

# Dell Latitude 5580

## Owner's 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


## Topics:


- [Safety instructions](#)
- [Before working inside your computer](#)
- [Turning off your computer](#)
- [After working inside 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 the reverse order.


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


 **NOTE:** 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 that is grounded to ground yourself before you touch the computer to perform any disassembly tasks.

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

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

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


## Before working inside your computer

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.


## Turning off your computer

### 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 .

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.

### Turning off your computer — Windows 7


 **CAUTION:** To avoid losing data, save and close all open files and exit all open programs before you turn off your computer.

1. Click **Start**.
2. Click **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.

## 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.

# Removing and installing components

This section provides detailed information on how to remove or install the components from your computer.

## Topics:

- [Recommended tools](#)
- [Subscriber Identity Module\(SIM\) board](#)
- [Base cover](#)
- [Battery](#)
- [Solid State Drive — optional](#)
- [Hard drive](#)
- [Coin cell battery](#)
- [WLAN card](#)
- [WWAN card](#)
- [Memory module](#)
- [Keyboard](#)
- [Heat sink](#)
- [System fan](#)
- [Power connector port](#)
- [Chassis frame](#)
- [System board](#)
- [Touchpad panel](#)
- [SmartCard module](#)
- [LED board](#)
- [Speaker](#)
- [Hinge cap](#)
- [Display assembly](#)
- [Display bezel](#)
- [Display hinges](#)
- [Display panel](#)
- [eDP cable](#)
- [Camera](#)
- [Display back cover assembly](#)
- [Palm rest](#)

## Recommended tools

The procedures in this document require the following tools:

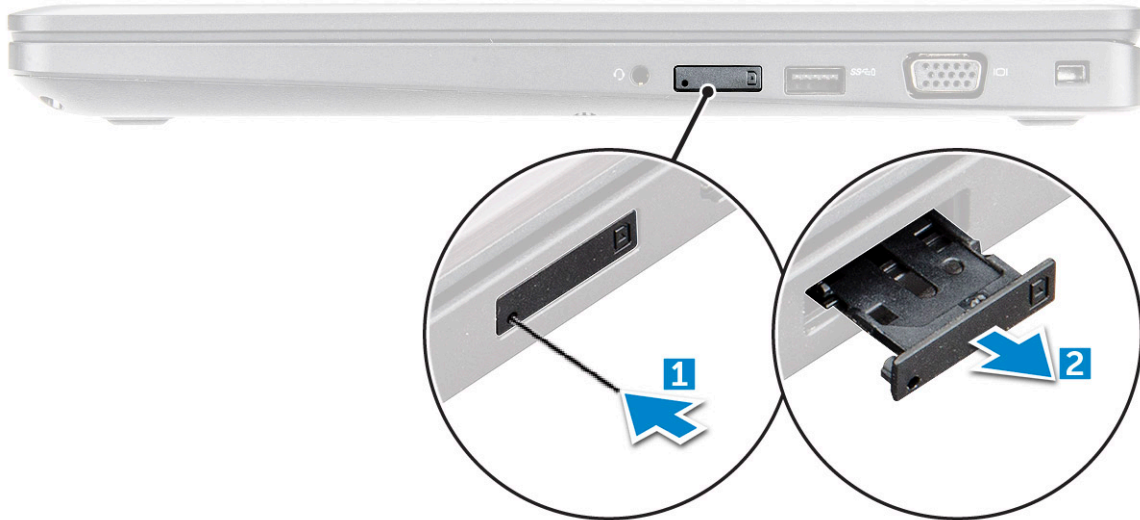
- Phillips #0 screwdriver
- Phillips #1 screwdriver
- Plastic scribe

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

# Subscriber Identity Module(SIM) board

## Installing the Subscriber Identification Module card

1. Insert Subscriber Identification Module (SIM) card removal tool or a paperclip into the pinhole [1].
2. Pull the SIM card tray to remove it [2].
3. Place the SIM card on the SIM card tray.
4. Push the SIM card tray into the slot until it clicks into



place.

## Removing the Subscriber Identification Module card

**CAUTION:** Removing the Subscriber Identification Module (SIM) card when the computer is on may cause data loss or damage the card. Ensure your computer is turned off or the network connections are disabled.

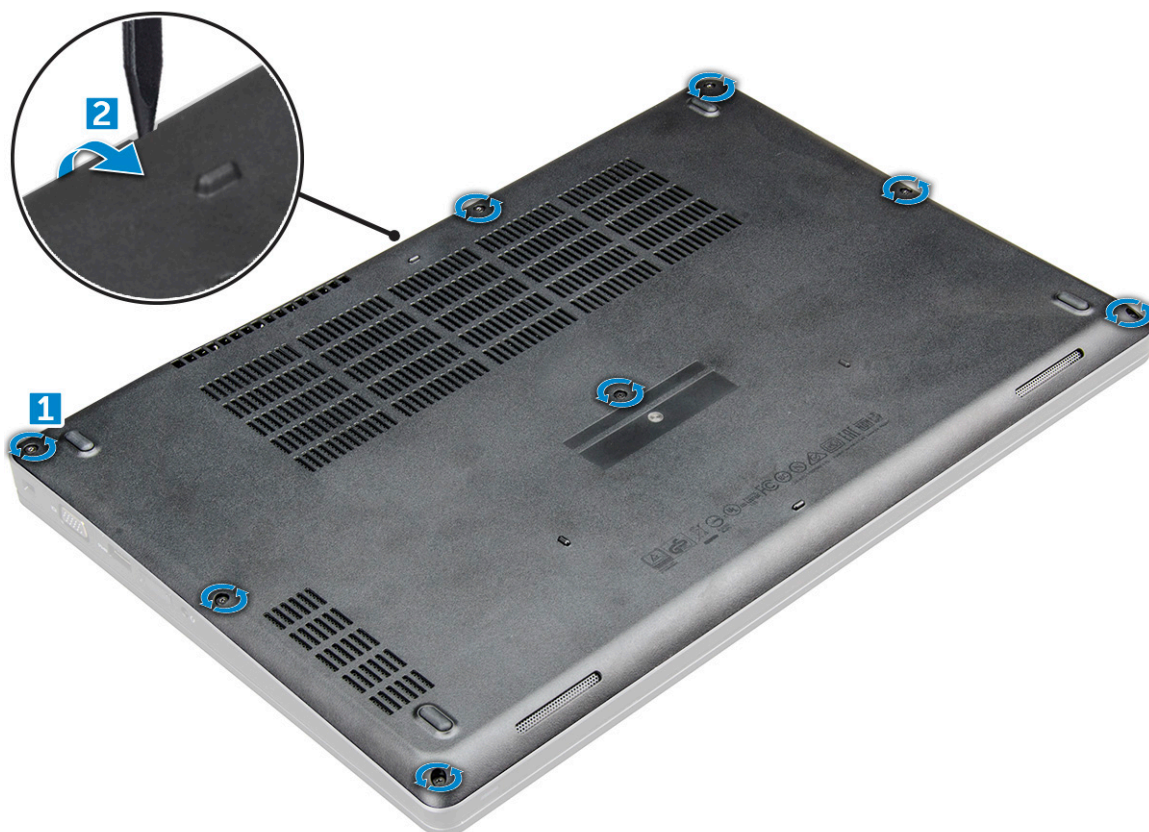
1. Insert a paperclip or a SIM card removal tool into the pinhole on the SIM card tray.
2. Pull the SIM card tray to remove it.
3. Remove the SIM card from the SIM card tray.
4. Push the SIM card tray into the slot until it clicks into place.

## Base cover

### Removing the base cover

1. Follow the procedure in [Before working inside your computer](#).
  2. To remove the base cover:
    - a. Loosen the M2.5x5 captive screws that secure the base cover to the computer [1].
    - b. Pry the base cover from the edge near the air vent [2].
- NOTE:** You may need a plastic scribe to pry the recess, starting from the top edge of the base cove.





3. Lift the base cover away from the computer .



## Installing the base cover

1. Align the base cover with the screw holders on the computer.

2. Press the edges of the cover until it clicks into place.
3. Tighten the M2x5 screws to secure the base cover to the computer .
4. Follow the procedure in [After working inside your computer](#).


## Battery

### Lithium-ion battery precautions

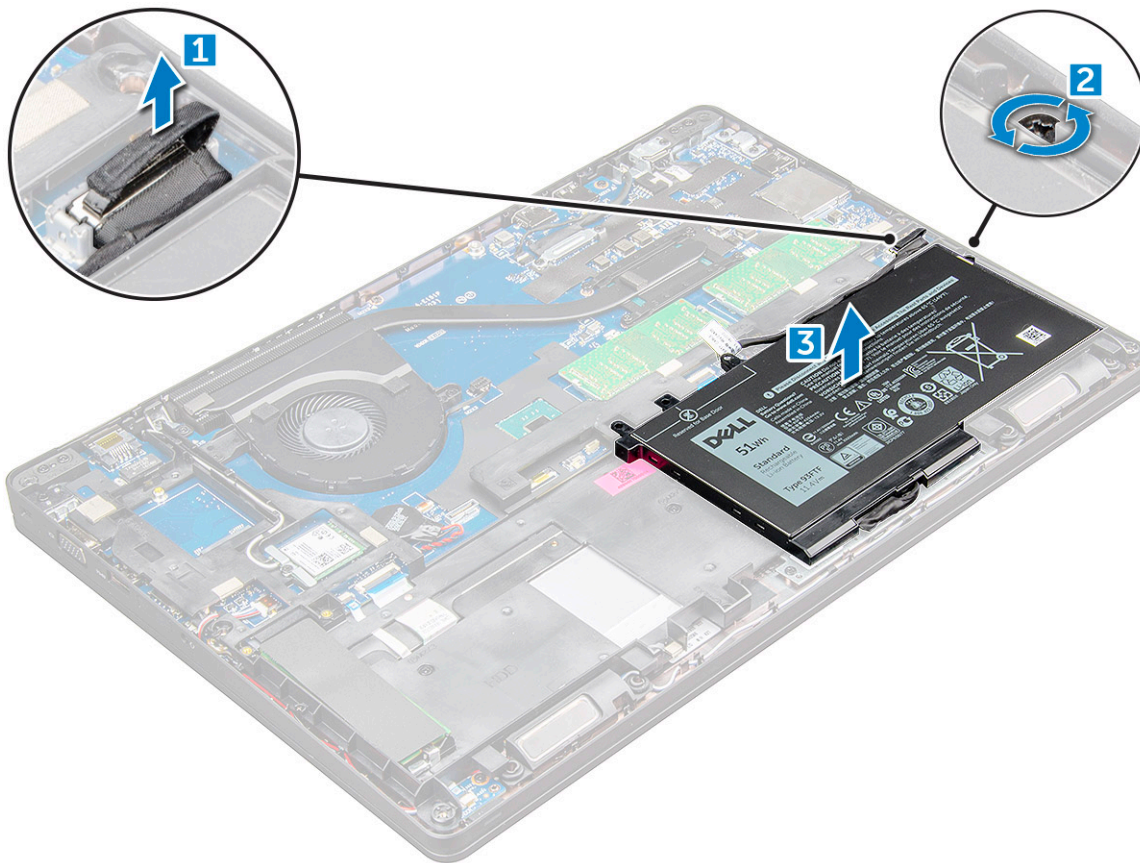
#### CAUTION:

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

### Removing the battery

 **NOTE:** 92 WHr battery requires the use of a M.2 card and a 68Whr battery can use either a M.2 or 7mm SATA drive.

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. To remove the battery:
  - a. Disconnect the battery cable from the connector on the system board [1].
  - b. Loosen the M2.5x5 captive screw that secures the battery to the computer [2].
  - c. Lift the battery away from the [3].



## Installing the battery

**NOTE:** the 92Whr battery requires the use of a M.2 card and a 68Whr battery can be used with either a M.2 or 7mm SATA drive.

1. Insert the battery into the slot on the computer .
2. Connect the battery cable to the connector on the system board.
3. Tighten the M2.5x5 screw to secure the battery to the computer.
4. Install the [base cover](#).
5. Follow the procedure in [After working inside your computer](#).

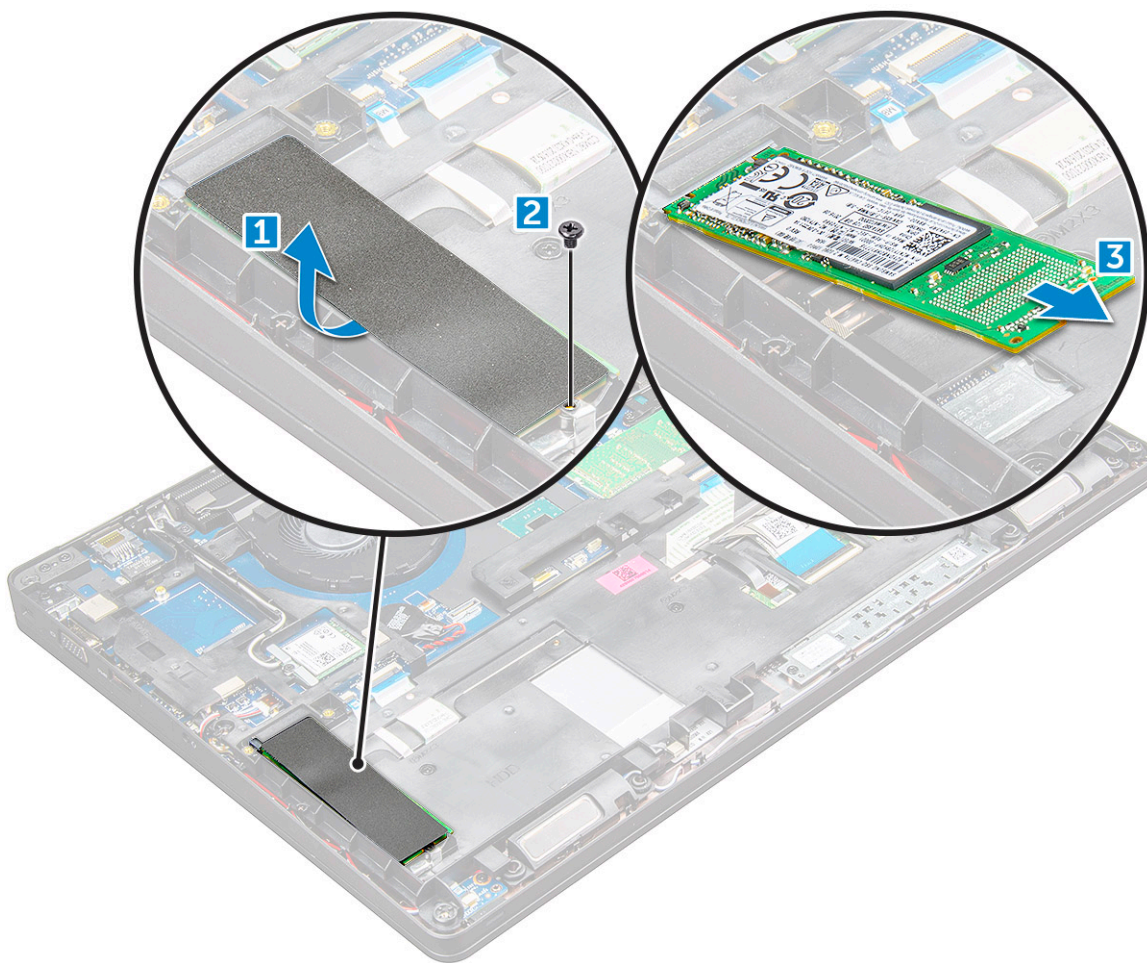
## Solid State Drive — optional

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

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [base cover](#)
  - b. [battery](#)
3. To remove the SSD:
  - a. Peel off the adhesive tape that is placed above the SSD card [1]. Remove the one M2x3 screw [1] that secures the SSD to the computer [2].
  - b. Lift the SSD frame that secures the SSD card to the system board [2].
  - c. Slide and lift the SSD card from the computer [3].



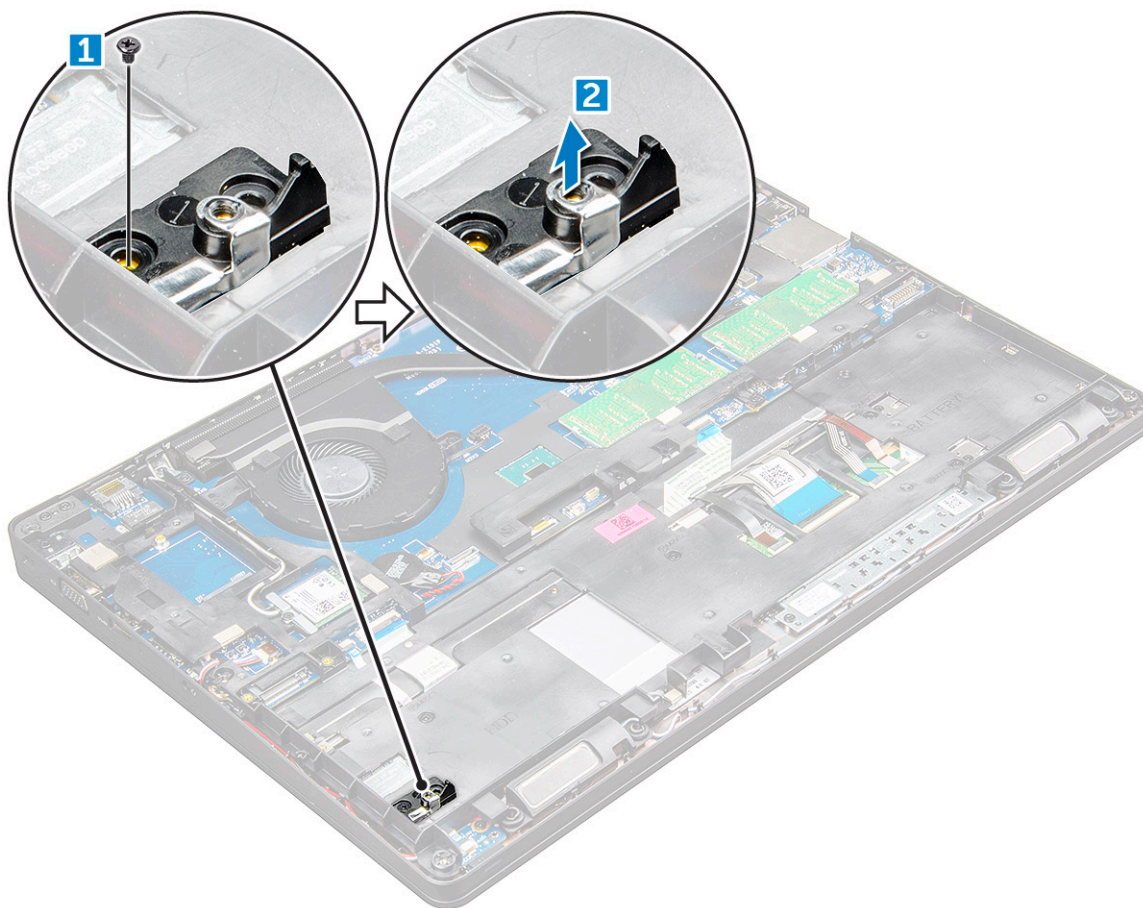
**NOTE:** For models shipped with NVMe SSDs, remove the thermal plate placed over the SSD.



4. To remove the SSD clip:

- a. Remove the M2x3 screw that secures the SSD clip to the computer [1].
- b. Lift the SSD clip away from the computer [2].

**NOTE:** SSD frame is installed onto the chassis frame to secure the SSD to the system. The SSD frame is a separate service part that needs to be removed and re-installed whenever the chassis frame is removed. The image below shows the location and placement of the SSD frame.



## Installing the M.2 Solid State Drive - SSD

**NOTE:** Before installing SSD card, ensure that the battery is fully charged or the power cable is plugged in.

1. Place the SSD clip on the computer .
2. Tighten the M2x3 screw that secures SSD clip to the computer.
3. Insert the SSD into the socket on the computer .
4. Tighten the M2x3 screw to secure the SSD to the computer .
5. Affix the adhesive tape following the SSD card.

**NOTE:** For models shipped with NVMe SSDs, the SSD requires installation of a thermal plate over it.

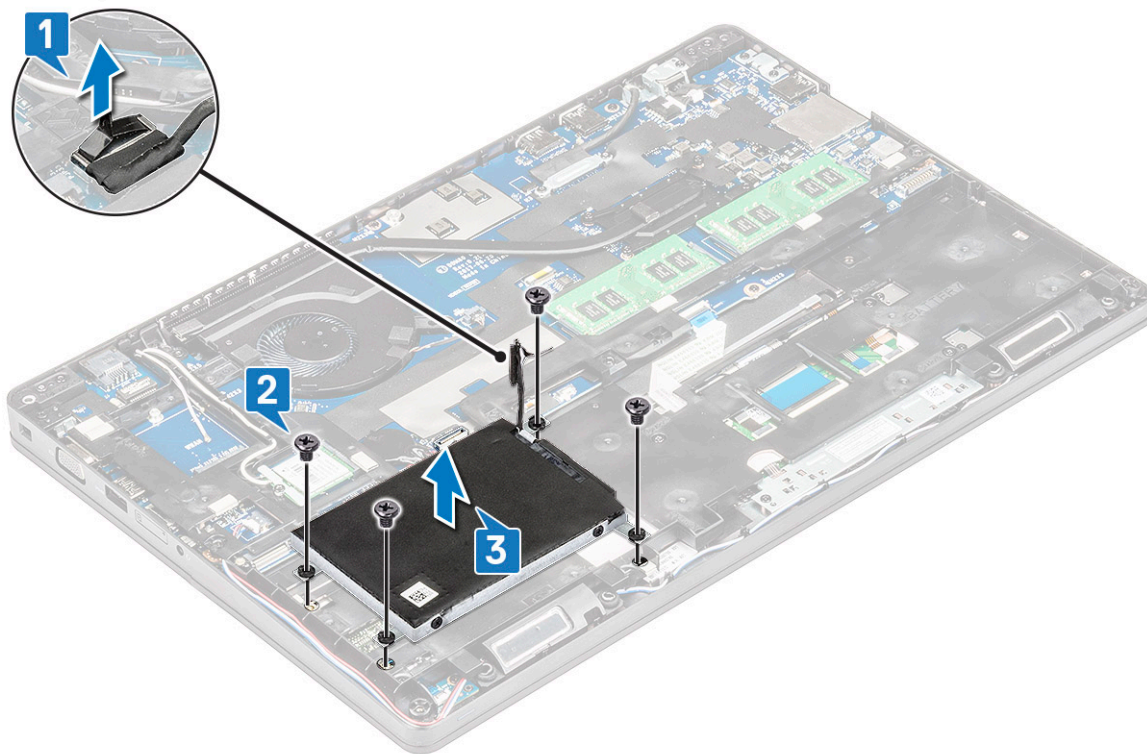
6. Install the:
  - a. [battery](#)
  - b. [base cover](#)
7. Follow the procedure in [After working inside your computer](#).

## Hard drive

### Removing hard drive assembly

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

- b. [battery](#)
- 3. To remove the hard drive assembly:
  - a. Disconnect the hard drive cable from the connector on the system board [1].
  - b. Remove the screws that secure the hard drive assembly to the computer [2].
  - c. Lift the hard drive assembly away from the computer [3].



**NOTE:** The image displayed above is for reference only. Some components location may vary.

## Installing the hard drive assembly

**NOTE:** 7mm SATA drive requires a 68Whr battery.

1. Insert the hard drive assembly into the slot on the computer.
2. Tighten the screws to secure the hard drive assembly to the computer.
3. Connect the hard drive cable to the connector on the hard drive and on the system board.
4. Install the:
  - a. [battery](#)
  - b. [base cover](#)
5. Follow the procedures in [After working inside your system](#).

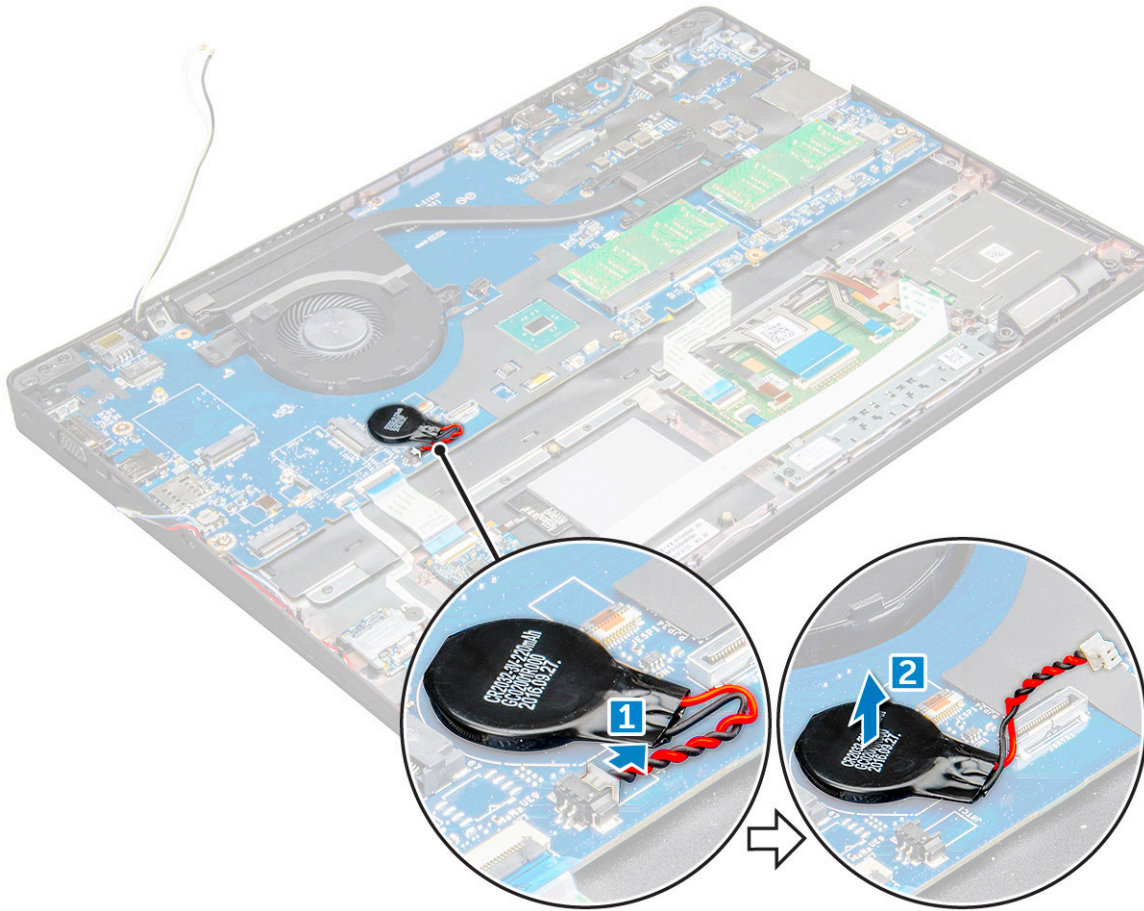
## Coin cell battery

### Removing the coin cell battery

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [base cover](#)
  - b. [battery](#)
3. To remove the coin cell battery:



- a. Disconnect the coin cell battery cable from the connector on the system board [1].
- b. Pry the coin cell battery to release from the adhesive and lift it away from the system board [2].



