Dell Latitude 7400 2-in-1

Service Manual

Regulatory Model: P110G
Regulatory Type: P110G001
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Notes, cautions, and warnings

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

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

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

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1

Working on your computer

Topics:

- Safety instructions
- Turning off your computer — Windows 10
- Before working inside your computer
- After working inside 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.

Turning off your computer — Windows 10

About this task

CAUTION: To avoid losing data, save and close all open files and exit all open programs before you turn off your computer or remove the side cover.

Steps

1. Click or tap .
2. Click or tap ⏻ and then click or tap **Shut down**.

   NOTE: Ensure that the computer and all attached devices are turned off. If your computer and attached devices did not automatically turn off when you shut down your operating system, press and hold the power button for about 6 seconds to turn them off.

Before working inside your computer

About this task

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.

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**.

2

Technology and components

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

Topics:

- USB features
- USB Type-C
- HDMI 1.4a
- Corning Gorilla Glass

USB features

Universal Serial Bus, or USB, was introduced in 1996. It dramatically simplified the connection between host computers and peripheral devices like mice, keyboards, external drivers, and printers.

Table 1. USB evolution

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

USB 3.0/USB 3.1 Gen 1 (SuperSpeed USB)

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

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

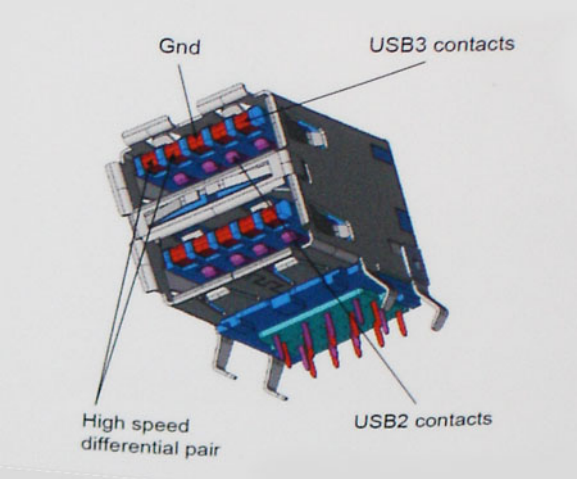
The topics below cover some of the most commonly asked questions regarding USB 3.0/USB 3.1 Gen 1.

Speed

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

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

- An additional physical bus that is added in parallel with the existing USB 2.0 bus (refer to the picture below).
- USB 2.0 previously had four wires (power, ground, and a pair for differential data); USB 3.0/USB 3.1 Gen 1 adds four more for two pairs of differential signals (receive and transmit) for a combined total of eight connections in the connectors and cabling.
- USB 3.0/USB 3.1 Gen 1 utilizes the bidirectional data interface, rather than USB 2.0's half-duplex arrangement. This gives a 10-fold increase in theoretical bandwidth.



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

Applications

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

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

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

Compatibility

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

USB Type-C

USB Type-C is a new, tiny physical connector. The connector itself can support various exciting new USB standards like USB 3.1 and USB power delivery (USB PD).

Alternate Mode

USB Type-C is a new connector standard that is very small. It is about a third the size of an old USB Type-A plug. This is a single connector standard that every device should be able to use. USB Type-C ports can support a variety of different protocols using “alternate modes,” which allows you to have adapters that can output HDMI, VGA, DisplayPort, or other types of connections from that single USB port

USB Power Delivery

The USB PD specification is also closely intertwined with USB Type-C. Currently, smartphones, tablets, and other mobile devices often use a USB connection to charge. A USB 2.0 connection provides up to 2.5 watts of power — that'll charge your phone, but that's about it. A laptop might require up to 60 watts, for example. The USB Power Delivery specification ups this power delivery to 100 watts. It's bi-directional, so a device can either send or receive power. And this power can be transferred at the same time the device is transmitting data across the connection.

This could spell the end of all those proprietary laptop charging cables, with everything charging via a standard USB connection. You could charge your laptop from one of those portable battery packs you charge your smartphones and other portable devices from today. You could plug your laptop into an external display connected to a power cable, and that external display would charge your laptop as you used it as an external display — all via the one little USB Type-C connection. To use this, the device and the cable have to support USB Power Delivery. Just having a USB Type-C connection doesn't necessarily mean they do.

USB Type-C and USB 3.1

USB 3.1 is a new USB standard. USB 3's theoretical bandwidth is 5 Gbps, while USB 3.1's is 10 Gbps. That's double the bandwidth, as fast as a first-generation Thunderbolt connector. USB Type-C isn't the same thing as USB 3.1. USB Type-C is just a connector shape, and the underlying technology could just be USB 2 or USB 3.0. In fact, Nokia's N1 Android tablet uses a USB Type-C connector, but underneath it's all USB 2.0 — not even USB 3.0. However, these technologies are closely related.

Thunderbolt over USB Type-C

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

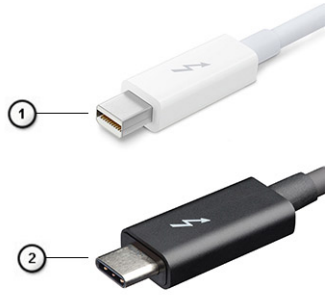


Figure 1. Thunderbolt 1 and Thunderbolt 3

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

Thunderbolt 3 over USB Type-C

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

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

Key Features of Thunderbolt 3 over USB Type-C

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

NOTE: Data transfer speed may vary between different devices.

Thunderbolt Icons

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

Figure 2. Thunderbolt Iconography Variations

HDMI 1.4a

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

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

HDMI 1.4a Features

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

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

Advantages of HDMI

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

Corning Gorilla Glass

Corning Gorilla Glass 5: Corning's latest composition was formulated to address breakage the #1 consumer complaint, according to Corning's research. The new glass is just as thin and light as previous versions, but has been formulated to deliver dramatically improved native damage resistance allowing improved in-field performance. Corning Gorilla Glass 5 has been tested for performance when subjected to sharp contact damage, such as asphalt and other real-world surfaces.

Benefits

- Enhanced retained strength after use.
- High resistance to scratch and sharp contact damage.
- Improved drop performance.
- Superior surface quality.

Applications

- Ideal protective cover for electronic displays in:
  - Smartphones
  - Laptop and tablet computer screens
  - Wearable devices
- Touchscreen devices
- Optical components
- High strength glass articles

Dimensions

Thickness: 0.4 mm

Viscosity

Table 2. Viscosity

Parameters	Vectors
Softening Point ($10^{7.6}$ poises)	884°C
Annealing Point ($10^{13.2}$ poises)	623°C
Strain Point ($10^{14.7}$ poises)	571°C

Properties

Table 3. Properties

Density	2.43 g/cm
Youngs Modulus	76.7 GPa
Poissons Ratio	0.21
Shear Modulus	31.7 GPa
Vickers Hardness (200 g load)	
• Un-strengthened • Strengthened	489 kgf/mm^2 596 kgf/mm^2 596 kgf/mm^2
Fracture Toughness	0.69 MPa m$^{0.5}$
Coefficient of Expansion (0 ˚C - 300 ˚C)	78.8 x 10^{-7} /ºC

Chemical Strengthening

Capability of >850MPa CS, at 50 µm Depth Of Layer(DOL)

Specifications subject to change

Optical

Table 4. Optical

Refractive Index (590 nm)	
Core glass**	1.50
Compression layer	1.51
Photo-elastic constant	30.3 nm/cm/MPa

** Core index is used for FSM-based measurements since it is unaffected by ion-exchange conditions.

Chemical Durability

Durability is measured via weight loss per surface area after immersion in the solvents shown below. Values are highly dependent upon actual testing conditions. Data reported is for Corning Gorilla Glass 5.

Table 5. Chemical Durability

Reagent	Time	Temperature (ºC)	Weight Loss (mg/cm2)
HCl - 5%	24 hrs	95	5.9
NH4F:HF - 10%	20 min	20	1.0
HF - 10%	20 min	20	25.2
NaOH - 5%	6 hrs	95	2.7

Electrical

Table 6. Electrical

Frequency (MHz)	Dielectric Constant	Loss Tangent
54	7.08	0.009
163	7.01	0.010
272	7.01	0.011
272	7.00	0.010
490	7.99	0.010
599	7.97	0.011
912	7.01	0.012
1499	6.99	0.012
1977	6.97	0.014
2466	6.96	0.014
2986	6.96	0.014

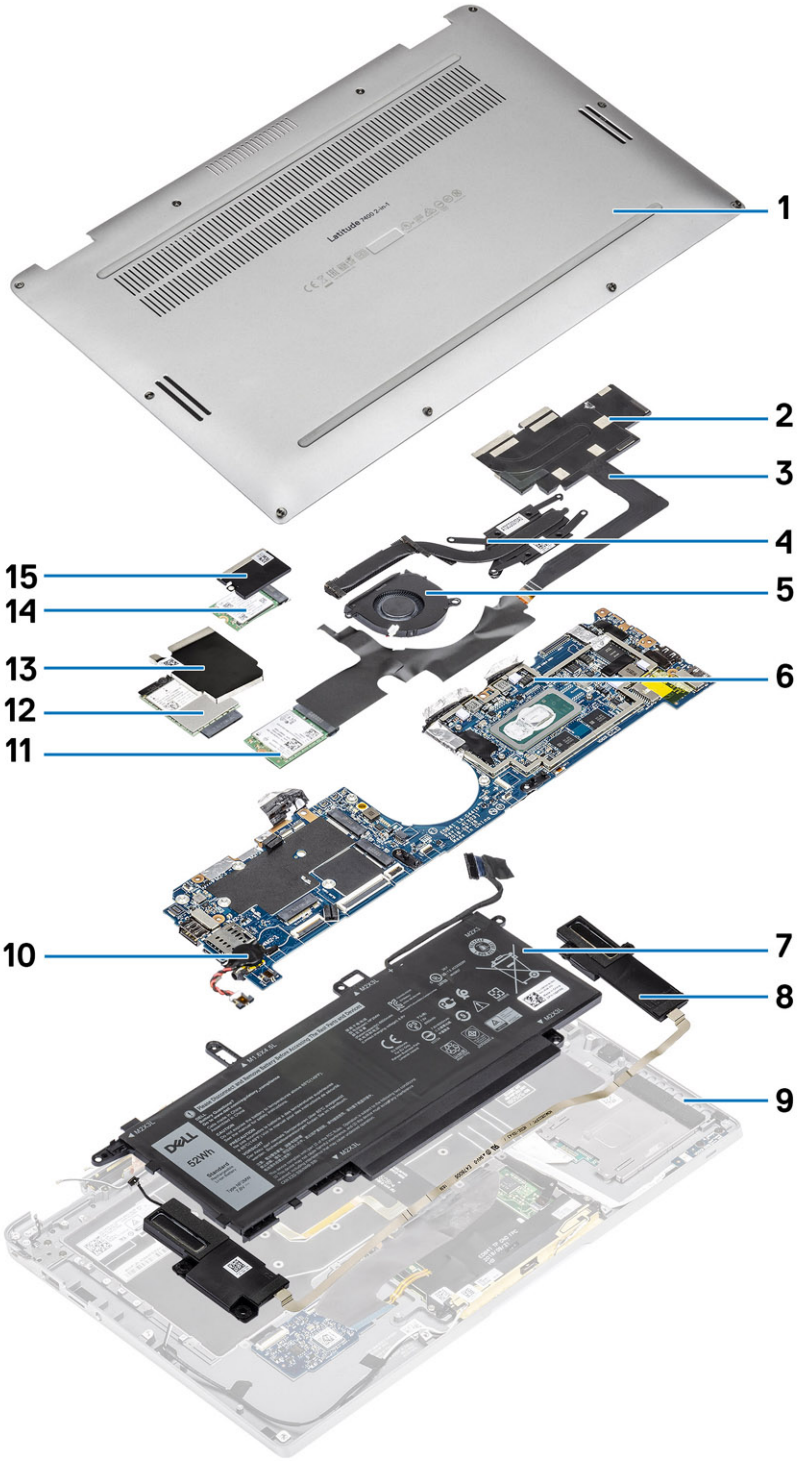
Terminated coaxial line similar to that outlined in NIST Technical Notes 1520 and 1355-R

Putting Corning Gorilla Glass 5 to the test.

- Greater damage resistance (upto 1.8X) with deep abrasion.
- Faster chemical strengthening with high Compressive Stress and deeper depth of compression
  - Shallower check depth with higher abrasions levels
- Enables thickness reduction

3

Major components of your system



1. Base cover
2. Heatsink shield

3. Touchscreen FPC cable
4. Heatsink
5. Fan
6. System board
7. Battery
8. Speakers
9. Palmrest assembly
10. Coin cell
11. WLAN card
12. WWAN card
13. WWAN shield
14. Solid state drive
15. SSD shield

NOTE: Dell provides a list of components and their part numbers for the original system configuration purchased. These parts are available according to warranty coverages purchased by the customer. Contact your Dell sales representative for purchase options.

4

Removing and installing components

Topics:

- Recommended tools
- Screw List
- SD memory card
- SIM card tray
- Base cover
- Battery cable
- Coin cell
- Solid state drive
- WLAN card
- WWAN card
- Fan
- Speakers
- Heatsink
- Display assembly
- Battery
- System board
- Keyboard
- Palmrest assembly

Recommended tools

The procedures in this document require the following tools:

- Phillips #0 screwdriver
- Phillips #1 screwdriver
- Plastic scribe
- T-30 torx screwdriver

NOTE: The #0 screw driver is for screws 0-1 and the #1 screw driver is for screws 2-4.

Screw List

The following table shows the screw list and the images for Dell Latitude 7400 2-in-1, for different components and locations.

Table 7. Screw Size List

Component	Screw type	Quantity	Image
Base cover	Captive screws **NOTE:** Screws are part of the base cover	10	
Solid State Drive	M2x2	1	
WLAN card	M2x2	1	

Table 7. Screw Size List (continued)

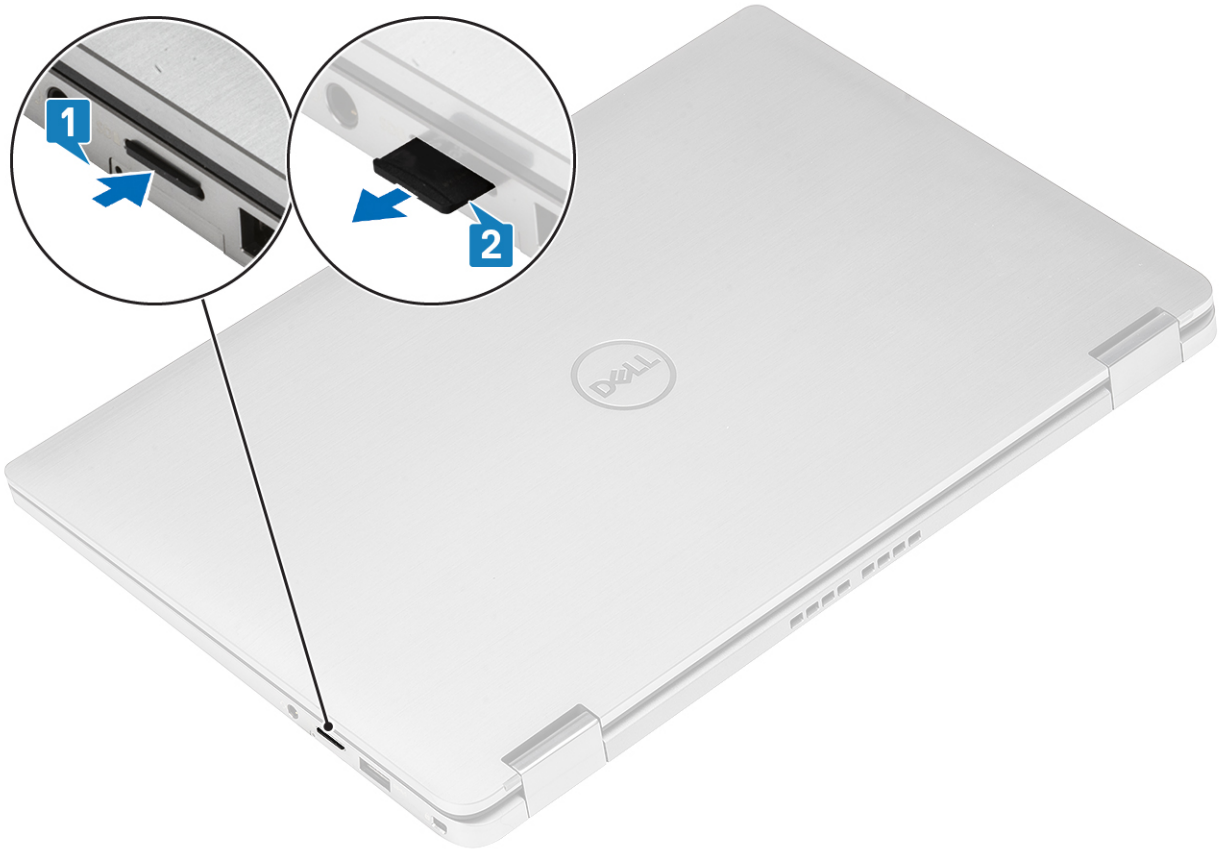
Component	Screw type	Quantity	Image
WWAN card	M2x2	1	
Fan	M2x2	1	
Speakers	M1.6x1.4	3	
Heatsink	M1.6x2.5	4	
Display assembly	M2.5x3.5	6	
Battery	• M1.6x4.5 • M2x3	• 1 • 4	•  • 
System board	• M2x2 • M2x4 • M2x3	• 2 • 2 • 5	•  •  • 
Keyboard	M1.6x1.5	• 1 • 2 • 40	

SD memory card

Removing the SD memory card

Steps

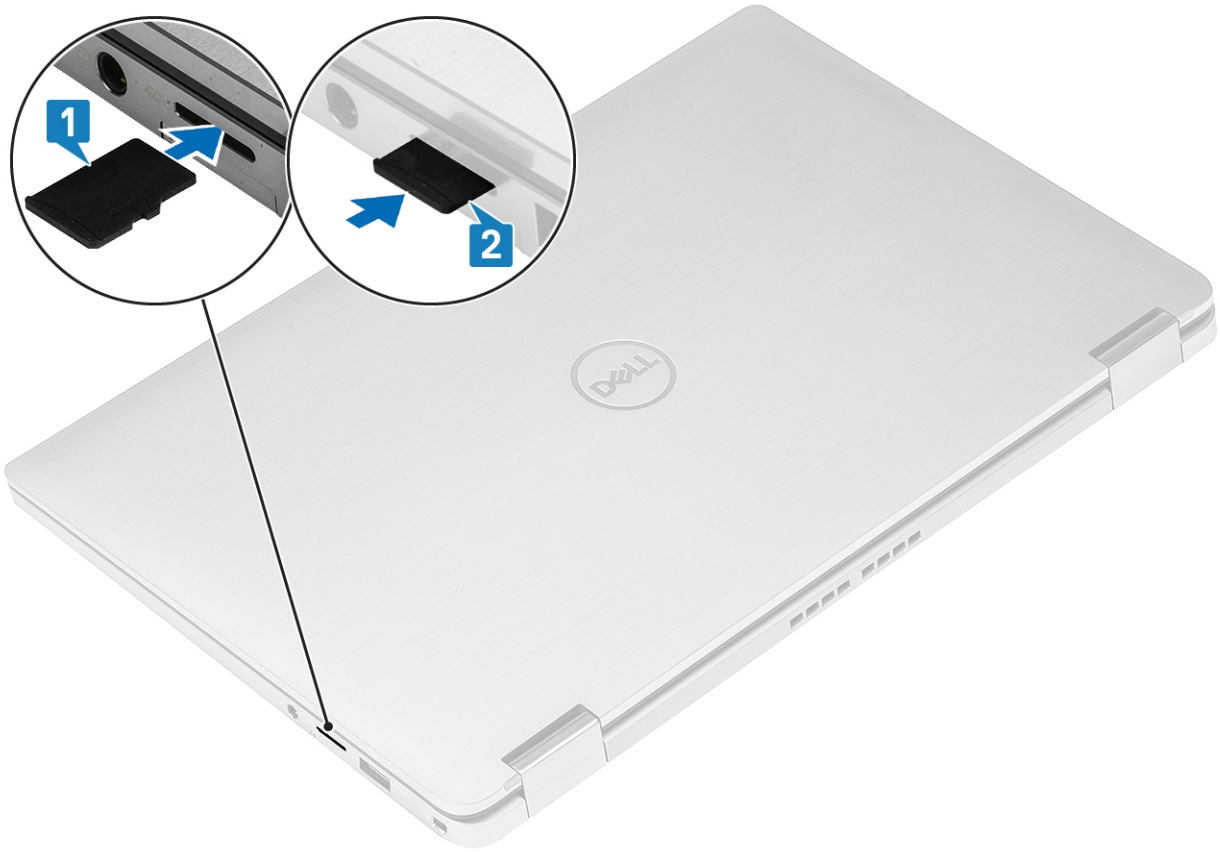
1. Press the SD memory card to eject it from the SD memory card slot [1].
2. Remove the SD memory card from the computer [2].



Installing the SD memory card

Steps

Insert the SD memory card into its slot [1] until it clicks into place [2].



SIM card tray

Removing the SIM card tray

NOTE: This procedure applies for models that are shipped with WWAN card only.

Steps

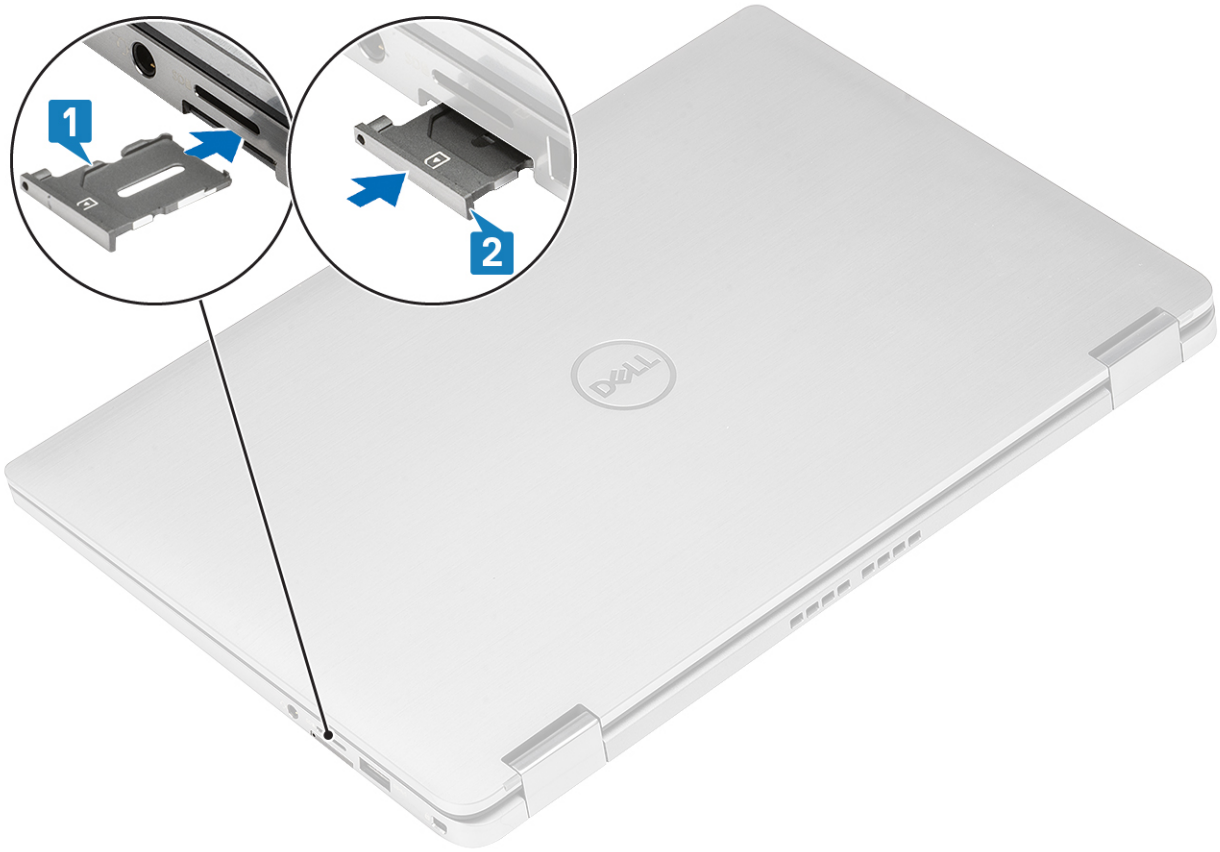
1. Insert a paperclip or a SIM card removal tool into the pinhole on the SIM card tray [1].
2. Push the pin to disengage the lock and eject the SIM card tray [2].
3. Pull the SIM card tray out of the computer [3].



Installing the SIM card tray

Steps

Install the SIM card tray into its slot on the computer [1] and push to lock it in place [2].



Base cover

Removing the base cover

Prerequisites

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

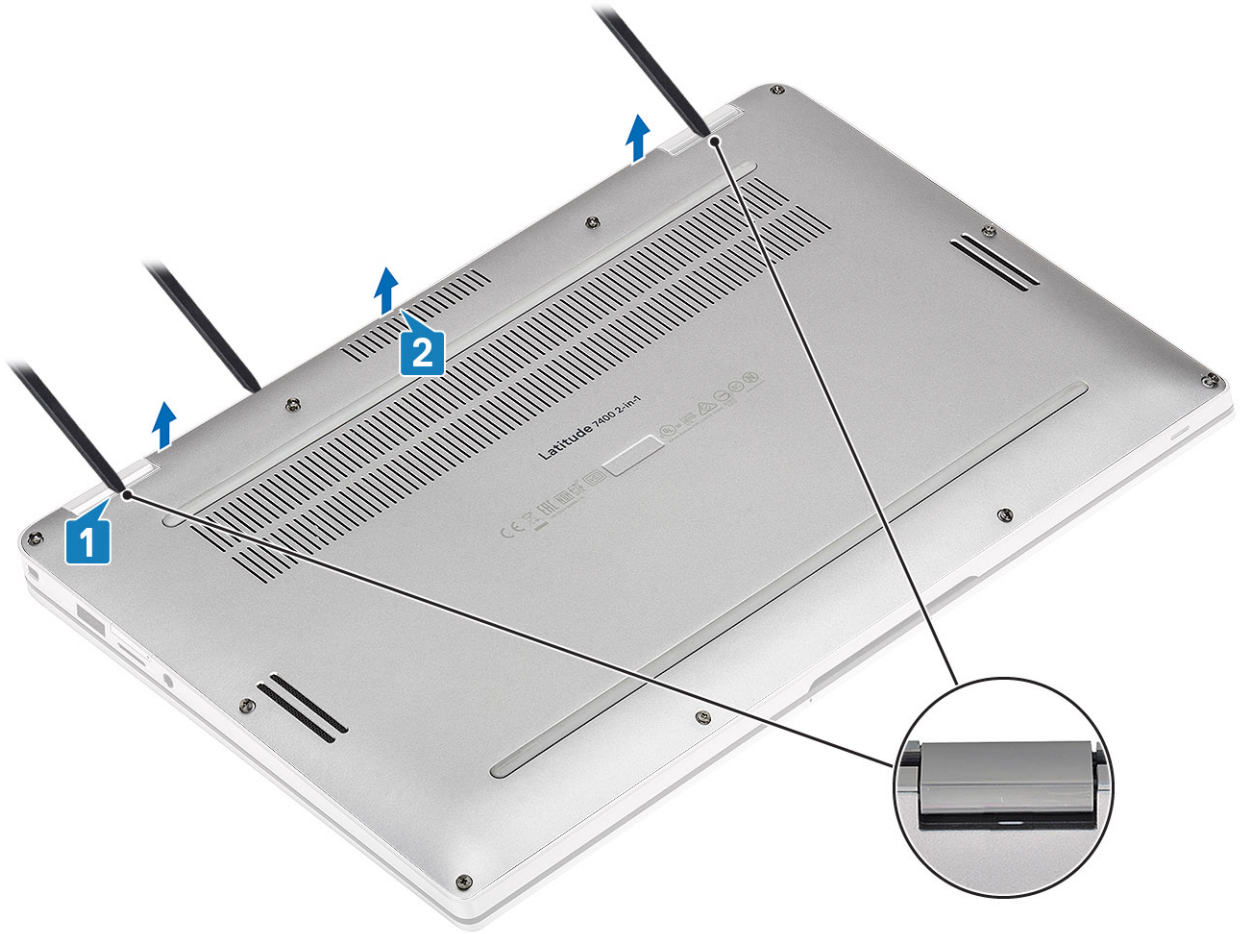
Steps

1. Loosen the 10 captive screws that secure the base cover to the computer.



2. Use a plastic scribe [1] to pry the base cover along the recess points located in the hinge indents as shown in the image.
3. Pry the base cover along the edges from the top side [2] to separate the base cover from the computer [2].

CAUTION: Do not pull on the base cover from the top side immediately after prying it open from the recesses as it can damage the base cover.



4. Pry along the left, right and bottom edges of the base.



5. Slide the base cover outwards before removing it off the computer and then life the base cover off the computer.



Installing the base cover

Steps

1. Slide in base cover and place it on the computer.



2. Press along the edges of the base cover until it clicks into place.



3. Tighten the 10 captive screws to secure the base cover to the computer.



4. Press the two highlighted middle area of the system as shown in the image after the screws are secured to complete the installation process.



Next steps

1. Install the SD memory card.
2. Follow the procedure in after working inside your computer.

Battery cable

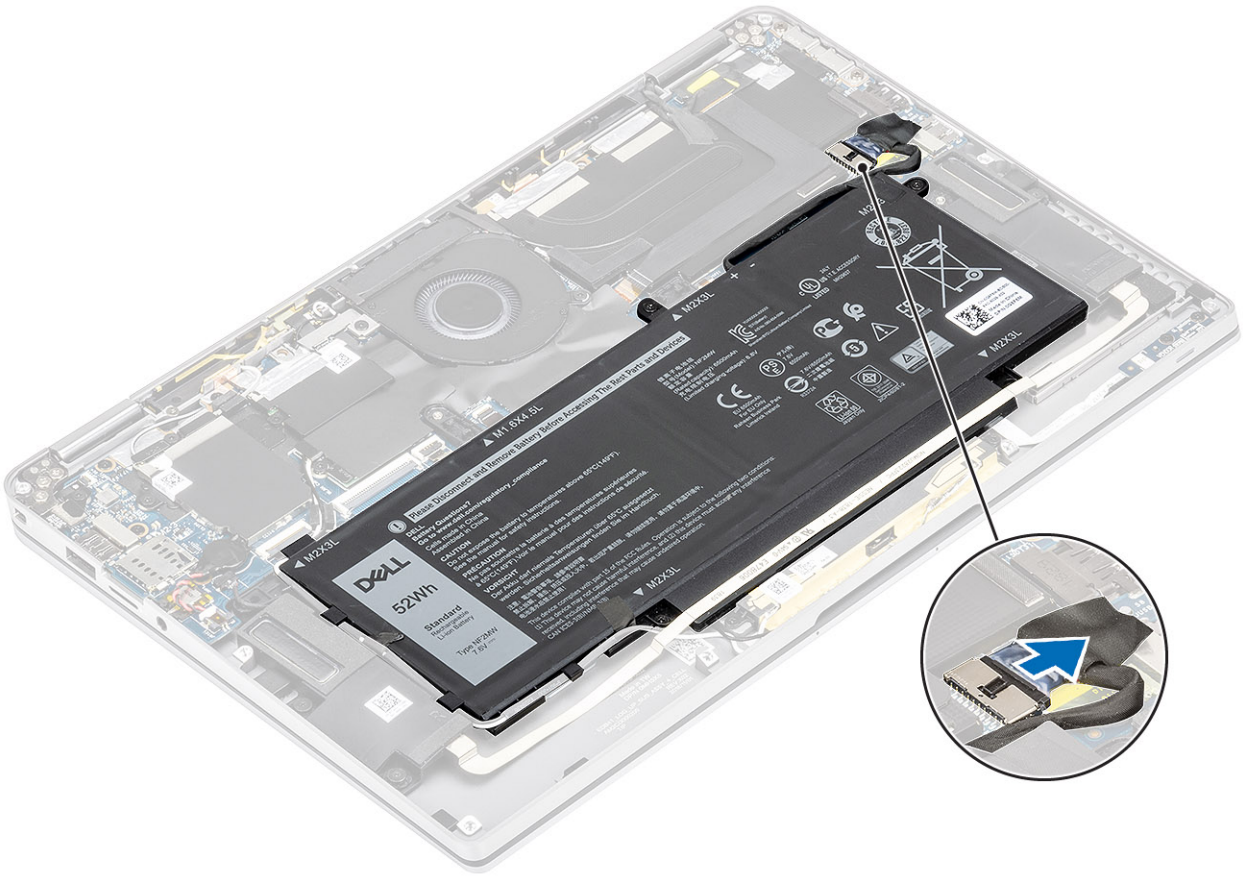
Disconnecting the battery cable

Prerequisites

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

Steps

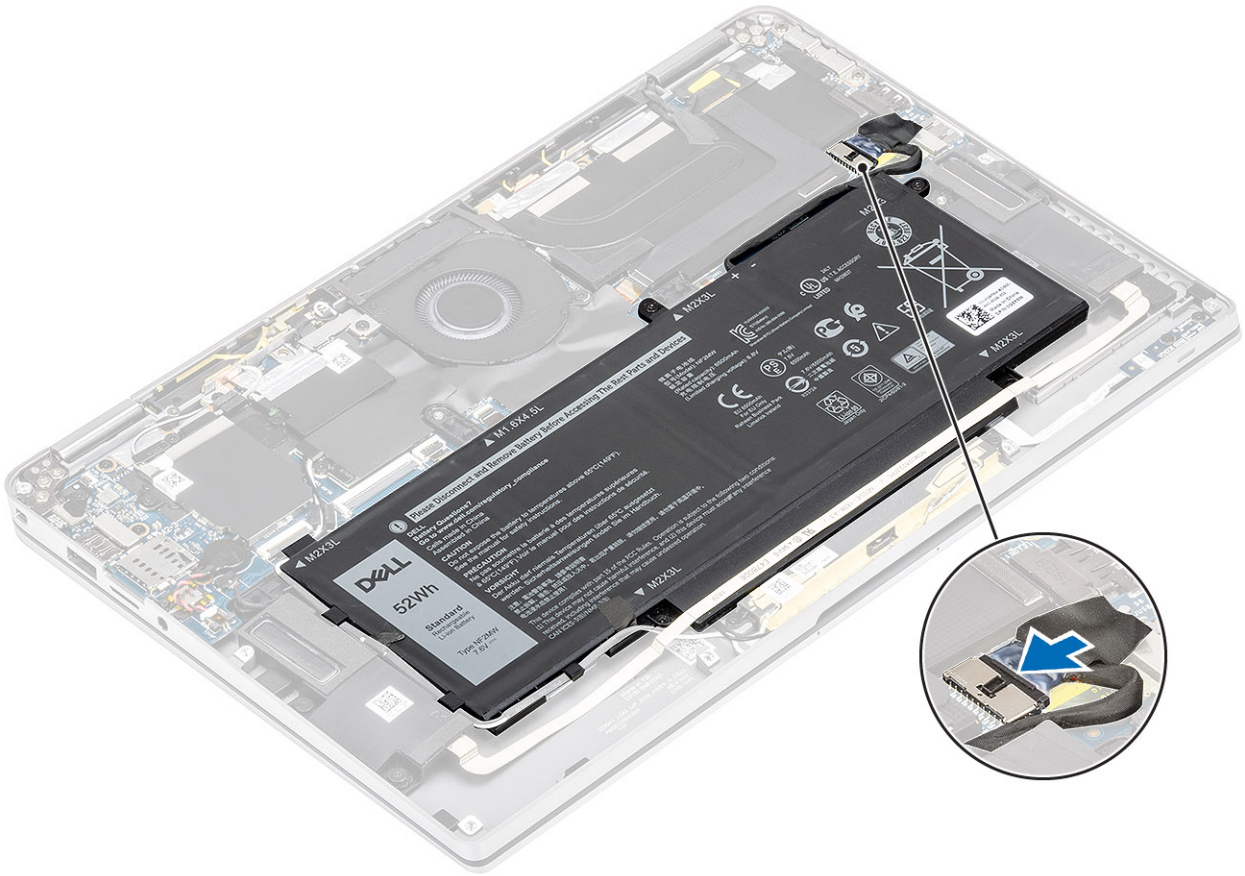
Disconnect the battery cable from the connector on the system board.



Connecting the battery cable

Steps

Connect the battery cable to the connector on the system board.



Next steps

1. Install the base cover.
2. Install the SIM card.
3. Install the SD memory card.
4. Follow the procedure in after working inside your computer.

