


Dell Precision 5510

Owner's Manual



Notes, cautions, and warnings

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

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

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

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Working on your computer

Topics:

- [Turning off Your Computer](#)
- [Before working inside your computer](#)
- [After working inside your computer](#)

Turning off Your Computer

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



You can turn off your computer in two ways :

1. Using the power button
2. Using the charms menu

Using power button

1. Press and hold the **Power** button  to turn off the screen.

Using charms

1. Swipe from the right edge of the display to access the **Charms** menu.
2. Touch **Settings**  —> **Power**  —> **Shut down** to turn off the computer.


Before working inside your computer

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

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

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


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

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


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

After working inside your computer

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

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

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

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

3. Replace the battery.
4. Connect your computer and all attached devices to their electrical outlets.
5. Turn on your computer.

Disassembly and reassembly

Topics:

- Recommended Tools
- Removing the Base Cover
- Installing the Base Cover
- Removing the Battery
- Installing the Battery
- Removing the Hard Drive
- Installing the Hard Drive
- Removing the Solid-State Drive (half-length)
- Installing the Solid-State Drive (half-length)
- Removing the Solid-State Drive (full-length)
- Installing the Solid-State Drive (full-length)
- Removing the Speakers
- Installing the Speakers
- Removing the WLAN Card
- Installing the WLAN Card
- Removing the Fans
- Installing the Fans
- Removing the Heatsink
- Installing the Heatsink
- Removing the Memory Module(s)
- Installing the Memory Module(s)
- Removing the System Board
- Installing the System Board
- Removing the Audio Daughter Board
- Installing the audio daughter board
- Removing the Keyboard
- Installing the Keyboard
- Removing the Display Assembly
- Installing the Display Assembly
- Removing the DC-in Connector
- Installing the DC-in Adapter Port
- Removing the antenna cover
- Installing the antenna cover
- Removing the display hinges
- Installing the display hinges
- Removing the antenna module
- Installing the antenna module
- Removing the palm-rest assembly
- Installing the palm-rest assembly

Recommended Tools


The procedures in this document may require the following tools:

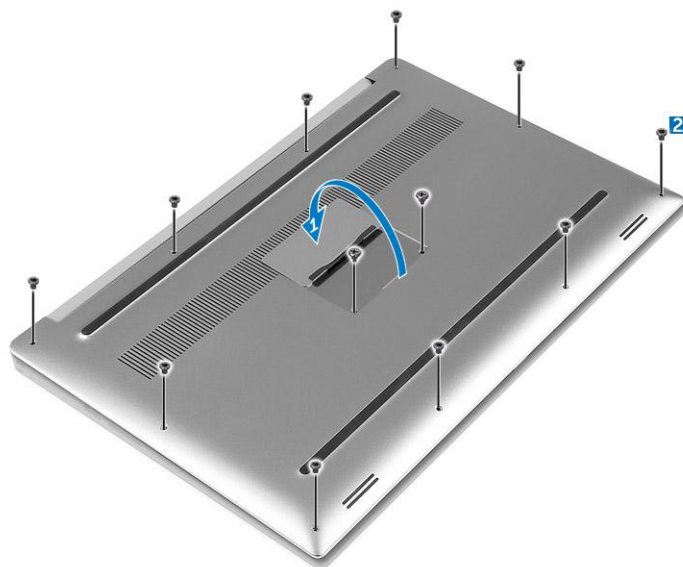
- Small flat-blade screwdriver
- #0 Phillips screwdriver
- #1 Phillips screwdriver

- T5 Torx screwdriver
- Small plastic scribe

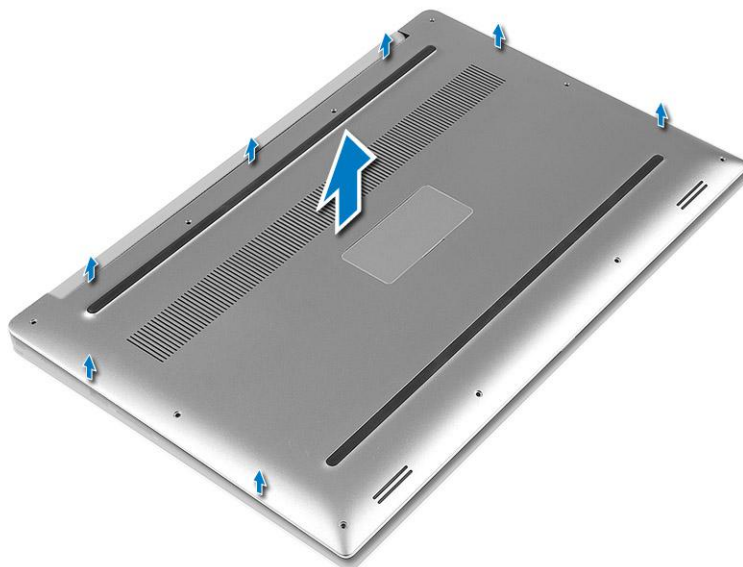
Removing the Base Cover

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Close the display and turn the computer over.
3. Turn the system badge flap over (1) and then remove the screws that secure the base cover to the computer (2).

 **NOTE:** Use a Torx #5 screwdriver for the base screws and a Philips screwdriver for the screws inside the badge flap.



4. Pry the edges base cover and lift it to remove it from computer .



Installing the Base Cover

1. Place the base cover on the computer and snap it in place.
2. Tighten the screws to secure the base cover to the computer.

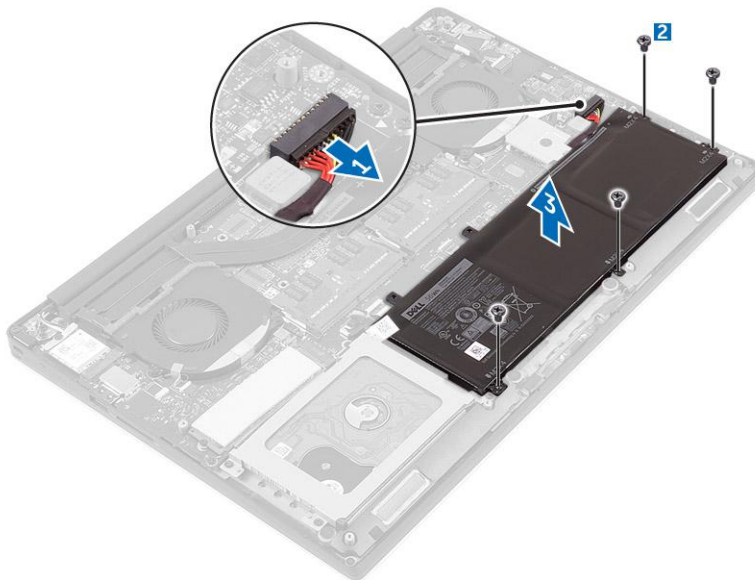
NOTE: Ensure you use a Torx #5 screwdriver for the base screws and a Philips screwdriver for the system badge screws.

3. Turn the system badge flap over and snap it in place.
4. Follow the procedures in *After Working Inside Your Computer*.

Removing the Battery

NOTE: Discharge the battery as much as possible before removing from the system. This can be done by disconnecting the A/C adapter from the system (while the system is turned on) to allow the system to drain the battery.

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the [base cover](#).
3. Perform the following steps to remove the battery:
 - a. Disconnect the battery cable from the system board [1].
 - b. Remove the screws that secure the battery to the computer [2].
 - c. Lift the battery off the computer [3].
 - **Do not** apply pressure to the surface of the battery
 - **Do not** bend
 - **Do not** use tools of any kind to pry on or against the battery
 - If a battery cannot be removed within the constraints above, please contact Dell technical support



Installing the Battery

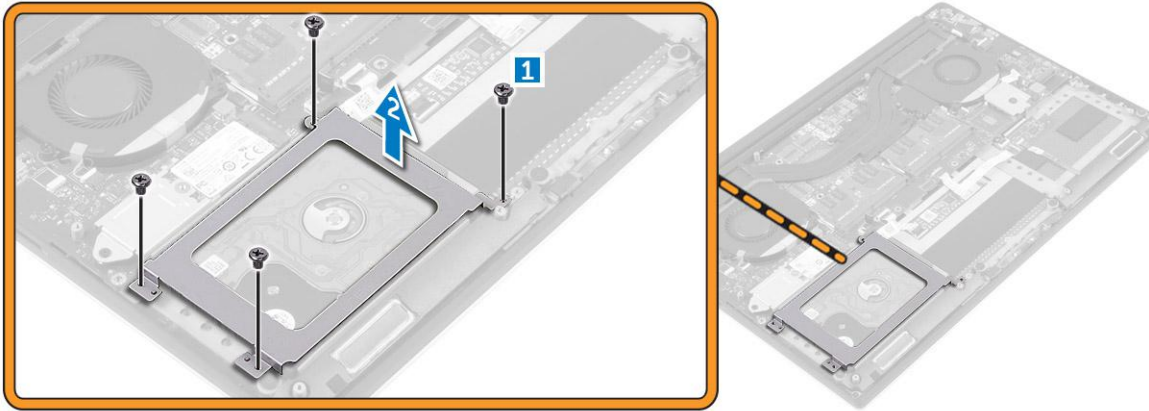
1. Place and align the battery in the battery bay.
2. Tighten the screws that secure the battery to the computer.
3. Connect the battery cable to the system board.
4. Install the base cover.
5. Follow the procedures in *After Working Inside Your Computer*.

Removing the Hard Drive

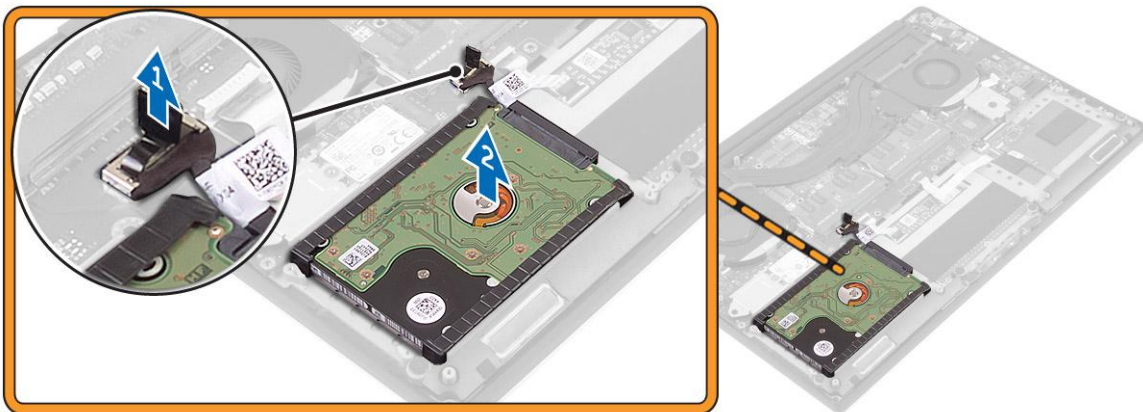
1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the:

- a. base cover
- b. battery

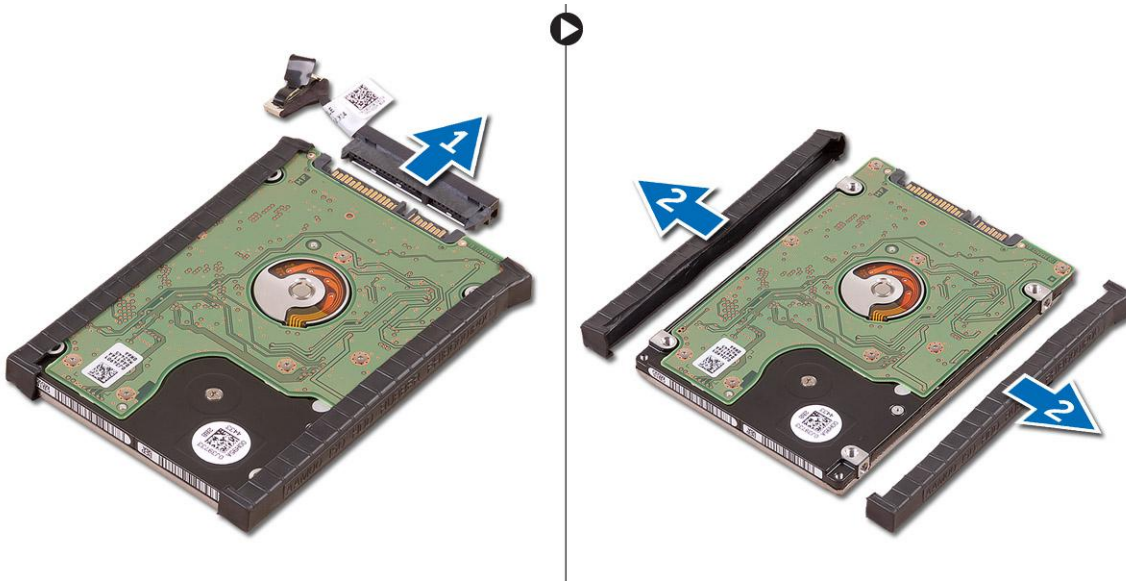
3. Perform the following steps to remove the hard-drive bracket from the computer:
- a. Remove the screws securing the hard-drive bracket to the computer [1].
 - b. Lift the hard-drive bracket off the computer [2].



