

# Dell Vostro 5390

## 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

**ⓘ NOTE:** The images in this document may differ from your computer depending on the configuration you ordered.

# After working inside your computer

 **CAUTION:** Leaving stray or loose screws inside your computer may severely damage your computer.

- 1 Replace all screws and ensure that no stray screws remain inside your computer.
- 2 Connect any external devices, peripherals, or cables you removed before working on your computer.
- 3 Replace any media cards, discs, or any other parts that you removed before working on your computer.
- 4 Connect your computer and all attached devices to their electrical outlets.
- 5 Turn on your computer.

# Technology and components

**NOTE:** Instructions provided in this section are applicable on computers shipped with Windows 10 operating system. Windows 10 is factory-installed with this computer.

Topics:

- [DDR4](#)
- [HDMI 1.4](#)
- [USB features](#)

## DDR4

DDR4 (double data rate fourth generation) memory is a higher-speed successor to the DDR2 and DDR3 technologies and allows up to 512 GB in capacity, compared to the DDR3's maximum of 128 GB per DIMM. DDR4 synchronous dynamic random-access memory is keyed differently from both SDRAM and DDR to prevent the user from installing the wrong type of memory into the system.

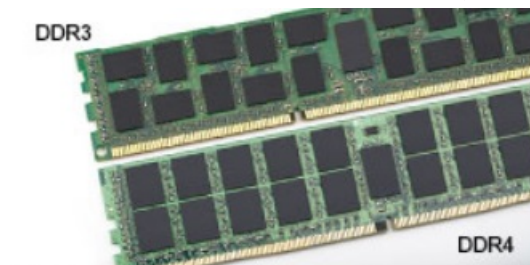
DDR4 needs 20 percent less or just 1.2 volts, compared to DDR3 which requires 1.5 volts of electrical power to operate. DDR4 also supports a new, deep power-down mode that allows the host device to go into standby without needing to refresh its memory. Deep power-down mode is expected to reduce standby power consumption by 40 to 50 percent.

## DDR4 Details

There are subtle differences between DDR3 and DDR4 memory modules, as listed below.

Key notch difference

The key notch on a DDR4 module is in a different location from the key notch on a DDR3 module. Both notches are on the insertion edge but the notch location on the DDR4 is slightly different, to prevent the module from being installed into an incompatible board or platform.



**Figure 1. Notch difference**

Increased thickness

DDR4 modules are slightly thicker than DDR3, to accommodate more signal layers.

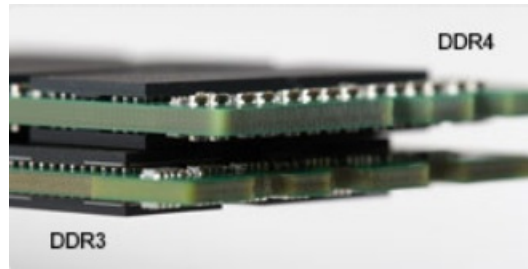


Figure 2. Thickness difference

Curved edge

DDR4 modules feature a curved edge to help with insertion and alleviate stress on the PCB during memory installation.



Figure 3. Curved edge

## Memory Errors

Memory errors on the system display the new ON-FLASH-FLASH or ON-FLASH-ON failure code. If all memory fails, the LCD does not turn on. Troubleshoot for possible memory failure by trying known good memory modules in the memory connectors on the bottom of the system or under the keyboard, as in some portable systems.

**NOTE:** The DDR4 memory is imbedded in board and not a replaceable DIMM as shown and referred.

## HDMI 1.4

This topic explains the HDMI 1.4 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 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 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 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.

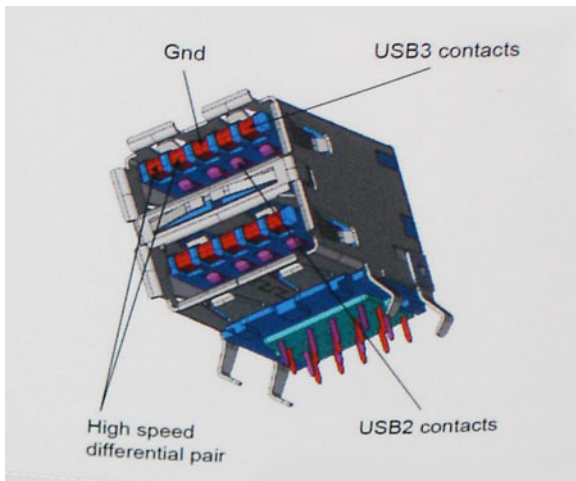


# Speed

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 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.



# 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 list

The table provides the list of screws that are used for securing different components.

## Base cover

### Removing the base cover

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

The following image indicates the location of the base cover and provides a visual representation of the removal procedure.



**4x**  
M2x6

1



- 1 Loosen the three captive screws on the base cover.
- 2 Remove the four screws (M2x6) that secure the base cover to the palm-rest and keyboard assembly.
- 3 Pry the base cover starting from the top-left corner of the palm-rest and keyboard assembly.
- 4 Lift the base cover off the palm-rest and keyboard assembly.

## Installing the base cover

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the base cover and provides a visual representation of the installation procedure.



**4x**  
M2x6



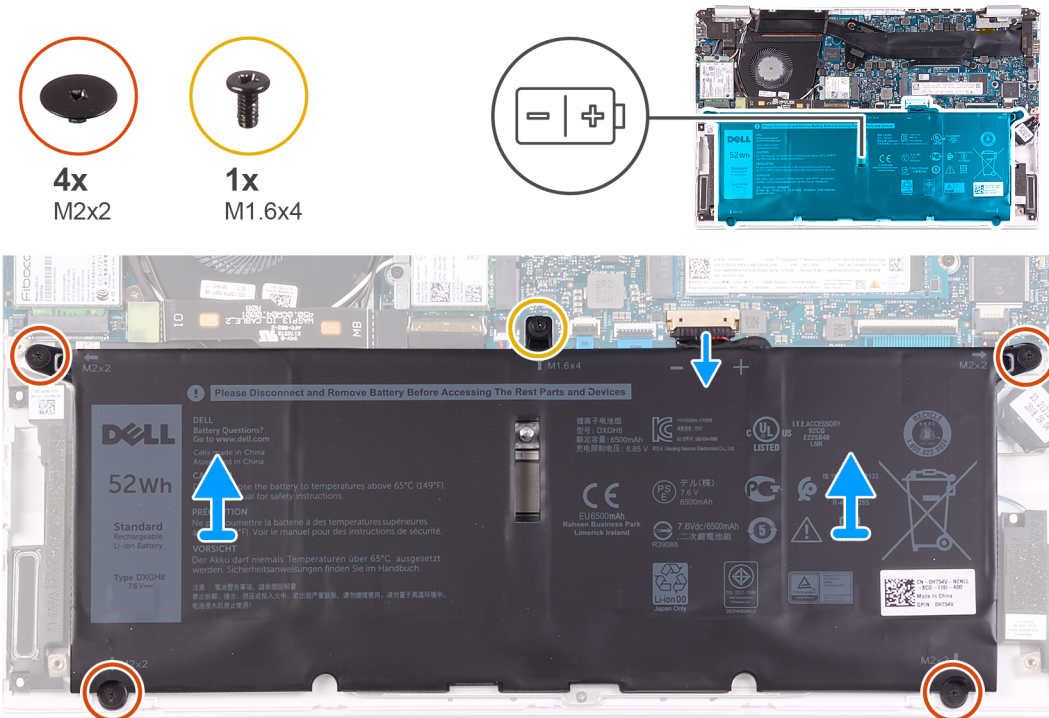
- 1 Place the computer with the hinges facing towards you.
  - 2 Align the base cover on the palm-rest and keyboard assembly, and snap the base cover into place.
  - 3 Replace the four screws (M2x6) that secure the base cover to the palm-rest and keyboard assembly.
  - 4 Tighten the three captive screws that secure the base cover to the palm-rest and keyboard assembly.
- 1 Follow the procedure in [After working inside your computer](#).

## Battery

### Removing the battery

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

The following image indicates the location of the battery and provides a visual representation of the removal procedure.

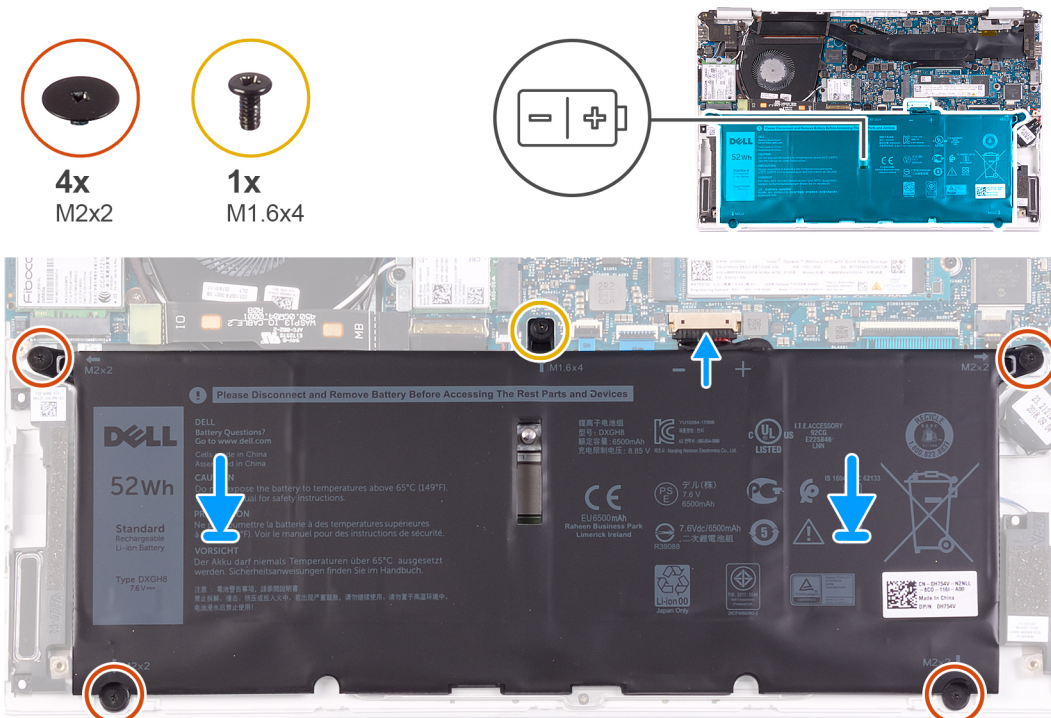


- 1 Disconnect the battery cable from the system board.
- 2 Remove the four screws (M2x2) that secure the battery to the palm-rest and keyboard assembly.
- 3 Remove the screw (M1.6x4) that secures the battery to the system board and palm-rest and keyboard assembly.
- 4 Lift the battery off the palm-rest and keyboard assembly.

## Installing the battery

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the battery and provides a visual representation of the installation procedure.



- 1 Connect the battery cable to the system board.
- 2 Replace the four screws (M2x2) that secure the battery to the palm-rest and keyboard assembly.
- 3 Replace the screw (M1.6x4) that secures the battery to the system board and palm-rest and keyboard assembly.

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

## Coin-cell battery

### Removing the coin-cell battery

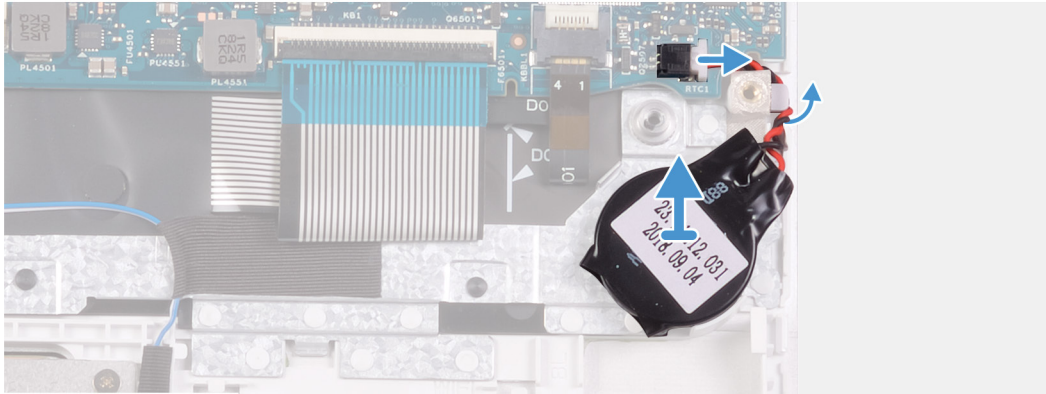
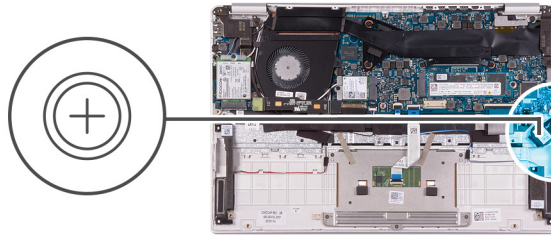
- 1 Follow the procedure in [Before working inside your computer](#).

**CAUTION:** Removing the coin-cell battery resets the BIOS setup program's settings to default. It is recommended that you note the BIOS setup program's settings before removing the coin-cell battery.

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

The following image indicates the location of the coin-cell battery and provides a visual representation of the removal procedure.



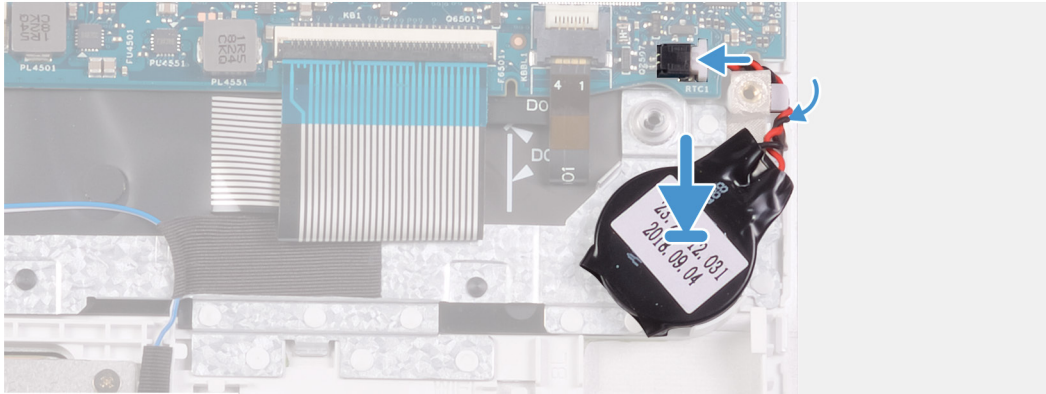
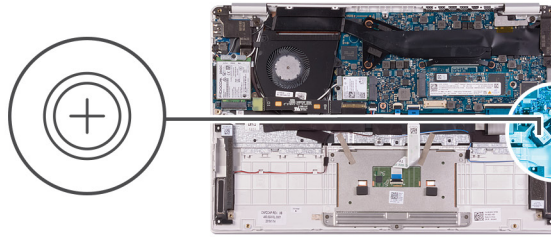


- 1 Disconnect the coin-cell battery cable from the system board.
- 2 Remove the coin-cell battery cable from the routing guide.
- 3 Peel the coin-cell battery off the palm-rest and keyboard assembly.

## Installing the coin-cell battery

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the coin-cell battery and provides a visual representation of the installation procedure.



- 1 Adhere the coin-cell battery to the slot on the palm-rest and keyboard assembly.
  - 2 Route the coin-cell battery cable through the routing guide.
  - 3 Connect the coin-cell battery cable to the system board.
- 
- 1 Install the [battery](#).
  - 2 Install the [base cover](#).
  - 3 Follow the procedure in [After working inside your computer](#).

## Solid-state drive

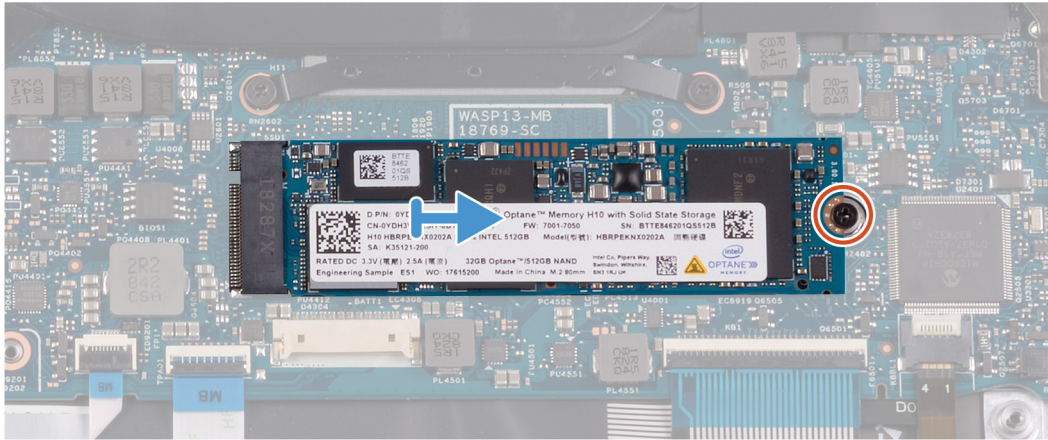
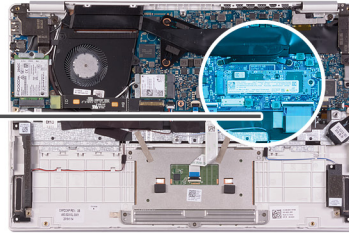
### Removing the M.2 2280 solid-state drive

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

The following image indicates the location of the solid-state drive and provides a visual representation of the removal procedure.



1x  
M2x2.5



- 1 Remove the screw (M2x2.5) that secures the solid-state drive to the system board.
- 2 Slide and remove the solid-state drive off the solid-state drive slot on the system board.

