

# Dell Latitude 14 Rugged Extreme – 7414 Owner's Manual

Regulatory Model: P45G  
Regulatory Type: P45G002



# 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

## 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](#)).
4. 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.**

5. Disconnect all network cables from the computer.
6. Disconnect your computer and all attached devices from their electrical outlets.
7. Close the display and turn the computer upside-down on a flat work surface.

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

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

 **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.**

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

## Turning off your computer

### Turning off your computer — Windows 10

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

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

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

## Turning off your computer — Windows 8

 **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 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**.
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.

## Turning off your computer — Windows 7

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

1. Click **Start**.
2. Click **Shut Down**.

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

## After working inside your computer

After you complete any replacement procedure, ensure that you connect 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.**

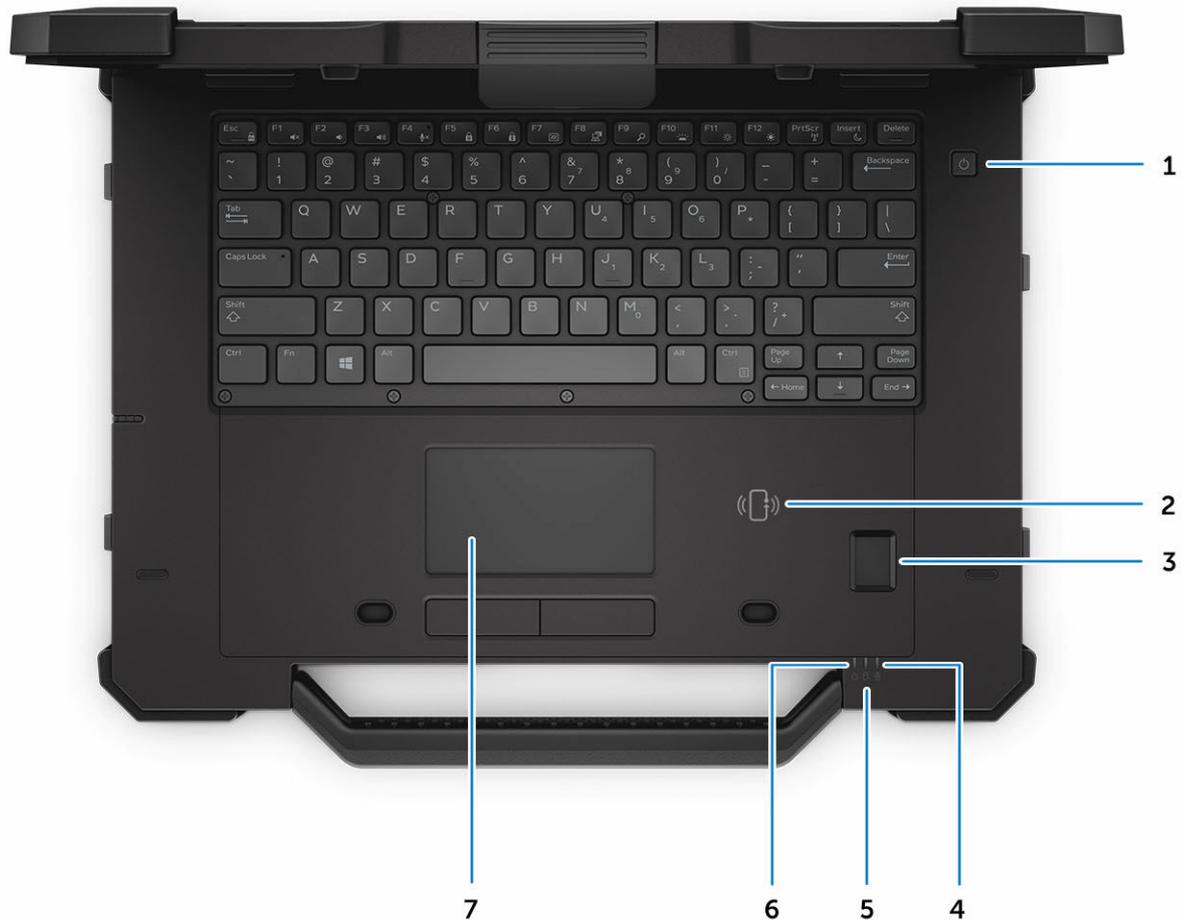
1. Connect any external devices, such as a port replicator or media base, and replace any cards, such as an ExpressCard.
2. Connect any telephone or network cables to your computer.

 **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. Connect your computer and all attached devices to their electrical outlets.
5. Turn on your computer.

# System overview

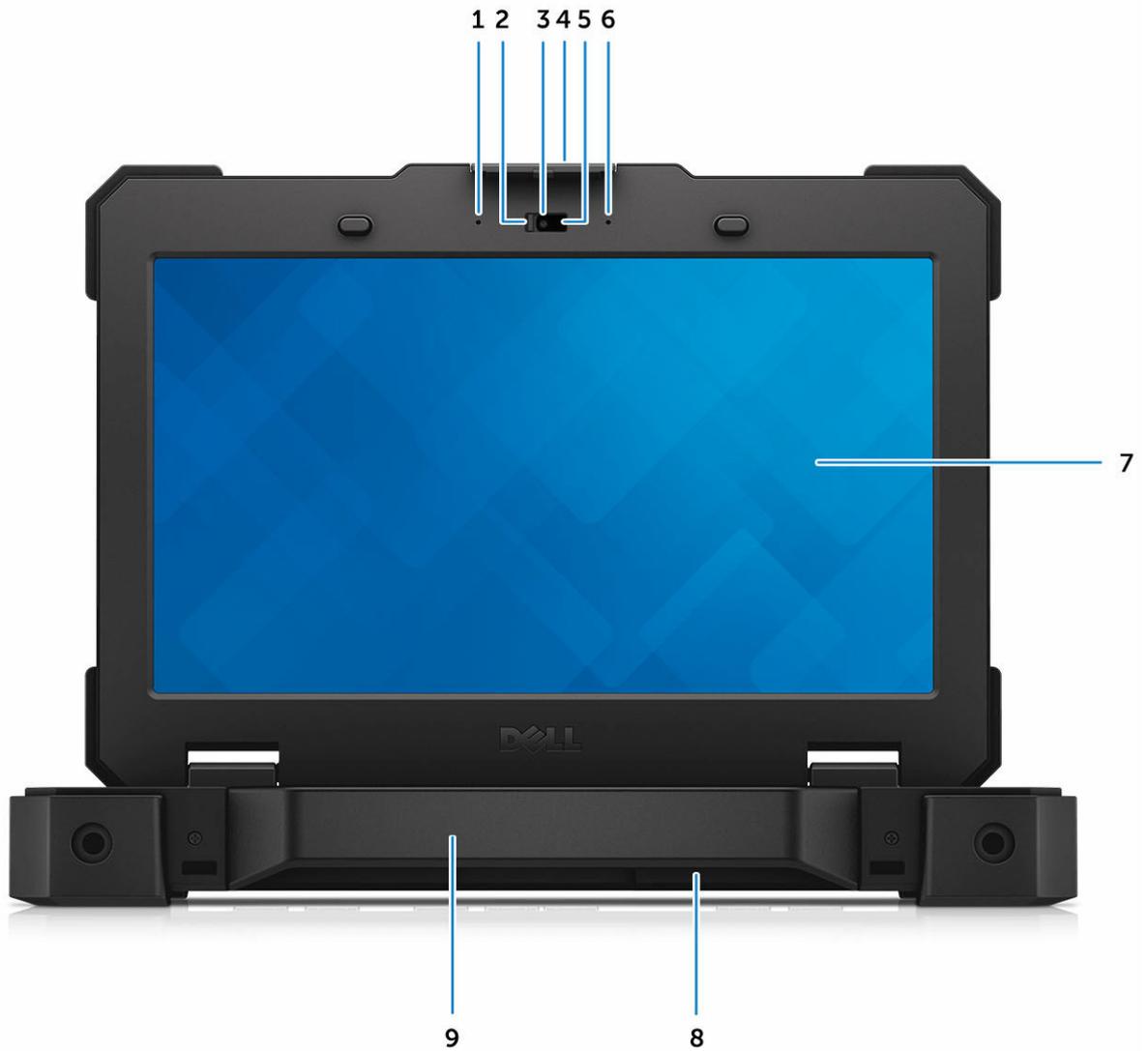
## System top view



**Figure 1. System top view**

- |                            |                                  |
|----------------------------|----------------------------------|
| 1. power button            | 2. contactless Smart card reader |
| 3. fingerprint reader      | 4. battery status light          |
| 5. hard drive status light | 6. power status light            |
| 7. touchpad                |                                  |

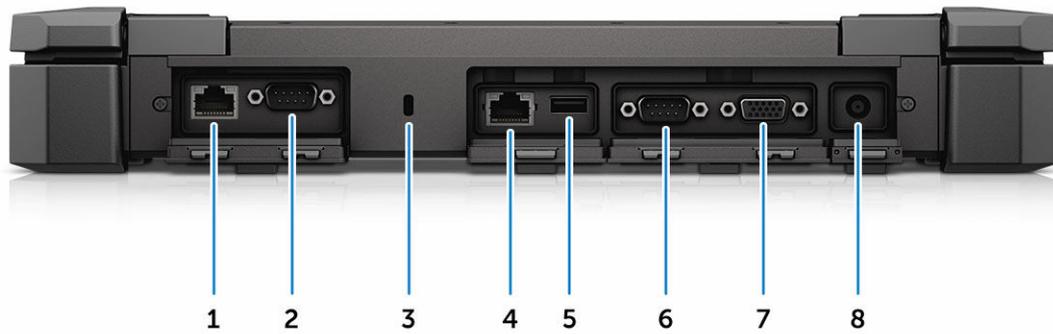
## System front view



**Figure 2. System front view**

- |   |                               |
|---|-------------------------------|
| 1. microphone                           | 2. privacy shutter (optional) |
| 3. camera (optional)                    | 4. display latch              |
| 5. camera status light (optional)       | 6. microphone                 |
| 7. outdoor readable display/touchscreen | 8. speaker                    |
| 9. handle                               |                               |

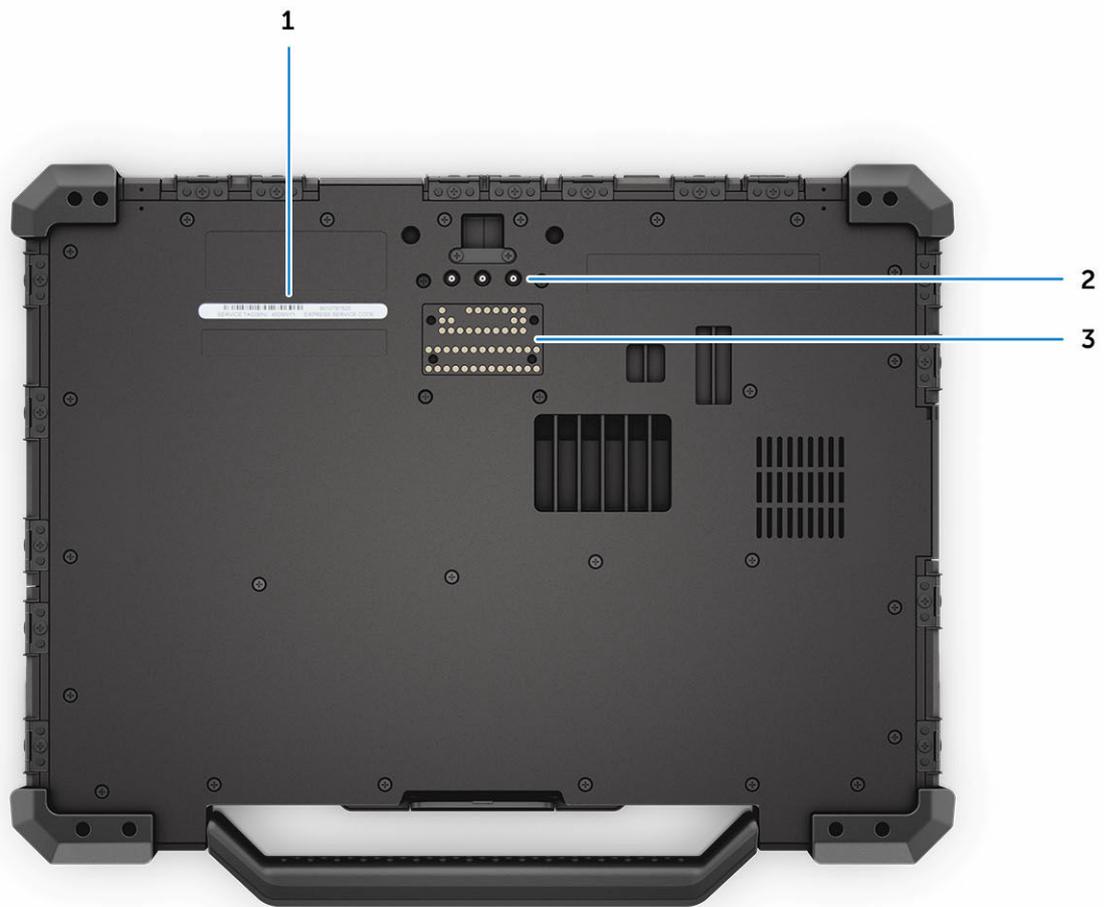
## System back view



**Figure 3. System back view**

- |                        |                    |
|------------------------|--------------------|
| 1. network port        | 2. serial port     |
| 3. security cable slot | 4. network port    |
| 5. USB 2.0 port        | 6. serial port     |
| 7. VGA port            | 8. power connector |

## System base view



**Figure 4. System base view**

1. service tag
2. radio frequency pass-through connectors
3. docking device connector

## System side view

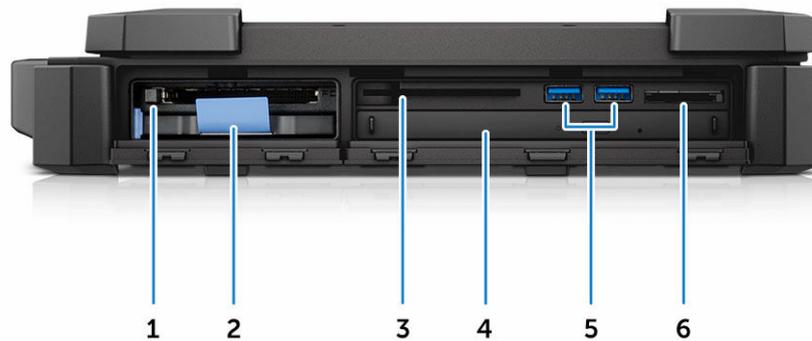


Figure 5. System side view — right

- |   |                             |
|---|-----------------------------|
| 1. ExpressCard reader/PCMCIA (optional) | 2. hard drive               |
| 3. Smart card reader                    | 4. optical drive (optional) |
| 5. USB 3.0 ports                        | 6. memory card reader       |

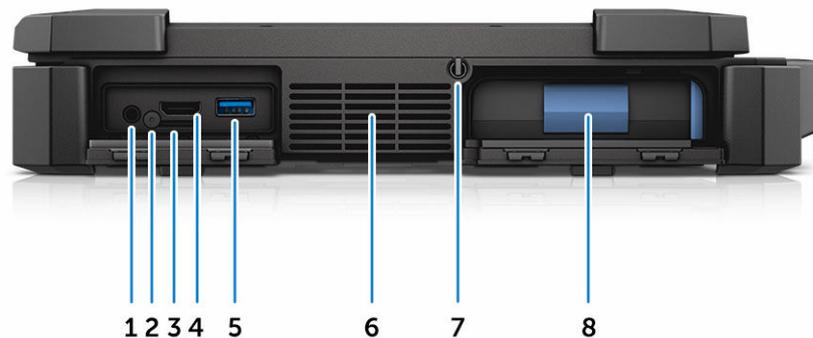


Figure 6. System side view — left

- |                                 |                                    |
|---------------------------------|------------------------------------|
| 1. audio port                   | 2. SIM card security screw         |
| 3. SIM card slot                | 4. HDMI port                       |
| 5. USB 3.0 port with PowerShare | 6. QuadCool sealed thermal chamber |
| 7. stylus                       | 8. battery                         |

**CAUTION: EXPLOSION HAZARD**—External connections (power adapter port, HDMI port, USB ports, RJ45 port, serial ports, audio port, Smart Card reader slot, SD card reader slot, Express Card reader slot, PC card reader slot, SIM card slot) should not to be used in a hazardous location.

**WARNING:** Do not block, push objects into, or allow dust to accumulate in the air vents. Do not store your Dell computer in a low-airflow environment, such as a closed briefcase, while it is running. Restricting the airflow can damage the computer. The computer turns on the fan when the computer gets hot. Fan noise is normal and does not indicate a problem with the fan or the computer.

# Removing and installing components

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

## Recommended tools

The procedures in this document require the following tools:

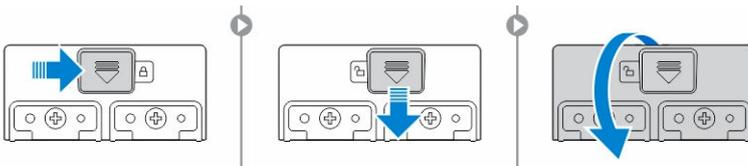
- Small flat blade screwdriver
- Phillips #0 screwdriver
- Phillips #1 screwdriver
- Hex screwdriver
- Small plastic scribe

## Press latch doors

### Opening the press latch doors

The computer includes eight press latch doors:

- Four on the back of the computer
  - Two on the right side of the computer
  - Two on the left side of the computer
1. Slide the latch until the unlock icon is visible.
  2. Press the latch and open the press latch door in the downward direction.

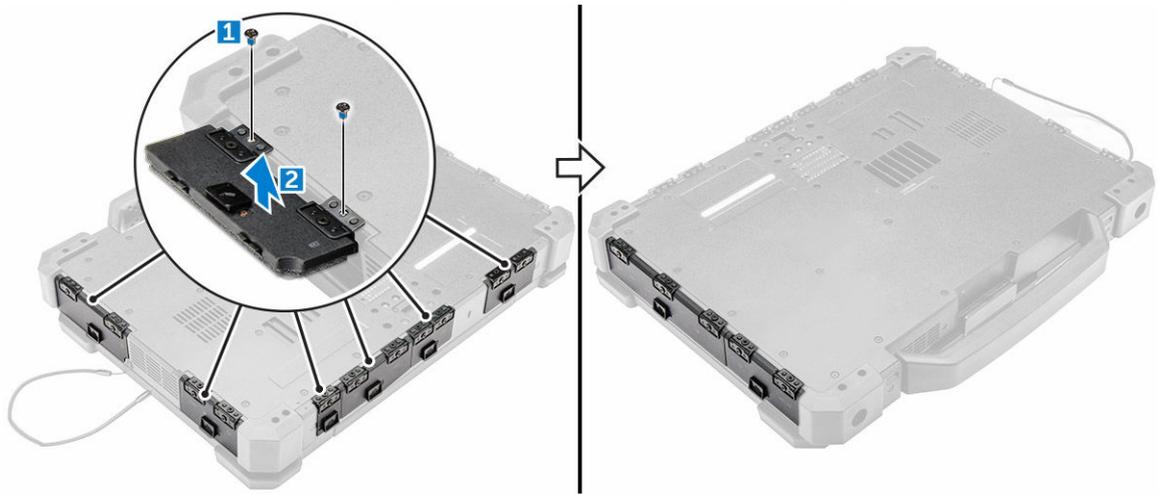


### Closing the press latch doors

1. Close the latch door back by pressing it toward the computer.
2. To lock the latch doors, slide the latch until the lock icon is visible.

## Removing the press latch doors

Remove the screws that secure the press-latch door and lift it from the computer [1,2].



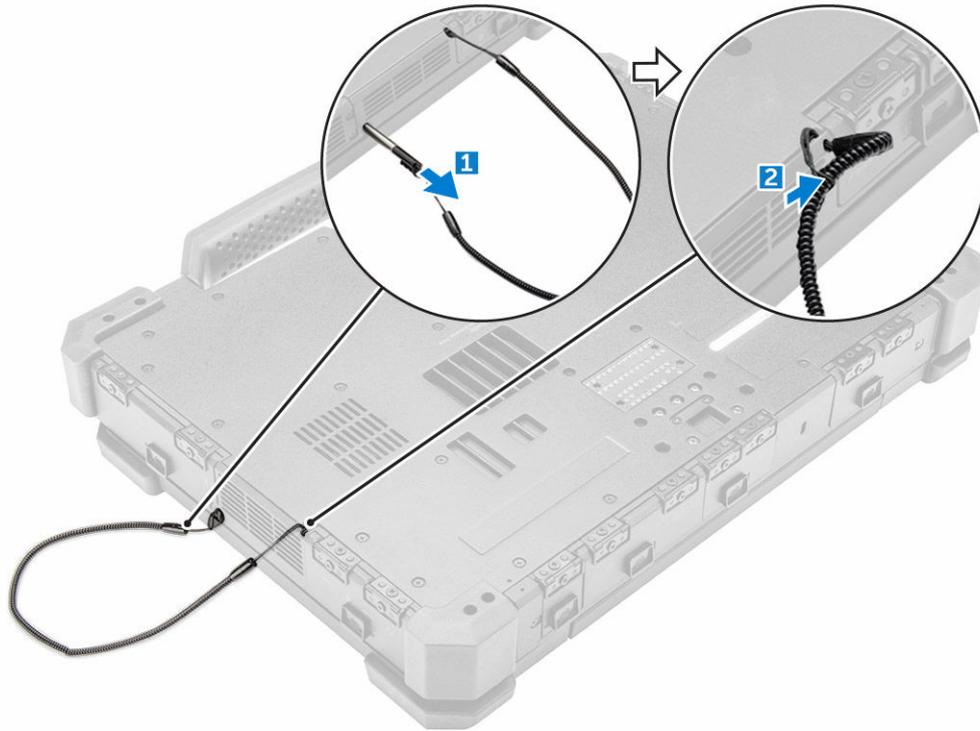
## Installing the press latch doors

1. Align the press latch door with the screw holes on the computer.
2. Tighten the screws to secure the press latch door.

## Stylus and tether

### Removing the stylus and tether

1. Pull the stylus out from the slot on the computer [1].
2. Release and remove the tether from the computer [2].



## Installing the stylus and tether

1. Install the tether to the computer.
2. Insert the stylus into the slot and push it inwards.

## Battery

Your system ships with a non-hot swappable battery. You also have an option to select a hot swap battery.

 **NOTE:** The battery is a field replaceable unit.

To check if your battery is a hot swap battery, go to **System Setup** → **General** → **System Information** screen. The battery is not a customer replaceable part. If the hot swap battery is installed, the optical drive is removed.

## Hot swap battery

This section explains what happens when you swap the battery.

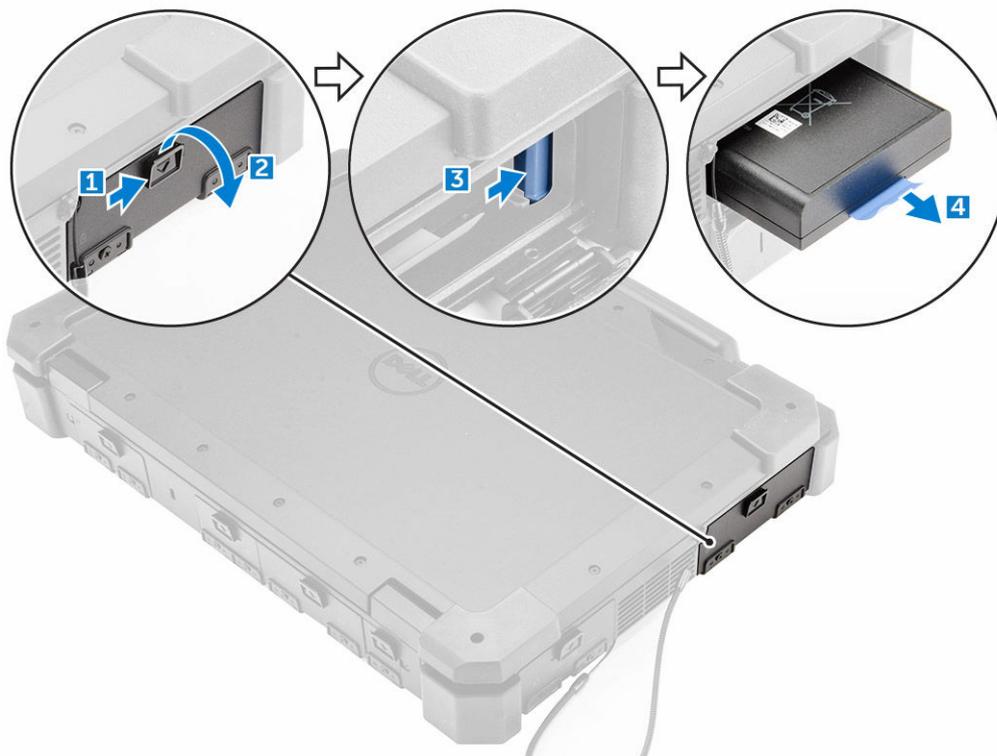
The BIOS allows 1 minute to swap the hot swap battery if there is sufficient charge and the temperature is 0°–60° C. When swapping the battery, the LCD, backlight and all LEDs turn off and the processor enters a low power state to reduce system power. The battery LED flashes green/amber (once per second) for the first 45 seconds. For the last 15 seconds, the green/amber flashes at a faster rate to indicate that the swap time limit is near. If the 1-minute time is exceeded, the unit attempts to enter the Sleep (S3) state. If

the user has disabled S3 or the OS fails to enter S3 entering Sleep is not guaranteed. When the system enters the sleep (S3) state, the battery LED continues to flash green/amber at the faster rate to indicate to the user that a power source needs to be installed.

