# Dell Vostro 14–3478

Owner's Manual

## Notes, cautions, and warnings

(i) **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.

# Contents

**1**

# Working on your computer

## Safety precautions

The safety precautions chapter details the primary steps to be taken before performing any disassembly instructions.

Observe the following safety precautions before you perform any installation or break/fix procedures involving disassembly or reassembly:

- Turn off the system and all attached peripherals.
- Disconnect the system and all attached peripherals from AC power.
- Disconnect all network cables, telephone, and telecommunications lines from the system.
- Use an ESD field service kit when working inside any notebook to avoid electrostatic discharge (ESD) damage.
- After removing any system component, carefully place the removed component on an anti-static mat.
- Wear shoes with non-conductive rubber soles to reduce the chance of getting electrocuted.

## Standby power

Dell products with standby power must be unplugged before you open the case. Systems that incorporate standby power are essentially powered while turned off. The internal power enables the system to be remotely turned on (wake on LAN) and suspended into a sleep mode and has other advanced power management features.

Unplugging, pressing and holding the power button for 15 seconds should discharge residual power in the system board. Remove the battery from notebooks.

## Bonding

Bonding is a method for connecting two or more grounding conductors to the same electrical potential. This is done through the use of a field service electrostatic discharge (ESD) kit. When connecting a bonding wire, ensure that it is connected to bare metal and never to a painted or non-metal surface. The wrist strap should be secure and in full contact with your skin, and ensure that you remove all jewelry such as watches, bracelets, or rings prior to bonding yourself and the equipment.

## Electrostatic discharge—ESD protection

ESD is a major concern when you handle electronic components, especially sensitive components such as expansion cards, processors, memory DIMMs, and system boards. Very slight charges can damage circuits in ways that may not be obvious, such as intermittent problems or a shortened product life span. As the industry pushes for lower power requirements and increased density, ESD protection is an increasing concern.

Due to the increased density of semiconductors used in recent Dell products, the sensitivity to static damage is now higher than in previous Dell products. For this reason, some previously approved methods of handling parts are no longer applicable.

Two recognized types of ESD damage are catastrophic and intermittent failures.

- **Catastrophic** – Catastrophic failures represent approximately 20 percent of ESD-related failures. The damage causes an immediate and complete loss of device functionality. An example of catastrophic failure is a memory DIMM that has received a static shock and immediately generates a "No POST/No Video" symptom with a beep code emitted for missing or nonfunctional memory.
- **Intermittent** – Intermittent failures represent approximately 80 percent of ESD-related failures. The high rate of intermittent failures means that most of the time when damage occurs, it is not immediately recognizable. The DIMM receives a static shock, but the tracing is merely weakened and does not immediately produce outward symptoms related to the damage. The weakened trace may take weeks or months to melt, and in the meantime may cause degradation of memory integrity, intermittent memory errors, etc.

The more difficult type of damage to recognize and troubleshoot is the intermittent (also called latent or "walking wounded") failure.

Perform the following steps to prevent ESD damage:

- Use a wired ESD wrist strap that is properly grounded. The use of wireless anti-static straps is no longer allowed; they do not provide adequate protection. Touching the chassis before handling parts does not ensure adequate ESD protection on parts with increased sensitivity to ESD damage.

- Handle all static-sensitive components in a static-safe area. If possible, use anti-static floor pads and workbench pads.
- When unpacking a static-sensitive component from its shipping carton, do not remove the component from the anti-static packing material until you are ready to install the component. Before unwrapping the anti-static packaging, ensure that you discharge static electricity from your body.
- Before transporting a static-sensitive component, place it in an anti-static container or packaging.

# ESD field service kit

The unmonitored Field Service kit is the most commonly used service kit. Each Field Service kit includes three main components: anti-static mat, wrist strap, and bonding wire.

## Components of an ESD field service kit

The components of an ESD field service kit are:

- **Anti-Static Mat** – The anti-static mat is dissipative and parts can be placed on it during service procedures. When using an anti-static mat, your wrist strap should be snug and the bonding wire should be connected to the mat and to any bare metal on the system being worked on. Once deployed properly, service parts can be removed from the ESD bag and placed directly on the mat. ESD-sensitive items are safe in your hand, on the ESD mat, in the system, or inside a bag.
- **Wrist Strap and Bonding Wire** – The wrist strap and bonding wire can be either directly connected between your wrist and bare metal on the hardware if the ESD mat is not required, or connected to the anti-static mat to protect hardware that is temporarily placed on the mat. The physical connection of the wrist strap and bonding wire between your skin, the ESD mat, and the hardware is known as bonding. Use only Field Service kits with a wrist strap, mat, and bonding wire. Never use wireless wrist straps. Always be aware that the internal wires of a wrist strap are prone to damage from normal wear and tear, and must be checked regularly with a wrist strap tester in order to avoid accidental ESD hardware damage. It is recommended to test the wrist strap and bonding wire at least once per week.
- **ESD Wrist Strap Tester** – The wires inside of an ESD strap are prone to damage over time. When using an unmonitored kit, it is a best practice to regularly test the strap prior to each service call, and at a minimum, test once per week. A wrist strap tester is the best method for doing this test. If you do not have your own wrist strap tester, check with your regional office to find out if they have one. To perform the test, plug the wrist-strap's bonding-wire into the tester while it is strapped to your wrist and push the button to test. A green LED is lit if the test is successful; a red LED is lit and an alarm sounds if the test fails.
- **Insulator Elements** – It is critical to keep ESD sensitive devices, such as plastic heat sink casings, away from internal parts that are insulators and often highly charged.
- **Working Environment** – Before deploying the ESD Field Service kit, assess the situation at the customer location. For example, deploying the kit for a server environment is different than for a desktop or portable environment. Servers are typically installed in a rack within a data center; desktops or portables are typically placed on office desks or cubicles. Always look for a large open flat work area that is free of clutter and large enough to deploy the ESD kit with additional space to accommodate the type of system that is being repaired. The workspace should also be free of insulators that can cause an ESD event. On the work area, insulators such as Styrofoam and other plastics should always be moved at least 12 inches or 30 centimeters away from sensitive parts before physically handling any hardware components
- **ESD Packaging** – All ESD-sensitive devices must be shipped and received in static-safe packaging. Metal, static-shielded bags are preferred. However, you should always return the damaged part using the same ESD bag and packaging that the new part arrived in. The ESD bag should be folded over and taped shut and all the same foam packing material should be used in the original box that the new part arrived in. ESD-sensitive devices should be removed from packaging only at an ESD-protected work surface, and parts should never be placed on top of the ESD bag because only the inside of the bag is shielded. Always place parts in your hand, on the ESD mat, in the system, or inside an anti-static bag.
- **Transporting Sensitive Components** – When transporting ESD sensitive components such as replacement parts or parts to be returned to Dell, it is critical to place these parts in anti-static bags for safe transport.

## ESD protection summary

It is recommended that all field service technicians use the traditional wired ESD grounding wrist strap and protective anti-static mat at all times when servicing Dell products. In addition, it is critical that technicians keep sensitive parts separate from all insulator parts while performing service and that they use anti-static bags for transporting sensitive components.

# Transporting sensitive components

When transporting ESD sensitive components such as replacement parts or parts to be returned to Dell, it is critical to place these parts in anti-static bags for safe transport.

## Lifting equipment

Adhere to the following guidelines when lifting heavy weight equipment:

⚠ **CAUTION: Do not lift greater than 50 pounds. Always obtain additional resources or use a mechanical lifting device.**

1. Get a firm balanced footing. Keep your feet apart for a stable base, and point your toes out.
2. Tighten stomach muscles. Abdominal muscles support your spine when you lift, offsetting the force of the load.
3. Lift with your legs, not your back.
4. Keep the load close. The closer it is to your spine, the less force it exerts on your back.
5. Keep your back upright, whether lifting or setting down the load. Do not add the weight of your body to the load. Avoid twisting your body and back.
6. Follow the same techniques in reverse to set the load down.

# Before working inside your computer

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

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

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

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

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

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

# After working inside your computer

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

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

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

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

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

# Disassembly and reassembly

## Recommended tools

The procedures in this document require the following tools:

- Phillips #0 screwdriver
- Phillips #1 screwdriver
- Plastic scribe

ⓘ **NOTE: The #0 screw driver is for screws 0-1 and the #1 screw driver is for screws 2-4.**

## Screw size list

**Table 1. Vostro 14–3478 screw size list**

| Component | M2x2 (Big head 07) | M2x2 (Big head 05) | M2x2.5 | M2x5 | M2x3 (Thin head) | M2x3 | M2.5x2.5 (Big head) | M2.5x8 | M3x3 |
|---|---|---|---|---|---|---|---|---|---|
| Optical drive bridge | | 3 | | | | | | | |
| Optical drive bracket | | | | | 1 | | | | |
| Base Cover | | | 3 | 6 | | | 1 | 8 | |
| Hard drive | | | | | | | | | 4 |
| Hard drive bracket | | | | | 2 | | | | |
| System fan | | | | 2 | | | | | |
| System board | | | | | 2 | 1 | | | |
| Touchpad support bracket | | 4 | | | 1 | | | | |
| Display assembly | | | | | | | | 3 | |
| Display panel | | | | | 4 | | | | |
| Display Hinge | | | | | | | 6 | | |
| Power button board | 1 | | | | | | | | |
| Fingerprint reader bracket | | | 1 | | | | | | |

## Battery

## Removing the battery

1. Follow the procedure in Before working inside your computer.
2. To remove the battery:
   a) Slide the release latch to release the battery [1].
   b) Remove the battery from the computer [2].
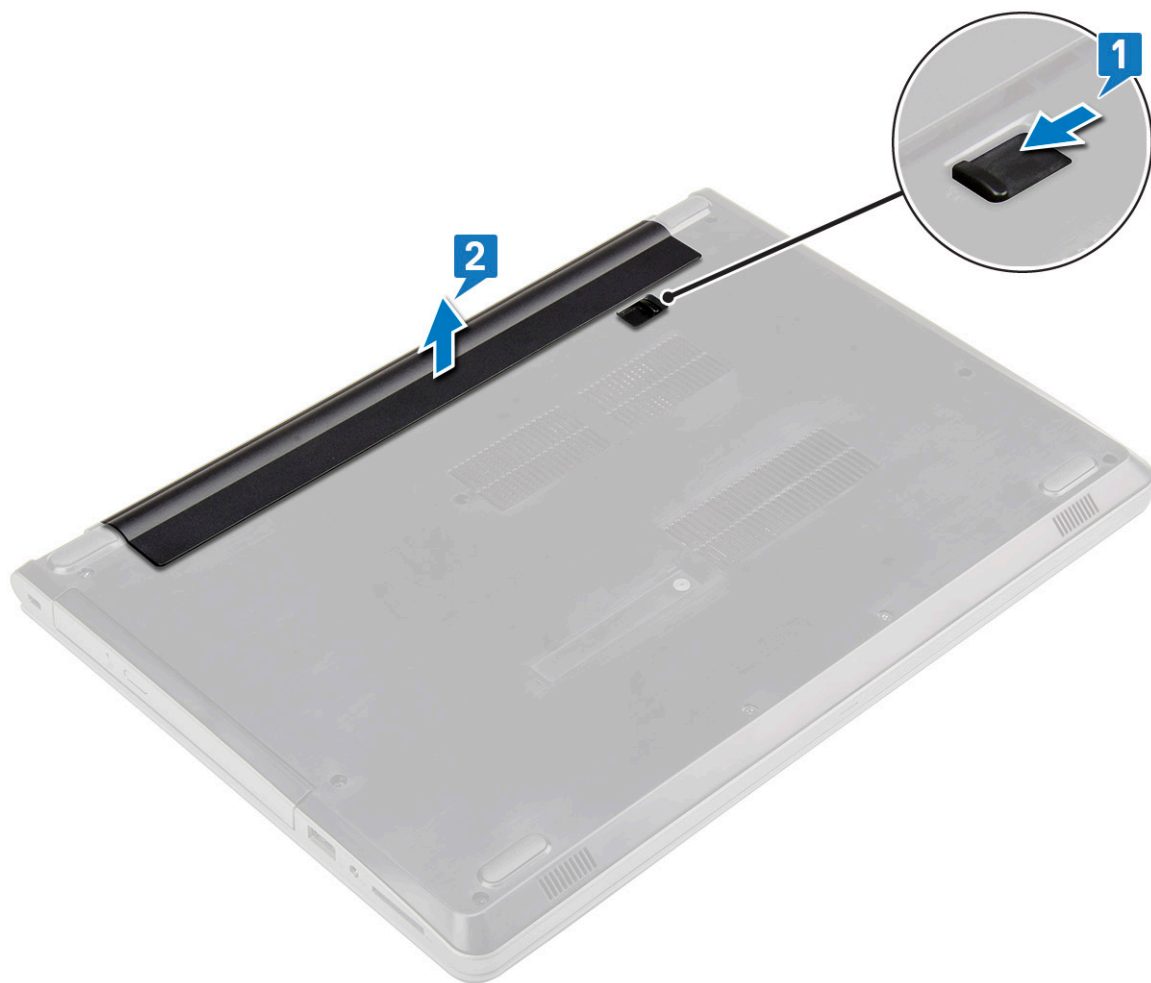
# Installing the battery

1. Insert the battery into the slot and press until it clicks into place.
2. Follow the procedures in After working inside your computer.

# Optical drive

## Removing the optical drive

1. Follow the procedure in Before working inside your computer.
2. Remove the Battery.
3. To remove the optical drive:
   a) Remove the M2x5 screw that secures the optical drive to the computer [1].
   b) Using a plastic scribe, push the tab in the direction of the arrow indicated on the chassis. [2].
   c) Slide the optical drive out of the computer [3].
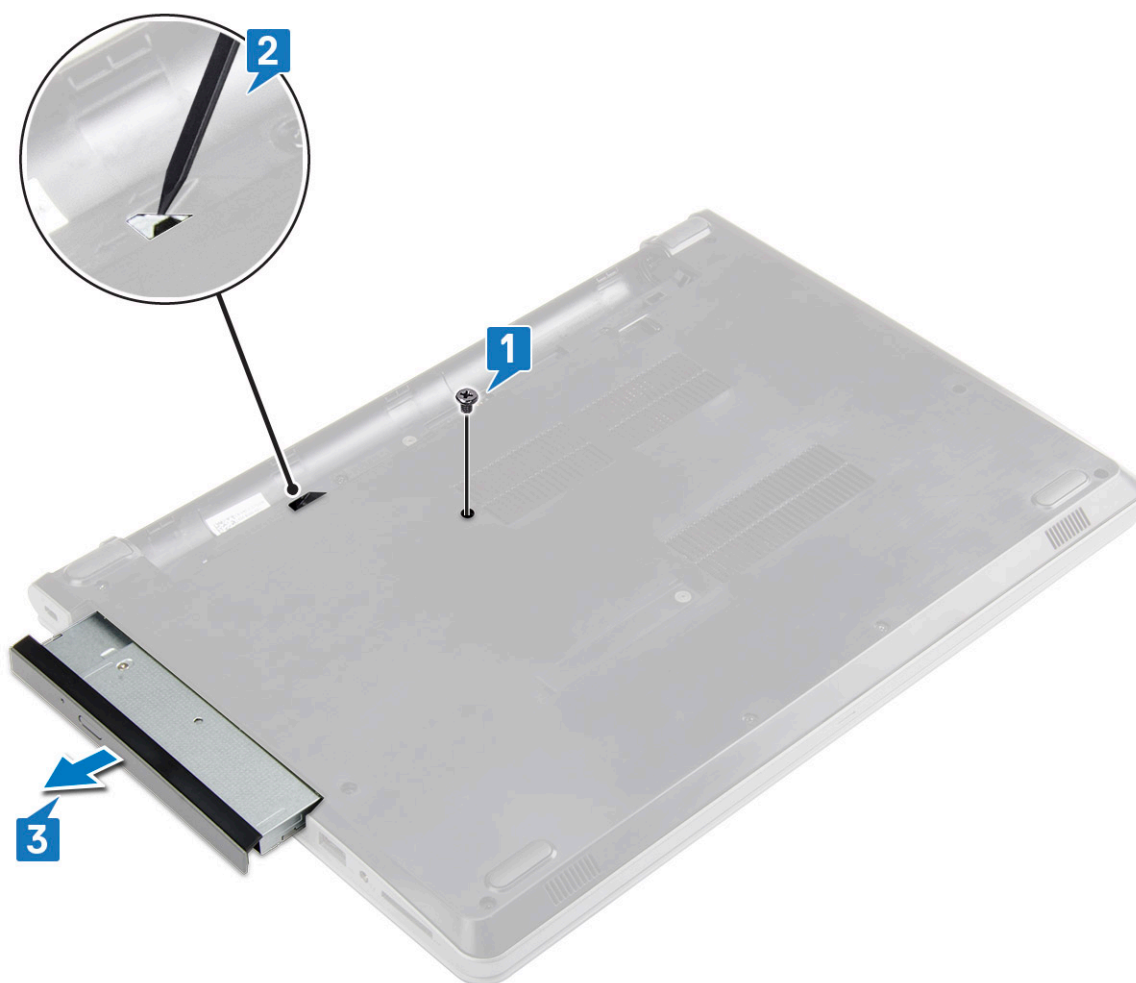
# Removing the optical drive bracket

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) Battery
   b) Optical drive
3. To remove the optical drive from the bracket:
   a) Remove the M2x3(Thin head) screw that secures the optical drive bracket.
   b) Remove the optical drive bracket from the optical drive .

# Installing the optical drive bracket

1. Install the optical drive bracket.
2. Tighten the M2x3 (Thin head) screw to secure the optical drive bracket.
3. Install the:
   a) Optical drive
   b) Battery
4. Follow the procedure in After working inside your computer.

# Installing the optical drive

1. Insert the optical drive into the slot until it clicks into place.
2. Tighten the M2x5 screw to secure the optical drive to the computer.
3. Install the Battery.
4. 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 Battery.
3. To remove the keyboard:
   a) Using a plastic scribe, release the five tabs from the slots located above the keyboard [1].
   b) Flip the keyboard on the palm rest to access the keyboard connector cable under the keyboard [2].
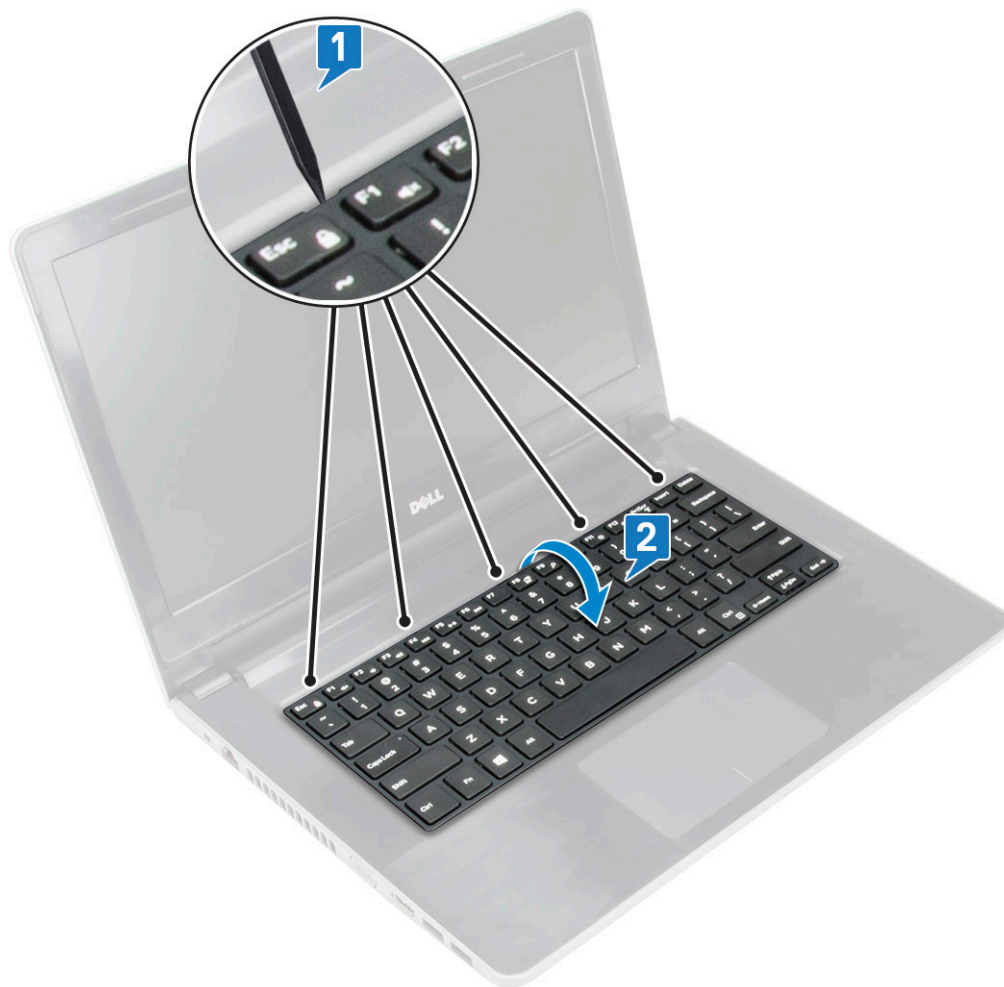
4. To remove the keyboard cable:
   a) Disconnect the keyboard cable from the system board.
   b) Remove the keyboard from the computer.

