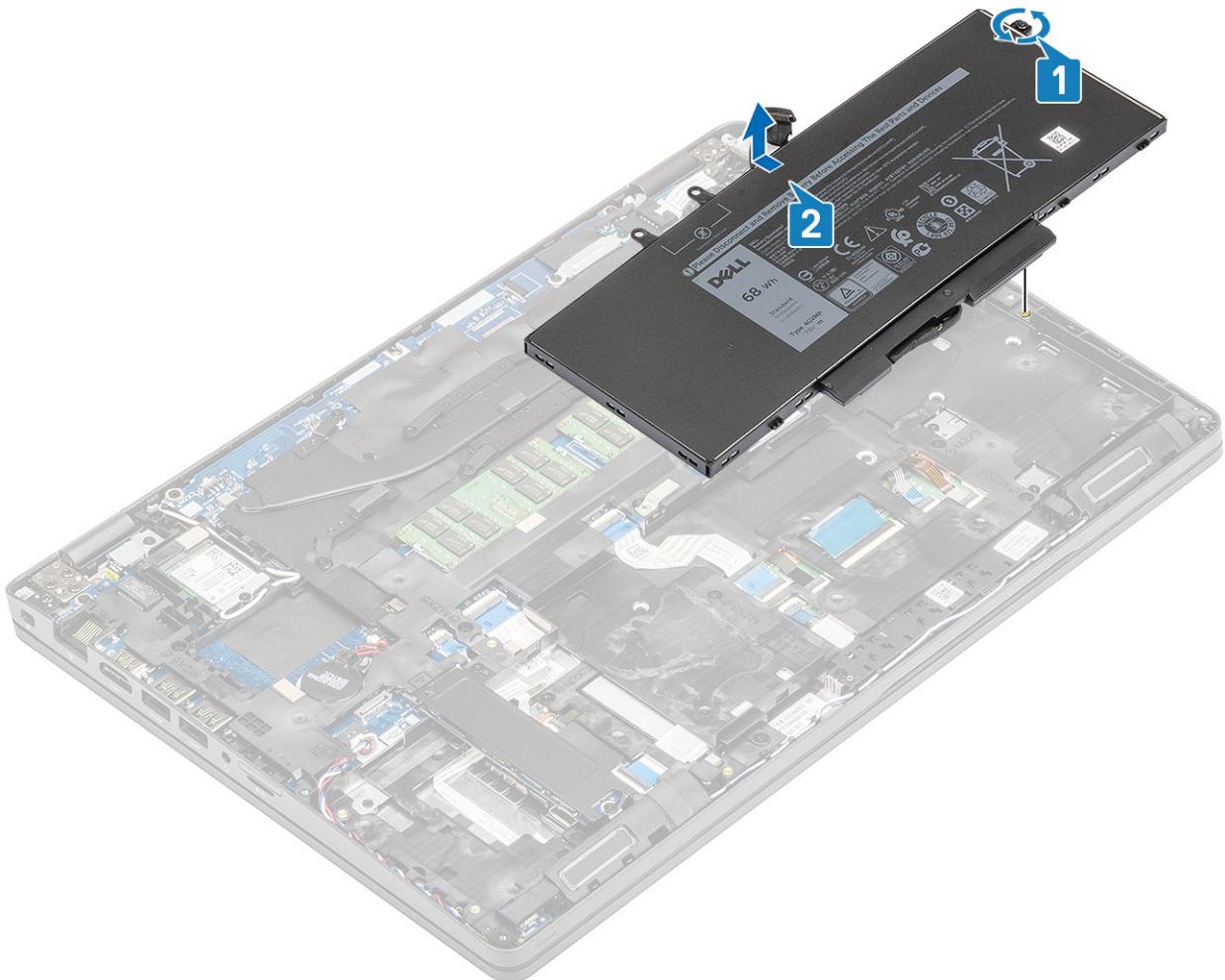
1. Follow the procedure in [before working inside your computer](#)
2. Remove the [microSD card](#).
3. Remove the [base cover](#).

### Steps

1. Disconnect the battery cable from the connector in the system board.



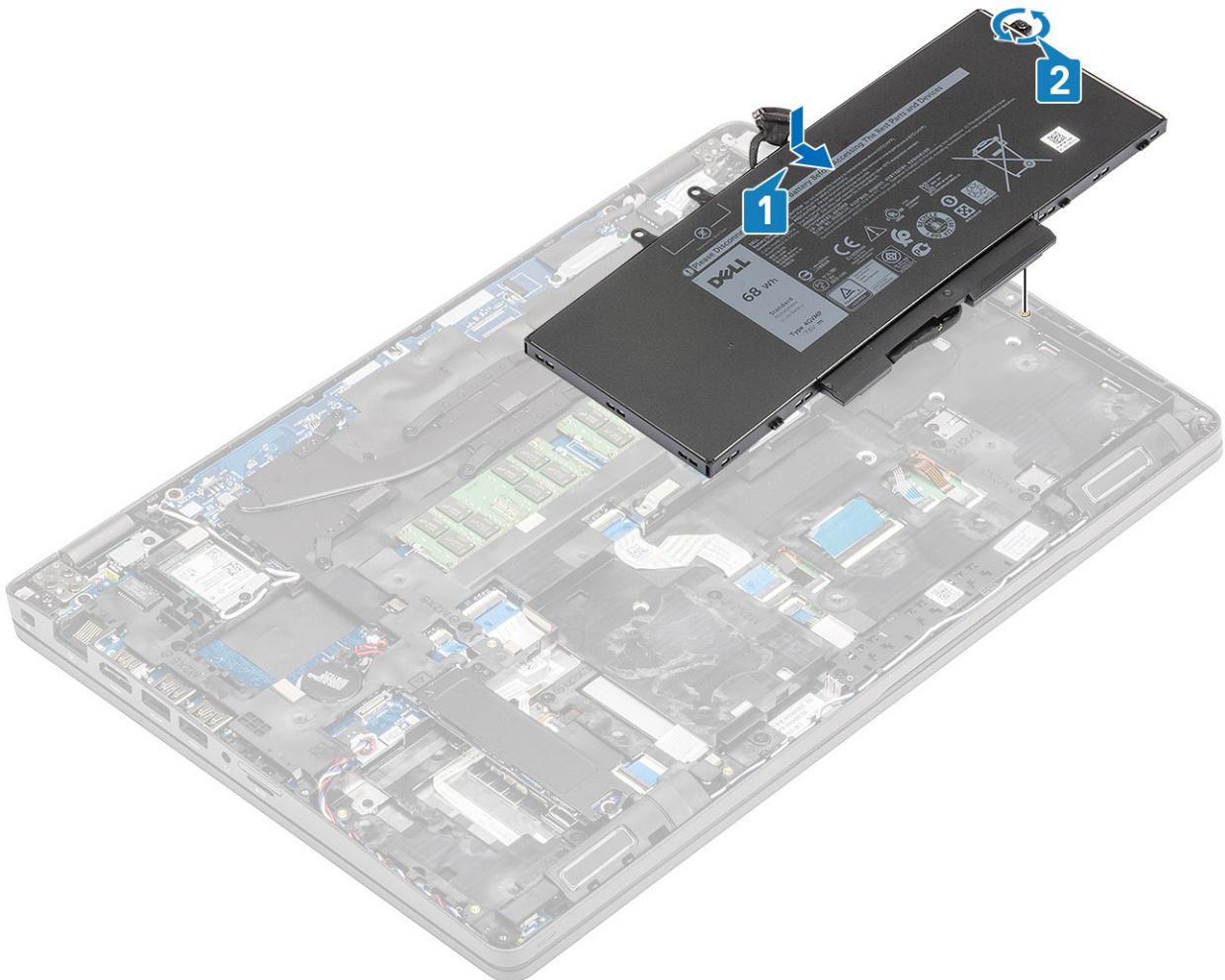
2. Remove the one (M2.0x4.0) screw that secures the battery to the palmrest [1].
3. Remove the battery from the computer [2].



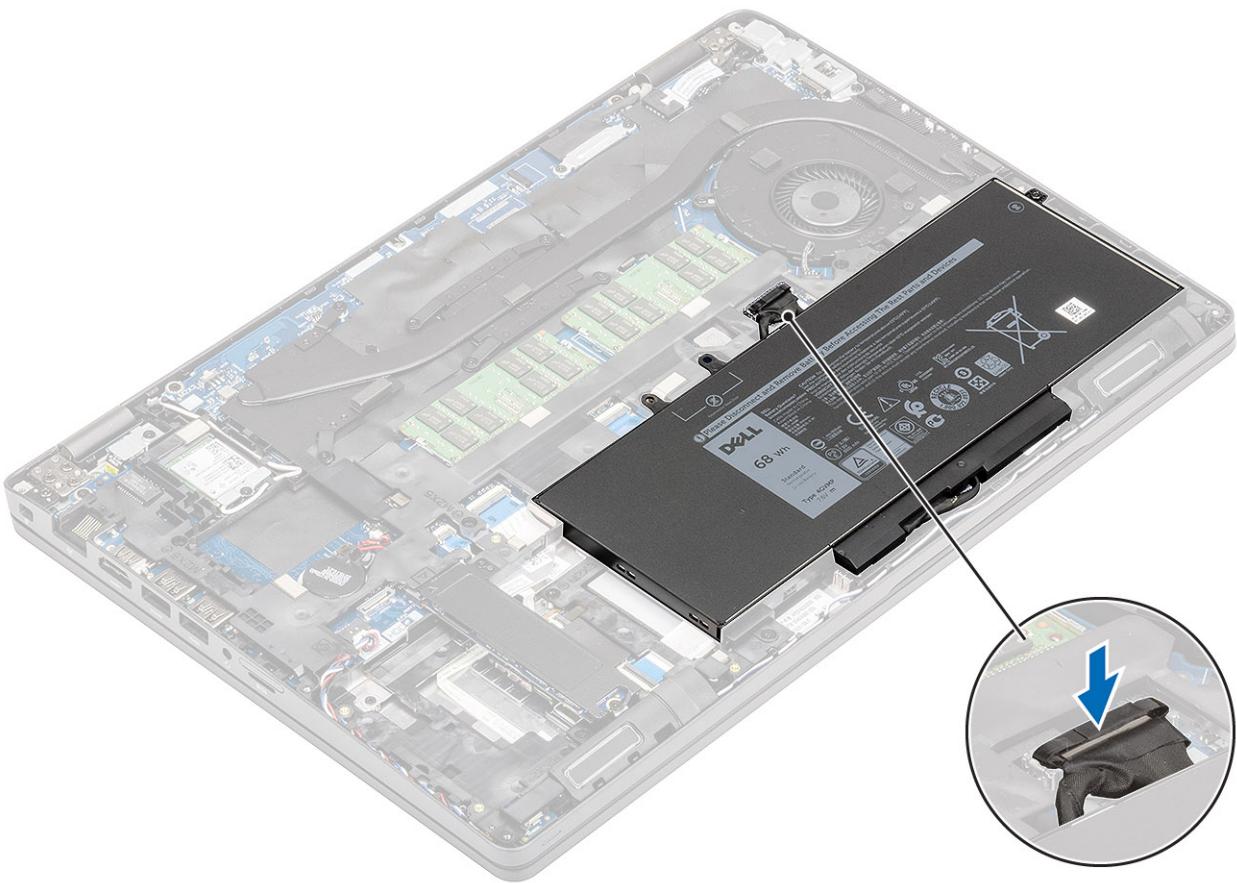
## Installing the battery

### Steps

1. Align the battery into the slot on the computer [1] and replace the single (M2.0x4.0) screw to secure the battery to the palmrest [2].



2. Reconnect the battery cable to the connector on the system board.



#### Next steps

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

## Memory modules

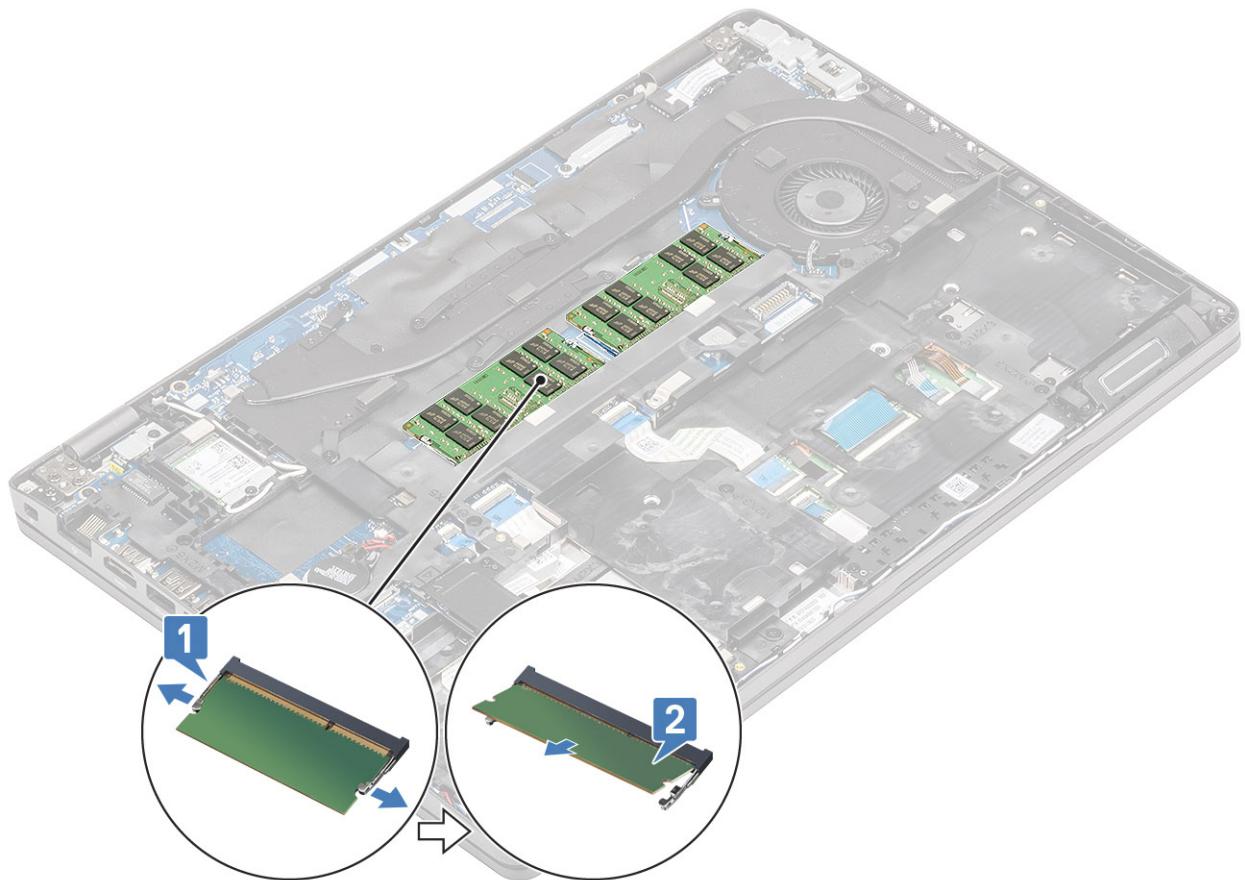
### Removing the memory

#### 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

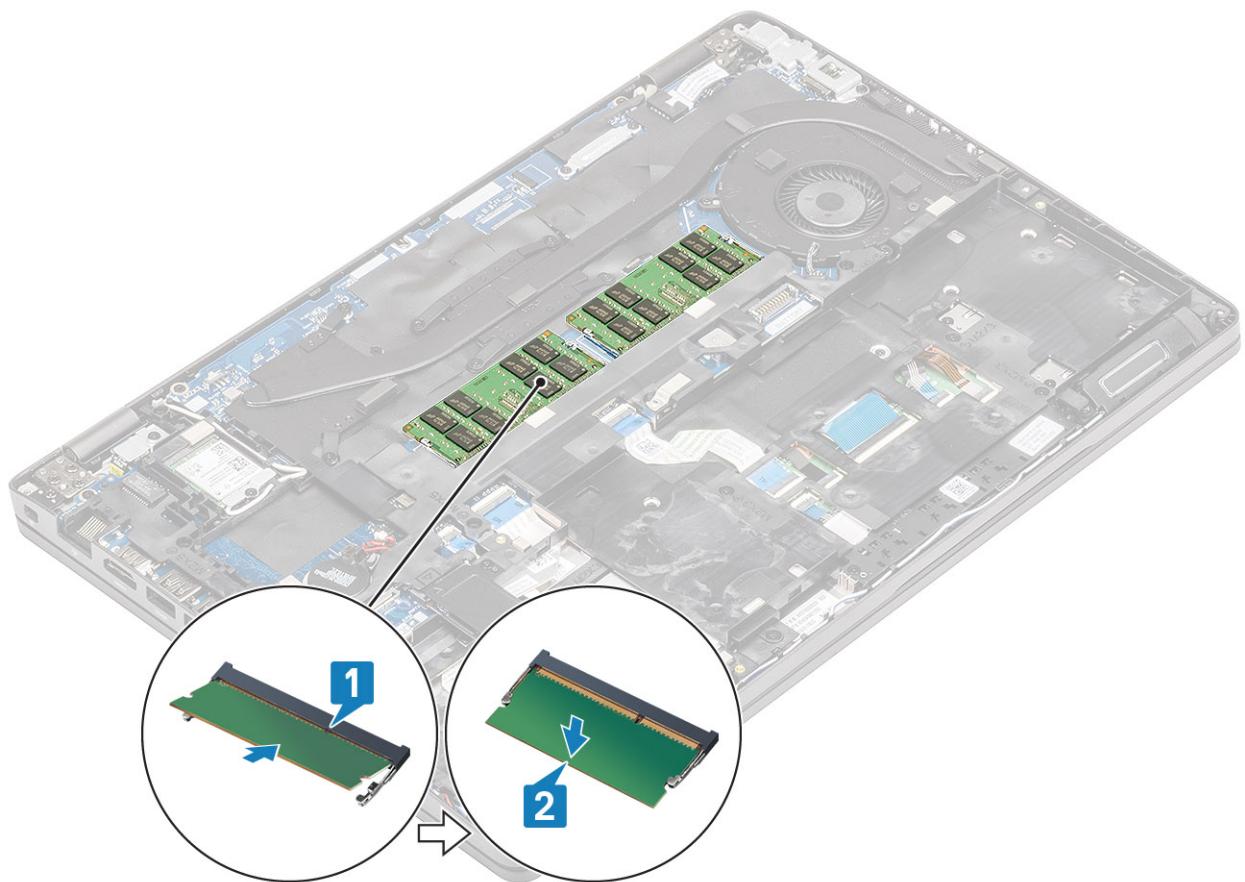
Gently pry on the memory module latch [1] and slide it out of the slot [2].



## Installing the memory

### Steps

Align the memory and slide it into the slot on the computer [1] and gently press down on the memory module till it locks into the latches [2].



#### Next steps

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

## WLAN card

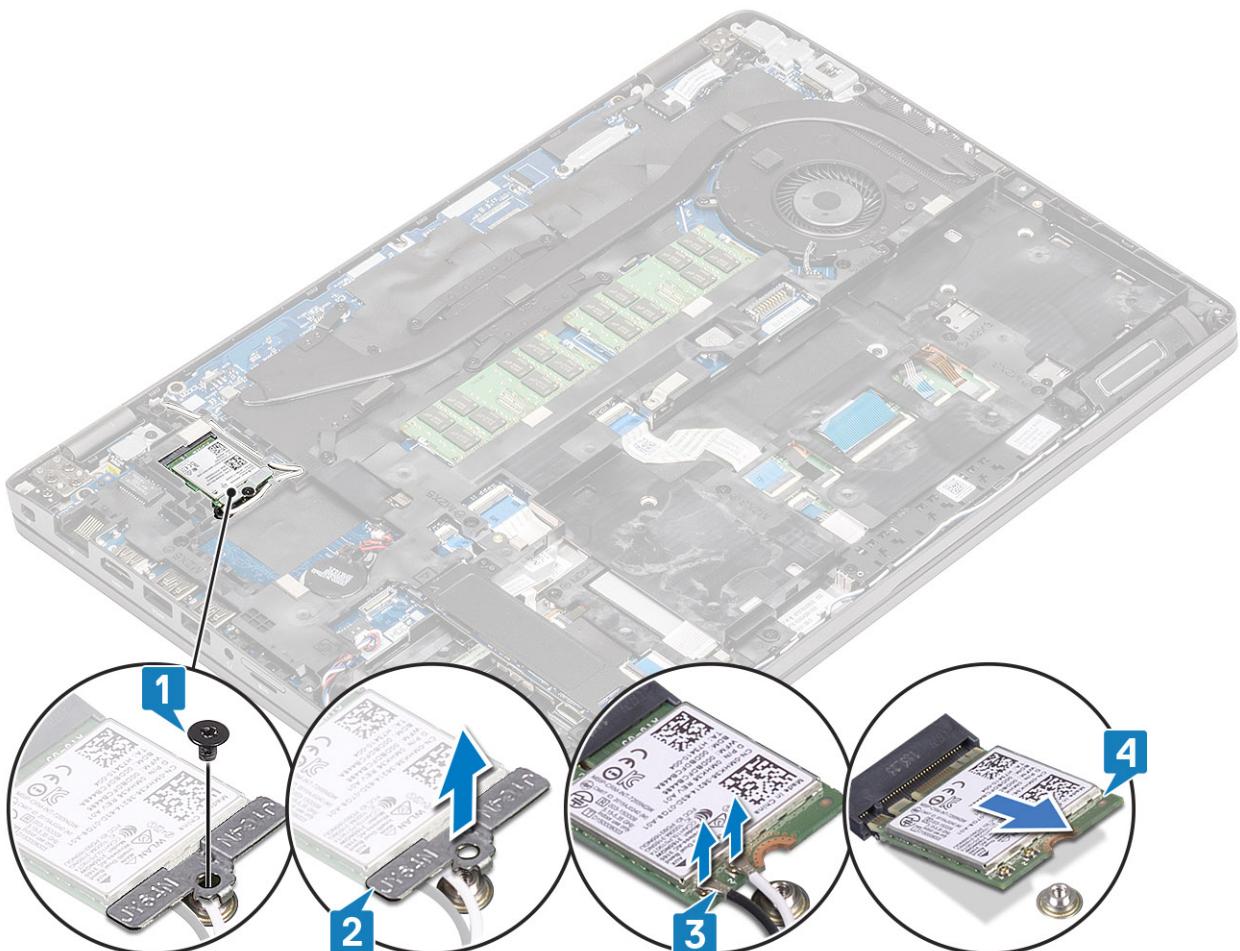
### Removing the wireless card

#### 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

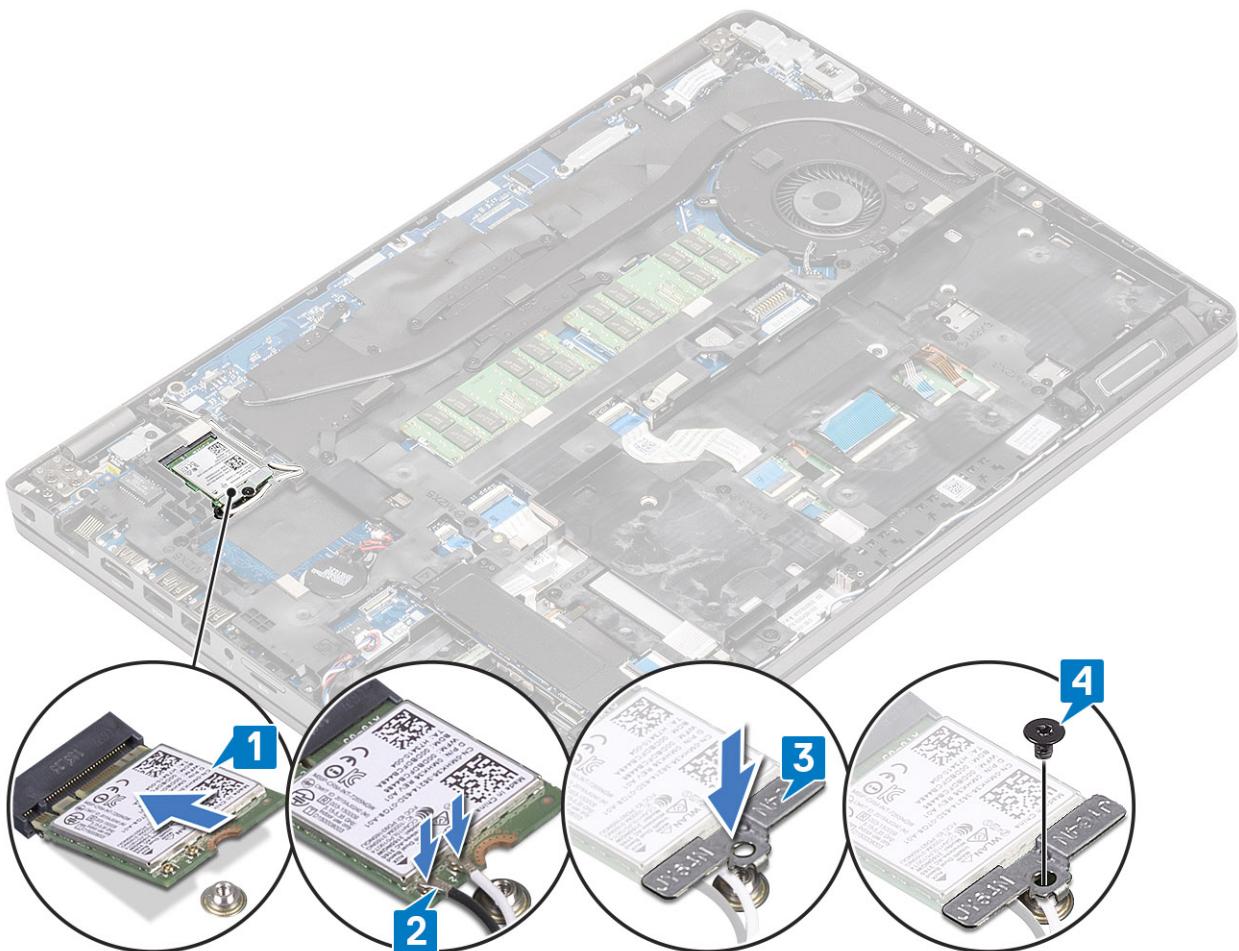
1. Remove the single screw that secures the wlan bracket to the computer [1] and lift the bracket away from the computer [2].
2. Disconnect the two wireless antennas from the wireless card [3] and slide the card out of the connector [4].



## Installing the wireless card

### Steps

1. Slide the wireless card into the slot on the computer [1] and reconnect the wireless antennas to the card [2].
2. Replace the wireless bracket on the card [3] and secure it with the single screw to the computer [4].



#### Next steps

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

## Solid state drive

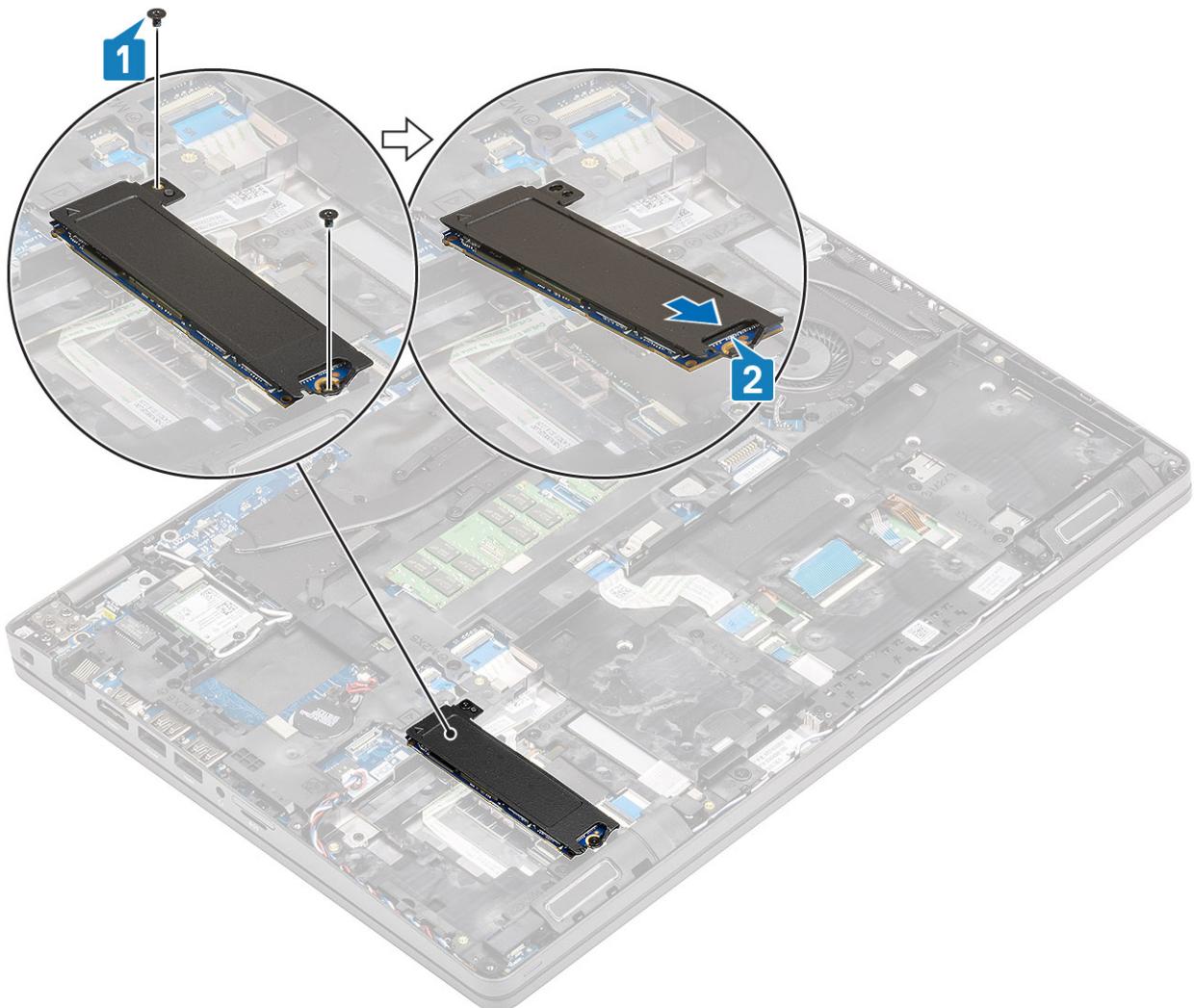
### Removing the Solid state drive

#### Prerequisites

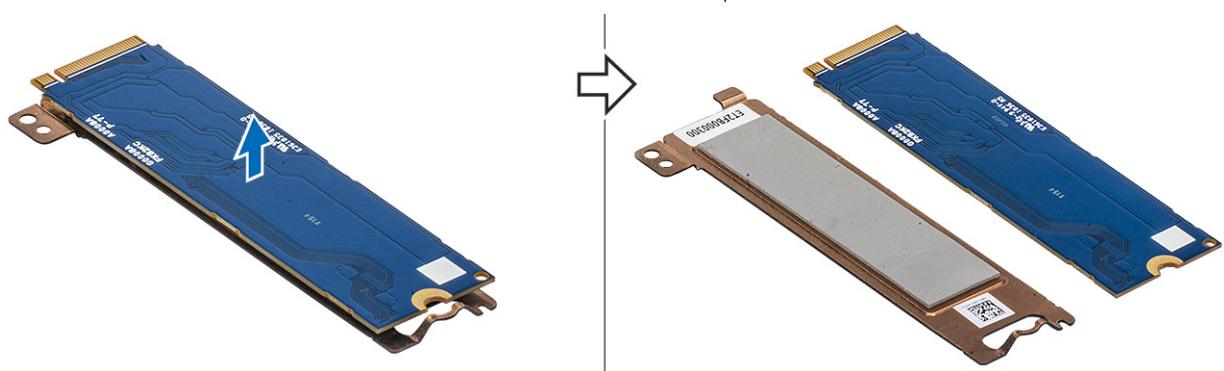
1. Follow the procedure in [before working inside your computer](#)
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).

#### Steps

1. Remove the two screws that secure the ssd to computer [1] and slide the ssd module along with the metal bracket from the connector [2].



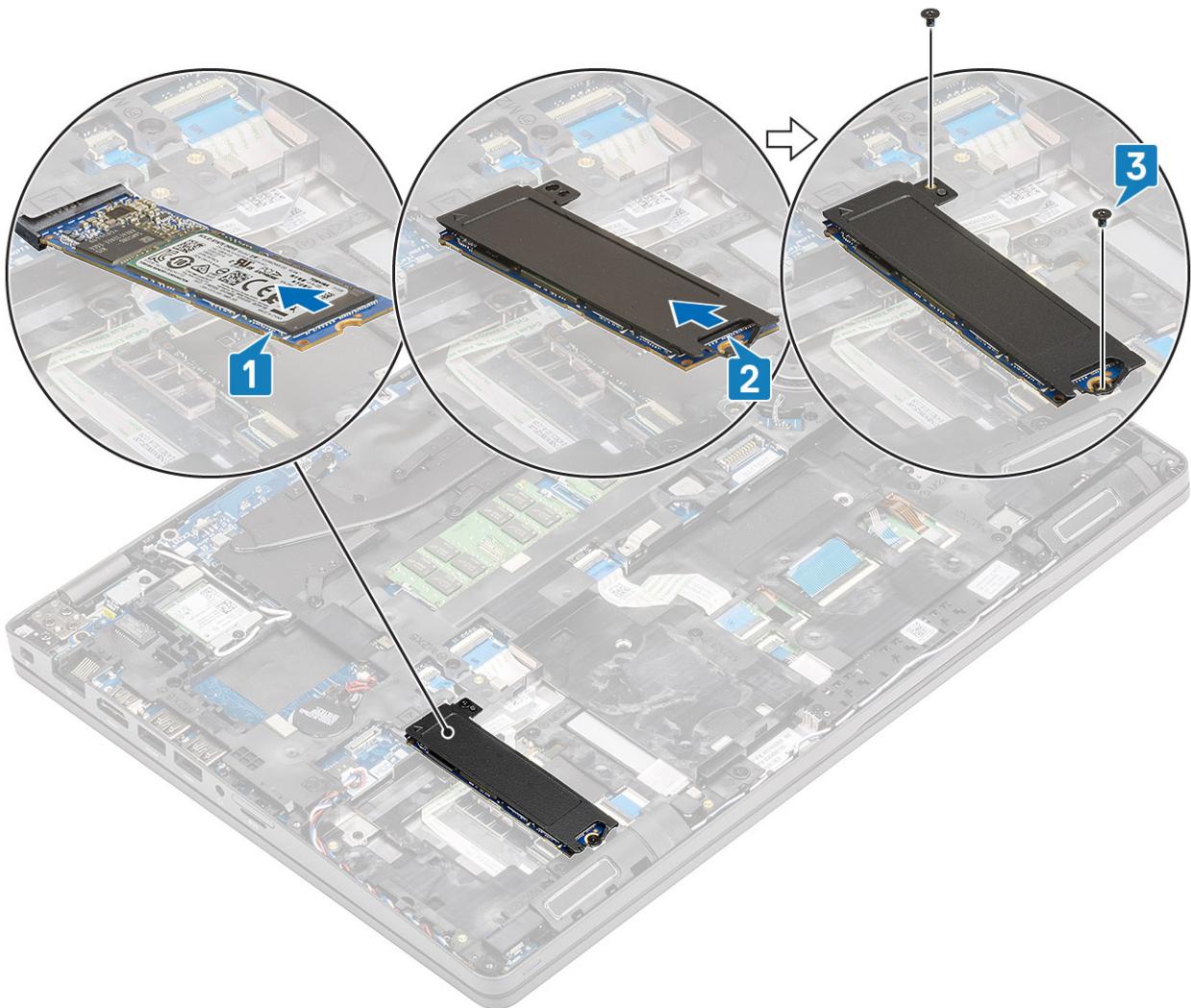
2. Turn the metal bracket over and detach the ssd module from the thermal pad on the metal bracket.



## Installing the solid state drive

### Steps

1. Affix the ssd module on the metal bracket [1] and slide the module into the connector on the computer [2].
2. Replace the two screws to secure the module on the computer [3].



