

Dell Latitude 7400

Service Manual



Notes, cautions, and warnings

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

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

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

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Working on your computer

Safety instructions

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.

⚠ WARNING: 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

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

- 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 notebook to avoid electrostatic discharge (ESD) damage.
- After removing any system component, carefully place the removed component on an anti-static mat.
- Wear shoes with non-conductive rubber soles to reduce the chance of getting electrocuted.

Standby power

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

Unplugging, pressing and holding the power button for 15 seconds should discharge residual power in the system board. notebooks.

Bonding

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

Electrostatic discharge—ESD protection

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

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

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

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

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

Perform the following steps to prevent ESD damage:

- Use a wired ESD wrist strap that is properly grounded. The use of wireless anti-static straps is no longer allowed; they do not provide adequate protection. Touching the chassis before handling parts does not ensure adequate ESD protection on parts with increased sensitivity to ESD damage.

- Handle all static-sensitive components in a static-safe area. If possible, use anti-static floor pads and workbench pads.
- When unpacking a static-sensitive component from its shipping carton, do not remove the component from the anti-static packing material until you are ready to install the component. Before unwrapping the anti-static packaging, ensure that you discharge static electricity from your body.
- Before transporting a static-sensitive component, place it in an anti-static container or packaging.

ESD field service kit

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

Components of an ESD field service kit

The components of an ESD field service kit are:

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

ESD protection summary

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

Transporting sensitive components

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

Lifting equipment

Adhere to the following guidelines when lifting heavy weight equipment:

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

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

After working inside your computer

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

- 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](#)

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.

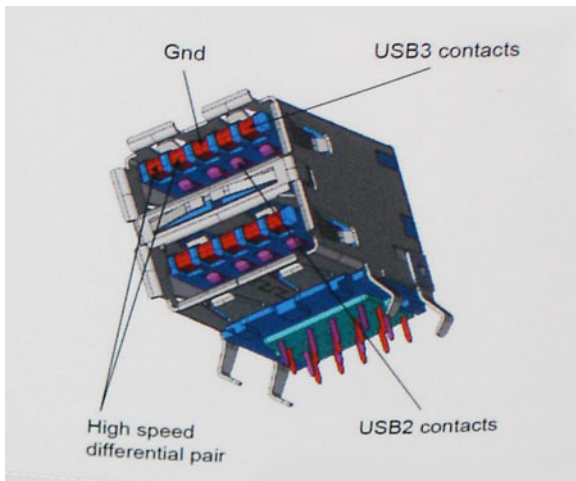


Speed

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.

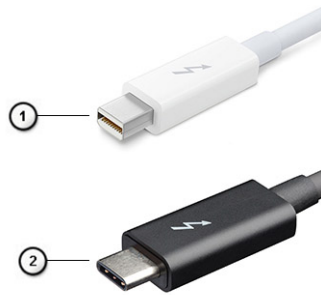


Figure 1. Thunderbolt 1 and Thunderbolt 3

- 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

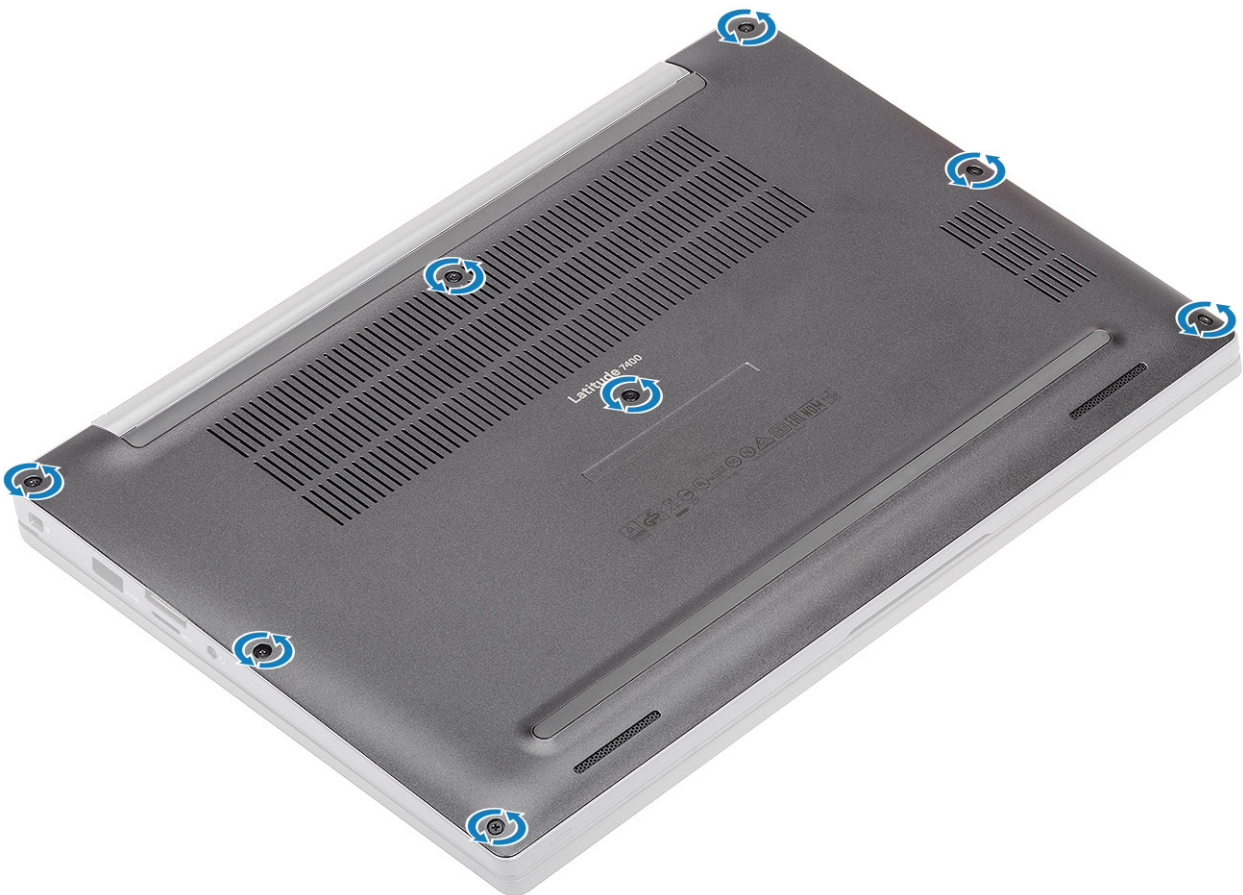
Removing and installing components

Base cover

Removing the base cover

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

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



- 2 Use a plastic scribe to pry the base cover at the indents near the left and right hinges [1].
- 3 Work along the edges to separate the base cover from the computer [2].



- 4 Lift and remove the base cover from the computer.

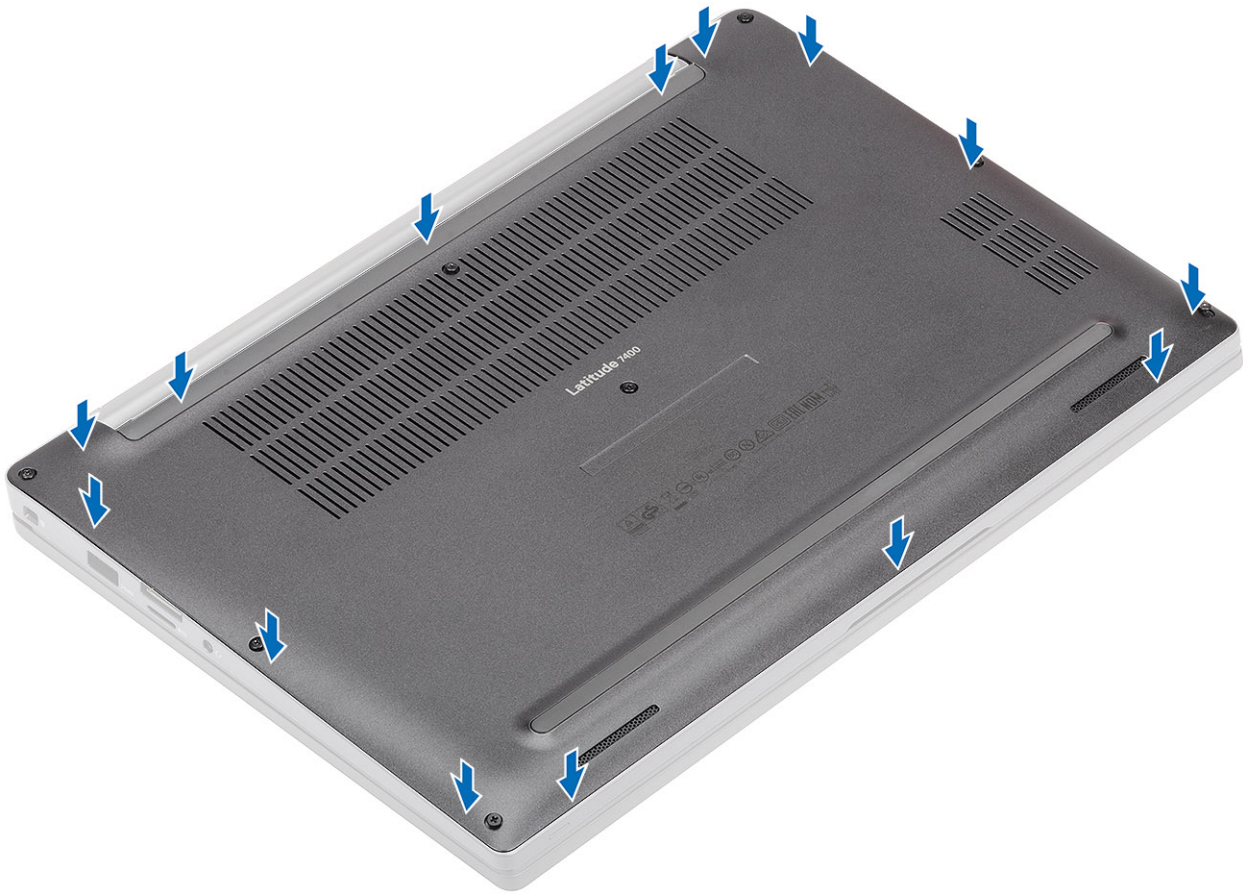


Installing the base cover

- 1 Align and place the base cover on the computer.



- 2 Press along the edges of the base cover until it clicks into the palmrest assembly.



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



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

Battery

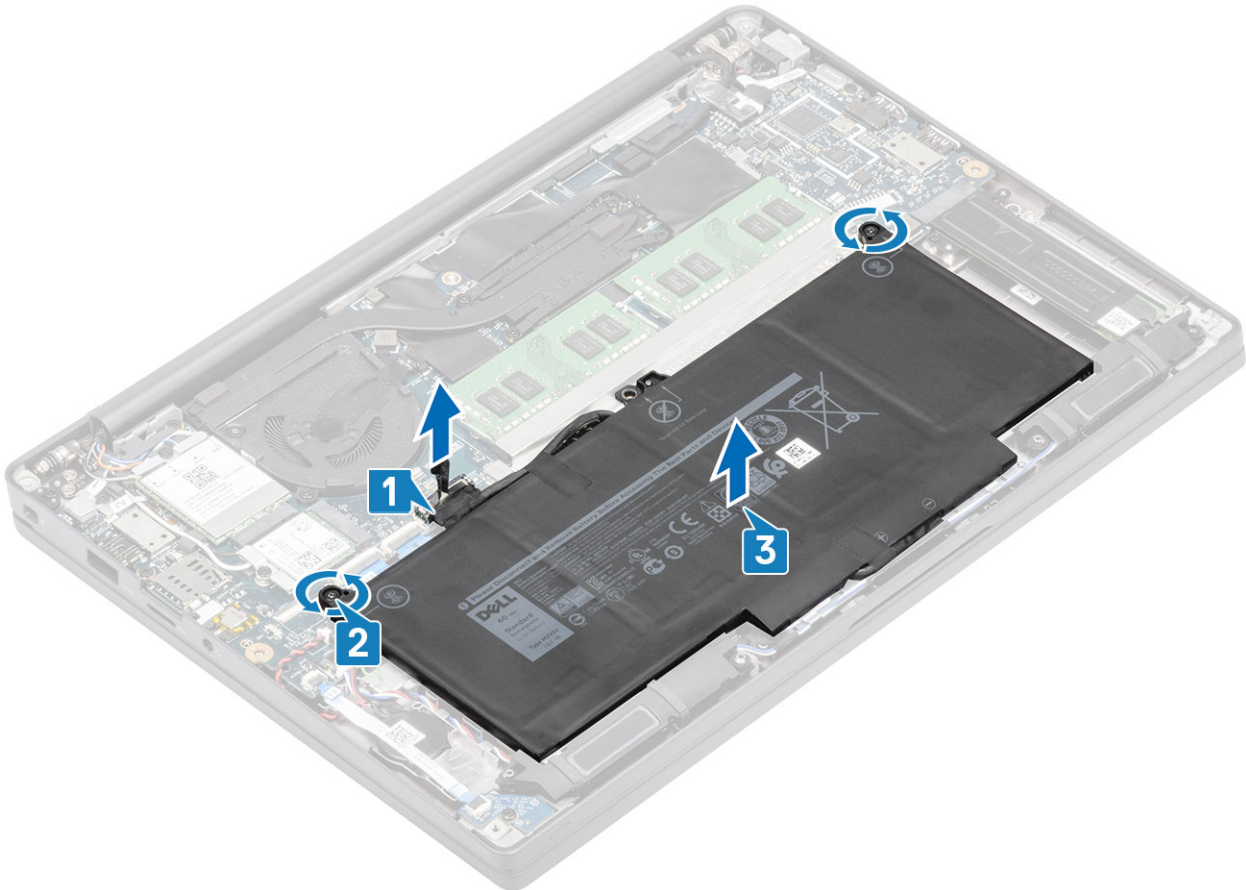
Lithium-ion battery precautions

⚠ 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, the entire system should be replaced. Contact <https://www.dell.com/support> for assistance and further instructions.
- Always purchase genuine batteries from <https://www.dell.com> or authorized Dell partners and resellers.

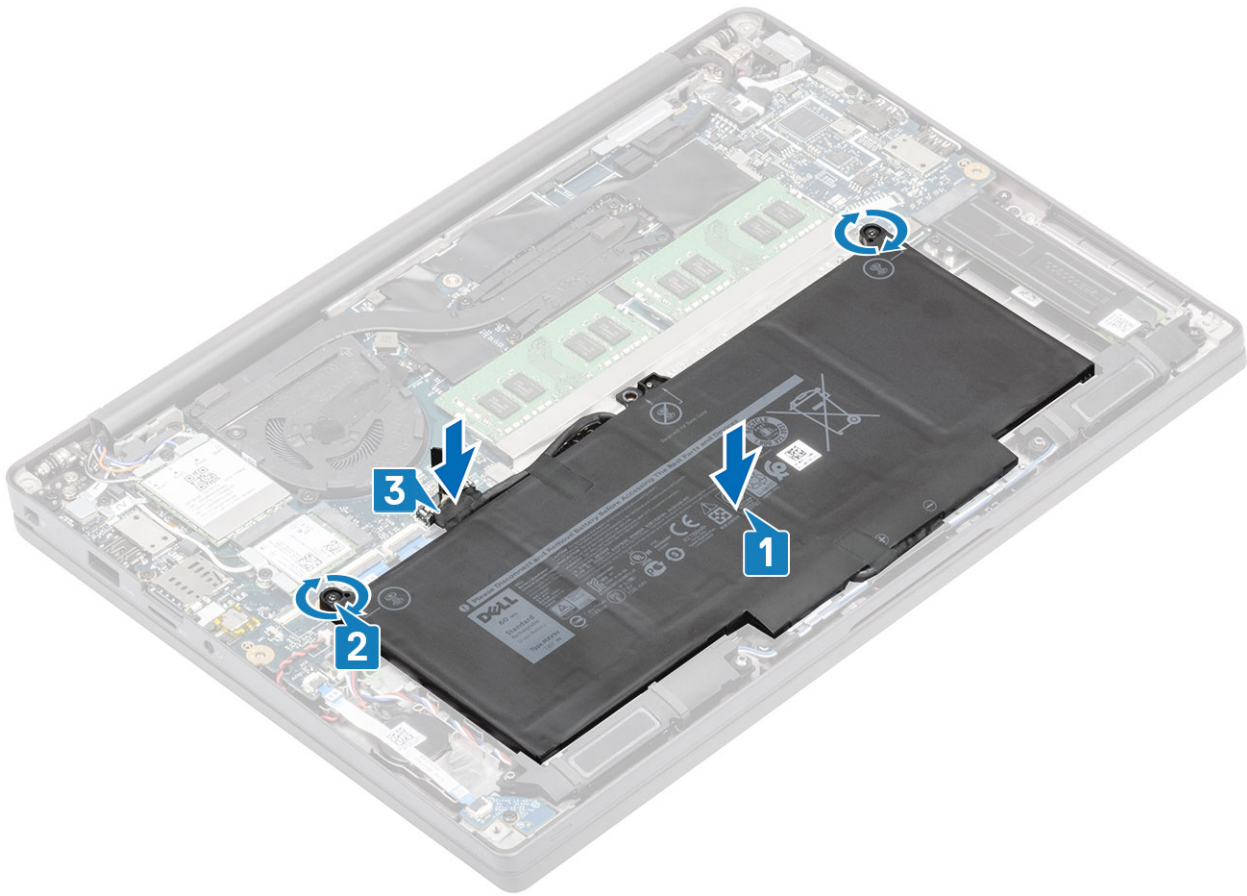
Removing the battery

- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [base cover](#).
- 1 Pull the tag to disconnect the battery cable from its connector on the system board [1].
- 2 **① | NOTE: This procedure illustrates a 4-cell battery. A 3-cell battery has single captive screw securing it to the computer.**
Loosen the two captive screws [2] that secure the battery to the computer.
- 3 Lift and remove the battery from the computer [3].



Installing the battery

- 1 Align and place the battery in the computer [1].
- 2 Tighten the two captive screws [2] to secure the battery (4-Cell) to the computer.
① | NOTE: A 3-Cell battery has single captive screw that secures the battery to the computer.
- 3 Connect the battery cable to its connector on the system board [3].

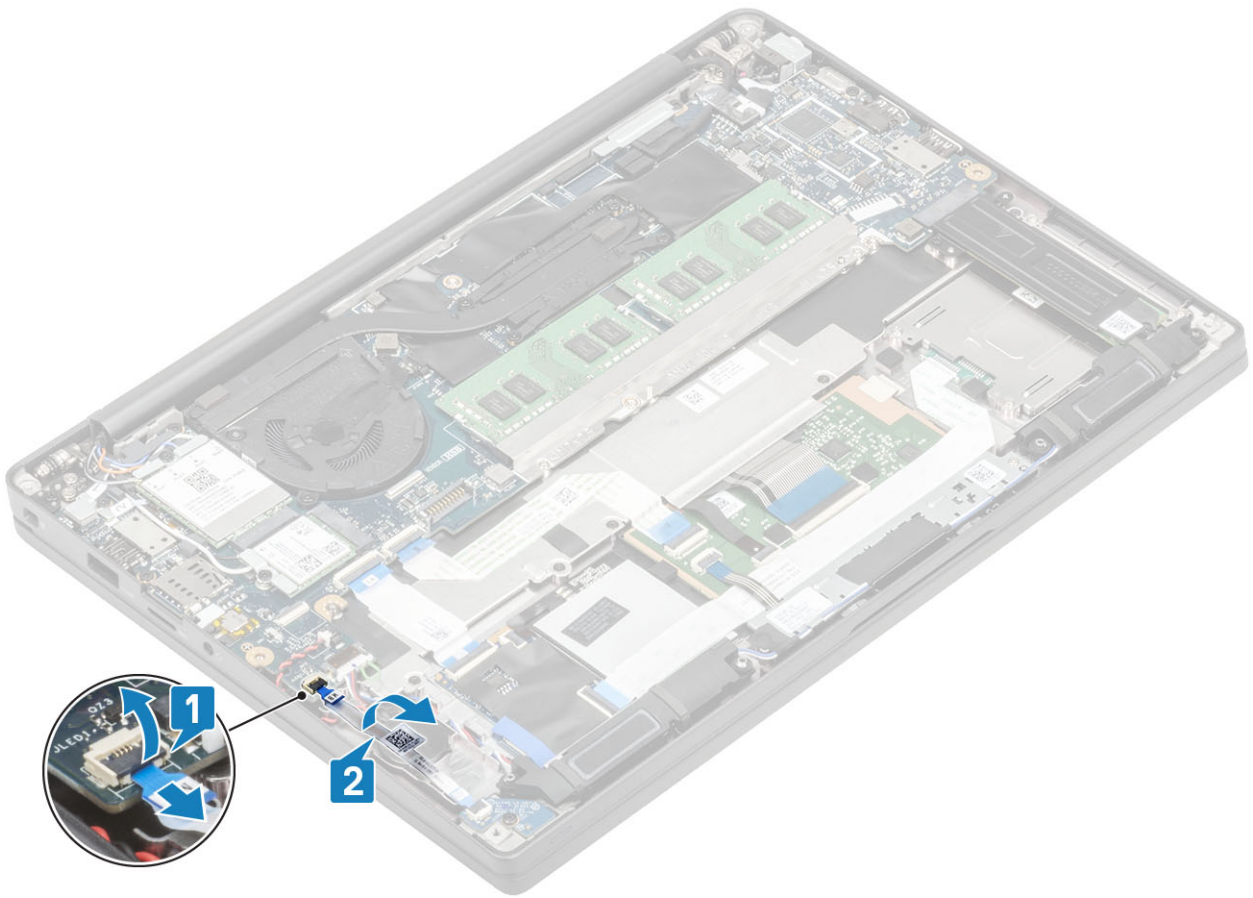


- 1 Install the [base cover](#).
- 2 Follow the procedure [after working inside your computer](#).

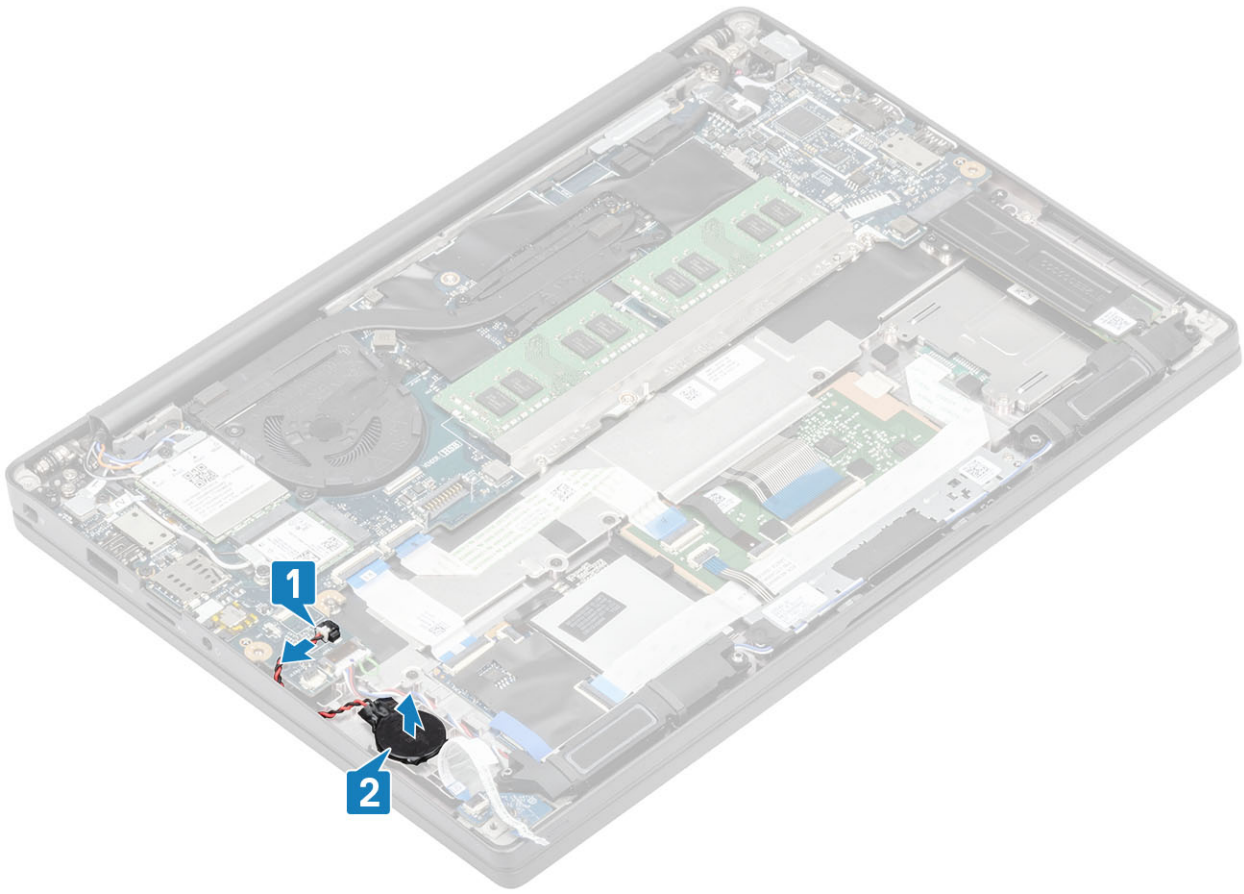
Coin cell

Removing the coin cell

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [base cover](#).
 - 3 Remove the [battery](#).
- 1 Disconnect the LED daughterboard cable from the connector on the system board [1].
 - 2 Peel back the LED daughterboard cable from over the coin cell [2].

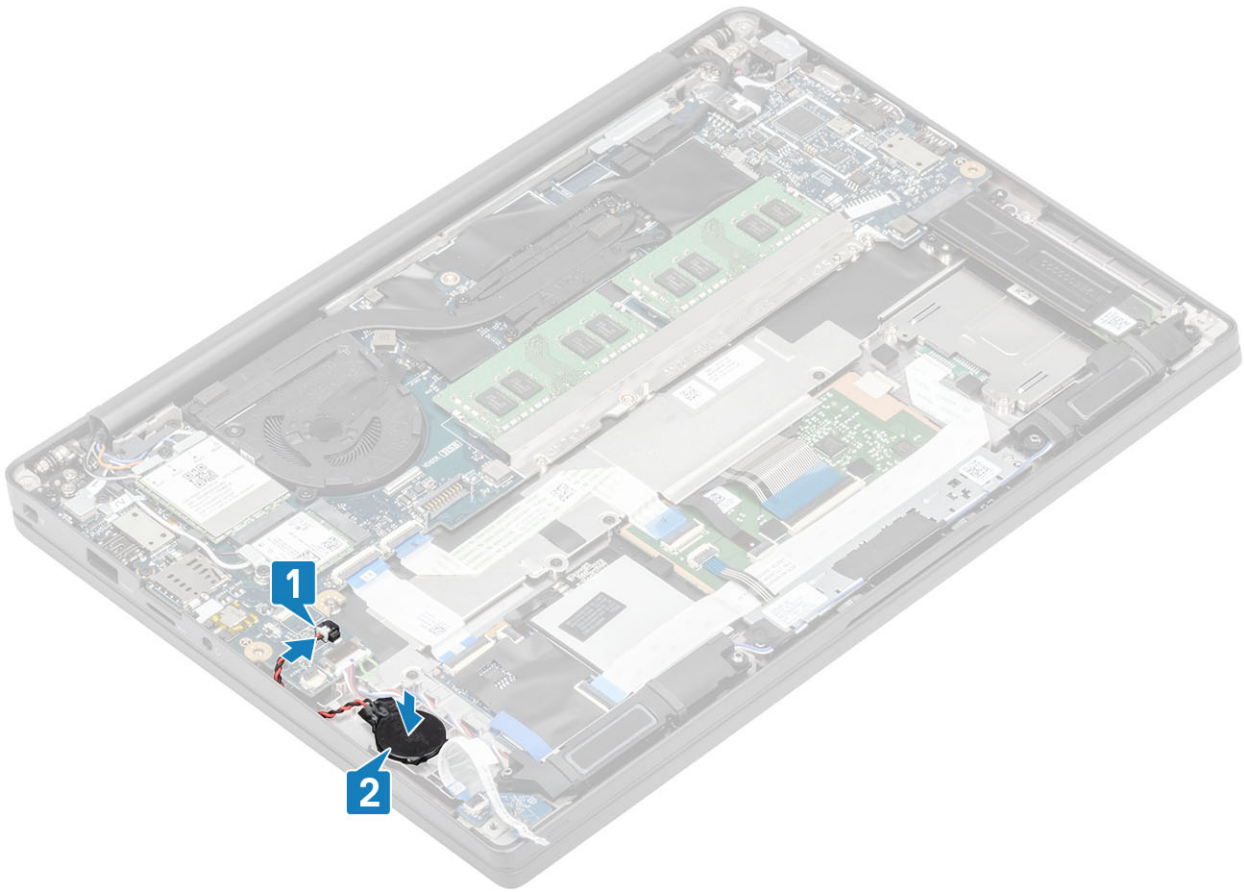


- 3 Disconnect the coin cell cable from the connector on the system board [1].
- 4 Remove the coin cell from the computer [2].

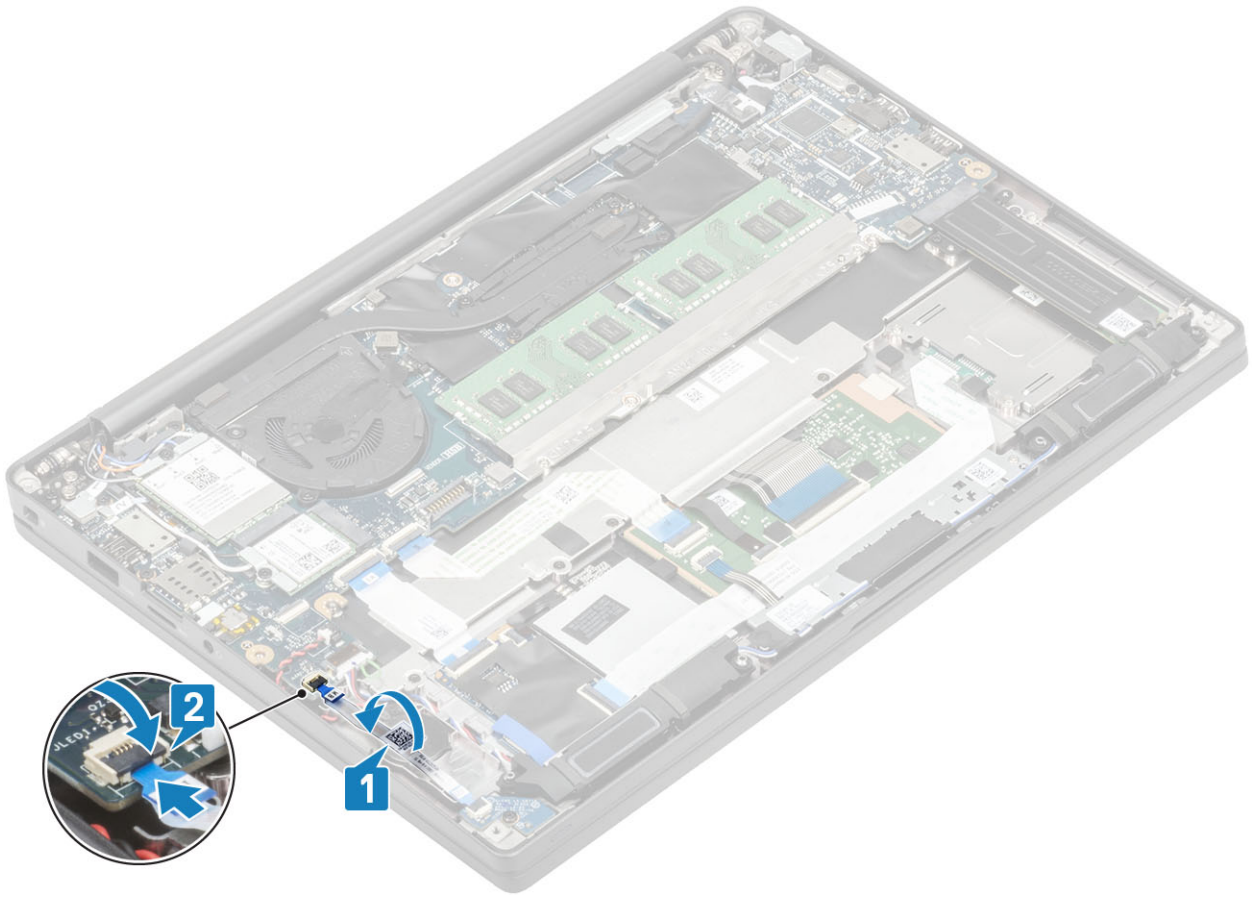


Installing the coin cell

- 1 Connect the coin cell cable to its connector on the system board [1] and adhere the coin cell to the palmrest [2].



- 2 Connect the LED board cable to the system board [1] and route the ribbon cable over the coin cell [2].

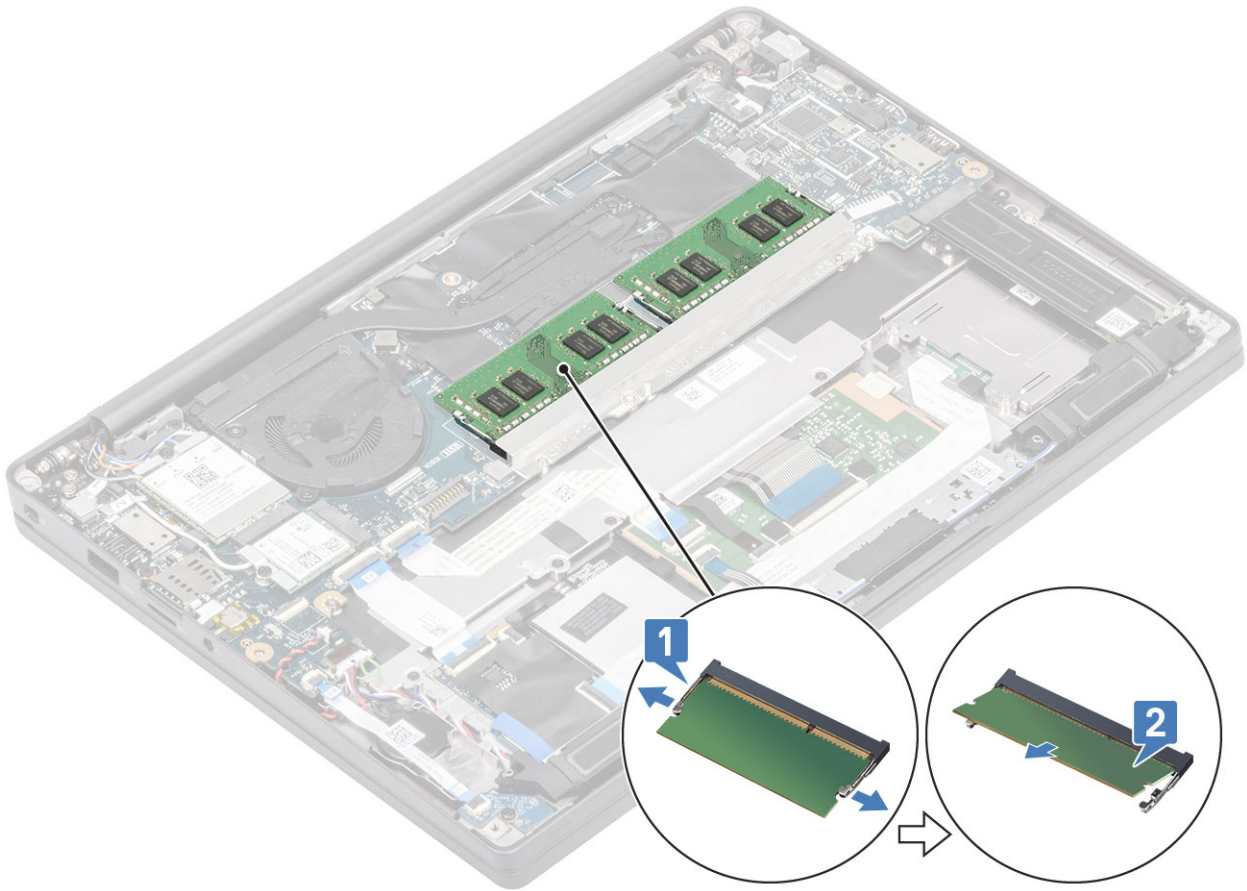


- 1 Install the [battery](#).
- 2 Install the [base cover](#).
- 3 Follow the procedure [after working inside your computer](#).

