

# Dell Latitude E6540

## Owner's Manual

Regulatory Model: P29F  
Regulatory Type: P29F001



# Notes, Cautions, and Warnings



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



**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

## Before Working Inside Your Computer

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 performed the steps in Working on Your Computer.
- 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:** 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.

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

1. Ensure that your work surface is flat and clean to prevent the computer cover from being scratched.
2. Turn off your computer (see [Turning Off Your Computer](#)).
3. If the computer is connected to a docking device (docked) such as the optional Media Base or Battery Slice, undock it.

 **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 network cables from the computer.
5. Disconnect your computer and all attached devices from their electrical outlets.

6. Close the display and turn the computer upside-down on a flat work surface.

 **NOTE:** To avoid damaging the system board, you must remove the main battery before you service the computer.

7. Remove the main battery.
8. Turn the computer top-side up.
9. Open the display.
10. Press the power button to ground the system board.

 **CAUTION:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the display.

 **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.

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

## 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. Shut down the operating system:

– In Windows 8:

\* Using a touch-enabled device:

a. Swipe in from the right edge of the screen, opening the Charms menu and select **Settings**.

b. Select the  and then select **Shut down**

\* Using a mouse:

a. Point to upper-right corner of the screen and click **Settings**.

b. Click the  and select **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 as shown below, and then click **Shut**



**Down..**

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 4 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, battery slice, 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. Connect your computer and all attached devices to their electrical outlets.
5. Turn on your computer.



# Removing and Installing Components

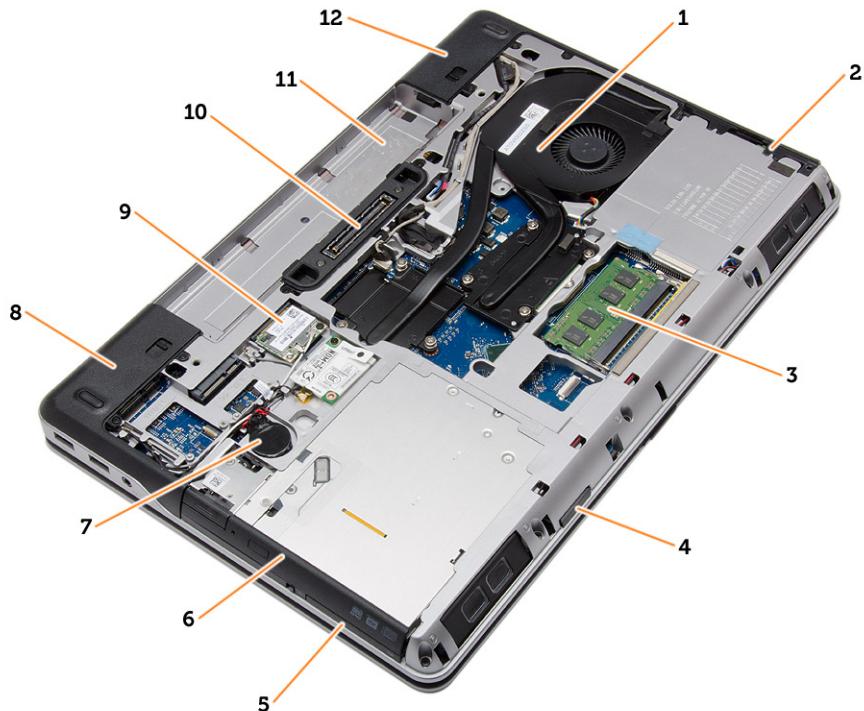
This section provides detailed information on how to remove or install the components from your computer.

## Recommended Tools

The procedures in this document may require the following tools:

- Small flat-blade screwdriver
- Phillips screwdriver
- Small plastic scribe

## System Overview



**Figure 1. Back View — Back Cover Removed**

1. heat-sink assembly	4. SD card
2. hard drive	5. ExpressCard slot
3. memory	6. optical drive

- 7. coin-cell battery
- 8. base corner cap (left)
- 9. WLAN card
- 10. docking port
- 11. battery bay
- 12. base corner cap (right)



**Figure 2. Top View — Keyboard and Palmrest Assembly removed**

1. WiFi-switch board	6. hard-drive bay
2. speaker	7. VGA board
3. ExpressCard cage	8. display assembly
4. system board	
5. speaker	

## Removing the Secure Digital (SD) Card

1. Follow the procedures 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.

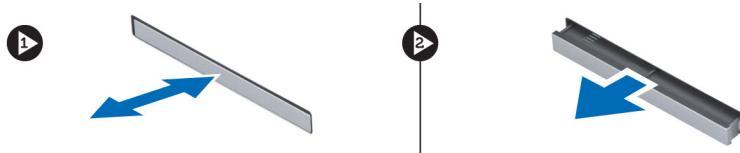


## Installing the Secure Digital (SD) Card

1. Slide the SD card into its slot until it clicks into place.
2. Follow the procedures in *After Working Inside Your Computer*.

## Removing the ExpressCard

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Press in on the ExpressCard to release it from the computer. Slide the ExpressCard out of the computer.



## Installing the ExpressCard

1. Slide the ExpressCard in its slot until it clicks in place.
2. Follow the procedures in *After Working Inside Your Computer*.

## Removing the Battery

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Slide the release latches to unlock the battery.



3. Flip the battery out of the computer.

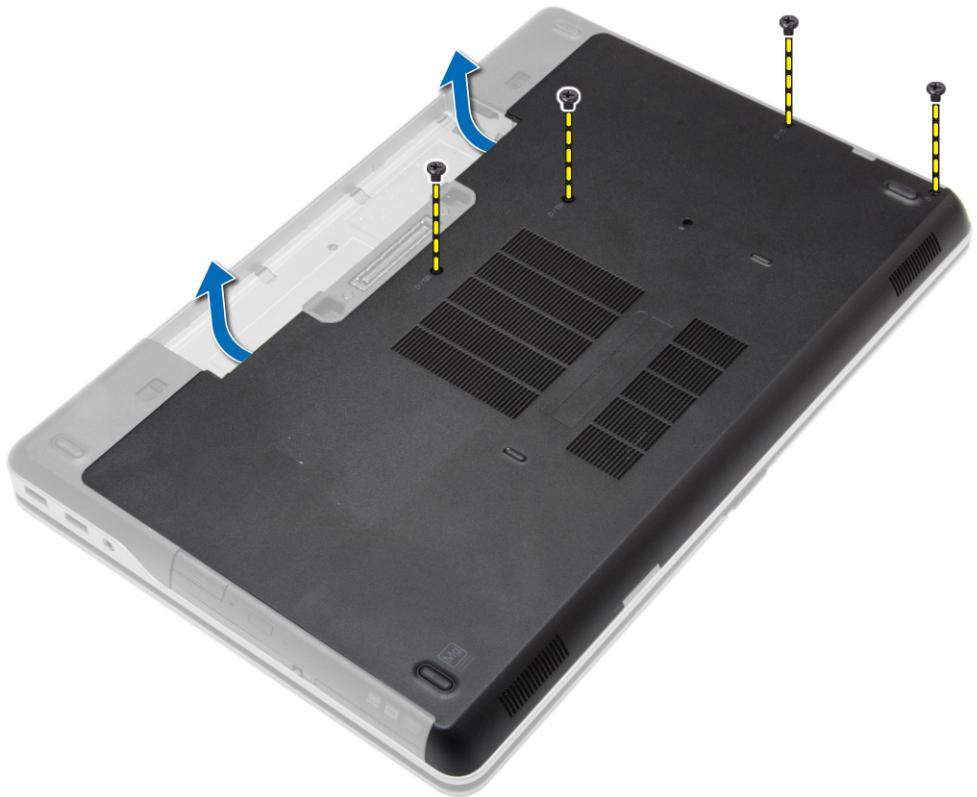


## Installing the Battery

1. Slide the battery into its slot until it clicks into place.
2. Follow the procedures in *After Working Inside Your Computer*.

## Removing the Base Cover

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the screws that secure the base cover to the computer.



3. Lift the base cover and remove it from the computer.



## Installing the Base Cover

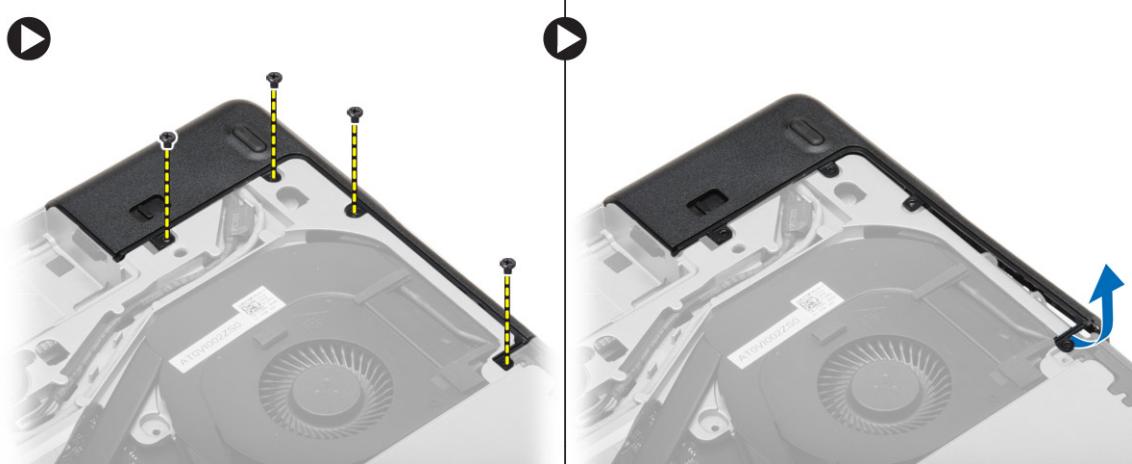
1. Place the base cover to align with the screw holes on the computer.
2. Tighten the screws to secure the base cover to the computer.
3. Install the battery.
4. Follow the procedures in *After Working Inside Your Computer*.

## Removing the Base Corner Caps

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the battery.
3. Remove the base cover.
4. Remove the screws that secure the left base corner cap, lift and remove it from the computer.



5. Remove the screws that secure the right base corner cap, lift and remove it from the computer.



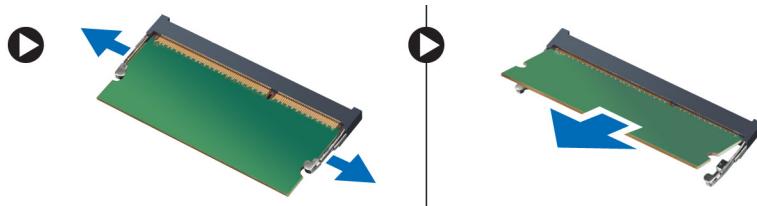
## Installing the Base Corner Caps

1. Place the left and right base corner caps to align with the screw holes on the computer.
2. Tighten the screws to secure the base corner caps to the computer.
3. Install:
  - a) base cover
  - b) battery
4. Follow the procedures in *After Working Inside Your Computer*.

## Removing the Memory

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
  - a) battery
  - b) base cover

3. Pry the securing clips away from the memory module until it pops-up and remove the memory module from its connector on the system board.



## Installing the Memory

1. Insert the memory into the memory socket.
2. Press the securing clips to secure the memory module to the system board.
3. Install:
  - a) base cover
  - b) battery
4. Follow the procedures in *After Working Inside Your Computer*.

## Removing the Hard Drive

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the battery.
3. Remove the screws that secure the hard drive to the computer. Slide the hard drive out of the computer.



4. Remove the screw that secures the hard-drive caddy to the hard drive. Remove the hard-drive caddy from the hard drive.



5. Flex the hard-drive isolation. Peel off the hard-drive isolation from the hard drive.

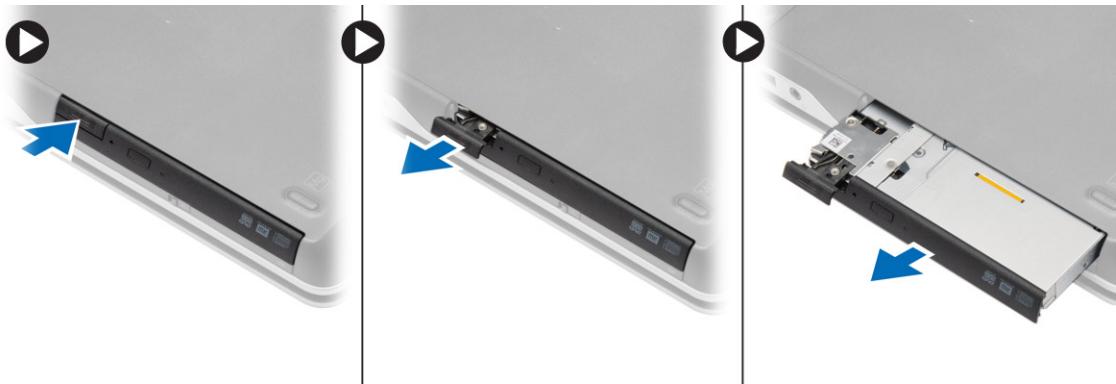


## Installing the Hard Drive

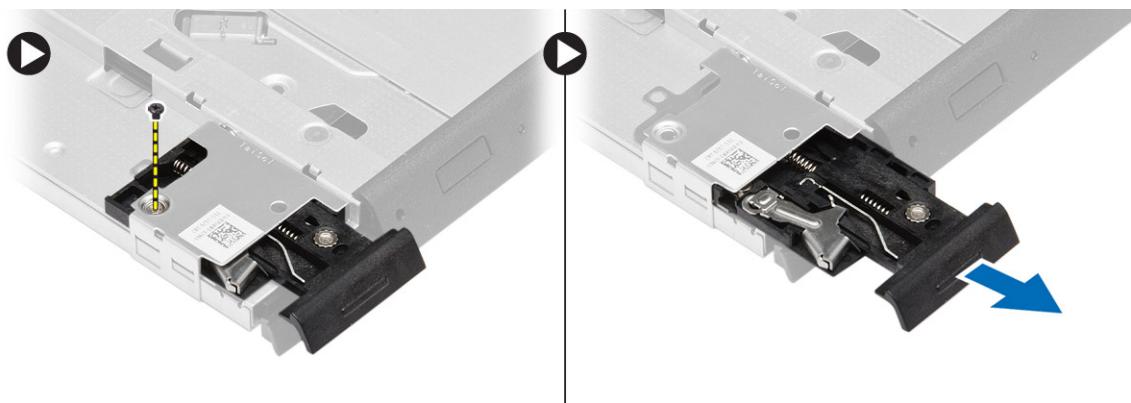
1. Install the hard-drive isolation on the hard drive.
2. Attach the hard-drive caddy to the hard drive.
3. Tighten the screws to secure the hard-drive caddy to the hard drive.
4. Slide the hard drive into the computer.
5. Tighten the screws to secure the hard drive to the computer.
6. Install the battery.
7. Follow the procedures in *After Working Inside Your Computer*.

