Inspiron 7590 2in1

Service Manual

Notes, cautions, and warnings

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

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

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

Contents

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.

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.

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.

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

⚠️ **WARNING: Disconnect your computer from 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 your computer to an electrical outlet.**

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

⚠️ **CAUTION: To avoid damaging the components and cards, handle them by their edges, and avoid touching the pins and the contacts.**

⚠️ **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 is shipped with the product or at www.dell.com/regulatory_compliance.**

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

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

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

⚠️ **CAUTION: Exercise caution when handling Lithium-ion batteries in laptops. Swollen batteries should not be used and should be replaced and disposed properly.**

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

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.

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 surfaces 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 assembly	M2x4	7	
Battery	Palm-rest assembly	M2x3	2	
Fan	Palm-rest assembly	M2x3	2	
Hard-drive assembly	Palm-rest assembly	M2x3	3	
Hard-drive bracket	Hard drive	M3x3	4	
Display hinges	Palm-rest assembly	M2.5x4	4	
I/O board	Palm-rest assembly	M2x4	1	
Keyboard	Palm-rest assembly	M1.2x1.5	19	
Keyboard bracket	Palm-rest assembly	M1.2x1.8	24	
Power-adapter port	Palm-rest assembly	M2x3	1	
Solid-state drive	Palm-rest assembly	M2x3	1	
Solid-state drive	Soldi-state drive bracket	M2x3	1	
System board	Palm-rest assembly	M2x2 Big Head	2	
Touchpad bracket	Palm-rest assembly	M2x3	3	
Touchpad	Palm-rest assembly	M1.6x2	2	
Wireless-card bracket	System board	M2x3	1	

Removing the base cover

ⓘ **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. Loosen the two captive screws that secure the base cover to the palm-rest assembly.
2. Remove the seven screws (M2x4) that secure the base cover to the palm-rest assembly.

3. Using a plastic scribe, pry the base cover from the tabs on the hinges and continue to pry the base cover from the slots on the palm-rest assembly.

   ⚠ **CAUTION: Do not pry the base cover from the middle as it might damage the chassis.**

4. Carefully remove the base cover off the palm-rest assembly.
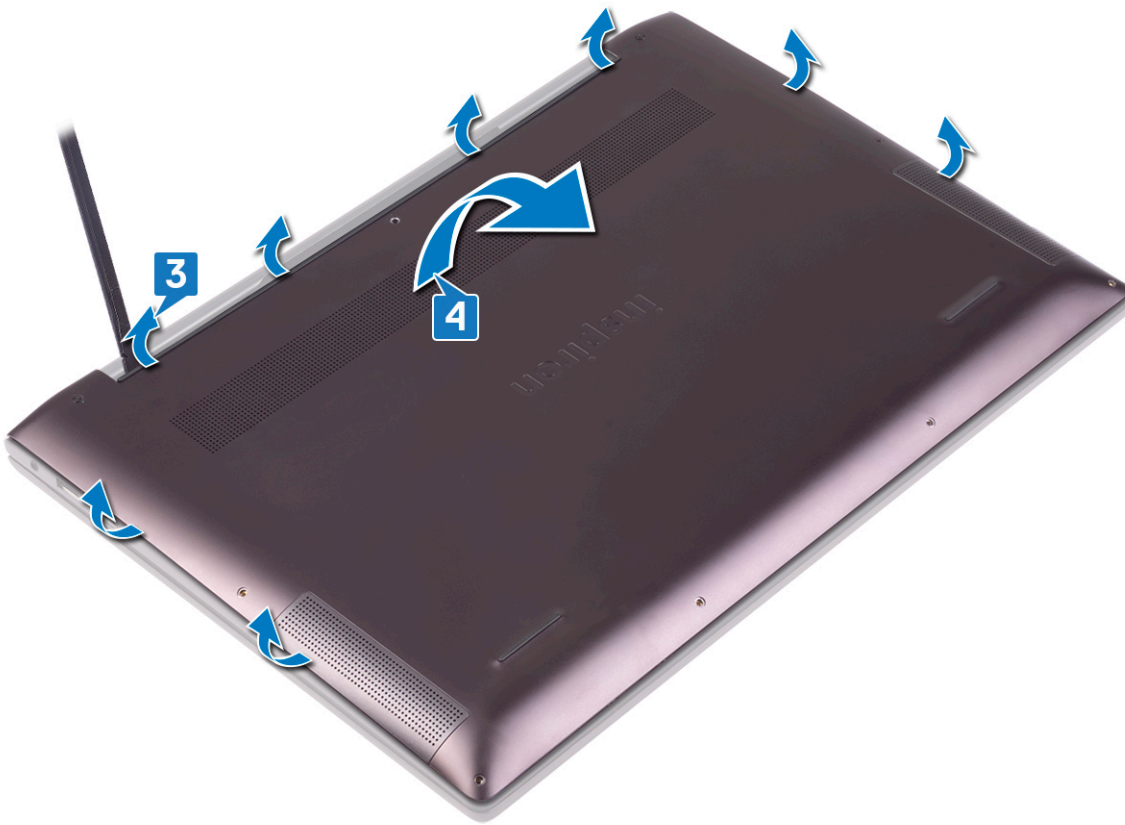
ⓘ **NOTE:** Disconnect the battery cable only when you continue to remove other components from your computer.

5. Disconnect the battery cable from the system board.
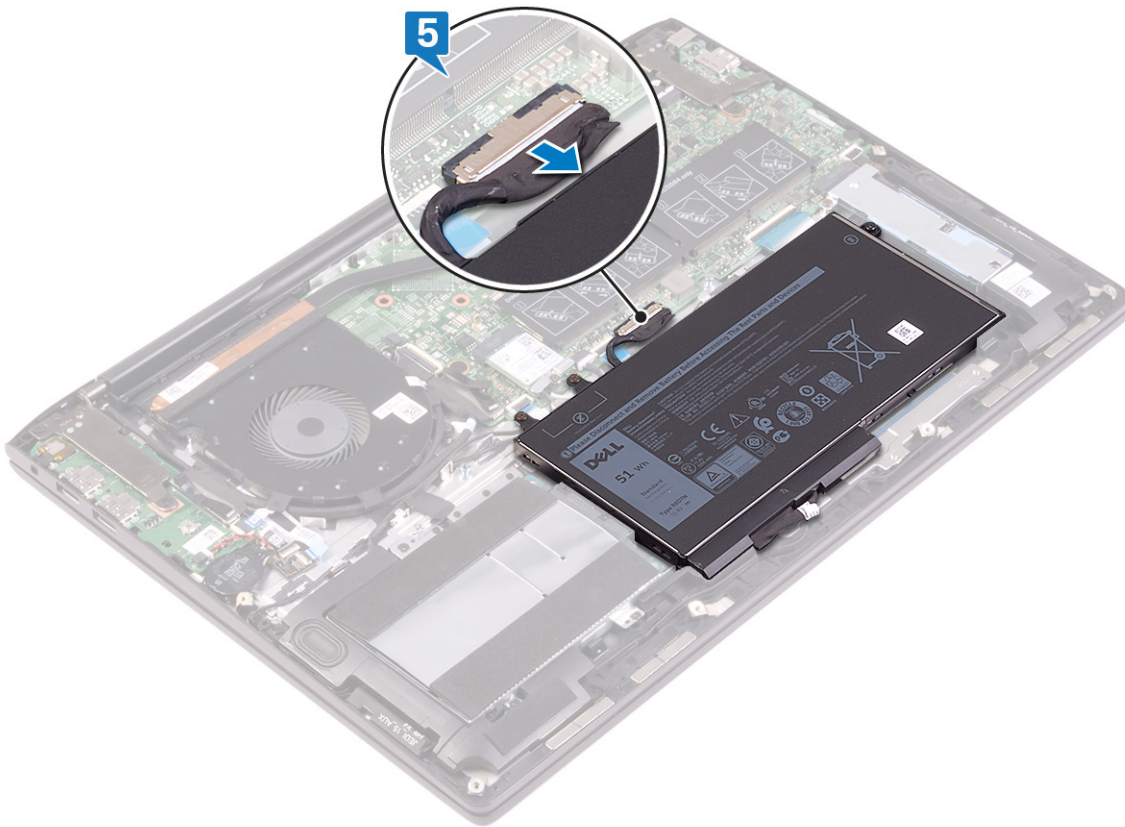
Replacing the base cover

(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. Connect the battery cable to the system board, if applicable.

2. Align the tabs on the base cover with the slots on the palm-rest assembly and snap the base cover to the palm-rest assembly.
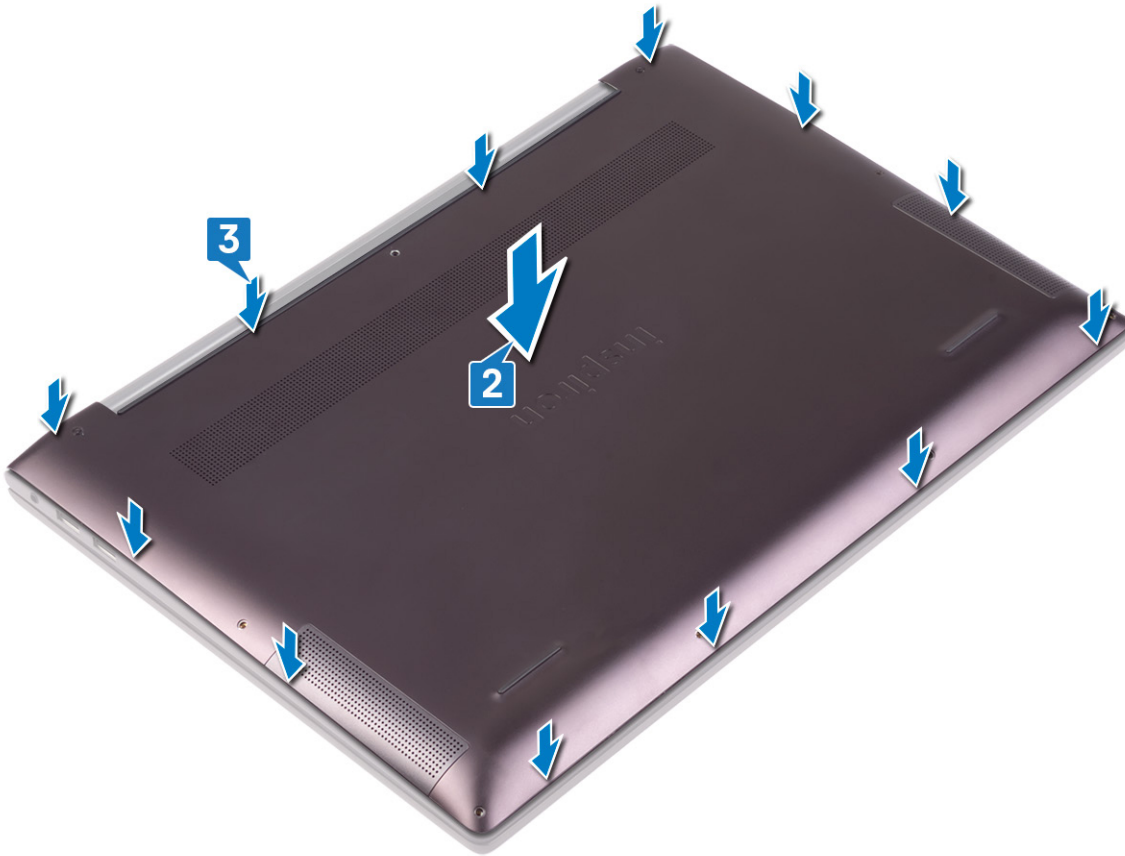
3. Replace the seven screws (M2x4) that secure the base cover to the palm-rest assembly.
4. Tighten the two captive screws that secure the base cover to the palm-rest assembly.

Removing the battery

ⓘ **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.

Lithium-ion battery precautions

⚠ **CAUTION:**
- **Exercise caution when handling Lithium-ion batteries.**
- **Discharge the battery completely before removing it. Disconnect the AC power adapter from the system and operate the computer solely on battery power—the battery is fully discharged when the computer no longer turns on when the power button is pressed.**
- **Do not crush, drop, mutilate, or penetrate the battery with foreign objects.**
- **Do not expose the battery to high temperatures, or disassemble battery packs and cells.**
- **Do not apply pressure to the surface of the battery.**
- **Do not bend the battery.**
- **Do not use tools of any kind to pry on or against the battery.**
- **Ensure any screws during the servicing of this product are not lost or misplaced, to prevent accidental puncture or damage to the battery and other system components.**
- **If the battery gets stuck inside your computer as a result of swelling, do not try to release it as puncturing, bending, or crushing a lithium-ion battery can be dangerous. In such an instance, contact Dell technical support for assistance. See www.dell.com/contactdell.**
- **Always purchase genuine batteries from www.dell.com or authorized Dell partners and resellers.**
- **Swollen batteries should not be used and should be replaced and disposed properly. For guidelines on how to handle and replace swollen Lithium-ion batteries, see Handling swollen Lithium-ion batteries.**

Prerequisites

Remove the base cover.

Procedure

1. Disconnect the battery cable from the system board (applicable only if not disconnected earlier).
2. Remove the two screws (M2x3) that secure the battery to the palm-rest assembly.
3. Loosen the captive screw that secures the battery to the palm-rest assembly.
4. Lift the battery off the palm-rest assembly.
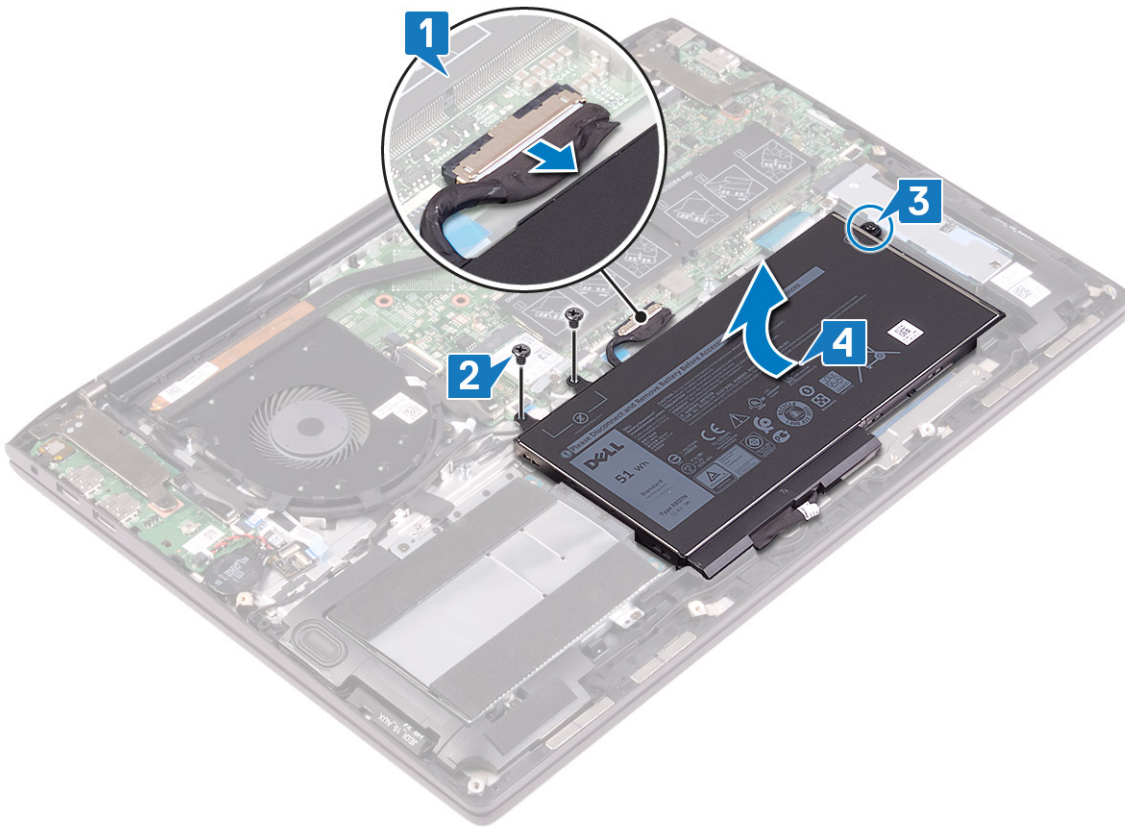
5. Turn the computer over, open the display, and then press and hold the power button for five seconds to ground the system board.

Replacing the battery

ⓘ **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.

Lithium-ion battery precautions

⚠️ **CAUTION:**
- **Exercise caution when handling Lithium-ion batteries.**
- **Discharge the battery completely before removing it. Disconnect the AC power adapter from the system and operate the computer solely on battery power—the battery is fully discharged when the computer no longer turns on when the power button is pressed.**
- **Do not crush, drop, mutilate, or penetrate the battery with foreign objects.**
- **Do not expose the battery to high temperatures, or disassemble battery packs and cells.**
- **Do not apply pressure to the surface of the battery.**
- **Do not bend the battery.**
- **Do not use tools of any kind to pry on or against the battery.**
- **Ensure any screws during the servicing of this product are not lost or misplaced, to prevent accidental puncture or damage to the battery and other system components.**
- **If the battery gets stuck inside your computer as a result of swelling, do not try to release it as puncturing, bending, or crushing a lithium-ion battery can be dangerous. In such an instance, contact Dell technical support for assistance. See www.dell.com/contactdell.**
- **Always purchase genuine batteries from www.dell.com or authorized Dell partners and resellers.**
- **Swollen batteries should not be used and should be replaced and disposed properly. For guidelines on how to handle and replace swollen Lithium-ion batteries, see Handling swollen Lithium-ion batteries.**

Procedure

1. Using the alignment posts, place the battery on the palm-rest assembly.
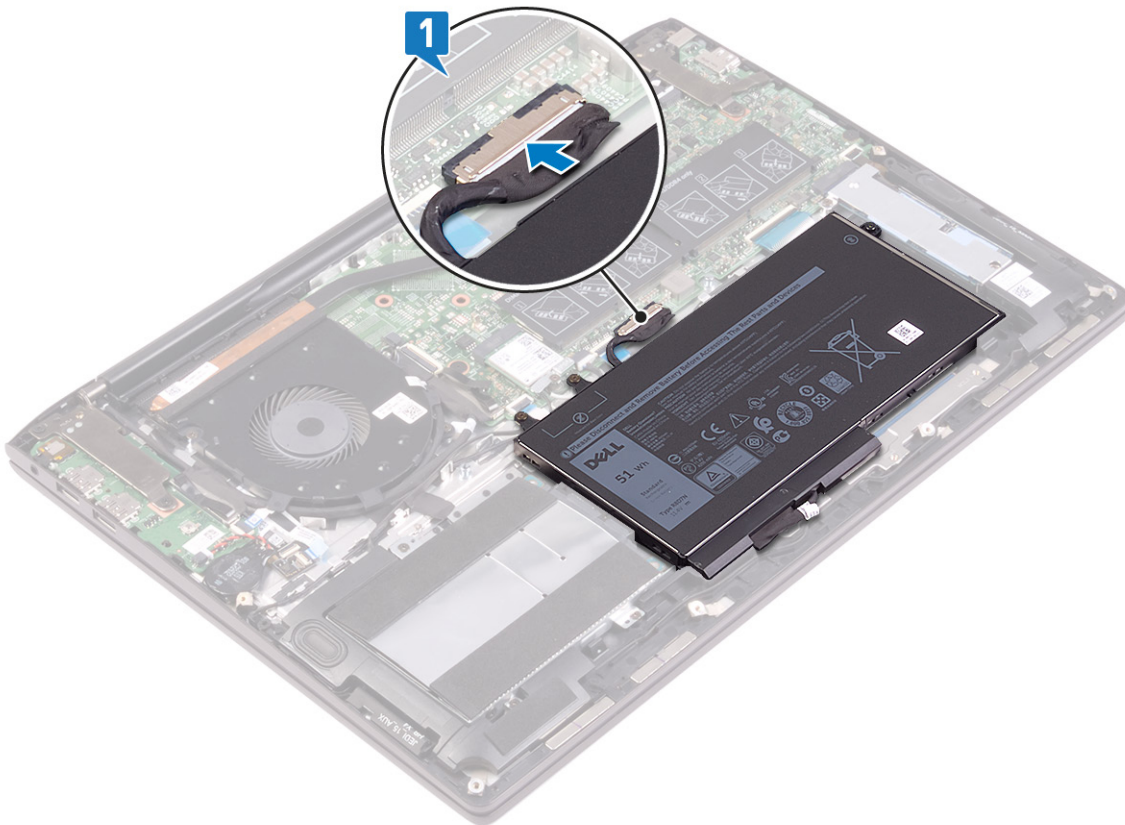2. Tighten the captive screw that secures the battery to the palm-rest assembly.
3. Replace the two screws (M2x3) that secure the battery to the palm-rest assembly.
4. Connect the battery cable to the system board.
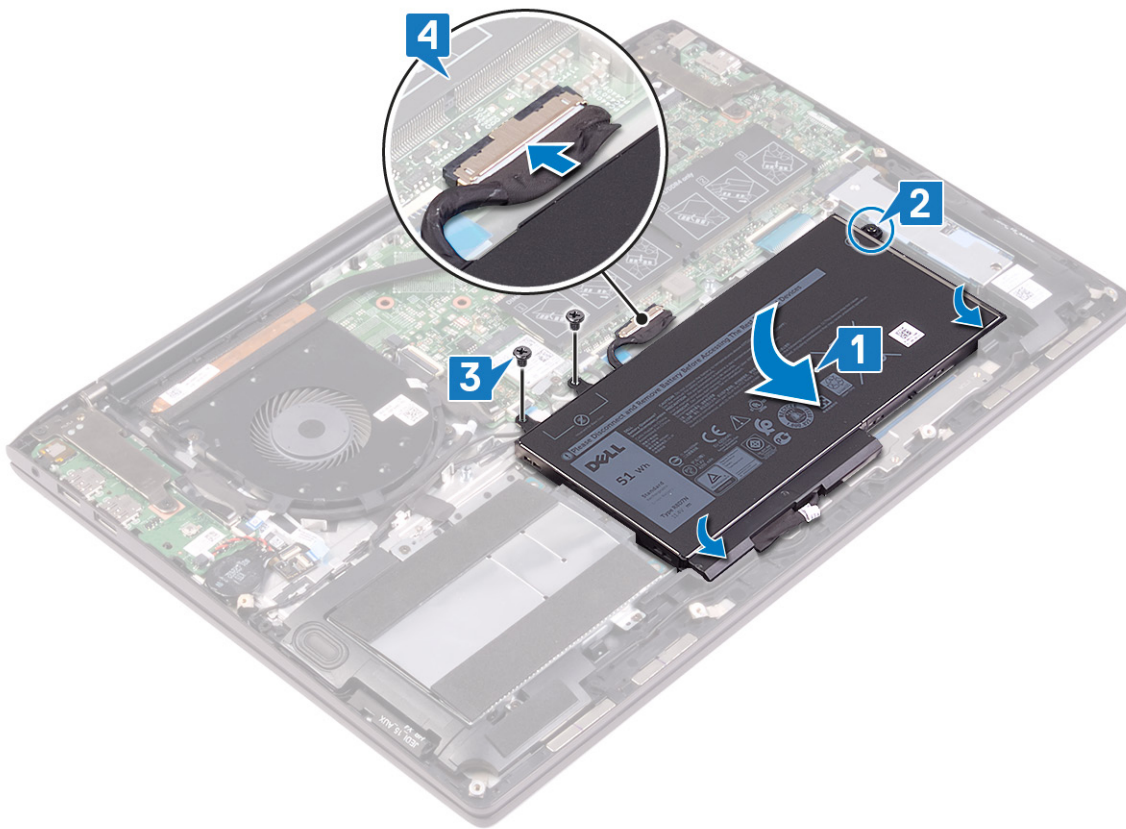
Post-requisites

Replace the base cover.

Removing the memory modules

(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. Lift the flap to access the memory module.