4. Perform the following steps to remove the hard-drive:
- a. Disconnect the hard-drive cable from the system board [1].
 - b. Lift the hard drive off the computer [2].



5. Remove the data-cable connector [1] and then slide out the two end brackets [2].

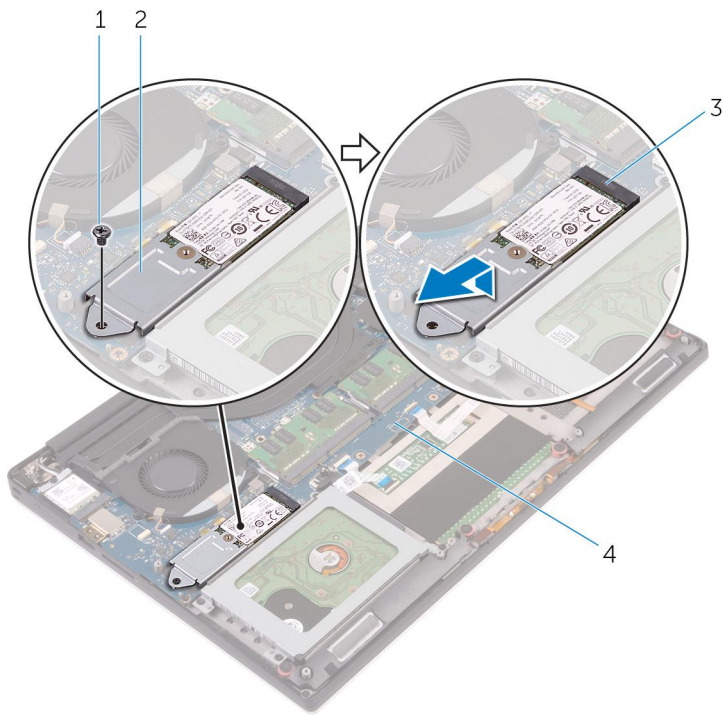


Installing the Hard Drive

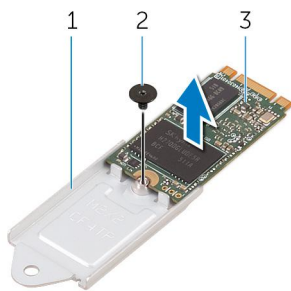
1. Replace the hard-drive covers on the hard drive.
2. Connect the hard-drive interposer to the hard-drive assembly.
3. Place the hard-drive assembly on the palm-rest assembly.
4. Connect the hard-drive cable to the system board.
5. Align the screw holes on the hard-drive cage with the screw holes on the hard-drive assembly.
6. Replace the screws that secure the hard-drive cage to the palm-rest assembly.
7. Install the:
 - a. battery
 - b. base cover
8. Follow the procedures in *After Working Inside Your Computer*.

Removing the Solid-State Drive (half-length)

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the:
 - a. [base cover](#)
 - b. [battery](#)
3. Remove the screw that secures the solid-state drive assembly to the system board [1, 2].
4. Lift and slide the solid-state drive assembly from the system board [3].



5. Remove the screw that secures the solid-state drive to the solid-state drive bracket [1, 2, 3].



6. Lift the solid-state drive off the solid-state drive bracket.

Installing the Solid-State Drive (half-length)

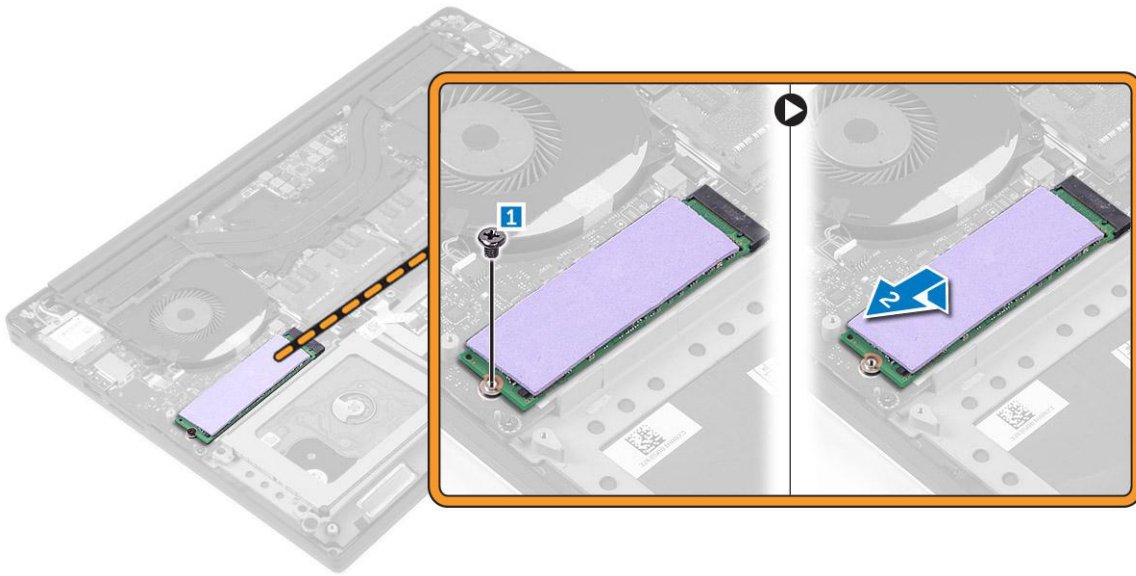
1. Align the screw hole on the solid-state drive bracket with the screw hole on the solid-state drive.
2. Replace the screw that secures the solid-state drive to the solid-state drive bracket.
3. Align the notches on the solid-state drive assembly with the tabs in the solid-state drive slot.
4. Slide the solid-state drive assembly at an angle into the solid-state drive slot.
5. Press the other end of the solid-state drive down and replace the screw that secures the solid-state drive to the system board.
6. Install the:
 - a. battery
 - b. base cover
7. Follow the procedures in *After Working Inside Your Computer*.

Removing the Solid-State Drive (full-length)

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

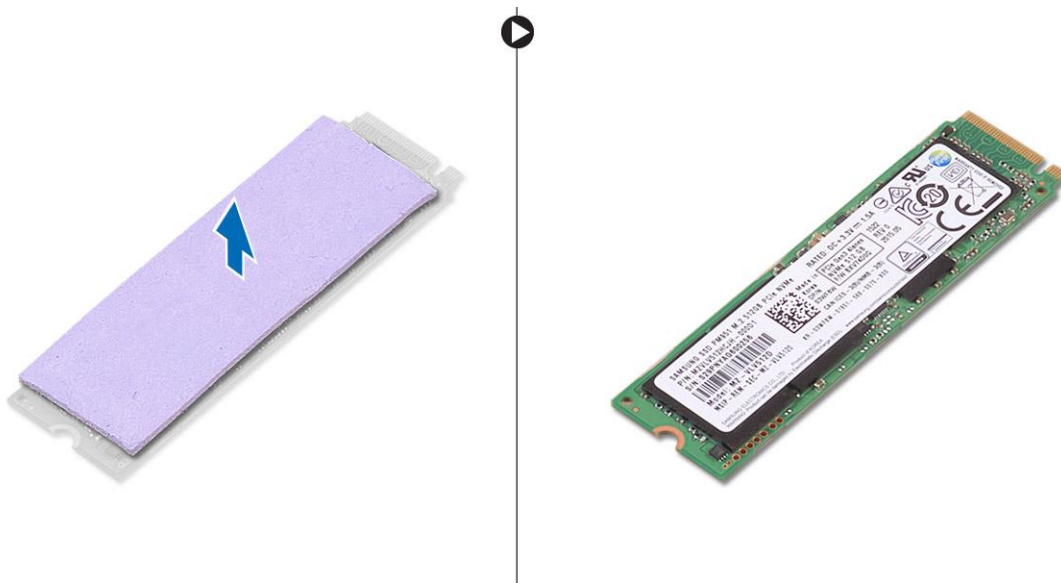
b. battery

3. Remove the screw that secures the solid-state drive to the system board.



4. Remove the thermal pad from the SSD.

NOTE: The thermal pad is applicable only for a PCIe SSD card.



Installing the Solid-State Drive (full-length)

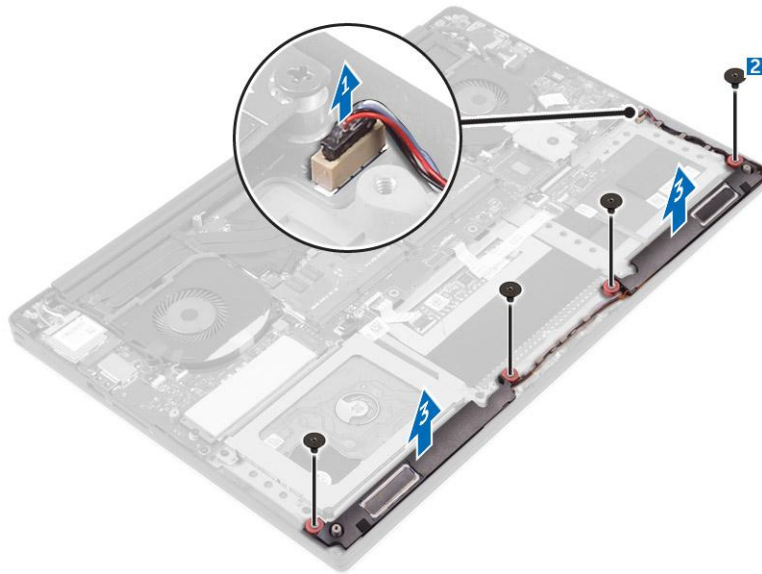
1. Adhere the thermal pad to the solid-state drive.

NOTE: The thermal pad is applicable only for a PCIe SSD card.

2. Slide the solid-state drive at an angle into the solid-state drive slot.
3. Press the other end of the solid-state drive down and replace the screw that secures the solid-state drive to the system board.
4. Install the:
 - a. battery
 - b. base cover
5. Follow the procedures in *After Working Inside Your Computer*.

Removing the Speakers

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the:
 - a. [base cover](#)
 - b. [battery](#)
3. Perform the following steps to remove the speaker:
 - a. Disconnect the speaker cable from the system board [1].
 - b. Remove the screws that secure the speakers to the computer [2].
 - c. Lift the speakers, along with the speaker cable, off the computer [3].

