

# Dell Latitude 5400 Chrome

## Service Manual



## Notes, cautions, and warnings

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

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

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

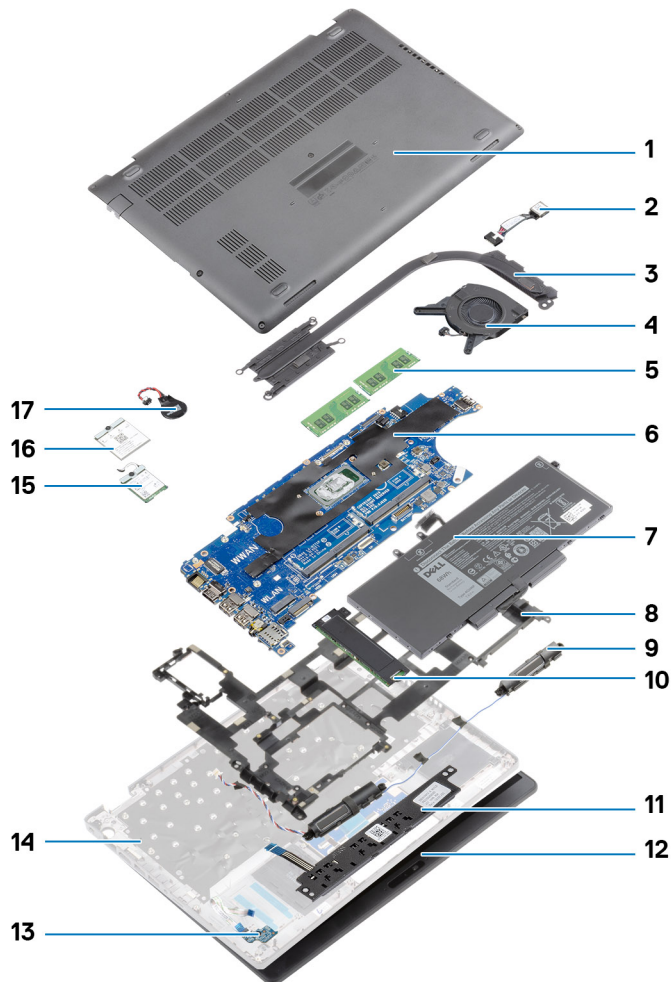
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# Major components of your system

This section illustrates the major components of your system and their locations.



1. Base cover
2. DC-in port
3. Heatsink assembly
4. System fan
5. Memory modules
6. System board
7. Battery
8. Inner frame
9. Speakers
10. Solid state drive
11. Touchpad buttons
12. Display assembly
13. LED board
14. Palmrest assembly
15. WLAN card
16. WWAN card

17. Coin-cell battery

 **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.

# Working on your computer

## Topics:

- [Safety instructions](#)


## Safety instructions

### Prerequisites


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


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


### About this task


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

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

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

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

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

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

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

## Before working inside your computer

### About this task

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

### Steps

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

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

5. Disconnect your computer and all attached devices from their electrical outlets.
6. Press and hold the power button while the computer is unplugged to ground the system board.

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

## Safety precautions

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

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

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

## Standby power

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

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

## Bonding

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

## Electrostatic discharge—ESD protection

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

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

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

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

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

Perform the following steps to prevent ESD damage:

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

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

## ESD field service kit

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

## Components of an ESD field service kit

The components of an ESD field service kit are:

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

## ESD protection summary

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

# Transporting sensitive components

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

## Lifting equipment

Adhere to the following guidelines when lifting heavy weight equipment:

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

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

## After working inside your computer

### About this task

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

### Steps

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

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

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

# Removing and installing components

## Topics:

- [Recommended tools](#)
- [Screw List](#)
- [Disassembly and reassembly](#)

## Recommended tools



The procedures in this document require the following tools:

- Phillips #0 screwdriver
- Phillips #1 screwdriver
- Plastic scribe: Recommended for field technicians.

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










## Screw List

This table shows the screw list and the images for the Dell Latitude 5300 2-in-1 Chrome , for different components.

**Table 1. Screw Size List**

Component	Screw type	Quantity	Image
Base cover	M2.5x6.5 (captive screws) <b>NOTE:</b> Screws are part of the base cover.	8	
Battery	M2x5 (captive screws)	2	
WWAN	M2x3	1	
WLAN	M2x2	1	
SSD support bracket	M2x3	2	
SSD	M2x2 (big head)	1	
LED board	M2x2.5 (big head)	1	

**Table 1. Screw Size List (continued)**

Component	Screw type	Quantity	Image
Fan	M2x5	2	
eDP bracket	M2x4	1	
Display assembly	M2.5x4	4	
Touchpad button board	M2x3	2	
Power adapter port bracket	M2x4	2	
Memory module frame	M2x3	3	
System board	M2.5x4	2	
Keyboard support bracket	M2x2	19	
Keyboard	M2x2	5	

## Disassembly and reassembly

### MicroSD card

#### Removing the microSD card

##### Prerequisites

1. Follow the procedure in Before working inside your computer.

##### Steps

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

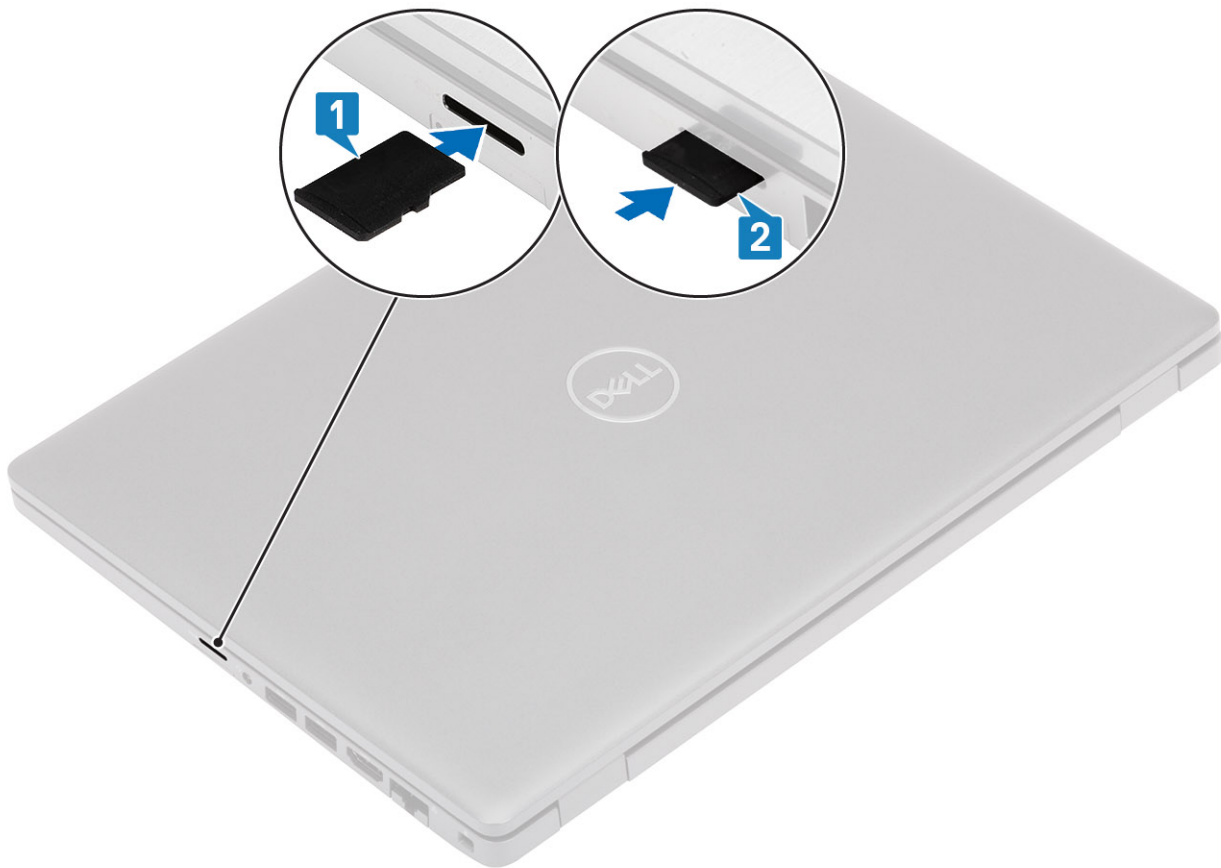




## Installing the microSD card

### Steps

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



3. Follow the procedures in [After working inside your computer](#).

## Base cover

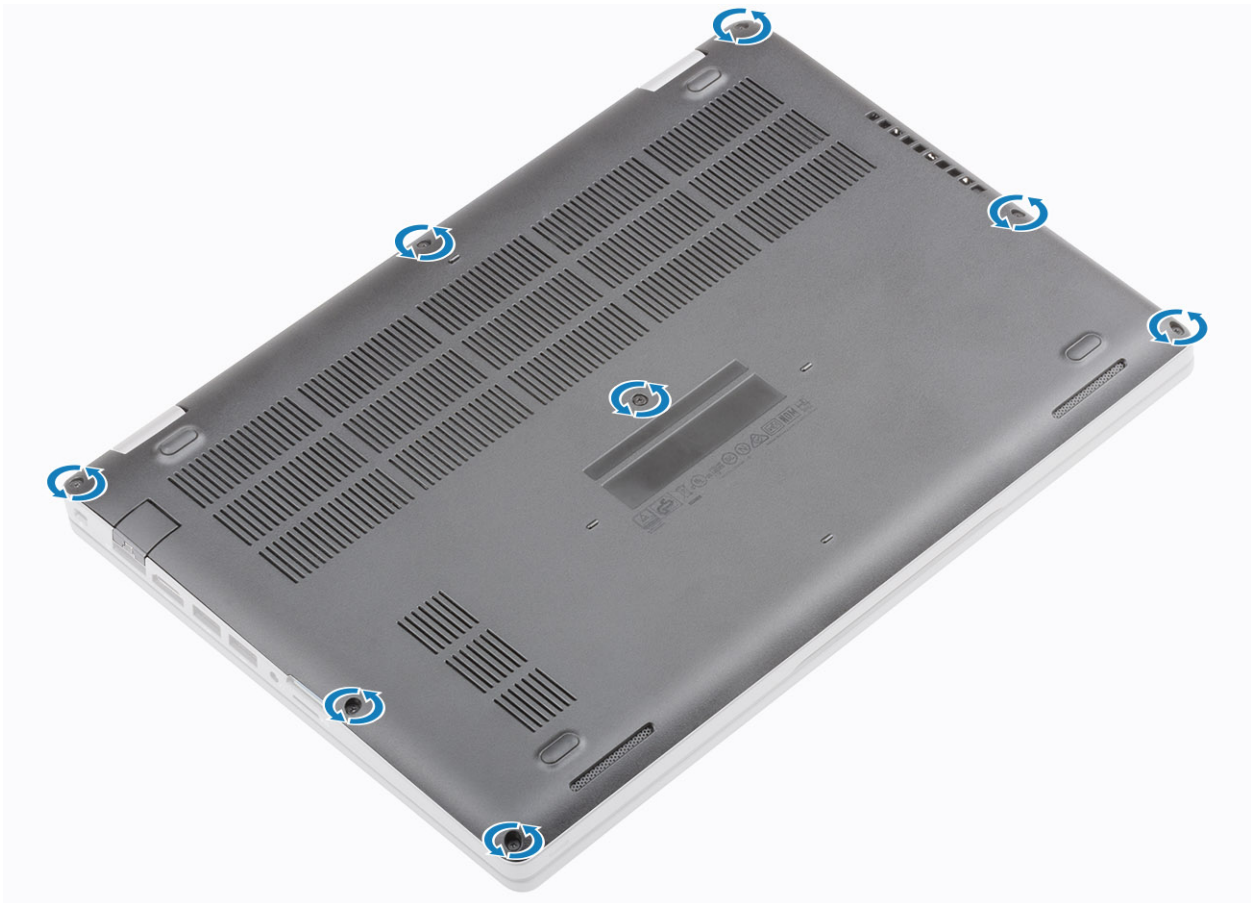
### Removing the base cover

#### Prerequisites

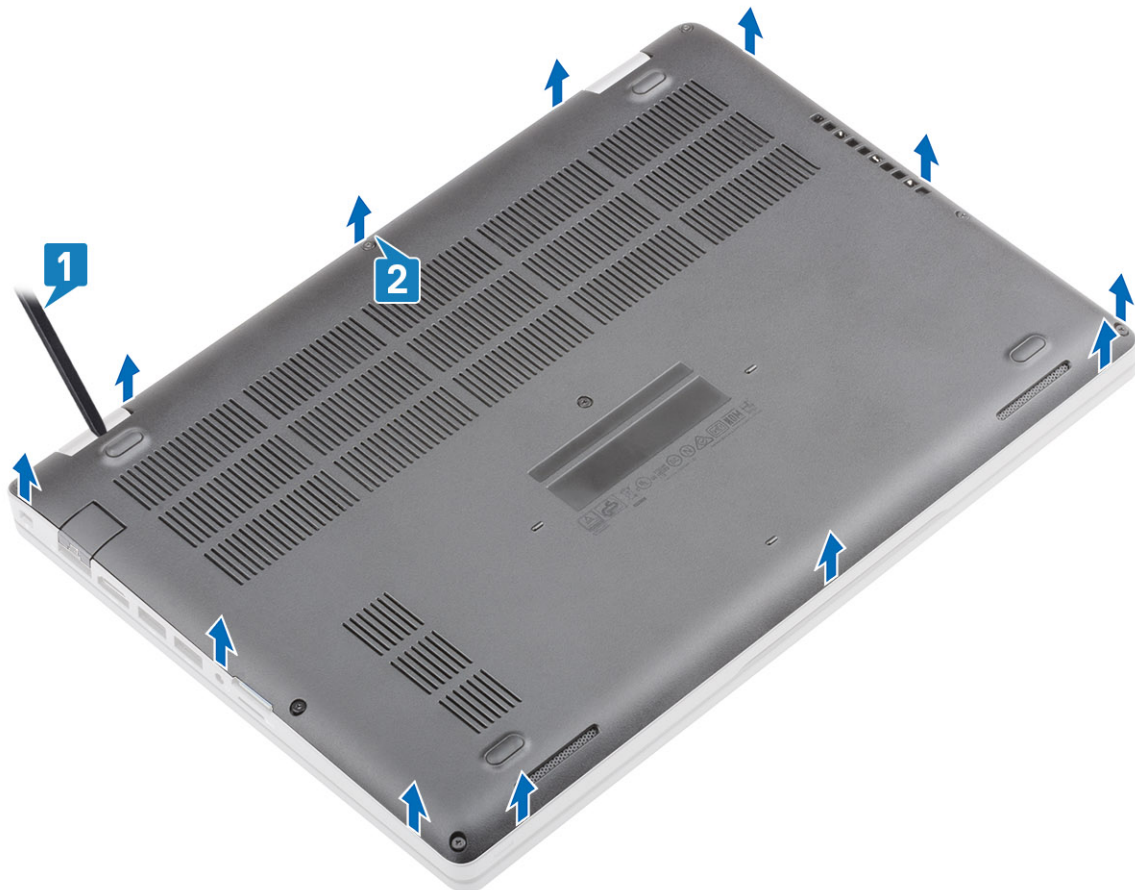
1. Follow the procedure in [before working with your computer](#).
2. Remove the [microSD card](#).

#### Steps

1. Loosen the eight captive screws [1].



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



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



## Installing the base cover

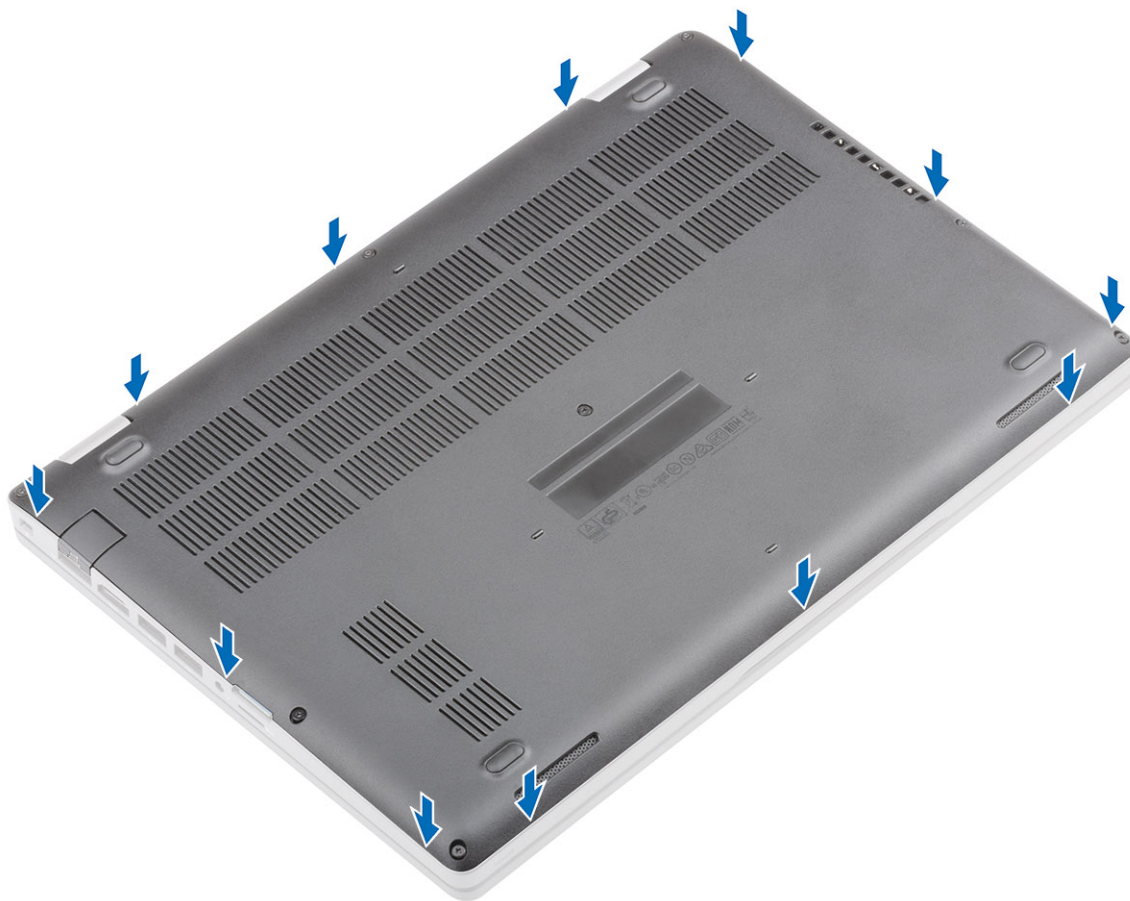
### Steps

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

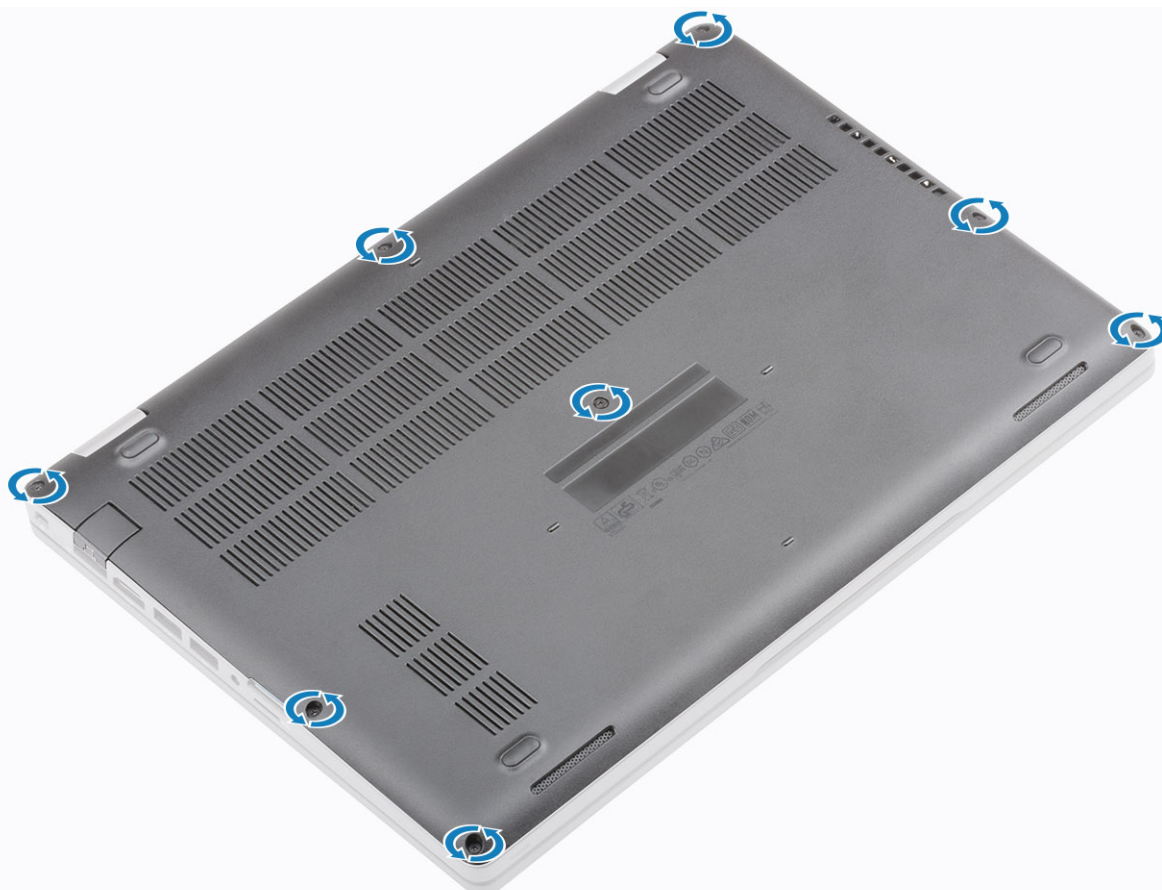


2. Press the edges and sides of the base cover until it snaps into place.





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



### Next steps

1. Install the [microSD card](#).
2. Follow the procedure in [After working on your computer](#).

## Battery

### Lithium-ion battery precautions

#### CAUTION:

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

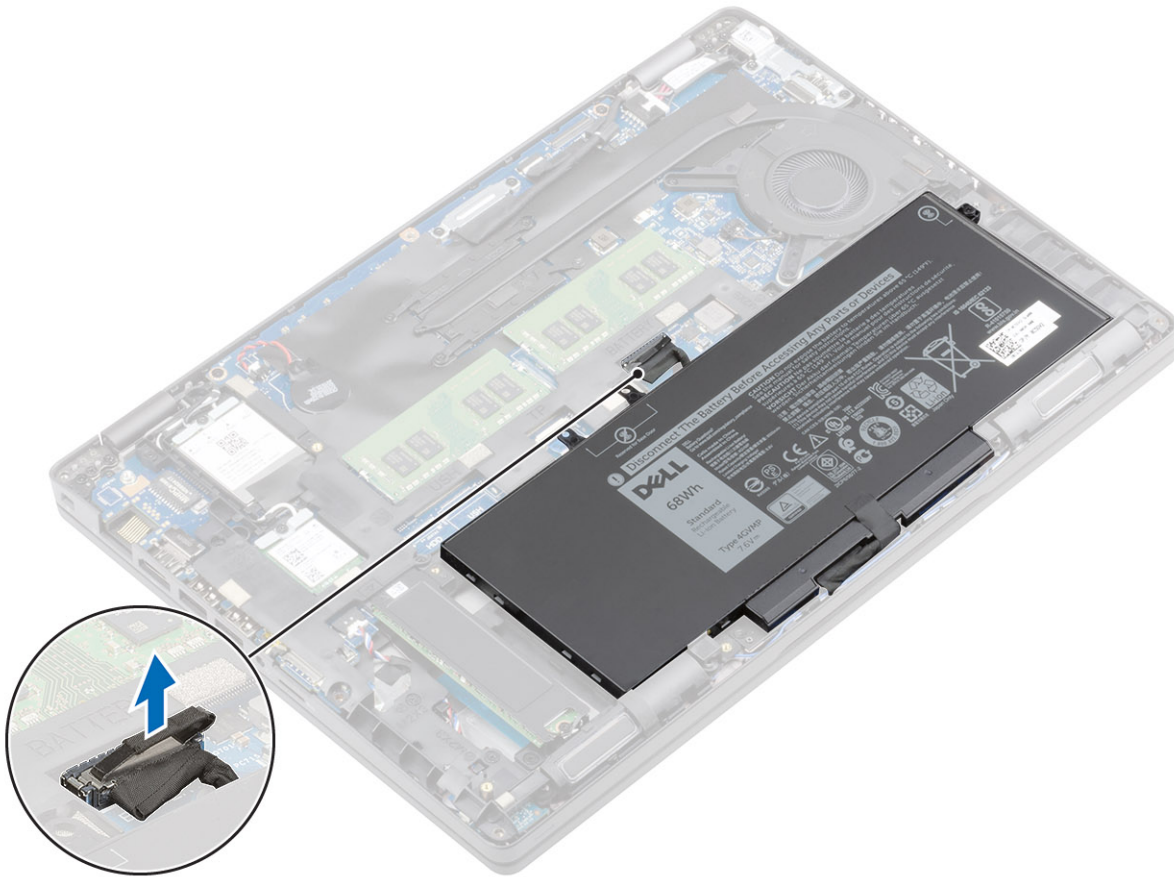
### Removing the battery

#### Prerequisites

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

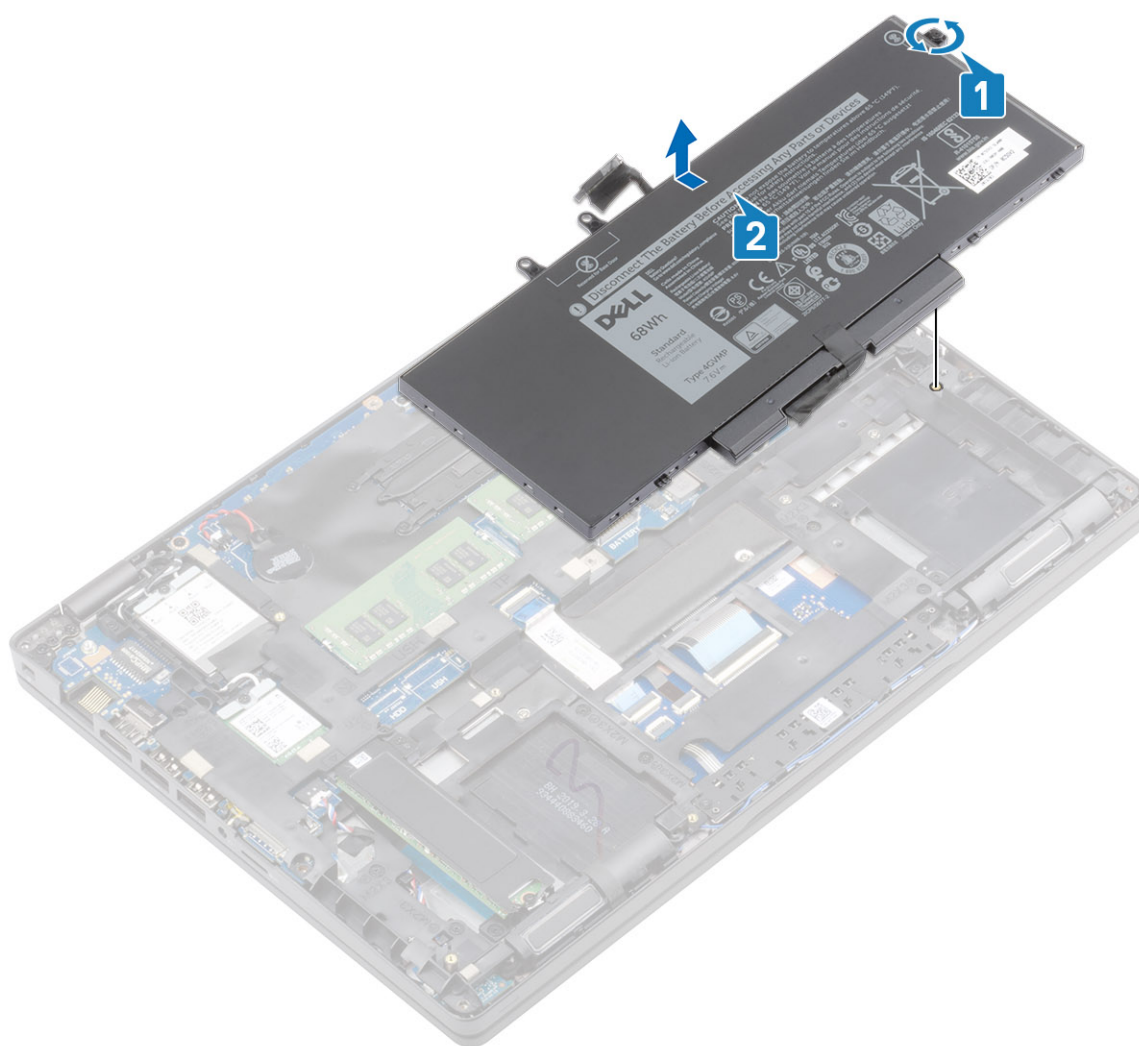
#### Steps

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



3. Loosen the single captive screw that secures the battery to the palmrest [1]. Slide the battery inward and lift the battery away from the palmrest.

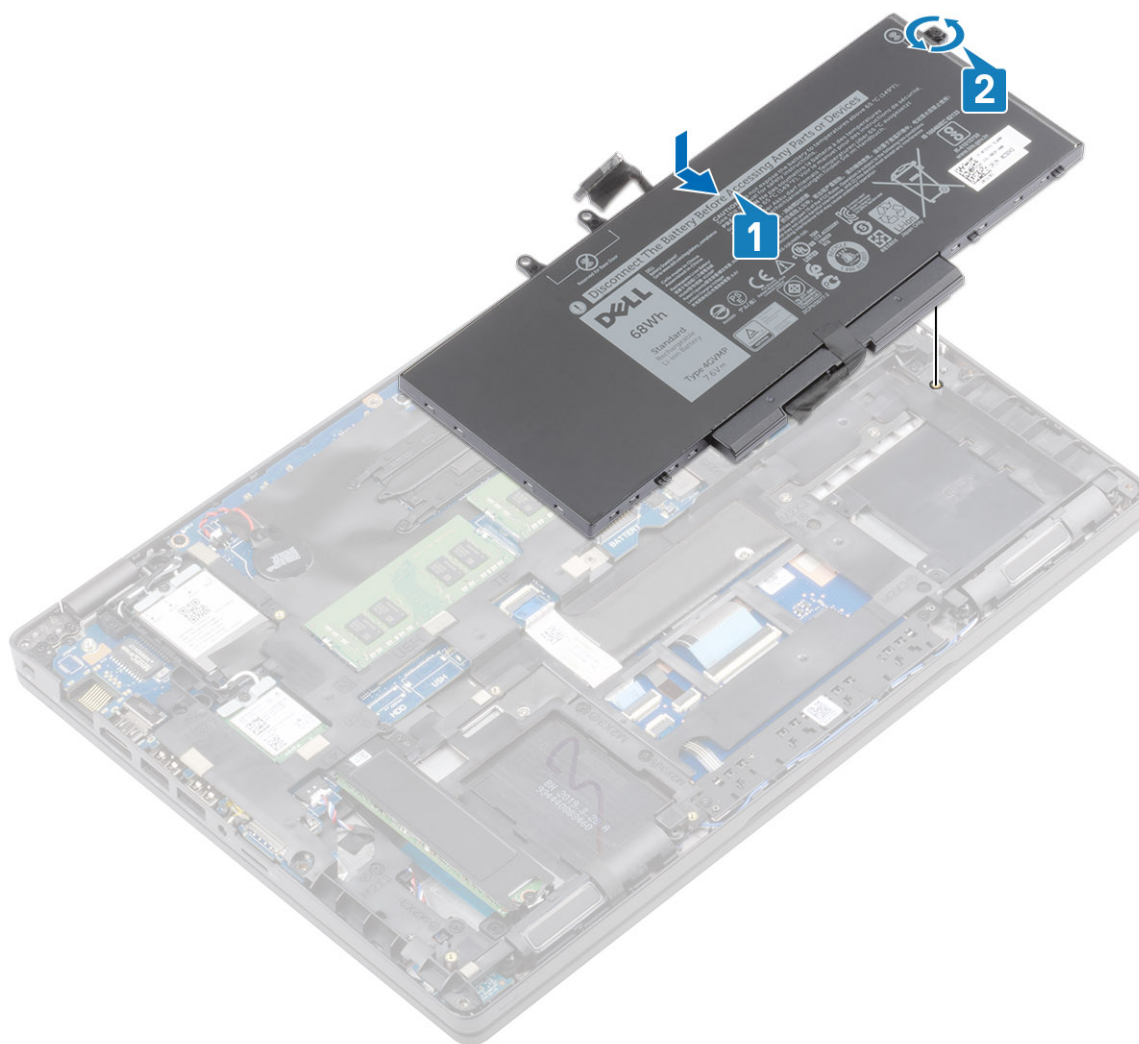




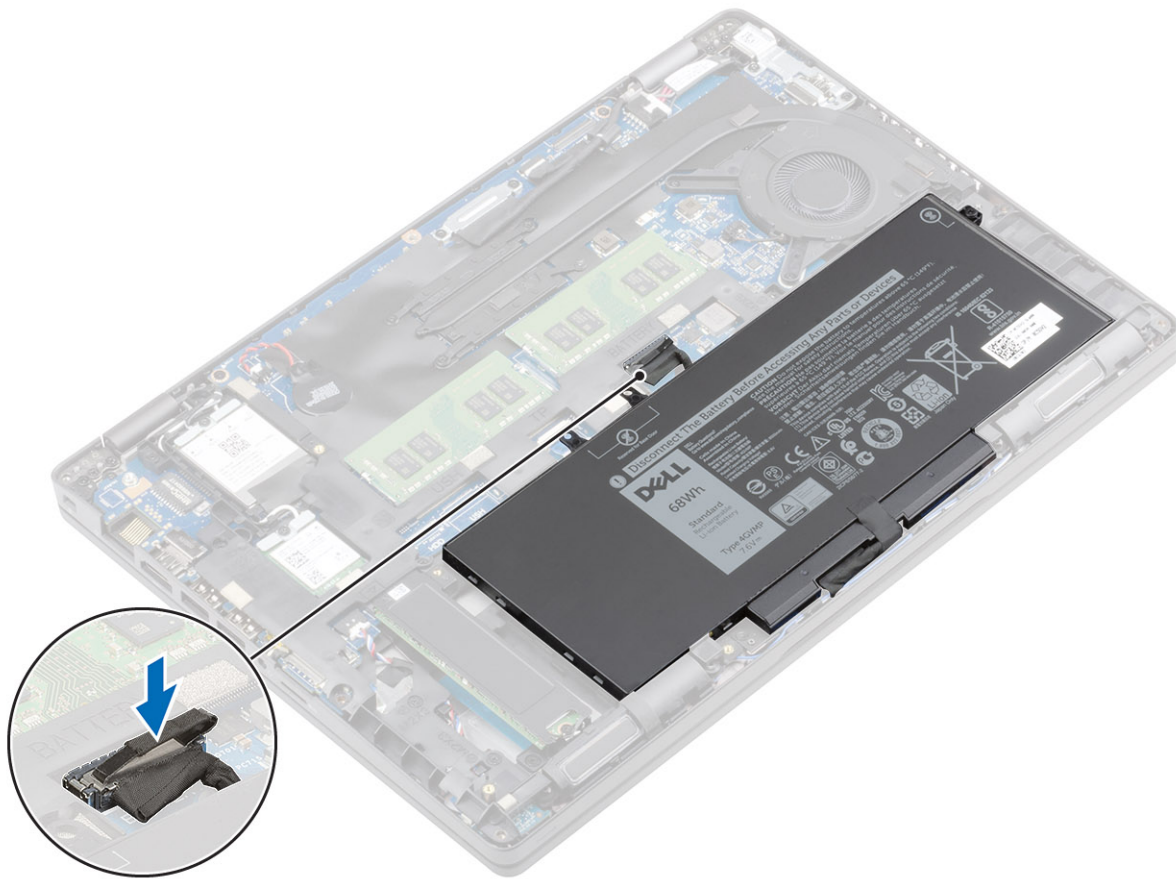
## Installing the battery

### Steps

1. Align and slide the battery on the palmrest [1].
2. Tighten the single captive screw to secure the battery to the palmrest [2].



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



### Next steps

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

## WLAN card

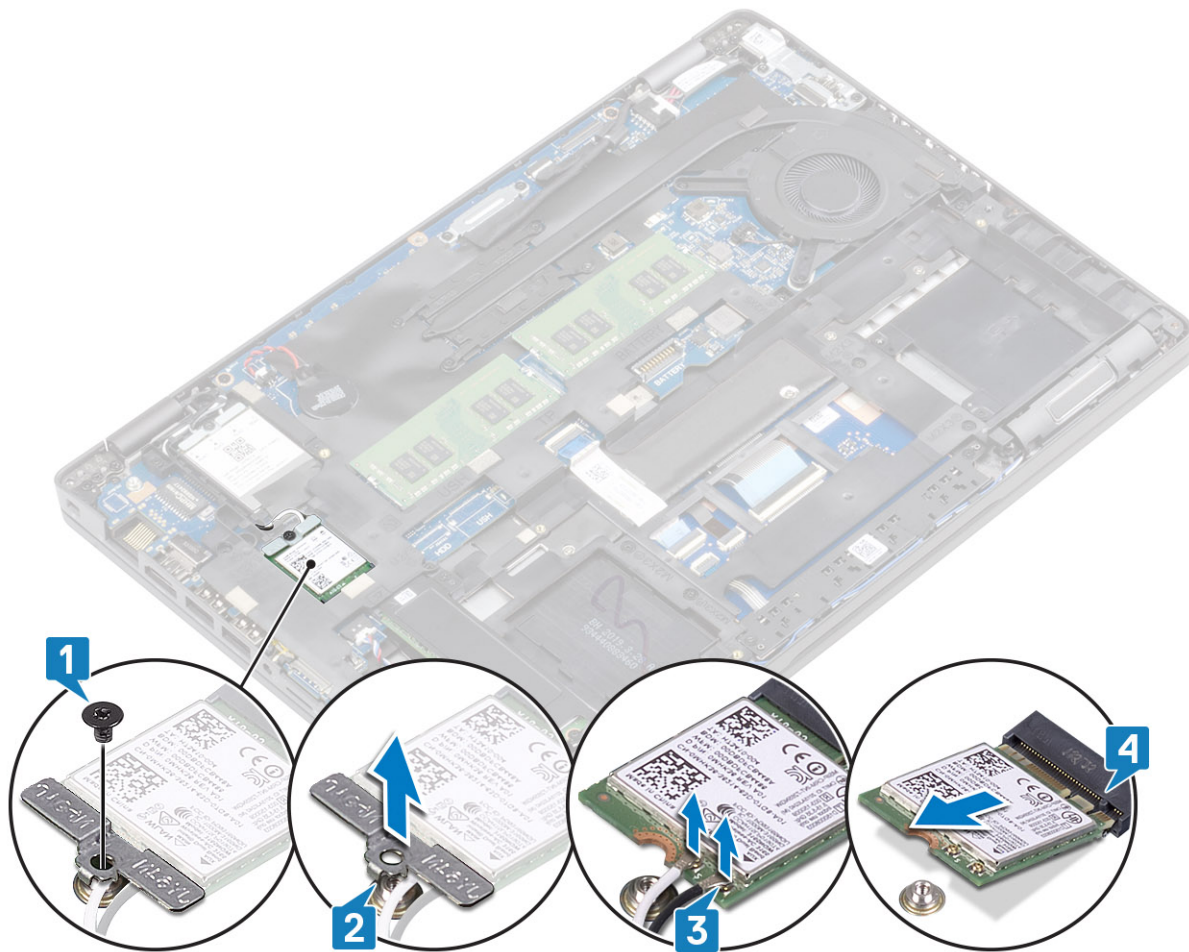
### Removing the WLAN card

#### Prerequisites

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

#### Steps

1. Remove the single (M2x3)(M2x3) screw that secures the WLAN card bracket to the system board [1].
2. Remove the WLAN card bracket that secures the WLAN antenna cables [2].
3. Disconnect the WLAN antenna cables from the connectors on the WLAN card [3].
4. Slide and lift the WLAN card away from the connector on the system board [4].



WLAN card

Remove

## Installing the WLAN card

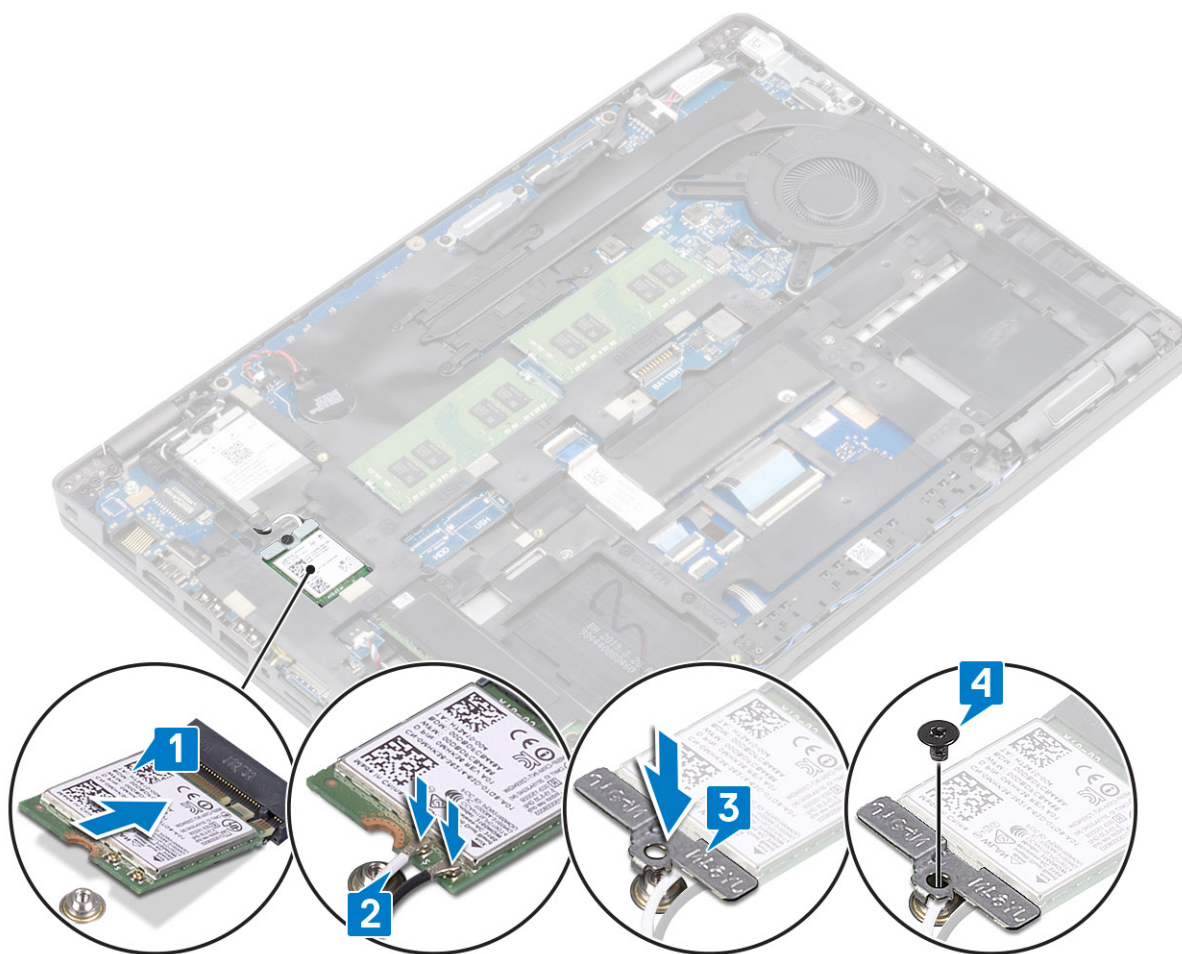
### About this task

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

### Steps

1. Insert the WLAN card into the connector on the system board [1].
2. Connect the WLAN antenna cables to the connectors on the WLAN card [2].
3. Place the WLAN card bracket to secure the WLAN antenna cables to the WLAN card [3].
4. Replace the single (M2x3) screw to secure the WLAN card bracket to the WLAN card [4].





### Next steps

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

## WWAN card

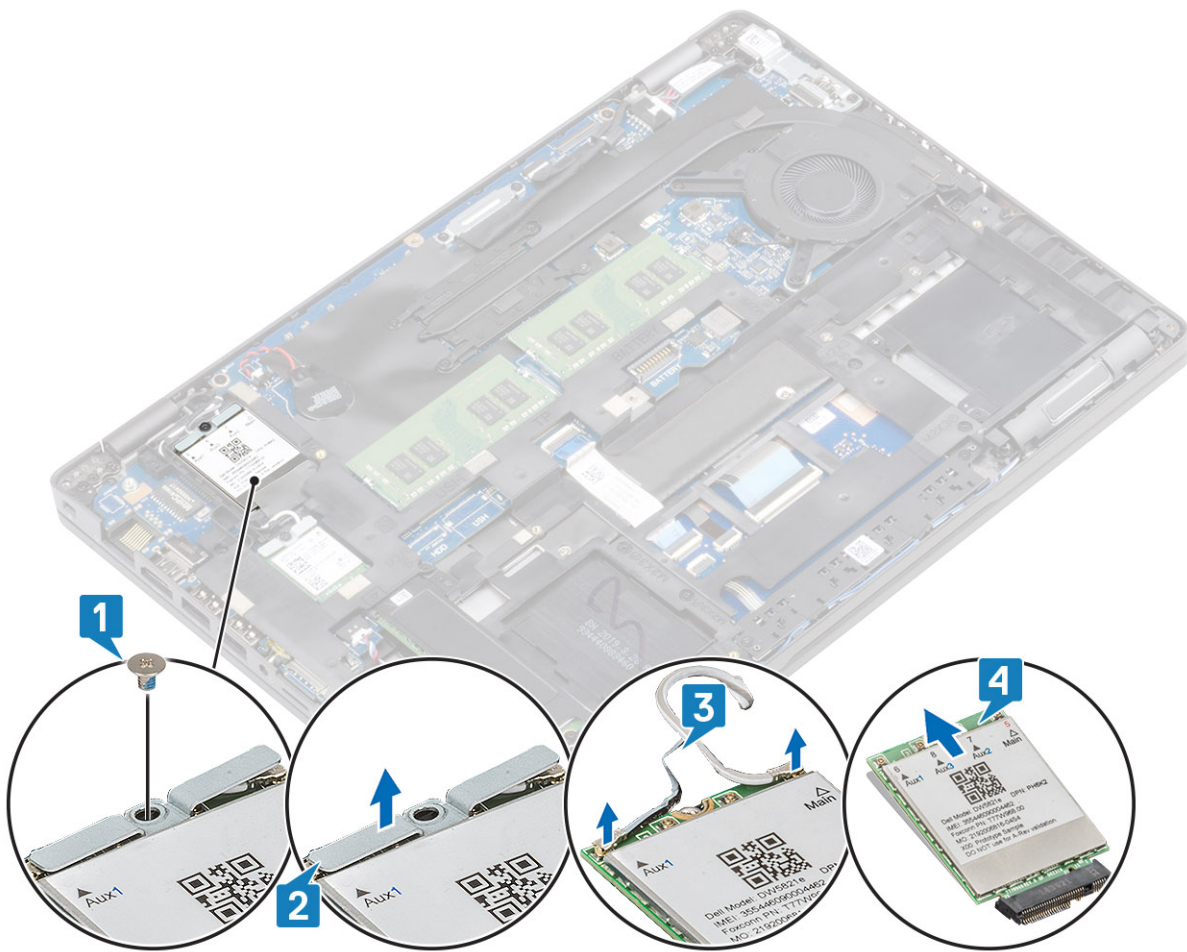
### Removing the WWAN card

#### Prerequisites

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

#### Steps

1. Remove the single (M2x3) screw that secures the WWAN card bracket to the system board [1].
2. Remove the WWAN card bracket that secures the WWAN antenna cables [2].
3. Disconnect the WWAN antenna cables from the connectors on the WWAN card [3].
4. Slide and lift the WWAN card away from the connector on the system board [4].



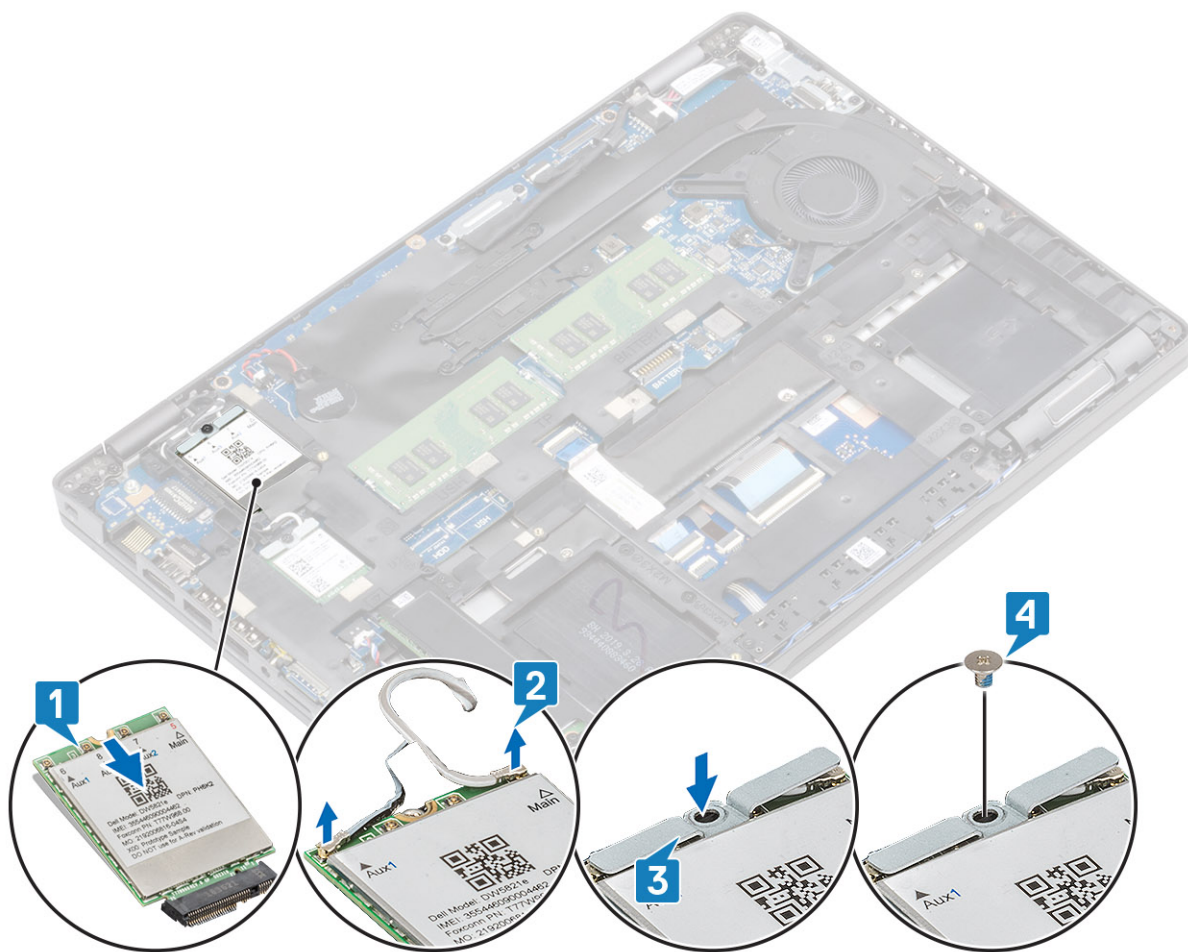
## Installing the WWAN card

### About this task

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

### Steps

1. Insert the WWAN card into the connector on the system board [1].
2. Connect the WWAN antenna cables to the connectors on the WWAN card [2].
3. Place the WWAN card bracket to secure the WWAN antenna cables to the WWAN card [3].
4. Replace the single (M2x3) screw to secure the WWAN card bracket to the WWAN card [4].



### Next steps

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

## Coin-cell battery

### Removing the coin-cell battery

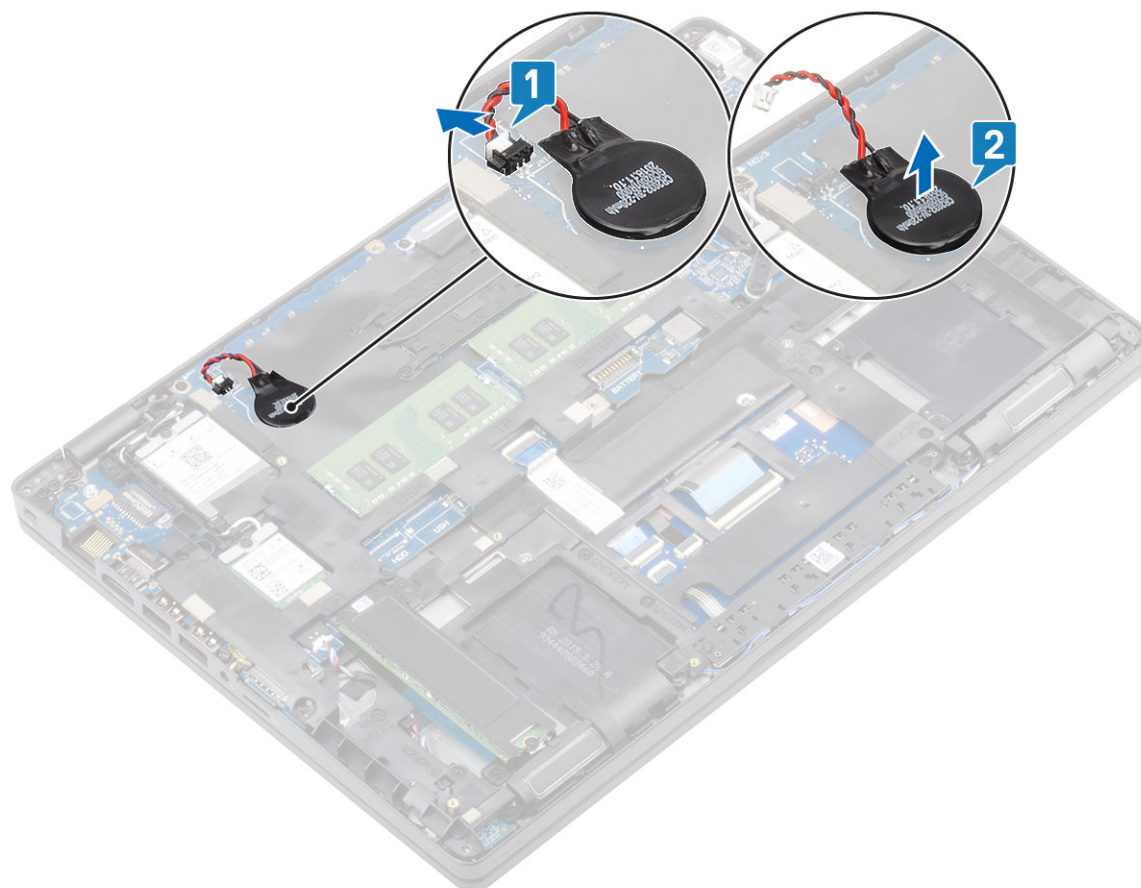
#### Prerequisites

1. Follow the procedure in [before working with your computer](#).
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [WWAN](#).
6. Remove the [WLAN](#).
7. Remove the [memory module](#).
8. Remove the [DC-in port](#).

