

Dell Latitude E5470

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:

- [Safety instructions](#)
- [Before working inside your computer](#)
- [Turning off your computer](#)
- [After working inside your computer](#)
- [Keyboard Short-Cut Key Function](#)

Safety instructions

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

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

i **NOTE:** 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.

i **NOTE:** Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage at www.dell.com/regulatory_compliance

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

△ CAUTION: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface that is grounded to ground yourself before you touch the computer to perform any disassembly tasks.

△ 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.

i **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.

4. Disconnect all the network cables from the computer.

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

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

NOTE: 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.

Turning off your computer

After working inside your computer

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

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

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

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

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

Keyboard Short-Cut Key Function

The below table is a list of combination of short-cut key functions using the E3 series keyboard.

Table 1. Keyboard Short-Cut Key

Combination Key	83 Keys Keyboard	104 Keys Keyboard
<FN>+<F1>	Enter sleep/hibernation mode.	
<FN>+<F2>	In the BIOS, the Post Behaviour section, the Keypad(Embedded) option is set to 'Fn Key Only' option by default. Change to 'By Numlock' otherwise, user will need to press and hold the <FN>+<F2> keys in order to use the embedded number keys.	N/A
<FN>+<F3>	Enable or disable Scroll Lock.	
<FN>+<F5>	Enable or disable the touchpad and/or touchstick.	
<FN>+<F7>	Launch Dell Control Point.	
<FN>+<F8>	Enable or disable multiple display. Option include, clone display or extended display to an external monitor. Or project the current view to external monitor only.	
<FN>+<F10>	Go back to previous track when playing a file in Windows Media Player.	N/A
<FN>+<F11>	Play or pause a file in Windows Media Player.	N/A

Table 1. Keyboard Short-Cut Key (continued)

Combination Key	83 Keys Keyboard	104 Keys Keyboard
<FN>+<F12>	Go forward to the next track when playing a file in Windows Media Player.	N/A
<FN>+ <End>	Print the current desktop screen.	
<FN>+ <Insert>	Performs a "Break". This key is used in programming and debugging applications. It has no function in most programs.	
<FN>+ <Up Arrow>	Increase the LCD brightness.	
<FN>+ <Down Arrow>	Decrease the LCD brightness.	
<FN>+ <Right Arrow>	Increase and decrease the keyboard backlight illumination.	
Windows logo key and <M>	Minimizes all open windows.	
Windows logo key and <Shift>+<M>	Maximizes all windows.	
Windows logo key and <E>	Runs Windows Explorer.	
Windows logo key and <R>	Opens the Run dialog box.	
Windows logo key and <F>	Opens the Search Results dialog box.	
Windows logo key and <FN>+<Pause>	Opens the System Properties dialog box.	
<FN>+<PrtScr>	Toggle Wireless on/off	

Disassembly and reassembly

Topics:

- Recommended tools
- Subscriber Identification Module (SIM) card
- Base cover
- Battery
- Hard drive
- Solid State Drive
- Memory modules
- WLAN card
- WWAN card
- Docking frame
- Touchpad
- Power connector port
- Keyboard lattice and Keyboard
- Display assembly
- Display hinges
- SmartCard module
- Fingerprint reader
- LED board
- Heat sink
- Speaker
- System board
- Coin-cell battery
- Palm rest

Recommended tools

The procedures in this document require the following tools:

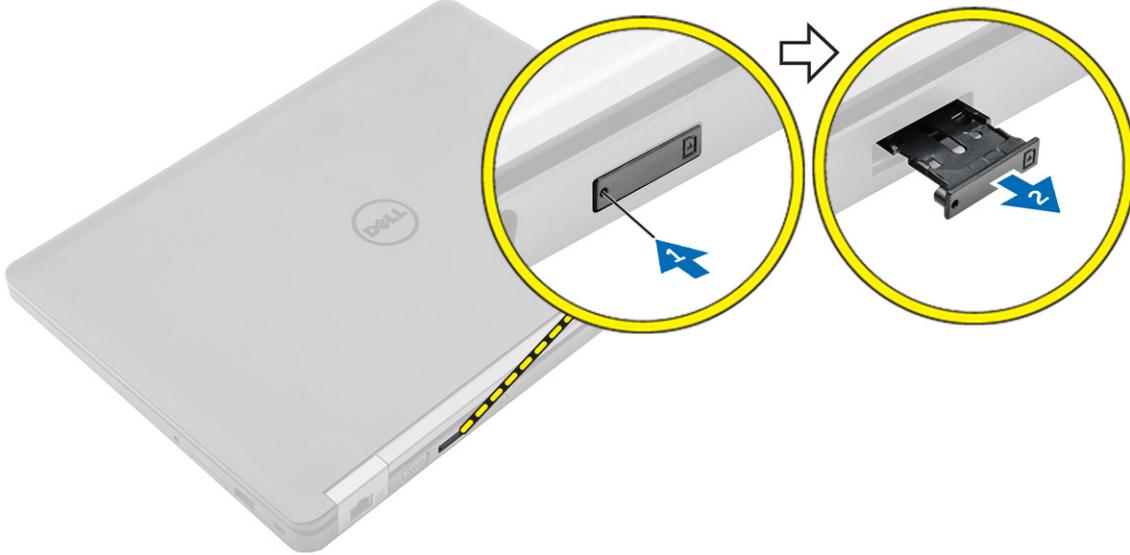
- Phillips #0 screwdriver
- Phillips #1 screwdriver
- Small plastic scribe

Subscriber Identification Module (SIM) card

Installing the Subscriber Identification Module SIM card

1. Follow the procedure in [Before working inside your computer](#).
2. Insert a paperclip or a SIM card removal tool into the pinhole to remove the SIM card tray [1].
3. Place the SIM card on the SIM card tray [2].

4. Push the SIM card tray into the slot until it clicks into place.



Removing the Subscriber Identification Module SIM card

CAUTION: Removing the SIM card when the computer is on may cause data loss or damage the card. Ensure your computer is turned off or the network connections are disabled.

1. Insert a paperclip or a SIM card removal tool into the pinhole on the SIM card tray.
2. Remove the SIM card from the SIM card tray.
3. Push the SIM card tray into the slot until it clicks into place.

Base cover

Removing the base cover

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

NOTE: You may need a plastic scribe to lift the base cover from the edges.



Installing the base cover

1. Align the base cover with the screw holders on the computer.
2. Press the edges of the cover until it clicks into place.
3. Tighten the screws to secure the base cover to the computer.
4. Follow the procedure in [After working inside your computer](#).

Battery

Lithium-ion battery precautions

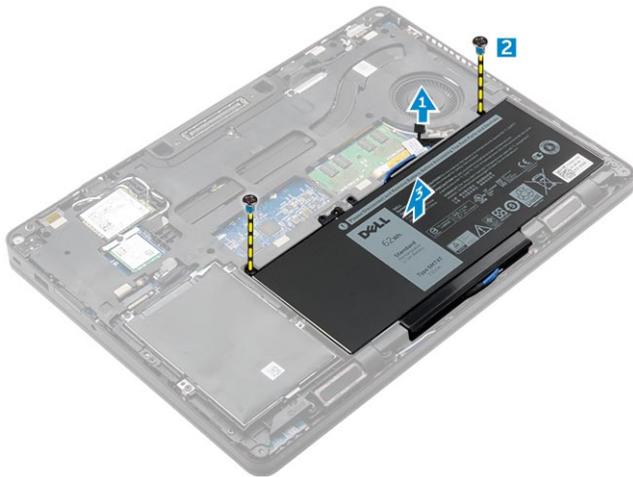
CAUTION:

- Exercise caution when handling Lithium-ion batteries.
- Discharge the battery completely before removing it. Disconnect the AC power adapter from the system and operate the computer solely on battery power—the battery is fully discharged when the computer no longer turns on when the power button is pressed.
- 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 kind to pry on or against the battery.
- Ensure any screws during the servicing of this product are not lost or misplaced, to prevent accidental puncture or damage to the battery and other system components.
- If the battery gets stuck inside your computer as a result of swelling, do not try to release it as puncturing, bending, or crushing a lithium-ion battery can be dangerous. In such an instance, contact Dell technical support for assistance. See www.dell.com/contactdell.
- Always purchase genuine batteries from www.dell.com or authorized Dell partners and resellers.
- Swollen batteries should not be used and should be replaced and disposed properly. For guidelines on how to handle and replace swollen Lithium-ion batteries, see [Handling swollen Lithium-ion batteries](#).

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



4. Unroute the cable from the routing channel [1] and remove the cable from the battery [2].



Installing the battery

NOTE: If your computer supports a 6-cell battery, it will not support a hard drive.

1. Connect the battery cable to the connector on the battery.
2. Route the battery cable through the routing channel on the battery.
3. Insert the battery into the slot on the computer.
4. Tighten the screws to secure the battery to the computer.
5. Connect the battery cable to the connector on the system board.
6. Install the [base cover](#).
7. Follow the procedure in [After working inside your computer](#).

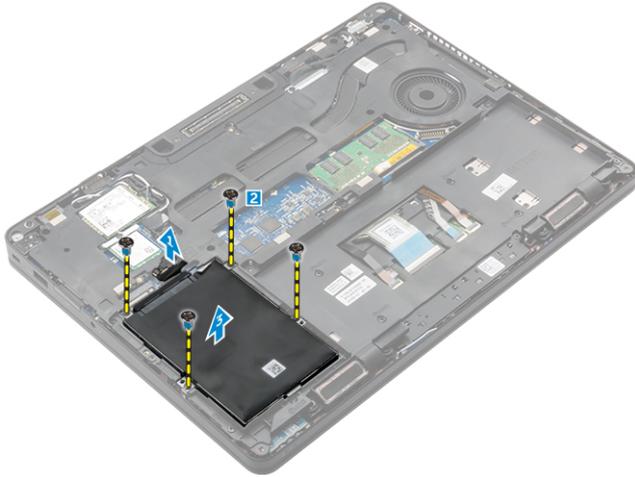
Hard drive

Removing the hard drive assembly

If the system is shipped with hard drive assembly perform the following steps.

1. Follow the procedure in [Before working inside your computer](#).

2. Remove the:
 - a. [base cover](#)
 - b. [battery](#)
3. To remove the hard drive assembly:
 - a. Disconnect the hard drive cable from the connector on the system board [1] .
 - b. Remove the screws that secure the hard drive assembly to the computer [2].
 - c. Lift the hard drive assembly away from the computer [3].



Installing the hard drive assembly

If the system is shipped with hard drive assembly perform the following steps.