## Installing the coin cell battery

1. Place the coin cell battery on the system board.
2. Connect the coin cell battery cable to the connector on the system board.  
**NOTE:** Route the coin cell battery cable carefully to avoid damaging the cable.
3. Install the:
  - a. chassis frame
  - b. battery
  - c. base cover
4. Follow the procedure in [After working inside your computer](#).

## WLAN card

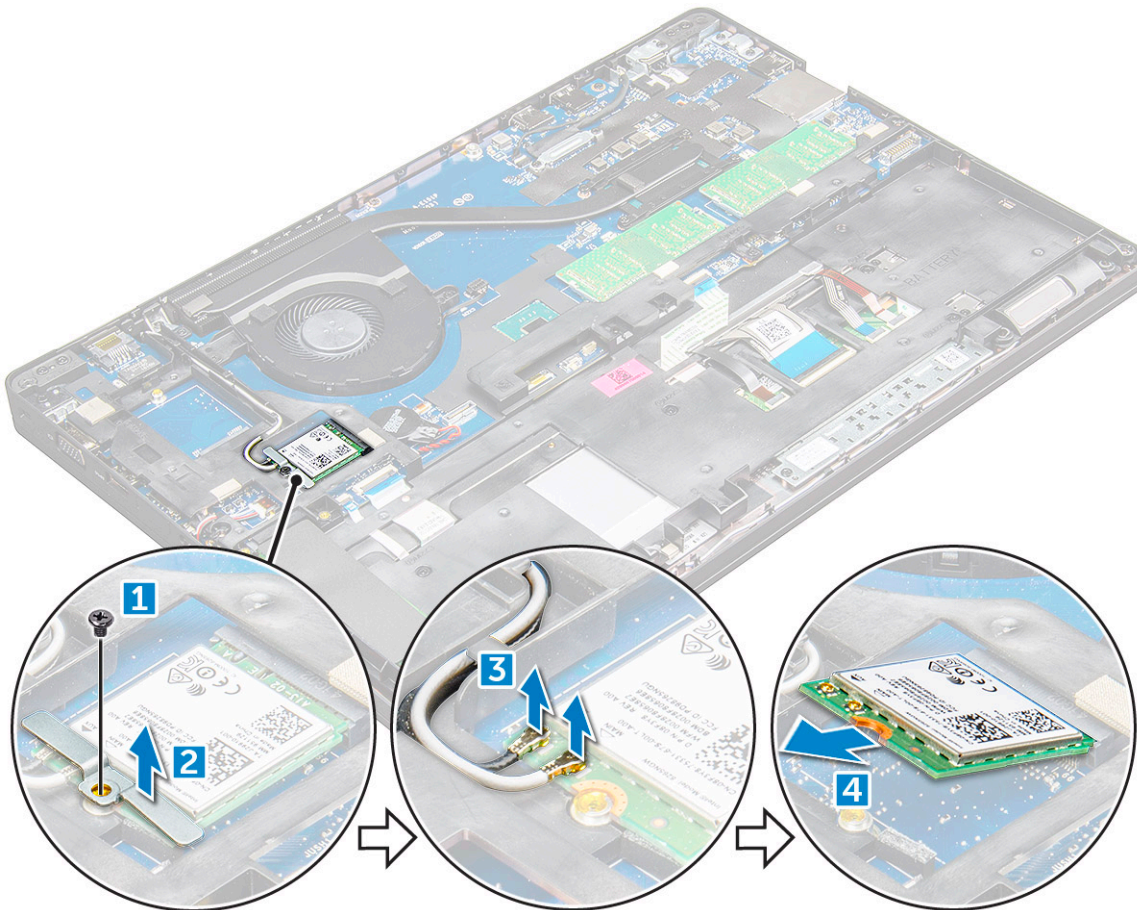
### Removing the WLAN card

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

- a. Remove the M2x3 screw that secures the WLAN card to the computer [1].
- b. Remove the metal tab that secures the WLAN cables to the WLAN card [2].
- c. Disconnect the WLAN cables from the connectors on the WLAN card [3].

**i NOTE:** The WLAN card is held in place with an adhesive foam spacer. When removing the wireless card from the system, make sure the adhesive pad stays on the system board/chassis frame during the prying process. If the adhesive pad is removed from the system along with the wireless card, adhere it back to the system.

- d. Lift the WLAN card to release it from the adhesive[4].



## Installing the WLAN card

1. Insert the WLAN card into the slot on the computer .
2. Route the WLAN cables through the routing channel.

**i NOTE:** When installing the display assembly or chassis frame onto the system, the wireless and WLAN antennas must be routed correctly into the routing channels on the chassis frame.

3. Connect the WLAN cables to the connectors on the WLAN Card.
4. Place the metal bracket and tighten the M2x3 screw to secures the WLAN card to the computer.
5. Install the:
  - a. [battery](#)
  - b. [base cover](#)
6. Follow the procedure in [After working inside your system](#).



# WWAN card

## Removing the WWAN card

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [base cover](#)
  - b. [battery](#)
3. To remove the WWAN card:
  - a. Disconnect the WWAN cables from the connectors .
  - b. Remove the M2.0x3.0 screw that secures the WWAN card to the computer .
  - c. Lift the WWAN card away from the connector.

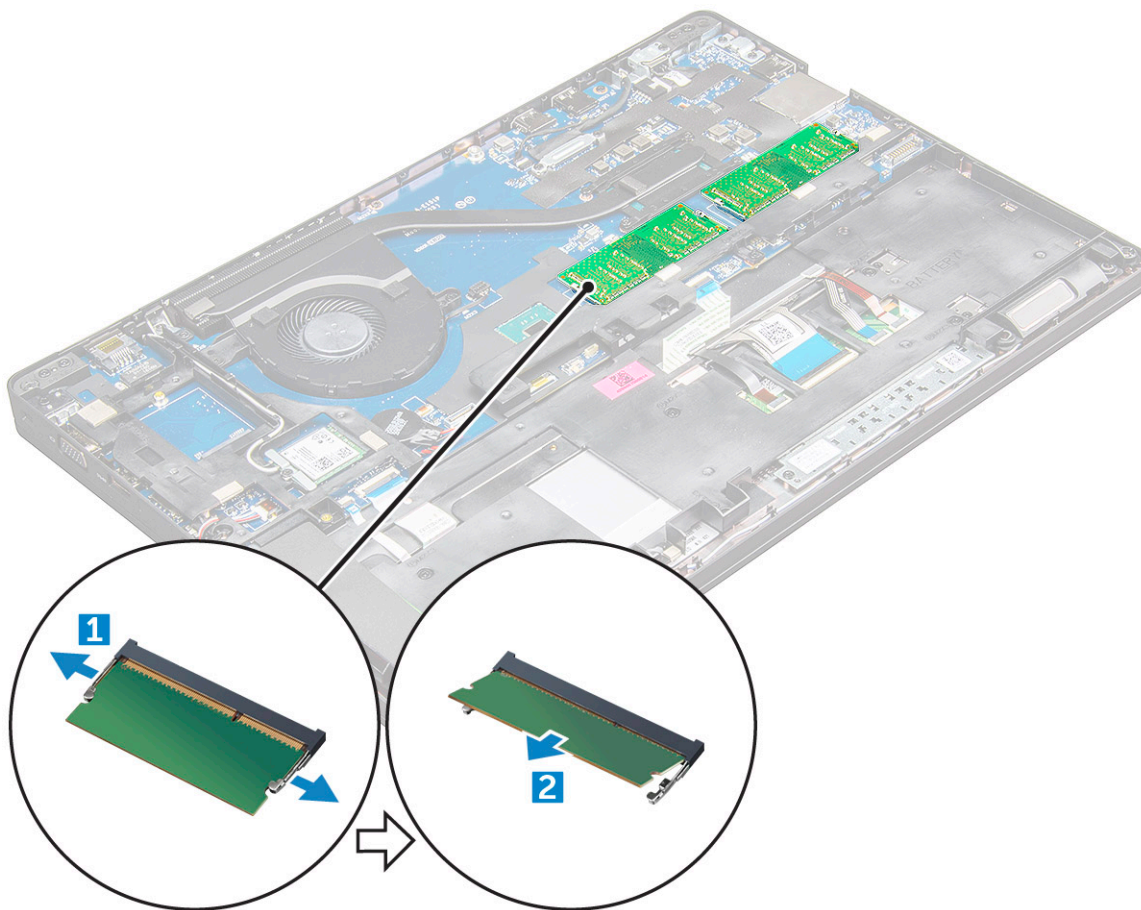
## Installing the WWAN card

1. Insert the WWAN card into the slot on the computer .
2. Tighten the M2.0x3.0 screw to secure WWAN card on the computer.
3. Connect the WWAN cables to the connectors on the WWAN Card.
4. Install the:
  - a. [battery](#)
  - b. [base cover](#)
5. Follow the procedure in [After working inside your system](#).

# Memory module

## Removing the memory module

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [base cover](#)
  - b. [battery](#)
3. To remove the memory module:
  - a. Pry the clips securing the memory module until the memory pops-up [1].
  - b. Lift the memory module away from the connector [2].



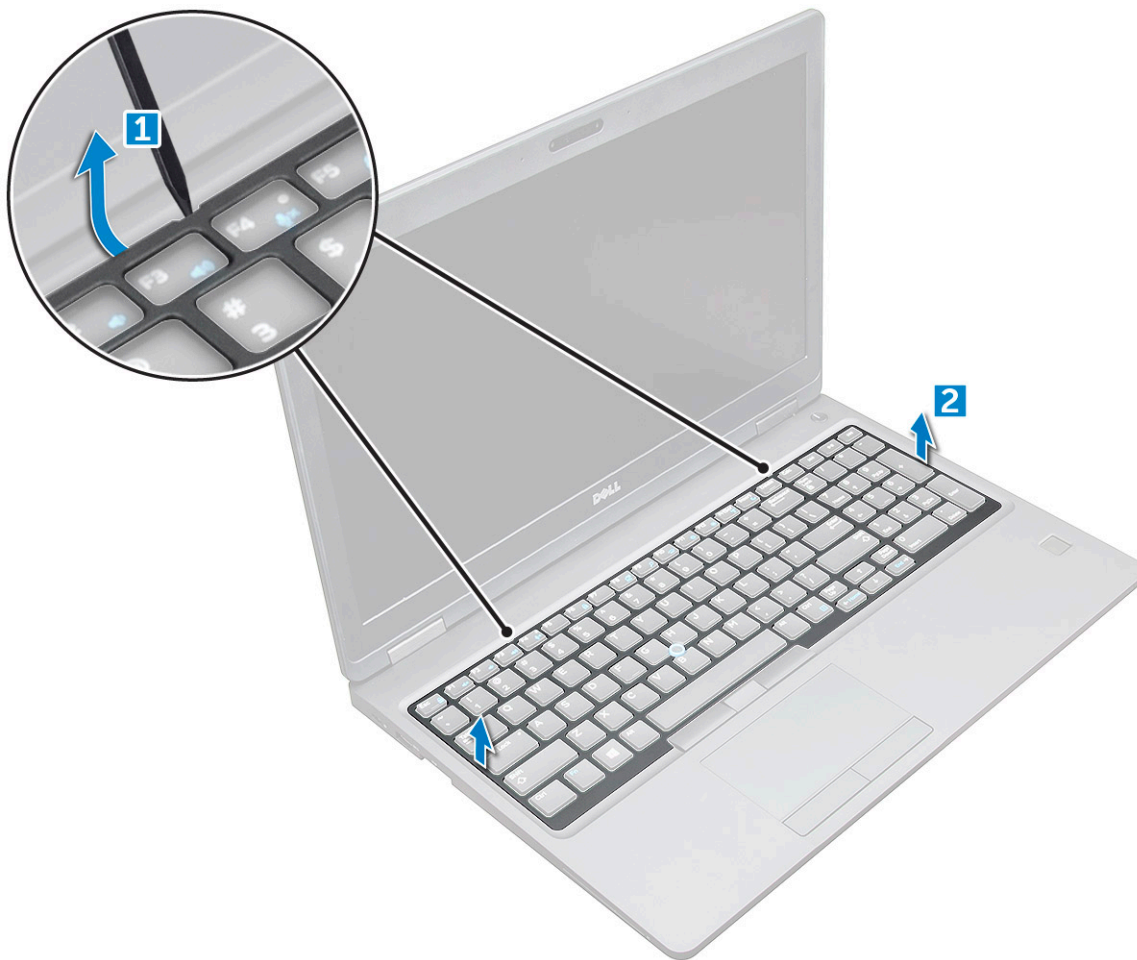
## Installing the memory module

1. Insert the memory module into the memory module socket then press downward until the clips secure the memory module.
2. Install the:
  - a. [battery](#)
  - b. [base cover](#)
3. Follow the procedures in [After working inside your computer](#).

## Keyboard

### Removing the keyboard trim

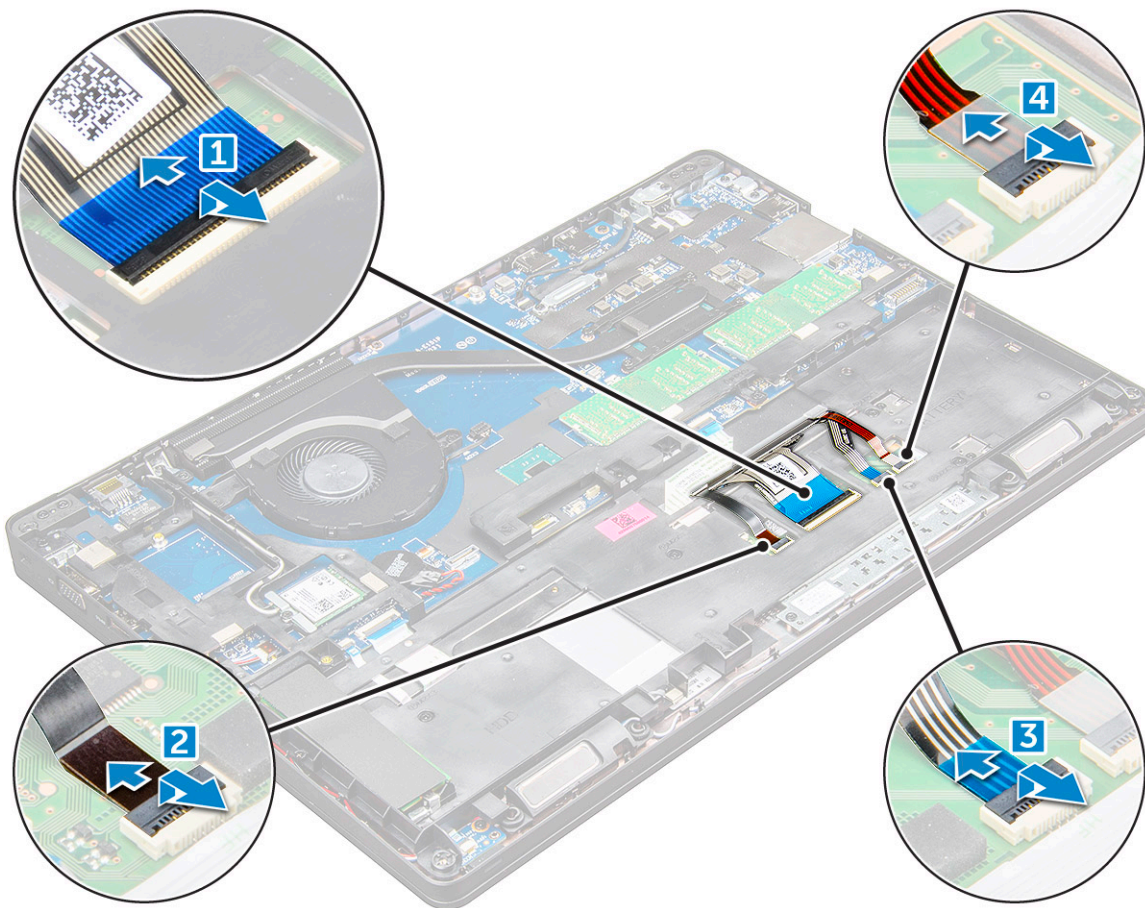
1. Follow the procedure in [Before working inside your computer](#).
2. Pry the keyboard trim from the edges [1] and lift it away from the computer [2].



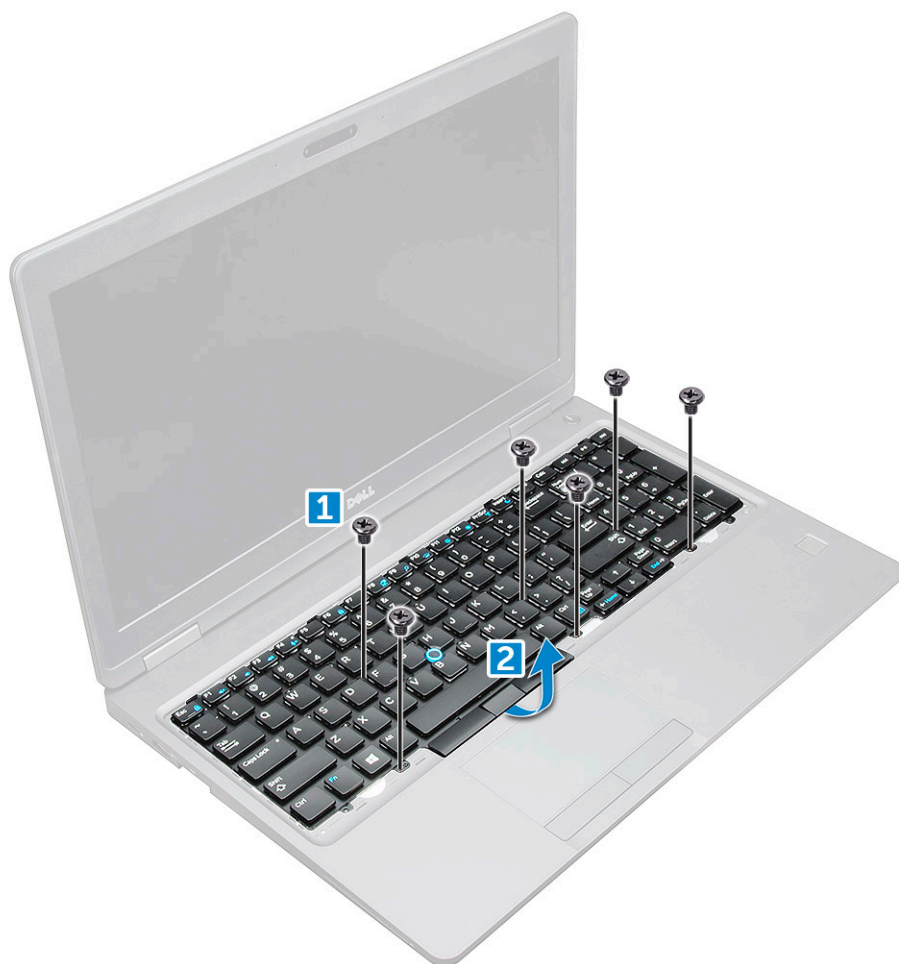
**NOTE:** You may need a plastic scribe to pry the keyboard trim from the edges.

## Removing the keyboard

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [base cover](#)
  - b. [battery](#)
  - c. [keyboard trim](#)
3. Lift the latch, and disconnect the keyboard cable [1], touchpad cable [2], trackstick cable [3] and back light(optional) [4] from the connector.



4. To remove the keyboard:
  - a. Remove the M2x2 screws that secure the keyboard to the computer [1].
  - b. Pry the keyboard from the edge of the computer [2].



5. Slide and lift the keyboard away from the computer.





## Installing the keyboard

1. Align the keyboard with the screw holders on the computer.
2. Tighten the M2.0x2.5 screws to secure the keyboard to the computer.
3. Connect the keyboard cable, touchpad cable, trackstick cable and back light(optional) to the connectors on the system board.
4. Install the:
  - a. [keyboard trim](#)
  - b. [battery](#)
  - c. [base cover](#)
5. Follow the procedure in [After working inside your system](#).


## Installing the keyboard trim

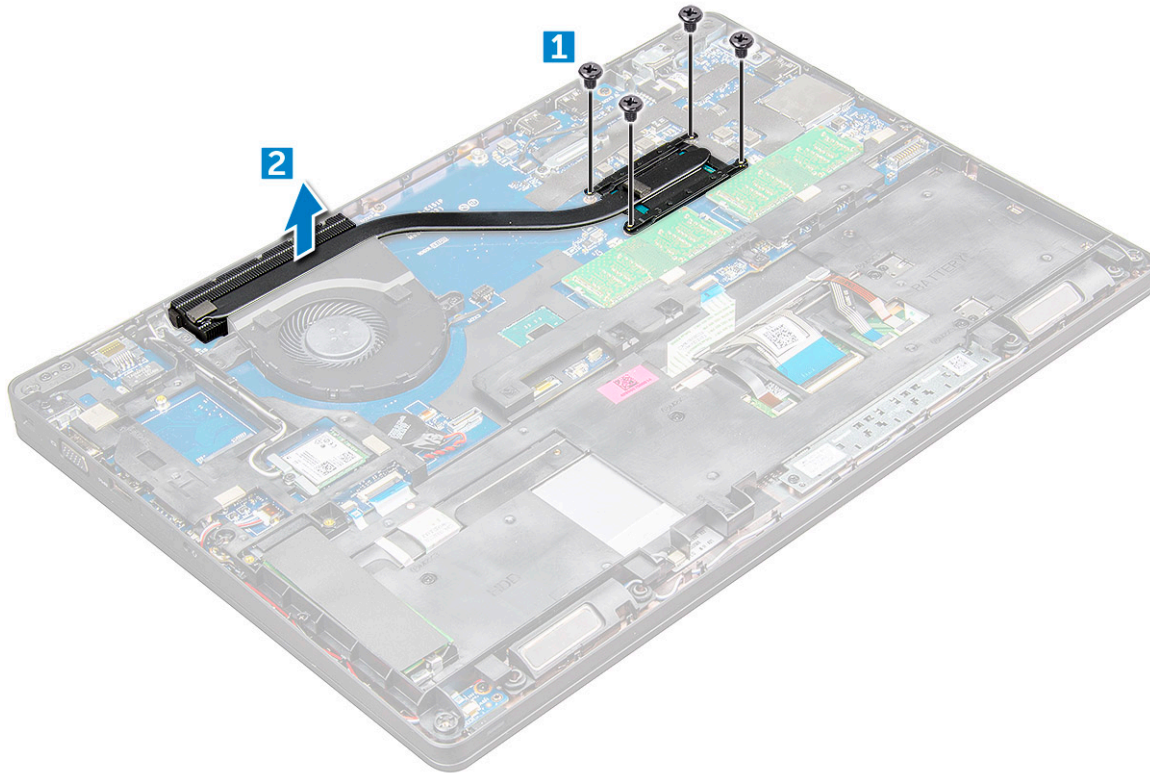
1. Align the keyboard trim with the tabs on the computer and press the keyboard until the keyboard clicks into place.
2. Follow the procedure in [After working inside your system](#).

## Heat sink


### Removing the heat sink

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

2. Remove the:
  - a. [base cover](#)
  - b. [battery](#)
3. To remove the heat sink - :
  - a. [1].  
 **NOTE:** Remove the screws that secure the heat sink .
  - b. Lift the heat sink away from the system board [2] .




## Installing the heat sink

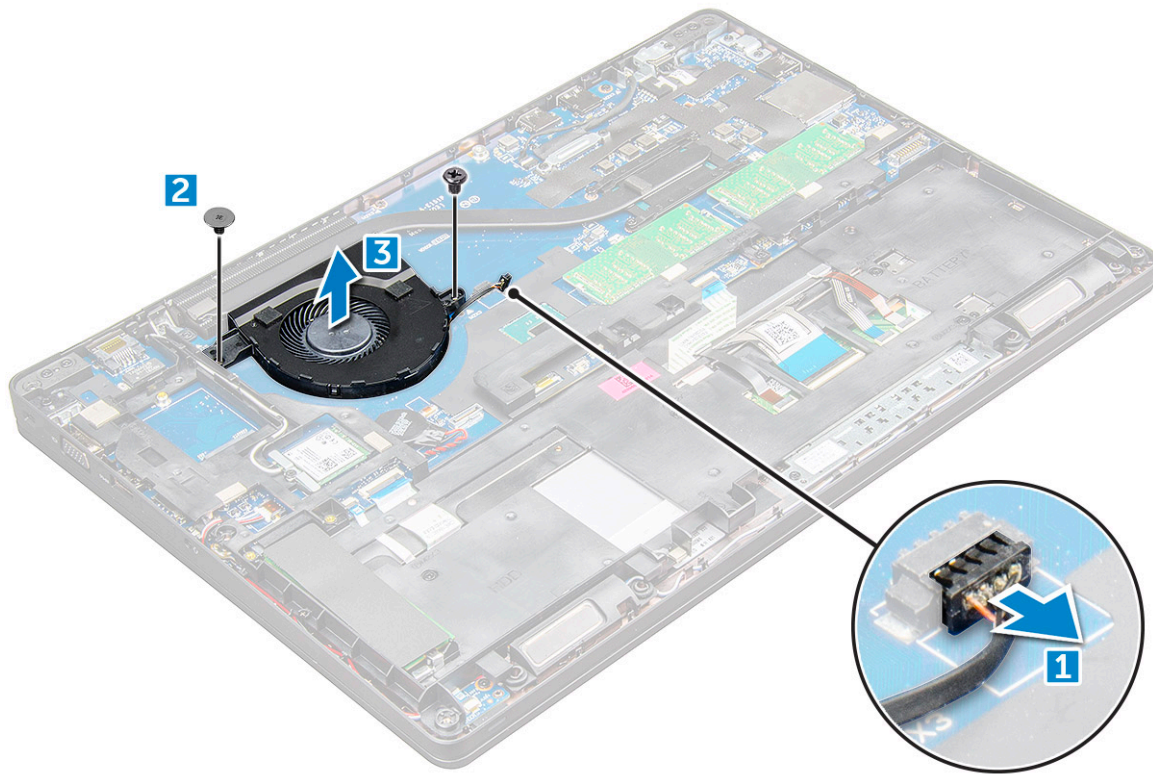
1. Place the heat sink on the system board and align the heat sink with the screw holders.
2. Tighten the M2x3 screws to secure the heat sink to the system board.  
 **NOTE:** Tighten the screws on the system board in the order of the callout numbers [1, 2, 3, 4, 5, 6].
3. Connect the fan cable to the connector on the system board.
4. Install the:
  - a. [battery](#)
  - b. [base cover](#)
5. Follow the procedure in [After working inside your computer](#).

## System fan

### Removing the system fan

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

- a. [base cover](#)
- b. [battery](#)
3. To remove the system fan:
  - a. Disconnect the system fan cable from the connector on the system board [1].
  - b. Remove the M2x3 screws (2) that secures the system fan to the system board
  -  **NOTE:** Some system may have an integrated heat sink and system fan.
  - c. Lift the system fan away from the system board [2].



