

# Dell Precision 17 7000 series (7710) Owner's Manual

Regulatory Model: P29E  
Regulatory Type: P29E001



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2015 - 11

Rev. A00

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# Working on your computer


## Safety instructions


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


- You have read the safety information that shipped with your computer.
- A component can be replaced or--if purchased separately--installed by performing the removal procedure in reverse order.


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


 **WARNING: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at [www.dell.com/regulatory\\_compliance](http://www.dell.com/regulatory_compliance)**

 **CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.**

 **CAUTION: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface, such as 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.


## Before working inside your computer

To avoid damaging your computer, perform the following steps before you begin working inside the computer.

1. Ensure that you follow the [Safety instructions](#).
2. Ensure that your work surface is flat and clean to prevent the computer cover from being scratched.
3. Turn off your computer, see [Turning off your computer](#).

 **CAUTION: To disconnect a network cable, first unplug the cable from your computer and then unplug the cable from the network device.**

4. Disconnect all the network cables from the computer.
5. Disconnect your computer and all attached devices from the electrical outlets.
6. Press and hold the power button while the computer is unplugged to ground the system board.
7. Remove the cover.


 **CAUTION: Before touching anything inside your computer, ground yourself by touching an unpainted metal surface, such as the metal at the back of the computer. While you work, periodically touch an unpainted metal surface to dissipate static electricity, which could harm internal components.**




## Recommended tools


The procedures in this document require the following tools:

- Small flat blade screwdriver
- Phillips #0 screwdriver
- Phillips #1 screwdriver
- Small plastic scribe

## Turning off your computer


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

1. Turning off your computer:
  - In Windows 10 (using a touch enabled device or mouse):
    1. Click or tap .
    2. Click or tap  and then click or touch **Shut down**.
  - In Windows 8 (using a touch enabled device):
    1. Swipe in from the right edge of the screen, opening the **Charms** menu and select **Settings**.
    2. Tap  and then tap **Shut down**
  - In Windows 8 (using a mouse):

1. Point to upper-right corner of the screen and click **Settings**.
  2. Click  and then click **Shut down**.
  - In Windows 7:
    1. Click **Start**.
    2. Click **Shut Down**.
- or
1. Click **Start**.
  2. Click the arrow in the lower-right corner of the **Start** menu and then click **Log off**.
2. Ensure that the computer and all attached devices are turned off. If your computer and attached devices did not automatically turn off when you shut down your operating system, press and hold the power button for about 6 seconds to turn them off.

## After working inside your computer

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

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

1. 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. Replace the battery.
4. Replace the base cover.
5. Connect your computer and all attached devices to their electrical outlets.
6. Turn on your computer.

## Removing and installing components

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

### Removing the Secure Digital (SD) card

1. Follow the procedure in [Before working inside your computer](#).
2. Press in on the SD card to release it from the computer. Slide the SD card out of the computer.

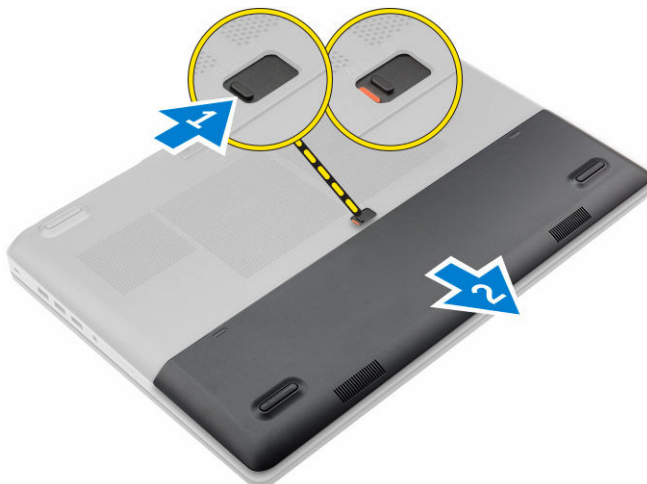


### Installing the SD card

1. Push in the SD card into its slot until it clicks into place.
2. Follow the procedure in [After working inside your computer](#)

### Removing the battery cover

1. Follow the procedure in [Before working inside your computer](#).
2. Perform the following steps as shown in the illustration:
  - a. Slide the release latch to unlock the battery cover [1].
  - b. Slide and lift the battery cover to remove it from the computer [2].



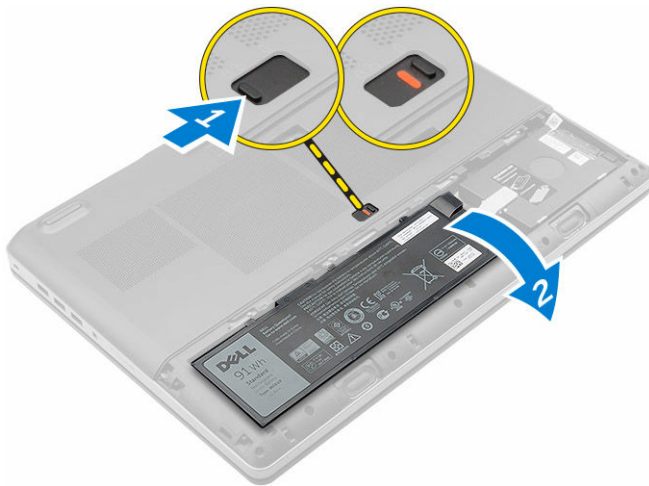


## Installing the battery cover

1. Slide the battery cover into its slot until it clicks into place.
2. Follow the procedure in [After working inside your computer](#).

## Removing the battery

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [battery cover](#).
3. Perform the following steps as shown in the illustration:
  - a. Slide the release latch to unlock the battery [1].
  - b. Lift and remove the battery from the computer [2].

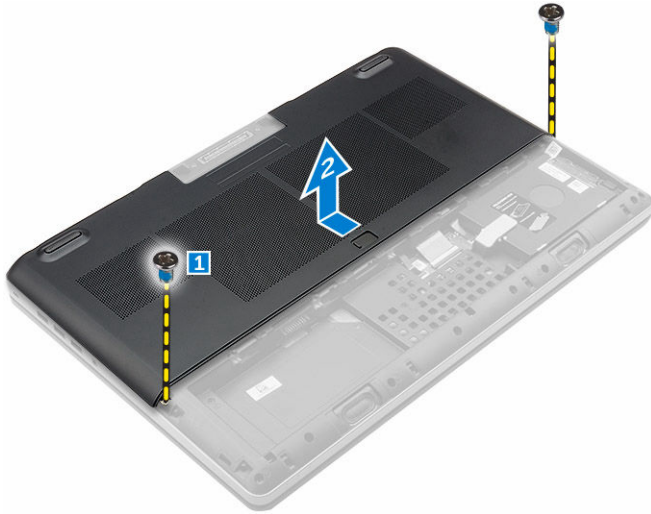


## Installing the battery

1. Slide the battery into its slot until it clicks into place.
2. Install the [battery cover](#).
3. Follow the procedure in [After working inside your computer](#)

## Removing the base cover

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery cover](#)
  - b. [battery](#)
3. Perform the following steps as shown in the illustration:
  - a. Remove the screws that secure the base cover to the computer [1].
  - b. Slide and lift the base cover away from the computer [2].

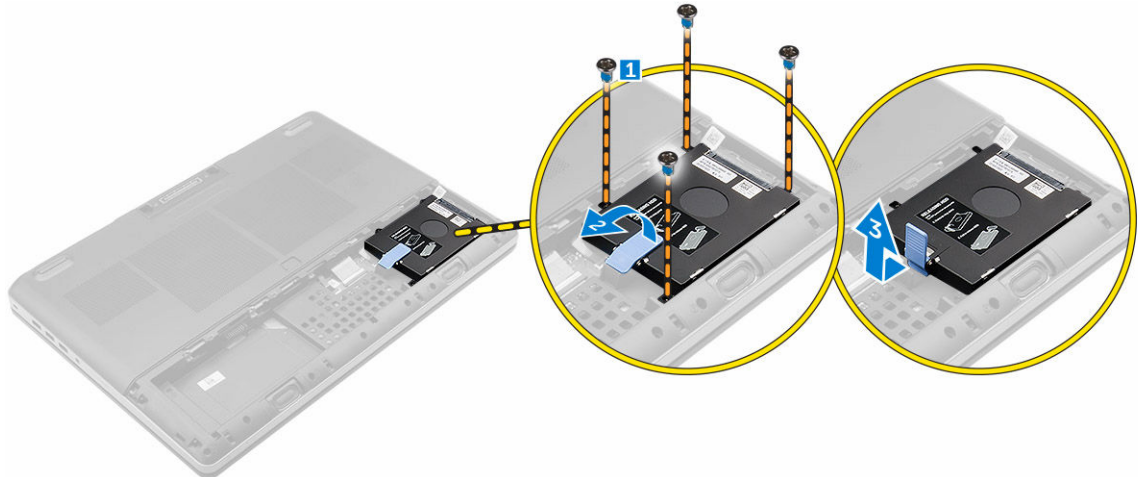


## Installing the base cover

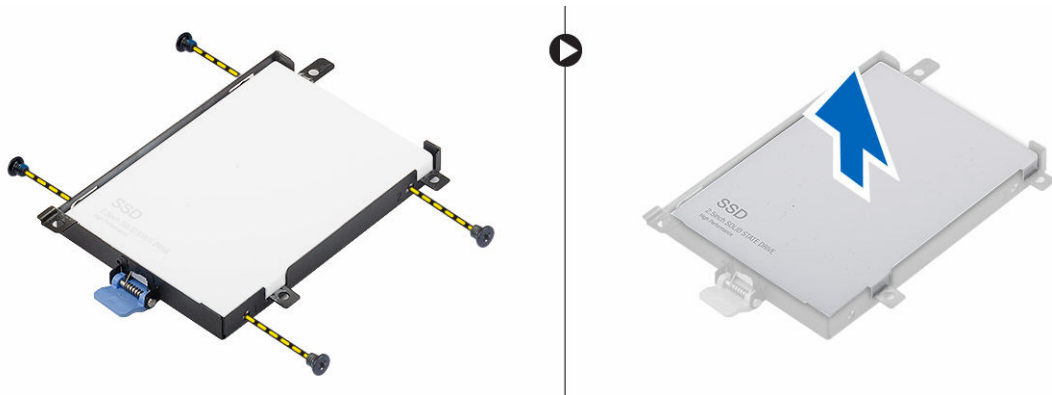
1. Slide the base cover to align with the screw holes on the computer.
2. Tighten the screws to secure the base cover to the computer.
3. Install the:
  - a. [battery](#)
  - b. [battery cover](#)
4. Follow the procedure in [After working inside your computer](#).

## Removing the hard drive

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery cover](#)
  - b. [battery](#)
3. Perform the following steps as shown in the illustration:
  - a. Remove the screws that secure the hard drive to the computer [1].
  - b. Lift the hard-drive latch to the unlock position [2].
  - c. Slide and lift the hard drive from the computer [3].



4. Remove the screws that secure the hard drive. Lift the hard drive from the bracket.

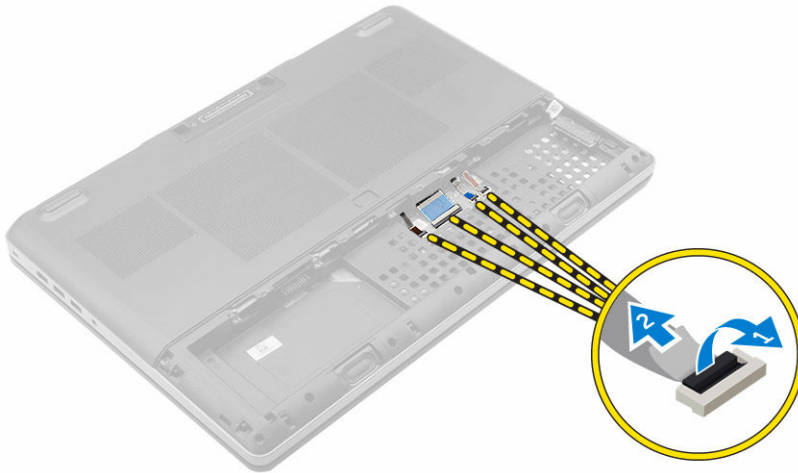


## Installing the hard drive

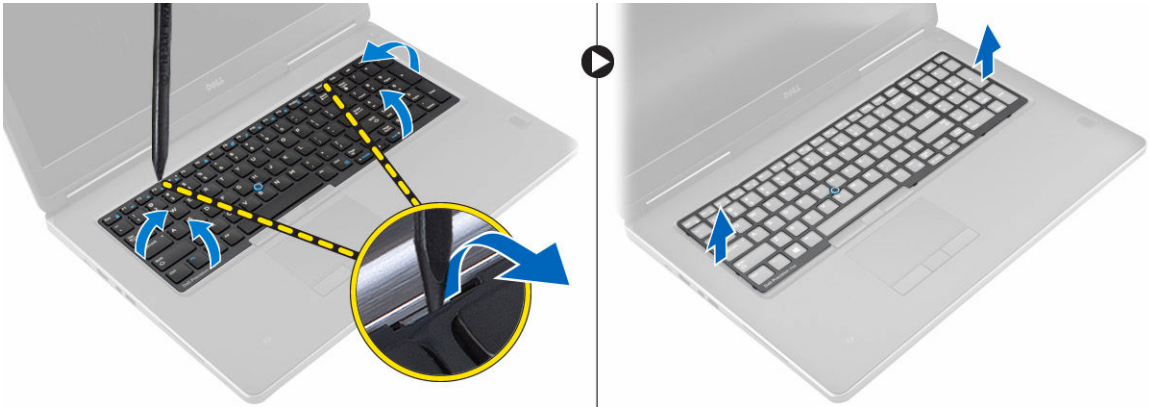
1. Tighten the screws to secure the hard drive to the hard-drive bracket.
2. Insert the hard drive into its slot in the computer.
3. Tighten the screws to secure the hard drive to the computer.
4. Install the:
  - a. [battery](#)
  - b. [battery cover](#)
5. Follow the procedure in [After working inside your computer](#)