If the hot swap battery is not charged to a sufficient level or the temperature is outside the mentioned range and the user performs a hot swap, the BIOS puts the system into the Sleep (S3) state and flashes the battery LED at a faster green/amber rate.

## Removing the battery

1. Follow the procedure in [Before working inside your computer.](#)
2. To remove the battery:
  - a. Slide and open the battery bay press latch door [1, 2].
  - b. Press the blue battery release tab to release the battery [3].
  - c. Pull the blue tab on the battery to remove the battery from the computer [4].



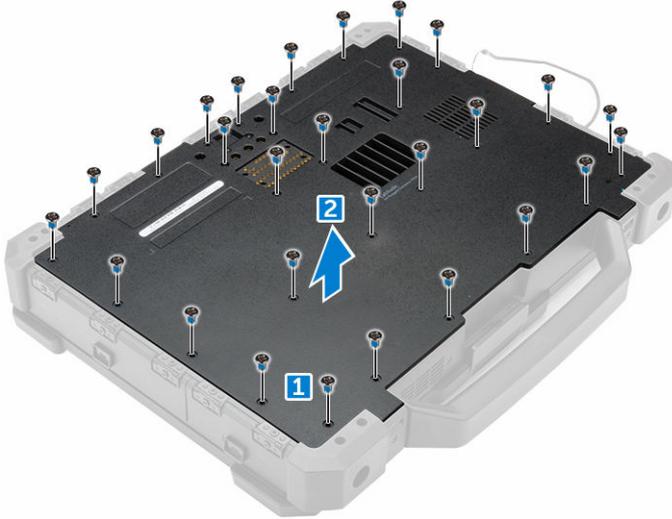
## Installing the battery

1. Insert the battery into the battery bay.
2. Close the battery bay press latch door.
3. Follow the procedure in [After working inside your computer.](#)

## Base cover

### Removing the base cover

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



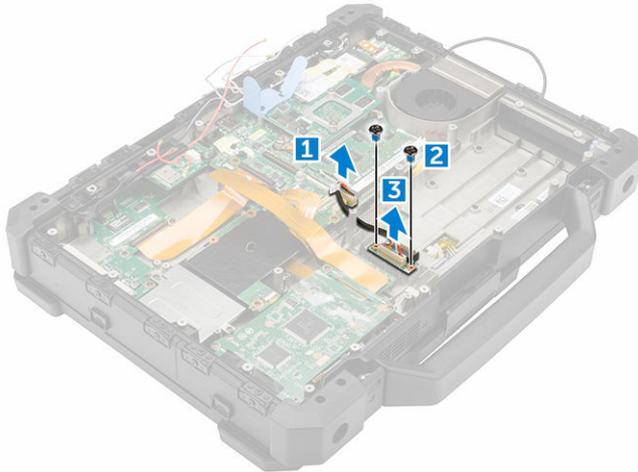
### Installing the base cover

1. Place the base cover on the computer.
2. Secure the base cover to the computer by using the screws.
3. Install the [battery](#).
4. Follow the procedure in [After working inside your computer](#).

## Battery connector

### Removing the battery connector

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



## Installing the battery connector

1. Install the battery connector board on the computer.
2. Secure the battery connector to the computer by using the screws.
3. Connect the battery connector cable to the slot on the system board.
4. Install the:
  - a. [base cover](#)
  - b. [battery](#)
5. Follow the procedure in [After working inside your computer](#).

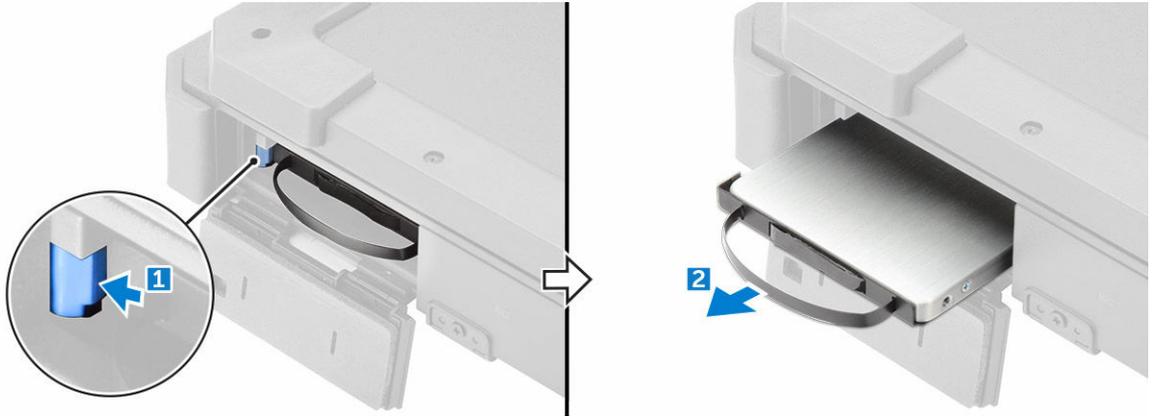
## Hard drive

### Removing the hard drive

1. Follow the procedure in [Before working inside your computer](#).
2. To remove the hard drive:

 **CAUTION: Turn off the computer before you remove the hard drive.**

- a. Unlock the hard drive press latch door and lift it up to open it.
- b. Release the hard drive by pressing the blue hard drive release latch [1].
- c. Pull the hard drive out of the computer using the hard drive pull loop [2].



3. To remove the hard drive pull loop from the hard drive assembly:
  - a. Remove the screws that secure the hard drive pull loop to the hard drive assembly [1].
  - b. Pull the hard drive pull loop and separate it from the hard drive assembly [2].



## Installing the hard drive

1. Attach the hard drive pull loop to the hard drive assembly.
2. Install the screws that secure the hard drive pull loop to the hard drive assembly.
3. Slide the hard drive into the hard drive bay.
4. Close the hard drive bay press latch door.
5. Follow the procedure in [After working inside your computer.](#)

## Solid State Drive (SSD)

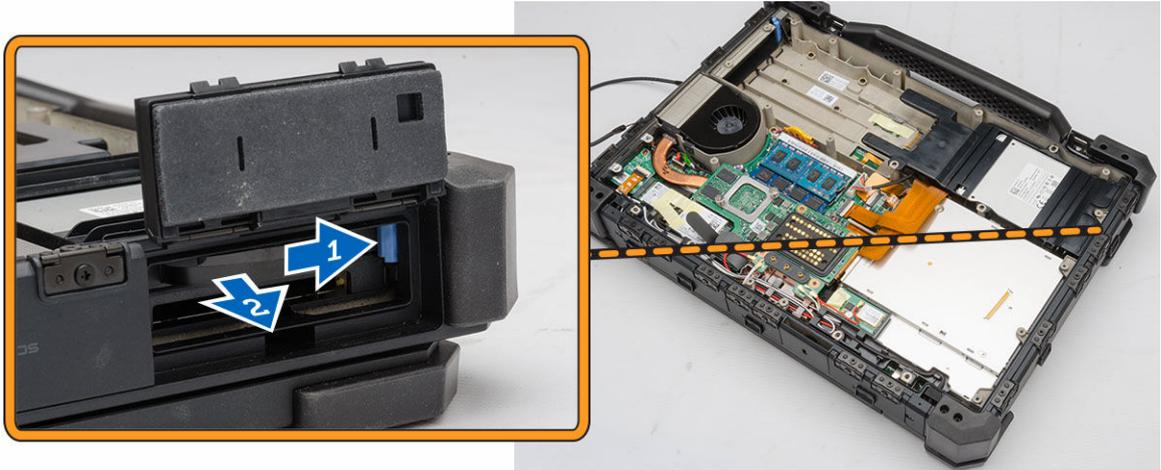
### Removing the SSD

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

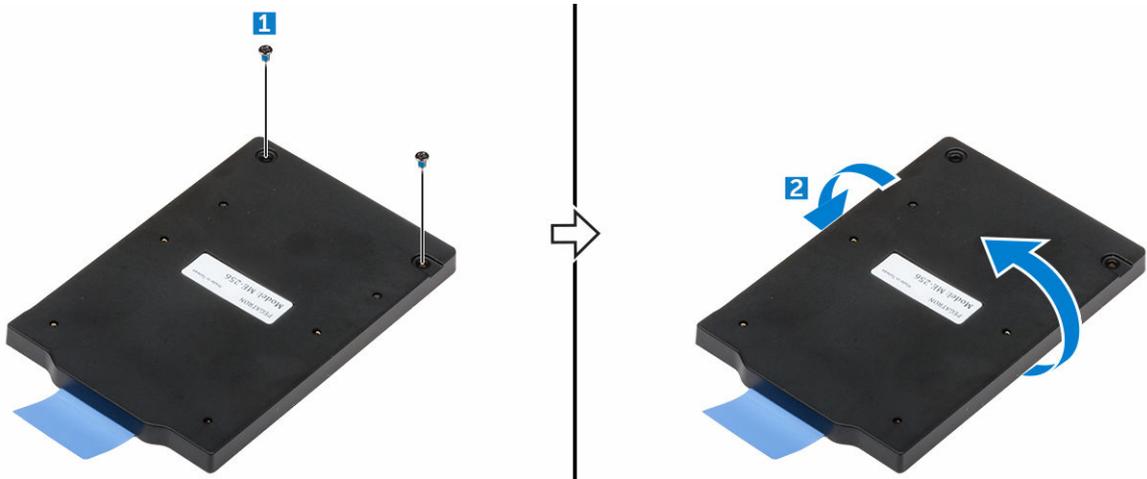
3. Perform the following steps:

 **CAUTION: Turn off the computer before you remove the hard drive.**

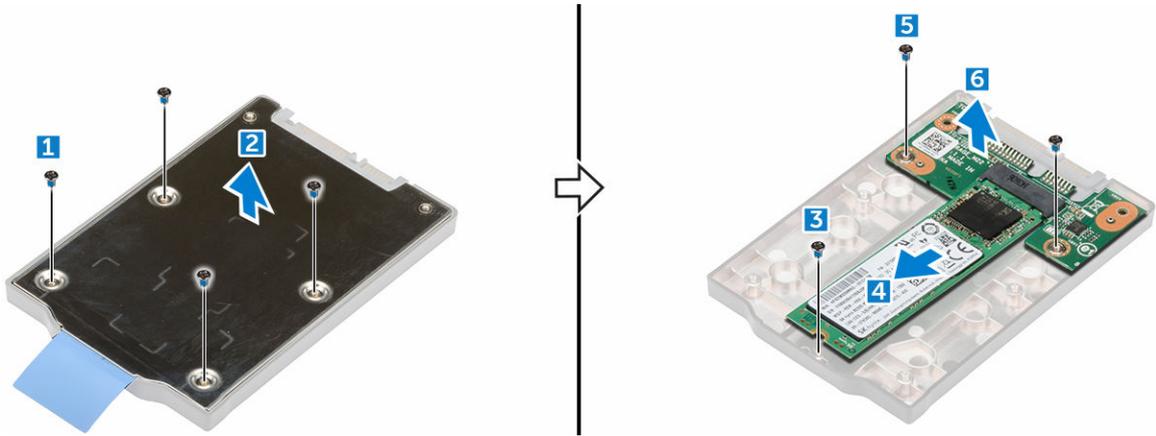
- a. Unlock the SSD press latch door and lift it upwards to open it.
- b. Release the SSD by opening the blue hard drive release latch.
- c. Slide the SSD out of the computer by using the pull tab.



4. Remove the screws that secure the SSD plate [1]
5. Turn the SSD plate over [2].



6. To remove the SSD:
  - a. Remove the screws that secure the SSD plate cover [1].
  - b. Lift and remove the SSD plate cover [2].
  - c. Remove the screw that secures the SSD to the SSD plate [3].
  - d. Slide the SSD and disconnect it from the connector on the SSD controller board [4].
  - e. Remove the screws that secure the SSD controller board to the SSD plate [5].
  - f. Lift and remove the SSD controller board from the SSD plate.



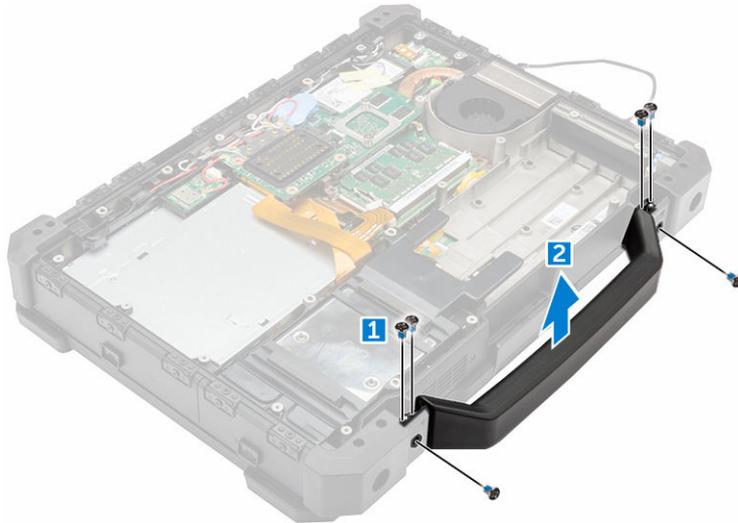
## Installing the SSD

1. Insert the SSD controller board into the SSD plate.
2. Secure the SSD controller board to the SSD plate by using the screws.
3. Insert the SSD into the connector on the SSD controller board.
4. Secure the SSD to the SSD plate by using the screw.
5. Install the SSD plate over the SSD cover and secure it by using the screws.
6. Turn over the SSD and secure the SSD plate cover by using the screws.
7. Insert the SSD into the SSD slot on the computer.
8. Close the hard drive/SSD bay press latch door.
9. Install the:
  - a. [base cover](#)
  - b. [battery](#)
10. Follow the procedure in [After working inside your computer.](#)

## Handle

### Removing the handle

1. Follow the procedure in [Before working inside your system.](#)
2. Remove the:
  - a. [battery](#)
  - b. [hard drive](#) or [SSD](#)
  - c. [base cover](#)
3. To remove the handle:
  - a. Remove the screws that secure the handle to the computer [1].
  - b. Lift and remove the handle from the computer [2].



## Installing the handle

1. Align the handle on the computer.
2. Secure the handle to the computer by using the screws.
3. Install the:
  - a. [base cover](#)
  - b. [hard drive](#) or [SSD](#)
  - c. [battery](#)
4. Follow the procedure in [After working inside your computer](#).

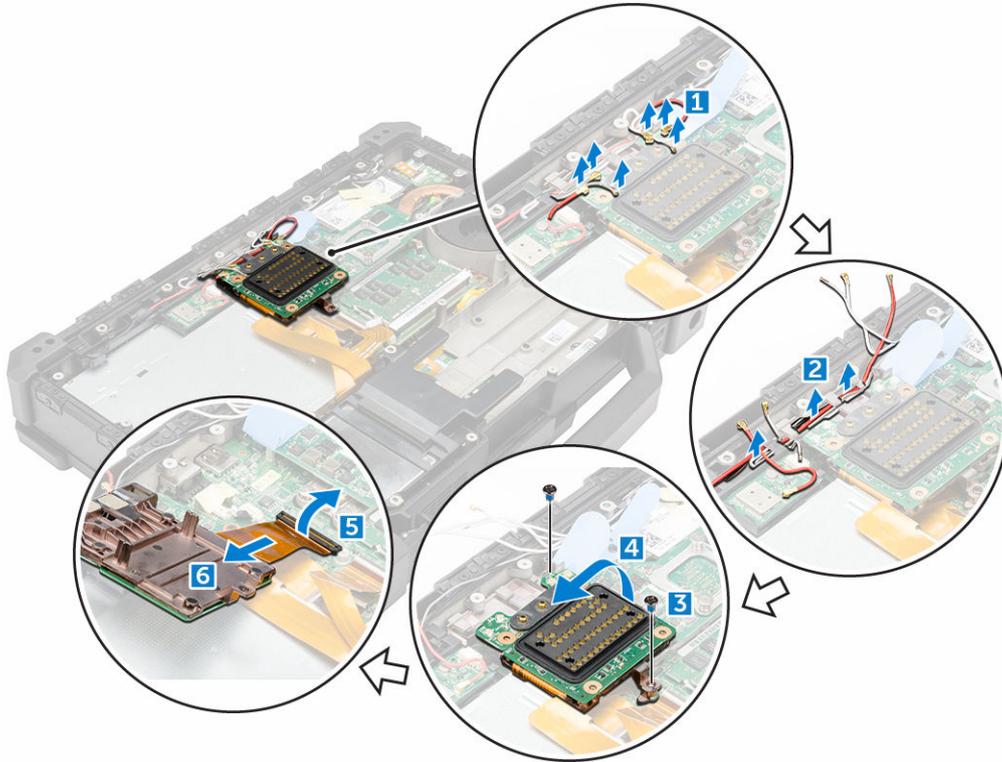
## Docking board

### Removing the docking board

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

**⚠ CAUTION: Please exercise caution while disconnecting the antenna cables. Improper removal may result in damage or breakage of the antenna cables.**

- b. Release the docking board antenna cables from the routing channels [2].
- c. Remove the screws that secure the docking board to the system board and turn it over in the direction indicated [3, 4].
- d. Disconnect the docking board connector cable by lifting the cable release tab [5, 6].
- e. Lift and remove the docking board from the computer.



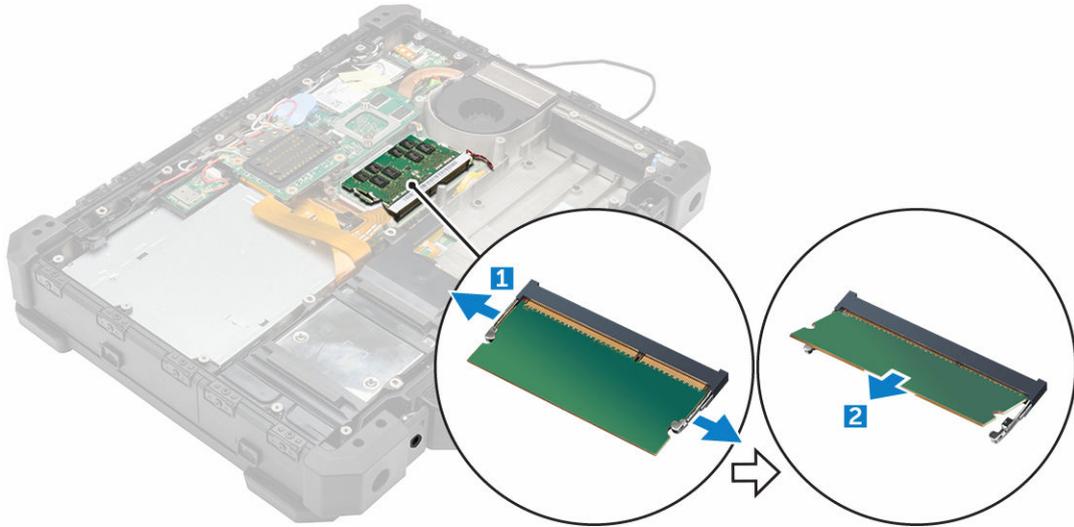
## Installing the docking board

1. Connect the docking board connector cable to the system board.
2. Align the docking board with the system board and install the screws that secure it.
3. Route the docking board antenna cables through the routing channels.
4. Connect the antenna cables to the corresponding location on the docking board.
5. Install the:
  - a. [base cover](#)
  - b. [battery](#)
6. Follow the procedure in [After working inside your computer](#).

## Memory module

### Removing the memory module

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery](#)
  - b. [base cover](#)
3. Pull the clips securing the memory module until the memory module pops up [1].
4. Remove the memory module from the memory module socket[2].



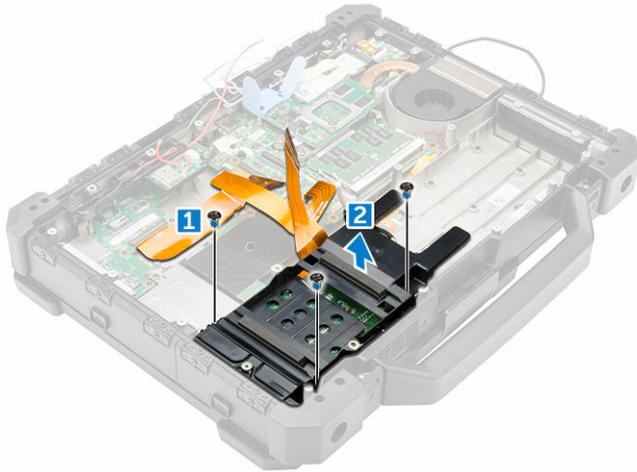
## Installing the memory module

1. Align the keyed notch on the memory module with the memory module socket.
2. Insert the memory module into the memory module socket.
3. Press the memory module until it clicks into place.
4. Install the:
  - a. [base cover](#)
  - b. [battery](#)
5. Follow the procedure in [After working inside your computer](#).

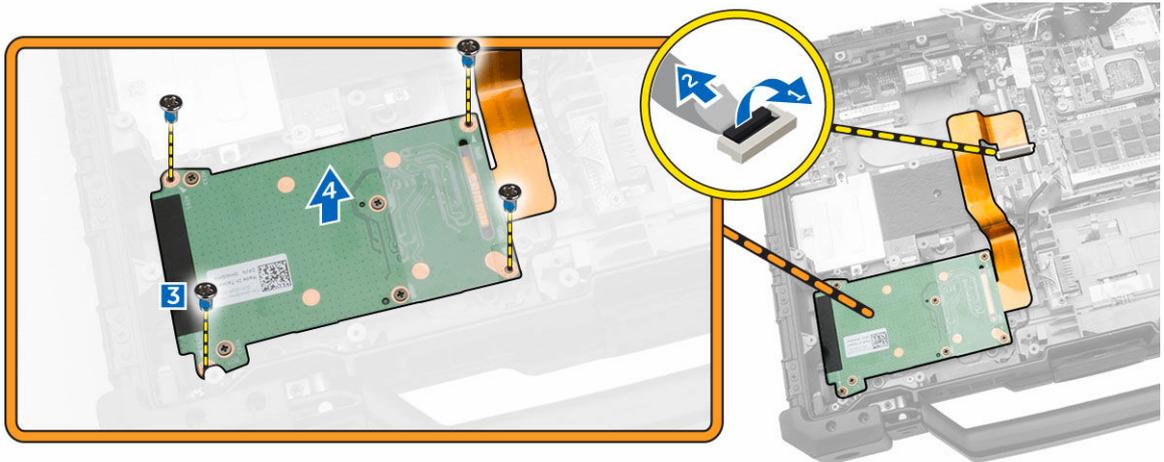
## ExpressCard module

### Removing the ExpressCard module

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery](#)
  - b. [base cover](#)
  - c. [hard drive](#) or [SSD](#)
  - d. [optical drive](#)
3. To remove the ExpressCard shroud:
  - a. Remove the screws that secure the ExpressCard shroud [1].
  - b. Lift and remove the ExpressCard shroud from the computer .



4. To remove the ExpressCard board:
  - a. Disconnect the ExpressCard board connector cable from the system board [1, 2].
  - b. Remove the screws that secure the ExpressCard board [3].
  - c. Lift and remove the ExpressCard board from the computer [4].



## Installing the ExpressCard module

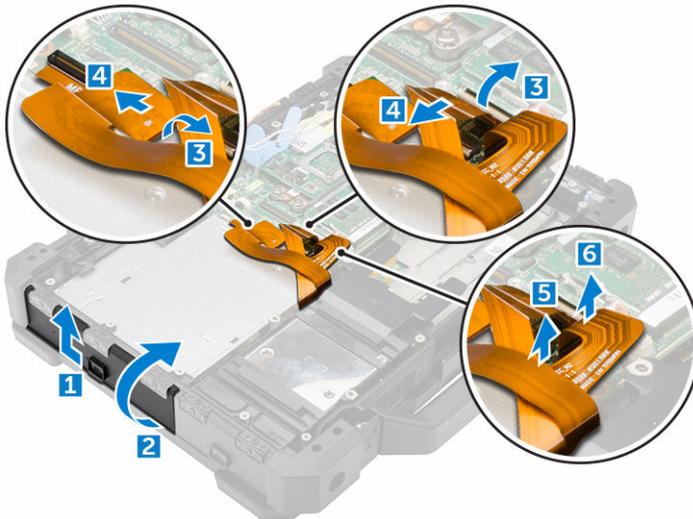
1. Insert the ExpressCard board into the slot on the chassis.
2. Connect the ExpressCard board connector cable to the system board.
3. Install the screws that secure the ExpressCard board to the system board.
4. Install the ExpressCard shroud.
5. Install the screws that secure the ExpressCard shroud to the ExpressCard board.
6. Connect the ExpressCard board shroud cable to the system board.
7. Install the:
  - a. [optical drive](#)
  - b. [hard drive](#) or [SSD](#)
  - c. [base cover](#)
  - d. [battery](#)

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

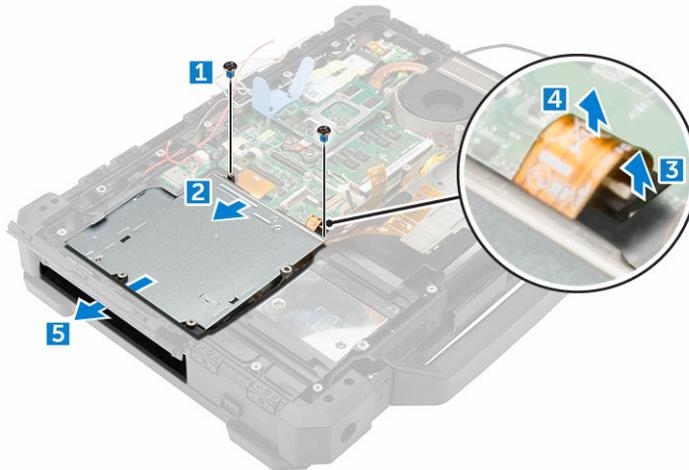
## Optical drive

### Removing the optical drive

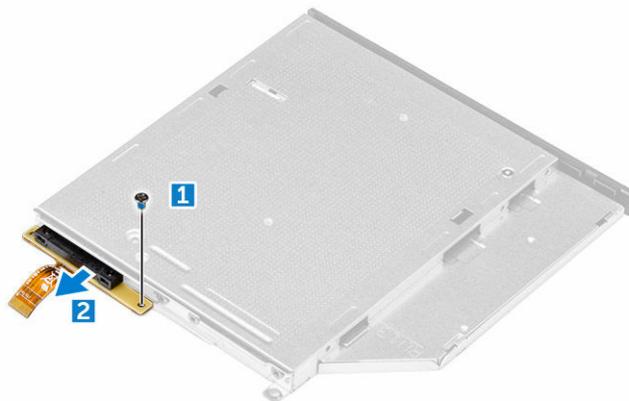
1. Follow the procedure in [Before working inside your computer.](#)
2. Remove the:
  - a. [battery](#)
  - b. [base cover](#)
  - c. [docking board](#)
3. Unlock the optical drive bay press latch door and open it [1, 2].
4. To disconnect the ExpressCard cables and the shroud cables:
  - a. Lift the release tab and lift the cable out of the connector [3, 4].
  - b. Remove the ExpressCard cable by lifting the cable out of the connector on the system board [5, 6].