# Installing the keyboard

1. Connect the keyboard cable to the connector on the system board.
2. Slide the keyboard to align it with the tabs.
3. Press along the top edges to lock the keyboard in place.
4. Install the Battery.
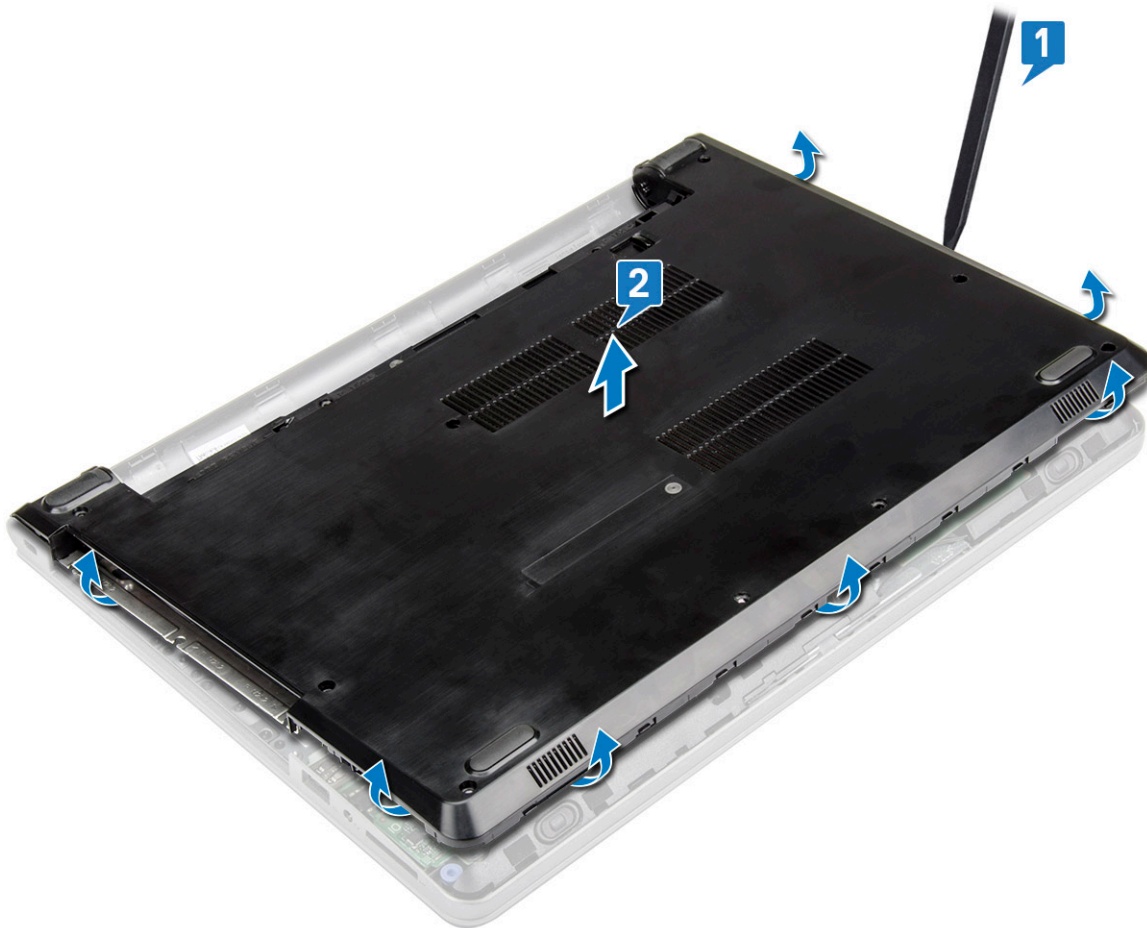5. Follow the procedure in After working inside your computer.

# Base cover

## Removing the base cover

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) Battery
   b) Optical drive
   c) Keyboard
3. To remove the base cover:
   a) Disconnect the optical drive connector and lift it to remove it from the system board [1].
   b) Remove the 3 (M2x5) screws that secure the base cover [2].

4. Flip the computer and remove the screws (8 screws - M2.5x8; 3 screws - M2x2; 2 screws- M2x5) that secure the base cover to the computer.

5. To remove the base cover:
   a) Use a scribe to pry the edges of the base cover [1].
   b) Lift the base cover and remove it from the computer [2].

# 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 (8 screws - M2.5x8; 3 screws - M2x2; 2 screws- M2x5) screws to secure the base cover to the computer.
4. Flip the computer over.
5. Open the display and connect the optical drive connector to the system board.
6. Tighten the screws to secure the base cover to the palm rest.
7. Install the:
   a) Keyboard
   b) Optical drive
   c) Battery
8. Follow the procedure in After working inside your computer.
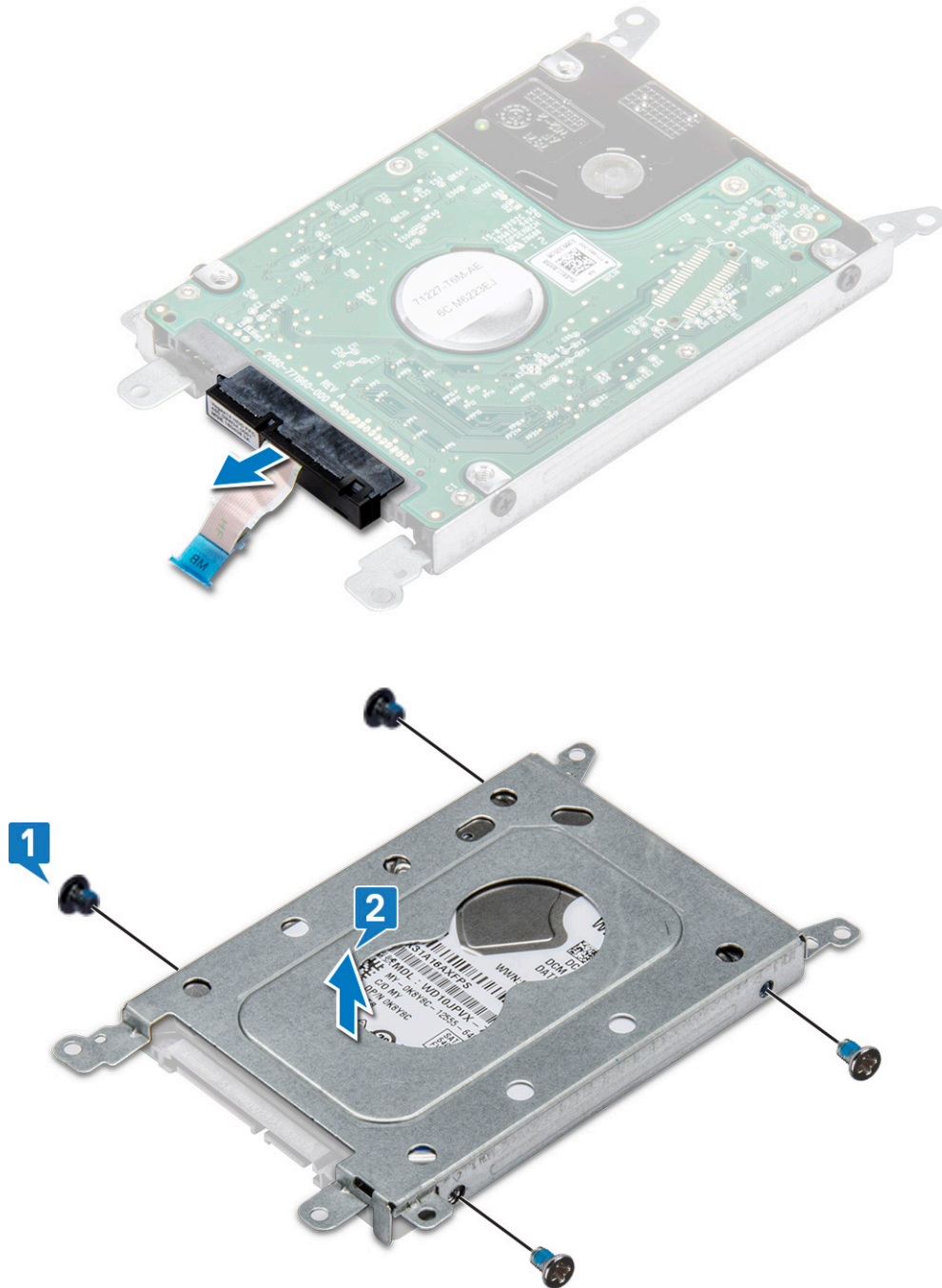
# Hard drive

## Removing the hard drive assembly

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) Battery
   b) Optical drive
   c) Keyboard
   d) Base cover

3. To remove the hard drive assembly:
   a) Disconnect the hard drive cable from the connector on the system board [1].
   b) Remove the 2 (M2x3) screws that secure the hard drive assembly to the computer [2].
   c) Lift the hard drive assembly away from the computer [3].
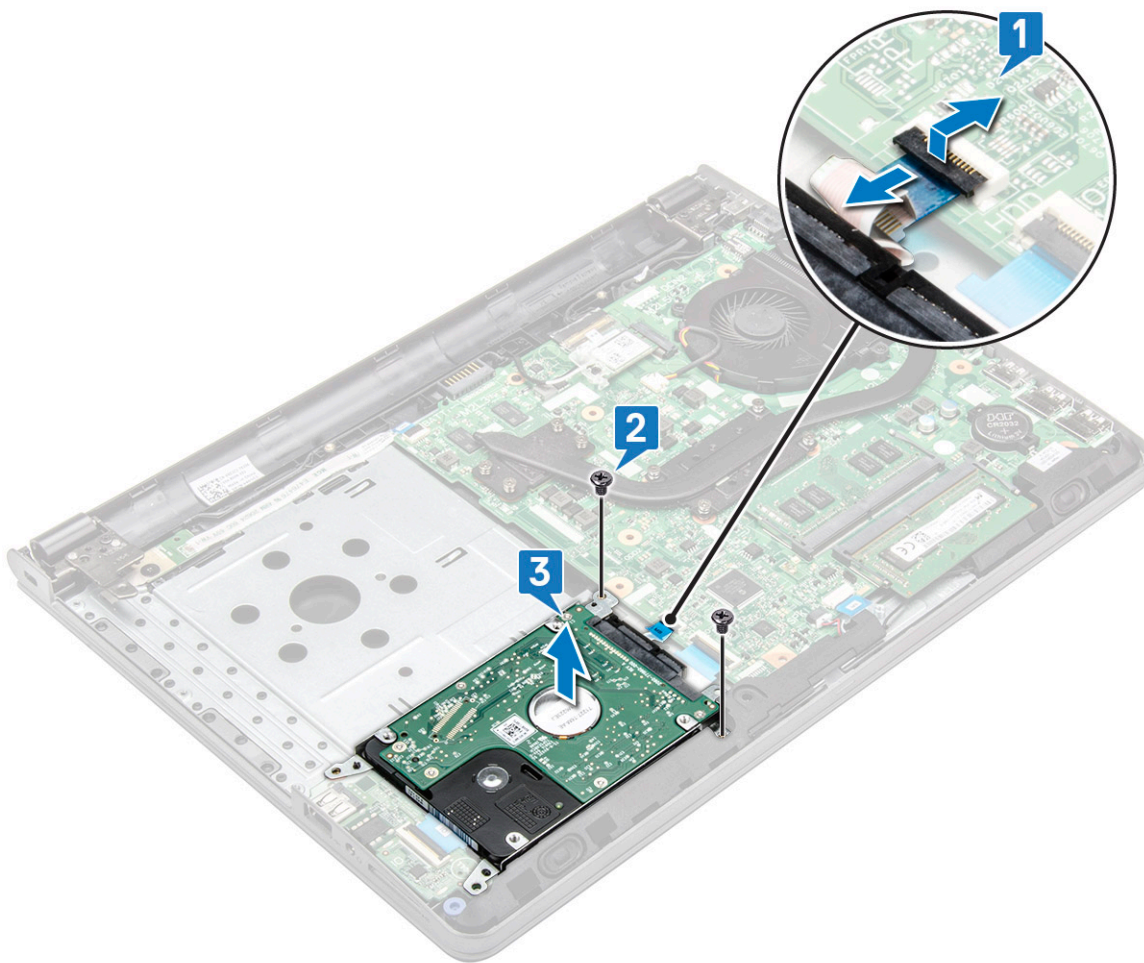
# Removing the hard drive from the hard drive bracket

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) Battery
   b) Optical drive
   c) Keyboard
   d) Base cover
   e) Hard drive assembly
3. To remove the hard drive from the hard drive assembly:
   a) Pull the hard drive cable connector to remove it from the hard drive .
   b) Remove the 4 (M3x3) screws that secure the hard drive bracket to the hard drive [1].
   c) Lift the hard drive from the hard drive bracket [2].

# Installing the hard drive into the hard drive bracket

1. Align the screw holders and insert the hard drive into the hard drive bracket.
2. Tighten the M3x3 screws to secure the hard drive to the hard drive bracket.
3. Connect the hard drive cable connector to the hard drive.
4. Install the:
   a) Hard drive assembly
   b) Base cover
   c) Keyboard
   d) Optical drive
   e) Battery

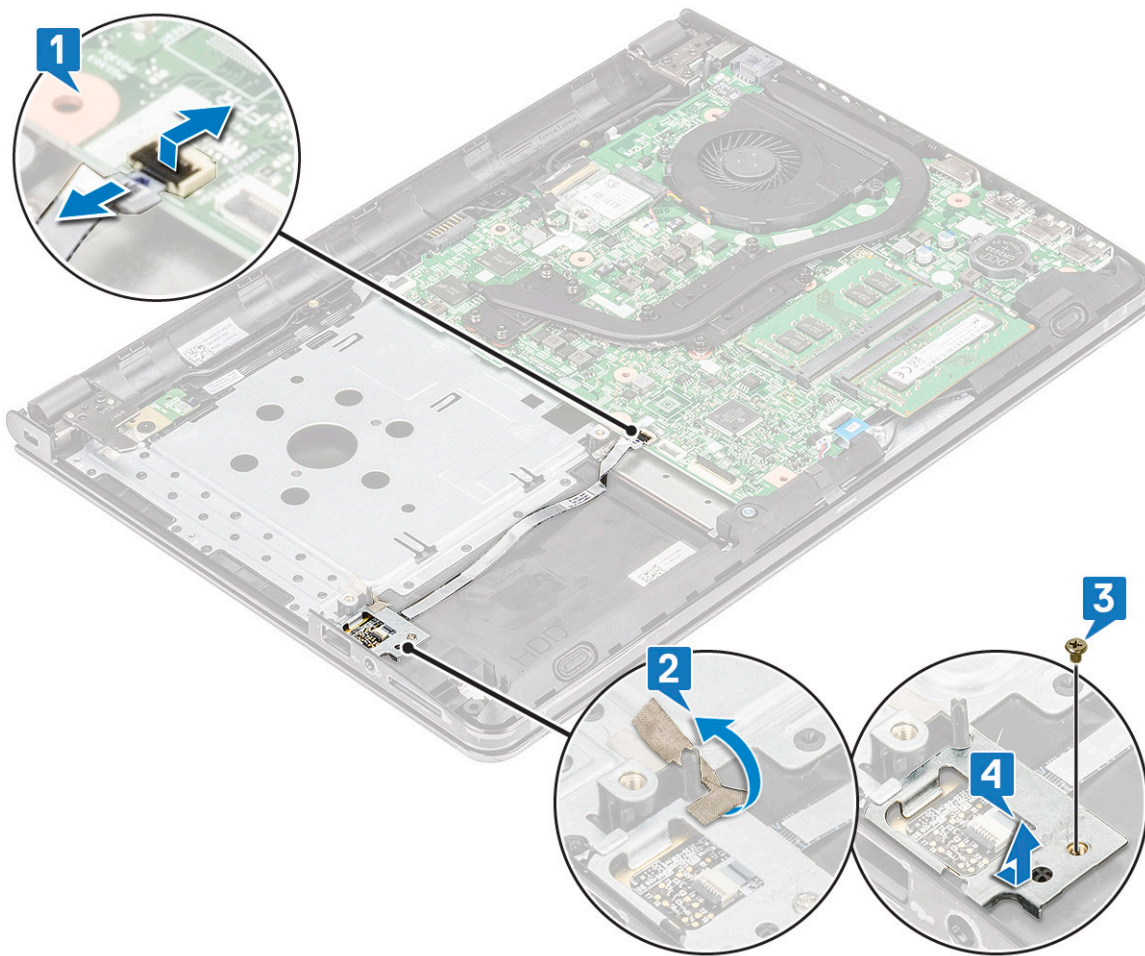5. Follow the procedure in After working inside your computer

# Installing the hard drive assembly

1. Insert the hard drive assembly into the slot on the computer.
2. Tighten the 4 (M2x3) screws to secure the hard drive assembly to the computer.
3. Connect the hard drive cable to the connector on the system board.
4. Install the:
   a) Base cover
   b) Keyboard
   c) Optical drive
   d) Battery
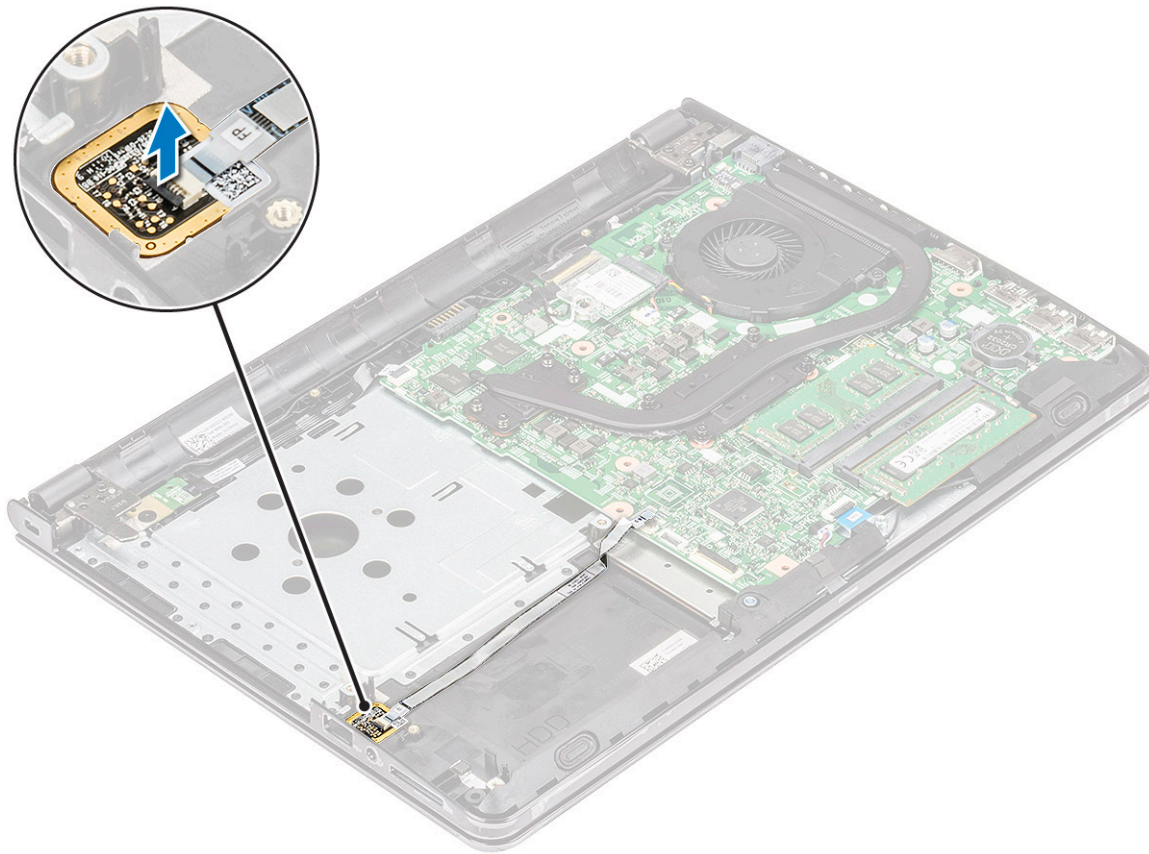5. Follow the procedures in After working inside your computer.

# Fingerprint reader

## Removing the fingerprint reader

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) Battery
   b) Optical drive
   c) Keyboard
   d) Base cover
   e) Hard drive
3. To remove the fingerprint reader bracket:
   a) Disconnect the fingerprint reader from the connector on the system board [1].
   b) Remove the tape that secures the fingerprint assembly to the computer [2]
   c) Remove the 1 (M2x2.5) screw that secures the fingerprint assembly to the computer [3].
   d) Lift the fingerprint reader bracket from the computer [4].

