

# Dell Precision 7730

## Service Manual



## Notes, cautions, and warnings

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

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

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

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# Working on your computer

## Safety instructions

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

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

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

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

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

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

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

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

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

## Turning off your computer — Windows 10

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

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

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

## Before working inside your computer

- 1 Ensure that your work surface is flat and clean to prevent the computer cover from being scratched.
- 2 Turn off your computer.
- 3 If the computer is connected to a docking device (docked), undock it.
- 4 Disconnect all network cables from the computer (if available).

 **CAUTION:** If your computer has an RJ45 port, disconnect the network cable by first unplugging the cable from your computer.

- 5 Disconnect your computer and all attached devices from their electrical outlets.
- 6 Open the display.
- 7 Press and hold the power button for few seconds, to ground the system board.

 **CAUTION:** To guard against electrical shock unplug your computer from the electrical outlet before performing Step # 8.

 **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.

- 8 Remove any installed ExpressCards or Smart Cards from the appropriate slots.

## After working inside your computer

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

 **CAUTION:** To avoid damage to the computer, use only the battery designed for this particular Dell computer. Do not use batteries designed for other Dell computers.

- 1 Connect any external devices, such as a port replicator or media base, and replace any cards, such as an ExpressCard.
- 2 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.

- 3 Connect your computer and all attached devices to their electrical outlets.
- 4 Turn on your computer.

# Technology and components

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

Topics:

- [HDMI 2.0](#)
- [USB features](#)
- [USB Type-C](#)

## HDMI 2.0

This topic explains the HDMI 2.0 and its features along with the advantages.

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

## HDMI 2.0 Features

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

## Advantages of HDMI

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

# USB features

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

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

**Table 1. USB evolution**

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

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

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

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

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

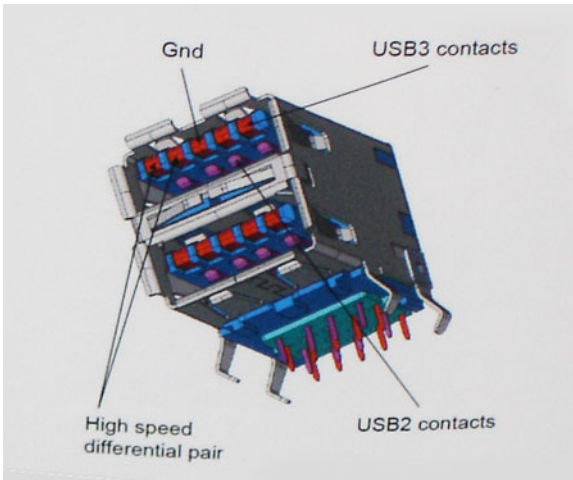


## Speed

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

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

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



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

## Applications

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

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

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

## Compatibility

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

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

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

## USB Type-C

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

### Alternate Mode

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

### USB Power Delivery

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

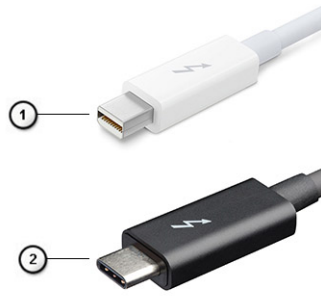
This could spell the end of all those proprietary laptop charging cables, with everything charging via a standard USB connection. You could charge your laptop from one of those portable battery packs you charge your smartphones and other portable devices from today. You could plug your laptop into an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

### USB Type-C and USB 3.1

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

### Thunderbolt over Type-C

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



**Figure 1. Thunderbolt 1 and Thunderbolt 3**

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

## Thunderbolt 3 over Type-C

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

- 1 Thunderbolt 3 uses USB Type-C connector and cables - It is compact and reversible
- 2 Thunderbolt 3 supports speed up to 40 Gbps
- 3 DisplayPort 1.2 – compatible with existing DisplayPort monitors, devices and cables
- 4 USB Power Delivery - Up to 130W on supported computers

## Key Features of Thunderbolt 3 over USB Type-C

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

**NOTE:** Data transfer speed may vary between different devices.

## Thunderbolt Icons

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

**Figure 2. Thunderbolt Iconography Variations**



# Removing and installing components

## Recommended tools




The procedures in this document require the following tools:








- Phillips #0 screwdriver
- Phillips #1 screwdriver
- Plastic scribe

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

## Screw size list

**Table 2. Precision 7730**

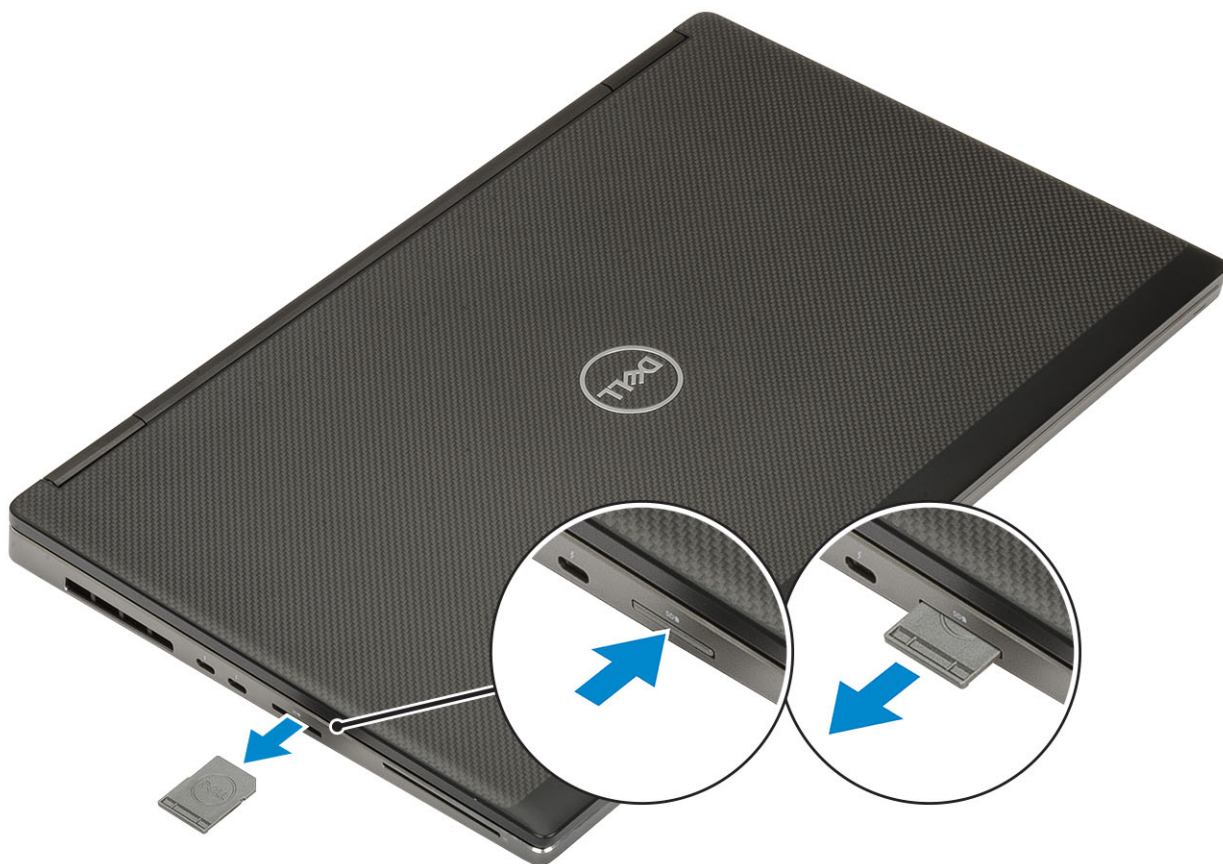
Component	Screw type	Quantity	Image
SSD thermal plate	M2.0x3.0	1 per SSD	
M.2 SSD card		1 per SSD	
HDD Interposer board		1	
WLAN card		1	
WWAN		1	
Power connector port		1	
eDP bracket		2	
Display panel		4	
Smart card cage		2	
Palmrest		6	
HDD Interposer board holder		3	
LED board		1	
Display support bracket		6	
Touchpad button		2	
Beam connector	M2.0x3.0	2	
Keyboard	M2.0x2.5	5	

Component	Screw type	Quantity	Image
Base cover	M2.5X5.0	2	
Type-C bracket	M2.0x5.0	3	
HDD Interposer board		1	
4 Cell Battery	M2.5x3.0	2	
6 Cell Battery		3	
HDD assembly		4	
Display hinge	M2.5x4.0	6	
Hinge cap		4	
GPU card	M2.5x5.0	3	
System board		2	
Palmrest		15	
Display assembly (bottom)		2	
Display assembly (rear)	M2.5x6.0	2	
HDD bracket	M3.0x3.0	4	

## SD card

### Removing SD card

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Press the SD card in to release it from the system.
- 3 Slide the SD card out of the system.



## Installing SD card

- 1 Slide the SD card into its slot until it clicks into place.

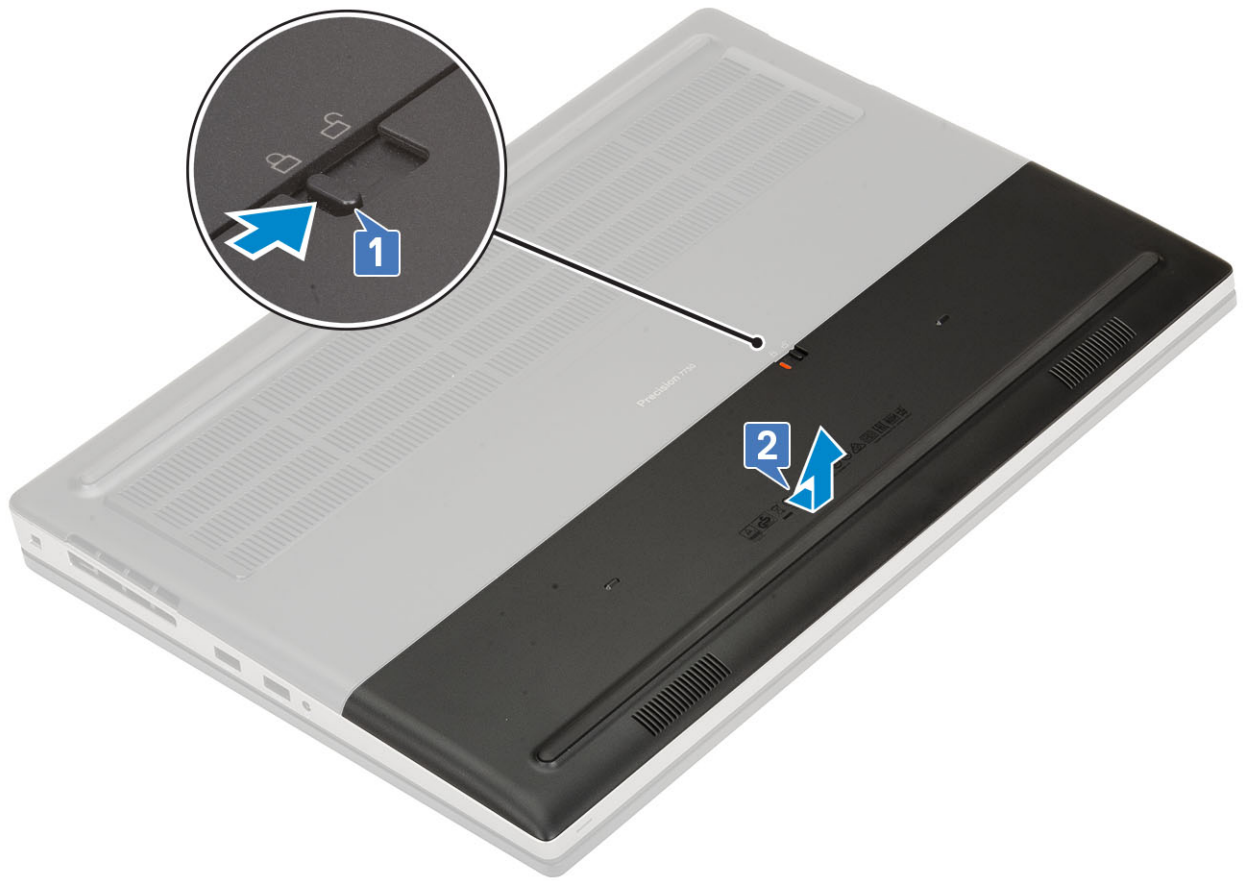


- 2 Follow the procedure in [After working inside your computer.](#)

## Battery cover

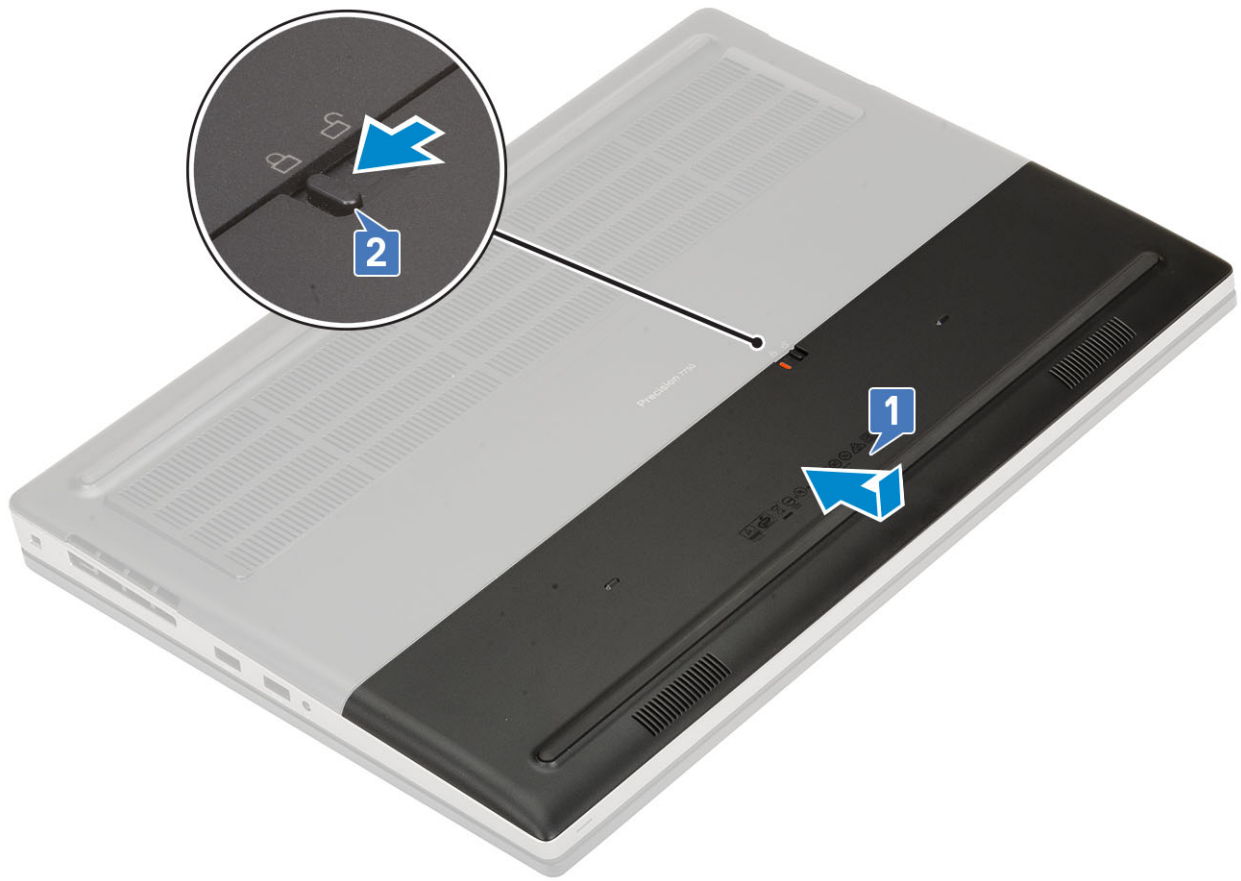
### Removing the battery cover

- 1 Follow the procedure in [Before working inside your computer.](#)
- 2 Remove the [SD card](#).
- 3 To remove the battery cover:
  - a Slide the battery cover release latch towards the unlock icon to release the battery cover [1].
  - b Slide the battery cover outwards and lift the cover to remove it from the system [2].



## Installing the battery cover

- 1 To install the battery cover:
  - a Slide the battery cover into its slot until it clicks into place [1].
  - b The release latch automatically springs back to the lock position [2].



- 2 Install the [SD card](#).
- 3 Follow the procedure in [After working inside your computer](#).

## Battery

### Lithium-ion battery precautions

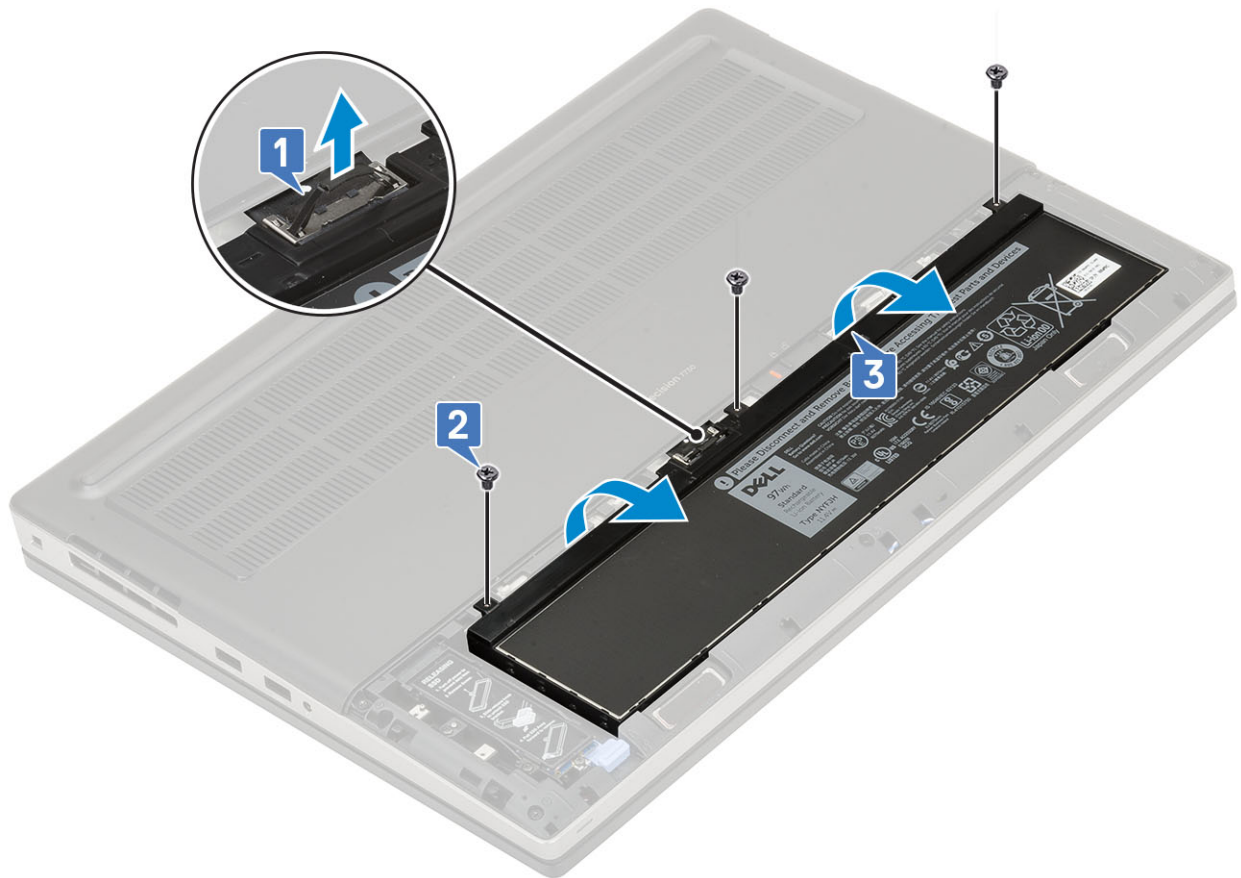
#### ⚠ CAUTION:

- Exercise caution when handling Lithium-ion batteries.
- Discharge the battery as much as possible before removing it from the system. This can be done by disconnecting the AC adapter from the system to allow the battery to drain.
- Do not crush, drop, mutilate, or penetrate the battery with foreign objects.
- Do not expose the battery to high temperatures, or disassemble battery packs and cells.
- Do not apply pressure to the surface of the battery.
- Do not bend the battery.
- Do not use tools of any kind to pry on or against the battery.
- If a battery gets stuck in a device as a result of swelling, do not try to free it as puncturing, bending, or crushing a Lithium-ion battery can be dangerous. In such an instance, the entire system should be replaced. Contact <https://www.dell.com/support> for assistance and further instructions.
- Always purchase genuine batteries from <https://www.dell.com> or authorized Dell partners and re-sellers.

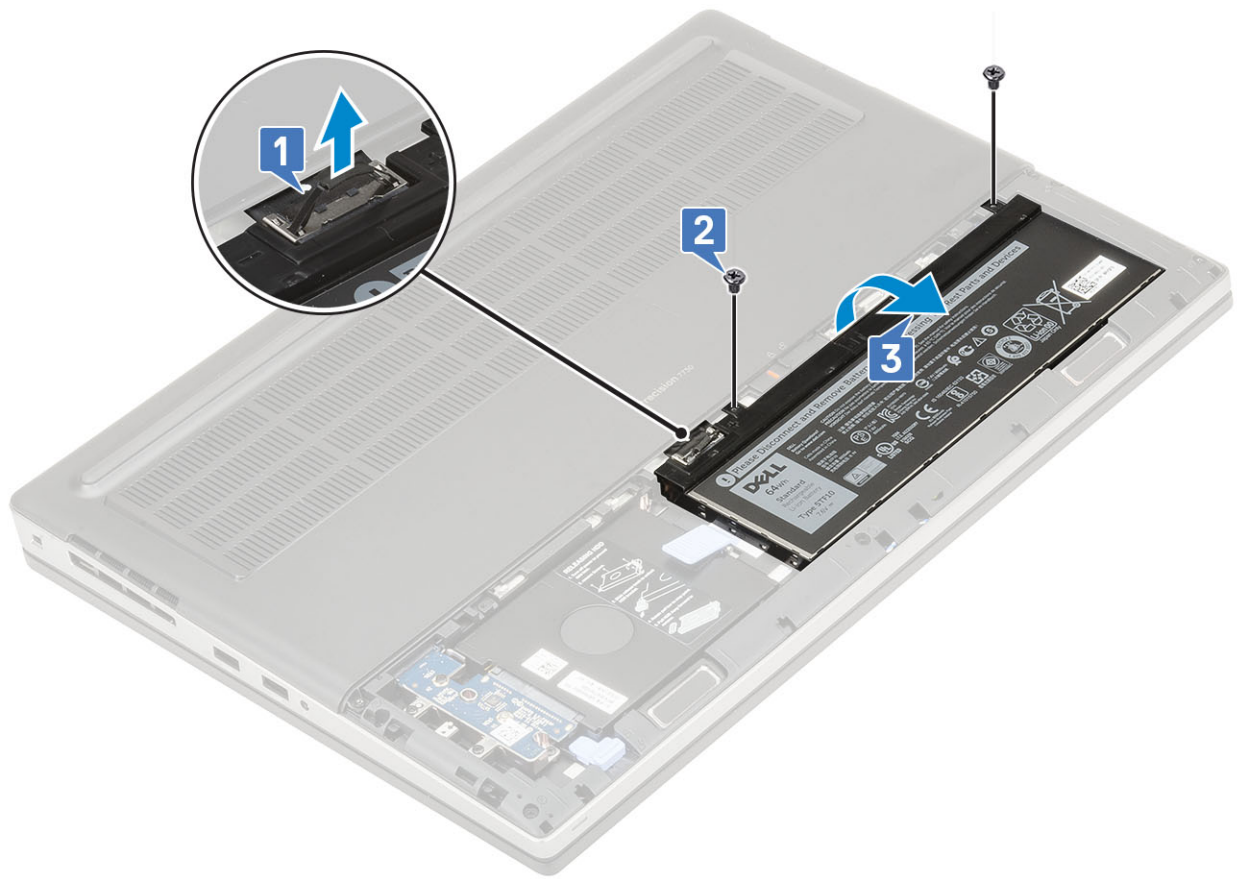


# Removing the battery

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a [SD card](#)
  - b [battery cover](#)
- 3 To remove the 6-cell battery:
  - a Disconnect the battery cable from the connector on the battery [1].
  - b Remove the 3 (M2.5x3.0) screws that secure the battery to the system [2].
  - c Remove the battery away from the system [3].



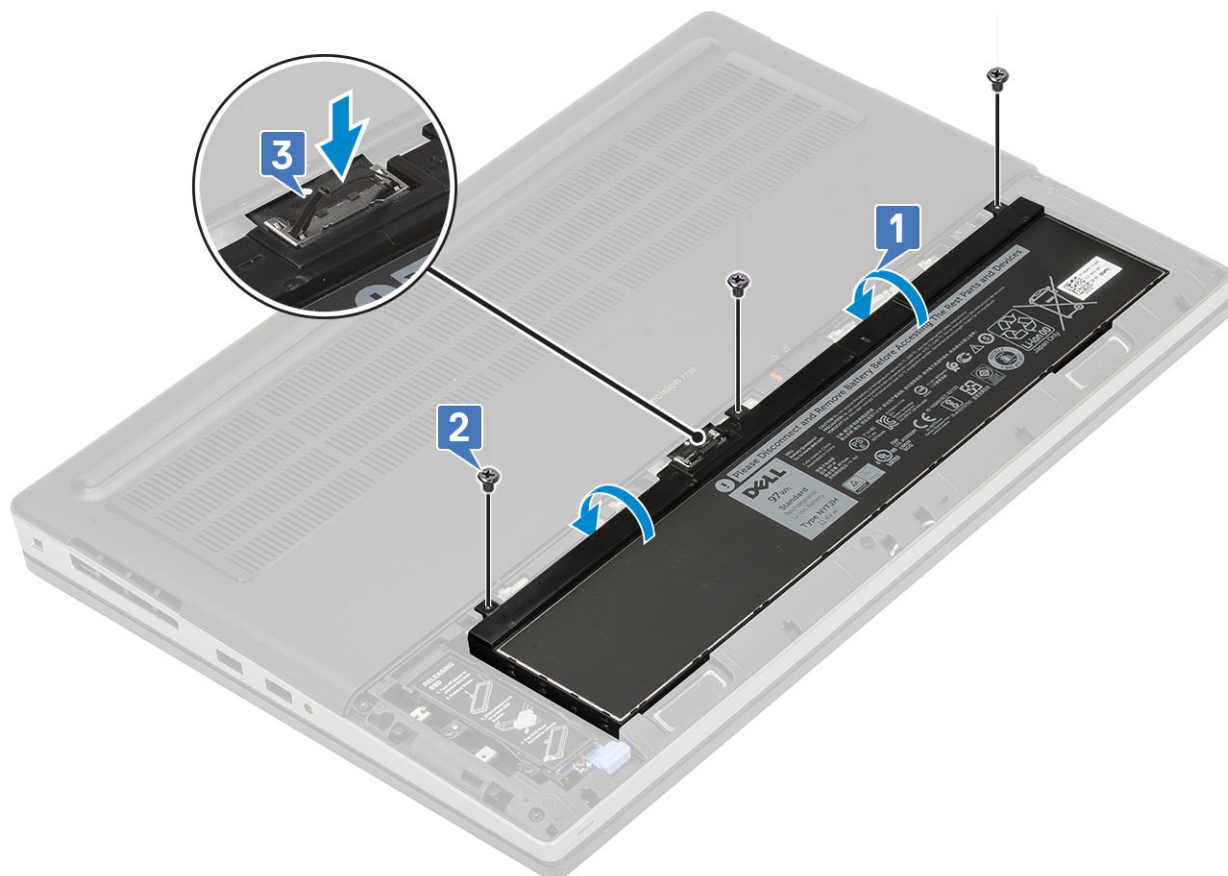
- 4 To remove the 4-cell battery:
  - a Disconnect the battery cable from the connector on the battery [1].
  - b Remove the 2 (M2.5x3.0) screws that secure the battery to the system [2].
  - c Remove the battery away from the system [3].



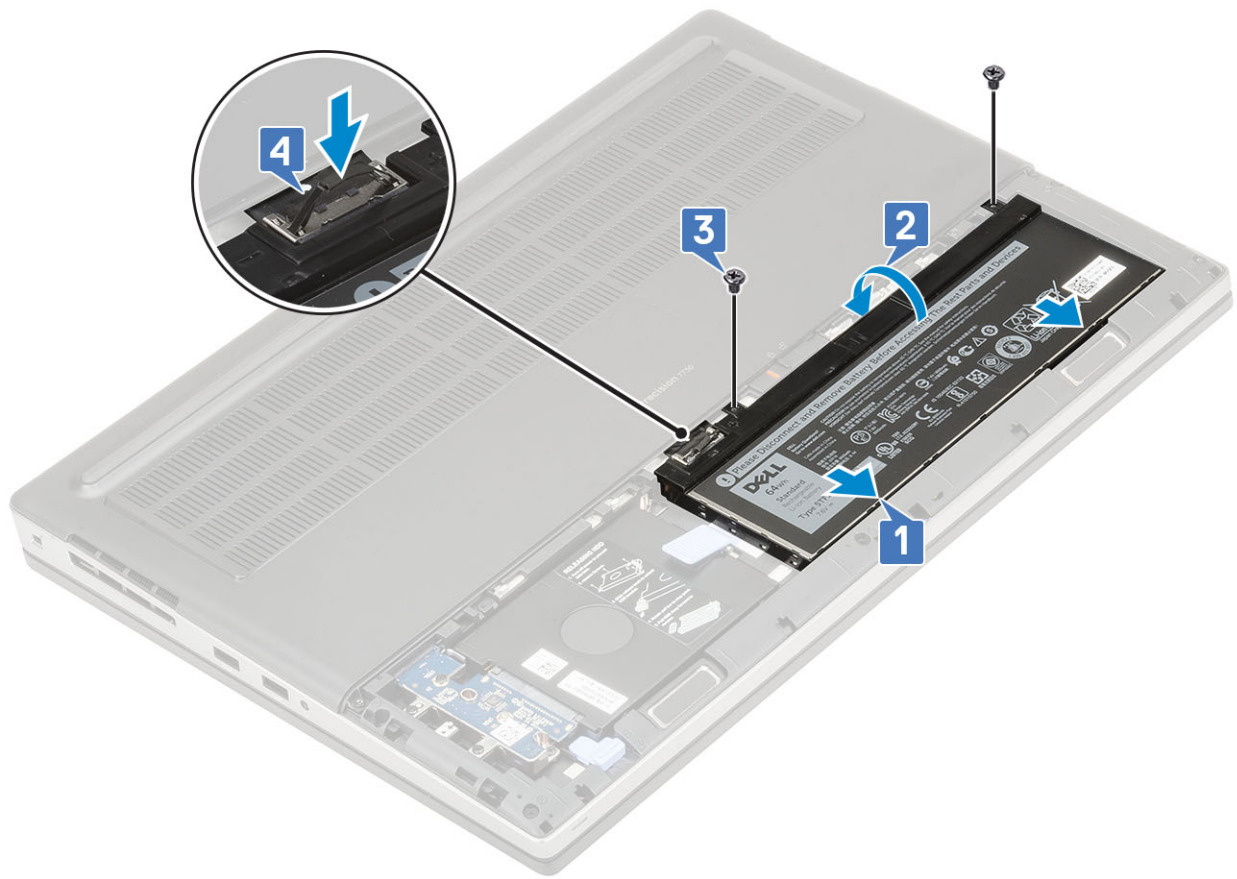
## Installing the battery

- 1 To install the 6-cell battery:
  - a Place the battery onto its slot in the system [1].
  - b Replace the 3 (M2.5x3.0) screws to secure the battery to the system [2].
  - c Connect the battery cable to the connector in the battery [3].





- 2 To install the 4-cell battery:
  - a Place the battery onto its slot in the system [1 , 2].
  - b Replace the 2 (M2.5x3.0) screws to secure the battery to the system [3].
  - c Connect the battery cable to the connector in the system board [4].

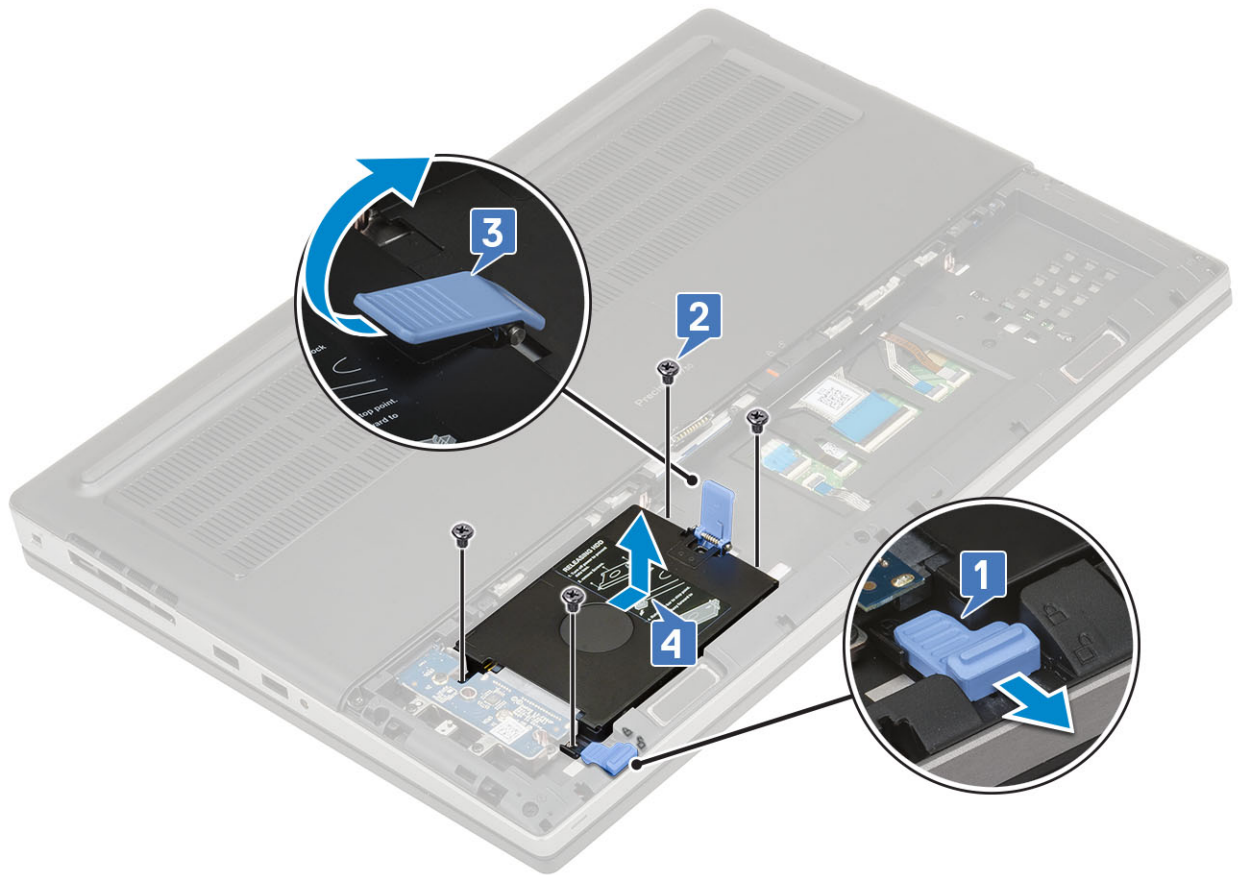


- 3 Install the:
  - a [battery cover](#)
  - b [SD card](#)
- 4 Follow the procedure in [After working inside your computer](#).