## Removing the Optical Drive

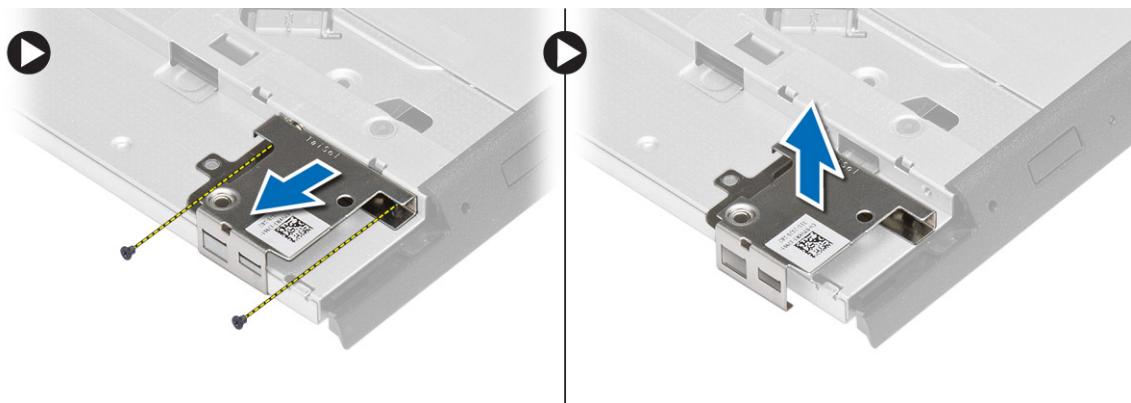
1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the battery.
3. Press the optical-drive latch to release the optical drive and pull the optical drive from the computer.



4. Remove the screw that secures the optical-drive latch to the optical drive. Slide the optical-drive latch and remove it from the optical-drive.



5. Remove the screws that secure the optical-drive latch bracket to the optical drive. Remove the latch bracket from the optical drive.



## Installing the Optical Drive

1. Align the optical-drive latch bracket to its position on the optical drive.
2. Tighten the screw to secure the optical-drive latch bracket to the optical drive.
3. Slide the optical-drive latch in the optical-drive latch bracket.
4. Tighten the screws to secure the optical-drive latch to the optical-drive latch bracket.
5. Slide the optical drive into the drive bay.

6. Press the optical-drive latch to secure the optical drive.
7. Install the battery.
8. Follow the procedures in *After Working Inside Your Computer*.

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

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
  - a) battery
  - b) base cover
3. Disconnect the antenna cables, remove the screw that secures the WLAN card to the system board and lift the WLAN card from the computer.

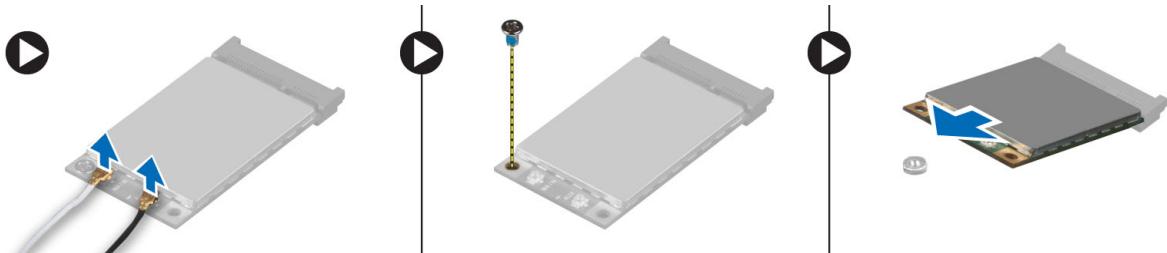


## Installing the WLAN Card

1. Insert the WLAN card in its connector at a 45-degree angle in its slot.
2. Connect the antenna cables to their respective connectors marked on the WLAN card.
3. Tighten the screw to secure the WLAN card to the computer.
4. Install:
  - a) base cover
  - b) battery
5. Follow the procedures in *After Working Inside Your Computer*.

## Removing the Wireless Wide Area Network (WWAN) Card

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
  - a) battery
  - b) base cover
3. Perform the following steps as shown in the illustration:
  - a) Disconnect the antenna cables from the WWAN card.
  - b) Remove the screw that secures the WWAN card to the computer.
  - c) Remove the WWAN card from the computer.

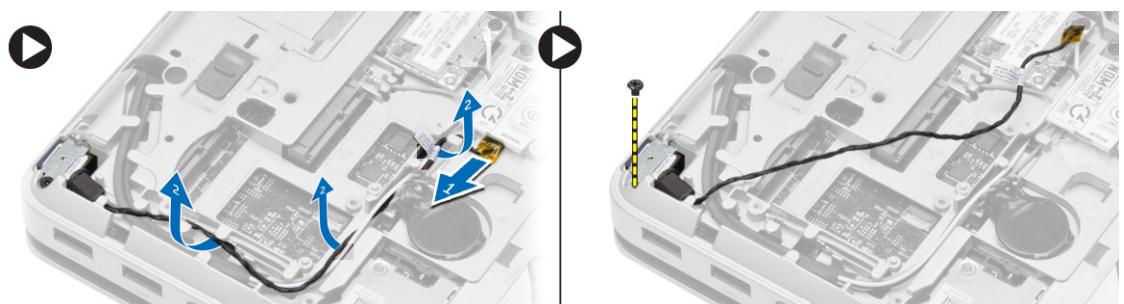


## Installing the WWAN Card

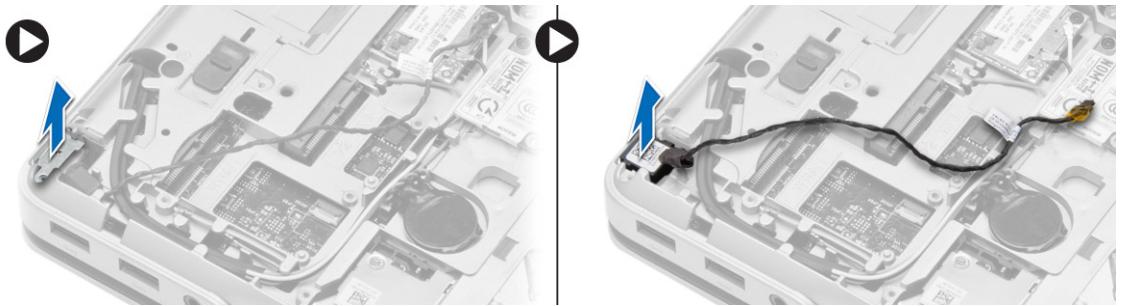
1. Place the WWAN card in its slot in the system board.
2. Press the WWAN card down and tighten the screw to secure the WWAN card to the computer.
3. Connect the antenna cables to their connectors on the WWAN card.
4. Install:
  - a) base cover
  - b) battery
5. Follow the procedures in *After Working Inside Your Computer*.

## Removing the Network Connector

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
  - a) battery
  - b) base cover
  - c) base corner cap (left)
3. Perform the following steps as shown in the illustration:
  - a) Disconnect the cable from the system board.
  - b) Release cable from the routing channel.
  - c) Remove the screw that secures the network-connector bracket to the computer.



4. Lift the network-connector bracket from the computer. Lift the network connector from the computer.

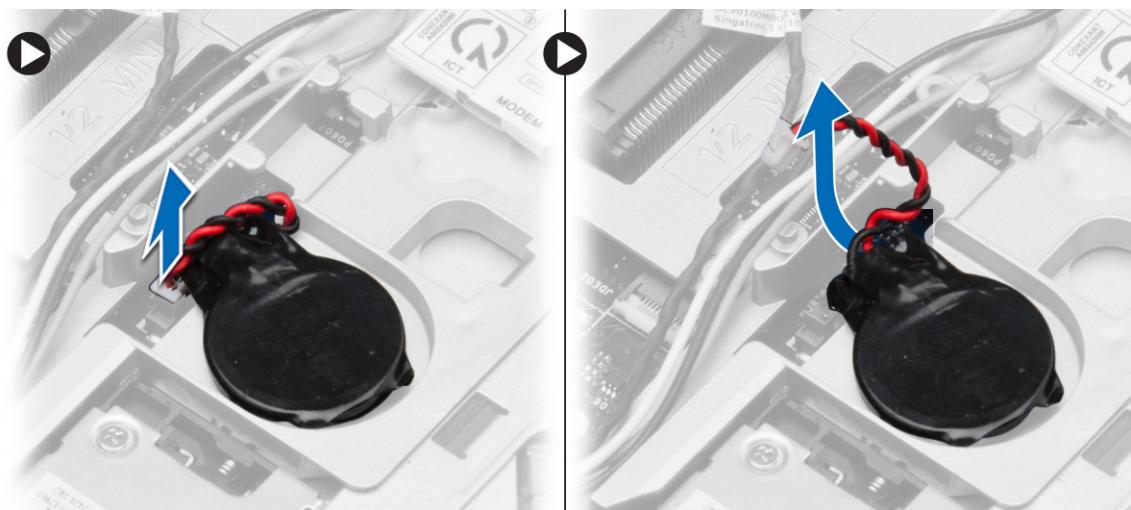


## Installing the Network Connector

1. Align the network connector to its position on the computer.
2. Place the network-connector bracket on the network connector.
3. Tighten the screw to secure the network-connector bracket to the computer.
4. Route the cable through the routing channel.
5. Connect the cable to the system board.
6. Install:
  - a) base corner cap (left)
  - b) base cover
  - c) battery
7. Follow the procedures in *After Working Inside Your Computer*.

## Removing the Coin-Cell Battery

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
  - a) battery
  - b) base cover
3. Disconnect the coin-cell battery cable, pry the coin-cell battery upward and remove it from the computer.

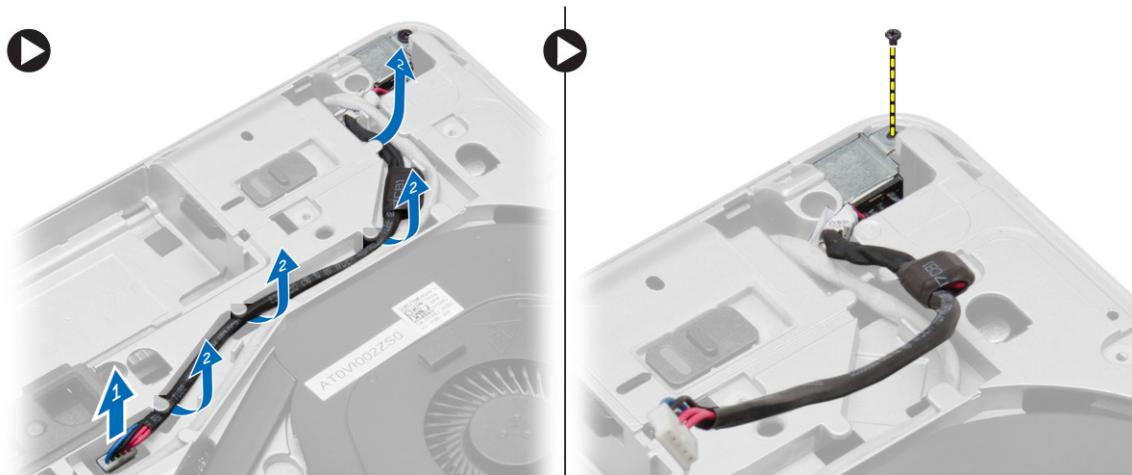


## Installing the Coin-Cell Battery

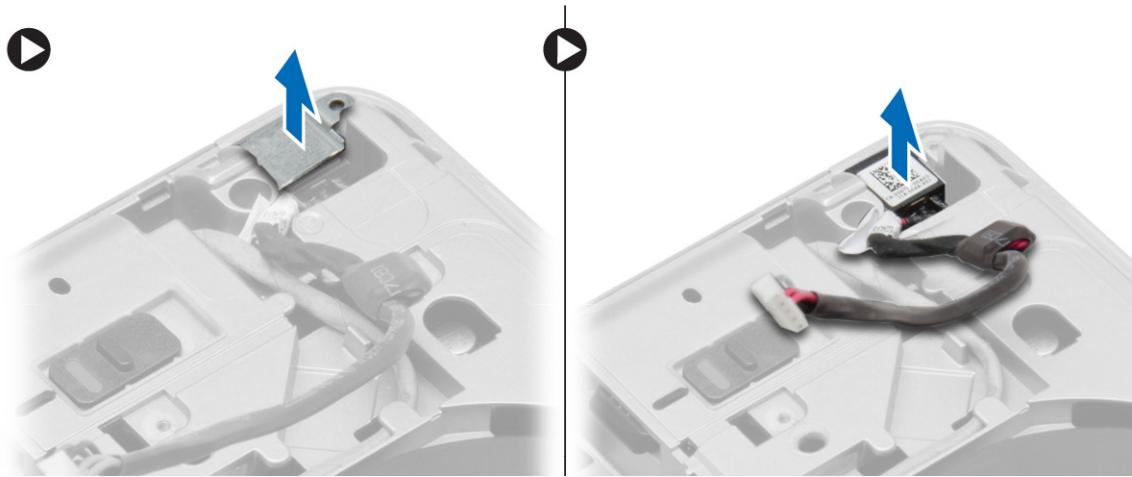
1. Place the coin-cell battery in its slot.
2. Connect the coin-cell battery cable to the system board.
3. Install:
  - a) base cover
  - b) battery
4. Follow the procedures in *After Working Inside Your Computer*.