## Installing the M.2 2280 solid-state drive

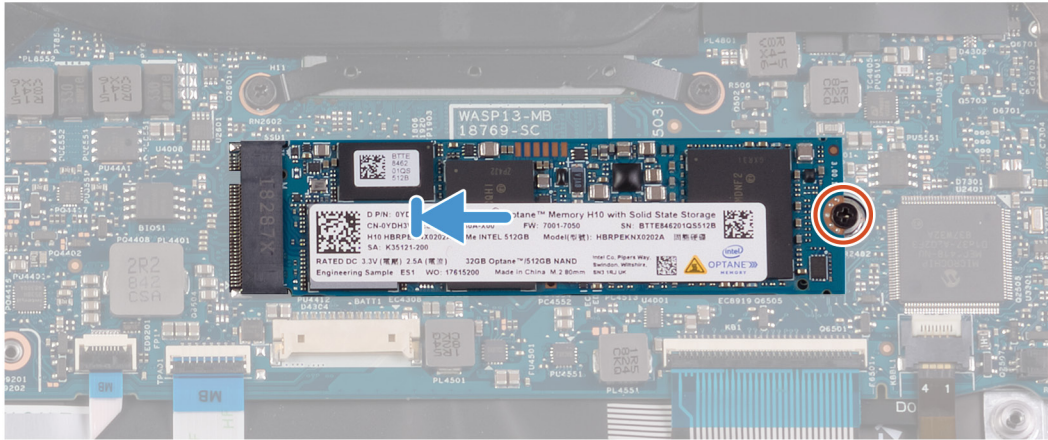
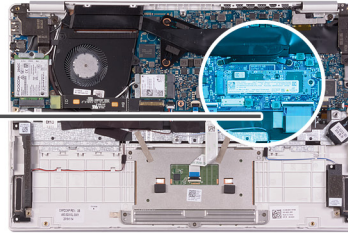
If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the solid-state drive and provides a visual representation of the installation procedure.





1x  
M2x2.5



- 1 Align the notch on the solid-state drive with the tab on the solid-state drive slot and slide the solid-state drive into the solid-state drive slot on the system board.
- 2 Replace the screw (M2x2.5) that secures the solid-state drive to the system board.
  - 1 Install the [battery](#).
  - 2 Install the [base cover](#).
  - 3 Follow the procedure in [After working inside your computer](#).

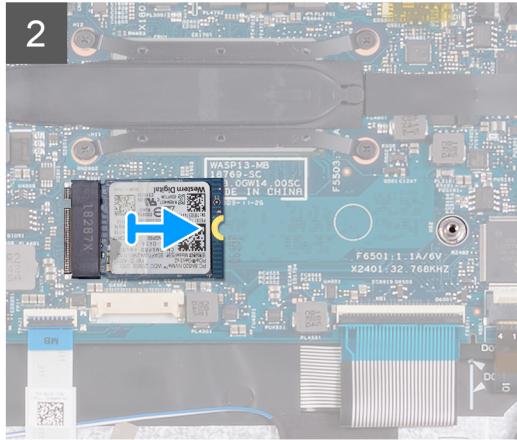
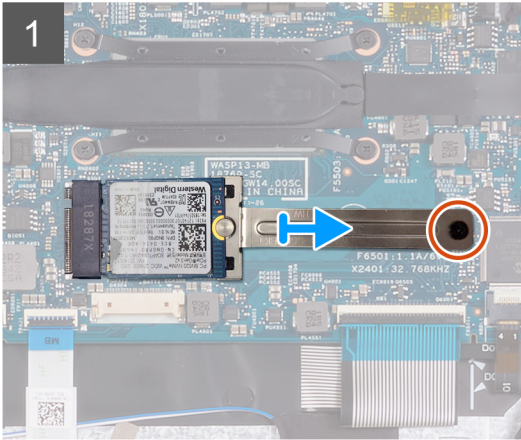
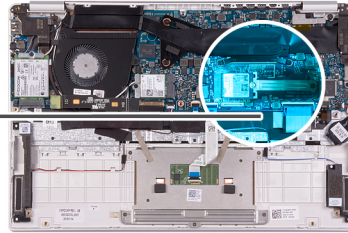
## Removing the M.2 2230 solid-state drive

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

The following image indicates the location of the solid-state drive and provides a visual representation of the removal procedure.



1x  
M2x2.5



- 1 Remove the screw (M2x2.5) that secures the solid-state drive bracket to the system board.
- 2 Slide and remove the solid-state drive bracket off the solid-state drive on the system board.
- 3 Slide and remove the solid-state drive off the solid-state drive slot on the system board.

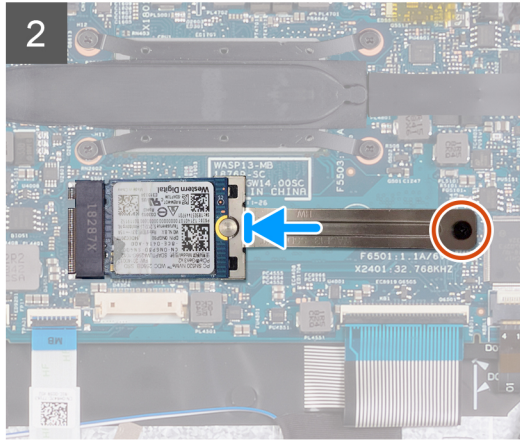
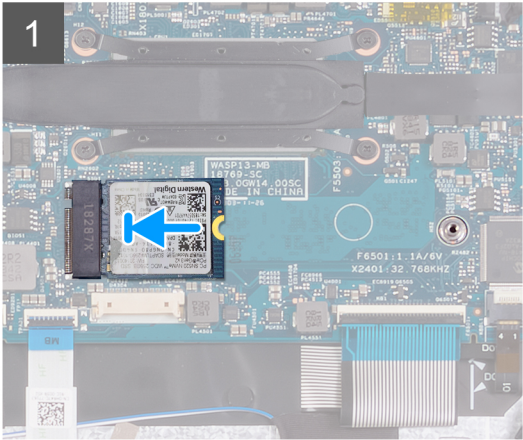
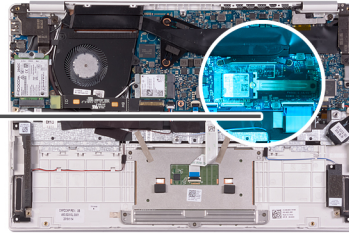
## Installing the M.2 2230 solid-state drive

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the solid-state drive and provides a visual representation of the installation procedure.



1x  
M2x2.5



- 1 Align the notch on the solid-state drive with the tab on the solid-state drive slot and slide the solid-state drive into the solid-state drive slot on the system board.
- 2 Slide the solid-state bracket on to the solid-state drive on the system board.
- 3 Replace the screw (M2x2.5) that secures the solid-state drive to the system board.

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

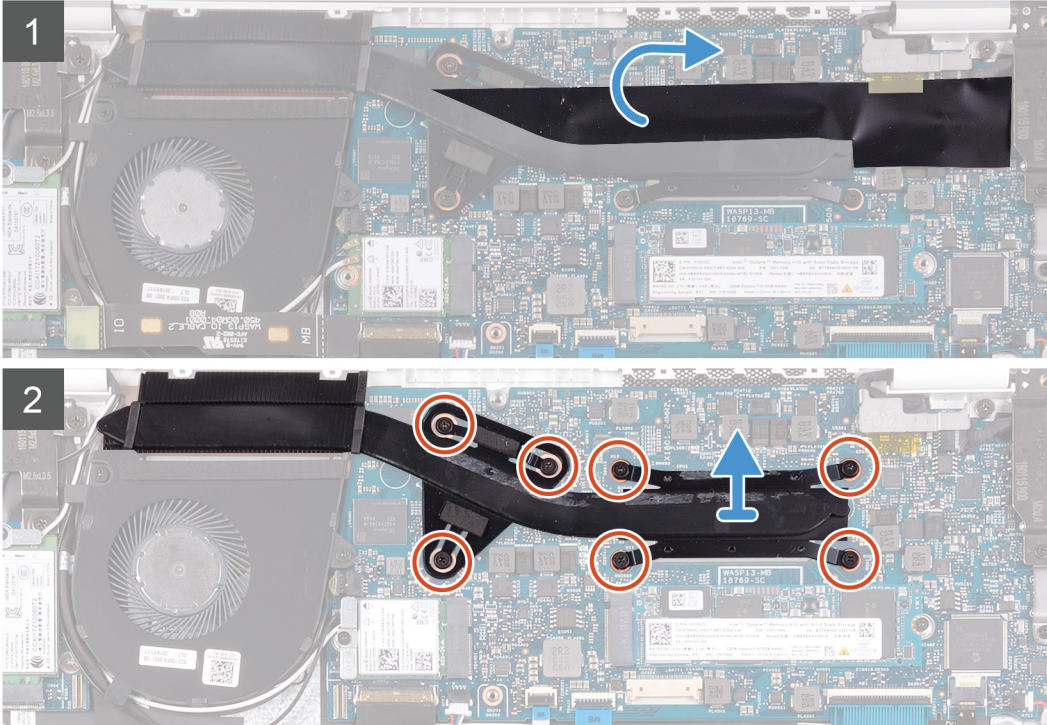
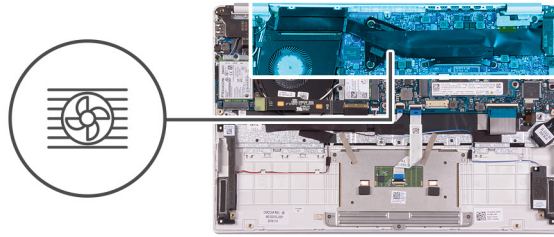
## Heat sink

### Removing the heat sink

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

The following image indicates the location of the heat sink and provides a visual representation of the removal procedure.



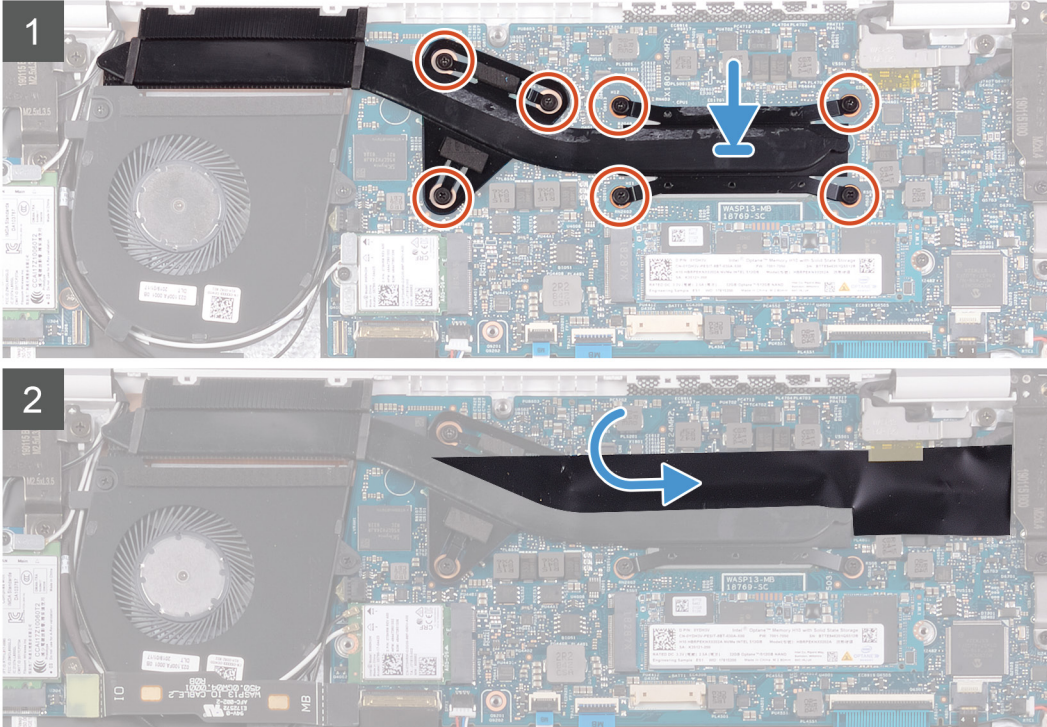
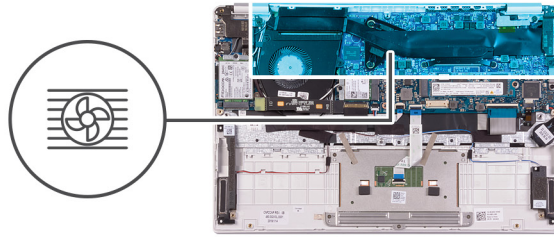


- 1 Peel the tape that secures the heat sink to the system board.
- 2 In the reverse sequential order (7>6>5>4>3>2>1), loosen the seven captive screws that secure the heat sink to the system board.
- 3 Lift the heat sink off the system board.

## Installing the heat sink

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the base cover and provides a visual representation of the installation procedure.



- 1 Align and place the screw holes on the heat sink with the screw holes on the system board.
  - 2 In sequential order (as indicated on the heat sink), tighten the seven captive screws that secure the heat sink to the system board.
  - 3 Adhere the tape that secures the heat sink to the system board.
- 1 Install the [battery](#).
  - 2 Install the [base cover](#).
  - 3 Follow the procedure in [After working inside your computer](#).

## Fan

### Removing the fan

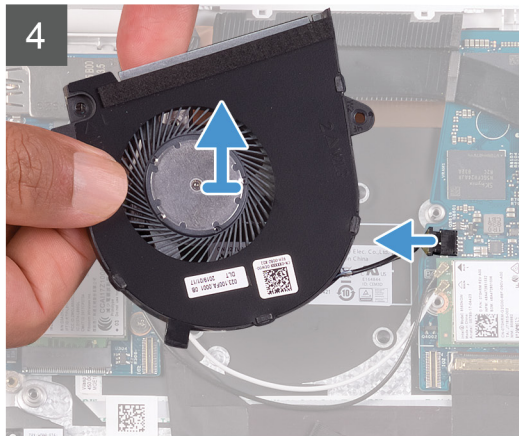
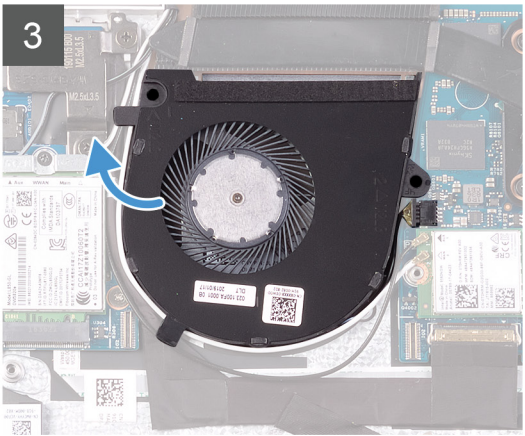
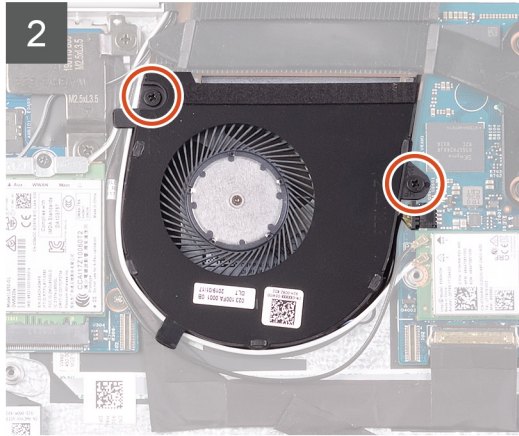
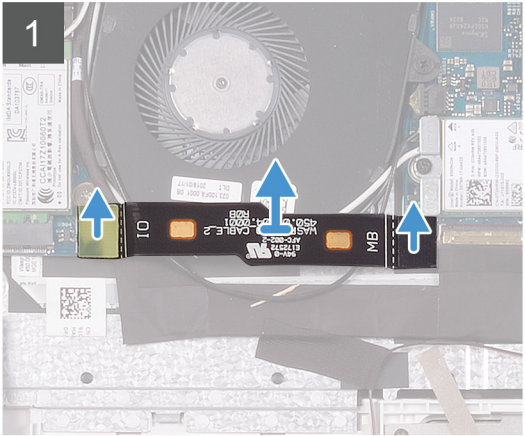
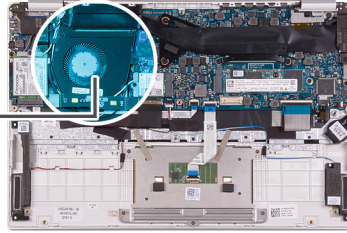
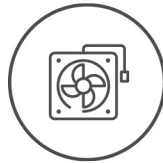
- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the [base cover](#).
- 3 Remove the [battery](#).

The following image indicates the location of fan and provides a visual representation of the removal procedure.





2x  
M2x3



1 Disconnect the I/O-board cable from the system board and I/O board.

**ⓘ | NOTE: This step is only applicable for computers shipped with a WWAN configuration.**

2 Remove the two (M2x3) screws that secure the fan to the system board.

3 Lift the fan slightly off the palm-rest and keyboard assembly.

4 Disconnect the fan cable from the system board and completely lift the fan off the palm-rest and keyboard assembly.

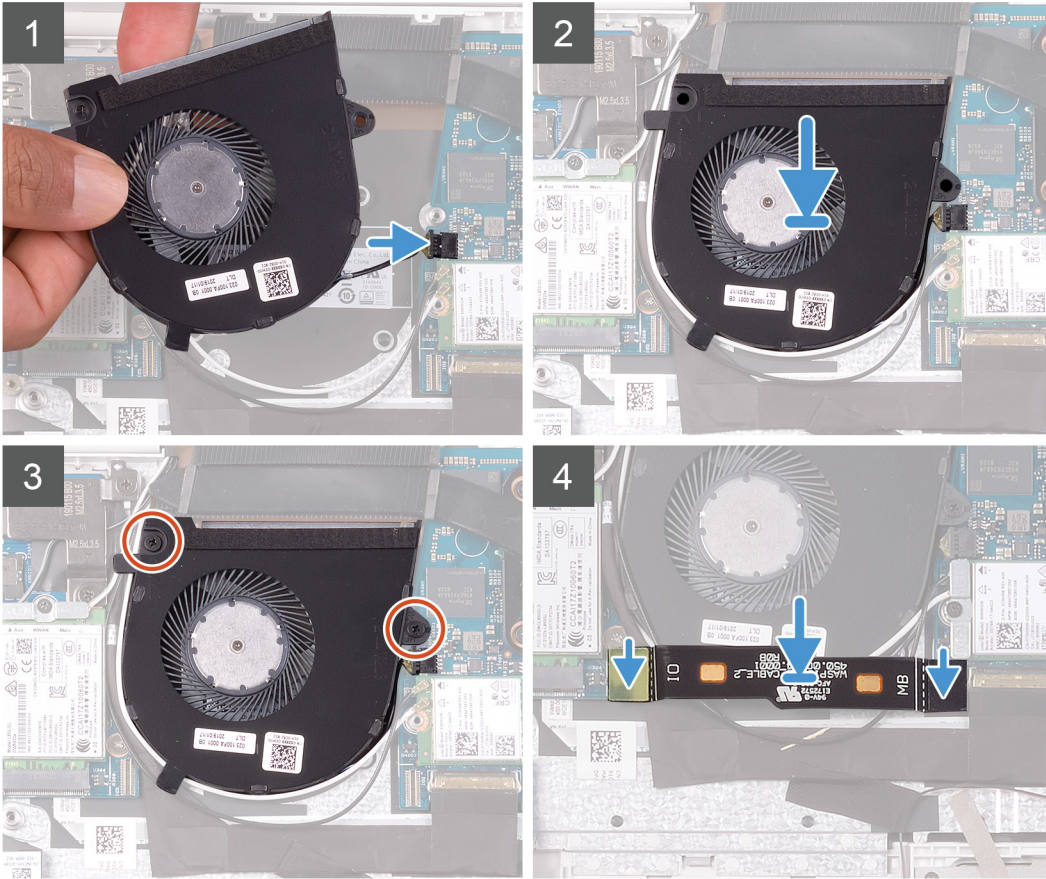
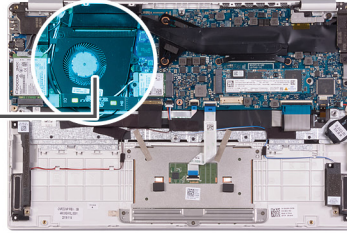
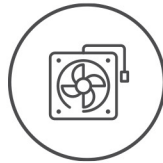
## Installing the fan

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of fan and provides a visual representation of the installation procedure.



