Notes, cautions, and warnings

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

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

**WARNING:** A WARNING indicates a potential for property damage, personal injury, or death.
# Working on Your Computer

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Dell
Working on Your Computer

Topics:
• Before Working Inside Your Computer
• Turning Off Your Computer
• After Working Inside Your Computer

Before Working Inside Your Computer

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

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

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

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

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

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

⚠️ CAUTION: Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a processor by its edges, not by its pins.

⚠️ CAUTION: When you disconnect a cable, pull on its connector or on its pull-tab, not on the cable itself. Some cables have connectors with locking tabs; if you are disconnecting this type of cable, press in on the locking tabs before you disconnect the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, ensure that both connectors are correctly oriented and aligned.

⚠️ NOTE: The color of your computer and certain components may appear differently than shown in this document.

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

1. Ensure that your work surface is flat and clean to prevent the computer cover from being scratched.
2. Turn off your computer (see Turning Off Your Computer).
3. If the computer is connected to a docking device (docked), undock it.

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

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

⚠️ NOTE: To avoid damaging the system board, you must remove the main battery before you service the computer.
7 Remove the main battery.
8 Turn the computer top-side up.
9 Open the display.
10 Press the power button to ground the system board.

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

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

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

## Turning Off Your Computer

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

1 Shut down the operating system:
   - In Windows 8 (touch-enabled device):
     1 Swipe in from the right edge of the screen, opening the Charms menu and select **Settings**.
     2 Select the 🔄 and then select **Shut down**.
   - Using a mouse:
     1 Point to upper-right corner of the screen and click **Settings**.
     2 Click the 🔄 and select **Shut down**.
   - In Windows 7:
     1 Click **Start**.
     2 Click **Shut Down**.
     
     Or

     1 Click **Start**.
     2 Click the arrow in the lower-right corner of the **Start** menu as shown below, and then click **Shut Down**

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

## After Working Inside Your Computer

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

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

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

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

Connect your computer and all attached devices to their electrical outlets.

Turn on your computer.
Removing and Installing Components

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

Removing the Battery

⚠️ WARNING: Using an incompatible battery may increase the risk of fire or explosion. Replace the battery only with a compatible battery purchased from Dell. The battery is designed to work with your Dell computer. Do not use a battery from any other computer with your computer.

⚠️ WARNING: Before removing or replacing the battery, turn off the computer, disconnect the AC adapter from the electrical outlet and the computer, disconnect the modem from the wall connector and computer, and remove any other external cables from the computer.

⚠️ WARNING: Not for use in hazardous locations. See installation instructions.

1. Follow the procedures in Before Working Inside Your Computer
2. Push and hold the battery release button to the right while pulling on the plastic battery tab

![Battery Removal Illustration]

Installing the Battery

1. Slide the battery into its slot until it clicks into place.
2. Press firmly on the door until a click is heard and the latch is engaged.
3. Follow the procedures in After Working Inside Your computer

Removing the hard drive

1. Follow the procedure in Before working inside your computer
2. Remove the battery.
3. To remove the hard drive:
   a. Unlock the hard drive press latch door [1].
   b. Push it downwards to open it [2].
   c. Push and hold the hard drive release button to the left while pulling on the plastic hard drive tab [3].
   d. Pull the hard drive away from the computer [4].

![Hard Drive Removal Illustration]
Installing the Hard Drive

1. Slide the hard drive into its place on the computer.
2. Close the hard-drive bay press latch door.
3. Install:
   a. Battery
4. Follow the procedures in After Working Inside Your computer

Removing the optical drive

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. battery
   b. hard drive
3. To remove the optical drive:
   a. Remove the screws that secure the optical drive to the computer [1].
   b. Remove the optical drive from the computer [2].
Installing the Optical Drive

1. Place the optical drive on to the computer.
2. Tighten the screws that secure the optical drive to the computer.
3. Install:
   a. Hard Drive
   b. Battery
4. Follow the procedures in After Working Inside Your computer

Removing the optical drive connector

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a. battery
   b. hard drive
   c. optical drive
   d. base cover
To release the optical drive connector:
   a. Remove the screws that secure the optical drive connector to the computer [1].
   b. Flip the connector [2].
   c. Remove the screws that secure the connector to the computer [3].
   d. Lift the connector in an upward direction [4].
   e. Lift the latch [5] and disconnect the optical drive connector cable from the connector on the system board [6].

4. Lift the optical drive connector away from the computer.

Installing the Optical Drive Connector

1. Place the optical drive onto the computer.
2. Connect the optical drive connector cable.
3. Press the locking tab.
4. Tighten the screws that secure the optical drive to the computer.
5. Flip the optical drive connector and seat it.
6. Tighten the screw that secures the optical drive connector to the computer.
7. Install:
   a. Bottom Cover
   b. Optical Drive
   c. Hard Drive
   d. Battery
8. Follow the procedures in After Working Inside Your Computer

Removing the Bottom Cover

1. Follow the procedures in Before Working Inside Your Computer
2. Remove:
   a. Battery
   b. Hard Drive
   c. Optical Drive
3. Perform the following steps as shown in the illustration:
a Unlock the I/O latch door [1].
b Lift the latch door upward to open it [3].
c Remove the screw that secures the bottom cover to the computer chassis [3].

4 Perform the following steps as shown in the illustration:
   a Unlock back door latch [1].
   b Lift the back door in an upward direction to open it [2].
   c Remove the screws that secure the bottom cover to the computer chassis [3].

5 Perform the following steps as shown in the illustration:
   a Unlock the HDMI latch door [1].
   b Lift the latch door upward direction [2].
   c Remove the screw that secure the bottom cover to the computer chassis [3].

6 Perform the following steps as shown in the illustration:
   a Remove the screws that secure the bottom cover [1].
   b Lift the bottom cover to remove it from the computer chassis [2].
Installing the Bottom Cover

1. Tighten the screws that secure I/O, back door, and HDMI to the computer chassis.
2. Press firmly on the door until a click is heard and the latch is engaged.
3. Place the bottom cover on the base of the computer.
4. Tighten the screws that secure the bottom cover to the computer chassis.
5. Install:
   a. Optical Drive
   b. Hard Drive
   c. Battery
6. Follow the procedures in After Working Inside Your computer

Removing the Keyboard

1. Follow the procedures in Before Working Inside Your Computer
2. Remove:
   a. Battery
3. Perform the following steps as shown in the illustration:
   a. Remove the screws that secure the keyboard to the computer chassis [1].
   b. Pry along the edges and flip the keyboard over [2].
Perform the following steps as shown in the illustration:

a. Remove the screws that secure the keyboard door [1].

b. Lift the locking tab [2].

c. Disconnect the keyboard cables from the system board [3].