Coin cell

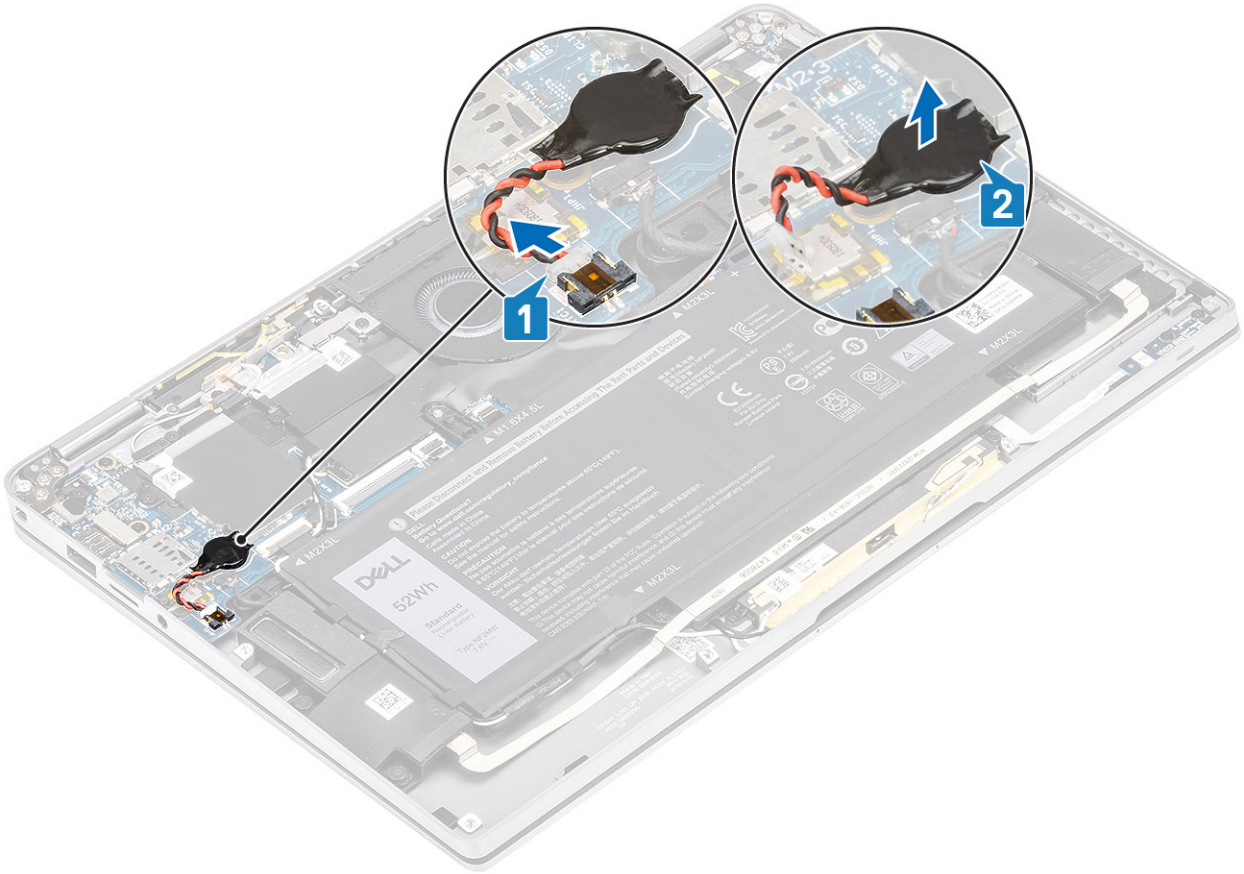
Removing the coin cell battery

Prerequisites

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

Steps

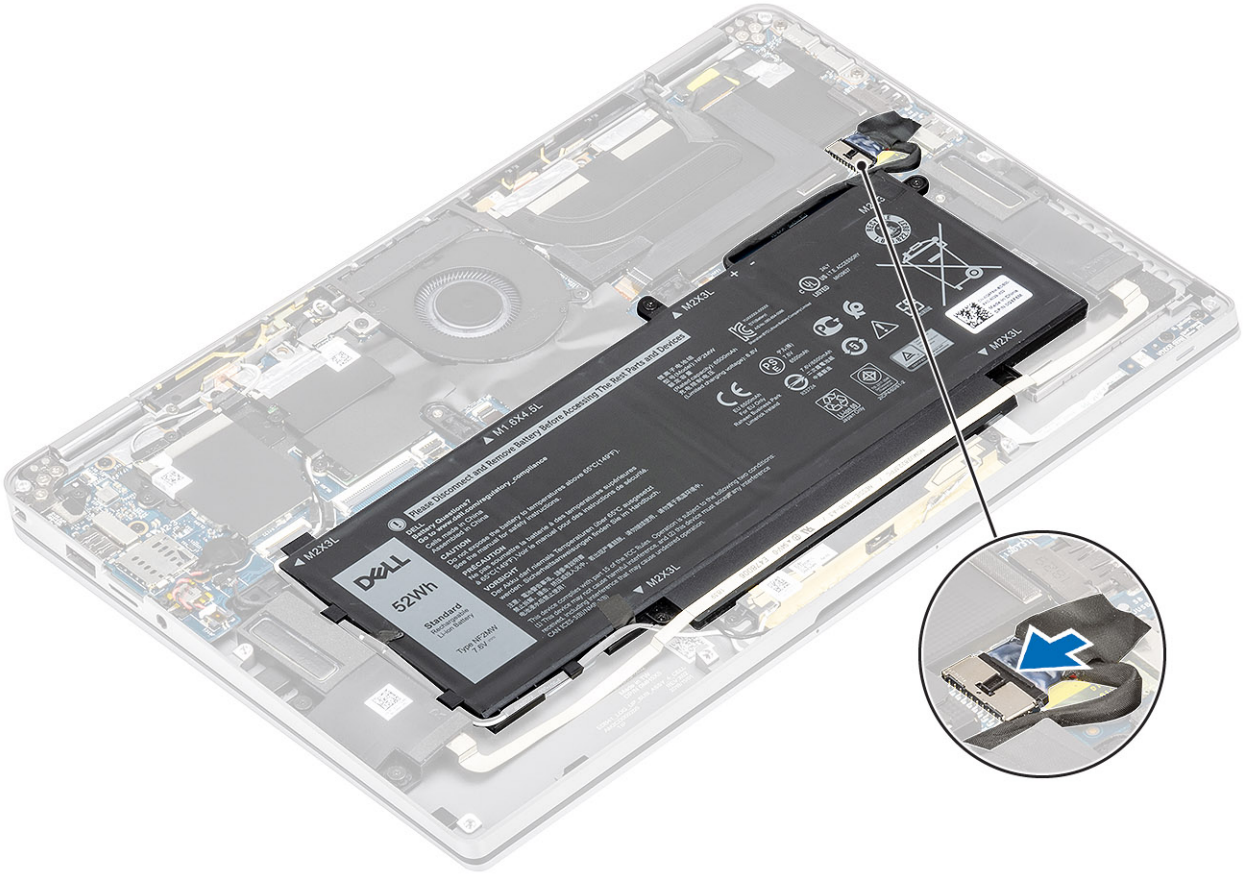
1. Disconnect the coin-cell battery cable from the connector on the system board [1].
2. Peel and lift the coin-cell battery off the computer [2].



Installing the coin-cell battery

Steps

1. Affix the coin-cell battery to the system [1].
2. Connect the coin-cell battery cable to the connector on the system board [2].



Next steps

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

Solid state drive

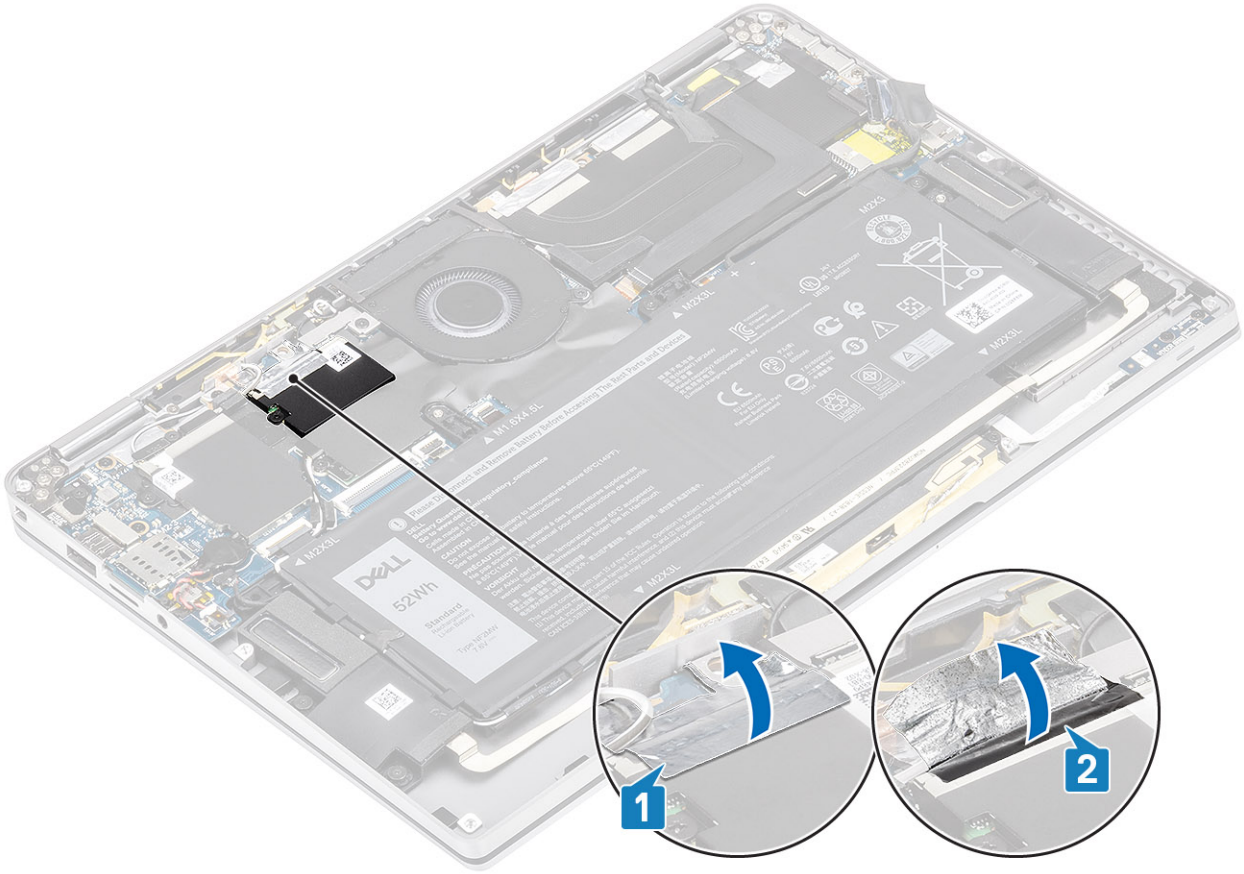
Removing the solid state drive

Prerequisites

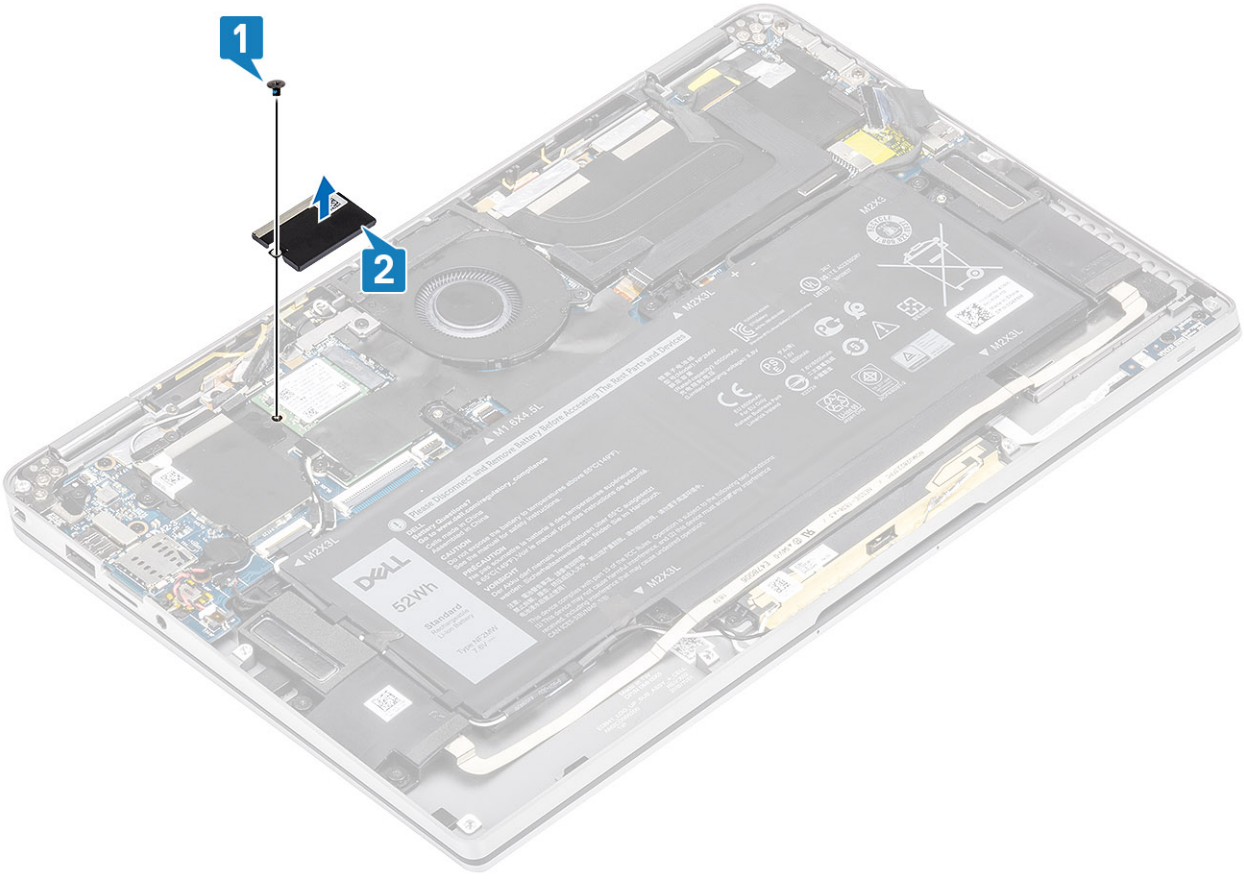
1. Follow the procedure in before working inside your computer.
2. Remove the SD memory card.
3. Remove the base cover.
4. Disconnect the battery cable.

Steps

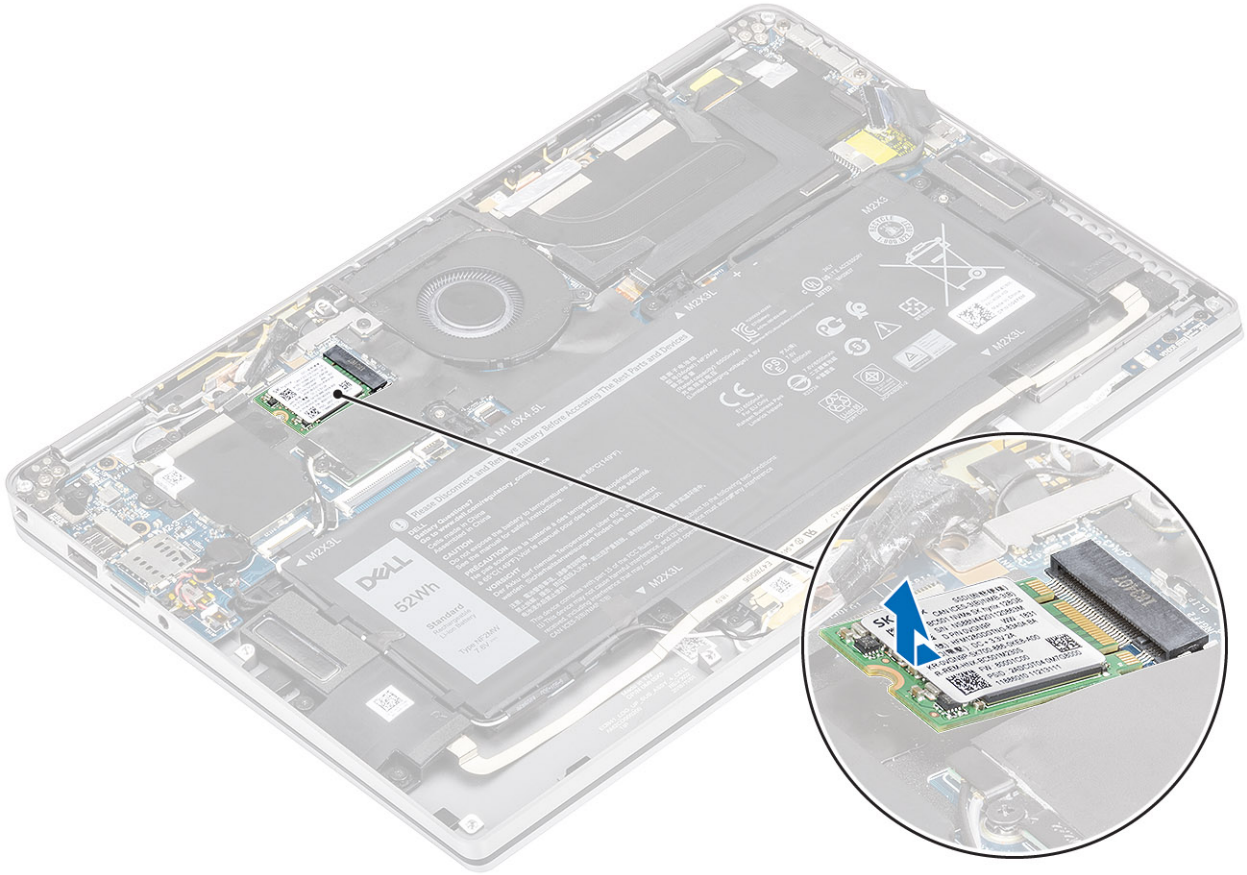
1. Peel off the metal foil [1] and the black tape [2] that partially covers the solid state drive (SSD) cover.



2. Remove the single (M2x2) screw [1] that secures the SSD shield to the system board.
3. Lift to remove the SSD shield from the system board [2].



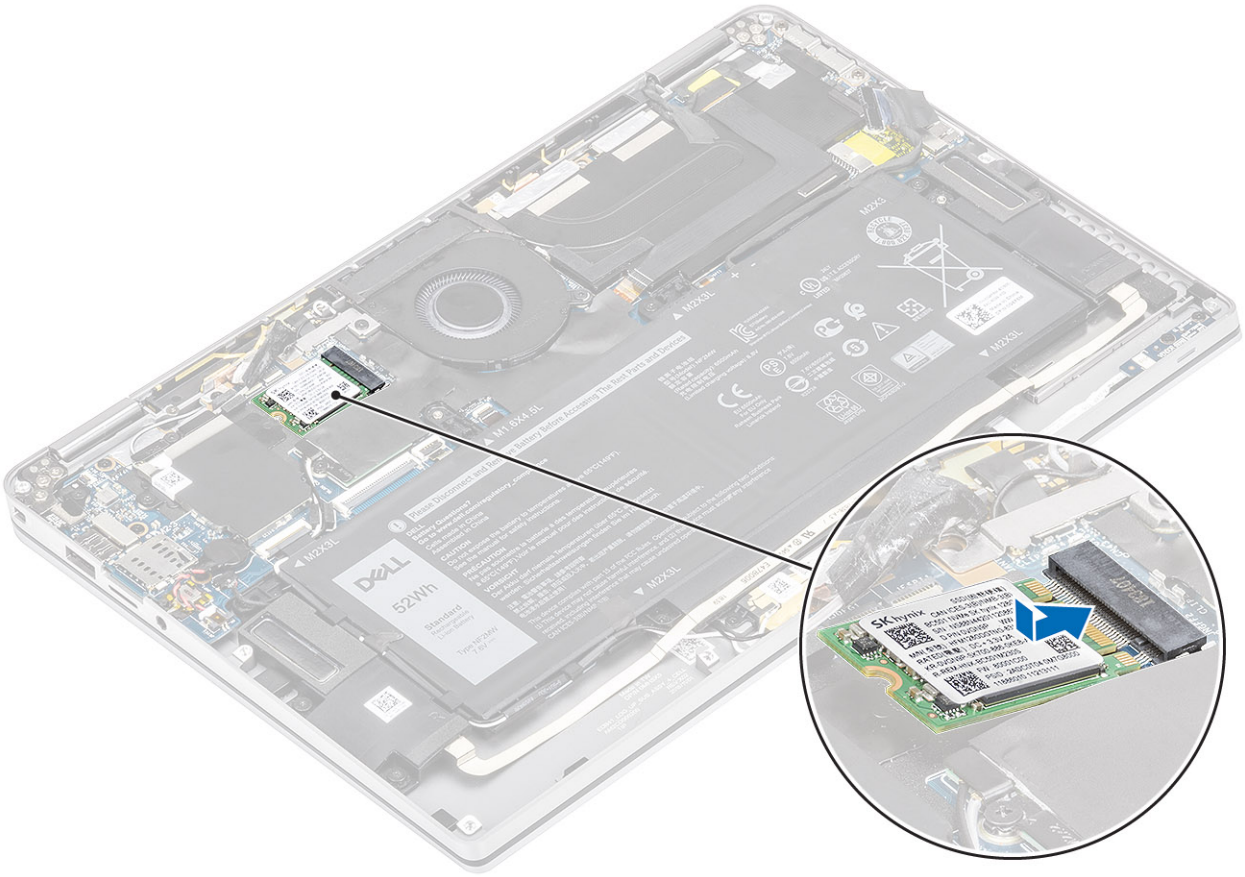
4. Slide and remove the SSD module from the connector on the system board.



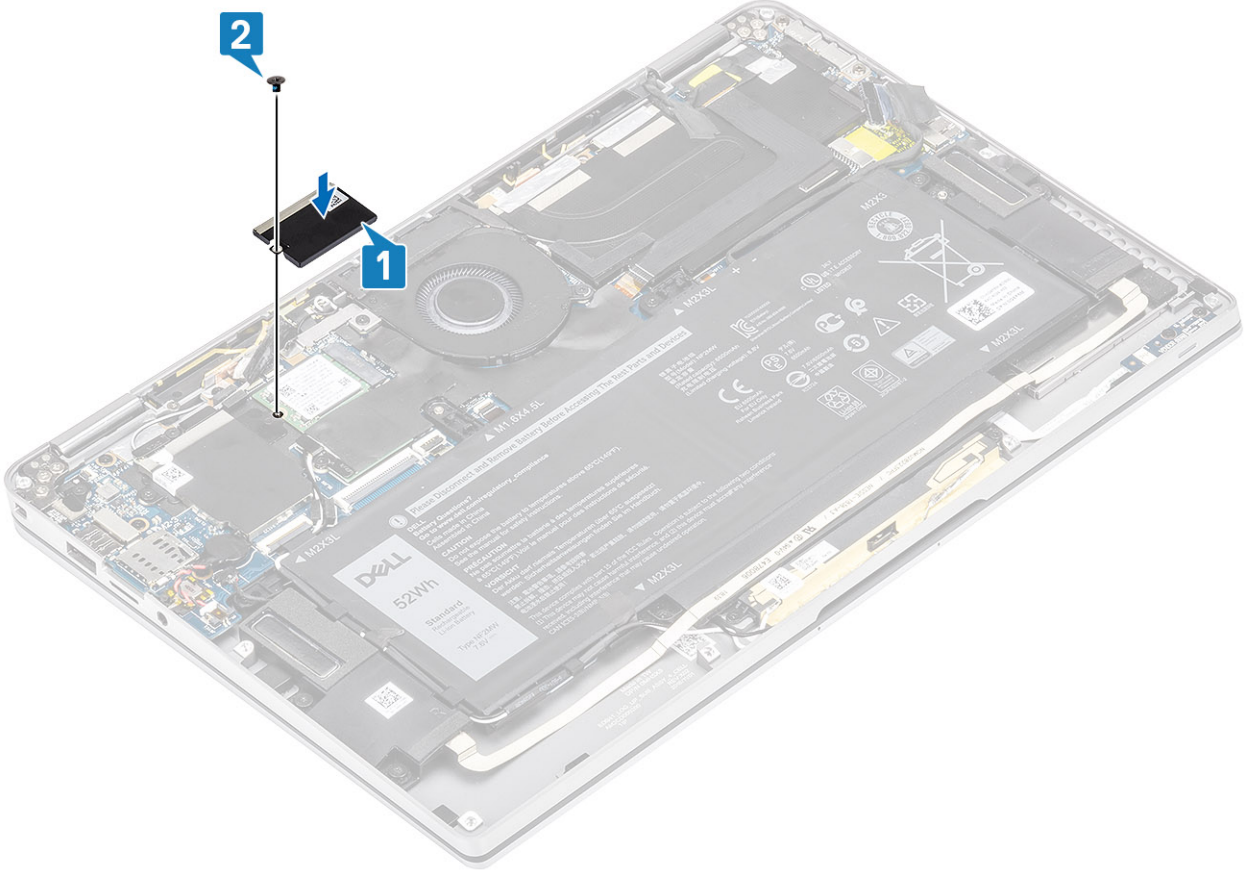
Installing the solid state drive

Steps

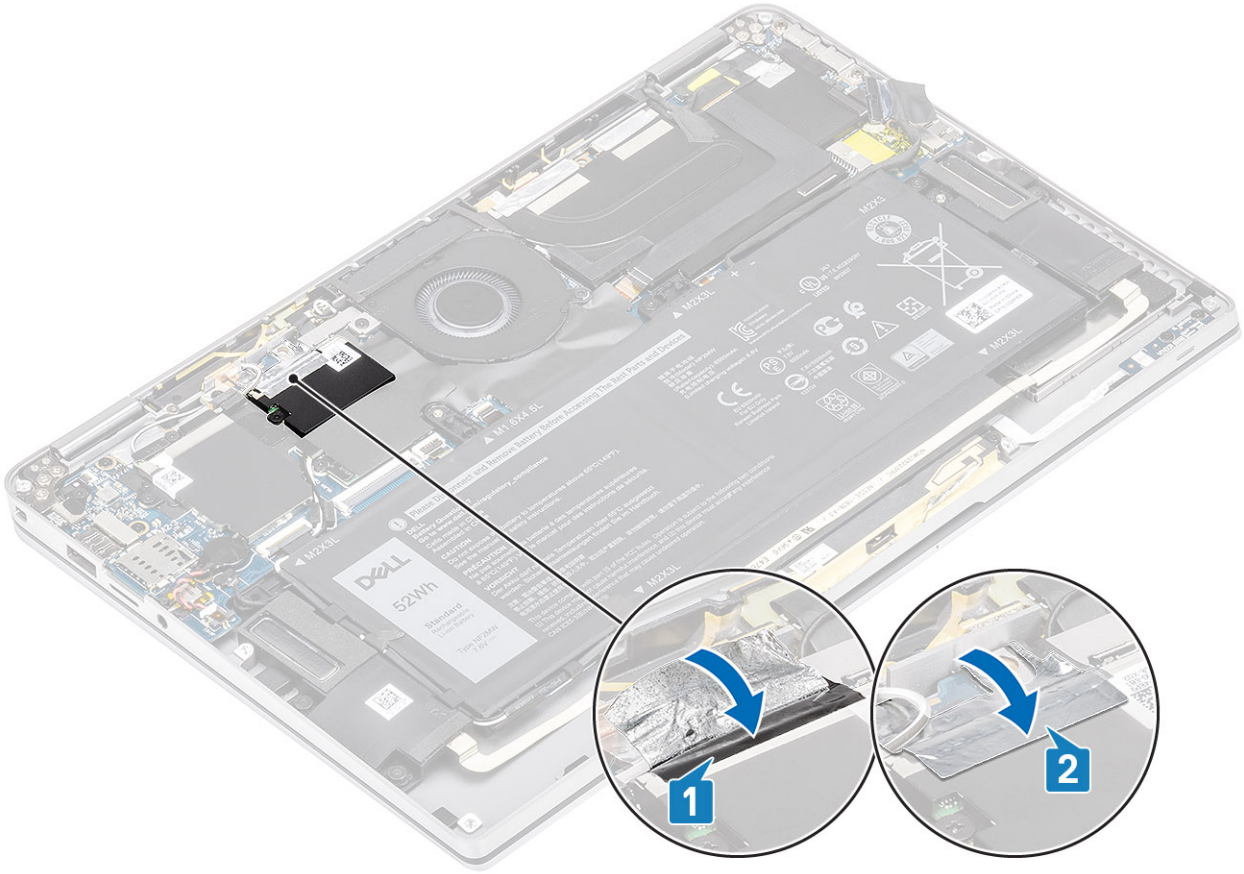
1. Align and slide the solid state drive (SSD) module into the connector on the system board.



2. Place the SSD shield on the SSD module [1] and replace the single (M2x2) screw [2] to secure it to the system board.



3. Affix the black tape [1] and the metal foil [2] to secure the SSD shield in place.



Next steps

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

WLAN card

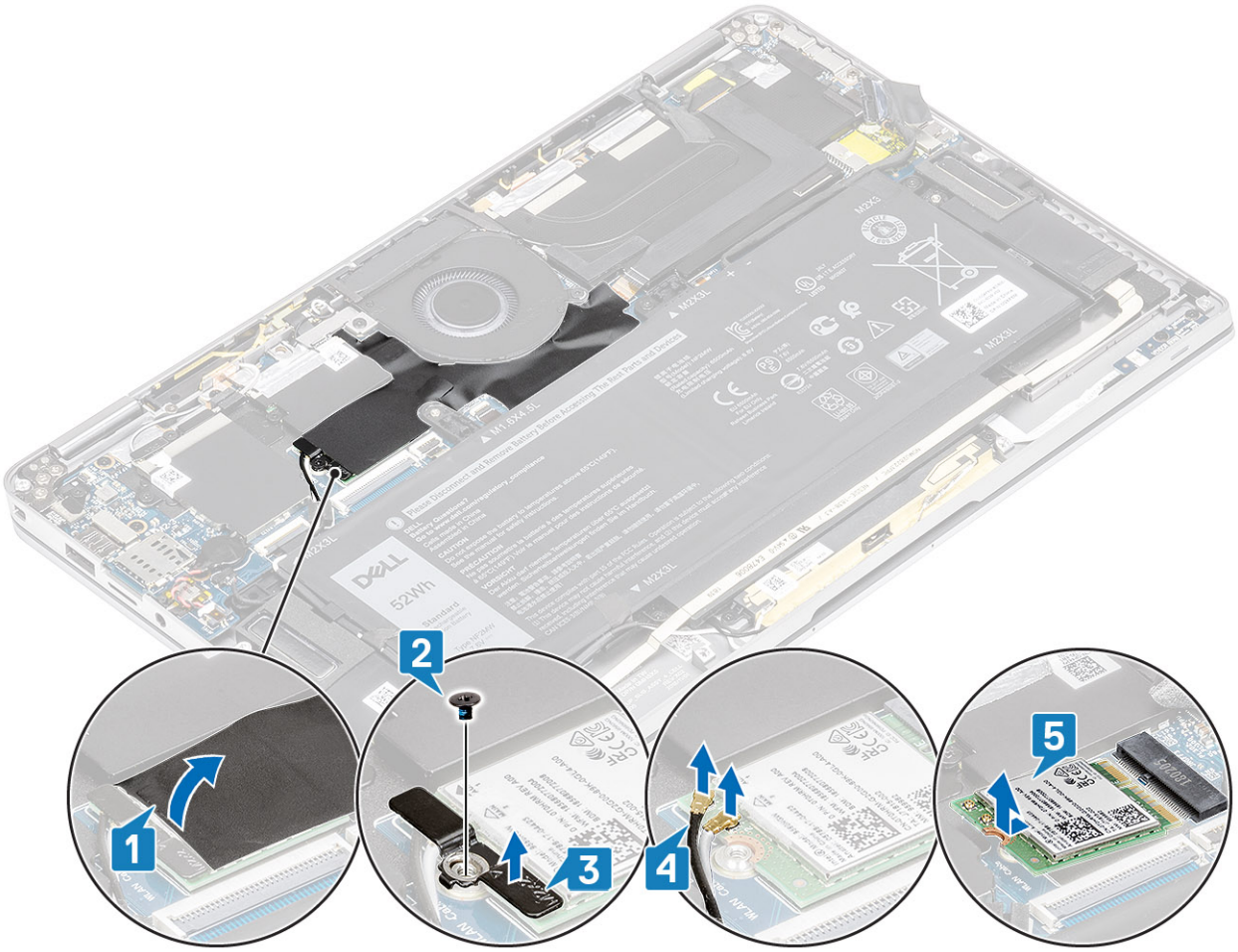
Removing the WLAN card

Prerequisites

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

Steps

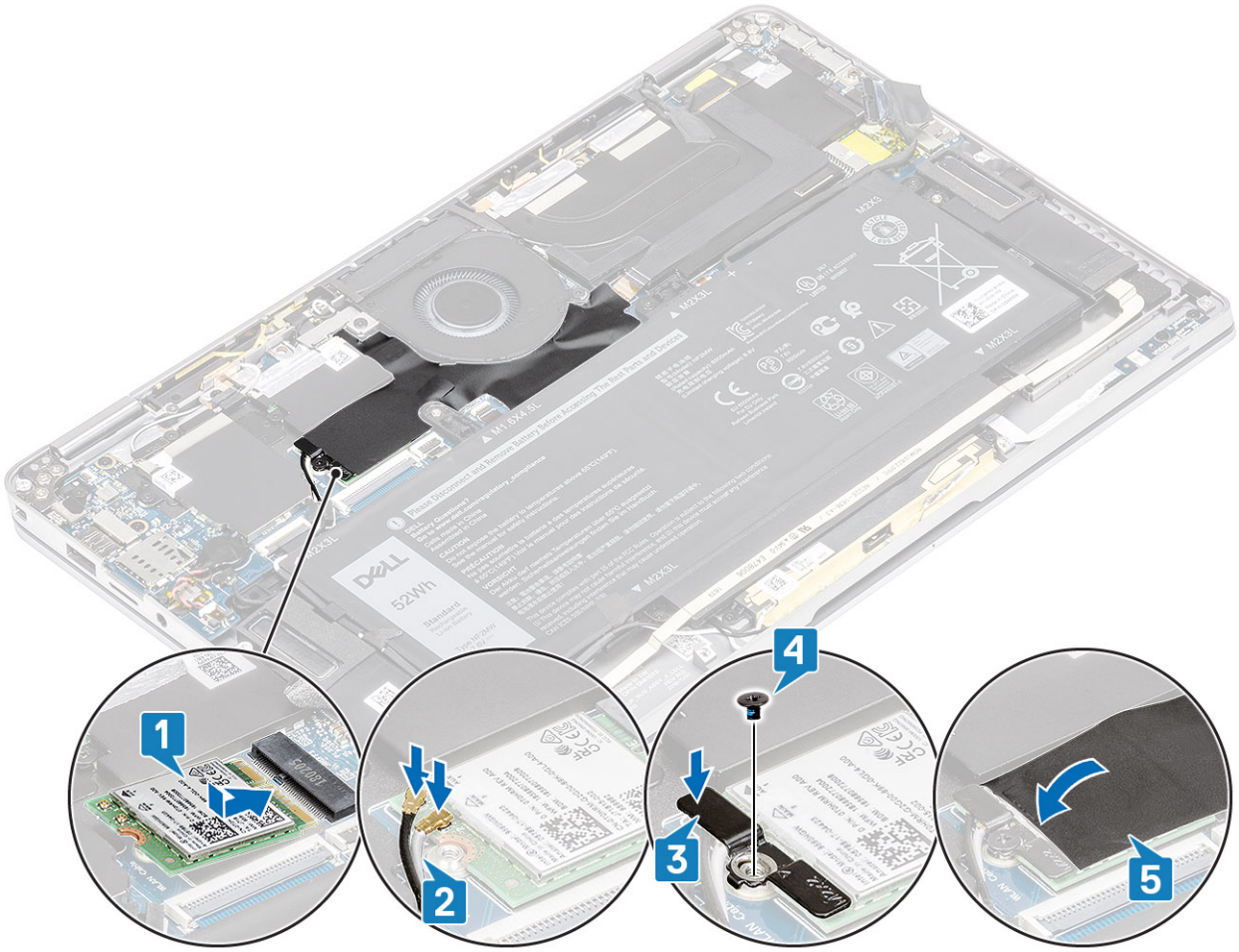
1. Partially peel off the Mylar sheet that covers the WLAN card [1].
2. Remove the single (M2x2) screw [2] that secures the WLAN card bracket to the WLAN card.
3. Remove the WLAN card bracket from the WLAN card.
4. Disconnect the wireless antennae cables [4] from the connectors on the WLAN card.
5. Slide and remove the WLAN card [5] from the connector on the system board.



Installing the WLAN card

Steps

1. Slide the WLAN card [1] at an angle into the WLAN card connector on the system board.
2. Connect the WLAN antenna card cables [2] to the connector on the WLAN card.
3. Align the screw hole on the WLAN card bracket with the screw hole on the WLAN card [3].
4. Replace the single (M2x2) [4] screw to secure the WLAN card to the system board.
5. Stick the Mylar sheet on the system board to cover the WLAN card [5].



Next steps

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

WWAN card

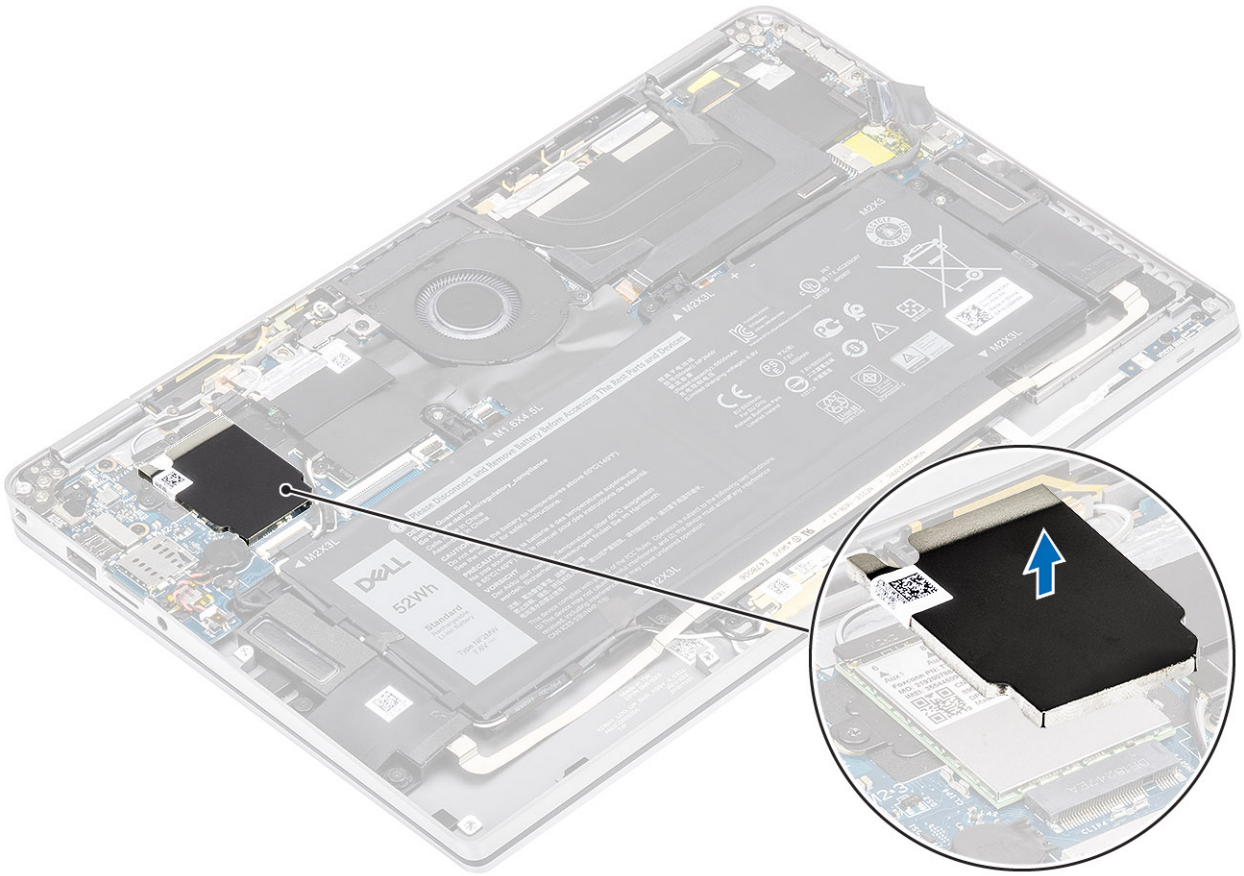
Removing the WWAN card

Prerequisites

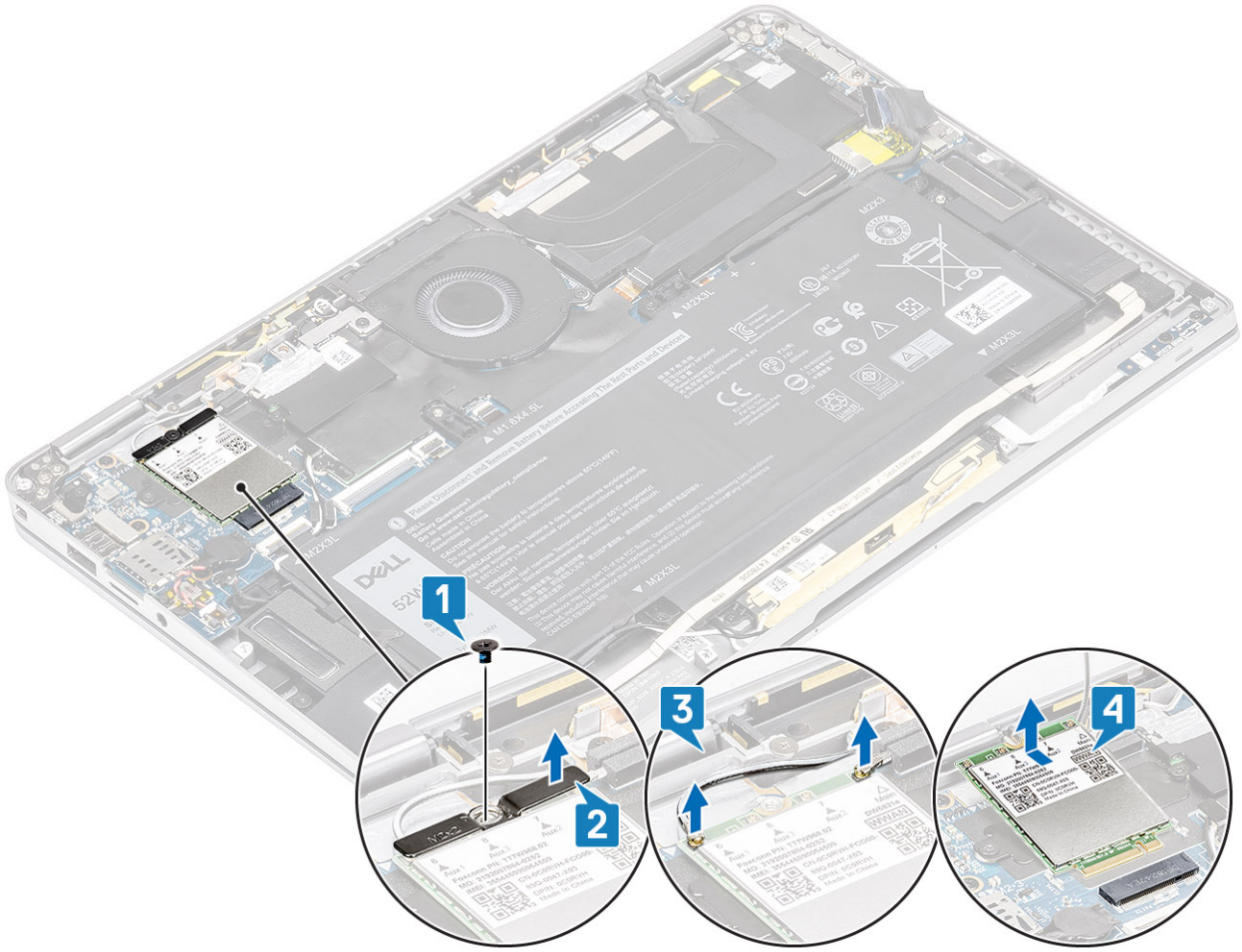
1. Follow the procedure in before working inside your computer.
2. Remove the SD memory card.
3. Remove the base cover.
4. Disconnect the battery cable.