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. Slide and remove the memory module from the memory-module slot.
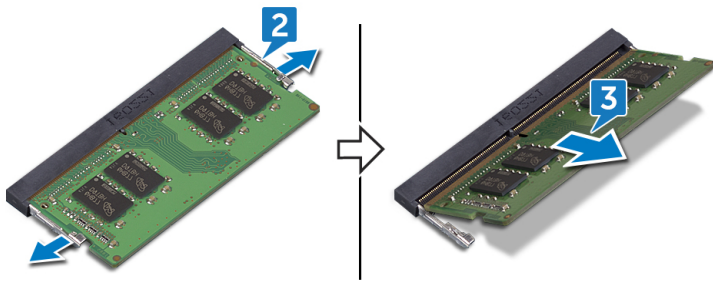
Replacing the memory modules

> (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. Lift the flap to access the memory-module slot.

2. Align the notch on the memory module with the tab on the memory-module slot.
3. Slide the memory module firmly at an angle, into the memory-module slot.
4. Press the memory module down until it clicks into place.

> (i) **NOTE:** If you do not hear the click, remove the memory module and reinstall it.
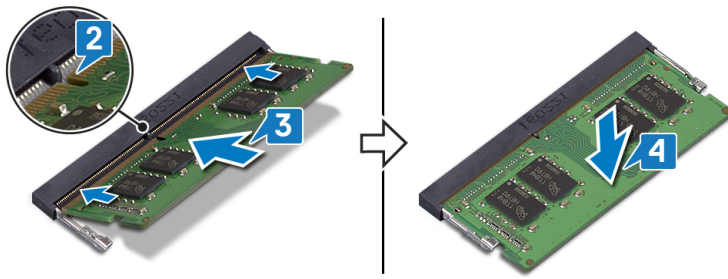
Post-requisites

Replace the base cover.

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 to the wireless card and palm-rest assembly.
3. Remove the wireless-card bracket from the wireless card.
4. Disconnect the antenna cables from the wireless card.
5. Slide and remove the wireless card from the wireless-card slot.

Removing the wireless card
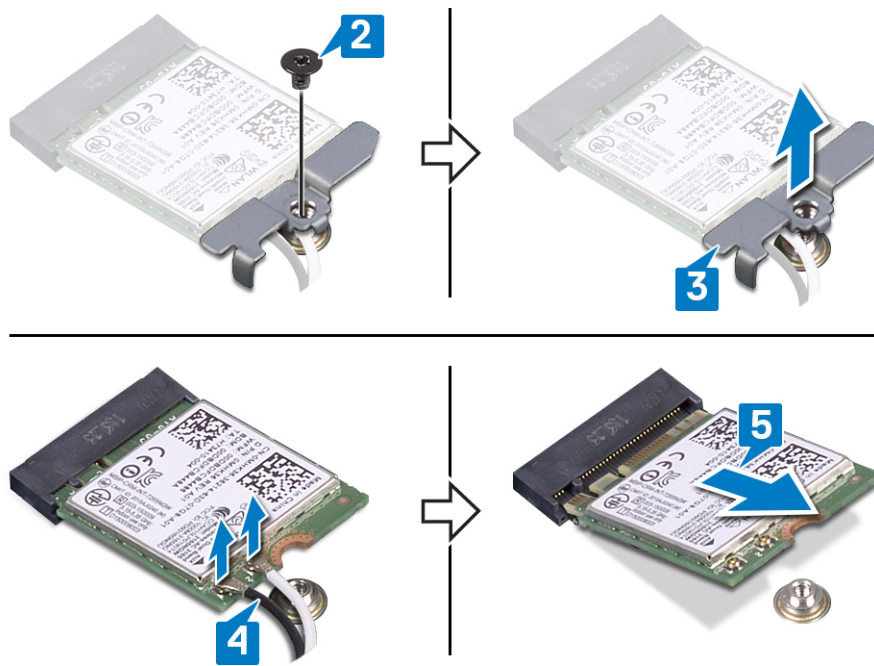
Replacing the wireless card

ⓘ **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.

   The following table provides the antenna-cable color scheme for the wireless card that is 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

2. Align the notch on the wireless card with the tab on the wireless-card slot and insert the wireless card at an angle into the wireless-card slot.
3. Align the screw hole on the wireless-card bracket with the screw hole on the wireless card and palm-rest assembly.
4. Replace the screw (M2x3) that secures the wireless-card bracket to the wireless card and palm-rest assembly.
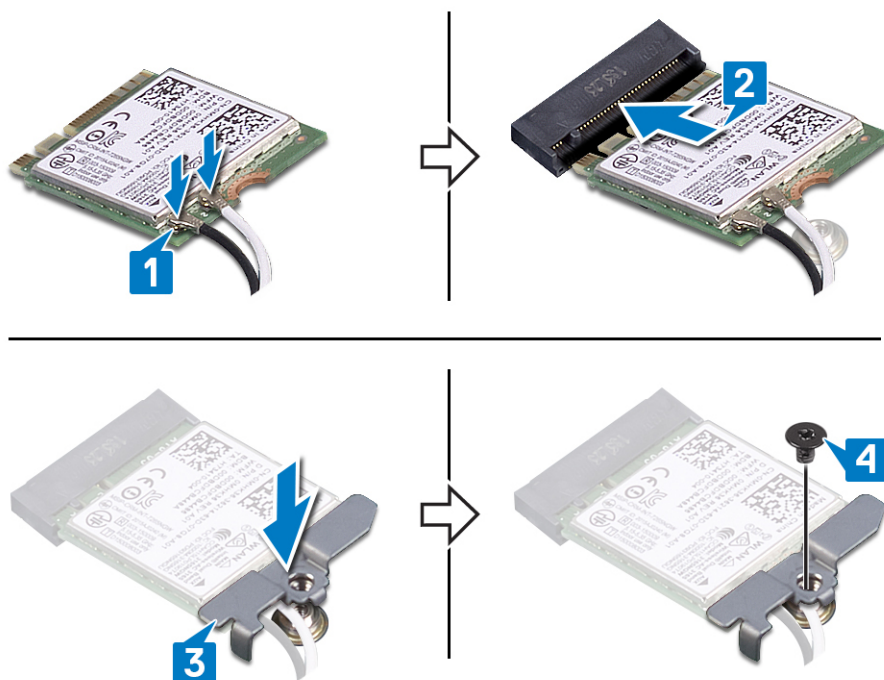
Post-requisites

Replace the base cover.

Removing 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.

Prerequisites

Remove the base cover.

Procedure

1. Remove the two screws (M2.5x4) that secure the left display hinge to the system board.
2. Lift the left display hinge from the system board.
3. Disconnect the power-adapter port cable from the system board.
4. Remove the screw (M2x3) that secures the power-adapter port to the palm-rest assembly.
5. Lift the power-adapter port, along with its cable, off the palm-rest assembly.

Replacing 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.

Procedure

1. Place the power-adapter port into the slot on the palm-rest assembly.
2. Replace the screw (M2x3) that secures the power-adapter port to the palm-rest assembly.
3. Connect the power-adapter port cable to the system board.
4. Close the left display hinge.
5. Replace the two screws (M2.5x4) that secure the left display hinge to the system board.

Post-requisites

Replace the base cover.

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. Using the pull tab, disconnect the I/O-board cable from the I/O board.
2. Open the latch and disconnect the fingerprint-reader cable from the I/O board.
3. Disconnect the coin-cell battery cable from the I/O board.
4. Remove the two screws (M2.5x4) that secure the right display hinge to the I/O board.
5. Lift the right display hinge from the I/O board.

6. Remove the screw (M2x3) that secures the I/O board to the palm-rest assembly.
7. Slide and lift the I/O board off the palm-rest assembly.
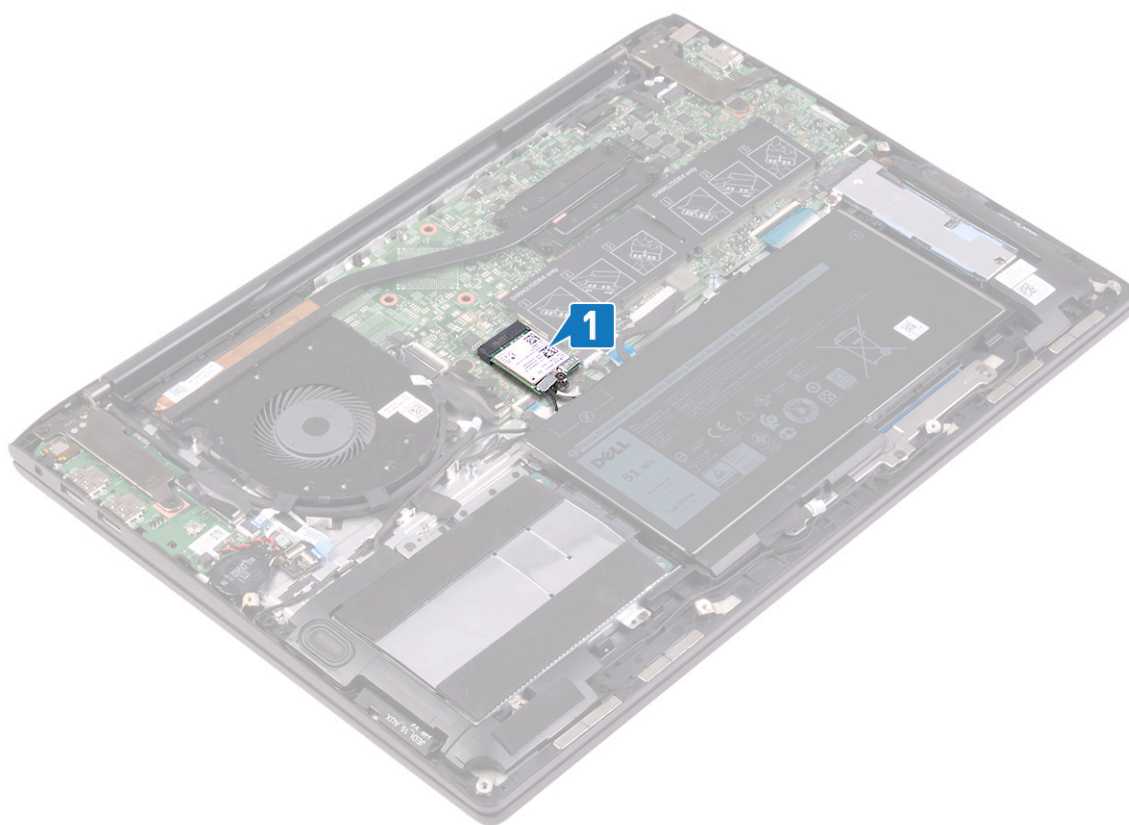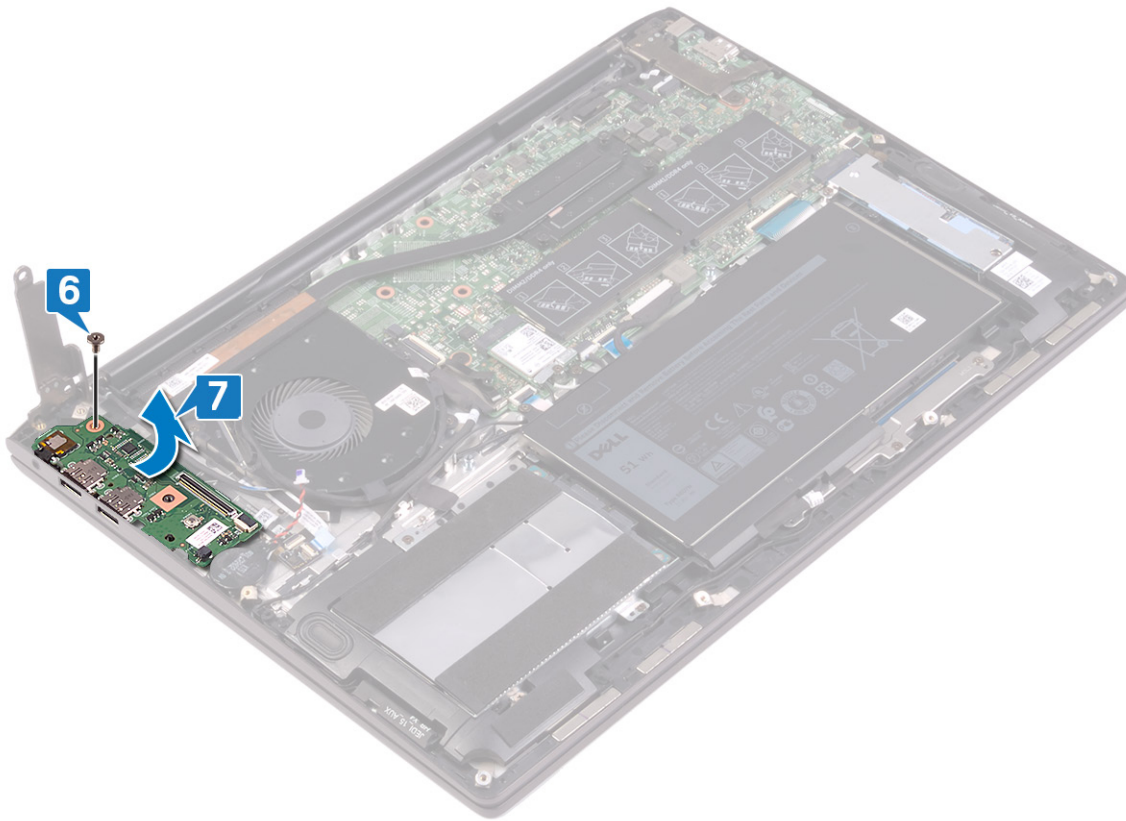
Replacing the I/O board

ⓘ **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. Slide the I/O board into the slots on the palm-rest assembly.
2. Align the screw hole on the I/O board with the screw hole on the palm-rest assembly, and replace the screw (M2x3) that secures the I/O board to the palm-rest assembly.
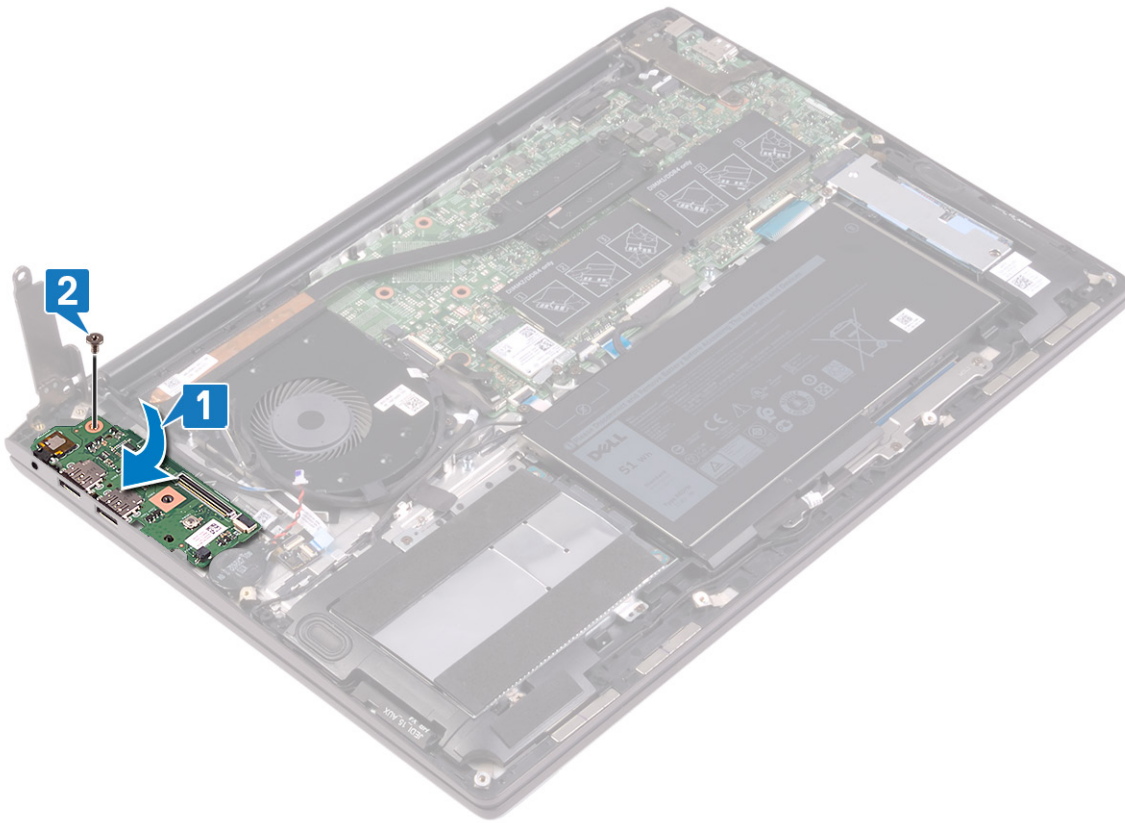
3. Close the right display hinge.
4. Replace the two screws (M2.5x4) that secure the right display hinge to the I/O board.
5. Connect the coin-cell battery cable to the I/O board.
6. Slide the fingerprint-reader cable into the connector on the I/O board and close the latch to secure the cable.
7. Connect the I/O-board cable to the I/O board.

Post-requisites

Replace the base cover.

Removing 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.

Prerequisites

Remove the base cover.

Procedure

1. Disconnect the fan cable from the system board.
2. Remove the two screws (M2x3) that secure the fan to the palm-rest assembly.
3. Lift the fan off the palm-rest 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. Using the alignment posts, place the fan on the palm-rest assembly.
2. Replace the two screws (M2x3) that secure the fan to the palm-rest assembly.
3. Connect the fan cable to the system board.

Post-requisites

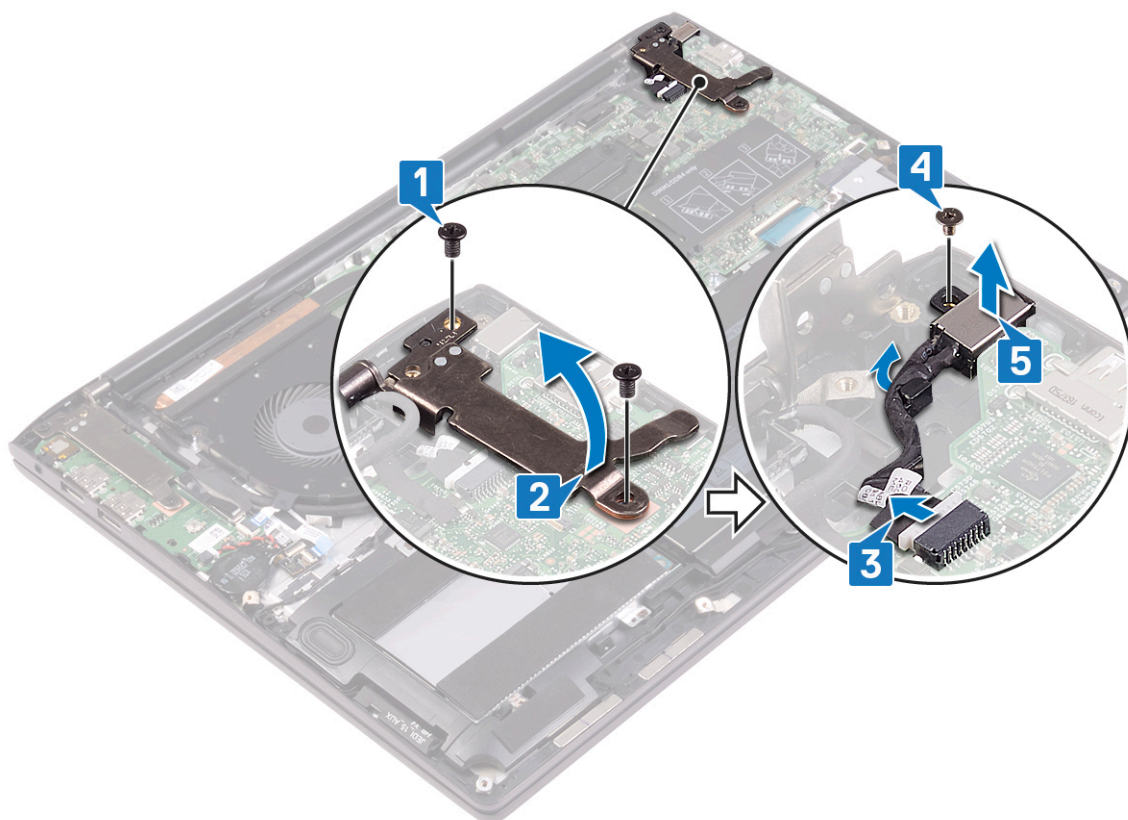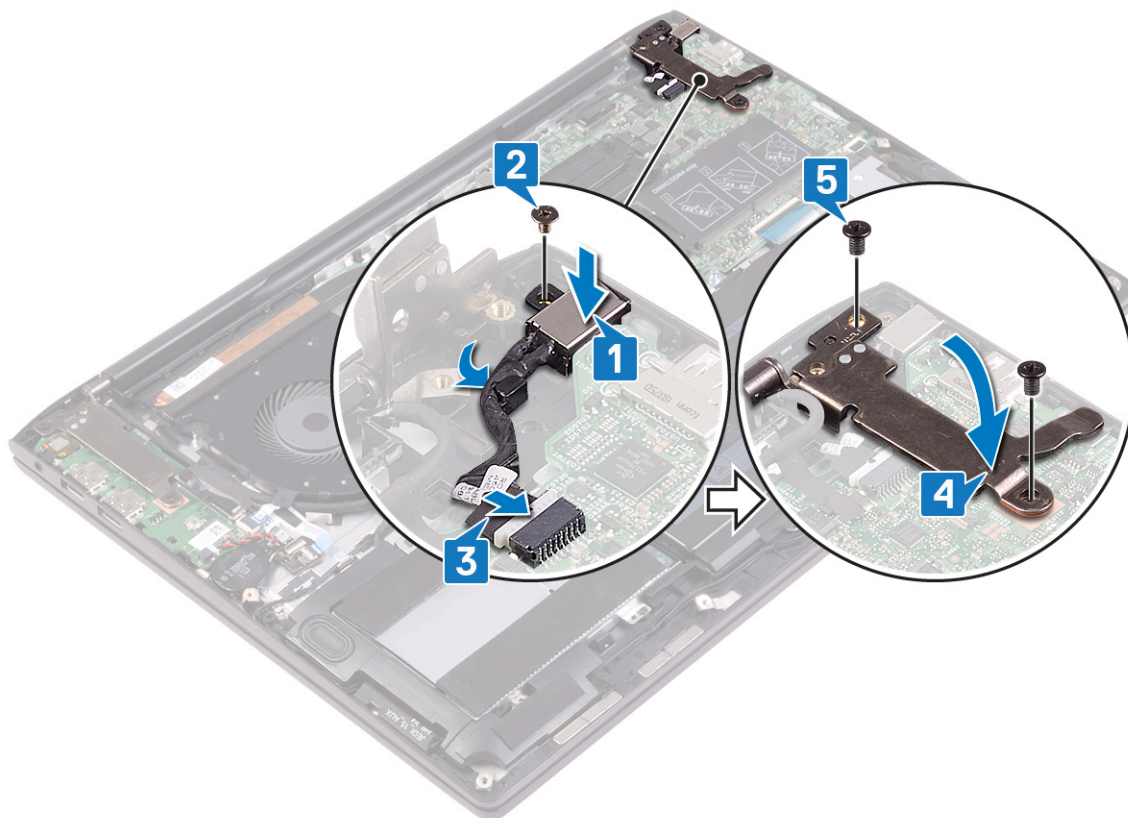Replace the base cover.

Removing the solid-state drive

(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.

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

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

Prerequisites

Remove the base cover.