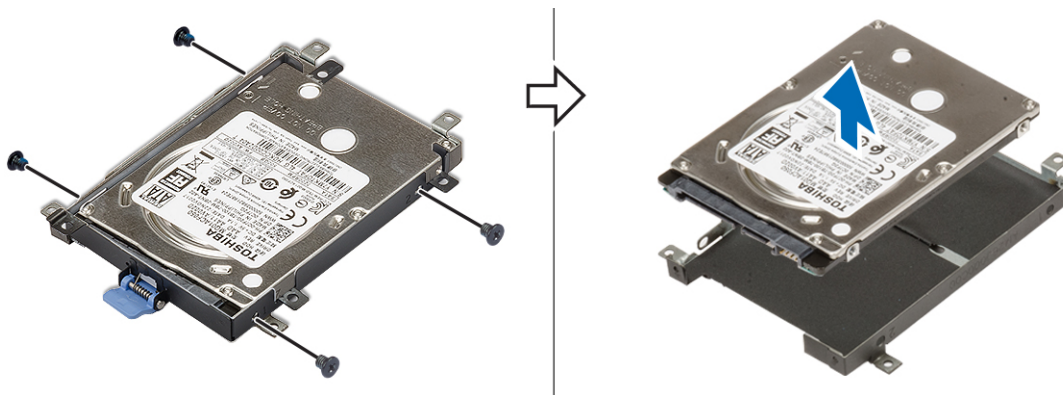
## Hard drive

### Removing the hard drive assembly

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a [SD card](#)
  - b [battery cover](#)
- 3 To remove hard drive assembly:
  - a Slide the hard drive release latch into the unlock position [1].
  - b Remove the 4 (M2.5x3.0) screws that secure the hard drive assembly to the system [2].
  - c Flip up the tab at the end of the hard drive assembly [3].
  - d Lift the hard drive assembly from the system [4].

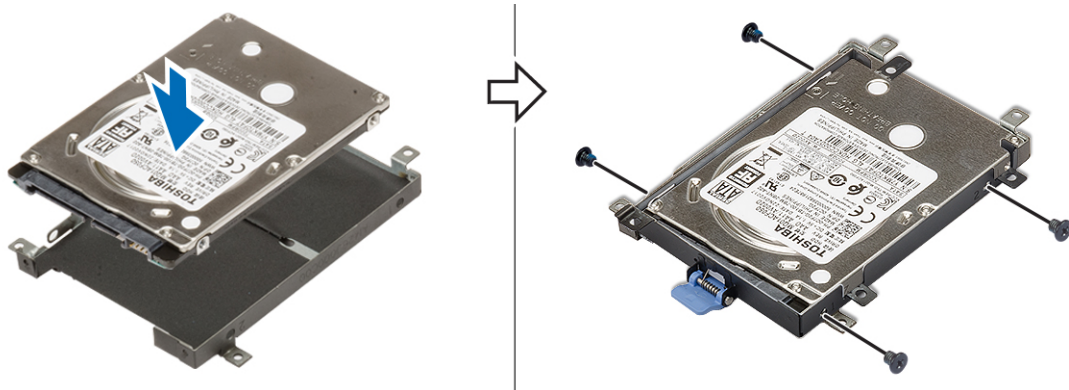


- e Remove the 4 (M3.0x3.0) screws that secure the hard drive assembly to the hard drive bracket.
- f Remove the hard drive from the hard drive bracket.

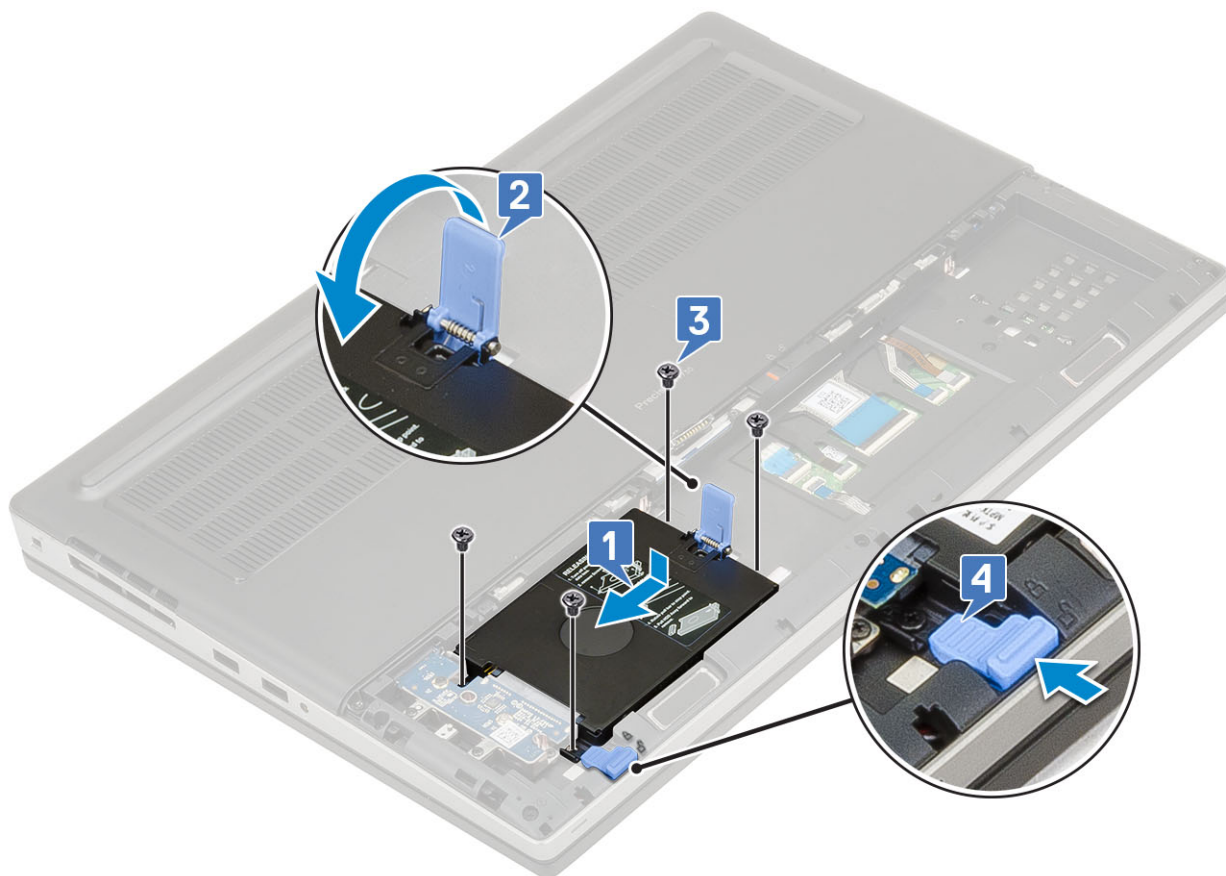


## Installing the hard drive assembly

- 1 To install the hard drive assembly:
  - a Place the hard drive to the hard drive bracket and replace the 4 (M3.0x3.0) screws to secure the hard drive to the hard drive bracket.



- b Insert the hard drive assembly into its slot in the system [1].
- c Flip down the tab at the end of the hard drive assembly [2].
- d Replace the 4 (M2.5x3.0) screws to secure the hard drive assembly to the system [3].
- e Slide the hard drive release latch into the lock position [4].



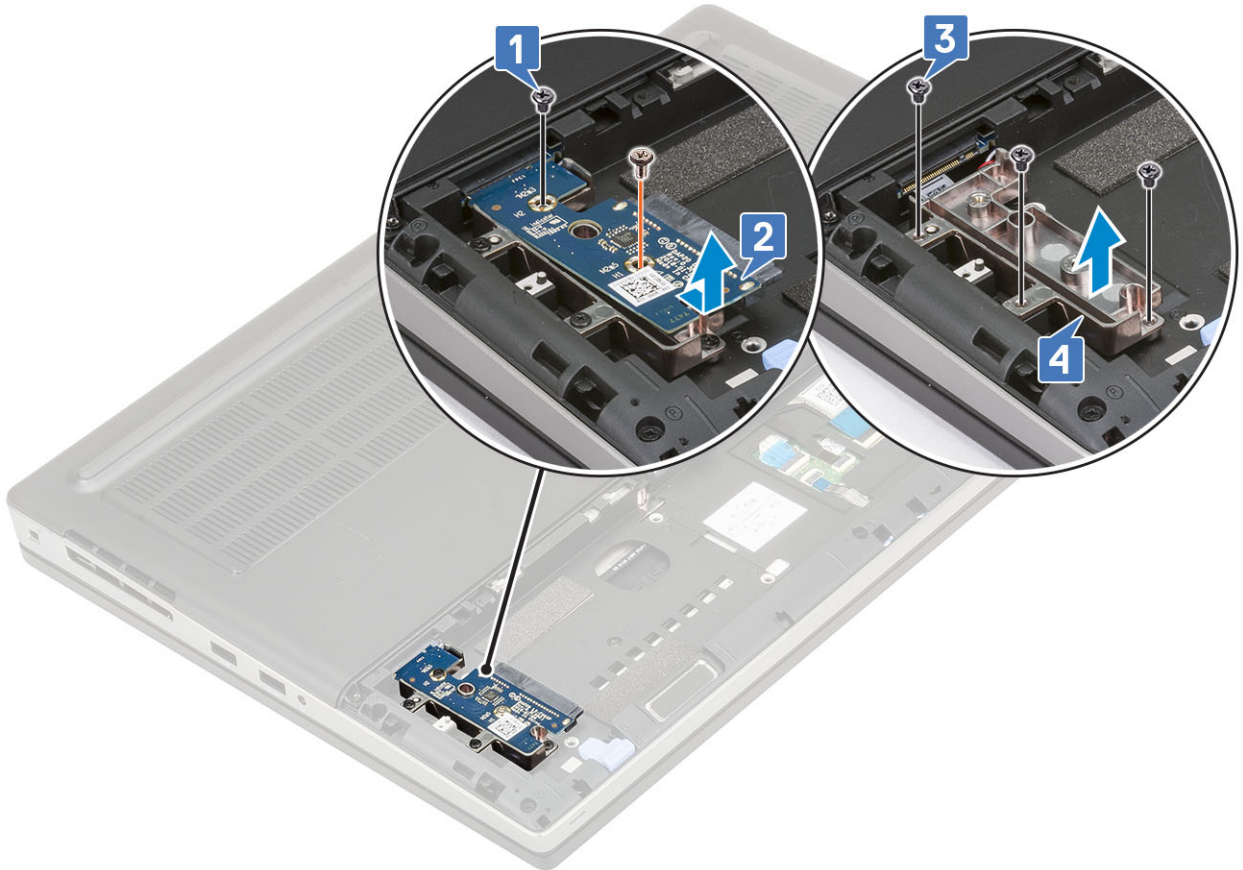
- 2 Install the:
  - a [battery cover](#)
  - b [SD card](#)
- 3 Follow the procedure in [After working inside your computer](#).



# Hard drive interposer board

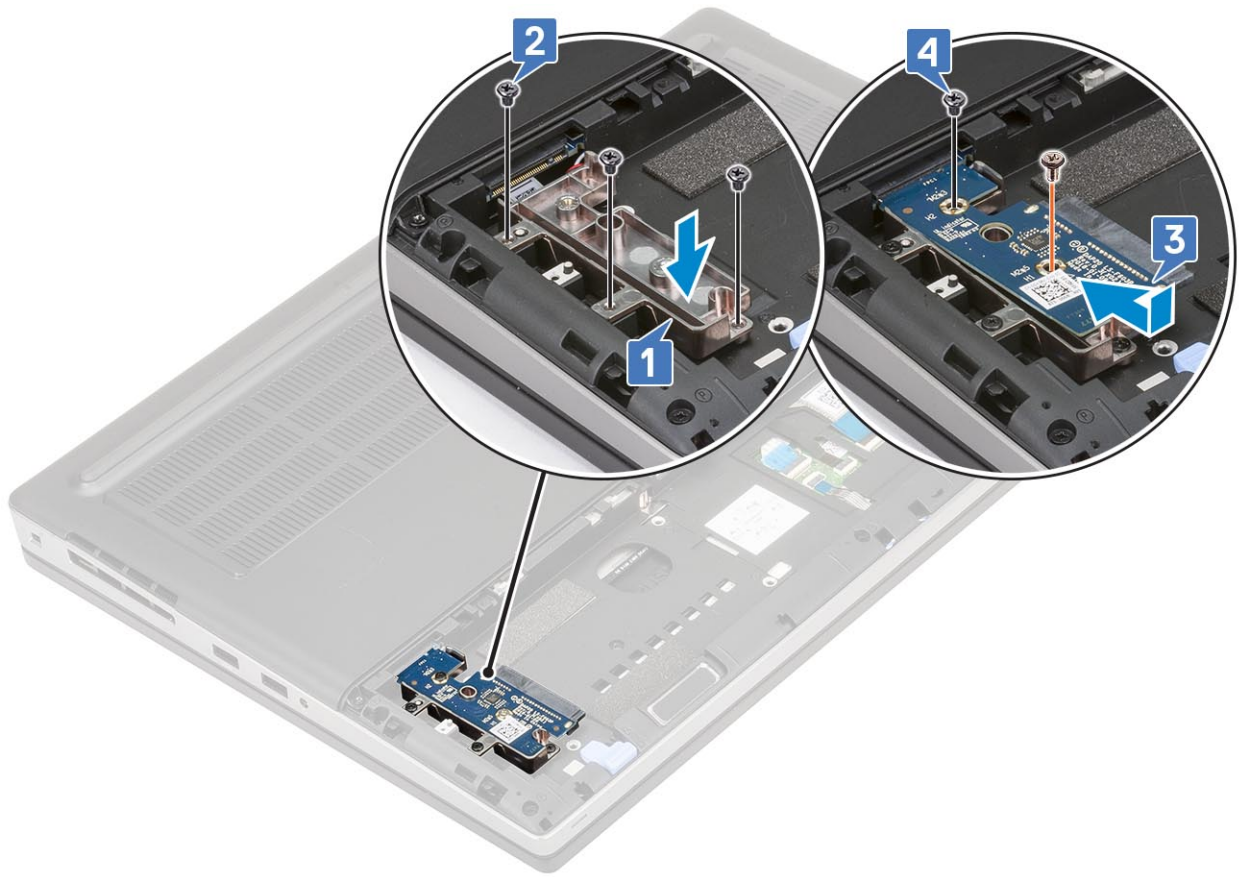
## Removing the hard drive interposer board

- 1 Follow the procedures in [Before working inside your computer](#).
- 2 Remove the:
  - a [SD card](#)
  - b [battery cover](#)
  - c [hard drive](#)
- 3 To remove the hard drive interposer board:
  - a Remove the single (M2.0x3.0) and the single (M2.0x5.0) screw that secures the hard drive interposer board to the hard drive interposer board holder [1].
  - b Remove the hard drive interposer board from the system [2].
  - c Remove the 3 (M2.0x3.0) screws that secure the hard drive interposer board holder to the system [3].
  - d Remove the hard drive interposer board holder from the system [4].



## Installing the hard drive interposer board

- 1 To install the hard drive interposer board:
  - a Align the hard drive interposer board holder into its position on the system [1].
  - b Replace the 3 (M2.0x3.0) screws to secure the hard drive interposer board holder to the system [2].
  - c Place the hard drive interposer board into its position on the hard drive interposer board holder [3].
  - d Replace the single (M2.0x3.0) and the single (M2.0x5.0) screw to secure the hard drive interposer board to the hard drive interposer board holder [4].

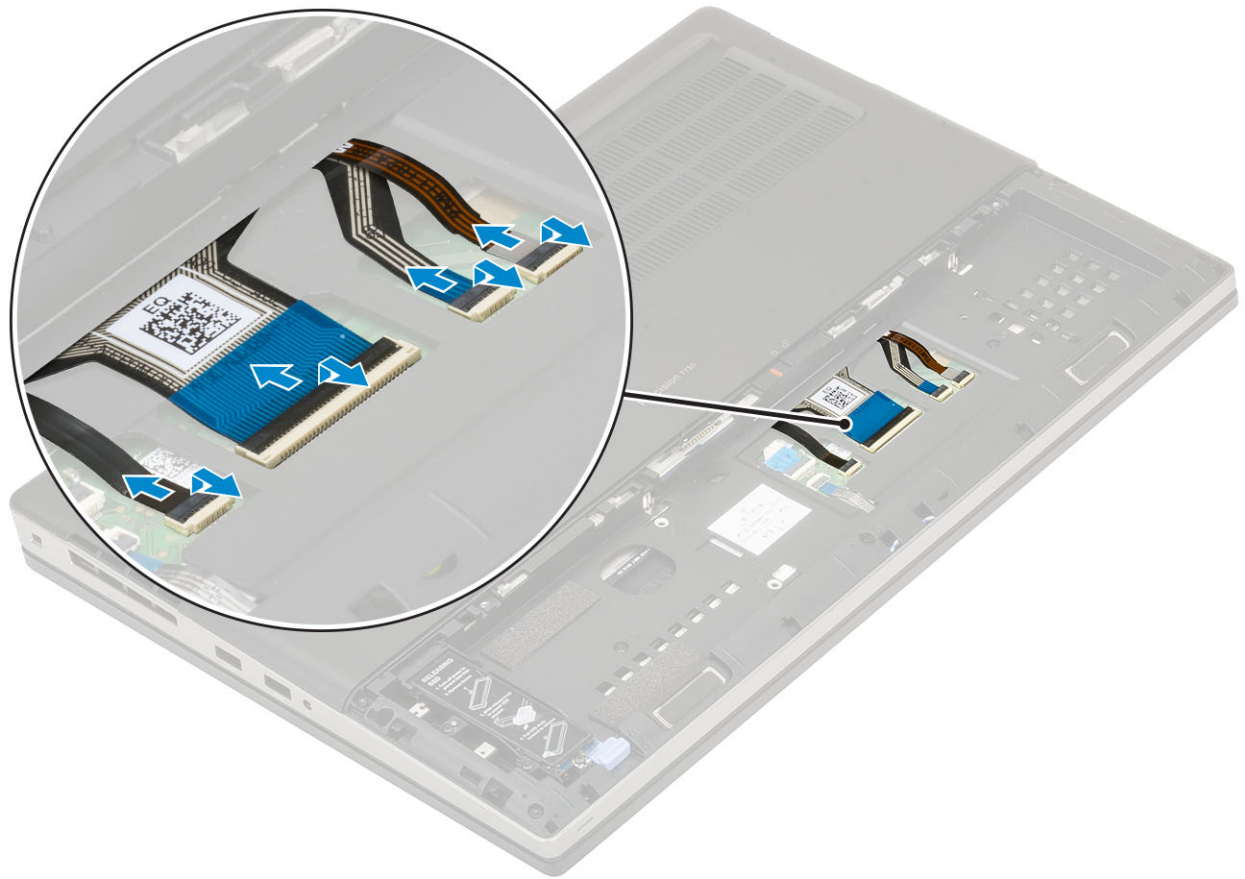


- 2 Install the:
  - a [hard drive](#)
  - b [battery cover](#)
  - c [SD card](#)
- 3 Follow the procedure in [After working inside your computer](#).

## Keyboard lattice and Keyboard

### Removing the keyboard

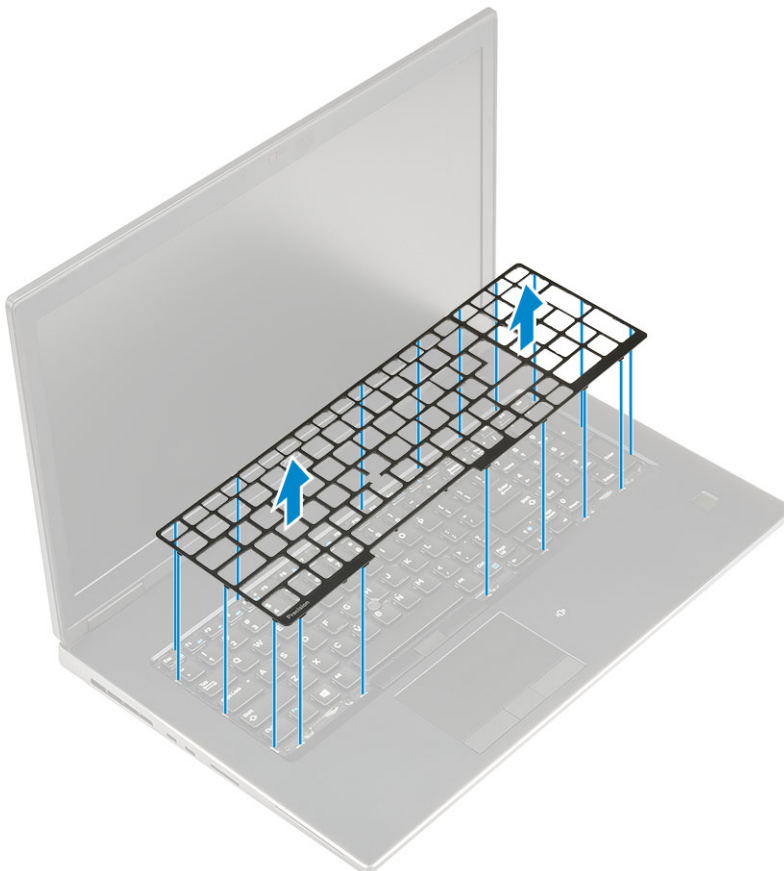
- 1 Follow the procedures in [Before working inside your computer](#).
- 2 Remove the:
  - a [SD card](#)
  - b [battery cover](#)
  - c [battery](#)
- 3 To remove the keyboard:
  - a Lift the latch and disconnect the keyboard cable, fingerprint cable and the fingerprint button cable from the connectors on the system board.



- b Turn-over and open the system at 90° angle.
- c Using a plastic scribe pry the keyboard lattice starting from the recess points on the top edge [1,2] and work along the sides and bottom edge of the keyboard lattice.

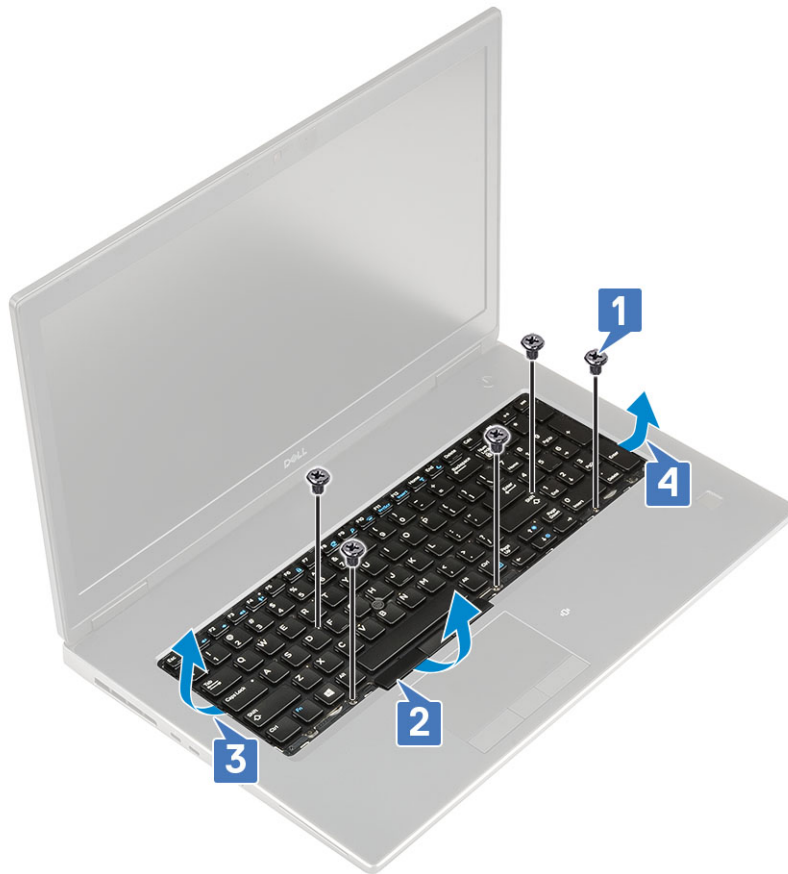


d Lift the keyboard lattice away from the system.





- e Remove the 5 (M2.0x2.5) screws that secure the keyboard to the palmrest [1].
- f Pry the bottom edge of the keyboard and then work along the left and right sides of the keyboard [2,3,4].



- g Slide and remove the keyboard from the system.

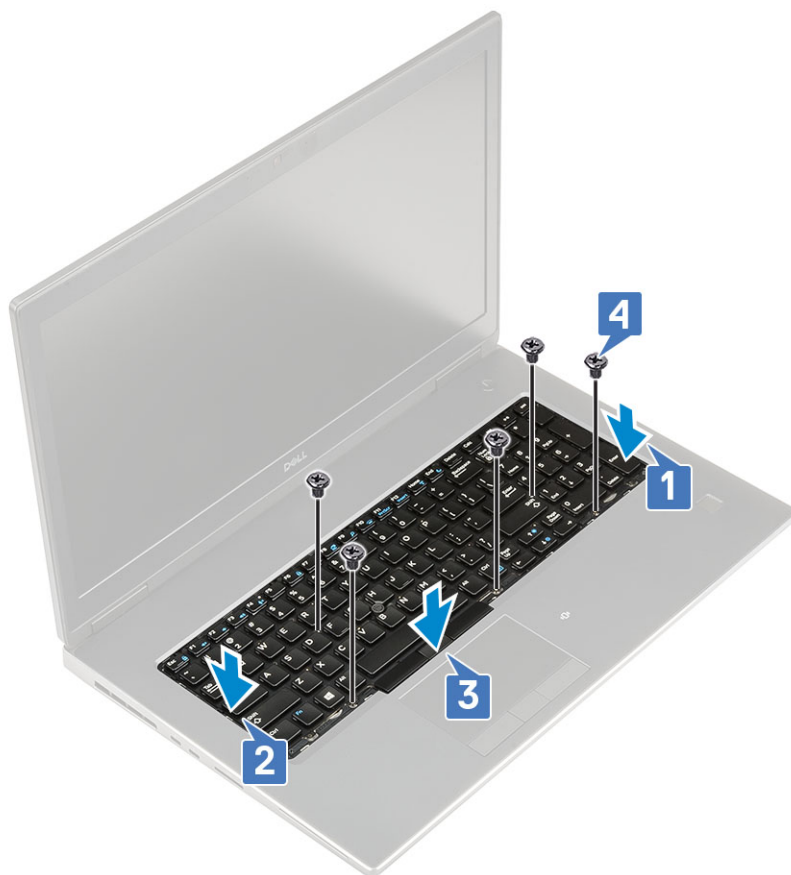


## Installing the keyboard

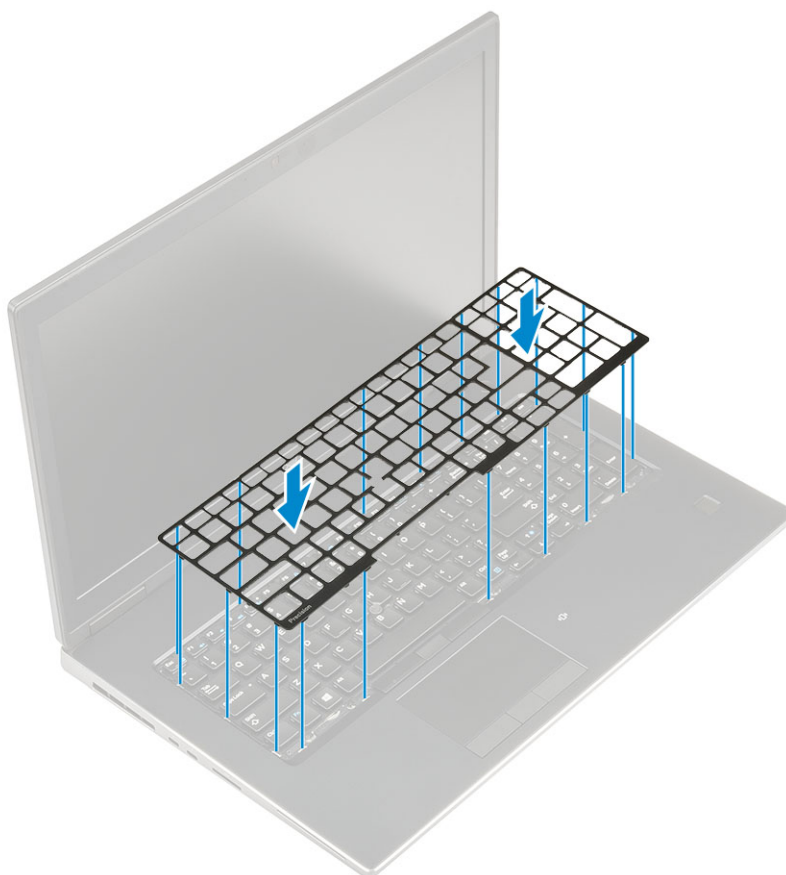
- 1 To Install the keyboard:
  - a Align the keyboard and route the cables back through to the bottom of the compartment.



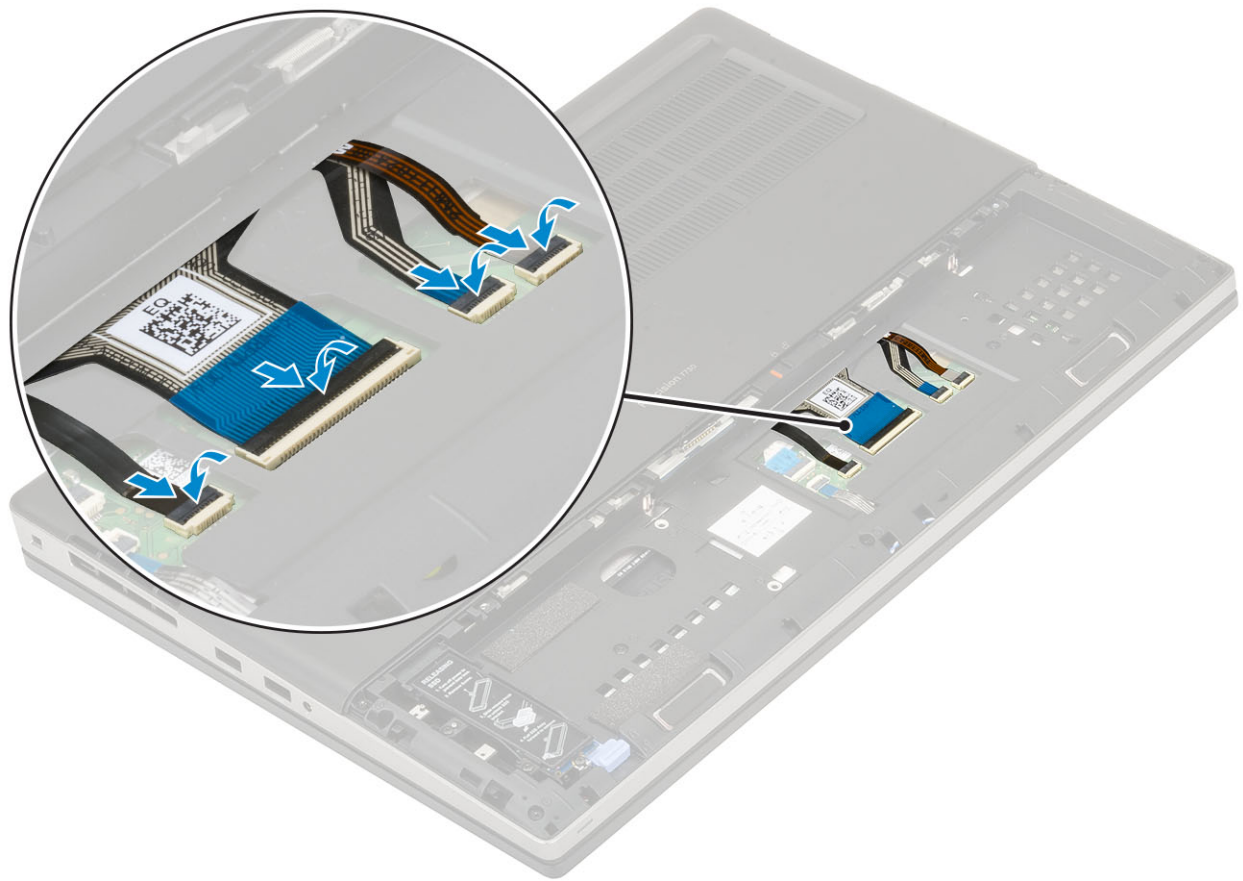
- b Press and align the keyboard to its compartment working along the left, right and bottom edges [1,2,3].
- c Replace the 5 (M2.0x2.5) screws to secure the keyboard to the palmrest [4].



- d Align the keyboard lattice to its position on the keyboard and ensure that the keyboard lattice clicks into its place.



- e Turn-over the system at 90° angle to access the keyboard cables.
- f Connect the keyboard cable, fingerprint cable and fingerprint button cable to the connectors on the system board.



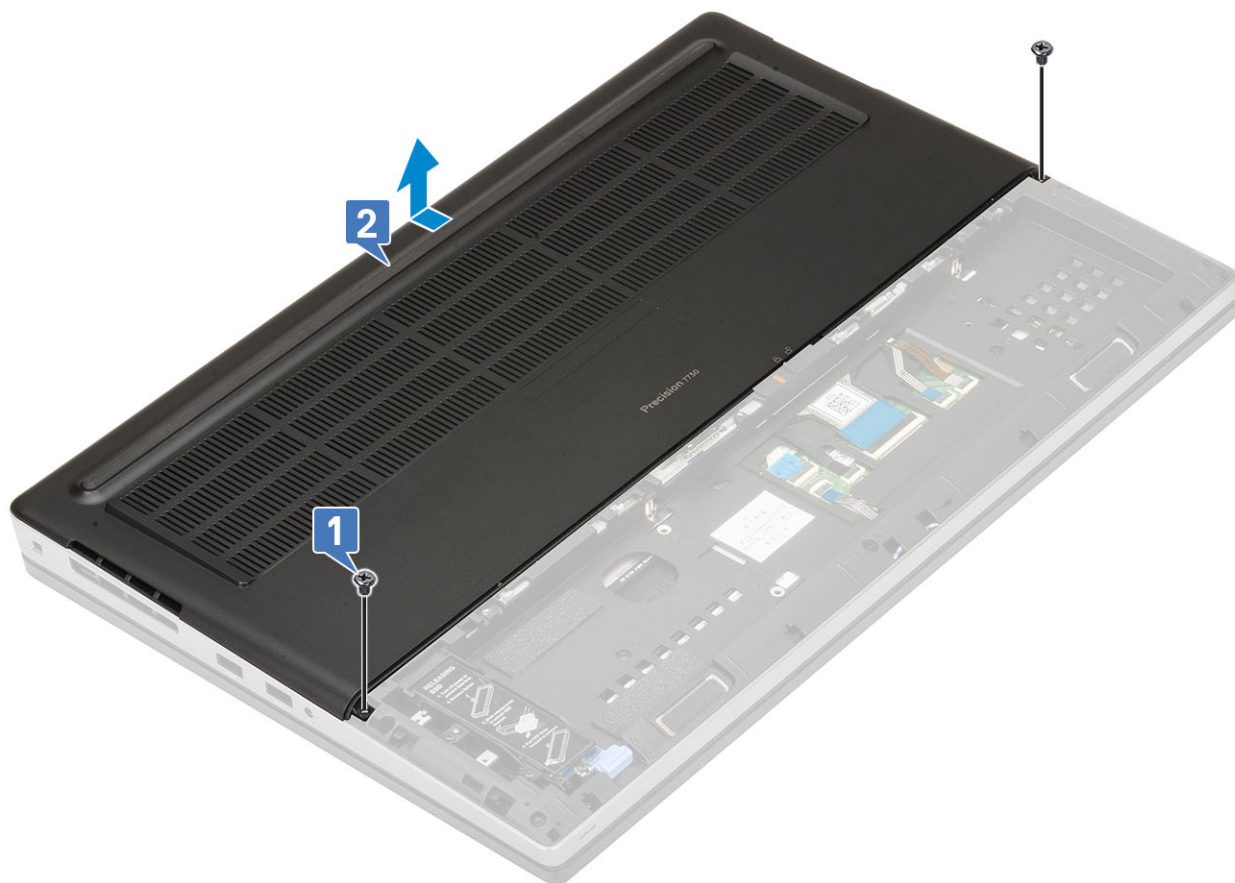
**NOTE:** Ensure that you fold the keyboard data cable in perfect alignment.

