

Dell Precision 3520

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

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.

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

⚠ WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance

⚠ 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 — 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**.

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

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.

Recommended tools

The procedures in this document require the following tools:

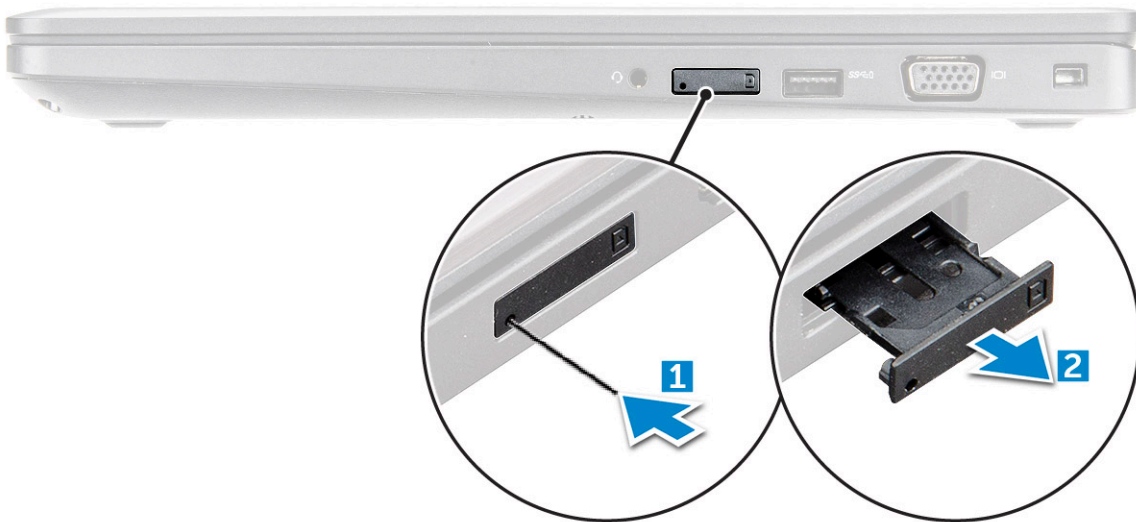
- Phillips #0 screwdriver
- Phillips #1 screwdriver
- Plastic scribe

① | **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 (SIM) card

- 1 Insert a paperclip or a SIM card removal tool 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 (SIM) card

⚠ **CAUTION:** Removing the 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.



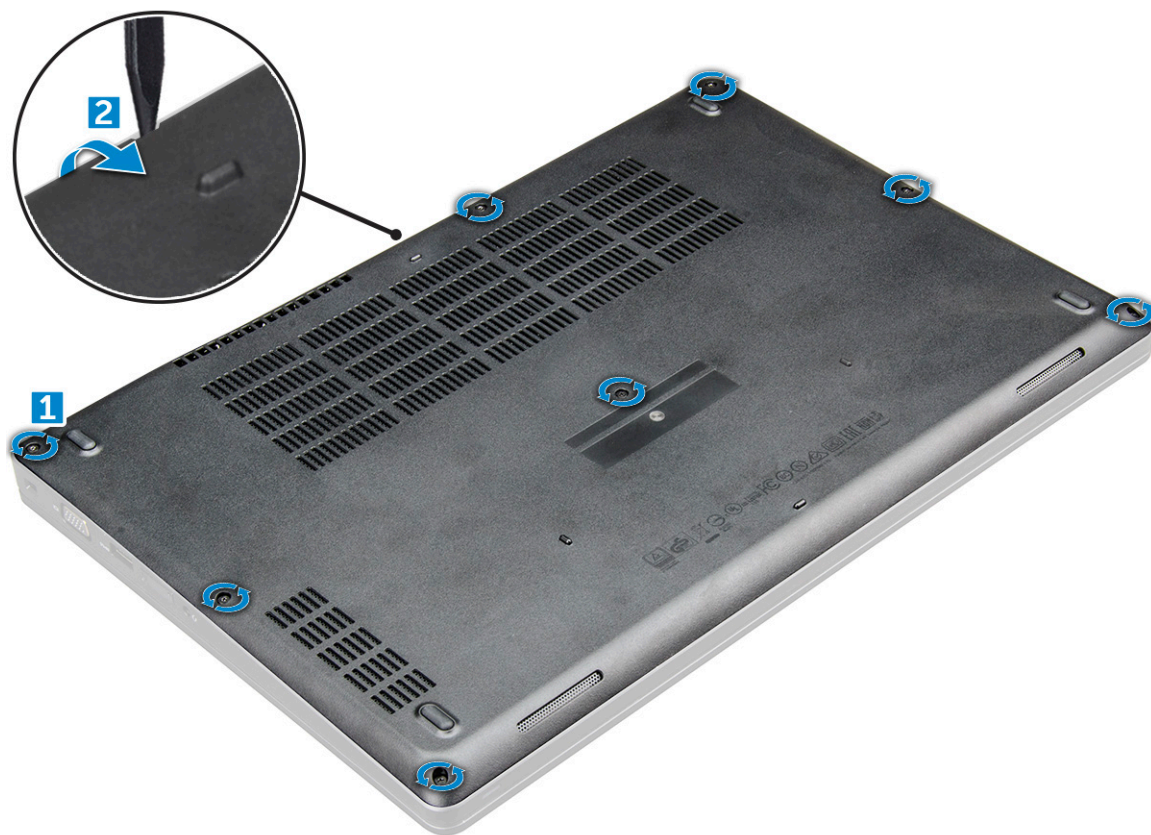
- 2 Pull the SIM card tray to remove it.
- 3 Remove the SIM card from the SIM card tray.
- 4 Push the SIM card tray into the slot until it clicks into place.

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 M2x5 captive screws that secure the base cover to the computer [1].
 - b Pry the base cover from the edge [2].

NOTE: You may need a plastic scribe to pry the base cover from the edge.



- 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

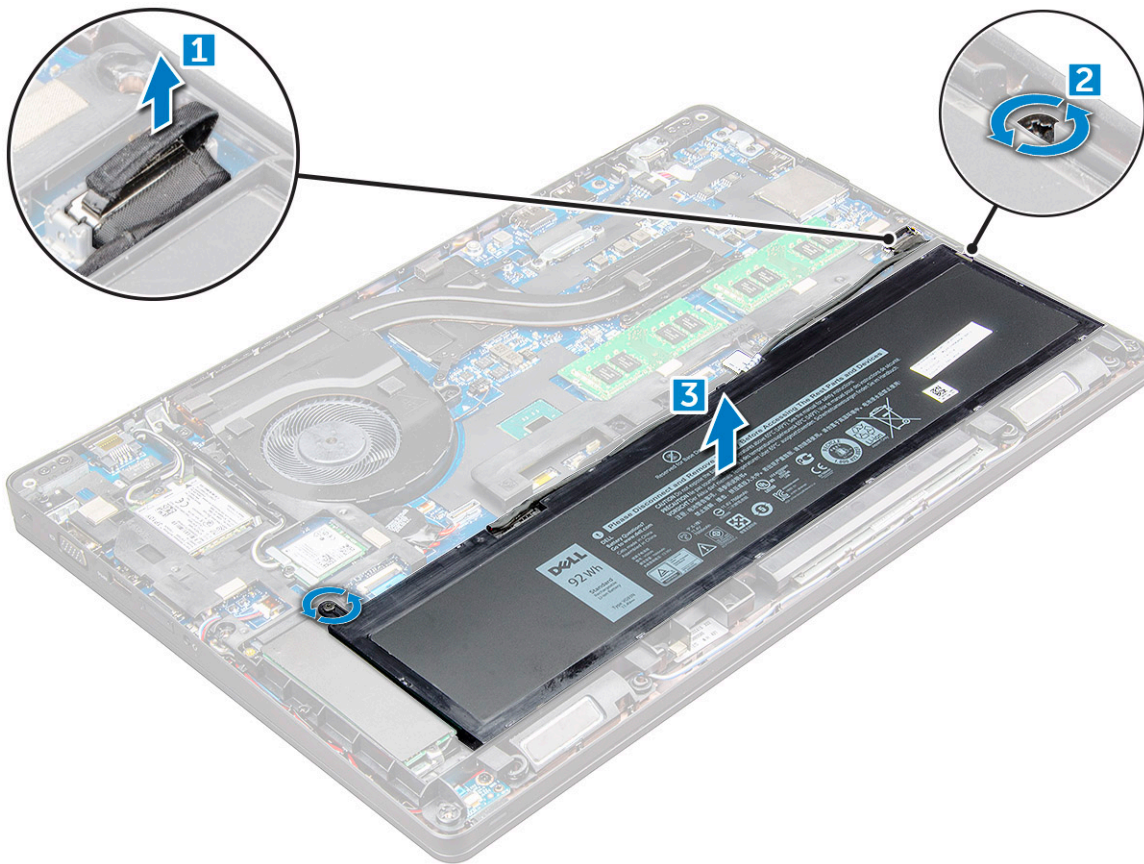
Removing the battery

ⓘ **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 M2x5 screws that secure the battery to the computer [2].
 - c Lift the battery away from the computer [3].

ⓘ **NOTE:** A 4-cell 68Whr battery has only 1 screw.





Installing the battery

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

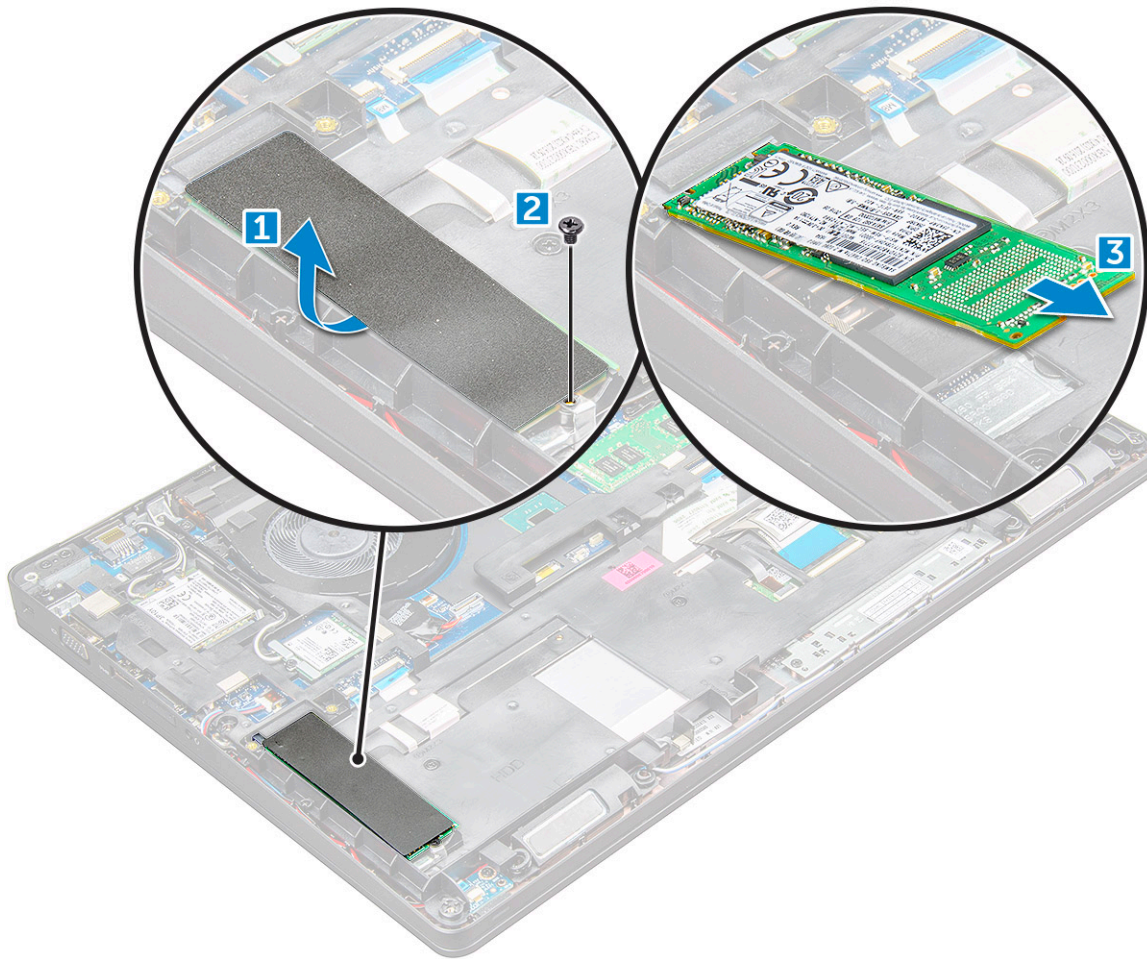
- 1 Insert the battery into the slot on the computer.
- 2 Connect the battery cable to the connector on the battery.
- 3 Tighten the M2x5 screw to secure the battery to the computer.
- 4 Install the [base cover](#).
- 5 Follow the procedure in [After working inside your computer](#).

Solid State Drive (SSD)

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].
 - b Remove the M2.0x3.0 screw that secures the SSD to the computer [2].
 - c Slide and lift the SSD from the computer [3].

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



Installing the M.2 Solid State Drive (SSD)

NOTE: Before installing SSD card, you must make sure that your computer has a 92 Whr battery.

- 1 Insert the SSD into the connector on the computer.
- 2 Tighten the M2.0x3.0 screw to secure the SSD to the computer.
- 3 Affix the adhesive tape above the SSD card.

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

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

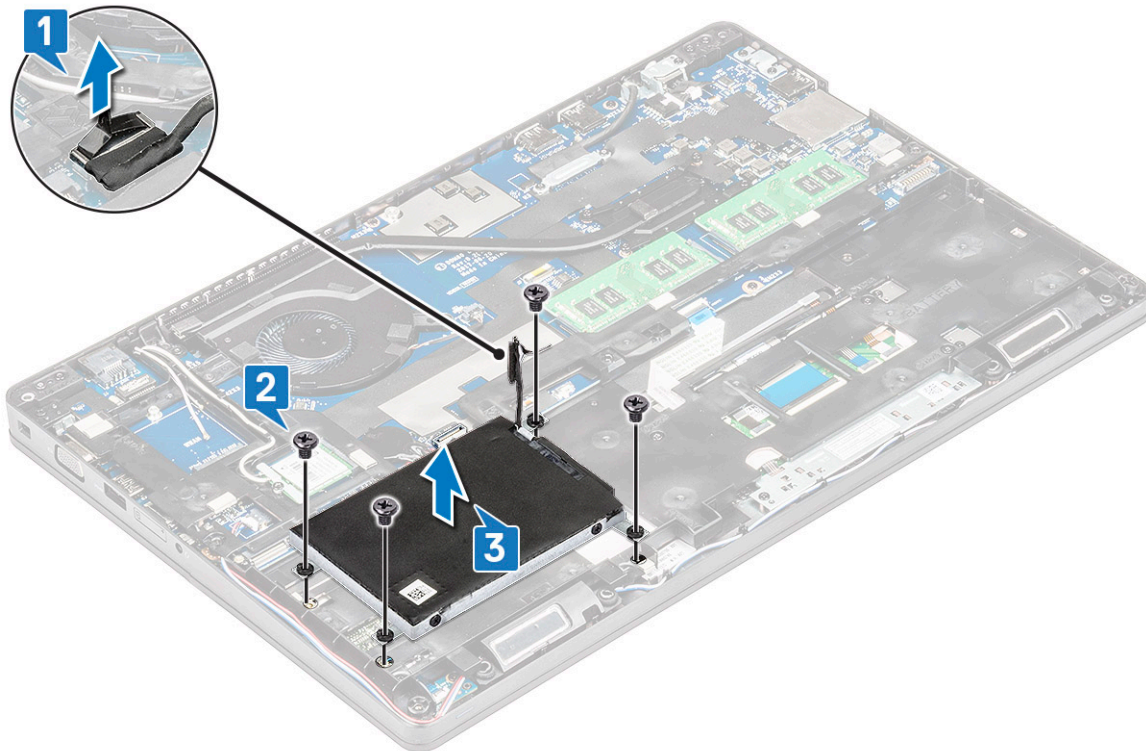
Hard drive

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.

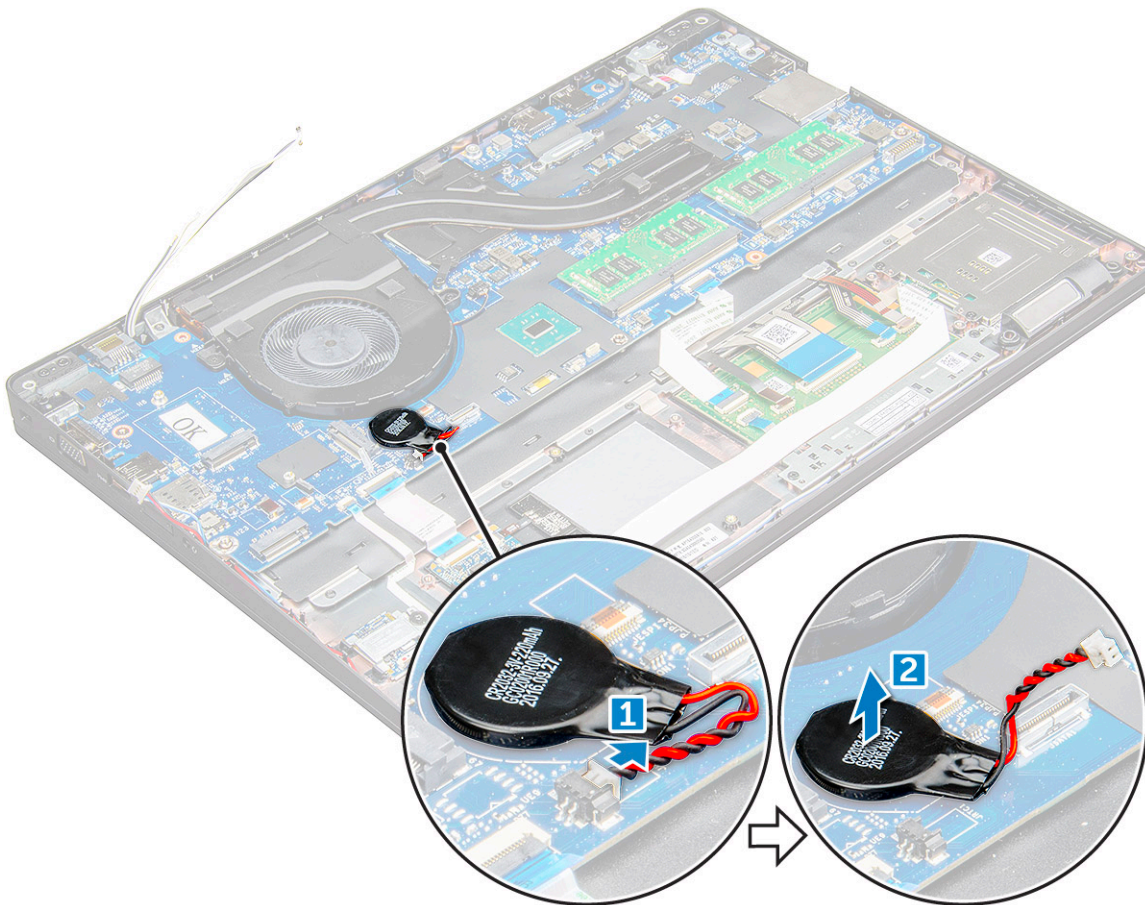
- 1 Insert the hard drive assembly into the slot on the computer.
- 2 Tighten the screws to secure the hard drive assembly to the computer.
- 3 Connect the hard drive cable to the connector on the hard drive and on the system board.
- 4 Install the:
 - a [battery](#)
 - b [base cover](#)
- 5 Follow the 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 into the slot on the system board.
- 2 Connect the coin cell battery cable to the connector on the system board.
- ① **NOTE:** Ensure the coin cell battery cable is properly routed to avoid damages to the cable.
- 3 Install the:
 - a [battery](#)
 - b [base cover](#)
- 4 Follow the procedure in [After working inside your computer](#).