Procedure to remove M.2 2230 solid-state drive

1. Remove the two screws (M2x3) that secure the solid-state drive to the palm-rest assembly.
2. Slide and remove the solid-state drive bracket from the solid-state drive slot.
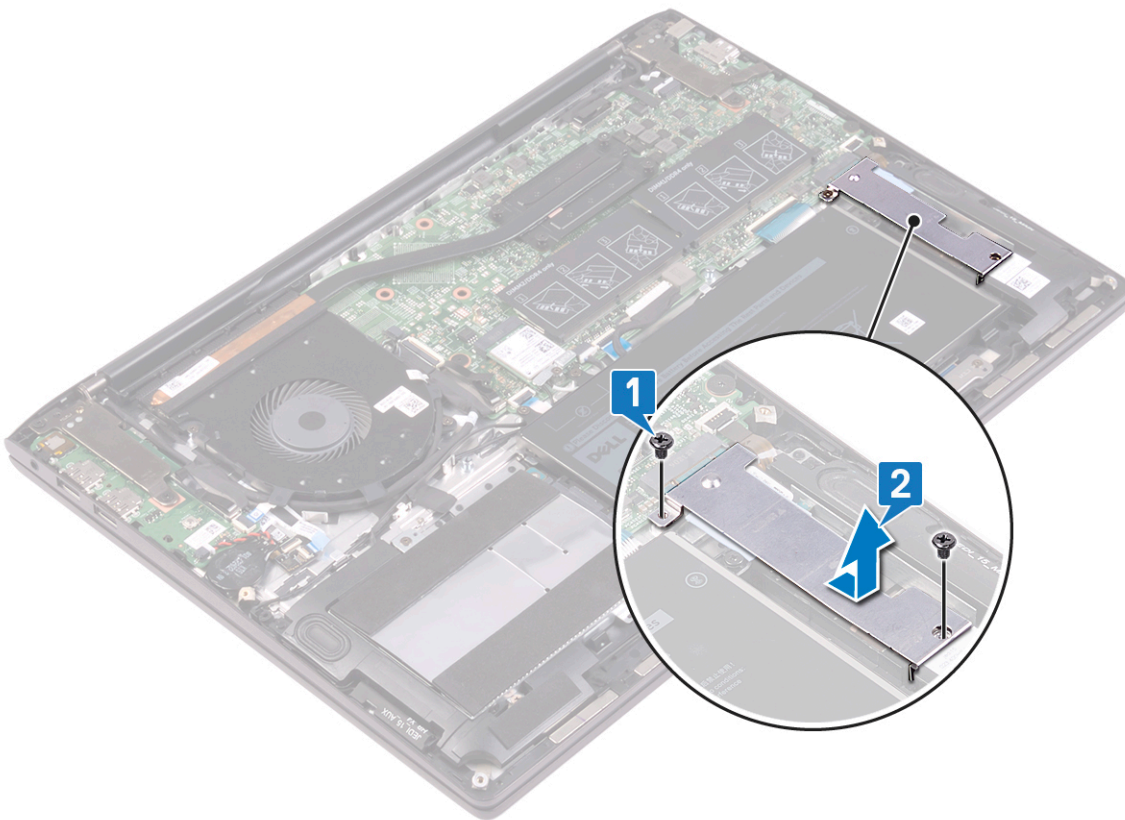
3. Remove the screw (M2x3) that secures the solid-state drive to the palm-rest assembly.
4. Slide and remove the solid-state drive from the solid-state drive slot.
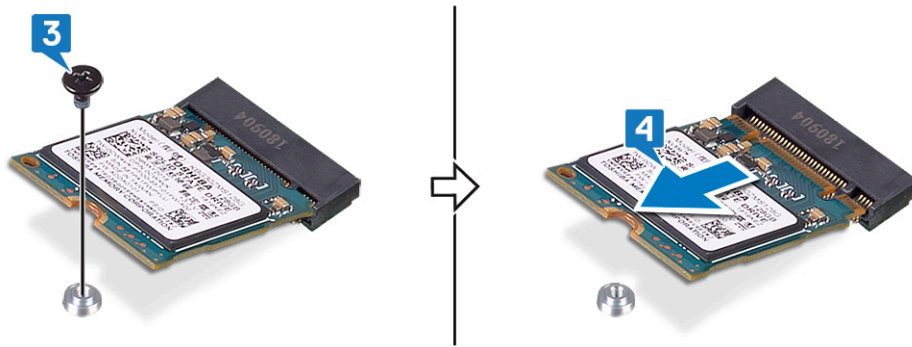
Procedure to remove M.2 2280 solid-state drive

1. Remove the two screws (M2x3) that secure the solid-state drive/Intel Optane storage module shield to the palm-rest assembly.
2. Slide and remove the solid-state drive/Intel Optane storage module shield from the solid-state drive slot.
3. Slide and remove the solid-state drive/Intel Optane storage module from the solid-state drive slot.
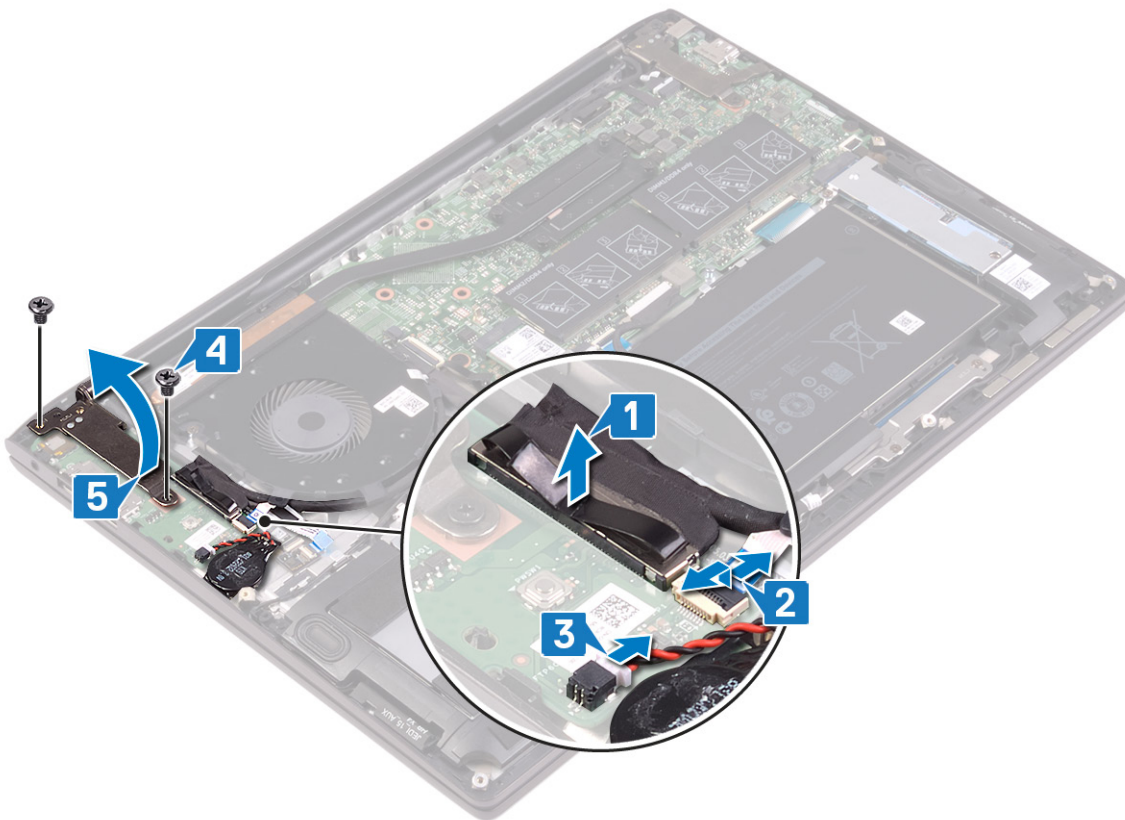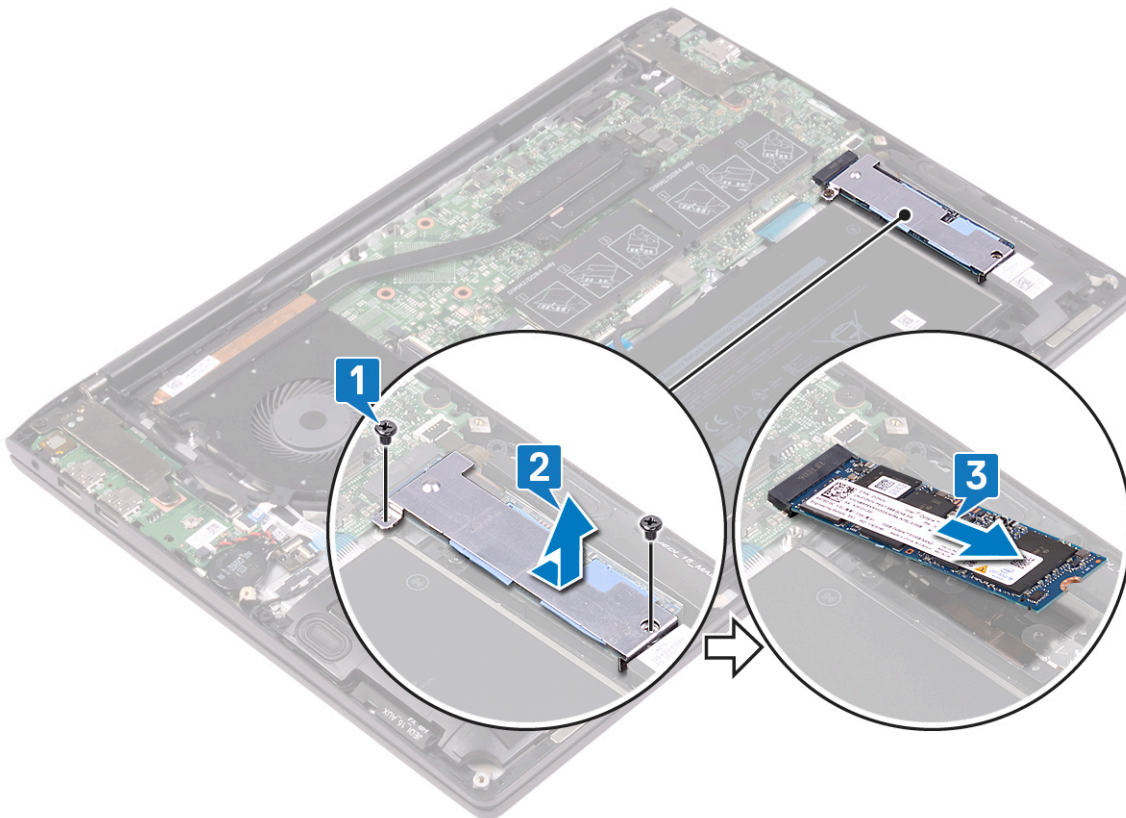
Replacing the solid-state drive

(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.

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

Procedure to replace M.2 2230 solid-state drive

1. Align the notch on the solid-state drive with the tab on the solid-state drive slot.
2. Slide the solid-state drive firmly into the solid-state drive slot at an angle.
3. Press the other end of the solid-state drive and replace the screw (M2x3) that secures the solid-state drive to the palm-rest assembly.
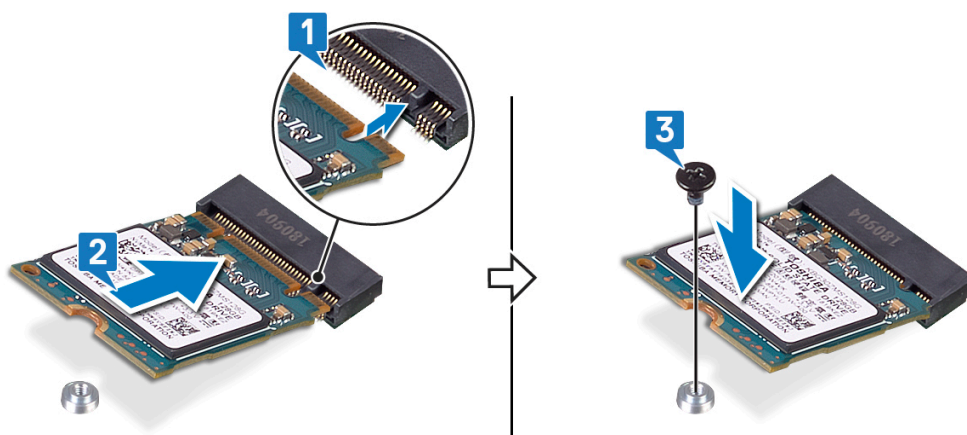
4. Slide the solid-state drive bracket firmly into the solid-state drive slot at an angle. Secure the tab on the solid-state drive slot with the slot on the solid-state drive bracket.
5. Replace the two screws (M2x3) that secure the solid-state drive to the palm-rest assembly.
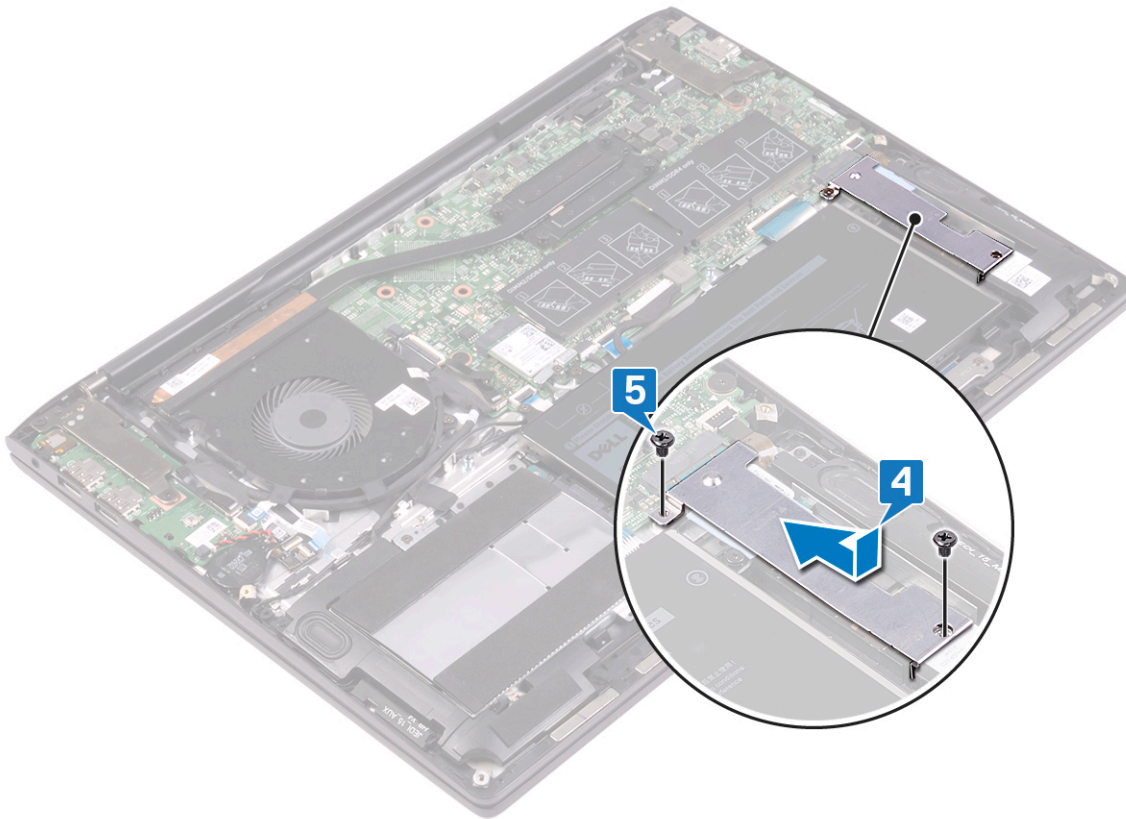
Procedure to replace M.2 2280 solid-state drive

1. Align the notch on the solid-state drive/Intel Optane storage module with the tab on the solid-state drive slot.
2. Slide the solid-state drive/Intel Optane storage module firmly into the solid-state drive slot at an angle.
3. Slide the solid-state drive/Intel Optane storage module shield firmly into the solid-state drive slot at an angle. Secure the tab on the solid-state drive slot with the slot on the solid-state drive bracket.
4. Replace the two screws (M2x3) that secure the solid-state drive/Intel Optane storage module shield to the palm-rest assembly.
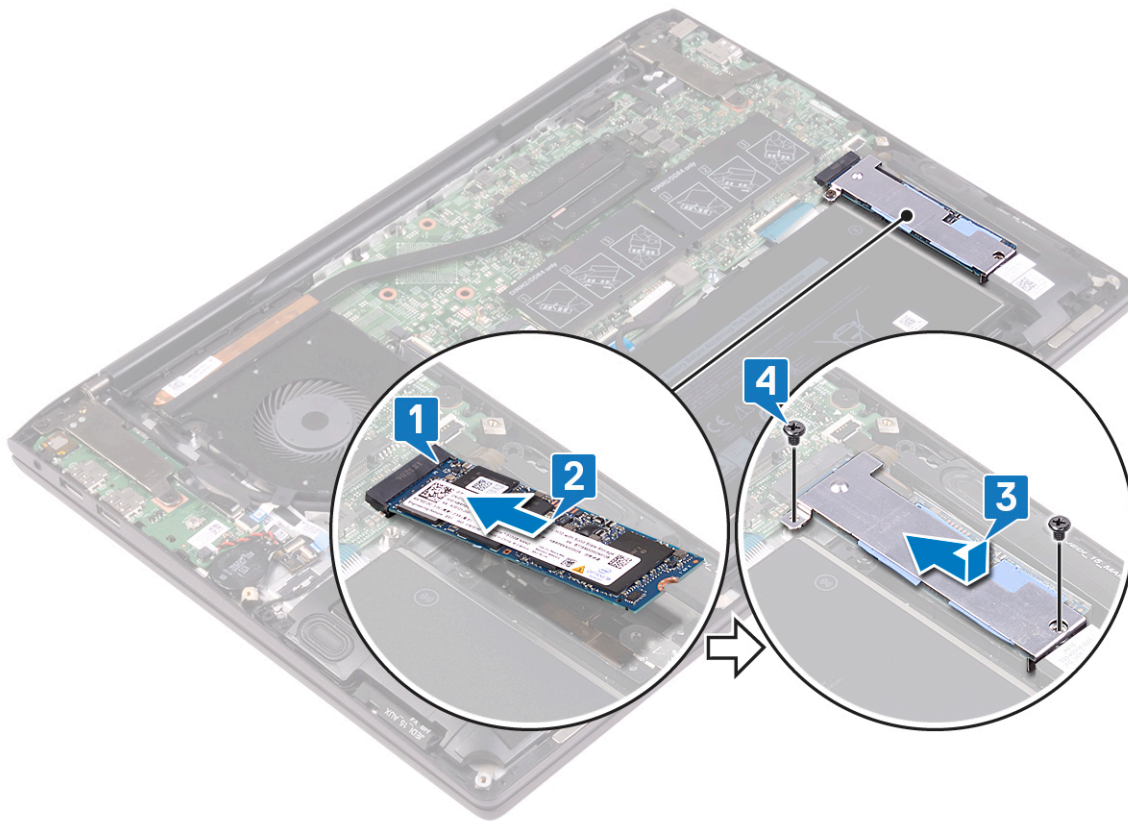
Post-requisites

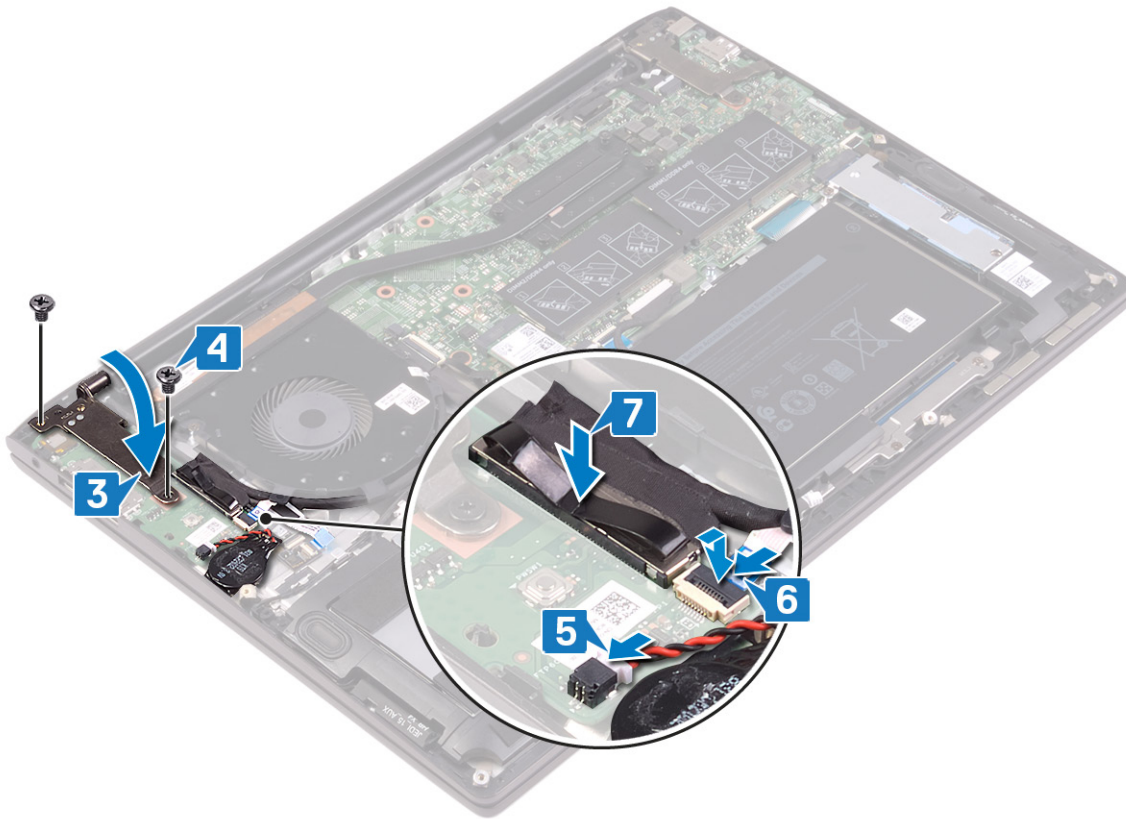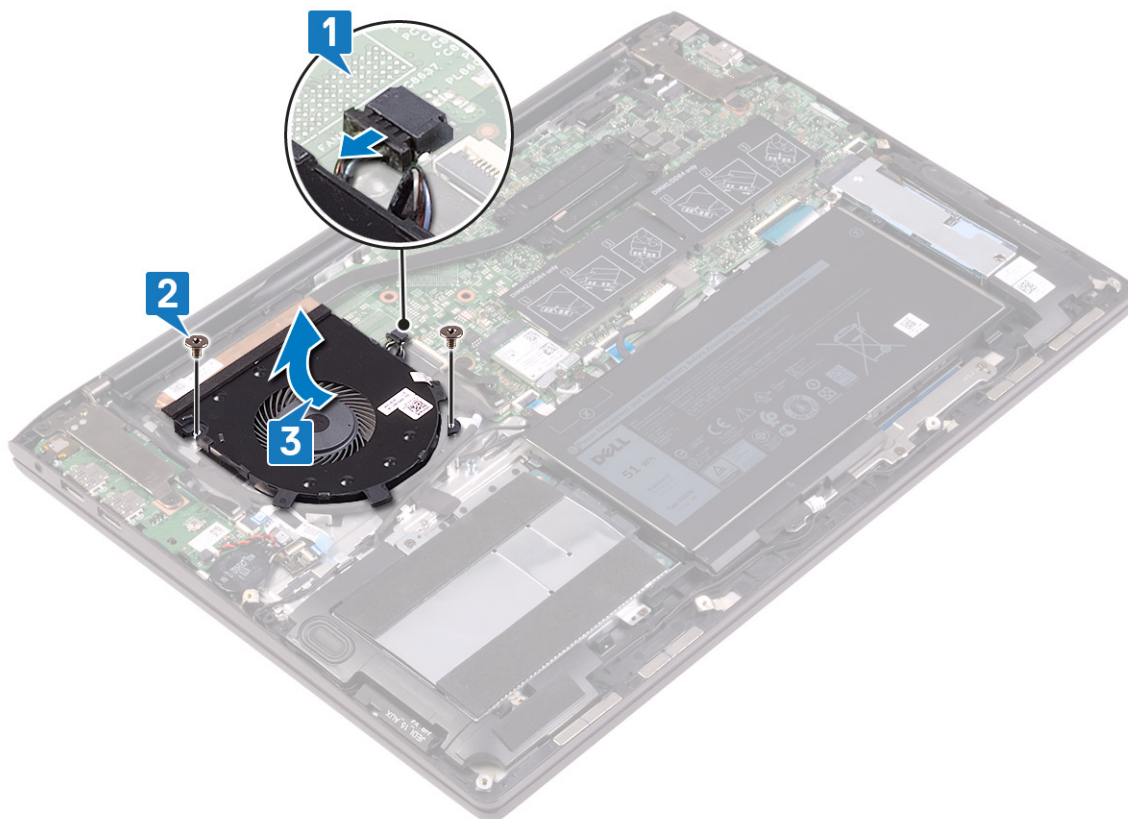Replace the base cover.

