

# Precision 5530

## 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 at [www.Dell.com/regulatory\\_compliance](http://www.Dell.com/regulatory_compliance)
- ⚠ 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.
- ℹ NOTE:** The color of your computer and certain components may appear differently than shown in this document.
- ⚠ CAUTION:** System will shut down if side covers are removed while the system is running. The system will not power on if the side cover is removed.
- ⚠ CAUTION:** System will shut down if side covers are removed while the system is running. The system will not power on if the side cover is removed.
- ⚠ CAUTION:** System will shut down if side covers are removed while the system is running. The system will not power on if the side cover is removed.

## 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**.

- ℹ 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 any 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 Replace the battery.
- 2 Replace the base cover.
- 3 Connect any external devices, such as a port replicator or media base, and replace any cards, such as an ExpressCard.
- 4 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.

- 5 Connect your computer and all attached devices to their electrical outlets.
- 6 Turn on your computer.

# Technology and components

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

Topics:

- Processors
- Chipset
- Memory features
- Display
- Hard drive
- USB features
- HDMI 1.4- HDMI 2.0

## Processors

The Precision 5530 is shipped with Intel 8th generation core processor technology. Processors supported on this platform are:

### 8th Generation:

Intel Core i9 (6-core 2.9GHz, 4.8GHz Turbo, 12MB 45W, w/ Intel UHD Graphics 630)  
Intel Core i7 (6-core 2.6GHz, 4.3GHz Turbo, 9MB 45W, w/ Intel UHD Graphics 630)  
Intel Core i5 (4-core 2.3GHz, 4.0GHz Turbo, 8MB 45W, w/ Intel UHD Graphics 630)  
Intel Xeon E-2176M (6-core 2.7GHz, 4.4GHz Turbo, 12MB 45W, w/ Intel UHD Graphics P630)

 **NOTE:** The clock speed and performance varies depending on the workload and other variables.

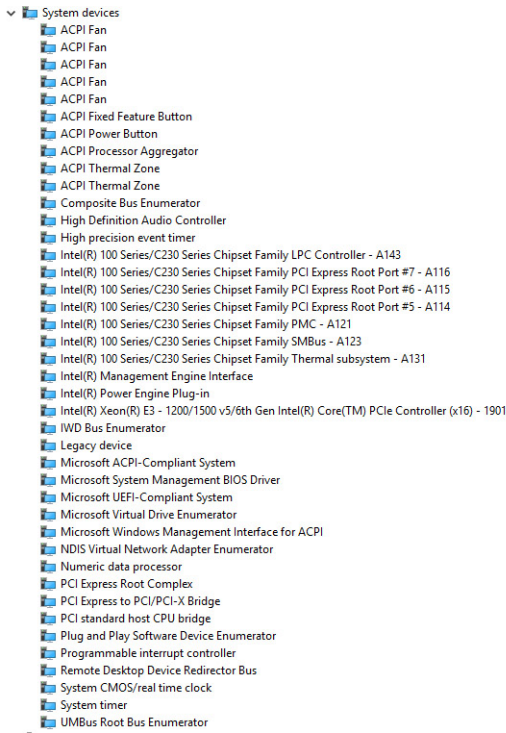
## Chipset

The chipset is Intel CM246.

## Identifying chipset in device manager on Windows 10

 **NOTE:** The Chipset information displayed is a generic image and may be different from what is displayed.

- 1 Type **Device Manager** in the **Ask me anything** field.  
Device Manager window appears.
- 2 Expand **System Devices** and search for the chipset.




## Memory features

The Precision 5530 supports the following memory configurations:

- 32 GB 2666 MHz DDR4—2x16G
- 16 GB 2666 MHz DDR4—1x16G
- 16 GB 2666 MHz DDR4—2x8G
- 8 GB 2666 MHz DDR4—1x8G
- 8 GB 2666 MHz DDR4—2x4G

## Verifying system memory

### Windows 10

- 1 Click the **Windows** button and select **All Settings**  > **System** .
- 2 Under **System**, click **About**.

## Verifying system memory in setup

- 1 Turn on or restart your tablet/notebook/desktop.
- 2 When the Dell logo appears, press F2.  
Entering BIOS setup message appears.
- 3 On the left pane, select **Settings > General > System Information**,  
The memory information is displayed on the right pane.

## Testing memory using ePSA

- 1 Turn on or restart your computer.
- 2 Press F12 or press Fn+PWR to invoke the ePSA diagnostics.  
The PreBoot System Assessment (PSA) starts on your computer.

**NOTE:** If you wait too long and the operating system logo appears, continue to wait until you see the login screen/desktop screen. Turn off the computer and try again.

If the memory test results in 25 or less errors, then the RMT basic feature automatically fixes the issues. The test will indicate a pass result since the defect(s) have been removed. If the memory test results in 26 - 50 errors, the RMT basic feature masks the defective memory blocks and results in pass with no memory replacement requirement. If the memory test results in more than 50 errors, then the test is stalled and the result indicates that memory module replacement is required.

## Display

Display section details on identifying the display adapter from the display manager along with steps on how change the screen resolution. It also contains information about connecting multiple monitors.

### Identifying display adapter

- 1 Type **Device manager** in the **Ask me anything** field.  
The **Display Manager** window is displayed.
- 2 Expand the **Display adapters**.  
The display adapter information is displayed.

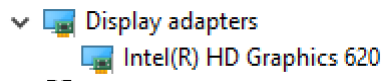
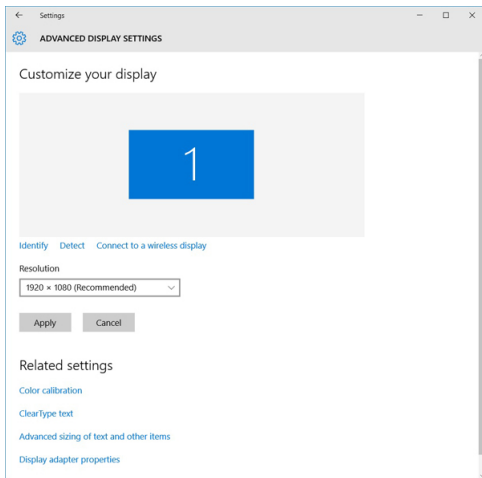


Figure 1. display adapter

### Changing the screen resolution

- 1 Right click on the desktop and select **Display Settings**.
- 2 Tap or click the **Advanced display settings**.
- 3 Select the required resolution from the drop-down list and tap **Apply**.



## Connecting to external display devices

Follow these steps to connect your computer to an external display device:

- 1 Ensure that the projector is turned on and plug the projector cable into a video port on your computer.
- 2 Press the Windows logo+P key.
- 3 Select one of the following modes:
  - PC screen only
  - Duplicate
  - Extend
  - Second Screen only

 **NOTE:** For more information, see the document that is shipped with your display device.

## Hard drive

This section explains how to identify the hard drive type installed in the system.

## Identifying storage device in Windows 10

- 1 Type **Device Manager** in **I'm Cortana, Ask me anything** field.  
The **Device Manager** window is displayed.
- 2 Click **Disk Drives**.  
The storage devices installed in the system are displayed.

## USB features

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

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 3.0/USB 3.1 Gen 1Port	5 Gbps	Super Speed	2010
USB 2.0	480 Mbps	High Speed	2000
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.

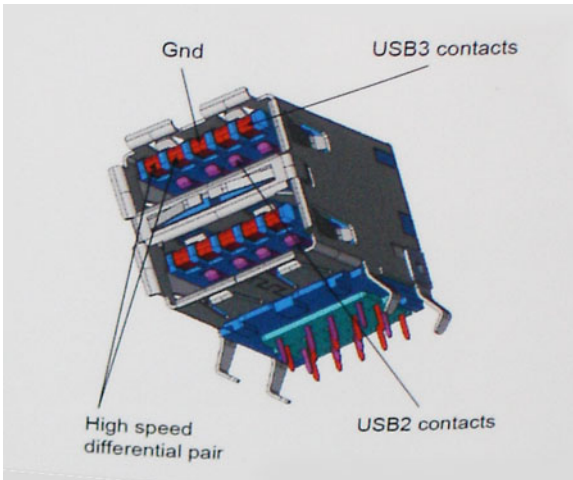


## Speed

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.

## HDMI 1.4- HDMI 2.0

This topic explains the HDMI 1.4/2.0 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.

 **NOTE: The HDMI 1.4 will provide 5.1 channel audio support.**

## HDMI 1.4- 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

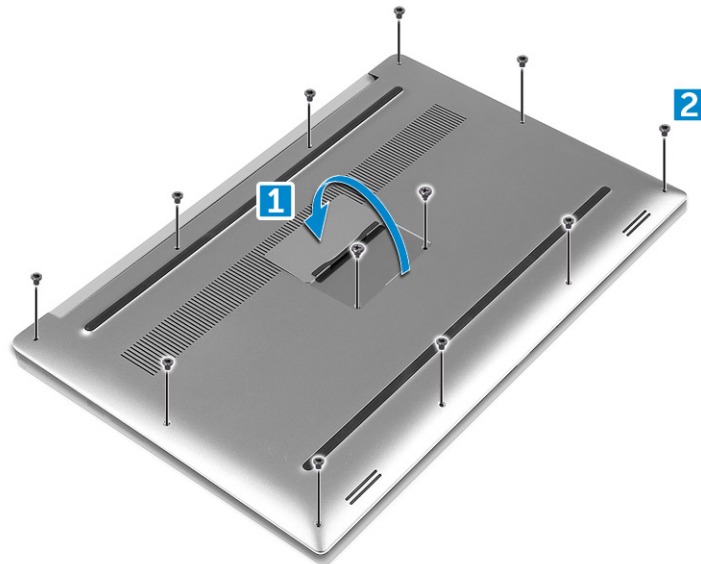
## Disassembly and reassembly

### Base cover

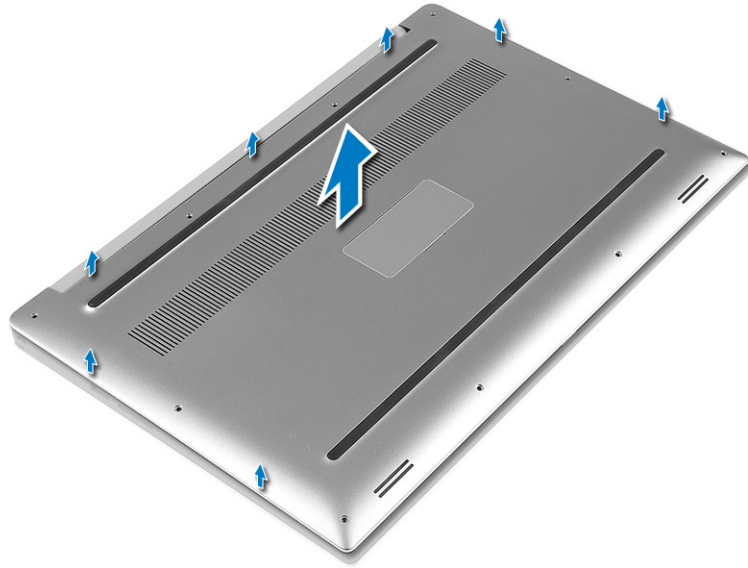
#### Removing the Base Cover

- 1 Follow the procedures in *Before Working Inside Your Computer*.
- 2 Close the display and turn the computer over.
- 3 Turn the system badge flap over and then remove the M2x3 T5 (10), M2x8 (2) screws that secure the base cover to the computer [1,2].

**NOTE:** Use a Torx #5 screwdriver for the base screws and a Philips screwdriver for the two M2x8 screws inside the badge flap.



- 4 Pry the edges of the base cover and lift it to remove it from the computer.



## Installing the Base Cover

- 1 Place the base cover on the computer and snap it in place.
- 2 Tighten the M2x3 T5 (10), M2x8 (2) screws to secure the base cover to the computer.

**NOTE:** Ensure you use a Torx #5 screwdriver for the base screws and a Philips screwdriver for the two M2x8 system badge screws.

- 3 Turn the system badge flap over and snap it in place.
- 4 Follow the procedures in [After Working Inside Your Computer](#).

## Battery

### Lithium-ion battery precautions

#### ⚠ CAUTION:

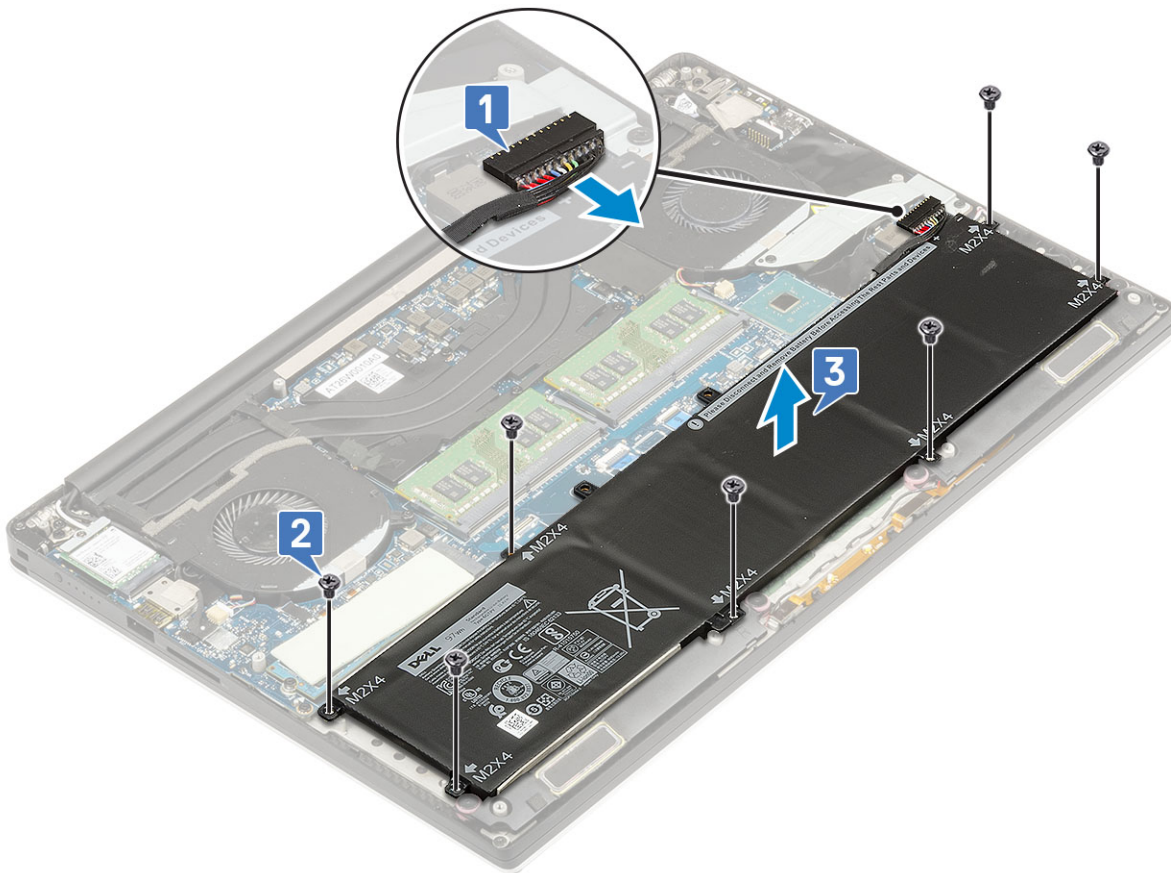
- Exercise caution when handling Lithium-ion batteries.
- Discharge the battery as much as possible before removing it from the system. This can be done by disconnecting the AC adapter from the system to allow the battery to drain.
- Do not crush, drop, mutilate, or penetrate the battery with foreign 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 **NOTE:** Discharge the battery as much as possible before removing from the system. This can be done by disconnecting the A/C adapter from the system (while the system is turned on) to allow the system to drain the battery.