## Removing the keyboard

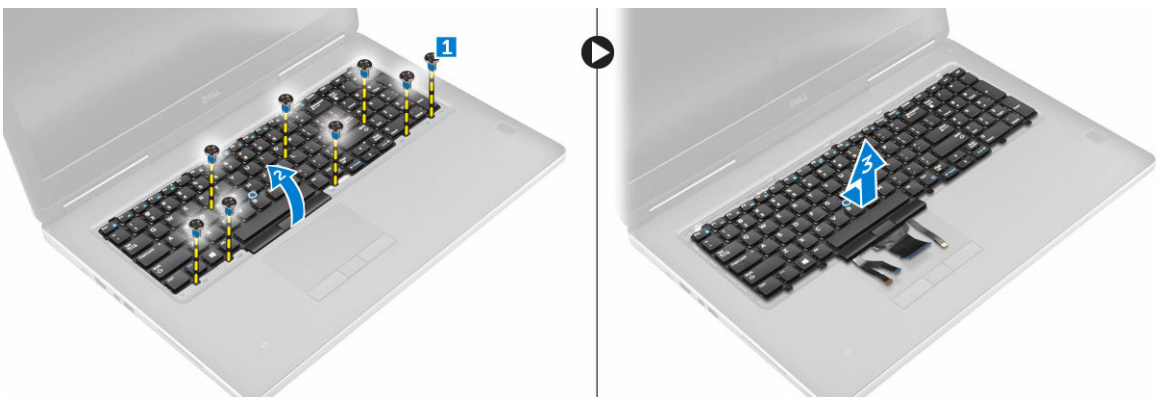
1. Follow the procedures in [Before working inside your computer](#).
2. Remove the:
  - a. [battery cover](#)
  - b. [battery](#)
  - c. [hard drive](#)
3. Lift the tab and disconnect the keyboard cables from the system board [1, 2].



4. Pry the keyboard trim starting from the bottom and work along the top edge and remove it from the computer.



5. Perform the following steps as shown in the illustration:
  - a. Remove the screws that secure the keyboard to the computer [1].
  - b. Lift the front side and slide the keyboard to remove it away from the computer [2, 3].



## Installing the keyboard

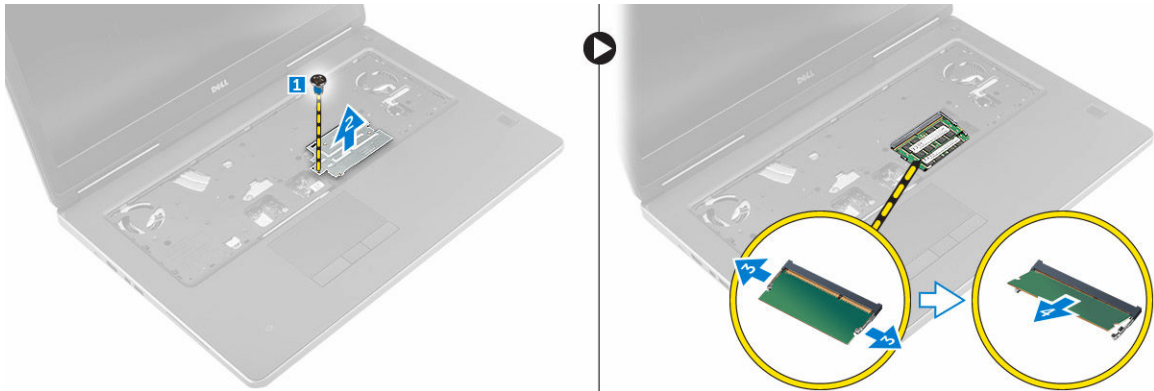
1. Press and align the keyboard to its compartment.
2. Tighten the screws to secure the keyboard to the computer.
3. Slide the keyboard trim from the front and align it to its position on the computer. Ensure that the keyboard trim clicks into its place
4. Connect the keyboard-data cable to the system board.

 **NOTE:** Ensure that you fold the keyboard-data cable in perfect alignment.

5. Install the:
  - a. [hard drive](#)
  - b. [battery](#)
  - c. [battery cover](#)
6. Follow the procedure in [After working inside your computer](#).

## Removing the secondary memory

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery cover](#)
  - b. [battery](#)
  - c. [hard drive](#)
  - d. [keyboard](#)
3. Perform the following steps as shown in the illustration:
  - a. Remove the screw that secures the memory shield to the computer [1].
  - b. Lift and remove the memory shield from the computer [2].
  - c. Pry the retention clips away from the memory module until it pops up [3].
  - d. Lift the memory module and remove it from the computer [4].



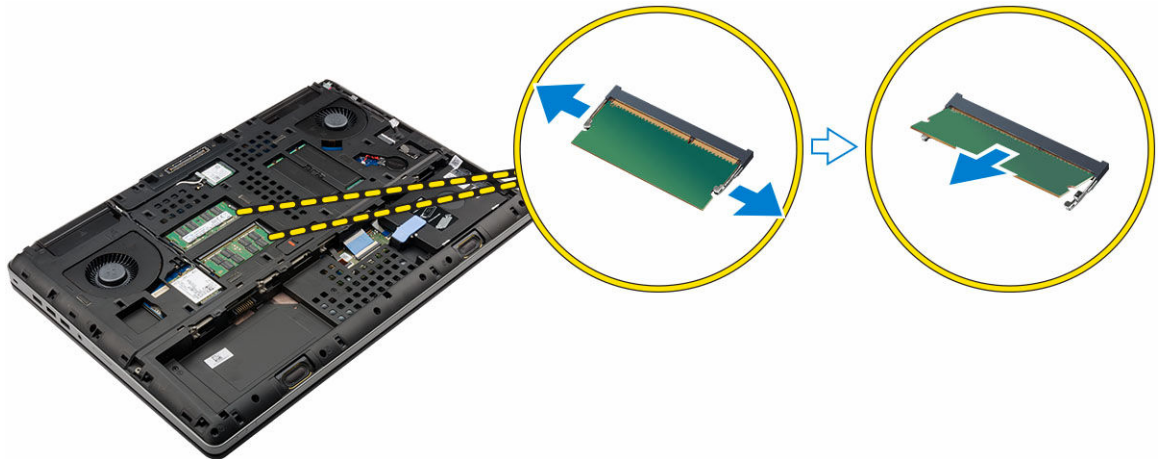
## Installing the secondary memory

1. Insert the secondary memory into the memory socket.
2. Press the clips to secure the memory module to the system board.
3. Place the memory shield in its original position on the computer and tighten the screw to secure it to the computer.

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

## Removing the primary memory

1. Follow the procedure in [Before working inside your computer.](#)
2. Remove the:
  - a. [battery cover](#)
  - b. [battery](#)
  - c. [base cover](#)
3. Perform the following steps to remove the primary memory:
  - a. Pry the retention clips away from the primary memory until it pops up.
  - b. Lift the primary memory and remove it from the computer.

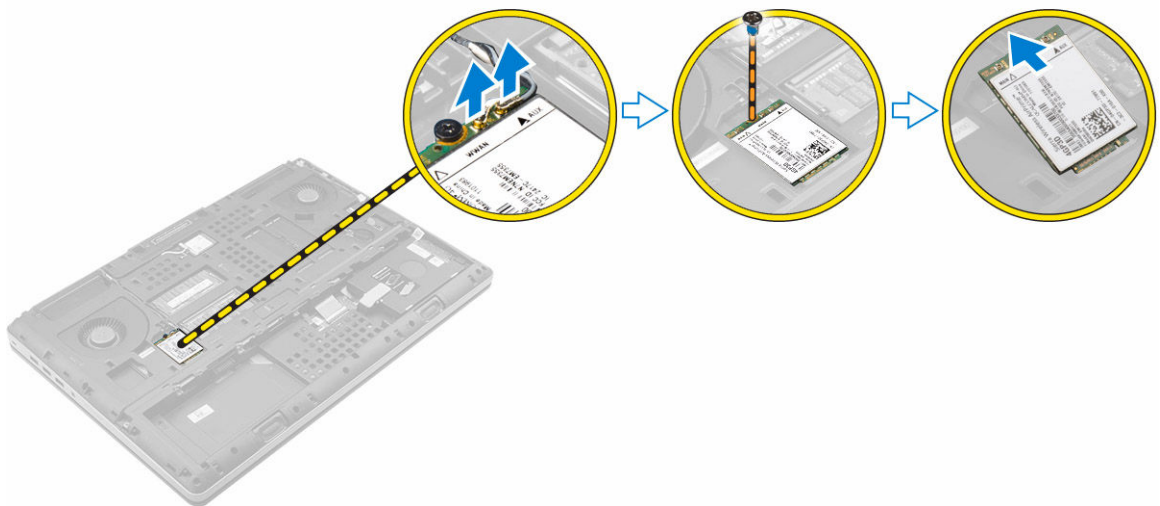


## Installing the primary memory

1. Insert the primary memory into the memory socket.
2. Press the clips to secure the primary memory to the system board.
3. Install the:
  - a. [base cover](#)
  - b. [battery](#)
  - c. [battery cover](#)
4. Follow the procedure in [After working inside your computer.](#)

## Removing Wireless Wide Area Network (WWAN) card (Optional)

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery cover](#)
  - b. [battery](#)
  - c. [base cover](#)
3. Please perform the following steps to remove the WWAN card:
  - a. Disconnect and remove the antenna cables connected to the WWAN card.
  - b. Remove the screw that secures the WWAN card to the computer.
  - c. Remove the WWAN card from the computer.



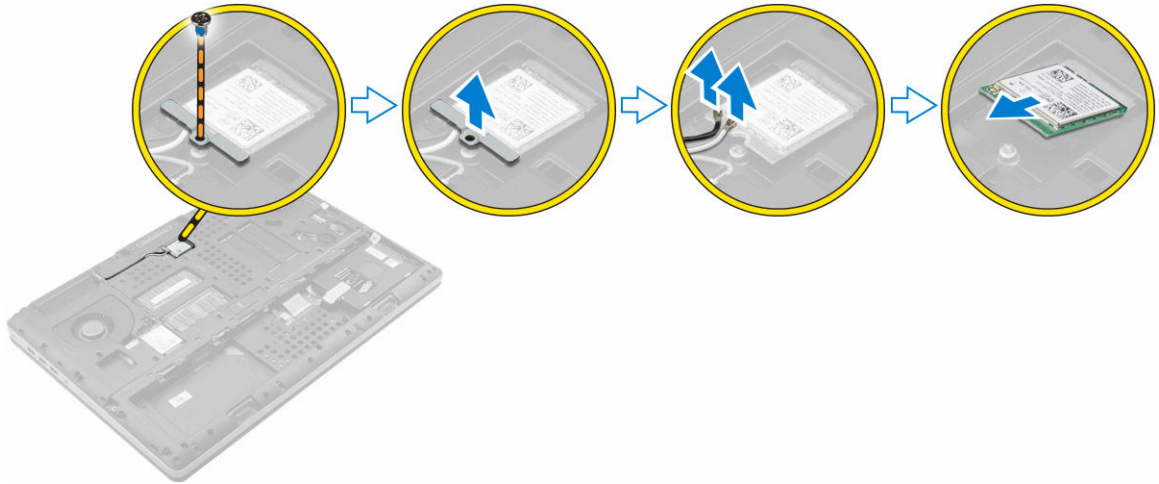
## Installing the WWAN card (Optional)

1. Slide the WWAN card to the WWAN card slot.
2. Tighten the screw to secure the WWAN card to the computer.
3. Route the antenna cables through the routing channels and connect them to the WWAN card.
4. Install the:
  - a. [base cover](#)
  - b. [battery](#)
  - c. [battery cover](#)
5. Follow the procedure in [After working inside your computer](#)

## Removing the Wireless Local Area Network (WLAN) card

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

- b. [battery](#)
  - c. [base cover](#)
3. Perform the following steps to remove the WLAN card from the computer:
- a. Remove the screw that secures the WLAN card to the computer.
  - b. Remove the shield that secures the antenna cables.
  - c. Disconnect and un-route the antenna cables connected to the WLAN card and remove the WLAN card from the computer.



