

Dell Vostro 5471

Owners's Manual



Notes, cautions, and warnings

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

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

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

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Working on your computer

Topics:

- Safety instructions
- Turning off your computer — Windows 10
- Before working inside your computer
- After working inside your computer

Safety instructions

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

- You have read the safety information that shipped with your computer.
- A component can be replaced or, if purchased separately, installed by performing the removal procedure in 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 at the same time as touching a connector on the back of the computer.

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

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

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

Turning off your computer — Windows 10

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

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



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

Before working inside your computer

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

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

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

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

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

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

After working inside your computer

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

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

- 1 Connect any external devices, such as a port replicator or media base, and replace any cards, such as an ExpressCard.
- 2 Connect any telephone or network cables to your computer.

CAUTION: To connect a network cable, first plug the cable into the network device and then plug it into the computer.

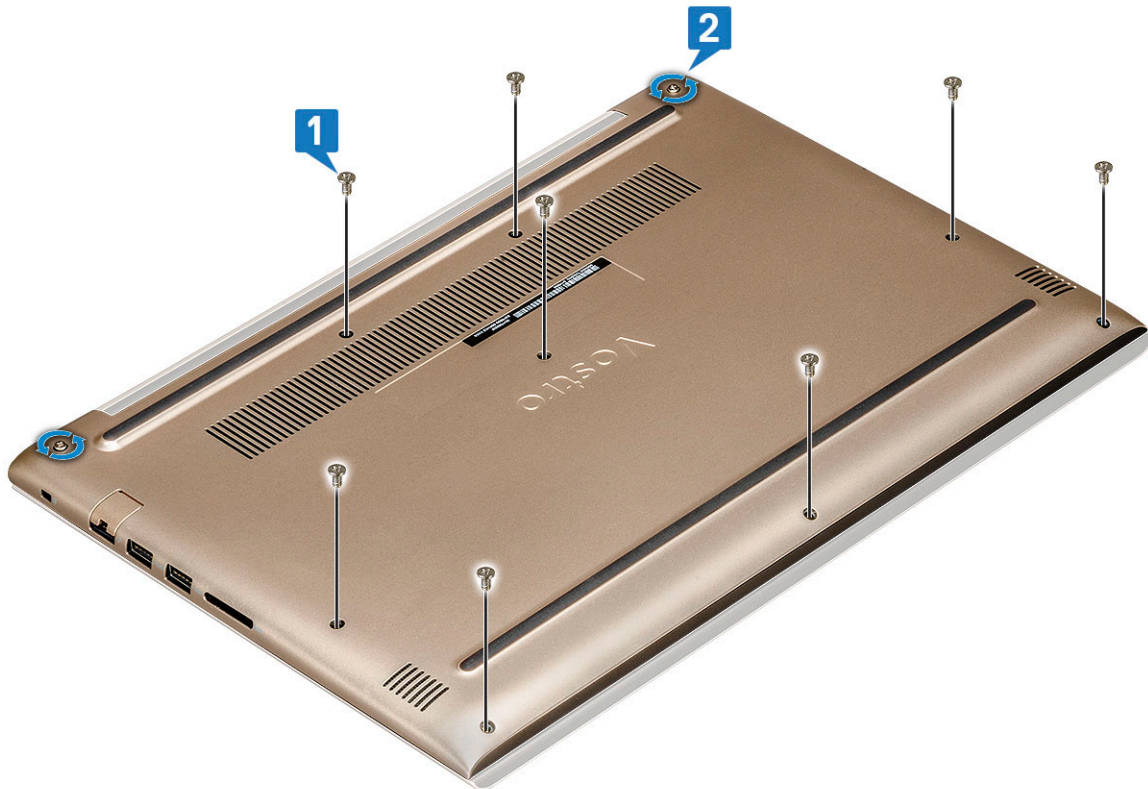
- 3 Connect your computer and all attached devices to their electrical outlets.
- 4 Turn on your computer.

Removing and installing components

Base cover

Removing the base cover

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 To remove the base cover:
 - a Remove the eight M2.5 x 6 screws [1].
 - b Loosen the two M2.5 x 6 screws [2].



- c Pry the base cover from the edge [1].

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

- d Lift the base cover away from the system [2].



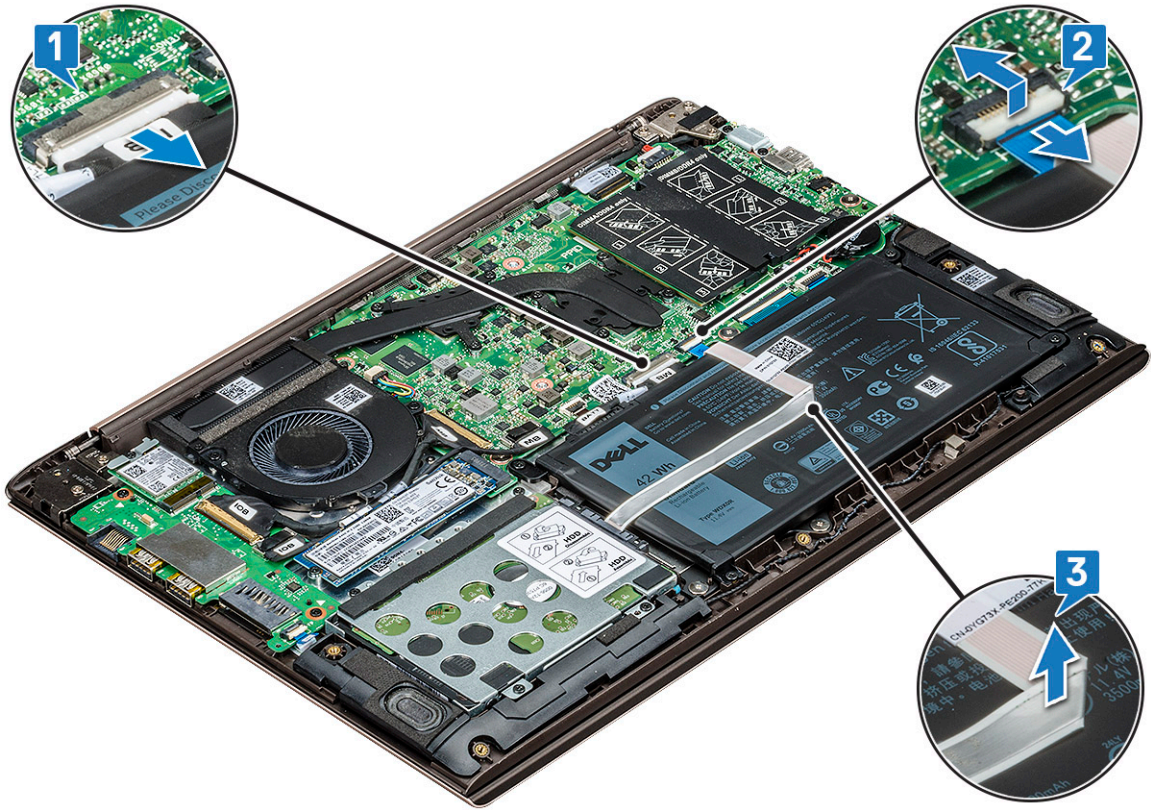
Installing the base cover

- 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 two M2.5 x 6 screws.
- 4 Replace the eight M2.5 x 6 screws to secure the base cover to the computer.
- 5 Follow the procedure in [After working inside your computer](#).

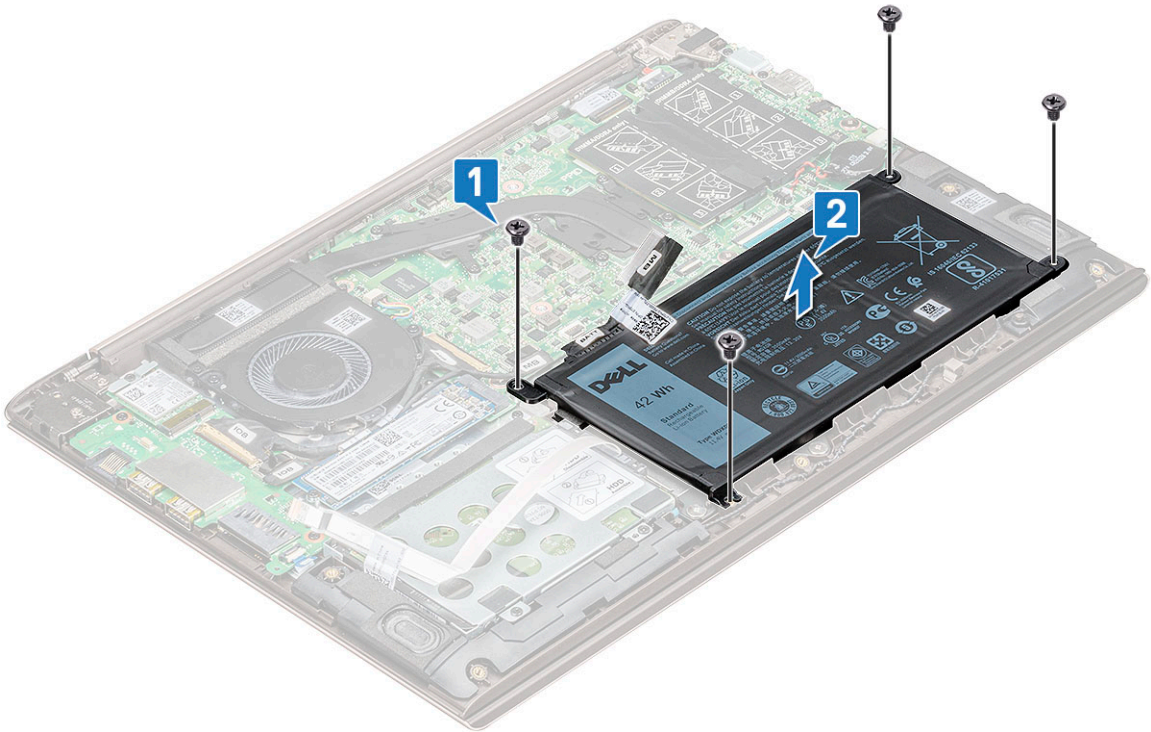
Battery

Removing the battery

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the [base cover](#).
- 3 To remove the battery:
 - a Disconnect the battery cable [1] from the connector on the system board.
 - b Lift the latch and disconnect the hard disk drive cable [2] from the connector on the system board.
 - c Peel the hard disk drive cable from the battery [3].



- d Remove the four M2.0 x 3 screws [1].
- e Lift the battery away from the system [2].



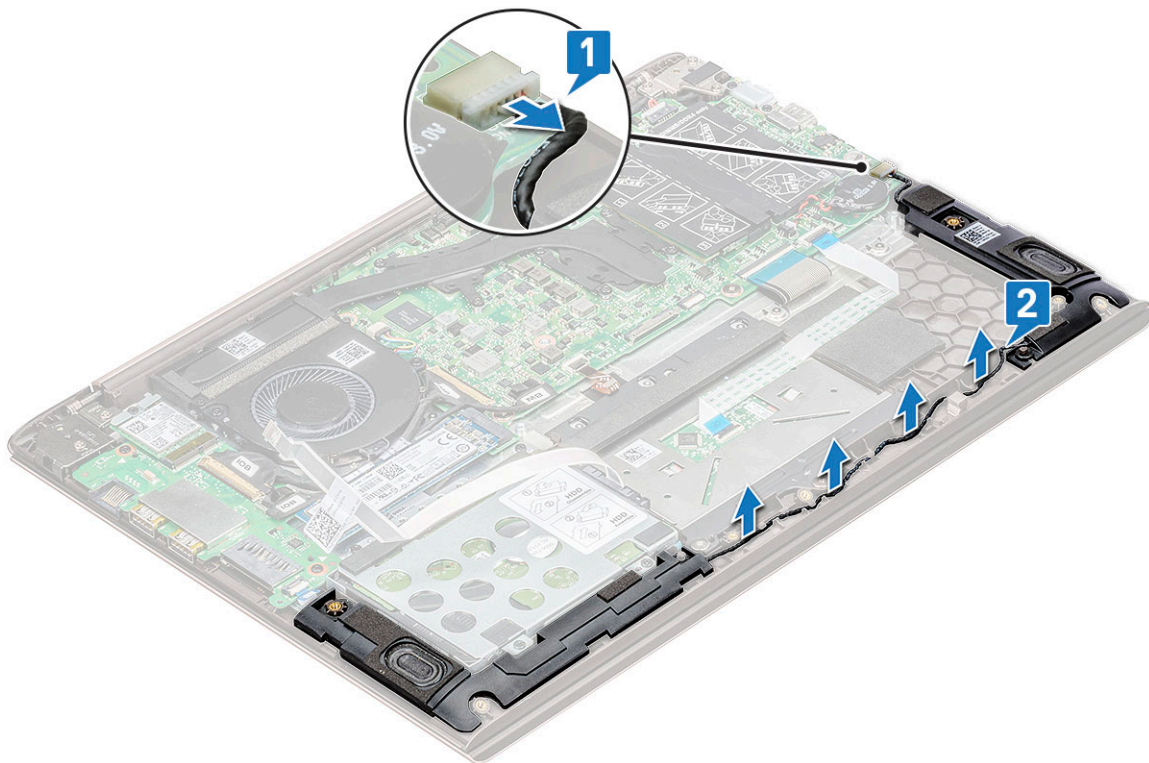
Installing the battery

- 1 Insert the battery into the slot on the computer.
- 2 Connect the battery cable to the connector on the system board.
- 3 Connect the hard disk drive cable to the connector on the system board and close the latch.
- 4 Replace the four M2.0 x 3 screws to secure the battery to the system.
- 5 Install the [base cover](#).
- 6 Follow the procedure in [After working inside your computer](#).

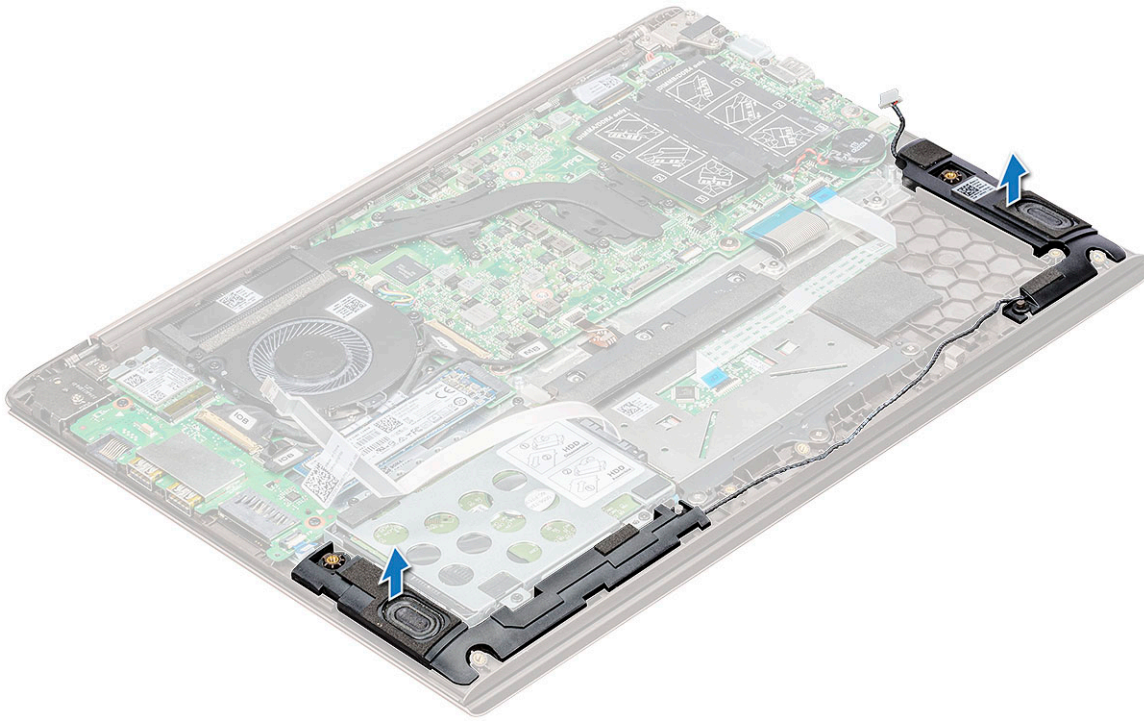
Speaker

Removing the speaker

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [battery](#)
- 3 To remove the speaker:
 - a Disconnect the speaker cable [1].
 - b Unroute the cable from routing channel [2].



- 4 Lift the speakers, along with the speaker cable, and remove it away from the back cover.



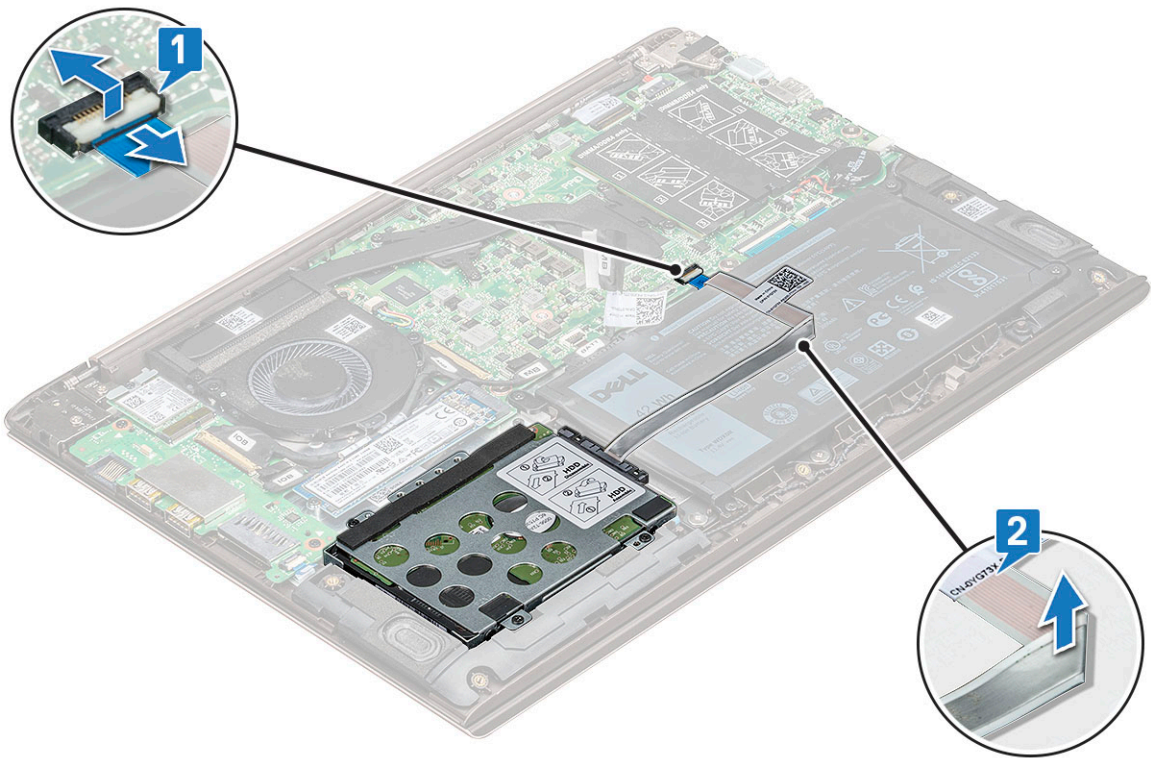
Installing the speaker

- 1 Align the speakers along the slots on the system.
- 2 Route the speaker cable through the routing tabs on the system.
- 3 Connect the speaker cable to the system board.
- 4 Install the:
 - a [battery](#)
 - b [base cover](#)
- 5 Follow the procedure in [After working inside your computer](#).