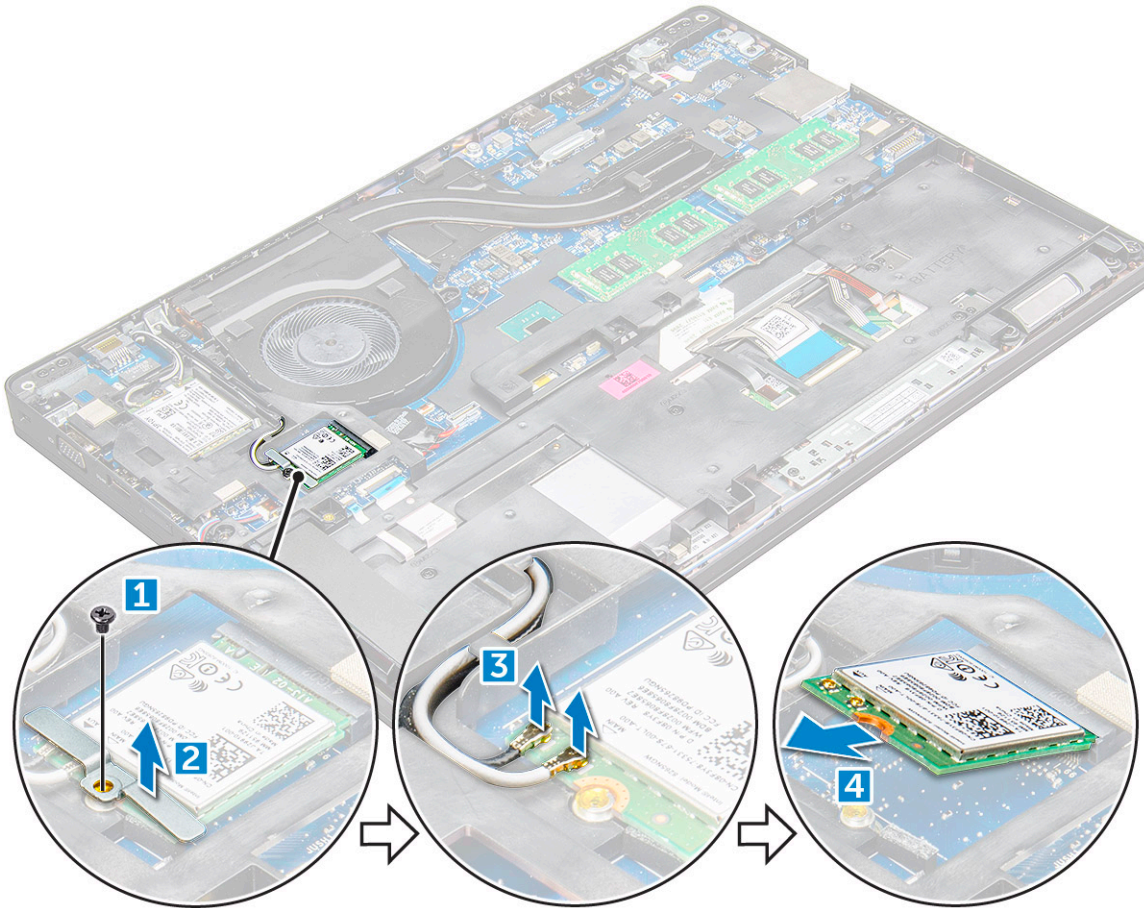
WLAN card

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 M2.0x3.0 screw that secures the WLAN card to the computer [1].
 - b Remove the metal tab that secures the WLAN cables [2].
 - c Disconnect the WLAN cables from the connectors on the WLAN card [3].
- NOTE:** The WLAN card is held in place with an adhesive foam spacer.
- d Lift the WLAN card to release it from the adhesive[4].



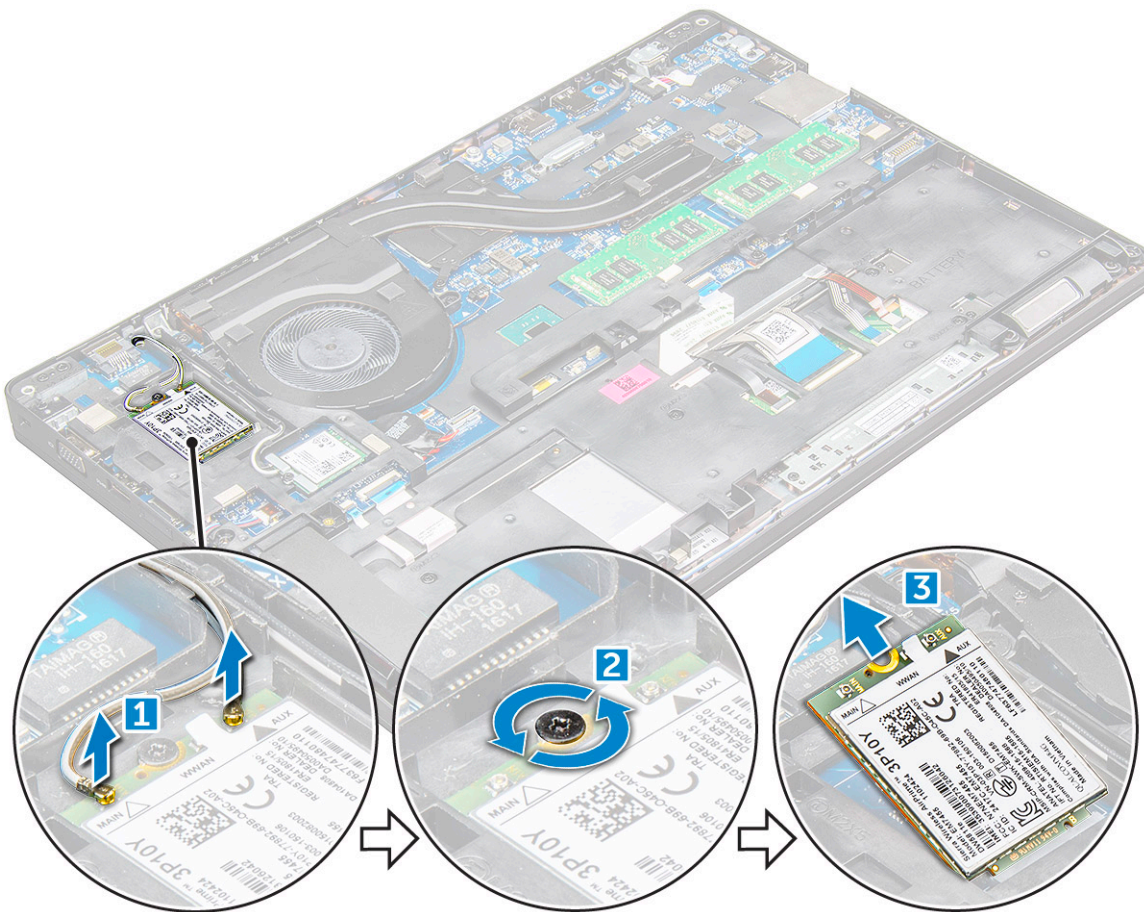
Installing the WLAN card

- 1 Insert the WLAN card into the slot on the computer.
- 2 Route the WLAN cables through the routing channel.
- 3 Connect the WLAN cables to the connectors on the WLAN Card.
- 4 Place the metal bracket and tighten the M2.0x3.0 screw to secures it 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 [1].
 - b Remove the M2.0x3.0 screw that secures the WWAN card to the computer [2].
 - c Lift the WWAN card away from the connector[3].



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](#)

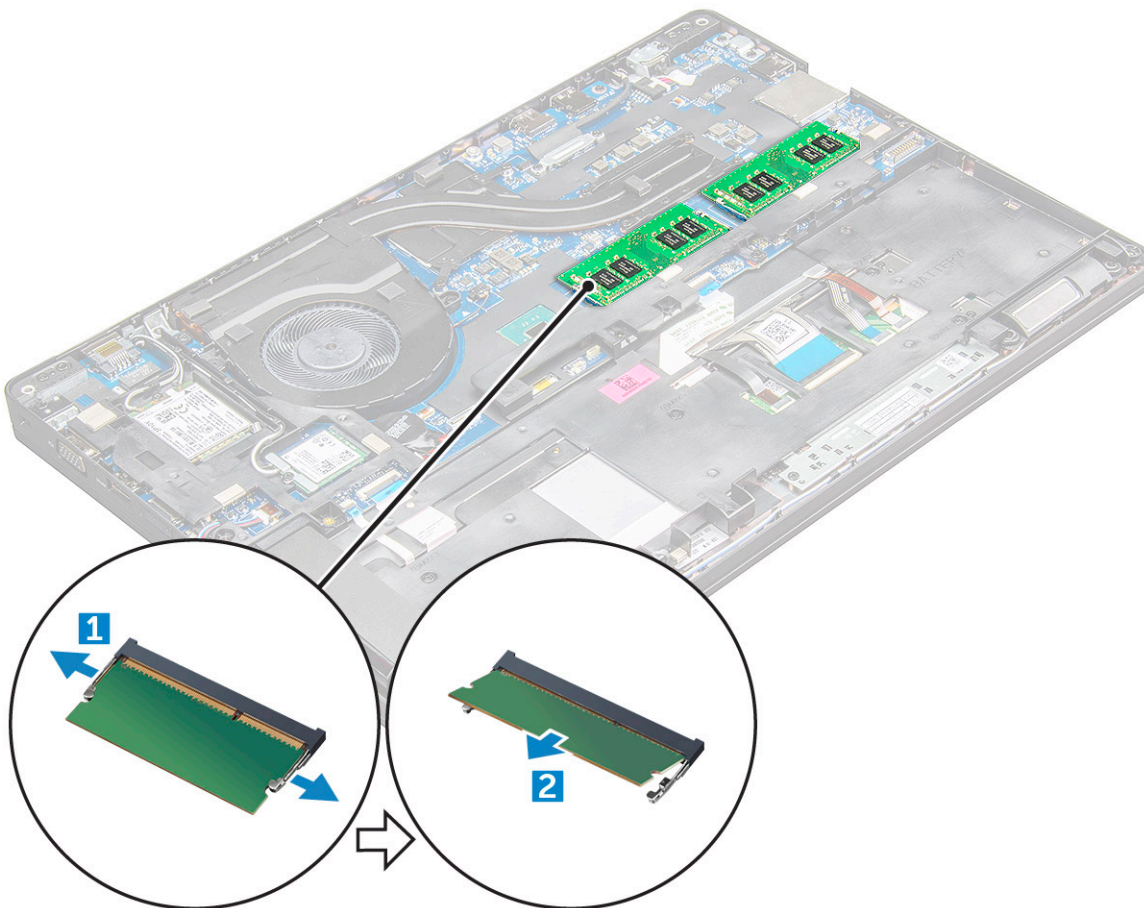


- 5 Follow the procedure in [After working inside your system](#).

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].



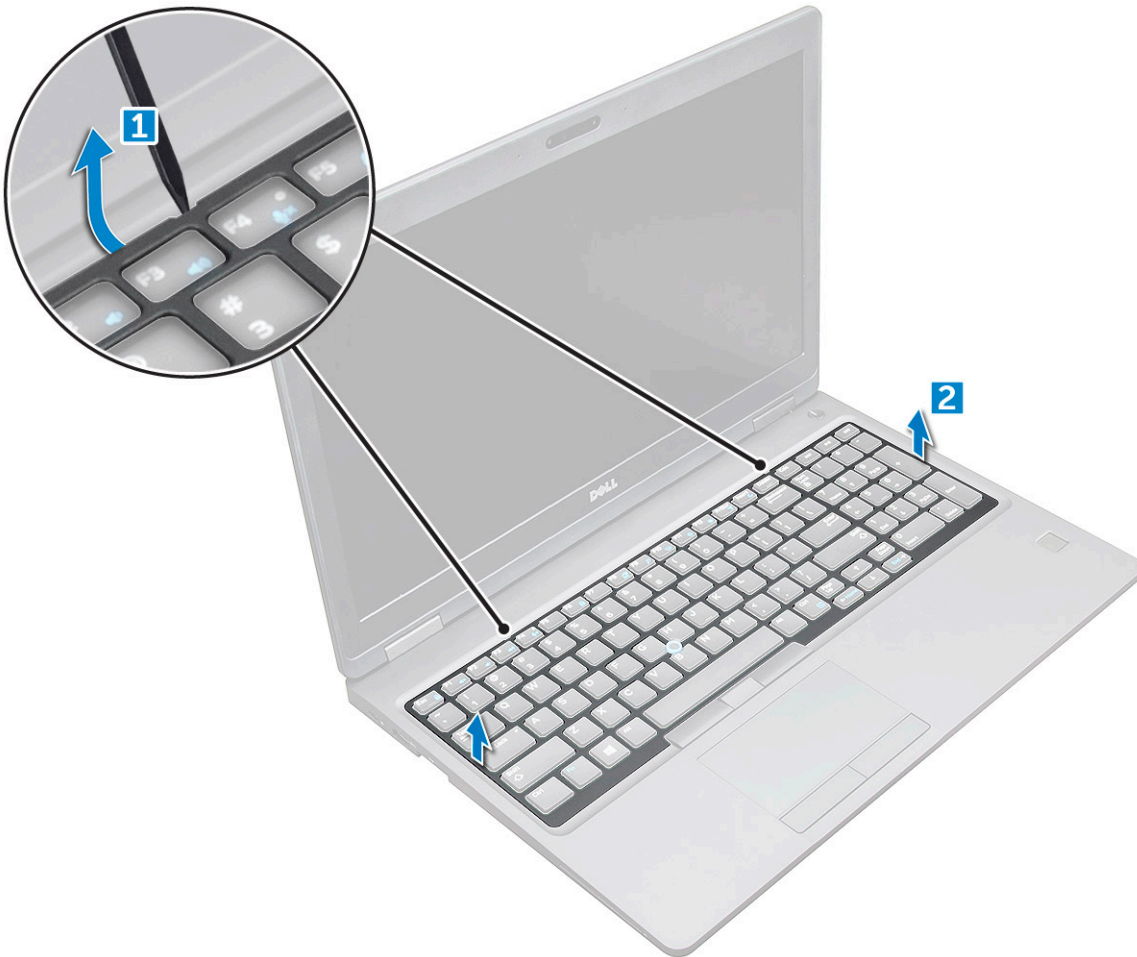
Installing the memory module

- 1 Insert the memory module into the memory module socket 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].

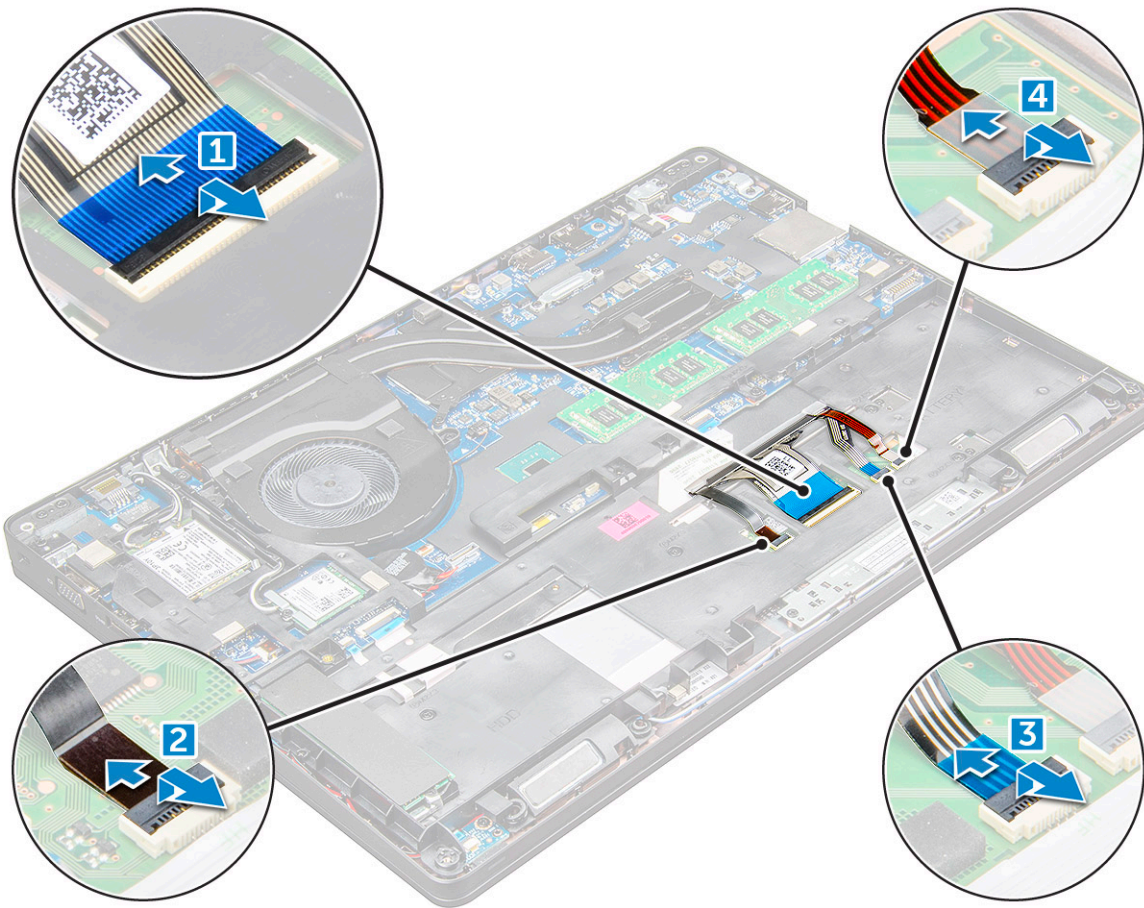


NOTE: You may need a plastic scribe to pry the keyboard trim from the edges.