Memory

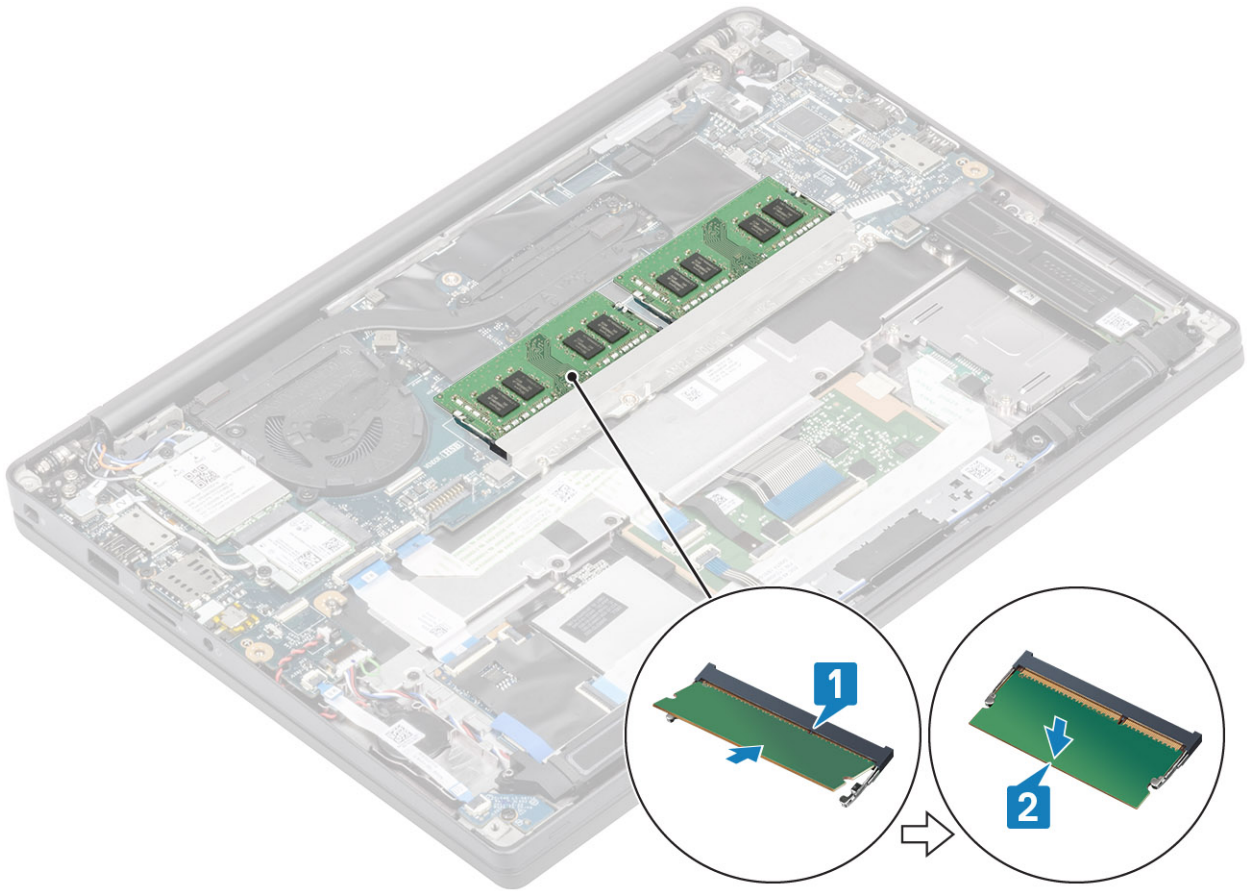
Removing the memory

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [base cover](#).
 - 3 Remove the [battery](#).
- 1 Pry the clips securing the memory module until the memory module pops-up [1].
 - 2 Lift the memory module away from the connector [2].



Installing the memory

Insert the memory module on the memory connector until the clips secure the memory module.



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

Solid state drive

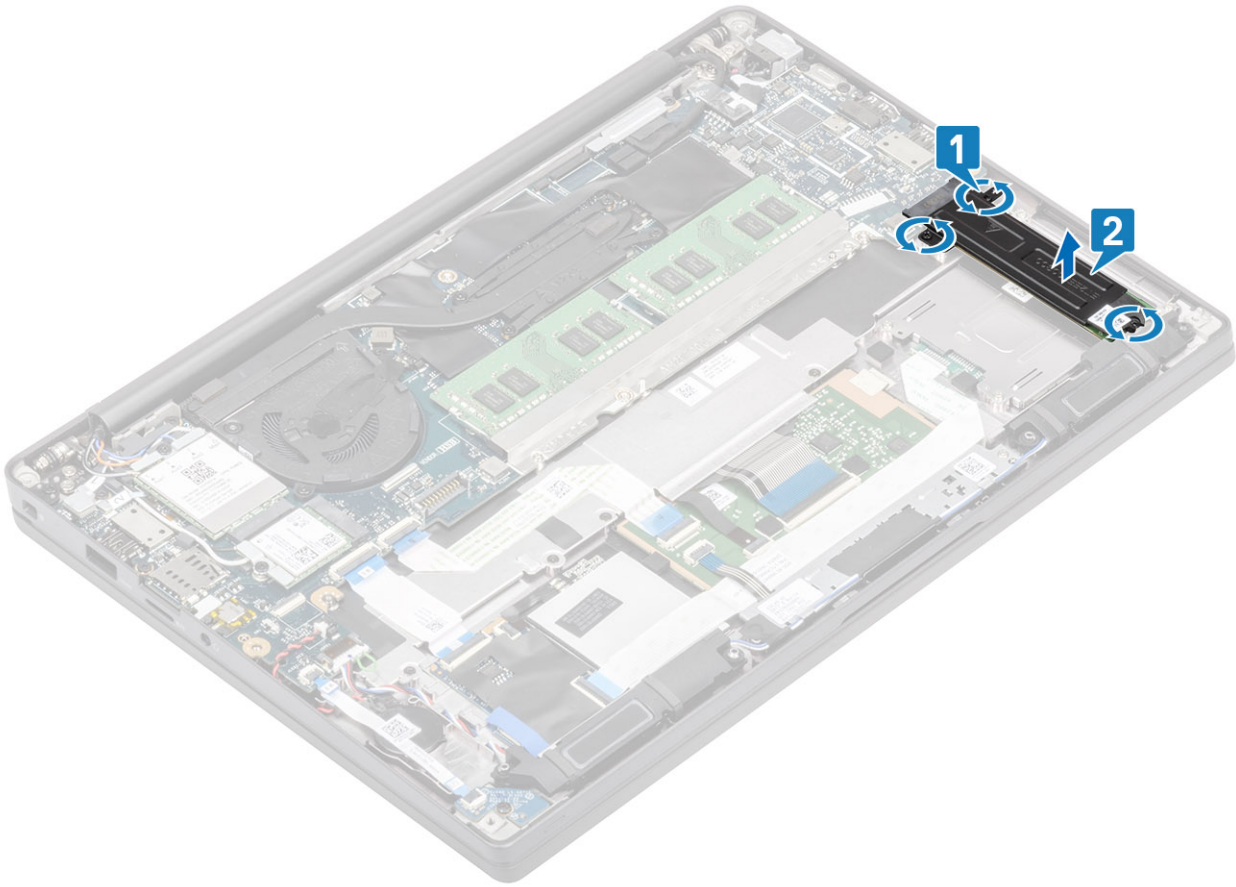
Removing the solid state drive

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

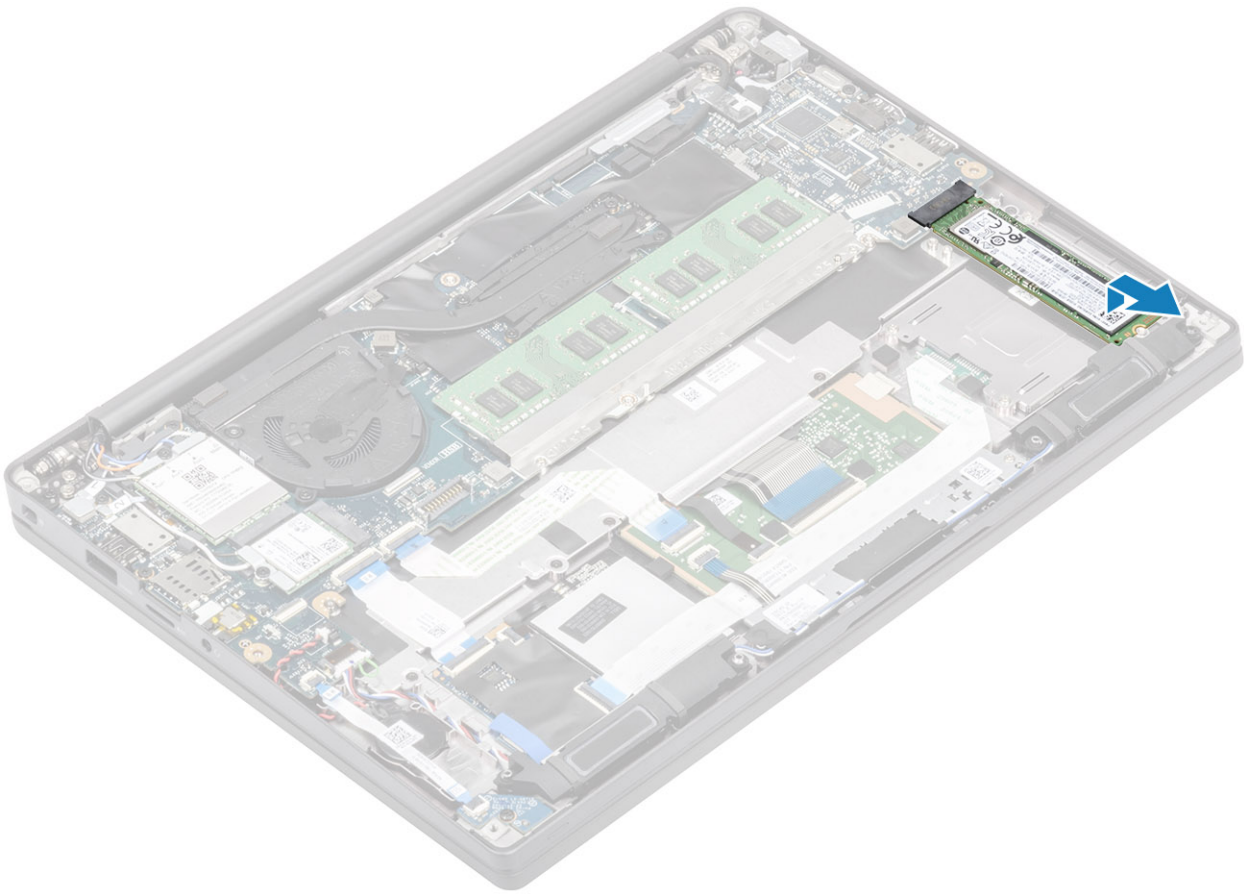
- 1 **NOTE:** This procedure illustrates a M.2 2280 SSD. M.2 2230 SSD is secured to the palmrest with special bracket and plate.

Loosen the three captive screws that secure the SSD bracket to the palmrest [1].

- 2 Remove the SSD plate from the top of the SSD [2].

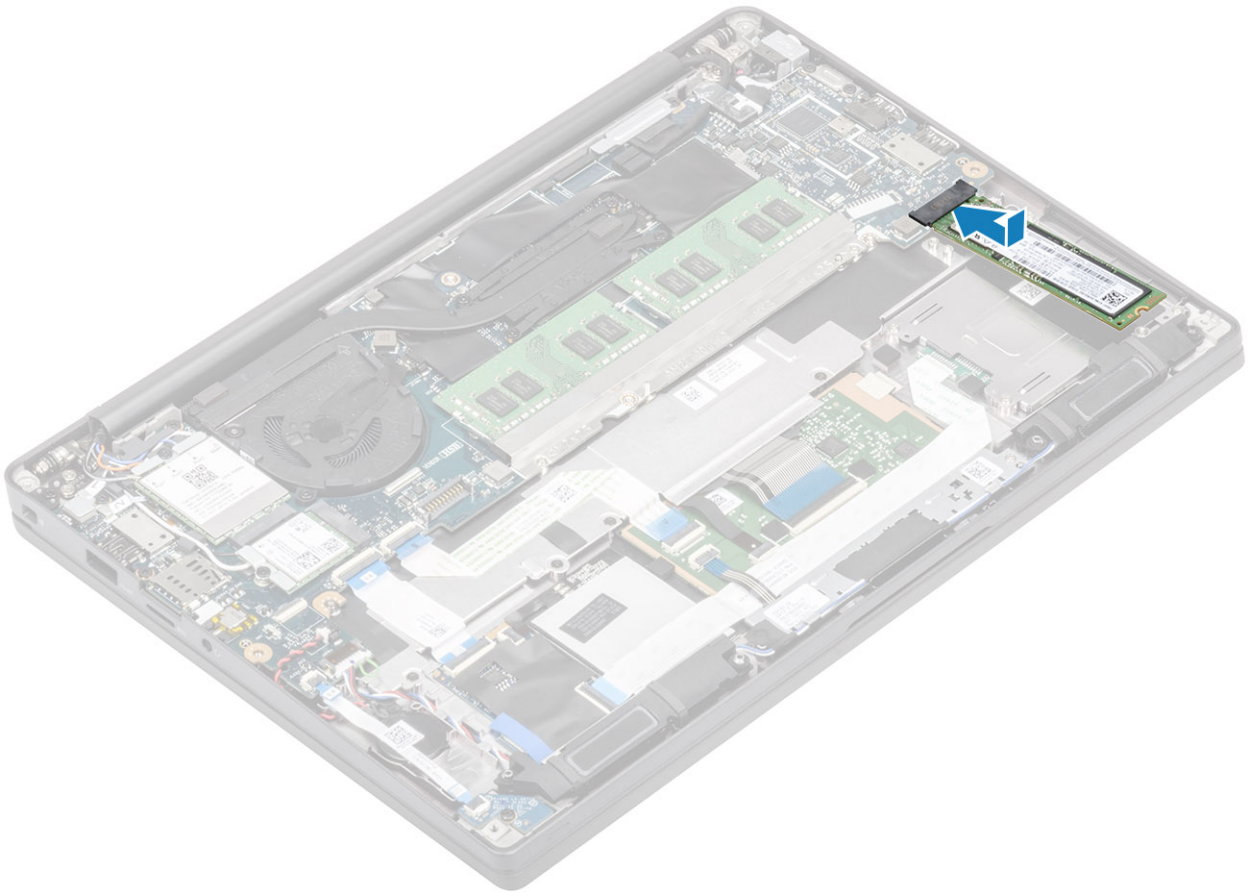


- 3 Slightly lift and remove the SSD out from its connector on the system board.

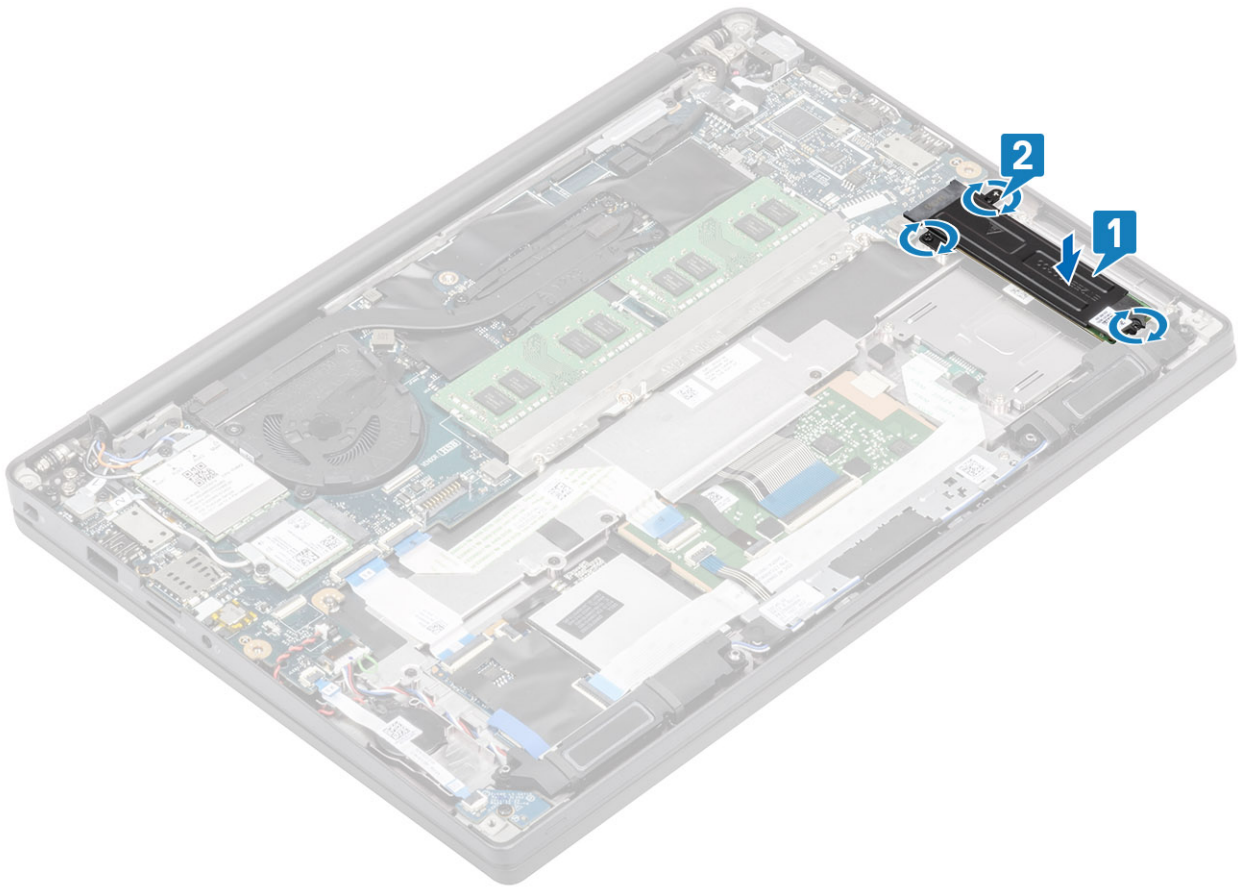


Installing the solid state drive

- 1 Place the SSD on its slot and slide it to its connector on the system board.



- 2 Place the SSD plate pre-installed with thermal sticker on the underside over the SSD [1].
- 3 Tighten the three captive screws to secure the SSD bracket to the palmrest [2].



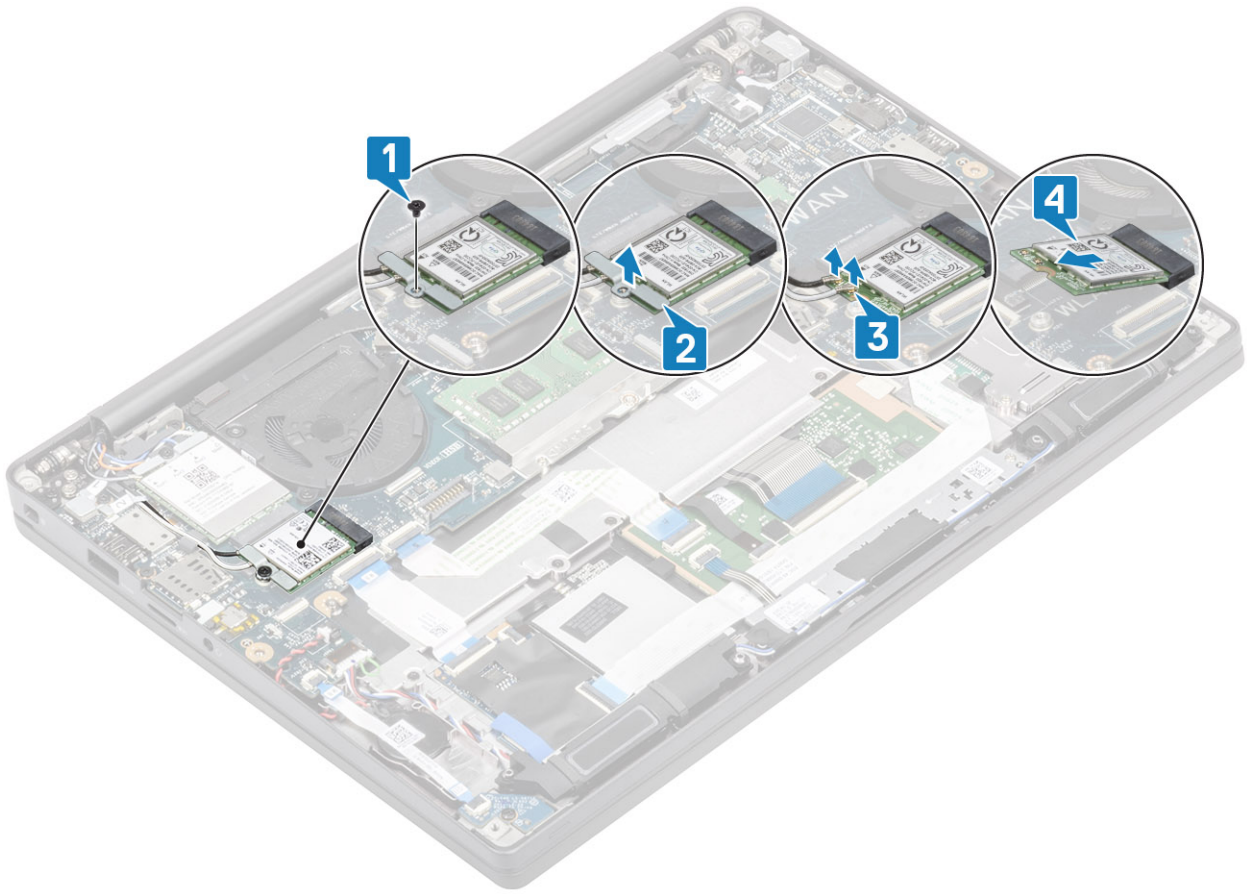
NOTE: This procedure illustrates a M.2 2280 SSD. M.2 2230 SSD requires a special bracket and plate to secure it to the palmrest assembly.

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

WLAN card

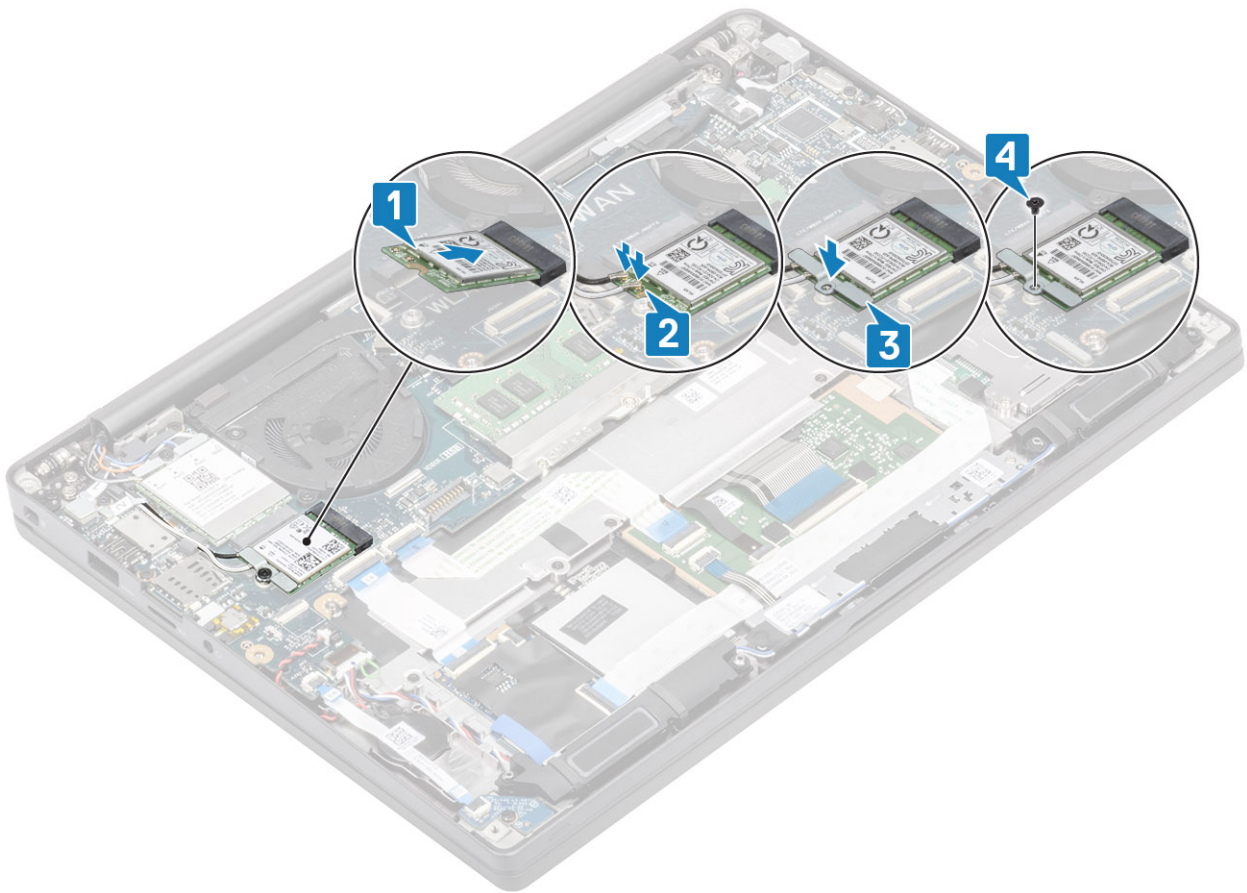
Removing the WLAN card

- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [base cover](#).
- 3 Remove the [battery](#).
- 1 Remove the single (M2x3) screw that secures the metal bracket to the WLAN card [1].
- 2 Remove the metal bracket from over the WLAN card antennae connector [2].
- 3 Disconnect the WLAN antennae cables from its connectors on the WLAN card [3].
- 4 Slightly lift and slide the WLAN card from the slot on the system board [4].



Installing the WLAN card

- 1 Insert the WLAN card into its slot on the system board [1].
- 2 Connect the antennae cables to the connectors on the WLAN card [2].
- 3 Place the metal bracket over the antennae connectors [3].
- 4 Replace the single (M2x3) screw to secure the metal bracket to the WLAN card and the system board [4].

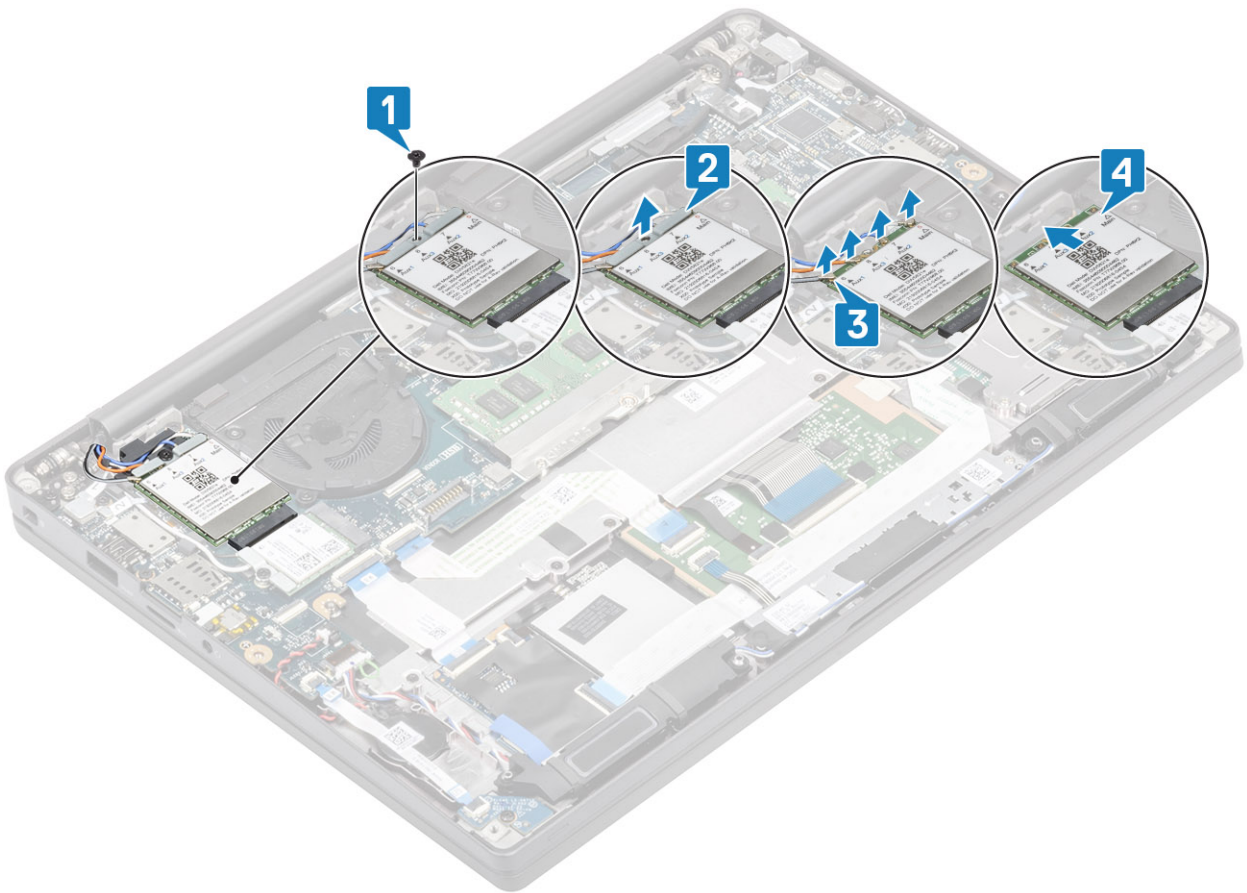


- 1 Install the [battery](#).
- 2 Install the [base cover](#).
- 3 Follow the procedure [after working inside your computer](#).

WWAN card

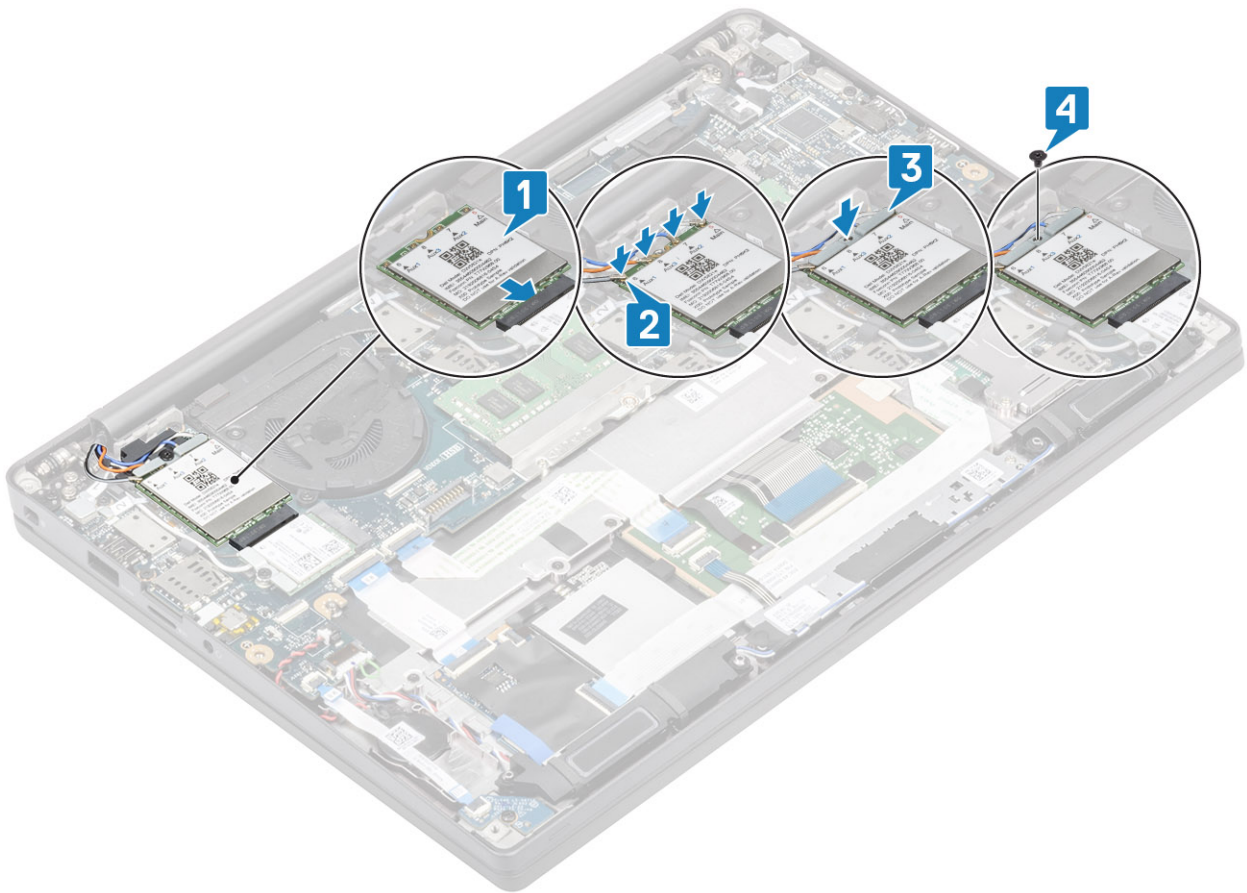
Removing the WWAN card

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [base cover](#).
 - 3 Remove the [battery](#).
- 1 Remove the single (M2x3) screw that secures the metal bracket to the WWAN card [1].
 - 2 Remove the metal bracket [2] and disconnect the antennae cables from the connectors on the WWAN card [3].
 - 3 Remove the WWAN card from its connector on the system board [4].



Installing the WWAN card

- 1 Place the WWAN card into its connector on the system board [1].
- 2 Connect the antennae cables to the connectors on WWAN card [2].
- 3 Place the metal bracket over the antennae connectors on the WWAN card [3].
- 4 Replace the single (M2x3) screw to secure the metal bracket to the WWAN card and the system board [4].