2x  
M2x3



- 1 Connect the fan cable to the system board.
- 2 Align the screw holes on the fan with the screw holes on the palm-rest and keyboard assembly.
- 3 Replace the two (M2x3) screws that secure the fan to the palm-rest and keyboard assembly.
- 4 Connect the I/O-board cable to the system board and I/O board.

**NOTE:** This step is only applicable for computers shipped with a WWAN configuration.

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

## Speakers

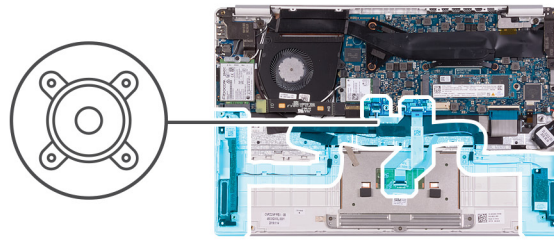
### Removing the speakers

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



- 3 Remove the **battery**.

The following image indicates the location of speakers and provides a visual representation of the removal procedure.



- 1 Open the latch and disconnect the touchpad cable from the system board.
- 2 Disconnect the speaker cable from the system board.
- 3 Peel the tapes that secure the speaker cable to the palm-rest and keyboard assembly.
- 4 Note the routing of the speaker cable and remove the speaker cable from the routing guides on the palm-rest and keyboard assembly.

**NOTE:** Note the position of the rubber grommets before lifting the speakers.

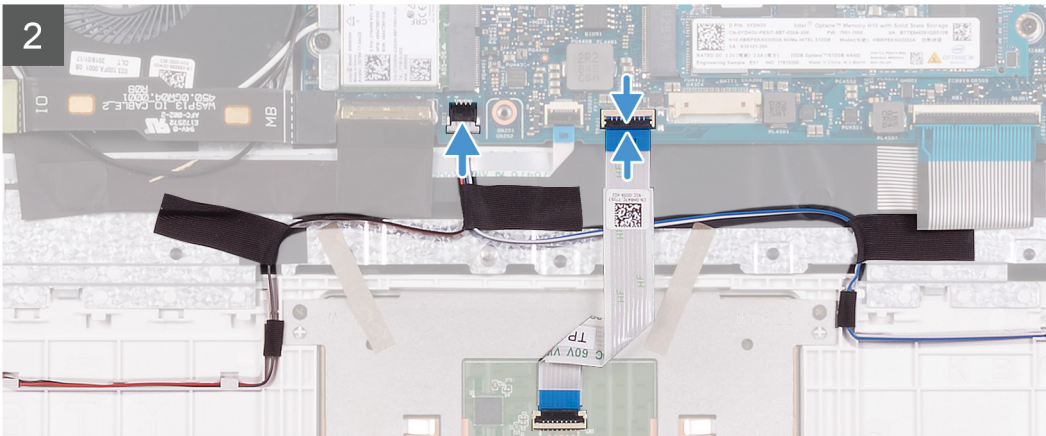
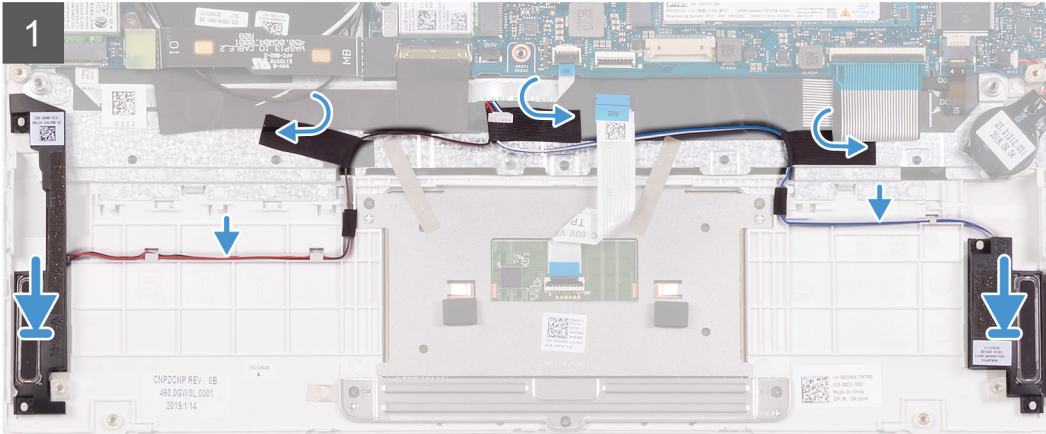
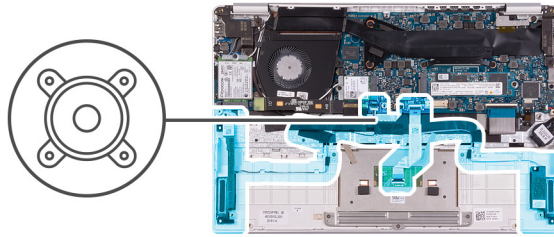
- 5 Lift the speakers, along with the cable, off the palm-rest and keyboard assembly.

## Installing the speakers

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of speakers and provides a visual representation of the installation procedure.





- 1 Using the alignment posts and rubber grommets, place the speakers in the slots on the palm-rest and keyboard assembly.
- 2 Route the speaker cable through the routing guides on the palm-rest and keyboard assembly.
- 3 Adhere the tapes that secure the speaker cable to the palm-rest and keyboard assembly.
- 4 Connect the speaker cable to the system board.
- 5 Connect the touchpad cable to the system board and close the latch to secure the cable.

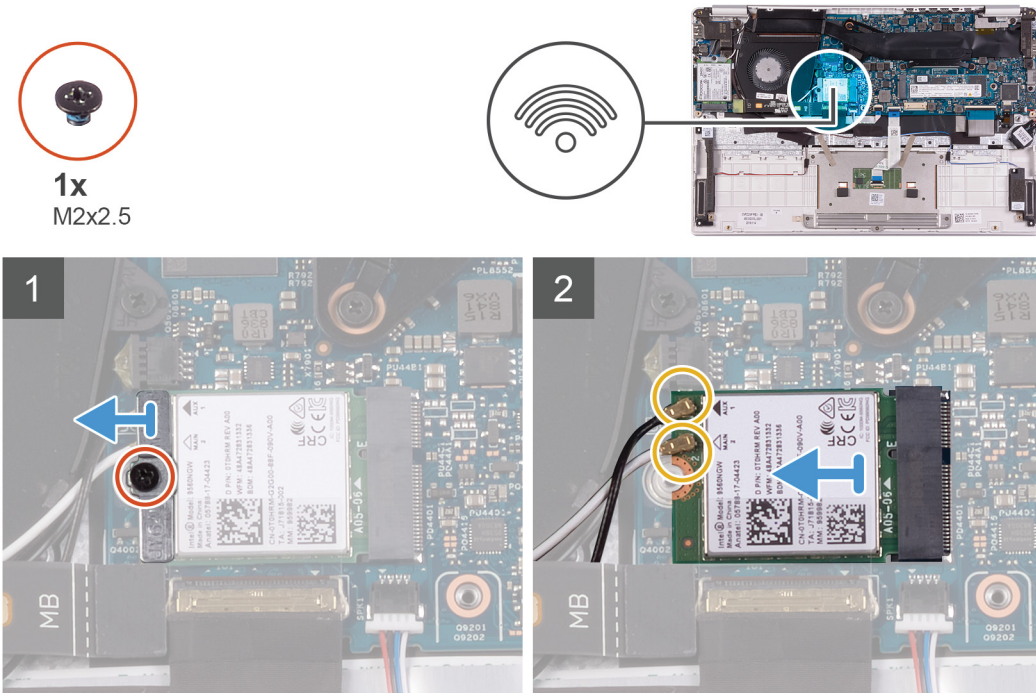
- 1 Install the [battery](#).
- 2 Install the [base cover](#).
- 3 Follow the procedure in [After working inside your computer](#).

## WLAN card

### Removing the WLAN card

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

The following image indicates the location of WLAN card and provides a visual representation of the removal procedure.



- 1 Remove the screw (M2x2.5) that secures the WLAN-card bracket to the WLAN card and lift the WLAN-card bracket off the WLAN card.
- 2 Disconnect the antenna cables from the WLAN card.
- 3 Slide and remove the WLAN card from the WLAN-card slot.

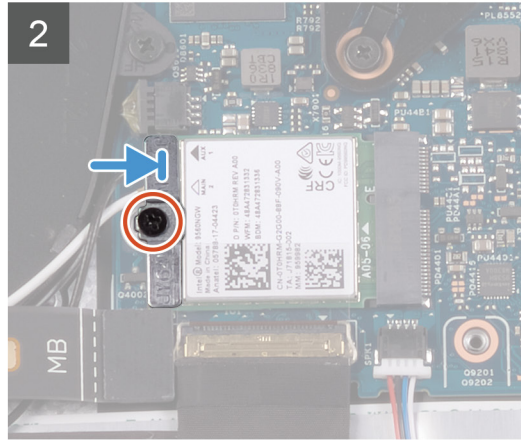
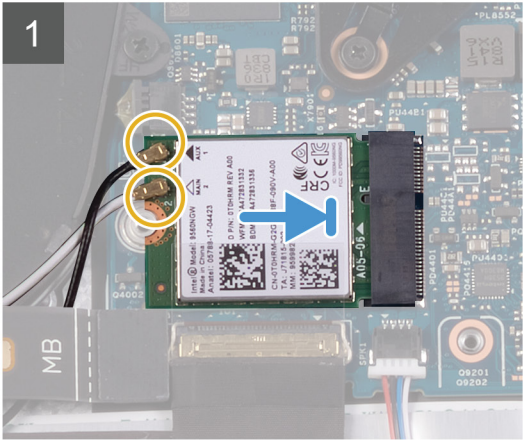
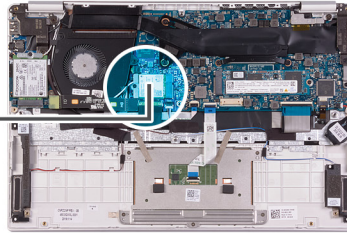
## Installing the WLAN card

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of WLAN card and provides a visual representation of the installation procedure.



1x  
M2x2.5



- 1 Connect the antenna cables to the WLAN card.
- 2 Align the notch on the WLAN card with the tab on the WLAN card slot and insert the WLAN card at an angle into the WLAN card slot.
- 3 Align and place the WLAN card bracket on the WLAN card.
- 4 Replace the screw (M2x2.5) to secure the WLAN card bracket to the WLAN card.

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

## WWAN card

### Removing the WWAN card

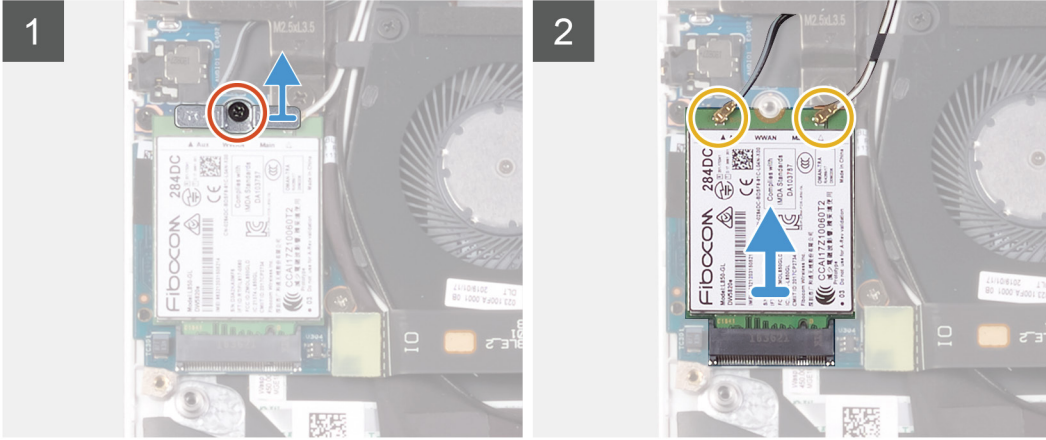
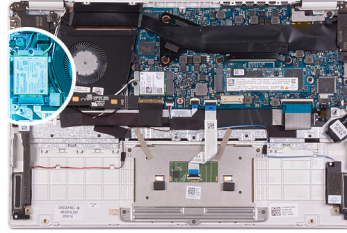
**NOTE:** This procedure is only applicable for computers shipped with a WWAN configuration.

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

The following image indicates the location of WWAN card and provides a visual representation of the removal procedure.



1x  
M2x2.5



- 1 Remove the screw (M2x2.5) that secures the WWAN card bracket to the WWAN card.
- 2 Note the alignment of the WWAN-card bracket before lifting it off the WWAN card.
- 3 Disconnect the antenna cables from the WWAN card.
- 4 Slide and remove the WWAN card from the WWAN card slot.

## Installing the WWAN card

**NOTE:** This procedure is only applicable for computers shipped with a WWAN configuration.

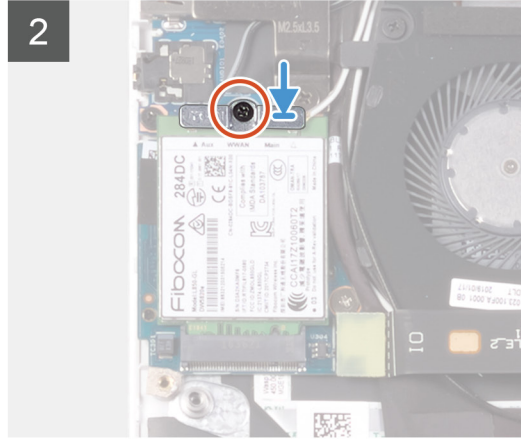
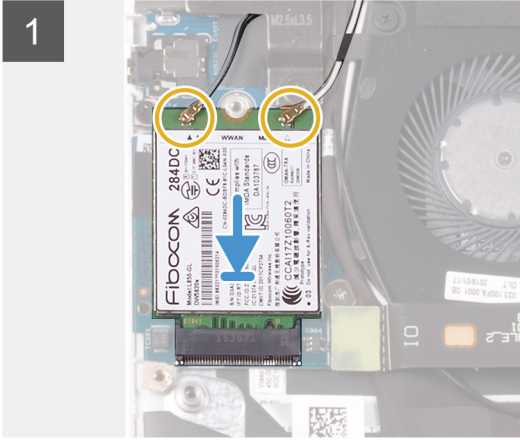
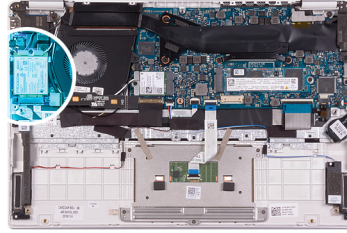
If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of WWAN card and provides a visual representation of the installation procedure.





1x  
M2x2.5



- 1 Align the notch on the WWAN card with the tab on the WWAN-card slot and insert the WWAN card at an angle into the WWAN-card slot.
  - 2 Connect the antenna cables to the WWAN card and align the WWAN-card bracket on the WWAN card.
  - 3 Replace the screw (M2x2.5) that secures the WWAN bracket to the WWAN card.
- 1 Install the [battery](#).
  - 2 Install the [base cover](#).
  - 3 Follow the procedure in [After working inside your computer](#).