- 2 **NOTE:** Ensure that you fold the keyboard data cable in perfect alignment.
- 3 Install the:
  - a battery
  - b battery cover
  - c SD card
- 4 Follow the procedure in [After working inside your computer](#).

## Base cover

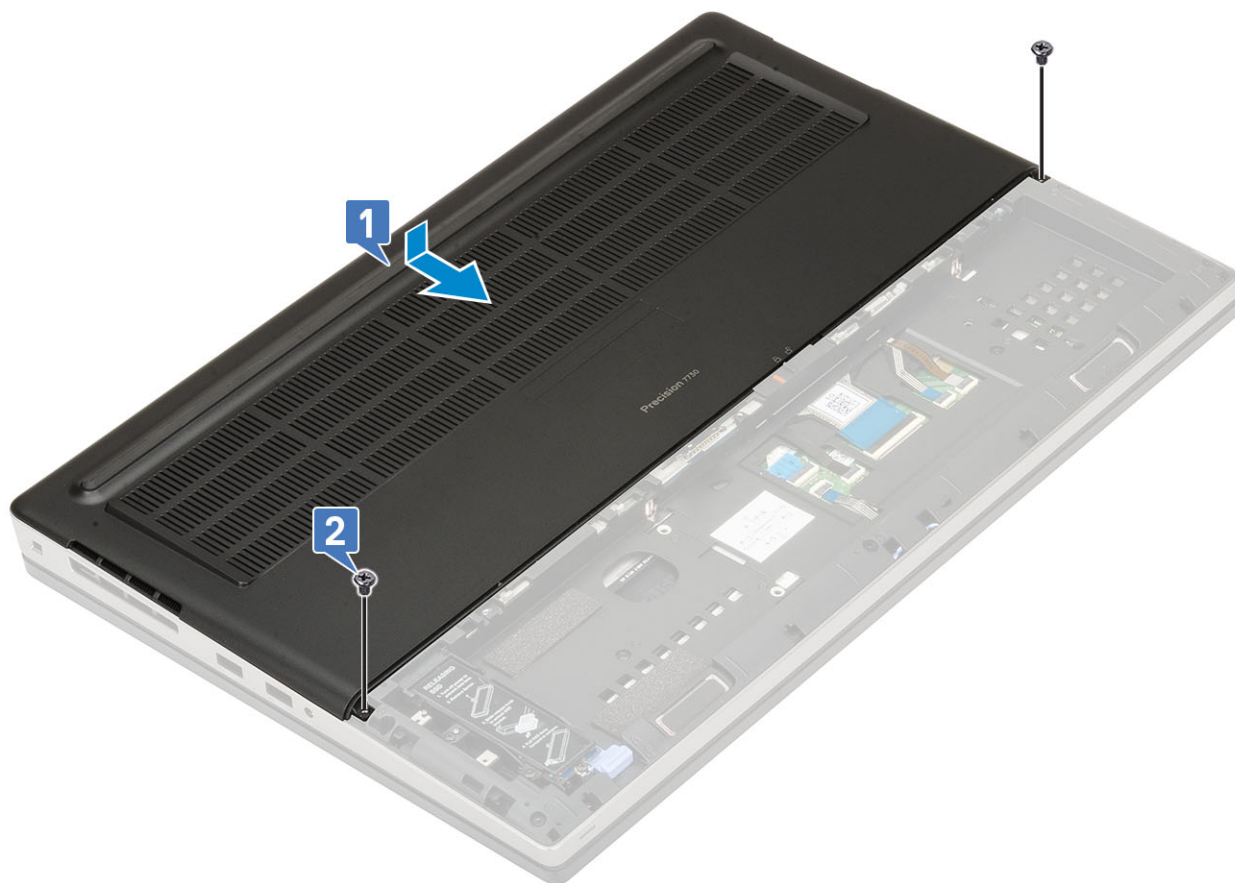
### Removing the base cover

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a SD card
  - b battery cover
  - c battery
- 3 To remove the base cover:
  - a Remove the 2 (M2.5X5.0) screws that secure the base cover to the system [1].
  - b Slide the rubber feet towards the rear end to disengage the base cover and lift the base cover away from the system [2].



## Installing the base cover

- 1 To install the base cover:
  - a Slide the base cover to align with the screw holes on the system [1].
  - b Replace the 2 (M2.5X5.0) screws to secure the base cover to the system [2].



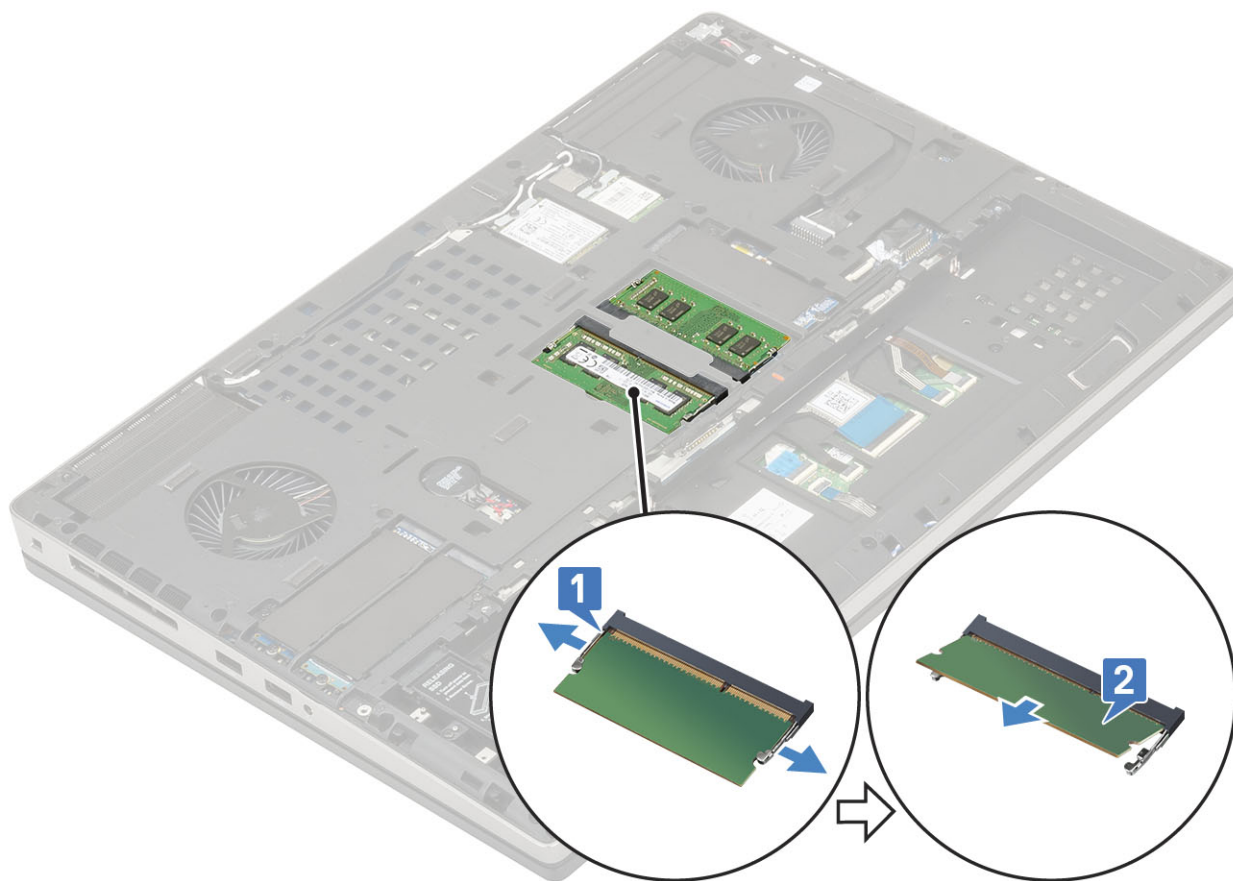
- 2 Install the:
  - a [battery](#)
  - b [battery cover](#)
  - c [SD card](#)
- 3 Follow the procedure in [After working inside your computer](#).

## Memory modules

### Removing the primary memory module

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a [SD card](#)
  - b [battery cover](#)
  - c [battery](#)
  - d [base cover](#)
- 3 To remove primary memory module:
  - a Pry the retention clips away from the memory module until it pops up.
  - b Lift the memory module and remove it from the system.

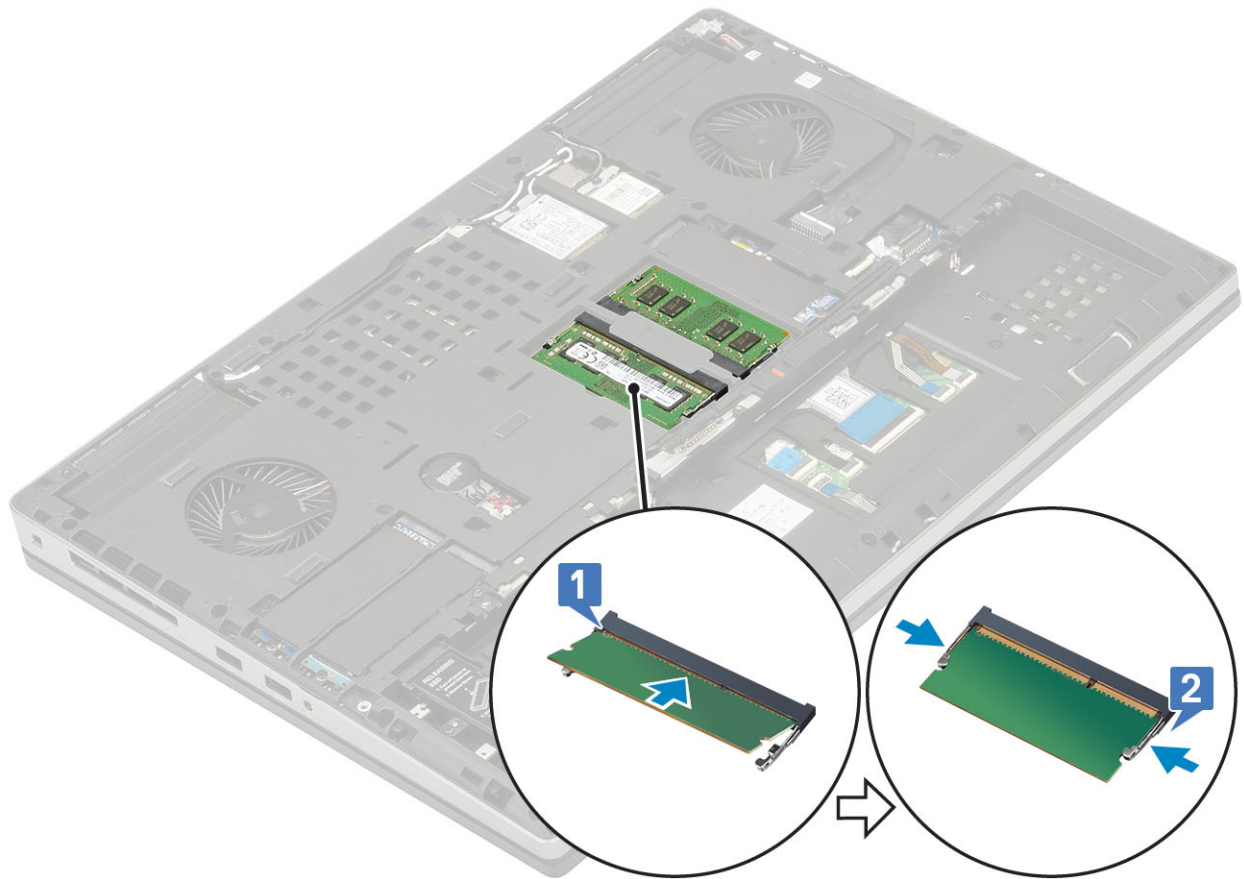




## Installing the primary memory module

- 1 To Install the primary memory module:
  - a Insert the memory module into the memory socket.
  - b Press the clips to secure the memory module to the system board.

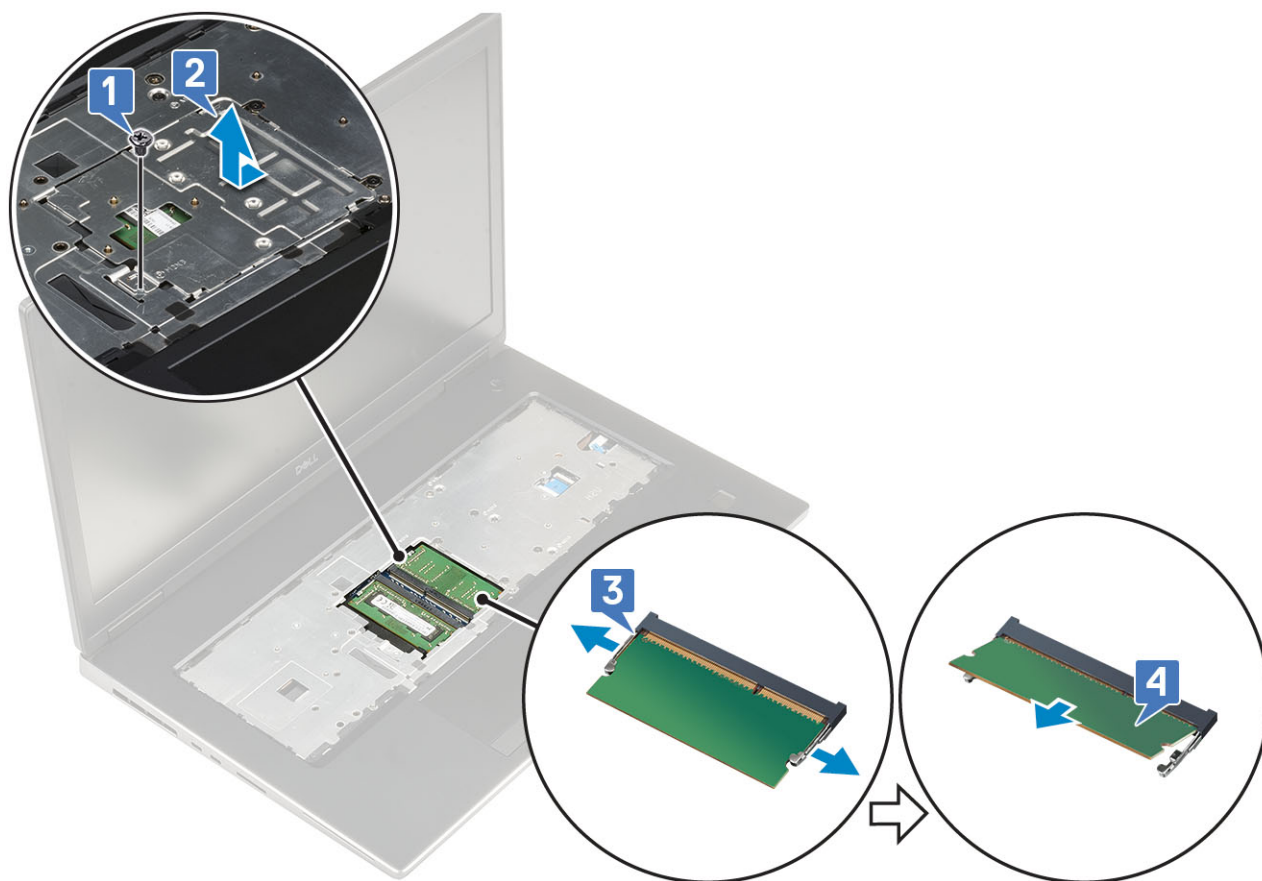




- 2 Install the:
  - a [base cover](#)
  - b [battery](#)
  - c [battery cover](#)
  - d [SD card](#)
- 3 Follow the procedure in [After working inside your computer](#).

## Removing the secondary memory module

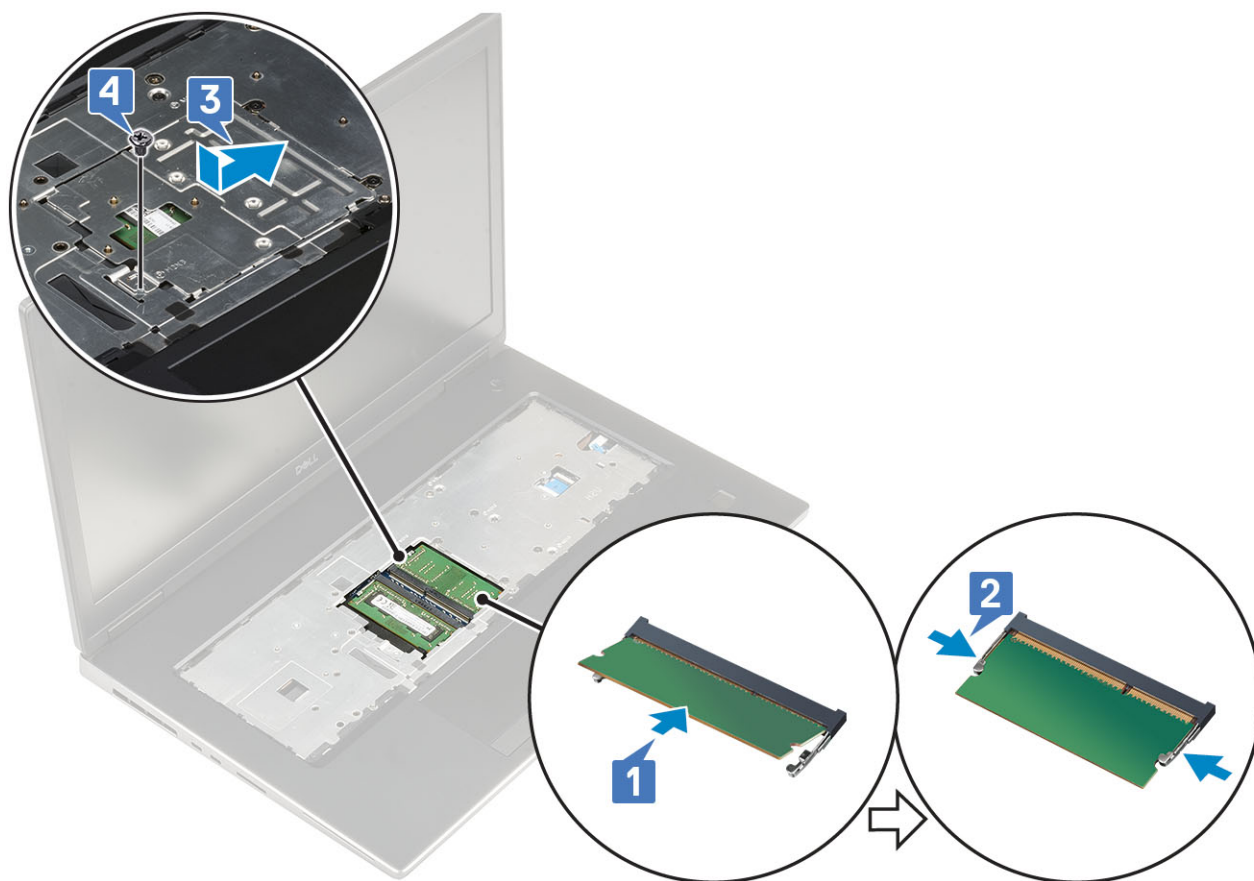
- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a [SD card](#)
  - b [battery cover](#)
  - c [battery](#)
  - d [keyboard](#)
- 3 To remove the secondary memory module:
  - a Remove the single (M2.0x3.0) screw that secures the memory shield [1].
  - b Slide and lift the memory shield from the memory module on the system [2].
  - c Pry the retention clips away from the memory module until it pops up [3].
  - d Lift the memory module and remove it from the system [4].



**NOTE:** Repeat step (c) and (d) if there is another memory installed.

## Installing the secondary memory module

- 1 To install the secondary memory module:
  - a Insert the memory module into the memory socket [1].
  - b Press the clips to secure the memory module to the system board [2].
  - c Slide in the memory shield on the memory module [3].
  - d Replace the single (M2.0x3.0) screw to secure the memory shield to the memory module [4].

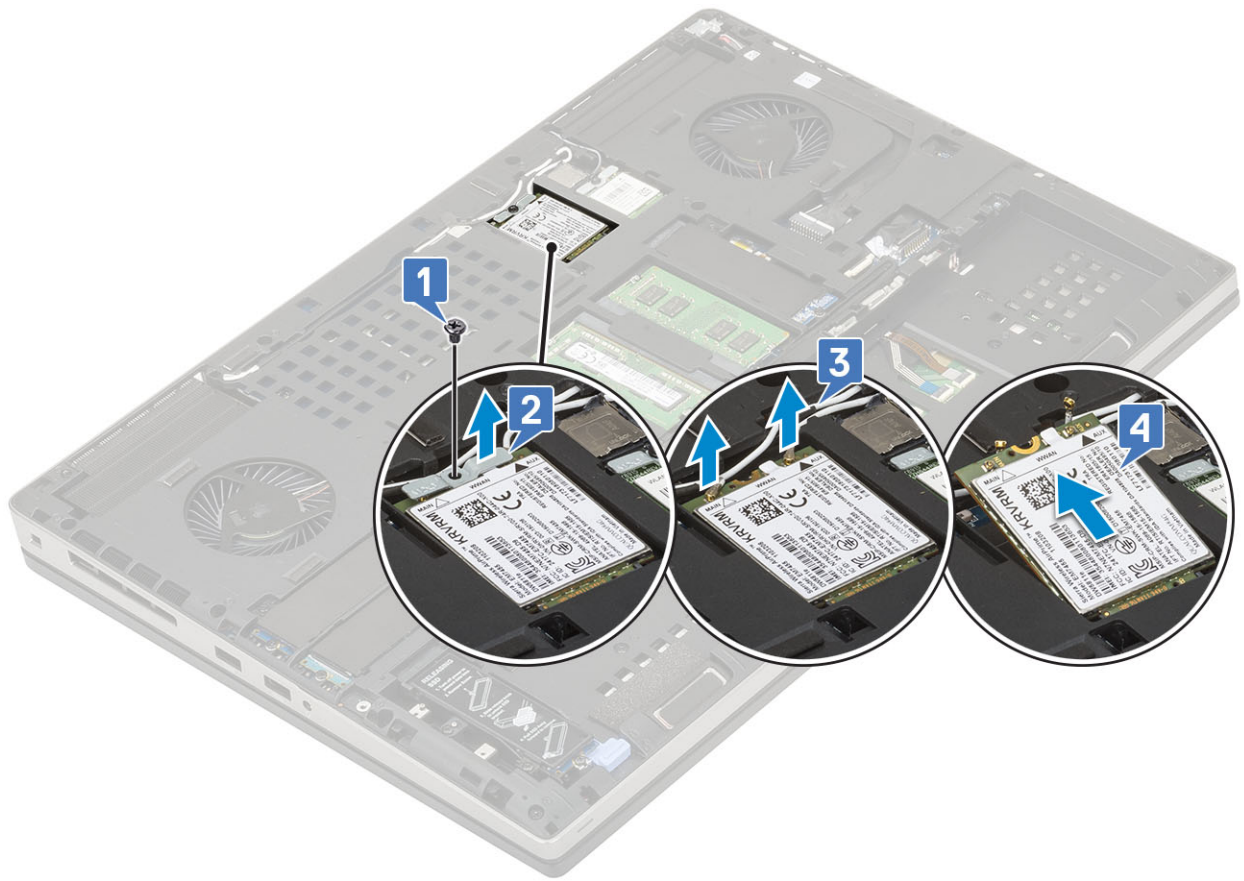


- 2 Install the:
  - a keyboard
  - b battery
  - c battery cover
  - d SD card
- 3 Follow the procedure in [After working inside your computer](#).

## WWAN card

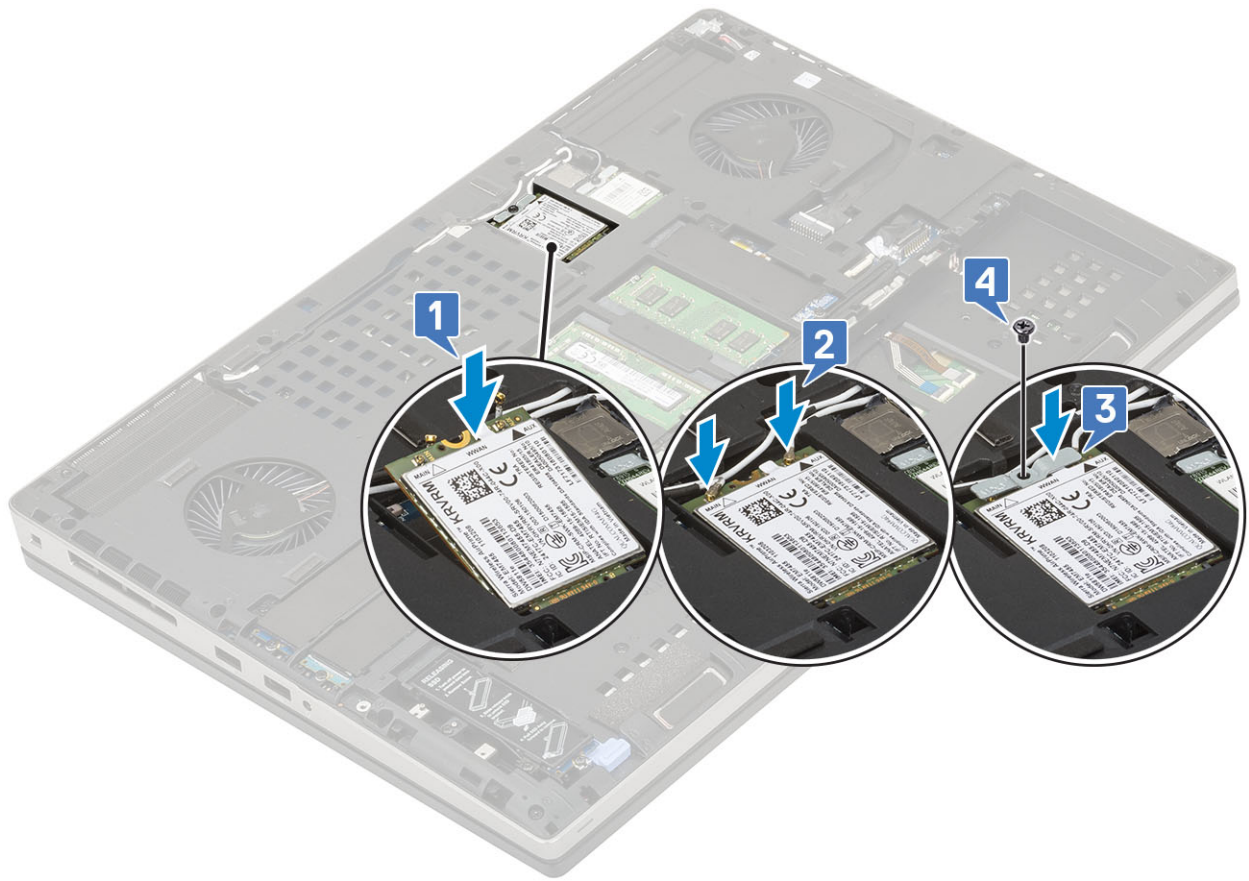
### Removing WWAN card

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a SD card
  - b battery cover
  - c battery
  - d base cover
- 3 To remove the WWAN card:
  - a Remove the single (M2.0x3.0) screw that secures the WWAN metal bracket to the system board [1].
  - b Remove the WWAN metal bracket that secures the WWAN antenna cables [2].
  - c Disconnect and unroute the WWAN antenna cables connected to the WWAN card [3].
  - d Remove the WWAN card from the WWAN card slot in the system board [4].



## Installing the WWAN card

- 1 To install the WWAN card:
  - a Slide the WWAN card to the WWAN card slot on the system board [1].
  - b Route the WWAN antenna cables through the routing channel.
  - c Connect the antenna cables to the connectors on the WWAN card [2].
  - d Align the WWAN metal bracket above the WWAN card and replace the single (M2.0x3.0) screw to secure the WWAN metal bracket to the system board [3,4].



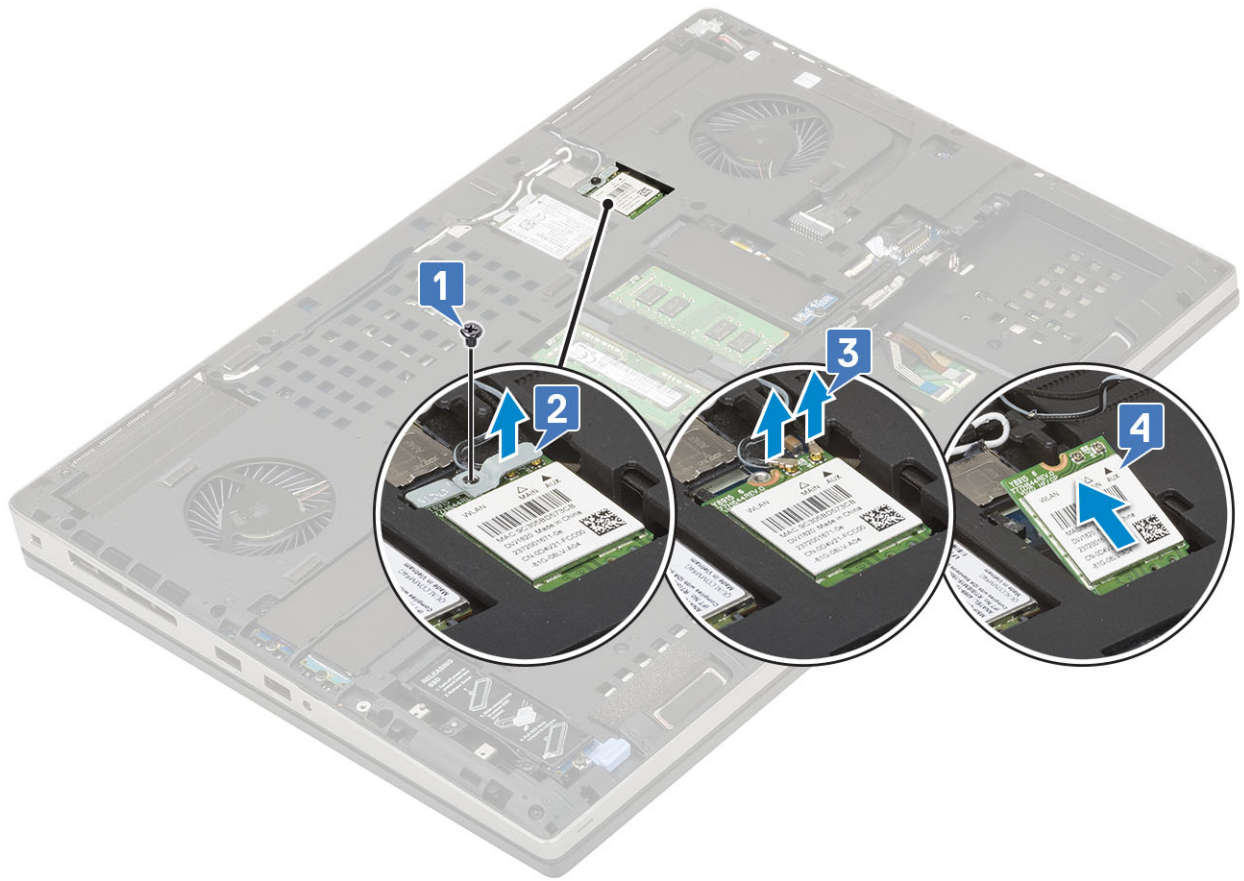
- 2 Install the:
  - a [base cover](#)
  - b [battery](#)
  - c [battery cover](#)
  - d [SD card](#)
- 3 Follow the procedure in [After working inside your computer](#).

## WLAN card

### Removing the WLAN card

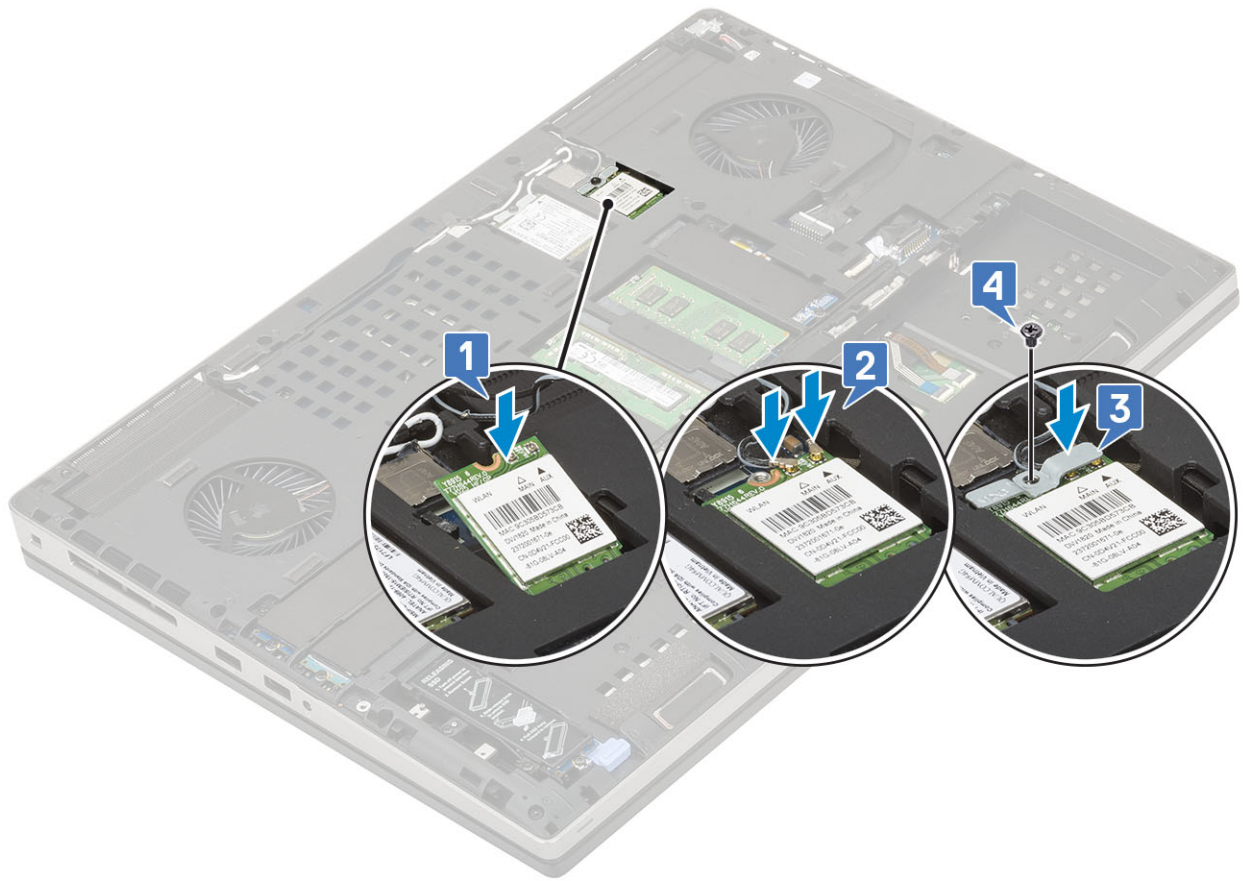
- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a [SD card](#)
  - b [battery cover](#)
  - c [battery](#)
  - d [base cover](#)
- 3 To remove the WLAN card:
  - a Remove the single (M2.0x3.0) screw that secures the WLAN metal bracket to the system board [1].
  - b Remove the WLAN metal bracket that secures the WLAN antenna cables [2].
  - c Disconnect and un-route the antenna cables connected to the WLAN card [3].
  - d Remove the WLAN card from the WLAN card slot in the system board [4].





## Installing the WLAN card

- 1 To install the WLAN card:
  - a Slide the WLAN card to the WLAN card slot in the system board [1].
  - b Route the WLAN antenna cables through the routing channel.
  - c Connect the antenna cables to the connectors in the WLAN card [2].
  - d Align the WLAN metal bracket above the WLAN card and replace the single (M2.0x3.0) screw to secure the WLAN metal bracket to the system board [3,4].