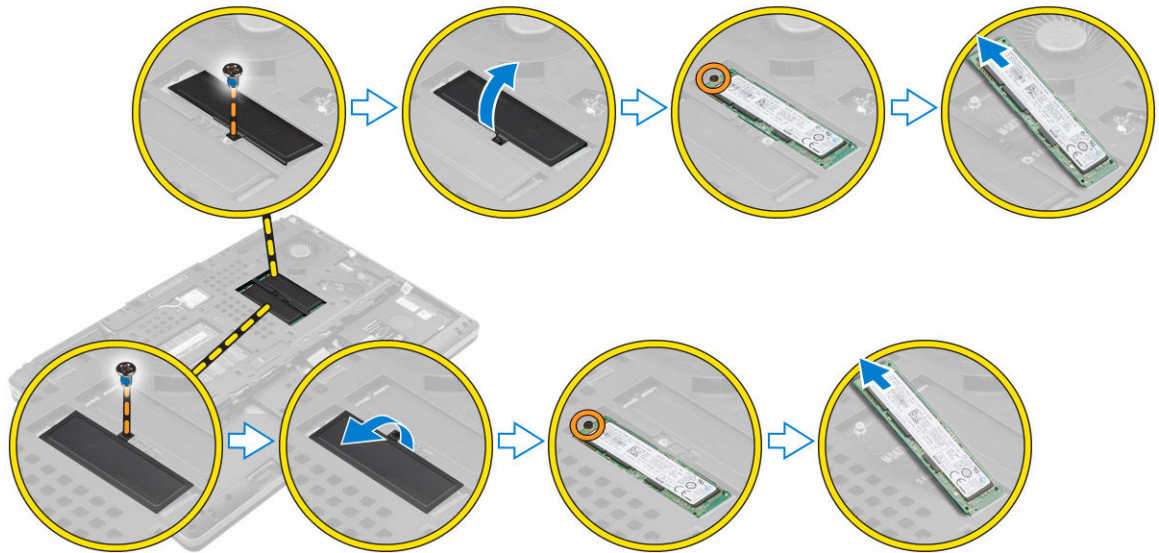
## Installing the WLAN Card

1. Insert the WLAN card in its slot in the computer.
2. Route the antenna cables through the routing channel and connect them to the WLAN card.
3. Align the shield and tighten the screw to secure the WLAN card to the computer.
4. Install the:
  - a. [base cover](#)
  - b. [battery](#)
  - c. [battery cover](#)
5. Follow the procedures in [After working inside your computer](#)

## Removing the M.2 Solid State Drive (SSD)

1. Follow the procedures in [Before working inside your computer](#).
2. Remove the:
  - a. [battery cover](#)
  - b. [battery](#)
  - c. [base cover](#)
3. Perform the following steps as shown in the illustration:
  - a. Remove the screw that secures the shield to the computer.
  - b. Remove the shield from the computer.
  - c. Remove the screw that secures the M.2 SSD to the computer.
  - d. Remove the M.2 SSD away from the computer.



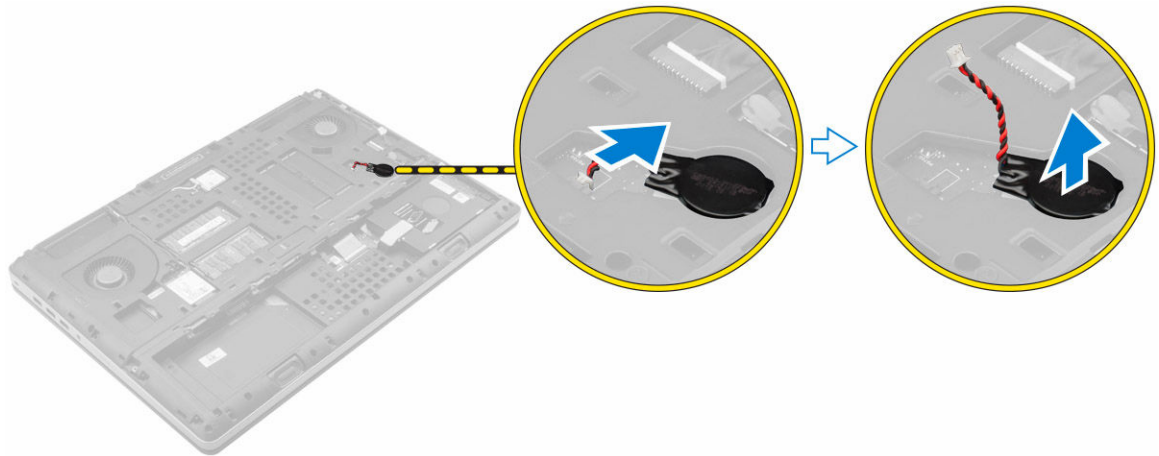


## Installing the M.2 SSD


1. Replace the M.2 SSD in its slot.
2. Tighten the screw to secure the M.2 SSD to the computer.
3. Place the shield on the M.2 SSD.
4. Tighten the screw to secure the shield to the computer.
5. Install the:
  - a. [base cover](#)
  - b. [battery](#)
  - c. [battery cover](#)
6. Follow the procedure in [After working inside your computer](#).

## Removing the coin cell battery

1. Follow the procedures in [Before working inside your computer](#).
2. Remove the:
  - a. [battery cover](#)
  - b. [battery](#)
  - c. [base cover](#)
3. Perform the following steps to remove the coin cell battery:
  - a. Disconnect the coin cell battery cable.
  - b. Pry the coin cell battery upward and remove it from the computer.

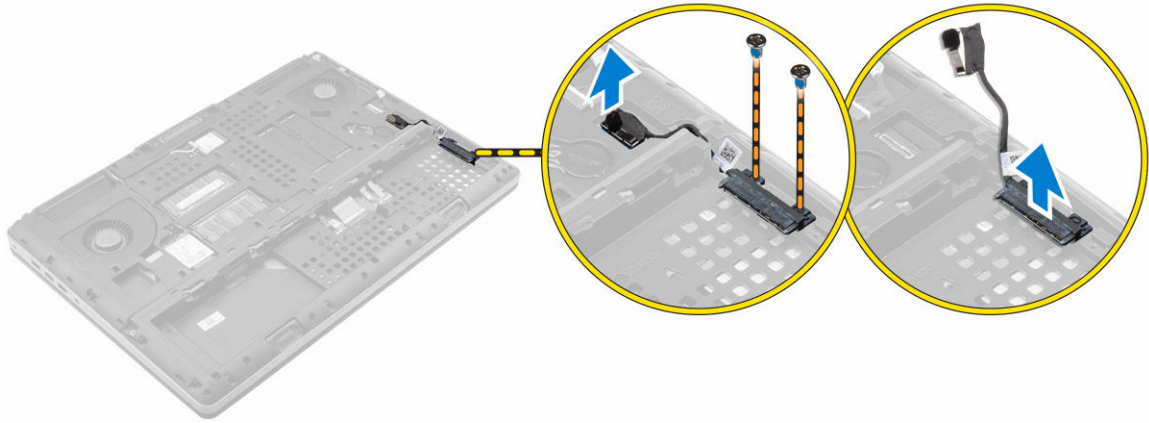


## Installing the coin cell battery

1. Replace the coin cell battery in its slot in the computer.
2. Connect the coin cell battery cable.  
 **NOTE:** Ensure that the coin cell battery cable does not protrude outside its compartment.
3. Install the:
  - a. [base cover](#)
  - b. [battery](#)
  - c. [battery cover](#)
4. Follow the procedure in [After working inside your computer](#).

## Removing the hard drive cable

1. Follow the procedures in [Before working inside your computer](#).
2. Remove the:
  - a. [battery cover](#)
  - b. [battery](#)
  - c. [base cover](#)
  - d. [hard drive](#)
3. Remove the screws that secure the hard drive connector to the system board and remove it from the computer.

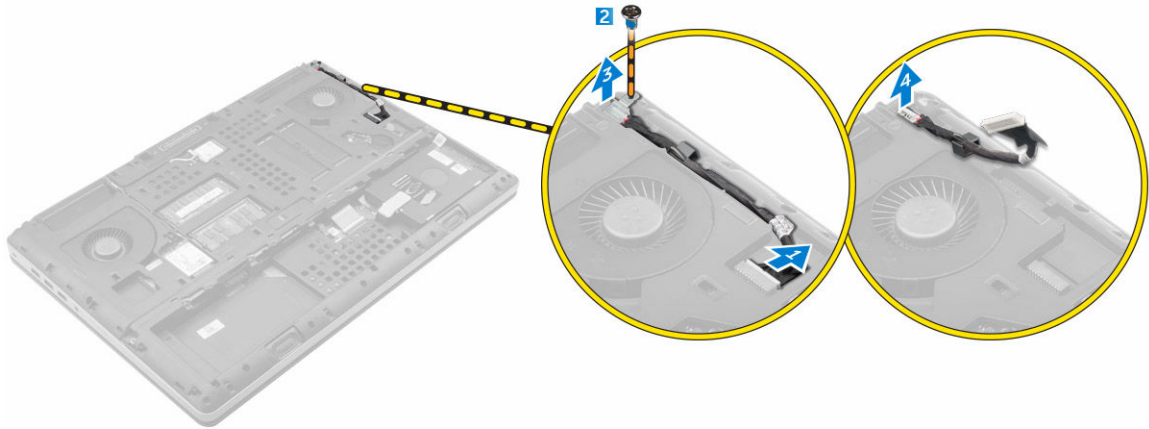


## Installing the hard drive cable

1. Connect the hard drive cable to the system board and route the cable through the routing channel.
2. Tighten the screws to secure the hard drive cable connector to the computer.
3. Install the:
  - a. [hard drive](#)
  - b. [base cover](#)
  - c. [battery](#)
  - d. [battery cover](#)
4. Follow the procedure in [After working inside your computer](#).

## Removing the power connector port

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery cover](#)
  - b. [battery](#)
  - c. [base cover](#)
3. Perform the following steps as shown in the illustration:
  - a. Disconnect the power connector cable from the computer [1].
  - b. Remove the screw to remove the bracket from the computer [2].
  - c. Remove the bracket from the computer [3].
  - d. Remove the power connector port from the computer [4].

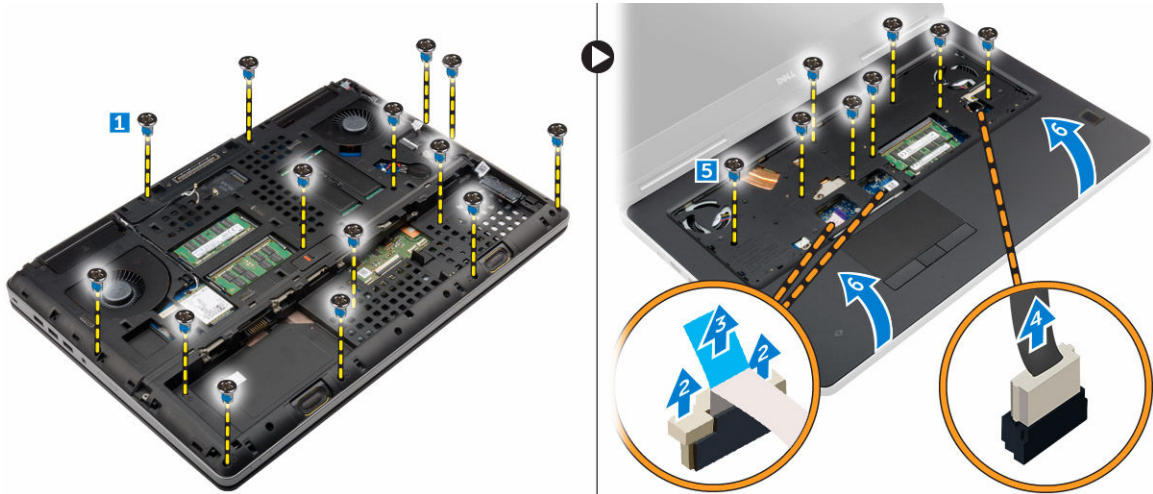


## Installing the power connector port

1. Connect the power connector cable to the computer and route the cable through the routing channel.
2. Insert the power connector port in its slot and replace the bracket.
3. Tighten the screw to secure the power connector port to the computer.
4. Install the:
  - a. [base cover](#)
  - b. [battery](#)
  - c. [battery cover](#)
5. Follow the procedure in [After working inside your computer](#).

## Removing the palmrest

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery cover](#)
  - b. [battery](#)
  - c. [base cover](#)
  - d. [hard drive](#)
  - e. [keyboard](#)
3. Perform the following steps as shown in the illustration:
  - a. Remove the screws (M2xL3) at the bottom of the computer which secure the palmrest to the computer [1].
  - b. Lift the tab and disconnect the touch-pad cable and security board cable [2, 3].
  - c. Disconnect the power-switch cable [4].
  - d. Remove the screws that secure the palmrest to the computer [5].
  - e. Release the tabs on the edges of the palmrest and remove the palmrest from the computer [6].

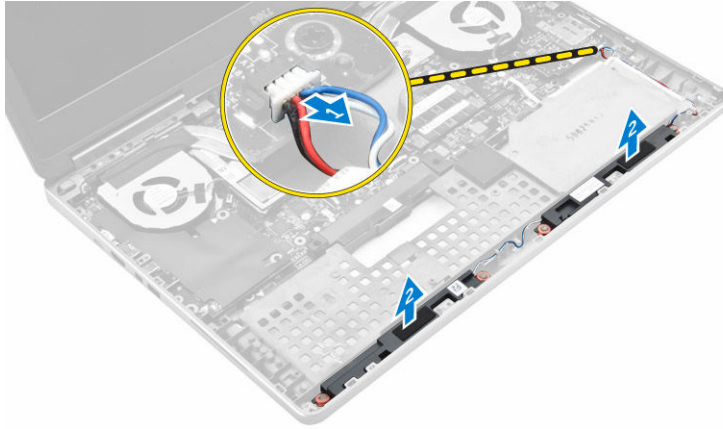


## Installing the palmrest

1. Align the palmrest on the computer and press on the positions indicated until it snaps in place.
2. Tighten the screws that secure the palmrest to the computer.
3. Connect the following cables:
  - a. security board
  - b. power-switch cable
  - c. touchpad
4. Flip the computer and tighten the screws at the bottom of the computer.
5. Install the:
  - a. [keyboard](#)
  - b. [hard drive](#)
  - c. [base cover](#)
  - d. [battery](#)
  - e. [battery cover](#)
6. Follow the procedure in [After working inside your computer](#).