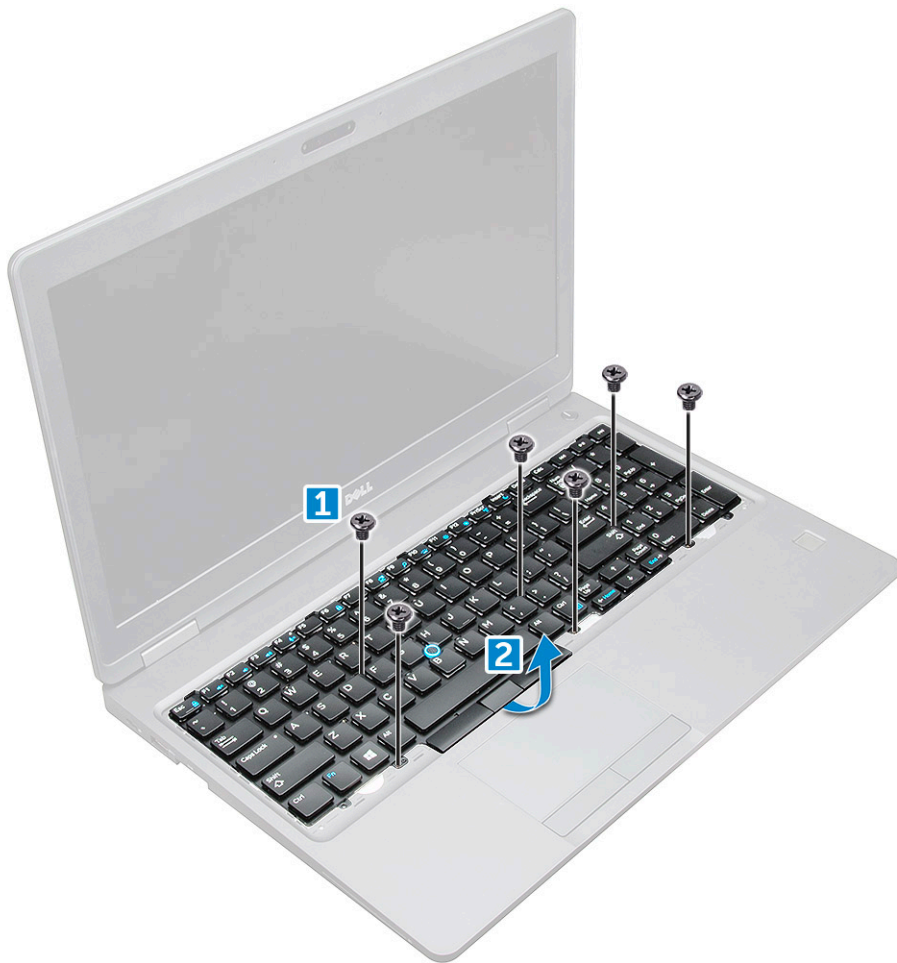
Removing the keyboard

- 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](#).

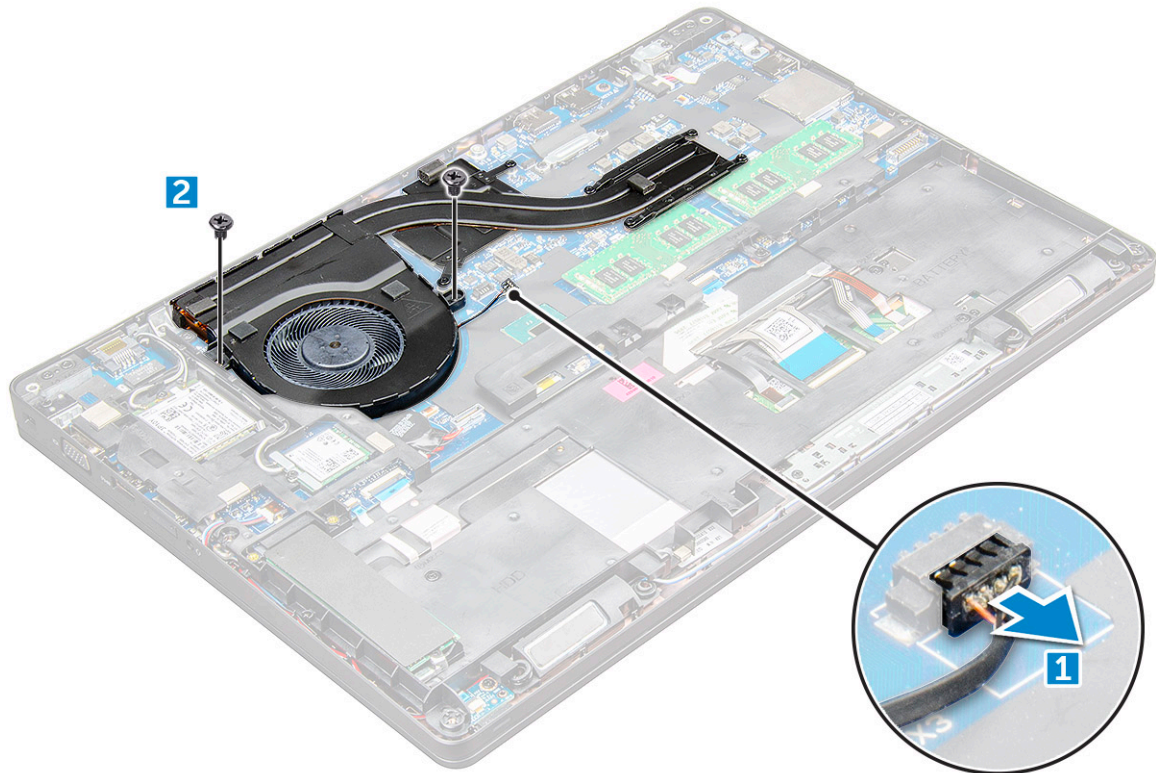
Installing the keyboard trim

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

Heat sink

Removing the heat sink assembly

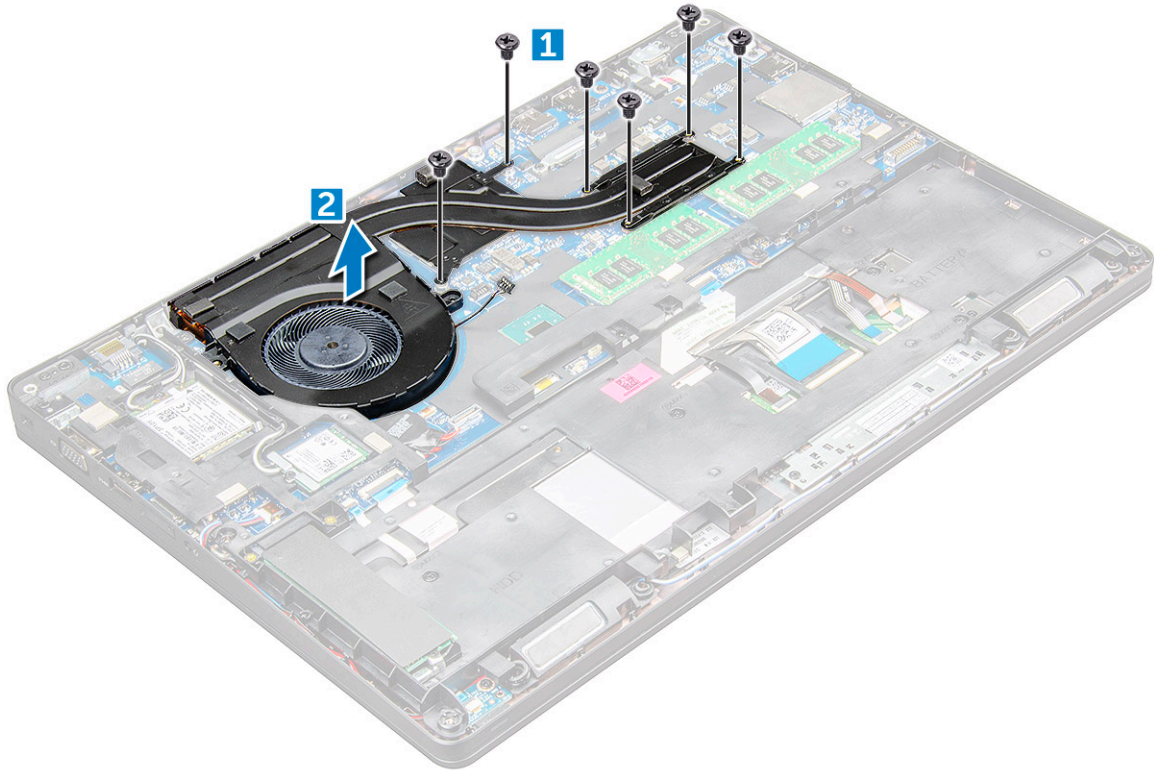
- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [battery](#)
- 3 To remove the heat sink assembly:
 - a Disconnect the heat sink assembly cable[1] and remove the screws that secure on the system board[2].



- b Remove the M2.0x3.0 screws that secure the heat sink assembly on the system board [1].

NOTE: Remove the screws that secure the heat sink assembly to the system board in the order of the callouts shown on the heat sink assembly [1, 2, 3, 4, 5, 6].

- c Lift the heat sink assembly away from the system board [2].



Installing the heat sink assembly

- 1 Place the heat sink assembly on the system board and align it with the screw holders.
- 2 Tighten the M2.0x3.0 screws to secure the heat sink assembly to the system board.

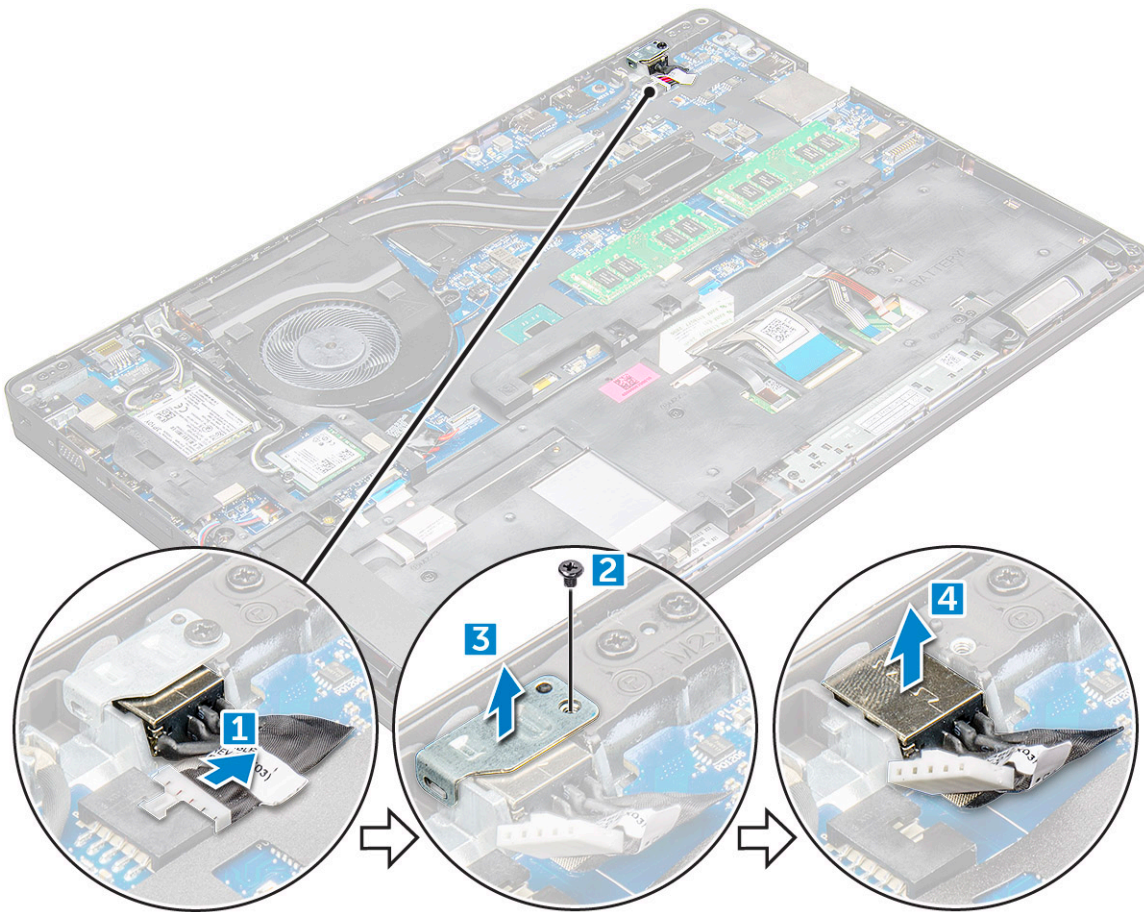
NOTE: Tighten the screws on the system board in the order of the callout numbers [1, 2, 3, 4, 5, 6].

- 3 Connect the heat sink assembly 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 M2.0x3.0 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 M2.0x3.0 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

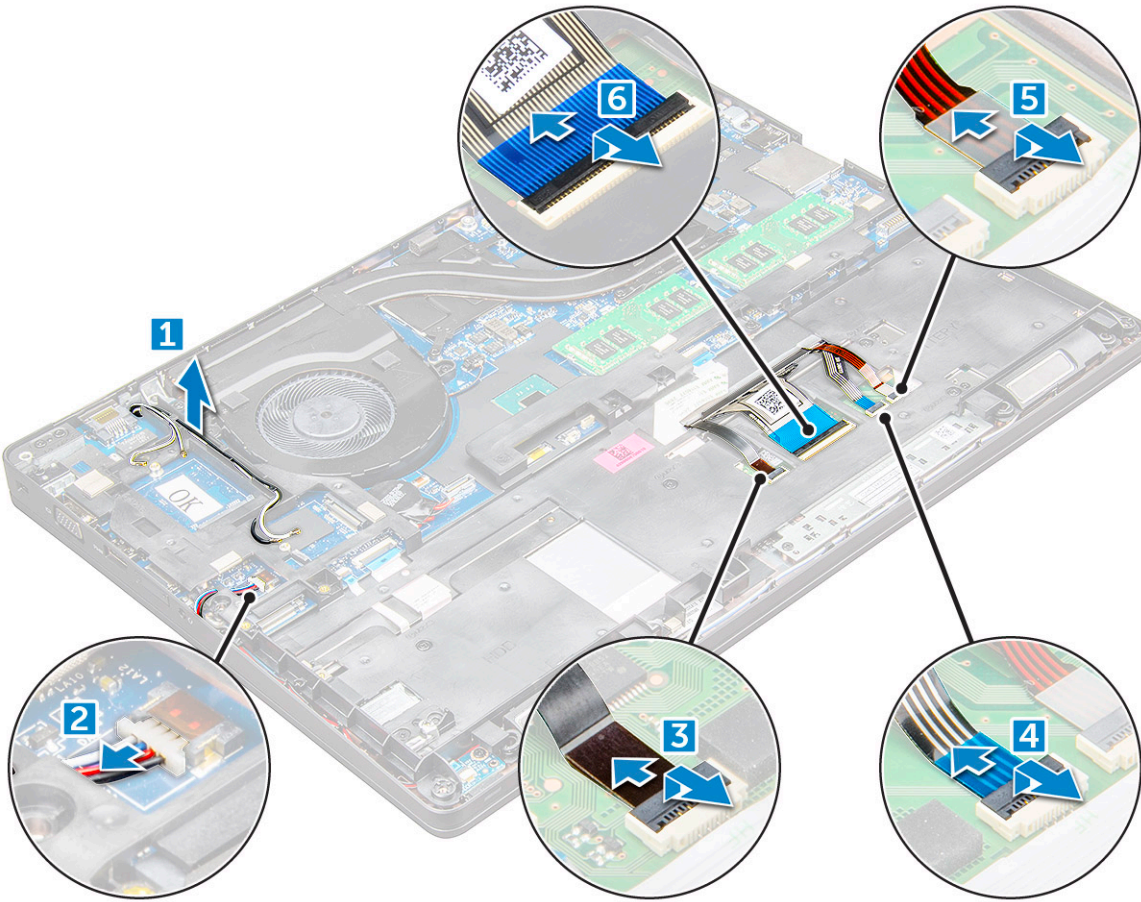
- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a SIM card module
 - b base cover
 - c battery
 - d WLAN card
 - e WWAN card



f SSD card or hard drive

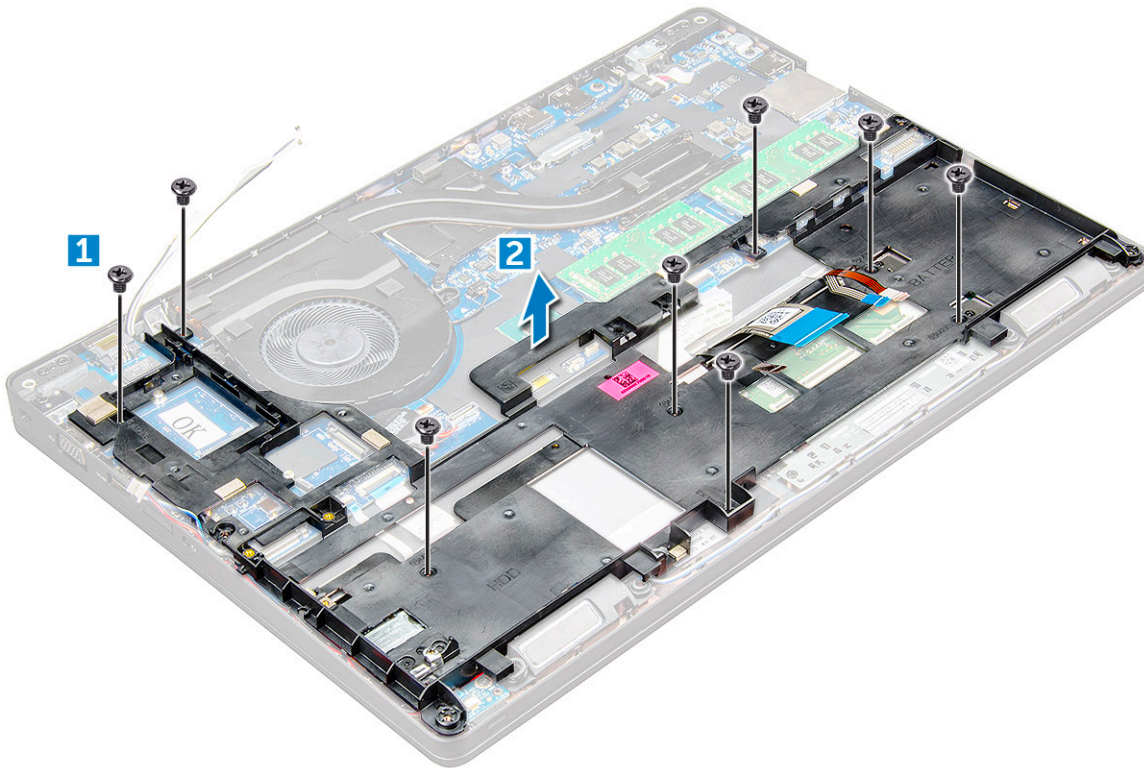
3 To release the chassis frame:

- 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, touchpad cable and pointstick cable from the connector [3, 4, 5, 6].