4. Remove the fingerprint reader
   a) Lift the fingerprint reader board from the computer.

# Installing the fingerprint reader

1. Place the fingerprint reader board into the slot on the computer.
2. Tighten the 1 (M2x2.5) screw that secures the fingerprint reader bracket to the computer.
3. Affix the tape that secures the fingerprint assembly to the computer
4. Connect the fingerprint reader cable to the connector on the system board.
5. Install the:
   a) Hard drive
   b) Base cover
   c) Keyboard
   d) Optical drive
   e) Battery
6. 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) Battery
   b) Optical drive
   c) Keyboard
   d) Base cover
3. To remove the WLAN card:
   a) Remove the 1 (M2x3) screw that secures the tab to the WLAN card [1].

b) Lift the tab that secures the WLAN card [2].

c) Disconnect the WLAN cables from the connectors on the WLAN card [3].

d) Slide the WLAN card from the connector on the system board [4].
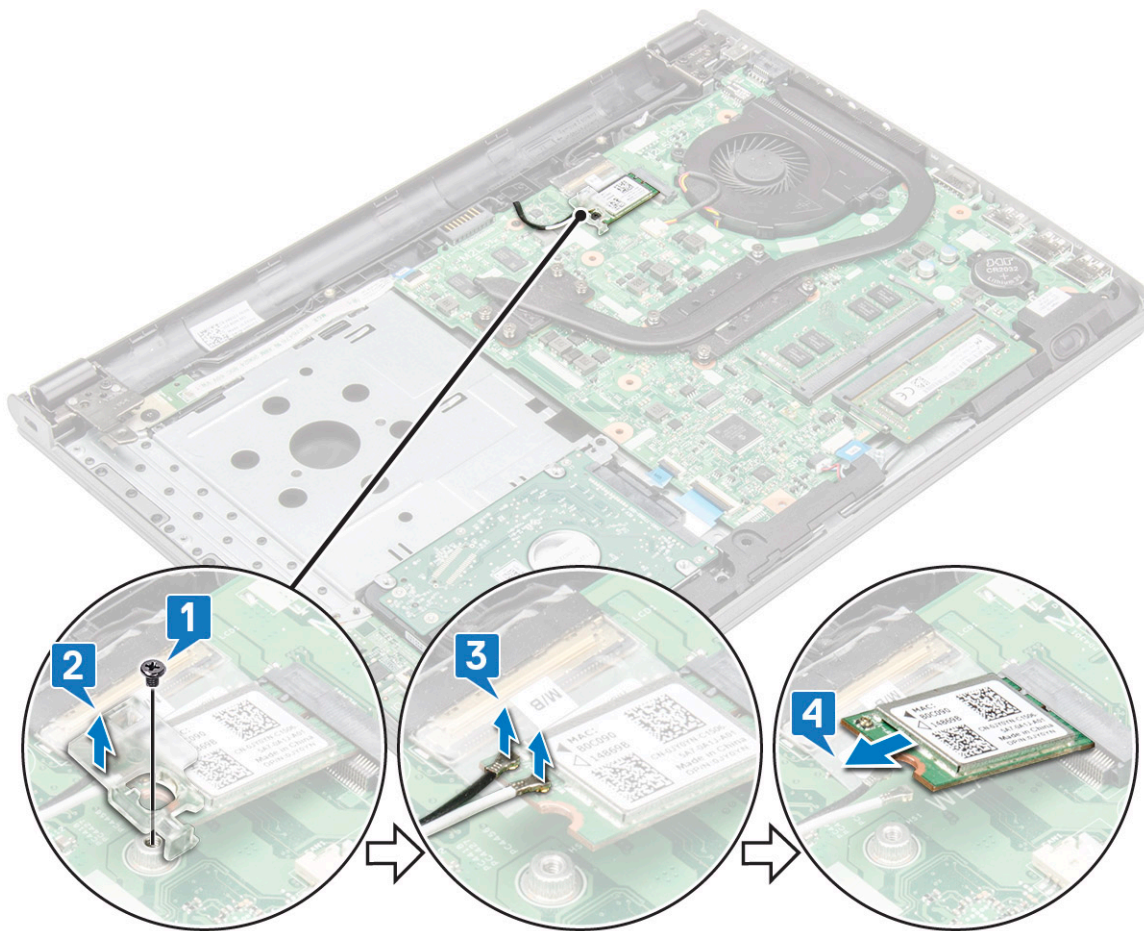


# Installing the WLAN card

1. Install the WLAN card to the connector on the system board.

2. Connect the WLAN cables to the connectors on the WLAN card.

3. Place the securing tab on the WLAN card and tighten the 1 (M2x3) screw on the computer.

4. Install the:
   a) Base cover
   b) Keyboard
   c) Optical drive
   d) Battery

5. 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) Battery
   b) Optical drive

c)  Keyboard

d)  Base cover

3. To remove memory module:

a)  Pull the clips securing the memory module until the memory module pops up [1].

b)  Remove the memory module from the system board [2].
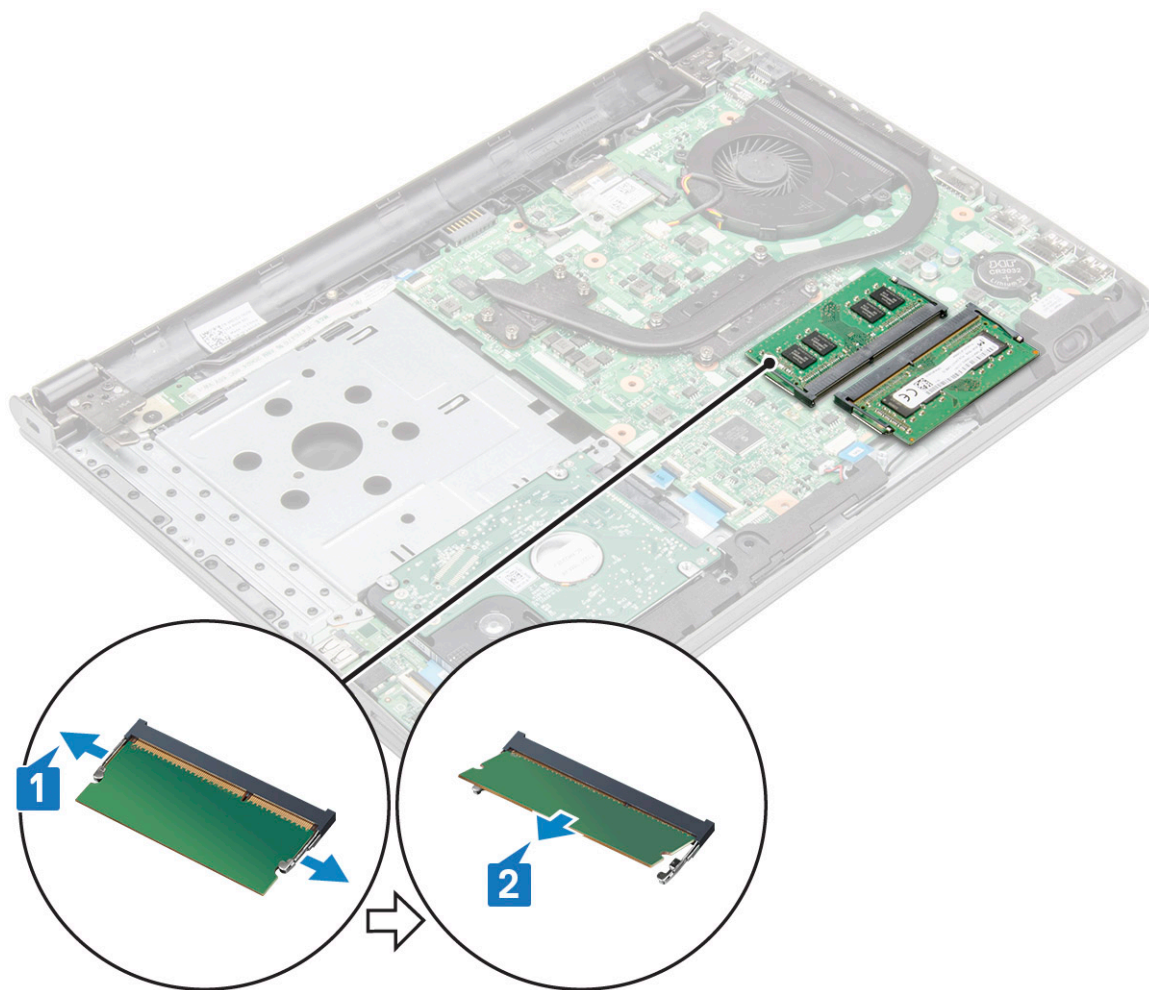


# Installing the memory module

1.  Insert the memory module into the memory socket.

2.  Press the memory module until the clips secure the memory module.

3.  Install the:

a)  Base cover

b)  Keyboard

c)  Optical drive

d)  Battery

4.  Follow the procedures in After working inside your computer.

# Coin-cell battery

# Removing the coin cell battery

1.  Follow the procedure in Before working inside your computer.

2.  Remove the:

a) Battery
b) Optical drive
c) Keyboard
d) Base cover

3. Removing the coin cell battery
    a) Use a plastic scribe to lift the battery out of the slot [1]
    b) Remove the battery [2]
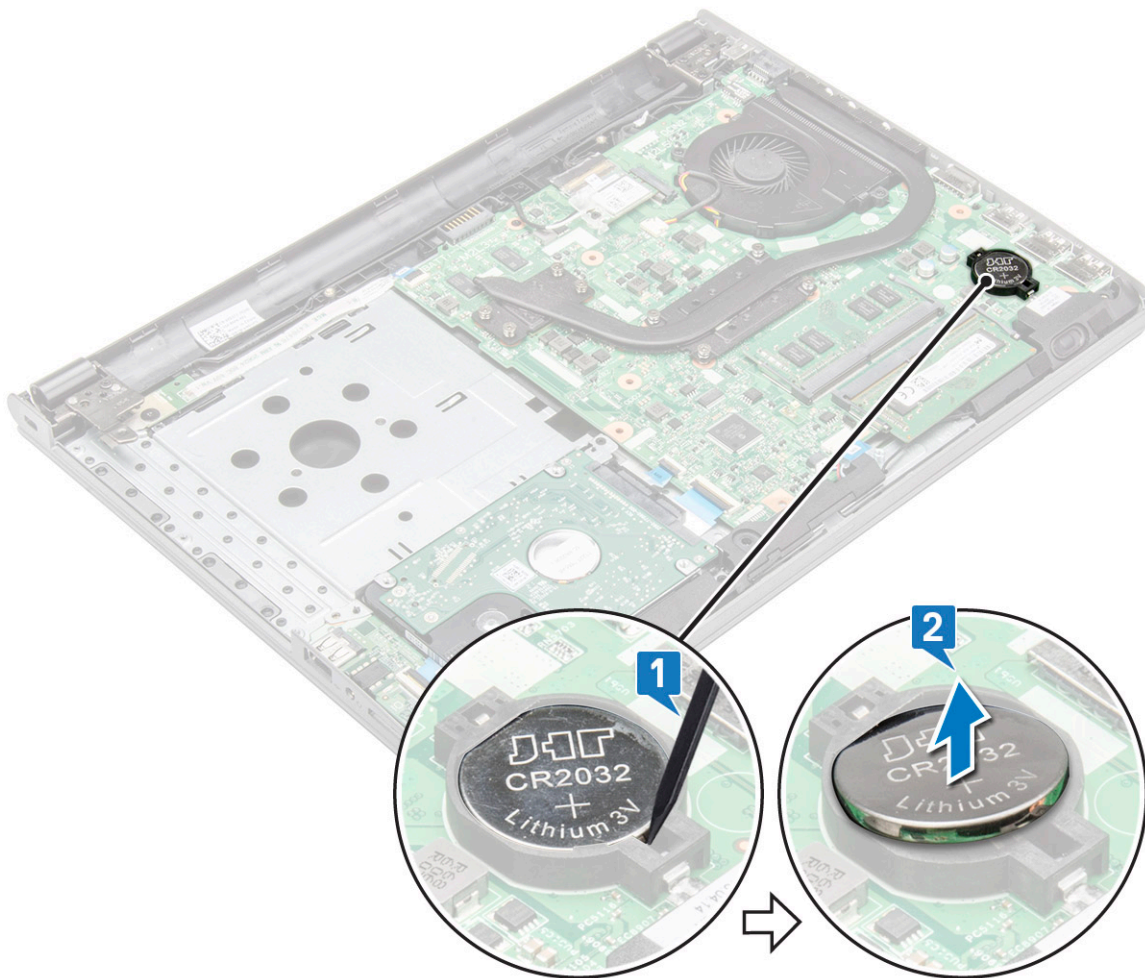


# Installing the coin cell battery

1. Insert the coin cell battery into the battery slot.
2. Press the battery until it clicks into place.
3. Install the:
    a) Basecover
    b) Keyboard
    c) Optical drive
    d) Battery
4. Follow the procedures in After working inside your computer.

# Power button board

## Removing the power button board

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) Battery
   b) Optical drive
   c) Keyboard
   d) Base cover
3. To remove the power button board:
   a) Disconnect the system board cable from the computer [1].
   b) Remove the display hinge screws (M2.5x8) from the computer [2].
   c) Flip the display hinge to reveal the power button board beneath the hinge [3].
   d) Remove the 1 M2x2 (Big head07) screw that secures the power button board to the chassis [4].
   e) Peel the system board cable from the chassis and the peel the tape that holds the power button board.
   f) Slide the Power button board away from the chassis.
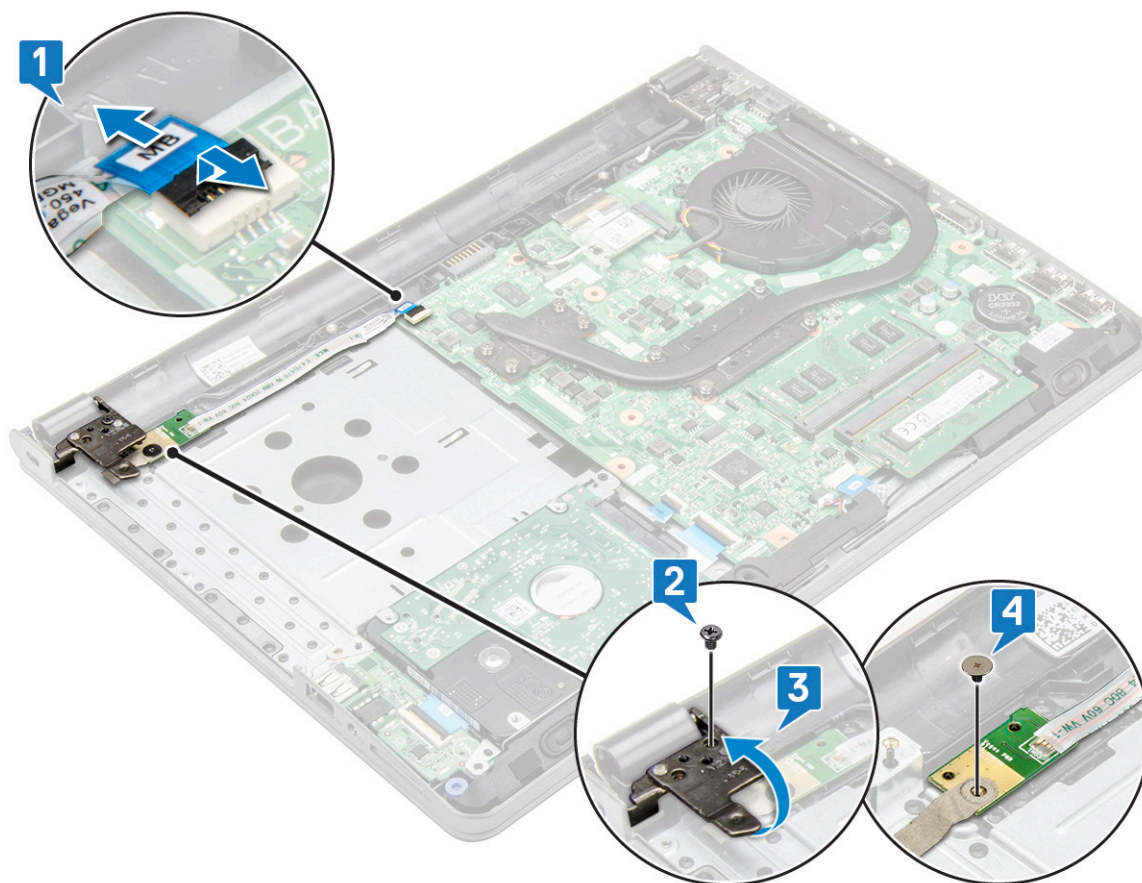


## Installing the power button board

1. Place the button board on the chassis.
2. Affix the tape that holds the power button board.
3. Affix the system board cable to the chassis.
4. Place the power button board and tighten the screw.
5. Connect the system board cable to the power button board.
6. Tighten the screws to secure it to the power button board.

7. Install the:
   a) Base cover
   b) Keyboard
   c) Optical drive
   d) Battery
8. Follow the procedures in After working inside your computer.

# Heat sink

## Removing the heat sink

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) Battery
   b) Optical drive
   c) Keyboard
   d) Base cover
3. To remove the heat sink:
   a) Loosen the captive screws that secure the heat sink to the system board [1].
   b) Remove the heat sink from the system board [2].



## Installing the heat sink

1. Align the screws on the heat sink with the screw holders on the system board.
2. Tighten the captive screws to secure it to the system board.

   ⓘ | **NOTE: Secure the screws in the order of the callout numbers [1, 2, 3, 4].**
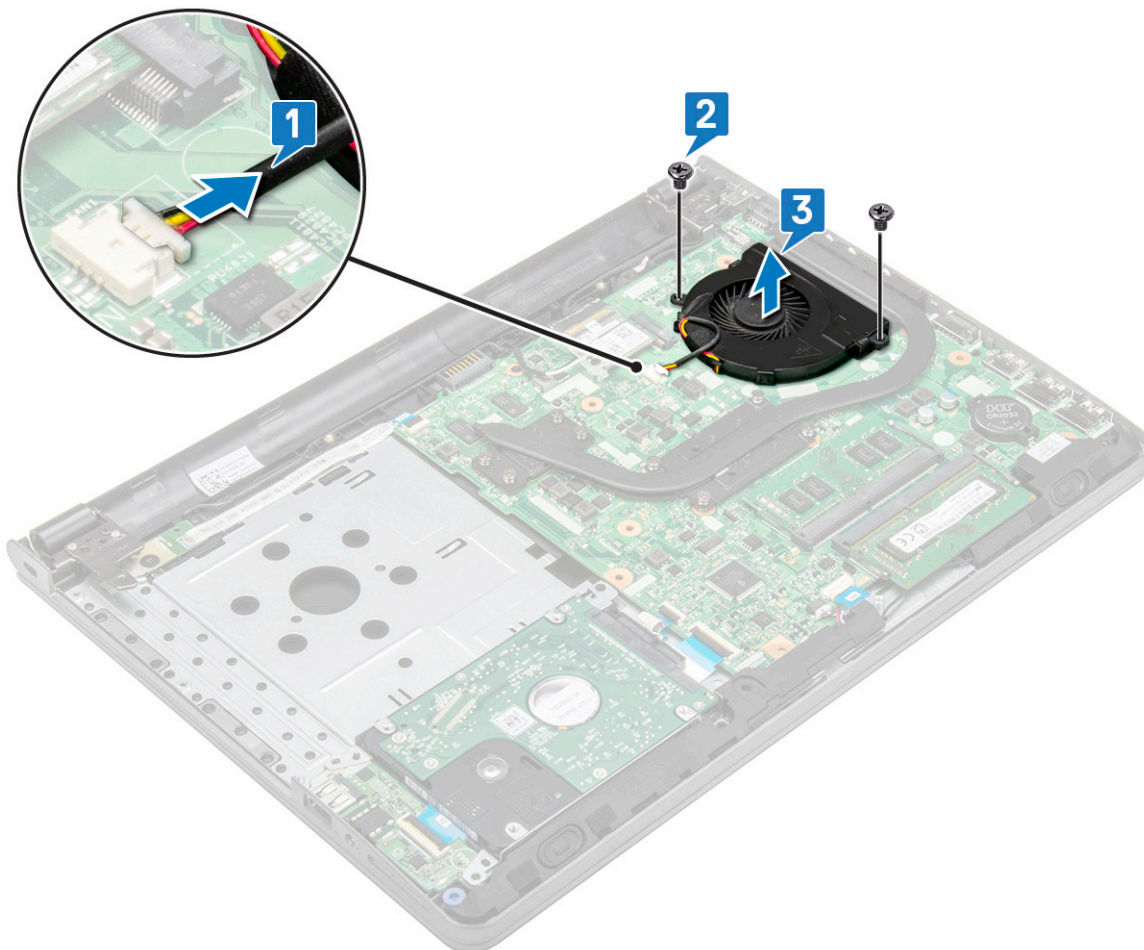
3. Install the:

a) Base cover
b) Keyboard
c) Optical drive
d) Battery

4. Follow the procedures in After working inside your computer.

# System fan

## Removing the system fan

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) Battery
   b) Optical drive
   c) Keyboard
   d) Base cover
3. To remove the system fan:
   a) Disconnect the system fan connector cable from the system board [1].
   b) Remove the 2 (M2x5) screws that secure the system fan to the computer [2].
   c) Lift and remove the system fan from the chassis [3].