Hard drive

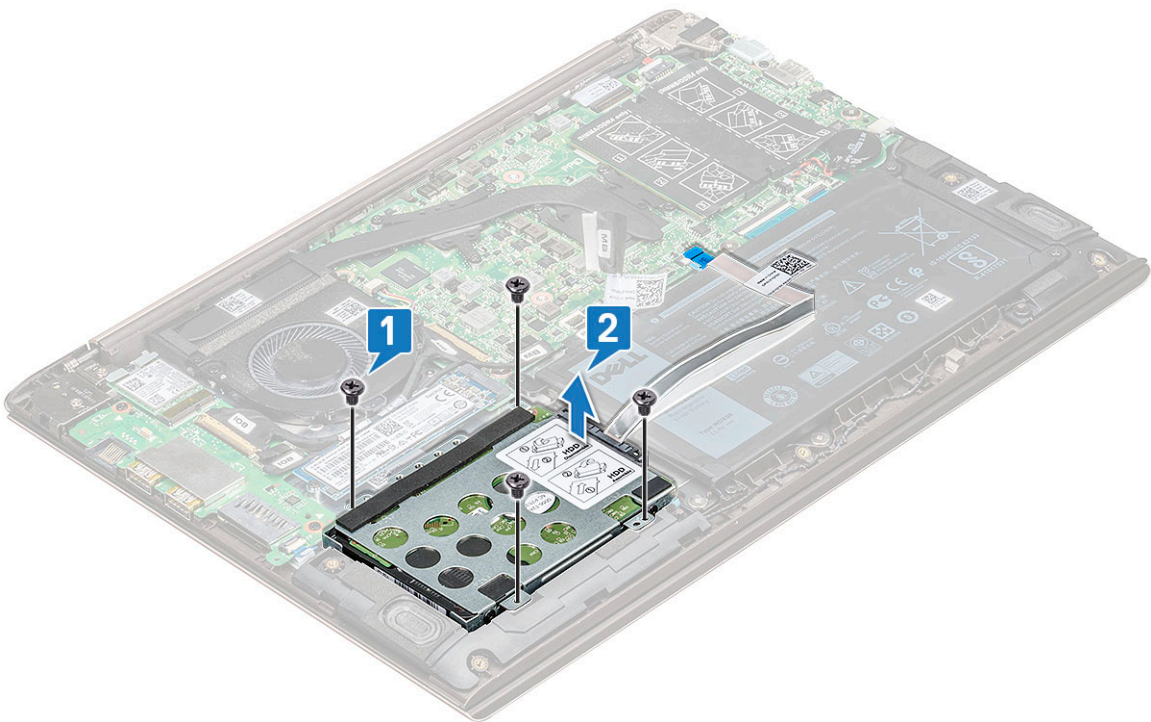
Removing the hard drive

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [battery](#)
- 3 To disconnect the cable:
 - a Lift the latch, and disconnect the hard drive cable from the system [1].
 - b Pry the hard drive cable to release the adhesive from the battery [2].



4 To remove the hard drive:

- a Remove the four M2.0 x 3 screws that secure the hard drive to the system [1].
- b Lift the hard drive away from the system [2].



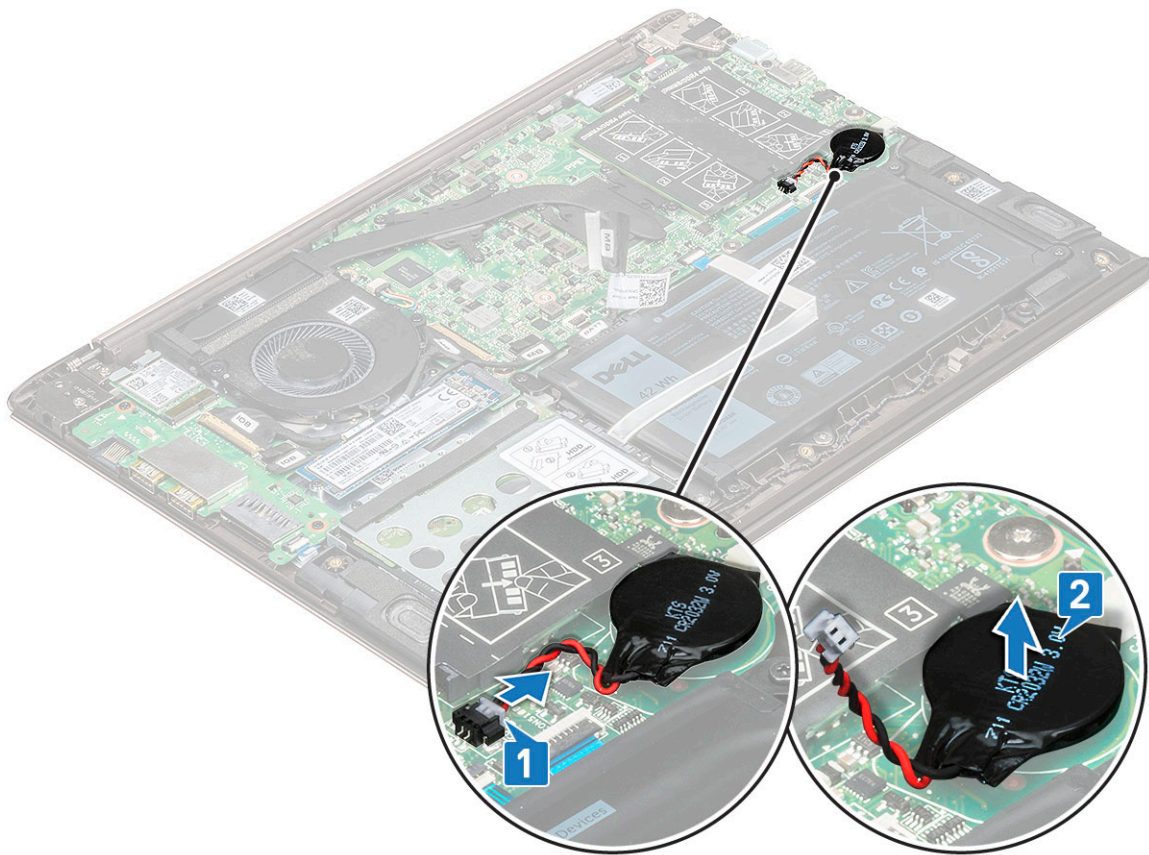
Installing the hard drive

- 1 Insert the hard drive into the slot on the system.
- 2 Replace the four M2.0 x 3 screws to secure the hard drive assembly to the system.
- 3 Affix the hard drive cable on the battery.
- 4 Connect the hard drive 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](#).

Coin cell battery

Removing the coin cell battery

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



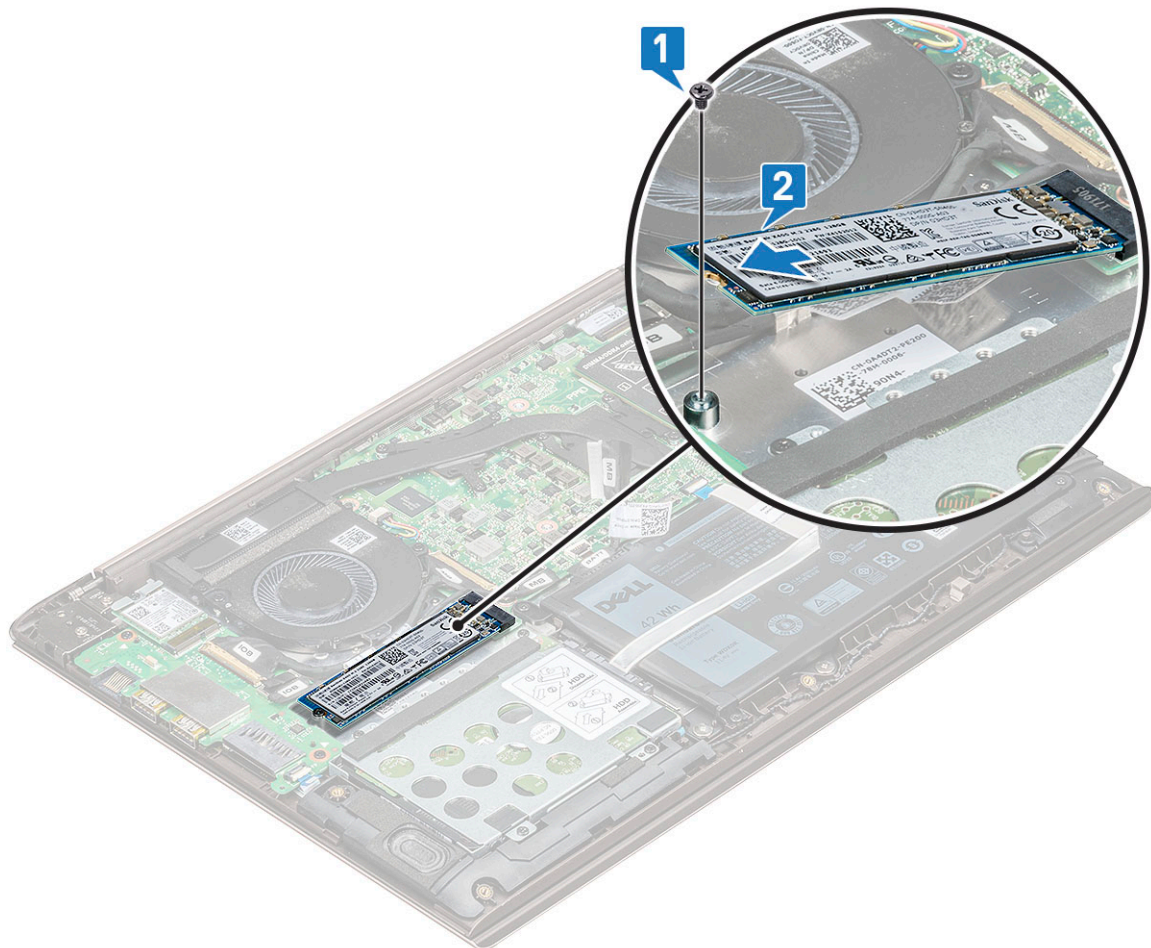
Installing the coin cell battery

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

Solid State Drive — optional

Removing the M.2 Solid-State Drive — SSD

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the [base cover](#).
- 3 To remove the solid-state drive (SSD):
 - a Remove the M2.0 x 3 screw that secure the SSD to the system [1].
 - b Lift and slide the SSD away from the system [2].



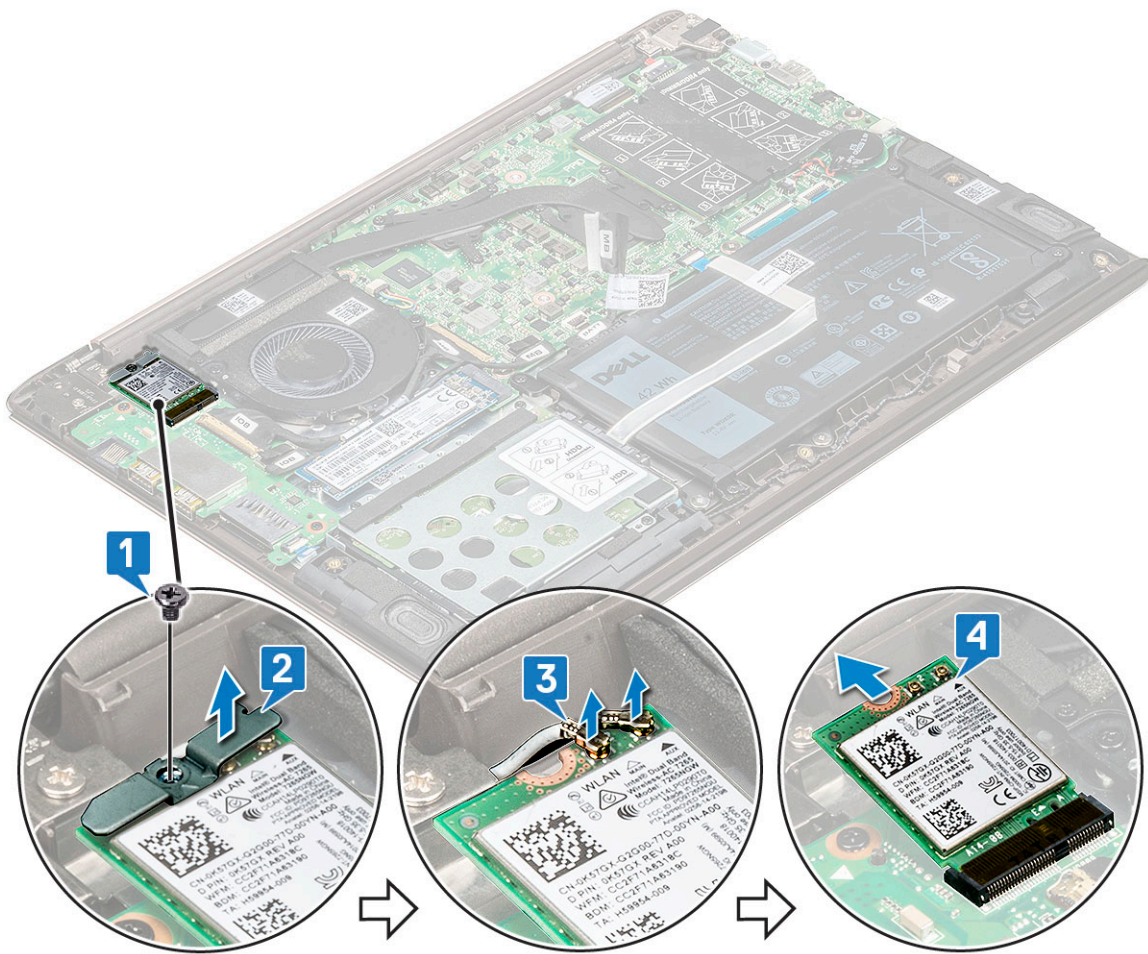
Installing the M.2 Solid State Drive — SSD

- 1 Align the notch on the solid-state drive with the tab on the solid-state drive slot.
- 2 Slide the solid-state drive into the slot.
- 3 Replace the M2.0 x 3 screw to secure the SSD to the system.
- 4 Install the [base cover](#).
- 5 Follow the procedure in [After working inside your computer](#).

WLAN card

Removing the WLAN card

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the [base cover](#).
- 3 To remove the WLAN card:
 - a Remove the M2.0 x 4 screw that secures the WLAN card to the system [1].
 - b Remove the tab that secures the WLAN cables [2].
 - c Disconnect the WLAN antenna cables from the WLAN card [3].
 - d Lift the WLAN card away from the connector [4].



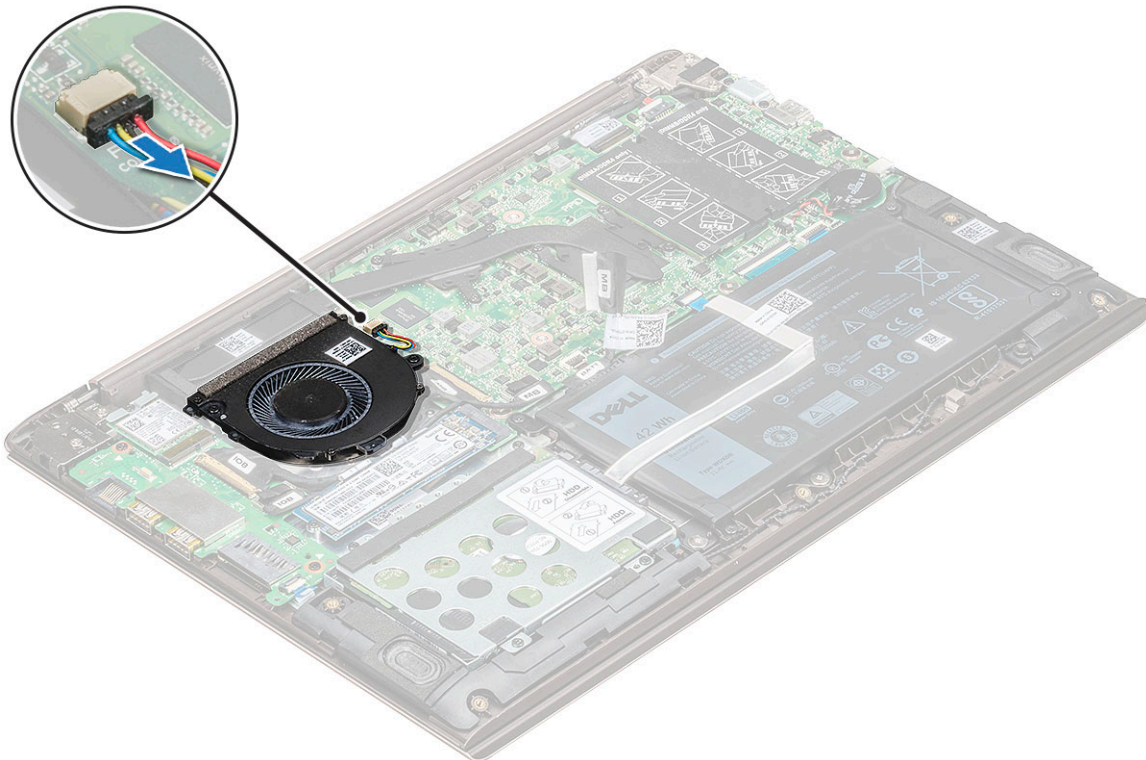
Installing the WLAN card

- 1 Insert the WLAN card into the slot on the system.
- 2 Connect the WLAN cables to the connectors on the WLAN Card.
- 3 Place the bracket and replace the M2.0 x 4 screw to secure it to the system.
- 4 Install the [base cover](#).
- 5 Follow the procedure in [After working inside your computer](#).

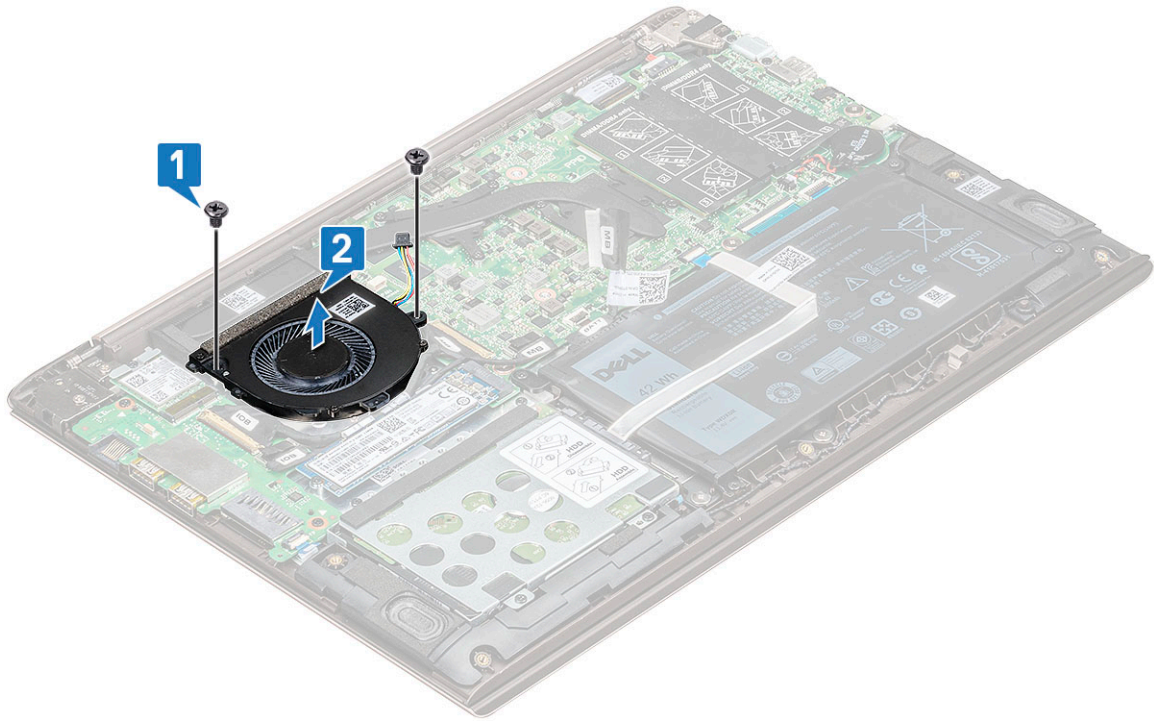
System fan

Removing the system fan

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the [base cover](#).
- 3 To remove the system fan:
 - a Disconnect the system fan cable from the connector on the system board.



