Inspiron 5591 2n1

Service Manual

Notes, cautions, and warnings

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

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

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

Contents

Working inside your computer

Safety instructions

Use the following safety guidelines to protect your computer from potential damage and to ensure your personal safety. Unless otherwise noted, each procedure included in this document assumes that you have read the safety information that shipped with your computer.

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

ⓘ **NOTE: Disconnect all power sources before opening the computer cover or panels. After you finish working inside the computer, replace all covers, panels, and screws before connecting to the electrical outlet.**

⚠ **CAUTION: To avoid damaging the computer, ensure that the work surface is flat and clean.**

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

⚠ **CAUTION: You should only perform troubleshooting and repairs as authorized or directed by the Dell technical assistance team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. See the safety instructions that shipped with the product or at www.dell.com/regulatory_compliance.**

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

⚠ **CAUTION: When you disconnect a cable, pull on its connector or on its pull tab, not on the cable itself. Some cables have connectors with locking tabs or thumb-screws that you must disengage before disconnecting the cable. When disconnecting cables, keep them evenly aligned to avoid bending any connector pins. When connecting cables, ensure that the ports and connectors are correctly oriented and aligned.**

⚠ **CAUTION: Press and eject any installed card from the media-card reader.**

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

Before working inside your computer

ⓘ **NOTE: The images in this document may differ from your computer depending on the configuration you ordered.**

Before you begin

1. Save and close all open files and exit all open applications.
2. Shut down your computer. Click **Start** > ⏻ **Power** > **Shut down**.

   ⓘ **NOTE: If you are using a different operating system, see the documentation of your operating system for shut-down instructions.**

3. Disconnect your computer and all attached devices from their electrical outlets.
4. Disconnect all attached network devices and peripherals, such as keyboard, mouse, and monitor from your computer.
5. Remove any media card and optical disc from your computer, if applicable.

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.

After working inside your computer

⚠ **CAUTION: Leaving stray or loose screws inside your computer may severely damage your computer.**

1. Replace all screws and ensure that no stray screws remain inside your computer.
2. Connect any external devices, peripherals, or cables you removed before working on your computer.
3. Replace any media cards, discs, or any other parts that you removed before working on your computer.
4. Connect your computer and all attached devices to their electrical outlets.
5. Turn on your computer.

Removing and installing components

Recommended tools

The procedures in this document may require the following tools:

- Philips screwdriver #1
- Flat-head screwdriver
- Plastic scribe

Screw list

(i) **NOTE: When removing screws from a component, it is recommended to note the screw type, the quantity of screws, and then place them in a screw storage box. This is to ensure that the correct number of screws and correct screw type is restored when the component is replaced.**

(i) **NOTE: Some computers have magnetic surfaces. Ensure that the screws are not left attached to such surface when replacing a component.**

(i) **NOTE: Screw color may vary with the configuration ordered.**

Table 1. Screw list

Component	Secured to	Screw type	Quantity	Screw image
Base cover	Palm-rest and keyboard assembly	M2x7	6	
Battery	Palm-rest and keyboard assembly	M2x3	2	
Hard-drive assembly	Palm-rest and keyboard assembly	M2x3	3	
Hard-drive bracket	Hard drive	M3x3	4	
Solid-state drive	Palm-rest and keyboard assembly	M2x3	1	
I/O board	Palm-rest and keyboard assembly	M2x3	2	
Fan	Palm-rest and keyboard assembly	M2x3	2	
Wireless card	System board	M2x3	1	
Power button with fingerprint reader (Only on computers shipped with finger print reader)	Palm-rest and keyboard assembly	M2x2.5	2	
Power-adapter port	Palm-rest and keyboard assembly	M2x3	1	

Component	Secured to	Screw type	Quantity	Screw image
Power button	Palm-rest and keyboard assembly	M2x2.5	2	
USB Type-C bracket	System board	M2x3	2	
System board	Palm-rest and keyboard assembly	M2x2 Big Head	5	
Touchpad bracket	Palm-rest and keyboard assembly	M2x3	3	
Touchpad	Palm-rest and keyboard assembly	M2x2 Big Head	4	
Display assembly	Palm-rest and keyboard assembly	M2.5x5	6	

Disassembly and reassembly

Base cover

Removing the base cover

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Procedure

1. Remove the six screws (M2x7) that secure the base cover to the palm-rest and keyboard assembly.
2. Loosen the three captive screws that secure the base cover to the palm-rest and keyboard assembly.

3. Using your fingertips, pry the base cover off the palm-rest and keyboard assembly from the top left corner.
4. Lift the base cover off the palm-rest and keyboard assembly.

5. Peel off the tape that secures the battery cable to the battery.
6. Peel the tape that secures the battery cable to the battery-cable connector.
7. Disconnect the battery cable from the system board.
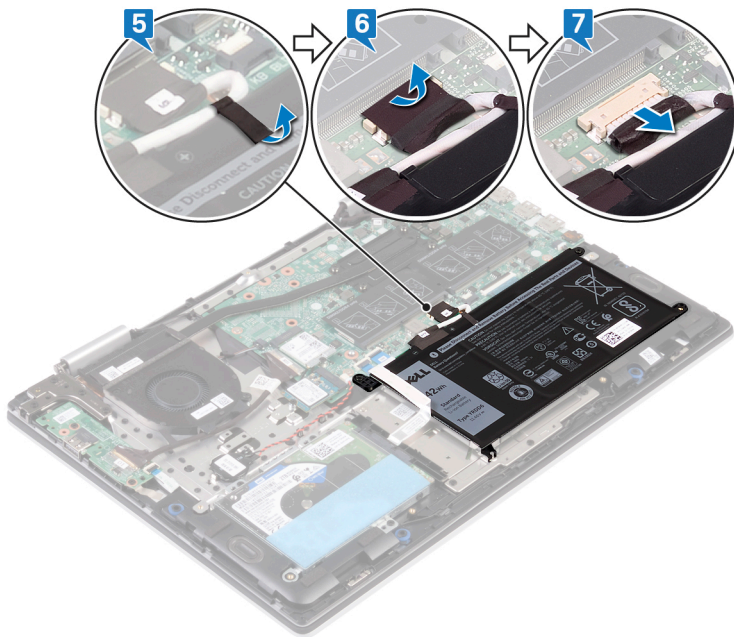
8. Turn the computer over, open the display, then press and hold the power button for 15 seconds to ground the system board.

Replacing the base cover

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Procedure

1. Close the display and turn the computer over. Connect the battery cable to the system board.
2. Adhere the tape that secures the battery cable to the battery-cable connector.
3. Adhere the tape that secures the battery cable to the battery.
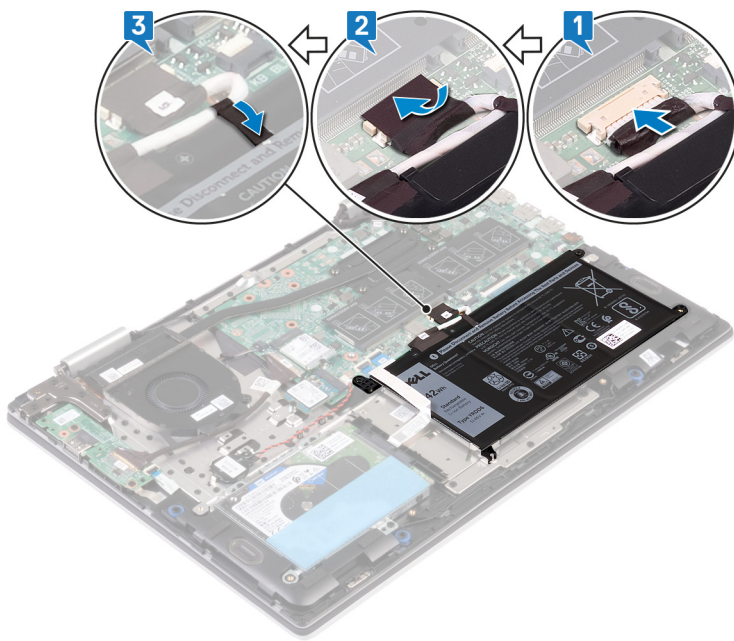
4. Align the tabs on the base cover with the slots on the palm-rest and keyboard assembly and snap the base cover into place.

5. Tighten the three captive screws that secure the base cover to the palm-rest and keyboard assembly.
6. Replace the six screws (M2x6) that secure the base cover to the palm-rest and keyboard assembly.
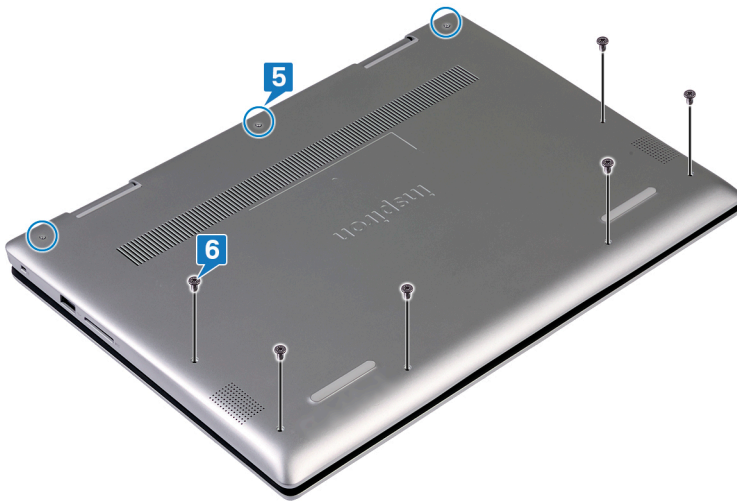
Battery

Removing the battery

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Prerequisites

Remove the base cover.

Procedure

1. Peel off the tape that secures the battery cable to the battery.
2. Peel the tape that secures the battery cable to the battery-cable connector.
3. Disconnect the battery cable from the system board.

4. Remove the two screws (M2x3) that secure the battery to the palm-rest and keyboard assembly.
5. Lift the battery off the palm-rest and keyboard assembly.
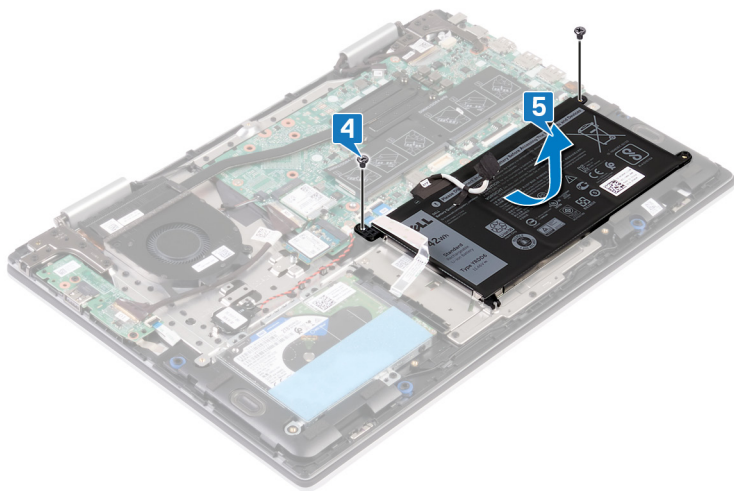
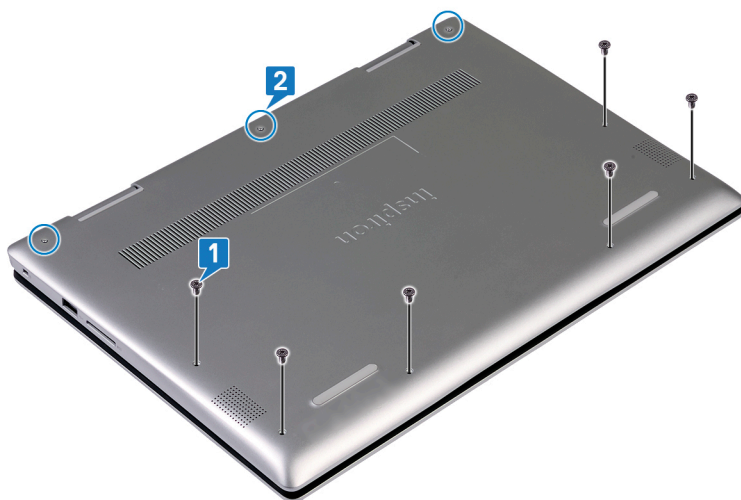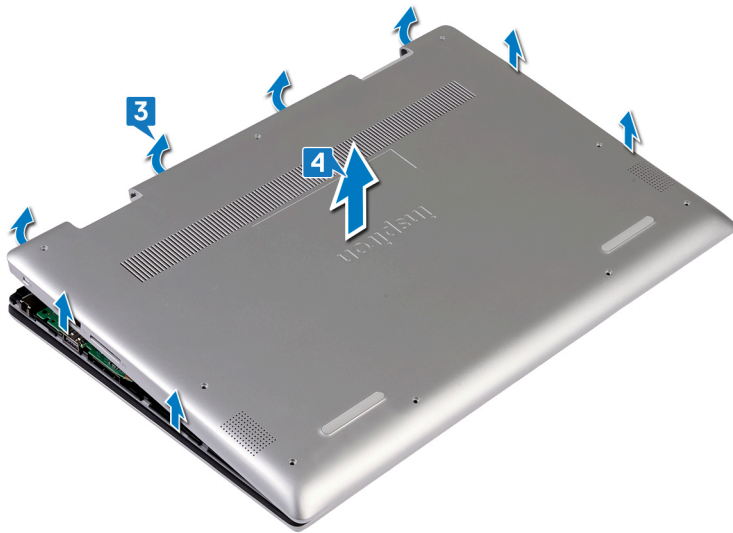# Replacing the battery

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Procedure

1. Align the screw holes on the battery with the screw holes on the palm-rest and keyboard assembly.
2. Replace the two screws (M2x3) that secure the battery to the palm-rest and keyboard assembly.

3. Connect the battery cable to the system board.
4. Adhere the tape that secures the battery cable to the battery-cable connector.
5. Adhere the tape that secures the battery cable to the battery.

Post-requisites

Replace the base cover.

Coin-cell battery

Removing the coin-cell battery

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⚠️ **CAUTION: Removing the coin-cell battery resets the BIOS setup program's settings to default. It is recommended that you note the BIOS setup program's settings before removing the coin-cell battery.**

Procedure

1. Disconnect the coin-cell battery cable from the system board.
2. Remove the coin-cell battery cable from the routing guides on the palm-rest and keyboard assembly.
3. Peel the coin-cell battery off the palm-rest and keyboard assembly.