5. To remove the optical drive:
  - a. Remove the screws that secure the optical drive to the system board [1].
  - b. Slide the optical drive forward until the optical drive cable is visible [2].
  - c. Lift the release tab [3] and lift the optical drive cable out of the connector on the system board [4].
  - d. Slide the optical drive out of the optical drive slot on the computer [5].



6. To remove the optical drive connector:
  - a. Remove the screw that secures the optical drive connector [1].
  - b. Pull the optical drive connector [2].
  - c. Remove the optical drive connector from the computer.



## Installing the optical drive

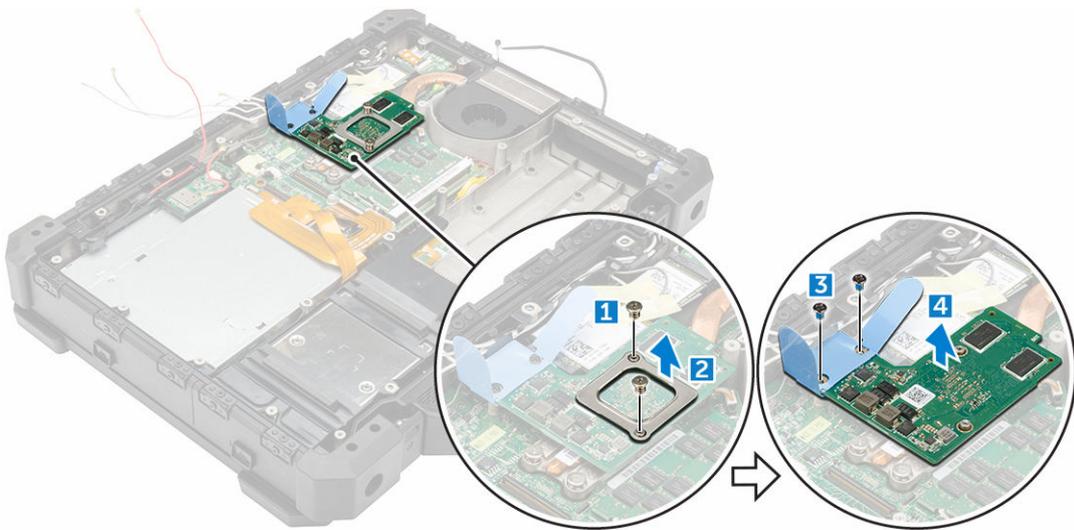
1. Install the optical drive bracket to the optical drive.
2. Secure it to the optical drive by using the screws.
3. Insert the optical drive through the press latch door until it is firmly aligned to the optical drive connector on the system board.
4. Install the screws that secure the optical drive to the system board.
5. Connect the optical drive cable.
6. Connect the ExpressCard cables and the shroud cables.
7. Install the:
  - a. [docking board](#)
  - b. [base cover](#)
  - c. [battery](#)

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

## Graphics Processing Unit (GPU)

### Removing the GPU

1. Follow the procedure in [Before working inside your computer.](#)
2. Remove the:
  - a. [battery](#)
  - b. [base cover](#)
3. To remove the GPU:
  - a. Remove the screws that secure the GPU module to the heat sink [1].
  - b. Remove the support bracket that secures the GPU module to the heat sink [2].
  - c. Remove the screws that secure the GPU module to the system board [3].
  - d. Using the pull tabs lift and remove the GPU module from the computer [4].



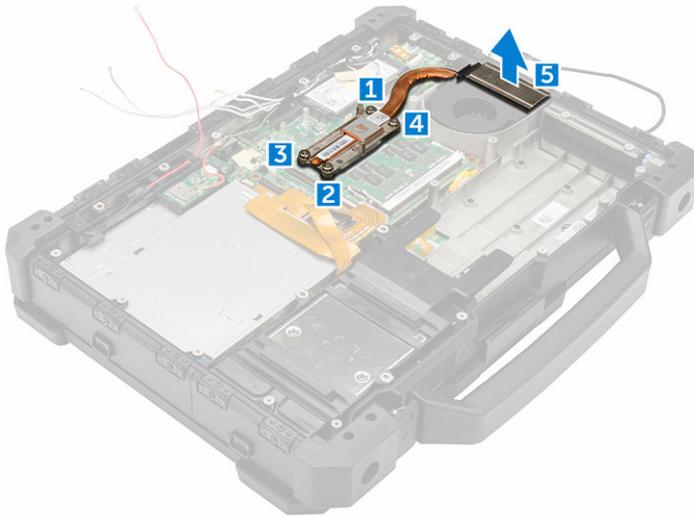
### Installing the GPU

1. Align and connect the GPU module to the slot on the heat sink.
2. Secure the GPU module to the system board by using the screws.
3. Place the support bracket on the GPU module.
4. Install the screws that secure the GPU module.
5. Install the:
  - a. [base cover](#)
  - b. [battery](#)
6. Follow the procedure in [After working inside your computer.](#)

# Heat sink

## Removing the heat sink

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery](#)
  - b. [base cover](#)
  - c. [optional GPU module](#)
3. To remove the heat sink:
  - a. Loosen the screws that secure the heat sink to the system board [1, 2, 3, 4].  
 **NOTE:** Loosen the screws in the order of the callout numbers [1, 2, 3, 4]. These screws are retention screws and cannot be fully removed.
  - b. Lift and remove the heat sink from the computer [5].



4. Clean the old thermal grease and apply a replacement thermal pad (if available).

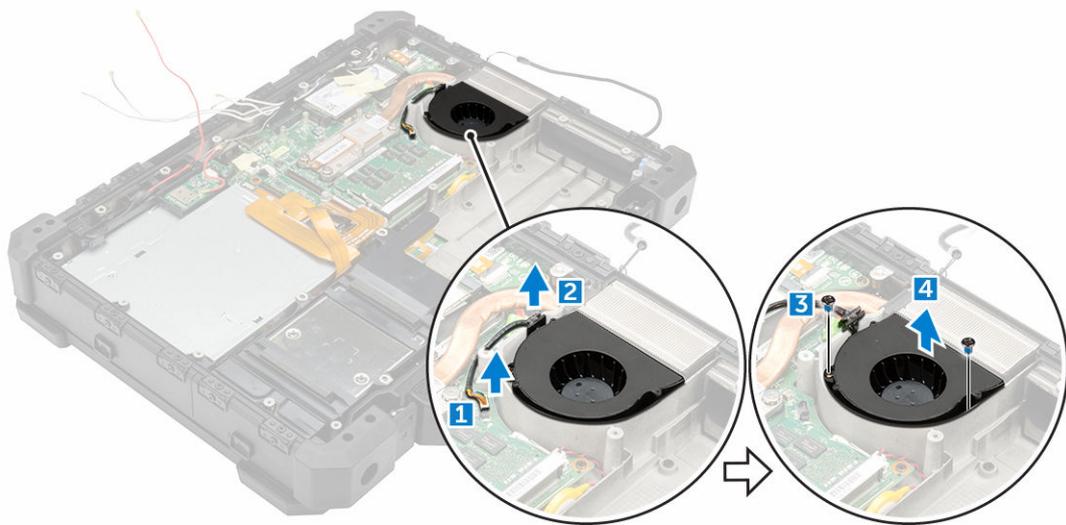
## Installing the heat sink

1. Align the heat sink with the system board.
2. Secure the heat sink to the system board by using the screws.  
 **NOTE:** Secure the screws in the order of the callout numbers [1, 2, 3, 4].
3. Install the:
  - a. [GPU module](#) (optional)
  - b. [base cover](#)
  - c. [battery](#)
4. Follow the procedure in [After working inside your computer](#).

# System fan

## Removing the system fan

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery](#)
  - b. [base cover](#)
3. To remove the system fan:
  - a. Disconnect the system fan connector cable from the system board [1, 2].
  - b. Remove the screws that secure the system fan to the computer [3].
  - c. Lift and remove the system fan from the computer [4].



## Installing the system fan

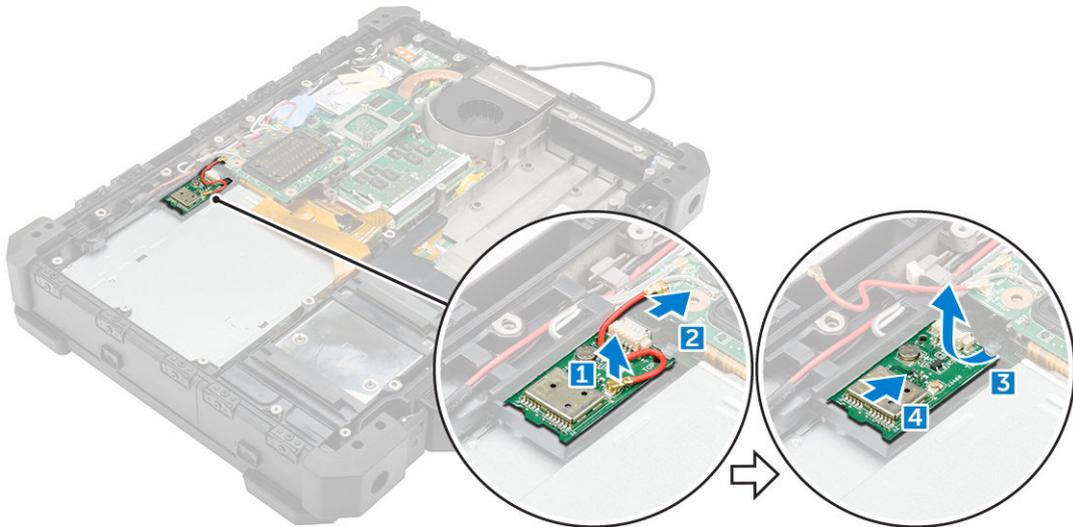
1. Align the system fan on the chassis.
2. Secure the system fan to the computer by using the screws.
3. Connect the system fan connector cable to the system board connector.
4. Install the:
  - a. [base cover](#)
  - b. [battery](#)
5. Follow the procedure in [After working inside your computer](#).

# Global Positioning System (GPS)

## Removing the GPS module

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

- b. [base cover](#)
- 3. To remove the GPS module:
  - a. Disconnect the GPS antenna cable from the module [1].
  - b. Release the GPS module from the connector on the system board [2].
  - c. Pull the GPS module retention latch upwards and remove the GPS module from the computer [3, 4].



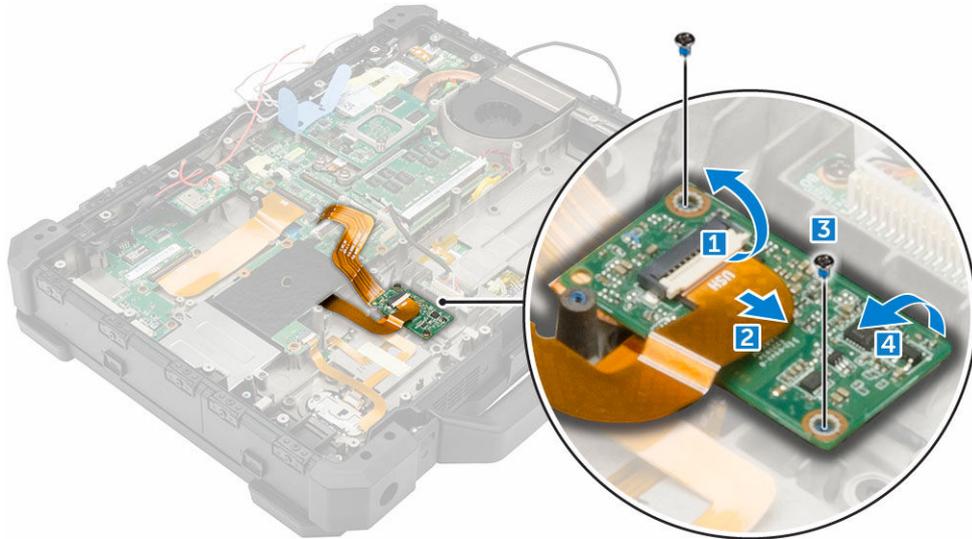
## Installing the GPS module

1. Align the GPS module with the connector on the system board.
2. Insert the GPS module into the slot.
3. Connect the GPS module antenna cable.
4. Install the:
  - a. [base cover](#)
  - b. [battery](#)
5. Follow the procedure in [After working inside your computer](#).

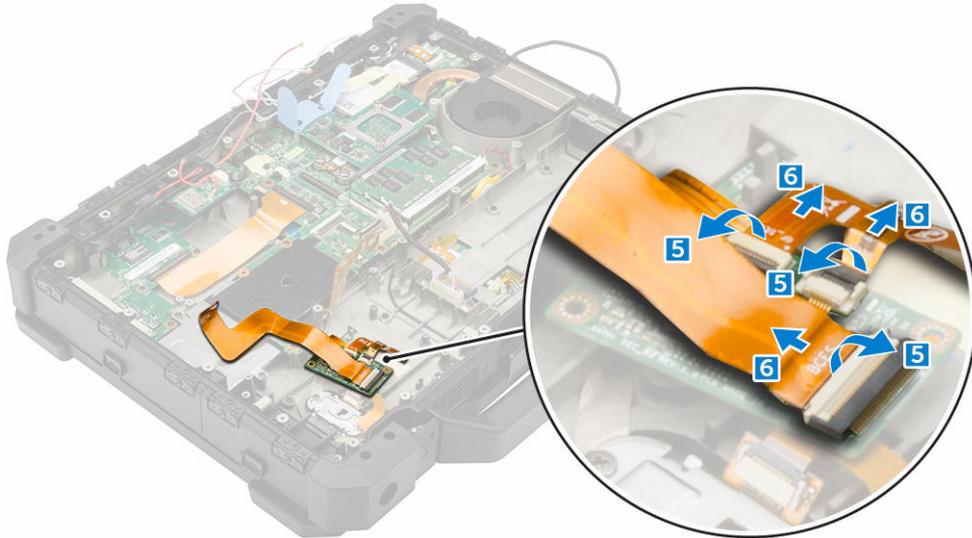
## USH daughter board

### Removing the USH daughter board

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery](#)
  - b. [base cover](#)
  - c. [hard drive](#) or [SSD](#)
  - d. [ExpressCard](#)
3. To remove the USH daughter board:
  - a. Lift the release tab and pull the USH daughter board connector cable to disconnect it [1, 2].
  - b. Remove the screws that secure the USH daughter board to the chassis [3].
  - c. Turn the board over [4].



d. Disconnect the other USH daughter board cable connectors [ 5, 6]



e. Remove the USH daughter board from the computer.

## Installing the USH daughter board

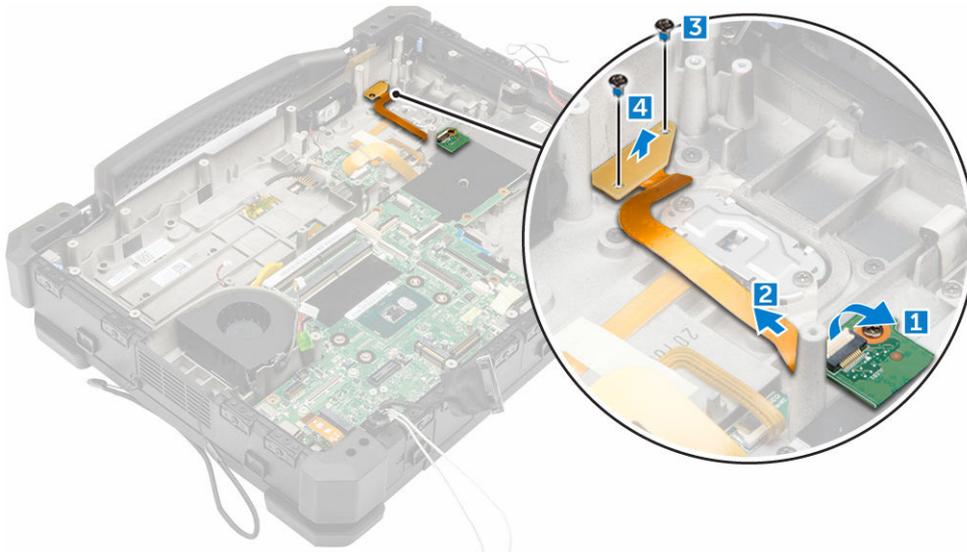
1. Connect the USH daughter board connector cables at the bottom of the USH daughter board and turn the board over.
2. Align the USH daughter board with the slot on the computer.
3. Install the screws that secure the USH daughter board to the system board.
4. Connect the USH daughter board connector cable on top of the USH daughter board.
5. Install the:
  - a. [ExpressCard](#)
  - b. [base cover](#)
  - c. [hard drive](#) or [SSD](#)
  - d. [battery](#)

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

## LED board

### Removing the LED board

1. Follow the procedure in [Before working inside your computer.](#)
2. Remove the:
  - a. [battery](#)
  - b. [hard drive](#) or [SSD](#)
  - c. [base cover](#)
  - d. [ExpressCard](#)
3. To remove the LED board:
  - a. Lift the release tab and disconnect the LED board connector cable [1, 2].
  - b. Remove the screws that secure the LED board to the chassis [3].
  - c. Lift and remove the LED board from the computer [4].



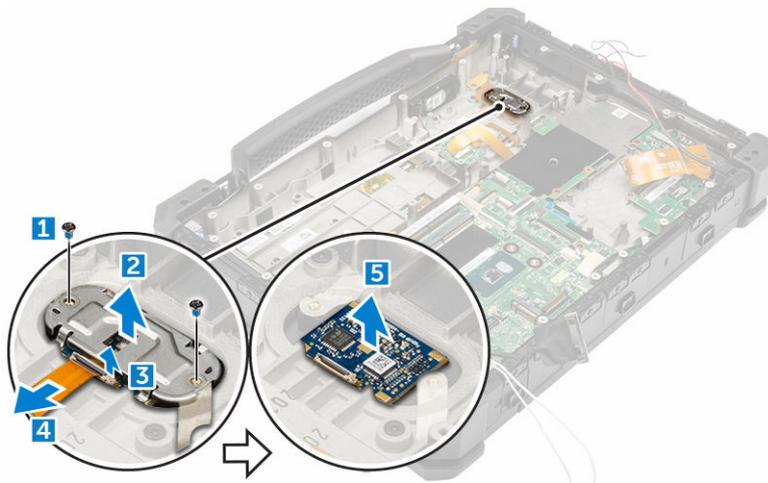
### Installing the LED board

1. Align the LED board with the slot on the chassis and insert the LED board into the slot.
2. Install the screws that secure the LED board to the computer.
3. Connect the LED board connector cable to the system board.
4. Install the:
  - a. [ExpressCard](#)
  - b. [base cover](#)
  - c. [hard drive](#) or [SSD](#)
  - d. [battery](#)
5. Follow the procedure in [After working inside your computer.](#)

# Fingerprint reader

## Removing the fingerprint reader board

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery](#)
  - b. [hard drive](#) or [SSD](#)
  - c. [base cover](#)
  - d. [ExpressCard](#)
3. To remove the fingerprint reader:
  - a. Remove the screws that secure the fingerprint reader cover [1].
  - b. Lift the cover and remove it to expose the fingerprint reader board [2].
  - c. Lift the release tab and disconnect the fingerprint reader cable [3, 4].
  - d. Lift and remove the fingerprint reader board from the computer [5].



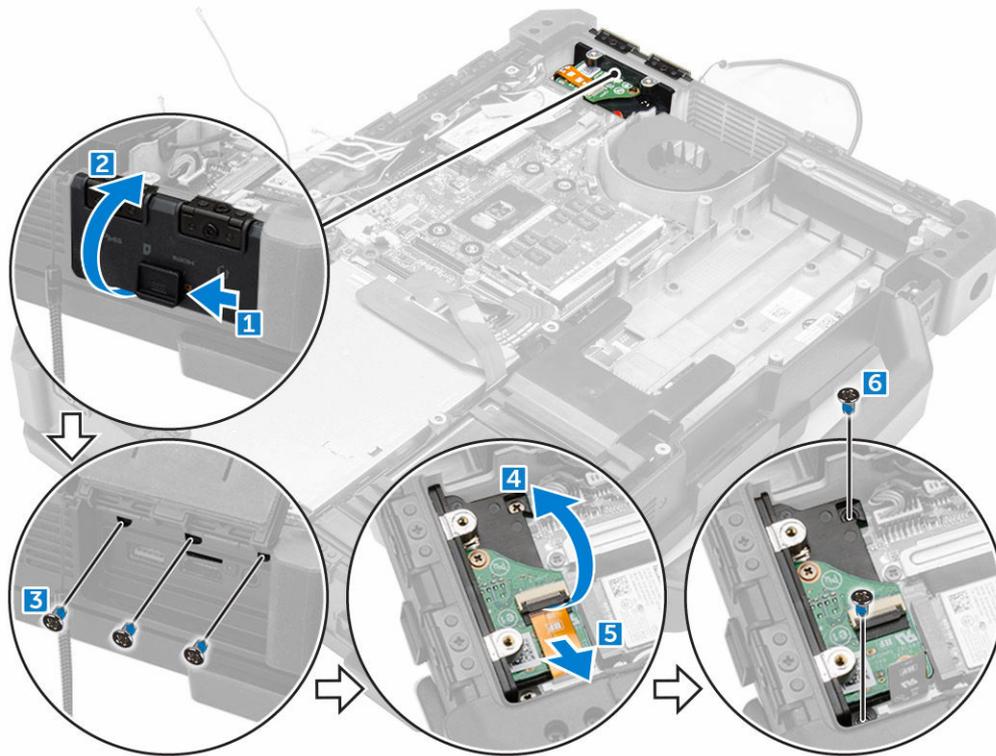
## Installing the fingerprint reader board

1. Insert the fingerprint reader board into the slot on the computer.
2. Connect the fingerprint reader board cable to the connector.
3. Secure the metal cover to fingerprint reader board by using the screws.
4. Install the:
  - a. [ExpressCard](#)
  - b. [base cover](#)
  - c. [hard drive](#)
  - d. [battery](#)
5. Follow the procedure in [After working inside your computer](#).

# Subscriber Identity Module(SIM) board

## Removing the SIM board

1. Follow the procedure in [Before working inside your Computer.](#)
2. Remove the:
  - a. [battery](#)
  - b. [base cover](#)
  - c. [docking board](#)
3. To remove the SIM board:
  - a. Open the press latch door by pressing the release tab and lifting it [1, 2].
  - b. Remove the screws that secure the SIM board to the chassis. [3].
  - c. Disconnect the SIM board cable by lifting the release tab [4, 5].
  - d. Remove the screws that secure the SIM board to the system board [6].
  - e. Lift and remove the SIM board from the computer.



## Installing the SIM board

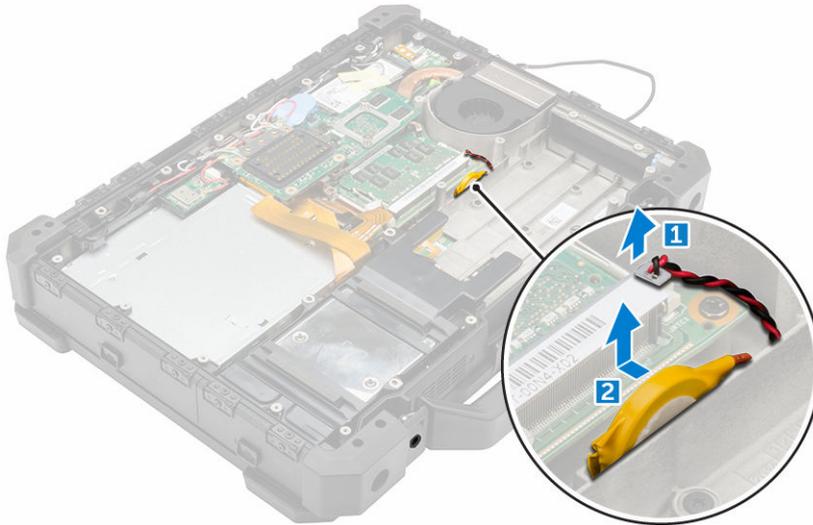
1. Insert the SIM board into the slot on the computer.
2. Install the screws that secure the SIM board to the computer.
3. Connect the SIM board connector cable to the SIM board.
4. Install the screws that secure the SIM board from inside the connection area within the computer.
5. Close the press latch door by lowering the door until it clicks into place.