## Installing the system fan

1. Place the system fan on the system board and align the system fan on the screw holders.
2. Tighten the M2x3 screws to secure the heat sink to the system board.
3. Connect the fan cable to the connector on the system board.
4. Install the:
  - a. [battery](#)
  - b. [base cover](#)
5. Follow the procedure in [After working inside your computer](#).

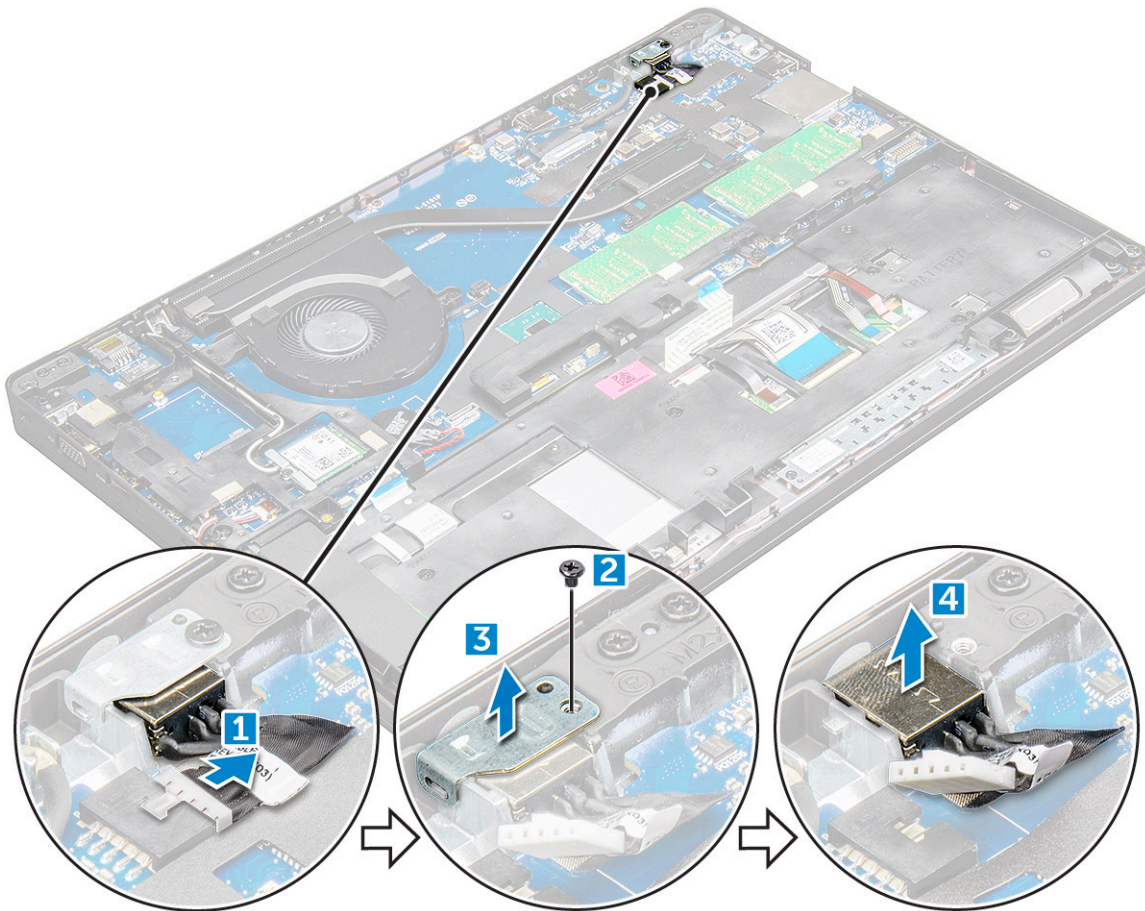
## Power connector port

### Removing the power connector port

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



- a. Disconnect the power connector port cable from the connector on the system board [1].
- b. Remove the M2x3 screw to release the metal bracket that secures the power connector port [2].
- c. Remove the metal bracket that secures the power connector port [3].
- d. Lift the power connector port away from the computer [4].



## Installing the power connector port

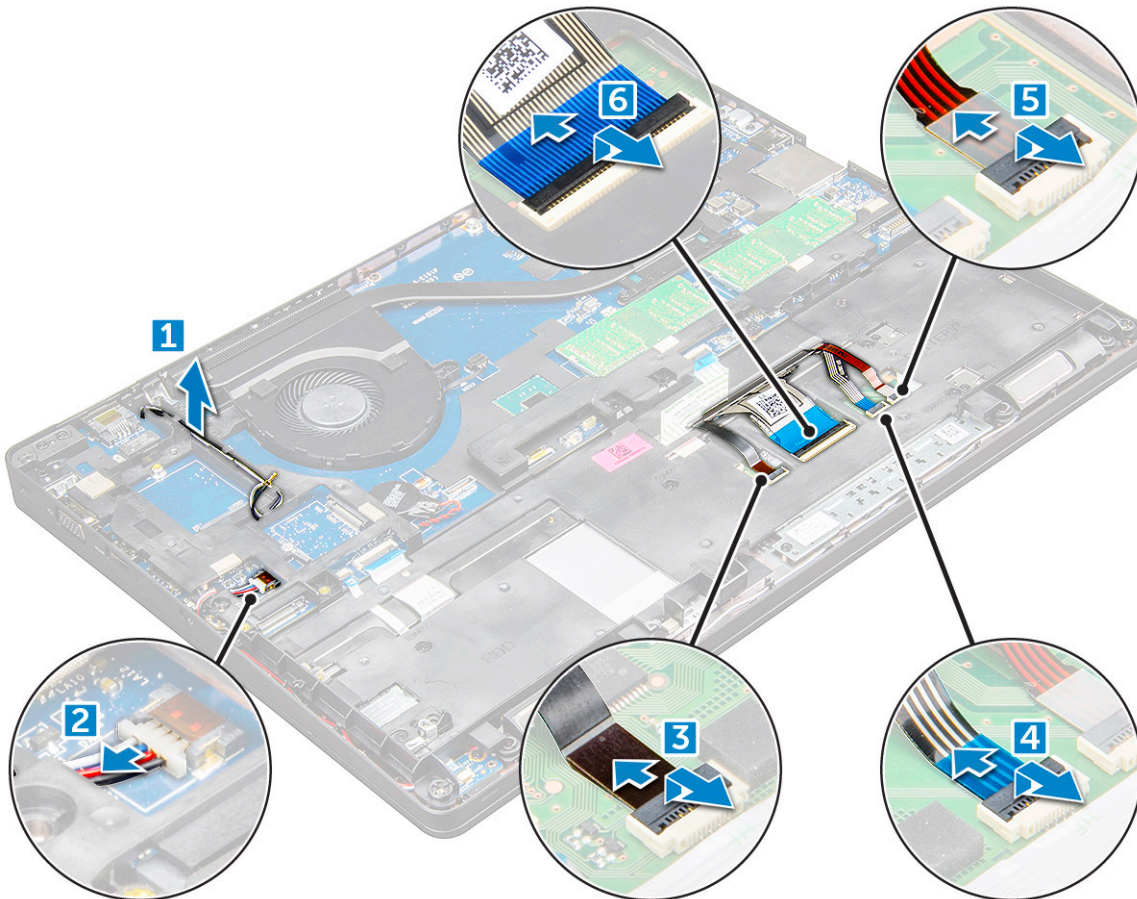
1. Insert the power connector port into the slot on the computer.
2. Place the metal bracket on the power connector port.
3. Tighten the M2x3 screw to secure the metal bracket to the power connector port on the computer.
4. Connect the power connector port cable to the connector on the system board.
5. Install the:
  - a. battery
  - b. base cover
6. Follow the procedure in [After working inside your computer](#).

## Chassis frame

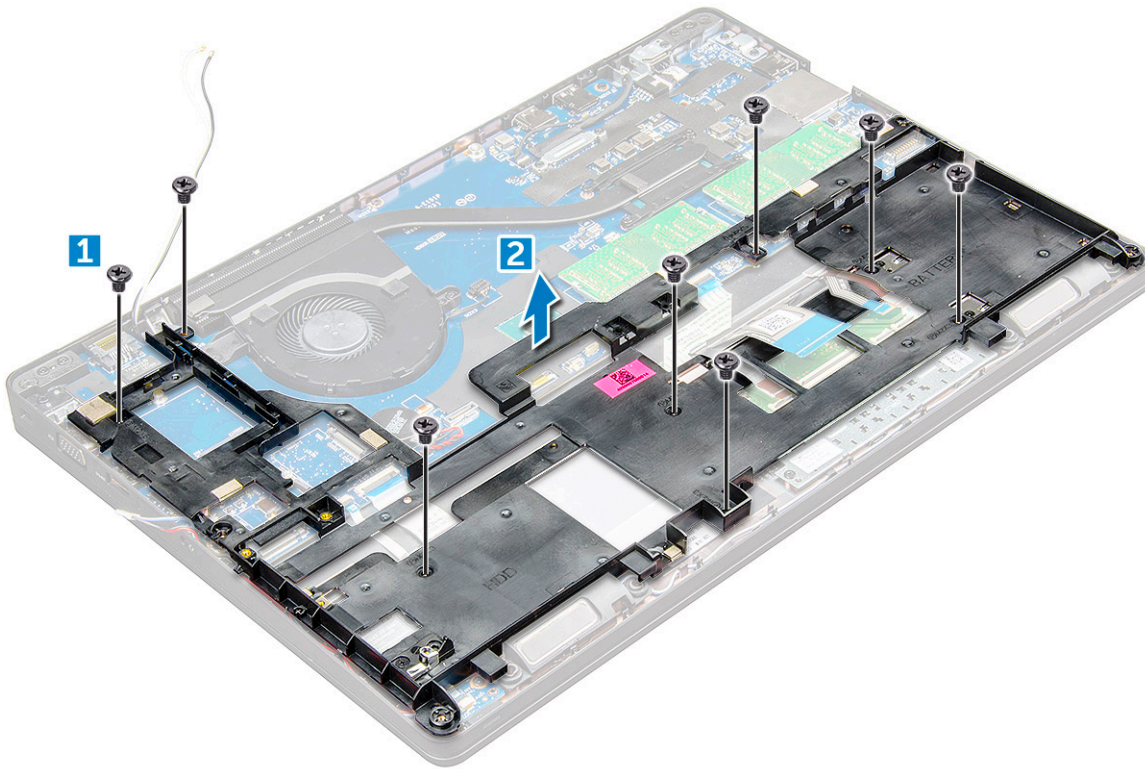
### Removing the chassis frame

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

- c. battery
  - d. WLAN card
  - e. WWAN card
  - f. SSD card or hard drive
3. To release the chassis frame:
- a. Release the WLAN and WWAN cables from the routing channels [1].
  - b. Disconnect the speaker cable from the connector on the system board [2].
  - c. Lift the latch and disconnect the keyboard cable[3], touchpad cable[4], pointstick cable[5] and backlight(optional) [6] from the connector.



4. To remove the chassis frame:
- a. Remove the screws (M2.0x3.0, M2x5) that secure the chassis frame to the computer [1].
  - b. Lift the chassis frame away from the computer [2].



## Installing the chassis frame

1. Place the chassis frame on the computer and tighten the screws (M2x5, M2.0x3.0).

**NOTE:** When reinstalling the chassis frame ensure the keyboard cables are NOT under the frame, but run through the opening in the frame.

2. Connect the speaker, keyboard cable, touchpad cable, pointstick cable and backlight(optional).
3. Route the WLAN and WWAN cable.

**NOTE:** Ensure the coin cell battery cable is properly routed in between the chassis frame and the system board to avoid damages to the cable.

4. Install the:
  - a. SSD card or hard drive
  - b. WWAN card
  - c. WLAN card
  - d. battery
  - e. base cover
  - f. SIM card module
5. Follow the procedure in [After working inside your system](#).

## System board

### Removing the system board

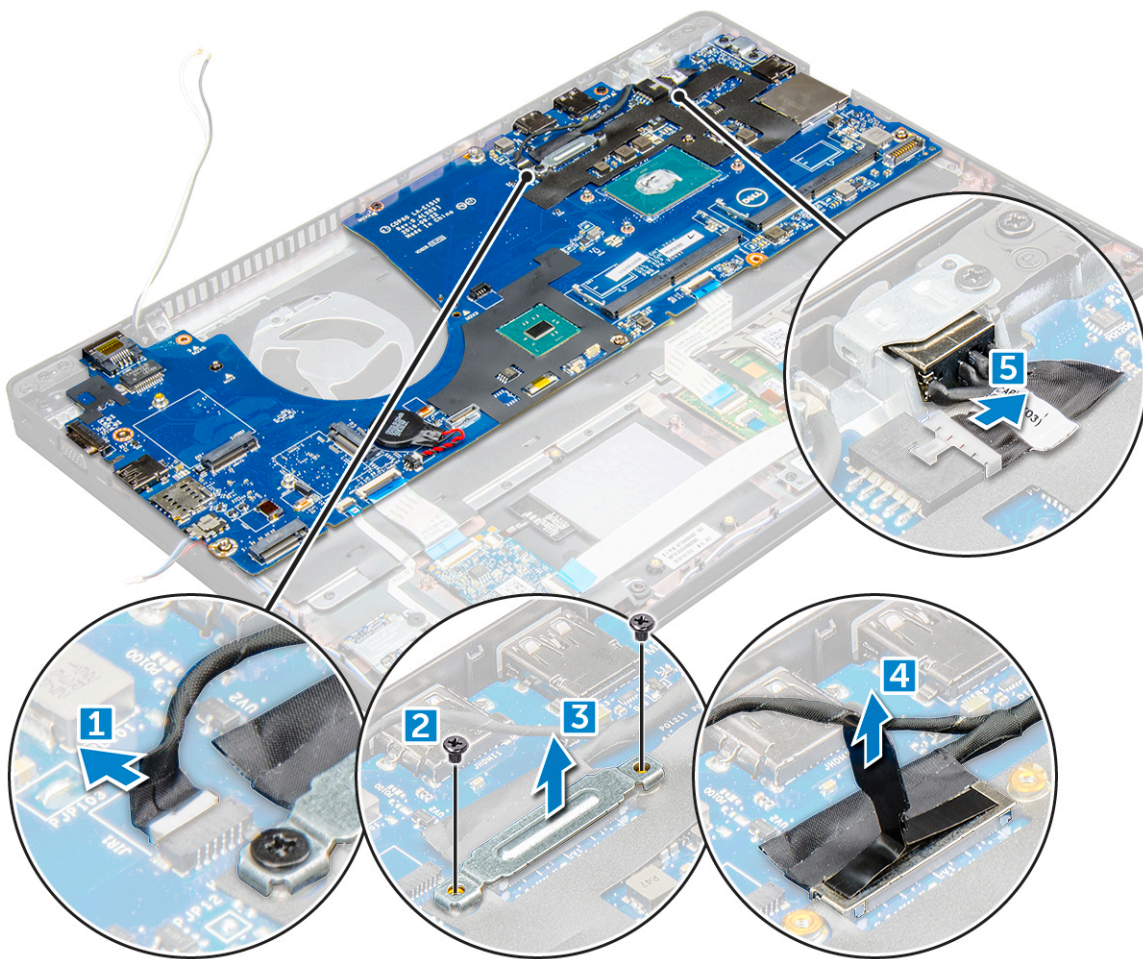
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. SIM card module
  - b. base cover



- c. battery
- d. WLAN card
- e. WWAN card
- f. SSD card or hard drive
- g. memory module
- h. heat sink
- i. system fan
- j. coin cell battery
- k. Power connector port
- l. chassis frame

3. To release the system board:

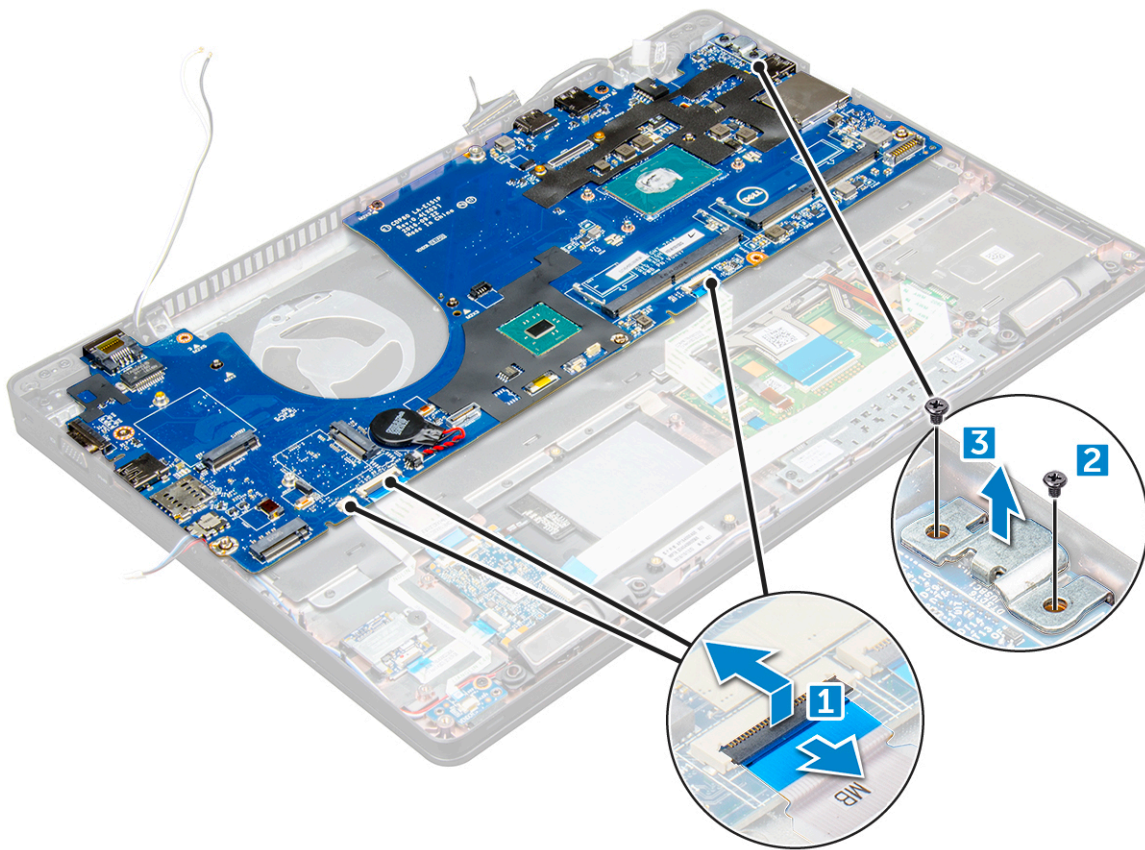
- a. Disconnect the IR camera cable [1].
- b. Remove the M2.0x3.0 screws that secures the metal bracket [2].
- c. Lift the metal bracket that secures the display cable [3].
- d. Disconnect the display cable from the connectors on the system board [4].
- e. Disconnect the power cable [5].



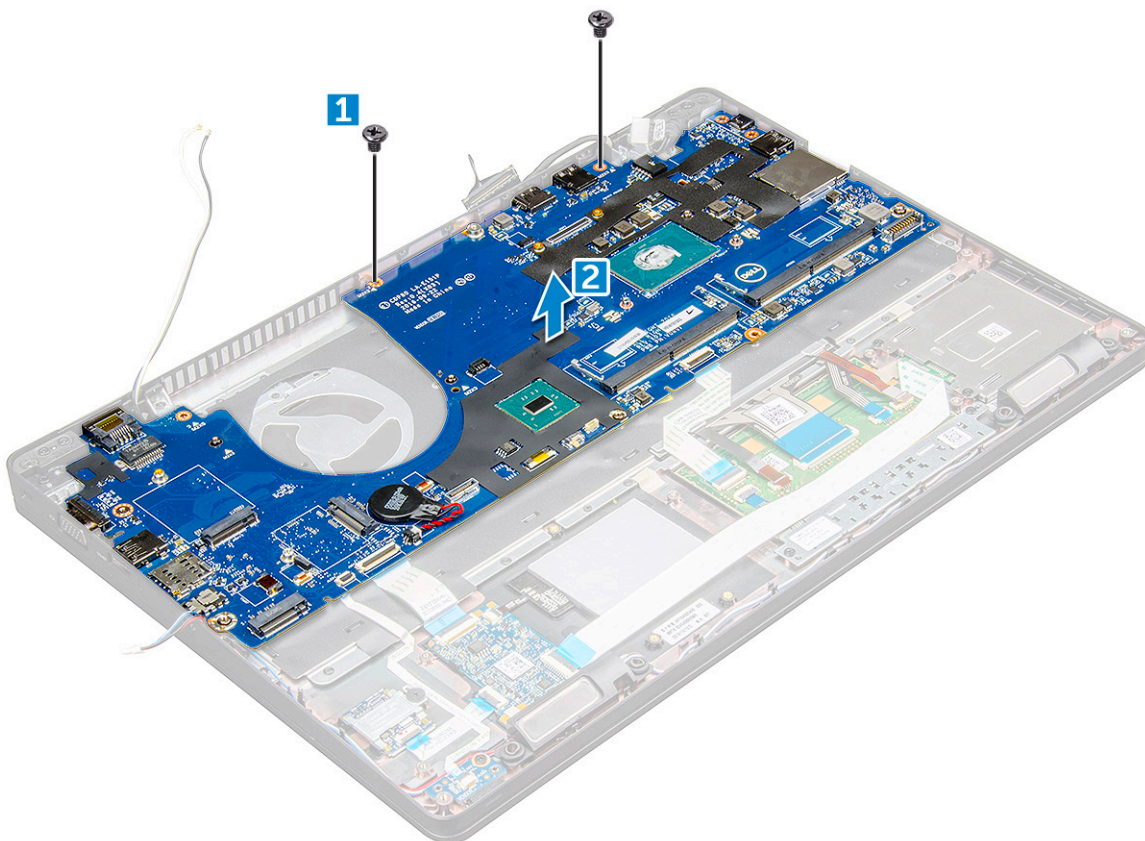
4. To remove the system board:

- a. Disconnect the LED board, mother board and touchpad cable from the system board [1].
- b. Remove the M2.0x5.0 screws that secure the metal bracket and lift it away from the system board [2,3].


**NOTE:** The metal bracket referred is the USB-C port bracket.



5. Remove the M2.0x3.0 screws and lift the system board away from the computer [1, 2].



## Installing the system board

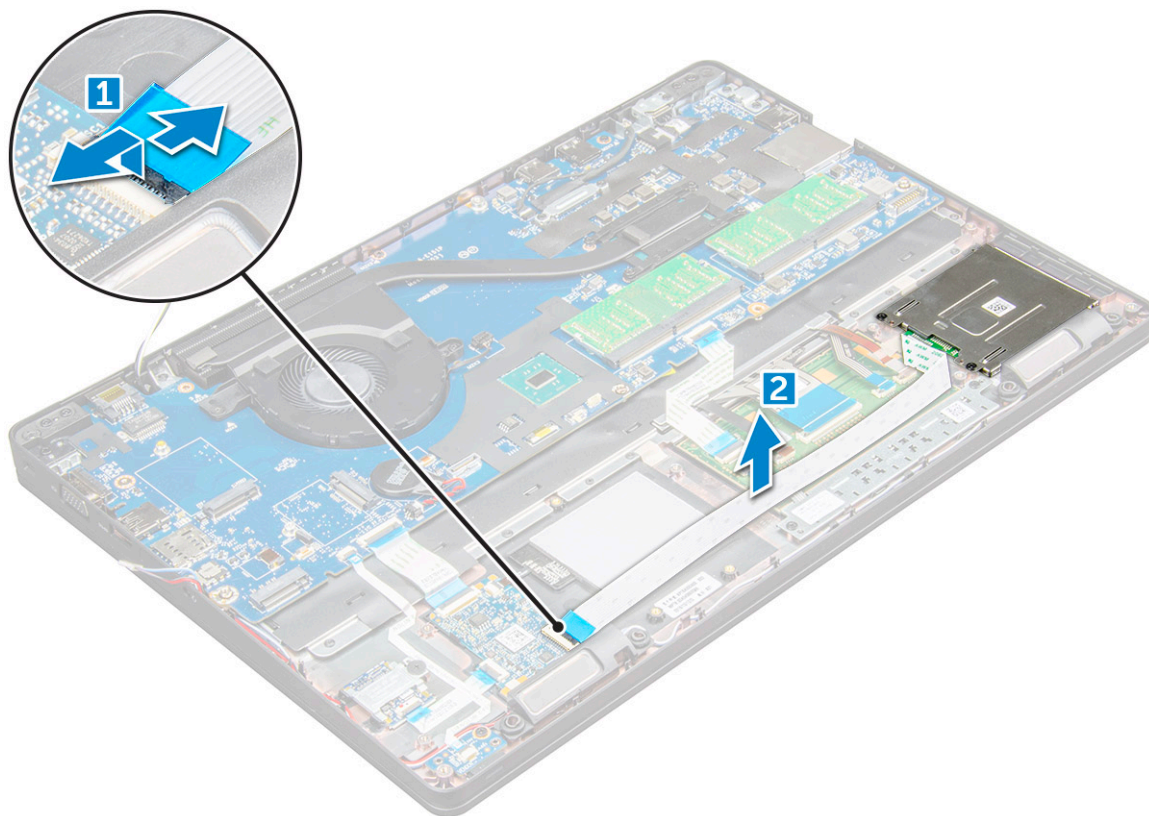
1. Align the system board with the screw holders on the computer.
2. Tighten the M2.0x3.0 screws to secure the system board to the computer.
3. Place the metal bracket and tighten the M2.0x5.0 screws on the system board.  
 **NOTE:** The metal bracket referred is the USB-C bracket.
4. Connect the LED, mother board and touchpad cable to the system board.
5. Connect the power cable.
6. Connect the display cable on the system board.
7. Place the eDP cable and metal bracket to system board and tighten the M2.0x3.0 screws to secure to the system board.
8. Connect the IR camera cable.
9. Install the:
  - a. [chassis frame](#)
  - b. [coin cell battery](#)
  - c. [heat sink](#)
  - d. [system fan](#)
  - e. [memory module](#)
  - f. [SSD card](#) or [hard drive](#)
  - g. [WWAN card](#)
  - h. [WLAN card](#)
  - i. [battery](#)
  - j. [base cover](#)
  - k. [SIM card module](#)
10. Follow the procedure in [After working inside your computer](#).