#### Next steps

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

## Solid state drive bracket

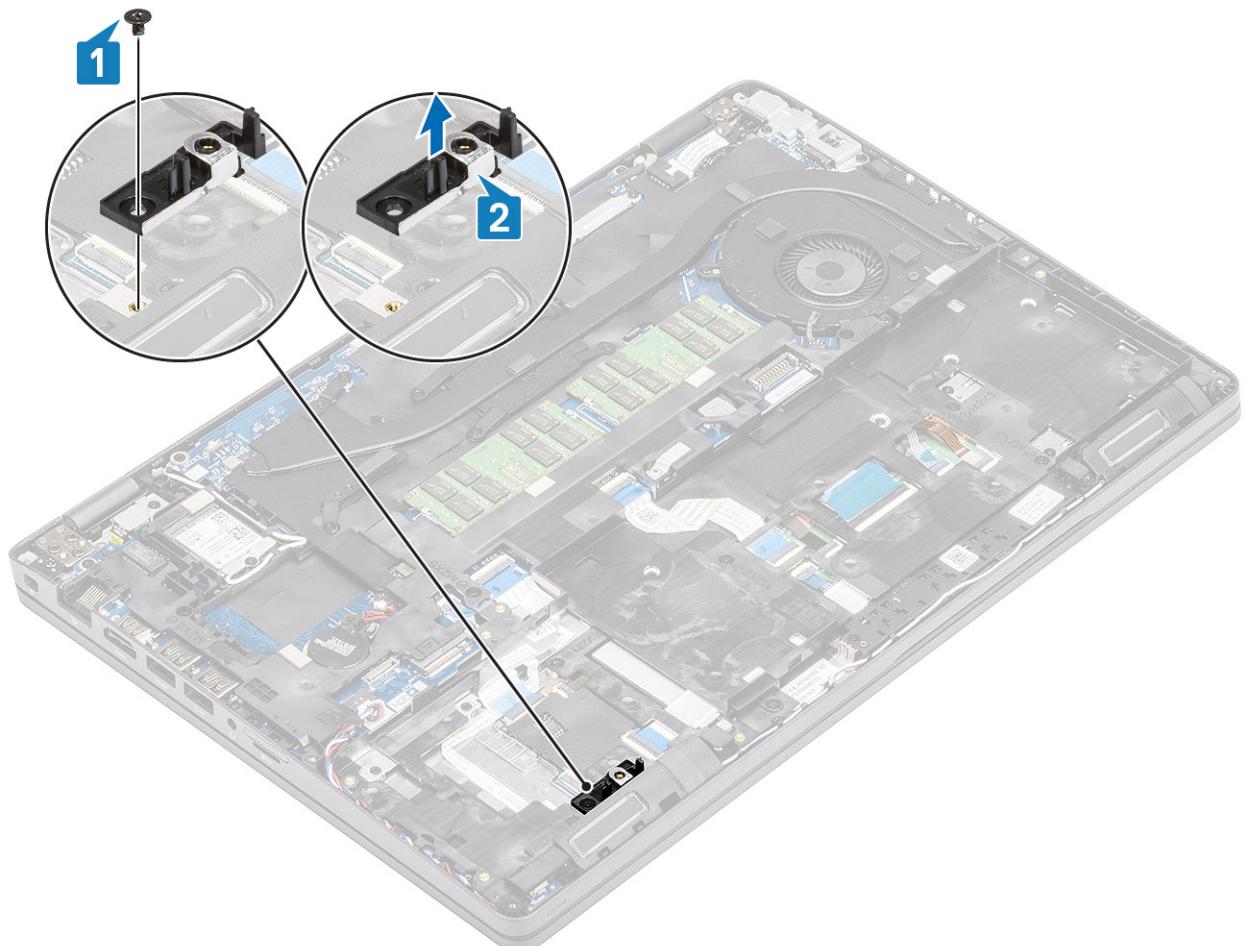
### Removing the solid state drive bracket

#### 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 [ssd](#).

#### Steps

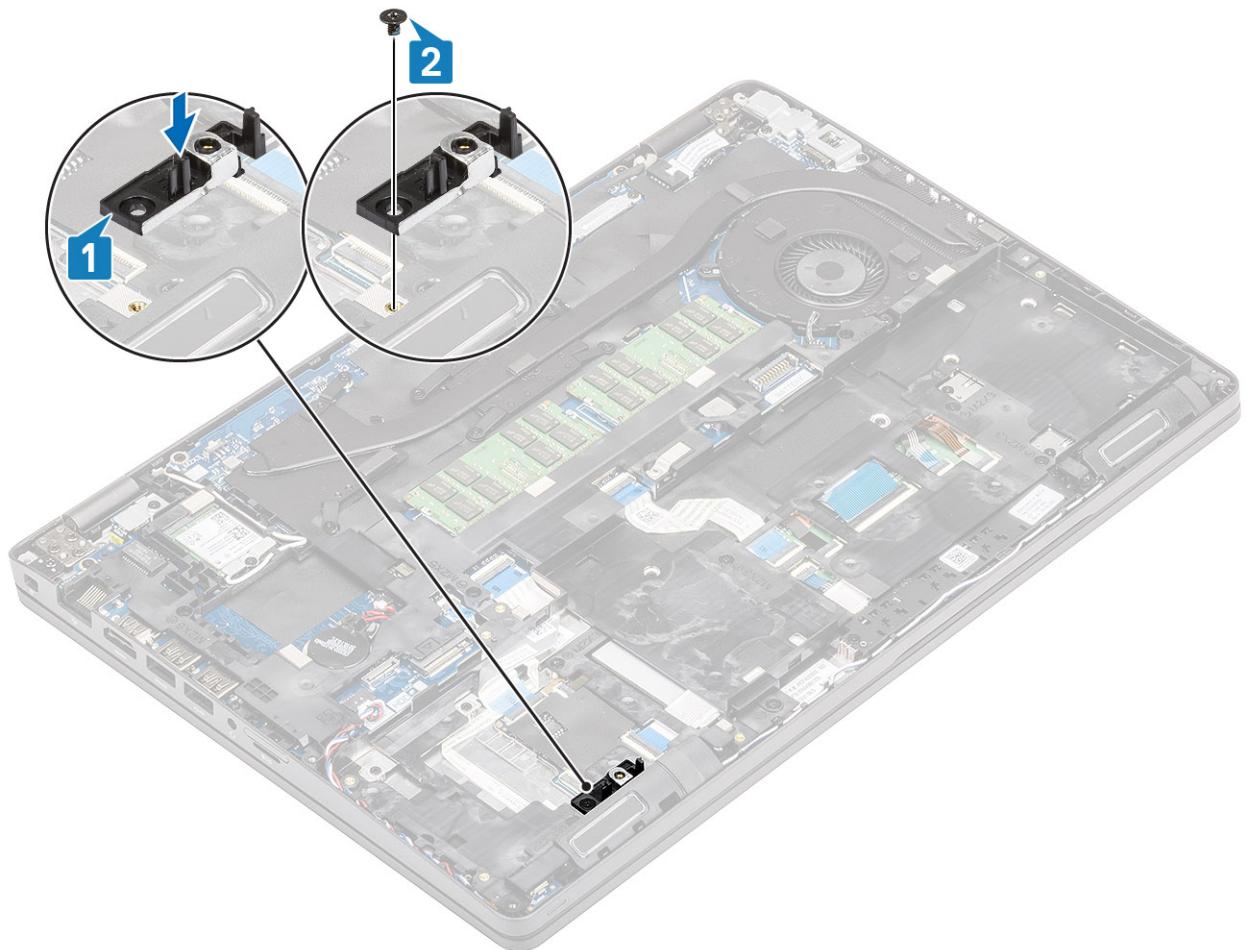
Remove the single screw that secures the bracket to the computer [1] and lift it out of the computer [2].



## Installing the solid state drive bracket

### Steps

Align the bracket and insert it into the slot on the computer [1] and replace the single screw that secures the bracket to the computer [2].



#### Next steps

1. Install the [ssd](#).
2. Install the [battery](#).
3. Install the [base cover](#).
4. Install the [microSD card](#).
5. Follow the procedure in [after working inside your computer](#).

## Palmrest bracket

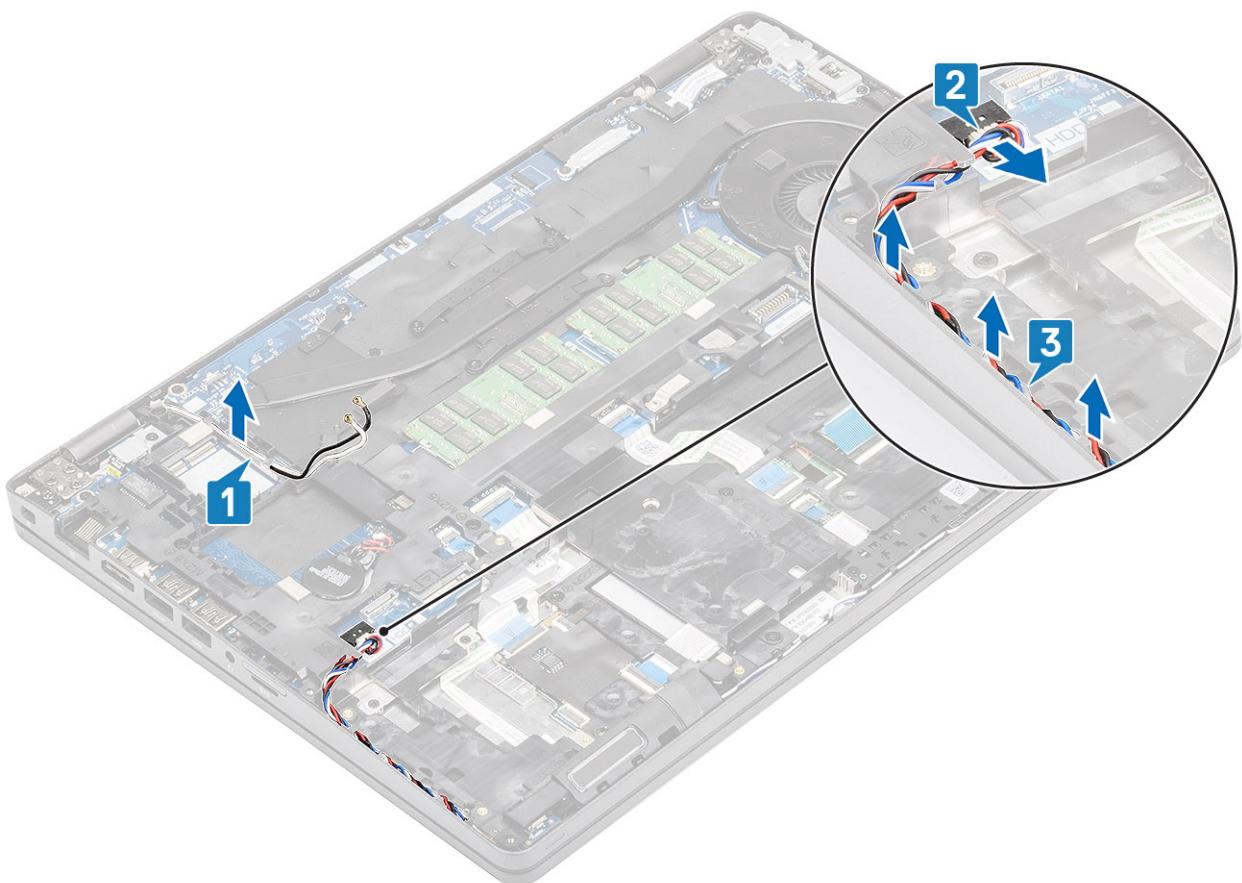
### Removing the palmrest bracket

#### Prerequisites

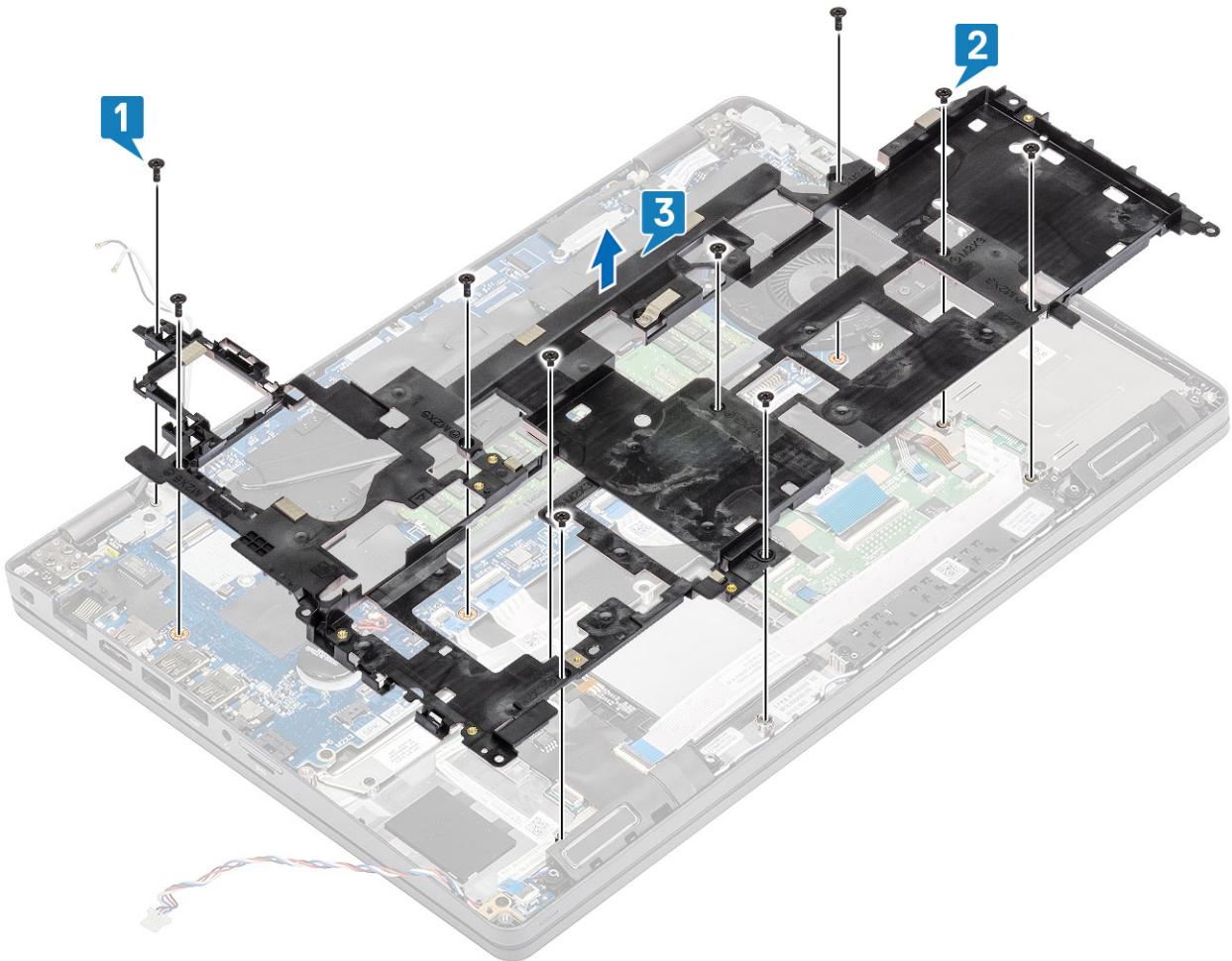
1. Follow the procedure in [before working inside your computer](#)
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [ssd](#).
6. Remove the [ssd bracket](#).

#### Steps

1. Un-route the wireless antenna [1] and then disconnect and un-route the speaker cable from the system board [2].



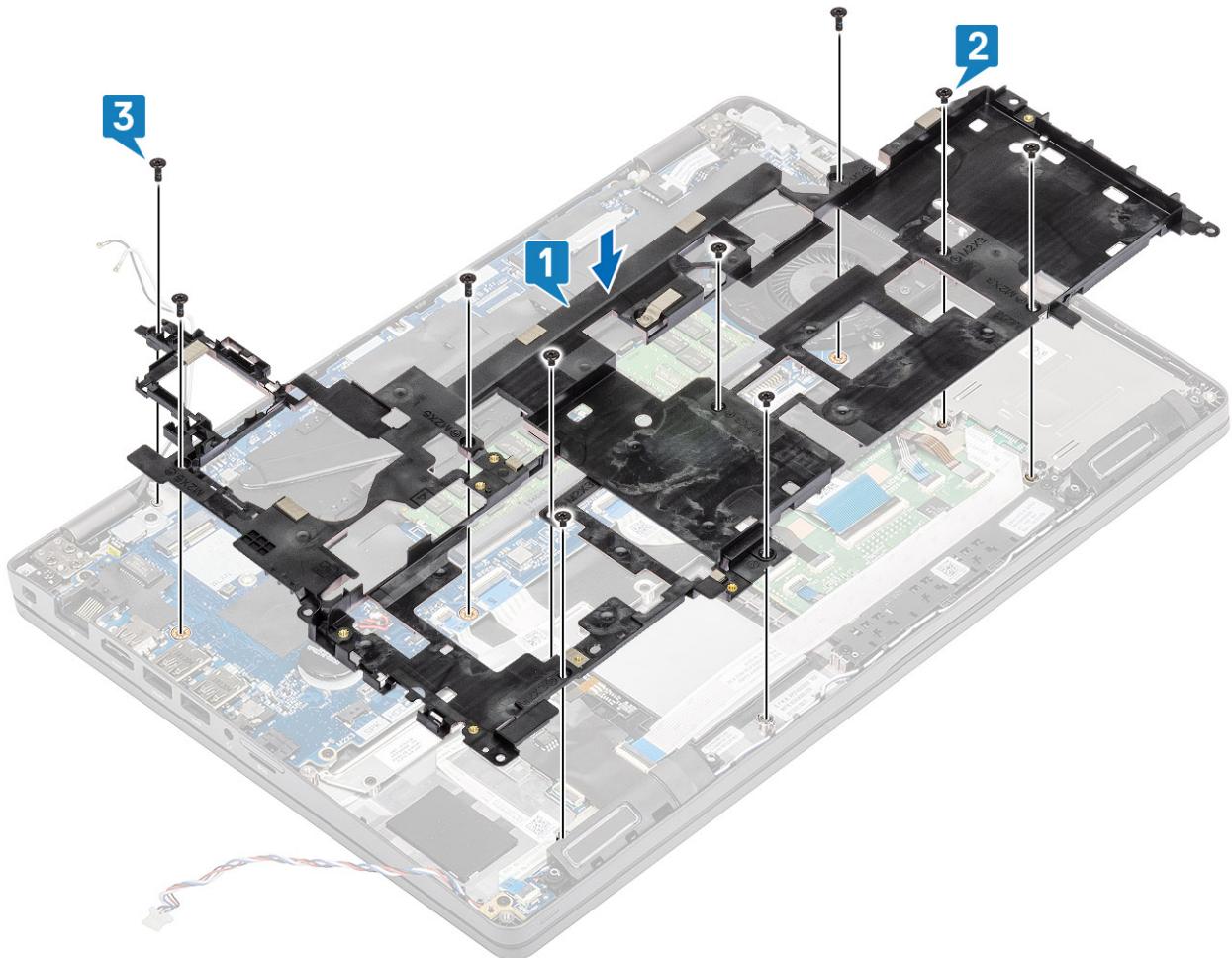
2. Remove the four (M2x5) and six (M2x3) screws that secure the palmrest bracket to the computer [1,2] and lift the bracket away from the computer [3].



## Installing the palmrest bracket

### Steps

1. Align and insert the palmrest bracket into the computer [1].
2. Replace the four (M2x5) screws and six (M2x3) to secure the palmrest bracket to the computer [2,3].



3. Re-route the wireless antennas and the speaker cable through the routing clips [1,2].
4. Reconnect the speaker cable to the system board [3].



#### Next steps

1. Install the [ssd bracket](#).
2. Install the [ssd](#).
3. Install the [battery](#).
4. Install the [base cover](#).
5. Install the [microSD card](#).
6. Follow the procedure in [after working inside your computer](#).

## Speaker

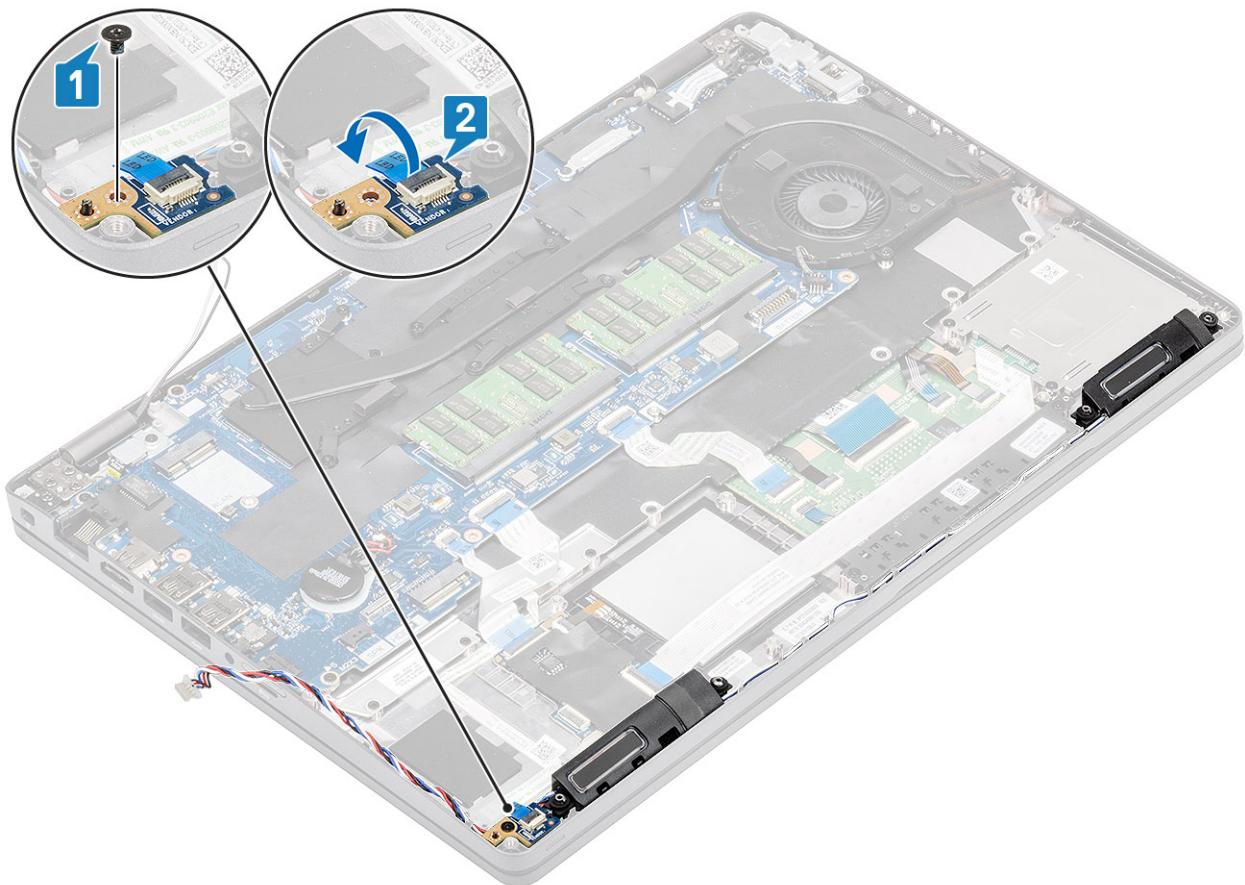
### Removing the speakers

#### Prerequisites

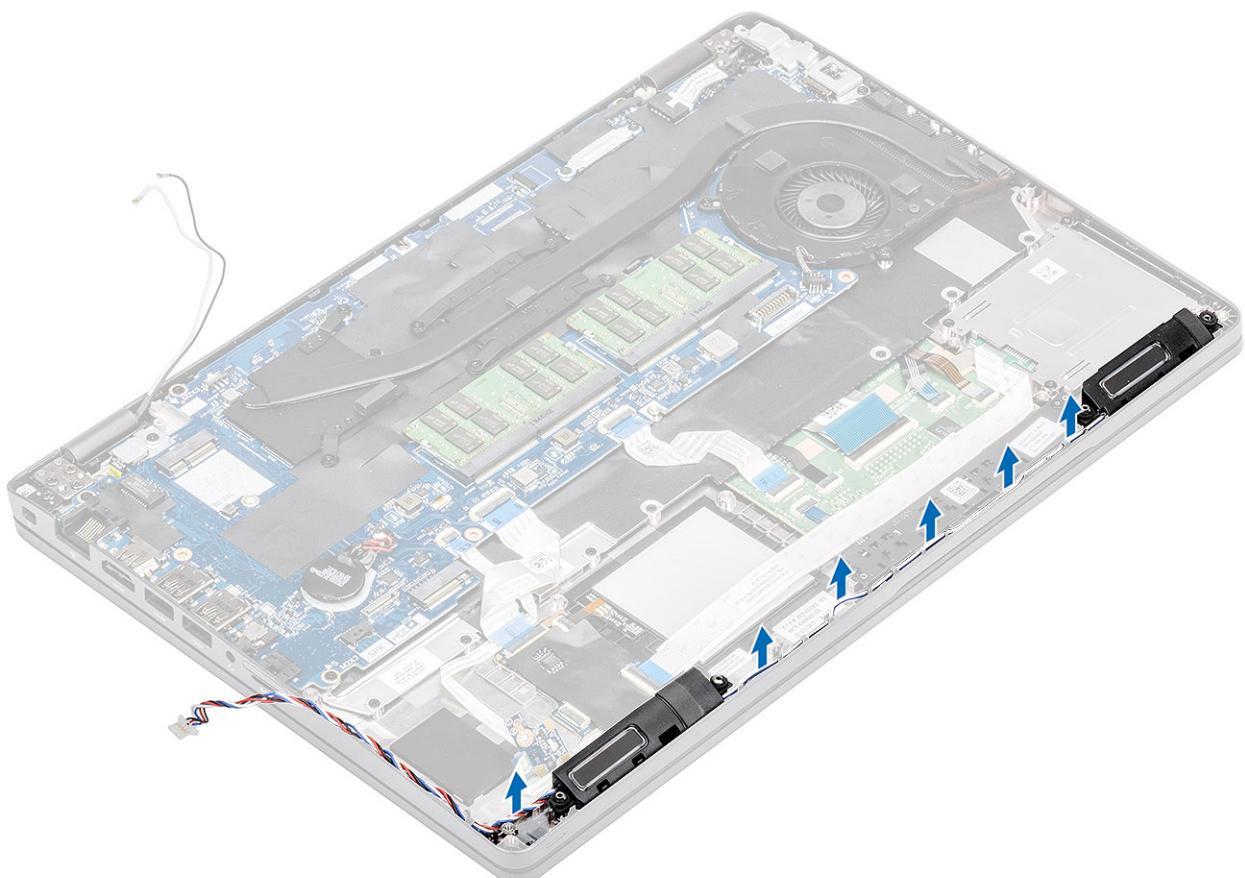
1. Follow the procedure in [before working inside your computer](#)
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [ssd](#).
6. Remove the [ssd bracket](#).
7. Remove the [palmrest bracket](#).

#### Steps

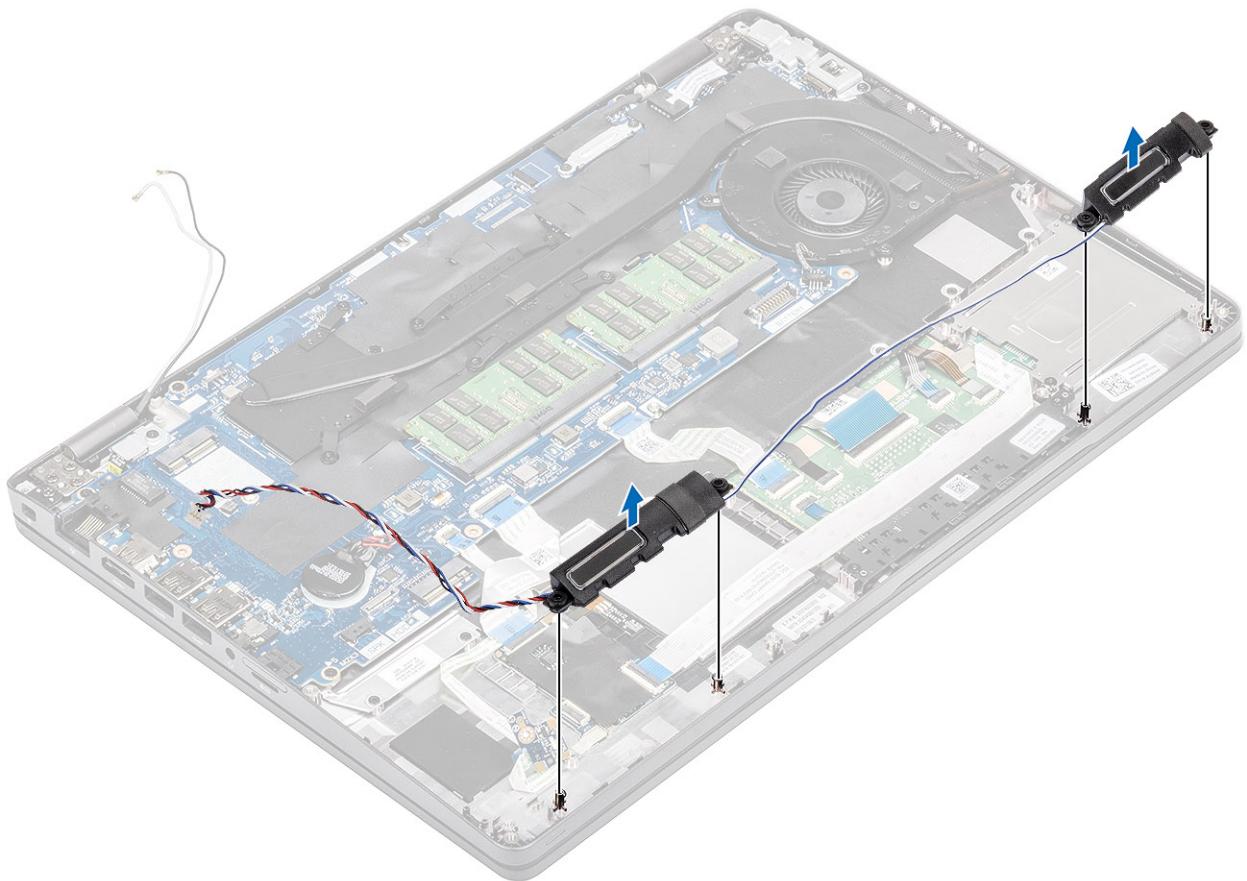
1. Remove the one (M2x2.5) screw that secures the LED board to the computer [1].
2. Lift and flip the LED board over to access the speaker cables [2].



3. Un-route the speaker cables from the routing clips on the computer chassis.



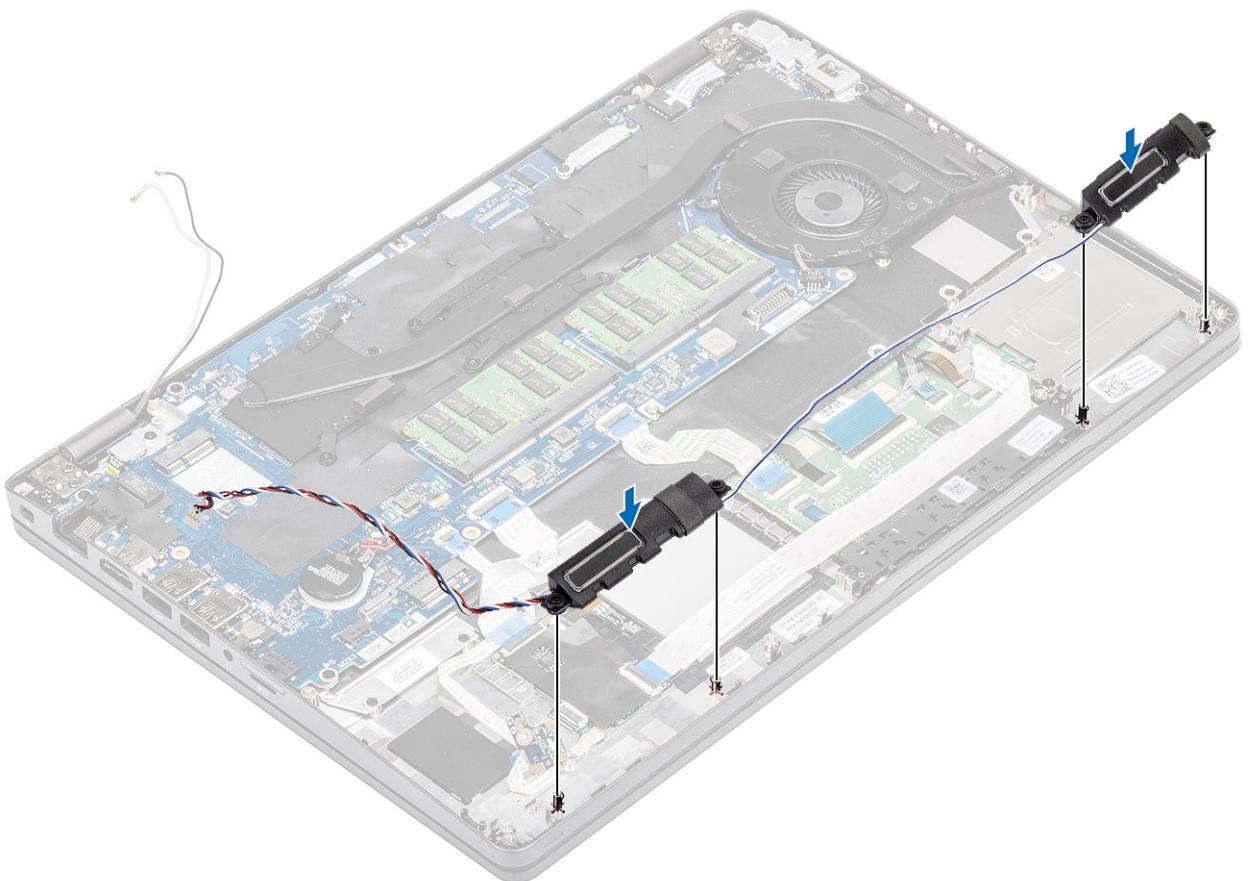
4. Lift the speaker up out of the computer.



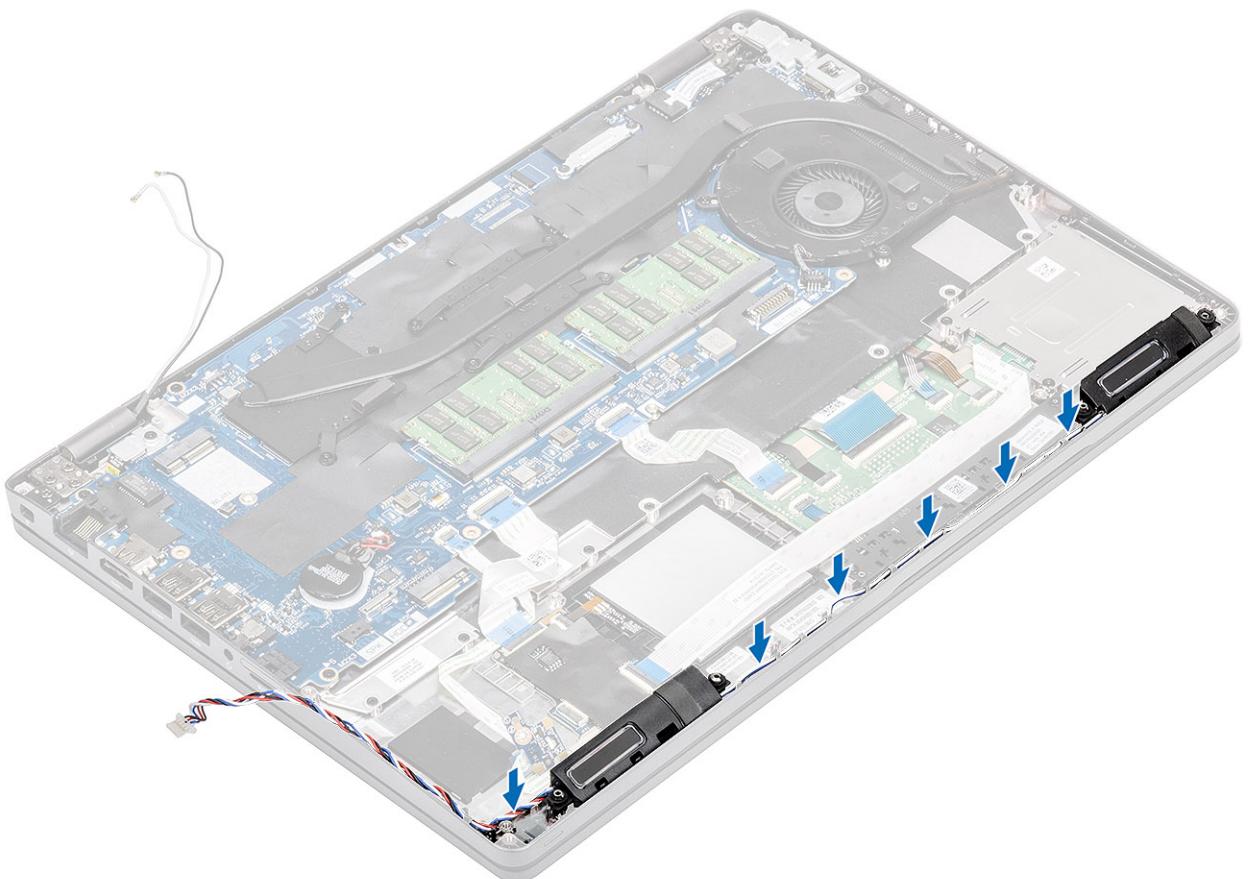
## Installing the speakers

### Steps

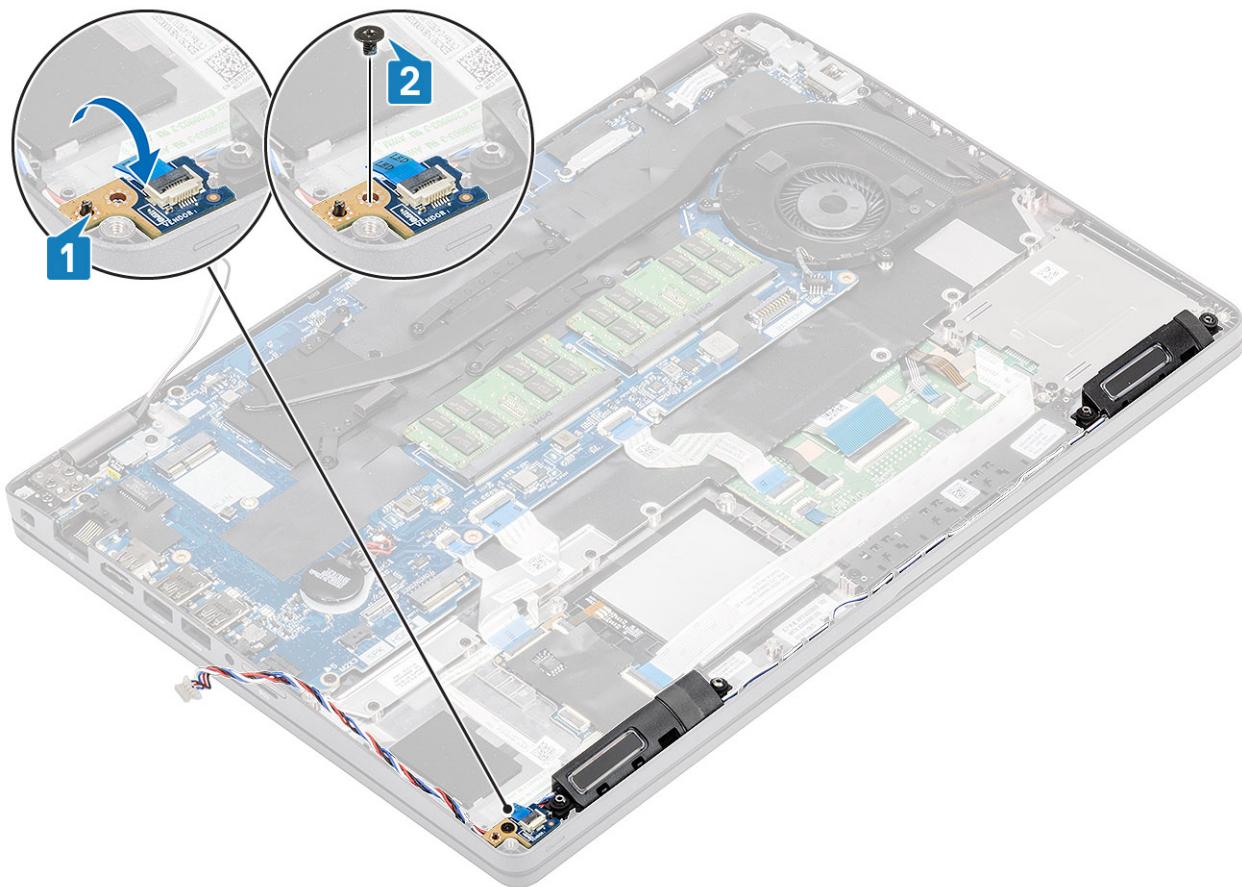
1. Align and place the holes on the speaker module with the pins located on the computer chassis.