Lift and remove the keyboard from the computer chassis

Installing the Keyboard

1. Connect the keyboard cables to its connectors on the keyboard controller card.
2. Place the keyboard door over its slot on the computer chassis.
3. Tighten the screws that secure the keyboard door to the computer chassis.
4. Align the keyboard into its slot on the computer.
5. Tighten the screws to secure the keyboard to the computer.
6. Install:
   a. Battery
7. Follow the procedures in After Working Inside Your computer
Removing the Memory Module

1. Follow the procedures in Before Working Inside Your Computer
2. Remove:
   a. Battery
   b. Hard Drive
   c. Optical Drive
   d. Bottom Cover
3. Pry the securing clips away from the memory module until it pops up
4. Remove the memory module from its connector on the system board.

Installing the Memory Module

1. Insert the memory module into the memory socket.
2. Press the memory module down until it clicks into place.
3. Install:
   a. Bottom Cover
   b. Optical Drive
   c. Hard Drive
   d. Battery
4. Follow the procedures in After Working Inside Your computer

Removing the Docking Board

1. Follow the procedures in Before Working Inside Your Computer
2. Remove:
   a. Battery
   b. Bottom Cover
3. Perform the following steps as shown in the illustration:
   a. Disconnect the antenna cables from the docking board [1].
   
   *CAUTION:* Exercise caution while disconnecting the antenna cables. Improper removal may result in damage/breakage of the antenna cables.
   b. Unroute the antenna cables [2].
   c. Remove the screws that secure the docking board [3].
   d. Flip the docking board [4].
   e. Lift the release tab [5].
   f. Disconnect the docking board connector cable from the system board [6].
4 Lift and remove the docking board from the computer chassis.

## Installing the Docking Board

1. Connect the docking board connector cable to the system board.
2. Flip the docking board and seat it on the slot.
3. Tighten the screws to secure the docking board.
4. Route the antenna cables.
5. Connect the antenna cables to the docking board.
6. Install:
   a. Bottom Cover
   b. Battery
7. Follow the procedures in After Working Inside Your computer

## Removing the GPU Board

1. Follow the procedures in Before Working Inside Your Computer
2. Remove:
   a. Battery
   b. Hard Drive
   c. Optical Drive
   d. Bottom Cover
   e. Docking Board
3. Perform the following steps as shown in the illustration:
   a. Remove the screws that secure the GPU socket to the computer [1].
   b. Lift GPU socket from the board [2].
   c. Remove the screws that secure the pull tab to the GPU board [3].
   d. Lift the GPU board from the computer [4].
Installing the GPU Board

1. Place the GPU board on the computer.
2. Tighten the screws that secure the pull tab to the GPU board.
3. Place the GPU socket on the board.
4. Tighten the screws that secure the socket to the computer.
5. Install:
   a. Docking Board
   b. Bottom Cover
   c. Optical Drive
   d. Hard Drive
   e. Battery
6. Follow the procedures in After Working Inside Your computer

Removing the SIM Module

1. Follow the procedures in Before Working Inside Your Computer
2. Remove:
   a. Battery
   b. Hard Drive
   c. Optical Drive
   d. Bottom Cover
3. Perform the following steps as shown in the illustration:
   a. Lift the locking tab [1].
   b. Disconnect the cable [2].
   c. Remove the screws that secure the SIM Module to the computer [3].
   d. Press the SIM module [4].
   e. Lift the module upward [5].
   f. Remove the SIM module from the computer [6].
Installing the SIM Module

1. Slide the SIM module into its place on the computer.
2. Close the SIM module bay press latch door.
3. Tighten the screws that secure the module to the computer.
4. Connect the cable.
5. Press the locking tab.
6. Install:
   a. Bottom Cover
   b. Optical Drive
   c. Hard Drive
   d. Battery
7. Follow the procedures in After Working Inside Your computer

Removing the WLAN Card

1. Follow the procedures in Before Working Inside Your Computer
2. Remove:
   a. Battery
   b. Hard Drive
   c. Optical Drive
   d. Bottom Cover
   e. GPS Holder
3. Perform the following steps as shown in the illustration:
   a. Disconnect the antenna cables from the WLAN card [1].
   b. Remove the screw that secures the WLAN card [2].
   c. Slide and lift the WLAN card from the slot [3].
Installing the WLAN Card

1. Insert the WLAN card in the slot.
2. Connect the screw to secure the cable holder.
3. Connect the antenna cables to the WLAN card.
4. Install:
   a. GPS Holder
   b. Bottom Cover
   c. Optical Drive
   d. Hard Drive
   e. Battery
5. Follow the procedures in After Working Inside Your computer

Removing the WWAN Card

1. Follow the procedures in Before Working Inside Your Computer
2. Remove:
   a. Battery
   b. Hard Drive
   c. Optical Drive
   d. Bottom Cover
   e. GPS Holder
3. Perform the following steps as shown in the illustration:
   a. Disconnect the cables from the WWAN card [1].
   b. Remove the screw that secures the WWAN card [2].
   c. Slide and lift the WWAN card from the slot [3].

Installing the WWAN Card

1. Insert the WWAN card in the slot.
2. Connect the screw to secure the WWAN.
3. Connect the cables to the WWAN card.
Removing the GPS Holder

1. Follow the procedures in Before Working Inside Your Computer
2. Remove:
   a. Battery
   b. Hard Drive
   c. Optical Drive
   d. Bottom Cover
3. Perform the following steps as shown in the illustration:
   a. Disconnect the antenna cable [1].
   b. Disconnect the GPS holder cable [2].
   c. Remove the screw that secures the GPS holder to the computer [3].
   d. Lift the GPS holder from the computer [4].

Installing the GPS Holder

1. Place the GPS holder into its place on the computer.
2. Tighten the screw that secure the holder to the computer.
3. Connect the antenna cable.
4. Align the cable to the computer.
5. Install:
   a. Bottom Cover
   b. Optical Drive
   c. Hard Drive
   d. Battery
6. Follow the procedures in After Working Inside Your computer

Removing the Heatsink

1. Follow the procedures in Before Working Inside Your Computer
2. Remove:
   a. Battery
   b. Hard Drive
   c. Optical Drive
Loosen the screws that secure the heatsink to the system board in the sequence shown [1,2,3,4].

**NOTE:** The screws are retained by the heatsink and should not be fully removed.

Lift the heatsink from the computer chassis.