## Touchpad panel

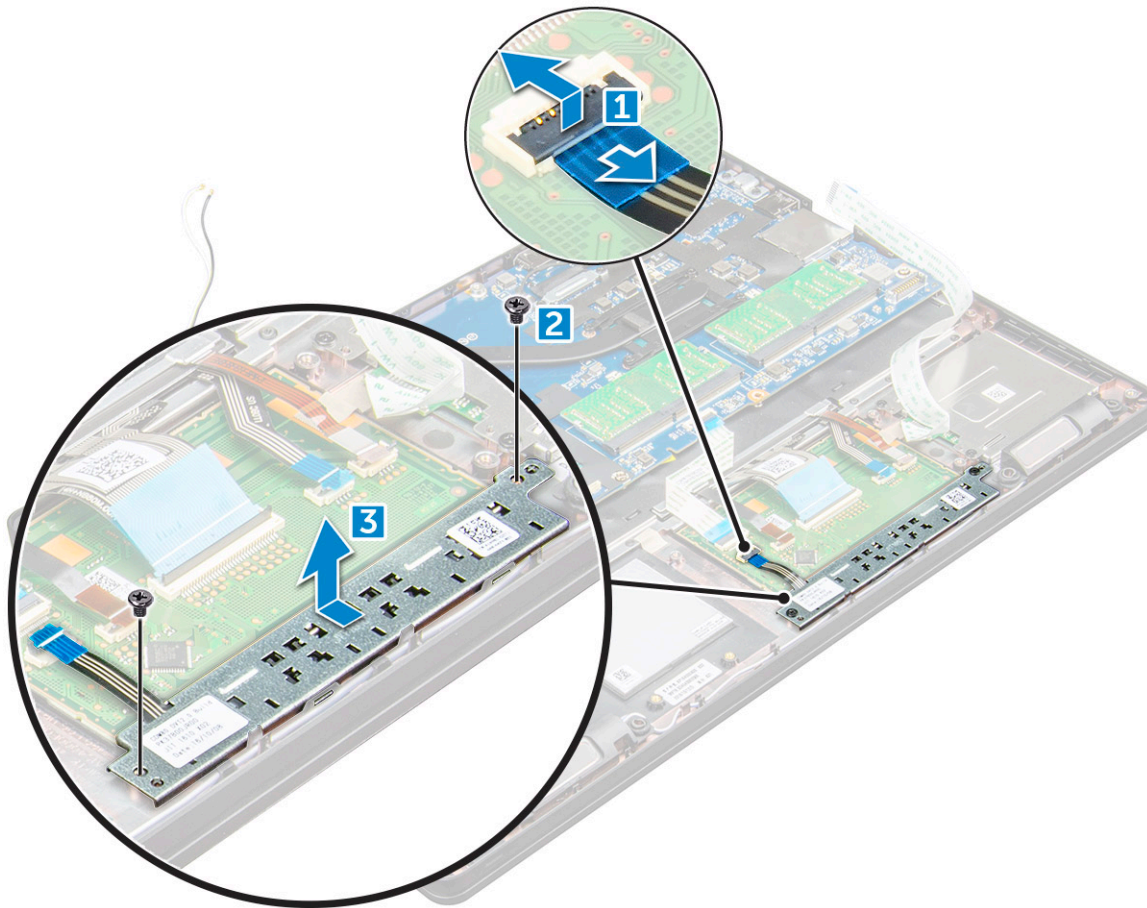
### Removing the touchpad buttons

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [base cover](#)
  - b. [battery](#)
  - c. [WLAN card](#)
  - d. [WWAN card](#)
  - e. [SSD card](#) or [hard drive](#)
  - f. [chassis frame](#)
3. To release the touchpad panel:
  - a. Lift the latch and disconnect the SmartCard reader cable from the connector [1].
  - b. Peel off the SmartCard reader cable from the adhesive [2].





4. To remove the touchpad panel:
  - a. Lift the latch and disconnect the touchpad panel cable from the connector [1].
  - b. Remove the M2.0x3.0 screws that secure the touchpad panel to the computer [2].
  - c. Lift the touchpad panel away from the computer.



## Installing the touchpad panel

1. Place the touchpad panel into the slot on the system board.
2. Tighten the M2.0x3.0 screws to secure the touchpad panel.
3. Connect the touchpad cable.
4. Connect the SmartCard reader cable to the computer.
5. Install the:
  - a. [chassis frame](#)
  - b. [SSD card](#) or [hard drive](#)
  - c. [WWAN card](#)
  - d. [WLAN card](#)
  - e. [battery](#)
  - f. [base cover](#)
6. Follow the procedure in [After working inside your computer](#).

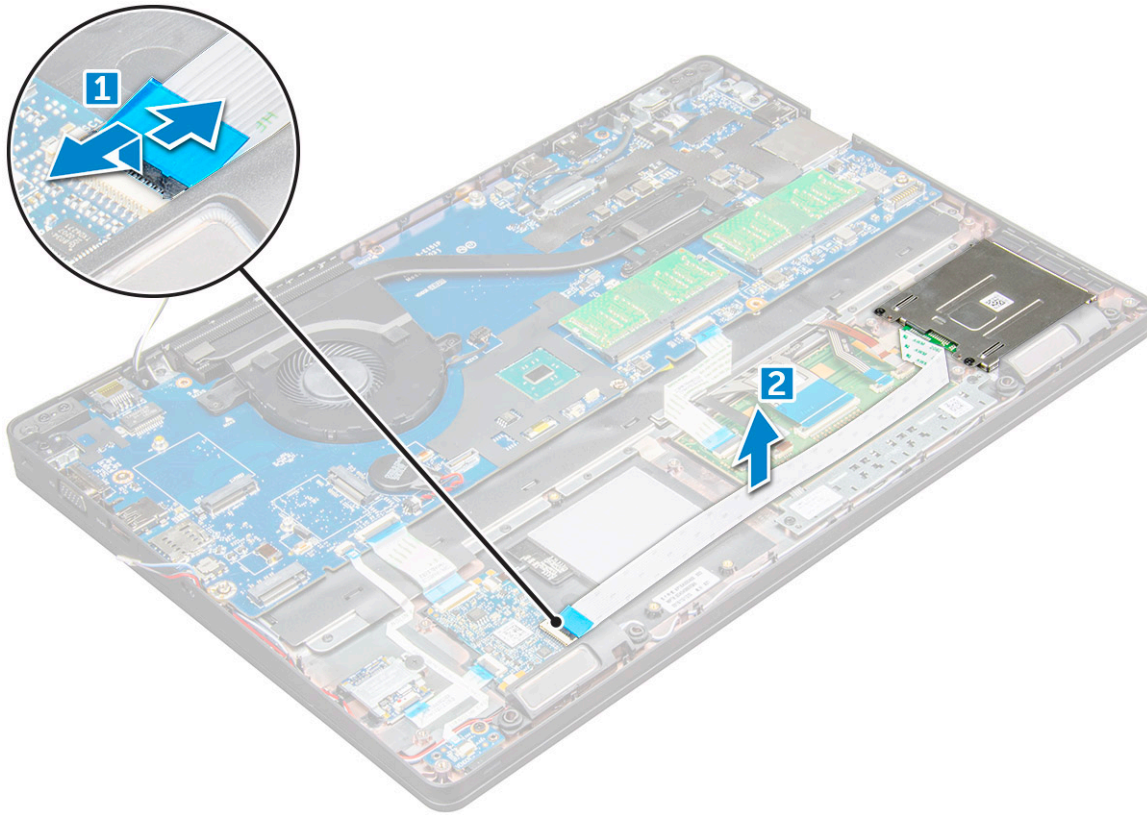
## SmartCard module

### Removing the SmartCard reader

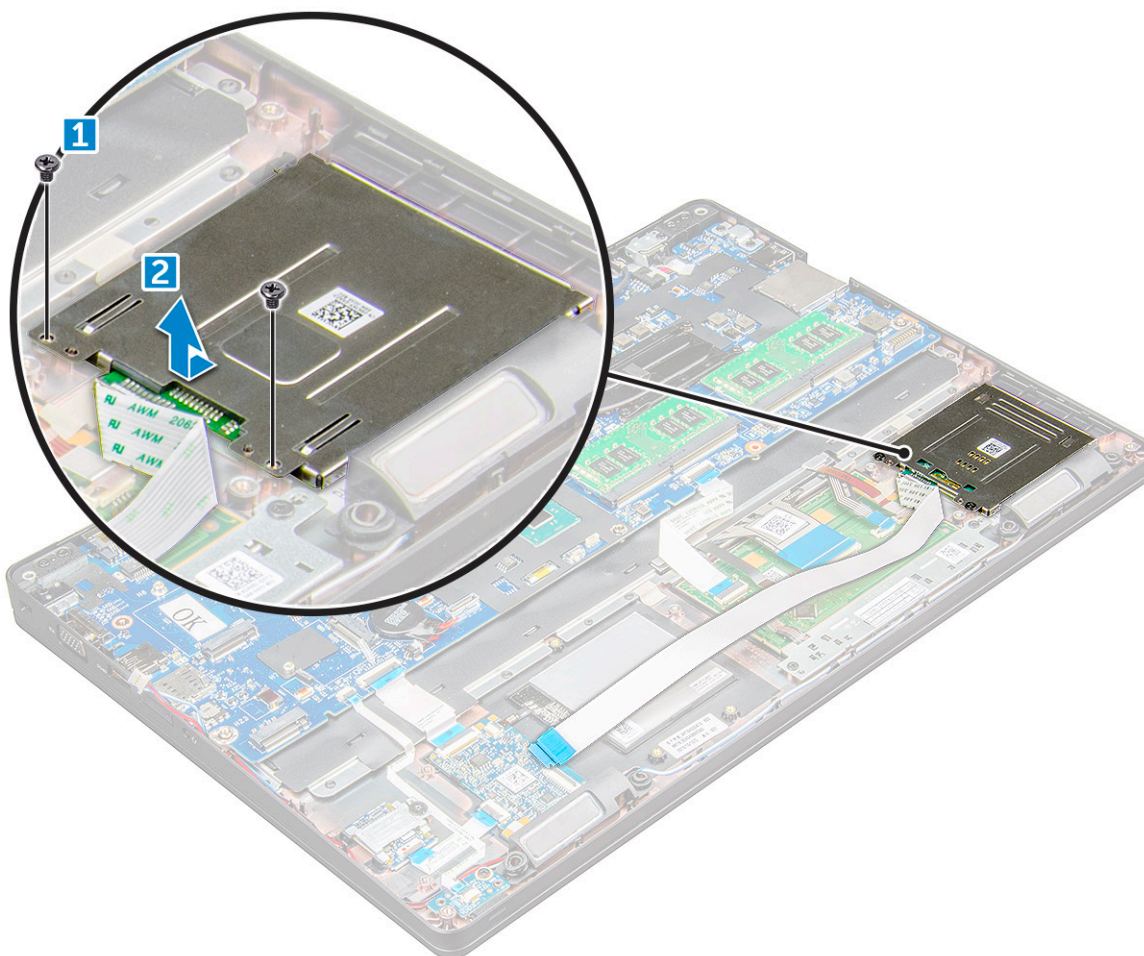
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [base cover](#)
  - b. [battery](#)
  - c. [WLAN card](#)



- d. SSD card
  - e. chassis frame
3. To release the SmartCard reader:
- a. Disconnect the SmartCard reader board cable from the connector on the system board [1].
  - b. Peel off the cable to release from the adhesive [2].



4. To remove the SmartCard reader:
- a. Remove the M2x3 screws that secure the SmartCard reader board to the palmrest [1].
  - b. Pull the SmartCard reader board to release on the system board [2].



## Installing the SmartCard reader

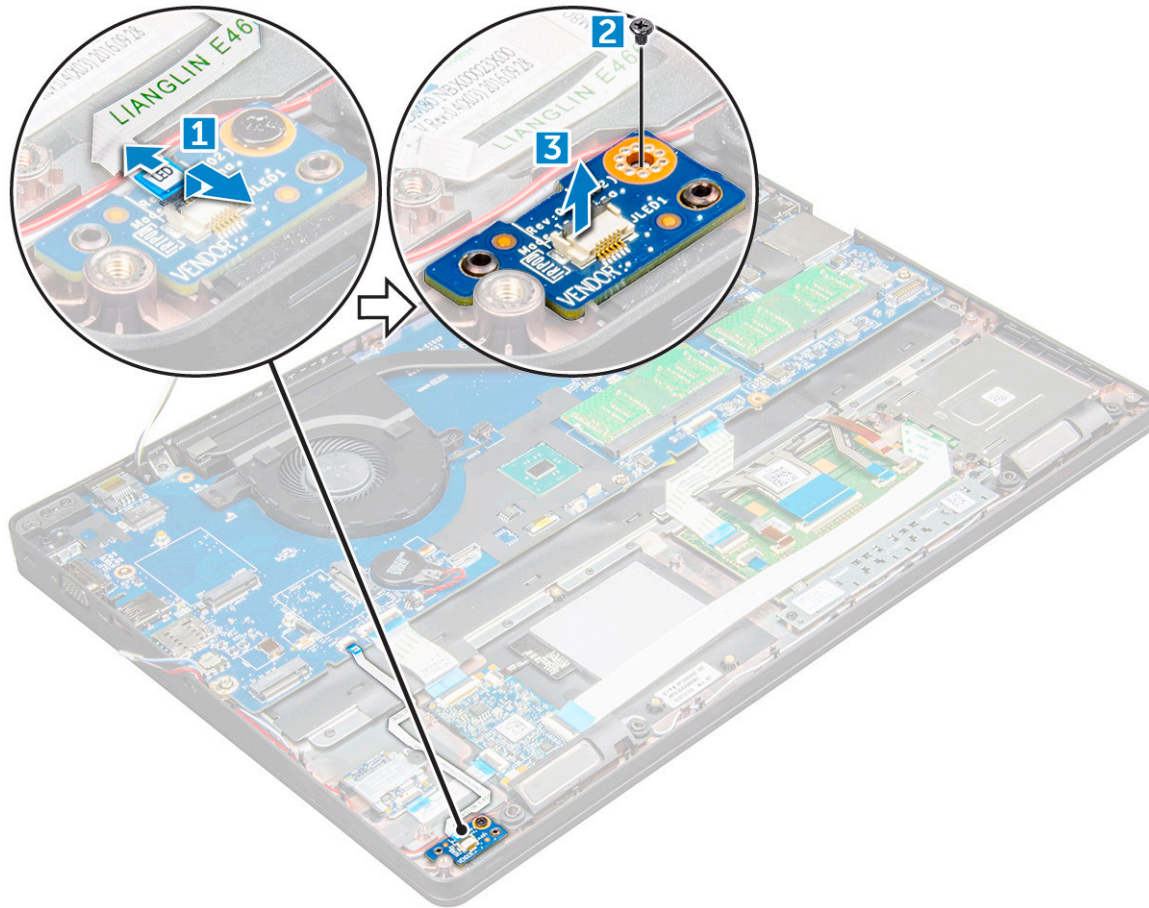
1. Place the SmartCard reader on the computer .
2. Tighten the M2x3 screws to secure the SmartCard reader to the computer .
3. Affix the SmartCard reader cable and connect the cable to the connector on the system board.
4. Install the:
  - a. chassis frame
  - b. SSD card
  - c. WLAN card
  - d. battery
  - e. base cover
5. Follow the procedure in [After working inside your computer](#).

## LED board

### Removing the LED board

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

- d. SSD card
  - e. chassis frame
3. To remove the LED board:
- a. Lift the latch and disconnect the LED board cable from the connector on the LED board [1].
  - b. Remove the M2x3 screw that secures the LED board to the computer [2].
  - c. Lift the LED board away from the computer [3].



## Installing the LED board

1. Place the LED board on the computer.
2. Tighten the M2x3 screw to secure the LED board to the computer .
3. Connect the LED board cable to the connector on the LED board.
4. Install the:
  - a. chassis frame
  - b. SSD card
  - c. WLAN card
  - d. battery
  - e. base cover
5. Follow the procedure in [After working inside your computer](#).

## Speaker

### Removing the speaker

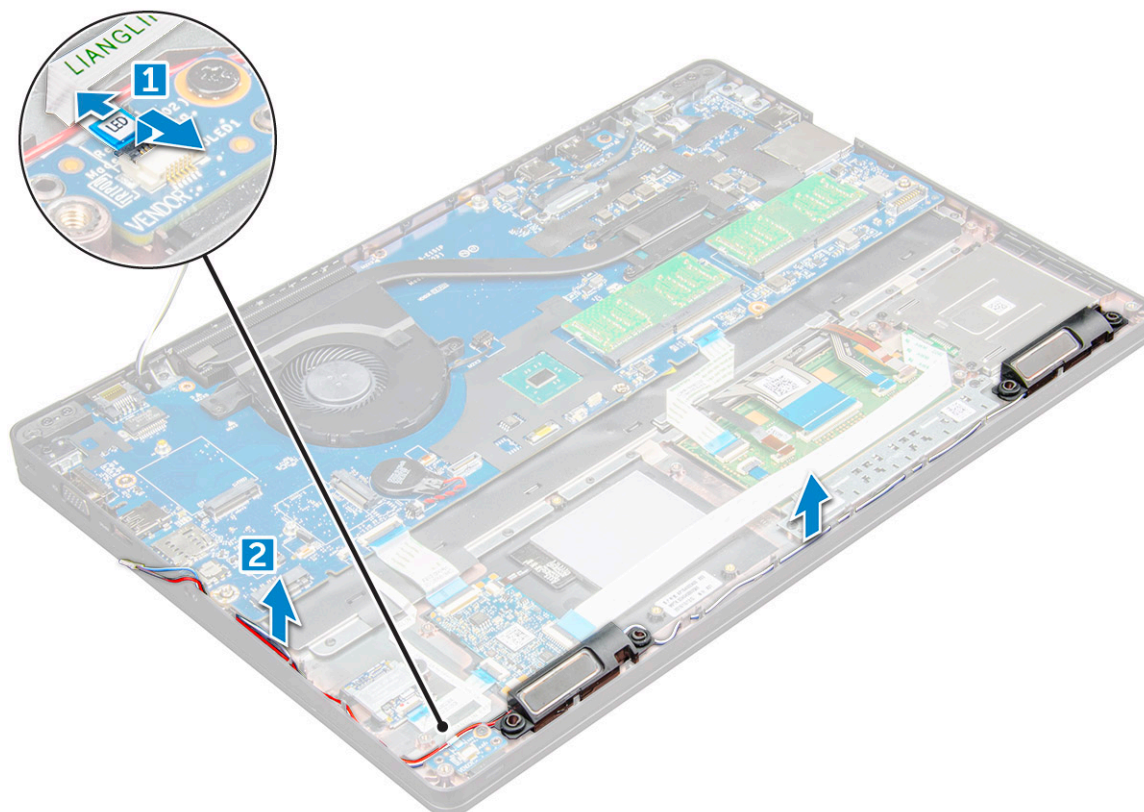
1. Follow the procedure in [Before working inside your computer](#).



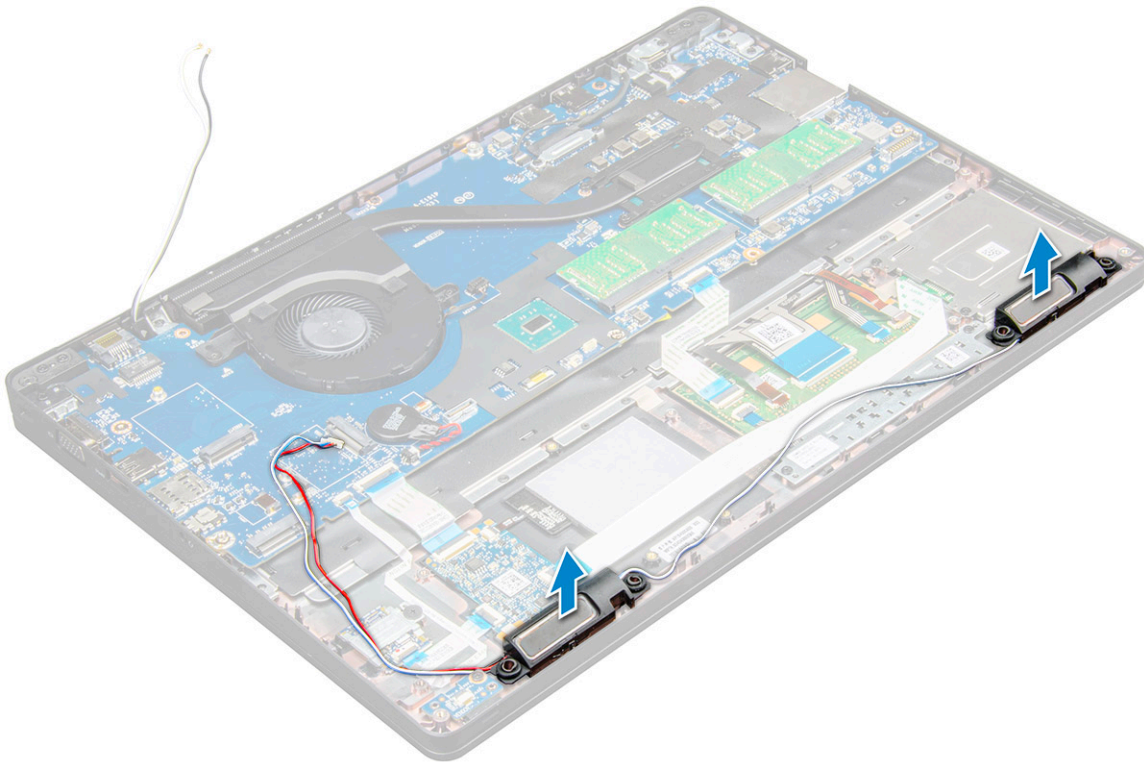
2. Remove the:
  - a. base cover
  - b. battery
  - c. WLAN card
  - d. SSD card
  - e. chassis frame
3. To disconnect the cables:

**NOTE:** Speaker cables are disconnected to remove the chassis frame.

- a. Lift the latch and disconnect the LED board cable [1].
- b. Disconnect and unroute the speaker cable [2].
- c. Remove the speaker cable from the routing clips [3].



4. Remove the speakers from the computer .



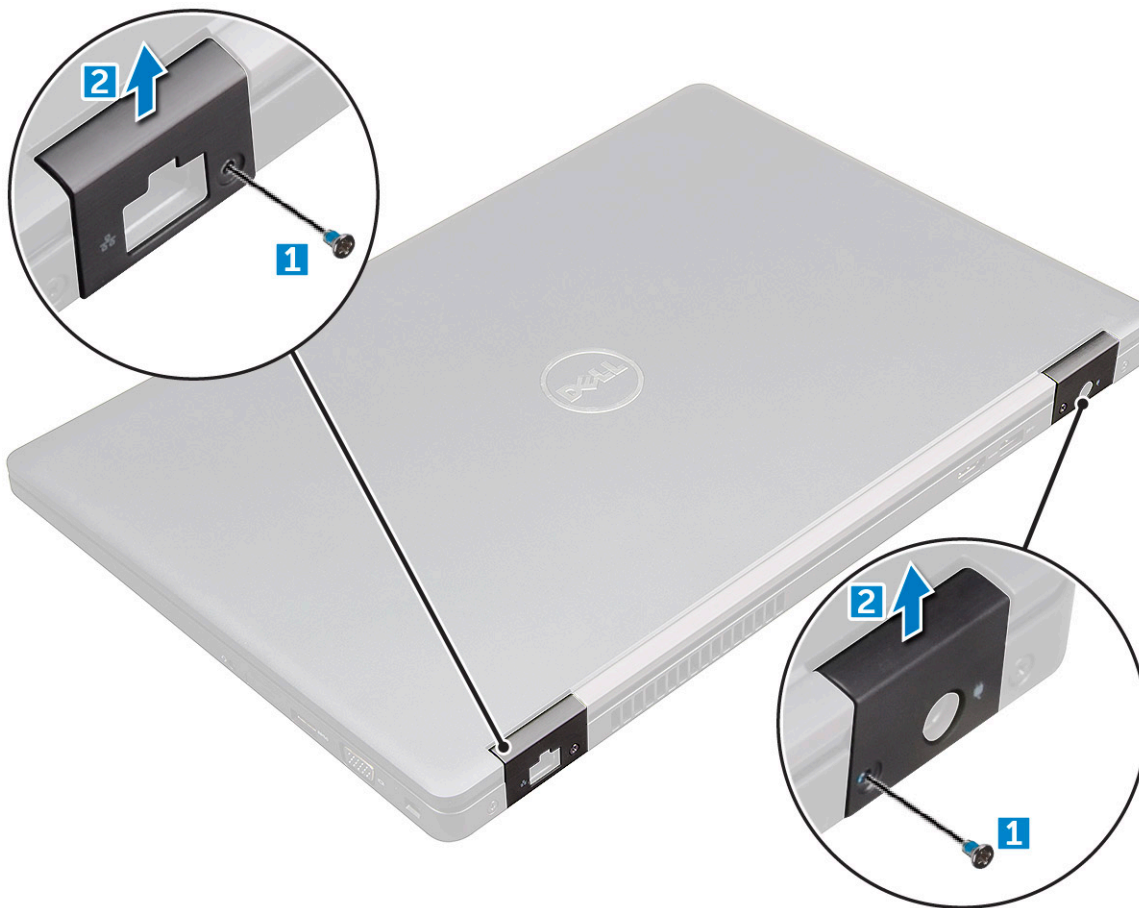
## Installing the speaker

1. Place the speakers into the slots on the computer .
2. Route the speaker cable through the retention clips through the routing channel.
3. Connect the speaker and LED board cable to the computer.
4. Install the:
  - a. chassis frame
  - b. SSD card
  - c. WLAN card
  - d. battery
  - e. base cover
5. Follow the procedure in [After working inside your computer](#).

## Hinge cap

### Removing the hinge cap

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. base cover
  - b. battery
3. To remove the hinge cap:
  - a. Remove the M2x3 screws that secure the hinge cap to the computer [1].
  - b. Remove the hinge cap from the computer [2].