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

NOTE: Ensure the coin cell battery cable is properly routed 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

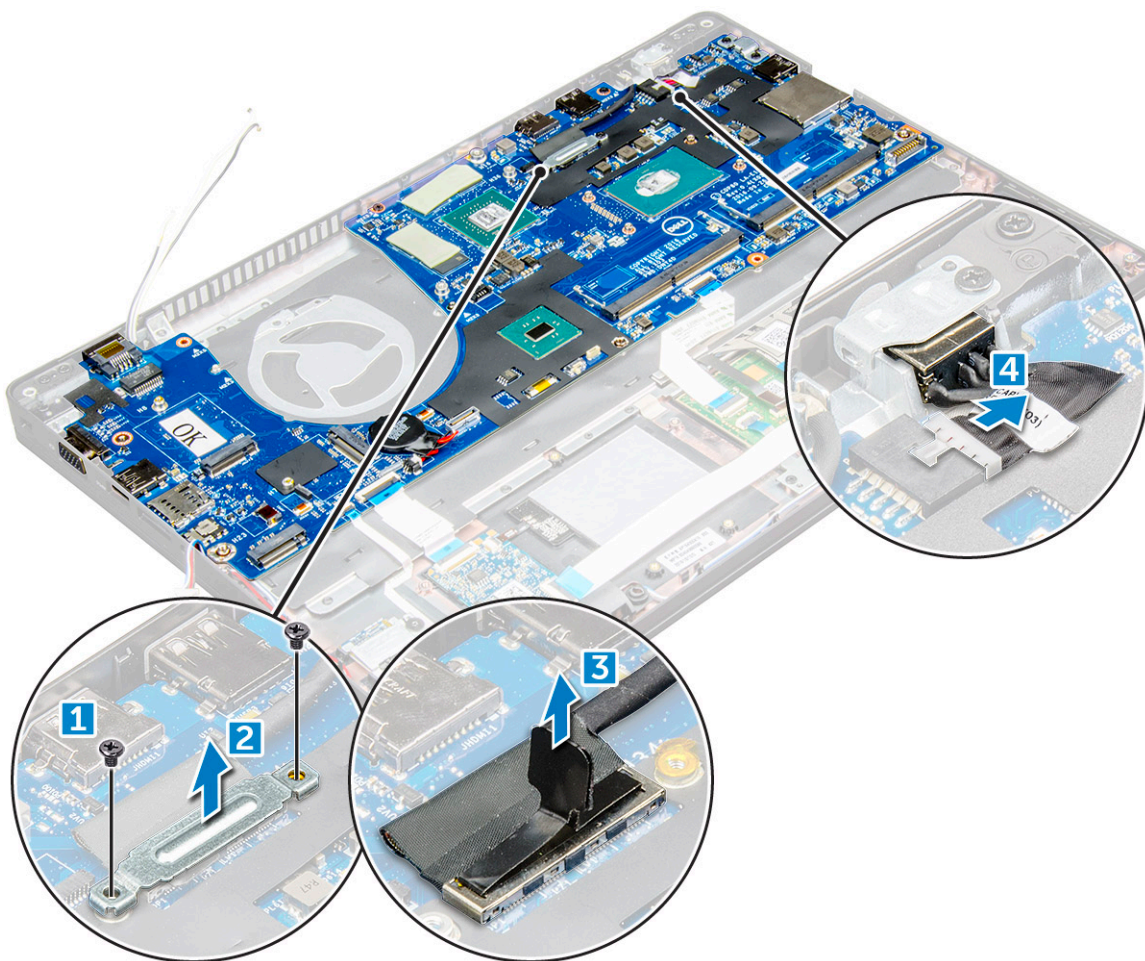
- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a SIM card module
 - b base cover
 - c battery
 - d WLAN card



- e WWAN card
- f SSD card or hard drive
- g memory module
- h heat sink assembly
- i coin cell battery
- j Power connector port
- k chassis frame

3 To release the system board:

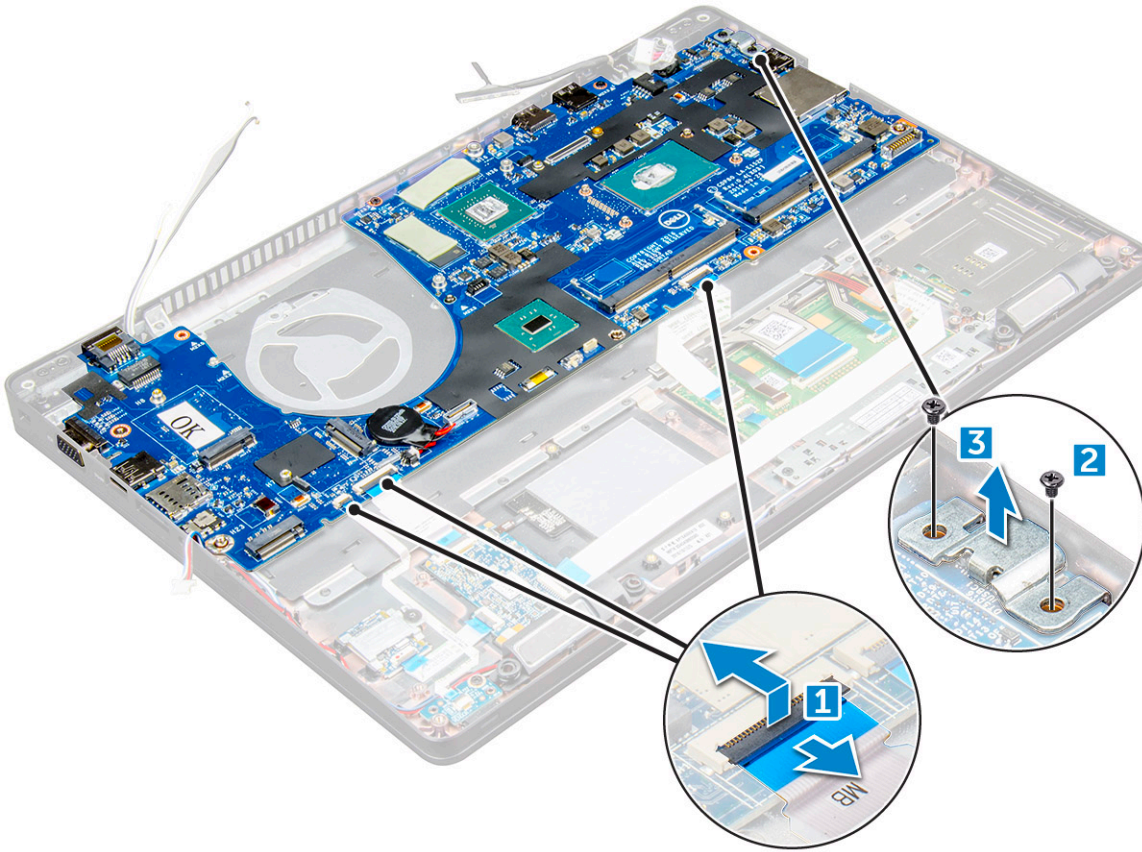
- a Remove the M2.0x3.0 screws that secures the metal bracket [1].
- b Lift the metal bracket that secures the display cable [2].
- c Disconnect the display cable from the connectors on the system board [3].
- d Disconnect the power cable [4].



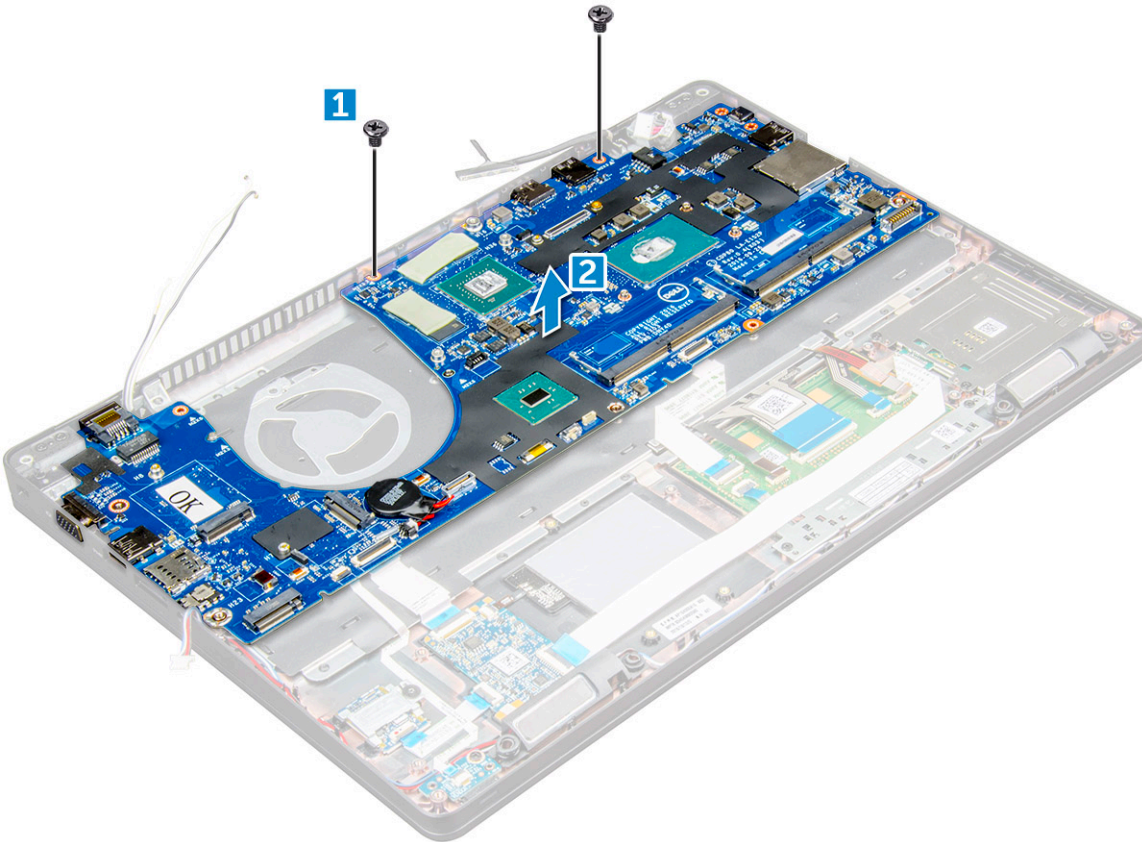
4 To remove the system board:

- 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.

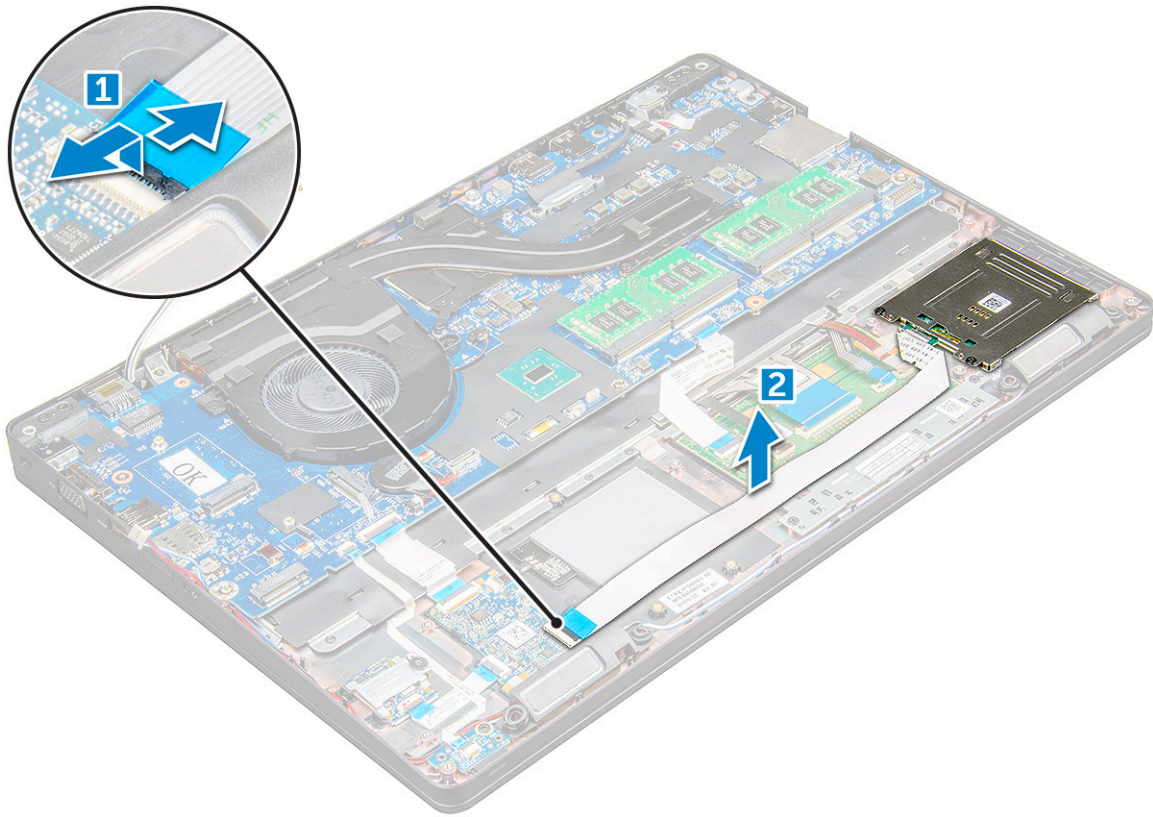
NOTE: The metal bracket referred is the USB-C bracket.

- 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 Install the:
 - a chassis frame
 - b coin cell battery
 - c heat sink assembly
 - d memory module
 - e SSD card or hard drive
 - f WWAN card
 - g WLAN card
 - h battery
 - i base cover
 - j SIM card module
- 9 Follow the procedure in [After working inside your computer](#).

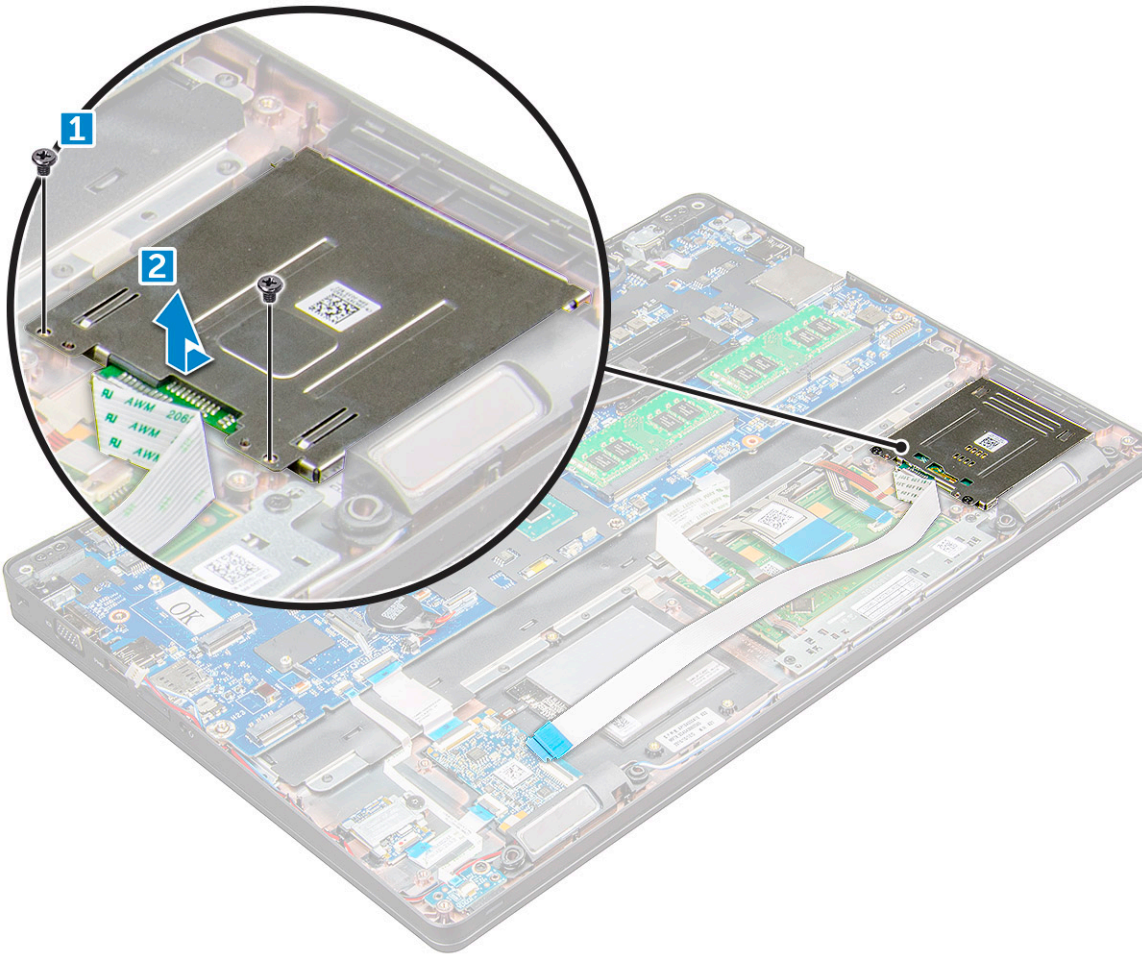
SmartCard module

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 WWAN card
 - e SSD card or hard drive
 - f chassis frame
- 3 To release the SmartCard reader:
 - a Disconnect the SmartCard reader board cable from the connector [1].
 - b Peel off the cable to release from the adhesive [2].



- 4 To remove the SmartCard reader:
 - a Remove the M2.0x3.0 screws that secure the SmartCard reader board to the palmrest [1].
 - b Push the SmartCard reader board to release it [2].



Installing the SmartCard reader

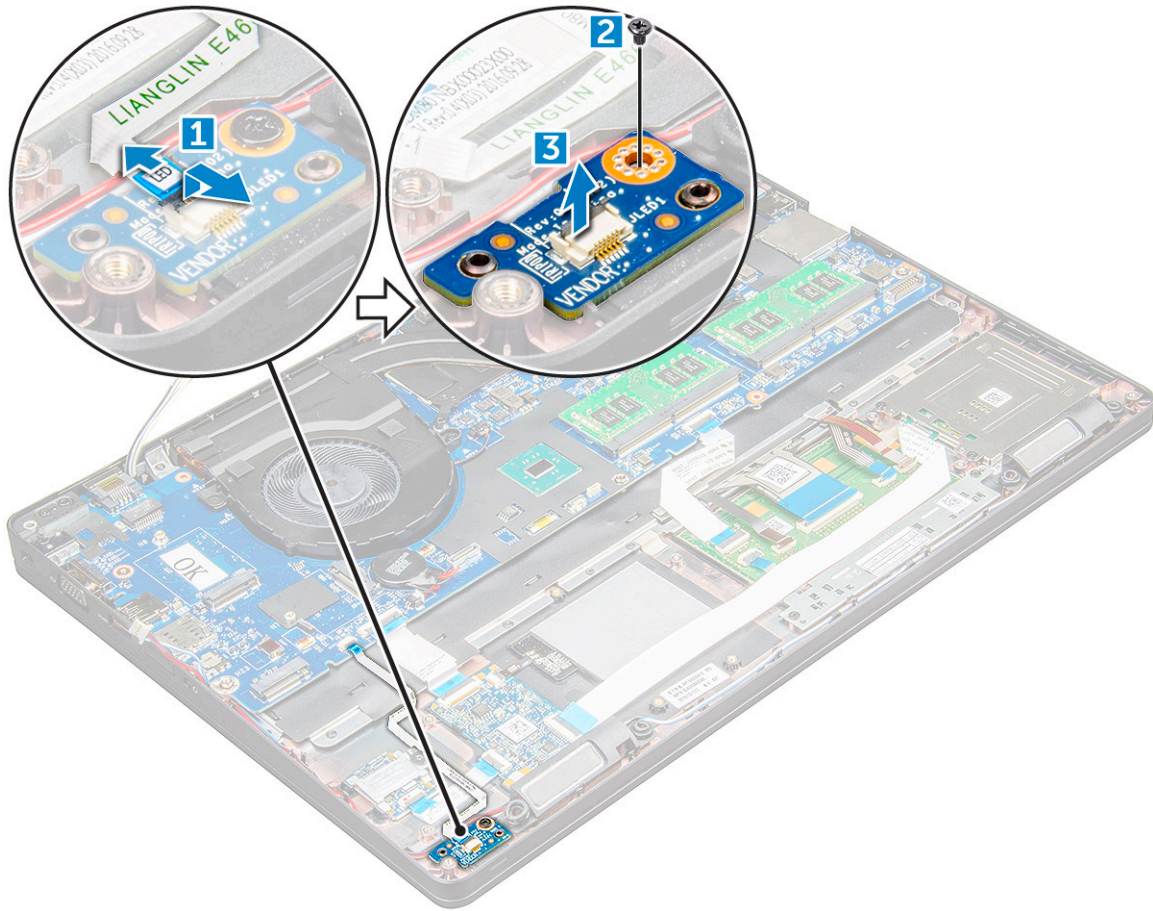
- 1 Place the SmartCard reader on the computer.
- 2 Tighten the M2.0x3.0 screws to secure the SmartCard reader to the computer.
- 3 Affix the SmartCard reader cable and connect the cable to the connector.
- 4 Install the:
 - a chassis frame
 - b SSD card or hard drive
 - c WWAN card
 - d WLAN card
 - e battery
 - f 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 WWAN card
 - e SSD card or hard drive
 - f 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 M2.0x3.0 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 M2.0x3.0 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 or hard drive
 - c WWAN card
 - d WLAN card
 - e battery
 - f 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](#).