## Removing the Power Connector

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
  - a) battery
  - b) base corner cap (right)
  - c) base cover
3. Perform the following steps as shown in the illustration:
  - a) Disconnect the power-connector cable.
  - b) Release the power-connector cable from the routing channel.
  - c) Remove the screw that secures the power-connector bracket to the computer.



4. Lift the power-connector bracket from the computer. Lift the power connector from the computer.

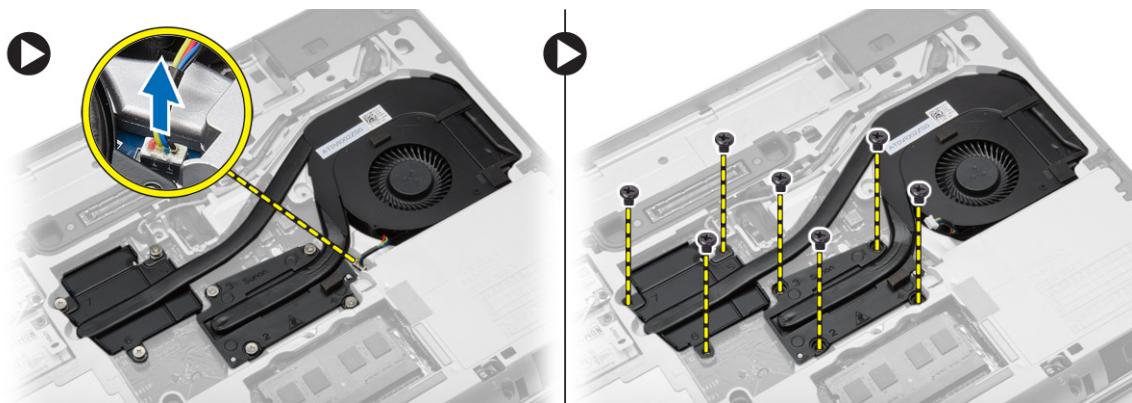


## Installing the Power Connector

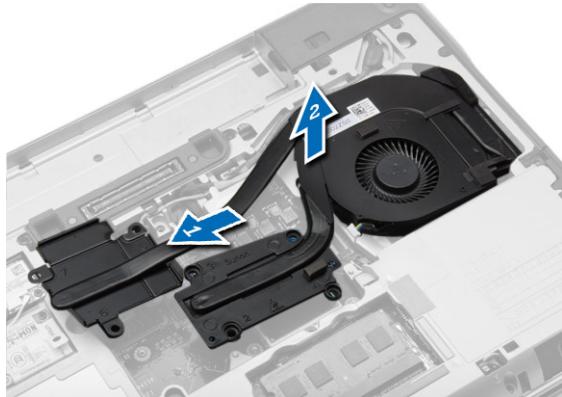
1. Align the power connector to its position in the computer.
2. Place the power-connector bracket on the power connector.
3. Tighten the screw to secure the power-connector bracket to the computer.
4. Route the cable through the routing channel.
5. Connect the cable to the system board.
6. Install:
  - a) base cover
  - b) base corner cap (right)
  - c) battery
7. Follow the procedures in *After Working Inside Your Computer*.

## Removing the Heat-Sink Assembly

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
  - a) battery
  - b) base cover
3. Disconnect the fan cable and remove the screws that secure the heat-sink assembly to the system board.



4. Perform the following steps as shown in the illustration:
  - a) Slide the heat-sink assembly.
  - b) Lift the heat-sink assembly from the computer.

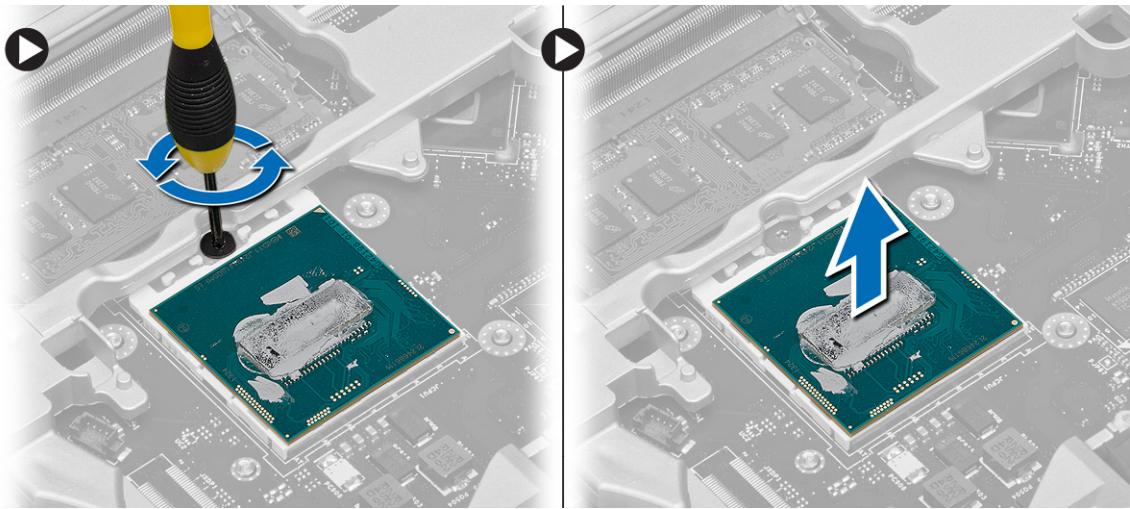


## Installing the Heat-Sink Assembly

1. Slide the heat-sink assembly to its position on the system board.
2. Tighten the screws to secure the heat-sink assembly to the system board.
3. Connect the fan cable to the system board.
4. Install:
  - a) base cover
  - b) battery
5. Follow the procedures in *After Working Inside Your Computer*.

## Removing the Processor

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
  - a) battery
  - b) base cover
  - c) heat-sink assembly
3. Rotate the processor-cam lock in a counter-clockwise direction. Remove the processor from the computer.

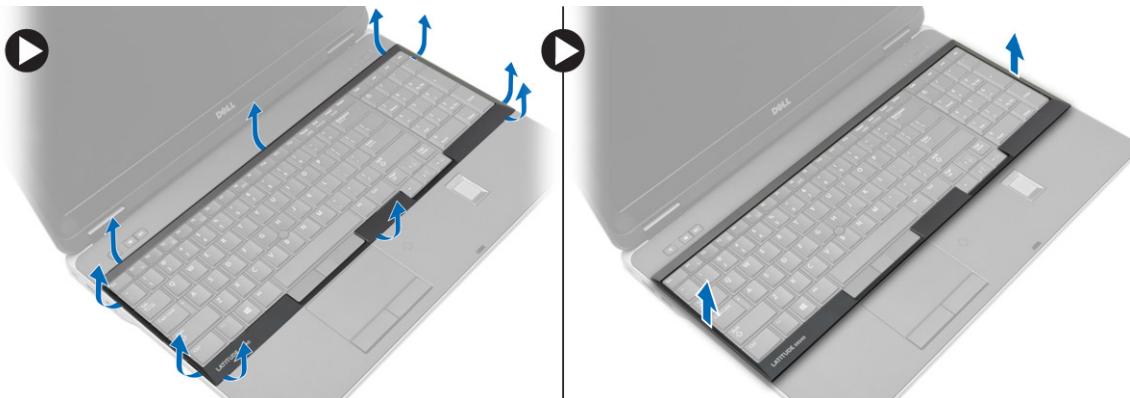


## Installing the Processor

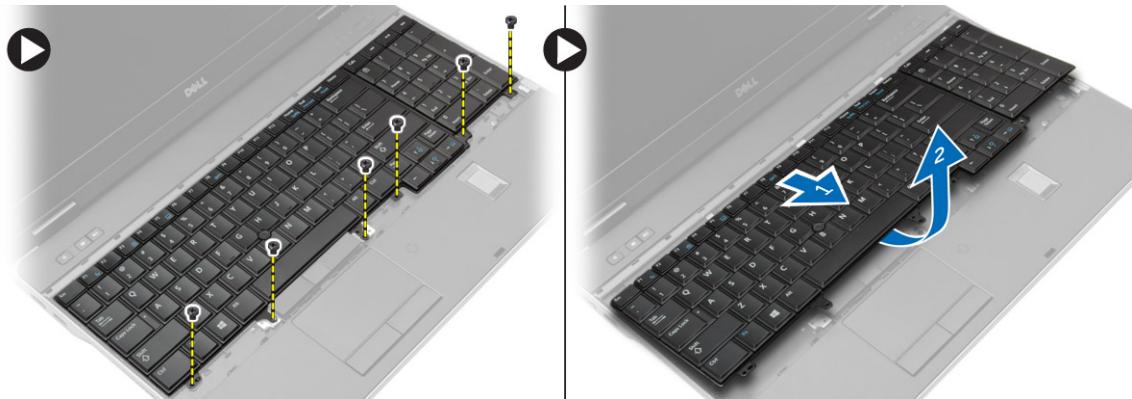
1. Align the notches on the processor and the socket, and insert the processor into the socket.
2. Rotate the processor-cam lock in a clockwise direction.
3. Install:
  - a) heat-sink assembly
  - b) base cover
  - c) battery
4. Follow the procedures in *After Working Inside Your Computer*.

## Removing the Keyboard

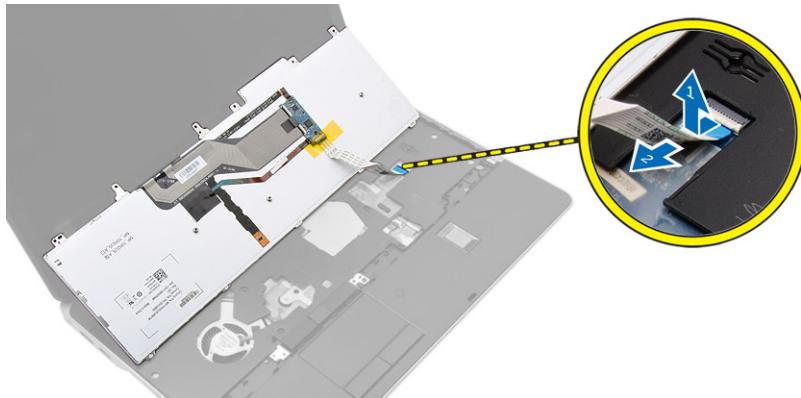
1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the battery.
3. Using a plastic scribe, pry under the keyboard trim and then along the sides and bottom to release it from the computer. Lift and remove the keyboard trim from the computer.



4. Remove the screws that secure the keyboard to the palmrest assembly, lift and flip the keyboard to access the keyboard-cable.