Removing the coin-cell battery

ⓘ **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: 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.**

Prerequisites

Remove the base cover.

Procedure

1. Disconnect the coin-cell battery cable from the I/O board.
2. Peel the coin-cell battery off the palm-rest assembly.
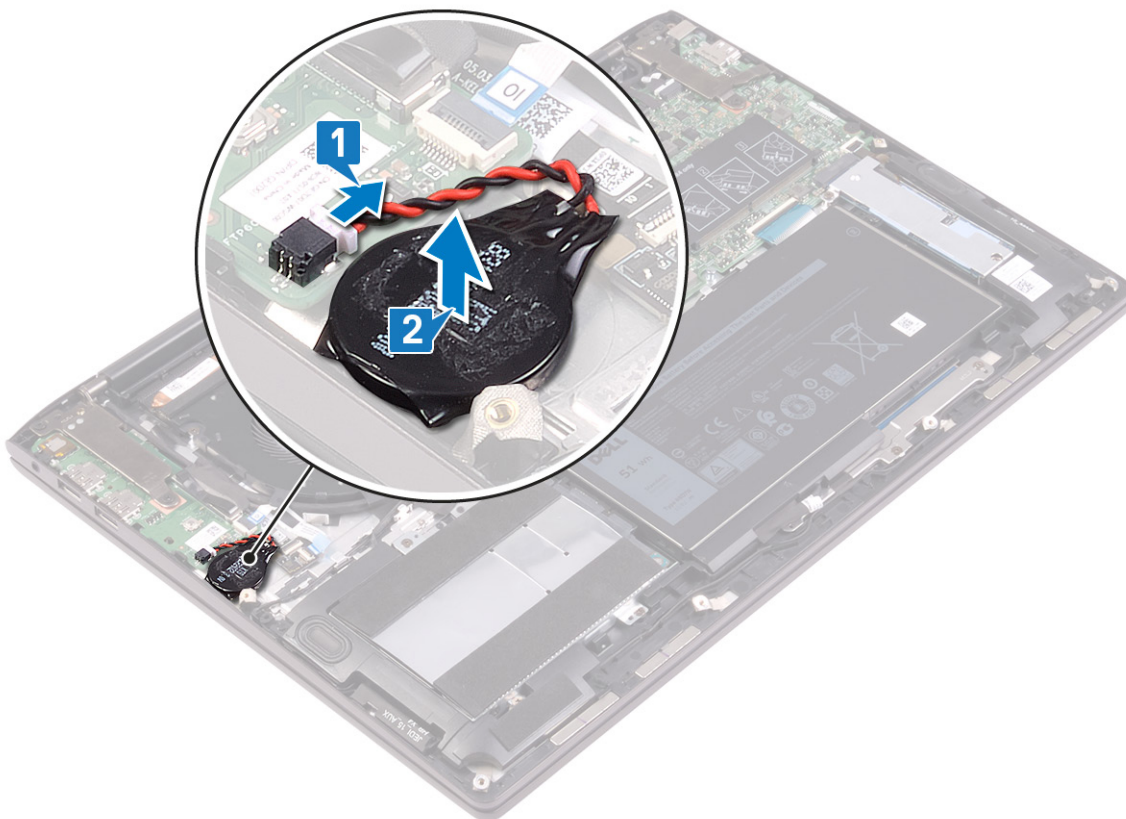
Replacing the coin-cell battery
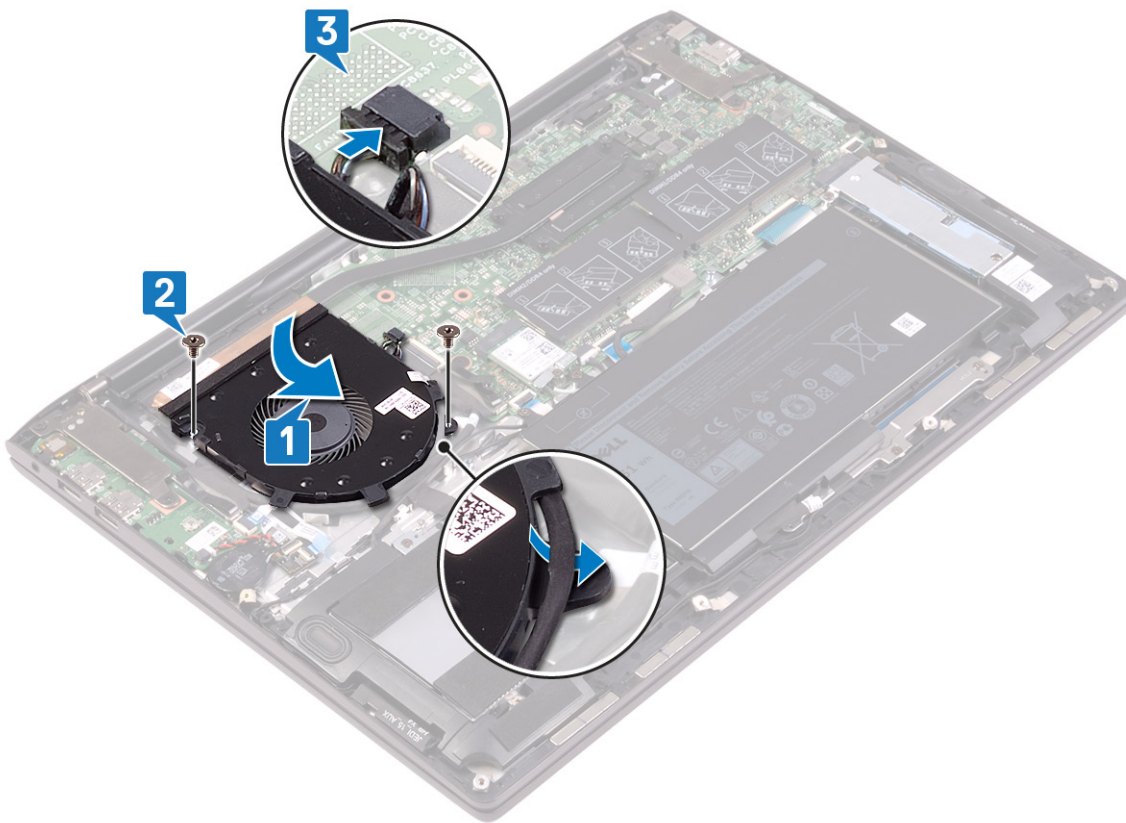
ⓘ **NOTE:** Before working inside your computer, read the safety information that shipped with your computer and follow the steps in Before working inside your computer. After working inside your computer, follow the instructions in After working inside your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.

Procedure

1. Adhere the coin-cell battery to the palm-rest assembly.
2. Connect the coin-cell battery cable to the I/O board.

Post-requisites

Replace the base cover.

Removing the hard drive

ⓘ **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.**

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

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

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. Disconnect the speaker cable from the system board.
3. Peel off the tapes and release the speaker cable from the routing guides on the palm-rest assembly.
4. Lift the right speaker from the palm-rest assembly.
5. Peel off the tapes and remove the speaker cable from the routing guides on the palm-rest assembly.
6. Lift the left speaker off the palm-rest assembly.

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 assembly.
3. Lift the hard-drive assembly, along with its cable, off the palm-rest assembly.
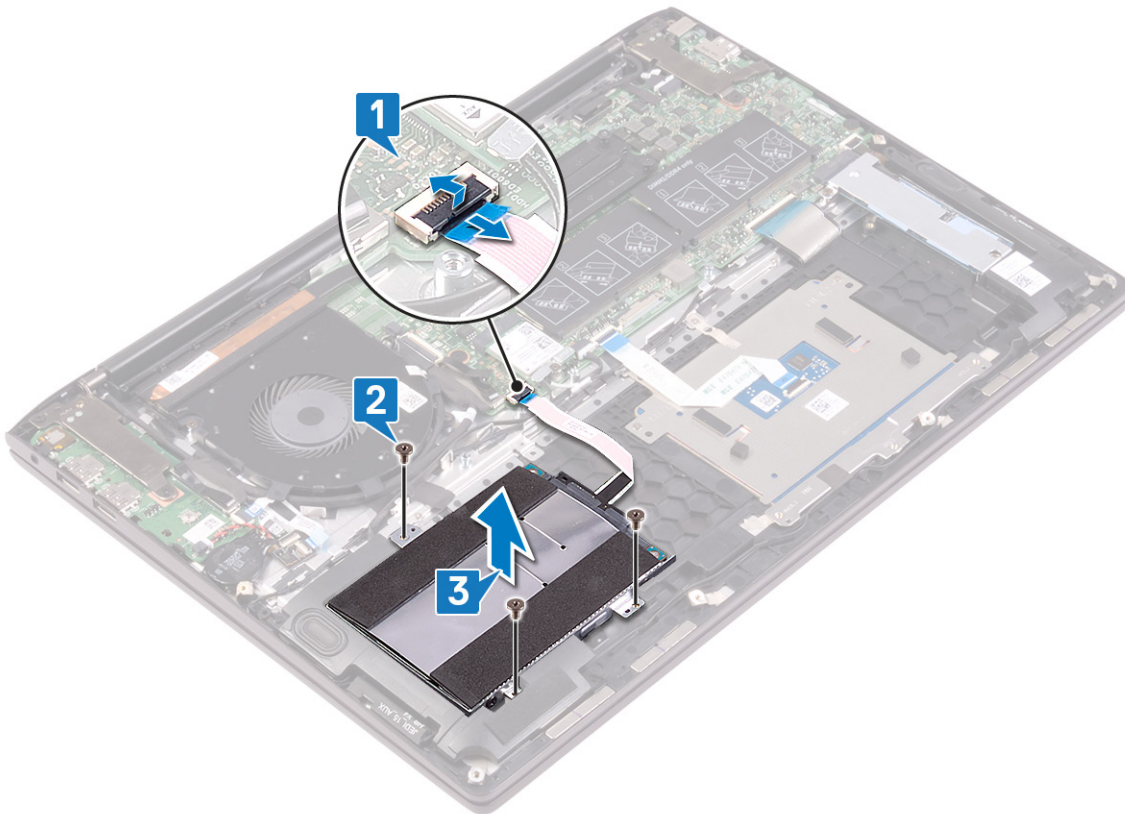
4. Disconnect the interposer from the hard-drive assembly.

5. Remove the four screws (M3x3) that secure the hard-drive bracket to the hard drive.
6. Lift the hard drive off of the hard-drive bracket.
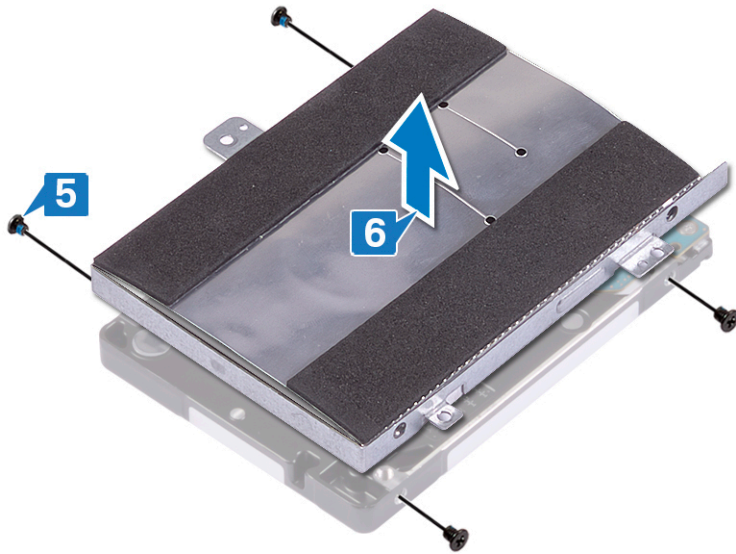
Replacing the hard drive

ⓘ **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. Place the hard drive into the hard-drive bracket.
2. Align the screw holes on the hard-drive bracket with the screw holes on the hard drive, and then 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 assembly.
5. Replace the three screws (M2x3) that secure the hard-drive assembly to the palm-rest assembly.
6. Connect the hard-drive cable to the system board.

Replacing the speakers

(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. Using the alignment posts on the palm-rest assembly, place the left speaker on the palm-rest assembly.
2. Route the speaker cable through the routing guides on the palm-rest assembly and adhere the tape secures the speaker cable to the palm-rest assembly.
3. Using the alignment posts on the palm-rest assembly, place the right speaker on the palm-rest assembly.
4. Adhere the tapes that secure the speaker cable to the touchpad bracket.
5. Connect the speaker cable to the system board.
6. Connect the hard-drive cable to the system board.

Post-requisites

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

Removing 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. Open the latch, and disconnect the touchpad cable from the system board.
2. Peel off the tapes that secure the touchpad assembly to the palm-rest assembly.
3. Peel off the tape that secures the speaker cable to the touchpad bracket.
4. Remove the three screws (M2x3) that secure the touchpad bracket to the palm-rest assembly.
5. Lift the touchpad bracket off the palm-rest assembly.
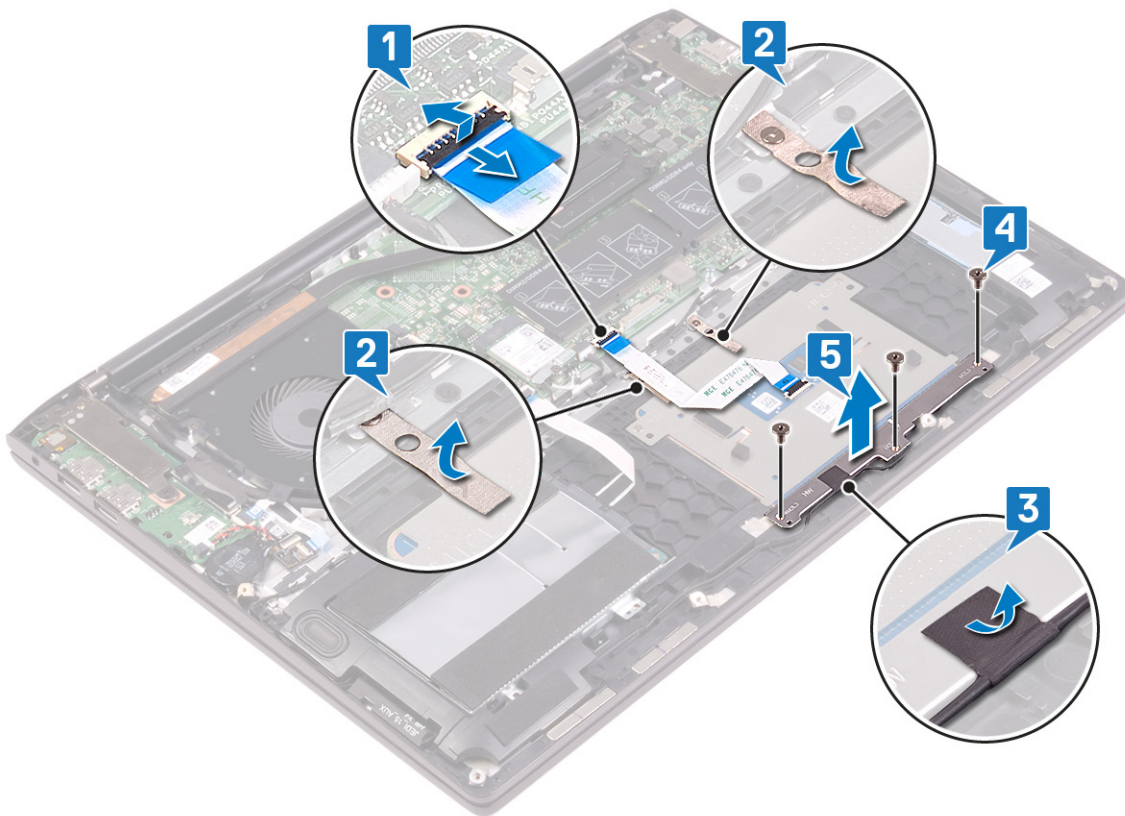
6. Remove the two screws (M1.6x2) that secure the touchpad to the palm-rest assembly.
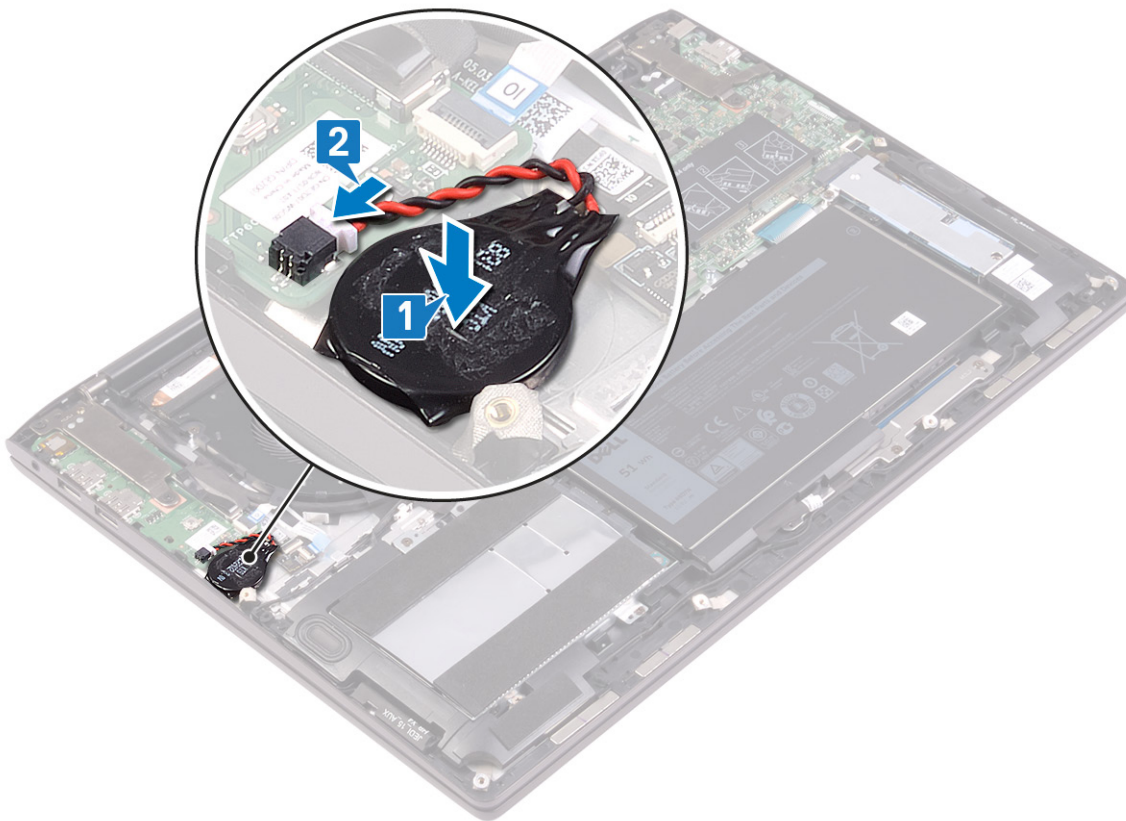7. Slide and lift the touchpad off the palm-rest assembly.

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. Slide the touchpad into the slot on the palm-rest assembly.
2. Replace the two screws (M1.6x2) that secure the touchpad to the palm-rest assembly.

3. Align the screw holes on the touchpad bracket with the screw holes on the palm-rest assembly.
4. Replace the three screws (M2x3) that secure the touchpad bracket to the palm-rest assembly.
5. Adhere the tape that secures the touchpad bracket to the palm-rest assembly.
6. Adhere the tapes that secure the touch-pad assembly to the palm-rest assembly.
7. Slide the touchpad cable into the connector on the system board and close the latches to secure the cable.
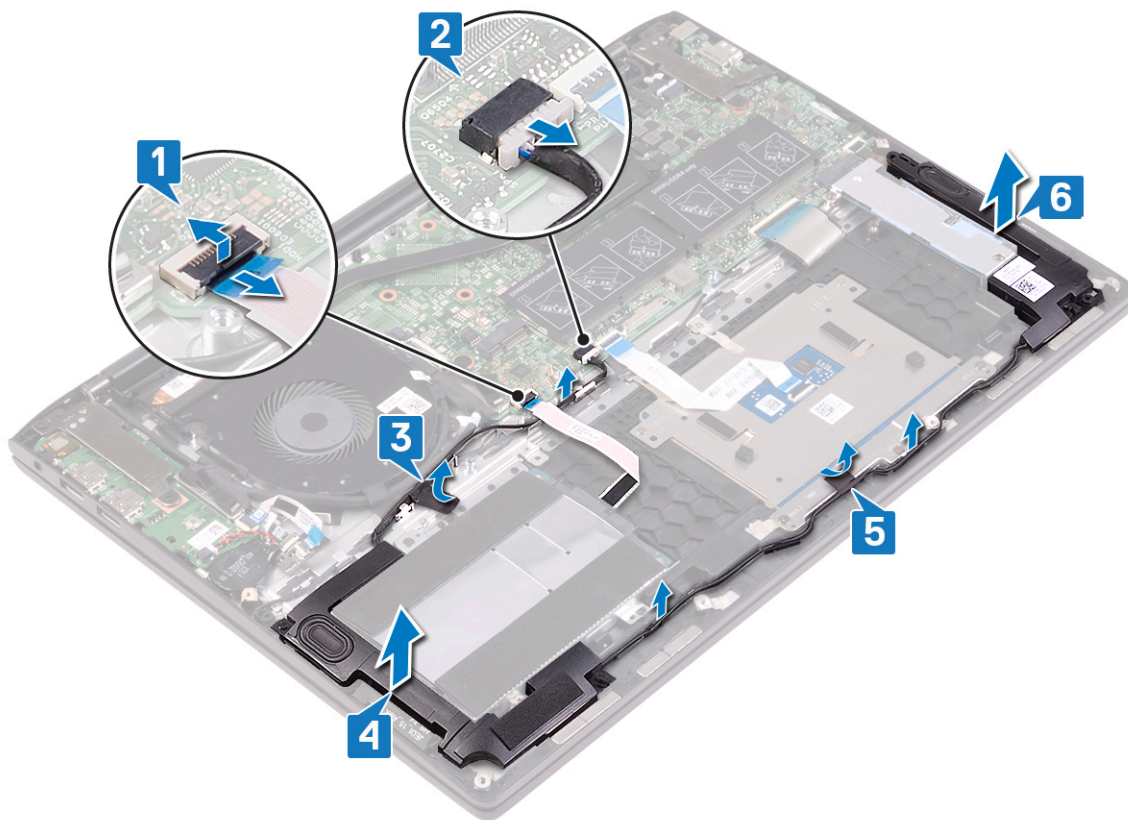
Removing the speakers

(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

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. Disconnect the speaker cable from the system board.
3. Peel off the tapes and release the speaker cable from the routing guides on the palm-rest assembly.
4. Lift the right speaker from the palm-rest assembly.
5. Peel off the tapes and remove the speaker cable from the routing guides on the palm-rest assembly.
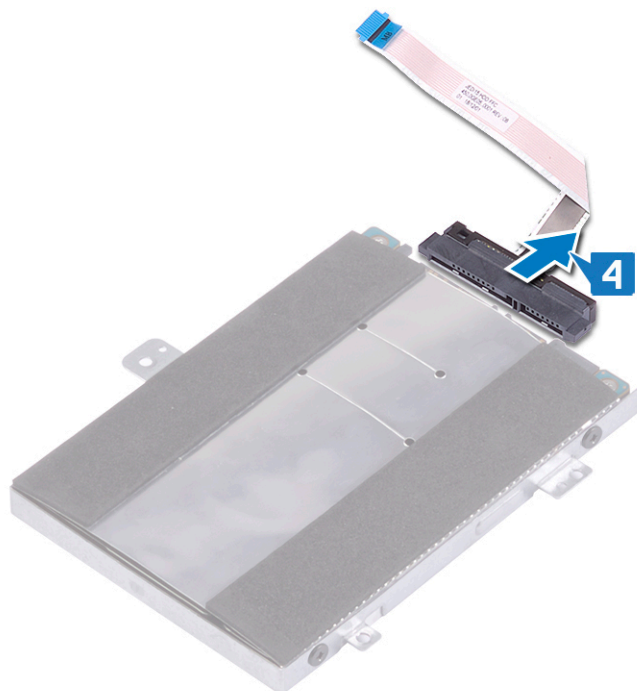6. Lift the left speaker off the palm-rest assembly.