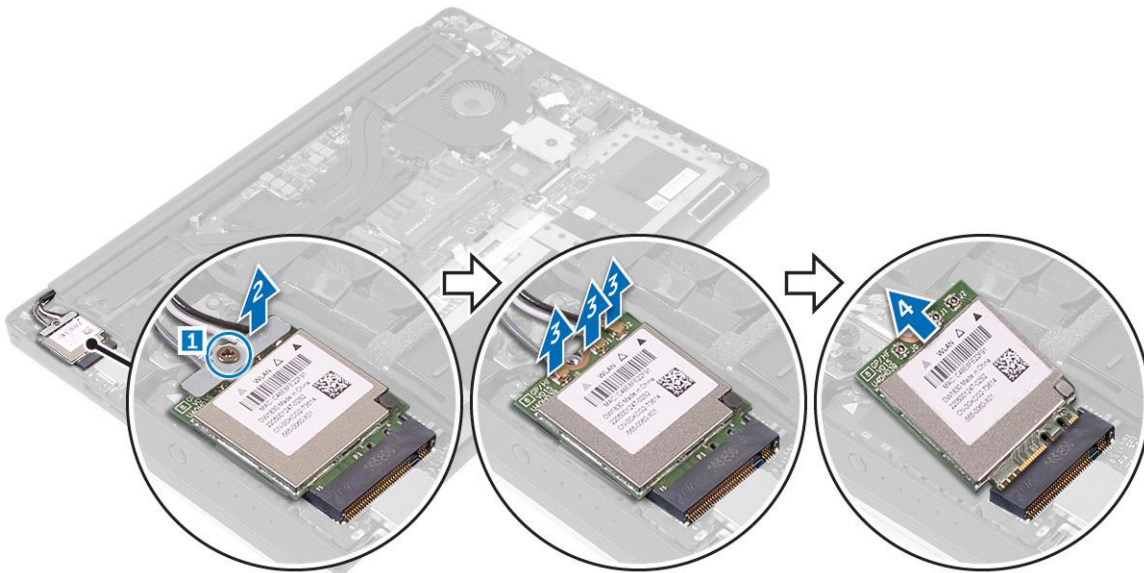


Installing the Speakers

1. Using the alignment posts, place the speakers on the palm-rest assembly.
2. Replace the screws that secure the speakers to the palm-rest assembly.
3. Route the speaker cables through the routing guides on the palm-rest assembly.
4. Connect the speaker cable to the system board.
5. Install the:
 - a. [battery](#)
 - b. [base cover](#)
6. Follow the procedures in *After Working Inside Your Computer*.

Removing the WLAN Card

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the:
 - a. [base cover](#)
 - b. [battery](#)
3. Perform the following steps to remove the WLAN card:
 - a. Remove the screw to release the bracket that secures the WLAN card to the computer [1] and lift the bracket away from the computer [2].
 - b. Disconnect the antenna cables from the WLAN card [3].
 - c. Slide and remove the WLAN card from its connector on the board [4].



Installing the WLAN Card

1. Align the notch on the WLAN card with the tab on the WLAN-card connector on the I/O board.
2. Align the bracket which secures the WLAN card to the palmrest assembly.
3. Connect the antenna cables to the WLAN card.

CAUTION: To avoid damage to the WLAN card, do not place any cables under it.

NOTE: The color of the antenna cables is visible near the tip of the cables. The antenna-cable color scheme for the WLAN card supported by your computer is as follows:

Table 1. Antenna-Cable Color Scheme for the WLAN Card

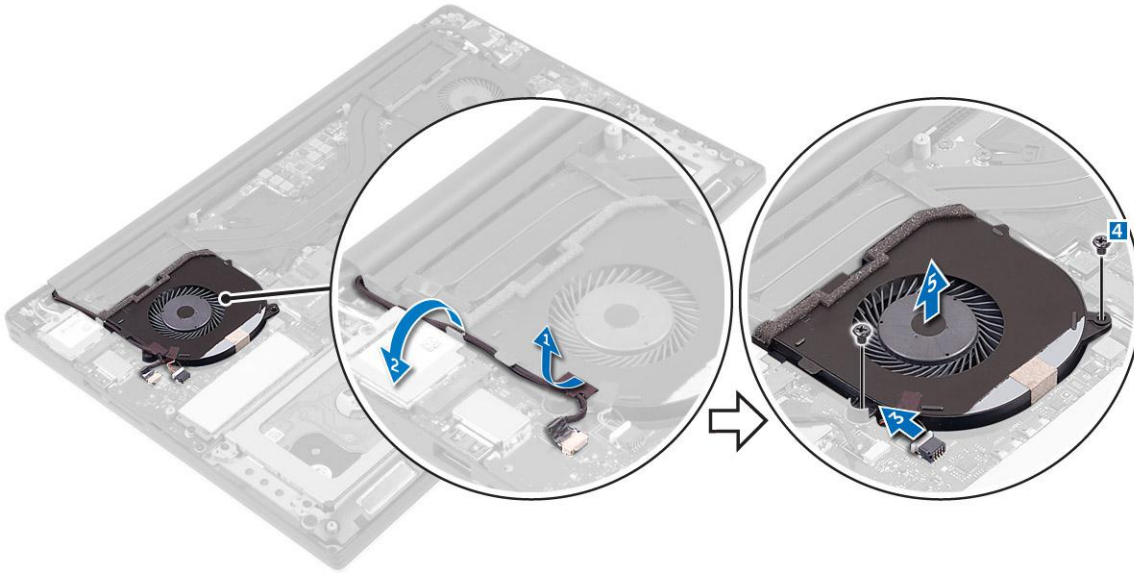
Connectors on the WLAN card	Antenna-cable color
Main (white triangle)	white
Auxiliary (black triangle)	black
Multiple input, multiple output (grey triangle)	Grey (optional)

4. Tighten the screw to secure the bracket and the WLAN card to the palmrest assembly.
5. Install the:
 - a. battery
 - b. base cover
6. Follow the procedures in *After Working Inside Your Computer*.

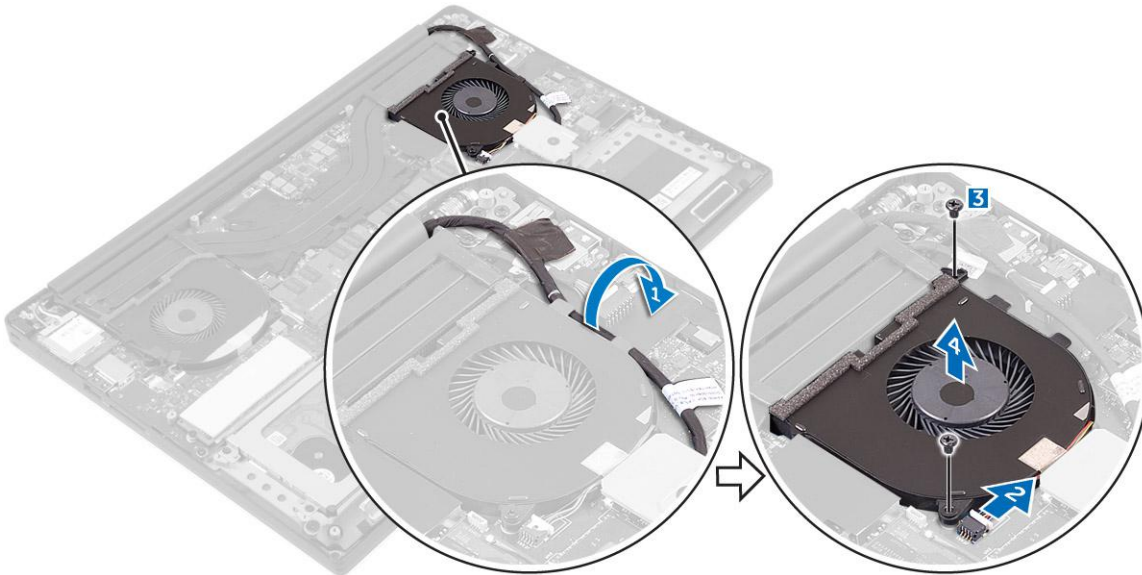
Removing the Fans

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the:
 - a. base cover
 - b. battery
3. Perform the following steps to remove the left video-card fan:
 - a. Un-thread the LVDS cable from its restraints [1] and [2].
 - b. Disconnect the fan cable from the system board [3]
 - c. Remove the screws that secure the fan to the computer [4].

- d. Lift the fan away from the computer [5].



4. Perform the following steps to remove the right system fan:
- a. Un-thread the LVDS cable from its restraints [1].
 - b. Disconnect the fan cable from the system board [2]
 - c. Remove the screws that secure the fan to the computer [3].
 - d. Lift the fan away from the computer [4].



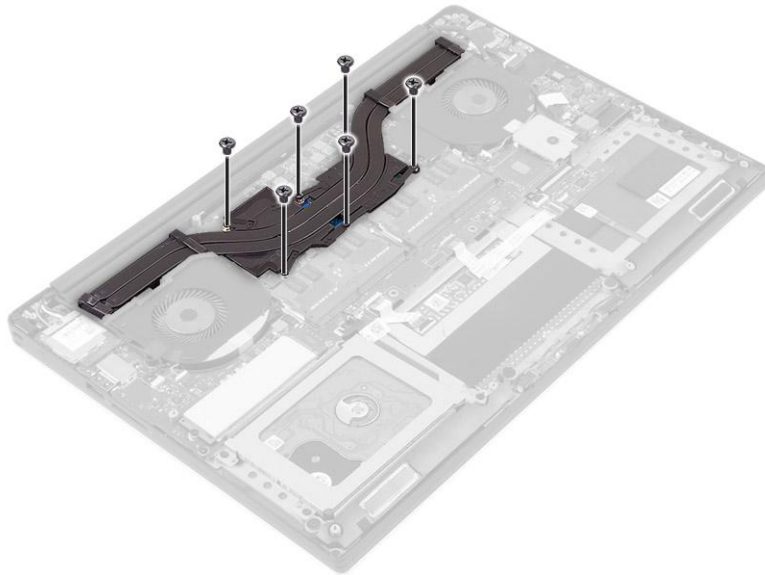
Installing the Fans

1. Perform the following steps to install the system fan:
- a. Align the screw holes on the left fan with the screw holes on the palm-rest assembly.
 - b. Connect the left fan cable to the system board.
 - c. Route the display cable through the routing guides on the left fan.
 - d. Replace the screws that secure the left fan to the system board.
 - e. Connect the right fan cable to the system board.
 - f. Route the touch-screen cable through the routing guides on the right fan.
 - g. Adhere the tape that secures the touch-screen cable to the right fan.
 - h. Connect the display cable to the system board.
 - i. Replace the screws that secure the right fan to the system board.

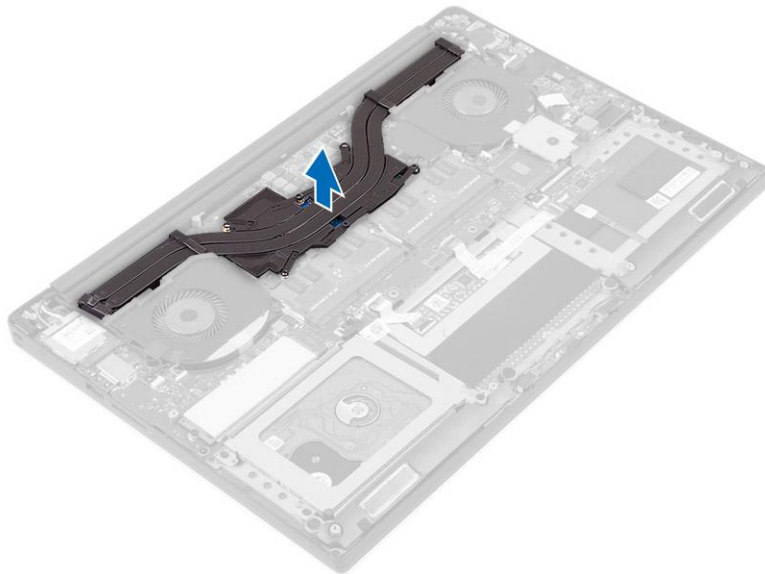
2. Follow the procedures in *After Working Inside Your Computer*.

Removing the Heatsink

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the:
 - a. [base cover](#)
 - b. [battery](#)
3. Remove the screws that secure the heatsink to the system board.