Steps

1. Remove the metal shield from the WWAN card.



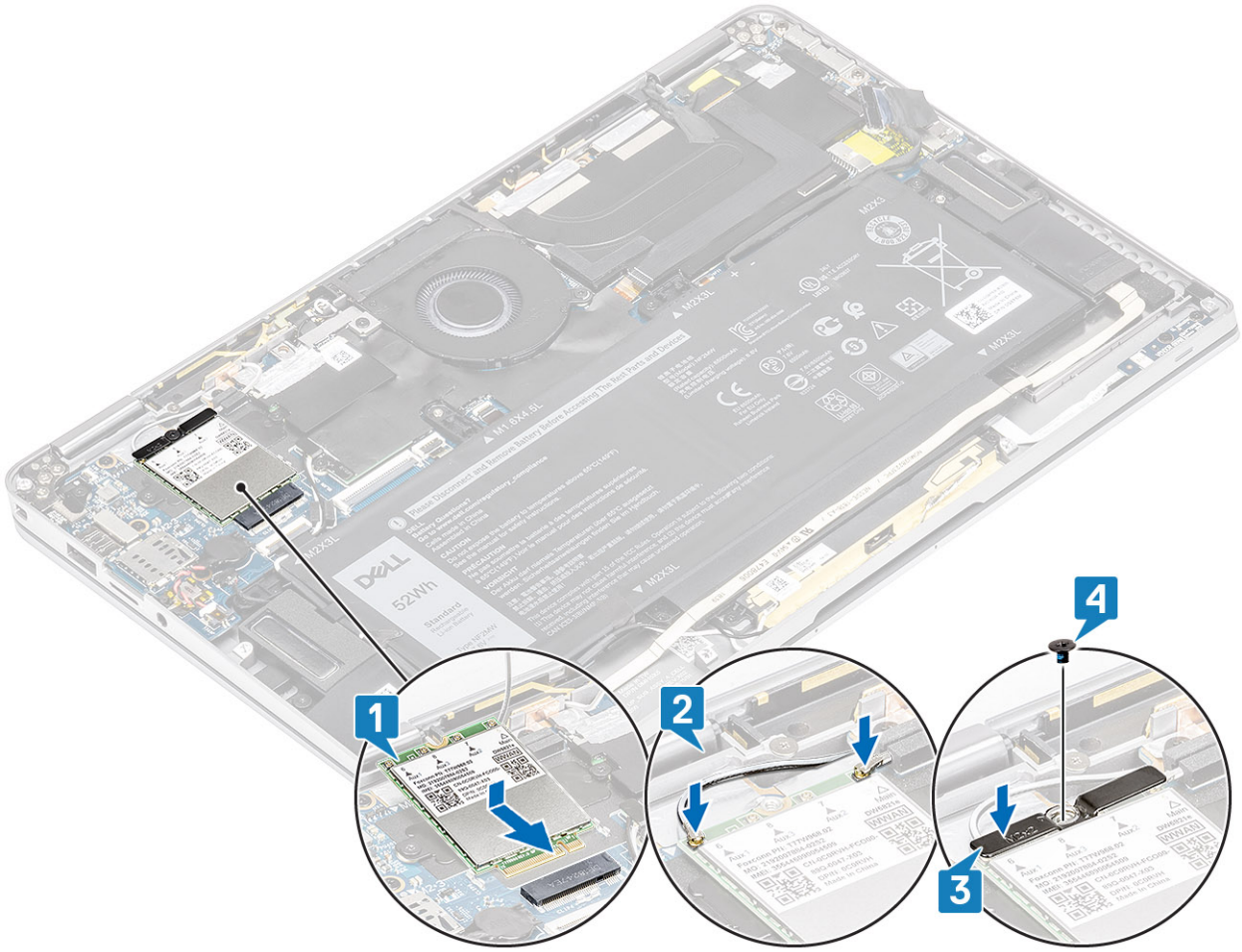
2. Remove the single (M2x2) screw [1] that secures the WWAN bracket to the WWAN card.
3. Remove the WWAN bracket [2] from the WWAN card.
4. Disconnect the wireless antennae cables [3] from the connectors on the WWAN card.
5. Slide and remove the WWAN card [4] from the connector on the system board.



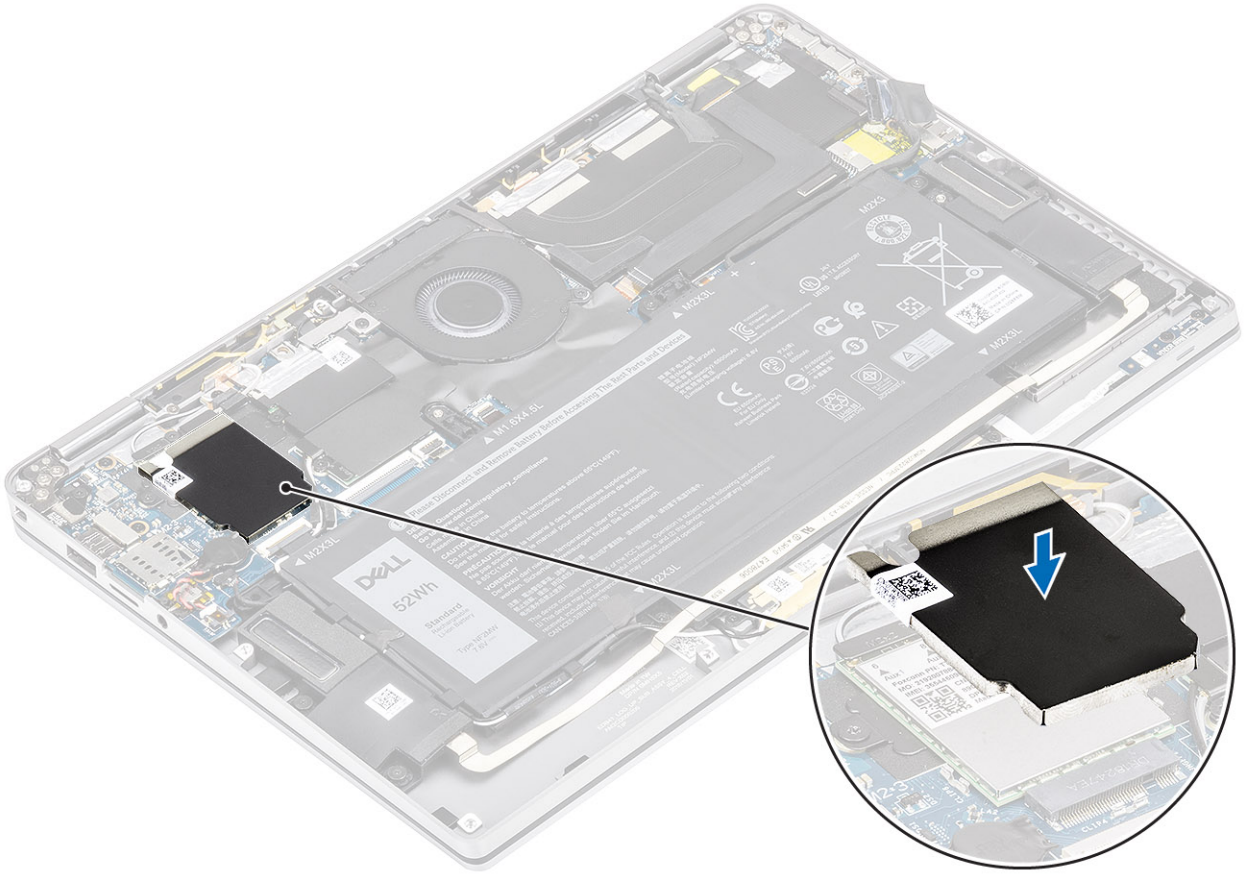
Installing the WWAN card

Steps

1. Slide the WWAN card [1] at an angle into the WWAN card connector on the system board.
2. Connect the WWAN antenna cables [2] to the connector on the WWAN card.
3. Align the screw hole on the WWAN card bracket with the screw hole on the WWAN card [3].
4. Replace the single (M2x2) screw [4] to secure the WWAN card to the system board.



5. Place the metal shield on the WWAN card.



Next steps

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

Fan

Removing the fan

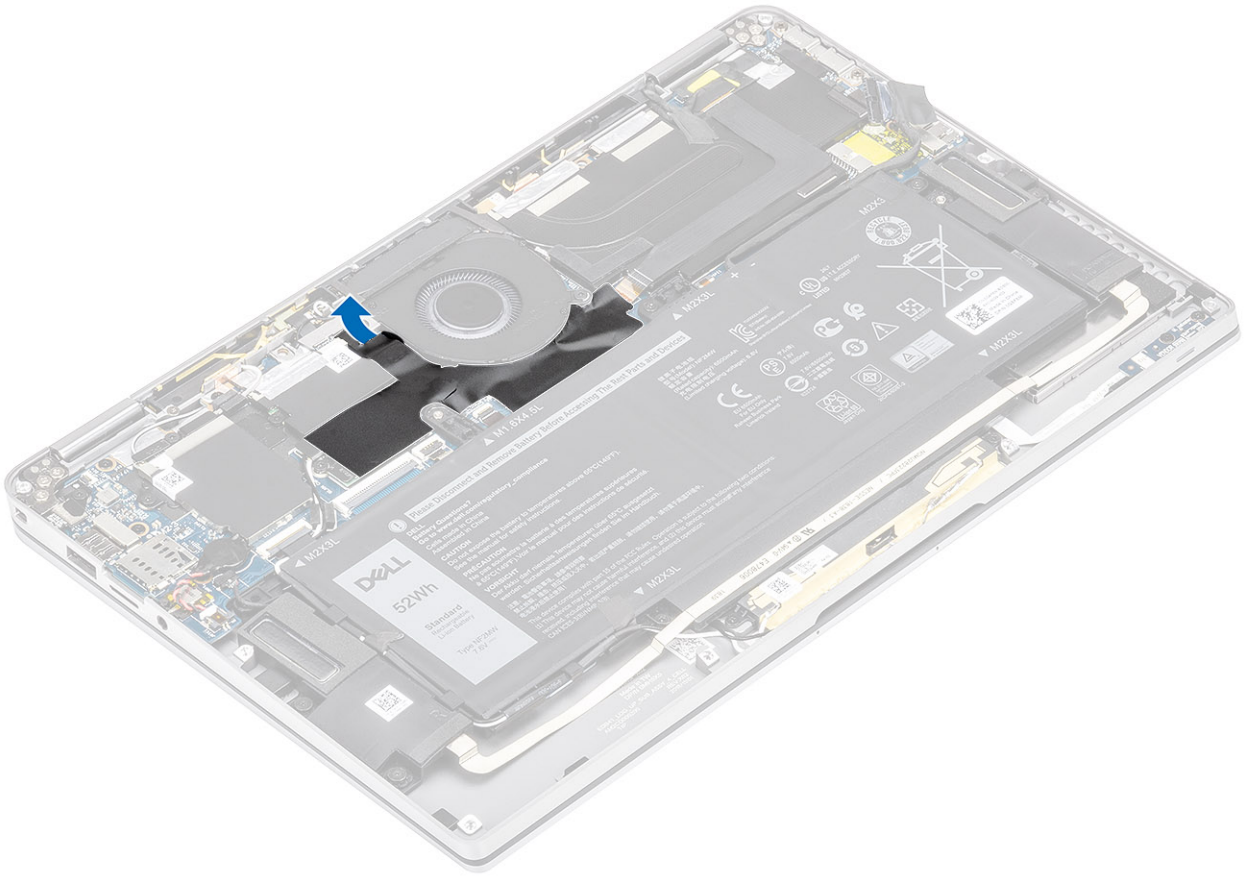
Prerequisites

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

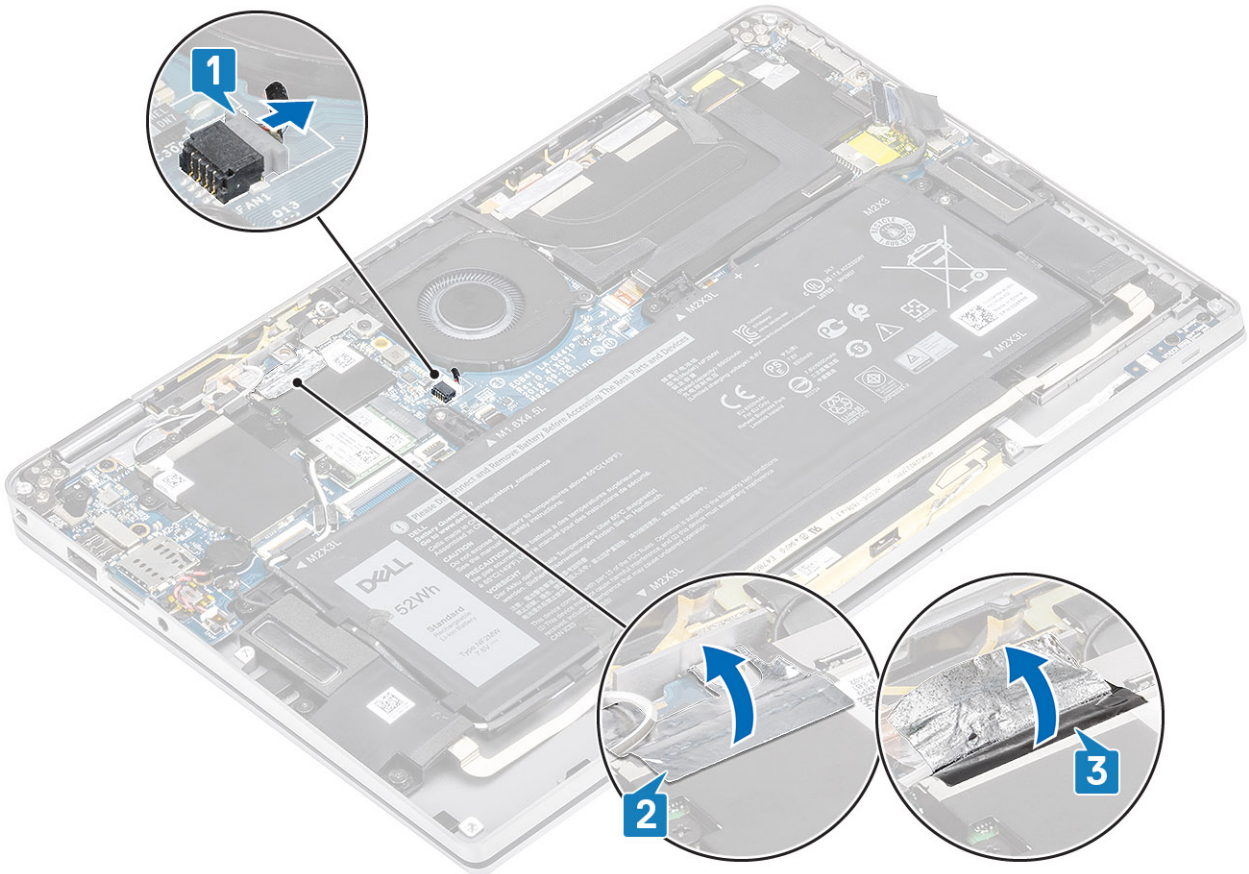
NOTE: For the Latitude 7400 2-in-1 model shipped with a WWAN card, there is an L-shaped bracket (P-sensor bracket) that covers the four WWAN LTE antenna cable connections to the system board. The screw that secures the bracket to the system also helps secure the fan to the system. Technicians must first remove the bracket before removing the fan and then reinstall the bracket after the fan is reinstalled.

Steps

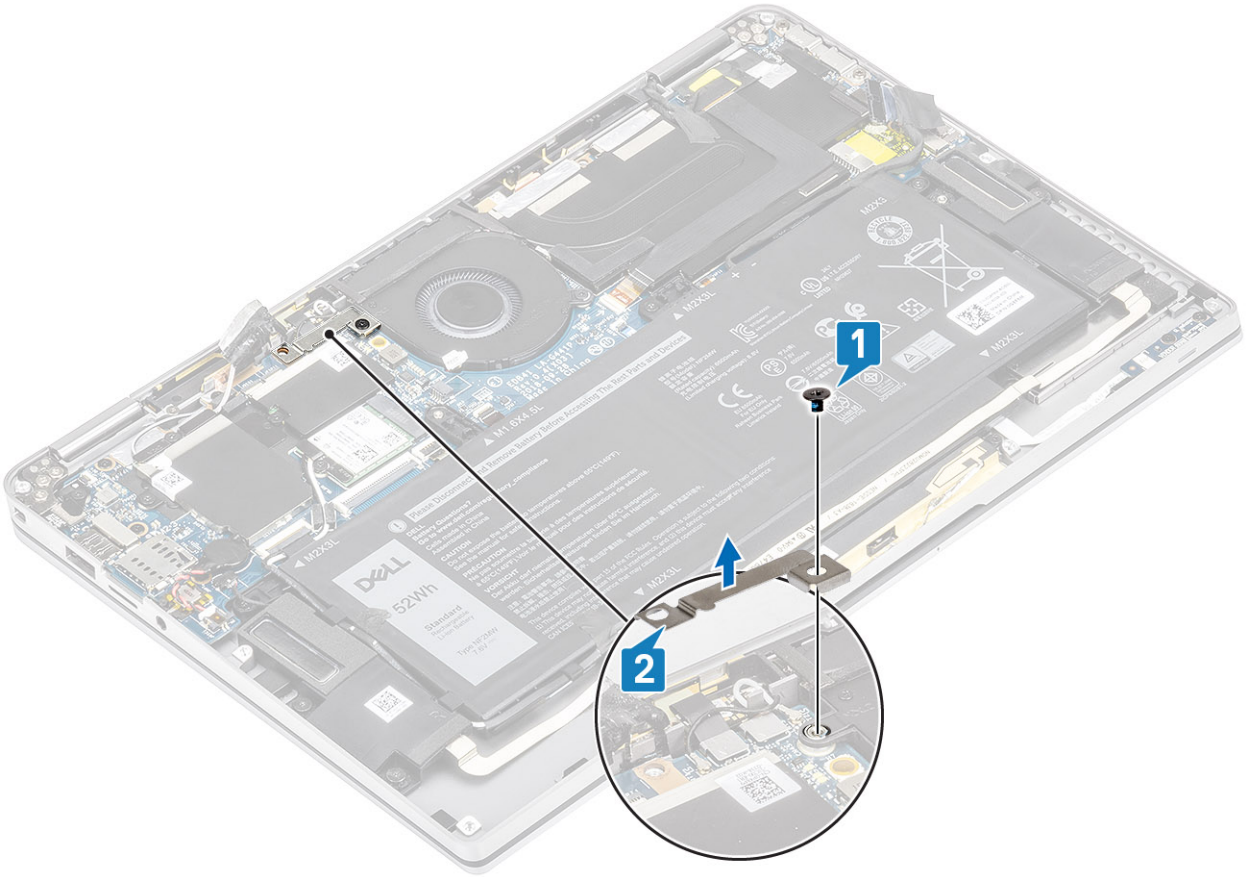
1. Peel off the Mylar sheet from the system board.



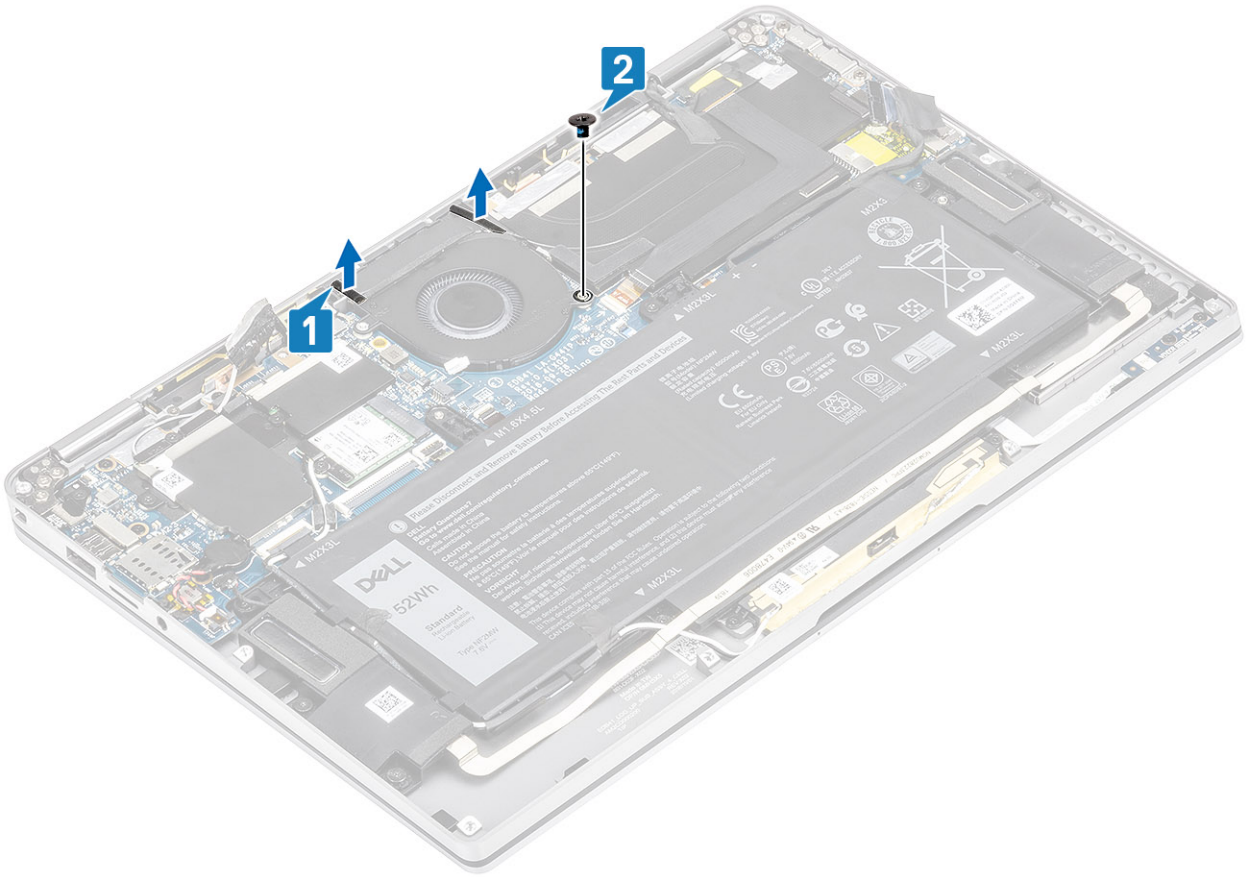
2. Disconnect the fan cable [1] from the connector on the system board [1].
3. Partially peel off the metal foil [2] and the black tape [3] on the SSD shield.



4. Remove the single (M2x2) screw [1] that secures the WWAN P-sensor bracket to the system board.
5. Remove the WWAN P-sensor bracket [2] from the system board.

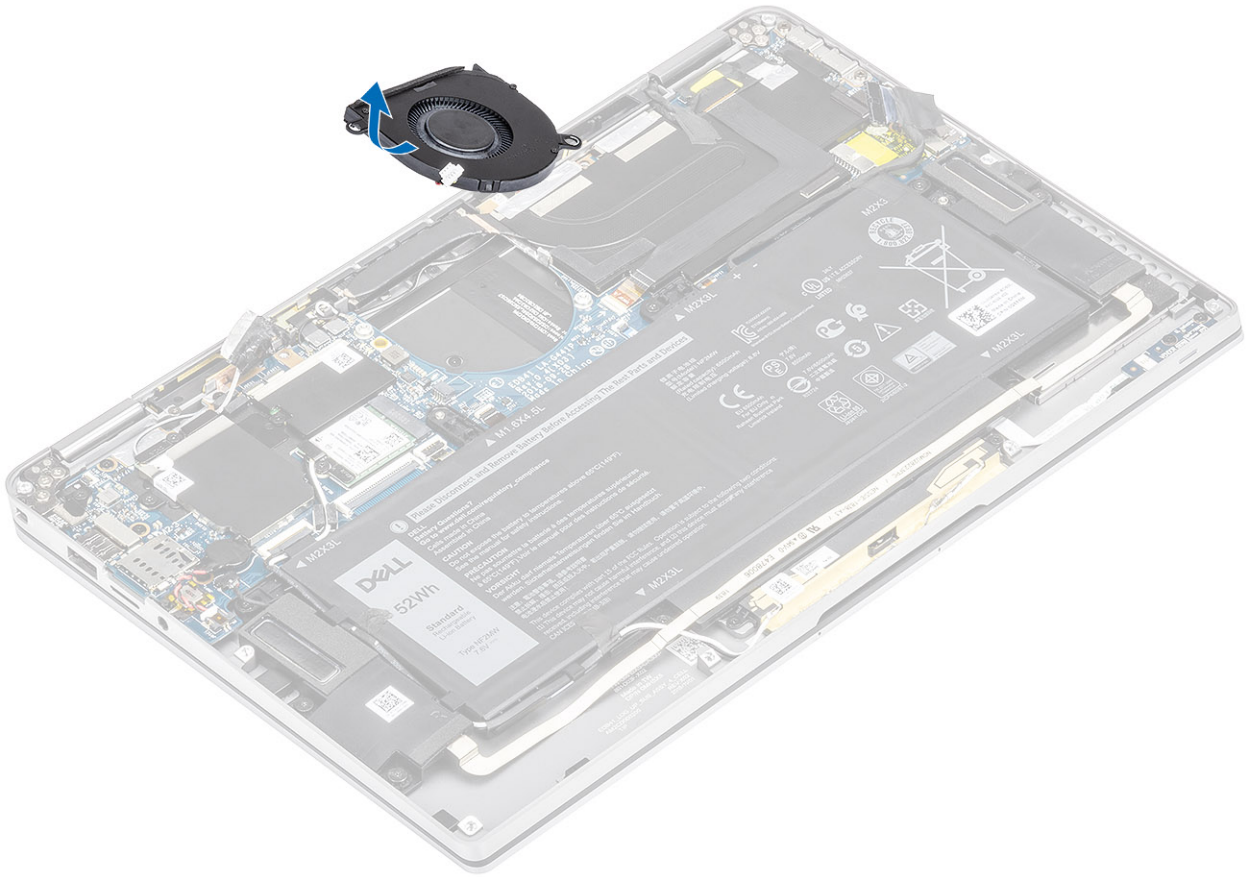


6. Partially peel off the padded gasket [1] from the fan case.
7. Remove the single (M2x2) screw [2] that secures the fan to the system board.



8. **CAUTION: There are cushions, partially obstructing the palmrest, on the bottom side of the fan. Technicians should not lift the fan directly up, as it may damage the fan.**

   Partially lift the left side of the fan and slide it to the left to remove it from the computer.



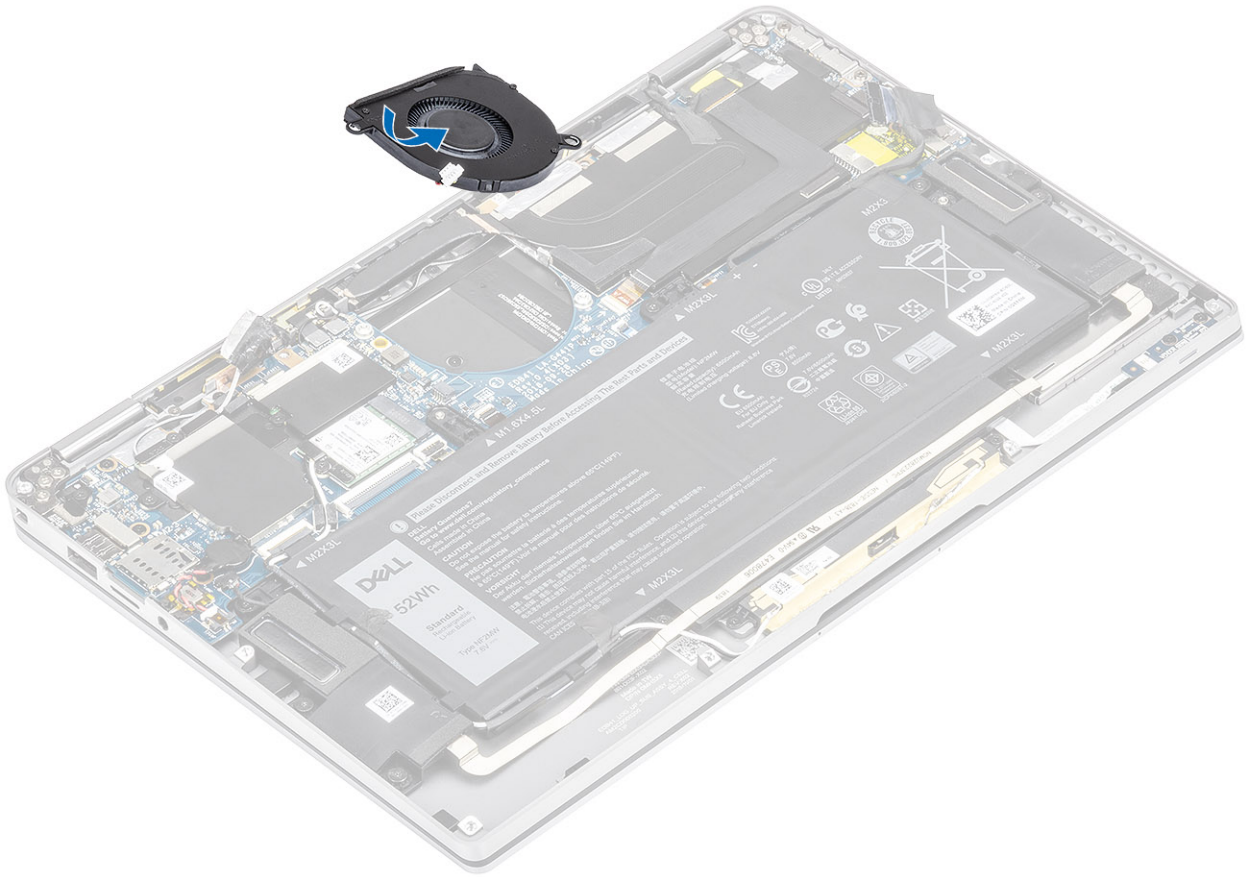
Installing the fan

About this task

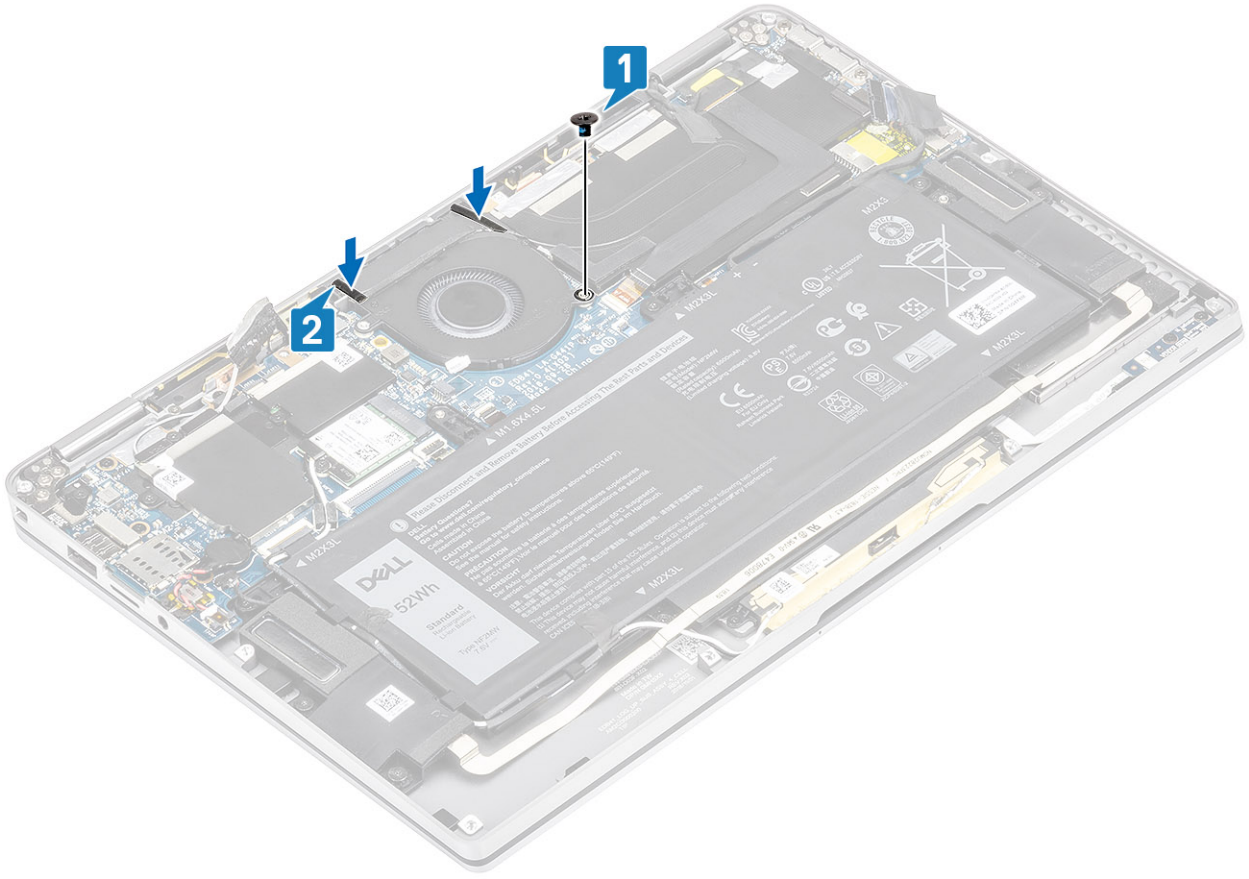
For the Latitude 7400 2-in-1 model shipped with a WWAN card, there is an L-shaped bracket (P-sensor bracket) that covers the four WWAN LTE antenna cable connections to the system board. The screw that secures the bracket to the system also helps secure the fan to the system. Technicians must first remove the bracket before removing the fan and then reinstall the bracket after the fan is reinstalled.

Steps

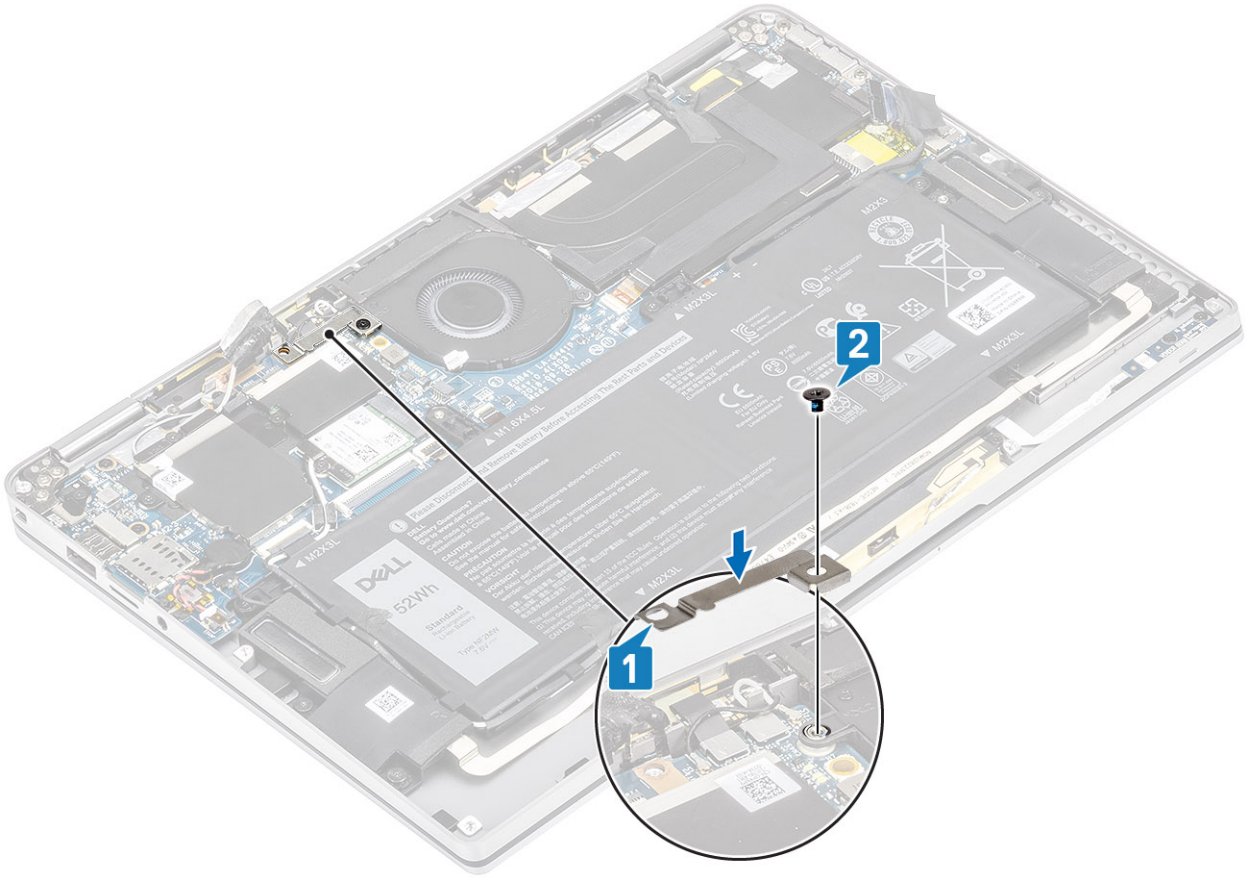
1. Slide the fan at an angle into its slot on the system board.