#### Steps

1. Turn the system board and disconnect the coin cell battery cable from the connector on the system board.
2. Disconnect the coin cell battery cable from the connector on the system board [1].

3. Lift the coin cell battery from the system board [2].

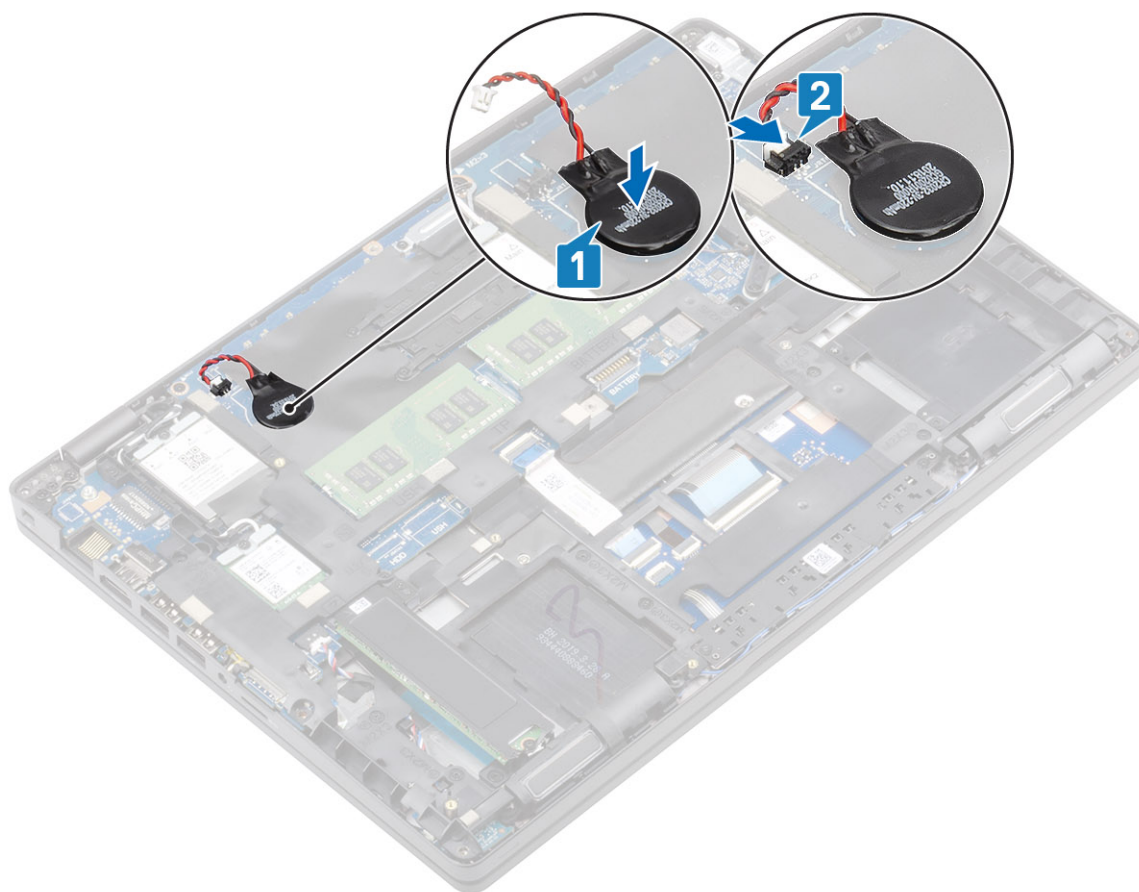


## Installing the coin-cell battery

### Steps

1. Turn the system board and connect the coin cell battery cable to the connector on the system board.
2. Place the coin cell on the system board [1].
3. Connect the coin cell battery cable to the connector on the system board [2].





### Next steps

1. Install the [DC-in](#).
2. Install the [memory module](#).
3. Install the [WLAN](#).
4. Install the [WWAN](#).
5. Install the [battery](#).
6. Install the [base cover](#).
7. Install the [microSD card](#).
8. Follow the procedure in [After working on your computer](#).

## Memory modules

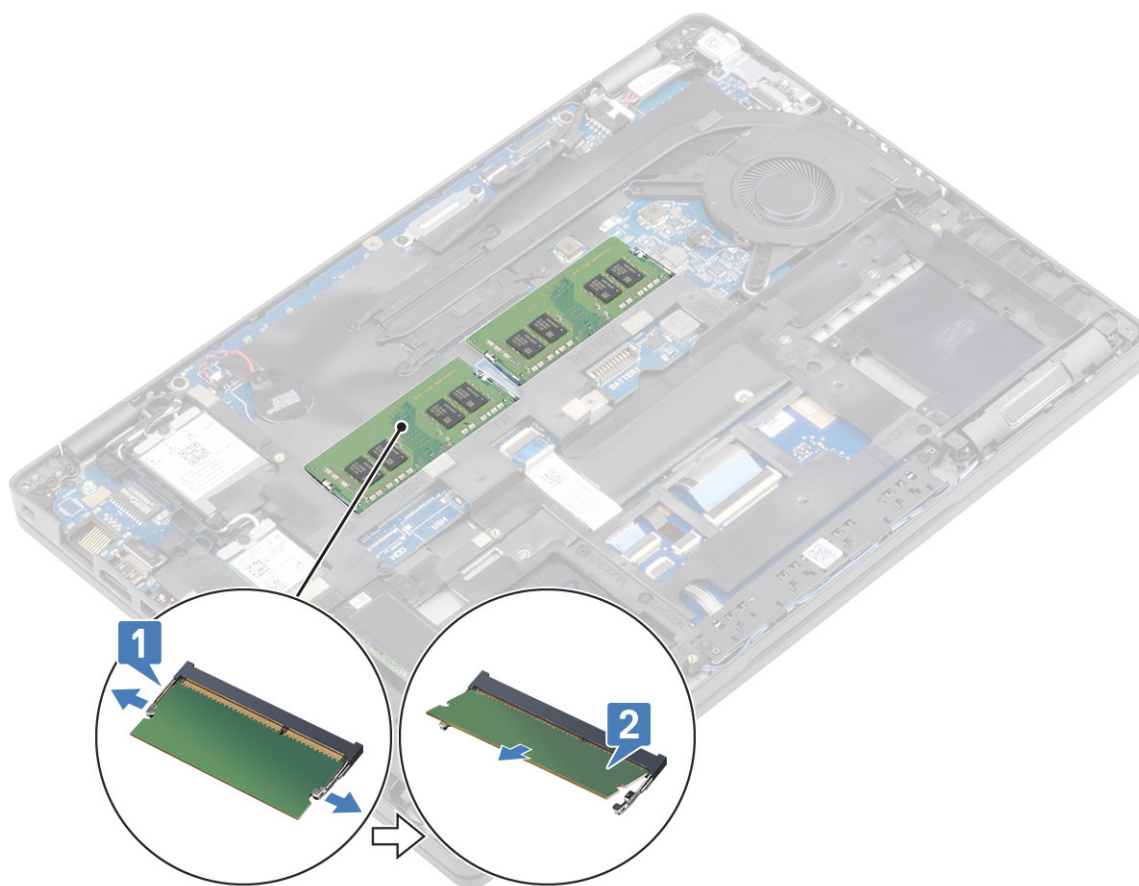
### Removing the memory module

#### Prerequisites

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

#### Steps

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

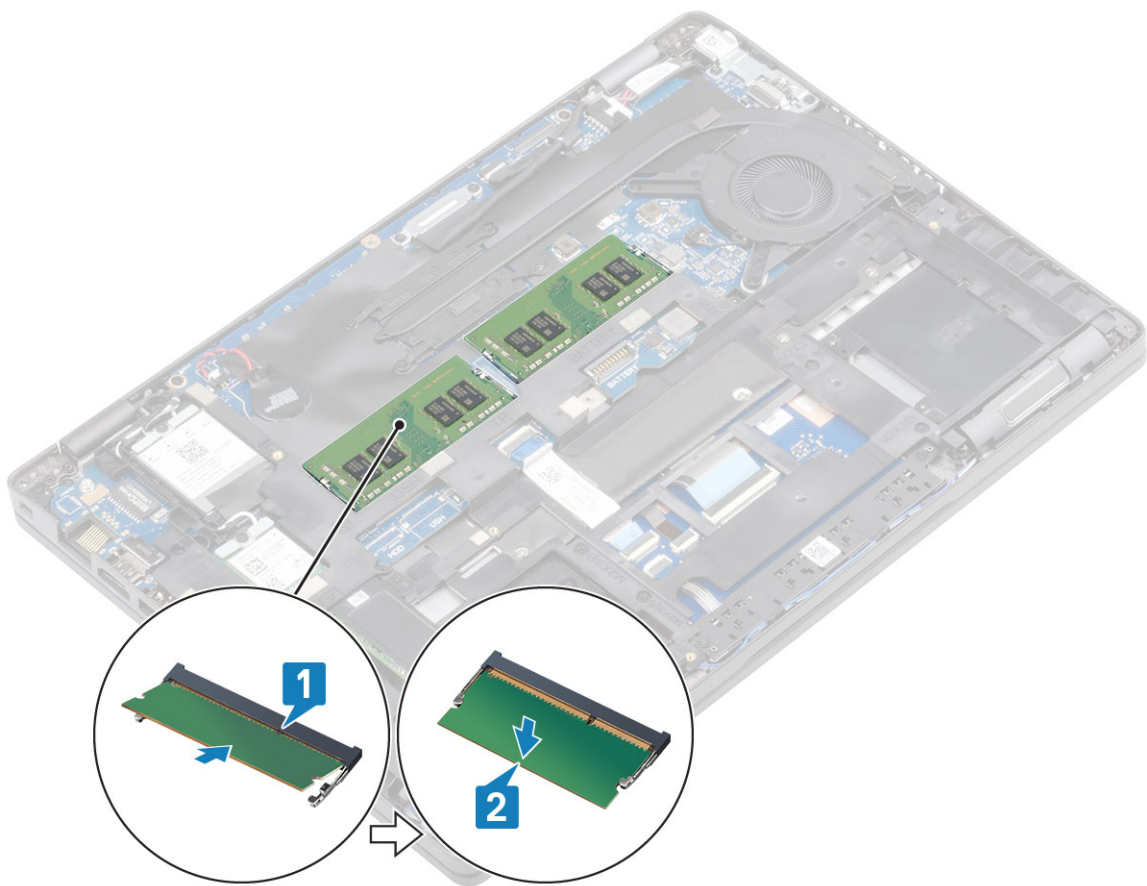


## Installing the memory module

### Steps

1. Align the notch on the memory module with the tab on the memory-module slot.
2. Slide the memory module firmly into the slot at an angle [1].
3. Press the memory module down until the clips secure it [2].

**i** **NOTE:** If you do not hear the click, remove the memory module and reinstall it.



#### Next steps

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

## DC-in port

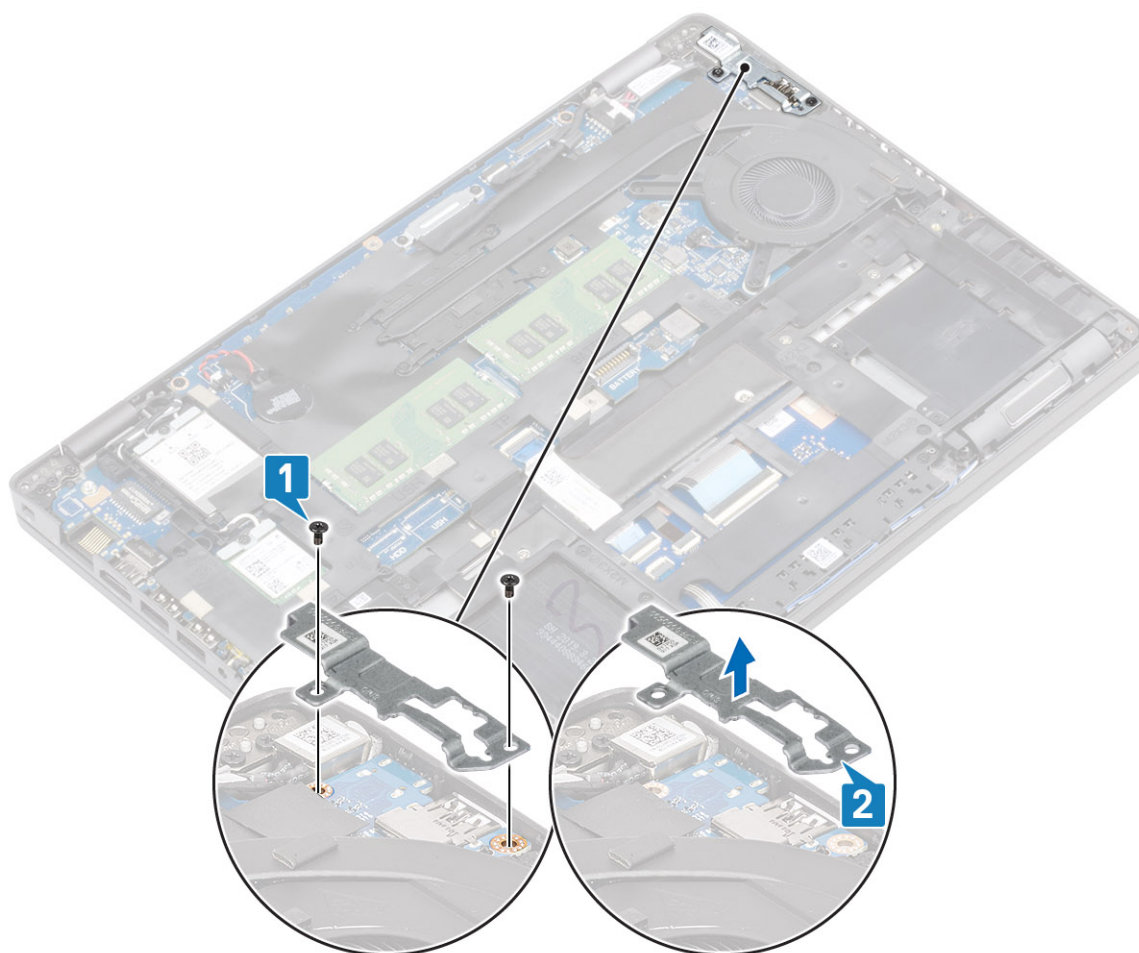
### Removing the DC-in port

#### Prerequisites

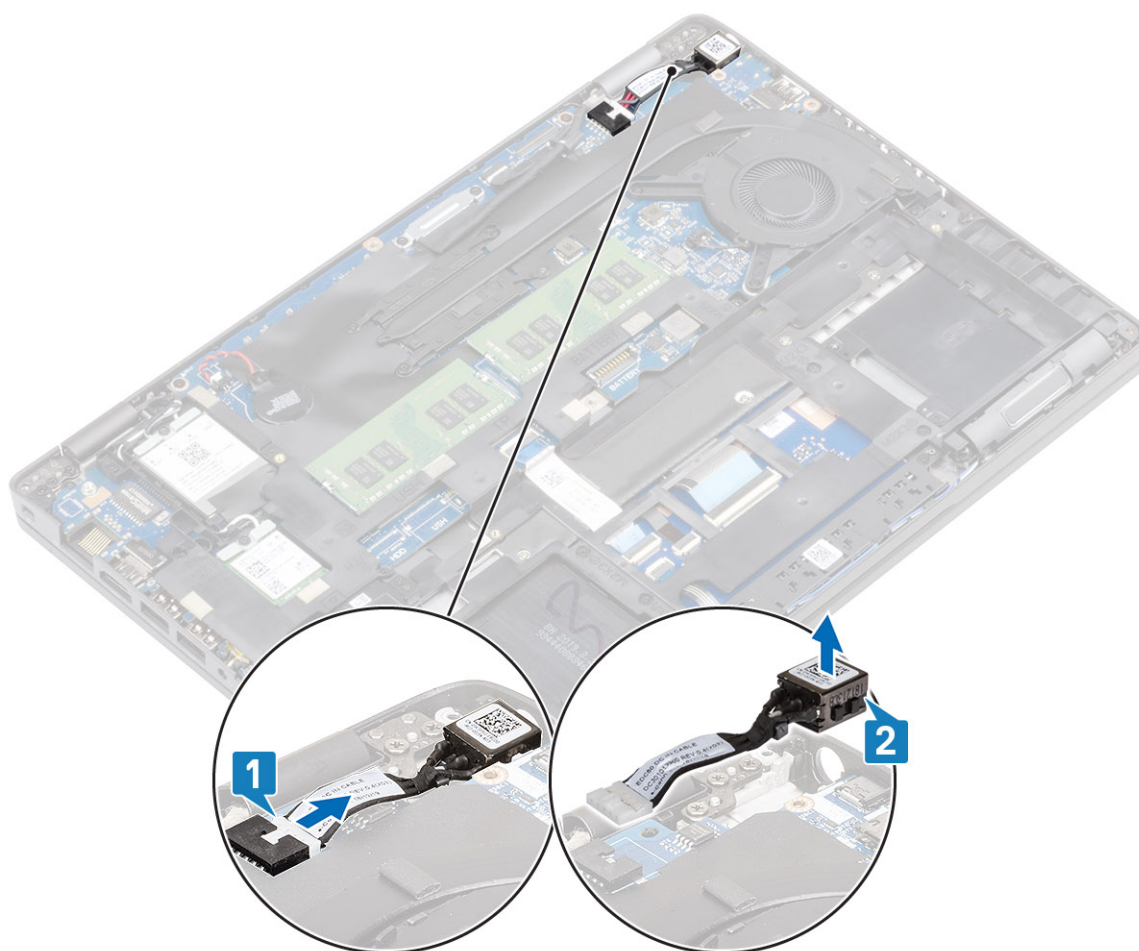
1. Follow the procedure in [before working with your computer](#).
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).

#### Steps

1. Remove the two (M2x4) and (M2x5) screws that secure the Type-C bracket to the system board [1]. Lift the Type-C bracket away from the computer [2].



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

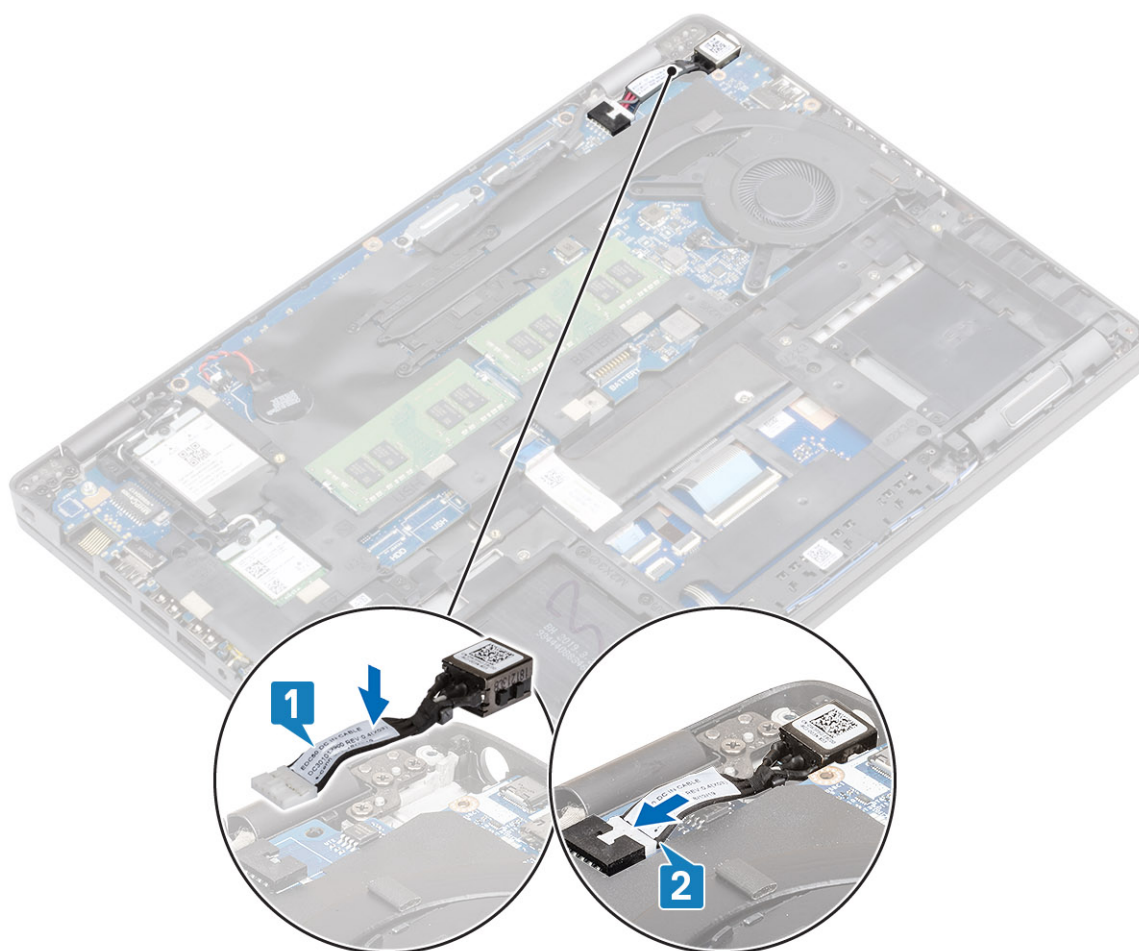


## Installing the DC-in port

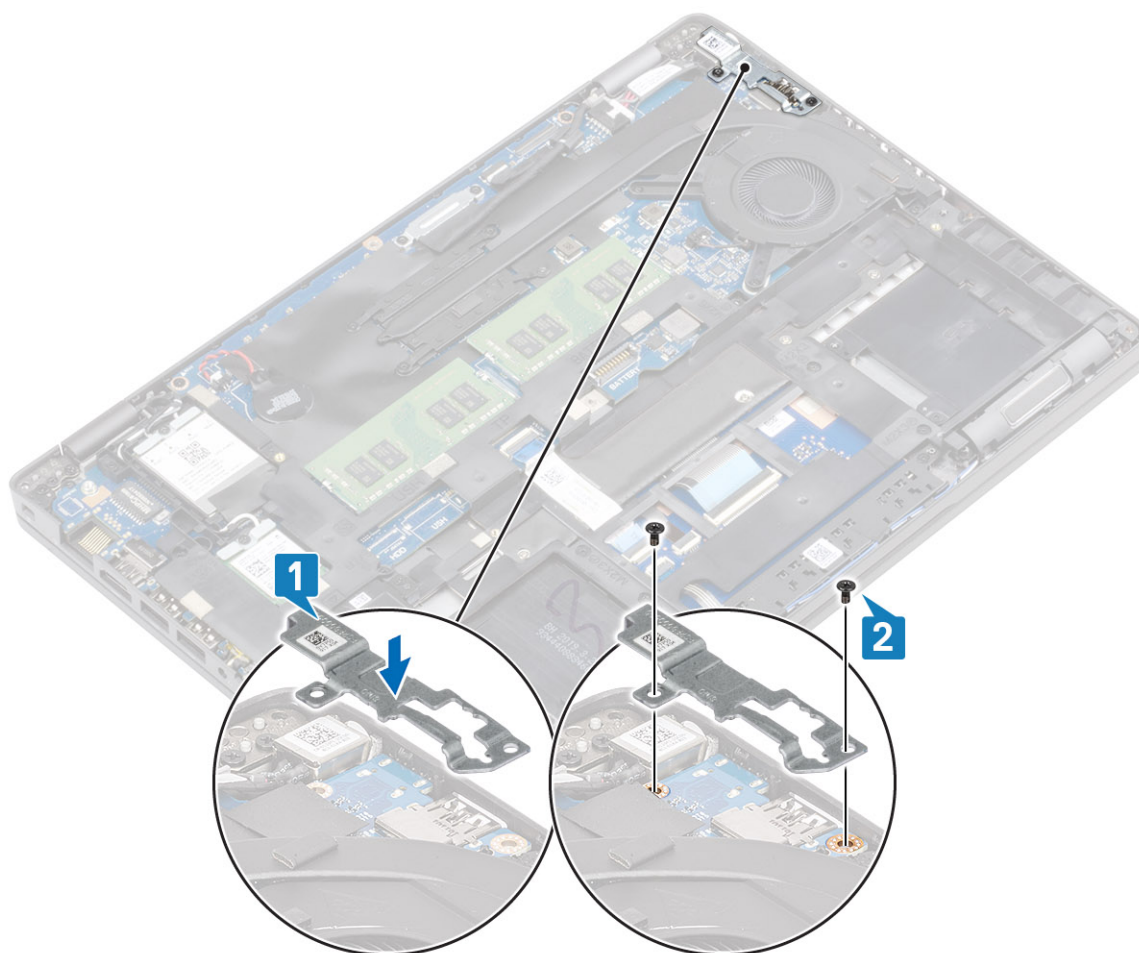
### Steps

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





3. Place the Type-C bracket on its slot on the computer [1].
4. Replace the two (M2x4) and (M2x5) screws to secure the Type-C bracket to the palmrest [2].



### Next steps

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

## Solid-state drive

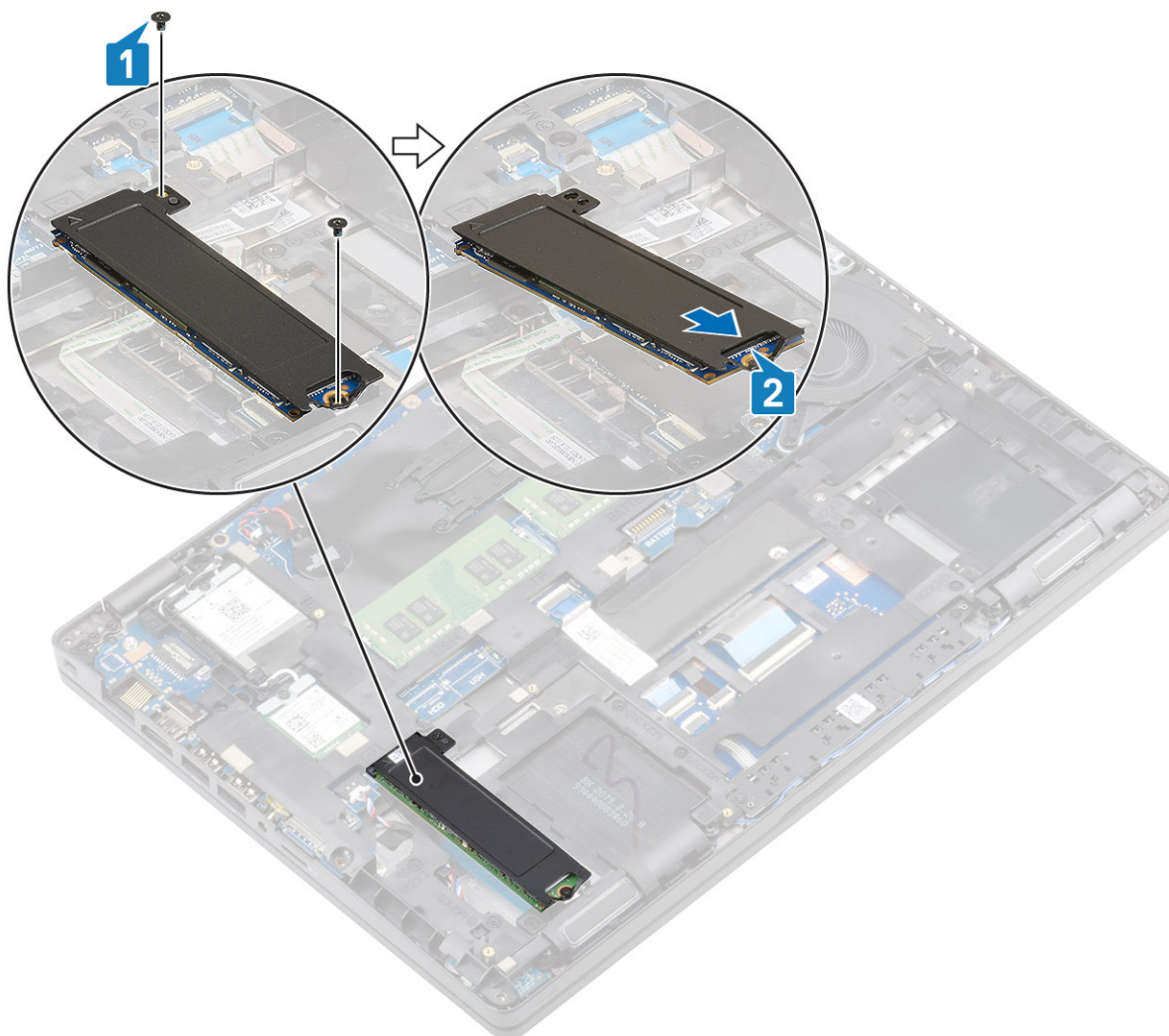
### Removing the M.2 SSD

#### Prerequisites

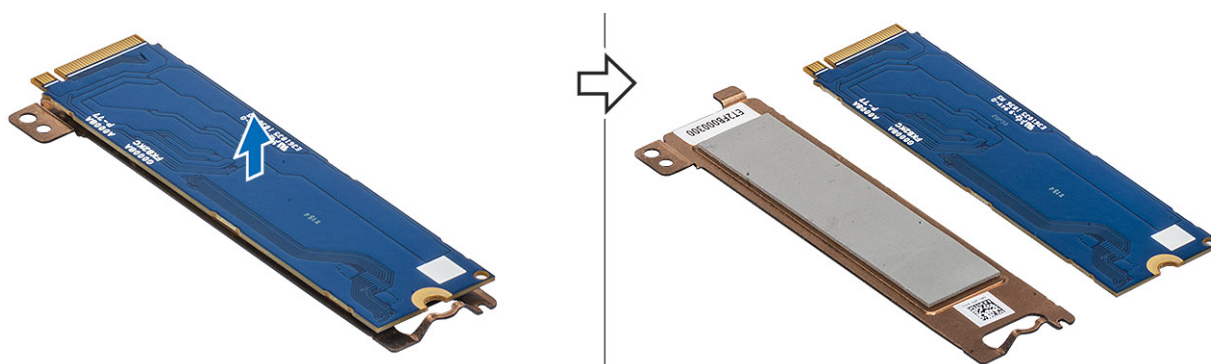
1. Follow the procedure in [before working with your computer](#).
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).

#### Steps

1. Remove the two (M2x3) screws that secures the SSD to the palmrest [1].
2. Slightly turn and remove the SSD support bracket from the M.2 SSD slot [2]. Remove the single (M2x2) screw that secures the M.2 SSD to the palmrest [1].



3. Lift the M.2 SSD away from the computer and remove the SSD of the SSD thermal plate

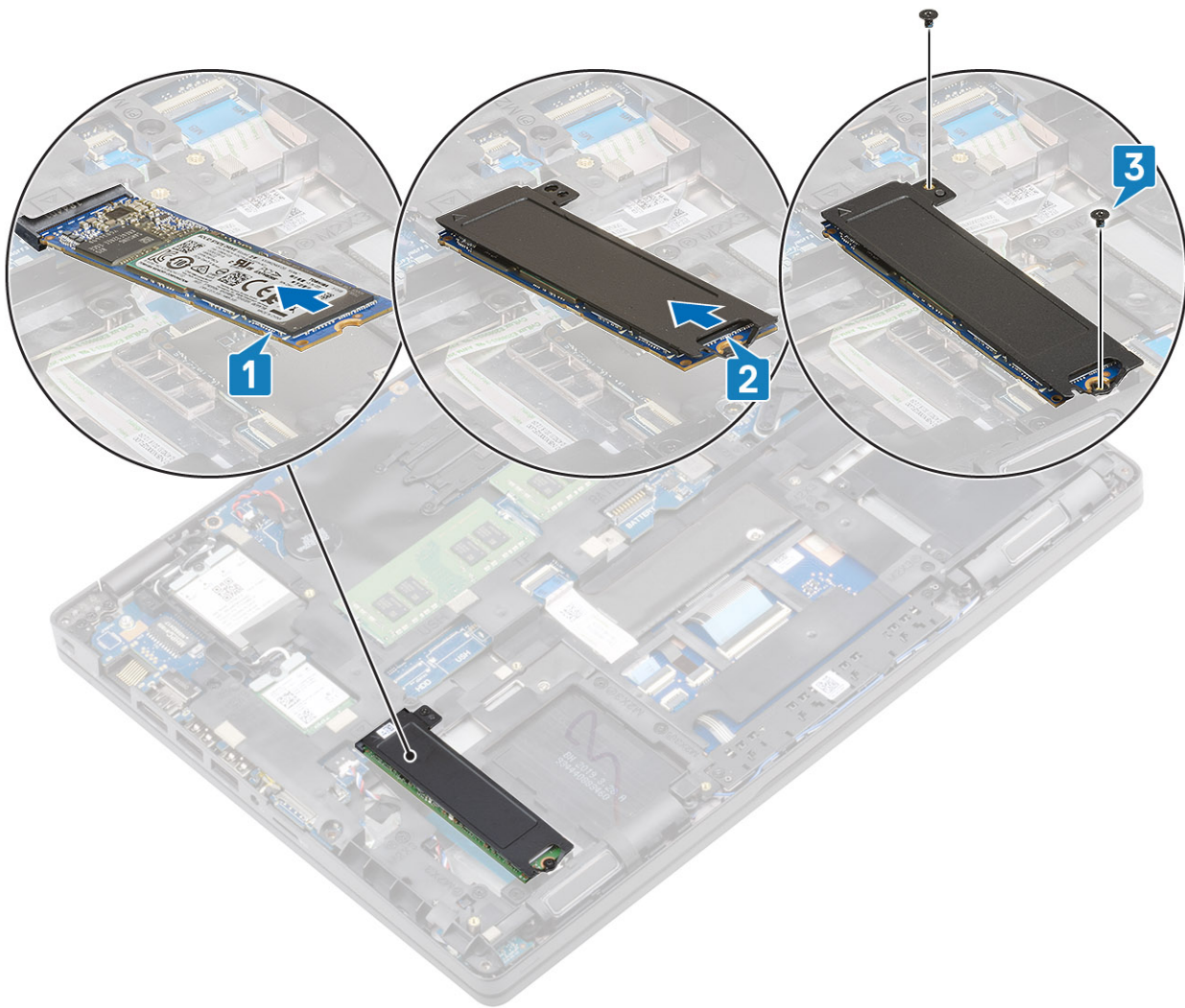


## Installing the M.2 SSD

### Steps

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





### Next steps

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

## Solid state drive bracket

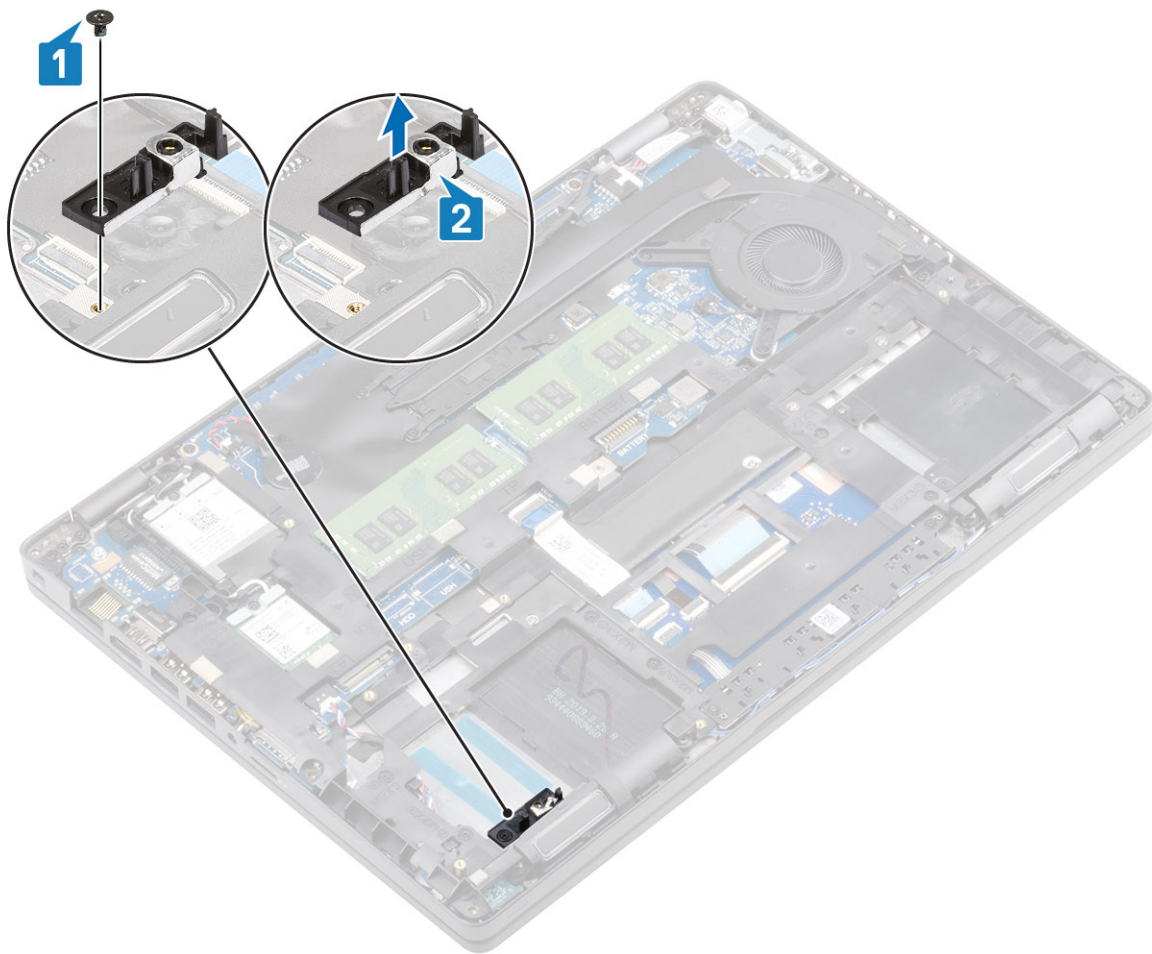
### Removing the solid state drive bracket

#### Prerequisites

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

#### Steps

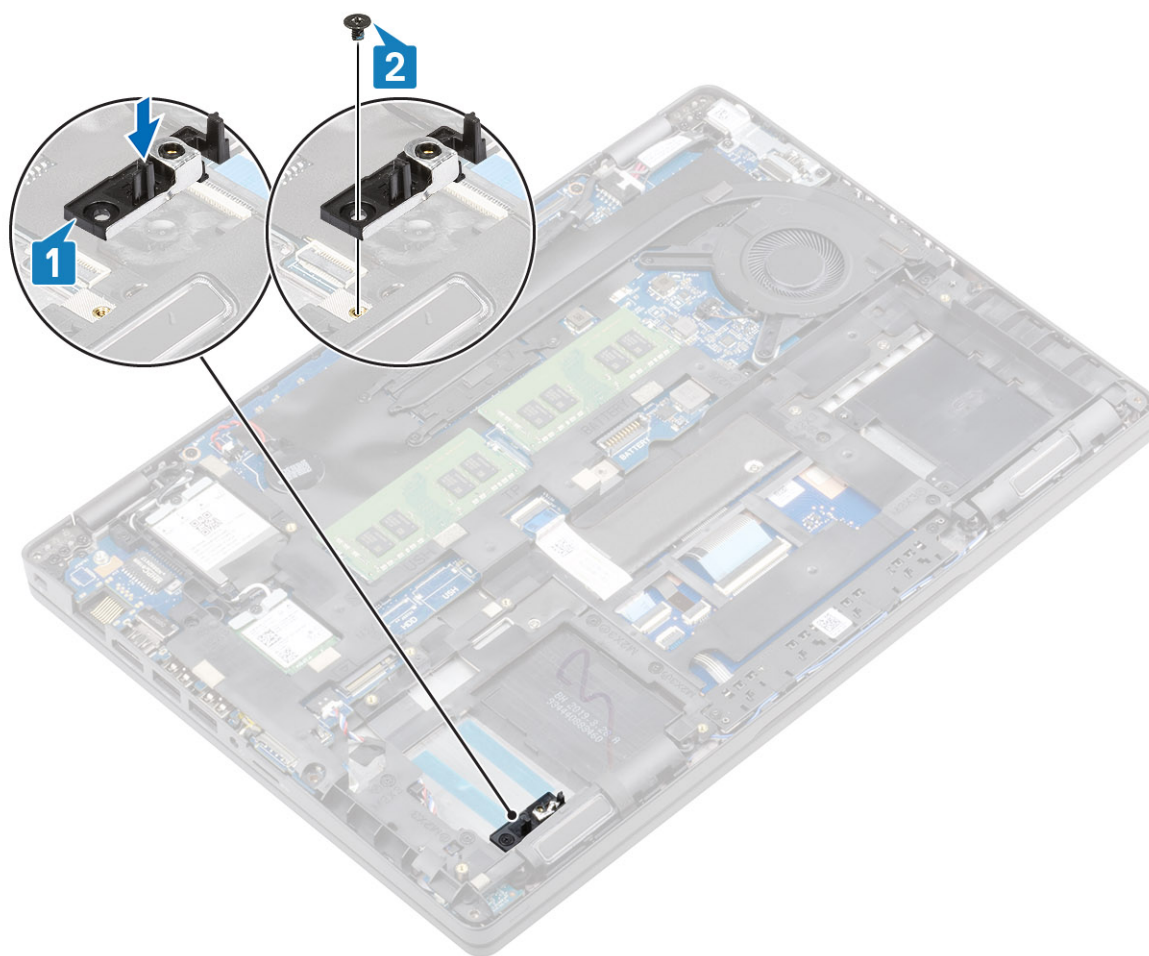
1. Remove the single (M2x3) screw that secures the bracket to the palmrest [1].
2. Lift the SSD bracket of the slot on the palmrest [2].



## Installing the solid state drive bracket

### Steps

1. Align the bracket and insert it into the slot on the palmrest [1].
2. Replace the single (M2x3) screw to secure the bracket to the palmrest [2].



### Next steps

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

## Inner frame

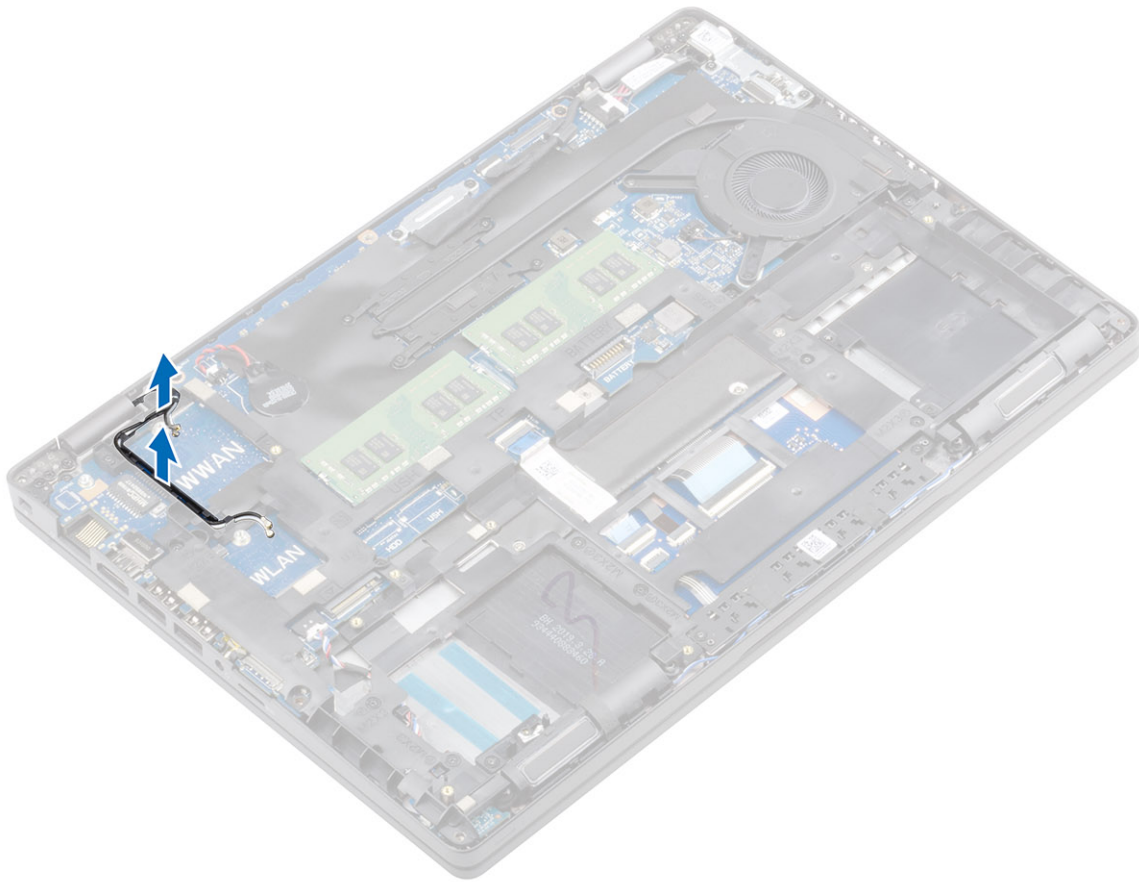
### Removing the inner frame

#### Prerequisites

1. Follow the procedure in [before working with your computer](#).
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [WWAN](#).
6. Remove the [WLAN](#).
7. Remove the [memory module](#).
8. Remove the [DC-in port](#).
9. Remove the [Coin cell battery](#).

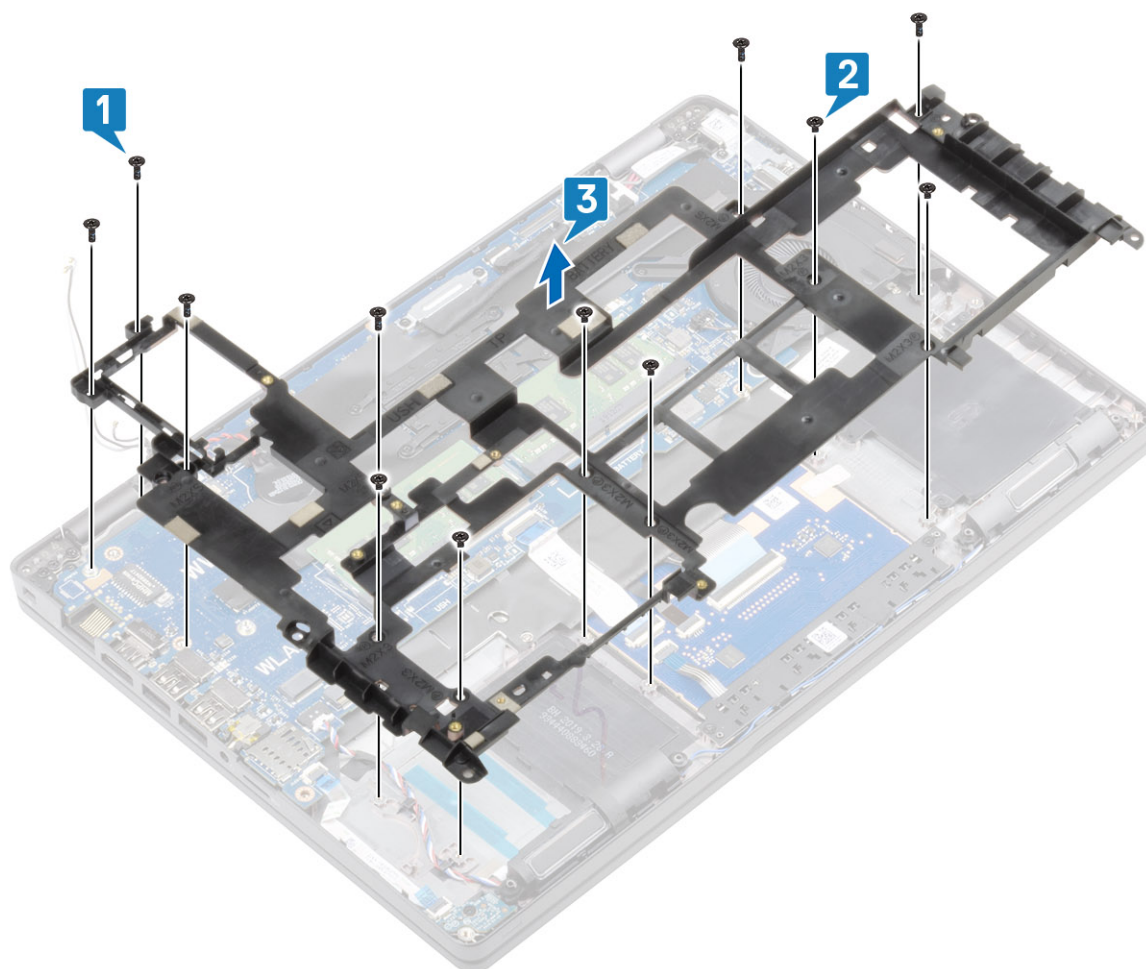
#### Steps

1. Unroute the WLAN antenna cables.



2. Remove the four five (M2x5) screws that secure the inner frame to the system board [1].
3. Remove the six (M2x3) screws that secure the inner frame to the system chassis [2].
4. Lift the inner frame away from the system chassis [3].