2. Re-route the speaker cables through the routing clips on the computer chassis



3. Reseat the LED board [1].
4. Replace the one (M2x2.5) to secure the LED board to the computer [2].



#### Next steps

1. Install the [palmrest bracket](#).
2. Install the [ssd bracket](#).
3. Install the [ssd](#).
4. Install the [battery](#).
5. Install the [base cover](#).
6. Install the [microSD card](#).
7. Follow the procedure in [after working inside your computer](#).

## Heat sink

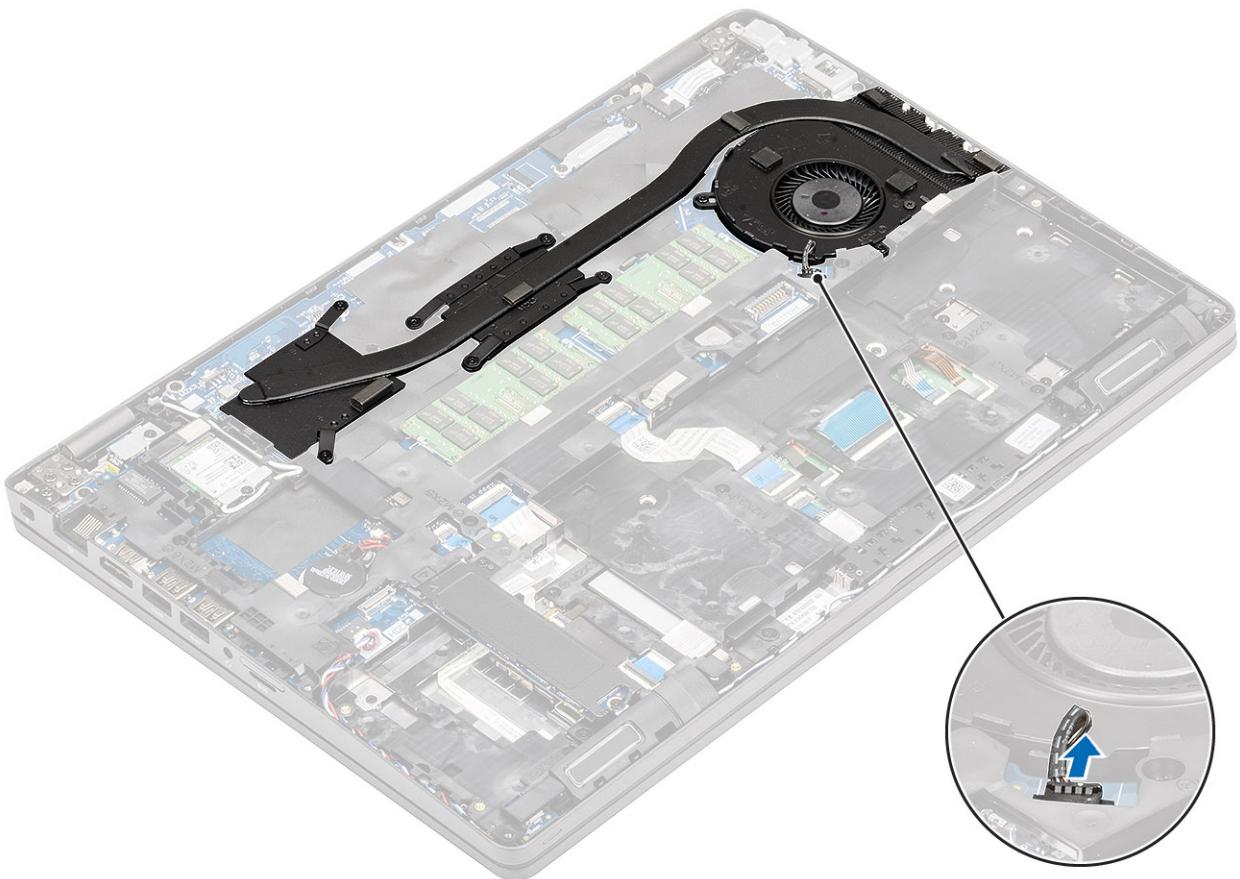
### Removing the Heatsink

#### Prerequisites

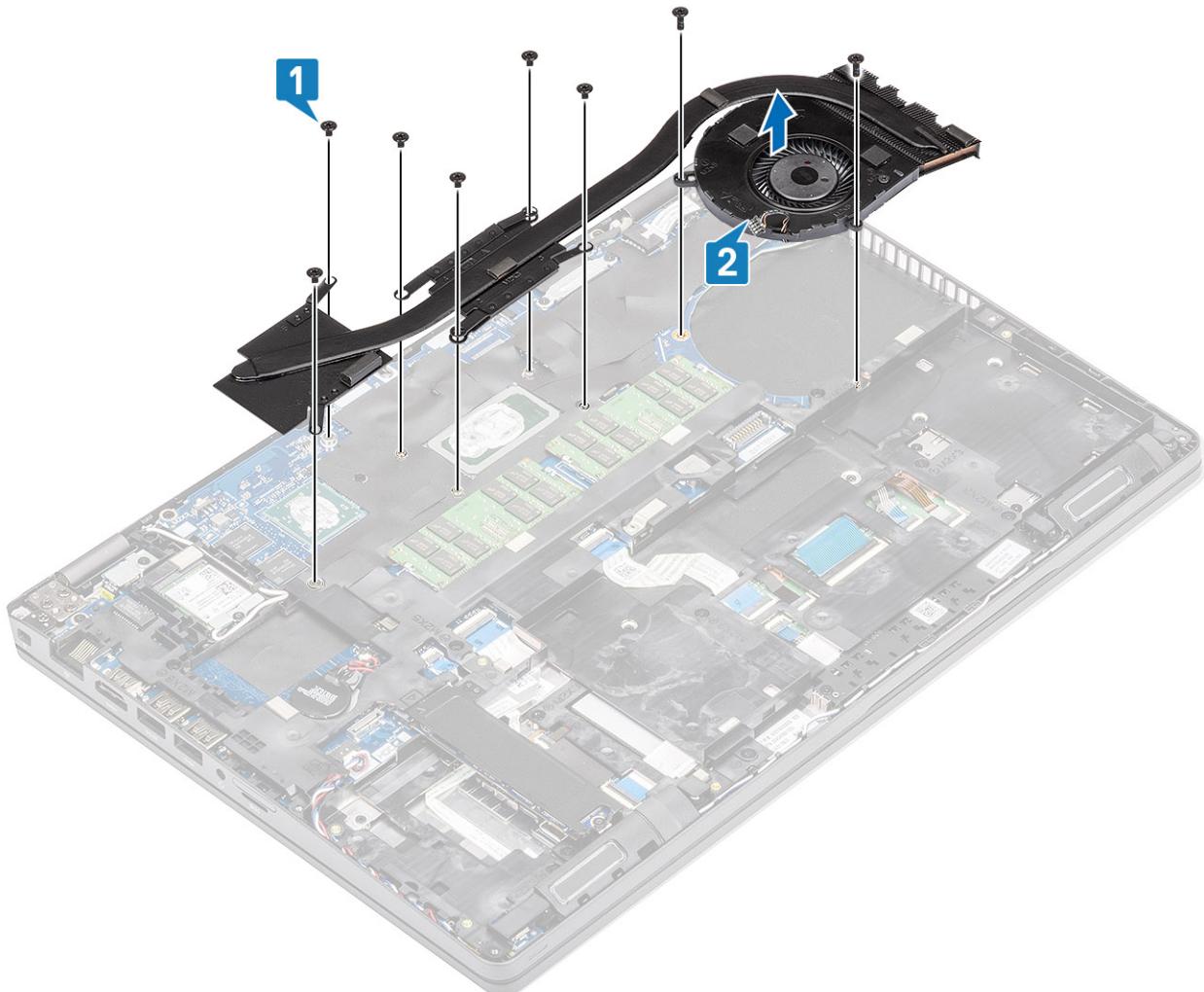
1. Follow the procedure in [before working inside your computer](#)
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).

#### Steps

1. Disconnect the Heatsink fan cable from the connector on the system board [1].



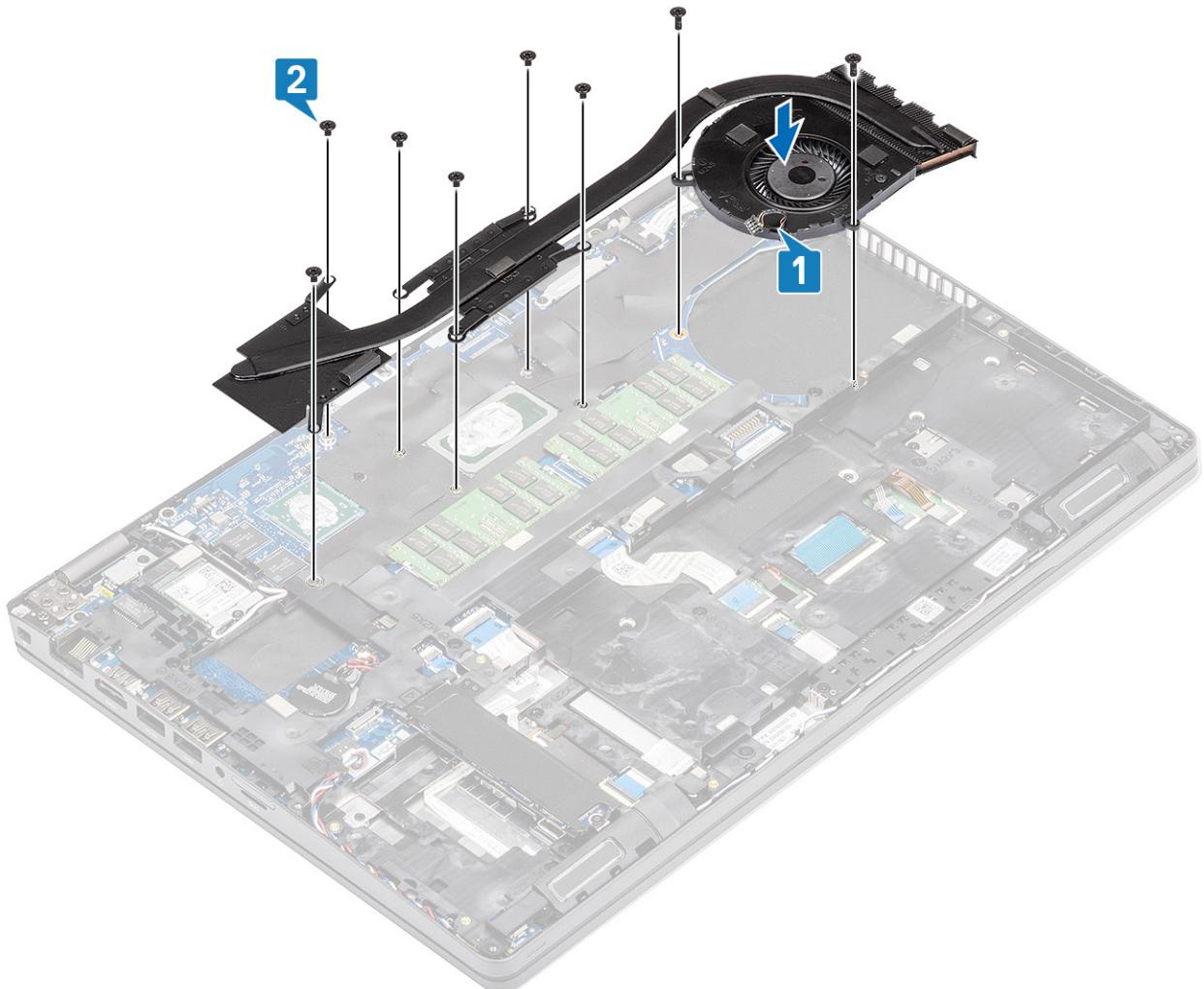
2. Remove the seven (M2x3) screws and the two (M2x5) screws as per the numerical callout on the Heatsink [1].
3. Lift the Heatsink out of the computer [2].



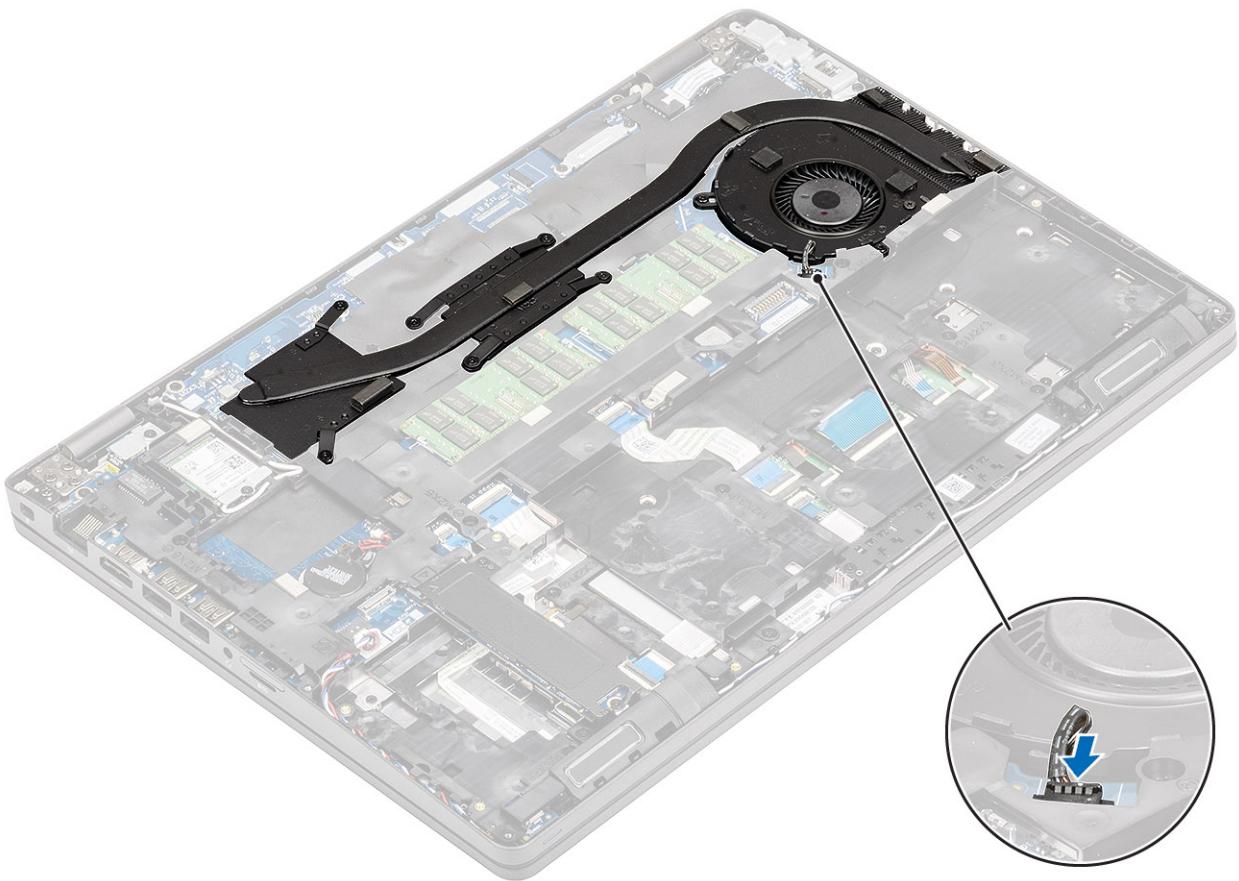
## Installing the Heatsink

### Steps

1. Align and place the Heatsink over the screw holes on the computer [1].
2. Replace the seven (M2x3) and (M2x5) screws as per the callouts on the Heatsink [2].



3. Re-connect the Heatsink fan cable to the connector on the system board.



#### Next steps

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

## System fan

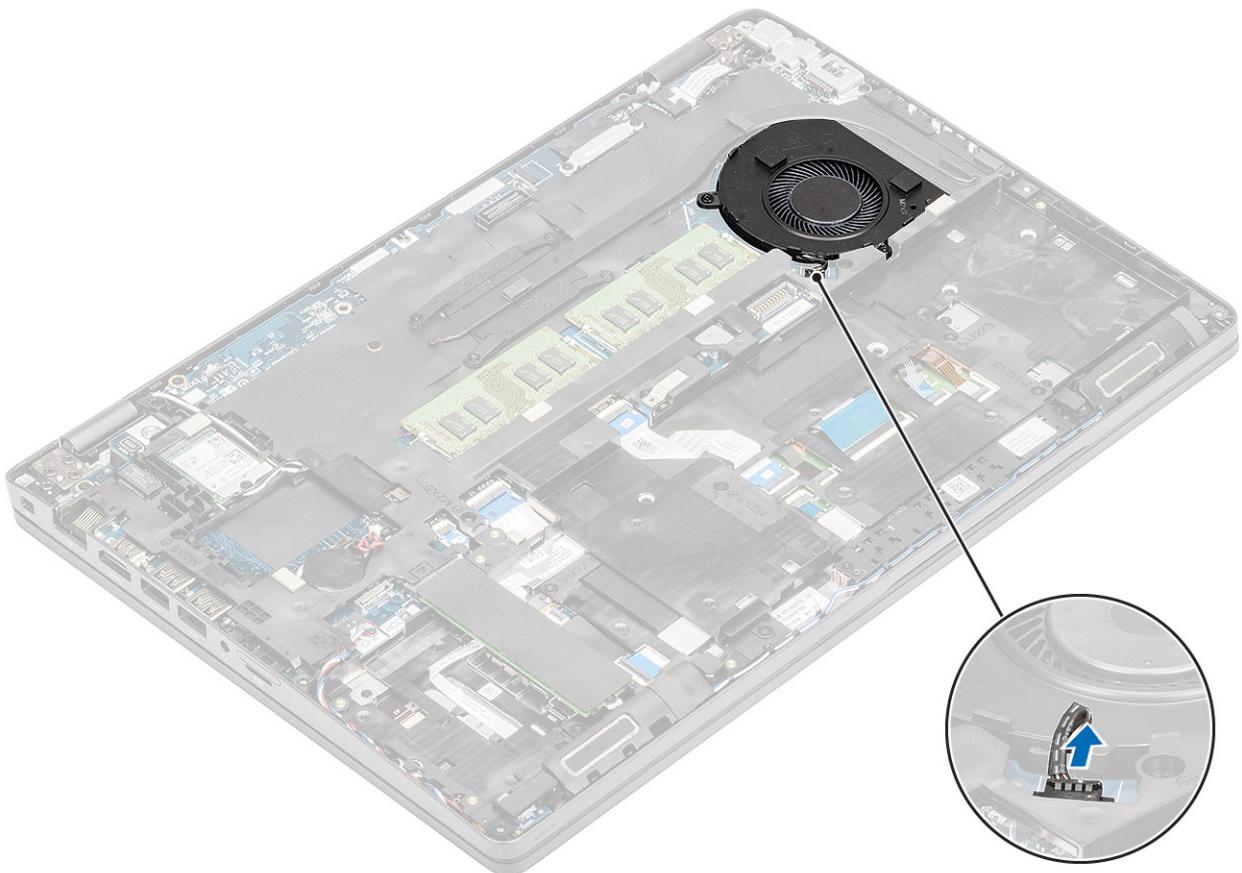
### Removing the system fan

#### Prerequisites

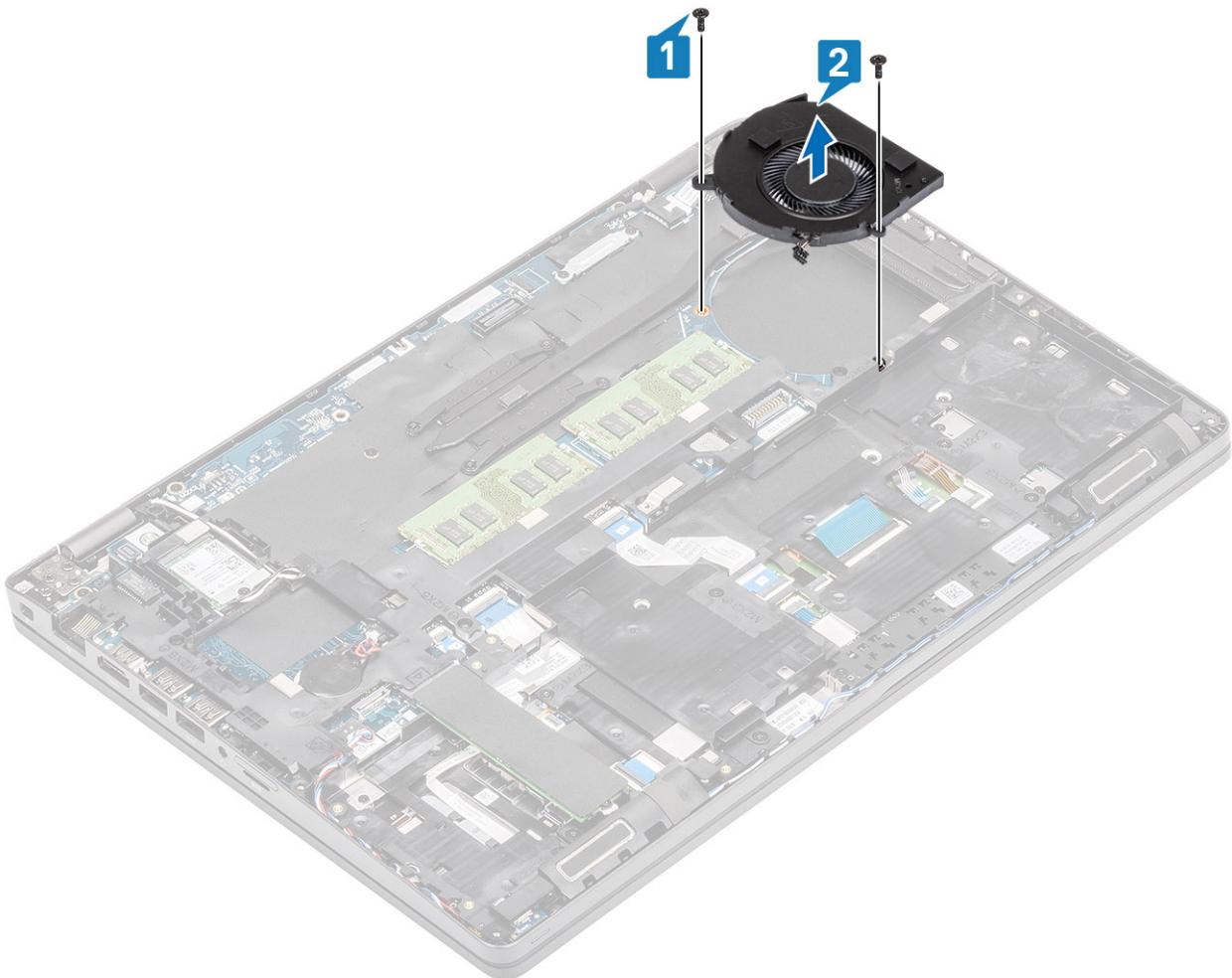
1. Follow the procedure in [before working inside your computer](#).
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).

#### Steps

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



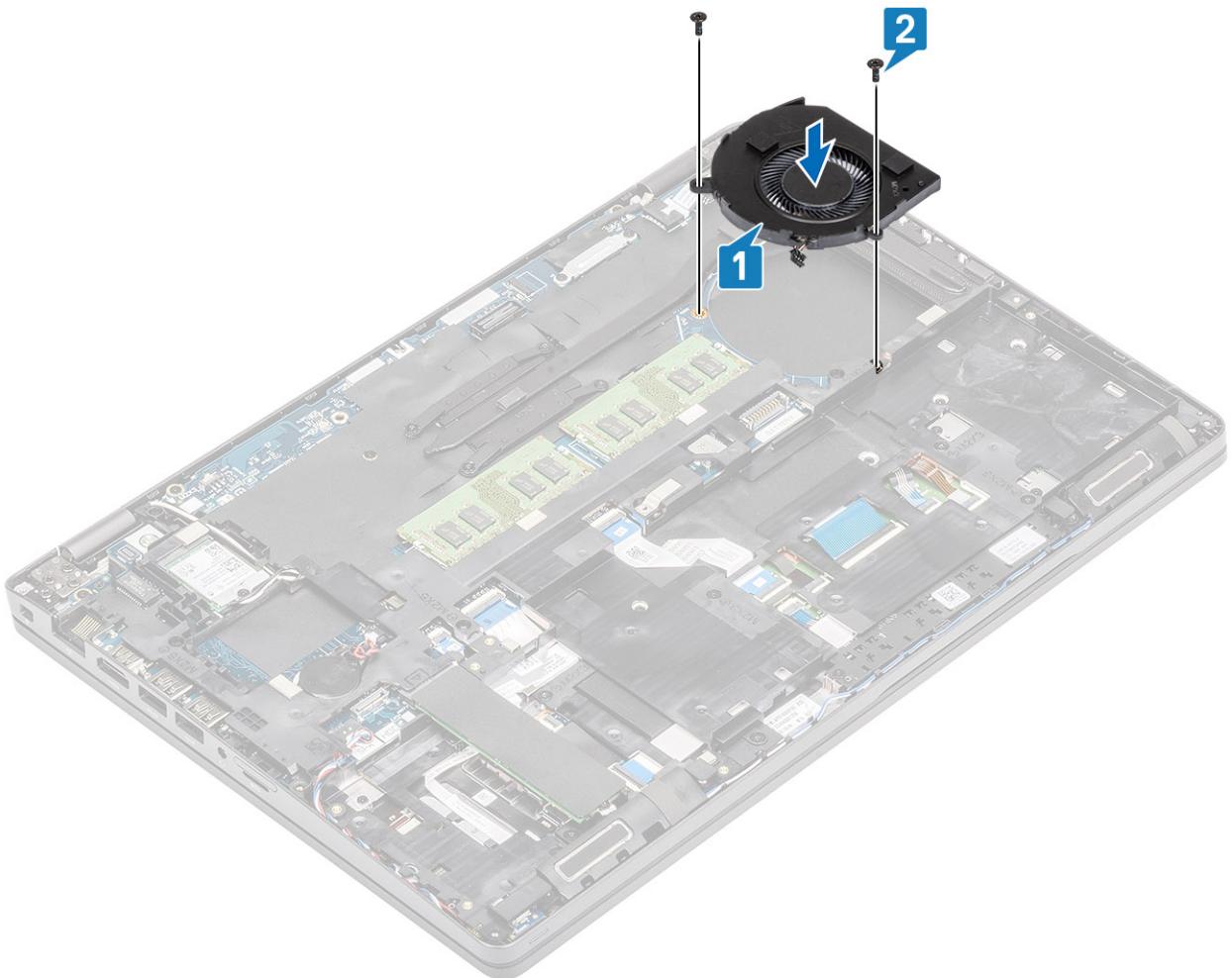
2. Remove the two (M2x5) screws that secure the system fan to the palmrest [1].
3. Lift the system fan away from the computer [2].



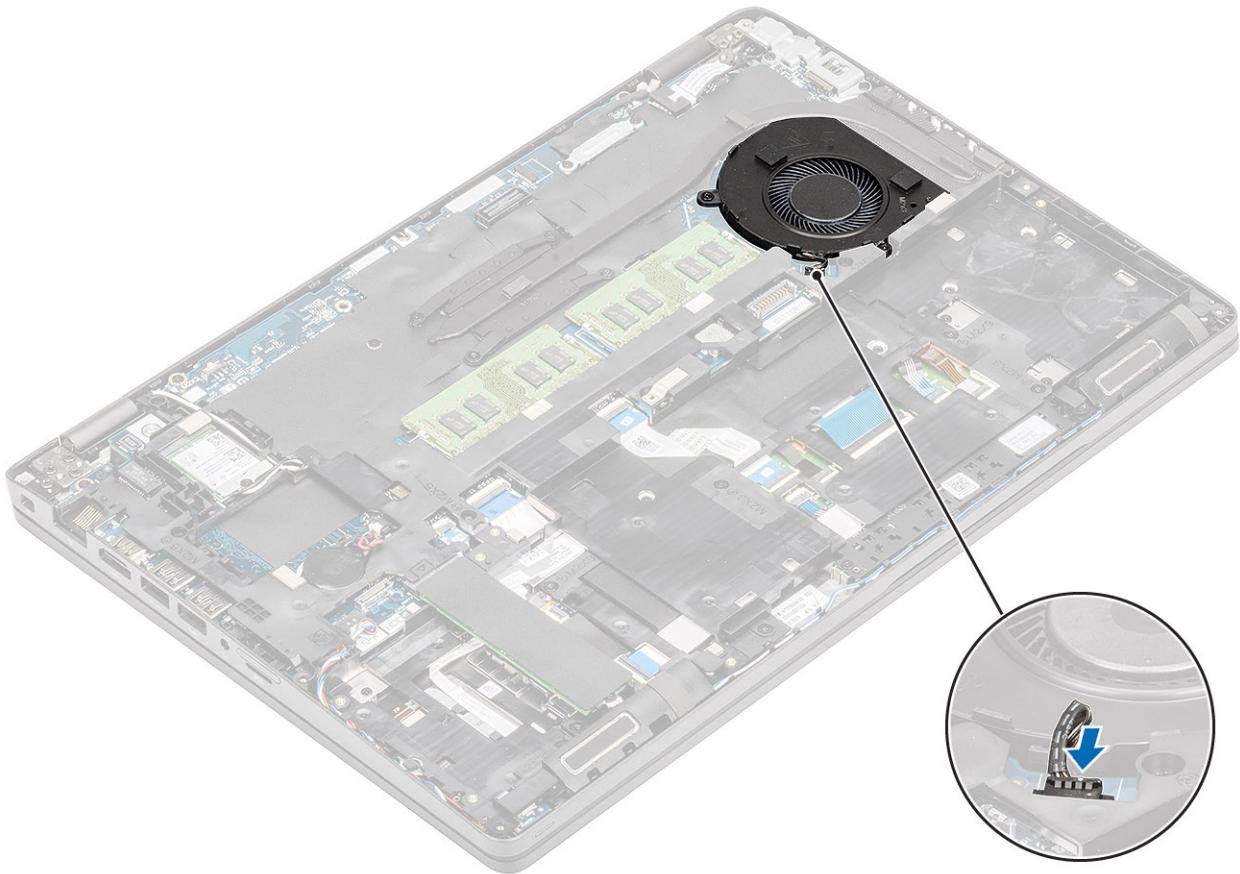
## Installing the system fan

### 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](#).

## Power-adapter port

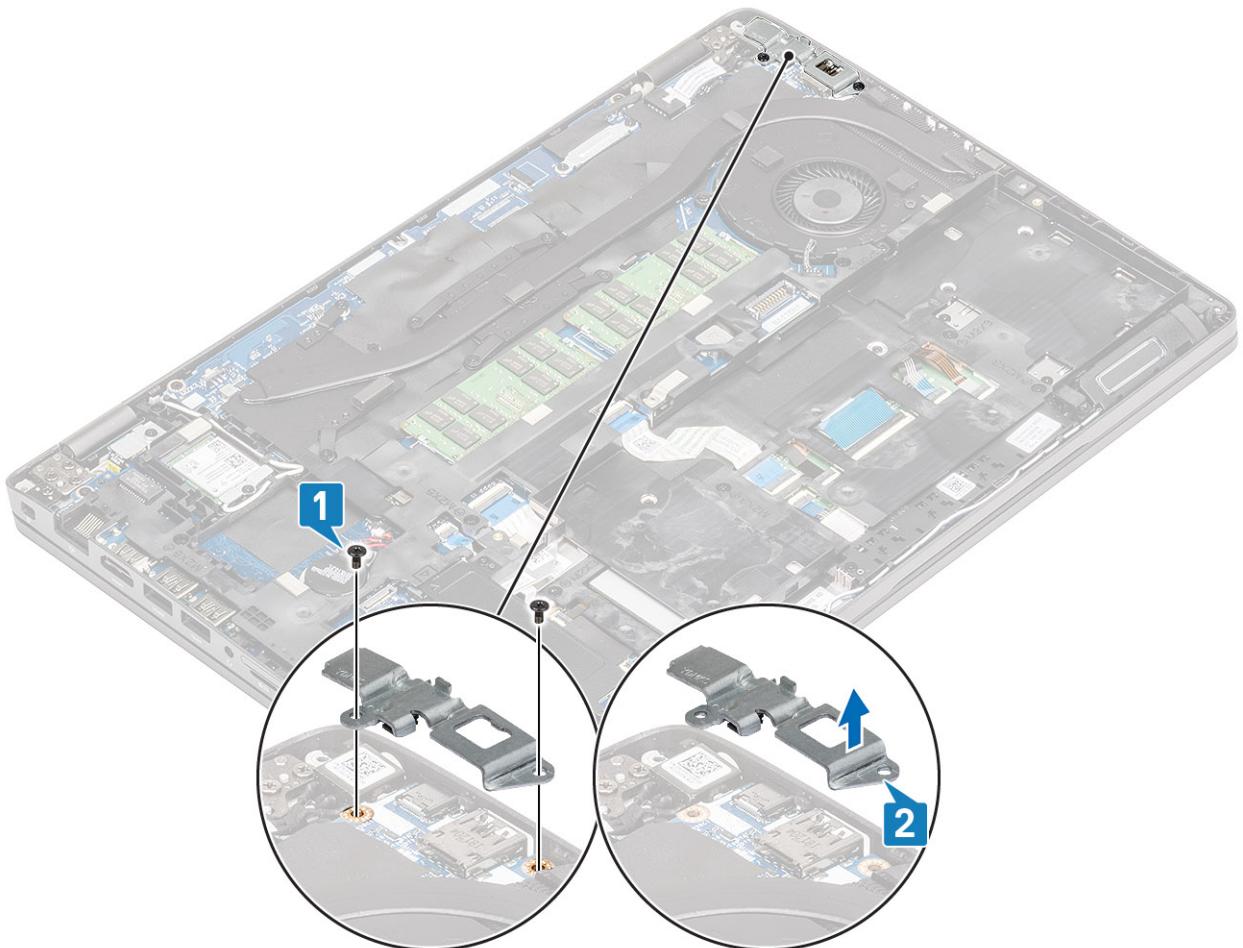
### Removing the DC-in port

#### Prerequisites

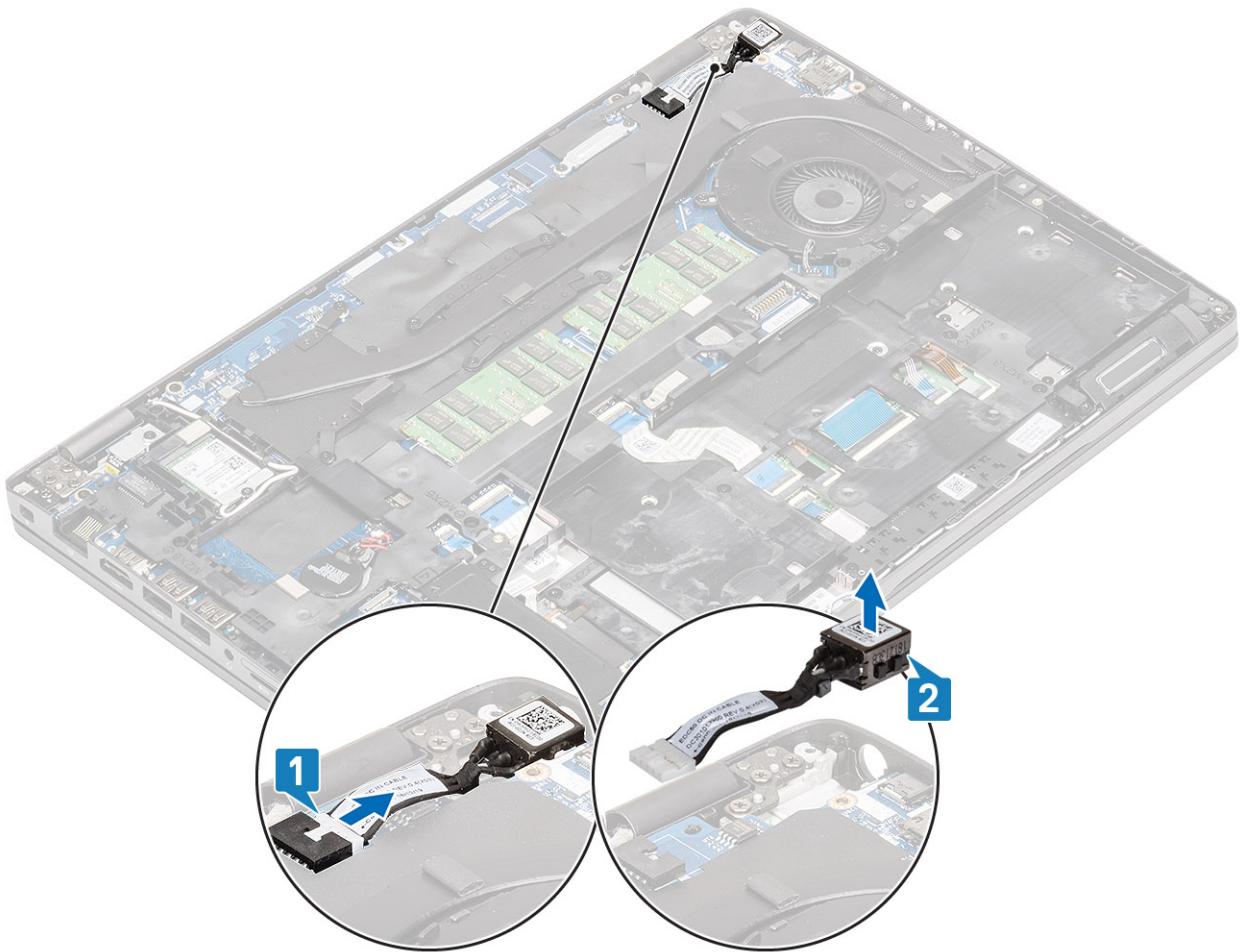
1. Follow the procedure in [before working inside your computer](#)
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).

#### Steps

1. Remove the two (M2x5) screws that secure the Type-C bracket [1]
2. Lift the Type-C bracket away from the computer [2].