- b Remove the two M2.0 x 4 screws that secure the system fan to the system [1].
- c Lift the system fan away from the system [2].



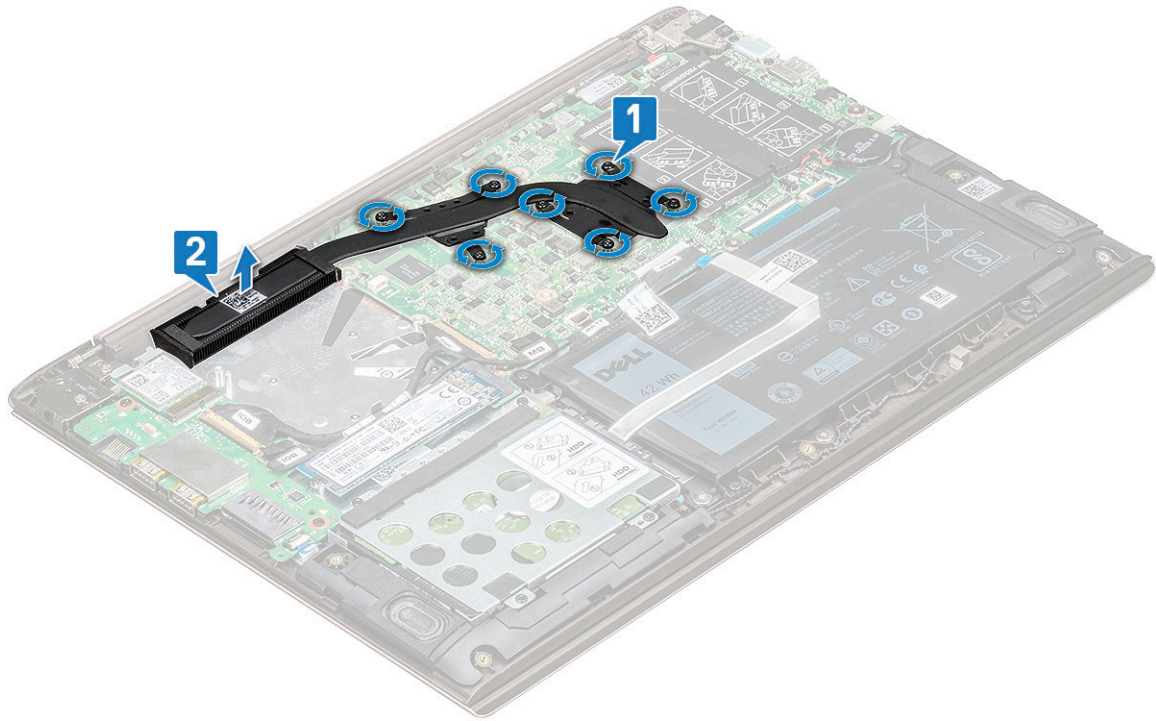
Installing the system fan

- 1 Place the system fan into the slot on the system.
- 2 Replace the two M2.0 x 4 screws to secure it to the system.
- 3 Connect the system fan cable to the connector on the system board.
- 4 Install the [base cover](#).
- 5 Follow the procedure in [After working inside your computer](#).

Heat sink

Removing the heat sink

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [system fan](#)
- 3 To remove the heat sink:
 - a In sequential order (as indicated on the heat-sink), loosen the seven M2.0 x 3 screws that secure the heat sink to the system board [1].
 - b Lift the heat sink away from the system [2].



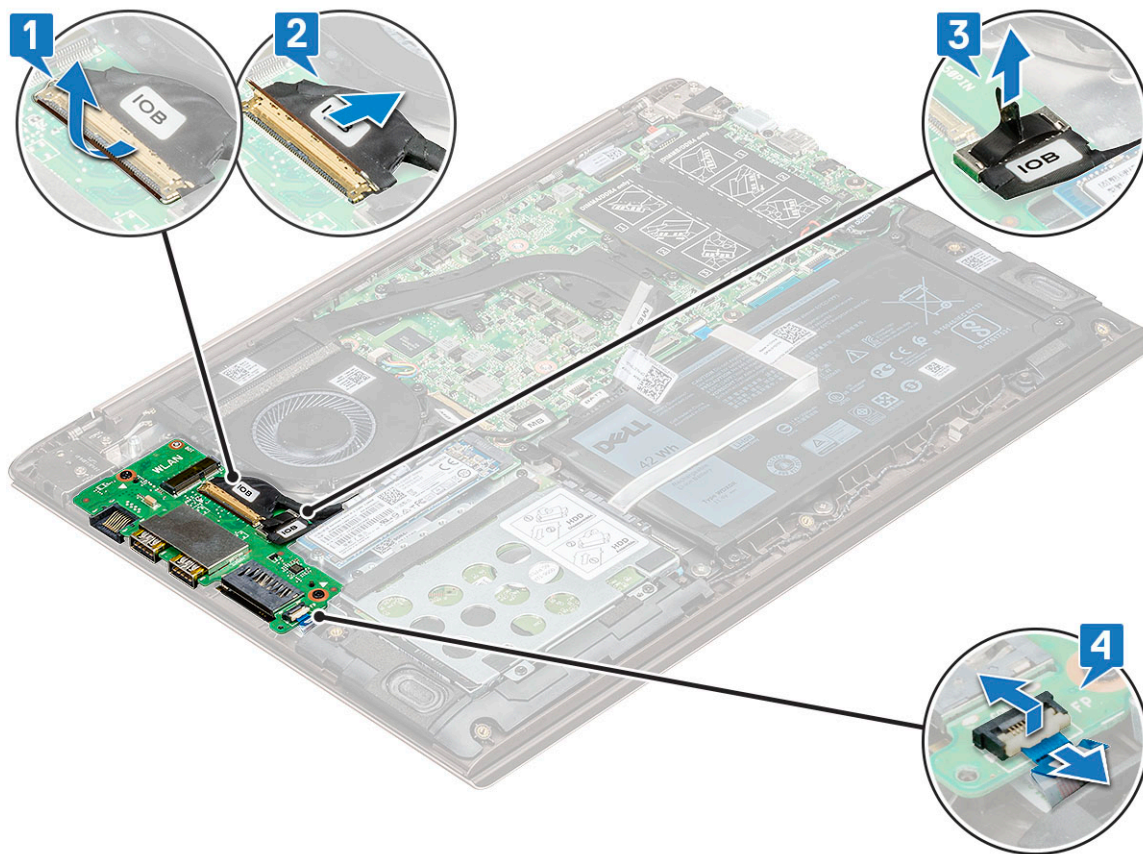
Installing the heat sink

- 1 Place the heat sink to its slot in the system.
- 2 Tighten the seven M2.0 x 3 screws to secure the heat sink to the system board.
- 3 Install the:
 - a [system fan](#)
 - b [base cover](#)
- 4 Follow the procedure in [After working inside your computer](#).

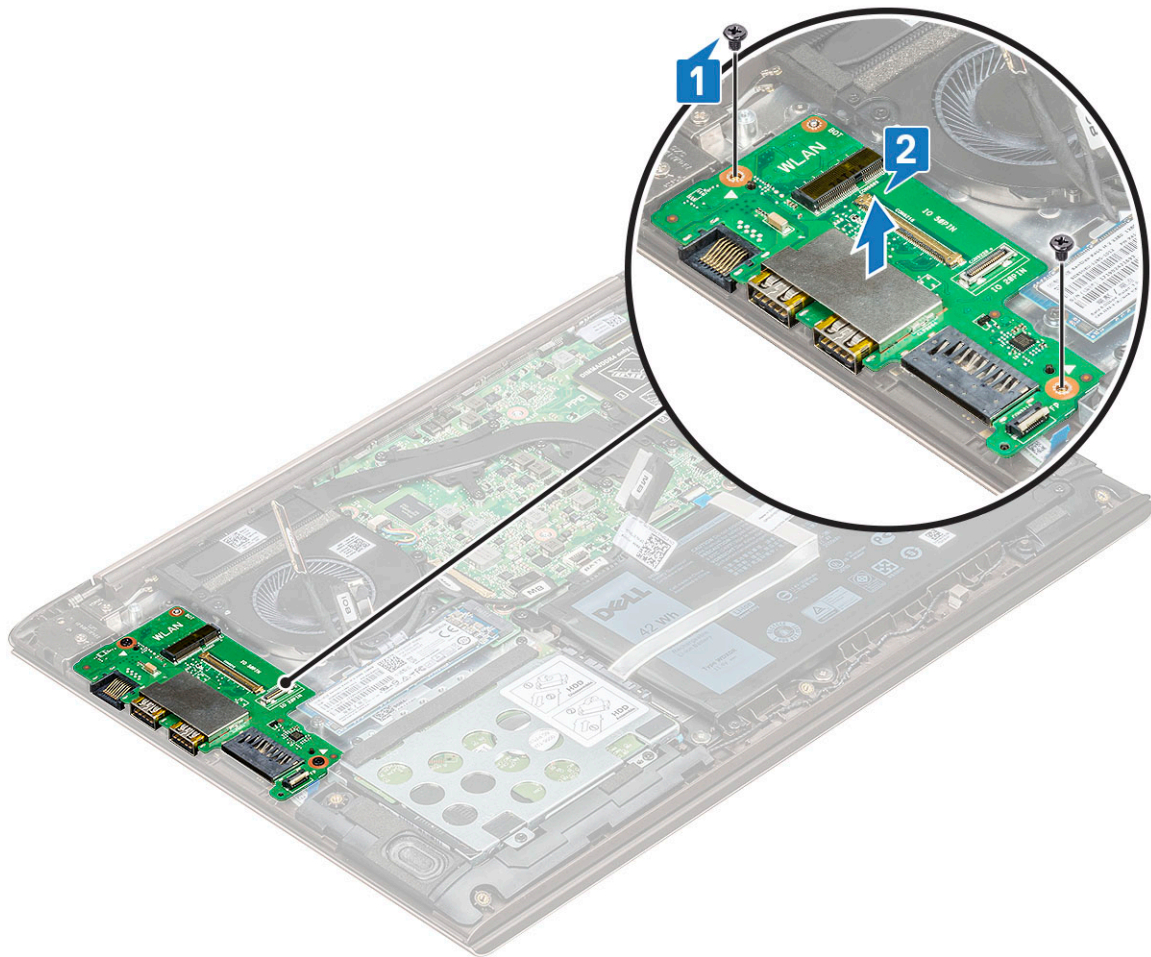
Input Output board

Removing the Input Output board

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [WLAN card](#)
- 3 To remove the Input Output(I/O) board:
 - a Lift the latch and, disconnect the I/O cable from the connector on the I/O board [1,2].
 - b Pull and disconnect the IOB cable from the I/O board [3].
 - c Lift the latch, and disconnect the fingerprint cable from the I/O board [4].



- d Remove the two M2.0 x 4 screws that secure the I/O board to the system [1].
- e Lift the I/O board away from the system.



Installing the Input output board

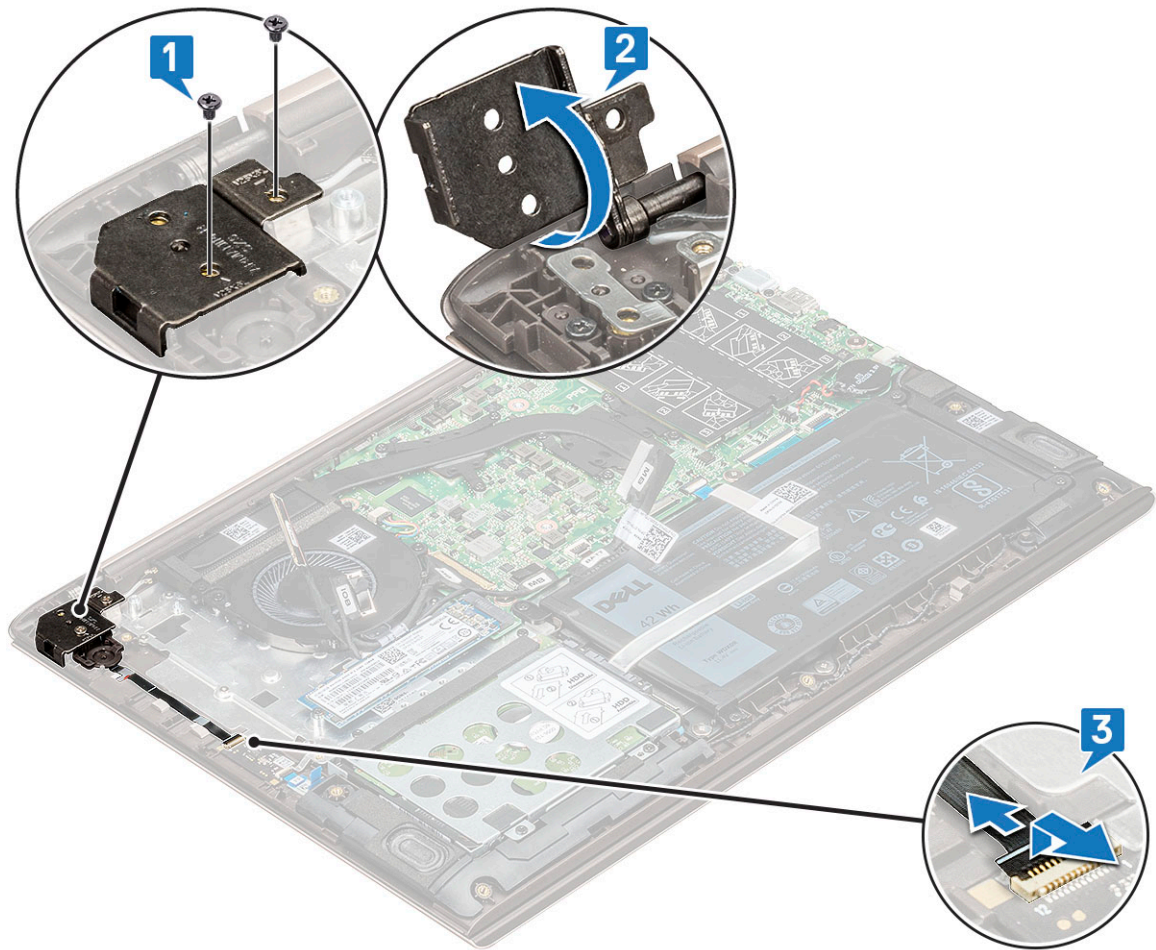
- 1 Place the Input output(I/O) board to its slot in the system.
- 2 Replace the two M2.0 x 4 screws to secure the I/O board to the system board.
- 3 Connect the I/O cable and the fingerprint cable and close the latch to secure it to the I/O board.
- 4 Install the:
 - a WLAN
 - b solid state drive(SSD)
 - c base cover
- 5 Follow the procedure in [After working inside your computer](#).

Power button

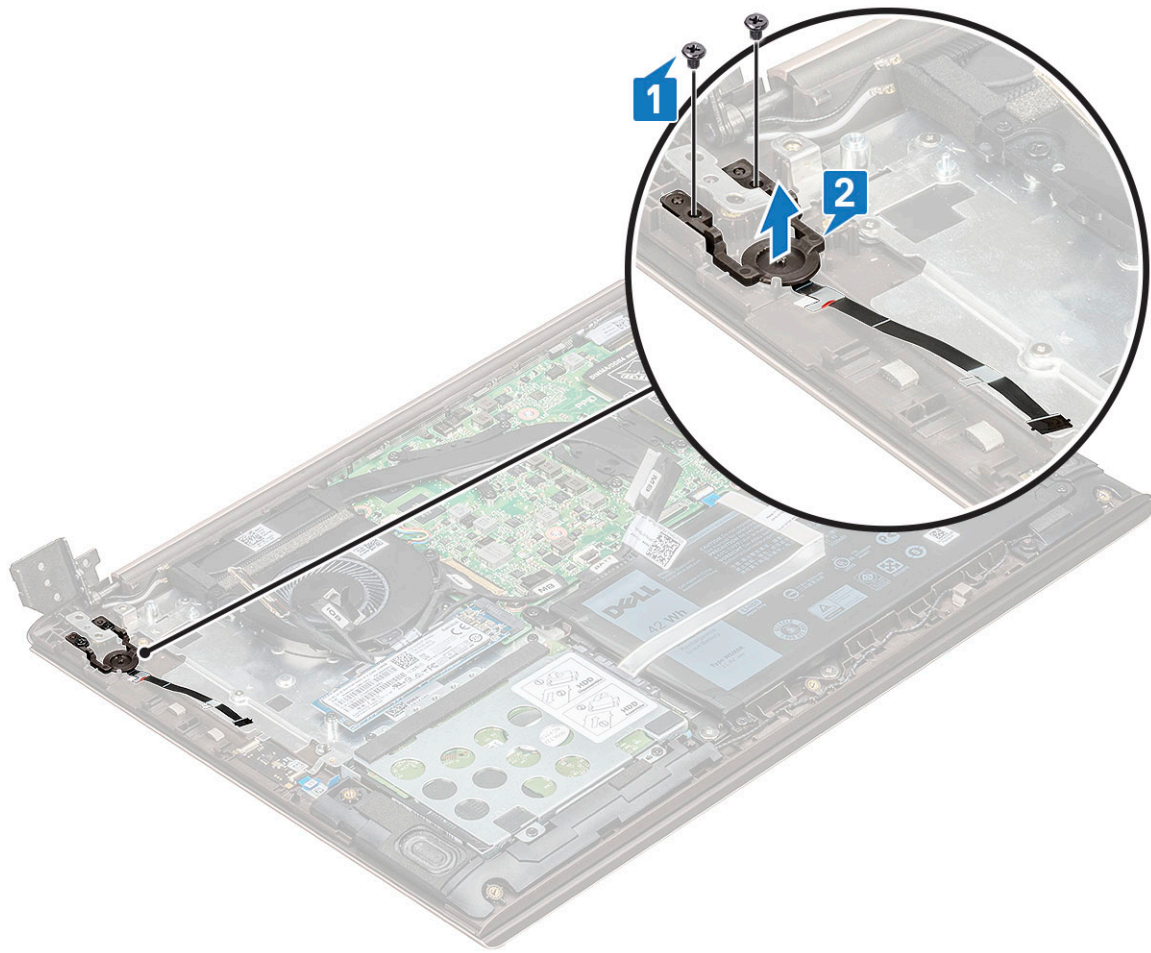
Removing the power button

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a base cover
 - b WLAN card
 - c Input output(I/O) board

- 3 To remove the power button:
- a Remove the two M2.5 x 6 screws securing the right display hinge to the system [1].
 - b Lift the hinge [2].
 - c Lift the latch and disconnect the power button cable from the connector in the fingerprint board.



- d Remove the two M2.0 x 3 screws securing the power button to the system [1].
- e Lift the button away from the system [2].



Installing the power button

- 1 Place the power button to its slot in the system.
- 2 Replace the screws to secure the power button to the system.
- 3 Connect the power cable to the connector in the fingerprint board.
- 4 Close the display hinge and secure it with the two M2.5 x 4 screws to the system.
- 5 Install the:
 - a [Input output\(I/O\) board](#)
 - b [WLAN](#)
 - c [base cover](#)
- 6 Follow the procedure in [After working inside your computer](#).