## Removing the speakers

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery cover](#)
  - b. [battery](#)
  - c. [base cover](#)
  - d. [hard drive](#)
  - e. [keyboard](#)
  - f. [palmrest](#)
3. Perform the following steps to remove the speaker:
  - a. Disconnect the speaker cable from the system board [1].
  - b. Unroute the speaker cable and remove the cable from the routing tabs.
  - c. Lift the speakers, along with the speaker cable and remove it away from the computer [2].

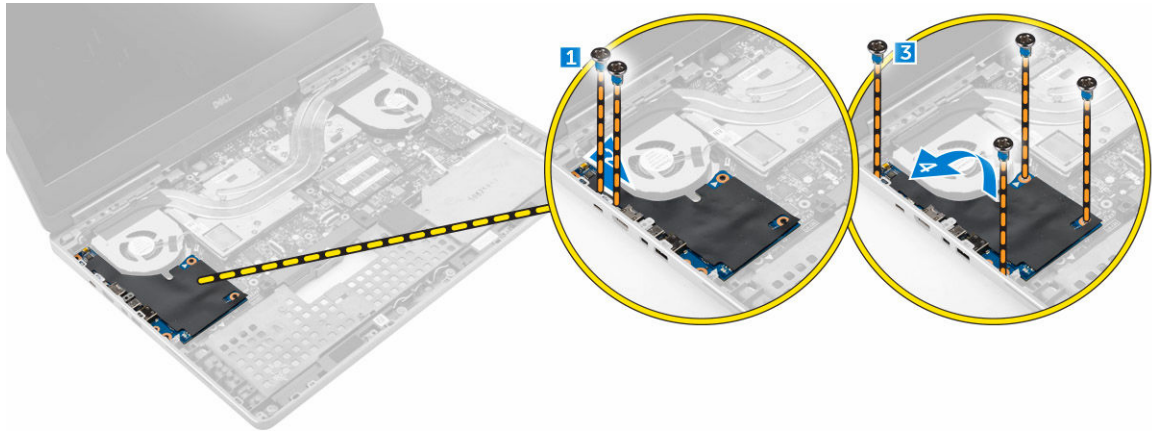


## Installing the speakers

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

## Removing the Input/Output (I/O) board left

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery cover](#)
  - b. [battery](#)
  - c. [base cover](#)
  - d. [hard drive](#)
  - e. [keyboard](#)
  - f. [palmrest](#)
3. Perform the following steps to remove the I/O board:
  - a. Remove the screws that secure the I/O board to the computer [1, 3].
  - b. Remove the bracket of the thunderbolt connector [2].
  - c. Lift the right edge of the I/O board upwards to disengage the connector and remove it from the computer [4].

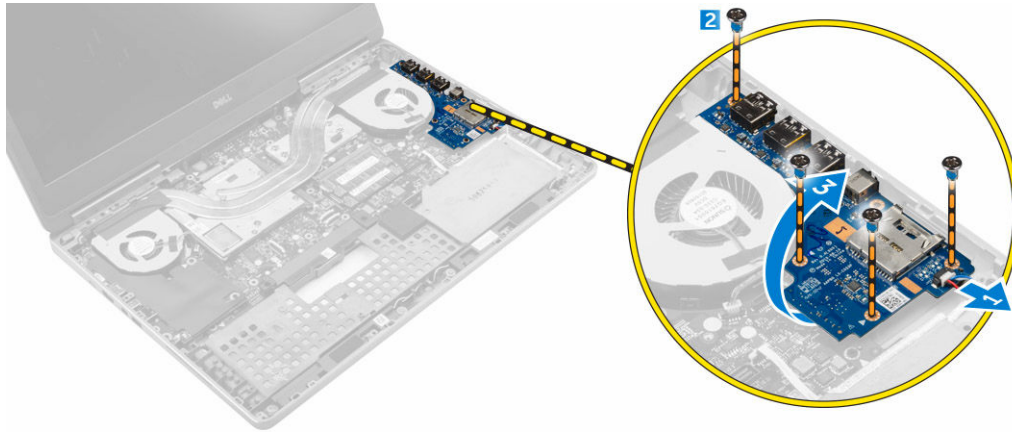


## Installing the I/O board left

1. Connect the I/O board connector and slide the I/O board into its slot in the computer.
2. Install the thunderbolt bracket.
3. Tighten the screws to secure the I/O board to the computer.
4. Install the:
  - a. [palmrest](#)
  - b. [keyboard](#)
  - c. [hard drive](#)
  - d. [base cover](#)
  - e. [battery](#)
  - f. [battery cover](#)
5. Follow the procedures in [After working inside your computer](#).

## Removing the Input/Output (I/O) board right


1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [SD card](#)
  - b. [battery cover](#)
  - c. [battery](#)
  - d. [base cover](#)
  - e. [hard drive](#)
  - f. [keyboard](#)
  - g. [palmrest](#)
3. Perform the following steps to remove the I/O board:
  - a. Disconnect the speaker cable from the I/O board [1].
  - b. Remove the screws that secure the I/O board to the computer [2].
  - c. Lift the left edge of the I/O board upwards to disengage the connector and remove it from computer [3].



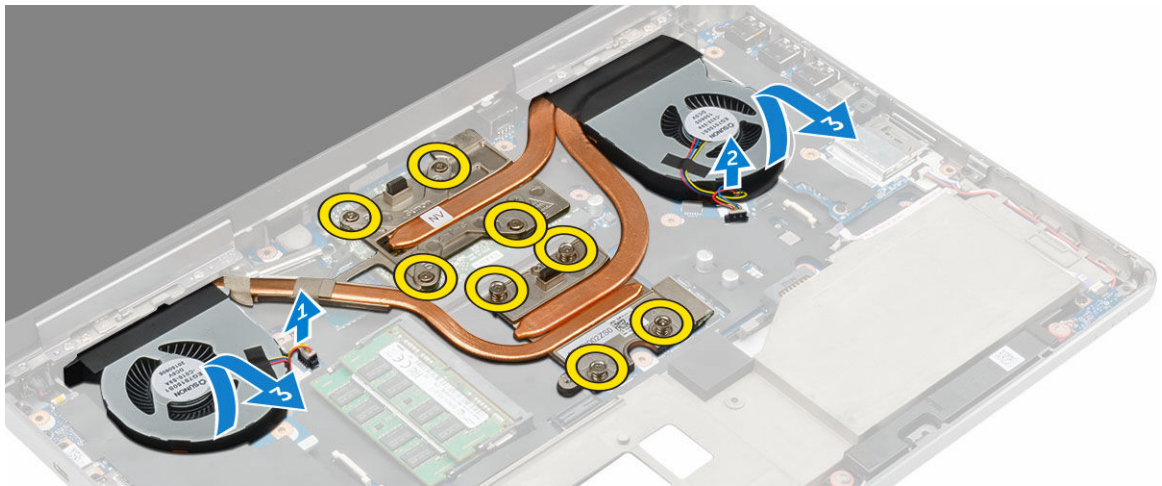
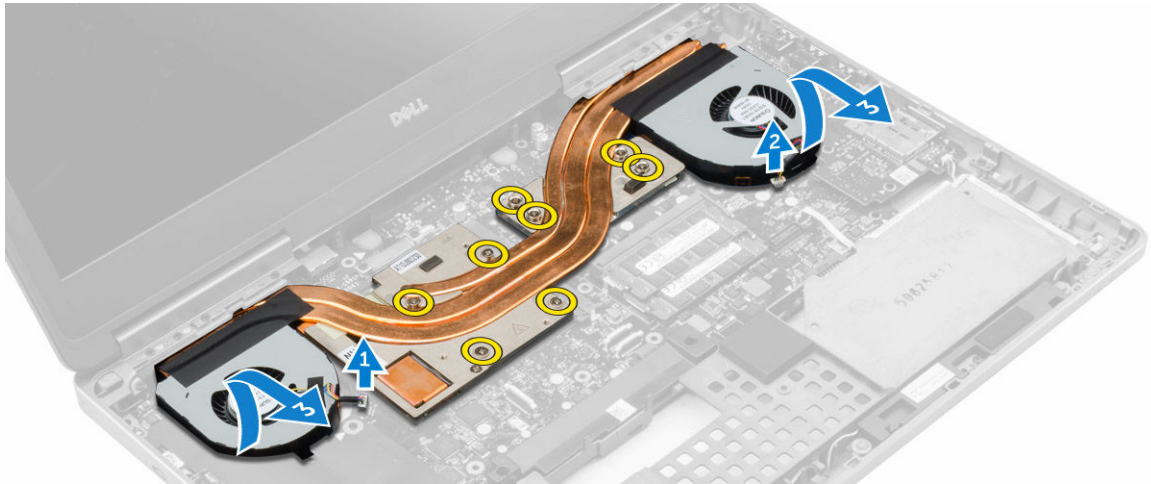
## Installing the I/O board right

1. Connect the I/O board connector and slide the I/O board into its slot in the computer.
2. Tighten the screws to secure the I/O board to the computer.
3. Connect the speaker cable to the I/O board.
4. Install the:
  - a. [palmrest](#)
  - b. [keyboard](#)
  - c. [hard drive](#)
  - d. [base cover](#)
  - e. [battery](#)
  - f. [battery cover](#)
  - g. [SD card](#)
5. Follow the procedure in [After working inside your computer](#).


## Removing the heat sink assembly

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery cover](#)
  - b. [battery](#)
  - c. [base cover](#)
  - d. [hard drive](#)
  - e. [keyboard](#)
  - f. [palmrest](#)
3. Perform the following steps as shown in the illustration:
  - a. Disconnect the heat sink fan cables [1, 2] .
  - b. Loosen the captive screws that secure the heat sink assembly to the computer.  
 **NOTE:** Loosen the screws based on the numbering on the heat sink.
  - c. Lift up and remove the heat sink assembly from the computer [3].



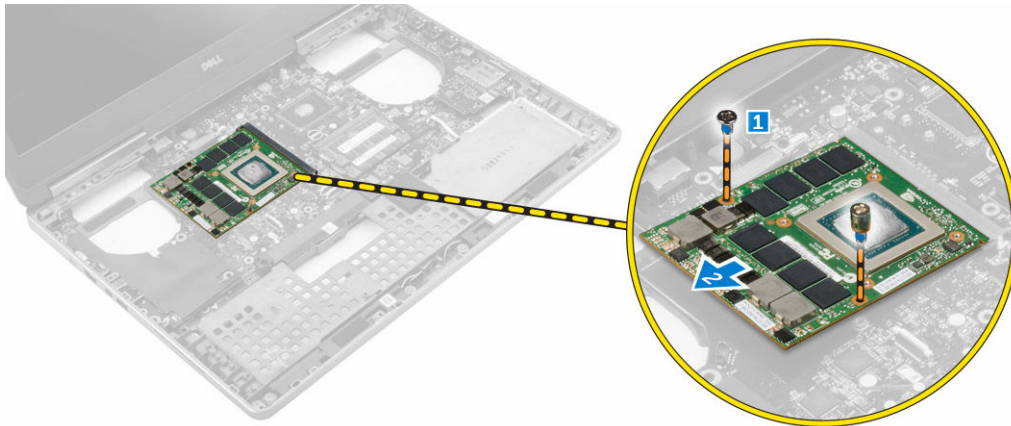


## Installing the heat sink assembly

1. Replace the heat-sink assembly in its slot.
2. Tighten the captive screws to secure the heat-sink assembly to the computer.  
 **NOTE:** Tighten the screws based on the order mentioned in the removal procedure.
3. Connect the heat-sink fan cables to the system board.
4. Install the:
  - a. [palmrest](#)
  - b. [keyboard](#)
  - c. [hard drive](#)
  - d. [base cover](#)
  - e. [battery](#)
  - f. [battery cover](#)
5. Follow the procedure in [After working inside your computer](#).

## Removing the video card

1. Follow the procedure in [Before working inside your computer.](#)
2. Remove the:
  - a. [battery cover](#)
  - b. [battery](#)
  - c. [base cover](#)
  - d. [hard drive](#)
  - e. [keyboard](#)
  - f. [palmrest](#)
  - g. [heat sink](#)
3. Perform the following steps as shown in the illustration:
  - a. Remove the screws that secure the video card to the computer [1].
  - b. Remove the video card from the computer [2].