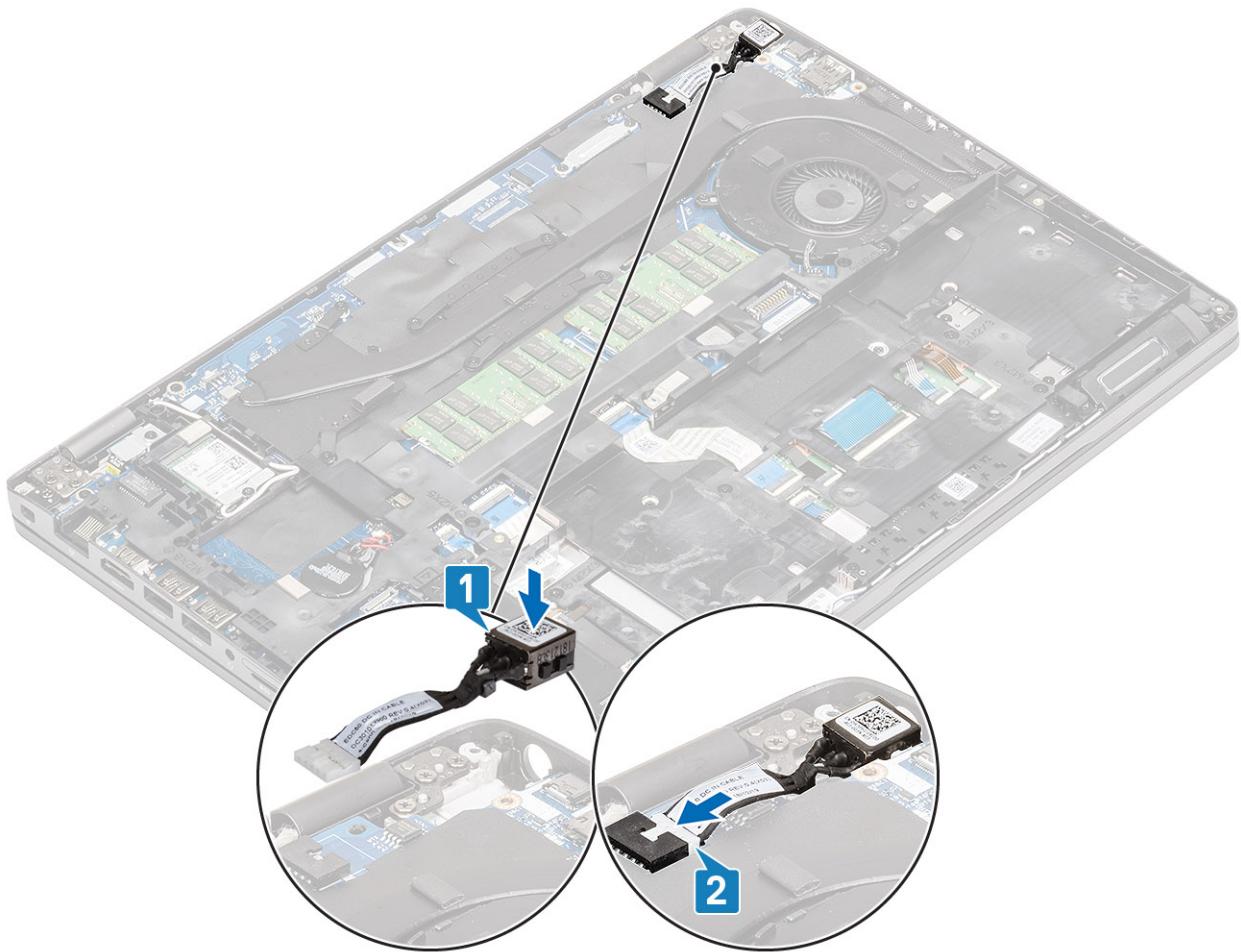
3. Disconnect the DC-in port cable from the connector on the system board and remove it from the computer [1,2].



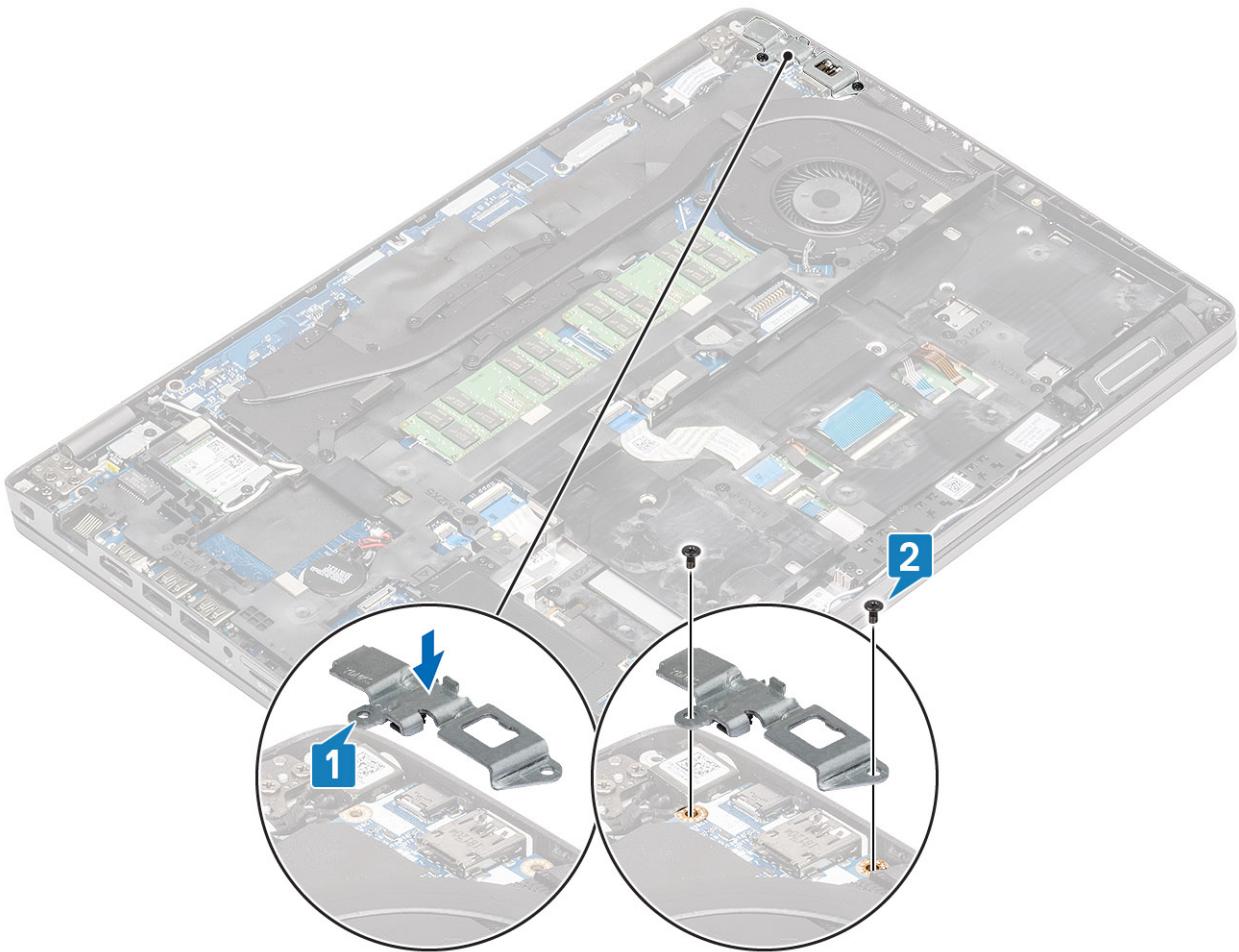
## Installing the DC-in port

### Steps

1. Insert the DC-in port into the computer [1].
2. Reconnect the DC-in port cable to the connector on the system board [2].



3. Place the Type-C bracket on top of the DC-in port [1].
4. Replace the two (M2x5) screws to secure the Type-C on the computer [2].



#### Next steps

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

## LED board

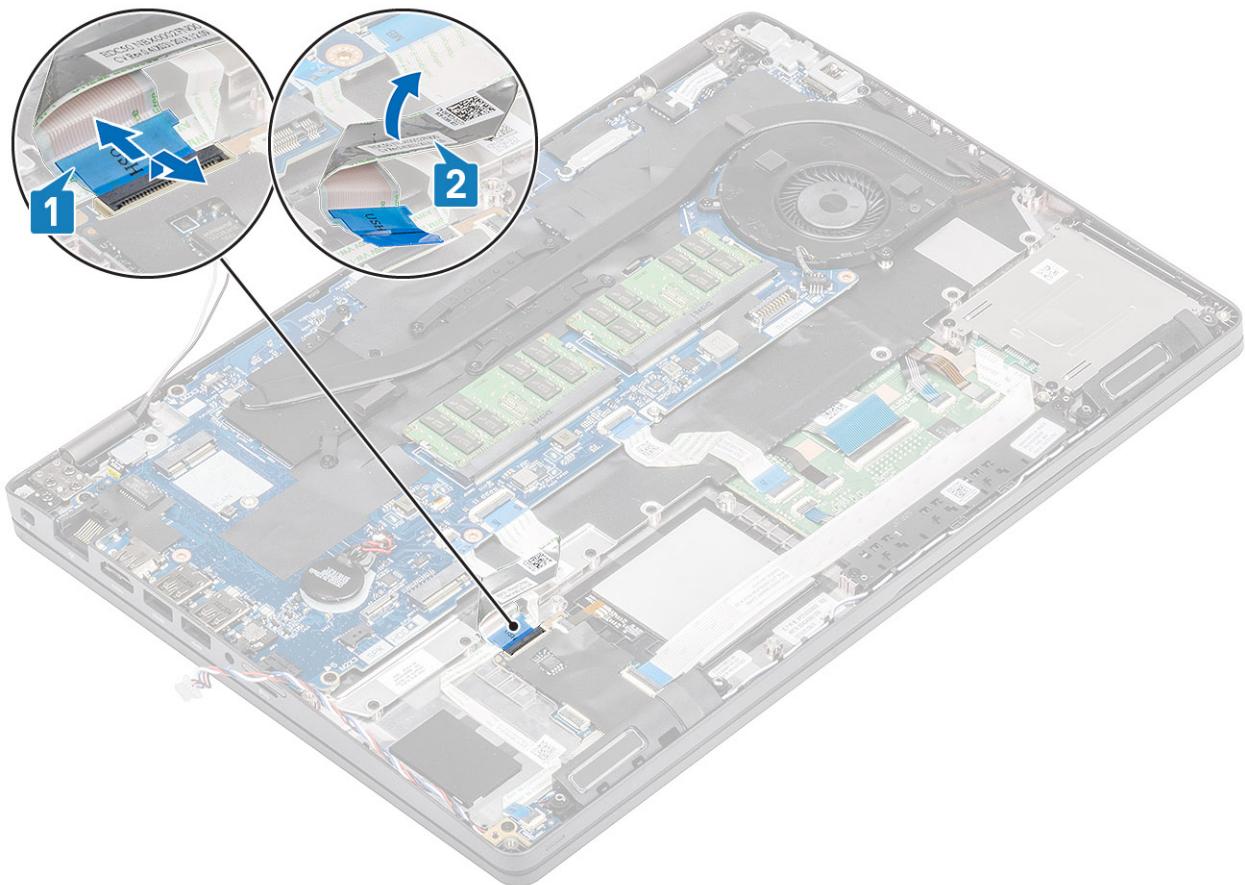
### Removing the LED board

#### Prerequisites

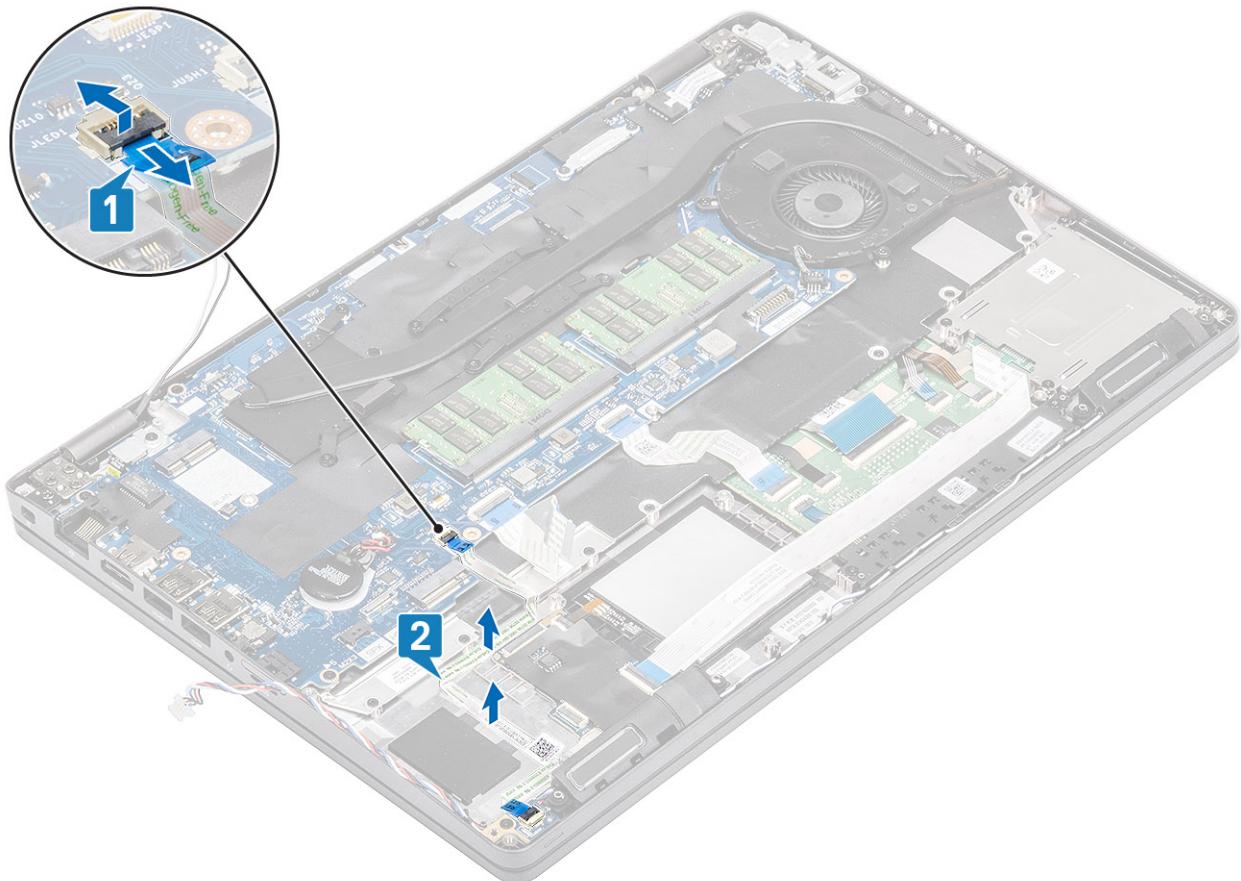
1. Follow the procedure in [before working inside your computer](#)
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [ssd](#).
6. Remove the [ssd bracket](#).
7. Remove the [palmrest bracket](#).

#### Steps

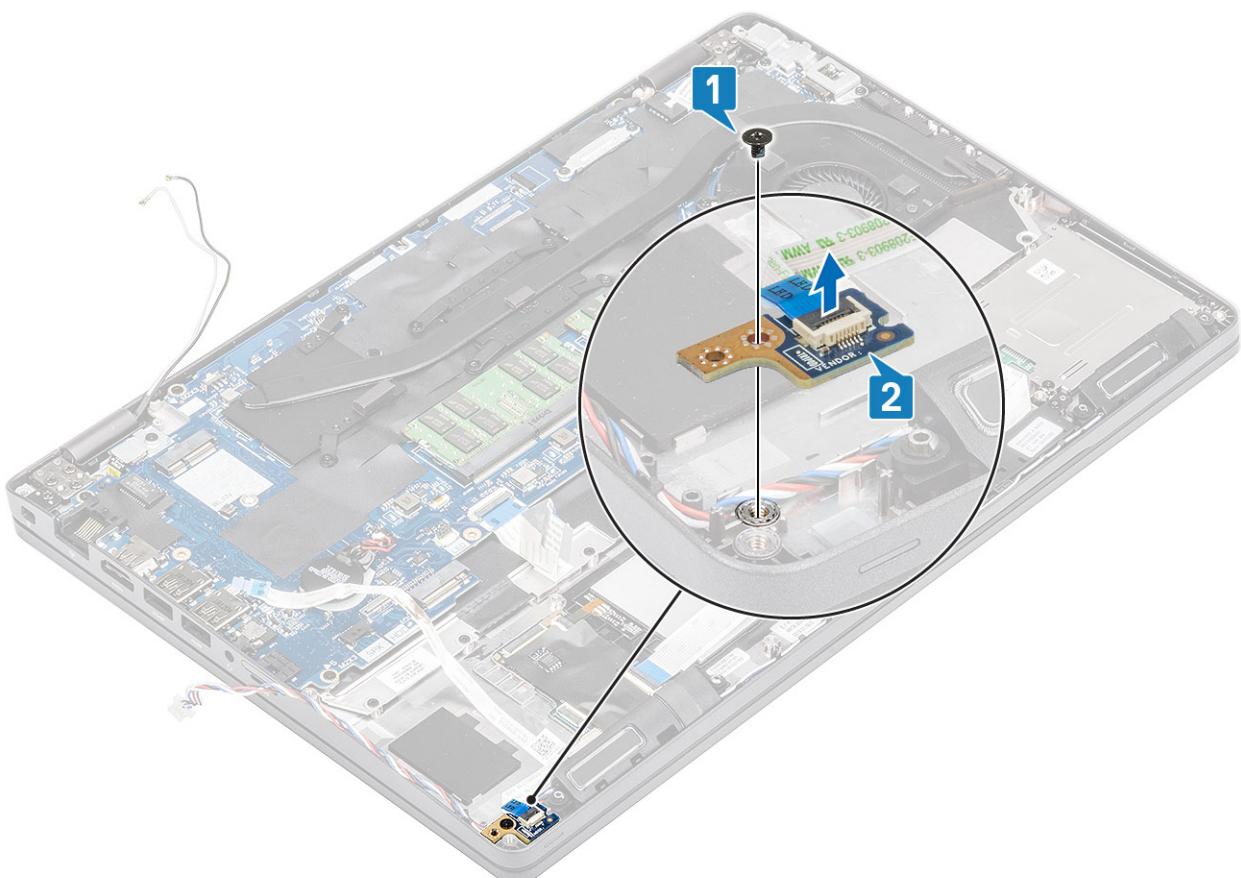
1. Unlock and disconnect the USH cable from the palmrest [1,2].



2. Unlock and disconnect the LED board cable from the system board [1].
3. Un-route the LED board cable from the computer chassis [2].



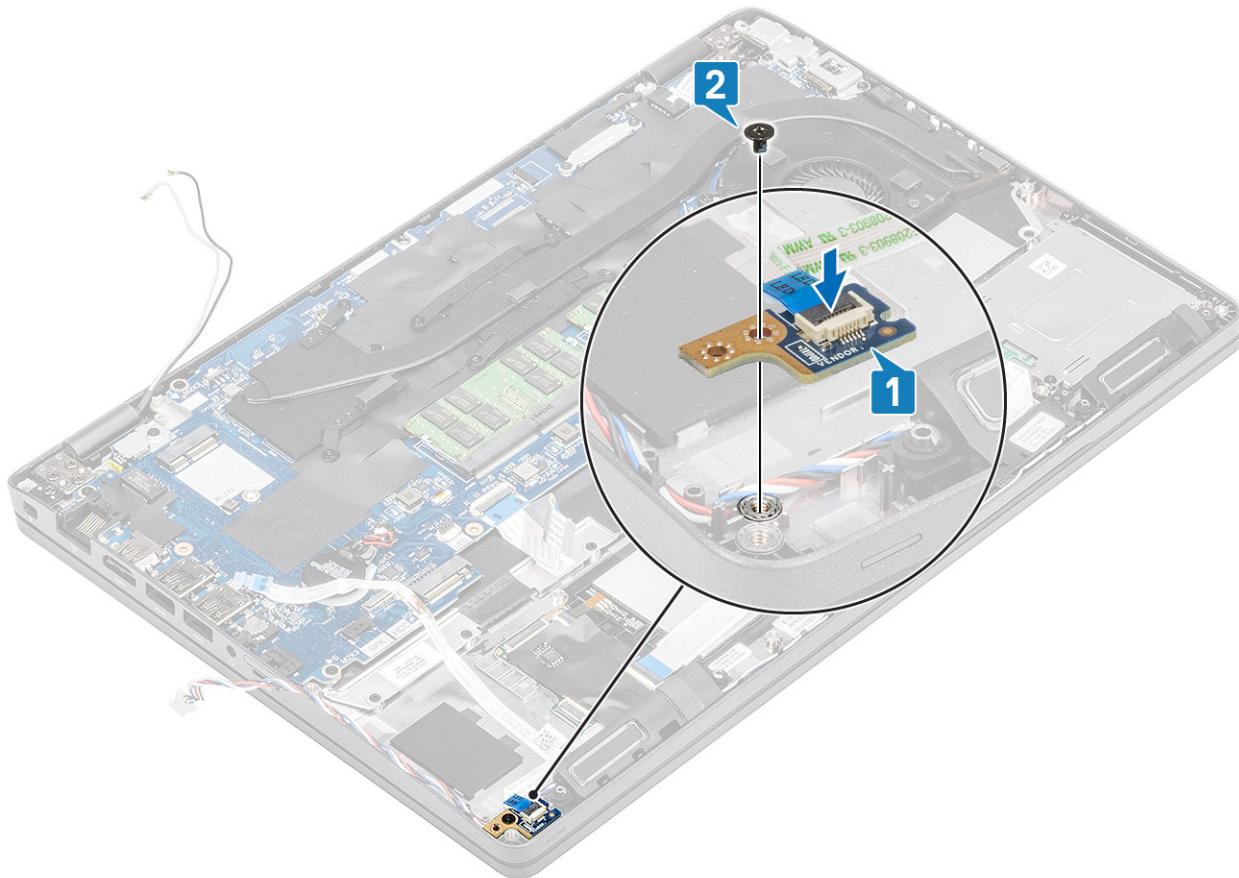
4. Remove the single (M2x2.5) screw and lift the LED board out of the computer [1,2].



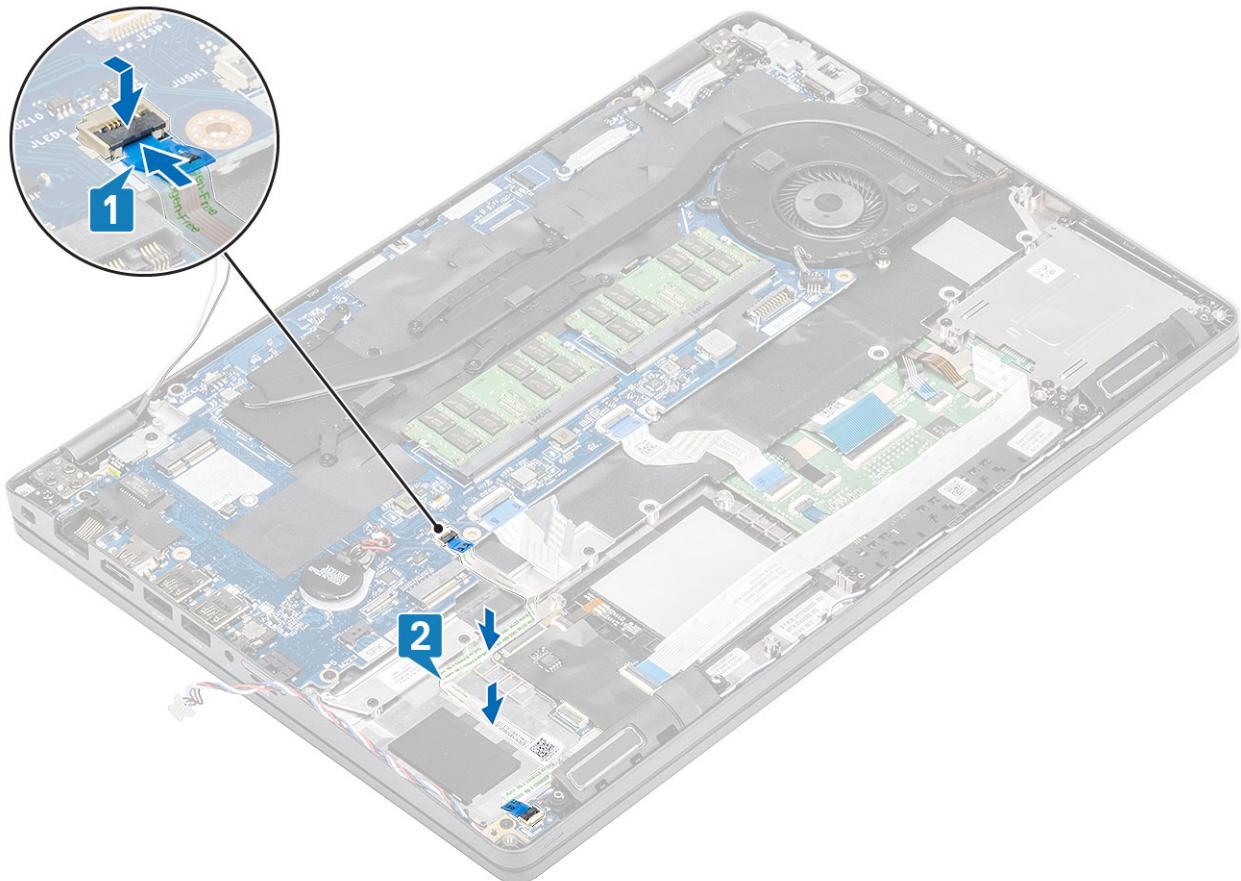
# Installing the LED board

## Steps

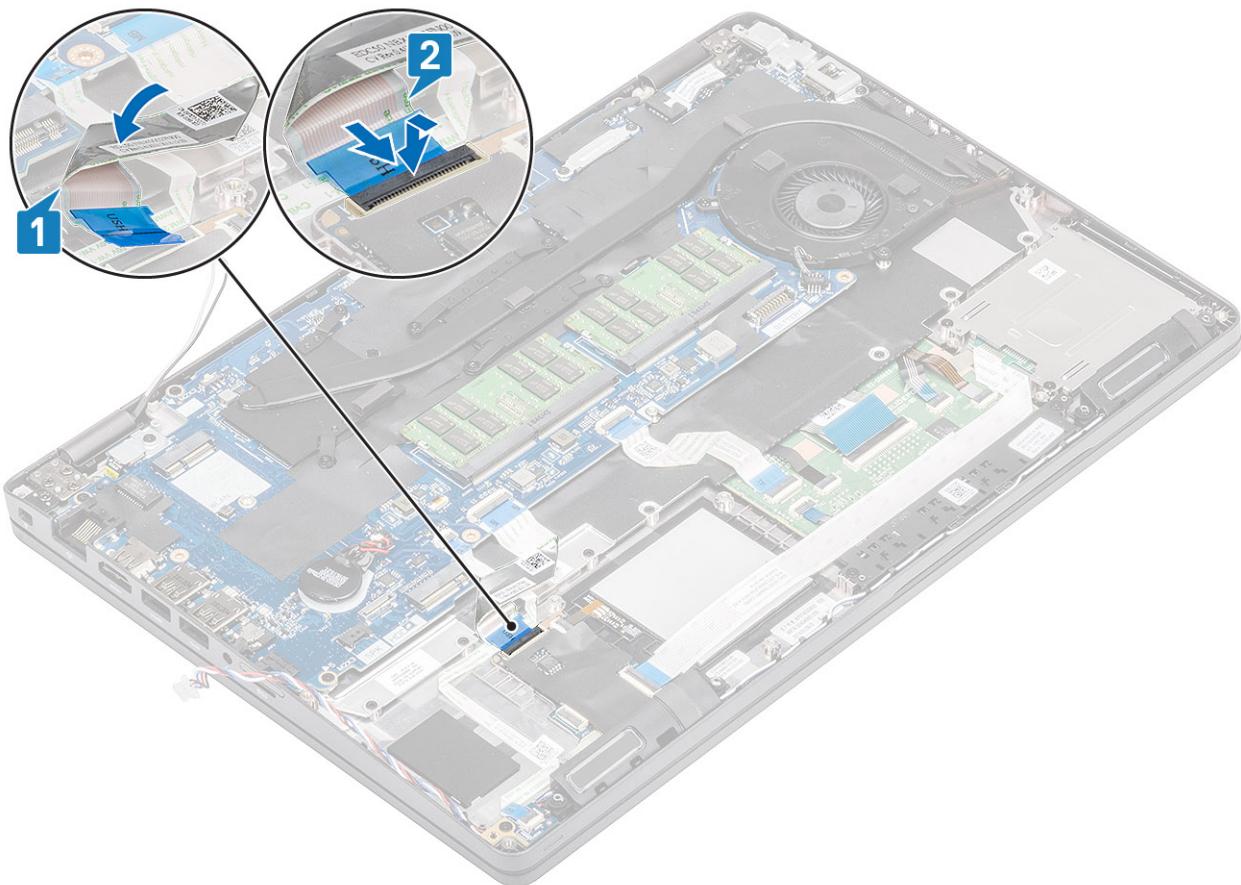
1. Reseat the LED board in its place and secure it with the single (M2x2.5) screw to the computer [1,2].



2. Connect the LED board cable to the system board and re-route it on the computer chassis [1,2]



3. Gently fold the fold the USH cable as shown [1].
4. Re-connect the USH cable to the palmrest and secure the lock [2].



#### Next steps

1. Install the [palmrest bracket](#).
2. Install the [SSD bracket](#).
3. Install the [SSD](#).
4. Install the [battery](#).
5. Install the [base cover](#).
6. Install the [microSD card](#).
7. Follow the procedure in [after working inside your computer](#).

## Touchpad

### Removing the touchpad button

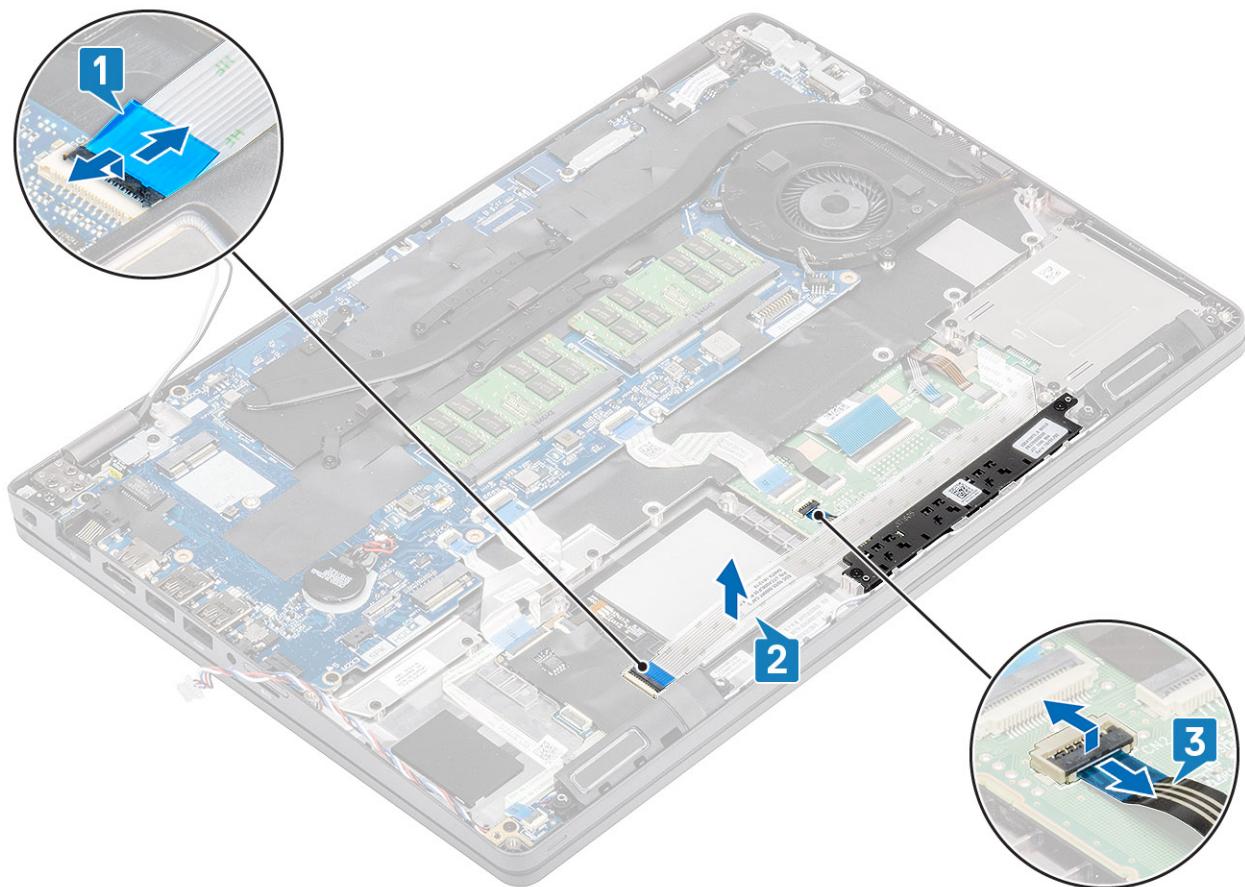
#### Prerequisites

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 [SSD](#).
6. Remove the [SSD bracket](#).
7. Remove the [palmrest bracket](#).

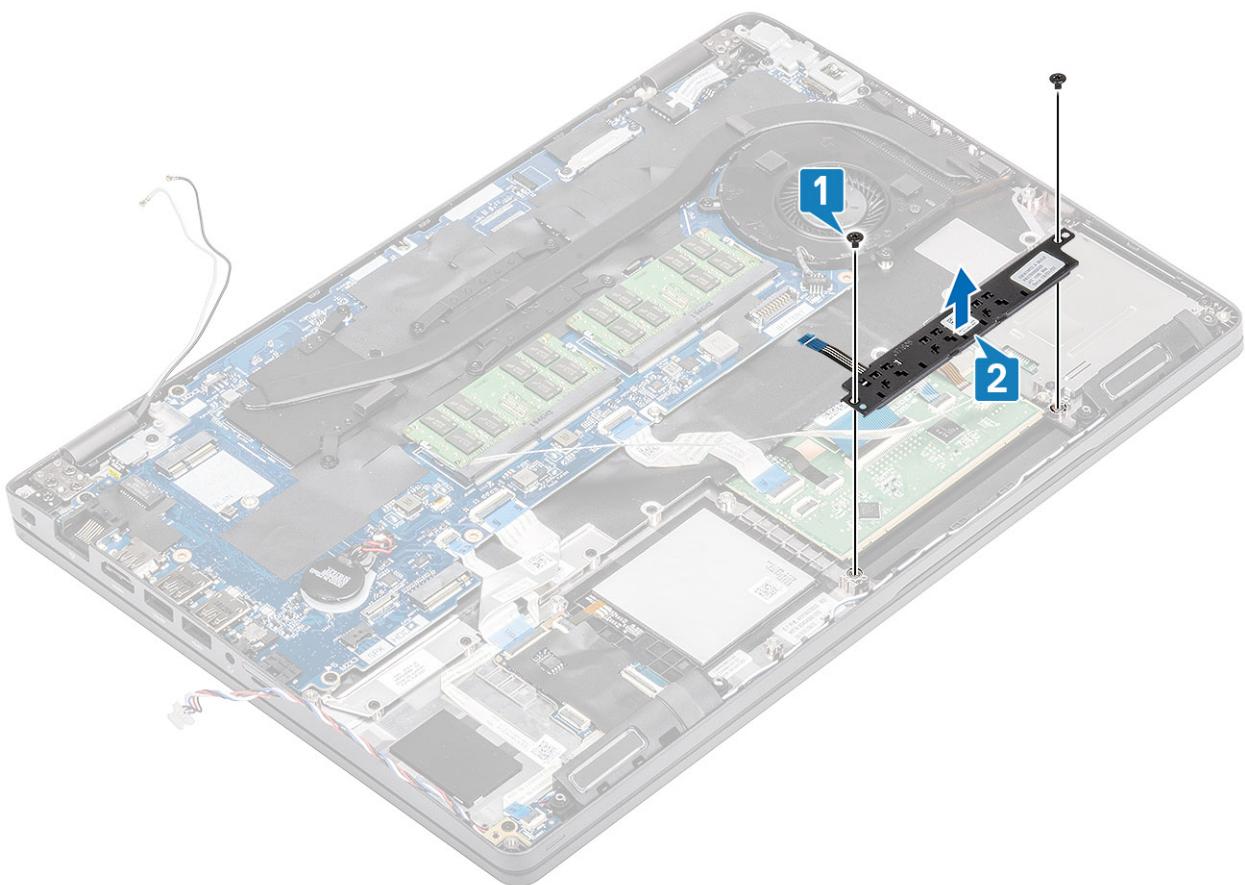
#### Steps

1. Disconnect the smart card reader cable and unroute the cable [1,2].

2. Disconnect the touchpad cable from the connector [3].



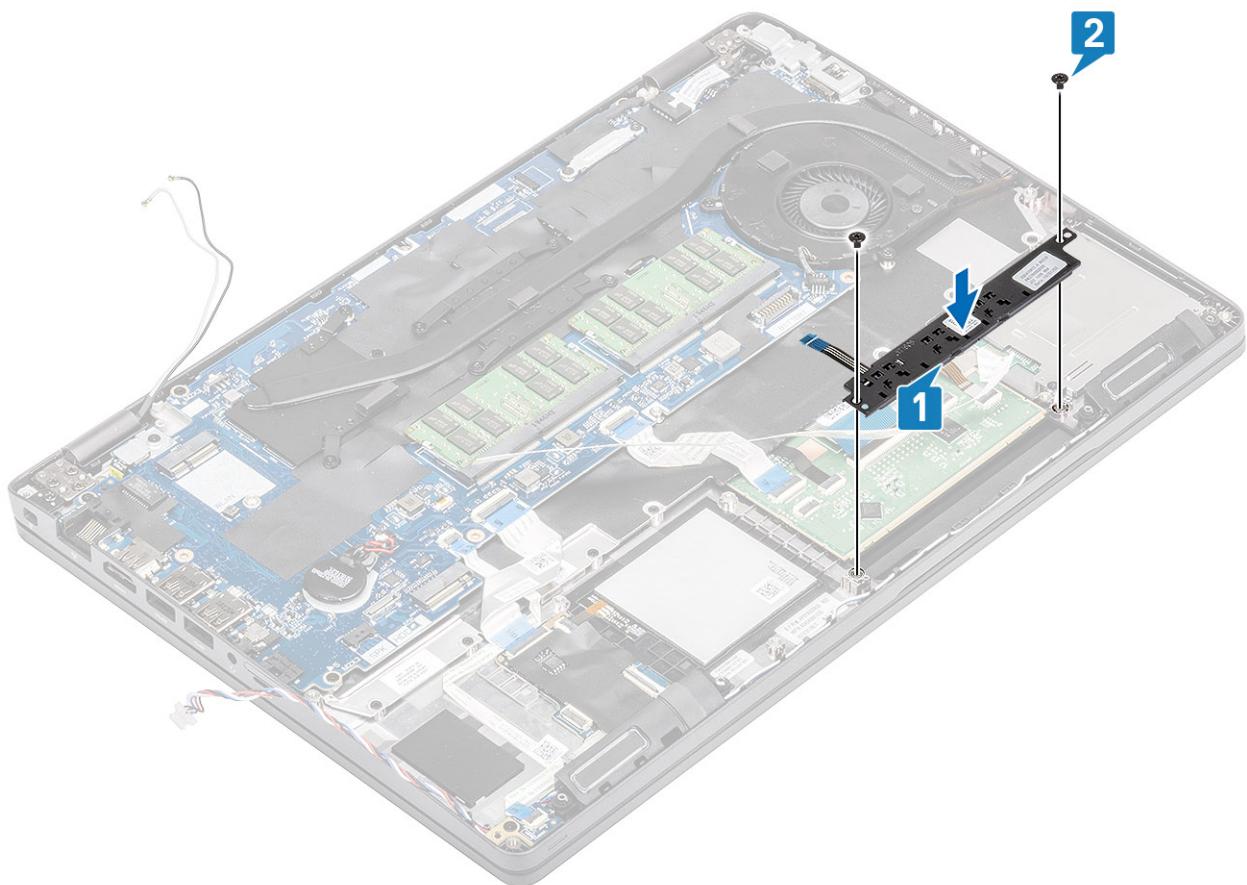
3. Remove the two (M2x3) screws and lift the touchpad away from the computer [1,2].