① **NOTE:** System shipped with 3-Cell battery has 4 screws, the hard drive will be part of the configuration (Optional).

- 1 Follow the procedures in [Before Working Inside Your Computer](#).
- 2 Remove the [base cover](#)
- 3 Perform the following steps to remove the battery:
  - a Disconnect the battery cable from the system board [1].
  - b Remove the M2x4 (7) screws that secure the battery to the computer [2].
  - c Lift the battery off the computer [3].
  - **Do not** apply pressure to the surface of the battery
  - **Do not** bend
  - **Do not** use tools of any kind to pry on or against the battery
  - If a battery cannot be removed within the constraints above, please contact Dell technical support



# Installing the Battery

- 1 Place and align the battery in the battery bay.
- 2 Tighten the M2x4 (7) screws that secure the battery to the computer.

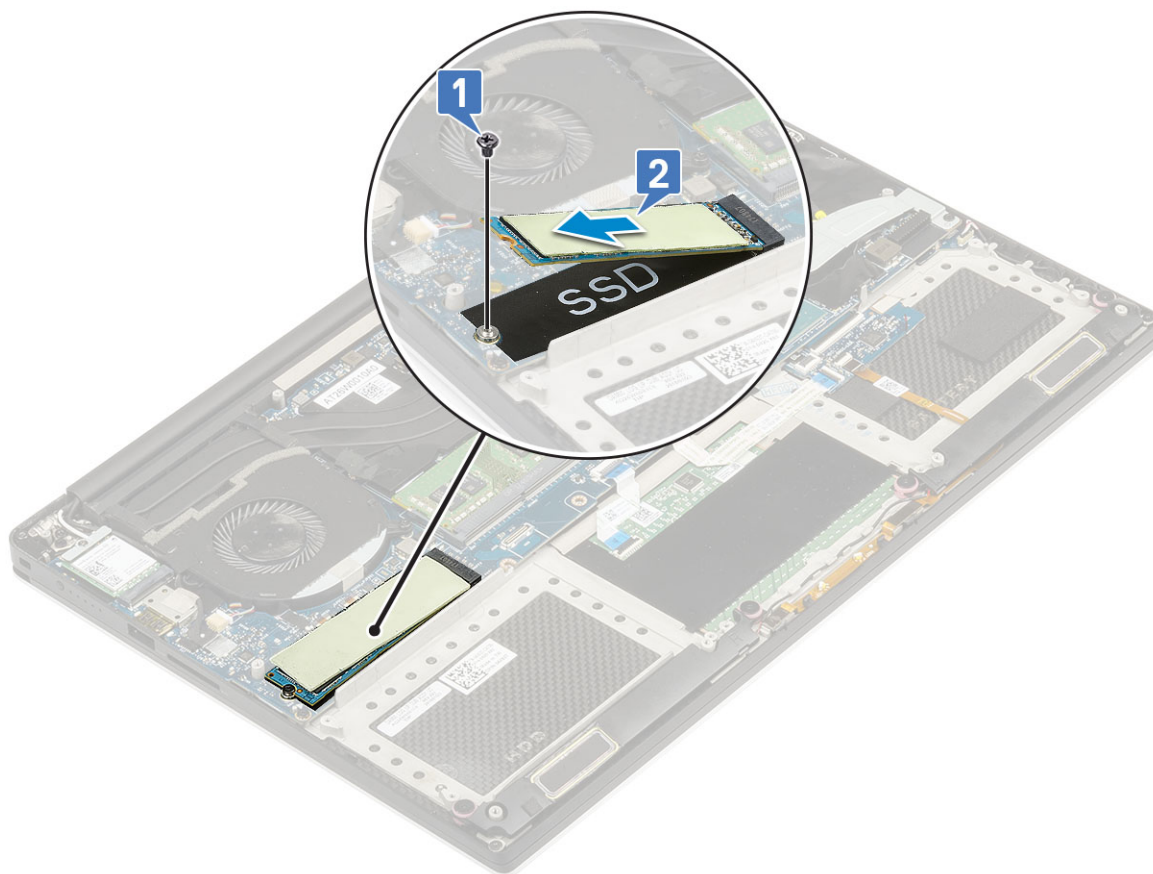


- 3 Connect the battery cable to the system board.
- 4 Install the base cover.
- 5 Follow the procedures in [After Working Inside Your Computer](#).

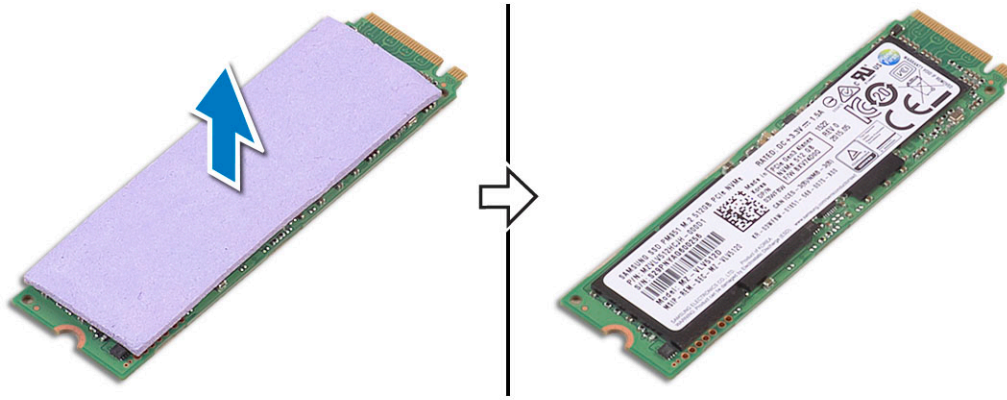
## PCIe Solid State Drive (SSD)

### Removing M.2 Solid State Drive -SSD

- 1 Follow the procedures in [Before Working Inside Your Computer](#)
- 2 Remove the:
  - a [base cover](#)
  - b [battery](#)
- 3 Remove the M2x3 (1) screw that secures the M.2 solid-state drive (SSD) to the system board [1].
- 4 Lift the M.2 solid-state drive (SSD) from the system board [2].



- 5 Pull the SSD card thermal pad to access the bare SSD card.



## Installing M.2 Solid State Drive -SSD

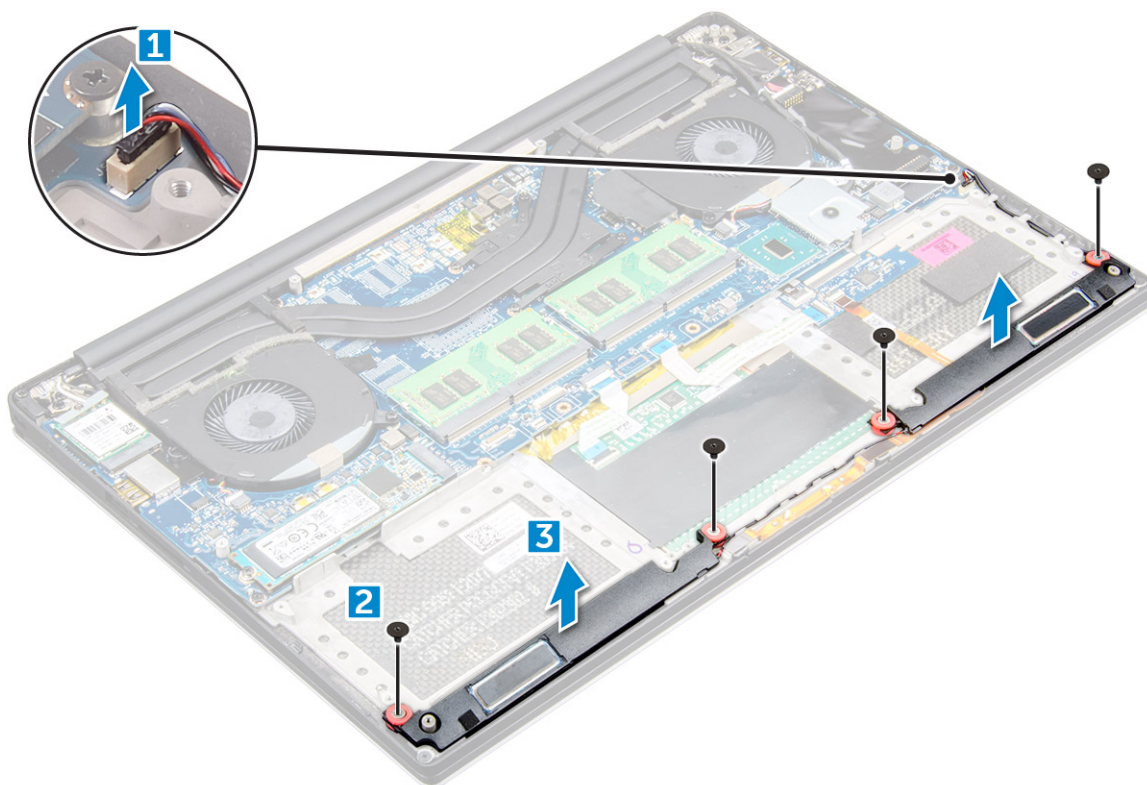
- 1 Adhere the thermal pad to the M.2 solid-state drive.  
**① | NOTE: The thermal pad is applicable only for a PCIe SSD card.**
- 2 Slide the M.2 solid-state drive at an angle into the solid-state drive slot.
- 3 Press the other end of the solid-state drive down and replace the M2x3 (1) screw that secures the solid-state drive to the system board.
- 4 Install the:
  - a battery
  - b base cover
- 5 Follow the procedures in [After Working Inside Your Computer](#).

## Speaker

### Removing the Speakers

- 1 Follow the procedures in [Before Working Inside Your Computer](#).
- 2 Remove the:
  - a base cover
  - b battery
- 3 Perform the following steps to remove the speaker:
  - a Disconnect the speaker cable from the system board [1].
  - b Remove the M2x2 (4) screws that secure the speakers to the computer [2].
  - c Lift the speakers, along with the speaker cable, off the computer [3].





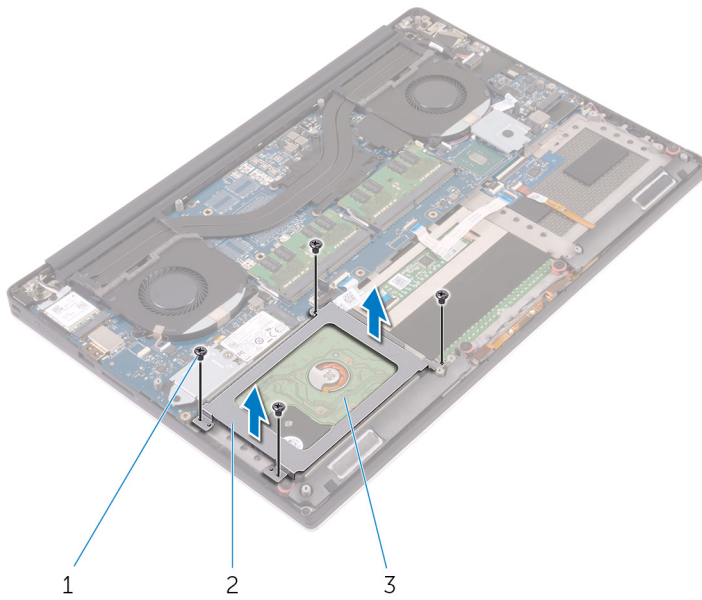
## Installing the Speakers

- 1 Using the alignment posts, place the speakers on the palm-rest assembly.
- 2 Replace the M2x2 (4) screws that secure the speakers to the palm-rest assembly.
- 3 Route the speaker cables through the routing guides on the palm-rest assembly.
- 4 Connect the speaker cable to the system board.
- 5 Install the:
  - a battery
  - b base cover
- 6 Follow the procedures in [After Working Inside Your Computer](#).