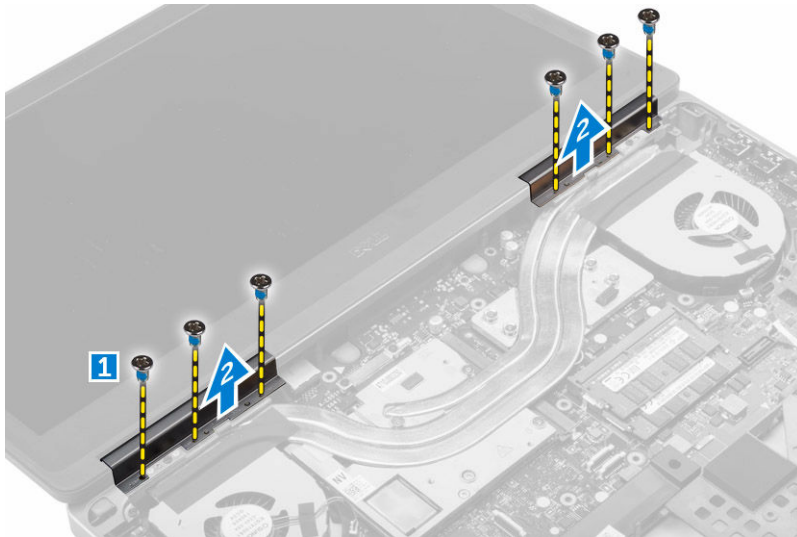


## Installing the video card

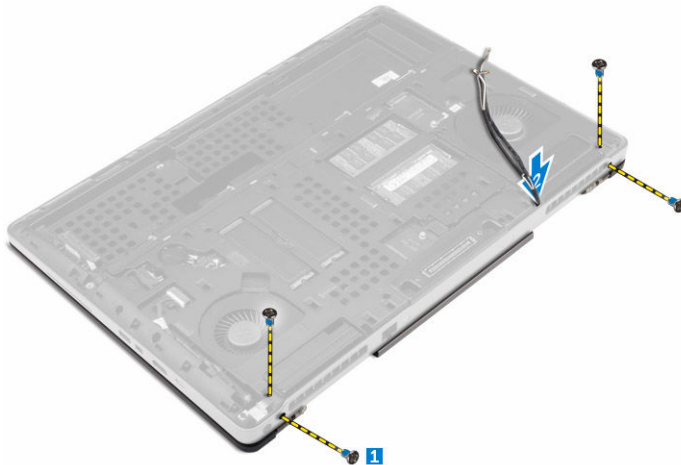
1. Slide the video card into its original position in the computer.
2. Tighten the screws to secure the video card to the computer.
3. Install the:
  - a. [heat sink](#)
  - b. [palmrest](#)
  - c. [keyboard](#)
  - d. [hard drive](#)
  - e. [base cover](#)
  - f. [battery](#)
  - g. [battery cover](#)
4. Follow the procedure in [After working inside your computer.](#)

## Removing the display assembly

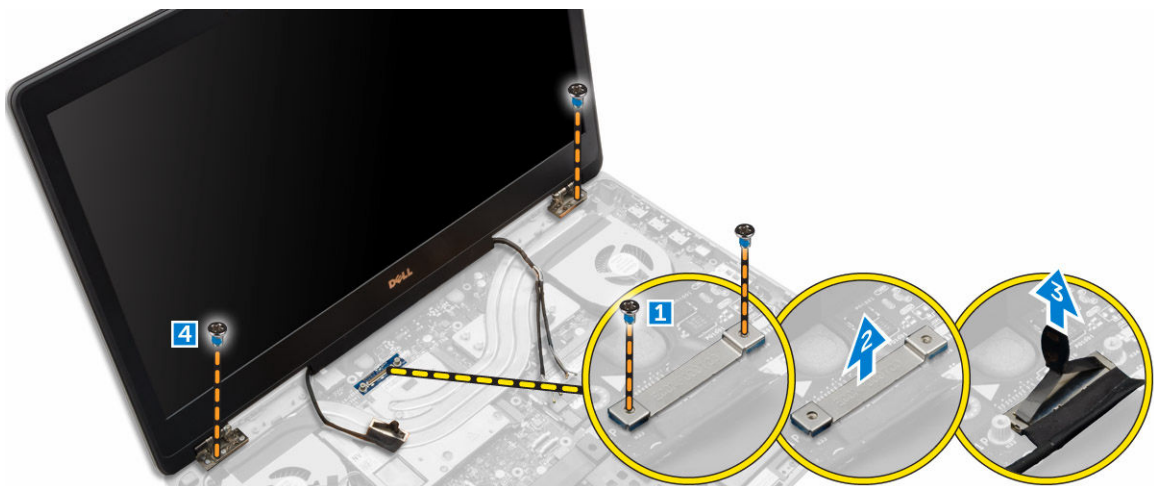
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery cover](#)
  - b. [battery](#)
  - c. [base cover](#)
  - d. [hard drive](#)
  - e. [keyboard](#)
  - f. [WLAN card](#)
  - g. [WWAN card](#)
  - h. [palmrest](#)
3. Perform the following as shown in the illustration:
  - a. Remove the screws that secure the display hinge cap to the computer [1].
  - b. Remove the display hinge cap from the computer [2].



4. Perform the following steps as shown in the illustration:
  - a. Flip the computer and remove the cosmetic screws from the bottom and back of the computer [1].
  - b. Pull up the antenna cables through the routing hole [2].



5. Perform the following as shown in the illustration:
  - a. Remove the screws that secure the eDP cable bracket [1].
  - b. Remove the eDP cable bracket [2].
  - c. Peel off the tape on the heat pipe and disconnect the eDP cable from the system board [3].
  - d. Remove the screws that secure the display assembly to the computer and remove it from the computer [4] .



## Installing the display assembly

1. Tighten the screws to secure the display assembly in place.
2. Affix the tape on the heat pipe.
3. Connect the eDP cable to the correct connectors on the system board.
4. Insert the wireless antenna cables through the routing hole on the chassis.
5. Tighten the screws at the bottom and back of the computer.
6. Align the display hinge cap and tighten the screws to secure it to the computer.
7. Route and connect the antenna cables to their connectors.
8. Install the:
  - a. [palmrest](#)

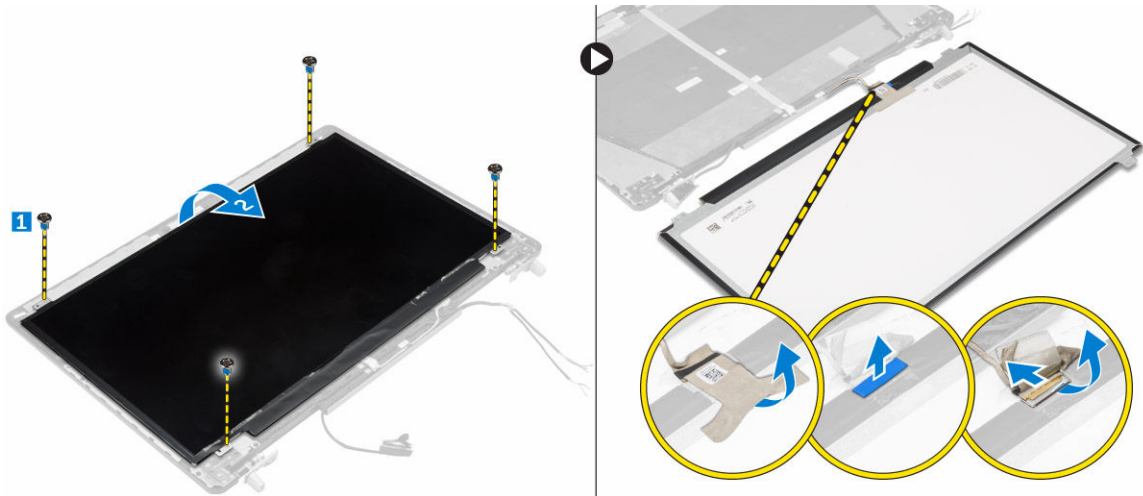
- b. [WWAN card](#)
  - c. [WLAN card](#)
  - d. [keyboard](#)
  - e. [hard drive](#)
  - f. [base cover](#)
  - g. [battery](#)
  - h. [battery cover](#)
9. Follow the procedure in [After working inside your computer](#)

## Removing the display bezel

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery cover](#)
  - b. [battery](#)
  - c. [base cover](#)
  - d. [hard drive](#)
  - e. [keyboard](#)
  - f. [palmrest](#)
  - g. [display assembly](#)
3. Perform the following as shown in the illustration:
  - a. Pry up all the edges of the display bezel [1, 2]



4. Perform the following steps as shown in the illustration:
  - a. Remove the screws that secure the display panel to the display cover [1].
  - b. Lift the display panel [2].
  - c. Disconnect the eDP cable.

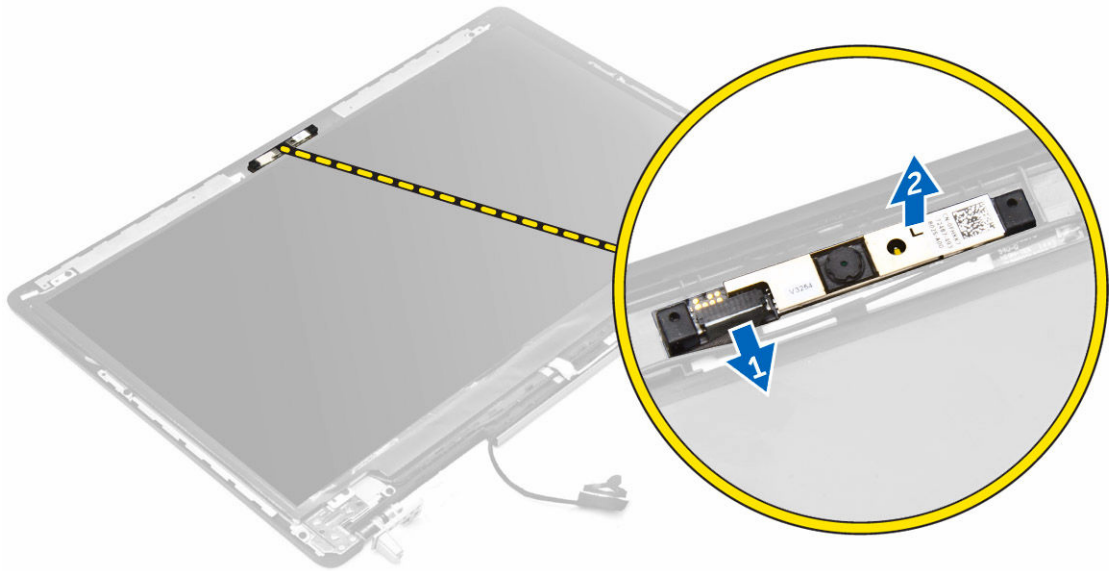


## Installing the display bezel

1. Connect the eDP cable.
2. Align the display panel and tighten the screws to secure display panel to the display cover.
3. Slide the display bezel from the bottom and press on the display bezel.
4. Work around the entire bezel until it snaps onto the display assembly.
5. Install the:
  - a. [display assembly](#)
  - b. [palmrest](#)
  - c. [keyboard](#)
  - d. [hard drive](#)
  - e. [base cover](#)
  - f. [battery](#)
  - g. [battery cover](#)
6. Follow the procedure in [After working inside your computer](#)

## Removing the camera

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery cover](#)
  - b. [battery](#)
  - c. [base cover](#)
  - d. [hard drive](#)
  - e. [keyboard](#)
  - f. [palmrest](#)
  - g. [display assembly](#)
  - h. [display bezel](#)
3. Perform the following steps as shown in the illustration.
  - a. Disconnect the camera cable from the computer [1].
  - b. Remove the camera module from the computer [2].



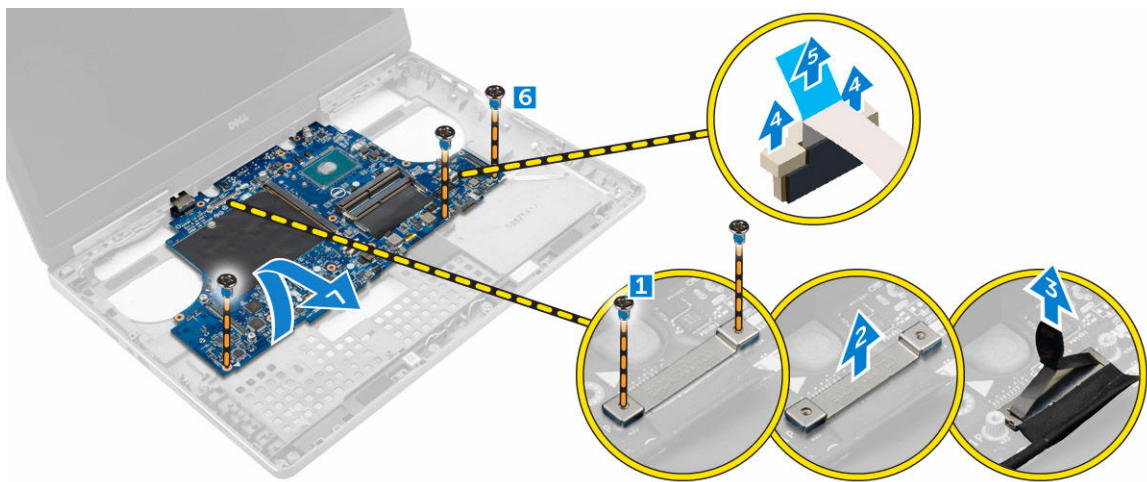
## Installing the camera

1. Place the camera module in its slot on the computer.
2. Connect the camera cable.
3. Install the:
  - a. [display bezel](#)
  - b. [display assembly](#)
  - c. [palmrest](#)
  - d. [keyboard](#)
  - e. [hard drive](#)
  - f. [base cover](#)
  - g. [battery](#)
  - h. [battery cover](#)
4. Follow the procedure in [After working inside your computer](#).