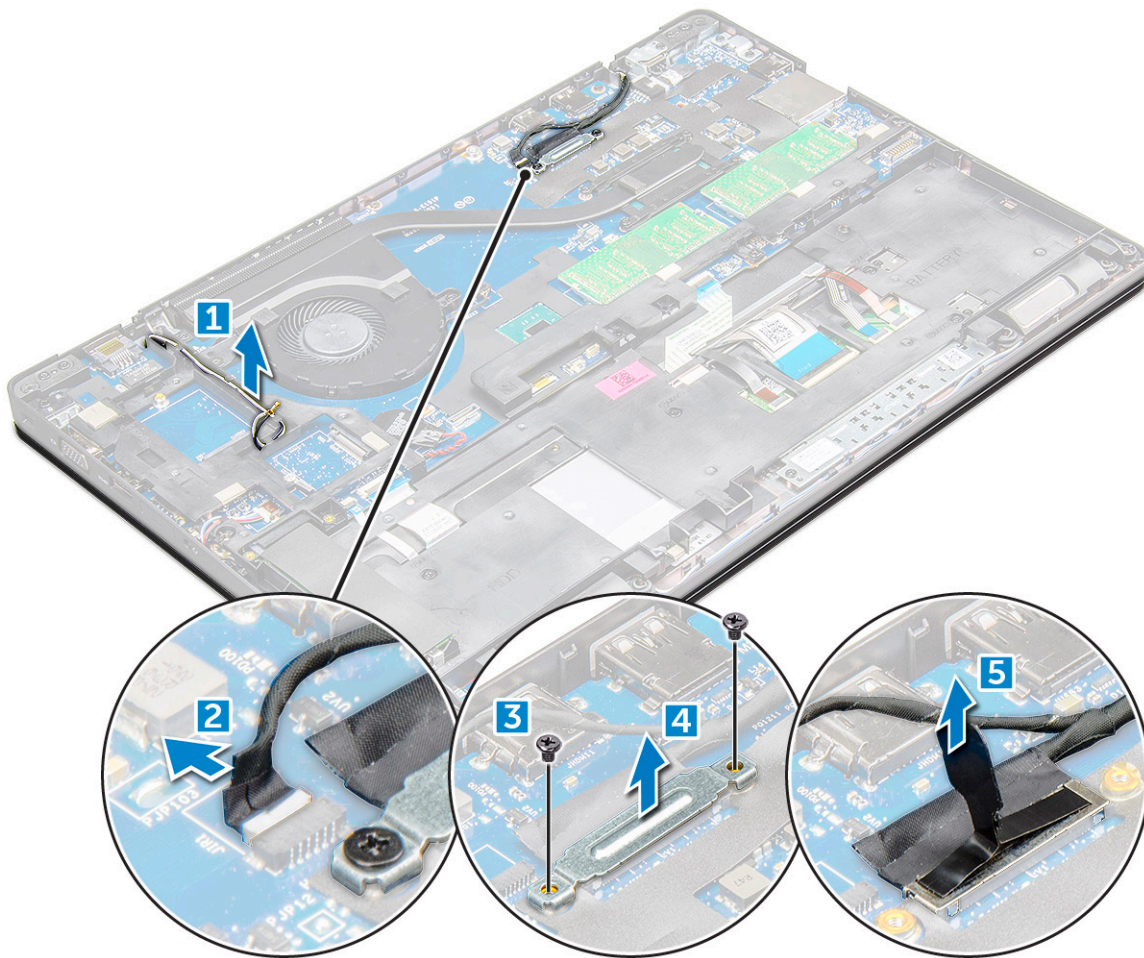
## Installing the hinge cap

1. Place the hinge bracket to align with the screw holders on the computer.
2. Tighten the M2x3 screws to secure the display assembly to the computer.
3. Install the:
  - a. [battery](#)
  - b. [base cover](#)
4. Follow the procedure in [After working inside your computer](#).

## Display assembly

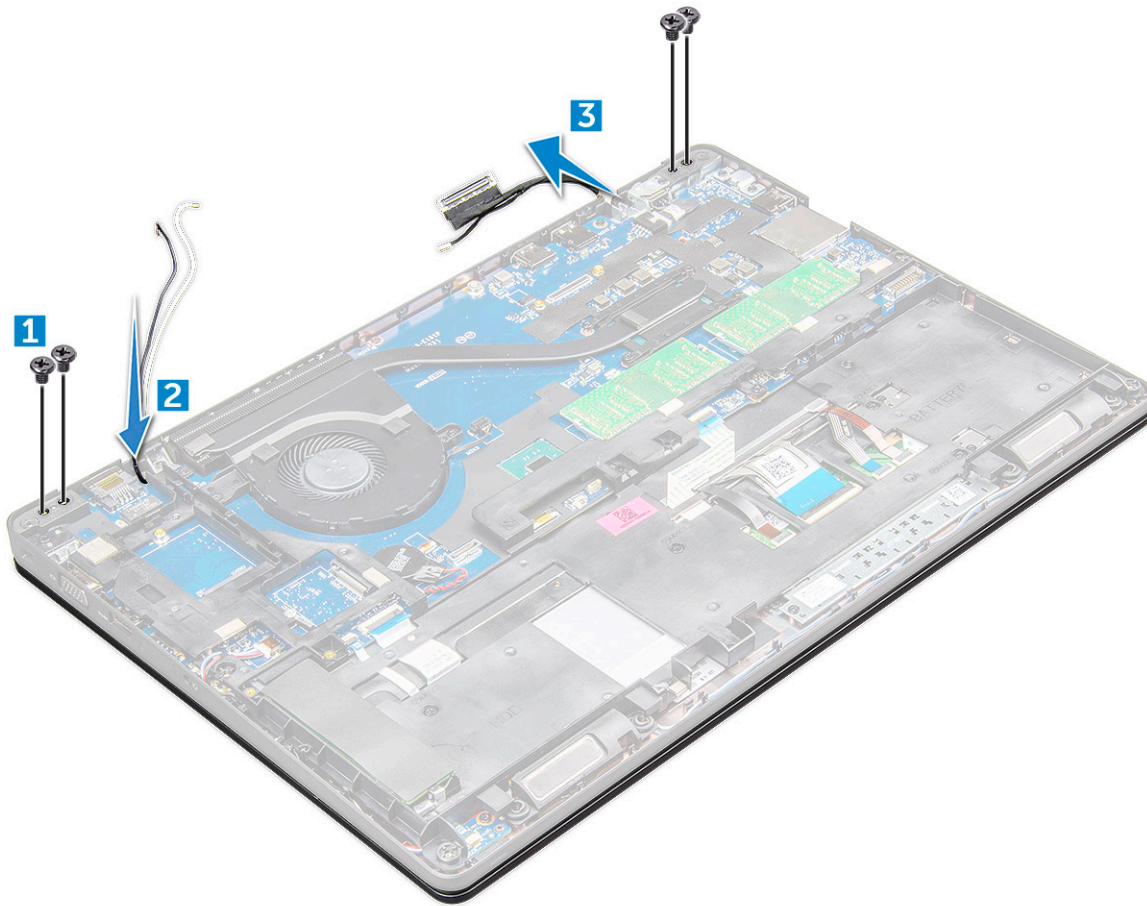
### Removing the display assembly

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [base cover](#)
  - b. [battery](#)
  - c. [WLAN card](#)
  - d. [hinge cap](#)
3. To disconnect the display cable:
  - a. Release the WLAN cable from the routing channels [1].
  - b. Disconnect the IR camera cable [2].
  - c. Remove the M2x5 screws and lift the metal bracket that secure the display cable on the computer [3, 4].
  - d. Disconnect the display(eDP) cable [5].



4. To remove hinge screws:
- a. Remove the M2x5 screws that secure the display assembly to the system board [1].
  - b. Release the antenna cables and display cable from the routing channel [2, 3].





5. Turn over the computer.
6. To remove the display assembly:
  - a. Remove the M2x5 screws that secure the display assembly to the computer [1].
  - b. Open the display [2].






7. Slide the display assembly away from the computer.



## Installing the display assembly

1. Place the display assembly to align with the screw holders on the computer.

 **NOTE:** Close the LCD before inserting the screws or turning over the laptop.

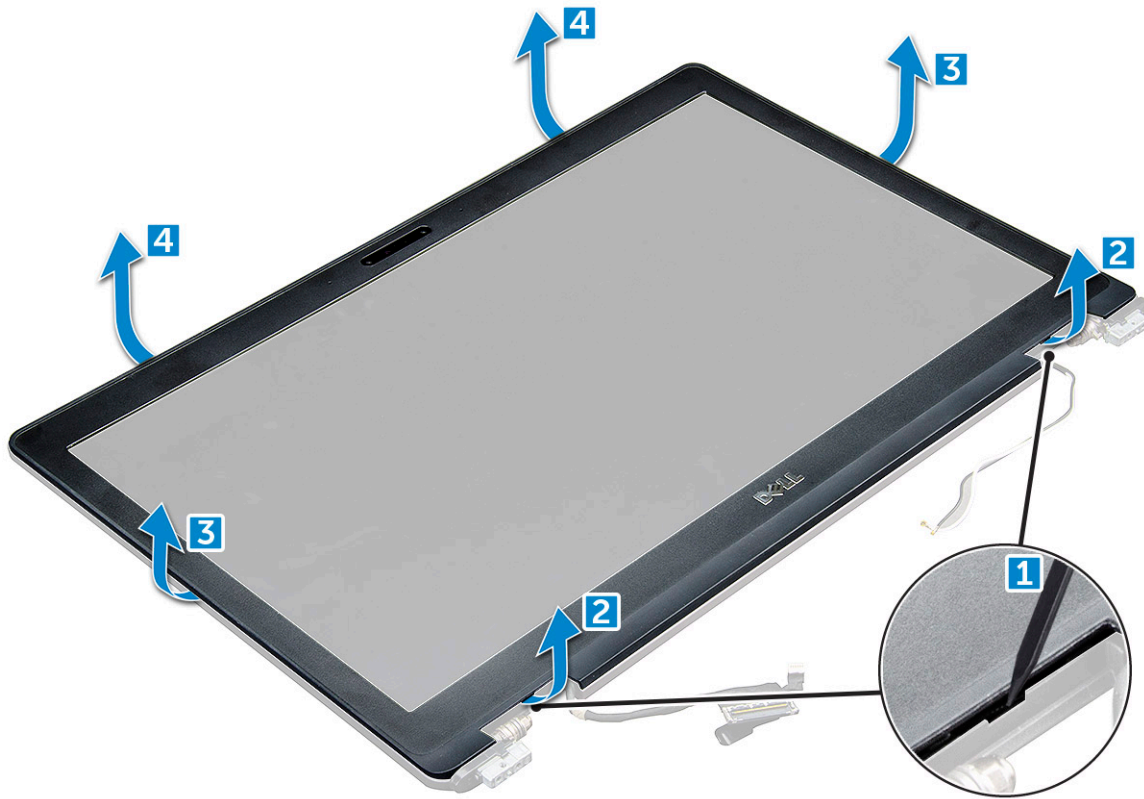
 **CAUTION:** Route the display cable and the antenna cable through the LCD hinge mount holes as LCD assembly is inserted into the base, to prevent possible cable damage.

2. Tighten the M2x5 screws to secure the display assembly to the computer.
3. Turn over the computer.
4. Connect the antenna cables and display cable to the connectors.
5. Place the display cable bracket over the connector and tighten the M2x5 screws to secure the display cable to the computer.
6. Install the:
  - a. [hinge cap](#)
  - b. [WLAN card](#)
  - c. [battery](#)
  - d. [base cover](#)
7. Follow the procedure in [After working inside your computer](#).

## Display bezel

### Removing the display bezel

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [base cover](#)
  - b. [battery](#)
  - c. [WWAN card](#)
  - d. [WLAN card](#)
  - e. [hinge cap](#)
  - f. [display assembly](#)
3. Pry the edges [1,2,3,4] to release the display bezel from the display assembly.



**CAUTION:** There is a very strong adhesive on the back of the bezel that seals it to the LCD, this can take some force to pry apart from the LCD, care needs to be taken when removing the bezel that the LCD is not damaged

## Installing the display bezel

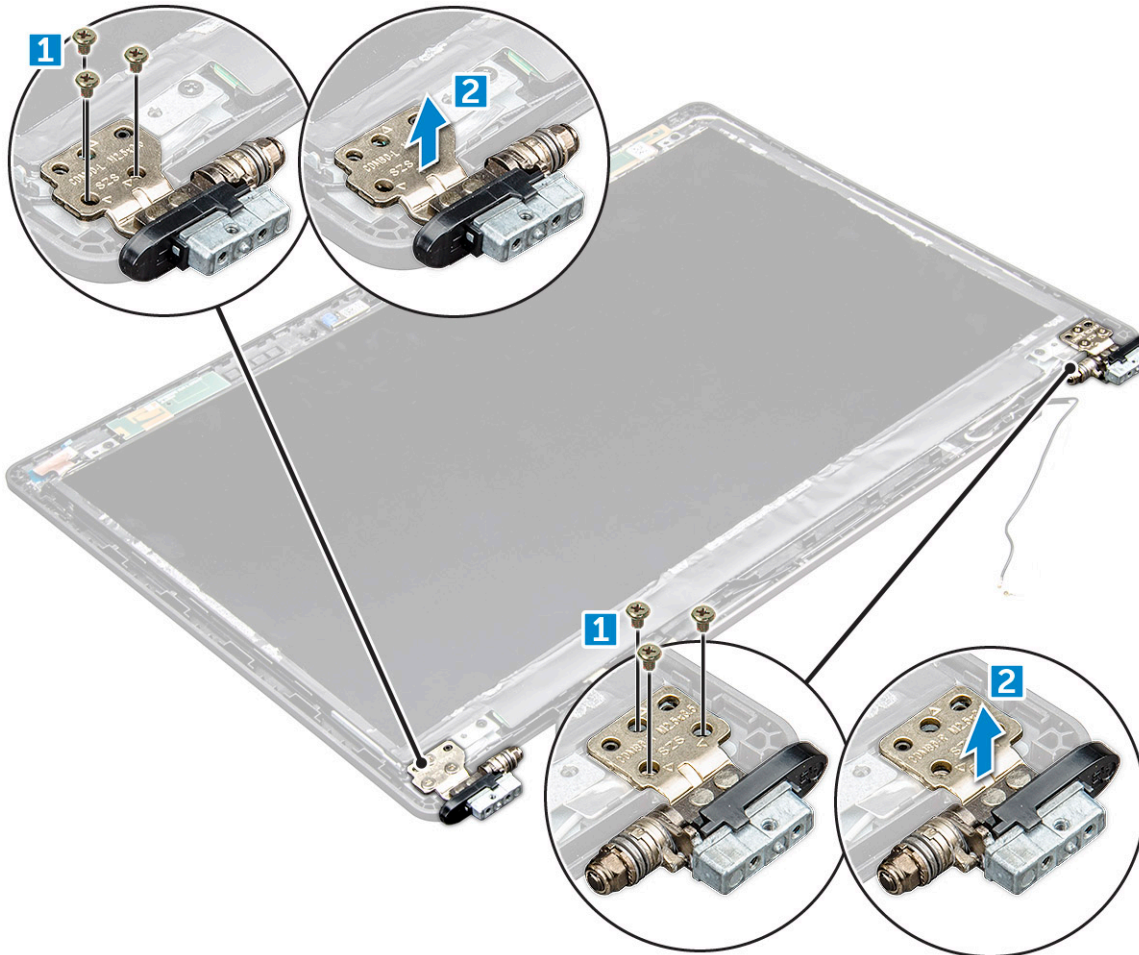
1. Place the display bezel on the display assembly.
2. Starting from the top corner, press on the display bezel and work around the entire bezel until it clicks on to the display assembly.
3. Install the:
  - a. [display assembly](#)
  - b. [hinge cap](#)
  - c. [WWAN card](#)
  - d. [WLAN card](#)
  - e. [battery](#)
  - f. [base cover](#)
4. Follow the procedure in [After working inside your computer](#).

## Display hinges

### Removing the display hinge

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

- d. [hinge cap](#)
  - e. [display assembly](#)
  - f. [display bezel](#)
3. To remove the display hinge:
- a. Remove the M2.5x3.5 screws that secure the display hinge to the display assembly [1].
  - b. Lift the display hinge away from the display assembly [2].
  - c. Repeat the same procedure to remove the other display hinge.



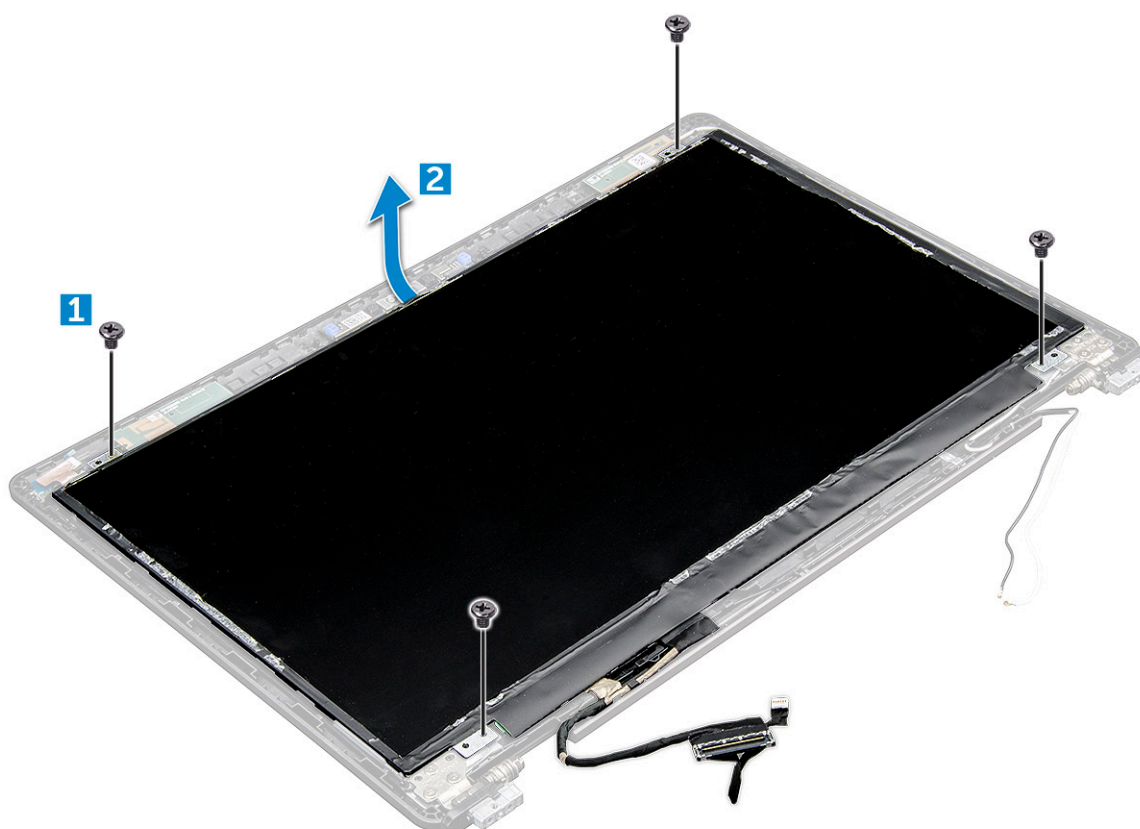
## Installing the display hinge

- 1. Place the display hinge cover on the display assembly.
- 2. Tighten the M2.5x3.5 screw to secure the display hinge cover to the display assembly.
- 3. Repeat the same procedure step 1-2 to install the other display hinge cover.
- 4. Install the:
  - a. [display bezel](#)
  - b. [display assembly](#)
  - c. [hinge cap](#)
  - d. [WWAN card](#)
  - e. [WLAN card](#)
  - f. [battery](#)
  - g. [base cover](#)
- 5. Follow the procedure in [After working inside your computer](#).

# Display panel

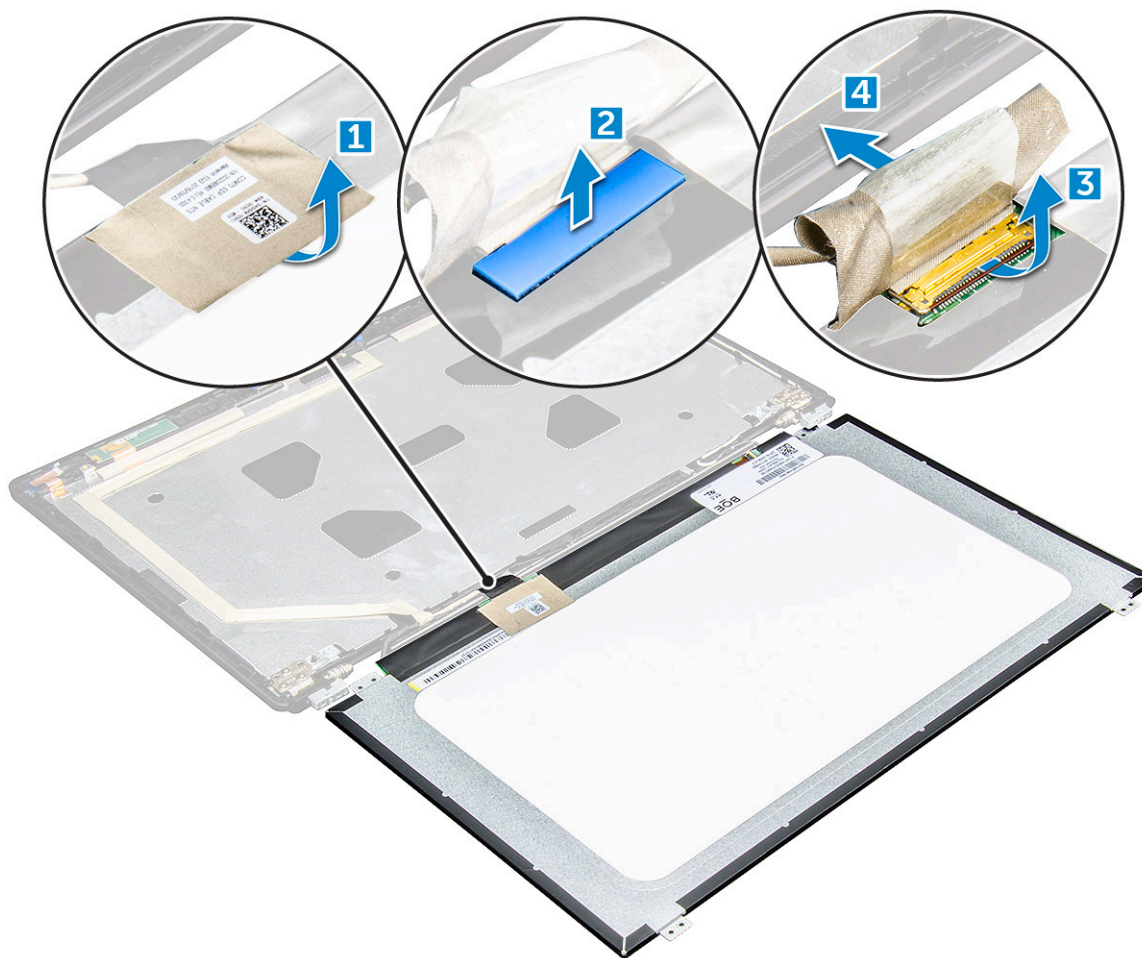
## Removing the display panel

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [base cover](#)
  - b. [battery](#)
  - c. [WWAN card](#)
  - d. [WLAN card](#)
  - e. [hinge cap](#)
  - f. [display assembly](#)
  - g. [display bezel](#)
3. Remove the M2x3 screws that secure the display panel to the display assembly [1] and lift to turn over the display panel to access the eDP cable [2].



4. To remove the display panel:
  - a. Peel off the adhesive tape [1].
  - b. Lift the blue tape that secures the display cable [2].
  - c. Lift the latch to disconnect the display cable from the connector on the display panel [3, 4].





## Installing the display panel

1. Connect the eDP cable to the connector and affix the blue tape.
2. Affix the adhesive tape to secure the eDP cable.
3. Replace the display panel to align with the screw holders on the display assembly.
4. Tighten the M2x3 screws to secure the display panel to the display assembly.
5. Install the:
  - a. [display bezel](#)
  - b. [display assembly](#)
  - c. [hinge cap](#)
  - d. [WWAN card](#)
  - e. [WLAN card](#)
  - f. [battery](#)
  - g. [base cover](#)
6. Follow the procedure in [After working inside your computer](#).

## eDP cable

### Removing the eDP cable

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

- a. [base cover](#)
  - b. [battery](#)
  - c. [WWAN card](#)
  - d. [WLAN card](#)
  - e. [display assembly](#)
  - f. [Display Panel](#)
  - g. [display bezel](#)
3. Peel off the eDP cable from the adhesive to remove it from the display.



## Installing the eDP cable

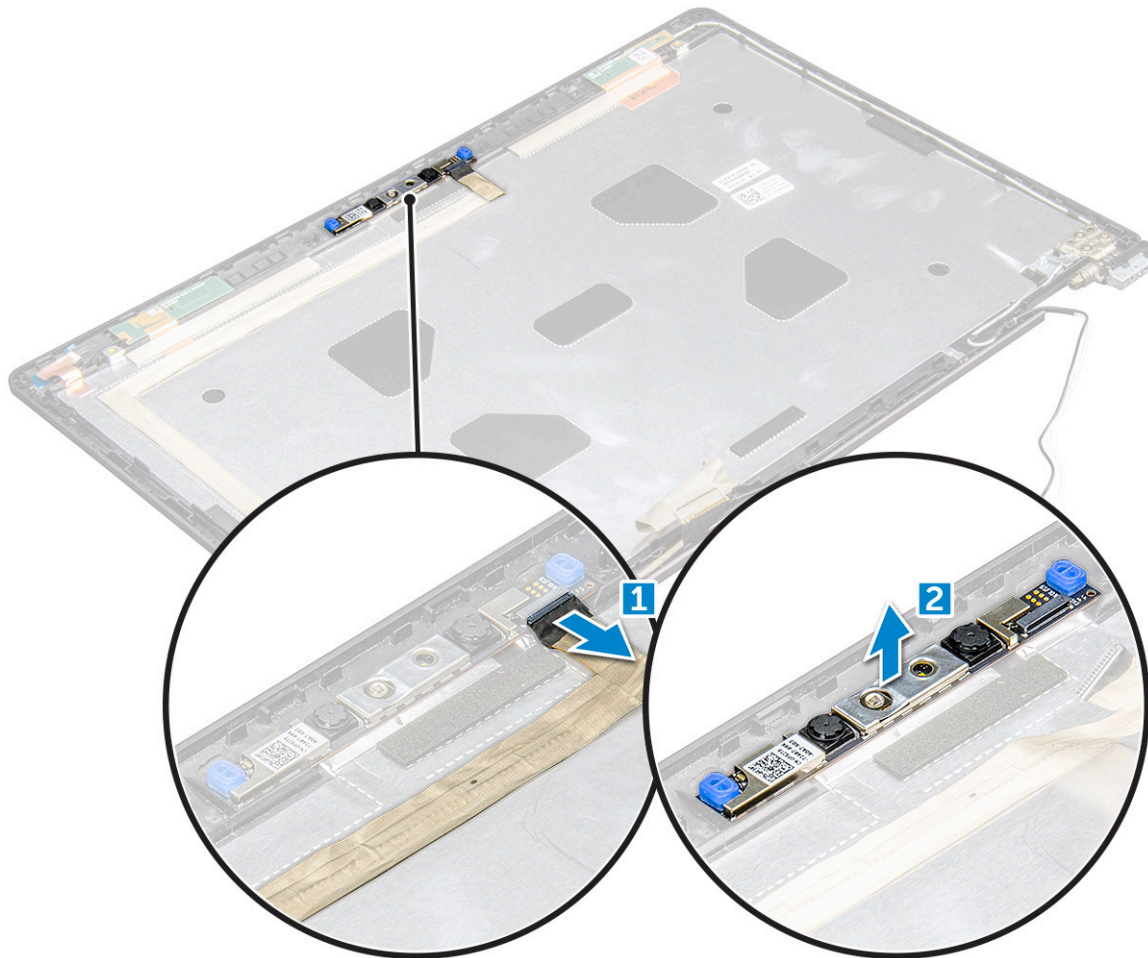
1. Affix the eDP cable on the display assembly.
2. Install the:
  - a. [display panel](#)
  - b. [display bezel](#)
  - c. [display assembly](#)
  - d. [hinge cap](#)
  - e. [WWAN card](#)
  - f. [WLAN card](#)
  - g. [battery](#)
  - h. [base cover](#)
3. Follow the procedure in [After working inside your computer](#).