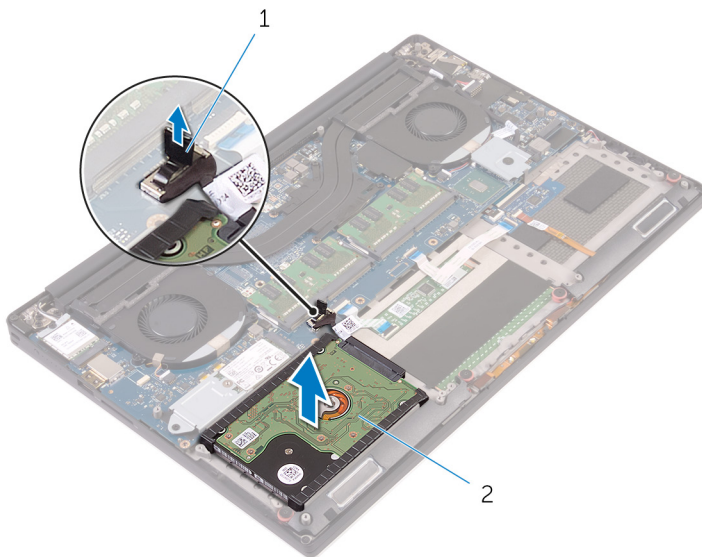
## Hard drive

### Removing 2.5 inch Hard Drive -optional

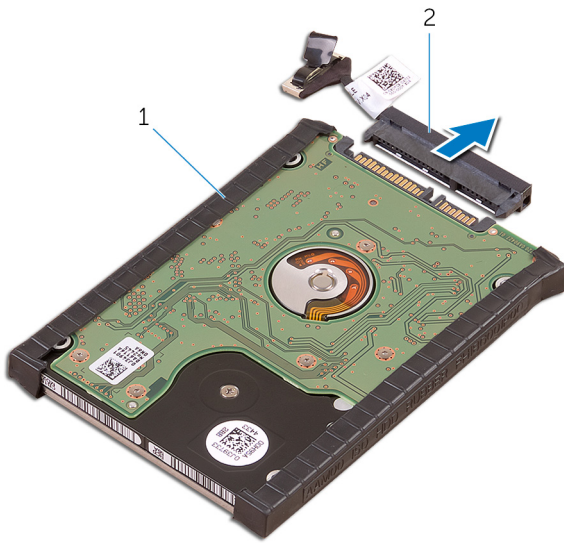
- 1 Follow the procedures in [Before Working Inside Your Computer](#).
- 2 Remove the:
  - a base cover
  - b battery
- NOTE:** System shipped with 3-Cell battery, the hard drive will be part of the configuration (Optional).
- 3 Perform the following steps to remove the hard-drive bracket from the computer:
  - a Remove the M2x4 (4) screws securing the hard-drive bracket to the computer [1].
  - b Lift the hard-drive cage [2] off the hard drive assembly [3].



- 4 Perform the following steps to remove the hard-drive:
  - a Disconnect the hard-drive cable from the system board [1].
  - b Lift the hard drive off the palm rest assembly [2].



- 5 Disconnect the hard drive interposer from the hard drive assembly and then remove the hard drive covers away from the hard drive [1,2].



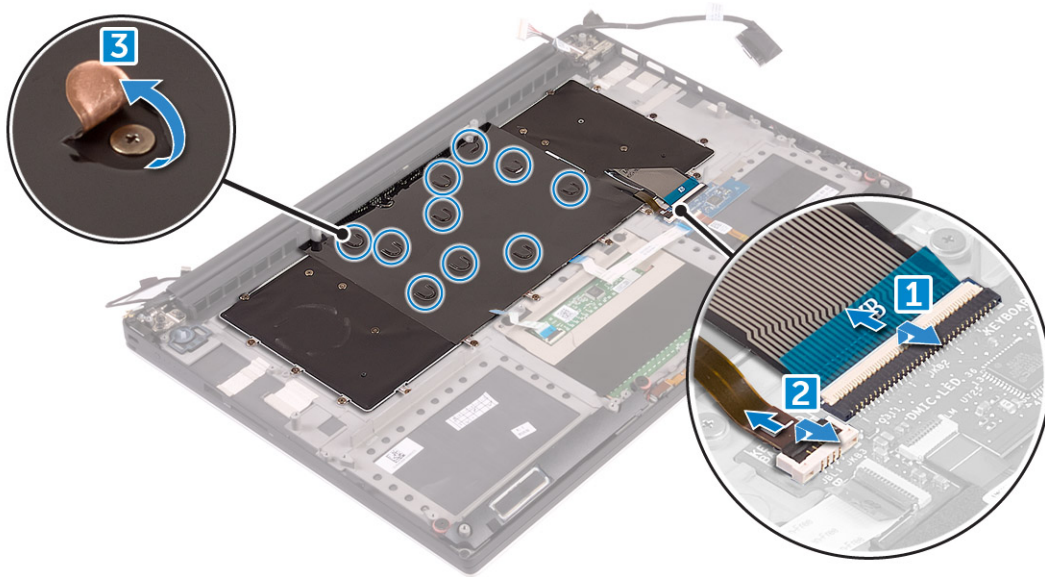
## Installing the Hard Drive -optional

- 1 Replace the hard-drive covers on the hard drive.
- 2 Connect the hard-drive interposer to the hard-drive assembly.
- 3 Place the hard-drive assembly on the palm-rest assembly.
- 4 Connect the hard-drive cable to the system board.
- 5 Align the screw holes on the hard-drive cage with the screw holes on the hard-drive assembly.
- 6 Replace the M2x4 (4) screws that secure the hard-drive cage to the palm-rest assembly.
- 7 Install the:
  - a battery
  - b base cover
- 8 Follow the procedures in [After Working Inside Your Computer](#).

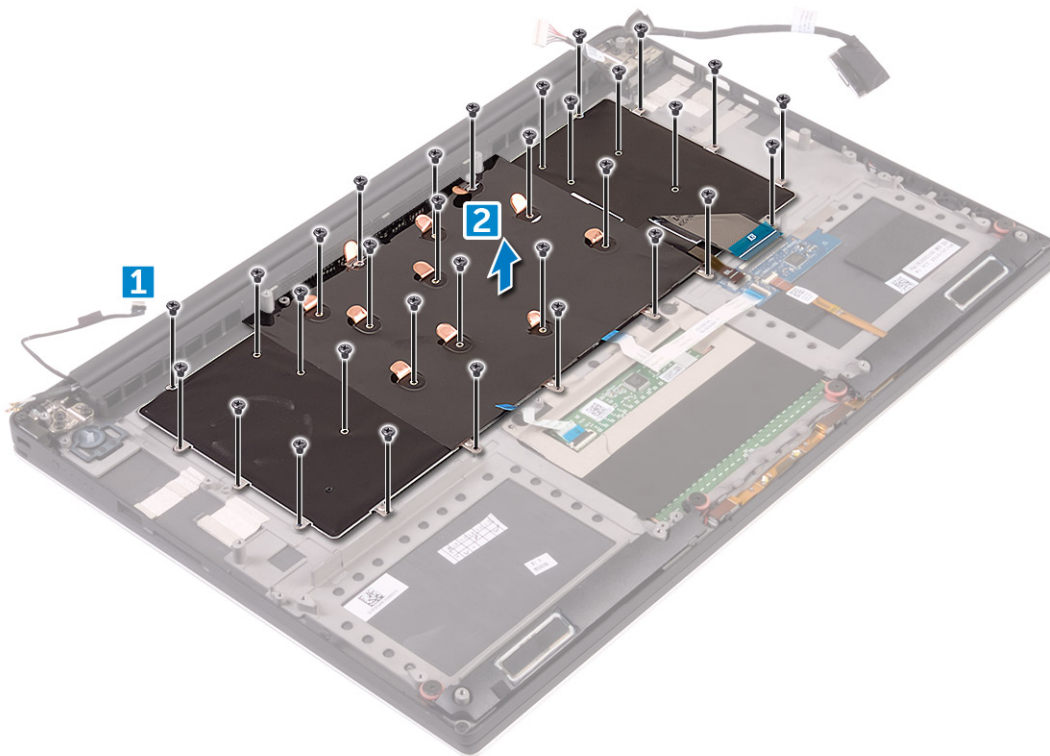
## Keyboard

### Removing the Keyboard

- 1 Follow the procedures in [Before Working Inside Your Computer](#).
- 2 Remove the:
  - a base cover
  - b battery
  - c fans
  - d heatsink assembly
  - e SSD
  - f memory modules
  - g system board
- 3 Perform the following steps to disconnect the keyboard and backlight connectors from the computer.
  - a Lift up the latch [1] and the disconnect the cables from the connectors [2].
  - b Peel back the screw shields [3].

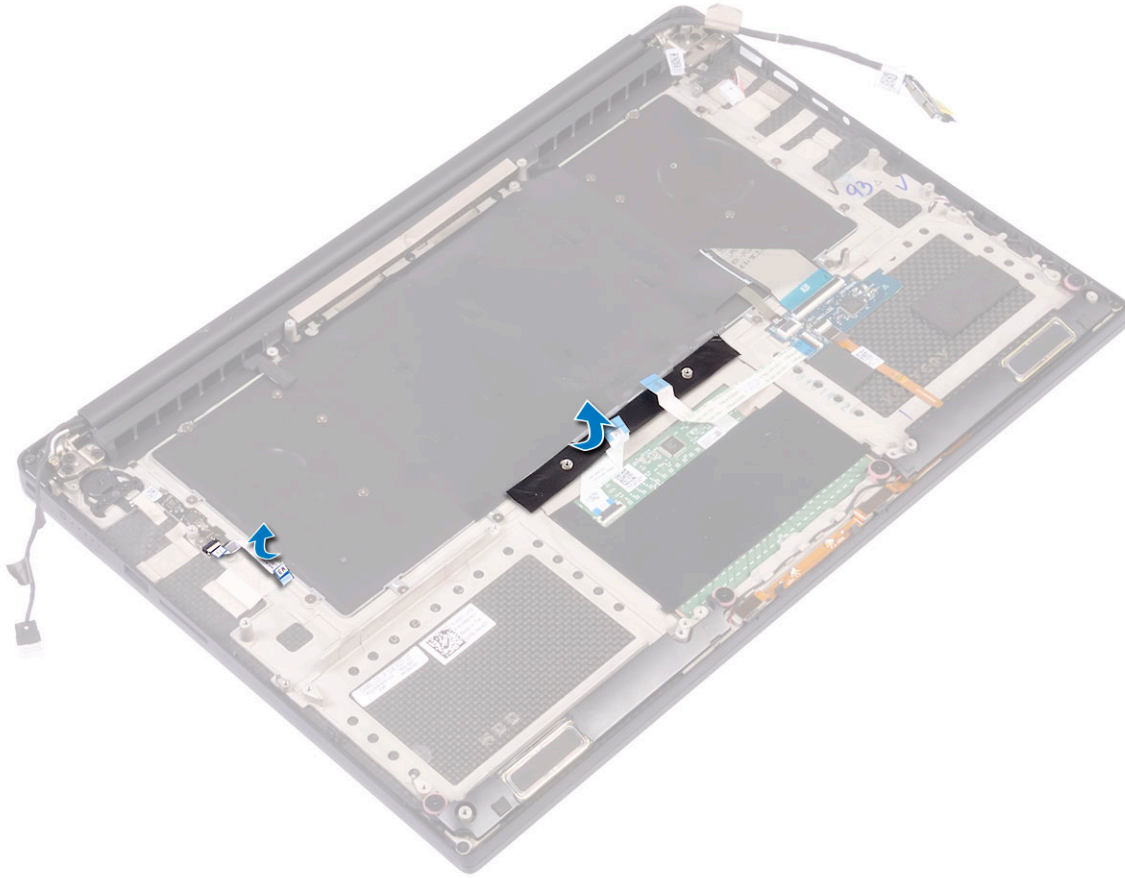


- 4 Un-route the Keyboard cable [1] and then remove the M1.6 x 1.5 (31) screws that secure the keyboard to the computer [2].



- 5 Disconnect the cable from the connector on the system board.
- 6 Remove the screw (2) that secures the keyboard pad to the system board.
- 7 Lift and remove the keyboard from the system chassis.





## Installing the Keyboard

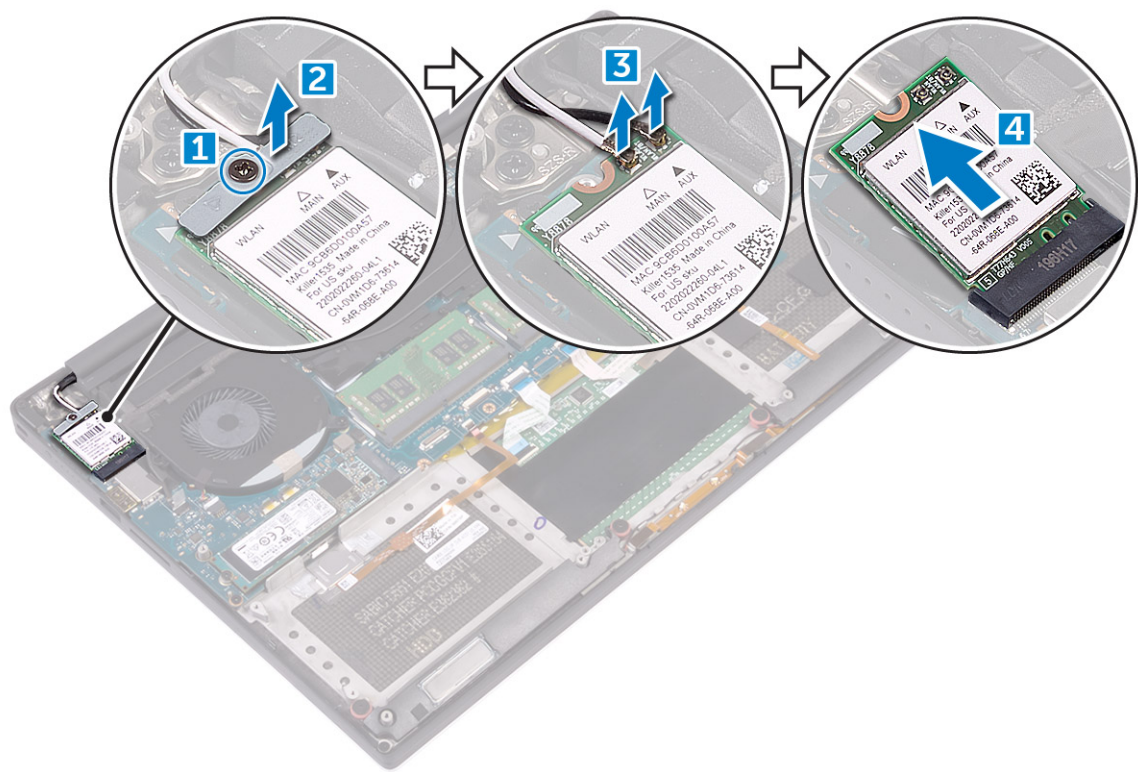
- 1 Adhere the Mylar to the keyboard.
- 2 Align the screw holes on the keyboard with the screw holes on the palm-rest assembly.
- 3 Replace the M1.6 x 1.5 (31) screws that secure the keyboard to the palm-rest assembly.
- 4 Adhere the Mylar to the screws that secure the keyboard to the palm-rest assembly.
- 5 Connect the keyboard cable and keyboard-backlight cable to the keyboard-controls board.
- 6 Install the:
  - a [System Board](#)
  - b [Hard drive](#)
  - c [Base cover](#)
- 7 Follow the procedures in [After Working Inside Your Computer](#).