System board

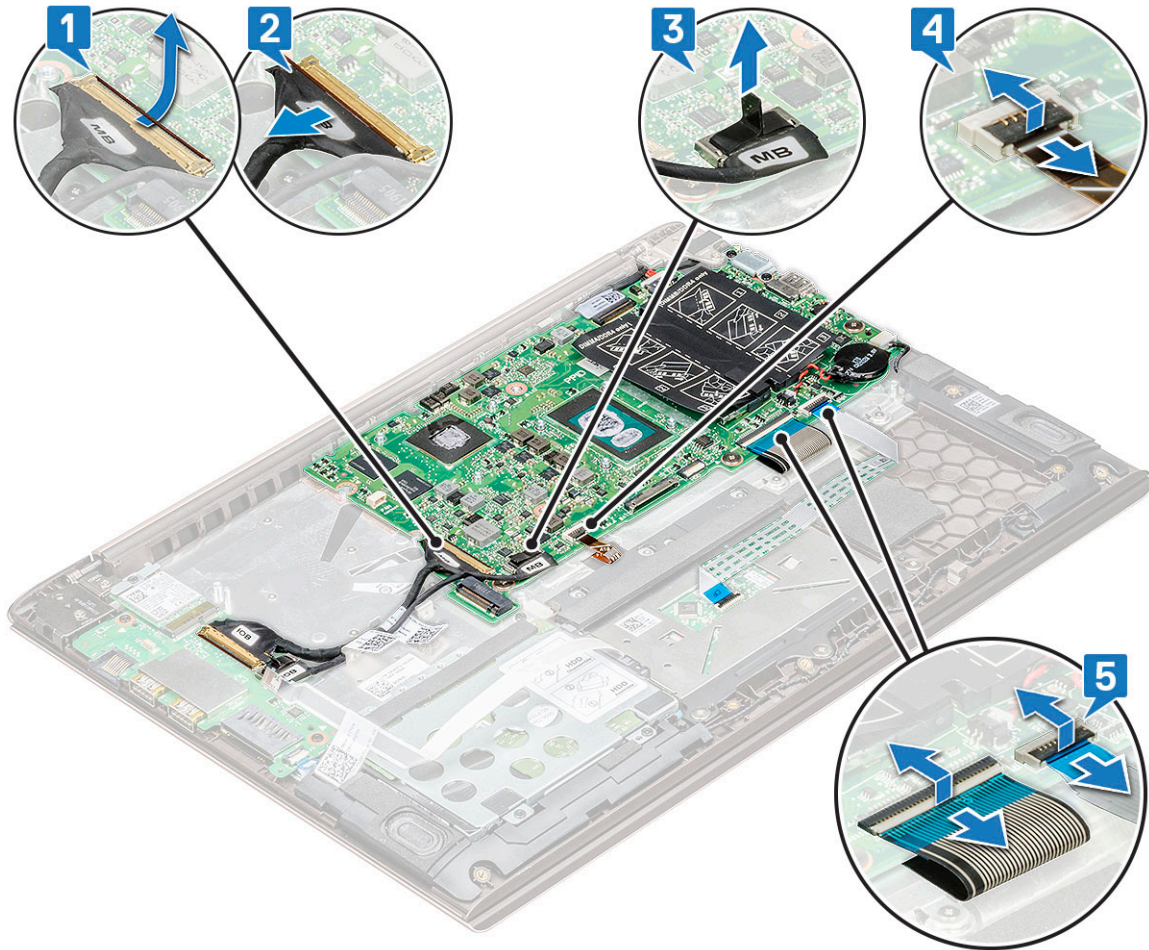
Removing the system board

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

- c system fan
- d heat sink
- e solid-state drive(SSD)

3 To remove the system board:

- a Disconnect the following cables:

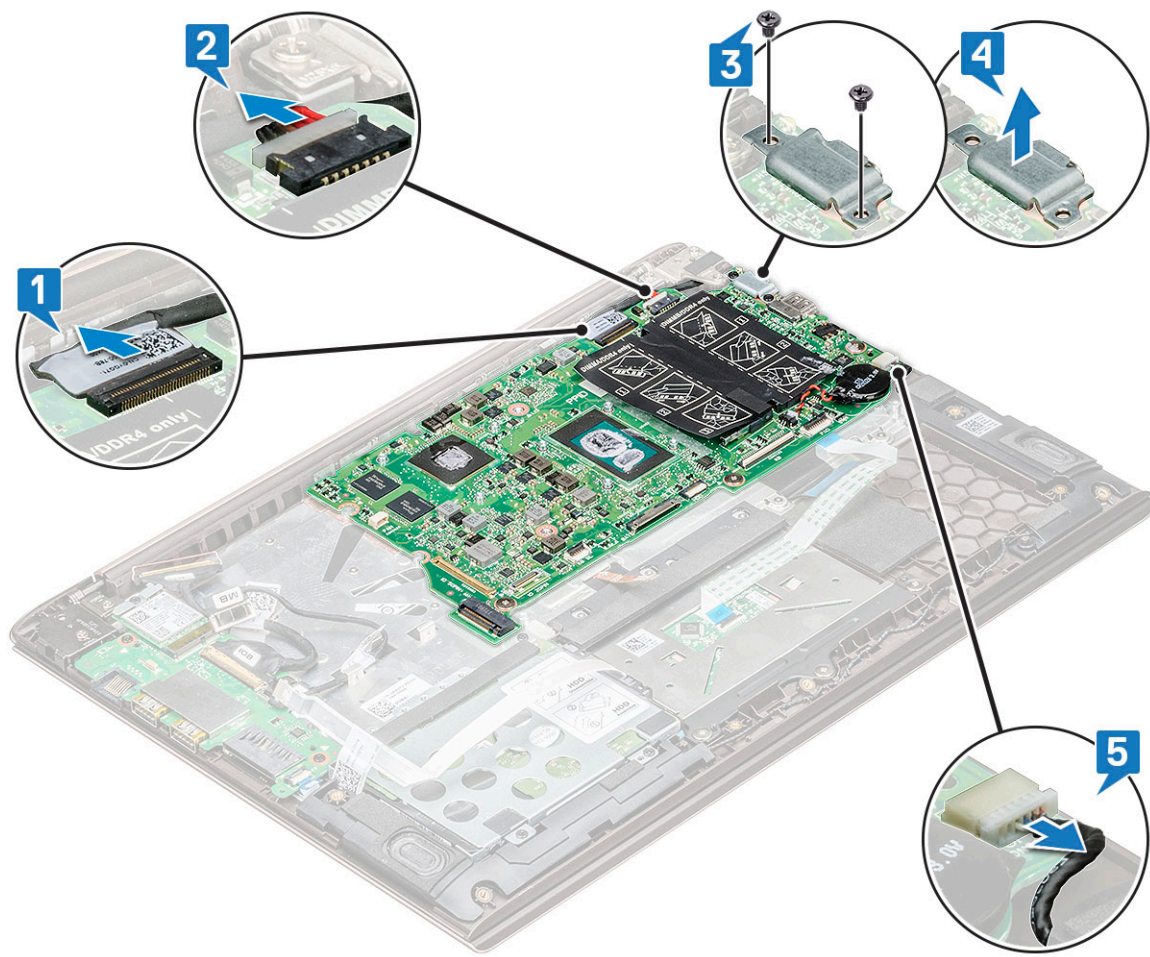


- Input output(I/O) board cable [1,2]
- Input output(I/O) board cable [3]
- Keyboard backlight cable [4]
- Keyboard and Touchpad cable [5]

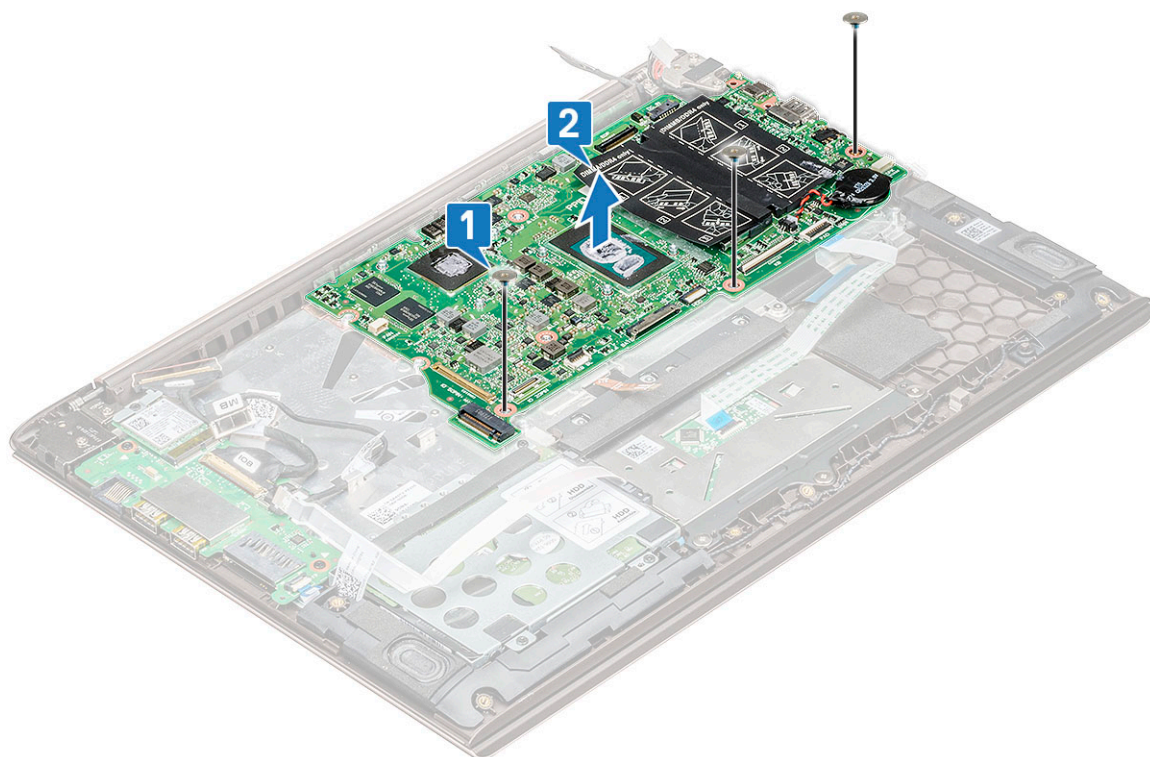
b Disconnect the eDP cable [1], power adapter port cable [2] and speaker cable [1] from the connector.

c Remove the two M2.0 x 4 screws that secure the USB Type C port bracket to the system board [3].

d Lift the USB Type C port bracket away from the system [4].



- e Remove the three M2.0 x 2 screws that secure the system board to the system [1].
- f Lift and remove the system board from the system [2].



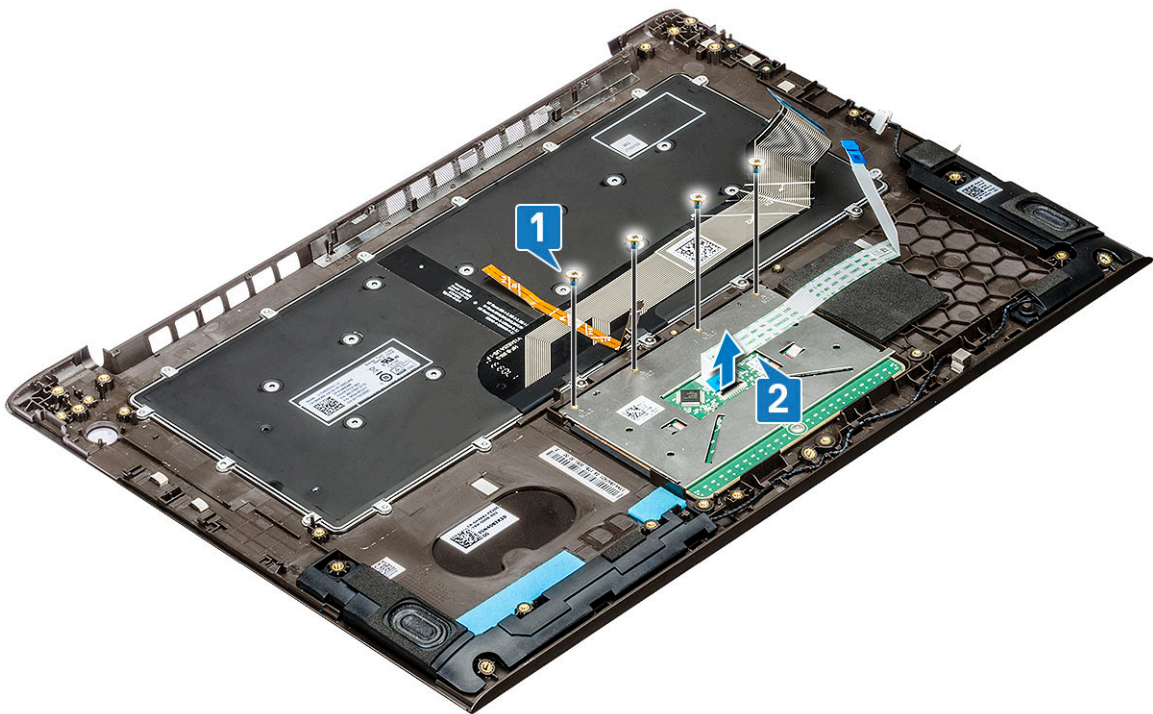
Installing the system board

- 1 Align the screw holes on the system board with the screw holes on the system.
- 2 Replace the three M2.0 x 2 screws to secure the system board to the computer.
- 3 Align the screw holes of the USB Type C bracket with the screw holes on the system board and replace the two screws to secure the bracket to the system.
- 4 Connect the eDP cable, power adapter port cable and speaker cable to the connector in the system board.
- 5 Connect the Input output board cable, speaker cable, keyboard backlight cable, keyboard cable and touchpad cable to the system board.
- 6 Install the:
 - a [solid state drive\(SSD\)](#)
 - b [heat sink](#)
 - c [system fan](#)
 - d [battery](#)
 - e [base cover](#)
- 7 Follow the procedure in [After working inside your computer](#).

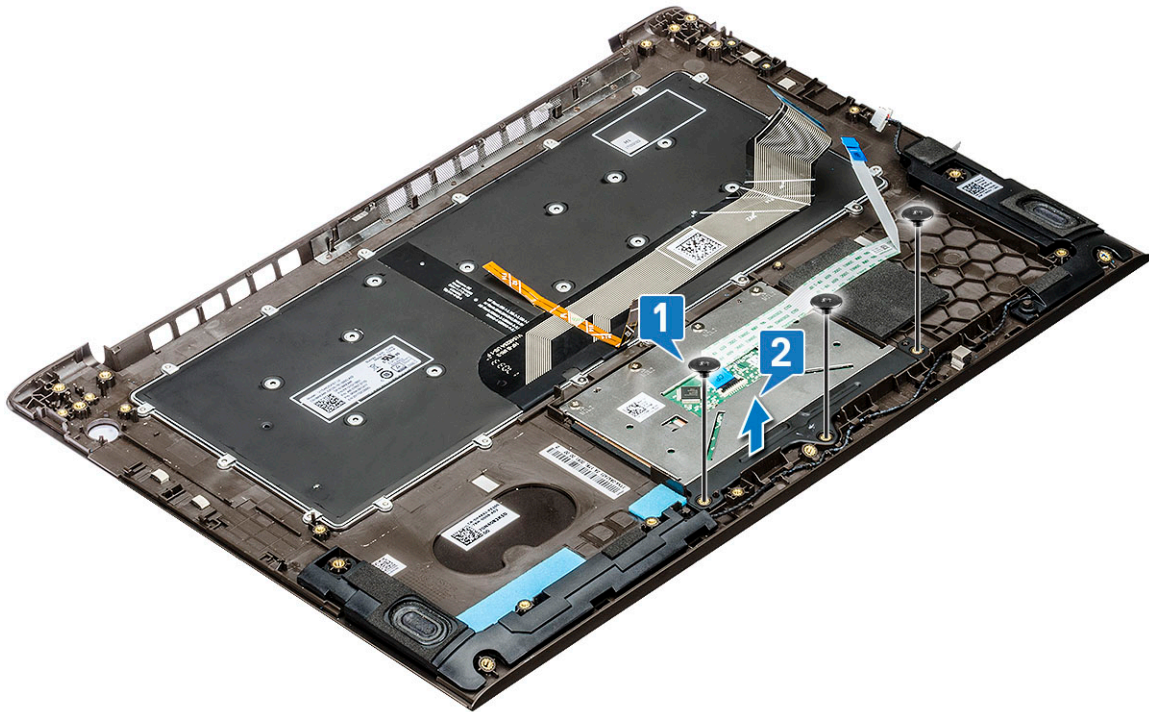
Touchpad

Removing touchpad

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [battery](#)
 - c [hard drive](#)
- 3 To remove the touchpad:
 - a Remove the four M2.0 x 2 screws that secure the touchpad to the system [1].
 - b Disconnect the touchpad cable from the connector in the system [2].



- c Remove the three M2.0 x 2 screws that secure the touchpad support bracket to the system and lift the touchpad away from system [1, 2].



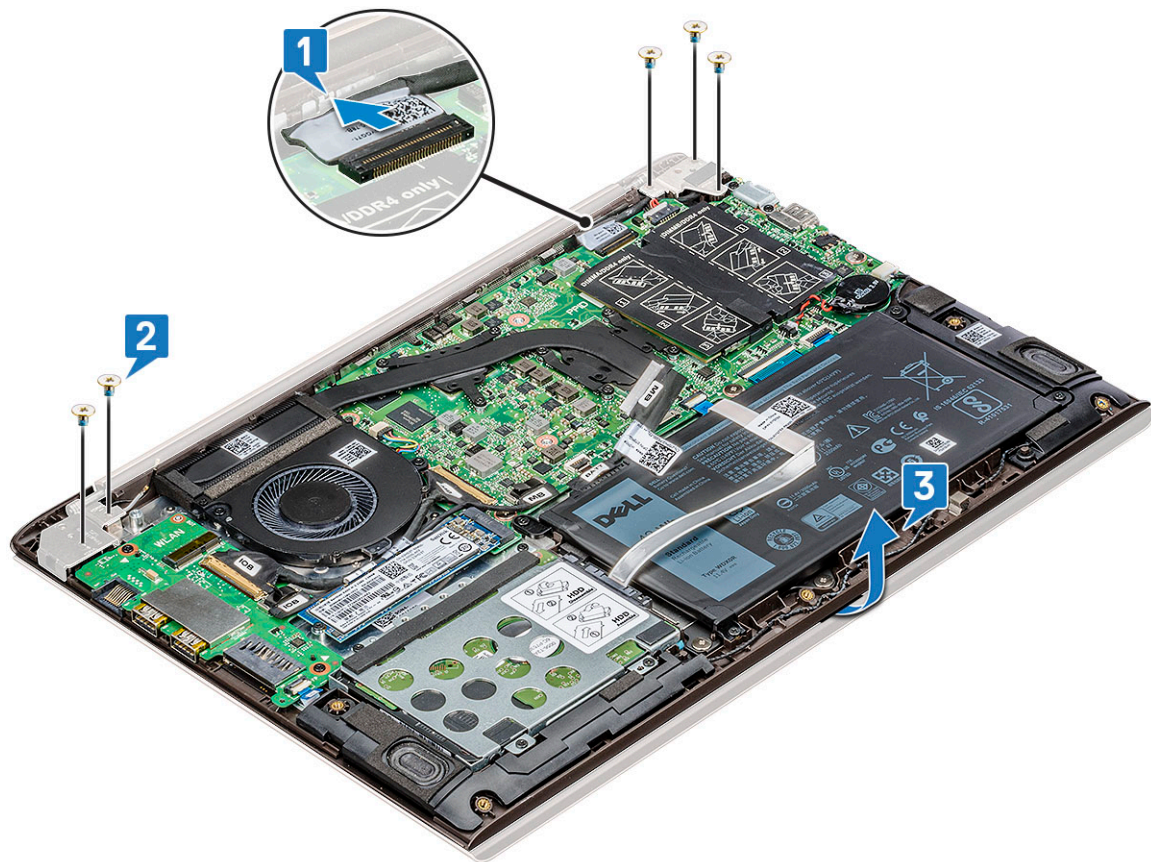
Installing touchpad

- 1 Replace the three screws to secure the touchpad support bracket to the system.
- 2 Connect the touchpad cable to the connector in the system.
- 3 Replace the four screws to secure the touchpad to the system.
- 4 Install the:
 - a [hard drive](#)
 - b [battery](#)
 - c [base cover](#)
- 5 Follow the procedure in [After working inside your computer](#).

Display assembly

Removing display assembly

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [WLAN card](#)
- 3 To remove the display assembly:
 - a Disconnect the eDP cable from the connector in the system board [1].
 - b Remove the five M2.5 x 6 screws [2] that secure the hinge bracket to the system and lift the display assembly.



c Lift and slide the display assembly.



d The component you are left with is the display assembly.