4. Lift the heatsink off the computer.



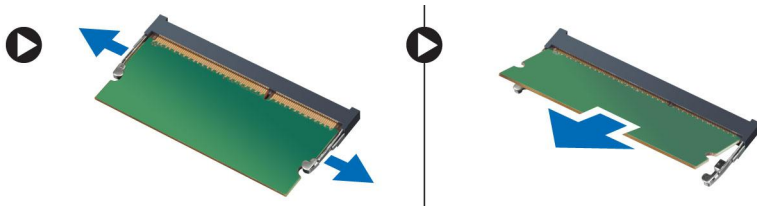
Installing the Heatsink

1. Align the screw holes on the heatsink with the screw holes on the system board.
2. Replace the screws to secure the heatsink to the system board.
3. Install the:
 - a. [battery](#)

- b. base cover
4. Follow the procedures in *After Working Inside Your Computer*.

Removing the Memory Module(s)

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the:
 - a. base cover
 - b. battery
3. Pry the securing clips away from the memory module until it pops-up. Remove the memory module from its connector on the system board.



Installing the Memory Module(s)

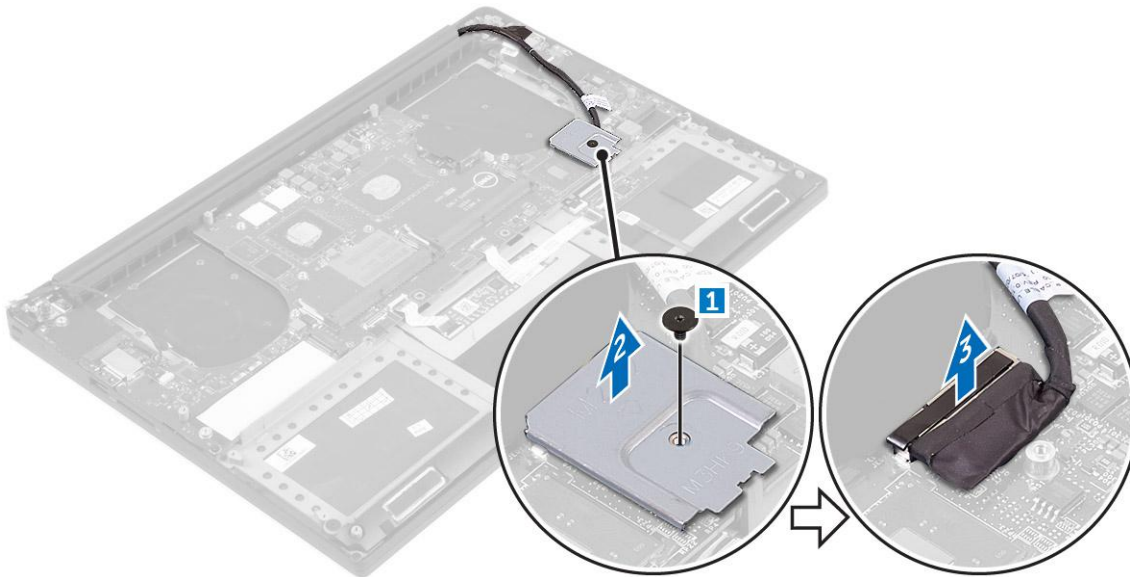
1. Insert the memory module into the memory socket.
2. Press the memory module down until it clicks into place.
i **NOTE:** If you do not hear the click, remove the memory module and re-install it.
3. Install the:
 - a. battery
 - b. base cover
4. Follow the procedures in *After Working Inside Your Computer*.

Removing the System Board

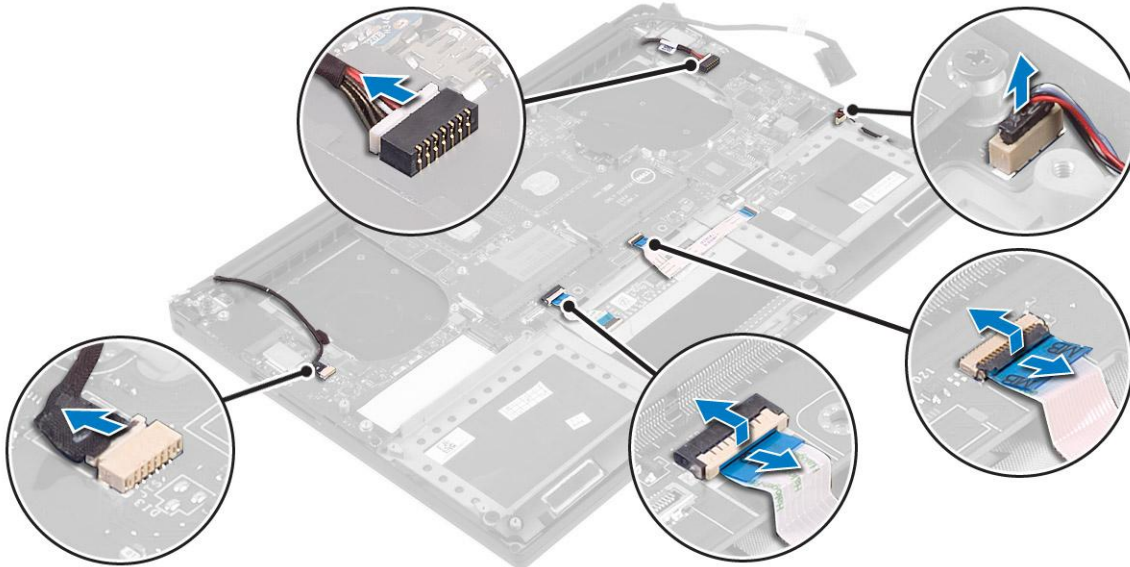
1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the:
 - a. base cover
 - b. battery
 - c. fans
 - d. heatsink
 - e. SSD
 - f. memory modules
i **NOTE:** Your computer's Service Tag is located under the system badge flap. You must enter the Service Tag in the BIOS after you replace the system board.

i **NOTE:** Before disconnecting the cables from the system board, note the location of the connectors so that you can re-connect them correctly after you replace the system board.

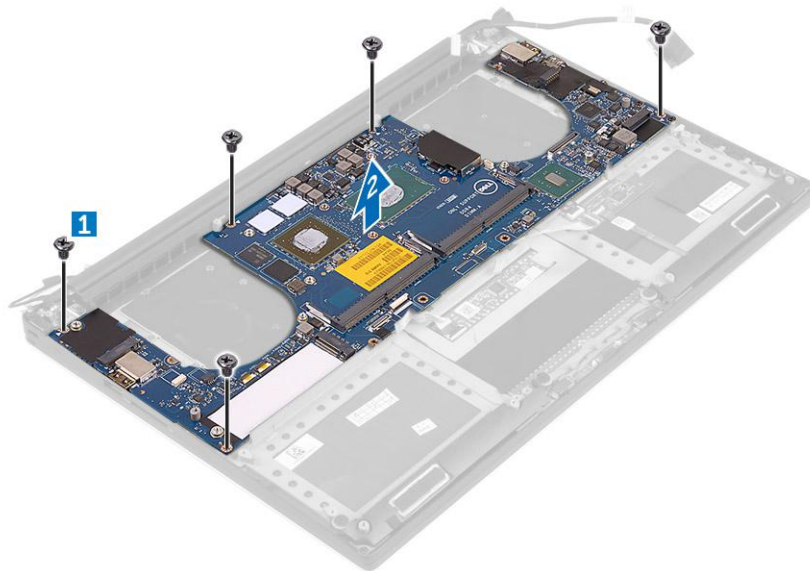
3. Remove the screw securing the metal bracket for the LVDS to the system board [1] and remove the bracket off the computer [2]. Then, disconnect the LVDS cable from the system board [3].



4. Slide out the connector latches to disconnect all the cables from the system board.



5. Perform the following steps to remove the system board from the computer:
- Remove the screws that secure the system board to the computer [1].
 - Lift the system board off the computer [2].

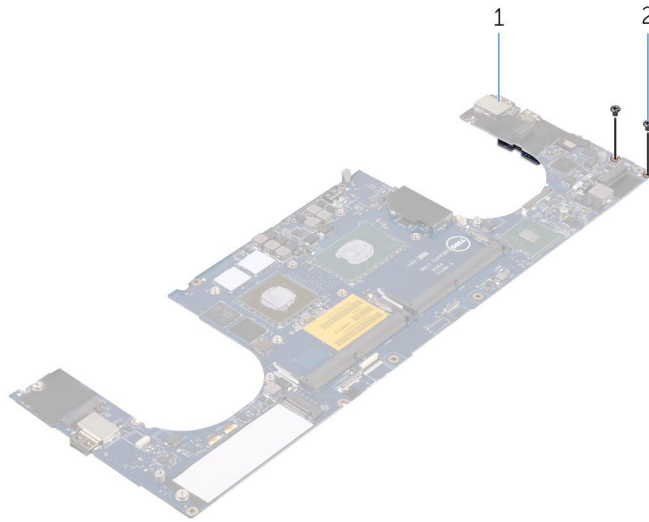


Installing the System Board

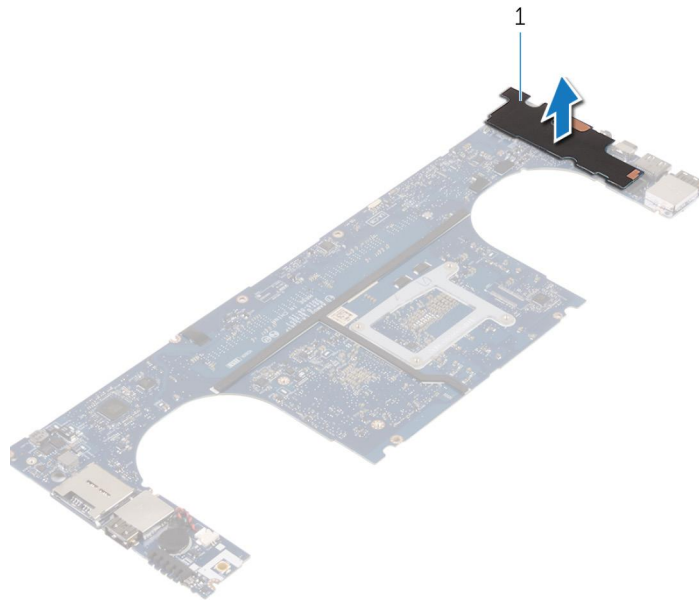
1. Align the system board on the computer.
2. Replace the screws that secure the system board to the palm-rest assembly.
3. Connect the power-adaptor port cable, speaker cable, keyboard-control board cable, touch-pad cable, and touch-screen cable to the system board.
4. Connect the display cable to the system board.
5. Align the screw hole on the display-cable bracket with the screw hole on the system board.
6. Follow the procedures in *After Working Inside Your Computer*.

Removing the Audio Daughter Board

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the:
 - a. base cover
 - b. battery
 - c. WLAN card
 - d. hard drive
 - e. SSD (half length)
 - f. SSD (full length)
 - g. fans
 - h. heatsink
 - i. memory modules
 - j. system board
3. Remove the two screws that secure the audio daughter board to the system board.



- a. system board
 - b. screws
4. Flip the system board over, then lift the audio daughter board from the system board.