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 on the palm-rest assembly, place the left speaker on the palm-rest assembly.
2. Route the speaker cable through the routing guides on the palm-rest assembly and adhere the tape secures the speaker cable to the palm-rest assembly.
3. Using the alignment posts on the palm-rest assembly, place the right speaker on the palm-rest assembly.
4. Adhere the tapes that secure the speaker cable to the touchpad bracket.
5. Connect the speaker cable to the system board.
6. Connect the hard-drive cable to the system board.

Post-requisites
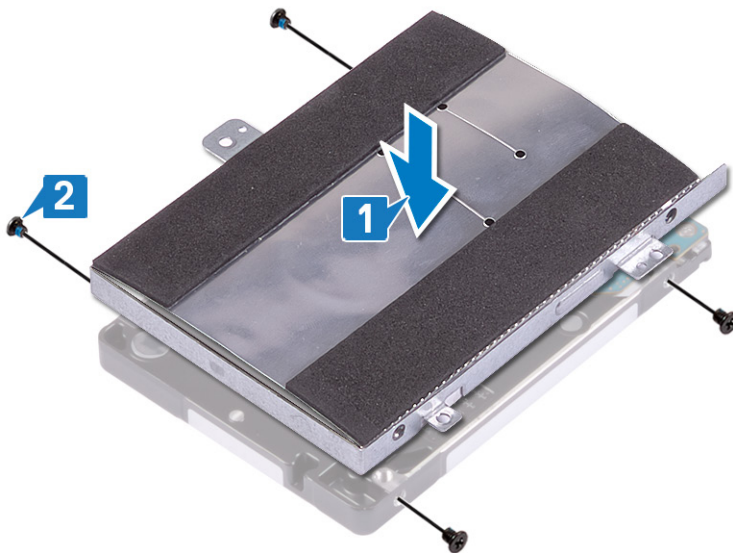
1. Replace the battery.
2. Replace the base cover.

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

1. Remove the base cover.
2. Remove the fan.

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.
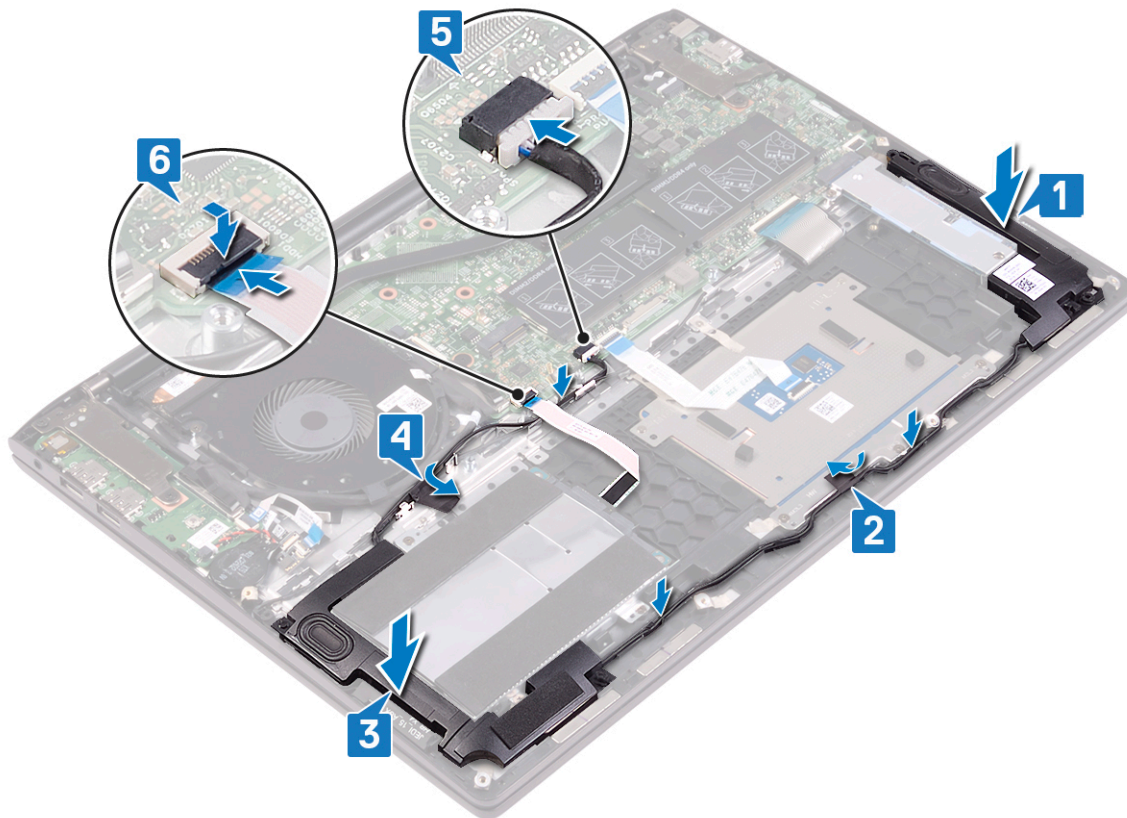2. Lift the heat sink off the system board.
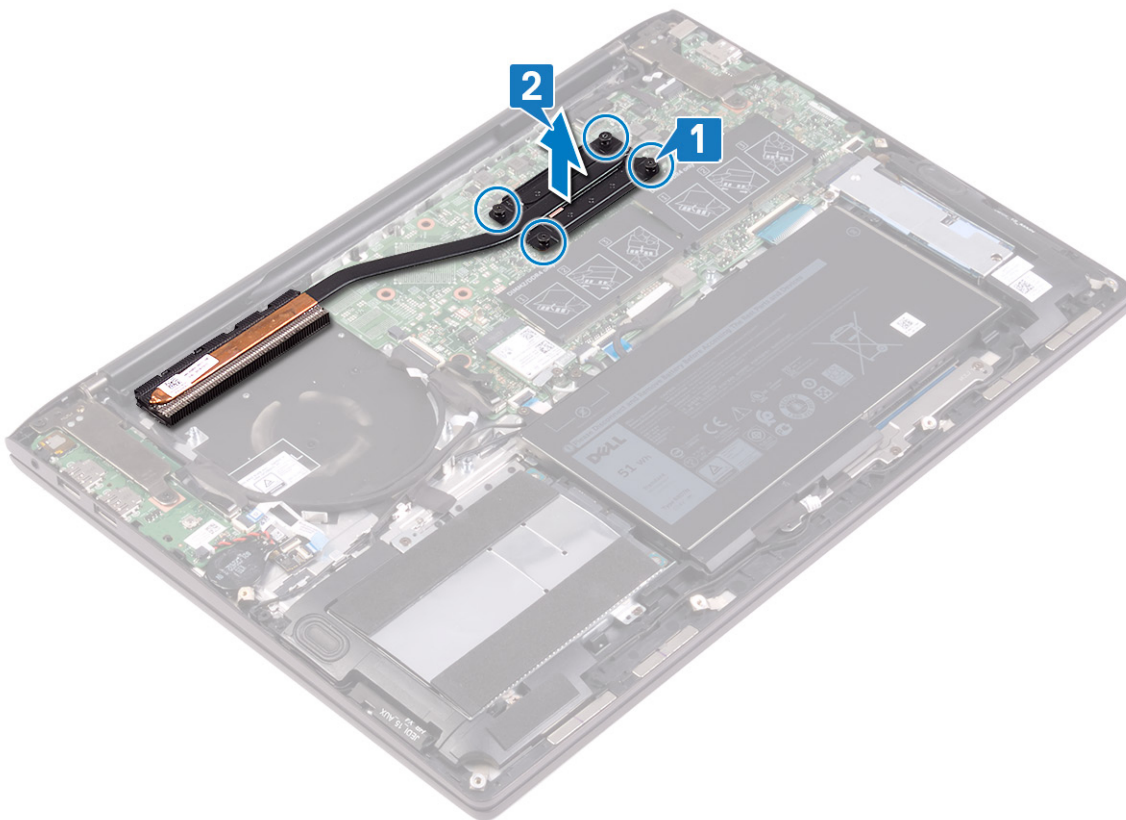
Replacing the heat sink

ⓘ **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. Align 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

1. Replace the fan.
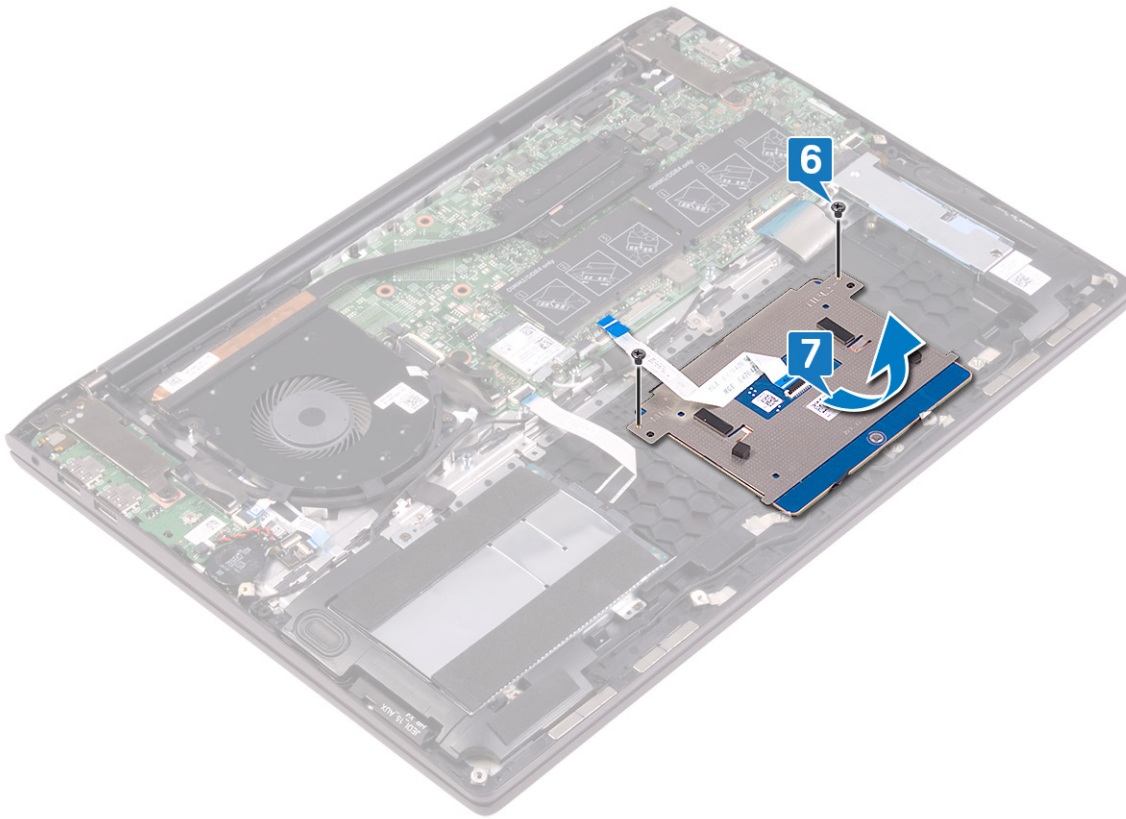2. Replace the base cover.

Removing 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.

Prerequisites

1. Remove the base cover.
2. Remove the fan.

Procedure

1. Open the latch and disconnect the touchscreen-board cable from the system board.
2. Peel the tape to release the touchscreen-board cable and remove the cable from the routing guides on the palm-rest assembly.
3. Using the pull tab, disconnect the display cable from the system board.
4. Peel the tape that secures the display cable to the system board.

5. Turn the computer over and open the display as far as possible.

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

6. Turn the computer over and remove the four screws (M2.5x4) that secure the display hinges to the I/O board and system board.
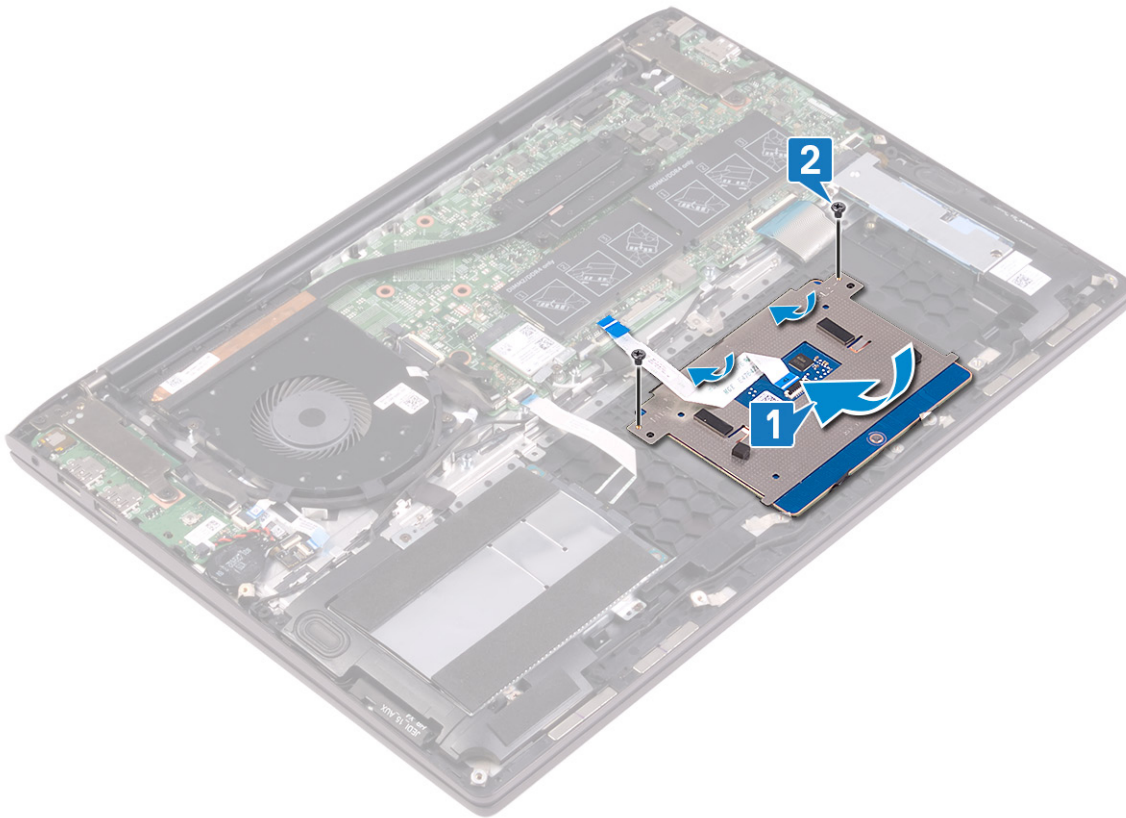7. Lift the display assembly off the palm-rest assembly.
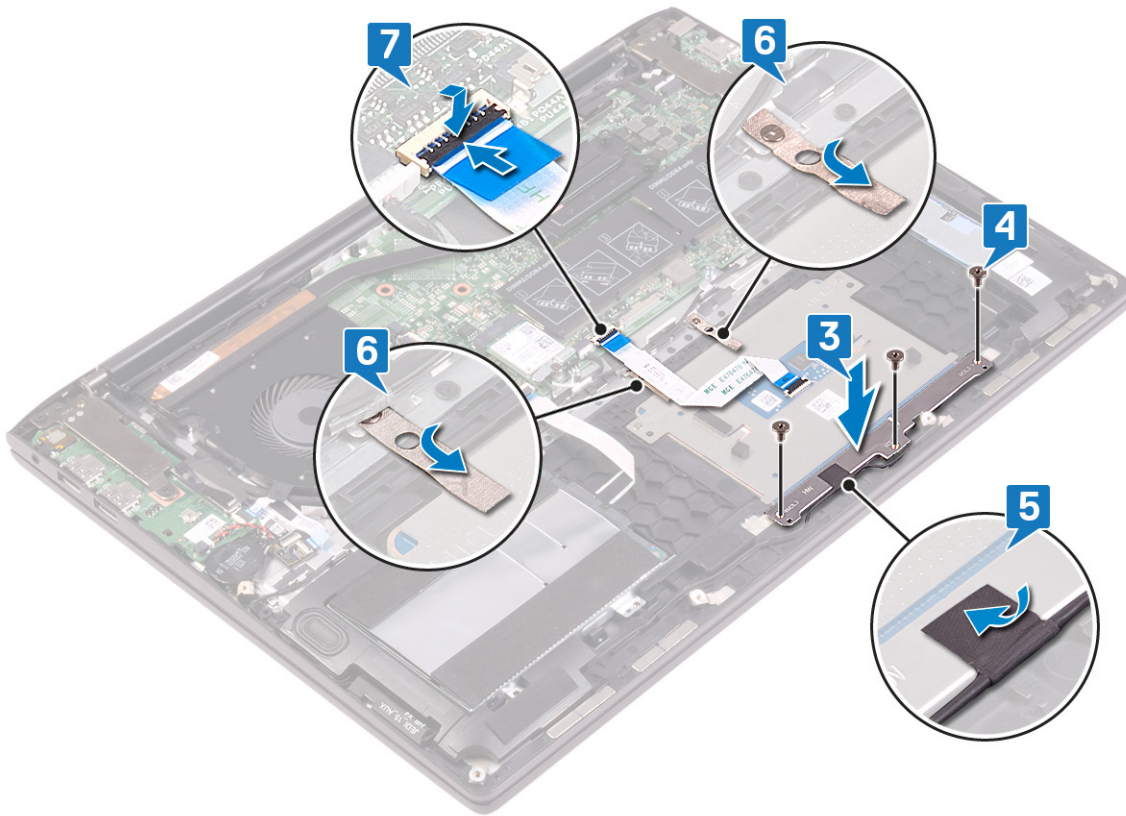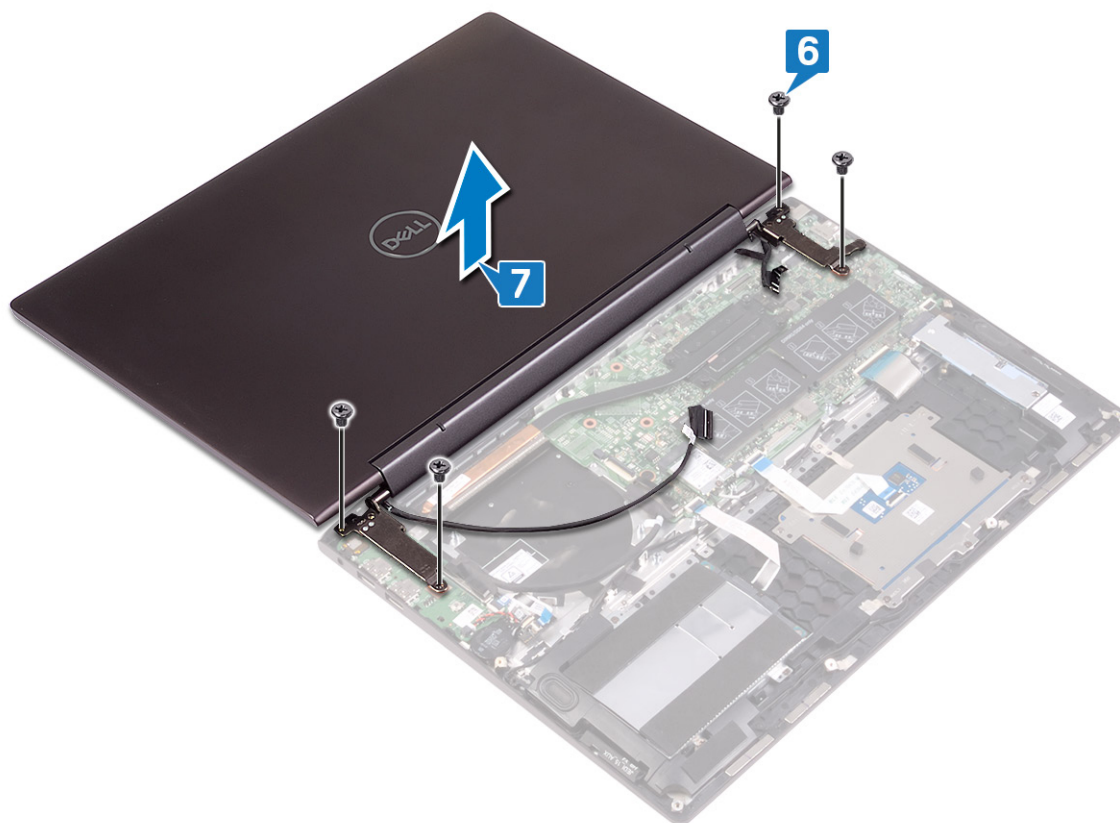
Replacing the display assembly

(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

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

1. Place the display assembly on the palm-rest assembly. Align the screw holes on the display hinges with the screw holes on the I/O board and system board.
2. Replace the four screws (M2.5x4) that secure the display hinges to the I/O board and system board.
3. Close the display.