Installing display assembly

- 1 Align and place the display assembly on the system.
- 2 Place the hinge bracket on the system and replace the screws to secure the display assembly to the system.
- 3 Connect the eDP cable to the connector in the system board.
- 4 Install the:
 - a WLAN card
 - b base cover
- 5 Follow the procedure in [After working inside your computer](#).

Display bezel

Removing display bezel

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a base cover
 - b WLAN card
 - c display assembly
- 3 To remove the display bezel:
 - a Using a plastic scribe, pry the outer edges to release the display bezel from the display assembly [1, 2].



b Remove the display bezel from display assembly.



Installing 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.

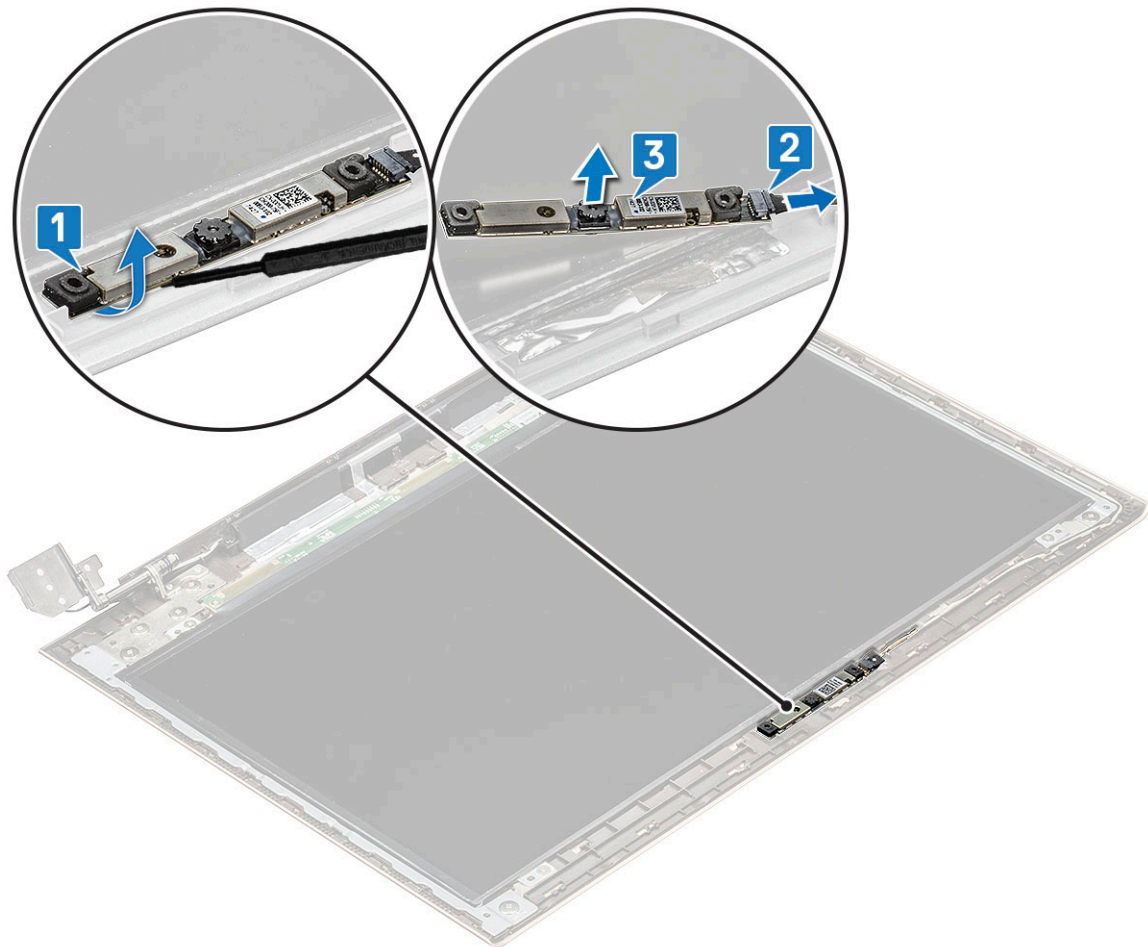


- 3 Install the:
 - a [display assembly](#)
 - b [WLAN card](#)
 - c [base cover](#)
- 4 Follow the procedure in [After working inside your computer](#).

Camera

Removing the camera

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a [base cover](#)
 - b [WLAN card](#)
 - c [display assembly](#)
 - d [display bezel](#)
- 3 To remove the camera:
 - a Slide the camera from the display assembly with a plastic scribe [1].
 - b Disconnect the camera cable from the connector [2].
 - c Lift the camera away from the display [3].



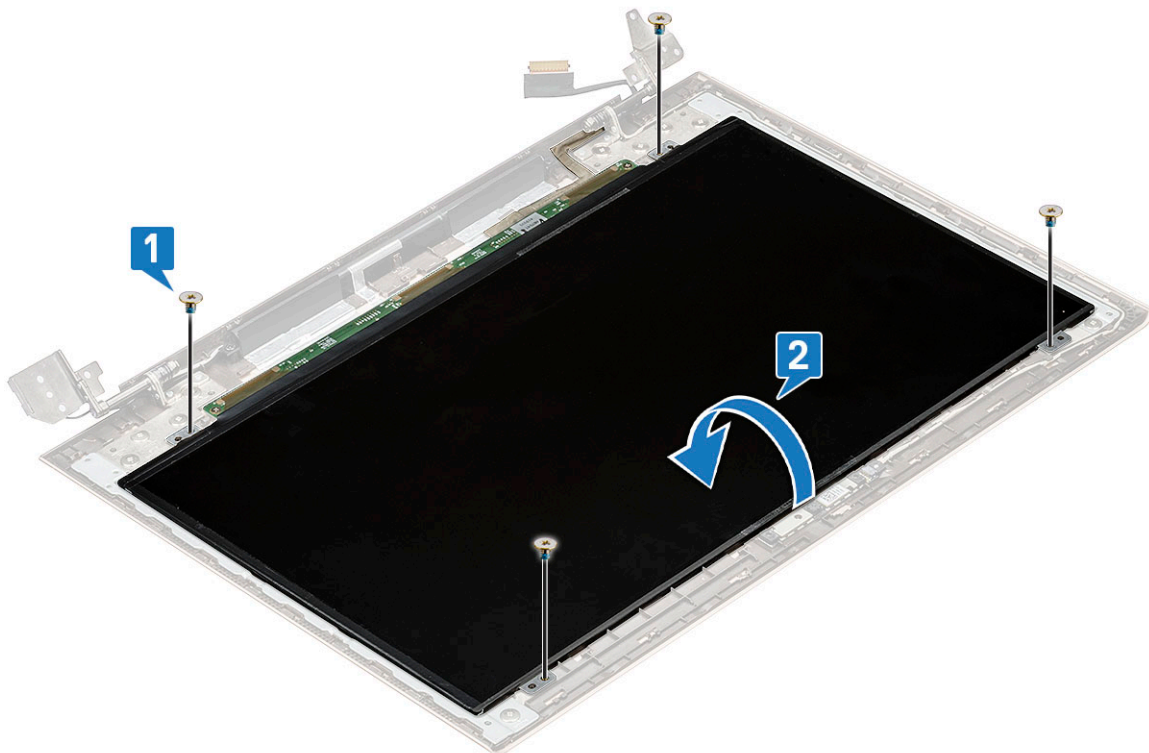
Installing the camera

- 1 Align and place the camera to its slot in the display assembly.
- 2 Connect the camera cable to the connector on the display assembly.
- 3 Install the:
 - a display bezel
 - b display assembly
 - c WLAN card
 - d base cover
- 4 Follow the procedure in [After working inside your computer](#).

Display panel

Removing display panel

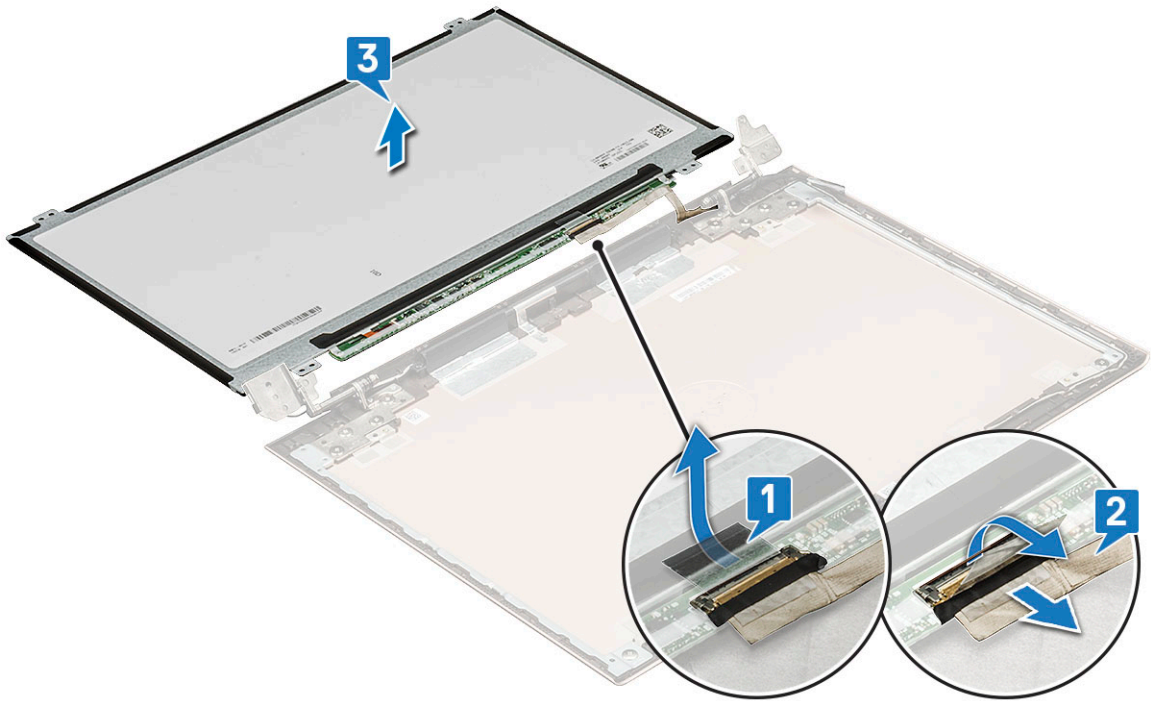
- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a base cover
 - b WLAN card
 - c display assembly
 - d display bezel
- 3 To remove the display panel:
 - a Remove the four M2.0 x 2 screws that secure the display panel to the display assembly [1] and lift to turn over the display panel to access the eDP cable [2].



- b Remove the adhesive tape [1].
- c Lift the latch and disconnect the display cable from the connector on the display panel [2].



d Lift the display panel [3].



e The component you are left with is the display panel.



Installing the display panel

- 1 Connect the eDP cable to the connector.
- 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 Replace the four screws to secure the display panel to the display assembly.
- 5 Install the:
 - a display bezel
 - b display assembly
 - c WLAN card
 - d base cover
- 6 Follow the procedure in [After working inside your computer](#).

Display hinges

Removing display hinge

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a base cover
 - b WLAN card
 - c display assembly
 - d display bezel
 - e display panel
- 3 To remove the display hinge:
 - a Remove the ten M2 x 2 screws that secure the display hinge to the display assembly [1].
 - b Lift the display hinge away from the display assembly [2].



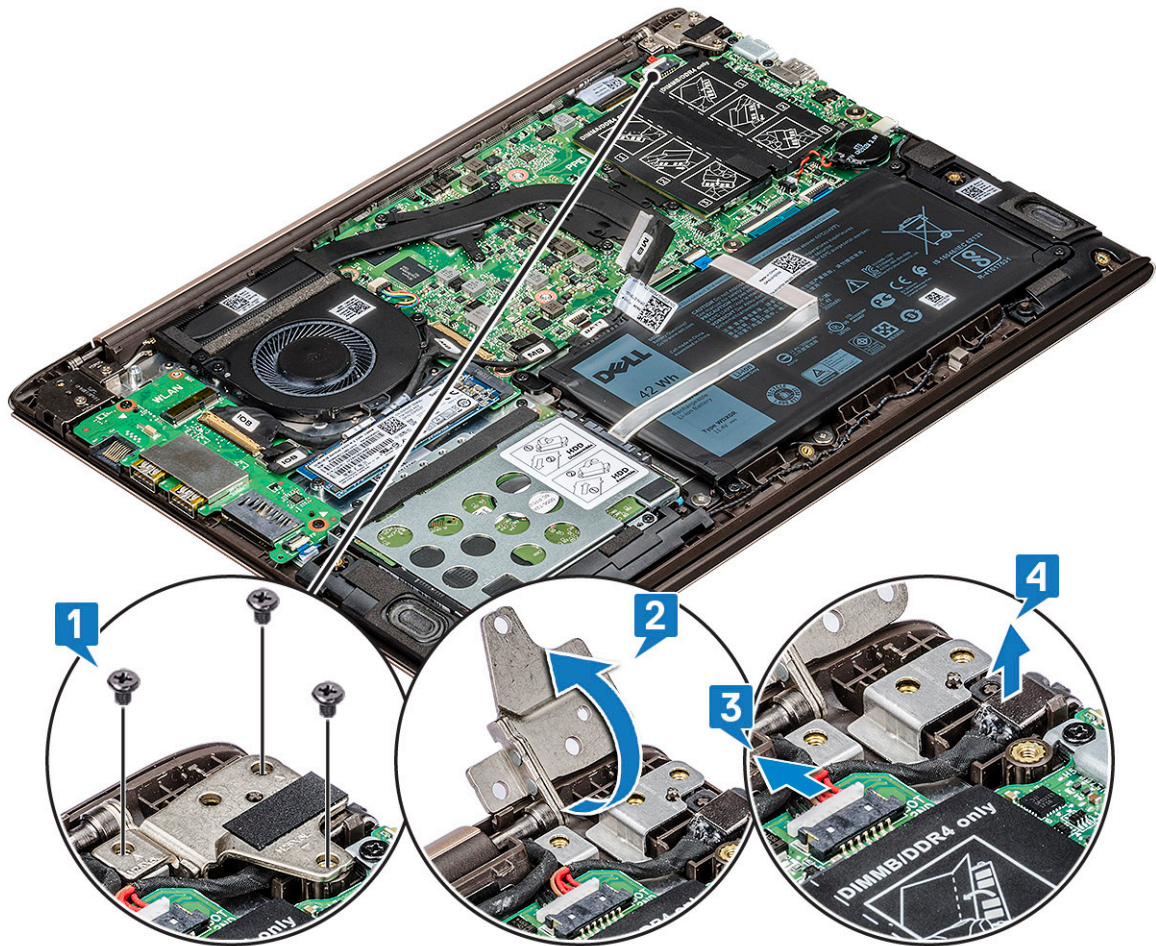
Installing display hinge

- 1 Place the display hinge cover on the display assembly.
- 2 Replace the screws to secure the display hinge cover to the display assembly.
- 3 Install the:
 - a display panel
 - b display bezel
 - c display assembly
 - d WLAN card
 - e base cover
- 4 Follow the procedure in [After working inside your computer](#).

DC-in

Removing the DC-in

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a base cover
 - b WLAN card
 - c display assembly
- 3 To remove the DC-in:
 - a Remove the 3 M2.5 x 6 screws that secure the right display hinge bracket to the system [1].
 - b Lift the hinge bracket [2].
 - c Disconnect the power-adaptor port cable from the connector in the system board [3].
 - d Disconnect the DC-in from the system [4].



Installing the DC-in

- 1 Place and connect the DC-in to its slot in the system.
- 2 Connect the power-adapter port cable to the connector in the system board.
- 3 Place the right display hinge and replace the 3 screws to secure the hinge to the system.
- 4 Install the:
 - a display assembly
 - b WLAN card
 - c base cover
- 5 Follow the procedure in [After working inside your computer](#).

Keyboard

Removing the keyboard

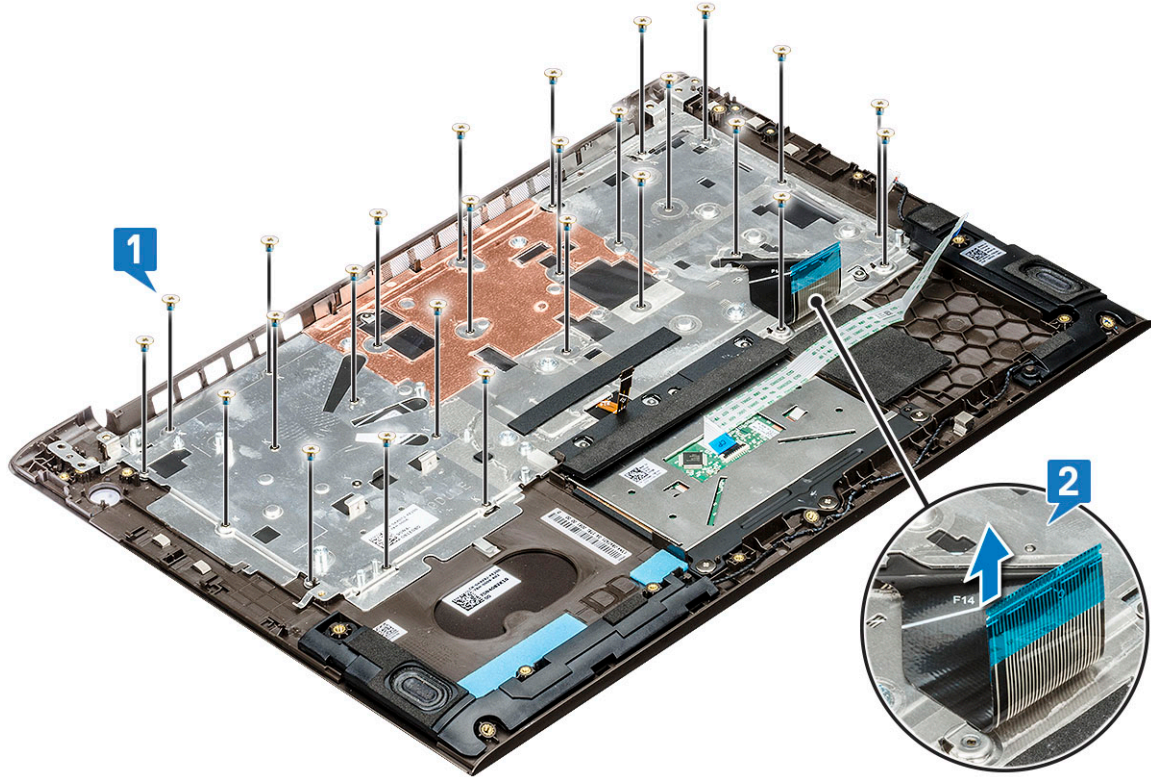
- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a base cover
 - b battery
 - c system fan



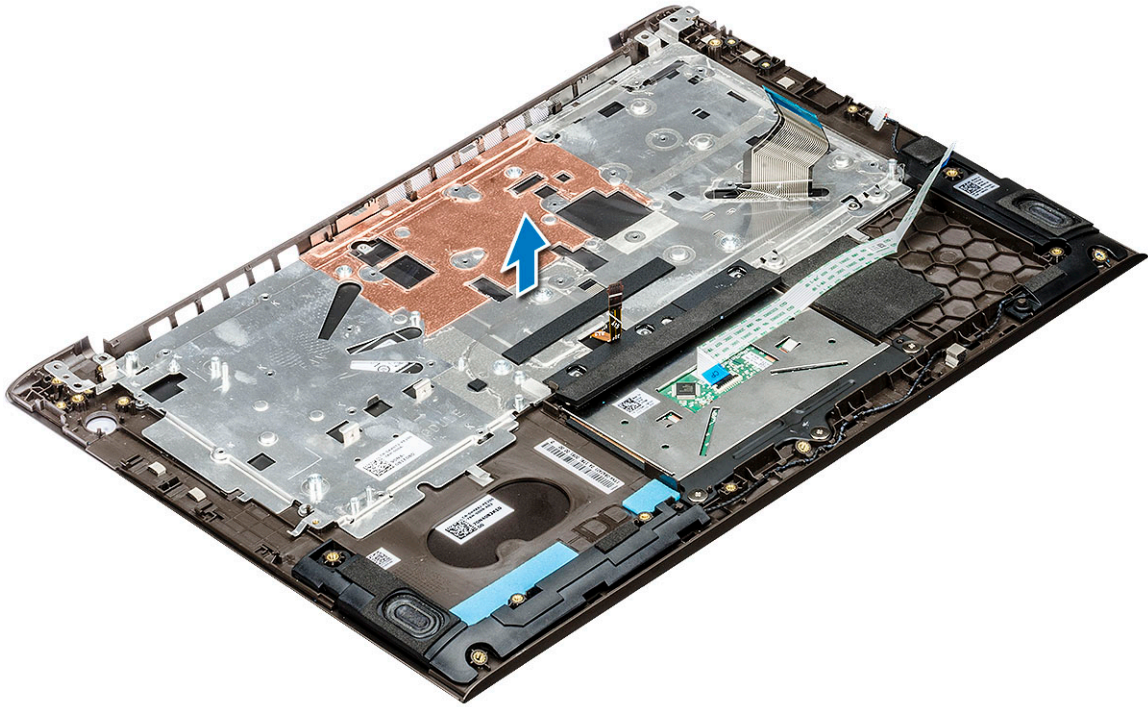
- d heat sink
- e solid state drive(SSD)
- f WLAN card
- g Input output(I/O) board
- h power button
- i hard drive
- j system board
- k display assembly