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

Heatsink

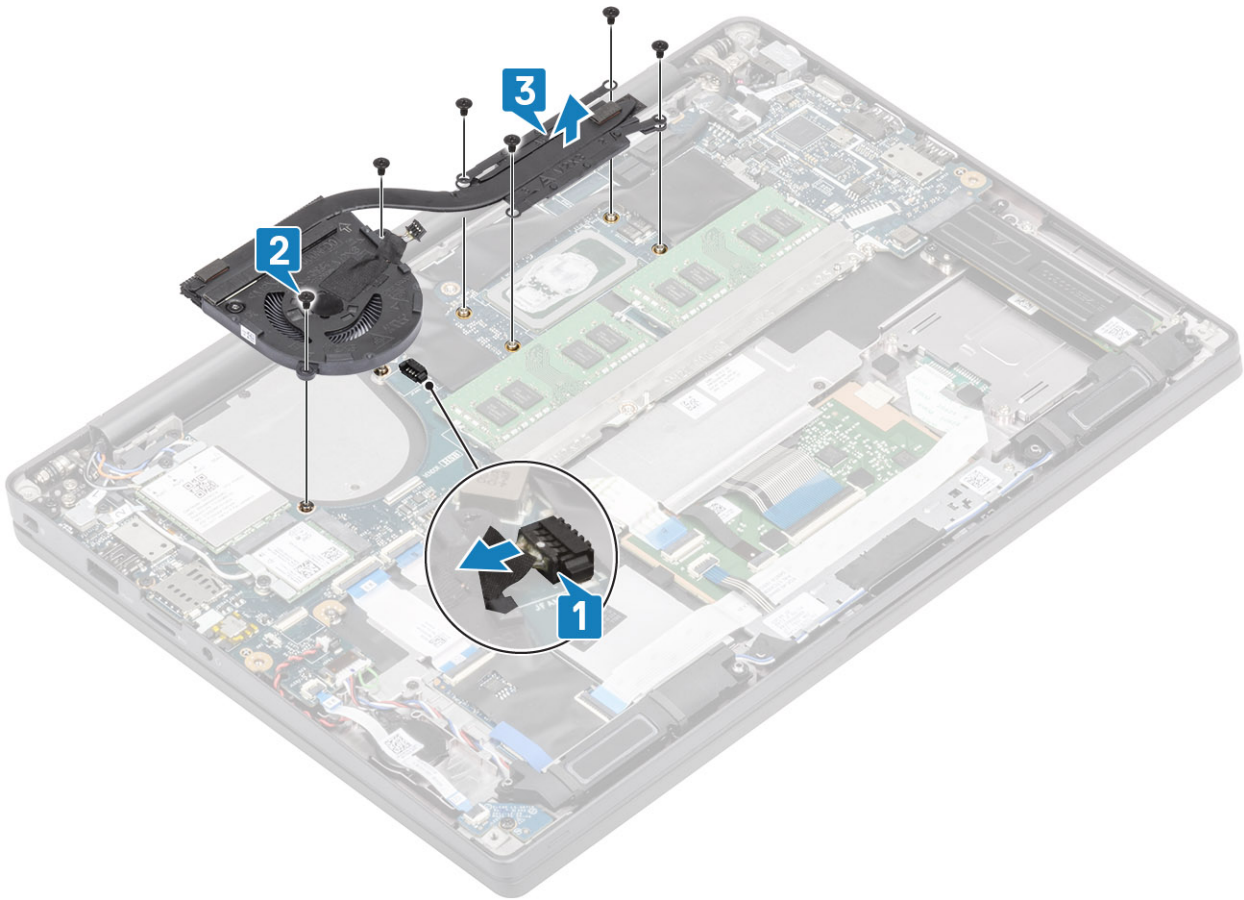
Removing the heatsink fan assembly

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

- 1 **NOTE: Heatsink and Fan are separately orderable parts.**

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

- 2 Remove the two (M2x3) screws in sequence (2 > 1) on the fan case and four (M2x3) screws in sequence (4 > 3 > 2 > 1) from the heatsink [2].
- 3 Lift and remove the heatsink fan assembly from the computer [3].



- 4 Remove the single screw securing the fan to heatsink.

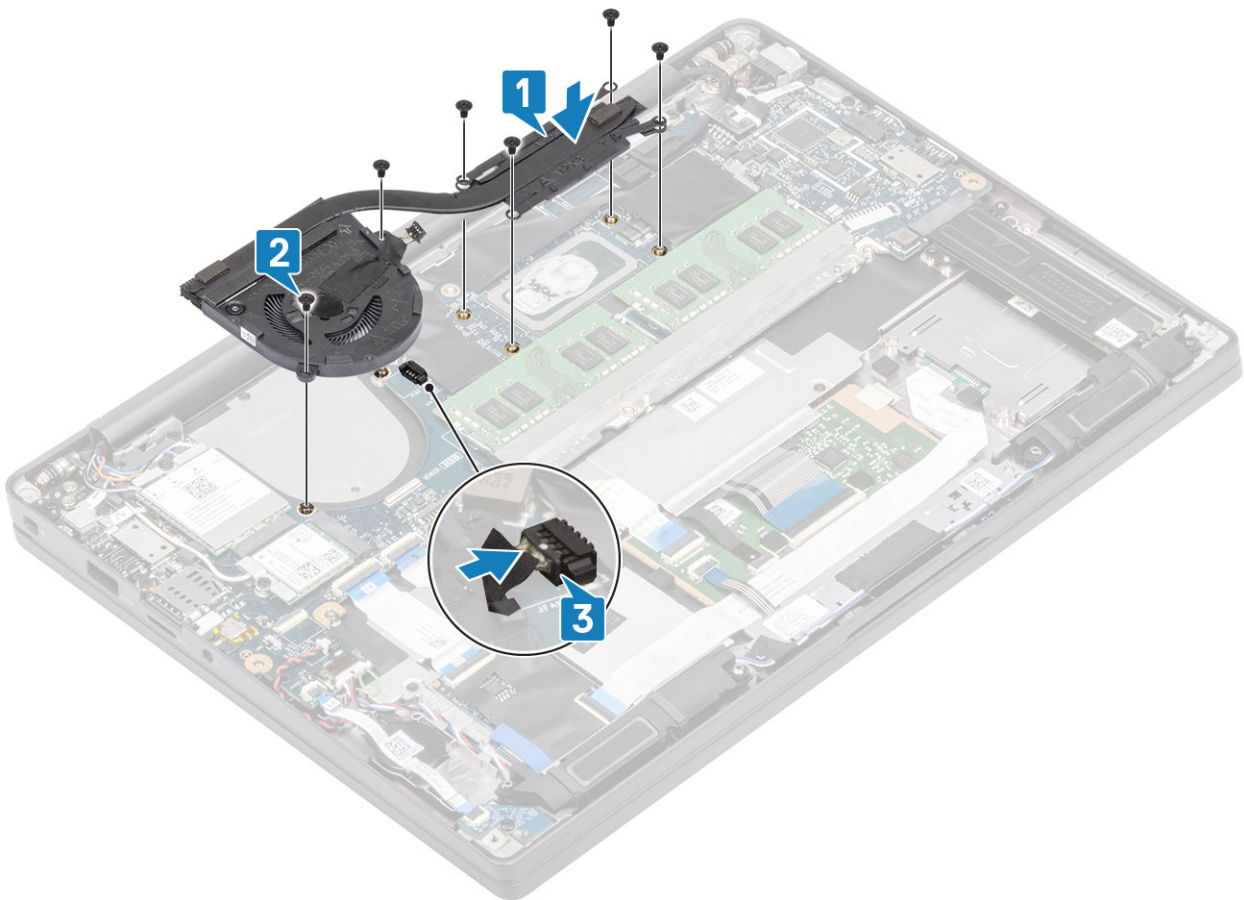


Installing the heatsink assembly

- 1 **NOTE: Heatsink and Fan are separately orderable parts.**
Install the single screw securing the fan to the heatsink.



- 2 Place the heatsink fan assembly in the computer [1].
- 3 Replace the two (M2x3) screws in sequence (2 > 1) on fan case and four (M2x3) screws in sequence (4 > 3 > 2 > 1) on the heatsink fan assembly [1].
- 4 Connect the fan cable to the system board [2].

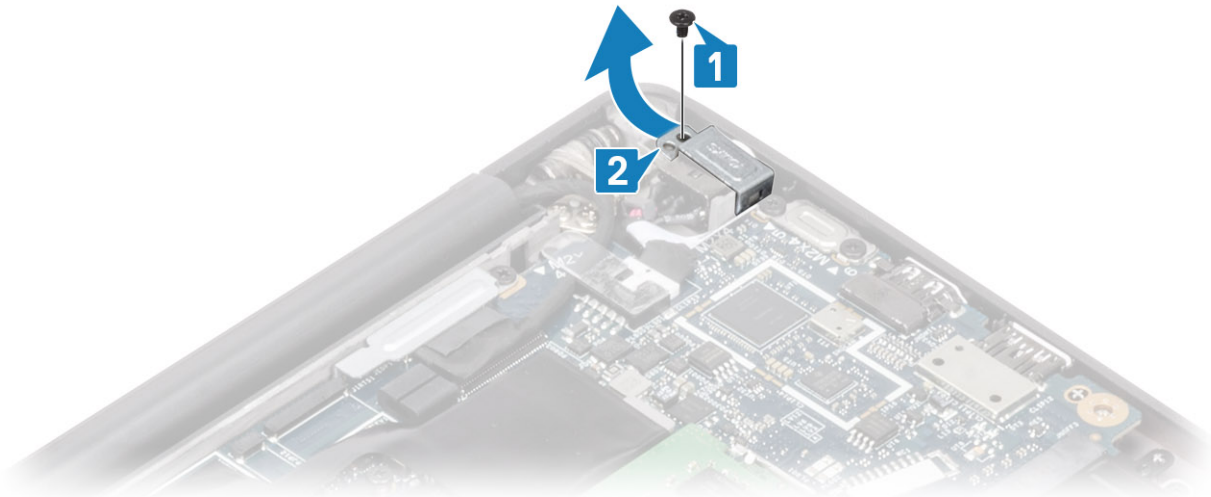


- 1 Install the [WWAN card](#).
- 2 Install the [battery](#).
- 3 Install the [base cover](#).
- 4 Follow the procedure [after working inside your computer](#).

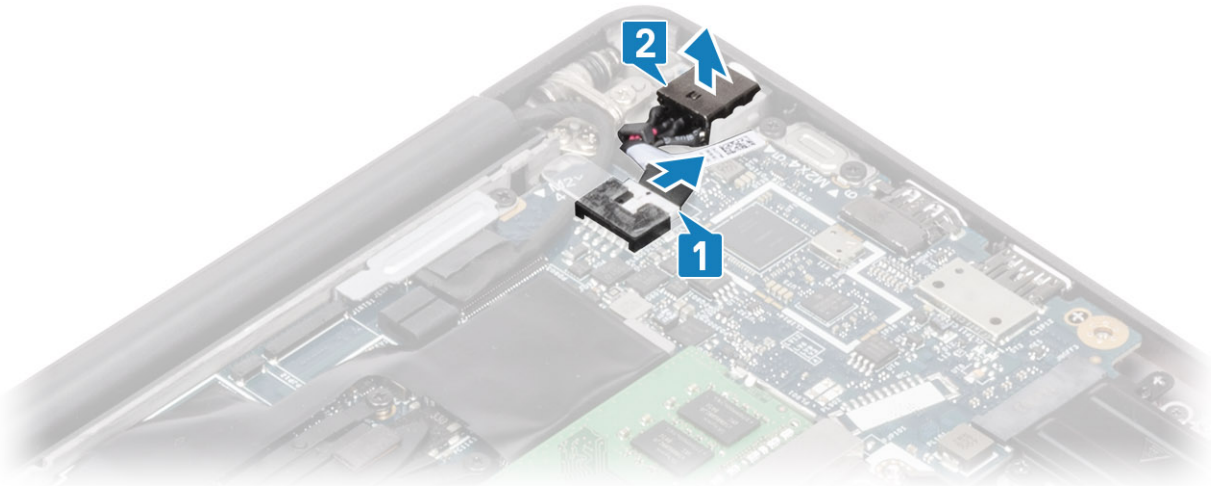
Power adapter port

Removing the power adapter port

- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [base cover](#).
- 3 Remove the [battery](#).
- 1 Remove the single (M2x3) screw from the metal bracket on the power adapter port [1].
- 2 Remove the metal bracket that secures the power adapter port [2].

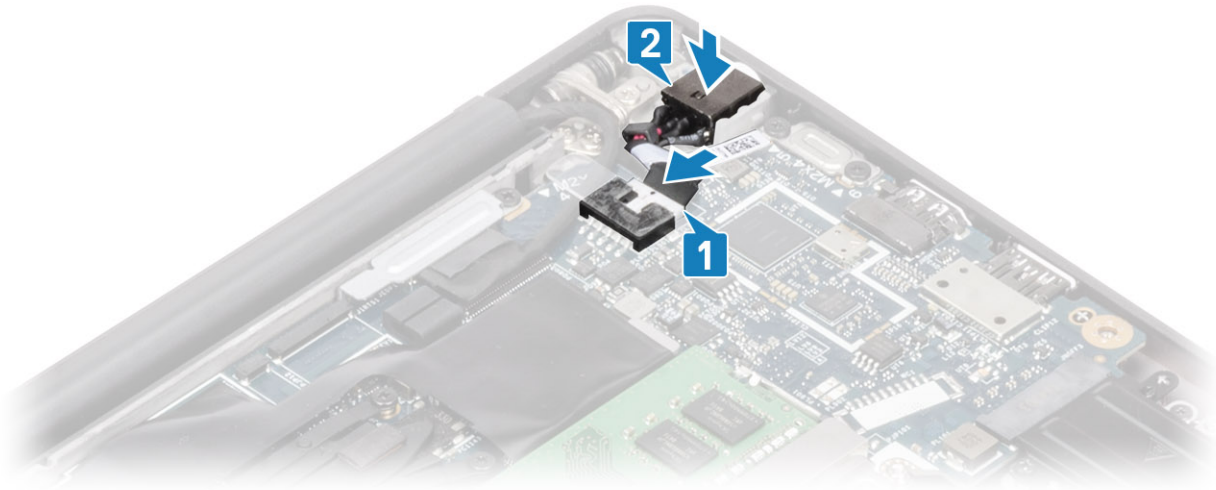


- 3 Disconnect the power adapter port cable from the system board [1].
- 4 Lift and remove the power adapter port from its slot in the palmrest [2].

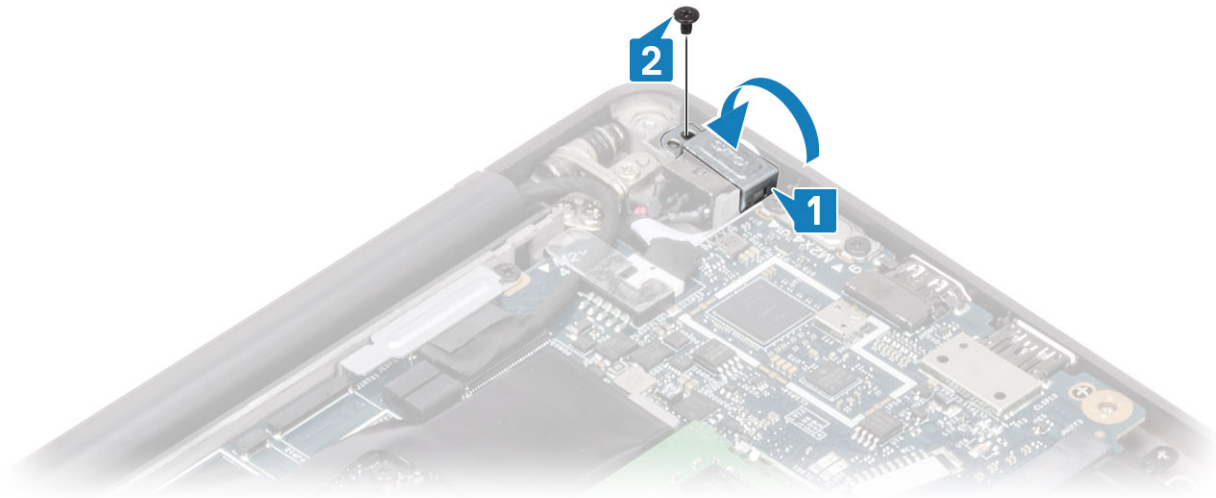


Installing the power adapter port

- 1 Connect the power adapter port cable to its connector on the system board [1].
- 2 Place the power adapter port into its slot on the palmrest [2].



- 3 Replace the metal bracket over the power adapter port [1].
- 4 Replace the single (M2x3) screw to secure the power adapter port to the palmrest assembly [2].

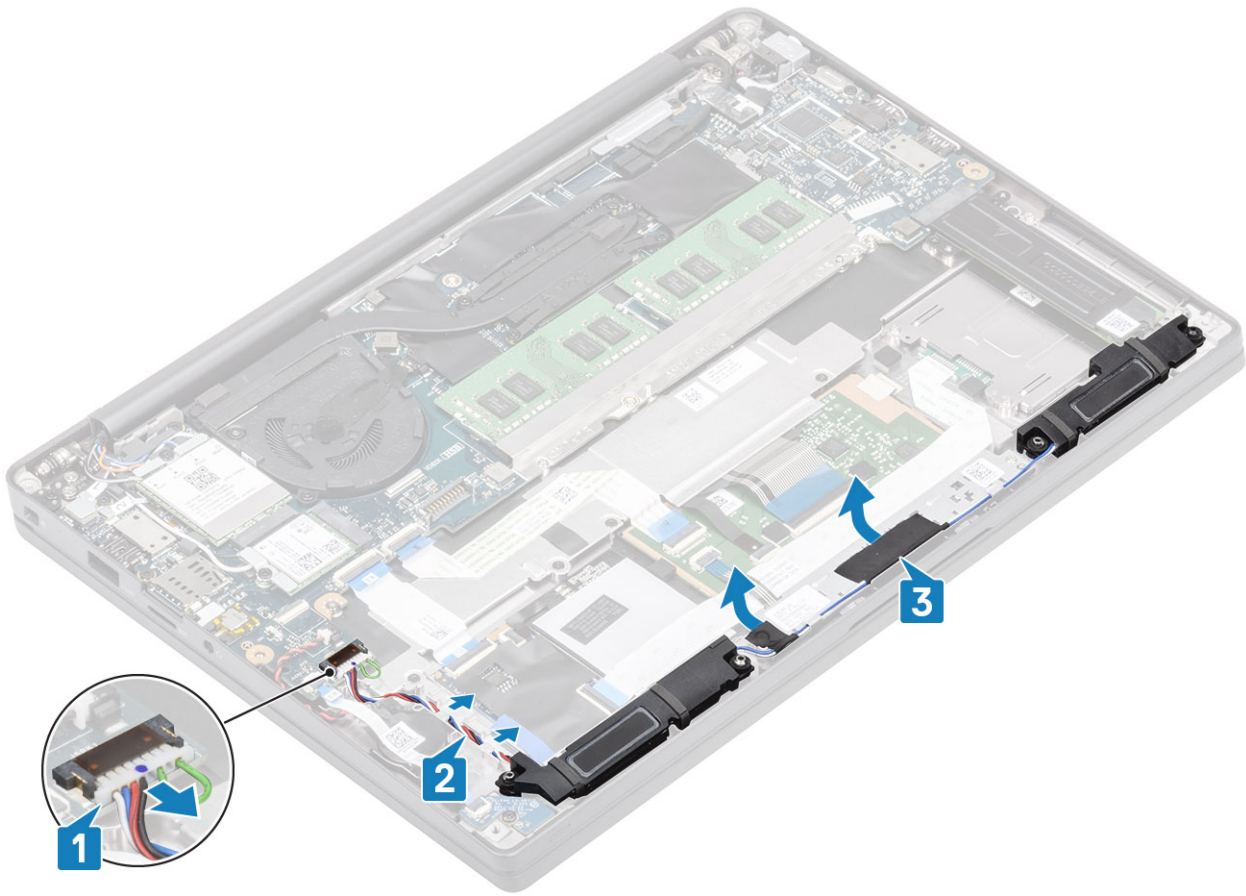


- 1 Install the [battery](#).
- 2 Install the [base cover](#).
- 3 Follow the procedure [after working inside your computer](#).

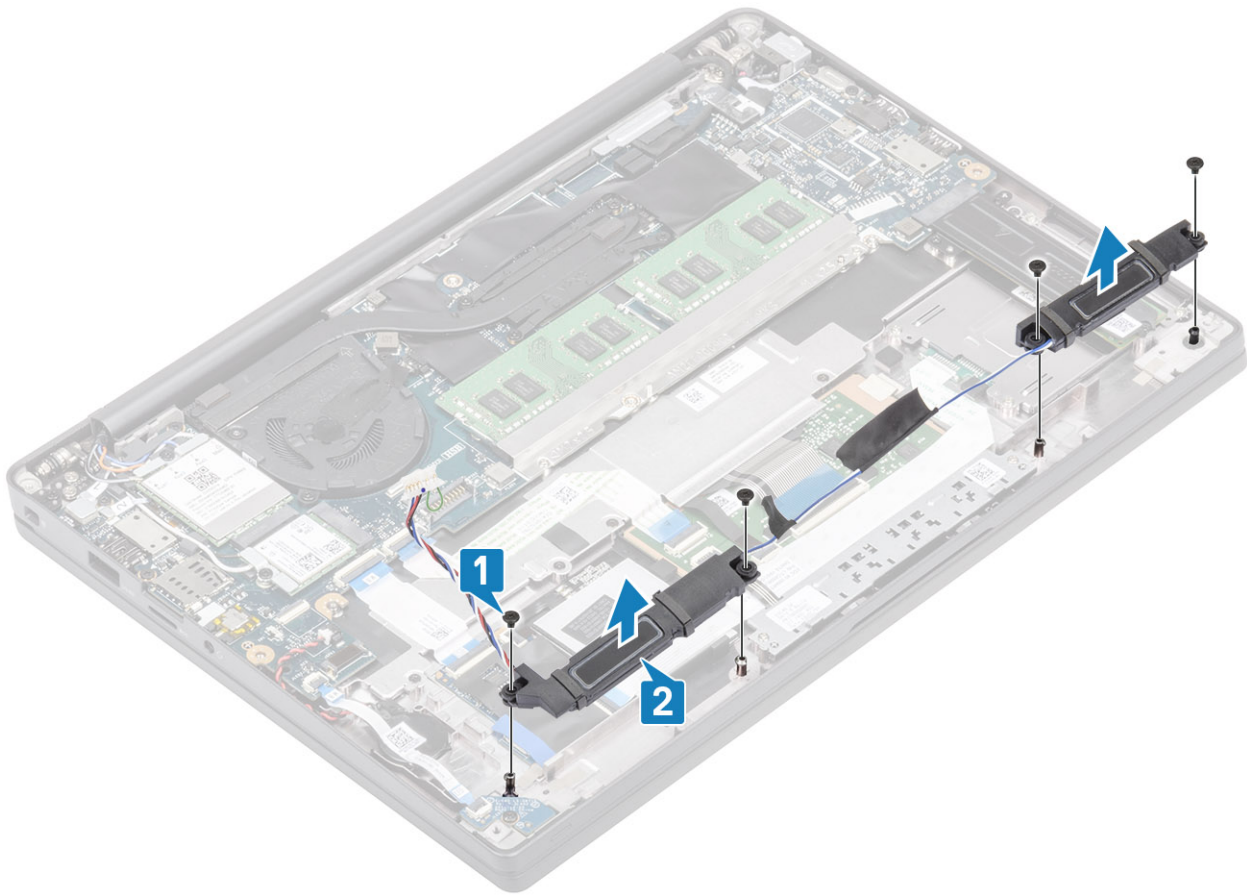
Speakers

Removing the speakers

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [base cover](#).
 - 3 Remove the [battery](#).
- 1 Disconnect the speaker cable from its connector on the system board [1].
 - 2 Unroute the speaker cable from the routing channel near the coin cell [2].
 - 3 Peel back the tape securing the speaker cable to the touchpad button board [3].

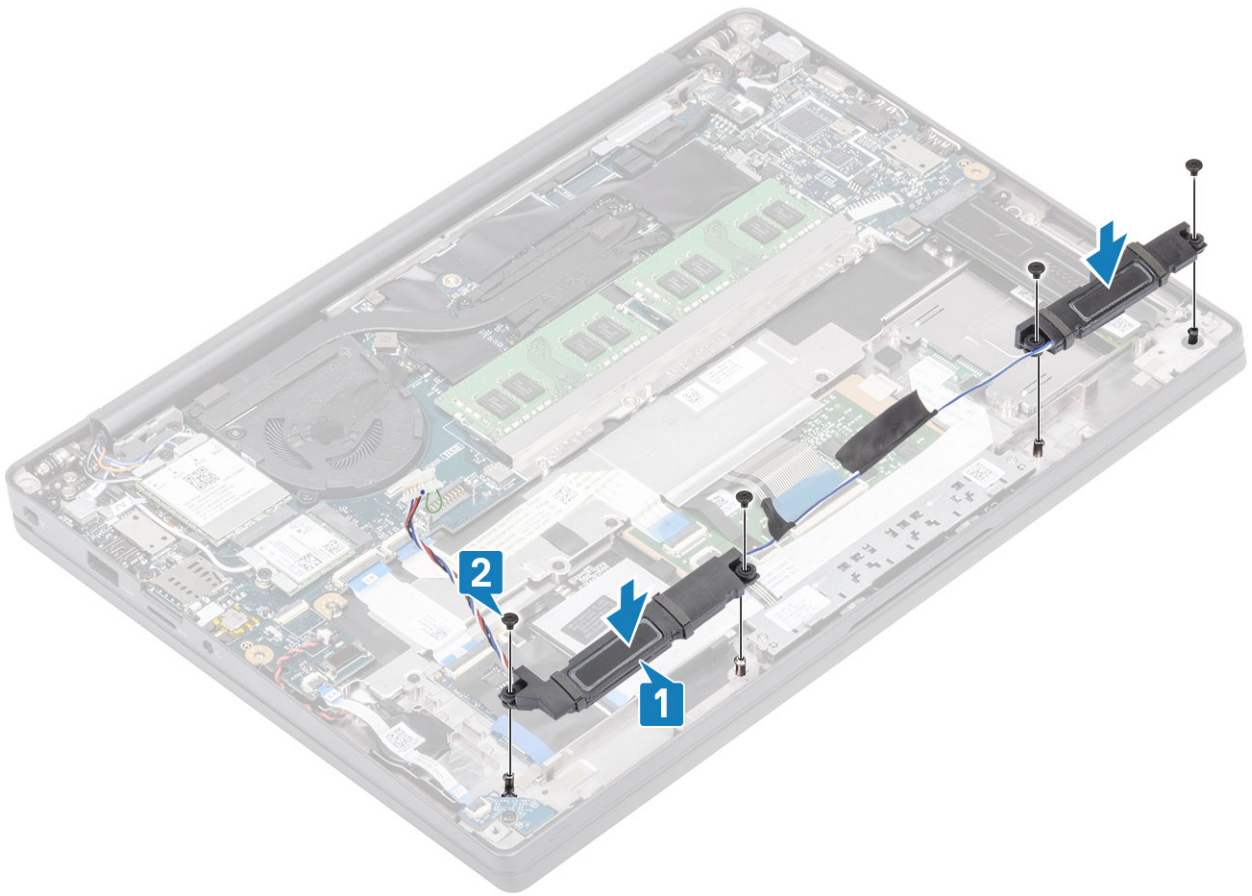


- 4 Remove the four (M2x3) screws securing the speakers to the palmrest assembly [1].
- 5 Lift and remove the speakers from the palmrest assembly [2].

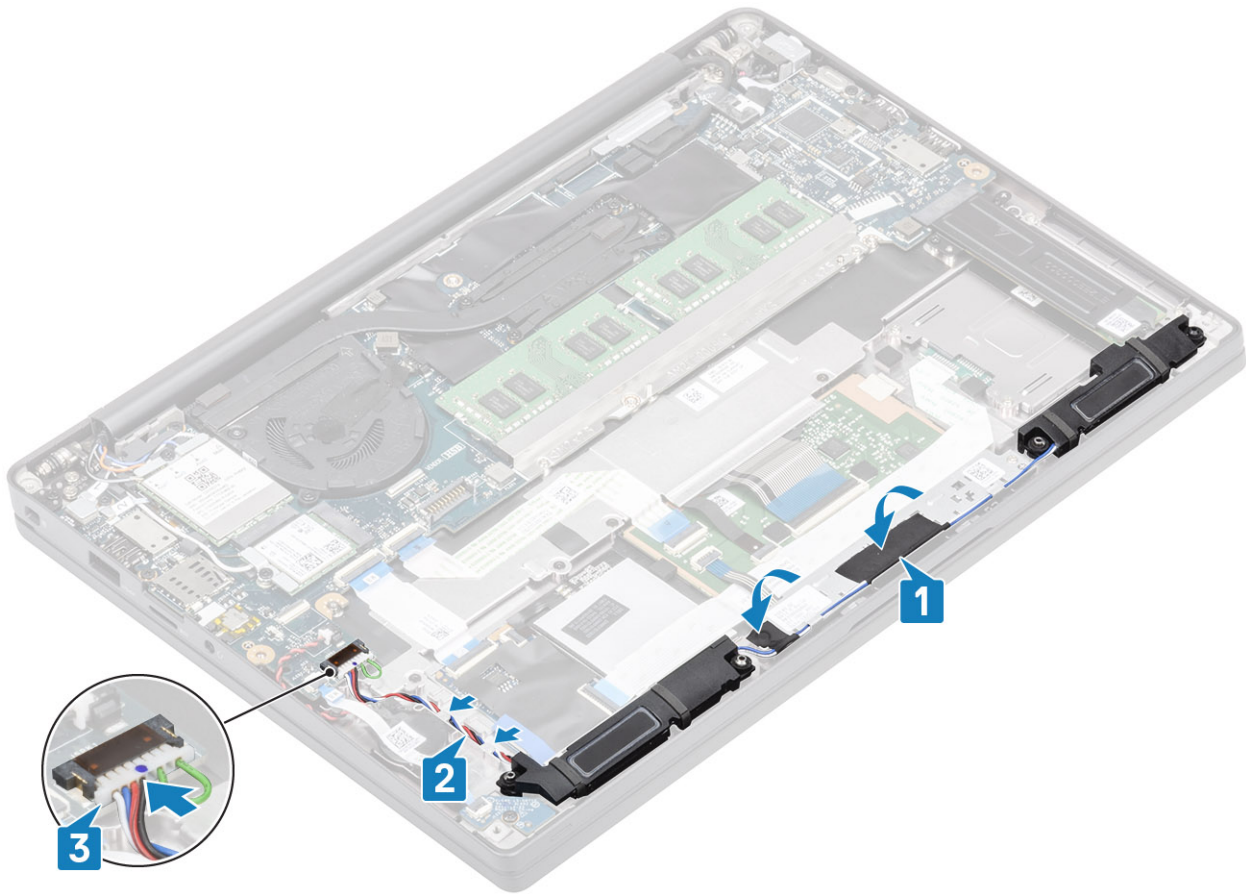


Installing the speakers

- 1 Align and place the speakers into the palmrest assembly [1].
- 2 Replace the four (M2x3) screws to secure the speakers to the palmrest assembly [2].



- 3 Adhere the tape to secure the speaker cable on the touchpad button board [1].
- 4 Route the speaker cable [2] and connect the speaker cable to the connector on the system board [3].

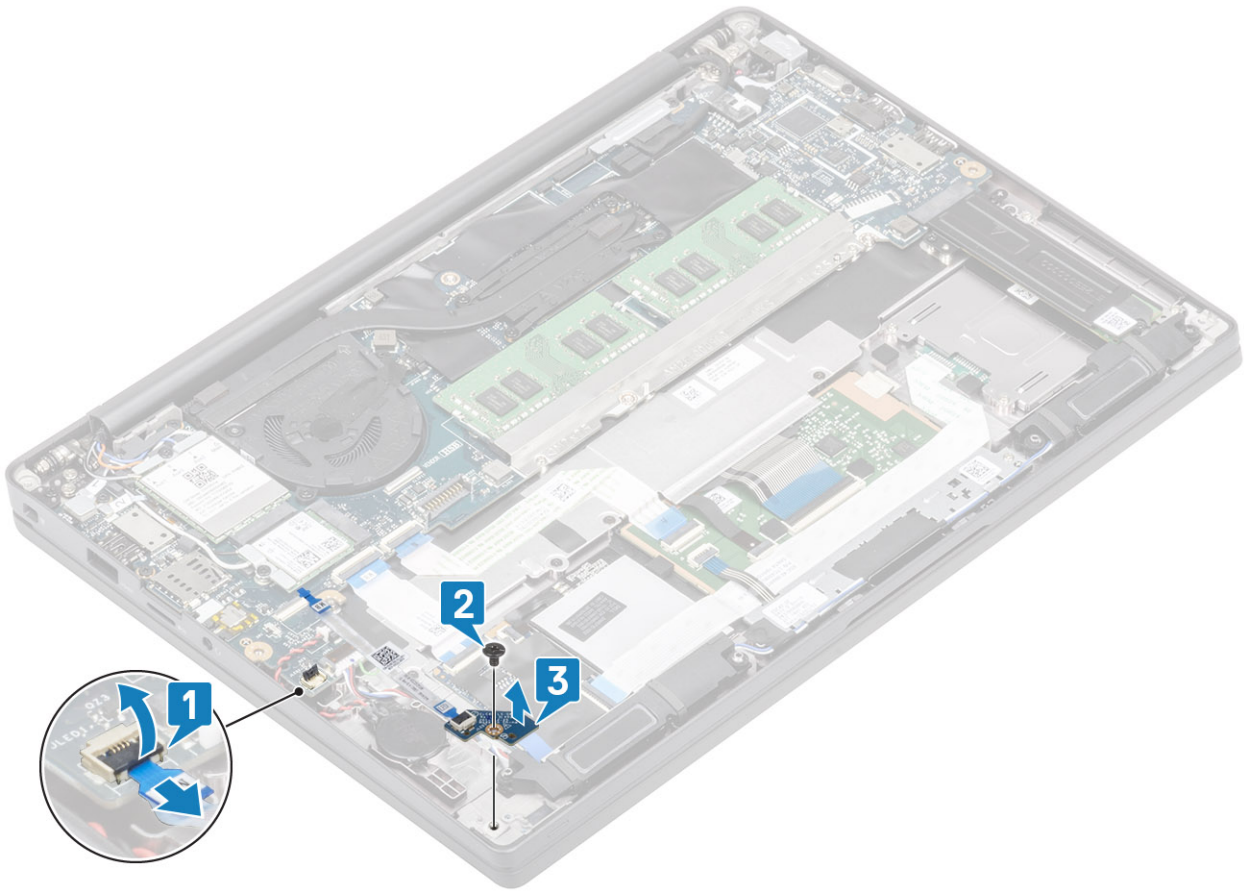


- 1 Install the [battery](#).
- 2 Install the [base cover](#).
- 3 Follow the procedure [after working inside your computer](#).