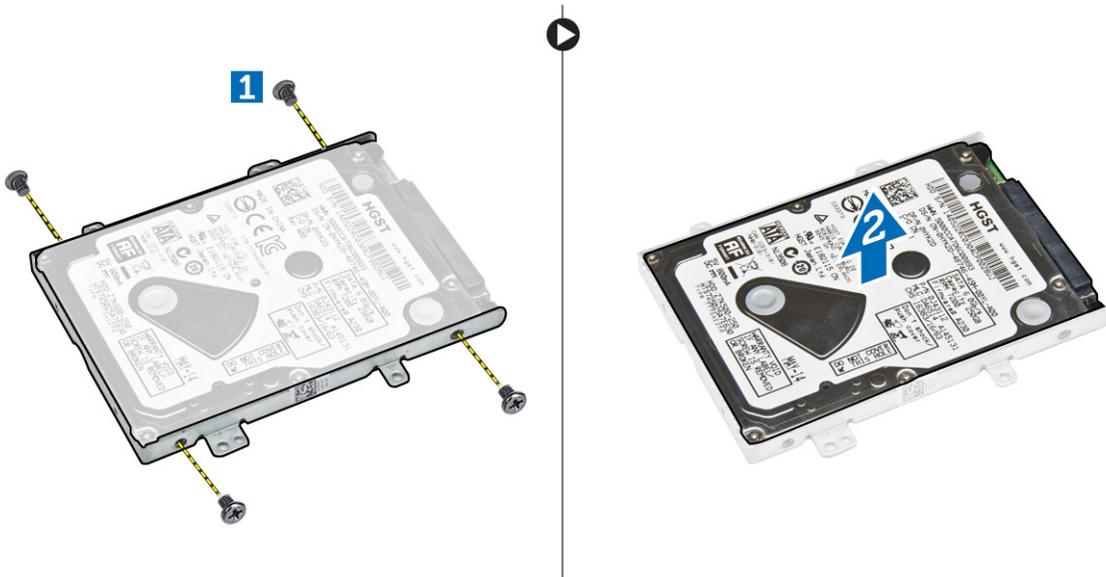
1. Insert the hard drive assembly into the slot on the computer.
2. Tighten the screws to secure the hard drive assembly to the computer.
3. Connect the hard drive cable to the connector on the hard drive and on the system board.
4. Install the:
 - a. [battery](#)
 - b. [base cover](#)
5. Follow the procedures in [After working inside your system](#).

Removing the hard drive from the hard drive bracket

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a. [base cover](#)
 - b. [battery](#)
 - c. [hard drive assembly](#)
3. Pull the hard drive cable to remove it from the connector.



4. Remove the screws that secure the hard drive bracket to the hard drive [1] and lift the hard drive from the hard drive bracket [2].



Installing the hard drive into the hard drive bracket

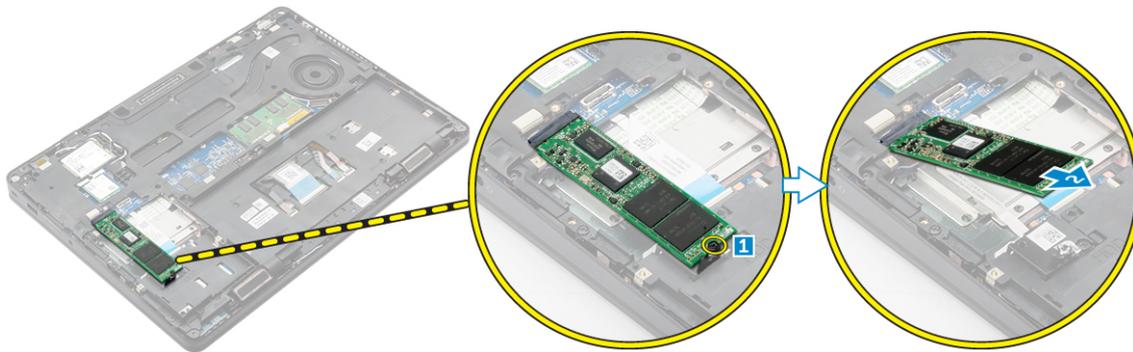
1. Align the screw holders on the hard drive with the screws on the hard drive bracket.
2. Insert the hard drive into the hard drive bracket.
3. Tighten the screws to secure the hard drive to the hard drive bracket.
4. Install the:
 - a. [hard drive assembly](#)
 - b. [battery](#)
 - c. [base cover](#)
5. Follow the procedure in [After working inside your system](#).

Solid State Drive

Removing the optional M.2 Solid State Drive SSD

If the system is shipped with M.2 SSD perform the following steps.

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a. [base cover](#)
 - b. [battery](#)
3. To remove the SSD:
 - a. Remove the screw that secures the SSD to the computer [1].
 - b. Slide and lift the SSD from the computer [2].



Installing the optional M.2 SSD

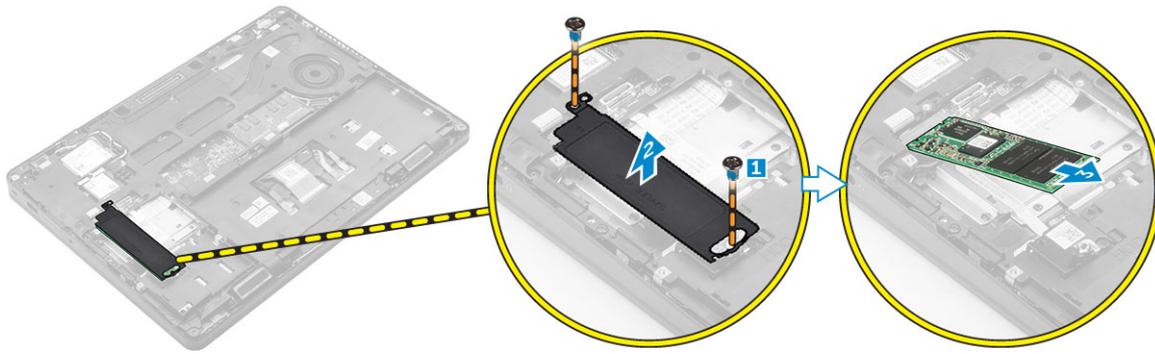
If the system is shipped with M.2 SSD perform the following steps.

1. Insert the SSD into the connector on the computer.
2. Tighten the screw to secure the SSD to the computer.
3. Install the:
 - a. [battery](#)
 - b. [base cover](#)
4. Follow the procedure in [After working inside your computer](#).

Removing the optional PCIe SSD

If the system is shipped with PCIe SSD perform the following steps.

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



Installing the optional PCIe SSD

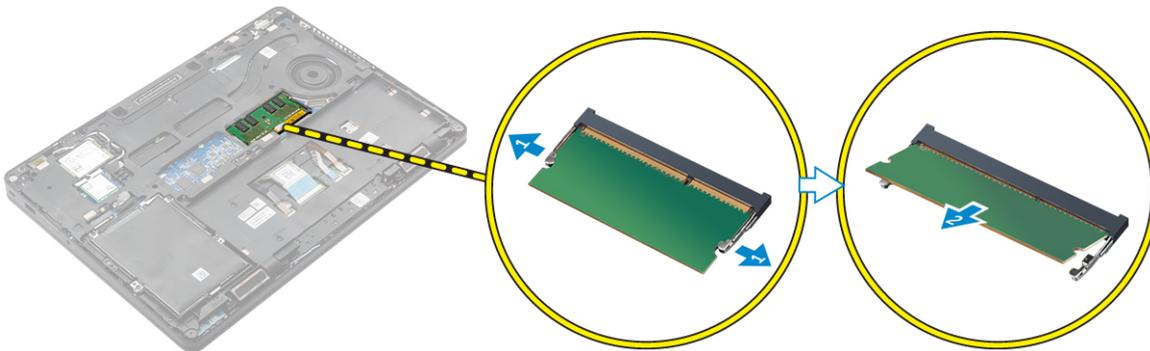
If the system is shipped with PCIe SSD perform the following steps.

1. Insert the SSD clip into the slot on the computer.
2. Tighten the screw to secure the SSD clip to the computer.
3. Insert the SSD into the connector on the computer.
4. Place the SSD bracket over the SSD and tighten the screws to secure it to the computer.
5. Install the:
 - a. [battery](#)
 - b. [base cover](#)
6. Follow the procedure in [After working inside your computer](#).

Memory modules

Removing the memory module

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



Installing the memory module

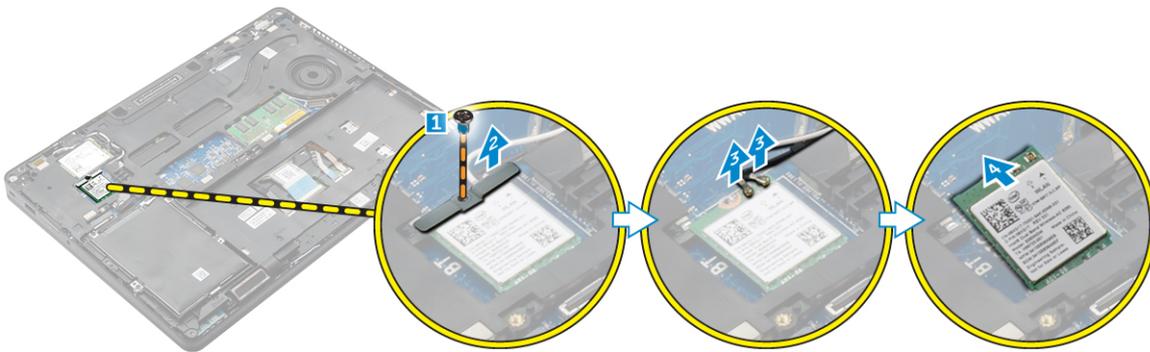
1. Insert the memory module into the memory module socket until the clips secure the memory module.
2. Install the:
 - a. [battery](#)

- b. [base cover](#)
3. Follow the procedures 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. [base cover](#)
 - b. [battery](#)
3. To remove the WLAN card:
 - a. Remove the screw that secures the metal bracket to the WLAN card [1].
 - b. Remove the metal bracket [2].
 - c. Disconnect the WLAN cables from the connectors on the WLAN card [3].
 - d. Unroute the WLAN cables from the routing channel.
 - e. Remove the WLAN card from the computer [4].



Installing the WLAN card

1. Insert the WLAN card into the slot on the computer.
2. Route the WLAN cables through the routing channel.
3. Connect the WLAN cables to the connectors on the WLAN Card.
4. Place the metal bracket and tighten the screw to secure it to the computer.
5. Install the:
 - a. [battery](#)
 - b. [base cover](#)
6. Follow the procedure in [After working inside your system](#).