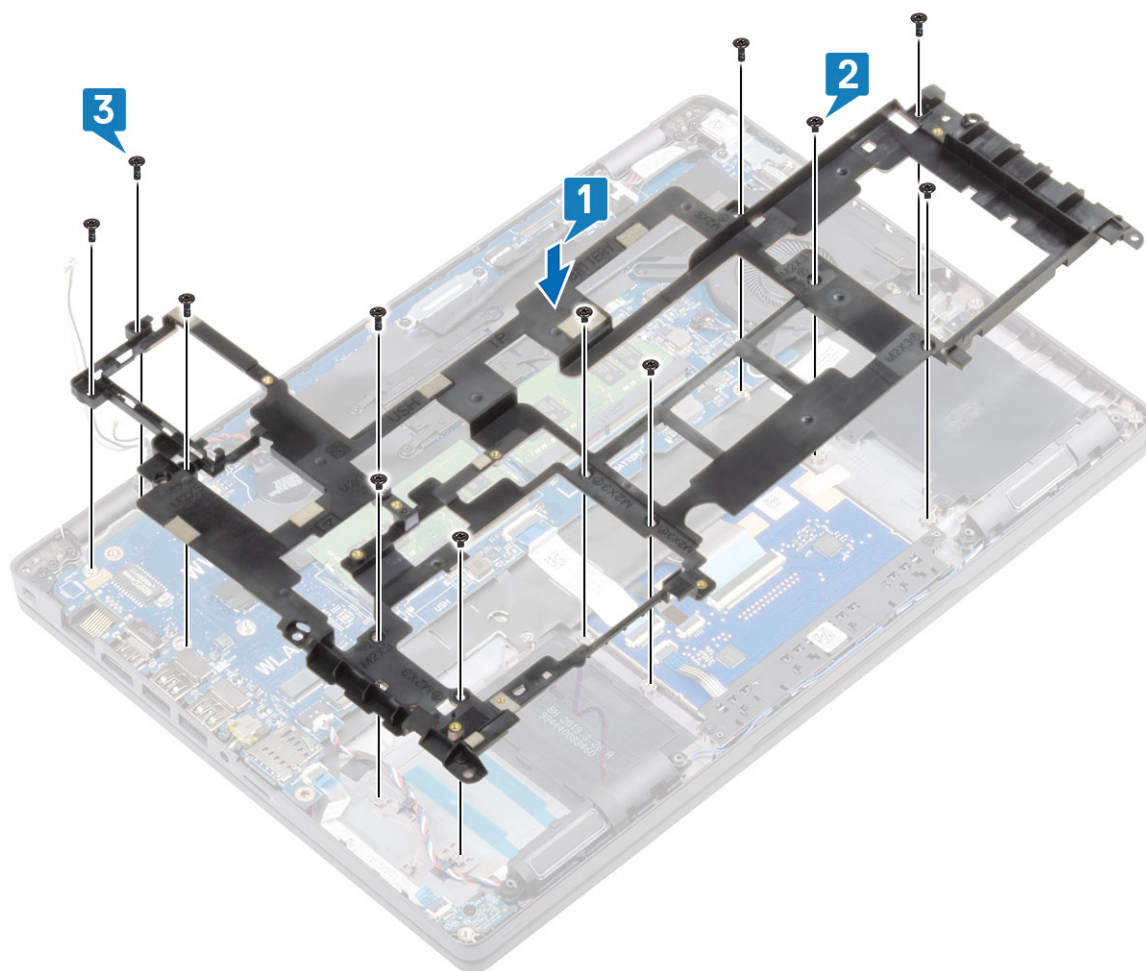




## Installing the inner frame

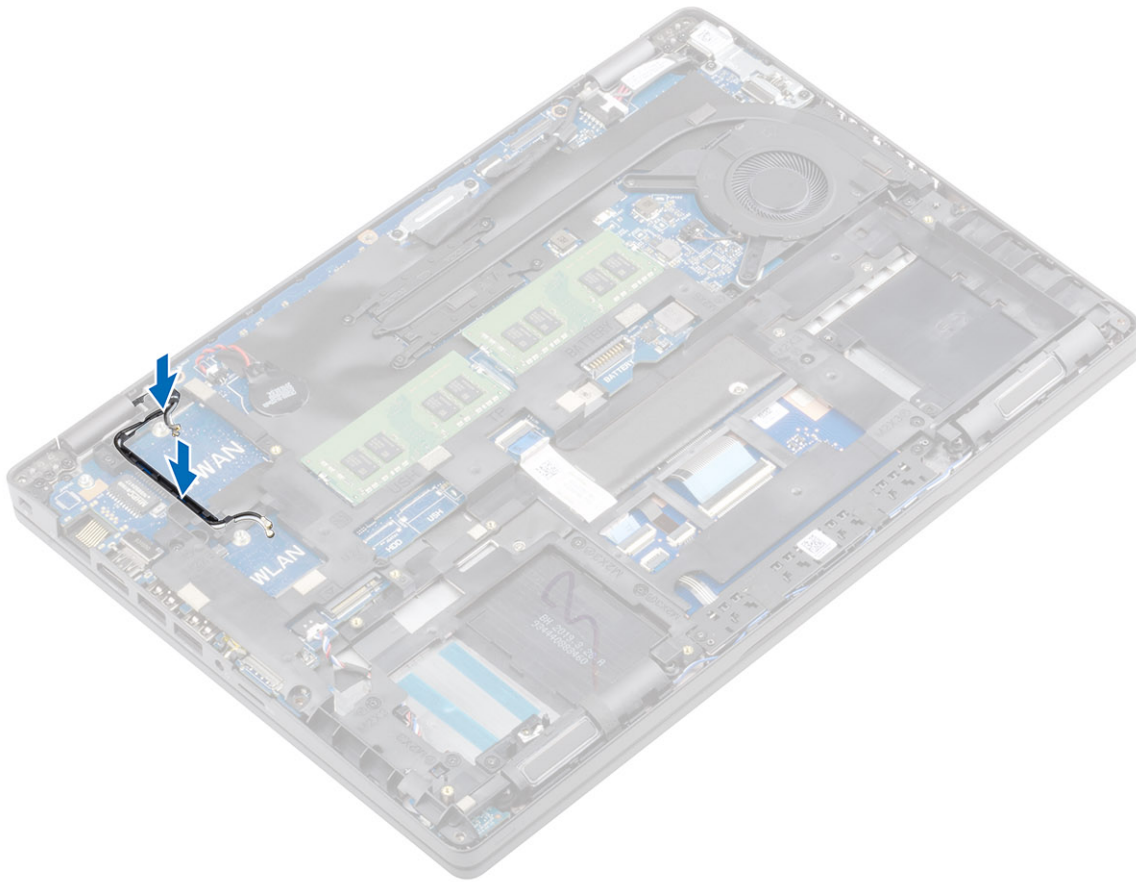
### Steps

1. Align and place the inner frame on the system chassis [1].
2. Replace the six (M2x3) screws to secure the inner frame to the system chassis [2].
3. Replace the three (M2x5) screws to secure the inner frame to the system board [3].



4. Reroute the WLAN antenna cables.





Install

inner frame 1

### Next steps

1. Install the [coin cell battery](#).
2. Install the [DC-in](#).
3. Install the [memory module](#).
4. Install the [WLAN](#).
5. Install the [WWAN](#).
6. Install the [battery](#).
7. Install the [base cover](#).
8. Install the [microSD card](#).
9. Follow the procedure in [After working on your computer](#).

## Touchpad buttons

### Removing the touchpad button board

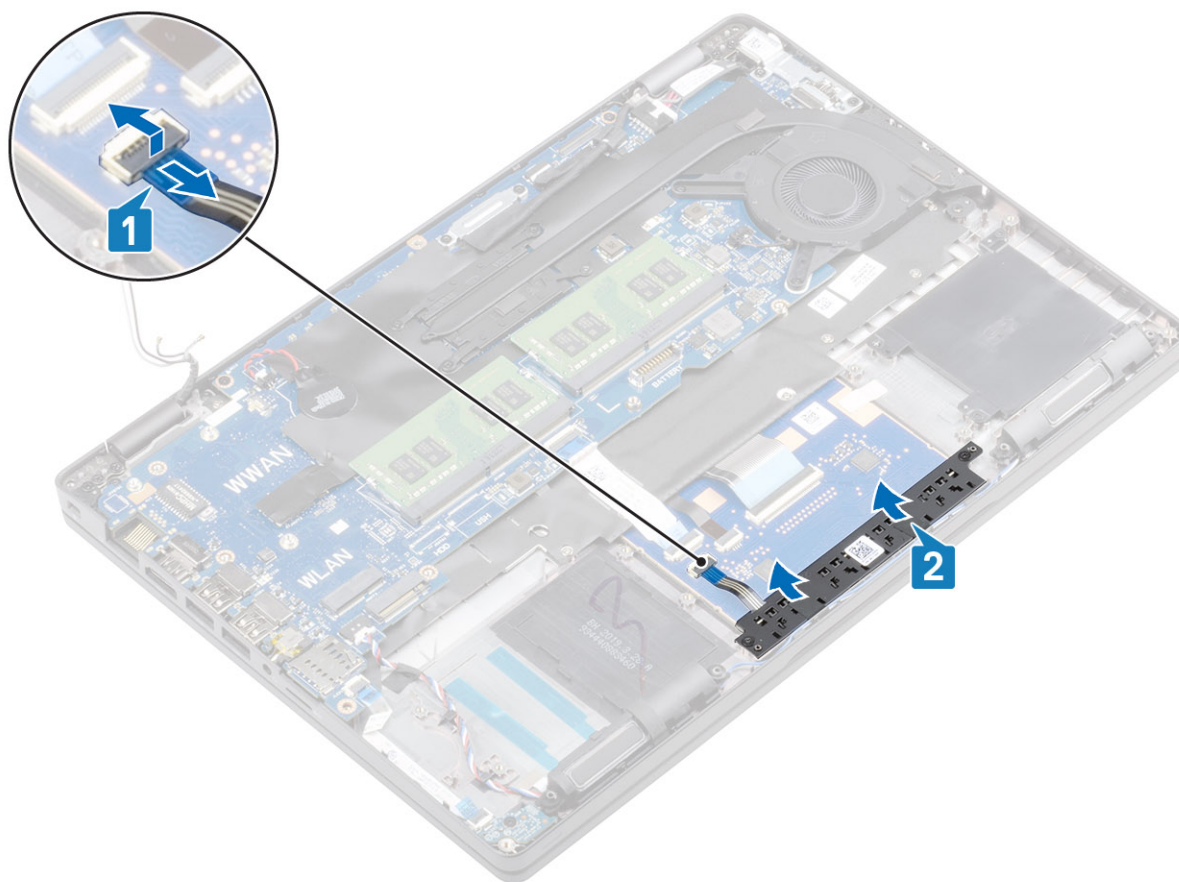
#### Prerequisites

1. Follow the procedure in [before working with your computer](#).
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [WWAN](#).
6. Remove the [WLAN](#).
7. Remove the [memory module](#).
8. Remove the [DC-in port](#).
9. Remove the [Coin cell battery](#).

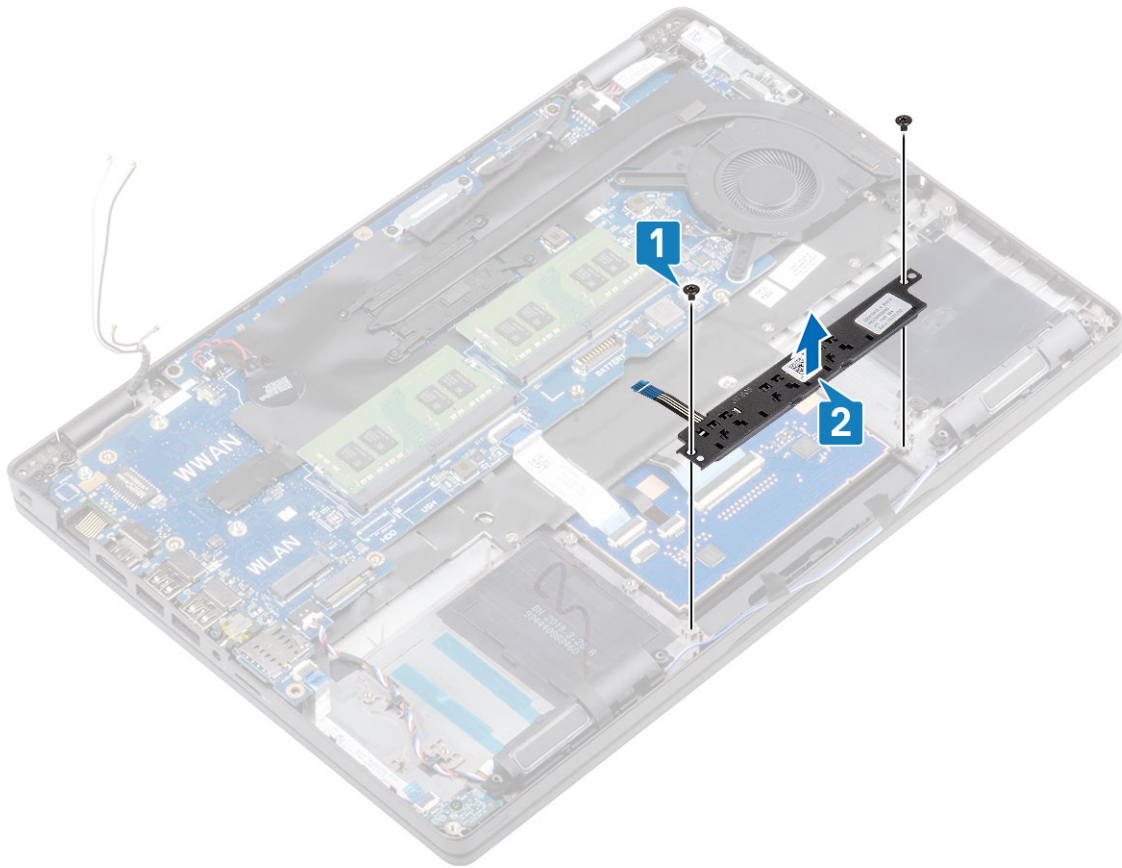
10. Remove the [Inner frame](#).

### Steps

1. Open the latch and disconnect the touchpad button board cable from the connector on the touchpad board [1] .
2. Peel out the speaker cable tapes securing the touchpad buttons [2].



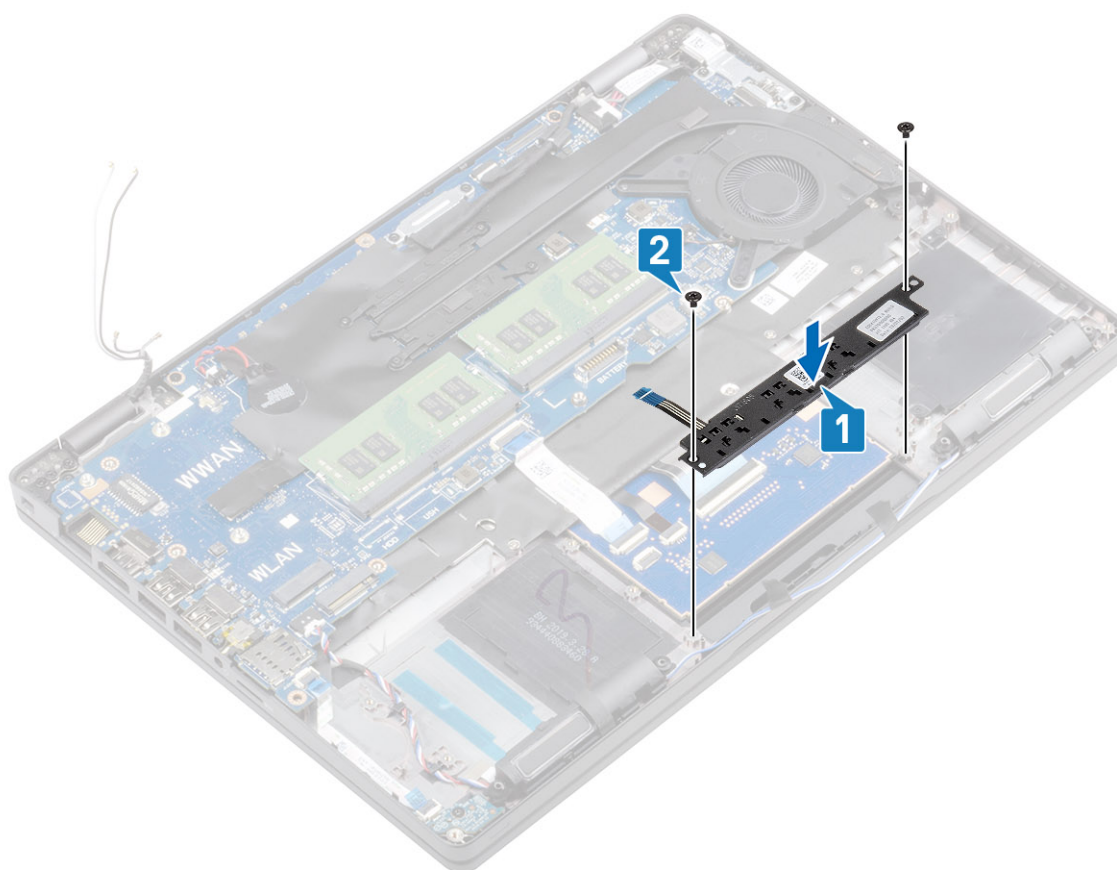
3. Remove the two (M2x3) screws that secure the touchpad button bracket to the palmrest [1].
4. Lift the touchpad button board bracket away from the computer [2].



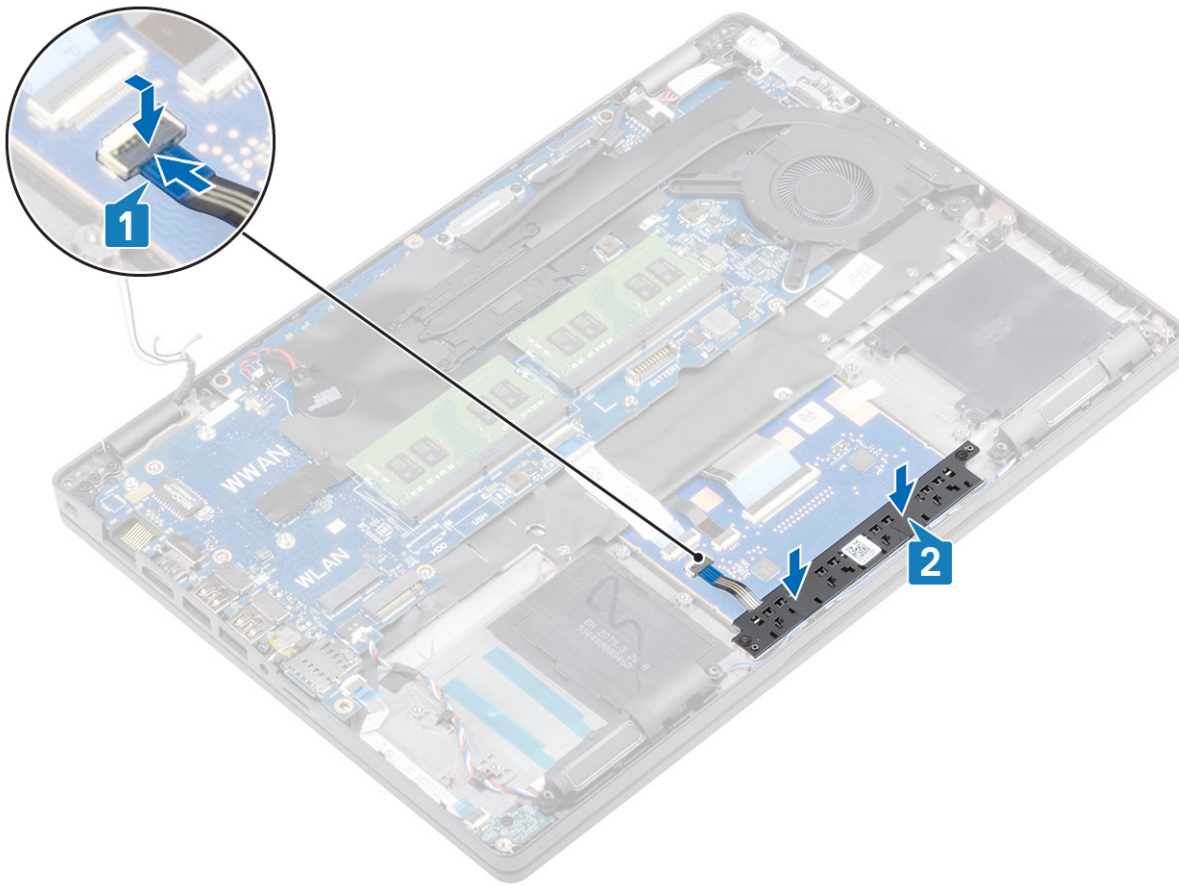
## Installing the touchpad button board

### Steps

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



3. Adhere the speaker cable tapes securing the touchpad buttons [2].
4. Open the latch and fix the touchpad button board cable to the connector on the touchpad board [1]



### Next steps

1. Install the [Inner frame](#).
2. Install the [coin cell battery](#).
3. Install the [DC-in](#).
4. Install the [memory module](#).
5. Install the [WLAN](#).
6. Install the [WWAN](#).
7. Install the [battery](#).
8. Install the [base cover](#).
9. Install the [microSD card](#).
10. Follow the procedure in [After working on your computer](#).

## LED board

### Removing the LED board

#### Prerequisites

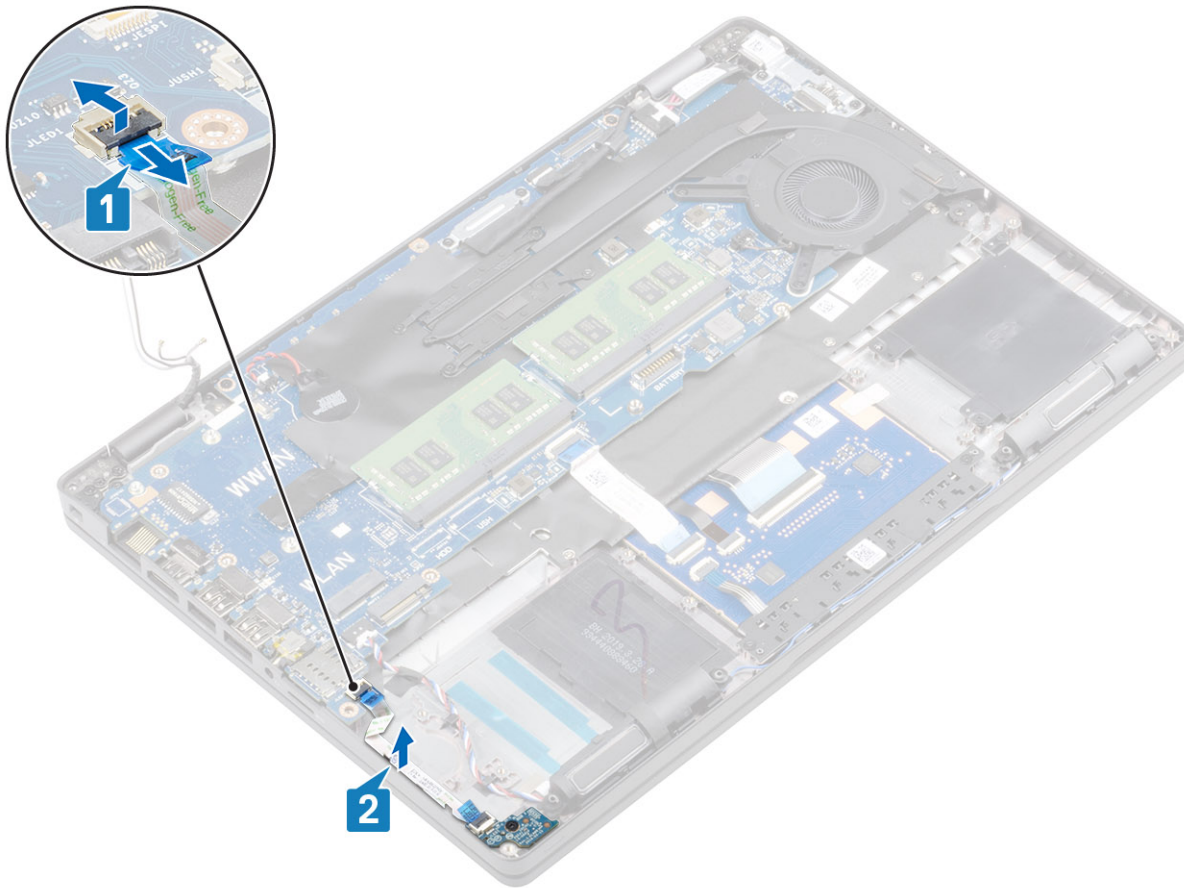
1. Follow the procedure in [before working with your computer](#).
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [WWAN](#).
6. Remove the [WLAN](#).
7. Remove the [memory module](#).
8. Remove the [DC-in port](#).



9. Remove the [Coin cell battery](#).
10. Remove the [Inner frame](#).

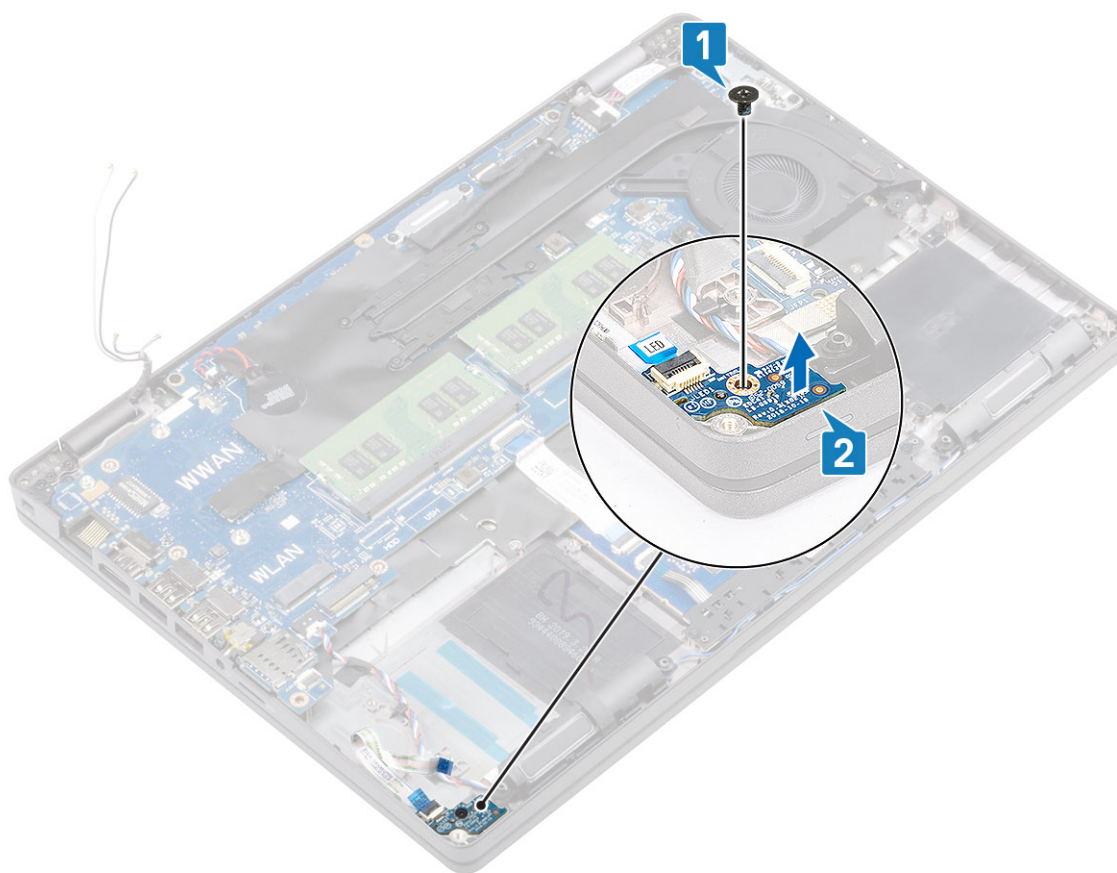
### Steps

1. Disconnect and peel the USH daughter board Flexible Flat Cable (FFC) from the USH daughter board [1, 2].
2. Disconnect the LED board cable from the connector on the system board.
3. Unroute the LED board cable [2].



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





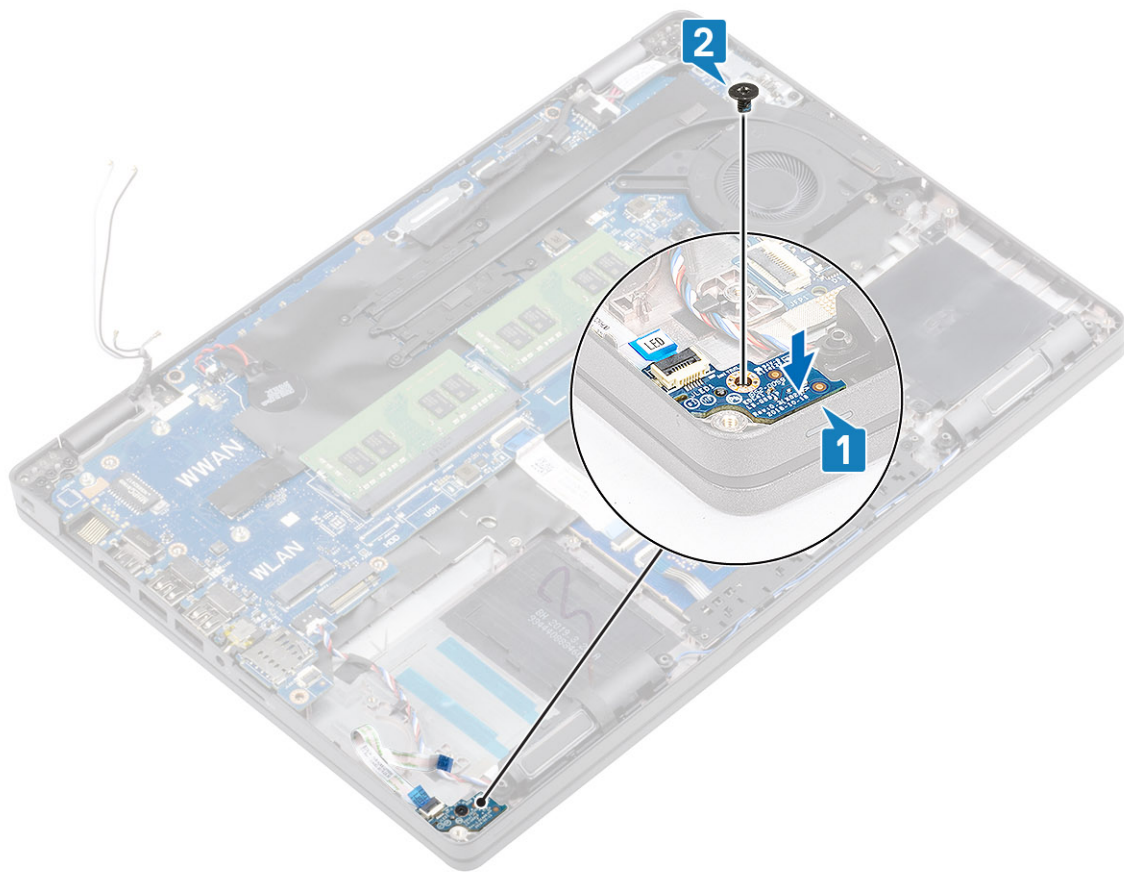
LED 1

Remove

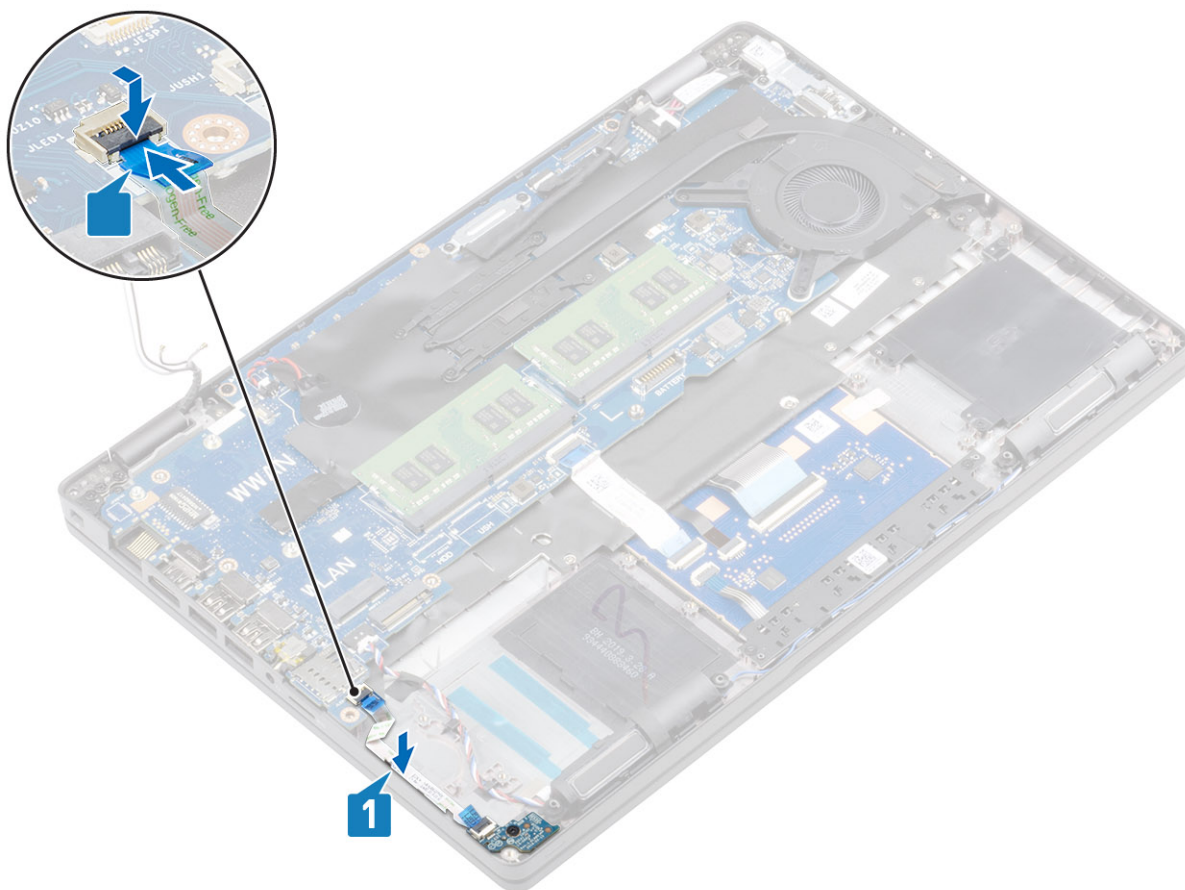
## Installing the LED board

### Steps

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



3. Connect the LED board cable to the connector on the system board and route the LED board cable [1]
4. Connect and adhere the USH daughter board Flexible Flat Cable (FFC) from the USH daughter board.



### Next steps

1. Install the [Inner frame](#).
2. Install the [coin cell battery](#).
3. Install the [DC-in](#).
4. Install the [memory module](#).
5. Install the [WLAN](#).
6. Install the [WWAN](#).
7. Install the [battery](#).
8. Install the [base cover](#).
9. Install the [microSD card](#).
10. Follow the procedure in [After working on your computer](#).

## Speakers

### Removing the speakers

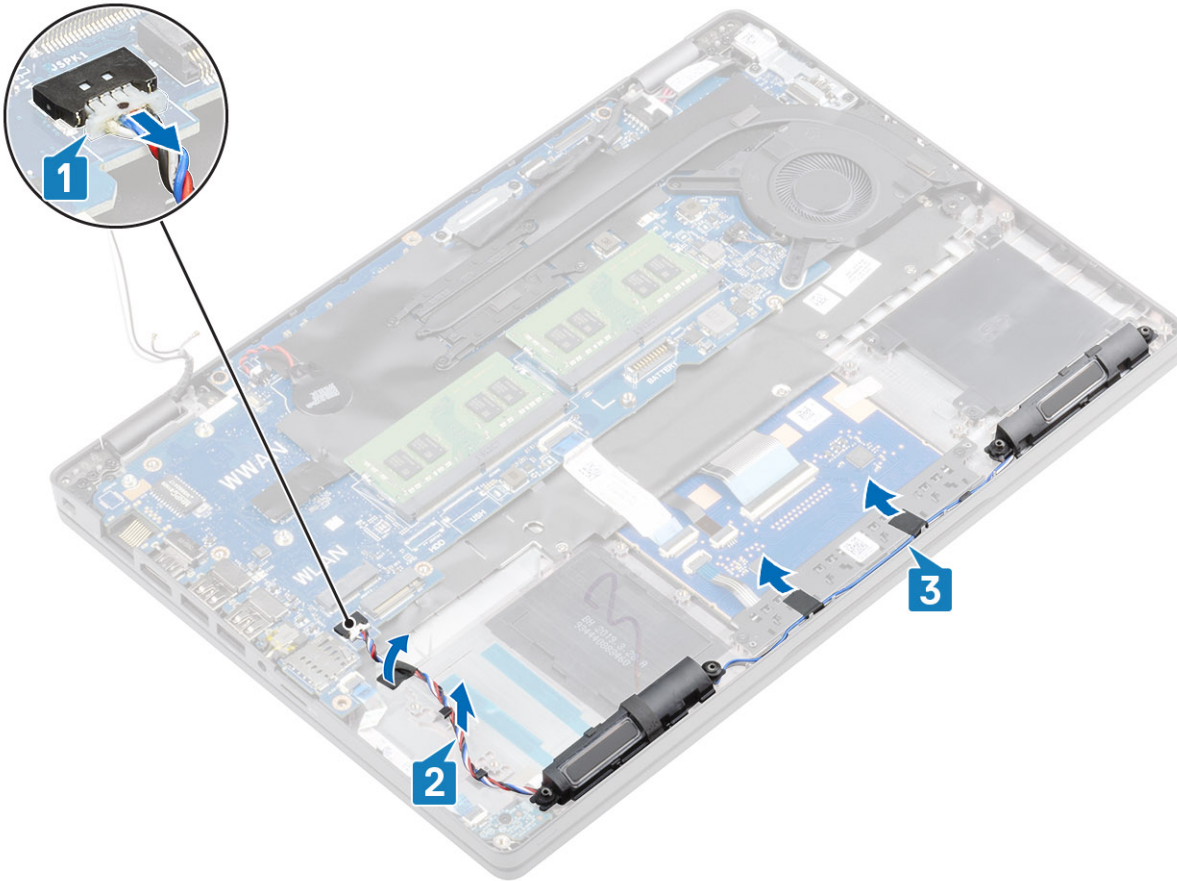
#### Prerequisites

1. Follow the procedure in [before working with your computer](#).
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [WWAN](#).
6. Remove the [WLAN](#).
7. Remove the [memory module](#).
8. Remove the [DC-in port](#).

9. Remove the [Coin cell battery](#).
10. Remove the [Inner frame](#).

### Steps

1. Disconnect the speaker cable from the connector on the system board [1].
2. Peel the adhesive tape that secures the speaker cable to the palmrest [2].
3. Disconnect the touchpad cable from the connector on the daughter board [3].

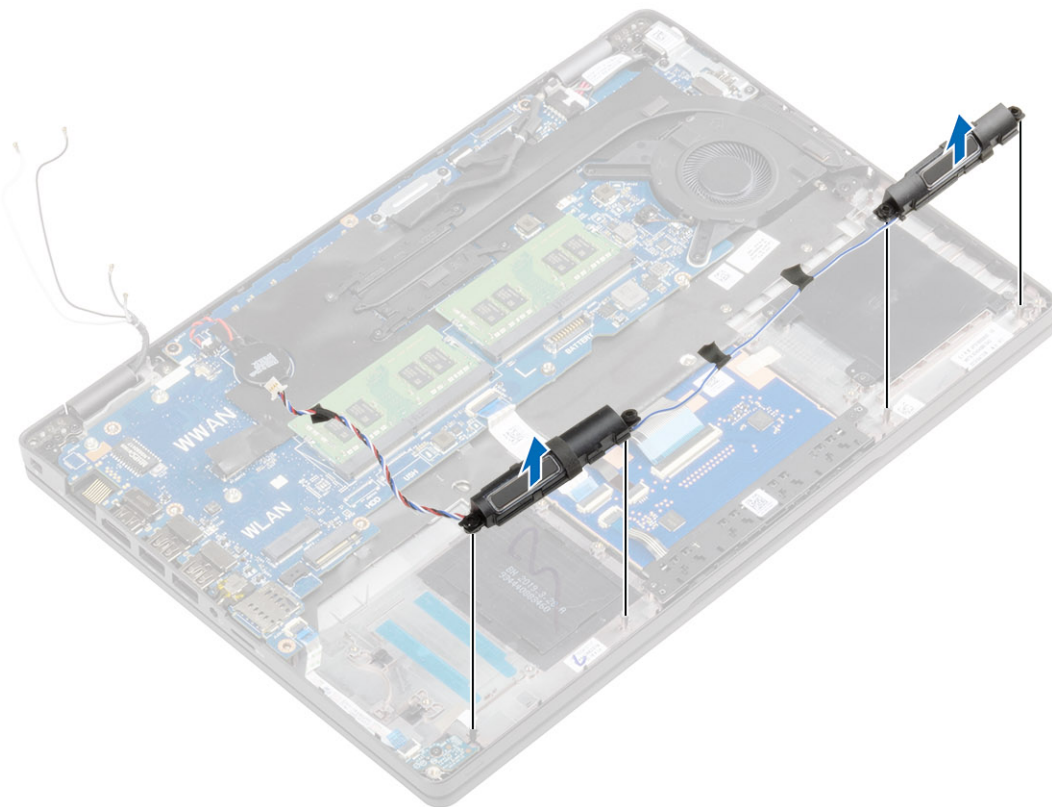


4. Peel the adhesive tapes and unroute the speaker cable





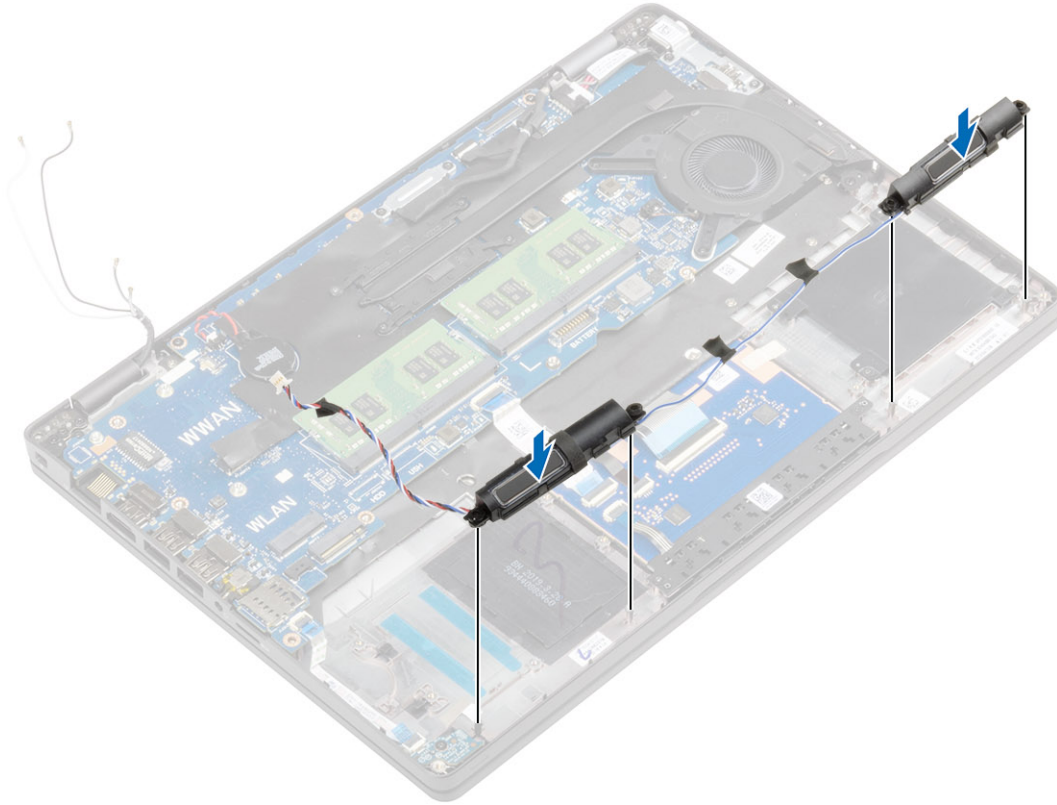
5. Lift and remove the speakers away from the palmrest.



## Installing the speakers

### Steps

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



Install

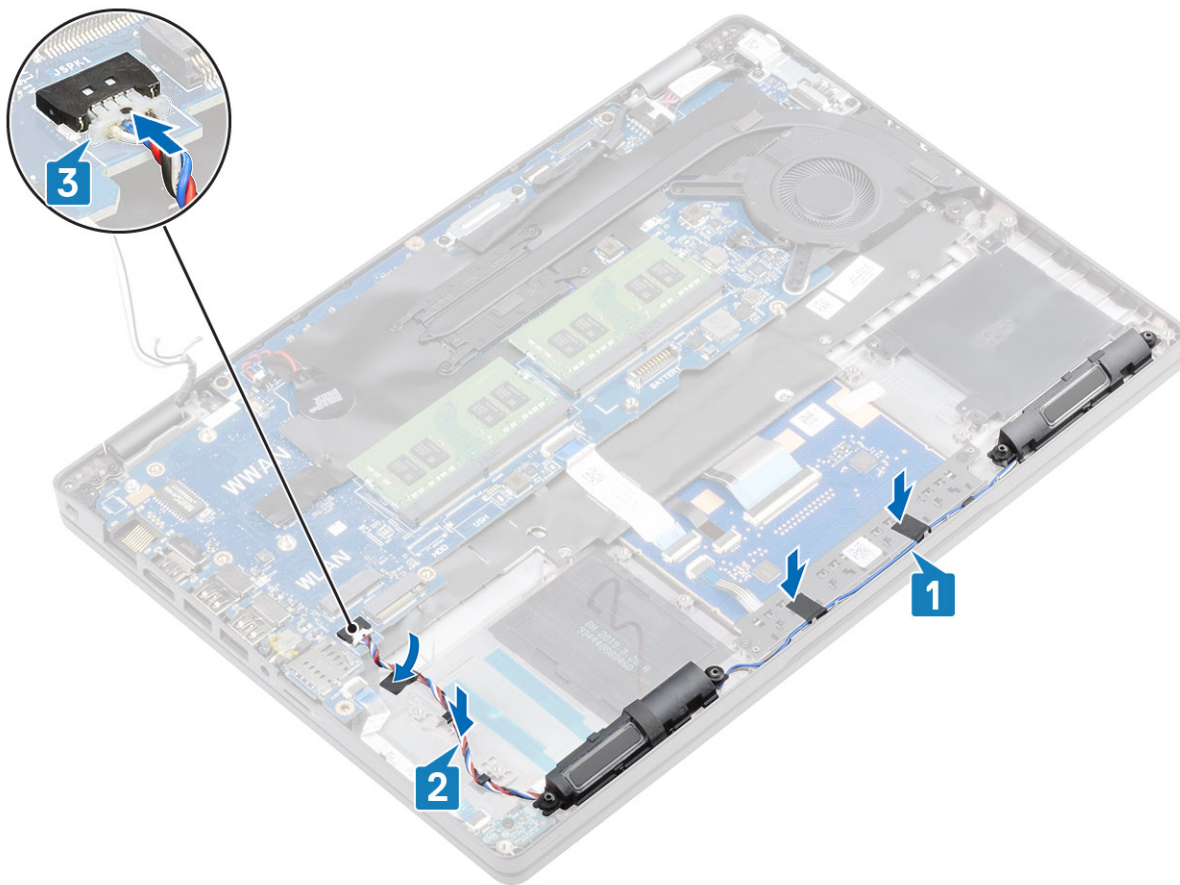
Speakers

2. Route the speaker cable through the routing guides.





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



Install

Speakers 2

### Next steps

1. Install the [Inner frame](#).
2. Install the [coin cell battery](#).
3. Install the [DC-in](#).
4. Install the [memory module](#).
5. Install the [WLAN](#).
6. Install the [WWAN](#).
7. Install the [battery](#).
8. Install the [base cover](#).
9. Install the [microSD card](#).
10. Follow the procedure in [After working on your computer](#).

## Heatsink assembly

### Removing the heatsink assembly

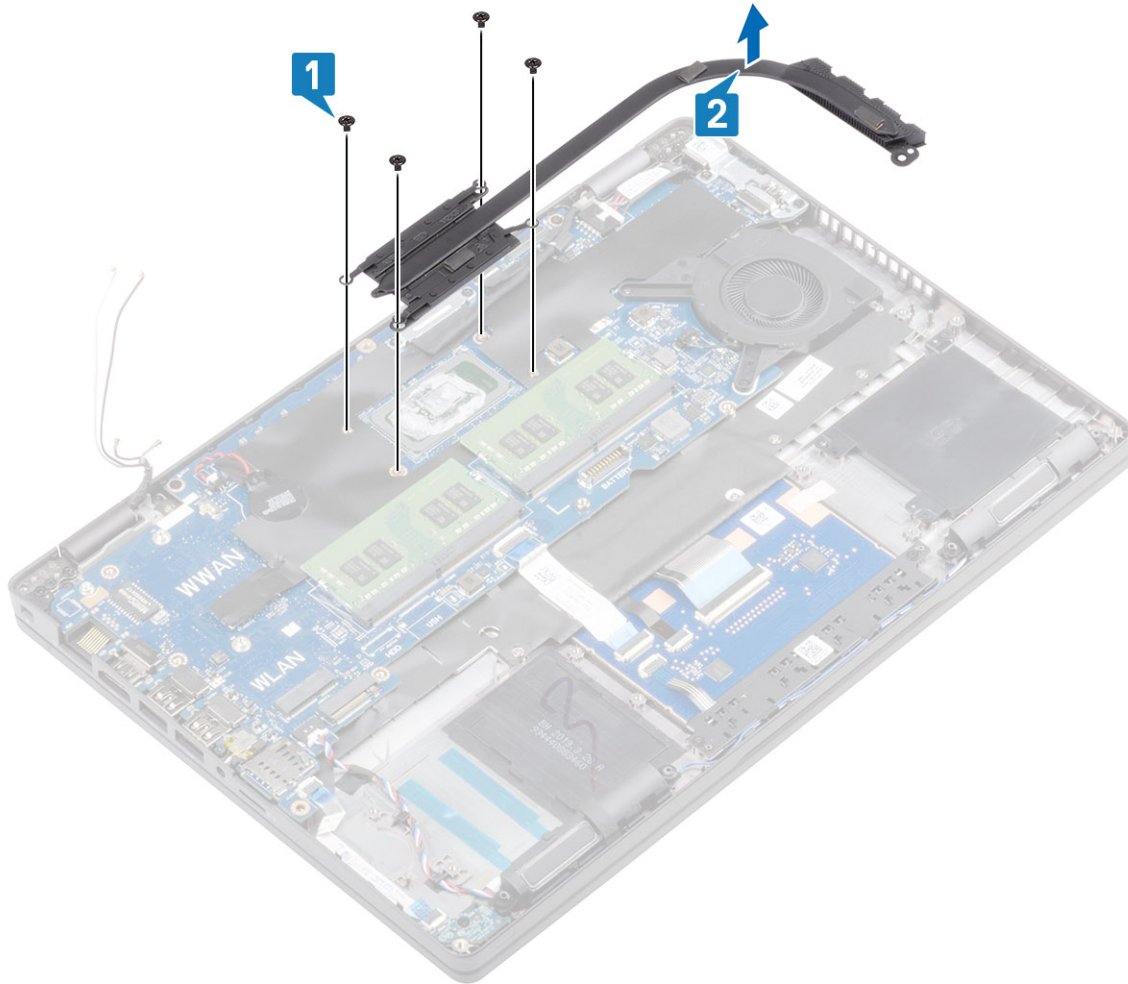
#### Prerequisites

1. Follow the procedure in [before working with your computer](#).
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [WWAN](#).
6. Remove the [WLAN](#).
7. Remove the [memory module](#).
8. Remove the [DC-in port](#).

9. Remove the [Coin cell battery](#).
10. Remove the [Inner frame](#).

### Steps

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

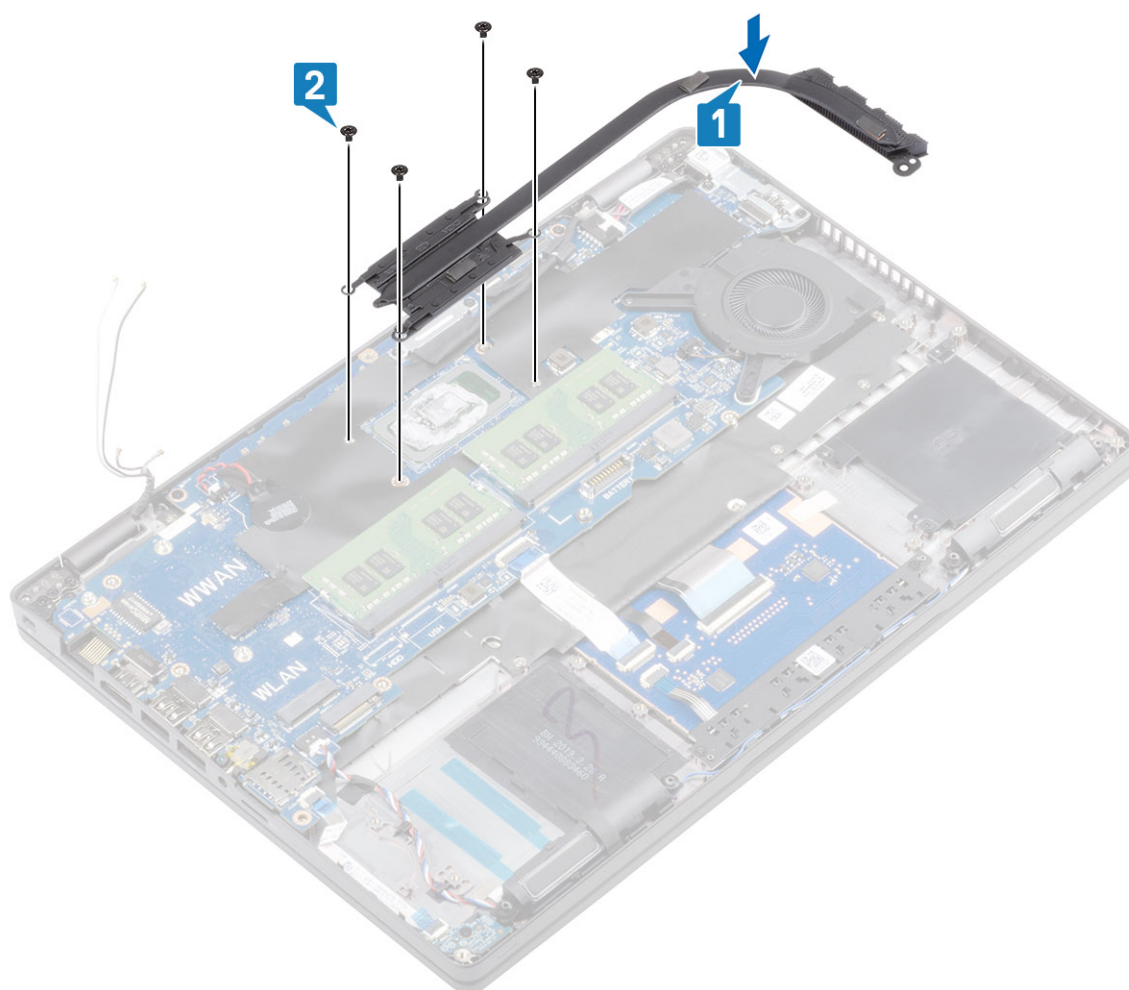


2. Remove the four (M2x3) screws that secure the heatsink assembly to the system board [1].

## Installing the heatsink assembly

### Steps

1. Place the heatsink assembly on the system board and align the screw holes on the heatsink with the screw holes on the system board [1].
2. In sequential order (as indicated on the heatsink), tighten the four (M2x3) screws that secure the heatsink assembly to the system board [2].



### Next steps

1. Install the [Inner frame](#).
2. Install the [coin cell battery](#).
3. Install the [DC-in](#).
4. Install the [memory module](#).
5. Install the [WLAN](#).
6. Install the [WWAN](#).
7. Install the [battery](#).
8. Install the [base cover](#).
9. Install the [microSD card](#).
10. Follow the procedure in [After working on your computer](#).