LED Board

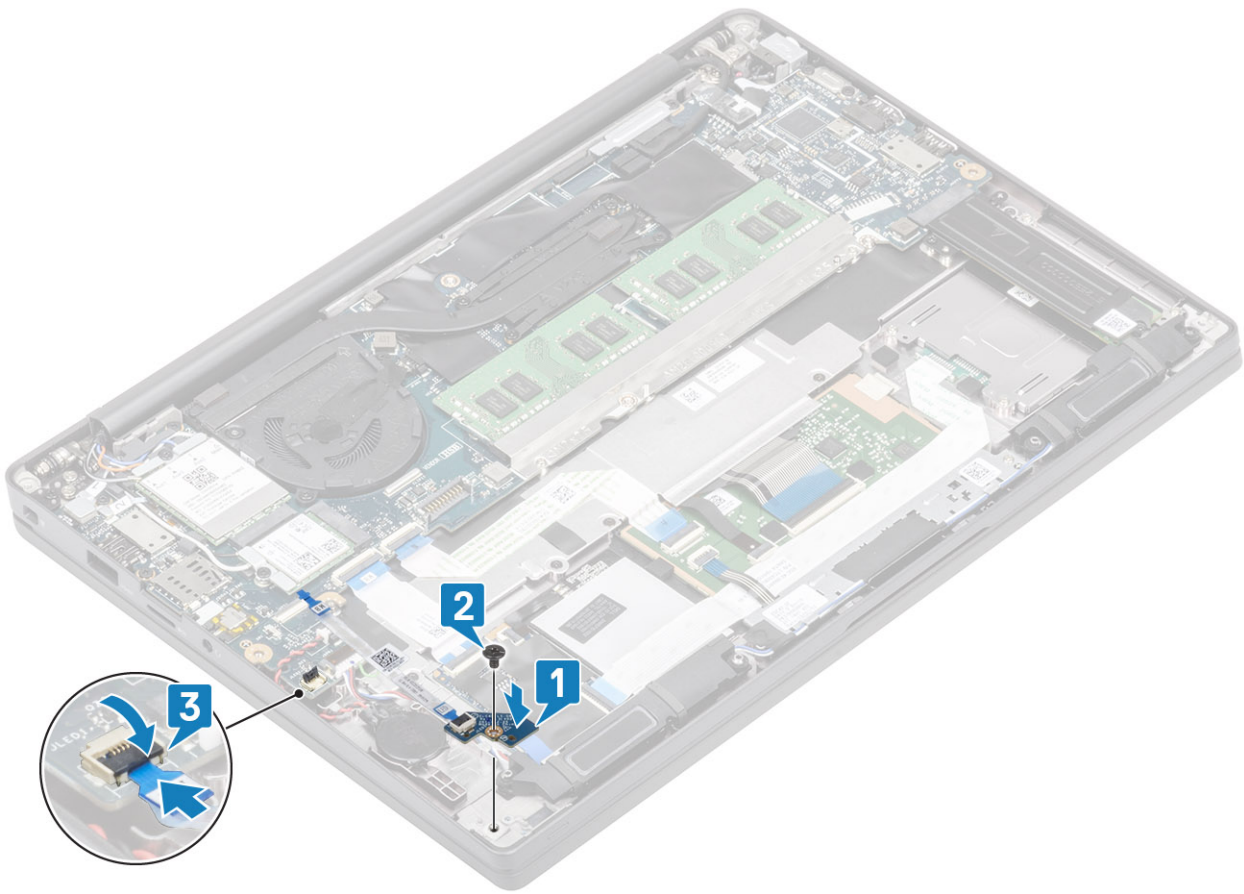
Removing the LED daughterboard

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [base cover](#).
 - 3 Remove the [battery](#).
- 1 Disconnect the LED board ribbon cable from the connector on the system board [1].
 - 2 Remove the single (M2x3) screw [2] and lift the LED daughterboard from the palmrest assembly [3].



Installing the LED daughterboard

- 1 Align and place the LED daughterboard on the palmrest assembly [1].
- 2 Replace the single (M2x3) screw securing the LED daughterboard to the palmrest assembly [2].
- 3 Connect the LED daughterboard ribbon cable to the system board [3].

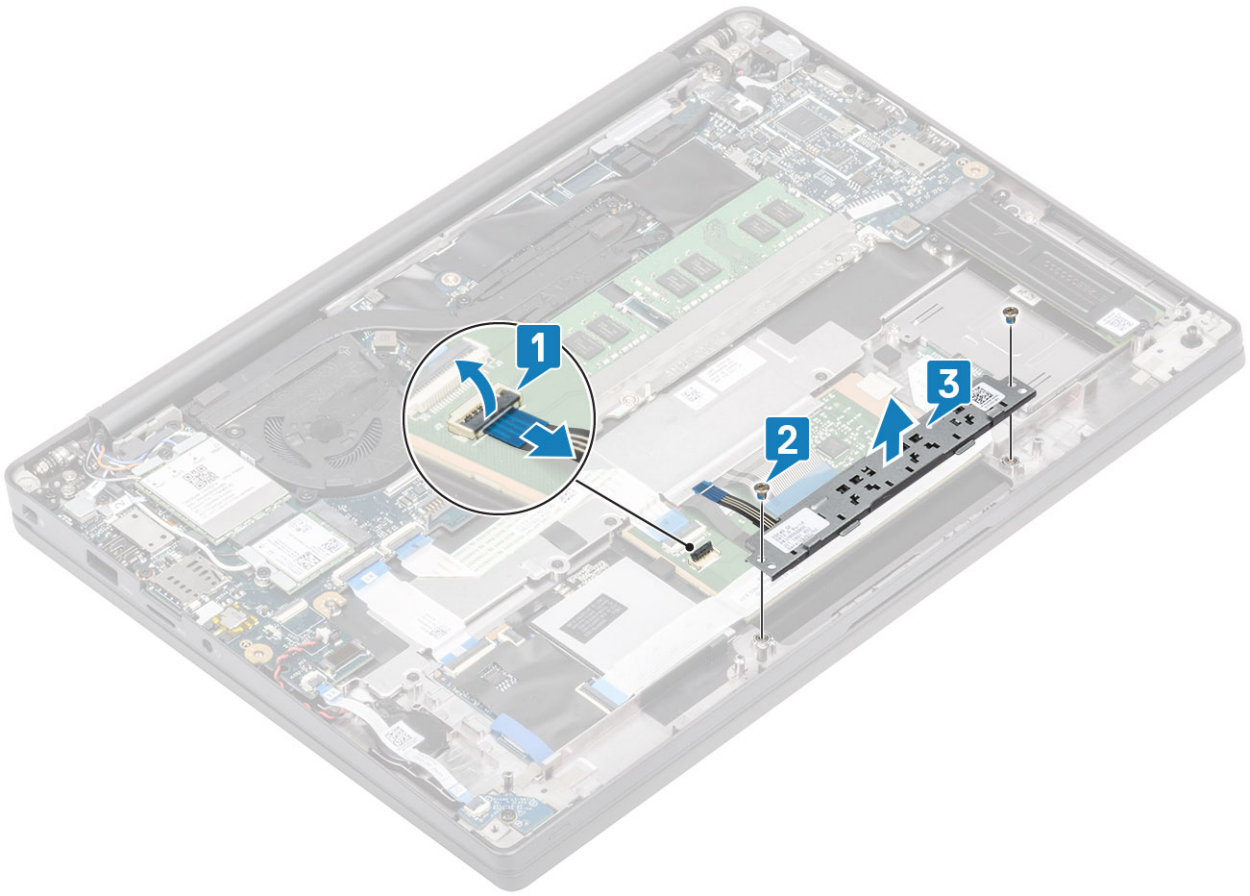


- 1 Connect the [speaker cable](#)
- 2 Install the [battery](#).
- 3 Install the [base cover](#).
- 4 Follow the procedure [after working inside your computer](#).

Touchpad button board

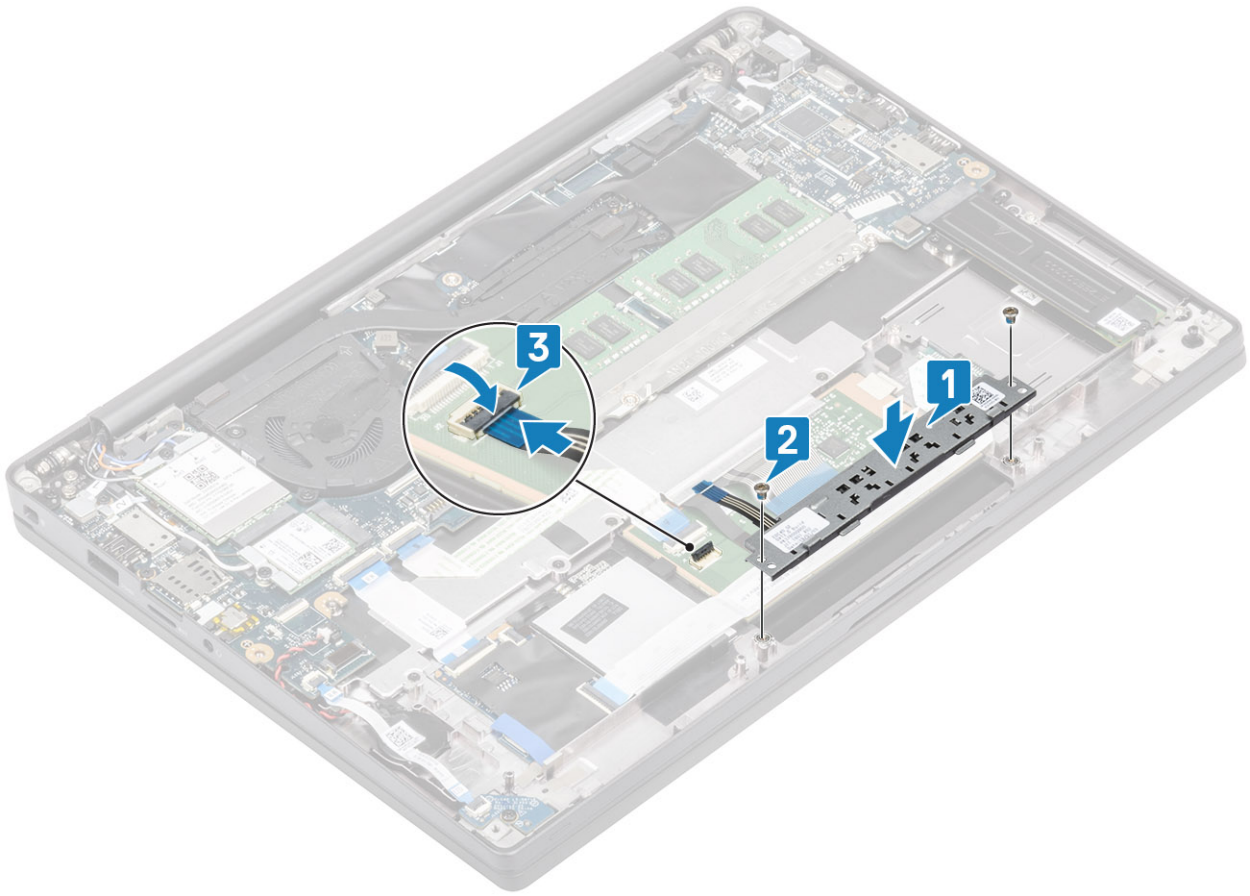
Removing the touchpad button board

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [base cover](#).
 - 3 Remove the [battery](#).
 - 4 Remove the [speaker](#).
- 1 Disconnect the touchpad button board cable from the touchpad module [1].
 - 2 Remove the two (M2x2.5) screws that secures touchpad button board to the palmrest assembly [2].
 - 3 Remove the touchpad button board from the palmrest assembly [3].



Installing the touchpad button board

- 1 Place the touchpad button board on the palmrest assembly [1].
- 2 Replace the two (M2x2.5) screws to secure it to the palmrest assembly [2].
- 3 Connect the touch pad button board cable to the touchpad module [3].

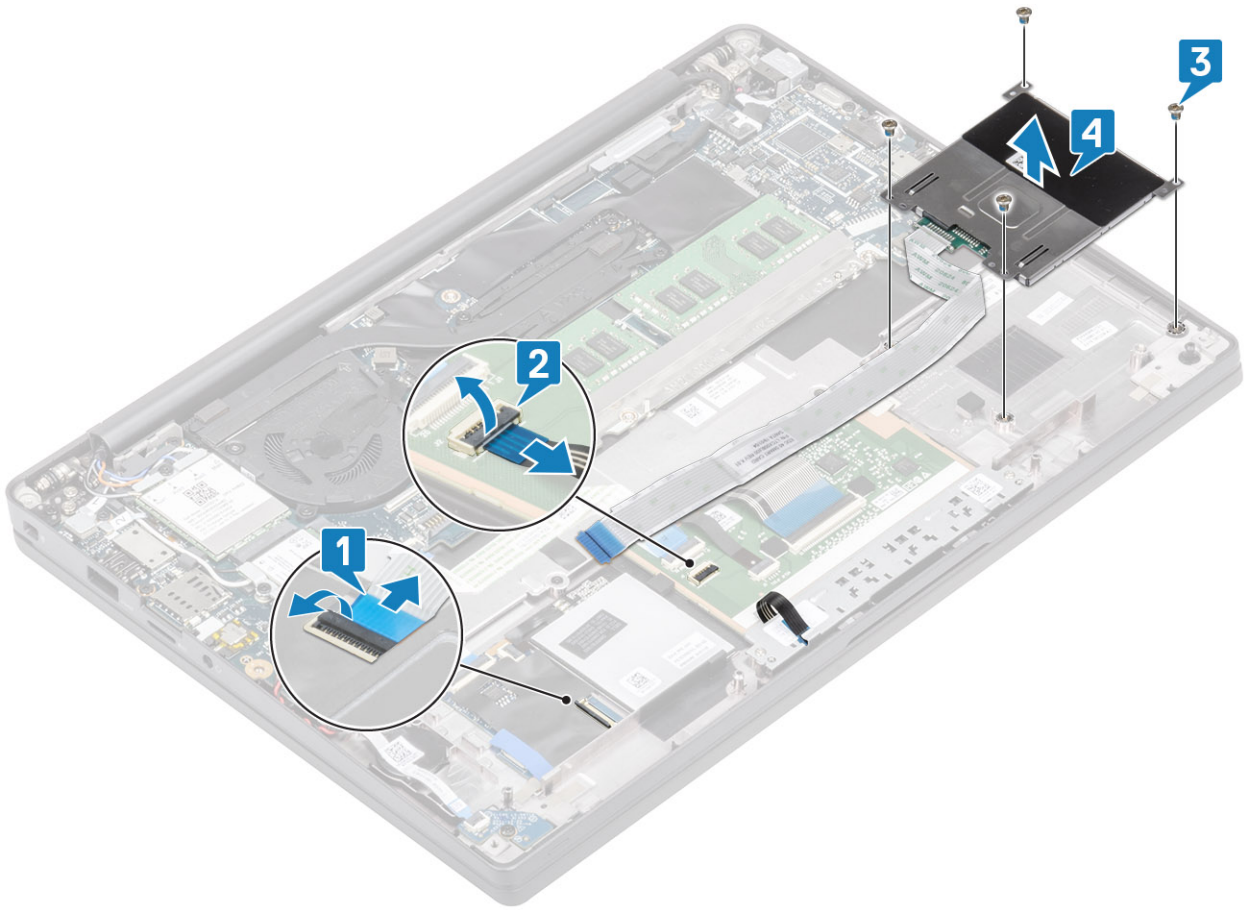


- 1 Install the [speaker](#).
- 2 Install the [battery](#).
- 3 Install the [base cover](#).
- 4 Follow the procedure [after working inside your computer](#).

Smart card reader

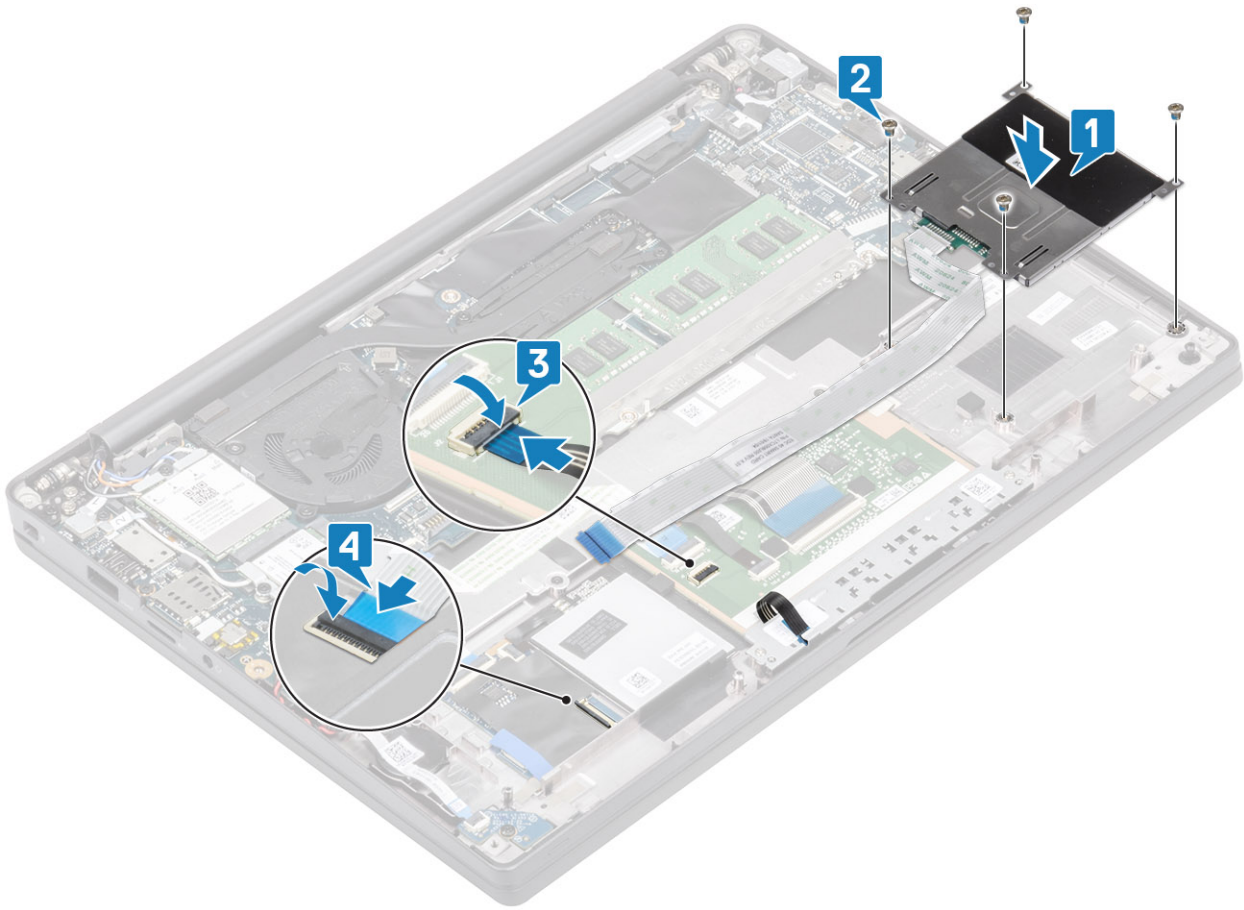
Removing the smart card reader

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [base cover](#).
 - 3 Remove the [battery](#).
 - 4 Remove the [SSD](#).
 - 5 Remove the [speaker](#).
- 1 Disconnect the smart card reader cable from the USH board [1].
 - 2 Disconnect the touchpad button cable from the touchpad module [2].
 - 3 Remove the four (M2x2.5) screws securing the smart card reader to the palmrest assembly [3].
 - 4 Remove the smart card reader from the computer [4].



Installing the smart card reader

- 1 Replace the smart card reader into its slot on the palmrest assembly [1].
- 2 Replace the four (M2x2.5) screws securing it to the palmrest assembly [2].
- 3 Connect the touchpad button board cable to the touchpad module [3].
- 4 Connect the smart card reader cable to the USH board [4].

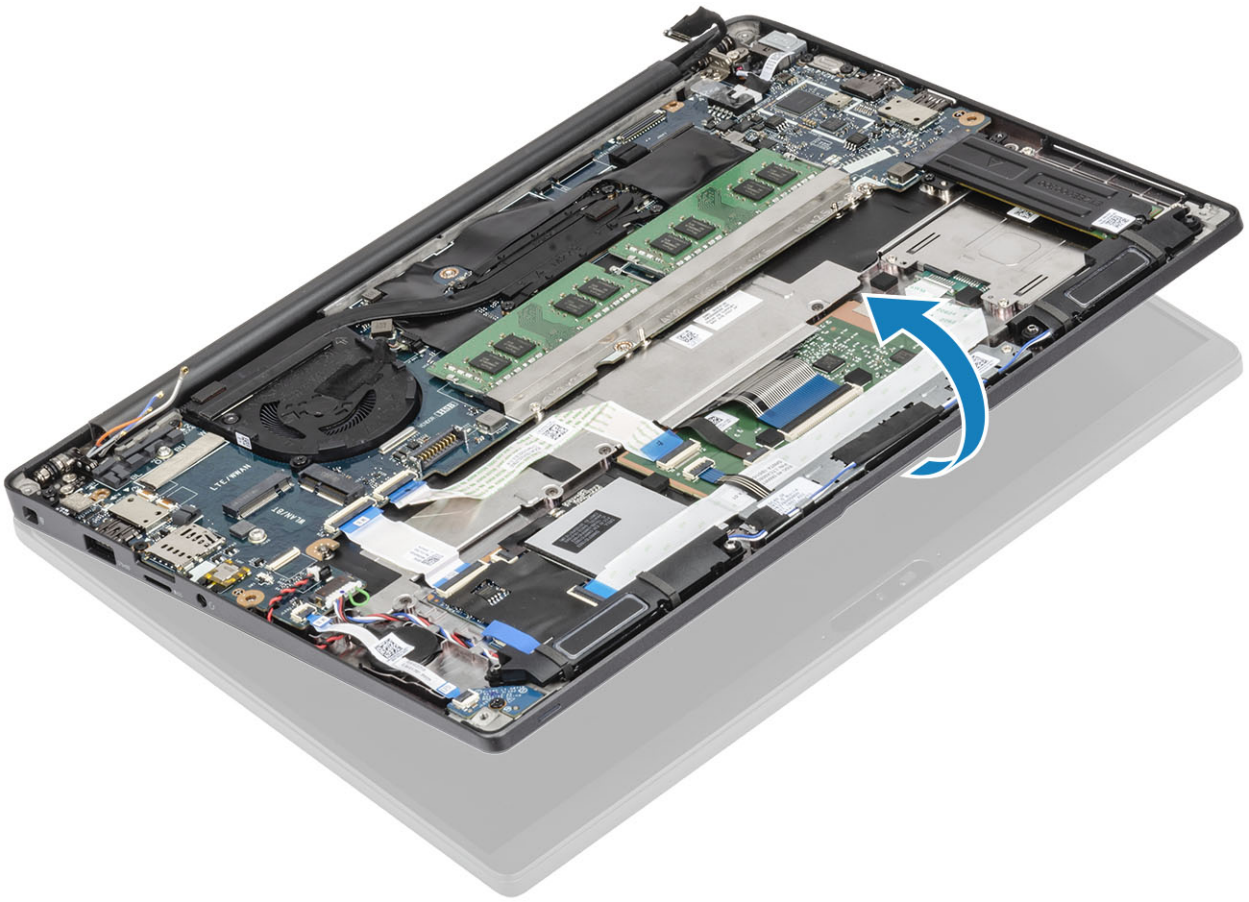


- 1 Install the [speakers](#).
- 2 Install the [SSD](#).
- 3 Install the [battery](#).
- 4 Install the [base cover](#).
- 5 Follow the procedure [after working inside your computer](#).

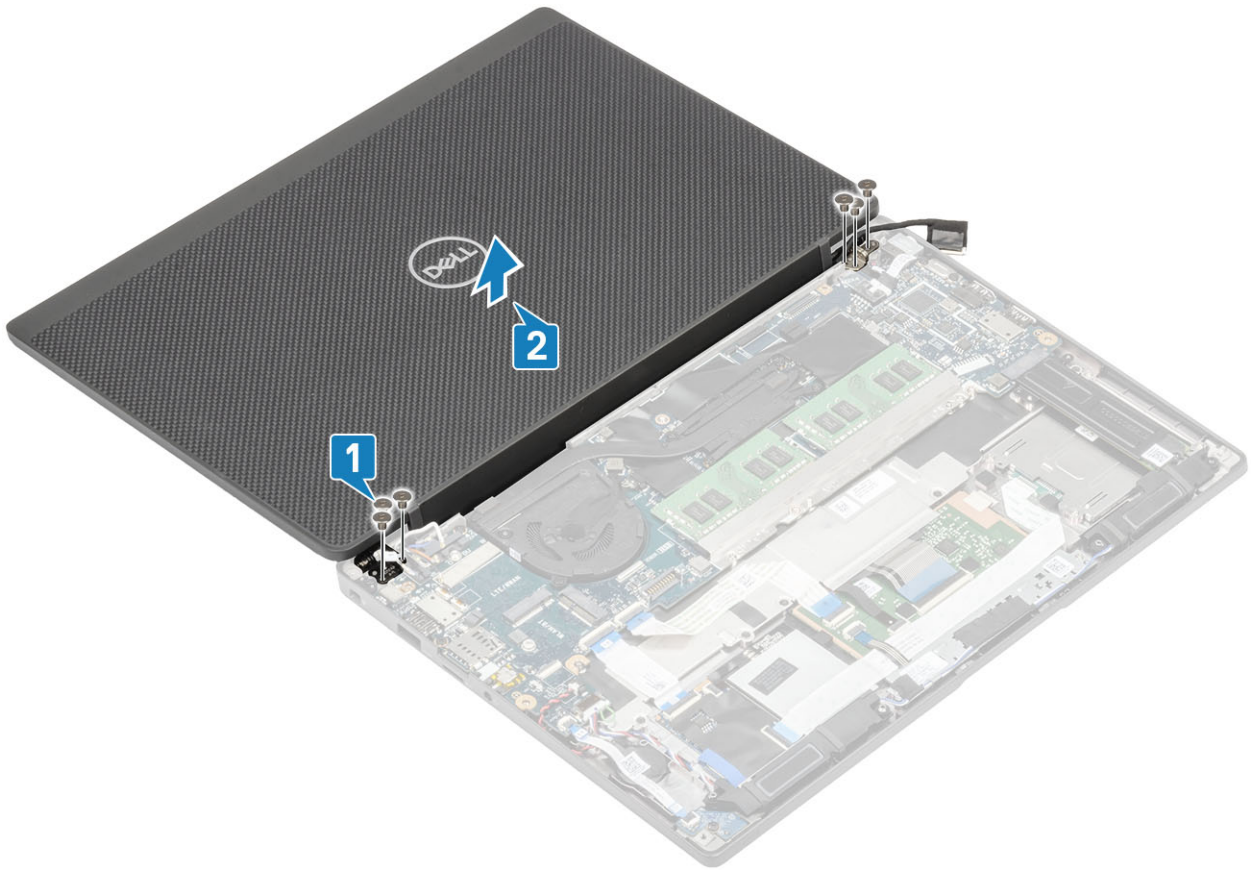
Display assembly

Removing the display assembly

- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [base cover](#).
- 3 Remove the [battery](#).
- 1 Open the display lid 180 degrees.

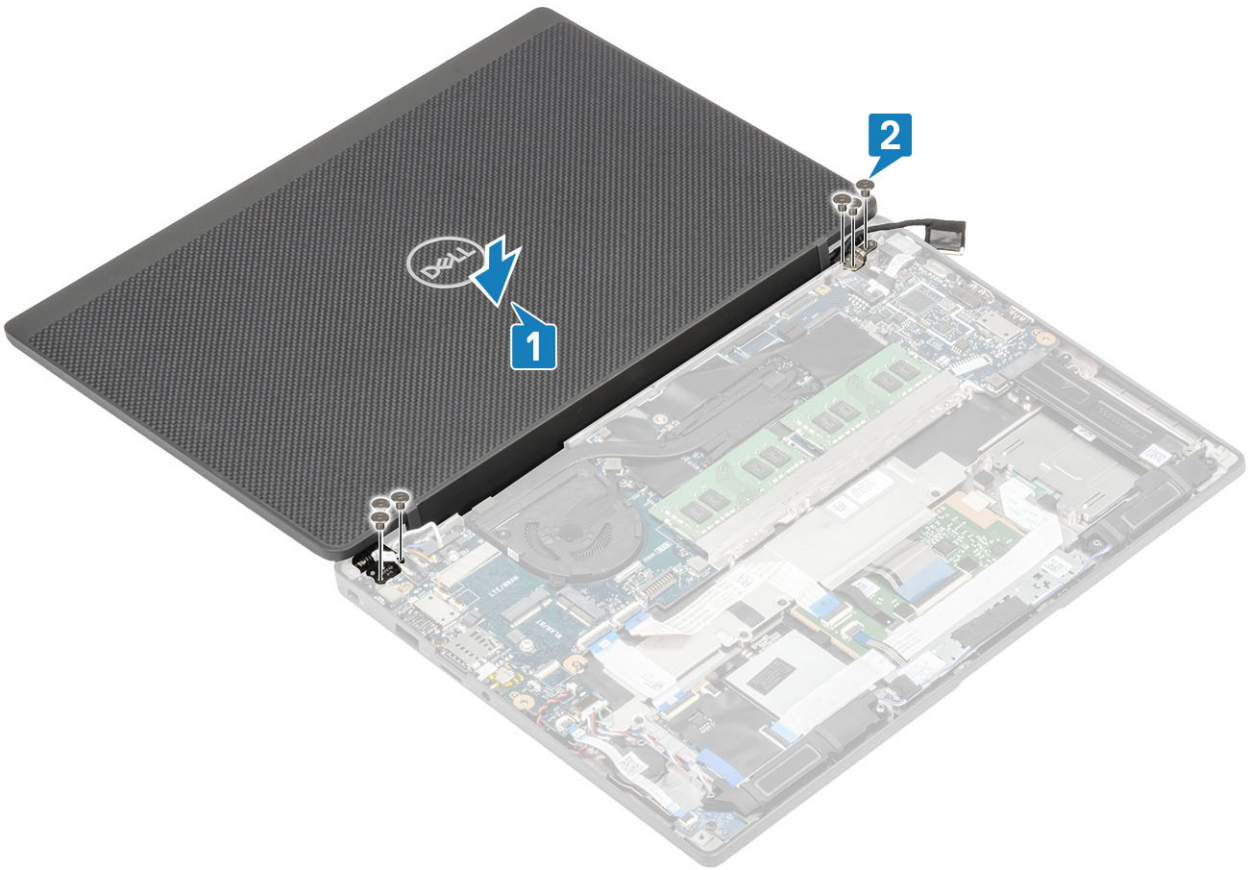


- 2 Remove the six (M2.5x4) screws [1] and remove the display assembly from the palmrest assembly [2].

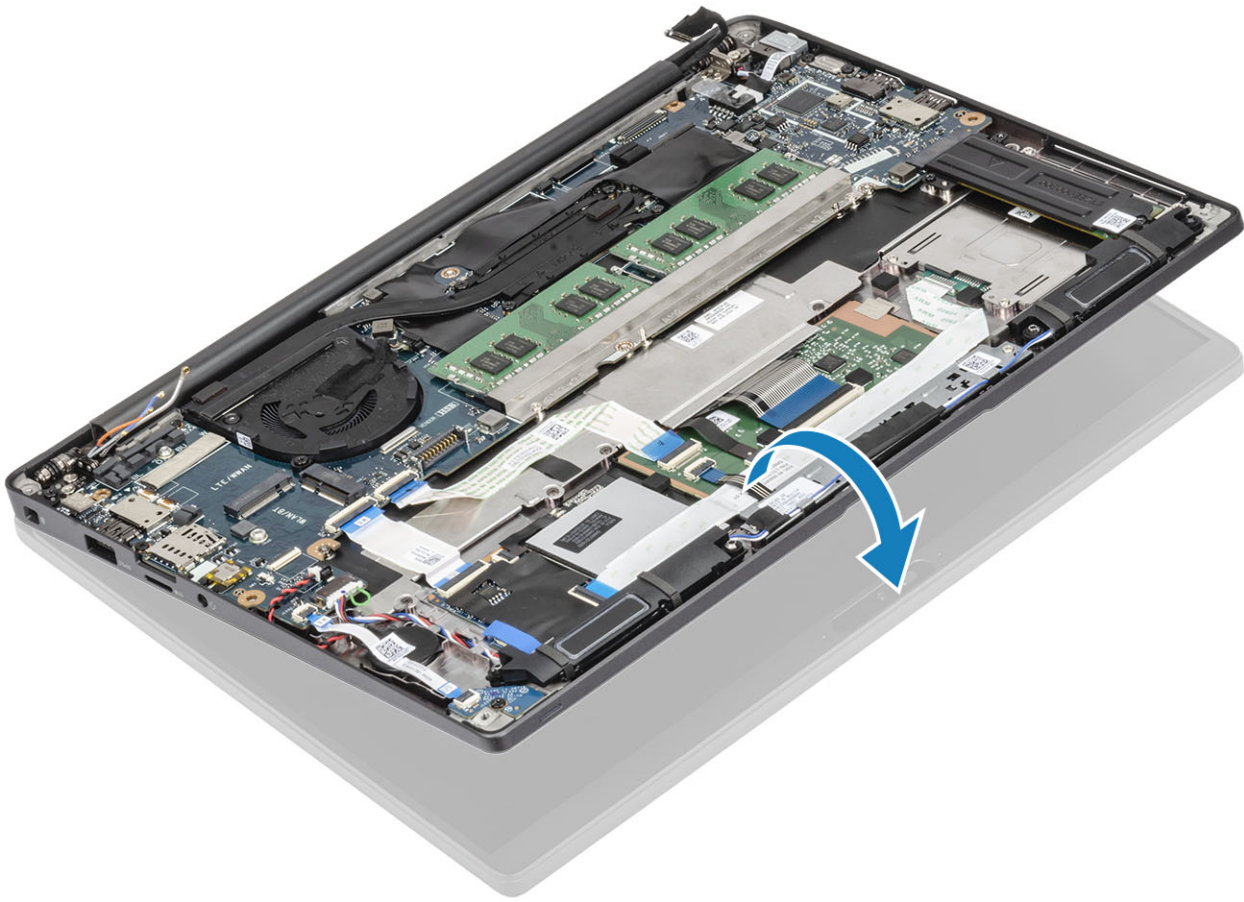


Installing the display assembly

- 1 Replace the display assembly aligning the screw holes on the hinges with the screw holes on the palmrest assembly [1].
- 2 Replace the six (M2.5x3.5) screws [2] to secure the display assembly to the computer [2].