### Installing the Heatsink

1. Align the heatsink to its position on the system board.
2. Tighten the screws in the numerical sequence depicted on the bracket, to secure the heatsink on the system board.
3. Install:
   a. SIM Module
   b. GPU Board
   c. Docking Board
   d. Bottom Cover
   e. Optical Drive
   f. Hard Drive
   g. Battery
4. Follow the procedures in *After Working Inside Your computer*

### Removing the System Fan

1. Follow the procedures in *Before Working Inside Your Computer*
2. Remove:
   a. Battery
   b. Hard Drive
   c. Optical Drive
   d. Bottom Cover
3. Perform the following steps as shown in the illustration:
   a. Unroute the system fan cable [1].
   b. Disconnect the system fan cable [2].
   c. Remove the screw that secures the system fan to the computer [3].
   d. Lift the system fan from the computer [4].
Installing the System Fan

1. Place the system fan into its place on the computer.
2. Tighten the screw that secures the system fan to the computer.
3. Connect the system fan cable to the computer.
4. Route the system fan cable.
5. Install:
   a. Bottom Cover
   b. Optical Drive
   c. Hard Drive
   d. Battery
6. Follow the procedures in After Working Inside Your computer

Removing the RF Holder

1. Follow the procedures in Before Working Inside Your Computer
2. Remove:
   a. Battery
   b. Hard Drive
   c. Optical Drive
   d. Bottom Cover
   e. GPS Holder
   f. WLAN Card
   g. Docking Board
3. Perform the following steps as shown in the illustration:
   a. Unthread the antenna cables [1].
   b. Disconnect the antenna cables [2].
   c. Remove the screw that secures the RF Holder to the computer [3].
   d. Lift and remove the RF Holder from the computer [4].
Installing the RF Holder

1. Place the RF holder on the computer.
2. Tighten the screws that secure the RF holder to the computer.
3. Connect the antenna cable.
4. Route the antenna cable.
5. Install:
   a. WLAN Card
   b. WWAN Card
   c. Bottom Cover
   d. Optical Drive
   e. Hard Drive
   f. Battery
6. Follow the procedures in After Working Inside Your computer

Removing the Display Assembly

1. Follow the procedures in Before Working Inside Your Computer
2. Remove:
   a. Battery
   b. Hard Drive
   c. Optical Drive
   d. Bottom Cover
3. Perform the following steps as shown in the illustration:
   a. Lift the locking tab [1].
   b. Disconnect the I/O cable [2].
   c. Peel the adhesive tape [3].
   d. Disconnect the eDP cable on the system board [4].
   e. Peel the adhesive tape [5]
   f. Disconnect the display assembly cable on the system board [6]
4 Perform the following steps as shown in the illustration:
   a. Remove the screws that secure the display assembly connector [1].
   b. Lift the tab [2].
   c. Disconnect the display assembly connector [3].

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

6 Flip the computer to remove the display assembly.
Installing the Display Assembly

1. Install the display assembly and close the display.
2. Flip the computer chassis.
3. Tighten the screws that secure the display assembly to the computer chassis.
4. Connect the display assembly connector.
5. Re-seat the pull tab on the connector.
6. Tighten the screws that secure the display assembly connector.
7. Connect the display assembly cable on the system board.
8. Affix the adhesive tape.
9. Connect the eDP cable on the system board.
10. Affix the adhesive tape.
11. Install:
   a. Bottom Cover
   b. Optical Drive
   c. Hard Drive
   d. Battery
12. Follow the procedures in After Working Inside Your computer

Removing the I/O Board

1. Follow the procedures in Before Working Inside Your Computer
2. Remove:
   a. Battery
   b. Hard Drive
   c. Optical Drive
   d. Bottom Cover
3. Perform the following steps as shown in the illustration:
   a. Unlock the I/O press latch door [1].
   b. Lift it upwards to open it [2].
   c. Remove the screw that secures I/O board to the computer chassis [3].
4. Perform the following steps as shown in the illustration:
   a. Lift the locking tab [1].
   b. Disconnect the I/O cable from the system board [2].
   c. Lift the display assembly cable in an upward direction [3]
   d. Disconnect the cable [4].
Perform the following steps as shown in the illustration:

a. Remove the screws that secure the I/O board to the computer [1].

b. Lift and the remove the I/O board from the computer [2].

Installing the I/O Board

1. Place the I/O board on the computer.
2. Tighten the screws that secure the I/O board to the computer.
3. Connect display assembly cable to the computer.
4. Connect the I/O cable to the computer.
5. Tighten the screw that secures the I/O board.
6. Slide the I/O board into its place on the computer.
7. Close the I/O bay press latch door.
8. Install:
   a. Bottom Cover
   b. Optical Drive
   c. Hard Drive
   d. Battery
9. Follow the procedures in After Working Inside Your computer

Removing the Storage Connector

1. Follow the procedures in Before Working Inside Your Computer
2. Remove:
Perform the following steps as shown in the illustration:

- Lift the locking tab [1].
- Disconnect the storage connector cable [2].
- Remove the screw that secures the storage connector [3].
- Lift the storage connector from the computer [4].

**Installing the Storage Connector**

1. Place the storage connector on the computer.
2. Tighten the screws that secure the storage connector.
3. Connect the storage connector cable to the computer.
4. Install:
   - Bottom Cover
   - Optical Drive
   - Hard Drive
   - Battery
5. Follow the procedures in After Working Inside Your computer

**Removing the SSD Bracket**

1. Follow the procedures in Before Working Inside Your Computer
2. Remove:
   - Battery
   - Hard Drive
   - Optical Drive
   - Bottom Cover
3. Perform the following steps as shown in the illustration:
   - Lift the locking tab [1].
   - Disconnect the SSD connector cable [2].
   - Remove the adhesive tape from the computer [3].
Perform the following steps as shown in the illustration:
  a  Remove the screws that secure the SSD bracket to the computer [1].
  b  Lift the SSD bracket from the computer [2].

Installing the SSD Bracket

1  Place the SSD bracket on the computer.
2  Tighten the screws that secure the SSD connector.
3  Affix the adhesive tape to the computer.
4  Connect the SSD bracket cable to the computer.
5  Install:
   a  Bottom Cover
   b  Optical Drive
   c  Hard Drive
   d  Battery
6  Follow the procedures in After Working Inside Your computer

Removing the USH Board

1  Follow the procedures in Before Working Inside Your Computer
2  Remove:
   a  Battery
   b  Hard Drive
   c  Optical Drive
   d  Bottom Cover
3  Perform the following steps as shown in the illustration:
   a  Lift the locking tab [1].
   b  Disconnect the USH board cables from the connectors [2].
   c  Remove the screws that secure the board [3].
d  Lift and flip the board at an angle to access the smart card cable at the bottom [4].
e  Lift the locking tab [5].
f  Disconnect the smart card cable and release the USH board from the computer chassis [6].