4. Connect the display cable to the system board .
5. Adhere the tape that secures the display cable to the system board.
6. Route the touchscreen-board cable through the routing guides on the palm-rest assembly, and adhere the tape that secures the touchscreen-board cable to the palm-rest assembly.
7. Slide the touchscreen-board cable into the connector on the system board and close the latch to secure the cable.
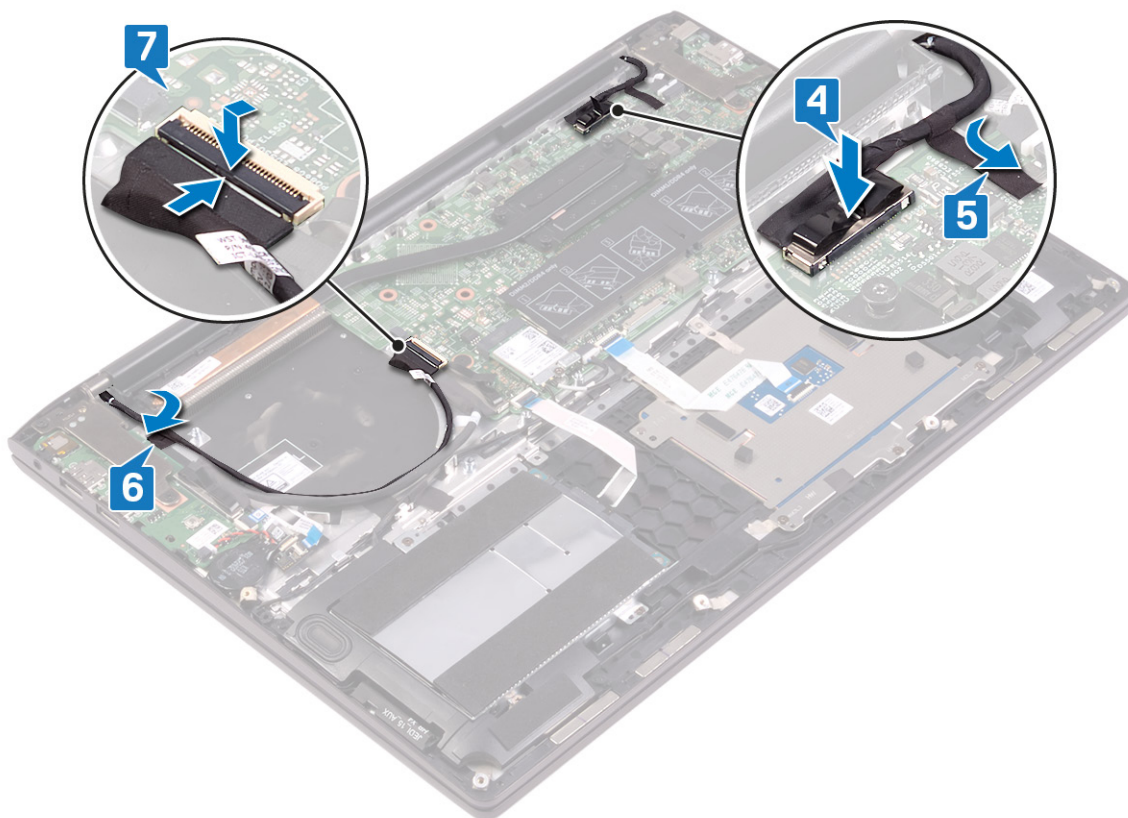
Post-requisites

1. Replace the fan.
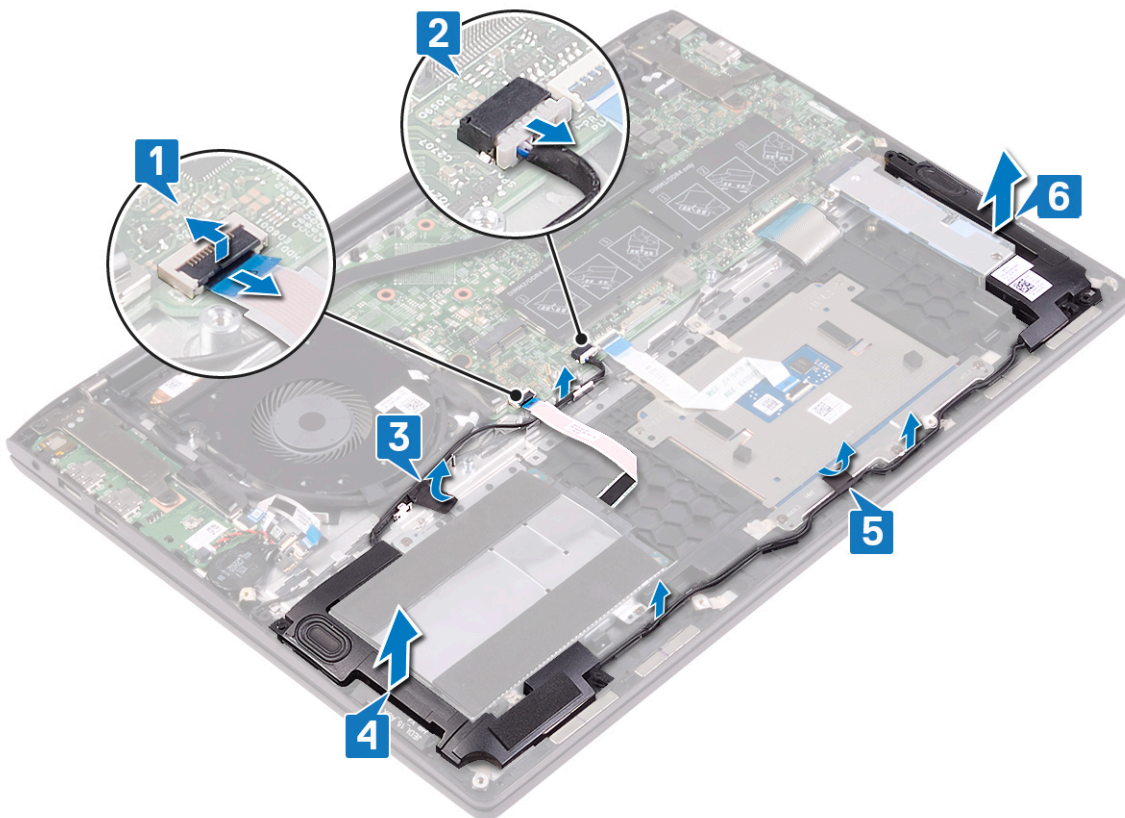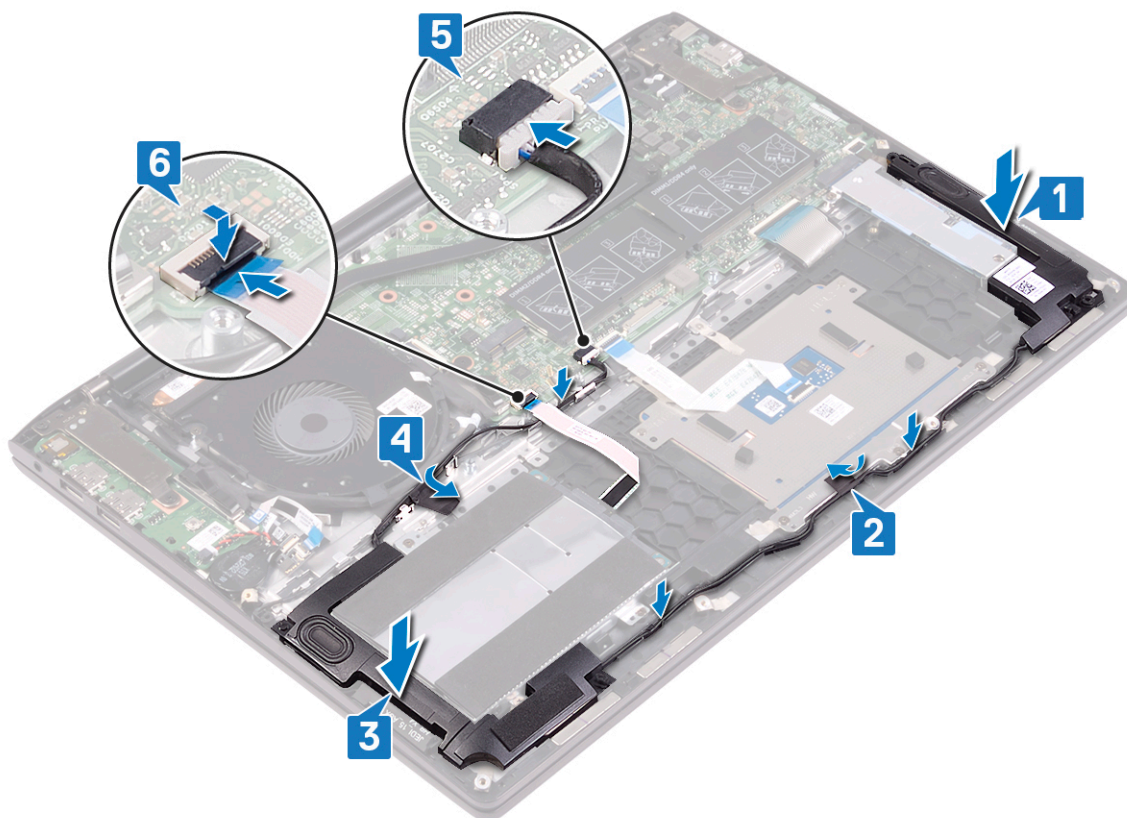2. Replace the base cover.

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 solid-state drive.
5. Remove the wireless card.
6. Remove the fan.

    ⓘ **NOTE:** Remove the heat sink from the system board only when you want to replace the system board. To replace the keyboard, power button with fingerprint reader, and palm-rest and antenna assembly, remove the system board assembly along with the heat sink.

7. Remove the heat sink.

Procedure

1. Remove the two screws (M2.5x4) that secure the left display hinge to the system board.
2. Lift the left display hinge from the system board.
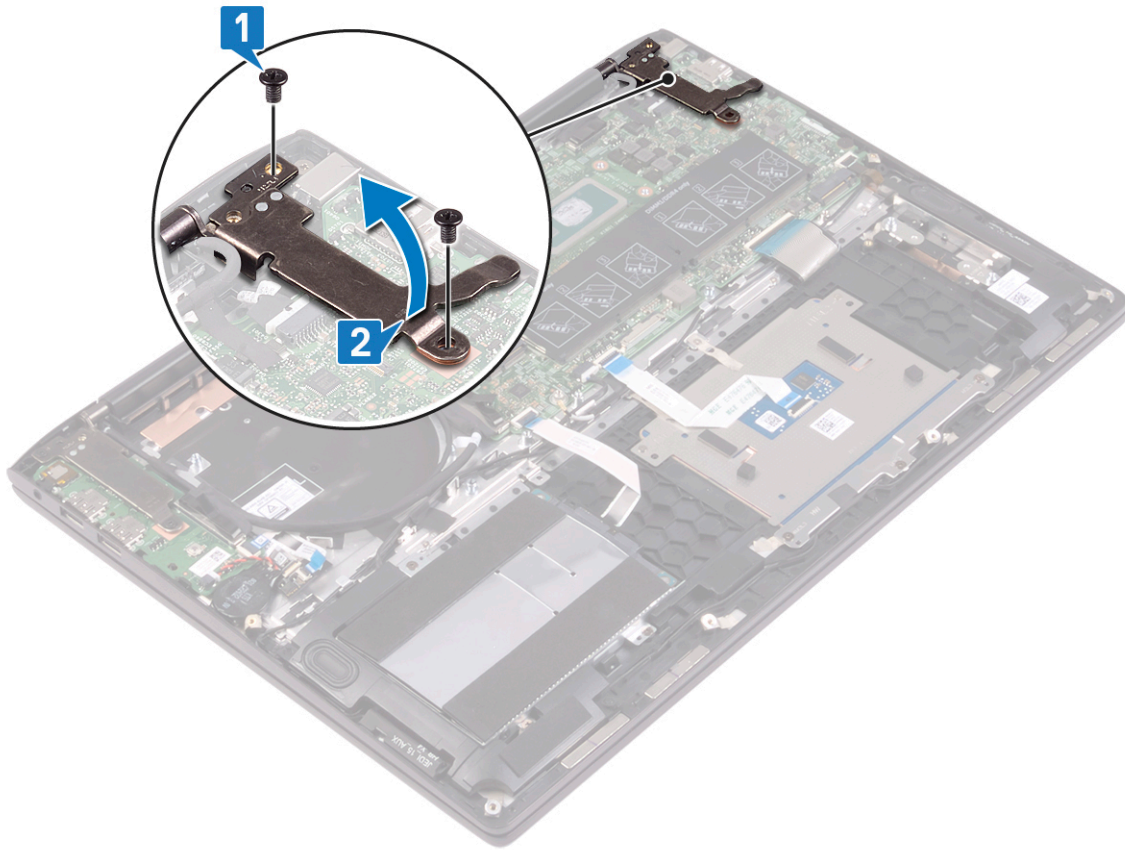
3. Using the pull tab, disconnect the display cable from the system board.
4. Peel off the tape that secures the display cable to the system board.
5. Disconnect the power-adapter port cable from the system board.
6. Open the latch, and disconnect the keyboard-backlight cable from the system board.
7. Open the latch, and disconnect the keyboard cable from the system board.
8. Open the latch, and disconnect the touchpad cable from the system board.
9. Disconnect the speaker cable from the system board.
10. Open the latch, and disconnect the hard-drive cable from the system board.
11. Using the pull tab, disconnect the I/O-board cable from the system board.
12. Open the latch, and disconnect the touch-screen cable from the system board.
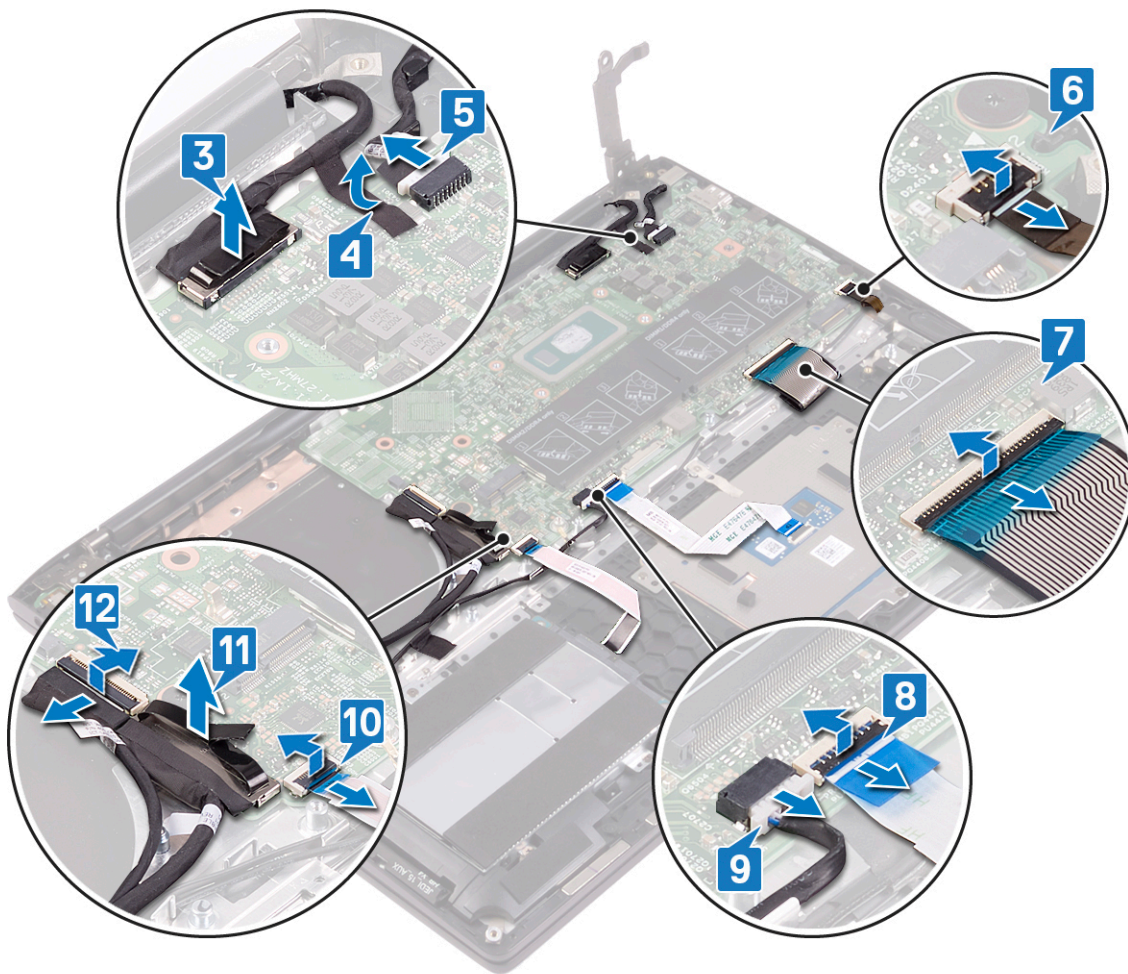
13. Remove the two screws (M2x2) that secure the system board to the palm-rest assembly.
14. Lift the system board off the palm-rest assembly.
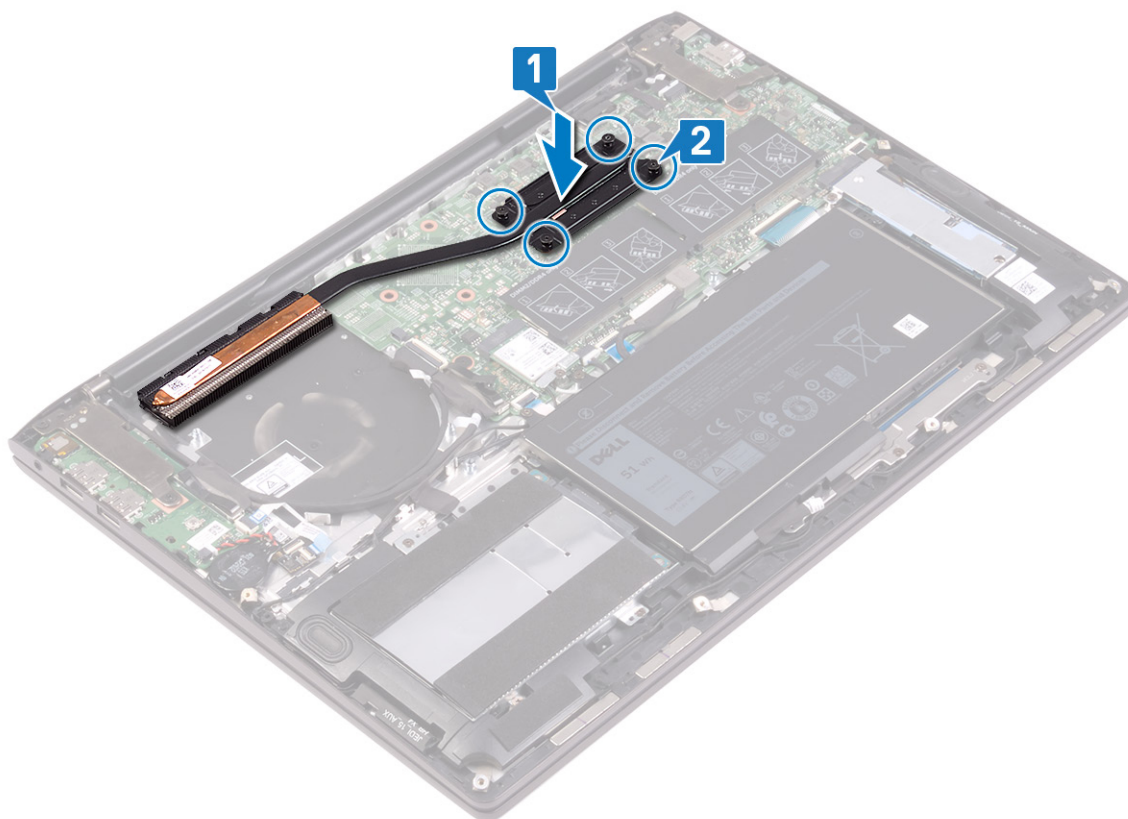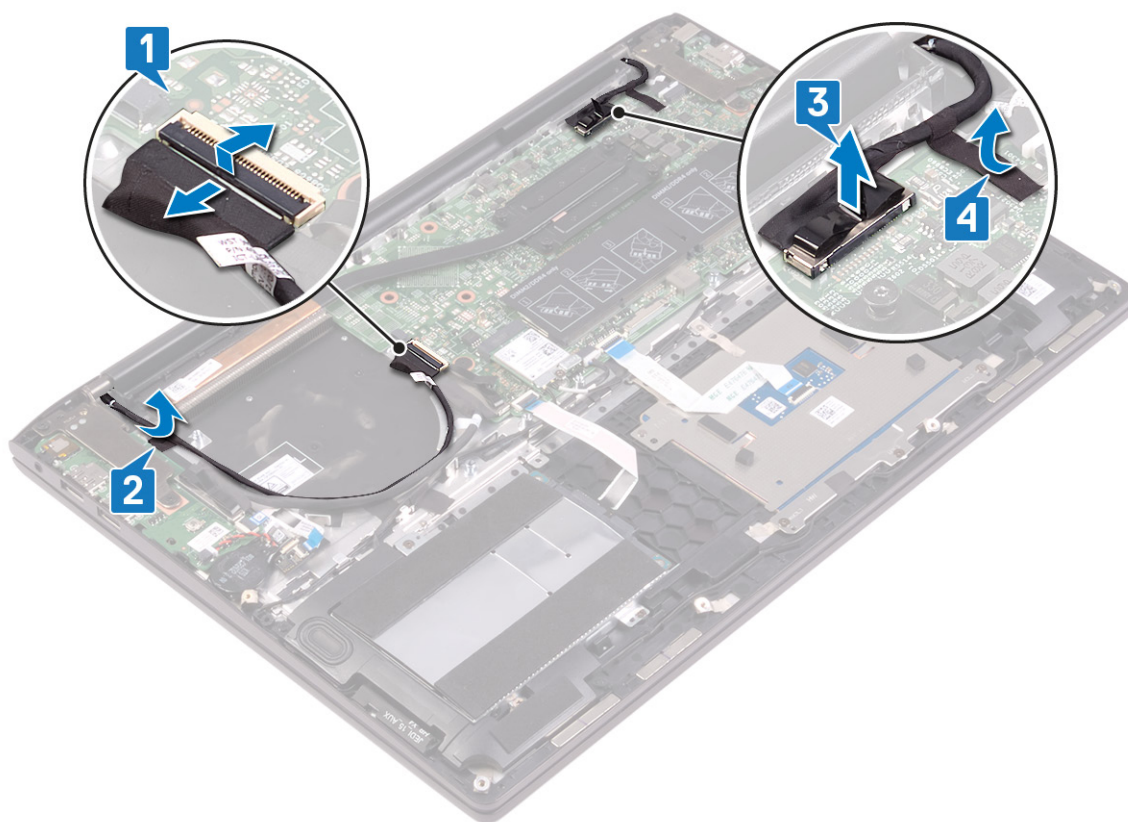
Replacing the system board

ⓘ **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 assembly.
2. Replace the two screws (M2x2) that secure the system board to the palm-rest assembly.
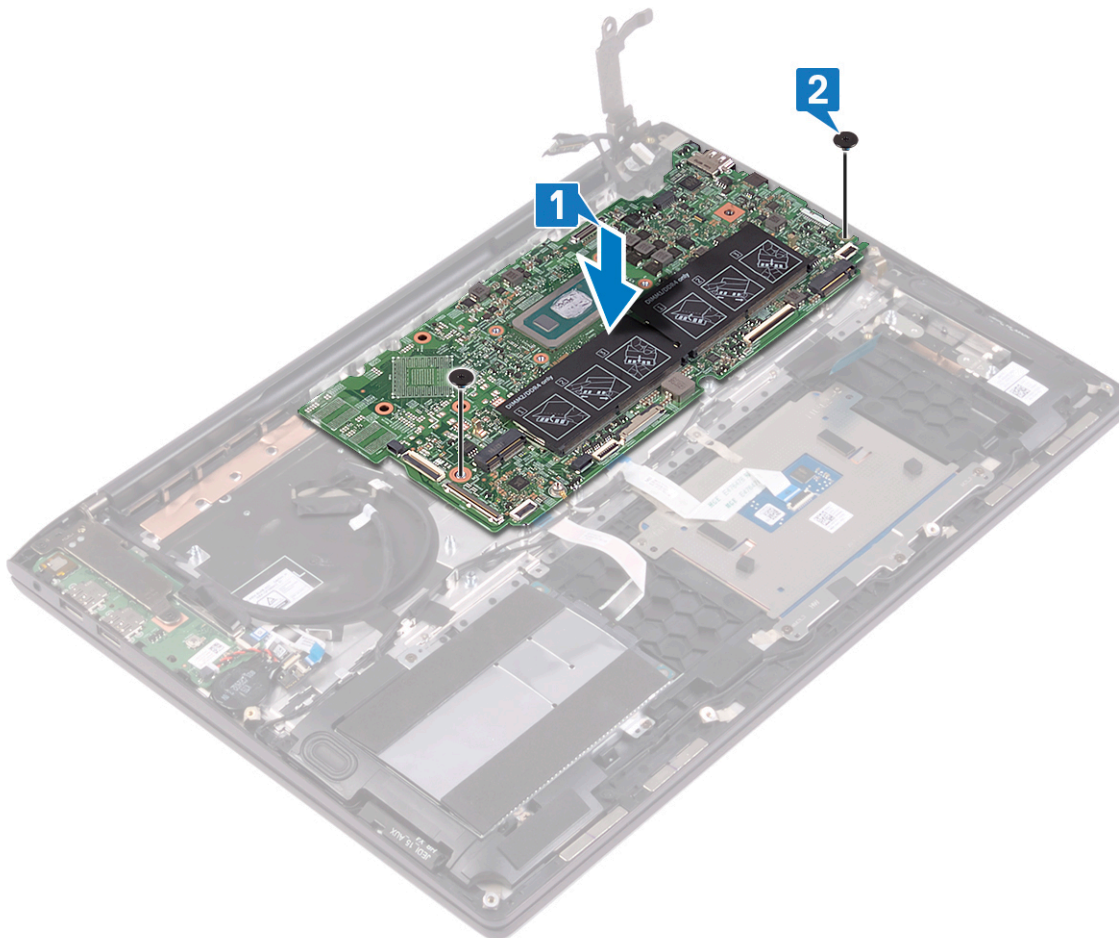
3. Slide the touch-screen cable to the system board and close the latch to secure the cable.
4. Connect the I/O-board cable to the system board.
5. Slide the hard-drive cable to the system board and close the latch to secure the cable.