3 Close the LCD lid.

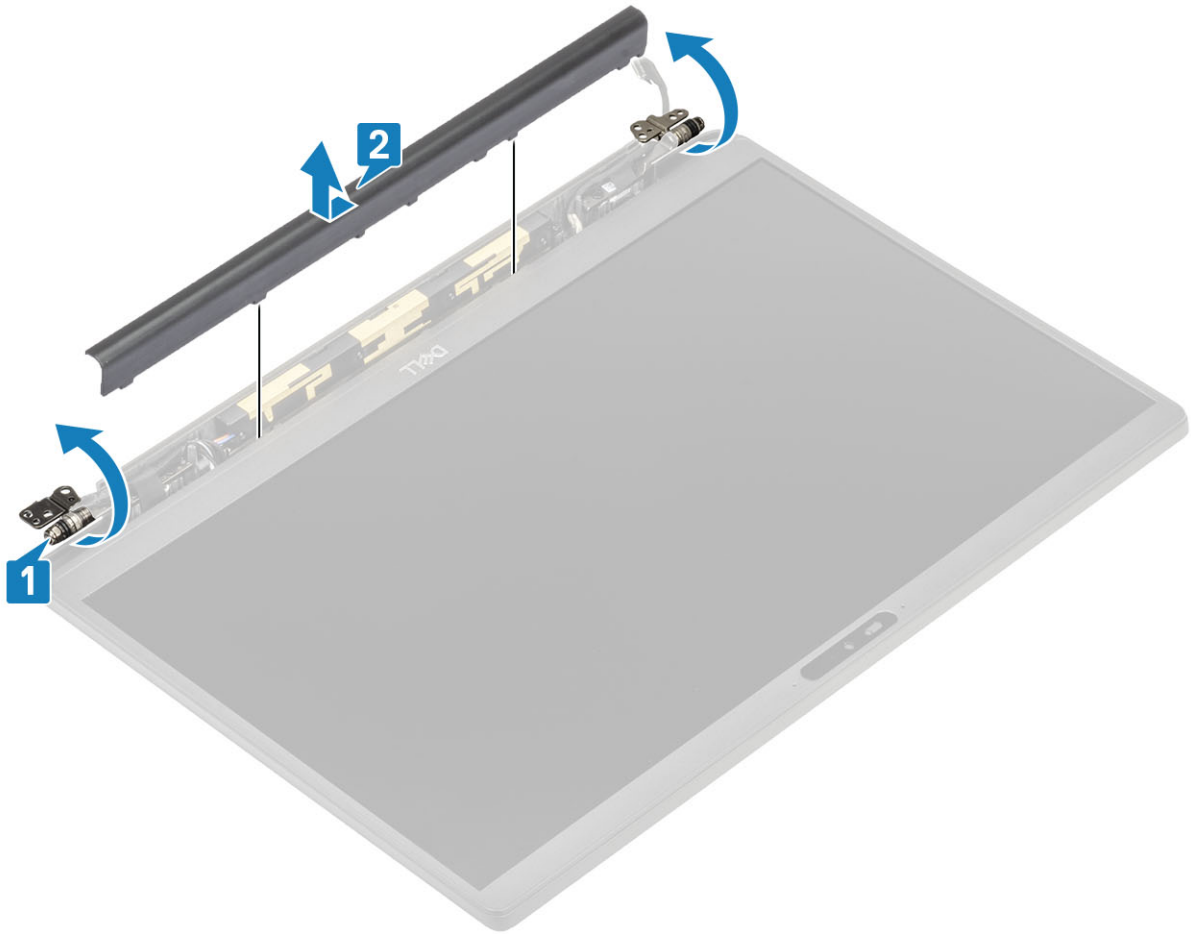


- 1 Install the [battery](#).
- 2 Install the [base cover](#).
- 3 Follow the procedure [after working inside your computer](#).

Hinge caps

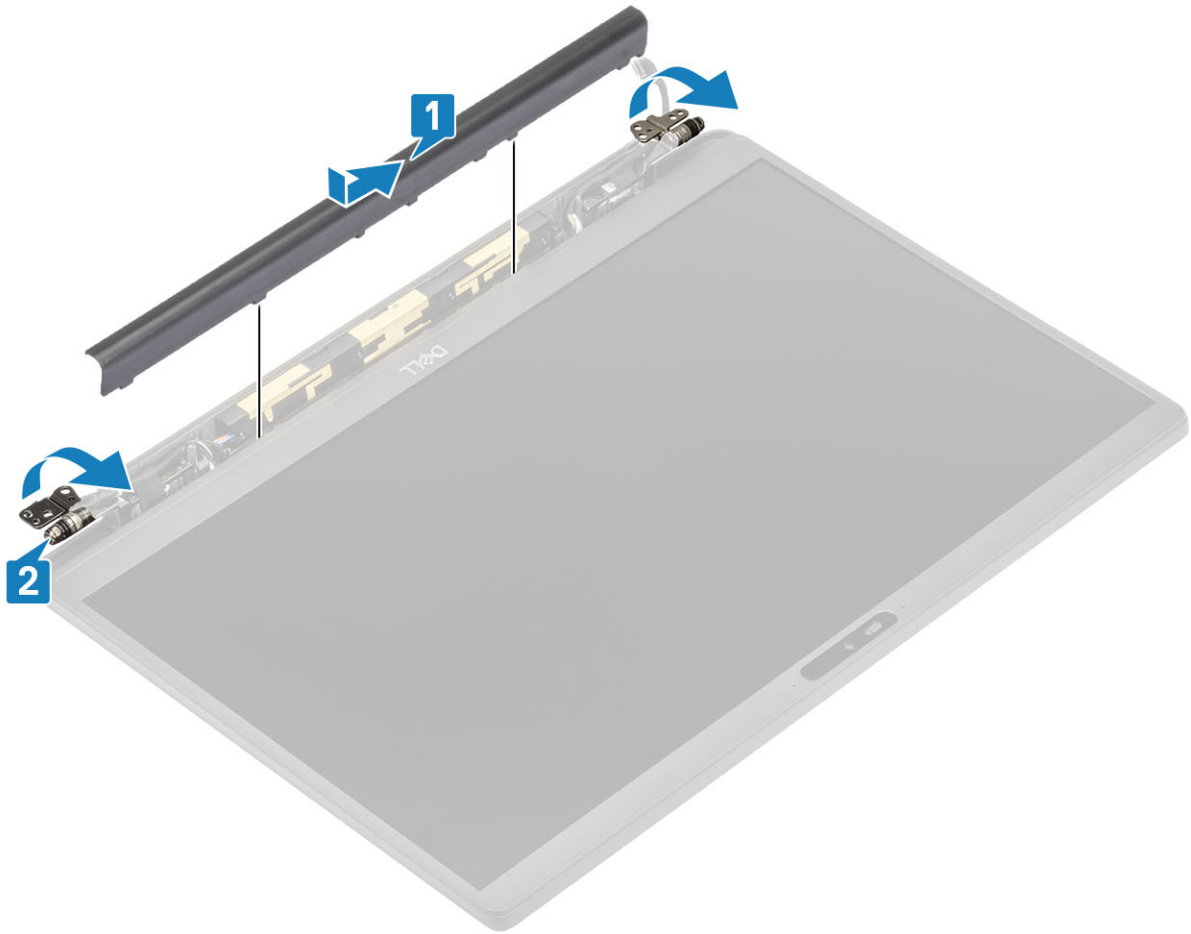
Removing the hinge cap

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [base cover](#).
 - 3 Remove the [battery](#).
 - 4 Remove the [display assembly](#).
- 1 Open the hinges to 90 degrees to the display assembly [1].
 - 2 Slide the hinge cap towards the right hinge and lift it away from the display assembly [2].



Installing the hinge cap

- 1 Slide the hinge cap towards the left hinge until it click locks on the display assembly [1].
- 2 Close the hinges to 180 degrees to the display assembly [2].

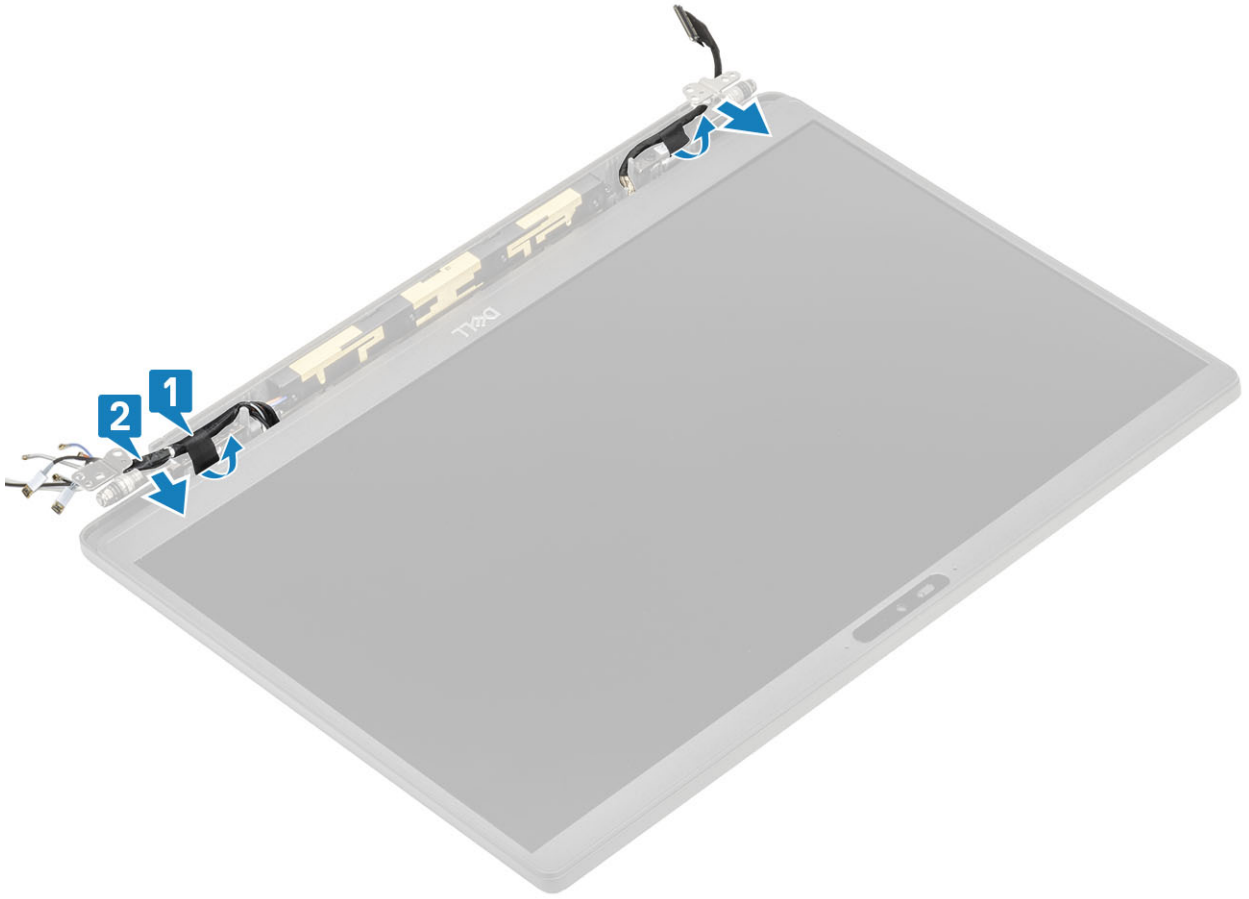


- 1 Install the [display assembly](#)
- 2 Install the [battery](#).
- 3 Install the [base cover](#).
- 4 Follow the procedure [after working inside your computer](#).

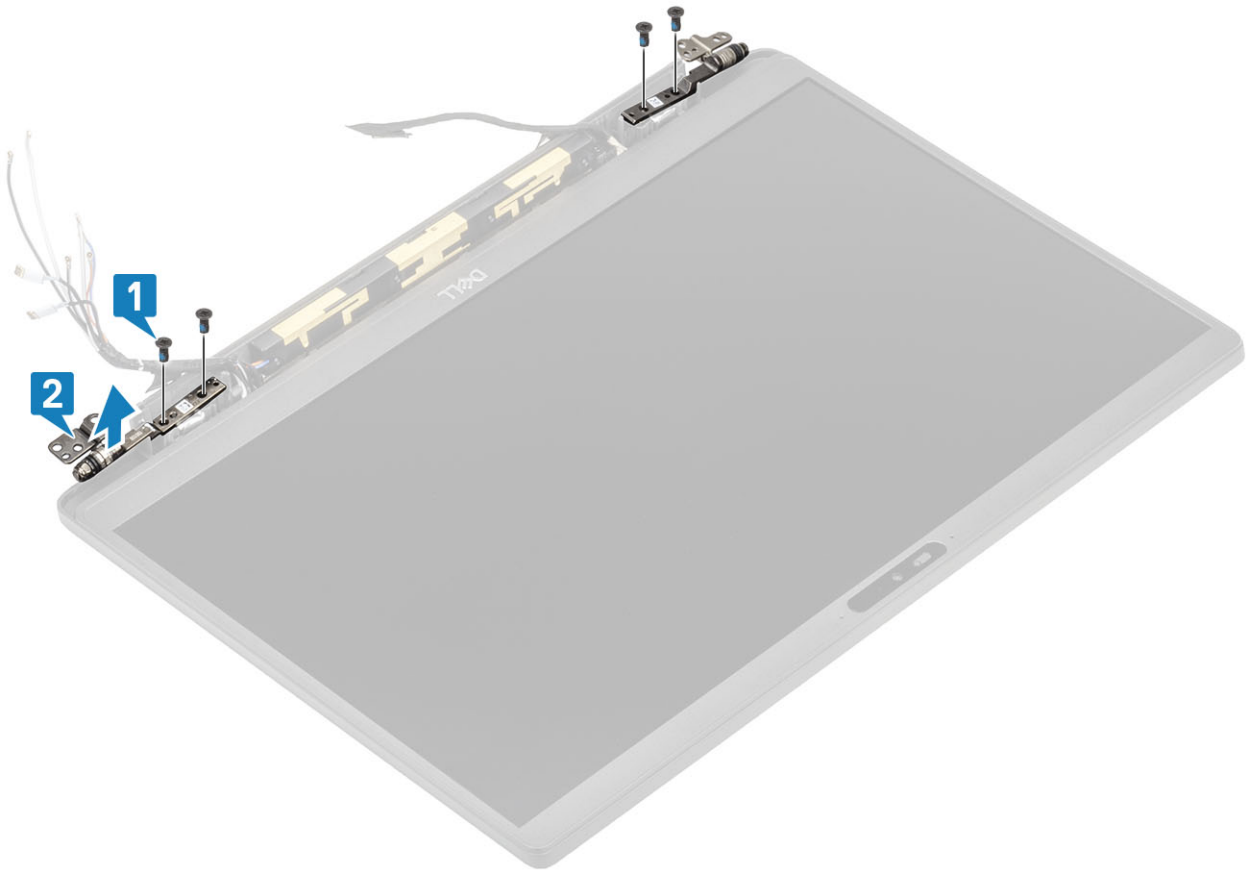
Display Hinges

Removing the hinges

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [base cover](#).
 - 3 Remove the [battery](#).
 - 4 Remove the [display assembly](#).
 - 5 Remove the [hinge cap](#).
- 1 Unroute the antennae and display cable away from the hinges.

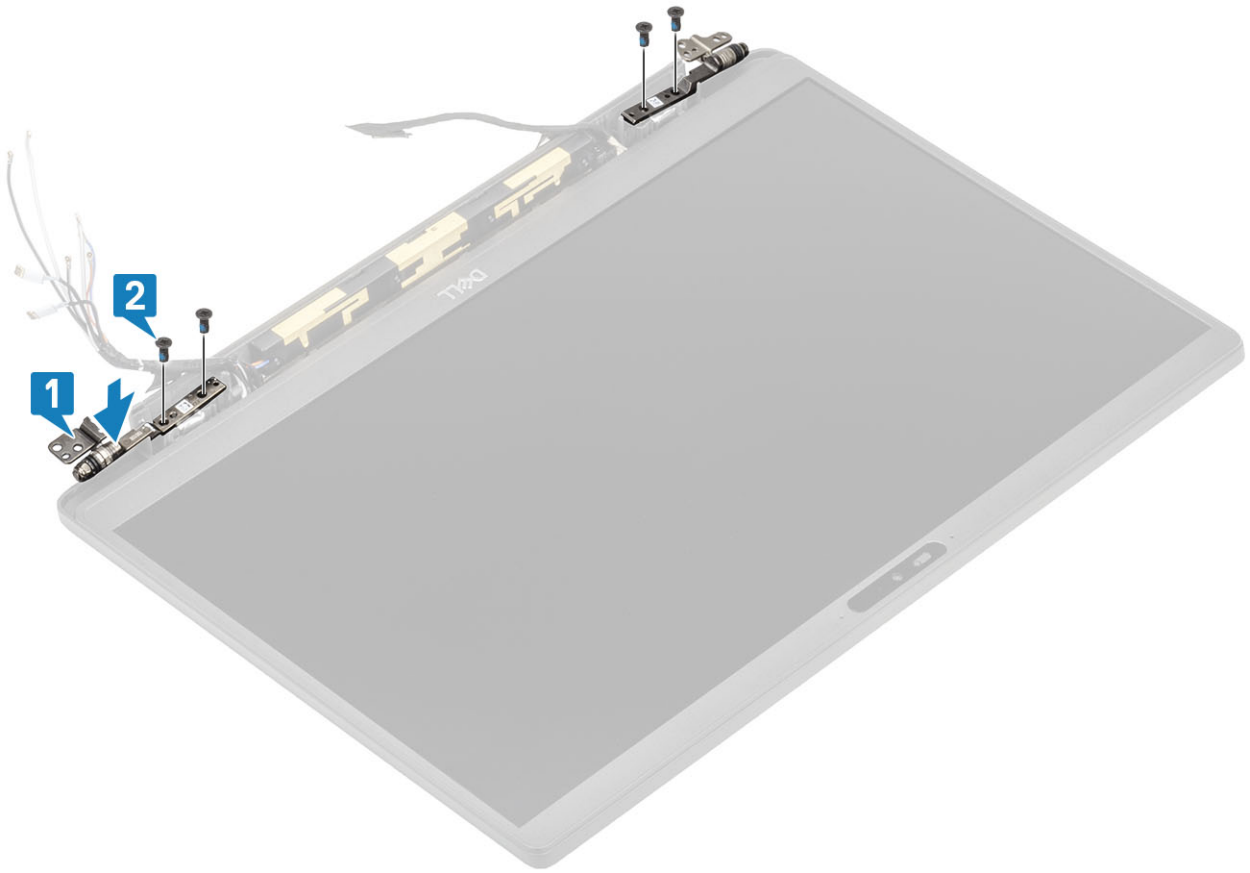


- 2 Remove the four (M2.5x5) screws [1] securing the hinges to the display assembly.
- 3 Lift and remove the hinges from the display back cover assembly [2].

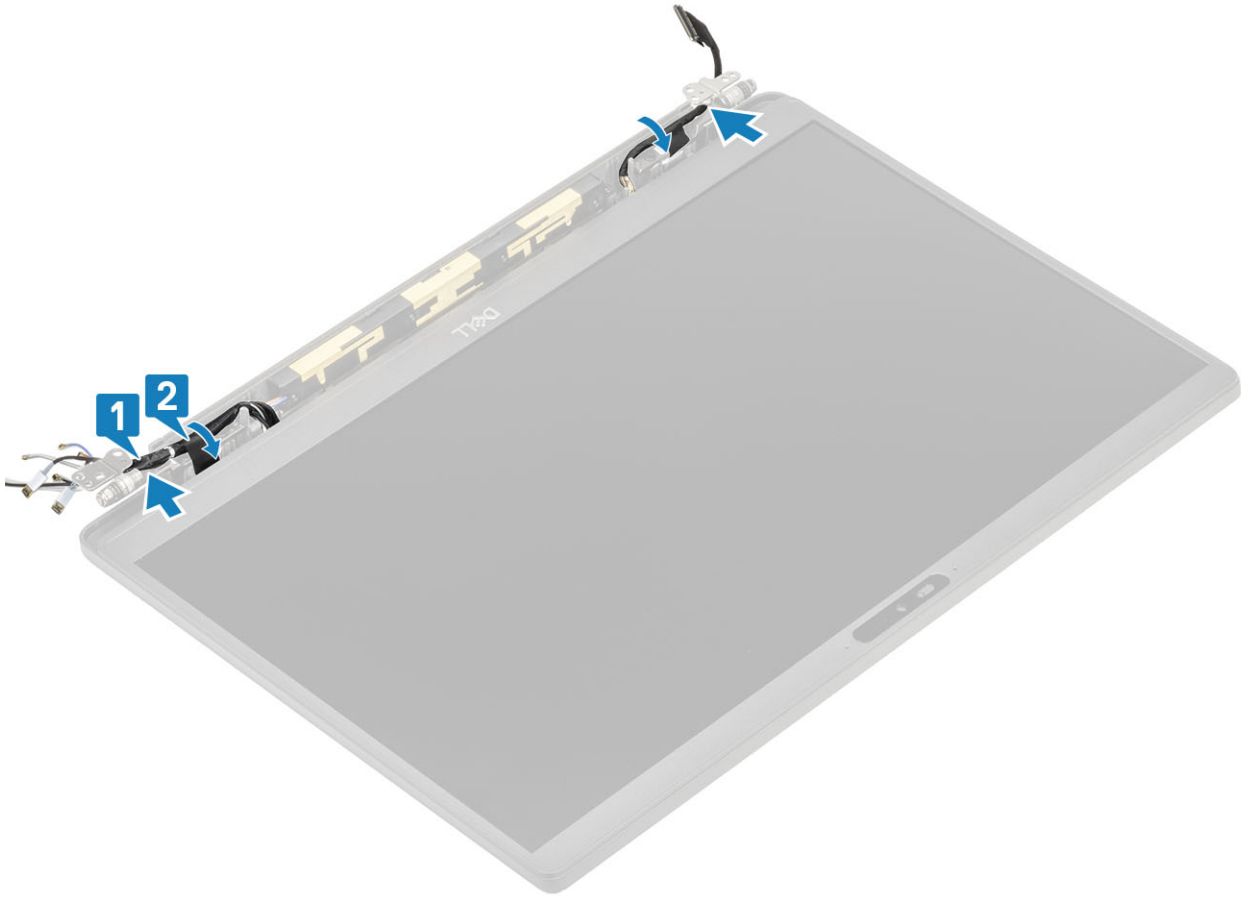


Installing the hinges

- 1 Align and place the hinges on the display assembly [1].
- 2 Replace the four (2.5x5) screws to secure hinges to the display back cover assembly [2].



- 3 Route the antennae and display cable along the hinges.

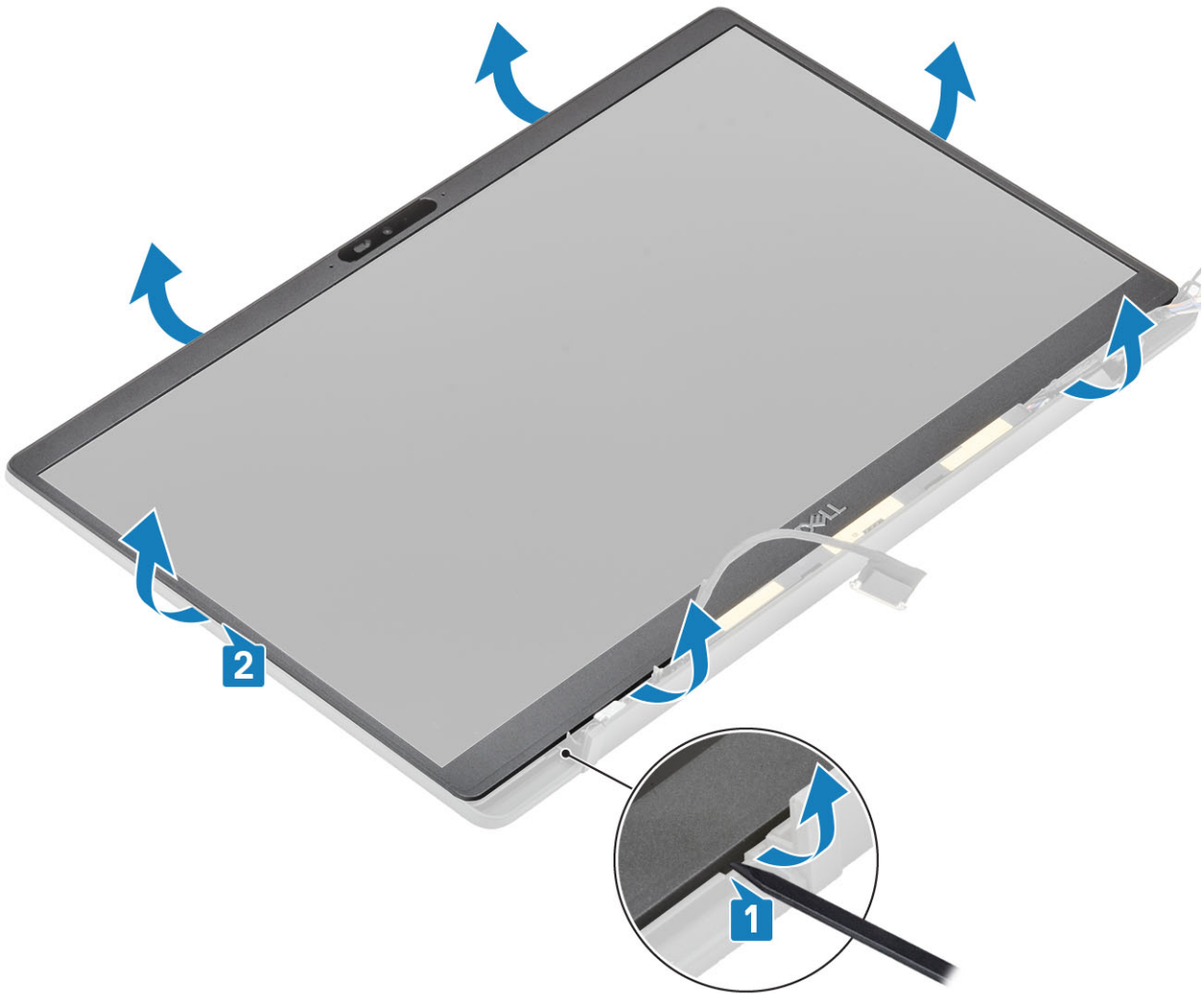


- 1 Install the [hinge cap](#)
- 2 Install the [display assembly](#)
- 3 Install the [battery](#).
- 4 Install the [base cover](#).
- 5 Follow the procedure [after working inside your computer](#).

Display Bezel

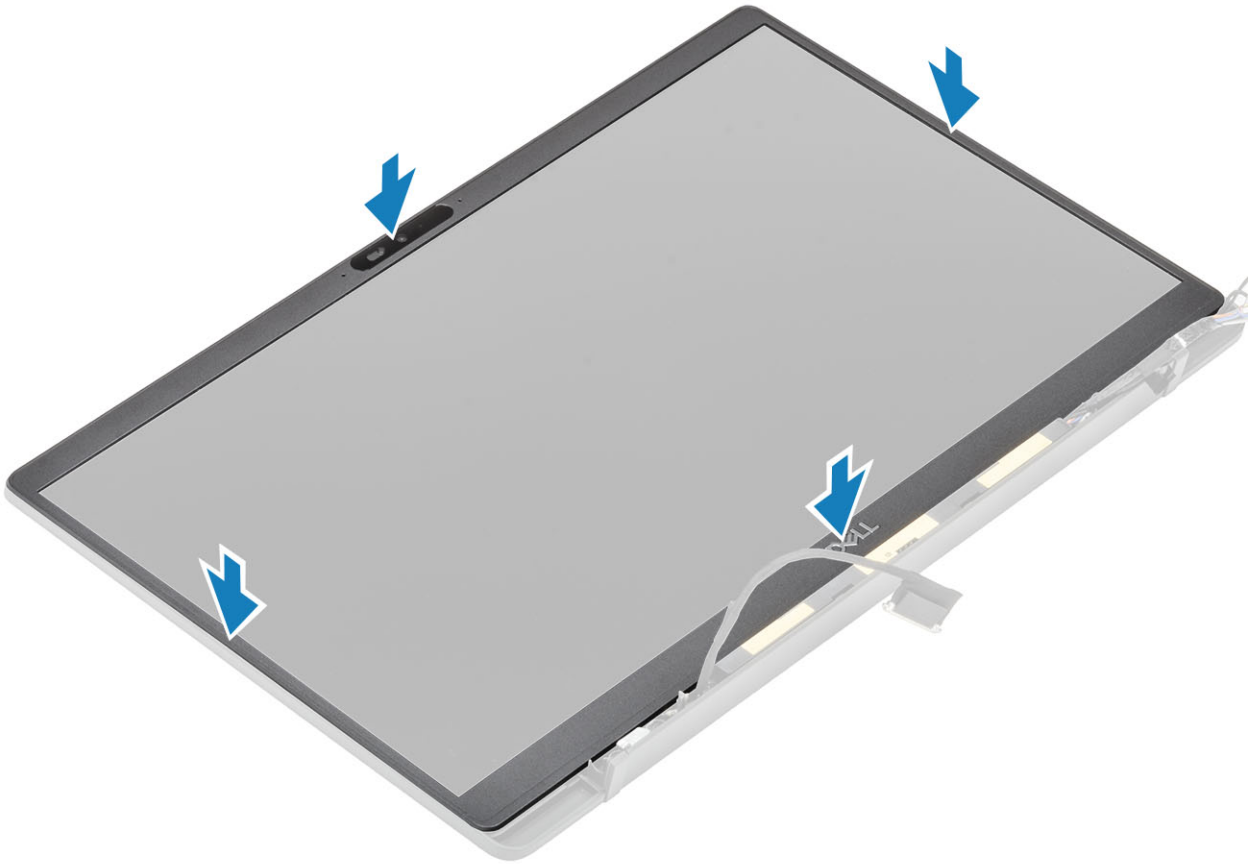
Removing the display bezel

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [base cover](#).
 - 3 Remove the [battery](#).
 - 4 Remove the [display assembly](#).
 - 5 Remove the [hinge cap](#).
 - 6 Remove the [hinges](#).
- 1 Use a plastic scribe to pry at the indents on the bottom of display assembly beside the hinges [1].
 - 2 Pry along the outer edges of display bezel to remove the bezel from the display assembly [2].



Installing the display bezel

Place the display bezel on the display assembly and press along the edges to click lock it to the display back cover.

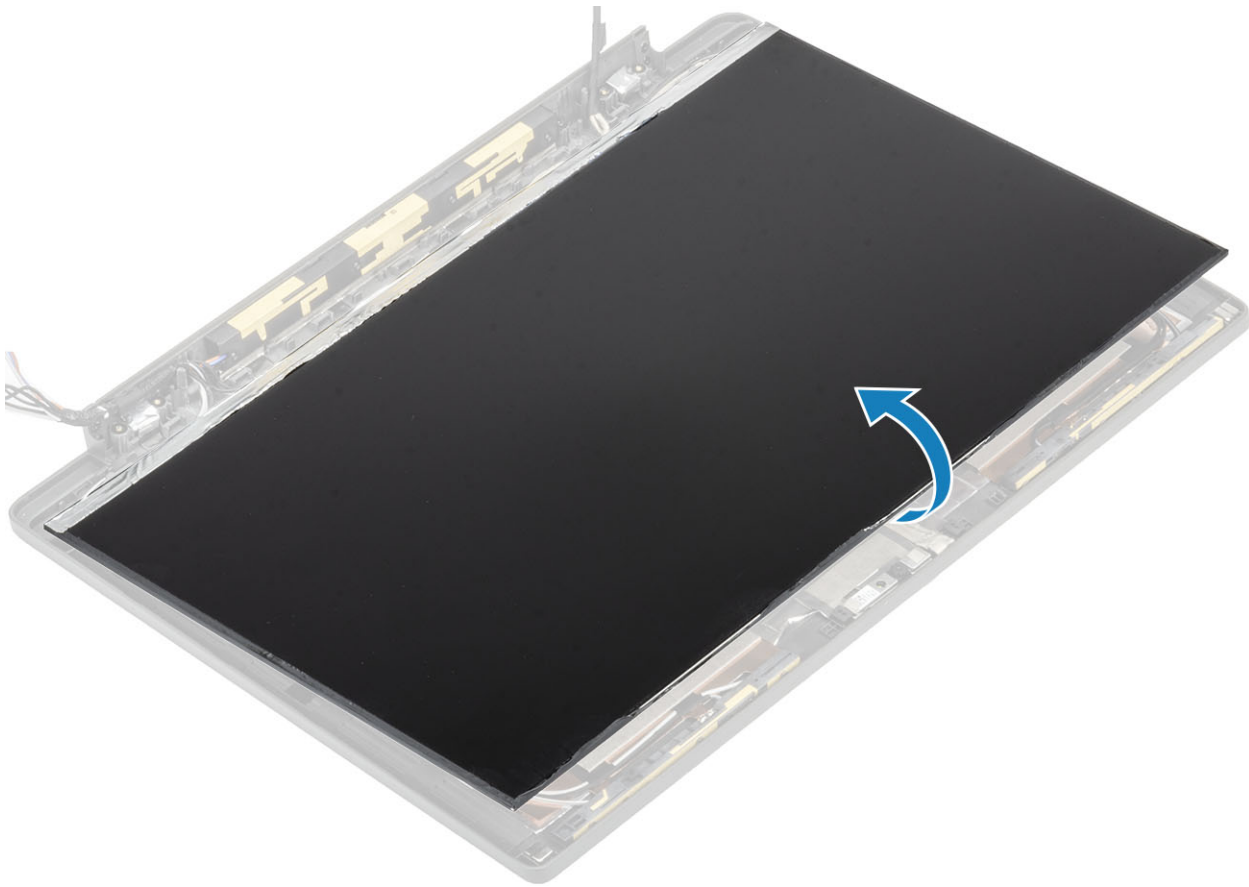


- 1 Install the [hinges](#).
- 2 Install the [hinge cap](#)
- 3 Install the [display assembly](#)
- 4 Install the [battery](#).
- 5 Install the [base cover](#).
- 6 Follow the procedure [after working inside your computer](#).

Display Panel

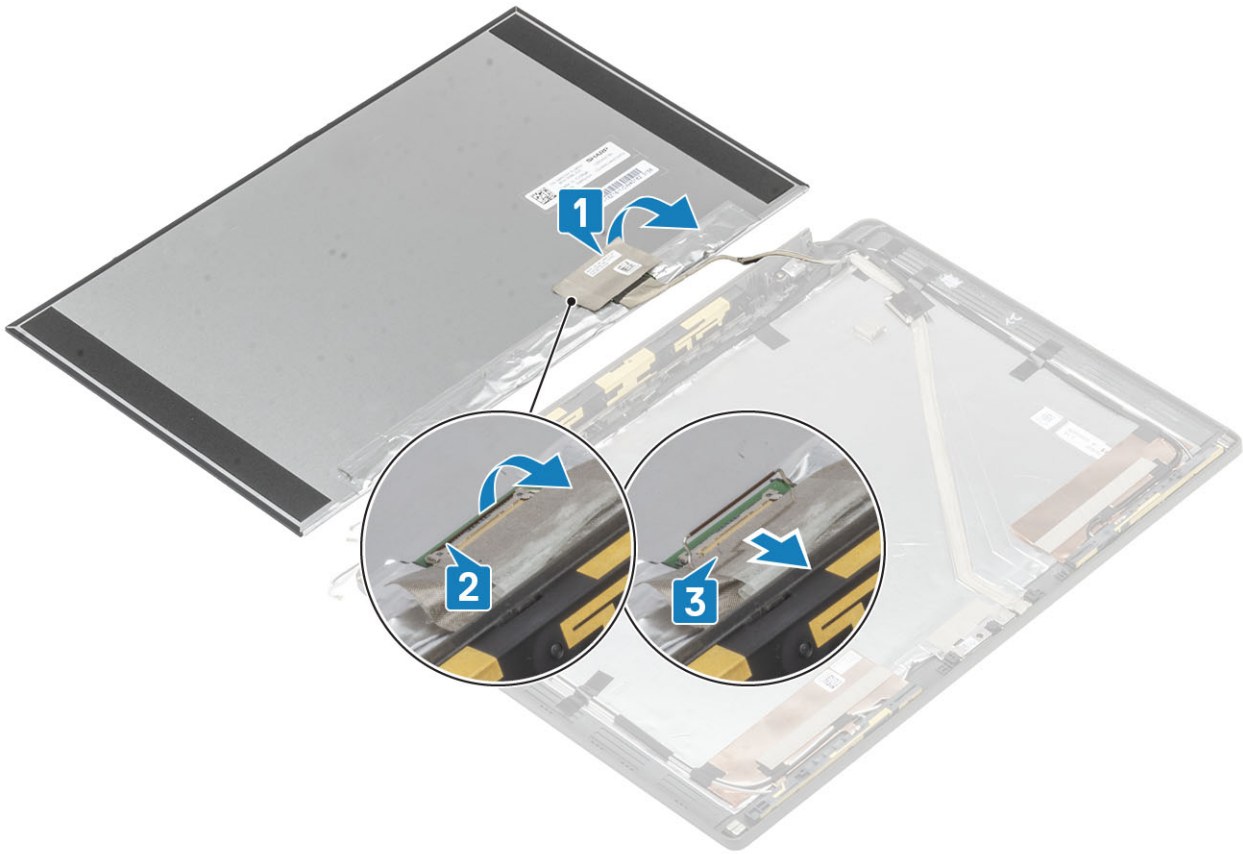
Removing the display panel

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [base cover](#).
 - 3 Remove the [battery](#).
 - 4 Remove the [display assembly](#).
 - 5 Remove the [hinge cap](#).
 - 6 Remove the [hinges](#).
 - 7 Remove the [display bezel](#).
- 1 Flip over the display panel to separate the LCD panel from the back cover.