## System fan

### Removing the system fan

#### Prerequisites

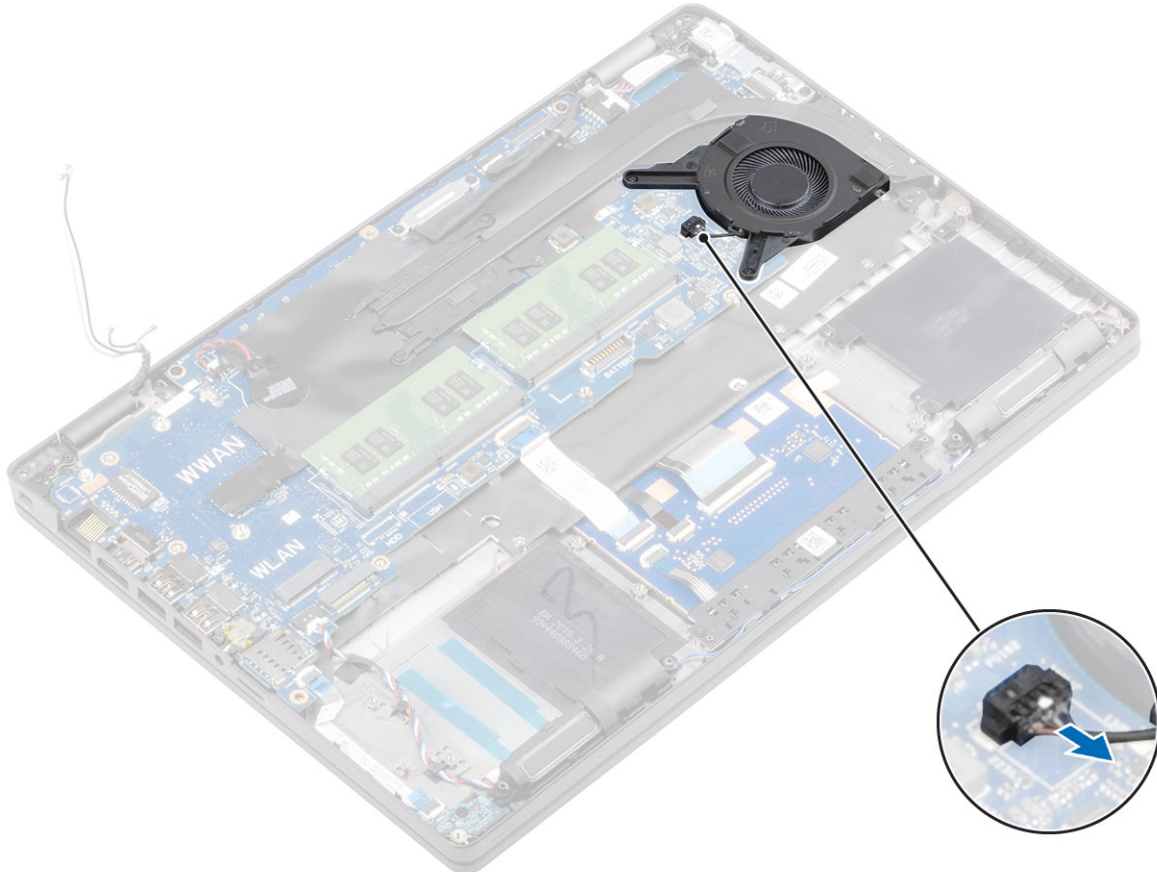
1. Follow the procedure in [before working with your computer](#).
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).



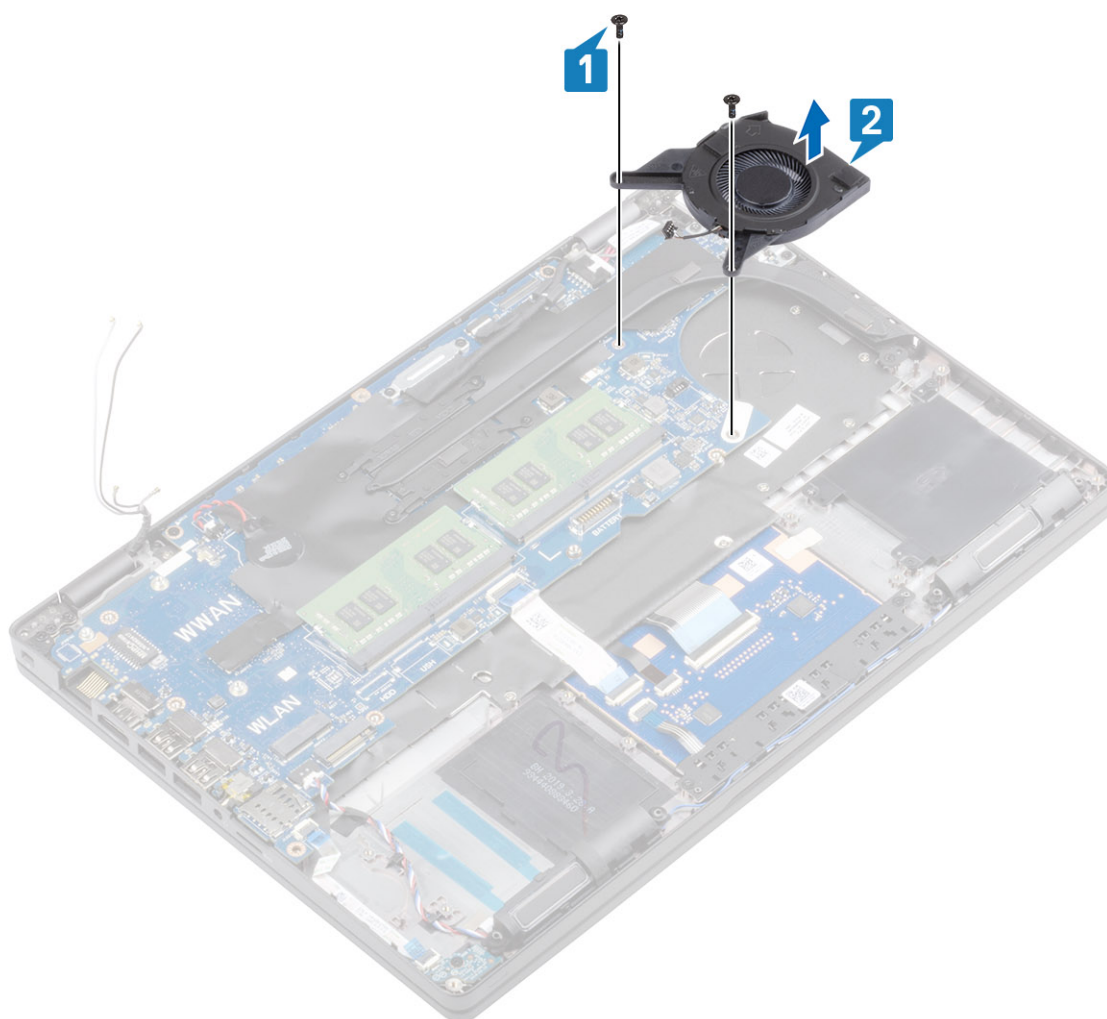
5. Remove the [WWAN](#).
6. Remove the [WLAN](#).
7. Remove the [memory module](#).
8. Remove the [DC-in port](#).
9. Remove the [Coin cell battery](#).
10. Remove the [Inner frame](#).

### Steps

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



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

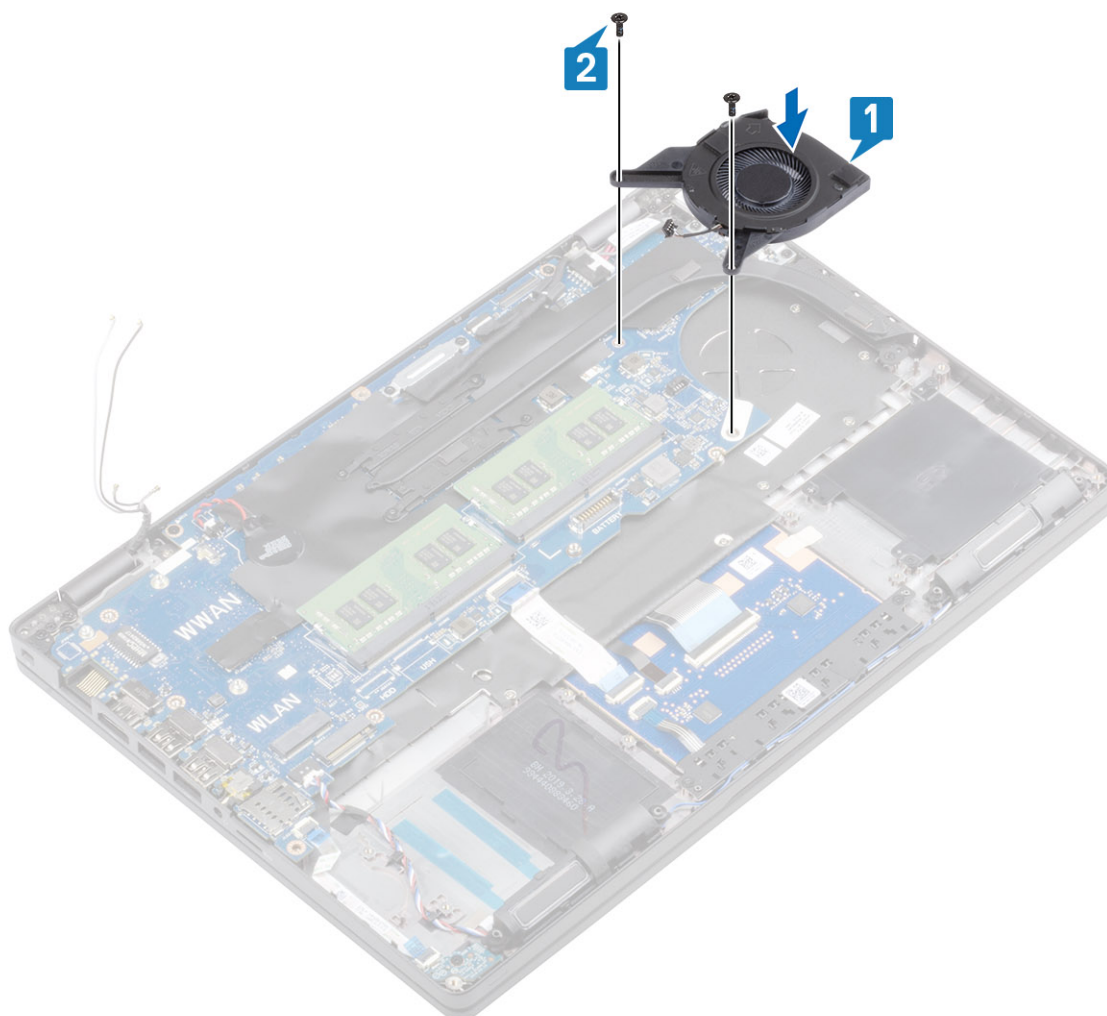


## Installing the system fan

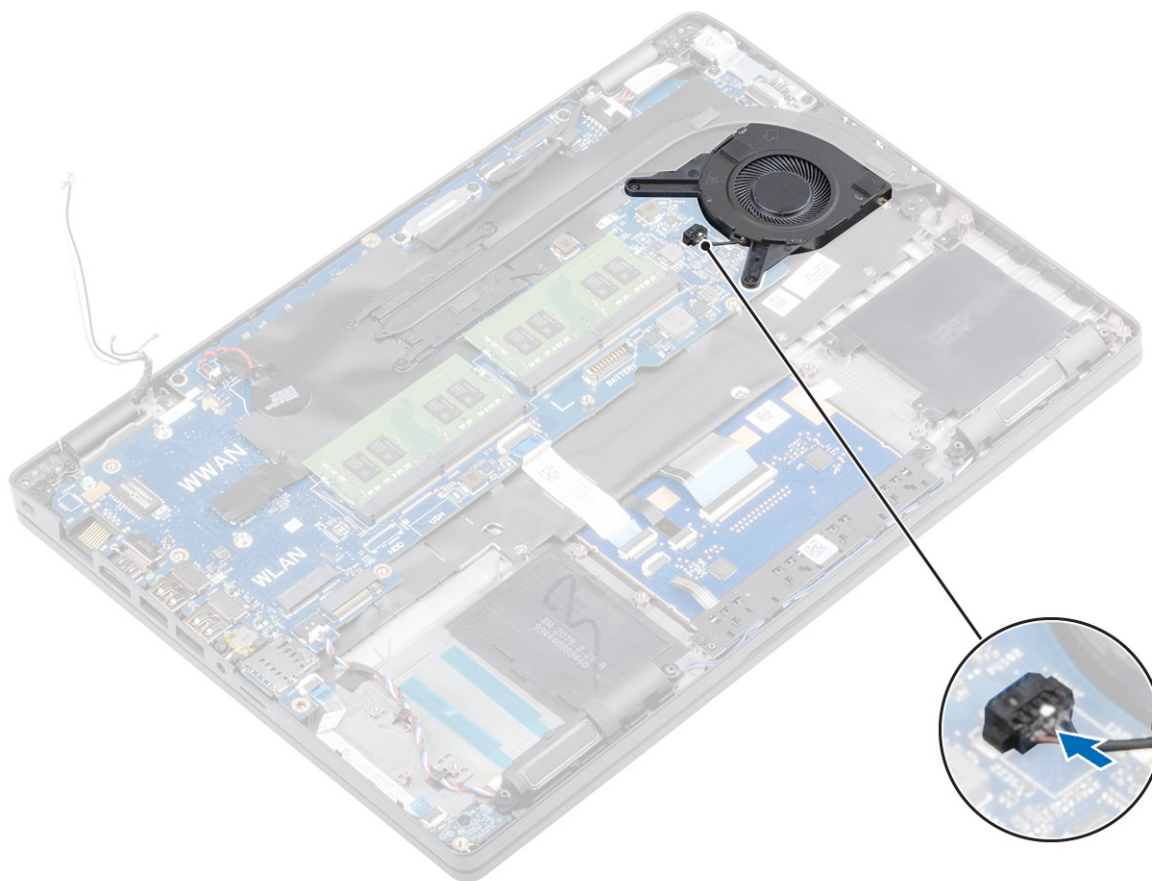
### Steps

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





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



### Next steps

1. Install the [Inner frame](#).
2. Install the [coin cell battery](#).
3. Install the [DC-in](#).
4. Install the [memory module](#).
5. Install the [WLAN](#).
6. Install the [WWAN](#).
7. Install the [battery](#).
8. Install the [base cover](#).
9. Install the [microSD card](#).
10. Follow the procedure in [After working on your computer](#).

## System board

### Removing the system board

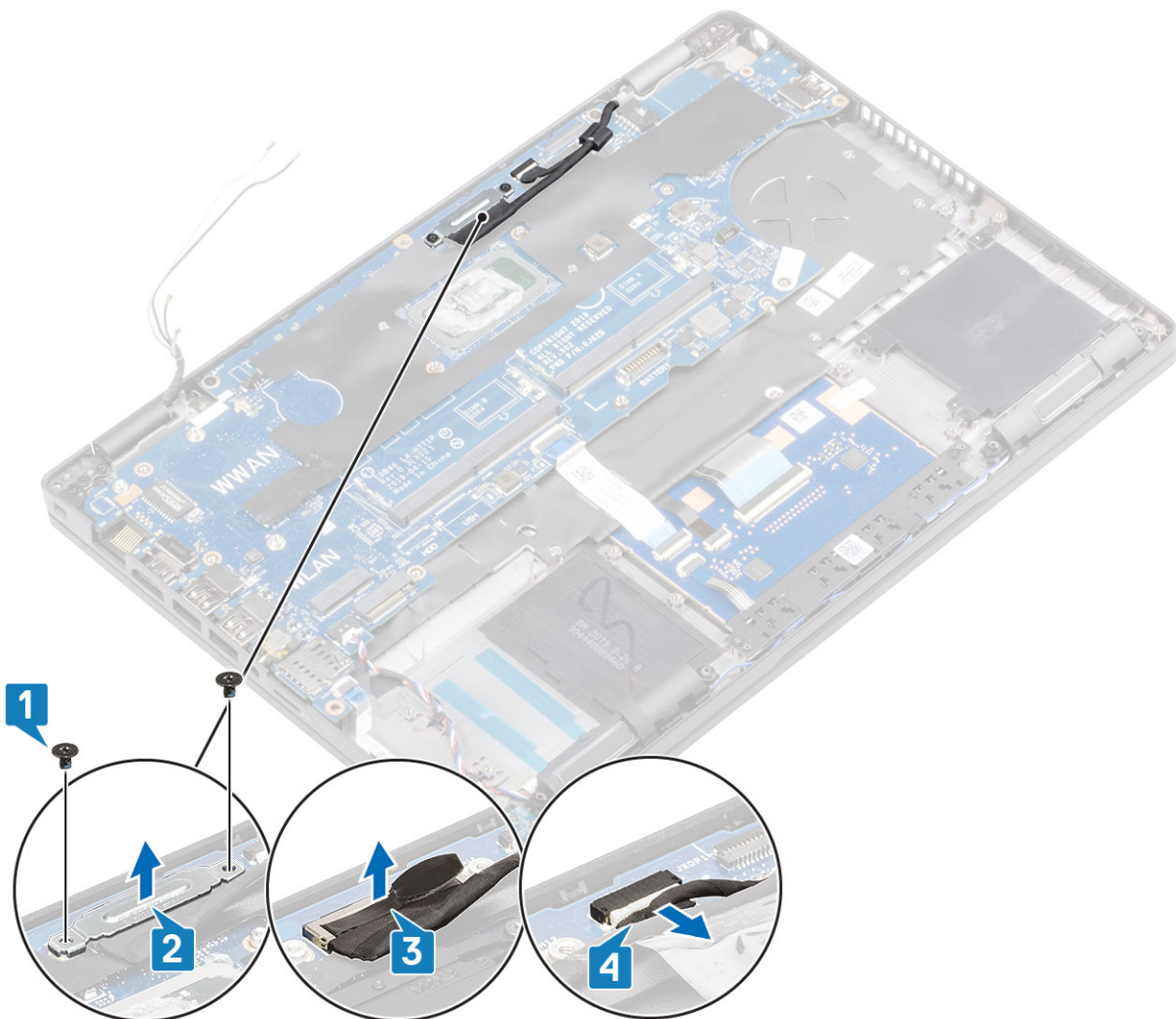
#### Prerequisites

1. Follow the procedure in [before working with your computer](#).
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [WWAN](#).
6. Remove the [WLAN](#).
7. Remove the [memory module](#).
8. Remove the [DC-in port](#).

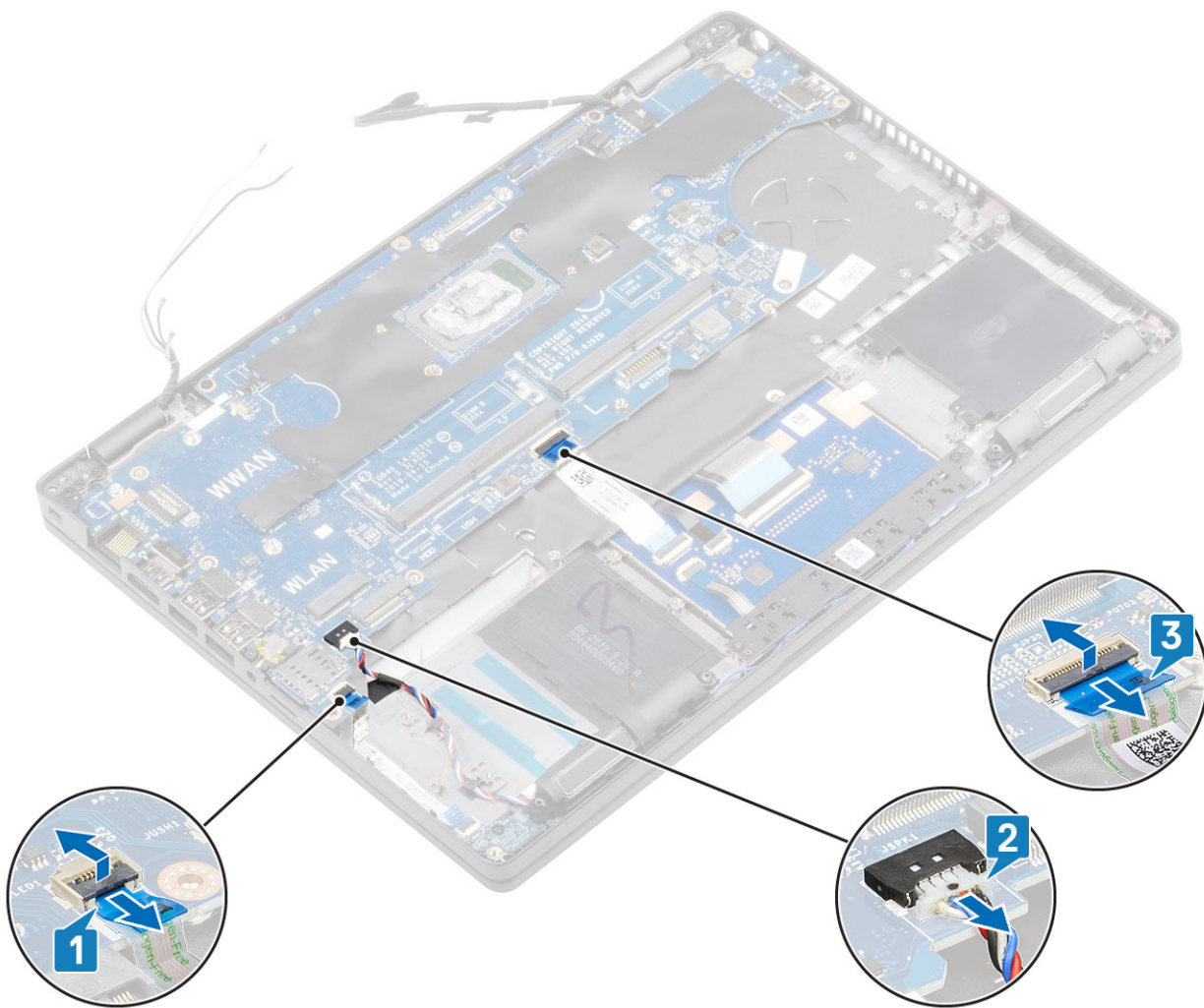
9. Remove the [Coin cell battery](#).
10. Remove the [Inner frame](#).
11. Remove the [heatsink](#).
12. Remove the [system fan](#).

## Steps

1. Peel the adhesive tape and disconnect the touch screen cable from the connector on the system board [1].
2. Remove the single (M2x4) screw that secures the eDP cable bracket to the system board [2].
3. Lift the eDP cable bracket from the system board [3].
4. Disconnect the eDP cable from the system board [4].
5. Disconnect the following cables:
  - a. Speaker cable [2].
  - b. LED board cable [1].
  - c. touchpad cable [3].
6. Remove the two (M2.5x4) screws that secures the system board [1].
7. Peel the adhesive tape and disconnect the cable from the connector on the system board [1].

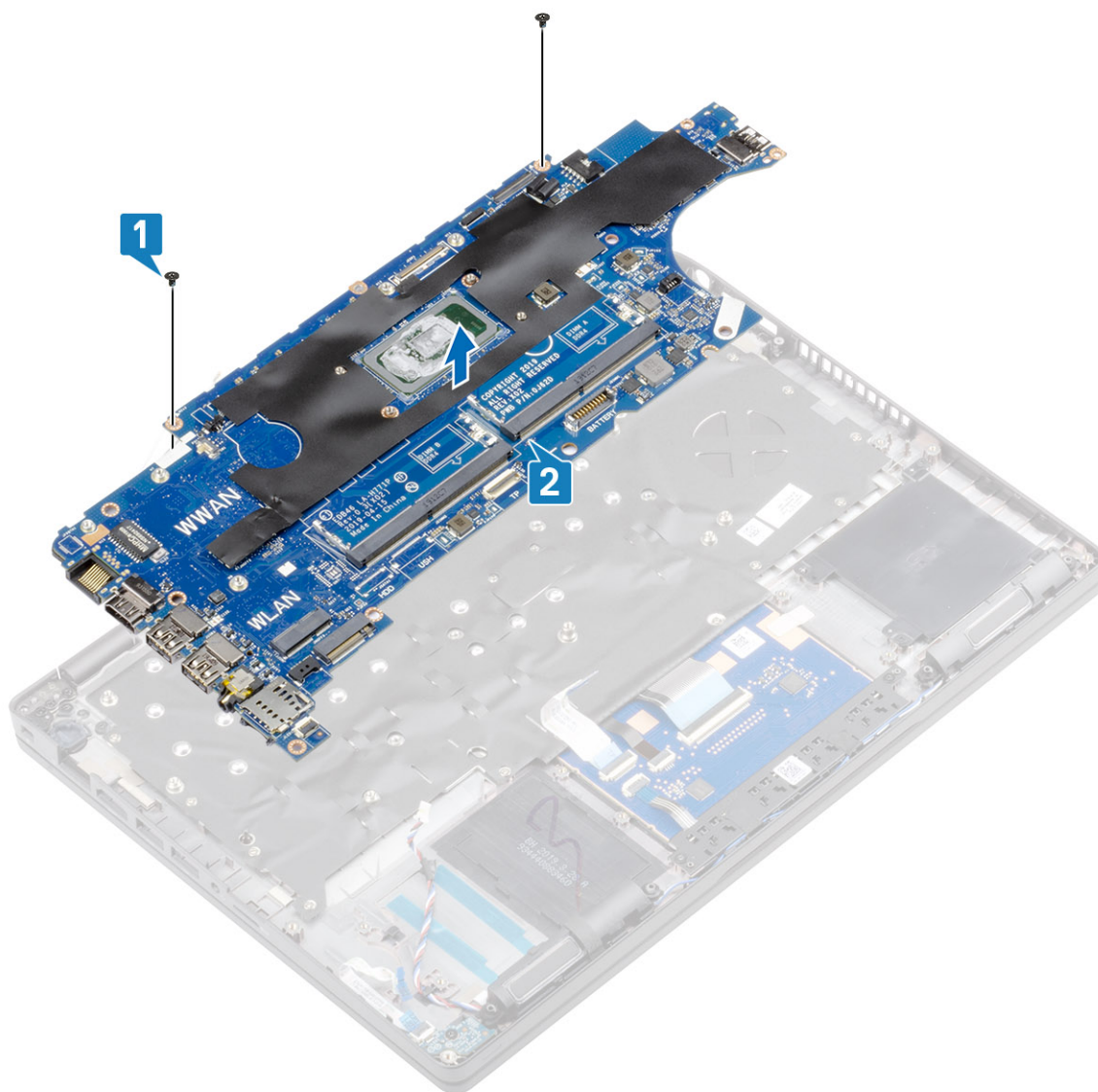


8. Disconnect the sensor board cable from the connector on the system board [1].



9. Remove the two (M2.5x4) screws that secures the system board to the palmrest [1].



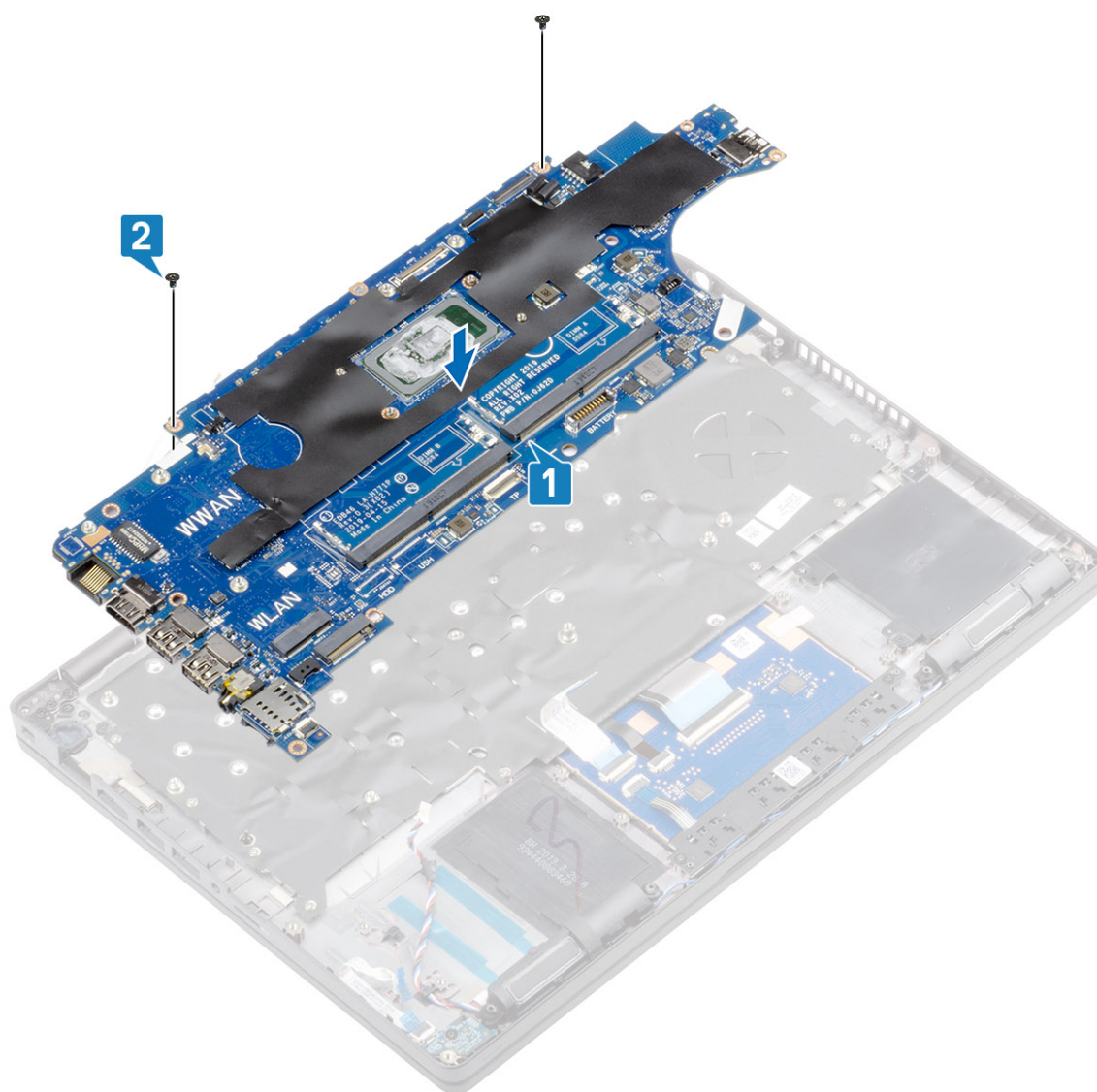


## Installing the system board

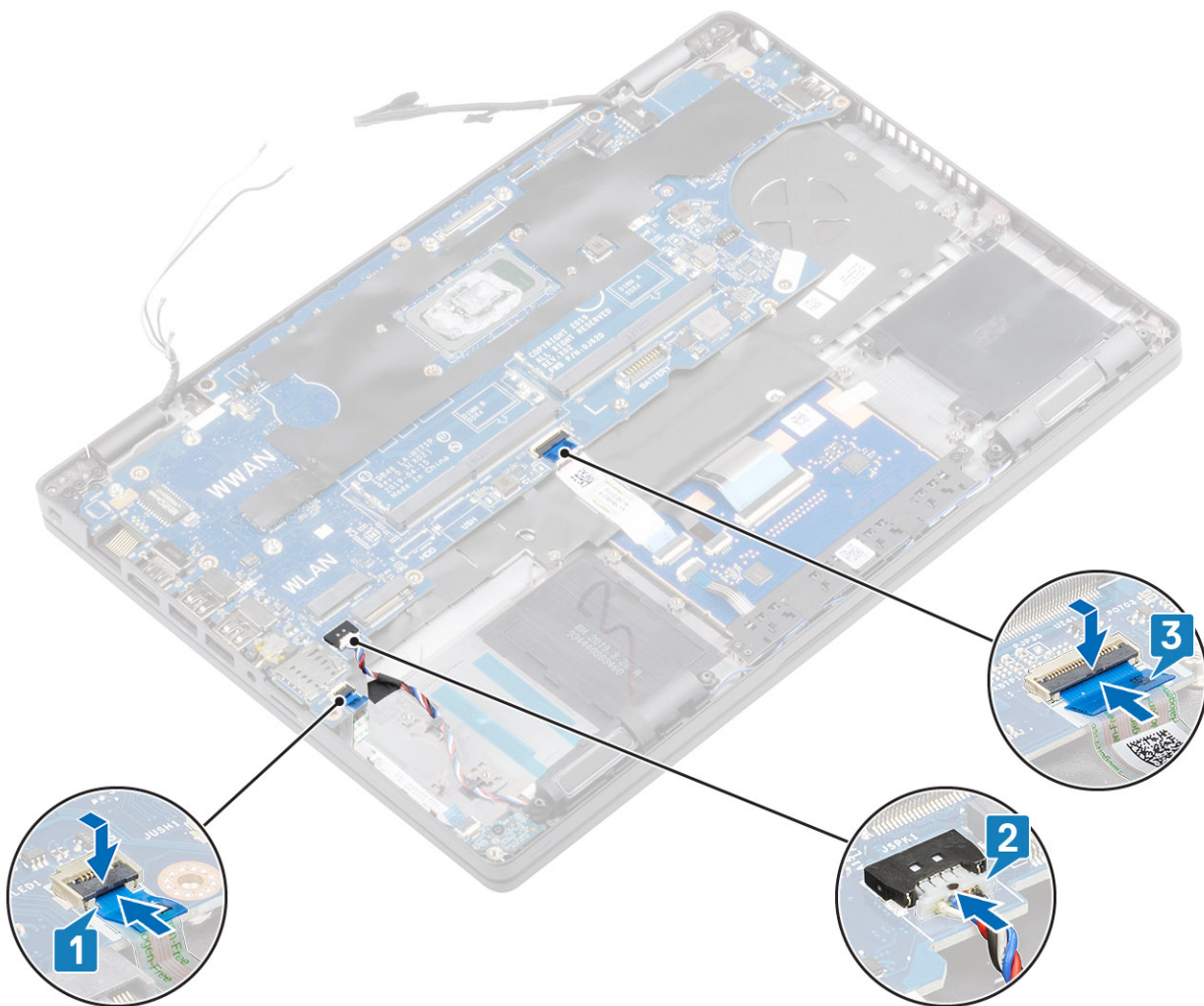
### Steps

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

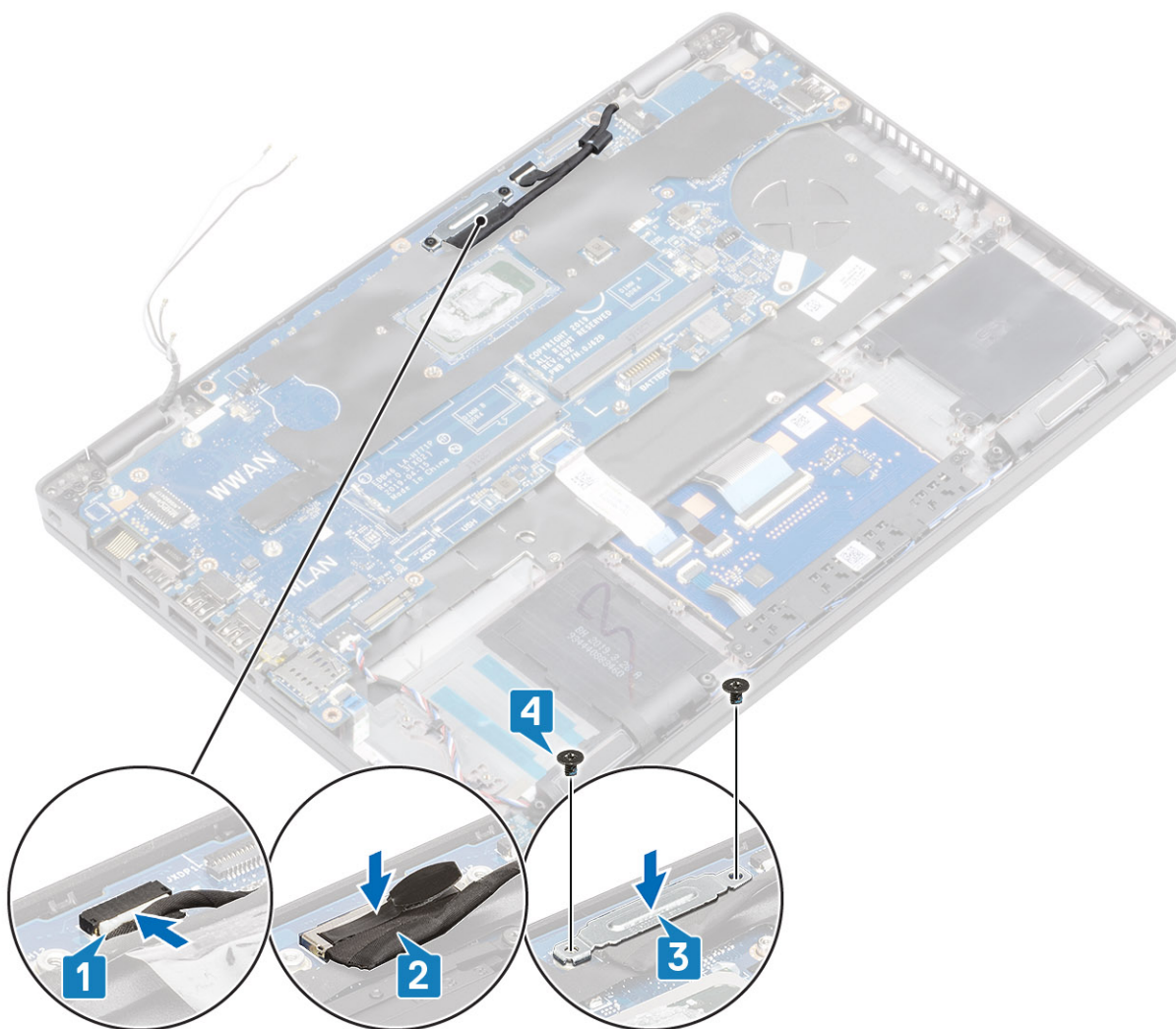




3. Connect the following cables:
- a. Speaker cable [2].
  - b. LED board cable [1].
  - c. touchpad cable [3].



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



### Next steps

1. Install the [System fan](#).
2. Install the [Heatsink](#).
3. Install the [Inner frame](#).
4. Install the [coin cell battery](#).
5. Install the [DC-in](#).
6. Install the [memory module](#).
7. Install the [WLAN](#).
8. Install the [WWAN](#).
9. Install the [battery](#).
10. Install the [base cover](#).
11. Install the [microSD card](#).
12. Follow the procedure in [After working on your computer](#).

## Keyboard

### Removing the keyboard

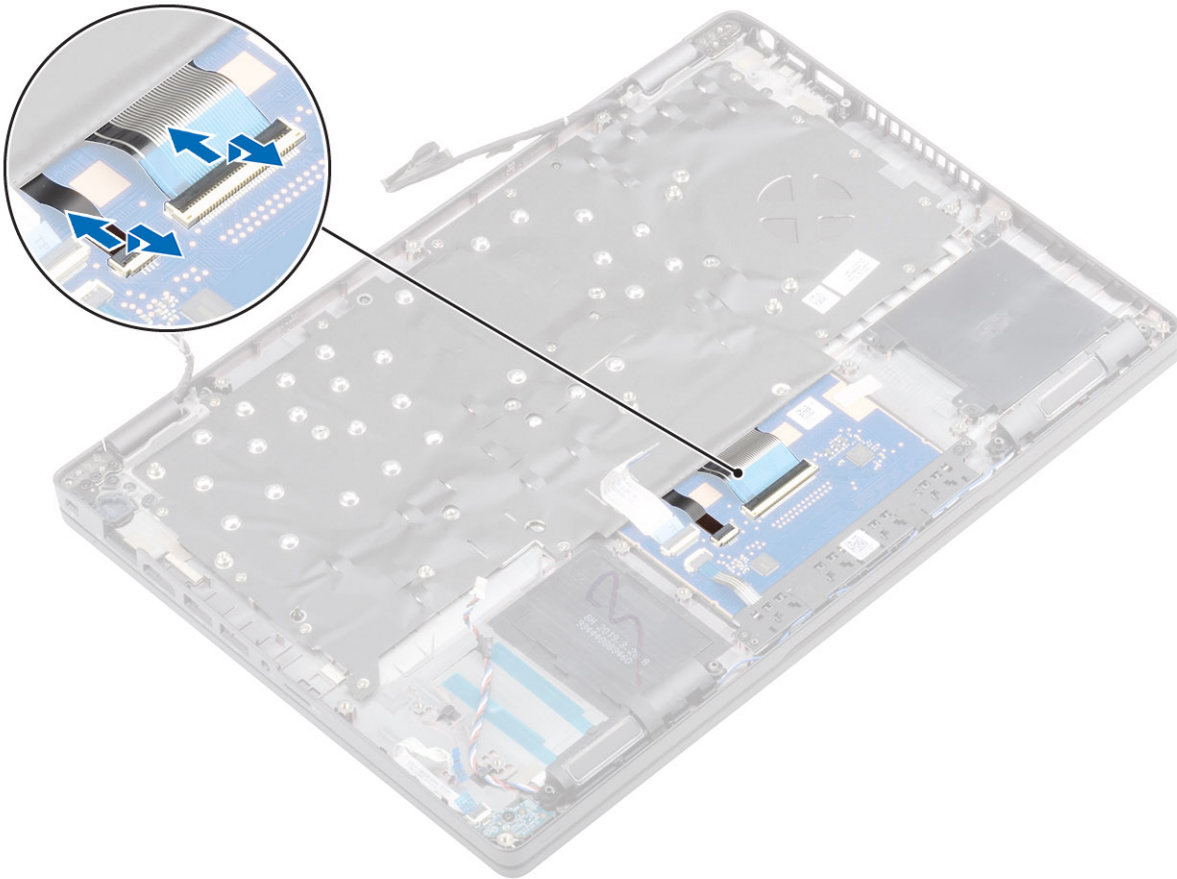
#### Prerequisites

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

3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [WWAN](#).
6. Remove the [WLAN](#).
7. Remove the [memory module](#).
8. Remove the [DC-in port](#).
9. Remove the [Coin cell battery](#).

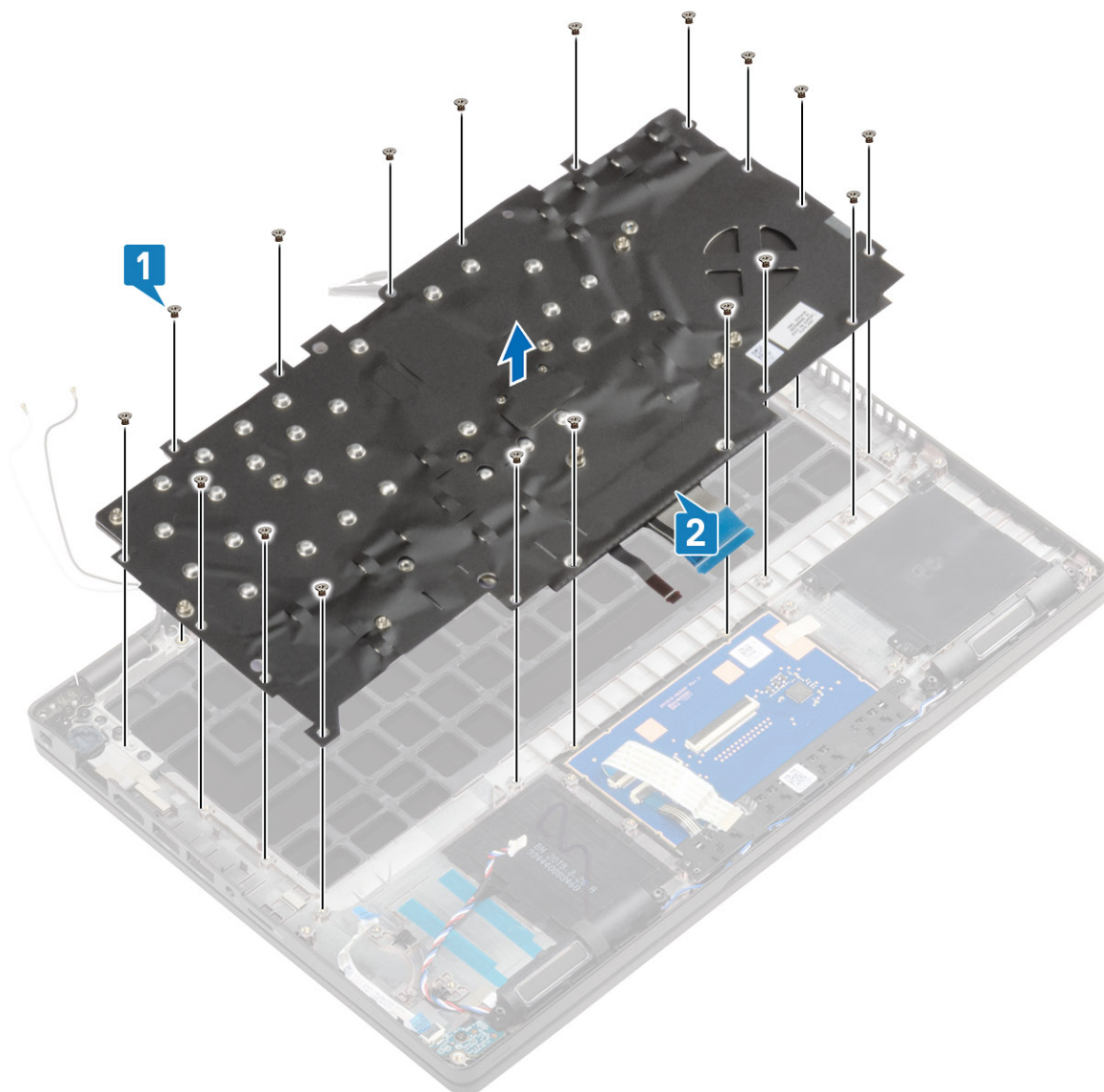
### Steps

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



2. Remove the M2x2.5 screws that secure the keyboard to the palmrest [1].
3. Remove the keyboard away from the computer [2]. The touchpad FFC covers one of the screws that secure the keyboard assembly to the palmrest.



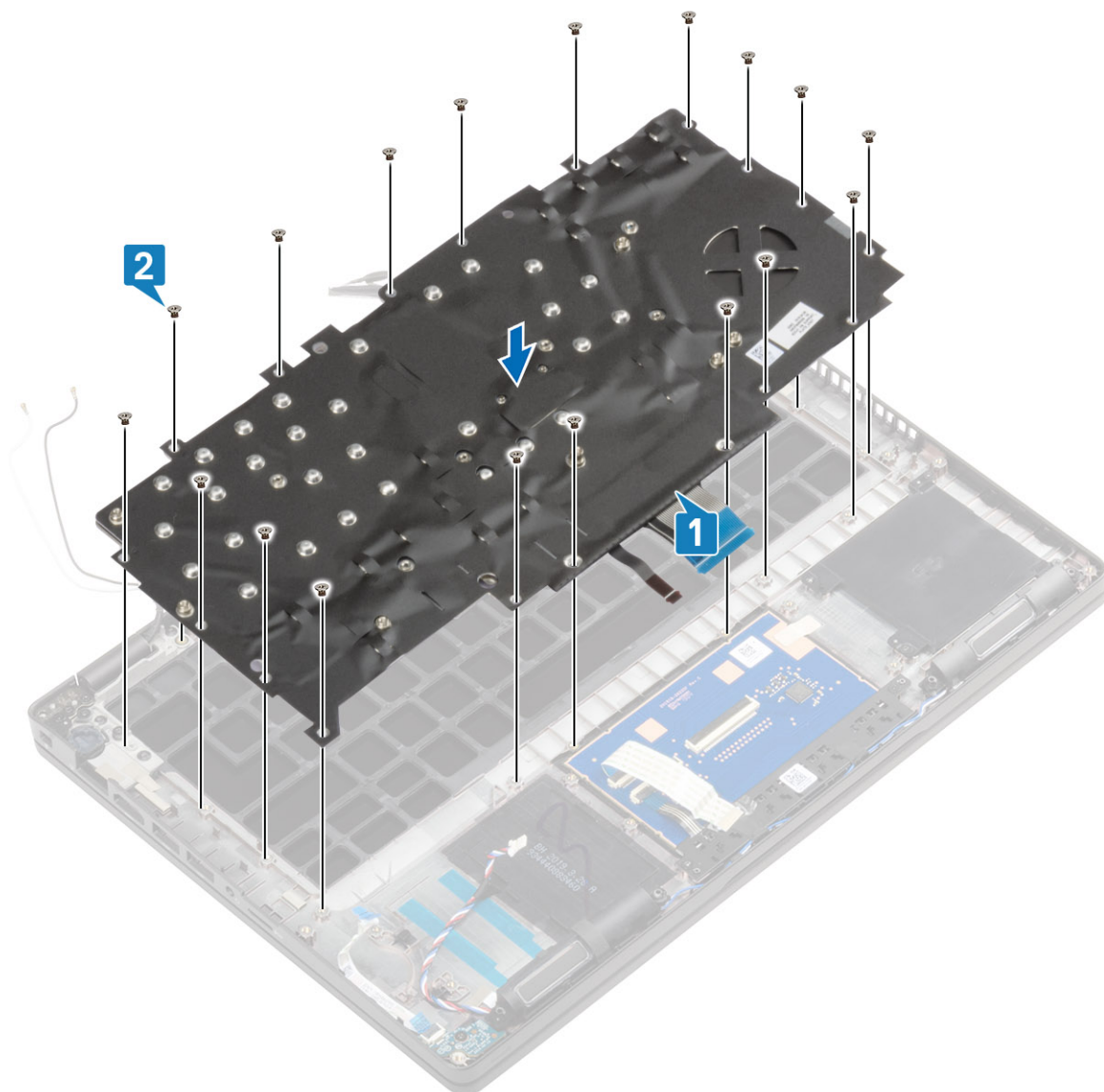


## Installing the keyboard

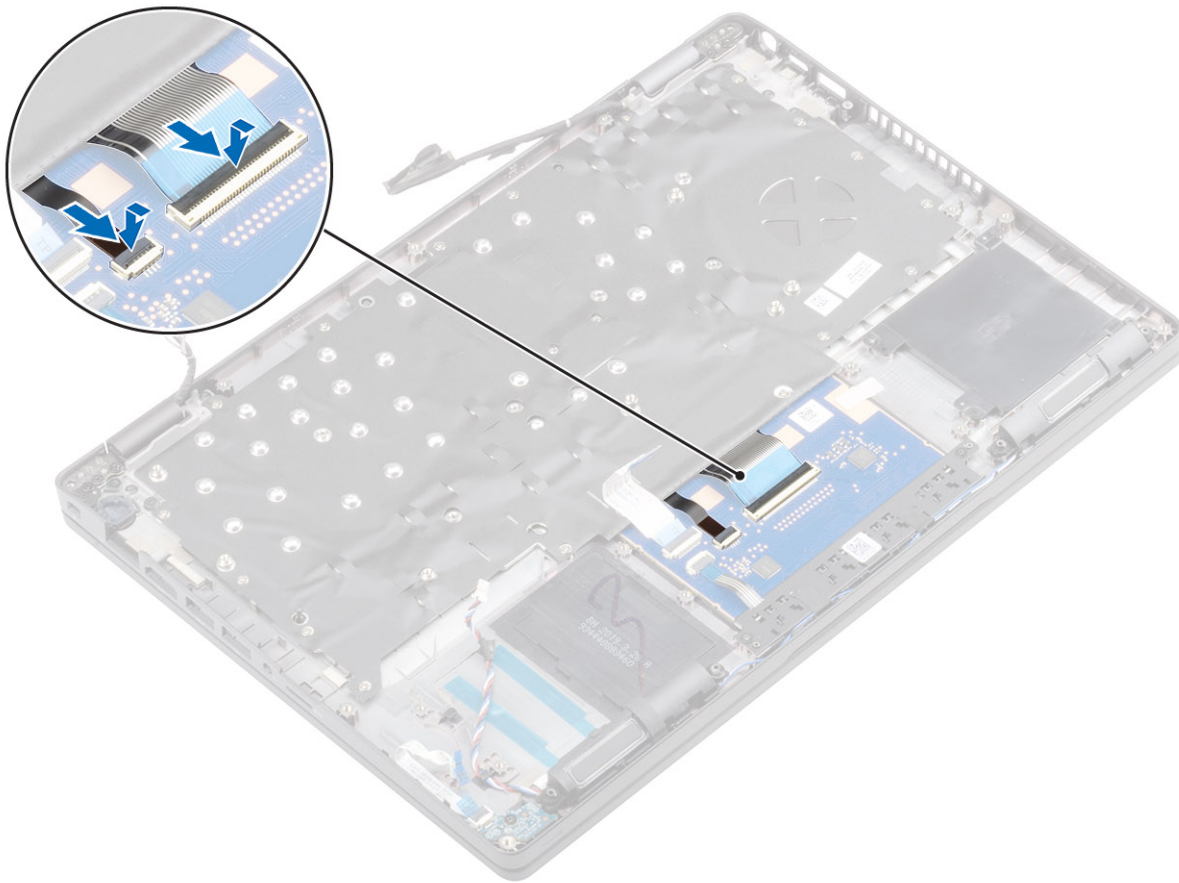
### Steps

1. Align and place the keyboard on the palmrest [1].
2. Replace the 18 (M2x2.5) screws to secure the keyboard to the palmrest [2].





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



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

#### Next steps

1. Install the [coin cell battery](#).
2. Install the [DC-in](#).
3. Install the [memory module](#).
4. Install the [WLAN](#).
5. Install the [WWAN](#).
6. Install the [battery](#).
7. Install the [base cover](#).
8. Install the [microSD card](#).
9. Follow the procedure in [After working on your computer](#).

## Keyboard bracket

### Removing the keyboard bracket

#### Prerequisites

1. Follow the procedure in [before working with your computer](#).
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [WWAN](#).
6. Remove the [WLAN](#).
7. Remove the [memory module](#).
8. Remove the [DC-in port](#).

9. Remove the [Coin cell battery](#).
10. Remove the [Inner frame](#).
11. Remove the [heatsink](#).
12. Remove the [system fan](#).
13. Remove the [speaker](#).
14. Remove the [LED board](#).
15. Remove the [system board](#).
16. Remove the [keyboard](#).

### Steps

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

## Installing the keyboard bracket

### Steps

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

### Next steps

1. Install the [keyboard](#).
2. Install the [system board](#).
3. Install the [LED board](#).
4. Install the [speaker](#).
5. Install the [System fan](#).
6. Install the [Heatsink](#).
7. Install the [Inner frame](#).
8. Install the [coin cell battery](#).
9. Install the [DC-in](#).
10. Install the [memory module](#).
11. Install the [WLAN](#).
12. Install the [WWAN](#).
13. Install the [battery](#).
14. Install the [base cover](#).
15. Install the [microSD card](#).
16. Follow the procedure in [After working on your computer](#).