Replacing the coin-cell battery

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Procedure

1. Adhere the coin-cell battery to the palm-rest and keyboard assembly.
2. Route the coin-cell battery cable through the routing guides on the palm-rest and keyboard assembly.
3. Connect the coin-cell battery cable to the system board.
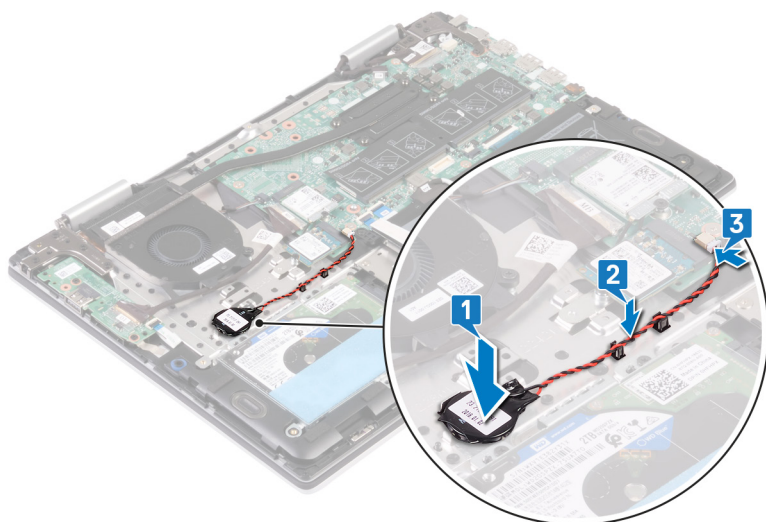
Memory modules

Removing the memory modules

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Prerequisites

Remove the base cover.

Procedure

1. Locate the memory module on the system board and lift the mylar that covers the memory modules.

2. Use your fingertips to carefully spread apart the securing-clips on each end of the memory-module slot until the memory module pops up.
3. Remove the memory module from the memory-module slot.
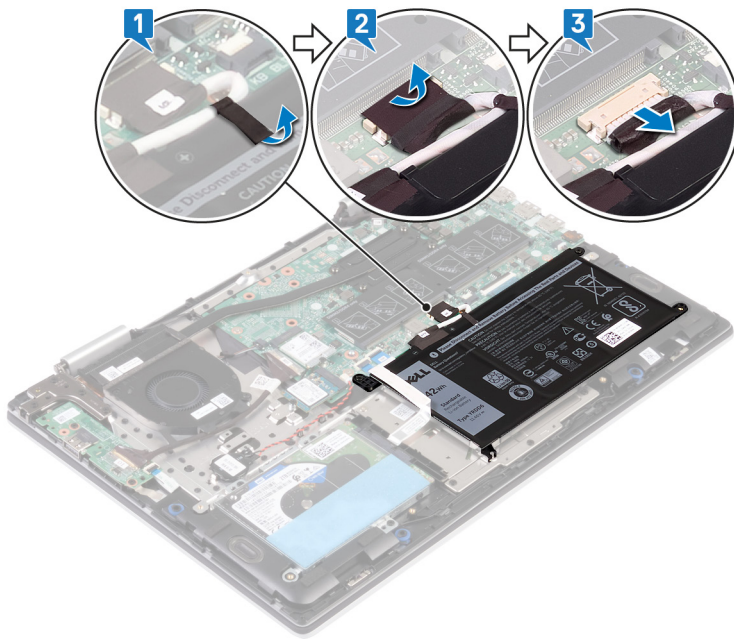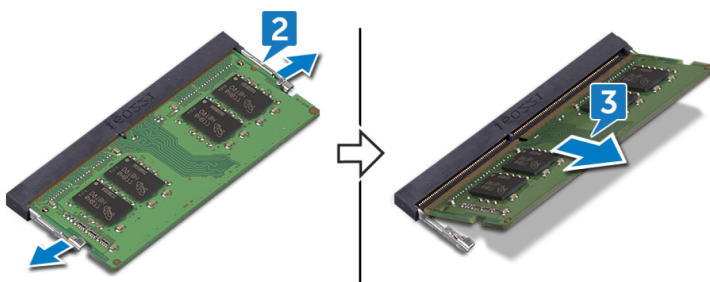

Replacing the memory modules

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Procedure

1. Locate the memory modules on the system board and lift the mylar that covers the memory modules.
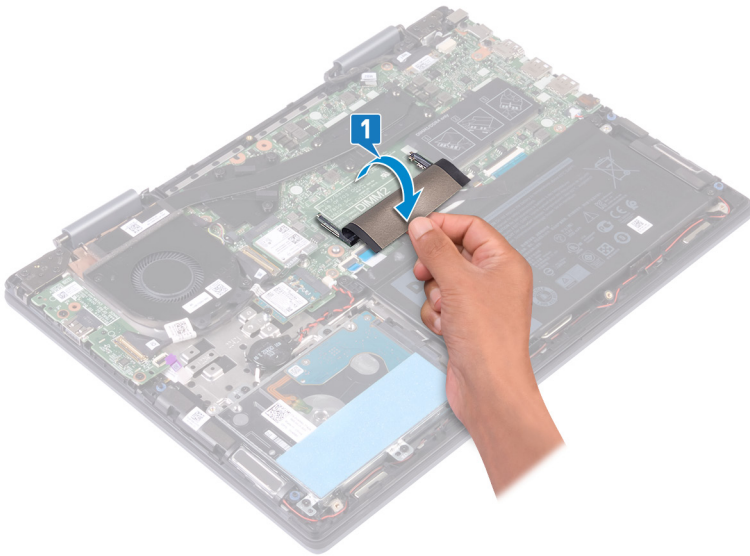
2. Align the notch on the memory module with the tab on the memory-module slot.
3. Slide the memory module firmly into the slot at an angle.
4. Press the memory module down until it clicks into place.

ⓘ **NOTE: If you do not hear the click, remove the memory module and reinstall it.**
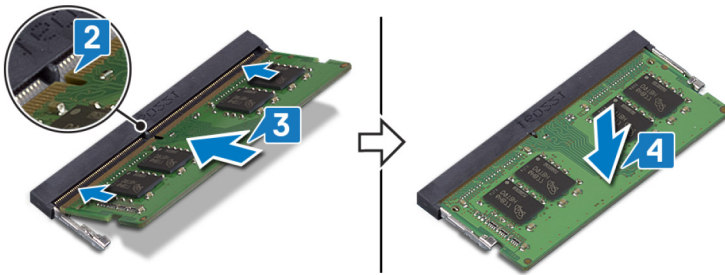
5. Release the mylar that covers the memory modules on the system board.
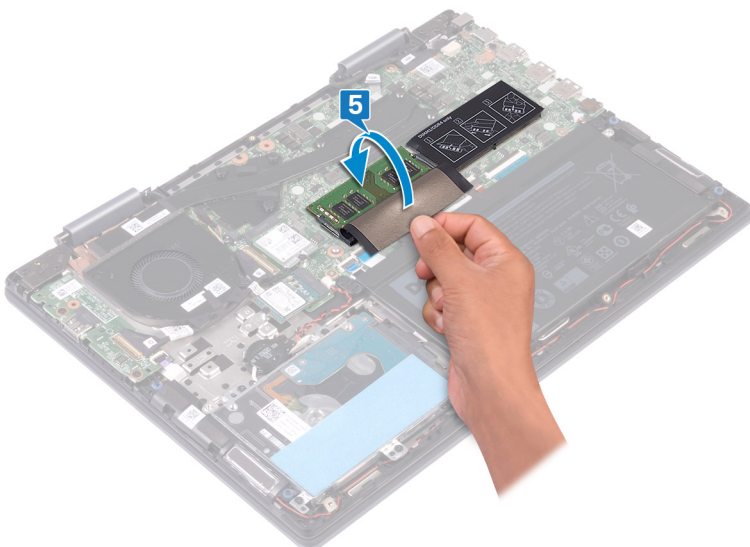
Post-requisites

Replace the base cover.

Solid-state drive/Intel Optane

Removing the solid-state drive/Intel Optane

You need to disable the Intel Optane device before removing it from your computer. For more information about disabling the Intel Optane device, see Disabling Intel Optane memory.
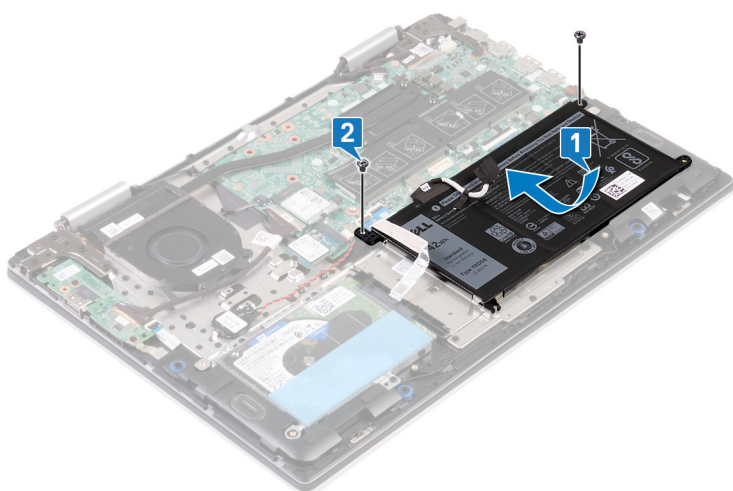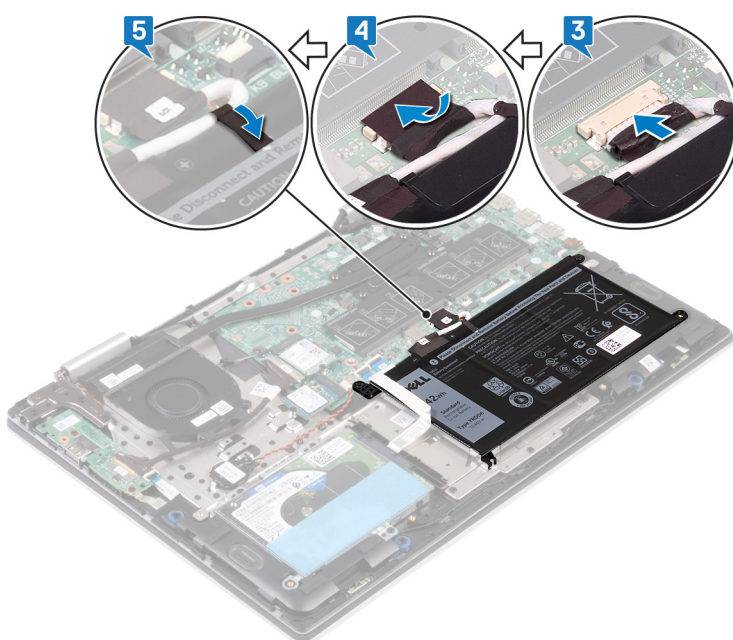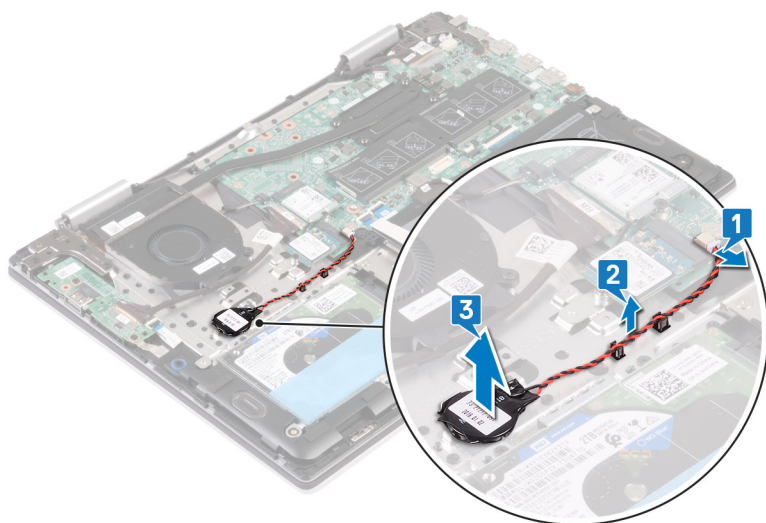
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Prerequisites

⚠ **CAUTION: You need to disable the Intel Optane memory before removing Intel Optane memory module from your computer. For more information about disabling the Intel Optane memory, see Disabling Intel Optane memory.**

Remove the base cover.

Procedure

1. Locate the solid-state drive/Intel Optane memory module on the system board.
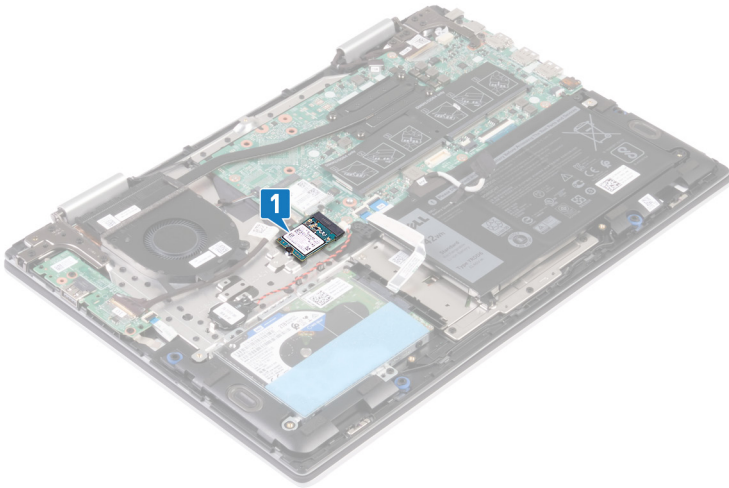
2. Remove the screw (M2x3) that secures the solid-state drive/Intel Optane memory module to the palm-rest and keyboard assembly.
3. Slide and remove the solid-state drive from the solid-state drive slot.

M.2 2280
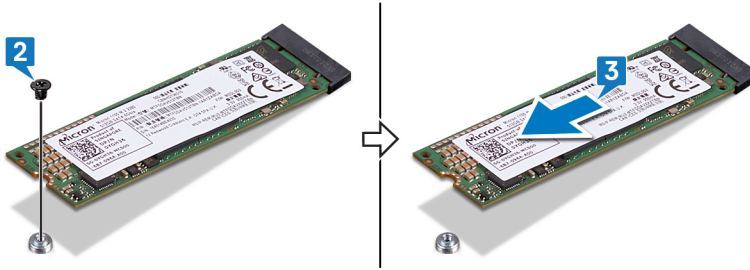
M.2 2230
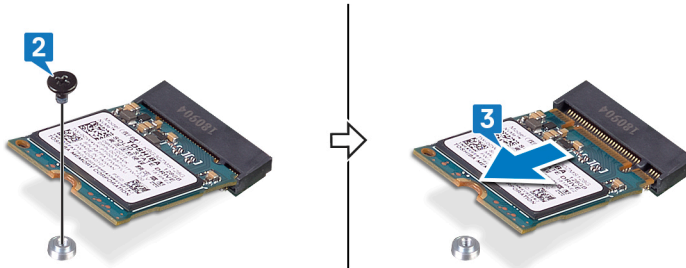
Replacing the solid-state drive/Intel Optane

Enable the Intel Optane device after you replace it. For more information about enabling the Intel Optane device, see Enabling Intel Optane memory.
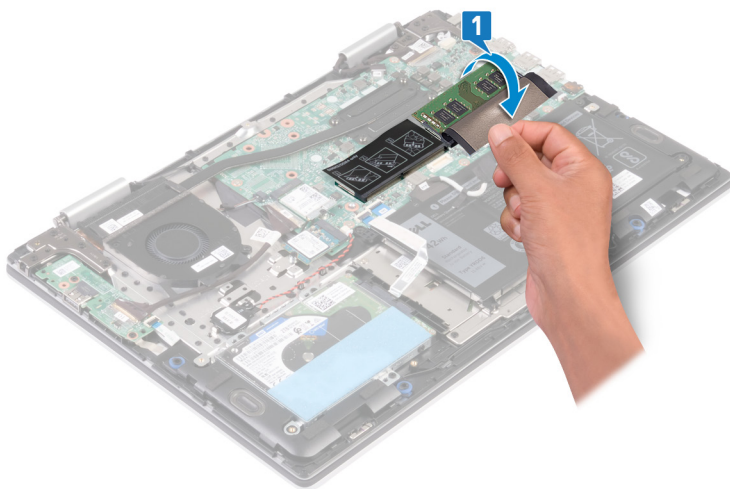
ⓘ **NOTE: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in Before working inside your computer. After working inside your computer, follow the instructions in After working inside your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.**

⚠ **CAUTION: Solid-state drives are fragile. Exercise care when handling the solid-state drive.**

Procedure

ⓘ **NOTE: Follow the procedure to change the location of the screw mount, in case if you are replacing the solid-state drive of a different form factor.**

1. Align the notch on the solid-state drive/Intel Optane memory module with the tab on the solid-state drive/Intel Optane memory module slot.
2. Slide the solid-state drive/Intel Optane memory module firmly into the solid-state drive/Intel Optane memory module slot at an angle.
3. Gently press the other end of the solid-state drive/Intel Optane memory module and replace the screw (M2x3) that secures the solid-state drive/Intel Optane memory module to the palm-rest and keyboard assembly.