## Touchpad

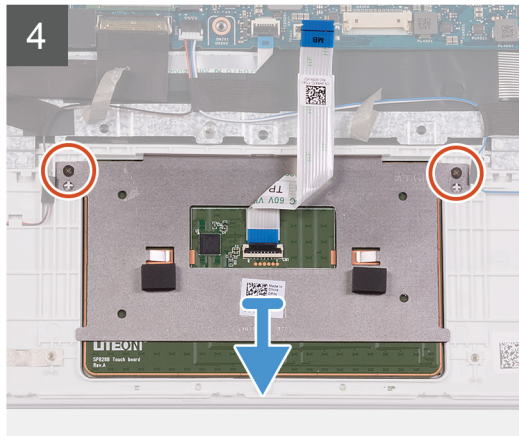
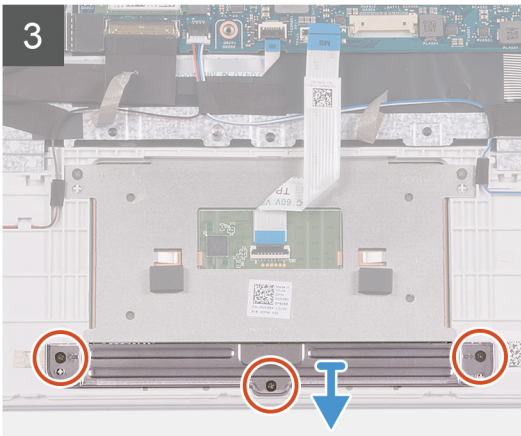
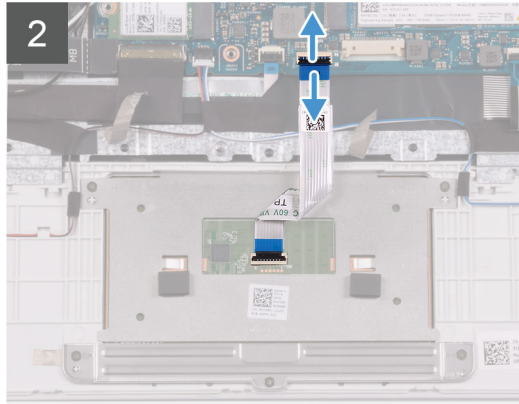
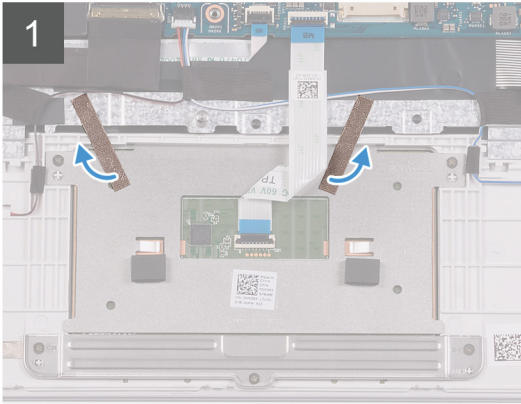
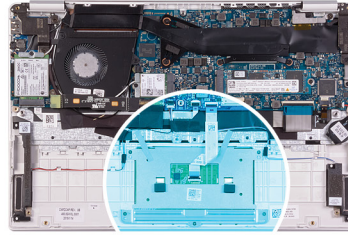
### Removing the touchpad

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

The following image indicates the location of touchpad and provides a visual representation of the removal procedure.



5x  
M1.6x2



- 1 Peel the tapes that secure the touchpad to the palm-rest and keyboard assembly.
- 2 Open the latch and disconnect the touchpad cable from the system board.
- 3 Remove the three (M1.6x2) screws that secure the touchpad bracket to the palm-rest and keyboard assembly.
- 4 Lift the touchpad bracket off the palm-rest and keyboard assembly.
- 5 Remove the two (M1.6x2) screws that secure the touchpad to the palm-rest and keyboard assembly.
- 6 Lift the touchpad, along with the cable, off the palm-rest and keyboard assembly.

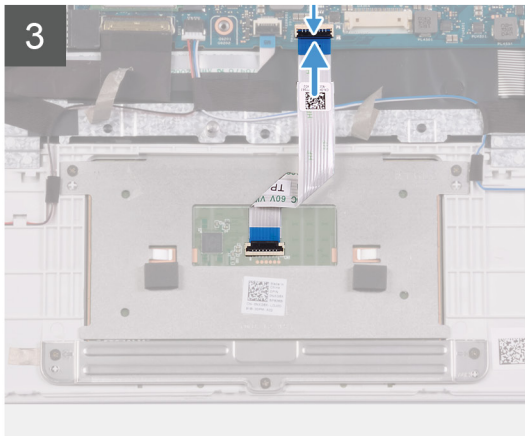
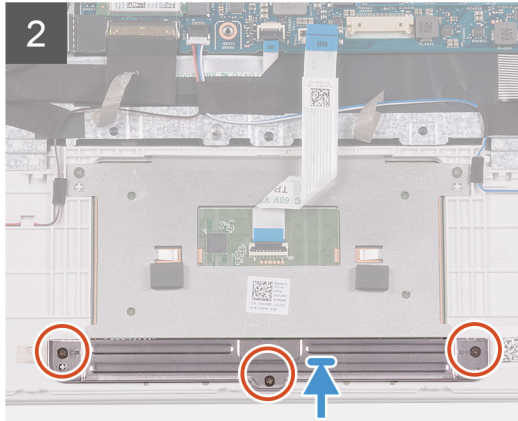
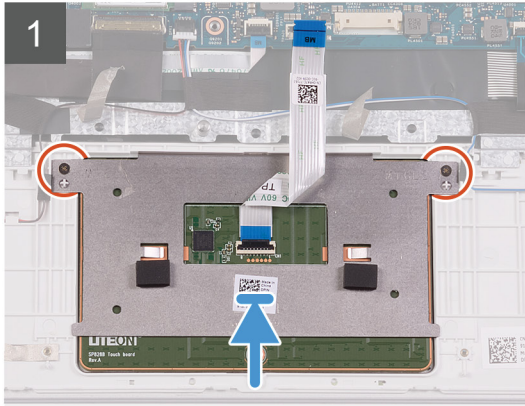
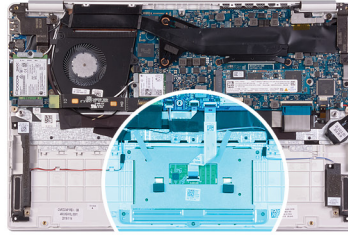
## Installing the touchpad

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of touchpad and provides a visual representation of the installation procedure.



5x  
M1.6x2



- 1 Align and place the touchpad into the slot on the palm-rest and keyboard assembly.
- 2 Replace the two (M1.6x2) screws that secure the touchpad to the palm-rest and keyboard assembly.
- 3 Align and place the touchpad bracket into the slot on the palm-rest and keyboard assembly.
- 4 Replace the three (M1.6x2) screws that secure the touchpad bracket to the palm-rest and keyboard assembly.
- 5 Slide the touchpad cable into its connector on the system board and close the latch to secure the cable.
- 6 Adhere the tape that secures the touchpad to the palm-rest and keyboard assembly.

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

## Power-adapter port

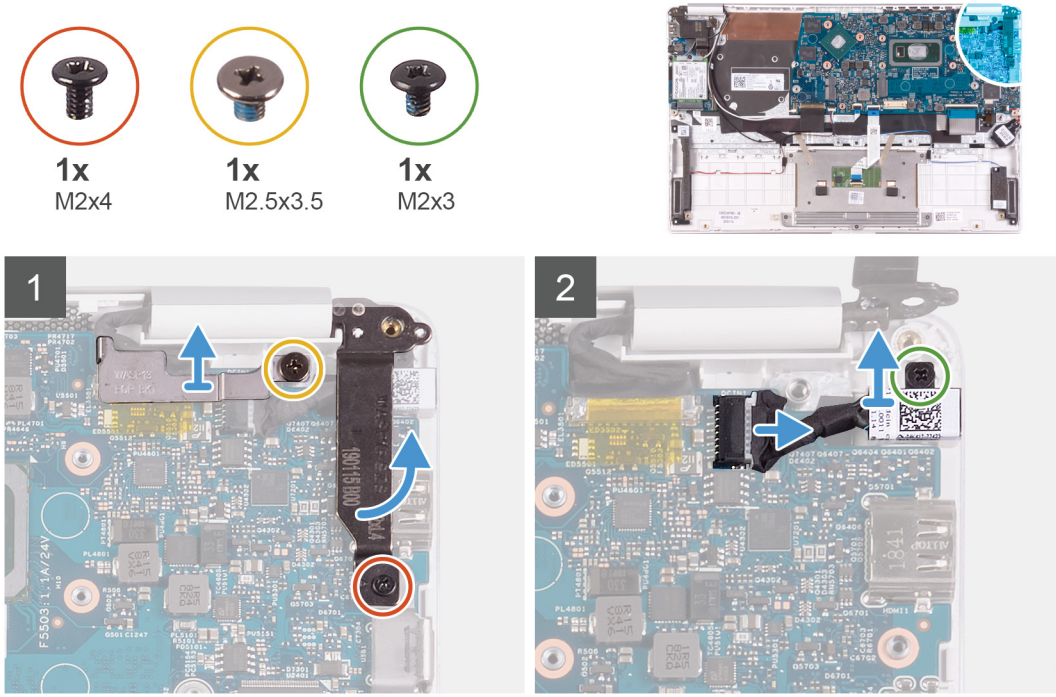
### Removing the power-adapter port

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



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

The following image indicates the location of power-adapter port and provides a visual representation of the removal procedure.



- 1 Remove the screw (M2.5x3.5) that secures the display-cable bracket to the system board.
- 2 Remove the screw (M2x4) that secures the right display hinge to the system board.
- 3 Open the display hinges at an angle of 90 degrees.
- 4 Disconnect the power-adapter port cable from the system board.
- 5 Remove the screw (M2x3) that secures the power-adapter port to the palm-rest and keyboard assembly.
- 6 Lift the power-adapter port, along with its cable, off the palm-rest and keyboard assembly.

## Installing the power-adapter port

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of power-adapter port and provides a visual representation of the installation procedure.





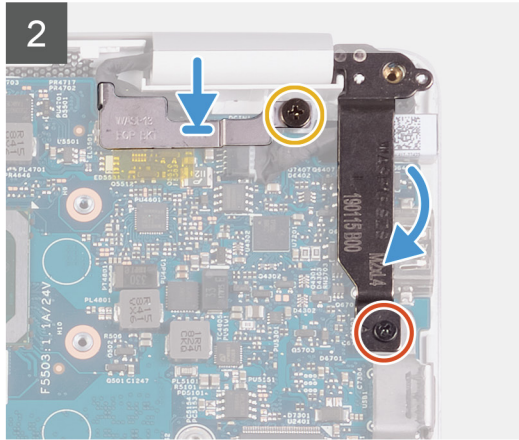
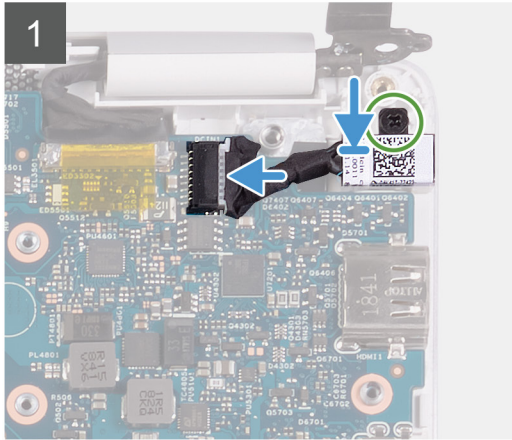
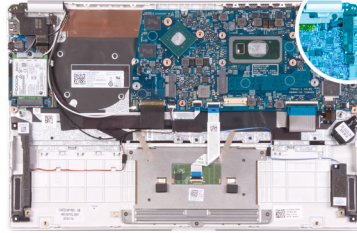
1x  
M2x4



1x  
M2.5x3.5



1x  
M2x3



- 1 Connect the power-adaptor port cable to the system board.
- 2 Replace the screw (M2x3) that secures the power-adaptor port to the palm-rest and keyboard assembly.
- 3 Align and place the display-cable bracket on the system board.
- 4 Replace the screw (M2.5x3.5) that secure the display-cable bracket to the system board.
- 5 Using the alignment posts, close the display hinges.
- 6 Replace the screw (M2x4) that secure the right display hinge to the system board.

- 1 Install the [battery](#).
- 2 Install the [base cover](#).
- 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 [base cover](#).
- 3 Remove the [battery](#).

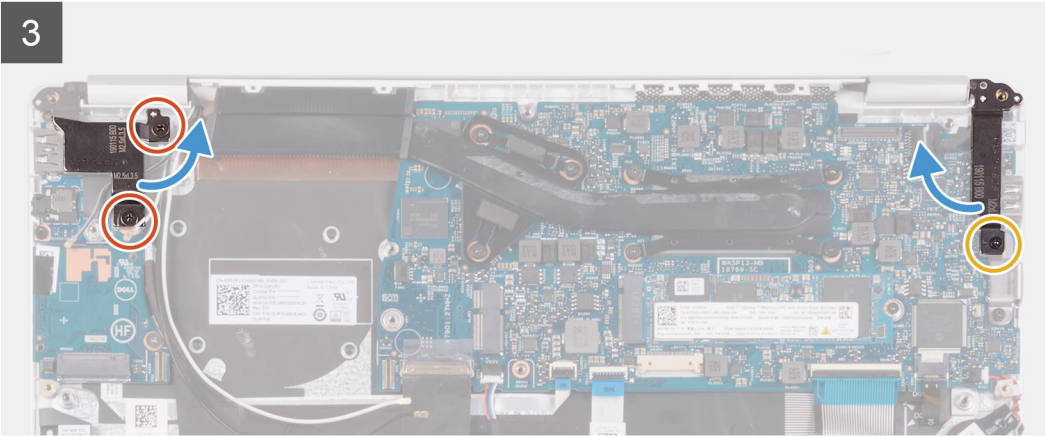
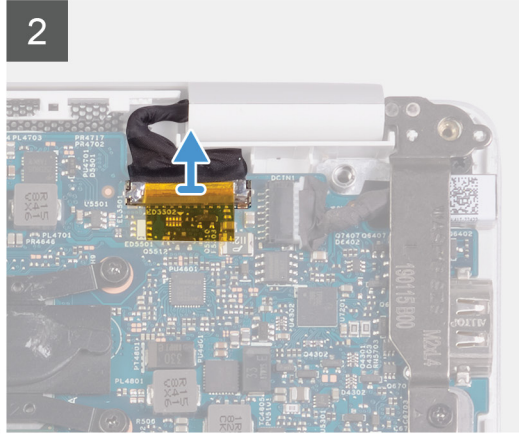
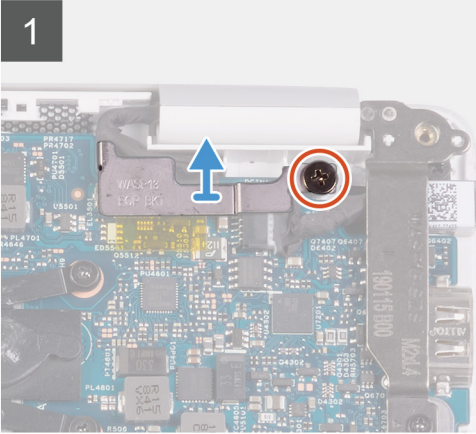
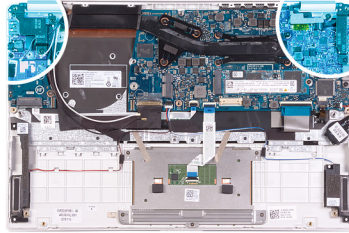
The following image indicates the location of display assembly and provides a visual representation of the removal procedure.



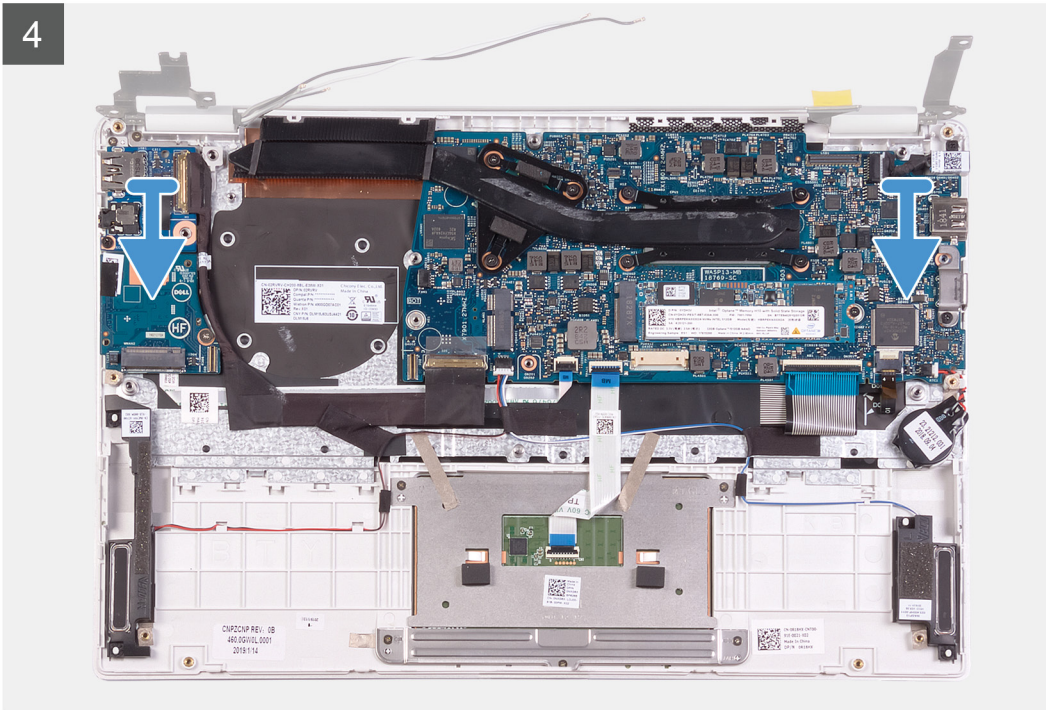
**3x**  
M2.5x3.5



**1x**  
M2x4



4



- 1 Remove the screw (M2.5x3.5) that secures the display-cable bracket to the system board.
- 2 Lift the display-cable bracket off the system board.
- 3 Using the pull tab, disconnect the display cable from the system board.
- 4 Remove the two screws (M2.5x3.5) that secure the left display hinge to the I/O board and palm-rest and keyboard assembly.
- 5 Remove the screw (M2x4) that secures the right display hinge to the system board.
- 6 Open the display hinges at an angle of 90 degrees.
- 7 Remove the palm-rest and keyboard assembly off the display assembly.