## Power button

## Removing the power button

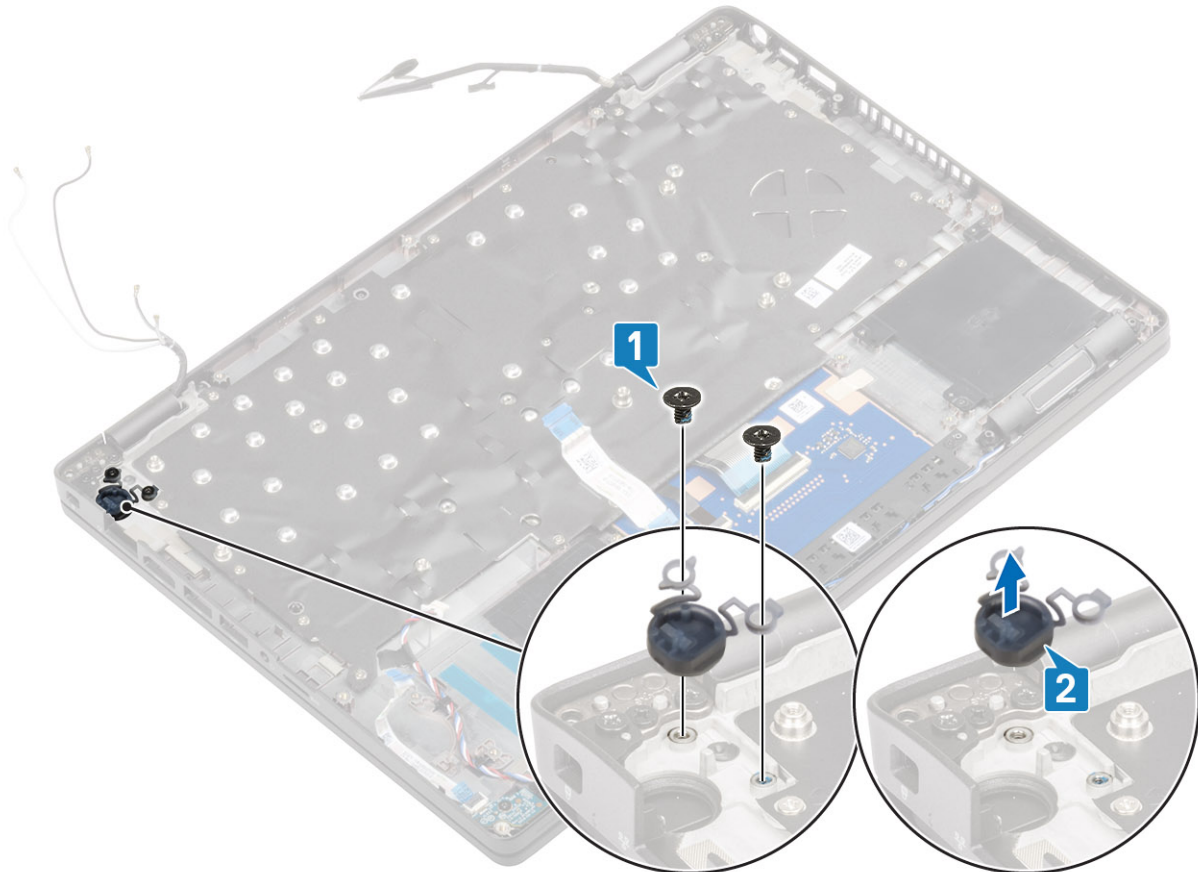
### Prerequisites

1. Follow the procedure in [before working with your computer](#).
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [WWAN](#).
6. Remove the [WLAN](#).
7. Remove the [memory module](#).
8. Remove the [DC-in port](#).
9. Remove the [Coin cell battery](#).
10. Remove the [Inner frame](#).
11. Remove the [heatsink](#).

12. Remove the [system fan](#).
13. Remove the [speaker](#).
14. Remove the [LED board](#).
15. Remove the [system board](#).
16. Remove the [keyboard](#).

### Steps

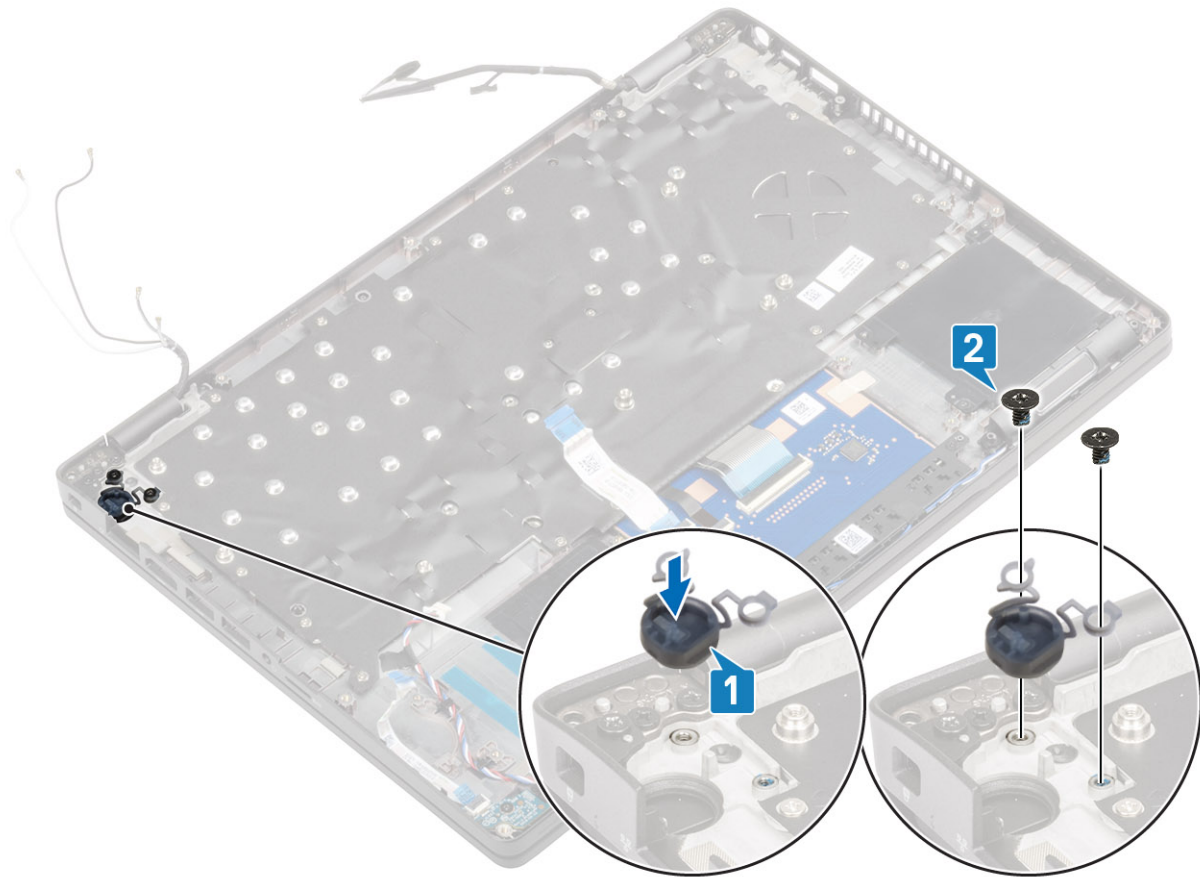
1. Remove the two (M2x3) screws that secure the power button with the fingerprint reader on the palmrest [1].
2. Lift the power button with fingerprint reader board off the palmrest [2].



## Installing the power button

### Steps

1. Place the power button with fingerprint reader on the palmrest [1].
2. Replace the two (M2x3) screws that secure the power button with fingerprint reader on the palmrest [2].



### Next steps

1. Install the [keyboard](#).
2. Install the [system board](#).
3. Install the [LED board](#).
4. Install the [speaker](#).
5. Install the [System fan](#).
6. Install the [Heatsink](#).
7. Install the [Inner frame](#).
8. Install the [coin cell battery](#).
9. Install the [DC-in](#).
10. Install the [memory module](#).
11. Install the [WLAN](#).
12. Install the [WWAN](#).
13. Install the [battery](#).
14. Install the [base cover](#).
15. Install the [microSD card](#).
16. Follow the procedure in [After working on your computer](#).

## Display assembly

### Removing the display assembly

#### Prerequisites

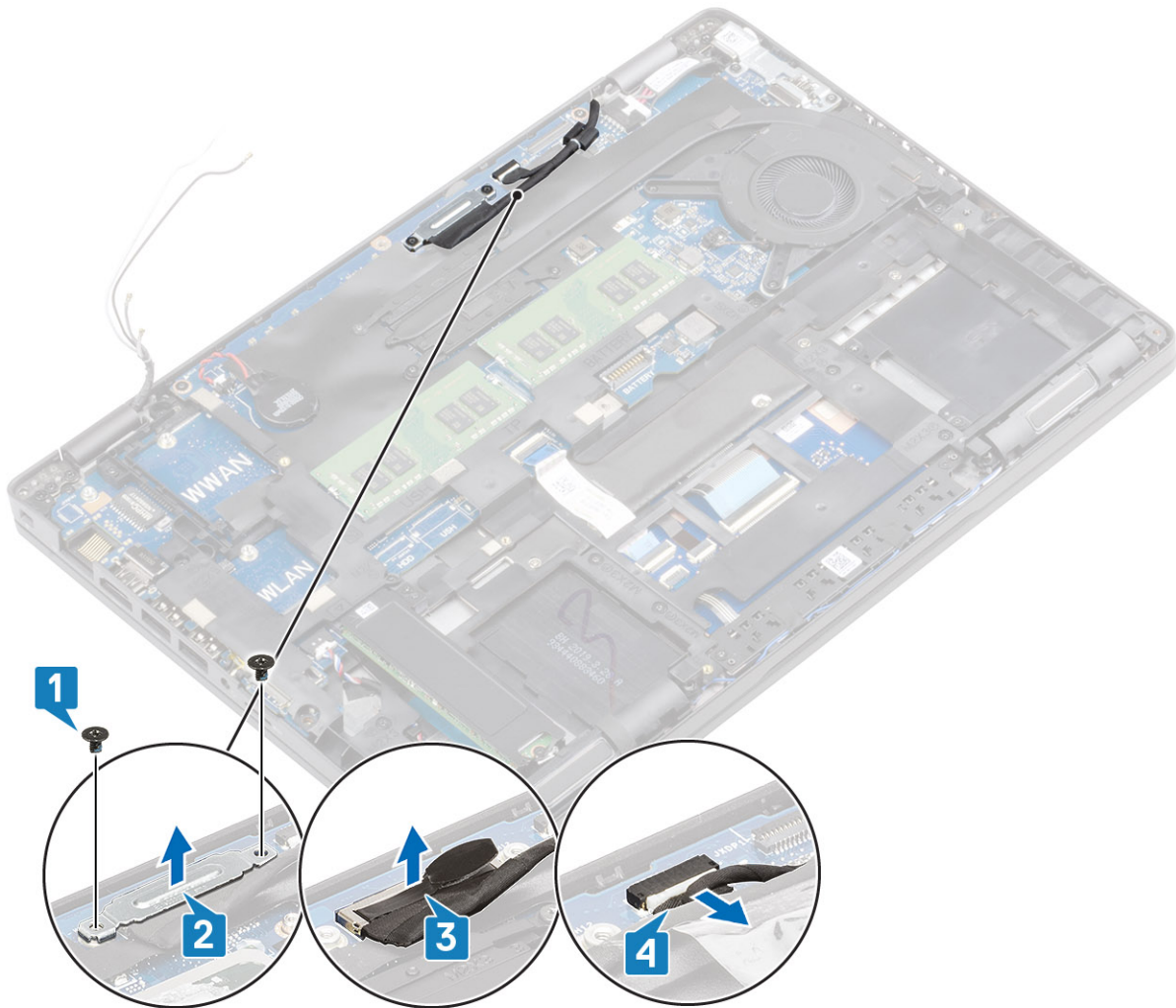
1. Follow the procedure in [before working with your computer](#).
2. Remove the [microSD card](#).



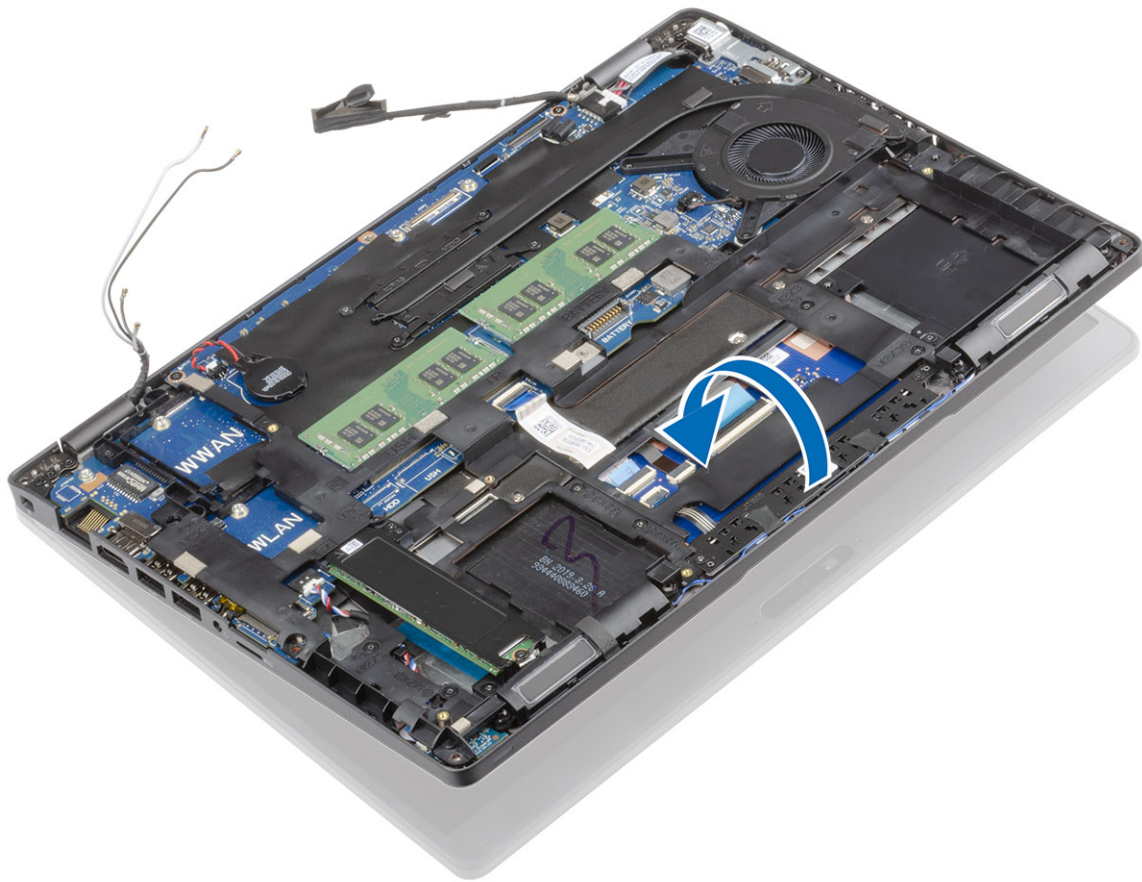
3. Remove the [base cover](#).
4. Remove the [battery](#).

### Steps

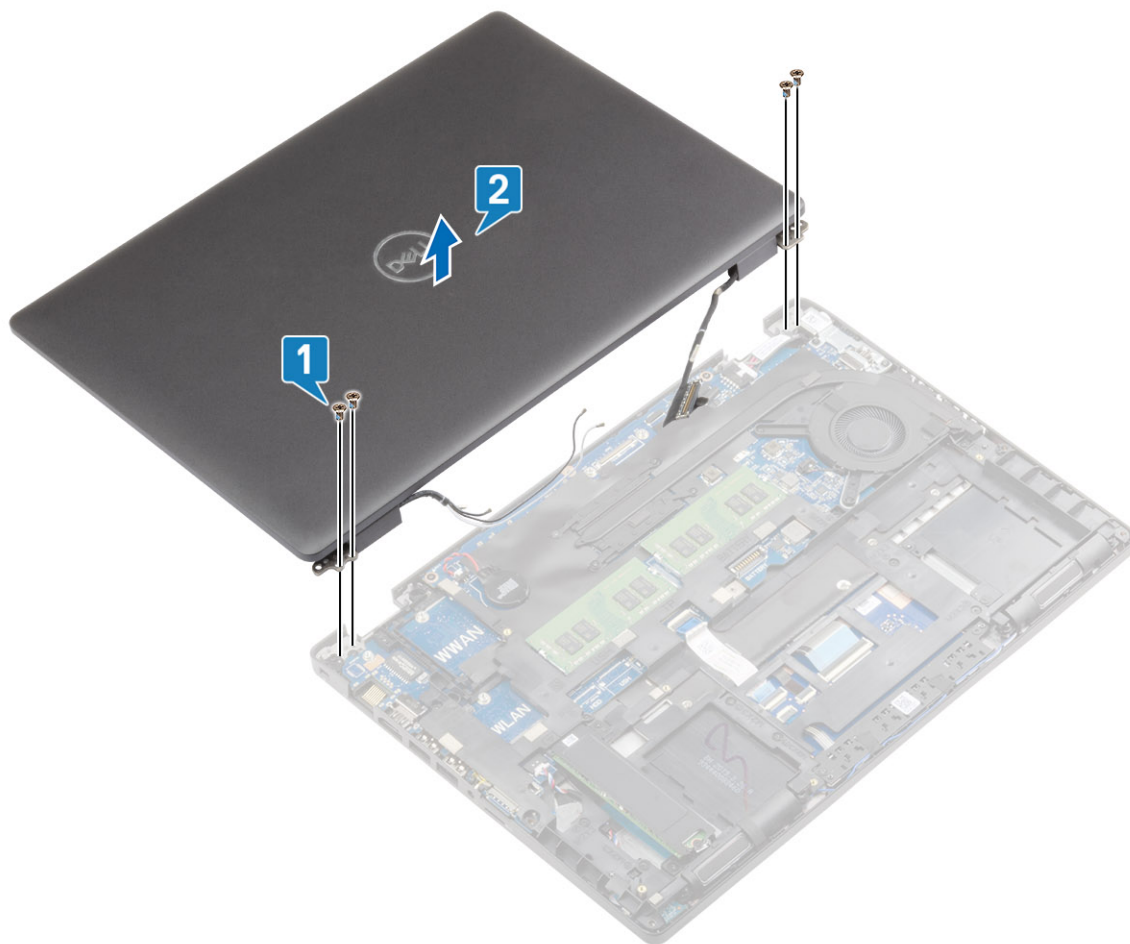
1. Peel the adhesive tape and disconnect the cable from the connector on the system board [1].
2. Remove the two (M2x4) screws that secures the eDP cable bracket to the system board [2].
3. Lift the eDP cable bracket from the system board [3].
4. Disconnect and unroute the eDP cable [4].



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



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



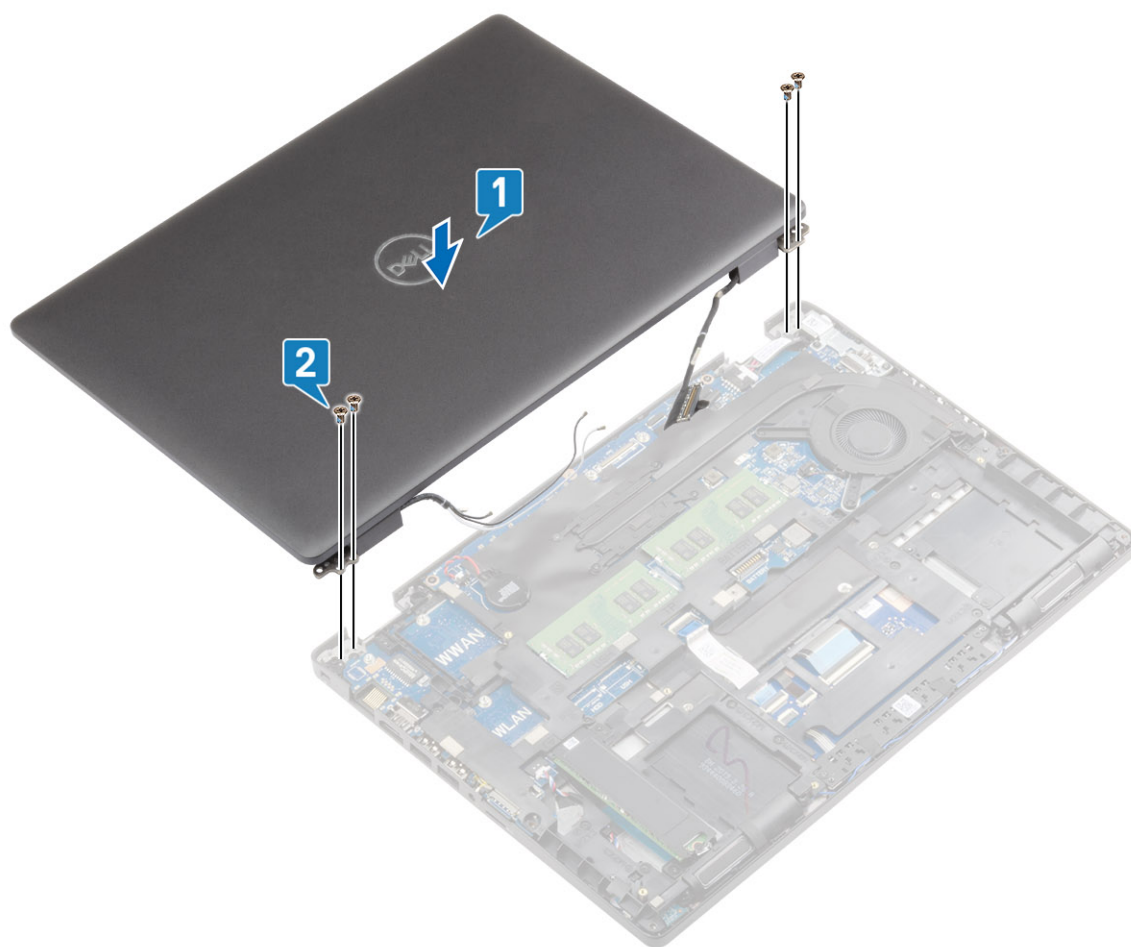
## Installing the display assembly

### About this task

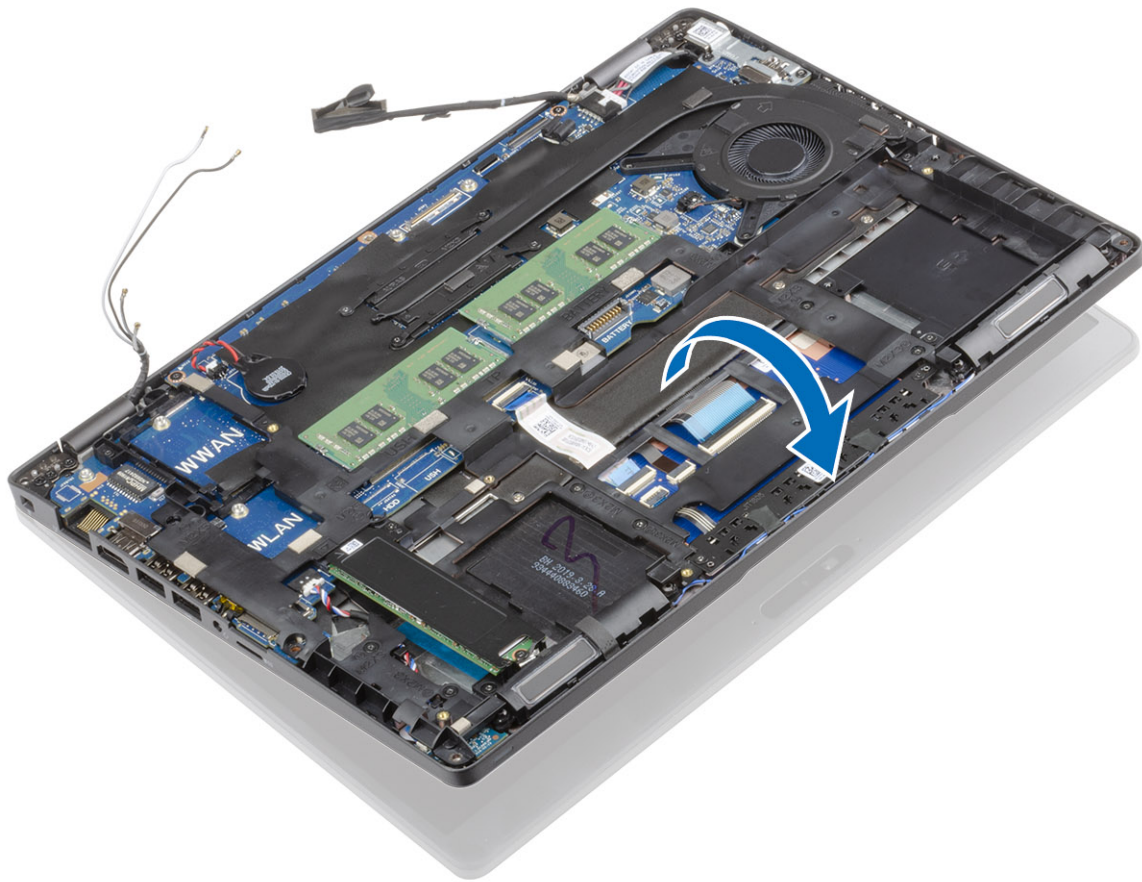
**NOTE:** Ensure that the hinges are opened to the maximum before replacing the display assembly on the palmrest and keyboard assembly.

### Steps

1. Align and place the system chassis under the hinges of the display assembly [1].
2. Replace the four (M2.5x3) screws that secures the display assembly to the system chassis [2].

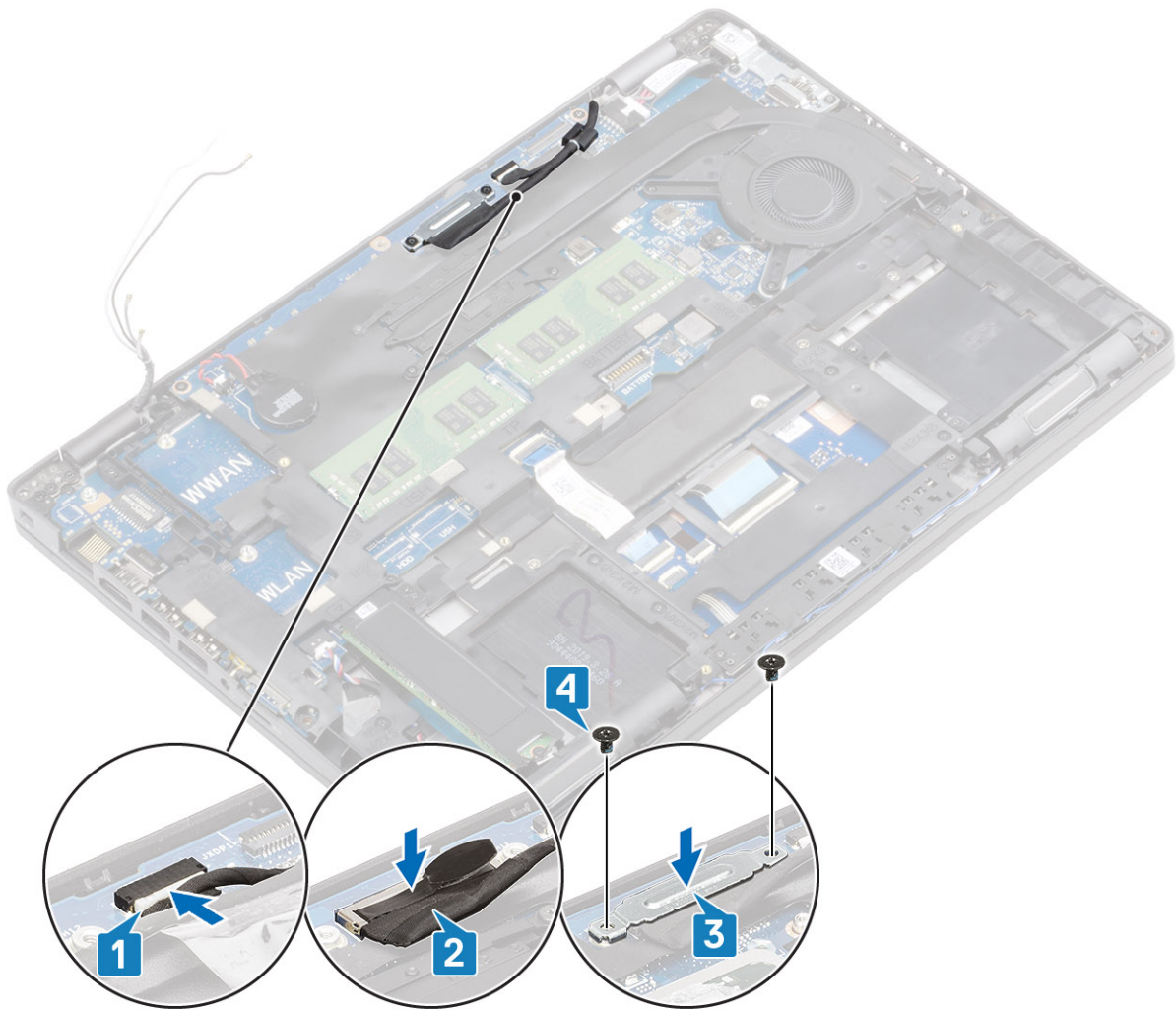


3. Seat the system chassis on the display assembly.



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





#### Next steps

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

## Display bezel

### Removing display bezel

#### Prerequisites

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

#### Steps

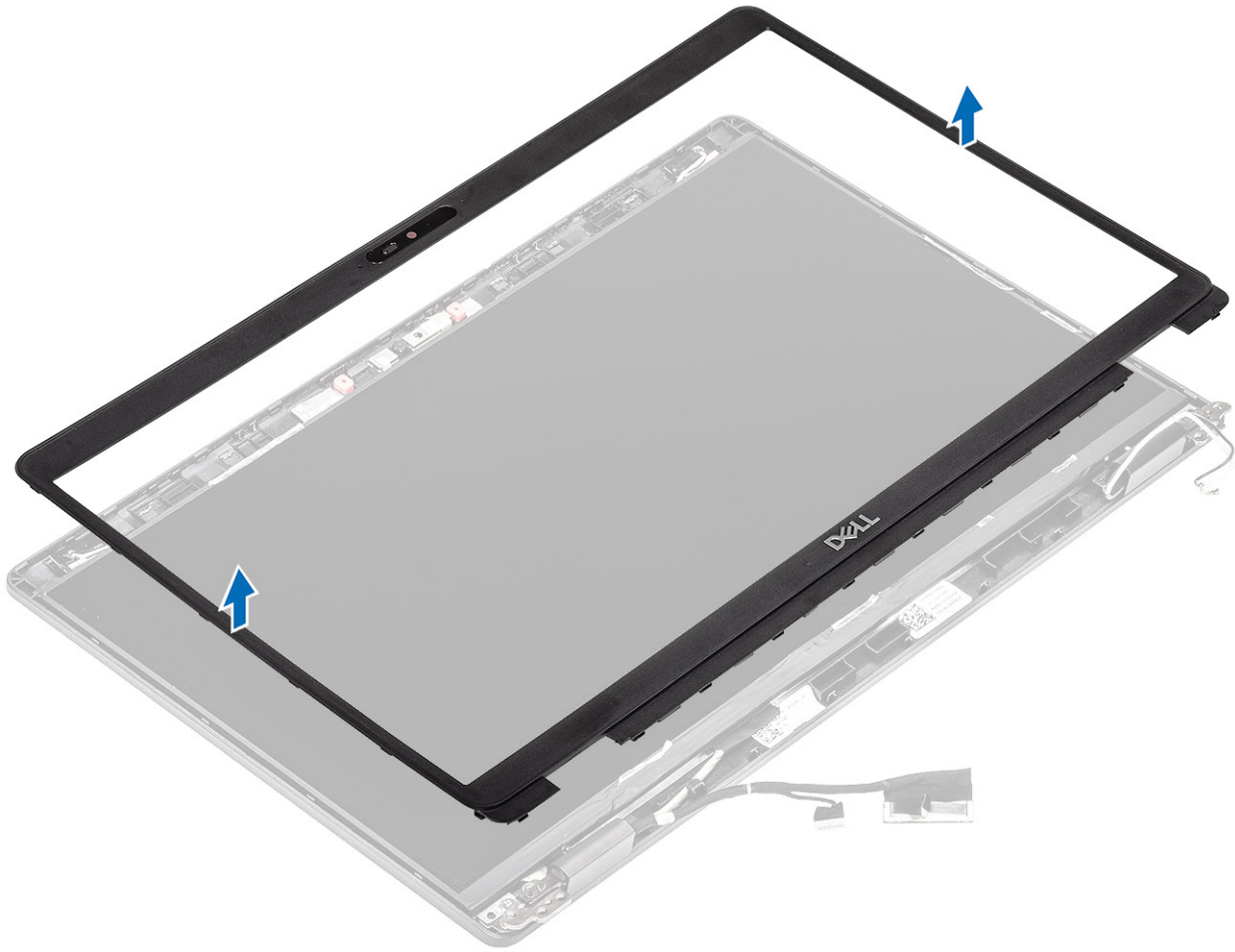
1.  **NOTE:** Display bezel cannot be reused after being removed.

Use a plastic scribe to carefully pry open the recesses near the left and right hinges on the bottom edge of the display bezel [1]. When prying open the display bezel, ensure to pry along the outside edge of the display bezel using your hands or plastic scribes—using a screw driver or other sharp objects may damage the display cover.

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



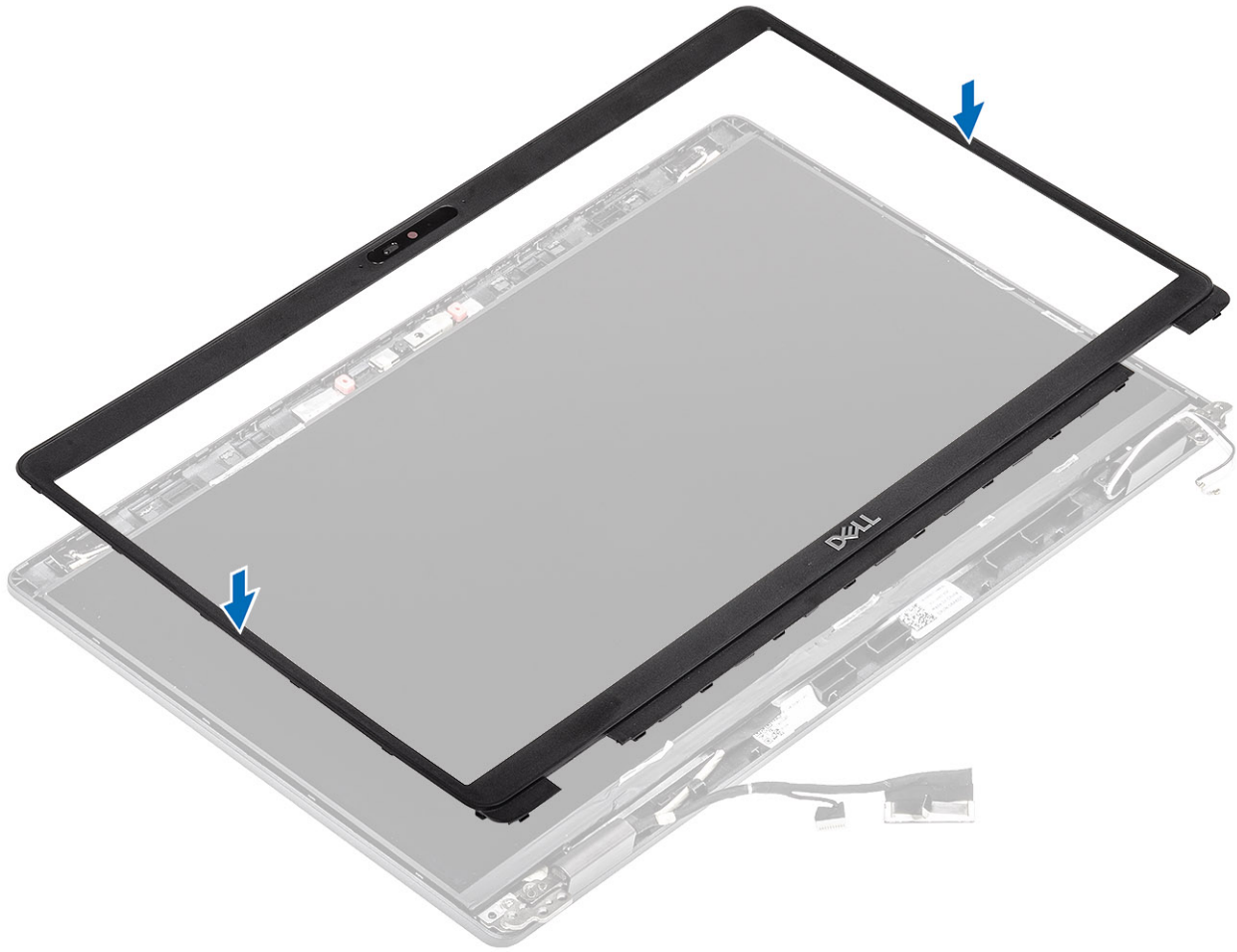
3. Lift the display bezel from the display assembly.

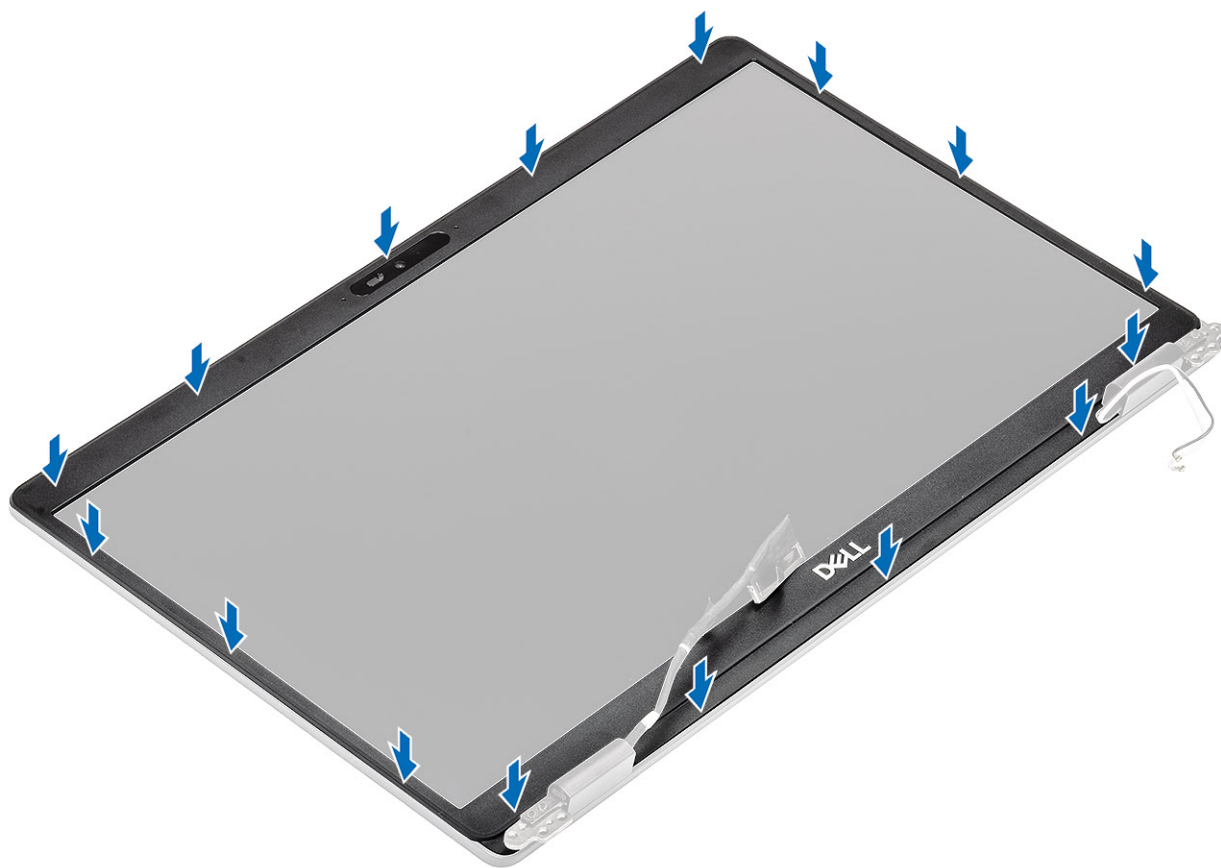


## Installing the display bezel

### Steps

Align the display bezel with the display assembly, and then gently snap the display bezel into place.





#### Next steps

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

## Display panel

### Removing display panel

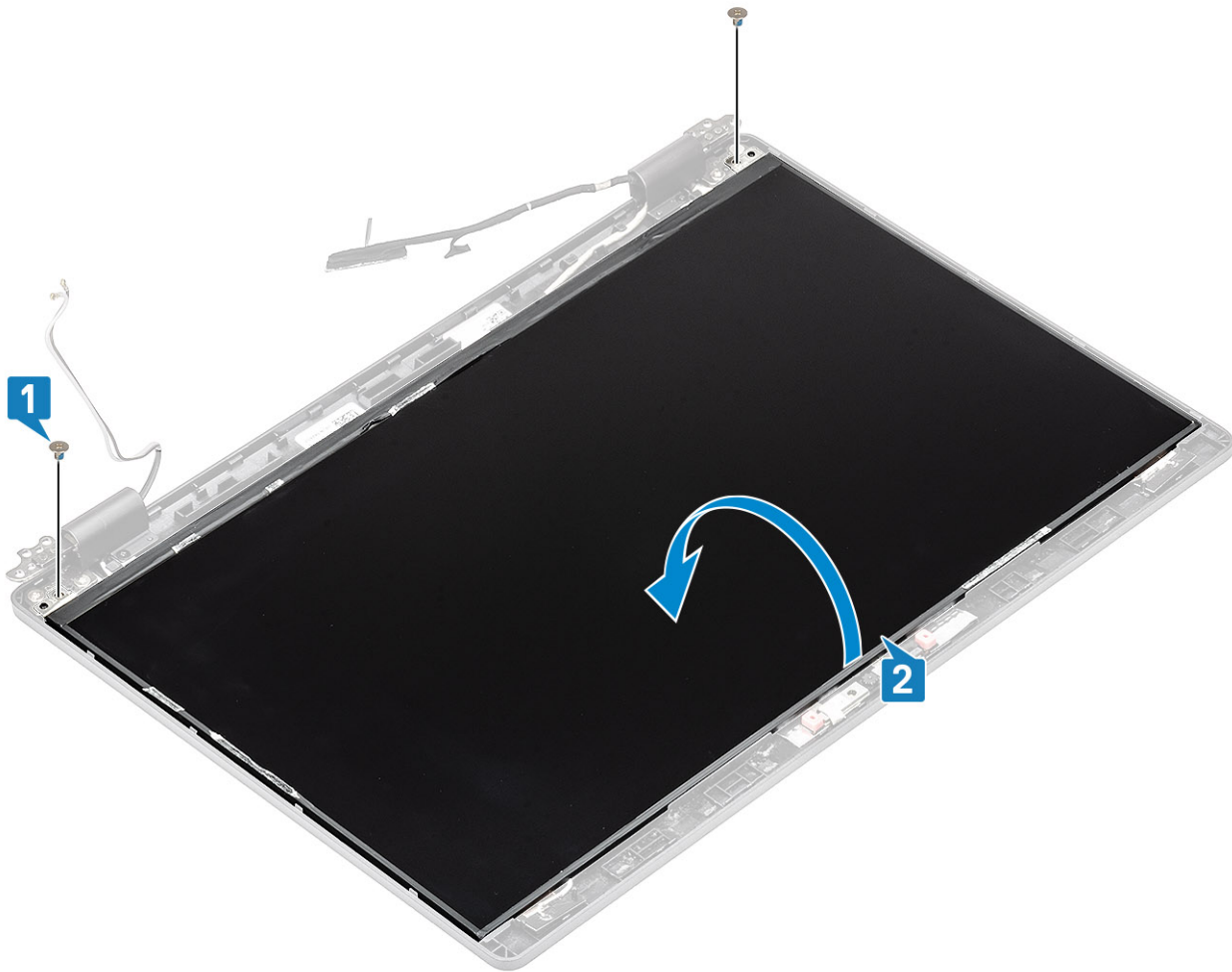
#### Prerequisites

1. Follow the procedure in [before working with your computer](#).
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [WWAN](#).
6. Remove the [WLAN](#).
7. Remove the [inner frame](#).
8. Remove the [display assembly](#).
9. Remove the [Display hinges](#).

#### Steps

1. Remove the (M2.5x3) screws that secure the display panel to the display assembly [1] and lift to turn over the display panel to access the display cable [2].





2. Peel the conductive tape [1] on the display cable connector.
3. Remove the adhesive strip that secures the display cable connector [2]
4. Lift the latch and disconnect the display cable from the connector on the display panel. Do not pull and release the Stretch (SR) Tapes from the display panel. There is no need to separate the brackets from the display panel [3,4].



## Installing display panel

### Steps

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



3. Adhere the conductive tape to secure the display cable connector . LCD Panel comes with two (L+R) brackets that needs to toe-in first, then secure two screws located at the base of the LCD panel.
4. Replace the two (M2.5x3) screws that secure the display panel to the display assembly.



### Next steps

1. Install the [Display hinges](#).
2. Install the [display assembly](#).
3. Install the [battery](#).
4. Install the [base cover](#).
5. Install the [microSD card](#).
6. Install the [WLAN](#).
7. Install the [WWAN](#).
8. Install the [Inner frame](#).
9. Follow the procedure in [After working on your computer](#).

## Camera

### Removing camera

#### Prerequisites

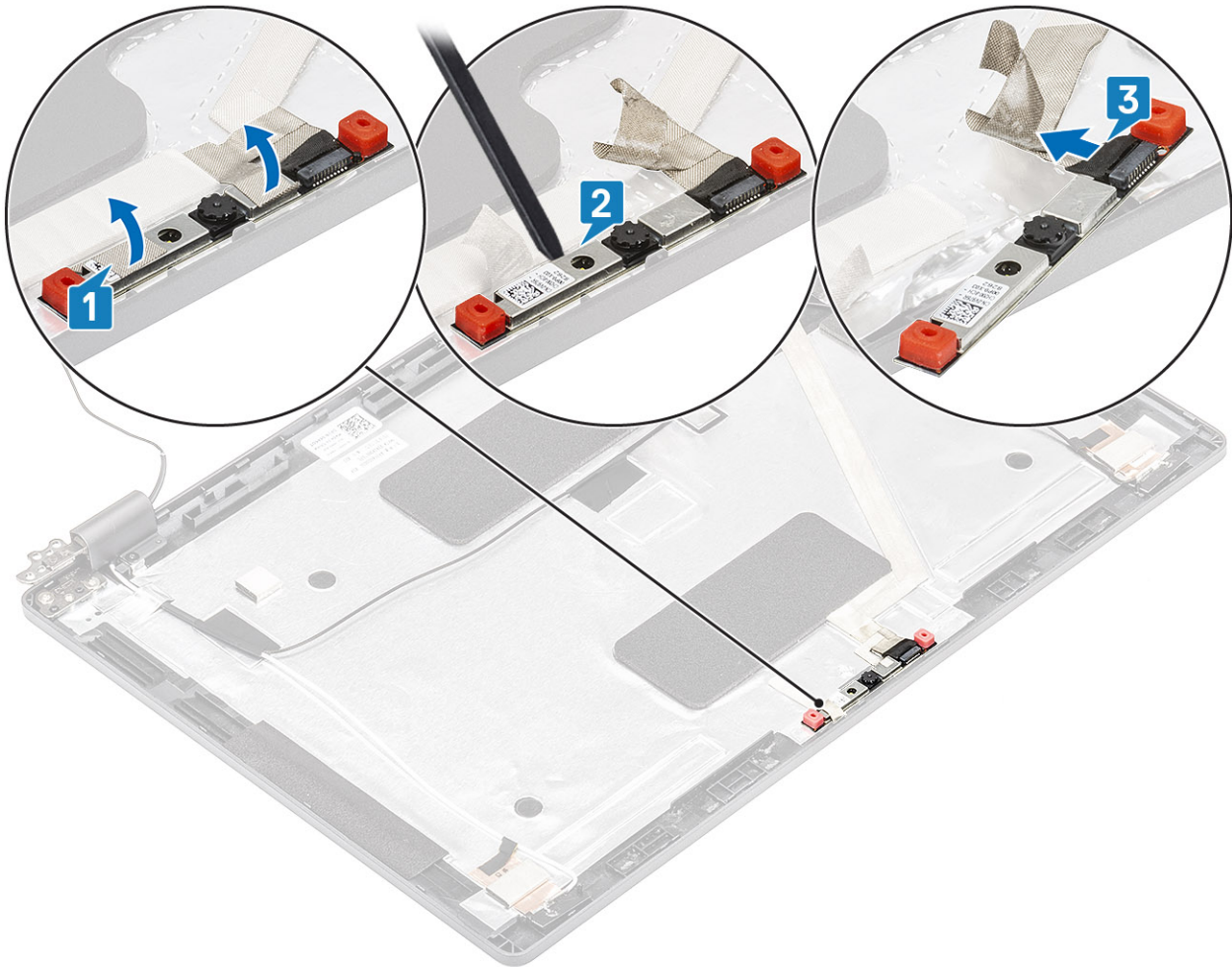
1. Follow the procedure in [before working with your computer](#).
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [WWAN](#).
6. Remove the [WLAN](#).



7. Remove the [Inner frame](#).
8. Remove the [Display hinge](#)
9. Remove the [display assembly](#).

#### Steps

1. Peel the two conductive tape that secures the camera in place [1]
2. Carefully pry and lift the camera module from the display back cover [2].



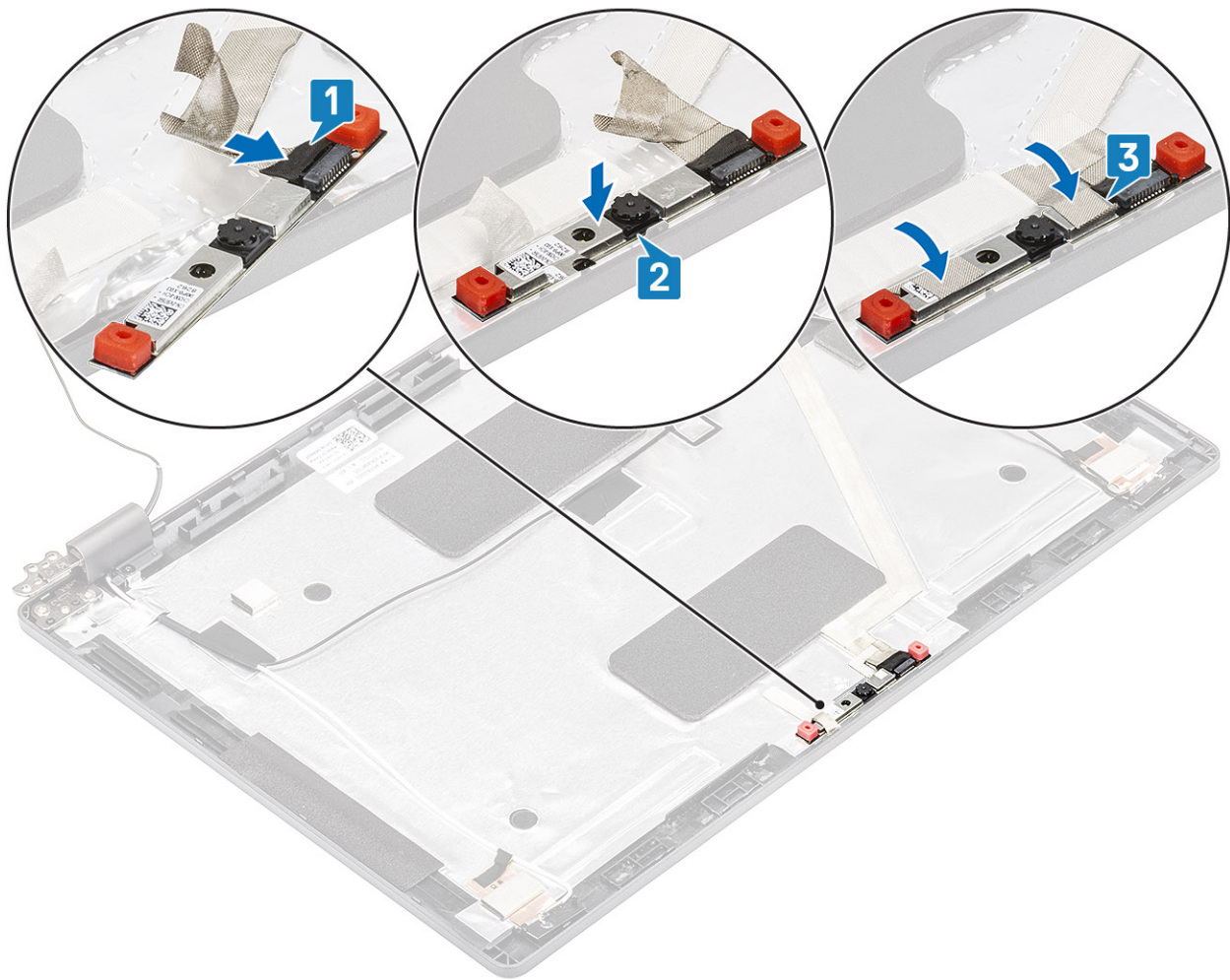
3. Disconnect the camera cable from the connector on the camera module .