M.2 2280
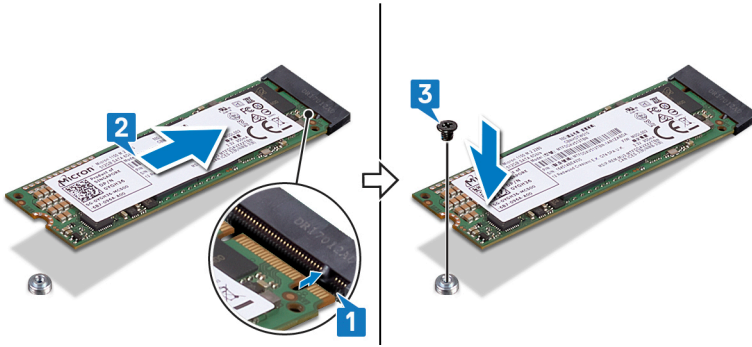
M.2 2230
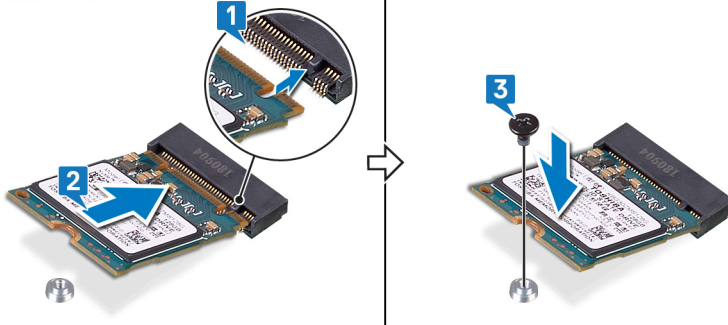
Post-requisites

Replace the base cover.

⚠ **CAUTION: Enable the Intel Optane memory after you replace the Intel Optane memory module. For more information about enabling the Intel Optane memory, see Enabling Intel Optane memory.**

Procedure to move the screw mount

This computer supports two solid-state drive form factors:

- M.2 2230
- M.2 2280

If you are replacing the solid-state drive of a different form factor other than the one removed, see the following procedure to move the location of the screw mount.

1. Remove the screw mount from the palm-rest and keyboard assembly.
2. Turn the screw mount to 180 degrees.
3. Insert the screw mount into the other screw mount slot on the palm-rest and keyboard assembly.

M.2 2230 → M.2 2280
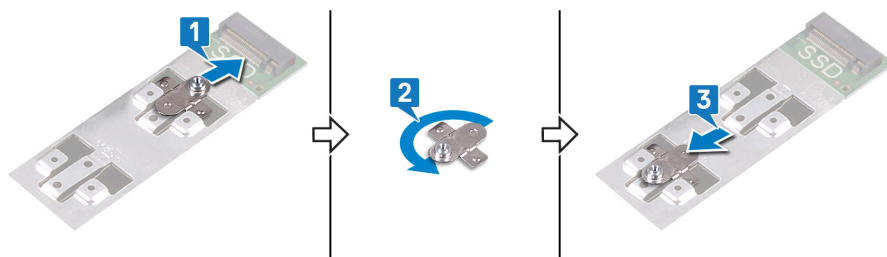
M.2 2280 → M.2 2230
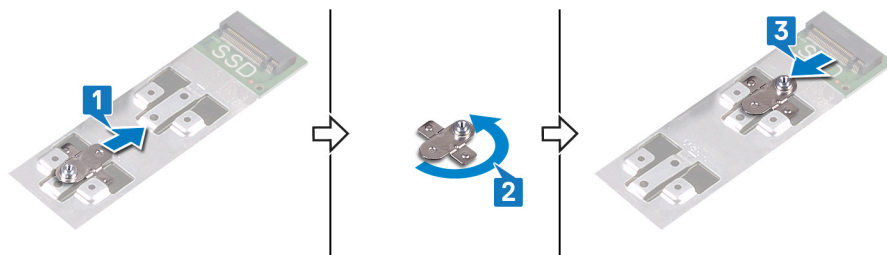
4. Align the notch on the solid-state drive/Intel Optane memory module with the tab on the solid-state drive slot.

5. Slide the solid-state drive/Intel Optane memory module firmly into the solid-state drive slot at an angle.

6. Press the other end of the solid-state drive/Intel Optane memory module and replace the screw (M2x3) that secures the solid-state drive to the palm-rest assembly.

M.2 2280
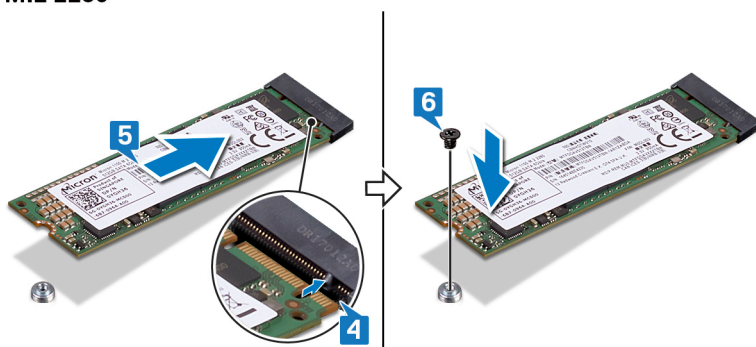
M.2 2230
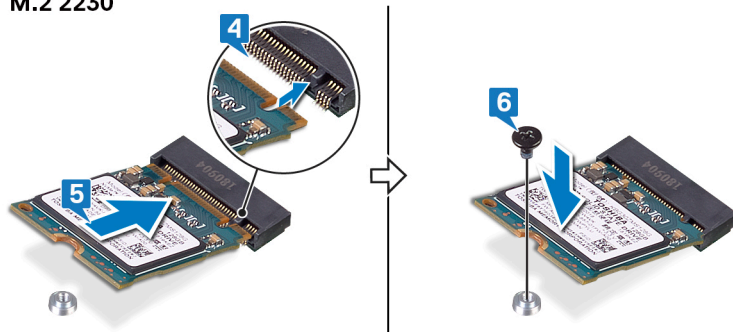
Hard drive

Removing the hard drive

If your computer is using a SATA storage device accelerated by Intel Optane memory, disable Intel Optane before removing the SATA storage device. For more information about disabling the Intel Optane, see Disabling Intel Optane.

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⚠ **CAUTION: Hard drives are fragile. Exercise care when handling the hard drive.**

⚠ **CAUTION: To avoid data loss, do not remove the hard drive while the computer is in sleep or on state.**

Prerequisites

1. Remove the base cover.
2. Remove the battery.

Procedure

1. Open the latch, and disconnect the hard-drive cable from the system board.
2. Remove the three screws (M2x3) that secure the hard-drive assembly to the palm-rest and keyboard assembly.
3. Lift the hard-drive assembly along with its cable off the palm-rest and keyboard assembly.
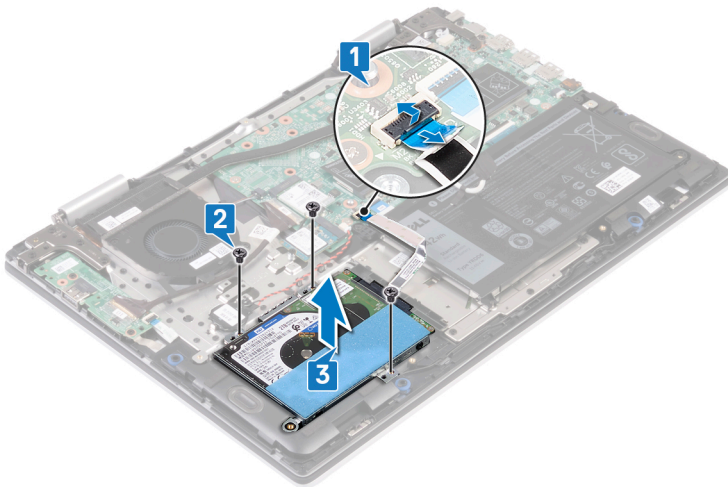
4. Disconnect the interposer from the hard-drive assembly.
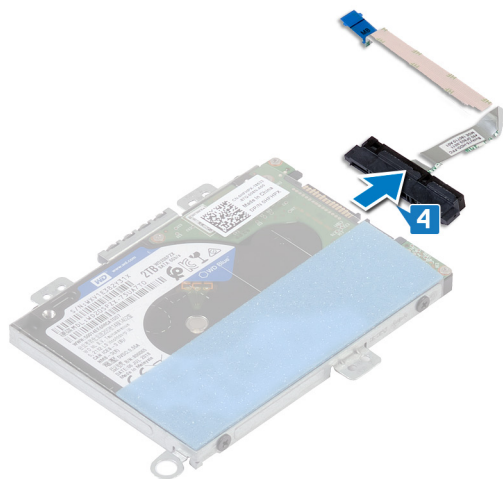
5. Remove the four screws (M3x3) that secure the hard-drive bracket to the hard drive.
6. Remove the hard-drive bracket off the hard drive.
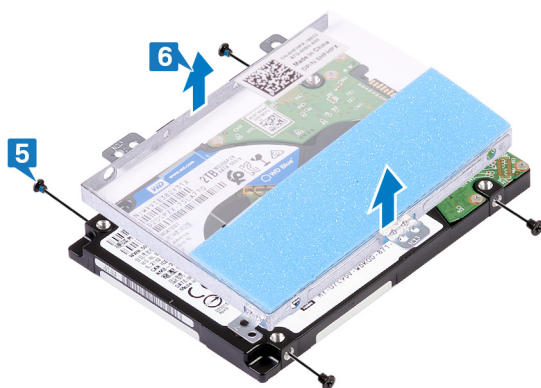
Replacing the hard drive

Enable Intel Optane after replacing the SATA storage. For more information about enabling the Intel Optane, see Enabling Intel Optane.

ⓘ NOTE: **Before working inside your computer, read the safety information that shipped with your computer and follow the steps in Before working inside your computer. After working inside your computer, follow the instructions in After working inside your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.**

⚠ CAUTION: **Hard drives are fragile. Exercise care when handling the hard drive.**

Procedure

1. Align the screw holes on the hard-drive bracket with the screw holes on the hard drive.
2. Replace the four screws (M3x3) that secure the hard-drive bracket to the hard drive.
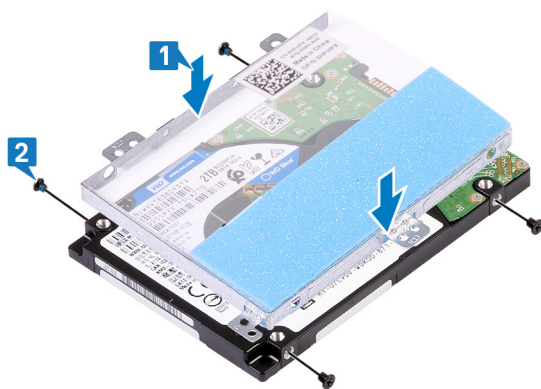
3. Connect the interposer to the hard-drive assembly.
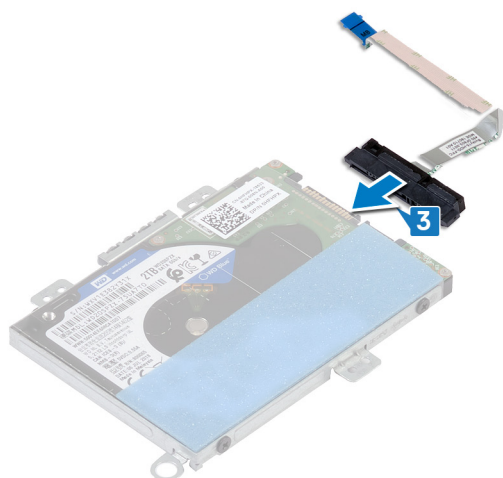
4. Align the screw holes on the hard-drive assembly with the screw holes on the palm-rest and keyboard assembly.
5. Replace the three screws (M2x3) that secure the hard-drive assembly to the palm-rest and keyboard assembly.
6. Connect the hard-drive cable to the connector on the system board.
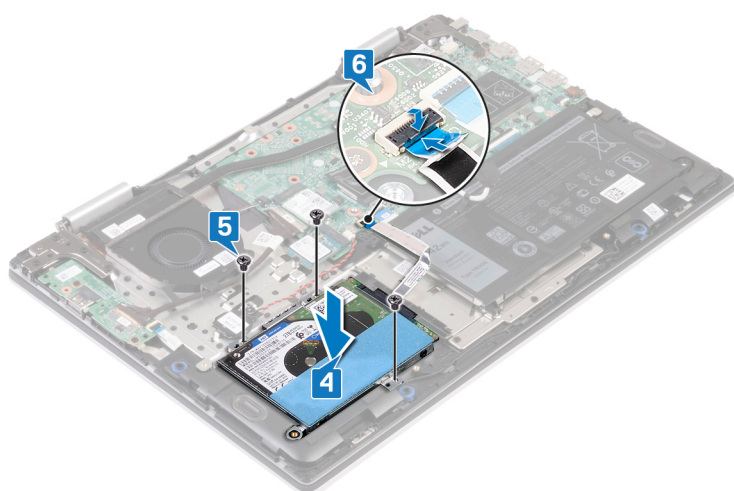
Post-requisites

1. Replace the battery.
2. Replace the base cover.

Heat sink

Removing the heat sink

ⓘ **NOTE: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in Before working inside your computer. After working inside your computer, follow the instructions in After working inside your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.**

ⓘ **NOTE: The heat sink may become hot during normal operation. Allow sufficient time for the heat sink to cool before you touch it.**

⚠ **CAUTION: For maximum cooling of the processor, do not touch the heat transfer areas on the heat sink. The oils in your skin can reduce the heat transfer capability of the thermal grease.**

Prerequisites

Remove the base cover.