4  Remove the USH board from the computer.

Installing the USH Board

1  Connect the smart card cable to the USH board at the bottom of the board.
2  Flip the USH board to replace it to its original position.
3  Tighten the screws to secure the USH board.
4  Connect the cables to the USH board.
5  Install:
   a  Bottom Cover
   b  Optical Drive
   c  Hard Drive
   d  Battery
6  Follow the procedures in After Working Inside Your computer

Removing the Driving Board

1  Follow the procedures in Before Working Inside Your Computer
2  Remove:
   a  Battery
   b  Hard Drive
   c  Optical Drive
   d  Bottom Cover
3  Perform the following steps as shown in the illustration:
   a  Peel the adhesive tape [1].
   b  Disconnect the display assembly cable [2].
   c  Peel the adhesive tape [3].
   d  Disconnect the I/O cable [4]
   e  Remove the screws that secure the driving board to the computer [5]
   f  Lift the driving board from the computer [6].
Installing the Driving Board

1. Place the driving board on the computer.
2. Tighten the screws that secure the driving board on the computer.
3. Connect the I/O board cable.
4. Affix the adhesive tape.
5. Connect the display assembly cable
6. Affix the tape.
7. Install:
   a. Bottom Cover
   b. Hard Drive
   c. Optical Drive
   d. Battery
8. Follow the procedures in After Working Inside Your computer

Removing the Battery Connector

1. Follow the procedures in Before Working Inside Your Computer
2. Remove:
   a. Battery
   b. Hard Drive
   c. Optical Drive
   d. Bottom Cover
   e. I/O Board
3. Perform the following steps as shown in the illustration:
   a. Disconnect the battery connector cable [1].
   b. Remove the screws that secure the battery connector [2].
   c. Lift the battery connector [3].
Installing the Battery Connector

1. Place the battery connector on the system board.
2. Tighten the screws that secure the battery connector to the computer.
3. Connect the battery connector cable.
4. Install:
   a. I/O Board
   b. Bottom Cover
   c. Optical Drive
   d. Hard Drive
   e. Battery

5. Follow the procedures in After Working Inside Your computer

Removing the System Board

1. Follow the procedures in Before Working Inside Your Computer
2. Remove:
   a. Battery
   b. Hard Drive
   c. Optical Drive
   d. Bottom Cover
   e. GPS Holder
   f. WLAN Card
   g. WWAN Card

3. Perform the following steps as shown in the illustration:
   a. Lift the locking tab [1].
   b. Disconnect the system board connector cable [2].

4. Perform the following steps as shown in the illustration:
   a. Unlock the latch door [1].
   b. Push it downwards to open it [2].
   c. Remove the screws that secure the system board.
Perform the following steps as shown in the illustration:
   a. Remove the screws that secure the system board to the computer [1].
   b. Lift the system board from the computer [2].

Installing the System Board

1. Place the system board on the computer.
2. Tighten the screws that secure the system board to the computer.
3. Connect the system board cable to the computer.
4. Tighten the screws that secure the connector to the computer chassis.
5. Install:
   a. Bottom Cover
   b. Optical Drive
   c. Hard Drive
   d. WLAN Card
   e. WWAN Card
   f. I/O Board
   g. Battery
6. Follow the procedures in After Working Inside Your computer
System Setup

System Setup enables you to manage your computer hardware and specify BIOS-level options. From the System Setup, you can:

- Change the NVRAM settings after you add or remove hardware
- View the system hardware configuration
- Enable or disable integrated devices
- Set performance and power management thresholds
- Manage your computer security

Topics:

- Boot Sequence
- Navigation Keys
- System Setup Options
- Updating the BIOS
- System and Setup Password

Boot Sequence

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

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

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

- Removable Drive (if available)
- STXXXX Drive

  | NOTE: XXX denotes the SATA drive number.

- Optical Drive
- Diagnostics

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

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

Navigation Keys

The following table displays the system setup navigation keys.

  | NOTE: For most of the system setup options, changes that you make are recorded but do not take effect until you re-start the system.
Table 1. Navigation Keys

<table>
<thead>
<tr>
<th>Keys</th>
<th>Navigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up arrow</td>
<td>Moves to the previous field.</td>
</tr>
<tr>
<td>Down arrow</td>
<td>Moves to the next field.</td>
</tr>
<tr>
<td>&lt;Enter&gt;</td>
<td>Allows you to select a value in the selected field (if applicable) or follow the link in the field.</td>
</tr>
<tr>
<td>Spacebar</td>
<td>Expands or collapses a drop-down list, if applicable.</td>
</tr>
<tr>
<td>&lt;Tab&gt;</td>
<td>Moves to the next focus area.</td>
</tr>
</tbody>
</table>

**NOTE:** For the standard graphics browser only.

| <Esc>  | Moves to the previous page till you view the main screen. Pressing <Esc> in the main screen displays a message that prompts you to save any unsaved changes and restarts the system. |
| <F1>   | Displays the System Setup help file.            |

## System Setup Options

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

Table 2. General

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Information</td>
<td>This section lists the primary hardware features of your computer.</td>
</tr>
<tr>
<td></td>
<td>• System Information: Displays BIOS Version, Service Tag, Asset Tag, Ownership Tag, Ownership Date, Manufacture Date, and the Express Service Code.</td>
</tr>
<tr>
<td></td>
<td>• Memory Information: Displays Memory Installed, Memory Available, Memory Speed, Memory Channels Mode, Memory Technology, DIMM A Size, DIMM B Size,</td>
</tr>
<tr>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td>• Device Information: Displays Primary Hard Drive, MiniCard Device, ODD Device, Dock eSATA Device, LOM MAC Address, Video Controller, Video BIOS Version, Video Memory, Panel Type, Native Resolution, Audio Controller, Wi-Fi Device, WiGig Device, Cellular Device, Bluetooth Device.</td>
</tr>
<tr>
<td>Battery Information</td>
<td>Displays the battery status and the type of AC adapter connected to the computer</td>
</tr>
<tr>
<td>Boot Sequence</td>
<td>Boot Sequence</td>
</tr>
<tr>
<td></td>
<td>Allows you to change the order in which the computer attempts to find an operating system. The options are:</td>
</tr>
<tr>
<td></td>
<td>• Diskette Drive</td>
</tr>
<tr>
<td></td>
<td>• Internal HDD</td>
</tr>
<tr>
<td></td>
<td>• USB Storage Device</td>
</tr>
<tr>
<td></td>
<td>• CD/DVD/CD-RW Drive</td>
</tr>
<tr>
<td></td>
<td>• Onboard NIC</td>
</tr>
<tr>
<td></td>
<td>By default, all the options are checked. You can also deselect any option or change the boot order.</td>
</tr>
<tr>
<td>Boot List Option</td>
<td>Allows you to change the boot list option.</td>
</tr>
<tr>
<td></td>
<td>• Legacy <em>(Enabled)</em></td>
</tr>
<tr>
<td></td>
<td>• UEFI</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Advanced Boot Options</td>
<td>This option allows you the legacy option ROMs to load. By default, the Enable Legacy Option ROMs is checked.</td>
</tr>
<tr>
<td>Date/Time</td>
<td>Allows you to change the date and time.</td>
</tr>
</tbody>
</table>