6. Connect the speaker cable to the system board.
7. Slide the touchpad cable to the system board and close the latch to secure the cable.
8. Slide the keyboard cable to the system board and close the latch to secure the cable.
9. Slide the keyboard-backlight cable to the system board and close the latch to secure the cable.
10. Connect the power-adapter port cable to the system board.
11. Adhere the tape that secures the display cable to the system board.
12. Connect the display cable to the system board.
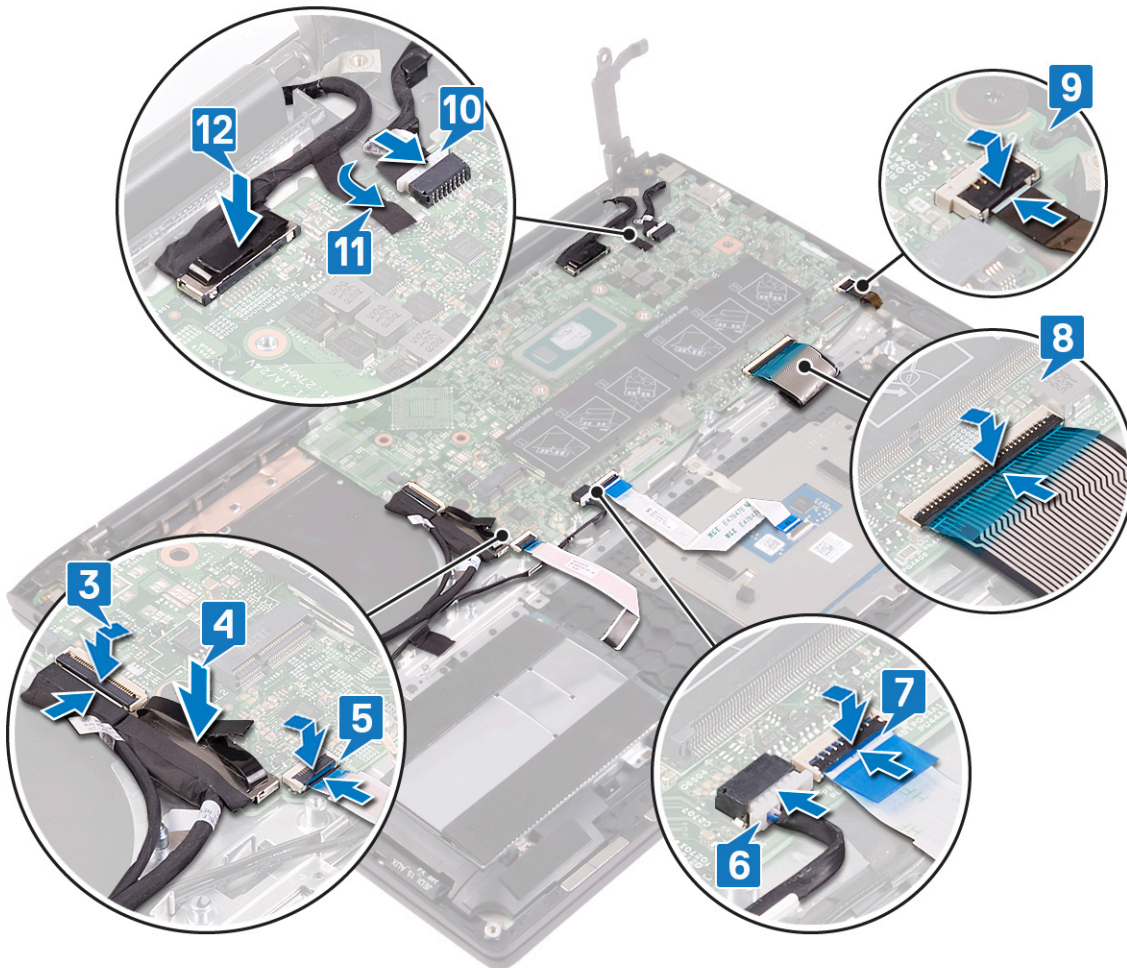
13. Close the left display hinge.
14. Replace the two screws (M2.5x4) that secure the left display hinge to the system board.
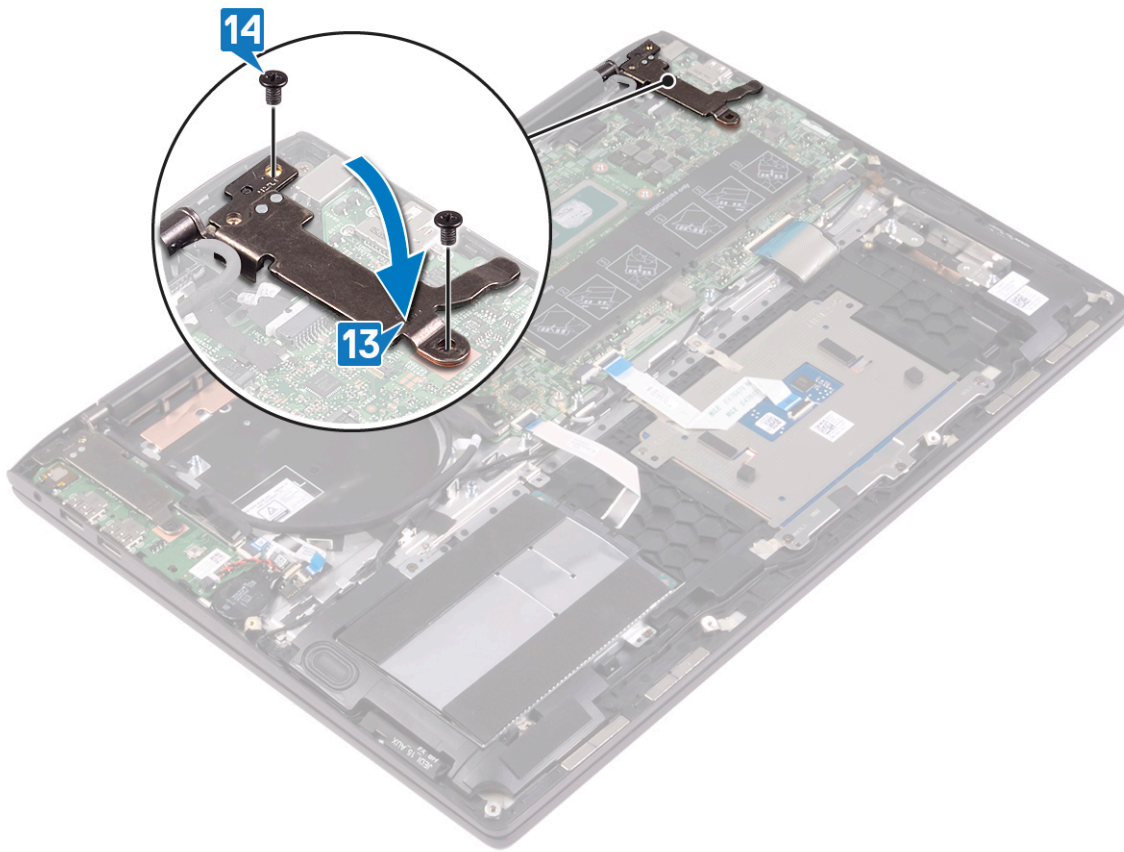
Post-requisites

1. Replace the heat sink.
2. Replace the fan.
3. Replace the wireless card.
4. Replace the solid-state drive.
5. Replace the memory modules.
6. Replace the battery.
7. Replace the base cover.

Entering the Service Tag in the BIOS setup program

1. Turn on or restart your computer.
2. Press F2 when the Dell logo is displayed to enter the BIOS setup program.
3. Navigate to the **Main** tab and enter the Service Tag in the **Service Tag Input** field.

ⓘ **NOTE:** Service tag is the alphanumeric identifier located at the back side of your computer.
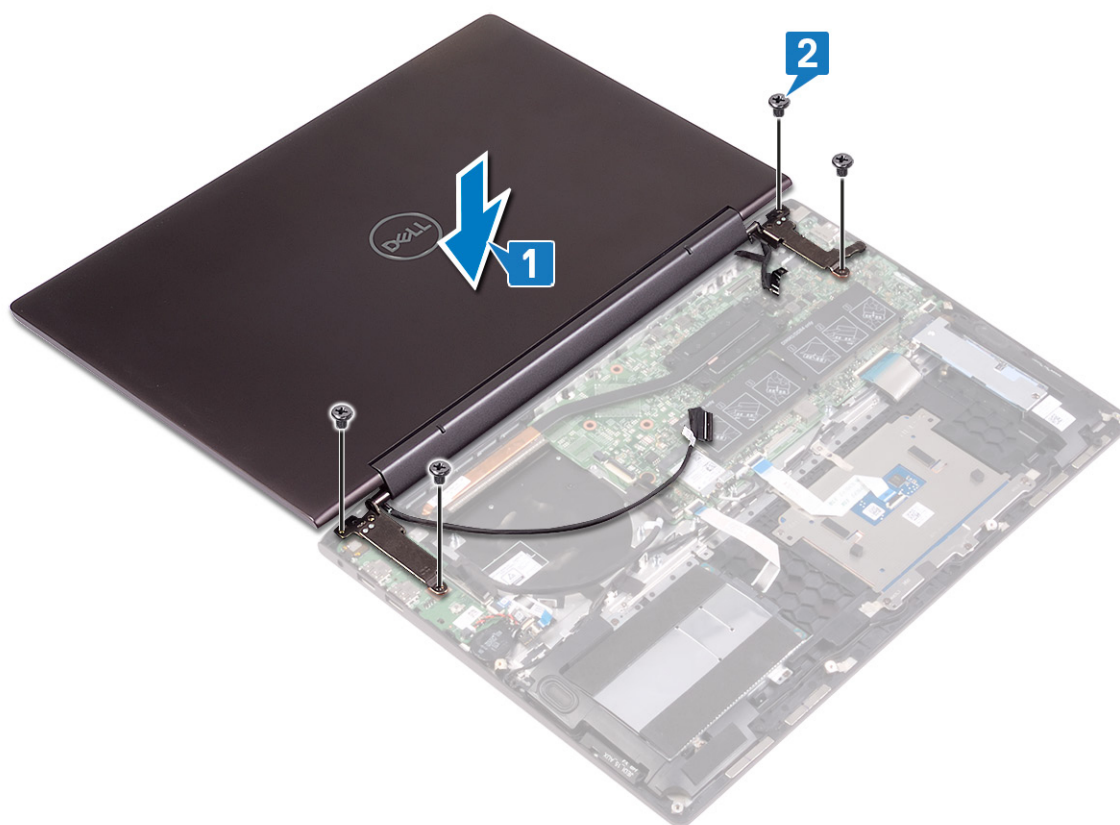
Removing the keyboard

ⓘ **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 solid-state drive.
5. Remove the hard drive.
6. Remove the coin-cell battery.
7. Remove the wireless card.
8. Remove the speakers.
9. Remove the fan.
10. Remove the display assembly.
11. Remove the I/O board.
12. Remove the power button with fingerprint reader.
13. Remove the system board.

Procedure

1. Peel the tapes that secure the antenna cables to the keyboard bracket.
2. Remove the antenna cables from the routing guides on the keyboard bracket.

3. Remove the 24 screws (M1.2x1.4) that secures the keyboard bracket to the keyboard.

   ⓘ **NOTE:** Lift the plastic sheet on the keyboard bracket to access the screws.

4. Peel off the tapes that secure the keyboard bracket to the palm-rest assembly.

5. Lift the keyboard bracket off the keyboard.
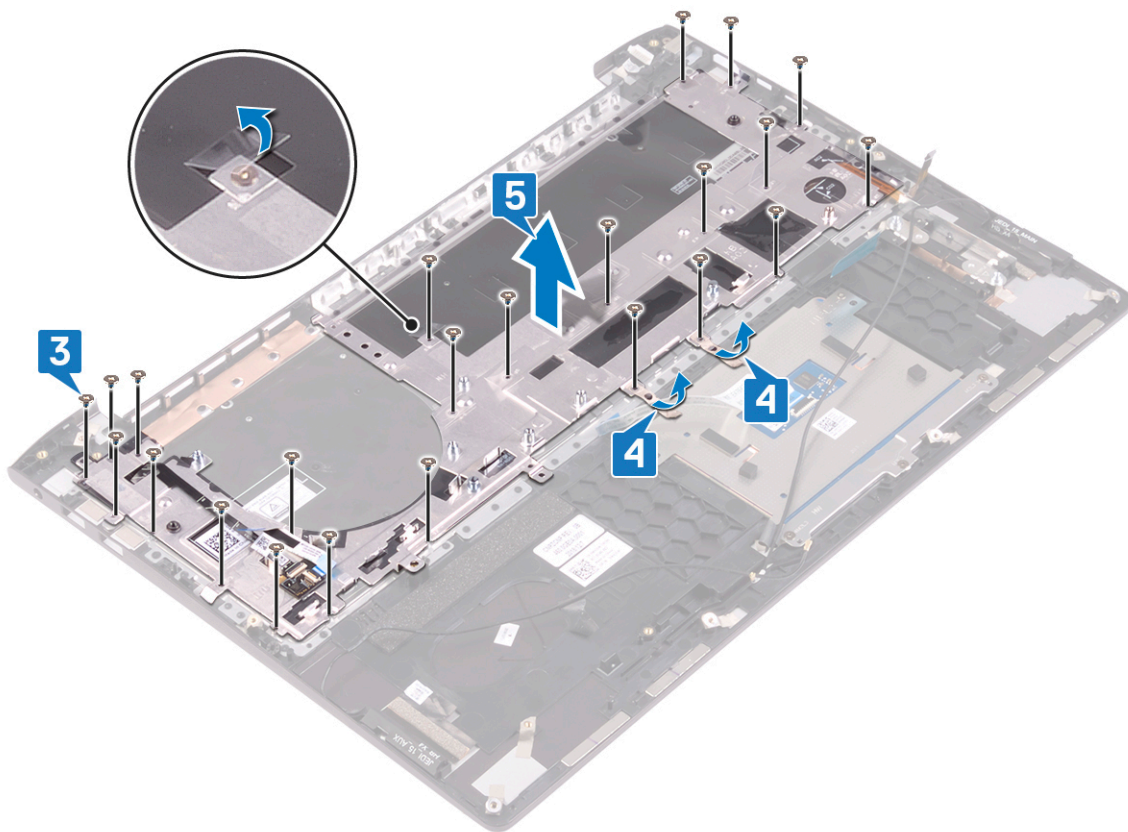
6. Remove the 19 screws (M1.2x1.5) that secure the keyboard to the palm-rest assembly.

7. Lift the keyboard off the palm-rest assembly.
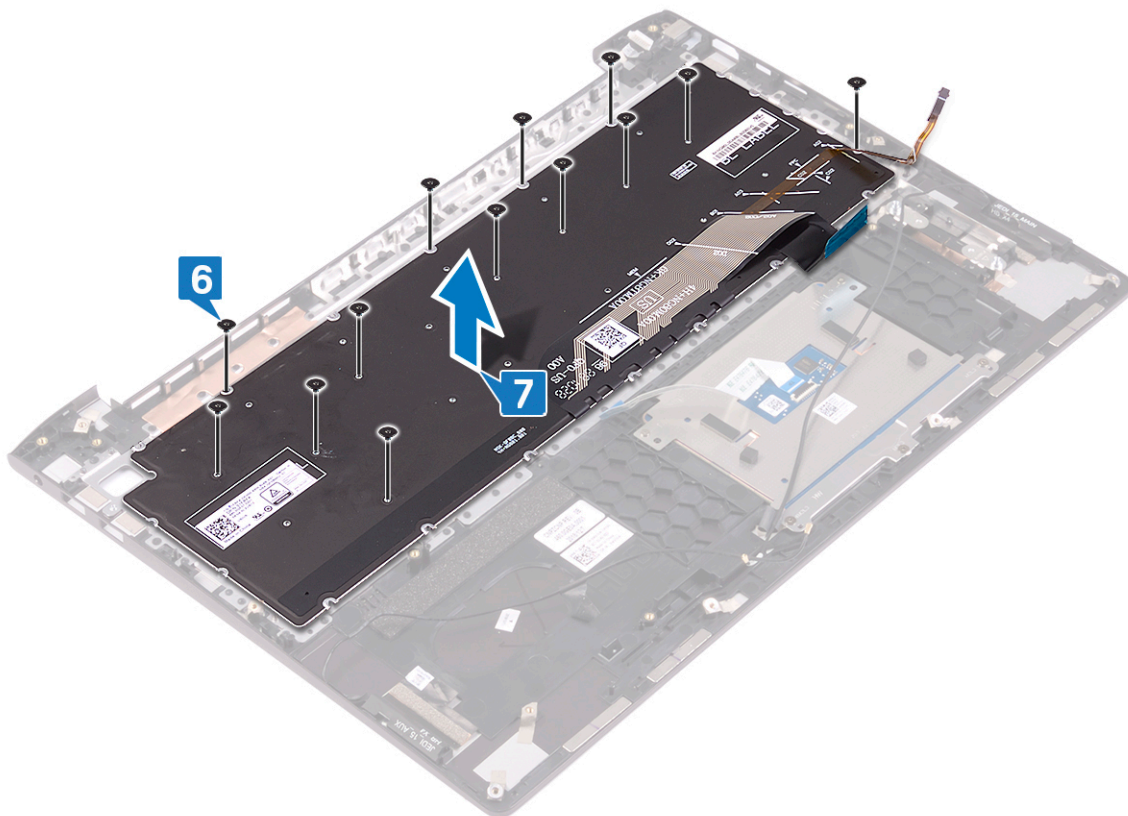
Replacing the keyboard

ⓘ **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 keyboard with the screw holes on the palm-rest assembly.
2. Replace the 19 screws (M1.2x1.5) that secure the keyboard to palm-rest assembly.
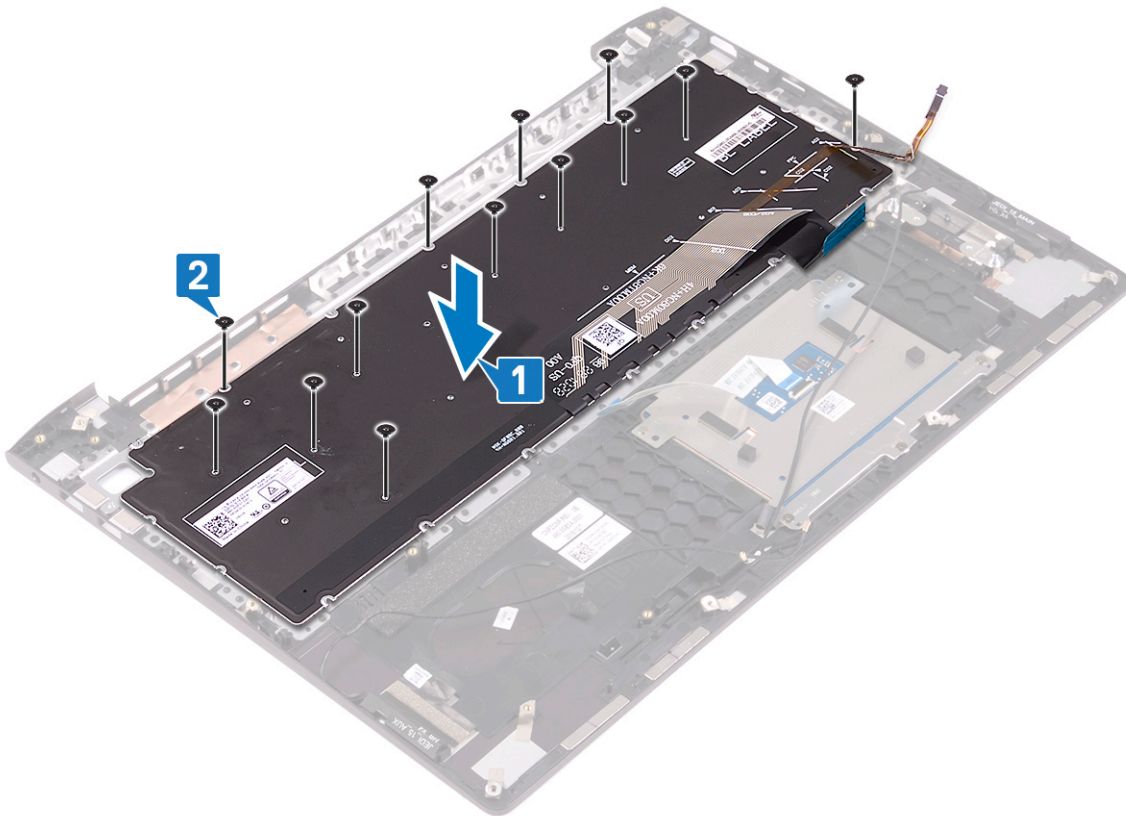
3. Align the screws holes on the keyboard bracket with the screw holes on the keyboard.
4. Adhere the tapes that secure the keyboard bracket to the palm-rest assembly.
5. Replace the 24 screws (M1.2x1.4) that secure the keyboard bracket to keyboard.
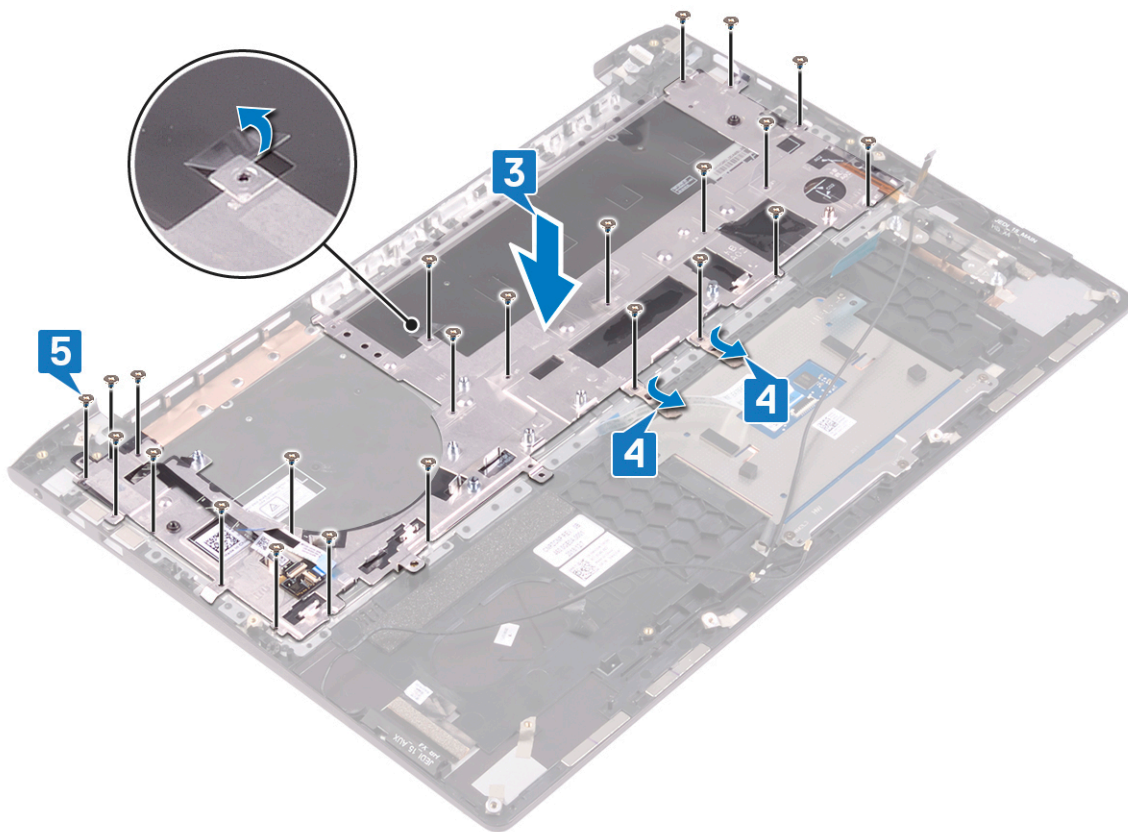
6. Replace the plastic sheet on the keyboard bracket.
7. Route the antenna cables through the routing guides on the keyboard bracket.
8. Adhere the tapes that secure the antenna cables to the keyboard bracket.
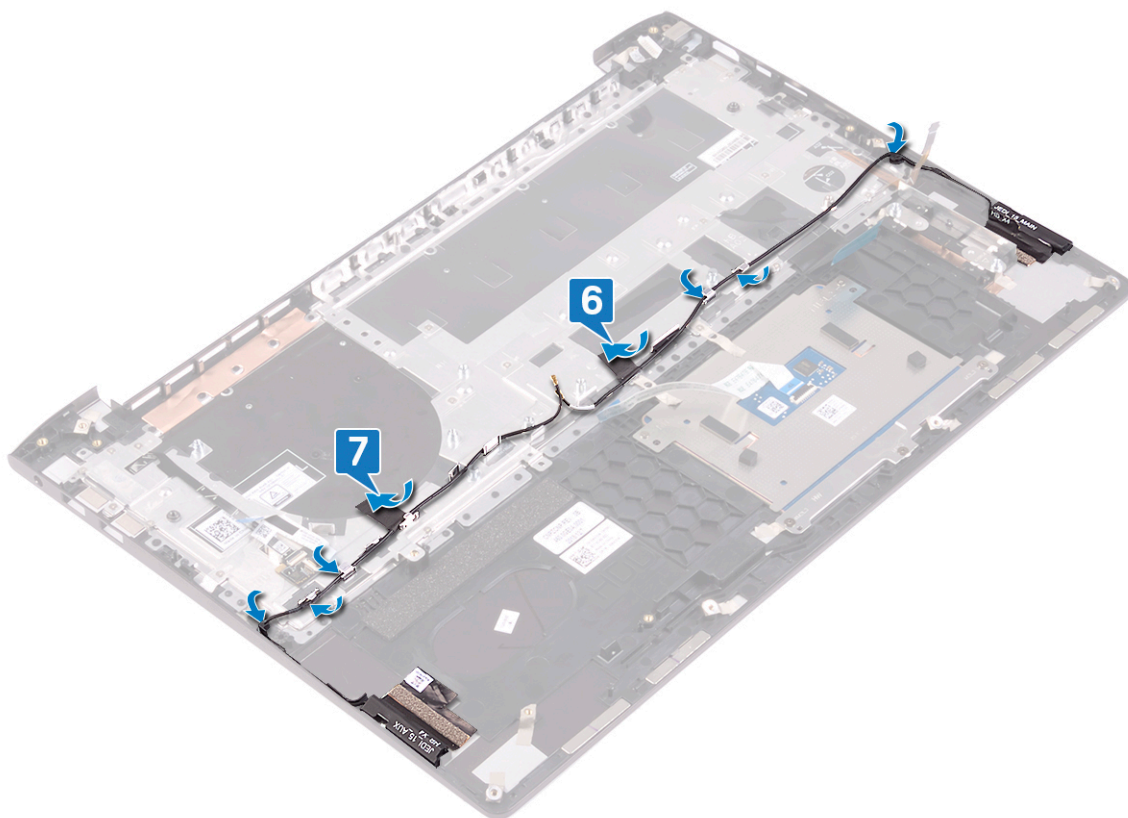
Post-requisites

1. Replace the system board.
2. Replace the power button with fingerprint reader
3. Replace the I/O board.
4. Replace the display assembly.
5. Replace the fan.
6. Replace the speakers.
7. Replace the wireless card.
8. Replace the coin-cell battery.
9. Replace the hard drive.
10. Replace the solid-state drive.
11. Replace the memory modules.
12. Replace the battery.
13. Replace the base cover.