## Removing the system board

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [SD card](#)
  - b. [battery cover](#)
  - c. [battery](#)
  - d. [base cover](#)
  - e. [hard drive](#)
  - f. [keyboard](#)
  - g. [HDD cable](#)
  - h. [primary memory](#)
  - i. [WLAN card](#)
  - j. [WWAN card](#)

- k. [M.2 SSD](#)
  - l. [video card](#)
  - m. [power connector port](#)
  - n. [palmrest](#)
  - o. [I/O board left](#)
  - p. [I/O board right](#)
  - q. [heat sink](#)
3. Perform the following steps as shown in the illustration:
- a. Remove the screws that secure the shield to the system board [1].
  - b. Lift the shield away from the computer [2].
  - c. Disconnect the eDP cable [3].
  - d. Lift the tab and disconnect the power-connector cable [4, 5].
  - e. Remove the screws that secure the system board to the computer [6].
  - f. Lift and remove the system board from the computer [7].



## Installing the system board

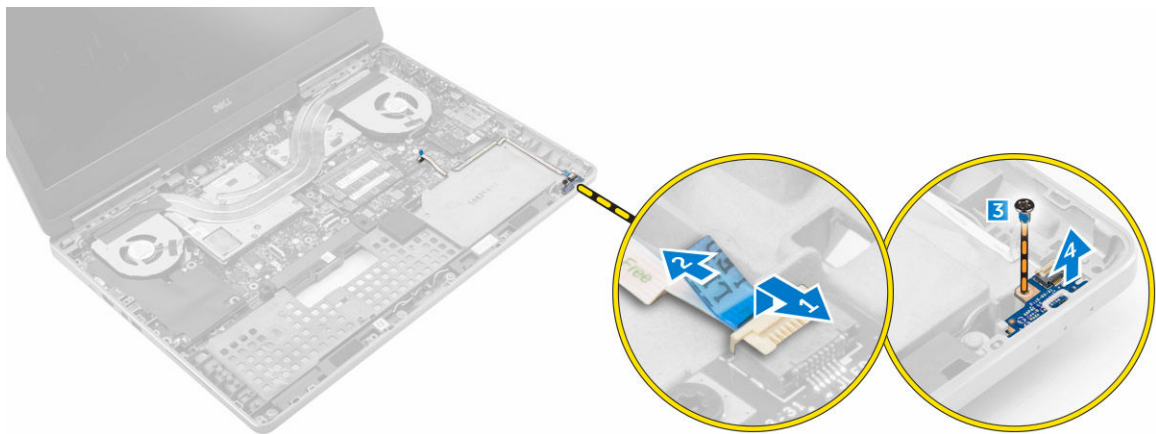
- 1. Align the system board into its original position on the computer.
- 2. Tighten the screws to secure the system board to the computer.
- 3. Connect the following cables:
  - a. power connector
  - b. eDP
- 4. Install the:
  - a. [heat sink](#)
  - b. [I/O board right](#)
  - c. [I/O board left](#)
  - d. [palmrest](#)
  - e. [power-connector port](#)
  - f. [video card](#)
  - g. [M.2 SSD](#)
  - h. [WWAN card](#)
  - i. [WLAN card](#)
  - j. [primary memory](#)



- k. [HDD cable](#)
  - l. [keyboard](#)
  - m. [hard drive](#)
  - n. [base cover](#)
  - o. [battery](#)
  - p. [battery cover](#)
  - q. [SD card](#)
5. Follow the procedure in [After working inside your computer](#).

## Removing the LED board

1. Follow the procedures in [Before working inside your computer](#).
2. Remove the:
  - a. [battery cover](#)
  - b. [battery](#)
  - c. [base cover](#)
  - d. [hard drive](#)
  - e. [keyboard](#)
  - f. [secondary memory](#)
  - g. [palmrest](#)
3. Perform the following steps as shown in the illustration:
  - a. Lift the tab and disconnect the LED-board cable from the system board [1, 2].
  - b. Remove the screw that secures the LED board to the computer and remove it from the computer [3,4].



## Installing the LED board

1. Align the LED board to its original position on the computer.
2. Tighten the screw to secure the LED board to the computer.
3. Connect the LED-board cable to the system board and secure it through the routing channel.
4. Install the:
  - a. [palmrest](#)
  - b. [secondary memory](#)
  - c. [keyboard](#)

- d. [hard drive](#)
  - e. [base cover](#)
  - f. [battery](#)
  - g. [battery cover](#)
5. Follow the procedure in [After working inside your computer](#).

## System setup

System Setup enables you to manage your computer 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


## Boot Sequence

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


- Access System Setup by pressing F2 key
- Bring up the one-time boot menu by pressing F12 key

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

- Removable Drive (if available)
- STXXXX Drive

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


- Optical Drive
- Diagnostics

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


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

## Navigation keys


The following table displays the system setup 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.

**Table 1. Navigation keys**

Keys	Navigation
Up arrow	Moves to the previous field.
Down arrow	Moves to the next field.
Enter	Allows you to select 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.
	 <b>NOTE:</b> For the standard graphics browser only.
Esc	Moves to the previous page till 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.
F1	Displays the System Setup help file.

## System setup options

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

**Table 2. General**

Option	Description
<b>System Information</b>	This section lists the primary hardware features of your computer. <ul style="list-style-type: none"> <li>• System Information</li> <li>• Memory Information</li> <li>• Processor Information</li> <li>• Device Information</li> </ul>
<b>Battery Information</b>	Displays the charge status of the battery.
<b>Boot Sequence</b>	Allows you to change the order in which the computer attempts to find an operating system. All the below options are enabled by default. <ul style="list-style-type: none"> <li>• <b>UEFI: SAMSUNG SSD SM951 M.2 256GB PCIe NVMe</b> (Default Setting)</li> </ul> <p>You can also choose the Boot List option. The options are:</p> <ul style="list-style-type: none"> <li>• Legacy</li> <li>• <b>UEFI</b> (Default Setting)</li> </ul>
<b>Advanced Boot Options</b>	When in UEFI boot mode, the Enable Legacy Option ROMs option will allow legacy option ROMs to load. This option is disabled by default.




Option	Description
	 <b>NOTE:</b> Without this option, only UEFI option ROMs will load. This option is required for Legacy boot mode. This option is not allowed if Secure Boot is enabled. <ul style="list-style-type: none"> <li>• Enable Legacy Option ROMs</li> </ul>
<b>Date/Time</b>	Allows you to set the date and time.

Table 3. System configuration

Option	Description
<b>Integrated NIC</b>	<p>Allows you to configure the integrated network controller. The options are:</p> <ul style="list-style-type: none"> <li>• Enable UEFI Network Stack</li> <li>• Disabled</li> <li>• Enabled</li> <li>• <b>Enabled w/PXE</b> (Default Setting)</li> </ul>
<b>Parallel Port</b>	<p>Allows you to define and set how the parallel port on the docking station operates. You can set the parallel port to:</p> <ul style="list-style-type: none"> <li>• Disabled</li> <li>• <b>AT</b> (Default Setting)</li> <li>• PS2</li> <li>• ECP</li> </ul>
<b>Serial Port</b>	<p>Identifies and defines the serial port settings. You can set the serial port to:</p> <ul style="list-style-type: none"> <li>• Disabled</li> <li>• <b>COM1</b> (Default Setting)</li> <li>• COM2</li> <li>• COM3</li> <li>• COM4</li> </ul> <p> <b>NOTE:</b> The operating system may allocate resources even if the setting is disabled.</p>
<b>SATA Operation</b>	<p>Allows you to configure the internal SATA hard-drive controller. The options are:</p> <ul style="list-style-type: none"> <li>• Disabled</li> <li>• AHCI</li> <li>• <b>RAID On</b> (Default Setting)</li> </ul> <p> <b>NOTE:</b> SATA is configured to support RAID mode.</p>

Option	Description
<b>Drives</b>	<p>Allows you to enable or disable various drives on board. The options are:</p> <ul style="list-style-type: none"> <li>• <b>SATA-0</b></li> <li>• <b>SATA-1</b></li> <li>• <b>SATA-3</b></li> <li>• <b>SATA-4</b></li> <li>• <b>M.2 PCIe SSD-0</b></li> <li>• <b>M.2 PCIe SSD-1</b></li> </ul> <p>Default Setting: The highlighted devices are enabled.</p>
<b>SMART Reporting</b>	<p>This field controls if the hard drive errors for the integrated drives are reported during system startup. This technology is part of the SMART (Self Monitoring Analysis and Reporting Technology) specification. This option is disabled by default.</p> <ul style="list-style-type: none"> <li>• Enable SMART Reporting</li> </ul>
<b>USB/Thunderbolt Configuration</b>	<p>Allows you to define the USB configuration. The options are:</p> <ul style="list-style-type: none"> <li>• <b>Enable USB Boot Support</b></li> <li>• <b>Enable External USB Port</b></li> <li>• <b>Enable Thunderbolt Port</b></li> <li>• Enable Thunderbolt Boot Support</li> <li>• <b>Always Allow Dell Dock</b></li> <li>• Enable Thunderbolt (and PCIe behind TBT) Pre-boot</li> </ul> <p>Default Setting: Highlighted options are enabled.</p>
<b>USB PowerShare</b>	<p>Allows you to configure the behavior of the USB PowerShare feature. The option is disabled by default.</p> <ul style="list-style-type: none"> <li>• Enable USB PowerShare</li> </ul>
<b>Audio</b>	<p>This field enables or disables the integrated audio controller.</p> <ul style="list-style-type: none"> <li>• <b>Enable Audio</b></li> <li>• <b>Enable Microphone</b></li> <li>• <b>Enable Internal Speaker</b></li> </ul> <p>Default Setting: All the options are enabled.</p>
<b>Keyboard Illumination</b>	<p>This field lets you choose the operating mode of the keyboard illumination feature.</p>

Option	Description
<b>Keyboard Backlight Timeout on AC</b>	<ul style="list-style-type: none"> <li>• Disabled</li> <li>• Dim</li> <li>• <b>Bright</b> (Default Setting)</li> </ul> <p>This feature defines the timeout value for the keyboard backlight when AC adapter is plugged into the system.</p> <ul style="list-style-type: none"> <li>• 5 seconds (Default settings)</li> <li>• 10 seconds</li> <li>• 15 seconds</li> <li>• 30 seconds</li> <li>• 1 minute</li> <li>• 5 minute</li> <li>• 15 minute</li> <li>• Never</li> </ul>
<b>Keyboard Backlight Timeout on Battery</b>	<p>This feature defines the timeout value for the keyboard backlight when system is running only on battery power.</p> <ul style="list-style-type: none"> <li>• 5 seconds</li> <li>• 10 seconds (Default settings)</li> <li>• 15 seconds</li> <li>• 30 seconds</li> <li>• 1 minute</li> <li>• 5 minute</li> <li>• 15 minute</li> <li>• Never</li> </ul>
<b>Unobtrusive Mode</b>	<p>When enabled, pressing Fn+F7 will turn Off all light and sound emissions in the system. Press Fn+F7 to resume normal operation. The option is disabled by default.</p> <ul style="list-style-type: none"> <li>• Enable Unobtrusive Mode</li> </ul>
<b>Miscellaneous Devices</b>	<p>Allows you enable or disable the various on board devices. The options are:</p> <ul style="list-style-type: none"> <li>• <b>Enable Camera</b></li> <li>• SD Card Read Only</li> <li>• <b>Enable Media Card</b></li> <li>• Disable Media Card</li> </ul> <p>Default Setting: The highlighted devices are enabled.</p>

Table 4. Video











Option	Description
<b>LCD Brightness</b>	Allows you to set the panel brightness independently for battery and AC power.
<b>Switchable Graphics</b>	<p>This option enables or disables switchable graphics technologies such as NVIDIA Optimus and AMD Power Express .</p> <p> <b>NOTE:</b> It should only be enabled for Windows 7/8 32/64-bit or Ubuntu OS. This feature is not applicable to other OS.</p> <ul style="list-style-type: none"> <li>• <b>Enable Switchable Graphics</b> (Default Setting)</li> <li>• Enable dock Display Port</li> </ul>

Table 5. Security

Option	Description
<b>Admin Password</b>	<p>Allows you to set, change, or delete the administrator (admin) password.</p> <p> <b>NOTE:</b> You must set the admin password before you set the system or hard drive password.</p> <p> <b>NOTE:</b> Successful password changes take effect immediately.</p> <p> <b>NOTE:</b> Deleting the admin password automatically deletes the system password and the hard drive password.</p> <p> <b>NOTE:</b> Successful password changes take effect immediately.</p> <p>Default Setting: <b>Not set</b></p>
<b>System Password</b>	<p>Allows you to set, change or delete the system password.</p> <p> <b>NOTE:</b> Successful password changes take effect immediately.</p> <p> <b>NOTE:</b> Requires the password be entered when the system is powered on.</p> <p>Default Setting: <b>Not set</b></p>
<b>Internal HDD-3 Password</b>	<p>Allows you to set, change, or delete the password on the computer's internal hard disk drive (HDD). Successful changes to this password take effect immediately.</p> <p>The drive does not have a password set by default.</p> <ul style="list-style-type: none"> <li>• Enter the old password</li> <li>• Enter the new password</li> <li>• Confirm the new password</li> </ul>
<b>Strong Password</b>	<p>Allows you to enforce the option to always set strong passwords.</p> <p>Default Setting: <b>Enable Strong Password</b> is not selected.</p>
<b>Password Configuration</b>	<p>You can define the length of your password. Admin Password Min = 4, Admin Password Max = 32</p>