5. Disconnect the keyboard cable from the system board.

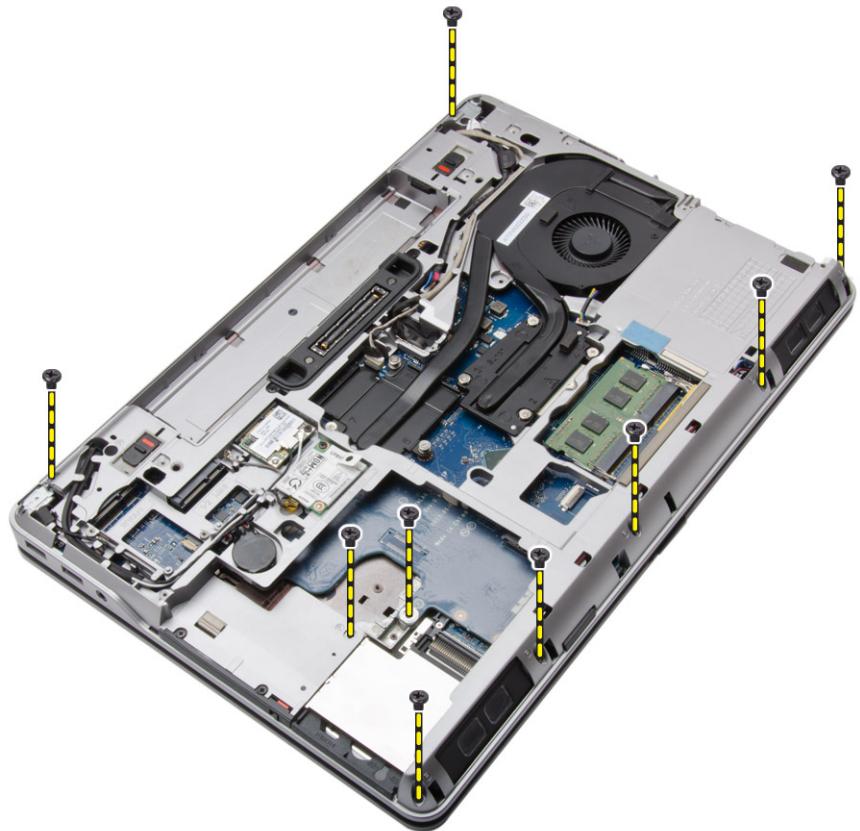


## Installing the Keyboard

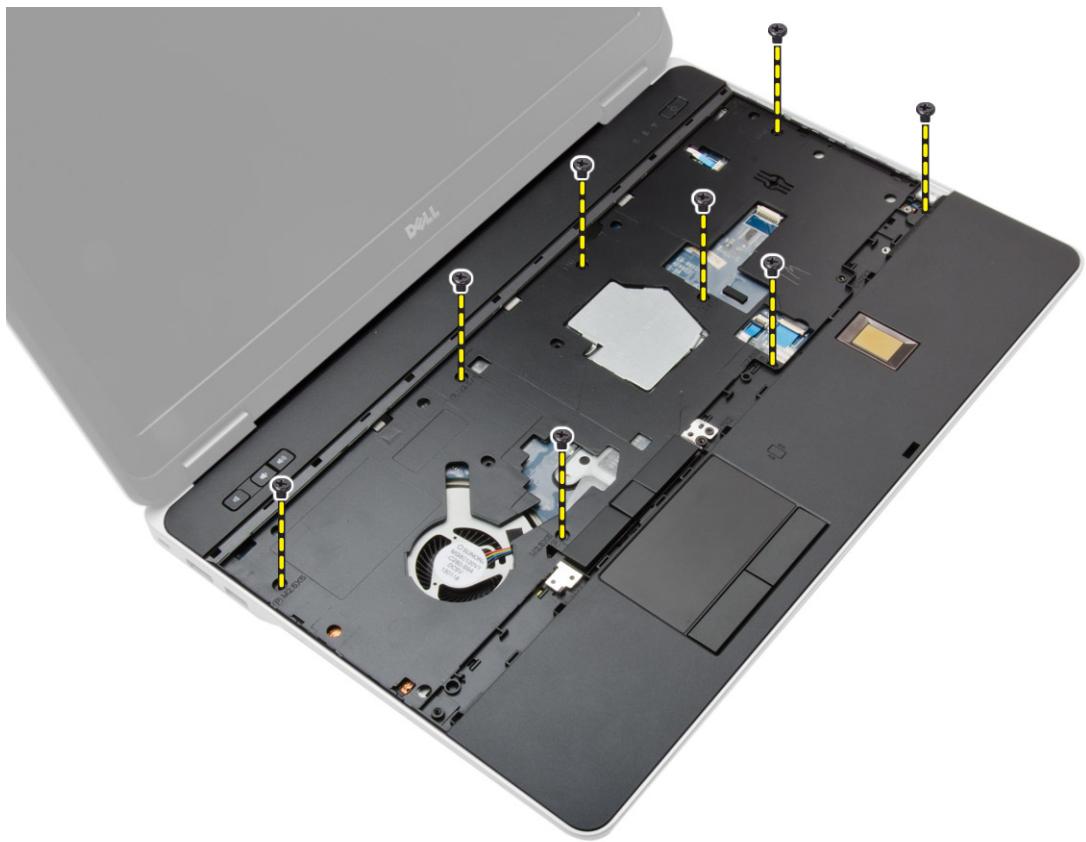
1. Connect the keyboard cable to the system board.
2. Slide the keyboard into its compartment and until it clicks into place.
3. Tighten the screws to secure the keyboard to the palmrest assembly.
4. Align the keyboard trim on its compartment and press along the sides until it snaps in place.
5. Install the battery.
6. Follow the procedures in *After Working Inside Your Computer*.

## Removing the Palmrest Assembly

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
  - a) SD card
  - b) ExpressCard
  - c) battery
  - d) keyboard
  - e) display-hinge cap
  - f) base cover
  - g) base corner caps
3. Remove the screws that secure the palmrest assembly to the base of the computer.

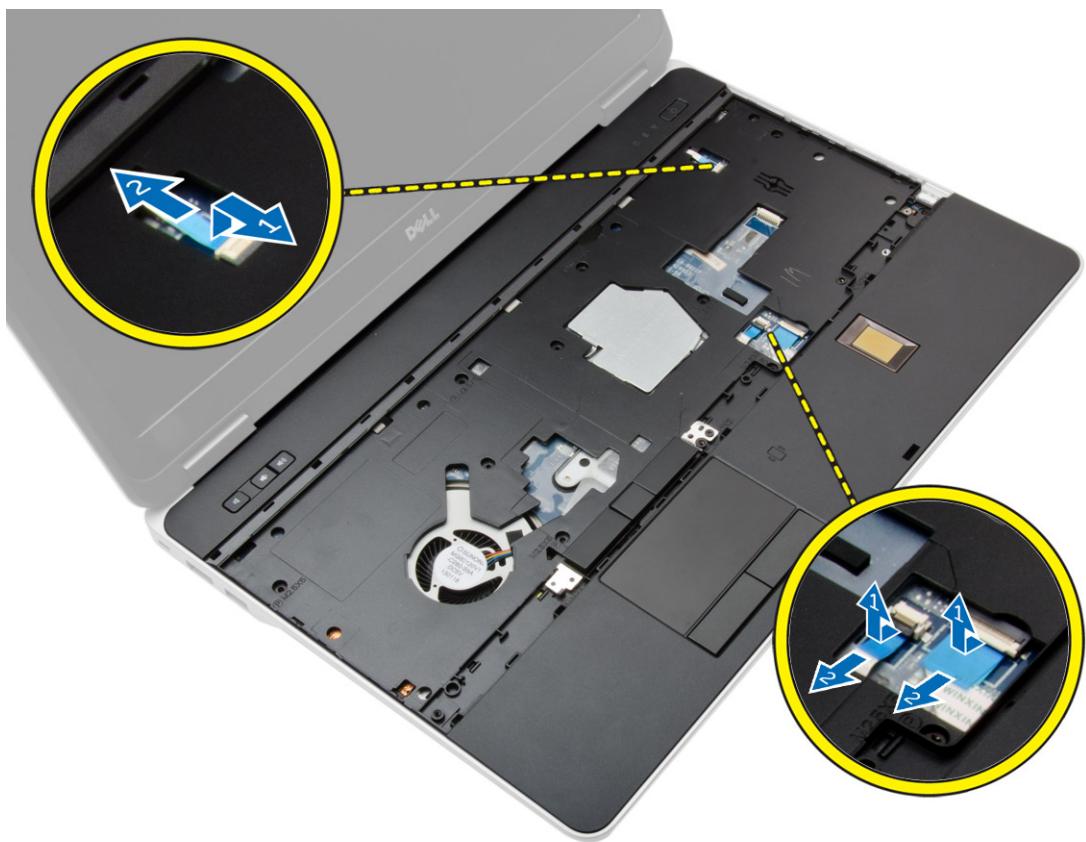


4. Flip the computer and remove the screws that secure the palmrest assembly to the computer.



**5. Disconnect the following cables:**

- a) fingerprint-reader
- b) touchpad
- c) power-button



6. Pry the palmrest assembly upwards and remove it from the computer.

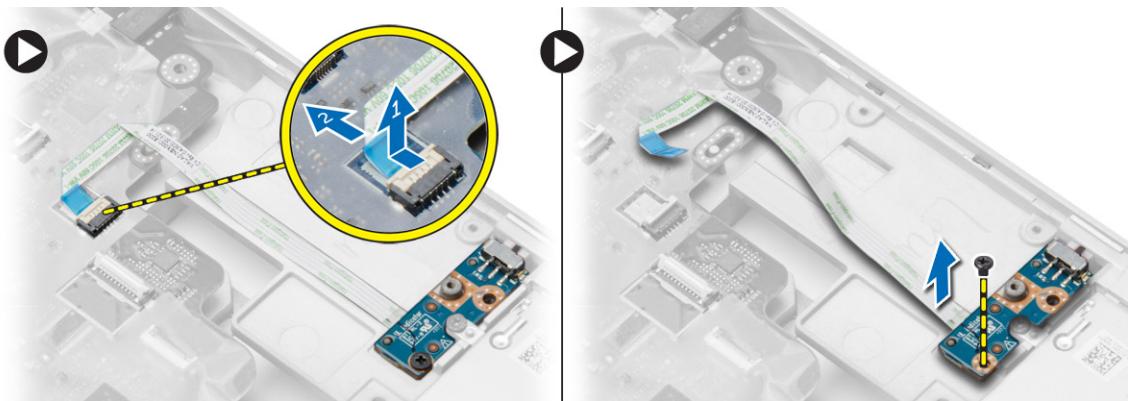


## Installing the Palmrest Assembly

1. Align the palmrest assembly to its original position in the computer and snap it into place.
2. Tighten the screws to secure the palmrest assembly to the computer.
3. Connect the following cables:
  - a) power-button
  - b) touchpad
  - c) fingerprint-reader
4. Flip the computer and tighten the screws to secure the palmrest assembly to the base of the computer.
5. Install:
  - a) base corner caps
  - b) base cover
  - c) display-hinge cap
  - d) keyboard
  - e) battery
  - f) ExpressCard
  - g) SD card
6. Follow the procedures in *After Working Inside Your Computer*.

## Removing the WiFi-Switch Board

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
  - a) SD Card
  - b) ExpressCard
  - c) battery
  - d) keyboard
  - e) display-hinge cap
  - f) base cover
  - g) base corner caps
  - h) palmrest assembly
3. Perform the following steps as shown in the illustration:
  - a) Disconnect the cable from the system board.
  - b) Remove the screw that secures the WiFi-switch board and lift it from the computer.

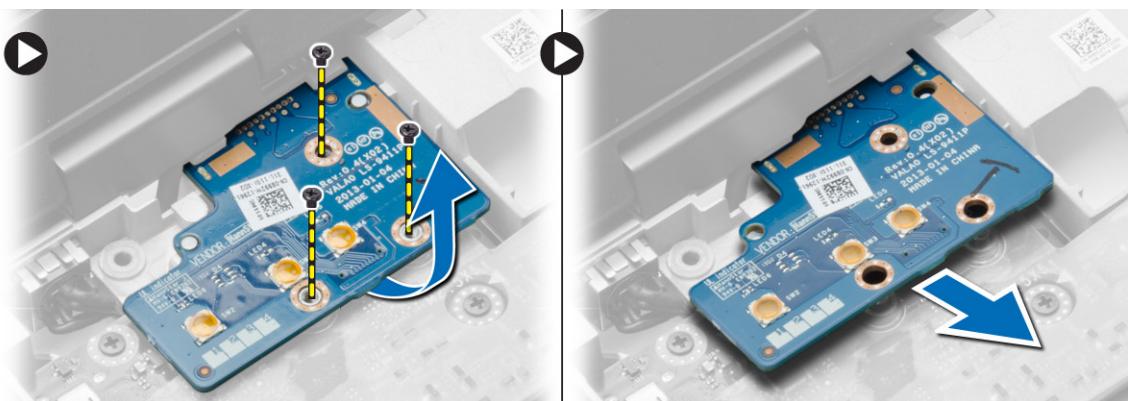


## Installing the WiFi-Switch Board

1. Place the WiFi-switch board in its slot.
2. Tighten the screw to secure the WiFi-switch board to the computer.
3. Connect the cable to the system board.
4. Install:
  - a) palmrest assembly
  - b) base cover
  - c) base corner caps
  - d) display-hinge cap
  - e) keyboard
  - f) battery
  - g) ExpressCard
  - h) SD Card
5. Follow the procedures in *After Working Inside Your Computer*.

## Removing the VGA Board

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
  - a) SD Card
  - b) ExpressCard
  - c) battery
  - d) keyboard
  - e) display-hinge cap
  - f) base cover
  - g) base corner caps
  - h) palmrest assembly
3. Remove the screws that secure the VGA board to the computer and remove it from its connector.



## Installing the VGA Board

1. Insert the VGA board in its slot
2. Tighten the screws to secure the VGA board to the computer.
3. Install:
  - a) palmrest assembly
  - b) base corner caps
  - c) base cover
  - d) display-hinge cap
  - e) keyboard
  - f) battery
  - g) ExpressCard
  - h) SD Card
4. Follow the procedures in *After Working Inside Your Computer*.

## Removing the ExpressCard Cage

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
  - a) SD Card

- b) ExpressCard
- c) battery
- d) keyboard
- e) display-hinge cap
- f) base cover
- g) base corner caps
- h) palmrest assembly

3. Remove the screws that secure the ExpressCard cage to the computer. Remove the ExpressCard cage from the computer.



## Installing the ExpressCard Cage

1. Place the ExpressCard cage in its slot.
2. Tighten the screws to secure the ExpressCard cage to the computer.
3. Install:
  - a) palmrest assembly
  - b) base corner caps
  - c) base cover
  - d) display-hinge cap
  - e) keyboard
  - f) battery
  - g) ExpressCard
  - h) SD Card
4. Follow the procedures in *After Working Inside Your Computer*.