3 To remove the keyboard:

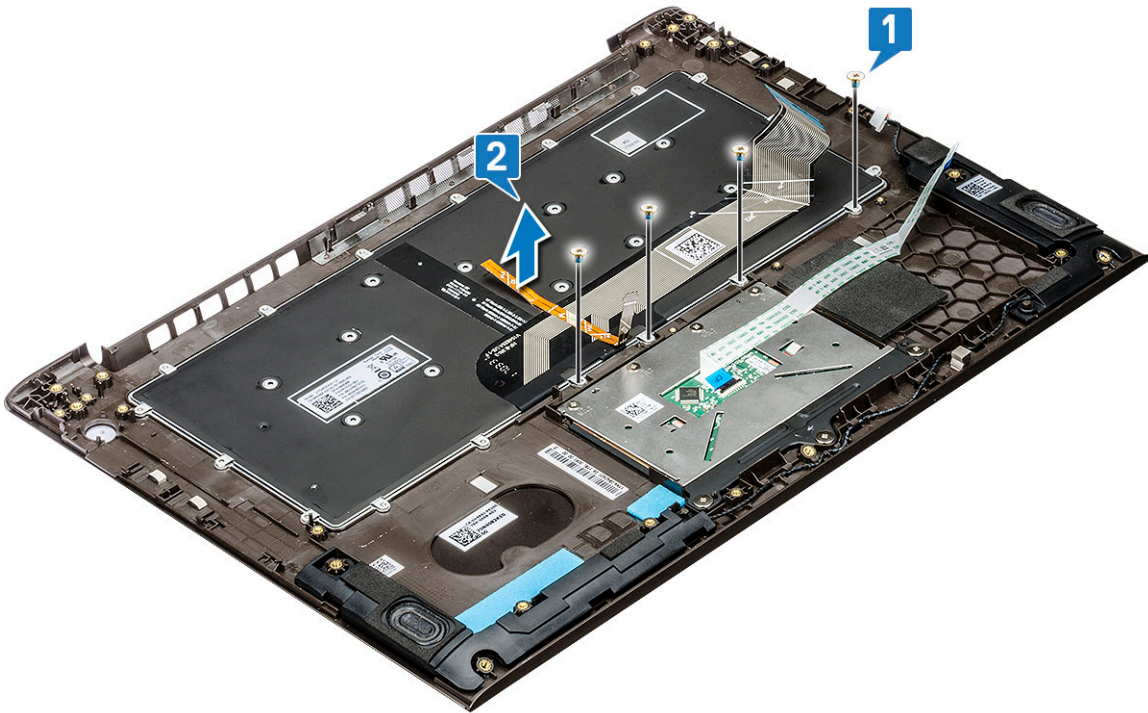
- a Remove the M1.2 x 2 (33) screws that secures the keyboard to the system [1].
- b Disconnect the keyboard cable from the connector in the system [2].



- c Lift the keyboard bracket away from the system.



- d Remove the four screws that secures the keyboard to the palmrest [1]
- e Lift the keyboard away from the system [2].



Installing the keyboard

- 1 Place the keyboard on to the slot on the palm rest.
- 2 Replace the screws that secure the keyboard on the palm rest.
- 3 Place the keyboard bracket above the keyboard in to the system slot.



- 4 Replace the screws to secure the keyboard to the system.
- 5 Install the:
 - a display assembly
 - b system board
 - c hard drive
 - d powered button
 - e Input Output(I/O) board
 - f WLAN card
 - g solid state drive(SSD)
 - h heat sink
 - i system fan
 - j battery
 - k base cover
- 6 Follow the procedure in [After working inside your computer](#).

Palm rest

Removing and installing palmrest

- 1 Follow the procedure in [Before working inside your computer](#).
- 2 Remove the:
 - a base cover
 - b battery
 - c speaker
 - d touchpad
 - e system fan
 - f heat sink
 - g solid state drive(SSD)
 - h WLAN card
 - i Input output(I/O) board
 - j power button
 - k hard drive
 - l system board
 - m keyboard
 - n display assembly

 **NOTE:** After the removal of all the components the component that you are left with is the palm rest



3 Install the following components on the new palm rest:

- a display assembly
- b keyboard
- c system board
- d hard drive
- e powered button
- f Input Output(I/O) board
- g WLAN card
- h solid state drive(SSD)
- i heat sink
- j system fan
- k touchpad
- l speaker
- m battery
- n base cover

4 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](#).

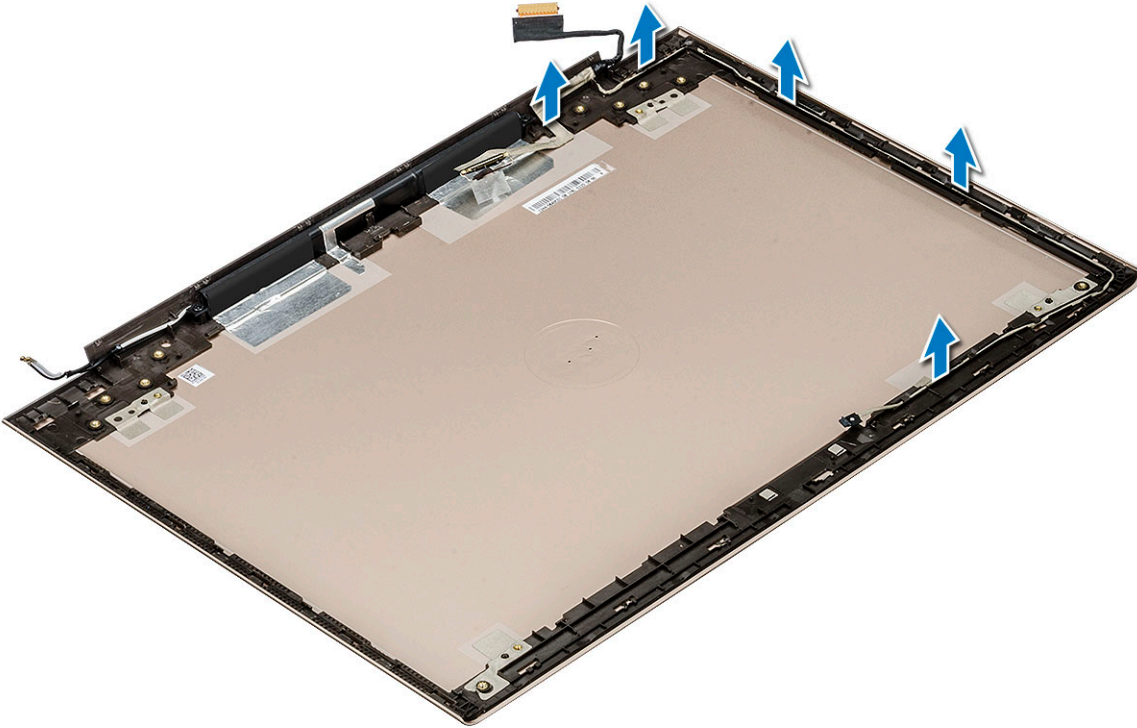
2 Remove the:

- a base cover
- b WLAN card
- c display assembly
- d display bezel
- e camera
- f display panel



g [display hinge](#)

- 3 Unroute the eDP cable from the routing channel to remove from the display.



Installing the eDP cable

- 1 Place the eDP cable on the display panel.
- 2 Route the eDP cable through the routing channel.
- 3 Install the:
 - a [display hinge](#)
 - b [display panel](#)
 - c [camera](#)
 - d [display bezel](#)
 - e [display assembly](#)
 - f [WLAN card](#)
 - g [base cover](#)
- 4 Follow the procedure in [After working inside your computer](#).

Display back cover assembly

Removing the display back cover

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

- e camera
- f display panel
- g display hinge
- h eDP cable

3 The display back cover assembly is the remaining component, after removing all the components.



Installing the display back cover

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

Technology and components

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

Topics:

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

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.

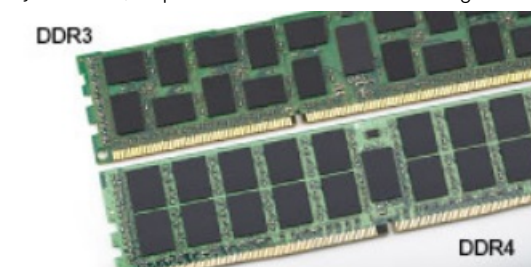


Figure 1. Notch difference

Increased thickness

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

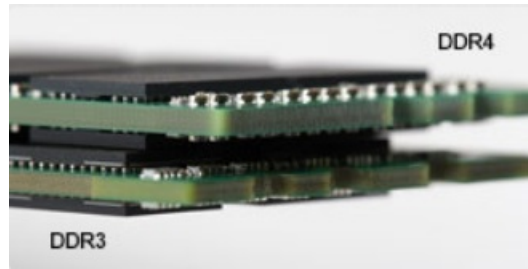


Figure 2. Thickness difference

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.

USB features

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

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

Table 1. USB evolution

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

USB 3.0/USB 3.1 Gen 1 (SuperSpeed USB)

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

- Higher transfer rates (up to 5 Gbps)



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

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

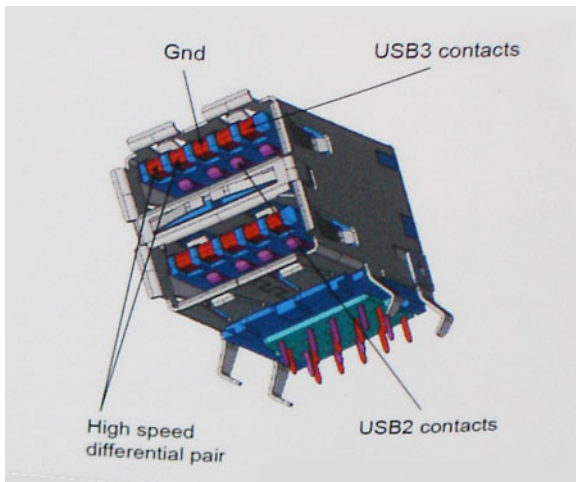


Speed

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

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

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



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

Applications

USB 3.0/USB 3.1 Gen 1 opens up the laneways and provides more headroom for devices to deliver a better overall experience. Where USB video was barely tolerable previously (both from a maximum resolution, latency, and video compression perspective), it's easy to imagine



that with 5-10 times the bandwidth available, USB video solutions should work that much better. Single-link DVI requires almost 2Gbps throughput. Where 480Mbps was limiting, 5Gbps is more than promising. With its promised 4.8Gbps speed, the standard will find its way into some products that previously weren't USB territory, like external RAID storage systems.

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

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

Compatibility

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

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

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

Super-Speed support for Windows XP is unknown at this point. Given that XP is a seven-year-old operating system, the likelihood of this happening is remote.

USB Type C

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

Alternate Mode

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

USB Power Delivery

The USB PD specification is also closely intertwined with USB Type-C. Currently, smartphones, tablets, and other mobile devices often use a USB connection to charge. A USB 2.0 connection provides up to 2.5 watts of power — that'll charge your phone, but that's about it. A laptop might require up to 60 watts, for example. The USB Power Delivery specification ups this power delivery to 100 watts. It's bi-



directional, so a device can either send or receive power. And this power can be transferred at the same time the device is transmitting data across the connection.

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

USB Type C and USB 3.1

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

HDMI 1.4

This topic explains the HDMI 1.4 and its features along with the advantages.

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

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

HDMI 1.4 Features

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

Advantages of HDMI

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

System specifications

System specification

Feature	Specification
Processor type	Intel Kaby Lake U-Quad Core
System Chipset	Integrated with the processor
Total cache	<ul style="list-style-type: none"> 8 MB Cache - 8th Generation Intel core i7 6 MB Cache - 8th Generation Intel core i5

Memory

Feature	Specification
Type	DDR4
Speed	2133/2400 MHz
Connectors	2
Capacity	4 GB, 8 GB, 16 GB
Minimum Memory	4 GB (1 x 4 GB)
Maximum memory	32 GB

Video specification

Feature	Specification
Video controller:	<ul style="list-style-type: none"> Intel Integrated UHD Graphics 620 (8th Gen Core i5, i7 processors) AMD Radeon 530 Graphics with 2GB/4GB GDDR5 vRAM
Memory	<ul style="list-style-type: none"> Shared system memory 2 GB/4 GB GDDR5 dedicated memory

Audio specification

Feature	Specification
Controller	Realtek ALC3254-CG
Integrated	<ul style="list-style-type: none"> 2 W x 2 Speakers HD Audio performance



Feature	Specification
	<ul style="list-style-type: none"> Digital-array microphones

Communication specification

Feature	Specification
Ethernet adapter	Network interface card capable of 10/100/1000 mb/s communication
Wireless	WLAN options: <ul style="list-style-type: none"> DW1820 2x2 ac 802.11ac+BT4.1 2x2 AC(Intel 7265) and 1x1 AC(Intel 3165 & DW1810) totally 3 cards

Ports and connectors specification

Feature	Specification
Audio	Universal audio jack connector
Network Adapter	1 x RJ45 connector
USB Type-C port	One
USB 3.1 with Gen 1	Two (one with PowerShare)
Video	HDMI
Memory card reader	SD card reader

Display specification

Feature	Specification
Type	<ul style="list-style-type: none"> FHD (1920 x 1080) anti-glare LED-backlit display HD (1366 x 768) anti-glare LED-backlit display
Size	14.0 inches
Dimensions:	
Height	190.00 mm(7.48 inches)
Width	323.5 mm(12.59 inches)
Diagonal	375.2 mm (14.77 inches)
Active area (X/Y)	<ul style="list-style-type: none"> FHD (1920 x 1080) HD (1366 x 768)
Maximum resolution	<ul style="list-style-type: none"> FHD (1920 x 1080) HD (1366 x 768)
Maximum Brightness	<ul style="list-style-type: none"> 14 inch FHD Anti-Glare LCD display with LED backlight

Feature	Specification
	<ul style="list-style-type: none"> 14 inch HD Anti-Glare LCD display with LED backlight
Operating angle	0° (closed) to 135°
Refresh rate	60 Hz
Horizontal	FHD (80/80/80/80)
Vertical	FHD (80/80/80/80)

Keyboard

Feature	Specification
Number of keys	<ul style="list-style-type: none"> United States: 80 keys United Kingdom: 81 keys Japan: 84 keys Brazil: 82 keys
Layout	QWERTY/AZERTY/Kanji

Touchpad specification

Feature	Specification
X/Y position resolution	1229 x 749
Dimensions	<ul style="list-style-type: none"> Width: 105 mm Height : 65 mm
Multi-Touch	Configurable single finger and multi-finger gestures

Camera

Feature	Specification
Camera type	HD fixed focus
Sensor type	CMOS Sensor
Still Resolution	1280 x 720 Pixels (Maximum)
Video Resolution	1280 x 720 Pixels (Maximum)
Diagonal	74 degrees

Storage specification

Features	Specification
Storage:	<ul style="list-style-type: none"> 500 GB - 5400 RPM 1 TB - 5400 RPM 128 GB M.2 SSD



- 256 GB M.2 SSD
- 512 GB M.2 SSD
- HDD Free Fall Sensor (FFS) Support

Battery specification

Feature	Specification
Wattage	42 Whr (3 Cell) Lithium-ion/polymer
Type	Li-ion/polymer
Length	175.36 mm (6.90 inch)
Height	5.9 mm (0.23 inch)
Width	90.73 mm (3.57 inch)
Weight	200.00 g
Voltage	11.4 VDC
Operating	<ul style="list-style-type: none"> · Charge: 0° C to 60° C (32° F to 140° F) · Discharge: 0° C to 70° C (32° F to 158° F)
Non-Operating	-20° C to 60° C (4° F to 140° F)
Typical Amp-hour capacity	3.684Ahr
Typical Watt-hour capacity	42 Whr
Coin-cell battery	3 V CR2032 lithium ion cell

AC adapter

Feature	Specification
Wattage	45 W and 65 W
Input voltage	100 VAC to 240 VAC
Input current (maximum)	1.3 A/1.7 A
Input frequency	50 Hz to 60 Hz
Output current (continuous)	2.31 A/3.34 A
Rated output voltage	19.50 VDC
Height	<ul style="list-style-type: none"> · 45 W: 26 mm (1.02 inches) · 65 W: 29.5 mm (1.16 inches)
Width	<ul style="list-style-type: none"> · 45 W: 40 mm (1.57 inches) · 65 W: 46 mm (1.81 inches)

Feature	Specification
Depth	<ul style="list-style-type: none"> 45 W: 94 mm (3.7 inches) 65 W: 108 mm (4.25 inches)
Weight	<ul style="list-style-type: none"> 45 W: 170 g 65 W: 265 g
Temperature range:	0° to 40°C
Operating	0°C to 40°C (32°F to 104°F)
Non-Operating	-40°C to 70°C (-40°F to 158°F)

Physical specification

Feature	Specification
Weight	1.685 kg (3.71 lbs)
Height (inches/mm)	<ul style="list-style-type: none"> Front – 16.1 mm (0.63 inch) Rear – 17.4 mm (0.68 inch)
Width (inches/mm)	343 mm (13.50 inch)
Depth (inches/mm)	240.8 mm (9.48 inch)

Environmental specification

Feature	Specification
Temperature range:	
Operating	10° C to 35° C (50° F to 95° F)
Storage	-40° C to 65° C (-40° F to 149° F)
Relative humidity (maximum):	
Storage	20% to 80% (non-condensing)
Maximum vibration:	
Operating	5 to 350 Hz at 0.0002 G ² /Hz
Storage	5 to 500 Hz at 0.001 to 0.01 G ² /Hz
Maximum shock:	
Operating	40 G +/- 5% with pulse duration of 2 msec +/-10% (equivalent to 51 cm/sec [20 in/sec])
Storage	105 G +/- 5% with pulse duration of 2 msec +/-10% (equivalent to 127 cm/sec [50 in/sec])
Maximum Altitude:	
Operating	-15.2 to 3048 m (-50 to 10,000 ft)
Storage	-15.2 to 10,668 m (-50 to 35,000 ft)



System setup

System setup enables you to manage your notebook hardware and specify BIOS level options. From the System setup, you can:

- Change the NVRAM settings after you add or remove hardware
- View the system hardware configuration
- Enable or disable integrated devices
- Set performance and power management thresholds
- Manage your computer security

Topics:

- [Boot menu](#)
- [Navigation keys](#)
- [System setup options](#)
- [Updating the BIOS in Windows](#)
- [System and setup password](#)

Boot menu

Press <F12> when the Dell™ logo appears to initiate a one-time boot menu with a list of the valid boot devices for the system. Diagnostics and BIOS Setup options are also included in this menu. The devices listed on the boot menu depend on the bootable devices in the system. This menu is useful when you are attempting to boot to a particular device or to bring up the diagnostics for the system. Using the boot menu does not make any changes to the boot order stored in the BIOS.