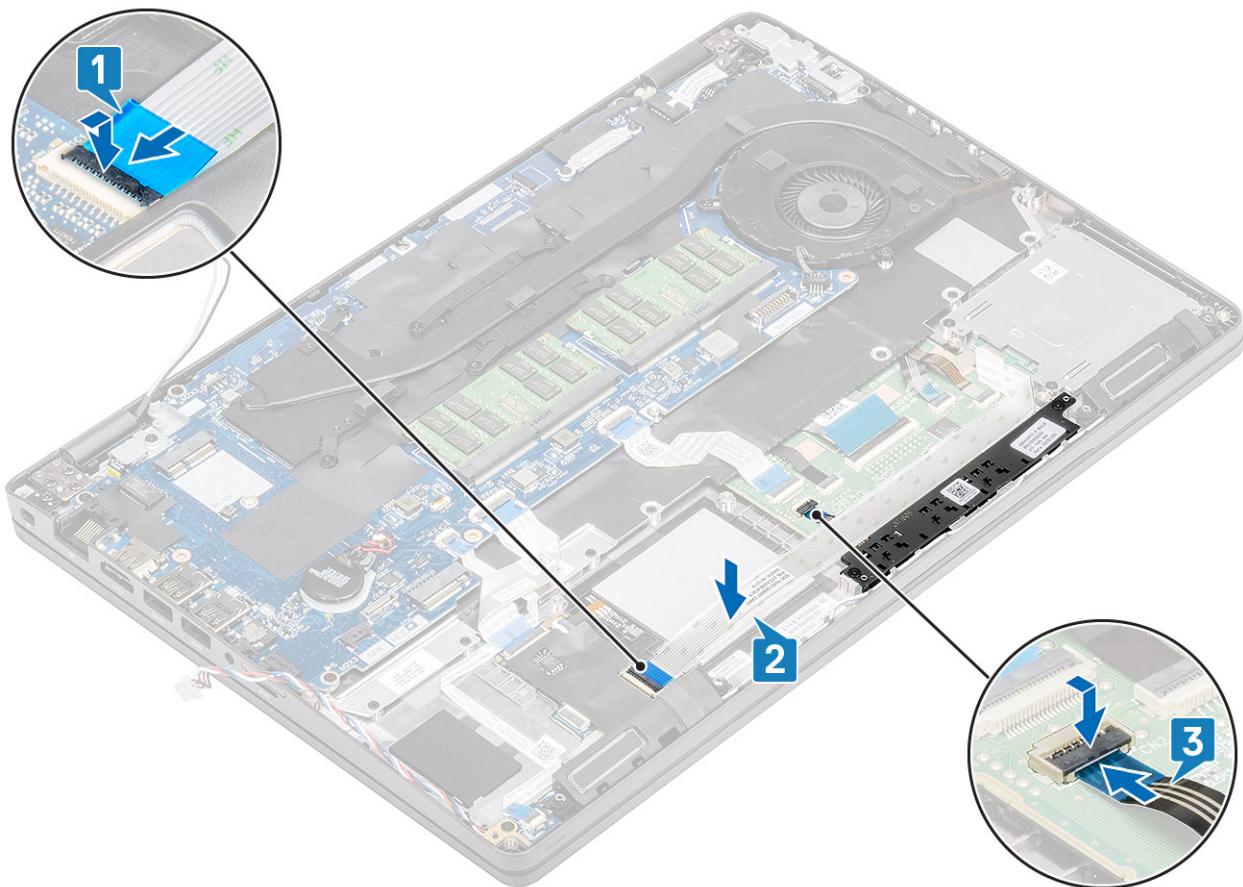
## Installing the touchpad buttons board

### Steps

1. Align and place touchpad with the computer chassis [1].
2. Replace the two (M2x3) screws that secure the touchpad to the computer [2].



3. Re-connect the smart card reader cables and press it down to the computer chassis [1,2].
4. Re-connect the touchpad cable to the palmrest [3].



#### Next steps

1. Install the [palmrest bracket](#).
2. Install the [ssd bracket](#).
3. Install the [ssd](#).
4. Install the [battery](#).
5. Install the [base cover](#).
6. Install the [microSD card](#).
7. Follow the procedure in [after working inside your computer](#).

## System board

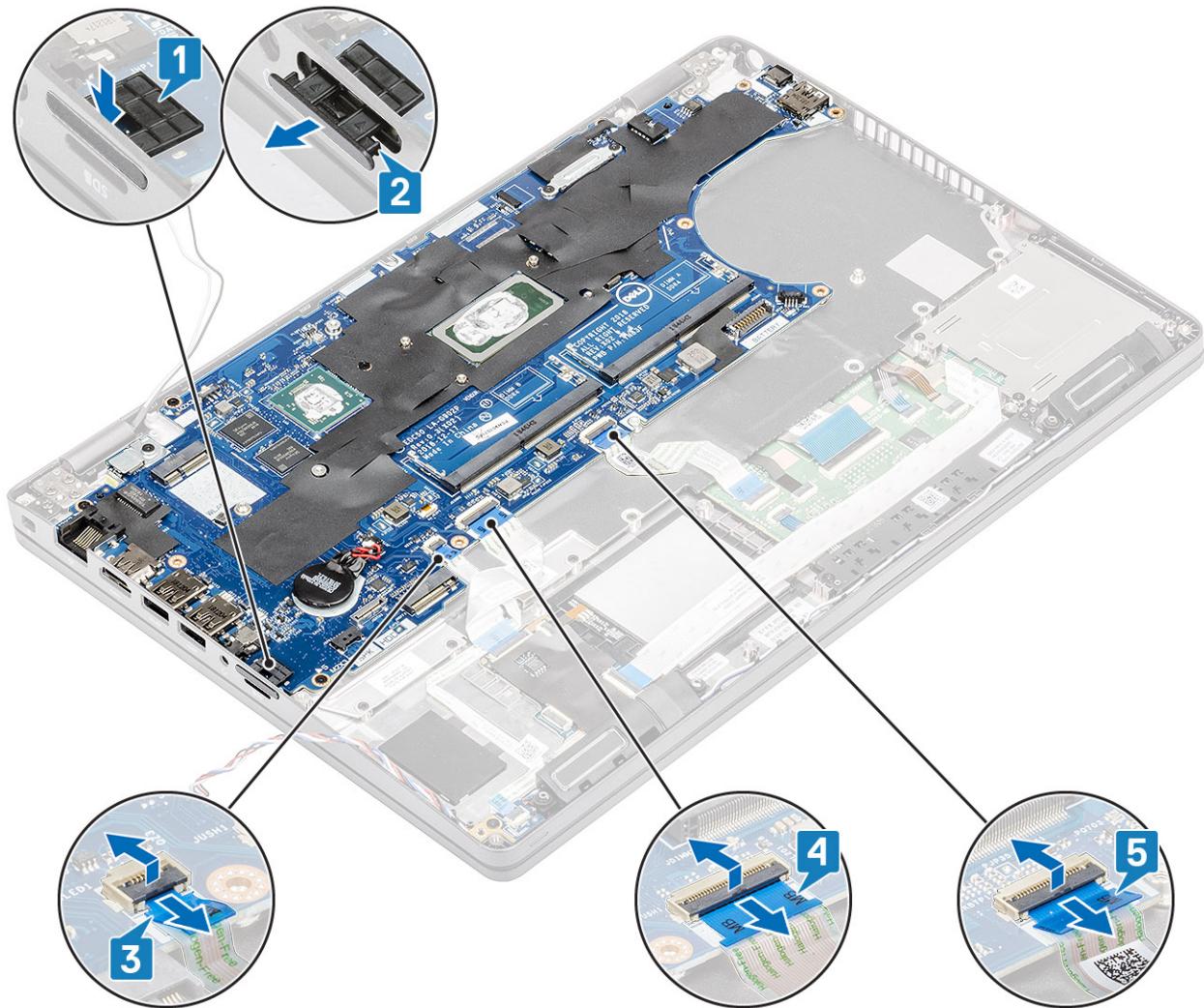
### Removing the system board

#### Prerequisites

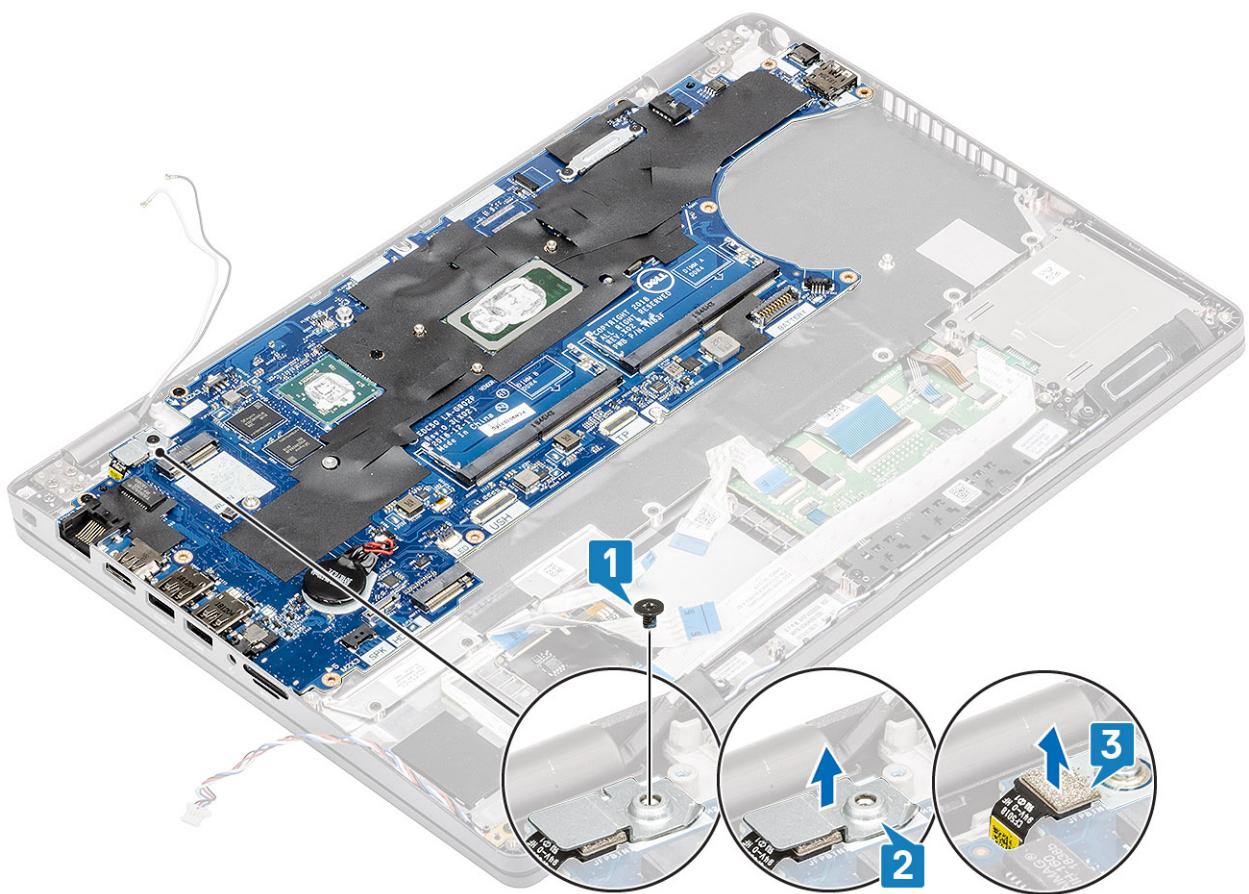
1. Follow the procedure in [before working inside your computer](#)
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [ssd](#).
6. Remove the [ssd bracket](#).
7. Remove the [palmrest bracket](#).
8. Remove the [LED board](#).
9. Remove the [heatsink](#).

## Steps

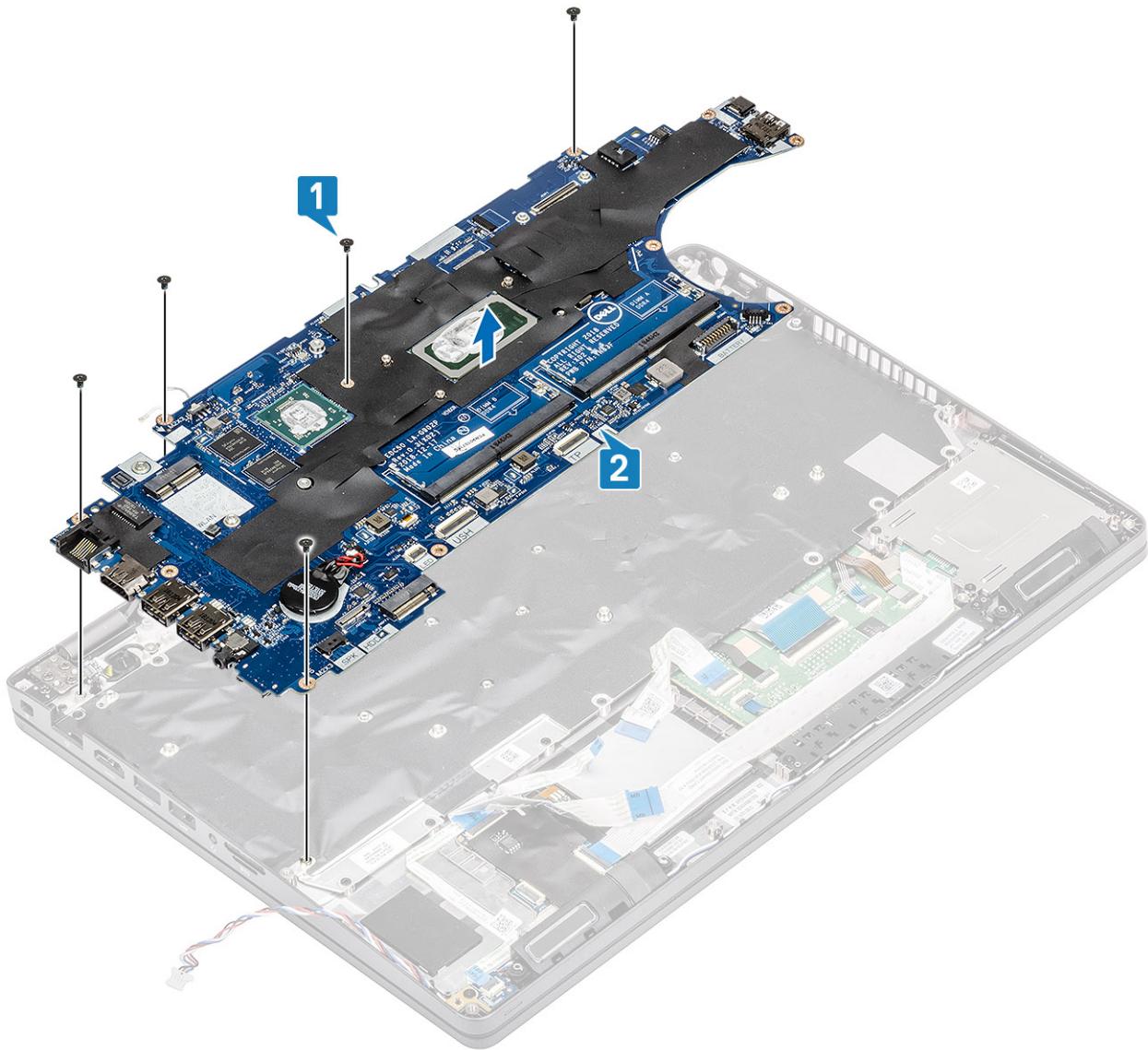
1. Press the lock and release the card slot tray [1,2].
2. Unlock and disconnect the LED board, USH and the touchpad cables from the connectors on the system board[3,4,5].



3. Remove the single screw securing the metal bracket to the computer [1] and lift it away from the computer [2].
4. Disconnect the fingerprint reader cable from the system board connector [3].



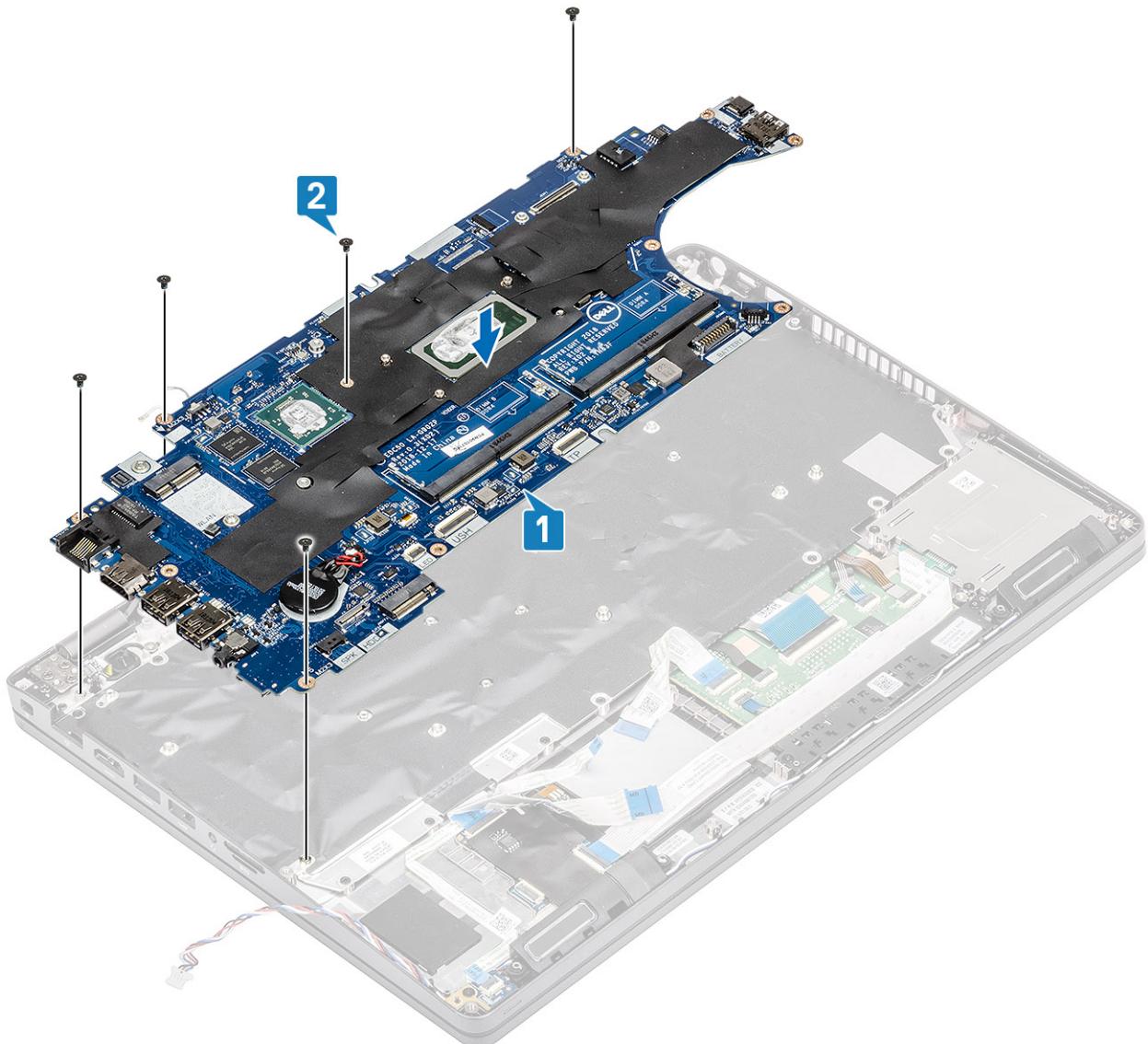
5. Remove the five (M2x3) screws that secure the system board to the computer [1].
6. Lift the system board out of the computer [2].



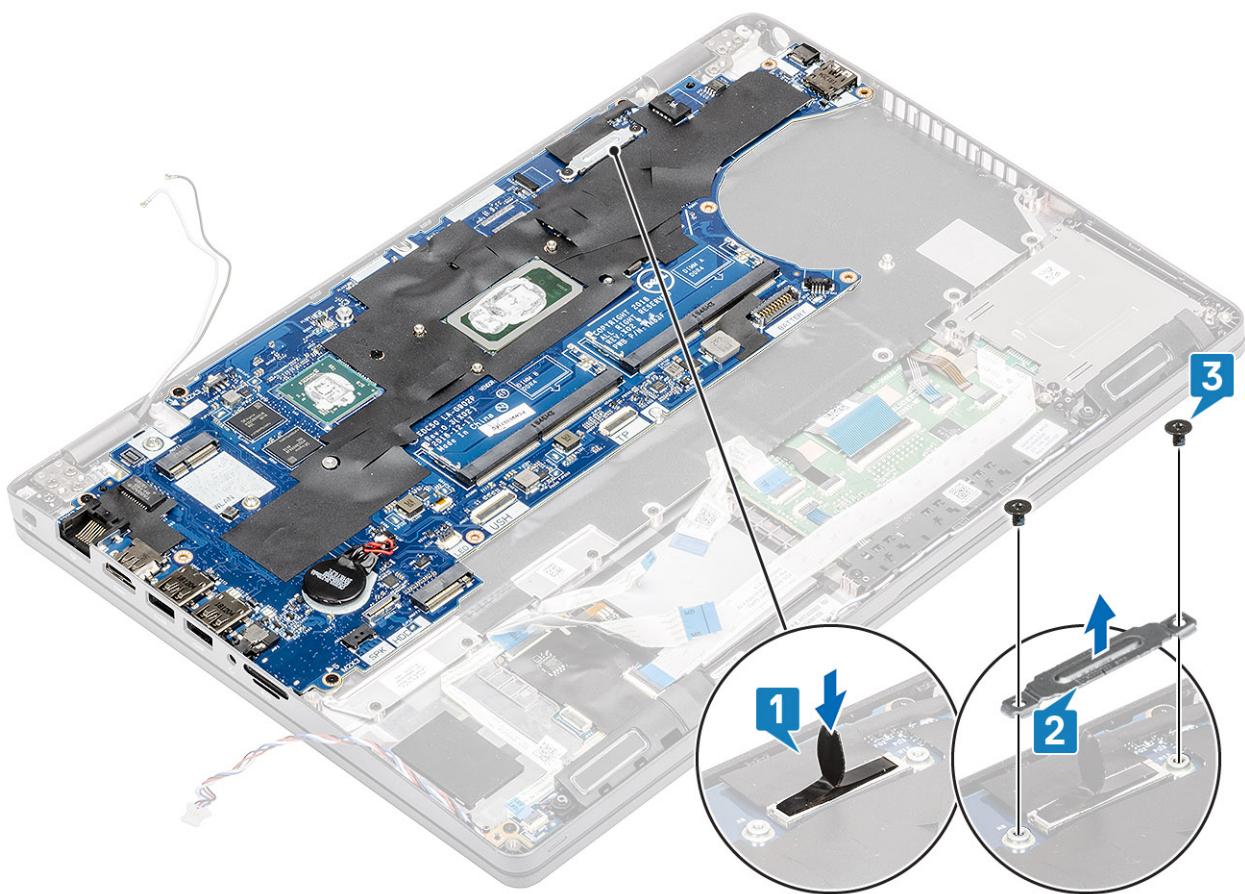
## Installing the system board

### Steps

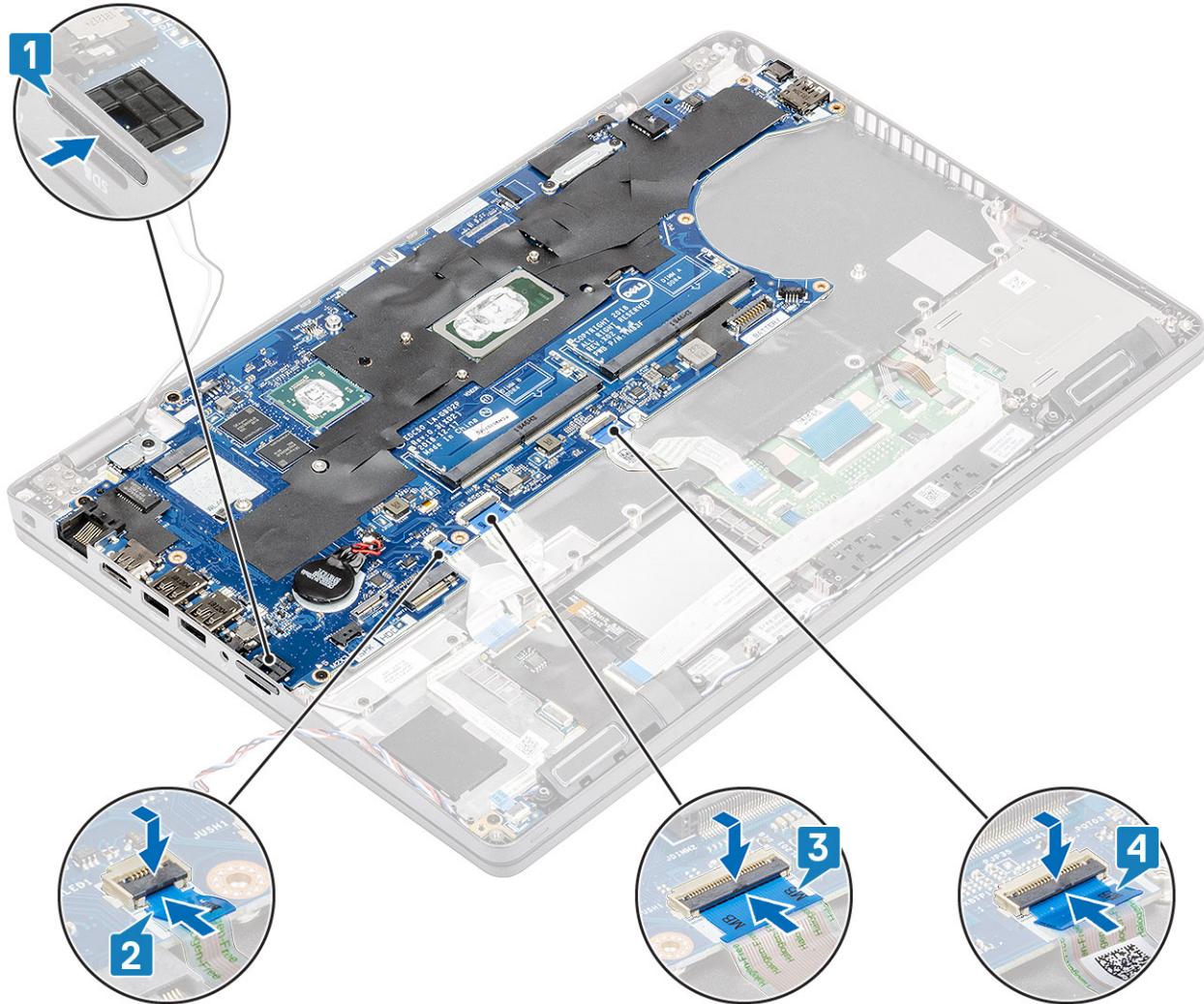
1. Align and place the system board on the computer chassis [1].
2. Replace the five (M2x3) screws to secure the system board to the computer [2].



3. Re-connect the display cable [1].
4. Place the display cable bracket and secure it with the two (M2x2.5) screws [2,3].



5. Replace the card slot tray [1].
6. Re-connect the LED board, USH and touchpad cables to the connector on the system board [2,3,4].



#### Next steps

1. Install the [heatsink](#).
2. Install the [LED board](#).
3. Install the [palmrest bracket](#).
4. Install the [ssd bracket](#).
5. Install the [ssd](#).
6. Install the [battery](#).
7. Install the [base cover](#).
8. Install the [microSD card](#).
9. Follow the procedure in [after working inside your computer](#).

## Coin-cell battery

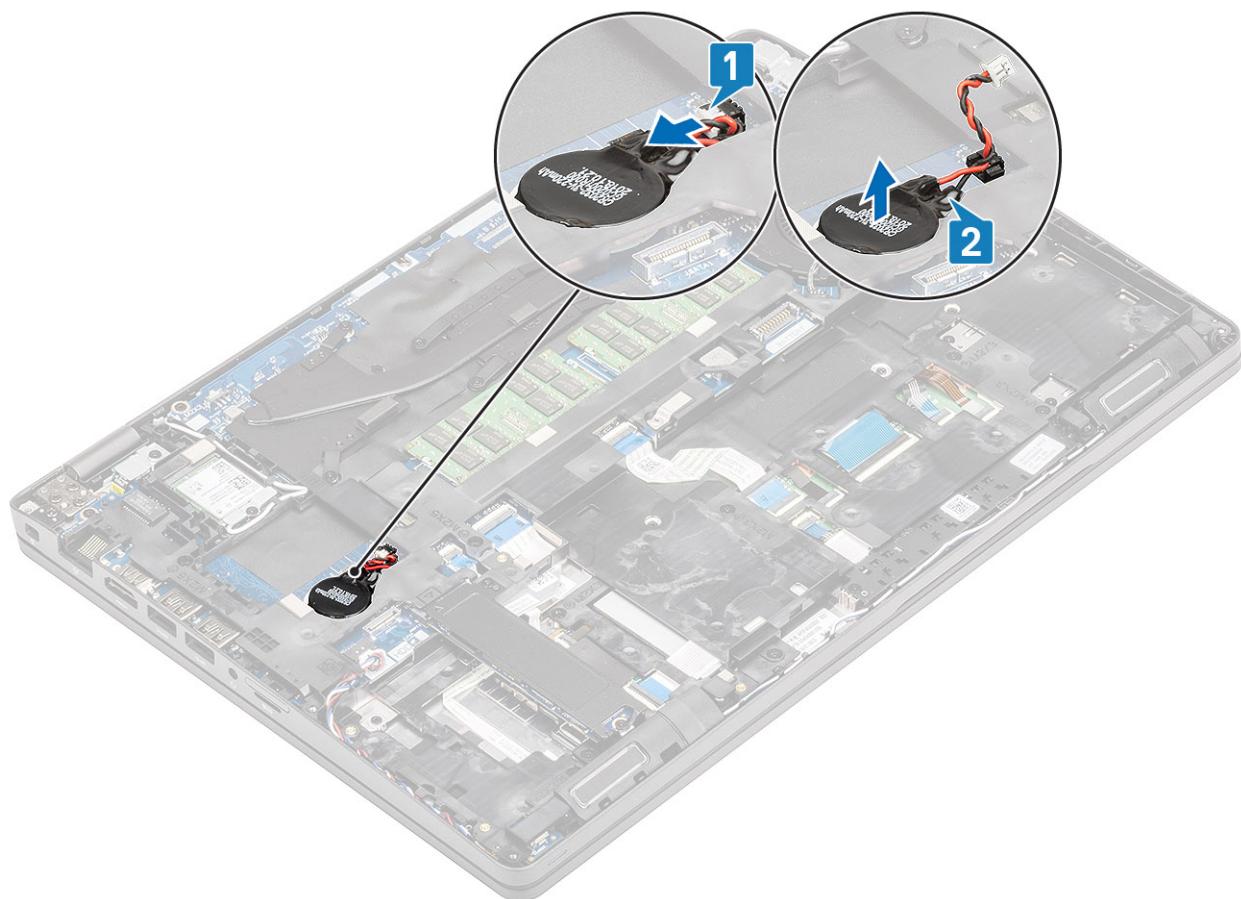
### Removing the coin cell battery

#### 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](#).

## Steps

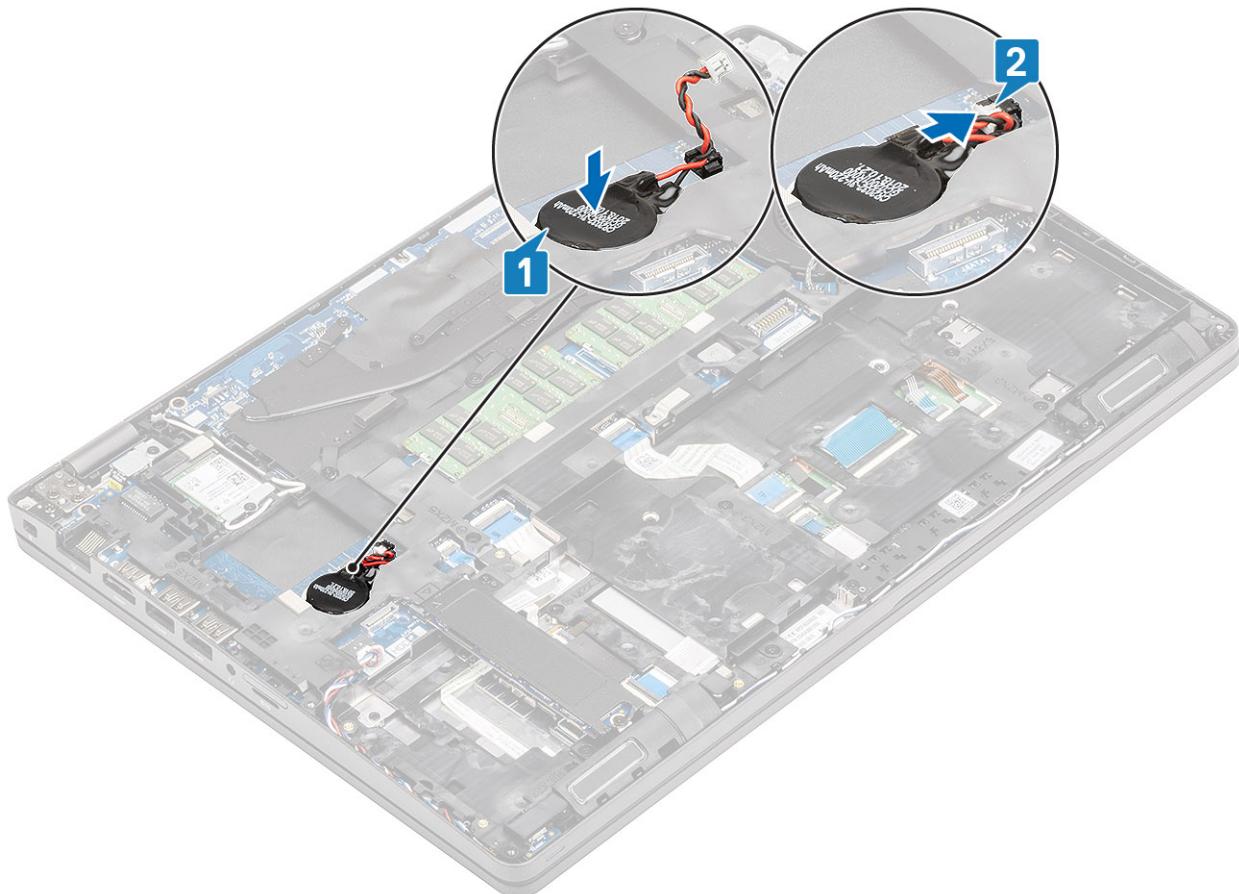
Disconnect the coin cell cable from the connector on the system board [1] and lift it out of the computer [2].



## Installing the coin cell battery

### Steps

Affix the coin cell battery back on the computer [1] and reconnect the coin cell battery cable to the connector on the system board [2].