- 2 Install the:
  - a [base cover](#)
  - b [battery](#)
  - c [battery cover](#)
  - d [SD card](#)
- 3 Follow the procedure in [After working inside your computer](#).

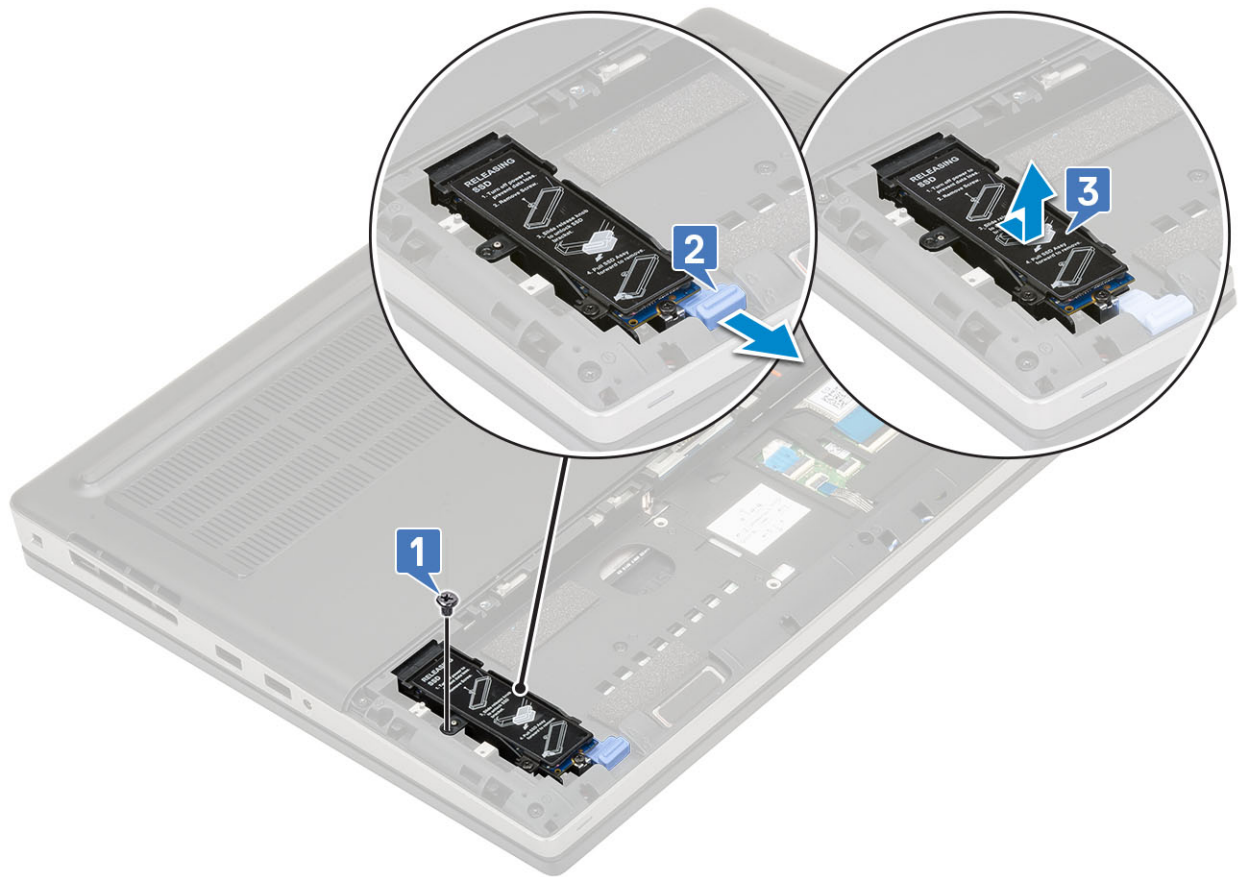
## Solid State Drive — optional

### Removing the M.2 Solid State Drive—SSD module

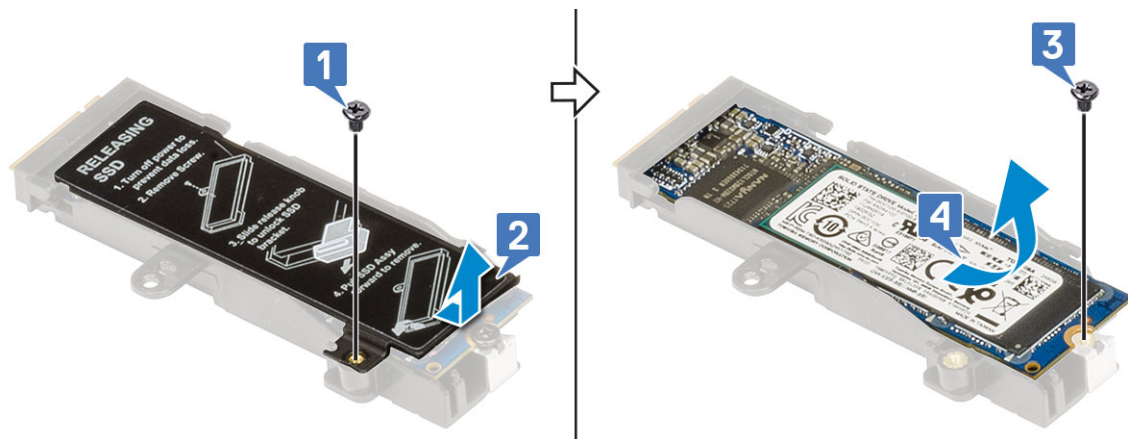
- 1 Follow the procedures in [Before working inside your computer](#).
- 2 Remove the:
  - a [SD card](#)
  - b [battery cover](#)
  - c [battery](#)
  - d [base cover](#)

**NOTE:** Removal of base cover is required only to access the M.2 SSD module in slot 3, 5 or 6.

- 3 To remove the M.2 SSD module (Slot 4):
  - a Remove the single (M2.0x3.0) screw that secures the SSD assembly to the system [1].
  - b Pull the release latch to unlock the SSD assembly [2].
  - c Remove the SSD assembly from the system [3].



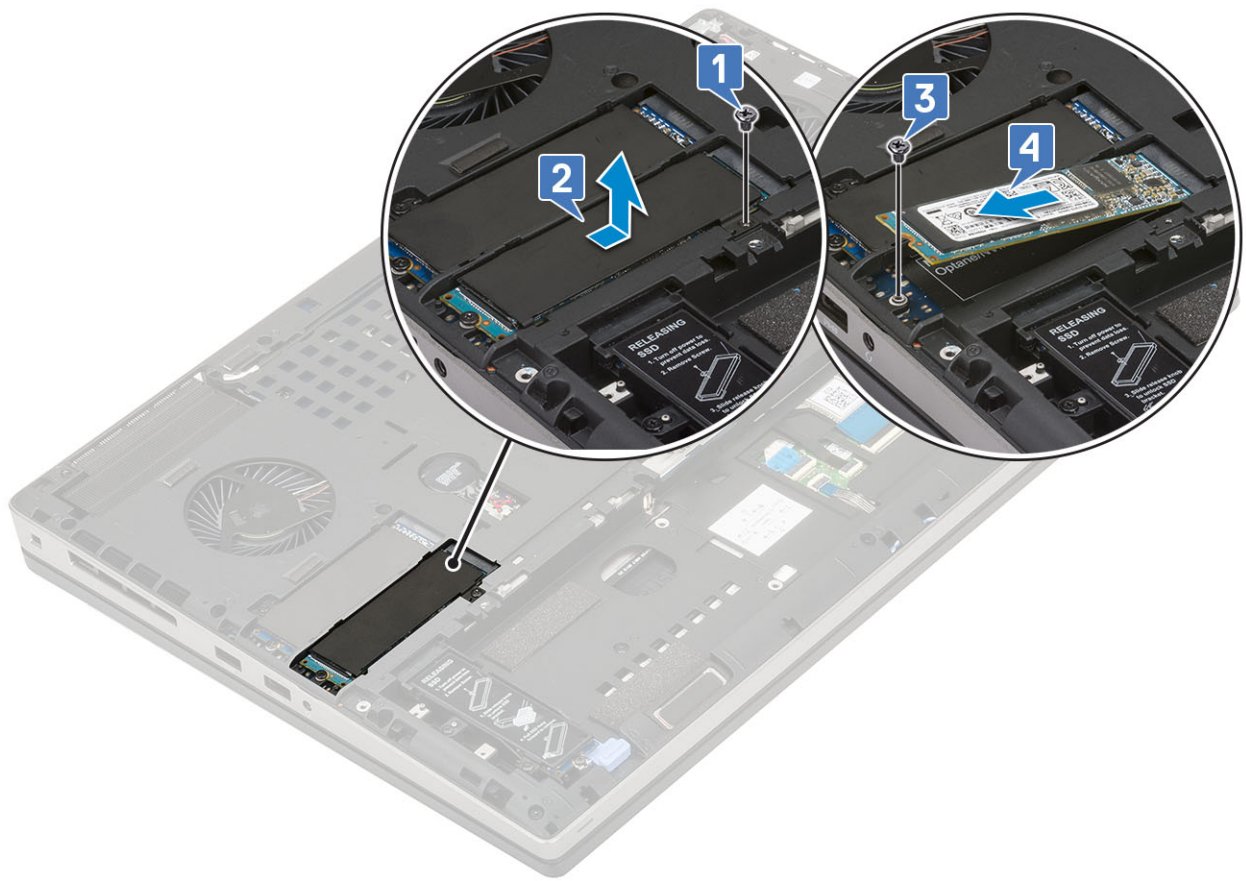
- d Remove the single (M2.0x3.0) screw that secures the thermal plate to the SSD assembly [1].
- e Remove the thermal plate away from the SSD assembly [2].
- f Remove the single (M2.0x3.0) screw that secures M.2 SSD to the SSD holder [3].
- g Remove the M.2 SSD from the SSD holder [4].

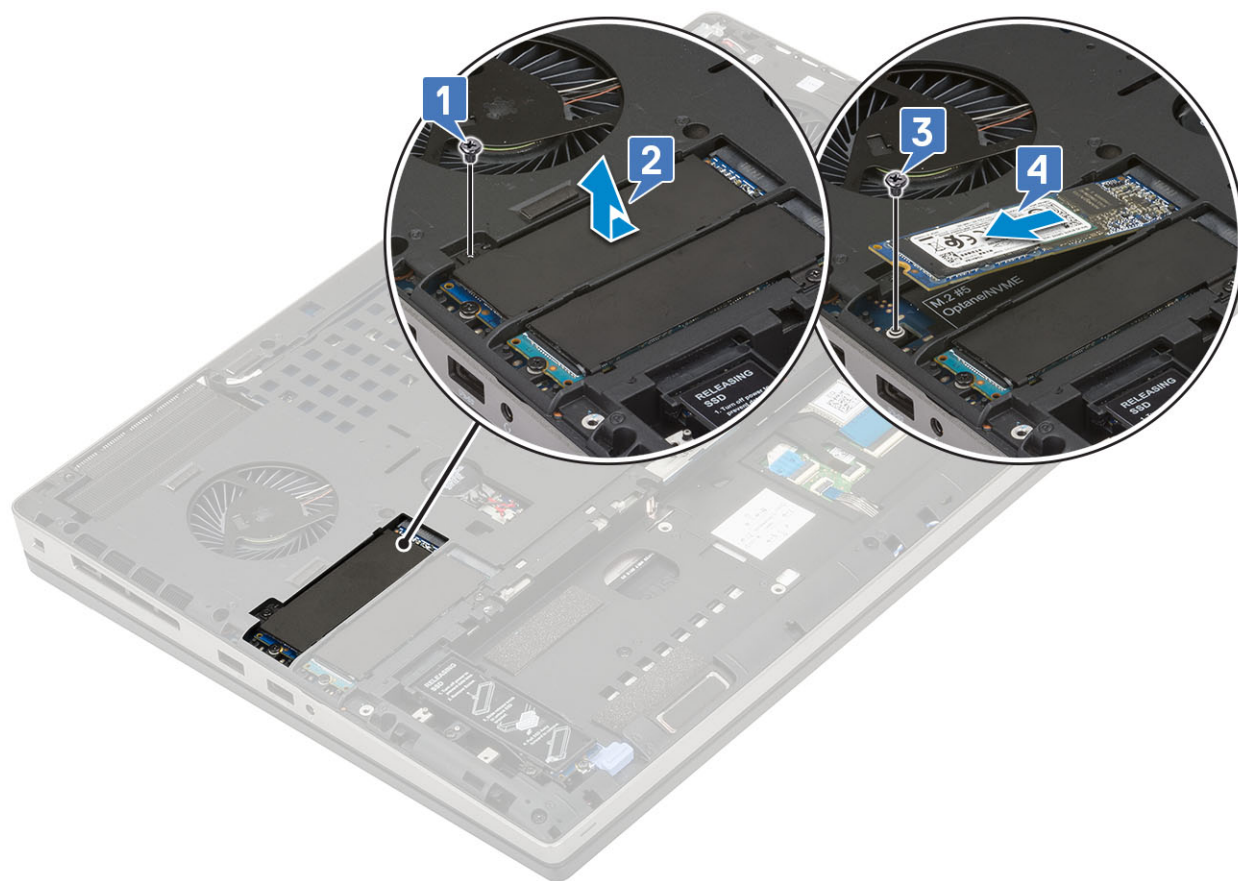


- 4 To remove the M.2 SSD module (Slot 3, 5 or 6):
  - a Remove the single (M2.0x3.0) screw that secures the thermal plate to the system [1].
  - b Slide and remove the thermal plate [2].
  - c Remove the single (M2.0x3.0) screw that secures the M.2 SSD to the system board [3].
  - d Remove the M.2 SSD from the system [4].

**NOTE:** Repeat the above steps for removal of other M.2 SSD installed.



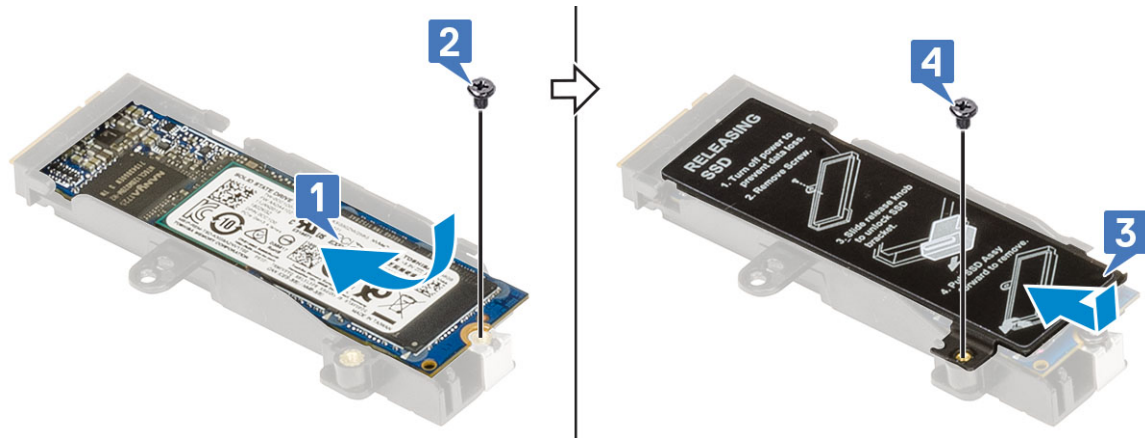




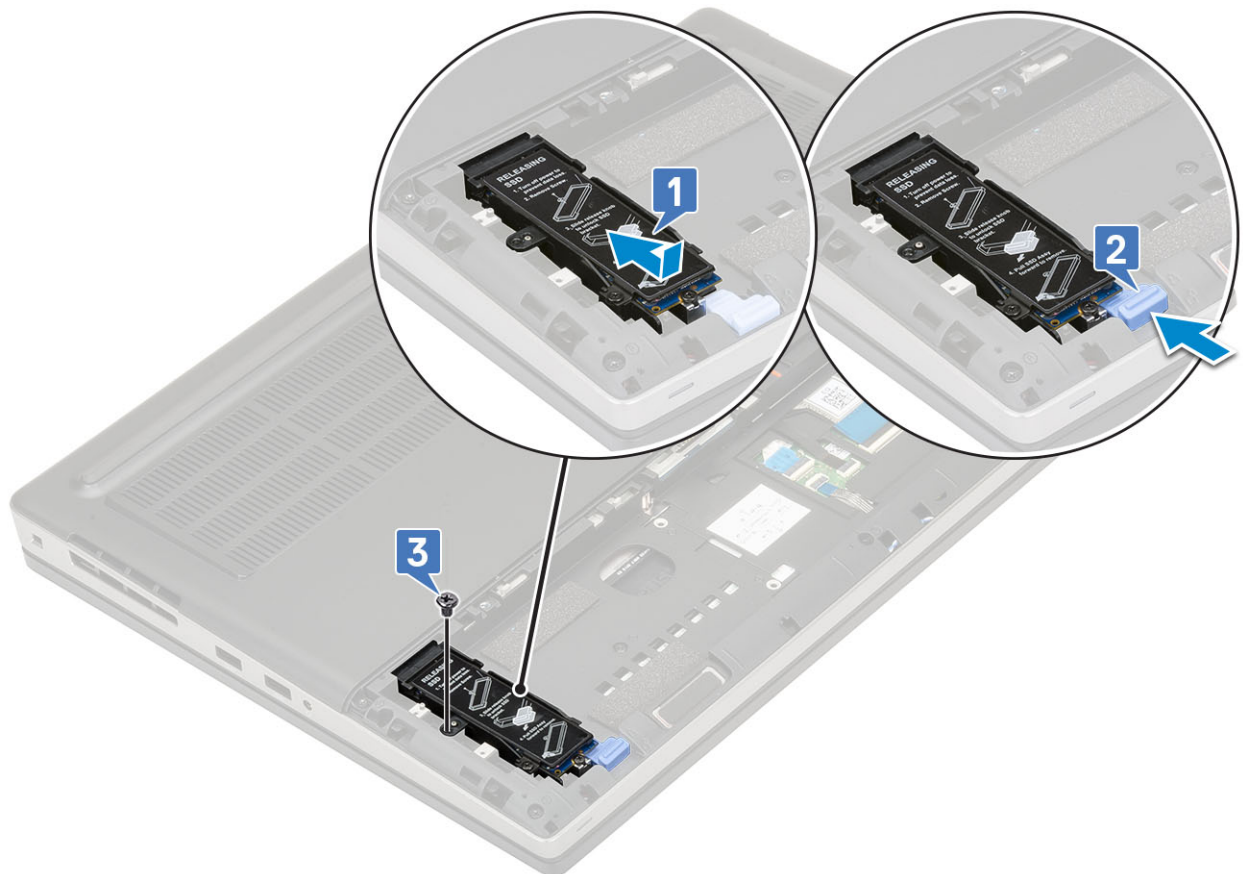
# Installing the M.2 SSD module

## 1 To install the M.2 SSD module (Slot 4):

- a Place the M.2 SSD into the slot in the SSD holder [1].
- b Replace the single (M2.0x3.0) screw to secure the M.2 SSD to the SSD holder [2].
- c Place the thermal plate above the M.2 SSD assembly [3].
- d Replace the single (M2.0x3.0) screw to secure the thermal plate to the M.2 SSD assembly [4].



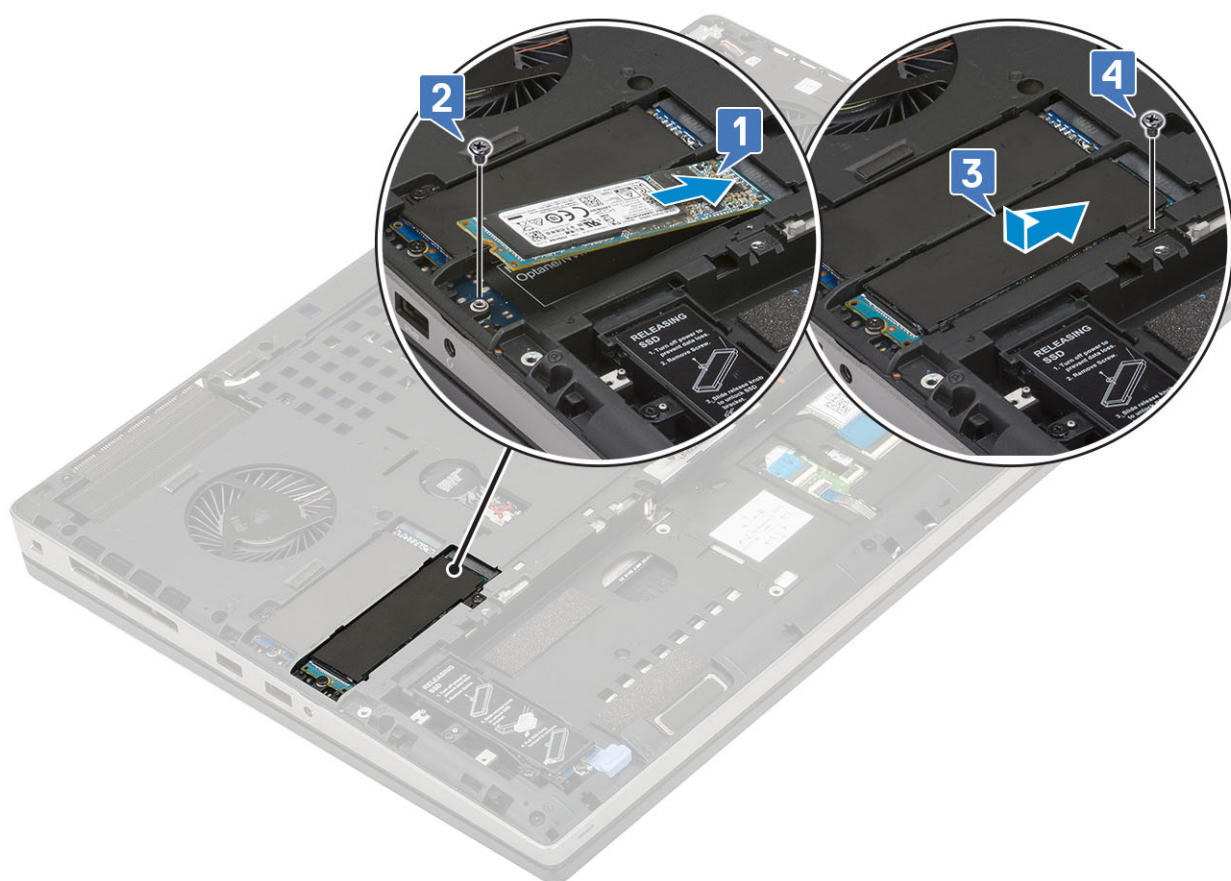
- e Align the M.2 SSD assembly into its slot in the system [1].
- f Slide the release latch to lock the M.2 SSD assembly into its slot [2].
- g Replace the single (M2.0x3.0) screw to secure the M.2 SSD assembly to the system [3].



## 2 To install the M.2 SSD module (Slot 3, 5 or 6):



- a Place the M.2 SSD into its slot in the system [1].
- b Replace the single (M2.0x3.0) screw to secure the M.2 SSD to the system board [2].
- c Place the thermal plate above the M.2 SSD module [3].
- d Replace the single (M2.0x3.0) screw to secure the thermal plate to the M.2 SSD [4].





- 3 Install the:
    - a [base cover](#)
    - b [battery](#)
    - c [battery cover](#)
    - d [SD card](#)
  - 4 Follow the procedure in [After working inside your computer](#).
- ① **NOTE:** Installing of base cover is required only if the M.2 SSD module in slot 3, 5 or 6 are accessed.

## Coin-cell battery

### Removing the coin cell battery

- 1 Follow the procedures in [Before working inside your computer](#).
- 2 Remove the:
  - a [SD card](#)
  - b [battery cover](#)
  - c [battery](#)
  - d [base cover](#)
- 3 To remove coin cell battery:
  - a Disconnect the coin cell battery cable from the system [1].
  - b Pry and lift the coin cell battery from the system [2].

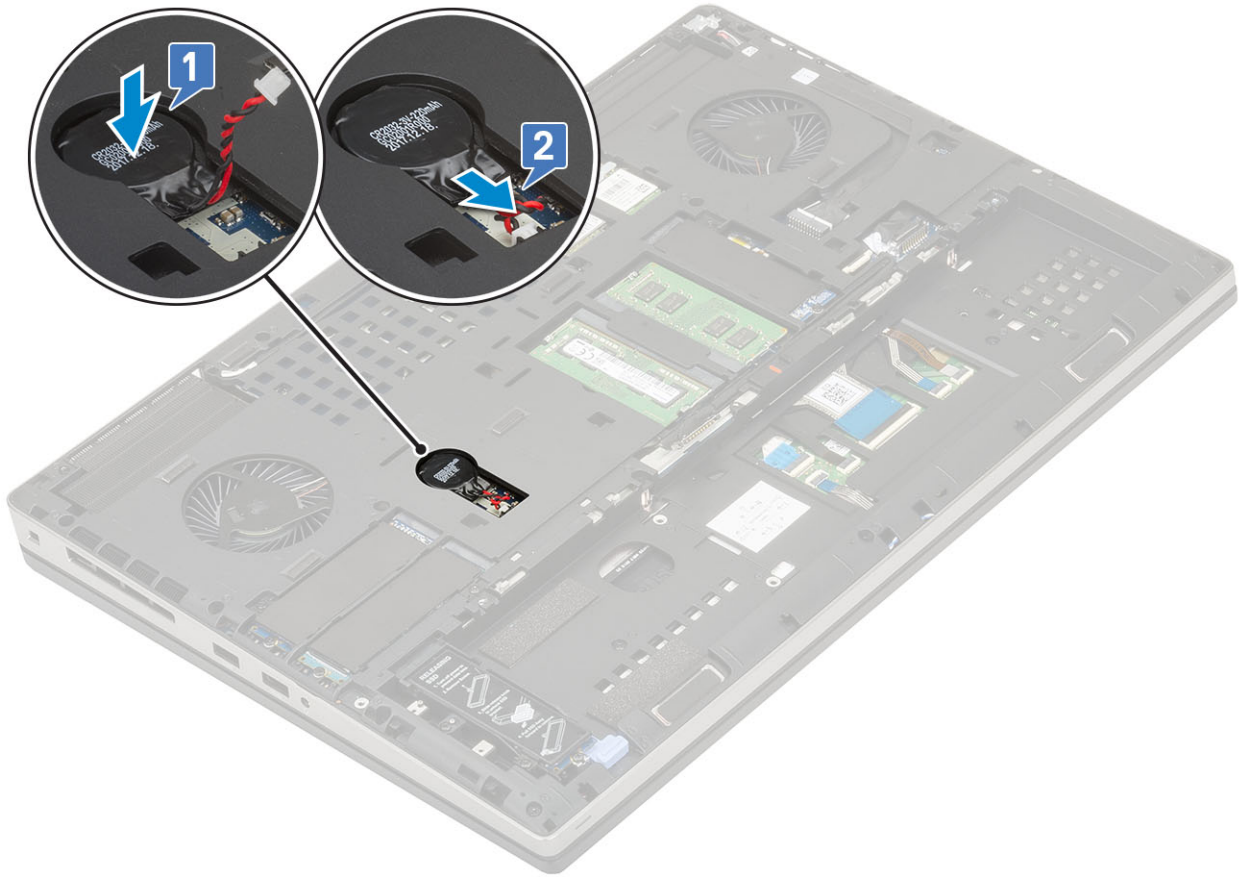


**CAUTION:** Disconnecting coin cell battery may reset BIOS settings, time and date within System Settings, cause BitLocker or other security resets.



## Installing the coin cell battery

- 1 To install the coin cell battery:
  - a Replace the coin cell battery in its slot on the system.
  - b Connect the coin cell battery cable to the system.



- 2 Install the:
  - a [base cover](#)
  - b [battery](#)
  - c [battery cover](#)
  - d [SD card](#)
- 3 Follow the procedure in [After working inside your computer](#).

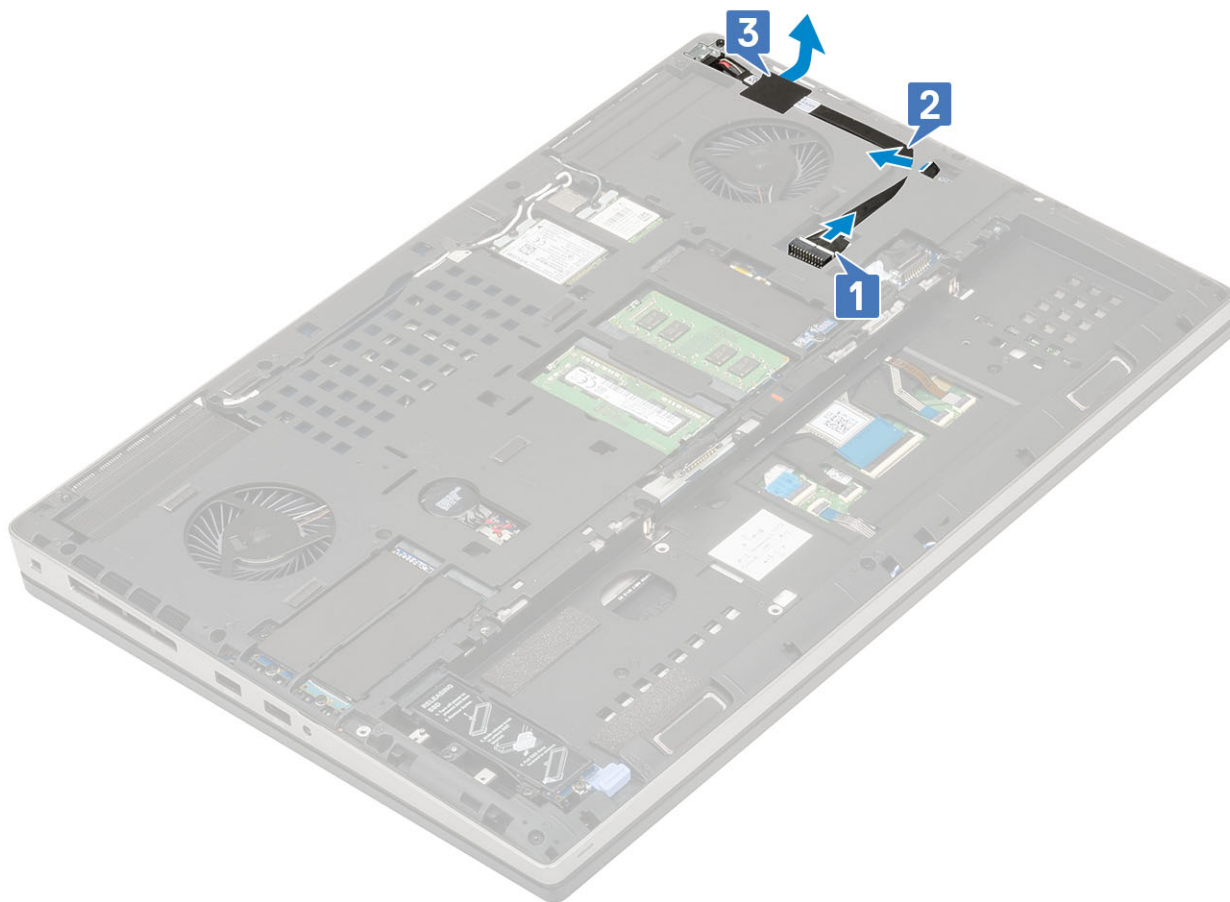
## Power connector port

### Removing the power connector port

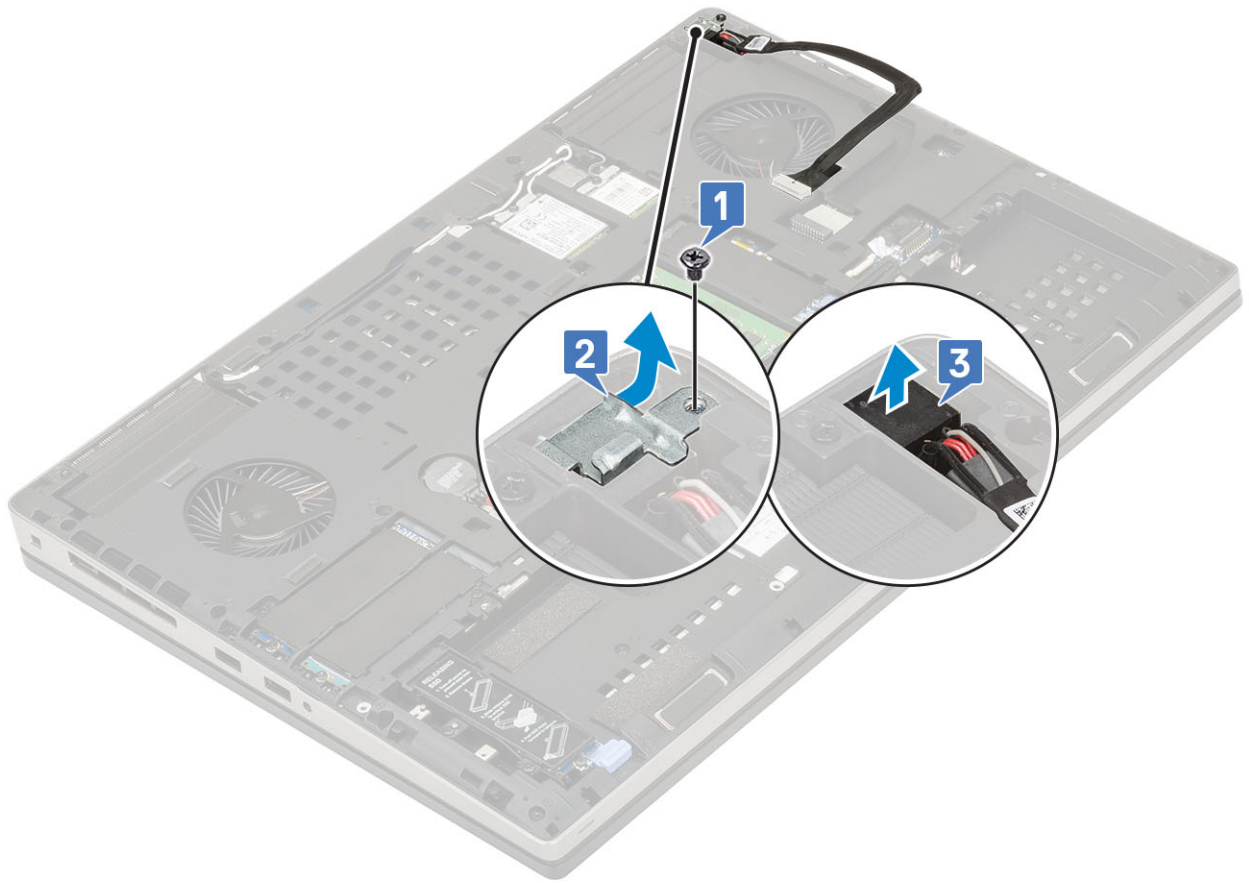
- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a [SD card](#)
  - b [battery cover](#)
  - c [battery](#)
  - d [base cover](#)
- 3 To remove power connector port:



- a Disconnect the power connector cable from the connector on the system board [1].
- b Peel the adhesive tape that secures the power connector cable to the system and unrout the cable [2, 3].