## Camera

### Removing the camera

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

- b. battery
  - c. WLAN card
  - d. WWAN card
  - e. hinge cap
  - f. display assembly
  - g. display bezel
  - h. display panel
3. To remove the camera:
- a. Disconnect the camera cable from the connector [1].
  - b. Lift the camera away from the display [2].



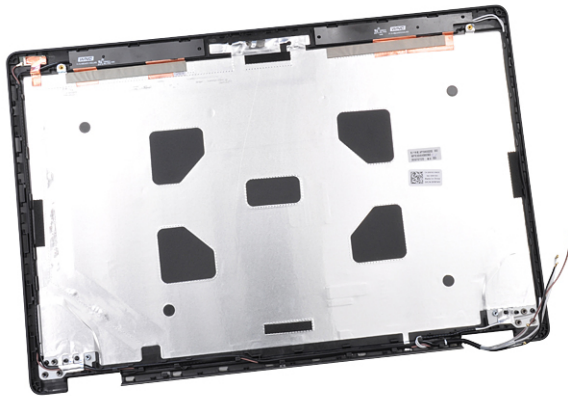
## Installing the camera

- 1. Place the camera on the display assembly.
- 2. Connect the camera cable to the connector on the display assembly
- 3. Install the:
  - a. display panel
  - b. display bezel
  - c. display assembly
  - d. hinge cap
  - e. WWAN card
  - f. WLAN card
  - g. battery
  - h. base cover
- 4. Follow the procedure in [After working inside your computer](#).

# Display back cover assembly

## Removing the display back cover assembly

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [base cover](#)
  - b. [battery](#)
  - c. [WWAN card](#)
  - d. [WLAN card](#)
  - e. [display assembly](#)
  - f. [display bezel](#)
  - g. [display panel](#)
  - h. [eDP cable](#)
  - i. [camera](#)
3. The display back cover assembly is the remaining component, after removing all the components.



## Installing the display back cover assembly

1. The display back cover assembly is the remaining component, after removing all the components.
2. Install the:
  - a. [camera](#)
  - b. [eDP cable](#)
  - c. [display panel](#)
  - d. [display bezel](#)
  - e. [display assembly](#)
  - f. [WWAN card](#)
  - g. [WLAN card](#)
  - h. [battery](#)
  - i. [base cover](#)
3. Follow the procedure in [After working inside your computer](#).




# Palm rest

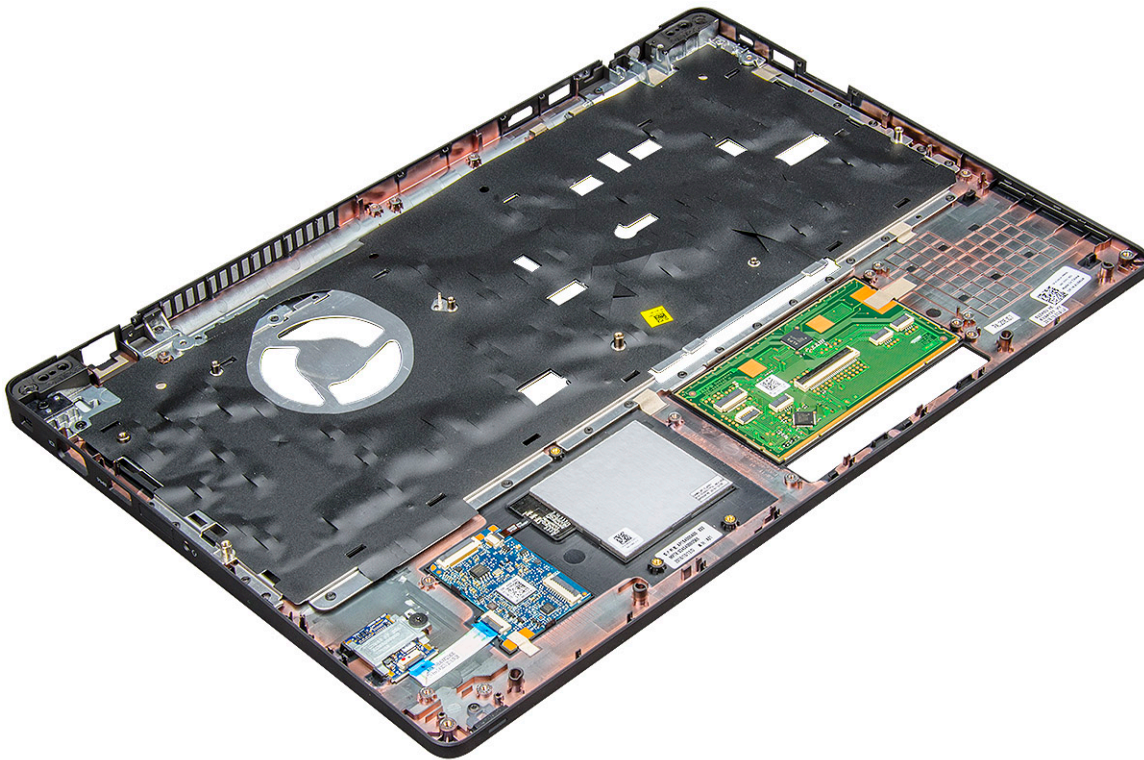
## Replacing the palm rest

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

2. Remove the:

- a. [base cover](#)
- b. [battery](#)
- c. [keyboard](#)
- d. [WLAN card](#)
- e. [SSD card](#)
- f. [memory module](#)
- g. [Touchpad](#)
- h. [heat sink](#)
- i. [system fan](#)
- j. [coin cell battery](#)
- k. [chassis frame](#)
- l. [system board](#)
- m. [hinge cap](#)
- n. [display assembly](#)

 **NOTE:** The component you are left with is the palm rest.



3. Install the following components on the new palm rest.

- a. [display assembly](#)
- b. [hinge cap](#)
- c. [system board](#)
- d. [chassis frame](#)
- e. [coin cell battery](#)
- f. [heat sink](#)
- g. [Touchpad](#)



- h. [system fan](#)
  - i. [memory module](#)
  - j. [SSD card](#)
  - k. [WLAN card](#)
  - l. [keyboard](#)
  - m. [battery](#)
  - n. [base cover](#)
4. Follow the procedure in [After working inside your computer](#).


# Technology and components


## Topics:

- Power adapter
- Processors
- Chipsets
- Graphic options
- Display options
- Realtek ALC3246 Waves MaxxAudio Pro controller
- WLAN cards
- Hard drive options
- Camera features
- Memory features
- Realtek HD audio drivers
- Thunderbolt over USB Type-C

## Power adapter

This laptop is shipped with 65 W or 90 W power adapter.

 **WARNING:** When you disconnect the power adapter cable from the laptop, grasp the connector, not the cable itself, and then pull firmly but gently to avoid damaging the cable.

 **WARNING:** The power adapter works with electrical outlets worldwide. However, power connectors and power strips vary among countries. Using an incompatible cable or improperly connecting the cable to the power strip or electrical outlet may cause fire or equipment damage.

## Processors

This laptop is shipped with the following processors:

- Intel Core i3-7100U (3M Cache, up to 2.4 GHz), Dual Core
- Intel Core i5-7200U (3M Cache, up to 3.1 GHz), Dual Core
- Intel Core i5-7300U (3M Cache, up to 3.5 GHz), vPro, Dual Core
- Intel Core i7-7600U (4M Cache, up to 3.9 GHz), vPro, Dual Core
- Intel Core i5-7300HQ (6M Cache, up to 3.5GHz), Quad Core, 35W
- Intel Core i5-7440HQ (6M Cache, up to 3.8GHz), vPro, Quad Core, 35W
- Intel Core i7-7820HQ (8M Cache, up to 3.9GHz), vPro, Quad Core, 35W
- Intel Core i5-6200U (Dual Core, 2.3GHz, 3M cache, 15W)
- Intel Core i5-6300U (Dual Core, 2.4GHz, 3M cache, 15W)-vPro
- Intel Core i5-6440HQ (Quad Core, 2.6GHz, 6M cache, cTDP 35W) –vPro

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

## Skylake processor

Intel Skylake is the successor to the Intel® Broadwell processor. It is a microarchitecture redesign using an already existing process technology and it will be branded as Intel 6th Gen Core. Like Broadwell, Skylake is available in four variants with suffixes SKL-Y, SKL-H, and SKL-U.

The Skylake also includes Core i7, i5, i3, Pentium and Celeron processors.

The following table illustrates the performance available on each Skylake suffix.

**Table 1. Processor performance features**

Processor number	Cache	No. of cores/No. of threads	Power	Memory type	Graphics
Intel Core i5-6200U (Dual Core, 2.3GHz, 15W)	3 MB	2/4	15 W	DDR4-2133	Intel HD graphics 620
Intel Core i5-6300U (Dual Core, 2.4GHz, 15W)-vPro	3 MB	2/4	15 W	DDR4-2133	Intel HD graphics 620
Intel Core i5-6440HQ (Quad Core, 2.6GHz, TDP 35W) -vPro	6 MB	4/4	35 W	DDR4-2133	Intel HD graphics 530

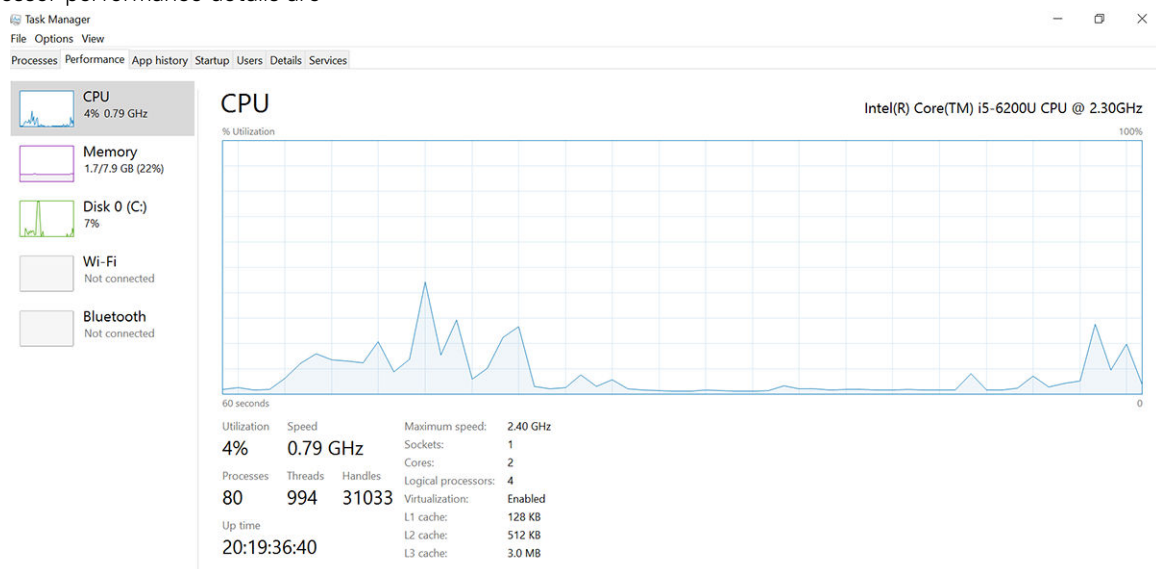
## Identifying processors in Windows 10

1. Tap **Search the Web and Windows**.
2. Type **Device Manager**.
3. Tap **Processor**.  
The processor information is displayed.



## Verifying the processor usage in Task Manager

1. Press and hold the taskbar.
2. Select **Start Task Manager**.  
The **Windows Task Manager** window is displayed.
3. Click the **Performance** tab in the **Windows Task Manager** window.  
The processor performance details are

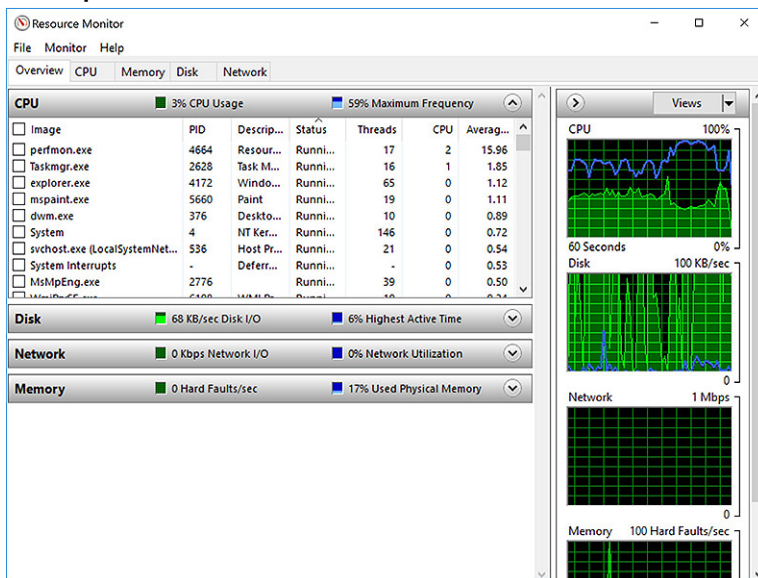


displayed. [Fewer details](#) [Open Resource Monitor](#)

## Verifying the processor usage in Resource Monitor

1. Press and hold the taskbar.

2. Select **Start Task Manager**.  
The **Windows Task Manager** window is displayed.
3. Click the **Performance** tab in the **Windows Task Manager** window.  
The processor performance details are displayed.
4. Click **Open Resource Monitor**.



## Chipsets

All laptops or notebook communicate with the CPU through the chipset. This laptop is shipped with the Intel 100 Series chipset.

## Intel chipset drivers


Verify if the Intel chipset drivers are already installed in the laptop.

**Table 2. Intel chipset drivers**

Before installation	After installation
<div> Other devices <ul style="list-style-type: none"> <li>PCI Data Acquisition and Signal Processing Controller</li> <li>PCI Device</li> <li>PCI Memory Controller</li> <li>PCI Simple Communications Controller</li> <li>SM Bus Controller</li> <li>Unknown device</li> </ul> System devices <ul style="list-style-type: none"> <li>ACPI Fan</li> <li>ACPI Fan</li> <li>ACPI Fan</li> <li>ACPI Fan</li> <li>ACPI Fan</li> <li>ACPI Fixed Feature Button</li> <li>ACPI Power Button</li> <li>ACPI Processor Aggregator</li> <li>ACPI Thermal Zone</li> <li>ACPI Thermal Zone</li> <li>Composite Bus Enumerator</li> <li>High Definition Audio Controller</li> <li>High precision event timer</li> <li>Intel(R) Power Engine Plug-in</li> <li>Legacy device</li> <li>Microsoft ACPI-Compliant Embedded Controller</li> <li>Microsoft ACPI-Compliant System</li> <li>Microsoft System Management BIOS Driver</li> <li>Microsoft UEFI-Compliant System</li> <li>Microsoft Virtual Drive Enumerator</li> <li>Microsoft Windows Management Interface for ACPI</li> <li>Microsoft Windows Management Interface for ACPI</li> <li>NDIS Virtual Network Adapter Enumerator</li> <li>Numeric data processor</li> <li>PCI Express Root Complex</li> <li>PCI Express Root Port</li> <li>PCI Express Root Port</li> <li>PCI Express Root Port</li> <li>PCI standard host CPU bridge</li> <li>PCI standard ISA bridge</li> <li>Plug and Play Software Device Enumerator</li> <li>Programmable interrupt controller</li> <li>Remote Desktop Device Redirector Bus</li> <li>System CMOS/real time clock</li> <li>System timer</li> <li>UMBus Root Bus Enumerator</li> </ul> </div>	<div> Other devices <ul style="list-style-type: none"> <li>PCI Device</li> <li>PCI Simple Communications Controller</li> <li>Unknown device</li> </ul> System devices <ul style="list-style-type: none"> <li>ACPI Fan</li> <li>ACPI Fan</li> <li>ACPI Fan</li> <li>ACPI Fan</li> <li>ACPI Fan</li> <li>ACPI Fixed Feature Button</li> <li>ACPI Lid</li> <li>ACPI Processor Aggregator</li> <li>ACPI Sleep Button</li> <li>ACPI Thermal Zone</li> <li>ACPI Thermal Zone</li> <li>ACPI Thermal Zone</li> <li>Camera Sensor OV5670</li> <li>Camera Sensor OV8858</li> <li>Composite Bus Enumerator</li> <li>High precision event timer</li> <li>Intel(R) 100 Series Chipset Family LPC Controller/GPI Controller - 9D48</li> <li>Intel(R) 100 Series Chipset Family PCI Express Root Port #10 - 9D19</li> <li>Intel(R) 100 Series Chipset Family PCI Express Root Port #9 - 9D18</li> <li>Intel(R) 100 Series Chipset Family PMIC - 9D21</li> <li>Intel(R) 100 Series Chipset Family SMBUS - 9D23</li> <li>Intel(R) 100 Series Chipset Family Thermal subsystem - 9D31</li> <li>Intel(R) C102 Host Controller</li> <li>Intel(R) Control Logic</li> <li>Intel(R) Imaging Signal Processor 2500</li> <li>Intel(R) Integrated Sensor Solution</li> <li>Intel(R) Management Engine Interface</li> <li>Intel(R) Power Engine Plug-in</li> <li>Intel(R) Serial IO GPIO Host Controller - INT3448</li> <li>Intel(R) Serial IO I2C Host Controller - 9D60</li> <li>Intel(R) Serial IO I2C Host Controller - 9D61</li> <li>Intel(R) Serial IO I2C Host Controller - 9D62</li> <li>Intel(R) Serial IO I2C Host Controller - 9D63</li> </ul> </div>

## Downloading the chipset driver

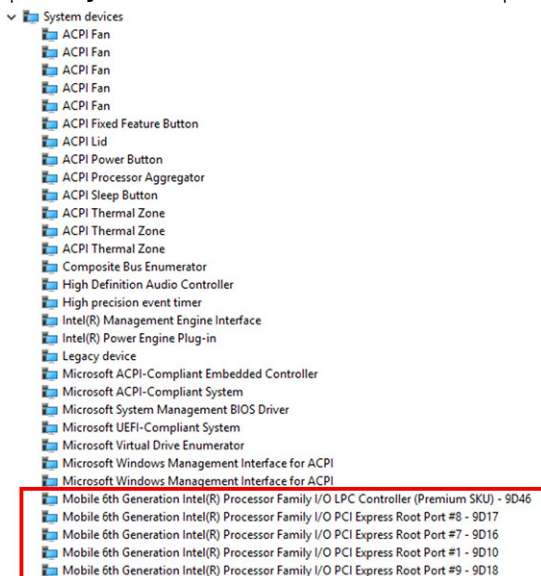
1. Turn on the laptop.
2. Go to **Dell.com/support**.
3. Click **Product Support**, enter the Service Tag of your laptop, and then click **Submit**.

 **NOTE:** If you do not have the Service Tag, use the autodetect feature or manually browse for your laptop model.

4. Click **Drivers and Downloads**.
5. Select the operating system installed on your laptop.
6. Scroll down the page, expand **Chipset**, and select your chipset driver.
7. Click **Download File** to download the latest version of the chipset driver for your laptop.
8. After the download is complete, navigate to the folder where you saved the driver file.
9. Double-click the chipset driver file icon and follow the instructions on the screen.

## Identifying the chipset in Device Manager on Windows 10

1. Right click the **Start Menu**.
2. Select **Device Manager**.
3. Expand **System Devices** and search for the chipset.



## Graphic options

This laptop is shipped with the following graphics chipset options:


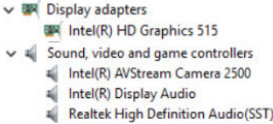
- Intel HD Graphics 620
- Intel HD Graphics 630
- NVIDIA GeForce 940M 64 Bit
- NVIDIA GeForce 930MX 64 Bit

## Intel HD Graphics drivers

Verify if the Intel HD Graphics drivers are already installed in the laptop.




**Table 3. Intel HD Graphics drivers**

Before installation	After installation
	

## Downloading drivers

1. Turn on the laptop.
2. Go to **Dell.com/support**.
3. Click **Product Support**, enter the Service Tag of your laptop, and then click **Submit**.

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

4. Click **Drivers and Downloads**.
5. Select the operating system installed on your laptop.
6. Scroll down the page and select the graphic driver to install.
7. Click **Download File** to download the graphic driver for your laptop.
8. After the download is complete, navigate to the folder where you saved the graphic driver file.
9. Double-click the graphic driver file icon and follow the instructions on the screen.

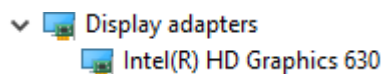
## Display options

This laptop has the following display options:

- 15.6" HD (1366 x 768)
- 15.6" FHD WVA (1920 x 1080)
- 15.6" FHD WVA (touch) (1920 x 1080)

## Identifying the display adapter

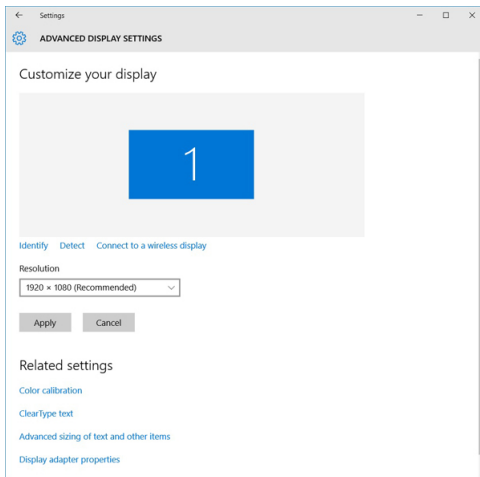
1. Start the **Search Charm** and select **Settings**.
2. Type **Device Manager** in the search box and tap **Device Manager** from the left pane.
3. Expand **Display adapters**.



The display adapters are displayed.

## Changing the screen resolution

1. Press and hold the desktop screen and select **Display Settings**.
2. Tap or click **Display settings**.  
The Setting window is displayed.
3. Scroll down and select **Advanced Display Settings**.  
The Advanced Display Setting is displayed.
4. Select the required resolution from the drop-down list and tap **Apply**.




## Rotating the display

1. Press and hold on the desktop screen.  
A sub menu is displayed.
  2. Select **Graphic Options > Rotation** and choose one of the following:
    - Rotate to Normal
    - Rotate to 90 Degrees
    - Rotate to 180 Degrees
    - Rotate to 270 Degrees
- NOTE:** The Display can also be rotated using the following key combinations:
- Ctrl + Alt + Up arrow key (Rotate to normal)
  - Right arrow key (Rotate 90 degrees)
  - Down arrow key (Rotate 180 degrees)
  - Left arrow key (Rotate 270 degrees)

## Adjusting brightness in Windows 10

To enable or disable automatic screen brightness adjustment:

1. Swipe-in from the right edge of the display to access the Action Center.
2. Tap or click **All Settings**  **> System > Display**.
3. Use the **Adjust my screen brightness automatically** slider to enable or disable automatic-brightness adjustment.

**NOTE:** You can also use the **Brightness level** slider to adjust the brightness manually.

## Cleaning the display

1. Check for any smudges or areas that have to be cleaned.
2. Use a microfiber cloth to remove any obvious dust and gently brush off any dirt particles.
3. Proper cleaning kits should be used to clean and keep your display in a crisp clear pristine condition.
 

**NOTE:** Never spray any cleaning solutions directly on the screen; spray it to the cleaning cloth.
4. Gently wipe the screen in a circular motion. Do not press hard on the cloth.
 


**NOTE:** Do not press hard or touch the screen with your fingers or you may leave oily prints and smears.

**NOTE:** Do not leave any liquid on the screen.
5. Remove all excess moisture as it may damage your screen.

6. Let the display dry thoroughly before you turn it on.
7. For stains that are hard to remove, repeat this procedure till the display is clean.

## Using touch screen in Windows 10


Follow these steps to enable or disable the touch screen:

1. Go to the Charms Bar and tap **All Settings** .
2. Tap **Control Panel**.
3. Tap **Pen and Input Devices** in the **Control Panel**.
4. Tap the **Touch** tab.
5. Select **Use your finger as an input device** to enable the touch screen. Clear the box to disable the touch screen.

## Connecting to external display devices

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

1. Ensure that the projector is turned on and plug the projector cable into a video port on your laptop.
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 shipped with your display device.

## Realtek ALC3246 Waves MaxxAudio Pro controller

This laptop is shipped with integrated Realtek ALC3246-CG Controller Waves MaxxAudio Pro controller. It is a High Definition audio codec designed for Windows desktop and laptops.


## Downloading the audio driver

1. Turn on the laptop.
2. Go to **www.Dell.com/support**.
3. Click **Product Support**, enter the Service Tag of your laptop and click **Submit**.

 **NOTE:** If you do not have the Service Tag, use the autodetect feature or manually browse for your laptop model.

4. Click **Drivers and Downloads**.
5. Select the operating system installed on your laptop.
6. Scroll down the page and expand **Audio**.
7. Select the audio driver.
8. Click **Download File** to download the latest version of the audio driver for your laptop.
9. After the download is complete, navigate to the folder where you saved the audio driver file.
10. Double-click the audio driver file icon and follow the instructions on the screen.

## Identifying the audio controller in Windows 10

1. Swipe from the right edge to access the **Search Charm** and select **All Settings** .
2. Type **Device Manager** in the search box and select **Device Manager** from the left pane.

3. Expand **Sound, video and game controllers**.  
The audio controller is displayed.

Table 4. Identifying the audio controller in Windows 10

Before installation	After installation
	

## Changing the audio settings

1. Tap or touch the **Search the web and Windows** and type **Dell Audio**.
2. Start the Dell Audio utility from the left pane.

## WLAN cards

This laptop supports the Intel 8265 with and without Bluetooth or Qualcomm 1820 with Bluetooth card.

**NOTE:** Qualcomm xxxxxx (for example :QCA61x4A) is a product of Qualcomm Technologies, Inc

## Secure Boot screen options

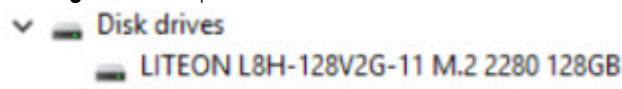
Option	Description
<b>Secure Boot Enable</b>	<p>This option enables or disables the <b>Secure Boot</b> feature.</p> <ul style="list-style-type: none"><li>• Disabled</li><li>• Enabled</li></ul> <p>Default setting: Enabled.</p>
<b>Expert Key Management</b>	<p>Allows you to manipulate the security key databases only if the system is in Custom Mode. The <b>Enable Custom Mode</b> option is disabled by default. The options are:</p> <ul style="list-style-type: none"><li>• PK</li><li>• KEK</li><li>• db</li><li>• dbx</li></ul> <p>If you enable the <b>Custom Mode</b>, the relevant options for <b>PK, KEK, db, and dbx</b> appear. The options are:</p> <ul style="list-style-type: none"><li>• <b>Save to File</b>—Saves the key to a user-selected file</li><li>• <b>Replace from File</b>—Replaces the current key with a key from a user-selected file</li><li>• <b>Append from File</b>—Adds a key to the current database from a user-selected file</li><li>• <b>Delete</b>—Deletes the selected key</li><li>• <b>Reset All Keys</b>—Resets to default setting</li><li>• <b>Delete All Keys</b>—Deletes all the keys</li></ul> <p><b>NOTE:</b> If you disable the <b>Custom Mode</b>, all the changes made will be erased and the keys will restore to default settings.</p>

## Hard drive options

This laptop supports HDD, M.2 SATA SSD, and M.2 PCIe NVMe.