- a. audio daughter board

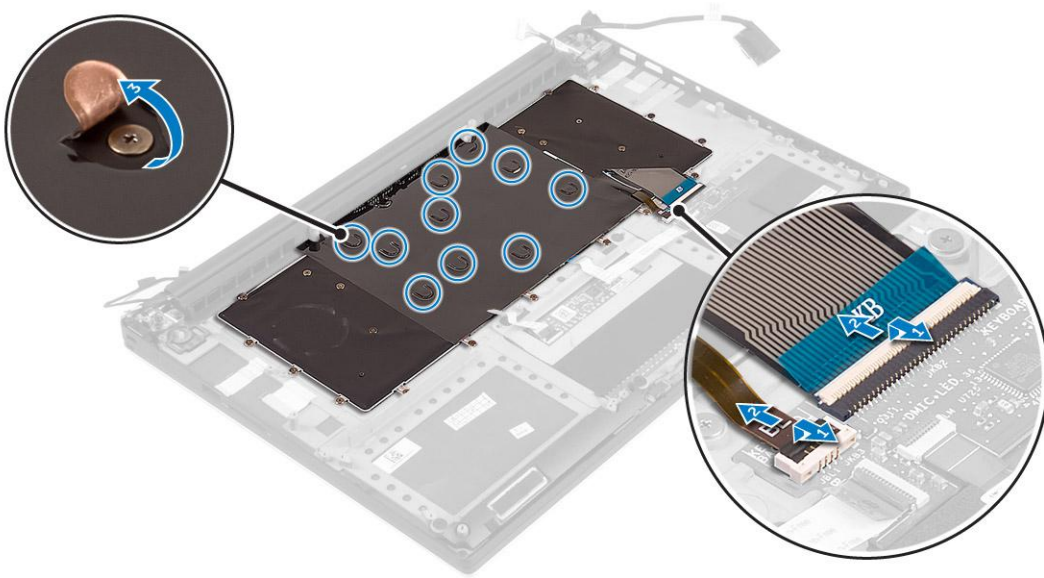
Installing the audio daughter board

1. Align the screw holes on the audio daughter board with the screw holes on the system board.
2. Flip the system board over, then replace the screws that secure the audio daughter board to the system board.
3. Install the:
 - a. system board
 - b. memory modules
 - c. heat-sink assembly
 - d. fans
 - e. solid-state drive (half-length)
 - f. solid-state drive (full-length)
 - g. hard drive
 - h. wireless card

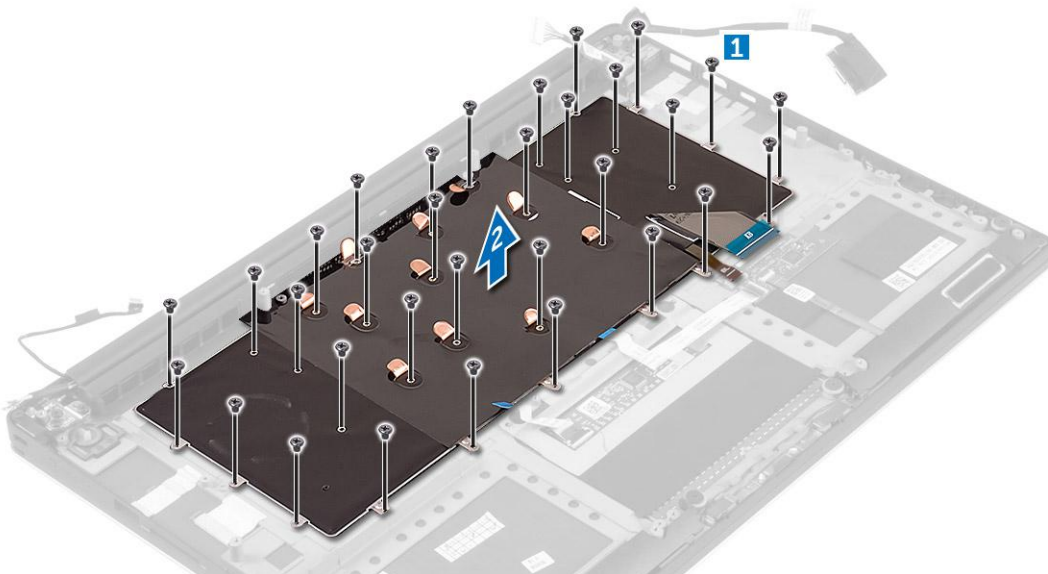
- i. battery
 - j. base cover
4. Follow the procedures in *After Working Inside Your Computer*.

Removing the Keyboard

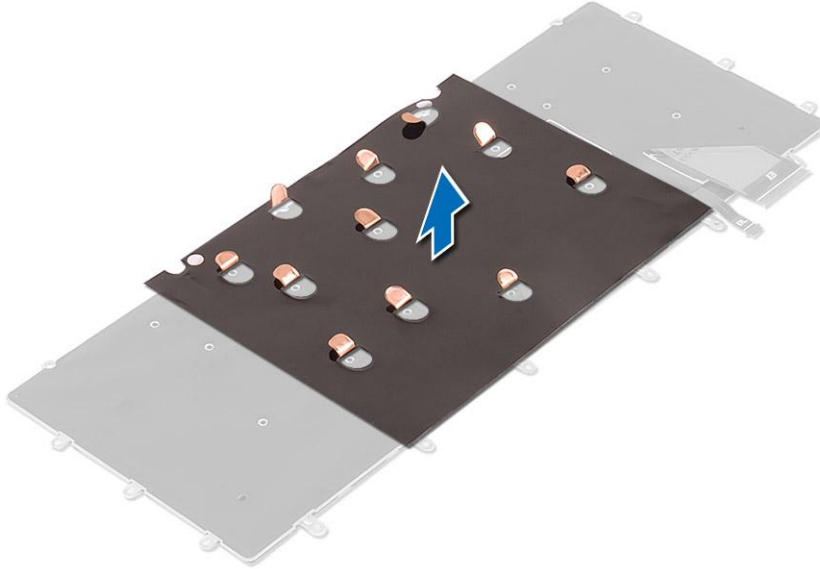
1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the:
 - a. base cover
 - b. battery
 - c. fans
 - d. heatsink
 - e. SSD
 - f. memory modules
 - g. system board
3. Perform the following steps to disconnect the keyboard and backlight connectors from the computer.
 - a. Lift up the connector lock [1] and disconnect the cables from the connectors [2].
 - b. Peel back the screw shields [3].



4. Un-route the LVDS cable [1] and then remove the screws that secure the keyboard to the computer [2].



5. Lift and remove the keyboard from the computer.

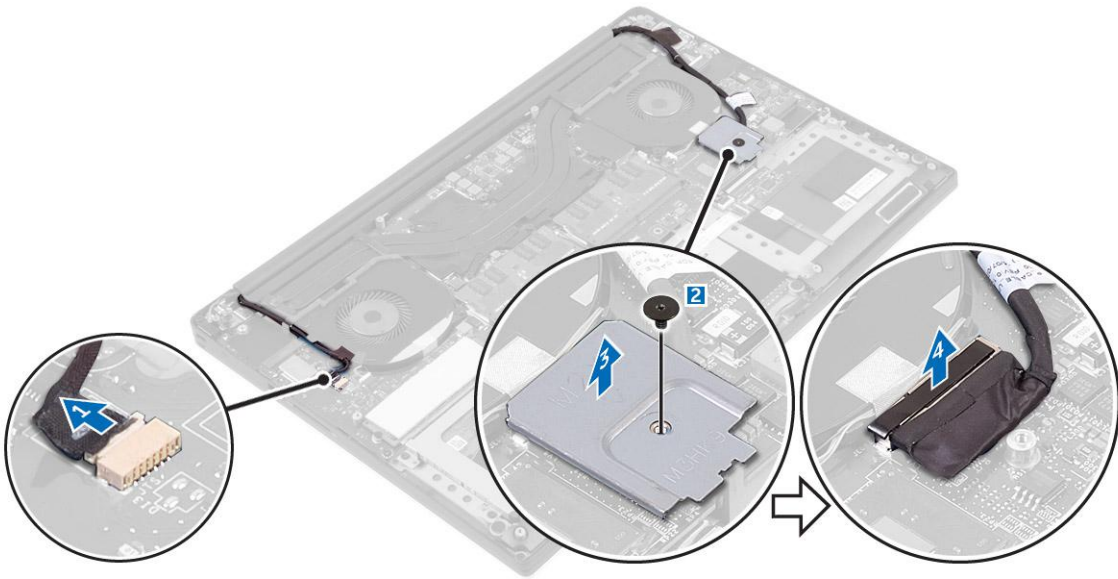


Installing the Keyboard

1. Adhere the Mylar to the keyboard.
2. Align the screw holes on the keyboard with the screw holes on the palm-rest assembly.
3. Replace the screws that secure the keyboard to the palm-rest assembly.
4. Adhere the Mylar to the screws that secure the keyboard to the palm-rest assembly.
5. Connect the keyboard cable and keyboard-backlight cable to the keyboard-controls board.
6. Install the:
 - a. system board
 - b. hard drive
 - c. base cover
7. Follow the procedures in *After Working Inside Your Computer*.

Removing the Display Assembly

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the:
 - a. [base cover](#)
 - b. [battery](#)
3. Perform the following steps:
 - a. Disconnect the left LVDS cable [1].
 - b. Remove the screw securing the metal bracket [2] and lift the bracket off the computer [3].
 - c. Disconnect the right LVDS cable from the system board [4].



4. Place the computer at the edge of a table as shown and remove the screws [1] securing the display assembly to the computer. Then, lift the display assembly off the computer [2].



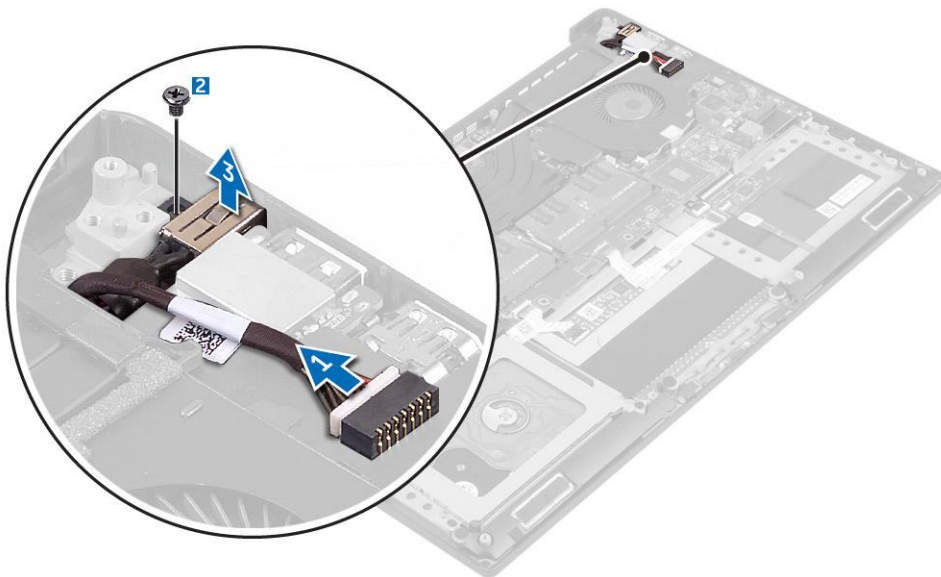
Installing the Display Assembly

1. Place the palm-rest assembly at the edge of the table with the speakers facing away from the edge.

2. Align the screw holes on the palm-rest assembly with the screw holes on the display hinges.
3. Replace the screws that secure the display hinges to the palm-rest assembly.
4. Adhere the tape and route the touch-screen cable through the routing guides on the fan.
5. Connect the touch-screen cable and display cable to the system board.
6. Replace the screw that secures the display-cable bracket to the system board.
7. Follow the procedures in *After Working Inside Your Computer*.

Removing the DC-in Connector

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the:
 - a. base cover
 - b. battery
3. Perform the following steps to remove the I/O board:
 - a. Disconnect the DC-in cable from the system board [1].
 - b. Remove the screw that secures the DC-in cable to the computer.
 - c. Remove the DC-in connector from the computer.



Installing the DC-in Adapter Port

1. Place the DC-in adapter port into the slot on the palm-rest assembly.
2. Route the power-adapter port cable through its routing guides on the palm-rest assembly.
3. Replace the screw that secures the power-adapter port to the palm-rest assembly.
4. Connect the power-adapter port cable to the system board.
5. Install the:
 - a. battery
 - b. base cover
6. Follow the procedures in *After Working Inside Your Computer*.

Removing the antenna cover

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the:

- a. base cover
 - b. battery
 - c. WLAN Card
 - d. display assembly
3. Carefully turn the display hinges at an angle.