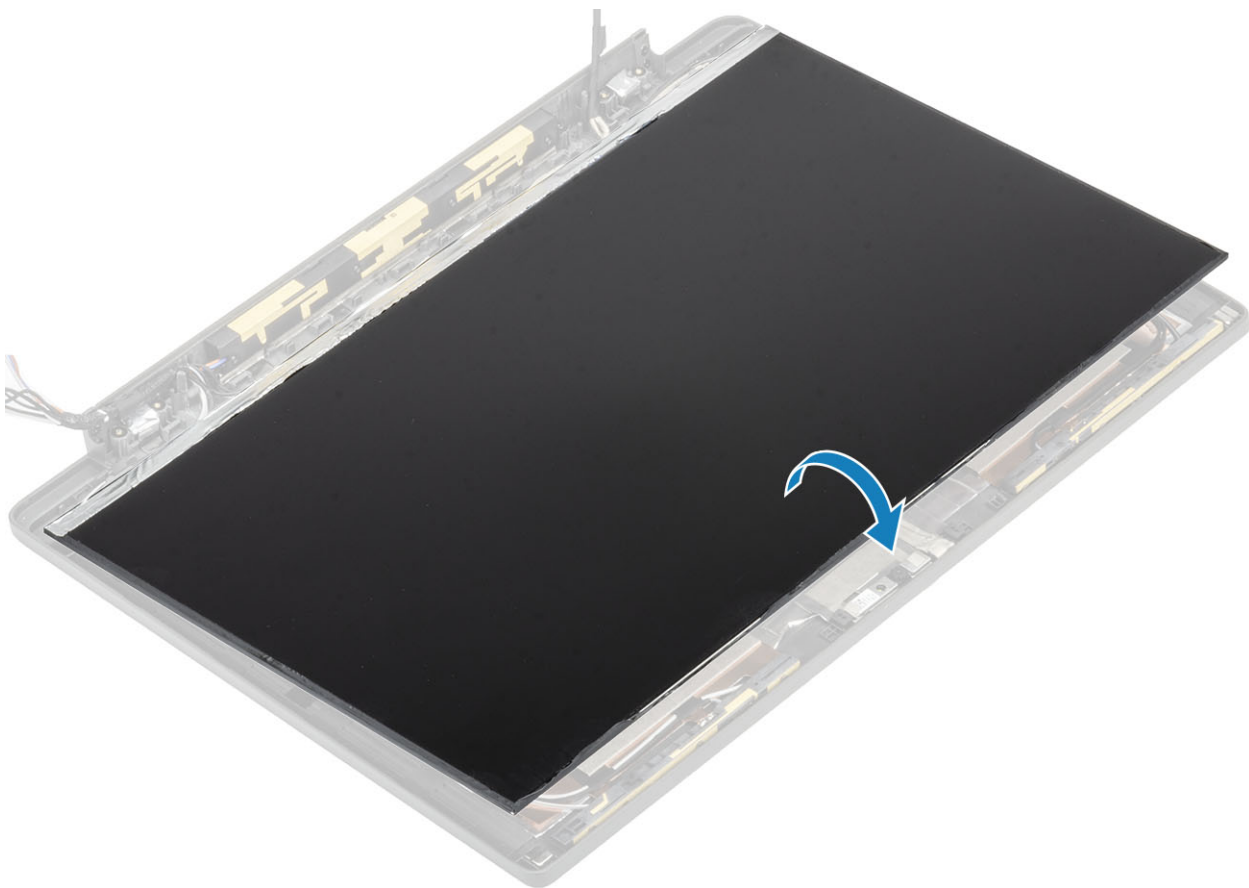
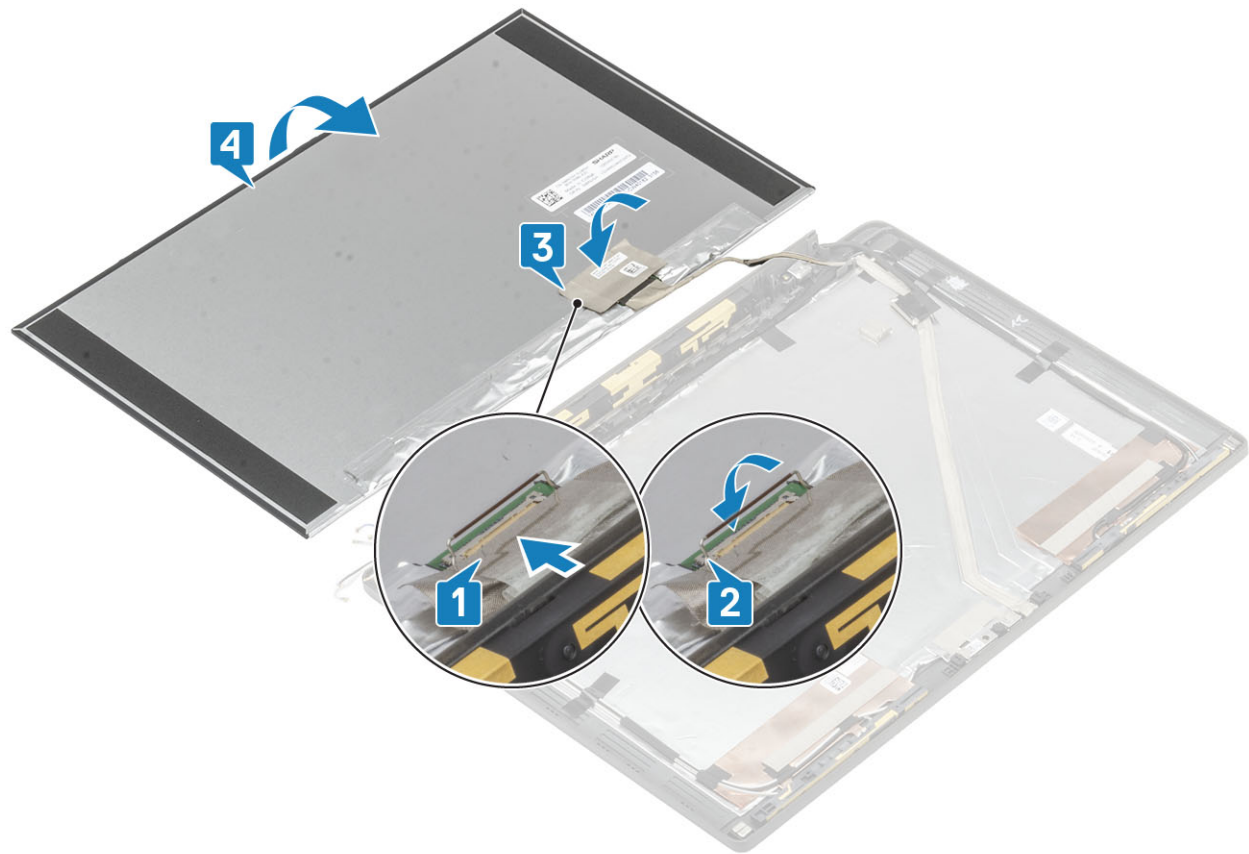
- 2 **NOTE:** Do not pull and release the Stretch (SR) tapes from the display panel. There is no need to separate the brackets from the display panel.

Peel back the tape [1] and flip open the latch [2] to disconnect the EDP cable from the display panel [3].



Installing the display panel

- 1 Connect the EDP cable to the connector on the display panel [1] and close the actuator to secure the connector [2].
- 2 Adhere the adhesive tape over the EDP connector on the display panel [3] and flip over the display panel on the back cover [4].

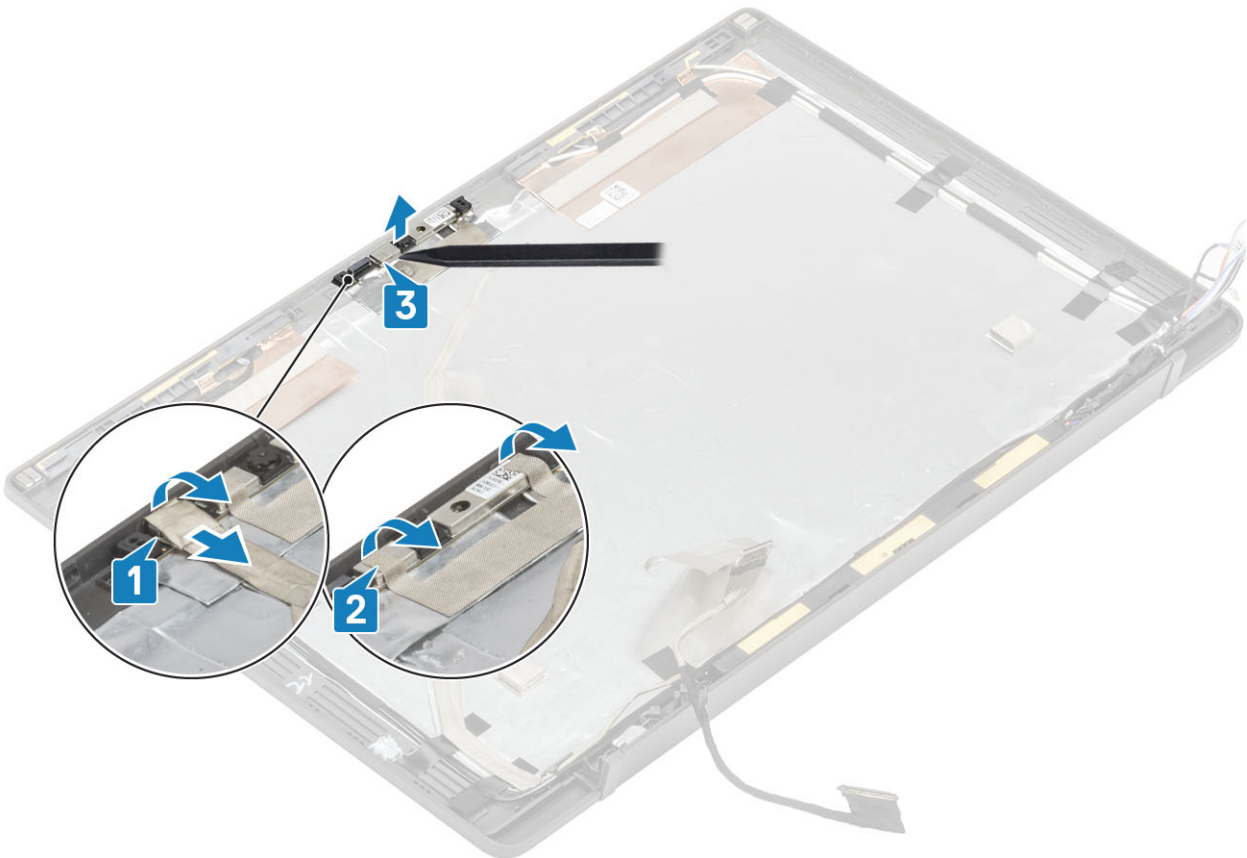


- 1 Install the [display bezel](#).
- 2 Install the [hinges](#).
- 3 Install the [hinge cap](#)
- 4 Install the [display assembly](#)
- 5 Install the [battery](#).
- 6 Install the [base cover](#).
- 7 Follow the procedure [after working inside your computer](#).

Camera—microphone module

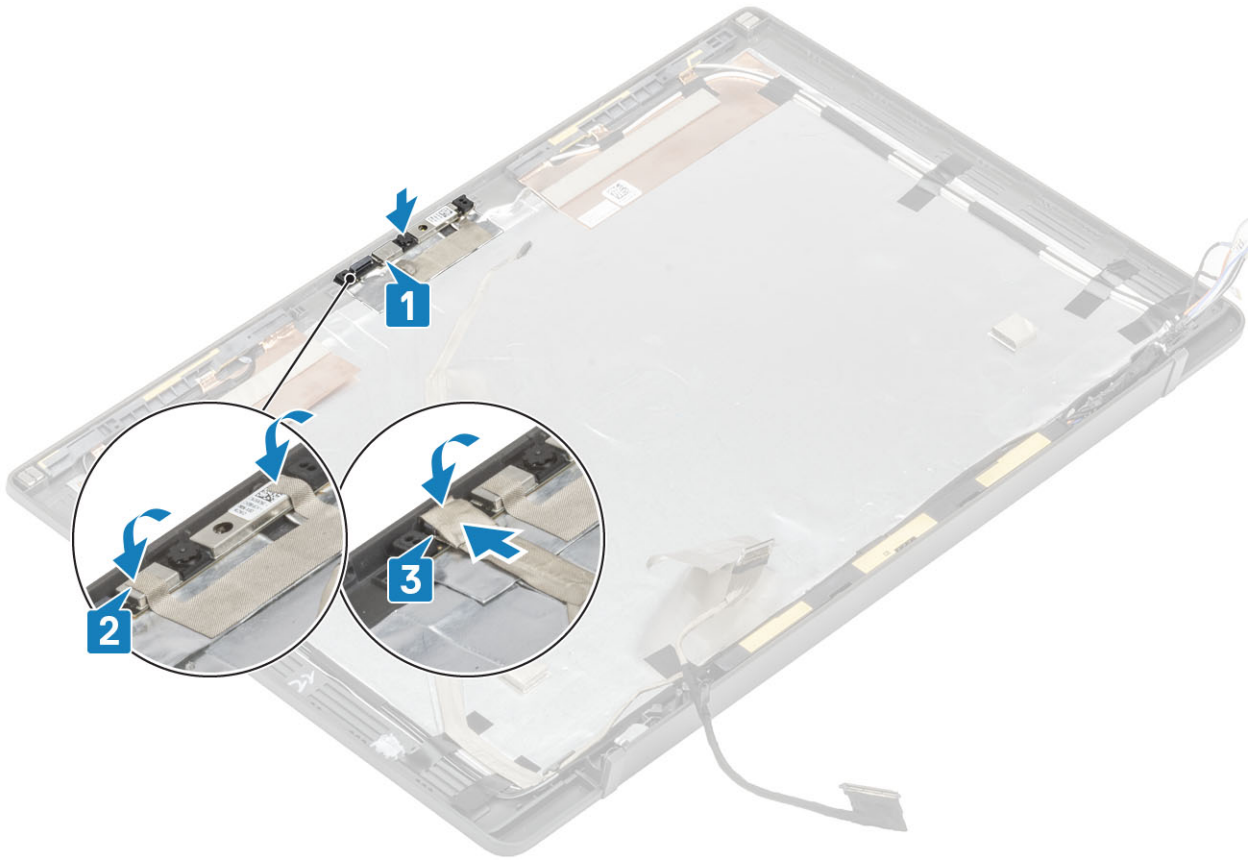
Removing the camera—microphone module

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [base cover](#).
 - 3 Remove the [battery](#).
 - 4 Remove the [display assembly](#).
 - 5 Remove the [hinge cap](#).
 - 6 Remove the [hinges](#).
 - 7 Remove the [display bezel](#).
 - 8 Remove the [display panel](#).
- 1 Peel back the adhesive tape [1] on the camera-microphone module
 - 2 Disconnect the display cable from the camera-microphone module [2].
 - 3 Use a plastic scribe to pry the camera-microphone module from the display back cover [3].



Installing the camera—microphone module

- 1 Align and place the camera-microphone module in the display back cover assembly [1].
- 2 Adhere the adhesive tape to secure the camera-microphone module to the display back cover [2].
- 3 Connect the display cable to the camera microphone module [3].



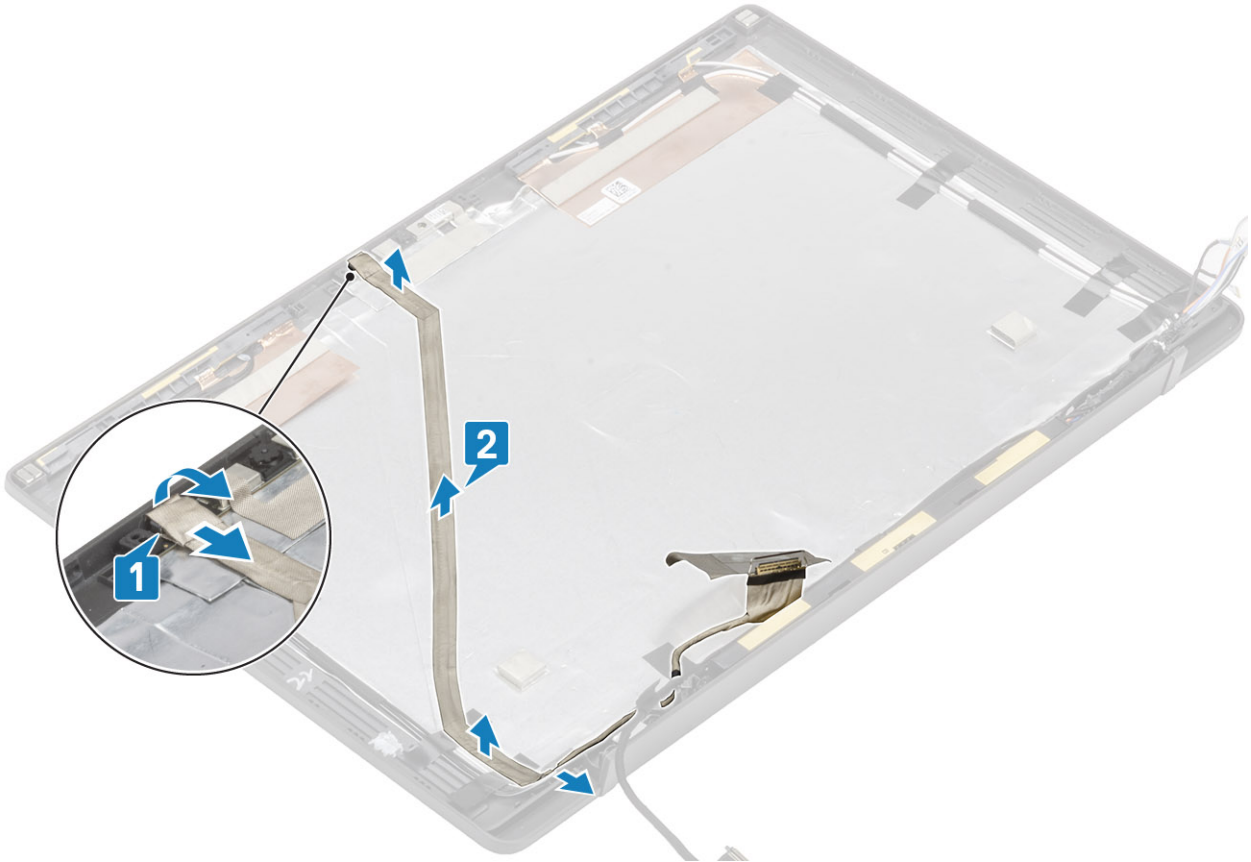
- 1 Install the [display panel](#).
- 2 Install the [hinges](#).
- 3 Install the [display bezel](#).
- 4 Install the [hinge cap](#).
- 5 Install the [display assembly](#).
- 6 Install the [battery](#).
- 7 Install the [base cover](#).
- 8 Follow the procedure [after working inside your computer](#).

Display Cable

Removing the display cable

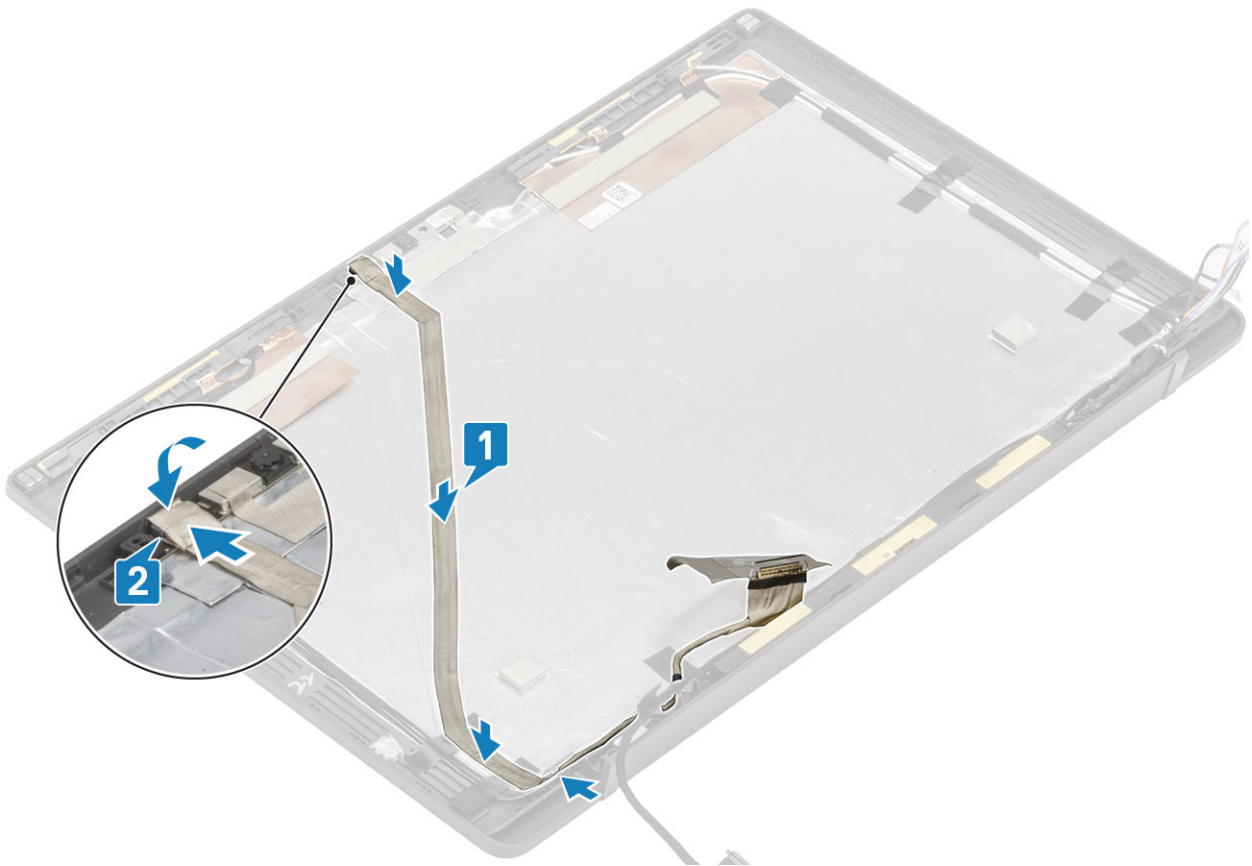
- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [base cover](#).
- 3 Remove the [battery](#).

- 4 Remove the [display assembly](#).
 - 5 Remove the [hinge cap](#).
 - 6 Remove the [display bezel](#).
 - 7 Remove the [hinges](#).
 - 8 Remove the [display panel](#).
- 1 Peel back the adhesive tape securing the display cable to the camera-microphone module [1].
 - 2 Gently peel off the display cable from its routing channel on the display back cover [2].



Installing the display cable

- 1 Adhere the display cable along the routing channel on the display back cover assembly [1].
- 2 Connect the display cable to the camera microphone module and replace the tape on the connector [2].



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

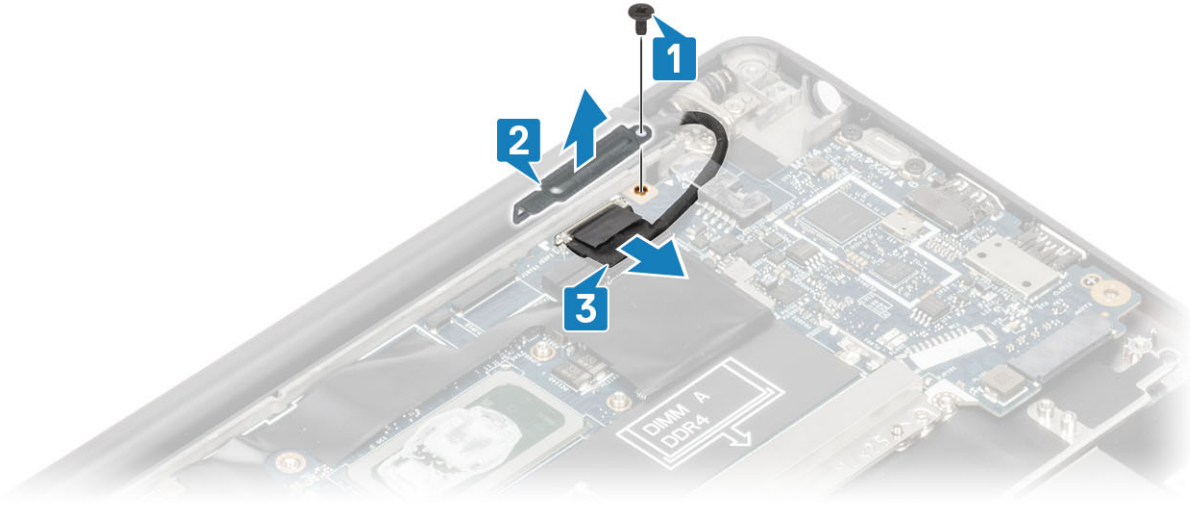
System board

Removing the system board

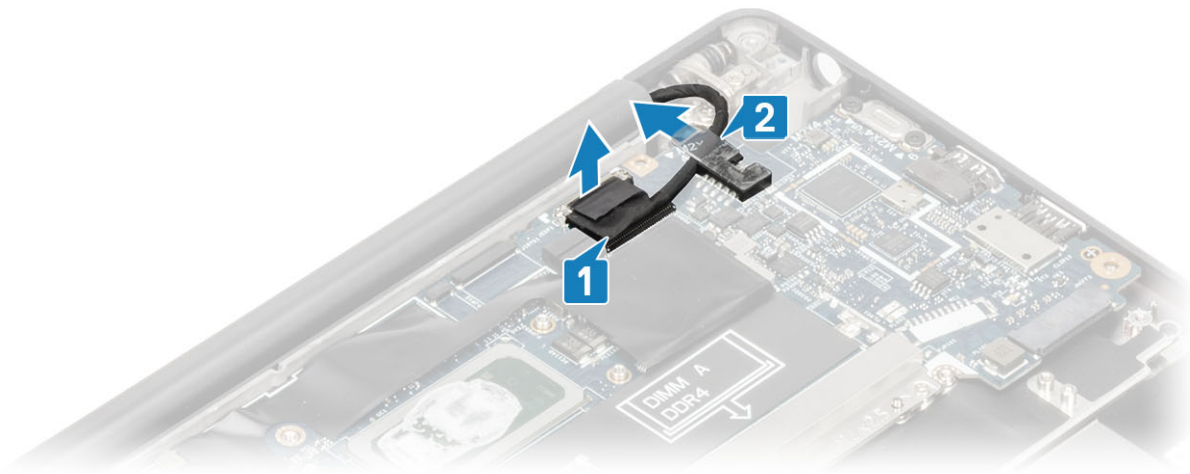
- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [base cover](#).
- 3 Remove the [battery](#).
- 4 Remove the [memory](#).
- 5 Remove the [SSD](#).
- 6 Remove the [WLAN card](#).
- 7 Remove the [heatsink-fan assembly](#).
- 8 Remove the [power adapter port](#).
- 9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

NOTE: System board can be removed with heatsink assembly installed, this simplifies the procedure in an event of power button, keyboard and palmrest assembly replacements.

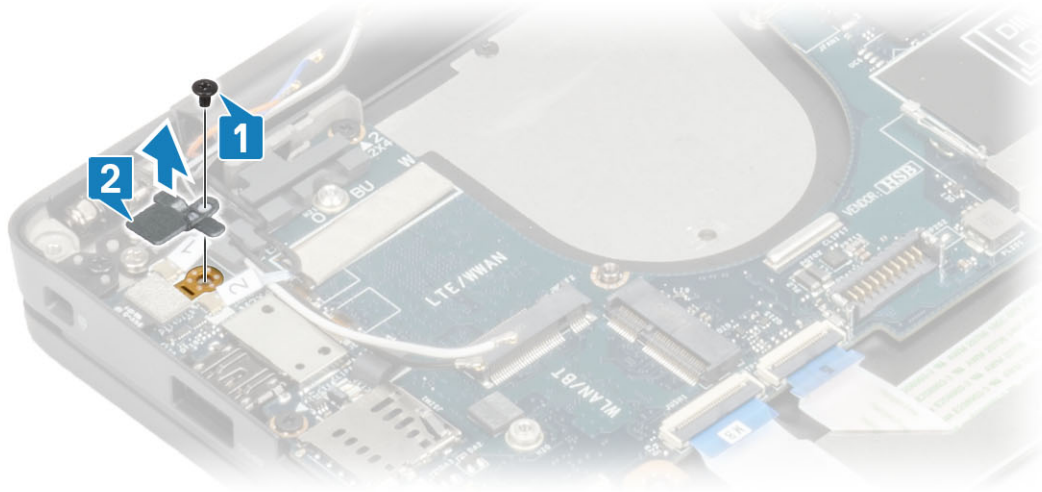
- 1 Remove the single (M2x4) screw on the metal bracket over the display cable connector on the system board [1]
- 2 Lift and remove the metal bracket [2] to disconnect the display cable from the system board [3].



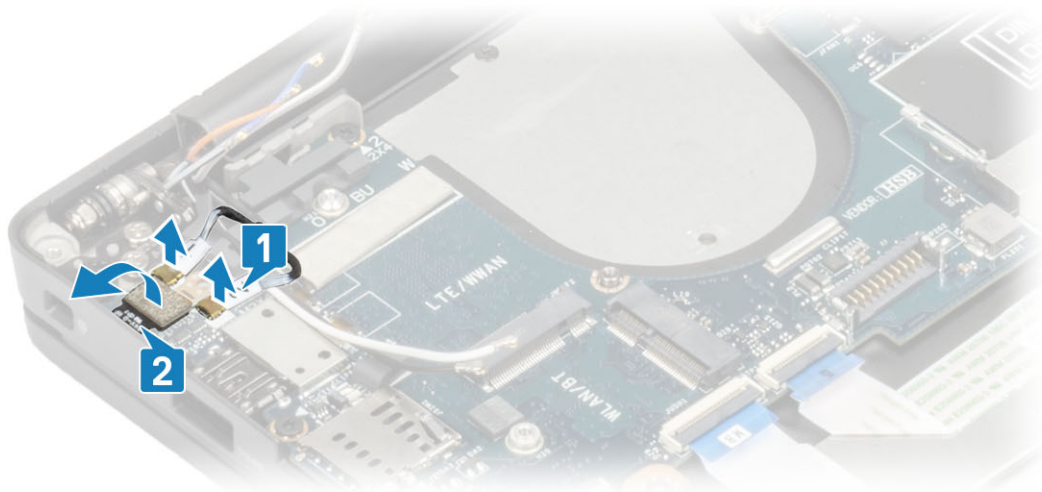
- 3 Disconnect the display cable [1] and unroute it from the metal bracket on the system board [2].



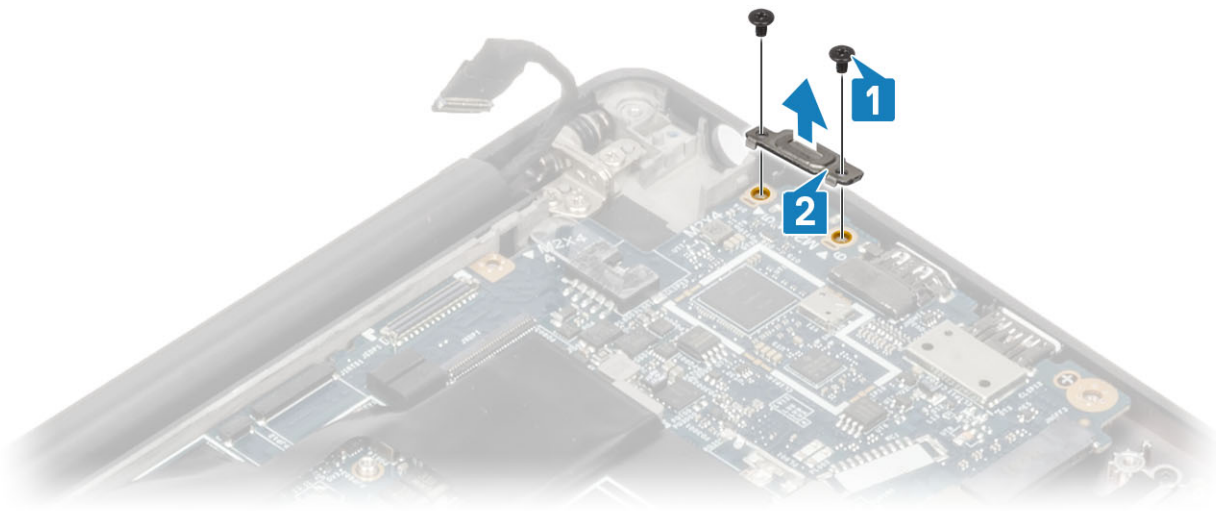
- 4 Remove the single (M2x4) screw [1] and remove the metal bracket over the WWAN Darwin antennae cable [2].



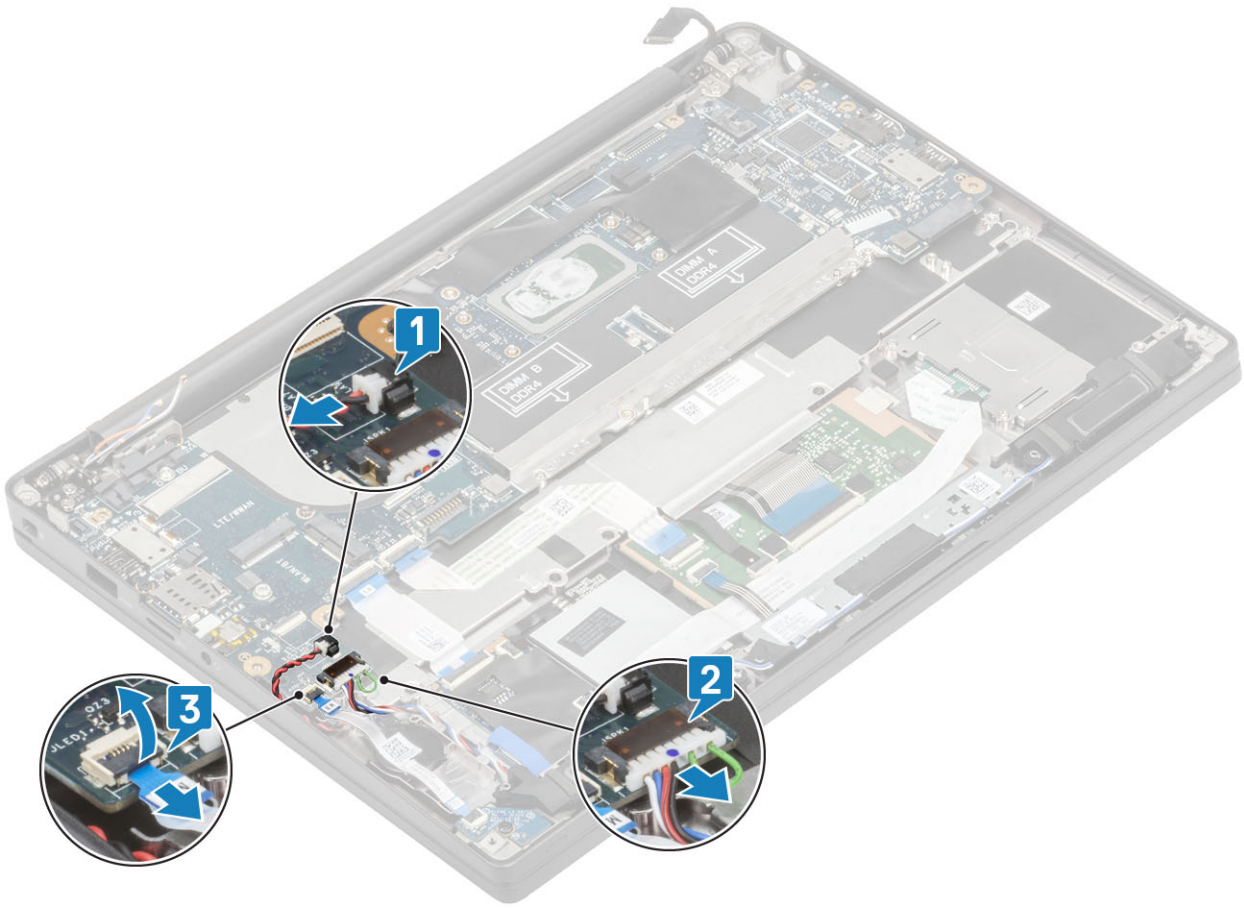
- 5 Disconnect the power button (with finger print reader) cable from the system board [1].
- 6 Disconnect the WWAN Darwin antennae cables [2] from the system board.