Procedure

1. In reverse order (as indicated on the heat-sink), loosen the four captive screws that secure the heat sink to the system board.

   ⓘ **NOTE: The number of screws may vary depending on the configuration ordered.**

2. Lift the heat sink off the system board.

Replacing the heat sink

ⓘ **NOTE: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in Before working inside your computer. After working inside your computer, follow the instructions in After working inside your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.**

⚠ **CAUTION: Incorrect alignment of the heat sink can damage the system board and processor.**

ⓘ **NOTE: If either the system board or the heat sink is replaced, use the thermal pad/paste provided in the kit to ensure that thermal conductivity is achieved.**

Procedure

1. Place the heat sink on the system board as illustrated, aligning the screw holes on the heat sink with the screw holes on the system board.
2. In sequential order (as indicated on the heat-sink), tighten the four captive screws that secure the heat sink to the system board.

Post-requisites

Replace the base cover.

Fan

Removing the fan

(i) **NOTE: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in Before working inside your computer. After working inside your computer, follow the instructions in After working inside your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.**

Prerequisites

Remove the base cover.

Procedure

1. Peel off the tape that secures the fan cable to the palm-rest and keyboard assembly.
2. Disconnect the fan cable from the system board.
3. Remove the two screws (M2x3) that secure the fan to the palm-rest and keyboard assembly.
4. Lift the fan off the palm-rest and keyboard assembly.

Replacing the fan

ⓘ **NOTE: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in Before working inside your computer. After working inside your computer, follow the instructions in After working inside your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.**

Procedure

1. Align the screw holes on the fan with the screw holes on the palm-rest and keyboard assembly.
2. Replace the two screws (M2x3) securing the fan to the palm-rest and keyboard assembly.
3. Connect the fan cable to the system board.
4. Adhere the tape that secures the fan cable to the palm-rest and keyboard assembly.

Post-requisites

Replace the base cover.

Speakers

Removing the speakers

ⓘ NOTE: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in **Before working inside your computer**. After working inside your computer, follow the instructions in **After working inside your computer**. For more safety best practices, see the Regulatory Compliance home page at **www.dell.com/regulatory_compliance**.

Prerequisites

Remove the base cover.

Procedure

1. Disconnect the speaker cable from the system board.
2. Note the cable routing, and remove the speaker cable from the routing guides on the palm-rest and keyboard assembly.
3. Remove the speakers, along with the cable from the palm-rest and keyboard assembly.

Replacing the speakers

ⓘ NOTE: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in **Before working inside your computer**. After working inside your computer, follow the instructions in **After working inside your computer**. For more safety best practices, see the Regulatory Compliance home page at **www.dell.com/regulatory_compliance**.

Procedure

1. Using the alignment posts, align and place the speakers on the palm-rest and keyboard assembly.

    ⓘ NOTE: **Replace the rubber grommets if they are pushed up while replacing the speakers.**

2. Route the speaker cable through the routing guides on the palm-rest and keyboard assembly.
3. Connect the speaker cable to the system board.

Post-requisites

Replace the base cover.

I/O board

Removing the I/O board

ⓘ NOTE: **Before working inside your computer, read the safety information that shipped with your computer and follow the steps in Before working inside your computer. After working inside your computer, follow the instructions in After working inside your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.**

Prerequisites

Remove the base cover.

Procedure

1. Peel off the tape that secures the I/O-board cable to the palm-rest and keyboard assembly.
2. Open the latch, and disconnect the I/O-board cable from the I/O board.
3. Disconnect the fingerprint-reader board cable from the I/O board.
4. Remove the two screws (M2x3) that secure the I/O board to the palm-rest and keyboard assembly.
5. Lift the I/O board off the palm-rest and keyboard assembly.

Replacing the I/O board
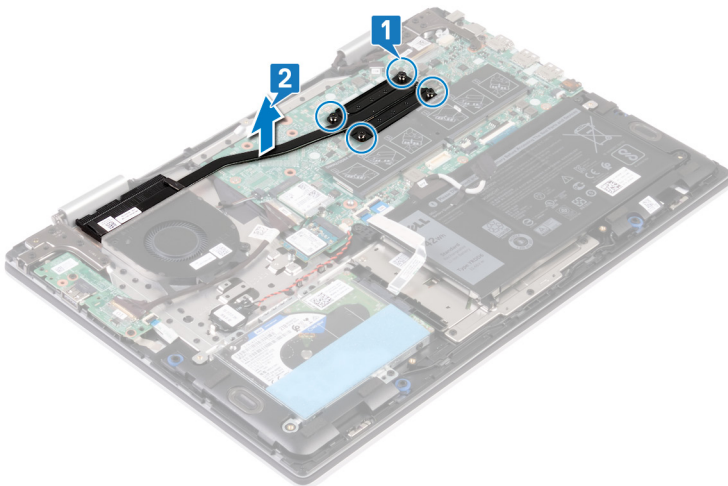
ⓘ **NOTE: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in Before working inside your computer. After working inside your computer, follow the instructions in After working inside your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.**

Procedure

1. Place the I/O board on the palm-rest and keyboard assembly, and then align the screw holes on the I/O board with the screw holes on the palm-rest and keyboard assembly.
2. Replace the two screws (M2x3) that secure the I/O board to the palm-rest and keyboard assembly.
3. Slide the fingerprint-reader cable into the connector on the I/O board and close the latch to secure the cable.
4. Slide the I/O-board cable into the connector on the I/O board and close the latch to secure the cable.
5. Adhere the tape that secures the I/O-board cable to the palm-rest and keyboard assembly.

Post-requisites

Replace the base cover.

Power-adapter port

Removing the power-adapter port
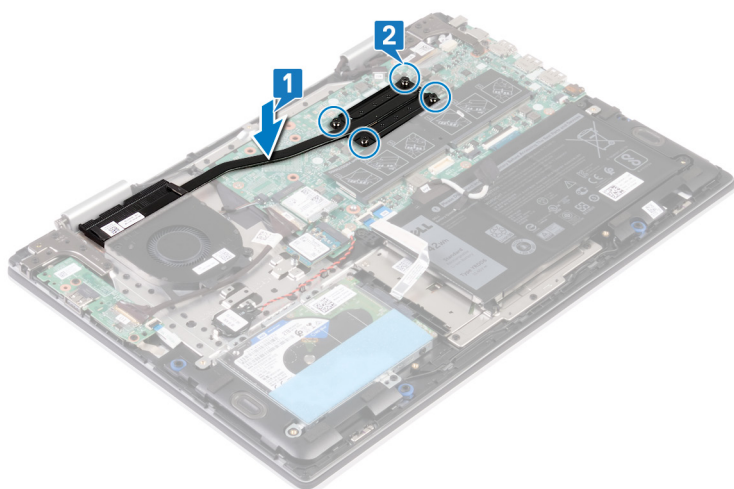
ⓘ **NOTE: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in Before working inside your computer. After working inside your computer, follow the instructions in After working inside your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.**

Prerequisites

Remove the base cover.

Procedure

1. Disconnect the power-adapter port cable from the system board.
2. Remove the screw (M2x3) that secures the power-adapter port to the palm-rest and keyboard assembly.
3. Lift the power-adapter port along with its cable off the palm-rest and keyboard assembly.
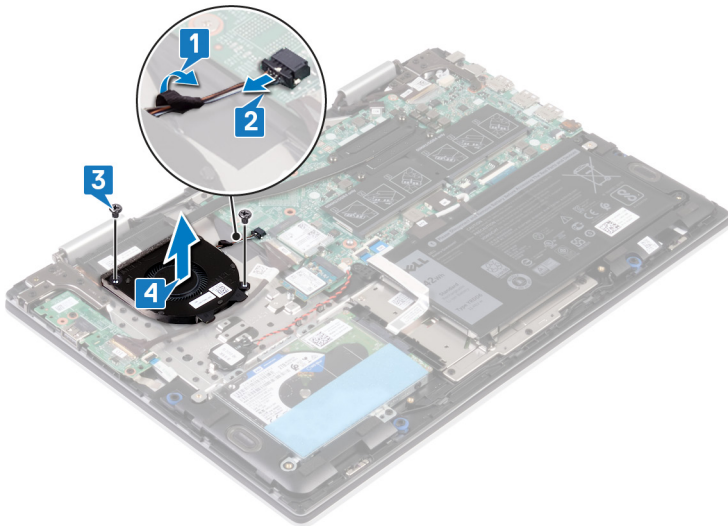
Replacing the power-adapter port

(i) **NOTE: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in Before working inside your computer. After working inside your computer, follow the instructions in After working inside your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.**

Procedure

1. Place the power-adapter port into the slot on the palm-rest and keyboard assembly, and then align the screw hole on the power-adapter port with the screw hole on the palm-rest and keyboard assembly.
2. Replace the screw (M2x3) that secures the power-adapter port to the palm-rest and keyboard assembly.
3. Connect the power-adapter port cable to the system board.

Post-requisites

Replace the base cover.

Wireless card

Removing the wireless card

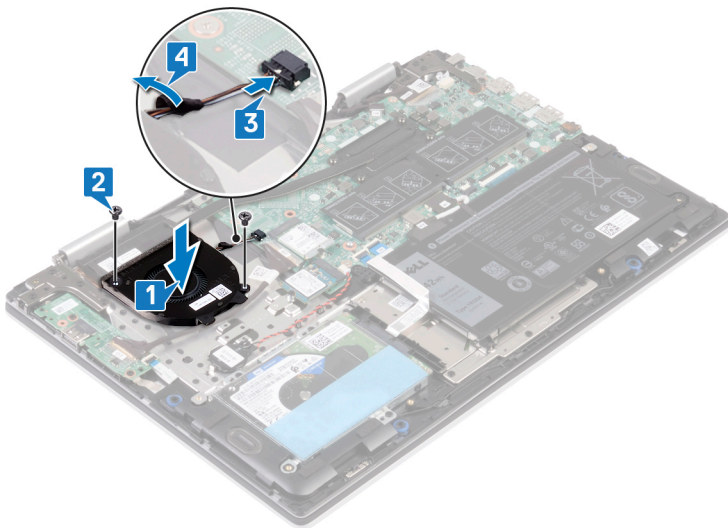ⓘ **NOTE: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in Before working inside your computer. After working inside your computer, follow the instructions in After working inside your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.**

Prerequisites

Remove the base cover.

Procedure

1. Locate the wireless card on the system board.

2. Remove the screw (M2x3) that secures the wireless-card bracket and wireless card to the system board.
3. Lift the wireless-card bracket off the wireless card.
4. Disconnect the antenna cables from the wireless card.
5. Slide and remove the wireless card from the wireless-card slot.
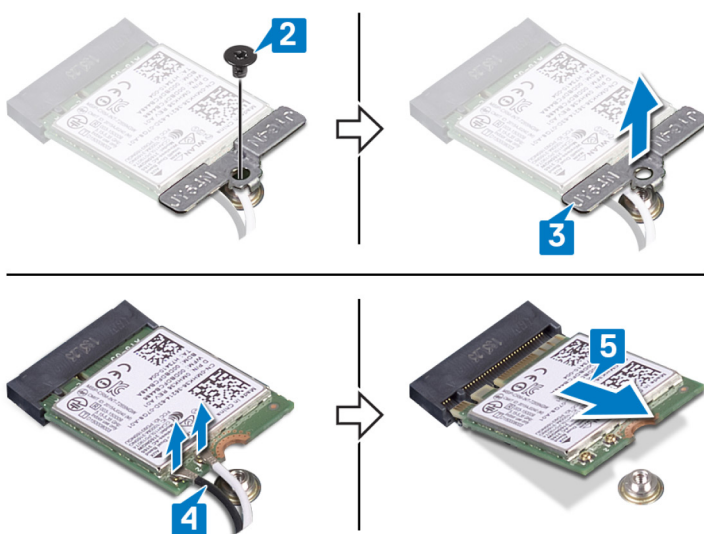
Replacing the wireless card

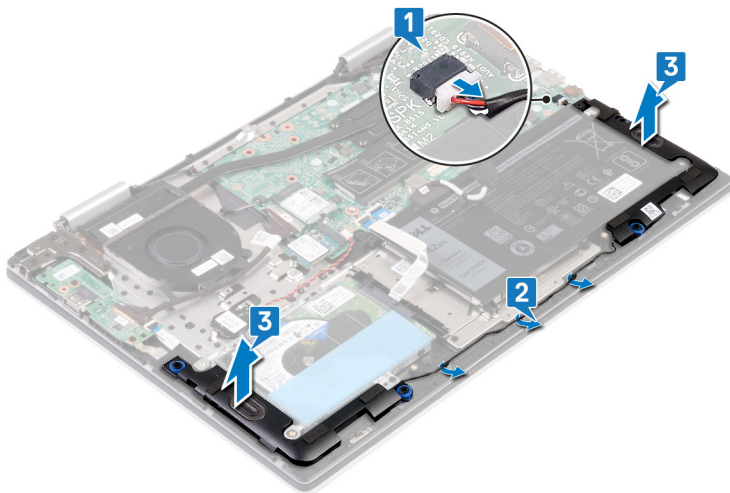> ⓘ NOTE: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in **Before working inside your computer**. After working inside your computer, follow the instructions in **After working inside your computer**. For more safety best practices, see the Regulatory Compliance home page at **www.dell.com/regulatory_compliance**.

Procedure

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

1. Connect the antenna cables to the wireless card.
2. Align the notch on the wireless card with the tab on the wireless-card slot and slide the wireless card at an angle into the wireless-card slot.

   The following table provides the antenna-cable color scheme for the wireless card supported by your computer.