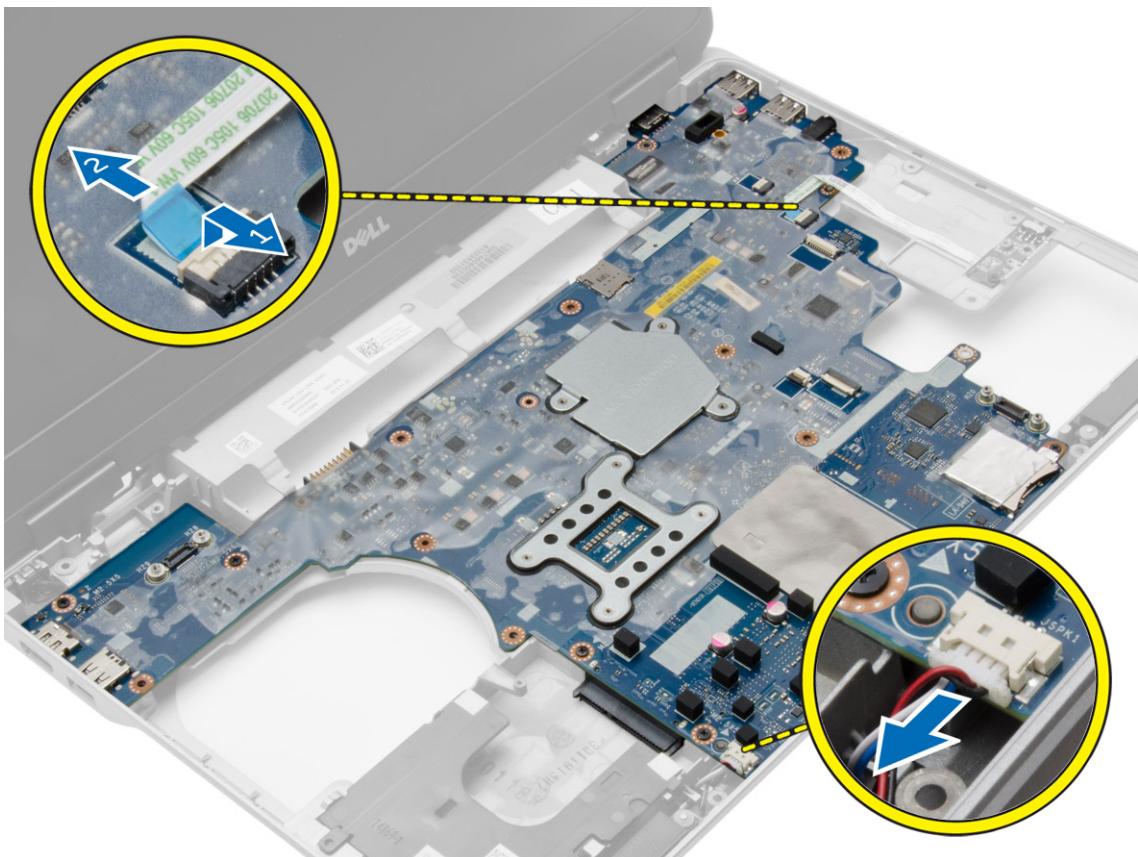
## Removing the System Board

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
  - a) SD Card
  - b) ExpressCard
  - c) battery
  - d) keyboard
  - e) hard drive
  - f) optical drive
  - g) display-hinge cap

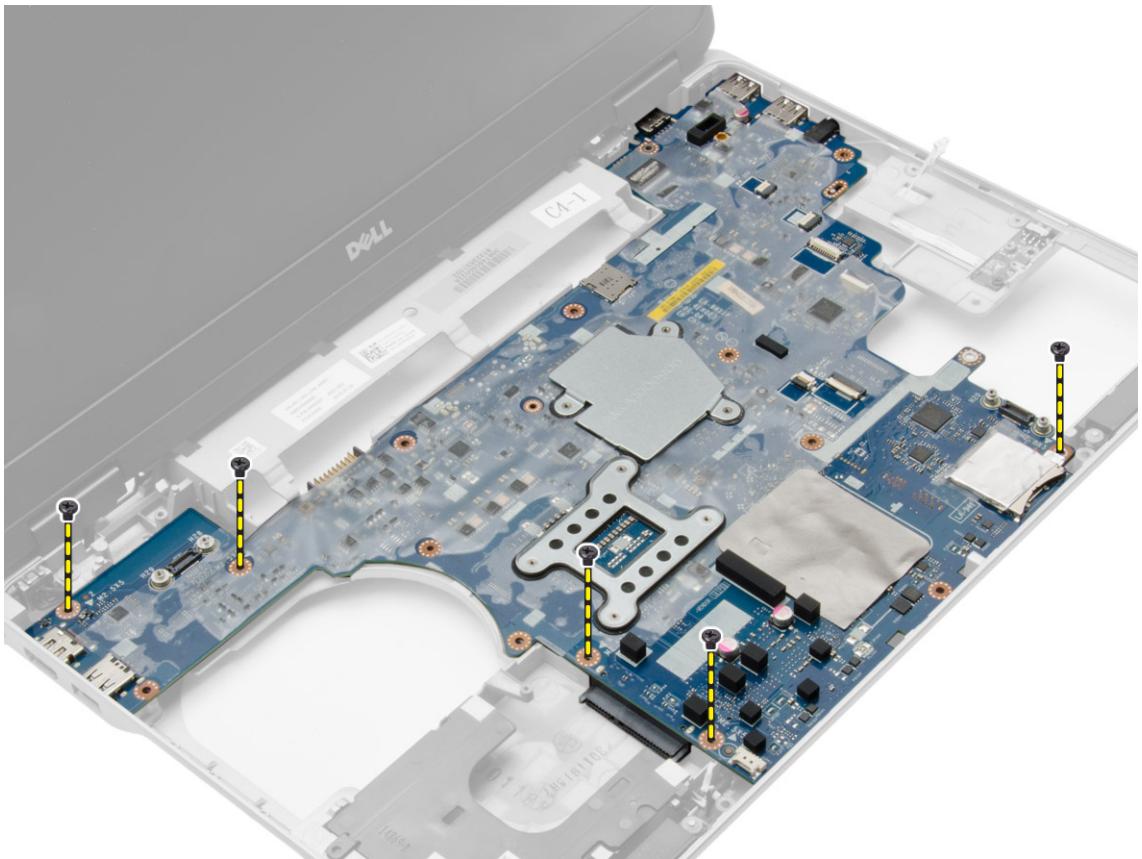
- h) base cover
- i) base corner caps
- j) power connector
- k) coin-cell battery
- l) memory
- m) WLAN card
- n) WWAN card
- o) heat-sink assembly
- p) processor
- q) palmrest assembly
- r) VGA board
- s) ExpressCard cage

3. Perform the following steps as shown in the illustration:

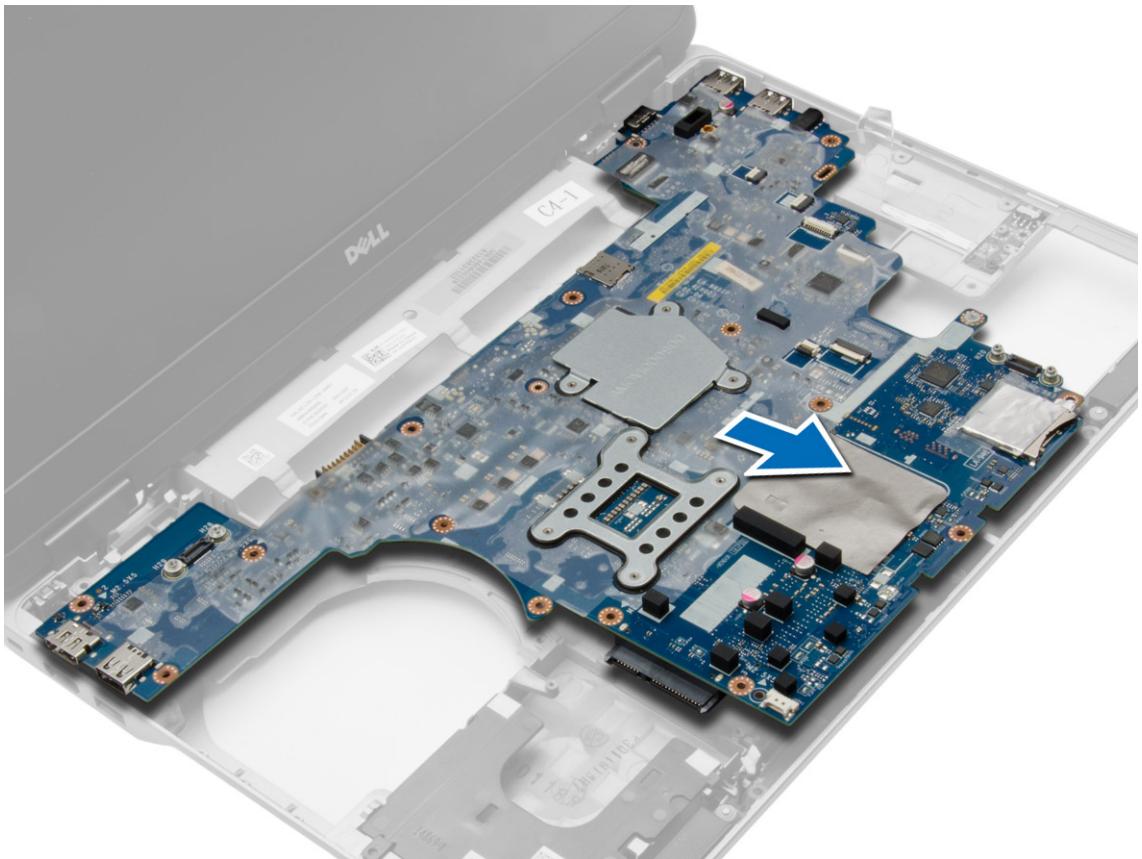
- a) Disconnect the WiFi-switch from the system board.
- b) Disconnect the speaker cables from the system board.



4. Remove the screws that secure the system board to the computer.



5. Lift the system board from the computer.



## Installing the System Board

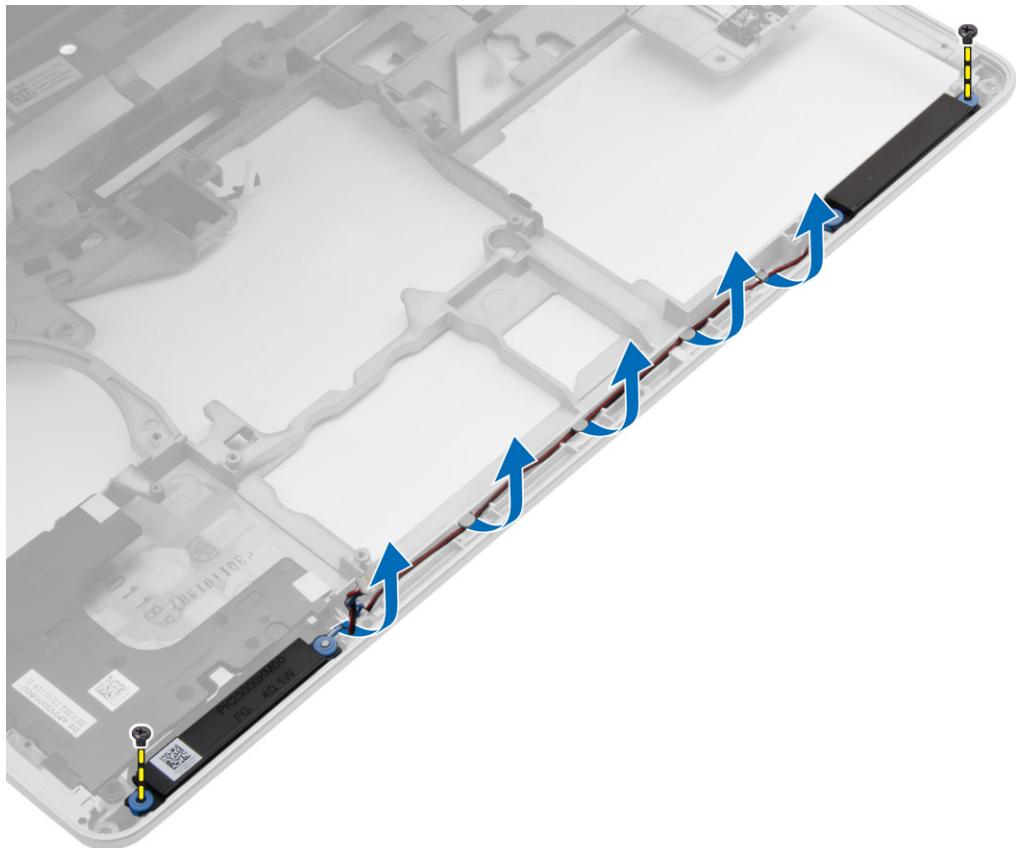
1. Place the system board to align with the ports on the computer.
2. Tighten the screws to secure the system board.
3. Connect the following cables to the system board:
  - a) speaker
  - b) WiFi-switch
4. Install:
  - a) ExpressCard cage
  - b) VGA board
  - c) palmrest assembly
  - d) processor
  - e) heat-sink assembly
  - f) WWAN
  - g) WLAN card
  - h) memory
  - i) coin-cell battery
  - j) power connector
  - k) base corner caps
  - l) base cover
  - m) display-hinge cap

- n) optical drive
- o) hard drive
- p) keyboard
- q) battery
- r) ExpressCard
- s) SD card

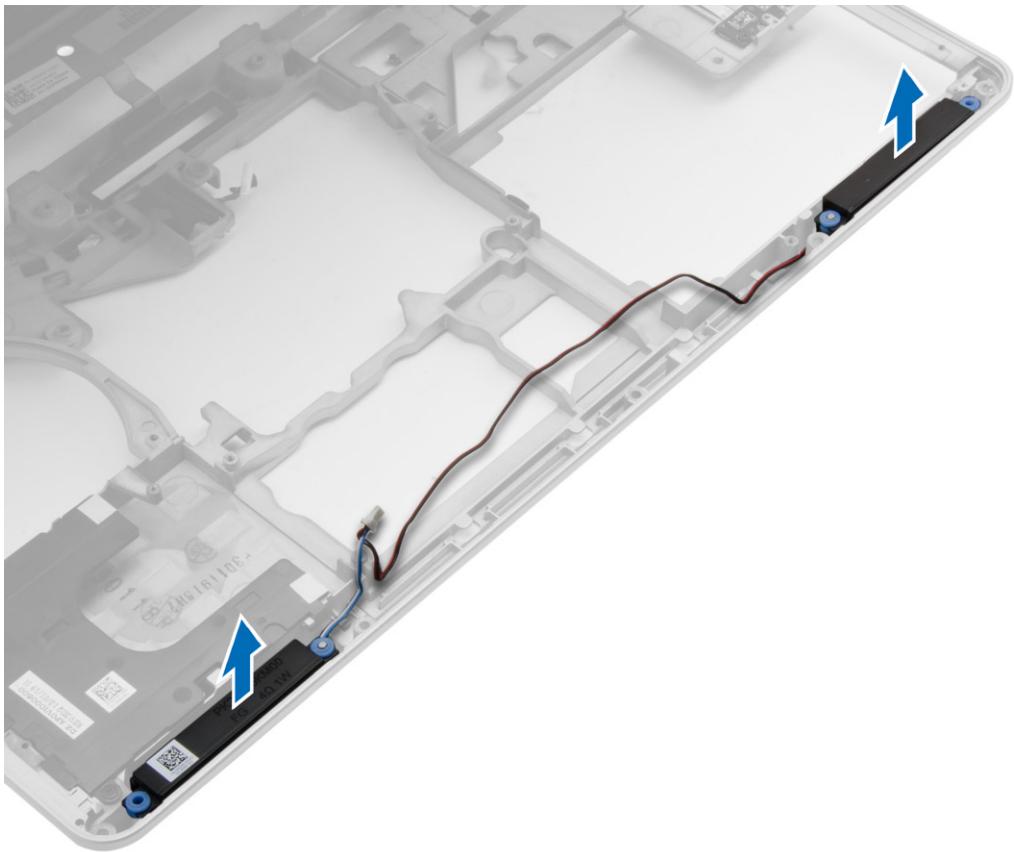
5. Follow the procedures in *After Working Inside Your Computer*.