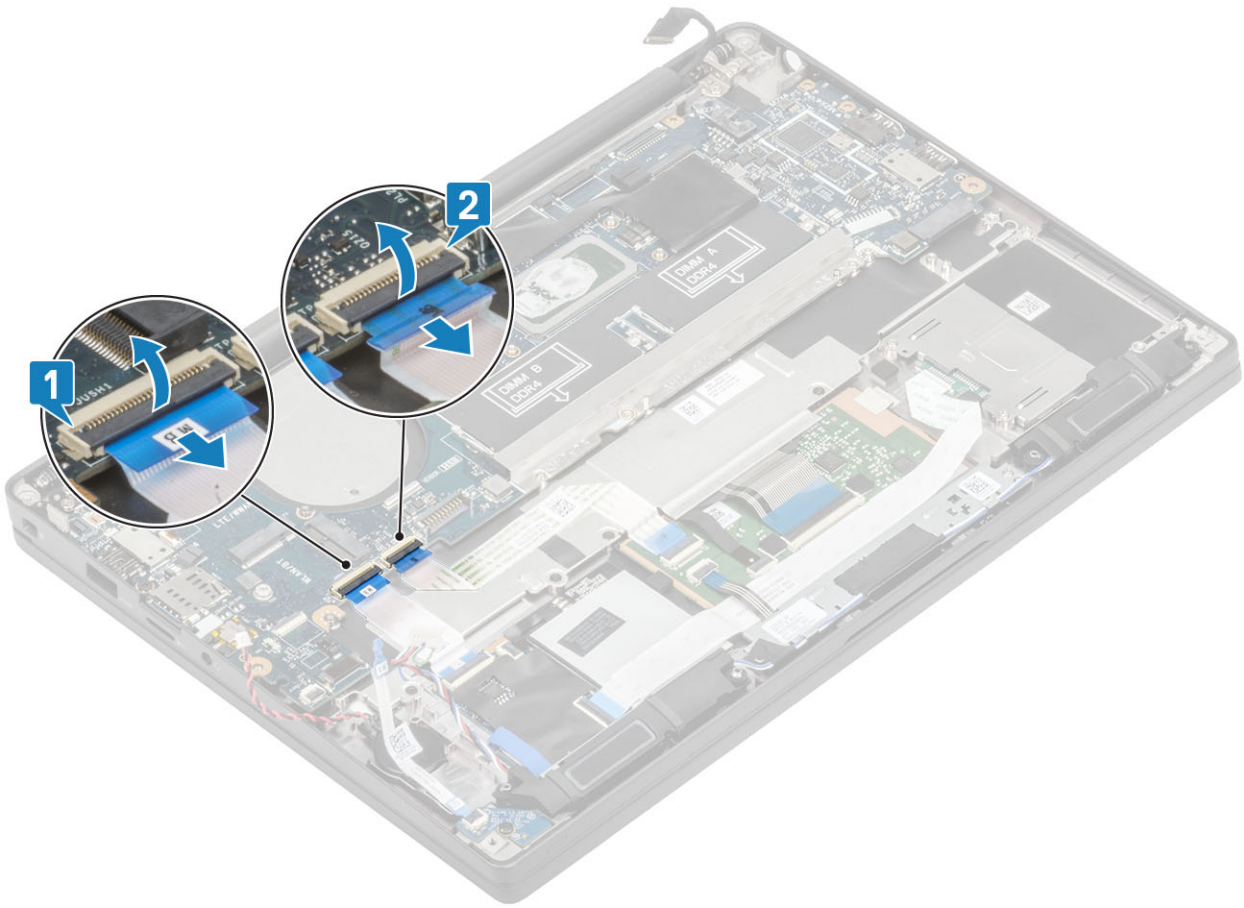
- 7 Remove the two (M2x4) screws [1] and lift up the USB Type-C bracket from the system board [2].



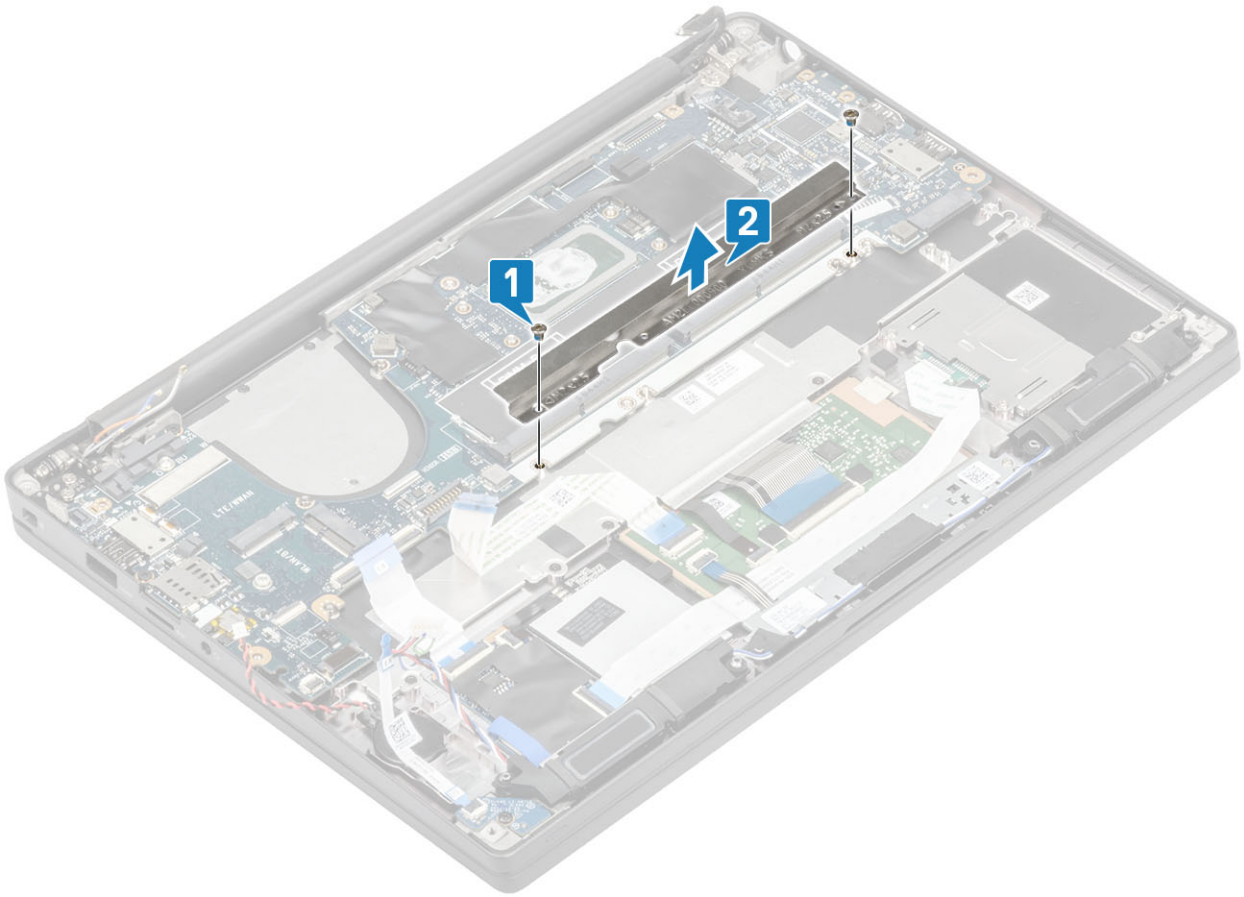
- 8 Disconnect the coin cell [1], speaker cable [2] and the LED daughterboard cable [3] from the system board.



9 Disconnect the USB daughterboard [1] and touchpad cables [2] from the system board.

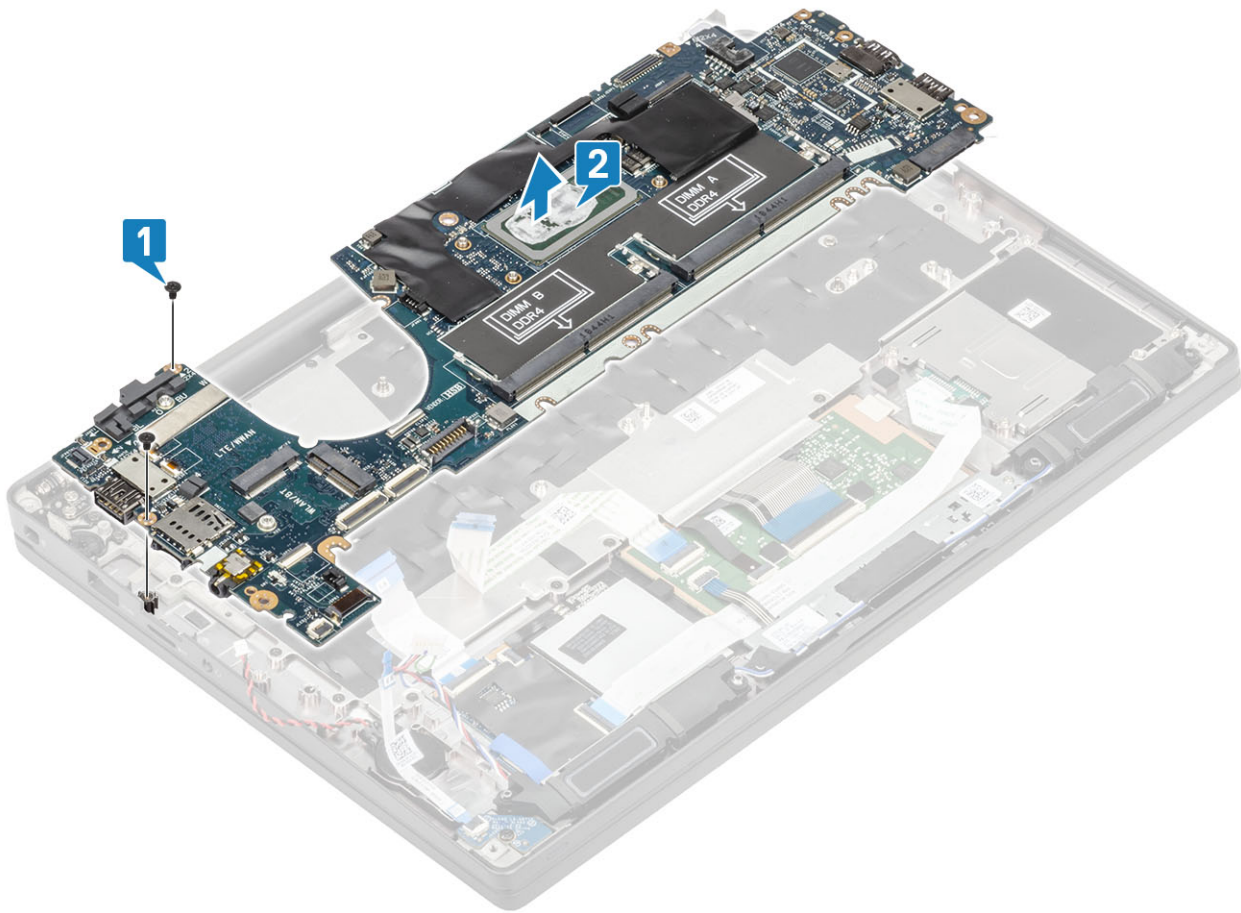


10 Remove the two (M2x2.5) screws on the DDR ESD bracket [1] and lift to remove it from the system board [2].



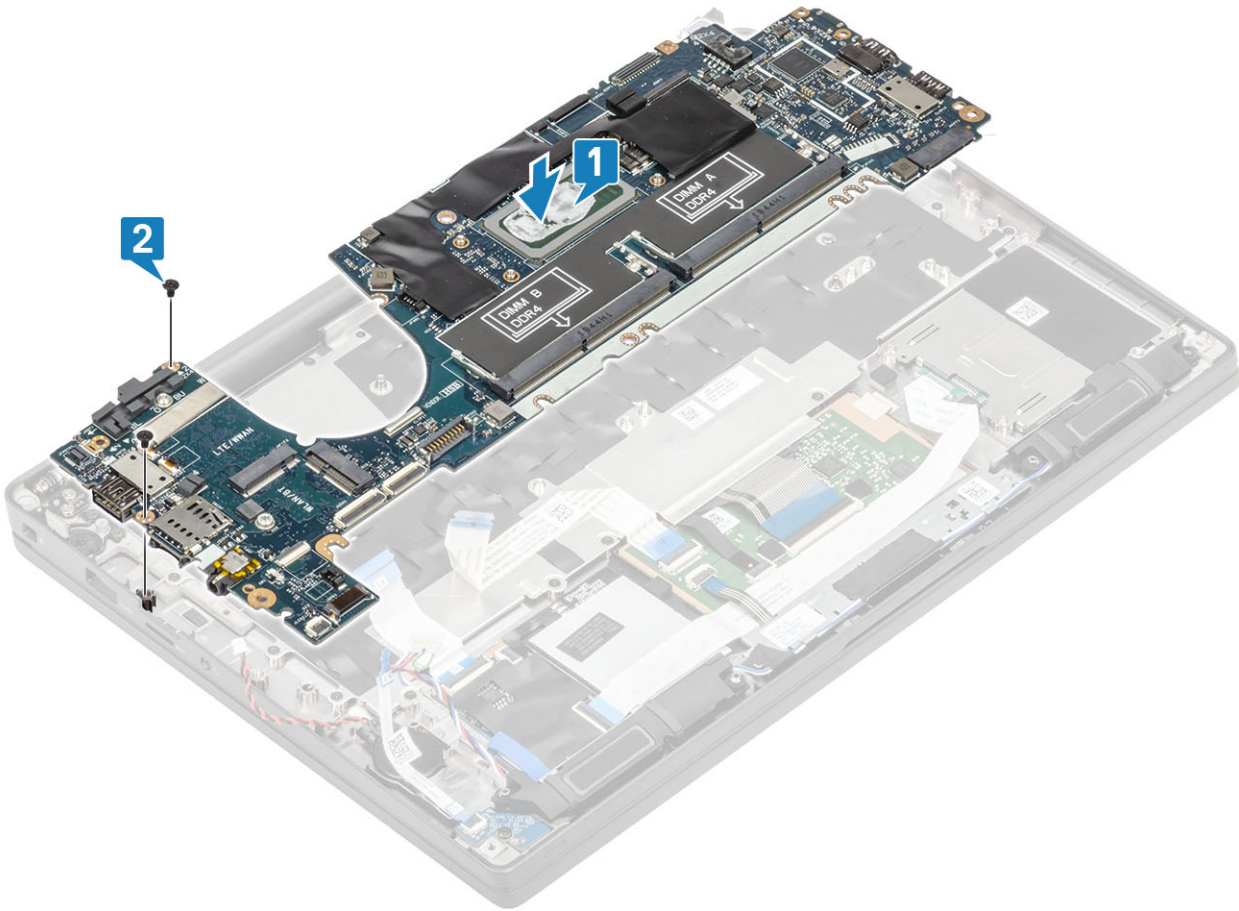
- 11 Remove the two (M2x4) screws [1] and remove the system board from the palmrest assembly [2].

NOTE: For models shipped with a fingerprint reader or WWAN antennas, there are three (M2x3) screws securing the system board to the computer.



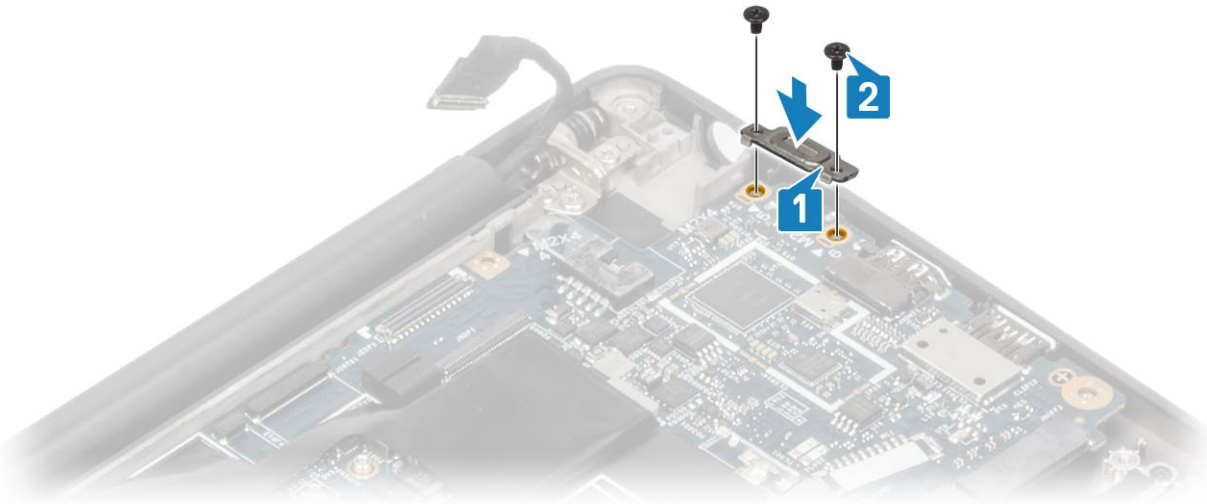
Installing the system board

- 1 Align and place the system board in the palmrest assembly [1]
- 2 Replace the two (M2x4) screws on the system board securing it to the palmrest assembly [2].

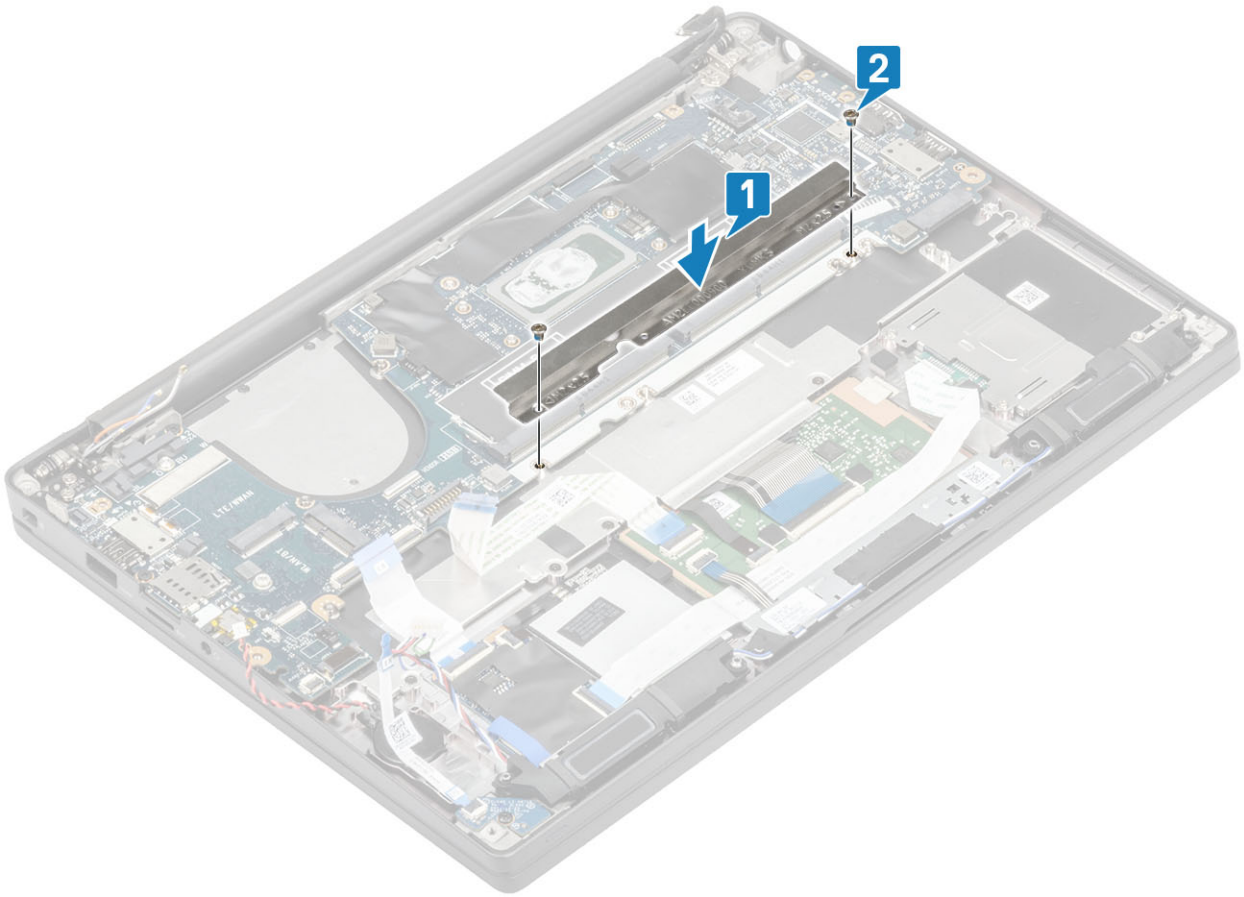


① **NOTE:** For models shipped with a fingerprint reader or WWAN antennas, there are three (M2x4) screws securing the system board to the computer.

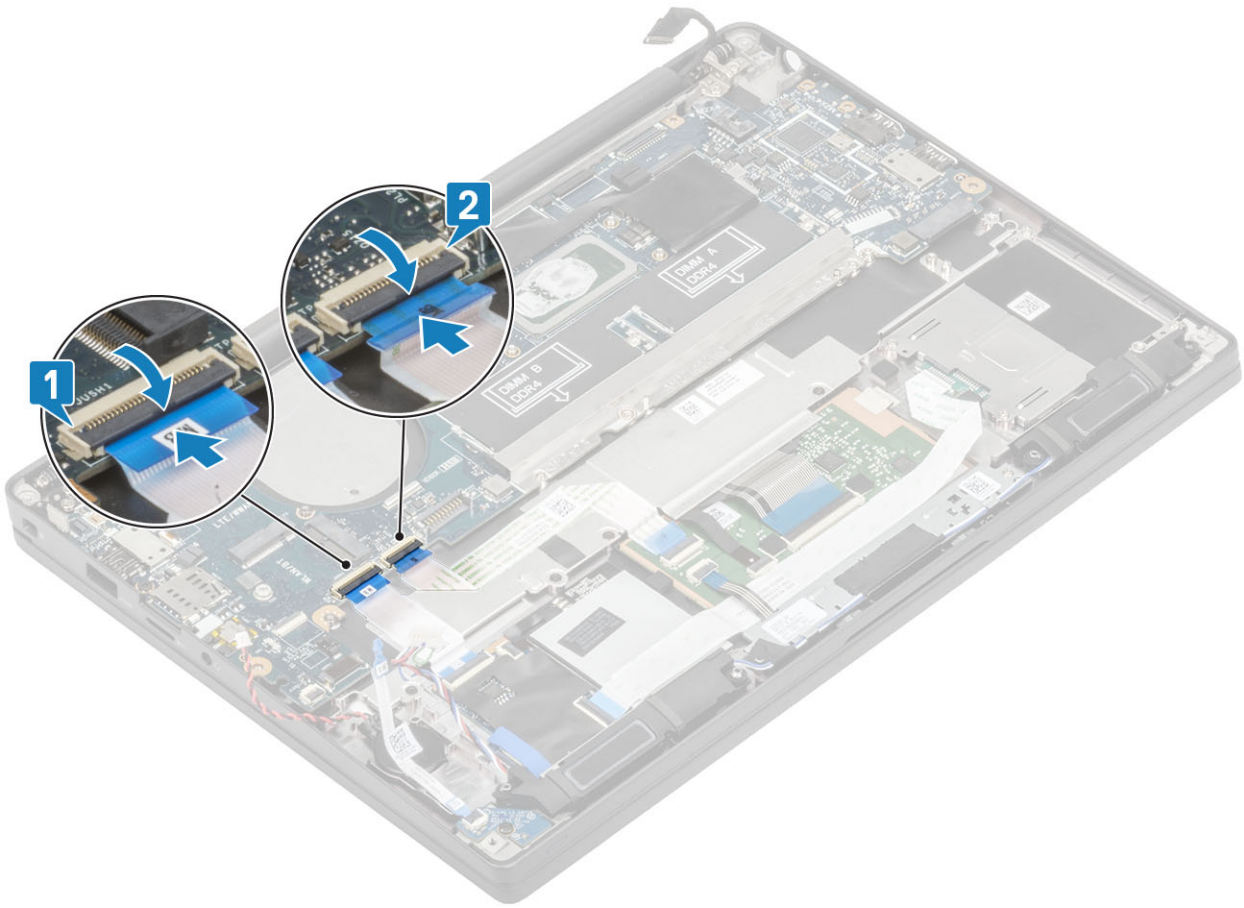
- 3 Place the USB Type-C bracket [1] on the system board and secure it using two (M2x5) screws [2] to the system board.



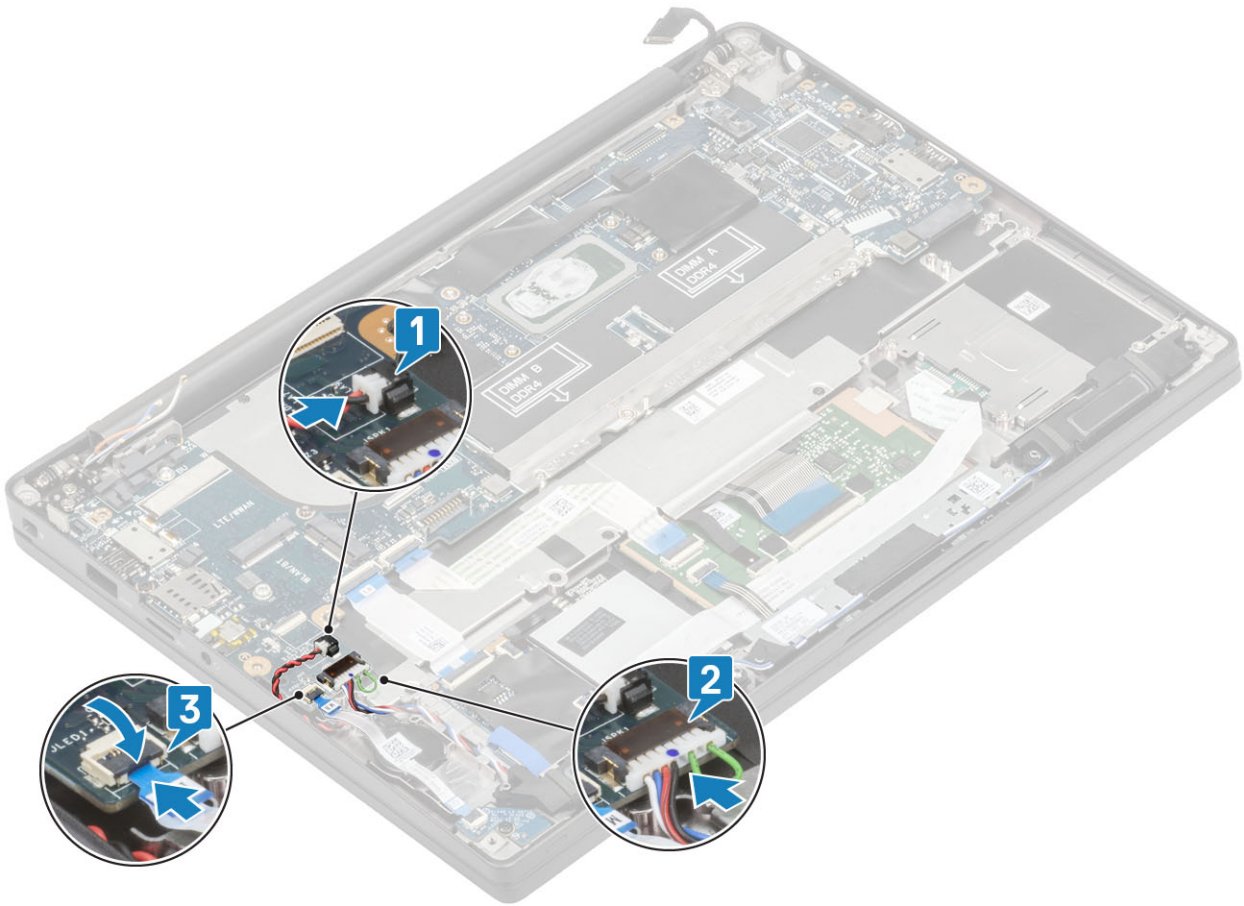
- 4 Install the DDR ESD bracket [1] on the system board and secure it using two (M2x2.5) screws to the system board [2]



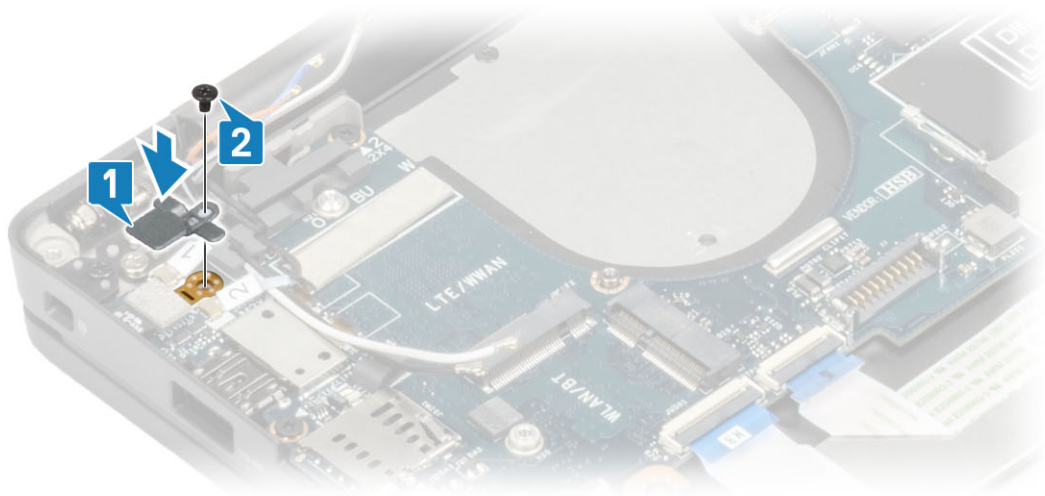
- 5 Open the latch and connect the USH board cable [1] and the touchpad cable [2] to the system board.



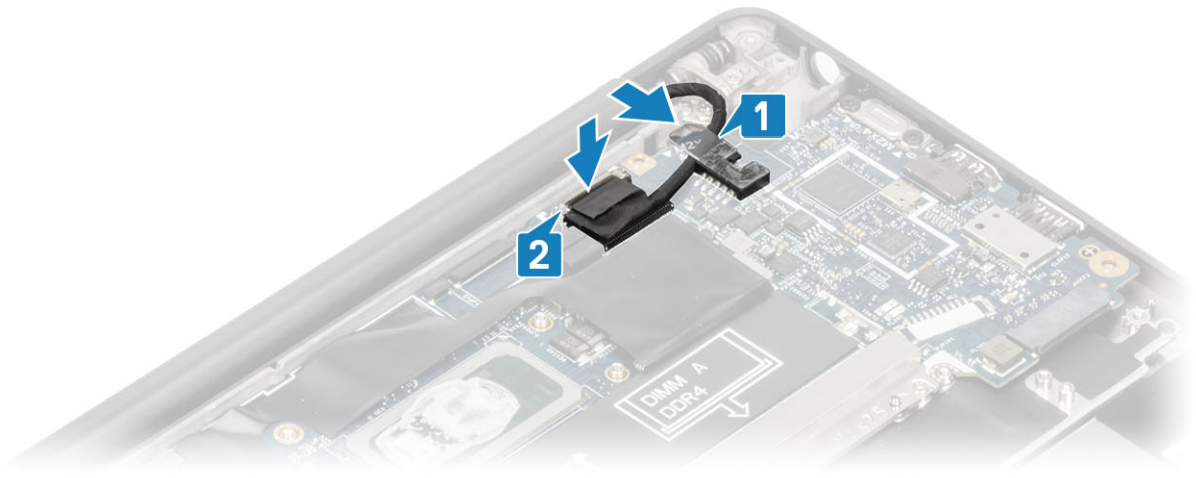
6 Connect the coin cell [1], speaker cable [2], and the LED daughterboard ribbon cable [3] to the system board.



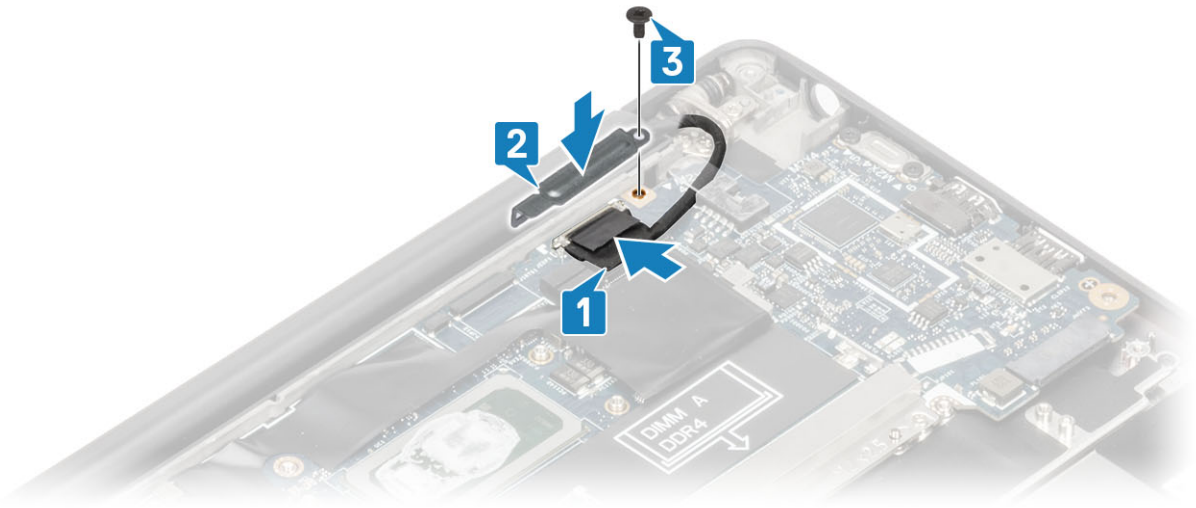
- 7 Install the metal bracket on the Darwin connector [1] and secure it to the palmrest using a single (M2x4) screw [2] to the system board.