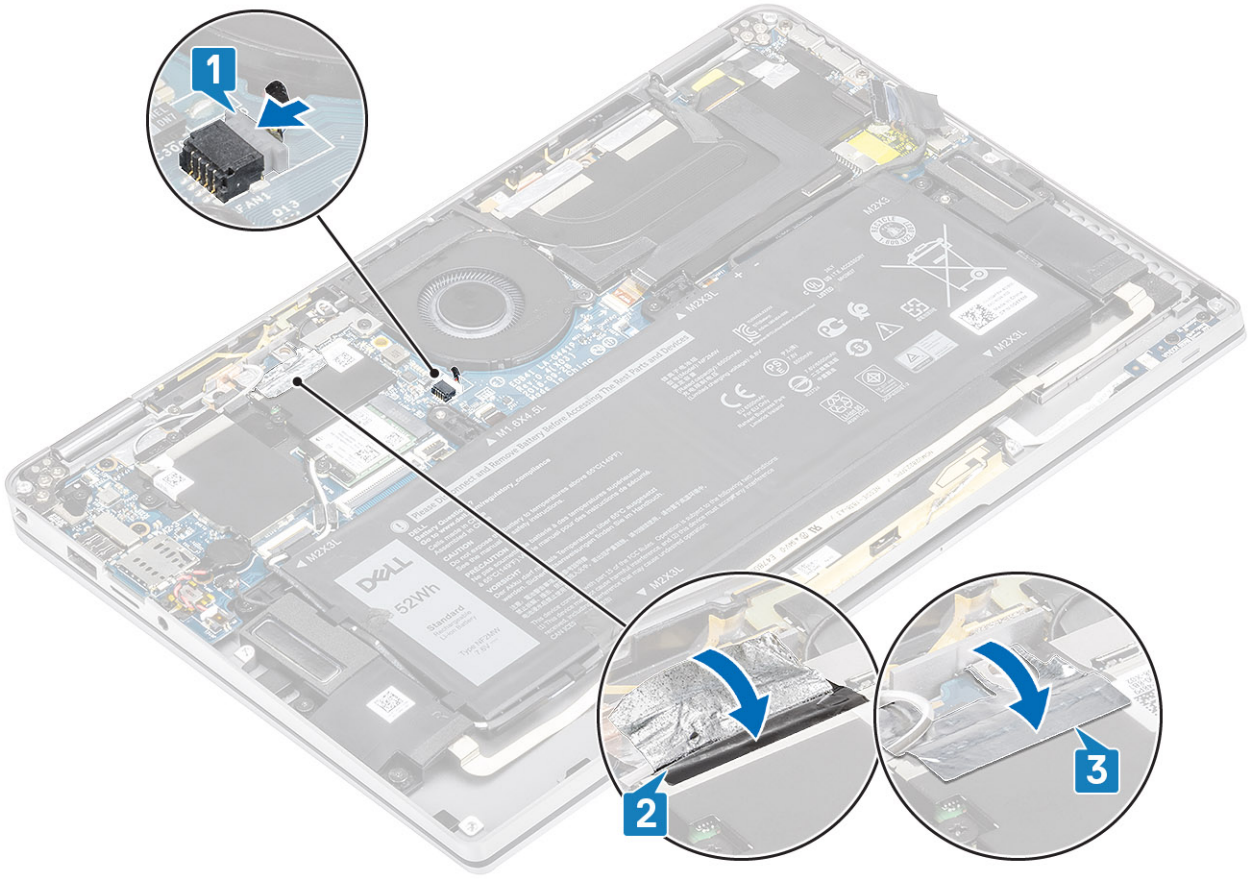
2. Replace the single (M2x2) screw [1] to secure the fan to the system board.
3. Adhere the padded rubber gasket [2] on the fan case.



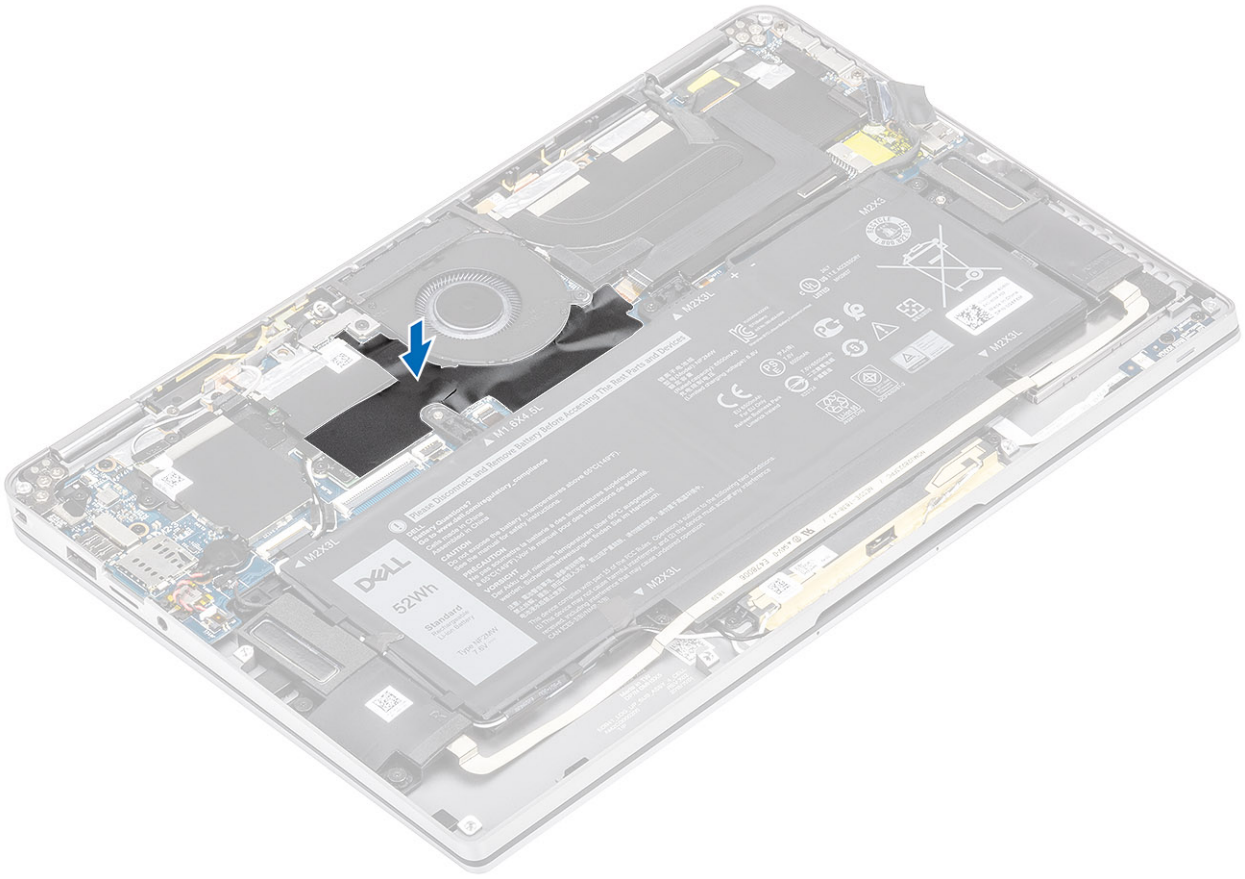
4. Align the screw holes on the WWAN P-sensor bracket [1] with the screw hole on the fan.
5. Replace the single (M2x2) screw [2] to secure the WWAN P-sensor bracket to the fan.



6. Connect the fan cable [1] to the connector on the system board.
7. Adhere the black tape [2] and the metal foil [3] partially covering the SSD shield.



8. Adhere the Mylar sheet on the system board.



Next steps

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

Speakers

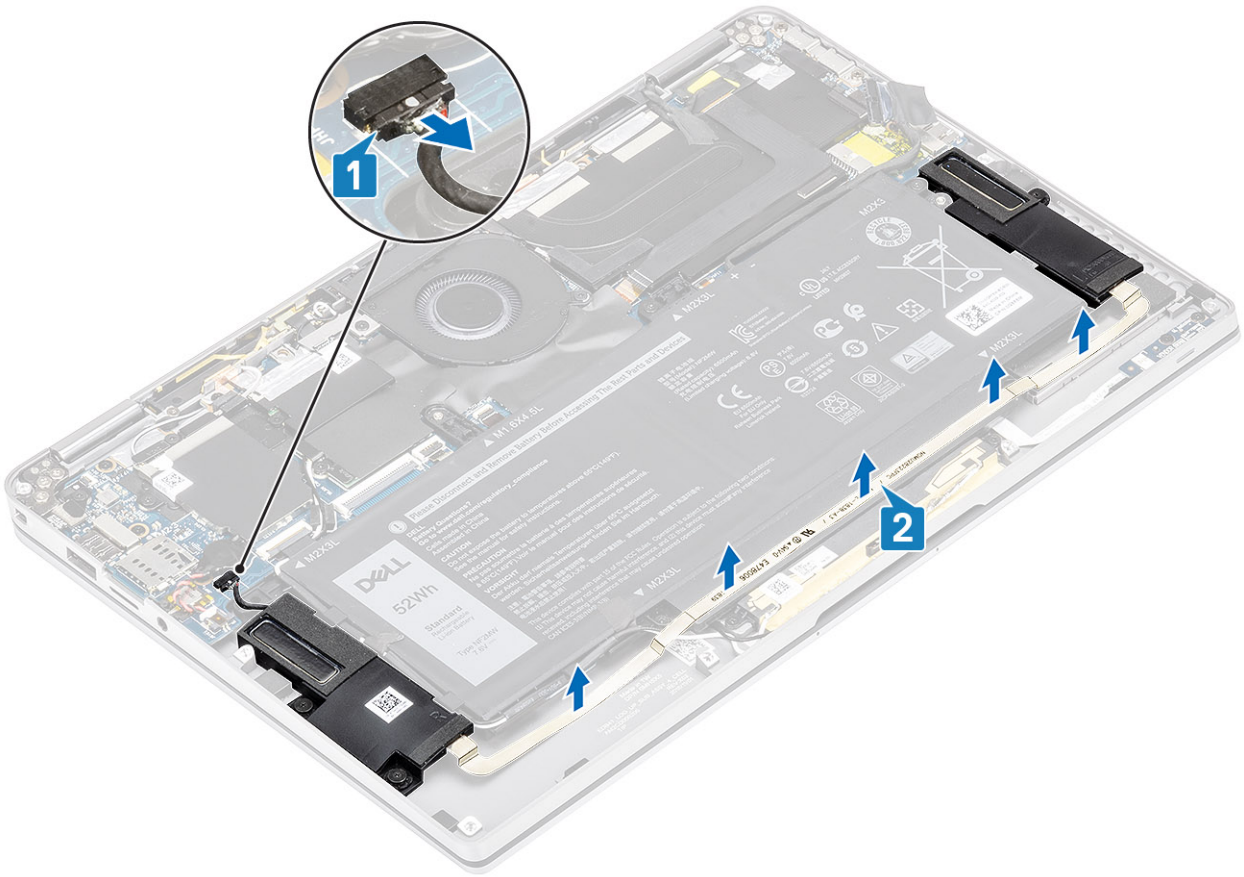
Removing the speakers

Prerequisites

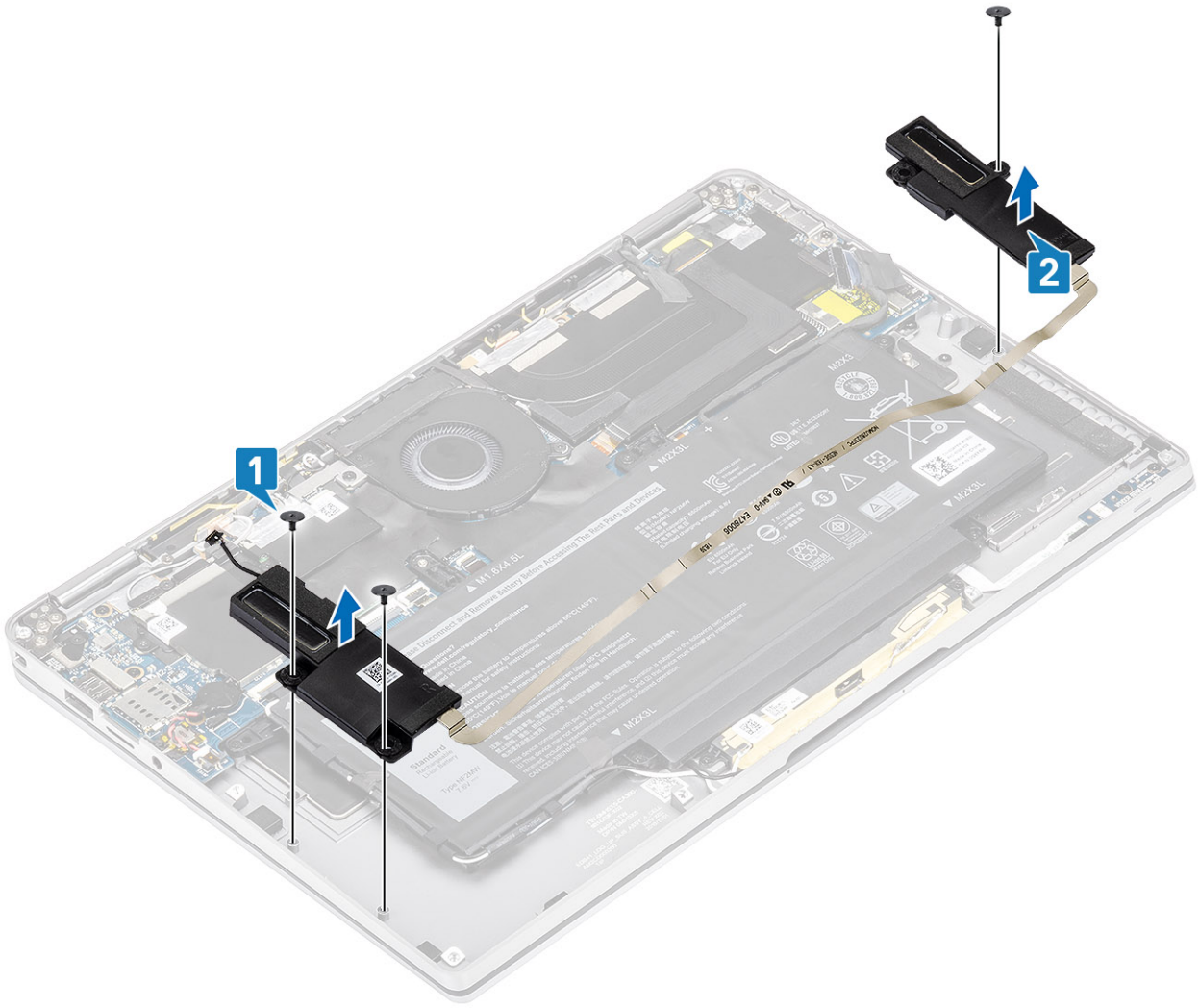
1. Follow the procedure in before working inside your computer.
2. Remove the SD memory card.
3. Remove the base cover.
4. Disconnect the battery cable.

Steps

1. Disconnect the speaker cable [1] from the connector from the system board and peel off the speaker flex cable [2] from the battery.



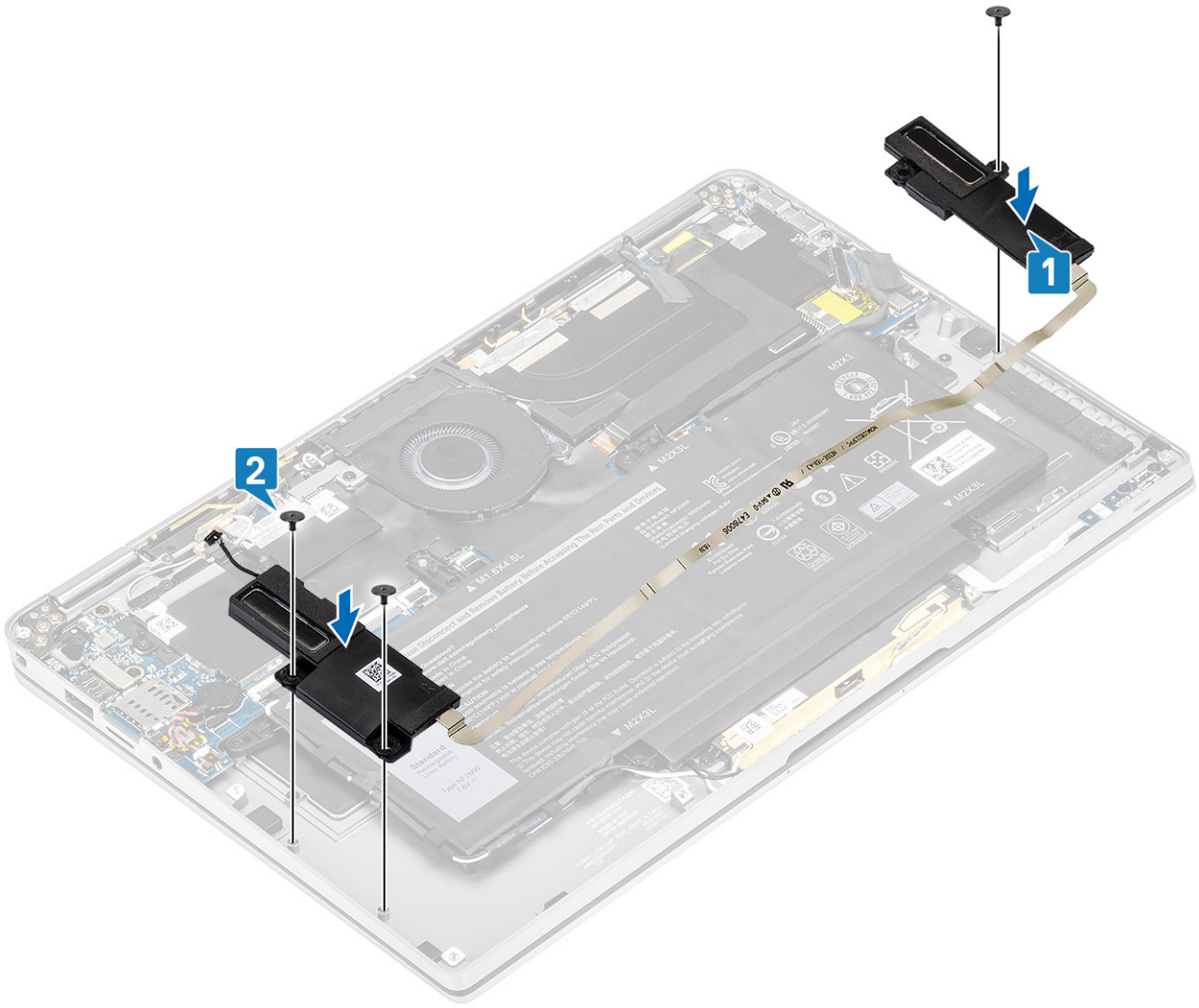
2. Remove the three (M1.6x1.4) screws [1] that secure the speakers to the system board and lift the speakers off the computer [2].



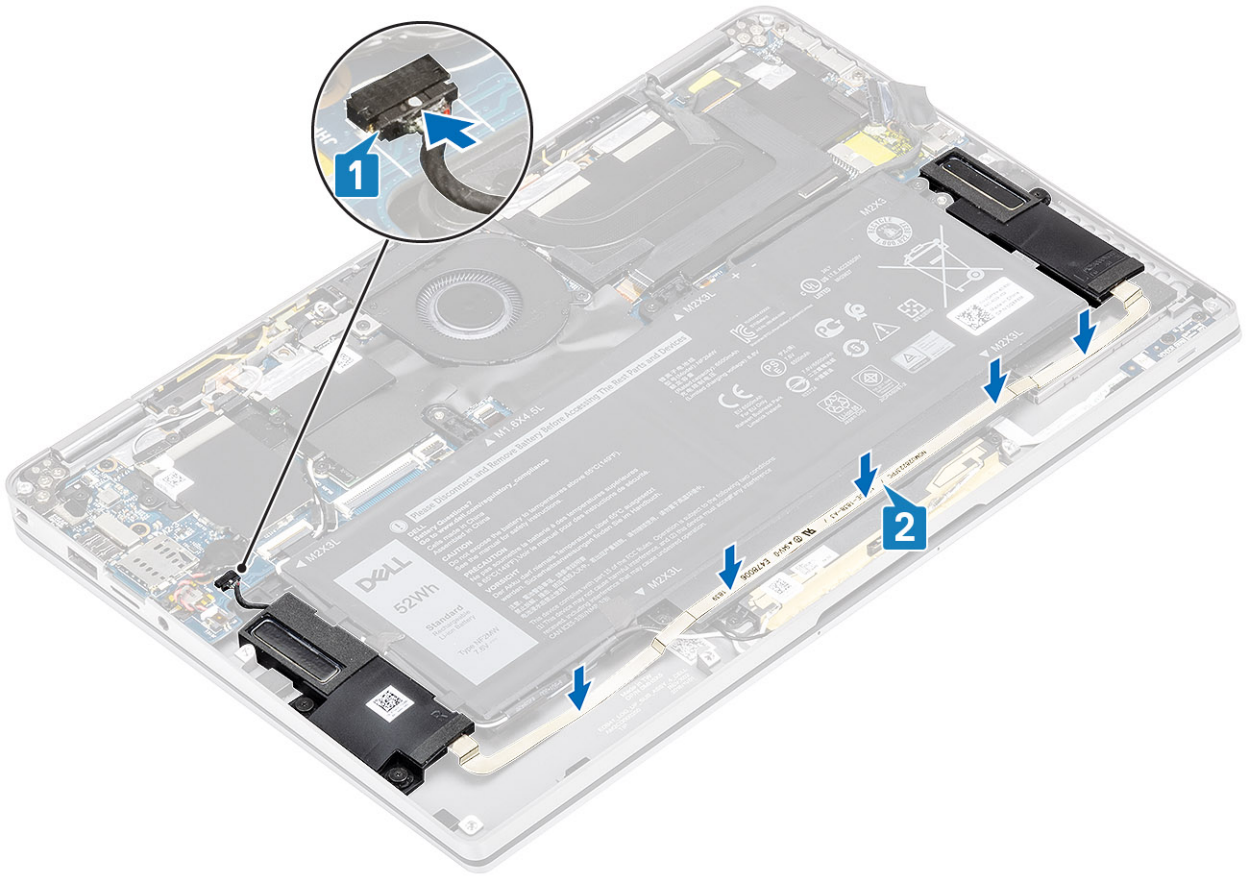
Installing the speakers

Steps

1. Align the screw holes on the speakers [1] with the screw holes on the chassis
2. Replace the three (M1.6x1.4) screws [2] that secure the speakers to the chassis.



3. Connect the speaker cable [1] to the connector on the system board and adhere the speaker flex cable [2] on the battery.



Next steps

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

Heatsink

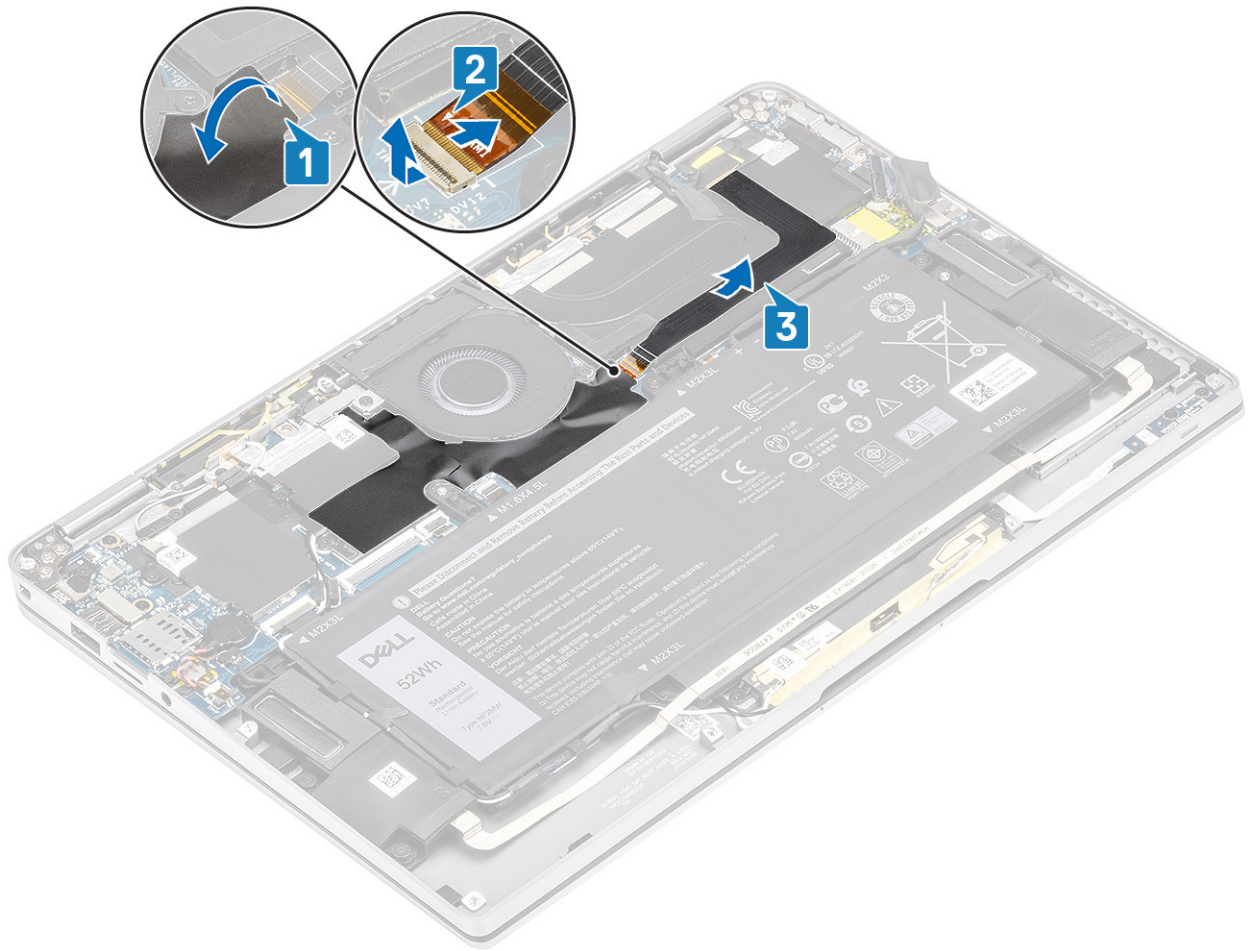
Removing the heatsink

Prerequisites

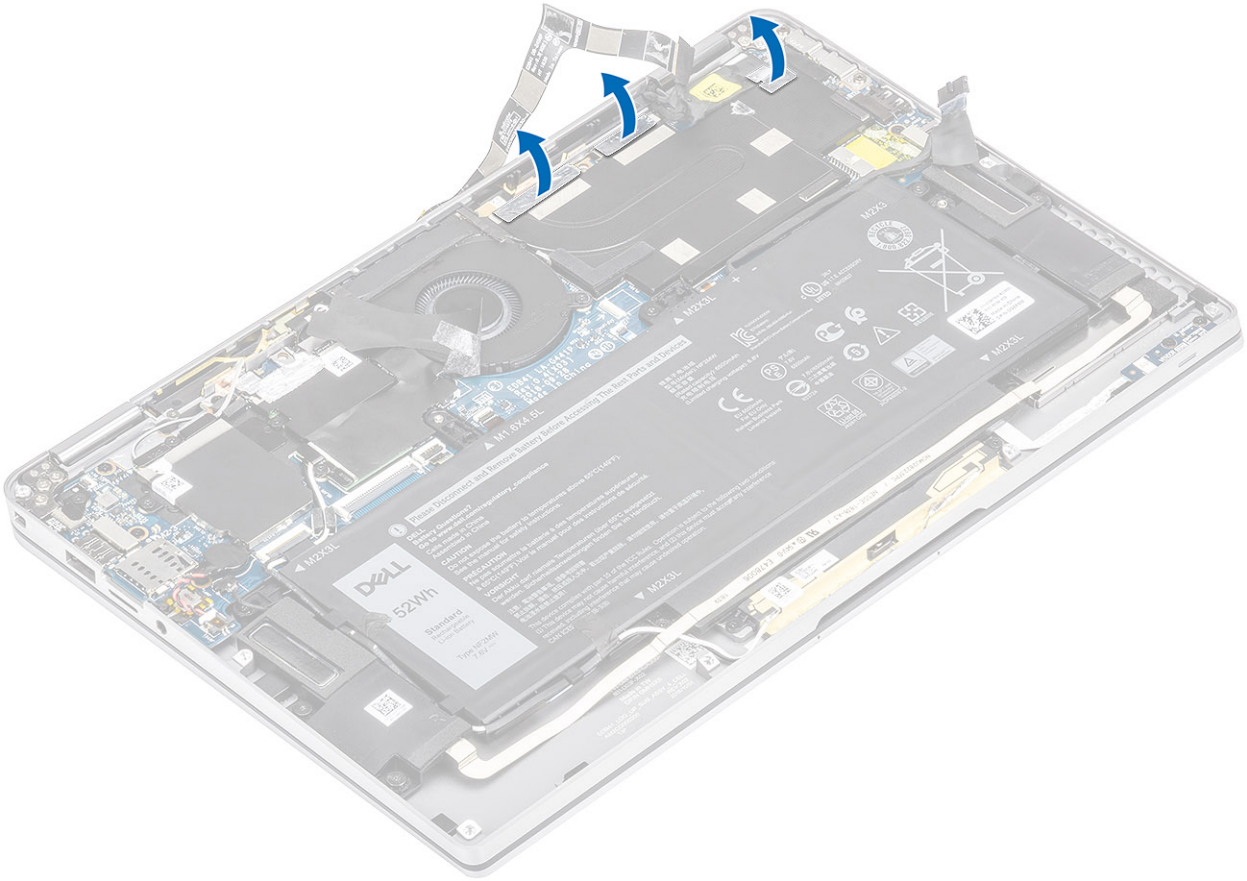
1. Follow the procedure in before working inside your computer.
2. Remove the SD memory card.
3. Remove the base cover.
4. Disconnect the battery cable.

Steps

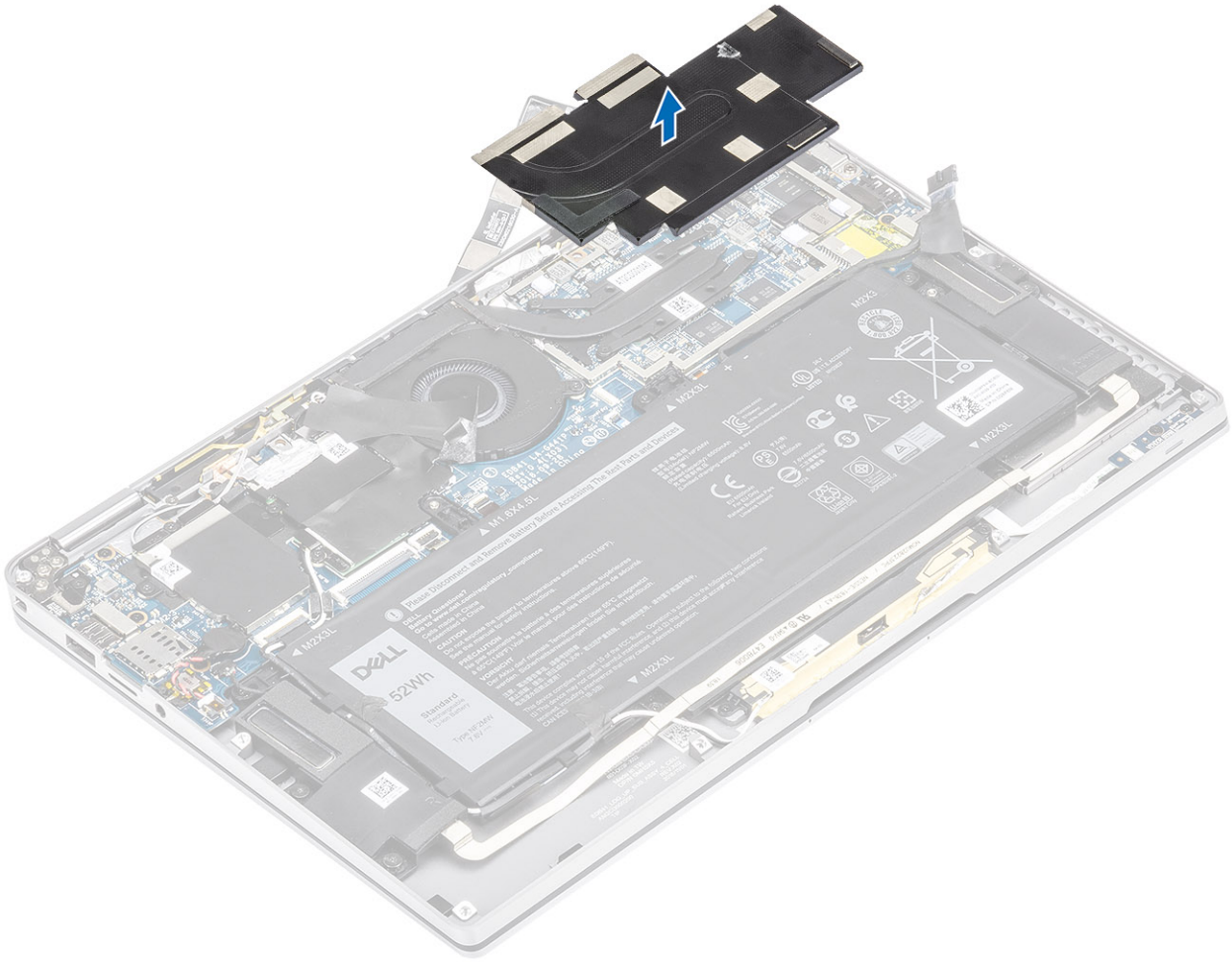
1. Partially peel off the Mylar sheet [1] from the system board.
2. Disconnect the camera and touch screen FPC cable [2] from the connector on the system board.
3. Peel off the camera and touch screen FPC cable from the heatsink shield [3].



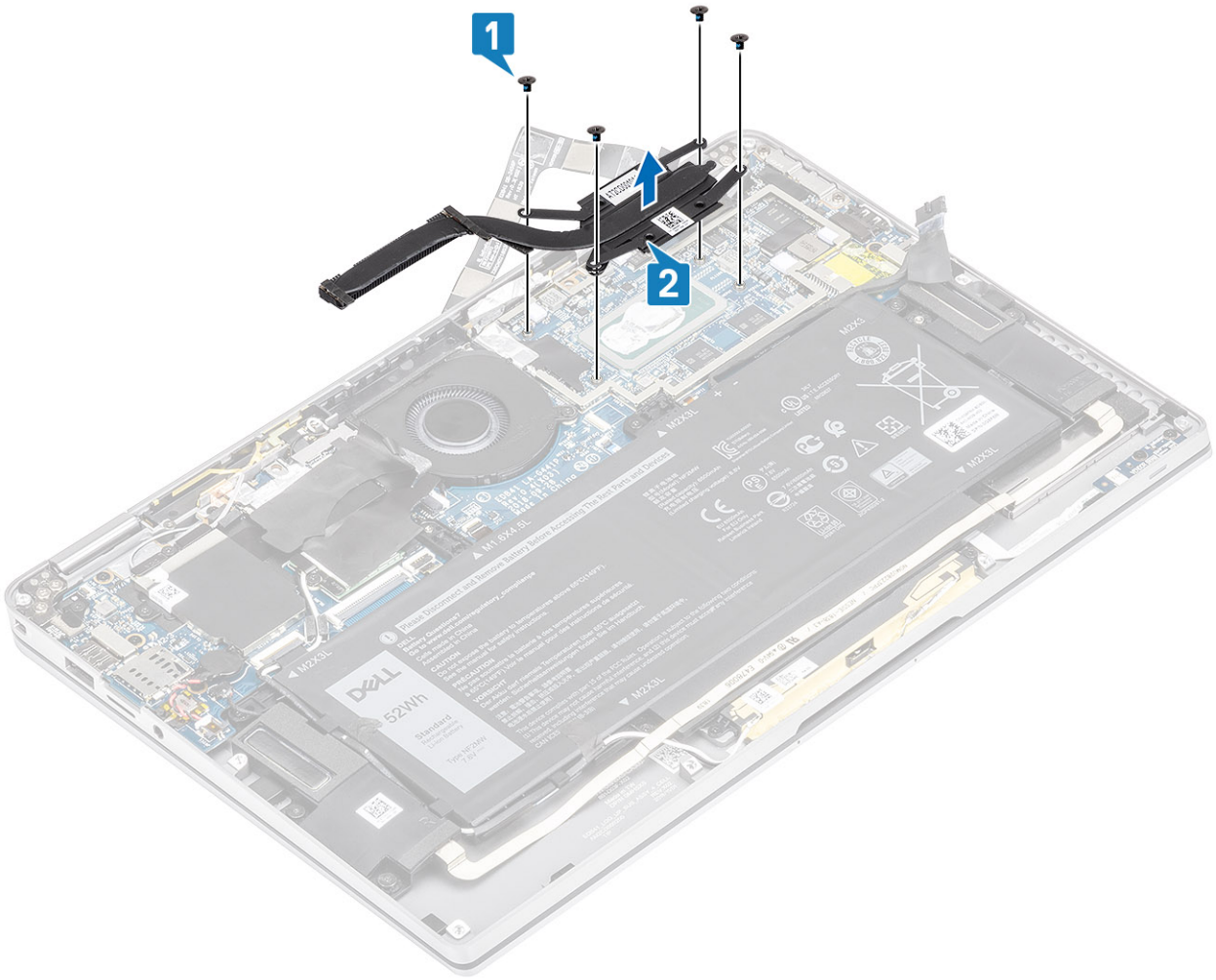
4. Remove the metal foil from the heatsink shield.



5. Remove the heatsink shield from the system board.



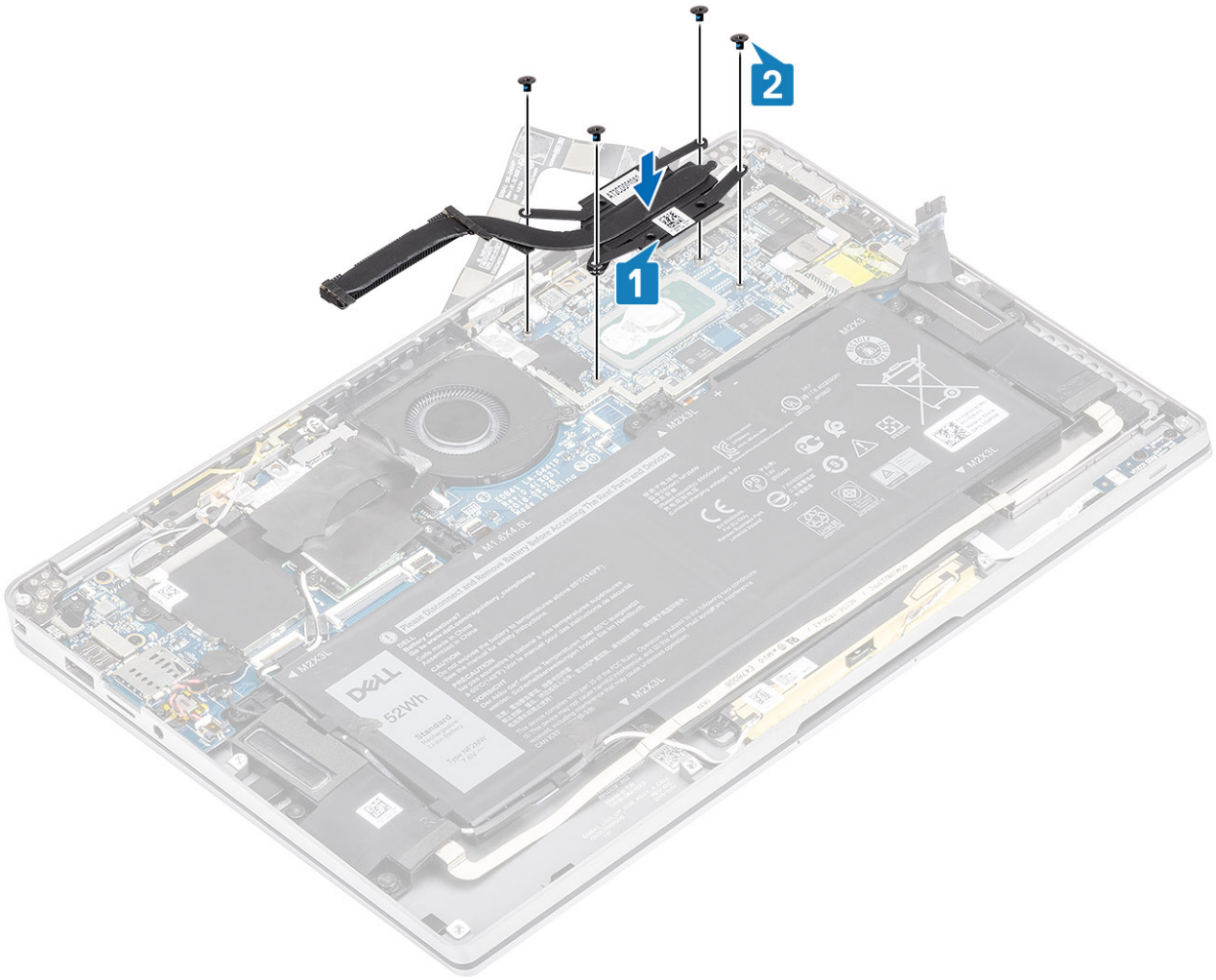
6. Remove the four (M1.6x2.5) screws [1] that secure the heatsink on the system board.
7. Lift the heatsink [2] off the system board.