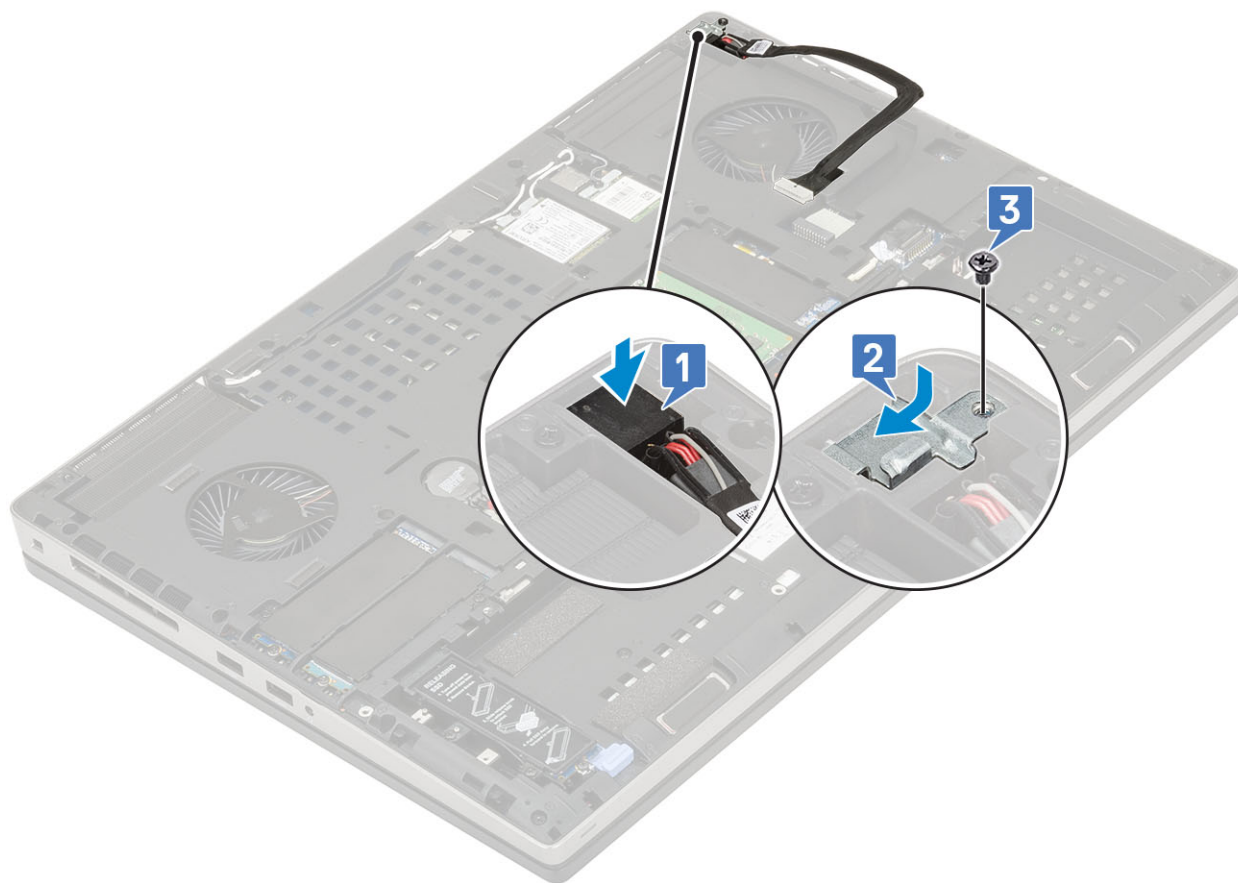


- c Remove the single (M2.0x3.0) screw that secures the power connector cable metal bracket to the system [1].
- d Remove the metal bracket away from the system [2].
- e Lift the power connector port from the system [3].

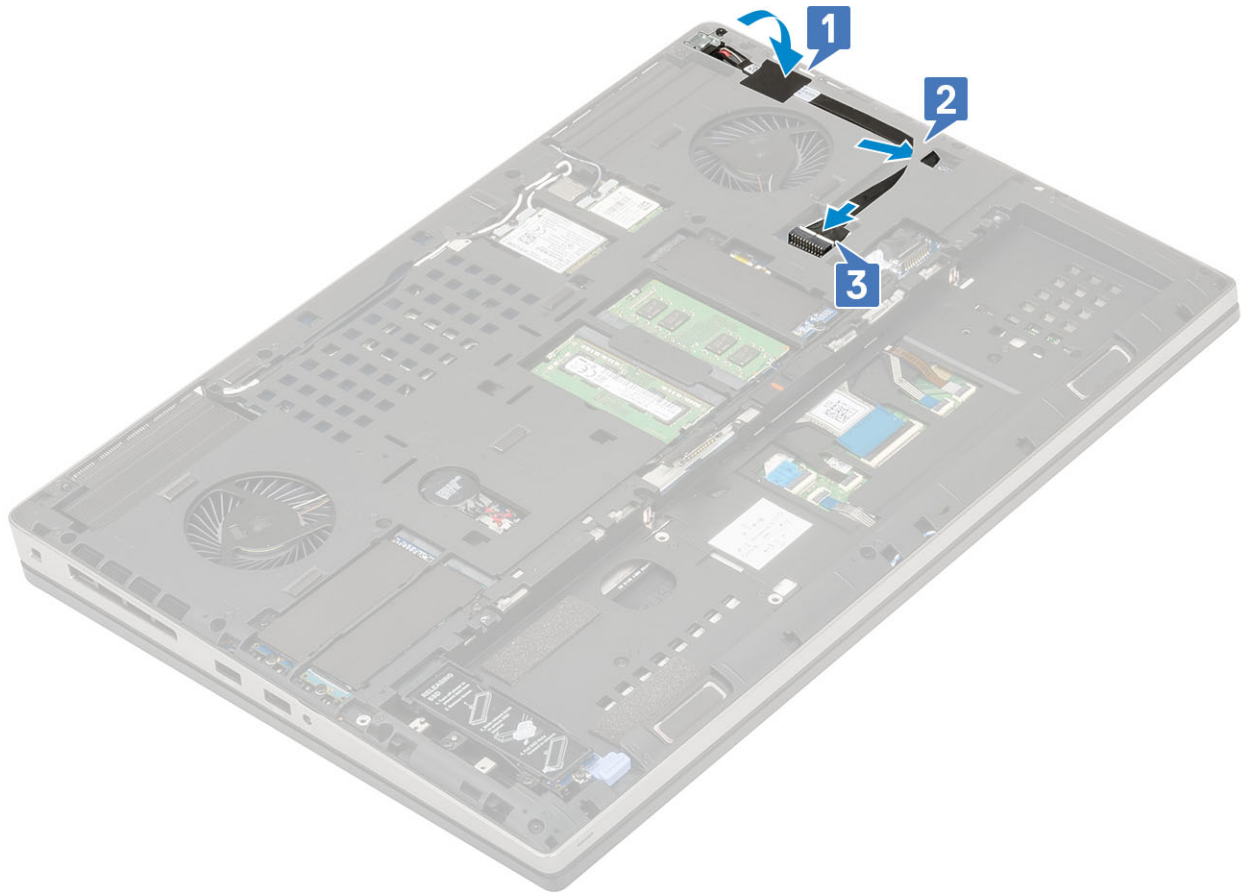


## Installing the power connector port

- 1 To install the power connector port:
  - a Connect the power connector port to the system [1].
  - b Place the power connector cable metal bracket [2].
  - c Replace the single (M2.0x3.0) screw to secure the metal bracket to the system [3].



- d Affix the adhesive tape to secure the power connector cable in place [1].
- e Route the cable through the routing channel and affix the adhesive tape [2].
- f Connect the power connector cable to the connector on the system board [3].

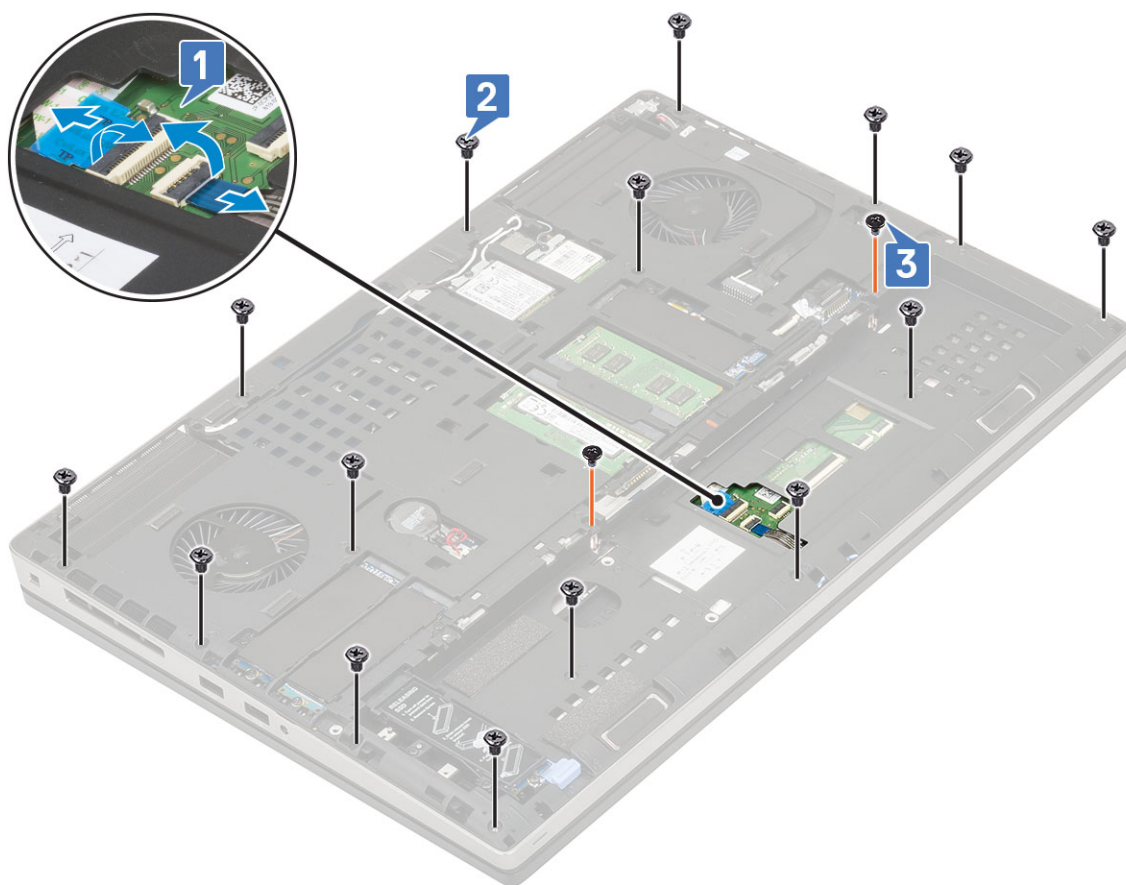


- 2 Install the:
  - a [base cover](#)
  - b [battery](#)
  - c [battery cover](#)
  - d [SD card](#)
- 3 Follow the procedure in [After working inside your computer](#).

## Palm rest

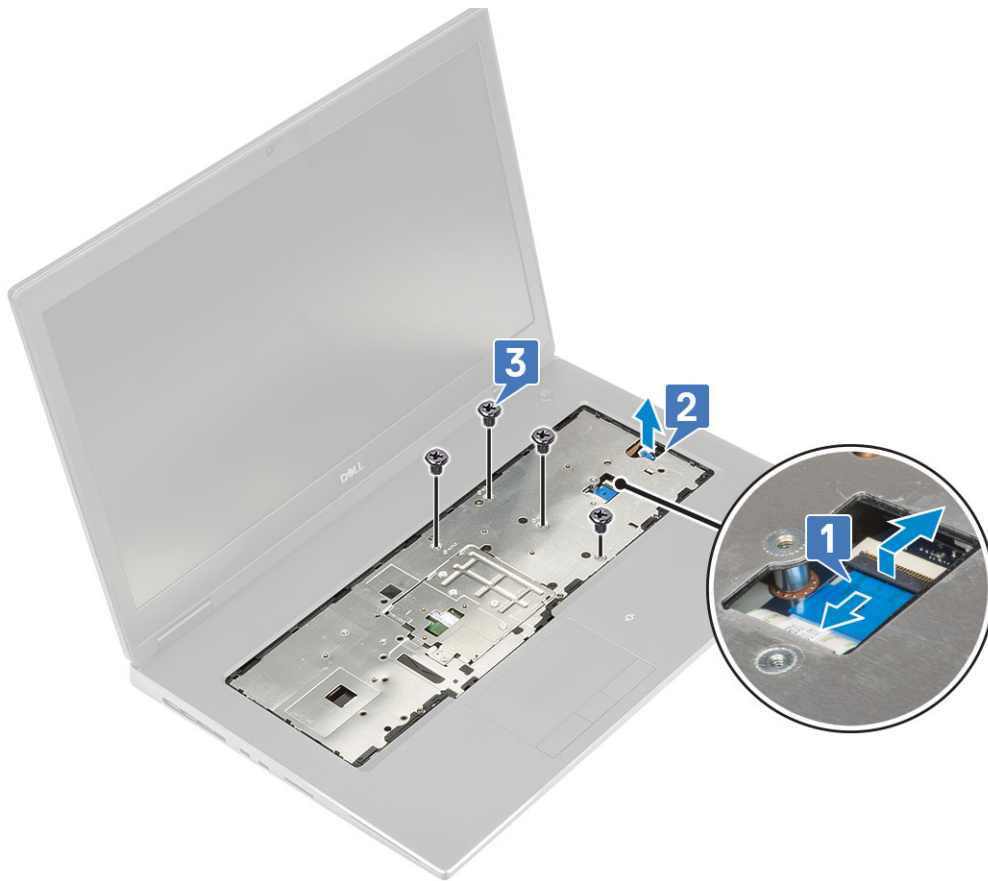
### Removing the palmrest

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a [SD card](#)
  - b [battery cover](#)
  - c [battery](#)
  - d [keyboard](#)
  - e [hard drive](#)
  - f [base cover](#)
- 3 To remove the palmrest:
  - a Lift the latches and disconnect the touchpad and touchpad button cables from the connectors on the system board [1].
  - b Remove the 15 (M2.5x5.0) and the 2 (M2.0x3.0) screws that secure the palmrest assembly in place [2, 3].

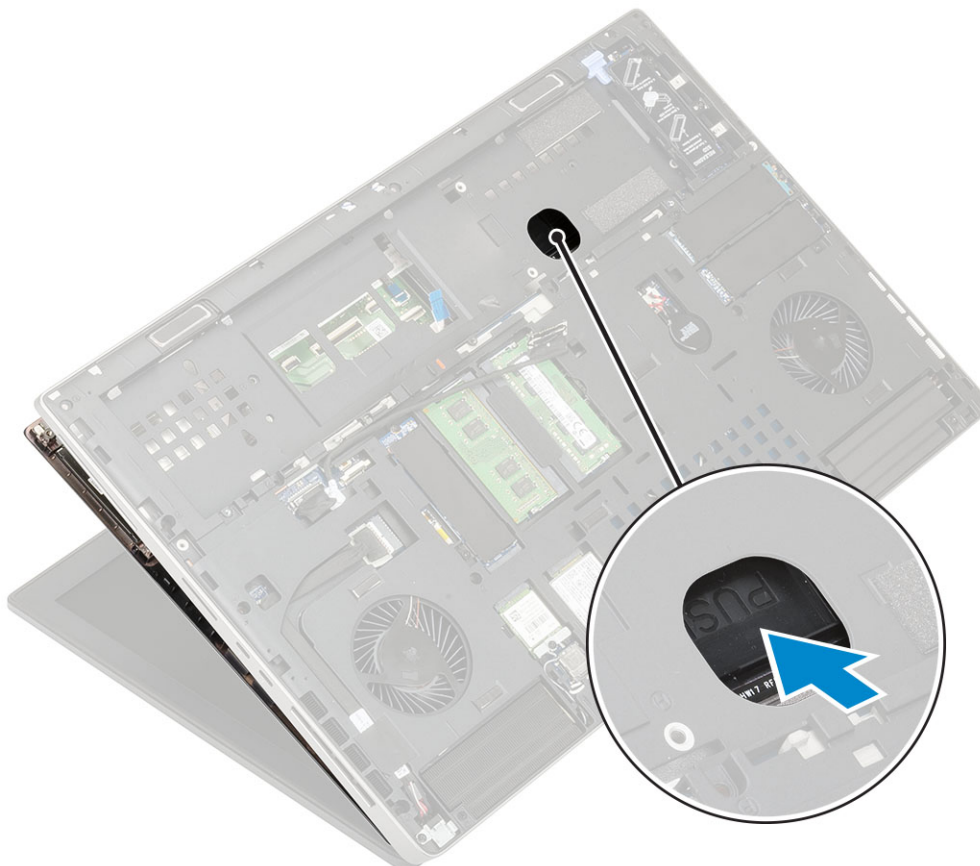


- c Turn the system around and disconnect the system board cable and power button cable from the connectors on the system board [1, 2].
- d Remove the 4 (M2.0x3.0) screws that secure the palmrest to the system [3].





- e Push the hole at the bottom of the system to release the palmrest from the bottom chassis.



- f Lift and remove the palmrest from the system.



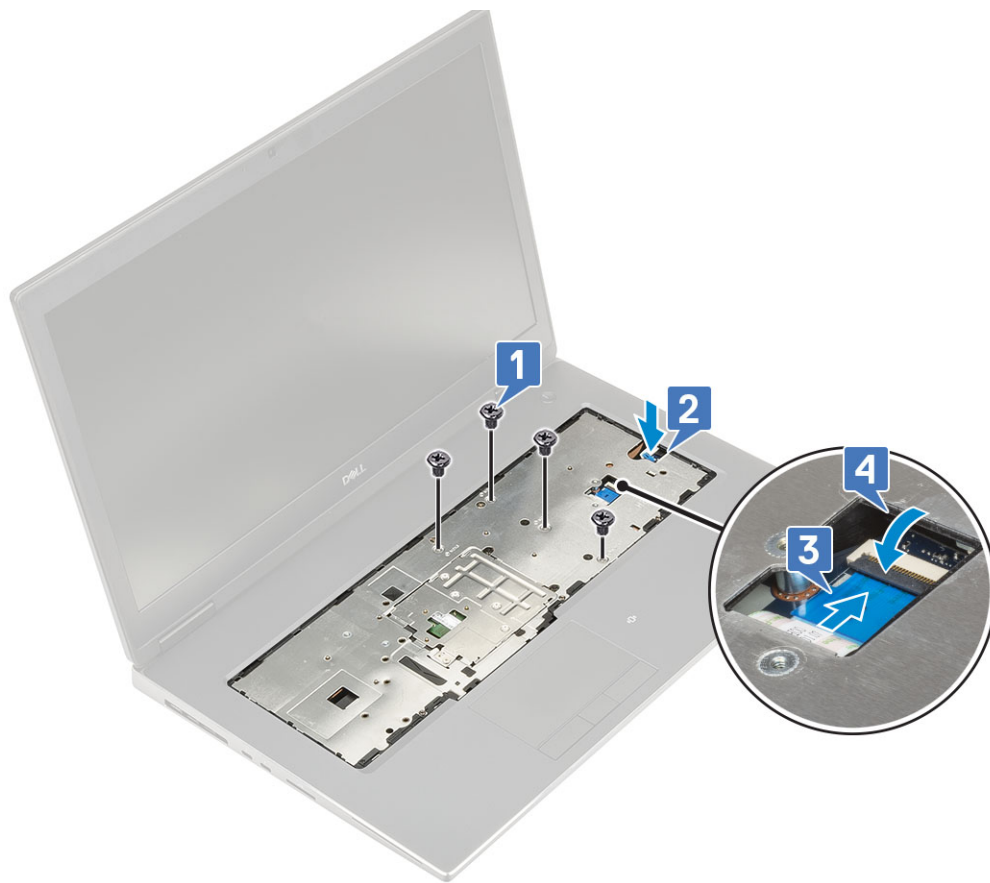
## Installing the palmrest

- 1 To install the palmrest:
  - a Align the palmrest on the system and press until it snaps in its place [1, 2].

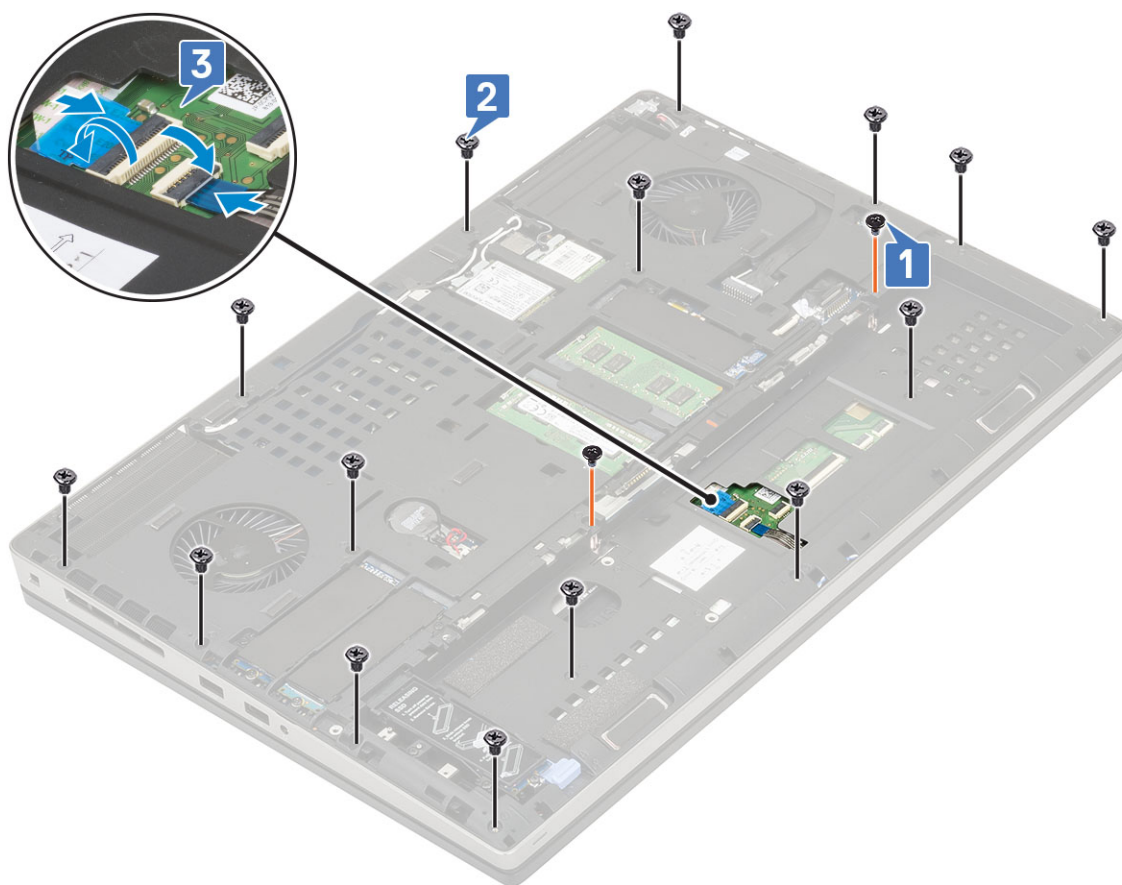




- b Replace the 4 (M2.0x3.0) screws to secure the palmrest to the system [1].
- c Connect the system board and power button cable to the connectors on the system board [2,3, 4].



- d Turn the system and replace the 15 (M2.5x5.0) and the 2 (M2.0x3.0) screws to secure the palmrest to the system [1, 2].
- e Connect the touchpad and touchpad button cables to the connectors on the system board and lock the latch [3].



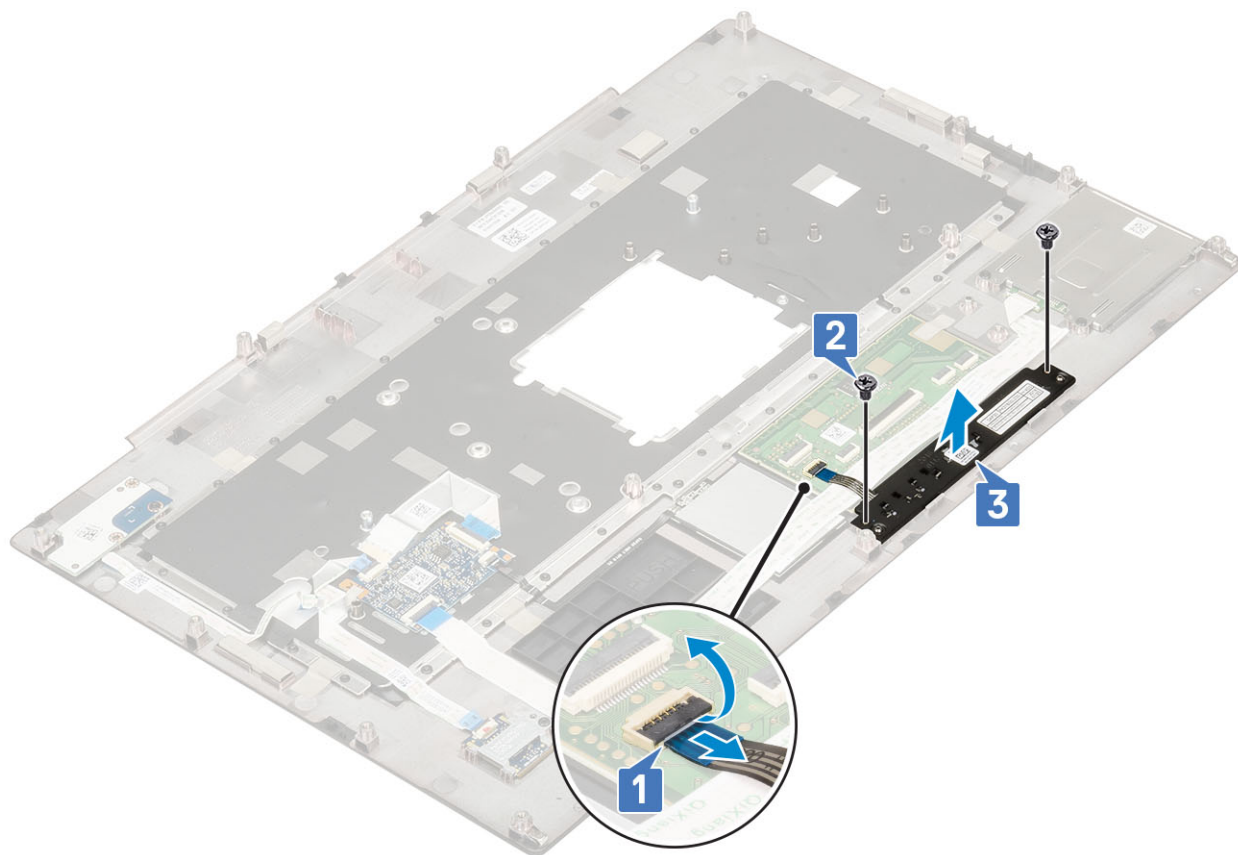
- 2 Install the:
  - a [base cover](#)
  - b [keyboard](#)
  - c [hard disk](#)
  - d [battery](#)
  - e [battery cover](#)
  - f [SD card](#)
- 3 Follow the procedure in [After working inside your computer](#).

## Touchpad button

### Removing the Touchpad buttons

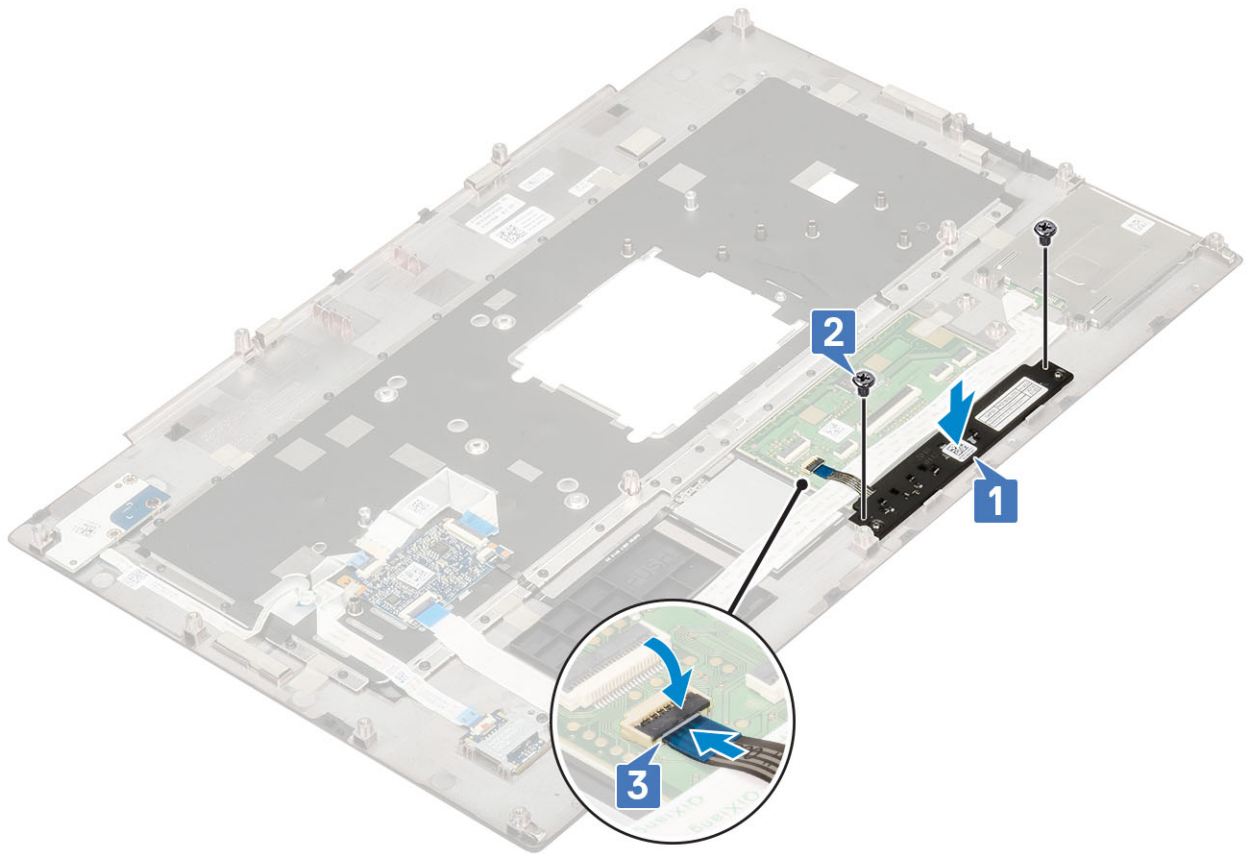
- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a [SD card](#)
  - b [battery cover](#)
  - c [battery](#)
  - d [keyboard](#)
  - e [hard drive](#)
  - f [base cover](#)
  - g [palmrest](#)
- 3 To remove touchpad buttons:
  - a Disconnect the touchpad cable from the touchpad [1].
  - b Remove the 2 (M2.0x3.0) screws that secure the touchpad buttons to the palmrest [2].

- c Remove the touchpad button from the palmrest [3].



## Installing the Touchpad button

- 1 To install the touchpad button:
  - a Place the touchpad button into its slot in the palmrest [1].
  - b Replace the 2 (M2.0x3.0) screws to secure the touchpad button to the palmrest [2].
  - c Connect the touchpad button cable to the connector in the touchpad [3].




- 2 Install the:
  - a [palmrest](#)
  - b [base cover](#)
  - c [hard drive](#)
  - d [keyboard](#)
  - e [battery](#)
  - f [battery cover](#)
  - g [SD card](#)
- 3 Follow the procedure in [After working inside your computer](#).

## SIM card

### Removing SIM card

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a [SD card](#)
  - b [battery cover](#)
  - c [battery](#)
  - d [base cover](#)
- 3 To remove SIM card:
  - a Gently slide the SIM card cover towards the rear of the system to unlock the SIM card cover [1].
 

 **CAUTION:** The SIM card cover is very fragile and can be easily damaged if it is not properly unlocked before opening.
  - b Flip the SIM card cover from the bottom edge [2].

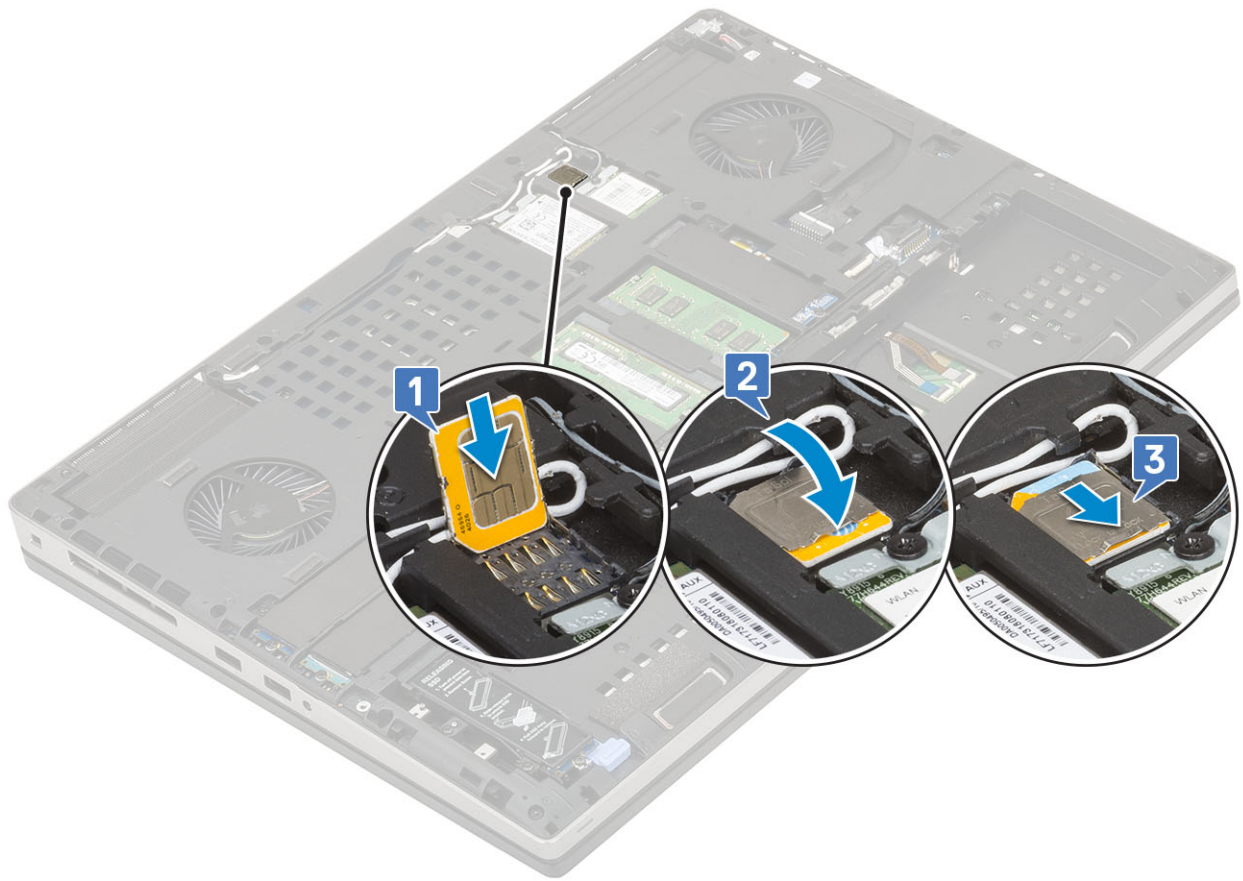
- c Lift the SIM card from the SIM card compartment [3].



## Installing SIM card

- 1 To install the SIM card:
  - a Slide the SIM card into the SIM card compartment [1].
  - b Snap the SIM card cover down [2].
  - c Slide the SIM card cover towards the front of the system to lock the SIM card cover [3].





- 2 Install the:
  - a [base cover](#)
  - b [battery](#)
  - c [battery cover](#)
  - d [SD card](#)
- 3 Follow the procedure in [After working inside your computer](#).