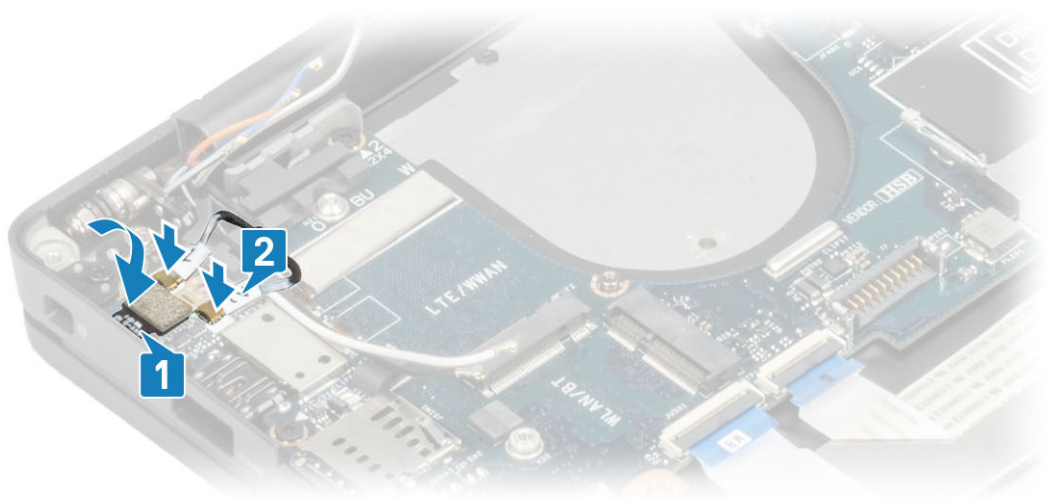
- 8 Route the display cable through the metal bracket [1] and connect it to the system board [2].



- 9 Install the display cable bracket [1] on the EDP connector of the system board and secure it using a single (M2x3) screw [2].



- 10 Connect the power button (with finger print reader) cable to the system board [1].
11 Connect the Darwin WWAN antenna cables [2] to the the system board.



- 1 Install the [display assembly](#)

- 2 Install the [power adapter port](#).
- 3 Install the [heatsink-fan assembly](#).
- 4 Install the [WLAN card](#).
- 5 Install the [SSD](#).
- 6 Install the [memory](#).
- 7 Install the [battery](#).
- 8 Install the [base cover](#).
- 9 Follow the procedure [after working inside your computer](#).

Power-Button Board

Removing the power-button board

- 1 Follow the procedure in [before working inside your computer](#).
 - 2 Remove the [base cover](#).
 - 3 Remove the [battery](#).
 - 4 Remove the [memory](#).
 - 5 Remove the [SSD](#).
 - 6 Remove the [WLAN card](#).
 - 7 Remove the [heatsink-fan assembly](#).
 - 8 Remove the [power adapter port](#).
 - 9 Remove the [speaker](#).
 - 10 Remove the [display assembly](#).
 - 11 Remove the [system board](#).
- 1 Remove the two (M2x2.5) screws, that secure the power-button board to the palmrest assembly [1].
 - 2 Remove the power-button board from its slot, in the palmrest assembly [2].

 **NOTE:** Power-button board with Finger Print Reader (FPR), has a cable that [disconnects](#) from the system board.

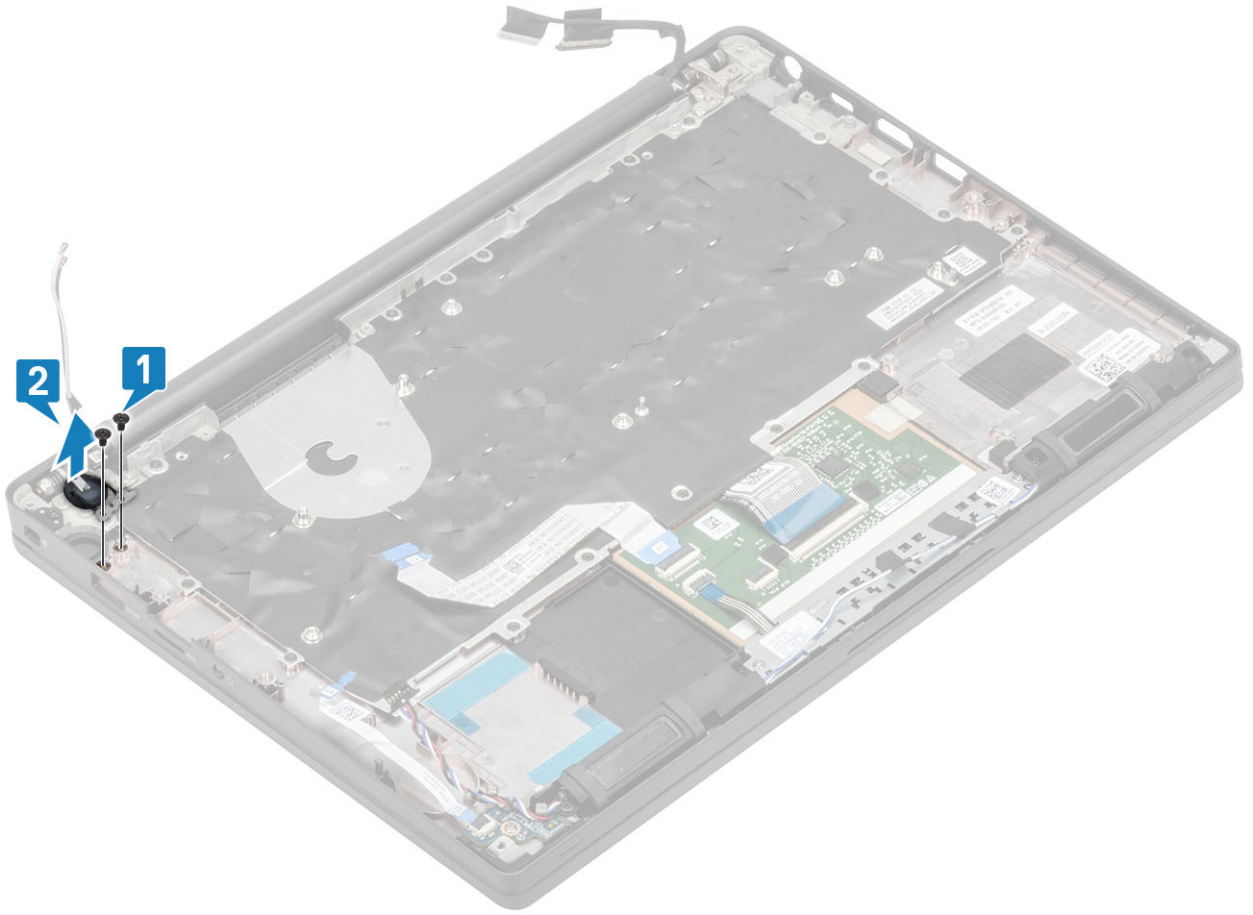


Figure 3. Power-button board without FPR

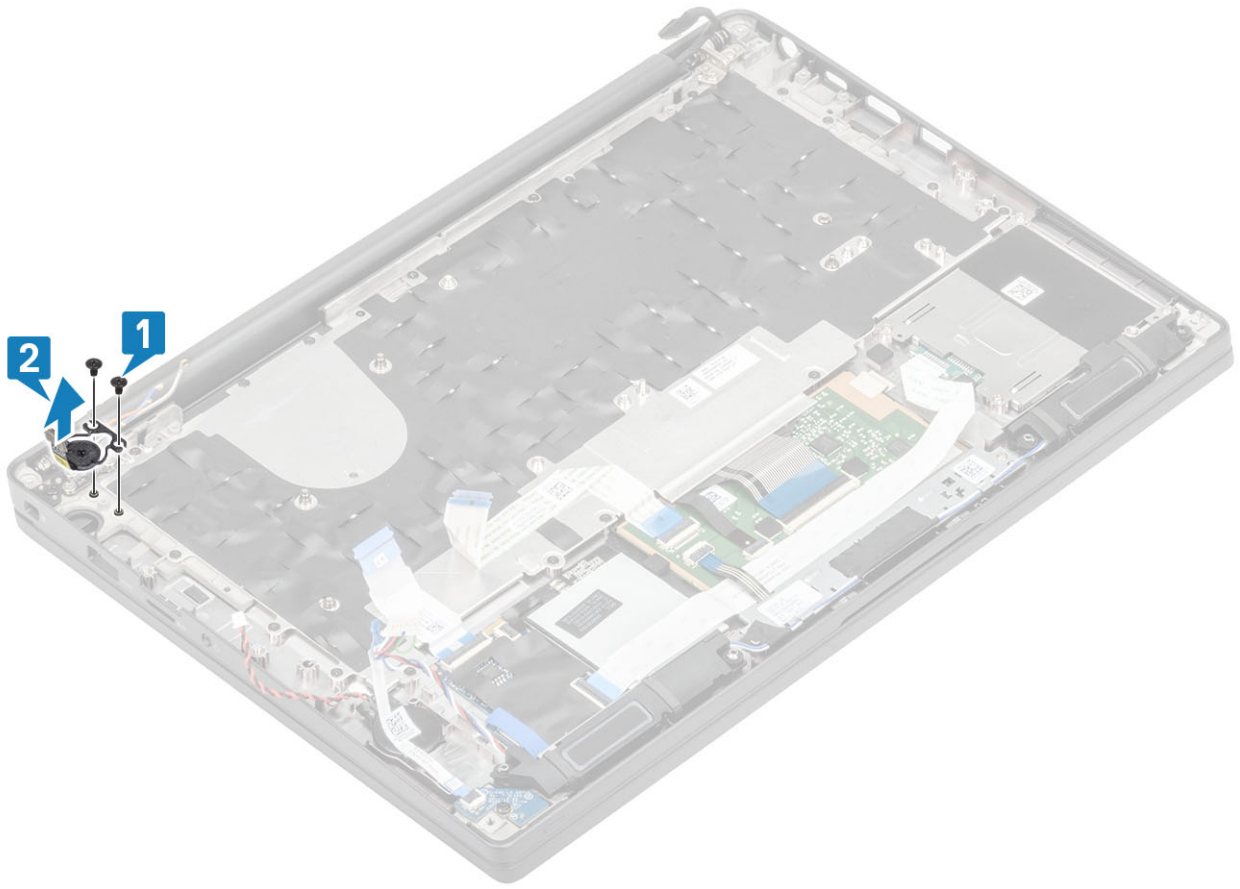


Figure 4. Removing the power-button board with FPR

Installing the power-button board

- 1 Align and place the power-button board in to its slot on the palmrest assembly [1].
- 2 Replace the two (M2x2.5) screws to secure the power-button board to the palmrest assembly [2].

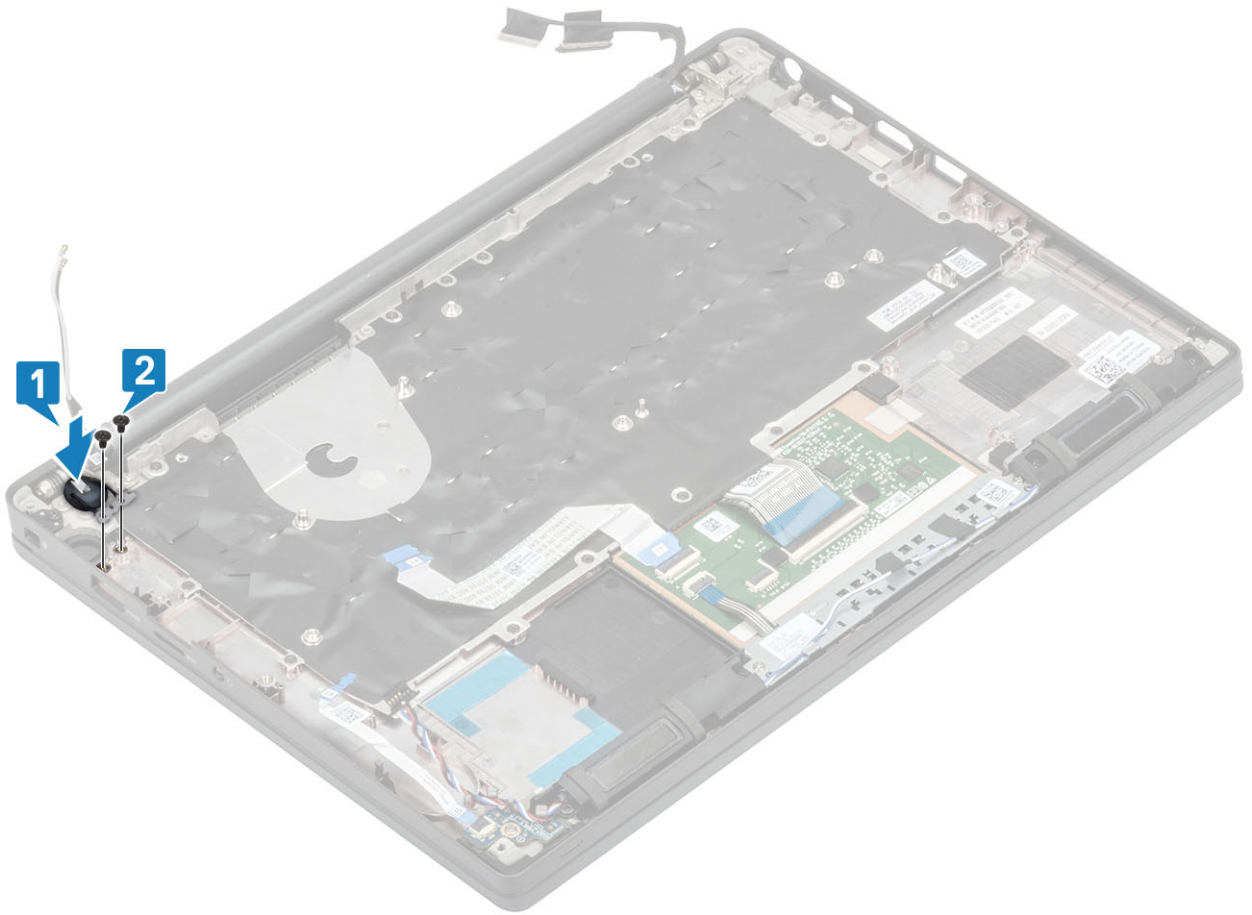


Figure 5. Power-button board - without FPR

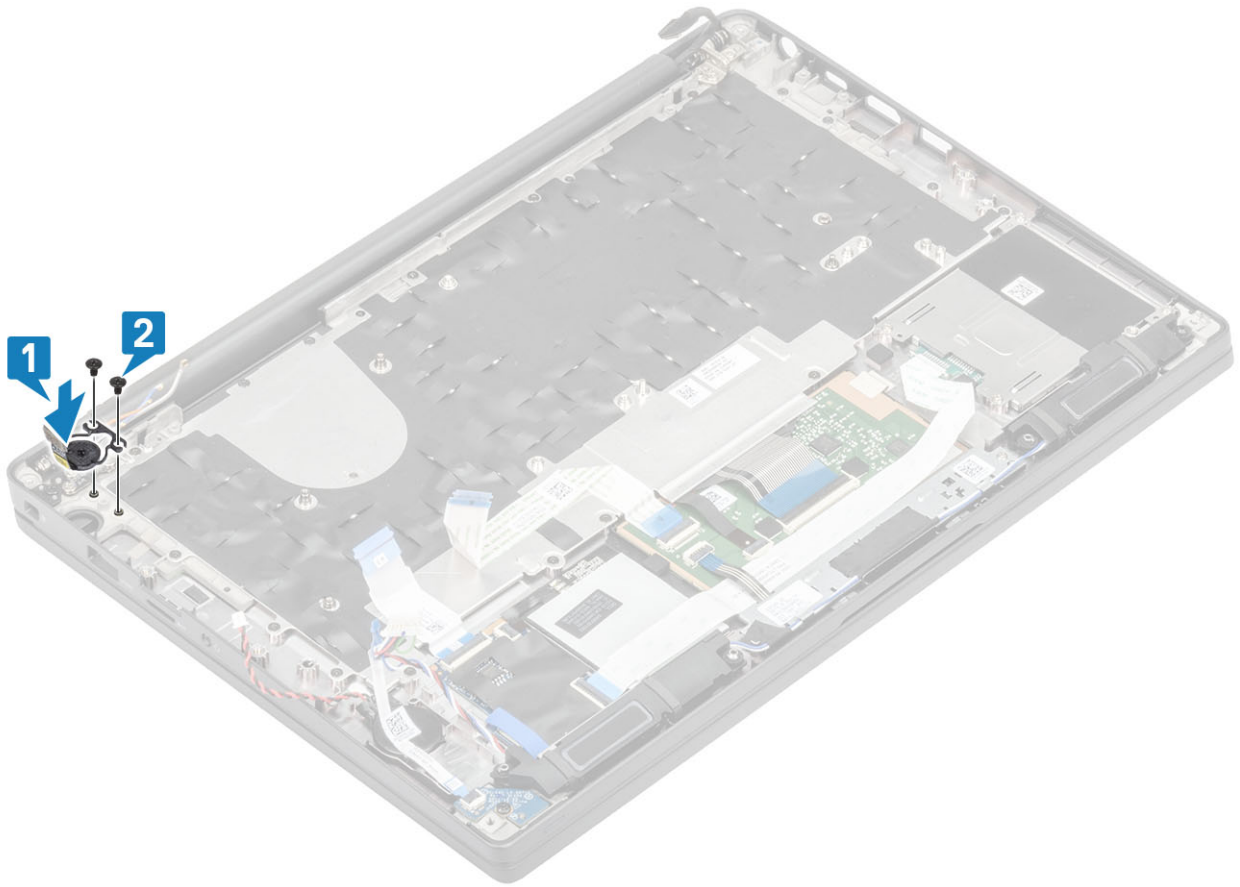


Figure 6. Installing the power-button board with FPR

① **NOTE:** Power-button board with finger print reader, has a cable that **connects** to the system board.

- 1 Install the [system board](#).
- 2 Install the [touchpad buttons](#).
- 3 Install the [display assembly](#)
- 4 Install the [power adapter port](#).
- 5 Install the [heatsink-fan assembly](#).
- 6 Install the [WLAN card](#).
- 7 Install the [SSD](#).
- 8 Install the [memory](#).
- 9 Install the [battery](#).
- 10 Install the [base cover](#).
- 11 Follow the procedure [after working inside your computer](#).

Keyboard

Removing the keyboard

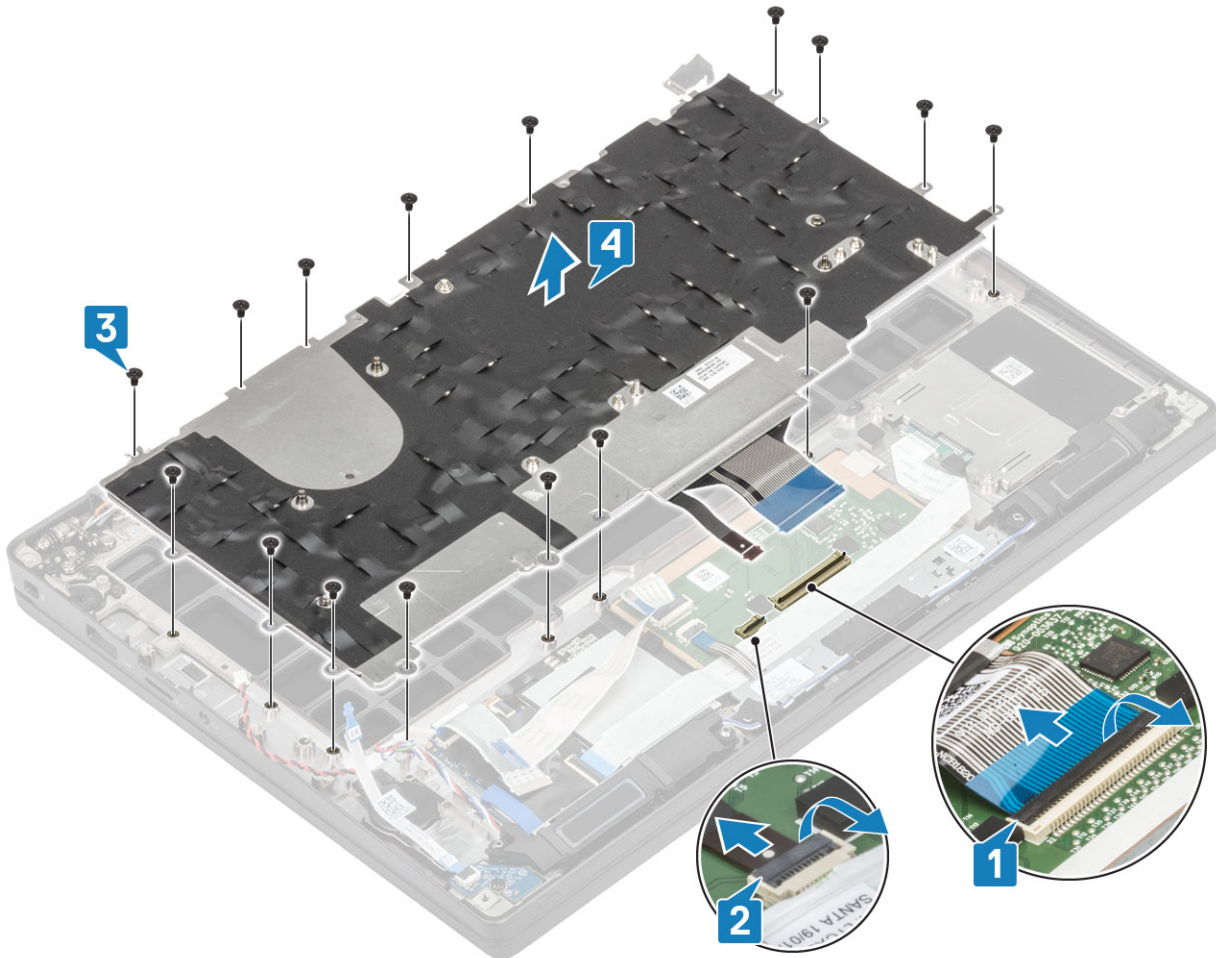
- 1 Follow the procedure in [before working inside your computer](#).
- 2 Remove the [base cover](#).

- 3 Remove the [battery](#).
- 4 Remove the [memory](#).
- 5 Remove the [SSD](#).
- 6 Remove the [WLAN card](#).
- 7 Remove the [heatsink-fan assembly](#).
- 8 Remove the [power adapter port](#).
- 9 Remove the [display assembly](#).
- 10 Remove the [system board](#).
- 11 Remove the [coin cell](#).
- 12 Remove the [power-button board](#).

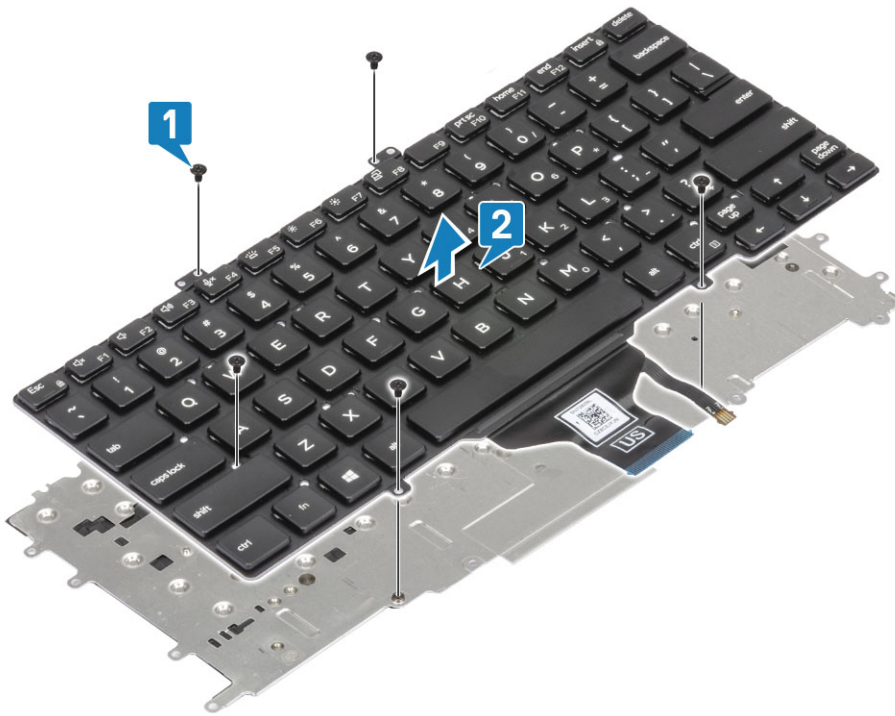
1 Lift the latch and disconnect the keyboard cable [1] and the backlight cable [2] from the touchpad module.

2 **① NOTE: This image shows disassembly of a carbon fiber variant, an Aluminum variant of this model has 21 M1.6x2 screws securing the keyboard assembly to palmrest.**

Remove the 19 (M1.6x2) screws [3] and separate the keyboard assembly from the palmrest [4].

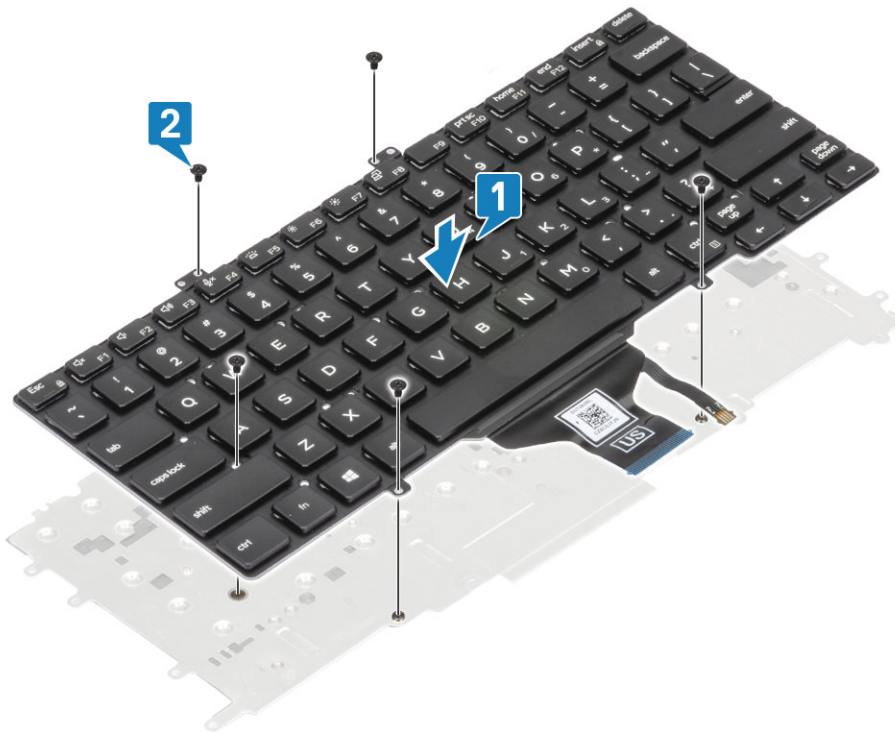


3 Remove the five (M2x2) screws [1] to lift the keyboard from the keyboard support plate.



Installing the keyboard

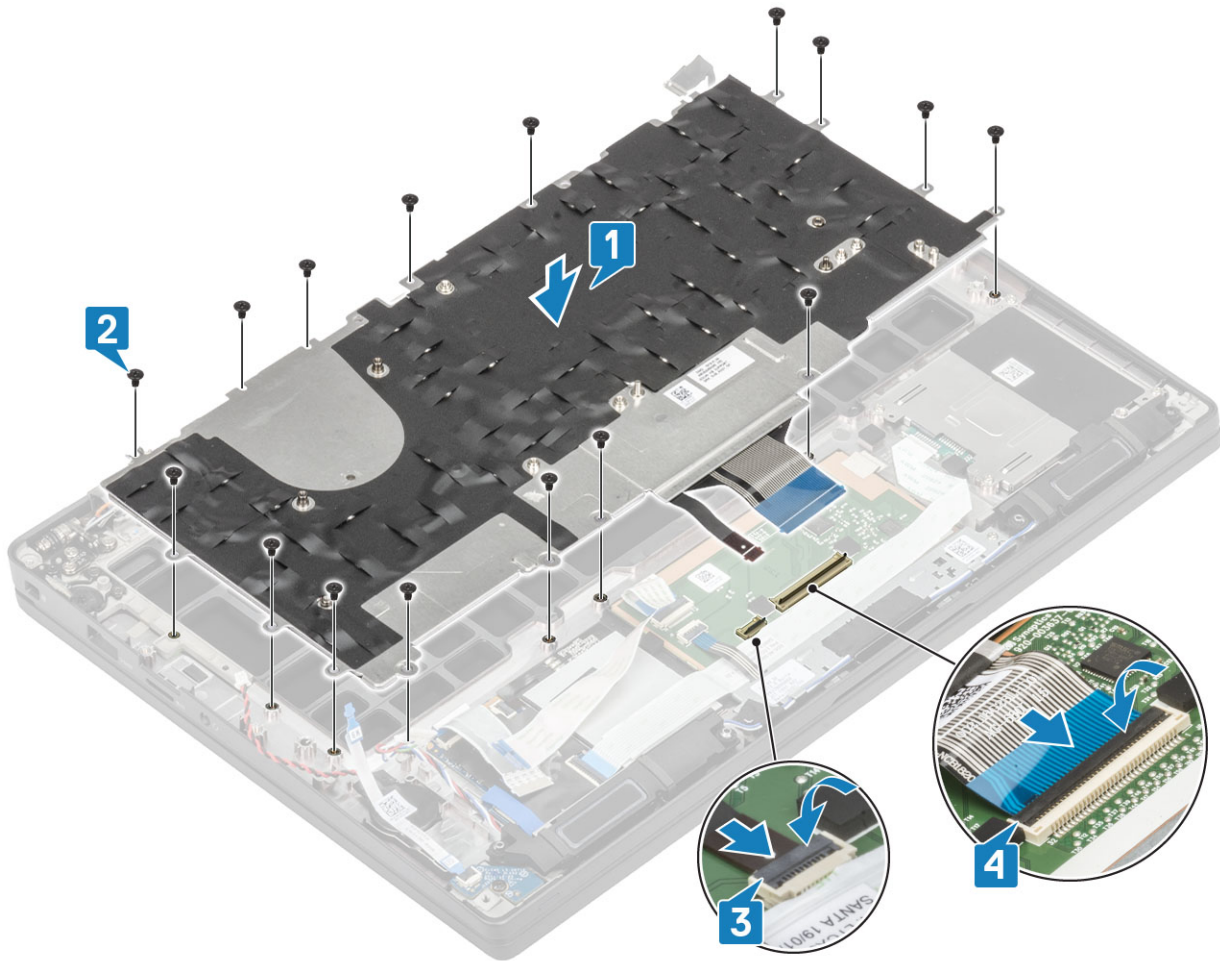
- 1 Align the keyboard to the keyboard support plate [1] and replace the two (M2x2) screws [2].



- 2 Place the keyboard assembly in the palmrest [1] and secure it with the 17 (M1.6x2) screws [2].

NOTE: This image shows disassembly of a carbon fiber variant, an Aluminum variant of this model has 21 M1.6x2 screws securing the keyboard assembly to palmrest assembly.

- 3 Connect the keyboard cable [3] and the backlight cable [4] to the touchpad module.



- 1 Install the [power button](#).
- 2 Install the [coin cell](#).
- 3 Install the [system board](#).
- 4 Install the [display assembly](#)
- 5 Install the [power adapter port](#).
- 6 Install the [heatsink-fan assembly](#).
- 7 Install the [WLAN card](#).
- 8 Install the [SSD](#).
- 9 Install the [memory](#).
- 10 Install the [battery](#).
- 11 Install the [base cover](#).
- 12 Follow the procedure [after working inside your computer](#).

Palmrest

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

- 8 Remove the [power adapter port](#).
 - 9 Remove the [LED daughterboard](#).
 - 10 Remove the [speaker](#).
 - 11 Remove the [display assembly](#).
 - 12 Remove the [touchpad buttons](#).
 - 13 Remove the [system board](#).
 - 14 Remove the [coin cell](#).
 - 15 Remove the [power button](#).
 - 16 Remove the [keyboard](#).
- 1 After removing these components, you are left with the palmrest assembly.



- 2 Install the following components to the new palmrest assembly:

- 1 Install the [keyboard](#).
- 2 Install the [power button](#).
- 3 Install the [coin cell](#).
- 4 Install the [system board](#).
- 5 Install the [display assembly](#)
- 6 Install the [speaker](#).
- 7 Install the [LED board](#).
- 8 Install the [power adapter port](#).
- 9 Install the [heatsink-fan assembly](#).
- 10 Install the [WLAN card](#).
- 11 Install the [SSD](#).
- 12 Install the [memory](#).
- 13 Install the [battery](#).

- 14 Install the [base cover](#).
- 15 Follow the procedure [after working inside your computer](#).

Troubleshooting

Enhanced Pre-Boot System Assessment (ePSA) diagnostics

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

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

- 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 2. LED codes

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

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

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

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

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

Flashing BIOS (USB key)

- 1 Follow the procedure from step 1 to step 7 in "[Flashing the BIOS](#)" to download the latest BIOS setup program file.
- 2 Create a bootable USB drive. For more information see the knowledge base article [SLN143196](#) at www.dell.com/support.
- 3 Copy the BIOS setup program file to the bootable USB drive.
- 4 Connect the bootable USB drive to the computer that needs the BIOS update.
- 5 Restart the computer and press **F12** when the Dell logo is displayed on the screen.
- 6 Boot to the USB drive from the **One Time Boot Menu**.
- 7 Type the BIOS setup program filename and press **Enter**.
- 8 The **BIOS Update Utility** appears. Follow the instructions on the screen to complete the BIOS update.

Flashing the BIOS

You may need to flash (update) the BIOS when an update is available or when you replace the system board. Follow these steps to flash the BIOS:

- 1 Turn on your computer.
- 2 Go to www.dell.com/support.
- 3 Click **Product support**, enter the Service Tag of your computer, and then click **Submit**.

NOTE: If you do not have the Service Tag, use the auto-detect feature or manually browse for your computer model.

- 4 Click **Drivers & downloads > Find it myself**.
- 5 Select the operating system installed on your computer.
- 6 Scroll down the page and expand **BIOS**.
- 7 Click **Download** to download the latest version of the BIOS for your computer.
- 8 After the download is complete, navigate to the folder where you saved the BIOS update file.
- 9 Double-click the BIOS update file icon and follow the instructions on the screen.

Backup media and recovery options

Dell proposes multiple options for recovering Windows operating system on your Dell PC. For more information, see [Dell Windows Backup Media and Recovery Options](#).

WiFi power cycle

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.

- 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.

Flea power release

Flea power is the residual static electricity that remains on the computer even after it has been powered off and the battery has been removed. The following procedure provides the instructions on how to conduct flea power release:

- 1 Turn off your computer.
- 2 Disconnect the power adapter from your computer.
- 3 Press and hold the power button for 15 seconds to drain the flea power.
- 4 Connect the power adapter to your computer.
- 5 Turn on your computer.

Getting help

Contacting Dell

① **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.

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:

- 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.