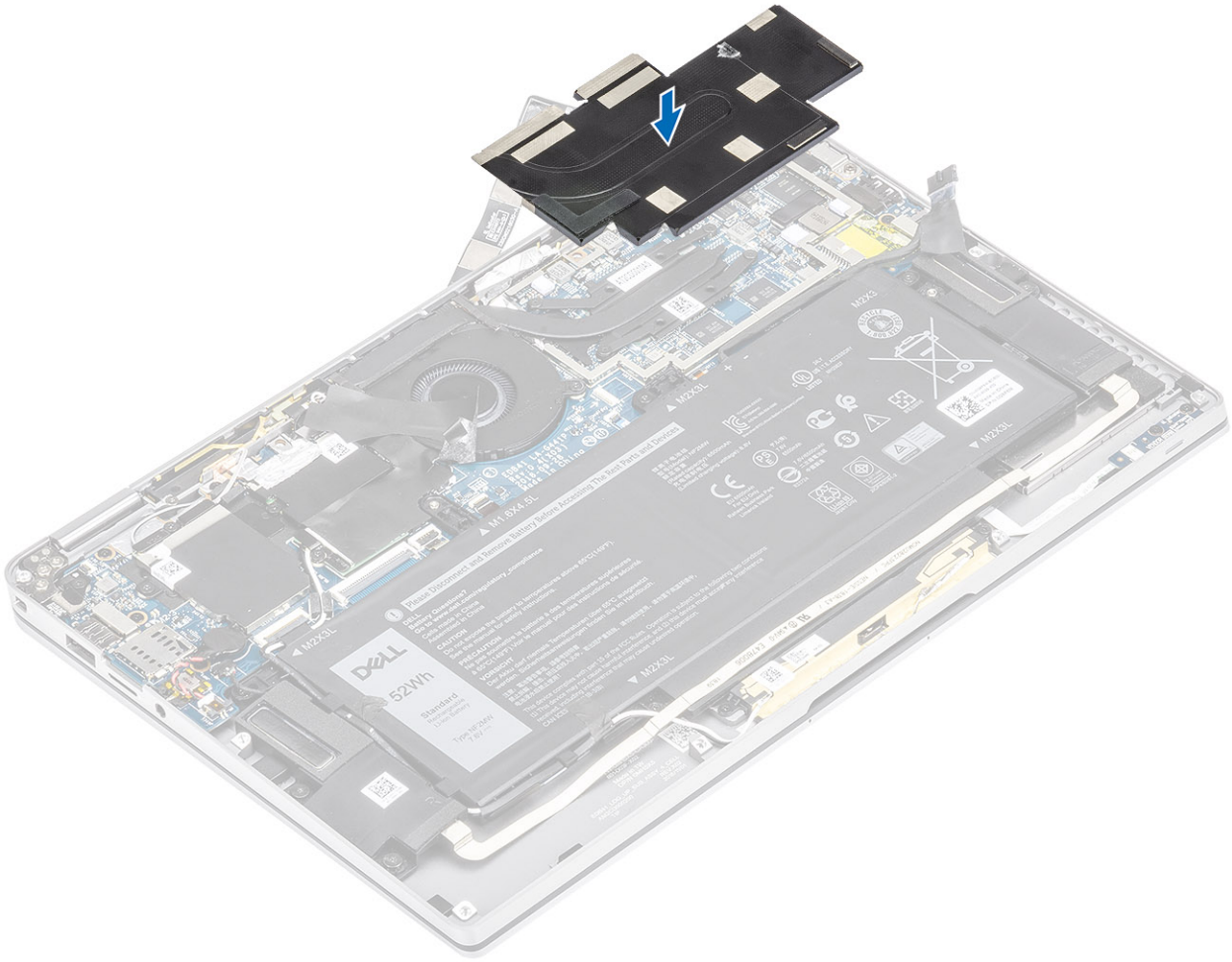
Installing the heatsink

Steps

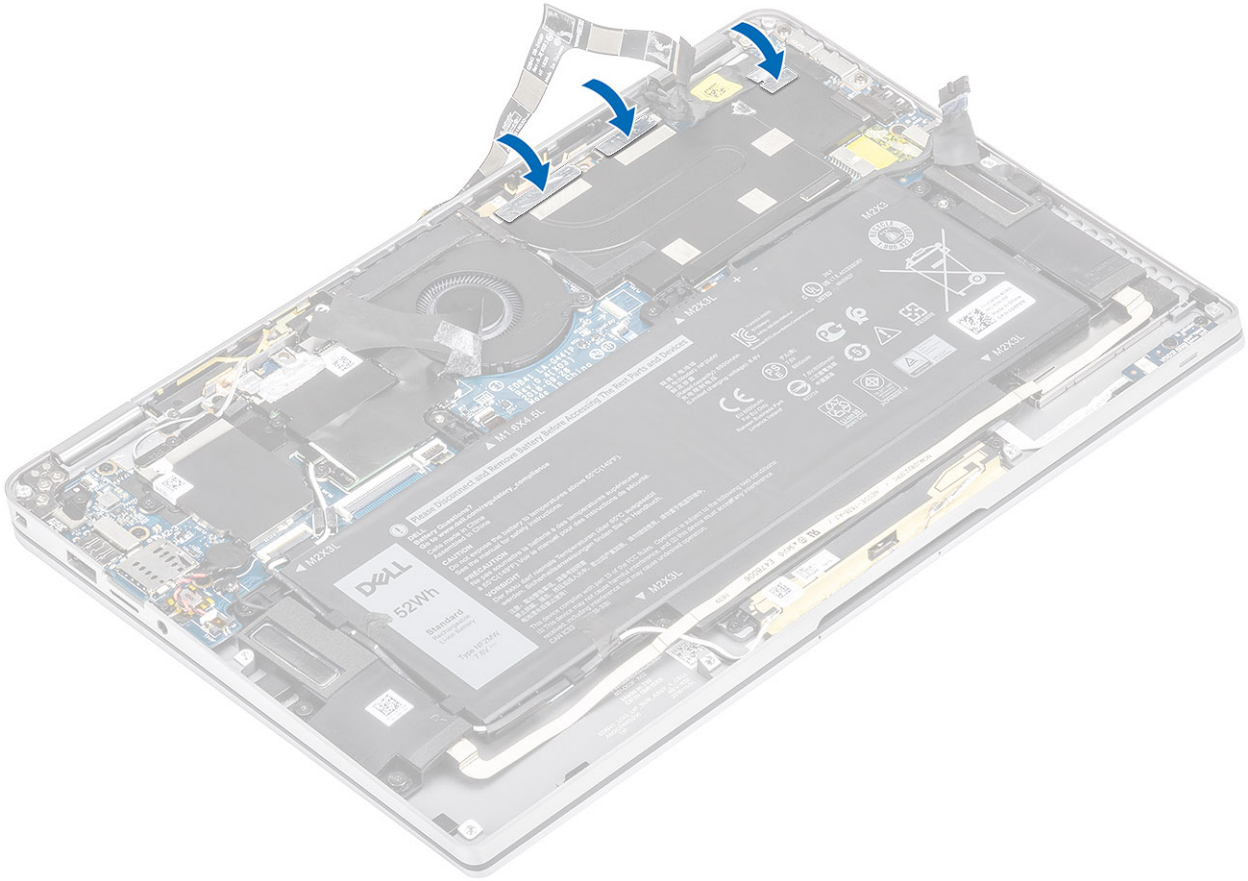
1. Align the screw holes on the heatsink [1] with the screw holes on the system board.
2. Replace the four (M1.6x2.5) screws [2] that secure the heatsink to the system board.



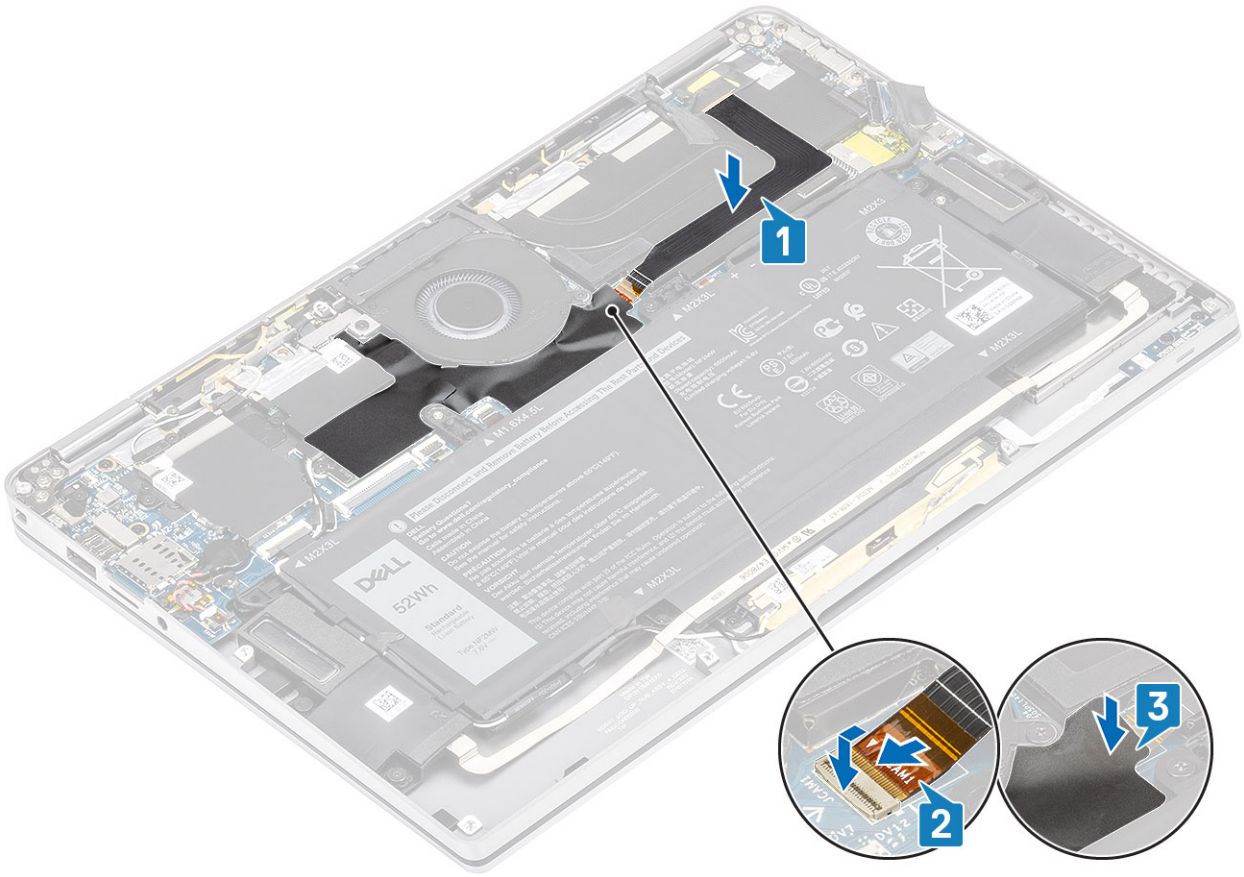
3. Place the heatsink shield on the heatsink.



4. Adhere the metal foils on the heatsink shield.



5. Adhere the camera and touch screen FPC cables on the heatsink shield [1].
6. Connect the camera and touch screen FPC cables [2] to the connector on the system board.
7. Adhere the Mylar sheet [3] on the system board.



Next steps

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

Display assembly

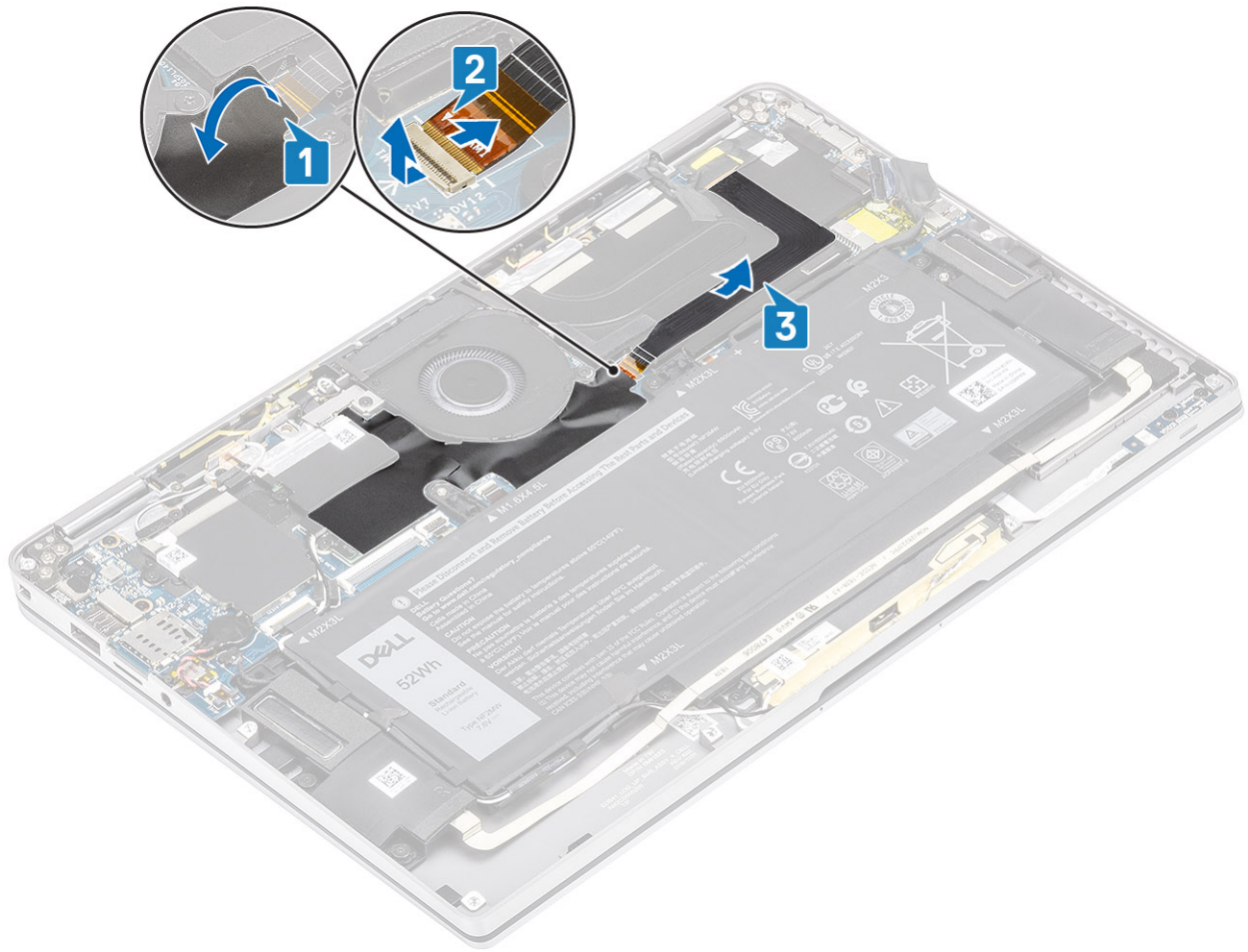
Removing the display assembly

Prerequisites

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

Steps

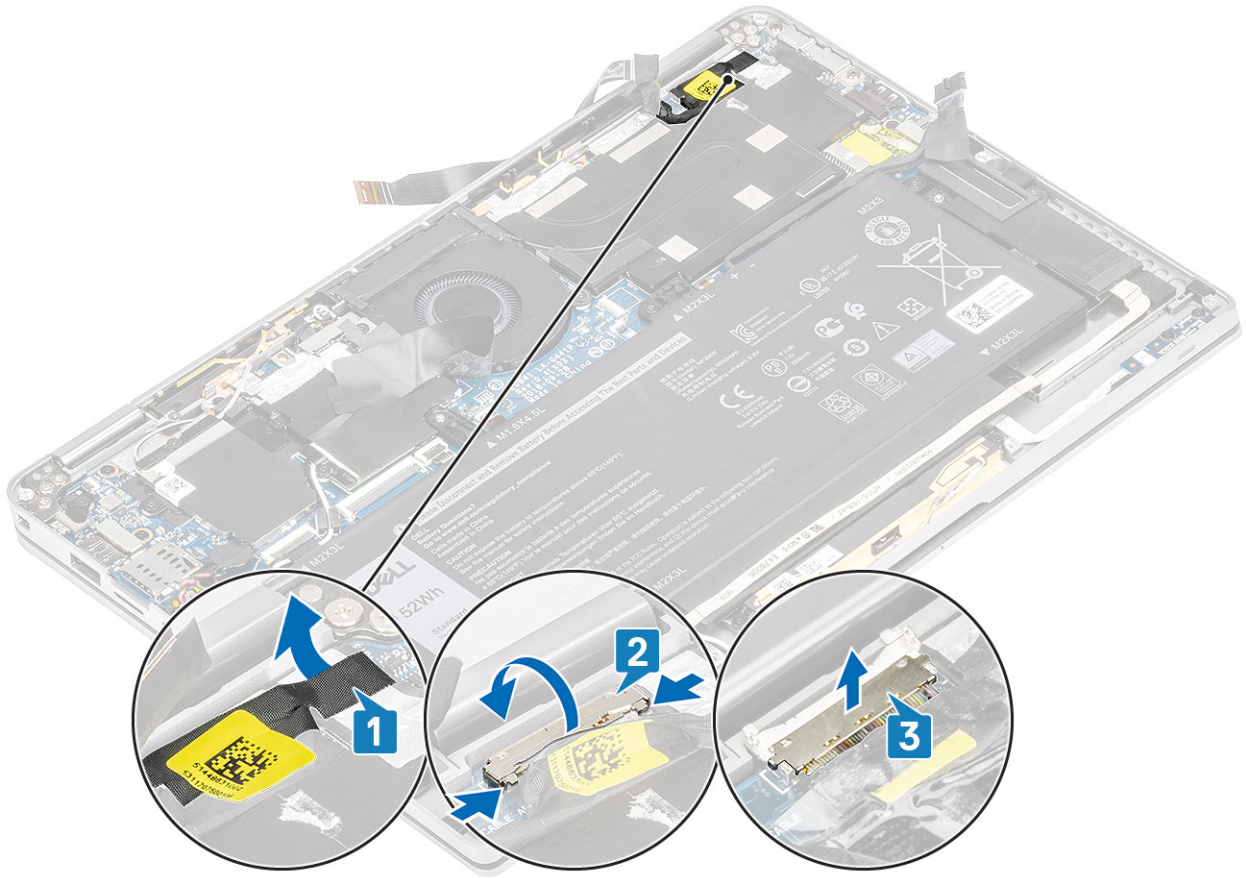
1. Partially peel off the Mylar sheet [1] from the system board.
2. Disconnect the camera and touch screen FPC cable [2] from the connector on the system board.
3. Peel off the camera and touch screen FPC cable from the heatsink shield [3].



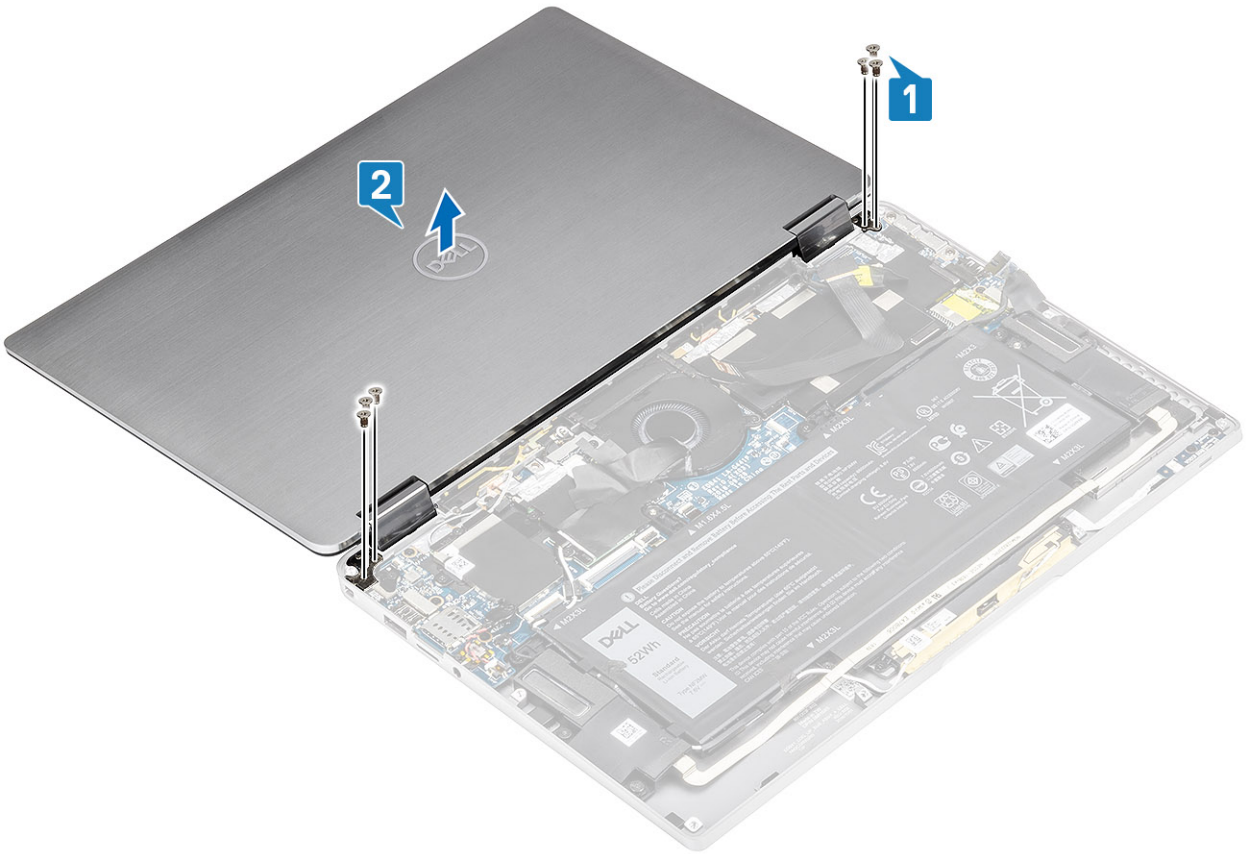
4. Peel off the tape on the display cable [1].
5. Pry the retention clips on both sides and flip open the latch [2].

   CAUTION: The connector for the display cable features a latch that locks it in place on the system board which technicians must flip open in order to disconnect the display cable from the system board. After flipping open the latch, technicians must grasp the left and right sides of the cable's connector head and disconnect the display cable from the system board in a direct upward motion to prevent damage to the connector's pins.

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



7. Remove the six (M2.5x3.5) screws [1] that secures the display hinges to the computer.
8. Lift the display assembly off the computer [2].

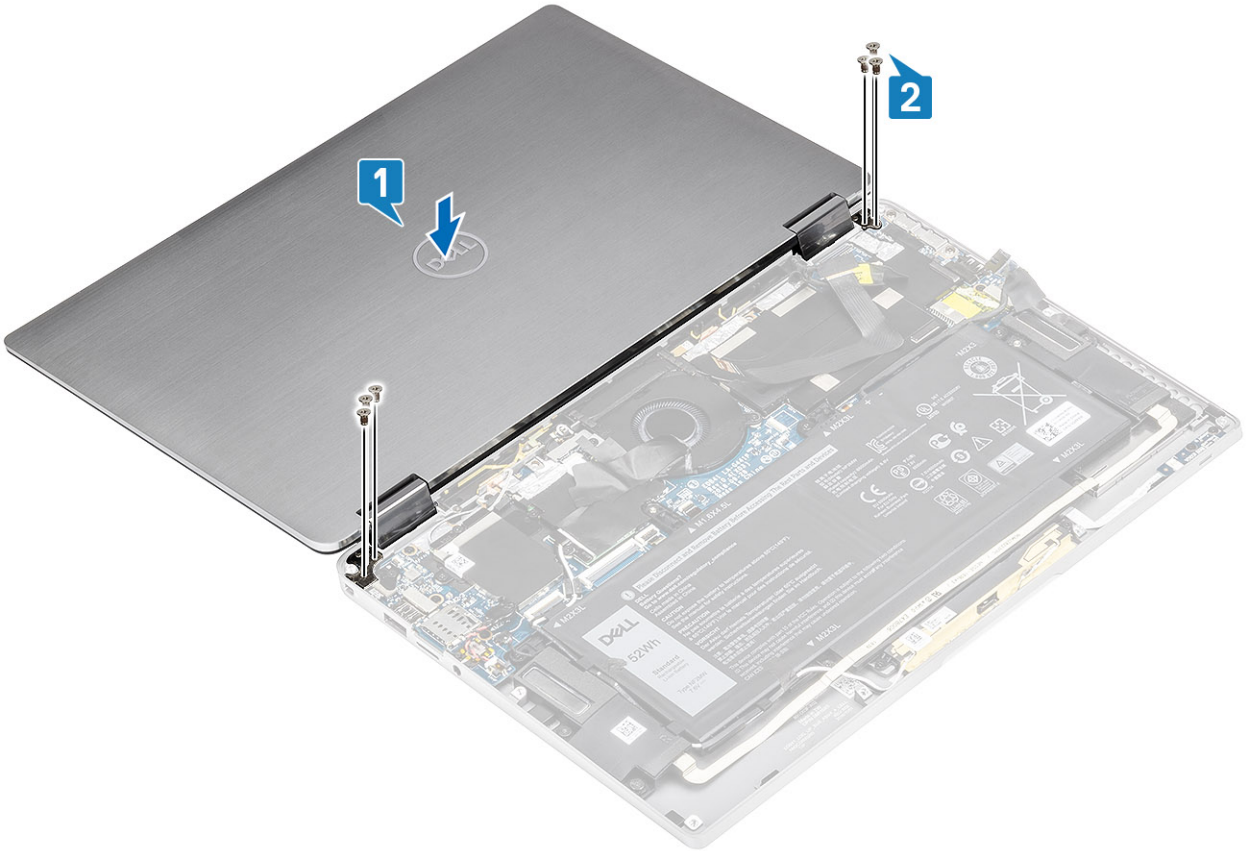


NOTE: The display assembly for the Latitude 7400 2-in-1 is a Hinge-Up Design (HUD) assembly and cannot be further disassembled once it is removed from the bottom chassis. If any components of the HUD assembly are malfunctioning and need to be replaced, replace the entire display assembly.

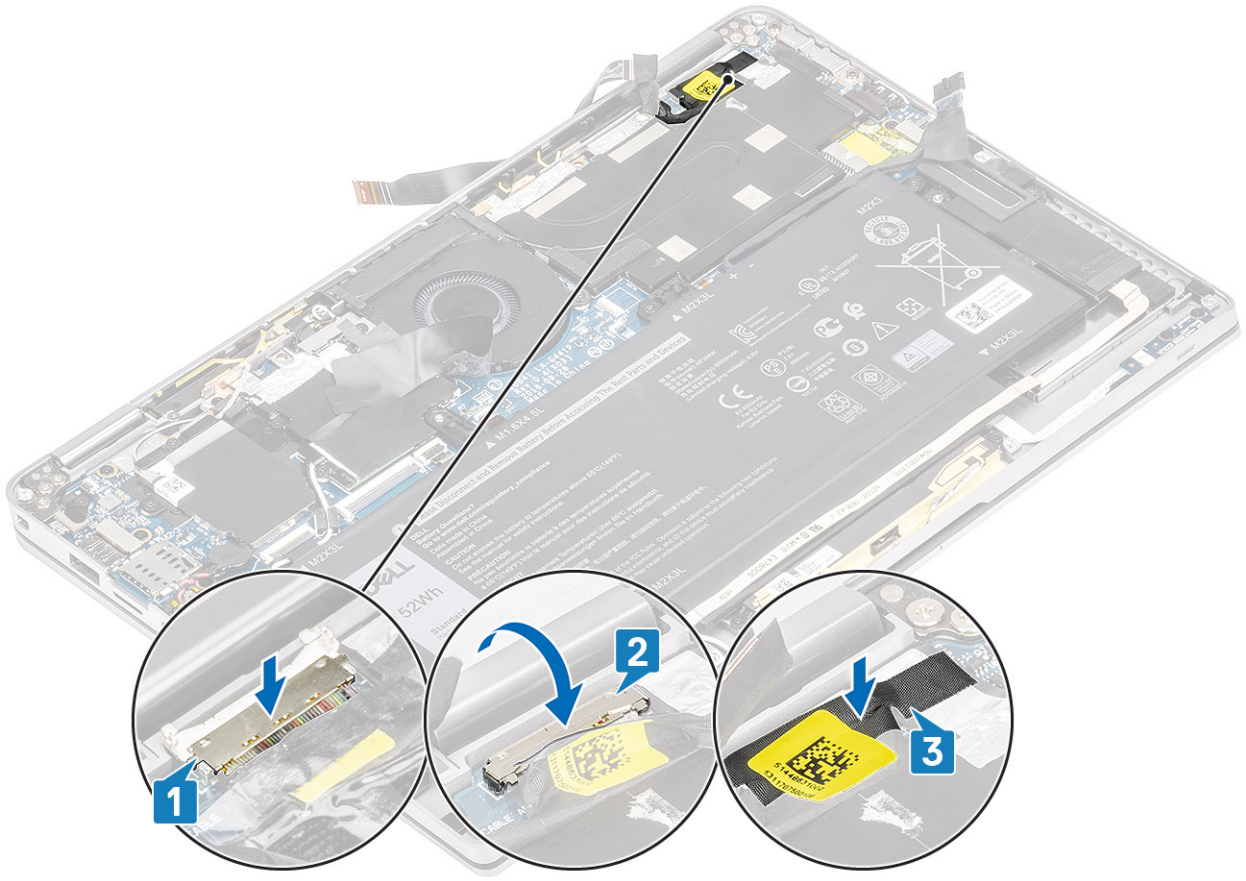
Installing the display assembly

Steps

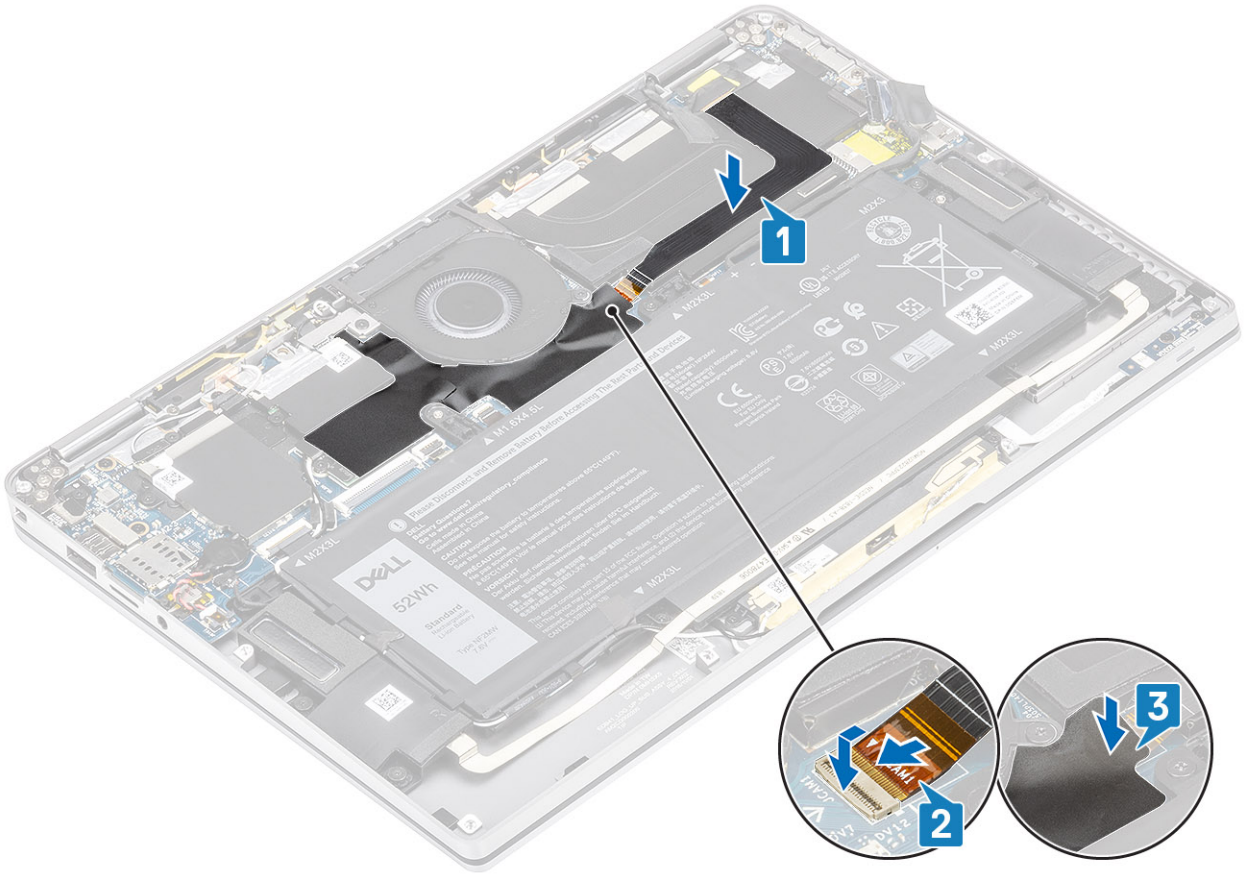
1. Install the display assembly with hinges open at 180º aligned to the computer [1].
2. Replace the six (M2.5x3.5) screws [1] that secures the display hinges to the computer [2].



3. Connect the display cable [1] to the connector on the system board.
4. Close the latch [2] and adhere the tape on the display cable [3].



5. Route the camera and touch screen FPC and adhere it on the heatsink shield [1].
6. Connect the camera and touch screen FPC to the connector on the system board [2] and stick the Mylar sheet on the system board [3].



Next steps

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

Battery

Lithium-ion battery precautions

CAUTION:

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

- **Always purchase genuine batteries from www.dell.com or authorized Dell partners and resellers.**

Removing the battery

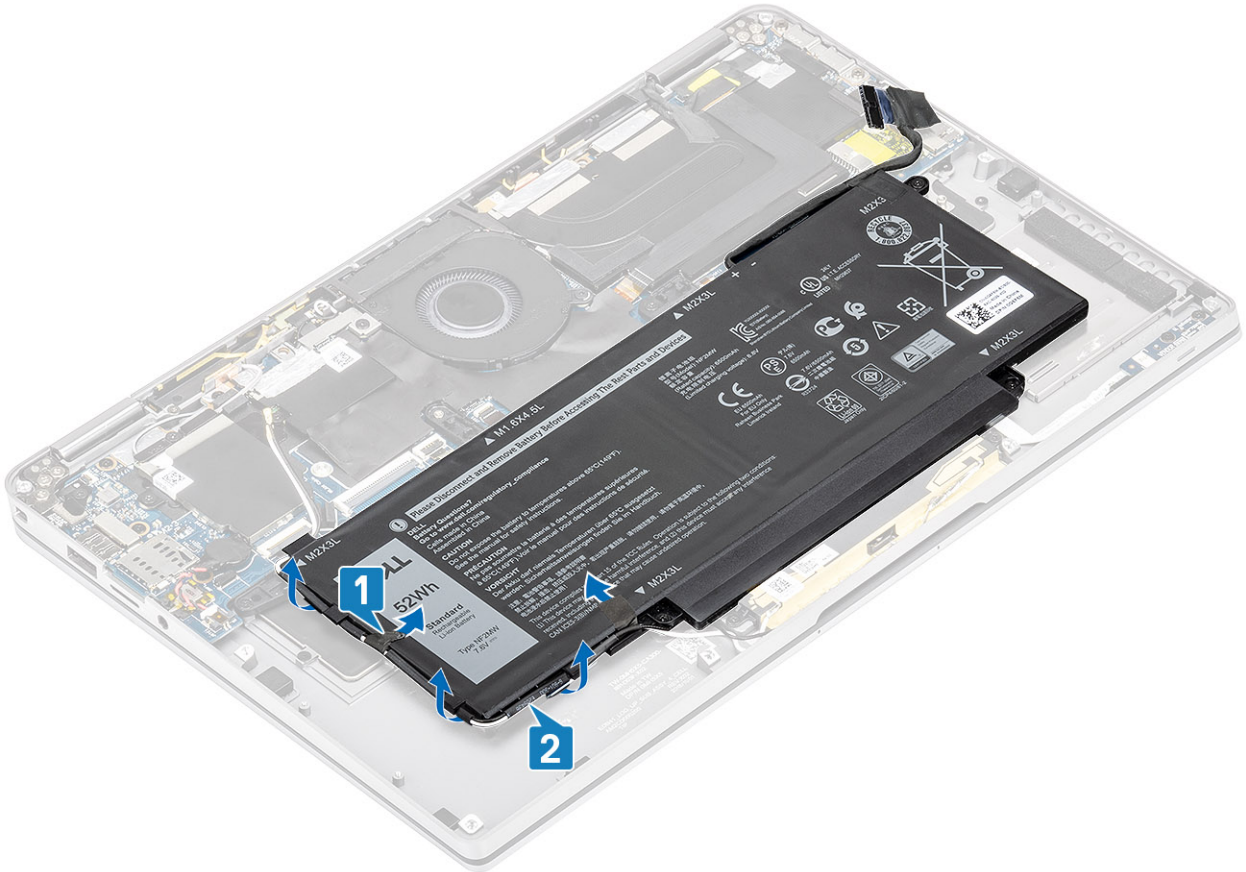
Prerequisites

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

Steps

1. Peel off the tape [1] and unroute the wireless antennae cables from the routing guides on the battery [2].

   NOTE: The cables for the wireless antennas are routed over the plastic bracket at the top left corner and within the routing channels along the left and bottom side of the battery. As a result, technicians must be careful when unrouting the antenna cables from their routing guides while they are still attached to the wireless card. If there is difficulty in unrouting the antenna cables from their routing channels, remove the WLAN card from the computer to create space to unroute the cables.



2. Remove the single (M1.6x4.5) screw [1] in highlighted in red circle and four (M2x3) screws highlighted in yellow color that secure the battery to the chassis.
3. Lift and remove the battery off the computer [2].

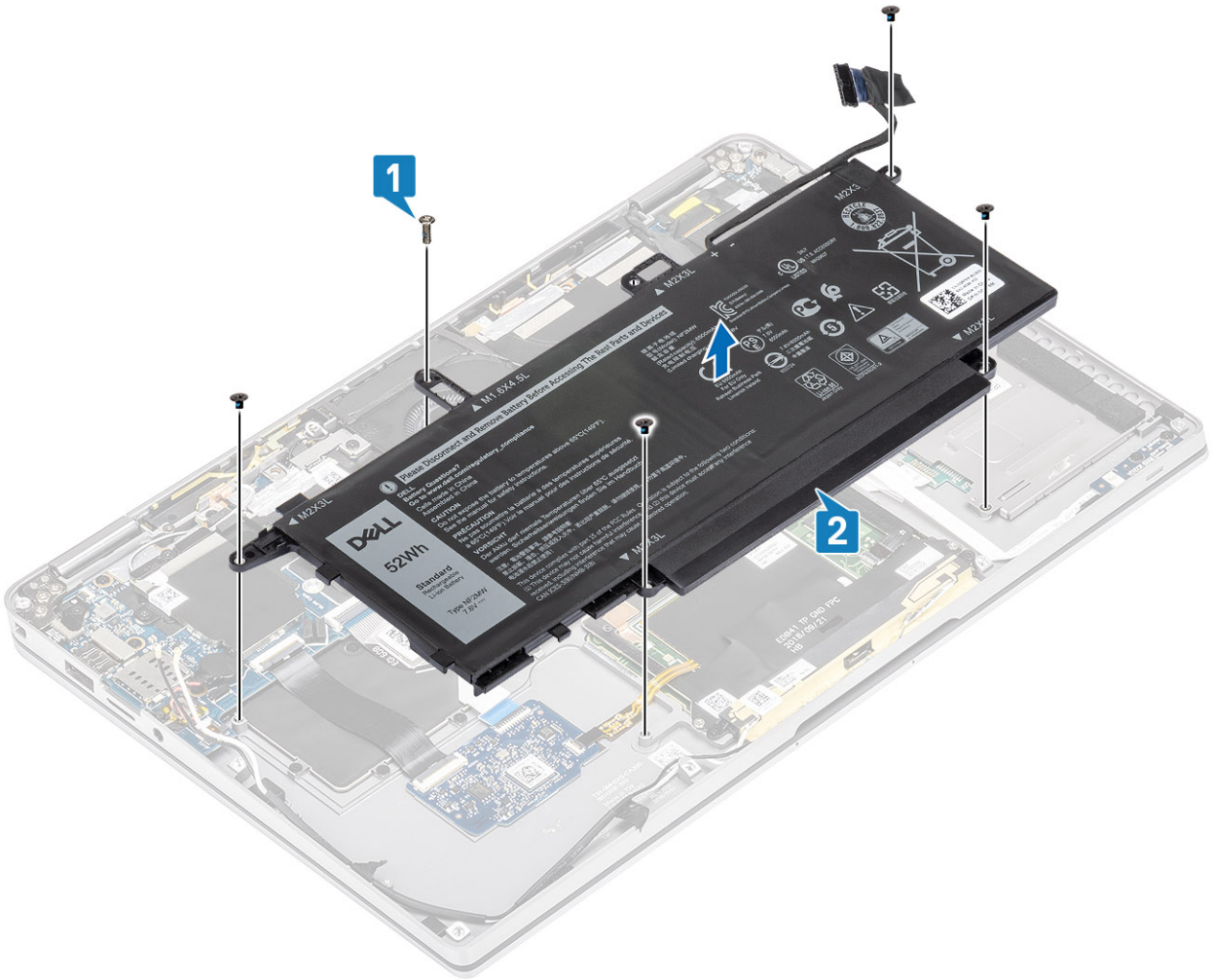


Figure 3. 4-cell battery

NOTE: A 6-cell battery has an extra M2x4 screw shown in green. Remove the screw before removing the battery from the computer.