   Table 2. Antenna-cable color scheme

Connectors on the wireless card	Antenna-cable color
Main (white triangle)	White
Auxiliary (black triangle)	Black

3. Align the screw hole on the wireless-card bracket with the screw hole on the wireless card and the system board.
4. Replace the screw (M2x3) that secures the wireless-card bracket and wireless card to the system board.
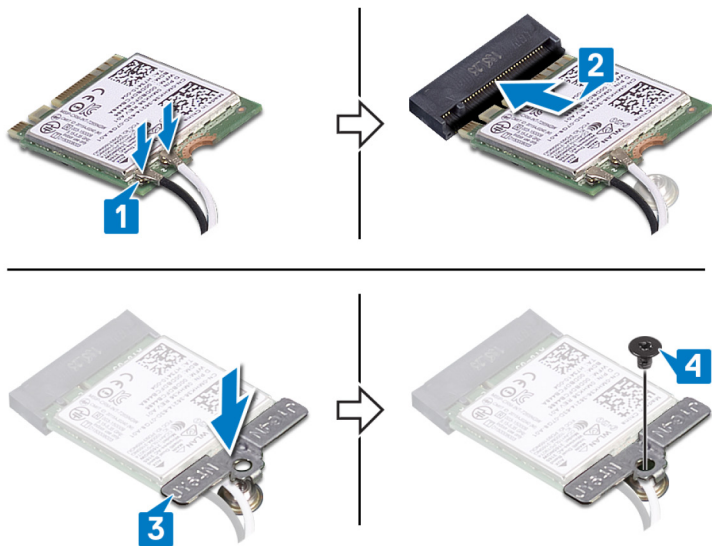
Post-requisites
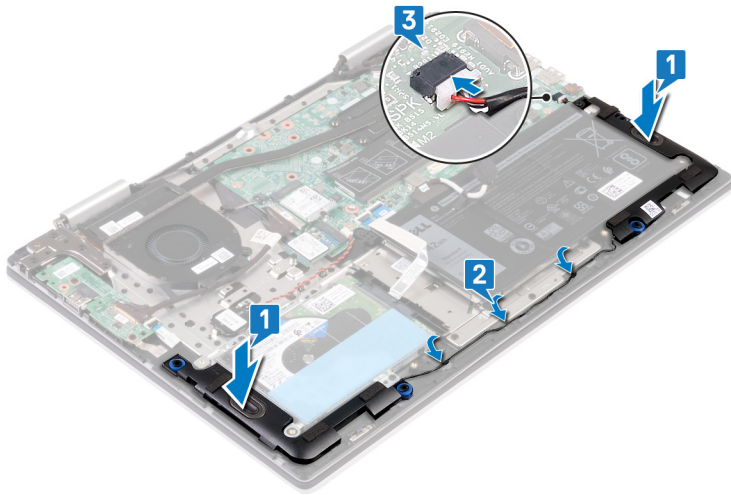
Replace the base cover.

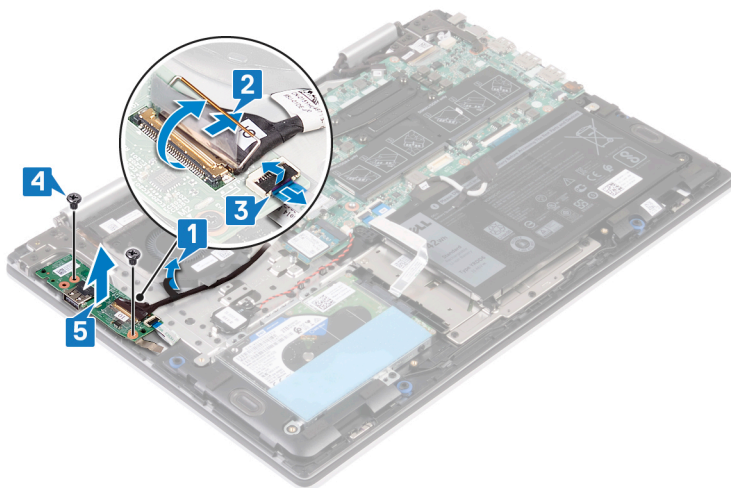# Display assembly

Removing the display assembly

> ⓘ NOTE: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in **Before working inside your computer**. After working inside your computer, follow the instructions in **After working inside your computer**. For more safety best practices, see the Regulatory Compliance home page at **www.dell.com/regulatory_compliance**.

Prerequisites

1. Remove the base cover.
2. Remove the wireless card.

Procedure

1. Peel off the tape that secures the fan cable to the palm-rest and keyboard assembly.
2. Disconnect the fan cable from the system board.
3. Open the latch, and disconnect the I/O cable from the system board.
4. Peel off the tape that secures the antenna cable to the palm-rest and keyboard assembly.
5. Peel off the tape that secures the touchscreen cable and the display cable to their respective connectors on the system board.
6. Open the latch, and disconnect the touchscreen cable from the system board.
7. Open the latch, and disconnect the display cable from the system board.

8. Turn the computer over, and open the display as far as possible. Then place the computer face down on a flat surface.

   ⚠ **CAUTION: Place the computer on a soft and clean surface to avoid scratching the display.**

9. Remove the antenna cables from the routing guides on the palm-rest and keyboard assembly.
10. Remove the six screws (M2.5x5) that secure the display assembly to the palm-rest and keyboard assembly.
11. Gently lift the display assembly off the palm-rest and keyboard assembly.
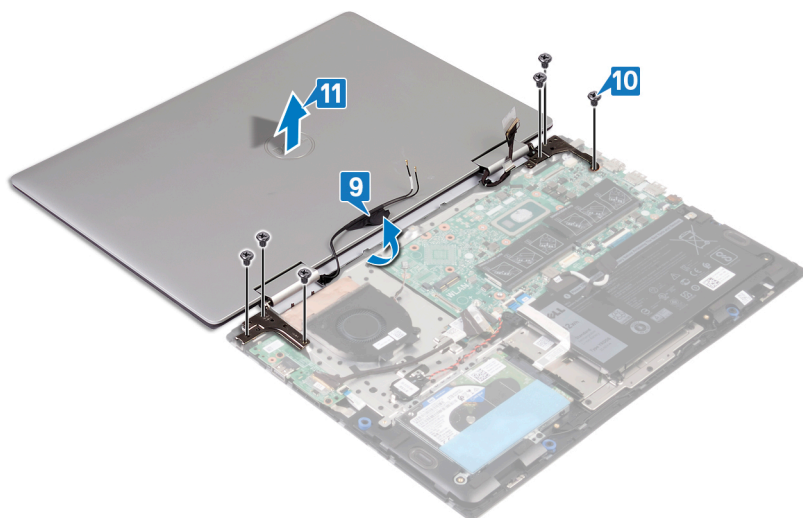
Replacing the display assembly

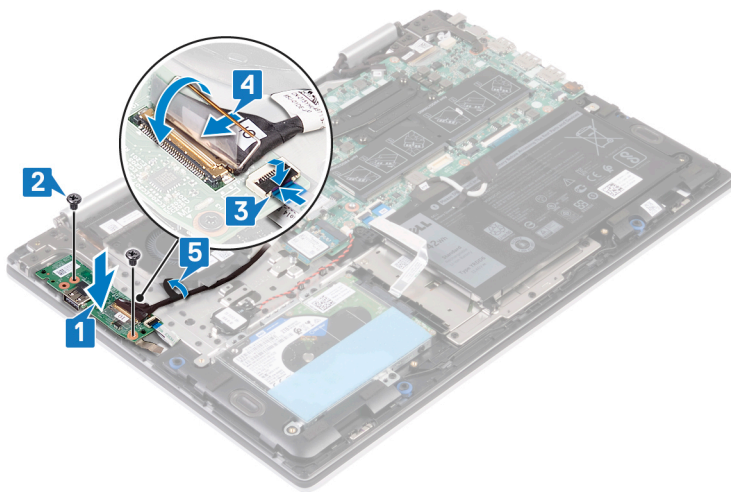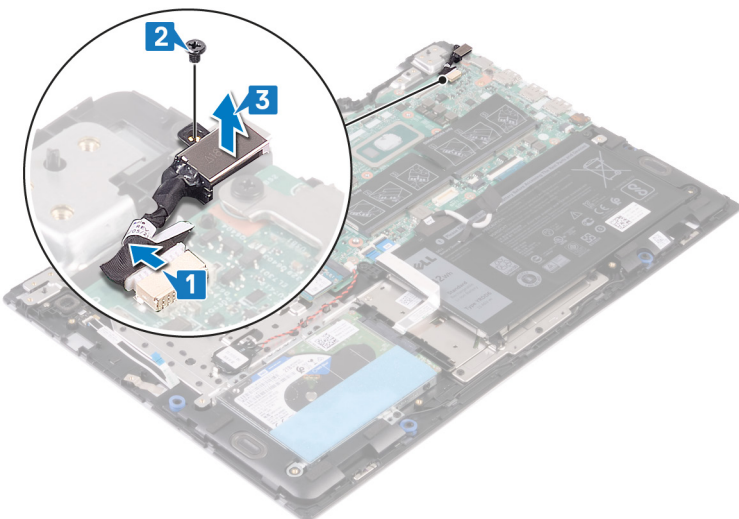(i) **NOTE: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in Before working inside your computer. After working inside your computer, follow the instructions in After working inside your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.**

Procedure

1. ⚠ **CAUTION: Place the computer on a soft and clean surface to avoid scratching the display.**

   Align the screw holes on the display assembly with the screw holes on the palm-rest and keyboard assembly.
2. Replace the six screws (M2.5x5) that secure the display assembly to the palm-rest and keyboard assembly.
3. Route the antenna cables through the routing guides on the palm-rest and keyboard assembly.
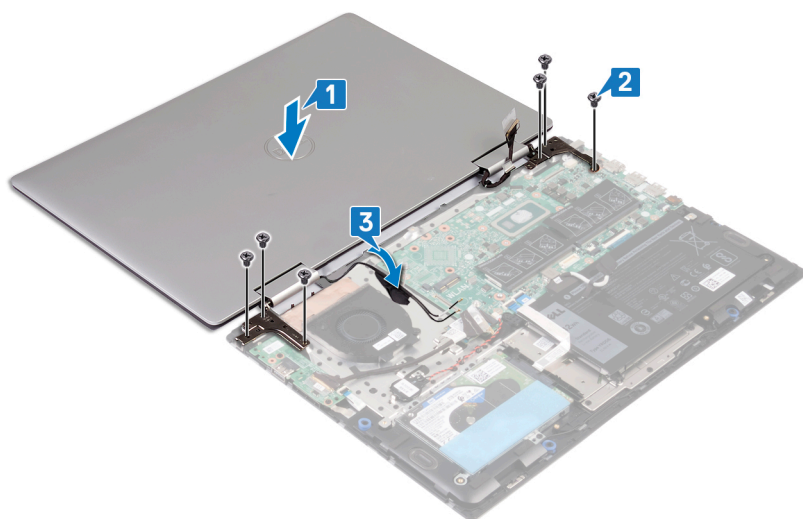
4. Close the display, and turn the computer over.
5. Adhere the tape that secures the antenna cable to the palm-rest and keyboard assembly.
6. Connect the fan cable to the system board.
7. Adhere the tape that secures the fan cable to the palm-rest and keyboard assembly.
8. Slide the I/O cable into the slot on the system board and close the latches to secure the cable.
9. Slide the touchscreen cable into the slot on the system board and close the latch to secure the cable.
10. Slide the display cable into the slot on the system board and close the latch to secure the cable.
11. Adhere the tape that secures the touchscreen cable to the system board.
12. Adhere the tape that secures the display cable to the system board.
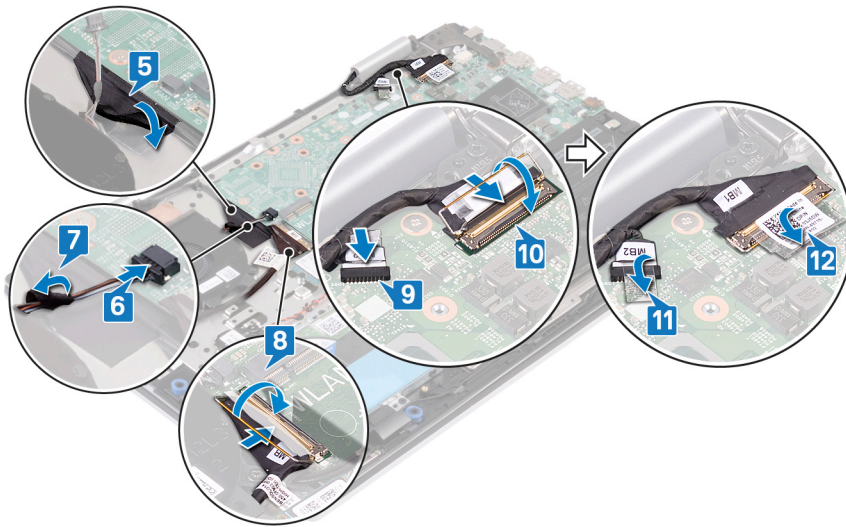
Post-requisites

1. Replace the wireless card.
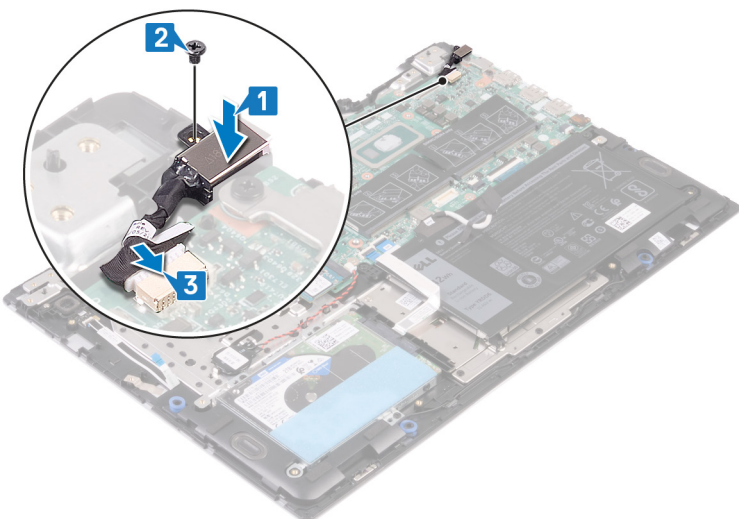2. Replace the base cover.
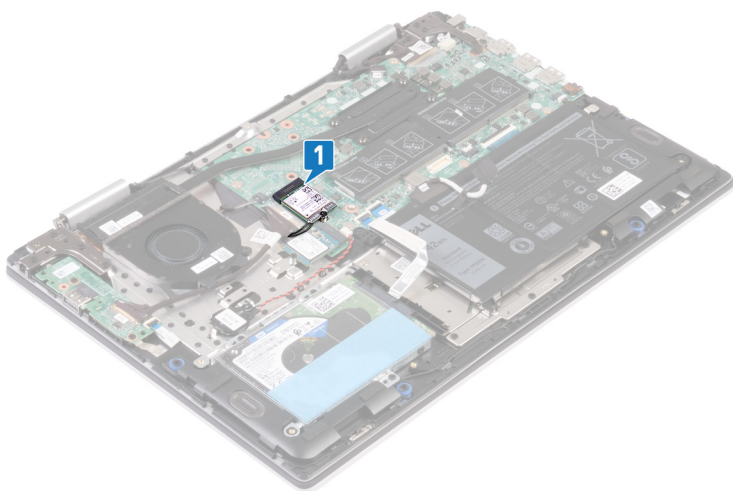
Power button

Removing the power button

ⓘ **NOTE: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in Before working inside your computer. After working inside your computer, follow the instructions in After working inside your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.**

Prerequisites

1. Remove the base cover.
2. Remove the I/O board.
3. Remove the wireless card.
4. Remove the display assembly.

Procedure

1. ⓘ **NOTE: Your computer is shipped with either a power button or power button with fingerprint reader, depending on the configuration ordered.**

   Remove the two screws (M2x2.5) that secure the power button to the palm-rest and keyboard assembly.

2. ⓘ **NOTE: This step is applicable only on the computers that are shipped with fingerprint reader.**

   Open the latch, and disconnect the fingerprint-reader cable from the power button cable connector.