## Installing camera

#### Steps

1. Connect the camera cable to the connector on the camera module [1].





2. Insert the camera into the slot on the display back cover .
3. Affix the two conductive tape above the camera [2].

#### Next steps

1. Install the [display assembly](#).
2. Install the [WLAN](#).
3. Install the [WWAN](#).
4. Install the [battery](#).
5. Install the [base cover](#).
6. Install the [inner frame](#).
7. Install the [microSD card](#).
8. Follow the procedure in [After working on your computer](#).

## Hinge caps

### Removing hinge caps

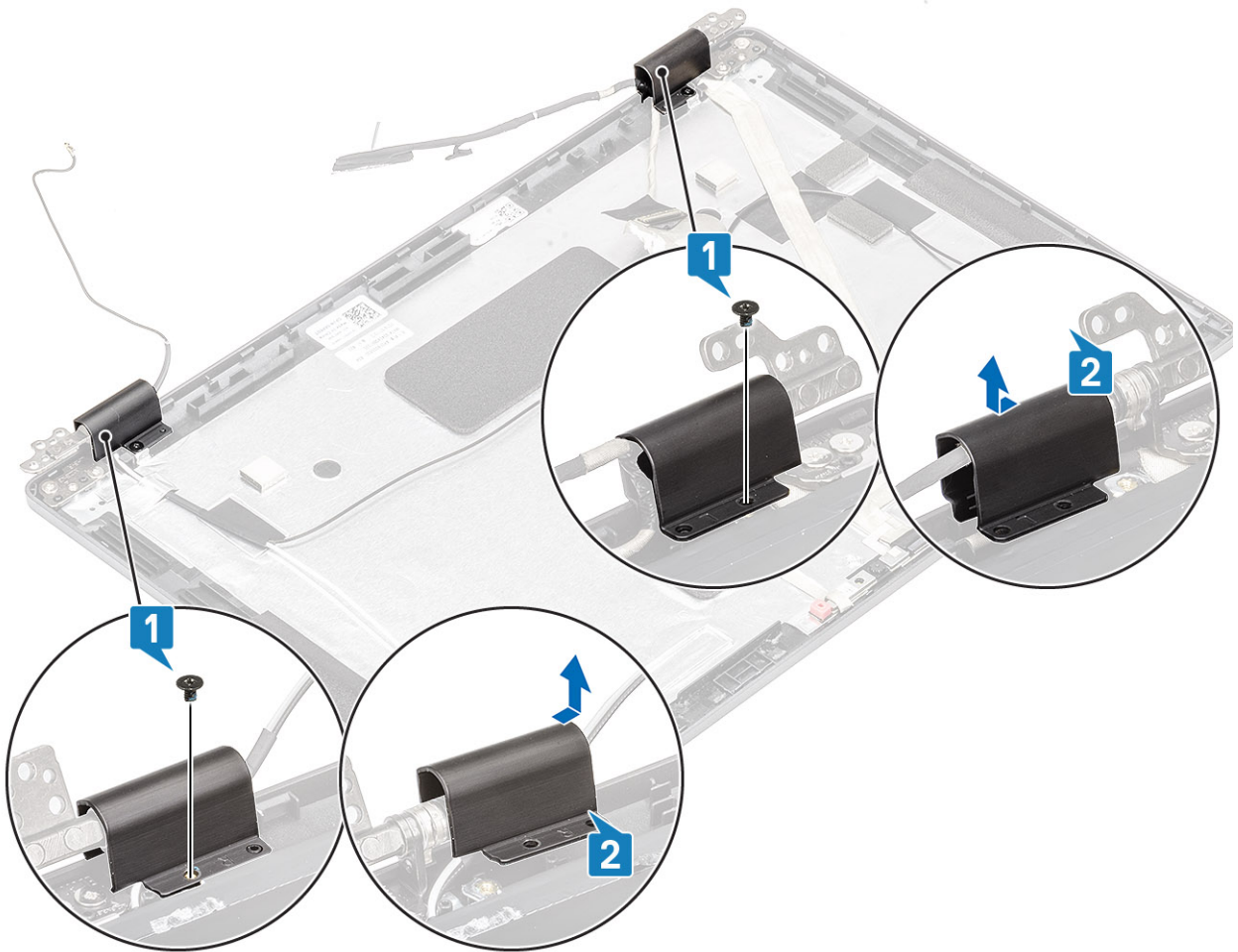
#### Prerequisites

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

6. Remove the [WLAN](#).
7. Remove the [display assembly](#).
8. Remove the [Display panel](#)

### Steps

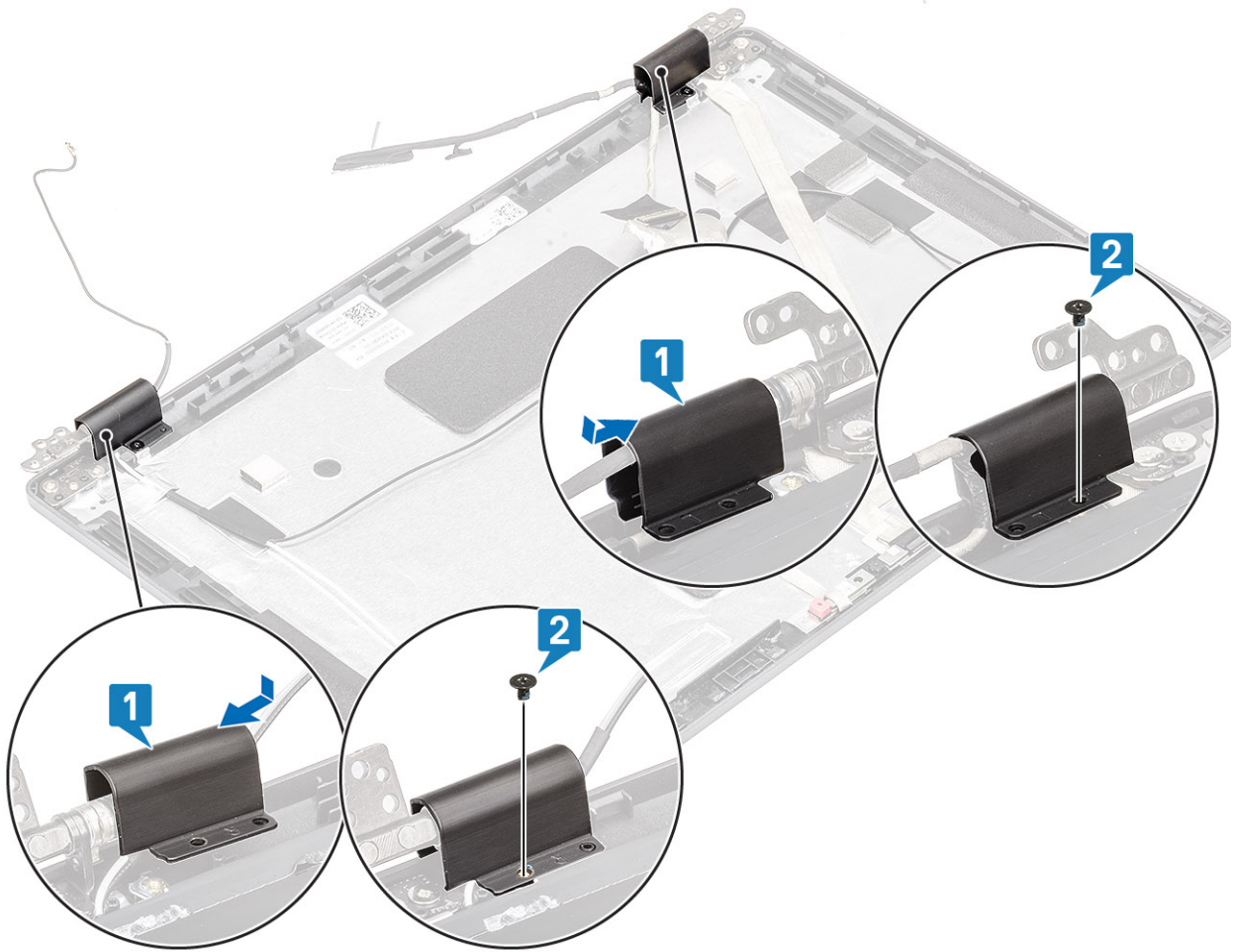
1. Remove the two (M2x3) screws that secure the hinge caps to the chassis [1].
2. Pinch the hinge caps to release the hinge caps from the ribs on the display back cover then slide inwards to remove the hinge caps from the display hinge [2].



## Installing hinge caps

### Steps

1. Place the hinge caps and slide outward on the display hinges [1].
2. Replace the two (M2x3) screws to secure the hinge caps to the display hinge.



#### Next steps

1. Replace the [Display panel](#)
2. Install the [display assembly](#).
3. Install the [WLAN](#).
4. Install the [WWAN](#).
5. Install the [battery](#).
6. Install the [base cover](#).
7. Install the [microSD card](#).
8. Follow the procedure in [After working on your computer](#).

## Display hinges

### Removing display hinge

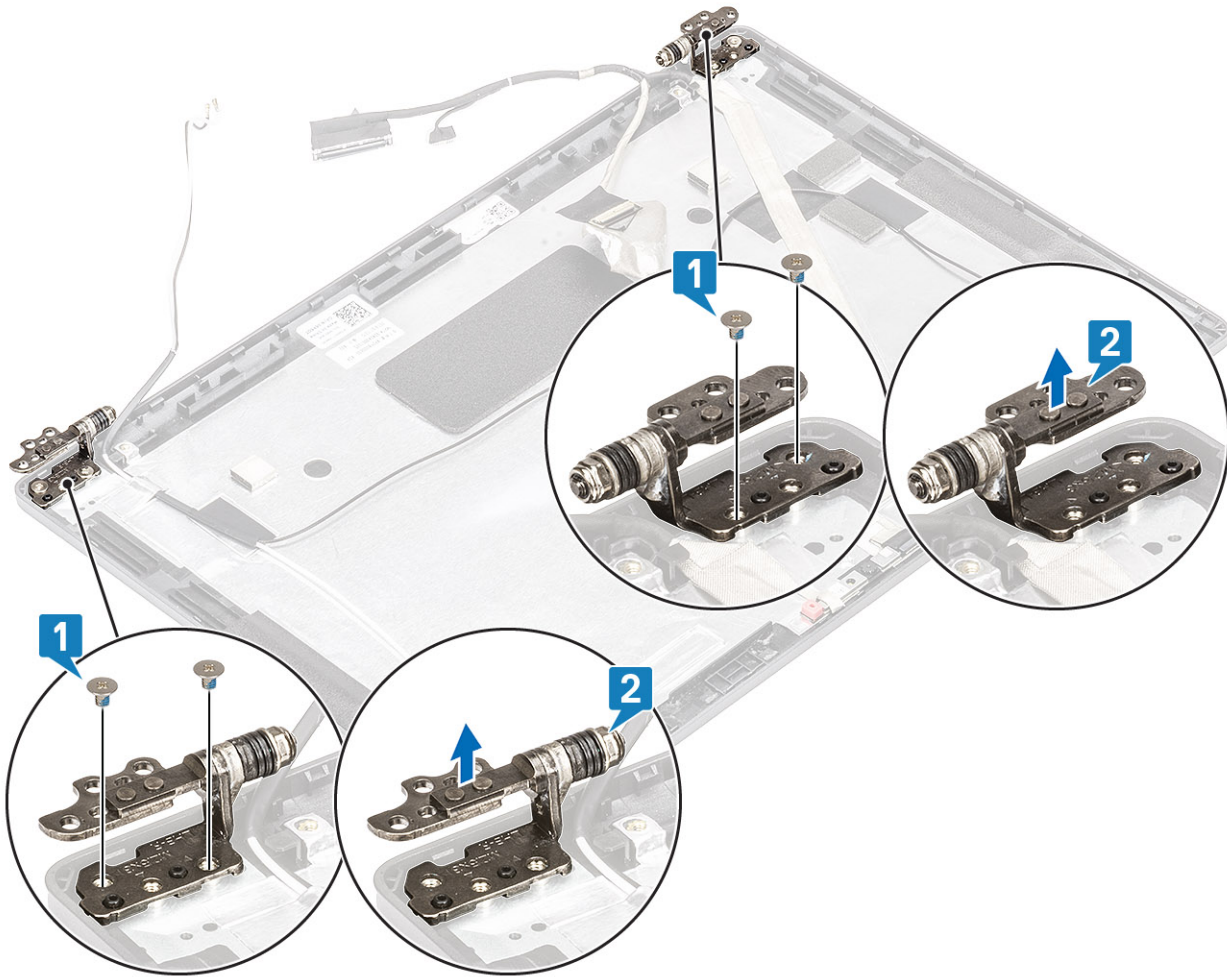
#### Prerequisites

1. Follow the procedure in [before working with your computer](#).
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [WWAN](#).
6. Remove the [WLAN](#).
7. Remove the [Display assembly](#).

8. Remove the [Display panel](#).

#### Steps

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

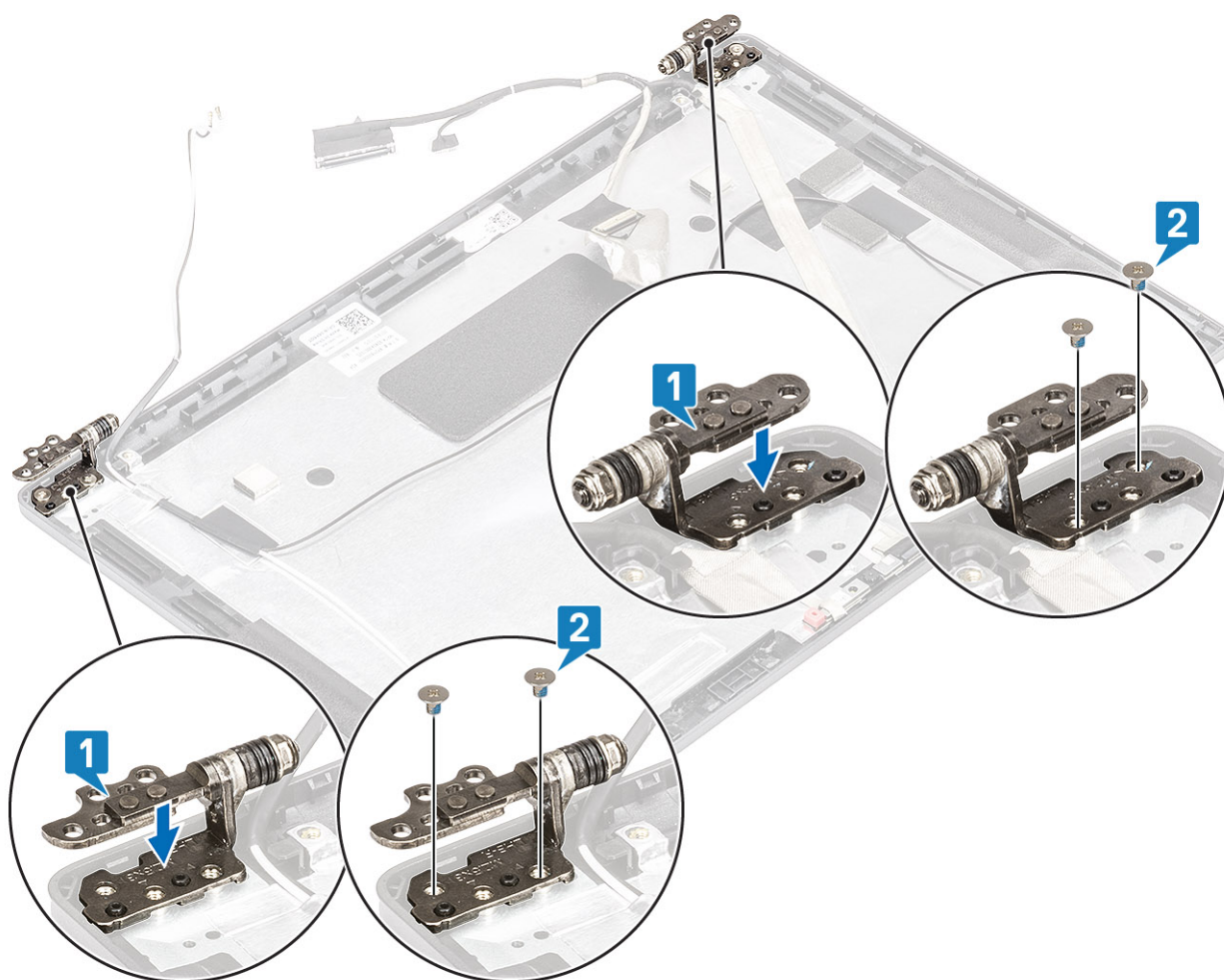


## Installing display hinge

#### Steps

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





- a. Install the [Display panel](#).
- b. Install the [Display assembly](#).
- c. Install the [WLAN](#).
- d. Install the [WWAN](#).
- e. Install the [battery](#).
- f. Install the [base cover](#).
- g. Install the [microSD card](#).
- h. Follow the procedure in [After working on your computer](#).

## Display (eDP) cable

### Removing display cable

#### Prerequisites

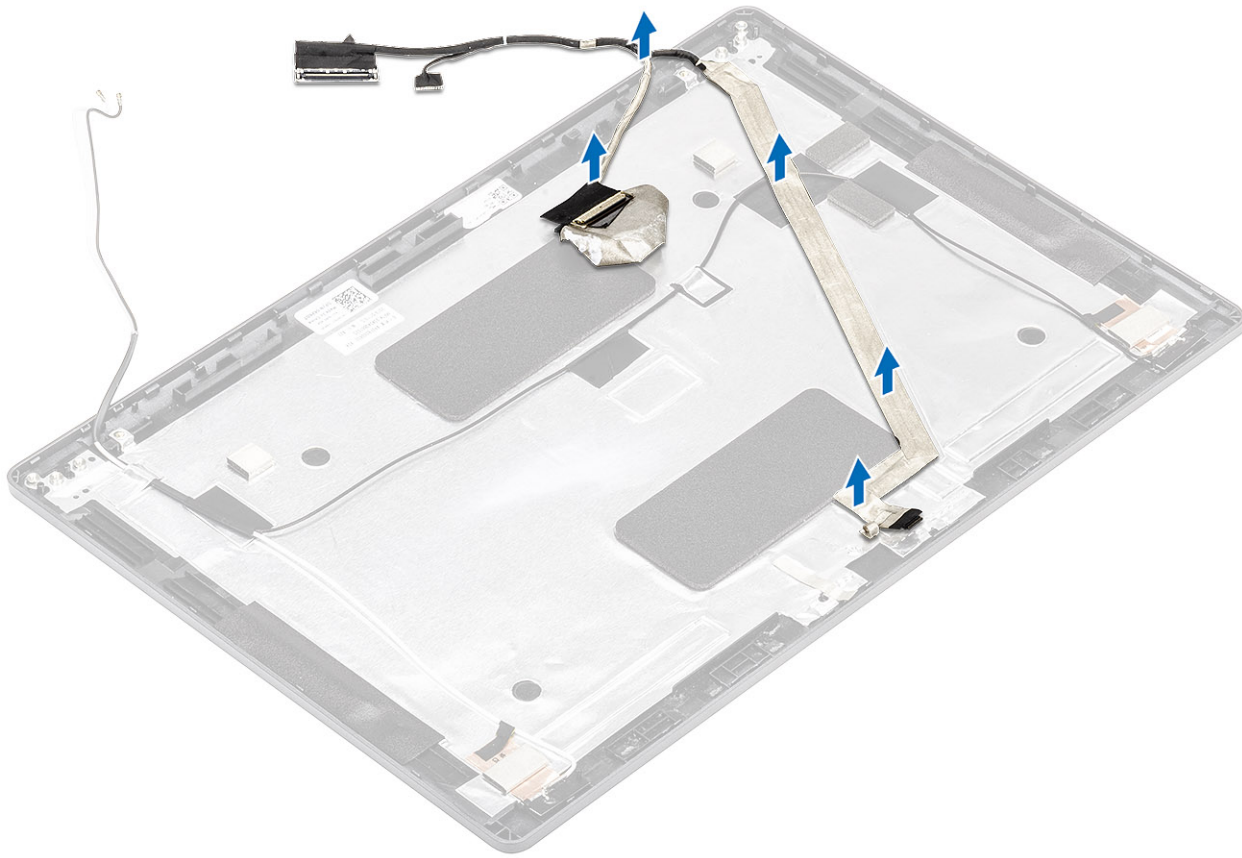
1. Follow the procedure in [before working with your computer](#).
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [WWAN](#).
6. Remove the [WLAN](#).
7. Remove the [display assembly](#).
8. Remove the [Display bezel](#).
9. Remove the [Display hinge](#).



10. Remove the [Display panel](#)
11. Remove the [Camera](#)

### Steps

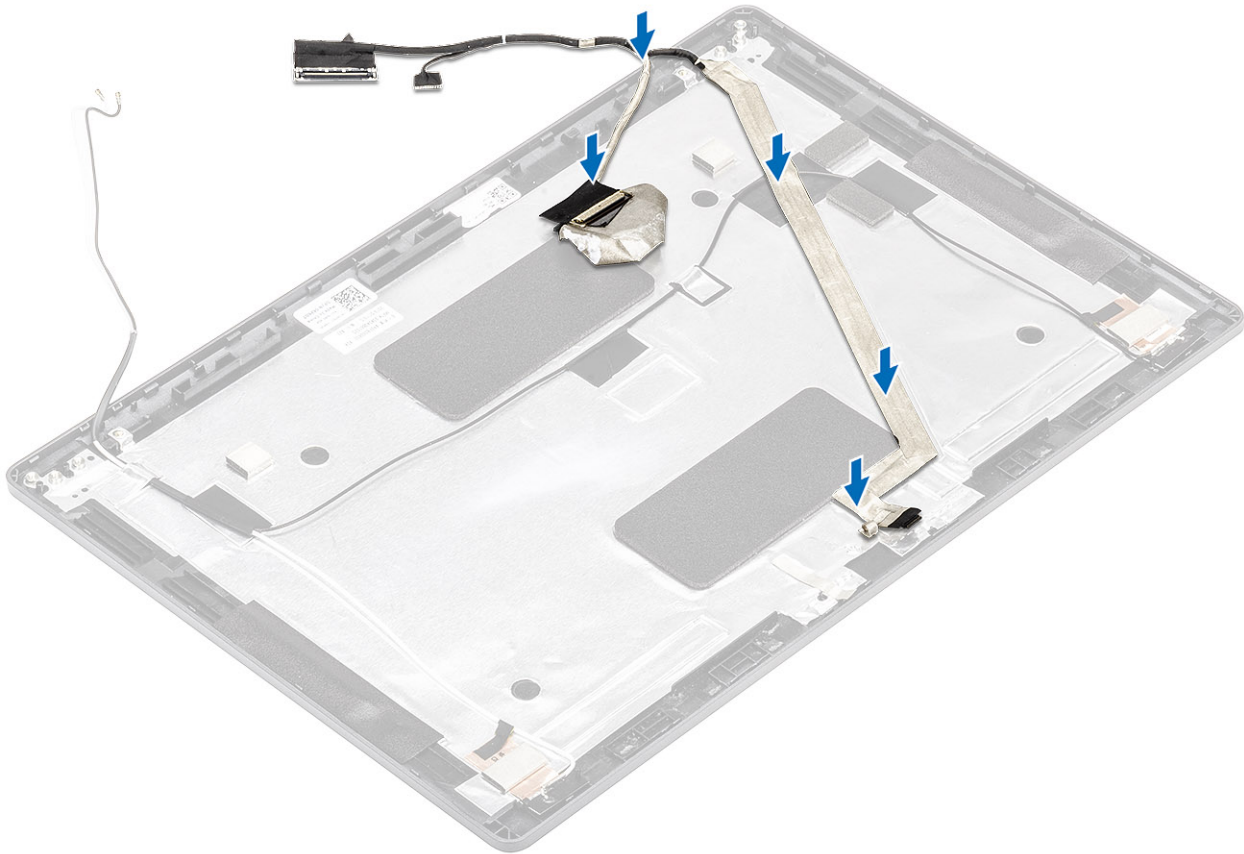
Peel the conductive tape and unroute the display cable to release it from adhesive and lift the display cable from the display back cover.



## Installing display cable

### Steps

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



### Next steps

1. Install the [Camera](#).
2. Install the [Display panel](#)
3. Install the [Display hinge](#)
4. Install the [display assembly](#).
5. Install the [WLAN](#).
6. Install the [WWAN](#).
7. Install the [battery](#).
8. Install the [base cover](#).
9. Install the [microSD card](#).
10. Follow the procedure in [After working on your computer](#).

## Display back cover assembly

### Replacing the display back cover

#### Prerequisites

1. Follow the procedure in [before working with your computer](#).
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [WWAN](#).
6. Remove the [WLAN](#).
7. Remove the [memory module](#).
8. Remove the [DC-in port](#).
9. Remove the [Coin cell battery](#).
10. Remove the [Inner frame](#).

11. Remove the [heatsink](#).
12. Remove the [system fan](#).
13. Remove the [speaker](#).
14. Remove the [LED board](#).
15. Remove the [system board](#).
16. Remove the [keyboard](#).
17. Remove the [power button](#).
18. Remove the [display assembly](#).
19. Remove the [Display hinges](#).
20. Remove the [Display panel](#).
21. Remove the [Camera](#)

### About this task

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



### Next steps

1. Install the [power button](#).
2. Install the [keyboard](#).
3. Install the [system board](#).
4. Install the [LED board](#).
5. Install the [display assembly](#)
6. Install the [Inner frame](#).
7. Install the [coin cell battery](#).
8. Install the [DC-in](#).
9. Install the [memory module](#).
10. Install the [WLAN](#).
11. Install the [WWAN](#).
12. Install the [battery](#).
13. Install the [base cover](#).

14. Install the [microSD card](#).
15. Follow the procedure in [After working on your computer](#).

## Palmrest assembly

### Replacing the palmrest assembly

#### Prerequisites

1. Follow the procedure in [before working with your computer](#).
2. Remove the [microSD card](#).
3. Remove the [base cover](#).
4. Remove the [battery](#).
5. Remove the [WWAN](#).
6. Remove the [WLAN](#).
7. Remove the [memory module](#).
8. Remove the [DC-in port](#).
9. Remove the [Coin cell battery](#).
10. Remove the [Inner frame](#).
11. Remove the [heatsink](#).
12. Remove the [system fan](#).
13. Remove the [speaker](#).
14. Remove the [LED board](#).
15. Remove the [system board](#).
16. Remove the [keyboard](#).
17. Remove the [power button](#).
18. Remove the [display assembly](#).
19. Remove the [touchpad button board](#).

#### About this task

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



### Next steps

1. Install the [touchpad button board](#).
2. Install the [display assembly](#).
3. Install the [power button](#).
4. Install the [keyboard](#).
5. Install the [system board](#).
6. Install the [LED board](#).
7. Install the [speaker](#).
8. Install the [System fan](#).
9. Install the [Heatsink](#).
10. Install the [Inner frame](#).
11. Install the [coin cell battery](#).
12. Install the [DC-in](#).
13. Install the [memory module](#).
14. Install the [WLAN](#).
15. Install the [WWAN](#).
16. Install the [battery](#).
17. Install the [base cover](#).
18. Install the [microSD card](#).
19. Follow the procedure in [After working on your computer](#).



# Troubleshooting

## Topics:

- [Basic troubleshooting](#)
- [CROSH](#)
- [CROSH commands](#)
- [Chrome commands](#)
- [Commonly used CROSH command](#)
- [Recovery Chromebook](#)
- [Reset Chromebook](#)
- [LCD Built-in Self Test \(BIST\)](#)
- [Diagnostic LEDs](#)
- [Diagnostics](#)

## Basic troubleshooting

This page contains all the information for Dell Latitude 5400 Chrome basic troubleshooting

**NOTE:** Refer to <https://support.google.com/chrome/a/?hl=en#topic=4386908> for the online troubleshooter.

**NOTE:** **Resetting** the Chromebook, also known as **Powerwash**, can be attempted before **Recovering** the Chromebook. **Recovering the Chromebook is the last resort.**

## Power issues

Table 2. Power issue

Power issues	
Issue	Possible solutions
Chromebook would not Power On	<p>If the Chromebook will not turn on, follow these steps:</p> <ol style="list-style-type: none"> <li>1. Remove all external devices.               <ol style="list-style-type: none"> <li>a. If the Chromebook starts, reconnect devices one at a time while restarting the computer to figure out which device is causing the problem. You are done.</li> <li>b. If the Chromebook still does not start or exhibits the same problem, do not reconnect anything, and continue troubleshooting.</li> </ol> </li> <li>2. The battery life might be too low. Plug the Chromebook into the AC adapter and let it charge for at least an hour and try turning it on again.               <p><b>NOTE:</b> When a new Chromebook is used for the first time, the battery is still in shipping mode. To resolve this issue, turn off the Chromebook and plug in the AC adapter and turn on the Chromebook again.</p> </li> <li>3. Depending on the Chromebook you have, you may see a power indicator light close to the charging port. If you have let the Chromebook charge and the light is not coming on, perform a hard reset.               <p><b>NOTE:</b> You can perform a hard reset by pressing <b>Refresh + Power</b>.</p> </li> </ol>

**Table 2. Power issue (continued)**

Power issues	
	<ol style="list-style-type: none"> <li>4. Use a different AC adapter with the same power voltage.</li> <li>5. Remove the AC adapter, and turn on with the battery power only.</li> </ol>

## Display issue

**Table 3. Display issue**

Display issue	
Issue	Possible solutions
Screen is Blank	<p>If the Chromebook's screen is blank, try the following troubleshooting steps to resolve the issue, checking to see if the screen turns on after each step:</p> <ol style="list-style-type: none"> <li>1. Make sure the Chromebook is on. If you are using the battery, plug the Chromebook in and press the power button.</li> <li>2. Restart the Chromebook by holding the power button down until the device turns off, then turn it back on again.</li> <li>3. Reset or Recover the Chromebook.</li> </ol>

## Audio, screen, and camera issues

**Table 4. Audio, screen, and camera issues**

Audio, screen, and camera issues	
Issues	Possible solutions
Audio issues	<p>If you hear static, or the volume from the speakers is low when attempting to listen to audio:</p> <ol style="list-style-type: none"> <li>1. Make sure the device is not muted. Try adjusting the volume.</li> <li>2. Try rebooting the Chromebook.</li> <li>3. Try playing audio from various sources, including YouTube and audio files stored locally on the Chromebook.</li> </ol> <p>If the speakers are not responding when attempting to listen to audio:</p> <ol style="list-style-type: none"> <li>1. Unplug the device from all cables (USB, headphones, and displays).</li> <li>2. Try playing audio from various sources, including YouTube and audio files stored locally on the Chromebook.</li> <li>3. Try rebooting the Chromebook.</li> <li>4. If audio still does not respond, try to Reset or Recover the Chromebook.</li> </ol>
Screen issues	<p>If the screen is not operating properly (images are too dark or no image is appearing):</p> <ol style="list-style-type: none"> <li>1. Try adjusting the brightness with the brightness keys at the top of the keyboard.</li> <li>2. In the status area in the bottom-right of the screen, check the display and make sure there are no issues with a mirrored or extended display.</li> <li>3. Try rebooting the Chromebook</li> <li>4. If the screen issues persist, try to Reset or Recover the Chromebook.</li> </ol>

**Table 4. Audio, screen, and camera issues (continued)**

Audio, screen, and camera issues	
Camera issues	<p>If the camera is not operating properly (blurry images or poor performance):</p> <ol style="list-style-type: none"> <li>1. Check that the camera is not being blocked or covered by a privacy screen or other obstruction.</li> <li>2. Try using different apps that use the camera. Try a Google+ Hangout or the onboard camera app</li> <li>3. Try rebooting the Chromebook</li> <li>4. If the camera issues persist, try to Reset or Recover the Chromebook.</li> </ol>

## Bluetooth issue

**Table 5. Bluetooth issue**

Bluetooth issue	
Issue	Possible solutions
Bluetooth issues	<p>If you run into issues while attempting to pair or use a Bluetooth device with the Chromebook, try the following steps to resolve the issue:</p> <ol style="list-style-type: none"> <li>1. First, make sure that the Bluetooth device you are trying to pair is supported by the Chromebook.</li> <li>2. Try disabling and re-enabling Bluetooth connectivity from the status area in the lower-right corner.</li> <li>3. Try restarting the Chromebook.</li> <li>4. If you are still encountering issue with bluetooth, try to Reset or Recover the Chromebook.</li> </ol>

## Touchpad and Hotkeys issues

**Table 6. Touchpad and hotkeys issues**

Touchpad / Hotkeys issues	
Issue	Possible solutions
Touchpad not responding	<p>If the touch pad has stopped responding, try the following steps to resolve the issue: Try moving the cursor after each step:</p> <ol style="list-style-type: none"> <li>1. Tap the Esc key several times.</li> <li>2. Drumroll the fingers across the touch pad for a few seconds.</li> <li>3. Restart the Chrome OS by holding down the power button until the device turns off, and then turn it back on again.</li> <li>4. If the cursor still does not move when using the touch pad, try logging in from the Guest account using the tab key to navigate.</li> <li>5. If users experience touch pad issues with the account that is not the owner (primary) account, delete the user account and re-create it. Again, use the tab key to navigate.</li> <li>6. If none of the above steps work, try to Reset or Recover the Chromebook.</li> </ol>
Top row of keys (Hotkeys) not responding	<p>If a hotkey (like the volume or brightness keys) are not responding, try the following troubleshooting steps, making sure to test the keys after each one:</p> <ol style="list-style-type: none"> <li>1. If the affected key is volume or brightness, check to make sure you are not at the upper or lower limit for that setting.</li> </ol>

**Table 6. Touchpad and hotkeys issues (continued)**

Touchpad / Hotkeys issues	
	<ol style="list-style-type: none"> <li>If the backward or forward buttons do not work, check that the same icons in a web browser are not grayed out. For example, if the back button on a web page is grayed, this is because the browser is not aware of a page to move backward to.</li> <li>Restart the Chrome OS by holding down the power button until the device turns off, and then turn it back on again.</li> <li>Try using the keys in the Guest account.</li> <li>If users experience hotkey issues with the account that is not the owner (primary) account, delete the user account and re-create it.</li> <li>If none of the above steps work, try to Reset or Recover the Chromebook.</li> </ol>

## Chrome OS issue

**Table 7. Chrome OS issue**

Chrome OS issues	
He's Dead, Jim! error message	<p>If the Chromebook becomes slow or unresponsive, and the <b>He's Dead, Jim!</b> error message appears, the system could be running low on memory.</p> <p><b>NOTE:</b> If you terminated the process using Google Chrome's Task Manager, the system's task manager, or with a command line tool, this message will appear as well.</p> <ol style="list-style-type: none"> <li>If the page was not ended intentionally, reload the page to continue. If the message continues to appear, try closing inactive tabs or other programs to free up more memory.</li> <li>If issue persists, please see He's Dead, Jim! from Google knowledge base.</li> </ol>
Chrome OS is missing or damaged	<p>If the Chromebook does not start and displays the message, <b>Chrome OS is missing or damaged. Please insert a recovery USB stick into the USB ports on the device:</b></p> <p>Perform a system recovery. See performing Recover Chromebook for more information.</p>
Chrome OS stops responding and nothing moves on the computer display	<p>If the Chrome OS stops responding and nothing moves on the computer display:</p> <ol style="list-style-type: none"> <li>Turn off the computer.</li> <li>Disconnect all peripheral devices, and remove all USB devices and media cards.</li> <li>Disconnect the AC adapter.</li> <li>Press and hold the power button for 10 seconds.</li> <li>Reconnect the AC adapter, and turn on the system.</li> <li>If issue persists, please perform a Reset or Recover the Chromebook.</li> </ol>
Lost / Forget Sign in password (Chrome OS)	<p>If you lost/forget the sign-in password to the Chromebook:</p> <ol style="list-style-type: none"> <li>Check if this is a managed device (Enterprise enrolled device). <ol style="list-style-type: none"> <li>If this is a managed device, please contact the administrator to have them reset the password via Google Admin Console.</li> </ol> </li> </ol>

**Table 7. Chrome OS issue (continued)**

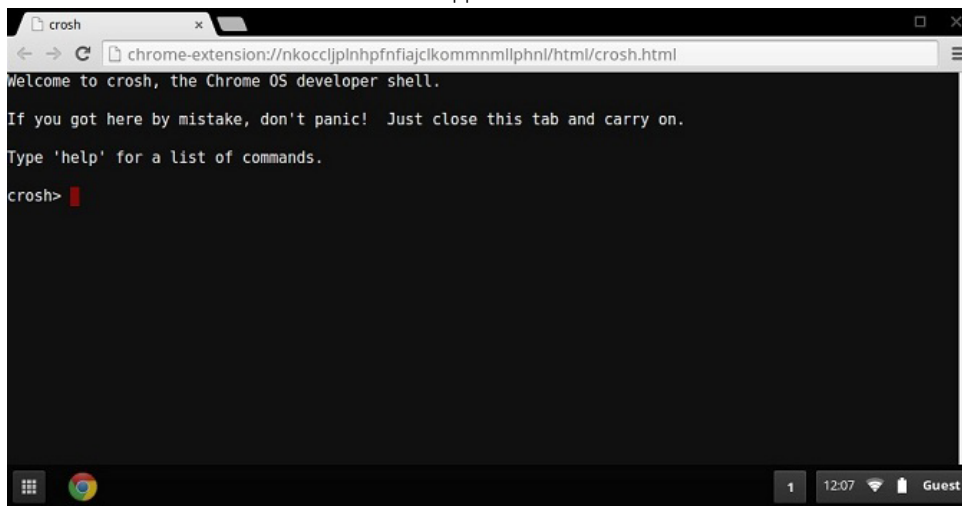
Chrome OS issues	
	<ol style="list-style-type: none"> <li>b. If this is not a managed device, please proceed with the following steps:</li> <li>2. Sign in as guest or use a different PC.</li> <li>3. Open an internet browser, and navigate to <a href="https://www.google.com/accounts/recovery/">https://www.google.com/accounts/recovery/</a></li> <li>4. Select I do not know my password, and then enter the email address that you use to sign in to Google.</li> <li>5. Click Continue and follow the on-screen instructions to reset the password.</li> </ol>
Other Chromebook lock up or freeze symptoms that are not listed here	If none of the above symptoms match the Chromebook's issue, refer to Google Help Center for the online troubleshooter and more help.

## CROSH

This topic covers the information that you need to know for the Chrome Shell (CROSH). CROSH and the Google Chrome URL commands provide some troubleshooting tools, information, and advanced settings.

The Chrome OS does not support ePSA, Dell BIOS, the F12 boot menu, or DellConnect. There are no preboot diagnostics. All troubleshooting must be done inside the OS. Chrome Shell (CROSH) and the Chrome URL commands provide some troubleshooting tools, information, and advanced settings. CROSH is a command line interface similar to the Linux BASH or Windows command (cmd.exe) terminals. Chrome OS is based on Linux, but CROSH does not recognize most Linux commands. The most useful commands for troubleshooting are memory\_test, storage\_test\_1, storage\_test\_2, ping, and tracepath. Ping works differently than it does in Windows. By default, it repeats until you press **<Ctrl> + <C>**, and it does not show any statistics. The tracepath command is similar to the Windows traceroute command. A detailed explanation of the commands can be viewed below, by typing help, or help\_advanced in CROSH.

1. Open the Chrome browser.
2. Press **<Ctrl> + <Alt> + <T>** The interface appears as shown in the screenshot below:



3. Type in the CROSH command for diagnostics. Type **'help'** for a list of available commands. Type **help\_advanced** to display a complete list of commands for debugging purposes

Alternately, refer to CROSH Commands for the list of the CROSH commands available for diagnostics.

## CROSH commands

The table below lists the available commands in Chrome Shell (CROSH).



**Table 8. Help commands**

Command	Purpose
exit	Exits the CROSH Shell.
help	Displays this help.
help_advanced	Displays the help for more advanced commands, which are used for debugging.
ping	[-c count] [-i interval] [-n] [-s packetsize] [-W waittime] — Sends ICMP ECHO_REQUEST packets to a network host. If it is "gw", then the next hop gateway for the default route is used. It works like the ping command on other operating systems. Press <b>&lt;Ctrl&gt; + &lt;C&gt;</b> to stop the ping process or halt any other command in CROSH.
ssh	[optional args...] — Starts the ssh subsystem if invoked without any arguments. "ssh <user> <host>", "ssh <user> <host> <port>", "ssh< user>@<host>". or "ssh <user>@<host> <port>" connect without entering the subsystem
ssh_forget_host	Removes a host from the list of known ssh hosts. This command displays a menu of known hosts and prompts for the host to forget.
top	Sets the chaps debug logging level. No arguments start verbose logging

**Table 9. Advanced help command**

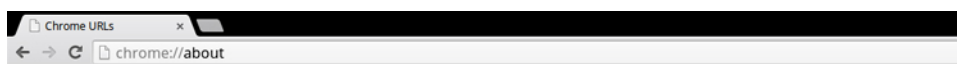
Command	Purpose
battery_test[<test length>]	Tests the battery discharge rate for a given number of seconds. No argument defaults to a 300 s test.
bt_console [<agent capability>]	Enters a Bluetooth debugging console. The <b>Optional</b> argument specifies the capability of a pairing agent the console provides; see the <b>Bluetooth Core</b> specification for valid options.
chaps_debug [start stop <log_level>]	Sets the chaps debug logging level. No arguments will start verbose logging.
connectivity	Shows connectivity status.
experimental_storage<status enable disable>	Enables or disables experimental storage features.
ff_debug [<tag_expr>] [--help] [--list_valid_tags] [--reset]	Adds and removes flimflam debugging tags.
memory_test	Performs extensive memory testing on the available free memory.
modem <command> [args...]	Interacts with the 3G modem. Run <b>modem help</b> for detailed help.
modem_set_carrier carrier-name	Configures the modem for the specified carrier.
network_diag[--date] [--link] [--show-macs] [--wifi] [--help] [--wifi-mon] <host>	Performs a suite of network diagnostics and saves a copy of the output to your download directory
network_logging <wifi cellular ethernet>	Enables a predefined set of tags useful for debugging the specified device.
p2p_update [enable   disable]	Enables or disables the peer-to-peer (P2P) sharing of updates over the local network. This will both attempt to get updates from other peers in the network and shares the downloaded updates with them. Run this command without arguments to see the current state.
rlz < status   enable   disable>	Enables or disables RLZ.

**Table 9. Advanced help command (continued)**

Command	Purpose
rollback	Attempts to roll back to the previous update cached on your system. Only available on non-stable channels and non-enterprise enrolled devices. Please note that this will power wash your device.
route [-n] [-6]	Displays the routing tables.
set_apn [-n <network-id>] [-u <username>] [-p <password>] <apn>	Sets the APN to use when connecting to the network specified by <network-id>. If <network-id> is not specified, use the network-id of the currently registered network.
set_apn - c	Clears the APN to be used, so that the default APN is used instead.
set_arpgw <true   false>	Turns on the extra network state checking to make sure the default gateway is reachable.
set_cellular_ppp [-u <username>] [-p <password>]	Sets the PPP username and/or password for an existing cellular connection. If neither -u nor -p is provided, this shows the existing PPP username for the cellular connection.
set_cellular_ppp -c	Clears any existing PPP username and PPP password for an existing cellular connection.
sound <command> <argument>	Low level sound configuration. Can be used to play/record audio samples and enable beam forming on Pixel. <b>sound beamforming &lt;on off&gt;</b> will enable/disable the feature. <b>sound record [duration]</b> will start recording. <b>sound play &lt;filename&gt;</b> plays the recorded audio samples
storage_status	Reads storage device SMART health status, vendor attributes, and error logs.
storage_test_1	Performs a short offline SMART test.
storage_test_2	Performs an extensive readability test.
syslog <message>	Logs a message to system log.
tpcontrol{status   taptoclick [on off] sensitivity [1-5]   set <property>< value>} tpcontrol {syntp [on off]}	Allows the user to manually adjust advanced touchpad settings.
tracpath [-n] <destination>[/port]	Traces the path/route to a network host.
update_over_cellular [enable disable]	Enables or disables the auto updates over cellular networks. Run without arguments to see the current state.
upload_crashes	Uploads available crash reports to the crash server.
wpa_debug [<debug_level>] [--help] [--list_valid_level] [--reset]	Sets the wpa_supplicant debugging level.
xset m [acc_mult[/acc_div] [thr]] xset m default	Tweaks the mouse acceleration rate.
xset r rate [delay [rate]]	Tweaks the autorepeat rates. The delay is the number of milliseconds before autorepeat starts. The rate is the number of repeats per second.
xset r [keycode] < on off >	Turns autorepeat on/off. If a keycode is specified, it affects only that key. If not specified, it affects global behavior.

## Chrome commands

Chrome:// pages contain experimental features, diagnostic tools, and detailed statistics. They are hidden in Chrome's user interface. **Chrome://about** page lists all Chrome's internal pages. To view all the commands, type **chrome://about** in the Chrome browser URL as shown below:



## List of Chrome URLs

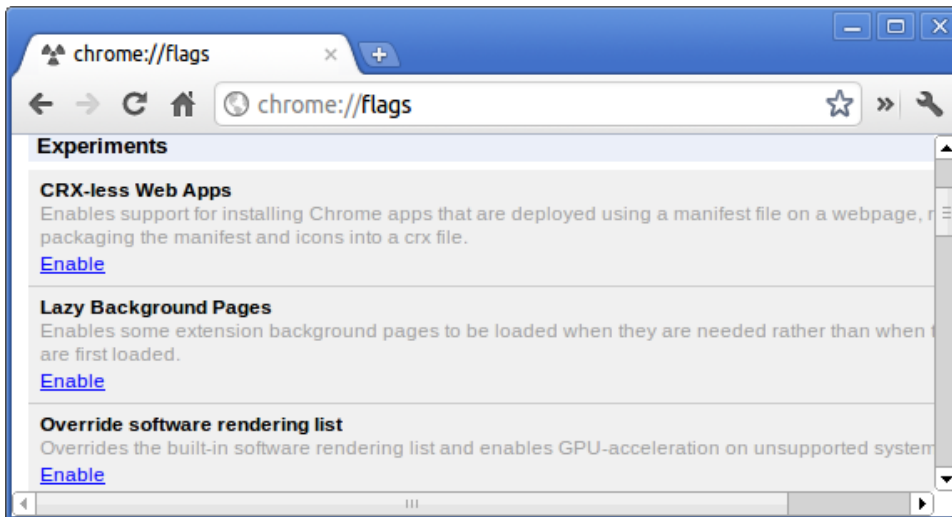
- <chrome://accessibility>
- <chrome://appcache-internals>
- <chrome://blob-internals>
- <chrome://bookmarks>
- <chrome://cache>
- <chrome://choose-mobile-network>
- <chrome://chrome-urls>
- <chrome://components>
- <chrome://crashes>
- <chrome://credits>
- <chrome://cryptohome>
- <chrome://diagnostics>
- <chrome://discards>
- <chrome://dns>
- <chrome://downloads>
- <chrome://drive-internals>
- <chrome://extensions>
- <chrome://first-run>
- <chrome://flags>
- <chrome://flash>
- <chrome://gpu>
- <chrome://histograms>
- <chrome://history>

**Table 10. Chrome browser shortcuts**

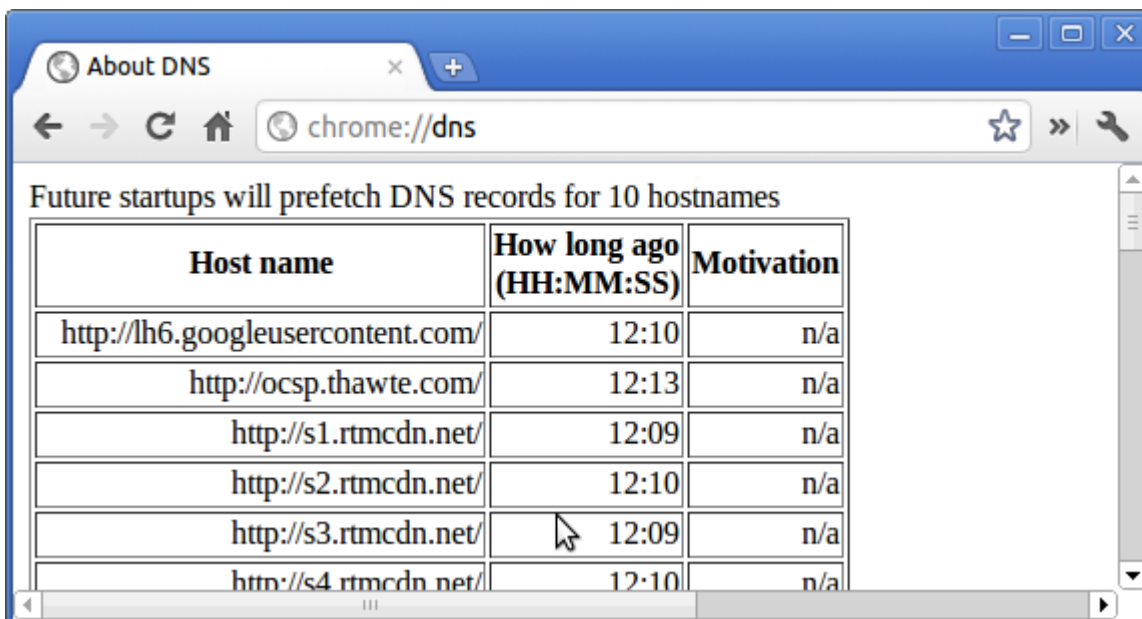
Purpose	Browser Shortcut	Explanation
System Information	<code>chrome://system/</code>	"Who am I".. BIOS version, and so on
Basic Connectivity Diags	<code>chrome://diagnostics/</code>	Test for NIC and Internet connection
Chrome Information	<code>chrome://version</code>	More "Who am I" type of stuff
Create Recovery USB Stick	<code>chrome://imageburner/</code>	Google's version of DBAR/DBRM
Chrome Flags	<code>chrome://flags</code>	Experimental features beyond the scope of what Dell supports
Memory Troubleshooting	<code>chrome://memory</code>	View running processes and memory utilization
Module Load	<code>chrome://conflicts</code>	Shows conflicts of all modules loaded by Chrome
Chrome Sync Status	<code>chrome://syncchrome://sync-internals</code>	Allows troubleshooting of connected accounts
Connectivity Troubleshooting	<code>chrome://net-internals</code>	Comprehensive network/connectivity diagnostics, including DNS analysis, Waterfall and Bandwidth diagnostics, and so on
Histogram	<code>chrome://histograms</code>	Actual work and I/O audit
Credits	<code>chrome://credits</code>	References to all module/libs contributions and their respective wiki/license URLs
Crash Reporting	<code>chrome://crashes</code>	Shows detailed crash report, if the feature was enabled
Apps RAM Utilization	<code>chrome://appcache-internals</code>	Detailed memory usage for apps/extensions, especially handy for 2 GB Chromebooks

Following are the 12 most helpful `chrome://` commands that you should know:

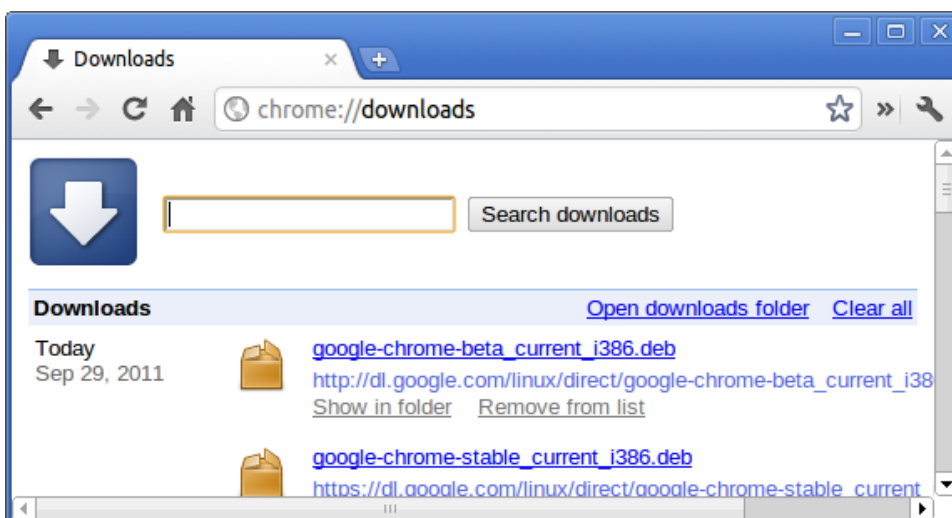
1. **`chrome://flags`** : From here you can enable some of the experimental features that are hidden in the Google Chrome browser. Please note that as mentioned on this page, since these are experimental, these might not work as expected and might cause issues. Enable these features, and use it at your own risk.



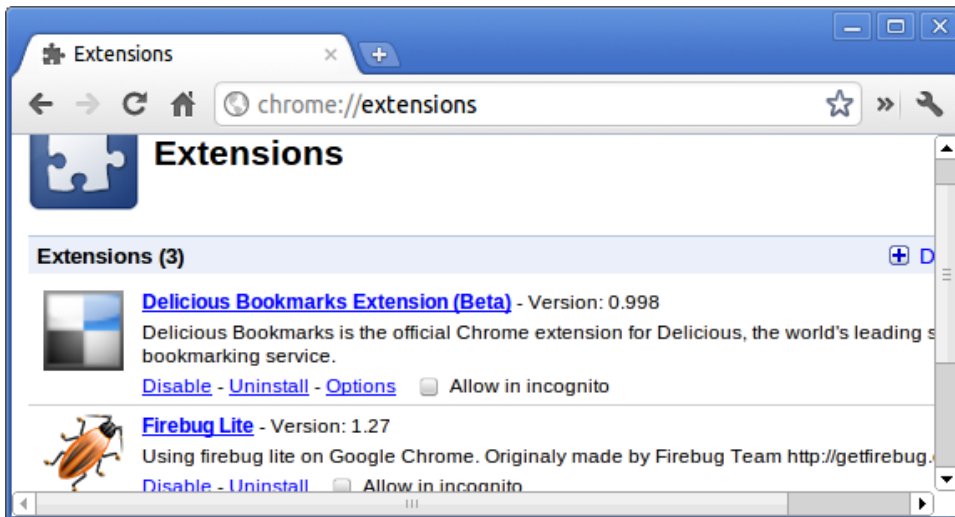
2. **chrome://dns**: This displays the list of host names for which the browser will pre-fetch the DNS records.