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

## Coin cell battery

### Removing the coin cell battery

1. Follow the procedure in [Before working inside your computer.](#)
2. Remove the:
  - a. [battery](#)
  - b. [base cover](#)
3. To remove the coin cell battery:
  - a. Peel the adhesive tape sticking the coin cell battery to the chassis.
  - b. Disconnect the coin cell battery cable from the system board [1].
  - c. Lift and remove the coin cell battery from the computer [2].



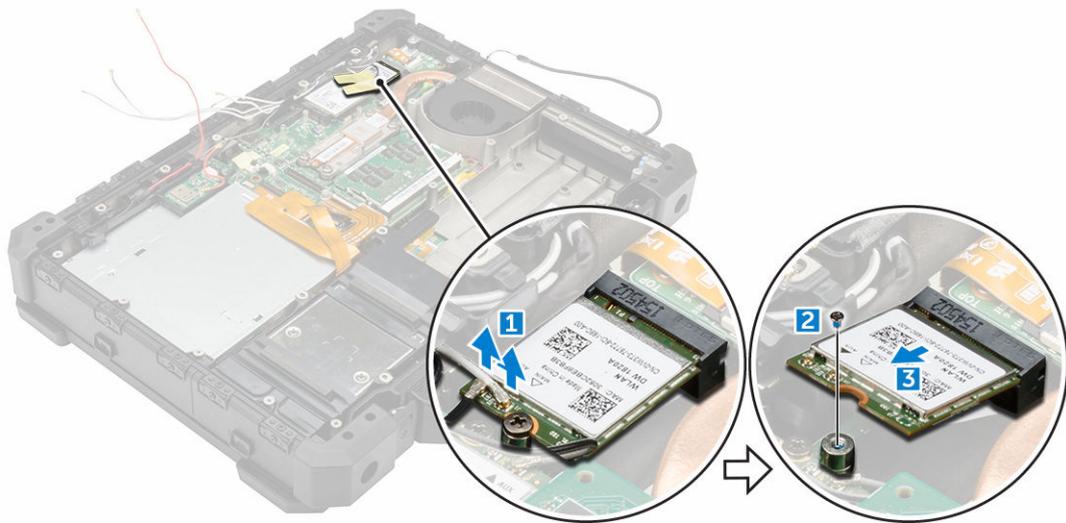
### Installing the coin cell battery

1. Align the coin cell battery into the slot on the computer, affixing it to the chassis wall.
2. Connect the coin cell battery cable to the system board.
3. Install the:
  - a. [base cover](#)
  - b. [battery](#)
4. Follow the procedure in [After working inside your computer.](#)

## WLAN card

### Removing the WLAN card

1. Follow the procedure in [Before working inside your computer.](#)
2. Remove the:
  - a. [battery](#)
  - b. [base cover](#)
3. To remove the WLAN card:
  - a. Disconnect the antenna cables from the WLAN card [1].
  - b. Remove the screw that secures the WLAN card [2].
  - c. Slide the card out of the card connector on the system board and remove it [3].



### Installing the WLAN card

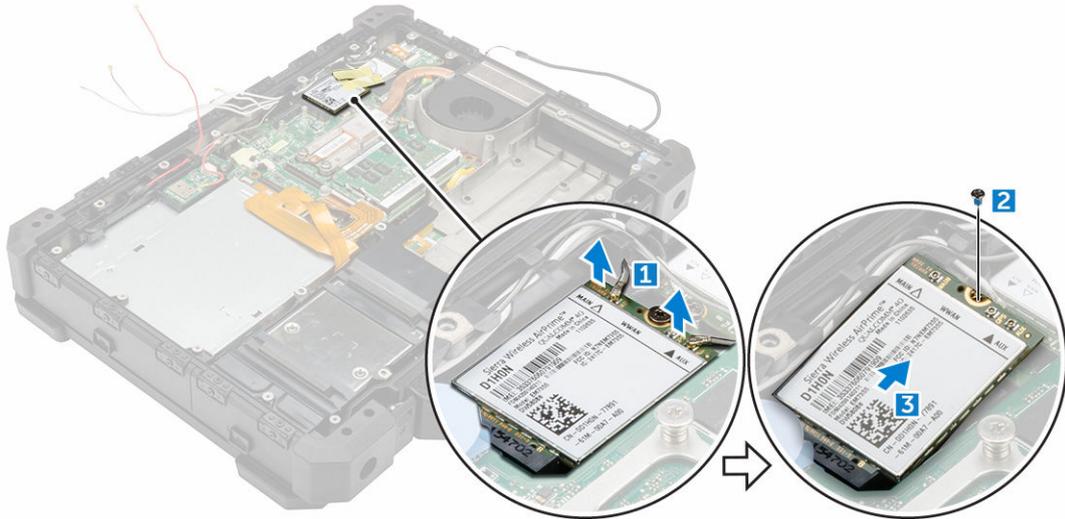
1. Insert the WLAN card into its connector on the system board.
2. Press the card down and install the screw that secures the WLAN card.
3. Connect the antenna cables on the WLAN card.
4. Install the:
  - a. [base cover](#)
  - b. [battery](#)
5. Follow the procedure in [After working inside your computer.](#)

## WWAN card

### Removing the WWAN card

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

- b. [base cover](#)
- 3. To remove the WWAN card:
  - a. Disconnect the antenna cables from the WWAN card [1].
  - b. Remove the screw that secures the WWAN card [2].
  - c. Slide the card out of the card connector on the system board and remove it [3].



## Installing the WWAN card

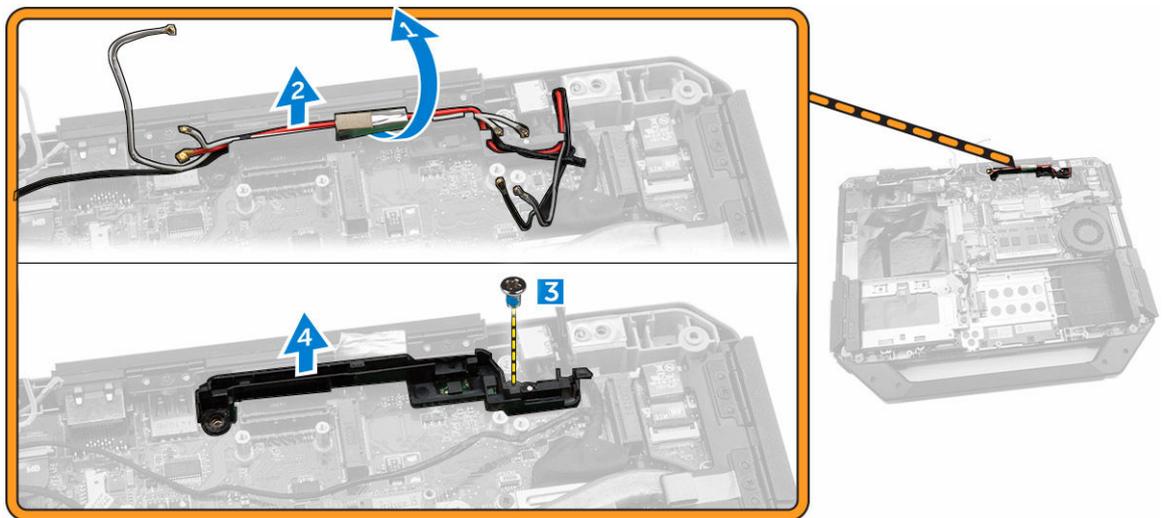
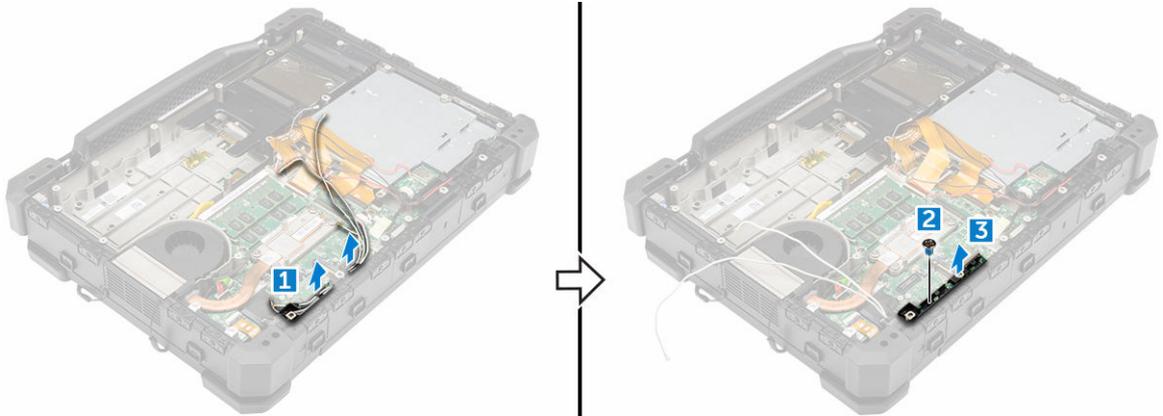
1. Insert the WWAN card into the connector on the system board.
2. Press the card down and install the screw that secures the WWAN card.
3. Connect the antenna cables on the WWAN card.
4. Install the:
  - a. [base cover](#)
  - b. [battery](#)
5. Follow the procedure in [After working inside your computer](#).

## RF cable holder

### Removing the RF cable holder

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery](#)
  - b. [hard drive](#) or [SSD](#)
  - c. [optical drive](#)
  - d. [base cover](#)
  - e. [GPS board](#)
  - f. [WLAN card](#)
  - g. [docking board](#)
3. To remove the RF cable holder:
  - a. Unroute the antenna cables from the cable routing clips [1].

- b. Remove the screw that secures the RF holder to the computer [2] [3].
- c. Lift and remove the RF holder from the computer [3] [4].



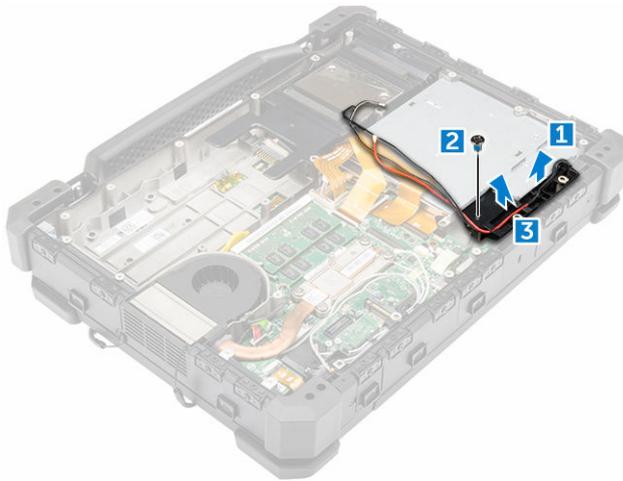
## Installing the RF holder

1. Place the RF holder on the computer.
2. Install the screws that secure the RF holder to the computer.
3. Connect the antenna cables.
4. Route the antenna cables.
5. Install the:
  - a. [docking board](#)
  - b. [WLAN card](#)
  - c. [GPS board](#)
  - d. [optical drive](#)
  - e. [hard drive](#) or [SSD](#)
  - f. [base cover](#)
  - g. [battery](#)
6. Follow the procedure in [After working inside your computer](#).

# GPS holder

## Removing the GPS holder

1. Follow the procedure in [Before working inside your computer.](#)
2. Remove the:
  - a. [battery](#)
  - b. [hard drive](#) or [SSD](#)
  - c. [base cover](#)
  - d. [optical drive](#)
3. To remove the GPS holder:
  - a. Disconnect the antenna cable and unrout it from the GPS holder [1].
  - b. Disconnect the GPS holder cable.
  - c. Remove the screw that secures the GPS holder to the computer [2].
  - d. Lift the GPS holder from the computer [3].



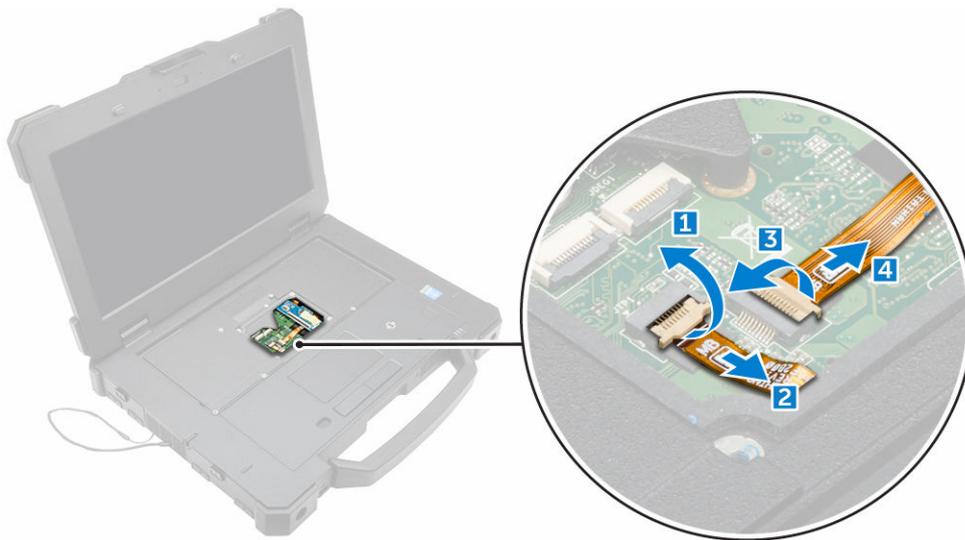
## Installing the GPS holder

1. Insert the GPS holder into the slot on the computer.
2. Tighten the screw that secures the holder to the computer.
3. Connect the antenna cable and the GPS holder cable.
4. Install the:
  - a. [optical drive](#)
  - b. [hard drive](#) or [SSD](#)
  - c. [base cover](#)
  - d. [battery](#)
5. Follow the procedure in [After working inside your computer.](#)

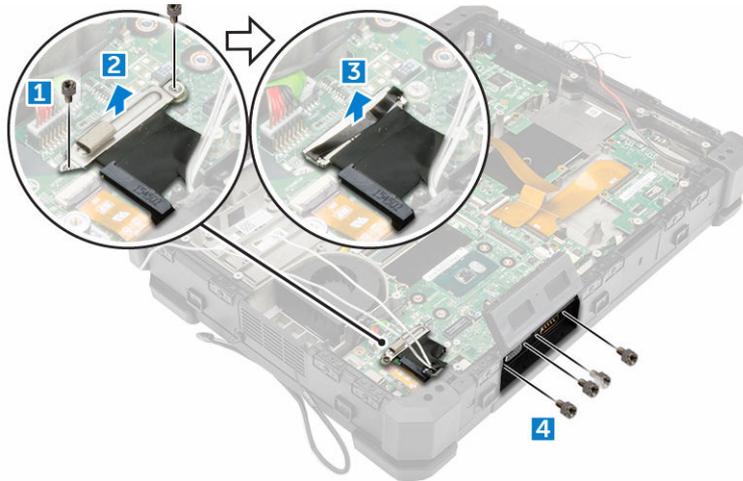
# System board

## Removing the system board

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery](#)
  - b. [hard drive](#) or [SSD](#)
  - c. [keyboard](#)
  - d. [keyboard door](#)
  - e. [base cover](#)
  - f. [docking board](#)
  - g. [optical drive](#)
  - h. [memory module](#)
  - i. [GPU module](#)
  - j. [heat sink](#)
  - k. [ExpressCard](#)
  - l. [GPS module](#)
  - m. [WLAN card](#)
  - n. [WWAN card](#)
  - o. [SIM board](#)
  - p. [GPS holder](#)
  - q. [RF holder](#)
3. Disconnect the cables under the keyboard by pressing on the release tab and lifting it [1, 2, 3, 4].



4. To disconnect the DisplayPort cable:
  - a. Remove the screws that secure the display connector to the system board [1].
  - b. Lift and remove the metal bracket that covers the display connector [2].
  - c. Disconnect the display connector cable from the system board [3].
  - d. Remove the screws that secure the DisplayPort to the computer chassis [4].



**NOTE:** All the cables connected to the system board should be disconnected prior to system board removal.

5. To remove the system board from the chassis:
  - a. Remove the screws that secure the system board to the chassis [1].
  - b. Slide the system board forward and release any other additional connections at the bottom of the chassis [2].
  - c. Disconnect the connector cable under the system board by pressing the release tab and lifting it.
  - d. Slide and remove the system board from the computer.



## Installing the system board

1. Connect the system board connector cable to the system board and turn it around.
2. Align the system board into the chassis until it is firmly seated.
3. Install the screws that secure the system board to the chassis.
4. Install the screws that secure the DisplayPort press latch doors to the computer.
5. Connect the display cable to the system board.
6. Install the screws that secure the metal bracket to the display cable on the system board.
7. Turn the computer over and connect the cables under the keyboard to the system board.

8. Install the:
  - a. [SIM board](#)
  - b. [WWAN card](#)
  - c. [WLAN card](#)
  - d. [GPS module](#)
  - e. [ExpressCard](#)
  - f. [heat sink](#)
  - g. [GPU module](#)
  - h. [RF holder](#)
  - i. [GPS holder](#)
  - j. [memory module](#)
  - k. [optical drive](#)
  - l. [docking board](#)
  - m. [base cover](#)
  - n. [keyboard](#)
  - o. [keyboard door](#)
  - p. [hard drive](#) or [SSD](#)
  - q. [battery](#)



**NOTE:** When the service technician replaces a system board, he should set the service tag once the system starts up. This is a one time effort. If you fail to set the service tag, the system battery will not charge. Therefore, it is very important that the service technician sets the correct system service tag. If a wrong service tag is set, there is no way to reset it and the technician will have to place order for another system board.

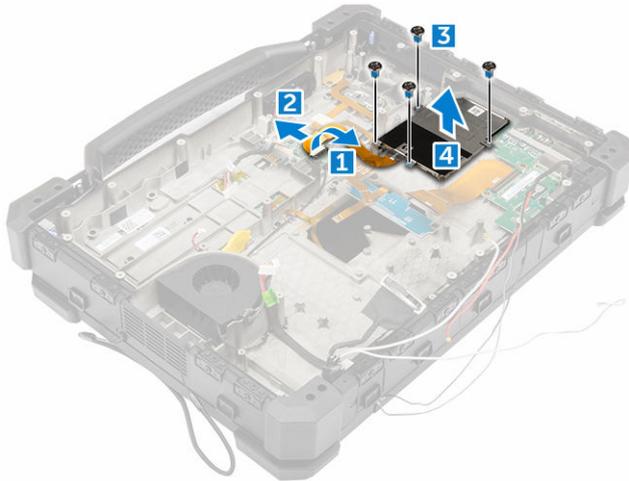
9. Follow the procedure in [After working inside your computer](#).

## Smart card module

### Removing the Smart card module

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery](#)
  - b. [hard drive](#) or [SSD](#)
  - c. [keyboard](#)
  - d. [base cover](#)
  - e. [docking board](#)
  - f. [optical drive](#)
  - g. [memory module](#)
  - h. [GPU module](#)
  - i. [heat sink](#)
  - j. [ExpressCard](#)
  - k. [GPS module](#)
  - l. [WLAN card](#)
  - m. [WWAN card](#)
  - n. [SIM board](#)
  - o. [system board](#)
3. To remove the Smart card module:
  - a. Lift the release tab and disconnect the smart card ribbon cable from the USH board [1,2].

- b. Remove the screws that secure the Smart card module to the computer [3].
- c. Lift and remove the smart card module from the computer [4].



## Installing the Smart card module

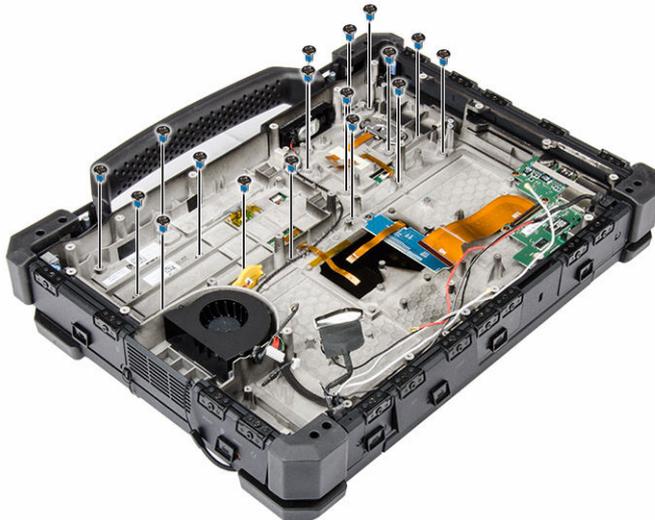
1. Align and insert the Smart card module into the slot on the computer.
2. Install the screws that secure the Smart card module to the computer.
3. Connect the Smart card ribbon cable to the USH board.
4. Install the:
  - a. [system board](#)
  - b. [SIM board](#)
  - c. [WWAN card](#)
  - d. [WLAN card](#)
  - e. [GPS module](#)
  - f. [ExpressCard](#)
  - g. [heat sink](#)
  - h. [GPU module](#)
  - i. [memory module](#)
  - j. [optical drive](#)
  - k. [docking board](#)
  - l. [base cover](#)
  - m. [keyboard](#)
  - n. [hard drive](#) or [SSD](#)
  - o. [battery](#)
5. Follow the procedure in [After working inside your computer](#).

## Palmrest

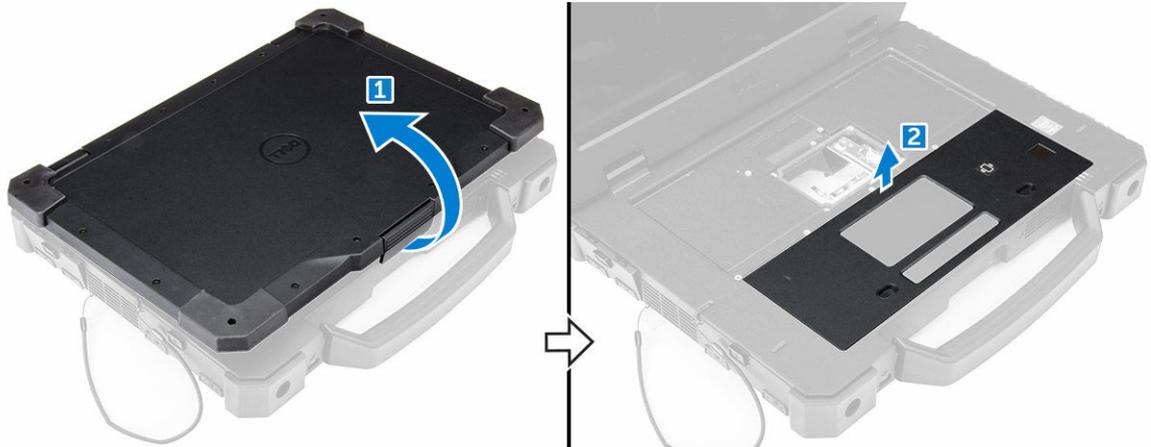
### Removing the palmrest

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

- b. [hard drive](#) or [SSD](#)
  - c. [keyboard](#)
  - d. [base cover](#)
  - e. [docking board](#)
  - f. [optical drive](#)
  - g. [memory module](#)
  - h. [coin cell battery](#)
  - i. [GPU module](#)
  - j. [heat sink](#)
  - k. [ExpressCard](#)
  - l. [GPS module](#)
  - m. [WLAN card](#)
  - n. [WWAN card](#)
  - o. [fingerprint reader](#)
  - p. [SIM board](#)
  - q. [system board](#)
  - r. [SmartCard reader](#)
3. To disengage the palmrest:
- a. Remove the screws that secure the palmrest to the computer [1].
  - b. Turn the computer over.



4. To remove the palmrest from the computer:
- a. Open the computer lid [1].
  - b. Lift the palmrest at the bottom of the touch pad buttons to release it from the computer [2].
  - c. Lift and remove the palmrest from the computer.



## Installing the palmrest

1. Insert the palmrest into the slot on the computer until it clicks into place.
2. Turn the computer over and install the screws that secure the palmrest to the computer.
3. Install the:
  - a. [SmartCard reader](#)
  - b. [system board](#)
  - c. [SIM board](#)
  - d. [fingerprint reader](#)
  - e. [WWAN card](#)
  - f. [WLAN card](#)
  - g. [GPS module](#)
  - h. [coin cell battery](#)
  - i. [ExpressCard](#)
  - j. [heat sink](#)
  - k. [GPU module](#)
  - l. [memory module](#)
  - m. [optical drive](#)
  - n. [docking board](#)
  - o. [base cover](#)
  - p. [keyboard](#)
  - q. [hard drive](#) or [SSD](#)
  - r. [battery](#)
4. Follow the procedure in [After working inside your computer](#).