Option	Description
<b>Password Bypass</b>	<p>Allows you to enable or disable the permission to bypass the System and the Internal HDD password, when they are set. The options are:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b> (Default Setting)</li> <li>• Reboot bypass</li> </ul>
<b>Password Change</b>	<p>Allows you to enable or disable permissions to set a System password and a Hard Drive password when the admin password is set. Default Setting: <b>Allow Non-Admin Password Changes</b> is selected</p>
<b>Non-Admin Setup Changes</b>	<p>Allows you to determine whether changes to setup option are permitted when an administrator password is set. This option is disabled by default.</p> <ul style="list-style-type: none"> <li>• Allows Wireless Switch Changes</li> </ul>
<b>TPM 1.2 Security</b>	<p>This option lets you control whether the Trusted Platform Module (TPM) in the system is enabled and visible to the operating system. When disabled the BIOS will not turn On the TPM During POST. The TPM will be non-functional and invisible to the operating system. When enabled, the BIOS will turn On the TPM during POST so that it can be used by the operating system.</p> <p> <b>NOTE:</b> Disabling this option does not change any settings you may have made to the TPM, nor does it delete or change any information or keys you may have stored there. It simply turns Off the TPM so that it cannot be used. When you re-enable this option, the TPM will function exactly as it did before it was disabled. This option is enabled by default.</p> <p> <b>NOTE:</b> Changes to this option take effect immediately.</p> <ul style="list-style-type: none"> <li>• <b>TPM On</b></li> <li>• Clear</li> <li>• PPI Bypass for Enable Commands</li> <li>• PPI Bypass for Disable Commands</li> </ul>
<b>Computrace(R)</b>	<p>Allows you to activate or disable the optional Computrace software The options are:</p> <ul style="list-style-type: none"> <li>• <b>Deactivate</b> (Default Setting)</li> <li>• Disable</li> <li>• Activate</li> </ul> <p> <b>NOTE:</b> The Activate and Disable options will permanently activate or disable the feature and no further changes will be allowed</p>
<b>CPU XD Support</b>	<p>Allows you to enable the Execute Disable mode of the processor. Default Setting: <b>Enable CPU XD Support</b></p>
<b>OROM Keyboard Access</b>	<p>Allows you to set access to enter the Option ROM Configuration screens using hotkeys during boot process. The options are:</p> <ul style="list-style-type: none"> <li>• <b>Enable</b> (Default Setting)</li> <li>• One Time Enable</li> </ul>

Option	Description
	<ul style="list-style-type: none"> <li>• Disable</li> </ul>
<b>Admin Setup Lockout</b>	<p>Allows you to prevent users from entering Setup when an Administrator password is set.</p> <p>Default Setting: <b>Disabled</b></p>

**Table 6. Secure Boot**

Option	Description
<b>Secure Boot Enable</b>	<p>This option enables or disables the Secure Boot feature.</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b> (Default Setting)</li> <li>• Enabled</li> </ul>
<b>Expert Key Management</b>	<p>Expert key Management allows the PK, KEK, db, and dbx security key databases to be manipulated.</p> <ul style="list-style-type: none"> <li>• Expert Key Management <ul style="list-style-type: none"> <li>– Enable Custom Mode - Disabled by default</li> </ul> </li> <li>• Custom Mode Key Management <ul style="list-style-type: none"> <li>– <b>PK</b> (Default Setting)</li> <li>– KEK</li> <li>– Db</li> <li>– Dbx</li> </ul> </li> </ul>

**Table 7. Performance**

Option	Description
<b>Multi Core Support</b>	<p>This field specifies whether the process will have one or all cores enabled. The performance of some applications will improve with the additional cores. This option is enabled by default. Allows you to enable or disable multi-core support for the processor. The options are:</p> <ul style="list-style-type: none"> <li>• <b>All</b> (Default Setting)</li> <li>• 1</li> <li>• 2</li> <li>• 3</li> </ul>
<b>Intel SpeedStep</b>	<p>Allows you to enable or disable the Intel SpeedStep feature.</p> <p>Default Setting: <b>Enable Intel SpeedStep</b></p>
<b>C States Control</b>	<p>Allows you to enable or disable the additional processor sleep states. Allows</p>

Option	Description
	you to enable or disable the additional processor sleep states. Default Setting: <b>C states</b> .
<b>Intel TurboBoost</b>	Allows you to enable or disable the Intel TurboBoost mode of the processor. Default Setting: <b>Enable Intel TurboBoost</b>
<b>Hyper-Thread Control</b>	Allows you to enable or disable the HyperThreading in the processor. Default Setting: <b>Enabled</b>

**Table 8. Power Management**

Option	Description
<b>AC Behavior</b>	Allows the computer to power-on automatically, when AC adapter is plugged. The option is disabled. <ul style="list-style-type: none"> <li>Wake on AC</li> </ul>
<b>Auto On Time</b>	Allows you to set the time at which the computer must turn on automatically. The options are: <ul style="list-style-type: none"> <li><b>Disabled</b> (Default Setting)</li> <li>Every Day</li> <li>Weekdays</li> <li>Select Days</li> </ul>
<b>USB Wake Support</b>	Allows you to enable the USB devices to wake the computer from standby mode. The option is disabled <ul style="list-style-type: none"> <li>Enable USB Wake Support</li> </ul>
<b>Wireless Radio Control</b>	Allows you to control the WLAN and WWAN radio. The options are: <ul style="list-style-type: none"> <li>Control WLAN radio</li> <li>Control WWAN radio</li> </ul> <p>Default Setting: both the options are disabled.</p>
<b>Wake on LAN/WLAN</b>	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. <ul style="list-style-type: none"> <li><b>Disabled</b> - 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. (Default Setting)</li> <li>LAN or WLAN - Allows the system to be powered on by special LAN signals or WLAN signals.</li> <li>LAN Only - Allows the system to be powered on by special LAN signals.</li> </ul>

Option	Description
	<ul style="list-style-type: none"> <li>WLAN Only - Allows the system to be powered on by special WLAN signals.</li> </ul>
<b>Block Sleep</b>	<p>Allows you to block the computer from entering into the sleep state. This option is disabled by default.</p> <ul style="list-style-type: none"> <li>Block Sleep (S3 State)</li> </ul>
<b>Peak Shift</b>	<p>Peak Shift can be used to minimize AC consumption during peak power times of day. For each weekday listed, set a start and end time to run in Peak Shift mode. During these times the system will run from the battery even if the AC is attached as long as the battery stays above the threshold specified in the Battery Threshold field. After the end time specified the system will run from AC if attached but will not charge the battery. The system will again function normally using AC and recharging the battery after the Charge Start time is specified. This option is disabled by default.</p> <ul style="list-style-type: none"> <li>Enable Peak Shift</li> </ul>
<b>Advanced Battery Charge Configuration</b>	<p>This places all batteries in the system in Advanced Battery Charging Mode to maximize battery health. In Advanced Charging Mode the system will use standard charging algorithm and other techniques during non-work hours to maximize battery health. During work hours express charge is used so that the battery will be charged faster and therefore ready to use again sooner. For each weekday, specify the time of day in which the system will be most heavily used. Setting the Work Period to 0 means the system will only be lightly used that day. This option is disabled by default.</p> <ul style="list-style-type: none"> <li>Enable Advanced Battery Charge Mode</li> </ul>
<b>Primary Battery Configuration</b>	<p>Allows you to define how to use the battery charge, when AC is plugged in. The options are:</p> <ul style="list-style-type: none"> <li>Adaptive (Default settings)</li> <li>Standard</li> <li>Express Charge</li> <li>Primarily AC use</li> <li>Custom - You can set the percentage to which the battery must charge .</li> </ul>

Table 9. POST behavior

Option	Description
<b>Adapter Warnings</b>	<p>Allows you to activate the adapter warning messages when certain power adapters are used.</p> <ul style="list-style-type: none"> <li><b>Enable Adapter Warnings</b> (Default Setting)</li> </ul>
<b>Keypad (Embedded)</b>	<p>Allows you to choose one of the two methods to enable keypad that is embedded in the internal keyboard.</p> <ul style="list-style-type: none"> <li><b>Fn Key Only</b> (Default Setting)</li> <li>By Numlock</li> </ul>

Option	Description
<b>Mouse/Touchpad</b>	Allows you to define how the computer handles the mouse and touchpad input. The options are: <ul style="list-style-type: none"> <li>Serial Mouse</li> <li>PS2 Mouse</li> <li><b>Touchpad/PS-2 Mouse</b> (Default Setting)</li> </ul>
<b>Numlock Enable</b>	Specifies if the NumLock function can be enabled when the computer boots. This option is enabled by default. <ul style="list-style-type: none"> <li>Enable Numlock</li> </ul>
<b>Fn Key Emulation</b>	Allows you to match the <Scroll Lock> key feature of PS-2 keyboard with the <Fn> key feature in an internal keyboard. The option is enabled by default. <ul style="list-style-type: none"> <li>Enable Fn Key Emulation</li> </ul>
<b>Fn Lock Options</b>	This option can enable the hot key combination <fn>+<Esc> toggle the primary behavior of F1–F12, between their standard and secondary functions. Fn Lock Modes are: <ul style="list-style-type: none"> <li>Lock Mode Disable/Standard</li> <li>Lock Mode Enable/Secondary</li> </ul>
<b>MEBx Hotkey</b>	This option specifies whether the MEBx Hotkey function should be enabled when the system boots. <ul style="list-style-type: none"> <li><b>Enable MEBx Hotkey</b> (Default Setting)</li> </ul>
<b>Fastboot</b>	This option can speed up the boot process by bypassing some compatibility steps. <ul style="list-style-type: none"> <li>Minimal – Reduces boot time by skipping certain hardware and configuration initialization during boot.</li> <li><b>Through</b> – Performs complete hardware and configuration initialization during boot. (Default Setting)</li> <li>Auto – Allows the BIOS to decide configuration initialization performed during the boot.</li> </ul>
<b>Extend BIOS POST Time</b>	This option creates an additional pre-boot delay. This allows the user to see POST status messages. <ul style="list-style-type: none"> <li><b>0 seconds</b> (Default Setting)</li> <li>5 seconds</li> <li>10 seconds</li> </ul>

**Table 10. Virtualization support**

Option	Description
<b>Virtualization</b>	This option specifies whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by Intel Virtualization technology.

Option	Description
	<ul style="list-style-type: none"> <li>• <b>Enable Intel Virtualization Technology</b> (Default Setting)</li> </ul>
<b>VT for Direct I/O</b>	<p>Enables or disables the Virtual Machine Monitor (VMM) from utilizing the additional hardware capabilities provided by Intel Virtualization technology for direct I/O.</p> <ul style="list-style-type: none"> <li>• <b>Enable Intel VT for Direct I/O</b> (Default Setting)</li> </ul>
<b>Trusted Execution</b>	<p>This option specifies whether a Measured Virtual Machine Monitor (MVMM) can utilize the additional hardware capabilities provided by Intel ® Trusted Execution Technology. The TPM Virtualization Technology, and Virtualization Technology for Direct I/O must be enabled to use this feature. This option is disabled by default.</p> <ul style="list-style-type: none"> <li>• Trusted execution</li> </ul>

**Table 11. Wireless**

Option	Description
<b>Wireless Switch</b>	<p>Allows you to determine which wireless device can be controlled by the wireless switch. The options are:</p> <ul style="list-style-type: none"> <li>• <b>WWAN</b></li> <li>• <b>WLAN</b></li> <li>• <b>GPS (on WWAN Module)</b></li> <li>• <b>Bluetooth</b></li> </ul> <p>All options are enabled by default.</p>
<b>Wireless Device Enable</b>	<p>Allows you to enable or disable the wireless devices. The options are:</p> <ul style="list-style-type: none"> <li>• <b>WWAN/GPS</b></li> <li>• <b>WLAN</b></li> <li>• <b>Bluetooth</b></li> </ul> <p>All options are enabled by default.</p>

**Table 12. Maintenance**

Option	Description
<b>Service Tag</b>	Displays the service tag of your computer.
<b>Asset Tag</b>	Allows you to create a system asset tag if an asset tag is not already set. This option is not set by default.
<b>BIOS Downgrade</b>	<p>This field controls flashing of the system firmware to previous revisions.</p> <ul style="list-style-type: none"> <li>• Allow BIOS Downgrade</li> </ul>
<b>Data Wipe</b>	<p>This field allows users to securely erase data from all the internal storage devices.</p> <ul style="list-style-type: none"> <li>• Wipe on Next Boot</li> </ul> <p>Selecting this operation will securely erase all devices installed in the system. The following is a list of devices affected by this operation:</p> <ul style="list-style-type: none"> <li>• Internal HDD</li> </ul>



Option	Description
	<ul style="list-style-type: none"> <li>• Internal SDD</li> <li>• Internal mSATA</li> <li>• Internal eMMC</li> </ul>
<b>BIOS Recovery</b>	<p>This enablesthe user to recover from certain corrupted BIOS conditions from a recovery file on the user primary hard drive or an external USB key. This options is enabled by default.</p> <ul style="list-style-type: none"> <li>• Enable Recovery from Hard Drive</li> </ul>

**Table 13. System logs**

Option	Description
<b>BIOS events</b>	Displays the system event log and allows you to clear the log.
<b>Thermal Events</b>	Displays the thermal event logs and allows you clear the thermal event log.
<b>Power Events</b>	Displays the power event logs and allows you clear the power event log.