## Identifying the hard drive in Windows 10

1. Tap or click **All Settings**  on the Windows 10 Charms Bar.
2. Tap or click **Control Panel**, select **Device Manager**, and expand **Disk drives**.

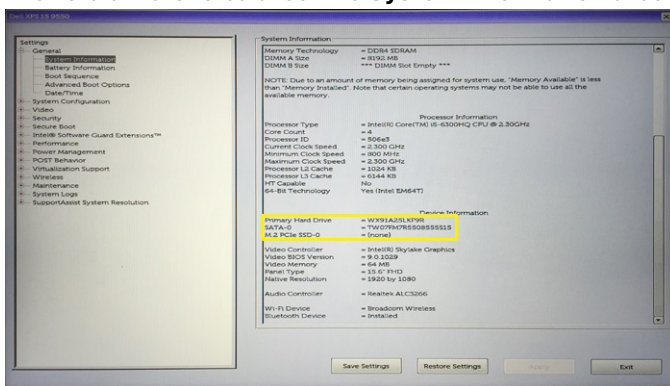


The hard drive is listed under **Disk drives**.

## Identifying the hard drive in the BIOS


1. Turn on or restart your laptop.
2. When the Dell logo appears, perform one of the following actions to enter the BIOS setup program:
  - With keyboard — Tap F2 until the Entering BIOS setup message appears. To enter the Boot selection menu, tap F12.
  - Without keyboard — When the **F12 boot selection** menu is displayed, press the Volume Down button to enter BIOS setup. To enter the Boot selection menu, press the Volume Up button.

The hard drive is listed under the **System Information** under the **General** group.



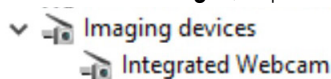
## Camera features

This laptop is shipped with front-facing camera with the image resolution of 1280 x 720 (maximum).

 **NOTE:** The camera is at the top center of the display.

## Identifying the camera in Device Manager on Windows 10

1. In the **Search** box, type **device manager**, and tap to start it.
2. Under **Device Manager**, expand **Imaging devices**.



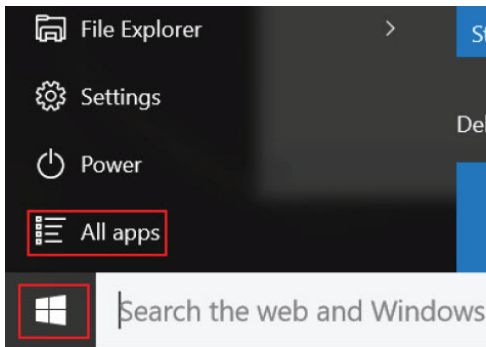
## Starting the camera

To start the camera, open an application that uses the camera. For instance, if you tap the Skype software that is shipped with the laptop, the camera turns on. Similarly, if you are chatting on the internet and the application requests to access the webcam, the webcam turns on.

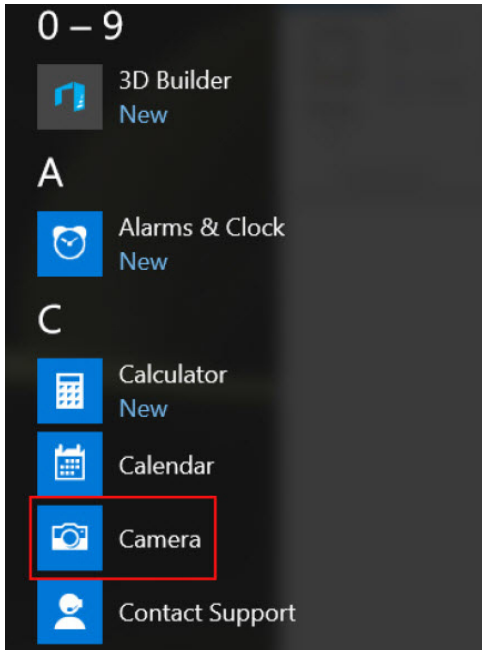
## Starting the camera application

1. Tap or click the **Windows** button and select **All apps**.

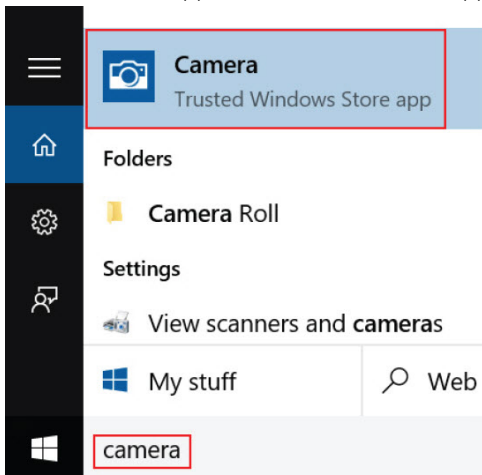




2. Select **Camera** from the apps list.



3. If the **Camera** App is not available in the apps list, search for it.




## Memory features

This laptop supports a minimum memory of :

- 4 GB and a maximum of 32 GB DDR4 memory, up to 2133 MHz (dual core).
- 4 GB and a maximum of 32 GB DDR4 memory, up to 2400 MHz (quad core).

**NOTE:** The memory module in the Dual Core processor will have 2400 MHz printed, but it performs at 2133 MHz.


# Verifying system memory in Windows 10

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

# Verifying system memory in system setup BIOS

- 1. Turn on or restart your system.
- 2. Perform the following actions after the Dell logo is displayed
  - With keyboard — Tap F2 until the Entering BIOS setup message appears. To enter the Boot selection menu, tap F12.
- 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 system.
  - 2. Perform one of the following actions after the Dell logo is displayed:
    - With keyboard — Press **F12**.
    - Without keyboard — Press and hold the **Volume Up** button when the Dell logo is displayed on the screen. When the F12 boot selection menu is displayed, select **Diagnostics** from the boot menu, and press Enter.
- The PreBoot System Assessment (PSA) starts on your system.
-  **NOTE:** If you wait too long and the operating system logo appears, continue to wait until you see the desktop. Turn off the laptop and try again.

# Realtek HD audio drivers

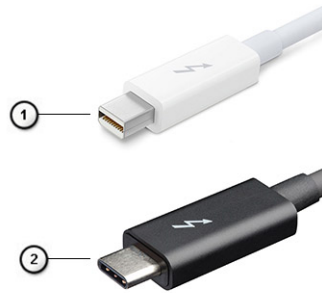
Verify if the Realtek audio drivers are already installed in the laptop.

Table 5. Realtek HD audio drivers

Before installation	After installation
<div><div>Audio inputs and outputs</div><div><div>Microphone (High Definition Audio Device)</div><div>Speakers (High Definition Audio Device)</div></div></div> <div><div>Sound, video and game controllers</div><div><div>High Definition Audio Device</div><div>Intel(R) Display Audio</div></div></div>	<div><div>Audio inputs and outputs</div><div><div>Microphone Array (Realtek High Definition Audio(SST))</div><div>Speakers / Headphones (Realtek High Definition Audio(SST))</div></div></div> <div><div>Sound, video and game controllers</div><div><div>Intel(R) AVStream Camera 2500</div><div>Intel(R) Display Audio</div><div>Realtek High Definition Audio(SST)</div></div></div>

# Thunderbolt over USB Type-C

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



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

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

## Thunderbolt 3 over USB Type-C

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

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


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

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

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

## Thunderbolt Icons

**Table 6. Thunderbolt Iconography Variation**

Protocol	USB Type-A	USB Type-C	Notes
Thunderbolt	Not Applicable		mDP or USB Type-C

# System setup options

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

## Topics:

- [BIOS overview](#)
- [Entering BIOS setup program](#)
- [Boot Sequence](#)
- [Navigation keys](#)
- [One time boot menu](#)
- [System Setup overview](#)
- [Accessing System Setup](#)
- [General screen options](#)
- [System Configuration screen options](#)
- [Video screen options](#)
- [Security screen options](#)
- [Secure Boot screen options](#)
- [Intel Software Guard Extensions](#)
- [Performance screen options](#)
- [Power Management screen options](#)
- [POST Behavior screen options](#)
- [Virtualization support screen options](#)
- [Wireless screen options](#)
- [Maintenance screen options](#)
- [System Log screen options](#)
- [Updating the BIOS](#)
- [System and setup password](#)
- [Clearing BIOS \(System Setup\) and System passwords](#)

## BIOS overview

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

## Entering BIOS setup program

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

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

## Boot Sequence


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

- Access System Setup by pressing F2 key


- Bring up the one-time boot menu by pressing F12 key

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

- Removable Drive (if available)
- STXXXX Drive


 **NOTE:** XXX denotes the SATA drive number.


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

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

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


## Navigation keys

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

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


## One time boot menu

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

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

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

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

 **NOTE:** XXX denotes the SATA drive number.

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

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


## System Setup overview

System Setup allows you to:

- Change the system configuration information after you add, change, or remove any hardware in your computer.
- Set or change a user-selectable option such as the user password.
- Read the current amount of memory or set the type of hard drive installed.



Before you use System Setup, it is recommended that you write down the System Setup screen information for future reference.


 **CAUTION:** Unless you are an expert computer user, do not change the settings for this program. Certain changes can cause your computer to work incorrectly.

## Accessing System Setup

1. Turn on (or restart) your computer.
2. After the white Dell logo appears, press F2 immediately.

The System Setup page is displayed.

 **NOTE:** If you wait too long and the operating system logo appears, wait until you see the desktop. Then, shut down or restart your computer and try again.


 **NOTE:** After the Dell logo appears, you can also press F12 and then select **BIOS setup**.

## General screen options

This section lists the primary hardware features of your computer.

Option	Description
<b>System Information</b>	<p>This section lists the primary hardware features of your computer.</p> <ul style="list-style-type: none"><li>• System Information: Displays BIOS Version, Service Tag, Asset Tag, Ownership Tag, Ownership Date, Manufacture Date, and the Express Service Code.</li><li>• Memory Information: Displays Memory Installed, Memory Available, Memory Speed, Memory Channels Mode, Memory Technology, DIMM A Size, DIMM B Size,</li><li>• Processor Information: Displays Processor Type, Core Count, Processor ID, Current Clock Speed, Minimum Clock Speed, Maximum Clock Speed, Processor L2 Cache, Processor L3 Cache, HT Capable, and 64-Bit Technology.</li><li>• Device Information: Displays Primary Hard Drive, M.2 SATA2, M.2 SATA, M.2 PCIe SSD-0, LOM MAC Address, Video Controller, Video BIOS Version, Video Memory, Panel Type, Native Resolution, Audio Controller, Wi-Fi Device, WiGig Device, Cellular Device, Bluetooth Device.</li></ul>
<b>Battery Information</b>	<p>Displays the battery status and the type of AC adapter connected to the computer.</p>
<b>Boot Sequence</b>	<p>Allows you to change the order in which the computer attempts to find an operating system.</p> <ul style="list-style-type: none"><li>• Diskette Drive</li><li>• Internal HDD</li><li>• USB Storage Device</li><li>• CD/DVD/CD-RW Drive</li><li>• Onboard NIC</li></ul>
<b>Advanced Boot Options</b>	<p>This option allows you the legacy option ROMs to load. By default, the <b>Enable Legacy Option ROMs</b> is disabled.</p>
<b>UEFI Boot Path Security</b>	<p>This options controls whether or not the system will prompt the user to enter the Admin password when booting a UEFI boot path from the F12 Boot Menu.</p> <ul style="list-style-type: none"><li>• Always, Except Internal HDD</li><li>• Always</li><li>• Never (by default enabled)</li></ul>
<b>Date/Time</b>	<p>Allows you to change the date and time.</p>


# System Configuration screen options

Option	Description
<b>Integrated NIC</b>	<p>Allows you to configure the integrated network controller. The options are:</p> <ul style="list-style-type: none"><li>• Disabled</li><li>• Enabled</li><li>• Enabled w/PXE: This option is enabled by default.</li></ul>
<b>Parallel Port</b>	<p>Allows you to configure the parallel port on the docking station. The options are:</p> <ul style="list-style-type: none"><li>• Disabled</li><li>• AT: This option is enabled by default.</li><li>• PS2</li><li>• ECP</li></ul>
<b>Serial Port</b>	<p>Allows you to configure the integrated serial port. The options are:</p> <ul style="list-style-type: none"><li>• Disabled</li><li>• COM1: This option is enabled by default.</li><li>• COM2</li><li>• COM3</li><li>• COM4</li></ul>
<b>SATA Operation</b>	<p>Allows you to configure the internal SATA hard-drive controller. The options are:</p> <ul style="list-style-type: none"><li>• Disabled</li><li>• AHCI</li><li>• RAID On: This option is enabled by default.</li></ul>
<b>Drives</b>	<p>Allows you to configure the SATA drives on board. All drives are enabled by default. The options are:</p> <ul style="list-style-type: none"><li>• SATA-0</li><li>• SATA-2</li><li>• SATA-4</li><li>• M.2 PCI-e SSD-0</li></ul>
<b>SMART Reporting</b>	<p>This field controls whether hard drive errors for integrated drives are reported during system startup. This technology is part of the SMART (Self Monitoring Analysis and Reporting Technology) specification. This option is disabled by default.</p> <ul style="list-style-type: none"><li>• Enable SMART Reporting</li></ul>
<b>USB Configuration</b>	<p>This is an optional feature.</p> <p>This field configures the integrated USB controller. If Boot Support is enabled, the system is allowed to boot any type of USB Mass Storage Devices (HDD, memory key, floppy).</p> <p>If USB port is enabled, device attached to this port is enabled and available for OS.</p> <p>If USB port is disabled, the OS cannot see any device attached to this port.</p> <p>The options are:</p> <ul style="list-style-type: none"><li>• Enable USB Boot Support (by default enable)</li><li>• Enable External USB Port (by default enable)</li><li>• Enable Thunderbolt Ports (by default enable)</li><li>• Enable Thunderbolt Boot Support</li><li>• Always Allow Dell Docks (by default enable)</li><li>• Enable Thunderbolt (ans PCIe behind TBT) Pre-boot</li><li>• Security level — No Secuirty</li><li>• Security level — User Configuration(by default enable)</li><li>• Security level — Secure connect</li><li>• Security level — Display Port Only</li></ul> <p> <b>NOTE:</b> USB keyboard and mouse always work in the BIOS setup irrespective of these settings.</p>
<b>USB PowerShare</b>	<p>This field configures the USB PowerShare feature behavior. This option allows you to charge external devices using the stored system battery power through the USB PowerShare port.</p>







Option	Description
<b>Audio</b>	<p>This field enables or disables the integrated audio controller. By default, the <b>Enable Audio</b> option is selected. The options are:</p> <ul style="list-style-type: none"> <li>• Enable Microphone (by default enable)</li> <li>• Enable Internal Speaker (by default enable)</li> </ul>
<b>Keyboard Illumination</b>	<p>This field lets you choose the operating mode of the keyboard illumination feature. The keyboard brightness level can be set from 0% to 100%. The options are:</p> <ul style="list-style-type: none"> <li>• Disabled</li> <li>• Dim</li> <li>• Bright (enabled by default)</li> </ul>
<b>Keyboard Backlight Timeout on AC</b>	<p>The Keyboard Backlight Timeout dims out with AC option. The main keyboard illumination feature is not affected. Keyboard Illumination will continue to support the various illumination levels. This field has an effect when the backlight is enabled.</p> <ul style="list-style-type: none"> <li>• 5 seconds</li> <li>• 10 seconds (enabled by default)</li> <li>• 15 seconds</li> <li>• 30 seconds</li> <li>• 1 minute</li> <li>• 5 minutes</li> <li>• 15 minutes</li> <li>• Never</li> </ul>
<b>Keyboard Backlight Timeout on Battery</b>	<p>The Keyboard Backlight Timeout dims out with Battery option. The main keyboard illumination feature is not affected. Keyboard Illumination will continue to support the various illumination levels. This field has an effect when the backlight is enabled.</p> <ul style="list-style-type: none"> <li>• 5 seconds</li> <li>• 10 seconds (enabled by default)</li> <li>• 15 seconds</li> <li>• 30 seconds</li> <li>• 1 minute</li> <li>• 5 minutes</li> <li>• 15 minutes</li> <li>• Never</li> </ul>
<b>Keyboard Backlight with AC</b>	<p>The Keyboard Backlight with AC option does not affect the main keyboard illumination feature. Keyboard Illumination will continue to support the various illumination levels. This field has an effect when the backlight is enabled.</p>
<b>Touchscreen</b>	<p>This fields controls whether the touchscreen is enabled or disabled.</p> <ul style="list-style-type: none"> <li>• Touchscreen (enabled by default)</li> </ul>
<b>Unobtrusive Mode</b>	<p>This option, when enabled, pressing Fn+F7 turns off all light and sound emissions in the system. To resume normal operation, press Fn+F7 again. This option is disabled by default.</p>
<b>Miscellaneous Devices</b>	<p>Allows you to enable or disable the following devices:</p> <ul style="list-style-type: none"> <li>• Enable Camera —enabled by default</li> <li>• Enable Hard Drive Free Fall Protection (enabled by default)</li> <li>• Enable Secure Digital (SD) Card (enabled by default)</li> <li>• Secure Digital (SD) Card Boot</li> <li>• Secure Digital (SD) Card Read — only Mode</li> </ul>


## Video screen options

Option	Description
<b>LCD Brightness</b>	Allows you to set the display brightness depending up on the power source (On Battery and On AC).


 **NOTE:** The video setting will be visible only when a video card is installed into the system.

# Security screen options

Option	Description
<b>Admin Password</b>	<p>Allows you to set, change, or delete the administrator (admin) password.</p> <p> <b>NOTE:</b> You must set the admin password before you set the system or hard drive password. Deleting the admin password automatically deletes the system password and the hard drive password.</p> <p> <b>NOTE:</b> Successful password changes take effect immediately.</p> <p>Default setting: Not set</p>
<b>System Password</b>	<p>Allows you to set, change or delete the system password.</p> <p> <b>NOTE:</b> Successful password changes take effect immediately.</p> <p>Default setting: Not set</p>
<b>M.2 SATA SSD Password</b>	<p>Allows you to set, change, or delete the M.2 SATA SSD password.</p> <p> <b>NOTE:</b> Successful password changes take effect immediately.</p> <p>Default setting: Not set</p>
<b>Strong Password</b>	<p>Allows you to enforce the option to always set strong passwords.</p> <p>Default Setting: Enable Strong Password is not selected.</p> <p> <b>NOTE:</b> If Strong Password is enabled, Admin and System passwords must contain at least one uppercase character, one lowercase character and be at least 8 characters long.</p>
<b>Password Configuration</b>	<p>Allows you to determine the minimum and maximum length of Administrator and System passwords.</p>
<b>Password Bypass</b>	<p>Allows you to enable or disable the permission to bypass the System and the Internal HDD password, when they are set. The options are:</p> <ul style="list-style-type: none"><li>• Disabled</li><li>• Reboot bypass</li></ul> <p>Default setting: Disabled</p>
<b>Password Change</b>	<p>Allows you to enable the disable permission to the System and Hard Drive passwords when the admin password is set.</p> <p>Default setting: <b>Allow Non-Admin Password Changes</b> is selected.</p>
<b>Non-Admin Setup Changes</b>	<p>Allows you to determine whether changes to the setup options are allowed when an Administrator Password is set. If disabled the setup options are locked by the admin password.</p>
<b>UEFI Capsule Firmware Updates</b>	<p>Allows you to control whether this system allows BIOS updates via UEFI capsule update packages.</p> <ul style="list-style-type: none"><li>• Enable UEFI Capsule Firmware Updates (enabled by default)</li></ul>
<b>TPM 2.0 Security</b>	<p>Allows you to enable the Trusted Platform Module (TPM) during POST. The options are:</p> <ul style="list-style-type: none"><li>• TPM On (enabled by default)</li><li>• Clear</li><li>• PPI Bypass for Enabled Commands(enabled by default)</li><li>• Attestation Enable (enabled by default)</li><li>• Key Storage Enable (enabled by default)</li><li>• PPI Bypass for Disabled Commands</li><li>• SHA-256 (enabled by default)</li><li>• Disabled</li><li>• Enabled</li></ul> <p> <b>NOTE:</b> To upgrade or downgrade TPM1.2/2.0, download the TPM wrapper tool (software).</p>
<b>Computrace</b>	<p>Allows you to activate or disable the optional Computrace software The options are:</p>

Option	Description
	<ul style="list-style-type: none"> <li>Deactivate</li> <li>Disable</li> <li>Activate</li> </ul> <p> <b>NOTE:</b> The Activate and Disable options will permanently activate or disable the feature and no further changes will be allowed</p> <p>Default setting: Deactivate</p>
<b>CPU XD Support</b>	<p>Allows you to enable the Execute Disable mode of the processor.</p> <p>Enable CPU XD Support (default)</p>
<b>OROM Keyboard Access</b>	<p>Allows you to set an option to enter the Option ROM Configuration screens using hotkeys during boot. The options are:</p> <ul style="list-style-type: none"> <li>Enable</li> <li>One Time Enable</li> <li>Disable</li> </ul> <p>Default setting: Enable</p>
<b>Admin Setup Lockout</b>	<p>Allows you to prevent users from entering Setup when an Administrator password is set.</p> <p>Default Setting: <b>Disabled</b></p>
<b>Master Password Lockout</b>	<p>Allows you to disable master password support. Hard disk password need to be cleared before the setting can be changed</p> <ul style="list-style-type: none"> <li>Enable Master Password Lockout (Disabled)</li> </ul>

## Secure Boot screen options

Option	Description
<b>Secure Boot Enable</b>	<p>This option enables or disables the <b>Secure Boot</b> feature.</p> <ul style="list-style-type: none"> <li>Disabled</li> <li>Enabled</li> </ul> <p>Default setting: Enabled.</p>
<b>Expert Key Management</b>	<p>Allows you to manipulate the security key databases only if the system is in Custom Mode. The <b>Enable Custom Mode</b> option is disabled by default. The options are:</p> <ul style="list-style-type: none"> <li>PK</li> <li>KEK</li> <li>db</li> <li>dbx</li> </ul> <p>If you enable the <b>Custom Mode</b>, the relevant options for <b>PK, KEK, db, and dbx</b> appear. The options are:</p> <ul style="list-style-type: none"> <li><b>Save to File</b>—Saves the key to a user-selected file</li> <li><b>Replace from File</b>—Replaces the current key with a key from a user-selected file</li> <li><b>Append from File</b>—Adds a key to the current database from a user-selected file</li> <li><b>Delete</b>—Deletes the selected key</li> <li><b>Reset All Keys</b>—Resets to default setting</li> <li><b>Delete All Keys</b>—Deletes all the keys</li> </ul> <p> <b>NOTE:</b> If you disable the <b>Custom Mode</b>, all the changes made will be erased and the keys will restore to default settings.</p>



# Intel Software Guard Extensions



Option	Description
<b>Intel SGX Enable</b>	This field specifies you to provide a secured environment for running code/storing sensitive information in the context of the main OS. The options are: <ul style="list-style-type: none"><li>• Disabled</li><li>• Enabled</li><li>• Software Controlled: This option is enabled by default.</li></ul>
<b>Enclave Memory Size</b>	This option sets SGX Enclave Reserve Memory Size. The options are: <ul style="list-style-type: none"><li>• 32 MB</li><li>• 64 MB</li><li>• 128 MB</li></ul>

## Performance screen options



Option	Description
<b>Multi Core Support</b>	This field specifies whether the process has one or all cores enabled. The performance of some applications improves with the additional cores. <ul style="list-style-type: none"><li>• All (By default enabled)</li><li>• 1</li><li>• 2</li><li>• 3</li></ul>
<b>Intel SpeedStep</b>	Allows you to enable or disable the Intel SpeedStep feature. <ul style="list-style-type: none"><li>• Enable Intel SpeedStep</li></ul> Default setting: The option is enabled.
<b>C-States Control</b>	Allows you to enable or disable the additional processor sleep states. <ul style="list-style-type: none"><li>• C states</li></ul> Default setting: The option is enabled.
<b>Intel TurboBoost</b>	Allows you to enable or disable the Intel TurboBoost mode of the processor. <ul style="list-style-type: none"><li>• Enable Intel TurboBoost</li></ul> Default setting: The option is enabled.
<b>Hyper-Thread Control</b>	Allows you to enable or disable the Hyper-Threading in the processor. <ul style="list-style-type: none"><li>• Disabled</li><li>• Enabled</li></ul> Default setting: Enabled.