Table 8. Battery screw description

		Size	Amount
4-cell battery	Yellow	M2x3L	5
	Red	M1.6x4.5L	1
6-cell battery	Green	M2x4L	1

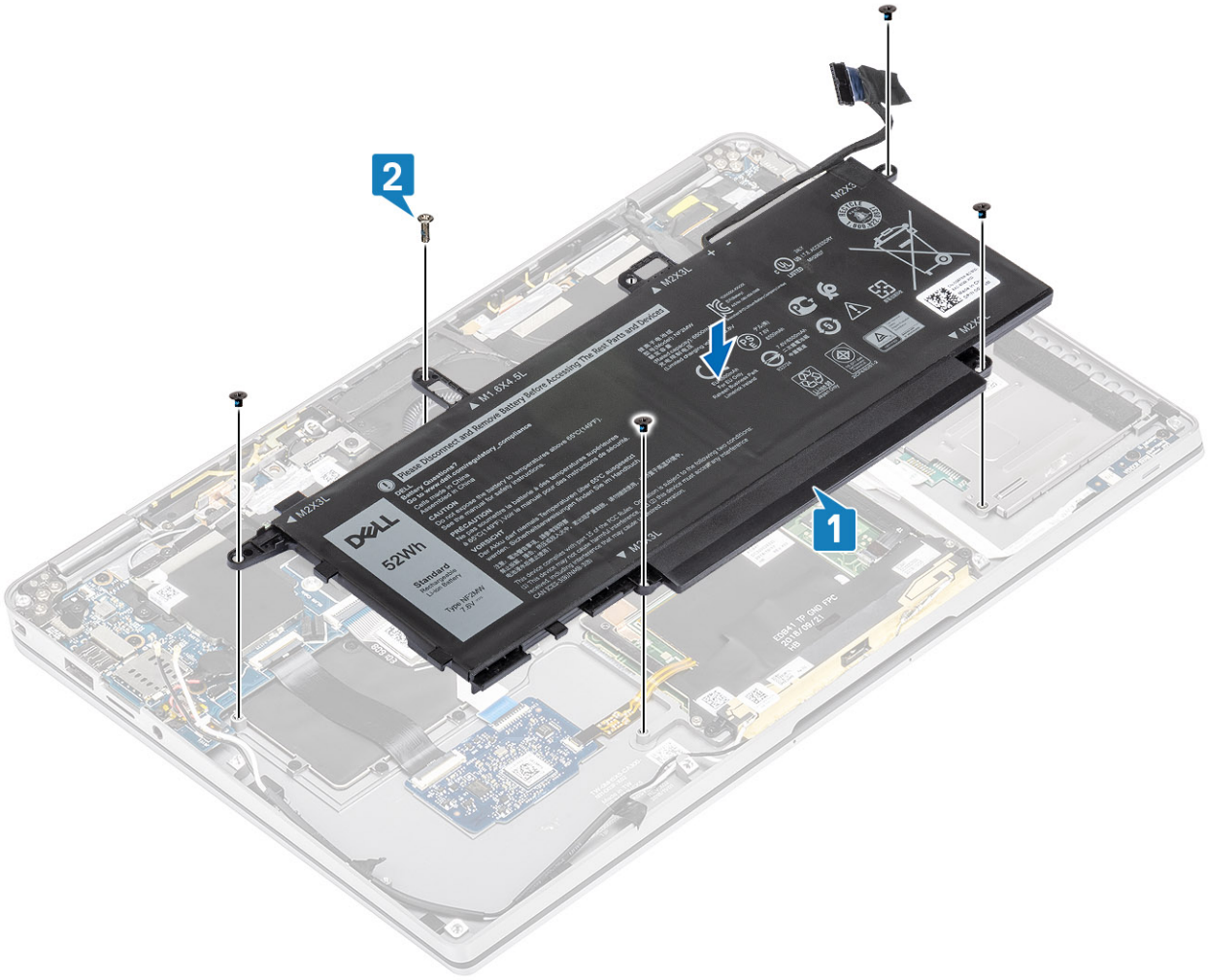


Figure 4. 6-cell battery

Installing the battery

Steps

1. Align the screw holes on the battery with the screw holes on the palmrest assembly [1].
2. Replace the four (M2x3) screws and single (M1.6x4.5) screw that secure the battery to the palmrest assembly [2].

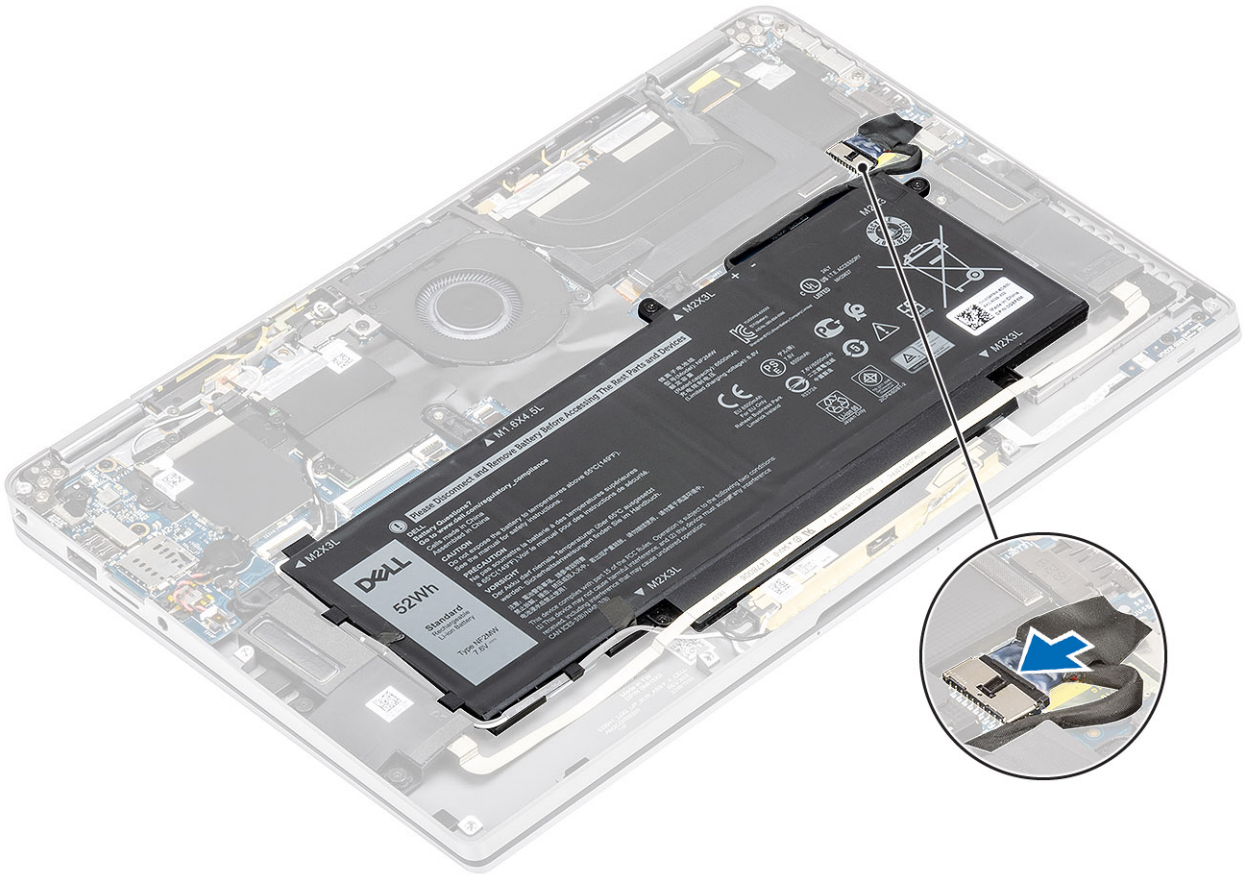


NOTE: Install the extra M2x4 screw for 6-cell battery. The screw is shown in green, in the battery disassembly section.

3. Stick the tape on wireless antennae cable securing it to the battery [1].
4. Thread the antennae cables along the routing channels and supporting bracket on the battery [2].



5. Connect the battery cable to the system board.



Next steps

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

System board

Removing the system board

Prerequisites

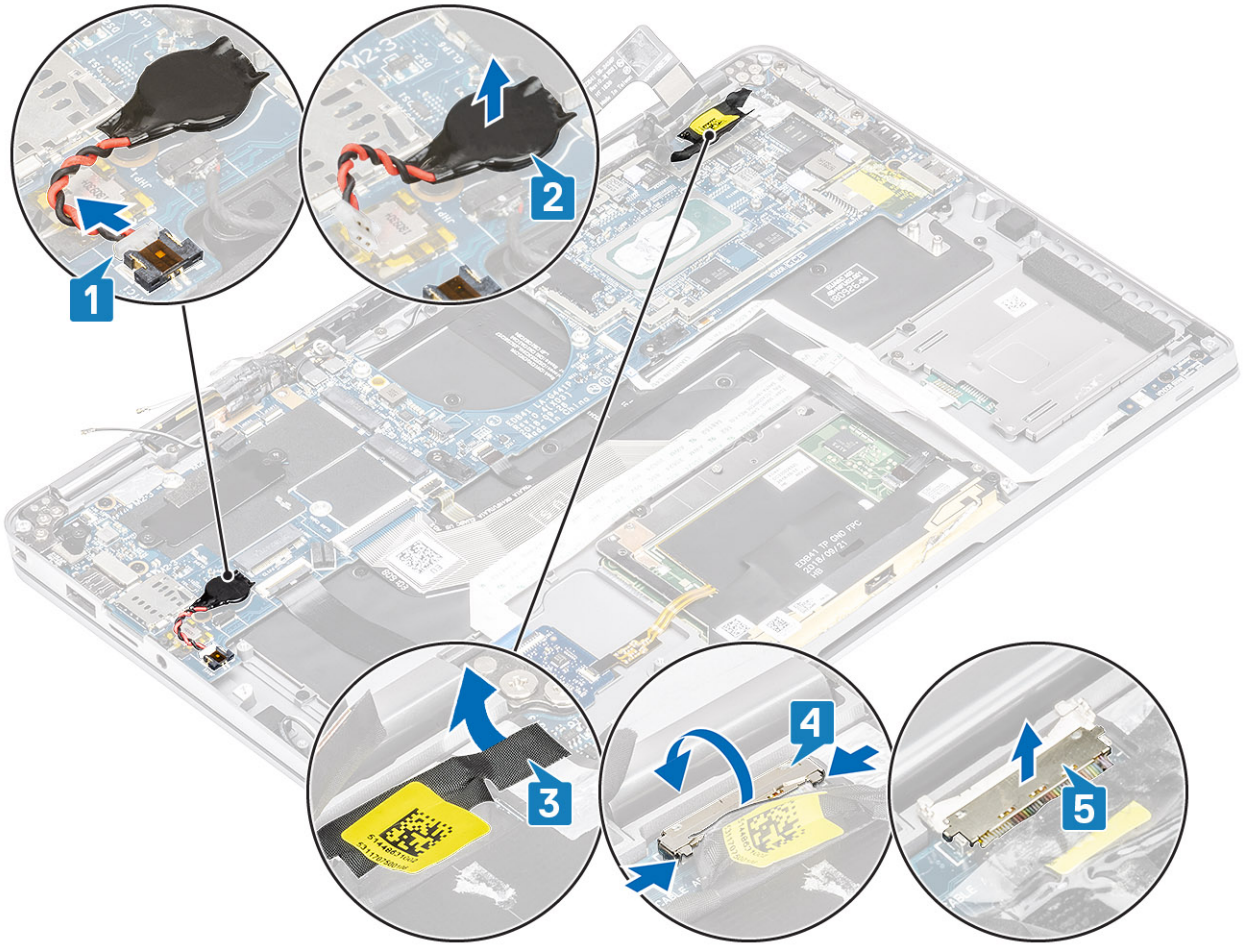
1. Follow the procedure in before working inside your computer.
2. Remove the SD memory card.
3. Remove the base cover.
4. Disconnect the battery cable.
5. Remove the coin cell.
6. Remove the SSD.
7. Remove the WLAN card.
8. Remove the WWAN card.
9. Remove the fan.
10. Remove the speakers.
11. Remove the heatsink.
12. Remove the battery.

Steps

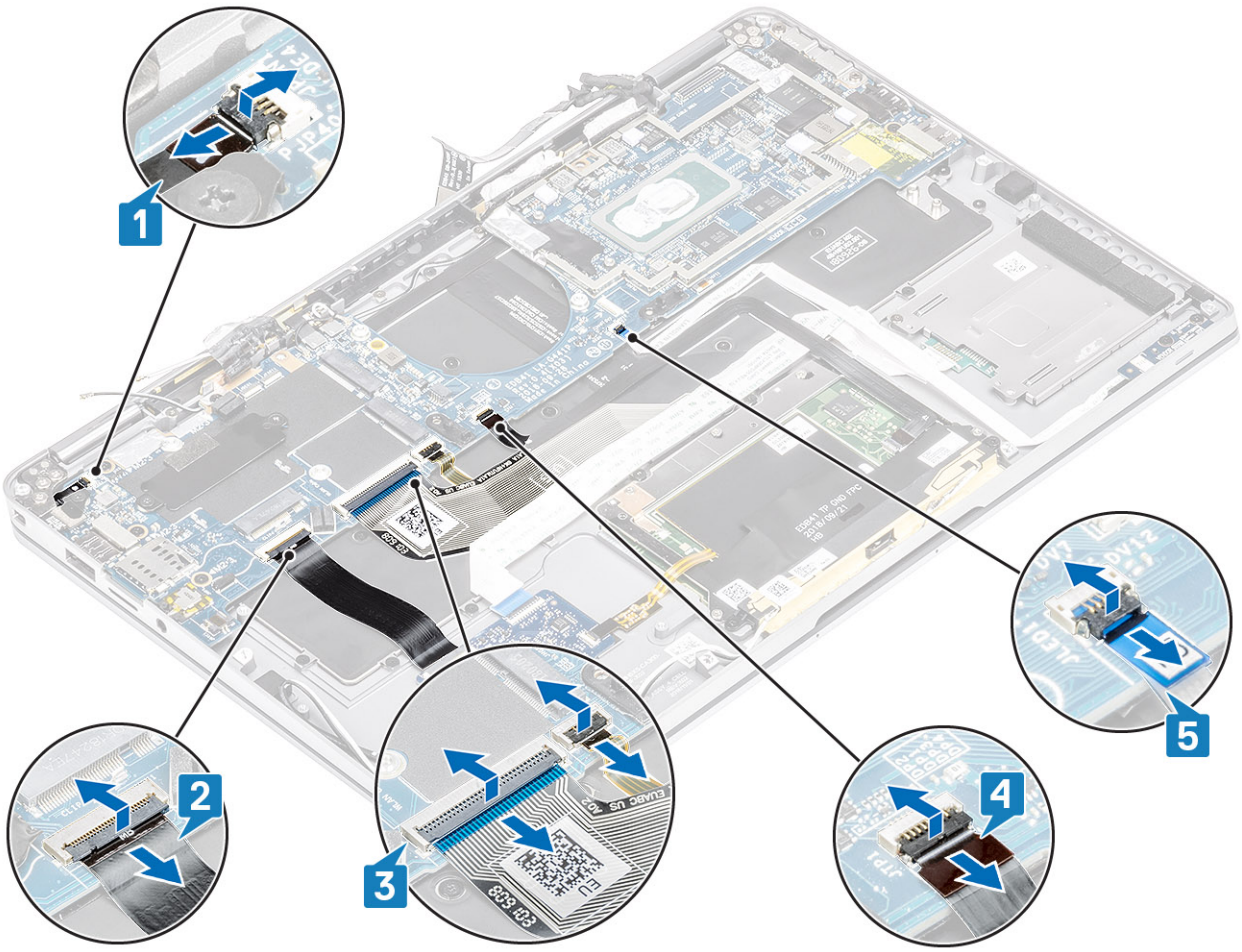
1. Disconnect the coin cell cable from the system board [1] and remove the coin cell from the system board [2].

   After removing all brackets and disconnecting all cables, there are five screws that secure the system board to the palmrest. One of the screw is covered by the Real Time Clock (RTC) battery. Technicians must first peel the RTC battery off the system board in order to access all the screws for the system board.
2. Peel off the tape on the display cable connector of the system board [3].
3. Pry the retention clips on both sides of the display cable connector, to flip open the latch [4].
4. **CAUTION: The connector for the display cable features an actuator that locks it in place on the system board. Flip open the latch to disconnect the display cable from the system board. Grasp the left and right sides of the cable's connector head and disconnect the display cable from the system board in a direct upward motion to prevent damage to the connector's pins.**

   Disconnect the display cable from the system board [5].

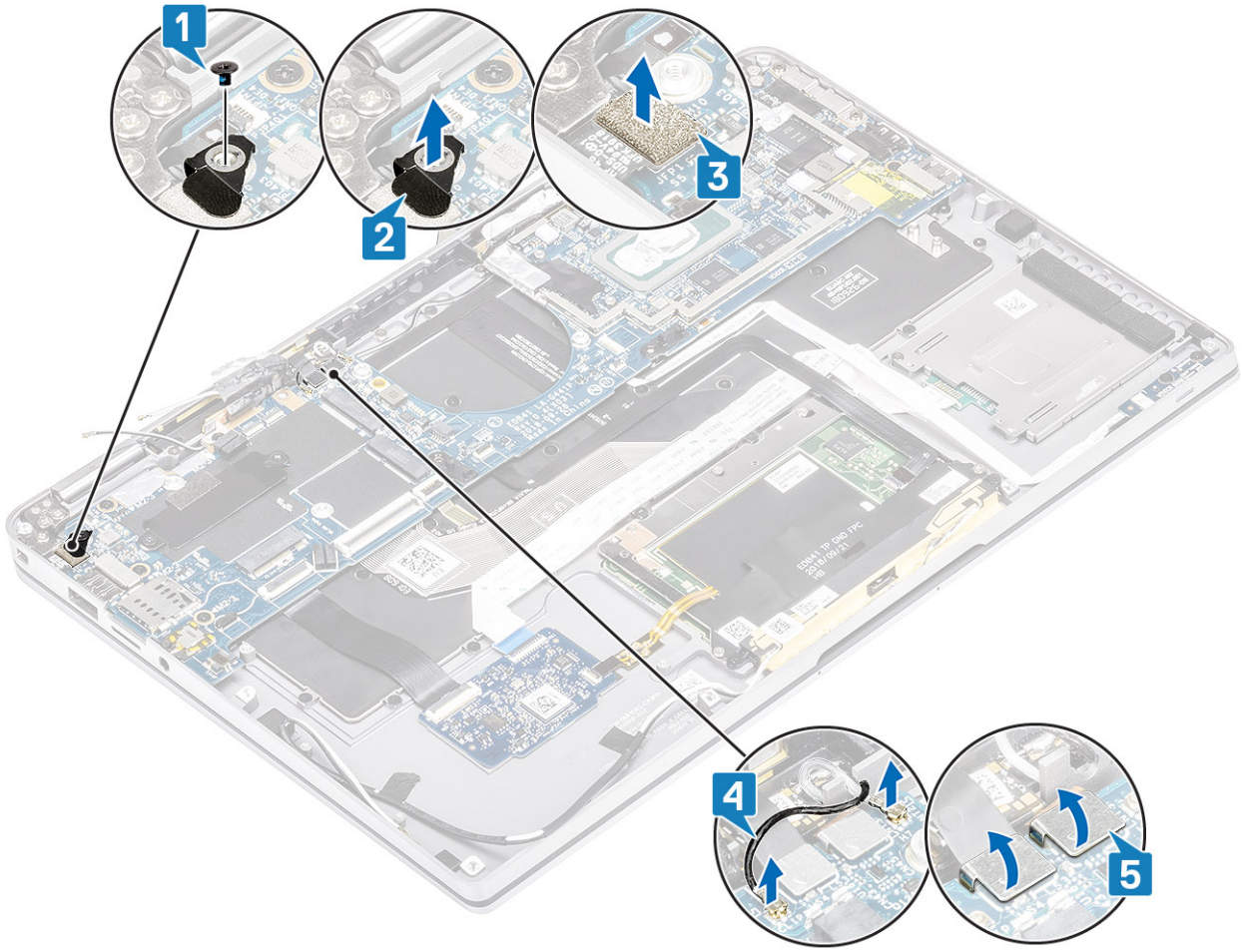


5. Disconnect the following power button cable from the system board [1].
6. Disconnect the USH board cable [2] and keyboard with backlight cable [3] from the system board.
7. Disconnect the touchpad cable [4] and LED board cable [5] from the system board.

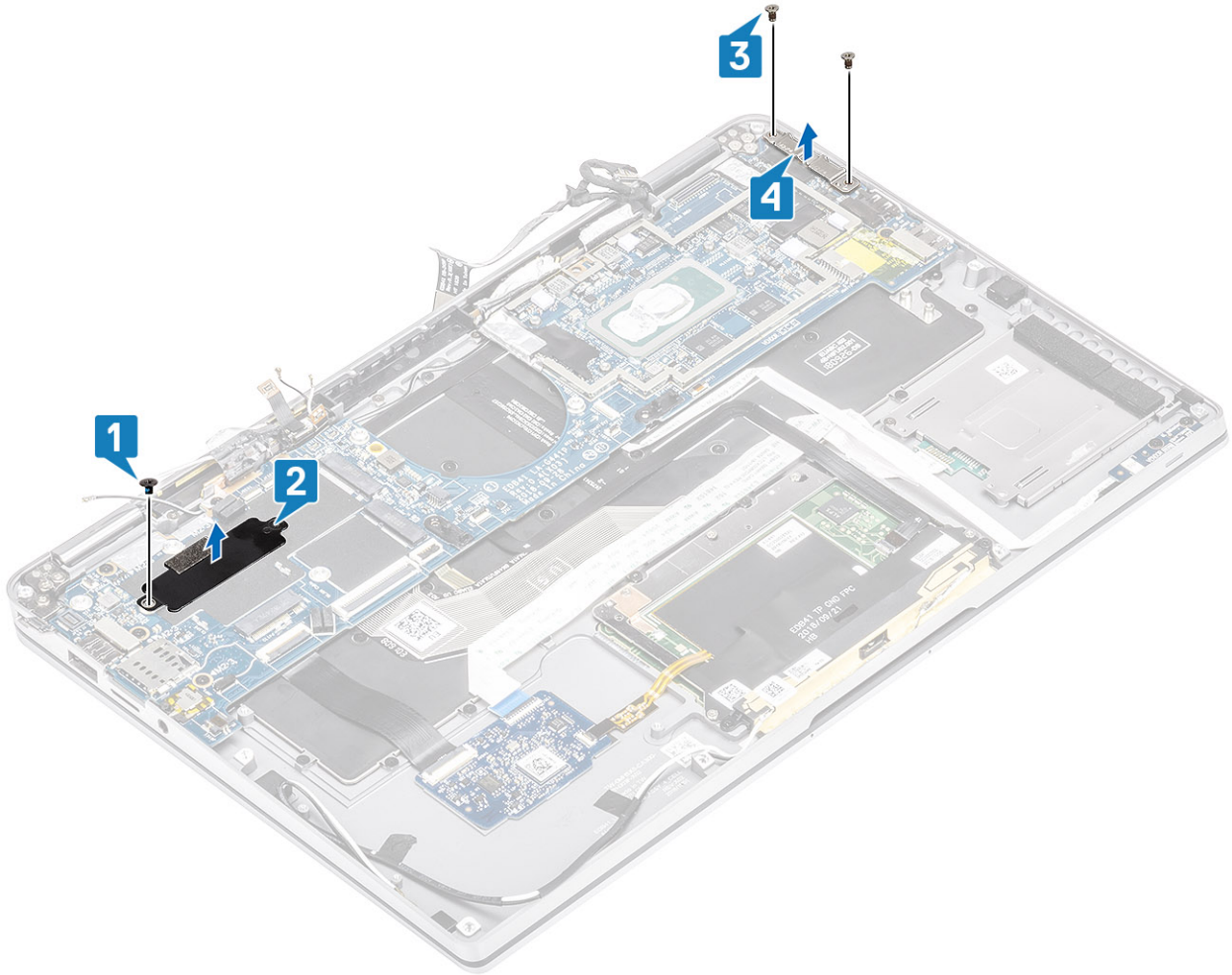


8. Remove the single (M2x2) screw [1] securing the power fingerprint bracket to system board.
9. Remove the power fingerprint bracket [2] and disconnect the cable from the system board [3].
10. Disconnect the LTE P-sensor and isolator antenna cables [4] from the system board.
11. Disconnect the LTE MAIN and AUX antennae cables [5] from the system board.

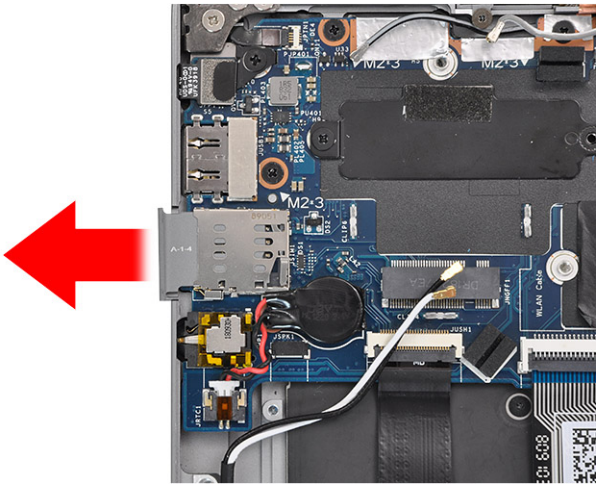
    Insert a plastic scribe into the slit at the bottom-left corner of the connector and then carefully pry up the cable connector from the system board.



12. Remove the single (M2x2) screw [1] and remove the SSD bracket from the system board [2].
13. Remove the two (M2x4) screws [3] and remove the USB Type-C bracket [4] from the system board.

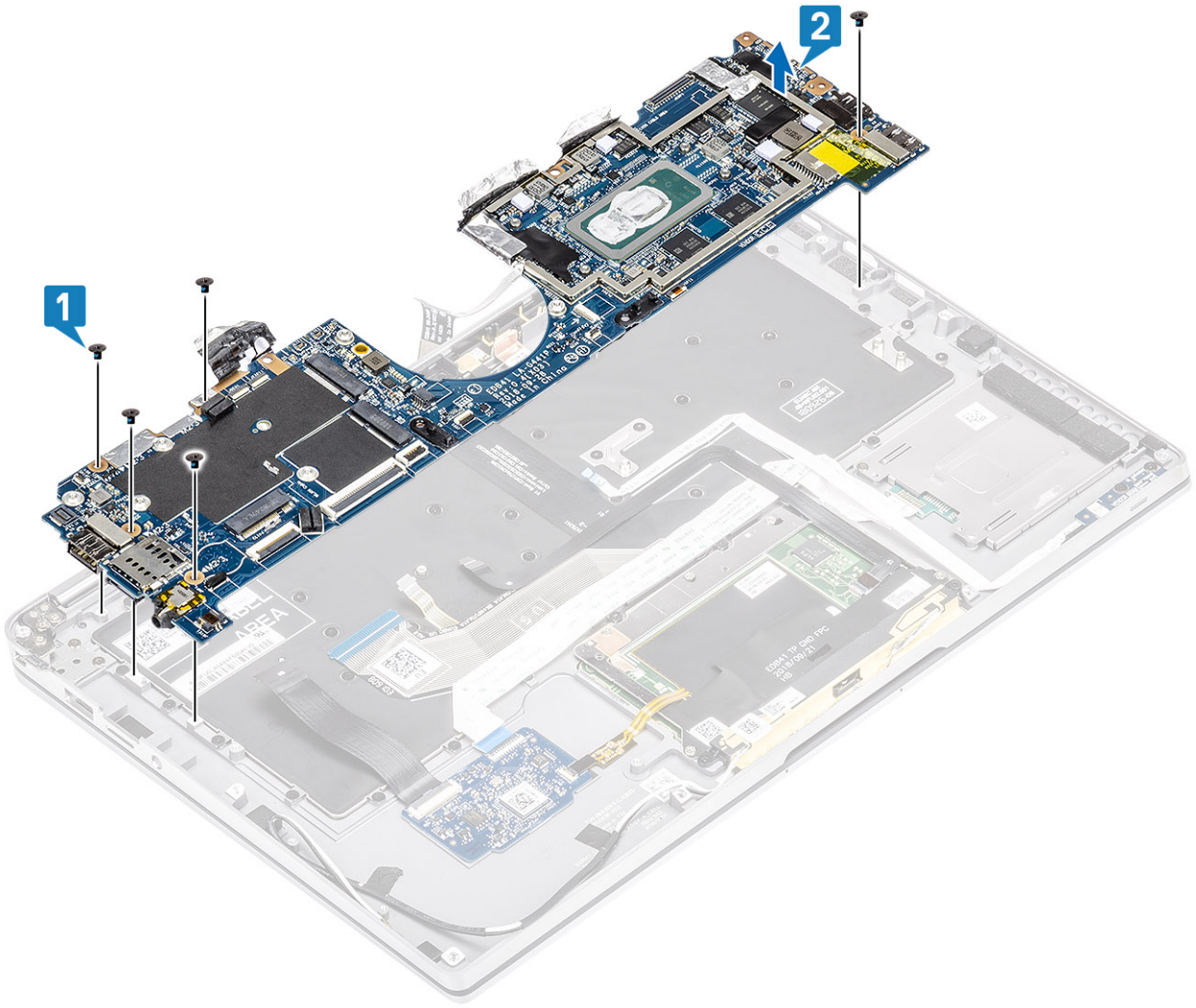


14. **CAUTION: For models shipped with no LTE support, the dummy SIM card tray must first be removed from the system before removing the system board.**



Remove the five (M2x3) screws [1] and remove the system board from the computer [2].

NOTE: Lifting the system board from the thin middle portion might damage the board.

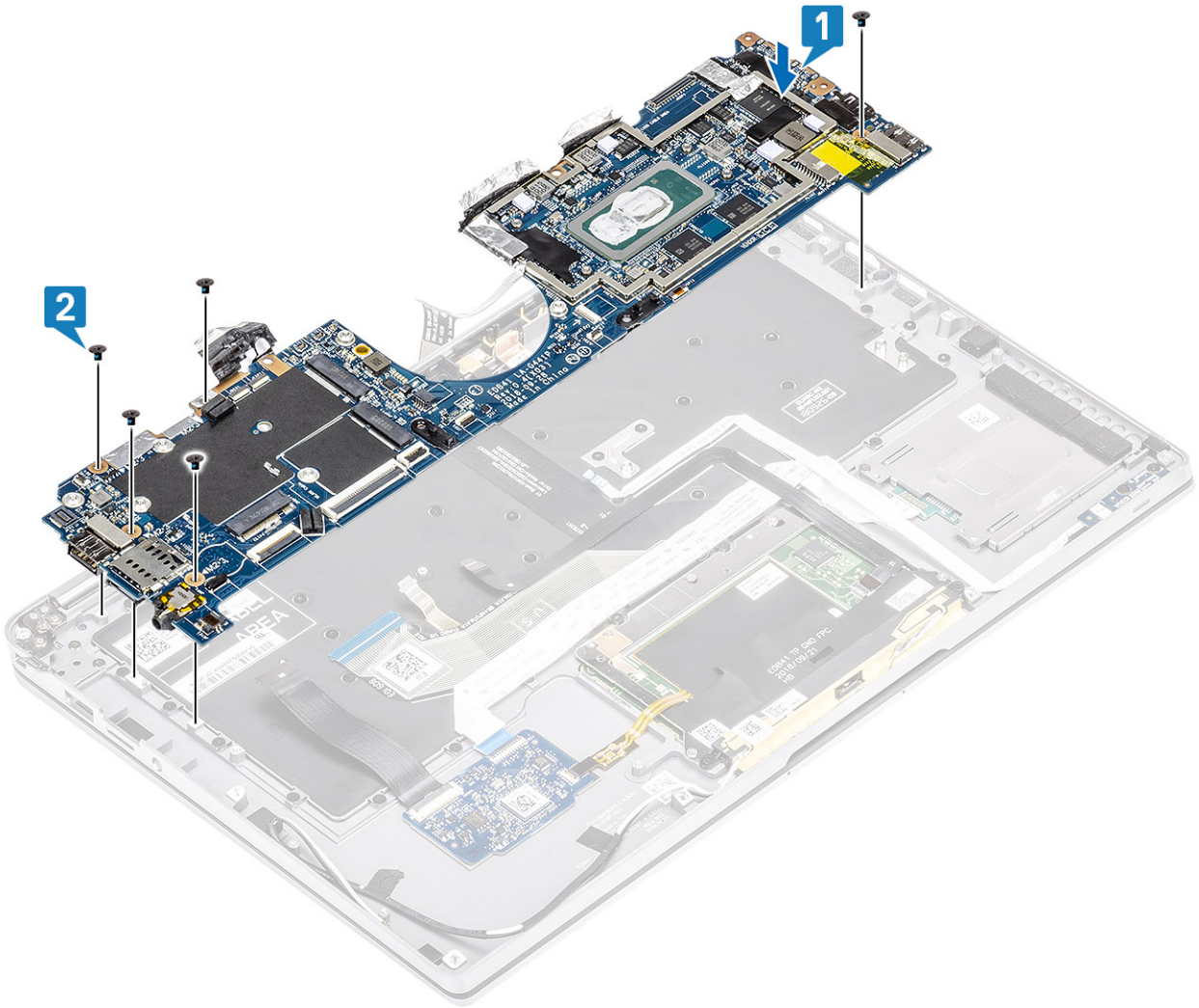


Installing the system board

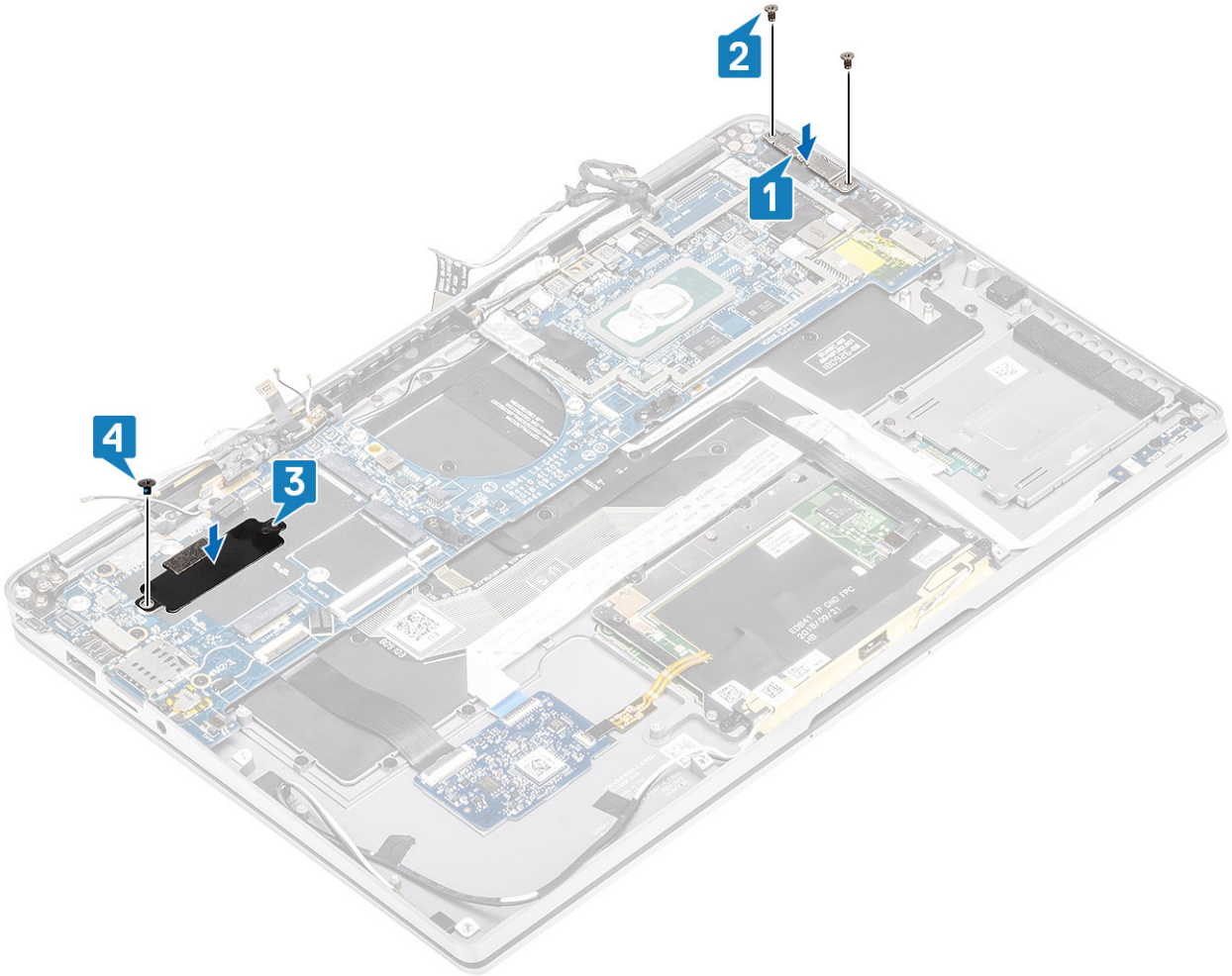
Steps

1. Install the system board in the computer [1] and install the five (M2x3) screws securing it to the computer.

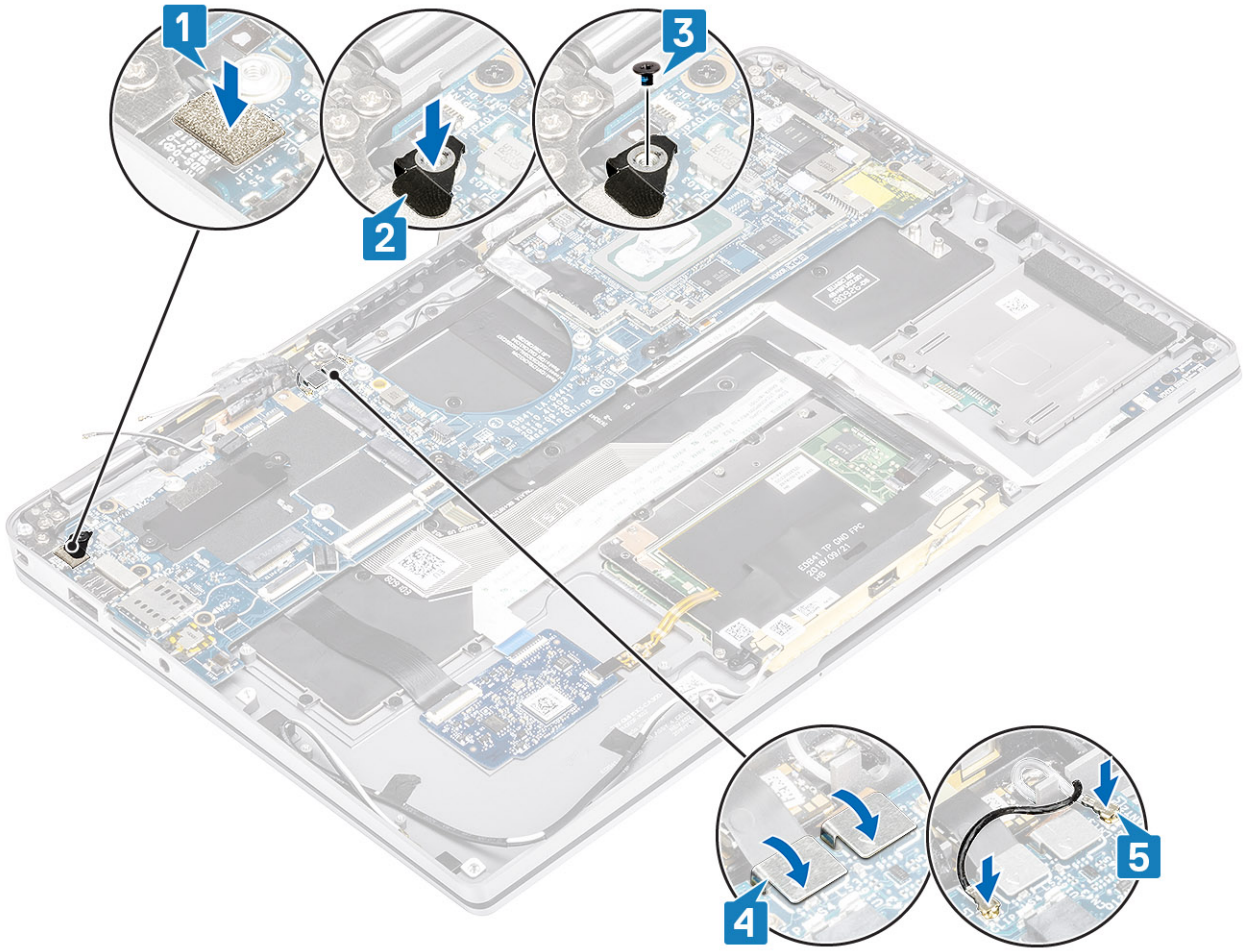
   NOTE: After removing all brackets and disconnecting all cables, there are five screws that secure the system board to the palmrest. One of the screw is covered by the Real Time Clock (RTC) battery. Technicians must first peel the RTC battery off the system board in order to access all the screws for the system board.