## Input/Output(I/O) board

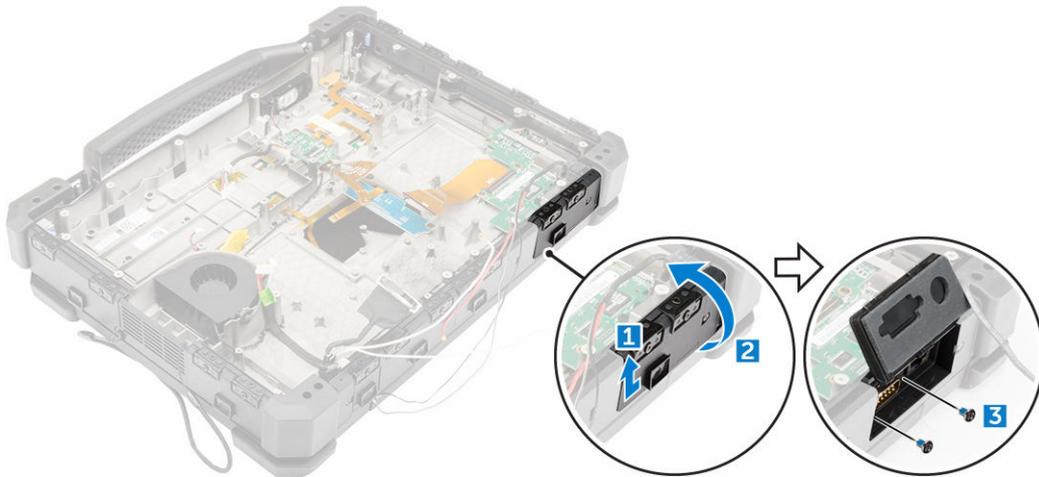
### Removing the I/O board

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery](#)
  - b. [hard drive](#) or [SSD](#)

- c. [keyboard](#)
- d. [base cover](#)
- e. [docking board](#)
- f. [optical drive](#)
- g. [memory module](#)
- h. [GPU module](#)
- i. [heat sink](#)
- j. [ExpressCard](#)
- k. [GPS module](#)
- l. [WLAN card](#)
- m. [WWAN card](#)
- n. [SIM board](#)
- o. [system board](#)
- p. [Smart card reader](#)

**3.** To remove the I/O port:

- a. Open the I/O port press latch door [1, 2].
- b. Remove the thumb screws that secure the I/O port module to the computer [3].



**4.** To remove the I/O board:

- a. Remove the screws that secure the I/O board module to the computer chassis [1].
- b. Lift and remove the I/O board module from the computer [2].



## Installing the I/O board

1. Align the I/O board module with the slot on the computer by first sliding I/O port end through the press latch door.
2. Connect the I/O board ribbon cable to the system board.
3. Install the screws that secure the I/O port to the computer and close the press latch door.
4. Install the thumb screws that secure the I/O board to the computer chassis.
5. Install the:
  - a. [Smart card reader](#)
  - b. [system board](#)
  - c. [SIM board](#)
  - d. [WWAN card](#)
  - e. [WLAN card](#)
  - f. [GPS module](#)
  - g. [ExpressCard](#)
  - h. [heat sink](#)
  - i. [GPU module](#)
  - j. [memory module](#)
  - k. [optical drive](#)
  - l. [docking board](#)
  - m. [base cover](#)
  - n. [keyboard](#)
  - o. [hard drive](#) or [SSD](#)
  - p. [battery](#)
6. Follow the procedure in [After working inside your computer](#).

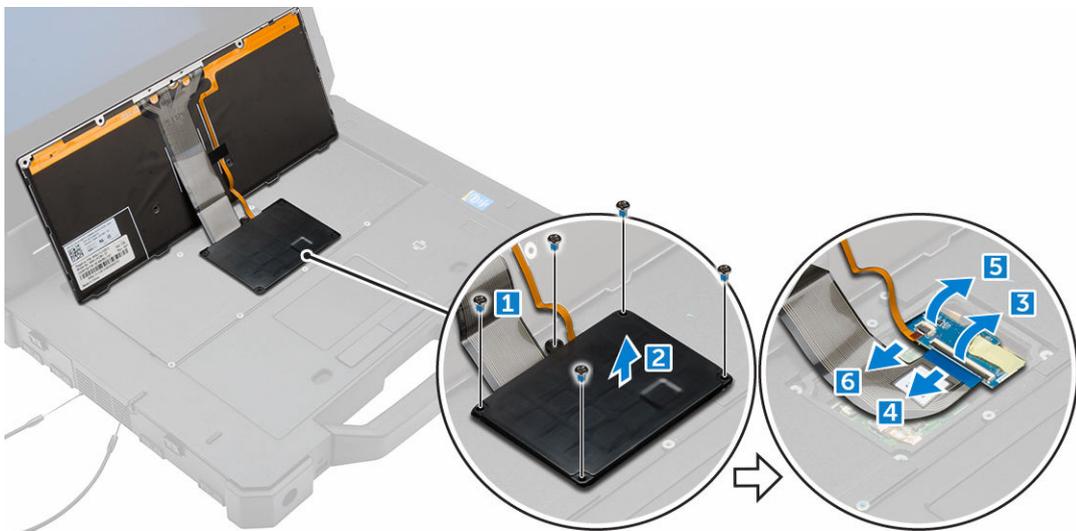
## Keyboard

### Removing the keyboard

1. Follow the procedures in [Before working inside your computer](#).
2. Remove the [battery](#).
3. To remove the keyboard:
  - a. Remove the screws that secure the keyboard to the computer [1].
  - b. Lift the edges and flip the keyboard towards the display [2].



4. To remove the keyboard door:
  - a. Remove the screws that secure the keyboard door [1].
  - b. Lift and remove the keyboard door [2].
  - c. Disconnect the keyboard cables from the keyboard controller card by pressing on the lock tab and lifting the connector [3, 4, 5, 6].
  - d. Lift and remove the keyboard from the computer.



## Installing the keyboard

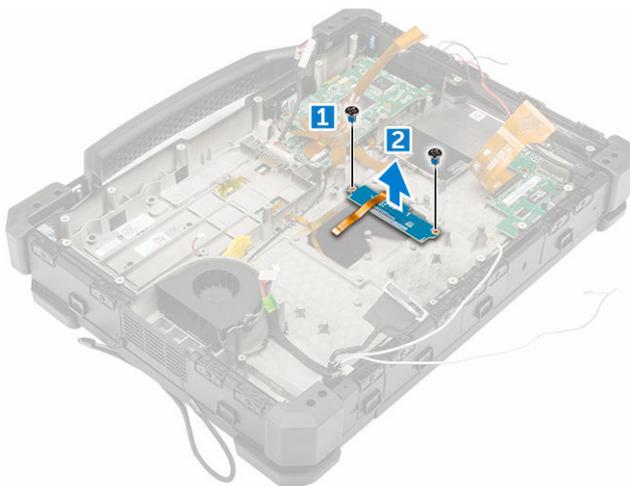
1. Connect the keyboard flex cables to the connectors on the keyboard controller card.
2. Place the keyboard door over the slot on the computer chassis.
3. Tighten the screws that secure the keyboard door to the computer chassis.
4. Align the keyboard with the slot on the computer.
5. Install the screws to secure the keyboard to the computer.
6. Install the [battery](#).

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

## Keyboard control board

### Removing the keyboard control board

1. Follow the procedure in [Before working inside your computer.](#)
2. Remove the:
  - a. [battery](#)
  - b. [hard drive](#) or [SSD](#)
  - c. [keyboard](#)
  - d. [base cover](#)
  - e. [docking board](#)
  - f. [optical drive](#)
  - g. [memory module](#)
  - h. [GPU module](#)
  - i. [heat sink](#)
  - j. [ExpressCard](#)
  - k. [GPS module](#)
  - l. [WLAN card](#)
  - m. [WWAN card](#)
  - n. [SIM board](#)
  - o. [system board](#)
3. To remove the keyboard control board:
  - a. Remove the screws that secure the keyboard control board [1].
  - b. Lift and remove the keyboard control board module from the computer [2].



### Installing the keyboard control board

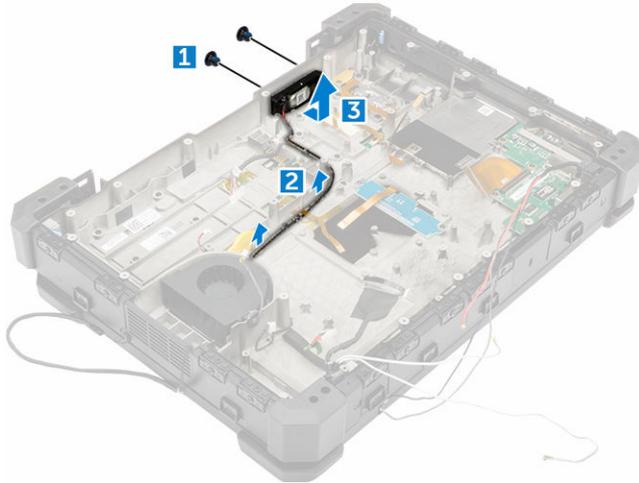
1. Align the keyboard control board with the slot on the computer.
2. Install the screws that secure the keyboard control board to the computer chassis.
3. Install the:
  - a. [system board](#)

- b. [SIM board](#)
  - c. [WWAN card](#)
  - d. [WLAN card](#)
  - e. [GPS module](#)
  - f. [ExpressCard](#)
  - g. [heat sink](#)
  - h. [GPU module](#)
  - i. [memory module](#)
  - j. [optical drive](#)
  - k. [docking board](#)
  - l. [base cover](#)
  - m. [keyboard](#)
  - n. [hard drive](#) or [SSD](#)
  - o. [battery](#)
4. Follow the procedure in [After working inside your computer](#).

## Speaker

### Removing the speaker

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery](#)
  - b. [hard drive](#) or [SSD](#)
  - c. [keyboard](#)
  - d. [base cover](#)
  - e. [docking board](#)
  - f. [optical drive](#)
  - g. [memory module](#)
  - h. [GPU module](#)
  - i. [heat sink](#)
  - j. [ExpressCard](#)
  - k. [GPS module](#)
  - l. [WLAN card](#)
  - m. [WWAN card](#)
  - n. [SIM board](#)
  - o. [system board](#)
3. To remove the speaker:
  - a. Remove the screws that secure the speaker module to the computer [1].
  - b. Unroute the speaker cable from its routing channel on the chassis [2].
  - c. Push the speaker module inwards and lift it to remove it from the computer [3].



## Installing the speaker

1. Insert the speaker into the slot on the computer.
2. Install the screws that secure the speaker to the computer.
3. Route the speaker cable along the routing channel on the chassis.
4. Install the:
  - a. [system board](#)
  - b. [SIM board](#)
  - c. [WWAN card](#)
  - d. [WLAN card](#)
  - e. [GPS module](#)
  - f. [ExpressCard](#)
  - g. [heat sink](#)
  - h. [GPU module](#)
  - i. [memory module](#)
  - j. [optical drive](#)
  - k. [docking board](#)
  - l. [base cover](#)
  - m. [keyboard](#)
  - n. [hard drive](#) or [SSD](#)
  - o. [battery](#)
5. Follow the procedure in [After working inside your computer](#).

## Power connector

### Removing the power connector

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery](#)
  - b. [hard drive](#) or [SSD](#)
  - c. [keyboard](#)

- d. [base cover](#)
  - e. [docking board](#)
  - f. [optical drive](#)
  - g. [memory module](#)
  - h. [GPU module](#)
  - i. [heat sink](#)
  - j. [ExpressCard](#)
  - k. [GPS module](#)
  - l. [WLAN card](#)
  - m. [WWAN card](#)
  - n. [SIM board](#)
  - o. [system board](#)
3. Lift the power connector and remove it from the computer.



## Installing the power connector

1. Align the guide pins on the connector sides with the base of the chassis.
2. Insert the power connector into the slot on the chassis.
3. Press the power connector to secure it to the chassis.
4. Install the:
  - a. [system board](#)
  - b. [SIM board](#)
  - c. [WWAN card](#)
  - d. [WLAN card](#)
  - e. [GPS module](#)
  - f. [ExpressCard](#)
  - g. [heat sink](#)
  - h. [GPU module](#)
  - i. [memory module](#)
  - j. [optical drive](#)
  - k. [docking board](#)
  - l. [base cover](#)
  - m. [keyboard](#)
  - n. [hard drive](#) or [SSD](#)

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

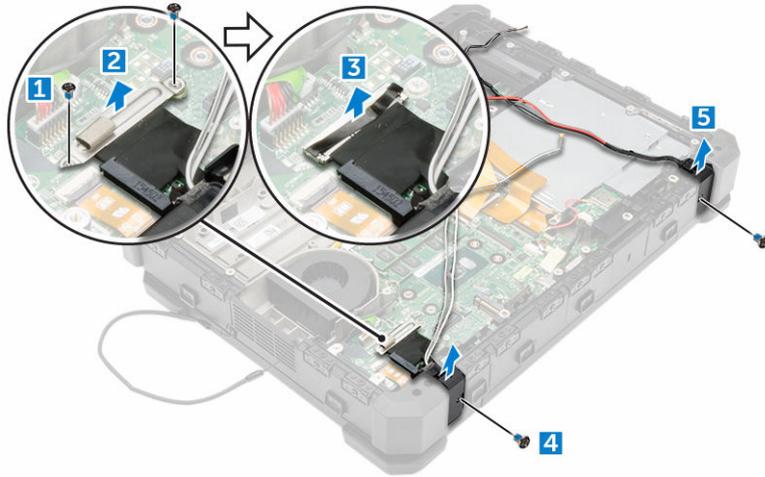
## Display assembly

### Removing the display assembly

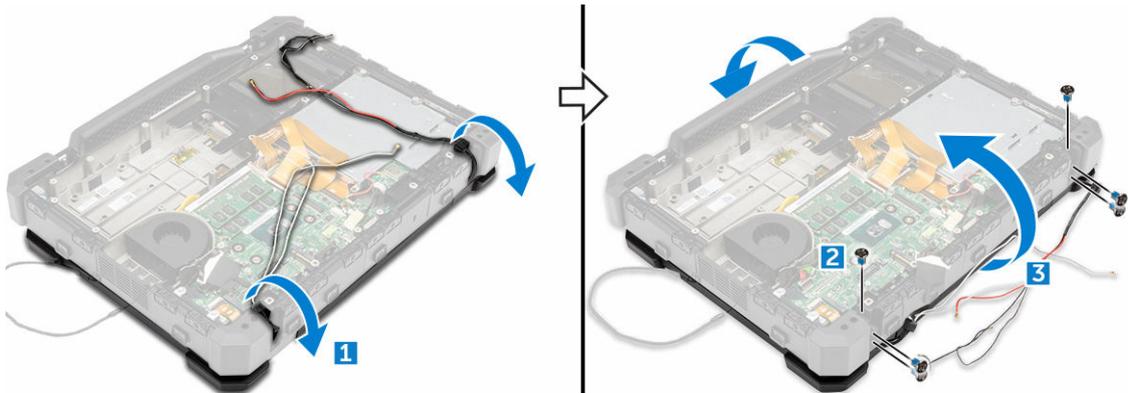
1. Follow the procedure in [Before working inside your computer.](#)
2. Remove the:
  - a. [battery](#)
  - b. [base cover](#)
  - c. [GPU module](#)
  - d. [heat sink](#)
3. To disconnect the cables:
  - a. Unroute the display cables and antenna cables from the routing channels .



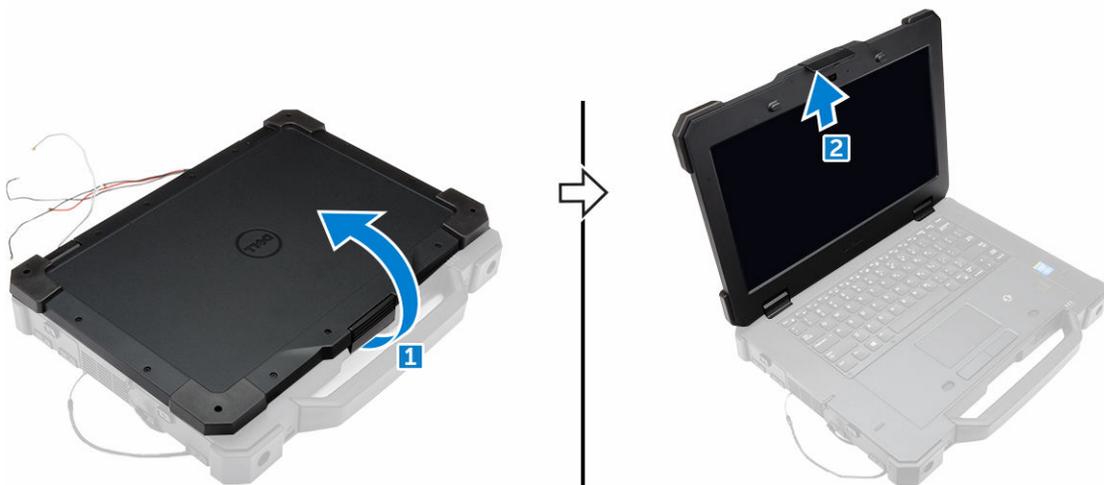
- b. Disconnect the antenna cables from the modules.
- c. Remove the screws that secure the display connector cable cover to the system board [1].
- d. Disconnect the display connector cable from the system board [2, 3].
- e. Remove the screws to remove the hinge covers [4].
- f. Lift the hinge covers and remove them to expose the display cable routing and the display hinges [5].



4. To remove the display hinges:
  - a. Unroute the display cables completely from the routing channels. [1].
  - b. Remove the screws that secure the display hinges to the computer [2].
  - c. Turn the computer over to continue with the display removal [3].



5. To remove the display assembly:
  - a. Open the display [1].
  - b. Lift the display panel from the hinges and remove it from the computer [2].



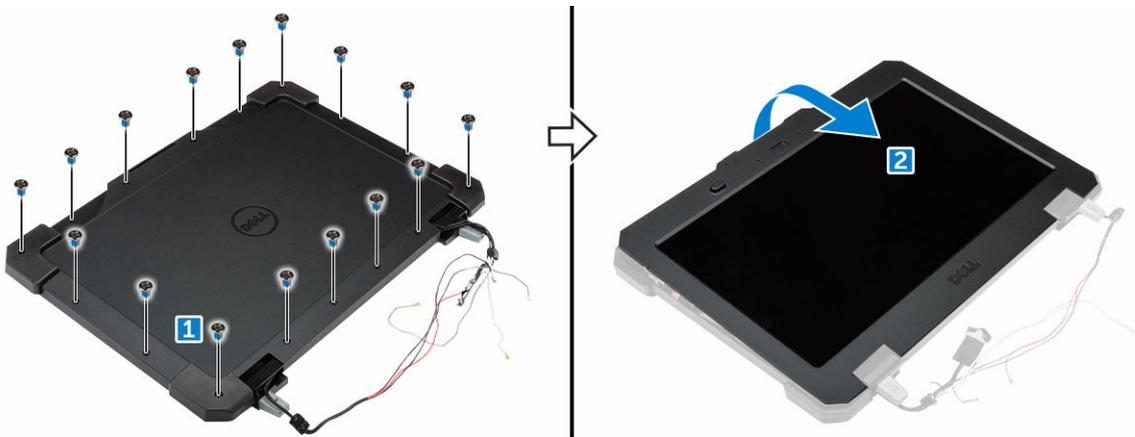
## Installing the display assembly

1. Attach the display to the hinges on the computer.
2. Close the display and turn it over.
3. Route the display connector and antenna cables along the routing channels.
4. Install the screws that secure the display hinges to the computer chassis.
5. Install the display hinges.
6. Install the screws that secure the hinges to the computer.
7. Connect the display connector cable to the system board.
8. Place the hinge cover to conceal the connector cable.
9. Install the screws to secure the hinge cover.
10. Install the:
  - a. [heat sink](#)
  - b. [GPU module](#)
  - c. [base cover](#)
  - d. [battery](#)
11. Follow the procedure in [After working inside your computer](#).

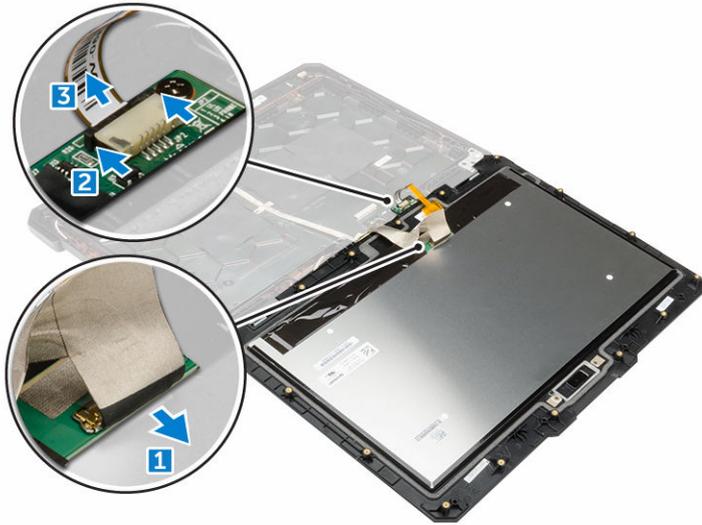
## Display panel

### Removing the display panel

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [battery](#).
3. To disengage the display panel from the display assembly:
  - a. Remove the screws that secure the display panel [1].
  - b. Turn the display assembly over so that screen is facing upwards.
  - c. Lift along the edges to separate the display panel from the display assembly [2].



4. To remove the display panel:
  - a. Disconnect the eDP cable from the display assembly [1].
  - b. Disconnect the camera connector cables from the display assembly [2, 3].
  - c. Remove the display panel from the display assembly [4].



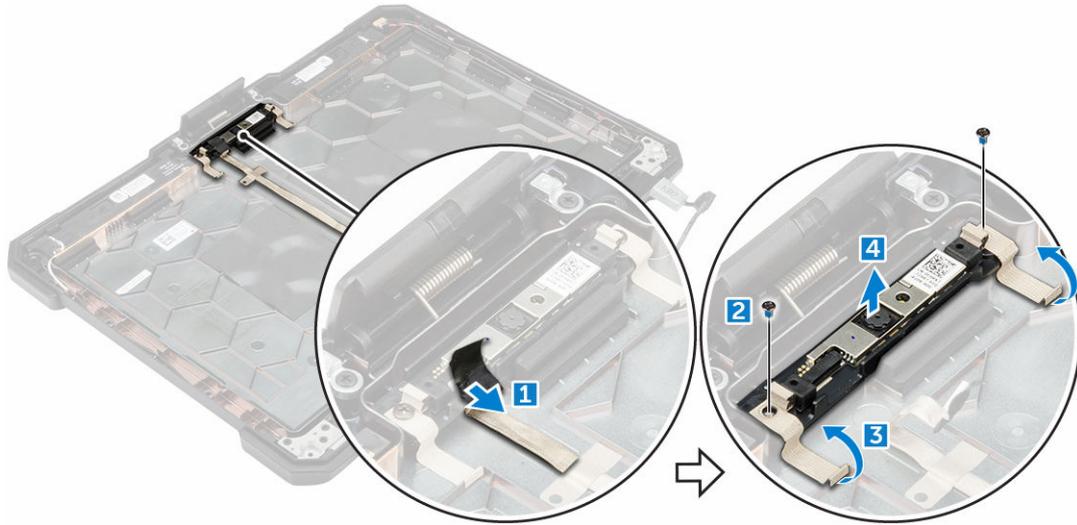
## Installing the display panel

1. Connect the eDP connector cable to the display assembly.
2. Connect the camera cable connectors to the display assembly.
3. Attach the display panel to the display assembly.
4. Turn the display assembly over.
5. Press on the sides of the display panel to secure it.
6. Install the screws that secure the display panel to the display assembly.
7. Install the [battery](#).
8. Follow the procedure in [After working inside your computer](#).

## Camera

### Removing the camera

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery](#)
  - b. [display panel](#)
3. To remove the camera:
  - a. Disconnect the camera cable from the assembly [1].
  - b. Remove the screws that secure the camera to the display panel [2].
  - c. Remove the adhesive tapes [3].
  - d. Lift and remove the camera from the computer [4].



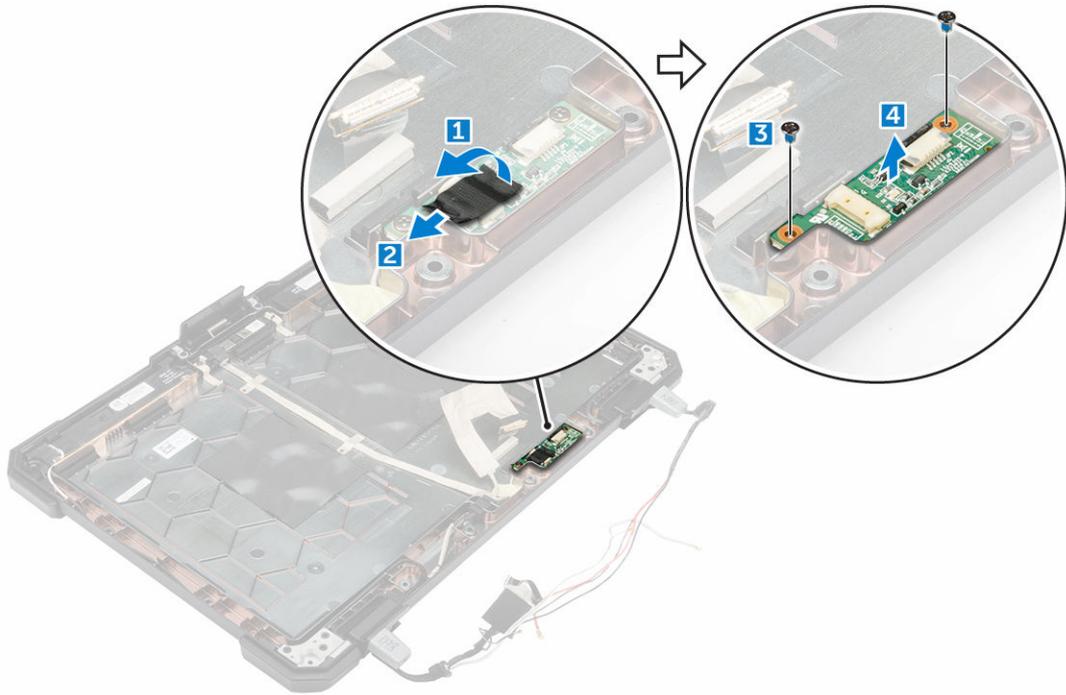
## Installing the camera

1. Align and insert the camera into the slot on the display panel.
2. Install the screws that secure the camera to the display panel.
3. Connect the camera cable connector to the camera board.
4. Install the:
  - a. [display panel](#)
  - b. [battery](#)
5. Follow the procedure in [After working inside your computer](#).