#### Next steps

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

## Display assembly

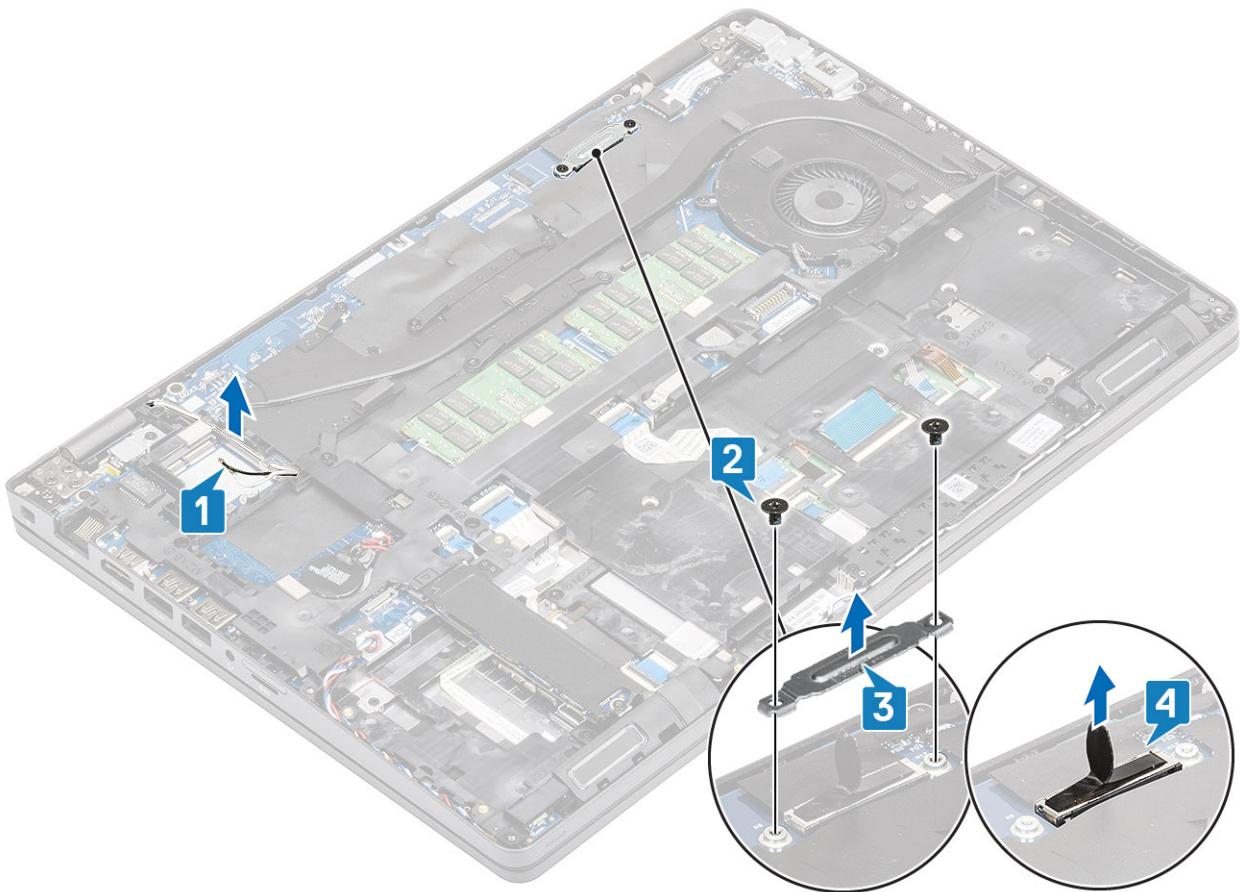
### Removing the LCD assembly

#### Prerequisites

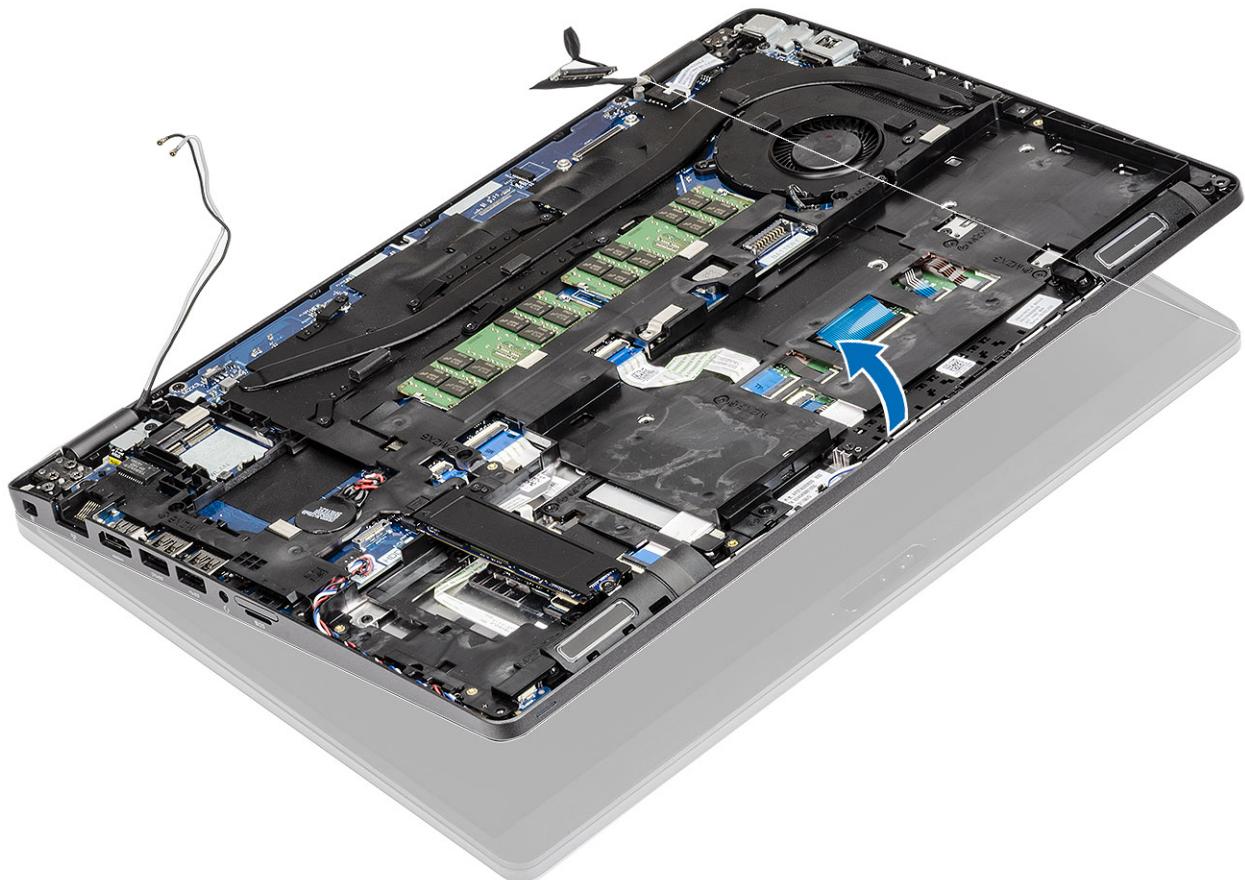
1. Follow the procedure in [before working inside your computer](#)
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [WLAN card](#).

#### Steps

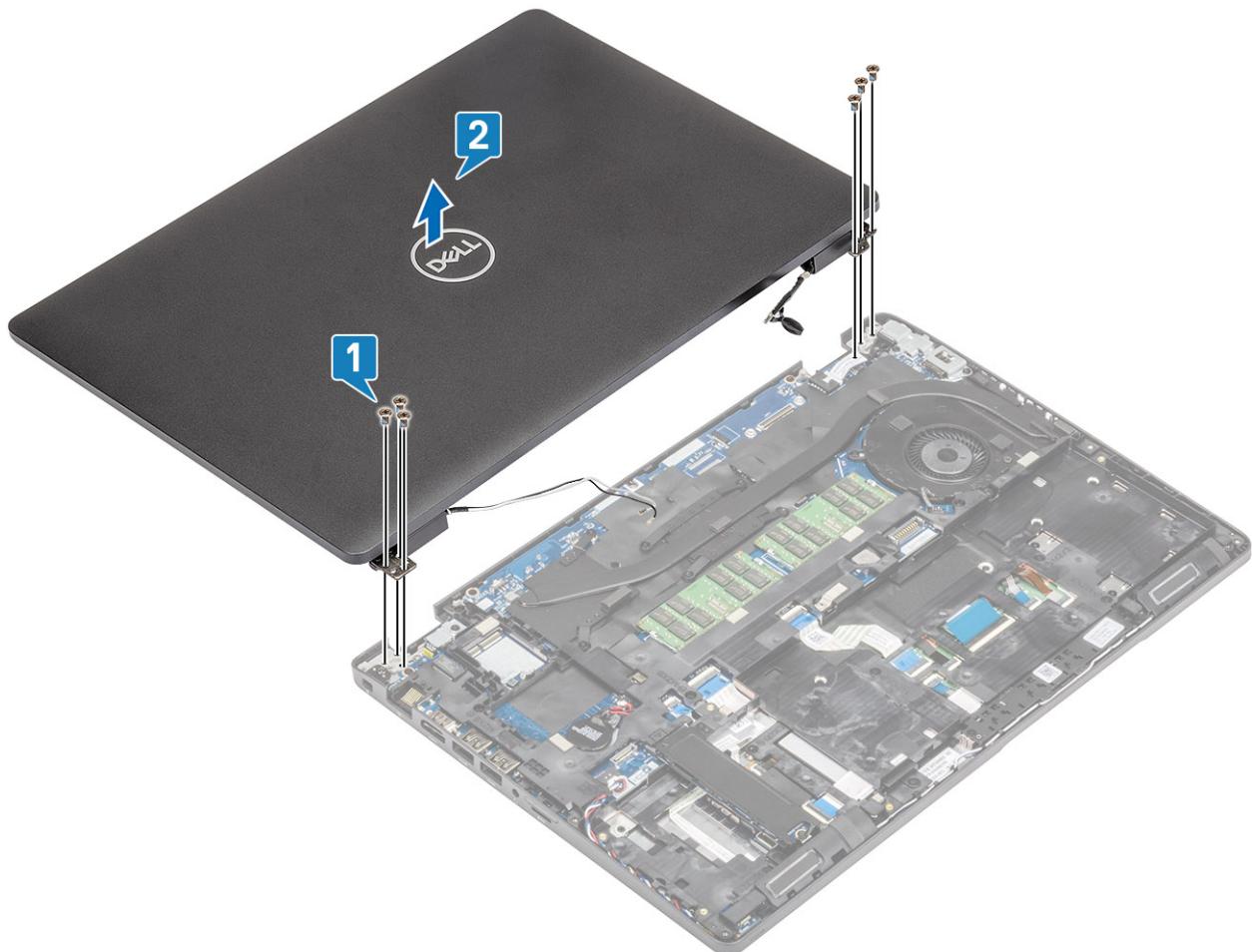
1. Un-route the wireless antenna [1].
2. Remove the twp (M2x3) screws that secure the display cable bracket to the computer [2].



3. Open the system to 180 degrees and place the computer on a flat surface, with the display hinges facing up.



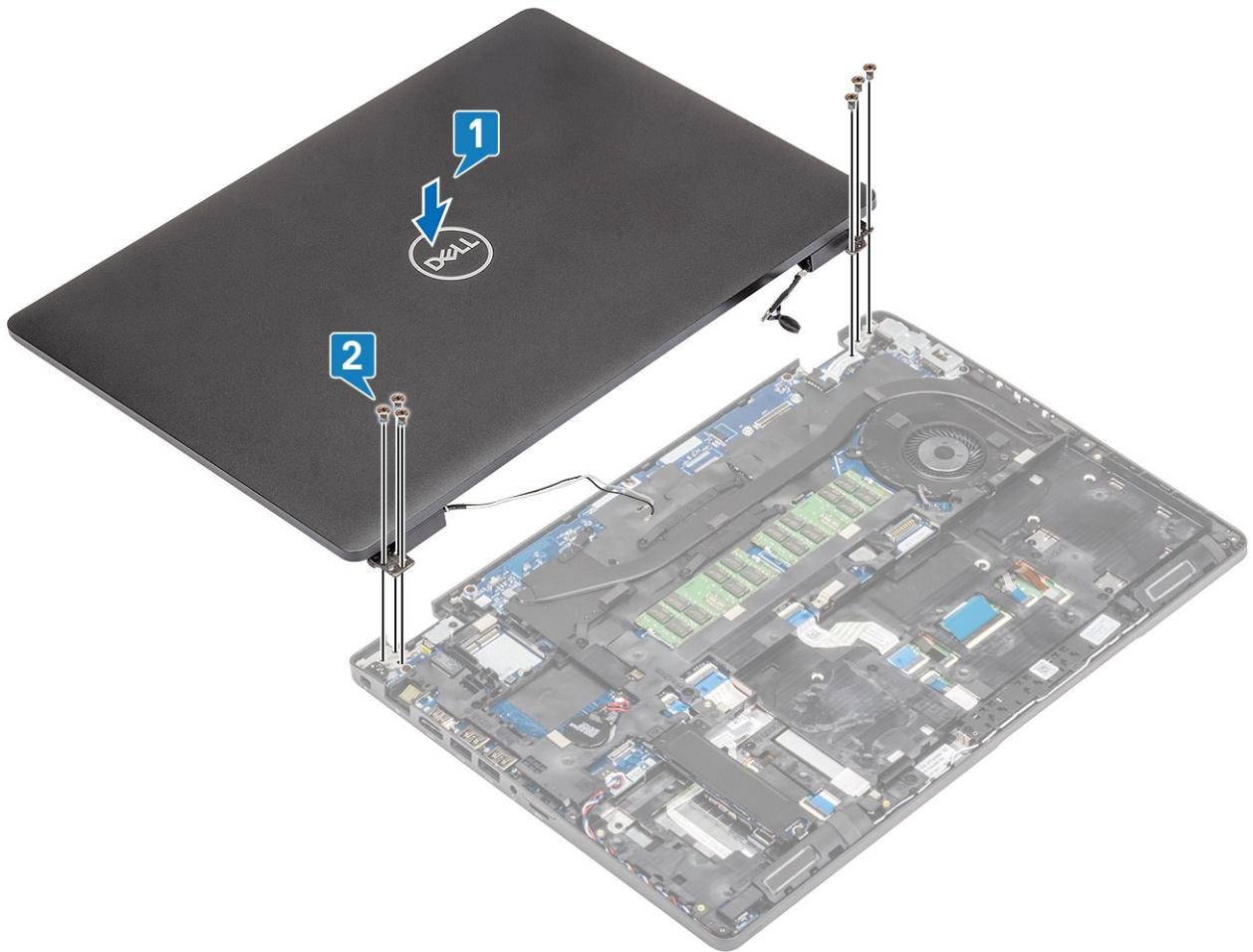
4. Remove the six (M2.5x5.0) display hinge bracket screws that secure the display assembly to the system [1].
5. Lift the display assembly away from the system [2].



## Installing the LCD assembly

### Steps

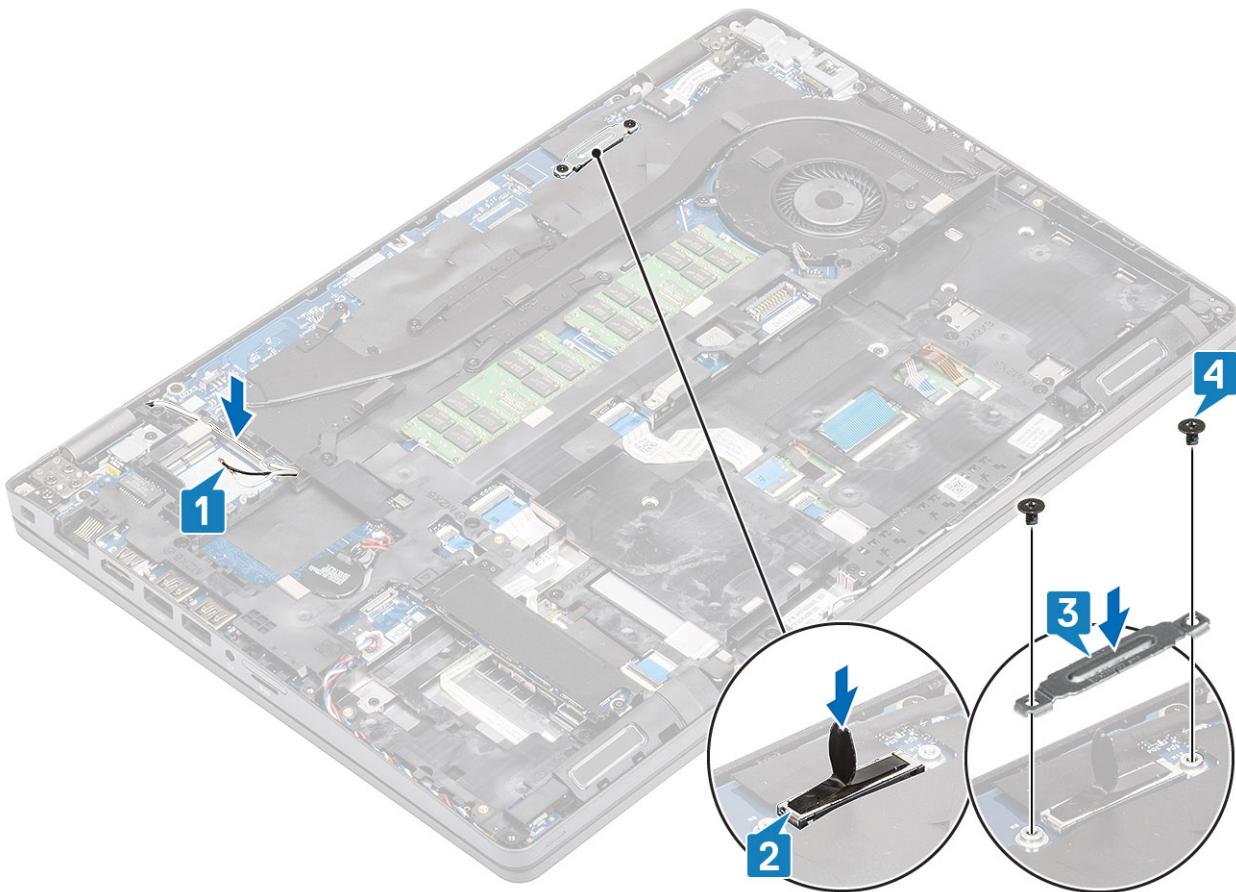
1. Place the chassis on a plane surface.
2. Align the display assembly with the screw holders on the system [1].
3. Replace the six (M2.5x5.0) display hinge screws that secure the display assembly to the system [2].



4. Carefully close the LCD screen.



5. Re-route the wireless antennas [1].
6. Re-connect the display cable to the connector on the system board [2].
7. Place the display cable bracket and secure it with the two (M2x3) screws [3,4].



#### Next steps

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

## Keyboard lattice and Keyboard

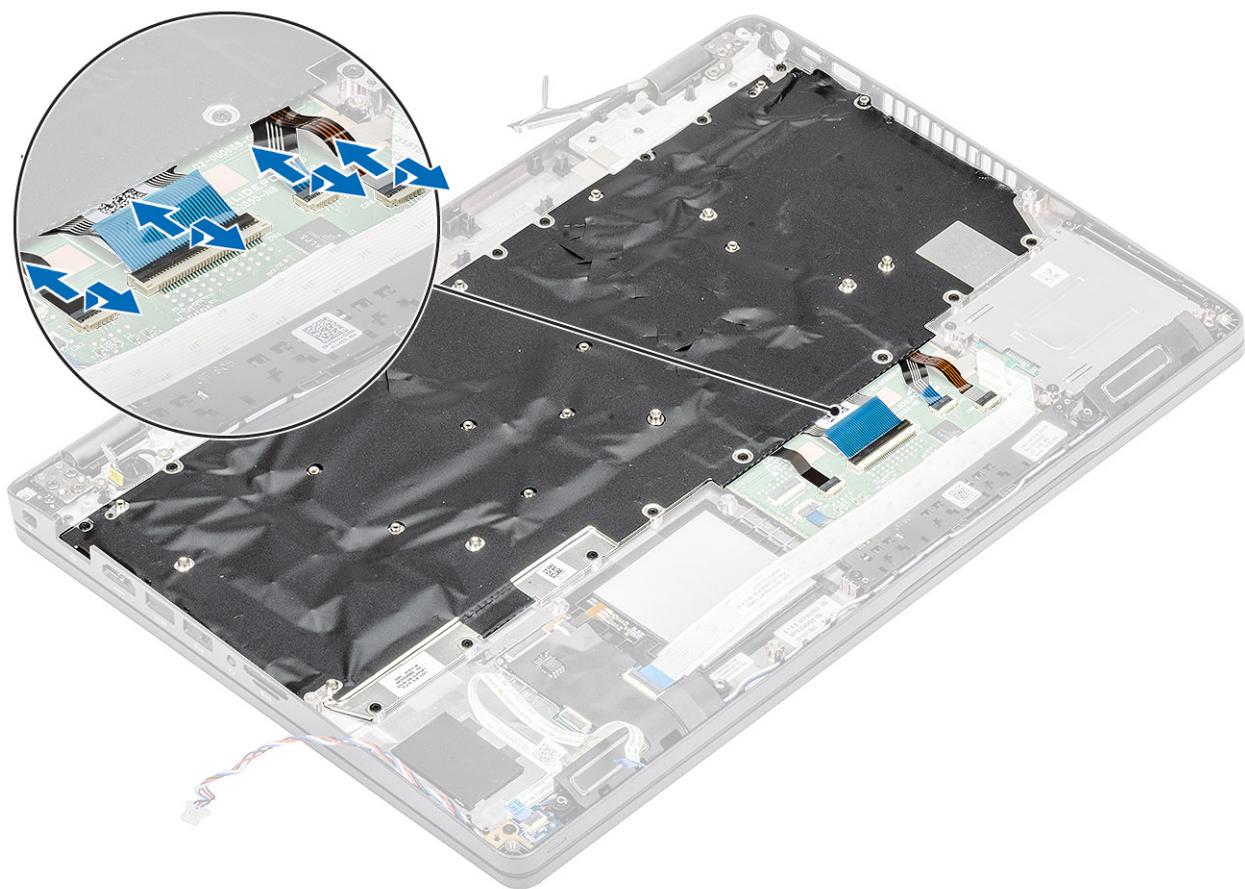
### Removing the keyboard

#### Prerequisites

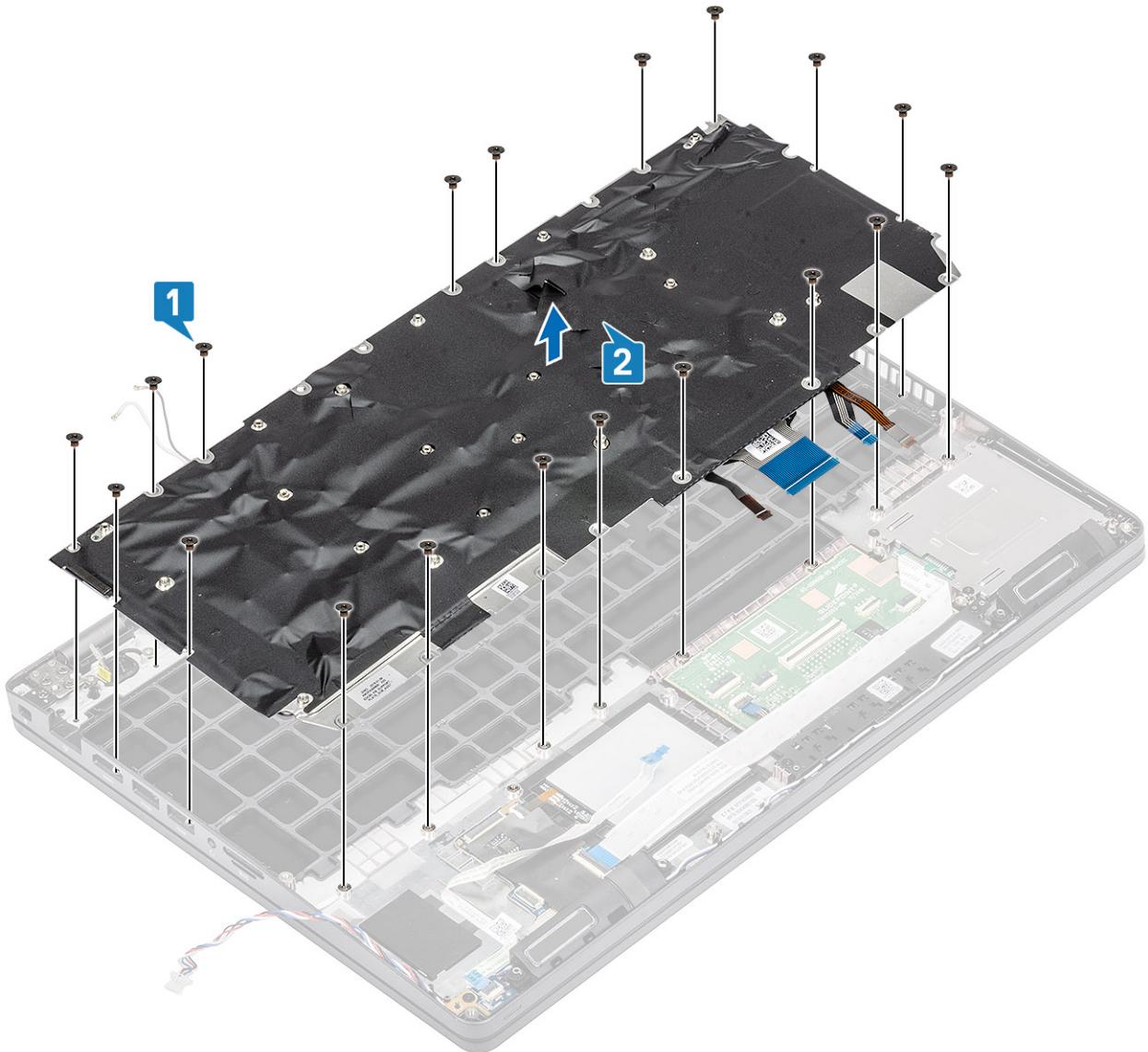
1. Follow the procedure in [before working inside your computer](#)
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [ssd](#).
6. Remove the [ssd bracket](#).
7. Remove the [palmrest bracket](#).
8. Remove the [heatsink](#).
9. Remove the [memory module](#).
10. Remove the [DC-in](#).
11. Remove the [WLAN card](#).
12. Remove the [system board](#).

## Steps

1. Disconnect the backlit cable and the keyboard cable from the touchpad.



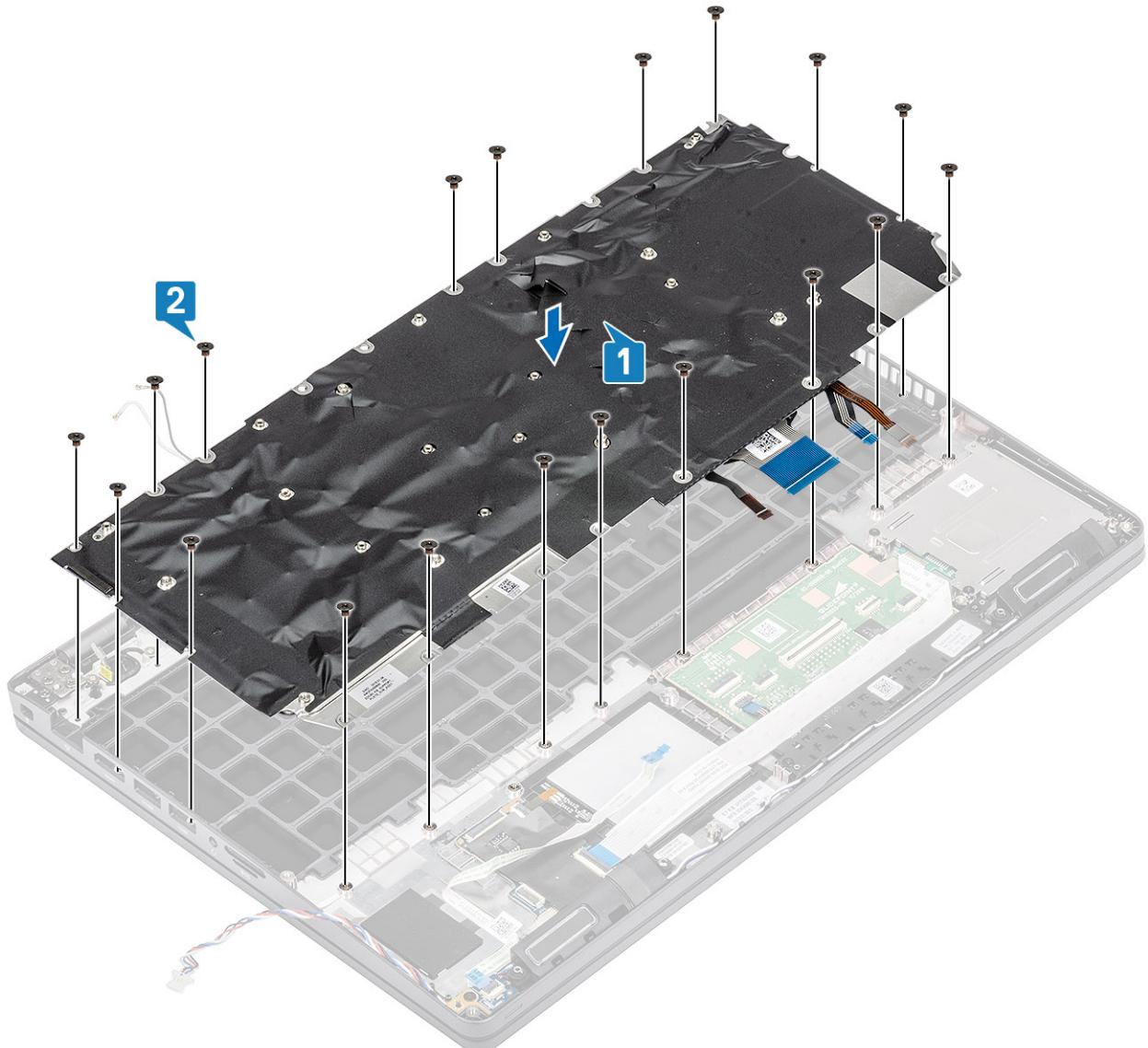
2. Remove the nineteen (M2x2) screws that secure the keyboard [1].
3. Lift the keyboard away from the computer [2].



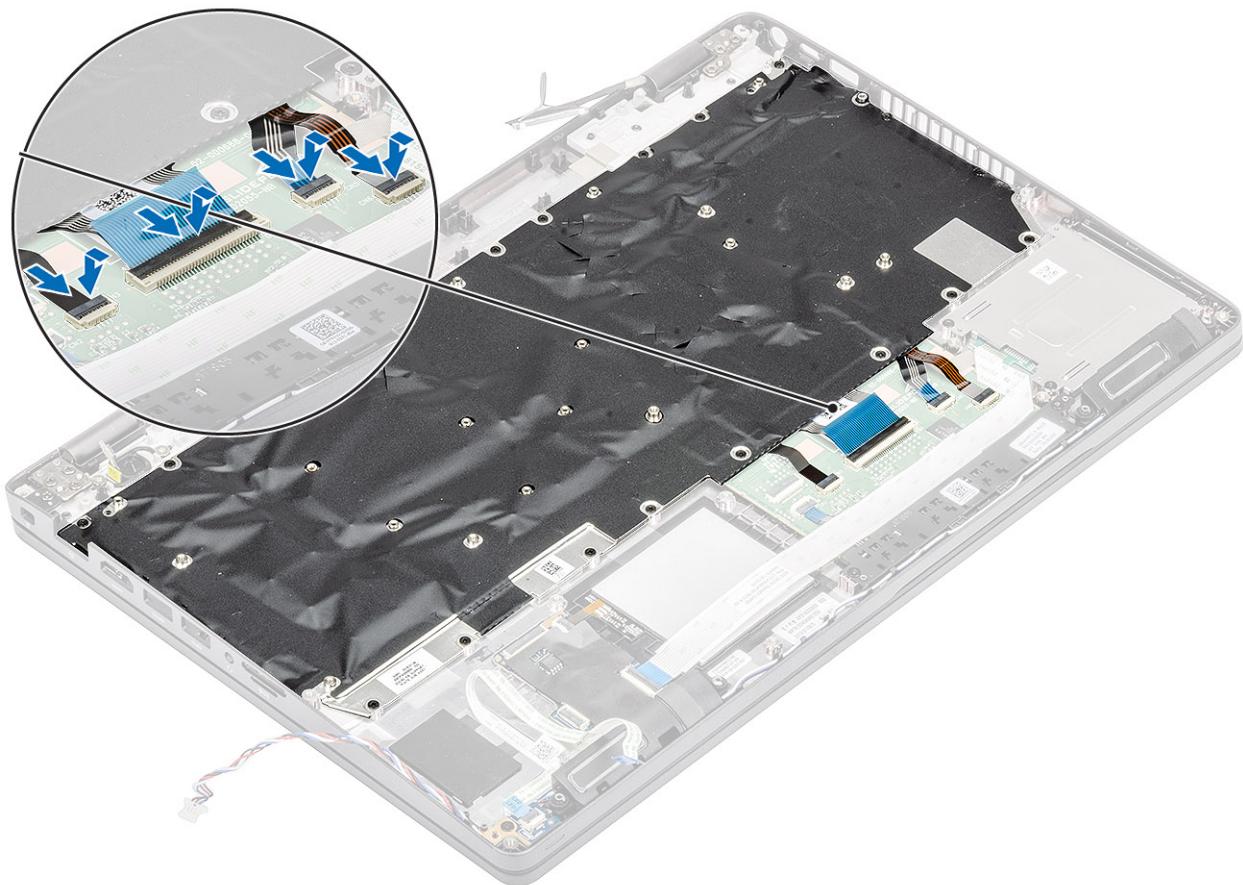
## Installing the keyboard

### Steps

1. Align and place the keyboard on the computer chassis [1].
2. Replace the nineteen (M2x2) screws to secure the keyboard to the computer [2].



3. Reconnect the backlit cable and the keyboard cable to the touchpad.



#### Next steps

1. Install the [system board](#).
2. Install the [WLAN card](#).
3. Install the [Dc-in](#).
4. Install the [memory module](#).
5. Install the [heatsink](#).
6. Install the [palmrest bracket](#).
7. Install the [ssd bracket](#).
8. Install the [ssd](#).
9. Install the [battery](#).
10. Install the [base cover](#).
11. Install the [microSD card](#).
12. Follow the procedure in [after working inside your computer](#).

## Keyboard bracket

### Removing the keyboard bracket

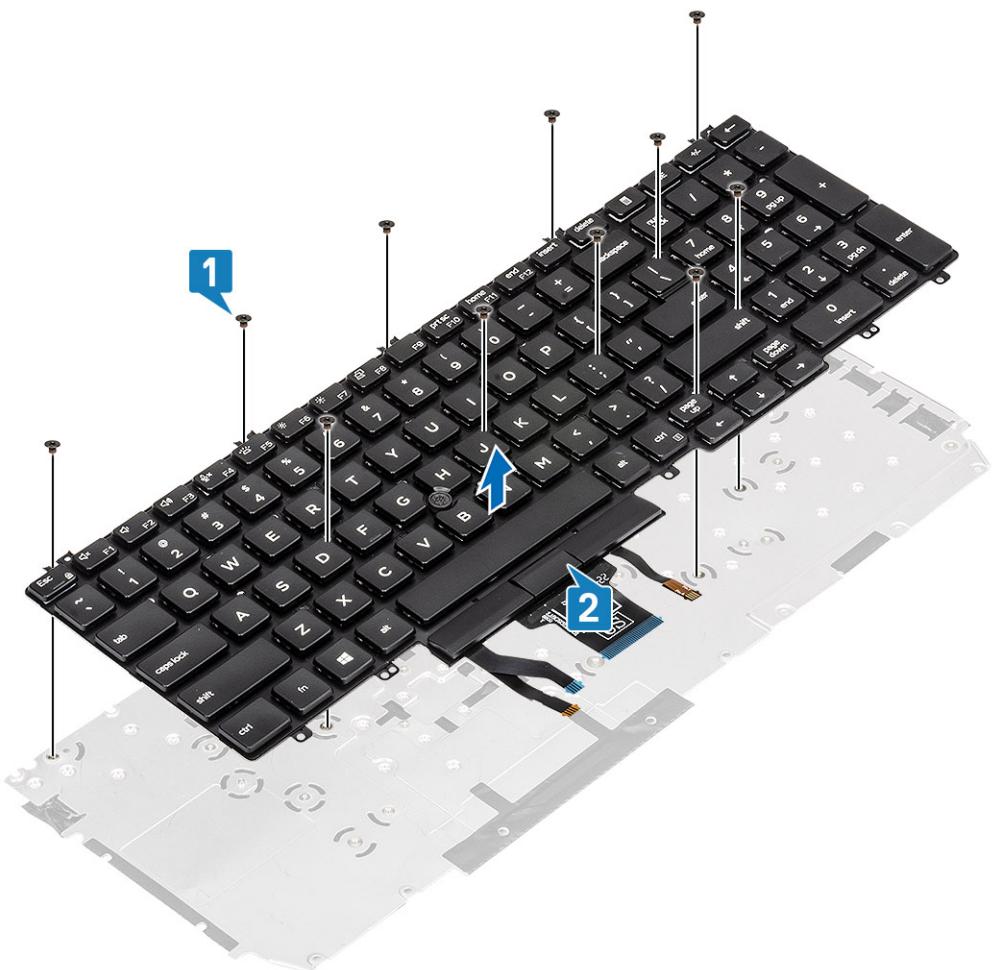
#### Prerequisites

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 [ssd](#).
6. Remove the [ssd bracket](#).

7. Remove the [palmrest bracket](#).
8. Remove the [LED board](#).
9. Remove the [speaker](#).
10. Remove the [heatsink](#).
11. Remove the [memory module](#).
12. Remove the [DC-in](#).
13. Remove the [WLAN card](#).
14. Remove the [system board](#).
15. Remove the [coin cell battery](#).
16. Remove the [keyboard](#).
17. Remove the [SmartCard reader board](#).

### Steps

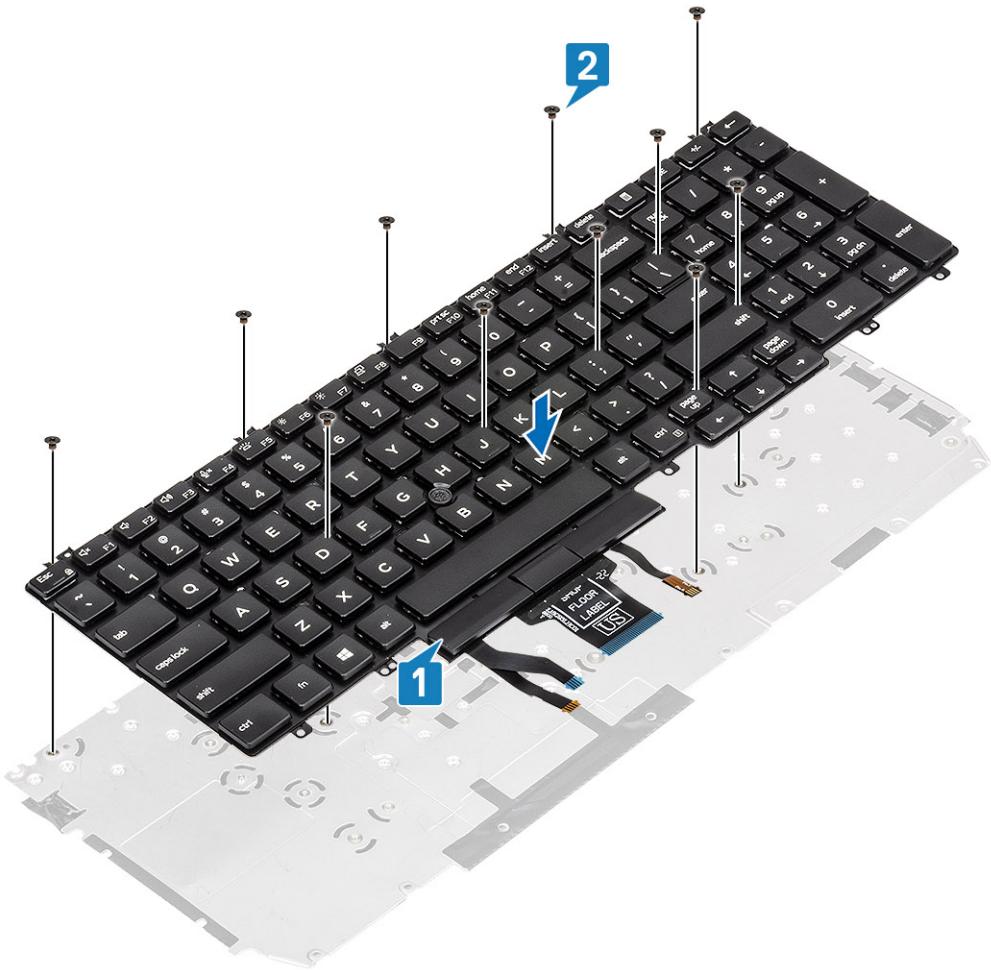
1. Remove the eleven (M2x2) screws that secure the keyboard to the keyboard bracket [1].
2. Remove the keyboard from the keyboard bracket [2].