The options are:

- Legacy Boot:
 - Secure Digital (SD) Card
- UEFI Boot:
 - Windows Boot Manager
- Other Options:
 - BIOS Setup
 - BIOS Flash Update
 - Diagnostics
 - SupportAssist OS Recovery
 - Change Boot Mode Settings

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.

Keys	Navigation
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 options

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

General options

Table 2. General

Option	Description
System Information	<p>This section lists the primary hardware features of your computer.</p> <p>The options are:</p> <ul style="list-style-type: none"> • System Information • Memory Configuration • Processor Information • Device Information
Battery Information	<p>Displays the battery status and the type of AC adapter connected to the computer.</p>
Boot Sequence	<p>Allows you to change the order in which the computer attempts to find an operating system.</p> <p>The options are:</p> <ul style="list-style-type: none"> • Windows Boot Manager • Boot List Option: Allows you to change the boot list options. <p>Click one of the following options:</p> <ul style="list-style-type: none"> • Legacy • UEFI—Default
Advanced Boot Options	<p>Allows you to Enable Legacy Option ROMs.</p> <p>The options are:</p> <ul style="list-style-type: none"> • Enable Legacy Option ROMs—Default • Enable Attempt Legacy Boot • Enable UEFI Network Stack




Option	Description
UEFI Boot Path Security	<p>Allows you to control whether the system prompts the user to enter the Admin password when booting to a UEFI boot path.</p> <p>Click one of the following options:</p> <ul style="list-style-type: none"> • Always, Except Internal HDD—Default • Always • Never
Date/Time	<p>Allows you to set the date and time. The change to the system date and time takes effect immediately.</p>

System configuration

Table 3. System Configuration

Option	Description
Integrated NIC	<p>Allows you to configure the integrated network controller.</p> <p>Click one of the following options:</p> <ul style="list-style-type: none"> • Disabled • Enabled • Enabled w/PXE—Default
SATA Operation	<p>Allows you to configure the operating mode of the integrated SATA hard-drive controller.</p> <p>Click one of the following options:</p> <ul style="list-style-type: none"> • Disabled • AHCI • RAID On—Default <p>NOTE: SATA is configured to support RAID mode.</p>
Drives	<p>Allows you to enable or disable various drives on board.</p> <p>The options are:</p> <ul style="list-style-type: none"> • SATA-0 • SATA-2 • M.2 PCIe SSD-0 <p>All the options are set by default.</p>
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>Allows you to enable or disable the internal/integrated USB configuration.</p>

Option	Description
	<p>The options are:</p> <ul style="list-style-type: none"> · Enable USB Boot Support · Enable External USB Ports <p>All the options are set by default.</p> <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 (disabled by default).</p> <ul style="list-style-type: none"> · Enable PowerShare
Audio	<p>Allows you to enable or disable the integrated audio controller. By default, the Enable Audio option is selected.</p> <p>The options are:</p> <ul style="list-style-type: none"> · Enable Microphone · Enable Internal Speaker <p>This option is set by default.</p>
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%.</p> <p>The options are:</p> <ul style="list-style-type: none"> · Disabled · Dim · Bright—Default
Keyboard Backlight Always on with AC Power	<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 (selected by default).</p> <ul style="list-style-type: none"> · Keyboard Backlight with AC <p>The option is set by default.</p>
Miscellaneous devices	<p>Allows you to enable or disable the following devices:</p> <ul style="list-style-type: none"> · Camera · HardDrive Free Fall Protection <p>This options are set by default.</p>

Video screen options

Table 4. Video

Option	Description
LCD Brightness	Allows you to set the display brightness depending upon the power source. On Battery(50% is default) and On AC (100 % default).


Security

Table 5. Security

Option	Description
Admin Password	<p>Allows you to set, change, or delete the administrator(admin) password.</p> <p>The entries to set password are:</p> <ul style="list-style-type: none"> • Enter the old password: • Enter the new password: • Confirm new password: <p>Click OK once you set the password.</p> <p>i NOTE: For the first time login, "Enter the old password:" field is marked to "Not set". Hence, password has to be set for the first time you login and then you can change or delete the password.</p>
System Password	<p>Allows you to set, change, or delete the System password.</p> <p>The entries to set password are:</p> <ul style="list-style-type: none"> • Enter the old password: • Enter the new password: • Confirm new password: <p>Click OK once you set the password.</p> <p>i NOTE: For the first time login, "Enter the old password:" field is marked to "Not set". Hence, password has to be set for the first time you login and then you can change or delete the password.</p>
Internal HDD-0 Password	<p>Allows you to set, change, or delete the password on the system's internal hard disk drive (HDD).</p> <ul style="list-style-type: none"> • Enter the old password: • Enter the new password: • Confirm new password: <p>Click OK once you set the password.</p> <p>i NOTE: For the first time login, "Enter the old password:" field is marked to "Not set". Hence, password has to be set for the first time you login and then you can change or delete the password.</p>
M.2 SATA SSD Password	<p>Allows you to set, change, or delete the password on the system's M.2 SATA solid state drive.</p>



Option	Description
	<p>The entries to set password are:</p> <ul style="list-style-type: none"> • Enter the old password: • Enter the new password: • Confirm new password: <p>Click OK once you set the password.</p> <p> NOTE: For the first time login, "Enter the old password:" field is marked to "Not set". Hence, password has to be set for the first time you login and then you can change or delete the password.</p>
Strong Password	<p>Allows you to enforce the option to always set strong password.</p> <ul style="list-style-type: none"> • Enable Strong Password <p>This option is not set by default.</p>
Password Configuration	<p>You can define the length of your password. Min = 4, Max = 32</p>
Password Bypass	<p>Allows you to bypass the System password and the Internal HDD password, when it is set, during a system restart.</p> <p>Click one of the options:</p> <ul style="list-style-type: none"> • Disabled—Default • Reboot bypass
Password Change	<p>Allows you to change the System password when the administrator password is set.</p> <ul style="list-style-type: none"> • Allow Non-Admin Password Changes <p>This option is set by default.</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> <ul style="list-style-type: none"> • Allow Wireless Switch Changes <p>This option is not set by default.</p>
UEFI Capsule Firmware Updates	<p>Allows you to update the system BIOS via UEFI capsule update packages.</p> <ul style="list-style-type: none"> • Enable UEFI Capsule Firmware Updates <p>This option is set by default.</p>
TPM 2.0 Security	<p>Allows you to enable or disable the Trusted Platform Module (TPM) during POST.</p> <p>The options are:</p> <ul style="list-style-type: none"> • TPM On—Default • Clear • PPI Bypass for Enable Commands • PPI Bypass for Disable Commands • PPI Bypass for Clear Command • Attestation enable—Default • Key storage enable—Default • SHA-256—Default

Option	Description
	<p>Click any one of the following:</p> <ul style="list-style-type: none"> • Enabled—Default • Disabled
Computrace (R)	<p>Allows you to activate or disable the optional Computrace software.</p> <p>The options are:</p> <ul style="list-style-type: none"> • Deactivate • Disable • Activate—Default
CPU XD Support	<p>Allows you to enable the Execute Disable mode of the processor.</p> <ul style="list-style-type: none"> • Enable CPU XD Support <p>This option is set by default.</p>
Admin Setup Lockout	<p>Allows you to prevent users from entering Setup when an administrator password is set.</p> <ul style="list-style-type: none"> • Enable Admin Setup Lockout <p>This option is not set by default.</p>
Master Password Lockout	<p>Allows you to disable master password support.</p> <ul style="list-style-type: none"> • Enable Master Password Lockout <p>This option is not set by default.</p> <p> NOTE: Hard Disk password should be cleared before the settings can be changed.</p>

Secure boot

Table 6. Secure Boot

Option	Description
Secure Boot Enable	<p>Allows you to enable or disable the Secure Boot Feature.</p> <p>Click one of the following options:</p> <ul style="list-style-type: none"> • Disabled—Default • Enabled
Expert Key Management	<p>Allows you to enable or disable Expert Key Management.</p> <ul style="list-style-type: none"> • Enable Custom Mode <p>This option is not set by default.</p> <p>The Custom Mode Key Management options are:</p> <ul style="list-style-type: none"> • PK—Default • KEK • db • dbx

Intel Software Guard Extensions options

Table 7. Intel Software Guard Extensions

Option	Description
Intel SGX Enable	<p>This field specifies you to provide a secured environment for running code/storing sensitive information in the context of the main OS.</p> <p>Click one of the following options:</p> <ul style="list-style-type: none"> • Disabled • Enabled • Software controlled—Default
Enclave Memory Size	<p>This option sets SGX Enclave Reserve Memory Size</p> <p>Click one of the following options:</p> <ul style="list-style-type: none"> • 32 MB • 64 MB • 128 MB—Default

Performance

Table 8. Performance

Option	Description
Multi Core Support	<p>This field specifies whether the process has one or all cores enabled. The performance of some applications improves with the additional cores.</p> <ul style="list-style-type: none"> • All—Default • 1 • 2 • 3
Intel SpeedStep	<p>Allows you to enable or disable the Intel SpeedStep mode of processor.</p> <ul style="list-style-type: none"> • Enable Intel SpeedStep <p>This option is set by default.</p>
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>This option is set by default.</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




Option	Description
	This option is set by default.
Hyper-Thread Control	<p>Allows you to enable or disable the HyperThreading in the processor.</p> <ul style="list-style-type: none"> • Disabled • Enabled—Default

Power management

Table 9. Power Management

Option	Description
AC Behavior	<p>Allows you to enable or disable the computer from turning on automatically when an AC adapter is connected.</p> <ul style="list-style-type: none"> • Wake on AC <p>This option is not set by default.</p>
Enable Intel Speed Shift Technology	<p>Allows you to enable or disable the Intel Speed Shift Technology.</p> <ul style="list-style-type: none"> • Enabled—Default
Auto On Time	<p>Allows you to set the time at which the computer must turn on automatically.</p> <p>The options are:</p> <ul style="list-style-type: none"> • Disabled—Default • Every Day • Weekdays • Select Days <p>This option is not set by default.</p>
USB Wake Support	<p>Allows you to enable USB devices to wake the system from standby.</p> <ul style="list-style-type: none"> • Enable USB Wake Support <p>This option is not set by default.</p>
Wake on LAN	<p>This option allows the computer to power up from the off state when triggered by a special LAN signal. Wake-up from the Standby state is unaffected by this setting and must be enabled in the operating system. This feature only works when the computer is connected to AC power supply.</p> <ul style="list-style-type: none"> • Disabled—Default - Does not allow the system to power on by special LAN signals when it receives a wake-up signal from the LAN or wireless LAN. • LAN Only - Allows the system to be powered on by special LAN signals.
Peak shift	<p>This option minimizes AC power usage at times of peak demand.</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>
Primary Battery Charge Configuration	<p>Allows you to select the charging mode for the battery.</p>

Option	Description
	<p>The options are:</p> <ul style="list-style-type: none"> • Adaptive—Default • 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. • 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>

Post behavior

Table 10. POST Behavior

Option	Description
Adapter Warnings	<p>Allows you to enable or disable the system setup (BIOS) warning messages when you use certain power adapters.</p> <ul style="list-style-type: none"> • Enable Adapter Warnings—Default
Fn Lock Options	<p>Allows you to let hot key combinations Fn + Esc toggle the primary behavior of F1–F12, between their standard and secondary functions. If you disable this option, you cannot toggle dynamically the primary behavior of these keys.</p> <ul style="list-style-type: none"> • Fn Lock—Default <p>Click one of the following options:</p> <ul style="list-style-type: none"> • Lock Mode Disable/Standard • Lock Mode Enable/Secondary—Default
Fastboot	<p>Allows you to speed up the boot process by bypassing some of the compatibility steps.</p> <p>Click one of the following options:</p> <ul style="list-style-type: none"> • Minimal • Thorough—Default • Auto
Extended BIOS POST Time	<p>Allows you to create an additional preboot delay.</p> <p>Click one of the following options:</p> <ul style="list-style-type: none"> • 0 seconds—Default • 5 seconds • 10 seconds
Full Screen Logo	<p>Allows you to display full screen logo, if your image matches screen resolution.</p> <ul style="list-style-type: none"> • Enable Full Screen Logo <p>This option is not set by default.</p>

Option	Description
Sign of Life Indication	Allows the system to indicate during POST that the power button press has been acknowledged by turning on the keyboard backlight.
Warnings and Errors	<p>Allows you to select different options to either stop, prompt and wait for user input, continue when warnings are detected but pause on errors, or continue when either warnings or errors are detected during the POST process.</p> <p>Click one of the following options:</p> <ul style="list-style-type: none"> • Prompt on Warnings and Errors—Default • Continue on Warnings • Continue on Warnings and Errors

Virtualization support

Table 11. Virtualization Support

Option	Description
Virtualization	<p>This option specifies whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by the Intel Virtualization technology.</p> <ul style="list-style-type: none"> • Enable Intel Virtualization Technology <p>This option is set by default.</p>
VT for Direct I/O	<p>Enables or disables the Virtual Machine Monitor (VMM) from utilizing the additional hardware capabilities provided by the Intel Virtualization technology for direct I/O.</p> <ul style="list-style-type: none"> • Enable VT for Direct I/O <p>This option is set by default.</p>

Wireless options


Table 12. Wireless

Option	Description
Wireless Switch	<p>Allows to set the wireless devices that can be controlled by the wireless switch.</p> <p>The options are:</p> <ul style="list-style-type: none"> • WLAN/WiGig • Bluetooth <p>All the options are enabled by default.</p>
Wireless Device Enable	<p>Allows you to enable or disable the internal wireless devices.</p> <p>The options are:</p> <ul style="list-style-type: none"> • WLAN/WiGig • Bluetooth

Option	Description
	All the options are enabled by default.

Maintenance

Table 13. Maintenance

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	Allows you to flash previous revisions of the system firmware. <ul style="list-style-type: none"> • Allow BIOS Downgrade This option is set by default.
Data Wipe	Allows you to securely erase data from all internal storage devices. <ul style="list-style-type: none"> • Wipe on Next Boot This option is not set by default.
Bios Recovery	<p>BIOS Recovery from Hard Drive—This option is set by default. Allows you to recover the corrupted BIOS from a recovery file on the HDD or an external USB key.</p> <p>BIOS Auto-Recovery— Allows you to recover the BIOS automatically.</p> <p> NOTE: BIOS Recovery from Hard Drive field should be enabled.</p> <p>Always Perform Integrity Check—Performs integrity check on every boot.</p>

System logs

Table 14. System Logs

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.



SupportAssist system resolution

Table 15. SupportAssist System Resolution

Option	Description
Auto OS Recovery Threshold	<p>The Auto OS Recovery Threshold setup option controls the automatic boot flow for Support Assist System Resolution Console and Dell OS Recovery tool.</p> <p>Click one of the following options:</p> <ul style="list-style-type: none">• OFF• 1• 2—Default• 3
SupportAssist OS Recovery	Allows you to recover the SupportAssist OS Recovery (Disabled by default)

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.

Updating BIOS on systems with bitlocker enabled

CAUTION: If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, see Knowledge Article: <http://www.dell.com/support/article/us/en/19/SLN153694/updating-bios-on-systems-with-bitlocker-enabled?lang=EN>

Updating your system BIOS using a USB flash drive

If the system cannot load into Windows but there is still a need to update the BIOS, download the BIOS file using another system and save it to a bootable USB Flash Drive.

NOTE: You will need to use a bootable USB Flash drive. Please refer to the following article for further details: <http://www.dell.com/support/article/us/en/19/SLN143196/how-to-create-a-bootable-usb-flash-drive-using-dell-diagnostic-deployment-package--ddd-p-?lang=EN>

- 1 Download the BIOS update .EXE file to another system.
- 2 Copy the file e.g. O9010A12.EXE onto the bootable USB Flash drive.
- 3 Insert the USB Flash drive into the system that requires the BIOS update.
- 4 Restart the system and press F12 when the Dell Splash logo appears to display the One Time Boot Menu.
- 5 Using arrow keys, select **USB Storage Device** and click Return.
- 6 The system will boot to a Diag C:\> prompt.
- 7 Run the file by typing the full filename e.g. O9010A12.exe and press Return.
- 8 The BIOS Update Utility will load, follow the instructions on screen.



Figure 4. DOS BIOS Update Screen

Updating the Dell BIOS in Linux and Ubuntu environments

If you want to update the system BIOS in a Linux environment such as Ubuntu, see <http://www.dell.com/support/article/us/en/19/SLN171755/updating-the-dell-bios-in-linux-and-ubuntu-environments?lang=EN>.



Flashing the BIOS from the F12 One-Time boot menu

Updating your system BIOS using a BIOS update .exe file copied to a FAT32 USB key and booting from the F12 one time boot menu.

BIOS Update

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

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

NOTE: Only systems with BIOS Flash Update option in the F12 One-Time Boot Menu can use this function.

Updating from the One-Time Boot Menu

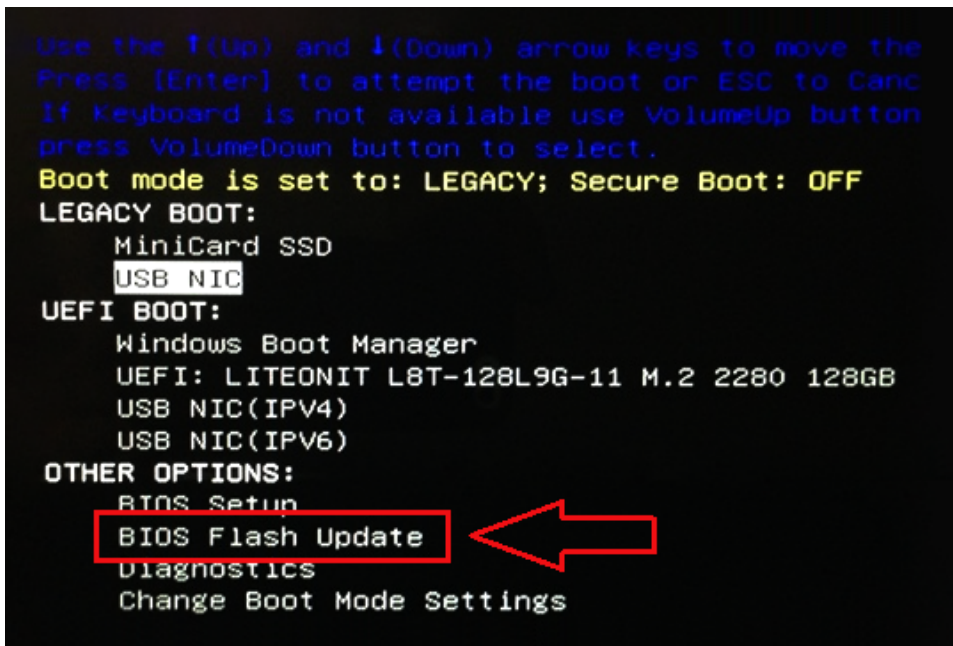
To update your BIOS from the F12 One-Time boot menu, you will need:

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

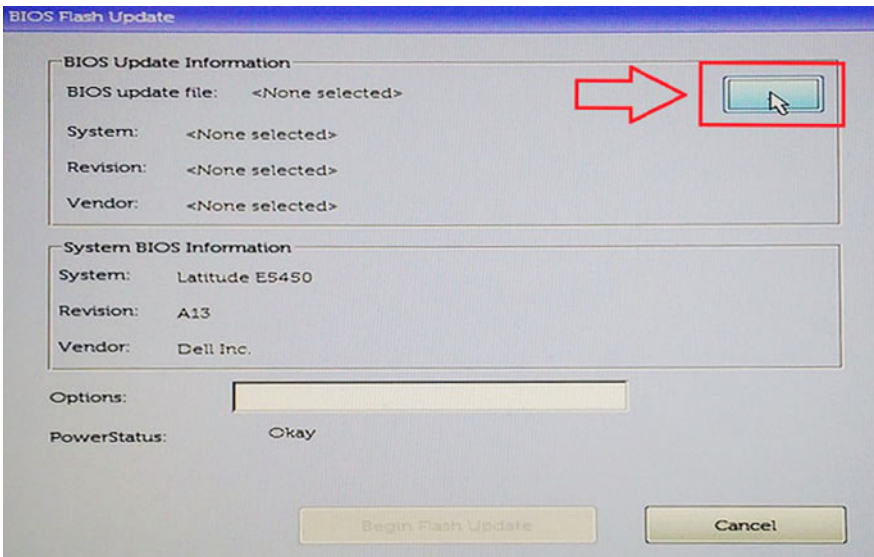
Perform the following steps to execute the BIOS update flash process from the F12 menu:

CAUTION: Do not power off the system during the BIOS update process. Powering off the system could make the system fail to boot.