### Table 3. System Configuration

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated NIC</td>
<td>Allows you to configure the integrated network controller. The options are:</td>
</tr>
<tr>
<td></td>
<td>• Enable UEFI Network Stack</td>
</tr>
<tr>
<td></td>
<td>• Disabled</td>
</tr>
<tr>
<td></td>
<td>• Enabled</td>
</tr>
<tr>
<td></td>
<td>• Enabled w/PXE: This option is enabled by default.</td>
</tr>
<tr>
<td>Onboard Unmanaged NIC</td>
<td>This option controls the on-board USB LAN controller. This option is enabled by default.</td>
</tr>
<tr>
<td>Serial Port 1</td>
<td>Allows you to configure the integrated serial port. The options are:</td>
</tr>
<tr>
<td></td>
<td>• Disabled</td>
</tr>
<tr>
<td></td>
<td>• COM1: This option is enabled by default.</td>
</tr>
<tr>
<td></td>
<td>• COM3</td>
</tr>
<tr>
<td>Serial Port 2</td>
<td>Allows you to configure the integrated serial port. The options are:</td>
</tr>
<tr>
<td></td>
<td>• Disabled</td>
</tr>
<tr>
<td></td>
<td>• COM2: This option is enabled by default.</td>
</tr>
<tr>
<td></td>
<td>• COM4</td>
</tr>
<tr>
<td>SATA Operation</td>
<td>Allows you to configure the internal SATA hard-drive controller. The options are:</td>
</tr>
<tr>
<td></td>
<td>• Disabled</td>
</tr>
<tr>
<td></td>
<td>• AHCI</td>
</tr>
<tr>
<td></td>
<td>• RAID On: This option is enabled by default.</td>
</tr>
<tr>
<td>Drives</td>
<td>Allows you to configure the SATA drives on board. All drives are enabled by default. The options are:</td>
</tr>
<tr>
<td></td>
<td>• SATA-0</td>
</tr>
<tr>
<td></td>
<td>• SATA-1</td>
</tr>
<tr>
<td></td>
<td>• SATA-2</td>
</tr>
<tr>
<td></td>
<td>• SATA-3</td>
</tr>
<tr>
<td>SMART Reporting</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>• Enable SMART Reporting</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| **USB Configuration**         | 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).
|                               | If USB port is enabled, device attached to this port is enabled and available for OS.
|                               | If USB port is disabled, the OS cannot see any device attached to this port.
|                               | - Enable USB Boot Support
|                               | - Enable External USB Ports
|                               | - Enable USB3.0 Controller
|                               | - Disable Docking Station Devices except video
| **NOTE:** USB keyboard and mouse always work in the BIOS setup irrespective of these settings. |                                                                                                                                                      |
| **USB PowerShare**            | This option configures the USB PowerShare feature behavior. This option is unchecked by default.                                                                                                          |
| **Audio**                    | This field enables or disables the integrated audio controller. By default, the Enable Audio option is selected.                                                                                              |
| **Keyboard Illumination**     | This field lets you choose the operating mode of the keyboard illumination feature. The keyboard brightness level can be set from 25% to 100%
|                               | - Disabled: This option is enabled by default
|                               | - Level is 25%
|                               | - Level is 50%
|                               | - Level is 75%
|                               | - Level is 100%
| **Keyboard Backlight with AC**| This option support the various illumination level. This option is enabled by default.                                                                                                                      |
| **RGB Keyboard Backlight**    | This option configures the RGB keyboard backlight feature. There are six available colors: four preset colors (white, red, green, and blue) and two user configurable colors.                                   |
| **Touchscreen**               | This field controls whether the touchscreen is enabled or disabled. This option is enabled by default.                                                                                                      |
| **Stealth Mode Control**      | This field is used to enable or disable the stealth mode. This option is enabled by default. On entering stealth mode, the actions checked below are to be taken:
|                               | - Disable onboard LEDs. This option is enabled by default.
|                               | - Disable onboard LCD screen. This option is enabled by default.
|                               | - Disable onboard speakers*. This option is enabled by default.
|                               | - Disable onboard fans*. This option is enabled by default.
|                               | - Disable Bluetooth radio*
|                               | - Disable GPS receiver*
|                               | - Disable WLAN radio*
|                               | - Disable WiGig radio*
|                               | - Disable WWAN radio*
| **Miscellaneous Devices**     | Allows you to enable or disable the following devices:
|                               | - Enable Microphone
|                               | - Enable Camera
|                               | - Enable Express card
|                               | - Enable Hard Drive Free Fall Protection
|                               | - Enable Dedicated GPS Radio
### Table 4. Video

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCD Brightness</td>
<td>Allows you to set the display brightness depending on the power source (On Battery and On AC).</td>
</tr>
</tbody>
</table>

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

### Table 5. Security

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admin Password</td>
<td>Allows you to set, change, or delete the administrator (admin) password.</td>
</tr>
</tbody>
</table>

**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.

**NOTE:** Successful password changes take effect immediately.

Default Setting: Not set

| System Password  | Allows you to set, change or delete the system password.                                                                                     |

**NOTE:** Successful password changes take effect immediately.

Default Setting: Not set

| Internal HDD-1 Password | Allows you to set or change the system's internal hard-disk drive.                                                                          |

**NOTE:** Successful password changes take effect immediately.

Default Setting: Not set

| Strong Password    | Allows you to enforce the option to always set strong passwords.                                                                             |

Default Setting: Enable Strong Password is not selected.

**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.

| Password Configuration | Allows you to determine the minimum and maximum length of Administrator and System passwords.                                                |

<table>
<thead>
<tr>
<th>Password Bypass</th>
<th>Allows you to enable or disable the permission to bypass the System and the Internal HDD password, when they are set. The options are:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Disabled</td>
</tr>
<tr>
<td></td>
<td>• Reboot bypass</td>
</tr>
</tbody>
</table>

Default Setting: Disabled
## Option Description

### Password Change
Allows you to enable the disable permission to the System and Hard Drive passwords when the admin password is set.

Default Setting: Allow Non-Admin Password Changes is selected

### 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.

### TPM Security
Allows you to enable the Trusted Platform Module (TPM) during POST.

Default Setting: The option is disabled.

### Computrace
Allows you to activate or disable the optional Computrace software. The options are:

- Deactivate
- Disable
- Activate

**NOTE:** The Activate and Disable options will permanently activate or disable the feature and no further changes will be allowed

Deactivate (default)

### CPU XD Support
Allows you to enable the Execute Disable mode of the processor.

Enable CPU XD Support (default)

### OROM Keyboard Access
Allows you to set an option to enter the Option ROM Configuration screens using hotkeys during boot. The options are:

- Enable
- One Time Enable
- Disable

Default Setting: Enable

### Admin Setup Lockout
Allows you to prevent users from entering Setup when an Administrator password is set.

Default Setting: Enable Admin Setup Lockout is not selected.