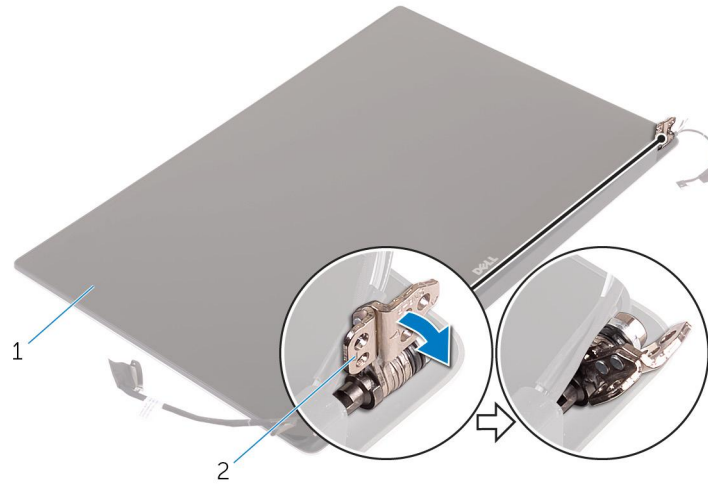


Figure 1. Turning the display hinge

- a. display assembly
 - b. display hinges (2)
4. Slide and lift the antenna cover away from the display assembly.

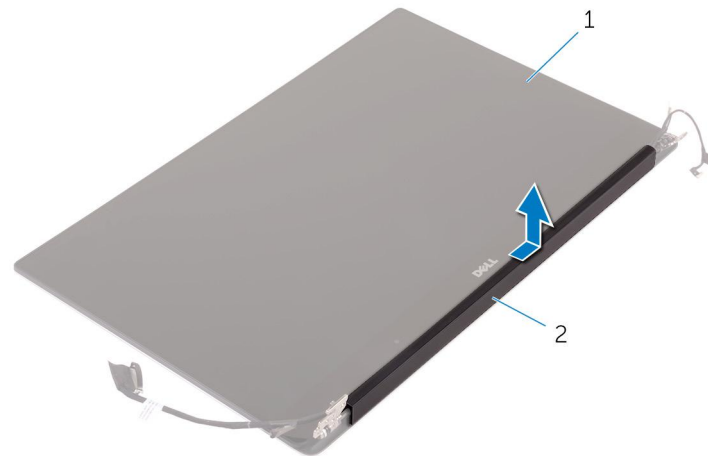


Figure 2. Removing the antenna cover

- a. display assembly
- b. antenna cover

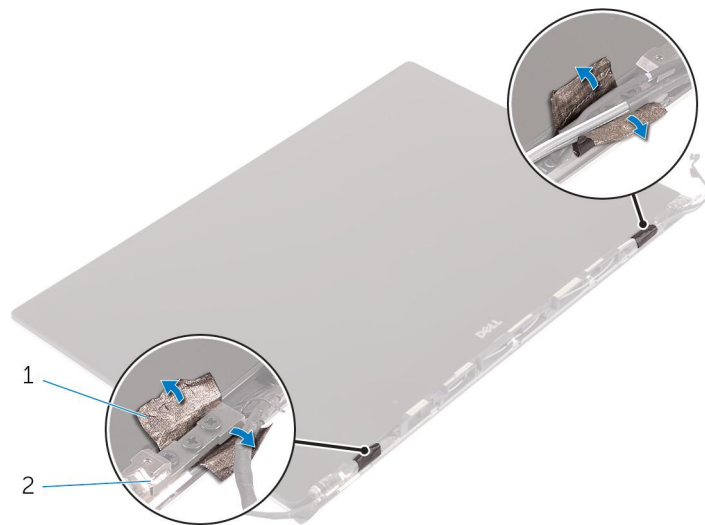
Installing the antenna cover

1. Replace the antenna cover on the display assembly.
2. Turn the display hinges to the normal position.
3. Install the:
 - a. display assembly
 - b. wireless card
 - c. battery
 - d. base cover

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

Removing the display hinges

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the:
 - a. base cover
 - b. battery
 - c. WLAN Card
 - d. display assembly
 - e. antenna cover
3. Peel off the tape to access the screws on the display hinges.



- a. tape
 - b. display hinges (2)
4. Remove the screws that secure the display hinges to the display assembly.
 5. Carefully lift the display hinges off the display assembly.



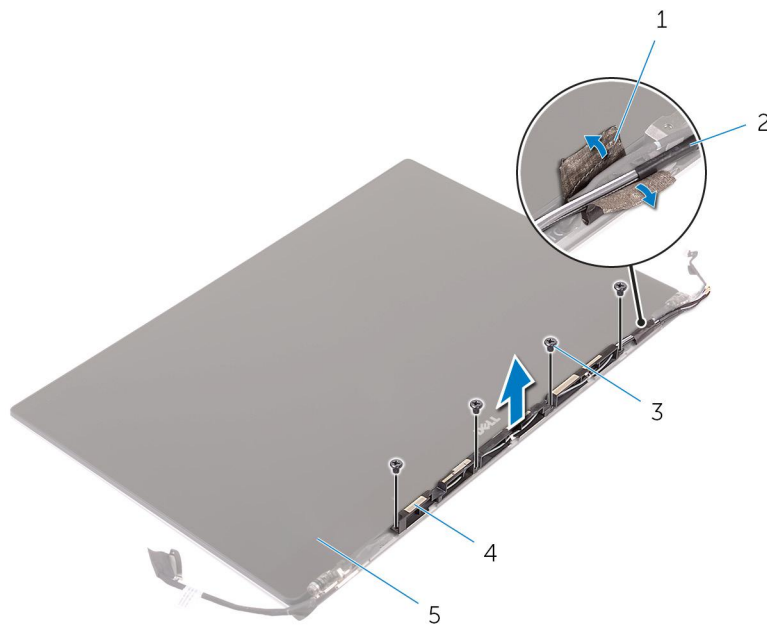
- a. screws (6)
- b. display hinges (2)

Installing the display hinges

1. Align the screw holes on the display hinges with the screw holes on the display assembly.
2. Replace the screws that secure the display hinges to the display assembly.
3. Adhere the tape to the display hinges.
4. Install the:
 - a. antenna cover
 - b. display assembly
 - c. wireless card
 - d. battery
 - e. base cover
5. Follow the procedures in *After Working Inside Your Computer*.

Removing the antenna module

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the:
 - a. base cover
 - b. battery
 - c. wireless card
 - d. display assembly
 - e. antenna cover
 - f. display hinges
3. Peel the tape that covers the antenna cables.
4. Remove the screws that secure the antenna module to the display assembly.
5. Lift the antenna module away from the display assembly.



- | | |
|---------------------|-------------------|
| 1. tape | 2. antenna cable |
| 3. screws (4) | 4. antenna module |
| 5. display assembly | |

Installing the antenna module

1. Align the screw holes on the antenna module with the screw holes on the display assembly.
2. Replace the screws that secure the antenna module to the display assembly.
3. Adhere the tape that covers the antenna cable.
4. Install the:
 - a. display hinges
 - b. antenna cover
 - c. display assembly
 - d. wireless card
 - e. battery
 - f. base cover
5. Follow the procedures in *After Working Inside Your Computer*.

Removing the palm-rest assembly

1. Follow the procedures in *Before Working Inside Your Computer*.
2. Remove the:
 - a. base cover
 - b. battery
 - c. memory modules
 - d. Follow the procedure from step 1 to step 4 in "Removing the hard drive"
 - e. wireless card
 - f. speakers
 - g. heat-sink
 - h. fans
 - i. display assembly
 - j. power-adapter port
 - k. system board
 - l. keyboard

After performing the steps in the prerequisites we are left with the palm-rest assembly.



- a. palm-rest assembly

Installing the palm-rest assembly

1. Place the palm-rest assembly on a clean and flat surface.

2. Install the:
 - a. keyboard
 - b. system board
 - c. power-adapter port
 - d. display assembly
 - e. fans
 - f. heat-sink assembly
 - g. speakers
 - h. wireless card
 - i. Follow the procedure from step 3 to step 6 in “Replacing the hard drive”.
 - j. memory modules
 - k. battery
 - l. base cover
3. Follow the procedures in *After Working Inside Your Computer*.

BIOS setup

CAUTION: Unless you are an expert computer user, do not change the settings in the BIOS Setup program. Certain changes can make your computer work incorrectly.

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

NOTE: Before you change BIOS Setup program, it is recommended that you write down the BIOS Setup program screen information for future reference.

Use the BIOS Setup program for the following purposes:

- Get information about the hardware installed in your computer, such as the amount of RAM and the size of the hard drive.
- Change the system configuration information.
- Set or change a user-selectable option, such as the user password, type of hard drive installed, and enabling or disabling base devices.

Topics:

- [Boot Sequence](#)
- [BIOS overview](#)
- [Entering BIOS setup program](#)
- [Navigation keys](#)
- [One time boot menu](#)
- [System Setup Options](#)
- [Updating the BIOS](#)
- [System and setup password](#)
- [Clearing BIOS \(System Setup\) and System passwords](#)

Boot Sequence

Boot sequence enables 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: XXXX denotes the SATA drive number.

- Optical Drive (if available)
- SATA Hard Drive (if available)
- Diagnostics

NOTE: Choosing **Diagnostics**, displays the **SupportAssist** screen.

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

BIOS overview

The BIOS manages data flow between the computer's operating system and attached devices such as hard disk, video adapter, keyboard, mouse, and printer.

Entering BIOS setup program

1. Turn on your computer.
2. Press F2 immediately to enter the BIOS setup program.

i **NOTE:** If you wait too long and the operating system logo appears, continue to wait until you see the desktop. Then, turn off your computer and try again.

Navigation keys

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

Table 2. Navigation keys

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

One time boot menu

To enter **one time boot menu**, turn on your computer, and then press F12 immediately.

i **NOTE:** It is recommended to shutdown the computer if it is on.

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 (if available)
i **NOTE:** XXX denotes the SATA drive number.
- Optical Drive (if available)
- SATA Hard Drive (if available)
- Diagnostics

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

System Setup Options

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

Table 3. Main

Option	Description
System Time/Date	Allows you to set the date and time.
BIOS Version	Displays the BIOS version.
Product Name	Displays the product name. Dell Precision M3800 (Default Setting)
Service Tag	Displays the service tag.
Asset Tag	Displays the asset tag. None (Default Setting)
CPU Type	Displays the CPU type.
CPU Speed	Displays the CPU speed.
CPU ID	Displays the CPU ID.
CPU Cache	Displays the sizes of the CPU caches.
Fixed HDD	Displays the type and size of the HDD. WDC WD10SPCX-75HWSTO (1000 GB) (Default Setting)
mSATA Device	Displays the type and size of the mSATA device.
AC Adapter Type	Displays the type of the AC adapter. None (Default Setting)
System Memory	Displays the size of the system memory.
Extended Memory	Displays the size of the extended memory.
Memory Speed	Displays the speed of the memory.
Keyboard Type	Displays the type of keyboard. Backlite (Default Setting)

Table 4. Advanced

Option	Description
Intel (R) SpeedStep (TM)	Allows you to enable or disable the Intel (R) SpeedStep (TM) feature. Enabled (Default Setting)
Virtualization	This option specifies whether a Virtual Machine Monitor (VMM) can utilize the additional hardware capabilities provided by Intel Virtualization technology. Allows you to enable or disable the Virtualization feature. Enabled (Default Setting)
USB Emulation	Allows you to enable or disable the USB Emulation feature. Enabled (Default Setting)
USB PowerShare	Allows you to enable or disable the USB PowerShare feature. Enabled (Default Setting)
USB Wake Support	This option allows you to enable USB devices to wake the system from Standby. Disable (Default Setting)
SATA Operation	Displays the SATA Operation information.
Adapter Warnings	Allows you to enable or disable the adapter warnings feature.