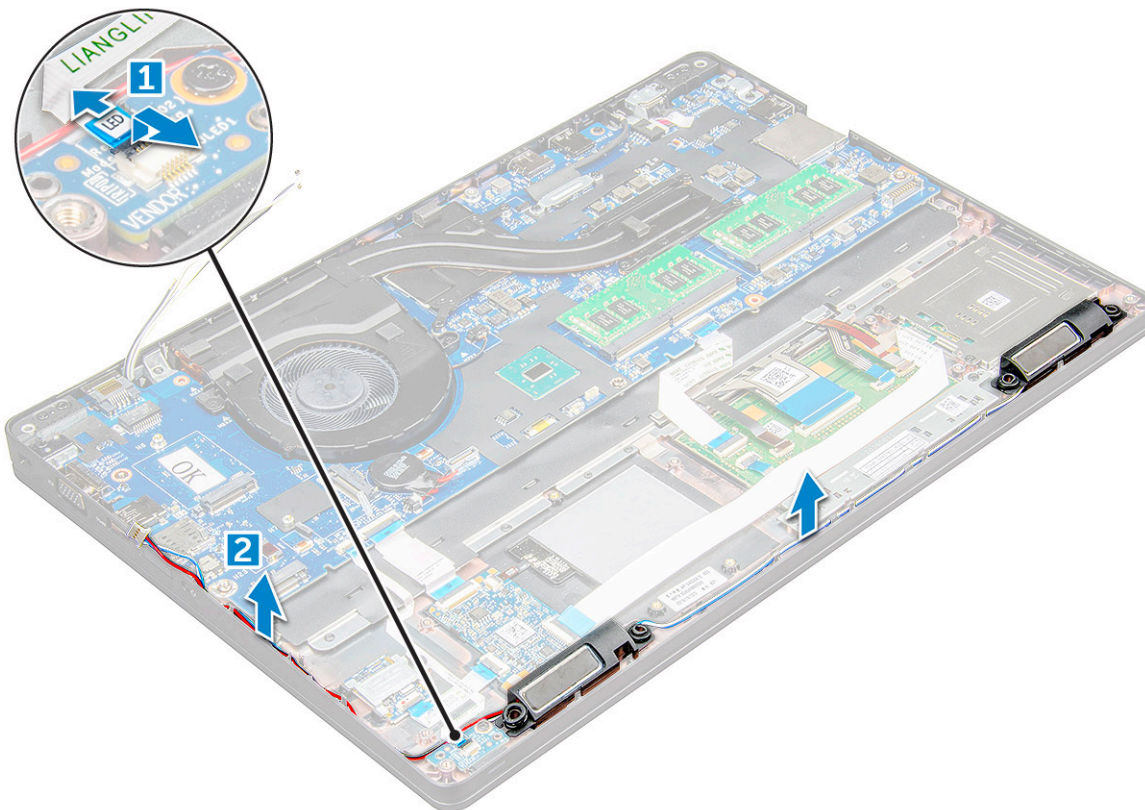
2 Remove the:

- a base cover
- b battery
- c WLAN card
- d WWAN card
- e SSD card or hard drive
- f chassis frame

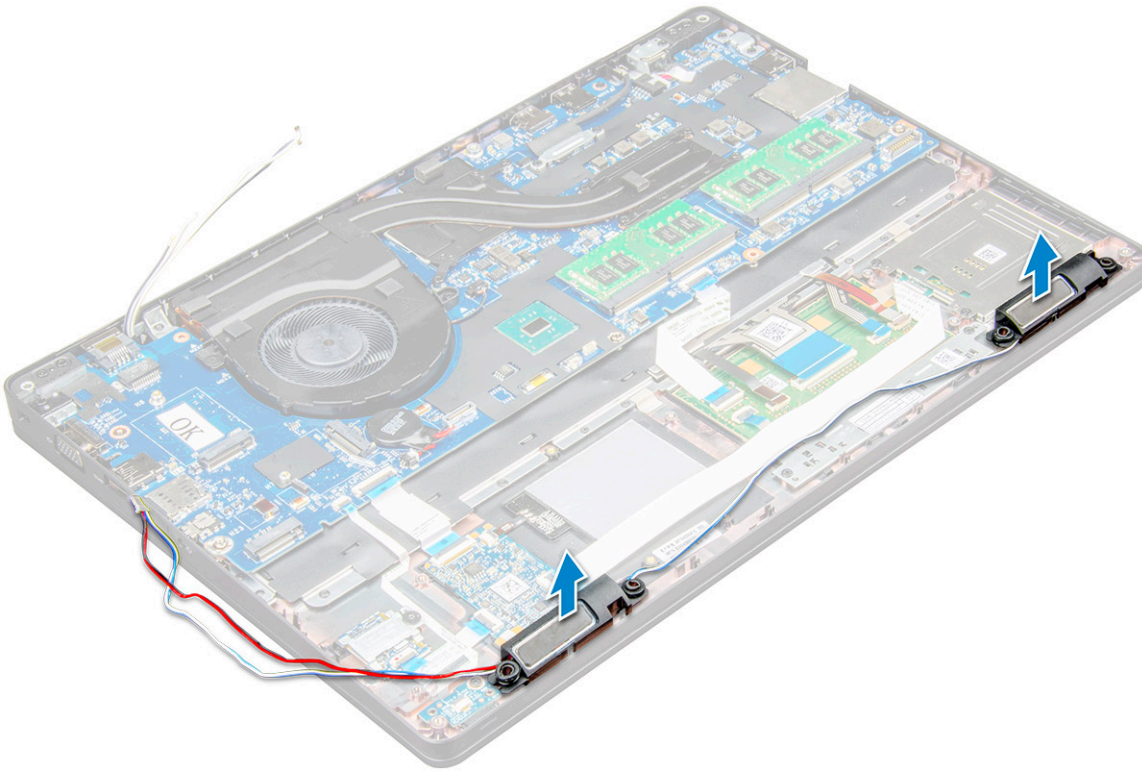
3 To disconnect the cables:

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].



4 Remove the speakers from the computer.



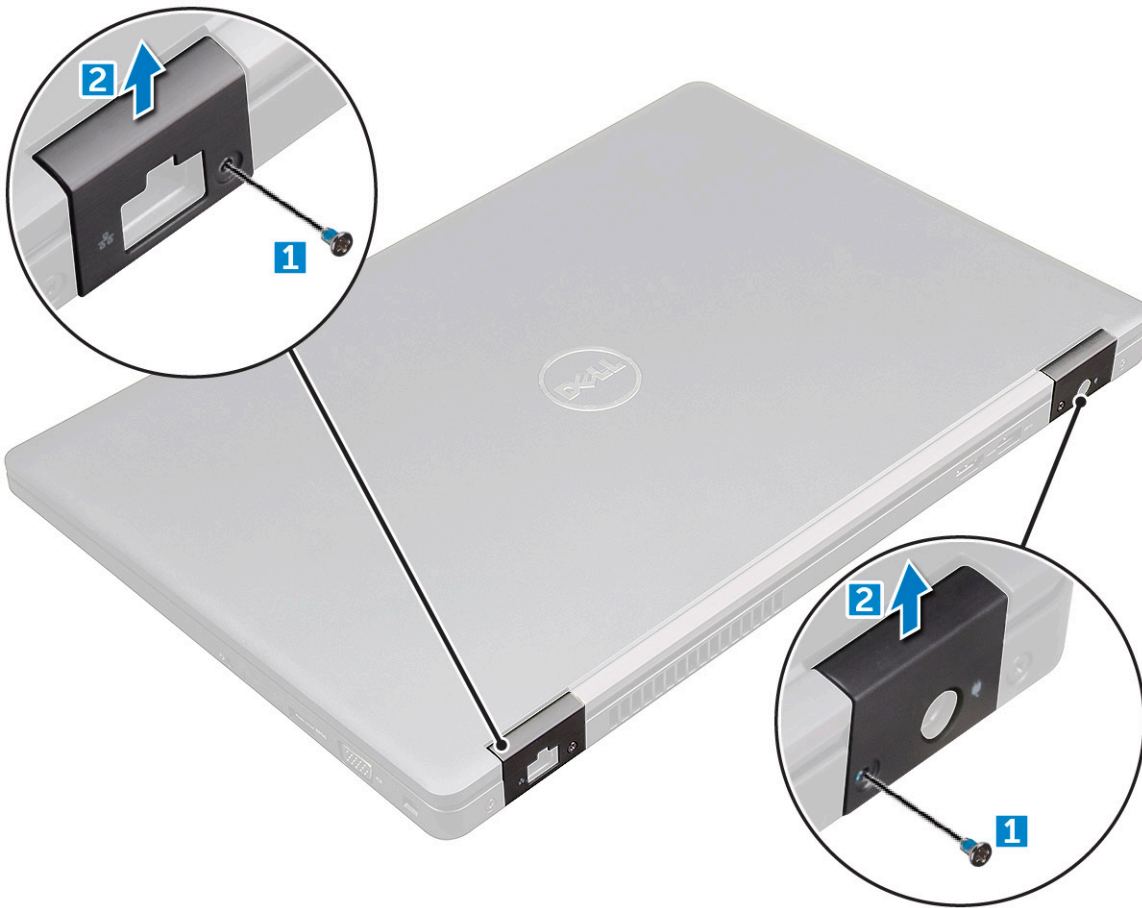
Installing the speaker

- 1 Place the speakers into the slots on the computer.
- 2 Route the speaker cable through the retention clips through routing channel.
- 3 Connect the speaker and LED board cable on the computer.
- 4 Install the:
 - a chassis frame
 - b SSD card or hard drive
 - c WWAN card
 - d WLAN card
 - e battery
 - f 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 M2x3.0 (OD4.5) screws that secure the hinge cap to the computer [1].
 - b Remove the hinge cap from the computer [2].



Installing the hinge cap

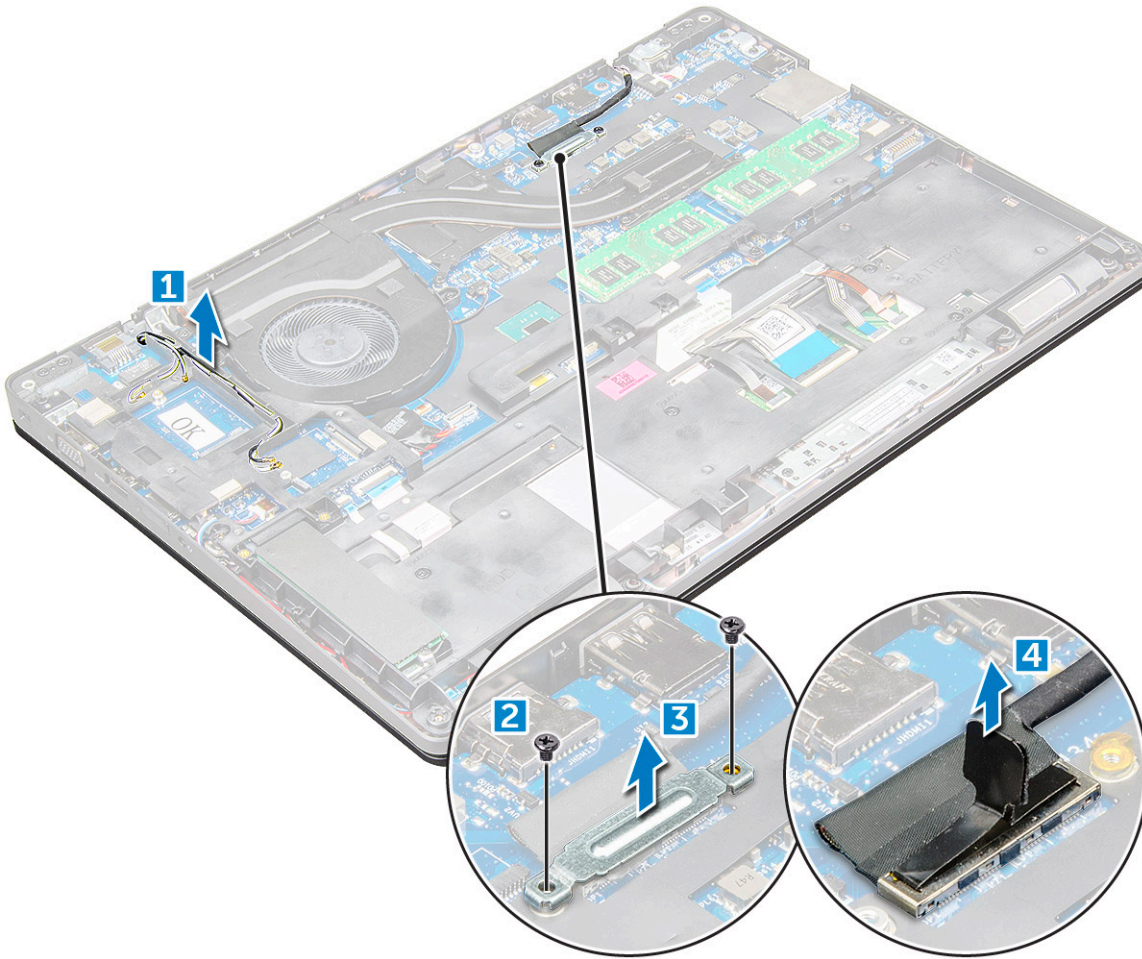
- 1 Place the hinge bracket to align with the screw holders on the computer.
- 2 Tighten the M2x3.0 (OD4.5) screws to secure the display assembly to the computer.
- 3 Install the:
 - a battery
 - b base cover
- 4 Follow the procedure in [After working inside your computer](#).

Display assembly

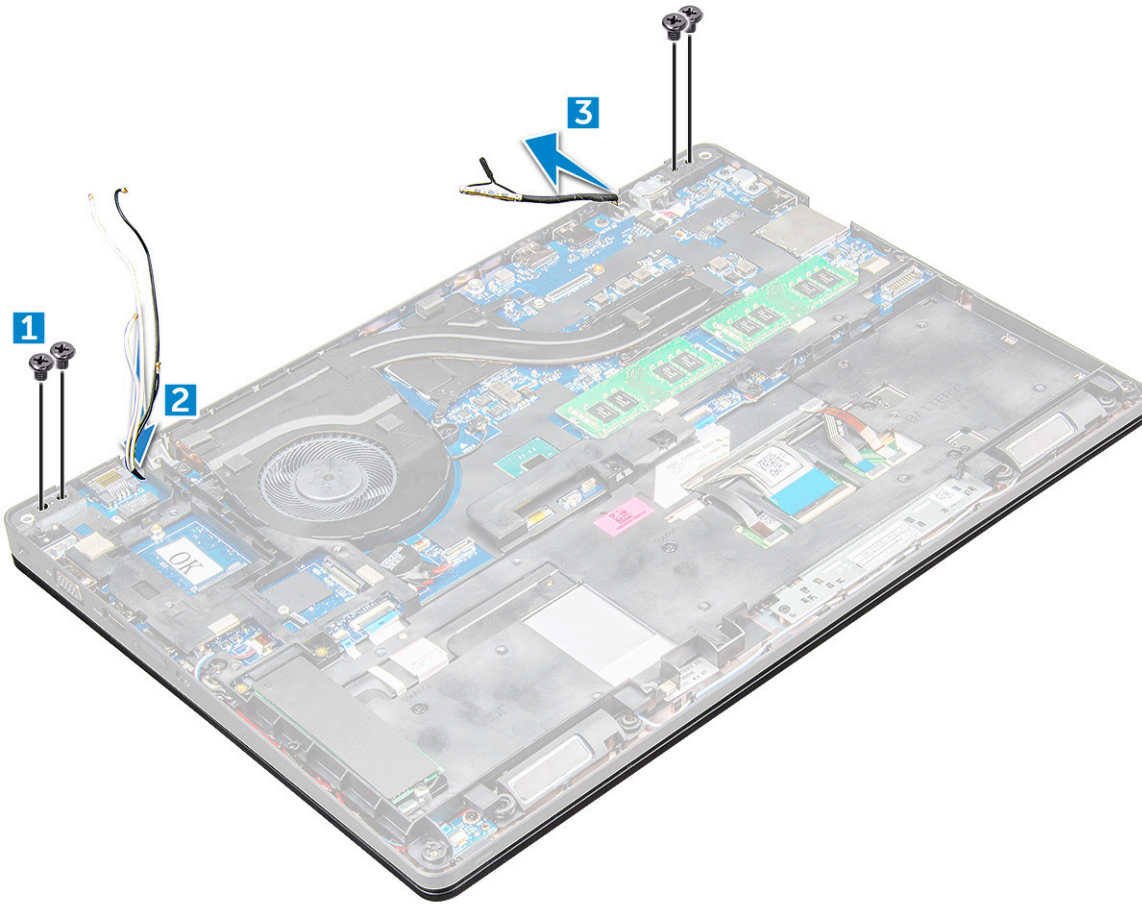
Removing the display assembly

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a base cover
 - b battery
 - c WWAN card
 - d WLAN card
 - e hinge cap
- 3 To disconnect the display cable:
 - a Release the WLAN cable from the routing channels [1].

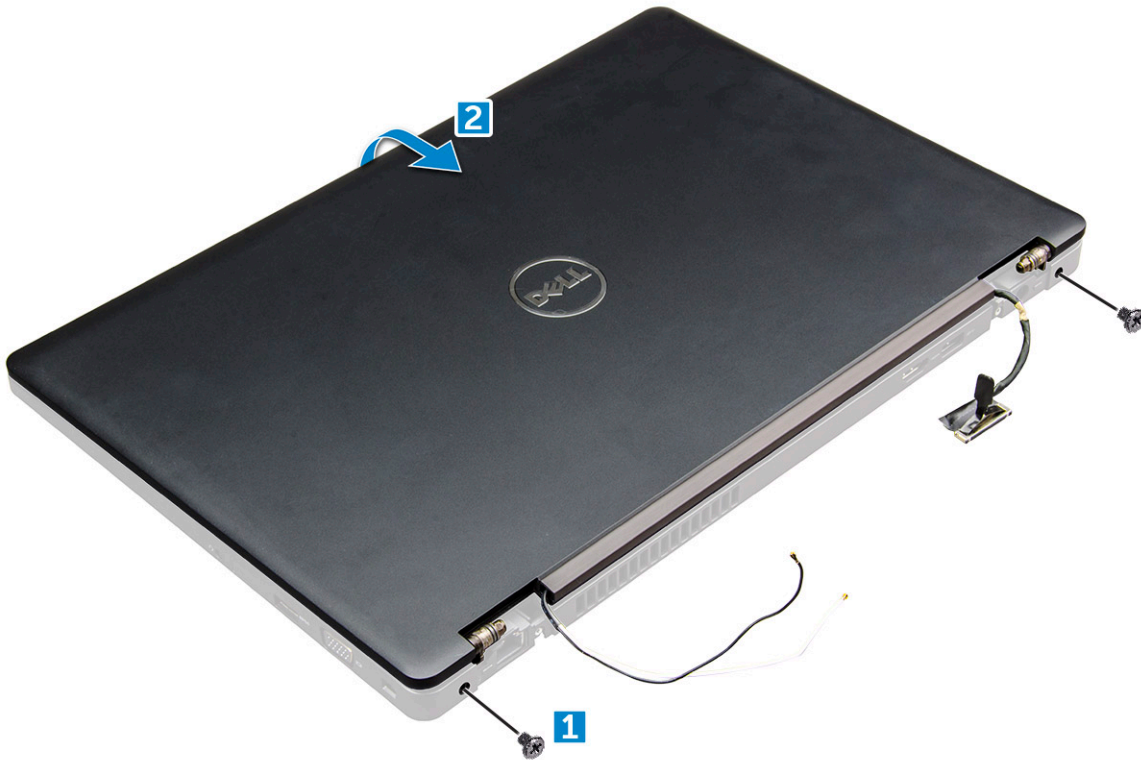
- b Disconnect the eDP cable [2].
- c Remove the screws and lift the metal bracket that secure the display cable on the computer [3, 4].
- d Disconnect the display cable [5].