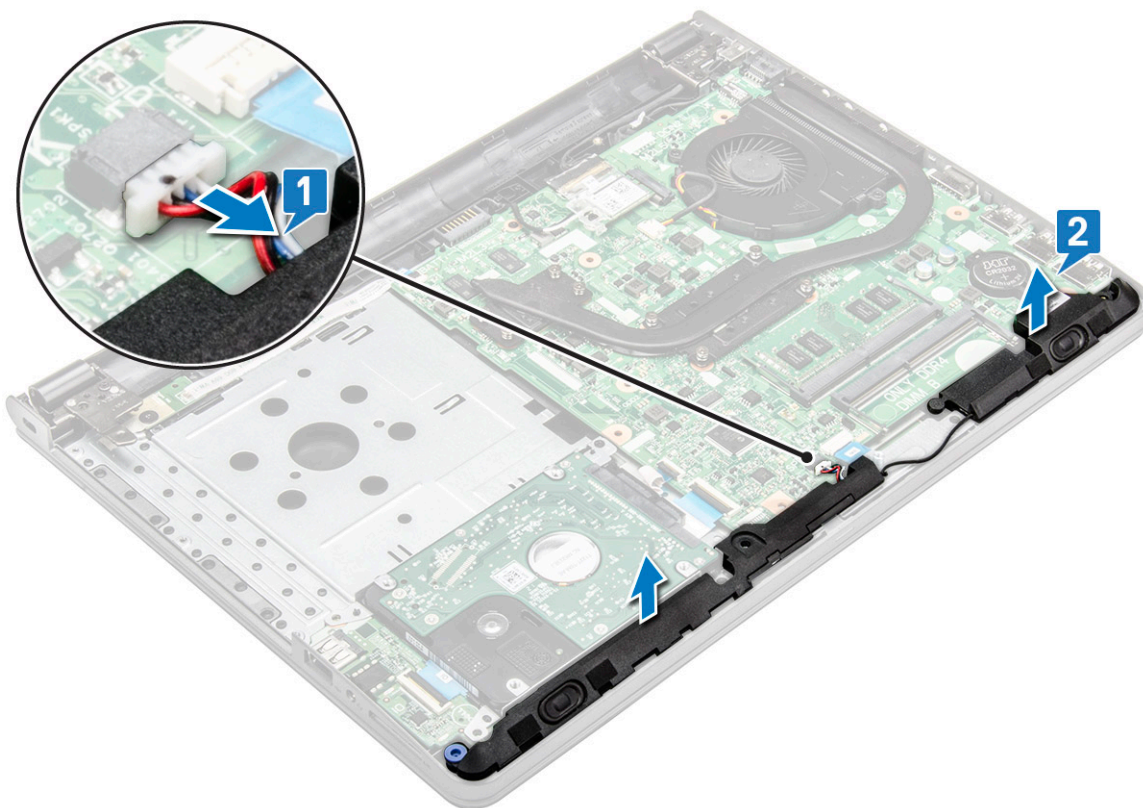## Installing the system fan

1. Align the system fan on the chassis.

2. Secure the system fan to the computer by tightening the 2 (M2x5) screws.

3. Connect the system fan connector cable to the system board connector.

4. Install the:
    a) Base cover
    b) Keyboard
    c) Optical drive
    d) Battery

5. Follow the procedures in After working inside your computer.

# Speaker

## Removing the speakers

1. Follow the procedure in Before working inside your computer.

2. Remove the:
    a) Battery
    b) Optical drive
    c) Keyboard
    d) Base cover

3. To remove the speakers:
    a) Disconnect the speaker cable from the computer [1].
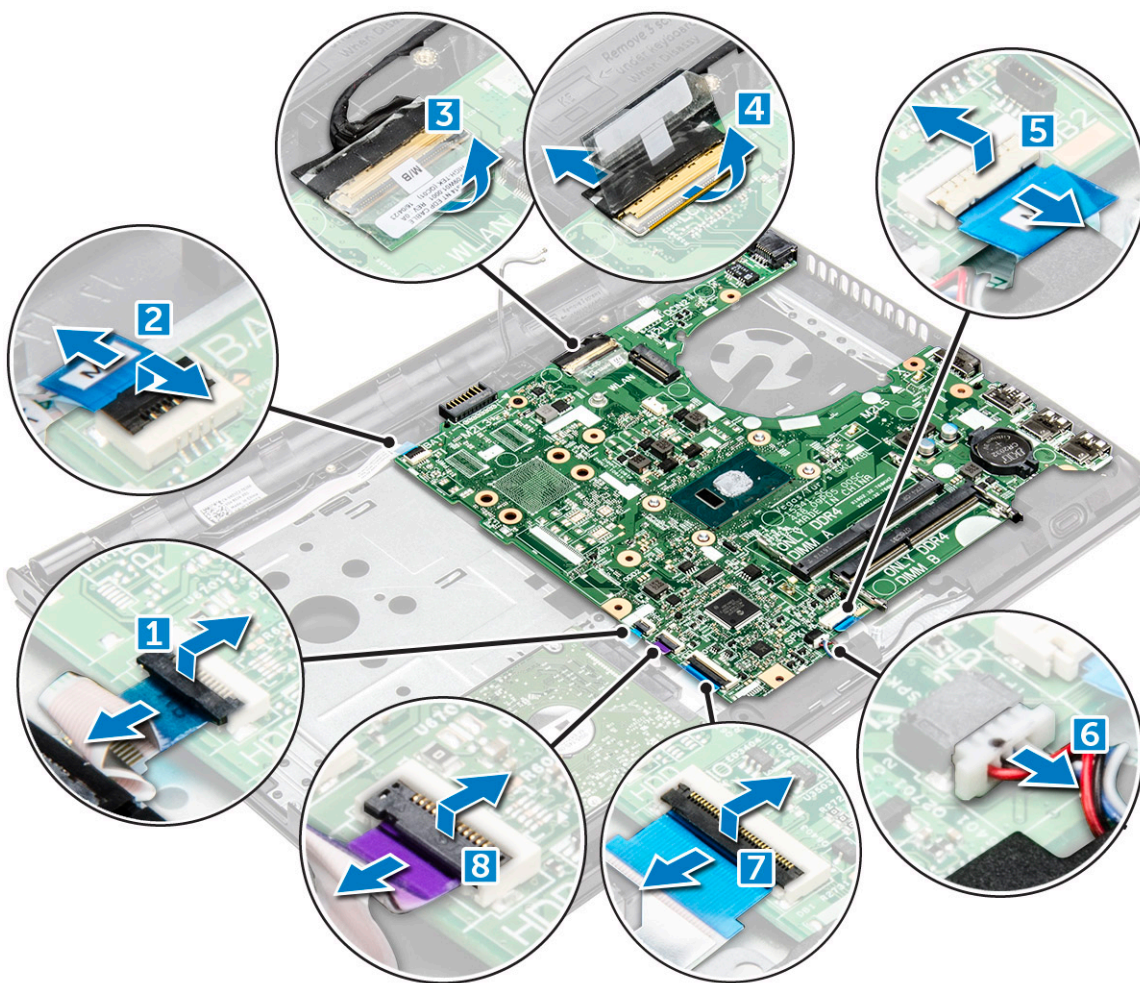    b) Remove the speakers from the computer [2].



## Installing the speakers

1. Place the speakers into the slots on the computer.

2. Connect the speaker cable to the system board.

3. Install the:

a) Base cover
b) Keyboard
c) Optical drive
d) Battery

4. Follow the procedure in After working inside your computer

# System board

## Removing the system board

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) Battery
   b) Optical drive
   c) Keyboard
   d) Base cover
   e) Hard drive assembly
   f) WLAN card
   g) Memory module
   h) Heat sink
   i) System fan
3. Lift the locking tab to disconnect the following cables
   a) hard drive connector [1]
   b) power connector [2]
   c) remove the adhesive tape [3]
   d) lift the locking tab and disconnect the eDP connector [4]
   e) speaker [5]
   f) touchpad connector [6]
   g) I/O connector [7]
   h) fingerprint connector [8]

4. Remove 1 (M2x3) screw that secures the system board to the computer [1] and lift the system board [2].
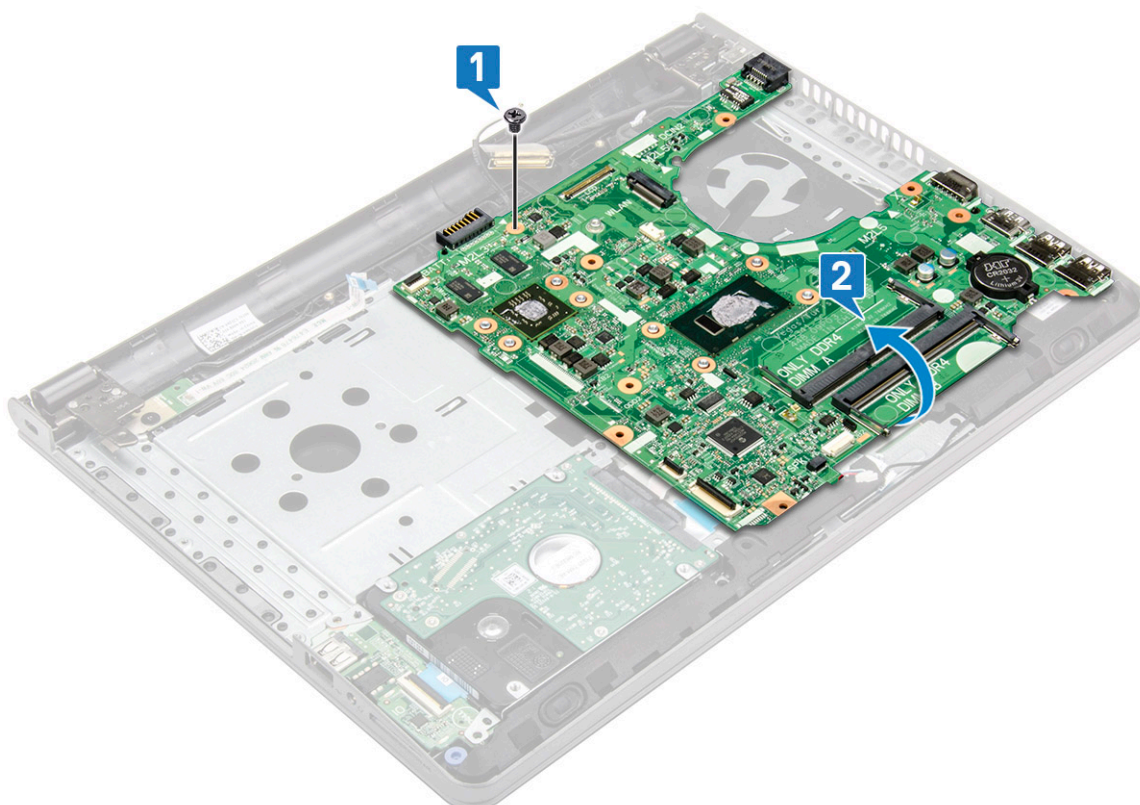
5. Flip the system board.
6. To remove the system board:
   a) Peel the white adhesive tape and disconnect the power cable [1].
   b) Remove the system board from the computer [2].
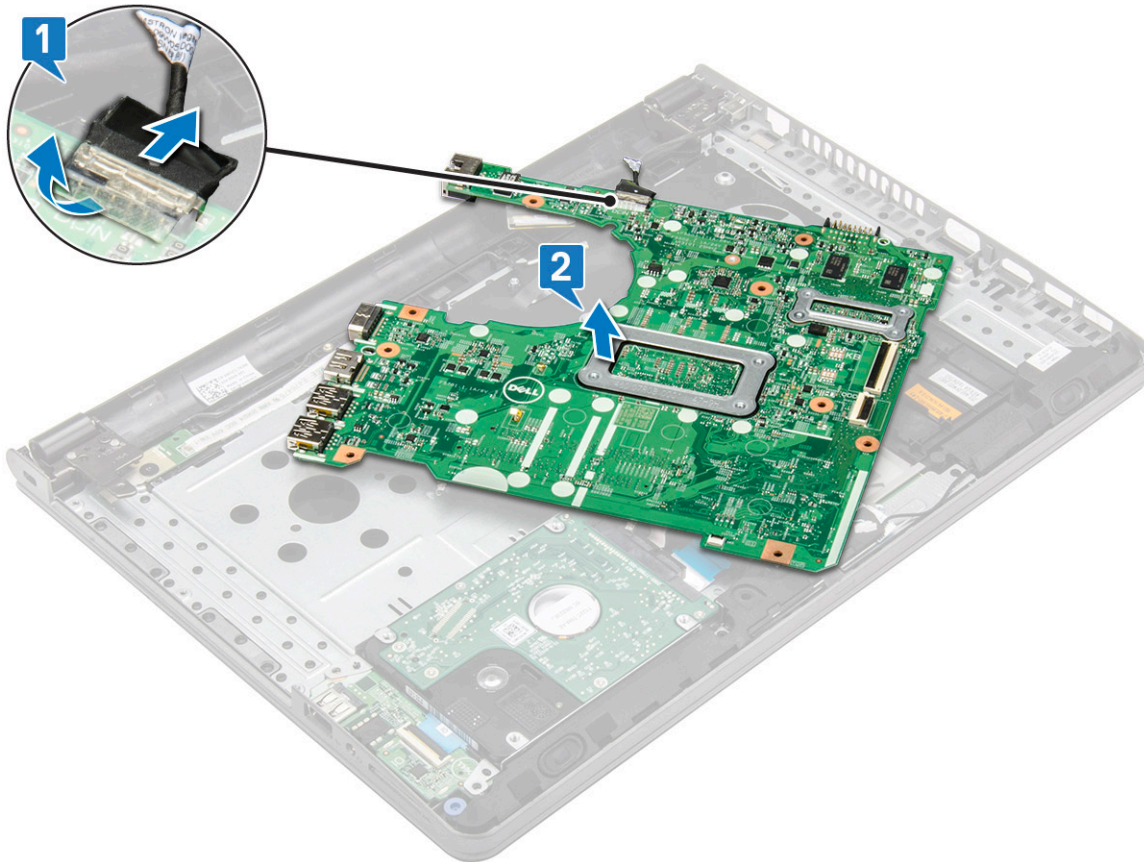


# Installing the system board

1. Connect the power cable.
2. Affix the white adhesive tape.
3. Flip the system board.
4. Align the system board with the screw holders on the computer.
5. Tighten the 1 (M2x3) screw to secure the system board to the computer.
6. Connect the following cables to the system board.
   a) hard drive connector
   b) touchpad connector
   c) speaker connector
   d) I/O connector
   e) eDP connector
   f) power connector
   g) fingerprint connector
7. Install the:
   a) System fan
   b) Heat sink
   c) Memory module
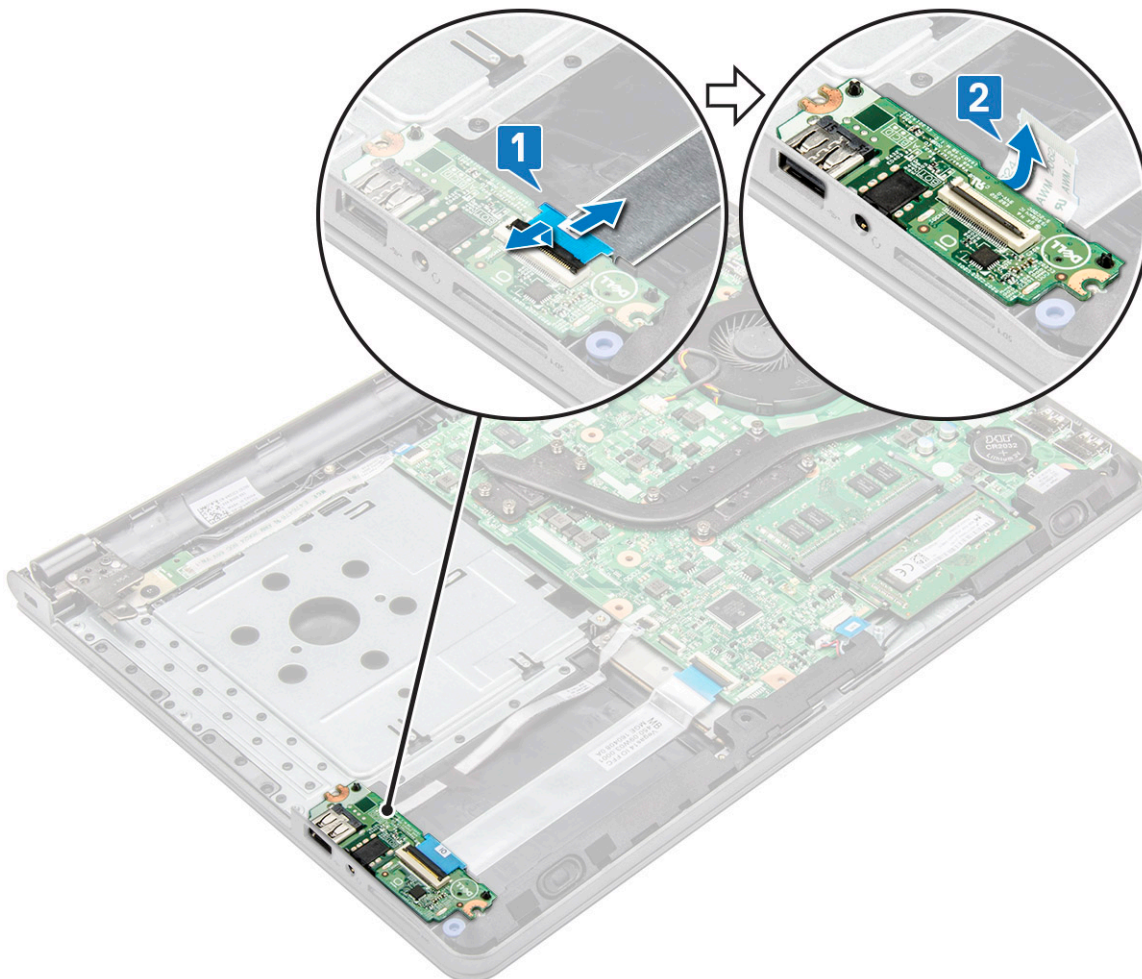   d) WLAN Card
   e) Hard drive assembly
   f) Base cover
   g) Keyboard

h) Optical drive
i) Battery

8. Follow the procedure in After working inside your computer.

# Input-Output board

## Removing the Input and Output board

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) Battery
   b) Optical drive
   c) Keyboard
   d) Base cover
   e) Hard drive assembly
3. To remove the Input/Output board (I/O board):
   a) Disconnect the I/O board cable [1].
   b) Lift and remove the I/O board from the computer [2]

## Installing the Input and Output board

1. Place the I/O board on the computer.
2. Connect the input/output (I/O board) cable to the I/O board.

3. Install the:
   a) Hard drive assembly
   b) Base cover
   c) Keyboard
   d) Optical drive
   e) Battery
4. Follow the procedure in After working inside your computer.

# Power connector port

## Removing the power connector

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) Battery
   b) Optical drive
   c) Keyboard
   d) Base cover
   e) Hard drive assembly
   f) WLAN card
   g) Memory module
   h) Heat sink
   i) System fan
   j) Coin cell battery
   k) System board
3. To remove the power connector:
   a) Remove the 1 (M2x3) screw that secures the power connector to the computer [1].
   b) Lift the power connector [2].
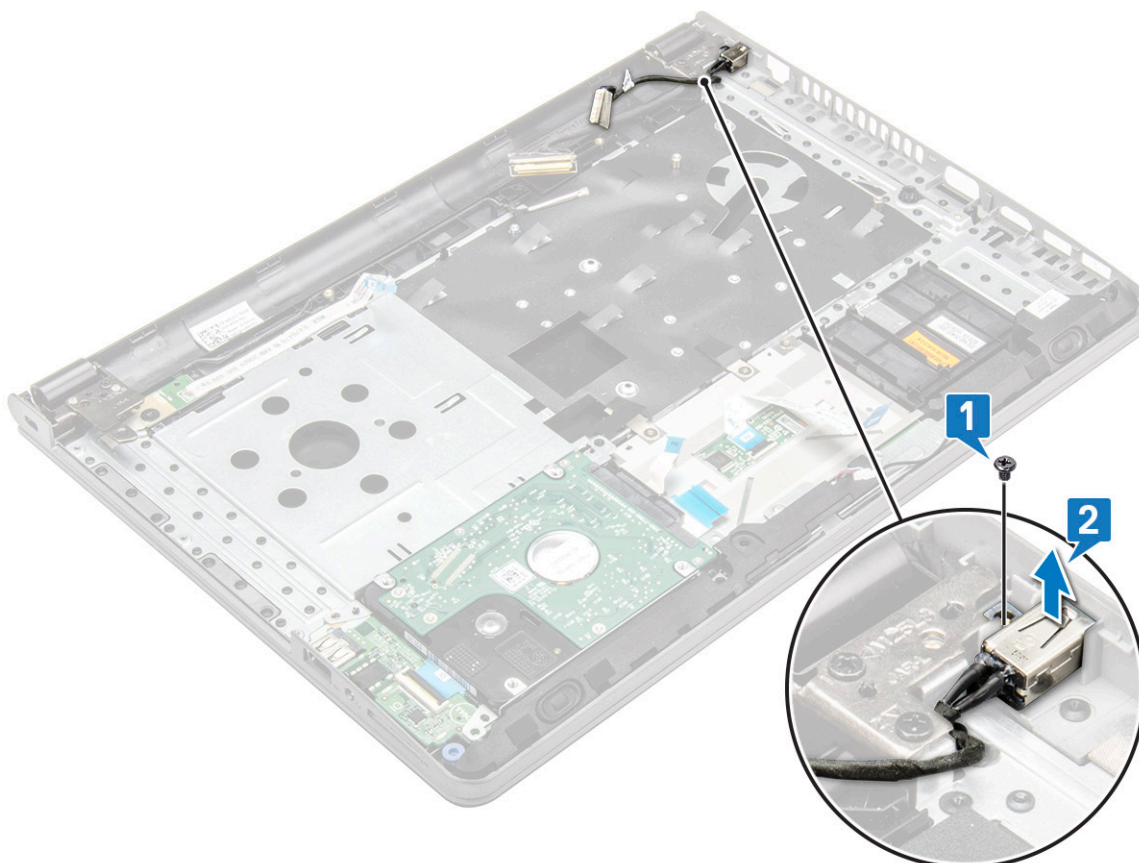
# Installing the power connector

1. Insert the power connector into the slot on the computer.
2. Secure the power connector to the computer by using 1 (M2x3) screw.
3. Install the:
   a) System board
   b) Coin cell battery
   c) System fan
   d) WLAN Card
   e) Memory module
   f) Heat sink
   g) Hard drive assembly
   h) Base cover
   i) Keyboard
   j) Optical drive
   k) Battery
4. Follow the procedure in After working inside your computer.