## Installing the keyboard bracket

### Steps

1. Align and place the keyboard on the keyboard bracket [1].
2. Replace the 12 (M2x2) screws to secure the keyboard on the keyboard bracket [2].



### Next steps

1. Install the [SmartCard reader board](#).
2. Install the [keyboard](#).
3. Install the [coin cell battery](#).
4. Install the [system board](#).
5. Install the [WLAN card](#).
6. Install the [Dc-in](#).
7. Install the [memory module](#).
8. Install the [heatsink](#).
9. Install the [speaker](#).
10. Install the [LED board](#).
11. Install the [palmrest bracket](#).
12. Install the [ssd bracket](#).
13. Install the [ssd](#).
14. Install the [battery](#).
15. Install the [base cover](#).
16. Install the [microSD card](#).
17. Follow the procedure in [after working inside your computer](#).

# Smart card reader board

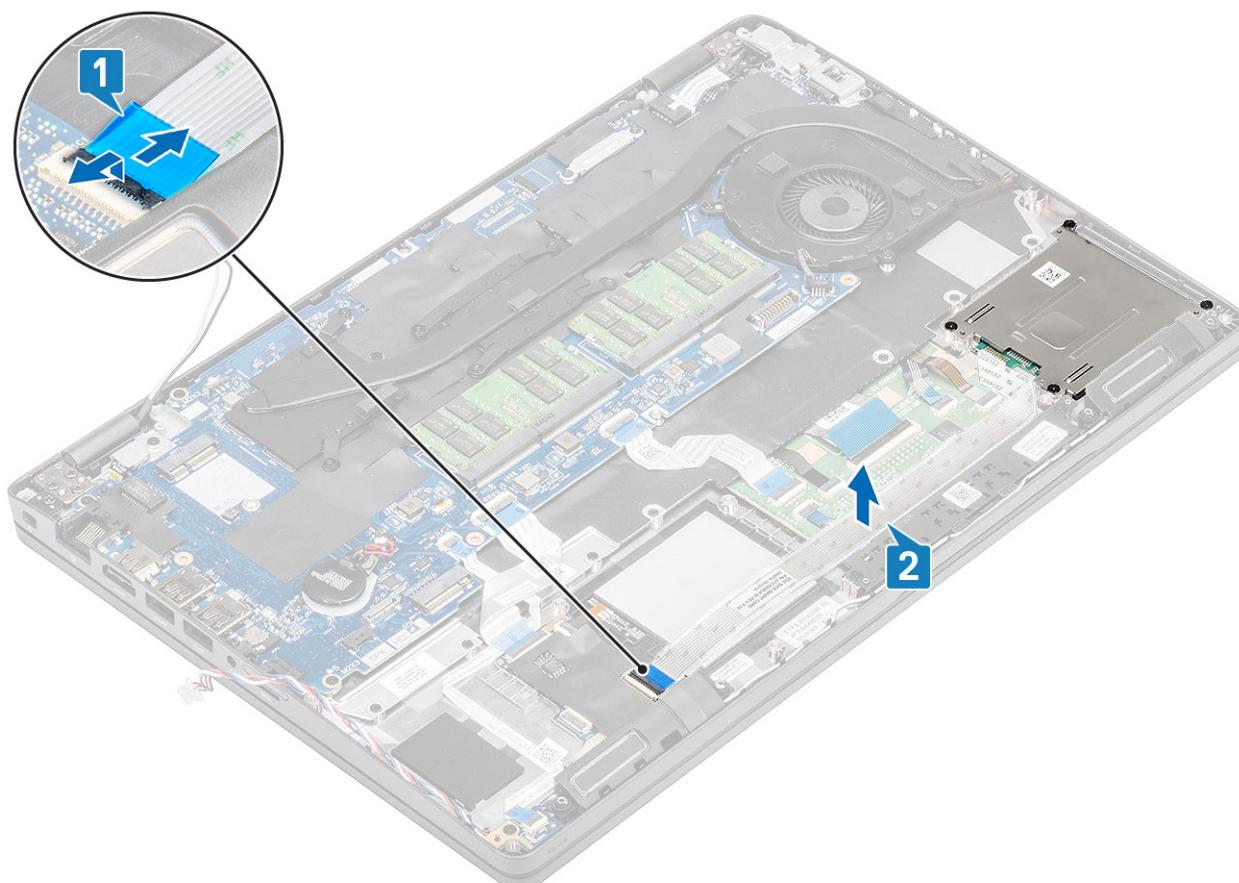
## Removing the smart card reader

### Prerequisites

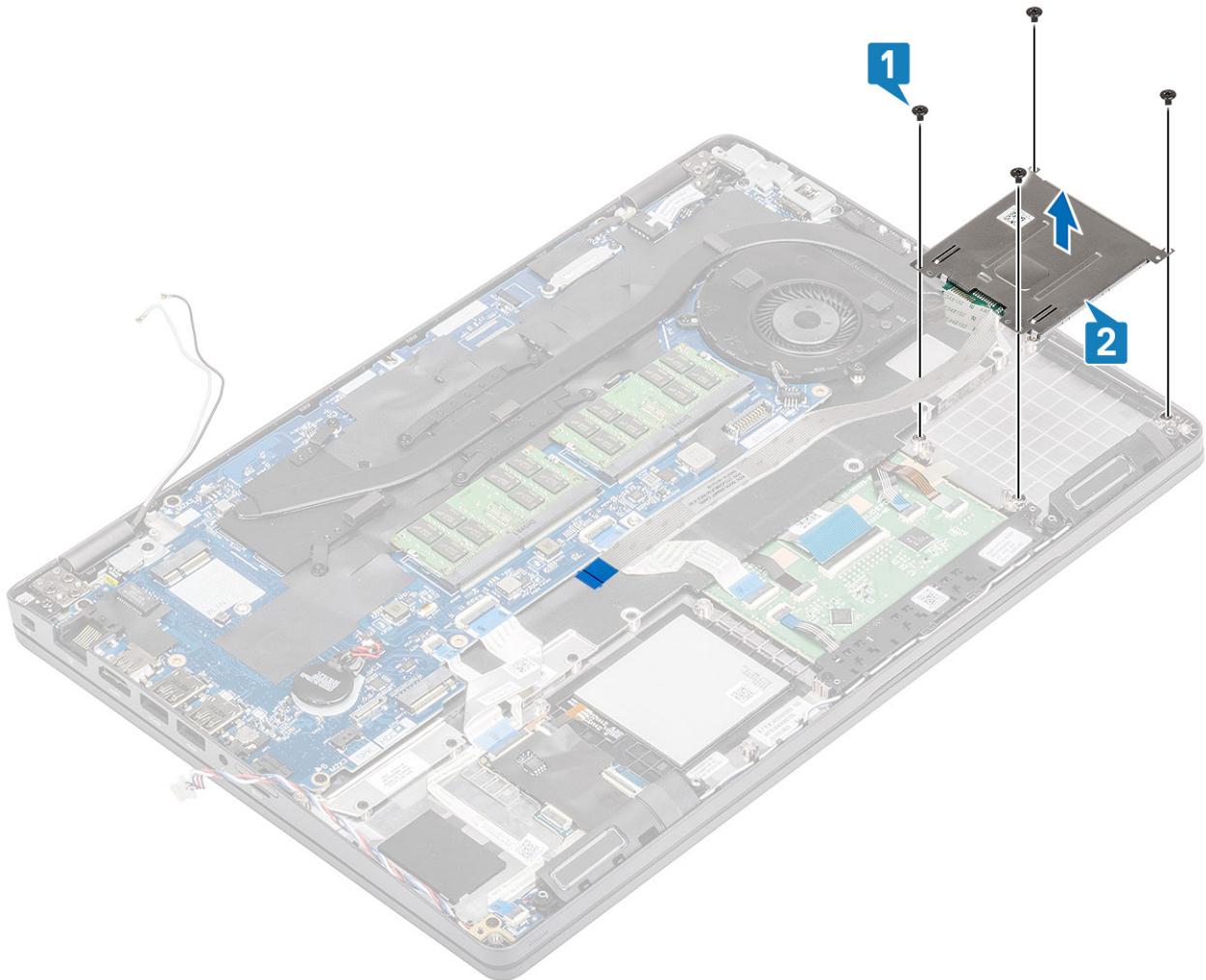
1. Follow the procedure in [before working inside your computer](#)
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [ssd](#).
6. Remove the [ssd bracket](#).
7. Remove the [palmrest bracket](#).

### Steps

1. Disconnect and un-route the smart card reader cable [1].



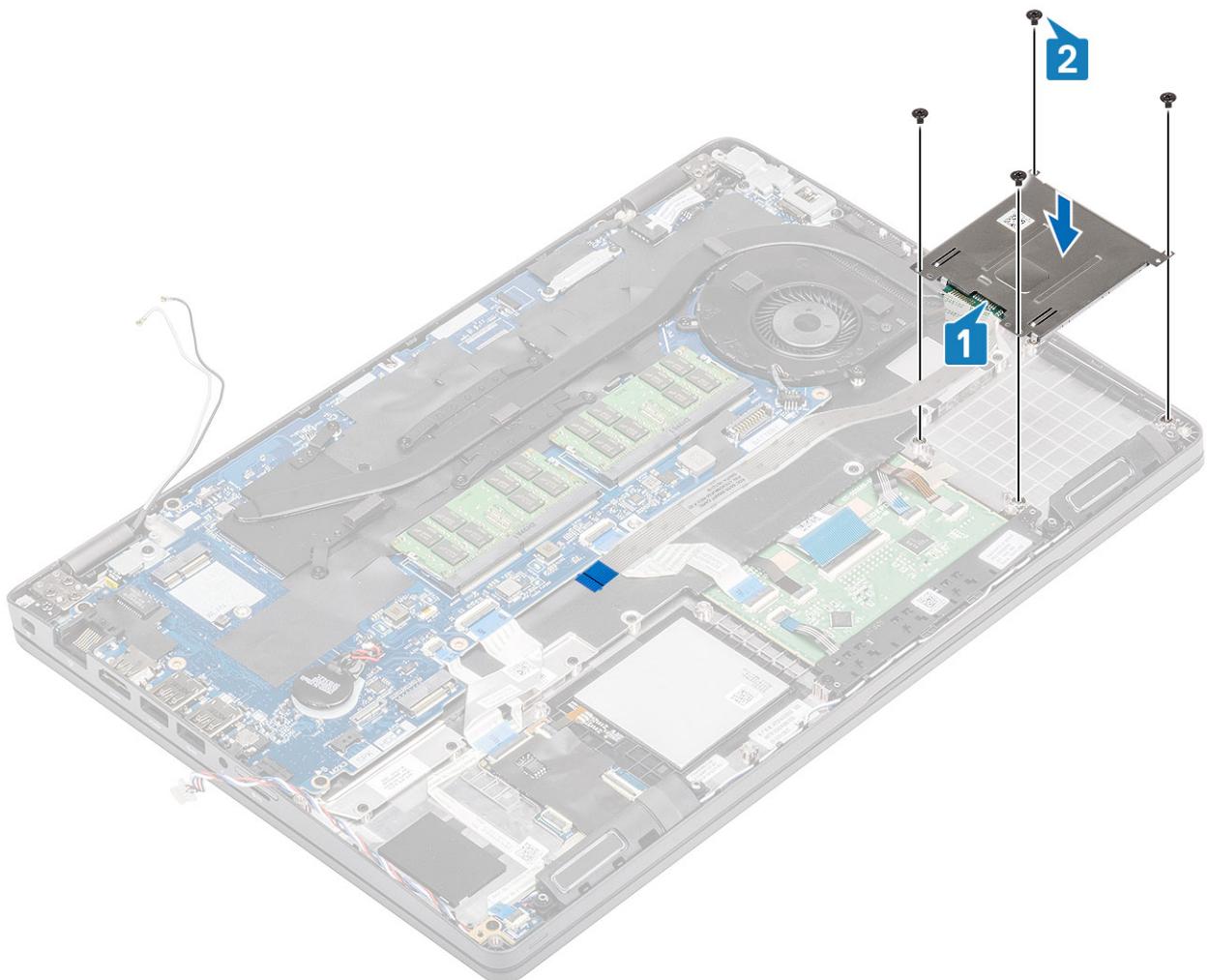
2. Remove the four (M2x2.5) screws that secure the smart card reader module to the computer [1].
3. Lift the smart card reader module out of the computer [2].



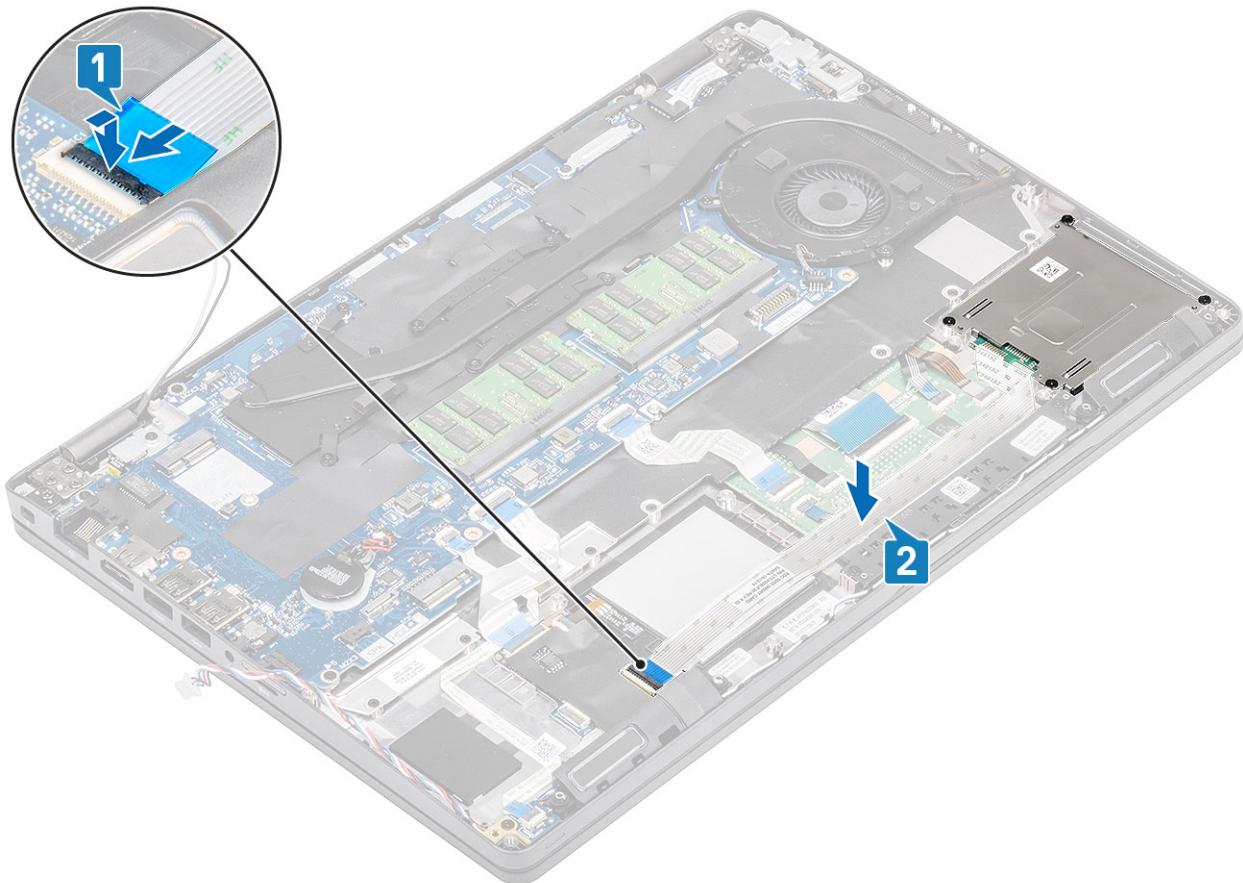
## Installing the smart card reader

### Steps

1. Align and place the smart card reader module into the computer chassis [1].
2. Replace the four (M2x2.5) screws to secure the smart card reader module to the computer [2].



3. Re-connect the smart card reader cable to the system board and secure the cable to the computer [1,2].



#### Next steps

1. Install the [palmrest bracket](#).
2. Install the [ssd bracket](#).
3. Install the [ssd](#).
4. Install the [battery](#).
5. Install the [base cover](#).
6. Install the [microSD card](#).
7. Follow the procedure in [after working inside your computer](#).

## Display bezel

### Removing the display bezel

#### Prerequisites

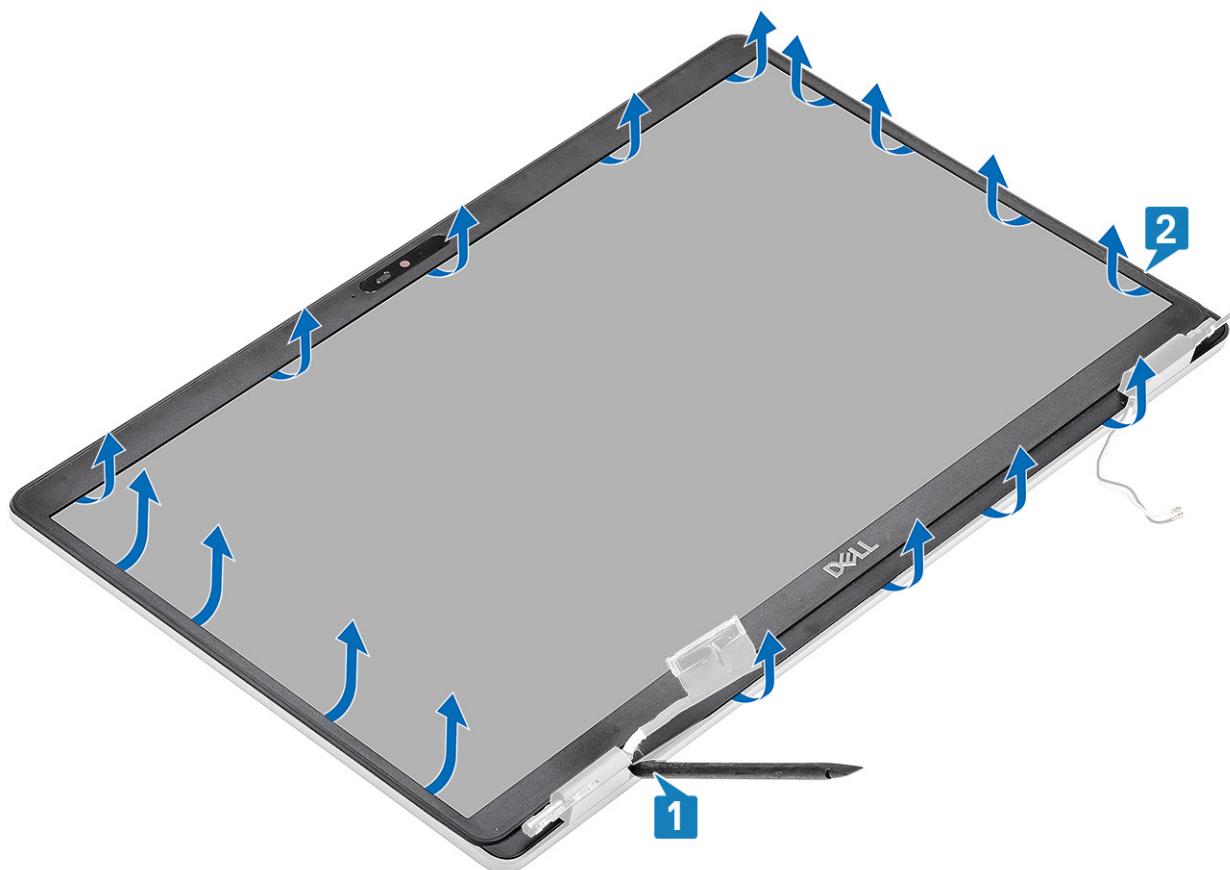
1. Follow the procedure in [before working inside your computer](#)
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [display assembly](#)

#### Steps

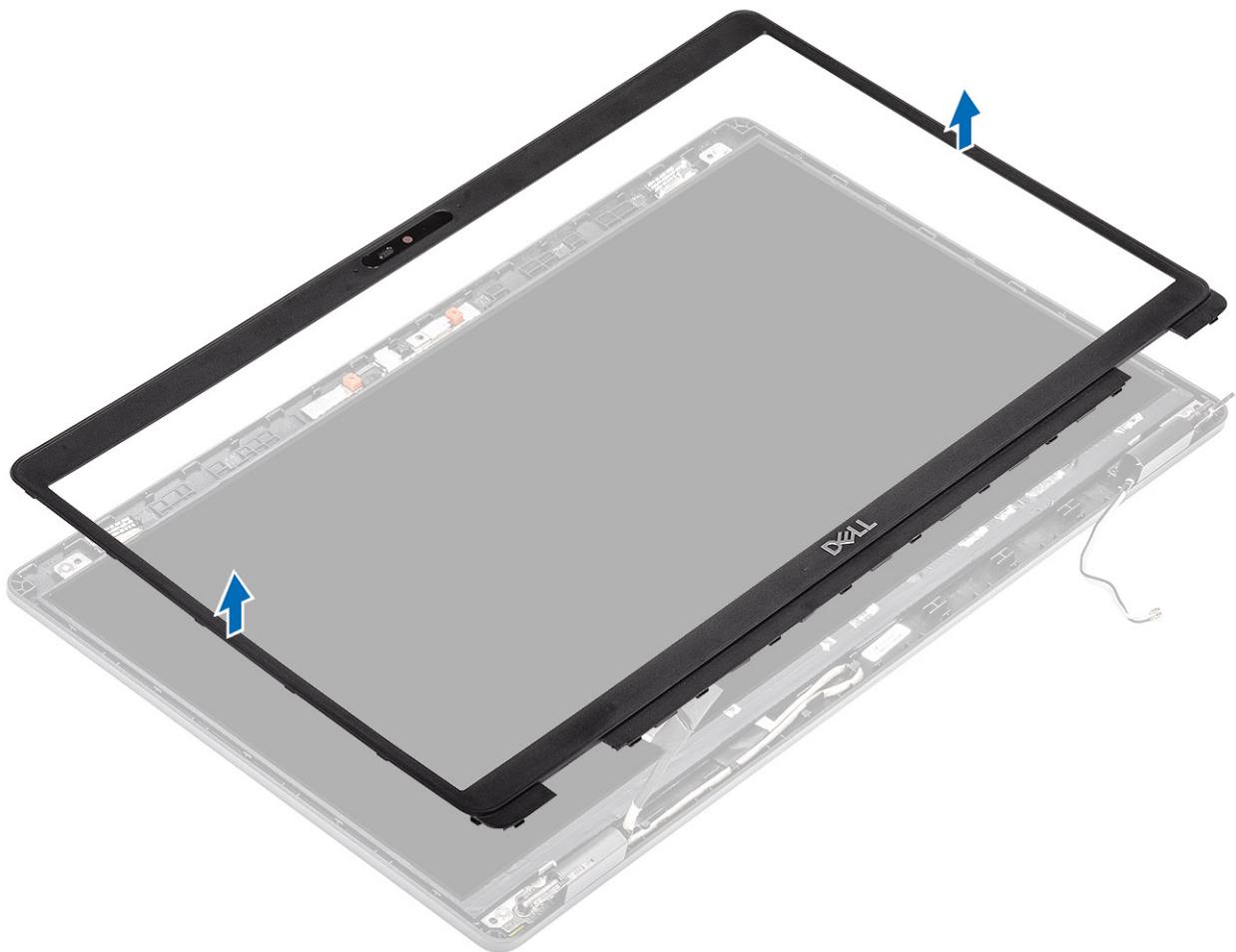
1. **i | NOTE: Display bezel cannot be reused after being removed.**

Use a plastic scribe to carefully pry open the recesses near the left and right hinges on the bottom edge of the display bezel [1].

2. Carefully pry open the inside edge of the display bezel and then pry open the inside edge of the left and right sides of the display bezel [2].



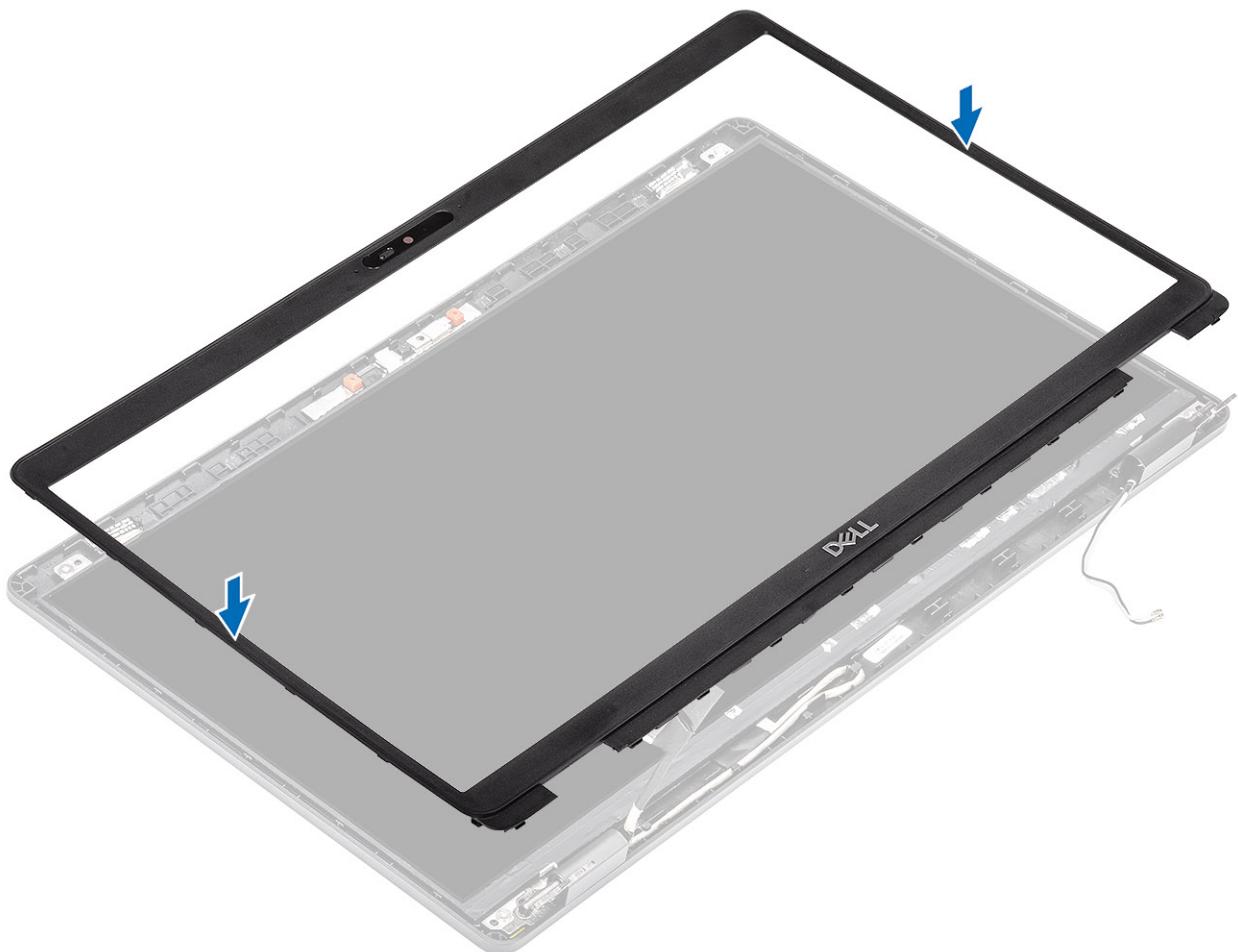
3. Lift the display bezel from the display assembly.



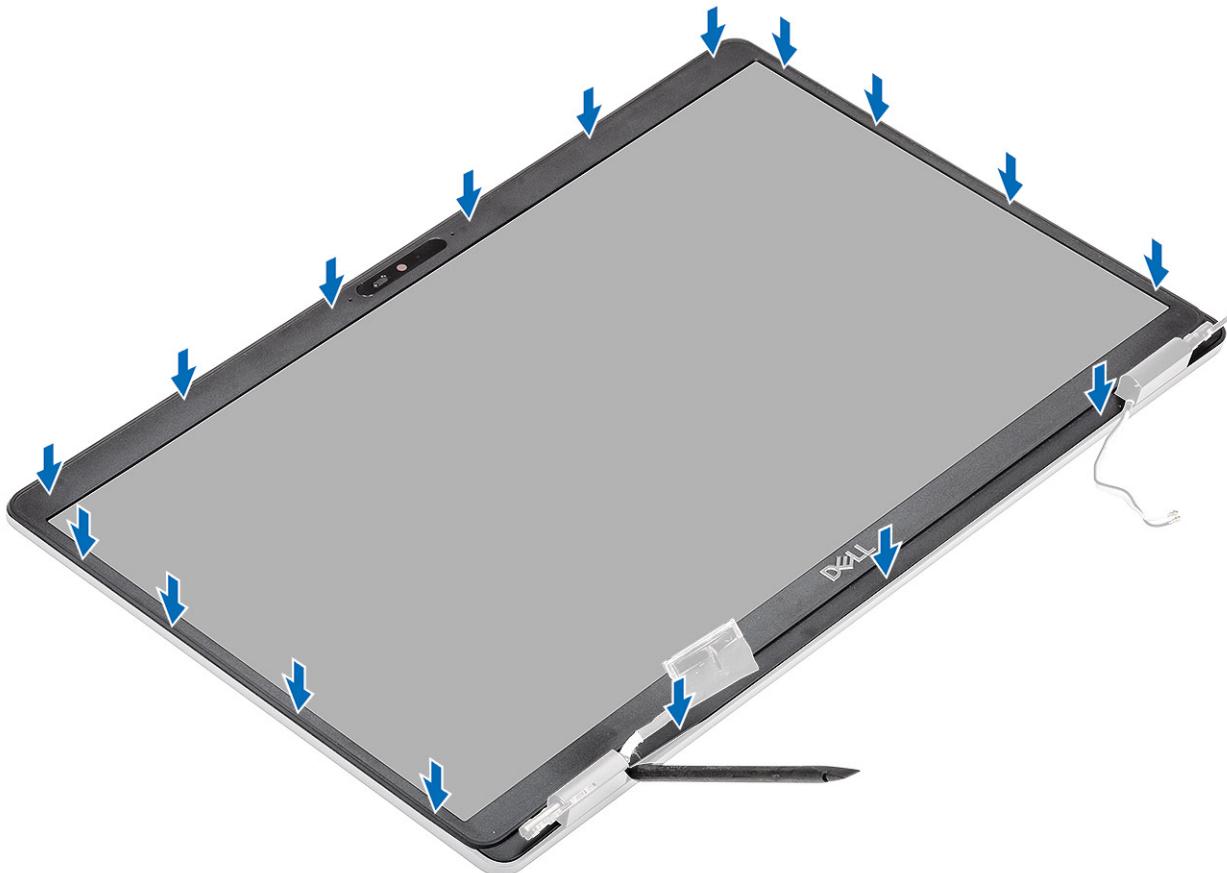
## Installing the display bezel

### Steps

1. Align and place the display bezel on the display assembly.



2. Gently snap the display bezel into place.



#### Next steps

1. Install the [display assembly](#).
2. Install the [battery](#).
3. Install the [base cover](#).
4. Install the [microSD card](#).
5. Follow the procedure in [after working inside your computer](#).

## Hinge caps

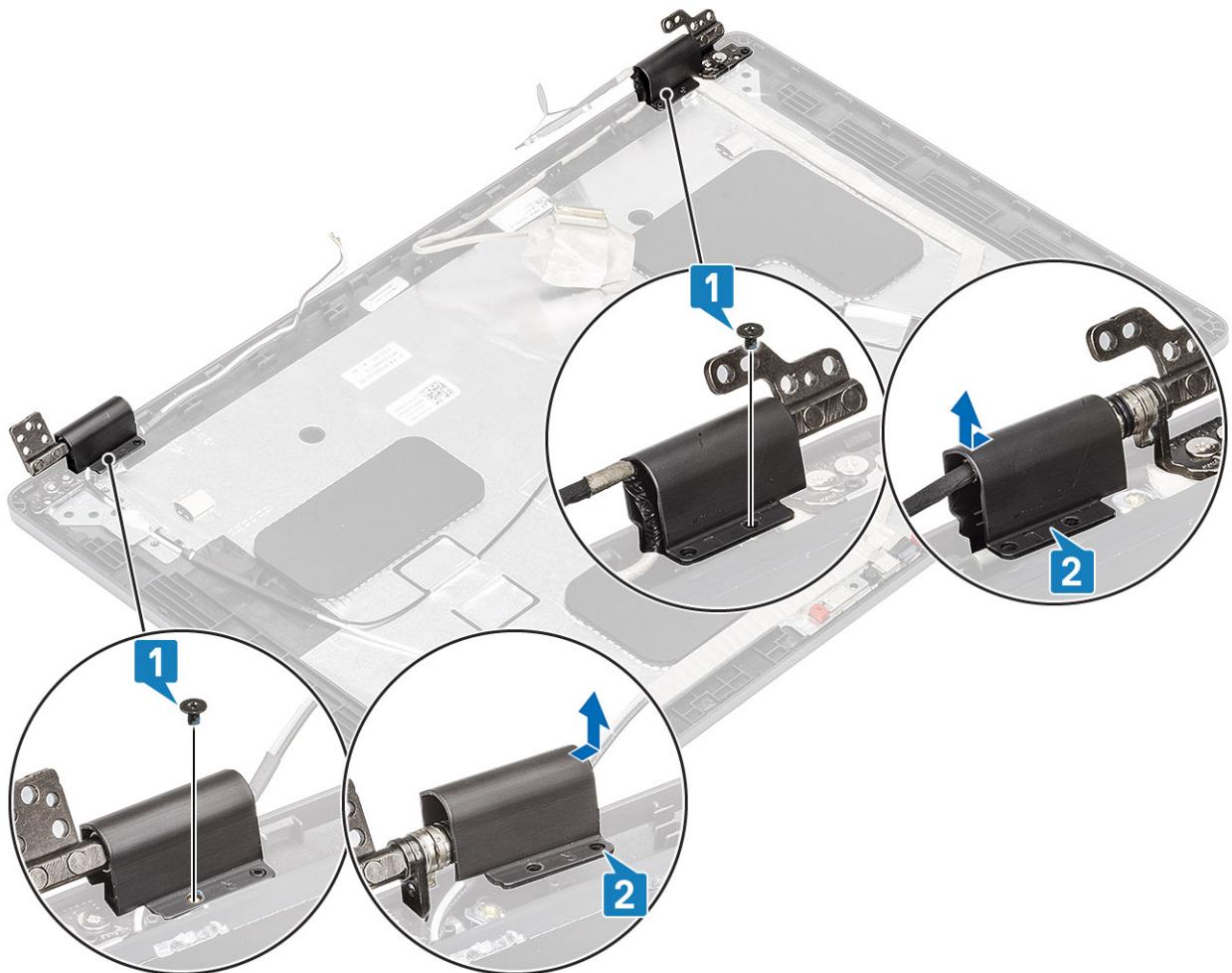
### Removing hinge caps

#### 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 [display assembly](#)
6. Remove the [display bezel](#).

#### Steps

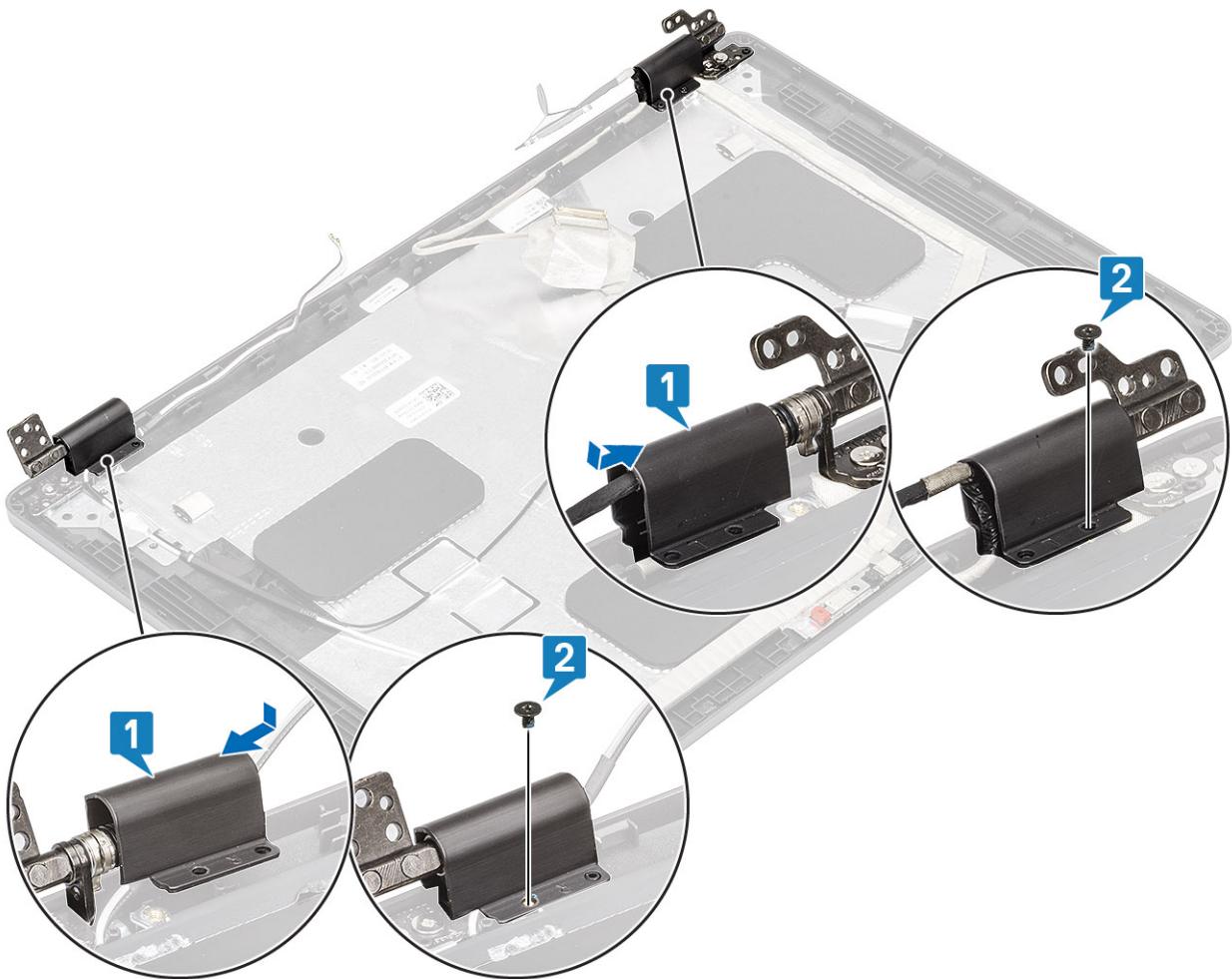
1. Remove the two (M2x2.5) screws that secure the hinge caps to the chassis [1].
2. Pinch the hinge caps to release the hinge caps from the ribs on the display back cover and then slide inwards to remove the hinge caps from the display hinge [2].