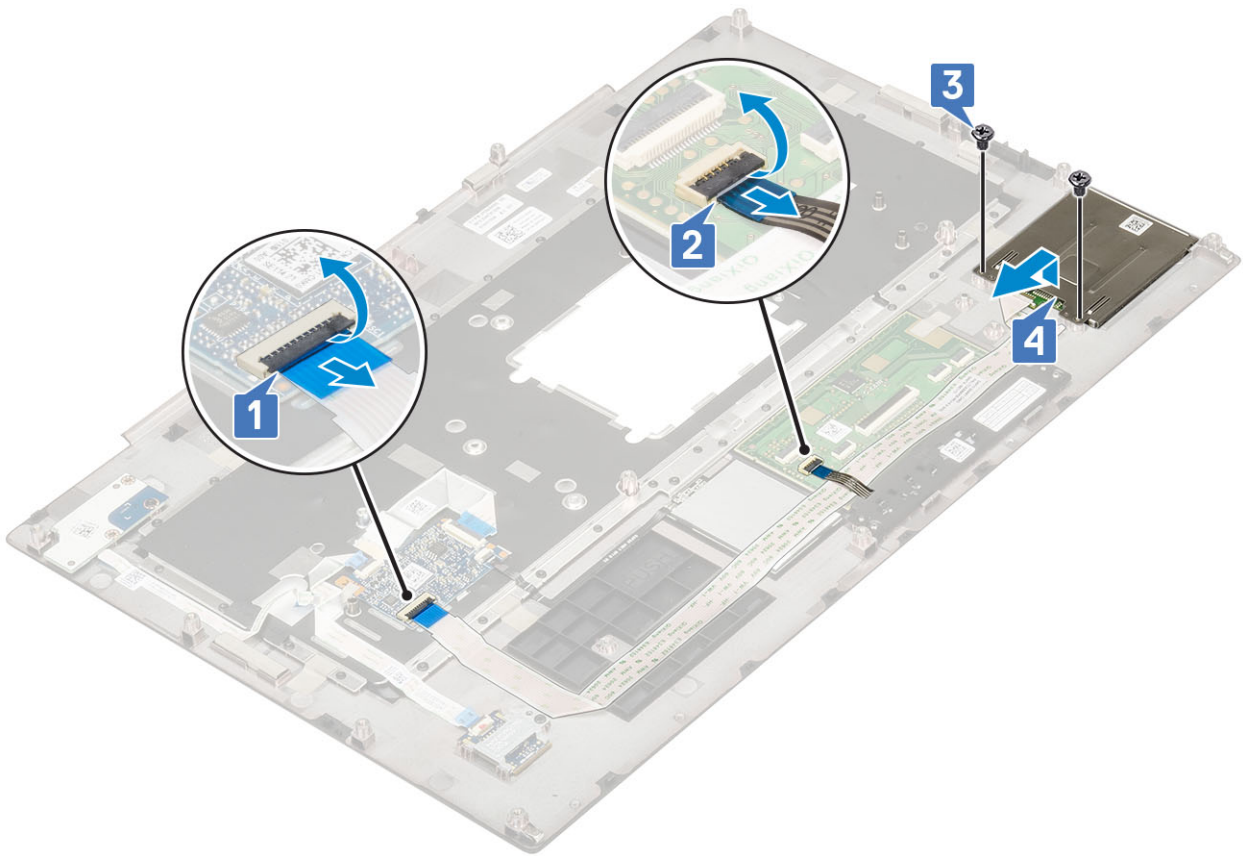
## Smart card cage

### Removing the smart card cage

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a [SD card](#)
  - b [battery cover](#)
  - c [battery](#)
  - d [keyboard](#)
  - e [hard drive](#)
  - f [base cover](#)
  - g [palmrest](#)
- 3 To remove power switch board:
  - a Disconnect the smart card cage cable from the connector on the system board [1].
  - b Disconnect the touchpad button cable from the connector on the touchpad [2].
  - c Pry the smart card cage cable.

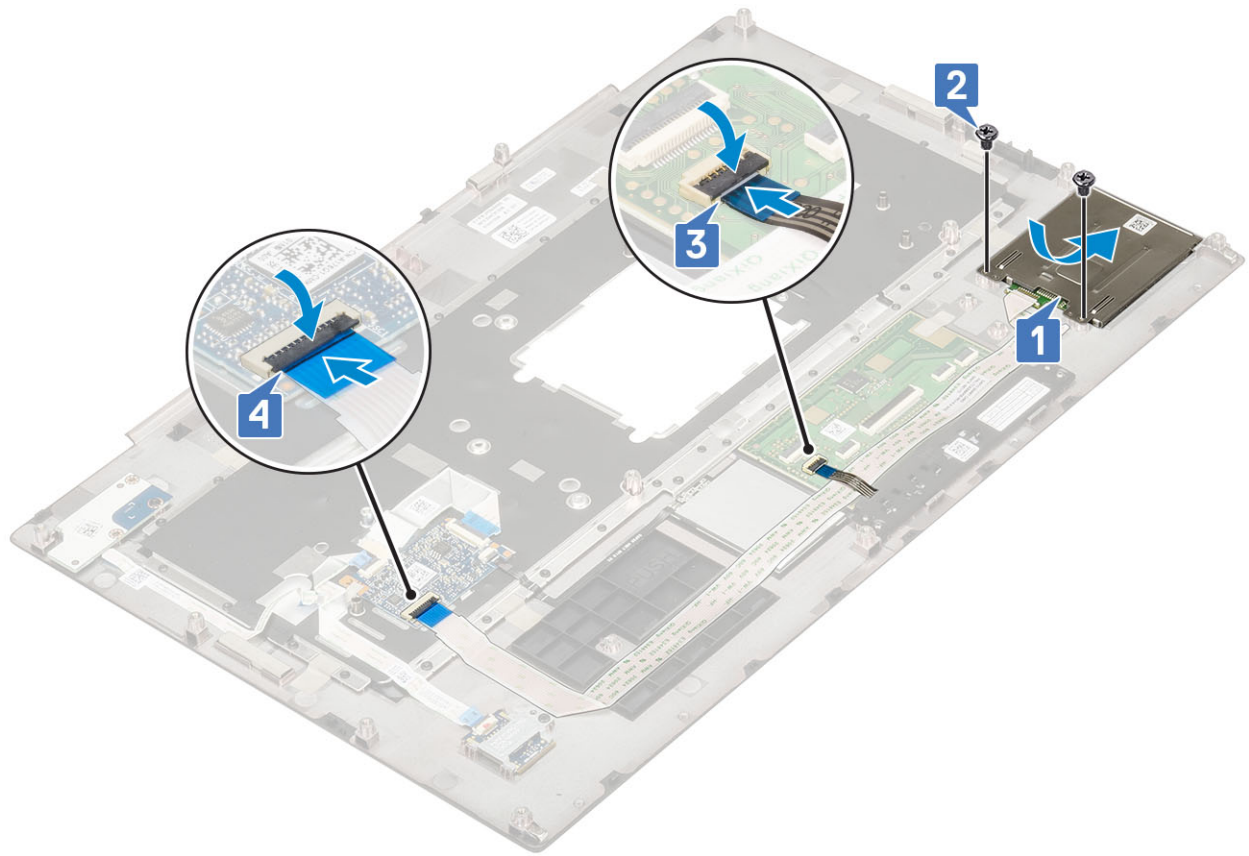


- d Remove the 2 (M2.0X3.0) screws that secure the smart card cage to the system [3].
- e Remove the smart card cage from the system [4].



## Installing the smart card cage

- 1 To install the smart card cage:
  - a Place the smart card cage into its slot in the system [1].
  - b Replace the 2 (M2.0X3.0) screws to secure the smart card cage to the system [2].
  - c Affix the smart card cable .
  - d Connect the touchpad button cable to the connector on the touchpad [3].
  - e Connect the smart card cage cable to the connector on the system [4]



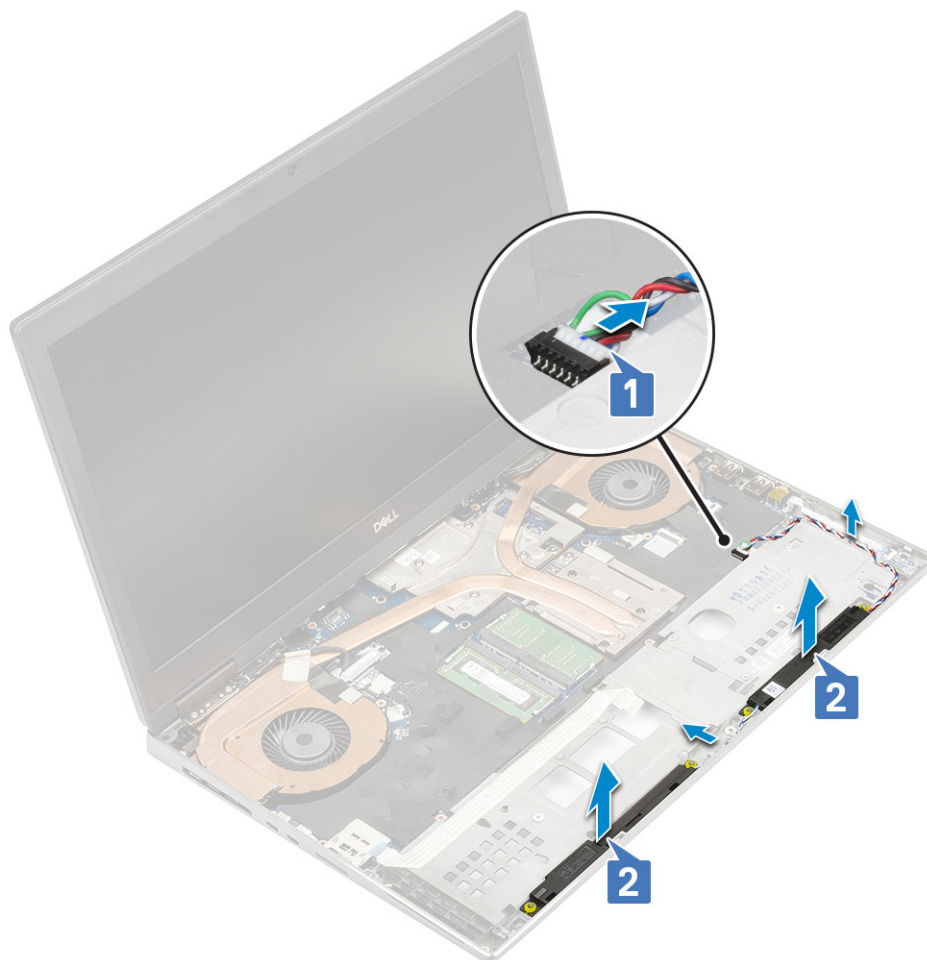
- 2 Install the:
  - a [palmrest](#)
  - b [base cover](#)
  - c [hard drive](#)
  - d [keyboard](#)
  - e [battery](#)
  - f [battery cover](#)
  - g [SD card](#)
- 3 Follow the procedure in [After working inside your computer](#).

## Speaker

### Removing the speakers

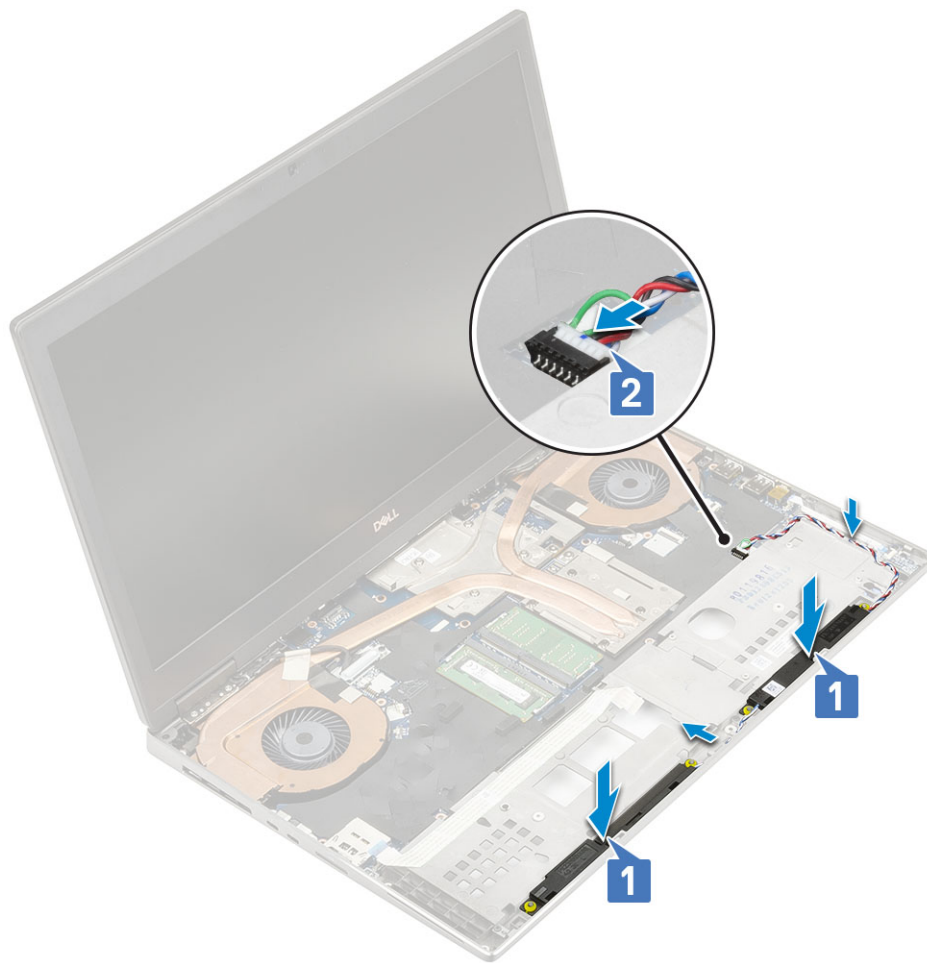
- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a [SD card](#)
  - b [battery cover](#)
  - c [battery](#)
  - d [keyboard](#)
  - e [hard drive](#)
  - f [base cover](#)
  - g [palmrest](#)
- 3 To remove the speaker:
  - a Disconnect the speaker cable from the system board [1].
  - b Unroute the speaker cable and remove the cable from the routing channels.

- c Lift the speakers, along with the speaker cable and remove it away from the system [2].



## Installing the speakers

- 1 To install the speaker:
  - a Align the speakers along the slots on the system [1].
  - b Route the speaker cable through the routing channels on the system.
  - c Connect the speaker cable to the connector on the system board [2].



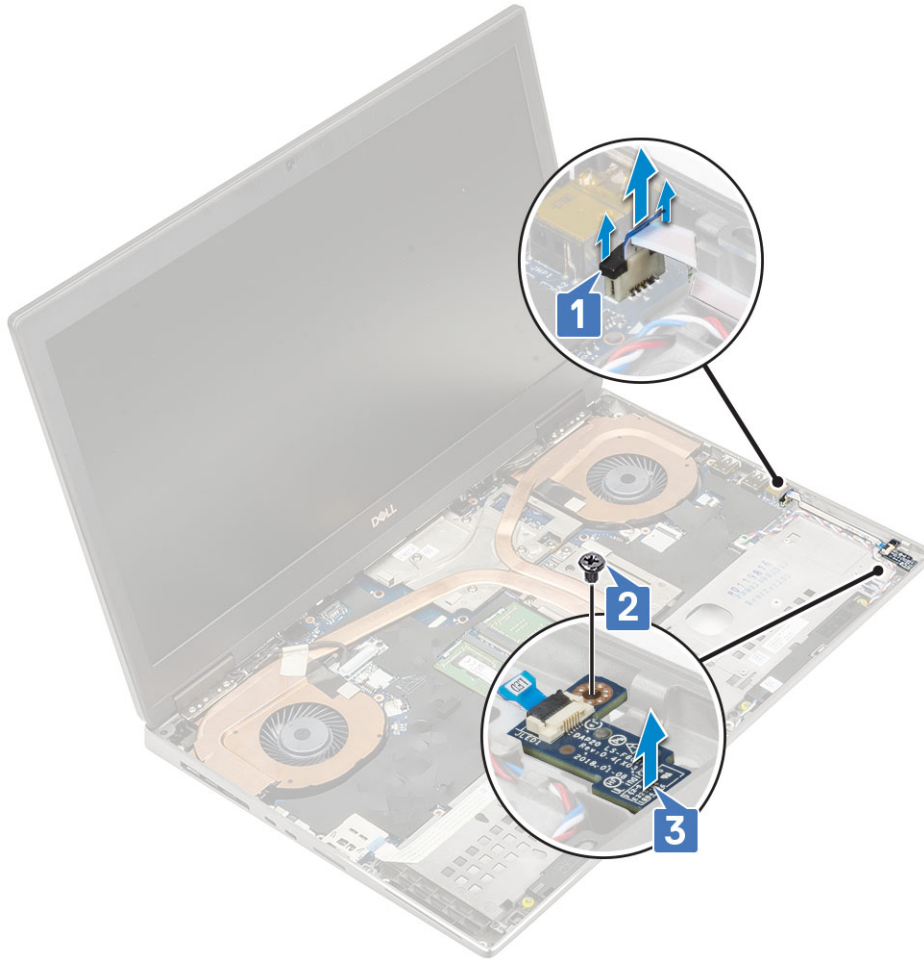
- 2 Install the:
  - a palmrest
  - b base cover
  - c hard drive
  - d keyboard
  - e battery
  - f battery cover
  - g SD card
- 3 Follow the procedure in [After working inside your computer](#).

## LED board

### Removing the LED board

- 1 Follow the procedures in [Before working inside your computer](#).
- 2 Remove the:
  - a SD card
  - b battery cover
  - c battery
  - d keyboard
  - e hard drive
  - f base cover
  - g palmrest

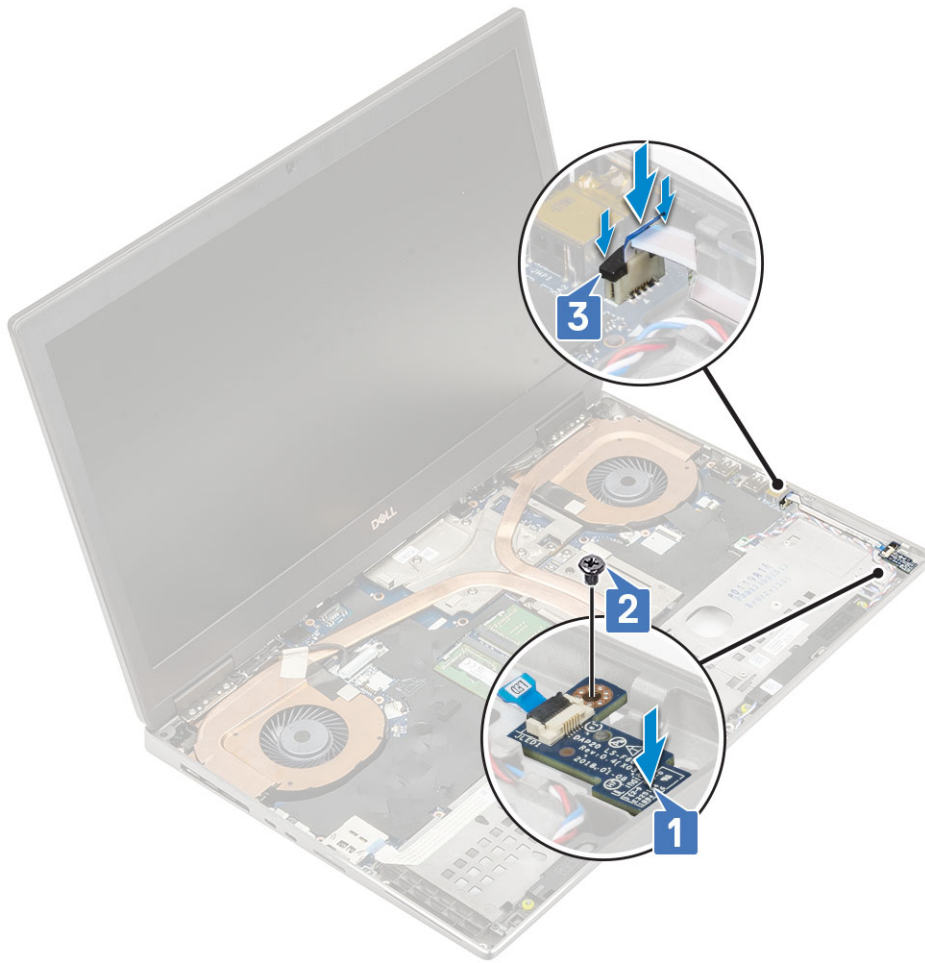
- 3 To remove LED board:
  - a Lift the tab and disconnect the LED-board cable from the system board [1].
  - b Peel the LED-board cable from the system.
  - c Remove the single (M2.0x3.0) screw that secures the LED board to the system [2].
  - d Remove the LED board from the system [3].



## Installing the LED board

- 1 To install the LED board:
  - a Align the LED board to its original position on the system [1].
  - b Replace the single (M2.0x3.0) screw to secure the LED board to the system [2].
  - c Affix the LED-board cable.
  - d Connect the LED-board cable to the connector in the system board [3].





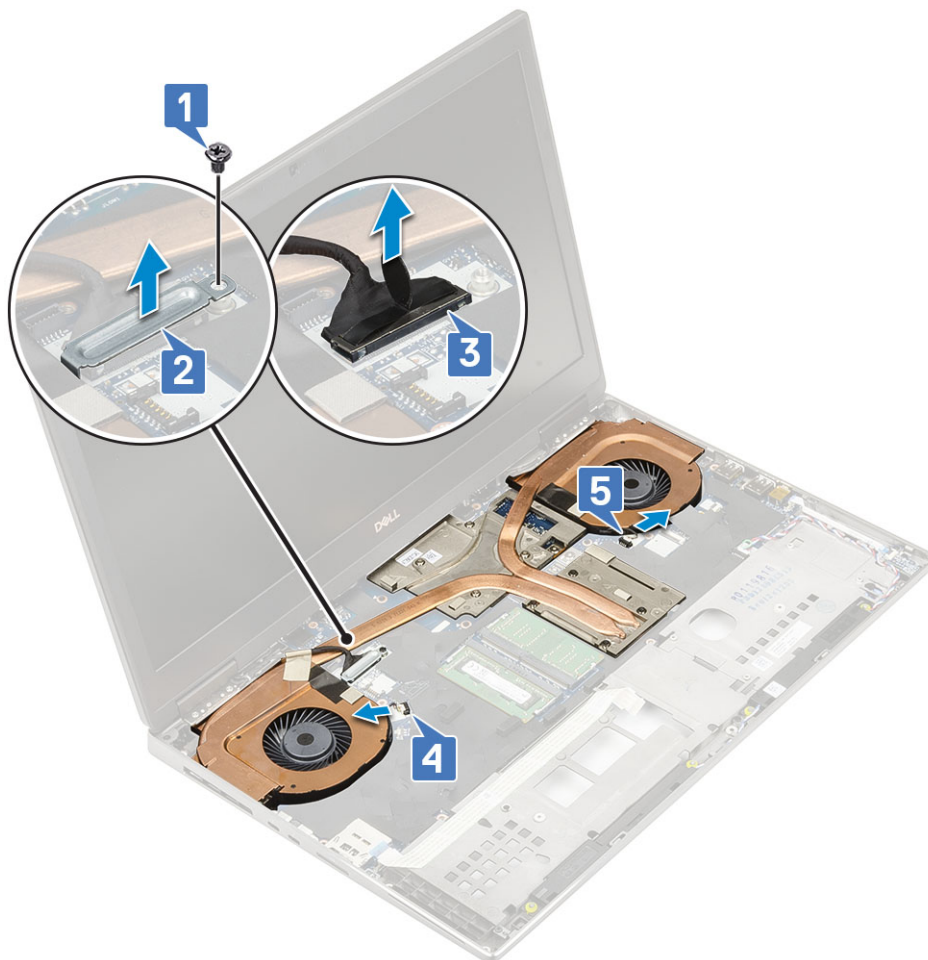
- 2 Install the:
  - a palmrest
  - b base cover
  - c hard drive
  - d keyboard
  - e battery
  - f battery cover
  - g SD card
- 3 Follow the procedure in [After working inside your computer](#).

## Heat sink assembly

### Removing the heat sink assembly

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a SD card
  - b battery cover
  - c battery
  - d keyboard
  - e hard drive
  - f base cover
  - g palmrest

- 3 To remove heat sink:
- Remove the single (M2.0x3.0) screw that secures the eDP cable bracket to the system board [1].
  - Remove the eDP cable bracket from the system [2].
  - Disconnect the eDP cable from the connector on the system board [3].
  - Pry the adhesive tape that secures the eDP cable in place.
  - Disconnect the two fan cables from the connector on the system board [4,5].



- Loosen the 8 captive screws that secure the heat sink assembly to the system board [1].

**NOTE:** Remove the captive screws in the order stamped onto the heat sink next to the screws [1 > 2 > 3 > 4 > 5 > 6 > 7 > 8].

- Lift the heat sink assembly [2].



h Slide and remove the heat sink assembly from the system.



## Installing the heat sink assembly

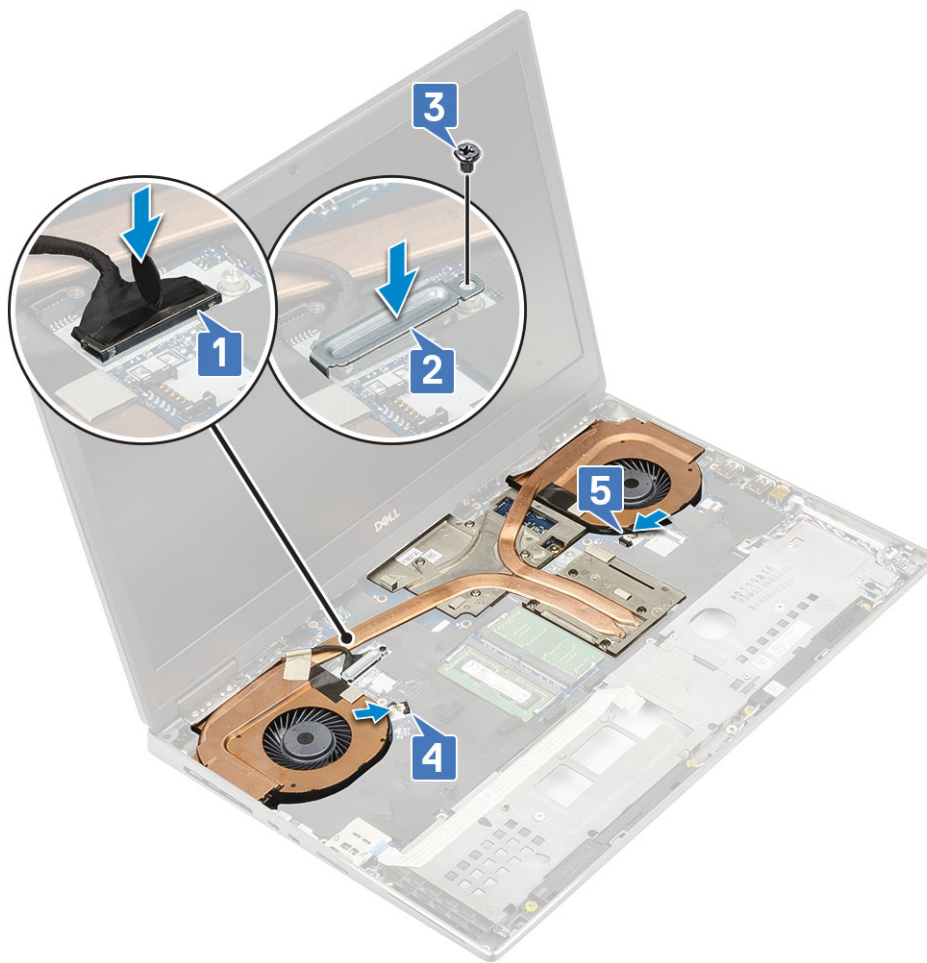
- 1 To install the heat sink assembly:
  - a Insert the heat-sink assembly in its slot on the system [1].
  - b Tighten the 8 captive screws to secure the heat-sink assembly to the system board [2].

**NOTE:** Tighten the captive screws in the order stamped onto the heat sink next to the screws [1 > 2 > 3 > 4 > 5 > 6 > 7 > 8].



- c Connect the eDP cable to the connector on the system board and affix the adhesive tape to secure the eDP cable in place [1].
- d Place and align the display cable bracket above the eDP cable connector [2].
- e Replace the single (M2.0x3.0) screw to secure the eDP cable bracket to the system board [3].
- f Connect the two fan cables to the connector on the system board [4, 5].





- 2 Install the:
  - a palmrest
  - b base cover
  - c hard drive
  - d keyboard
  - e battery
  - f battery cover
  - g SD card
- 3 Follow the procedure in [After working inside your computer](#).

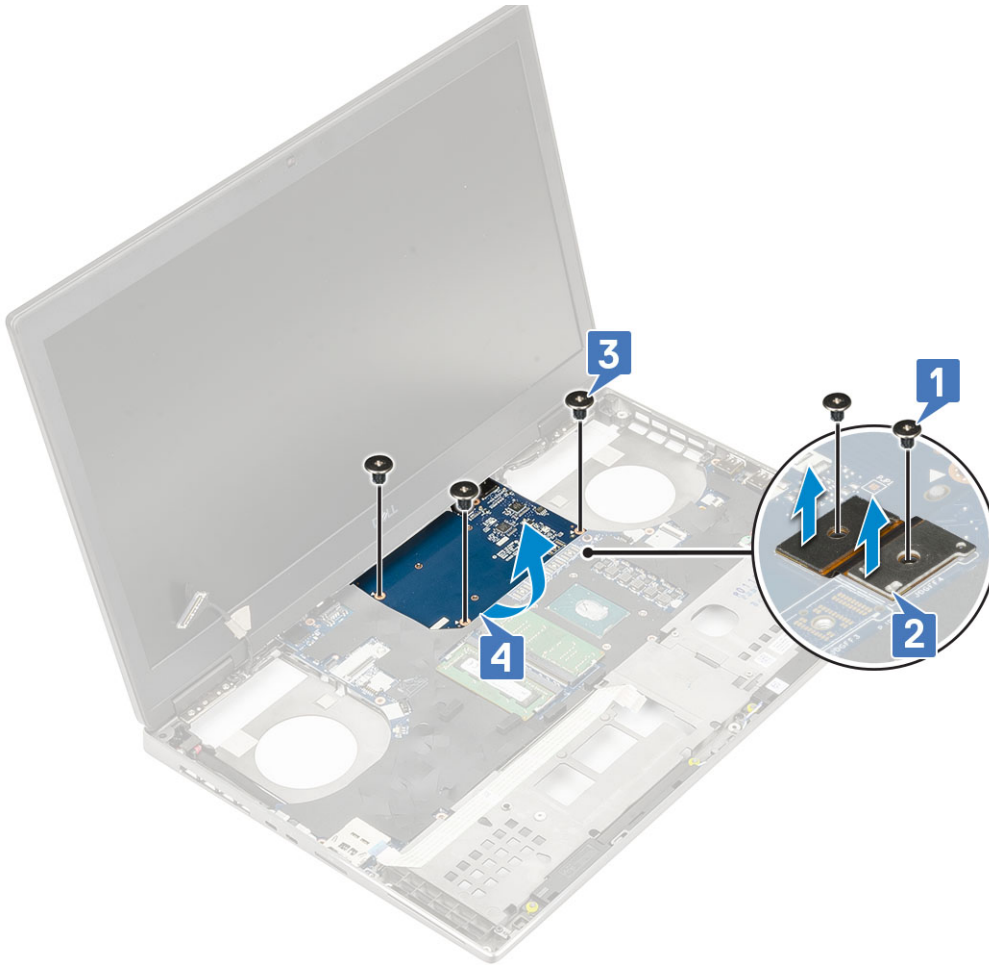
## Graphics card

### Removing the graphics card

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a SD card
  - b battery cover
  - c battery
  - d keyboard
  - e hard drive
  - f base cover
  - g palmrest

h [heatsink assembly](#)

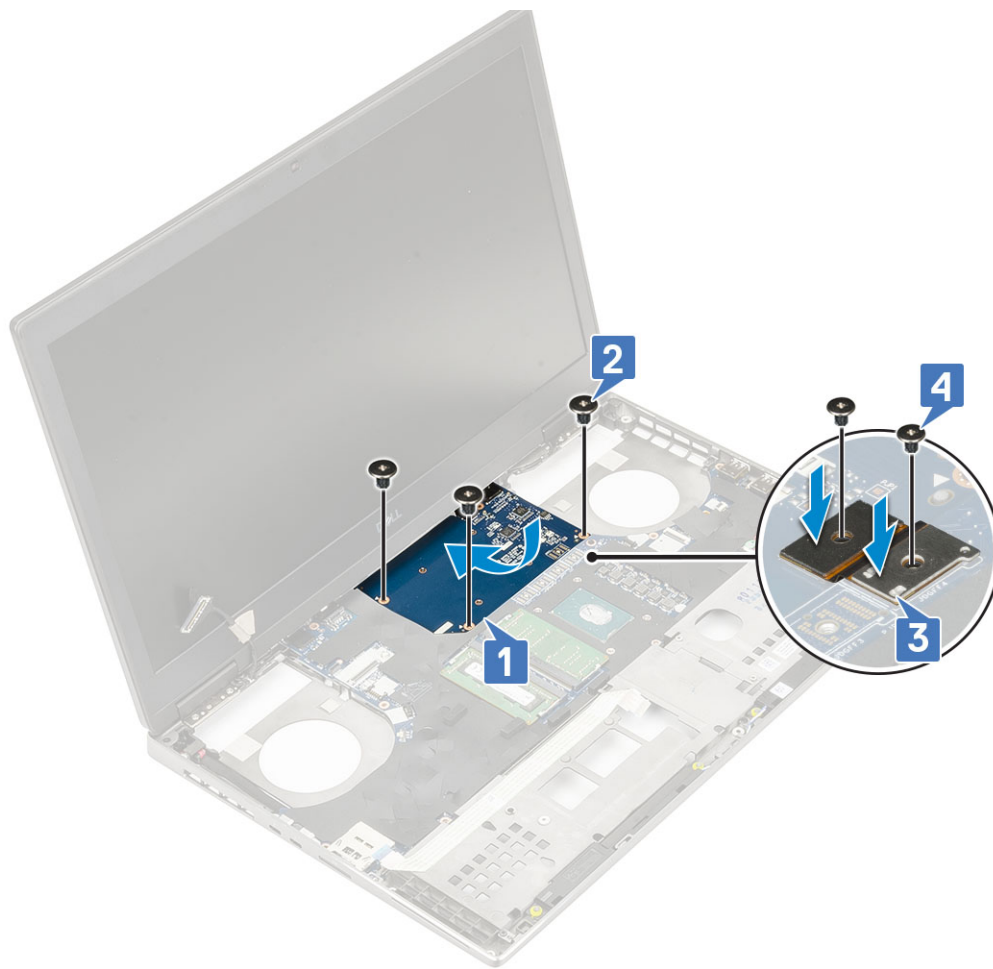
- 3 To remove the graphics card:
  - a Remove the 2 (M2.0x3.0) screws that secure the beam connector to the system board [1].
  - b Remove the beam connector from the system board [2].
  - c Remove the 3 (M2.5x5.0) screws that secure the graphics card to the system board [3].
  - d Remove the graphics card from the system [4].



**NOTE:** The above procedures are for UMA graphics card. Systems shipped with UMA GPU card do not have GPU power cable. However, for discrete models shipped with either a 128 MB or 256 MB VRAM GPU card, you need to disconnect the GPU power cable before removing the GPU card.

## Installing the graphics card

- 1 To Install the graphics card:
  - a Slide the graphics card into its original position in the system [1].
  - b Replace the 3 (M2.5x5.0) screws to secure the graphics card to the system board [2].
  - c Replace the beam connector [3].
  - d Replace the 2 (M2.0x3.0) screws to secure the beam connector to the system board [4].



- 2 **NOTE:** The above procedures are for UMA graphics card. Systems shipped with UMA GPU card do not have GPU power cable. However, for discrete models shipped with either a 128 MB or 256 MB VRAM GPU card, you need to connect the GPU power cable after installing the GPU card.