WWAN card

Removing the WWAN card

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a. [base cover](#)
 - b. [battery](#)
3. To remove the WWAN card:
 - a. Remove the screw that secures the WWAN card [1].

- b. Disconnect the WWAN cables from the connectors on the WWAN card [2].
- c. Unroute the WWAN cables from the routing channel.
- d. Remove the WWAN card from the computer [3].



Installing the WWAN card

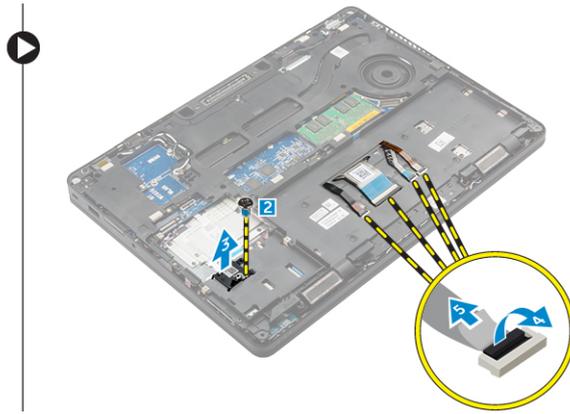
1. Insert the WWAN card into the slot on the computer.
2. Route the WWAN cables through the routing channel.
3. Connect the WWAN cables to the connectors on the WWAN card.
4. Tighten the screw to secure the WWAN card to the computer
5. Install the:
 - a. battery
 - b. base cover
6. Follow the procedure in [After working inside your computer](#).

Docking frame

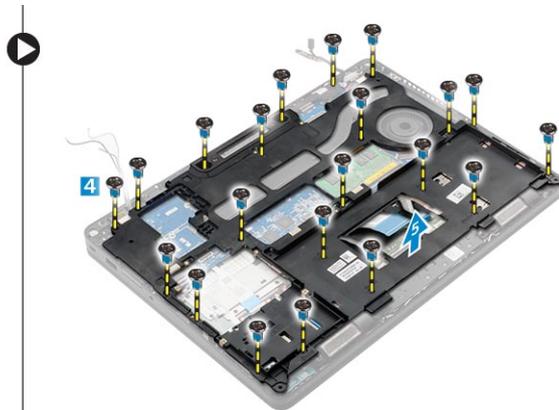
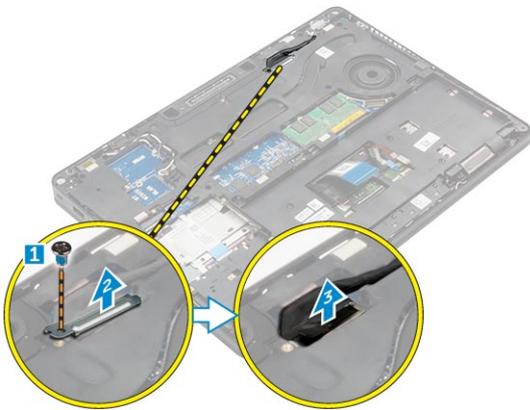
Removing the dock frame

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a. base cover
 - b. battery
 - c. hard drive assembly or M.2 SSD or PCIe SSD
 - d. WLAN card
 - e. WWAN card
3. To remove the dock frame connectors:
 - a. Remove the screws that secure the dock frame to the computer [1].
 - b. Remove the screw and lift the SSD plate from the computer [2, 3].

NOTE: Step 3b is required only if the PCIe SSD card is removed.
 - c. Disconnect the keyboard cables [4, 5].



4. To remove the dock frame:
- a. Remove the screw and lift the metal bracket [1,2].
 - b. Disconnect the eDP cable [3].
 - c. Remove the screws that secure the dock frame to the computer [4].
 - d. Lift the dock frame from the computer [5].



Installing the dock frame

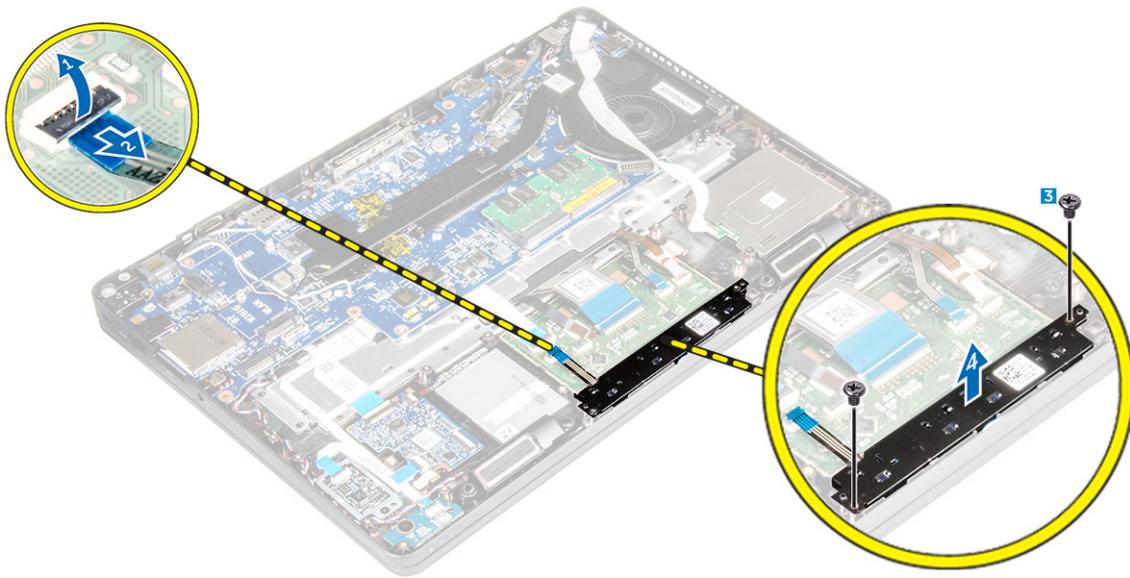
1. Place the dock frame on the computer and tighten the screws.
2. Connect the eDP cable.
3. Place the metal bracket and tighten the screw.
4. Connect the keyboard cable.
5. Place the SSD plate and tighten the screw to secure it.

i **NOTE:** Step 5 is required only if the PCIe SSD card is removed.
6. Tighten the screws to secure the dock frame to the computer.
7. Install the:
 - a. [WWAN card](#)
 - b. [WLAN card](#)
 - c. [hard drive assembly](#) or [M.2 SSD](#) or [PCIe SSD](#)
 - d. [battery](#)
 - e. [base cover](#)
8. Follow the procedure in [After working inside your system](#).

Touchpad

Removing the touchpad button

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a. [base cover](#)
 - b. [battery](#)
 - c. [dock frame](#)
3. To remove the touchpad button:
 - a. Lift the latch and disconnect the touchpad button cable from the connector [1] [2].
 - b. Remove the screws that secure the touchpad button [3].
 - c. Lift and remove the touchpad button away from the computer [4].



Installing the touchpad button

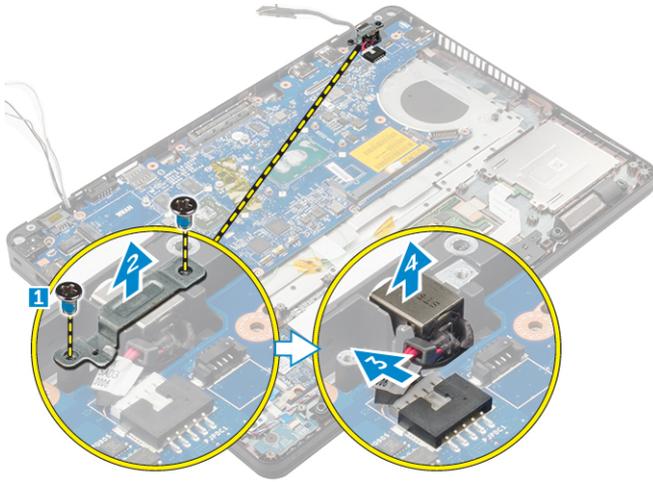
1. Place the touchpad button into the slot on the system board.
2. Tighten the screws to secure the touchpad button to the system board.
3. Connect the touchpad button cable to the connector on the system board.
4. Install the:
 - a. [dock frame](#)
 - b. [battery](#)
 - c. [base cover](#)
5. Follow the procedure in [After working inside your computer](#).

Power connector port

Removing the power connector port

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

- c. [dock frame](#)
- 3. To remove the power connector port:
 - a. Remove the screws to release the metal bracket on the power connector port [1].
 - b. Lift the metal bracket from the computer [2].
 - c. Disconnect the power connector port cable from the computer [3].
 - d. Remove the power connector port from the computer [4].



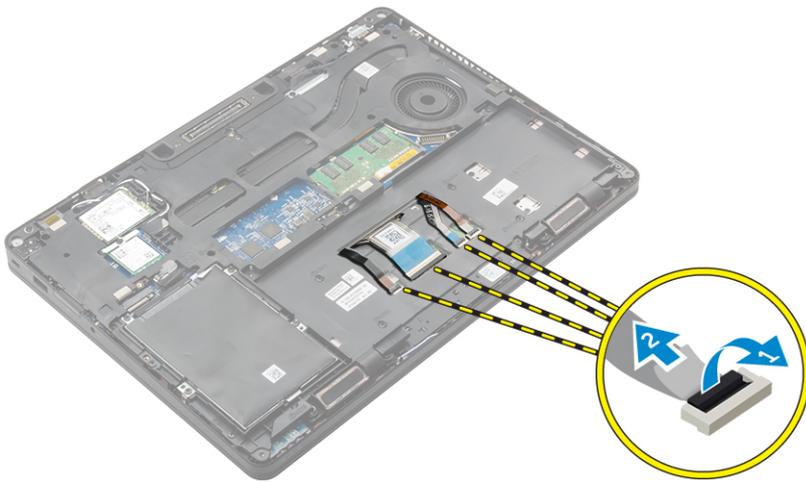
Installing the power connector port

1. Insert the power connector port into the slot on the computer.
2. Place the metal bracket on the power connector port.
3. Tighten the screw to secure the power connector port to the computer.
4. Route the power connector port cable through the routing channels.
5. Connect the power connector port cable to the connector on the system board.
6. Install the:
 - a. [dock frame](#)
 - b. [battery](#)
 - c. [base cover](#)
7. Follow the procedure in [After working inside your computer](#).

Keyboard lattice and Keyboard

Removing the keyboard

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a. [base cover](#)
 - b. [battery](#)
3. Disconnect the keyboard cables from the connectors on the touchpad board [1, 2].