# Display assembly

## Removing the display assembly

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) Battery
   b) Optical drive
   c) Keyboard
   d) Base cover
   e) Hard drive assembly
   f) WLAN card
3. To remove the display assembly:
   a) Unroute the WLAN cable [1].
   b) Peel white adhesive tape [2].
   c) Lift the locking tab [3].
   d) Disconnect the eDP cable [4].
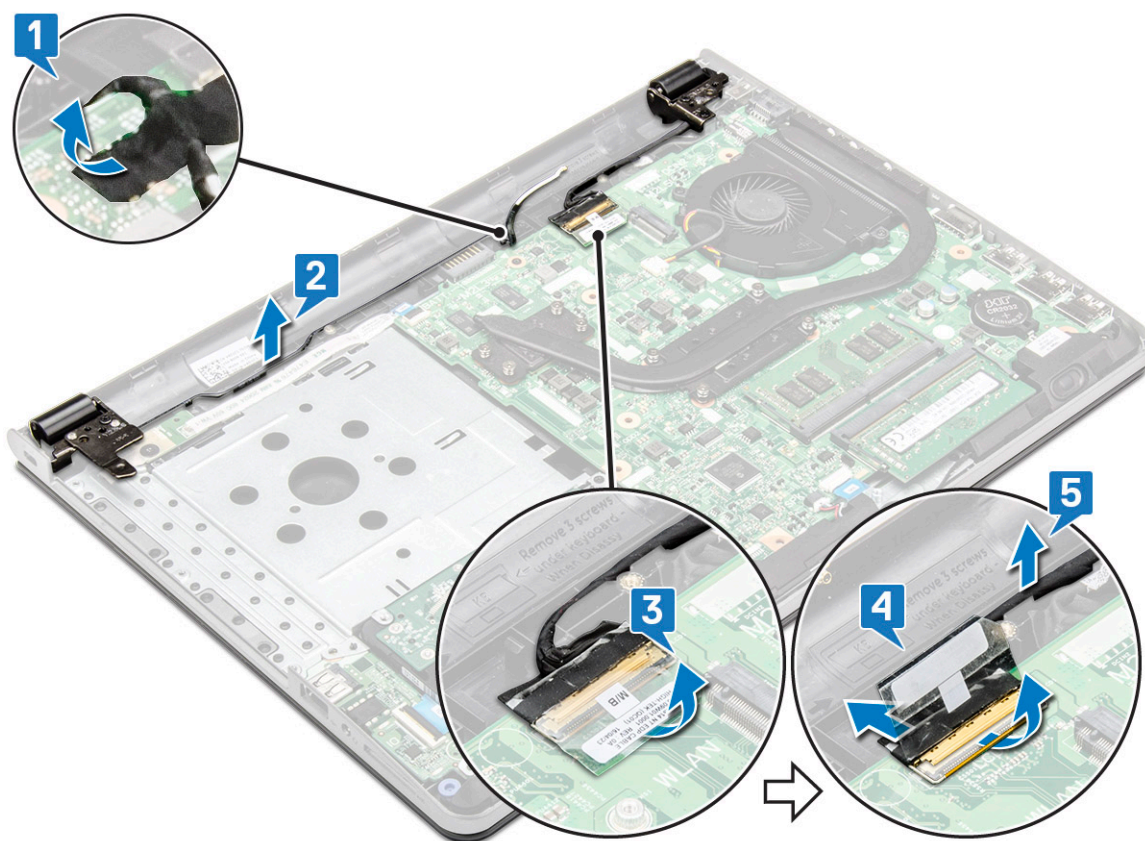
4. Flip the computer.
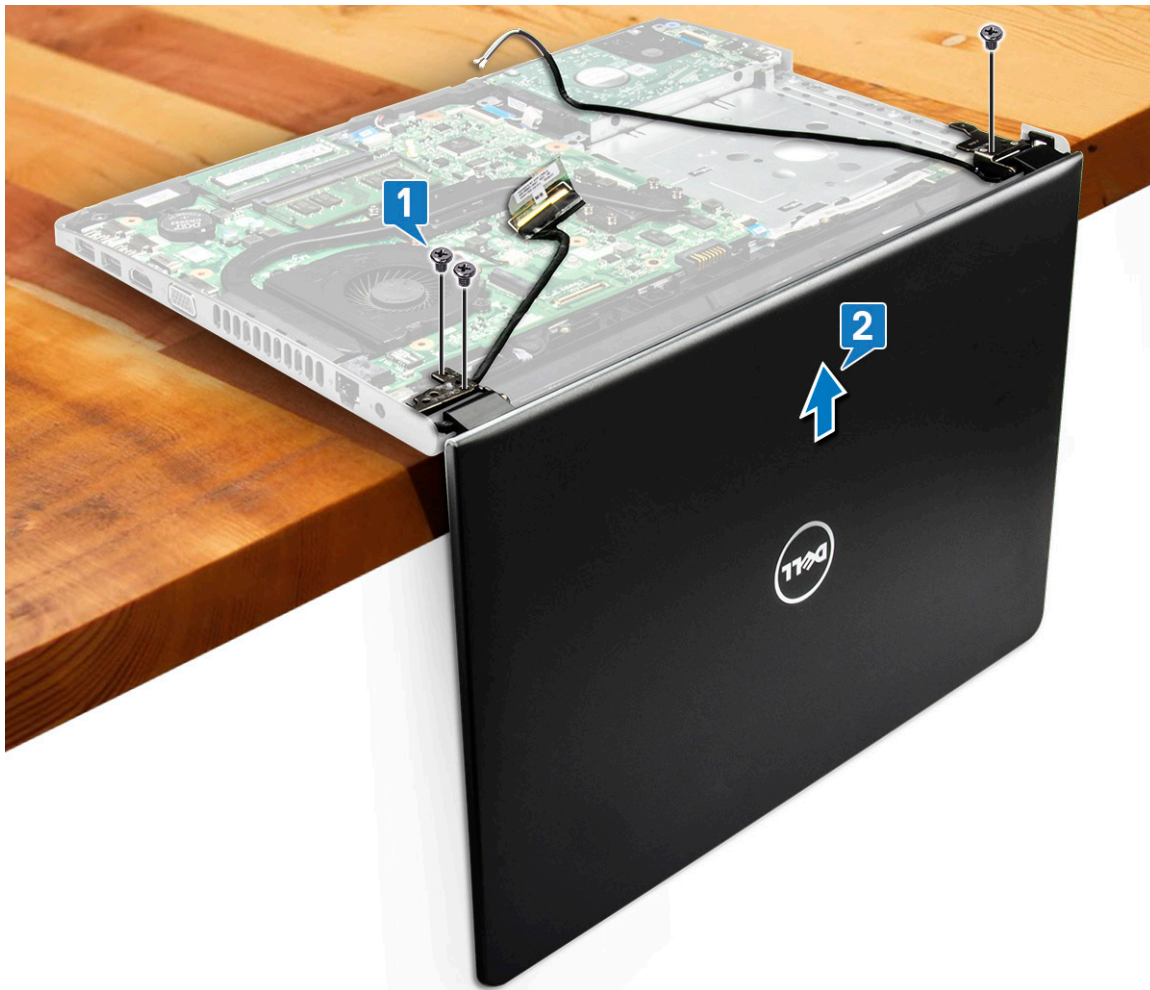


> ⓘ NOTE:
> **Hold the system firmly when the system is placed at this position.**

5. To remove the display assembly:

(i) **NOTE: Place the chassis on the edge of a table with the display facing down.**

a) Remove the 3 (M2.5x8) screws and lift the display hinge secured to the computer [1].

b) Lift and remove the display assembly [2].



(i) **NOTE:**

**Hold the display assembly firmly when you place the display assembly at a 90 degree angle to the palm rest, to avoid damaging the display assembly**

# Installing the display assembly

1. Align the display assembly with the chassis.
2. Route the WLAN and display assembly cables through the cable-securing tabs.
3. Tighten the display hinges 3 (M2.5x8) screws to secure the display assembly.
4. Install the:
   a) WLAN Card
   b) Hard drive assembly
   c) Base cover
   d) Keyboard
   e) Optical drive
   f) Battery
5. Follow the procedure in After working inside your computer.

# Display bezel

(i) **NOTE: Non-touch display panel**

## Removing the display bezel

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) Battery
   b) Optical drive
   c) Keyboard
   d) Base cover
   e) Hard drive assembly
   f) WLAN card
   g) Display assembly
3. To disconnect the display bezel:
   a) Use a plastic scribe to release the tabs on the edges to release the display bezel from the display assembly.
   b) Remove the display bezel display assembly.

## Installing the display bezel

1. Place the display bezel on the display assembly.
2. Press the display bezel on the edges until it snaps onto the display assembly.
3. Install the:
   a) Display assembly
   b) WLAN Card
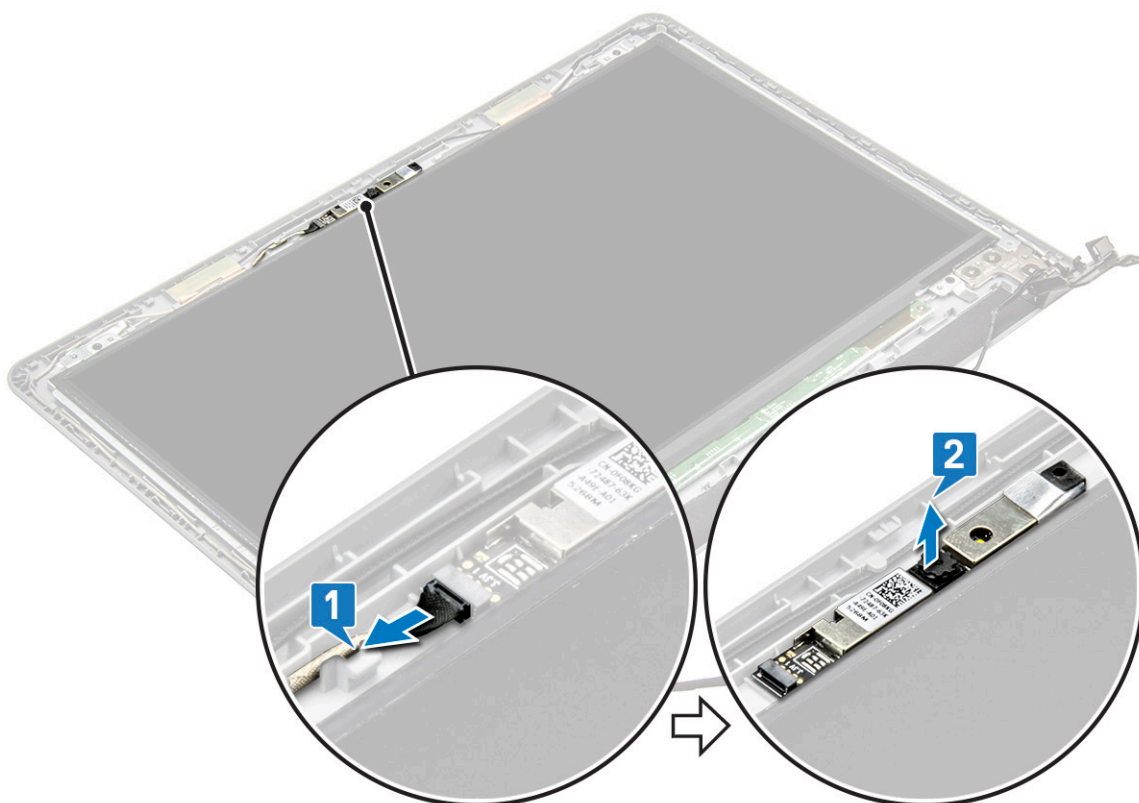   c) Hard drive assembly
   d) Base cover
   e) Keyboard

f) Optical drive

g) Battery

4. Follow the procedure in After working inside your computer.

# Camera

ⓘ **NOTE: Non-touch display panel**

# Removing the camera

1. Follow the procedure in Before working inside your computer.

2. Remove the:
   a) Battery
   b) Optical drive
   c) Keyboard
   d) Base cover
   e) Hard drive assembly
   f) WLAN card
   g) Display assembly
   h) Display bezel

3. To remove the camera:
   a) Disconnect the camera cable from the camera [1].
   b) Remove the camera from the display assembly [2].



# Installing the camera

1. Install the camera into the slot on the display assembly.

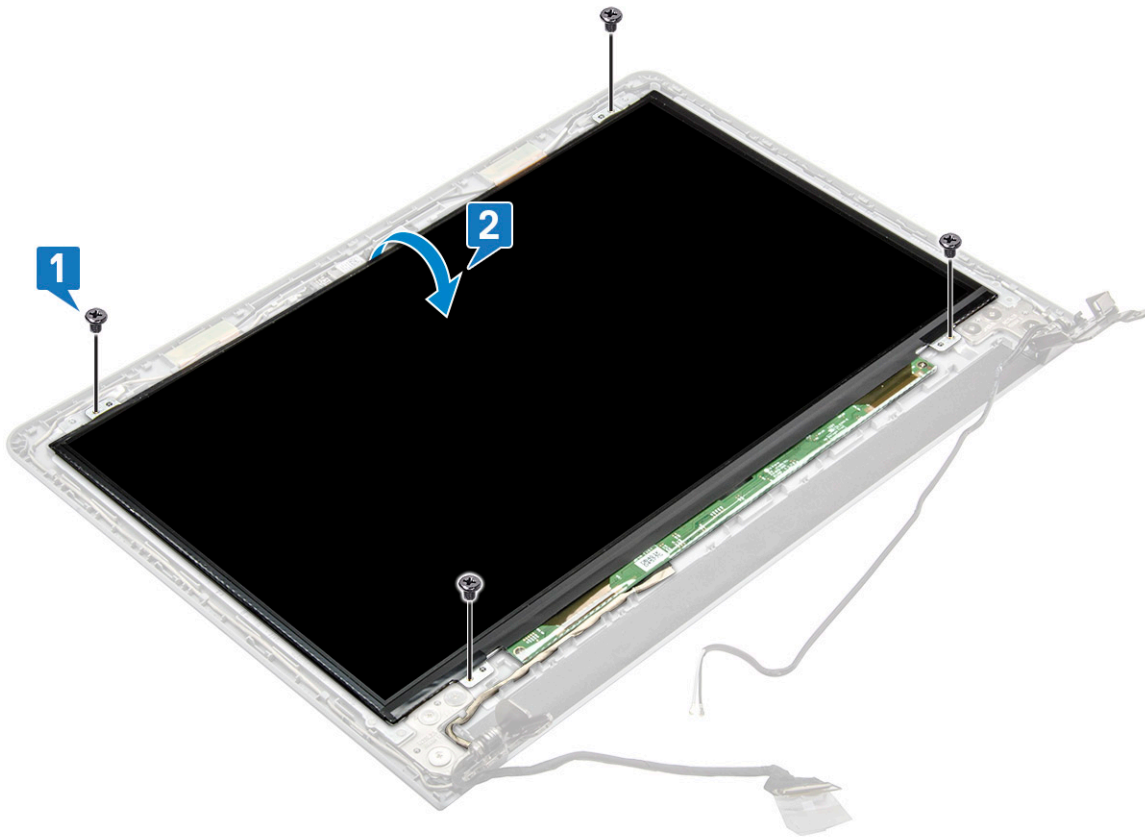2. Connect the camera cable.

3. Install the:

a) Display bezel
b) Display assembly
c) WLAN Card
d) Hard drive assembly
e) Base cover
f) Keyboard
g) Optical drive
h) Battery

4. Follow the procedure in After working inside your computer.

# Display panel

ⓘ NOTE: **Non-touch display panel**

# Removing the display panel

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) Battery
   b) Optical drive
   c) Keyboard
   d) Base cover
   e) Hard drive assembly
   f) WLAN card
   g) Display assembly
   h) Display bezel
3. To remove the display panel:
   a) Remove the 4 (M2x3) screws that secure the display panel to the display assembly [1].
   b) Lift the display panel to access the cables underneath [2].

4. To disconnect the cable:
   a) Remove the tape that secures the eDP cable to the display panel [1].
   b) Lift the locking tab and remove the eDP cable [2].
   c) Remove the display panel from the computer [3].
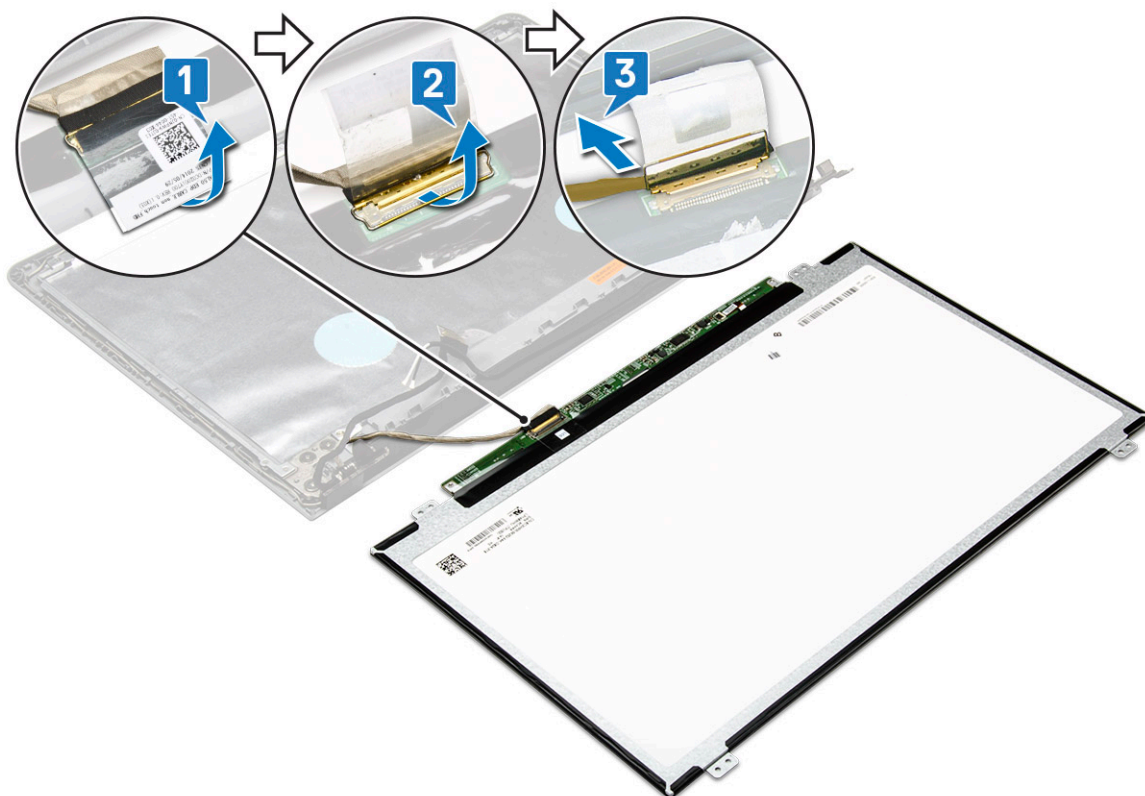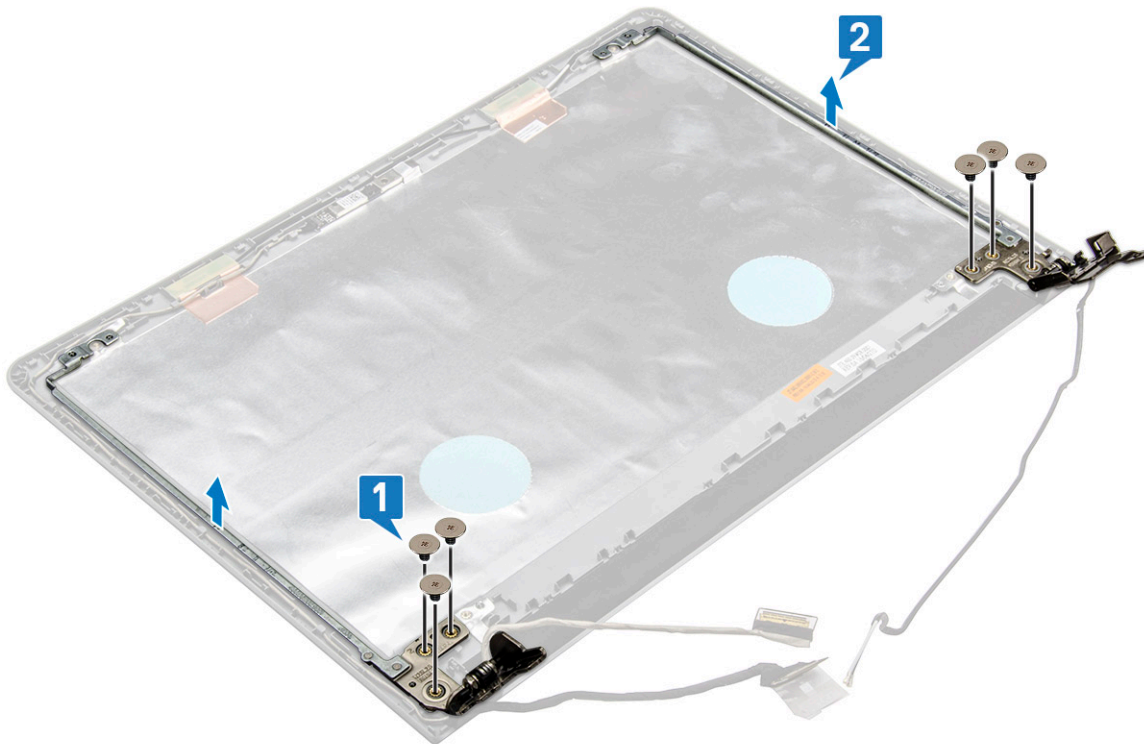
# Installing the display panel

1. Connect the eDP cable to the display panel.
2. Affix the tape to secure the display cable.
3. Place the display panel on the display assembly.
4. Tighten the 4 (M2x3) screws to secure the display panel to the display assembly.
5. Install the:
   a) Display bezel
   b) Display assembly
   c) WLAN Card
   d) Hard drive assembly
   e) Base cover
   f) Keyboard
   g) Optical drive
   h) Battery
6. Follow the procedure in After working inside your computer.