## Removing the Speakers

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
  - a) SD card
  - b) ExpressCard
  - c) battery
  - d) keyboard
  - e) hard drive
  - f) optical drive
  - g) display-hinge cap
  - h) base cover
  - i) base corner caps
  - j) palmrest assembly
  - k) power connector
  - l) coin-cell battery
  - m) memory
  - n) WLAN card
  - o) WWAN card
  - p) heat-sink assembly
  - q) processor
  - r) VGA board
  - s) ExpressCard cage
  - t) system board
3. Remove the speaker cable from the routing channels. Remove the screws that secure the speakers to the computer.



4. Lift the speakers from the computer.



## Installing the Speakers

1. Align the speakers in its position on the computer and route the speaker cable in the routing channels on the computer.
2. Tighten the screws to secure the speakers.
3. Install:
  - a) system board
  - b) ExpressCard cage
  - c) VGA board
  - d) processor
  - e) heat-sink assembly
  - f) WWAN card
  - g) WLAN card
  - h) memory
  - i) coin-cell battery
  - j) power connector
  - k) palmrest assembly
  - l) base corner caps
  - m) base cover
  - n) display-hinge cap
  - o) optical drive

- p) hard drive
- q) keyboard
- r) battery
- s) ExpressCard
- t) SD card

4. Follow the procedures in *After Working Inside Your Computer*.

## Removing the Display-Hinge Cap

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the battery.
3. Remove the screws that secure the display-hinge cap to the computer and remove the display-hinge cap from the computer.

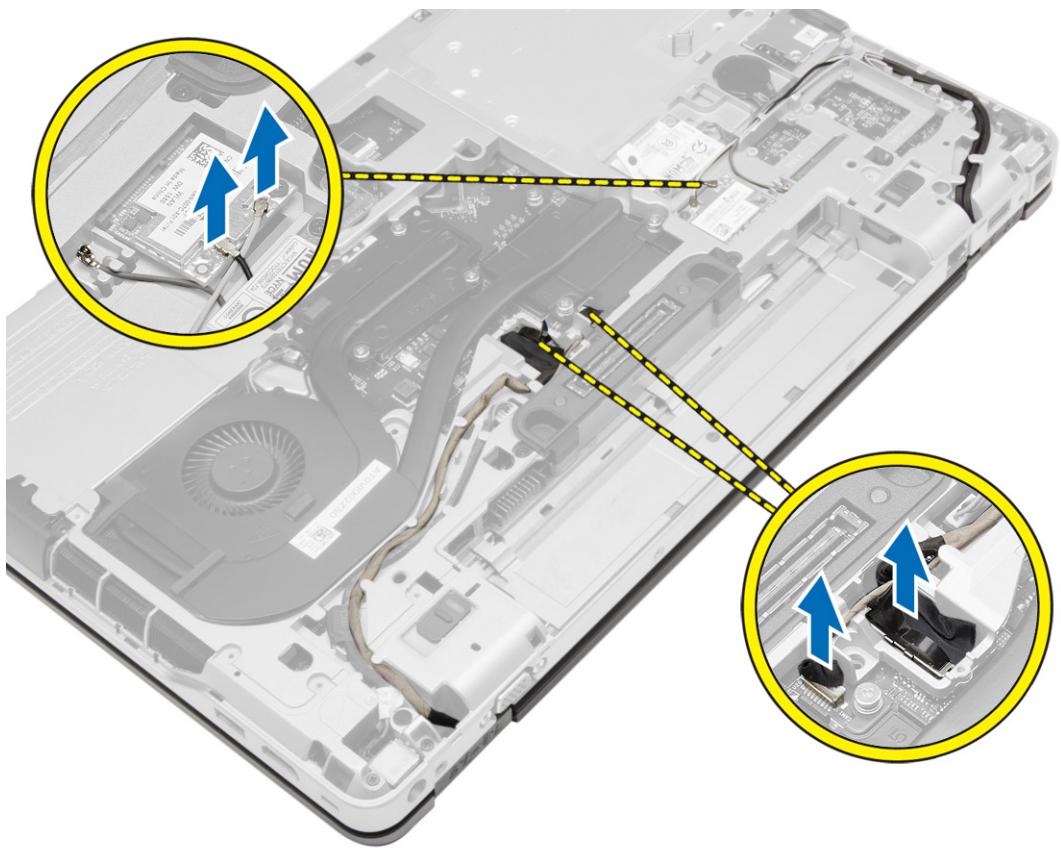


## Installing the Display-Hinge Cap

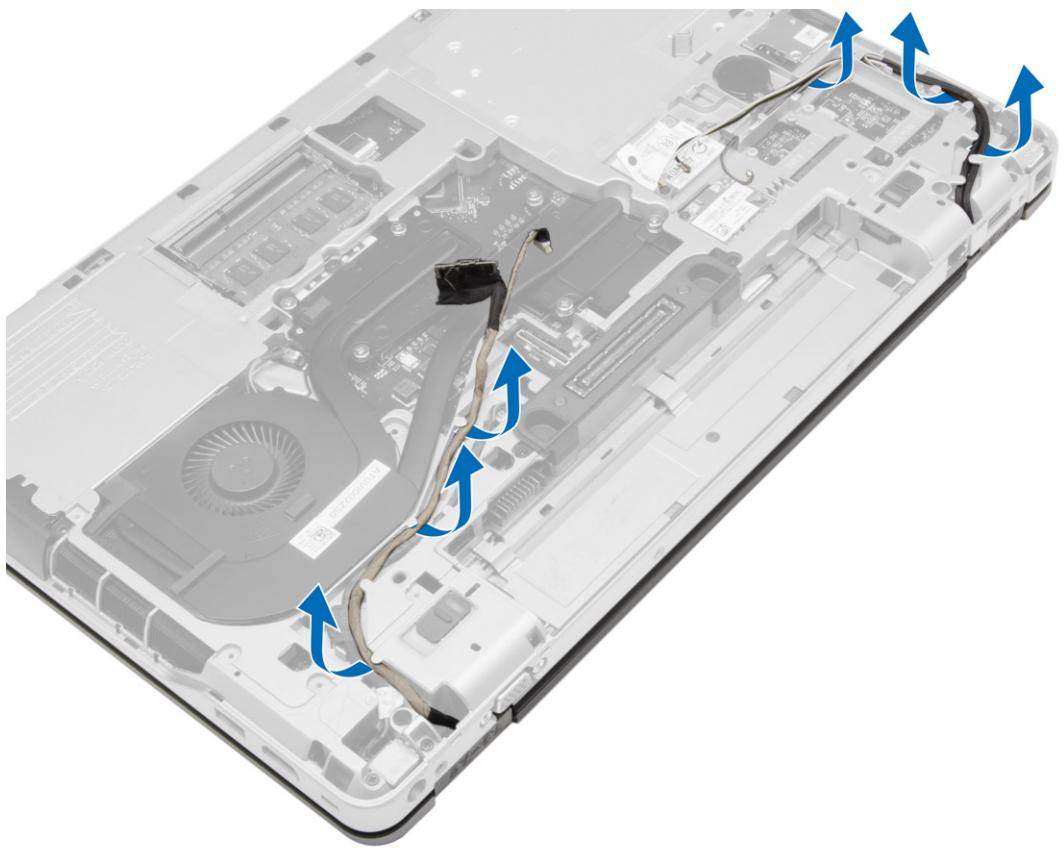
1. Align the display-hinge cap with the screw holes.
2. Tighten the screws to secure the display-hinge cap to the computer.
3. Install the battery.
4. Follow the procedures in *After Working Inside Your Computer*.

## Removing the Display Assembly

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
  - a) battery
  - b) display-hinge cap
  - c) base cover
  - d) base corner caps
3. Disconnect the antenna cables connected to the WLAN card and release it from the routing channel. Disconnect the camera cable from the system board.



4. Disconnect the LVDS cable and release the LVDS cable and camera cable from the routing channel. Remove them from the computer.



5. Remove the screws that secure the display assembly to the computer.



6. Remove the display assembly from the computer.



## Installing the Display Assembly

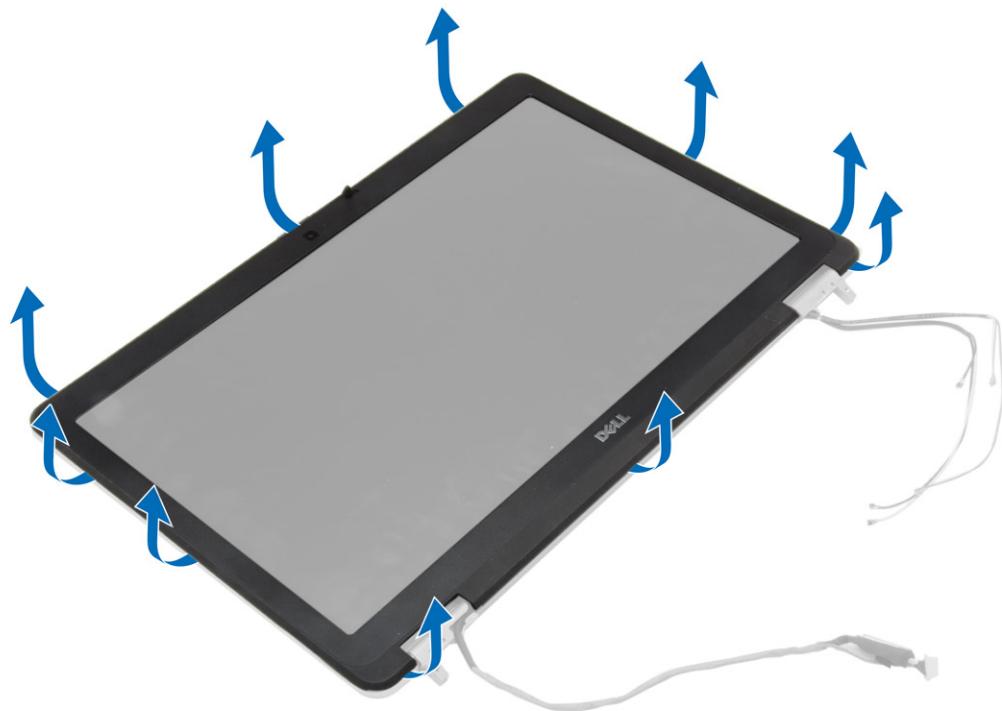
1. Place the display assembly in its position on the computer.
2. Tighten the screws to secure the display assembly.
3. Route the LVDS cable and the camera cable through the routing channel.
4. Route the antenna cables through the routing channel.
5. Connect the antenna cables to the WLAN card on the computer.
6. Connect the camera cable to the computer.
7. Install:
  - a) base corner caps
  - b) base cover
  - c) display-hinge cap
  - d) battery
8. Follow the procedures in *After Working Inside Your Computer*.

## Removing the Display Bezel

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
  - a) battery

- b) display-hinge cap
- c) base cover
- d) base corner caps
- e) display assembly

3. Pry up along the edges to release the display bezel.



4. Remove the display bezel from the display assembly.



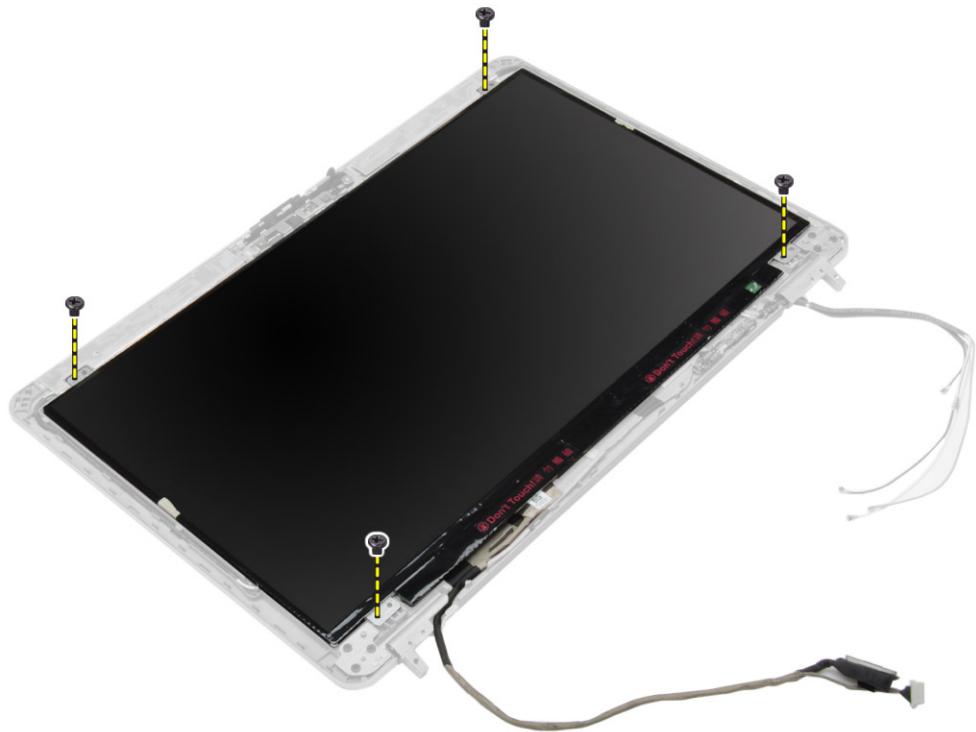
## Installing the Display Bezel

1. Place the display bezel onto the display assembly.
2. Starting from the top corner, press on the display bezel and work around the entire bezel until it clicks onto the display assembly.
3. Press on the left and right edges of the display bezel.
4. Install:
  - a) display assembly
  - b) base corner caps
  - c) base cover
  - d) display-hinge cap
  - e) battery
5. Follow the procedures in *After Working Inside Your Computer*.