## Power Management screen options

Option	Description
<b>AC Behavior</b>	Allows you to enable or disable the computer from turning on automatically when an AC adapter is connected. Default setting: Wake on AC is not selected.
<b>Auto On Time</b>	Allows you to set the time at which the computer must turn on automatically. The options are: <ul style="list-style-type: none"><li>• Disabled</li><li>• Every Day</li><li>• Weekdays</li></ul>

Option	Description
	<ul style="list-style-type: none"> <li>Select Days</li> </ul> <p>Default setting: Disabled</p>
<b>USB Wake Support</b>	<p>Allows you to enable USB devices to wake the system from Standby.</p> <p> <b>NOTE:</b> This feature is only functional when the AC power adapter is connected. If the AC power adapter is removed during Standby, the system setup removes power from all the USB ports to conserve battery power.</p> <ul style="list-style-type: none"> <li>Enable USB Wake Support</li> <li>Wake on Dell USB-C Dock (By default enable)</li> </ul>
<b>Wireless Radio Control</b>	<p>Allows you to enable or disable the feature that automatically switches from wired or wireless networks without depending on the physical connection.</p> <ul style="list-style-type: none"> <li>Control WLAN Radio</li> <li>Control WWAN Radio</li> </ul> <p>Default setting: The option is disabled.</p>
<b>Wake on LAN/WLAN</b>	<p>Allows you to enable or disable the feature that powers on the computer from the Off state when triggered by a LAN signal.</p> <ul style="list-style-type: none"> <li>Disabled</li> <li>LAN Only</li> <li>WLAN Only</li> <li>LAN or WLAN</li> </ul> <p>Default setting: Disabled</p>
<b>Block Sleep</b>	<p>This option lets you block entering to sleep (S3 state) in operating system environment.</p> <p>Block Sleep (S3 state)</p> <p>Default setting: This option is disabled</p>
<b>Peak Shift</b>	<p>This option enables you to minimize the AC power consumption during the peak power times of day. After you enable this option, your system runs only in battery even if the AC is attached.</p>
<b>Advanced Battery Charge Configuration</b>	<p>This option enables you to maximize the battery health. By enabling this option, your system uses the standard charging algorithm and other techniques, during the non-work hours to improve the battery health.</p> <p>Disabled</p> <p>Default setting: Disabled</p>
<b>Primary Battery Charge Configuration</b>	<p>Allows you to select the charging mode for the battery. The options are:</p> <ul style="list-style-type: none"> <li>Adaptive</li> <li>Standard — Fully charges your battery at a standard rate.</li> <li>ExpressCharge — The battery charges over a shorter period of time using Dell's fast charging technology. This option is enabled by default.</li> <li>Primarily AC use</li> <li>Custom</li> </ul> <p>If Custom Charge is selected, you can also configure Custom Charge Start and Custom Charge Stop.</p> <p> <b>NOTE:</b> All charging mode may not be available for all the batteries. To enable this option, disable the <b>Advanced Battery Charge Configuration</b> option.</p>
<b>Sleep Mode</b>	<p>This option is used to select which sleep mode will be used by operating system.</p> <ul style="list-style-type: none"> <li>OS Automatic Selection</li> <li>Force S3 (By default enable)</li> </ul>
<b>Type-C Connector Power</b>	<p>This option lets you set the maximum power that can be drawn from the Type-C connector.</p> <ul style="list-style-type: none"> <li>7.5 Watts (By default enable)</li> <li>15 Watts</li> </ul>

# POST Behavior screen options


Option	Description
<b>Adapter Warnings</b>	<p>Allows you to enable or disable the system setup (BIOS) warning messages when you use certain power adapters.</p> <p>Default setting: Enable Adapter Warnings</p>
<b>Keypad (Embedded)</b>	<p>Allows you to choose one of two methods to enable the keypad that is embedded in the internal keyboard.</p> <ul style="list-style-type: none"><li>• Fn Key Only: This option is enabled by default.</li><li>• By Numlock</li></ul> <p> <b>NOTE:</b> When setup is running, this option has no effect. Setup works in Fn Key Only mode.</p>
<b>Mouse/Touchpad</b>	<p>Allows you to define how the system handles mouse and touch pad input. The options are:</p> <ul style="list-style-type: none"><li>• Serial Mouse</li><li>• PS2 Mouse</li><li>• Touchpad/PS-2 Mouse: This option is enabled by default.</li></ul>
<b>Numlock Enable</b>	<p>Allows you to enable the Numlock option when the computer boots.</p> <p>Enable Network. This option is enabled by default.</p>
<b>Fn Key Emulation</b>	<p>Allows you to set the option where the Scroll Lock key is used to simulate the Fn key feature.</p> <p>Enable Fn Key Emulation (default)</p>
<b>Fn Lock Options</b>	<p>Allows you to let hot key combinations Fn + Esc toggle the primary behavior of F1–F12, between their standard and secondary functions. If you disable this option, you cannot toggle dynamically the primary behavior of these keys. The available options are:</p> <ul style="list-style-type: none"><li>• Fn Lock. This option is selected by default.</li><li>• Lock Mode Disable/Standard</li><li>• Lock Mode Enable/Secondary</li></ul>
<b>Fastboot</b>	<p>Allows you to speed up the boot process by bypassing some of the compatibility steps. The options are:</p> <ul style="list-style-type: none"><li>• Minimal</li><li>• Thorough (default)</li><li>• Auto</li></ul>
<b>Extended BIOS POST Time</b>	<p>Allows you to create an additional preboot delay. The options are:</p> <ul style="list-style-type: none"><li>• 0 seconds. This option is enabled by default.</li><li>• 5 seconds</li><li>• 10 seconds</li></ul>
<b>Full Screen Logo</b>	<p>This option will display full screen logo if your image match screen resolution</p> <ul style="list-style-type: none"><li>• Enable Full Screen Logo</li></ul>
<b>Warnings and Error</b>	<p>This option will cause the boot process to only pause when warnings or errors are detected.</p> <ul style="list-style-type: none"><li>• Prompt on Warnings and Errors This option is enabled by default.</li><li>• Continue on Warnings</li><li>• Continue on Warnings and Errors</li></ul> <p> <b>NOTE:</b> Error deemed critical to the operation of the system hardware will always halt the system.</p>

# Virtualization support screen options

Option	Description
<b>Virtualization</b>	<p>Allows you to enable or disable the Intel Virtualization Technology.</p> <p>Enable Intel Virtualization Technology: This option is enabled by default.</p>

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

## Wireless screen options

Option	Description
<b>Wireless Switch</b>	<p>Allows to set the wireless devices that can be controlled by the wireless switch. The options are:</p> <ul style="list-style-type: none"> <li>• WWAN</li> <li>• GPS (on WWAN Module)</li> <li>• WLAN/WiGig</li> <li>• Bluetooth</li> </ul> <p>All the options are enabled by default.</p> <p> <b>NOTE:</b> For WLAN and WiGig enable or disable controls are tied together and they cannot be enabled or disabled independently.</p>
<b>Wireless Device Enable</b>	<p>Allows you to enable or disable the internal wireless devices.</p> <ul style="list-style-type: none"> <li>• WWAN/GPS</li> <li>• WLAN/WiGig</li> <li>• Bluetooth</li> </ul> <p>All the options are enabled by default.</p>

## Maintenance screen options


Option	Description
<b>Service Tag</b>	Displays the Service Tag of your computer.
<b>Asset Tag</b>	Allows you to create a system asset tag if an asset tag is not already set. This option is not set by default.
<b>BIOS Downgrade</b>	<p>This controls flashing of the system firmware to previous revisions.</p> <ul style="list-style-type: none"> <li>• Allows BIOS Downgrade (enabled by default)</li> </ul>
<b>Data Wipe</b>	<p>This field allows users to erase the data securely from all internal storage devices. The following is list of devices affected:</p> <ul style="list-style-type: none"> <li>• Internal SATA HDD/SSD</li> <li>• Internal M.2 SATA SDD</li> <li>• Internal M.2 PCIe SSD</li> <li>• Internal eMMC</li> </ul>
<b>BIOS Recovery</b>	<p>This field allows you to recover from certain corrupted BIOS conditions from a recover file on the user primary hard drive or an external USB key.</p> <ul style="list-style-type: none"> <li>• BIOS Recovery from Hard Drive (enabled by default)</li> <li>• BIOS Auto-Recovery</li> <li>• Always perform Integrity Check</li> </ul>


## System Log screen options

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

## Updating the BIOS

### Updating the BIOS in Windows

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


1. Go to [www.dell.com/support](http://www.dell.com/support).
2. Click **Product support**. In the **Search support** box, enter the Service Tag of your computer, and then click **Search**.  
 **NOTE:** If you do not have the Service Tag, use the SupportAssist feature to automatically identify your computer. You can also use the product ID or manually browse for your computer model.
3. Click **Drivers & Downloads**. Expand **Find drivers**.
4. Select the operating system installed on your computer.
5. In the **Category** drop-down list, select **BIOS**.
6. Select the latest version of BIOS, and click **Download** to download the BIOS file for your computer.
7. After the download is complete, browse the folder where you saved the BIOS update file.
8. Double-click the BIOS update file icon and follow the on-screen instructions.

For more information, see knowledge base article [000124211](https://www.dell.com/support/article/000124211) at [www.dell.com/support](http://www.dell.com/support).

### Updating the BIOS in Linux and Ubuntu

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

### Updating the BIOS using the USB drive in Windows

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


1. Follow the procedure from step 1 to step 6 in [Updating the BIOS in Windows](#) to download the latest BIOS setup program file.
2. Create a bootable USB drive. For more information, see the knowledge base article [000145519](https://www.dell.com/support/article/000145519) 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**.
6. Select the USB drive from the **One Time Boot Menu**.



7. Type the BIOS setup program filename and press **Enter**.  
The **BIOS Update Utility** appears.
8. Follow the on-screen instructions to complete the BIOS update.

## Updating the BIOS from the F12 One-Time boot menu


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

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

### BIOS Update

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

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

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

### Updating from the One-Time boot menu

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

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

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

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

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

## System and setup password


Table 7. System and setup password

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

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

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

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

 **NOTE:** System and setup password feature is disabled.

## Assigning a system setup password

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


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

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

## Deleting or changing an existing system setup password


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

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

1. In the **System BIOS** or **System Setup** screen, select **System Security** and press Enter.  
The **System Security** screen is displayed.
2. In the **System Security** screen, verify that **Password Status** is **Unlocked**.
3. Select **System Password**, update, or delete the existing system password, and press Enter or Tab.
4. Select **Setup Password**, update, or delete the existing setup password, and press Enter or Tab.  
 **NOTE:** If you change the System and/or Setup password, reenter the new password when prompted. If you delete the System and/or Setup password, confirm the deletion when prompted.
5. Press Esc and a message prompts you to save the changes.
6. Press Y to save the changes and exit from System Setup.  
The computer restarts.

## Clearing BIOS (System Setup) and System passwords

To clear the system or BIOS passwords, contact Dell technical support as described at [www.dell.com/contactdell](http://www.dell.com/contactdell).

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

# Technical specifications

**NOTE:** Offerings may vary by region. For more information regarding the configuration of your computer in:

- Windows 10, click or tap **Start**  > **Settings** > **System** > **About**.

## Topics:

- [System specifications](#)
- [Processor specifications](#)
- [Memory specifications](#)
- [Storage specifications](#)
- [Audio specifications](#)
- [Video specifications](#)
- [Camera specifications](#)
- [Communication specifications](#)
- [Port and connector specifications](#)
- [Contactless smart card specifications](#)
- [Display specifications](#)
- [Keyboard specifications](#)
- [Touchpad specifications](#)
- [Battery specifications](#)
- [AC Adapter specifications](#)
- [Physical specifications](#)
- [Environmental specifications](#)

## System specifications


Feature	Specification
<b>Chipset</b>	Intel 7th Generation processors Intel 6th Generation processors
<b>DRAM bus width</b>	64-bit
<b>Flash EPROM</b>	SPI 128 Mbits
<b>PCIe bus</b>	100 MHz
<b>External Bus Frequency</b>	PCIe Gen3 (8 GT/s)

## Processor specifications

Feature	Specification
<b>Types</b>	<ul style="list-style-type: none"> <li>• Intel Core i3 series, i5 series, i7 series (Dual core)</li> <li>• Intel Core i5 series, i7 series (Quad core)</li> <li>• </li> </ul>
<b>L3 cache</b>	
<b>i3 U-series</b>	<ul style="list-style-type: none"> <li>• 3 MB</li> </ul>

Feature	Specification
i5 U-series	<ul style="list-style-type: none"> <li>• 3 MB</li> </ul>
i5 H-series	<ul style="list-style-type: none"> <li>• 6 MB</li> </ul>
i7 U-series	<ul style="list-style-type: none"> <li>• 4 MB</li> </ul>
i7 H-series	<ul style="list-style-type: none"> <li>• non vPro — 6 MB</li> <li>• vPro — 8 MB</li> </ul>

## Memory specifications

Feature	Specification
Memory connector	Two SODIMM slots
Memory capacity	4 GB, 8 GB, and 16 GB
Memory type	DDR4 SDRAM
Speed	<ul style="list-style-type: none"> <li>• 2133 MHz</li> <li>• 2400 MHz</li> </ul> <p> <b>NOTE:</b> 2133 MHz supports only in Intel Dual Core.</p>
Minimum memory	4 GB
Maximum memory	32 GB

## Storage specifications

Feature	Specification
SSD M.2 SATA / PCIe	Up to 512 GB
HDD	Up to 1 TB


## Audio specifications

Feature	Specification
Types	High-definition audio
Controller	Realtek ALC3246
Stereo conversion	Digital audio-out through HDMI — up to 7.1 compressed and uncompressed audio
Internal interface	High-definition audio codec
External interface	Stereo headset/mic combo
Speakers	Two
Internal speaker amplifier	2 W (RMS) per channel
Volume controls	Hot keys

## Video specifications

Feature	Specification
Type	Integrated on system board, hardware accelerated
Graphic cards	i3, i5, i7 Intel HD Graphics 620 (dual core) Intel HD Graphics 630 (quad core) NVIDIA GeForce 930MX 64 Bit(dual core) NVIDIA GeForce 940MX 64 Bit
Data bus	Integrated video
External display support	<ul style="list-style-type: none"><li>• 19-pin HDMI connector</li><li>• 15-pin VGA connector</li><li>• DisplayPort over Type-C connector</li></ul>

## Camera specifications

 **NOTE:** Windows Hello face authentication enabled.

Feature	Specification
Camera resolution	0.92 megapixels
HD Panel Resolution	1366 x 768 pixels
FHD Panel Resolution	1280 x 720 pixels
HD Panel Video Resolution (maximum)	1280 x 720 pixels
FHD Panel Video Resolution (maximum)	1920 x 1080 pixels
Diagonal viewing angle	74°

## Communication specifications

Features	Specification
Network adapter	10/100/1000 Mb/s Ethernet (RJ-45)
Wireless	<ul style="list-style-type: none"><li>• Internal wireless local area network (WLAN)</li><li>• Wireless wide area network (WWAN) - optional</li><li>• Wireless gigabit (WiGig) - optional</li></ul>



# Port and connector specifications

Feature	Specification
Audio	Stereo headset / mic combo
Video	<ul style="list-style-type: none"><li>One 19-pin HDMI connector</li><li>15 pin VGA connector</li></ul>
Network adapter	One RJ-45 connector
USB	Three USB 3.0 ports, with one PowerShare
Memory card reader	Up to SD4.0
Micro SIM (uSIM) card	One external (optional)
Docking port	Docking has one options: <ul style="list-style-type: none"><li>One DisplayPort over USB type C, optional Thunderbolt 3 cable docking port</li></ul> <div><div><div></div><div>i</div></div><div><b>NOTE:</b> DisplayPort over USB Type-C Thunderbolt 3 is available in systems with discrete graphics only.</div></div>

# Contactless smart card specifications

Feature	Specification
Supported Smart Cards/ Technologies	BTO with USH

# Display specifications

Table 8. Display specification

Feature	Specification
Height	360 mm (14.17 inches)
Width	224.3 mm (8.83 inches)
Diagonal	396.24 mm (15.6 inches)
Actual screen size	15.6 inches
Non-touch HD anti-glare	
Maximum resolution	1920 x 1080
Maximum brightness	200 nits
Refresh rate	60 Hz
Maximum viewing angles (horizontal)	40/40
Maximum viewing angles (vertical)	+ 10/ - 30
Pixel pitch	0.252 mm (0.01 inches)

**Table 8. Display specification (continued)**

Feature	Specification
<b>Non-touch FHD anti-glare</b>	
Maximum resolution	1920 x 1080
Maximum brightness	220 nits
Refresh rate	60 Hz
Maximum viewing angles (horizontal)	+ 80/ - 80
Maximum viewing angles (vertical)	+ 80/ - 80
Pixel pitch	0.179 mm (0.007 inches)
<b>Touch FHD anti-glare</b>	
Maximum resolution	1920 x 1080
Maximum brightness	220 nits
Refresh rate	60 Hz
Maximum viewing angles (horizontal)	+ 80/ - 80
Maximum viewing angles (vertical)	+ 80/ - 80
Pixel pitch	0.179 mm (0.007 inches)

## Keyboard specifications

Feature	Specification
<b>Number of keys</b>	<ul style="list-style-type: none"><li>• United States: 103 keys</li><li>• United Kingdom: 104 keys</li><li>• Japan: 107 keys</li><li>• Brazil: 106 keys</li></ul>

## Touchpad specifications

Feature	Specification
<b>Active Area:</b>	
<b>X-axis</b>	99.50 mm
<b>Y-axis</b>	53.00 mm

## Battery specifications

Feature	Specification
<b>Type</b>	42 Whr

Feature	Specification
	51Whr
	68Whr
	92Whr
<b>42 Whr :</b>	
<b>Depth</b>	181 mm (7.126 inches)
<b>Height</b>	7.05 mm (0.28 inch)
<b>Width</b>	95.9 mm (3.78 inches)
<b>Weight</b>	210 g (0.46 lb)
<b>Voltage</b>	11.4 V DC
<b>51 Whr :</b>	
<b>Depth</b>	181 mm (7.126 inches)
<b>Height</b>	7.05 mm (0.28 inch)
<b>Width</b>	95.9 mm (3.78 inches)
<b>Weight</b>	250 g (0.55 lb)
<b>Voltage</b>	11.4 V DC
<b>68 Whr :</b>	
<b>Depth</b>	233.00 mm (9.17 inches)
<b>Height</b>	7.5 mm (0.28 inch)
<b>Width</b>	95.90 mm (3.78 inches)
<b>Weight</b>	340 g (0.74 lb)
<b>Voltage</b>	7.6 V DC
<b>92Whr :</b>	
<b>Depth</b>	332.00 mm (13.07 inches)
<b>Height</b>	7.7 mm (0.303 inches)
<b>Width</b>	96.0 mm (3.78 inches)
<b>Weight</b>	450.00 g (0.99 lb)
<b>Voltage</b>	11.4 V DC
<b>Life span</b>	300 discharge per charge cycles
<b>Temperature range</b>	
<b>Operating</b>	<ul style="list-style-type: none"> <li>• Charge: 0°C to 50°C (32°F to 158°F)</li> <li>• Discharge: 0°C to 70°C (32°F to 122°F)</li> <li>• Operating: 0°C to 35°C (32°F to 95°F)</li> </ul>
<b>Non-operating</b>	- 20°C to 65°C (- 4°F to 149°F)
<b>Coin cell battery</b>	3 V CR2032 lithium coin cell

## AC Adapter specifications

Feature	Specification
<b>Type</b>	65 W / 90 W
<b>Input voltage</b>	100 V AC to 240 V AC

Feature	Specification
Input current (maximum)	1.7 A / 2.5 A
Input frequency	50 Hz to 60 Hz
Output current	3.34 A / 4.62 A
Rated output voltage	19.5 +/- 1.0 V DC
Temperature range (Operating)	0°C to 40°C (32°F to 104°F)
Temperature range (Non-Operating)	–40°C to 70°C (–40°F to 158°F)

## Physical specifications

Feature	Specification
Front height (non-touch)	<ul style="list-style-type: none"> <li>23.25 mm (0.91 inch) (dual core)</li> <li>24.3 mm (0.95 inch) (quad core)</li> </ul>
Back height (non-touch)	<ul style="list-style-type: none"> <li>23.25 mm (0.91 inch) (dual core)</li> <li>24.3 mm (0.95 inch) (quad core)</li> </ul>
Width	<ul style="list-style-type: none"> <li>376.0 mm (14.8 inches) (dual core)</li> <li>376.0 mm (14.8 inches) (quad core)</li> </ul>
Depth	<ul style="list-style-type: none"> <li>250.7 mm (9.9 inches) (dual core)</li> <li>250.65 mm (9.86 inches) (quad core)</li> </ul>
Starting weight	<ul style="list-style-type: none"> <li>4.19 lbs (1.90 kg) (dual core)</li> <li>4.26 lbs (1.93 kg) (quad core)</li> </ul>

## Environmental specifications

Temperature	Specifications
Operating	0°C to 35°C (32°F to 95°F)
Storage	–40°C to 65°C (–40°F to 149°F)
Relative humidity (maximum)	Specifications
Operating	10 % to 90 % (non condensing)
Storage	5 % to 95 % (non condensing)
Altitude (maximum)	Specifications
Operating	0 m to 3048 m (0 ft to 10,000 ft)
Non-operating	0 m to 10,668 m (0 ft to 35,000 ft)
Airborne contaminant level	G1 as defined by ISA-71.04–1985

# Diagnostics

If you experience a problem with your computer, run the ePSA diagnostics before contacting Dell for technical assistance. The purpose of running diagnostics is to test your computer's hardware without requiring additional equipment or risking data loss. If you are unable to fix the problem yourself, service and support personnel can use the diagnostics results to help you solve the problem.


## Topics:


- [Enhanced Pre-Boot System Assessment ePSA diagnostics](#)
- [Device status lights](#)
- [Battery status lights](#)
- [Troubleshooting](#)
- [Drain residual flea power \(perform hard reset\)](#)

## 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.

You can launch the ePSA diagnostics in two ways:

1. Power-on the 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.

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

4. If you wish to run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
5. Select the device from the left pane and click **Run Tests**
6. If there are any issues, error codes are displayed.

Note the error code and contact Dell.

OR

1. Shutdown the computer.
2. Press and hold the fn key, while pressing the power button, and then release both.

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

3. On the boot menu screen, select the **Diagnostics** option.






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

4. If you wish to run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
5. Select the device from the left pane and click **Run Tests**
6. If there are any issues, error codes are displayed.


Note the error code and contact Dell.

## Device status lights

Table 9. Device status lights

Icon	Name	Description
	Power status light	Turns on when you turn on the computer and blinks when the computer is in a power management mode.
	Hard drive status light	Turns on when the computer reads or writes data.
	Battery charge indicator	Turns on steadily or blinks to indicate battery charge status.

The device status LEDs are usually located either on the top or left side of the keyboard. They display the storage, battery and wireless devices connectivity and activity. Apart from that they can be useful as a diagnostic tool when there's a possible failure to the system.


 **NOTE:** The position of the power status light may vary depending on the system.

The following table lists how to read the LED codes when possible errors occur.

Table 10. Battery charge LED indicator

Amber blinking pattern	Problem description	Suggested resolution
2,1	CPU	CPU failure
2,2	System board: BIOS ROM	System board, covers BIOS corruption or ROM error
2,3	Memory	No memory/RAM detected
2,4	Memory	Memory/RAM failure
2,5	Memory	Invalid memory installed
2,6	System board: Chipset	System board/Chipset error
2,7	LCD	Replace the system board
3,1	RTC Power Failure	CMOS battery failure
3,2	PCI/Video	PCI or video card/chip failure
3,3	BIOS Recovery 1	Recovery image not found
3,4	BIOS Recovery 2	Recovery image found but invalid

The blinking patterns will consist of 2 set of numbers being represented by (First Group: Amber blinks, Second Group: White blinks)

-  **NOTE:**
1. First Group: The LED blinks 1 to 9 times followed by a brief pause with LED off at the interval of 1.5 seconds.(This is in Amber color)
  2. Second Group: The LED blinks 1 to 9 times, that would be then followed by a longer pause before the next cycle starts again at the interval of 1.5 seconds.(This is in White color)

For Example: No Memory detected (2,3), Battery LED blinks two times of amber color followed by a pause, and then blinks three times of white color. The Battery LED will pause for 3 seconds before the next cycle repeat itself again.

# Battery status lights

If the computer is connected to an electrical outlet, the battery light operates as follows:

<b>Alternately blinking amber light and white light</b>	An unauthenticated or unsupported non-Dell AC adapter is attached to your laptop. Re-plug battery connector, replace battery if the issue reoccurs.
<b>Alternately blinking amber light with steady white light</b>	Temporary battery failure with AC adapter present. Re-plug battery connector, replace battery if the issue reoccurs.
<b>Constantly blinking amber light</b>	Fatal battery failure with AC adapter present. Fetal battery, replace the battery.
<b>Light off</b>	Battery in full charge mode with AC adapter present.
<b>White light on</b>	Battery in charge mode with AC adapter present.

## Troubleshooting

### Handling swollen Lithium-ion batteries

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

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

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

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


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


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

## Enhanced Pre-Boot System Assessment — ePSA diagnostics

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. Power-on the 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 key at the bottom left corner.  
Diagnostics front page is displayed.
5. Press the arrow in the lower-right corner to go to the page listing.  
The items detected are listed.
6. To run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
7. Select the device from the left pane and click **Run Tests**.
8. If there are any issues, error codes are displayed.  
Note the error code and validation number and contact Dell.

## Built-in self-test (BIST)

### M-BIST

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

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

#### How to run M-BIST

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

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


**Table 11. LED error codes**

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

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

## LCD Power rail test (L-BIST)

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

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

### How to invoke L-BIST Test:

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


## LCD Built-in Self Test (BIST)

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

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

### How to invoke LCD BIST Test

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

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

# Recovering the operating system

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

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

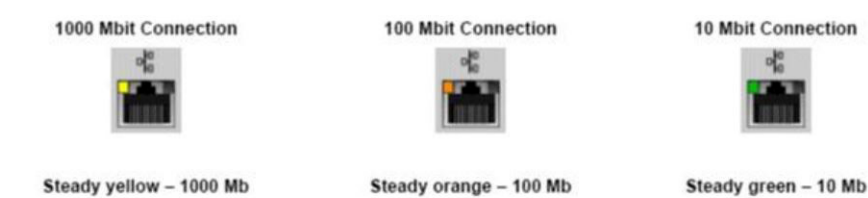
You can also download it from the Dell Support website to troubleshoot and fix your computer when it fails to boot into their primary operating system due to software or hardware failures.

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

## LAN status LED

The RJ-45 connector includes two LEDs in the top corners. When the connection is oriented as shown below, the LED in the top-left corner is the link integrity LED and the one in the top-right corner is the network activity LED.

The link integrity LED can display three colors: green, orange, and yellow. These colors indicate the three possible network connection speeds: 10 Mbps, 100 Mbps, and 1000 Mbps, respectively. These LED states are shown in the image below. The network activity LED is always yellow and blinks to indicate passing network traffic.



The LAN controller supports two status LEDs. A link LED displays the current transfer rate supported (10, 100, or 1000Mbps), while the activity LED indicates when the card is receiving or transmitting data. The following table illustrates the LEDs' operation.

Table 12. Status LEDs

LED	Status	Description
Activity	Amber	The LAN controller is receiving or transmitting data
	Off	The LAN controller is idle
Link	Green	The LAN controller is operating in 10 Mbps mode
	Orange	The LAN controller is operating in 100 Mbps mode
	Yellow	The LAN controller is operating in 1000 Mbps (Gigabit) mode

## Real Time Clock reset

The Real Time Clock (RTC) reset function allows you or the service technician to recover the recently launched model Dell Latitude and Precision systems from select **No POST/No Boot/No Power** situations. You can initiate the RTC reset on the system from a power off state only if it is connected to AC power. Press and hold the power button for 25 seconds. The system RTC reset occurs after you release the power button.

**NOTE:** If AC power is disconnected from the system during the process or the power button is held longer than 40 seconds, the RTC reset process is aborted.

The RTC reset will reset the BIOS to Defaults, un-provision Intel vPro and reset the system date and time. The following items are unaffected by the RTC reset:

- Service Tag
- Asset Tag
- Ownership Tag
- Admin Password
- System Password
- HDD Password
- Key Databases
- System Logs

The following items may or may not reset based on your custom BIOS setting selections:


- The Boot List
- Enable Legacy OROMs
- Secure Boot Enable
- Allow BIOS Downgrade

## Backup media and recovery options

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

## WiFi power cycle

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.

## Drain residual flea power (perform hard reset)

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

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


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

### To drain residual flea power (perform a hard reset)


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



8. Connect the power adapter to your computer.
9. Turn on your computer.

 **NOTE:** For more information about performing a hard reset, see the knowledge base article [000130881](https://www.dell.com/support/article/sln000130881) at [www.dell.com/support](https://www.dell.com/support).

## 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.