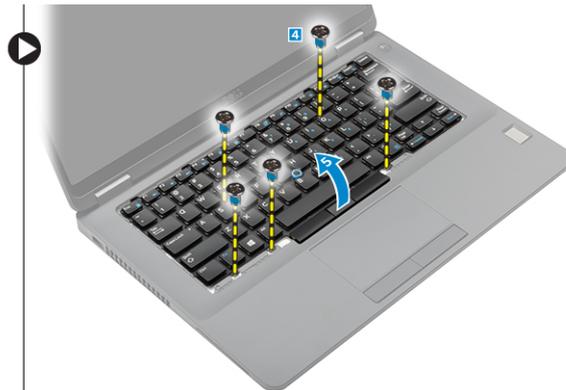


NOTE: The number of keyboard cables may differ based on the computer configuration.

4. To remove the keyboard:
 - a. Using a plastic scribe, lift the keyboard trim from the edges to release it from the keyboard [1, 2, 3].
 - b. Remove the screws that secure the keyboard to the computer [4].

NOTE: To avoid damage to the keyboard, gently remove the keyboard from the computer.

- c. Lift the keyboard from computer [5].



Installing the keyboard

1. Align the keyboard with the screw holders on the computer.
2. Tighten the screws to secure the keyboard to the computer.
3. Align the keyboard trim with the tabs on the computer and press it until it clicks into place.
4. Connect the keyboard cables to the connectors on the touchpad board.

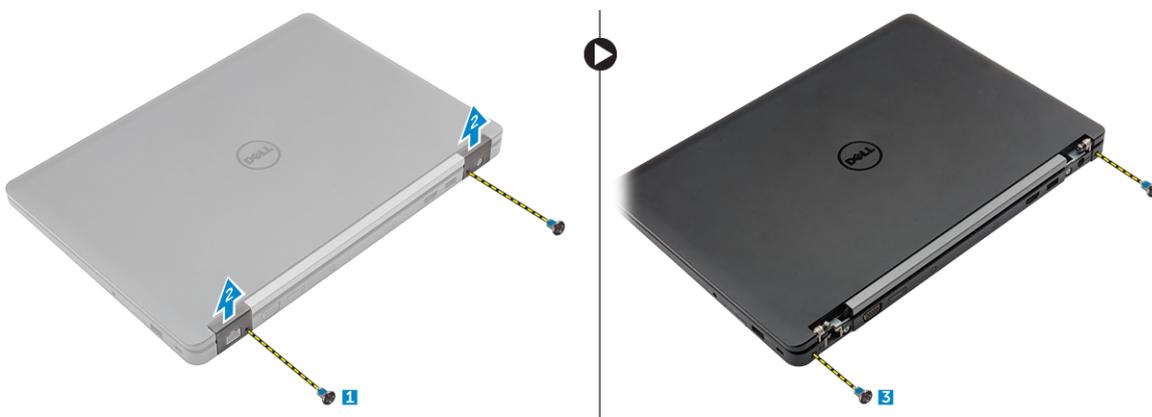
NOTE: If you have removed the dock frame, then install the dock frame and then connect the keyboard cables.

5. Install the:
 - a. battery
 - b. base cover
6. Follow the procedure in [After working inside your system](#).

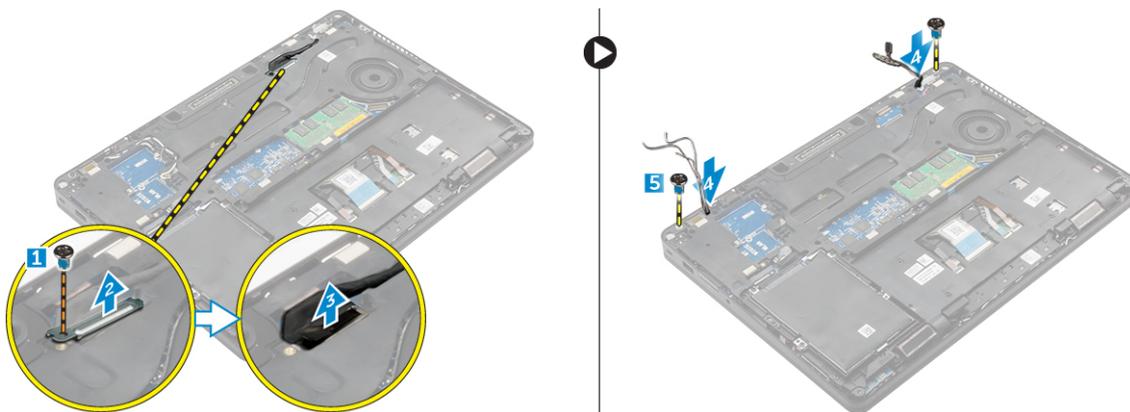
Display assembly

Removing the display assembly - Touch

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a. [base cover](#)
 - b. [battery](#)
 - c. [WLAN](#)
 - d. [WWAN](#)
3. To remove the display hinge brackets:
 - a. Remove the screw that secures the display hinge bracket to the computer [1].
 - b. Remove the display hinge bracket from the computer [2].
 - c. Remove the screws that secure the display assembly to the computer [3].



4. To disconnect display cable and remove the display assembly:
 - a. Remove the screw that secures the display cable bracket to the computer [1].
 - b. Remove the display cable bracket to access the display cable [2].
 - c. Disconnect the display cable from the system board [3].
 - d. Release the antenna cables and display cable from the routing channel [4].
 - e. Remove the screws that secure the display assembly [5].



- f. Turn over the computer, open the display, and lift the display assembly from the computer [1] [2].



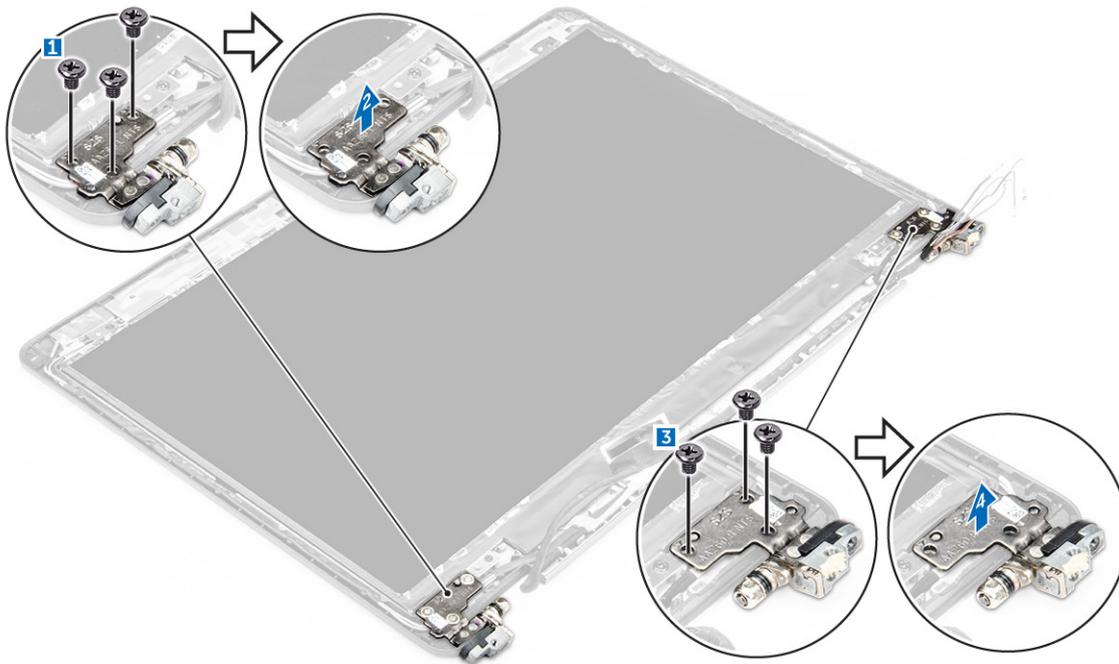
Installing the display assembly - Touch

1. Place the display assembly to align with the screw holders on the computer.
2. Tighten the screws to secure the display assembly to the computer.
3. Route the display cable through the routing channel and route the antenna cables by pushing it through the hole.
4. Connect the antenna cables and display cable to the connectors.
5. Place the display cable bracket over the connector and tighten the screw to secure the display cable to the computer.
6. Place the display hinge bracket and tighten the screw to secure it to the computer.
7. Install the:
 - a. WLAN
 - b. WWAN
 - c. battery
 - d. base cover
8. Follow the procedure in [After working inside your computer](#).

Display hinges

Removing display hinge - non touch

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a. Base cover
 - b. Battery
 - c. WLAN
 - d. WWAN
3. To remove the hinges:
 - a. Remove the screws that secure the display hinge to the display assembly [1, 3].
 - b. Remove the display hinge [2, 4].



i **NOTE:** The image illustrated is for reference, in actual system hinge position may differ.

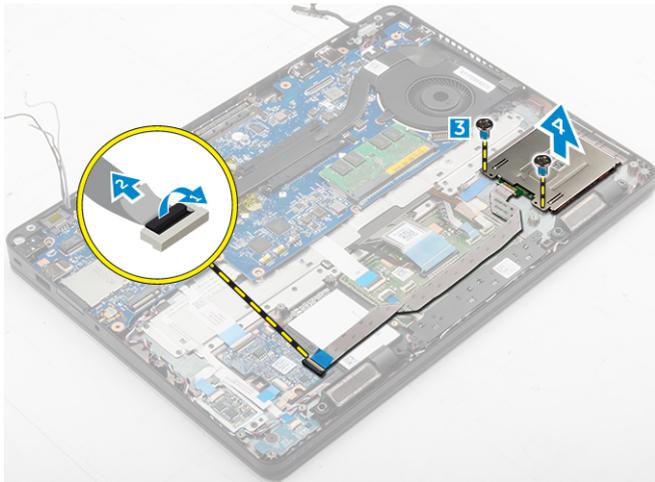
Installing the display hinge - non touch

1. Align the display hinges with the screw holders on the display assembly.
2. Tighten the screws to secure the display hinge to the display assembly.
3. Install the:
 - a. WLAN
 - b. WWAN
 - c. battery
 - d. base cover
4. Follow the procedure in [After working inside your system.](#)

SmartCard module

Removing the optional SmartCard reader board

1. Follow the procedure in [Before working inside your computer.](#)
2. Remove the:
 - a. base cover
 - b. battery
 - c. hard drive assembly or M.2 SSD or PCIe SSD
 - d. WLAN card
 - e. WWAN card
 - f. dock frame
3. To remove the SmartCard reader board:
 - a. Disconnect the SmartCard reader board cable from the USH board [1, 2].
 - b. Peel the cable to release from the adhesive.
 - c. Remove the screws that secure the SmartCard reader board to the computer [3].
 - d. Lift the SmartCard reader board from the computer [4].