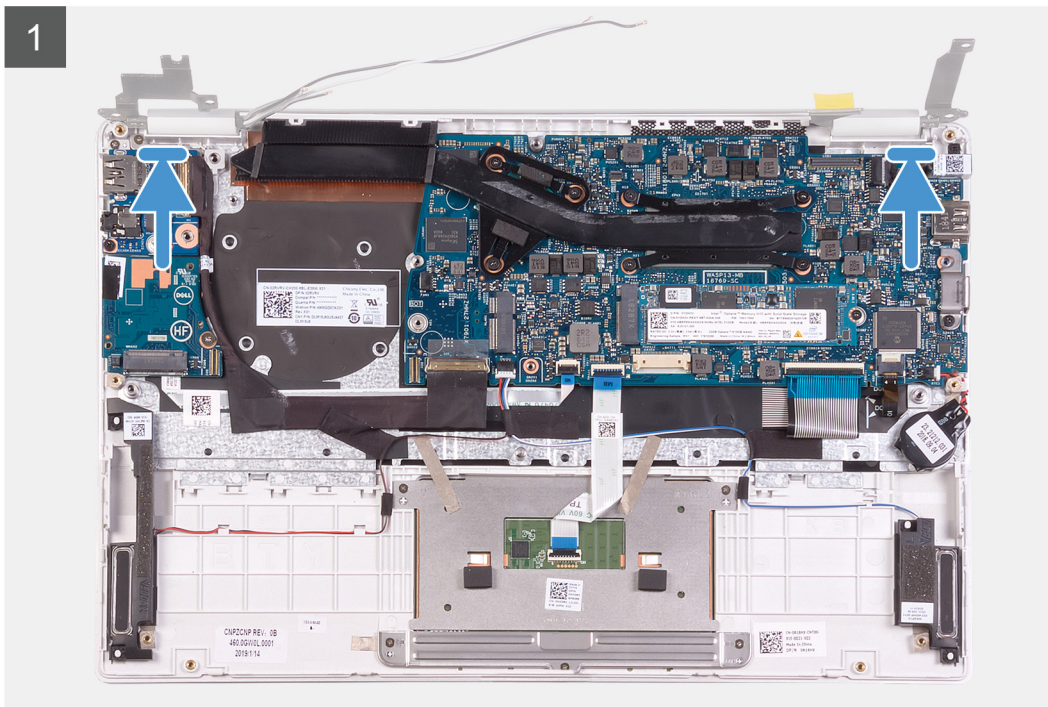




# Installing the display assembly

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of display assembly and provides a visual representation of the installation procedure.

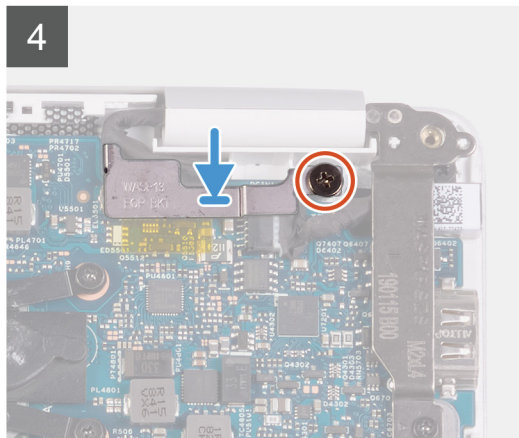
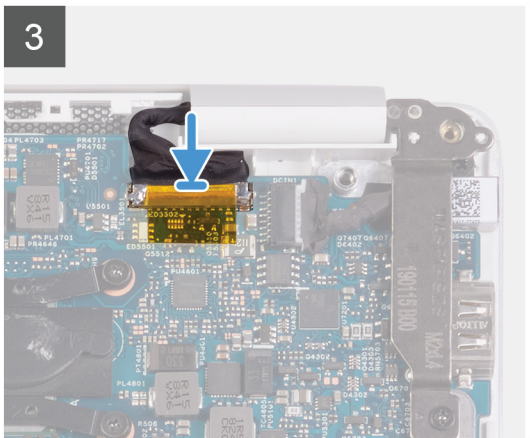
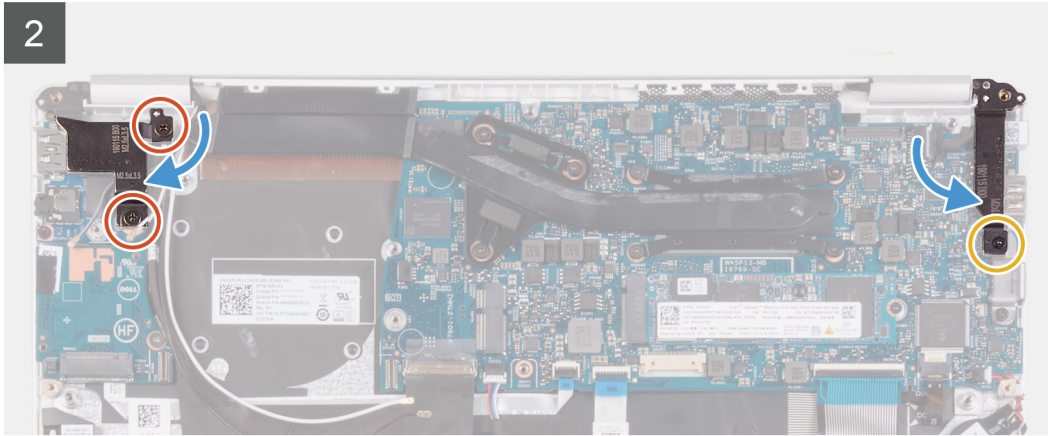
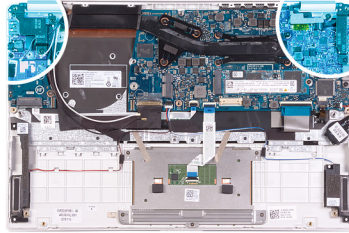




**3x**  
M2.5x3.5



**1x**  
M2x4



- 1 Align and place the palm-rest and keyboard assembly on the display assembly.
  - 2 Using the alignment posts, close the display hinges.
  - 3 Replace the two screws (M2.5x3.5) that secures the left display hinge to the I/O board and palm-rest and keyboard assembly.
  - 4 Replace the screw (M2x4) that secures the right display hinge to the system board.
  - 5 Connect the display cable on to the connector on the system board
  - 6 Align and place the display-cable bracket on the display cable.
  - 7 Replace the screw (M2x4) that secures the display-cable bracket to the system board.
- 1 Install the [battery](#).
  - 2 Install the [base cover](#).
  - 3 Follow the procedure in [After working inside your computer](#).

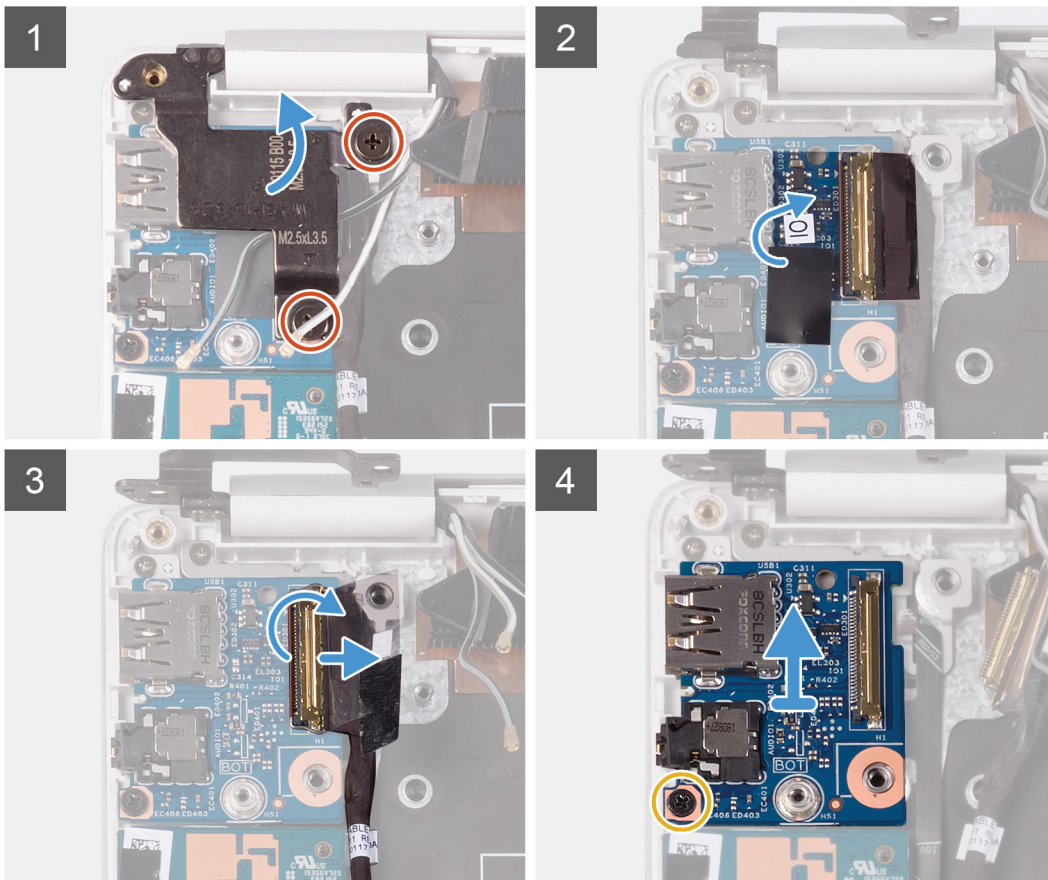
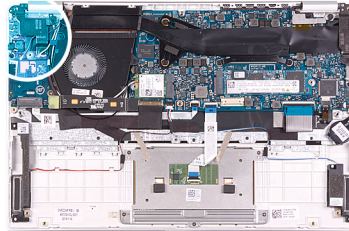
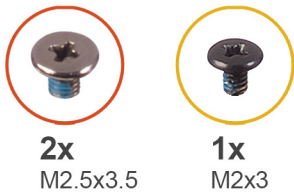
## I/O board



# Removing the I/O board

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

The following image indicates the location of I/O board and provides a visual representation of the removal procedure.

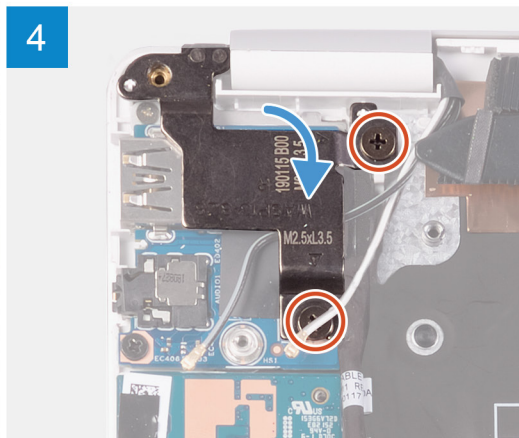
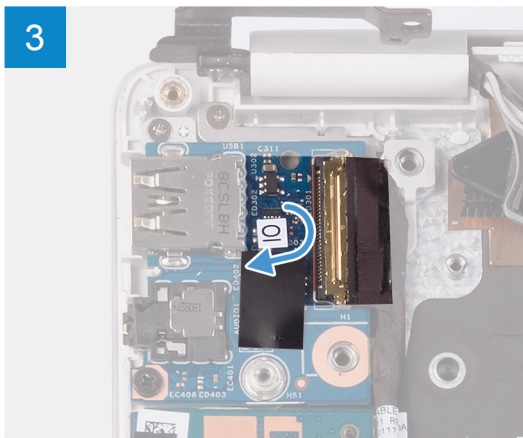
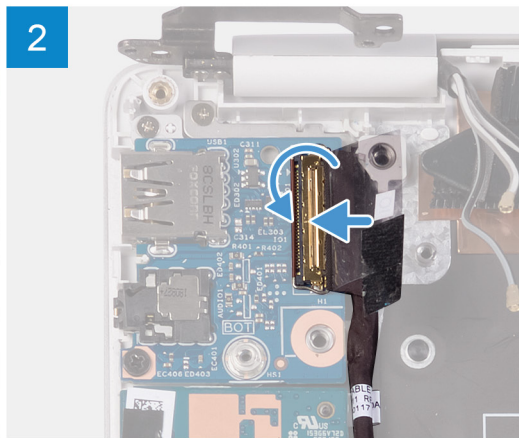
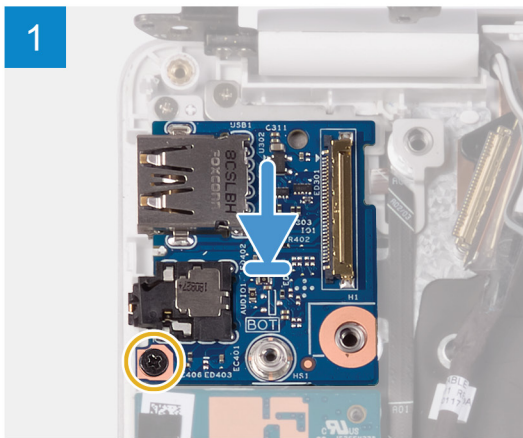
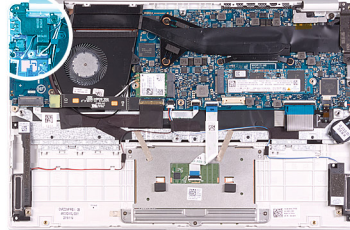
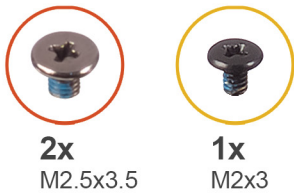


- 1 Remove the two screws (M2.5x3.5) that secure the left display hinge to the I/O board and palm-rest and keyboard assembly.
- 2 Open the display hinges at an angle of 90 degrees.
- 3 Peel the tape that secures the I/O-board cable to the I/O board.
- 4 Open the latch and disconnect the I/O-board cable from the I/O board.
- 5 Remove the screw (M2x3) that secures the I/O board to the palm-rest and keyboard assembly.
- 6 Lift the I/O board off the palm-rest and keyboard assembly.

# Installing the I/O board

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of I/O board and provides a visual representation of the installation procedure.



- 1 Align and place the I/O board on the palm-rest and keyboard assembly.
  - 2 Replace the screw (M2x3) that secures the I/O board to the palm-rest and keyboard assembly.
  - 3 Connect the I/O-board cable to the I/O board and close the latch to secure the cable.
  - 4 Adhere the tape that secures the I/O board to the I/O board.
  - 5 Using the alignment posts, close the display hinges.
  - 6 Replace the two screws (M2.5x3.5) that secure the left display hinge to the I/O board and palm-rest and keyboard assembly.
- 1 Install the [fan](#).
  - 2 Install the [battery](#).

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

## Power-button board

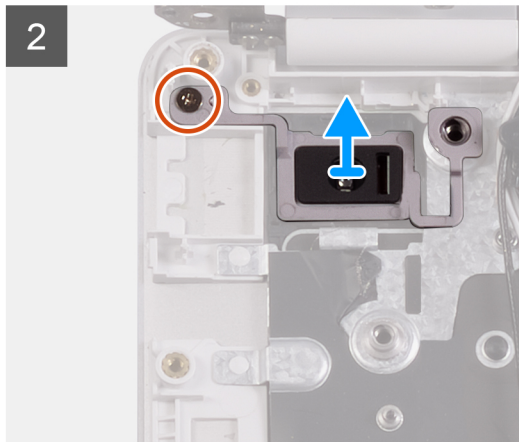
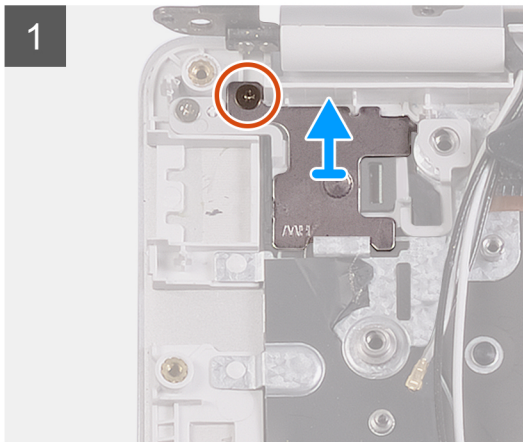
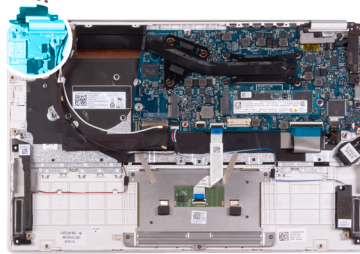
### Removing the power-button board

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the [base cover](#).
- 3 Remove the [battery](#).
- 4 Remove the [WLAN card](#).
- 5 Remove the [fan](#).
- 6 Remove the [I/O board](#).

The following image indicates the location of power button and provides a visual representation of the removal procedure.



**2x**  
M1.6x2



- 1 Remove the screw (M1.6x2) that secures the power-button bracket to the palm-rest and keyboard assembly.
- 2 Remove the screw (M1.6x2) that secures the power-button board to the palm-rest and keyboard assembly and lift the power-button board off the palm-rest and keyboard assembly.

### Installing the power-button board

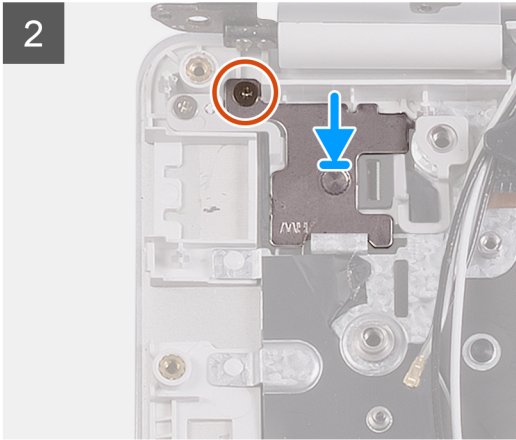
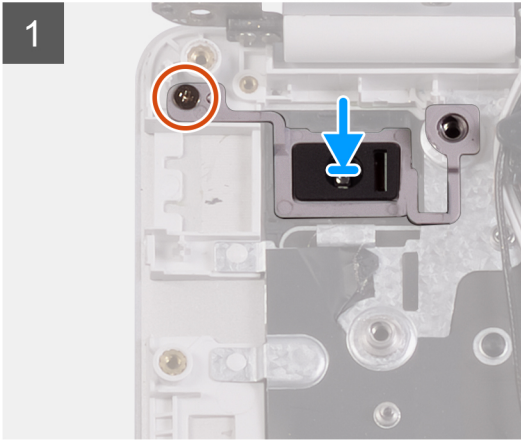
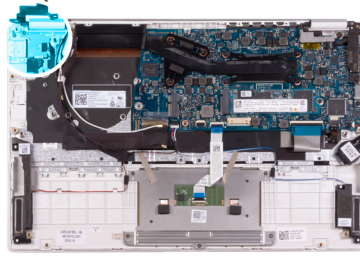
If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of power-button board and provides a visual representation of the installation procedure.