## WLAN card

### Removing the WLAN Card

- 1 Follow the procedures in [Before Working Inside Your Computer](#).
- 2 Remove the:
  - a [base cover](#)
  - b [battery](#)
- 3 Perform the following steps to remove the WLAN card:

- a Remove the captive screw to release the bracket that secures the WLAN card to the computer [1] and lift the bracket away from the computer [2].
- b Disconnect the antenna cables from the WLAN card [3].
- c Slide and remove the WLAN card from its connector on the board [4].



## Installing the WLAN Card

- 1 Align the notch on the WLAN card with the tab on the WLAN-card connector on the system board.
- 2 Align the bracket which secures the WLAN card to the palmrest assembly.
- 3 Connect the antenna cables to the WLAN card.

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

**NOTE:** The color of the antenna cables is visible near the tip of the cables. The antenna-cable color scheme for the WLAN card supported by your computer is as follows:

Table 2. Antenna-Cable Color Scheme for the WLAN Card

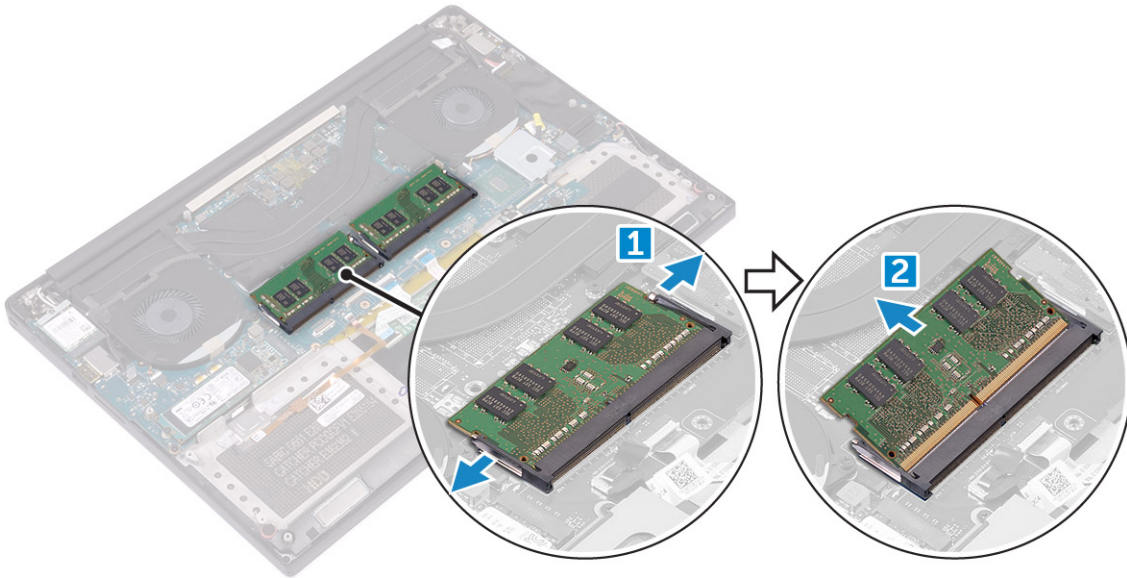
Connectors on the WLAN card	Antenna-cable color
Main (white triangle)	white
Auxiliary (black triangle)	black
Multiple input, multiple output (grey triangle)	Grey (optional)

- 4 Tighten the captive screw to secure the bracket and the WLAN card to the palmrest assembly.
- 5 Install the:
  - a Battery
  - b Base cover
- 6 Follow the procedures in [After Working Inside Your Computer](#)

# Memory modules

## Removing the Memory Modules

- 1 Follow the procedures in *Before Working Inside Your Computer*.
- 2 Remove the:
  - a [base cover](#)
  - b [battery](#)
- 3 Pry the securing clips away from the memory module until it pops-up [1]. Then, remove the memory module from its connector on the system board [2].



## Installing the Memory Modules

- 1 Insert the memory module into the memory socket.
- 2 Press the memory module down until it clicks into place.  
**⚠ NOTE: If you do not hear the click, remove the memory module and re-install it.**
- 3 Install the:
  - a [Battery](#)
  - b [Base cover](#)
- 4 Follow the procedures in *After Working Inside Your Computer*.

# Heat sink assembly

## Removing the Heatsink

- 1 Follow the procedures in *Before Working Inside Your Computer*.
- 2 Remove the:  
**⚠ CAUTION: The heat sink may become hot during normal operation. Allow sufficient time for the heat sink to cool before you touch.**

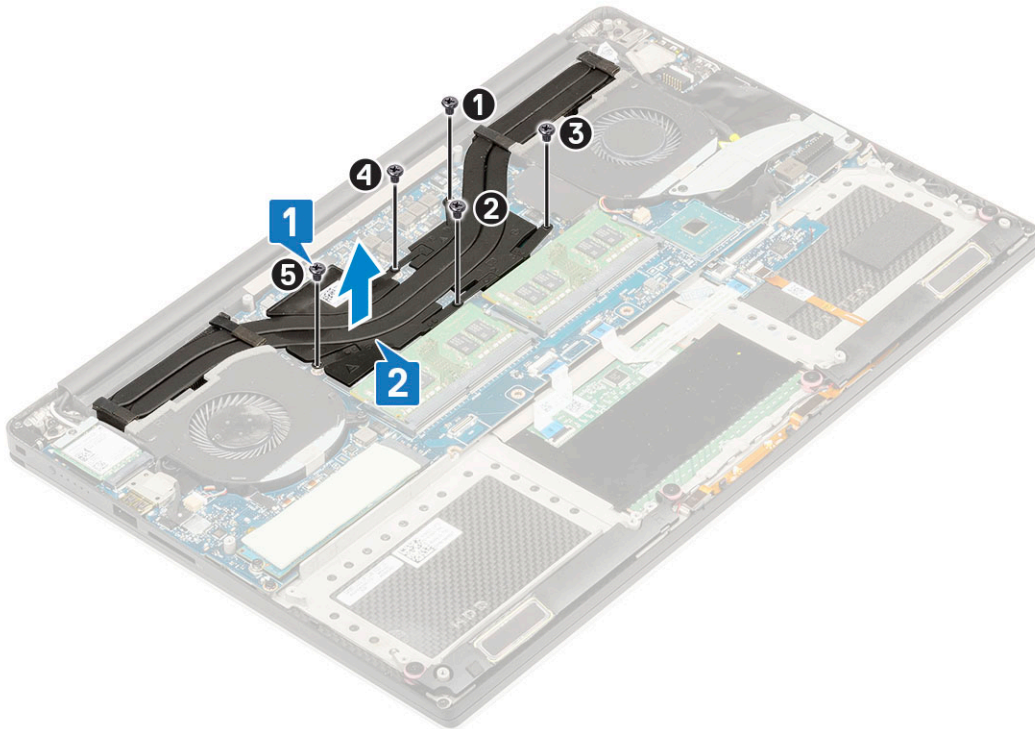
① **NOTE:** The Heatsink removal screw may vary depending upon the type of Heatsink installed.

- a base cover
- b battery

3 Remove the M2x3 (5) screws that secure the heatsink to the system board.

① **NOTE:** Ensure to remove the screws in the order (1,2,3,4,5). See the printed image number order on the top of heatsink.

4 Lift the heatsink away from the system board [2].



## Installing the Heatsink

1 Align the heatsink with the screw holes on the system board.

2 Replace the M2x3 (5) screws to secure the heatsink to the system board.

① **NOTE:** Ensure to replace the screws in the order (1,2,3,4,5). See the printed image number order on the top of heatsink

3 Install the:

- a Battery
- b Base cover

4 Follow the procedures in [After Working Inside Your Computer](#)

## System fan

### Removing the Fans

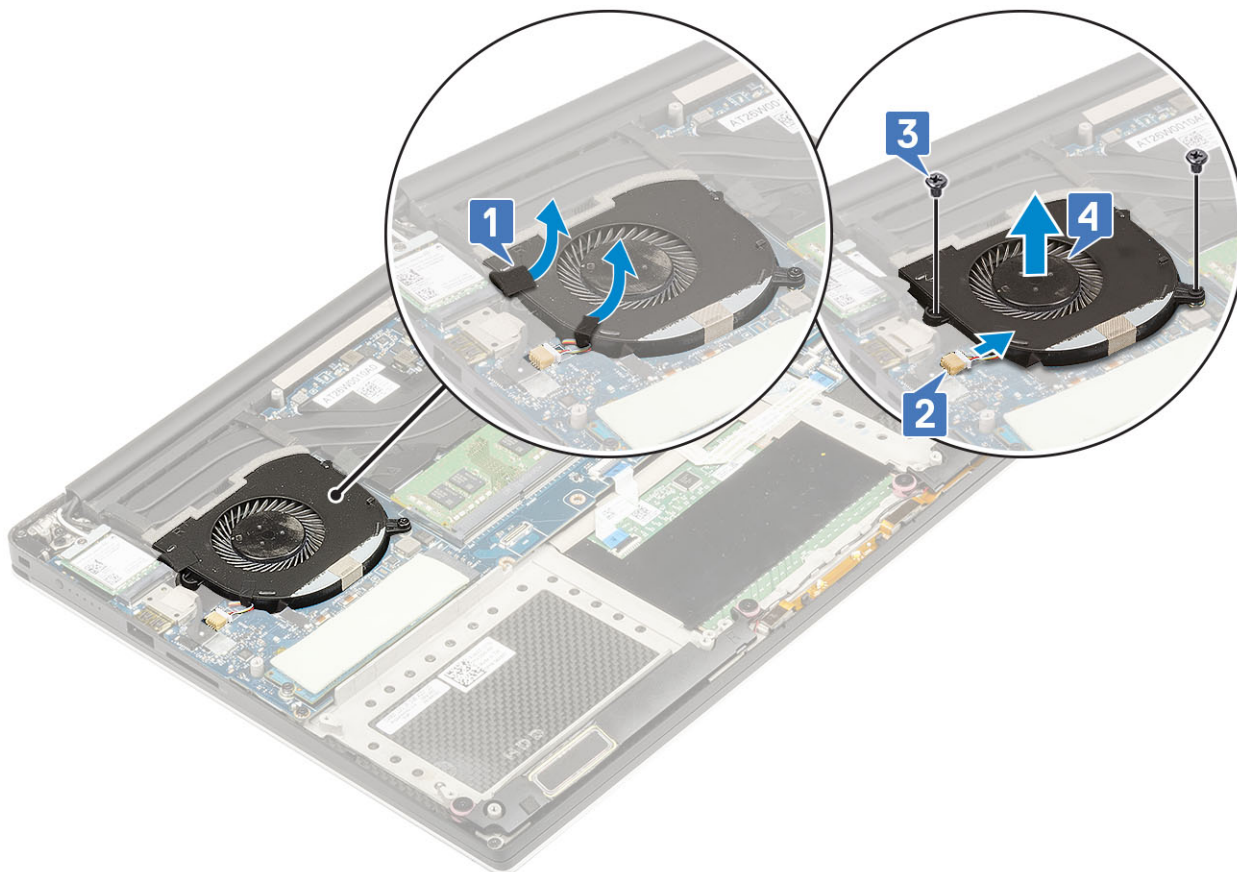
1 Follow the procedures in [Before Working Inside Your Computer](#).