3. Peel off the power button or power button with fingerprint reader from the palm-rest and keyboard assembly.
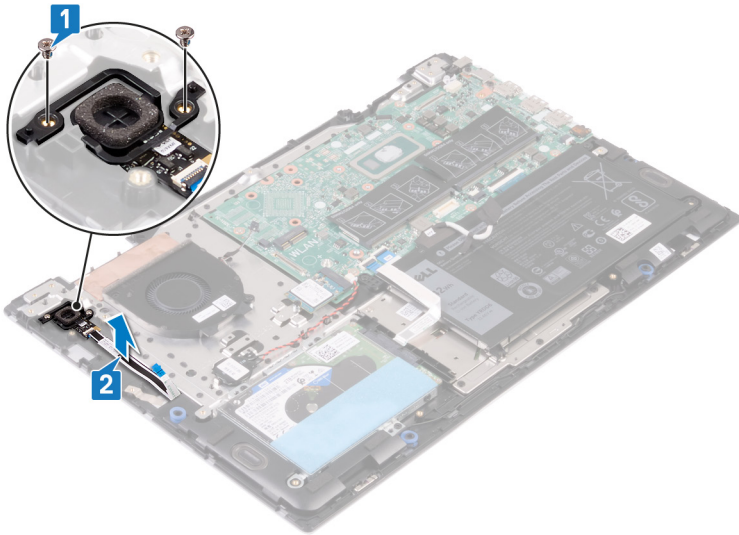
Replacing the power button

(i) **NOTE: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in Before working inside your computer. After working inside your computer, follow the instructions in After working inside your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.**

Procedure

1. Place the power button or power button with fingerprint reader into the slot on the palm-rest and keyboard assembly.
2. (i) **NOTE: This step is applicable only on the computers that are shipped with fingerprint reader.**

   Open the power button cable connector latch, reconnect the fingerprint-reader cable and close the latch.
3. Replace the two screws (M2x2.5) that secure the power button to the palm-rest and keyboard assembly.

Post-requisites

1. Replace the display assembly.
2. Replace the wireless card.
3. Replace the I/O board.
4. Replace the base cover.

System board

Removing the system board

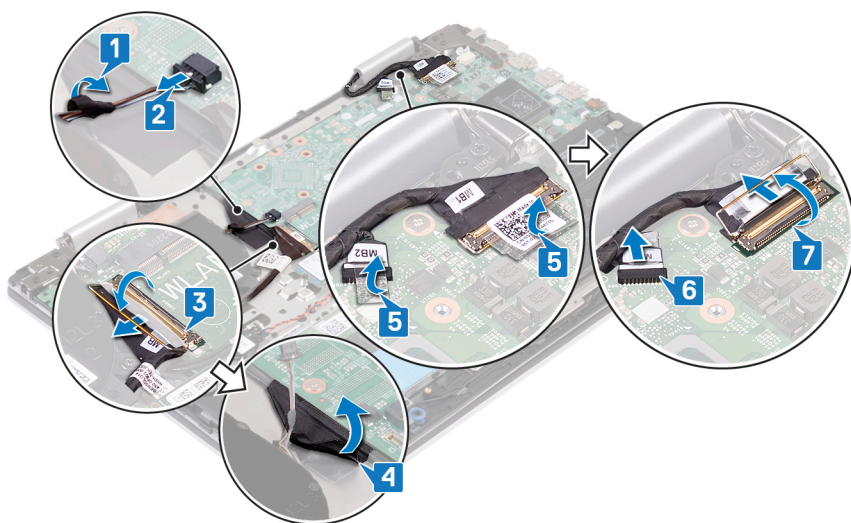ⓘ **NOTE: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in Before working inside your computer. After working inside your computer, follow the instructions in After working inside your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.**

ⓘ **NOTE: Your computer's Service Tag is stored in the system board. You must enter the Service Tag in the BIOS setup program after you replace the system board.**

ⓘ **NOTE: Replacing the system board removes any changes you have made to the BIOS using the BIOS setup program. You must make the appropriate changes again after you replace the system board.**

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

Prerequisites

1. Remove the base cover.
2. Remove the battery.
3. Remove the memory modules.
4. Remove the coin-cell battery.
5. Remove the solid-state drive/Intel Optane memory module.
6. Remove the fan.
7. Remove the heat sink.
8. Remove the wireless card.
9. Remove the display assembly.

Procedure

1. Open the latch, and disconnect the I/O-board cable from the system board.
2. Disconnect the power-adapter port cable from the system board.
3. Remove the two screws (M2x3) that secure the USB Type-C port bracket to the system board and palm-rest assembly.
4. Lift the USB Type-C port bracket off the system board.
5. Disconnect the speaker cable from the system board.
6. Open the latch, and disconnect the keyboard cable from the system board.
7. Open the latch, and disconnect the touchpad cable from the system board.
8. Open the latch, and disconnect the hard-drive cable from the system board.
9. Disconnect the coin-cell battery cable from the system board.

10. Remove the five screws (M2x2) that secure the system board to the palm-rest and keyboard assembly.
11. Lift the system board off the palm-rest and keyboard assembly.


Replacing the system board

ⓘ **NOTE: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in Before working inside your computer. After working inside your computer, follow the instructions in After working inside your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.**

ⓘ **NOTE: Your computer's Service Tag is stored in the system board. You must enter the Service Tag in the BIOS setup program after you replace the system board.**

ⓘ **NOTE: Replacing the system board removes any changes you have made to the BIOS using the BIOS setup program. You must make the appropriate changes again after you replace the system board.**

Procedure

1. Align the screw holes on the system board with the screw holes on the palm-rest and keyboard assembly.
2. Replace the five screws (M2x2) that secure the system board to the palm-rest and keyboard assembly.
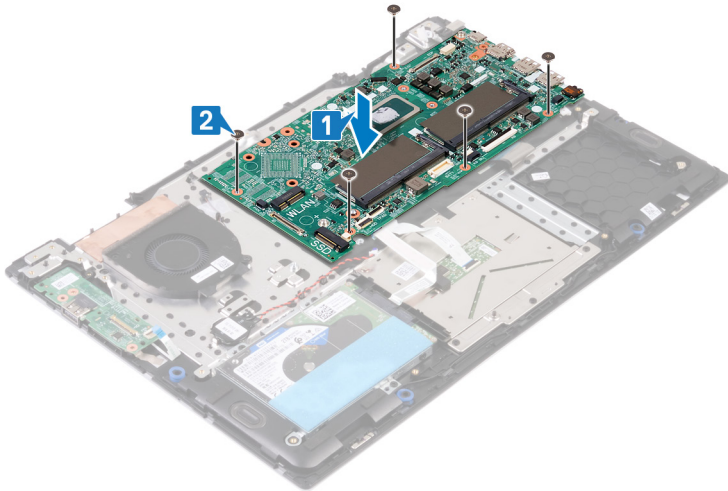
3. Slide the I/O-board cable into the connector on the system board and close the latch to secure the cable.
4. Connect the power-adapter port cable to the system board.
5. Align the screw holes on the USB Type-C port bracket with the screw holes on the system board.
6. Replace the two screws (M2x3) that secure the USB Type-C port bracket to the system board.
7. Connect the speaker cable to the system board.
8. Slide the keyboard cable into the connector on the system board and close the latch to secure the cable.
9. Slide the touchpad cable into the connector on the system board and close the latch to secure the cable.
10. Slide the hard-drive cable into the connector on the system board and close the latch to secure the cable.
11. Connect the coin-cell battery to the system board.

Post-requisites

1. Replace the display assembly.

2. Replace the wireless card.
3. Replace the heat sink.
4. Replace the fan.
5. Replace the solid-state drive/Intel Optane memory module.
6. Replace the coin-cell battery.
7. Replace the memory modules.
8. Replace the battery.
9. Replace the base cover.

Touchpad

Removing the touchpad

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Prerequisites

1. Remove the base cover.
2. Remove the battery.

Procedure

1. Open the latch, and disconnect the touchpad cable from the system board.
2. Peel the tapes that secure the touchpad to the palm-rest and keyboard assembly.
3. Remove the three screws (M2x3) that secure the touchpad bracket to the palm-rest and keyboard assembly.
4. Lift the touchpad bracket off the palm-rest and keyboard assembly.
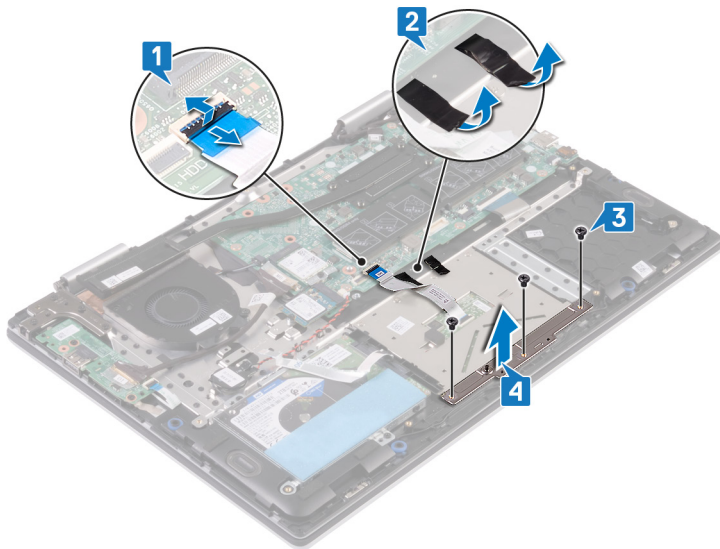
5. Remove the four screws (M2x2) that secure the touchpad to the palm-rest and keyboard assembly.
6. Lift the touchpad, along with the cable, at an angle from under the touch-pad bracket off the palm-rest and keyboard assembly.
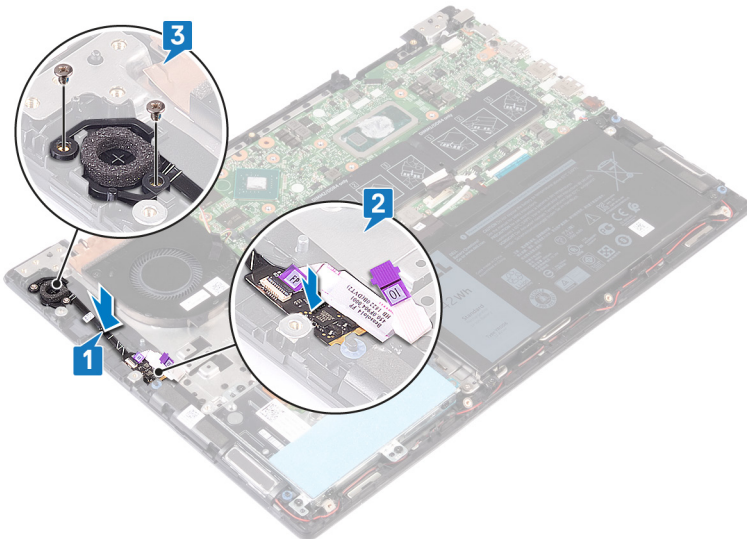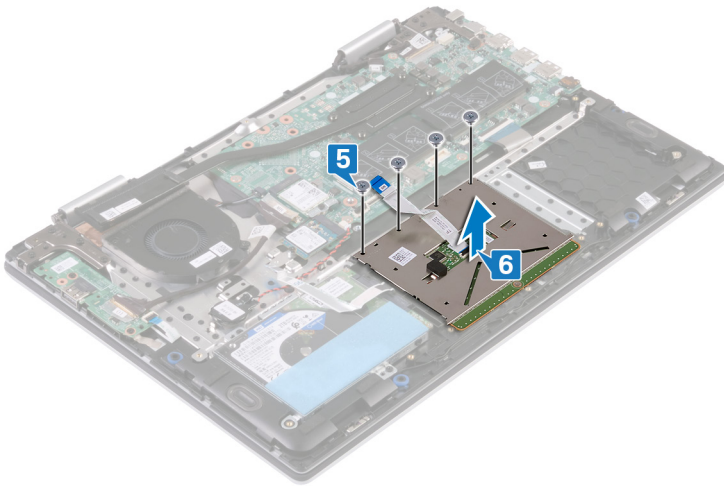
Replacing the touchpad

(i) **NOTE: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in Before working inside your computer. After working inside your computer, follow the instructions in After working inside your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.**

Procedure

1. Align the screw holes on the touchpad with the screw holes on the palm-rest and keyboard assembly.
2. Replace the four screws (M2x2) that secure the touchpad to the palm-rest and keyboard assembly.
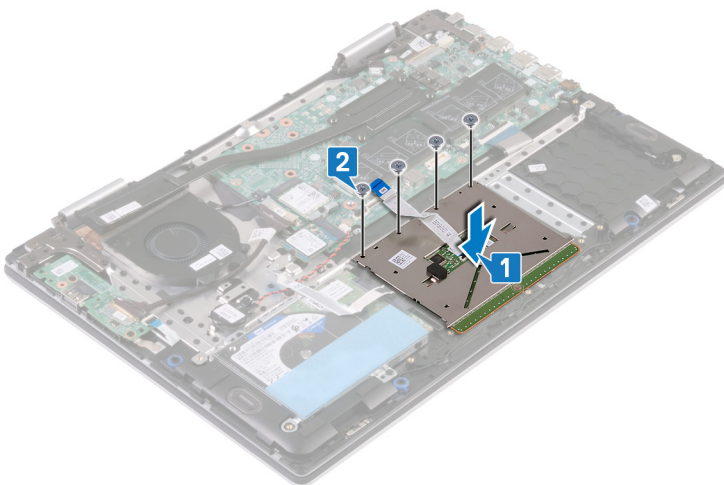
3. Align the screw holes on the touchpad bracket with the screw holes on the touchpad.
4. Replace the three screws (M2x3) that secure the touchpad bracket to the touchpad.
5. Adhere the tapes that secure the touchpad to the keyboard shield.
6. Slide the touchpad cable into the connector on the system board and close the latch to secure the cable.
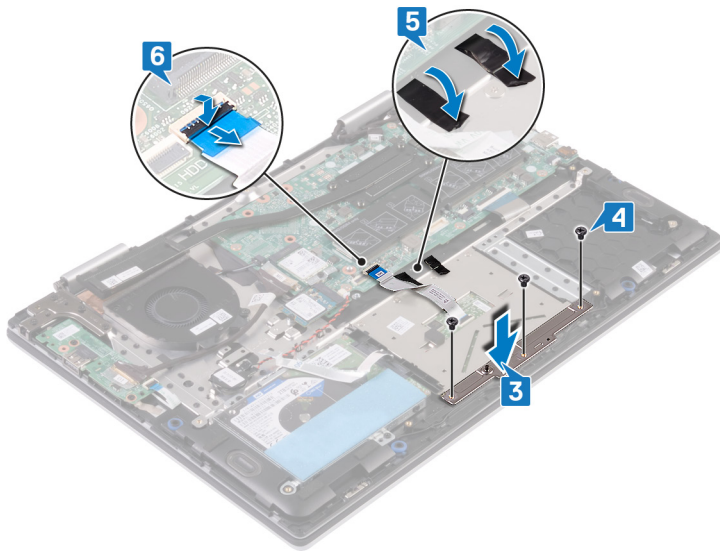
Post-requisites