Table 4. Advanced (continued)

Option	Description
Multimedia Key Behaviour	Function Key (Default Setting)
Battery Health	Displays the battery health information.
Battery Charge Configuration	Adaptive (Default Setting)
Miscellaneous Devices	Allows you enable or disable the various on board devices. The options are: <ul style="list-style-type: none"> ● External USB Ports - Enabled (Default Setting) ● USB Debug - Disabled (Default Setting)

Table 5. Security

Option	Description
Unlock Setup Status	Unlocked (Default Setting)
Admin Password Status	Displays the status of the admin password. Default Setting: Not set
System Password Status	Displays the status of the system password. Default Setting: Not set
HDD Password Status	Displays the status of the system password. Default Setting: Not set
Asset Tag	Allows you to set the asset tag.
Admin Password	Allows you to set, change, or delete the administrator (admin) password. <i>i</i> NOTE: You must set the admin password before you set the system or hard drive password. <i>i</i> NOTE: Successful password changes take effect immediately. <i>i</i> NOTE: Deleting the admin password automatically deletes the system password and the hard drive password. <i>i</i> NOTE: Successful password changes take effect immediately.
System Password	Allows you to set, change or delete the system password. <i>i</i> NOTE: Successful password changes take effect immediately.
HDD Password	Allows you to set, change or delete the administrator password.
Password Change	Allows you to enable or disable permissions to set a System password and a Hard Drive password when the admin password is set. Default Setting: Permitted
Computrace	Allows you to activate or disable the optional Computrace software The options are: <ul style="list-style-type: none"> ● Deactivate (Default Setting) ● Activate <i>i</i> NOTE: The Activate and Disable options will permanently activate or disable the feature and no further changes will be allowed.
TPM Security	This option lets you control whether the Trusted Platform Module (TPM) in the system is enabled and visible to the operating system. When disabled the BIOS will not turn On the TPM During POST. The TPM will be non-functional and invisible to the operating system. When enabled, the BIOS will turn On the TPM during POST so that it can be used by the operating system. This option is Enable by default.

Table 5. Security (continued)



Option	Description
	<p> NOTE: Disabling this option does not change any settings you may have made to the TPM, nor does it delete or change any information or keys you may have stored there. It simply turns Off the TPM so that it cannot be used. When you re-enable this option, the TPM will function exactly as it did before it was disabled.</p> <p> NOTE: Changes to this option take effect immediately.</p>

Table 6. Boot


Option	Description
Boot List Option	Default Setting: Legacy
Secure Boot	This option enables or disables the Secure Boot feature. <ul style="list-style-type: none"> ● Disabled (Default Setting) - Windows 7 ● Enabled - Windows 8.1
Load Legacy Option ROM	This option enables or disables the Load Legacy Option ROM feature. <ul style="list-style-type: none"> ● Enabled (Default Setting) - Windows 7 ● Disabled - Windows 8.1
Set Boot Priority	Allows you to change the order in which the computer attempts to find an operating system: <ul style="list-style-type: none"> ● 1st Boot Priority [CD/DVD/CD-RW Drive] ● 2nd Boot Priority [Network] ● 3rd Boot Priority [mini SSD] ● 4th Boot Priority [USB Storage Device] ● 5th Boot Priority [Hard Drive] ● 6th Boot Priority [Diskette Drive]

Table 7. Exit


Option	Description
Save Changes and Reset	Allows you to save the changes you made.
Discard Changes and Reset	Allows you to discard the changes you made.
Restore Defaults	Allows you to restore the default options.
Discard Changes	Allows you to discard the changes you made.
Save Changes	Allows you to save the changes you made.

Updating the BIOS

Updating the BIOS in Windows

 **CAUTION:** If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, see Knowledge Article: <https://www.dell.com/support/article/sln153694>

1. Go to www.dell.com/support.
2. Click **Product support**. In the **Search support** box, enter the Service Tag of your computer, and then click **Search**.

 **NOTE:** If you do not have the Service Tag, use the SupportAssist feature to automatically identify your computer. You can also use the product ID or manually browse for your computer model.


3. Click **Drivers & Downloads**. Expand **Find drivers**.
4. Select the operating system installed on your computer.
5. In the **Category** drop-down list, select **BIOS**.
6. Select the latest version of BIOS, and click **Download** to download the BIOS file for your computer.
7. After the download is complete, browse the folder where you saved the BIOS update file.
8. Double-click the BIOS update file icon and follow the on-screen instructions.

For more information, see knowledge base article [000124211](https://www.dell.com/support/article/000124211) at www.dell.com/support.

Updating the BIOS in Linux and Ubuntu

To update the system BIOS on a computer that is installed with Linux or Ubuntu, see the knowledge base article [000131486](https://www.dell.com/support/article/000131486) at www.dell.com/support.


Updating the BIOS using the USB drive in Windows

 **CAUTION:** If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, see Knowledge Article: <https://www.dell.com/support/article/sln153694>

1. Follow the procedure from step 1 to step 6 in [Updating the BIOS in Windows](#) to download the latest BIOS setup program file.
2. Create a bootable USB drive. For more information, see the knowledge base article [000145519](https://www.dell.com/support/article/000145519) at www.dell.com/support.
3. Copy the BIOS setup program file to the bootable USB drive.
4. Connect the bootable USB drive to the computer that needs the BIOS update.
5. Restart the computer and press **F12**.
6. Select the USB drive from the **One Time Boot Menu**.
7. Type the BIOS setup program filename and press **Enter**.
The **BIOS Update Utility** appears.
8. Follow the on-screen instructions to complete the BIOS update.

Updating the BIOS from the F12 One-Time boot menu


Update your computer BIOS using the BIOS update.exe file that is copied to a FAT32 USB drive and booting from the F12 One-Time boot menu.

 **CAUTION:** If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, see Knowledge Article: <https://www.dell.com/support/article/sln153694>

BIOS Update

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

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


 **NOTE:** Only computers with BIOS Flash Update option in the F12 One-Time boot menu can use this function.

Updating from the One-Time boot menu

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

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

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

 **CAUTION:** Do not turn off the computer during the BIOS update process. The computer may not boot if you turn off your computer.

1. From a turn off state, insert the USB drive where you copied the flash into a USB port of the computer.
2. Turn on the computer and press F12 to access the One-Time Boot Menu, select BIOS Update using the mouse or arrow keys then press Enter.
The flash BIOS menu is displayed.
3. Click **Flash from file**.
4. Select external USB device.
5. Select the file and double-click the flash target file, and then click **Submit**.
6. Click **Update BIOS**. The computer restarts to flash the BIOS.
7. The computer will restart after the BIOS update is completed.

System and setup password


Table 8. System and setup password

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

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

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

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

 **NOTE:** System and setup password feature is disabled.

Assigning a system setup password

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

To enter the system setup, press F12 immediately after a power-on or reboot.


1. In the **System BIOS** or **System Setup** screen, select **Security** and press Enter.
The **Security** screen is displayed.
2. Select **System/Admin Password** and create a password in the **Enter the new password** field.
Use the following guidelines to assign the system password:
 - A password can have up to 32 characters.
 - At least one special character: ! " # \$ % & ' () * + , - . / : ; < = > ? @ [\] ^ _ ` { | }
 - Numbers 0 through 9.
 - Upper case letters from A to Z.
 - Lower case letters from a to z.
3. Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.
4. Press Esc and save the changes as prompted by the pop-up message.
5. Press Y to save the changes.
The computer restarts.

Deleting or changing an existing system 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 F12 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**, update, or delete the existing system password, and press Enter or Tab.
4. Select **Setup Password**, update, or delete the existing setup password, and press Enter or Tab.

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

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

Clearing BIOS (System Setup) and System passwords

To clear the system or BIOS passwords, contact Dell technical support as described at www.dell.com/contactdell.

 **NOTE:** For information on how to reset Windows or application passwords, refer to the documentation accompanying Windows or your application.

Troubleshooting

Topics:

- [Handling swollen Lithium-ion batteries](#)
- [Built-in self-test \(BIST\)](#)
- [Recovering the operating system](#)
- [Backup media and recovery options](#)
- [WiFi power cycle](#)
- [Drain residual flea power \(perform hard reset\)](#)

Handling swollen Lithium-ion batteries

Like most laptops, Dell laptops use lithium-ion batteries. One type of lithium-ion battery is the lithium-ion polymer battery. Lithium-ion polymer batteries have increased in popularity in recent years and have become standard in the electronics industry due to customer preferences for a slim form factor (especially with newer ultra-thin laptops) and long battery life. Inherent to lithium-ion polymer battery technology is the potential for swelling of the battery cells.

Swollen battery may impact the performance of the laptop. To prevent possible further damage to the device enclosure or internal components leading to malfunction, discontinue the use of the laptop and discharge it by disconnecting the AC adapter and letting the battery drain.

Swollen batteries should not be used and should be replaced and disposed of properly. We recommend contacting Dell product support for options to replace a swollen battery under the terms of the applicable warranty or service contract, including options for replacement by a Dell authorized service technician.

The guidelines for handling and replacing Lithium-ion batteries are as follows:

- Exercise caution when handling Lithium-ion batteries.
- Discharge the battery before removing it from the system. To discharge the battery, unplug the AC adapter from the system and operate the system only on battery power. When the system will no longer power on when the power button is pressed, the battery is fully discharged.
- Do not crush, drop, mutilate, or penetrate the battery with foreign objects.
- Do not expose the battery to high temperatures, or disassemble battery packs and cells.
- Do not apply pressure to the surface of the battery.
- Do not bend the battery.
- Do not use tools of any type to pry on or against the battery.
- If a battery gets stuck in a device as a result of swelling, do not try to free it as puncturing, bending, or crushing a battery can be dangerous.
- Do not attempt to reassemble a damaged or swollen battery into a laptop.
- Swollen batteries that are covered under warranty should be returned to Dell in an approved shipping container (provided by Dell)—this is to comply with transportation regulations. Swollen batteries that are not covered under warranty should be disposed of at an approved recycling center. Contact Dell product support at <https://www.dell.com/support> for assistance and further instructions.
- Using a non-Dell or incompatible battery may increase the risk of fire or explosion. Replace the battery only with a compatible battery purchased from Dell that is designed to work with your Dell computer. Do not use a battery from other computers with your computer. Always purchase genuine batteries from <https://www.dell.com> or otherwise directly from Dell.

Lithium-ion batteries can swell for various reasons such as age, number of charge cycles, or exposure to high heat. For more information on how to improve the performance and lifespan of the laptop battery and to minimize the possibility of occurrence of the issue, see [Dell Laptop Battery - Frequently Asked Questions](#).

Built-in self-test (BIST)

M-BIST

M-BIST (Built In Self-Test) is the system board's built-in self-test diagnostics tool that improves the diagnostics accuracy of system board embedded controller (EC) failures.

NOTE: M-BIST can be manually initiated before POST (Power On Self Test).

How to run M-BIST

NOTE: M-BIST must be initiated on the system from a power-off state either connected to AC power or with battery only.

1. Press and hold both the **M** key on the keyboard and the **power button** to initiate M-BIST.
2. With both the **M** key and the **power button** held down, the battery indicator LED may exhibit two states:
 - a. OFF: No fault detected with the system board
 - b. AMBER: Indicates a problem with the system board
3. If there is a failure with the system board, the battery status LED will flash one of the following error codes for 30 seconds:

Table 9. LED error codes

Blinking Pattern		Possible Problem
Amber	White	
2	1	CPU Failure
2	8	LCD Power Rail Failure
1	1	TPM Detection Failure
2	4	Unrecoverable SPI Failure

4. If there is no failure with the system board, the LCD will cycle through the solid color screens described in the LCD-BIST section for 30 seconds and then power off.

LCD Power rail test (L-BIST)

L-BIST is an enhancement to the single LED error code diagnostics and is automatically initiated during POST. L-BIST will check the LCD power rail. If there is no power being supplied to the LCD (i.e., the L-BIST circuit fails), the battery status LED will flash either an error code [2,8] or an error code [2,7].

NOTE: If L-BIST fails, LCD-BIST cannot function as no power will be supplied to the LCD.

How to invoke L-BIST Test:

1. Press the power button to start the system.
2. If the system does not start up normally, look at the battery status LED:
 - If the battery status LED flashes an error code [2,7], the display cable may not be connected properly.
 - If the battery status LED flashes an error code [2,8], there is a failure on the LCD power rail of the system board, hence there is no power supplied to the LCD.
3. For cases, when a [2,7] error code is shown, check to see if the display cable is properly connected.
4. For cases when a [2,8] error code is shown, replace the system board.