2 Remove the:

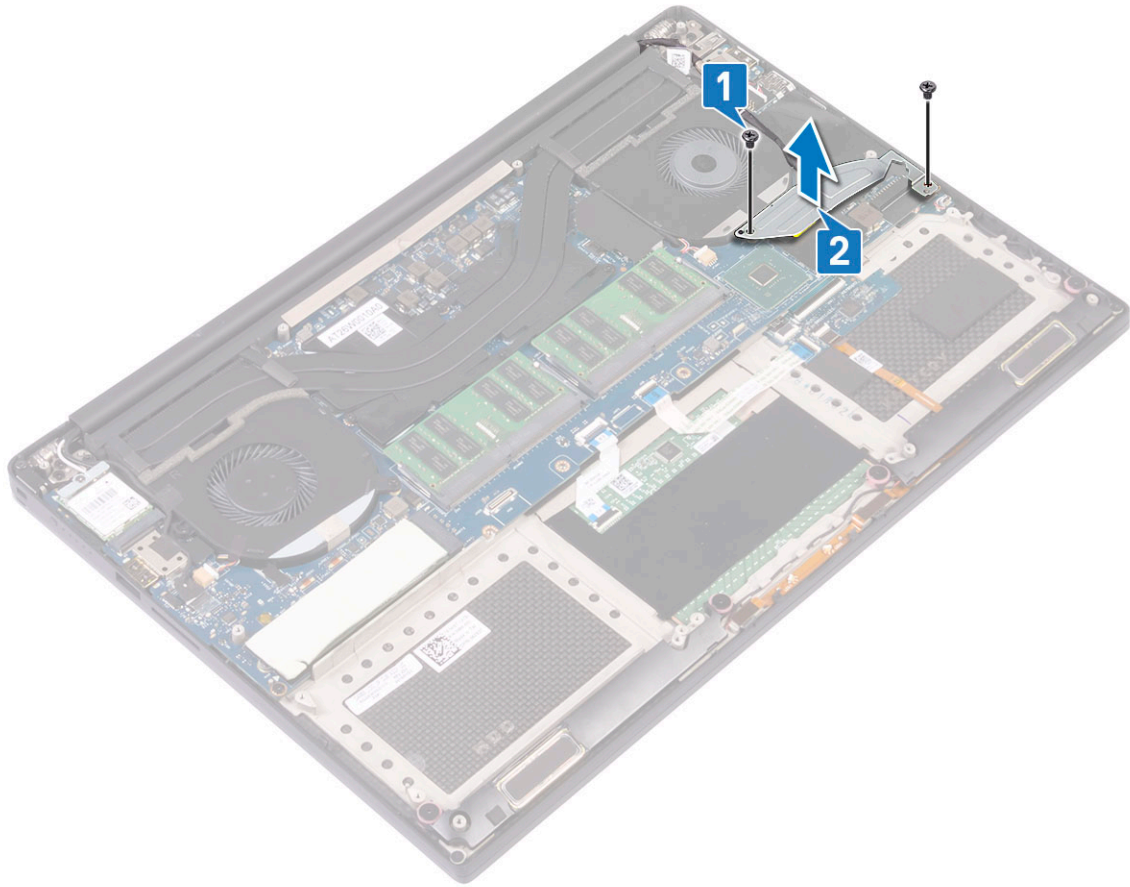
- a base cover
- b battery



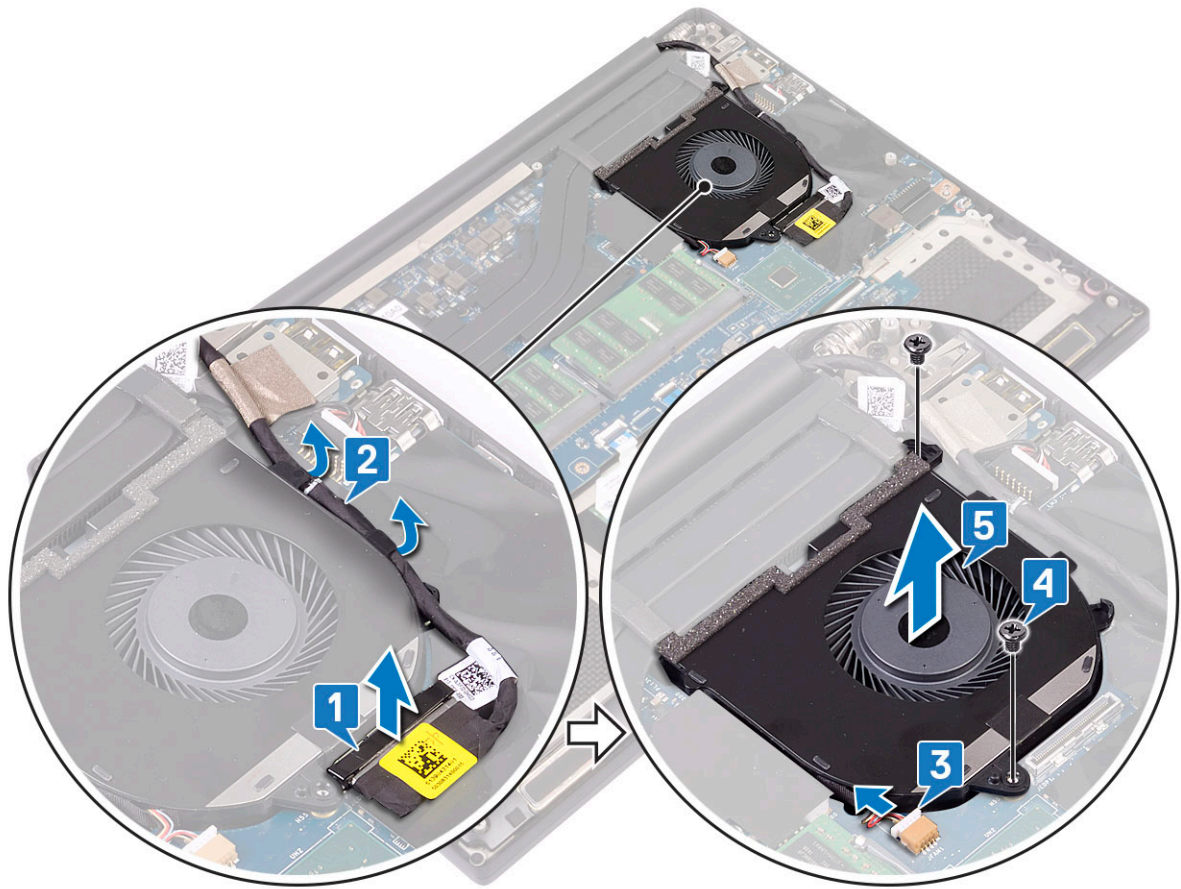
- 3 Perform the following steps to remove the left video-card fan:
- Release the Mylar tape that secures the cable to the system board [1].
  - Disconnect the fan cable from the system board [2]
  - Remove the M2x4 (2) screws that secure the fan to the system board [3].
  - Lift the fan away from the computer [4]



- 4 Perform the following steps to remove the right system fan:
- Remove the M2x4 (2) screws and lift the metal bracket that holds the left video-card fan to the system board [1].
  - Lift the metal bracket that secures the DisplayPort over Type-C [2].



- c Disconnect the display cable from the system board [1].
- d Un-route the display cable from the restraints [2]
- e Disconnect the system fan cable from the system board [3].
- f Remove the M2x4 (2) screws that secure the system fan to the system board [4].
- g Lift the fan away from the laptop [5].



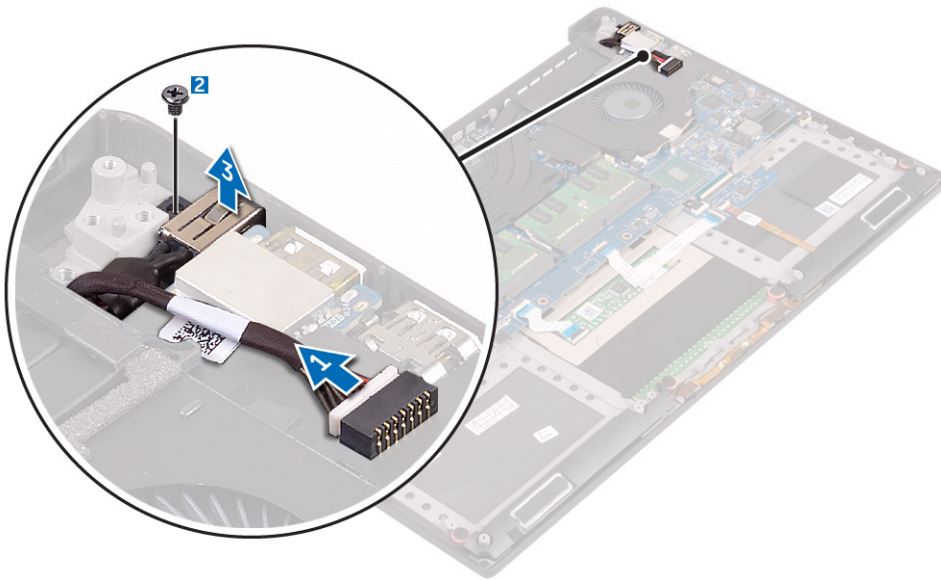
## Installing the Fans

- 1 Perform the following steps to install the system fan:
  - a Align the screw holes on the left fan with the screw holes on the palm-rest assembly.
  - b Connect the left fan cable to the system board.
  - c Route the display cable through the routing guides on the left fan.
  - d Replace the M2x4 (2) screws that secure the left fan to the system board.
  - e Align the right fan to the system board.
  - f Route the touch-screen cable through the routing guides on the right fan.
  - g Connect the touch-screen cable to the system board.
  - h Connect the fan cable to the connector to the system board.
  - i Replace the Mylar tape that secures the cable to the system board
  - j Align the metal brackets that secure touch-screen cable and DisplayPort Over Type-C cable.
  - k Replace the M2x4 (2) screws that secure the metal brackets and right fan to the system board.
  - a Install the [Base cover](#)
- 2 Follow the procedures in [After Working Inside Your Computer](#).

# Power connector port

## Removing the DC-in Connector

- 1 Follow the procedures in [Before Working Inside Your Computer](#).
- 2 Remove the:
  - a [base cover](#)
  - b [battery](#)
- 3 Perform the following steps to remove the I/O board:
  - a Disconnect the DC-in cable from the connector to the system board [1].
  - b Remove the M2x3 screw that secures the DC-in connector to the computer [2].
  - c Lift the DC-in connector from the computer [3].



## Installing the DC-in Adapter Port

- 1 Place the DC-in adapter port into the slot on the palm-rest assembly.
- 2 Route the power-adapter port cable through its routing guides on the palm-rest assembly.
- 3 Replace the M2x3 screw that secures the power-adapter port to the palm-rest assembly.
- 4 Connect the power-adapter port cable to the system board.
- 5 Install the:
  - a [Battery](#)
  - b [Base cover](#)
- 6 Follow the procedures in [After Working Inside Your Computer](#).

# Audio board

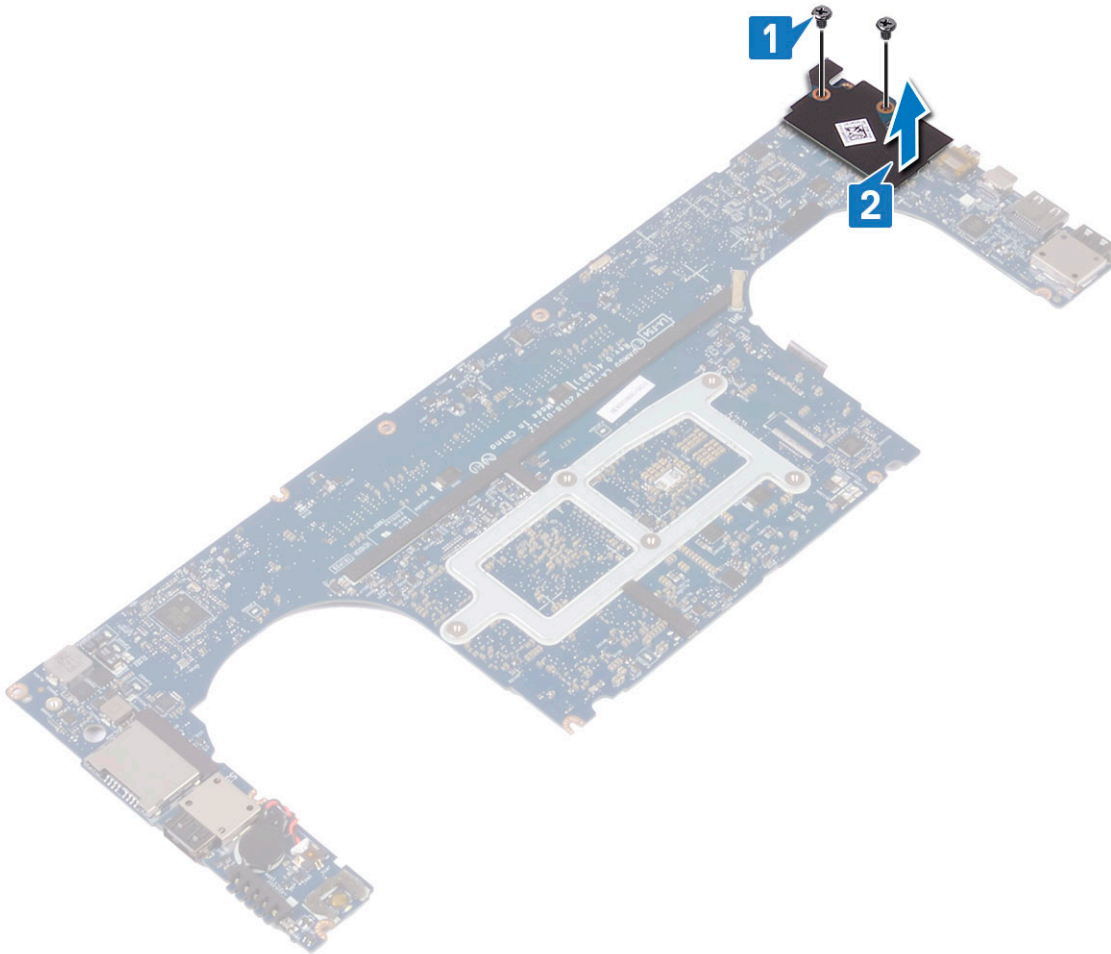
## Removing Audio board

- 1 Follow the procedures in [Before Working Inside Your Computer](#).
- 2 Remove the:



- a base cover
- b battery
- c WLAN card
- d hard drive
- e fans
- f heatsink assembly
- g memory modules
- h system board

- 3 Perform the following steps to remove the audio board:
- a Turn the system board over.
  - b Remove the M2x3 (2) screws that secure the audio board to the system board [1].
  - c Lift up the audio board [2].