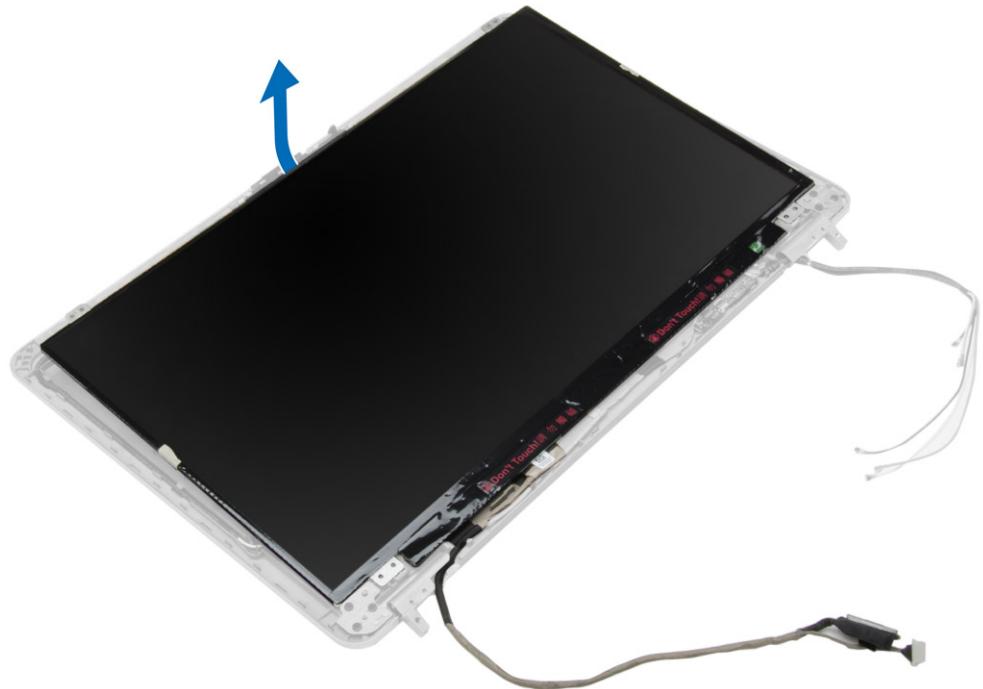
## Removing the Display Panel

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
  - a) battery
  - b) display-hinge cap
  - c) base cover
  - d) base corner caps
  - e) display assembly
  - f) display bezel

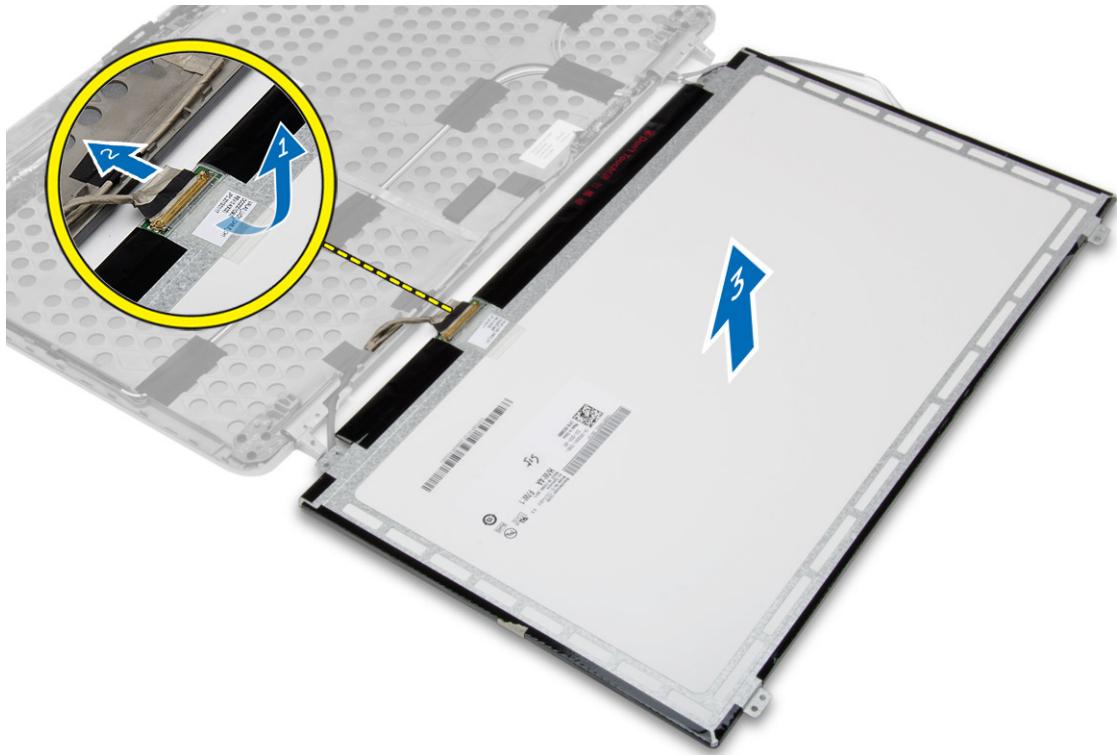
3. Remove the screws that secure the display panel to the display assembly.



4. Flip the display panel over.



5. Peel off the LVDS cable-connector tape and disconnect the LVDS cable from the display panel. Remove the display panel from the display assembly.



## Installing the Display Panel

1. Connect the LVDS cable and stick the LVDS cable-connector tape.
2. Flip the display and place it in the display assembly.
3. Tighten the screws to secure the display panel to the display assembly.
4. Install:
  - a) display bezel
  - b) display assembly
  - c) base corner caps
  - d) base cover
  - e) display-hinge cap
  - f) battery
5. Follow the procedures in *After Working Inside Your Computer*.

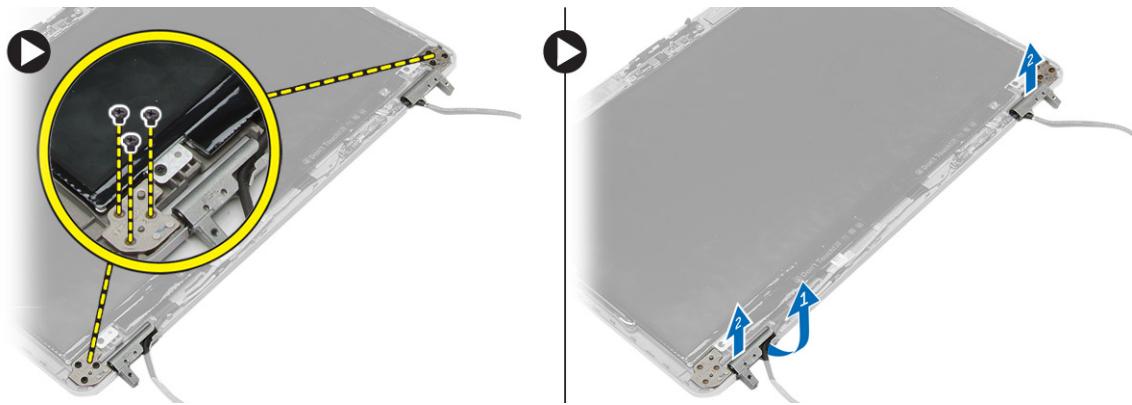
## Removing the Display Hinges

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
  - a) battery
  - b) display-hinge cap
  - c) base cover
  - d) base corner caps

- e) display assembly
- f) display bezel
- g) display panel

3. Perform the following steps as shown in the illustration:

- a) Remove the screws that secure the display hinges to the display assembly.
- b) Remove the display hinges from the computer.

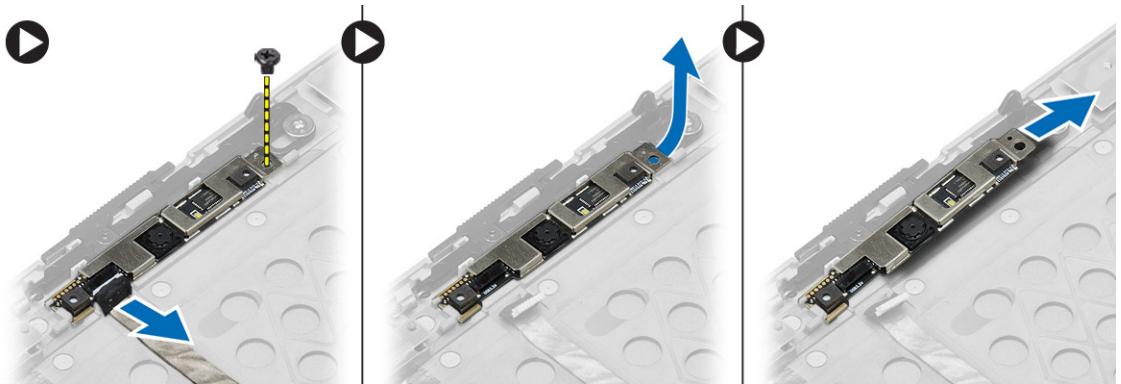


## Installing the Display Hinges

1. Place the display hinges in its location on the computer.
2. Tighten the screws to secure the display hinges to the display assembly.
3. Install:
  - a) display panel
  - b) display bezel
  - c) display assembly
  - d) base corner caps
  - e) base cover
  - f) display-hinge cap
  - g) battery
4. Follow the procedures in *After Working Inside Your Computer*.

## Removing the Camera

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove:
  - a) battery
  - b) display assembly
  - c) display bezel
3. Perform the following steps as shown in the illustration:
  - a) Disconnect the camera cable.
  - b) Remove the screw that secures the camera module.
  - c) Lift the camera module from the computer.



## Installing the Camera

1. Place the camera module in its slot in the computer.
2. Tighten the screw to secure the camera to the display assembly.
3. Connect the camera cable.
4. Install:
  - a) display bezel
  - b) display assembly
  - c) battery
5. Follow the procedures 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.

Keys	Navigation
<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 selected. <ul style="list-style-type: none"> <li>• Diskette Drive</li> <li>• Internal HDD</li> <li>• Onboard NIC</li> <li>• USB Storage Device</li> <li>• CD/DVD/CD-RW Drive</li> </ul> <p>You can also choose the Boot List option. The options are:</p> <ul style="list-style-type: none"> <li>• <b>Legacy</b> (Default Setting)</li> <li>• UEFI</li> </ul>
<b>Advanced Boot Options</b>	Allows you to configure your system for legacy boot mode. The option is enabled by default.
<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>• 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>
 <b>NOTE:</b> The operating system may allocate resources even if the setting is disabled.	
<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>• ATA</li><li>• AHCI</li><li>• <b>RAID On</b> (Default Setting)</li></ul>
 <b>NOTE:</b> SATA is configured to support RAID mode.	
<b>Drives</b>	<p>Allows you to configure the SATA drives on board. The options are:</p>
	<ul style="list-style-type: none"><li>• SATA-0</li><li>• SATA-1</li><li>• SATA-4</li><li>• SATA-5</li></ul>
	<p>Default Setting: All drives 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</p>

Option	Description
	<p>SMART (Self Monitoring Analysis and Reporting Technology) specification. This option is disabled by default.</p> <ul style="list-style-type: none"> <li>• <b>Enable SMART Reporting</b></li> </ul>
<b>USB Configuration</b>	<p>Allows you to define the USB configuration. The options are:</p> <ul style="list-style-type: none"> <li>• Enable Boot Support</li> <li>• Enable External USB Port</li> </ul>
	<p>Default Setting: Both the 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>• <b>Enable USB PowerShare</b></li> </ul>
	<p>Allows you to enable or disable the integrated audio controller. The option is enabled by default.</p>
<b>Keyboard Illumination</b>	<p>Allows you to choose the operating mode of the keyboard illumination feature. The options are:</p>
	<ul style="list-style-type: none"> <li>• <b>Disabled</b> (Default Setting)</li> </ul>
	<ul style="list-style-type: none"> <li>• Level is 25%</li> </ul>
	<ul style="list-style-type: none"> <li>• Level is 50%</li> </ul>
	<ul style="list-style-type: none"> <li>• Level is 75%</li> </ul>
	<ul style="list-style-type: none"> <li>• Level is 100%</li> </ul>
<b>Unobtrusive Mode</b>	<p>Allows you to set the mode that will turn off all light and sound emissions from the system.</p>
	<p>The option is disabled by default.</p>
<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>• Enable Internal Modem</li> </ul>
	<ul style="list-style-type: none"> <li>• Enable Microphone</li> </ul>
	<ul style="list-style-type: none"> <li>• Enable Camera</li> </ul>
	<ul style="list-style-type: none"> <li>• Enable Module Bay</li> </ul>
	<ul style="list-style-type: none"> <li>• Enable ExpressCard</li> </ul>
	<ul style="list-style-type: none"> <li>• Enable Hard Drive Free Fall Protection</li> </ul>
	<p>Default Setting: All devices are enabled</p>
	<p>You can select if you want to enable or disable media card. The options are:</p>
	<ul style="list-style-type: none"> <li>• <b>Enable Media Card</b> (Default Setting)</li> </ul>
	<ul style="list-style-type: none"> <li>• Disable Media Card</li> </ul>

**Table 4. Video**

Option	Description
<b>LCD Brightness</b>	Allows you to set the panel brightness when the ambient sensor is Off.