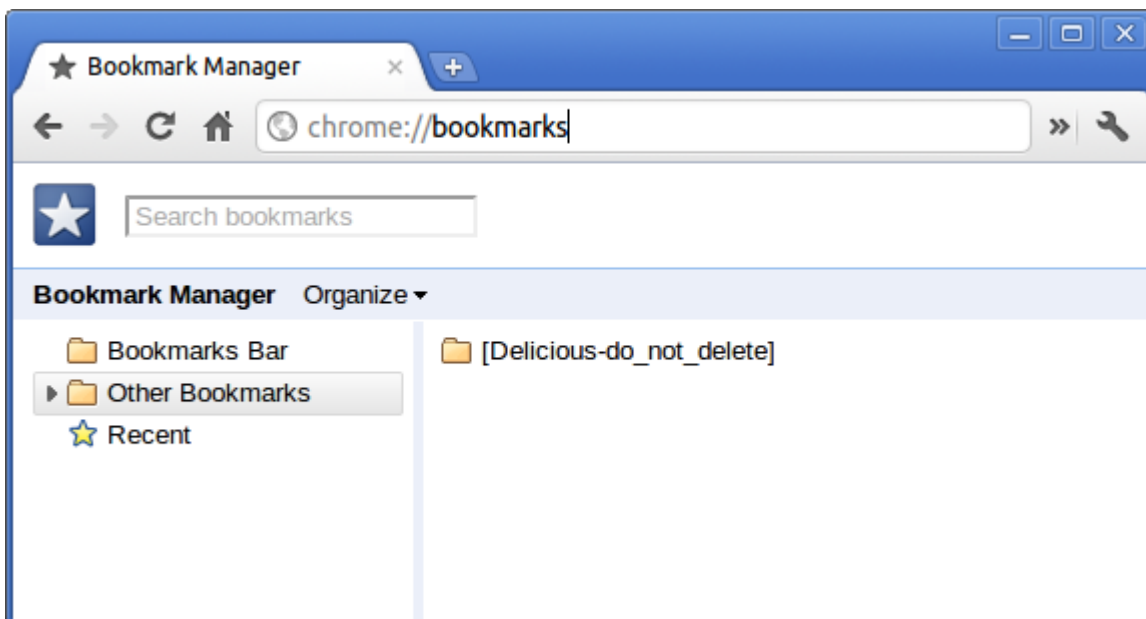
3. **chrome://downloads**: This is also available from the Menu > Downloads. Shortcut key is Ctrl+J.



4. **chrome://extensions**: This is also available from the Menu > Tools > Extensions.



5. **chrome://bookmarks:** This is also available from the Menu > Bookmarks > Bookmark Manager. Short cut key is Ctrl+Shift+O.

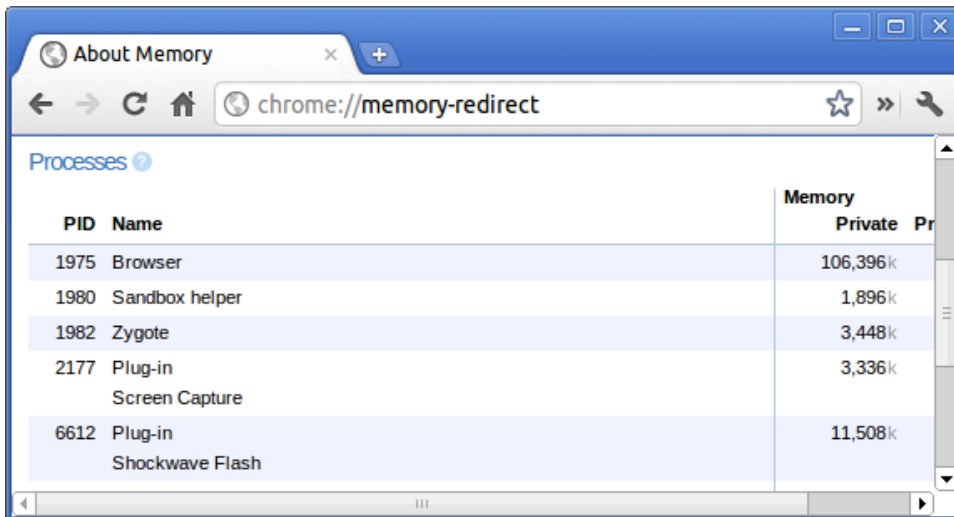


6. **chrome://history:** This is also available from the Menu > History. Short cut key is Ctrl+H.



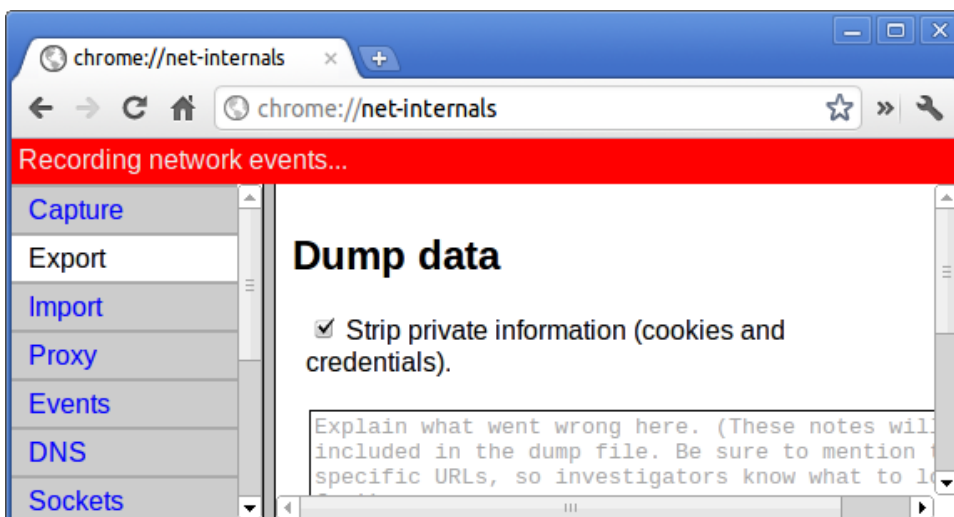
7. **chrome://memory:** This will redirect to "chrome://memory-redirect/". This will display the memory used by the Google Chrome browser. This also displays all the process related to browser with their PID, process name, and the memory it takes.



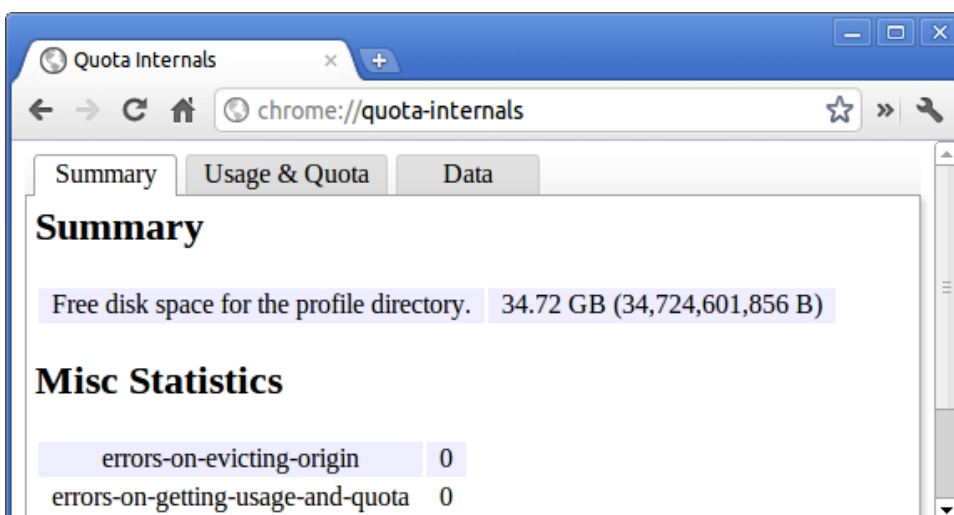


8. **NOTE:** Net-internals events viewer and related functionality has been removed. Please use `Chrome://net-export` to save netlogs and the external [Catapult netlog\\_viewer](#) to view them.

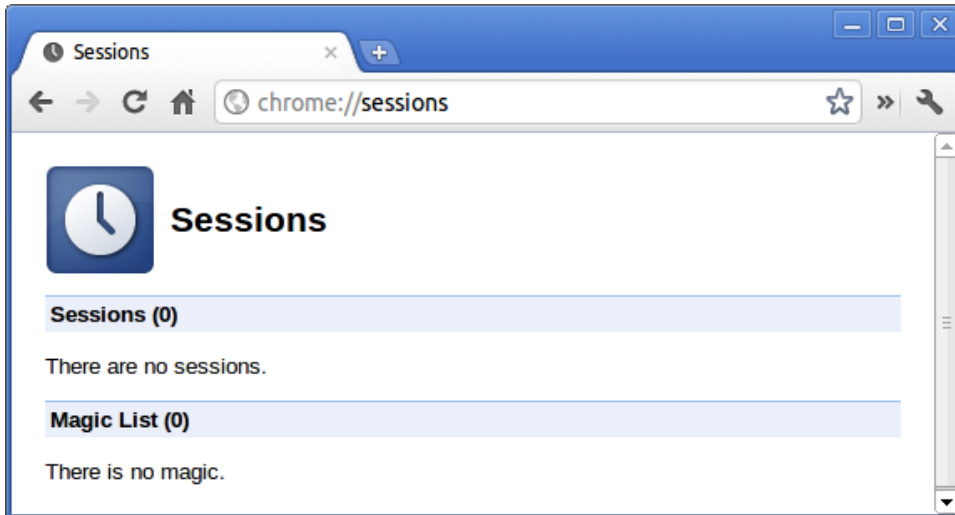
**chrome://net-internals:** This displays all networking related information. Use this to capture network events generated by the browser. You can also export this data. You can view DNS host resolver cache. One of the important features in this feature is "Test". If a URL failed to load, you can go to "chrome://net-internals" > click on "Tests" tab > type that URL which failed, and click on "Start Test", which does some test and report you why that URL failed. `chrome://plugins/`.



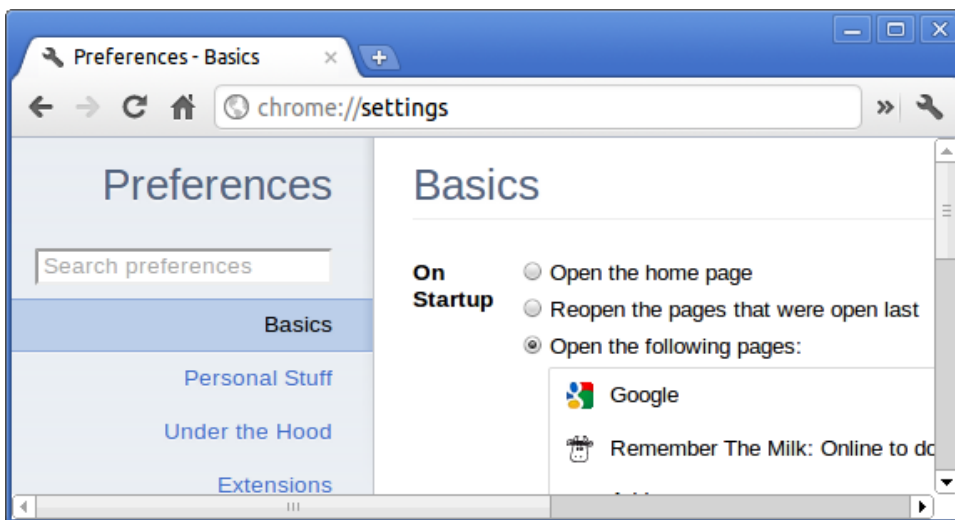
9. **chrome://quota-internals:** This gives information about the disk space quote used by the browser, including the breakdown of how much space the individual websites took under temporary files.



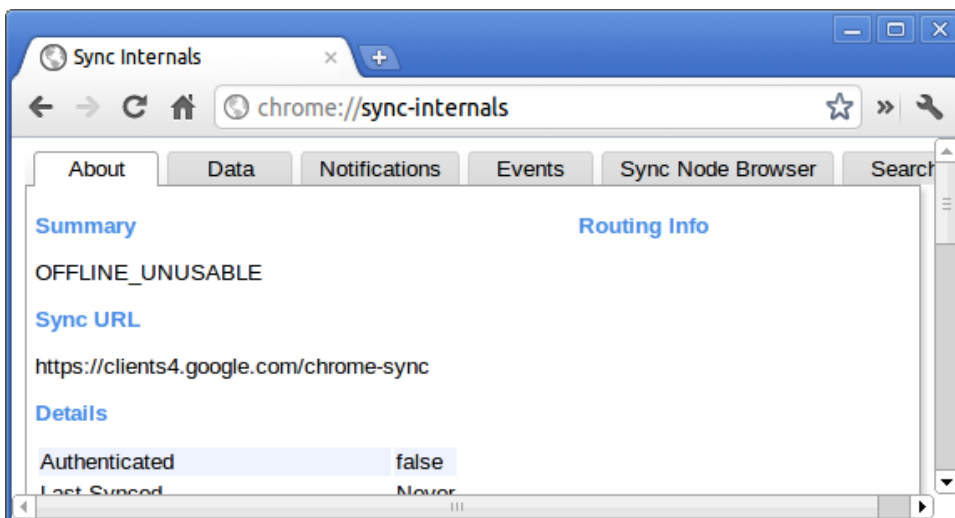
10. **chrome://sessions**: This displays the number of sessions and magic list that are currently running.



11. **chrome://settings**: This is also available from the Menu > Options (on Windows), and Menu > Preferences (on Linux). From here you can control various browser related settings.



12. **chrome://sync-internals**: This gives information about the Chrome sync feature, including the Sync URL used by Google, and sync statistics.



# Commonly used CROSH command

This page contains information about the most commonly used CROSH commands to diagnose the Dell .

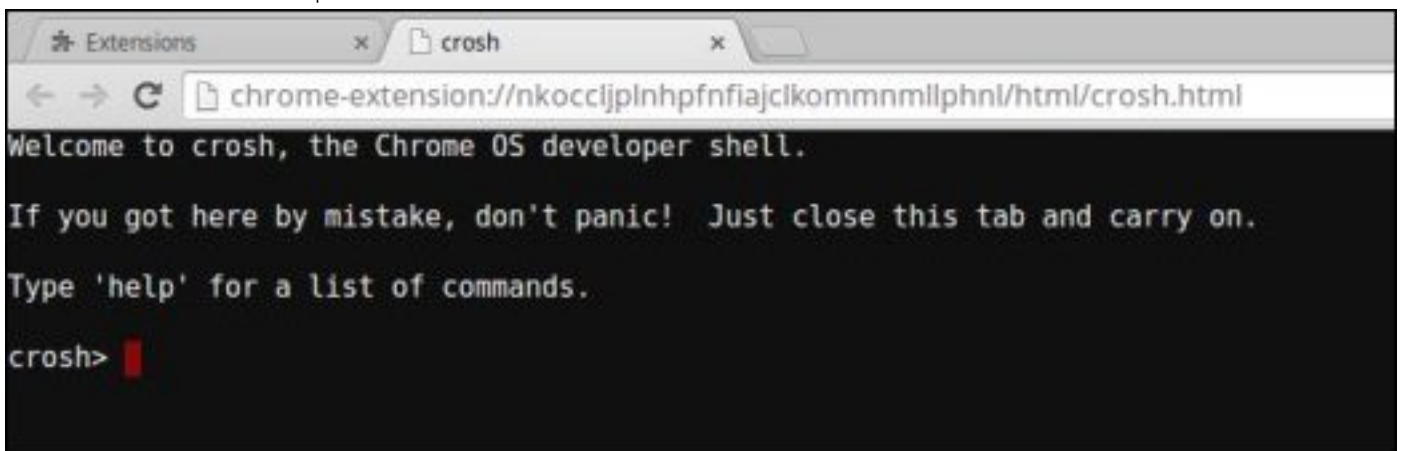
Below are some of the most commonly used CROSH commands to troubleshoot a hardware issue.

 **NOTE:** CROSH `storage_test_1` and `storage_test_2` are not supported on the eMMC storage device.

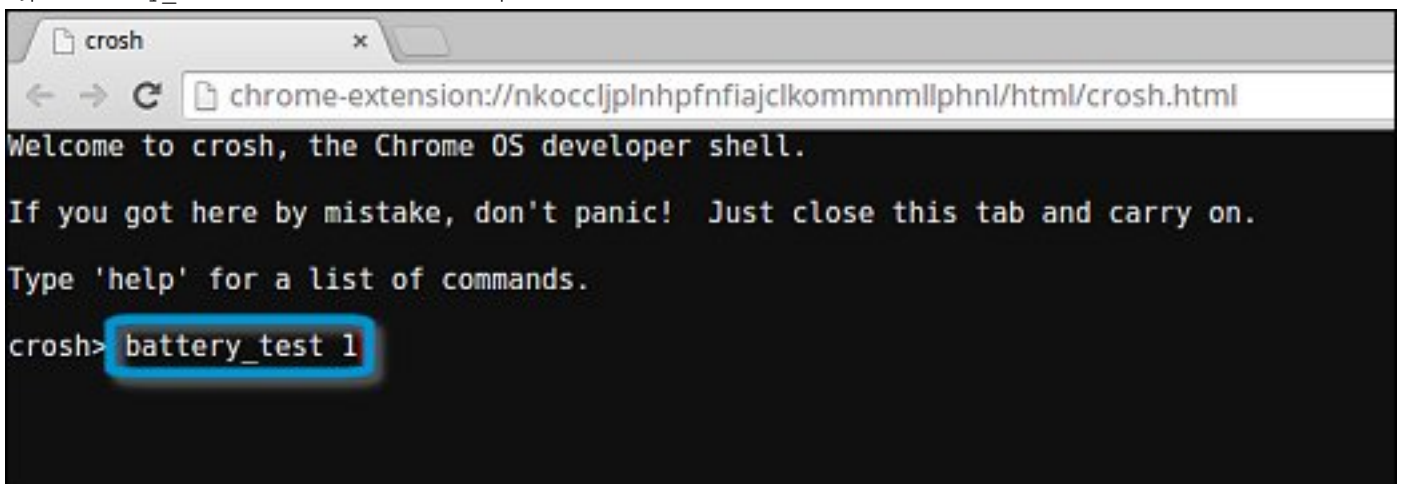
## Check battery charging status

The Chrome Shell (CROSH) includes a simple battery health diagnostic test. This is to confirm that the battery is charging and to check on the battery health and discharge rate. Follow the instruction provided to check on the battery charging status:

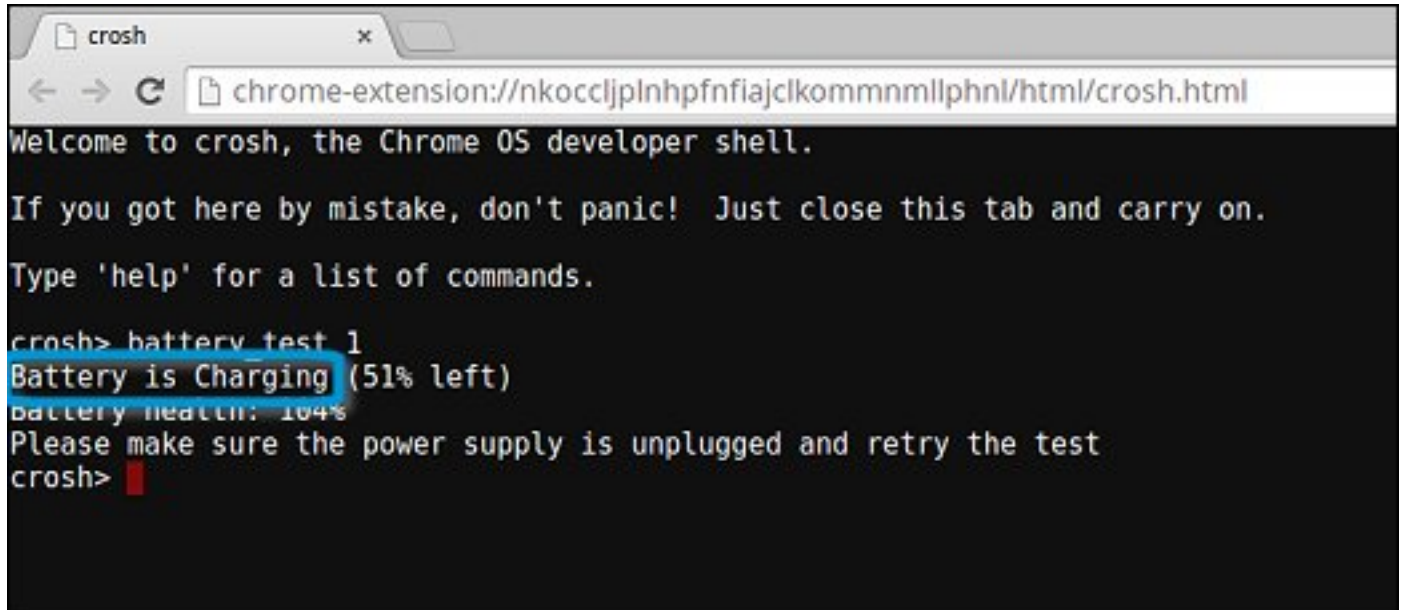
1. Connect the AC adapter to the Chromebook and a power outlet.
2. Turn on, and sign in to the Chromebook.
3. Open the Chrome browser.
4. Press **CTRL + ALT + T** to open CROSH.



5. Type `battery_test 1` into CROSH, and then press **Enter**.



6. Check the result to confirm that the battery is charging.



```
chrome-extension://nkoccljplnhpfnfajclkommmmlphnl/html/crosh.html
Welcome to crosh, the Chrome OS developer shell.

If you got here by mistake, don't panic! Just close this tab and carry on.

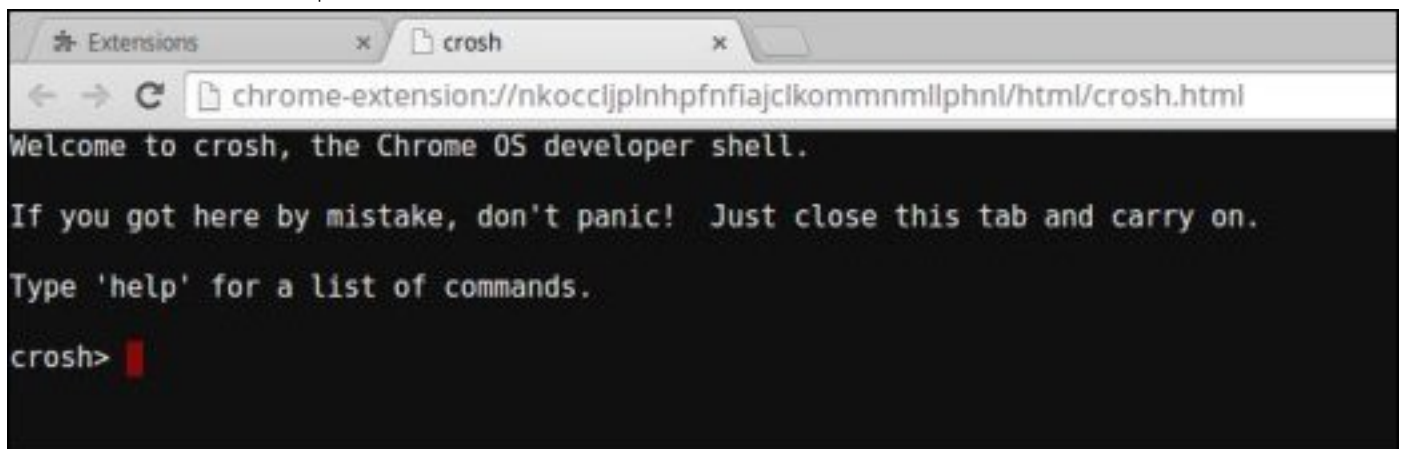
Type 'help' for a list of commands.

crosh> battery test 1
Battery is Charging (51% left)
battery health: 104%
Please make sure the power supply is unplugged and retry the test
crosh>
```

## Check battery health

Follow the steps to evaluate the health of the Chromebook battery, and check the discharge rate:

1. Disconnect the AC adapter from the Chromebook.
2. Turn on and sign in to Chromebook.
3. Open the Chrome browser.
4. Press CTRL + ALT + T to open CROSH.



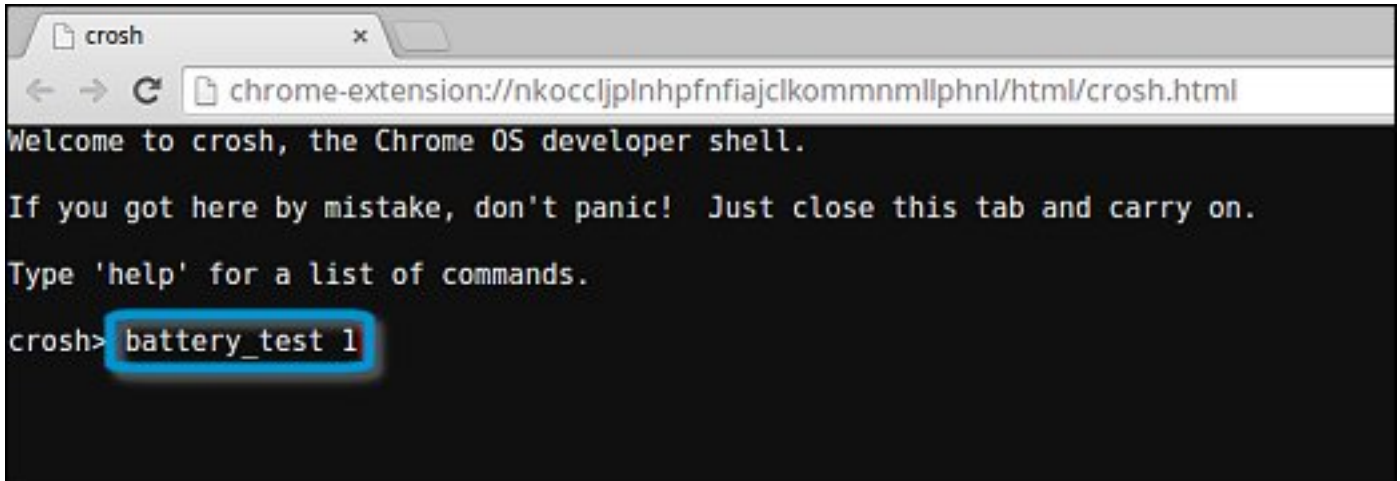
```
chrome-extension://nkoccljplnhpfnfajclkommmmlphnl/html/crosh.html
Welcome to crosh, the Chrome OS developer shell.

If you got here by mistake, don't panic! Just close this tab and carry on.

Type 'help' for a list of commands.

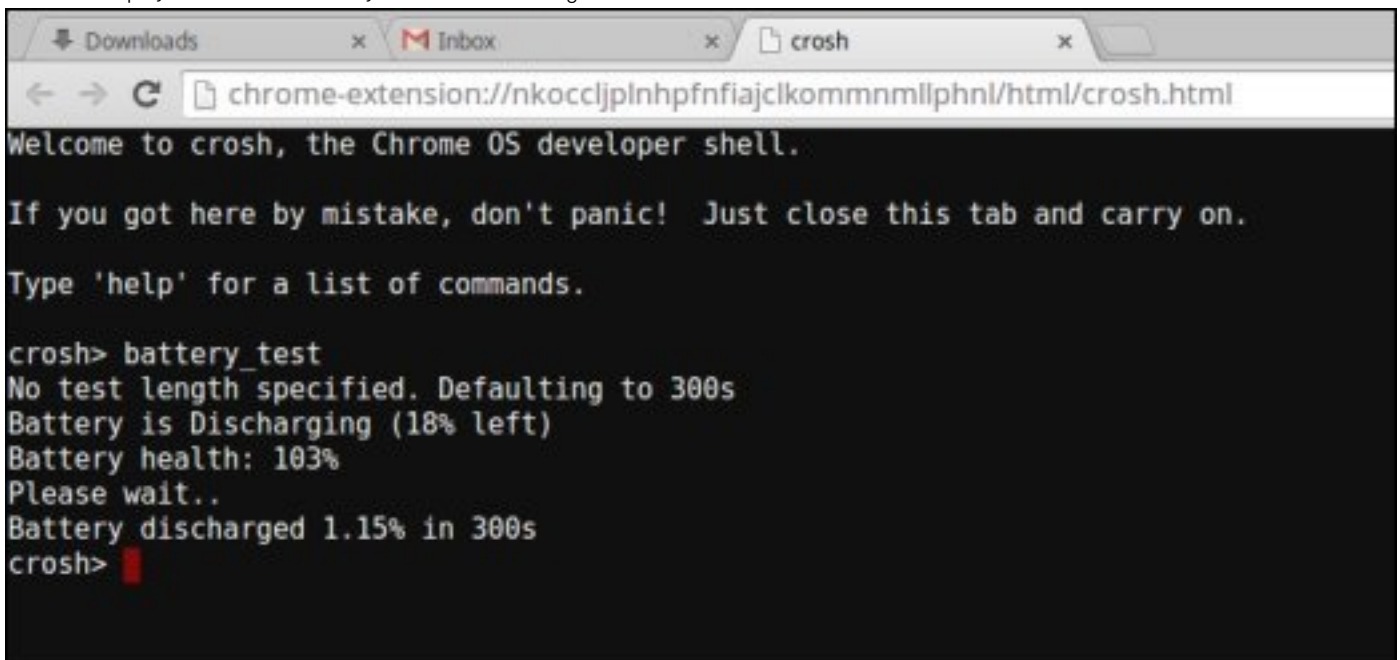
crosh>
```

5. Type `battery_test 1` into CROSH, and then press Enter.



The screenshot shows a web browser window with a single tab titled 'crosh'. The address bar displays 'chrome-extension://nkoccljplnhpfnfiajclkommmnmlphnl/html/crosh.html'. The main content area is a black terminal window with white text. It displays a welcome message: 'Welcome to crosh, the Chrome OS developer shell. If you got here by mistake, don't panic! Just close this tab and carry on. Type 'help' for a list of commands.' Below this, the prompt 'crosh>' is followed by the command 'battery\_test 1', which is highlighted with a blue rectangular selection box.

6. A screen displays the current battery health and discharge rate.



The screenshot shows the same 'crosh' browser window. The terminal now displays the output of the 'battery\_test' command. The text reads: 'crosh> battery\_test', 'No test length specified. Defaulting to 300s', 'Battery is Discharging (18% left)', 'Battery health: 103%', 'Please wait..', and 'Battery discharged 1.15% in 300s'. The prompt 'crosh>' is now followed by a red cursor bar.

- If the Battery health percentage is greater than 50%, the battery is within the expected wear limits.
- If the Battery health percentage is equal to or less than 50% and the battery is less than a year old, the battery is outside expected wear limits and might need to be replaced.
- If the test results show that Battery is Unknown, the battery might need to be replaced.

## Checking memory

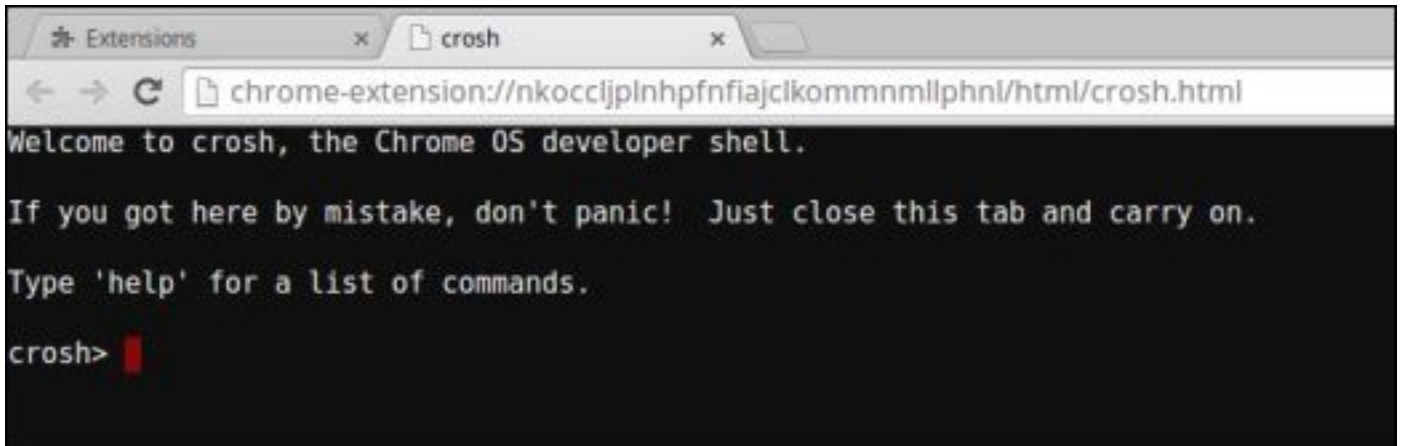
Follow the steps below to perform a memory check for Chromebook:

**NOTE:** This will approximately take 20 minutes to complete the test, and it also depends on the capacity of the memory.

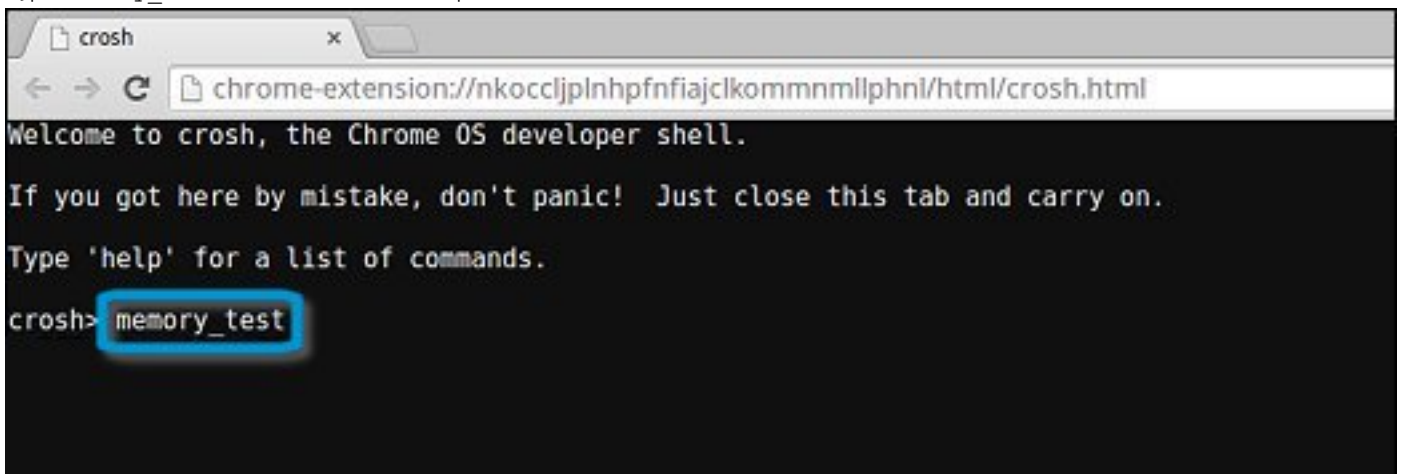
1. Turn on and sign in to Chromebook.
2. Open the Chrome browser.



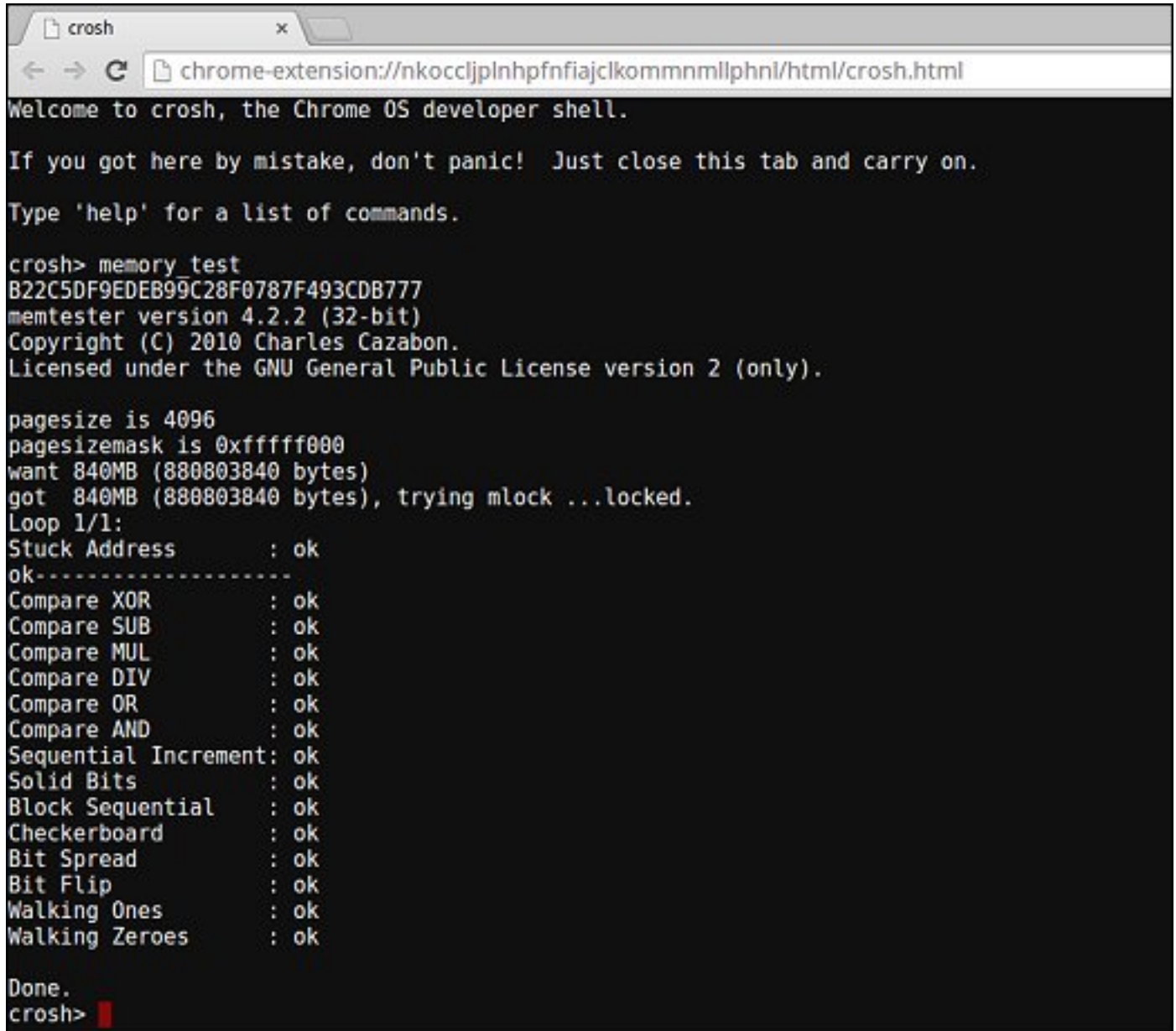
3. Press CTRL + ALT + T to open CROSH.



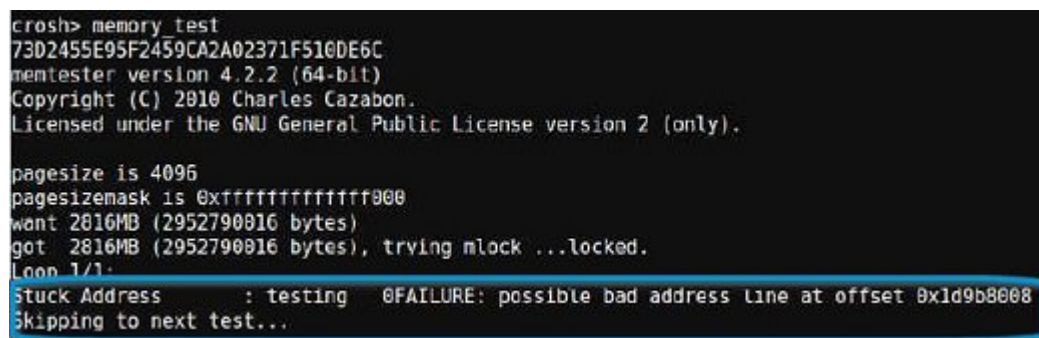
4. Type memory\_test into CROSH, and then press Enter.



5. A diagnostic screen displays the result of the memory test passed without any errors.



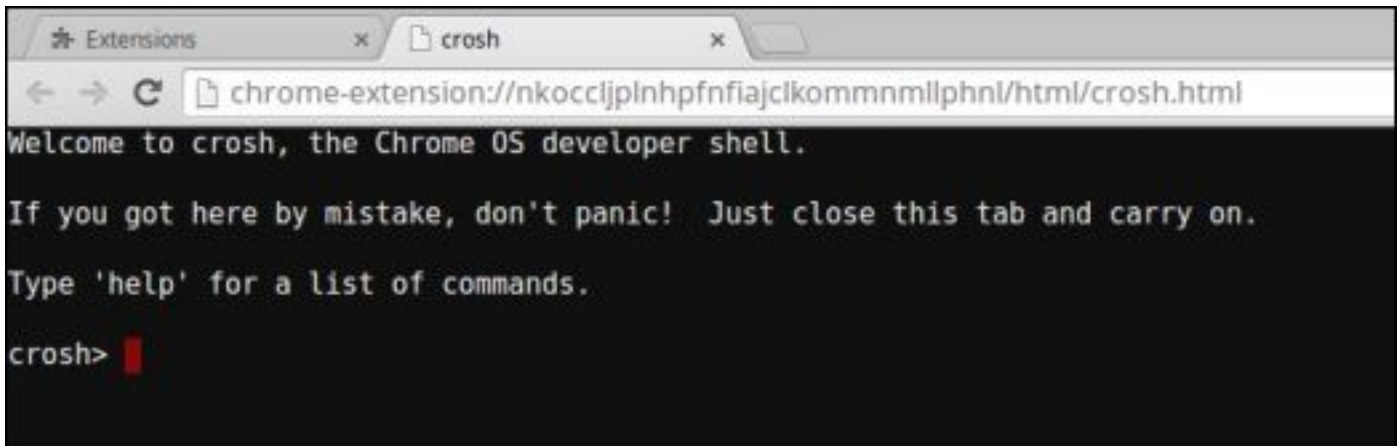
Example of a memory test failure.



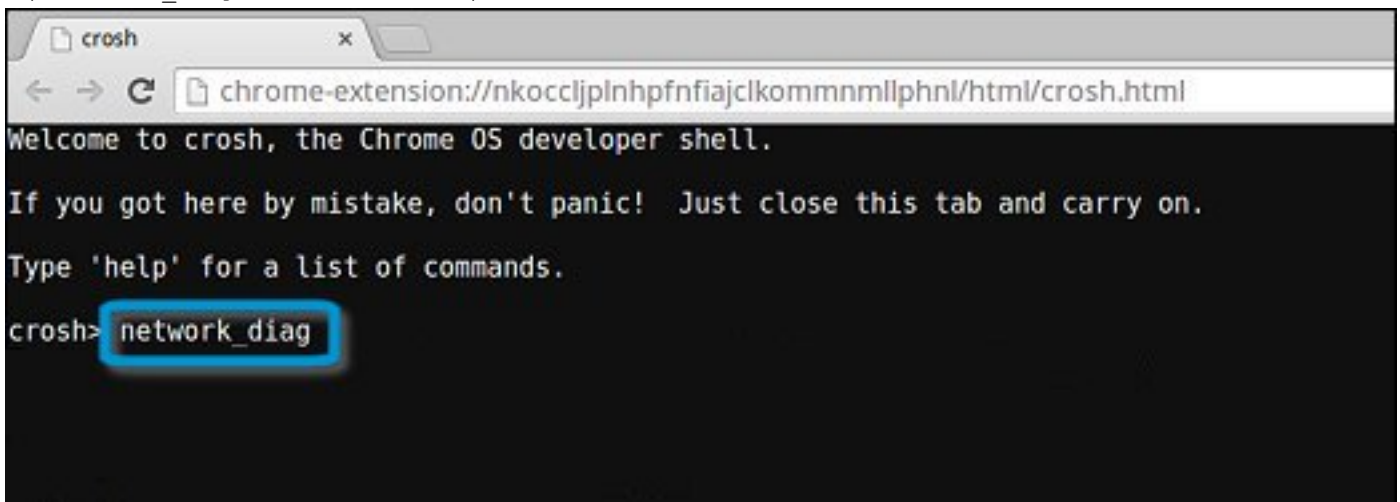
## Checking network status

If you are having trouble connecting to the Internet, use the steps in one or more of the following sections to test the network adapter: Follow the instruction to gather the information about the network and diagnose the network errors.

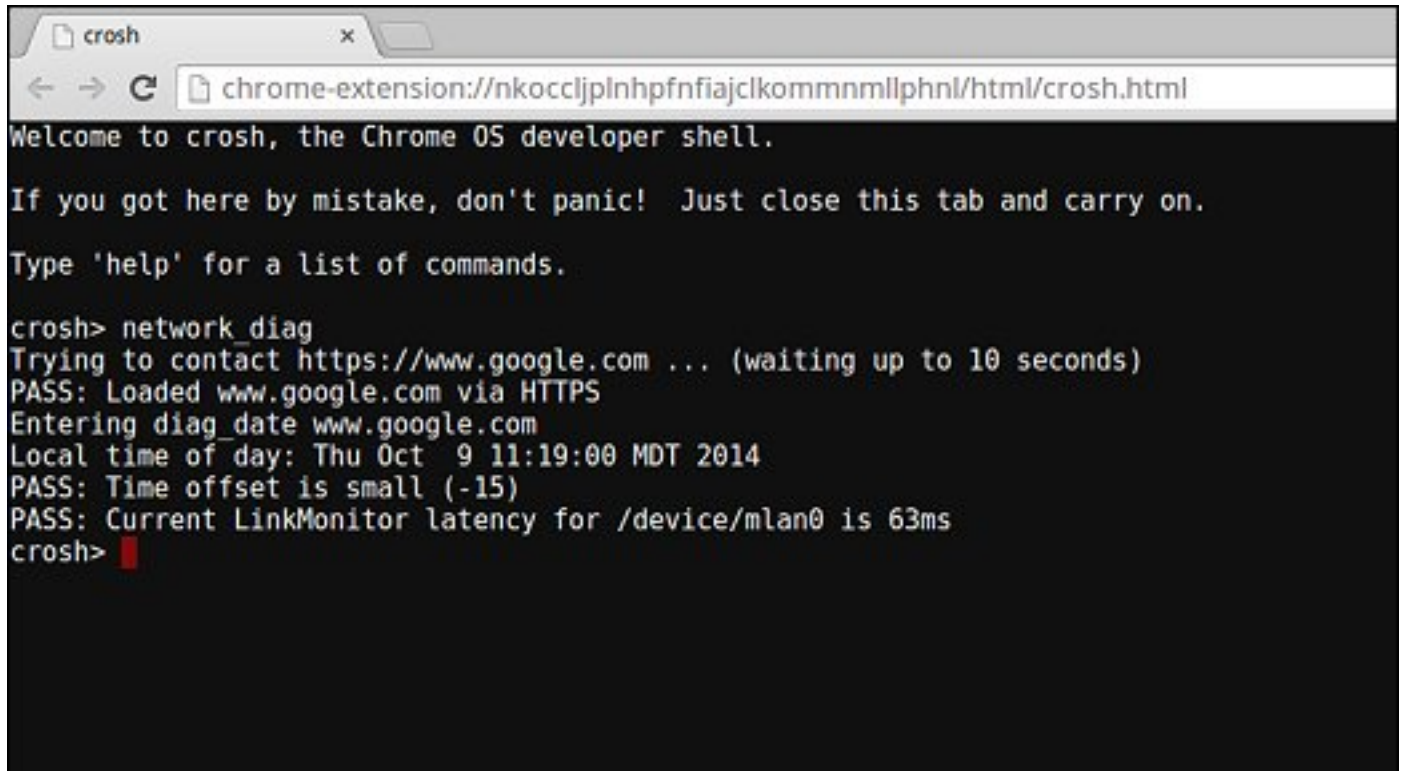
1. Turn on and sign in to Chromebook.
2. Open the Chrome browser.
3. Press CTRL + ALT + T to open CROSH.



4. Type `network_diag` into CROSH, and then press **Enter**.



5. Wait while CROSH performs a set of network diagnostic tests. A diagnostic screen displays the results of the network adapter health test.



The screenshot shows a web browser window with a single tab titled 'crosh'. The address bar displays 'chrome-extension://nkoccljplnhpfnfiajclkommmmlphnl/html/crosh.html'. The main content area is a black terminal window with white text. It displays a welcome message, instructions, and the output of the 'network\_diag' command. The command output shows successful connections to https://www.google.com via HTTPS, the local time as Thu Oct 9 11:19:00 MDT 2014, a time offset of -15, and a LinkMonitor latency of 63ms for /device/mlan0.

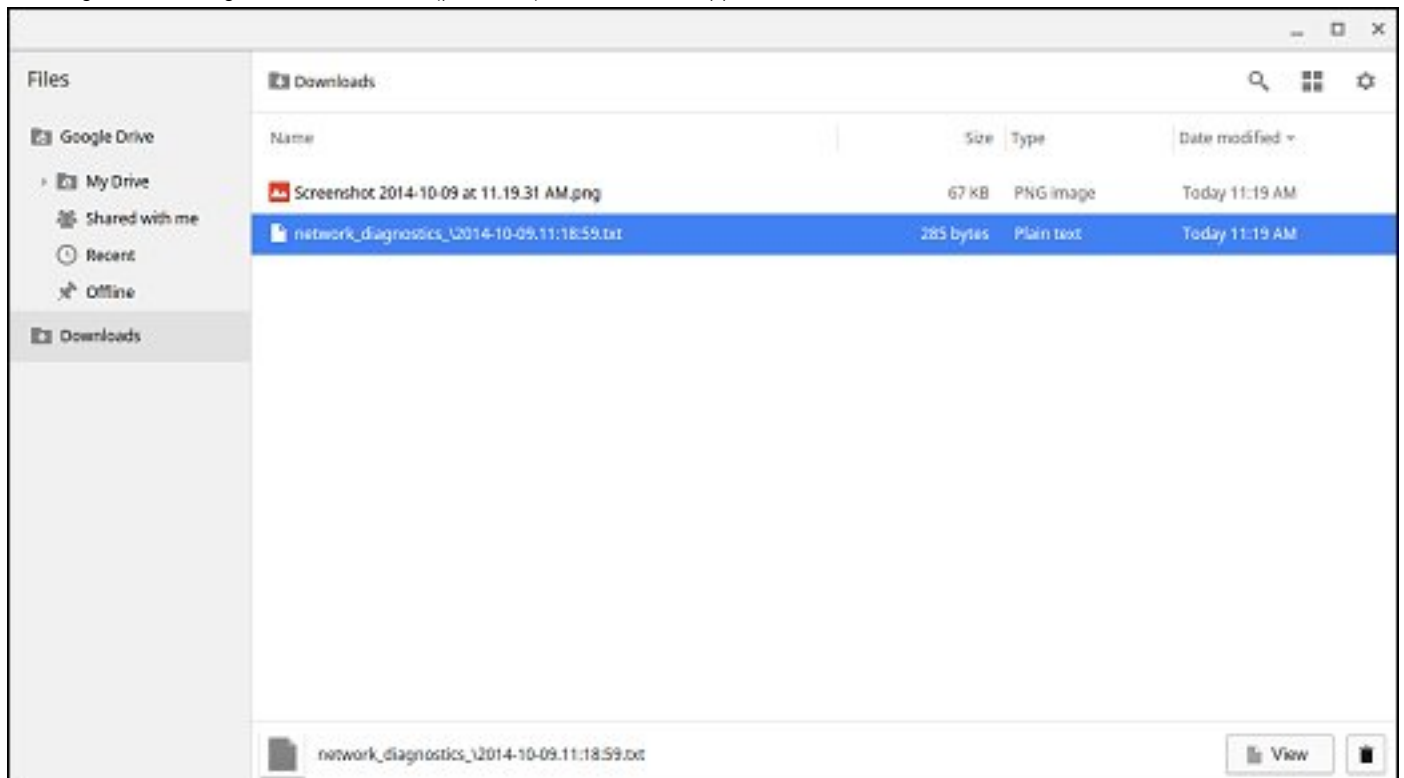
```
crosh
chrome-extension://nkoccljplnhpfnfiajclkommmmlphnl/html/crosh.html
Welcome to crosh, the Chrome OS developer shell.

If you got here by mistake, don't panic! Just close this tab and carry on.

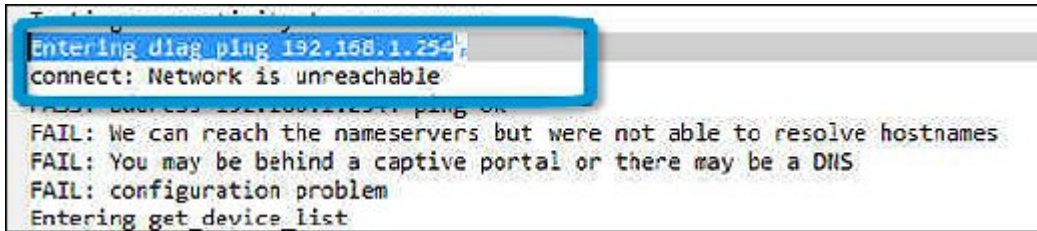
Type 'help' for a list of commands.

crosh> network_diag
Trying to contact https://www.google.com ... (waiting up to 10 seconds)
PASS: Loaded www.google.com via HTTPS
Entering diag_date www.google.com
Local time of day: Thu Oct 9 11:19:00 MDT 2014
PASS: Time offset is small (-15)
PASS: Current LinkMonitor latency for /device/mlan0 is 63ms
crosh>
```

6. The diagnostic test log is saved as a .txt (plain text) file in the Files app.



7. If the diagnostic test returns a failure message, make sure the Wi-Fi adapter is enabled and connect to a network.



## Recovery Chromebook

This page contains information about recovering Dell Latitude 5400 Chrome.