- 4 To remove hinge screws:
 - a Remove the M2.0x5.0 screws that secure the display assembly [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 M2.0x5.0 screws that secure the display assembly to the computer [1].
 - b Open the display [2].



7 Lift the display assembly away from the computer.



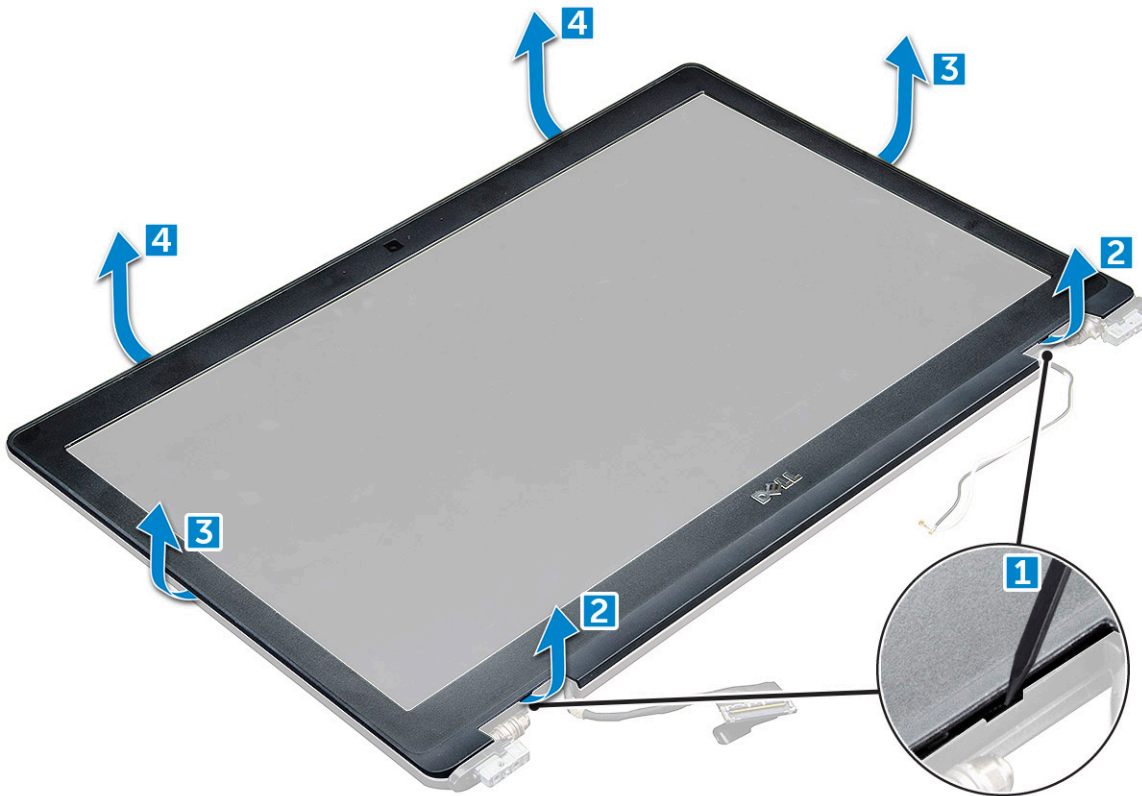
Installing the display assembly

- 1 Place the display assembly to align with the screw holders on the computer.
- 2 Tighten the M2.0x5.0 screws to secure the display assembly to the computer.
- 3 Turn over the computer.
- 4 Route the display cable through the routing channel and route the antenna cables by pushing it through the hole.
- 5 Connect the antenna cables and display cable to the connectors.
- 6 Place the display cable bracket over the connector and tighten the M2.0x5.0 screws to secure the display cable to the computer.
- 7 Install the:
 - a [hinge cap](#)
 - b [WWAN card](#)
 - c [WLAN card](#)
 - d [battery](#)
 - e [base cover](#)
- 8 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

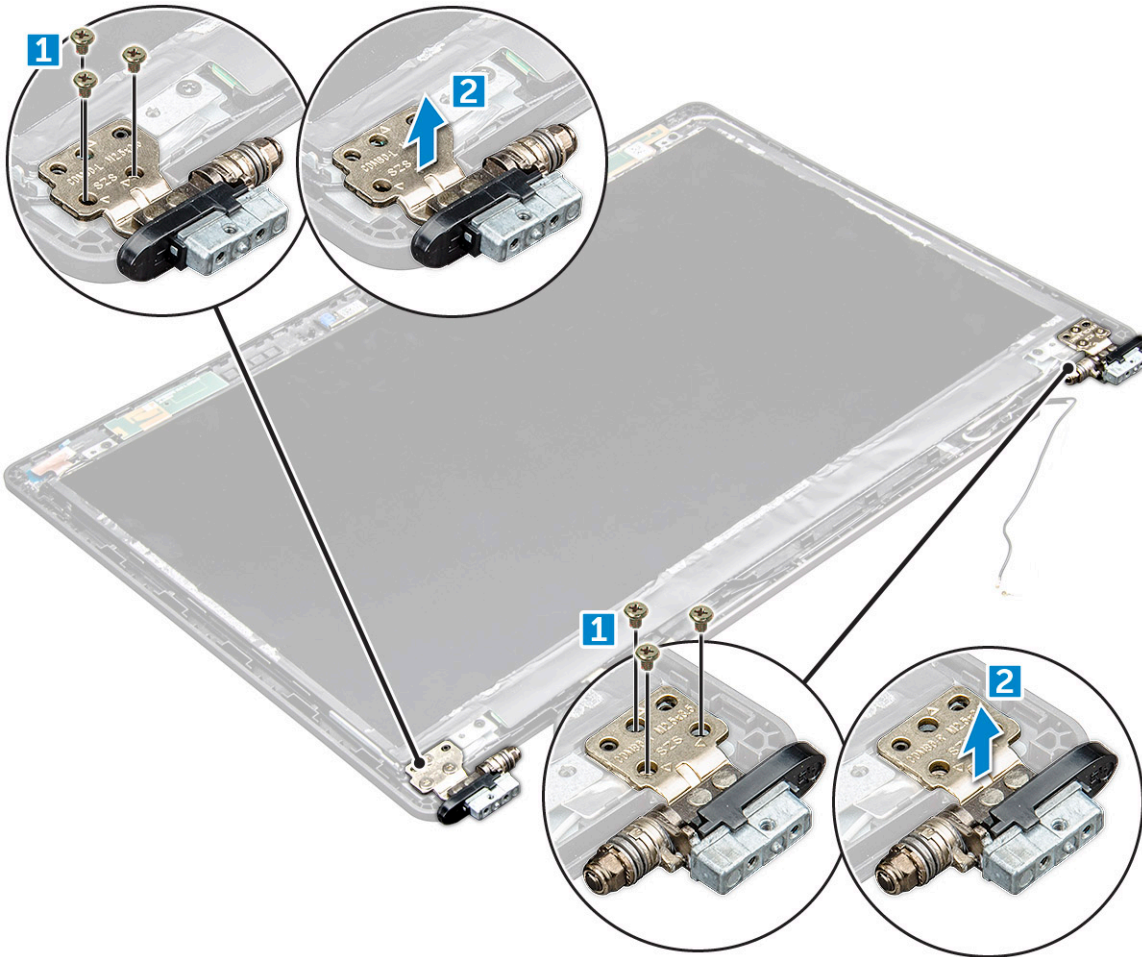
Removing the display hinge

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



- b battery
- c WWAN card
- d WLAN card
- e hinge cap
- f display assembly
- g 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 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:

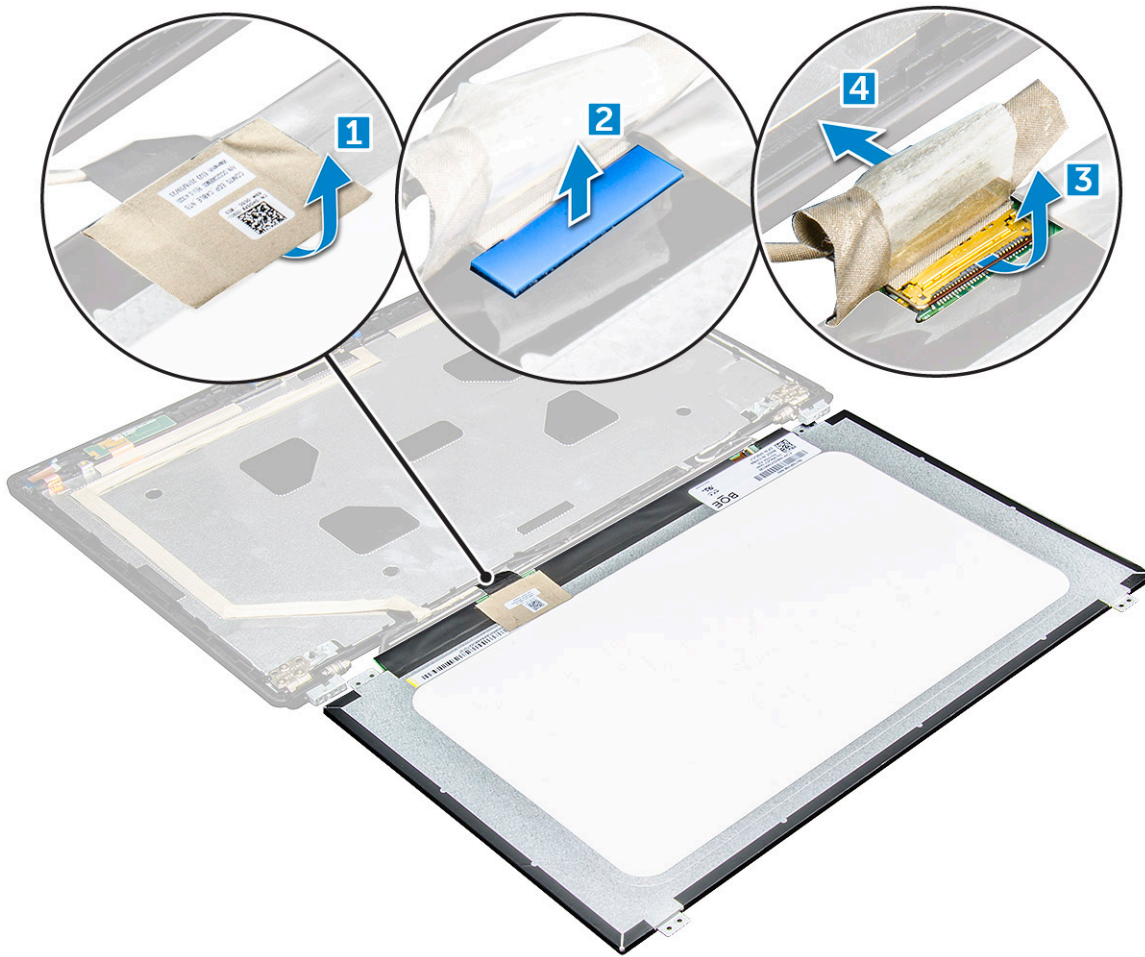
- a base cover
- b battery
- c WWAN card
- d WLAN card
- e hinge cap
- f display assembly
- g display bezel

3 Remove the M2.0x3.0 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 and 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 M2.0x3.0 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 bezel
 - g display panel
- 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

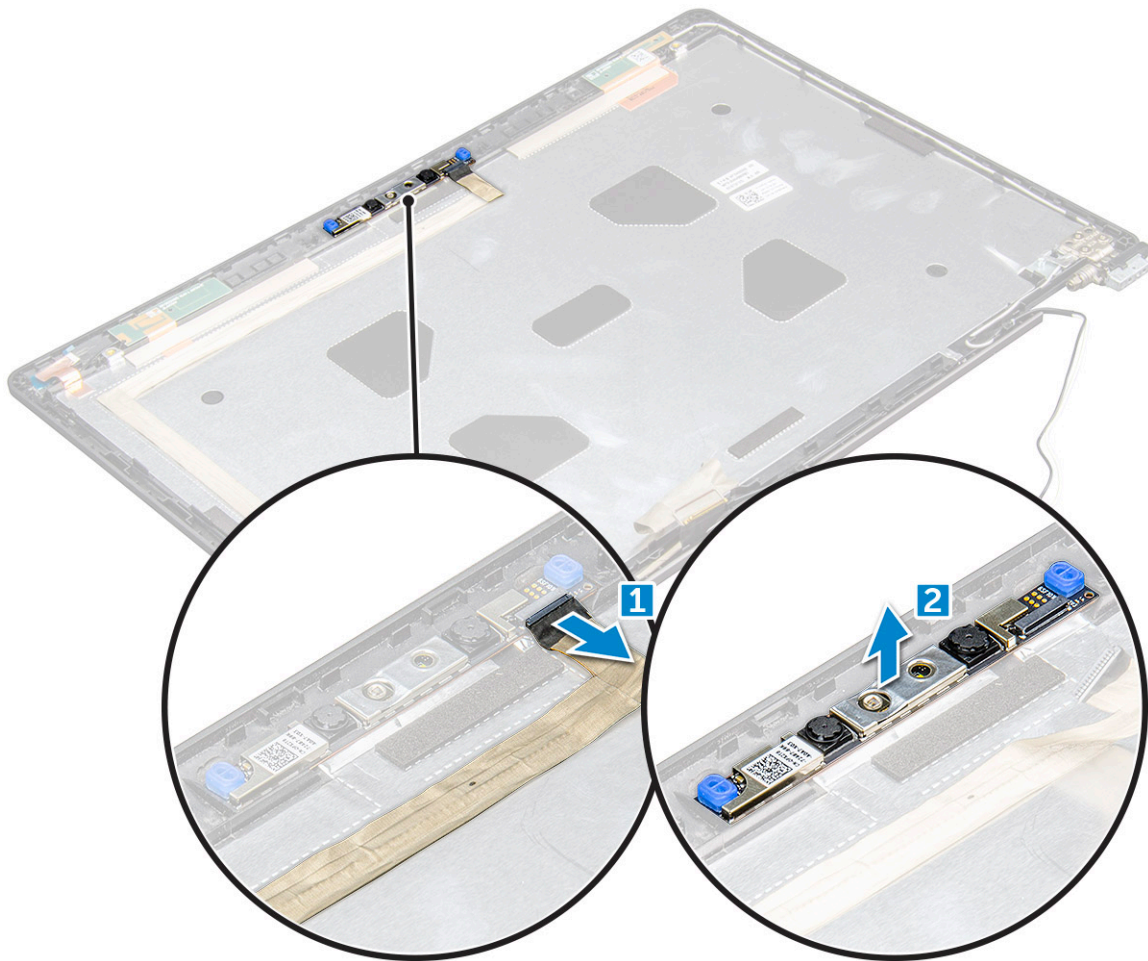


- 3 Follow the procedure in [After working inside your computer](#).

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

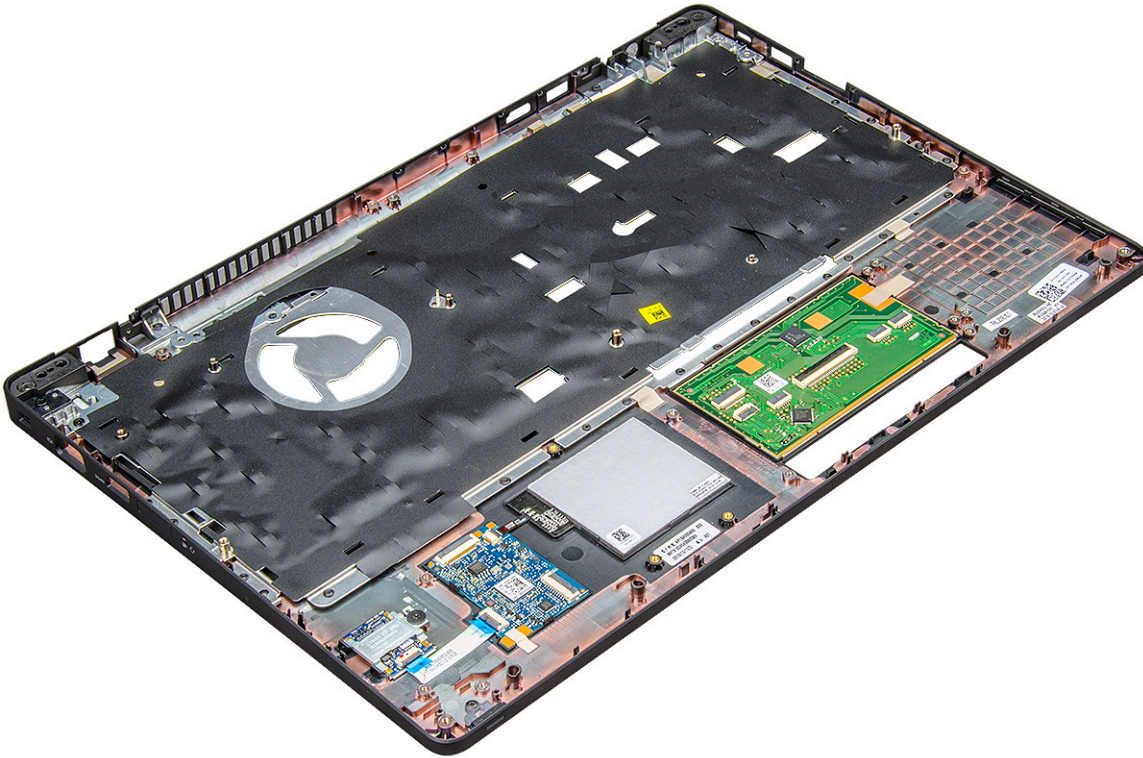
- 1 Place the camera on the display assembly.
- 2 Connect the camera cable to the connector on the display assembly
- 3 Install the:
 - a display panel
 - b display bezel
 - c display assembly
 - d hinge cap
 - e WWAN card
 - f WLAN card
 - g battery
 - h base cover
- 4 Follow the procedure in [After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

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 WWAN card
 - f SSD card or hard drive
 - g memory module
 - h heat sink assembly
 - i coin cell battery
 - j chassis frame
 - k system board
 - l hinge cap
 - m 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 assembly](#)
 - g [memory module](#)
 - h [SSD card or hard drive](#)
 - i [WWAN card](#)
 - j [WLAN card](#)
 - k [keyboard](#)
 - l [battery](#)
 - m [base cover](#)
- 4 Follow the procedure in [After working inside your computer](#).