Install the:

- a heat sink assembly
- b palmrest
- c base cover
- d hard drive
- e keyboard
- f battery
- g battery cover
- h SD card

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

## System board

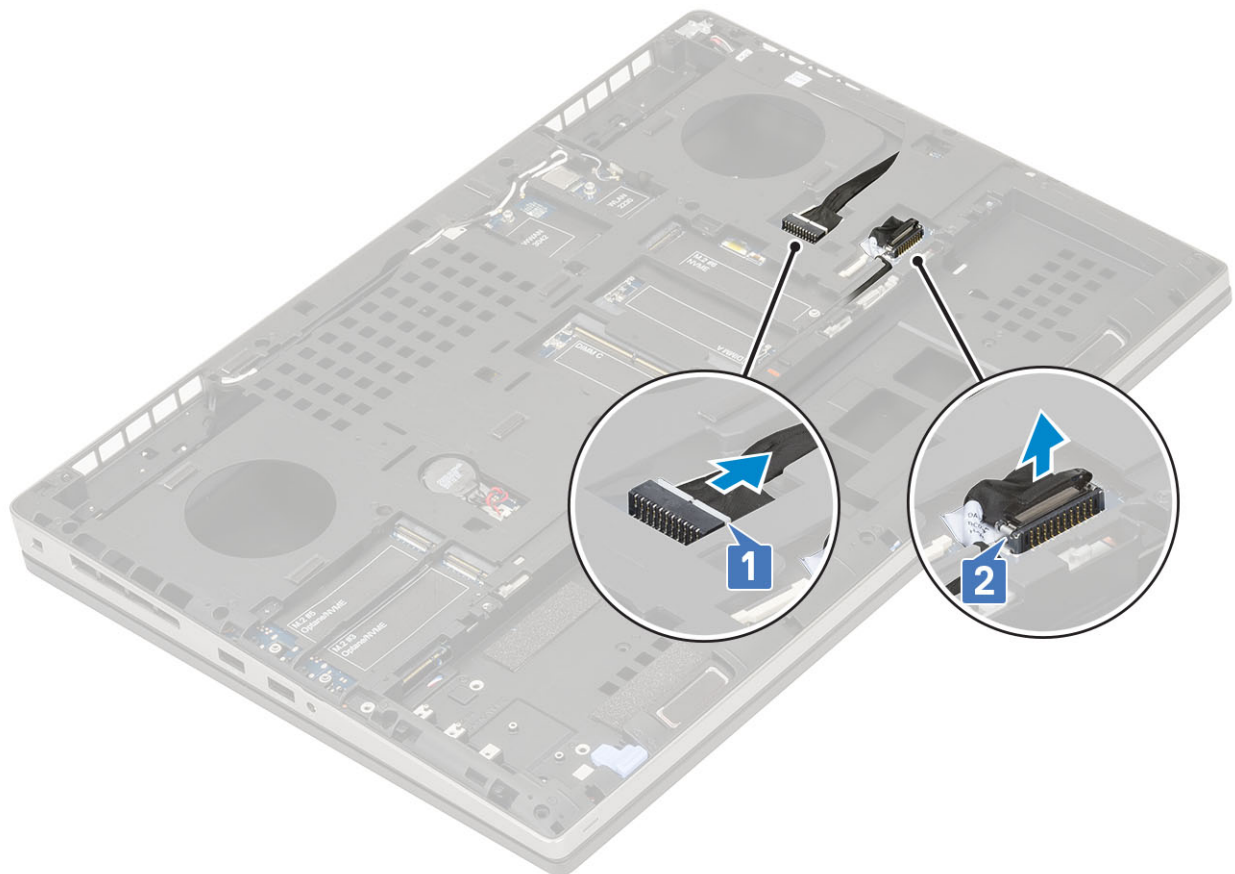
### Removing the system board

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a SD card
  - b battery cover
  - c battery

- d hard drive
- e hard drive interposer board
- f keyboard
- g base cover
- h primary memory
- i secondary memory
- j WLAN card
- k WWAN card
- l M.2 SSD card
- m SIM card
- n palmrest
- o heat sink assembly
- p graphic card

3 To disconnect the system board:

- a Disconnect the power connector cable and battery cable from the connectors on the system board [1, 2].



- b Remove the 3 (M2.0x5.0) screws that secure the Type-C USB bracket to the system [1].
- c Remove the Type-C USB bracket from the system [2].
- d Disconnect the touchpad cable [3], speaker cable [4] and LED board cable [5] from the connectors on the system board.



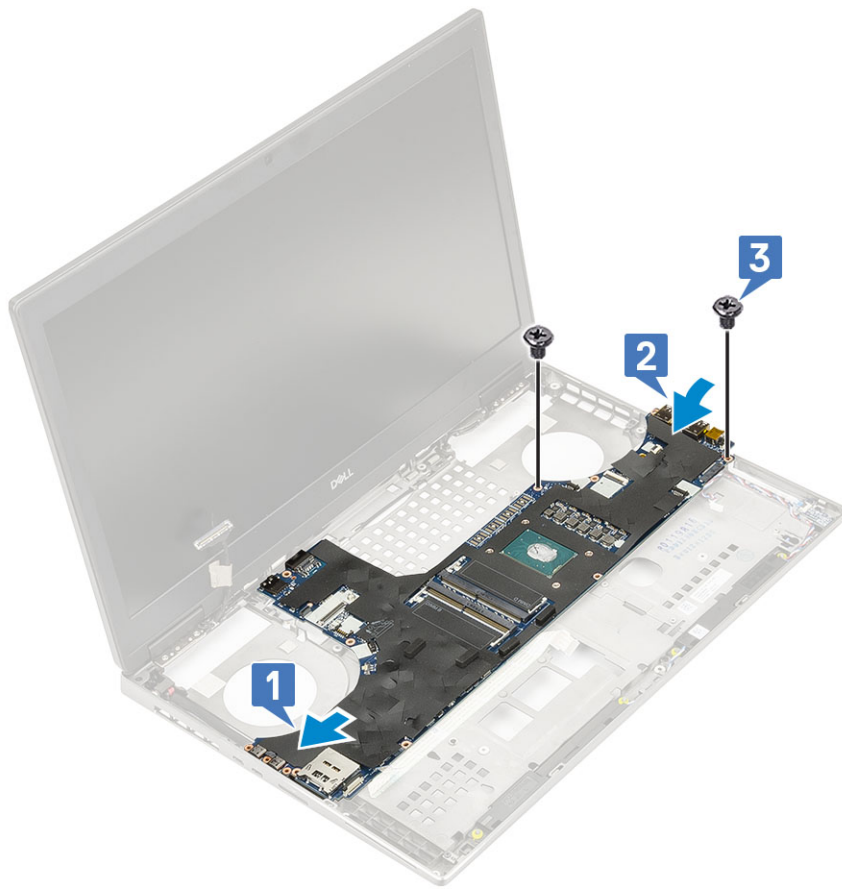
- e Remove the 2 (M2.5x5.0) screws that secure the system board in place [1].
- f Lift the right side of the system board and remove the system board from the system chassis [2, 3].





## Installing the system board

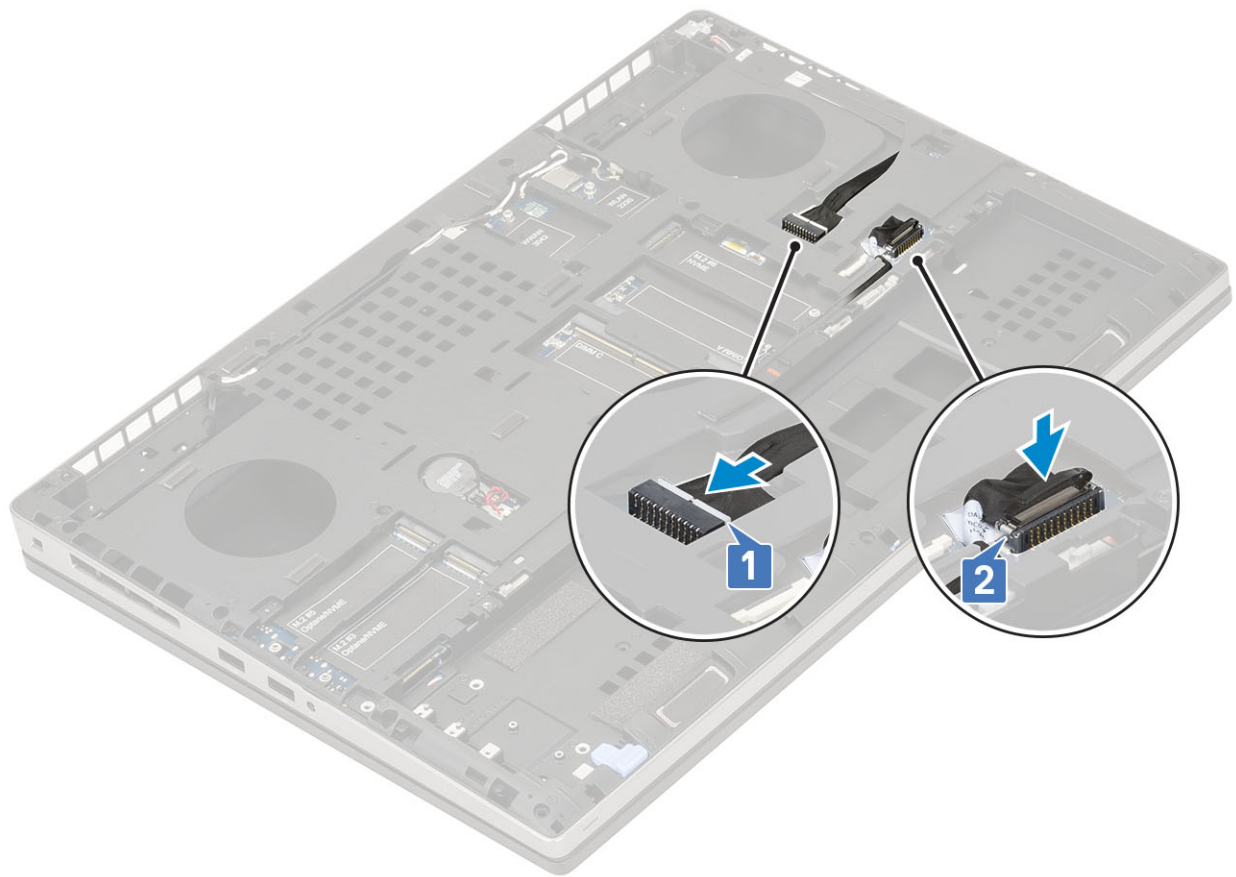
- 1 To install the system board:
  - a Align the system board into its original position on the system [1, 2].
  - b Replace the 2 (M2.5x5.0) screws to secure the system board in place [3].



- c Connect the LED board cable [1], speaker cable [2] and touchpad cable [3] to the connectors on the system board.
- d Place the Type-C USB bracket onto its slot on the system [4].
- e Replace the 3 (M2.0x5.0) screws to secure the Type-C USB bracket to the system [5].



- f Connect the power connector cable and battery cable to the connectors on the system board [1, 2].



2 Install the:

- a [graphic card](#)
- b [heat sink assembly](#)
- c [palmrest](#)
- d [SIM card](#)
- e [M.2 SSD card](#)
- f [WWAN card](#)
- g [WLAN card](#)
- h [primary memory](#)
- i [secondary memory](#)
- j [base cover](#)
- k [keyboard](#)
- l [hard drive interposer board](#)
- m [hard drive](#)
- n [battery](#)
- o [battery cover](#)
- p [SD card](#)

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

## Display assembly

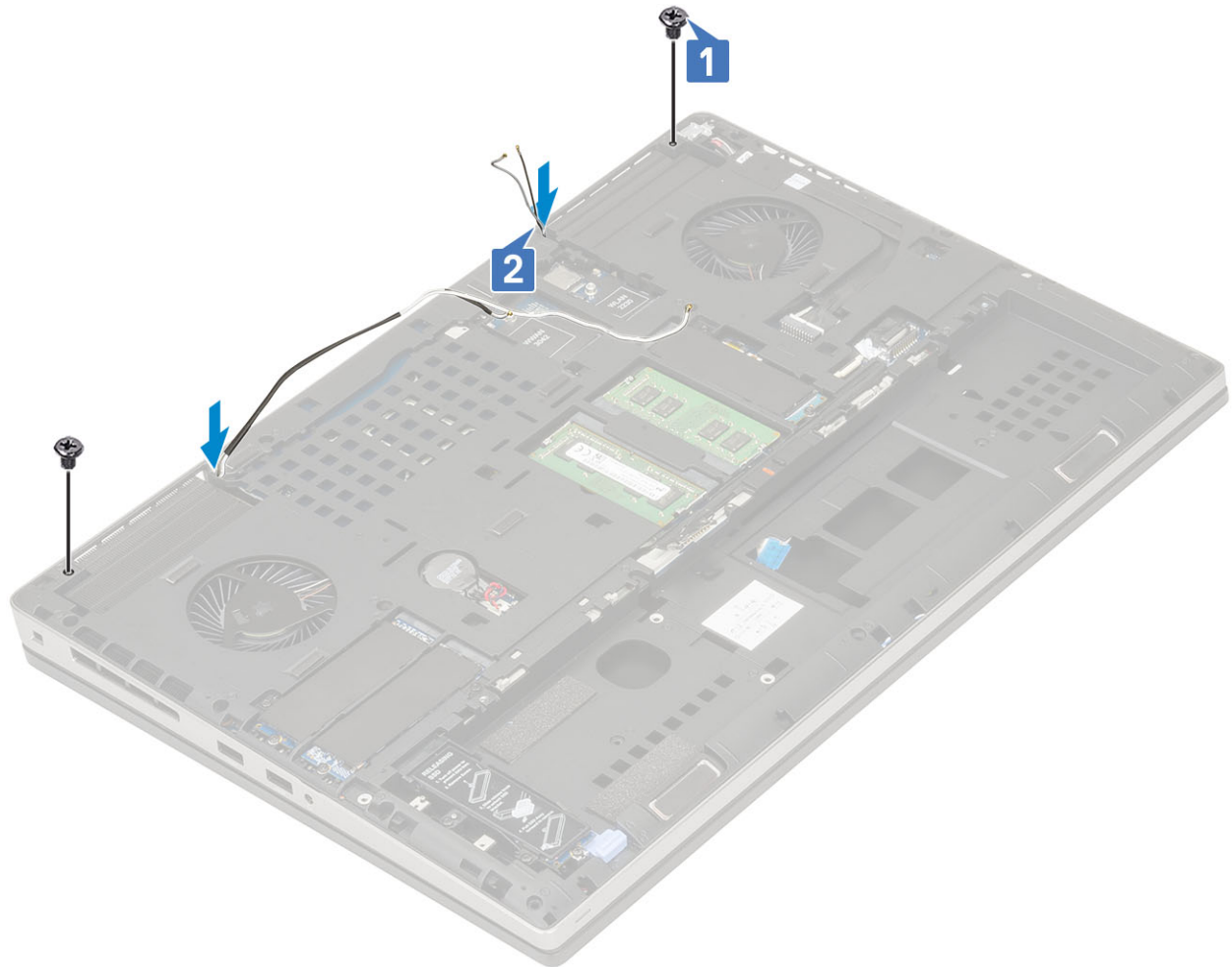
### Removing the display assembly

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:

- a SD card
- b battery cover
- c battery
- d keyboard
- e hard drive
- f base cover
- g WWAN card
- h WLAN card
- i palmrest

3 To remove display assembly:

- a Remove the 2 (M2.5x5.0) screws at the bottom of the system that secures the display assembly in place [1].
- b Unroute all the wireless antenna cables from the routing channels at the bottom of the system and next to the hinge caps [2] and unthread the antenna cables.



- c Remove the 2 (M2.5x6.0) screws at the rear of the system that secures the display assembly in place.





- d Open the display assembly to a 180-degree angle.
- e Remove the 4 (M2.5x4.0) screws that secures the display hinge caps to the system [1].
- f Remove the display hinge caps from the system [2].



- g Remove the single (M2.0x3.0) screw that secures the eDP cable bracket to the system board [1].

- h Remove the eDP cable bracket [2].
- i Disconnect the eDP cable from the connector on the system board [3].
- j Peel the adhesive tape that secures the eDP cable in place [4].
- k Unroute the wireless cable from the routing channels located next to the hinges .
- l Remove the display assembly [5].

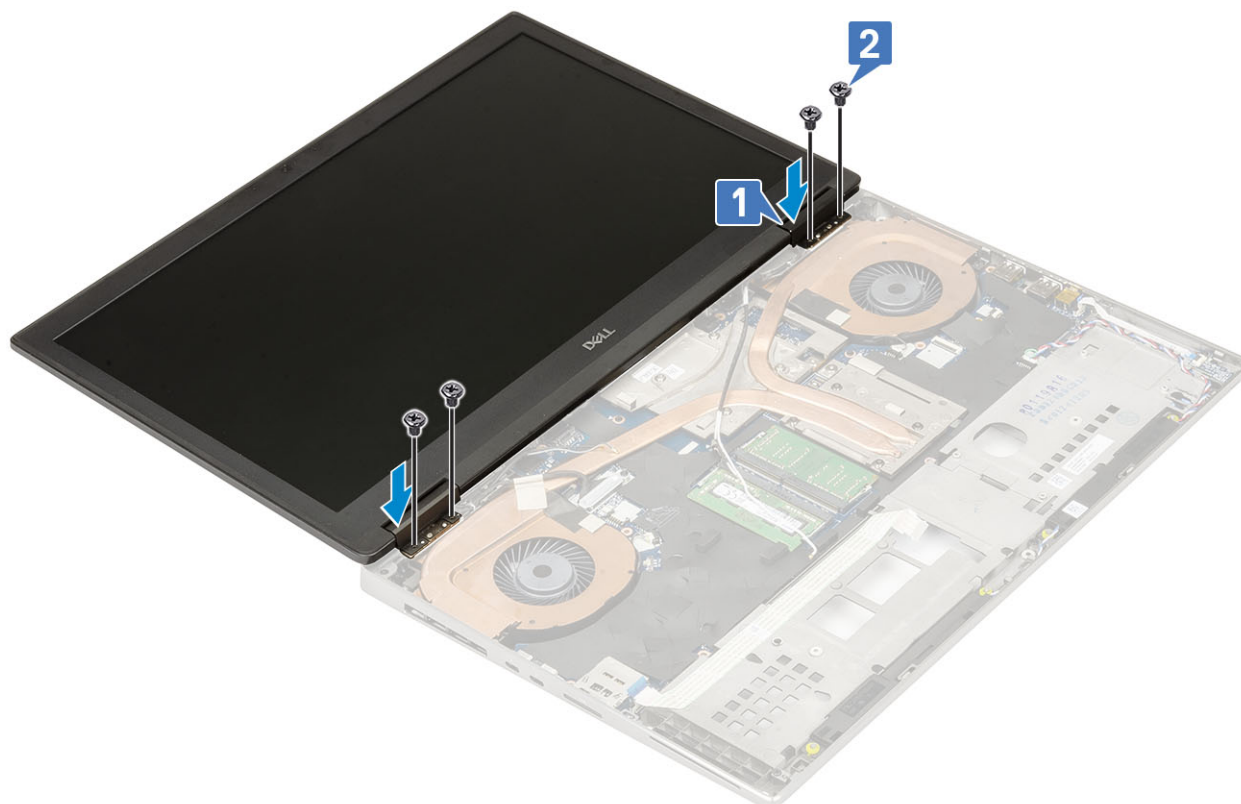


## Installing the display assembly

- 1 To install display assembly:
  - a Align the display assembly into the slots on the system [1].
  - b Route the wireless cable located next to the hinges .
  - c Affix the adhesive tape to secure the eDP cable in place [2].
  - d Connect the eDP cable to the connector on the system board [3].
  - e Place the eDP cable bracket and replace the single (M2.0x3.0) screw to secure the eDP cable bracket to the system board [4, 5].



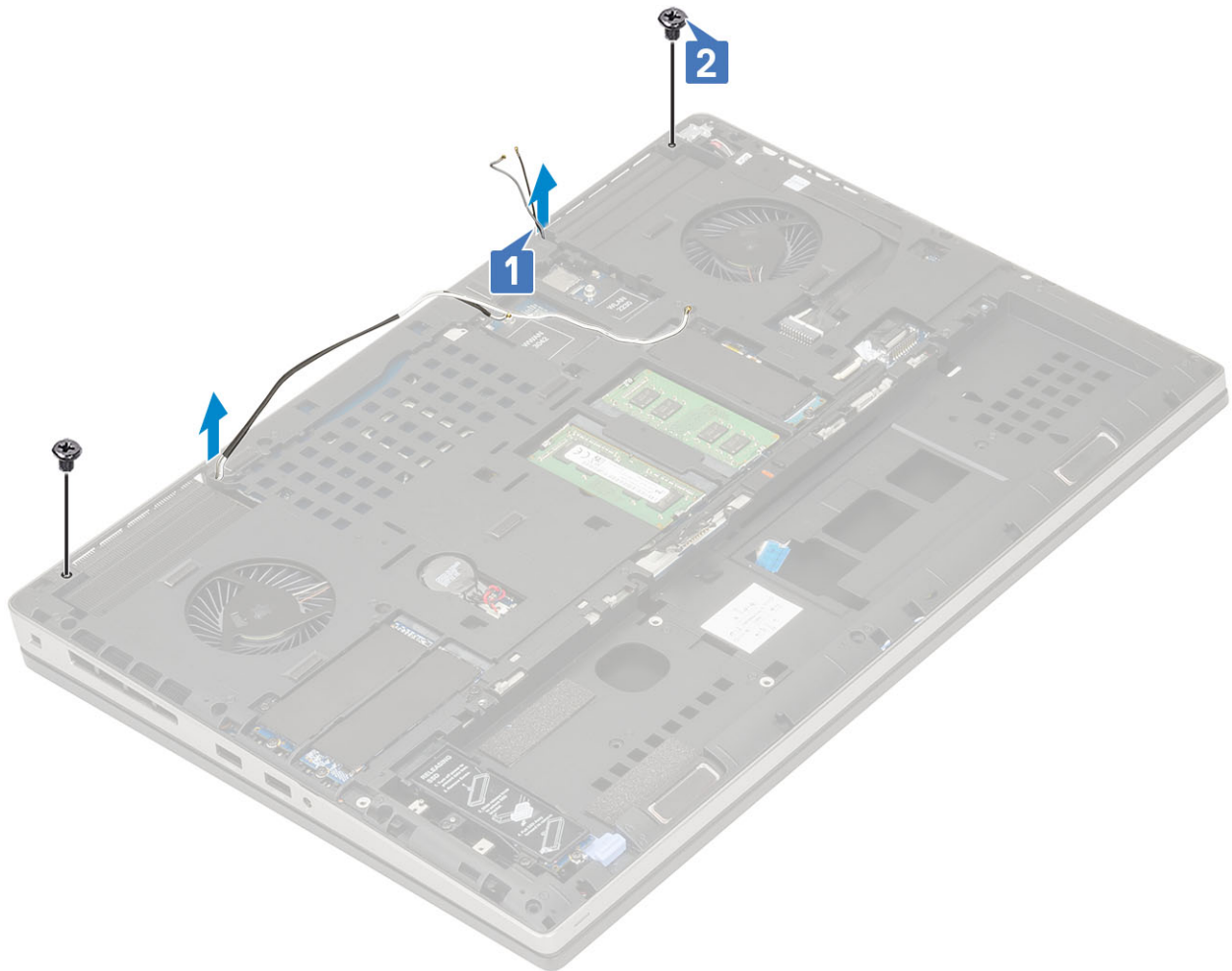
- f Align the display hinge caps and replace the 4 (M2.5x4.0) screws to secure the display hinge caps to the system [1, 2].



- g Close the display assembly and replace the 2 (M2.5x6.0) screws at the rear of the system to secure the display assembly in place.
- h Route all the wireless antenna cables to the routing channels at the bottom of the system and next to the hinge caps [1].



- i Replace the 2 (M2.5x5.0) screws at the bottom of the system to secure the display assembly in place [2].



- 2 Install the:
  - a palmrest
  - b WWAN card
  - c WLAN card
  - d base cover
  - e hard drive
  - f keyboard
  - g battery
  - h battery cover
  - i SD card

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

## Display bezel

### Removing the display bezel

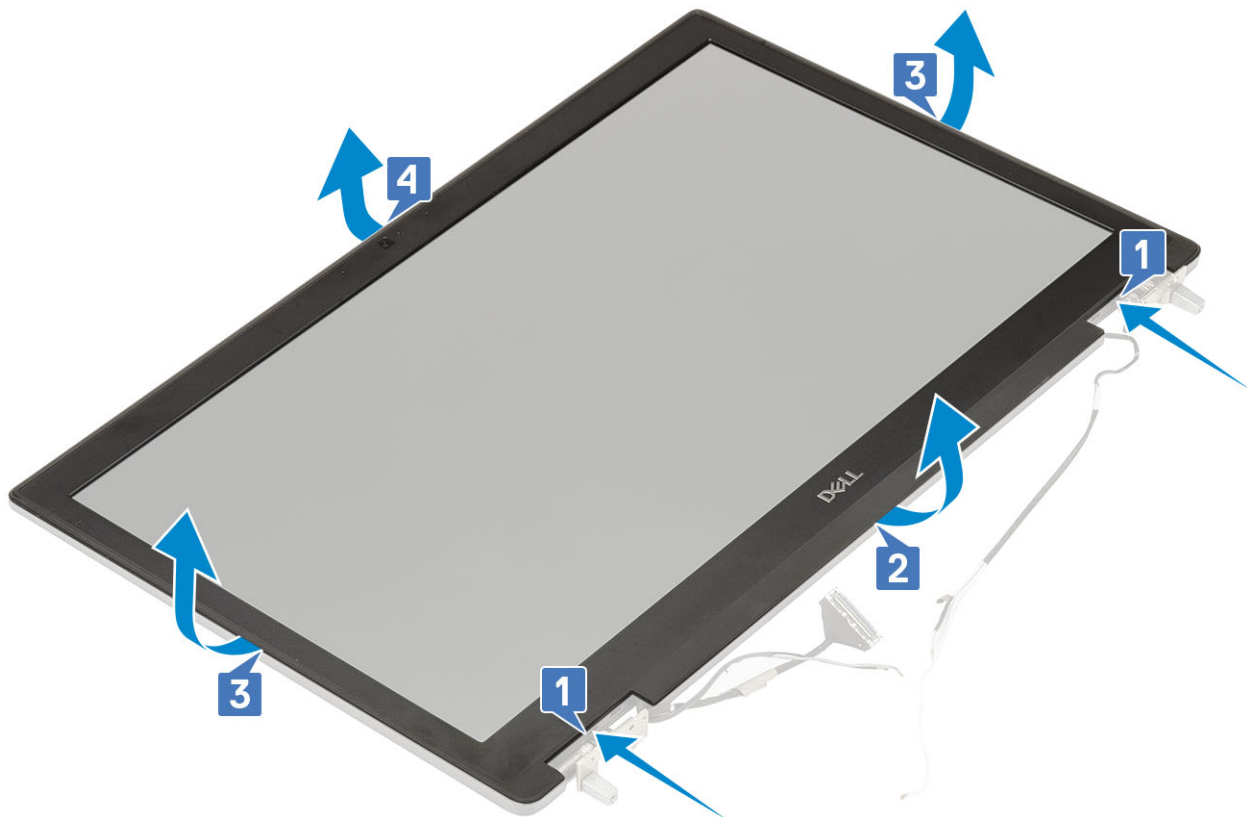
- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a SD card
  - b battery cover
  - c battery

- d keyboard
- e hard drive
- f base cover
- g WWAN card
- h WLAN card
- i palmrest
- j display assembly

3 To remove display bezel:

- a Using a plastic scribe pry the two recess points at the bottom edge of the display bezel [1].
- b Pry around the sides and top edge of the display bezel [2, 3, 4].

**NOTE:** While prying the display bezel, make sure to pry along the outside edge of the display bezel using your hands—using a screw driver or other sharp objects may damage the display cover.

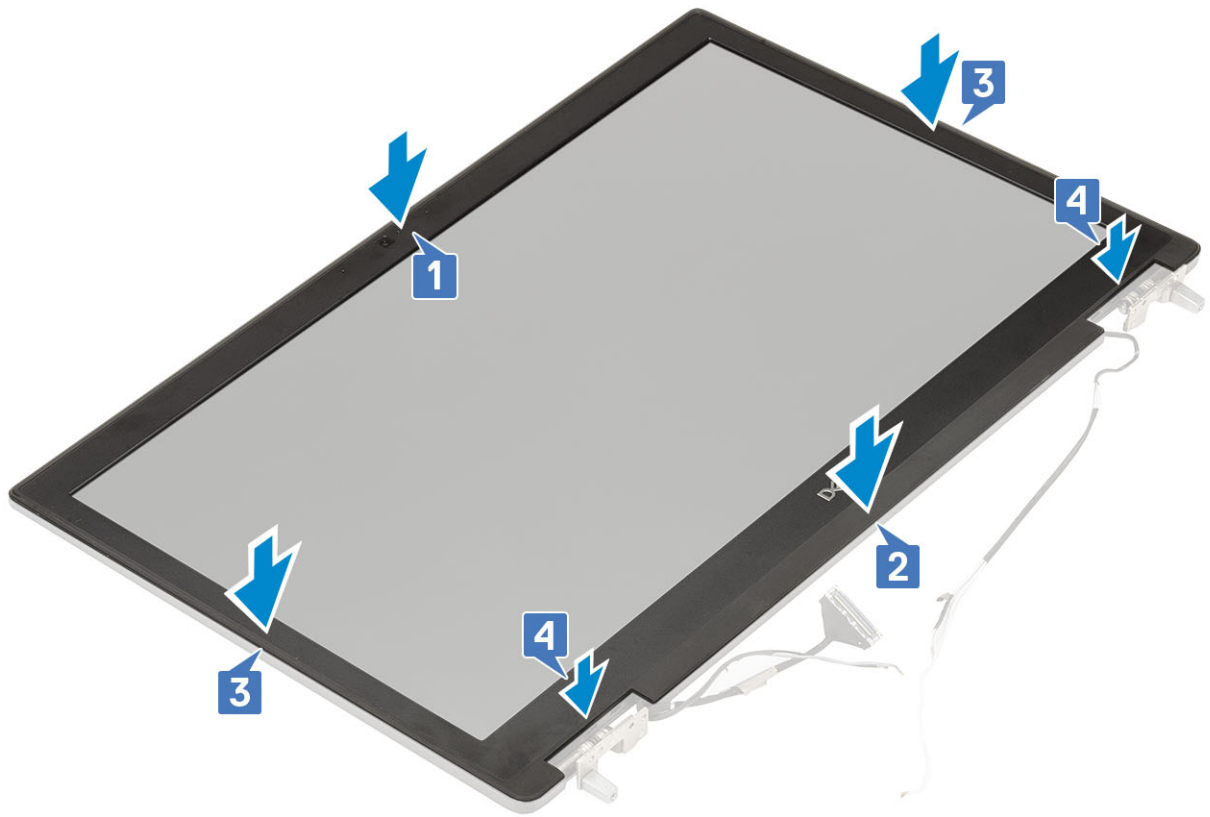


**NOTE:** The display bezel shipped with a non-touch display is a disposable part and should be replaced with a new display bezel anytime it is removed from the system.

## Installing the display bezel

1 To install the display bezel:

- a Place the display bezel on the display assembly.
- b Press the edges of the display bezel until it clicks onto the display assembly [1, 2, 3, 4].



- 2 Install the:
  - a [display assembly](#)
  - b [palmrest](#)
  - c [WWAN card](#)
  - d [WLAN card](#)
  - e [base cover](#)
  - f [hard drive](#)
  - g [keyboard](#)
  - h [battery](#)
  - i [battery cover](#)
  - j [SD card](#)
- 3 Follow the procedure in [After working inside your computer](#).

## Display hinges

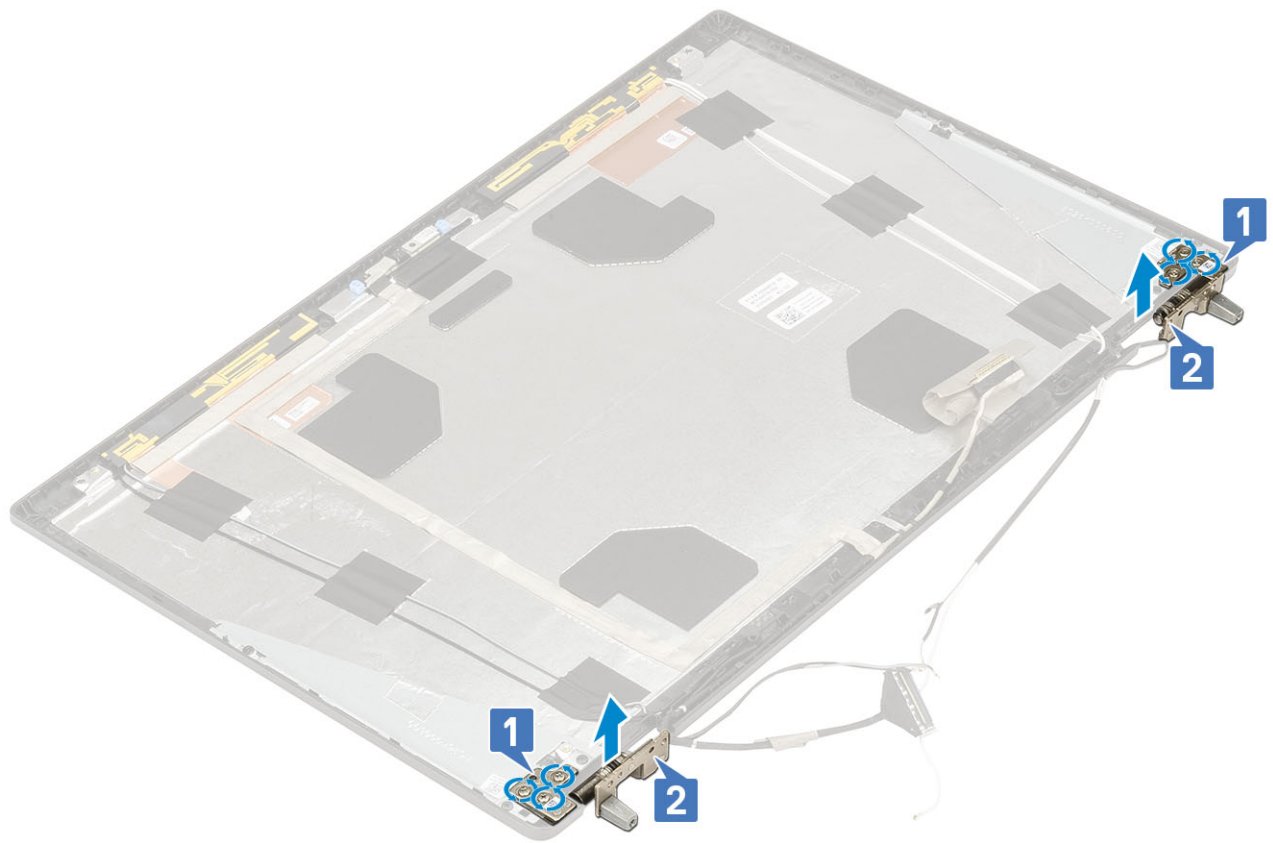
### Removing the display hinge

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a [SD card](#)
  - b [battery cover](#)
  - c [battery](#)
  - d [keyboard](#)
  - e [hard drive](#)
  - f [base cover](#)
  - g [WWAN card](#)
  - h [WLAN card](#)



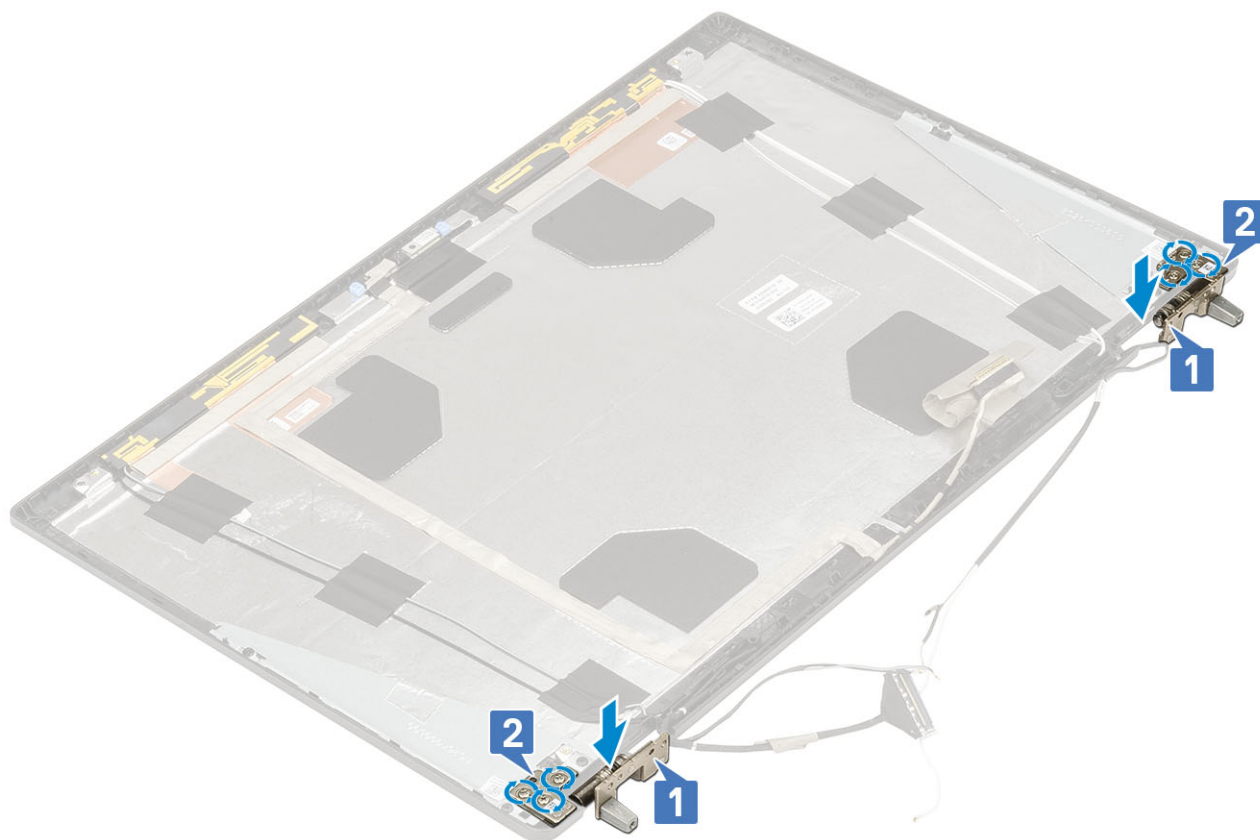
- i palmrest
- j display assembly
- k display bezel
- l display panel

- 3 To remove display hinge:
  - a Remove the 6 (M2.5x4.0) screws that secure the display hinges to the display assembly [1].
  - b Remove the display hinges [2].