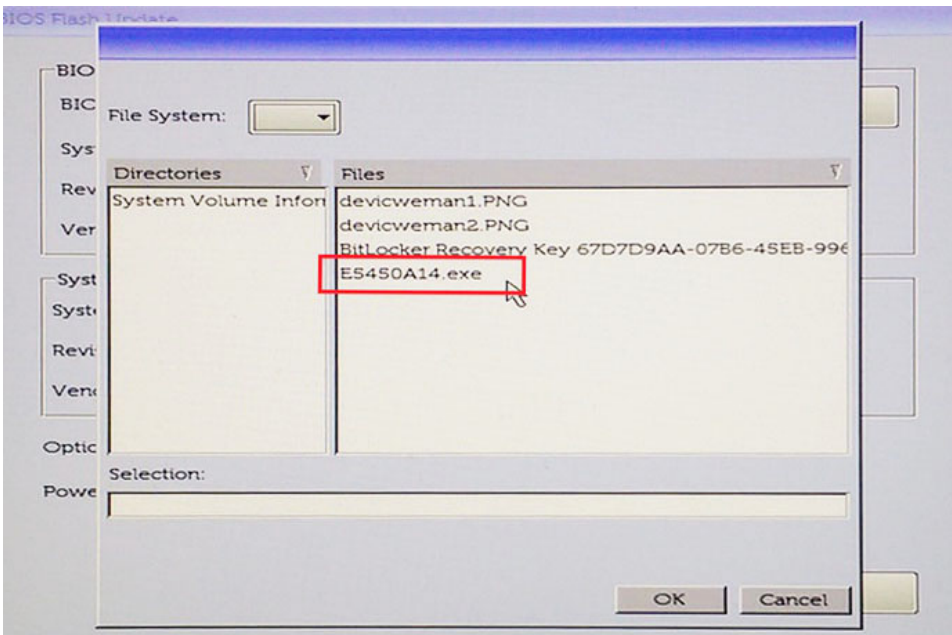
- 1 From a power off state, insert the USB key where you copied the flash into a USB port of the system .
- 2 Power on the system and press the F12 key to access the One-Time Boot Menu, Highlight BIOS Flash Update using the arrow keys then press **Enter**.



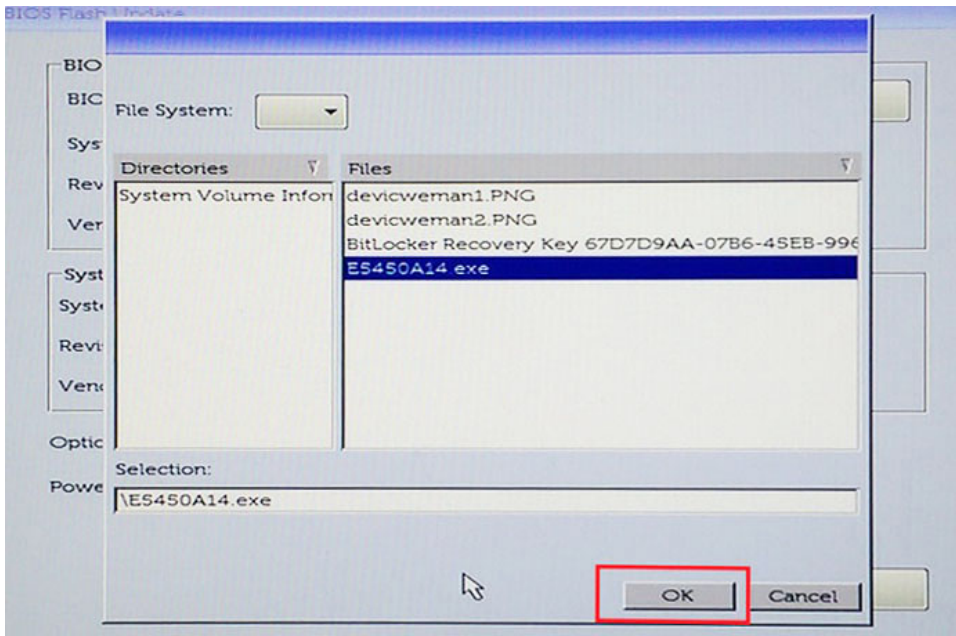
- 3 The Bios flash menu will open then click the browse button.



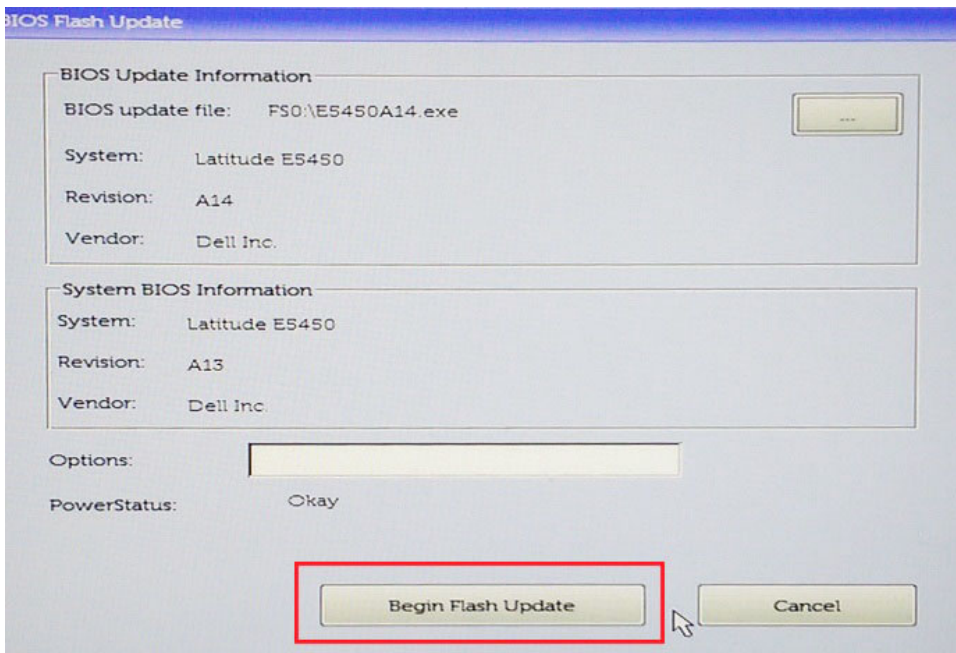
- 4 The E5450A14.exe file is shown as an example in the following screenshot. The actual file name may vary.



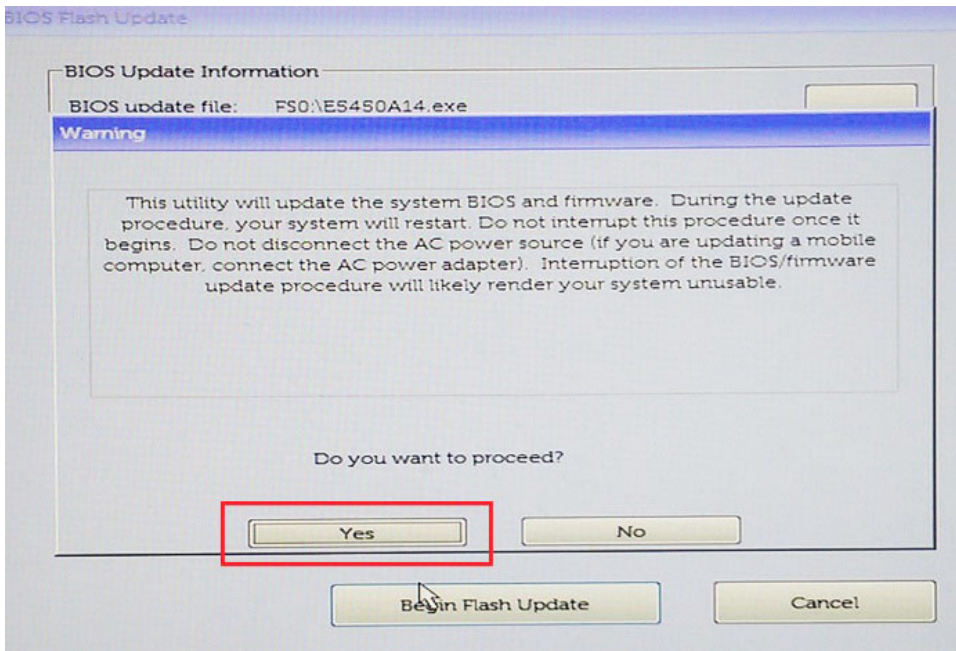
- 5 Once the file is selected, it will show in the file selection box and you can click the OK button to continue.



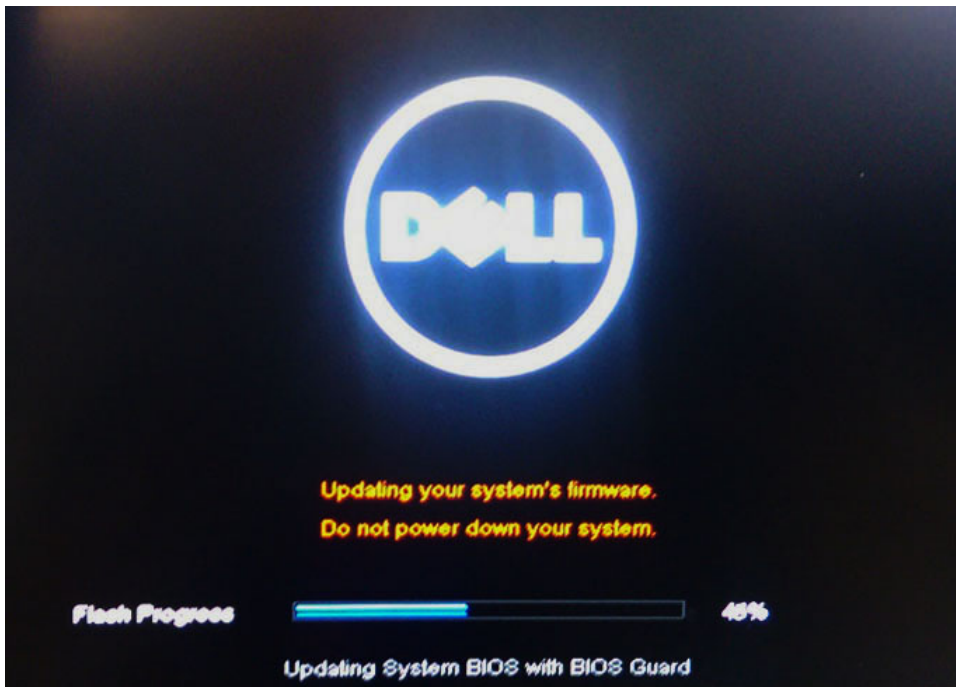
6 Click the **Begin Flash Update** button.



7 A warning box is displayed asking you if you want to proceed. Click the Yes button to begin the flash.



- 8 At this point the BIOS flash will execute, the system will reboot and then the BIOS flash will start and a progress bar will show the progress of the flash. Depending on the changes included in the update, the progress bar may go from zero to 100 multiple times and the flash process could take as long as 10 minutes. Generally this process takes two to three minutes.



- 9 Once complete, the system will reboot and the BIOS update process is completed.

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.

- 1 In the **System BIOS** or **System Setup** screen, select **Security** and press Enter.
The **Security** screen is displayed.
- 2 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, ("), (+), (,), (-), (.), (/), (;), ([), (\), (]), (`).
- 3 Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.
- 4 Press Esc and a message prompts you to save the changes.
- 5 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.

- 1 In the **System BIOS** or **System Setup** screen, select **System Security** and press Enter.
The **System Security** screen is displayed.
- 2 In the **System Security** screen, verify that **Password Status** is **Unlocked**.
- 3 Select **System Password**, alter or delete the existing system password and press Enter or Tab.
- 4 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 promoted. If you delete the System and/or Setup password, confirm the deletion when promoted.

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

Software

This chapter details the supported operating systems along with instructions on how to install the drivers.

Topics:

- [Operating system configurations](#)
- [Downloading drivers](#)
- [Chipset drivers](#)
- [Graphics controller driver](#)
- [USB drivers](#)
- [Network drivers](#)
- [Audio drivers](#)
- [Storage controller drivers](#)
- [Other drivers](#)

Operating system configurations

This topic lists the operating system supported by

Table 16. Operating systems

Windows 10	<ul style="list-style-type: none"> • Microsoft Windows 10 Home 64 bit • Microsoft Windows10 Professional 64 bit • Microsoft Windows 10 National Academic 64-bit (Bid Desk)
Others	<ul style="list-style-type: none"> • Ubuntu 16.04 LTS 64-bit

Downloading drivers

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

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

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

Chipset drivers

Verify if the Intel chipset and Intel Management Engine Interface drivers are already installed in the computer.



- System devices
 - ACPI Fixed Feature Button
 - ACPI Lid
 - ACPI Power Button
 - ACPI Processor Aggregator
 - ACPI Sleep Button
 - ACPI Thermal Zone
 - Charge Arbitration Driver
 - Composite Bus Enumerator
 - Dell Diag Control Device
 - Dell System Analyzer Control Device
 - High Definition Audio Controller
 - High precision event timer
 - Intel(R) Management Engine Interface
 - Intel(R) Power Engine Plug-in
 - Intel(R) Serial IO I2C Host Controller - 9D60
 - Intel(R) Xeon(R) E3 - 1200 v6/7th Gen Intel(R) Core(TM) Host Bridge/DRAM Registers - 5914
 - Legacy device
 - Microsoft ACPI-Compliant Embedded Controller
 - Microsoft ACPI-Compliant System
 - Microsoft System Management BIOS Driver
 - Microsoft UEFI-Compliant System
 - Microsoft Virtual Drive Enumerator
 - Microsoft Windows Management Interface for ACPI
 - Mobile 6th/7th Generation Intel(R) Processor Family I/O PCI Express Root Port #1 - 9D10
 - Mobile 6th/7th Generation Intel(R) Processor Family I/O PCI Express Root Port #6 - 9D15
 - Mobile 6th/7th Generation Intel(R) Processor Family I/O PCI Express Root Port #5 - 9D14
 - Mobile 6th/7th Generation Intel(R) Processor Family I/O PMC - 9D21
 - Mobile 6th/7th Generation Intel(R) Processor Family I/O SMBUS - 9D23
 - Mobile 6th/7th Generation Intel(R) Processor Family I/O Thermal subsystem - 9D31
 - Mobile 7th Generation Intel(R) Processor Family I/O LPC Controller (U with iHDCP2.2 Premium)
 - NDIS Virtual Network Adapter Enumerator
 - PCI Express Root Complex
 - Plug and Play Software Device Enumerator
 - Programmable interrupt controller
 - Remote Desktop Device Redirector Bus
 - STMicroelectronics 3-Axis Digital Accelerometer
 - System CMOS/real time clock
 - System timer
 - UMBus Root Bus Enumerator

Graphics controller driver

Verify if the graphics controller driver is already installed in the computer.

- Display adapters
 - Intel(R) UHD Graphics 620
 - Radeon (TM) 530

USB drivers

Verify if the USB drivers are already installed in the computer.

- Universal Serial Bus controllers
 - Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
 - UCSI USB Connector Manager
 - USB Composite Device
 - USB Composite Device
 - USB Root Hub (USB 3.0)

Network drivers

The driver is labeled as Intel I219-LM Ethernet Driver.

- Network adapters
 - Bluetooth Device (Personal Area Network)
 - Bluetooth Device (RFCOMM Protocol TDI)
 - Intel(R) Dual Band Wireless-AC 7265
 - Realtek PCIe GBE Family Controller

Audio drivers

Verify if the audio drivers are already installed in the computer.

- Audio inputs and outputs
 - Microphone (Realtek Audio)
 - Speakers / Headphones (Realtek Audio)
- Sound, video and game controllers
 - Intel(R) Display Audio
 - Realtek Audio

Storage controller drivers

Verify if the storage controller drivers are already installed in the computer.

- Storage controllers
 - Intel(R) Chipset SATA/PCIe RST Premium Controller
 - Microsoft Storage Spaces Controller

Other drivers

This section lists different driver details for all the other components in the Device Manager.

Security device drivers




Verify if the security device drivers are already installed in the computer.

- Security devices
 - Trusted Platform Module 2.0



Software device drivers

Verify if the software device drivers are already installed in the computer.

- ▼  Software devices
 -  Microsoft Device Association Root Enumerator
 -  Microsoft GS Wavetable Synth



Human Interface Device drivers

Verify if the human interface device drivers are already installed in the computer.

- ▼  Human Interface Devices
 -  Converted Portable Device Control device
 -  HID-compliant consumer control device
 -  HID-compliant system controller
 -  HID-compliant touch pad
 -  HID-compliant vendor-defined device
 -  HID-compliant wireless radio controls
 -  I2C HID Device
 -  Intel(R) HID Event Filter
 -  Microsoft Input Configuration Device
 -  Portable Device Control device

Firmware

Verify if the Firmware drivers are already installed in the computer.

- ▼  Firmware
 -  System Firmware

Intel Dynamic Platform and Thermal Framework

Verify if the Intel Dynamic Platform and Thermal Framework drivers are already installed in the computer.

- ▼  Intel(R) Dynamic Platform and Thermal Framework
 -  Intel(R) Dynamic Platform and Thermal Framework Generic Participant
 -  Intel(R) Dynamic Platform and Thermal Framework Generic Participant
 -  Intel(R) Dynamic Platform and Thermal Framework Generic Participant
 -  Intel(R) Dynamic Platform and Thermal Framework Manager
 -  Intel(R) Dynamic Platform and Thermal Framework Memory Participant
 -  Intel(R) Dynamic Platform and Thermal Framework Processor Participant

Troubleshooting

Dell Enhanced Pre-Boot System Assessment — ePSA diagnostic 3.0

You can invoke the ePSA diagnostics by performing either of the following steps:

- Press the F12 key when the system boots and choosing **Diagnostics** option.
- Press Fn+PWR when the system boots.

For more details, see [Dell EPSA Diagnostic 3.0](#).

Running the ePSA diagnostics

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

Diagnostic LED

This section details the diagnostic features of the battery LED in a notebook.

Instead of beep codes errors are indicated via the bicolor Battery Charge LED. A specific blink pattern is followed by flashing a pattern of flashes in amber, followed by white. The pattern then repeats.

NOTE: The diagnostic pattern will consist of a two digit number being represented by a first group of LED blinks (1 through 9) in amber, followed by a 1.5 second pause with the LED off, and then a second group of LED blinks (1 through 9) in white. This is then followed by a three second pause, with the LED off, before repeating over again. Each LED blink takes 0.5 seconds.

The system will not shutdown when displaying the Diagnostic Error Codes. Diagnostic Error Codes will always supersede any other use of the LED. For instance, on Notebooks, battery codes for Low Battery or Battery Failure situations will not be displayed when Diagnostic Error Codes are being displayed:

Table 17. LED pattern

Blinking pattern		Problem Description	Suggested Resolution
Amber	White		



2	1	processor	processor failure
2	2	system board, BIOS ROM	system board, covers BIOS corruption or ROM error
2	3	memory	no memory/no RAM detected
2	4	memory	memory failure/RAM failure
2	5	memory	invalid memory installed
2	6	system board; chipset	system board/ chipset error
2	7	display	display failure
3	1	RTC power failure	coin-cell battery failure
3	2	PCI/Video	PCI/Video card/chip failure
3	3	BIOS recovery 1	recovery image nor found
3	4	BIOS recovery 2	recovery image found but invalid

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.