# Display hinges

(i) **NOTE: Non-touch display panel**

# Removing the display hinges

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) Battery
   b) Optical drive
   c) Keyboard
   d) Base cover
   e) Hard drive assembly
   f) WLAN card
   g) Display assembly
   h) Display bezel
   i) Display panel
3. To remove the hinges:
   a) Remove the 6 (M2.5x2.5) screws that secure the display hinges to the display assembly [1].
   b) Remove the display hinges [2].

# Installing the display hinges

1. Tighten the 6 (M2.5x2.5) screws to secure the display hinges to the display assembly.
2. Install the:
   a) Display panel
   b) Display bezel
   c) Display assembly
   d) WLAN Card
   e) Hard drive assembly
   f) Base cover
   g) Keyboard
   h) Optical drive
   i) Battery
3. Follow the procedure in After working inside your computer.

# Touchpad

# Removing the touchpad

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) Battery
   b) Optical drive
   c) Keyboard
   d) Base cover
   e) Hard drive assembly
   f) WLAN card
   g) Memory module

h) Speaker
i) Heat sink
j) System fan
k) System board

3. Removing the screw support bracket.
   a) Remove the conductive tapes [1].
   b) Remove the three (M2x2.5) screws [2].
   c) Lift and remove the screw support bracket [3].

4. Removing the touchpad board.
   a) Remove the four (M2x2) screws [1].
   b) Lift and remove the touchpad board [2].

# Installing the touchpad

1. Place the touchpad board into the slot.
2. Replace the four (M2xL2) screws that secure touchpad board.
3. Replace the three (M2x2.5) screws and fix the screw bracket.
4. Replace the conductive tapes.
5. Install the:
   a) System board
   b) System fan
   c) Heat sink
   d) Speaker
   e) Memory module
   f) WLAN card
   g) Hard drive assembly
   h) Base cover
   i) Keyboard
   j) Optical drive
   k) Battery
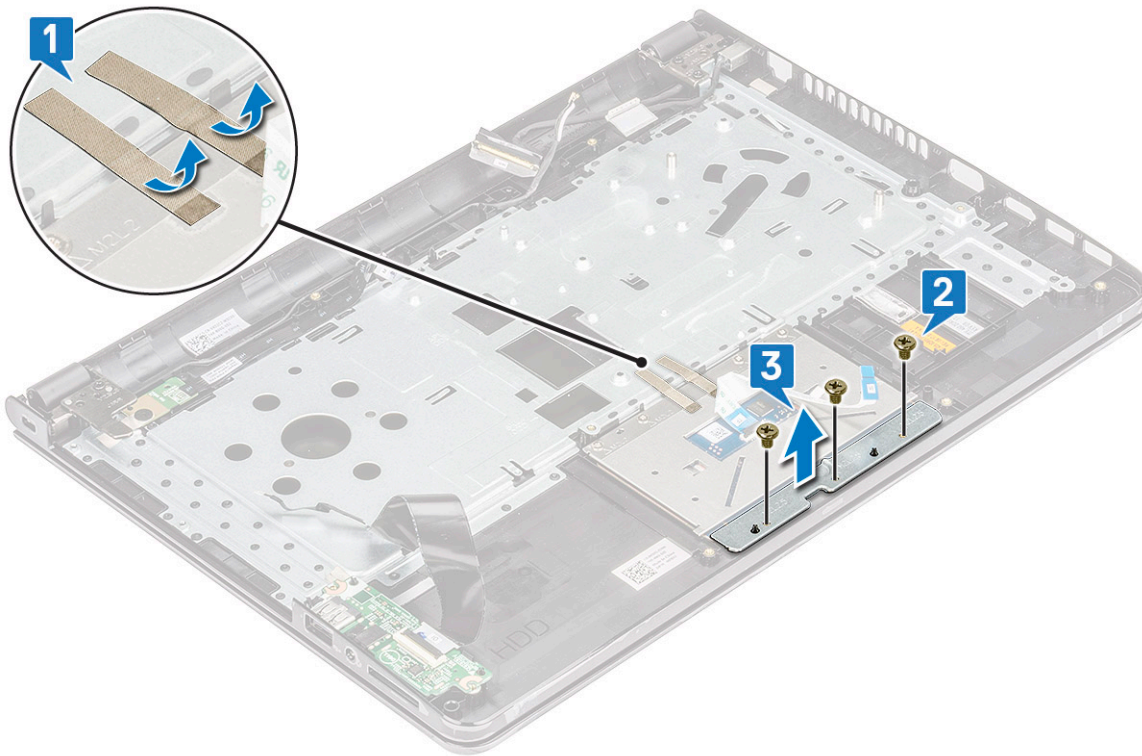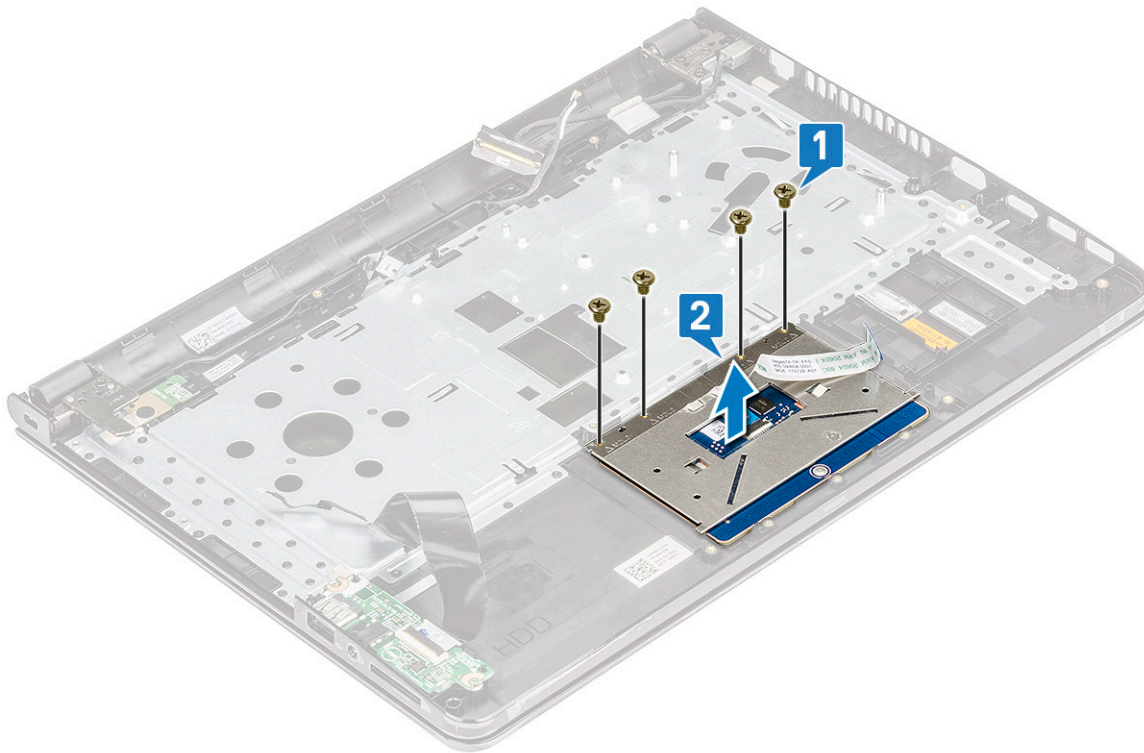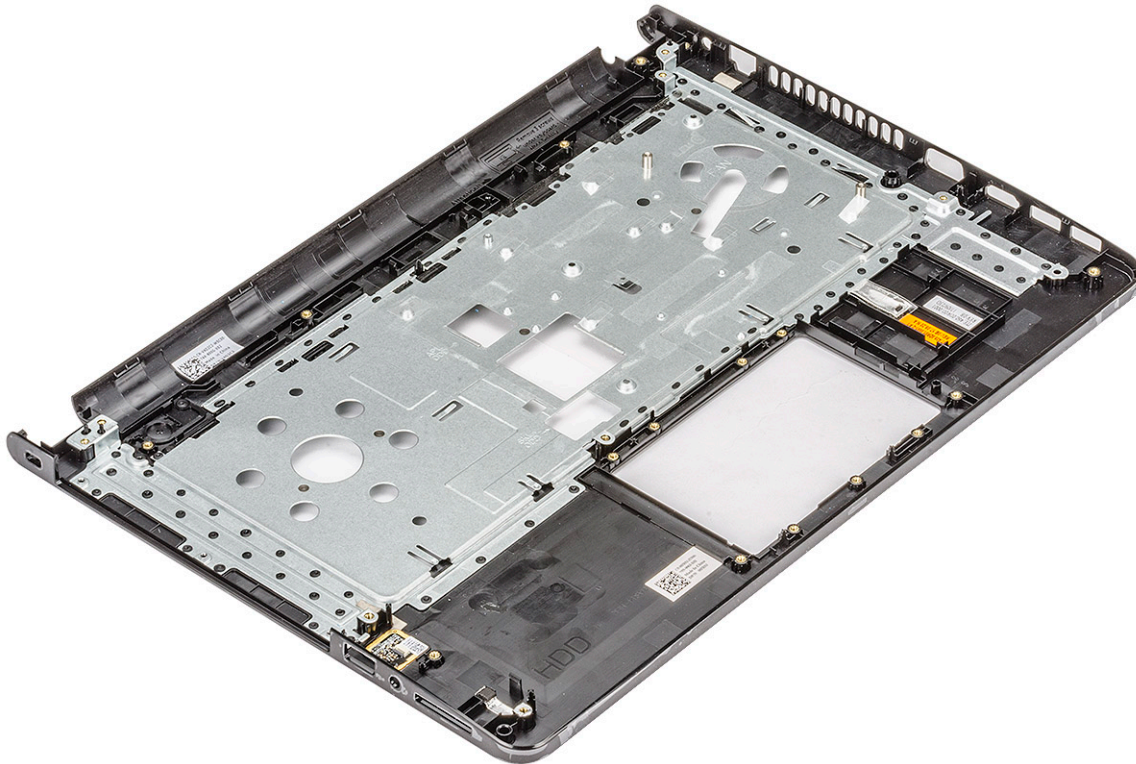6. Follow the procedure in After working inside your computer.

# Palm rest

## Removing the palmrest

1. Follow the procedure in Before working inside your computer.
2. Remove the:
   a) Battery
   b) Optical drive
   c) Keyboard

d) Base cover
e) Hard drive assembly
f) Fingerprint reader
g) WLAN card
h) Memory module
i) Heat sink
j) System fan
k) System board
l) Input/Output boards
m) Display assembly

ⓘ **NOTE: The component you are left with is the palmrest**

3. Remove the palmrest assembly away from the computer.



# Installing the palmrest

1. Place the palmrest on the computer.
2. Install the:
   a) Display assembly
   b) Input/Output boards
   c) System board
   d) System fan
   e) Heat sink
   f) Memory module
   g) WLAN Card
   h) Fingerprint reader
   i) Hard drive assembly
   j) Base cover
   k) Keyboard
   l) Optical drive
   m) Battery
3. Follow the procedure in After working inside your computer.

# Technology and components

This chapter details the technology and components available in the system.

**Topics:**

## HDMI 1.4

This topic explains the HDMI 1.4 and its features along with the advantages.

HDMI (High-Definition Multimedia Interface) is an industry-supported, uncompressed, all-digital audio/video interface. HDMI provides an interface between any compatible digital audio/video source, such as a DVD player, or A/V receiver and a compatible digital audio and/or video monitor, such as a digital TV (DTV). The intended applications for HDMI TVs, and DVD players. The primary advantage is cable reduction and content protection provisions. HDMI supports standard, enhanced, or high-definition video, plus multichannel digital audio on a single cable.

(i) **NOTE: The HDMI 1.4 will provide 5.1 channel audio support.**

## HDMI 1.4 Features

- **HDMI Ethernet Channel** - Adds high-speed networking to an HDMI link, allowing users to take full advantage of their IP-enabled devices without a separate Ethernet cable
- **Audio Return Channel** - Allows an HDMI-connected TV with a built-in tuner to send audio data "upstream" to a surround audio system, eliminating the need for a separate audio cable
- **3D** - Defines input/output protocols for major 3D video formats, paving the way for true 3D gaming and 3D home theater applications
- **Content Type** - Real-time signaling of content types between display and source devices, enabling a TV to optimize picture settings based on content type
- **Additional Color Spaces** - Adds support for additional color models used in digital photography and computer graphics
- **4K Support** - Enables video resolutions far beyond 1080p, supporting next-generation displays that will rival the Digital Cinema systems used in many commercial movie theaters
- **HDMI Micro Connector** - A new, smaller connector for phones and other portable devices, supporting video resolutions up to 1080p
- **Automotive Connection System** - New cables and connectors for automotive video systems, designed to meet the unique demands of the motoring environment while delivering true HD quality

## Advantages of HDMI

- Quality HDMI transfers uncompressed digital audio and video for the highest, crispest image quality.
- Low -cost HDMI provides the quality and functionality of a digital interface while also supporting uncompressed video formats in a simple, cost-effective manner
- Audio HDMI supports multiple audio formats from standard stereo to multichannel surround sound
- HDMI combines video and multichannel audio into a single cable, eliminating the cost, complexity, and confusion of multiple cables currently used in A/V systems
- HDMI supports communication between the video source (such as a DVD player) and the DTV, enabling new functionality

## USB features

Universal Serial Bus, or USB, was introduced in 1996. It dramatically simplified the connection between host computers and peripheral devices like mice, keyboards, external drivers, and printers.

Table 2. USB evolution

| Type | Data Transfer Rate | Category | Introduction Year |
|---|---|---|---|
| USB 2.0 | 480 Mbps | High Speed | 2000 |
| USB 3.0/USB 3.1 Gen 1 | 5 Gbps | SuperSpeed | 2010 |
| USB 3.1 Gen 2 | 10 Gbps | SuperSpeed | 2013 |

# USB 3.0/USB 3.1 Gen 1 (SuperSpeed USB)

For years, the USB 2.0 has been firmly entrenched as the de facto interface standard in the PC world with about 6 billion devices sold, and yet the need for more speed grows by ever faster computing hardware and ever greater bandwidth demands. The USB 3.0/USB 3.1 Gen 1 finally has the answer to the consumers' demands with a theoretically 10 times faster than its predecessor. In a nutshell, USB 3.1 Gen 1 features are as follows:

- Higher transfer rates (up to 5 Gbps)
- Increased maximum bus power and increased device current draw to better accommodate power-hungry devices
- New power management features
- Full-duplex data transfers and support for new transfer types
- Backward USB 2.0 compatibility
- New connectors and cable

The topics below cover some of the most commonly asked questions regarding USB 3.0/USB 3.1 Gen 1.



# Speed

Currently, there are 3 speed modes defined by the latest USB 3.0/USB 3.1 Gen 1 specification. They are Super-Speed, Hi-Speed and Full-Speed. The new SuperSpeed mode has a transfer rate of 4.8 Gbps. While the specification retains Hi-Speed, and Full-Speed USB mode, commonly known as USB 2.0 and 1.1 respectively, the slower modes still operate at 480 Mbps and 12 Mbps respectively and are kept to maintain backward compatibility.

USB 3.0/USB 3.1 Gen 1 achieves the much higher performance by the technical changes below:

- An additional physical bus that is added in parallel with the existing USB 2.0 bus (refer to the picture below).
- USB 2.0 previously had four wires (power, ground, and a pair for differential data); USB 3.0/USB 3.1 Gen 1 adds four more for two pairs of differential signals (receive and transmit) for a combined total of eight connections in the connectors and cabling.
- USB 3.0/USB 3.1 Gen 1 utilizes the bidirectional data interface, rather than USB 2.0's half-duplex arrangement. This gives a 10-fold increase in theoretical bandwidth.
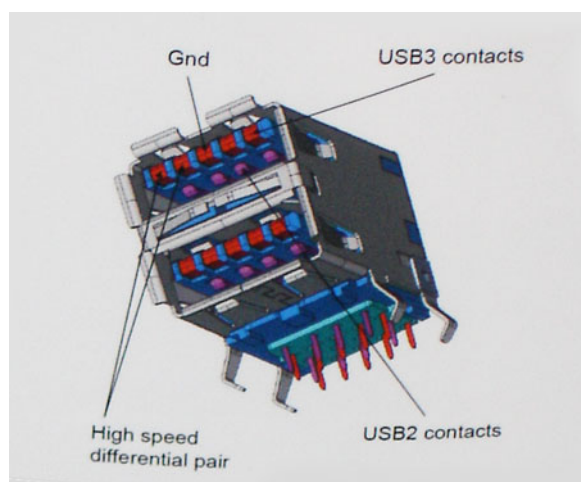


With today's ever increasing demands placed on data transfers with high-definition video content, terabyte storage devices, high megapixel count digital cameras etc., USB 2.0 may not be fast enough. Furthermore, no USB 2.0 connection could ever come close to the

480Mbps theoretical maximum throughput, making data transfer at around 320 Mbps (40 MB/s) — the actual real-world maximum. Similarly, USB 3.0/USB 3.1 Gen 1 connections will never achieve 4.8Gbps. We will likely see a real-world maximum rate of 400MB/s with overheads. At this speed, USB 3.0/USB 3.1 Gen 1 is a 10x improvement over USB 2.0.

# Applications

USB 3.0/USB 3.1 Gen 1 opens up the laneways and provides more headroom for devices to deliver a better overall experience. Where USB video was barely tolerable previously (both from a maximum resolution, latency, and video compression perspective), it's easy to imagine that with 5-10 times the bandwidth available, USB video solutions should work that much better. Single-link DVI requires almost 2Gbps throughput. Where 480Mbps was limiting, 5Gbps is more than promising. With its promised 4.8Gbps speed, the standard will find its way into some products that previously weren't USB territory, like external RAID storage systems.

Listed below are some of the available SuperSpeed USB 3.0/USB 3.1 Gen 1 products:

- External Desktop USB 3.0/USB 3.1 Gen 1 Hard Drives
- Portable USB 3.0/USB 3.1 Gen 1 Hard Drives
- USB 3.0/USB 3.1 Gen 1 Drive Docks & Adapters
- USB 3.0/USB 3.1 Gen 1 Flash Drives & Readers
- USB 3.0/USB 3.1 Gen 1 Solid-state Drives
- USB 3.0/USB 3.1 Gen 1 RAIDs
- Optical Media Drives
- Multimedia Devices
- Networking
- USB 3.0/USB 3.1 Gen 1 Adapter Cards & Hubs

# Compatibility

The good news is that USB 3.0/USB 3.1 Gen 1 has been carefully planned from the start to peacefully co-exist with USB 2.0. First of all, while USB 3.0/USB 3.1 Gen 1 specifies new physical connections and thus new cables to take advantage of the higher speed capability of the new protocol, the connector itself remains the same rectangular shape with the four USB 2.0 contacts in the exact same location as before. Five new connections to carry receive and transmitted data independently are present on USB 3.0/USB 3.1 Gen 1 cables and only come into contact when connected to a proper SuperSpeed USB connection.