## Installing the display hinge

- 1 To install display hinge:
  - a Place the display hinge in its slot on the display assembly [1].
  - b Replace the 6 (M2.5x4.0) screws to secure the display hinge to the display assembly [2].



- 2 Install the:
  - a display panel
  - b display bezel
  - c display assembly
  - d palmrest
  - e WWAN card
  - f WLAN card
  - g base cover
  - h hard drive
  - i keyboard
  - j battery
  - k battery cover
  - l SD card

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

## Display panel

### Removing the display panel

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a SD card
  - b battery cover
  - c battery
  - d keyboard
  - e hard drive
  - f base cover

- g WWAN card
- h WLAN card
- i palmrest
- j display assembly
- k display bezel

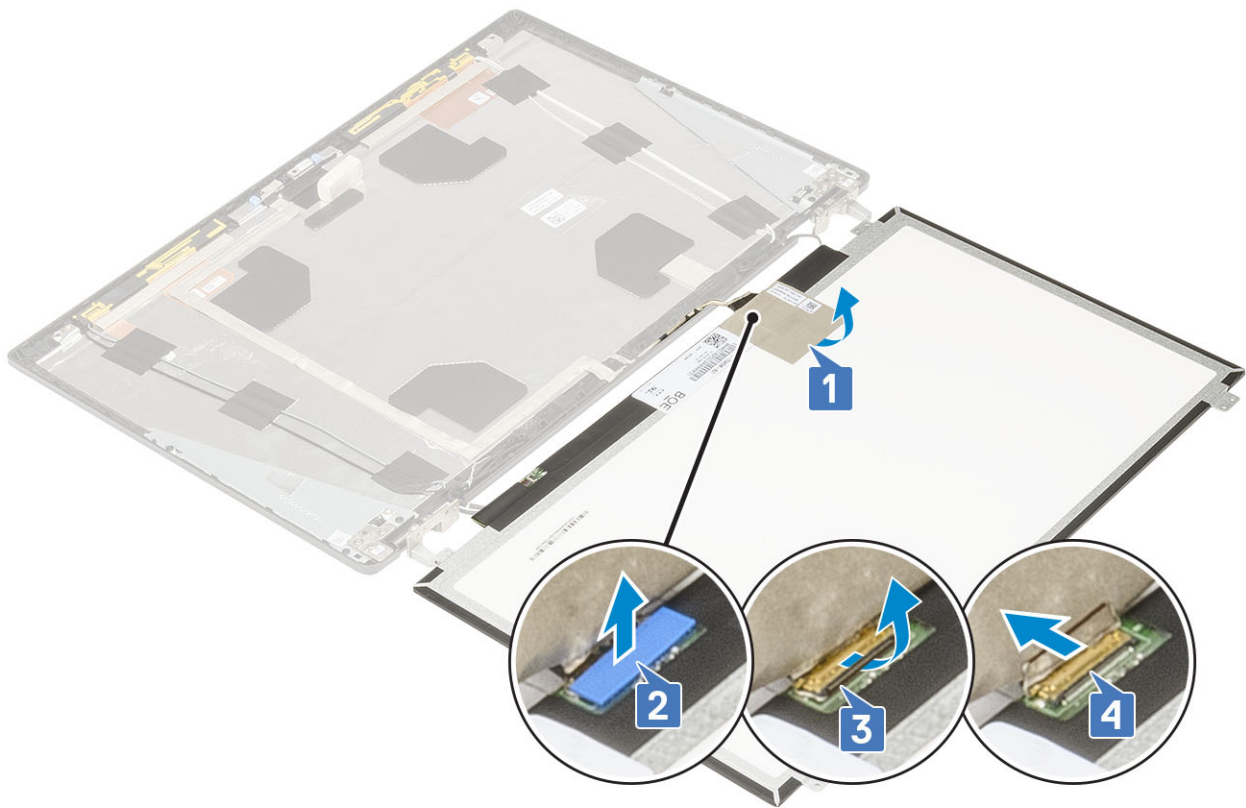
3 To remove screws from the display panel :

- a Remove the 4 (M2.0X3.0) screws that secure the display panel to the display assembly [1].
- b Lift the display panel and turn the display panel over to access the eDP cable [2].



4 To remove display panel:

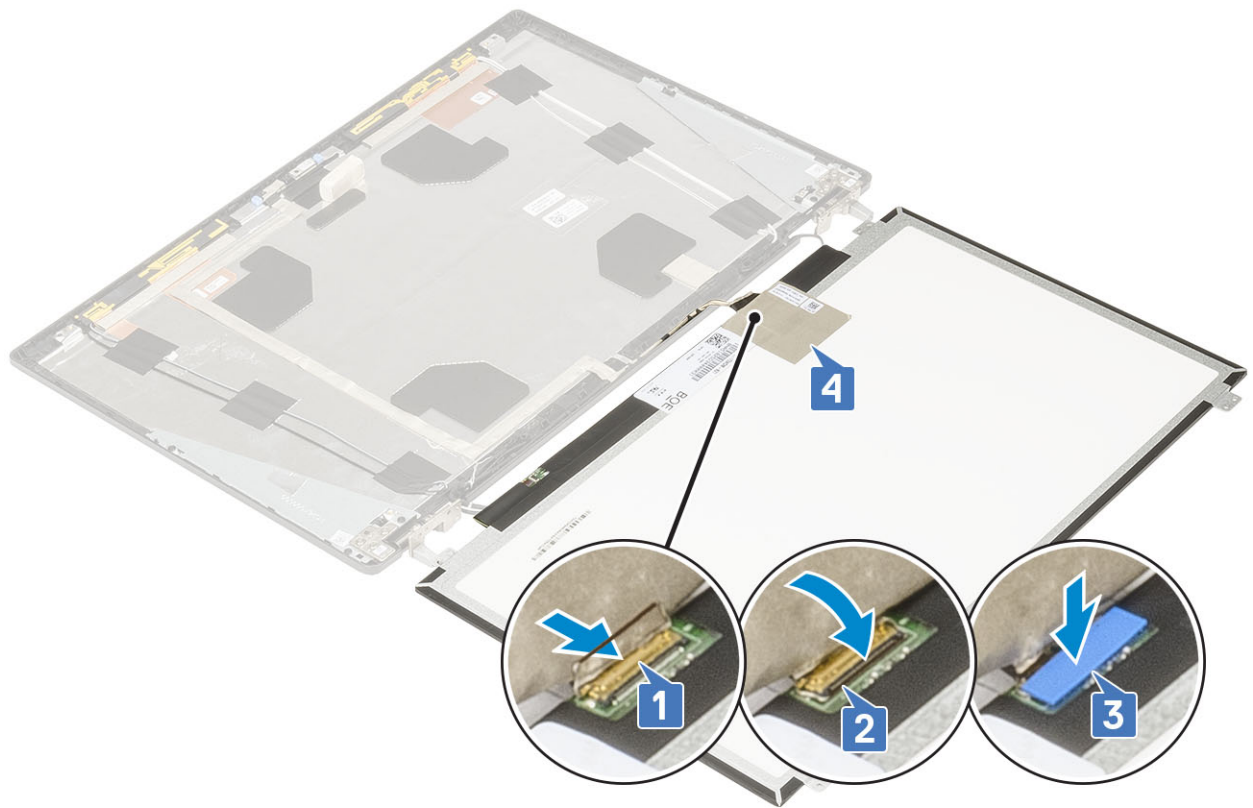
- a Peel the adhesive tape to access the eDP cable [1].
- b Peel the adhesive tapes that secures the eDP cable [2].
- c Lift the metal tab and disconnect the eDP cable from the connector on the display panel [3, 4].



- 5 Remove the display panel.

## Installing the display panel

- 1 To install the display panel:
  - a Connect the eDP cable to the connector on the back of the display panel and affix the adhesive tape [1, 2, 3, 4].



- b Align the display panel with the tabs on the display assembly.
- c Replace the 4 (M2.0X3) screws to secure the display panel to the display assembly.



- 2 Install the:
  - a [display bezel](#)
  - b [display assembly](#)
  - c [palmrest](#)
  - d [WWAN card](#)
  - e [WLAN card](#)
  - f [base cover](#)
  - g [hard drive](#)
  - h [keyboard](#)
  - i [battery](#)
  - j [battery cover](#)
  - k [SD card](#)

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

## Camera

### Removing the camera

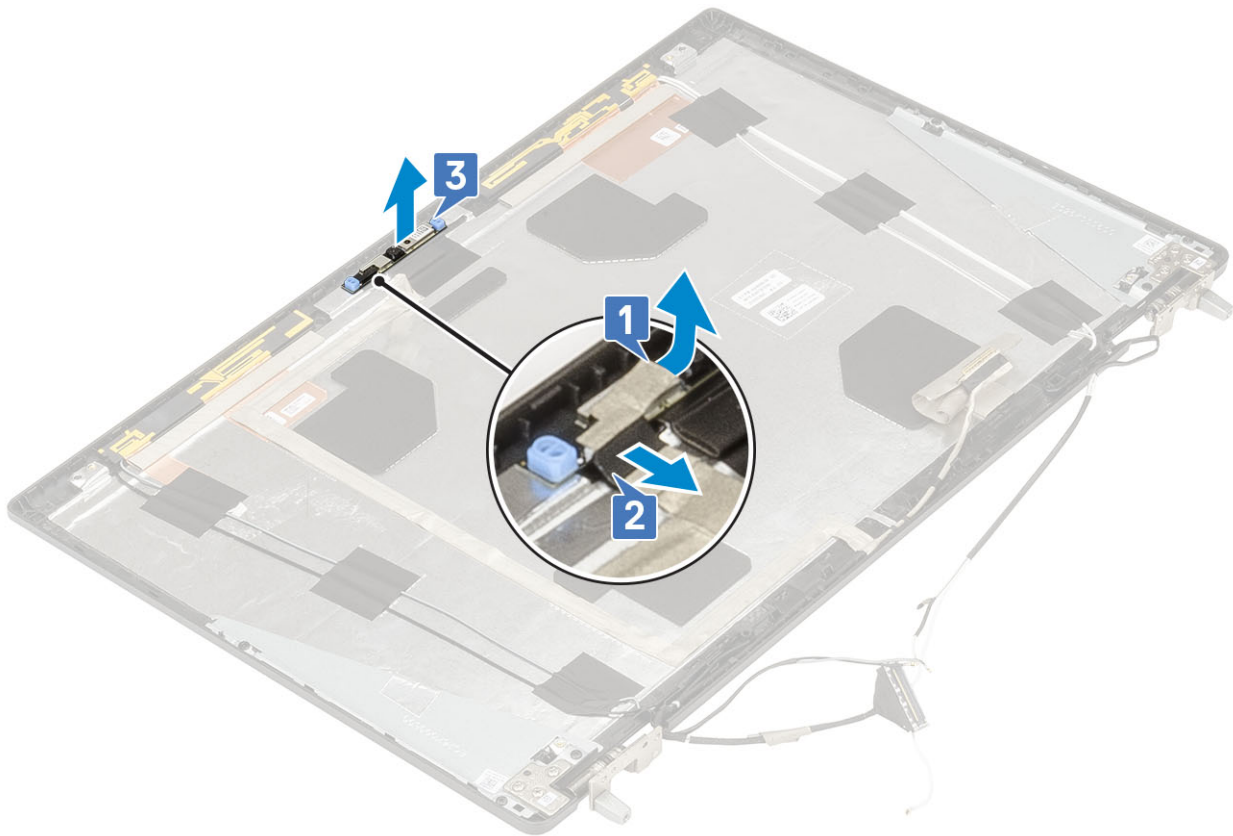
- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a [SD card](#)
  - b [battery cover](#)
  - c [battery](#)
  - d [keyboard](#)



- e hard drive
- f base cover
- g WWAN card
- h WLAN card
- i palmrest
- j display assembly
- k display bezel
- l display panel

3 To remove camera:

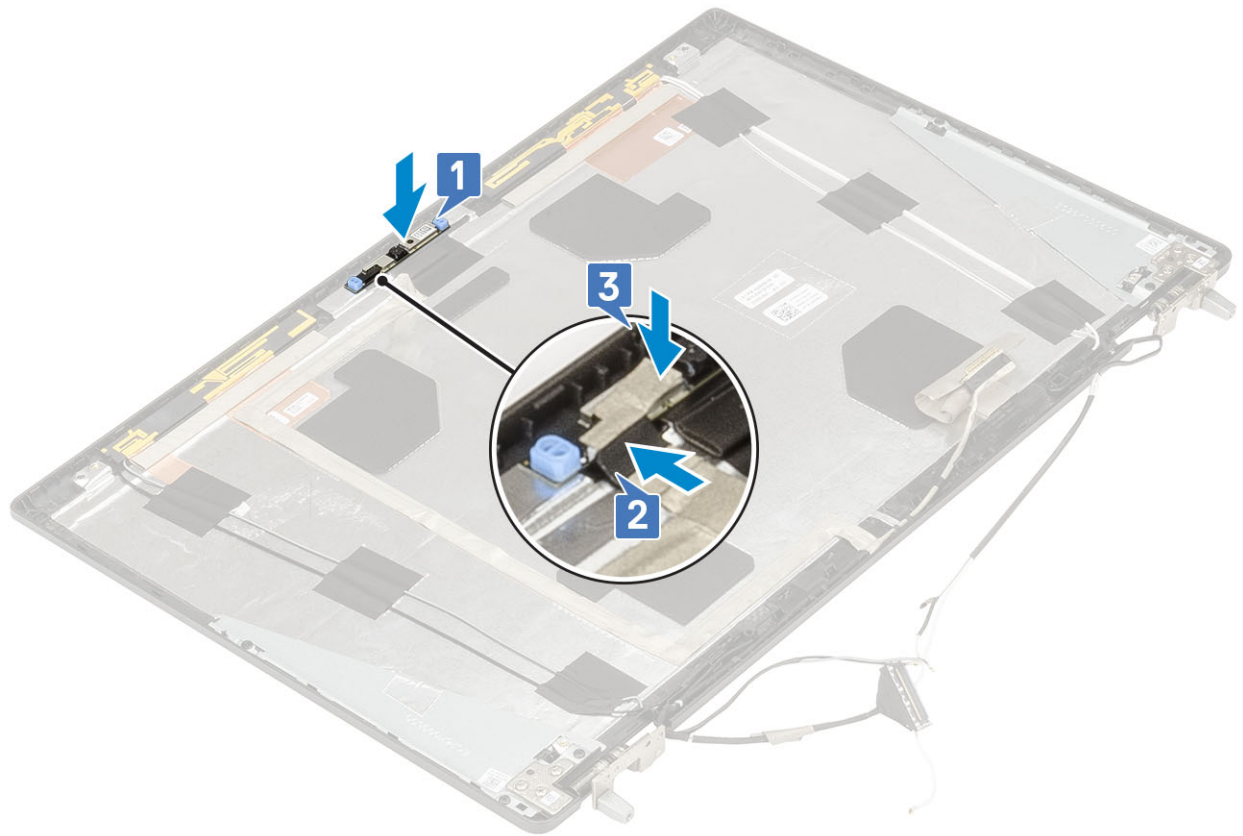
- a Peel the adhesive tape that covers the camera module [1].
- b Disconnect the eDP cable from the camera module [2].
- c Carefully pry the camera module from the system [3].



## Installing the camera

1 To install the camera:

- a Place the camera module in its slot on the system [1].
- b Connect the eDP cable to the camera module [2].
- c Affix the adhesive tape to cover the camera module [3].



- 2 Install the:
  - a [display panel](#)
  - b [display bezel](#)
  - c [display assembly](#)
  - d [palmrest](#)
  - e [WWAN card](#)
  - f [WLAN card](#)
  - g [base cover](#)
  - h [hard drive](#)
  - i [keyboard](#)
  - j [battery](#)
  - k [battery cover](#)
  - l [SD card](#)
- 3 Follow the procedure in [After working inside your computer](#).

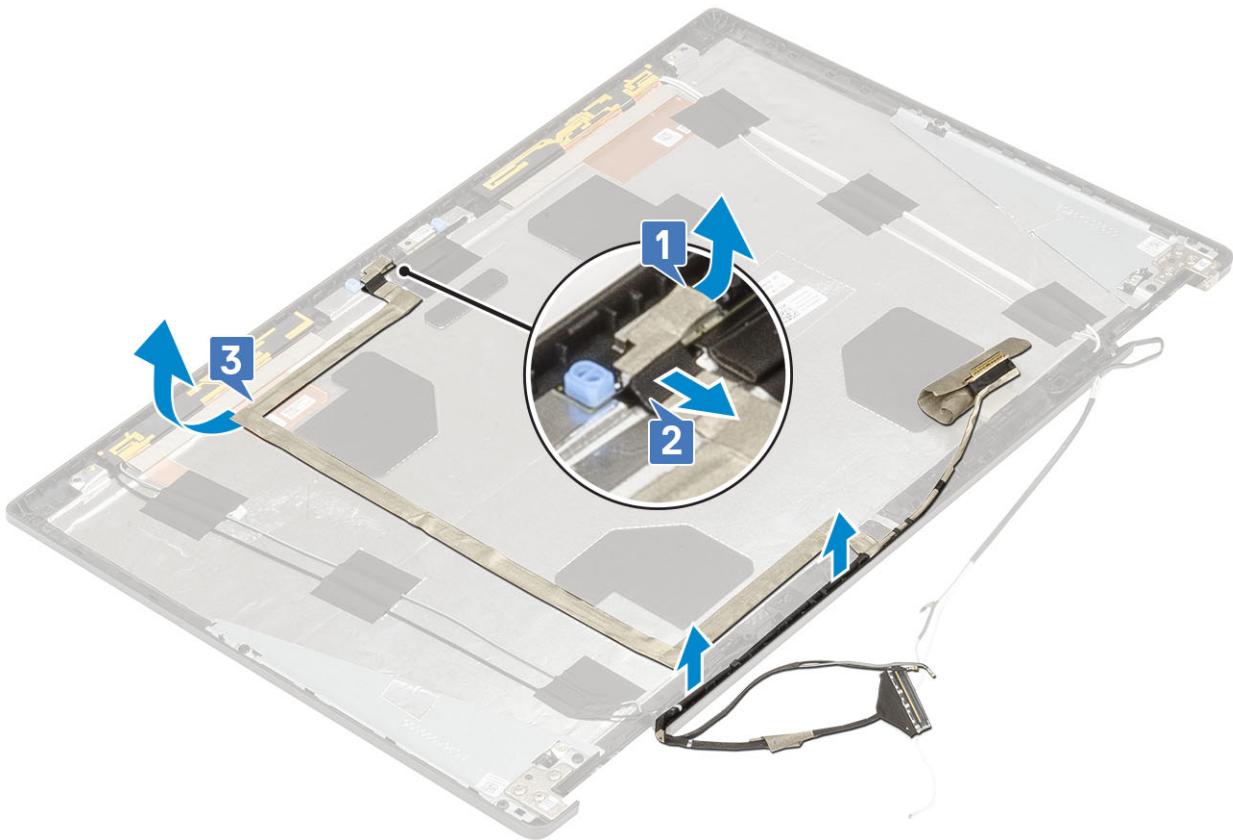
## eDP cable

### Removing the eDP cable

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a [SD card](#)
  - b [battery cover](#)
  - c [battery](#)
  - d [keyboard](#)
  - e [hard drive](#)

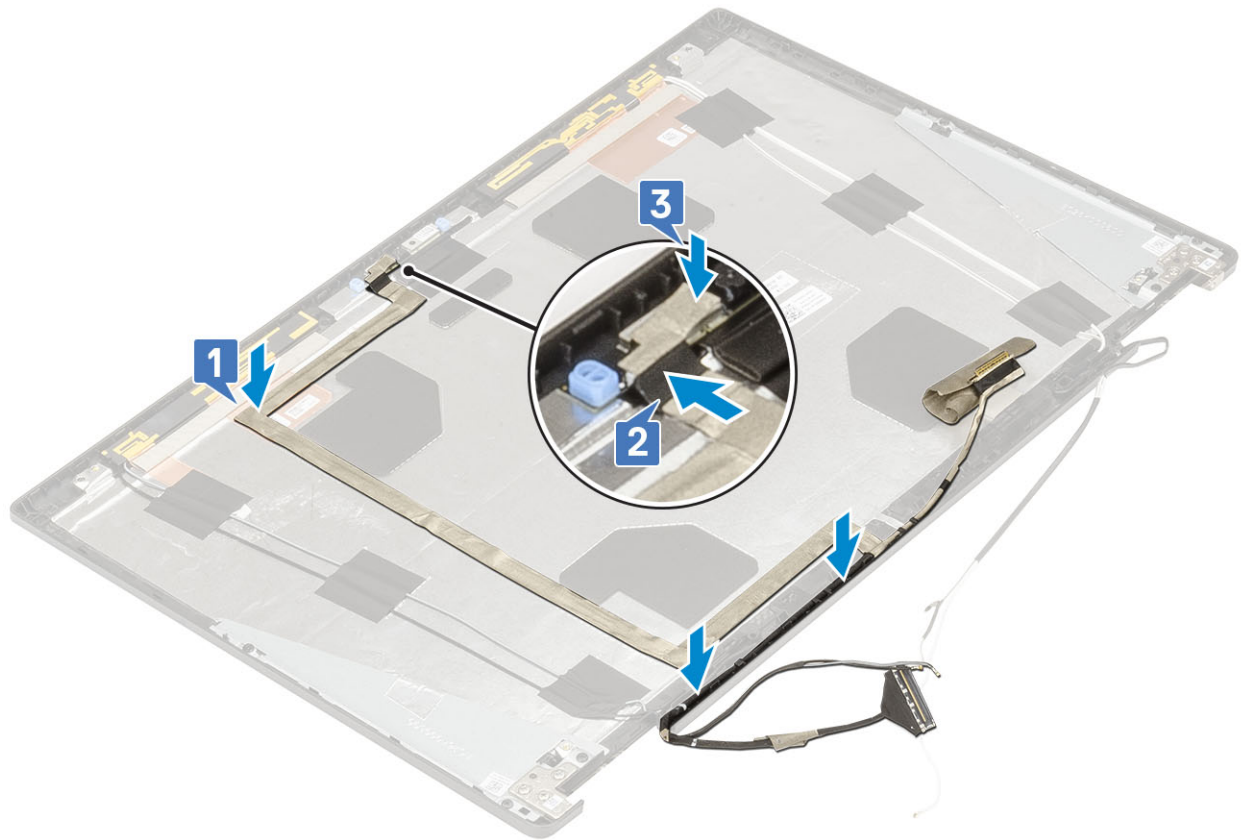
- f base cover
- g WWAN card
- h WLAN card
- i palmrest
- j display assembly
- k display bezel
- l display panel

- 3 To remove eDP cable:
- a Peel the adhesive tape covering the camera module [1].
  - b Disconnect the eDP cable from the camera module [2].
  - c Peel the eDP cable from the display cover and unroute the cable from the routing channels [3].
  - d Remove the eDP cable from the system.



## Installing the eDP cable

- 1 To install eDP cable:
- a Route and affix the eDP cable on the display cover [1].
  - b Connect the eDP cable to the connector on the camera module [2].
  - c Affix the adhesive tape covering the camera module [3].



- 2 Install the:
  - a [display panel](#)
  - b [display bezel](#)
  - c [display assembly](#)
  - d [palmrest](#)
  - e [WWAN card](#)
  - f [WLAN card](#)
  - g [base cover](#)
  - h [hard drive](#)
  - i [keyboard](#)
  - j [battery cover](#)
  - k [battery](#)
  - l [SD card](#)
- 3 Follow the procedure in [After working inside your computer](#).

## Display bracket

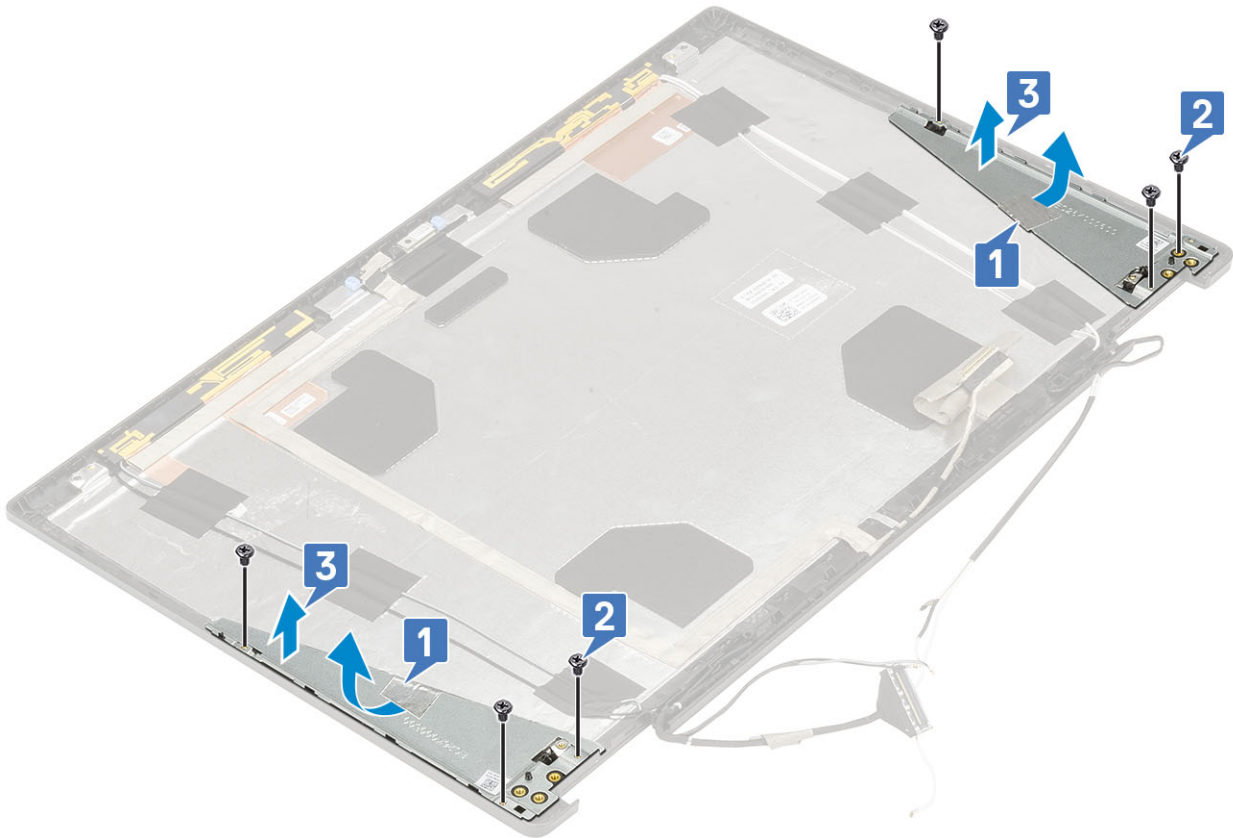
### Removing the display support bracket

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
  - a [SD card](#)
  - b [battery cover](#)
  - c [battery](#)
  - d [keyboard](#)
  - e [hard drive](#)

- f base cover
- g WWAN card
- h WLAN card
- i palmrest
- j display assembly
- k display bezel
- l display panel
- m display hinge

3 To remove display bracket:

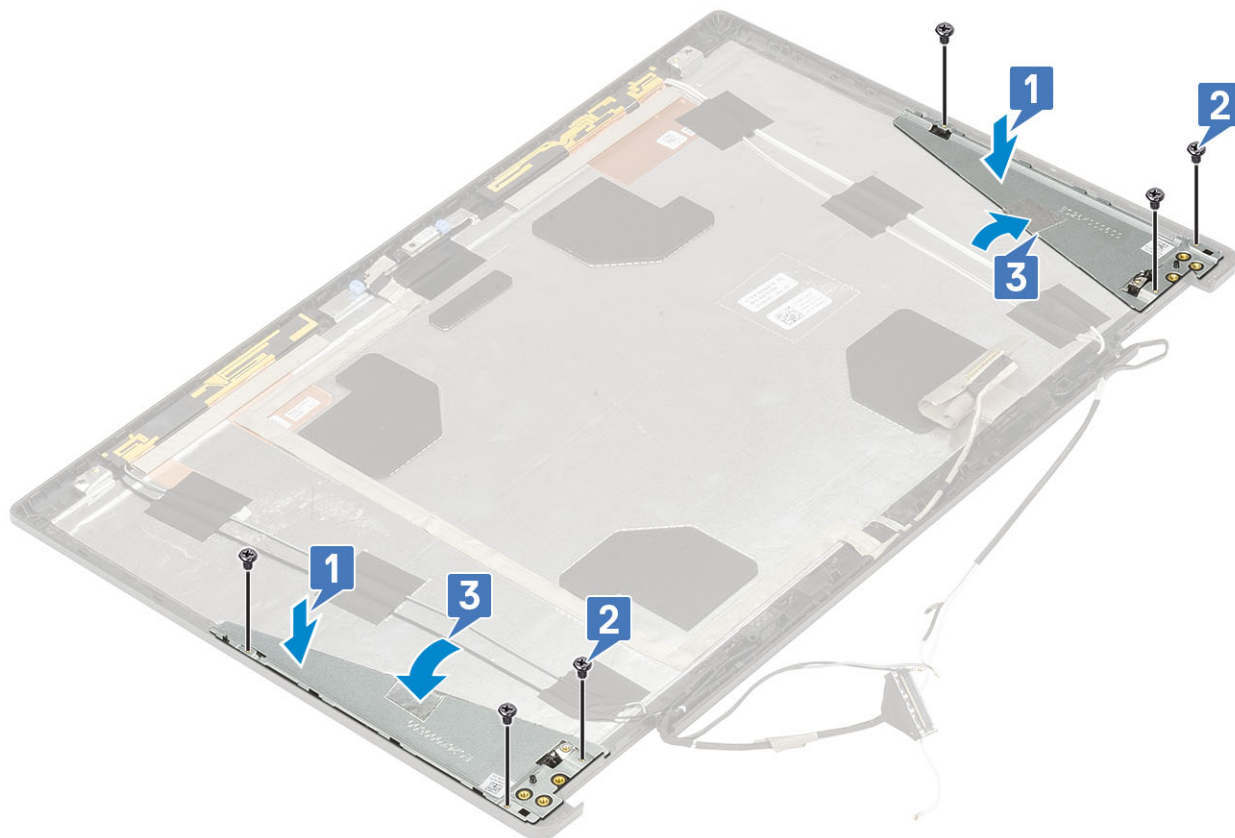
- a Peel the adhesive tape that covers the display support bracket [1].
- b Remove the 6 (M2.0x3.0) screws that secure the display support brackets to the display cover [2].
- c Remove the display support brackets from the display cover [3].



## Installing the display support bracket

1 To install the display support bracket:

- a Place the display brackets onto its slot on the display cover [1].
- b Replace the 6 (M2.0x3.0) screws to secure the display bracket to the display cover [2].
- c Affix the adhesive tape to cover the display support bracket [3].



2 Install the:

- a display hinge
- b display panel
- c display bezel
- d display assembly
- e palmrest
- f WWAN card
- g WLAN card
- h base cover
- i hard drive
- j keyboard
- k battery
- l battery cover
- m SD card

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



# Troubleshooting

## Enhanced Pre-Boot System Assessment — ePSA diagnostics

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

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

**⚠ CAUTION:** Use the system diagnostics to test only your computer. Using this program with other computers may cause invalid results or error messages.

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

## Running the ePSA Diagnostics

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

- 1 Power on the computer.
- 2 As the computer boots, press the F12 key when the Dell logo is displayed.
- 3 In the boot menu screen, use Up/Down arrow key to select the **Diagnostics** option and then press **Enter**.

**ℹ 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.

- 4 Press the arrow in the lower-right corner to go to the page listing.  
The detected items are listed and tested.
- 5 To run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
- 6 Select the device from the left pane and click **Run Tests**.
- 7 If there are any issues, error codes are displayed.  
Note the error code and contact Dell.  
or
- 8 Shut down the computer.
- 9 Press and hold the Fn key, while pressing the power button, and then release both.
- 10 Repeat steps 3–7 above.

# Diagnostic LED

This section details the diagnostic features of the battery LED.

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.

**NOTE:** 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 0.5 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 Notebooks, battery codes for Low Battery or Battery Failure situations will not be displayed when Diagnostic Error Codes are being displayed.

**Table 3. Diagnostic LED**

Blinking Pattern		Possible Problem	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 / Clock failure / Gate A20 failure / Super I/O failure / Keyboard controller failure	Replace the system board
2	7	LCD failure	Replace the LCD
3	1	RTC power failure	Replace the CMOS 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

## Battery status LED

**Table 4. Battery status LED**


Power Source	LED behavior	System Power State	Battery Charge Level
AC Adapter	Solid White	S0	0-100%
AC Adapter	Solid White	S4/S5	< Fully Charged

Power Source	LED behavior	System Power State	Battery Charge Level
AC Adapter	Off	S4/S5	Fully Charged
Battery	Amber	S0	< = 10%
Battery	Off	S0	> 10%
Battery	Off	S4/S5	0-100%

- **S0 (ON)** — System is turned on.
- **S4** — The system consumes the least power compared to all other sleep states. The system is almost at an OFF state, expect for a trickle power. The context data is written to hard drive.
- **S5 (OFF)** — The system is in a shutdown state.

## Getting help

### 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.

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

- 1 Go to **Dell.com/support**.
- 2 Select your support category.
- 3 Verify your country or region in the **Choose a Country/Region** drop-down list at the bottom of the page.
- 4 Select the appropriate service or support link based on your need.