1. Replace the battery.
2. Replace the base cover.

Palm-rest and keyboard assembly

Removing the palm-rest and keyboard assembly
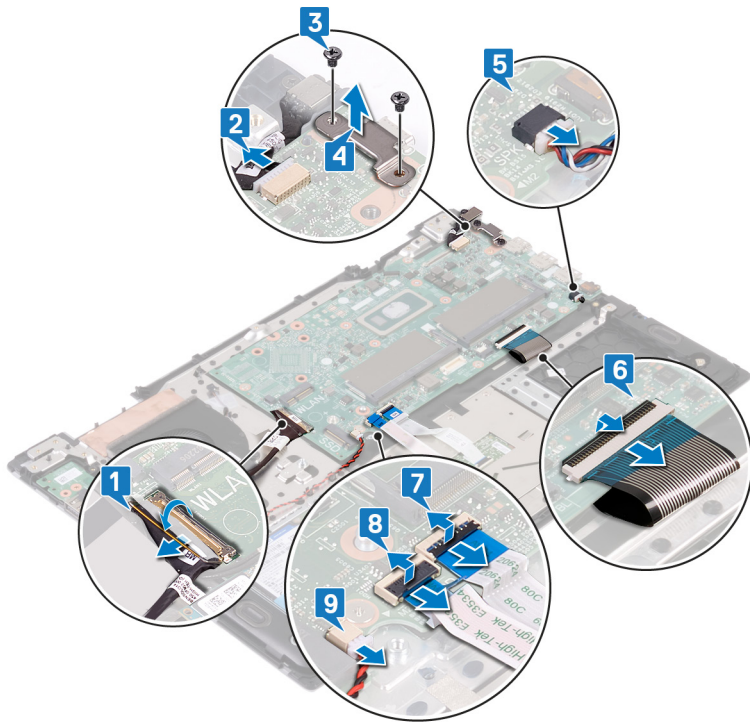
ⓘ NOTE: Before working inside your computer, read the safety information that shipped with your computer and follow the steps in **Before working inside your computer**. After working inside your computer, follow the instructions in **After working inside your computer**. For more safety best practices, see the Regulatory Compliance home page at **www.dell.com/regulatory_compliance**.

Prerequisites
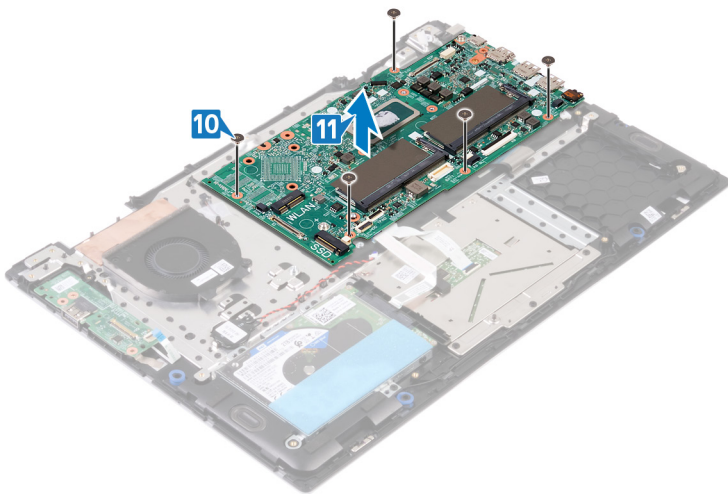
1. Remove the base cover.
2. Remove the battery.
3. Remove the memory modules.
4. Remove the coin-cell battery.
5. Remove the solid-state drive/Intel Optane memory module.
6. Remove the hard drive.
7. Remove the fan.
8. Remove the I/O board.
9. Remove the speakers.
10. Remove the power-adapter port.
11. Remove the wireless card.
12. Remove the display assembly.
13. Remove the system board.

   ⓘ NOTE: The system board can be removed and installed together with the heat sink attached, when replacing the palm-rest assembly.

14. Remove the touchpad.

Procedure

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

Replacing the palm-rest and keyboard assembly
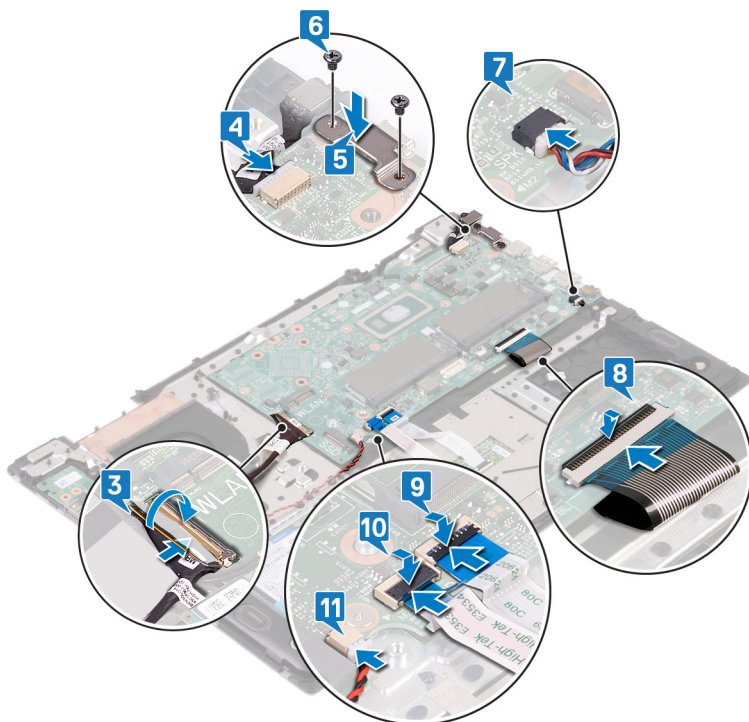
(i) **NOTE:** Before working inside your computer, read the safety information that shipped with your computer and follow the steps in **Before working inside your computer**. After working inside your computer, follow the instructions in **After working inside your computer**. For more safety best practices, see the Regulatory Compliance home page at **www.dell.com/regulatory_compliance**.

Procedure

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

Post-requisites

1. Replace the touchpad.
2. Replace the system board.

   (i) **NOTE:** The system board can be removed and installed together with the heat sink attached, when replacing the palm-rest assembly.

3. Replace the display assembly.
4. Replace the wireless card.
5. Replace the power-adapter port.
6. Replace the speakers.
7. Replace the I/O board.
8. Replace the fan.
9. Replace the hard drive.
10. Replace the solid-state drive/Intel Optane memory module.

11. Replace the coin-cell battery.
12. Replace the memory modules.
13. Replace the battery.
14. Replace the base cover.

Device drivers

Intel Chipset Software Installation Utility

In the Device Manager, check if the chipset driver is installed.

Install the Intel chipset updates from www.dell.com/support.

Video drivers

In the Device Manager, check if the video driver is installed.

Install the video driver update from www.dell.com/support.

Intel Serial IO driver

In the Device Manager, check if the Intel Serial IO driver is installed.

Install the driver updates from www.dell.com/support.

Intel Trusted Execution Engine Interface

In the Device Manager, check if the Intel Trusted Execution Engine Interface driver is installed.

Install the driver update from www.dell.com/support.

Intel Virtual Button driver

In the Device Manager, check if the Intel Virtual Button driver is installed.

Install the driver updates from www.dell.com/support.

Wireless and Bluetooth drivers

In the Device Manager, check if the network card driver is installed.

Install the driver updates from www.dell.com/support.

In the Device Manager, check if the Bluetooth driver is installed.

Install the driver updates from www.dell.com/support.

System setup

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

System setup

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

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

Use the BIOS Setup program for the following purposes:

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

Entering BIOS setup program

1. Turn on (or restart) your computer.
2. During POST, when the DELL logo is displayed, watch for the F2 prompt to appear, and then press F2 immediately.

    ⓘ **NOTE: The F2 prompt indicates that the keyboard is initialized. This prompt can appear very quickly, so you must watch for it, and then press F2. If you press F2 before the F2 prompt, this keystroke is lost. If you wait too long and the operating system logo appears, continue to wait until you see the desktop. Then, turn off your computer and try again.**

Navigation keys

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

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.

Boot Sequence

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

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

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

- Removable Drive (if available)
- STXXXX Drive (if available)

  (i) **NOTE: XXX denotes the SATA drive number.**

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

  (i) **NOTE: Choosing Diagnostics, will display the ePSA diagnostics screen.**

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

System setup options

(i) **NOTE: Depending on this computer and its installed devices, the items that are listed in this section may or may not be displayed.**

Table 3. System setup options—System information menu

Overview

BIOS Version	Displays the BIOS version number.
Service Tag	Displays the Service Tag of the computer.
Asset Tag	Displays the Asset Tag of the computer.
Ownership Tag	Displays the ownership tag of the computer.
Manufacture Date	Displays the manufacture date of the computer.
Ownership Date	Displays the ownership date of the computer.
Express Service Code	Displays the express service code of the computer.
Ownership Tag	Displays the ownership tag of the computer.
Signed Firmware Update	Displays whether the signed firmware update is enabled.
Battery	Displays the battery health information.
Primary	Displays the primary battery.
Battery Level	Displays the battery level.
Battery State	Displays the battery state.
Health	Displays the battery health.
AC Adapter	Displays whether an AC adapter is installed.
Processor Information	
Processor Type	Displays the processor type.
Maximum Clock Speed	Displays the maximum processor clock speed.
Core Count	Displays the number of cores on the processor.
Processor L2 Cache	Displays the processor L2 Cache size.
Processor ID	Displays the processor identification code.
Processor L3 Cache	Displays the processor L3 Cache size.
Current Clock Speed	Displays the current processor clock speed.
Minimum Clock Speed	Displays the minimum processor clock speed.
Microcode Version	Displays the microcode version.

Overview

Intel Hyper-Threading Capable	Displays whether the processor is Hyper-Threading (HT) capable.
64-Bit Technology	Displays whether 64-bit technology is used.
Memory Information	
Memory Installed	Displays the total computer memory installed.
Memory Available	Displays the total computer memory available.
Memory Speed	Displays the memory speed.
Memory Channel Mode	Displays single or dual channel mode.
Memory Technology	Displays the technology that is used for the memory.
DIMM_SLOT 1	Displays the memory module in DIMM slot 1
DIMM_SLOT 2	Displays the memory module in DIMM slot 2
Device Information	
Video Controller	Displays the integrate graphics information of the computer.
dGPU Video Controller	Displays the discrete graphics information of the computer.
Video BIOS Version	Displays the video BIOS version of the computer.
Video Memory	Displays the video memory information of the computer.
Panel Type	Displays the Panel Type of the computer.
Native Resolution	Displays the native resolution of the computer.
Audio Controller	Displays the audio controller information of the computer.
Wi-Fi Device	Displays the wireless device information of the computer.
Bluetooth Device	Displays the Bluetooth device information of the computer.

Table 4. System setup options—Boot options menu

Boot options

Advanced Boot Options	
Enable UEFI Network Stack	Enables or disables UEFI Network Stack.
	Default: OFF.
Boot Mode	
Boot Mode: UEFI only	Displays the boot mode of this computer.
Enable Boot Devices	Enables or disables boot devices for this computer.
Boot Sequence	Displays the boot sequence.
BIOS Setup Advanced Mode	Enables or disables advanced BIOS settings.
	Default: ON.
UEFI Boot Path Security	Enables or disables the system to prompt the user to enter the Admin password when booting a UEFI boot path from the F12 boot menu.
	Default: Always Except Internal HDD.

Table 5. System setup options—System Configuration menu

System Configuration

Date/Time	
Date	Sets the computer date in MM/DD/YYYY format. Changes to the date take effect immediately.

System Configuration

Time	Sets the computer time in HH/MM/SS 24-hour format. You can switch between 12-hour and 24-hour clock. Changes to the time take effect immediately.
Enable SMART Reporting	Enables or disables SMART (Self-Monitoring, Analysis, and Reporting Technology) during computer startup to report hard drive errors. Default: OFF.
Enable Audio	Enables or disables all integrated audio controller. Default: ON.
Enable Microphone	Enables or disables microphone. Default: ON.
Enable Internal Speaker	Enables or disables internal speaker. Default: ON.
USB Configuration	
Enable Boot Support	Enables or disables booting from USB mass storage devices such as external hard drive, optical drive, and USB drive.
Enable External USB Ports	Enables or disables USB ports to be functional in an operating system environment.
SATA Operation	Configures operating mode of the integrated SATA hard drive controller. Default: RAID. SATA is configured to support RAID (Intel Rapid Restore Technology).
Drives	Enables or disables various onboard drives.
M.2 PCIe SSD-0/SATA-2	Default: ON.
SATA-0	Default: ON.
Drive Information	Displays the information of various onboard drives.
Miscellaneous Devices	Enables or disables various onboard devices.
Enable Camera	Enables or disables the camera. Default: ON.
Keyboard Illumination	Configures the operating mode of the keyboard illumination feature. Default: Disabled. The keyboard illumination will always be off.
Keyboard Backlight Timeout on AC	Configures the timeout value for the keyboard when an AC adapter is connected to the computer. The keyboard backlight timeout value is only effect when the backlight is enabled. Default: 10 seconds.
Keyboard Backlight Timeout on Battery	Configures the timeout value for the keyboard when the computer is running on battery. The keyboard backlight timeout value is only effect when the backlight is enabled. Default: 10 seconds.
Touchscreen	Enables or disables the touchscreen for the operating system. (i) **NOTE: Touchscreen will always work in the BIOS setup irrespective of this setting.** Default: ON.

Table 6. System setup options—Video menu

Video

LCD Brightness

Video

Brightness on battery power	Sets the screen brightness when the computer is running on battery power.
Brightness on AC power	Sets the screen brightness when the computer is running on AC power.

Table 7. System setup options—Security menu

Security

Enable Admin Setup Lockout	Enables or disables the user from entering BIOS Setup when an Admin Password is set. Default: OFF.
Password Bypass	Bypass the System (Boot) Password and the internal hard drive password prompts during a system restart. Default: Disabled.
Enable Non-Admin Password Changes	Enables or disables the user to change the system and hard drive password without the need for admin password. Default: ON.
Non-Admin Setup Changes	
Allow Wireless Switch Changes	Enables or disables changes to the setup option when an Administrator password is set. Default: OFF.
Enable UEFI Capsule Firmware Updates	Enables or disables BIOS updates through UEFI capsule update packages.
Absolute	Enable or disable the BIOS module interface of the optional Computrace(R) Service from Absolute Software.
Intel Platform Trust Technology On	Enables or disables Platform Trust Technology (PTT) visibility to the operating system. Default: ON.
PPI Bypass for Clear Commands	Enables or disables the operating system to skip BIOS Physical Presence Interface (PPI) user prompts when issuing the Clear command. Default: OFF.
Clear	Enables or disables the computer to clear the PTT owner information, and returns the PTT to the default state. Default: OFF.
Intel SGX	Enables or disables the Intel Software Guard Extensions (SGX) to provide a secured environment for running code/storing sensitive information. Default: Software Control
SMM Security Mitigation	Enables or disables additional UEFI SMM Security Mitigation protections. Default: OFF. (i) **NOTE: This feature may cause compatibility issues or loss of functionality with some legacy tools and applications.**

Table 8. System setup options—Passwords menu

Secure Boot

Enable Strong Passwords	Enables or disables strong passwords. Default: OFF.
Password Configuration	Control the minimum and maximum number of characters that are allowed for Admin and System passwords.