Technology and components

Power adapter

This laptop is shipped with 7.4mm barrel plug on 130 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 Xeon E3-1505MV6 (8M Cache, 4.0GHz), vPro, Quad Core, 35W
- Intel Core i5-7300HQ (6M Cache, 3.5GHz), Quad Core, 35W
- Intel Core i5-7440HQ (6M Cache, 3.8GHz), vPro, Quad Core, 35W
- Intel Core i7-7700HQ (6M Cache, 3.8GHz), Quad Core, 35W
- Intel Core i7-7820HQ (8M Cache, up to 3.9GHz), vPro, Quad Core, 35W

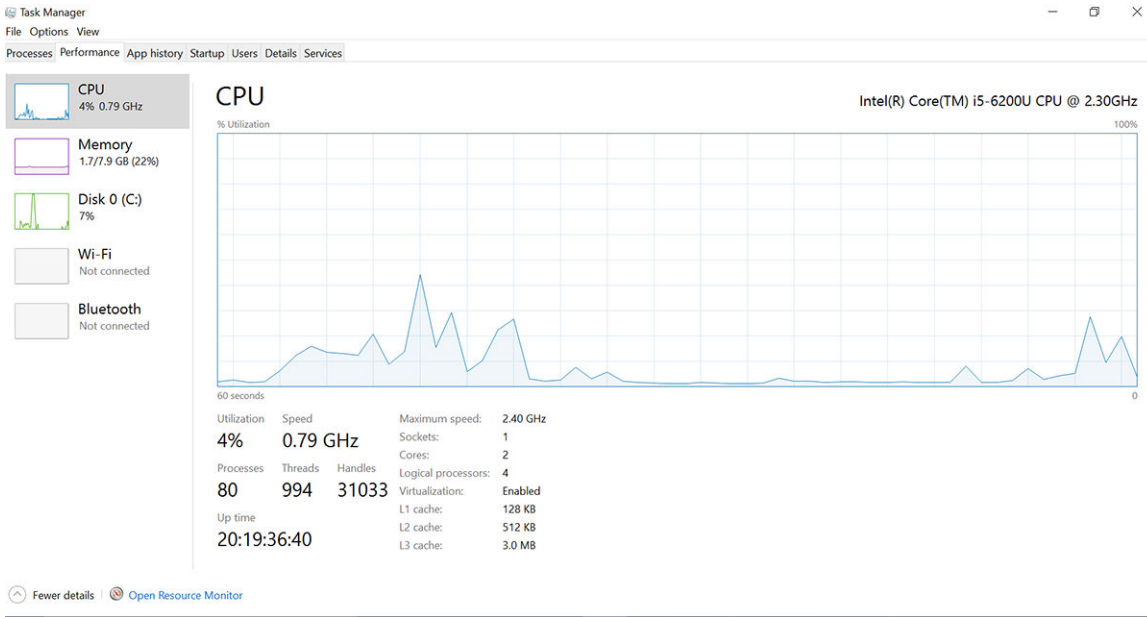
ⓘ NOTE: The clock speed and performance varies depending on the workload and other variables.

Verifying the processor usage in Task Manager

- 1 Right Click on 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.

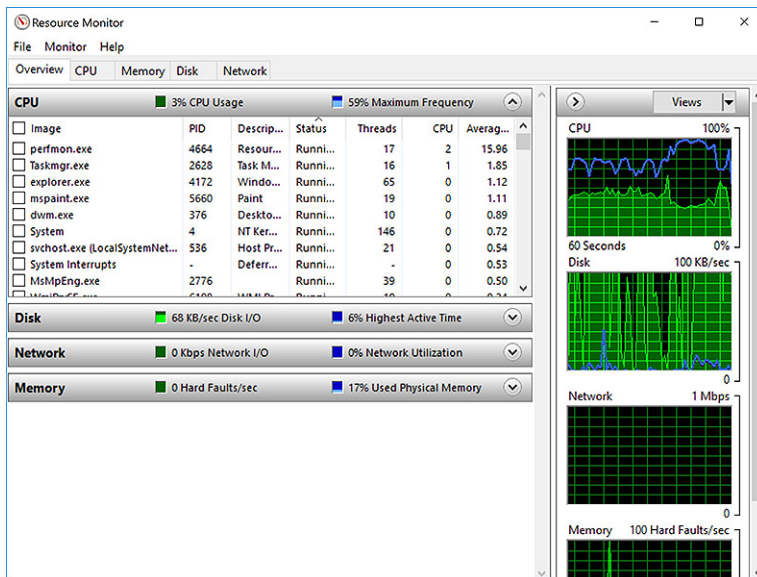


The processor performance details are displayed.



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 .

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.

Graphic options


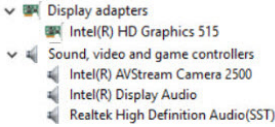
This laptop is shipped with the following graphics chipset options:

- Intel HD Graphics 630
- Intel HD Graphics P630
- NVIDIA Quadro M620 128 Bit

Intel HD Graphics drivers

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

Table 1. 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.

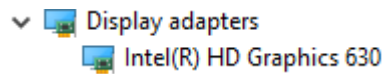
Display options

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

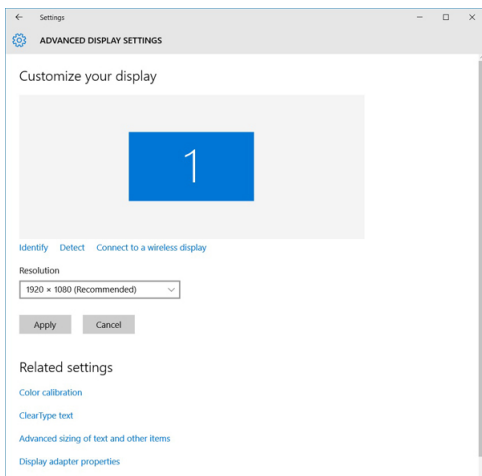
- 1 Start the **Search Charm** and select **Settings**.
- 2 Type `Device Manager` in the search box and tap **Device Manager** from the left pane.
- 3 Expand **Display adapters**.



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 has 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


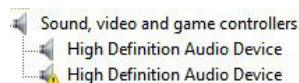
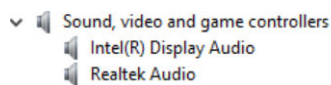
- 1 Swipe from the right edge to access the **Search Charm** and select **All Settings** .
- 2 Type **Device Manager** in the search box and select **Device Manager** from the left pane.
- 3 Expand **Sound, video and game controllers**.
The audio controller is displayed.

Table 2. 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 without Bluetooth or Qualcomm QCA61 with Bluetooth card.

NOTE: Qualcomm xxxxxx (for example :GCA61x4A) is a product of Qualcomm Technologies, Inc

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**.

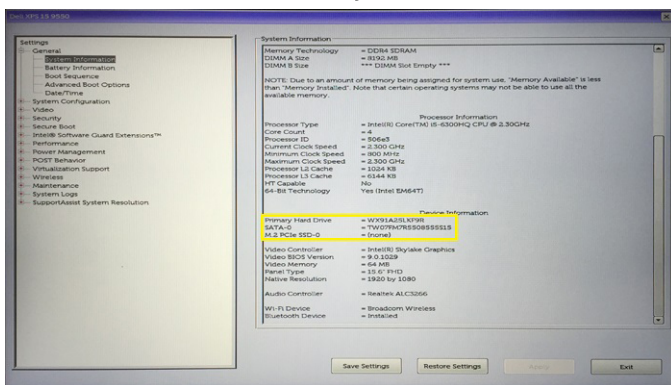


The hard drive is listed under **Disk drives**.

Identifying the hard drive in the BIOS

- 1 Turn on or restart your system.
- 2 When the Dell logo appears, perform the following action 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.

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



Camera features

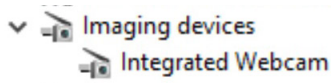
This laptop is shipped with front-facing camera with the image resolution of 1280 x 720 (maximum).

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**.

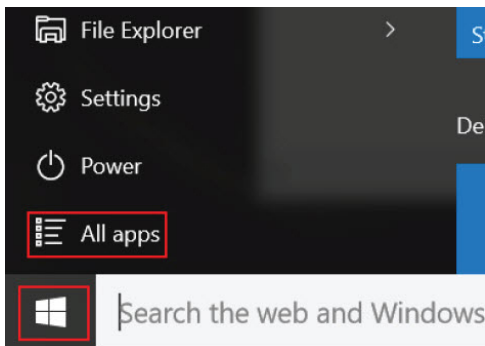


Starting the camera (Windows 7, 8.1 and 10)

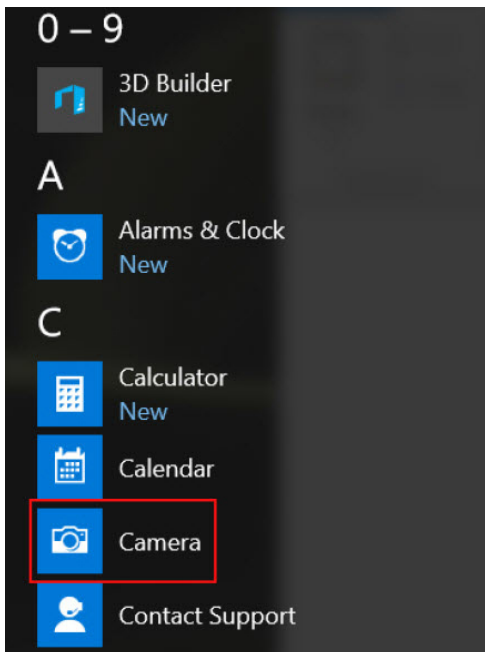
To start the camera, open an application that uses the camera. For instance, if you tap the Skype software that is shipped with the laptop, the camera turns on. Similarly, if you are chatting on the internet and the application requests to access the webcam, the webcam turns on.

Starting the camera application

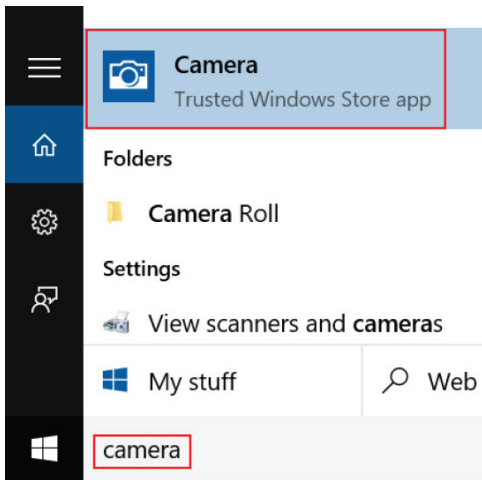
- 1 Tap or click the **Windows** button and select **All apps**.



- 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 2400 MHz (quad core).

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 one of 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.
 - 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.
- 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**.

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.

DDR4

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

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

DDR4 Details

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

Key notch difference

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

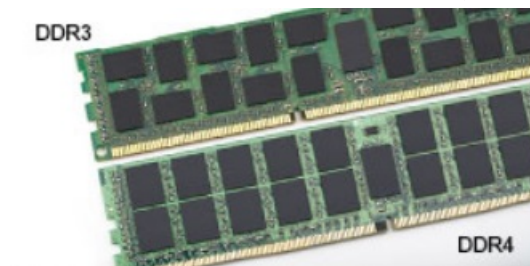


Figure 1. Notch difference

Increased thickness

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

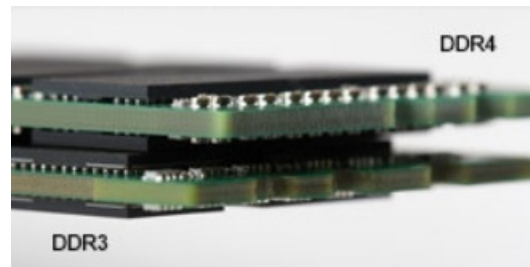


Figure 2. Thickness difference

Curved edge

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



Figure 3. Curved edge














Memory Errors

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

Realtek HD audio drivers

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

Table 3. Realtek HD audio drivers

| Before installation | After installation |
|--|--|
| <ul style="list-style-type: none"> ▼  Audio inputs and outputs <ul style="list-style-type: none">  Microphone (High Definition Audio Device)  Speakers (High Definition Audio Device) ▼  Sound, video and game controllers <ul style="list-style-type: none">  High Definition Audio Device  Intel(R) Display Audio | <ul style="list-style-type: none"> ▼  Audio inputs and outputs <ul style="list-style-type: none">  Microphone Array (Realtek High Definition Audio(SST))  Speakers / Headphones (Realtek High Definition Audio(SST)) ▼  Sound, video and game controllers <ul style="list-style-type: none">  Intel(R) AVStream Camera 2500  Intel(R) Display Audio  Realtek High Definition Audio(SST) |

System setup options

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

Topics:

- [Boot Sequence](#)
- [Navigation keys](#)
- [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 in Windows](#)
- [System and setup password](#)

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)
- 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 |
|------------|--|
| Up arrow | Moves to the previous field. |
| Down arrow | Moves to the next field. |
| Enter | Selects a value in the selected field (if applicable) or follow the link in the field. |
| Spacebar | Expands or collapses a drop-down list, if applicable. |
| Tab | Moves to the next focus area. |

NOTE: For the standard graphics browser only.

Esc 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.

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 |
|---------------------------|--|
| System Information | This section lists the primary hardware features of your computer. <ul style="list-style-type: none">• System Information: Displays BIOS Version, Service Tag, Asset Tag, Ownership Tag, Ownership Date, Manufacture Date, and the Express Service Code.• Memory Information: Displays Memory Installed, Memory Available, Memory Speed, Memory Channels Mode, Memory Technology, DIMM A Size, DIMM B Size, |



| Option | Description |
|--------|---|
| | <ul style="list-style-type: none"> 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. 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. |

Battery Information Displays the battery status and the type of AC adapter connected to the computer.

Boot Sequence Allows you to change the order in which the computer attempts to find an operating system.

- Diskette Drive
- Internal HDD
- USB Storage Device
- CD/DVD/CD-RW Drive
- Onboard NIC

Advanced Boot Options This option allows you the legacy option ROMs to load. By default, the **Enable Legacy Option ROMs** is disabled.

Date/Time Allows you to change the date and time.

System Configuration screen options

| Option | Description |
|-----------------------|--|
| Integrated NIC | Allows you to configure the integrated network controller. The options are: <ul style="list-style-type: none"> • Disabled • Enabled • Enabled w/PXE: This option is enabled by default. |

| | |
|----------------------|---|
| Parallel Port | Allows you to configure the parallel port on the docking station. The options are: <ul style="list-style-type: none"> • Disabled • AT: This option is enabled by default. • PS2 • ECP |
|----------------------|---|

| | |
|--------------------|---|
| Serial Port | Allows you to configure the integrated serial port. The options are: <ul style="list-style-type: none"> • Disabled • COM1: This option is enabled by default. • COM2 • COM3 • COM4 |
|--------------------|---|

| | |
|-----------------------|---|
| SATA Operation | Allows you to configure the internal SATA hard-drive controller. The options are: <ul style="list-style-type: none"> • Disabled • AHCI • RAID On: This option is enabled by default. |
|-----------------------|---|

Drives Allows you to configure the SATA drives on board. All drives are enabled by default. The options are:

| Option | Description |
|---|---|
| | <ul style="list-style-type: none"> · SATA-0 · SATA-2 · SATA-4 · M.2 PCI-e SSD-0 |
| SMART Reporting | <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"> · Enable SMART Reporting |
| USB Configuration | <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"> · Enable USB Boot Support (by default enable) · Enable External USB Port (by default enable) · Enable Thunderbolt Ports (by default enable) · Enable Thunderbolt Boot Support · Always Allow Dell Docks (by default enable) · Enable Thunderbolt (ans PCIe behind TBT) Pre-boot · Security level — No Security · Security level — User Configuration(by default enable) · Security level — Secure connect · Security level — Display Port Only <p>NOTE: USB keyboard and mouse always work in the BIOS setup irrespective of these settings.</p> |
| USB PowerShare | <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> |
| Audio | <p>This field enables or disables the integrated audio controller. By default, the Enable Audio option is selected. The options are:</p> <ul style="list-style-type: none"> · Enable Microphone (by default enable) · Enable Internal Speaker (by default enable) |
| Keyboard Illumination | <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"> · Disabled · Dim · Bright (enabled by default) |
| Keyboard Backlight Timeout on AC | <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> |



| Option | Description |
|--|---|
| Keyboard Backlight Timeout on Battery | <ul style="list-style-type: none"> · 5 seconds · 10 seconds (enabled by default) · 15 seconds · 30 seconds · 1 minute · 5 minutes · 15 minutes · Never <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"> · 5 seconds · 10 seconds (enabled by default) · 15 seconds · 30 seconds · 1 minute · 5 minutes · 15 minutes · Never |
| Keyboard Backlight with AC | <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> |
| Touchscreen | <p>This fields controls whether the touchscreen is enabled or disabled.</p> <ul style="list-style-type: none"> · Touchscreen (enabled by default) |
| Unobtrusive Mode | <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> |
| Miscellaneous Devices | <p>Allows you to enable or disable the following devices:</p> <ul style="list-style-type: none"> · Enable Camera —enabled by default · Enable Hard Drive Free Fall Protection (enabled by default) · Enable Secure Digital (SD) Card (enabled by default) · Secure Digital (SD) Card Boot · Secure Digital (SD) Card Read — only Mode |

Video screen options

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



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



Security screen options

| Option | Description |
|--------------------------------------|---|
| Admin Password | <p>Allows you to set, change, or delete the administrator (admin) password.</p> <p>NOTE: 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>NOTE: Successful password changes take effect immediately.</p> <p>Default setting: Not set</p> |
| System Password | <p>Allows you to set, change or delete the system password.</p> <p>NOTE: Successful password changes take effect immediately.</p> <p>Default setting: Not set</p> |
| M.2 SATA SSD Password | <p>Allows you to set, change, or delete the M.2 SATA SSD password.</p> <p>NOTE: Successful password changes take effect immediately.</p> <p>Default setting: Not set</p> |
| Strong Password | <p>Allows you to enforce the option to always set strong passwords.</p> <p>Default Setting: Enable Strong Password is not selected.</p> <p>NOTE: 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> |
| Password Configuration | <p>Allows you to determine the minimum and maximum length of Administrator and System passwords.</p> |
| Password Bypass | <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">· Disabled· Reboot bypass <p>Default setting: Disabled</p> |
| Password Change | <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: Allow Non-Admin Password Changes is selected.</p> |
| Non-Admin Setup Changes | <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> |
| UEFI Capsule Firmware Updates | <p>Allows you to control whether this system allows BIOS updates via UEFI capsule update packages.</p> <ul style="list-style-type: none">· Enable UEFI Capsule Firmware Updates (enabled by default) |
| TPM 2.0 Security | <p>Allows you to enable the Trusted Platform Module (TPM) during POST. The options are:</p> <ul style="list-style-type: none">· TPM On (enabled by default)· Clear· PPI Bypass for Enabled Commands(enabled by default) |



| | |
|--------------------------------|---|
| Option | <p>Description</p> <ul style="list-style-type: none"> · Attestation Enable (enabled by default) · Key Storage Enable (enabled by default) · PPI Bypass for Disabled Commands · SHA-256 (enabled by default) · Disabled · Enabled <p> NOTE: To upgrade or downgrade TPM1.2/2.0, download the TPM wrapper tool (software).</p> |
| Computrace | <p>Allows you to activate or disable the optional Computrace software. The options are:</p> <ul style="list-style-type: none"> · Deactivate · Disable · Activate <p> NOTE: 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> |
| CPU XD Support | <p>Allows you to enable the Execute Disable mode of the processor.</p> <p>Enable CPU XD Support (default)</p> |
| OROM Keyboard Access | <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"> · Enable · One Time Enable · Disable <p>Default setting: Enable</p> |
| Admin Setup Lockout | <p>Allows you to prevent users from entering Setup when an Administrator password is set.</p> <p>Default Setting: Disabled</p> |
| Master Password Lockout | <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"> · Enable Master Password Lockout (Disabled) |

Secure Boot screen options

| Option | Description |
|------------------------------|---|
| Secure Boot Enable | <p>This option enables or disables the Secure Boot feature.</p> <ul style="list-style-type: none"> · Disabled · Enabled <p>Default setting: Enabled.</p> |
| Expert Key Management | <p>Allows you to manipulate the security key databases only if the system is in Custom Mode. The Enable Custom Mode option is disabled by default. The options are:</p> |



| Option | Description |
|--------|-------------|
|--------|-------------|

- PK
- KEK
- db
- dbx

If you enable the **Custom Mode**, the relevant options for **PK, KEK, db, and dbx** appear. The options are:

- **Save to File**—Saves the key to a user-selected file
- **Replace from File**—Replaces the current key with a key from a user-selected file
- **Append from File**—Adds a key to the current database from a user-selected file
- **Delete**—Deletes the selected key
- **Reset All Keys**—Resets to default setting
- **Delete All Keys**—Deletes all the keys

NOTE: If you disable the Custom Mode, all the changes made will be erased and the keys will restore to default settings.