### Table 6. Secure Boot

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secure Boot Enable</td>
<td>This option enables or disables the Secure Boot Feature.</td>
</tr>
<tr>
<td></td>
<td>• Disable (default)</td>
</tr>
<tr>
<td></td>
<td>• Enable</td>
</tr>
</tbody>
</table>

### Expert Key Management
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:

- PK
- KEK
- db
- dbx

If you enable the *Custom Mode*, the relevant options for *PK, KEK, db, and dbx* appear. The options are:

- **Save to File**: Saves the key to a user-selected file
### Table 7. Performance

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Multi Core Support</strong></td>
<td>This field specifies whether the process will have one or all cores enabled. The performance of some applications will improve with the additional cores. This option is enabled by default. Allows you to enable or disable multi-core support for the processor. The options are:</td>
</tr>
<tr>
<td></td>
<td>· All</td>
</tr>
<tr>
<td></td>
<td>· 1</td>
</tr>
<tr>
<td></td>
<td>· 2</td>
</tr>
<tr>
<td>Default Setting: All</td>
<td></td>
</tr>
<tr>
<td><strong>Intel SpeedStep</strong></td>
<td>Allows you to enable or disable the Intel SpeedStep feature. Default Setting: Enable Intel SpeedStep</td>
</tr>
<tr>
<td><strong>C States Control</strong></td>
<td>Allows you to enable or disable the additional processor sleep states. Default Setting: The option C states is enabled.</td>
</tr>
<tr>
<td><strong>Intel TurboBoost</strong></td>
<td>Allows you to enable or disable the Intel TurboBoost mode of the processor. Default Setting: Enable Intel TurboBoost</td>
</tr>
<tr>
<td><strong>Hyper-Thread Control</strong></td>
<td>Allows you to enable or disable the HyperThreading in the processor. Default Setting: Enabled</td>
</tr>
</tbody>
</table>

### Table 8. Power Management

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AC Behavior</strong></td>
<td>Allows you to enable or disable the computer from turning on automatically when an AC adapter is connected. Default Setting: Wake on AC is not selected.</td>
</tr>
<tr>
<td><strong>Auto On Time</strong></td>
<td>Allows you to set the time at which the computer must turn on automatically. The options are:</td>
</tr>
<tr>
<td></td>
<td>· Disabled <em>(default)</em></td>
</tr>
<tr>
<td></td>
<td>· Every Day</td>
</tr>
<tr>
<td></td>
<td>· Weekdays</td>
</tr>
<tr>
<td></td>
<td>· Select Days</td>
</tr>
<tr>
<td><strong>USB Wake Support</strong></td>
<td>Allows you to enable USB devices to wake the system from Standby.</td>
</tr>
</tbody>
</table>
**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 will remove power from all of the USB ports to conserve battery power.

**Wireless Radio Control**
Allows you to enable or disable the feature that automatically switches from wired or wireless networks without depending on the physical connection.

- Control WLAN Radio
- Control WWAN Radio

**Wake on LAN/WLAN**
Allows you to enable or disable the feature that powers on the computer from the Off state when triggered by a LAN signal.

- Disabled: This option is enabled by default
- LAN Only
- WLAN Only
- LAN or WLAN
- LAN with PXE Boot

**Block Sleep**
This option lets you block entering to sleep (S3 state) in Operating System environment.

**Peak Shift**
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.

**Advanced Battery Charge Configuration**
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.

Disabled (default)

**Primary Battery Charge Configuration**
Allows you to select the charging mode for the battery. The options are:

- Adaptive
- Standard
- ExpressCharge: This option is enabled by default.
- Primarily AC use
- Custom

If Custom Charge is selected, you can also configure Custom Charge Start and Custom Charge Stop.

**Intel Smart Connect Technology**
This option, if enabled, periodically senses the nearby wireless connections, while the system is in sleep state. You can use this option to synchronize the email or other social media application that are open, when the system enters the sleep state.

**Table 9. POST Behavior**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapter Warnings</td>
<td>Allows you to enable or disable the system setup (BIOS) warning messages when you use certain power adapters.</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Keypad (Embedded)   | Allows you to choose one of two methods to enable the keypad that is embedded in the internal keyboard.  
|                     |   - Fn Key Only: This option is enabled by default.                         
|                     |   - By Numlock                                                              |
| Note: The Keyboard (Embedded) option is not supported in Latitude E5540 |
| Mouse/Touchpad      | Allows you to define how the system handles mouse and touchpad input. The options are:  
|                     |   - Serial Mouse                                                           
|                     |   - PS2 Mouse                                                              
|                     |   - Touchpad/PS-2 Mouse: This option is enabled by default.                |
| Numlock Enable      | Allows you to enable the Numlock option when the computer boots.           |
|                     | Enable Network (default)                                                   |
| Fn Key Emulation    | Allows you to set the option where the <Scroll Lock> key is used to simulate the <Fn> key feature.  
|                     | Enable Fn Key Emulation (default)                                          |
| Fn Lock Options     | Allows you to select hot key combination <Fn>+<Esc> to toggle the primary behaviour of F1–F12, between their standard and secondary function. The options are:  
|                     |   - Fn Lock                                                                
|                     |   - Lock Mode Enabled/Standard (default)                                   
|                     |   - Lock Mode Disabled/Secondary                                           |
| Mebx Hotkey         | Allows you to specify whether the MEBx Hotkey function should be enabled when the system boots.  
|                     | Enable MEBx Hotkey (default)                                               |
| Fastboot            | Allows you to speed up the boot process by bypassing some of the compatibility steps. The options are:  
|                     |   - Minimal                                                                
|                     |   - Thorough (default)                                                     
|                     |   - Auto                                                                   |
| Extended BIOS POST Time | Allows you to create an additional pre-boot delay. The options are:  
|                     |   - 0 seconds                                                              
|                     |   - 5 seconds (default)                                                    
|                     |   - 10 seconds (default)                                                   |
| Table 10. Virtualization Support |                                                                  |
| 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.                             |
Option | Description
--- | ---
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.

Table 11. Wireless

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| Wireless Switch | Allows to set the wireless devices that can be controlled by the wireless switch. The options are:
  - WWAN
  - WLAN
  - WiGig
  - Bluetooth
All the options are enabled by default. |
| Wireless Device Enable | Allows you to enable or disable the internal wireless devices.
  - WWAN
  - WLAN/WiGig
  - Bluetooth
All options are enabled by default. |

Table 12. Maintenance

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

Table 13. System Logs

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOS Events</td>
<td>Allows you to view and clear the System Setup (BIOS) POST events.</td>
</tr>
<tr>
<td>Thermal Events</td>
<td>Allows you to view and clear the System Setup (Thermal) events.</td>
</tr>
<tr>
<td>Power Events</td>
<td>Allows you to view and clear the System Setup (Power) events.</td>
</tr>
</tbody>
</table>

**Updating the BIOS**

It is recommended to update your BIOS (system setup), on replacing the system board or if an update is available. For laptops, ensure that your computer battery is fully charged and connected to a power outlet.

1. Re-start the computer.
2. Go to [dell.com/support](http://dell.com/support).
3. Enter the Service Tag or Express Service Code and click Submit.
To locate the Service Tag, click Where is my Service Tag?

If you cannot find your Service Tag, click Detect My Product. Proceed with the instructions on screen.

If you are unable to locate or find the Service Tag, click the Product Category of your computer.

Choose the Product Type from the list.

Select your computer model and the Product Support page of your computer appears.

Click Get drivers and click View All Drivers.
The Drivers and Downloads page opens.

On the Drivers and Downloads screen, under the Operating System drop-down list, select BIOS.

Identify the latest BIOS file and click Download File.

You can also analyze which drivers need an update. To do this for your product, click Analyze System for Updates and follow the instructions on the screen.

Select your preferred download method in the Please select your download method below window, click Download File.
The File Download window appears.