## Touchscreen controller board

### Removing the touch screen controller board

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
  - a. [battery](#)
  - b. [display panel](#)
3. To remove the touch screen controller board:
  - a. Peel the adhesive tape from the touch screen controller board [1].
  - b. Disconnect the touch screen controller board cable[2].
  - c. Remove the screw that secures the touch screen controller board to the display panel [3].
  - d. Lift and remove the touch screen controller board from the computer [4].



## Installing the touch screen controller board

1. Align and insert the touch screen controller board into the slot on the display panel.
2. Install the screws that secure the touch screen controller board to the display panel.
3. Connect the touch screen controller board connector to the controller board.
4. Replace the adhesive tape.
5. Install the:
  - a. [display assembly](#)
  - b. [battery](#)
6. 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

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

Keys	Navigation
Up arrow	Moves to the previous field.

Keys	Navigation
Down arrow	Moves to the next field.
Enter	Selects a value in the selected field (if applicable) or follow the link in the field.
Spacebar	Expands or collapses a drop-down list, if applicable.
Tab	Moves to the next focus area.
	 <b>NOTE:</b> For the standard graphics browser only.
Esc	Moves to the previous page until you view the main screen. Pressing Esc in the main screen displays a message that prompts you to save any unsaved changes and restarts the system.
F1	Displays the System Setup help file.

## System Setup overview

System Setup allows you to:

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

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

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

## General screen options

This section lists the primary hardware features of your computer.

Option	Description
<b>System Information</b>	<ul style="list-style-type: none"> <li>• System Information: Displays BIOS Version, Service Tag, Asset Tag, Ownership Tag, Ownership Date, Manufacture Date, and the Express Service Code, Hot Swap Battery (if installed).</li> <li>• Memory Information: Displays Memory Installed, Memory Available, Memory Speed, Memory Channels Mode, Memory Technology, DIMM A Size, DIMM B Size.</li> <li>• Processor Information: Displays Processor Type, Core Count, Processor ID, Current Clock Speed, Minimum Clock Speed, Maximum Clock Speed, Processor L2 Cache, Processor L3 Cache, HT Capable, and 64-Bit technology.</li> <li>• Device Information: Displays Primary Hard Drive, MiniCard Device, ODD Device, Dock eSATA Device, LOM MAC Address, Video Controller, Video BIOS Version, Video Memory, Panel Type, Native Resolution, Audio Controller, Wi-Fi Device, WiGig Device, Cellular Device, Bluetooth Device.</li> </ul>

Option	Description
<b>Battery Information</b>	Displays the battery status and the type of AC adapter connected to the computer.
<b>Boot Sequence</b>	<p><b>Boot Sequence</b> Allows you to change the order in which the computer attempts to find an operating system. The options are:</p> <ul style="list-style-type: none"> <li>• Internal HDD</li> <li>• USB Storage Device</li> <li>• CD/DVD/CD-RW Drive</li> <li>• Onboard NIC</li> </ul> <p>By default, all the options are checked. You can also clear any option or change the boot order.</p> <p><b>Boot List Options</b> Allows you to change the boot list option:</p> <ul style="list-style-type: none"> <li>• Legacy</li> <li>• UEFI (enabled by default)</li> </ul>
<b>Advanced Boot Options</b>	Allows you the legacy option ROMs to load. By default, the <b>Enable Legacy Option ROMs</b> is disabled.
<b>Date/Time</b>	Allows you to change the date and time.

## System Configuration screen options

Option	Description
<b>Integrated NIC</b>	<p>You can configure the integrated network controller. The options are:</p> <ul style="list-style-type: none"> <li>• <b>Enable UEFI Network Stack</b></li> <li>• <b>Disabled</b></li> <li>• <b>Enabled</b></li> <li>• <b>Enabled w/PXE.</b> This option is enabled by default.</li> </ul>
<b>Onboard Unmanaged NIC</b>	<p>You can control the on-board USB LAN controller. The options are:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b></li> <li>• <b>Enabled.</b> This option is enabled by default.</li> </ul>
<b>Parallel Port</b>	<p>You can configure the parallel port on the docking station. The options are:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b></li> <li>• <b>AT.</b> This option is enabled by default.</li> <li>• <b>PS2</b></li> <li>• <b>ECP</b></li> </ul>

Option	Description
<b>Serial Port 1</b>	<p>You can configure the integrated serial port. The options are:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b></li> <li>• <b>COM1</b>. This option is enabled by default.</li> <li>• <b>COM3</b></li> </ul>
<b>Serial Port 2</b>	<p>You can configure the integrated serial port. The options are:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b></li> <li>• <b>COM2</b>. This option is enabled by default.</li> <li>• <b>COM4</b></li> </ul>
<b>SATA Operation</b>	<p>You can configure the internal SATA hard drive controller. The options are:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b></li> <li>• <b>AHCI</b></li> <li>• <b>RAID On</b>. This option is enabled by default.</li> </ul>
<b>Drives</b>	<p>You can configure the SATA drives on board. All drives are enabled by default. The options are:</p> <ul style="list-style-type: none"> <li>• <b>SATA-0</b></li> <li>• <b>SATA-2</b></li> </ul>
<b>SMART Reporting</b>	<p>You can control whether hard drive errors for integrated drives are reported during system startup. This technology is part of the SMART (Self-Monitoring Analysis and Reporting Technology) specification. The option is:</p> <ul style="list-style-type: none"> <li>• <b>Enable SMART Reporting</b>. This option is disabled by default.</li> </ul>
<b>USB/Thunderbolt Configuration</b>	<p>You can configure the integrated USB controller. If Boot Support is enabled, the system is allowed to boot any type of USB Mass Storage Devices (hard drive or memory key).</p> <p>If the USB port is enabled, the device attached to this port is enabled and available for the OS.</p> <p>If the USB port is disabled, the OS cannot see any device attached to this port.</p> <p>The options are:</p> <ul style="list-style-type: none"> <li>• <b>Enable USB Boot Support</b></li> <li>• <b>Enable External USB Ports</b></li> <li>• <b>Disable Docking Station Devices except video</b></li> </ul> <p> <b>NOTE:</b> The USB keyboard and mouse always work in the BIOS setup irrespective of these settings.</p>

Option	Description
<b>USB PowerShare</b>	<p>You can configure the USB PowerShare feature behavior. This option allows you to charge external devices using the stored system battery power through the USB PowerShare port.</p> <p>This option is unchecked by default.</p>
<b>Audio</b>	<p>You can enable or disable the integrated audio controller.</p> <p>The <b>Enable Audio</b> option is selected by default.</p>
<b>Keyboard Illumination</b>	<p>You can choose the operating mode of the keyboard illumination feature. The keyboard brightness level can be set from 25 % to 100%. The options are:</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b></li> <li>• <b>Dim.</b> This option is enabled by default.</li> <li>• <b>Bright</b></li> </ul>
<b>Keyboard Backlight Timeout on AC</b>	<p>The Keyboard Backlight with AC option does not affect the main keyboard illumination feature. Keyboard Illumination continues to support the various illumination levels. The options are:</p> <ul style="list-style-type: none"> <li>• <b>5 seconds</b></li> <li>• <b>10 seconds.</b> This option is selected by default.</li> <li>• <b>15 seconds</b></li> <li>• <b>30 seconds</b></li> <li>• <b>1 minute</b></li> <li>• <b>5 minute</b></li> <li>• <b>15 minute</b></li> <li>• <b>Never</b></li> </ul>
<b>Keyboard Backlight Timeout on Battery</b>	<p>The Keyboard Backlight with Battery option does not affect the main keyboard illumination feature. Keyboard Illumination continues to support the various illumination levels. The options are:</p> <ul style="list-style-type: none"> <li>• <b>5 seconds</b></li> <li>• <b>10 seconds.</b> This option is selected by default.</li> <li>• <b>15 seconds</b></li> <li>• <b>30 seconds</b></li> <li>• <b>1 minute</b></li> <li>• <b>5 minute</b></li> <li>• <b>15 minute</b></li> <li>• <b>Never</b></li> </ul>
<b>RGB Keyboard Backlight</b>	<p>You can configure the RGB keyboard backlight feature. There are six available colors: four preset colors (white, red, green, and blue) and two user configurable colors</p>
<b>Touchscreen</b>	<p>You can enable or disable the touchscreen.</p>

Option	Description
	This option is enabled by default.

<b>Stealth Mode Control</b>	You can enable or disable the stealth mode. This option is enabled by default.
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## Video screen options

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

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

## Security screen options

Option	Description
<b>Admin Password</b>	Allows you to set, change, or delete the administrator (admin) password.  <b>NOTE:</b> You must set the admin password before you set the system or hard drive password. Deleting the admin password automatically deletes the system password and the hard drive password.

 **NOTE:** Password changes take effect immediately.  
By default, the drive will not have a password set.

<b>System Password</b>	Allows you to set, change or delete the system password.  <b>NOTE:</b> Password changes take effect immediately. By default, the drive will not have a password set.
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<b>Internal HDD Password</b>	Allows you to set, change or delete the password on the internal hard drive of the system.  <b>NOTE:</b> Password changes take effect immediately. By default, the drive will not have a password set.
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<b>Strong Password</b>	Allows you to enforce the option to always set strong passwords. Default Setting: Enable Strong Password is not selected.  <b>NOTE:</b> If user interface is enabled, Admin and System passwords must contain at least one uppercase character, one lowercase character and be at least 8 characters long.
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<b>Password Configuration</b>	Allows you to determine the minimum and maximum length of Administrator and System passwords.
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Option	Description
<b>Password Bypass</b>	<p>Allows you to enable or disable the permission to bypass the System and the Internal hard drive password, when they are set. The options are:</p> <ul style="list-style-type: none"> <li>• Disabled</li> <li>• Reboot bypass</li> </ul> <p>Default setting: Disabled</p>
<b>Password Change</b>	<p>Allows you to enable or disable permission to the System and Hard Drive passwords when the admin password is set.</p> <p>Default setting: <b>Allow Non-Admin Password Changes</b> is selected.</p>
<b>Non-Admin Setup Changes</b>	<p>Allows you to determine whether changes to the setup options are allowed when an administrator password is set. If disabled the setup options are locked by the admin password.</p>
<b>UEFI Capsule Firmware Updates</b>	<p>This option controls whether the system allows BIOS updates via UEFI capsule update packages.</p> <p> <b>NOTE:</b> Disabling this option will block BIOS updates from services such as Microsoft Windows Update and Linux Vendor Firmware Service (LVFS).</p>
<b>TPM 1.2 Security</b>	<p>Allows you to enable the Trusted Platform Module (TPM) during POST. You can control whether the trusted platform module is visible to the operating system. The option is:</p> <p> <b>CAUTION: For the TPM upgrade/downgrade process, it is recommended to complete the process in an AC power with AC adapter plugged into the computer. The upgrade/downgrade process without the AC adapter plugged in might damage the computer or hard disk.</b></p> <p> <b>NOTE:</b> Disabling this option does not change any settings you have made to the TPM, nor does it delete or change any information or keys you may have stored in the TPM. Changes to this setting take effect immediately.</p>
<b>Computrace</b>	<p>Allows you to activate or disable the optional Computrace software. The options are:</p> <ul style="list-style-type: none"> <li>• Deactivate</li> <li>• Disable</li> <li>• Activate</li> </ul> <p> <b>NOTE:</b> The Activate and Disable options will permanently activate or disable the feature and no further changes will be allowed</p> <p>Default setting: Deactivate</p>
<b>CPU XD Support</b>	<p>Allows you to enable the Execute Disable mode of the processor.</p>

Option	Description
	Enable CPU XD Support (default)
<b>OROM Keyboard Access</b>	<p>Allows you to set an option to enter the Option ROM Configuration screens using hotkeys during boot. The options are:</p> <ul style="list-style-type: none"> <li>• Enabled</li> <li>• One Time Enable</li> <li>• Disabled</li> </ul> <p>Default setting: Enable</p>
<b>Admin Setup Lockout</b>	<p>Allows you to prevent users from entering the setup when an Administrator password is set.</p> <p>Default Setting: Enable Admin Setup Lockout is not selected.</p>

## Secure Boot screen options

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

## Performance screen options

Option	Description
<b>Multi Core Support</b>	<p>This field specifies whether the process has one or all cores enabled. The performance of some applications improves with the additional cores. This option is enabled by default. Allows you to enable or disable multi-core support for the processor.</p> <ul style="list-style-type: none"><li>• Enable Multi Core Support</li></ul> <p>Default setting: The option is enabled.</p>
<b>Intel SpeedStep</b>	<p>Allows you to enable or disable the Intel SpeedStep mode of the processor.</p> <ul style="list-style-type: none"><li>• Enable Intel SpeedStep</li></ul> <p>Default setting: The option is enabled.</p>
<b>C-States Control</b>	<p>Allows you to enable or disable the additional processor sleep states.</p> <ul style="list-style-type: none"><li>• C states</li></ul> <p>Default setting: The option is enabled.</p>
<b>HyperThread Control</b>	<p>Allows you to enable or disable the HyperThreading in the processor.</p> <ul style="list-style-type: none"><li>• Disabled</li><li>• Enabled</li></ul> <p>Default setting: Enabled.</p>

## Power Management screen options

Option	Description
<b>AC Behavior</b>	<p>You can enable or disable the computer from turning on automatically when an AC adapter is connected. The option is:</p> <ul style="list-style-type: none"><li>• <b>Wake on AC</b></li></ul> <p>This option is not selected by default.</p>
<b>Auto On Time</b>	<p>You can set the time at which the computer must turn on automatically. The options are:</p> <ul style="list-style-type: none"><li>• <b>Disabled</b>. This option is selected by default.</li><li>• <b>Every Day</b></li><li>• <b>Weekdays</b></li><li>• <b>Select Days</b></li></ul>

Option	Description
<b>USB Wake Support</b>	<p>You can enable USB devices to wake the system from Standby.</p> <p> <b>NOTE:</b> This feature is only functional when the AC power adapter is connected. If the AC power adapter is removed during Standby, the system setup removes power from all the USB ports to conserve battery power.</p> <p>The option is:</p> <ul style="list-style-type: none"> <li>• <b>Enable USB Wake Support</b></li> </ul> <p>This option is disabled by default.</p>
<b>Wireless Radio Control</b>	<p>You can enable or disable the feature that automatically switches from wired or wireless networks without depending on the physical connection. The options are:</p> <ul style="list-style-type: none"> <li>• <b>Control WLAN Radio</b></li> <li>• <b>Control WWAN Radio</b></li> </ul> <p>This option is disabled by default.</p>
<b>Wake on LAN/WLAN</b>	<p>You can enable or disable the feature that turns on the computer from the Off state:</p> <ul style="list-style-type: none"> <li>• When triggered by a LAN signal</li> <li>• From the hibernate state when triggered by a special wireless LAN signal</li> </ul> <p>The options are:</p> <ul style="list-style-type: none"> <li>• <b>Disabled.</b> This option is set by default.</li> <li>• <b>LAN Only</b></li> <li>• <b>WLAN Only</b></li> <li>• <b>LAN or WLAN</b></li> </ul>
<b>Block Sleep</b>	<p>You can block entering to sleep (S3 state) in operating system environment. The option is:</p> <ul style="list-style-type: none"> <li>• <b>Block Sleep (S3 state)</b></li> </ul> <p>This option is disabled by default.</p>
<b>Peak Shift</b>	<p>You can minimize the AC power consumption during the peak power times of day. After you enable this option, your system runs only in battery even if the AC is attached. The option is:</p> <ul style="list-style-type: none"> <li>• <b>Enable Peak Shift</b></li> </ul> <p>This option is disabled by default.</p>
<b>Advanced Battery Charge Configuration</b>	<p>You can maximize the battery health. By enabling this option, your system uses the standard charging algorithm and other techniques, during the non-work hours to improve the battery health. The option is:</p>

Option	Description
	<ul style="list-style-type: none"> <li>• <b>Enable Advance Battery Charge Mode</b></li> </ul> <p>This option is disabled by default.</p>
<b>Primary Battery Charge Configuration</b>	<p>You can select the charging mode for the battery. The options are:</p> <ul style="list-style-type: none"> <li>• <b>Adaptive.</b> This option is set by default.</li> <li>• <b>Standard</b> – Fully charges your battery at a standard rate.</li> <li>• <b>ExpressCharge</b> – The battery charges over a shorter period of time using Dell's fast charging technology.</li> <li>• <b>Primarily AC use</b></li> <li>• <b>Custom</b></li> </ul> <p>If <b>Custom</b> charge is selected, you can also configure <b>Custom Charge Start</b> and <b>Custom Charge Stop</b>.</p> <p> <b>NOTE:</b> All charging mode may not be available for all the batteries. To enable this option, disable the <b>Advanced Battery Charge Configuration</b> option.</p>

## POST Behavior screen options

Option	Description
<b>Adapter Warnings</b>	<p>Allows you to enable or disable the system setup (BIOS) warning messages when you use certain power adapters.</p> <p>Default setting: Enable Adapter Warnings</p>
<b>Keypad (Embedded)</b>	<p>Allows you to choose one of two methods to enable the keypad that is embedded in the internal keyboard.</p> <ul style="list-style-type: none"> <li>• Fn Key Only: This option is enabled by default.</li> <li>• By Numlock</li> </ul> <p> <b>NOTE:</b> When setup is running, this option has no effect. Setup works in Fn Key Only mode.</p>
<b>Mouse/Touchpad</b>	<p>Allows you to define how the system handles mouse and touch pad input. The options are:</p> <ul style="list-style-type: none"> <li>• Serial Mouse</li> <li>• PS2 Mouse</li> <li>• Touchpad/PS-2 Mouse: This option is enabled by default.</li> </ul>
<b>Numlock Enable</b>	<p>Allows you to enable the Numlock option when the computer boots.</p> <p>Enable Network. This option is enabled by default.</p>
<b>Fn Key Emulation</b>	<p>Allows you to set the option where the Scroll Lock key is used to simulate the Fn key feature.</p>

Option	Description
	Enable Fn Key Emulation (default)
<b>Fn Lock Options</b>	<p>Allows you to let hot key combinations Fn + Esc toggle the primary behavior of F1–F12, between their standard and secondary functions. If you disable this option, you cannot toggle dynamically the primary behavior of these keys. The available options are:</p> <ul style="list-style-type: none"> <li>• Fn Lock. This option is selected by default.</li> <li>• Lock Mode Disable/Standard</li> <li>• Lock Mode Enable/Secondary</li> </ul>
<b>MEBx Hotkey</b>	<p>Allows you to specify whether the MEBx Hotkey function should enable, during the system boot.</p> <p>Default Setting: Enable MEBx Hotkey</p>
<b>Fastboot</b>	<p>Allows you to speed up the boot process by bypassing some of the compatibility steps. The options are:</p> <ul style="list-style-type: none"> <li>• Minimal</li> <li>• Thorough (default)</li> <li>• Auto</li> </ul>
<b>Extended BIOS POST Time</b>	<p>Allows you to create an additional preboot delay. The options are:</p> <ul style="list-style-type: none"> <li>• 0 seconds. This option is enabled by default.</li> <li>• 5 seconds</li> <li>• 10 seconds</li> </ul>

## Virtualization support screen options

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

## Maintenance screen options

Option	Description
<b>Service Tag</b>	Displays the Service Tag of your computer.
<b>Asset Tag</b>	Allows you to create a system asset tag if an asset tag is not already set. This option is not set by default.

## System Log screen options

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

## Updating the BIOS

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**.
3. Enter the **Service Tag** or **Express Service Code** and click **Submit**.
  -  **NOTE:** To locate the Service Tag, click **Where is my Service Tag?**
  -  **NOTE:** If you cannot find your Service Tag, click **Detect My Product**. Proceed with the instructions on screen.
4. If you are unable to locate or find the Service Tag, click the Product Category of your computer.
5. Choose the **Product Type** from the list.
6. Select your computer model and the **Product Support** page of your computer appears.
7. Click **Get drivers** and click **View All Drivers**.  
The Drivers and Downloads page opens.
8. On the Drivers and Downloads screen, under the **Operating System** drop-down list, select **BIOS**.
9. Identify the latest BIOS file and click **Download File**.  
You can also analyze which drivers need an update. To do this for your product, click **Analyze System for Updates** and follow the instructions on the screen.
10. Select your preferred download method in the **Please select your download method below** window, click **Download File**.  
The **File Download** window appears.
11. Click **Save** to save the file on your computer.
12. Click **Run** to install the updated BIOS settings on your computer.  
Follow the instructions on the screen.

 **NOTE:** It is recommended not to update the BIOS version for more than 3 revisions. For example: If you want to update the BIOS from 1.0 to 7.0, then install version 4.0 first and then install version 7.0.

## System and setup password

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

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

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

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

 **NOTE:** 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 the 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, ("), (+), (,), (-), (.), (/), (:), (|), (\), (|), (').

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.

### Running the ePSA diagnostics

1. Power-on the computer.
2. As the computer boots, press the F12 key as the Dell logo appears.
3. On the boot menu screen, select the **Diagnostics** option.  
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.

## Device status lights

Icon	Description
	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.

## Battery Status Lights

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

<b>Alternately blinking amber light and green light</b>	An unauthenticated or unsupported non-Dell AC adapter is attached to your laptop.
<b>Alternately blinking amber light with steady green light</b>	Temporary battery failure with AC adapter present.
<b>Constantly blinking amber light</b>	Fatal battery failure with AC adapter present.
<b>Light off</b>	Battery in full charge mode with AC adapter present.
<b>green light on</b>	Battery in charge mode with AC adapter present.

# Using your computer

## Using the backlit keyboard

The Latitude rugged series comes equipped with a backlit keyboard that can be customized. The following colors are enabled:

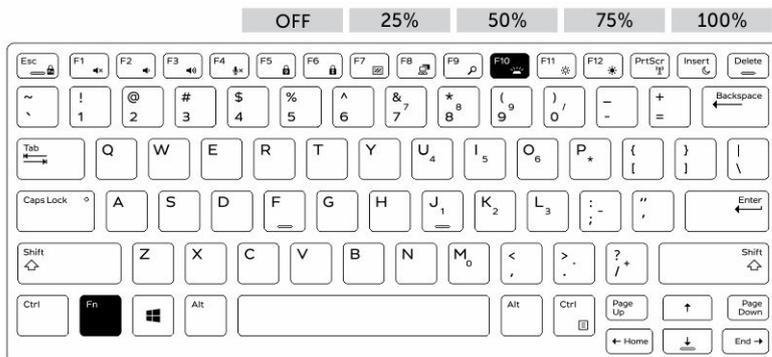
1. White
2. Red
3. Green
4. Blue

Alternatively, the system can be configured with two additional custom colors in the System Setup (BIOS).

### Turning the keyboard backlight on/off or adjusting brightness

To turn the backlight on/off or adjust the backlight brightness settings:

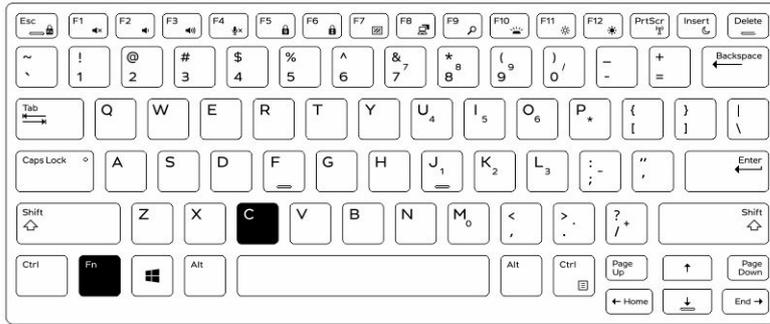
1. To initialize the keyboard backlight switch, press Fn+F10 (the Fn key is not needed if function key Fn lock is enabled).
2. The first use of the preceding key combination turns on the backlight to its lowest setting.
3. Repeated pressing of the key combinations cycles the brightness settings through 25 percent, 50 percent, 75 percent and 100 percent.
4. Cycle through the key combination to either adjust the brightness or turn off the keyboard backlight.



### Changing the keyboard backlight color

To change the keyboard backlight color:

1. To cycle through the available backlight colors press Fn+C keys .
2. White, Red, Green and Blue are active by default; up to two custom colors can be added to the cycle in the System Setup (BIOS).

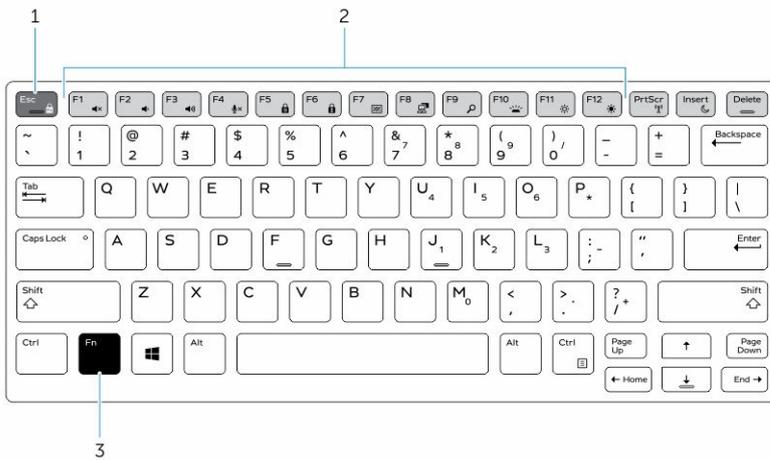


## Customizing the backlit keyboard in System Setup (BIOS)

1. Turn off the computer.
2. Turn on the computer and when the Dell logo appears, press the F2 key repeatedly to bring up the System Setup menu.
3. Under **System Configuration** menu, select **RGB Keyboard Backlight**.  
You can enable/disable the standard colors (White, Red, Green and Blue).
4. To set a custom RGB value, use the input boxes on the right side of the screen.
5. Click **Apply changes** and click **Exit** to close System Setup.