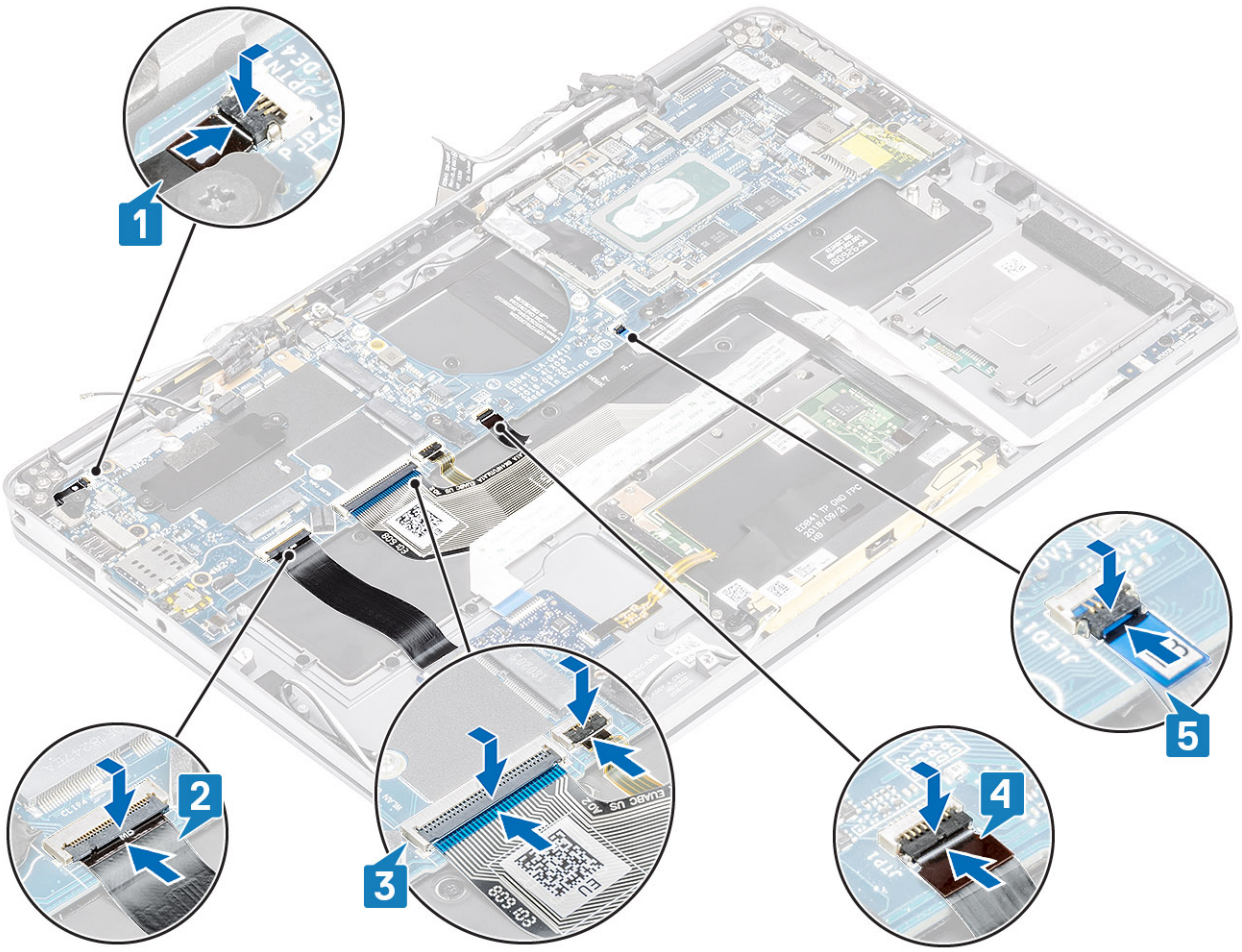
2. Install the USB Type-C bracket [1] on the system board and secure it using two (M2x4) screws [2] on the system board.
3. Install the SSD bracket [3] and secure it using a single (M2x2) screw [4] to the system board.



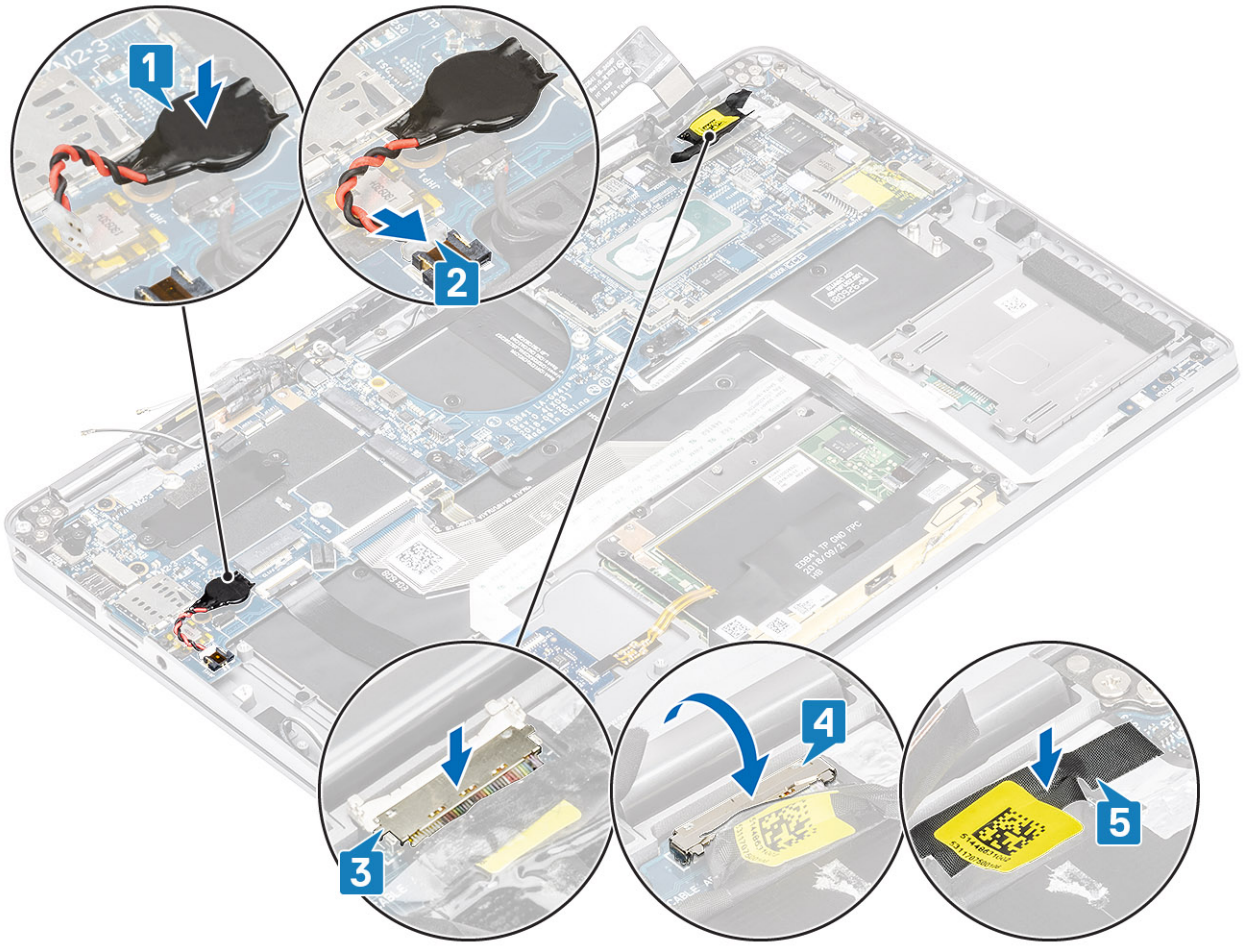
4. Connect the Power button/fingerprint reader cable to the system board [1].
5. Install the power button/finger print reader bracket [2] on the system board and secure it using the single (M2x2) screw [3].
6. Connect the LTE P-sensor and isolator antenna cables [4] on the system board.
7. Connect the LTE MAIN and AUX antennae cables [5] on the system board.



8. Connect the following power button cable to the system board [1].
9. Connect the USH board cable [2] and keyboard with backlight cable [3] to the system board.
10. Connect the touchpad cable [4] and LED board cable [5] to the system board.



11. Install the coin cell [1] on the system board and connect its cable to the system board [2].
12. Connect the display cable to the system board [3] and flip close the actuator [4].
13. Secure the display cable connector by sticking the tape on the system board [5].



Next steps

1. Install the battery.
2. Install the heatsink
3. Install the speaker.
4. Install the fan.
5. Install the WWAN card.
6. Install the WLAN card.
7. Install the SSD.
8. Install the coin cell
9. Connect the battery cable
10. Install the base cover.
11. Install the SIM card
12. Install the SD memory card.
13. Follow the procedure after working inside your computer.

Keyboard

Removing the keyboard

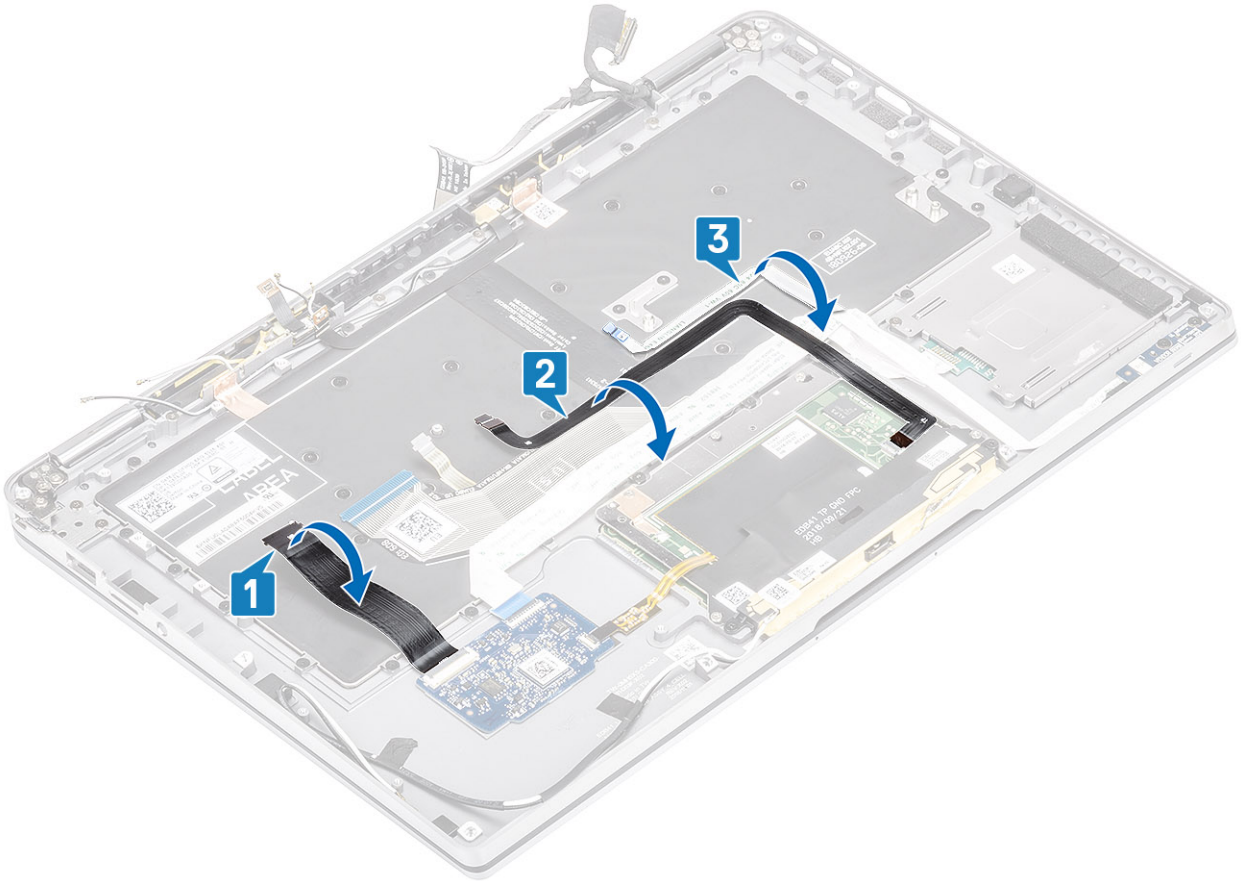
Prerequisites

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

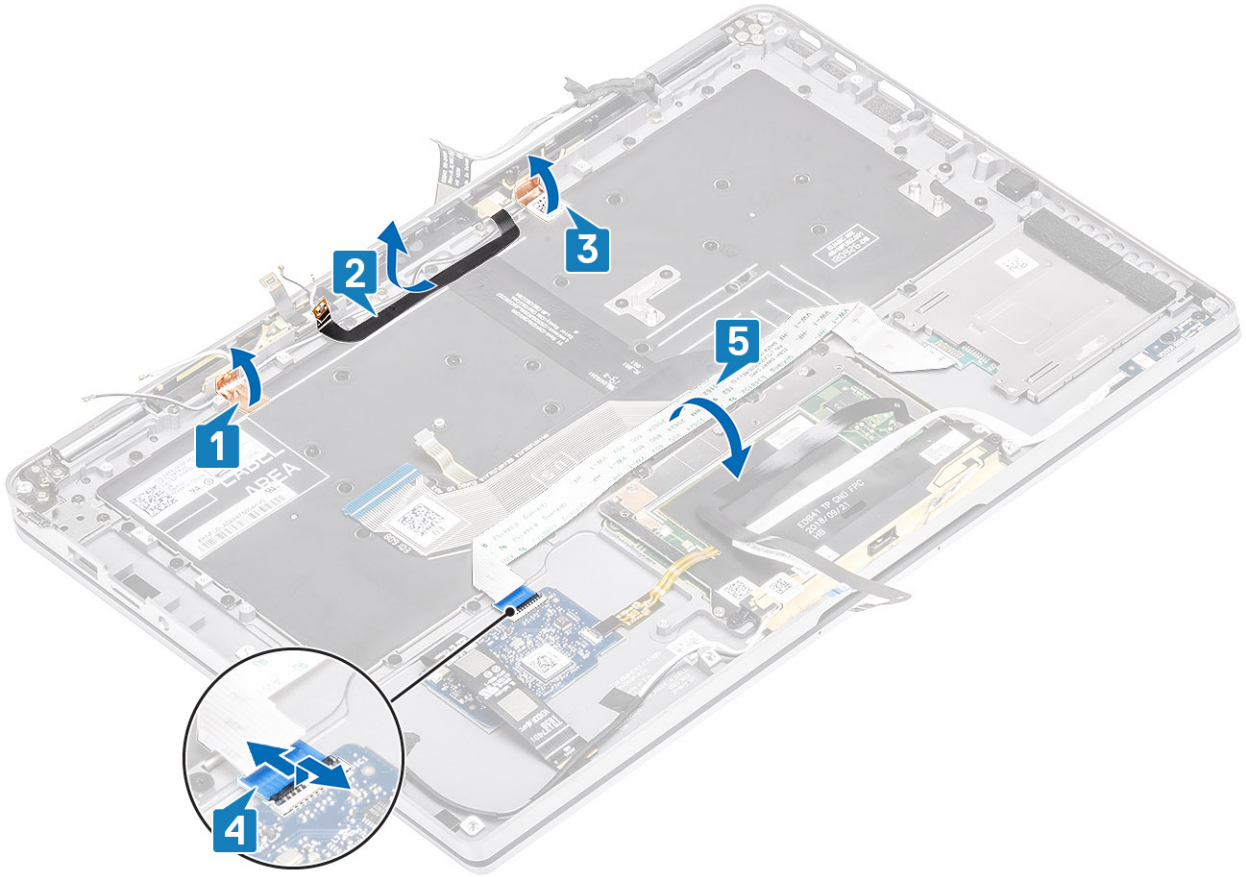
4. Disconnect the battery cable.
5. Remove the coin cell.
6. Remove the SSD.
7. Remove the WLAN card.
8. Remove the WWAN card.
9. Remove the fan.
10. Remove the speakers.
11. Remove the battery.
12. Remove the heatsink.
13. Remove the system board.

Steps

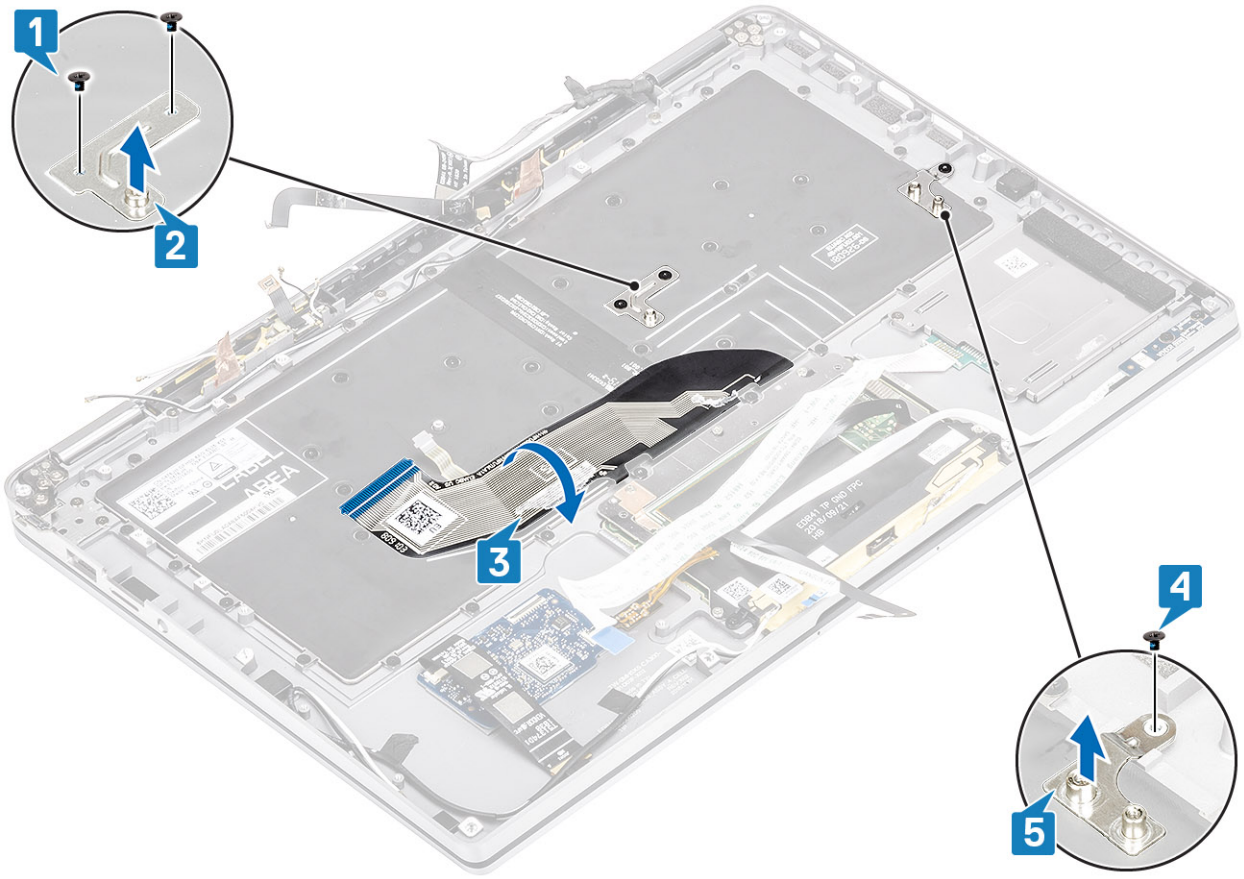
1. Peel off the USH board cable [1], touchpad cable [2], and LED board cable [3] from the keyboard base.



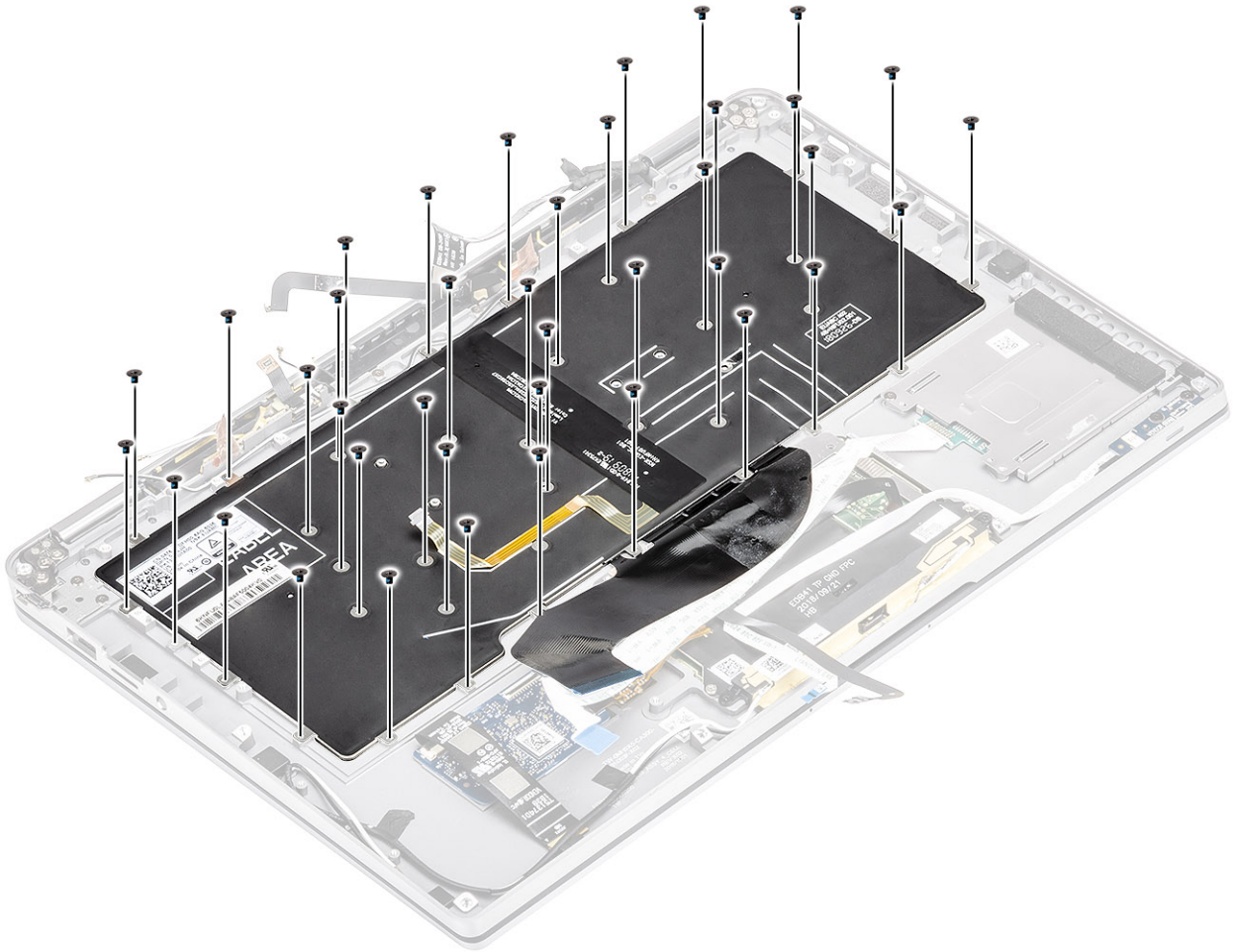
2. Peel back the two pieces of LTE antenna module copper foil [1, 3] and LTE AUX cable from the keyboard [2].
3. Disconnect the smartcard reader FPC from the USH board [4] and peel off the FPC cable from the keyboard [5].



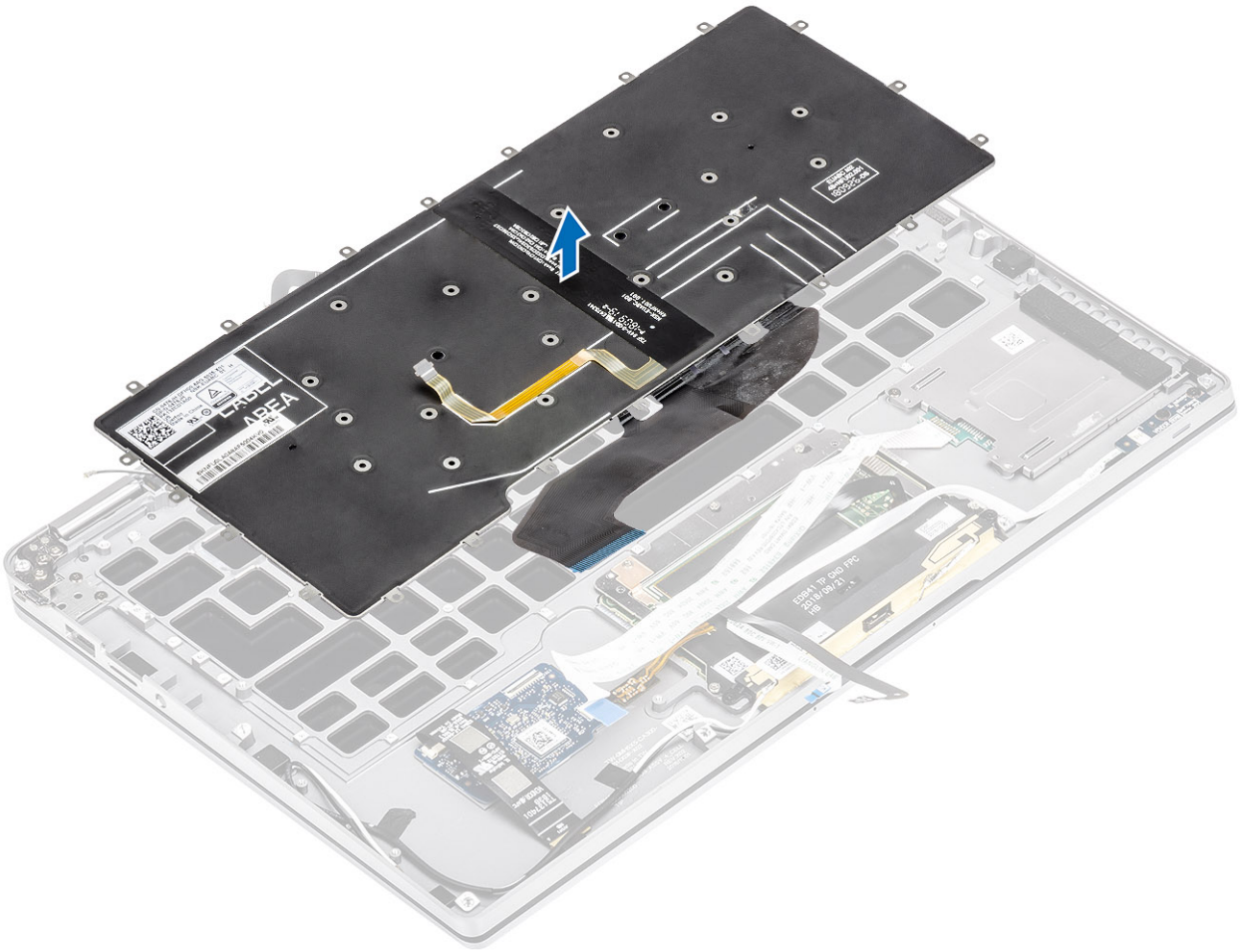
4. Remove the two (M1.6x1.5) screws [1] to remove the middle battery bracket [2] from the computer.
5. Peel off the keyboard and backlight FPC cables from the keyboard [3].
6. Remove the single (M1.6x1.5) screw [4] to remove the left battery bracket [5] from the computer.



7. Remove the 40 (M1.6x1.5) screws that secure the keyboard to the palmrest assembly. Several of the screws are covered by the touchpad flexible flat cable, LED flexible flat cable (FFC), keyboard flexible printed circuit (FPC), and copper foil. Technicians must peel back these FFC/FPC/foil in order to access the keyboard screws.



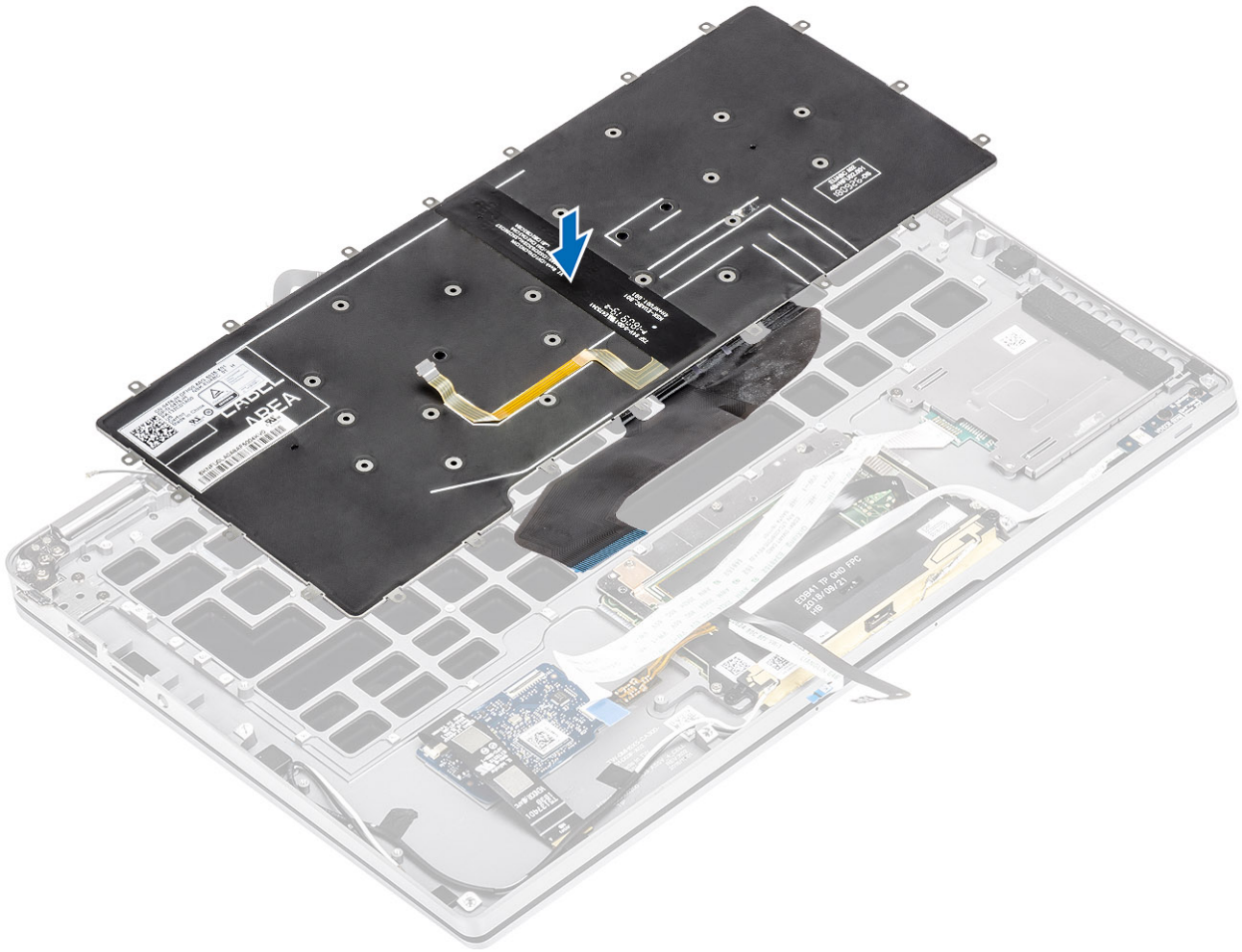
8. Lift the keyboard off the palmrest assembly.



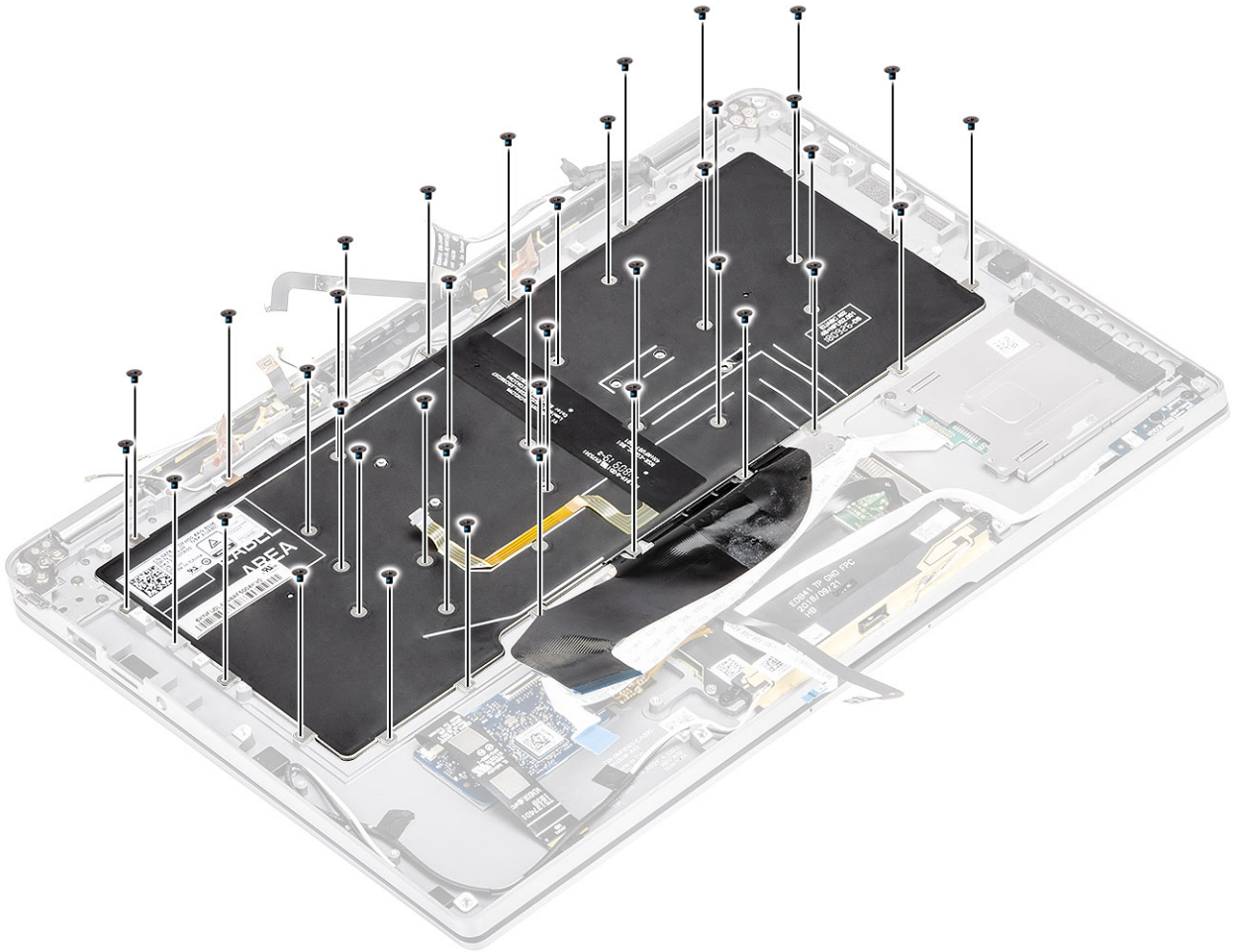
Installing the keyboard

Steps

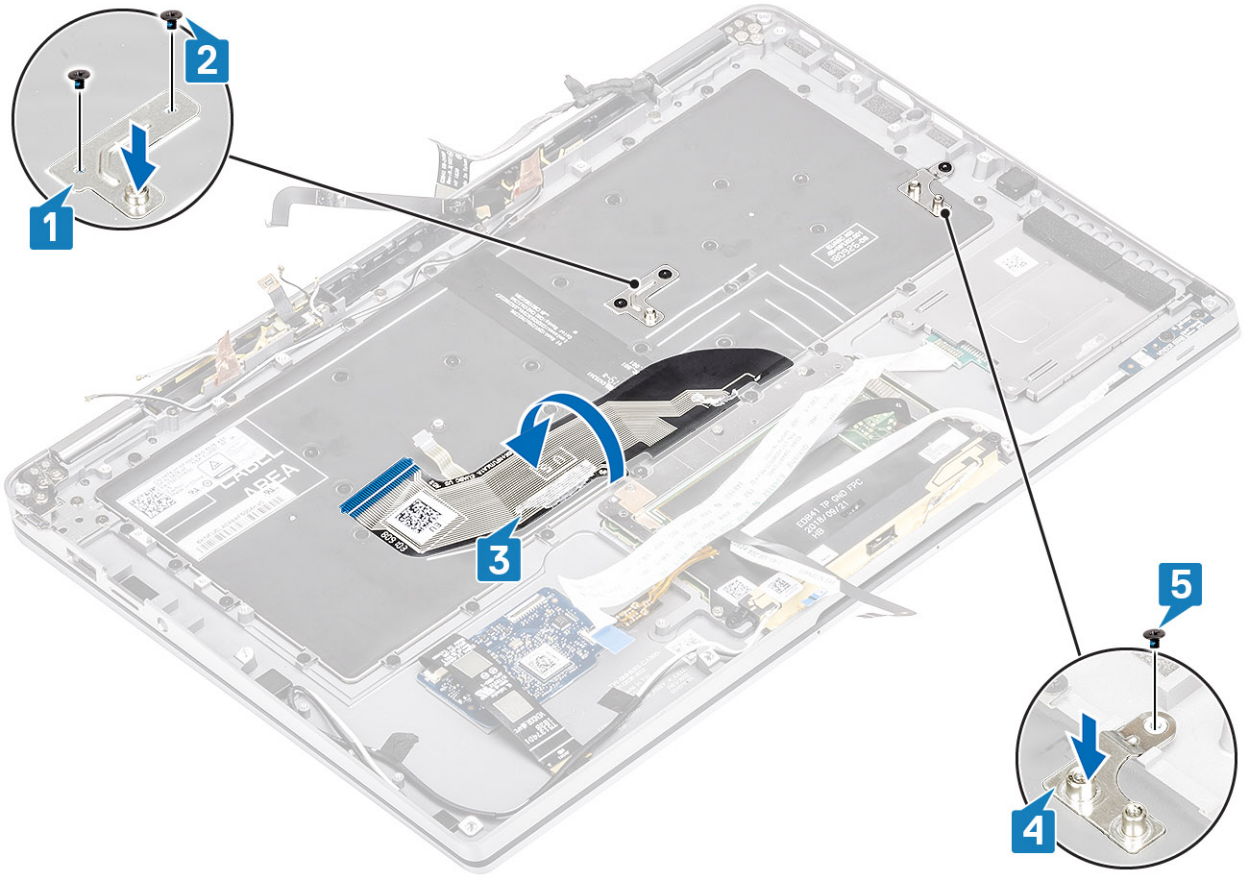
1. Place the keyboard on the palmrest assembly.