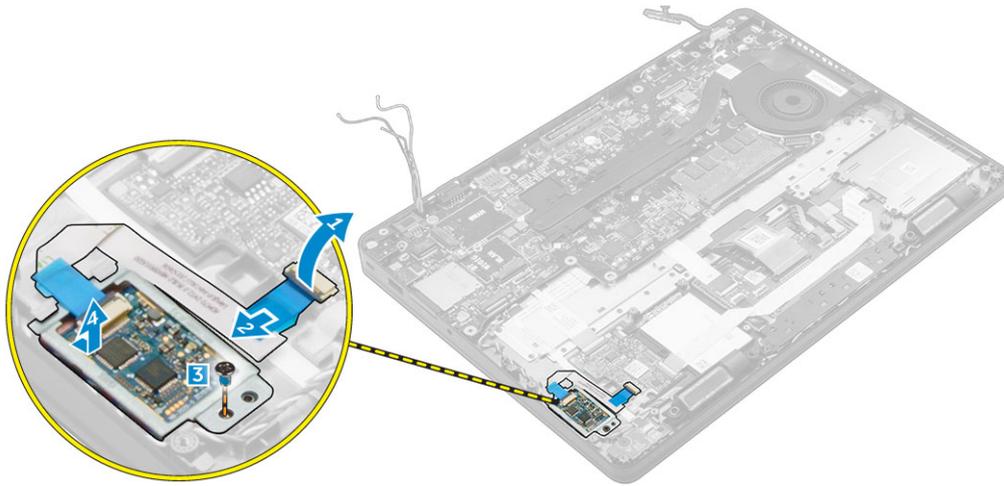
Installing the optional SmartCard reader board

1. Insert the SmartCard reader board into the slot on the computer.
2. Tighten the screws to secure the SmartCard reader board to the computer.
3. Connect the SmartCard reader cable to the connector on the USH board.
4. Install the:
 - a. dock frame
 - b. WWAN card
 - c. WLAN card
 - d. hard drive assembly or M.2 SSD or PCIe SSD
 - e. battery
 - f. base cover
5. Follow the procedure in [After working inside your computer](#).

Fingerprint reader

Removing the optional finger print reader board

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a. base cover
 - b. battery
 - c. hard drive assembly or M.2 SSD or PCIe SSD
 - d. WLAN card
 - e. WWAN card
 - f. dock frame
3. To remove the finger print reader board:
 - a. Disconnect the finger print reader cable from the finger print reader board [1, 2].
 - b. Remove the screw that secures the finger print reader board to the computer [3].
 - c. Lift the finger print reader board from the computer [4].



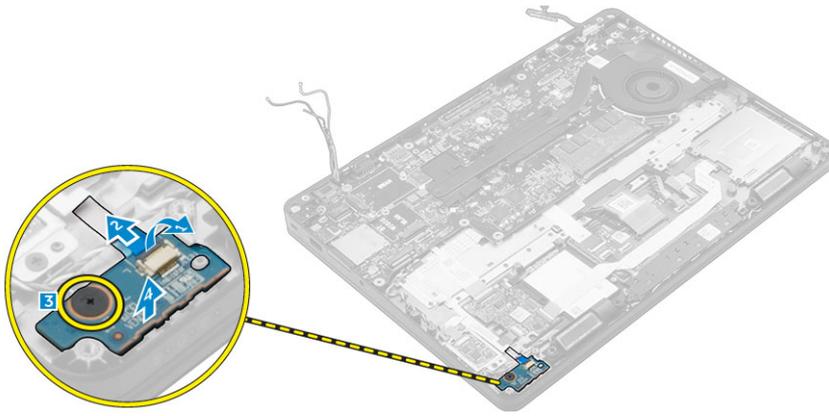
Installing the optional finger print reader board

1. Insert the finger print reader board into the slot on the computer.
2. Connect the finger print reader cable to the finger print reader board.
3. Install the:
 - a. [hard drive assembly](#) or [M.2 SSD](#) or [PCIe SSD](#)
 - b. [dock frame](#)
 - c. [WLAN card](#)
 - d. [WWAN card](#)
 - e. [battery](#)
 - f. [base cover](#)
4. Follow the procedure in [After working inside your system](#).

LED board

Removing the LED board

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a. [base cover](#)
 - b. [battery](#)
 - c. [hard drive assembly](#) or [M.2 SSD](#) or [PCIe SSD](#)
 - d. [WLAN card](#)
 - e. [WWAN card](#)
 - f. [dock frame](#)
3. To remove the LED board:
 - a. Disconnect the LED board cable from the connector on the LED board [1, 2].
 - b. Remove the screw that secures the LED board to the computer [3].
 - c. Lift the LED board from the computer [4].



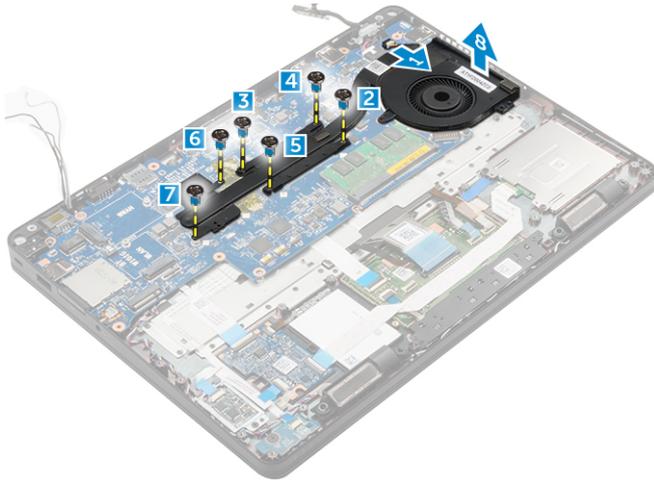
Installing the LED board

1. Insert the LED board into the slot on the computer.
2. Tighten the screw that secures the LED board to the computer.
3. Connect the LED board cable to the connector on the LED board.
4. Install the:
 - a. dock frame
 - b. WWAN card
 - c. WLAN card
 - d. hard drive assembly or M.2 SSD or PCIe SSD
 - e. battery
 - f. base cover
5. Follow the procedure in [After working inside your computer](#).

Heat sink

Removing the heat sink assembly

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a. base cover
 - b. battery
 - c. hard drive assembly or M.2 SSD or PCIe SSD
 - d. WLAN
 - e. WWAN
 - f. dock frame
3. To remove the heat sink:
 - a. Disconnect the fan cable [1].
 - b. Remove the screws that secure the heat sink assembly to the system board [2, 3, 4, 5, 6, 7].
 - c. Lift the heat sink assembly from the system board [8].



NOTE: The number of screws may vary depending upon the computer configuration.

Installing the heat sink assembly

1. Place the heat sink assembly on the system board and align it with the screw holders.
2. Tighten the screws to secure the heat sink assembly to the system board.
3. Connect the fan cable to the connector on the system board.
4. Install the:
 - a. dock frame
 - b. WWAN
 - c. WLAN
 - d. hard drive assembly or M.2 SSD or PCIe SSD
 - e. battery
 - f. base cover
5. Follow the procedure in [After working inside your computer](#).

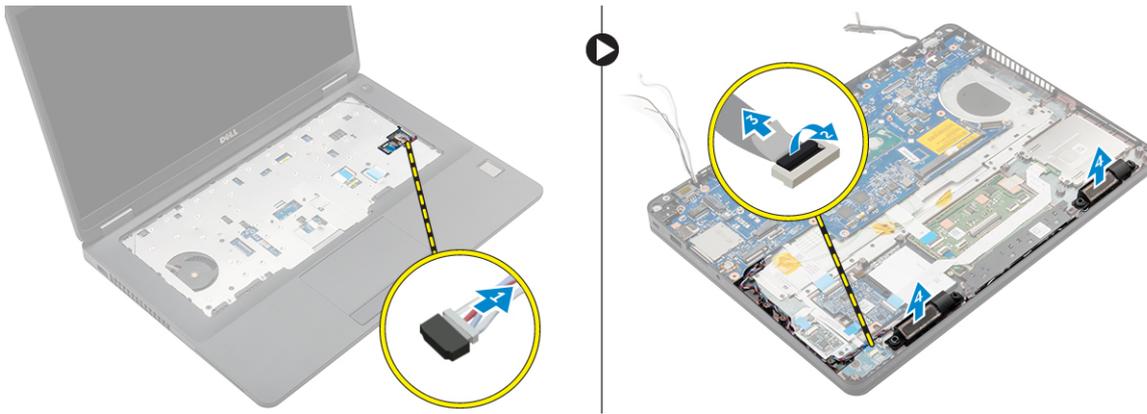
Speaker

Removing the speakers

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a. base cover
 - b. battery
 - c. memory module
 - d. hard drive assembly or M.2 SSD or PCIe SSD
 - e. WLAN
 - f. WWAN
 - g. dock frame
3. To remove the speaker:
 - a. Disconnect the speaker cable [1].
 - b. Disconnect the LED board cable [2, 3] from the LED board.

NOTE: This step is only applicable only if the speaker cable is routed under the LED board cable.

- c. Unroute the cables from the retention clips on the computer [2].
- d. Lift the speaker from the computer [4].