## Installing audio board

- 1 Align the audio port in the slot of the system board.
- 2 Replace the M2x3 (2) screws to secure the audio board to the system board.
- 3 Turn the system board over.
- 4 Install the:
  - a System Board
  - b Memory
  - c Heatsink assembly
  - d Fans

- e Hard drive
- f WLAN card
- g Battery
- h Base cover

5 Follow the procedures in [After Working Inside Your Computer](#).

## Coin-cell battery

### Removing the Coin-Cell Battery

1 Follow the procedures in [Before Working Inside Your Computer](#).

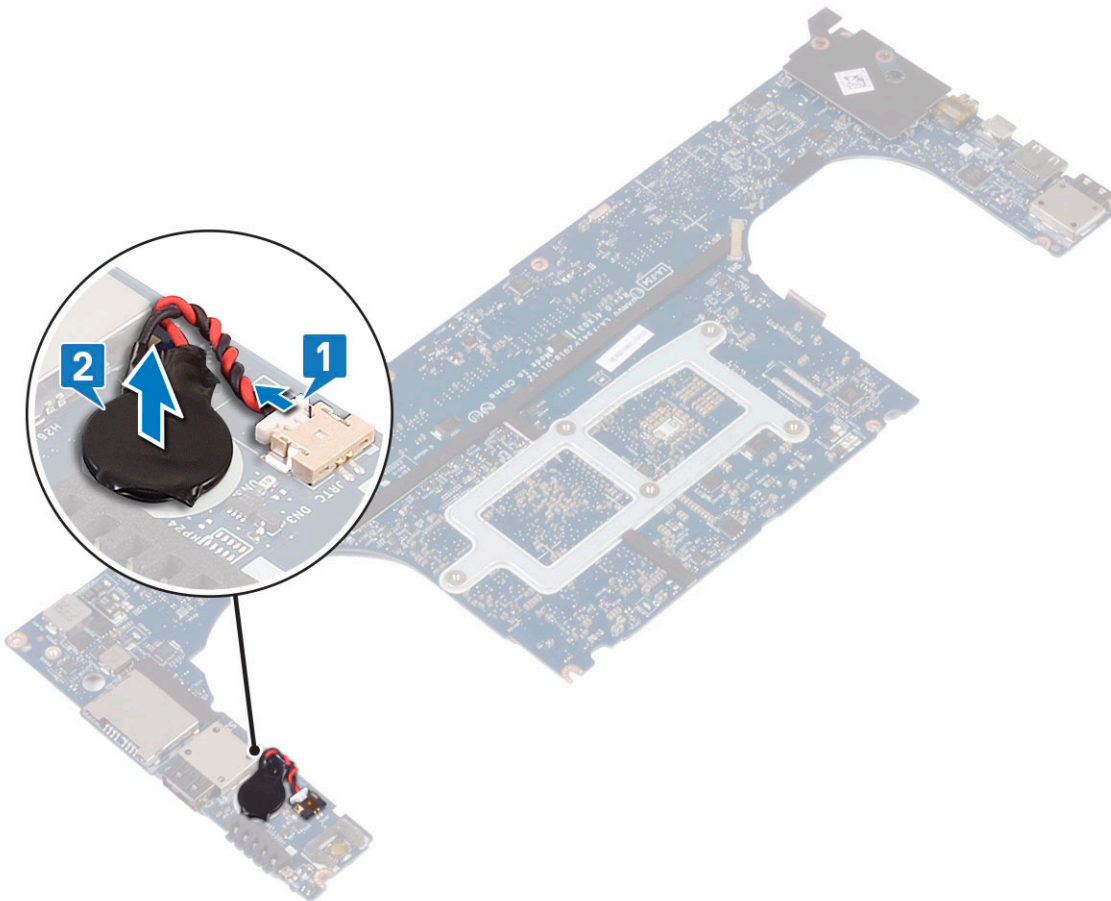
**CAUTION:** Removing the coin-cell battery re-sets the BIOS settings to default. It is recommended that you note the BIOS settings before removing the coin-cell battery.

2 Remove the:

- a base cover
- b battery
- c WLAN card
- d hard drive
- e fans
- f heatsink assembly
- g memory modules
- h system board

3 Perform the following steps to remove the coin-cell battery:

- a Turn the system board over.
- b Disconnect the coin-cell battery cable from the system board [1].
- c Lift up the coin-cell battery [2].



# Installing the Coin-Cell Battery

- 1 Replace the coin-cell battery in its slot in the computer.
- 2 Connect the coin-cell battery cable to the system board.
- 3 Turn the system board over.
- 4 Install the:
  - a [System Board](#)
  - b [Memory](#)
  - c [Heatsink assembly](#)
  - d [Fans](#)
  - e [Hard drive](#)
  - f [WLAN card](#)
  - g [Battery](#)
  - h [Base cover](#)
- 5 Follow the procedures in [After Working Inside Your Computer](#).

## Power button

### Removing power button

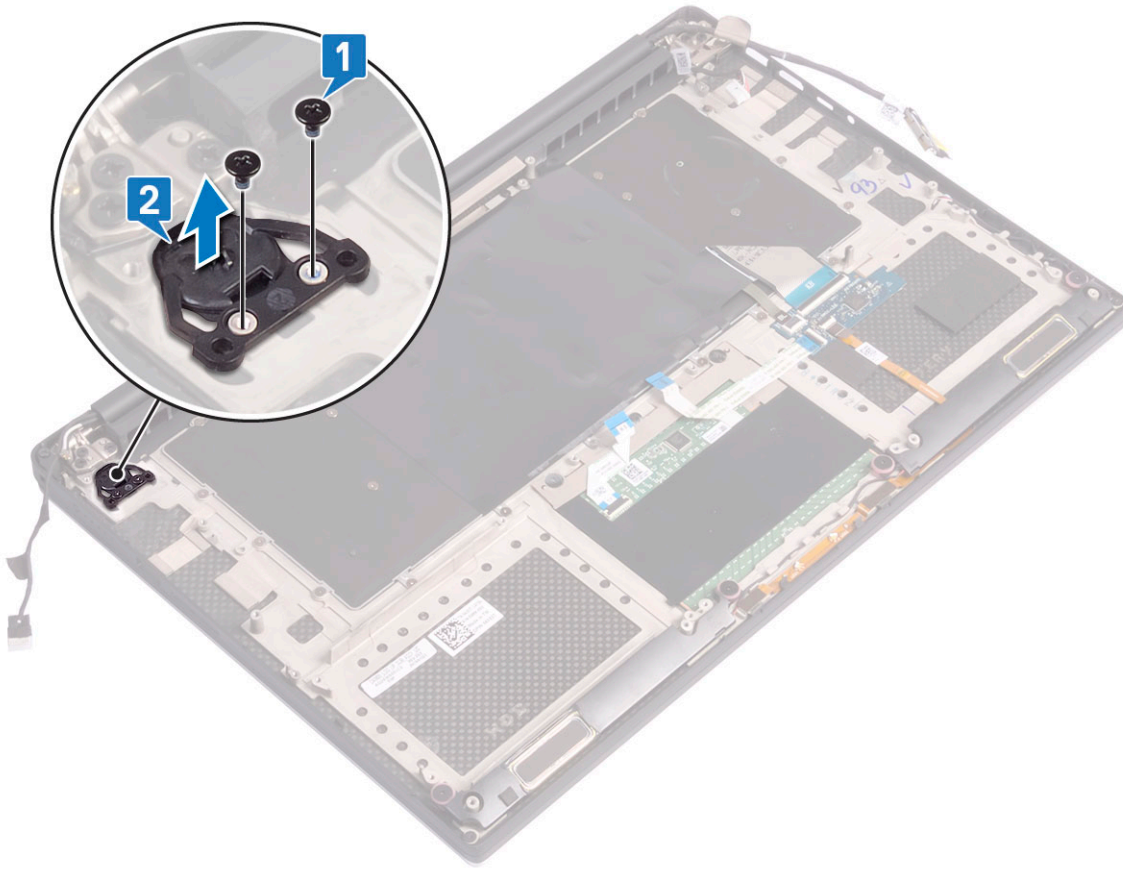
- 1 Follow the procedures in [Before Working Inside Your Computer](#).
- 2 Remove the:
  - a [base cover](#)
  - b [battery](#)
- 3 Perform the following steps to remove the power button:



**NOTE: There are two power button options:**

- Power button function with light indicator.
- Power button with fingerprint reader function without light indicator. (optional)

- a Remove the M2x4 (2) screws that secure the power button module to the system board [1].
- b Lift the power button away from the system chassis [2].



## Installing power button

- 1 Align the power button into the slot on the system chassis.
- 2 Replace the M2x4 (2) screws that secure the power button to the system board.
- 3 Install the:
  - a [Battery](#)
  - b [Base cover](#)
- 4 Follow the procedures in [After Working Inside Your Computer](#).

## Power button with fingerprint reader -optional

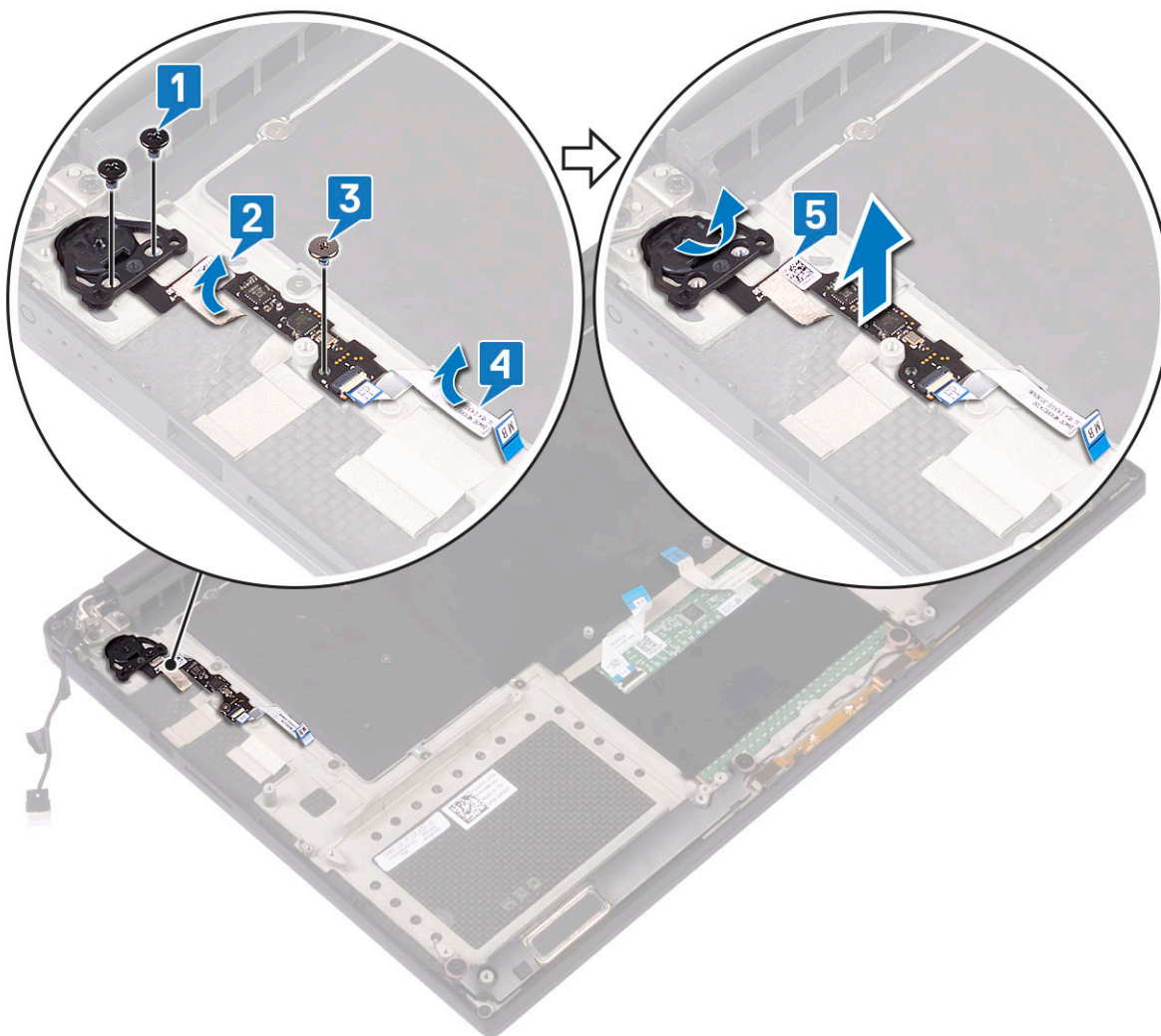
### Removing power button with fingerprint reader

- 1 Follow the procedures in [Before Working Inside Your Computer](#).
- 2 Remove the:
  - a [base cover](#)
  - b [battery](#)
- 3 Perform the following steps to remove the power button:
  - a Remove the M2x4 (2) screws that secure the power button to the system board [1].



**NOTE: There are two power button options:**

- Power button function with light indicator.
  - Power button with fingerprint reader function without light indicator (optional).
- Release the Mylar tape that secures the power button board to the system chassis [2].
  - Remove the M2x3 screw that secures the power button board to the system chassis [3].
  - Disconnect and release the adhesive data cable from the system chassis [4].
  - Lift the power button board away from the system chassis [5].



## Installing power button with fingerprint reader

- Place the power button into the slot on the system chassis.

**NOTE: There are two power button options:**

- Power button function with light indicator.
- Power button with fingerprint reader function without light indicator (optional).

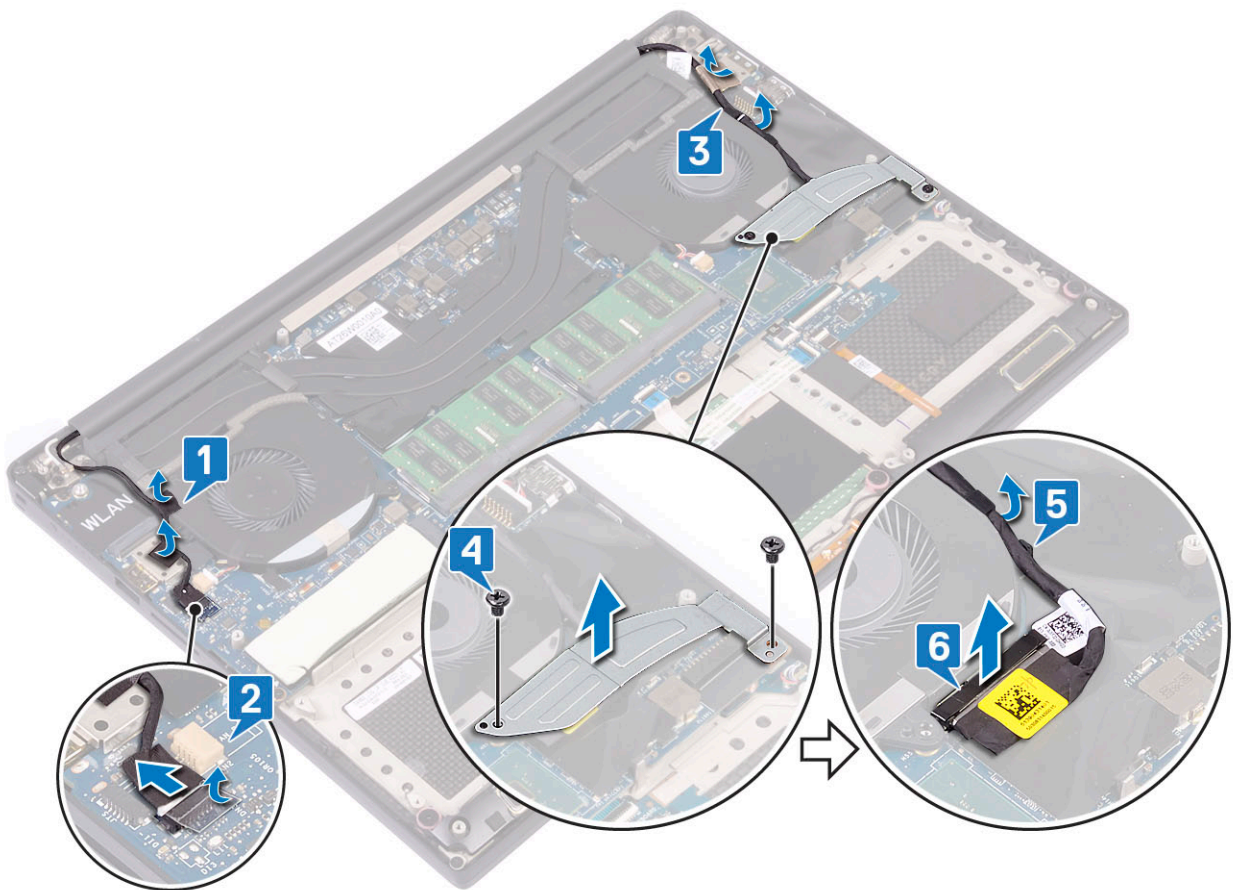
- Connect the adhesive data cable to the system chassis .
- Replace the M2x3 screw that secures the power button board to the system chassis.
- Replace the Mylar tape that secures the power button board to the system chassis.
- Replace the M2x4 (2) screws that secure the power button to the system board.
- Install the:

- a Battery
  - b Base cover
- 7 Follow the procedures in [After Working Inside Your Computer](#).