# System specifications

# Technical specifications

This topics lists out the technical specifications of your computer.

**Table 3. Technical specification 3478**

| Model Number | Vostro 3478 |
|---|---|
| Processor family | 8th generation Intel core processors |
| Operating System | • Microsoft Windows 10 Home 64 bit<br>• Microsoft Windows 10 Professional 64 bit<br>• Microsoft Windows 10 National Academic 64-bit (Bid Desk)<br>• Ubuntu 16.04 LTS 64-bit |
| Memory | DDR4 2400 MHz 2 slots supporting up to 16 GB |
| Chipset | Integrated with the Processor |
| Graphics | • Intel Integrated UHD 620 Graphics<br>• AMD Radeon 520 Graphics with 2GB GDDR5 vRAM |
| Display | 14.0 inches HD (1366 x 768) Anti-glare (16:9) WLED, 200 nits, Non-touch |
| Storage options | • 500 GB 5400RPM SATA hard drive<br>• 500 GB 7200RPM SATA hard drive<br>• 1 TB 5400RPM SATA hard drive<br>• 1 TB 7200RPM SATA hard drive<br>• 128 GB solid state drive (SSD)<br>• 256 GB solid state drive (SSD) |
| Multimedia | • Integrated High Quality Speakers<br>• Universal Headphone Jack<br>• Integrated single digital microphone<br>• Integrated HD video webcam |
| Battery options | 4-cell Lithium Ion (40 WHr)<br>• Length: 37.5 mm (1.47 inches)<br>• Width: 270.0 mm (10.63 inches)<br>• Weight: 0.25 kg (0.56 lb)<br>• Height: 20.0 mm (0.78 inch)<br>• Voltage: 14.8 VDC |
| Power adapter | • E4 45W<br>    • Input voltage: 100 to 240 VAC<br>    • Input current (max): 1.3 A<br>    • Input Frequency: 50 Hz to 60 Hz<br>    • Output current: 2.31 A (continuous)<br>    • Rated output voltage: 19.5 VDC<br>    • Weight (kg): 0.27 |

| Model Number | Vostro 3478 |
|---|---|
|  | • Dimensions (HxWxD inches): 0.87 x 2.6 x 4.17<br>• Temperature range: 0° to 40°C<br>• Operating: 32° to 104°F<br>• Storage:<br>    -40° to 70°C<br>    -40° to 158°F<br>• E4 65W<br>    • Input voltage: 100 to 240 VAC<br>    • Input current (max): 1.7 A<br>    • Input Frequency: 50 Hz to 60 Hz<br>    • Output current: 3.34 A (continuous)<br>    • Rated output voltage: 19.5 VDC<br>    • Weight (kg): 0.29<br>    • Dimensions (HxWxD inches): 1.1 x 1.9 x 4.3<br>    • Temperature range: 0° to 40°C<br>    • Operating: 32° to 104°F<br>    • Storage:<br>        -40° to 70°C<br>        -40° to 158°F |
| Connectivity | 10/100/1000 Ethernet<br>• Wireless LAN Options:<br>    • Qualcomm QCA9377 802.11ac Dual Band (1x1) Wireless Adapter+ Bluetooth 4.1<br>    • Qualcomm QCA61x4A 802.11ac Dual Band (2x2) Wireless Adapter+ Bluetooth 4.1 |
| Ports, Slots and Chassis | • 2 USB 3.1 Gen 1 ports, 1 USB 2.0 port, HDMI 1.4, VGA<br>• RJ-45<br>• SD 3.0 Memory card reader<br>• Universal Jack (global headset jack + mic phone in + line in support)<br>• Optional Touch Fingerprint Reader |
| Input device | Single Pointing, non backlit w/Precision compliant Clickpad Touchpad (no buttons) |
| Regulatory and Environmental Compliance | • ENERGY STAR 6.1 (includes Windows and Ubuntu OS)<br>• EPEAT Registered. |

**Table 4. 3478 Display specifications**

| Display | 14.0 – HD Non touch |
|---|---|
| Type | HD Anti-Glare |
| Luminance/Brightness (typical) | HD 200nits |
| Diagonal | 14.0 inches |
| Native Resolution | HD 1366x768 |
| Megapixels (millions of pixels) | HD 1.05 |
| Pixels per Inch (PPI) | 112 for HD |
| Contrast Ratio (min) | 300:1 for HD |
| Refresh Rate | 60 Hz |

| Display | 14.0 – HD Non touch |
|---|---|
| Horizontal Viewing Angle | HD +40/- 40 degrees |
| Vertical Viewing Angle | HD +10/- 30 degrees |
| Pixel Pitch | HD 0.226 mm |
| Power Consumption (max) | HD 3.0 W |

# Hot key combinations

**Table 5. Hot key combinations**

| Fn key combination | Function |
|---|---|
| Fn + ESC | Fn toggle |
| Fn + F1 | Speaker mute |
| Fn + F2 | Volume down |
| Fn + F3 | Volume up |
| Fn + F4 | Rewind or play previous track |
| Fn + F5 | Play or pause a track |
| Fn + F6 | Forward or play next track |
| Fn + F8 | Display toggle |
| Fn + F9 | Search |
| Fn + F11 | Panel brightness down |
| Fn + F12 | Panel brightness up |
| Fn + Home | Home |
| Fn + End | End |
| Fn + Up arrow | Page up |
| Fn + down arrow | Page down |

# System setup

System setup enables you to manage your notebook 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

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
  - (i) **NOTE: XXXX denotes the SATA drive number.**
- Optical Drive (if available)
- SATA Hard Drive (if available)
- Diagnostics
  - (i) **NOTE: Choosing Diagnostics, displays the ePSA diagnostics screen.**

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

# Navigation keys

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

| 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 the computer and its installed devices, the items listed in this section may or may not appear.**

**Table 6. General tab**

| Option | Description | |
|---|---|---|
| System Information | This section lists the primary hardware features of your computer.<br><br>• System Information: Displays BIOS Version, Service Tag, Asset Tag, Ownership Tag, Manufacture Date, Ownership Date, and the Express Service Code.<br>• Memory Information: Displays Memory Installed, Memory Available, Memory Speed, Memory Channels Mode, Memory Technology, DIMM A Size, and DIMM B Size<br>• 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.<br>• Device Information: SATA-0, SATA-1, LOM MAC Address, Video Controller, dGPU Video Controller, Video BIOS Version, Video Memory, Panel Type, Native Resolution, Audio Controller, Wi-Fi Device, Bluetooth Device. | |
| Battery Information | Displays the battery status and the type of AC adapter connected to the computer. | |
| Boot Sequence | Boot Sequence | Allows you to change the order in which the computer attempts to find an operating system. The option is:<br><br>• Windows Boot Manager<br><br>By default, all the options are checked. You can also deselect any option or change the boot order. |
| | Boot List Option | Allows you to change the boot list option.<br><br>• Legacy<br>• UEFI (Selected by default) |
| Advanced Boot Options | This option allows you the legacy option ROMs to load.<br><br>• Enable Legacy Option ROMs<br>• Enable Attempt Legacy Boot<br><br>By default, the **Enable Legacy Option ROMs** option is enabled. | |
| UEFI Boot Path Security | These options control whether or not the system will prompt the user to enter the Admin password (if set) when booting a UEFI boot path from the F12 Boot Menu.<br><br>• Always, Except Internal HDD<br>• Always<br>• Never<br><br>By default, **Always, Except Internal HDD** is enabled. | |
| Date/Time | Allows you to change the date and time. | |

**Table 7. System Configuration**

| Option | Description |
|---|---|
| Integrated NIC | Allows you to configure the integrated network controller. The options are:<br><br>• Disabled<br>• Enabled<br>• Enabled w/PXE: This option is enabled by default. |
| SATA Operation | Allows you to configure the internal SATA hard-drive controller. The options are:<br><br>• Disabled<br>• AHCI: This option is enabled by default. |

| Option | Description |
|---|---|
| Drives | Allows you to configure the SATA drives on board. All drives are enabled by default. The options are:<br>• SATA-0: This option is selected by default.<br>• SATA-1: This option is selected by default. |
| 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.<br>• Enable SMART Reporting |
| 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).<br><br>If USB port is enabled, device attached to this port is enabled and available for OS.<br><br>If USB port is disabled, the OS cannot see any device attached to this port.<br>• Enable Boot Support: This option is selected by default.<br>• Enable External USB Port: This option is selected by default.<br>ⓘ NOTE: **USB keyboard and mouse always work in the BIOS setup irrespective of these settings.** |
| Audio | This field enables or disables the integrated audio controller. The options are:<br>• Enable Microphone<br>• Enable Internal Speaker<br>ⓘ NOTE: **All devices are enabled by default.** |
| Miscellaneous Devices | Allows you to enable or disable the following devices:<br>• Enable Camera<br>• Enabled Secure Digital (SD) Card<br>ⓘ NOTE: **All devices are enabled by default.** |

**Table 8. Video**

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

**Table 9. Security**

| Option | Description |
|---|---|
| Admin Password | Allows you to set, change, or delete the administrator (admin) password.<br>ⓘ 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.**<br>ⓘ NOTE: **Successful password changes take effect immediately.**<br><br>Default Setting: Not set |
| System Password | Allows you to set, change or delete the system password.<br>ⓘ NOTE: **Successful password changes take effect immediately.**<br><br>Default Setting: Not set |
| Internal HDD-0 Password | Allows you to set, change or delete the password on the system's internal hard-disk drive. |

| Option | Description |
|---|---|
| | ⓘ **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. |
| 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:<br>• Disabled<br>• Reboot bypass<br>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.<br>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. |
| UEFI Capsule Firmware Updates | Allows you to controls whether the system allows BIOS update via UEFI capsule update packages. Default setting: Enable |
| TPM 2.0 Security | Allows you to enable the Trusted Platform Module (TPM) during POST. The options are:<br>• TPM On (enabled by default)<br>• Clear<br>• PPI Bypass for Enabled Commands<br>• PPI Bypass for Disabled Commands<br>• Attestation Enable (enabled by default)<br>• Key Storage Enable (enabled by default)<br>• SHA-256 (enabled by default)<br>• Disabled<br>• Enabled<br><br>ⓘ **NOTE: To upgrade or downgrade TPM1.2/2.0, download the TPM wrapper tool (software).** |
| Computrace | Allows you to activate or disable the optional Computrace software The options are:<br>• Deactivate<br>• Disable<br>• Activate<br><br>ⓘ **NOTE: The Activate and Disable options will permanently activate or disable the feature and no further changes will be allowed.**<br>Default setting: Deactivate |
| CPU XD Support | Allows you to enable the Execute Disable mode of the processor.<br>Enable CPU XD Support (default) |
| Admin Setup Lockout | Allows you to prevent users from entering Setup when an Administrator password is set.<br>Default Setting: Enable Admin Setup Lockout is not selected. |

| Option | Description |
|---|---|
| Master Password Lockout | When enabled, this option will disable master password support.<br><br>• Enable Master Password Lockout<br><br>Default setting: Enable Master Password Lockout is disabled |
| SMM Security Mitigation | This option enables or disables additional UEFI SMM Security Mitigation protections.<br><br>• Enable Master Password Lockout<br><br>Default setting: SMM Security Mitigation is disabled |

**Table 10. Secure Boot**

| Option | Description |
|---|---|
| Secure Boot Enable | This option enables or disables the Secure Boot Feature.<br><br>• Disabled<br>• Enabled<br><br>Default Setting: The option is disabled. |
| 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:<br><br>• PK<br>• KEK<br>• db<br>• dbx<br><br>If you enable the **Custom Mode**, the relevant options for **PK, KEK, db, and dbx** appear. The options are:<br><br>• **Save to File**- Saves the key to a user-selected file<br>• **Replace from File**- Replaces the current key with a key from a user-selected file<br>• **Append from File**- Adds a key to the current database from a user-selected file<br>• **Delete**- Deletes the selected key<br>• **Reset All Keys**- Resets to default setting<br>• **Delete All Key**s- Deletes all the keys<br><br>ⓘ NOTE: **If you disable the Custom Mode, all the changes made will be erased and the keys will restore to default settings.** |

**Table 11. Intel Software Guard Extensions screen options**

| Option | Description |
|---|---|
| Intel SGX Enable | 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:<br><br>• Disabled<br>• Enabled<br>• Software Controlled<br><br>Default setting: Software Controlled |
| Enclave Memory Size | This option sets **SGX Enclave Reserve Memory Size**. The options are:<br><br>• 32 MB<br>• 64 MB<br>• 128 MB<br><br>Default setting: 128 MB |

**Table 12. Performance**

| Option | Description |
|---|---|
| Multi Core Support | 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 installed processor supports two cores. If you enable Multi Core Support, two cores will be enabled. If you disable Multi Core Support, one core will be enabled.<br><br>Multi Core Support<br>· All<br>· 1<br>· 2<br>· 3<br><br>Default Setting: All is enabled. |
| Intel SpeedStep | Allows you to enable or disable the Intel SpeedStep feature.<br>· Enable Intel SpeedStep<br>Default Setting: The option is enabled. |
| C States Control | Allows you to enable or disable the additional processor sleep states.<br>· C states<br>Default Setting: The option is enabled. |
| Intel TurboBoost | Allows you to enable or disable the Intel TurboBoost mode of the processor.<br>· Enable Intel TurboBoost<br>Default Setting: The option is enabled. |
| Hyper-Thread Control | Allows you to enable or disable the HyperThreading in the processor.<br>· Disabled<br>· Enabled<br>Default Setting: The option is enabled. |

**Table 13. Power Management**

| Option | Description |
|---|---|
| AC Behavior | Allows you to enable or disable the computer from turning on automatically when an AC adapter is connected.<br>Default Setting: Wake on AC is not selected. |
| Enable Intel Speed Shift Technology | This option is used to enable/disable Intel Speed Shift Technology support. Setting this option to enable allows the operating system to select the appropriate processor performance automatically.<br>Default Setting: Enable Intel Speed Shift Technology is enabled. |
| Auto On Time | Allows you to set the time at which the computer must turn on automatically. The options are:<br>· Disabled (default)<br>· Every Day<br>· Weekdays<br>· Select Days |
| USB Wake Support | Allows you to enable USB devices to wake the system from Standby.<br>ⓘ **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.**<br>· Enable USB Wake Support |

| Option | Description |
|---|---|
| | Default Setting: The option is disabled. |
| Wake on LAN | Allows you to enable or disable the feature that powers on the computer from the Off state when triggered by a LAN signal.<br><br>• Disabled: This option is enabled by default<br>• LAN Only |
| Advanced Battery Charge Configuration | Advanced Battery Charge maximizes battery health while still supporting heavy use during work day. |
| Primary Battery Charge Configuration | Allows you to select the charging mode for the battery. The options are:<br><br>• Adaptive<br>• Standard — Fully charges your battery at a standard rate.<br>• Primarily AC use<br>• Custom<br><br>If Custom Charge is selected, you can also configure Custom Charge Start and Custom Charge Stop.<br><br>Default Setting: The option **Adaptive** is enabled.<br><br>ⓘ NOTE: **All charging mode may not be available for all the batteries. To enable this option, disable the Advanced Battery Charge Configuration option.** |

**Table 14. POST Behavior**

| Option | Description |
|---|---|
| Adapter Warnings | Allows you to enable or disable the system setup (BIOS) warning messages when you use certain power adapters.<br><br>Default Setting: Enable Adapter Warnings |
| Fn Lock Option | Allows the hot key combination <Fn> +<Esc> toggle the primary behavior of F1–F12, between the standard and secondary functions.<br><br>• Lock Mode Disable/Standard.<br>• Lock Mode Enable/Secondary. This option is enabled by default. |
| Fastboot | Allows you to speed up the boot process by bypassing some of the compatibility steps. The options are:<br><br>• Minimal<br>• Thorough (default)<br>• Auto |
| Extended BIOS POST Time | Allows you to create an additional preboot delay. The options are:<br><br>• 0 seconds. This option is enabled by default.<br>• 5 seconds<br>• 10 seconds |
| Full Screen Logo | This option will display full screen logo if your image match screen resolution.<br><br>Default Setting: Enable Full Screen Logo is disabled |
| Warnings and Logo | The Warning and Errors option cause the boot process to only pause when warnings or errors are detected, rather than stop, prompt and wait for user input.<br><br>• Prompt on Warnings and Errors (enabled).<br>• Continue on Warnings<br>• Continue on Warnings and Errors |

**Table 15. Virtualization Support**

| Option | Description |
|---|---|
| Virtualization | Allows you to enable or disable the Intel Virtualization Technology. <br><br> • **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. <br><br> **Enable VT for Direct I/O** — enabled by default. |

**Table 16. Wireless**

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

**Table 17. Maintenance**

| 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 field controls flashing of the system firmware to pervious revisions. <br><br> Allows BIOS Downgrade (Enabled by default) |
| Data Wipe | This field enables user to erase data from all internal storage device. |
| BIOS Recovery | Allows you to recover from certain corrupted BIOS conditions from a recover file on the user primary hard drive or an external USB key. Enabled by default. |

**Table 18. System Logs**

| 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) POST events. |
| Power Events | Allows you to view and clear the System Setup (Power) POST events. |

**Table 19. SupportAssist System Resolution**

| Option | Description |
|---|---|
| Auto OS Recovery Threshold | Allows you to control the automatic boot flow for SupportAssist System. Options are: <br><br> • Off <br> • 1 <br> • 2 (Enabled by default) <br> • 3 |
| SupportAssist OS Recovery | Allows you to recover the SupportAssist OS Recovery (Disabled by default) |

# Flashing the BIOS from the F12 One-Time boot menu

Updating your system BIOS using a BIOS update .exe file copied to a FAT32 USB key and booting from the F12 one time boot menu.

**BIOS Update**

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

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

> (i) **NOTE: Only systems 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 will need:

- USB key 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 key
- AC power adapter connected to the system
- Functional system battery to flash the BIOS

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

> ⚠ **CAUTION: Do not power off the system during the BIOS update process. Powering off the system could make the system fail to boot.**

1. From a power off state, insert the USB key where you copied the flash into a USB port of the system .
2. Power on the system and press the F12 key to access the One-Time Boot Menu, Highlight BIOS Update using the mouse or arrow keys then press **Enter**.
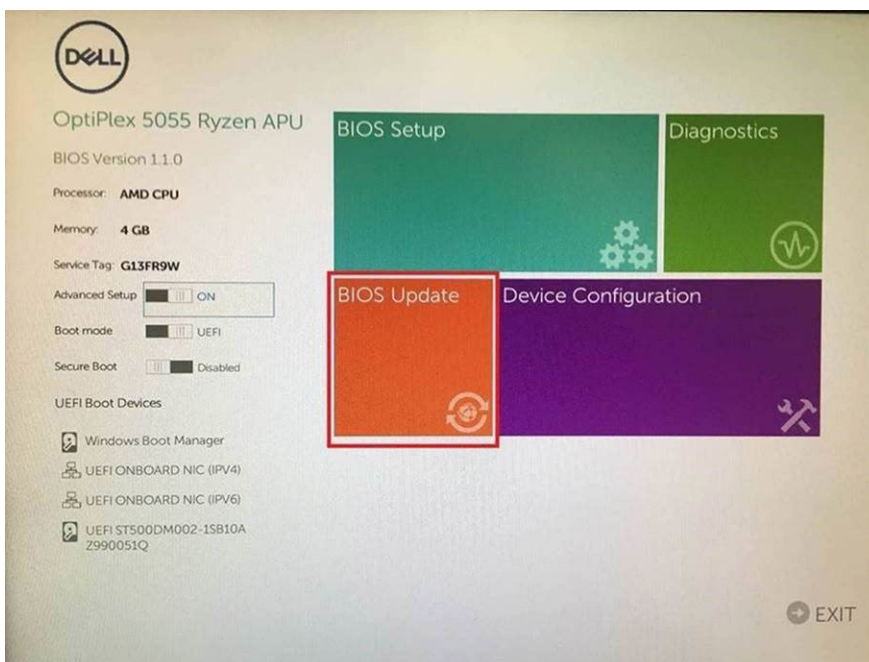