Click Save to save the file on your computer.

Click Run to install the updated BIOS settings on your computer.

Follow the instructions on the screen.

System and Setup Password

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

<table>
<thead>
<tr>
<th>Password Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System password</td>
<td>Password that you must enter to log on to your system.</td>
</tr>
<tr>
<td>Setup password</td>
<td>Password that you must enter to access and make changes to the BIOS settings of your computer.</td>
</tr>
</tbody>
</table>

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

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

⚠️ NOTE: Your computer is shipped with the system and setup password feature disabled.

Assigning a System Password and Setup Password

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

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

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

1. In the System BIOS or System Setup screen, select System Security and press <Enter>.
The System Security screen appears.
2. In the System Security screen, verify that Password Status is Unlocked.
3. Select System Password, enter your system password, and press <Enter> or <Tab>.

Use the following guidelines to assign the system password:

- A password can have up to 32 characters.
- The password can contain the numbers 0 through 9.
- Only lower case letters are valid, upper case letters are not allowed.
Deleting or Changing an Existing System and/or Setup Password

Ensure that the Password Status is Unlocked (in the System Setup) before attempting to delete or change the existing System and/or Setup password. You cannot delete or change an existing System or Setup password, if the Password Status is Locked.

To enter the System Setup, press <F2> immediately after a power-on or reboot.

1. In the System BIOS or System Setup screen, select System Security and press <Enter>.
   The System Security screen is displayed.
2. In the System Security screen, verify that Password Status is Unlocked.
3. Select System Password, alter or delete the existing system password and press <Enter> or <Tab>.
4. Select Setup Password, alter or delete the existing setup password and press <Enter> or <Tab>.

   **NOTE:** If you change the System and/or Setup password, re-enter the new password when promoted. If you delete the System and/or Setup password, confirm the deletion when prompted.
5. Press <Esc> and a message prompts you to save the changes.
6. Press <Y> to save the changes and exit from the System Setup.
   The computer reboots.
If you experience a problem with your computer, run the ePSA diagnostics before contacting Dell for technical assistance. The purpose of running diagnostics is to test your computer’s hardware without requiring additional equipment or risking data loss. If you are unable to fix the problem yourself, service and support personnel can use the diagnostics results to help you solve the problem.

Topics:
- Enhanced Pre-Boot System Assessment (ePSA) Diagnostics
- Device Status Lights
- Battery Status Lights

Enhanced Pre-Boot System Assessment (ePSA) Diagnostics

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

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

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

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

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

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>🌐</td>
<td>Turns on when you turn on the computer and blinks when the computer is in a power management mode.</td>
</tr>
<tr>
<td>📜</td>
<td>Turns on when the computer reads or writes data.</td>
</tr>
<tr>
<td>⚡️</td>
<td>Turns on steadily or blinks to indicate battery charge status.</td>
</tr>
<tr>
<td>📡</td>
<td>Turns on when wireless networking is enabled.</td>
</tr>
</tbody>
</table>

## Battery Status Lights

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

- **Alternately blinking amber light and green light**: An unauthenticated or unsupported non-Dell AC adapter is attached to your laptop.
- **Alternately blinking amber light with steady green light**: Temporary battery failure with AC adapter present.
- **Constantly blinking amber light**: Fatal battery failure with AC adapter present.
- **Light off**: Battery in full charge mode with AC adapter present.
- **Green light on**: Battery in charge mode with AC adapter present.
NOTE: Offerings may vary by region. For more information regarding the configuration of your computer, click Start (Start icon) > Help and Support, and then select the option to view information about your computer.

### Table 14. System Information

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chipset</td>
<td>Intel Mobile Express Series 6 chipset</td>
</tr>
<tr>
<td>DRAM bus width</td>
<td>64-bit</td>
</tr>
<tr>
<td>Flash EPROM</td>
<td>SPI 32 Mbits</td>
</tr>
<tr>
<td>PCIe Gen1 bus</td>
<td>100 MHz</td>
</tr>
</tbody>
</table>

### Table 15. Processor

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types</td>
<td>• Intel Core i3 series</td>
</tr>
<tr>
<td></td>
<td>• Intel Core i5 series</td>
</tr>
<tr>
<td></td>
<td>• Intel Core i7 series</td>
</tr>
<tr>
<td>L3 cache</td>
<td>up to 4 MB</td>
</tr>
<tr>
<td>External bus frequency</td>
<td>1600 MHz</td>
</tr>
</tbody>
</table>

### Table 16. Memory

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory connector</td>
<td>two SODIMM slots</td>
</tr>
<tr>
<td>Memory capacity</td>
<td>4 GB, or 8 GB</td>
</tr>
<tr>
<td>Memory type</td>
<td>DDR3 SDRAM 1600 Mhz</td>
</tr>
<tr>
<td>Minimum memory</td>
<td>4 GB</td>
</tr>
<tr>
<td>Maximum memory</td>
<td>16 GB</td>
</tr>
</tbody>
</table>

### Table 17. Audio

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>four-channel high definition audio</td>
</tr>
<tr>
<td>Controller</td>
<td>Realtek ALC3226</td>
</tr>
<tr>
<td>Stereo conversion</td>
<td>24-bit (analog-to-digital and digital-to-analog)</td>
</tr>
<tr>
<td>Interface:</td>
<td></td>
</tr>
<tr>
<td>Internal</td>
<td>HD audio</td>
</tr>
</tbody>
</table>
### Feature Specification

- **External microphone-in/stereo headphones/external speakers connector**
- **Speakers**
  - one mono speaker
- **Internal speaker amplifier**
  - 2W (RMS)
- **Volume controls**
  - Volume Up/Volume Down buttons

⚠️ **CAUTION:** Excessive sound pressure from earphones or headphones can cause hearing damage or loss. Adjustment of the volume control as well as the equalizer to settings other than the center position may increase the earphone or headphones output voltage, and therefore the sound pressure level. The use of factors influencing the earphones or headphones output other than those specified by the manufacturers (e.g. operating system, equalizer software, firmware, driver etc.) may increase the earphones or headphones output voltage and therefore the sound pressure level. The use of earphones and headphones other than those specified by the manufacturer may lead to heightened sound pressure level.