### Recovering the Chromebook

Install a new version of the Chrome operating system on your Chromebook by going through the recovery process. You may want to go through this process if you are having problems updating your Chromebook or if it stops working.

**NOTE:** All account information and data stored on your Chromebook, such as photos, downloaded files, and saved networks, will be deleted. Owner privileges for your primary account will also be reset. However, the actual Google Accounts and any data synced to these accounts are not affected by the recovery process. After the recovery process is complete, you will be guided through the initial setup again.

#### Prerequisites:

Before starting this process, you need the following:

- A Chrome device, Windows, Mac, or the Linux computer with administrative rights.
- A 4 GB or larger USB flash drive or SD card that you do not mind clearing.

### Step 1- Check for the Chrome OS is missing or damaged message

If you see this message, you can first try to perform a hard reset on your Chromebook by pressing Refresh + Power. If you still see this message after performing a hard reset, please proceed to Step 2.

If you see the **Chrome OS verification is turned off** message, refer to **Chrome OS verification is turned off** section below.

### Step 2- Create the recovery USB flash drive or SD card

Insert a USB flash drive or SD card into your computer and follow the instructions below

Table 11. USB flash drive or SD card

Operating System	Instructions
Chrome Device Instructions	<p>Create a recovery flash drive by using the Image Burner. The tool may not be available in all languages.</p> <ol style="list-style-type: none"><li>1. Type <code>chrome://imageburner</code> into the omnibox (browser's address bar) .</li><li>2. Run the tool and follow the instructions that appear on your screen.</li></ol> <p><b>NOTE:</b> When recovering your Chromebook, make sure to create the recovery flash drive on the same model.</p>
Windows Instructions	<ol style="list-style-type: none"><li>1. Click the link <a href="https://dl.google.com/dl/chromeos/recovery/chromeosimagecreatorV2.exe">https://dl.google.com/dl/chromeos/recovery/chromeosimagecreatorV2.exe</a> to download the Recovery Tool. If you are a network administrator for your school, business, or organization, click this link to download the Recovery Tool: 2. 3.</li><li>2. Run the tool and follow the instructions that appear on your screen.</li></ol>



**Table 11. USB flash drive or SD card (continued)**

Operating System	Instructions
	<ol style="list-style-type: none"> <li>After you recover your Chromebook, you must format your USB flash drive or SD card using the Recovery Tool. If you do not format your USB flash drive or SD card, you will not be able to use all the storage space on your external device. Additionally, your USB flash drive or SD card may not be recognizable by Windows.</li> </ol>
Mac Instructions	<p>Create a recovery flash drive by using the Recovery Tool. The tool may not be available in all languages.</p> <ol style="list-style-type: none"> <li>Click the link <a href="https://dl.google.com/dl/chromeos/recovery/chromeosimagecreatorV2.exe">https://dl.google.com/dl/chromeos/recovery/chromeosimagecreatorV2.exe</a> to download the Recovery Tool.</li> <li>Run the tool and follow the instructions that appear on your screen.</li> </ol> <p>After the process is complete, you might see an alert saying your USB drive or SD card is unreadable. If this fails, try removing and reinserting your USB drive or SD card. Your USB drive or SD card should now be ready to use for recovery.</p>
Linux Instructions	<p>Create a recovery flash drive by using the Recovery Tool. The tool may not be available in all languages.</p> <ol style="list-style-type: none"> <li>Click the link <a href="https://dl.google.com/dl/edgedl/chromeos/recovery/linux_recovery.sh">https://dl.google.com/dl/edgedl/chromeos/recovery/linux_recovery.sh</a> to download the Recovery Tool.</li> <li>Modify the script permissions to allow execution with the following command: <code>\$ &amp; sudo chmod 755 linux_recovery.sh</code></li> <li>Run the script with root privileges with the following command: <code>\$ sudo bash linux_recovery.sh</code></li> <li>Follow the prompts from the tool to complete building the operating system image.</li> </ol>

## Reinstall the Chrome Operating System

- Start your Chromebook.
- When the **Chrome OS is missing or damaged** screen appears, insert the USB flash drive or SD card you created into the USB port or SD card slot on your Chrome device
- Wait for the Chromebook to boot up from the flash drive
- Follow the instructions that appear on the screen.
- On successful installation of the Chrome operating system, you will be prompted to remove the USB flash drive or SD card.
- Remove the USB flash drive or SD card when prompted, and your Chromebook will automatically restart.

You should now be able to start your Chromebook as normal. Because the data stored on your Chromebook has been cleared, you will need to go through the initial setup again. Make sure you sign in with your primary Google Account, because this account will be set as the owner account.

## Chrome OS verification is turned off Message

By default, Chromebooks are set to the normal user mode. If you've set the user mode to developer mode instead, you'll see a screen with the message "Chrome OS verification is turned off" when you start up. Use the developer mode if you want to test your own version of the Chrome operating system.

Press **Ctrl+D** to enter developer mode. If you press the space bar instead, you'll see a screen asking to recover your device.

## Troubleshooting Tips

Table 12. Troubleshooting tips

Question	Solution
I am unable to recover my Chromebook	To help ensure that you are running the latest version of Chrome OS once you recover your Chromebook, we recommend creating the recovery media with the latest version of Chrome OS and avoid using recovery media that may contain an older version of the operating system.
An error message <b>An unexpected error has occurred.</b>	Try the following steps: <ol style="list-style-type: none"><li>1. Confirm that you successfully completed all instructions exactly as specified in Step 2: Create the recovery USB flash drive or SD card above.</li><li>2. Try using a different USB stick or SD card.</li><li>3. If the problem persists, contact Google Chrome support team.</li></ol>
An error message <b>You are using an out-of-date Chrome OS recovery image.</b>	You should download an up-to date recovery image. Simply follow all the instructions exactly as specified in Step 2 above.
You successfully recovered your Chromebook but now you can not use your USB or SD card with Windows	After you have completed recovery, you need to format your USB or SD card using the recovery tool.
You successfully recovered your Chromebook but now Windows does not recognize the whole size of the USB or SD card used for recover.	After you have completed recovery, you need to format your USB or SD card using the recovery tool.

## Reset Chromebook

This page contains all information about resetting Dell Latitude 5400 Chrome.

All local user data stored on the Chrome OS can be cleared by resetting it to its original factory state (also known as Powerwash).

This step might be helpful if you want to reset owner permissions or if you are experiencing issues with your user profile.

**NOTE:** All data stored on your Chrome OS such as downloaded files, photos, owner permissions, and saved networks, will be deleted for all accounts when performing a factory reset. After clearing this data, you will be guided through the initial setup again. Resetting your device will not affect your accounts themselves, or any data synced to these accounts.

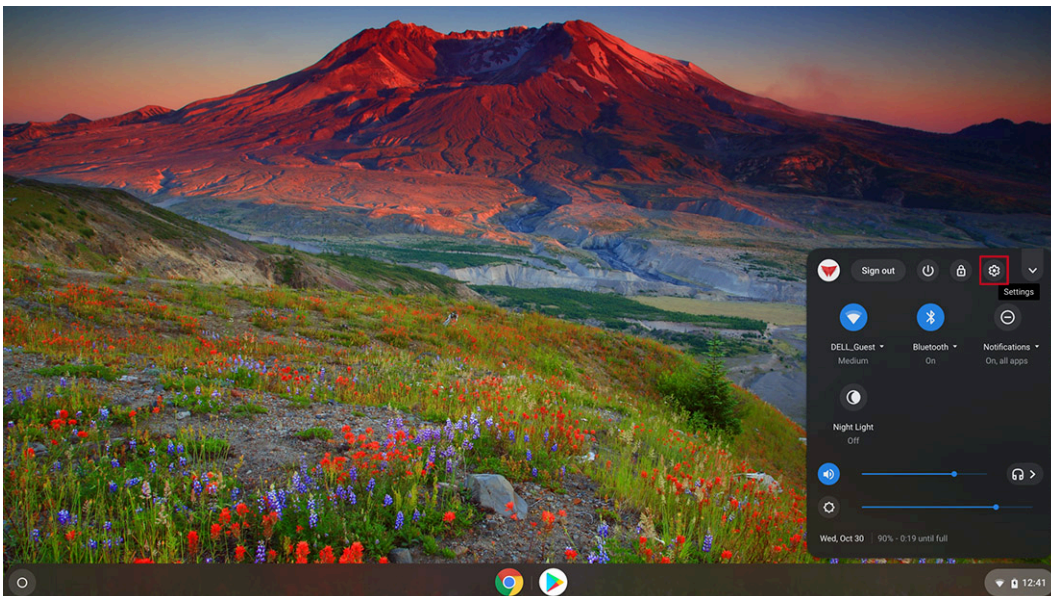
**NOTE:** Do not follow the instructions below if you're using a managed Chrome device, as you will not be able to re-enroll your device after powerwashing it.

Follow these steps to reset your Chrome OS to its original factory state:

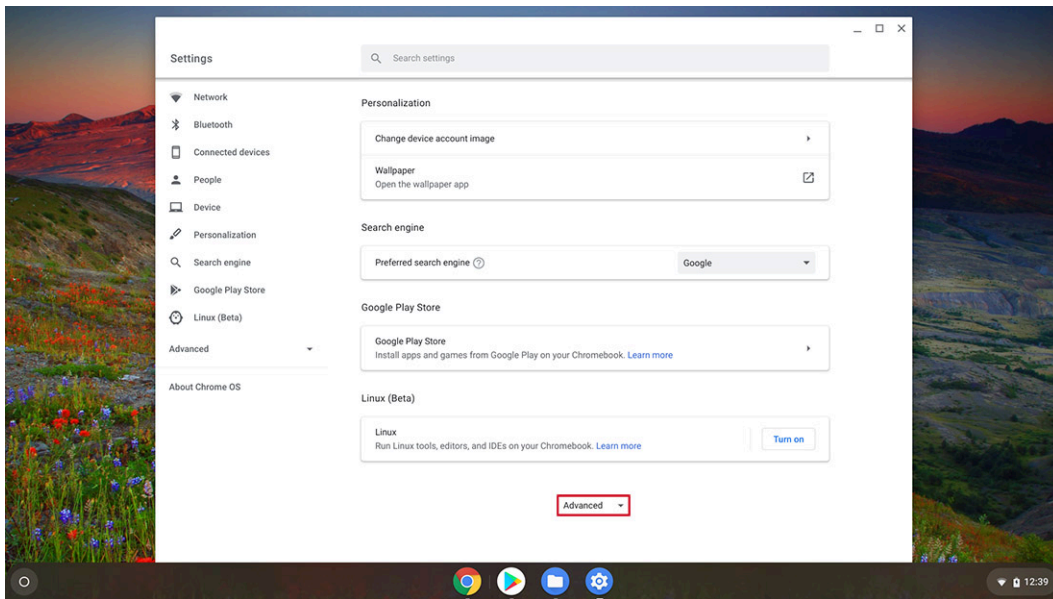
1. Click the status area in the lower-right corner, where your account picture appears.



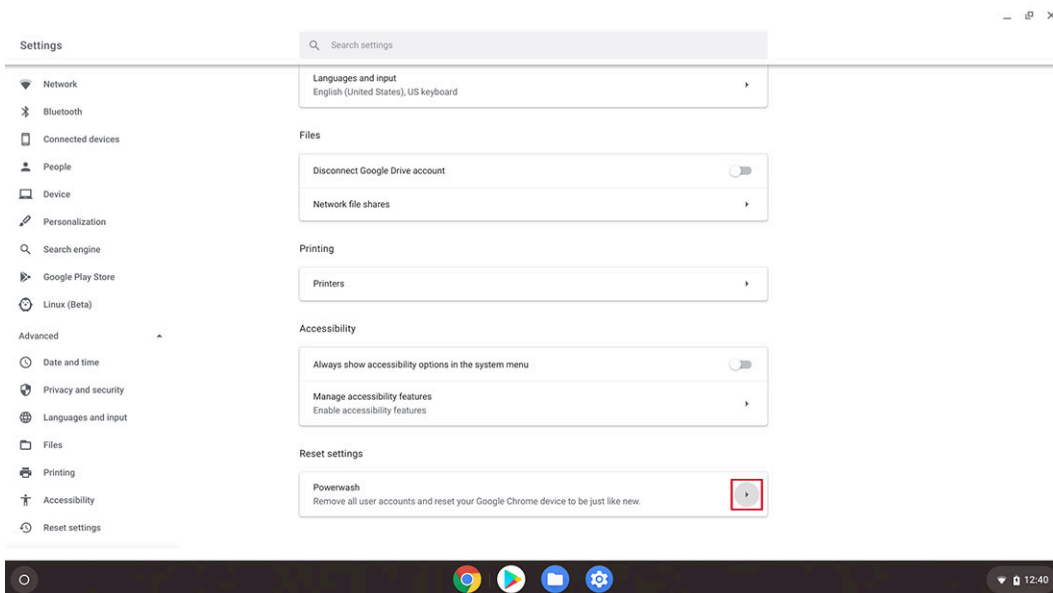
2. Click **Settings** as highlighted from the picture below.



3. Click **Show advanced settings** to expand the menu.

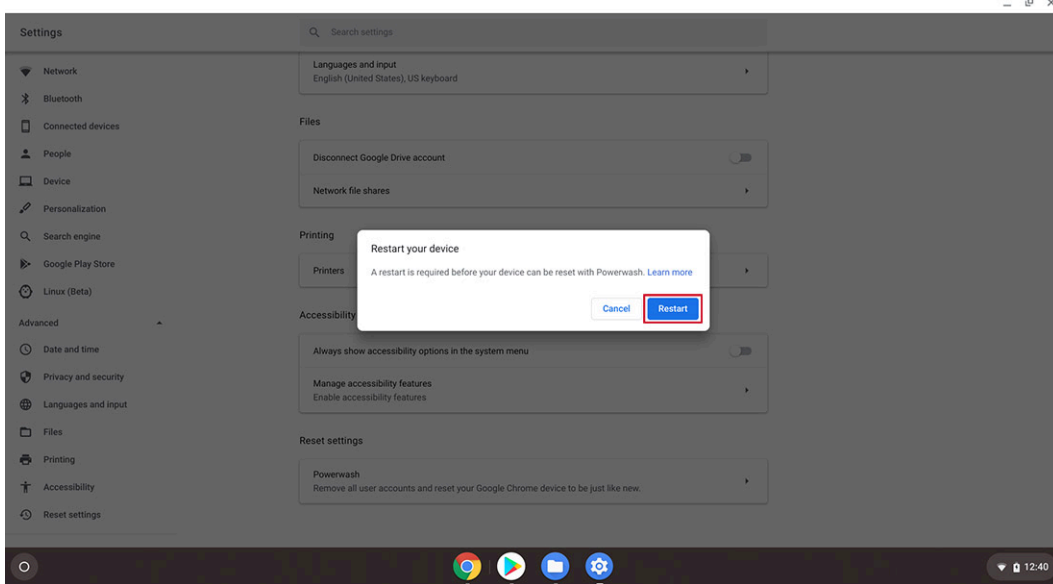


4. Click the **Powerwash** button.



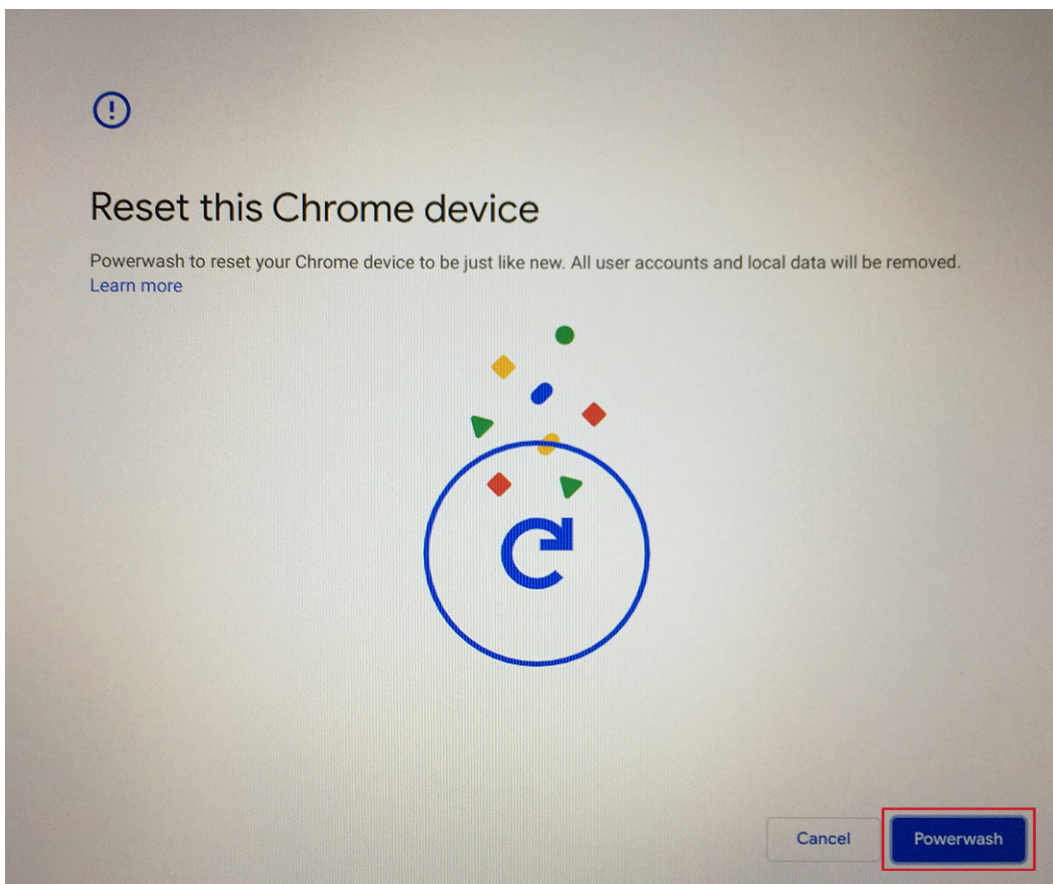
5. Click **Restart** when prompted.





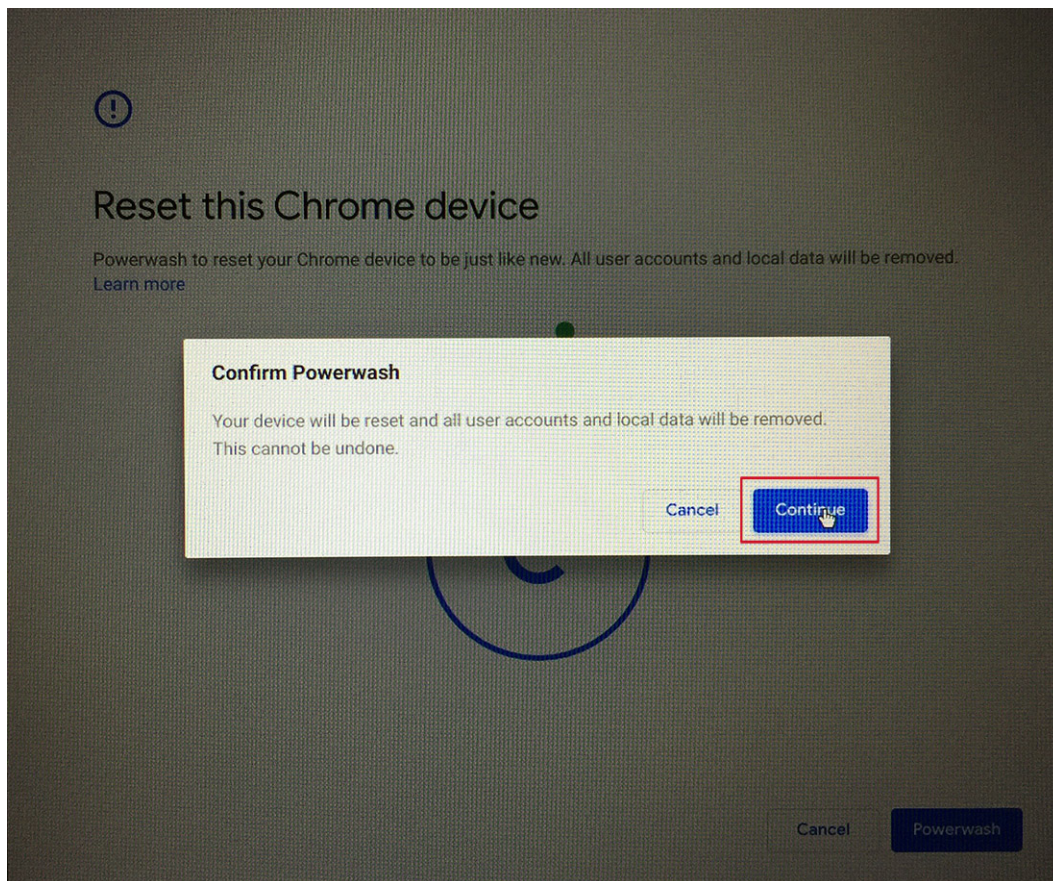
**NOTE:** You can also reset your Chrome OS from the sign-in screen by holding down the keys **Ctrl+Alt+Shift+R** and clicking **Restart**. (If you are signed in to your Chrome OS, sign out first before you press on **Ctrl+Alt+Shift+R**, then click **Restart**. Once the Chrome OS is restarted, click **Reset**.)

6. After you restart the Chrome OS, you should now see the setup screen. Click on **Powerwash** button.

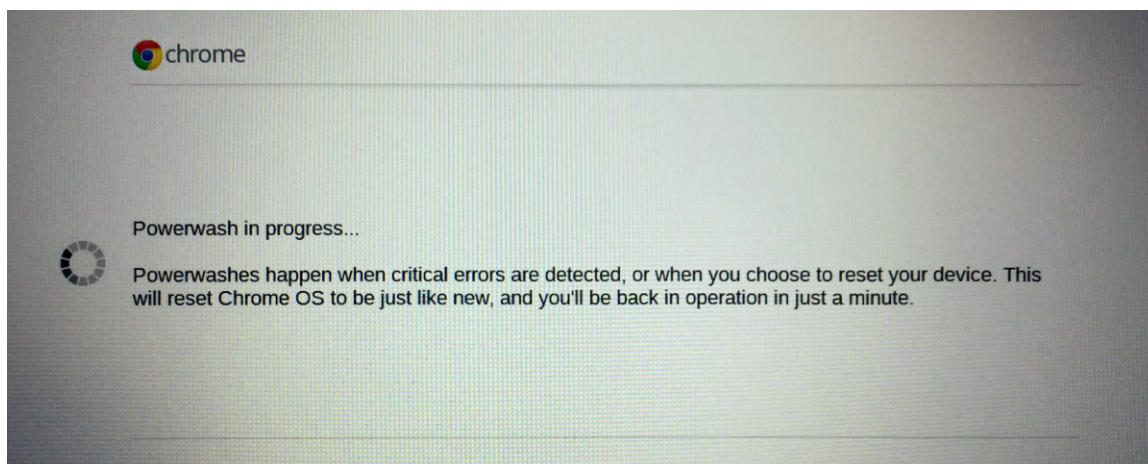


7. Confirm powerwash by clicking on **Continue** button.





8. Powerwash may take some time to complete. Let the screen transition to Chrome Operating System welcome screen and make sure you sign in with your primary Google Account, because this account is set as the owner account.



## 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 you see color bars on the LCD (screen).
5. The screen will display multiple color bars and change colors on the entire screen to red, green, and blue.
6. Carefully inspect the screen for abnormalities.
7. Press **Esc** key to exit.

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

## Diagnostic LEDs

Instead of beep codes, errors are indicated via the bicolor Battery Charge/Status LED. A specific blink pattern is followed by flashing a pattern of flashes in amber, followed by white. The pattern then repeats.

The diagnostic pattern will consist of a two-digit number being represented by a first group of LED blinks (1 through 9) in amber, followed by a 1.5 second pause with the LED off, and then a second group of LED blinks (1 through 9) in white. This is then followed by a three second pause, with the LED off, before repeating over again. Each LED blink takes 1.5 seconds.

The system will not shutdown when displaying the Diagnostic Error Codes.

Diagnostic Error Codes will always supersede any other use of the LED. For instance, on laptops, battery codes for Low Battery or Battery Failure situations will not be displayed when Diagnostic Error Codes are being displayed.

**Table 13. Diagnostic LEDs**

Blinking Pattern		Problem Description	Suggested Resolution
Amber	White		
2	1	CPU failure	Replace the system board.
2	2	System board failure (included BIOS corruption or ROM error)	Flash latest BIOS version. If problem persists, replace the system board.
2	3	No memory/RAM detected	Confirm that the memory module is installed properly. If problem persists, replace the memory module.
2	4	Memory/RAM failure	Replace the memory module.
2	5	Invalid memory installed	Replace the memory module.
2	6	System board/Chipset error	Replace the system board.
2	7	LCD failure	Replace the LCD module.
2	8	LCD Power rail failure	Replace the system board.
3	1	CMOS battery failure	Replace the RTS battery.
3	2	PCI or Video card/chip failure	Replace the system board.
3	3	BIOS Recovery Image not found	Flash latest BIOS version. If problem persists, replace the system board.
3	4	BIOS Recovery Image found but invalid	Flash latest BIOS version. If problem persists, replace the system board.

For diagnostics pattern 2-amber, 8-white connect an external monitor to isolate between system board or graphics controller failure.

# Diagnostics

This chapter details the built in troubleshooting features to diagnose the Dell Latitude 5400 Chrome systems. It also lists the invoking instructions along with related information for each diagnostics method.

## ePSA Diagnostics

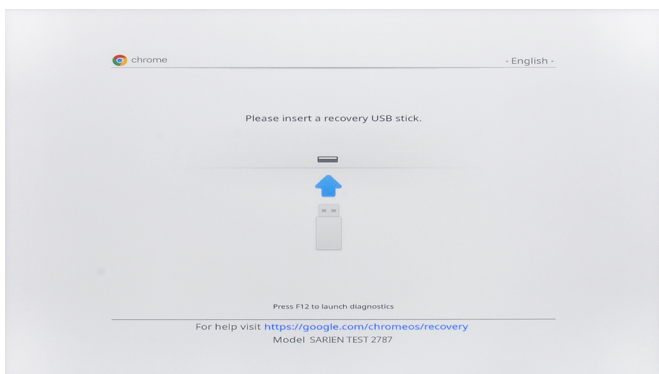
The ePSA diagnostics (also known as system diagnostics) performs a complete check of your hardware. The ePSA is embedded with the BIOS and is launched by the BIOS internally. The embedded system diagnostics provides a set of options for particular devices or device groups allowing you to:

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

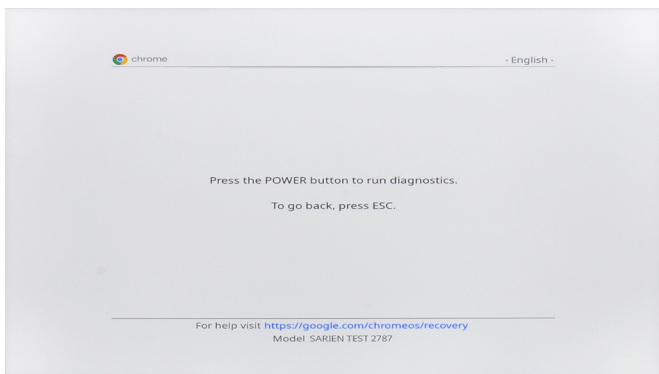
**NOTE:** The Enhanced Pre-boot System Assessment window displays, listing all devices detected in the computer. The diagnostics starts running the tests on all the detected devices.

## Running ePSA diagnostics

1. Press and Hold the **Power** and **F2** to boot into Chrome OS recovery menu.
2. Press **F12** or **Ctrl + C** key on the keyboard to go to diagnostics screen.



3. Press the **Power** button to launch ePSA.



## ePSA User Interface

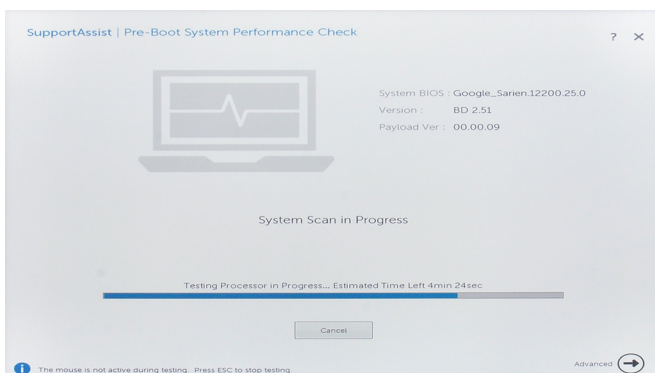
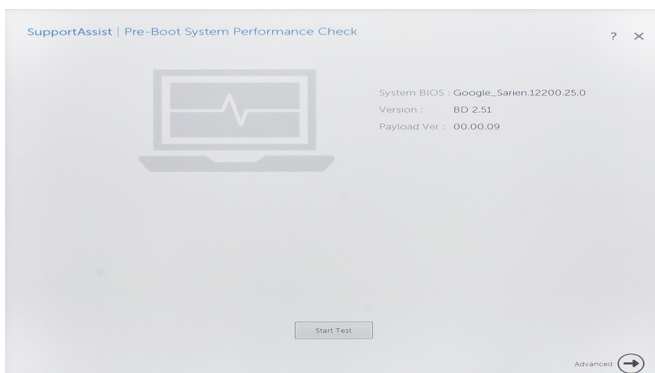
This section contains information on ePSA 3.0's Basic and Advanced Screen.

ePSA opens basic screen on start. You can switch to advanced screen using the arrow icon on the bottom. Advanced screen shows detected devices on the left column. Specific test can be included or excluded only in the interactive mode.



## ePSA Basic Screen

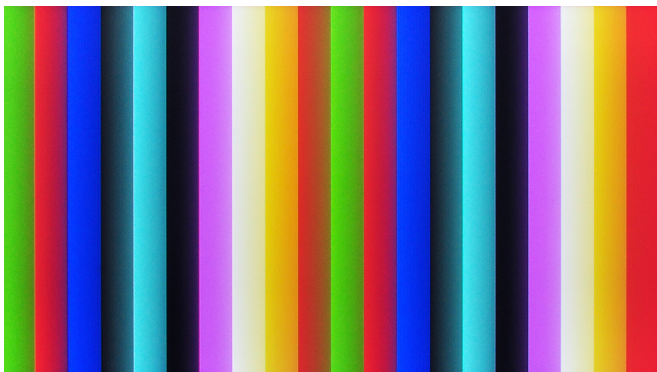
The Basic Screen has minimal controls which allows easy navigation for user to start or stop the diagnostic.



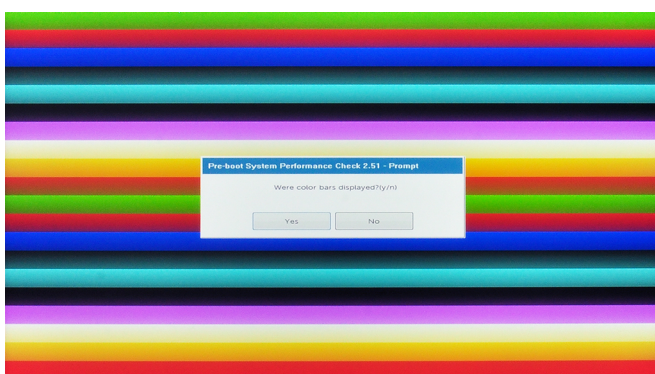
## LCD Test

The ePSA starts with LCD pixel test, where color bars are displayed on the screen. Check for any flaws with pixels on the screen

- **Dead Pixels:** Black dot
- **Bright Pixels:** Bright dot



Confirm the LCD functionality by pressing **Yes** or **No** on the next screen.



ePSA Advanced Screen

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

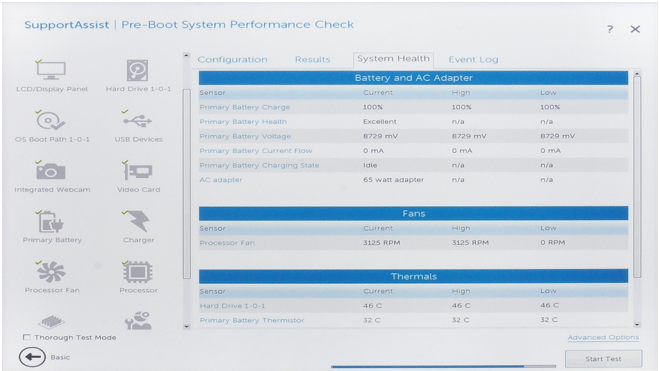


Figure 1. System Health

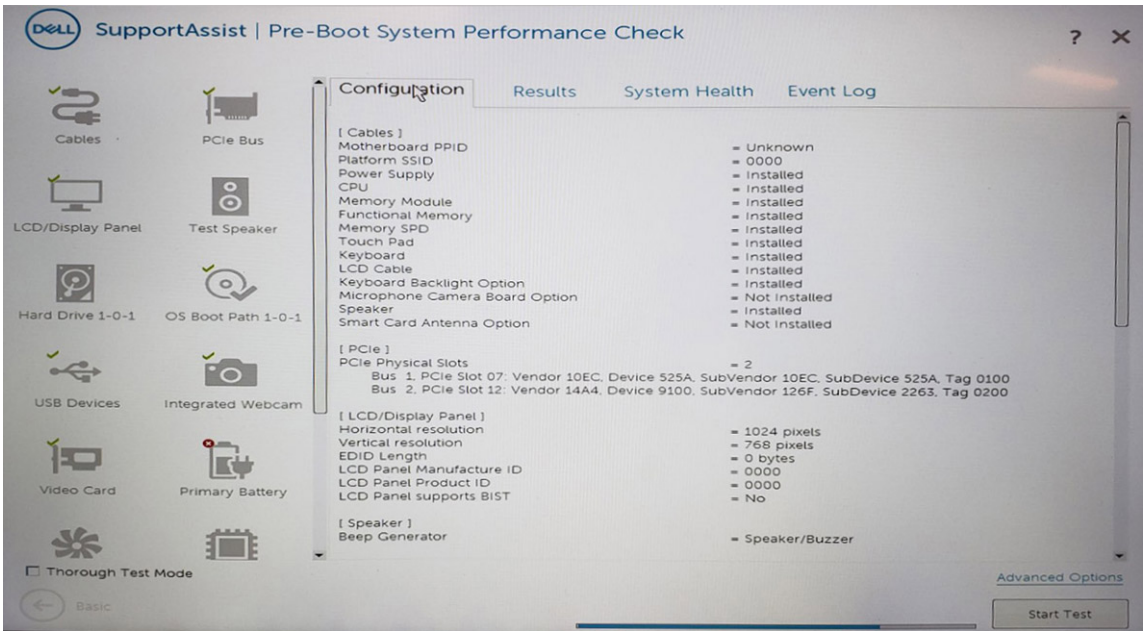


Figure 2. Configuration



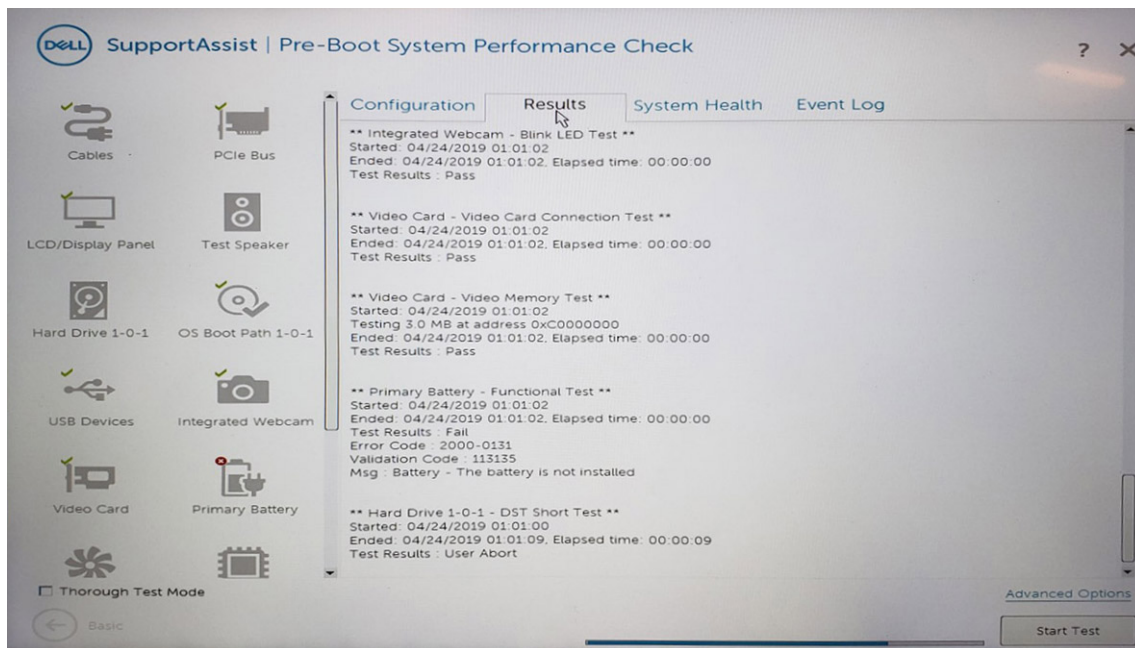


Figure 3. Results

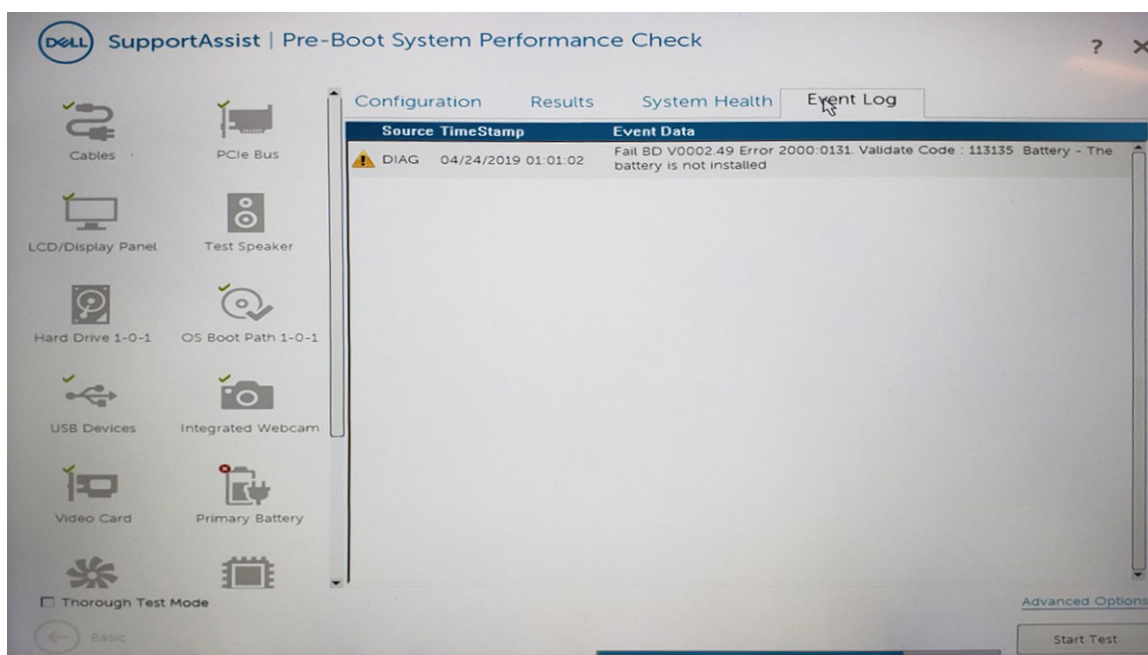


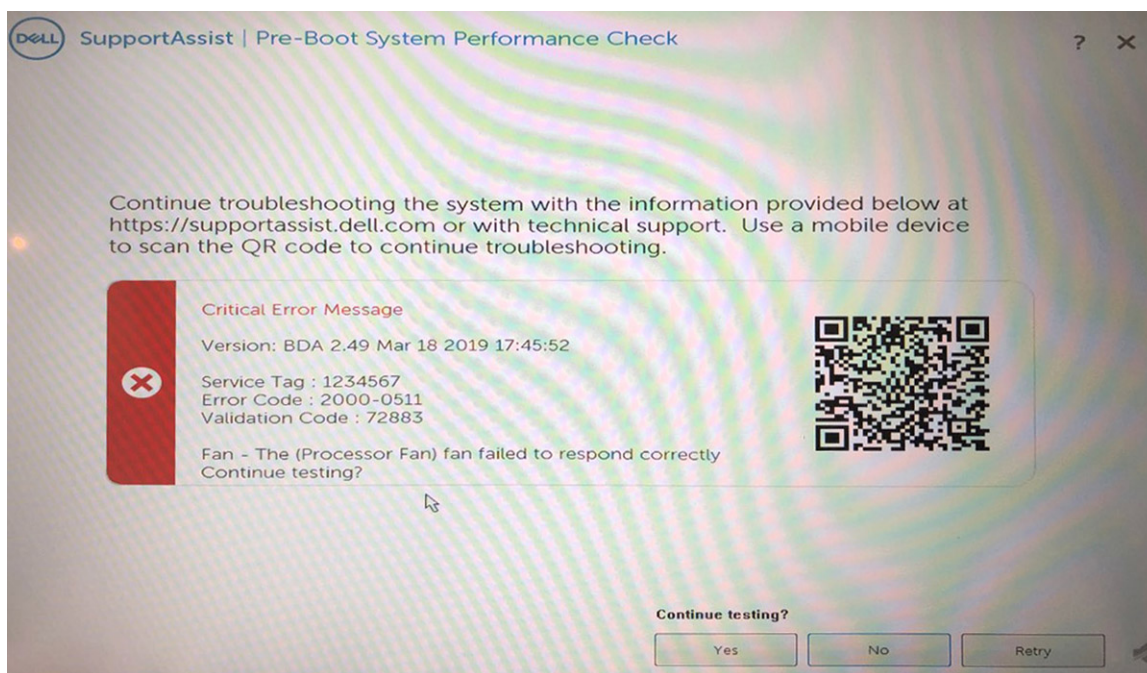
Figure 4. Event Logs

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

1. To run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
2. Select the device from the left pane and click **Run Tests** or use **Advanced Option** to include or exclude any Test.

## ePSA Error Messages


When the Dell ePSA Diagnostic detects an error while running, it will pause the test and then popup a window as shown below :



**NOTE:** If all the test passes you get a QR code to show the test results.

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

Capture the error code with Validation code or Scan QR code and [Contact Dell](#)

**NOTE:** As part of the new feature, user can now mute the beeping sound code when there is an error , by pressing on  at the bottom right side of the error window.

**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.

## Validation Tools

This section contains information on how to validate the SupportAssist ePSA, ePSA or PSA error codes.

Error code verification can be done using below two methods :

- [Online Enhanced Preboot System Assessment Validation Tool](#).
- QR scanning using QR APP on Smart Phone.

## Online SupportAssist On-board Diagnostics, ePSA or PSA Error Codes Validation Tool

### Usage Guide

#### Steps

1. User to obtain information from SupportAssist error windows.



2. Navigate to <https://www.dell.com/support/diagnose/Pre-boot-Analysis>.
3. Enter error code, validation code, and service tag. Part serial number is optional.

Error Code (without 2000-prefix) *	<input type="text" value="Error Code (without 2000-prefix)"/>
Validation Code *	<input type="text" value="Validation Code"/>
Service Tag ⓘ *	<input type="text" value="Service Tag"/>
Part Serial # (optional)	<input type="text" value="Part Serial # (optional)"/>
<input type="submit" value="Submit"/>	

[View System Requirements](#) and [Privacy And Legal Information](#)

ⓘ **NOTE:** For error code, use only the last 3 or 4 digits of the code. (user can enter 0142 or 142 instead of 2000–0142.)

4. Click on **Submit** once all the necessary information is entered.

Error Code (without  
2000-prefix) \*

0141

Validation Code \*

125870

Service Tag  \*

Part Serial # (optional)


Part Serial # (optional)


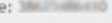
Submit

[View System Requirements and Privacy And Legal Information](#)

## Results

### Valid Error Code Example



**Vostro 20 All-in-One 3055**  
Service Tag:  | Express Service Code:   
[Add to My Products List](#)  
[View a different product](#)

[Manuals](#) [Warranty](#) [System configuration](#)


### Diagnostics

[Support topics & articles](#)

[Drivers & downloads](#)

[General maintenance](#)


[Parts & accessories](#)

 Your system is currently Out of Warranty. Please contact Dell Technical Support for further assistance.

### Result: Issues Found.

Your result requires attention. Review the affected hardware below and follow the instructions to troubleshoot problems or you may be presented with a request to replace parts.

[Clear results](#)


 **Needs Attention: System maintenance**

**Needs Attention**

A potential error has been found. [Click here](#) to view a list of steps that can help resolve your issue.

See full scan results.

**Diagnostics Completed**


Hardware			
Diagnostic Name	Error Code	Serial #	Result
EP5A	141		 Failed

After entering the correct information, the online tools will direct the user to the above screen which contains information on :

- Confirmation of the error code and result outcome
- Suggested Part Replacement
- If customer is still covered under Dell Warranty
- Case reference number if there is an open case under the service tag

#### Invalid Error Code Example

Error Code (without 2000-prefix) *	<input type="text" value="0141"/>
Validation Code *	<input type="text" value="123456"/>
Service Tag ⓘ *	<input type="text" value="N02P4H032"/>
Part Serial # (optional)	<input type="text" value="Part Serial # (optional)"/>

 You have entered an invalid ePSA request, please check your details and try again.

## QR APP Validation Tool

#### About this task

Besides using the online tool, customers can also validate the error code by scanning the QR code with a QR APP on a smartphone.

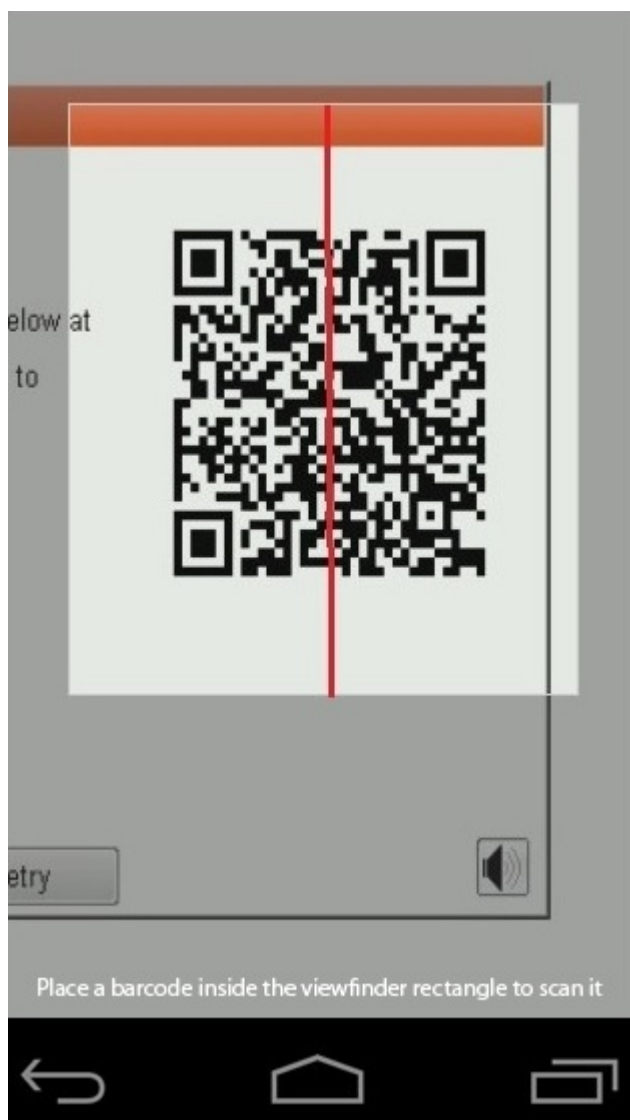
#### Steps

1. User to obtain the QR code from SupportAssist On-board Diagnostics error screen.

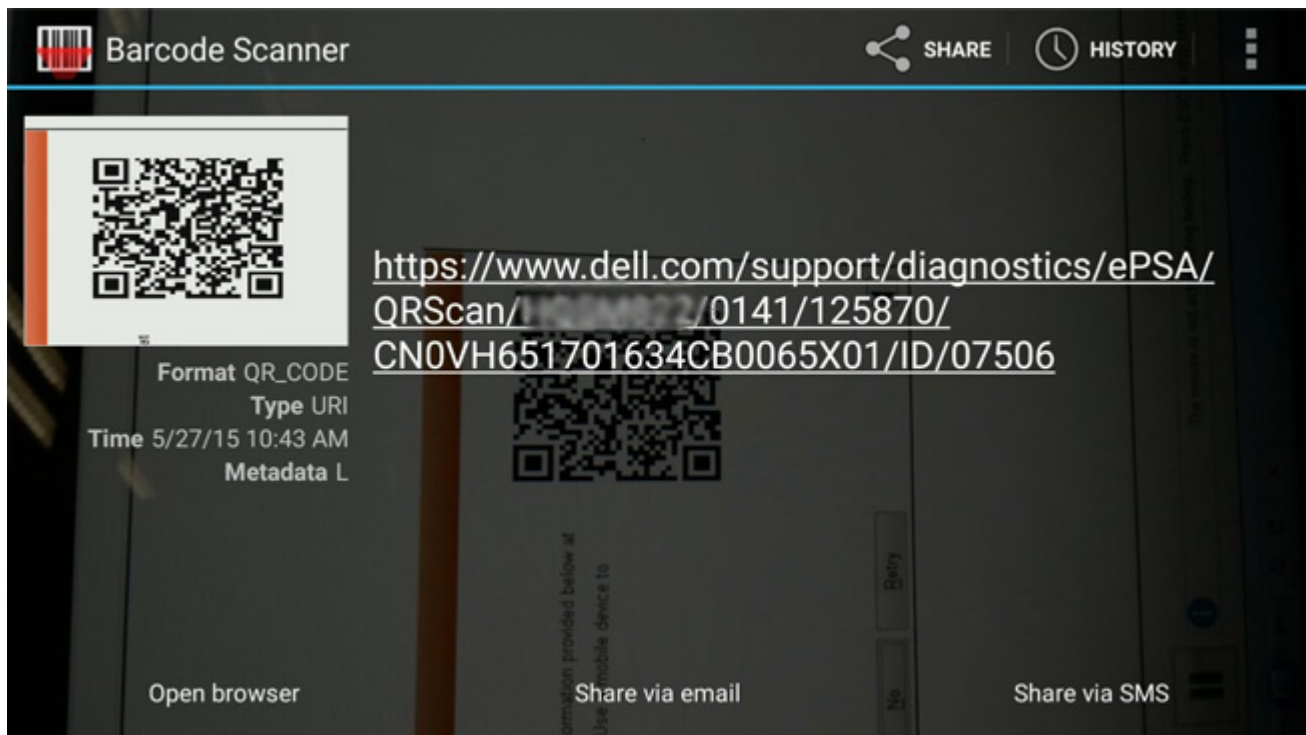


2. User can use any QR code scanner application through the smartphone to scan the QR code.





3. The QR code scanner application will scan the code and automatically generate a link. Click the link to proceed.



## Results

The link generated will take the customer to the Dell Support website which contains information on:

- Confirmation of the error code and result outcome
- Suggested Part Replacement
- If customer is still covered under Dell Warranty
- Case reference number if there is an open case under the service tag



## Vostro 20 All-in-One 3055

Service Tag: [XXXXXXXXXX](#) | Express Service Code: [XXXXXXXXXX](#)

[Add to My Products List](#)

[View a different product](#)

[Manuals](#)

[Warranty](#)

[System configuration](#)

### Diagnostics

[Support topics & articles](#)

[Drivers & downloads](#)

[General maintenance](#)

[Parts & accessories](#)



Your system is currently Out of Warranty. Please contact Dell Technical Support for further assistance.

### Result: Issues Found.

Your result requires attention. Review the affected hardware below and follow the instructions to troubleshoot problems or you may be presented with a request to replace parts.

[Clear results](#)



#### Needs Attention: System maintenance

##### Needs Attention

A potential error has been found. [Click here](#) to view a list of steps that can help resolve your issue.

### See full scan results.

#### Diagnostics Completed

##### Hardware

Diagnostic Name	Error Code	Serial #	Result
EP5A	141		Failed

# Getting help and contacting Dell

## Self-help resources

You can get information and help on Latitude 5400 Chrome and other Dell products and services using these self-help resources:

**Table 14. Self-help resources**

Self-help resources	Resource location
Information about Dell products and services	<a href="https://www.dell.com">https://www.dell.com</a>
Online help for operating system	<a href="https://www.dell.com/support/article/sln293900">https://www.dell.com/support/article/sln293900</a>
Troubleshooting information, user manuals, setup instructions, product specifications, technical help blogs, drivers, software updates, and so on.	<a href="https://www.dell.com/support">https://www.dell.com/support</a>
Dell knowledge base articles for a variety of computer concerns.	<a href="https://www.dell.com/support/home/app=knowledgebase">https://www.dell.com/support/home/app=knowledgebase</a>
Learn and know the following information about your product: <ul style="list-style-type: none"> <li>• Product specifications</li> <li>• Operating system</li> <li>• Setting up and using your product</li> <li>• Data backup</li> <li>• Troubleshooting and diagnostics</li> <li>• Factory and system restore</li> </ul>	<p>See <i>Service Manual and Setup and Specifications</i> at <a href="https://www.dell.com/support/manuals">https://www.dell.com/support/manuals</a>.</p> <p>To locate the <i>Service Manual and Setup and Specifications</i> relevant to your product, identify your product through one of the following:</p> <ul style="list-style-type: none"> <li>• Select <b>Detect Product</b>.</li> <li>• Locate your product through the drop-down menu under <b>View Products</b>.</li> <li>• Enter the <b>Service Tag number</b> or <b>Product ID</b> in the search bar.</li> </ul>

## Contacting Dell

**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.

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

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

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical support, or customer service issues:

1. Go to <https://www.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.