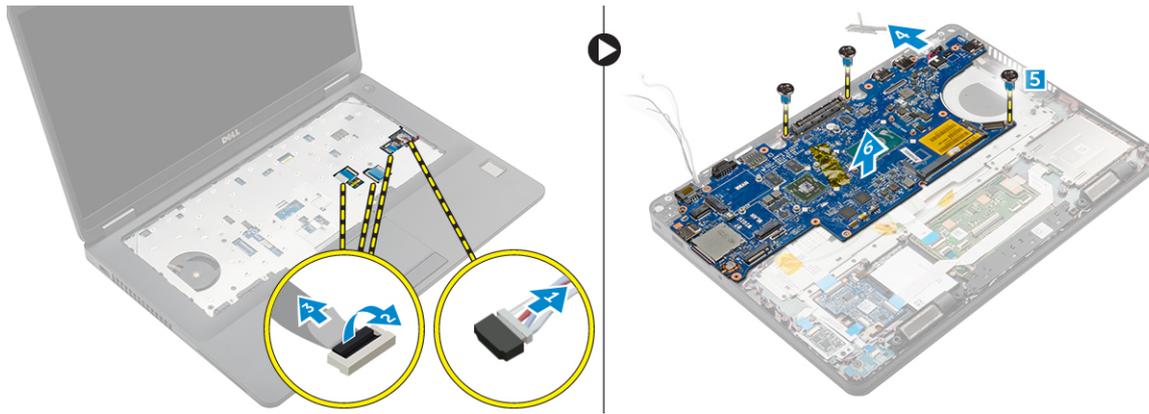
Installing the speakers

1. Place the speakers into the slots on the computer.
2. Route the speaker cable through the retention clips through the routing channel.
3. Connect the speaker cable to the connector on the system board.
4. Install the:
 - a. dock frame
 - b. WLAN
 - c. WWAN
 - d. hard drive assembly or M.2 SSD or PCIe SSD
 - e. battery
 - f. base cover
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. SIM card
 - b. base cover
 - c. battery
 - d. memory
 - e. hard drive assembly or M.2 SSD or PCIe SSD
 - f. keyboard
 - g. WLAN
 - h. WWAN
 - i. dock frame
 - j. heat sink assembly
 - k. power connector port
3. Remove the SIM card tray from the computer.
4. To remove the system board:
 - a. Lift the latch and disconnect the speaker cable, touch pad and system board cable from the computer [1, 2, 3].
 - b. Disconnect the power connector port cable from the system board [4].
 - c. Remove the screws that secures system board to the computer [5].
 - d. Lift the system board from the computer [6].



Installing the system board

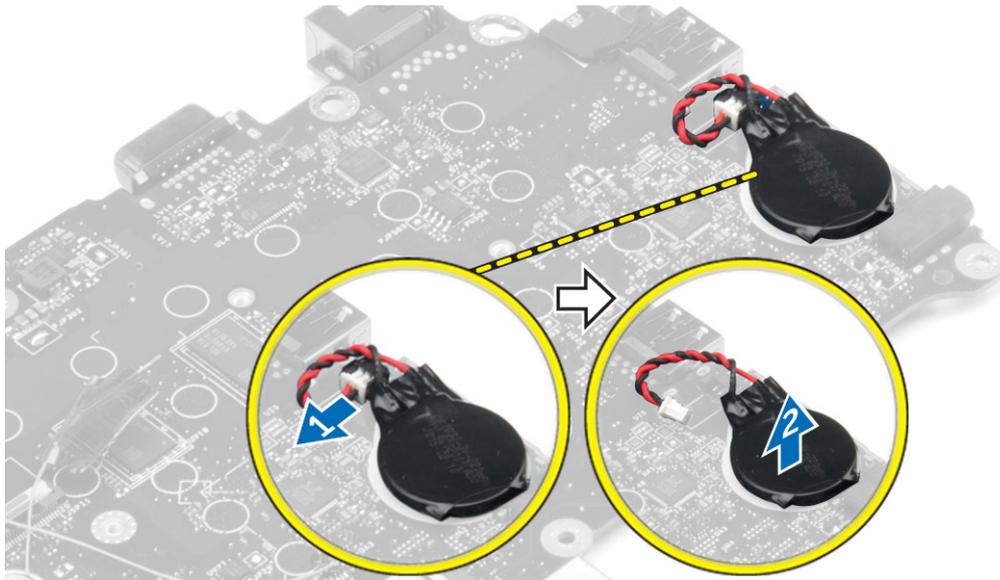
1. Align the system board with the screw holders on the computer.
2. Tighten the screws to secure the system board to the computer.
3. Connect the speaker cable to the connector on the system and route the cable through the routing channels.
4. Connect the power connector and coin cell battery cables to the connectors on the system board:
5. Install the:
 - a. power connector port
 - b. dock frame
 - c. WLAN
 - d. heat sink assembly
 - e. WWAN
 - f. hard drive assembly or M.2 SSD or PCIe SSD
 - g. keyboard
 - h. memory module
 - i. battery
 - j. base cover
 - k. SIM card
6. Follow the procedure in [After working inside your computer](#).

Coin-cell battery

Removing the coin cell battery

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a. base cover
 - b. battery
 - c. hard drive assembly or M.2 SSD or PCIe SSD
 - d. dock frame
 - e. memory
 - f. hard drive assembly or M.2 SSD or PCIe SSD
 - g. keyboard
 - h. WLAN
 - i. WWAN
 - j. dock frame
 - k. heat sink assembly
 - l. power connector port
3. To remove the coin cell battery:

- a. Disconnect the coin cell battery cable from the connector on the system board [1].
- b. Lift the coin cell battery to release it from the adhesive and remove it from the system board [2].



Installing the coin cell battery

1. Place the coin cell battery into the slot on the system board.
2. Connect the coin cell battery cable to the connector on the system board.
3. Install the:
 - a. power connector port
 - b. WLAN
 - c. heat sink assembly
 - d. WWAN
 - e. dock frame
 - f. hard drive assembly or M.2 SSD or PCIe SSD
 - g. keyboard
 - h. memory module
 - i. dock frame
 - j. hard drive assembly or M.2 SSD or PCIe SSD
 - k. battery
 - l. base cover
4. Follow the procedure in [After working inside your computer](#).

Palm rest

Removing the palmrest

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the:
 - a. SIM card
 - b. base cover
 - c. battery
 - d. memory
 - e. hard drive assembly or M.2 SSD or PCIe SSD
 - f. keyboard
 - g. WLAN

- h. WWAN
 - i. dock frame
 - j. heat sink assembly
 - k. power connector port
 - l. system board
3. The palmrest is the remaining component, after removing all the components.



Installing the palmrest

1. Align the palmrest on the computer.
2. Install the:
 - a. system board
 - b. power connector port
 - c. dock frame
 - d. WLAN
 - e. heat sink assembly
 - f. WWAN
 - g. hard drive assembly or M.2 SSD or PCIe SSD
 - h. keyboard
 - i. memory module
 - j. battery
 - k. base cover
 - l. SIM card
3. Follow the procedure in [After working inside your computer](#).

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**.

Topics:

- [System specifications](#)
- [Processor specifications](#)
- [Memory specifications](#)
- [Storage specifications](#)
- [Audio specifications](#)
- [Video specifications](#)
- [Camera specifications](#)
- [Communication specifications](#)
- [Port and connector specifications](#)
- [Contactless smart card specifications](#)
- [Display specifications](#)
- [Keyboard specifications](#)
- [Touchpad specifications](#)
- [Battery specifications](#)
- [AC Adapter specifications](#)
- [Physical specifications](#)
- [Environmental specifications](#)

System specifications

Feature	Specification
Chipset	Intel 6th Generation processors
DRAM bus width	64-bit
Flash EPROM	SPI 128 Mbits
PCIe bus	100 MHz
External Bus Frequency	PCIe Gen3 (8 GT/s)

Processor specifications

Feature	Specification
Types	6th Generation Intel up to Core i7 Processors, U & H, ULT Dual Core
L3 cache	

Feature	Specification
i3 series	3 MB
i5 series	<ul style="list-style-type: none"> • non Vpro — 6 MB • vPro — 8 MB
i7 series	<ul style="list-style-type: none"> • vPro — 8 MB

Memory specifications

Feature	Specification
Memory connector	<ul style="list-style-type: none"> • integrated graphics (Intel 6th generation U-type processors) – 2 DIMM slots • dedicated graphics (Intel 6th generation U-type processors) – 1 DIMM slot • dedicated and integrated graphics (Intel 6th generation H-type processors) – 2 DIMM slots
Memory capacity	4 GB, 8 GB, and 16 GB
Memory type	DDR4 SDRAM
Speed	2133 MHz
Minimum memory	4 GB
Maximum memory	16 GB

Storage specifications

Feature	Specification
HDD	Up to 1 TB
SSD 2.5 inches	Up to 512 GB
SSD M.2 SATA / PCIe	Up to 512 GB

Audio specifications

Feature	Specification
Types	High-definition audio
Controller	Realtek ALC3235
Stereo conversion	Digital audio-out through HDMI — up to 7.1 compressed and uncompressed audio
Internal interface	High-definition audio codec
External interface	Stereo headset/mic combo
Speakers	Two
Internal speaker amplifier	2 W (RMS) per channel
Volume controls	Hot keys

Video specifications

Feature	Specification
Type	Integrated on system board, hardware accelerated
UMA controller	Intel HD Graphics 530 (quad core) AMD Radeon R7M370
Data bus	Integrated video
External display support	<ul style="list-style-type: none">• 19-pin HDMI connector• 15-pin VGA connector

Camera specifications

Feature	Specification
Camera resolution	0.92 megapixels
HD Panel Resolution	1366 1377 x 768 pixels
FHD Panel Resolution	1920 x 1080 pixels
HD Panel Video Resolution (maximum)	1366 x 768 pixels
FHD Panel Video Resolution (maximum)	1920 x 1080 pixels
Diagonal viewing angle	74°

Communication specifications

Features	Specification
Network adapter	10/100/1000 Mb/s Ethernet (RJ-45)
Wireless	Internal wireless local area network (WLAN), wireless wide area network (WWAN), wireless gigabit (WiGig).  NOTE: WWAN and WiGig are optional.  NOTE: Intel or Qualcomm (optional)

Port and connector specifications

Feature	Specification
Audio	Stereo headset/mic combo
Video	<ul style="list-style-type: none">• One 19-pin HDMI connector• 15 pin VGA connector
Network adapter	One RJ-45 connector

Feature	Specification
USB	<ul style="list-style-type: none"> • Two USB 3.0 ports • One USB 3.0 with PowerShare
Memory card reader	Up to SD4.0
Micro SIM (uSIM) card	One external (optional)
Docking port	One

Contactless smart card specifications

Feature	Specification
Supported Smart Cards/ Technologies	BTO with USH

Display specifications

Feature	Specification
Type	<ul style="list-style-type: none"> • Non-touch FHD anti-glare • HD anti-glare
Height	205.6 mm (8.09 inches)
Width	320.9 mm (12.63 inches)
Diagonal	355.6 mm (14 inches)
Active area (X/Y)	
Non-touch FHD anti-glare:	
Maximum resolution	1920 x 1080
Maximum brightness	300 nits
Refresh rate	60 Hz
Maximum viewing angles (horizontal)	80/80
Maximum viewing angles (vertical)	80/80
Pixel pitch	0.161 mm (0.006 inches)
Touch FHD anti-glare:	
Maximum resolution	1920 x 1080
Maximum brightness	270 nits
Refresh rate	60 Hz