**Table 18. Video**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td>integrated on system board</td>
</tr>
<tr>
<td><strong>Controller</strong></td>
<td></td>
</tr>
<tr>
<td>UMA</td>
<td></td>
</tr>
<tr>
<td>Intel Core i3/i5</td>
<td>Intel HD Graphics 4400</td>
</tr>
<tr>
<td>Intel Core i7</td>
<td>Intel HD Graphics 5000</td>
</tr>
<tr>
<td><strong>Discrete (Optional)</strong></td>
<td>Nvidia GeForce (N14M-GE) Discrete Graphics Card, 2 GB Graphics</td>
</tr>
</tbody>
</table>

**Table 19. Communications**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network adapter</strong></td>
<td>10/100/1000 MB/s Ethernet (RJ-45)</td>
</tr>
<tr>
<td><strong>Wireless</strong></td>
<td>WLAN with Bluetooth 4.0 WWAN</td>
</tr>
</tbody>
</table>

**Table 20. Ports and Connectors**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio (optional)</td>
<td>one microphone/stereo headphone/speaker connector</td>
</tr>
<tr>
<td><strong>Video</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• one 15-pin VGA connector</td>
</tr>
<tr>
<td></td>
<td>• one 19-pin HDMI connector</td>
</tr>
<tr>
<td><strong>Network adapter</strong></td>
<td>one RJ-45 connector (second optional)</td>
</tr>
<tr>
<td><strong>USB 2.0</strong></td>
<td>two 4-pin USB 2.0 compliant connector</td>
</tr>
<tr>
<td><strong>USB 3.0</strong></td>
<td>• one 9-pin USB 3.0 compliant connector</td>
</tr>
<tr>
<td></td>
<td>• one 9-pin USB 3.0 compliant connector with PowerShare</td>
</tr>
<tr>
<td><strong>Memory card reader</strong></td>
<td>one SD card reader</td>
</tr>
<tr>
<td><strong>Expansion card</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• one ExpressCard reader</td>
</tr>
<tr>
<td></td>
<td>• optional PCMCIA reader (replaces ExpressCard reader)</td>
</tr>
</tbody>
</table>
### Table 21. Display

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>WLED display</td>
</tr>
<tr>
<td>Size</td>
<td>14.0 inches</td>
</tr>
<tr>
<td>Dimensions:</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>190.00 mm (7.48 inches)</td>
</tr>
<tr>
<td>Width</td>
<td>323.5 mm (12.59 inches)</td>
</tr>
<tr>
<td>Diagonal</td>
<td>375.2 mm (14.77 inches)</td>
</tr>
<tr>
<td>Active area (X/Y)</td>
<td>309.4 mm x 173.95 mm</td>
</tr>
<tr>
<td>Maximum resolution</td>
<td>1366 x 768 pixels</td>
</tr>
<tr>
<td>Operating angle</td>
<td>0° (closed) to 180°</td>
</tr>
<tr>
<td>Refresh rate</td>
<td>60 Hz</td>
</tr>
<tr>
<td>Minimum Viewing angles:</td>
<td></td>
</tr>
<tr>
<td>Horizontal</td>
<td>+/− 70° for HD</td>
</tr>
<tr>
<td>Vertical</td>
<td>+/− 70° for HD</td>
</tr>
<tr>
<td>Pixel pitch</td>
<td>1875 mm</td>
</tr>
</tbody>
</table>

### Table 22. Keyboard

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of keys</td>
<td>84 keys: US English, Thai, French-Canadian, Korean, Russian, Hebrew, English-International</td>
</tr>
<tr>
<td>Layout</td>
<td>QWERTY/AZERTY/Kanji</td>
</tr>
</tbody>
</table>

### Table 23. Touchpad

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Area:</td>
<td></td>
</tr>
<tr>
<td>X-axis</td>
<td>99.5 mm</td>
</tr>
<tr>
<td>Y-axis</td>
<td>53 mm</td>
</tr>
</tbody>
</table>
### Table 24. Battery

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>6–cell or 9–cell “smart” lithium ion</td>
</tr>
<tr>
<td>Dimensions:</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>21 mm (0.82 inches)</td>
</tr>
<tr>
<td>Width</td>
<td>166.9 mm (6.57 inches)</td>
</tr>
<tr>
<td>Depth</td>
<td>80 mm (3.14 inches)</td>
</tr>
<tr>
<td>Weight</td>
<td>6–cell: 365.5 g (0.80 lbs); 9–cell: 520 g (1.14 lbs)</td>
</tr>
<tr>
<td>Voltage</td>
<td>14.8 VDC</td>
</tr>
<tr>
<td>Life span</td>
<td>300 discharge/charge cycles</td>
</tr>
<tr>
<td>Temperature range:</td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>• Charging: 0 °C to 60 °C (32 °F to 140 °F)</td>
</tr>
<tr>
<td></td>
<td>• Discharging: 0 °C to 70 °C (32 °F to 158 °F)</td>
</tr>
<tr>
<td>Non-Operating</td>
<td>-51 °C to 71 °C (-60 °F to 160 °F)</td>
</tr>
</tbody>
</table>

**NOTE:** The battery pack is capable of safely withstanding the above storage temperatures with 100% charge.

**NOTE:** The battery pack is also capable of withstanding storage temperatures from –20 °C to +60 °C with no degradation in its performance.

Coin-cell battery  
3V CR2032 lithium coin cell

### Table 25. AC Adapter

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>65 W/90 W</td>
</tr>
<tr>
<td>Input voltage</td>
<td>100 VAC to 240 VAC</td>
</tr>
<tr>
<td>Input current (max)</td>
<td>1.5A / 1.7A</td>
</tr>
<tr>
<td>Input frequency</td>
<td>50 Hz to 60 Hz</td>
</tr>
<tr>
<td>Output power</td>
<td>65 W/90 W</td>
</tr>
<tr>
<td>Output current</td>
<td>3.34 A/4.62 A (continuous)</td>
</tr>
<tr>
<td>Rated output voltage</td>
<td>19.5 +/− 1.0 VDC</td>
</tr>
<tr>
<td>Temperature range:</td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>0 °C to 40 °C (32 °F to 104 °F)</td>
</tr>
<tr>
<td>Non-Operating</td>
<td>−40 °C to 70 °C (−40 °F to 158 °F)</td>
</tr>
</tbody>
</table>

### Table 26. Auto-air Adapter

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>90 W</td>
</tr>
<tr>
<td>Input voltage</td>
<td>11 VDC to 16 VDC</td>
</tr>
<tr>
<td>Input current (max)</td>
<td>9.0 A</td>
</tr>
<tr>
<td>Output power</td>
<td>90 W</td>
</tr>
</tbody>
</table>
Output current: 4.86 A (continuous)
Rated output voltage: 19.5 +/- 1.0 VDC
Temperature range:
  - Operating: 0 °C to 35 °C (32 °F to 95 °F)

Table 27. Physical Feature | Specification
--- | ---
Height | 44 mm (1.73 inches)
Width | 347 mm (13.66 inches)
Depth | 243 mm (9.57 inches)
Weight | 6.5 lbs (2.95 kg)

Table 28. Environmental Feature | Specification
--- | ---
Temperature:
  - Operating: -29 °C to 63 °C (-20 °F to 140 °F)
  - Storage: -51 °C to 71 °C (-60 °F to 160 °F)
Relative humidity (maximum):
  - Operating: 10 % to 90 % (non condensing)
  - Storage: 5 % to 95 % (non condensing)
Altitude (maximum):
  - Operating: -15.24 m to 4572 (-50 ft to 15,000 ft)
  - Non-Operating: 1-15.24 m to 4572 (-50 ft to 15,000 ft)
Airborne contaminant level: G1 as defined by ISA-71.04-1985
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.