2. Replace the 40 (M1.6x1.5) screws on the keyboard to secure it to the palmrest assembly. Several of the screws are covered by the touchpad flexible flat cable, LED flexible flat cable (FFC), keyboard flexible printed circuit (FPC), and copper foil. Technicians must peel back these FFC/FPC/foil in order to access the keyboard screws.



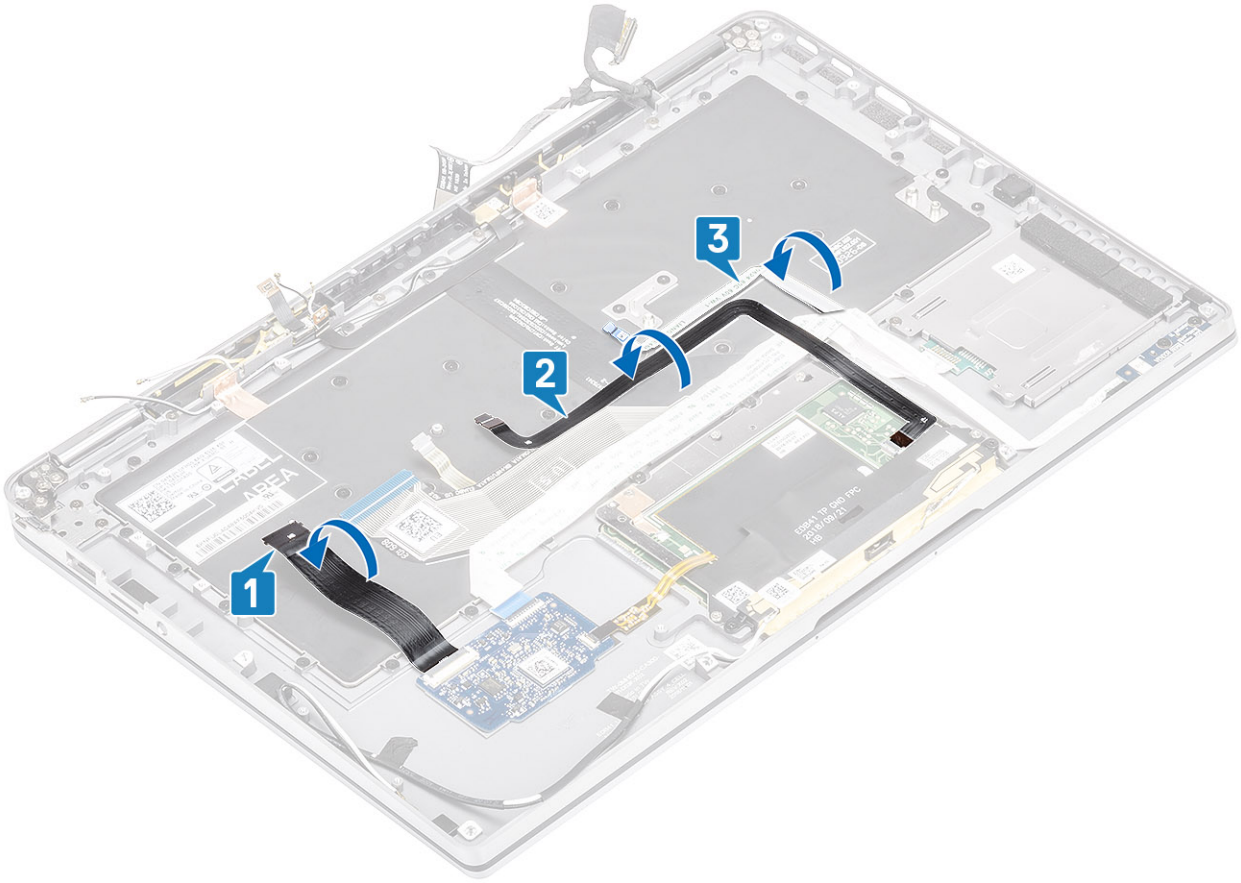
3. Install the middle battery bracket [1] and secure it using two (M1.6x1.5) screws [2].
4. Stick the keyboard and backlight FPC cables to the keyboard [3].
5. Install left battery bracket [4] and secure it using single (M1.6x1.5) screw [5].



6. Stick the two pieces of LTE antenna module copper foil [1, 3] and LTE AUX cable on the keyboard [2].
7. Route and stick the smart card FPC cable [4] on the keyboard and connect it to the USH board [5].



8. Stick the USH board cable [1], touchpad cable [2], and LED board cable [3] on the keyboard base.



Next steps

1. Install the system board
2. Install the battery.
3. Install the heatsink
4. Install the speaker.
5. Install the fan.
6. Install the WWAN card.
7. Install the WLAN card.
8. Install the SSD.
9. Install the coin cell
10. Connect the battery cable
11. Install the base cover.
12. Install the SIM card
13. Install the SD memory card.
14. Follow the procedure after working inside your computer.

Palmrest assembly

Prerequisites

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

7. Remove the WLAN card.
8. Remove the WWAN card.
9. Remove the fan.
10. Remove the speakers.
11. Remove the heatsink.
12. Remove the display assembly.
13. Remove the battery.
14. Remove the system board.
15. Remove the keyboard.

Steps

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



2. Transfer the post-requisite components onto the new palmrest assembly.

Next steps

Details of the Power button with FPC

1. WWAN antenna module with antenna cables and FPCs (for models shipped with a WWAN card)
2. SmartCard reader with FFC (for models shipped with a SmartCard reader)
3. LED board with FFC
4. Touchpad with FPC
5. Wireless antenna module with antenna cables
6. NFC module with FPC (for models shipped with an NFC reader)
7. USH daughter board with FPC (for models shipped with a USH daughter board)
8. Fingerprint reader module with FPC (for models shipped with a Fingerprint reader)
9. Power button with FPC

1. Install the keyboard
2. Install the system board
3. Install the battery.
4. Install the display assembly

5. Install the heatsink
6. Install the speaker.
7. Install the fan.
8. Install the WWAN card.
9. Install the WLAN card.
10. Install the SSD.
11. Install the coin cell
12. Connect the battery cable
13. Install the base cover.
14. Install the SIM card
15. Install the SD memory card.
16. Follow the procedure after working inside your computer.

5

System setup

CAUTION: Unless you are an expert computer user, do not change the settings in the BIOS Setup program. Certain changes can make your computer work incorrectly.

NOTE: Before you change BIOS Setup program, it is recommended that you write down the BIOS Setup program screen information for future reference.

Use the BIOS Setup program for the following purposes:

- Get information about the hardware installed in your computer, such as the amount of RAM and the size of the hard drive.
- Change the system configuration information.
- Set or change a user-selectable option, such as the user password, type of hard drive installed, and enabling or disabling base devices.

Topics:

- BIOS overview
- Entering BIOS setup program
- Boot menu
- Navigation keys
- One time boot menu
- Boot Sequence
- System setup options
- Updating the BIOS
- System and setup password
- Clearing BIOS (System Setup) and System passwords
- ExpressSign-in

BIOS overview

The BIOS manages data flow between the computer's operating system and attached devices such as hard disk, video adapter, keyboard, mouse, and printer.

Entering BIOS setup program

Steps

1. Turn on your computer.
2. Press F2 immediately to enter the BIOS setup program.

   NOTE: If you wait too long and the operating system logo appears, continue to wait until you see the desktop. Then, turn off your computer and try again.

Boot menu

Press <F12> when the Dell logo appears to initiate a one-time boot menu with a list of the valid boot devices for the system. Diagnostics and BIOS Setup options are also included in this menu. The devices listed on the boot menu depend on the bootable devices in the system. This menu is useful when you are attempting to boot to a particular device or to bring up the diagnostics for the system. Using the boot menu does not make any changes to the boot order stored in the BIOS.

The options are:

- UEFI Boot:
  - Windows Boot Manager
-
- Other Options:
  - BIOS Setup
  - BIOS Flash Update
  - Diagnostics
  - Change Boot Mode Settings

Navigation keys

NOTE: For most of the System Setup options, changes that you make are recorded but do not take effect until you restart the system.

Keys	Navigation
Up arrow	Moves to the previous field.
Down arrow	Moves to the next field.
Enter	Selects a value in the selected field (if applicable) or follow the link in the field.
Spacebar	Expands or collapses a drop-down list, if applicable.
Tab	Moves to the next focus area. **NOTE:** For the standard graphics browser only.
Esc	Moves to the previous page until you view the main screen. Pressing Esc in the main screen displays a message that prompts you to save any unsaved changes and restarts the system.

One time boot menu

To enter **one time boot menu**, turn on your computer, and then press F12 immediately.

NOTE: It is recommended to shutdown the computer if it is on.

The one-time boot menu displays the devices that you can boot from including the diagnostic option. The boot menu options are:

- Removable Drive (if available)
- STXXXX Drive (if available)

  NOTE: XXX denotes the SATA drive number.
- Optical Drive (if available)
- SATA Hard Drive (if available)
- Diagnostics

The boot sequence screen also displays the option to access the System Setup screen.

Boot Sequence

Boot Sequence allows you to bypass the System Setup–defined boot device order and boot directly to a specific device (for example: optical drive or hard drive). During the Power-on Self Test (POST), when the Dell logo appears, you can:

- Access System Setup by pressing F2 key
- Bring up the one-time boot menu by pressing F12 key

The one-time boot menu displays the devices that you can boot from including the diagnostic option. The boot menu options are:

- Removable Drive (if available)
- STXXXX Drive

NOTE: XXX denotes the SATA drive number.

- Optical Drive (if available)
- SATA Hard Drive (if available)
- Diagnostics

  NOTE: Choosing **Diagnostics**, will display the **ePSA diagnostics** screen.

The boot sequence screen also displays the option to access the System Setup screen.

System setup options

NOTE: Depending on the laptop and its installed devices, the items listed in this section may or may not appear.

General options

Table 9. General

Option	Description
System Information	This section lists the primary hardware features of your computer. The options are: • **System Information** • **Memory Configuration** • **Processor Information** • **Device Information**
Battery Information	Displays the battery status and the type of AC adapter connected to the computer.
Boot Sequence	Allows you to change the order in which the computer attempts to find an operating system. The options are: • **Windows Boot Manager** • **Boot List Option:** Allows you to change the boot list options. Click one of the following options: ○ **Legacy External Devices** ○ **UEFI**—Default
Advanced Boot Options	Allows you to Enable Legacy Option ROMs. The options are: • **Enable Legacy Option ROMs**—Default • **Enable Attempt Legacy Boot**
UEFI Boot Path Security	Allows you to control whether the system prompts the user to enter the Admin password when booting to a UEFI boot path. Click one of the following options: • **Always, Except Internal HDD**—Default • **Always** • **Never**
Date/Time	Allows you to set the date and time. The change to the system date and time takes effect immediately.

System configuration

Table 10. System Configuration

Option	Description
SATA Operation	Allows you to configure the operating mode of the integrated SATA hard-drive controller. Click one of the following options: • **Disabled** • **AHCI** • **RAID On**—Default **NOTE:** SATA is configured to support RAID mode.
Drives	These fields let you enable or disable various drives on board. The options are: • **SATA-2** • **M.2 PCIe SSD-0** • **M.2 PCIe SSD-1**
SMART Reporting	This field controls whether hard drive errors for integrated drives are reported during startup. The option is disabled by default.
USB Configuration	Allows you to enable or disable the internal/integrated USB configuration. The options are: • **Enable USB Boot Support** • **Enable External USB Ports** All the options are set by default. **NOTE:** USB keyboard and mouse always work in the BIOS setup irrespective of these settings.
Dell Type-C Dock Configuration	Allows you to connect to Dell WD and TB family of docks(Type-C Docks) independent of USB and thunderbolt adapter configuration. This option is enabled by default.
Thunderbolt™ Adapter Configuration	Allows you to enable or disable Thunderbolt options: • **Thunderbolt (Enabled by Defualt)** • **Enable Thunderbolt Boot Support** • **Enable Thunderbolt (and PCIe behind TBT) Pre-boot** With following security levels : • **No Security** • **User Authentication (Enabled by Defualt)** • **Secure Connect** • **Display Port and USB Only**
Thunderbolt™ Auto Switch	This option configures the method used by the Thunderbolt controller to perform PCIe device enumeration. • **Auto Switch** : The BIOS will automatically switch between BIOS Assist and Native Thunderbolt PC device enumeration modes to get all benefits of the installed OS

Table 10. System Configuration (continued)

Option	Description
	• **Native Enumeration**: The BIOS will program the Thunderbolt controller to Native mode (Auto Switching is disabled) • **BIOS Assist Enumeration**: The BIOS will program the Thunderbolt controller to BIOS Assist mode (Auto Switching is disabled) **NOTE:** A reboot is required for these changes to take effect.
USB PowerShare	This option enable/disable the USB PowerShare feature behavior. This option is disabled by default.
Audio	Allows you to enable or disable the integrated audio controller. By default, the **Enable Audio** option is selected. The options are: • **Enable Microphone** • **Enable Internal Speaker** This option is set by default.
Keyboard Illumination	This field lets you choose the operating mode of the keyboard illumination feature. • **Disabled**: The Keyboard illumination will always be off or 0%. • **Dim**: Enable the keyboard illumination feature at 50% brightness. • **Bright**: Enable the keyboard illumination feature at 100% brightness level.
Keyboard Backlight Timeout on AC	This feature defines the timeout value for the keyboard backlight when an AC adapter is plugged into the system. Options are: • **5 seconds** • **10 seconds**(Default) • **15 seconds** • **30 seconds** • **1 minute** • **5 minute** • **15 minute** • **Never**
Keyboard Backlight Timeout on Battery	This feature defines the timeout value for the keyboard backlight when the system is running only on battery power. Options are: • **5 seconds** • **10 seconds**(Default) • **15 seconds** • **30 seconds** • **1 minute** • **5 minute** • **15 minute** • **Never**

Table 10. System Configuration (continued)

Option	Description
Touchscreen	This option controls whether the touchscreen is enabled or disabled This option is enabled by default.
Unobtrusive Mode	When enabled, pressing Fn+F7 will turn off all light and sound emission in the system. Press Fn+F7 to resume normal operation. Default is Disabled.
Fingerprint Reader	Enable or disable the Fingerprint Reader or the Fingerprint Reader Device's Single Sign On capability. • **Enable Fingerprint Reader Device**: Enabled by Default • **ENable Fingerprint Reader Single Sign On**: Enabled by Default
Miscellaneous devices	Allows you to enable or disable various on board devices. • **Enable Camera**—Default • **Enable Secure Digital (SD) Card** • **Secure Digital (SD) Card Boot** - Disabled • **Secure Digital Card (SD) Read-Only Mode** - Disabled

Video screen options

Table 11. Video

Option	Description
LCD Brightness	Allows you to set the display brightness depending upon the power source. On Battery(50% is default) and On AC (100 % default).
Dynamic Backlight Control	This option Enables or Disables the Dynamic Backlight Control if the Panel supports this feature.

Security

Table 12. Security

Option	Description
Admin Password	Allows you to set, change, or delete the administrator(admin) password. The entries to set password are: • **Enter the old password:** • **Enter the new password:** • **Confirm new password:** Click **OK** once you set the password. **NOTE:** For the first time login, "Enter the old password:" field is marked to "Not set". Hence, password has to be set for the first time you login and then you can change or delete the password.
System Password	Allows you to set, change, or delete the System password. The entries to set password are:

Table 12. Security (continued)

Option	Description
	• **Enter the old password:** • **Enter the new password:** • **Confirm new password:** Click **OK** once you set the password. **NOTE:** For the first time login, "Enter the old password:" field is marked to "Not set". Hence, password has to be set for the first time you login and then you can change or delete the password.
Strong Password	Allows you to enforce the option to always set strong password. • **Enable Strong Password** This option is not set by default.
Password Configuration	You can define the length of your password. Min = 4, Max = 32
Password Bypass	Allows you to bypass the System password and the Internal HDD password, when it is set, during a system restart. Click one of the options: • **Disabled**—Default • **Reboot bypass**
Password Change	Allows you to change the System password when the administrator password is set. • **Allow Non-Admin Password Changes** This option is set by default.
Non-Admin Setup Changes	Allows you to determine whether changes to the setup options are allowed when an Administrator Password is set. If disabled the setup options are locked by the admin password. • **Allow Wireless Switch Changes** This option is not set by default.
UEFI Capsule Firmware Updates	Allows you to update the system BIOS via UEFI capsule update packages. • **Enable UEFI Capsule Firmware Updates** This option is set by default.
TPM 2.0 Security	Allows you to enable or disable the Trusted Platform Module (TPM) during POST. The options are: • **TPM On**—Default • **Clear** • **PPI Bypass for Enable Command**—Default • **PPI Bypass for Disbale Command** • **PPI Bypass for Clear Command** • **Attestation Enable**—Default • **Key Storage Enable**—Default • **SHA-256**—Default
Absolute®	This field lets you Enable, Disable, or Permanently Disable the BIOS module interface of the optional Absolute Persistence Module service from Absolute® Software.
OROM Keyboard Access	This option determines whether users are able to enter Option ROM Configuration screens via hotkey during boot. Specifically this settings is capable of preventing access to Intel® RAID(Ctrl+I) or Intel® Management Engine BIOS Extension (Ctrl+P/F12). Options are:

Table 12. Security (continued)

Option	Description
	• **Enable** • **One Time Enable** • **Disable**
Admin Setup Lockout	Allows you to prevent users from entering Setup when an administrator password is set. • **Enable Admin Setup Lockout** This option is not set by default.
Master Password Lockout	Allows you to disable master password support. • **Enable Master Password Lockout** This option is not set by default. **NOTE:** Hard Disk password should be cleared before the settings can be changed.
SMM Security Mitigation	Allows you to enable or disable additional UEFI SMM Security Mitigation protection. • **SMM Security Mitigation** This option is not set by default.

Secure boot

Table 13. Secure Boot

Option	Description
Secure Boot Enable	Allows you to enable or disable the Secure Boot Feature. • **Secure Boot Enable**—Default
Secure Boot Mode	Changes to the Secure Boot operation mode modifies the behaviour of Secure Boot to allow evaluation of UEFI driver signatures. Choose one of the option: • **Deployed Mode**—Default • **Audit Mode**
Expert Key Management	Allows you to enable or disable Expert Key Management. • **Enable Custom Mode** This option is not set by default. The Custom Mode Key Management options are: • **PK**—Default • **KEK** • **db** • **dbx**

Intel Software Guard Extensions options

Table 14. Intel Software Guard Extensions

Option	Description
Intel SGX Enable	This field specifies you to provide a secured environment for running code/storing sensitive information in the context of the main OS. Click one of the following options: • **Disabled** • **Enabled** • **Software controlled**—Default
Enclave Memory Size	This option sets **SGX Enclave Reserve Memory Size** Click one of the following options: • **32 MB** • **64 MB** • **128 MB**—Default

Performance

Table 15. Performance

Option	Description
Multi Core Support	This field specifies whether the process has one or all cores enabled. The performance of some applications improves with the additional cores. • **All**—Default • **1** • **2** • **3**
Intel SpeedStep	Allows you to enable or disable the Intel SpeedStep mode of processor. • **Enable Intel SpeedStep** This option is set by default.
C-States Control	Allows you to enable or disable the additional processor sleep states. • **C states** This option is set by default.
Intel® TurboBoost™	This option enables or disables the Intel® TurboBoost™ mode of the processor
Hyper-Thread Control	Allows you to enable or disable the HyperThreading in the processor. • **Disabled** • **Enabled**—Default

Power management

Table 16. Power Management

Option	Description
AC Behavior	Allows you to enable or disable the computer from turning on automatically when an AC adapter is connected. • **Wake on AC** This option is not set by default.
Enable Intel Speed Shift technology	This option is used to enable/disable Intel Speed Shift Technology. This option is not set by default.
Auto On Time	Allows you to set the time at which the computer must turn on automatically. The options are: • **Disabled**—Default • **Every Day** • **Weekdays** • **Select Days** This option is not set by default.
USB Wake Support	Allows you to enable USB devices to wake the system from standby. • **Enable USB Wake Support** • **Wake on Dell USB-C Dock** This option is not set by default.
Wireless Radio Control	This option if enabled, will sense the connection of the system to a wired network and subsequently disable the selected wireless radios (WLAN and/or WWAN). Upon disconnection from the wired network the selected wireless radio will ne enabled. • **Control WLAN radio** This option is not set by default.
Block Sleep	This option lets you to block entering to sleep in OS environment. This option is not set by default.
Peak Shift	Allows you enable of disable the Peak shift feature. This feature when enabled minimizes the AC power usage at times of peak demand. Battery doesnot charge between the Peak Shift start and end time Peak Shift Start and End Time can be configured for all weekdays This option set the battery threshold value (15 % to 100 %)
Advanced Battery Charge Configuration	This option enables you to maximize the battery health. By enabling this option, your system uses the standard charging algorithm and other techniques, during the non-work hours to improve the battery health. Advanced Battery Charge Mode can be configured for all weekdays
Primary Battery Charge Configuration	Allows you to select the charging mode for the battery. The options are: • **Adaptive**—Default • **Standard** - Fully charges your battery at a standard rate. • **ExpressCharge**- The battery charges over a shorter period of time using Dell's fast charging technology. • **Primarily AC use**

Table 16. Power Management (continued)

Option	Description
	• **Custom** If Custom Charge is selected, you can also configure Custom Charge Start and Custom Charge Stop. **NOTE:** All charging mode may not be available for all the batteries.

Post behavior

Table 17. POST Behavior

Option	Description
Adapter Warnings	Allows you to enable or disable the system setup (BIOS) warning messages when you use certain power adapters. • **Enable Adapter Warnings**—Default
Numlock Enable	Allows you to enable or disable the Numlock function when the system boots. • **Enable Numlock**—Default
Fn Lock Options	Allows you to let hot key combinations Fn + Esc toggle the primary behavior of F1–F12, between their standard and secondary functions. If you disable this option, you cannot toggle dynamically the primary behavior of these keys. • **Fn Lock**—Default Click one of the following options: • **Lock Mode Disable/Standard** • **Lock Mode Enable/Secondary**—Default
Fastboot	Allows you to speed up the boot process by bypassing some of the compatibility steps. Click one of the following options: • **Minimal**—Default • **Thorough** • **Auto**
Extended BIOS POST Time	Allows you to create an additional preboot delay. Click one of the following options: • **0 seconds**—Default • **5 seconds** • **10 seconds**
Full Screen Logo	Allows you to display full screen logo, if your image matches screen resolution. • **Enable Full Screen Logo** This option is not set by default.
Warnings and Errors	Allows you to select different options to either stop, prompt and wait for user input, continue when warnings are detected but pause on errors, or continue when either warnings or errors are detected during the POST process. Click one of the following options: • **Prompt on Warnings and Errors**—Default • **Continue on Warnings** • **Continue on Warnings and Errors**

Table 17. POST Behavior (continued)

Option	Description
Sign of Life Indicator	This option allows system to indicate during the POST that the power button has been acknowledged in a manner the user can either hear or feel. • **Enable Sign of Life Audio Indication** • **Enable Sign of Life Display Indication** • **Enable Sign of Life Keyboard Backlight Indication**

Manageability

Table 18. Manageability

Option	Description
USB Provision	When enabled Intel AMT can be provisioned using the local provisioning file via a USB storage device
MEBx Hotkey	This option specifies whether the MEBx Hotkey function should bee enabled when the system boots.

Virtualization support

Table 19. Virtualization Support

Option	Description
Virtualization	This option specifies whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by the Intel Virtualization technology. • **Enable Intel Virtualization Technology** This option is set by default.
VT for Direct I/O	Enables or disables the Virtual Machine Monitor (VMM) from utilizing the additional hardware capabilities provided by the Intel Virtualization technology for direct I/O. • **Enable VT for Direct I/O** This option is set by default.
Trusted Execution	This option specifies whether a Measured Virtual Machine Monitor (MVMM) can utilize the additional hardware capabilities provided by Intel® Trusted Execution Technology. **NOTE:** The TPM has to be enabled and activated and Virtualization Technology and VT for Direct I/O must be enabled to use this feature.

Wireless options

Table 20. Wireless

Option	Description
Wireless Switch	Allows to set the wireless devices that can be controlled by the wireless switch. The options are: • **WWAN** • **GPS (on WWAN Module)** • **WLAN**

Table 20. Wireless (continued)

Option	Description
	• **Bluetooth®** All the options are enabled by default.
Wireless Device Enable	Allows you to enable or disable the internal wireless devices. The options are: • **WWAN/GPS** • **WLAN** • **Bluetooth®** • **Contactless Smartcard/ NFC** All the options are enabled by default.

Maintenance

Table 21. Maintenance

Option	Description
Service Tag	Displays the service tag of your computer.
Asset Tag	Allows you to create a system asset tag if an asset tag is not already set. This option is not set by default.
BIOS Downgrade	Allows you to flash previous revisions of the system firmware. • **Allow BIOS Downgrade** This option is set by default.
Data Wipe	Allows you to securely erase data from all internal storage devices. • **Wipe on Next Boot** This option is not set by default.
Bios Recovery	**BIOS Recovery from Hard Drive**—This option is set by default. Allows you to recover the corrupted BIOS from a recovery file on the HDD or an external USB key. **BIOS Auto-Recovery**— Allows you to recover the BIOS automatically. **NOTE: BIOS Recovery from Hard Drive** field should be enabled. **Always Perform Integrity Check**—Performs integrity check on every boot.

System logs

Table 22. System Logs

Option	Description
BIOS events	Allows you to view and clear the System Setup (BIOS) POST events.
Thermal Events	Allows you to view and clear the System Setup (Thermal) events.
Power Events	Allows you to view and clear the System Setup (Power) events.

Updating the BIOS

Updating the BIOS in Windows

About this task

CAUTION: If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, see Knowledge Article: https://www.dell.com/support/article/sln153694

Steps

1. Go to www.dell.com/support.
2. Click **Product support**. In the **Search support** box, enter the Service Tag of your computer, and then click **Search**.

   NOTE: If you do not have the Service Tag, use the SupportAssist feature to automatically identify your computer. You can also use the product ID or manually browse for your computer model.

3. Click **Drivers & Downloads**. Expand **Find drivers**.
4. Select the operating system installed on your computer.
5. In the **Category** drop-down list, select **BIOS**.
6. Select the latest version of BIOS, and click **Download** to download the BIOS file for your computer.
7. After the download is complete, browse the folder where you saved the BIOS update file.
8. Double-click the BIOS update file icon and follow the on-screen instructions.
   For more information, see knowledge base article 000124211 at www.dell.com/support.

Updating the BIOS in Linux and Ubuntu

To update the system BIOS on a computer that is installed with Linux or Ubuntu, see the knowledge base article 000131486 at www.dell.com/support.

Updating the BIOS using the USB drive in Windows

About this task

CAUTION: If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, see Knowledge Article: https://www.dell.com/support/article/sln153694

Steps

1. Follow the procedure from step 1 to step 6 in Updating the BIOS in Windows to download the latest BIOS setup program file.
2. Create a bootable USB drive. For more information, see the knowledge base article 000145519 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** .
6. Select the USB drive from the **One Time Boot Menu**.
7. Type the BIOS setup program filename and press **Enter**.
   The **BIOS Update Utility** appears.
8. Follow the on-screen instructions to complete the BIOS update.

Updating the BIOS from the F12 One-Time boot menu

Update your computer BIOS using the BIOS update.exe file that is copied to a FAT32 USB drive and booting from the F12 One-Time boot menu.

About this task

CAUTION: If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, see Knowledge Article: https://www.dell.com/support/article/sln153694

BIOS Update

You can run the BIOS update file from Windows using a bootable USB drive or you can also update the BIOS from the F12 One-Time boot menu on the computer.

Most of the Dell computers built after 2012 have this capability, and you can confirm by booting your computer to the F12 One-Time Boot Menu to see if BIOS FLASH UPDATE is listed as a boot option for your computer. If the option is listed, then the BIOS supports this BIOS update option.

NOTE: Only computers with BIOS Flash Update option in the F12 One-Time boot menu can use this function.

Updating from the One-Time boot menu

To update your BIOS from the F12 One-Time boot menu, you need the following:

- USB drive formatted to the FAT32 file system (key does not have to be bootable)
- BIOS executable file that you downloaded from the Dell Support website and copied to the root of the USB drive
- AC power adapter that is connected to the computer
- Functional computer battery to flash the BIOS

Perform the following steps to perform the BIOS update flash process from the F12 menu:

CAUTION: Do not turn off the computer during the BIOS update process. The computer may not boot if you turn off your computer.

Steps

1. From a turn off state, insert the USB drive where you copied the flash into a USB port of the computer.
2. Turn on the computer and press F12 to access the One-Time Boot Menu, select BIOS Update using the mouse or arrow keys then press Enter.
   The flash BIOS menu is displayed.
3. Click **Flash from file**.
4. Select external USB device.
5. Select the file and double-click the flash target file, and then click **Submit**.
6. Click **Update BIOS**. The computer restarts to flash the BIOS.
7. The computer will restart after the BIOS update is completed.

System and setup password

Table 23. System and setup password

Password type	Description
System password	Password that you must enter to log in to your system.
Setup password	Password that you must enter to access and make changes to the BIOS settings of your computer.

You can create a system password and a setup password to secure your computer.

CAUTION: The password features provide a basic level of security for the data on your computer.

CAUTION: Anyone can access the data that is stored on your computer if it is not locked and left unattended.

NOTE: System and setup password feature is disabled.

Assigning a system setup password

Prerequisites

You can assign a new **System or Admin Password** only when the status is in **Not Set**.

About this task

To enter the system setup, press F12 immediately after a power-on or reboot.

Steps

1. In the **System BIOS** or **System Setup** screen, select **Security** and press Enter.
   The **Security** screen is displayed.
2. Select **System/Admin Password** and create a password in the **Enter the new password** field.
   Use the following guidelines to assign the system password:
   - A password can have up to 32 characters.
   - At least one special character: ! " # $ % & ' ( ) * + , - . / : ; < = > ? @ [\ ] ^ _ ` { | }
   - Numbers 0 through 9.
   - Upper case letters from A to Z.
   - Lower case letters from a to z.
3. Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.
4. Press Esc and save the changes as prompted by the pop-up message.
5. Press Y to save the changes.
   The computer restarts.

Deleting or changing an existing system setup password

Prerequisites

Ensure that the **Password Status** is Unlocked (in the System Setup) before attempting to delete or change the existing System and/or Setup password. You cannot delete or change an existing System or Setup password, if the **Password Status** is Locked.

About this task

To enter the System Setup, press F12 immediately after a power-on or reboot.

Steps

1. In the **System BIOS** or **System Setup** screen, select **System Security** and press Enter.
   The **System Security** screen is displayed.
2. In the **System Security** screen, verify that **Password Status** is **Unlocked**.
3. Select **System Password**, update, or delete the existing system password, and press Enter or Tab.
4. Select **Setup Password**, update, or delete the existing setup password, and press Enter or Tab.

   NOTE: If you change the System and/or Setup password, reenter the new password when prompted. If you delete the System and/or Setup password, confirm the deletion when prompted.
5. Press Esc and a message prompts you to save the changes.
6. Press Y to save the changes and exit from System Setup.
   The computer restarts.

Clearing BIOS (System Setup) and System passwords

About this task

To clear the system or BIOS passwords, contact Dell technical support as described at www.dell.com/contactdell.

NOTE: For information on how to reset Windows or application passwords, refer to the documentation accompanying Windows or your application.

ExpressSign-in

On Dell Latitude systems, the proximity sensor is accessed when the system is ON or in the sleep mode. The valid state of the proximity sensor is **Near**, and **Enable with external monitor**. The proximity feature is automatically disabled while the laptop is in the On state, and the remaining battery of the laptop is less than 30 minutes.

ExpressSign-in behavior in Near state

The following table explains the **Near** state behavior:

NOTE: The **Dell ExpressSign-in** user interface is the proximity sensor feature.

NOTE: In the **ExpressSign-in** window, click **Go** next to the **Setup facial recognition** field to start and setup the **Windows Hello facial sign-in** option.

Table 24. Near state behavior

System state	Description
ON/Standby	Wakes up the system when the user is within the sensor Field of View (FoV) of the system during the ON state and the LED illuminates solid white light or in the standby state. **NOTE:** Sensor does not wake the system from the low power states which is battery life less than 30 minutes. **NOTE:** Sensor does not support wake the system from hibernation and power off state.
Off	Does not wake the system from any of the power states even when the user is within the sensor Field of View (FoV).

ExpressSign-in with the external monitor usage state

You can select **ExpressSign-in enabled while connected to external monitor(s)** to **Yes** to keep the ExpressSign-in function still working even when the external monitor is connected. Select **No** to temporarily disable the ExpressSign-in functionality with the external monitor connected. The following table explains the **External monitor usage state behavior**:

Table 25. External monitor usage state behavior

System state	Description
Yes	If the system is connected to an external monitor, the proximity sensor checks whether the user is within the sensor FoV.
No	This is the default state and the system state remains unchanged even when the user is outside of sensor FoV.

ExpressSign-in user interface in external monitor usage state

When one or more external monitor(s) are connected to the system and **Near** or **Away** state is enabled, the **Dell ExpressSign-in**window is displayed on the primary monitor, and you can select **Yes** or **No** to enable or disable the proximity sensor.

If you select **Yes**, the proximity sensor is enabled. If you select **No**, the proximity sensor is not enabled. if you select the **Do not show again** checkbox, a message that the user must be within the sensor FoV for the features to function properly is not displayed until the option is again enabled manually.

NOTE: If multiple monitors are connected, the **Dell ExpressSign-in** window is displayed only for the first external monitor that is connected to the system and not for the subsequent monitors.

Launch Dell ExpressSign-in/Systray icon

The Dell ExpressSign-in application supports the auto-run feature only when the application stays in the system tray. Once you exit the Dell Proximity Sensor application, you have to re-launch the application and enable the feature manually. You can enable the **Systray** icon to start the **Dell ExpressSign-in** window from the system desktop after Dell Proximity Sensor has been launched.

To start the **Dell ExpressSign-in** , do the following:

1. Click **Windows Settings > System > Power & Sleep > Dell Proximity Sensor > Change PC behavior based on your proximity to the PC** to start the **Dell ExpressSign-in** window.
   NOTE: You can start the **Dell Proximity Sensor** window when the system is ON or in the sleep mode.
2. Click **Change PC Behavior based on your proximity to the PC** that is displayed at the bottom of the **Settings** screen.
3. You can also double-click **Systray** to start the **Dell ExpressSign-in** window.
4. Right-click **Systray** to view the context menu.

   The options in the context menu are:

Table 26. Context menu options

System state	Options
Near and **Away**	• Select **Away** to enable the system lock and turn off the display when you move away from the system. • Deselect **Near** to disable the system lock when you move away from the system.
Enable with external monitor(s)	• Select **Enable with external monitor(s)** to enable the ExpressSign-in. • Deselect **Enable with external monitor(s)** to disable the ExpressSign-in.
Open application	Select to start the ExpressSign-in desktop application.
Quit	Closes the ExpressSign-in desktop application and deletes the **Systray** icon from the system. Restart the ExpressSign-in from the operating system settings page or use the **Search** option to view and start the ExpressSign-in.

Dell ExpressSign-in Field of View (FoV) states

The Field of View (FoV) defines the distance and the angle that the proximity sensor can detect while the proximity feature is enabled. The FoV includes range angle and range distance. Dell recommends the distance between you and the laptop display should be 70cm for optimum performance of the proximity sensor.

Table 27. FoV states

Field name	Description
Range angle	The proximity sensor should function satisfactorily in detecting user presence / absence within a**27°** conical range as defined by the center of the target.

Table 27. FoV states (continued)

Field name	Description
Range distance	The proximity sensor should function satisfactorily in detecting user presence / absence **<100cm** away

Lock timer

The lock timer is the approximate time for **Dell Express Sign-in** to identify that the user is no longer in front of the system or within the FoV. This feature will recognize your physical absence and lock the system.

The lock timer values are 60 seconds (default), 90 seconds, and 120 seconds. If **Away** is set to **OFF**, the Lock timer option is grayed out.

Supported hinge angles

The ExpressSign-in works as configured in a supported four hinge angles for a particular mode. The ExpressSign-in does not change the existing state if you are within the sensor FoV for an unsupported hinge angle. Once the system is in the supported hinge angle, the ExpressSign-in will start to change the state. The supported hinge angles are:

Table 28. Supported hinge angles

System with status	Supported hinge angle	Illustration
Clamshell	60˚ to 150˚	
Stand	210˚ to 300˚	
Tablet	Not supported	

Table 28. Supported hinge angles (continued)

System with status	Supported hinge angle	Illustration
Tent	Not supported	

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Troubleshooting

Topics:

- Handling swollen Lithium-ion batteries
- Enhanced Pre-Boot System Assessment (ePSA) diagnostics
- Built-in self-test (BIST)
- System diagnostic lights
- Recovering the operating system
- Real-Time Clock (RTC Reset)
- Backup media and recovery options
- WiFi power cycle
- Drain residual flea power (perform hard reset)

Handling swollen Lithium-ion batteries

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

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

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

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

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

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

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

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.

Built-in self-test (BIST)

M-BIST

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

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

How to run M-BIST

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

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

Table 29. LED error codes

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

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

LCD Power rail test (L-BIST)

L-BIST is an enhancement to the single LED error code diagnostics and is automatically initiated during POST. L-BIST will check the LCD power rail. If there is no power being supplied to the LCD (i.e., the L-BIST circuit fails), the battery status LED will flash either an error code [2,8] or an error code [2,7].

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

How to invoke L-BIST Test:

1. Press the power button to start the system.
2. If the system does not start up normally, look at the battery status LED:
   - If the battery status LED flashes an error code [2,7], the display cable may not be connected properly.
   - If the battery status LED flashes an error code [2,8], there is a failure on the LCD power rail of the system board, hence there is no power supplied to the LCD.
3. For cases, when a [2,7] error code is shown, check to see if the display cable is properly connected.
4. For cases when a [2,8] error code is shown, replace the system board.

LCD Built-in Self Test (BIST)

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

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

How to invoke LCD BIST Test

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

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

System diagnostic lights

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 30. 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
2,8	LCD power rail failure. Replace system board
3,1	Coin-cell battery failure
3,2	PCI, video card/chip failure
3,3	Recovery image not found
3,4	Recovery image found but invalid
3,5	Power-rail failure
3,6	System BIOS Flash incomplete
3,7	Management Engine (ME) error

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

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

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

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

Recovering the operating system

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

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

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

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

Real-Time Clock (RTC Reset)

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

Start the RTC reset with the system powered off and connected to AC power. Press and hold the power button for thirty (30) seconds. The system RTC Reset occurs after you release the power button.

Backup media and recovery options

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

WiFi power cycle

About this task

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

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

Steps

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

Drain residual flea power (perform hard reset)

About this task

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

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

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

To drain residual flea power (perform a hard reset)

Steps

1. Turn off your computer.
2. Disconnect the power adapter from your computer.
3. Remove the base cover.
4. Remove the battery.
5. Press and hold the power button for 20 seconds to drain the flea power.
6. Install the battery.
7. Install the base cover.
8. Connect the power adapter to your computer.
9. Turn on your computer.

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

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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.