## Updating the BIOS

It is recommended to update your BIOS (system setup), on replacing 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.

1. Restart the computer.
2. Go to [dell.com/support](https://dell.com/support).
3. If you have your computer's Service Tag or Express Service Code:
  -  **NOTE:** To locate the Service Tag, click **Where is my Service Tag?**
  -  **NOTE:** If you cannot find your Service Tag, click **Detect Service Tag**. Proceed with the instructions on screen.
4. Enter the **Service Tag** or **Express Service Code** and click **Submit**.
5. If you are unable to locate or find the Service Tag, click the Product Category of your computer.
6. Choose the **Product Type** from the list.
7. Select your computer model and the **Product Support** page of your computer appears.
8. Click **Drivers & Downloads**.
9. On the Drivers and Downloads screen, under the **Operating System** drop-down list, select **BIOS**.
10. Identify the latest BIOS file and click **Download File**.
11. Select your preferred download method in the **Please select your download method below window**; click **Download File**.  
The **File Download** window appears.
12. Click **Save** to save the file on your computer.
13. Click **Run** to install the updated BIOS settings on your computer.  
Follow the instructions on the screen.


# 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:** Your computer is shipped with the system and setup password feature disabled.

## Assigning a system password and setup password

You can assign a new **System Password** and/or **Setup Password** or change an existing **System Password** and/or **Setup Password** only when **Password Status** is **Unlocked**. If the Password Status is **Locked**, you cannot change the System Password.

 **NOTE:** If the password jumper is disabled, the existing System Password and Setup Password are deleted and you need not provide the system password to log on to the computer.

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

1. In the **System BIOS** or **System Setup** screen, select **System Security** and press Enter.  
The **System Security** screen appears.
2. In the **System Security** screen, verify that **Password Status** is **Unlocked**.
3. Select **System Password**, enter your system password, and press Enter or Tab.  
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, ("), (+), (.), (-), (,), (/), (:), (I), (\), (l), (').

Re-enter the system password when prompted.

4. Type the system password that you entered earlier and click **OK**.
5. Select **Setup Password**, type your system password and press Enter or Tab.  
A message prompts you to re-type the setup password.
6. Type the setup password that you entered earlier and click **OK**.
7. Press Esc and a message prompts you to save the changes.
8. 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.


# Diagnostics


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

## Enhanced Pre-Boot System Assessment (ePSA) diagnostics

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

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

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

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





1. Power-on the computer.
2. As the computer boots, press the F12 key as the Dell logo appears.
3. On the boot menu screen, select the **Diagnostics** option.  
The **Enhanced Pre-boot System Assessment** window is displayed, listing all devices detected in the computer. The diagnostics starts running the tests on all the detected devices.
4. To run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
5. Select the device from the left pane and click **Run Tests**.
6. If there are any issues, error codes are displayed.  
Note the error code and contact Dell.

# Troubleshooting your computer

You can troubleshoot your computer using indicators like diagnostic lights, beep codes, and error messages during the operation of the computer.

## Device status lights

**Table 14. Device status lights**

	Turns on when you turn on the computer and blinks when the computer is in a power management mode.
	Turns on when the computer reads or writes data.
	Turns on steadily or blinks to indicate battery charge status.
	Turns on when wireless networking is enabled.

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

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

**Table 15. LED lights**

Storage LED	Power LED	Wireless LED	Fault Description
Blinking	Solid	Solid	A possible processor failure has occurred.
Solid	Blinking	Solid	The memory modules are detected but has encountered an error.
Blinking	Blinking	Blinking	A system board failure has occurred.
Blinking	Blinking	Solid	A possible graphics card/video failure has occurred.
Blinking	Blinking	Off	System failed on hard drive initialization OR System failed in Option ROM initialization.
Blinking	Off	Blinking	The USB controller encountered a problem during initialization.
Solid	Blinking	Blinking	No memory modules are installed/detected.
Blinking	Solid	Blinking	The display encountered a problem during initialization.

Storage LED	Power LED	Wireless LED	Fault Description
Off	Blinking	Blinking	The modem is preventing the system from completing POST.
Off	Blinking	Off	Memory failed to initialize or memory is unsupported.

## 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.

# Specifications

## Technical specification

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

- Windows 10, click or tap **Start**  → **Settings** → **System** → **About**.
- Windows 8.1 and Windows 8, click or tap **Start**  → **PC Settings** → **PC and devices** → **PC Info**.
- Windows 7, click **Start** , right-click **My Computer**, and then select **Properties**.

**Table 16. System information**

Feature	Specification
System Chipset	Intel SKL PCH-H CM236
Interrupt Levels	Interrupt Controller <ul style="list-style-type: none"> <li>• Supports up to eight legacy interrupt pins</li> <li>• Supports PCI 2.3 Message Signaled</li> </ul> Interrupts <ul style="list-style-type: none"> <li>• Integrated IO APIC capability with 24 interrupts</li> <li>• Supports Processor System Bus interrupt delivery</li> </ul>
BIOS Chip (NVRAM)	128 Mb (16 MB)

**Table 17. Processor**

Feature	Specification
Processor type	<ul style="list-style-type: none"> <li>• Intel Core i5 and i7 Quad Core (6th generation)</li> <li>• Intel Xeon</li> </ul>
L1 cache	Up to 32 KB cache depending on processor type
L2 cache	Up to 256 KB cache depending on processor type
L3 cache	Up to 8 MB cache depending on processor type

Feature	Specification
Intel Smart cache with Last Level Cache	Up to 8 MB cache depending on processor type

**Table 18. Memory**

Feature	Specification
Type	DDR4
Speed	2133MHz, 2667MHz and ECC 2133MHz
Connectors	4 SoDIMM Sockets
Capacity	4 GB, 8 GB, and 16 GB
Minimum Memory	8 GB
Maximum memory	64 GB

**Table 19. Video**

Feature	Specification
Type	MXM type-B add-in card
Data bus	PCIe x16, Gen3
Video controller and memory:	<ul style="list-style-type: none"> <li>• AMD FirePro W5170M, 2GB GDDR5</li> <li>• AMD FirePro W7170M, 4GB GDDR5</li> <li>• Nvidia Quadro M3000M, 4GB GDDR5</li> <li>• Nvidia Quadro M4000M, 4GB GDDR5</li> <li>• Nvidia Quadro M5000M, 8GB GDDR5</li> </ul>

**Table 20. Audio**

Feature	Specification
Integrated	dual-channel High-Definition audio

**Table 21. Communication**

Feature	Specification
Network adapter	network interface card capable of 10/100/1000 Mb/s communication
Wireless	<ul style="list-style-type: none"> <li>• internal wireless local area network (WLAN)</li> <li>• internal wireless wide area network (WWAN)</li> <li>• bluetooth wireless support</li> <li>• High speed bluetooth 4.0</li> </ul>

**Table 22. Expansion bus**

<b>Feature</b>	<b>Specification</b>
Bus Type	PCI Express 1.0, 2.0 and 3.0, SATA 1.0A ,2.0 and 3.0, USB 2.0 and 3.0
Bus Width	PCIe X16
BIOS Chip (NVRAM)	128 Mb (16 MB)

**Table 23. Ports and connectors**

<b>Feature</b>	<b>Specification</b>
Audio	Universal audio jack connector
Network Adapter	one RJ45 connector
USB C connector	one (optional)
USB 3.0	four
Video	19-pin HDMI connector, Mini DisplayPort connector
Memory card reader	SD 4.0
Docking port	one
Micro Subscriber Identity Module (Micro SIM) port	one
Smart card (optional)	one

**Table 24. Display**

<b>Feature</b>	
Type	<ul style="list-style-type: none"> <li>FHD (1920 x 1080)</li> <li>UHD (3840 x 2160)</li> </ul>
Size	17.3 inches
Dimensions:	
Height	270.60 mm (10.65 inches)
Width	416.70 mm (16.40 inches)
Diagonal	439.42 mm (17.3 inches)
Active area (X/Y)	<ul style="list-style-type: none"> <li>FHD (1920 x 1080)</li> <li>UHD (3840 x 2160)</li> </ul>
Maximum resolution	<ul style="list-style-type: none"> <li>FHD (1920 x 1080)</li> <li>UHD (3840 x 2160)</li> </ul>
Maximum Brightness	<ul style="list-style-type: none"> <li>UHD (400 nits)</li> </ul>
Operating angle	0° (closed) to 135°

<b>Feature</b>	
Refresh rate	60 Hz
Minimum viewing angles:	
Horizontal/Vertical	• FHD (60/60/50/50)

**Table 25. Keyboard**

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

**Table 26. Touchpad**

<b>Feature</b>	<b>Specification</b>
Active Area:	
X-axis	99.5 mm
Y-axis	53 mm

**Table 27. Camera**

<b>Feature</b>	<b>Specification</b>
Type	CMOS Sensor
Still Resolution	1280 x 720 Pixels ( Maximum )
Video Resolution	1280 x 720 Pixels @ 30 Frame Per Seconds ( Maximum )
Diagonal	74 degrees

**Table 28. Storage**

<b>Feature</b>	<b>Specification</b>
Storage:	
Storage Interface	<ul style="list-style-type: none"> <li>• SATA 1 (1.5 Gb/s)</li> <li>• SATA 2 (3.0 Gb/s)</li> <li>• SATA 3 (6 Gb/s)</li> <li>• PCIe express</li> </ul>
Drives configuration	one internal 9.5/7.0/5.0/ mm SATA HDD/SSD (SATA3)
Size	1 TB 5400 rpm, 128/256/512 GB SATA 3 SSD, 256 GB SATA 3 SSD, 1 TB M.2 SSD, 1 TB SATA 3 SSD



Feature	Specification
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**NOTE:** The size of the hard drive is bound to change. For more information, see dell.com.

**Table 29. Battery**

Feature	Specification
Type	lithium ion
Dimensions (6-cell entry/ 6-cell upsell/ 6-cell long cycle life (LCL)):	
Depth	71.3 mm (2.81 inches)
Height	234.89 mm (9.25 inches)
Width	18.45 mm (0.73 inches)
Weight	<ul style="list-style-type: none"> <li>6-cell entry - 395 g (0.87 lb)</li> <li>6-cell upsell/ LCL- 405 g (0.89 lb)</li> </ul>
Voltage	<ul style="list-style-type: none"> <li>6-cell entry — 11.1 V</li> <li>6-cell upsell/ LCL — 11.4 V</li> </ul>
Life span	<ul style="list-style-type: none"> <li>300 discharge/charge cycles</li> <li>1000 discharge/charge cycles (LCL)</li> </ul>
Temperature range:	
Operating	<ul style="list-style-type: none"> <li>Charge : 0°C to 50°C (32°F to 158°F)</li> <li>Discharge: 0°C to 70°C (32°F to 122°F)</li> </ul>
Non-operating	-20°C to 65°C (4°F to 149°F)
Coin-cell battery	3 V CR2032 lithium ion cell

**Table 30. AC Adapter**

Feature	Specification
Input voltage	100 VAC to 240 VAC
Input current (maximum)	3.50 A
Input frequency	50 Hz to 60 Hz
Output power	240 W
Output current	12.31 A
Rated output voltage	19.50 VDC
Dimensions:	240 W
Height	25.40 mm (1 inch)
Width	200 mm (7.87 inches)
Depth	100 mm (3.94 inches)

Feature	Specification
Weight	0.85 kg (1.88 lb)
Temperature range:	
Operating	0°C to 40°C (32°F to 104°F)
Non Operating	-40°C to 70°C (-40°F to 158°F)

**Table 31. Contactless smart card**

Feature	Specification
Supported Smart Cards and Technologies	<ul style="list-style-type: none"> <li>• ISO14443A – 160 kbps, 212 kbps, 424 kbps, and 848 kbps</li> <li>• ISO14443B – 160 kbps, 212 kbps, 424 kbps, and 848 kbps</li> <li>• ISO15693</li> <li>• HID iClass</li> <li>• FIPS201</li> <li>• NXP Desfire</li> </ul>

**Table 32. Physical dimension**

Physical	Specification
Height:	
Non-touch	<ul style="list-style-type: none"> <li>• Front: 28.7 mm ( 1.13 inches)</li> <li>• Back: 35.3 mm ( 1.39 inches)</li> </ul>
Width	416.70 mm (16.41 inches)
Depth	281.2 mm (11.07 inches)
Weight (Minimum)	3.42 kg (7.55 lb)


**Table 33. Environmental**

Feature	Specification
Temperature range:	
Operating	0°C to 40°C (32°F to 104°F)
Storage	-40°C to 65 °C (-40°F to 149°F)
Relative humidity (maximum):	
Operating	10 % to 90 % (non-condensing)
Storage	5 % to 95 % (non-condensing)
Maximum vibration:	
Operating	0.66 GRMS, 2 Hz - 600 Hz
Storage	1.3 GRMS, 2 Hz - 600 Hz
Maximum shock:	
Operating	140 G, 2 ms

<b>Feature</b>	<b>Specification</b>
Non-operating	163 G, 2 ms
Altitude:	
Storage	0 m to 10668 m (0 ft to 35,000 ft)
Airborne contaminant level	G1 or lower as defined by ANSI/ISA-S71.04-1985

# Contacting Dell

## 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.