## Display Assembly

### Removing the Display Assembly

- 1 Follow the procedures in [Before Working Inside Your Computer](#).
- 2 Remove the:
  - a base cover
  - b battery
- 3 Perform the following steps:
  - a Release the Mylar tape that secures the display cable to the system board [1].
  - b Lift the latch and disconnect the display cable from the connector on the system board [2].
  - c Release the Mylar tape that secures the display cable to the system board [3].
  - d Remove the M2x4 (2) screws and lift the metal bracket that holds the left video-card fan to the system board [4].
  - e Un-route the display cable from the restraints clips [5]
  - f Disconnect the display cable from the system board [6].



- 4 To remove the display assembly:
  - a Place the computer at the edge of a flat surface and remove the M2.5x5 (6) screws securing the display assembly to the system chassis [1].
  - b Lift the display assembly away from the system chassis [2].



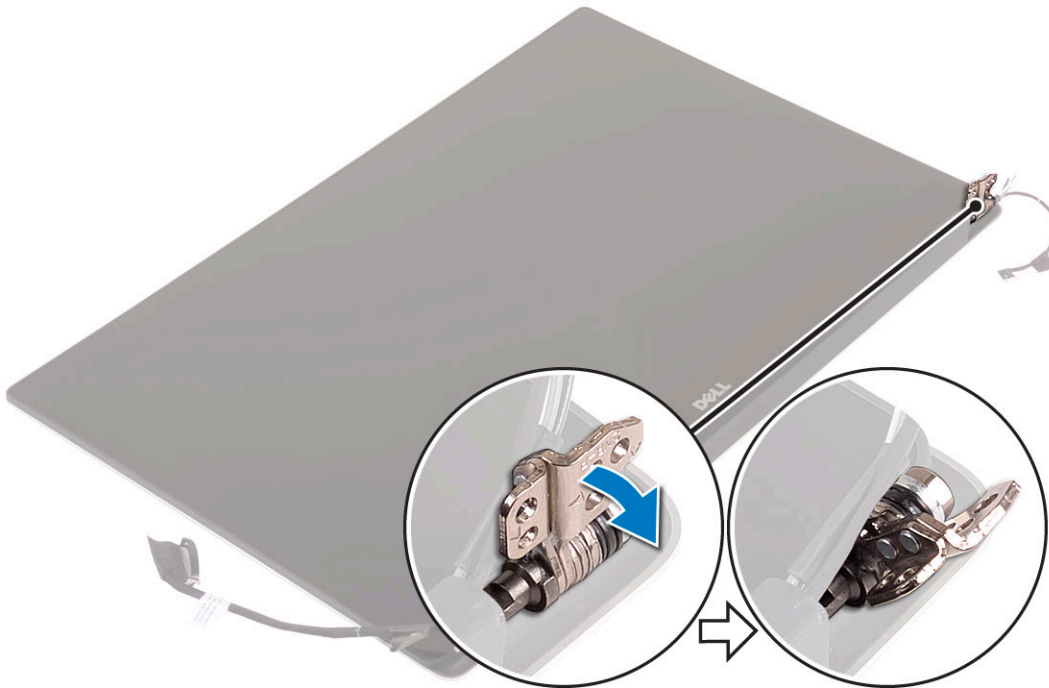
## Installing the Display Assembly

- 1 Place the palm-rest assembly at the edge of the table with the speakers facing away from the edge.
- 2 Align the screw holes on the palm-rest assembly with the screw holes on the display hinges.
- 3 Replace the M2.5 x 5 (6) screws that secure the display hinges to the palm-rest assembly.
- 4 Route the touchscreen cable through the routing guides on the fan.
- 5 Connect the touchscreen cable and display cable to the system board.
- 6 Replace the screw (2) that secures the display-cable bracket to the system board.
- 7 Install the:
  - a [Battery](#)
  - b [Base cover](#)
- 8 Follow the procedures in [After Working Inside Your Computer](#)

## Antenna

## Removing antenna

- 1 Follow the procedures in *Before Working Inside Your Computer*.
- 2 Remove the:
  - a base cover
  - b battery
  - c WLAN card
  - d display assembly
- 3 Gently place the system on a flat surface .
- 4 Rotate the hinges to angle 45° to release the antenna cable.



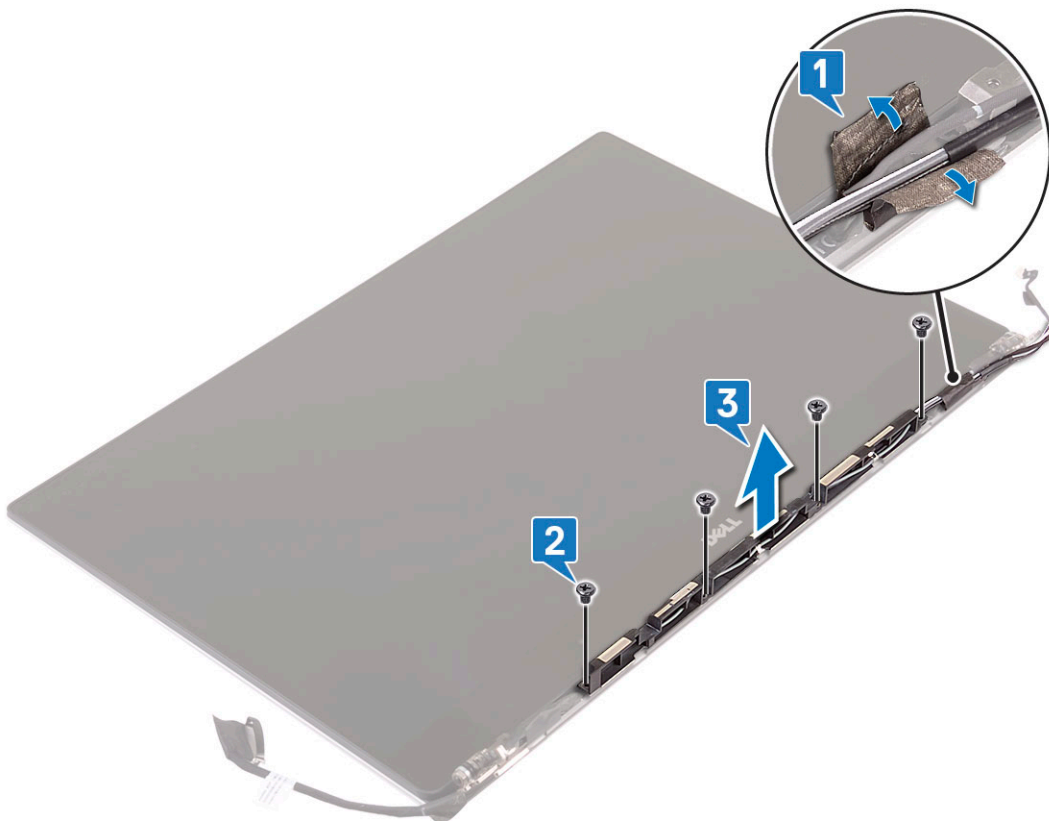
- 5 Slide and lift the antenna cover away from the display assembly.





6 To remove the antenna module:

- a Remove the copper tapes that secure the antenna module [1].
- b Remove the M2x4 (4) screws and lift the metal brackets that secure the antenna cable [2,3].



# Installing the antenna cover

- 1 Replace the antenna cover on the display assembly.
- 2 Turn the display hinges to the normal position.
- 3 Install the:
  - a [Display assembly](#)
  - b [WLAN card](#)
  - c [Battery](#)
  - d [Base cover](#)
- 4 Follow the procedures in [After Working Inside Your Computer](#).

## System board

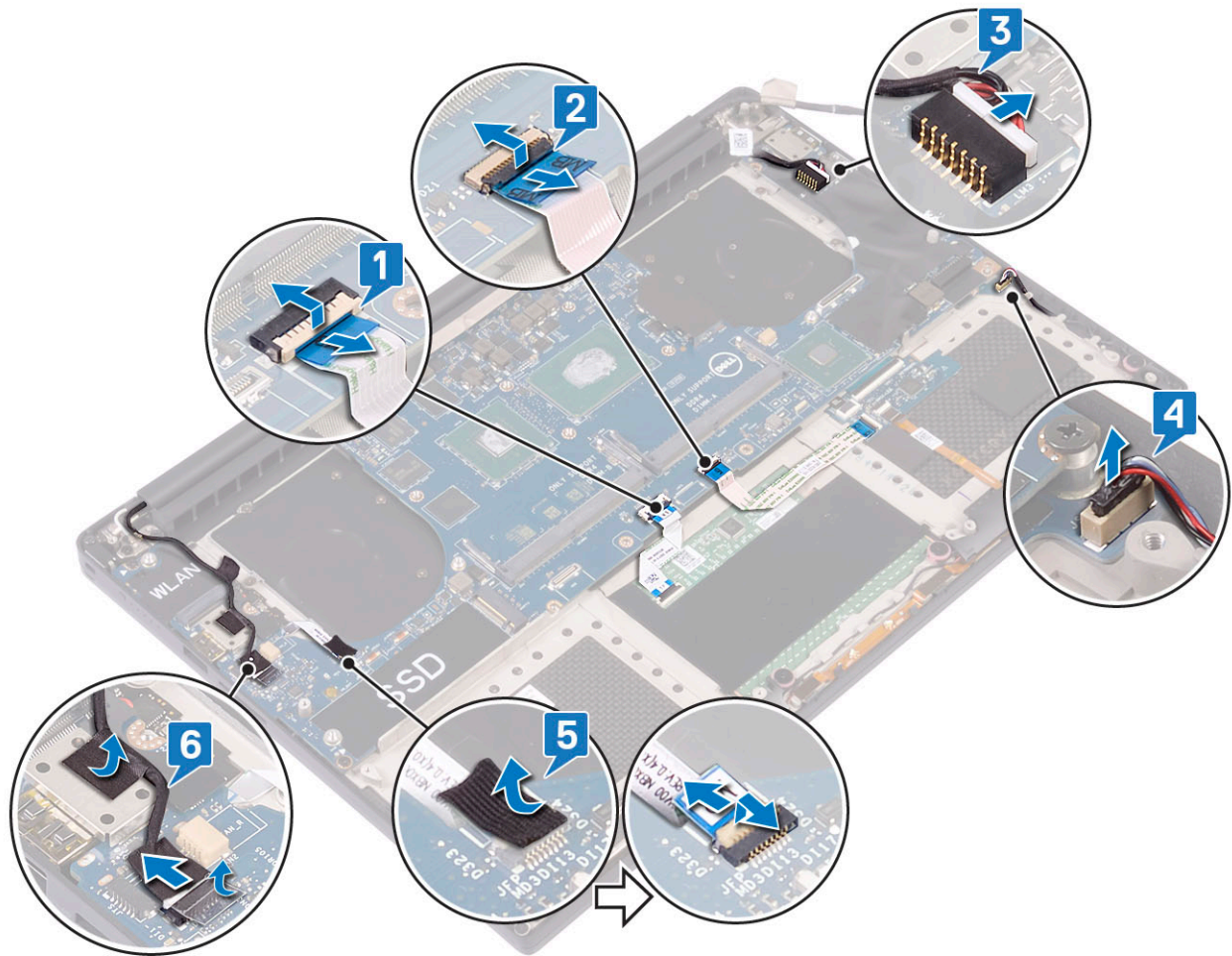
### Removing the System Board

- 1 Follow the procedures in [Before Working Inside Your Computer](#).
- 2 Remove the:
  - a [base cover](#)
  - b [battery](#)
  - c [fans](#)
  - d [heatsink assembly](#)
  - e [WLAN](#)
  - f [hard drive \(optional\)](#)
  - g [keyboard](#)
  - h [SSD](#)
  - i [memory modules](#)

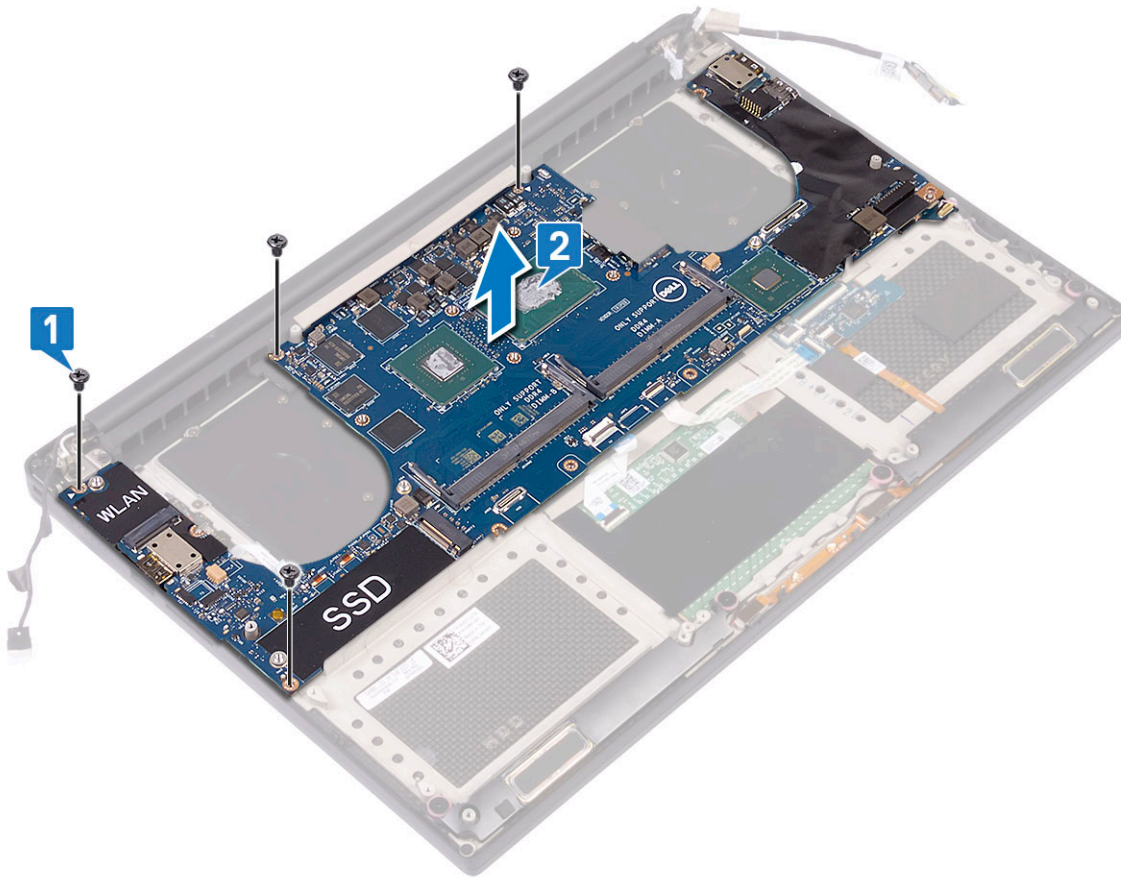
**NOTE:** Your computer's Service Tag is located under the system badge flap. You must enter the Service Tag in the BIOS after you replace the system board.