Secure Boot

Admin Password	Sets, Changes, or deletes the administrator (admin) password (sometimes called the "setup" password).
System Password	Sets, Changes, or deletes the system password.
Enable Master Password Lockout	Enables or disables the master password support.
	Default: OFF.

Table 9. System setup options—Secure Boot menu

Secure Boot

Enable Secure Boot	Enables or disables the computer to boos using only validated boot software.
	Default: OFF.
	ⓘ **NOTE: For Secure Boot to be enabled, the computer needs to be in UEFI boot mode and the Enable Legacy Option ROMs option needs to be turned off.**
Secure Boot Mode	Selects the Secure Boot operation mode.
	Default: Deployed Mode.
	ⓘ **NOTE: Deployed Mode should be selected for normal operation of Secure Boot.**

Table 10. System setup options—Expert Key Management menu

Expert Key Management

Enable Custom Mode	Enables or disables the keys in the PK, KEK, db, and dbx security key databases to be modified.
	Default: OFF.
Custom Mode Key Management	Selects the custom values for expert key management.
	Default: PK.

Table 11. System setup options—Performance menu

Performance

Intel Hyper-Threading Technology	Enables or disables the Intel Hyper-Threading Technology to use processor resources more efficiently.
	Default: ON.
Intel SpeedStep	Enables or disables the Intel SpeedStep Technology to dynamically adjust processor voltage and core frequency, decreasing average power consumption and heat production.
	Default: ON.
Intel TurboBoost Technology	Enabled or disabled the Intel TurboBoost mode of the processor. If enabled, the Intel TurboBoost driver increases the performance of the CPU or graphics processor.
	Default: ON.
Multi-Core Support	Changes the number of CPU cores available to the operating system. The default value is set to the maximum number of cores.
	Default: All Cores.
Enable C-State Control	Enables or disables the CPU's ability to enter and exit low-power states.
	Default: ON.

Table 12. System setup options—Power Management menu

Power Management

Wake on AC	Enables the computer to turn on and go to boot when AC power is supplied to the computer.
	Default: OFF.
Auto on Time	Enables the computer to automatically power on for defined days and times.
	Default: Disabled. The system will not automatically power up.
Battery Charge Configuration	Enables the computer to run on battery during power usage hours. Use the below options to prevent AC power usage between certain times of each day.
	Default: Adaptive. Battery settings are adaptively optimized based on your typical battery usage pattern.
Enable Advanced Battery Charge Configuration	Enables Advanced Battery Charge Configuration from the beginning of the day to a specified work period. Advanced Battery Charged maximizes battery health while still supporting heavy use during the work day.
	Default: OFF.
Block Sleep	Blocks the computer from entering Sleep (S3) mode in the operating system.
	Default: OFF.
	ⓘ **NOTE: If enabled, the computer will not go to sleep, Intel Rapid Start will be disabled automatically, and the operating system power option will be blank if it was set to Sleep.**
Enable USB Wake Support	Enables the USB devices to wake the computer from Standby mode.
	Default: OFF.
Enable Intel Speed Shift Technology	Enables or disables Intel Speed Shift Technology support which enables the operating system to select the appropriate processor performance automatically.
	Default: ON.

Table 13. System setup options—Wireless menu

Wireless

Wireless Switch	Determines which wireless devices can be controlled by the Wireless Switch. For Windows 8 systems, this is controlled by an operating system drive directly. As a result, the setting does not affect the Wireless Switch behavior.
	ⓘ **NOTE: When both WLAN and WiGig are present, enable/disable controls are tied together. Thus, they cannot be enabled or disabled independently.**
WLAN	Default: ON.
Bluetooth	Default: ON.
Wireless Device Enable	Enable or disable internal WLAN/Bluetooth devices.
WLAN	Default: ON.
Bluetooth	Default: ON.

Table 14. System setup options—POST Behavior menu

POST Behavior

Numlock Enable	Enables or disables Numlock when the computer boots.
	Default: ON.

POST Behavior

Enable Adapter Warnings	Enables the computer to display adapter warning messages during boot. Default: ON.
Extend BIOS POST Time	Configures the BIOS POST (Power-On Self-Test) load time. Default: 0 seconds.
Fastboot	Configures the speed of the UEFI boot process. Default: Thorough. Performs complete hardware and configuration initialization during boot.
Fn Lock Options	Enables or disables the Fn lock mode. Default: ON.
Lock Mode	Default: Lock Mode Secondary. Lock Mode Secondary = If this option is selected, the F1-F12 keys scan the code for their secondary functions.
Pull Screen Logo	Enabled or disabled the computer to display full screen logo if the image match screen resolution. Default: OFF.
Warnings and Errors	Selects an action on encountering a warning or error during boot. Default: Prompt on Warnings and Errors. Stop, prompt and wait for user input when warnings or errors are detected. (i) **NOTE: Errors deemed critical to the operation of the computer hardware will always halt the computer.**

Table 15. System setup options—Virtualization menu

Virtualization

Intel Virtualization Technology	Enables the computer to run a virtual machine monitor (VMM). Default: ON.
VT for Direct I/O	Enables the computer to perform Virtualization Technology for Direct I/O (VT-d). VT-d is an Intel method that provides virtualization for memory map I/O. Default: ON.

Table 16. System setup options—Maintenance menu

Maintenance

Asset Tag	Creates a system Asset Tag that can be used by an IT administrator to uniquely identify a particular system. Once set in BIOS, the Asset Tag cannot be changed.
Service Tag	Displays the Service Tag of the computer.
BIOS Recovery from Hard Drive	Enables the computer to recover from a bad BIOS image, as long as the Boot Block portion is intact and functioning. Default: ON. (i) **NOTE: BIOS recovery is designed to fix the main BIOS block and cannot work if the Boot Block is damaged. In addition, this feature cannot work in the event of EC corruption, ME corruption, or a hardware issue. The recovery image must exist on an unencrypted partition on the drive.**
BIOS Auto-Recovery	Enables the computer to automatically recover the BIOS without user actions. This feature requires BIOS Recovery from Hard Drive to be set to Enabled. Default: OFF.

Maintenance

Start Data Wipe	⚠ **CAUTION: This Secure Wipe Operation will delete information in a way that it cannot be reconstructed.**
	If enabled, the BIOS will queue up a data wipe cycle for storage devices that are connected to the motherboard on the next reboot.
	Default: OFF.
Allow BIOS Downgrade	Controls flashing of the system firmware to previous revisions.
	Default: ON.
Dell Development Configuration	Enables flash update signature override.
	Default: OFF.

Table 17. System setup options—System Logs menu

System Logs

Power Event Log	Displays Power events.
	Default: Keep.
BIOS Event Log	Displays BIOS events.
	Default: Keep.
Thermal Event Log	Displays Thermal events.
	Default: Keep.

Table 18. System setup options—SupportAssist menu

SupportAssist

Dell Auto OS Recovery Threshold	Controls the automatic boot flow for SupportAssist System Resolution Console and for Dell operating system Recovery tool.
	Default: 2.
SupportAssist OS Recovery	Enables or disables the boot flow for SupportAssist operating system Recovery tool in the even of certain system errors.
	Default: ON.

Clearing CMOS settings

⚠ **CAUTION: Clearing CMOS settings will reset the BIOS settings on your computer.**

1. Remove the base cover.
2. Disconnect the battery cable from the system board.
3. Remove the coin-cell battery.
4. Wait for one minute.
5. Replace the coin-cell battery.
6. Connect the battery cable to the system board.
7. Replace the base cover.

Clearing BIOS (System Setup) and System passwords

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

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

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:

- 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

1. Turn on your computer.
2. As the computer boots, press the F12 key as the Dell logo appears.
3. On the boot menu screen, select the **Diagnostics** option.
4. Click the arrow at the bottom left corner.
   Diagnostics front page is displayed.
5. Click the arrow in the lower-right corner to go to the page listing.
   The items detected are listed.
6. To run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
7. Select the device from the left pane and click **Run Tests**.
8. If there are any issues, error codes are displayed.
   Note the error code and validation number and contact Dell.

System diagnostic lights

Battery-status light

Indicates the power and battery-charge status.

Solid white — Power adapter is connected and the battery has more than 5 percent charge.

Amber — Computer is running on battery and the battery has less than 5 percent charge.

Off

- Power adapter is connected and the battery is fully charged.
- Computer is running on battery and the battery has more than 5 percent charge.
- Computer is in sleep state, hibernation, or turned off.

The power and battery-status light blinks amber along with beep codes indicating failures.

For example, the power and battery-status light blinks amber two times followed by a pause, and then blinks white three times followed by a pause. This 2,3 pattern continues until the computer is turned off indicating no memory or RAM is detected.

The following table shows different power and battery-status light patterns and associated problems.

Table 19. LED codes

Diagnostic light codes	Problem description
2,1	Processor failure
2,2	System board: BIOS or ROM (Read-Only Memory) failure
2,3	No memory or RAM (Random-Access Memory) detected
2,4	Memory or RAM (Random-Access Memory) failure
2,5	Invalid memory installed
2,6	System-board or chipset error
2,7	Display failure
3,1	Coin-cell battery failure
3,2	PCI, video card/chip failure
3,3	Recovery image not found
3,4	Recovery image found but invalid
3,5	Power-rail failure
3,6	System BIOS Flash incomplete
3,7	Management Engine (ME) error

Camera status light: Indicates whether the camera is in use.

- Solid white — Camera is in use.
- Off — Camera is not in use.

Caps Lock status light: Indicates whether Caps Lock is enabled or disabled.

- Solid white — Caps Lock enabled.
- Off — Caps Lock disabled.

Recovering the operating system

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

Dell SupportAssist OS Recovery is a standalone tool that is preinstalled in all Dell computers installed with Windows 10 operating system. It consists of tools to diagnose and troubleshoot issues that may occur before your computer boots to the operating system. It enables you to diagnose hardware issues, repair your computer, back up your files, or restore your computer to its factory state.

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

For more information about the Dell SupportAssist OS Recovery, see *Dell SupportAssist OS Recovery User's Guide* at www.dell.com/support.

Flashing BIOS (USB key)

1. Follow the procedure from step 1 to step 7 in "Flashing the BIOS" to download the latest BIOS setup program file.
2. Create a bootable USB drive. For more information see the knowledge base article SLN143196 at www.dell.com/support.
3. Copy the BIOS setup program file to the bootable USB drive.
4. Connect the bootable USB drive to the computer that needs the BIOS update.
5. Restart the computer and press **F12** when the Dell logo is displayed on the screen.
6. Boot to the USB drive from the **One Time Boot Menu**.
7. Type the BIOS setup program filename and press **Enter**.
8. The **BIOS Update Utility** appears. Follow the instructions on the screen to complete the BIOS update.

Flashing the BIOS

You may need to flash (update) the BIOS when an update is available or when you replace the system board.

Follow these steps to flash the BIOS:

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

   (i) **NOTE: If you do not have the Service Tag, use the auto-detect feature or manually browse for your computer model.**

4. Click **Drivers & downloads** > **Find it myself**.
5. Select the operating system installed on your computer.
6. Scroll down the page and expand **BIOS**.
7. Click **Download** to download the latest version of the BIOS for your computer.
8. After the download is complete, navigate to the folder where you saved the BIOS update file.
9. Double-click the BIOS update file icon and follow the instructions on the screen.

Enabling Intel Optane memory

1. On the taskbar, click the search box, and then type `Intel Rapid Storage Technology`.
2. Click **Intel Rapid Storage Technology**.
   The **Intel Rapid Storage Technology** window is displayed.
3. On the **Status** tab, click **Enable** to enable the Intel Optane memory.
4. On the warning screen, select a compatible fast drive, and then click **Yes** to continue enabling Intel Optane memory.
5. Click **Intel Optane memory** > **Reboot** to complete enabling your Intel Optane memory.

   (i) **NOTE: Applications may take up to three subsequent launches after enablement to see the full performance benefits.**

Disabling Intel Optane memory

⚠ **CAUTION: After disabling Intel Optane memory, do not uninstall the driver for Intel Rapid Storage Technology as it will result in a blue screen error. The Intel Rapid Storage Technology user interface can be removed without uninstalling the driver.**

(i) **NOTE: Disabling Intel Optane memory is required before removing the SATA storage device accelerated by the Intel Optane memory module from the computer.**

1. On the taskbar, click the search box, and then type `Intel Rapid Storage Technology`.
2. Click **Intel Rapid Storage Technology**.
   The **Intel Rapid Storage Technology** window is displayed.
3. On the **Intel Optane memory** tab, click **Disable** to disable the Intel Optane memory.

   (i) **NOTE: For computers in which Intel Optane memory acts as a primary storage, do not disable the Intel Optane memory. The Disable option will be grayed out.**

4. Click **Yes** if you accept the warning.
   The disabling progress is displayed.
5. Click **Reboot** to complete disabling your Intel Optane memory and restart your computer.

WiFi power cycle

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

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

1. Turn off your computer.

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

Flea power release

Flea power is the residual static electricity that remains on the computer even after it has been powered off and the battery has been removed. The following procedure provides the instructions on how to conduct flea power release:

1. Turn off your computer.
2. Disconnect the power adapter from your computer.
3. Press and hold the power button for 15 seconds to drain the flea power.
4. Connect the power adapter to your computer.
5. Turn on your computer.

Getting help and contacting Dell

Self-help resources

You can get information and help on Dell products and services using these self-help resources:

Table 20. Self-help resources

Self-help resources	Resource location
Information about Dell products and services	www.dell.com
My Dell app	
Tips	
Contact Support	In Windows search, type `Contact Support`, and press Enter.
Online help for operating system	www.dell.com/support/windows
Troubleshooting information, user manuals, setup instructions, product specifications, technical help blogs, drivers, software updates, and so on.	www.dell.com/support
Dell knowledge base articles for a variety of computer concerns.	1. Go to www.dell.com/support. 2. Type the subject or keyword in the **Search** box. 3. Click **Search** to retrieve the related articles.
Learn and know the following information about your product: • Product specifications • Operating system • Setting up and using your product • Data backup • Troubleshooting and diagnostics • Factory and system restore • BIOS information	See *Me and My Dell* at www.dell.com/support/manuals. To locate the *Me and My Dell* relevant to your product, identify your product through one of the following: • Select **Detect Product**. • Locate your product through the drop-down menu under **View Products**. • Enter the **Service Tag number** or **Product ID** in the search bar.

Contacting Dell

To contact Dell for sales, technical support, or customer service issues, see www.dell.com/contactdell.

ⓘ **NOTE: Availability varies by country/region and product, and some services may not be available in your country/region.**

ⓘ **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.**