## Installing hinge caps

### Steps

1. Place the hinge caps and slide outward on the display hinges [1].
2. Replace the two (M2x2.5) screws to secure the hinge caps to the display hinge [2].



#### Next steps

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

## Display hinges

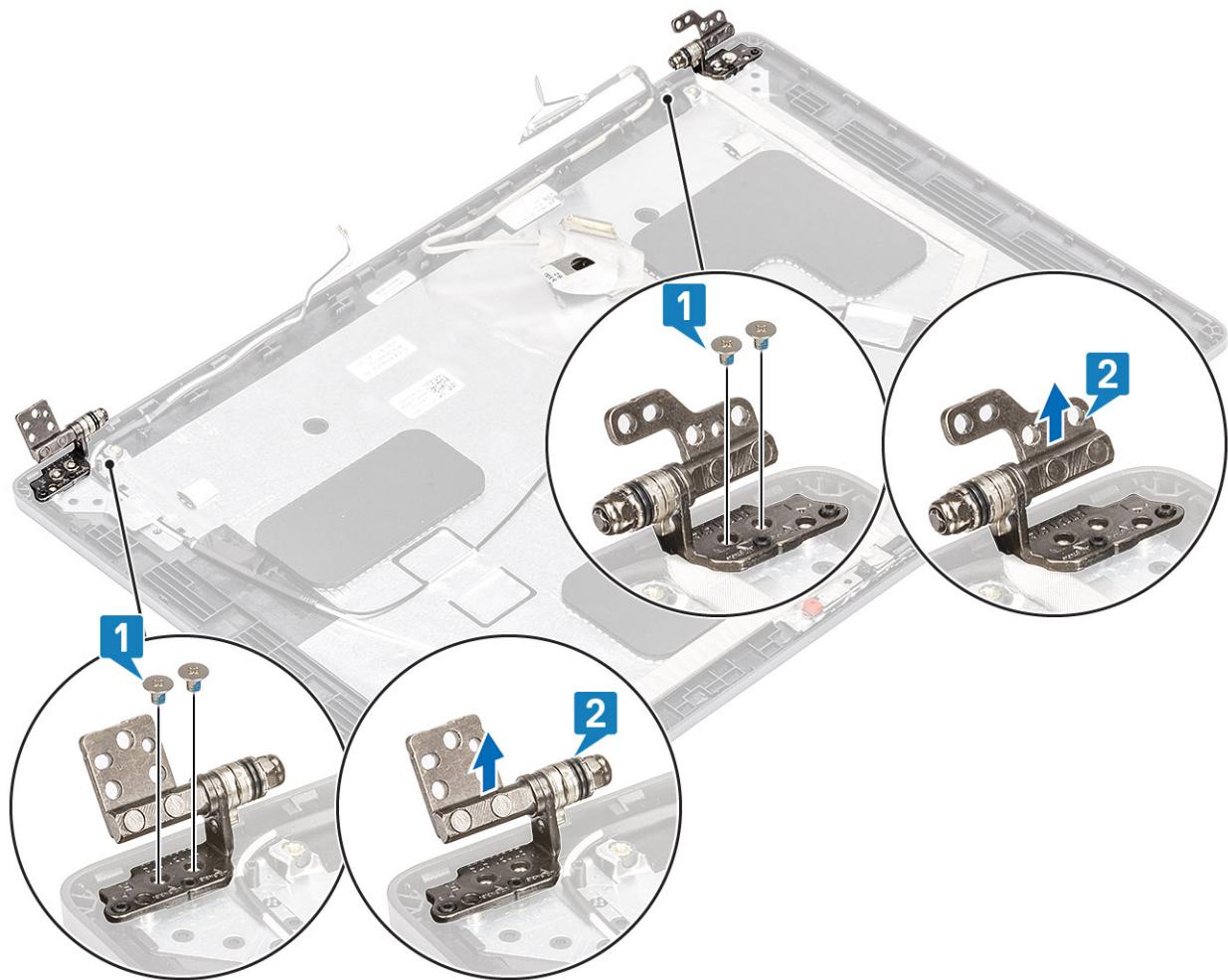
### Removing display hinge

#### 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 [display assembly](#)
6. Remove the [display bezel](#).
7. Remove the [hinge caps](#).

## Steps

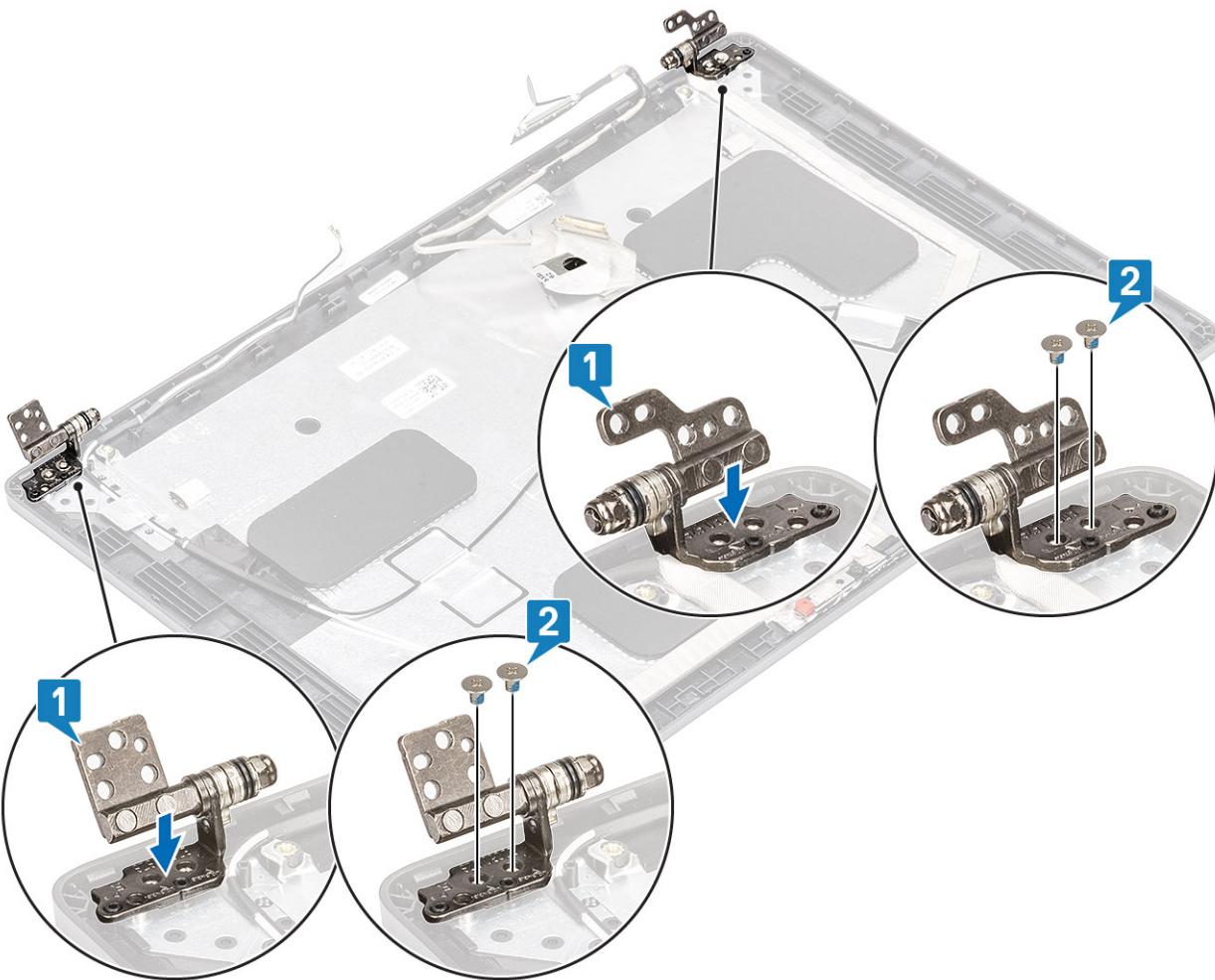
1. Remove the four (M2.5x3.5) screws that secure the display hinge to the display assembly [1].
2. Remove the display hinges from the display back cover [2].



## Installing display hinge

### Steps

1. Align and place the display hinge on the display assembly.
2. Replace the four (M2.5x3.5) screws to secure the display hinge to the display assembly.



#### Next steps

1. Install the [hinge caps](#).
2. Install the [display bezel](#).
3. Install the [display assembly](#).
4. Install the [battery](#).
5. Install the [base cover](#).
6. Install the [microSD card](#).
7. Follow the procedure in [after working inside your computer](#).

## Display panel

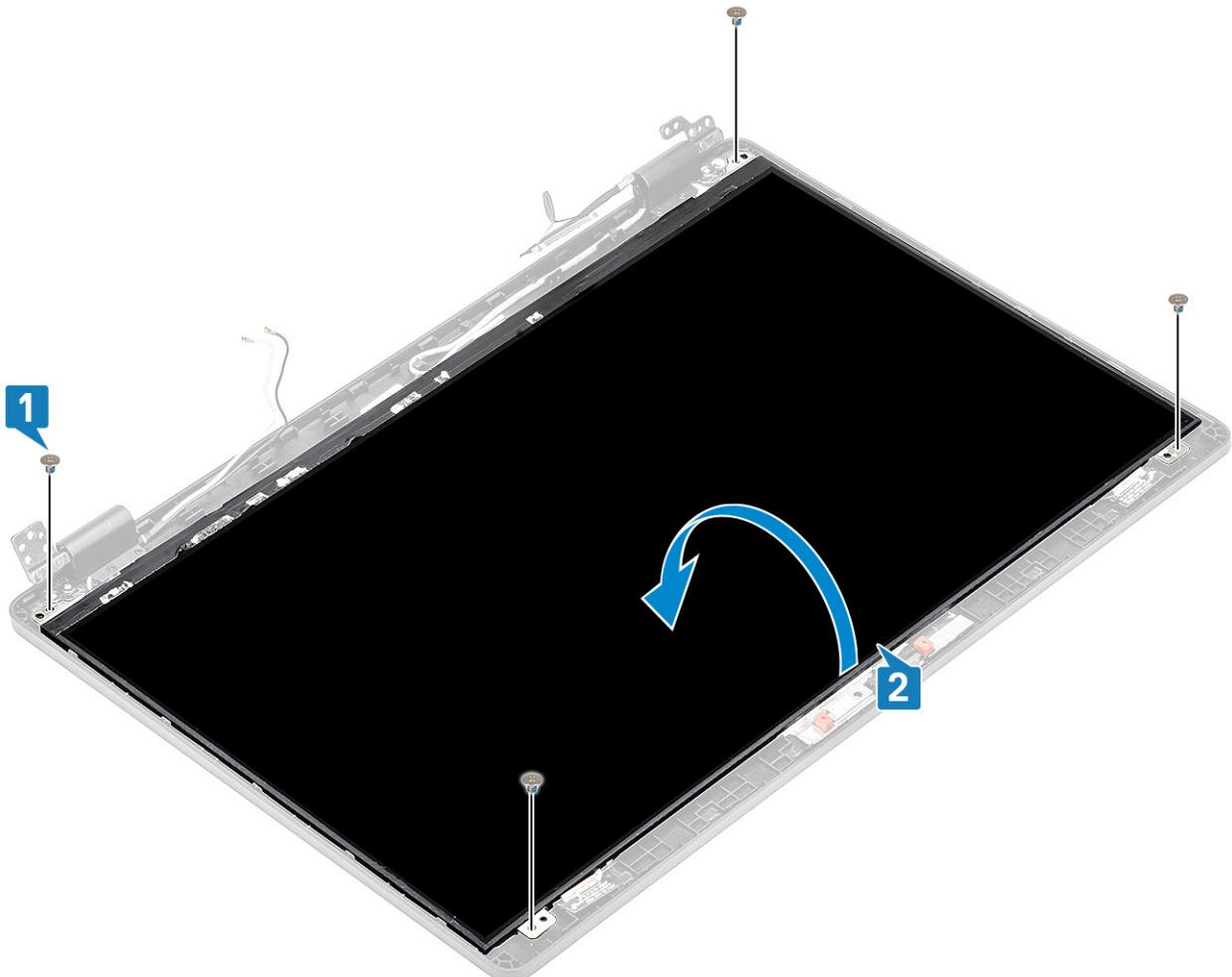
### Removing display panel

#### 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 [display assembly](#)
6. Remove the [display bezel](#).
7. Remove the [hinge caps](#).
8. Remove the [display hinges](#).

## Steps

1. Remove the four (M2x2) screws that secure the display panel to the display assembly [1] and lift to turn over the display panel to access the display cable [2].



2. Peel the conductive tape [1] on the display cable connector.
3. Remove the adhesive strip that secures the display cable connector [2].
4. Lift the latch and disconnect the display cable from the connector on the display panel [3, 4].



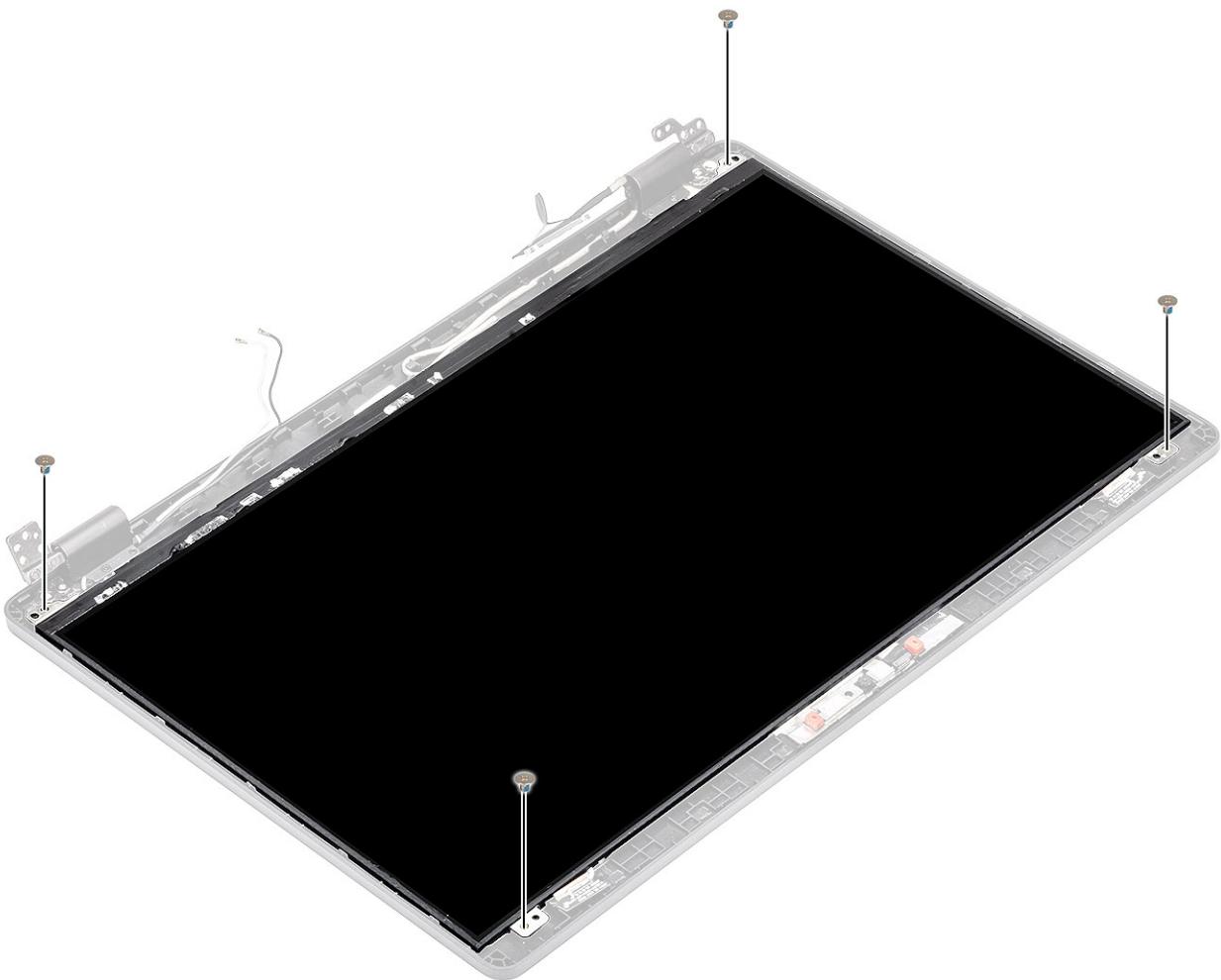
# Installing display panel

## Steps

1. Connect the display cable to the connector and close the latch [1, 2].
2. Adhere the adhesive strip to secure the display cable connector [3].
3. Adhere the conductive tape to secure the display cable connector [4].



4. Replace the four (M2x2) screws that secure the display panel to the display assembly.



#### Next steps

1. Install the [display hinges](#).
2. Install the [hinge caps](#).
3. Install the [display bezel](#).
4. Install the [display assembly](#).
5. Install the [battery](#).
6. Install the [base cover](#).
7. Install the [microSD card](#).
8. Follow the procedure in [after working inside your computer](#).

## Camera

### Removing camera

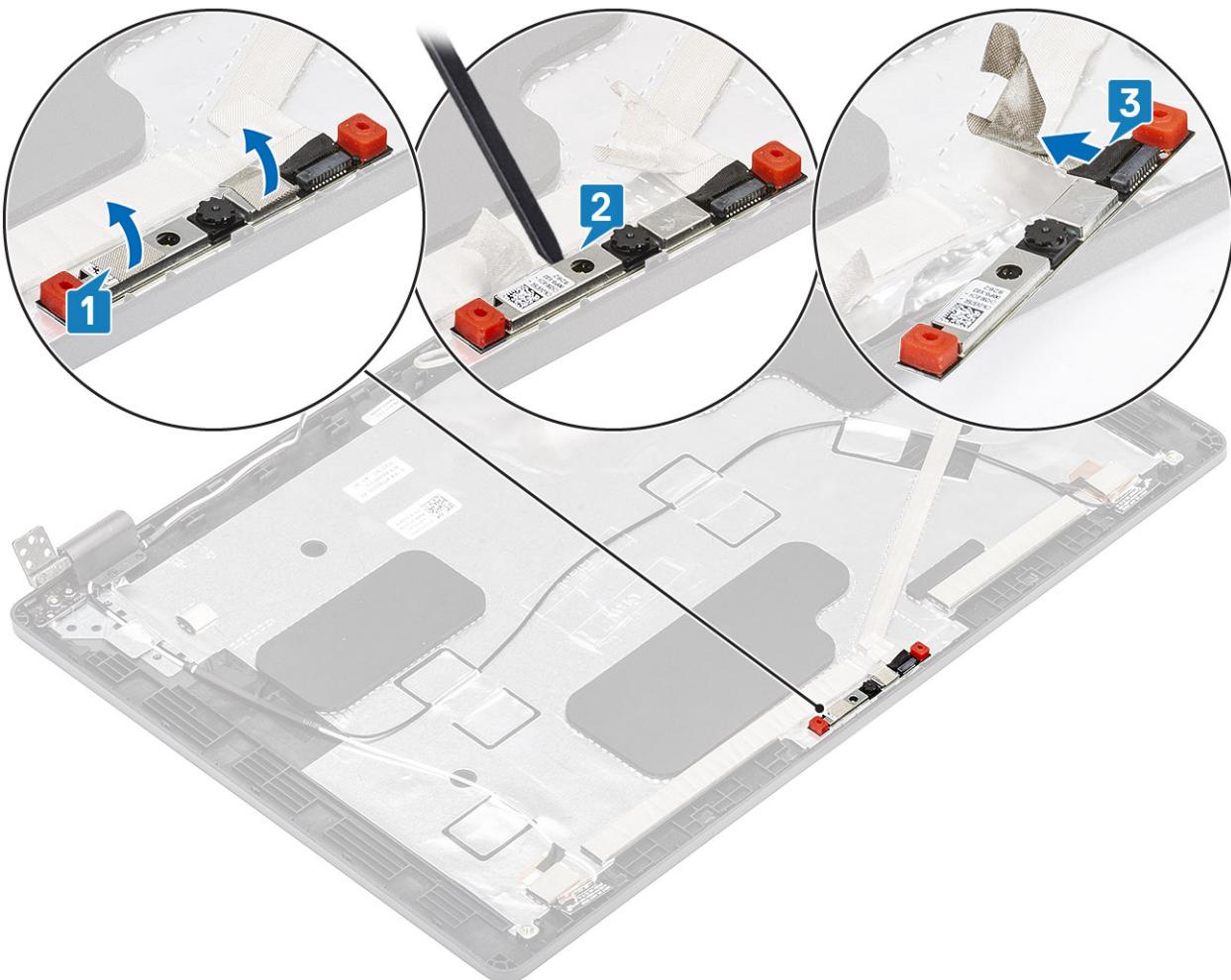
#### Prerequisites

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 [display assembly](#)
6. Remove the [display bezel](#).
7. Remove the [hinge caps](#).

8. Remove the [display hinges](#).
9. Remove the [display panel](#).

### Steps

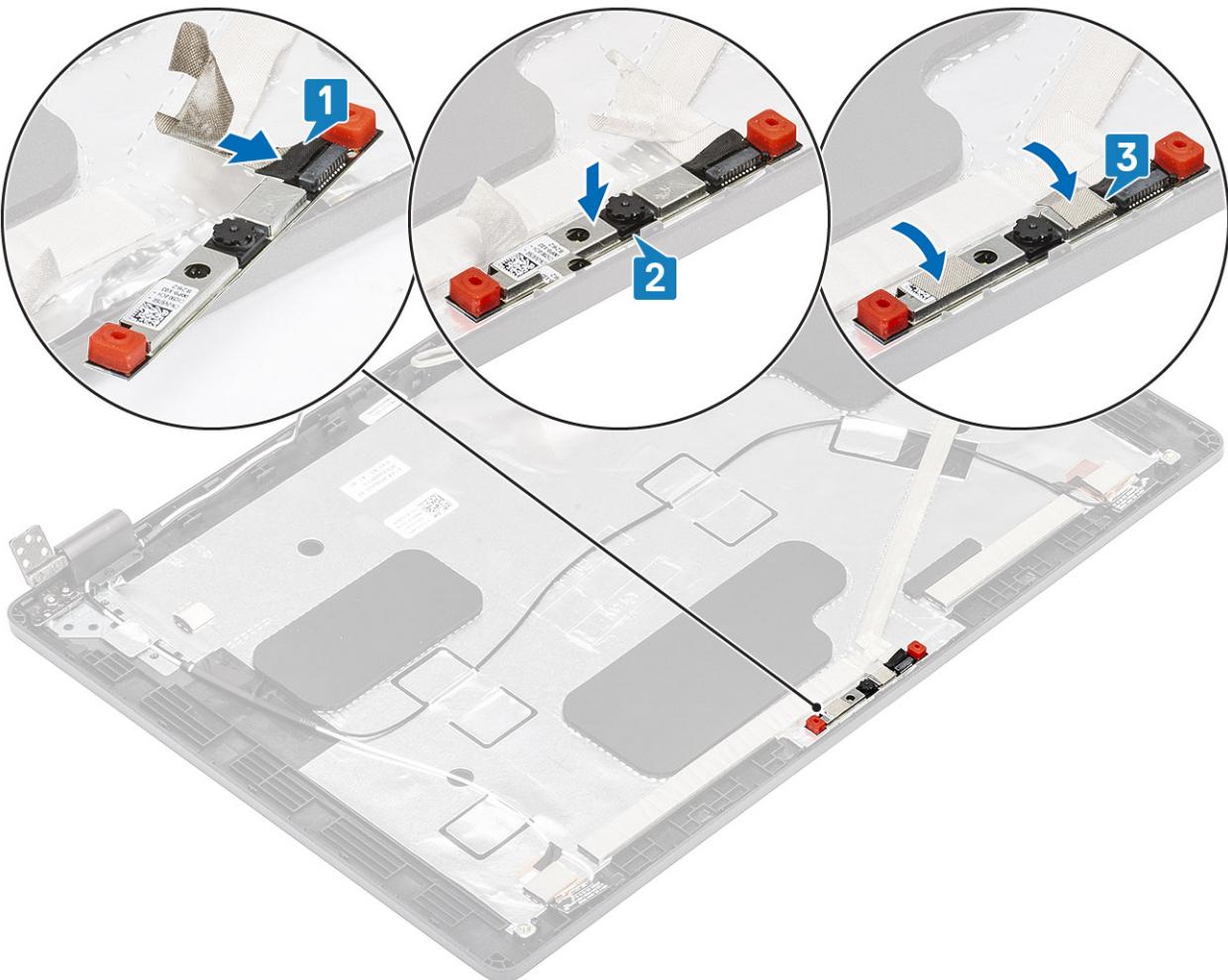
1. Peel the two conductive tape that secures the camera in place [1].
2. Using a plastic scribe carefully pry and lift the camera module from the display back cover [2].
3. Disconnect the camera cable from the connector on the camera module [3].



## Installing the camera

### Steps

1. Connect the camera cable to the connector on the camera module [1].
2. Insert the camera into the slot on the display back cover [2].
3. Affix the two conductive tape above the camera [3].



#### Next steps

1. Install the [display panel](#).
2. Install the [display hinges](#).
3. Install the [hinge caps](#).
4. Install the [display bezel](#).
5. Install the [display assembly](#).
6. Install the [battery](#).
7. Install the [base cover](#).
8. Install the [microSD card](#).
9. Follow the procedure in [after working inside your computer](#).

## Display (eDP) cable

### Removing display cable

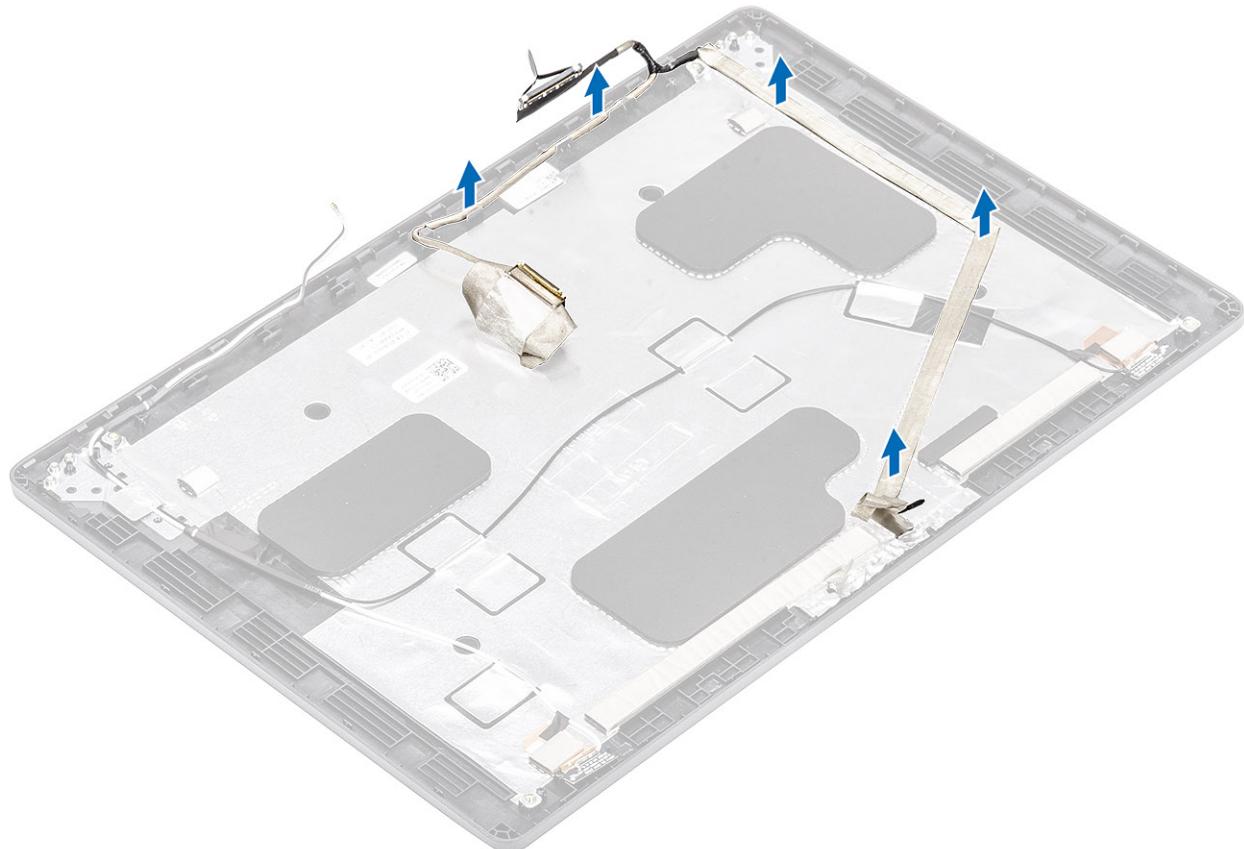
#### Prerequisites

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 [display assembly](#)
6. Remove the [display bezel](#).

7. Remove the [hinge caps](#).
8. Remove the [display hinges](#).
9. Remove the [display panel](#).
10. Remove the [camera](#).

### Steps

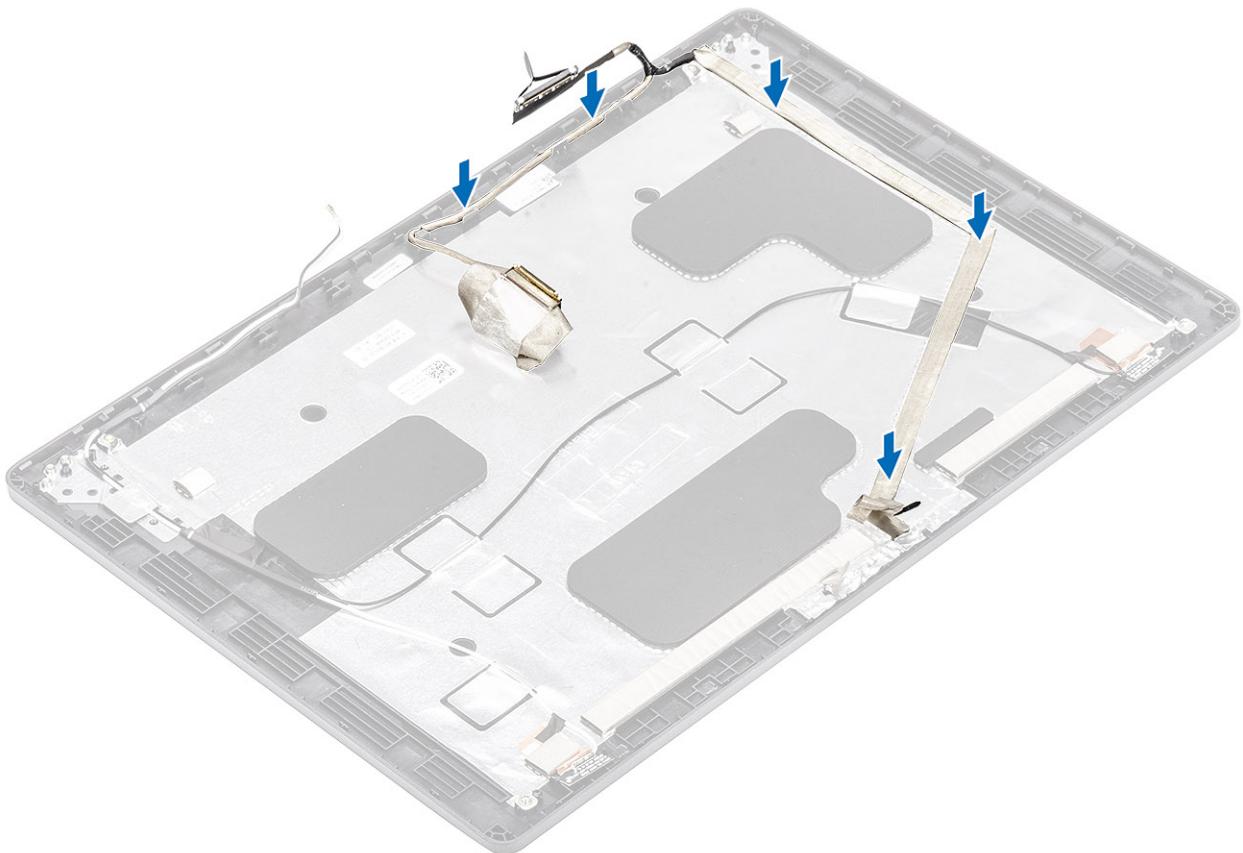
Peel the conductive tape and unroute the display cable to release it from the adhesive and lift the display cable from the display back cover.



## Installing display cable

### Steps

1. Adhere the display cable to the display back cover.
2. Adhere the conductive tape and route the display cable to the display back cover.



#### Next steps

1. Install the [camera](#).
2. Install the [display panel](#).
3. Install the [display hinges](#).
4. Install the [hinge caps](#).
5. Install the [display bezel](#).
6. Install the [display assembly](#).
7. Install the [battery](#).
8. Install the [base cover](#).
9. Install the [microSD card](#).
10. Follow the procedure in [after working inside your computer](#).

## Display back cover assembly

### Replacing the display back cover

#### 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 [display assembly](#)
6. Remove the [display bezel](#).
7. Remove the [hinge caps](#).
8. Remove the [display hinges](#).
9. Remove the [display panel](#).

10. Remove the [camera](#).
11. Remove the [display cable](#).

#### About this task

After performing the preceding steps, you are left with the display back cover.



#### Next steps

1. Install the [display cable](#).
2. Install the [camera](#).
3. Install the [display panel](#).
4. Install the [display hinges](#).
5. Install the [hinge caps](#).
6. Install the [display bezel](#).
7. Install the [display assembly](#).
8. Install the [battery](#).
9. Install the [base cover](#).
10. Install the [microSD card](#).
11. Follow the procedure in [after working inside your computer](#).

## Palmrest assembly

### Replacing the palmrest and keyboard assembly

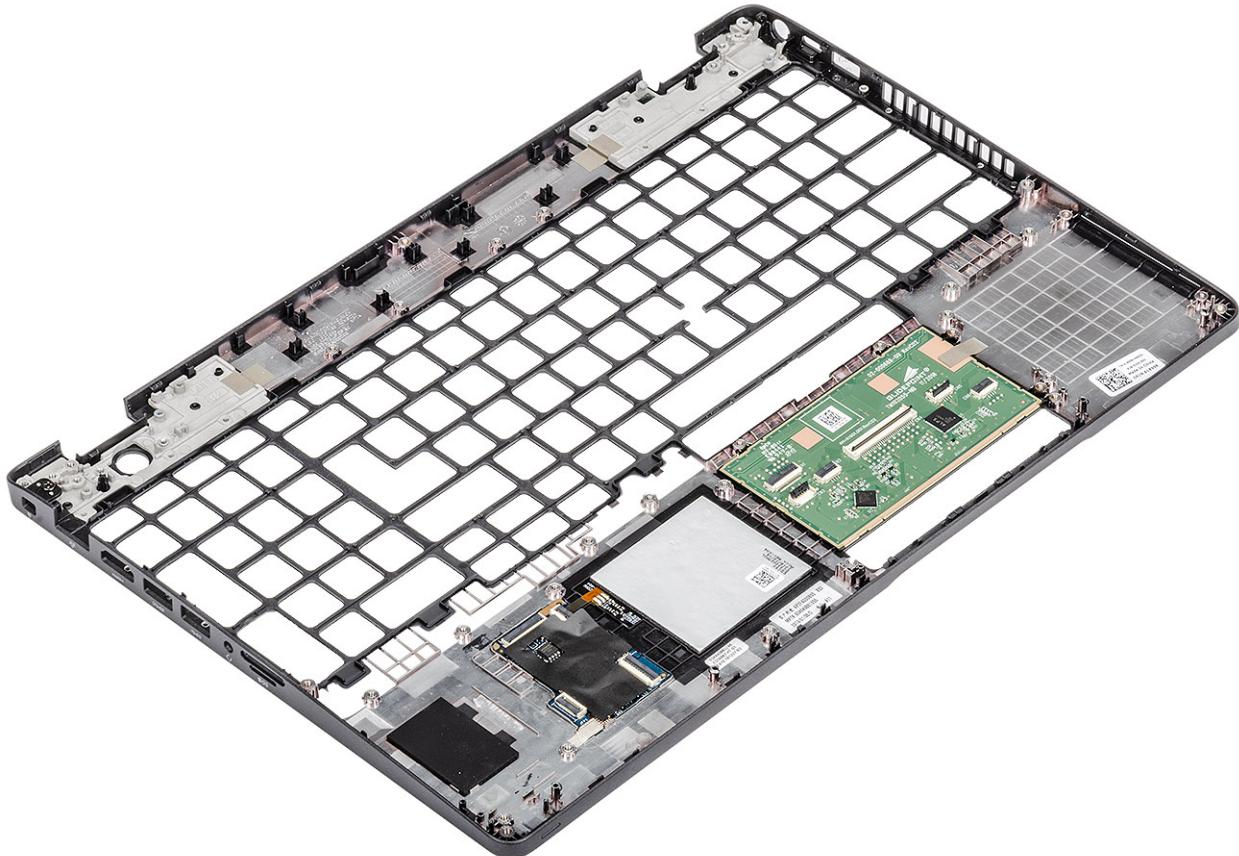
#### Prerequisites

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 [ssd](#).
6. Remove the [ssd bracket](#).
7. Remove the [palmrest bracket](#).
8. Remove the [LED board](#).
9. Remove the [speaker](#).
10. Remove the [heatsink](#).
11. Remove the [memory module](#).
12. Remove the [DC-in](#).
13. Remove the [WLAN card](#).
14. Remove the [system board](#).
15. Remove the [coin cell battery](#).
16. Remove the [keyboard](#).
17. 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. Install the [SmartCard reader board](#).
2. Install the [keyboard](#).
3. Install the [coin cell battery](#).
4. Install the [system board](#).
5. Install the [WLAN card](#).
6. Install the [Dc-in](#).
7. Install the [memory module](#).
8. Install the [heatsink](#).

9. Install the [speaker](#).
10. Install the [LED board](#).
11. Install the [palmrest bracket](#).
12. Install the [ssd bracket](#).
13. Install the [ssd](#).
14. Install the [battery](#).
15. Install the [base cover](#).
16. Install the [microSD card](#).
17. Follow the procedure in [after working inside your computer](#).

## Troubleshooting

# Enhanced Pre-Boot System Assessment (ePSA) diagnostics

### About this task

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

- 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

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

## Running the ePSA diagnostics

### 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.

## 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 3. LED codes**

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

# 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.