**Table 5. Security**

Option	Description
<b>Admin Password</b>	Allows you to set, change, or delete the administrator (admin) password. <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>	Allows you to set, change or delete the system password. <p> <b>NOTE:</b> Successful password changes take effect immediately.</p> <p>Default Setting: <b>Not set</b></p>
<b>Strong Password</b>	Allows you to enforce the option to always set strong passwords. <p>Default Setting: <b>Enable Strong Password</b> is not selected.</p>
<b>Password Configuration</b>	You can define the length of your password. Min = 4 , Max = 32
<b>Password Bypass</b>	Allows you to enable or disable the permission to bypass the System and the Internal HDD password, when they are set. The options are: <ul style="list-style-type: none"> <li>• <b>Disabled</b> (Default Setting)</li> <li>• Reboot bypass</li> </ul>
<b>Password Change</b>	Allows you to enable the disable permission to the System and Hard Drive passwords when the admin password is set. <p><b>Allow Non-Admin Password Changes</b> (Default Setting)</p>
<b>Non-Admin Setup Changes</b>	Allows you to determine whether changes to setup option are permitted when an administrator password is set. The option is disabled by default.
<b>TPM Security</b>	Allows you to enable the Trusted Platform Module (TPM) during POST. The option is disabled by default.
<b>Computrace</b>	Allows you to activate or disable the optional Computrace software The options are: <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>	Allows you to enable the Execute Disable mode of the processor. <p><b>Enable CPU XD Support</b>(Default Setting)</p>

Option	Description
<b>OROM Keyboard Access</b>	Allows you to set access to enter the Option ROM Configuration screens using hotkeys during boot process. The options are: <ul style="list-style-type: none"> <li>• <b>Enable</b> (Default Setting)</li> <li>• One Time Enable</li> <li>• Disable</li> </ul>
<b>Admin Setup Lockout</b>	Allows you to prevent users from entering Setup when an Administrator password is set. The option is disabled by default.

**Table 6. Secure Boot**

Option	Description
<b>Secure Boot Enable</b>	Allows you to enable or disable the secure boot feature. The options are: <ul style="list-style-type: none"> <li>• <b>Disabled</b> (Default Setting)</li> <li>• Enabled</li> </ul>

**Table 7. Performance**

Option	Description
<b>Multi Core Support</b>	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: <ul style="list-style-type: none"> <li>• <b>All</b> (Default Setting)</li> <li>• 1</li> <li>• 2</li> </ul>
<b>Intel SpeedStep</b>	Allows you to enable or disable the Intel SpeedStep feature. Default Setting: <b>Enable Intel SpeedStep</b>
<b>C States Control</b>	Allows you to enable or disable the additional processor sleep states. The option is enabled by default.
<b>Limit CPUID</b>	Allows you to limit the maximum value the processor standard CPUID function will support. The option is disabled by default.
<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>

Option	Description
<b>Rapid Start Technology</b>	Allows you to set the rapid start time. The option is set by default.

**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> </ul>
<b>Deep Sleep Control</b>	Allows you to set where deep sleep is enabled. The options are: <ul style="list-style-type: none"> <li>• <b>Disabled</b> (Default Setting)</li> <li>• Enabled in S5 only</li> <li>• Enabled in S4 and S5</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> Default Setting: Both the options are disabled.
<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 Only - Allows the system to be powered on by special LAN signals.</li> <li>• WLAN Only</li> <li>• LAN or WLAN</li> </ul>
<b>Block Sleep</b>	Allows you to block the computer from entering into the sleep state. Option is disabled by default. <ul style="list-style-type: none"> <li>• Block Sleep (S3)</li> </ul>
<b>Peak Shift</b>	Allows you to set the peak shift. The option is disabled by default.

Option	Description
<b>Advanced Battery Charge Configuration</b>	Allows you to enable the advance battery charge mode. The option is disabled by default.
<b>Primary Battery Charge Configuration</b>	Allows you to define how to use the battery charge, when AC is plugged in. The options are: <ul style="list-style-type: none"> <li>• <b>Adaptive</b> (Default Setting)</li> <li>• Standard</li> <li>• Express Charge</li> <li>• Primarily AC use</li> <li>• Custom</li> </ul>
<b>Battery Slice Charge Configuration</b>	Allows you to define the how to charge the battery. The options are: <ul style="list-style-type: none"> <li>• Standard Charge</li> <li>• <b>Express Charge</b> (Default Setting)</li> </ul>
<b>Module Bay Battery Charge Configuration</b>	Allows you to define how to charge the battery at standard rate. The options are: <ul style="list-style-type: none"> <li>• Standard</li> <li>• <b>Express Charge</b> (Default Setting)</li> </ul>
<b>Intel(R) Smart Connect Technology</b>	 <b>NOTE:</b> Disable the <b>Advanced Battery Charge Mode</b> in order to enable this option.

**Table 9. POST Behavior**

Option	Description
<b>Adapter Warnings</b>	Allows you to activate the adapter warning messages when certain power adapters are used. The option is enabled by default. <ul style="list-style-type: none"> <li>• Enable Adapter Warnings</li> </ul>
<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>

Option	Description
<b>Keyboard Errors</b>	Specifies whether keyboard related errors are reported when it boots. This option is enabled by default. <ul style="list-style-type: none"> <li>• Enable Keyboard Error Detection</li> </ul>
<b>Fastboot</b>	Allows you to speed up the boot processes. The options are: <ul style="list-style-type: none"> <li>• Minimal</li> <li>• <b>Thorough</b> (Default Setting)</li> <li>• Auto</li> </ul>
<b>Extend BIOS POST Time</b>	Allows you to create an additional pre-boot delay. The options are: <ul style="list-style-type: none"> <li>• <b>0 seconds</b> (Default Setting)</li> <li>• 5 seconds</li> <li>• 10 seconds</li> </ul>
<b>MEBx Hotkey</b>	Allows you to enable the MEBx hotkey function if required. The options is enabled by default.

**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. <ul style="list-style-type: none"> <li>• <b>Enable Intel Virtualization Technology</b> - Default Setting.</li> </ul>
<b>VT for Direct I/O</b>	Enables or disables the Virtual Machine Monitor (VMM) from utilizing the additional hardware capabilities provided by Intel Virtualization technology for direct I/O. <ul style="list-style-type: none"> <li>• <b>Enable Intel Virtualization Technology for Direct I/O</b> - Default Setting.</li> </ul>
<b>Trusted Execution</b>	Allows you to specify if additional hardware capabilities can be utilized. The option is disabled by default. <p> <b>NOTE:</b> The <b>TPM</b>, <b>Virtualization Technology</b>, and <b>Virtualization Technology for Direct I/O</b> must be enabled to use this feature.</p>

**Table 11. Wireless**

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

Option	Description
	<ul style="list-style-type: none"> <li>• Bluetooth</li> <li>• WLAN/WiGig</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.

**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 events and allows you to clear the log.
<b>Power Events</b>	Displays the power events and allows you to clear the 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](http://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
<b>System password</b>	Password that you must enter to log on to your system.
<b>Setup password</b>	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 is 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 reboot.

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, ("), (+), (.), (-), (.), (/), (:) (|), (\|), (|), (|).

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 prompted. If you delete the System and/or Setup password, confirm the deletion when prompted.

5. Press **<Esc>** and a message prompts you to save the changes.
6. Press **<Y>** to save the changes and exit from the 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. If you wish to run a diagnostic test on a specific device, press **<Esc>** and click **Yes** to stop the diagnostic test.
5. Select the device from the left pane and click **Run Tests**.
6. If there are any issues, error codes are displayed.

Note the error code and contact Dell.

## Device Status Lights

**Table 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.
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.

# Technical Specifications

 **NOTE:** Offerings may vary by region. The following specifications are only those required by law to ship with your computer. For comprehensive specification of your computer go to **Specifications**' section in your **Owner's Manual** available on the support site at [dell.com/support](http://dell.com/support). For more information about the configuration of your computer, go to **Help and Support** in your Windows operating system and select the option to view information about your computer.

**Table 16. System Information**

Feature	Specification
Chipset	Mobile Intel QM87 Express Chipset
DRAM bus width	64-bit
Flash EPROM	SPI 32 Mbits, 64 Mbits
PCIe bus	100 MHz
External Bus Frequency	PCIe Gen2 (5GT/s)

**Table 17. Processor**

Feature	Specification
Types	Intel Core i3 / i5 / i7series
L3 cache	3 MB, 4MB, 6 MB and 8 MB

**Table 18. Memory**

Feature	Specification
Memory connector	Two SODIMM slots
Memory capacity	1 GB, 2 GB, 4 GB, or 8 GB
Memory type	DDR3L SDRAM (1600 MHz)
Minimum memory	2 GB
Maximum memory	16 GB

**Table 19. Audio**

Feature	Specification
Type	four-channel high-definition audio
Controller	Realtek ALC3226
Stereo conversion	24-bit (analog-to-digital and digital-to-analog)

Feature	Specification
Interface:	
Internal	high-definition audio
External	microphone-in, stereo headphones, external speakers connector
Speakers	two
Internal speaker amplifier	1 W (RMS) per channel
Volume controls	hot keys

**Table 20. Video**

Feature	Specification
Type	integrated on system board
Controller:	
UMA	Intel HD Graphics 4600
Discrete	AMD MARS-XTX
Data bus	PCI-E Gen3 x8
External display support	<ul style="list-style-type: none"> <li>one VGA</li> <li>one HDMI</li> </ul>



**NOTE:** Support two DP/DVI ports through Docking station.

**Table 21. Camera**

Features	Specification
Camera Resolution	1280 x 720 pixels
Video Resolution (maximum)	1280 x 720 pixels
Diagonal viewing angle	74 °

**Table 22. Communications**

Features	Specification
Network adapter	10/100/1000 Mb/s Ethernet (RJ-45)
Wireless	internal wireless local area network (WLAN) and wireless wide area network (WWAN)

**Table 23. Ports and Connectors**

Features	Specification
Audio	one microphone/stereo headphone/speakers connector
Video	one 15-pin VGA connector and 19-pin HDMI connector
Network adapter	one RJ-45 connector

Features	Specification
USB	Four USB 3.0-compliant connectors
Memory card reader	Support upto SD4.0
Micro Subscriber Identity Module (uSIM) card	one
Docking port	one

**Table 24. Contactless Smart Card**

Feature	Specification
Supported Smart Cards/Technologies	BTO with USH

**Table 25. Display**

Feature	Specification
Type	HD Anti-Glare
Dimensions:	
Height	224.30 mm (8.83 inches)
Width	360.00 mm (14.17 inches)
Diagonal	396.24 mm (15.60 inches)
Active area (X/Y)	384 mm X 258 mm (15.12 inches X 10.16 inches)
Maximum resolution	1920 X 1080
Maximum Brightness	300 nits
Refresh rate	60 Hz
Minimum Viewing Angles:	
Horizontal	+/- 60°
Vertical	+/- 50°
Pixel pitch	0.179

**Table 26. Keyboard**

Feature	Specification
Number of keys	United States: 86 keys, United Kingdom: 87 keys, Brazil: 87 keys, and Japan: 90 keys

**Table 27. Touchpad**

Feature	Specification
Active Area:	
X-axis	80.00 mm

Feature	Specification
Y-axis	45.00 mm

**Table 28. Battery**

Feature	Specification
Type	6 cell (65 whr) lithium ion
Dimensions:	
Depth	48.08 mm (1.89 inches)
Height	20.00 mm (0.79 inches)
Width	208.00 mm (8.19 inches)
Weight	345.00 g (0.76 lb)
Voltage	11.1 VDC
Temperature range:	
Operating	0 °C to 50 °C (32 °F to 158 °F)
Non-Operating	-20 °C to 65 °C (4 °F to 149 °F)
Coin-cell battery	3 V CR2032 lithium coin cell

**Table 29. AC Adapter**

Feature	Specification
Type	65 W, 90 W and 130 W
Input voltage	100 VAC to 240 VAC
Input current (maximum)	2.5A
Input frequency	50 Hz to 60 Hz
Output current	3.34A, 4.62A and 6.7A
Rated output voltage	19.5 +/- 1.0 VDC
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 30. Physical**

Feature	Specification
Height	33.40 mm (1.31 inches)
Width	379.00 mm (14.92 inches)
Depth	250.50 mm (9.86 inches)

Feature	Specification
Weight	2.36 kg (5.21 lb)

**Table 31. Environmental**

Feature	Specification
Temperature:	
Operating	0 °C to 35 °C (32 °F to 95 °F)
Storage	–40 °C to 65 °C (–40 °F to 149 °F)
Relative humidity (maximum):	
Operating	10 % to 90 % (non condensing)
Storage	5 % to 95 % (non condensing)
Altitude (maximum):	
Operating	–15.2 m to 3048 m (–50 to 10,000 ft) 0° to 35°C
Non-Operating	–15.24 m to 10,668 m (–50 ft to 35,000 ft)
Airborne contaminant level	G1 as defined by ISA-71.04–1985



## 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. Visit [dell.com/support](http://dell.com/support)
2. Select your support category.
3. Verify your country or region in the Choose a Country/Region drop-down menu at the top of page.
4. Select the appropriate service or support link based on your need.