2x  
M1.6x2



- 1 Align the screw hole on the power-button board with the screw hole on the palm-rest and keyboard assembly.
- 2 Replace the screw (M1.6x2) that secures the power-button board to the palm-rest and keyboard assembly.
- 3 Align the screw hole on the power-button bracket with the screw hole on the palm-rest and keyboard assembly.
- 4 Replace the screw (M1.6x2) that secures the power-button bracket to the palm-rest and keyboard assembly.

- 1 Install the [I/O board](#).
- 2 Install the [fan](#).
- 3 Install the [WLAN card](#).
- 4 Install the [battery](#).
- 5 Install the [base cover](#).
- 6 Follow the procedure in [After working inside your computer](#).

## Power button with fingerprint reader

### Removing the power button with fingerprint reader

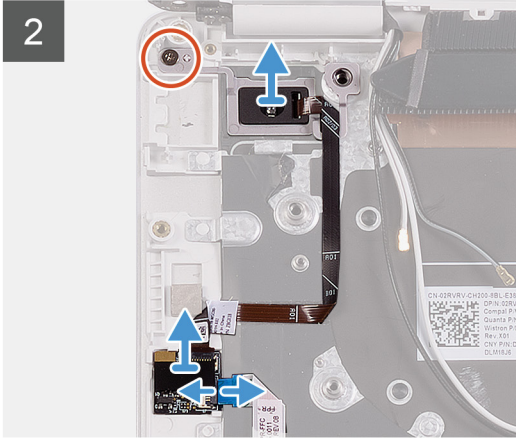
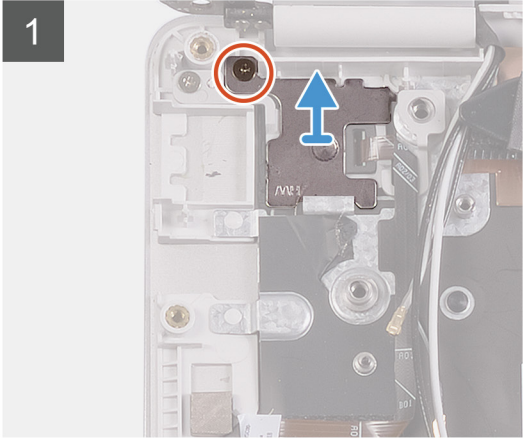
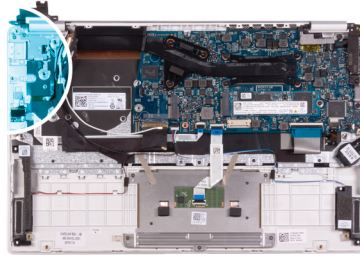
**ⓘ | NOTE:** This procedure is only applicable for computers shipped with a fingerprint reader.

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the [base cover](#).
- 3 Remove the [battery](#).
- 4 Remove the [WLAN card](#).
- 5 Remove the [fan](#).
- 6 Remove the [I/O board](#).

The following image indicates the location of power button with fingerprint reader and provides a visual representation of the removal procedure.



2x  
M1.6x2



- 1 Remove the screw (M1.6x2) that secures the power-button bracket to the palm-rest and keyboard assembly.
- 2 Remove the screw (M1.6x2) that secures the power button with fingerprint reader to the palm-rest and keyboard assembly.
- 3 Open the latch and disconnect the fingerprint-reader cable from the fingerprint-reader board.
- 4 Lift the power button with fingerprint-reader, along with the power-button cable, off the palm-rest and keyboard assembly.

## Installing the power button with fingerprint reader

**NOTE:** This procedure is only applicable for computers shipped with a fingerprint reader.

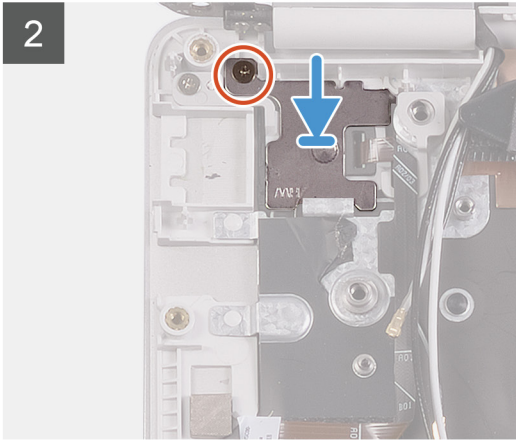
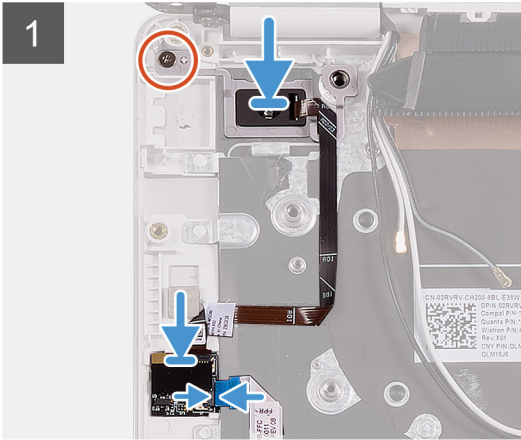
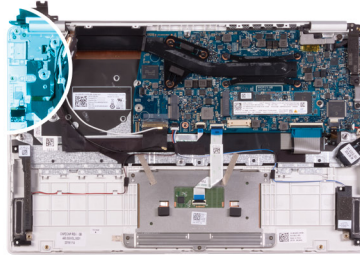
If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of power button with fingerprint reader and provides a visual representation of the installation procedure.





2x  
M1.6x2



- 1 Align and place the power button with fingerprint reader on the palm-rest and keyboard assembly.
- 2 Replace the screw (M1.6x2) that secure the power button with fingerprint reader to the palm-rest and keyboard assembly.
- 3 Connect the fingerprint-reader cable to the fingerprint-reader board and close the latch to secure the cable.
- 4 Align and place the power-button bracket on the palm-rest and keyboard assembly.
- 5 Replace the screw (M1.6x2) that secure the power-button bracket to the palm-rest and keyboard assembly.

- 1 Install the [I/O board](#).
- 2 Install the [fan](#).
- 3 Install the [WLAN card](#).
- 4 Install the [battery](#).
- 5 Install the [base cover](#).
- 6 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 [base cover](#).
- 3 Remove the [battery](#).
- 4 Remove the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#), whichever applicable.
- 5 Remove the [WLAN card](#).
- 6 Remove the [fan](#).
- 7 Remove the [heat sink](#).

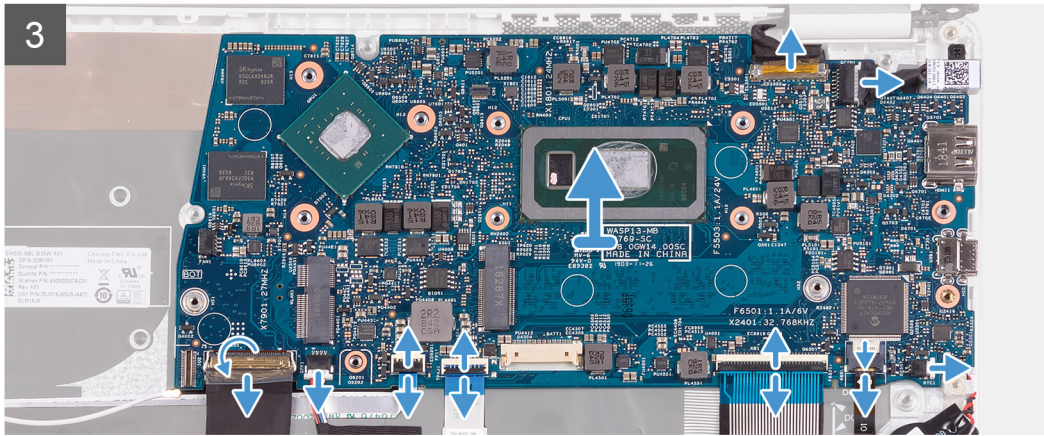
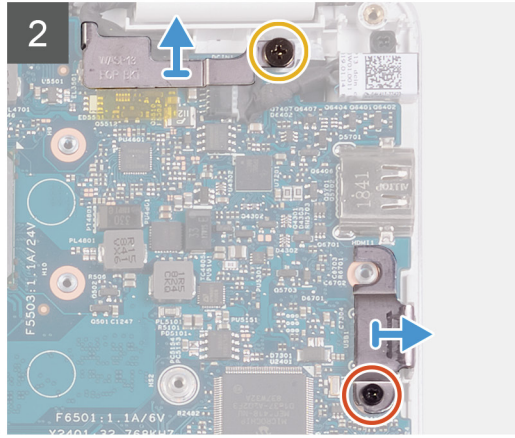
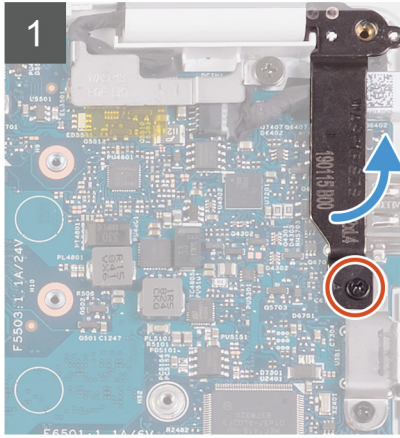
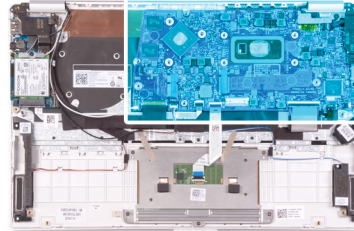
The following image indicates the location of system board and provides a visual representation of the removal procedure.



2x  
M2x4



1x  
M2.5x3.5



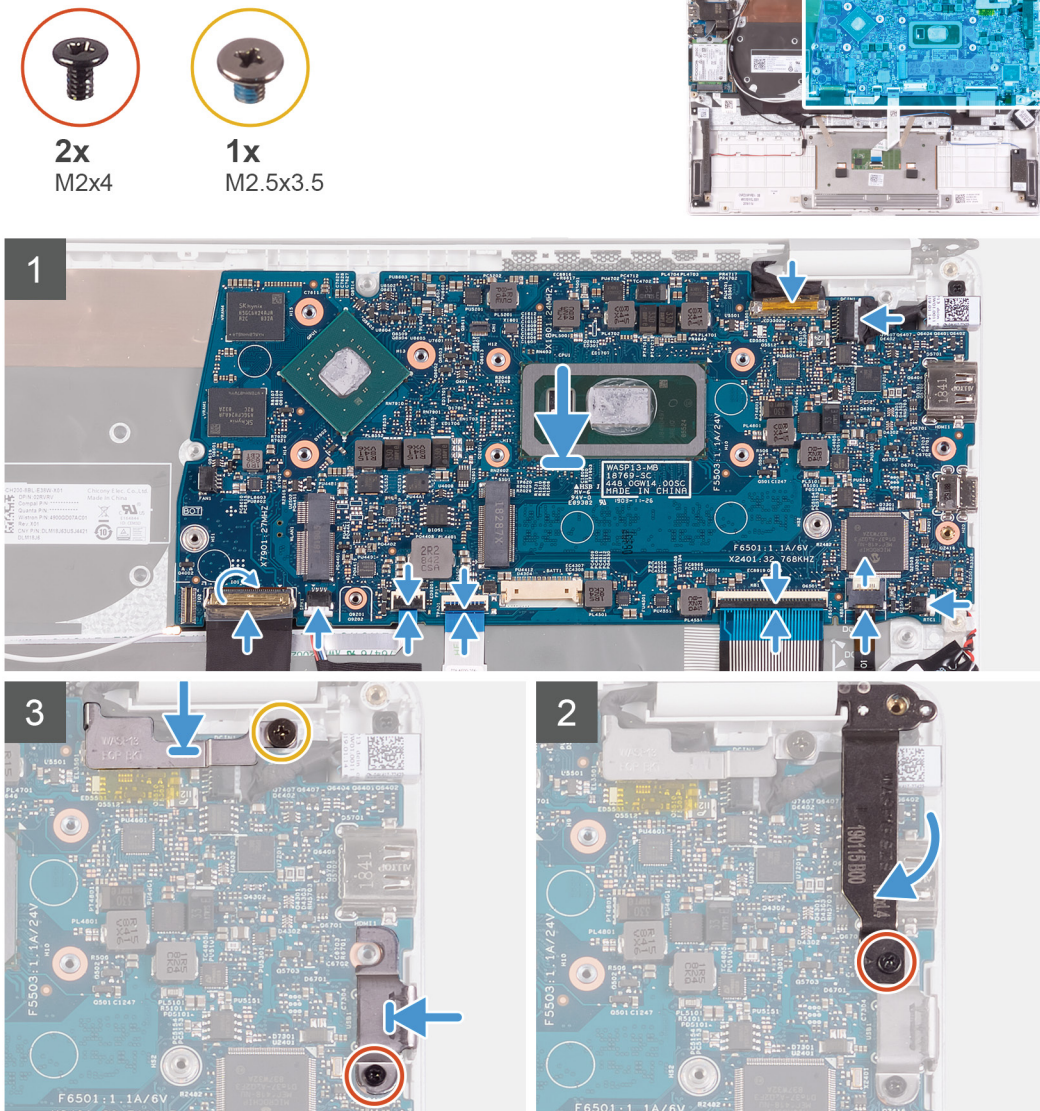
- 1 Remove the screw (M2x4) screw that secures the right display hinge to the system board.
- 2 Remove the screw (M2x4) that secures the display-cable bracket to the system board.
- 3 Remove the screw (M2.5x3.5) screw that secures the USB Type-C port bracket to the system board.
- 4 Peel the tape that secures the I/O-board cable to the system board.
- 5 Open the latch and disconnect the I/O-board cable from the system board.
- 6 Disconnect the speaker cable from the system board.
- 7 Open the latch and disconnect the fingerprint-reader cable from the system board.
- 8 Open the latch and disconnect the touchpad cable from the system board.
- 9 Open the latch and disconnect the keyboard cable from the system board.
- 10 Open the latch and disconnect the keyboard backlit cable from the system board.
- 11 Disconnect the coin-cell battery cable from the system board.
- 12 Disconnect the power-adaptor port cable from the system board.
- 13 Using the pull tab, disconnect the display cable from the system board.
- 14 Gently release the ports on the system board from the slots on the palm-rest and keyboard assembly and lift the system board off the palm-rest and keyboard assembly.



# Installing the system board

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of system board and provides a visual representation of the installation procedure.



- 1 Slide the ports on the system board into the slots on the palm-rest and keyboard assembly and align the screw holes on the system board with the screw holes on the palm-rest and keyboard assembly.
- 2 Connect the display cable on to the connector on the system board
- 3 Connect the power-adaptor port cable to the system board.
- 4 Connect the coin-cell battery cable to the system board.
- 5 Connect the keyboard backlit cable to the system board and close the latch to secure the cable.
- 6 Connect the keyboard cable to the system board and close the latch to secure the cable.
- 7 Connect the touchpad cable to the system board and close the latch to secure the cable.
- 8 Connect the fingerprint-reader cable to the system board and close the latch to secure the cable.
- 9 Connect the speaker cable to the system board.

- 10 Connect the I/O-board cable to the system board and close the latch to secure the cable.
  - 11 Adhere the tape that secures the I/O-board cable to the system board.
  - 12 Replace the screw (M2x4) screw that secures the right display hinge to the system board.
  - 13 Replace the screw (M2x4) that secures the display-cable bracket to the system board.
  - 14 Replace the screw (M2.5x3.5) screw that secures the USB Type-C port bracket to the system board.
- 
- 1 Install the [power-adaptor port](#).
  - 2 Install the [display assembly](#).
  - 3 Install the [heat sink](#).
  - 4 Install the [fan](#).
  - 5 Install the [WLAN card](#).
  - 6 Install the [M.2 2280 solid-state drive](#) or [M.2 2230 solid-state drive](#), whichever applicable.
  - 7 Install the [battery](#).
  - 8 Install the [base cover](#).
  - 9 Follow the procedure in [After working inside your computer](#).

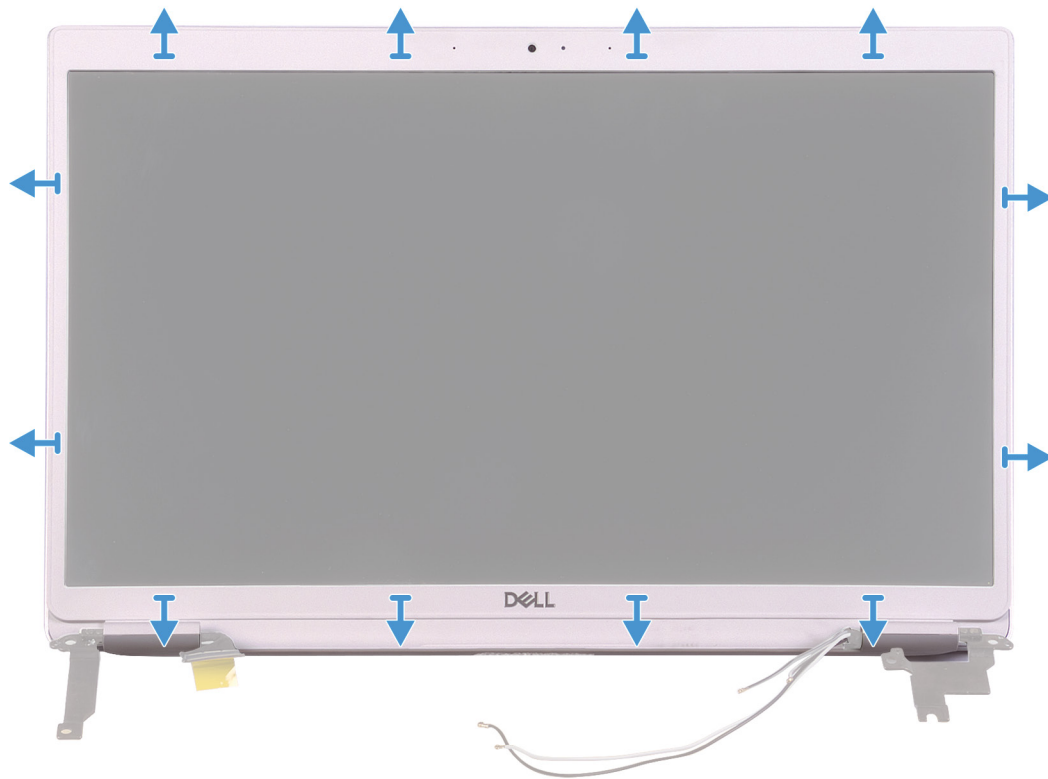
## Display bezel

### Removing the display bezel

**ⓘ | NOTE:** This procedure is not applicable to computers shipped with a WWAN configuration.

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the [base cover](#).
- 3 Remove the [battery](#).
- 4 Remove the [WLAN card](#).
- 5 Remove the [display assembly](#).