## Function Fn key lock features

**NOTE:** The keyboard has Function key Fn lock capability. When activated, the secondary functions on the top row of keys become default and will not require use of the Fn key.



**Figure 7. Fn key callouts**

1. Fn lock key
2. Affected Fn keys
3. Fn key

**NOTE:** Fn lock affects only the above keys (F1 to F12). Secondary functions will not require the Fn key to be pressed while enabled.

## Enabling the Function (Fn) lock

1. Press the Fn+Esc keys.

 **NOTE:** Other secondary function keys on the top row are not affected and requires the use of the Fn key.

2. Press the Fn+Esc keys again to deactivate the function lock feature.  
The function keys return to the default actions.

## Stealth mode

Latitude rugged products come equipped with a stealth mode feature. Stealth mode allows you to turn off the display, all the LED lights, internal speakers, the fan and all wireless radios with a single key combination.

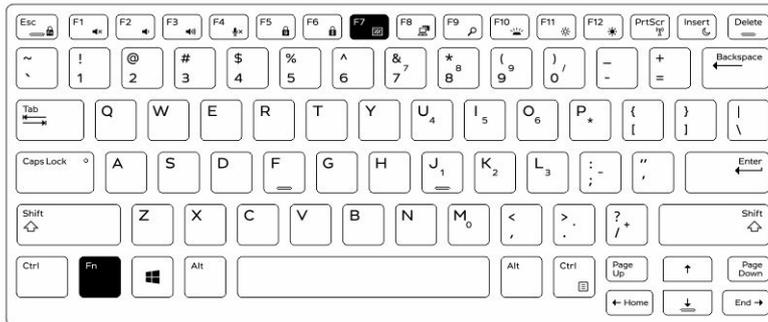
 **NOTE:** This mode is aimed at using the computer in covert operations. When the stealth mode is enabled, the computer remains functional but does not emit any light or sound.

## Turning stealth mode on/off

1. Press the Fn+F7 key combination (Fn key not needed if Fn lock is enabled) to turn on stealth mode.

 **NOTE:** Stealth mode is a secondary function of the F7 key. The key can be used to perform other functions on the computer when not used with the Fn key to enable stealth mode.

2. All the lights and sounds are turned off.
3. Press the Fn+F7 key combination again to turn off the stealth mode.



## Disabling stealth mode in the system setup (BIOS)

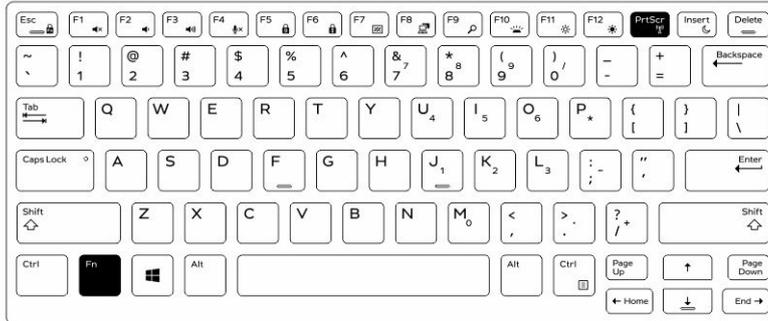
1. Power off the computer.
2. Power on the computer and at the Dell logo, tap the F2 key repeatedly to bring up the **System Setup** menu.
3. Expand and open the **System Configuration** menu.
4. Select **Stealth Mode Control**.

 **NOTE:** Stealth mode is enabled by default.

5. To disable stealth mode uncheck the **Enable Stealth Mode** option.
6. Click **Apply changes** and click **Exit**.

## Enabling and disabling the wireless (WiFi) feature

1. To enable wireless Networking, press Fn + PrtScr.
2. Press Fn + PrtScr again to disable wireless Networking.

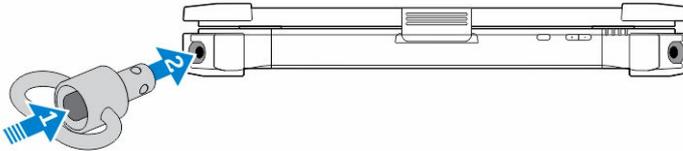


## Quick Disconnect (QD) connector

Latitude fully rugged products come equipped with receptacles for QD (Quick Disconnect) connectors at the corners. These receptacles allow the connection of optional accessories such as shoulder straps.

### Installing the QD connector

1. Align the QD connector to the receptacle on the corner of the computer.
2. Press and hold the button on top of the QD connector.
3. Insert the QD connector into the receptacle, while holding the button pressed [1, 2].



4. Release the button after the connector is seated in the receptacle to secure it.

### Removing the QD connector

1. Press and hold the button on top of the QD connector.
2. Pull the connector out of the receptacle while holding the button pressed.

# Technology and components

## Processors

This laptop is shipped with the following Intel 6th generation processors:

- Intel Core i3 series
- Intel Core i5 series
- Intel Core i7 series

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

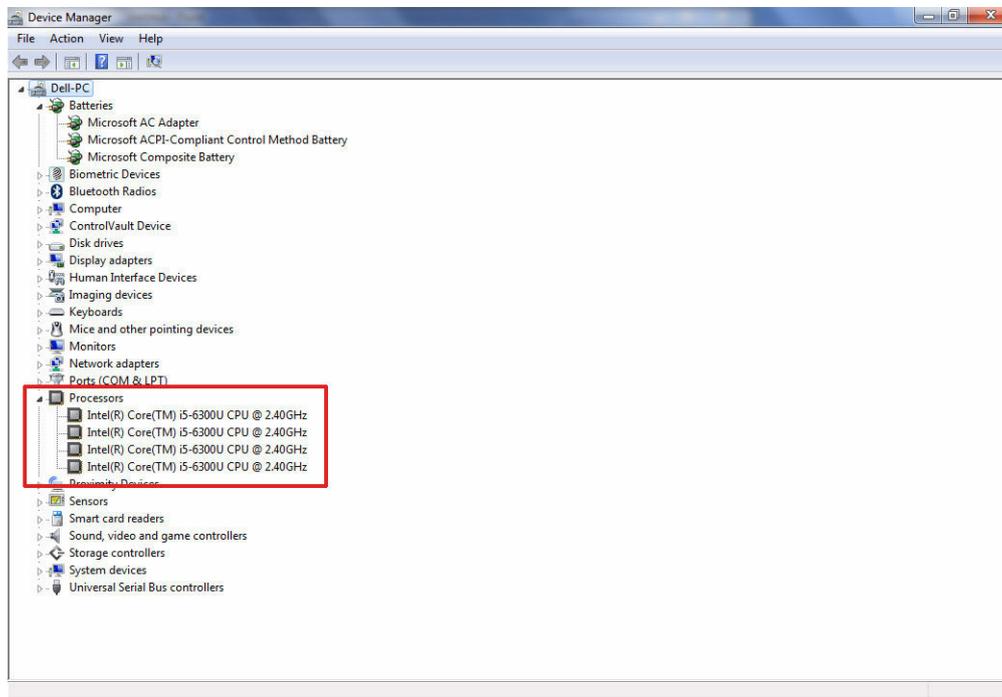
### Identifying processors in Windows 10

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

### Identifying processors in Windows 8

1. Tap **Search the Web and Windows**.
2. Type `Device Manager`.
3. Tap **Processor**.

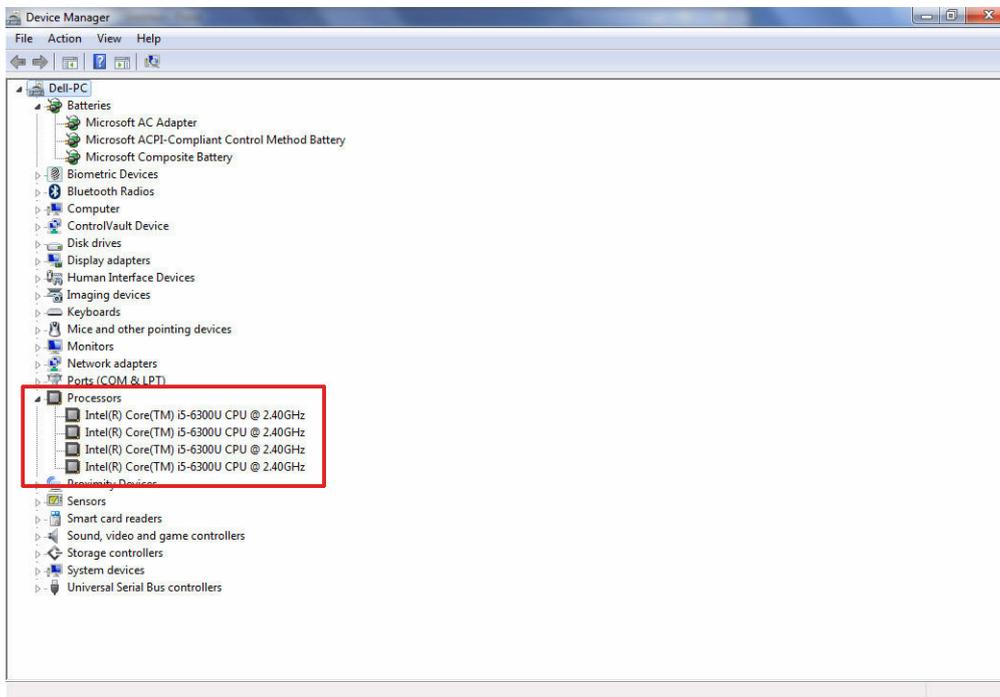
The basic information of the processor is displayed.



## Identifying processors in Windows 7

1. Click **Start** → **Control Panel** → **Device Manager**.
2. Select **Processor**.

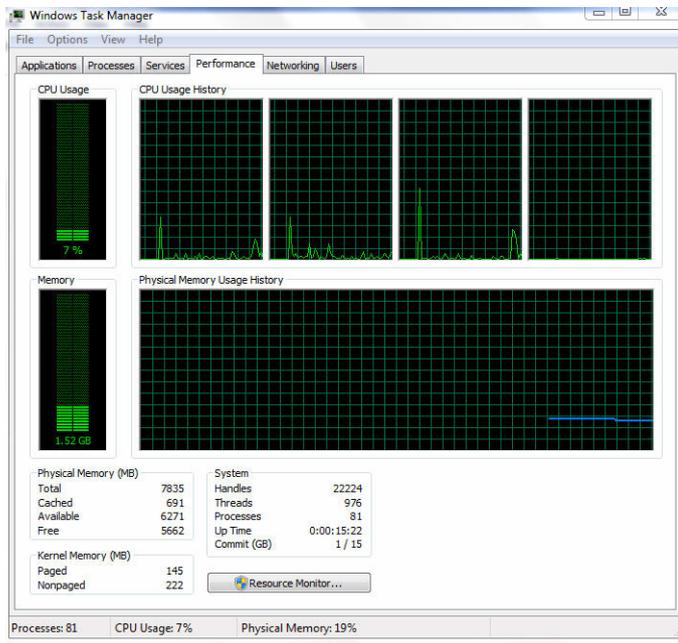
The basic information of the processor is displayed.



## Verifying the processor usage in Task Manager

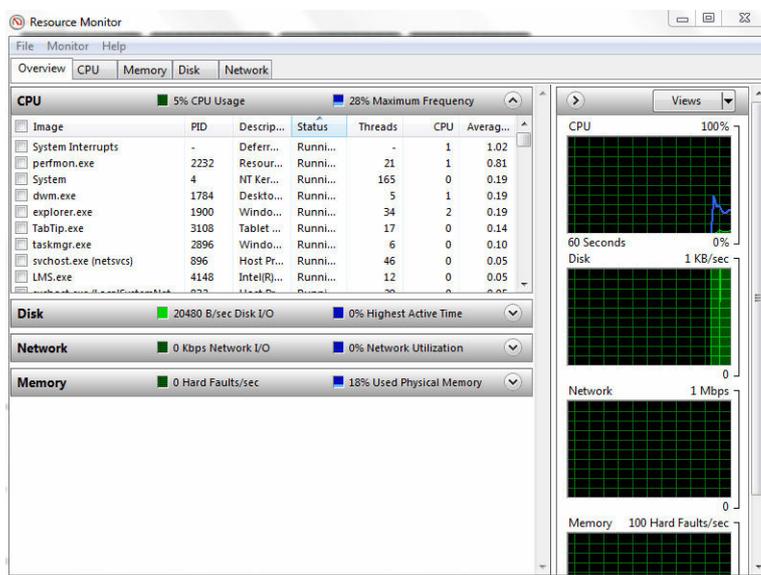
1. Press and hold the taskbar.
2. Select **Start Task Manager**.  
The **Windows Task Manager** window is displayed.
3. Click the **Performance** tab in the **Windows Task Manager** window.

The processor performance details are displayed.



## Verifying the processor usage in Resource Monitor

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



# Chipsets

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

## Downloading the chipset driver

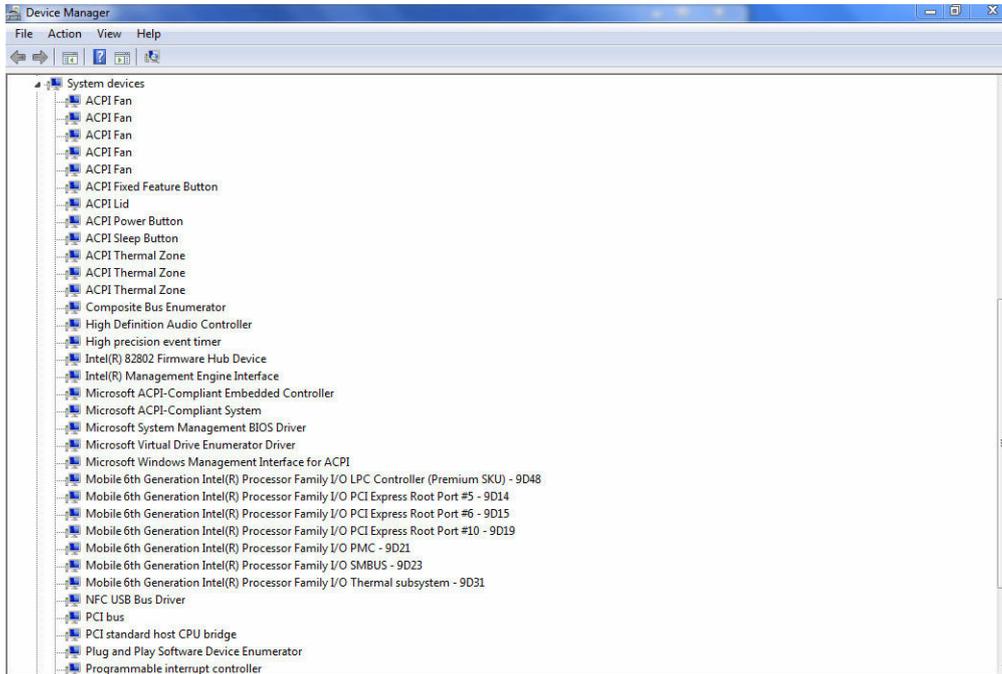
1. Turn on the laptop.
2. Go to **Dell.com/support**.
3. Click **Product Support**, enter the Service Tag of your laptop, and then click **Submit**.  
 **NOTE:** If you do not have the Service Tag, use the autodetect feature or manually browse for your laptop model.
4. Click **Drivers and Downloads**.
5. Select the operating system installed on your laptop.
6. Scroll down the page, expand **Chipset**, and select your chipset driver.
7. Click **Download File** to download the latest version of the chipset driver for your laptop.
8. After the download is complete, navigate to the folder where you saved the driver file.
9. Double-click the chipset driver file icon and follow the instructions on the screen.

## Identifying the chipset in Device Manager on Windows 10

1. Click **All Settings**  on the Windows 10 Charms Bar.
2. From the **Control Panel**, select **Device Manager**.
3. Expand **System Devices** and search for the chipset.

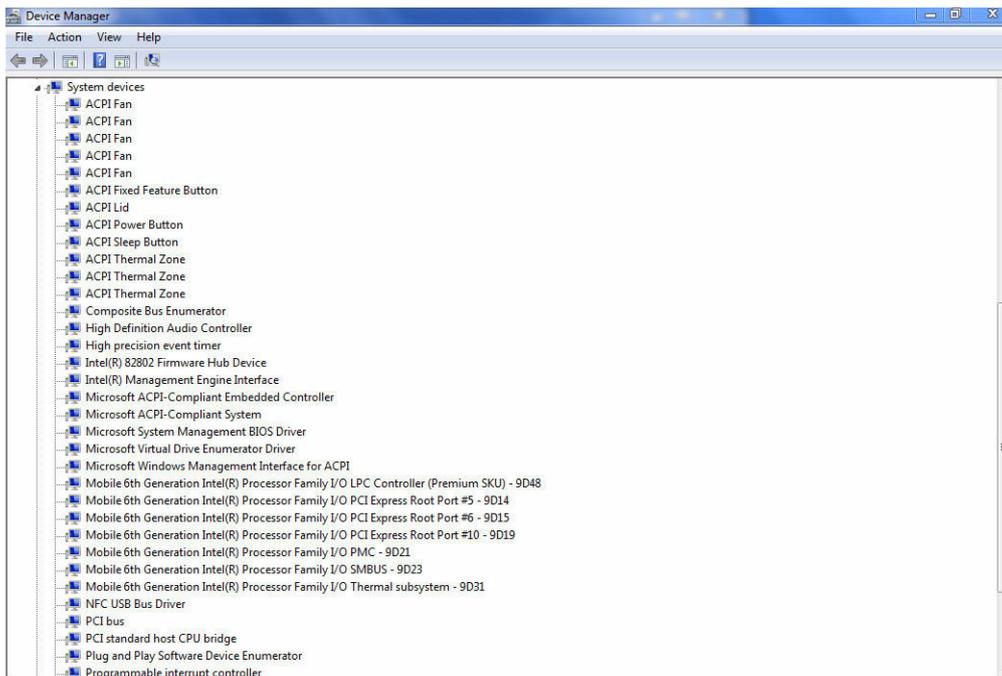
## Identifying chipset in Device Manager on Windows 8

1. Click **Settings**  on the Windows 8.1 Charms Bar.
2. From the **Control Panel**, select **Device Manager**.
3. Expand **System Devices** and search for the chipset.



## Identifying chipset in Device Manager on Windows 7

1. Click **Start** → **Control Panel** → **Device Manager**.
2. Expand **System Devices** and search for the chipset.



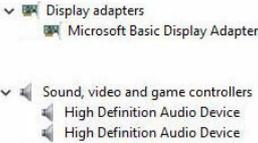
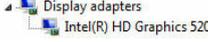
# Intel HD Graphics 520

This laptop is shipped with the Intel HD Graphics 520 graphics chipset.

## Intel HD Graphics drivers

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

**Table 1. Intel HD Graphics drivers**

Before installation	After installation
	

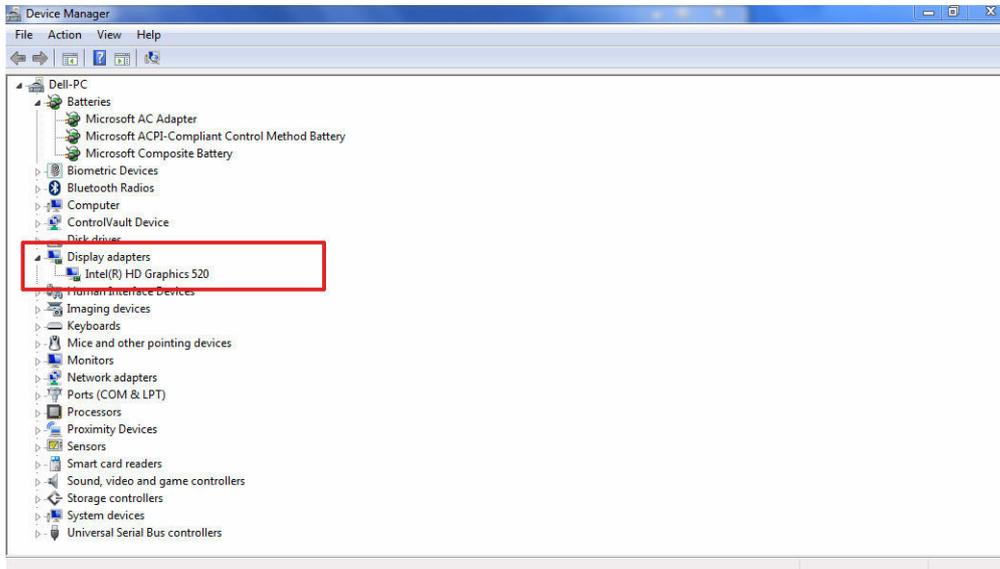
## Display options

This laptop has 14– inch HD with 1366 x 768 pixels resolution (maximum).

### Identifying the display adapter

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

The display adapters are displayed.



## Rotating the display

1. Press and hold on the desktop screen.  
A sub menu is displayed.
2. Select **Graphic Options** → **Rotation** and choose on of the following:
  - Rotate to Normal
  - Rotate to 90 Degrees
  - Rotate to 180 Degrees
  - Rotate to 270 Degrees

 **NOTE:** The Display can also be rotated using the following key combinations:

- Ctrl + Alt + Up arrow key (Rotate to normal)
- Right arrow key (Rotate 90 degrees)
- Down arrow key (Rotate 180 degrees)
- Left arrow key (Rotate 270 degrees)

## Downloading drivers

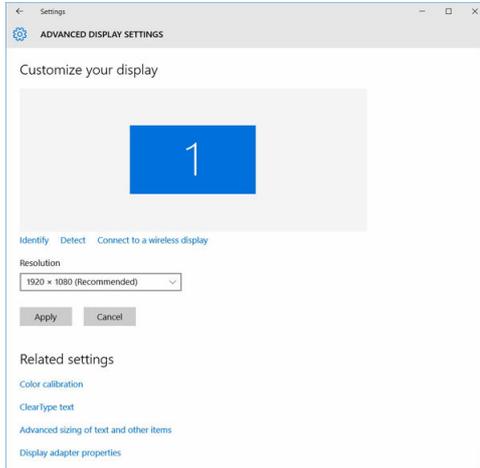
1. Turn on the laptop.
2. Go to **Dell.com/support**.
3. Click **Product Support**, enter the Service Tag of your laptop, and then click **Submit**.

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

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

## Changing the screen resolution

1. Press and hold the desktop screen and select **Display Settings**.
2. Tap or click **Advanced display settings**.
3. Select the required resolution from the drop-down list and tap **Apply**.



## Adjusting brightness in Windows 10

To enable or disable automatic screen brightness adjustment:

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

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

## Adjusting brightness in Windows 8

To enable or disable automatic screen brightness adjustment:

1. Swipe-in from the right edge of the display to access the Charms menu.
2. Tap or click **Settings**  → **Change PC Settings** → **PC and devices** → **Power and sleep**.
3. Use the **Adjust my screen brightness automatically** slider to enable or disable automatic-brightness adjustment.

## Adjusting brightness in Windows 7

To enable or disable automatic screen brightness adjustment:

1. Click **Start** → **Control Panel** → **Display**.
2. Use the **Adjust brightness** slider to enable or disable automatic-brightness adjustment.

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

## Cleaning the display

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

-  **NOTE:** Never spray any cleaning solutions directly on the screen; spray it to the cleaning cloth.
4. Gently wipe the screen in a circular motion. Do not press hard on the cloth.
-  **NOTE:** Do not press hard or touch the screen with your fingers or you may leave oily prints and smears.
-  **NOTE:** Do not leave any liquid on the screen.
5. Remove all excess moisture as it may damage your screen.
  6. Let the display dry thoroughly before you turn it on.
  7. For stains that are hard to remove, repeat this procedure till the display is clean.

## Connecting to external display devices

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

1. Ensure that the projector is turned on and plug the projector cable into a video port on your laptop.
2. Press the Windows logo+P key.
3. Select one of the following modes:
  - PC screen only
  - Duplicate
  - Extend
  - Second Screen only

 **NOTE:** For more information, see the document that shipped with your display device.

## Using touch screen in Windows 8/ Windows 10

Follow these steps to enable or disable the touch screen:

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

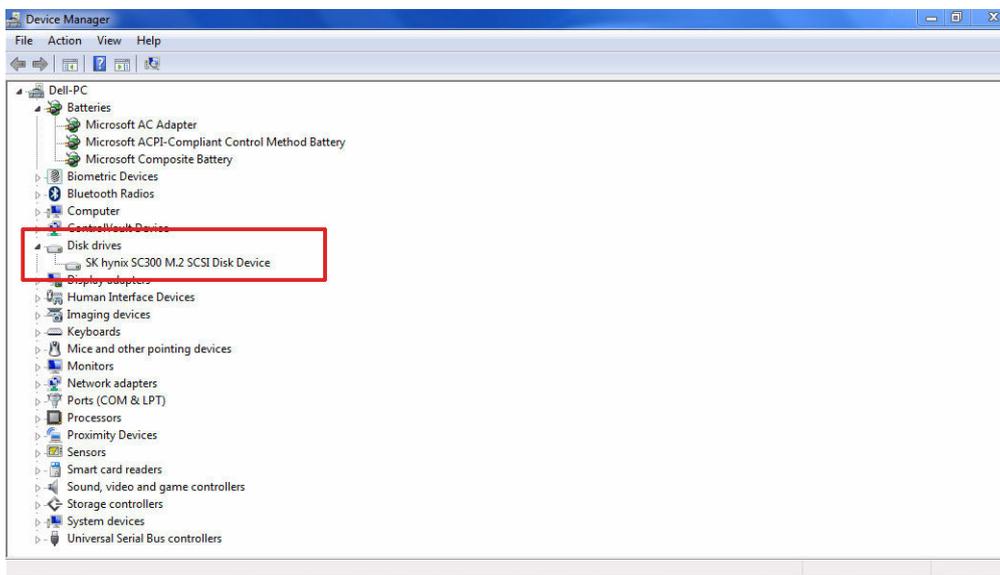
## Hard drive options

This laptop supports SATA drives and SSDs.