Feature	Specification
Maximum viewing angles (horizontal)	80/80
Maximum viewing angles (vertical)	80/80
Pixel pitch	0.161 mm (0.006 inches)
HD anti-glare:	
Maximum resolution	1366 x 768
Maximum brightness	200 nits
Refresh rate	60 Hz
Maximum viewing angles (horizontal)	40/40
Maximum viewing angles (vertical)	+10/-30
Pixel pitch	0.2265 mm (0.009 inches)

Keyboard specifications

Feature	Specification
Number of keys	<ul style="list-style-type: none"> • United States: 82 keys • United Kingdom: 83 keys • Japan: 86 keys • Brazil: 84 keys

Touchpad specifications

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

Battery specifications

Feature	Specification
Type	47 Whr (3-Cell) (dual core) 62 Whr (4-Cell) (quad core)
Depth	177.50 mm (6.98 inches) 233.00 mm (9.17 inches)

Feature	Specification	
Height	7.05 mm (0.27 inch)	7.05 mm (0.27 inch)
Width	94.80 mm (3.73 inches)	94.80 mm (3.73 inches)
Weight	265 g (0.58 lb)	340 g (0.75 lb)
Voltage	11.1 V DC	7.4 V DC
Life span	300 discharge per charge cycles	
Temperature range		
Operating	<ul style="list-style-type: none"> • Charge: 0°C to 50°C • Discharge: 0°C to 70°C • 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	3 V CR2032 lithium coin cell	

AC Adapter specifications

Feature	Specification
Type	65 W
Input voltage	100 V AC to 240 V AC
Input current (maximum)	1.5 A
Input frequency	50 Hz to 60 Hz
Output current	3.34 A
Rated output voltage	19.5 +/- 1.0 V DC
Temperature range (Operating)	0°C to 40°C (32°F to 104°F)
Temperature range (Non-Operating)	-40°C to 70°C (-40°F to 158°F)

Physical specifications

Feature	Specification
Front height (non-touch)	23.3 mm (0.9 inch)
Front height (touch)	24.53 mm (0.97 inch)
Back height (non-touch)	23.95 mm (0.94 inch)

Feature	Specification
Back height (touch)	25.35 mm (0.99 inch)
Width	334.9 mm (13.2 inches)
Depth	231.1 mm (9.1 inches)
Starting weight	3.88 lb (1.76 Kg)

Environmental specifications

Temperature	Specifications
Operating	0°C to 35°C (32°F to 95°F)
Storage	-40°C to 65°C (-40°F to 149°F)

Relative humidity (maximum)	Specifications
Operating	10 % to 90 % (non condensing)
Storage	5 % to 95 % (non condensing)

Altitude (maximum)	Specifications
Operating	0 m to 3048 m (0 ft to 10,000 ft)
Non-operating	0 m to 10,668 m (0 ft to 35,000 ft)

Airborne contaminant level	G1 as defined by ISA-71.04-1985
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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:

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

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.

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

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.  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.

 **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)
 **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.

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.

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.
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.
Esc	Moves to the previous page until you view the main screen. Pressing Esc in the main screen displays a message that prompts you to save any unsaved changes and restarts the system.

System setup options

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

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.

Accessing System Setup

1. Turn on (or restart) your computer.
2. After the white Dell logo appears, press F2 immediately.

The System Setup page is displayed.

 **NOTE:** If you wait too long and the operating system logo appears, wait until you see the desktop. Then, shut down or restart your computer and try again.

 **NOTE:** After the Dell logo appears, you can also press F12 and then select **BIOS setup**.

General screen options

This section lists the primary hardware features of your computer.

Option	Description
System Information	<ul style="list-style-type: none">• System Information: Displays BIOS Version, Service Tag, Asset Tag, Ownership Tag, Ownership Date, Manufacture Date, and the Express Service Code.• Memory Information: Displays Memory Installed, Memory Available, Memory Speed, Memory Channels Mode, Memory Technology, DIMM A Size, DIMM B Size.

Option	Description
	<ul style="list-style-type: none"> 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. Device Information: Displays Primary Hard Drive, SATA-0, M.2PCIe SSD-0, Dock eSATA Device, LOM MAC Address, Video Controller, Video BIOS Version, Video Memory, Panel Type, Native Resolution, Audio Controller, WiFi Device, WiGig Device, Cellular Device, Bluetooth Device.
Battery Information	Displays the battery status and the type of AC adapter connected to the computer.
Boot Sequence	<p>Boot Sequence 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"> Windows Boot Manager UEFI: Hard drive details <p>Boot List Options Allows you to change the boot list option:</p> <ul style="list-style-type: none"> Legacy UEFI (enabled by default)
Advanced Boot Options	This option allows you the legacy option ROMs to load. By default, the Enable Legacy Option ROMs is disabled.
Date/Time	Allows you to change the date and time.

System Configuration screen options

Option	Description
Integrated NIC	Allows you to configure the integrated network controller. The options are: <ul style="list-style-type: none"> Disabled Enabled Enabled w/PXE: This option is enabled by default.
Parallel Port	Allows you to configure the parallel port on the docking station. The options are: <ul style="list-style-type: none"> Disabled AT: This option is enabled by default. PS2 ECP
Serial Port	Allows you to configure the integrated serial port. The options are: <ul style="list-style-type: none"> Disabled COM1: This option is enabled by default. COM2 COM3 COM4
SATA Operation	Allows you to configure the internal SATA hard-drive controller. The options are: <ul style="list-style-type: none"> Disabled AHCI RAID On: This option is enabled by default.
Drives	Allows you to configure the SATA drives on board. All drives are enabled by default. The options are: <ul style="list-style-type: none"> SATA-0 SATA-1 SATA-2 M.2 PCIe SSD-0
SMART Reporting	This field controls whether hard drive errors for integrated drives are reported during system startup. This technology is part of the SMART (Self Monitoring Analysis and Reporting Technology) specification. This option is disabled by default.

Option	Description
	<ul style="list-style-type: none"> • Enable SMART Reporting
USB Configuration	<p>This field configures the integrated USB controller. If Boot Support is enabled, the system is allowed to boot any type of USB Mass Storage Devices (HDD, memory key, floppy).</p> <p>If USB port is enabled, device attached to this port is enabled and available for OS.</p> <p>If 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"> • Enable USB Boot Support: This option is enabled by default. • Enable External USB Port: This option is enabled by default.
USB/Thunderbolt Configuration	<p>This is an optional feature.</p> <p>This field configures the integrated USB controller. If Boot Support is enabled, the system is allowed to boot any type of USB Mass Storage Devices (HDD, memory key, floppy).</p> <p>If USB port is enabled, device attached to this port is enabled and available for OS.</p> <p>If 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"> • Enable USB Boot Support: This option is enabled by default. • Enable External USB Port: This option is enabled by default. • Enable Thunderbolt Port: This option is enabled by default. • Enable Thunderbolt Boot Support. This is an optional feature. • Always Allows Dell Docks. This is an optional feature. • Enables Thunderbolt (and PCIe behind TBT) Pre-boot <p> NOTE: USB keyboard and mouse always work in the BIOS setup irrespective of these settings.</p>
USB PowerShare	<p>This field configures the USB PowerShare feature behavior. This option allows you to charge external devices using the stored system battery power through the USB PowerShare port.</p>
Audio	<p>This field enables or disables the integrated audio controller. By default, the Enable Audio option is selected. The options are:</p> <ul style="list-style-type: none"> • Enable Microphone: This option is enabled by default. • Enable Internal Speaker: This option is enabled by default.
Keyboard Illumination	<p>This field lets you choose the operating mode of the keyboard illumination feature. The keyboard brightness level can be set from 0% to 100%. The options are:</p> <ul style="list-style-type: none"> • Disabled • Dim • Bright: This option is enabled by default.
Keyboard Backlight with AC	<p>The Keyboard Backlight with AC option does not affect the main keyboard illumination feature. Keyboard Illumination will continue to support the various illumination levels. This field has an effect when the backlight is enabled.</p>
Keyboard Backlight Timeout on AC	<p>This feature defines the timeout value for the keyboard backlight when AC adapter is plugged into the system. The options are:</p> <ul style="list-style-type: none"> • 5 seconds: This option is enabled by default. • 10 seconds • 15 seconds • 30 seconds • 1 minute • 5 minute • 15 minute • Never
Keyboard Backlight Timeout on Battery	<p>This feature defines the timeout value for the keyboard backlight when system is running only on battery power.</p> <ul style="list-style-type: none"> • 5 seconds: This option is enabled by default. • 10 seconds

Option	Description
	<ul style="list-style-type: none"> • 15 seconds • 30 seconds • 1 minute • 5 minute • 15 minute • Never
Touchscreen	<p>This option controls to enabled or disabled the touchscreen.</p> <p>i NOTE: Touchscreen option is available only if the computer is a touch version.</p>
Unobtrusive Mode	<p>This option, when enabled, pressing Fn+F7 turns off all light and sound emissions in the system. To resume normal operation, press Fn+F7 again. This option is disabled by default.</p>
Miscellaneous Devices	<p>Allows you to enable or disable the following devices:</p> <ul style="list-style-type: none"> • Enable Camera: This option is enabled by default. • SD Card Read Only • Enable Hard Drive Free Fall Protection: This option is enabled by default. • Enable Media Card • Disable Media Card <p>i NOTE: All devices are enabled by default.</p>

Video screen options

Option	Description
LCD Brightness	<p>Allows you to set the display brightness depending up on the power source (On Battery and On AC).</p> <p>i NOTE: The video setting will be visible only when a video card is installed into the system.</p>

Security screen options

Option	Description
Admin Password	<p>Allows you to set, change, or delete the administrator (admin) password.</p> <p>i NOTE: 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.</p> <p>i NOTE: Successful password changes take effect immediately.</p> <p>Default setting: Not set</p>
System Password	<p>Allows you to set, change or delete the system password.</p> <p>i NOTE: Successful password changes take effect immediately.</p> <p>Default setting: Not set</p>
Internal HDD-0 Password	<p>Allows you to set, change or delete the system's internal hard disk's password.</p> <p>Default setting: Not set</p>
Strong Password	<p>Allows you to enforce the option to always set strong passwords.</p> <p>Default Setting: Enable Strong Password is not selected.</p> <p>i NOTE: If Strong Password is enabled, Admin and System passwords must contain at least one uppercase character, one lowercase character and be at least 8 characters long.</p>