3. The Bios flash menu will open then click the **Flash from file**.
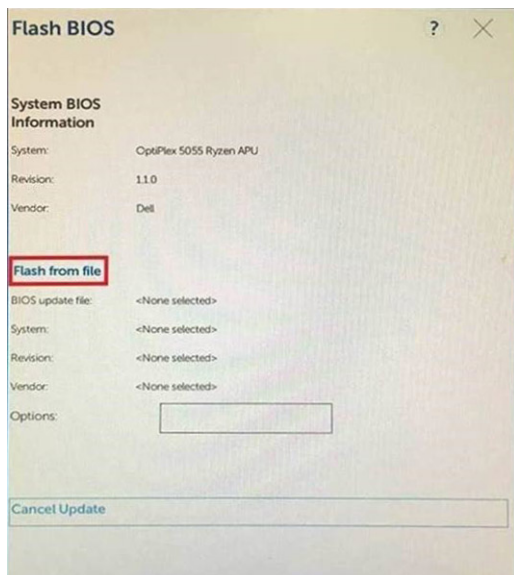
4. Select external USB device
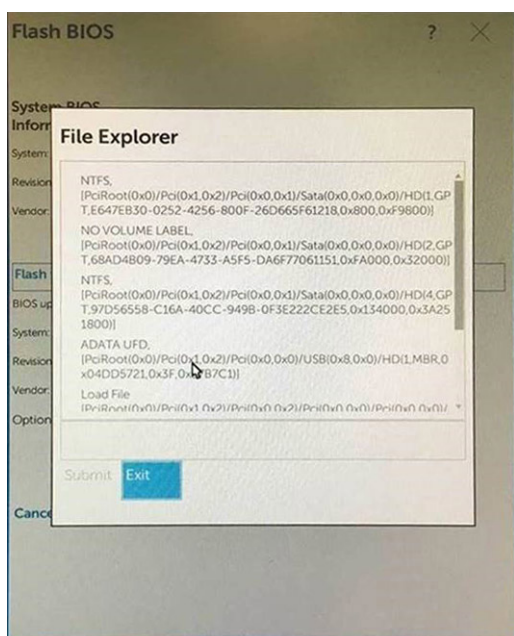


5. Once the file is selected, Double click the flash target file, then press submit .
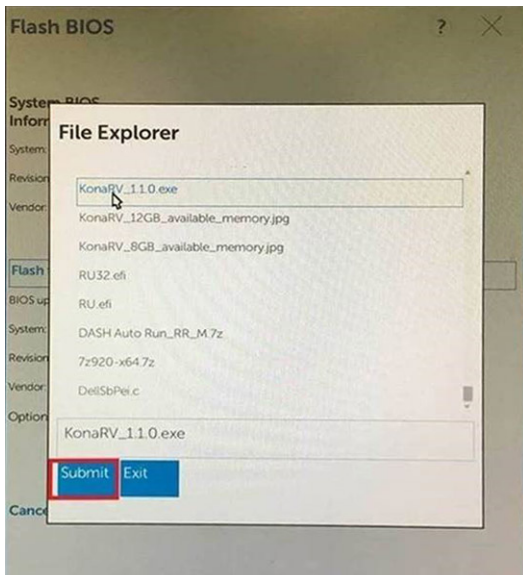
6. Click the **Update BIOS** then system will reboot to flash the BIOS.
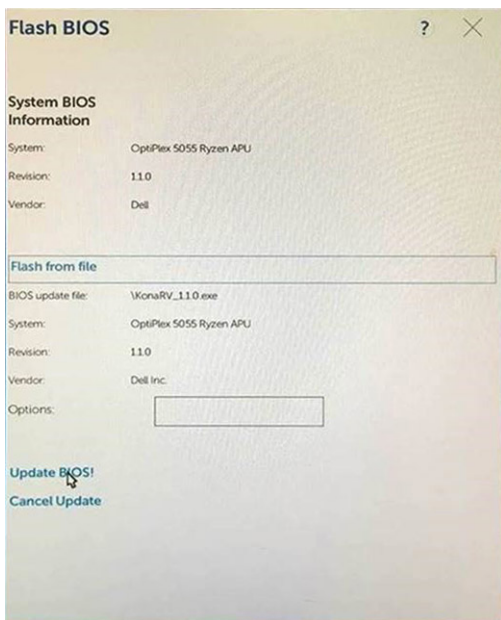


7. Once complete, the system will reboot and the BIOS update process is completed.

# Updating the BIOS in Windows

It is recommended to update your BIOS (System Setup), when you replace 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

ⓘ **NOTE: If BitLocker is enabled, it must be suspended prior to updating the system BIOS, and then re-enabled after the BIOS update is completed.**

1. Restart the computer.
2. Go to **Dell.com/support**.
   - Enter the **Service Tag** or **Express Service Code** and click **Submit**.
   - Click **Detect Product** and follow the instructions on screen.
3. If you are unable to detect or find the Service Tag, click **Choose from all products**.
4. Choose the **Products** category from the list.

   ⓘ **NOTE: Choose the appropriate category to reach the product page**

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

6. Click **Get drivers** and click **Drivers and Downloads**.
   The Drivers and Downloads section opens.

7. Click **Find it myself**.

8. Click **BIOS** to view the BIOS versions.

9. Identify the latest BIOS file and click **Download**.

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

11. Click **Save** to save the file on your computer.

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

    Follow the instructions on the screen.

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

# System and setup password

**Table 20. System and setup password**

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

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 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 F2 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.
   - The password can contain the numbers 0 through 9.
   - Only lower case letters are valid, upper case letters are not allowed.
   - Only the following special characters are allowed: space, ("), (+), (,), (-), (.), (/), (;), ([), (\), (]), (`).

3. Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.

4. Press Esc and a message prompts you to save the changes.

5. Press Y to save the changes.
   The computer reboots.

# 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 Setup password. You cannot delete or change an existing System or Setup password, if the **Password Status** is Locked.

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

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

   ⓘ **NOTE: If you change the System and/or Setup password, re enter the new password when prompted. If you delete the System and 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.

# Software

This chapter details the supported operating systems along with instructions on how to install the drivers.

**Topics:**

## Supported operating systems

**Table 21. Supported operating systems**

| Supported operating systems | Description |
| --- | --- |
| Windows | • Microsoft Windows 10 Pro 64-bit<br>• Microsoft Windows 10 Home 64-bit<br>• Microsoft Windows 10 National Academic 64-bit (Bid Desk) |
| Others | Ubuntu 16.04 LTS 64-bit |

## Downloading Windows drivers

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

   (i) **NOTE: If you do not have the Service Tag, use the auto detect feature or manually browse for your notebook model.**
4. Click **Drivers and Downloads**.
5. Select the operating system installed on your notebook.
6. Scroll down the page and select the driver to install.
7. Click **Download File** to download the driver for your notebook.
8. After the download is complete, navigate to the folder where you saved the driver file.
9. Double-click the driver file icon and follow the instructions on the screen.

## Intel chipset drivers

Verify if the Intel chipset drivers are already installed in the system.

**Table 22. Intel chipset drivers**

| Before Installation | After Installation |
|---|---|
| System devices<br>- ACPI Fixed Feature Button<br>- ACPI Lid<br>- ACPI Processor Aggregator<br>- ACPI Sleep Button<br>- ACPI Thermal Zone<br>- Charge Arbitration Driver<br>- Composite Bus Enumerator<br>- Dell Diag Control Device<br>- Dell System Analyzer Control Device<br>- High precision event timer<br>- Intel(R) Integrated Sensor Solution<br>- Intel(R) Management Engine Interface<br>- Intel(R) Power Engine Plug-in<br>- Intel(R) Serial IO I2C Host Controller - 9D60<br>- Intel(R) Serial IO I2C Host Controller - 9D61<br>- Intel(R) Serial IO I2C Host Controller - 9D62<br>- Intel(R) Serial IO I2C Host Controller - 9D64<br>- Intel(R) Smart Sound Technology (Intel(R) SST) Audio Controller<br>- Intel(R) Smart Sound Technology (Intel(R) SST) OED<br>- Intel(R) Virtual Buttons<br>- Intel(R) Xeon(R) E3 - 1200 v6/7th Gen Intel(R) Core(TM) Host Bridge/DRAM Registers - 5914<br>- ISS Dynamic Bus Enumerator<br>- Legacy device<br>- Microsoft ACPI-Compliant Embedded Controller<br>- Microsoft ACPI-Compliant System<br>- Microsoft System Management BIOS Driver<br>- Microsoft UEFI-Compliant System | System devices<br>- ACPI Fixed Feature Button<br>- ACPI Lid<br>- ACPI Power Button<br>- ACPI Processor Aggregator<br>- ACPI Sleep Button<br>- ACPI Thermal Zone<br>- Charge Arbitration Driver<br>- Composite Bus Enumerator<br>- Dell Diag Control Device<br>- Dell System Analyzer Control Device<br>- High Definition Audio Controller<br>- High precision event timer<br>- Intel(R) Management Engine Interface<br>- Intel(R) Power Engine Plug-in<br>- Intel(R) Serial IO GPIO Host Controller - INT344B<br>- Intel(R) Serial IO I2C Host Controller - 9D60<br>- Intel(R) Software Guard Extensions Device<br>- Intel(R) Xeon(R) E3 - 1200 v6/7th Gen Intel(R) Core(TM) Host Bridge/DI<br>- Legacy device<br>- Microsoft ACPI-Compliant Embedded Controller<br>- Microsoft ACPI-Compliant System<br>- Microsoft System Management BIOS Driver<br>- Microsoft UEFI-Compliant System<br>- Microsoft Virtual Drive Enumerator<br>- Microsoft Windows Management Interface for ACPI<br>- Mobile 6th/7th Generation Intel(R) Processor Family I/O PCI Express R<br>- Mobile 6th/7th Generation Intel(R) Processor Family I/O PCI Express R<br>- Mobile 6th/7th Generation Intel(R) Processor Family I/O PCI Express R<br>- Mobile 6th/7th Generation Intel(R) Processor Family I/O PMC - 9D21<br>- Mobile 6th/7th Generation Intel(R) Processor Family I/O SMBUS - 9D2<br>- Mobile 6th/7th Generation Intel(R) Processor Family I/O Thermal subs<br>- Mobile 7th Generation Intel(R) Processor Family I/O LPC Controller (U<br>- NDIS Virtual Network Adapter Enumerator<br>- PCI Express Root Complex<br>- Plug and Play Software Device Enumerator<br>- Programmable interrupt controller<br>- Remote Desktop Device Redirector Bus<br>- System CMOS/real time clock<br>- System timer<br>- UMBus Root Bus Enumerator |

# Battery drivers

The latest battery drivers are installed in the computer.

**Table 23. Battery drivers**

| Before Installation | After Installation |
|---|---|
| ∨ 🔋 Batteries<br>　　🔋 Microsoft AC Adapter | ∨ 🔋 Batteries<br>　　🔋 Microsoft AC Adapter<br>　　🔋 Microsoft ACPI-Compliant Control Method Battery |

# Intel HID Event Filter

Verify if the Intel HID event filter is already installed in the computer.
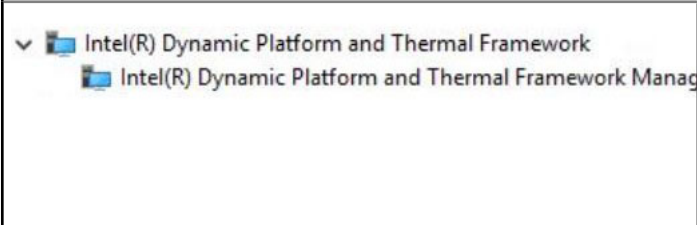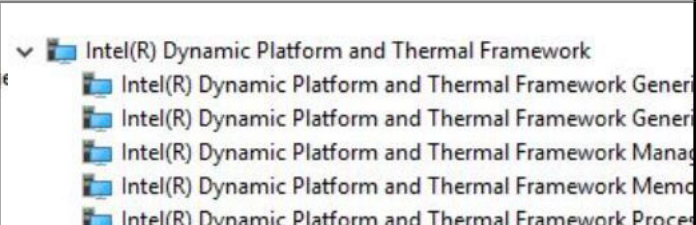
**Table 24. Intel HID Event Filter**

| Before Installation | After Installation |
|---|---|
| ∨ 🖮 Human Interface Devices<br>　　🖮 HID-compliant vendor-defined device<br>　　🖮 I2C HID Device | ∨ 🖮 Human Interface Devices<br>　　🖮 Converted Portable Device Control device<br>　　🖮 HID-compliant consumer control device<br>　　🖮 HID-compliant consumer control device<br>　　🖮 HID-compliant consumer control device<br>　　🖮 HID-compliant consumer control device<br>　　🖮 HID-compliant consumer control device<br>　　🖮 HID-compliant consumer control device<br>　　🖮 HID-compliant consumer control device<br>　　🖮 HID-compliant consumer control device<br>　　🖮 HID-compliant consumer control device<br>　　🖮 HID-compliant consumer control device<br>　　🖮 HID-compliant system controller<br>　　🖮 HID-compliant system controller<br>　　🖮 HID-compliant system controller<br>　　🖮 HID-compliant system controller<br>　　🖮 HID-compliant touch pad<br>　　🖮 HID-compliant vendor-defined device<br>　　🖮 HID-compliant vendor-defined device<br>　　🖮 HID-compliant vendor-defined device<br>　　🖮 HID-compliant vendor-defined device<br>　　🖮 HID-compliant wireless radio controls<br>　　🖮 I2C HID Device<br>　　🖮 Microsoft Input Configuration Device<br>　　🖮 Portable Device Control device<br>　　🖮 USB Input Device |

# Intel Dynamic Platform and Thermal Framework

Verify if the Intel dynamic platform and thermal framework is already installed in the computer.

**Table 25. Intel Dynamic Platform and Thermal Framework**

| Before Installation | After Installation |
|---|---|
| ∨ 🖥 Intel(R) Dynamic Platform and Thermal Framework<br>    🖥 Intel(R) Dynamic Platform and Thermal Framework Manage | ∨ 🖥 Intel(R) Dynamic Platform and Thermal Framework<br>        🖥 Intel(R) Dynamic Platform and Thermal Framework Generic Participa<br>        🖥 Intel(R) Dynamic Platform and Thermal Framework Generic Participa<br>        🖥 Intel(R) Dynamic Platform and Thermal Framework Manager<br>        🖥 Intel(R) Dynamic Platform and Thermal Framework Memory Particip<br>        🖥 Intel(R) Dynamic Platform and Thermal Framework Processor Partici |

# Disk drivers

Disk drivers installed in the system

**Table 26. Disk drivers**

| Before Installation | After Installation |
|---|---|
| None | ∨ 💾 Disk drives<br>    💾 TOSHIBA MQ01ABD100 |

# Realtek PCI-E Memory Card

Verify if the Realtek PCI-E Memory Card is already installed in the computer.

**Table 27. Realtek PCI-E memory card**

| Before Installation | After Installation |
|---|---|
| ∨ 🔌 Universal Serial Bus controllers<br>    🔌 Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)<br>    🔌 USB Composite Device<br>    🔌 USB Root Hub (USB 3.0) | ∨ 🔌 Universal Serial Bus controllers<br>    🔌 Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)<br>    🔌 Realtek USB 2.0 Card Reader<br>    🔌 USB Composite Device<br>    🔌 USB Root Hub (USB 3.0) |

# Graphics controller driver

Verify if the graphics controller driver is already installed in the computer.

**Table 28. Graphics controller driver**

| Before Installation | After Installation |
|---|---|
| ∨ 🖥 Display adapters<br>    🖥 Intel(R) UHD Graphics 620 | ∨ 🖥 Display adapters<br>    🖥 Intel(R) UHD Graphics 620<br>    🖥 Radeon (TM) 520 |

# Bluetooth drivers

This platform supports a variety of Bluetooth drivers. The following is an example

**Table 29. Bluetooth drivers**

| Before Installation | After Installation |
|---|---|
| ∨ 🅱 Bluetooth<br>　　🅱 Qualcomm QCA61x4A Bluetooth 4.1 | ∨ 🅱 Bluetooth<br>　　🅱 Microsoft Bluetooth Enumerator<br>　　🅱 Microsoft Bluetooth LE Enumerator<br>　　🅱 Microsoft Bluetooth Protocol Support Driver<br>　　🅱 Qualcomm QCA61x4A Bluetooth 4.1 |

# Network drivers

Install the WLAN and Bluetooth drivers from the Dell support site.

**Table 30. Network drivers**

| Before installation | After installation |
|---|---|
| ∨ 🖥 Network adapters<br>　　🖥 Bluetooth Device (Personal Area Network) | ∨ 🖥 Network adapters<br>　　🖥 Bluetooth Device (Personal Area Network)<br>　　🖥 Bluetooth Device (RFCOMM Protocol TDI)<br>　　🖥 Qualcomm QCA61x4A 802.11ac Wireless Adapter<br>　　🖥 Realtek PCIe GBE Family Controller<br>　　🖥 WAN Miniport (IKEv2)<br>　　🖥 WAN Miniport (IP)<br>　　🖥 WAN Miniport (IPv6)<br>　　🖥 WAN Miniport (L2TP)<br>　　🖥 WAN Miniport (Network Monitor)<br>　　🖥 WAN Miniport (PPPOE)<br>　　🖥 WAN Miniport (PPTP)<br>　　🖥 WAN Miniport (SSTP) |

# Realtek Audio

Verify if audio drivers are already installed in the computer.
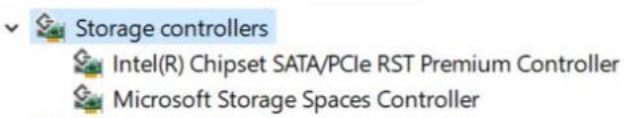
**Table 31. Realtek audio**

| Before Installation | After Installation |
|---|---|
| ∨ 🔊 Sound, video and game controllers<br>　　🔊 Intel(R) Display Audio | ∨ 🔊 Sound, video and game controllers<br>　　🔊 Intel(R) Display Audio<br>　　🔊 Realtek Audio |

# Storage drivers

Verify if the storage controller drivers are installed in the system.
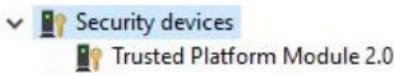
**Table 32. Storage drivers**

| Before Installation | After Installation |
|---|---|
| None | Storage controllers<br>    Intel(R) Chipset SATA/PCIe RST Premium Controller<br>    Microsoft Storage Spaces Controller |

# Security drivers

Verify if the security device drivers are installed in the computer.

**Table 33. Security drivers**

| Before Installation | After Installation |
|---|---|
| None | Security devices<br>    Trusted Platform Module 2.0 |

# Troubleshooting

## Enhanced Pre-Boot System Assessment — ePSA diagnostics

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

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

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

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

## Running the ePSA Diagnostics

Invoke diagnostics boot by either of the methods that are suggested below:

1. Power on the computer.
2. As the computer boots, press the F12 key when the Dell logo is displayed.
3. In the boot menu screen, use Up/Down arrow key to select the **Diagnostics** option and then press **Enter**.

   (i) **NOTE: 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. Press the arrow in the lower-right corner to go to the page listing.
   The detected items are listed and tested.
5. To run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
6. Select the device from the left pane and click **Run Tests**.
7. If there are any issues, error codes are displayed.
   Note the error code and contact Dell.

   or

8. Shut down the computer.
9. Press and hold the Fn key, while pressing the power button, and then release both.
10. Repeat steps 3–7 above.

## Diagnostic LED

This section details the diagnostic features of the battery LED in a notebook.

Instead of beep codes errors are indicated via the bicolor Battery Charge LED. A specific blink pattern is followed by flashing a pattern of flashes in amber, followed by white. The pattern then repeats.

(i) **NOTE: The diagnostic pattern will consist of a two digit number being represented by a first group of LED blinks (1 through 9) in amber, followed by a 1.5 second pause with the LED off, and then a second group of LED blinks (1 through 9) in white. This is then followed by a three second pause, with the LED off, before repeating over again. Each LED blink takes 0.5 seconds.**

The system will not shutdown when displaying the Diagnostic Error Codes. Diagnostic Error Codes will always supersede any other use of the LED. For instance, on Notebooks, battery codes for Low Battery or Battery Failure situations will not be displayed when Diagnostic Error Codes are being displayed:

**Table 34. LED pattern**

| Blinking pattern | | Problem Description | Suggested Resolution |
|---|---|---|---|
| Amber | White | | |
| 2 | 1 | processor | processor failure |
| 2 | 2 | system board, BIOS ROM | system board, covers BIOS corruption or ROM error |
| 2 | 3 | memory | no memory/no RAM detected |
| 2 | 4 | memory | memory failure/RAM failure |
| 2 | 5 | memory | invalid memory installed |
| 2 | 6 | system board; chipset | system board/ chipset error |
| 2 | 7 | display | display failure |
| 3 | 1 | RTC power failure | coin-cell battery failure |
| 3 | 2 | PCI/Video | PCI/Video card/chip failure |
| 3 | 3 | BIOS recovery 1 | recovery image nor found |
| 3 | 4 | BIOS recovery 2 | recovery image found but invalid |

# Real Time Clock reset

The Real Time Clock (RTC) reset function allows you to recover your Dell system from **No POST/No Boot/No Power** situations. To initiate the RTC reset on the system make sure system is in a power-off state and is connected to power source . Press and hold the power button for 25 seconds and then release the power button. Go to how to reset real time clock.

(i) **NOTE: If AC power is disconnected from the system during the process or the power button is held longer than 40 seconds, the RTC reset process is aborted.**

The RTC reset will reset the BIOS to Defaults, un-provision Intel vPro and reset the system date and time. The following items are unaffected by the RTC reset:

- Service Tag
- Asset Tag
- Ownership Tag
- Admin Password
- System Password
- HDD Password
- TPM on and Active
- Key Databases
- System Logs

The following items may or may not reset based on your custom BIOS setting selections:

- The Boot List
- Enable Legacy OROMs
- Secure Boot Enable
- Allow BIOS Downgrade

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# Contacting Dell

(i) **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.