The following image indicates the location of display bezel and provides a visual representation of the removal procedure.



- 1 Carefully pry the edges of the display bezel off the display back-cover and antenna assembly.
- 2 Remove the display bezel off the display back-cover and antenna assembly.

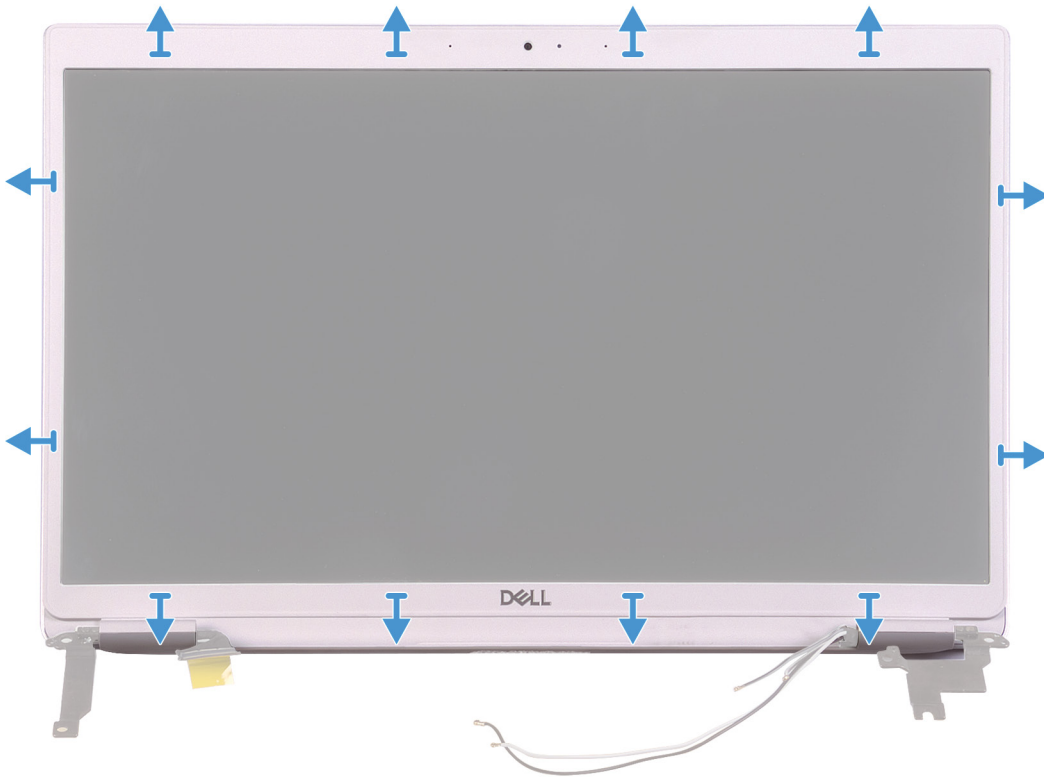
## Installing the display bezel

**NOTE:** This procedure is not applicable to computers shipped with a WWAN configuration.

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of display bezel and provides a visual representation of the installation procedure.





Align the display bezel with the display back-cover and antenna assembly, and gently snap the display bezel into place.

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

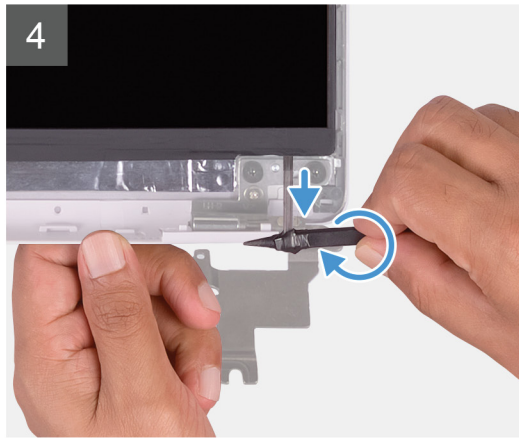
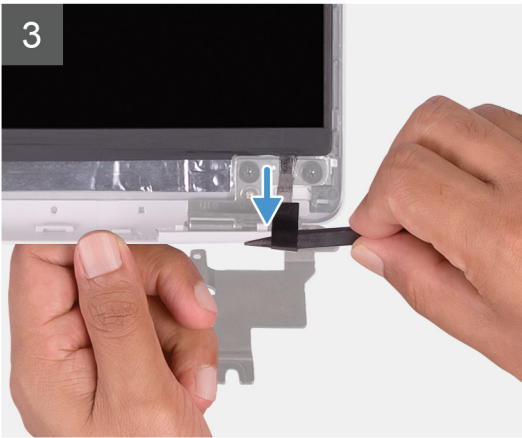
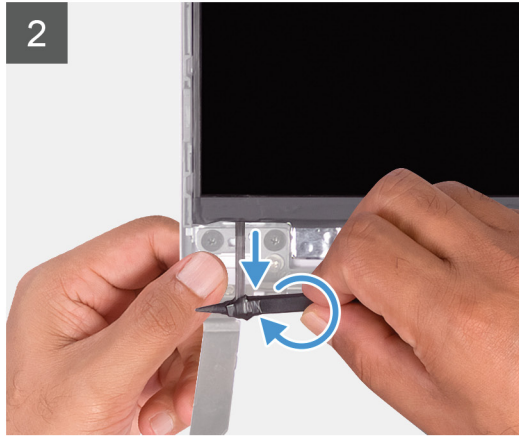
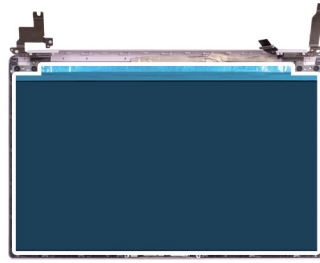
## Display panel

### Removing the display panel

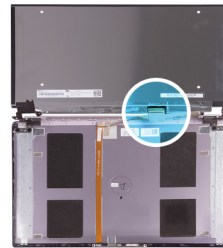
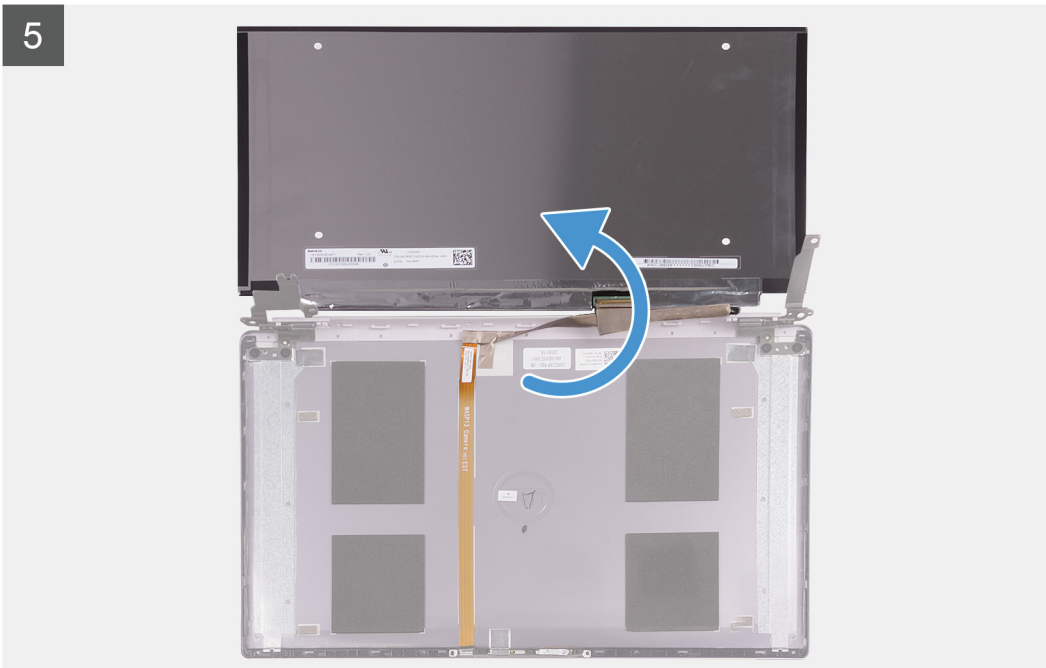
**NOTE:** This procedure is not applicable to computers shipped with a WWAN configuration.

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the [base cover](#).
- 3 Remove the [battery](#).
- 4 Remove the [WLAN card](#).
- 5 Remove the [display assembly](#).
- 6 Remove the [display bezel](#).

The following image indicates the location of display panel and provides a visual representation of the removal procedure.



5



6



- 1 Using a plastic scribe, slide out the pull tab of the SR tape from both sides of the display panel.
- 2 Pull out a small section of the SR tape.
- 3 Roll the SR tape around the plastic scribe.

**NOTE:** To avoid severing/breaking the SR tape, pull out only a small section of the SR tape and then roll the SR tape around the scribe.

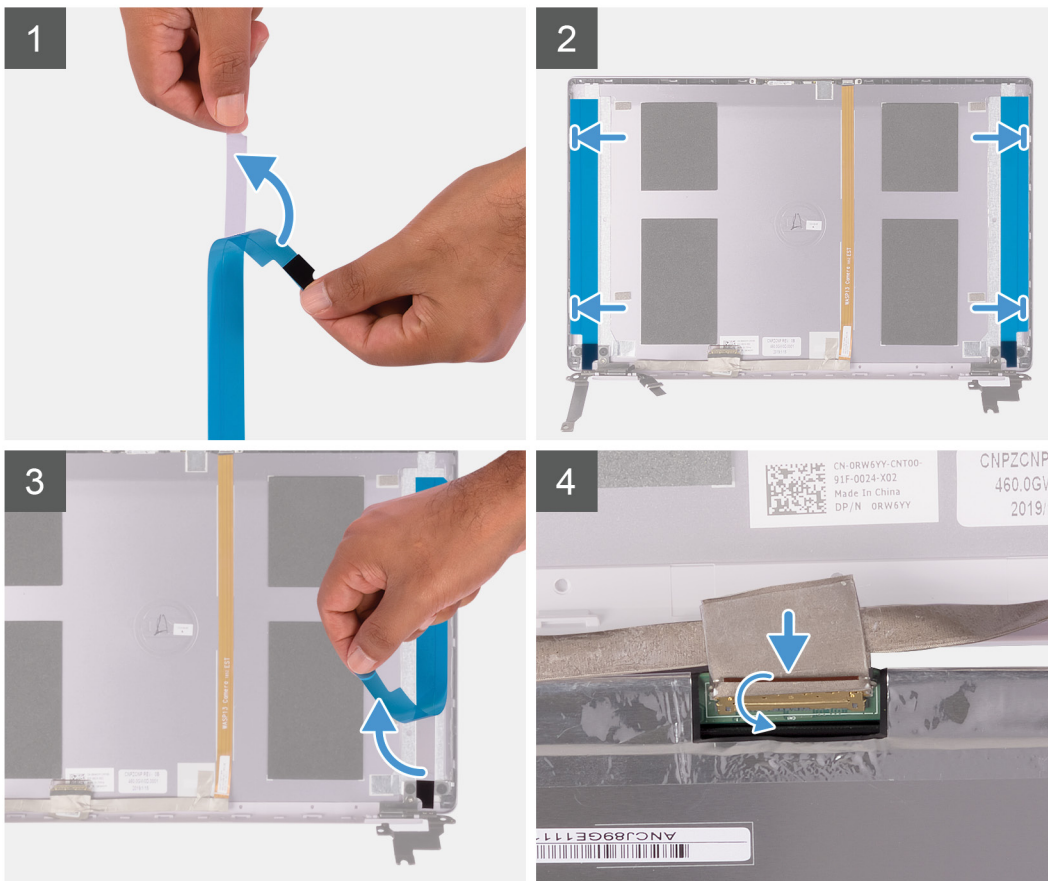
- 4 Lift the display panel off the display back-cover.
- 5 Peel the tape that secures the display cable to the display back-cover.
- 6 Open the latch and disconnect the display cable from the display back-cover.

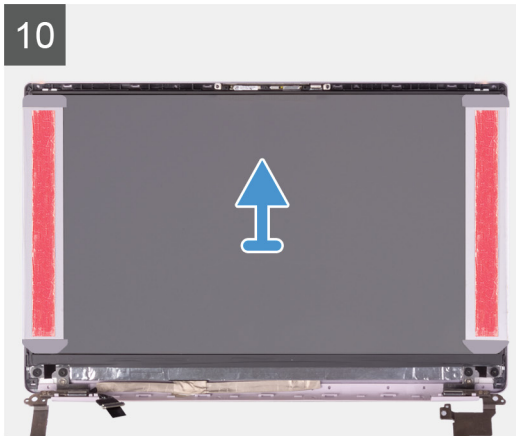
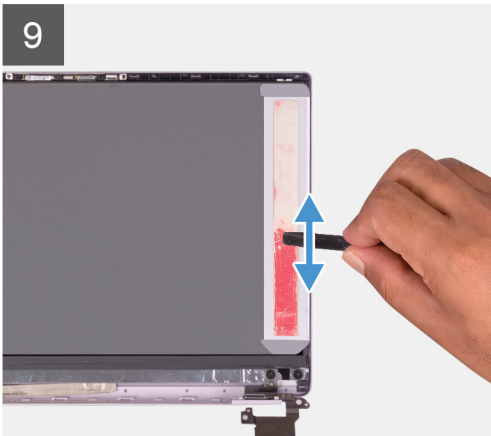
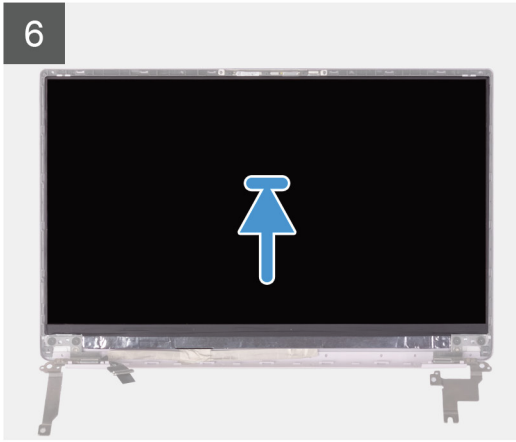
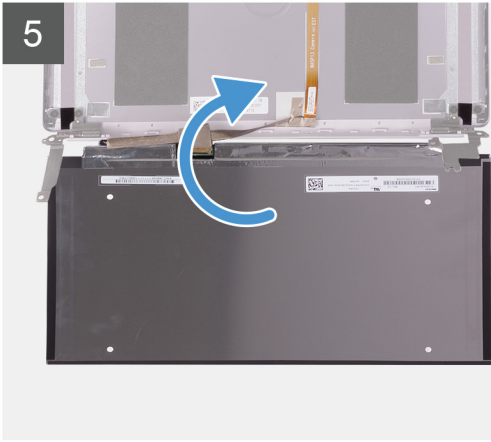
# Installing the display panel

① | **NOTE:** This procedure is not applicable to computers shipped with a WWAN configuration.

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of display panel and provides a visual representation of the installation procedure.





- 1 Peel off the transparent protective films from the SR tapes.
- 2 Align and adhere both the SR tapes to the plastic edge of the display back-cover.
- 3 Peel off the blue protective films from the SR tapes.
- 4 Starting from the top, align and place the display panel on the display back-cover.
- 5 Remove the release paper from the pressure film.
- 6 Adhere the pressure film on the display panel.
- 7 Using the flat end of the plastic scribe or handle of the screwdriver, press and roll over the pressure films until they turn pink.
- 8 Peel off the pressure film from the display panel.
- 9 Place the display bezel on the display back-cover and snap it into place.
- 1 Install the [display bezel](#).



- 2 Install the [display assembly](#).
- 3 Install the [WLAN card](#).
- 4 Install the [battery](#).
- 5 Install the [base cover](#).
- 6 Follow the procedure in [After working inside your computer](#).

## Display hinges

### Removing the display hinges

**NOTE:** This procedure is not applicable to computers shipped with a WWAN configuration.

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the [base cover](#).
- 3 Remove the [battery](#).
- 4 Remove the [WLAN card](#).
- 5 Remove the [display assembly](#).
- 6 Remove the [display bezel](#).

The following image indicates the location of display hinges and provides a visual representation of the removal procedure.



- 1 Remove the four (M2.5x2.5) screws that secure the display hinges to the display back-cover.
- 2 Remove the two (M2x2) screws that secure the display hinges to the display back-cover.
- 3 Lift the display hinges off the display back-cover.

# Installing the display hinges

**NOTE:** This procedure is not applicable to computers shipped with a WWAN configuration.

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of display hinges and provides a visual representation of the installation procedure.



- 1 Align the screw holes on the hinges with the screw holes on the display back-cover.
- 2 Replace the two (M2x2) screws that secure the display hinges to the display back-cover.
- 3 Replace the four (M2.5x2.5) screws to secure the display hinges to the display back-cover.
- 1 Install the [display bezel](#).
- 2 Install the [display assembly](#).
- 3 Install the [WLAN card](#).
- 4 Install the [battery](#).
- 5 Install the [base cover](#).
- 6 Follow the procedure in [After working inside your computer](#).