Option	Description
Password Configuration	Allows you to determine the minimum and maximum length of Administrator and System passwords.
Password Bypass	Allows you to enable or disable the permission to bypass the System and the Internal HDD password, when they are set. The options are: <ul style="list-style-type: none"> • Disabled • Reboot bypass Default setting: Disabled
Password Change	Allows you to enable the disable permission to the System and Hard Drive passwords when the admin password is set. <p>Default setting: Allow Non-Admin Password Changes is selected.</p>
Non-Admin Setup Changes	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.
UEFI Capsule Firmware Update	This option controls whether the system allows the BIOS updates through UEFI capsule update packages. This option is disabled by default.
TPM 1.2 Security	Allows you to enable the Trusted Platform Module (TPM) during POST. The options are: <ul style="list-style-type: none"> • TPM On (enabled by default) • Clear • PPI Bypass for Enabled Commands • PPI Bypass for Disabled Commands • Disabled • Enabled
Computrace	Allows you to activate or disable the optional Computrace software. The options are: <ul style="list-style-type: none"> • Deactivate • Disable • Activate <p> NOTE: 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>
CPU XD Support	Allows you to enable the Execute Disable mode of the processor. <p>Enable CPU XD Support (default)</p>
OROM Keyboard Access	Allows you to set an option to enter the Option ROM Configuration screens using hotkeys during boot. The options are: <ul style="list-style-type: none"> • Enable • One Time Enable • Disable <p>Default setting: Enable</p>
Admin Setup Lockout	Allows you to prevent users from entering the setup when an Administrator password is set. <p>Default Setting: Enable Admin Setup Lockout is not selected.</p>

Secure Boot screen options

Option	Description
Secure Boot Enable	This option enables or disables the Secure Boot feature. <ul style="list-style-type: none"> • Disabled • Enabled <p>Default setting: Enabled.</p>

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

Intel Software Guard Extensions screen options

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

Performance screen options

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

Option	Description
Hyper-Thread Control	<p>Allows you to enable or disable the Hyper-Threading in the processor.</p> <ul style="list-style-type: none"> • Disabled • Enabled <p>Default setting: Enabled.</p>

Power Management screen options

Option	Description
AC Behavior	<p>Allows you to enable or disable the computer from turning on automatically when an AC adapter is connected.</p> <p>Default setting: Wake on AC is not selected.</p>
Auto On Time	<p>Allows you to set the time at which the computer must turn on automatically. The options are:</p> <ul style="list-style-type: none"> • Disabled • Every Day • Weekdays • Select Days <p>Default setting: Disabled</p>
USB Wake Support	<p>Allows you to enable USB devices to wake the system from Standby.</p> <p>i NOTE: 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> <ul style="list-style-type: none"> • Enable USB Wake Support <p>Default setting: The option is disabled.</p>
Wireless Radio Control	<p>Allows you to enable or disable the feature that automatically switches from wired or wireless networks without depending on the physical connection.</p> <ul style="list-style-type: none"> • Control WLAN Radio • Control WWAN Radio <p>Default setting: The option is disabled.</p>
Wake on LAN/WLAN	<p>Allows you to enable or disable the feature that powers on the computer from the Off state when triggered by a LAN signal.</p> <ul style="list-style-type: none"> • Disabled • LAN Only • WLAN Only • LAN or WLAN <p>Default setting: Disabled</p>
Block Sleep	<p>This option lets you block entering to sleep (S3 state) in operating system environment.</p> <p>Block Sleep (S3 state)</p> <p>Default setting: This option is disabled</p>
Peak Shift	<p>This option enables you to 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.</p>
Dock Support on Battery	<p>This option allows you to use the docking station when AC power is absent but only when the battery is above a certain charge percentage. The percentage may change per battery and per platform.</p> <ul style="list-style-type: none"> • Dock Support on Battery <p>Default setting: Disabled</p>

Option	Description
Advanced Battery Charge Configuration	<p>This option enables you to maximize the battery health. By enabling this option, your system uses the standard charging algorithm and other techniques, during the non-work hours to improve the battery health.</p> <p>Disabled</p> <p>Default setting: Disabled</p>
Primary Battery Charge Configuration	<p>Allows you to select the charging mode for the battery. The options are:</p> <ul style="list-style-type: none"> • Adaptive • Standard — Fully charges your battery at a standard rate. • ExpressCharge — The battery charges over a shorter period of time using Dell's fast charging technology. This option is enabled by default. • Primarily AC use • Custom <p>If Custom Charge is selected, you can also configure Custom Charge Start and Custom Charge Stop.</p> <p> NOTE: All charging mode may not be available for all the batteries. To enable this option, disable the Advanced Battery Charge Configuration option.</p>

POST Behavior screen options

Option	Description
Adapter Warnings	<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>
Keypad (Embedded)	<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"> • Fn Key Only: This option is enabled by default. • By Numlock <p> NOTE: When setup is running, this option has no effect. Setup works in Fn Key Only mode.</p>
Mouse/Touchpad	<p>Allows you to define how the system handles mouse and touch pad input. The options are:</p> <ul style="list-style-type: none"> • Serial Mouse • PS2 Mouse • Touchpad/PS-2 Mouse: This option is enabled by default.
Numlock Enable	<p>Allows you to enable the Numlock option when the computer boots.</p> <p>Enable Network. This option is enabled by default.</p>
Fn Key Emulation	<p>Allows you to set the option where the Scroll Lock key is used to simulate the Fn key feature.</p> <p>Enable Fn Key Emulation (default)</p>
Fn Lock Options	<p>Allows you to let hot key combinations Fn + Esc toggle the primary behavior of F1–F12, between their standard and secondary functions. If you disable this option, you cannot toggle dynamically the primary behavior of these keys. The available options are:</p> <ul style="list-style-type: none"> • Fn Lock. This option is selected by default. • Lock Mode Disable/Standard • Lock Mode Enable/Secondary
MEBx Hotkey	<p>Allows you to specify whether the MEBx Hotkey function should enable, during the system boot.</p> <p>Default Setting: Enable MEBx Hotkey</p>
Fastboot	<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"> • Minimal • Thorough (default) • Auto

Option	Description
Extended BIOS POST Time	Allows you to create an additional preboot delay. The options are: <ul style="list-style-type: none"> • 0 seconds. This option is enabled by default. • 5 seconds • 10 seconds

Virtualization support screen options

Option	Description
Virtualization	Allows you to enable or disable the Intel Virtualization Technology. Enable Intel Virtualization Technology (default).
VT for Direct I/O	Enables or disables the Virtual Machine Monitor (VMM) from utilizing the additional hardware capabilities provided by Intel® Virtualization technology for direct I/O. Enable VT for Direct I/O - enabled by default.
Trusted Execution	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. Trusted Execution - disabled by default.

Wireless screen options

Option	Description
Wireless Switch	Allows to set the wireless devices that can be controlled by the wireless switch. The options are: <ul style="list-style-type: none"> • WWAN • GPS (on WWAN Module) • WLAN/WiGig • Bluetooth All the options are enabled by default.  NOTE: For WLAN and WiGig enable or disable controls are tied together and they cannot be enabled or disabled independently.
Wireless Device Enable	Allows you to enable or disable the internal wireless devices. <ul style="list-style-type: none"> • WWAN/GPS • WLAN/WiGig • Bluetooth All the options are enabled by default.

Maintenance screen options

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

Option	Description
	<ul style="list-style-type: none"> • Internal SDD • Internal mSATA • Internal eMMC <p> WARNING: Selecting this option results in permanent data loss and this action cannot be reversed.</p>
BIOS Recovery	<p>This field allows you to recover from certain corrupted BIOS conditions from a recover file on the user primary hard drive or an external USB key.</p> <ul style="list-style-type: none"> • BIOS Recovery from Hard Drive (enabled by default)

System Log screen options

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

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](#) 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 3. 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](#)
- [Enhanced Pre-Boot System Assessment ePSA diagnostics](#)
- [Built-in self-test \(BIST\)](#)
- [Device status lights](#)
- [Battery status lights](#)
- [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](#).

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.

You can launch the ePSA diagnostics in two ways:

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 displays, listing all devices detected in the computer. The diagnostics starts running the tests on all the detected devices.

4. If you wish to run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
5. Select the device from the left pane and click **Run Tests**
6. If there are any issues, error codes are displayed.

Note the error code and contact Dell.

OR

1. Shutdown the computer.
2. Press and hold the fn key, while pressing the power button, and then release both.

The **Enhanced Pre-boot System Assessment** window displays, listing all devices detected in the computer. The diagnostics starts running the tests on all the detected devices.

3. On the boot menu screen, select the **Diagnostics** option.

The **Enhanced Pre-boot System Assessment** window displays, listing all devices detected in the computer. The diagnostics starts running the tests on all the detected devices.

4. If you wish to run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
5. Select the device from the left pane and click **Run Tests**
6. If there are any issues, error codes are displayed.

Note the error code and contact Dell.

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 4. 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.

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

Device status lights

Table 5. Device status lights

Icon	Name	Description
	Power status light	Turns on when you turn on the computer and blinks when the computer is in a power management mode.
	Battery charge indicator	Turns on steadily or blinks to indicate battery charge status.

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

i **NOTE:** The position of the power status light may vary depending on the system.

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

Table 6. Battery charge LED indicator

Amber blinking pattern	Problem description	Suggested resolution
2,1	CPU	CPU failure
2,2	System board: BIOS ROM	System board, covers BIOS corruption or ROM error
2,3	Memory	No memory/RAM detected
2,4	Memory	Memory/RAM failure
2,5	Memory	Invalid memory installed
2,6	System board: Chipset	System board/Chipset error
2,7	LCD	Replace the system board
3,1	RTC Power Failure	CMOS battery failure
3,2	PCI/Video	PCI or video card/chip failure
3,3	BIOS Recovery 1	Recovery image not found
3,4	BIOS Recovery 2	Recovery image found but invalid

The blinking patterns will consist of 2 set of numbers being represented by (First Group: Amber blinks, Second Group: White blinks)

i **NOTE:**

1. First Group: The LED blinks 1 to 9 times followed by a brief pause with LED off at the interval of 1.5 seconds.(This is in Amber color)
2. Second Group: The LED blinks 1 to 9 times, that would be then followed by a longer pause before the next cycle starts again at the interval of 1.5 seconds.(This is in White color)

For Example: No Memory detected (2,3), Battery LED blinks two times of amber color followed by a pause, and then blinks three times of white color. The Battery LED will pause for 3 seconds before the next cycle repeat itself again.

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. Re-plug battery connector, replace battery if the issue reoccurs.
Alternately blinking amber light with steady white light	Temporary battery failure with AC adapter present. Re-plug battery connector, replace battery if the issue reoccurs.
Constantly blinking amber light	Fatal battery failure with AC adapter present. Fetal 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.

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.

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.