### Identifying the hard drive in Windows 10

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

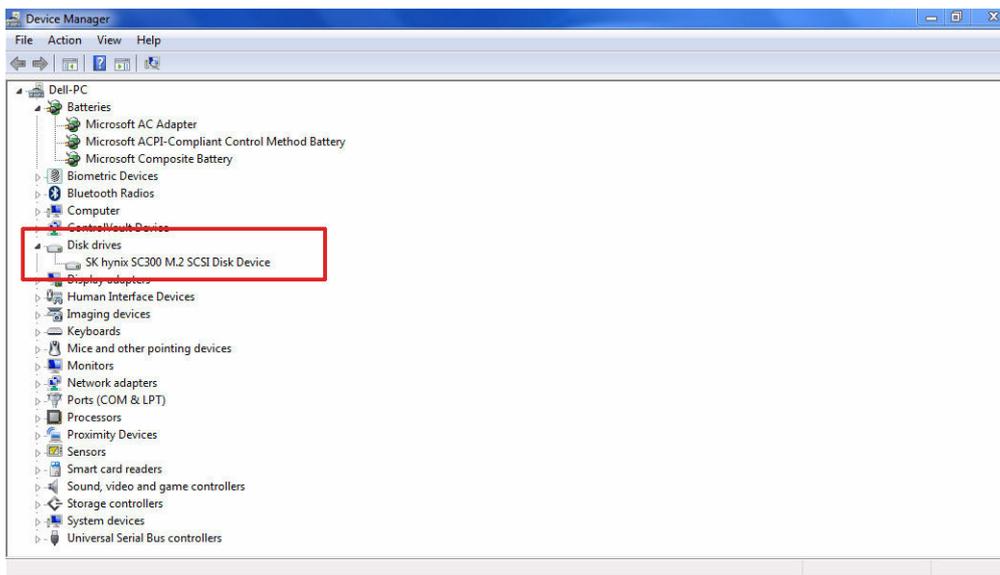
The hard drive is listed under **Disk drives**.



## Identifying the hard drive in Windows 8

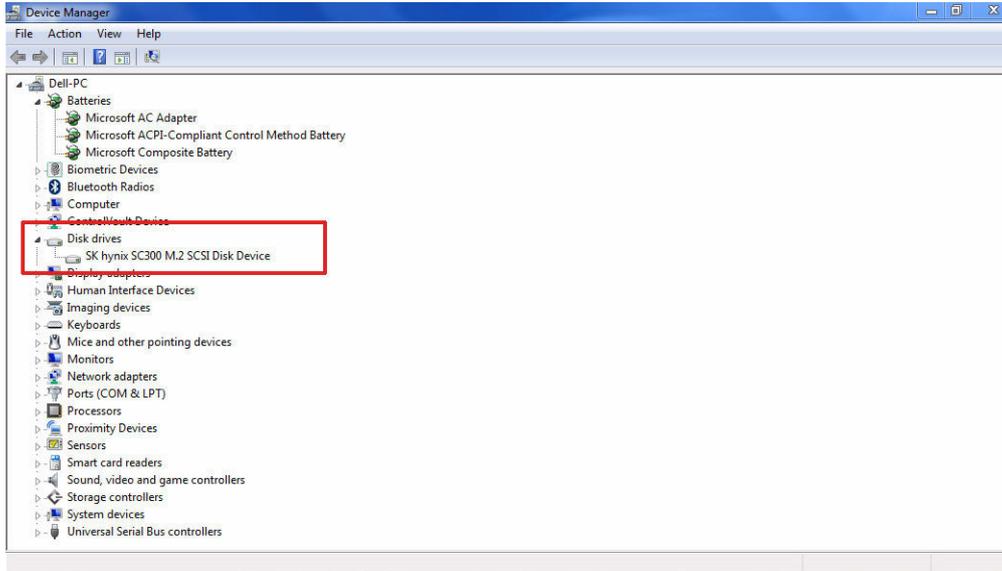
1. Tap or click **Settings**  on the Windows 8 Charms Bar.
2. Tap or click **Control Panel**, select **Device Manager**, and expand **Disk drives**.

The hard drive is listed under Disk drives.



## Identifying the hard drive in Windows 7

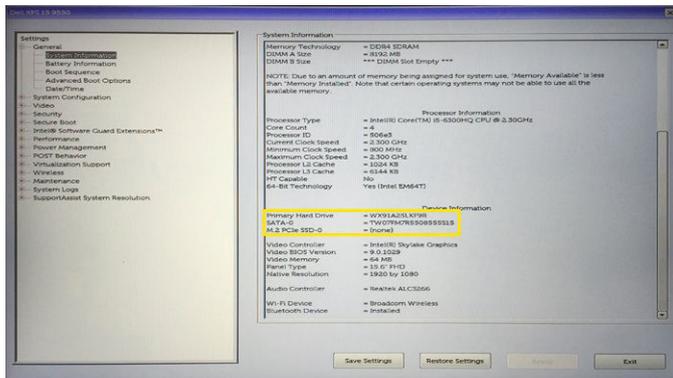
1. Click **Start** → **Control Panel** → **Device Manager**.  
The hard drive is listed under Disk drives.
2. Expand **Disk drives**.



## Entering BIOS setup

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

Hard drive is listed under the **System Information** under the **General** group.

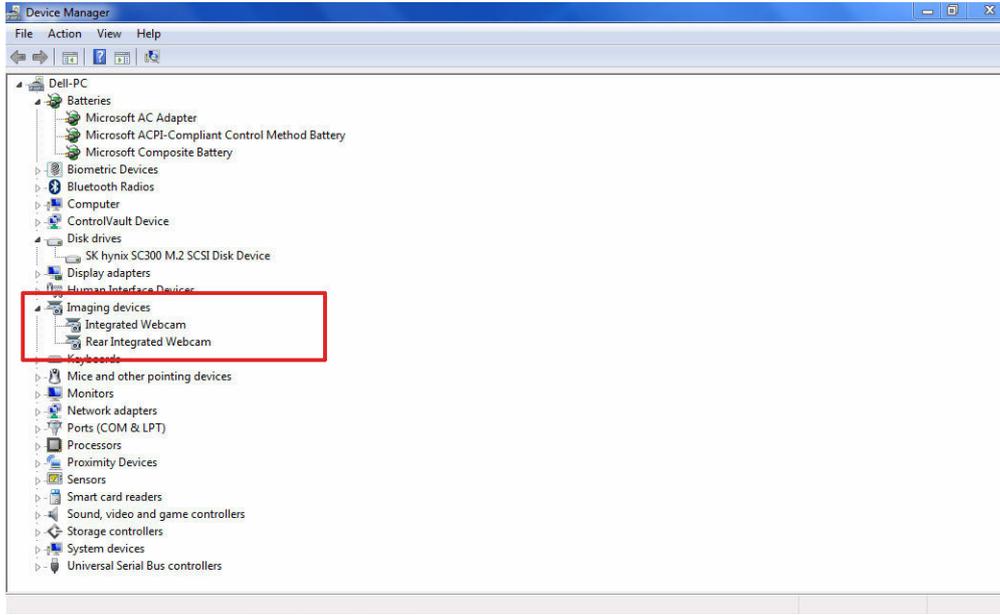


## Camera features

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

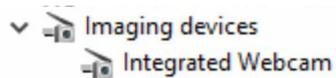
### Identifying the camera in Device Manager on Windows 10

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



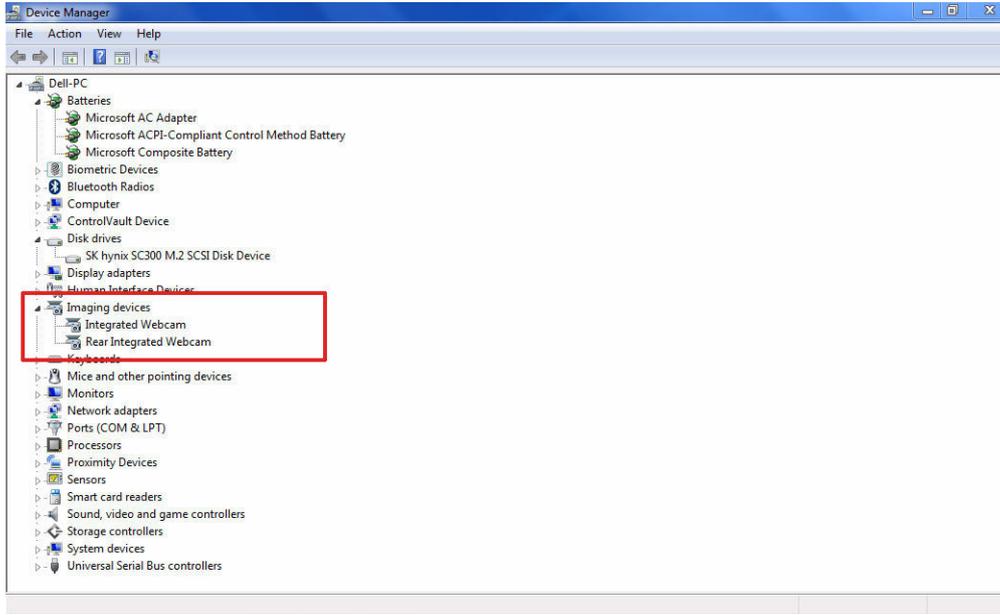
## Identifying the camera in Device Manager on Windows 8

1. Start the Charms Bar from the desktop interface.
2. Select **Control Panel**.
3. Select **Device Manager** and expand **Imaging devices**.



## Identifying the camera in Device Manager on Windows 7

1. Click **Start** → **Control Panel** → **Device Manager**.
2. Expand **Imaging devices**.

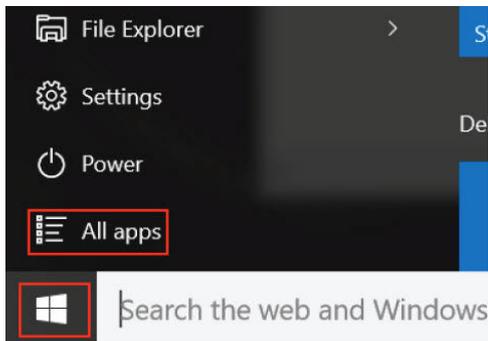


## Starting the camera

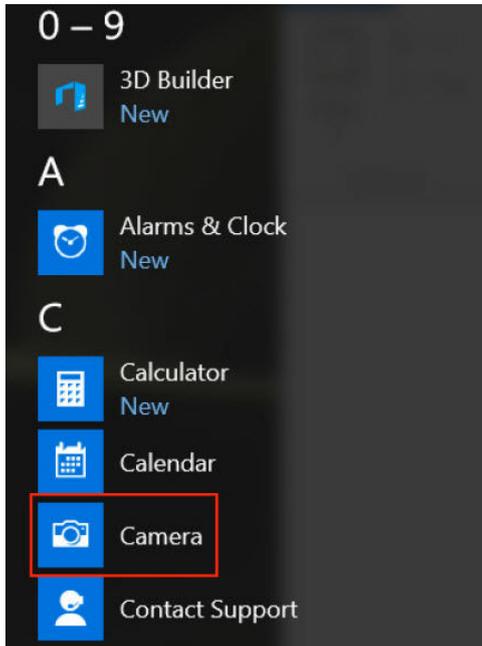
To start the camera, open an application that uses the camera. For instance, if you tap the Dell webcam central software or the Skype software that is shipped with the laptop, the camera turns on. Similarly, if you are chatting on the internet and the application requests to access the webcam, the webcam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

## Starting the camera app

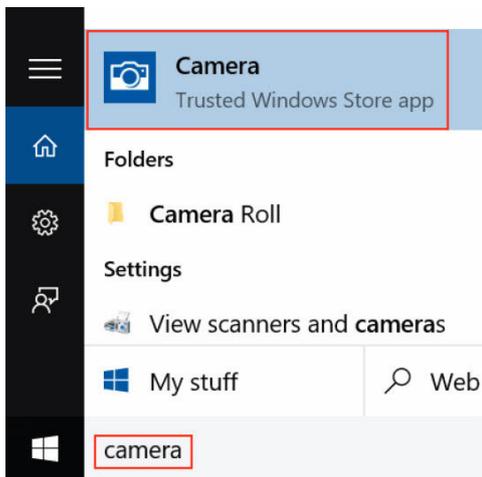
1. Tap or click the **Windows** button and select **All apps**.



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



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



## Memory features

This laptop supports 4–32 GB DDR4 SDRAM memory, up to 2133 MHz.

### Verifying system memory

#### Windows 10

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

## Windows 8

1. From your desktop, start the **Charms Bar**.
2. Select **Control Panel** and then select **System**.

## Windows 7

- Click **Start** → **Control Panel** → **System**.

## Verifying system memory in setup

1. Turn on or restart your laptop.
2. Perform one of the following actions after the Dell logo is displayed:
  - With keyboard — Tap F2 until the Entering BIOS setup message appears. To enter the Boot selection menu, tap F12.
  - Without keyboard — When the **F12 boot selection** menu is displayed, press the Volume Down button to enter BIOS setup. To enter the Boot selection menu, press the Volume Up button.
3. On the left pane, select **Settings** → **General** → **System Information**.  
The memory information is displayed on the right pane.

## Testing memory using ePSA

1. Turn on or restart your laptop.
2. Perform one of the following actions after the Dell logo is displayed:
  - With keyboard — Press F2.
  - Without keyboard — Press and hold the **Volume Up** button when the Dell logo is displayed on the screen. When the F12 boot selection menu is displayed, select **Diagnostics** from the boot menu, and press Enter.

The PreBoot System Assessment (PSA) starts on your laptop.

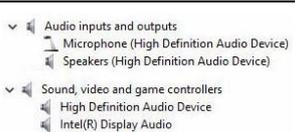


**NOTE:** If you wait too long and the operating system logo appears, continue to wait until you see the desktop. Turn off the laptop and try again.

## Realtek HD audio drivers

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

**Table 2. Realtek HD audio drivers**

Before installation	After installation
	

## Technical specifications

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

- Windows 10, click or tap **Start**  → **Settings** → **System** → **About**.
- Windows 8.1 and Windows 8, from the charms sidebar, click or tap **Settings** → **Change PC settings**. In the **PC Settings** window, select **PC and devices** → **PC Info**.
- Windows 7, click **Start** , right-click **My Computer**, and then select **Properties**.

## System information specifications

Feature	Specification
DRAM bus width	64 bit
Flash EPROM	SPI 128 Mbits
PCIe 3.0 bus	8.0 GHz

## Processor specifications

Feature	Specification
Types	Intel Core i3/i5/i7 series
L3 cache	up to 4 MB
External bus frequency	2133 MHz

## Memory specifications

Feature	Specification
Memory connector	Two SODIMM slots
Memory capacity	4 GB, 8 GB, and 16 GB
Memory type	DDR4 SDRAM
Speed	2133 MHz

Feature	Specification
Minimum memory	4 GB
Maximum memory	32 GB

## Battery specifications

Feature	Specification
Type	6-cell or 9-cell smart lithium ion
Depth	80 mm (3.14 inches)
Height	21 mm (0.82 inches)
Width	166.9 mm (6.57 inches)
Weight	<ul style="list-style-type: none"> <li>6-cell: 365.5 g (0.80 lb)</li> <li>9-cell: 520 g (1.14 lb)</li> </ul>
Voltage	14.8 V DC
Life span	300 discharge per charge cycles
Temperature range	
Operating	<ul style="list-style-type: none"> <li>Charging: 0°C to 60°C (32°F to 140°F)</li> <li>Discharging: 0°C to 70°C (32°F to 158°F)</li> </ul>
Nonoperating	-51°C to 71°C (-60°F to 160°F)  <b>NOTE:</b> The battery pack is capable of safely withstanding the above storage temperatures with 100% charge.  <b>NOTE:</b> The battery pack is also capable of withstanding storage temperatures from -20°C to +60°C with no degradation in its performance.
Coin cell battery	3 V CR2032 lithium coin cell

## Audio specifications

Feature	Specification
Type	four channel high definition audio
Controller	HDA Codec - ALC3235
Stereo conversion	24 bit (analog-to-digital and digital-to-analog)

Feature	Specification
Interface (internal)	HD audio
Interface (external)	microphone in/stereo headphones/external speakers connector
Speakers	one mono speaker
Internal speaker amplifier	2 W (RMS)
Volume controls	Volume up/Volume down buttons

 **CAUTION: Adjustment of volume control, as well as the equalizer in the operating system and/or equalizer software, to other settings than the center position may increase the earphones and/or headphones output and cause hearing damage or loss.**

## Video specifications

Feature	Specification
Type	integrated on system board
Controller (UMA) – Intel core i3/i5/i7	Intel HD Graphics 520
Discrete	AMD Radeon R7 M360 discrete graphics card

## Communication specifications

Feature	Specification
Network adapter	10/100/1000 Mb/s Ethernet (RJ-45)
Wireless	<ul style="list-style-type: none"> <li>• WLAN with Bluetooth 4.1 enabled</li> <li>• WWAN</li> </ul>

## Port and connector specifications

Feature	Specification
Audio	one microphone/stereo headphone/speakers connector
Video	<ul style="list-style-type: none"> <li>• one 19-pin HDMI port</li> <li>• one 15-pin VGA port</li> </ul>
Network adapter	two RJ45 connectors
Serial port	two DB9 pin serial ports
Docking port	one

Feature	Specification
USB ports	<ul style="list-style-type: none"> <li>• one 4-pin USB 2.0-compliant port</li> <li>• one 9-pin USB 3.0-compliant port with PowerShare</li> <li>• two 9-pin USB 3.0-compliant ports</li> </ul>
SIM card slot	one micro-SIM slot with security feature

## Display specifications

Feature	Specification
Type	WLED display
Size	14.0 inches
Height	190.00 mm (7.48 inches)
Width	323.5 mm (12.59 inches)
Diagonal	375.2 mm (14.77 inches)
Active area (X/Y)	309.4 mm x 173.95 mm
Maximum resolution	1366 x 768 pixels
Refresh rate	60 Hz
Operating angle	0° (closed) to 180°
Maximum viewing angles (horizontal)	+/- 70° minimum for HD
Maximum viewing angles (vertical)	+/- 70° minimum for HD
Pixel pitch	0.1875 mm

## Touchpad specifications

Feature	Specification
Active Area:	
X-axis	99.50 mm
Y-axis	53.00 mm

## Keyboard specifications

Feature	Specification
Number of keys	<ul style="list-style-type: none"><li>• 83 keys: US English, Thai, French-Canadian, Korean, Russian, Hebrew, English-International</li><li>• 84 keys: UK English, French Canadian Quebec, German, French, Spanish (Latin America), Nordic, Arabic, Canada Bilingual</li><li>• 85 keys: Brazilian Portuguese</li><li>• 87 keys: Japanese</li></ul>
Layout	QWERTY/AZERTY/Kanji

## Adapter specifications

Feature	Specification
Type	65 W and 90 W
Input voltage	100–240 V AC
Input current (maximum)	<ul style="list-style-type: none"><li>• 65 W – 1.7 A</li><li>• 90 W – 1.5 A</li></ul>
Input frequency	50–60 Hz
Output current	<ul style="list-style-type: none"><li>• 65 W – 3.34 A</li><li>• 90 W – 4.62 A</li></ul>
Rated output voltage	19.5 V DC
Temperature range (operating)	0°C to 40°C (32°F to 104°F)
Temperature range (nonoperating)	–40°C to 70°C (–40°F to 158°F)

## Physical dimension specifications

Feature	Specification
Height	52 mm (2.05 inches)
Width	247 mm (9.72 inches)
Length	356 mm (14.02 inches)

Feature	Specification
Weight (minimum config)	7.8 lbs (3.54 kg)

## Environmental specifications

Feature	Specifications
Temperature — operating	–29°C to 63°C (–20°F to 145°F)
Temperature — storage	–51°C to 71°C (–60°F to 160°F)
Relative humidity (maximum) — operating	10% to 90% (noncondensing)
Relative humidity (maximum) — storage	0% to 95% (noncondensing)
Altitude (maximum) — operating	–15.24 m to 4572 m (–50 ft to 15,000 ft)
Altitude (maximum) — nonoperating	–15.24 m to 9144 m (–50 ft to 30,000 ft)
Airborne contaminant level	G1 as defined by ISA-71.04–1985

# General troubleshooting

Table 3. General Troubleshooting

Issue	Suggested Troubleshooting Steps
Battery Charging	<p>The battery should be charged while the system is off for faster charge time. Users may notice longer charge times when the system is turned on and running graphics-intensive applications.</p> <p> <b>CAUTION: There is a danger of a new battery exploding if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.</b></p>
No POST	<p>When a user starts the notebook, the first thing that the BIOS does is to perform the Power-On Self-Test (POST). The POST is a built-in diagnostic program that checks the hardware to make sure that everything is present and functioning properly, before the BIOS begins the actual boot.</p> <p>If the system does not perform a Power-On Self-Test, there are various things that you can look for:</p> <ol style="list-style-type: none"> <li>1. Check that the system has a power light.</li> <li>2. If the system has no power light, make sure that it is plugged into AC power.</li> <li>3. Remove the battery. Make sure that the power is turned off and the system is unplugged.</li> <li>4. Remove all CRUs from the system and reconnect the AC adapter to the system and try again.</li> <li>5. Run the ePSA diagnostics.</li> </ol>
Video	<p>If the LCD on the system does not show any display or has other problems, here are some basic steps that you can perform:</p> <ol style="list-style-type: none"> <li>1. If the LCD is not displaying video or the video is garbled, run the ePSA diagnostics.</li> <li>2. If the LCD is not displaying any video, connect an external monitor to eliminate a no-POST problem. A good image on the external monitor eliminates a video card problem or a POST problem.</li> <li>3. Connect an external monitor, when possible, for all LCD-related problems to help eliminate a possible software or video card problem.</li> <li>4. If the LCD has dim video, adjust the brightness or connect an AC adapter to eliminate a power management conservation setting in the BIOS.</li> <li>5. If the LCD has lines on the screen, check the system during POST and system setup, to determine if the lines are present in all modes of operation. Run the ePSA diagnostics.</li> </ol>

Issue	Suggested Troubleshooting Steps
BIOS	<ol style="list-style-type: none"> <li data-bbox="507 258 1177 279">6. If the LCD has color problems, run the ePSA diagnostics.</li> <li data-bbox="507 296 1326 344">7. If the LCD has burned-out pixels, verify that the LCD is still within LCD standard guidelines. For Dell internal users only, click <a href="#">here</a>.</li> </ol> <p data-bbox="507 380 1390 485">If users have problems while using the notebook, the problems may be related to BIOS settings configured incorrectly in BIOS/System Setup. Check the System Setup pages to verify the settings on each page. Try resetting BIOS to default settings by pressing Alt+F.</p>
Touch Pad and Keyboard	<p data-bbox="507 522 1385 571">To troubleshoot touch pad and keyboard-related problems, you can perform the following steps:</p> <ol style="list-style-type: none"> <li data-bbox="507 600 1385 621">1. Attach an external mouse or keyboard to check for peripheral functionality.</li> <li data-bbox="507 638 842 659">2. Run the ePSA diagnostics.</li> </ol>
Integrated NIC	<p data-bbox="507 701 1362 749">If the system is not able to identify any network after connecting the network cable to the network port, try the following troubleshooting steps:</p> <ol style="list-style-type: none"> <li data-bbox="507 779 1299 827">1. Make sure that the network driver has been installed and is working properly.</li> <li data-bbox="507 844 1059 865">2. Check that the network LEDs are responding.</li> <li data-bbox="507 882 1198 903">3. Check System Setup to make sure that the NIC is enabled.</li> <li data-bbox="507 919 815 940">4. Try reseating the cable.</li> <li data-bbox="507 957 1027 978">5. Try a known good cable, if one is available.</li> <li data-bbox="507 995 1362 1043">6. If a known good system is available, check if that system is connecting to the network.</li> <li data-bbox="507 1060 1070 1081">7. Run the ePSA diagnostics on the network port.</li> </ol> <p data-bbox="507 1110 1283 1167"> <b>NOTE:</b> If the integrated network hardware solution is defective or nonfunctional, replace the system board.</p>
VGA	<p data-bbox="507 1197 1299 1245">No additional drivers or updates are needed for VGA functionality. When troubleshooting an external monitor, keep these tips in mind:</p> <ul style="list-style-type: none"> <li data-bbox="507 1274 1385 1323">• Check both ends of the cable for a snug connection into the laptop and into the external monitor.</li> <li data-bbox="507 1339 1289 1360">• Adjust the contrast and brightness controls on the external monitor.</li> <li data-bbox="507 1377 1225 1398">• Make sure that the notebook is not set to internal display only.</li> <li data-bbox="507 1415 895 1436">• Swap with a known good cable.</li> <li data-bbox="507 1453 1299 1501">• Try with a known good external monitor. Check the external device's documentation for any additional steps required for functionality.</li> </ul> <p data-bbox="507 1530 1374 1589"> <b>NOTE:</b> If the VGA hardware port is defective or nonfunctional, replace the system board.</p>

## 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.