## Camera

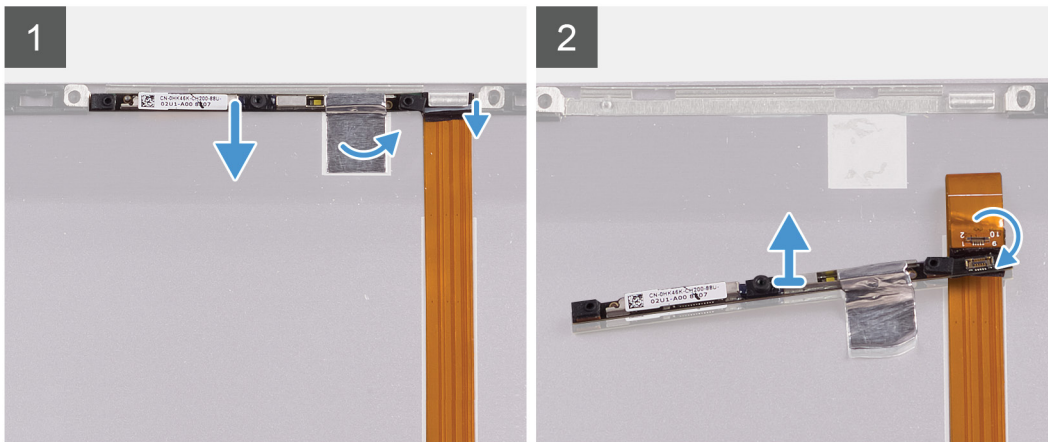
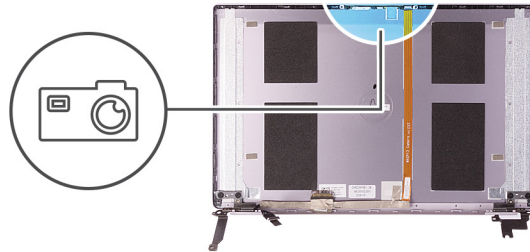
### Removing the camera

**NOTE:** This procedure is not applicable to computers shipped with a WWAN configuration.

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

- 3 Remove the [battery](#).
- 4 Remove the [WLAN card](#).
- 5 Remove the [display assembly](#).
- 6 Remove the [display bezel](#).
- 7 Remove the [display panel](#).

The following image indicates the location of camera and provides a visual representation of the removal procedure.



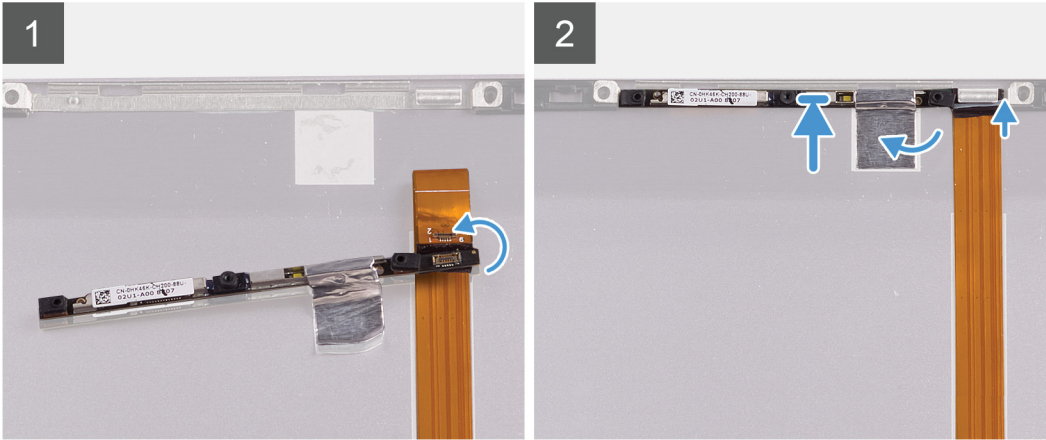
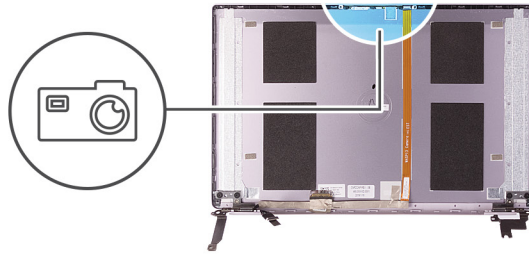
- 1 Peel the tape that secures the camera to the display back-cover
- 2 Using a plastic scribe, pry the camera from the alignment post on the display back-cover.
- 3 Turn over the camera and disconnect the camera cable off the camera.
- 4 Peel the tape off the camera and lift the camera off the display back-cover.

## Installing the camera

**ⓘ | NOTE: This procedure is not applicable to computers shipped with a WWAN configuration.**

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of camera and provides a visual representation of the installation procedure.



- 1 Adhere the camera to the display cable (tape) and connect the camera cable to the camera and turn it over.
- 2 Using the alignment post, turn the camera over and adhere to the display back-cover.
- 3 Adhere the tape that secures the camera to the display back-cover.

- 1 Install the [display panel](#).
- 2 Install the [display bezel](#).
- 3 Install the [display assembly](#).
- 4 Install the [WLAN card](#).
- 5 Install the [battery](#).
- 6 Install the [base cover](#).
- 7 Follow the procedure in [After working inside your computer](#).

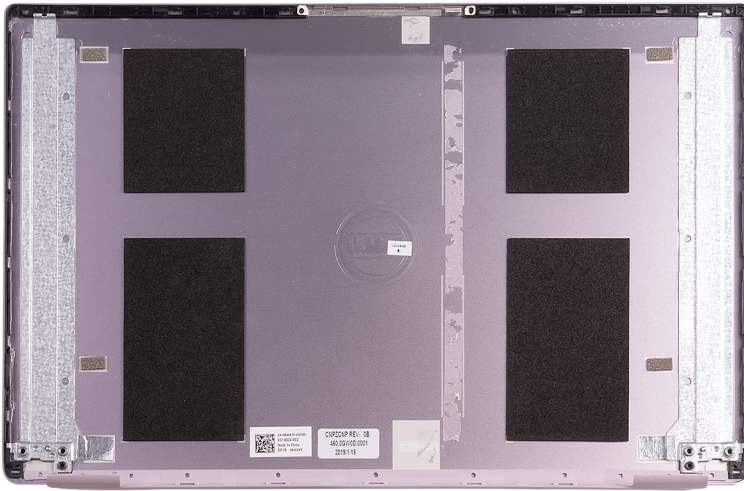
## Display back-cover

### Removing the display back-cover

① **NOTE:** This procedure is not applicable to computers shipped with a WWAN configuration.

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the [base cover](#).
- 3 Remove the [battery](#).
- 4 Remove the [WLAN card](#).
- 5 Remove the [display assembly](#).
- 6 Remove the [display bezel](#).
- 7 Remove the [display hinges](#).
- 8 Remove the [display panel](#).
- 9 Remove the [display cable](#).
- 10 Remove the [camera](#).

The following image indicates the display back-cover and provides a visual representation of the removal procedure.



After performing all the prerequisites, we are left with the display back-cover.

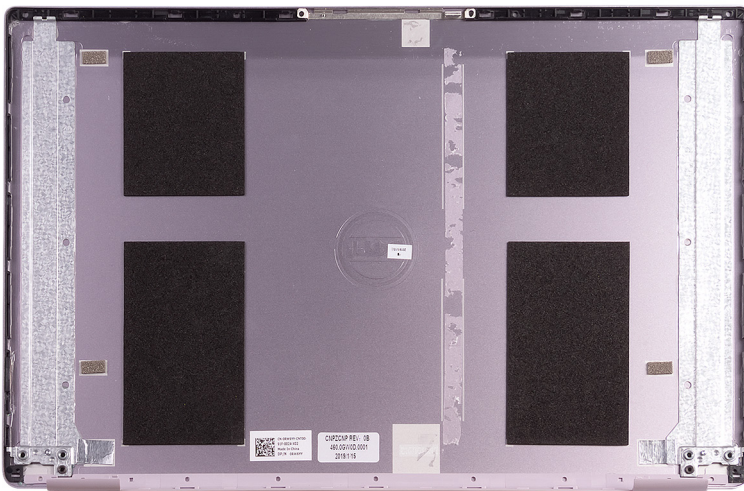
**① NOTE:** Antenna cables are a part of the palm-rest and keyboard assembly for computers shipping with WLAN configurations.

## Installing the display back-cover

**① NOTE:** This procedure is not applicable to computers shipped with a WWAN configuration.

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the display back-cover and provides a visual representation of the installation procedure.



Place the display back-cover on a flat surface.

**① NOTE:** Antenna cables are a part of the palm-rest and keyboard assembly for computers shipping with WLAN configurations.

- 1 Install the [camera](#).
- 2 Install the [display cable](#).



- 3 Install the [display panel](#).
- 4 Install the [display hinges](#).
- 5 Install the [display bezel](#).
- 6 Install the [display assembly](#).
- 7 Install the [WLAN card](#).
- 8 Install the [battery](#).
- 9 Install the [base cover](#).
- 10 Follow the procedure in [After working inside your computer](#).

## Display cable

### Removing the display cable

**NOTE:** This procedure is not applicable to computers shipped with a WWAN configuration.

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the [base cover](#).
- 3 Remove the [battery](#).
- 4 Remove the [display assembly](#).
- 5 Remove the [display panel](#).
- 6 Remove the [display bezel](#).

The following image indicates the location of display cable and provides a visual representation of the removal procedure.



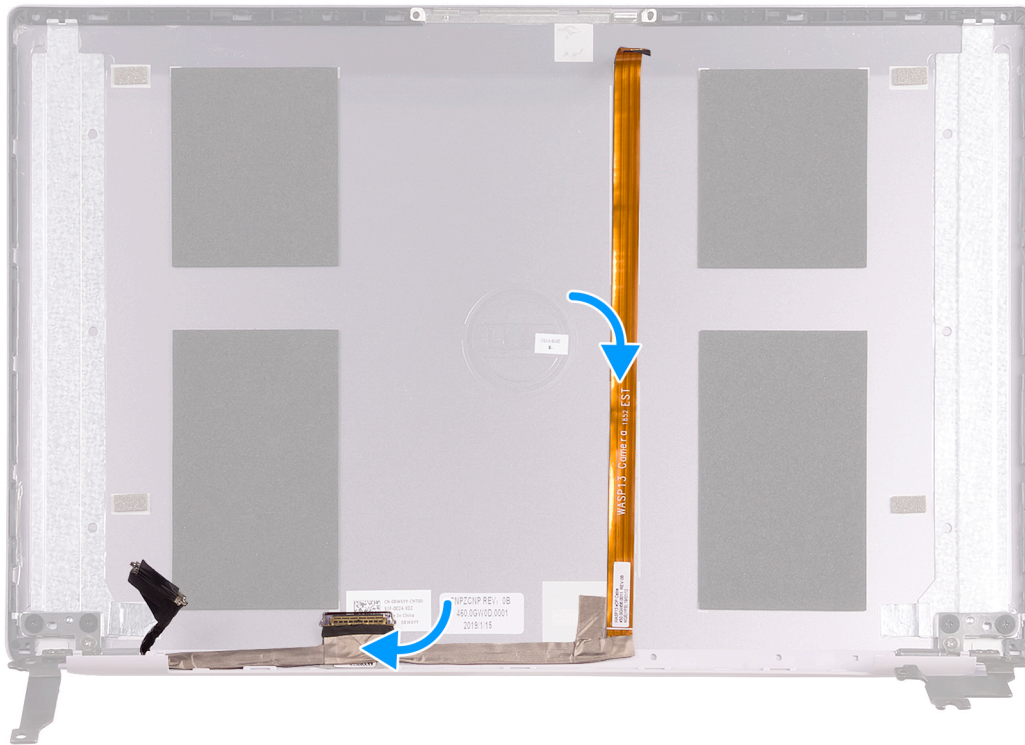
- 1 Peel off the tape securing the display cable to the back-cover.
- 2 Peel the display cable off the display back-cover.

# Installing the display cable

① | **NOTE:** This procedure is not applicable to computers shipped with a WWAN configuration.

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of display cable and provides a visual representation of the installation procedure.



- 1 Adhere the tape securing the display cable to the back-cover.
- 2 Adhere the display cable to the display back-cover.
- 1 Install the [display bezel](#).
- 2 Install the [display panel](#).
- 3 Install the [display assembly](#).
- 4 Install the [battery](#).
- 5 Install the [base cover](#).
- 6 Follow the procedure in [After working inside your computer](#).

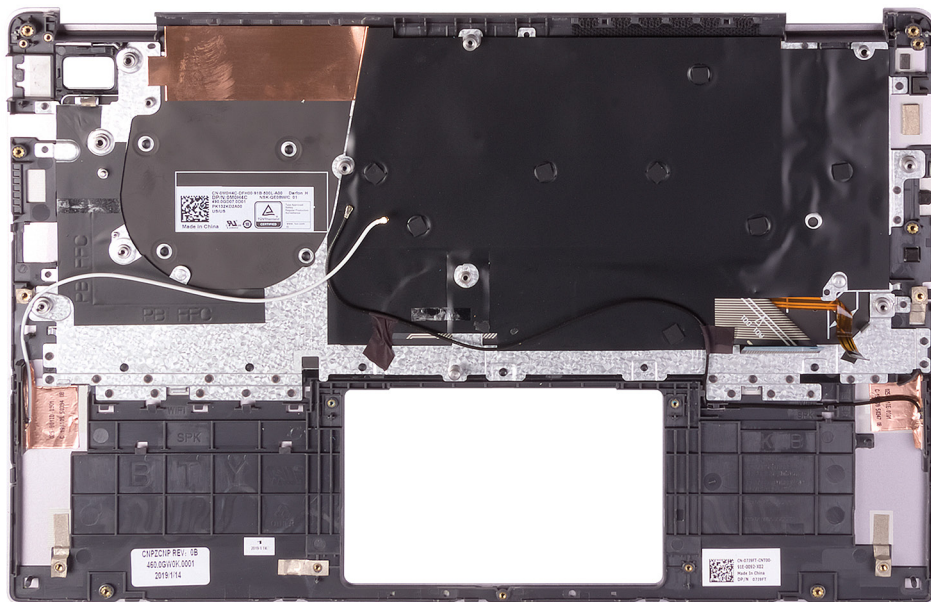
## Palm-rest and keyboard assembly

### Removing the palm-rest and keyboard assembly

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

- 5 Remove the [speakers](#).
- 6 Remove the [system board](#).
- 7 Remove the [display assembly](#).
- 8 Remove the [power button with fingerprint reader](#) or [power-button board](#), whichever applicable.
- 9 Remove the [power-adapter port](#).
- 10 Remove the [touchpad](#).

The following image indicates the palm-rest and keyboard assembly and provides a visual representation of the removal procedure.



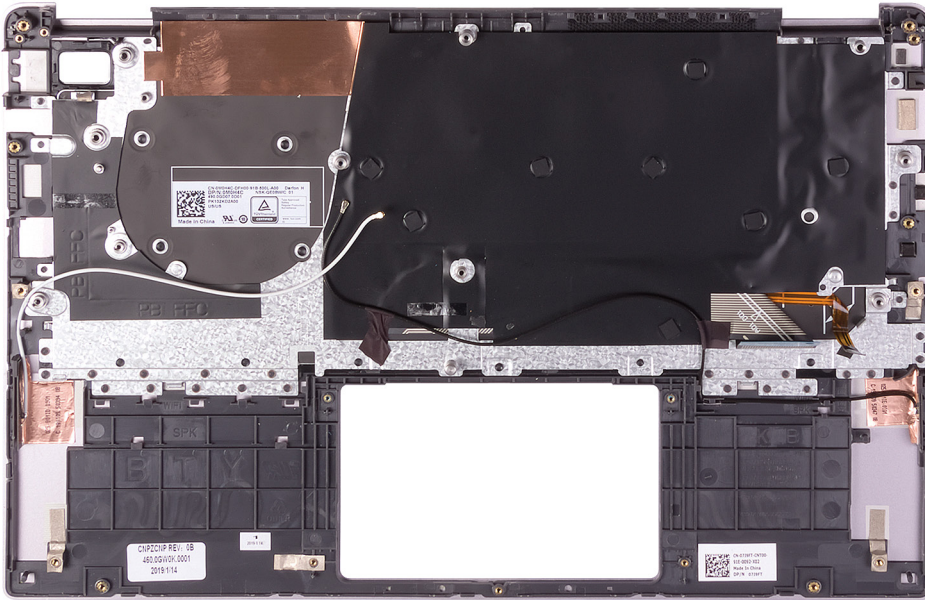
After performing the steps in the pre-requisites, we are left with the palm-rest and keyboard assembly.

**① | NOTE:** Antenna cables are a part of the display back-cover for computers shipping with WWAN configuration.

## Installing the palm-rest and keyboard assembly

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the palm-rest and keyboard assembly and provides a visual representation of the installation procedure.



Place the palm-rest and keyboard assembly on a flat surface.

**NOTE:** Antenna cables are a part of the display back-cover for computers shipping with WWAN configuration.

- 1 Install the [touchpad](#).
- 2 Install the [power-adapter port](#).
- 3 Install the [power button with fingerprint reader](#) or [power-button board](#), whichever applicable.
- 4 Install the [display assembly](#).
- 5 Install the [system board](#).
- 6 Install the [speakers](#).
- 7 Install the [WLAN card](#).
- 8 Install the [battery](#).
- 9 Install the [base cover](#).
- 10 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

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

## Running the ePSA diagnostics

- 1 Turn on your computer.
- 2 As the computer boots, press the F12 key as the Dell logo appears.
- 3 On the boot menu screen, select the **Diagnostics** option.
- 4 Click the arrow at the bottom left corner.  
Diagnostics front page is displayed.
- 5 Click the arrow in the lower-right corner to go to the page listing.  
The items detected are listed.
- 6 To run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
- 7 Select the device from the left pane and click **Run Tests**.
- 8 If there are any issues, error codes are displayed.  
Note the error code and validation number and contact Dell.

## System diagnostic lights

### Battery-status light

Indicates the power and battery-charge status.

**Solid white** — Power adapter is connected and the battery has more than 5 percent charge.

**Amber** — Computer is running on battery and the battery has less than 5 percent charge.

### Off

- Power adapter is connected and the battery is fully charged.

- Computer is running on battery and the battery has more than 5 percent charge.
- Computer is in sleep state, hibernation, or turned off.

The power and battery-status light blinks amber along with beep codes indicating failures.

For example, the power and battery-status light blinks amber two times followed by a pause, and then blinks white three times followed by a pause. This 2,3 pattern continues until the computer is turned off indicating no memory or RAM is detected.

The following table shows different power and battery-status light patterns and associated problems.

**Table 2. LED codes**

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

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

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

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

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

## Flashing BIOS (USB key)

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

# Flashing the BIOS

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

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

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

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

## Backup media and recovery options

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

## WiFi power cycle

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

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

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

## Flea power release

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

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

# Getting help

## Contacting Dell

① **NOTE:** If you do not have an active Internet connection, you can find contact information on your purchase invoice, packing slip, bill, or Dell product catalog.

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

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