Intel Software Guard Extensions

| Option | Description |
|--------|-------------|
|--------|-------------|

Intel SGX Enable

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:

- Disabled
- Enabled
- Software Controlled: This option is enabled by default.

Enclave Memory Size

This option sets SGX Enclave Reserve Memory Size. The option are:

- 32 MB
- 64 MB
- 128 MB

Performance screen options

| Option | Description |
|--------|-------------|
|--------|-------------|

Multi Core Support

This field specifies whether the process has one or all cores enabled. The performance of some applications improves with the additional cores.

- All (By default enabled)
- 1
- 2
- 3

Intel SpeedStep

Allows you to enable or disable the Intel SpeedStep feature.

- Enable Intel SpeedStep

Default setting: The option is enabled.



| Option | Description |
|-------------------------|---|
| C-States Control | <p>Allows you to enable or disable the additional processor sleep states.</p> <ul style="list-style-type: none"> · C states <p>Default setting: The option is enabled.</p> |
| Intel TurboBoost | <p>Allows you to enable or disable the Intel TurboBoost mode of the processor.</p> <ul style="list-style-type: none"> · Enable Intel TurboBoost <p>Default setting: The option is enabled.</p> |

Power Management screen options

| Option | Description |
|-------------------------------|---|
| AC Behavior | <p>Allows you to enable or disable the computer from turning on automatically when an AC adapter is connected.</p> <p>Default setting: Wake on AC is not selected.</p> |
| Auto On Time | <p>Allows you to set the time at which the computer must turn on automatically. The options are:</p> <ul style="list-style-type: none"> · Disabled · Every Day · Weekdays · Select Days <p>Default setting: Disabled</p> |
| USB Wake Support | <p>Allows you to enable USB devices to wake the system from Standby.</p> <p>i NOTE: 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"> · Enable USB Wake Support · Wake on Dell USB-C Dock (By default enable) |
| Wireless Radio Control | <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"> · Control WLAN Radio · Control WWAN Radio <p>Default setting: The option is disabled.</p> |
| Wake on LAN/WLAN | <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"> · Disabled · LAN Only · WLAN Only · LAN or WLAN |

| Option | Description |
|--|---|
| Block Sleep | <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> |
| Peak Shift | <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> |
| Advanced Battery Charge Configuration | <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> |
| Primary Battery Charge Configuration | <p>Allows you to select the charging mode for the battery. The options are:</p> <ul style="list-style-type: none"> • Adaptive • Standard — Fully charges your battery at a standard rate. • ExpressCharge — The battery charges over a shorter period of time using Dell's fast charging technology. This option is enabled by default. • Primarily AC use • Custom <p>If Custom Charge is selected, you can also configure Custom Charge Start and Custom Charge Stop.</p> <p>NOTE: All charging mode may not be available for all the batteries. To enable this option, disable the Advanced Battery Charge Configuration option.</p> |
| Sleep Mode | <p>This option is used to select which sleep mode will be used by operating system.</p> <ul style="list-style-type: none"> • OS Automatic Selection • Force S3 (By default enable) |
| Type-C Connector Power | <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"> • 7.5 Watts (By default enable) • 15 Watts |

POST Behavior screen options

| Option | Description |
|--------------------------|---|
| Adapter Warnings | <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> |
| Keypad (Embedded) | <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"> • Fn Key Only: This option is enabled by default. • By Numlock <p>NOTE: When setup is running, this option has no effect. Setup works in Fn Key Only mode.</p> |



| Option | Description |
|--------------------------------|--|
| Mouse/Touchpad | Allows you to define how the system handles mouse and touch pad input. The options are: <ul style="list-style-type: none"> Serial Mouse PS2 Mouse Touchpad/PS-2 Mouse: This option is enabled by default. |
| Numlock Enable | Allows you to enable the Numlock option when the computer boots. Enable Network. This option is enabled by default. |
| Fn Key Emulation | Allows you to set the option where the Scroll Lock key is used to simulate the Fn key feature. Enable Fn Key Emulation (default) |
| Fn Lock Options | 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: <ul style="list-style-type: none"> Fn Lock. This option is selected by default. Lock Mode Disable/Standard Lock Mode Enable/Secondary |
| Fastboot | Allows you to speed up the boot process by bypassing some of the compatibility steps. The options are: <ul style="list-style-type: none"> Minimal Thorough (default) Auto |
| Extended BIOS POST Time | Allows you to create an additional preboot delay. The options are: <ul style="list-style-type: none"> 0 seconds. This option is enabled by default. 5 seconds 10 seconds |
| Full Screen Logo | This option will display full screen logo if your image match screen resolution <ul style="list-style-type: none"> Enable Full Screen Logo |
| Warnings and Error | This option will cause the boot process to only pause when warnings or errors are detected. <ul style="list-style-type: none"> Prompt on Warnings and Errors This option is enabled by default. Continue on Warnings Continue on Warnings and Errors |

 **NOTE:** Error deemed critical to the operation of the system hardware will always halt the system.

Virtualization support screen options

| Option | Description |
|-----------------------|--|
| Virtualization | Allows you to enable or disable the Intel Virtualization Technology. Enable Intel Virtualization Technology: This option is enabled by default. |

| Option | Description |
|--------------------------|--|
| VT for Direct I/O | Enables or disables the Virtual Machine Monitor (VMM) from utilizing the additional hardware capabilities provided by Intel® Virtualization technology for direct I/O. Enable VT for Direct I/O: This option is enabled by default. |
| Trusted Execution | 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. Trusted Execution: This option is enabled by default. |

Wireless screen options

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

Maintenance screen options

| Option | Description |
|-----------------------|---|
| Service Tag | Displays the Service Tag of your computer. |
| Asset Tag | Allows you to create a system asset tag if an asset tag is not already set. This option is not set by default. |
| BIOS Downgrade | This controls flashing of the system firmware to previous revisions. <ul style="list-style-type: none"> · Allows BIOS Downgrade (enabled by default) |
| Data Wipe | This field allows users to erase the data securely from all internal storage devices. The following is list of devices affected: <ul style="list-style-type: none"> · Internal SATA HDD/SSD · Internal M.2 SATA SDD · Internal M.2 PCIe SSD · Internal eMMC |



| Option | Description |
|----------------------|---|
| BIOS Recovery | 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. <ul style="list-style-type: none"> · BIOS Recovery from Hard Drive (enabled by default) · BIOS Auto-Recovery · Always perform Integrity Check |

System Log screen options

| Option | Description |
|-----------------------|---|
| BIOS Events | Allows you to view and clear the System Setup (BIOS) POST events. |
| Thermal Events | Allows you to view and clear the System Setup (Thermal) events. |
| Power Events | Allows you to view and clear the System Setup (Power) events. |

Updating the BIOS in Windows

It is recommended to update your BIOS (System Setup), when you replace the system board or if an update is available. For laptops, ensure that your computer battery is fully charged and connected to a power outlet

NOTE: If BitLocker is enabled, it must be suspended prior to updating the system BIOS, and then re-enabled after the BIOS update is completed.

- 1 Restart the computer.
- 2 Go to **Dell.com/support**.
 - Enter the **Service Tag** or **Express Service Code** and click **Submit**.
 - Click **Detect Product** and follow the instructions on screen.
- 3 If you are unable to detect or find the Service Tag, click **Choose from all products**.
- 4 Choose the **Products** category from the list.

NOTE: Choose the appropriate category to reach the product page
- 5 Select your computer model and the **Product Support** page of your computer appears.
- 6 Click **Get drivers** and click **Drivers and Downloads**.
The Drivers and Downloads section opens.
- 7 Click **Find it myself**.
- 8 Click **BIOS** to view the BIOS versions.
- 9 Identify the latest BIOS file and click **Download**.
- 10 Select your preferred download method in the **Please select your download method below** window, click **Download File**.
The **File Download** window appears.
- 11 Click **Save** to save the file on your computer.
- 12 Click **Run** to install the updated BIOS settings on your computer.
Follow the instructions on the screen.

NOTE: It is recommended not to update the BIOS version for more than three revisions. For example: If you want to update the BIOS from 1.0 to 7.0, then install version 4.0 first and then install version 7.0.

System and setup password

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

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

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

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

NOTE: System and setup password feature is disabled.

Assigning a system password and setup password

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

To enter the system setup, press F2 immediately after a power-on or re-boot.

- In the **System BIOS** or **System Setup** screen, select **Security** and press Enter.
The **Security** screen is displayed.
- Select **System 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.
 - The password can contain the numbers 0 through 9.
 - Only lower case letters are valid, upper case letters are not allowed.
 - Only the following special characters are allowed: space, ("), (+), (.), (-), (.), (/), (:), ([), (\), (]), (`).
- Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.
- Press Esc and a message prompts you to save the changes.
- Press Y to save the changes.
The computer reboots.

Deleting or changing an existing system and or 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 F2 immediately after a power-on or reboot.

- In the **System BIOS** or **System Setup** screen, select **System Security** and press Enter.
The **System Security** screen is displayed.
- In the **System Security** screen, verify that **Password Status** is **Unlocked**.
- Select **System Password**, alter or delete the existing system password and press Enter or Tab.
- Select **Setup Password**, alter or delete the existing setup password and press Enter or Tab.

NOTE: If you change the System and/or Setup password, re-enter the new password when prompted. If you delete the System and/or Setup password, confirm the deletion when prompted.

- Press Esc and a message prompts you to save the changes.
- Press Y to save the changes and exit from System Setup.
The computer reboots.



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](#)
- [Contact smart card specifications](#)
- [Display specifications](#)
- [Keyboard specifications](#)
- [Touchpad specifications](#)
- [Battery specifications](#)
- [AC Adapter specifications](#)
- [Physical specifications](#)
- [Environmental specifications](#)

System specifications

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

Processor specifications

| Feature | Specification |
|-------------|--|
| Types | <ul style="list-style-type: none">• Intel Core i5 series, i7 series (Quad core)• Intel 6th Generation Processors (Available Q2'2016)• Xeon |
| L3 cache | |
| i5 H-series | <ul style="list-style-type: none">• 6 MB |
| i7 H-series | <ul style="list-style-type: none">• non vPro — 6 MB• vPro — 8 MB |
| Xeon | 8 MB |

Memory specifications

| Feature | Specification |
|------------------|-----------------------|
| Memory connector | Two SODIMM slots |
| Memory capacity | 4 GB, 8 GB, and 16 GB |
| Memory type | DDR4 SDRAM |
| Speed | 2400 MHz |
| Minimum memory | 4 GB |
| Maximum memory | 32 GB |

i **NOTE:** Intel Xeon processor supports both Error Correcting Code (ECC) and non-ECC memory as you can build out a system on Dell.com with either of them, the Intel Core processor only supports non-ECC memory as you can only build out a system with non-ECC memory.

Storage specifications

| Feature | Specification |
|---------------------|---------------|
| SSD M.2 SATA / PCIe | Up to 1 TB |
| HDD | Up to 2 TB |

Audio specifications

| Feature | Specification |
|------------|-----------------------|
| Types | High-definition audio |
| Controller | Realtek ALC3246 |



| Feature | Specification |
|----------------------------|--|
| 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 | Intel HD Graphics 630 (quad core) Nvidia QuadroM620 Intel HD Graphics P630 (Xeon) |
| Data bus | Integrated video |
| External display support | <ul style="list-style-type: none"> 19-pin HDMI connector 15-pin VGA connector DisplayPort over Type-C connector |

Camera specifications

| Feature | Specification |
|--------------------------------------|-------------------|
| Camera resolution | 0.92 megapixels |
| HD Panel Resolution | 1280 x 720 pixels |
| FHD Panel Resolution | 1280 x 720 pixels |
| HD Panel Video Resolution (maximum) | 1280 x 720 pixels |
| FHD Panel Video Resolution (maximum) | 1280 x 720 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">Internal wireless local area network (WLAN)Internal Wireless wide area network (WWAN) |

Port and connector specifications

| Feature | Specification |
|-----------------------|---|
| Audio | Stereo headset / mic combo |
| Video | <ul style="list-style-type: none">One 19-pin HDMI connector15 pin VGA connector |
| Network adapter | One RJ-45 connector |
| USB | Three USB 3.1 Gen1 ports, with one PowerShare |
| Memory card reader | Up to SD4.0 |
| Micro SIM (uSIM) card | One external (optional) |
| USB port | It has one option: <ul style="list-style-type: none">One DisplayPort over USB type C, optional Thunderbolt 3 cable docking port |

Contactless smart card specifications

| Feature | Specification |
|------------------------------------|---------------|
| Supported Smart Cards/Technologies | BTO with USH |

Contact smart card specifications

| Feature | Specification |
|------------------------------------|--|
| Supported Smart Cards/Technologies | Dual Pointing, Backlit/non-backlit, Display Port Over Type C, Optional Thunderbolt 3 |

Display specifications

| Feature | Specification |
|---------|--|
| Type | <ul style="list-style-type: none">Non-touch HDNon-touch FHD |



| Feature | Specification |
|-------------------------------------|---|
| | <ul style="list-style-type: none"> · Touch FHD with OTP lite - The OTP Lite provides better clarity than traditional LED displays. OTP Lite also reduces the number of display layers and improves multi touch functionality. |
| Height | 360 mm (14.17 inches) |
| Width | 224.3 mm (8.83 inches) |
| Diagonal | 396.24 mm (15.6 inches) |
| Active area (X/Y) | 344.23 mm x 193.54 mm |
| Actual screen size | 15.6 inches |
| Touch FHD anti-glare: | |
| Maximum resolution | 1920 x 1080 |
| Maximum brightness | 300 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) |
| HD anti-glare: | |
| Maximum resolution | 1366 x 768 |
| 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) |

Keyboard specifications

| Feature | Specification |
|----------------|--|
| Number of keys | <ul style="list-style-type: none"> · United States: 106 keys · United Kingdom: 104 keys · Japan: 107 keys · Brazil: 106 keys |

Touchpad specifications

| Feature | Specification |
|--------------|---------------|
| Active Area: | |
| X-axis | 99.50 mm |



| Feature | Specification |
|---------|---------------|
| Y-axis | 53.00 mm |

Battery specifications

| Feature | Specification |
|---------|---------------|
|---------|---------------|

| | |
|------|----------------|
| Type | 68Whr 92Whr |
|------|----------------|

68 Whr :

| | |
|---------|-------------------------|
| Depth | 233.00 mm (9.17 inches) |
| Height | 7.5 mm (0.28 inch) |
| Width | 95.90 mm (3.78 inches) |
| Weight | 340 g (0.74 lb) |
| Voltage | 7.6 V DC |

92Whr :

| | |
|-----------|---------------------------------|
| Depth | 332.00 mm (13.07 inches) |
| Height | 7.7 mm (0.303 inches) |
| Width | 96.0 mm (3.78 inches) |
| Weight | 450.00 g (0.99 lb) |
| Voltage | 11.4 V DC |
| Life span | 300 discharge per charge cycles |

Temperature range

| | |
|-----------|--|
| Operating | <ul style="list-style-type: none"> Charge: 0°C to 50°C (32°F to 158°F) Discharge: 0°C to 70°C (32°F to 122°F) Operating: 0°C to 35°C (32°F to 95°F) |
|-----------|--|

| | |
|---------------|---------------------------------|
| Non-operating | - 20°C to 65°C (- 4°F to 149°F) |
|---------------|---------------------------------|

| | |
|-------------------|------------------------------|
| Coin cell battery | 3 V CR2032 lithium coin cell |
|-------------------|------------------------------|

AC Adapter specifications

| Feature | Specification |
|---------|---------------|
|---------|---------------|

| | |
|-------------------------|----------------------|
| Type | 130 W |
| Input voltage | 100 V AC to 240 V AC |
| Input current (maximum) | 2.5 A |
| Input frequency | 50 Hz to 60 Hz |
| Output current | 6.7 A |



| Feature | Specification |
|-----------------------------------|--------------------------------|
| 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) |
| Barrel size | 7.4mm |

Physical specifications

| Feature | Specification |
|-----------------|---------------------------|
| Front height | · 24.3 mm (0.95 inch) |
| Back height | · 24.3 mm (0.95 inch) |
| Width | · 376.0 mm (14.8 inches) |
| Depth | · 250.65 mm (9.86 inches) |
| Starting weight | · 4.81 lbs (2.18 kg) |

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](#)
- [LAN status LED](#)
- [Battery status lights](#)

Enhanced Pre-Boot System Assessment (ePSA) diagnostics

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

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

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

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

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 4. 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. |
|  | 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 5. 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:

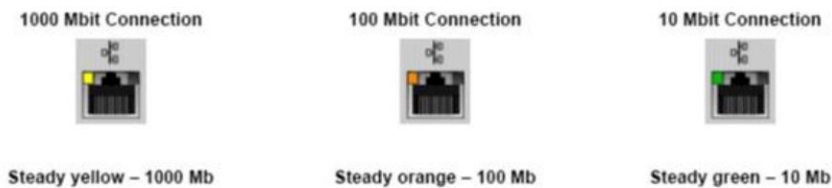
- 1 First Group: The LED blinks 1 to 9 times followed by a brief pause with LED off at the interval of 1.5 seconds.(This is in Amber color)
- 2 Second Group: The LED blinks 1 to 9 times, that would be then followed by a longer pause before the next cycle starts again at the interval of 1.5 seconds.(This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

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 6. 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 |

Battery status lights

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

- Alternately blinking amber light and white light** An unauthenticated or unsupported non-Dell AC adapter is attached to your laptop.
- Alternately blinking amber light with steady white light** Temporary battery failure with AC adapter present.



| | |
|--|--|
| Constantly blinking amber light | Fatal battery failure with AC adapter present. |
| Light off | Battery in full charge mode with AC adapter present. |
| White light on | Battery in charge mode with AC adapter present. |



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.