LCD Built-in Self Test (BIST)

Dell laptops have a built-in diagnostic tool that helps you determine if the screen abnormality you are experiencing is an inherent problem with the LCD (screen) of the Dell laptop or with the video card (GPU) and PC settings.

When you notice screen abnormalities like flickering, distortion, clarity issues, fuzzy or blurry image, horizontal or vertical lines, color fade etc., it is always a good practice to isolate the LCD (screen) by running the Built-In Self Test (BIST).

How to invoke LCD BIST Test

1. Power off the Dell laptop.
2. Disconnect any peripherals that are connected to the laptop. Connect only the AC adapter (charger) to the laptop.
3. Ensure that the LCD (screen) is clean (no dust particles on the surface of the screen).
4. Press and hold **D** key and **Power on** the laptop to enter LCD built-in self test (BIST) mode. Continue to hold the D key, until the system boots up.
5. The screen will display solid colors and change colors on the entire screen to white, black, red, green, and blue twice.
6. Then it will display the colors white, black and red.
7. Carefully inspect the screen for abnormalities (any lines, fuzzy color or distortion on the screen).
8. At the end of the last solid color (red), the system will shut down.

 **NOTE:** Dell SupportAssist Pre-boot diagnostics upon launch, initiates an LCD BIST first, expecting a user intervention confirm functionality of the LCD.

Recovering the operating system

When your computer is unable to boot to the operating system even after repeated attempts, it automatically starts Dell SupportAssist OS Recovery.

Dell SupportAssist OS Recovery is a standalone tool that is preinstalled in all Dell computers installed with Windows operating system. It consists of tools to diagnose and troubleshoot issues that may occur before your computer boots to the operating system. It enables you to diagnose hardware issues, repair your computer, back up your files, or restore your computer to its factory state.

You can also download it from the Dell Support website to troubleshoot and fix your computer when it fails to boot into their primary operating system due to software or hardware failures.


For more information about the Dell SupportAssist OS Recovery, see *Dell SupportAssist OS Recovery User's Guide* at www.dell.com/serviceabilitytools. Click **SupportAssist** and then, click **SupportAssist OS Recovery**.

Backup media and recovery options

It is recommended to create a recovery drive to troubleshoot and fix problems that may occur with Windows. Dell proposes multiple options for recovering Windows operating system on your Dell PC. For more information, see [Dell Windows Backup Media and Recovery Options](#).

WiFi power cycle

If your computer is unable to access the internet due to WiFi connectivity issues a WiFi power cycle procedure may be performed. The following procedure provides the instructions on how to conduct a WiFi power cycle:

 **NOTE:** Some ISPs (Internet Service Providers) provide a modem/router combo device.

1. Turn off your computer.
2. Turn off the modem.
3. Turn off the wireless router.
4. Wait for 30 seconds.
5. Turn on the wireless router.
6. Turn on the modem.
7. Turn on your computer.

Drain residual flea power (perform hard reset)

Flea power is the residual static electricity that remains in the computer even after it has been powered off and the battery is removed.

For your safety, and to protect the sensitive electronic components in your computer, you are requested to drain residual flea power before removing or replacing any components in your computer.

Draining residual flea power, also known as a performing a "hard reset", is also a common troubleshooting step if your computer does not power on or boot into the operating system.

To drain residual flea power (perform a hard reset)

1. Turn off your computer.
2. Disconnect the power adapter from your computer.
3. Remove the base cover.
4. Remove the battery.
5. Press and hold the power button for 20 seconds to drain the flea power.
6. Install the battery.
7. Install the base cover.
8. Connect the power adapter to your computer.
9. Turn on your computer.



NOTE: For more information about performing a hard reset, see the knowledge base article [000130881](https://www.dell.com/support) at www.dell.com/support.

Diagnostics

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

Topics:


- [Enhanced Pre-Boot System Assessment — ePSA diagnostics](#)
- [Device Status Lights](#)

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:


The ePSA diagnostics can be initiated by the FN+PWR buttons while powering on the computer.

- 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

 **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.

Device Status Lights

Table 10.

Icon	Description
	Turns on when you turn on the computer.

Battery status lights

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

Alternately blinking amber light and white light

An unauthenticated or unsupported non-Dell AC adapter is attached to your laptop. Replug battery connector, replace battery if the issue recurs.

Alternately blinking amber light with steady white light

Temporary battery failure with AC adapter present. Replug battery connector, replace battery if the issue recurs.

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

Diagnostic LED

Occasionally the computer may indicate bicolor flashes on Battery Charge LED. A specific blink pattern, flashing a pattern of amber, followed by white, and then the same pattern repeats.

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

The system does not shut down when displaying the Diagnostic Error Codes. Diagnostic Error Codes supersedes any other use of the LED. For instance, on laptops, battery codes for Low Battery or Battery Failure situations are not displayed when the Diagnostic Error Codes are being displayed:

Table 11. LED pattern

Blinking pattern		Problem Description	Suggested Resolution
Amber	White		
2	1	processor	processor failure
2	2	system board, BIOS ROM	system board, covers BIOS corruption or ROM error
2	3	memory	no memory/no RAM detected
2	4	memory	memory failure/RAM failure
2	5	memory	invalid memory installed
2	6	system board; chipset	system board/ chipset error
2	7	display	display failure
3	1	RTC power failure	coin-cell battery failure
3	2	PCI/Video	PCI/Video card/chip failure
3	3	BIOS recovery 1	recovery image not found
3	4	BIOS recovery 2	recovery image found but invalid

Technical Specifications



 **NOTE:** Offerings may vary by region. For more information regarding the configuration of your computer, click Start  (Start icon) > **Help and Support**, and then select the option to view information about your computer.

Table 12. System Information

Feature	Specification
System Chipset	Mobile Intel HM170 Express Chipset / Intel CM236
DMA Channels	two VT-d DMA remap engines
Interrupt Levels	Intel 64 and IA-32 Architecture
BIOS Chip (NVRAM)	8 MB

Table 13. Processor

Feature	Specification
Processor type	6th Generation Intel Core i3/ 6th Generation Intel Quad Core i5/ 6th Generation Intel Quad Core i7
L1 cache	up to 256 KB cache depending on processor type
L2 cache	up to 1024 KB cache depending on processor type
L3 cache	up to 6144 KB cache depending on processor type

Table 14. Memory

Feature	Specification
Type	DDR4
Speed	2133 MHz
Connectors	2 SoDIMM Sockets
Capacity	8 GB, 16 GB, and 32GB
Minimum Memory	8 GB
Maximum memory	32 GB

Table 15. Video

Feature	Specification
Type	
Discrete	NVIDIA GeForce GTX 960M
Integrated	Intel HD Graphics 530
Data bus	PCIe x16, Gen3
Memory	
Discrete	Up to 2 GB GDDR5
Integrated	Shared system memory

Table 16. Audio

Feature	Specification
Integrated	dual-channel High-Definition audio

Table 17. Communication

Feature	Specification
Network adapter	Ethernet via USB-to-Ethernet Dongle provided in box. i NOTE: No RJ45 (10/100/1000Base-T, IPv6) provided.
Wireless	<ul style="list-style-type: none"> • Wi-Fi 802.11ac • Wi-Fi 802.11a/g/n • Bluetooth 4.1 • Intel WiDi (optional)

Table 18. Ports and Connectors

Feature	Specification
Audio	<ul style="list-style-type: none"> • One headset port (headphone and microphone combo)
USB 3.0	<ul style="list-style-type: none"> • two USB 3.0 ports with PowerShare • One Thunderbolt 3 port with PowerShare (USB-C)
Video	<ul style="list-style-type: none"> • one HDMI 1.4
Memory card reader	SD 4.0

Table 19. Display

Feature	Specification
Type	1920 x 1080 FHD 3840 x 2160 UltraHD
Size	15.6 inches FHD 15.6 inches UltraHD
Dimensions:	
Height	194.50 mm (7.66 in)
Width	345.60 mm (13.61 in)
Diagonal	396.52 mm (15.61 in)
Active area (X/Y)	194.50 mm (7.66 in) x 345.60 mm (13.61 in) x 396.52 mm (15.61 in)
Maximum resolution	1920 X 1080 pixels / 3840 X 2160 pixels
Maximum Brightness	400 nits
Operating angle	0° (closed) to 135°
Refresh rate	60 Hz
Minimum viewing angles:	
Horizontal	80/80
Vertical	80/80

Table 20. Keyboard

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

Table 21. Touchpad

Feature	Specification
Active Area:	
X-axis	105 mm
Y-axis	80 mm

Table 22. Camera

Feature	Specification
Type	HD Camera / Digital Array Microphone
Still Resolution	0.92 megapixels (Maximum)
Video Resolution	1280 x 720 pixels (HD) at 30 frames per second (Maximum)
Diagonal	74 degrees

Table 23. Storage

Feature	Specification
Storage:	
Storage Interface	SATA 3 Gbps SATA 6 Gbps
Drives configurations:	
Hard Drives (optional)	one internal 2.5 inch SATA HDD (supports Intel Smart Response Technology)
Solid State Drives (optional)	one Solid State Drive (SSD), with Intel Cache support
Size:	512 GB and 1 TB

Table 24. Battery

Feature	Specification
Type	Li-polymer 3-cell (56 Whr) / 6-cell (84 Whr)
Dimensions :	
56 Whr :	
Depth	223.20 mm (8.79 in)
Height	7.20 mm (0.28 in)
Width	71.80 mm (2.83 in)
Weight	0.54 lb (0.24 kg)
84 Whr :	
Depth	330.50 mm (13.01 in)
Height	7.20 mm (0.28 in)
Width	71.80 mm (2.83 in)

Table 24. Battery (continued)

Feature	Specification
Weight	0.76 lb (0.34 kg)
Voltage	11.4 V
Life span	300 discharge/charge cycles
Temperature range:	
Operating (approximate)	<ul style="list-style-type: none"> • Charge : 0 °C to 50 °C (32 °F to 158 °F) • Discharge: 0 °C to 70 °C (32 °F to 122 °F) • Operating: 0 °C to 35 °C (32 °F to 95 °F)
Non-operating	-40 °C to 65 °C (-40 °F to 149 °F)
Coin-cell battery	ML1220

Table 25. AC Adapter

Feature	Specification
Input voltage	100 VAC to 240 VAC
Input current (maximum)	1.80 A
Input frequency	50 Hz to 60 Hz
Output power	130 W
Output current	6.67 A
Rated output voltage	19.50 VDC
Dimensions:	
Height	22 mm (0.86 inches)
Width	66 mm (2.59 inches)
Depth	143 mm (5.62 inches)
Temperature range:	
Operating	0 °C to 40 °C (32 °F to 104 °F)
Non Operating	-40 °C to 70 °C (-40 °F to 158 °F)

Table 26. Physical Dimensions

Physical	Specification
Height:	17 mm (0.66 in)
Width	357 mm (14.06 in)
Depth	235 mm (9.27 in)
Weight (Minimum)	2 kg (4.41 lb)


Table 27. Environmental

Feature	Specification
Temperature range:	
Operating	0 °C to 40 °C (32 °F to 104°F)
Storage	-40 °C to 70 °C (-40 °F to 158 °F)
Relative humidity (maximum):	
Operating	10 % to 90 % (non-condensing)
Storage	10 % to 95 % (non-condensing)

Table 27. Environmental (continued)

Feature	Specification
Maximum vibration:	
Operating	0.66 GRMS, 2 Hz - 600 Hz
Storage	1.3 GRMS, 2 Hz - 600 Hz
Maximum shock:	
Operating	110 G, 2 ms
Non-operating	160 G, 2 ms
Altitude:	
Operating	-15.2 m to 30482000 m (-50 to 10,0006560 ft)
Storage	15.2 m to 10,668 m (-50 ft to 35,000 ft)
Airborne contaminant level	G1 as defined by ISA-S71.04-1985

Contacting Dell

 **NOTE:** If you do not have an active Internet connection, you can find contact information on your purchase invoice, packing slip, bill, or Dell product catalog.

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical support, or customer service issues:

1. 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.