**NOTE:** Before disconnecting the cables from the system board, note the location of the connectors so that you can reconnect them correctly after you replace the system board.

- 3 To remove the system board:
  - a Lift the latch and disconnect the touchpad cable [1].
  - b Lift the latch and disconnect the keyboard controller board cable [2].
  - c Disconnect the power connector port cable from the system board [3].
  - d Disconnect the speaker cable from the connector from the system board [4].
  - e Peel the adhesive tape and lift the latch to remove the fingerprint cable [5]
  - f Lift the plastic lever and disconnect the display touchscreen cable [6]
  - g Peel the adhesive tape to release the touch screen cable.



- 4 Perform the following steps to remove the system board from the chassis:
  - a Remove the M2x4 (4) screws that secure the system board to the computer [1].
  - b Lift the system board from the computer [2].



## Installing the System Board

- 1 Align the system board on the computer.
- 2 Replace the M2x4 (4) screws that secure the system board to the palm-rest assembly.
- 3 Connect the power-adaptor port cable, speaker cable, keyboard-control board cable, touchpad cable, and touch-screen cable to the system board.
- 4 Connect the display cable to the system board.
- 5 Align the display-cable bracket with the screw hole on the system board and replace the screw (2).
- 6 Install the:
  - a [Memory](#)
  - b [SSD](#)
  - c [Keyboard](#)
  - d [Heatsink assembly](#)
  - e [Fans](#)
  - f [Hard drive\(optional\)](#)
  - g [WLAN card](#)
  - h [Battery](#)
  - i [Base cover](#)
- 7 Follow the procedures in [After Working Inside Your Computer](#).



# Palm rest

## Removing the Palm rest Assembly

- 1 Follow the procedures in [Before Working Inside Your Computer](#).
- 2 Remove the:
  - a [base cover](#)
  - b [battery](#)
  - c [WLAN card](#)
  - d [hard drive](#)
  - e [fans](#)
  - f [speakers](#)
  - g [heatsink assembly](#)
  - h [memory modules](#)
  - i [system board](#)
  - j [display assembly](#)
  - k [power adapter port](#)
  - l [keyboard](#)
- 3 After performing the above steps, we are left with the palm rest assembly.

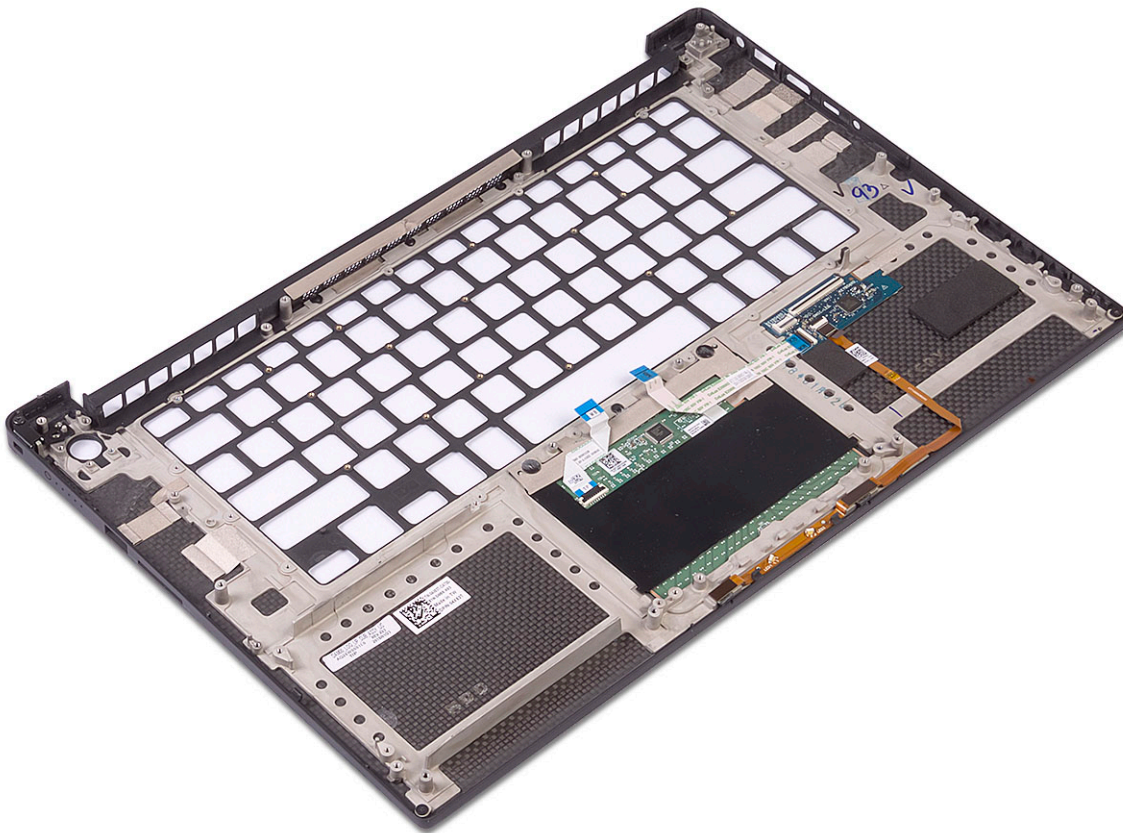


Table 3. Palm rest options

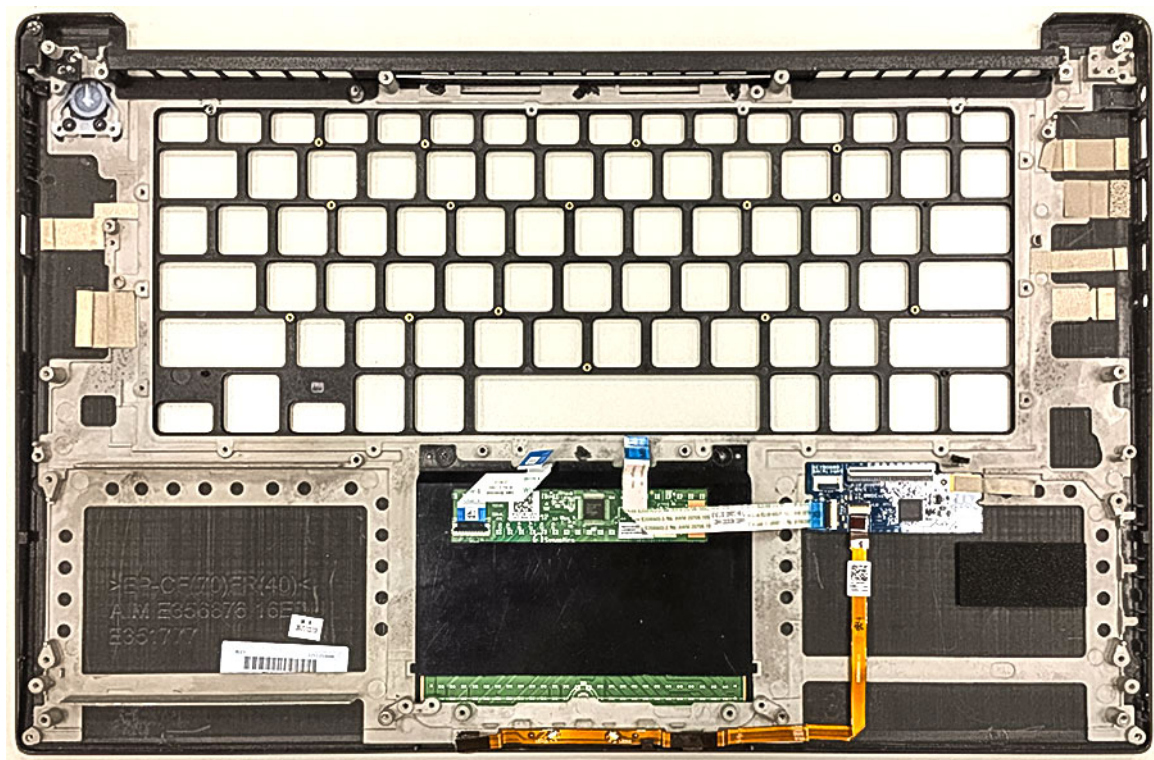


Figure 2. Power button with light indicator

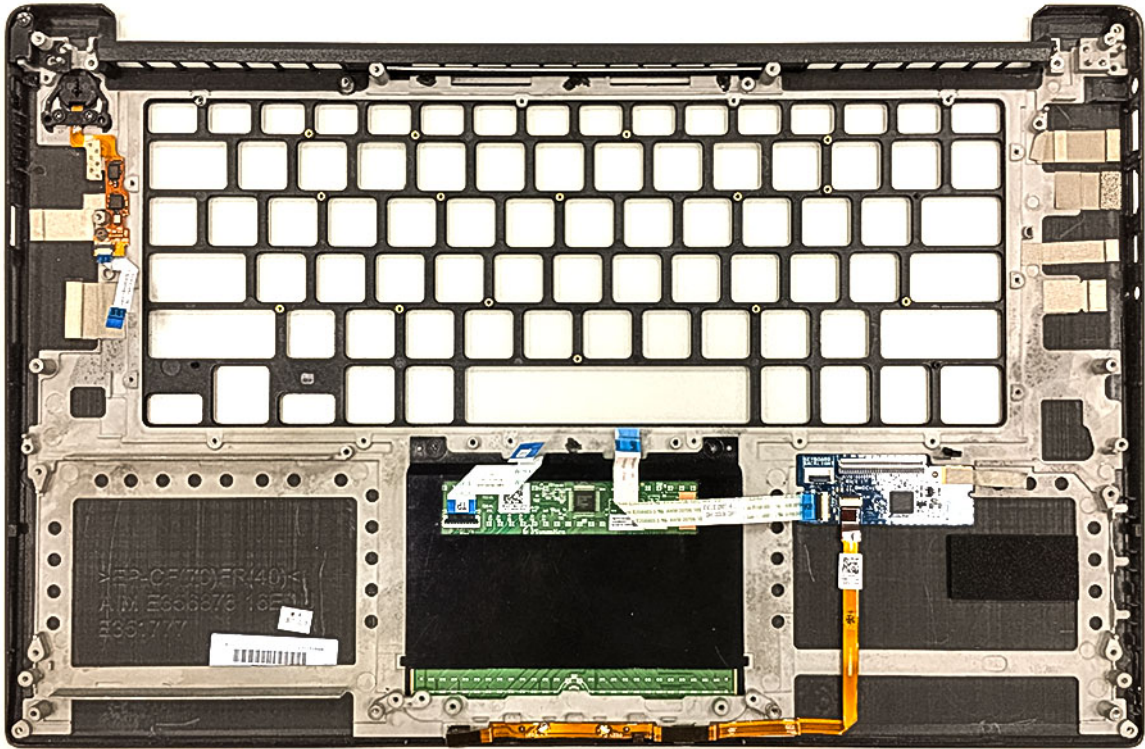


Figure 3. Fingerprint reader function without light indicator

## Installing the Palm rest Assembly

- 1 Align the palm rest assembly on the display assembly.
- 2 Tighten the screws to secure the display hinges to the palm rest assembly.
- 3 Press down on the palm rest assembly to close the display.
- 4 Install the:
  - a keyboard
  - b system board
  - c power adapter port
  - d display assembly
  - e fans
  - f heatsink assembly
  - g speakers
  - h WLAN card
  - i hard drive
  - j memory modules
  - k battery
  - l base cover
- 5 Follow the procedures 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.

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

## Running the ePSA Diagnostics

- 1 Invoke diagnostics boot by either of the methods suggested above
- 2 Once on one time boot menu use up/down arrow key to navigate to ePSA or diagnostics and press <return> key to launch  
Fn+PWR will flash diagnostics boot selected on screen and launch ePSA/diagnostics directly.
- 3 On the boot menu screen, select the **Diagnostics** option.
- 4 Press the arrow in the lower-right corner to go to the page listing.  
The items detected are listed and will be tested
- 5 If there are any issues, error codes are displayed.  
Note the error code and validation number and contact Dell.

## To run a diagnostic test on a specific device

- 1 Press Esc and click **Yes** to stop the diagnostic test.
- 2 Select the device from the left pane and click **Run Tests**.
- 3 If there are any issues, error codes are displayed.  
Note the error code and validation number and contact Dell.

## 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.