Removing the power button with fingerprint reader

ⓘ **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 solid-state drive.
5. Remove the hard drive.
6. Remove the coin-cell battery.
7. Remove the wireless card.
8. Remove the speakers.
9. Remove the fan.
10. Remove the display assembly.
11. Remove the I/O board.
12. Remove the system board.

Procedure

1. Follow the procedure from step 1 to step 5 in "Removing the keyboard".
2. Slide and remove the power button with fingerprint-reader cable from the keyboard bracket.
3. Peel the power button with fingerprint-reader cable from the keyboard bracket.
4. Lift the power button with fingerprint-reader, along with its cable, off the slot
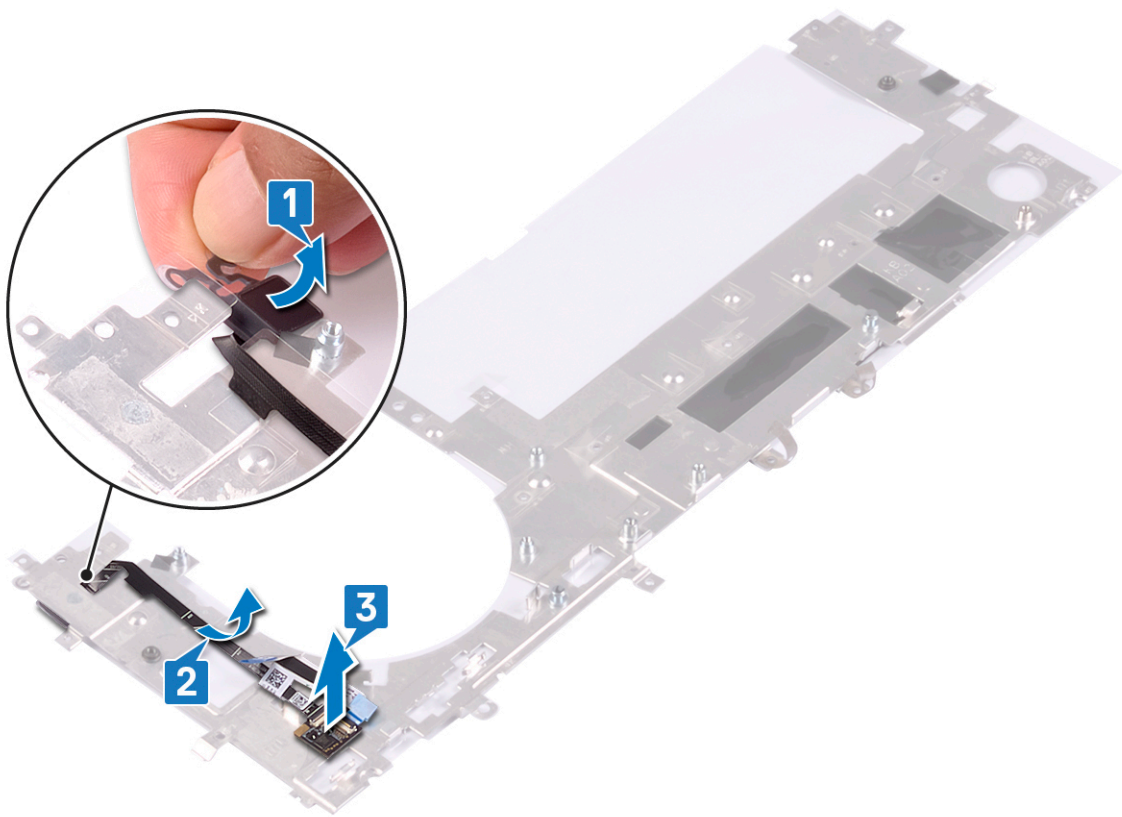
Replacing the power button with fingerprint reader

> (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 fingerprint-reader cable on the keyboard bracket.
2. Adhere the fingerprint-reader cable to the keyboard bracket.
3. Slide and insert the power button with fingerprint-reader cable on the slot on the keyboard bracket.
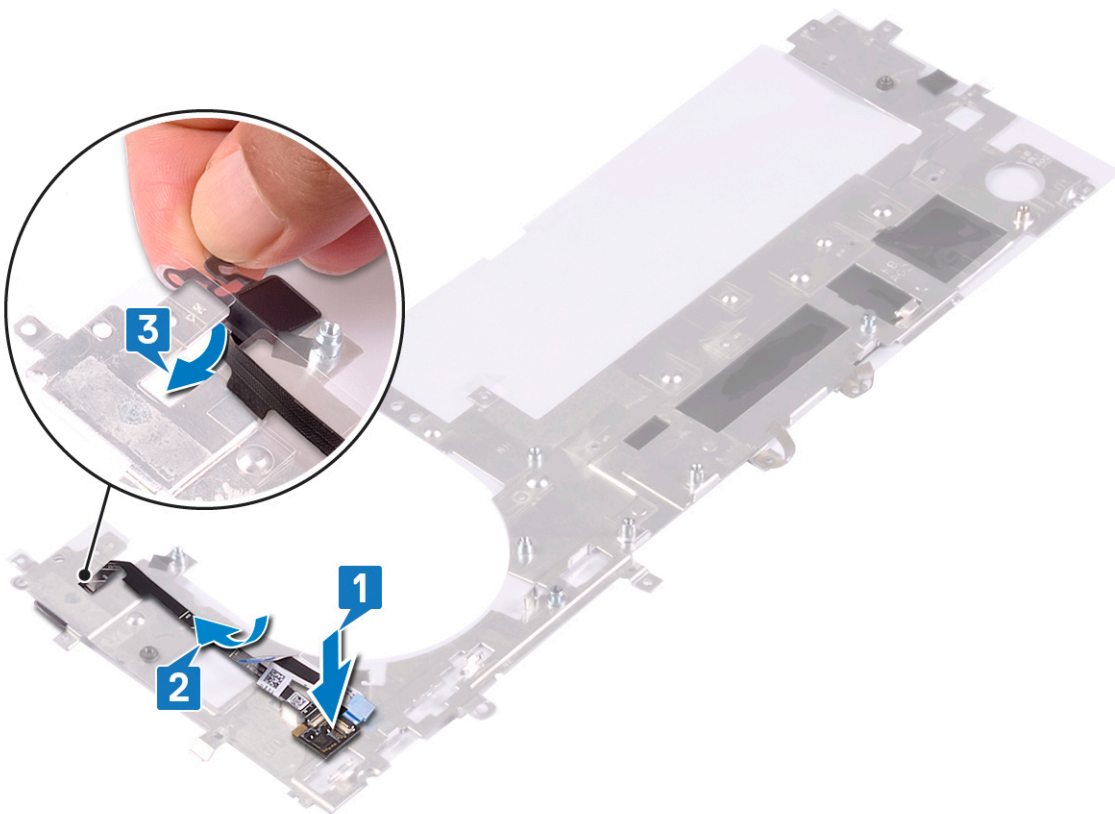
4. Follow the procedure from step 3 to step 8 in "Replacing the keyboard".

Post-requisites

1. Replace the system board.
2. Replace the I/O board.
3. Replace the display assembly.

4. Replace the fan.
5. Replace the speakers.
6. Replace the wireless card.
7. Replace the coin-cell battery.
8. Replace the hard drive.
9. Replace the solid-state drive.
10. Replace the memory modules.
11. Replace the battery.
12. Replace the base cover.

Removing the palm-rest and antenna 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 wireless card.
5. Remove the power-adapter port.
6. Remove the I/O board.
7. Remove the fan.
8. Remove the solid-state drive.
9. Remove the coin-cell battery.
10. Remove the hard drive.
11. Remove the touch pad.
12. Remove the speakers.
13. Remove the display assembly.
14. Remove the system board.
15. Remove the keyboard.
16. Remove the power button with fingerprint reader.

Procedure

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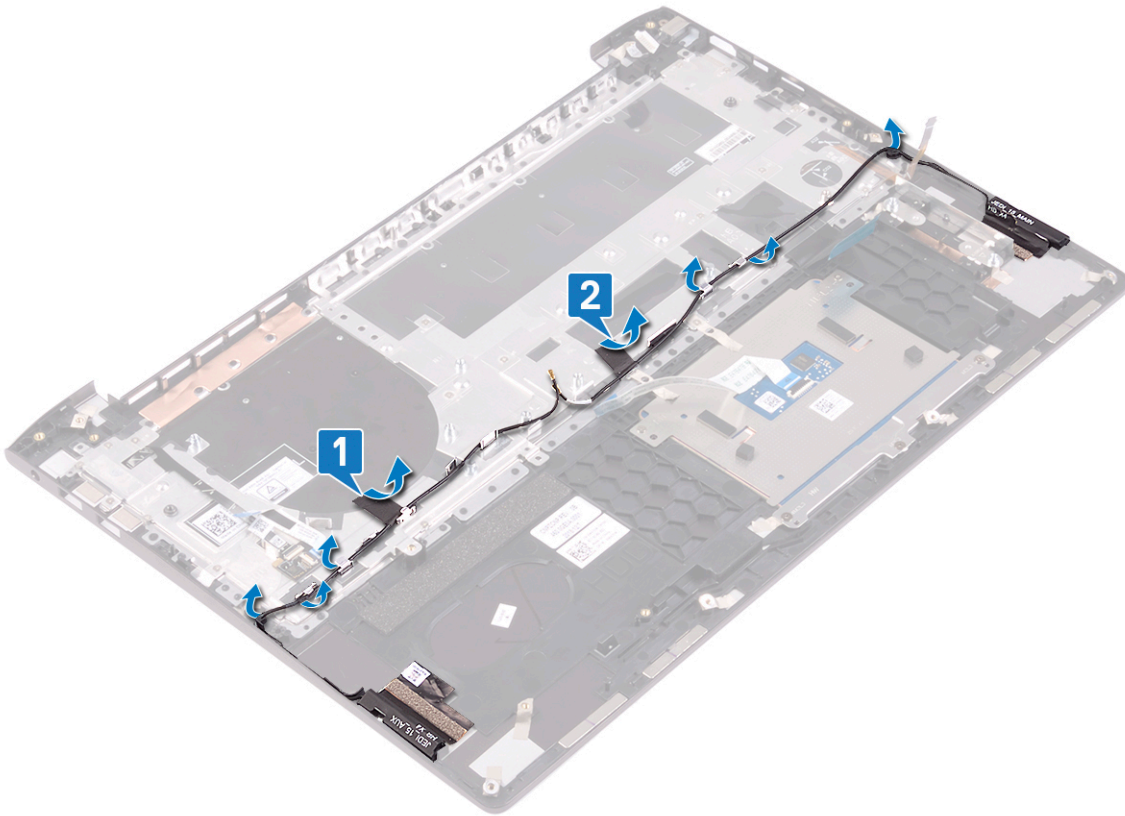
Replacing the palm-rest and antenna assembly

> (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 on a flat surface.

Post-requisites

1. Replace the power button with fingerprint reader.
2. Replace the keyboard.
3. Replace the system board.
4. Replace the display assembly.
5. Replace the speakers.
6. Replace the touch pad.

7. Replace the hard drive.
8. Replace the coin-cell battery.
9. Replace the solid-state drive.
10. Replace the I/O board.
11. Replace the power-adapter port.
12. Replace the wireless card.
13. Replace the fan.
14. Replace the memory modules.
15. Replace the battery.
16. Replace the base cover.

Procedure

Place the palm rest on a flat surface.

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

⚠ **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.

BIOS overview

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

Entering BIOS setup program

Turn on (or restart) your computer and press F2 immediately.

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

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.
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	

Table 3. System setup options—System information menu (continued)

Overview	
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.
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.
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.

Table 5. System setup options—System Configuration menu (continued)

System Configuration	
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	
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 6. System setup options—Video menu (continued)

Video	
EcoPower	Enables or disables EcoPower which increases the battery life by reducing the screen brightness when appropriate. Default: ON.

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.
Computrace	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.
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.

Table 7. System setup options—Security menu (continued)

Security	
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 8. 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 9. 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 10. 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.

Table 10. System setup options—Performance menu (continued)

Performance	
	Default: ON.

Table 11. 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.
Lid Switch	Enables the computer to power up from the off state whenever the lid is opened.
	Default: ON.

Table 12. 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.

Table 12. System setup options—Wireless menu (continued)

Wireless	
Bluetooth	Default: ON.

Table 13. System setup options—POST Behavior menu

POST Behavior	
Numlock Enable	Enables or disables Numlock when the computer boots.
	Default: ON.
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 14. 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 15. 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.

Table 15. System setup options—Maintenance menu (continued)

Maintenance	
	Default: ON.
	ⓘ **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.
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.

Table 16. 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 17. System setup options—SupportAssist menu

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

System and admin password

Table 18. System and admin password

Password type	Description
System password	Password that you must enter to log on to your computer.
Admin password	Password that you must enter to enable some security features in your computer.

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

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

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

ⓘ **NOTE:** System and admin password feature is disabled.

Assigning a system setup password

To enter the system setup, press F2 immediately after a power-on or re-boot.
1. In the **System BIOS** or **System Setup** screen, select **Passwords** on the left pane.
   The **Passwords** screen is displayed.
2. In the **System Password** or the **Admin Password** section, create a password in the **Enter the new password** field, and then press **Enter**.
   Use the following guidelines to assign the system password:
   - A password can have up to 32 characters.
   - The password can contain the numbers 0 through 9.
   - Only lower case letters are valid, upper case letters are not allowed.
   - Only the following special characters are allowed: space, ("), (+), (,), (-), (.), (/), (;), ([), (\), (]), (`).
3. Re-enter the password and press **Enter** to confirm.
4. Press Esc and a message prompts you to save the changes.
5. Press Y to save the changes.
   The computer reboots.

Deleting or changing an existing system/admin password

To enter the System Setup, press F2 immediately after a power-on or reboot.
1. In the **System BIOS** or **System Setup** screen, select **Passwords** on the left pane.
   The **Passwords** screen is displayed.
2. Select **System Password**, alter or delete the existing system password and press **Enter**.
3. Select **Admin Password**, alter or delete the existing setup password and press **Enter**.

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

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

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.

Updating the BIOS

Updating the BIOS in Windows

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

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

3. Click **Drivers & Downloads**. Expand **Find drivers**.
4. Select the operating system installed on your computer.
5. In the **Category** drop-down list, select **BIOS**.
6. Select the latest version of BIOS, and click **Download** to download the BIOS file for your computer.
7. After the download is complete, browse the folder where you saved the BIOS update file.
8. Double-click the BIOS update file icon and follow the on-screen instructions.
   For more information, see knowledge base article 000124211 at www.dell.com/support.

Updating the BIOS using the USB drive in Windows

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

Updating the BIOS from the F12 One-Time boot menu

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

BIOS Update

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

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

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

Updating from the One-Time boot menu

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

● USB drive formatted to the FAT32 file system (key does not have to be bootable)

- BIOS executable file that you downloaded from the Dell Support website and copied to the root of the USB drive
- AC power adapter that is connected to the computer
- Functional computer battery to flash the BIOS

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

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

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

Troubleshooting

Handling swollen Lithium-ion batteries

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

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

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

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

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

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

Built-in self-test (BIST)

There are three different types of BIST to check the performance of display, power rail, and system board. These tests are important to evaluate if an LCD or System board needs a replacement.

1. M-Bist: M-BIST is the system board built-in self-test diagnostics tool that improves the diagnostics accuracy of system board embedded controller (EC) failures. M-BIST must be manually initiated before POST and can also run on a dead system .
2. L-BIST: L-BIST is an enhancement to the single LED error code diagnostics and is automatically initiated during POST.
3. LCD-BIST: LCD BIST is an enhanced diagnostic test that is introduced through Preboot System Assessment (PSA) on legacy systems.

Table 19. Functions

	M-Bist	L-Bist
Purpose	Evaluates the health condition of the system board.	Checks if the system board is supplying power to the LCD by performing an LCD Power Rail test.
Trigger	Press the <M> key and power button	Integrated into the single LED error code diagnostics. Automatically initiated during POST
Indicator of fault	Battery LED light with **Solid Amber**	Battery LED error code of [2,8] blinks Amber x2, then pause, then blinks White x8
Repair instruction	Indicates a problem with the system board.	Indicates a problem with the system board.

System board built-in self-test (M-BIST)

1. Press and hold both the M key and the power button to initiate M-BIST.
2. The battery-status light illuminates in amber when there is a failure with the system board.
3. Replace the system board to fix the issue.

   (i) **NOTE:** The battery status LED will not illuminate if there is no failure present with the system board. If further troubleshooting is required, proceed with the applicable Guided Resolution for No Power/No POST, etc.

Display panel power rail built-in self-test (L-BIST)

L-BIST (LCD Power Rail Test) is an enhancement to the single LED error code diagnostics and is **automatically initiated** during **POST**. L-BIST isolates if the LCD is receiving power from the system board. L-BIST checks if the system board is supplying power to the LCD by performing an LCD Power Rail test. If there is no power going to the LCD, the battery status LED flashes a **[2,8] LED error code.**

Display panel built-in self-test (LCD-BIST)
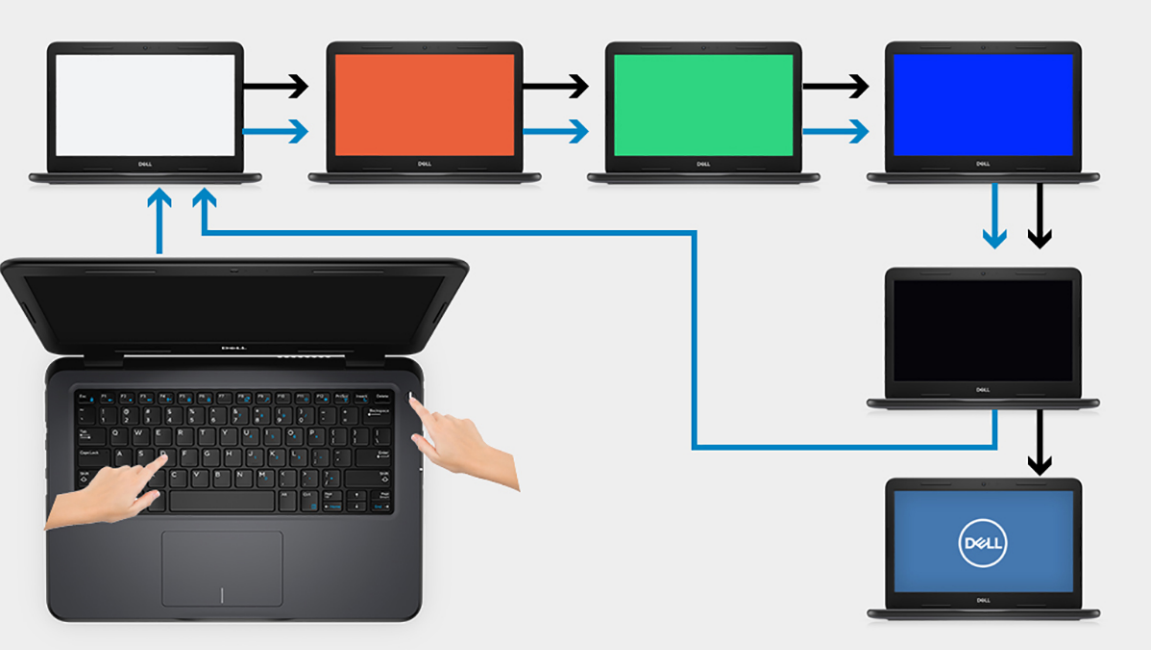
1. Press and hold the D key and then press the power button.
2. Release both the D key and the power button when the computer begins POST.
3. The display panel begins to display a solid color, or cycling through different colors.

   (i) **NOTE:** The sequence of colors may very due to different display panel vendor. The user only needs to ensure that the colors are being displayed correctly without distortion or graphical anomalies.

4. The computer reboot at the end of the last solid color.

Outcome

The following table shows the outcome of running different types of BIST.

Table 20. BIST outcome

M-BIST	
Off	No fault detected with system board.
Solid amber	Indicates a problem with the system board.

Table 20. BIST outcome

L-BIST	
Off	No fault detected with system board.
LED error code of [2,8] blinks Amber x2, then pause, then blinks White x8	Indicates a problem with the system board.

Table 20. BIST outcome

LCD-BIST
The LCD that flashes White, Red, Green, and Blue shows that the display is working fine and there is no fault with the LCD panel.

Dell SupportAssist Pre-boot System Performance Check diagnostics

SupportAssist diagnostics (also known as system diagnostics) performs a complete check of your hardware. The Dell SupportAssist Pre-boot System Performance Check diagnostics 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

ⓘ **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.

For more information, see https://www.dell.com/support/kbdoc/000180971.

SupportAssist diagnostics

The SupportAssist diagnostics (previously known as ePSA diagnostics) performs a complete check of your hardware. The SupportAssist diagnostics is embedded in the BIOS and is launched by it internally. The SupportAssist diagnostics provides a set of options for particular devices or device groups. It allows 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 and provide extra information about the failed device(s)
● View status messages that indicate if the tests are completed successfully
● View error messages that indicate if problems were encountered during the test

ⓘ **NOTE:** Some tests are meant for specific devices and require user interaction. Ensure that you are present in front of the computer when the diagnostic tests are performed.

For more information, see SupportAssist Pre-Boot System Performance Check.

System-diagnostic lights

Power and battery-status light

The power and battery status light indicates the power and battery status of the computer. These are the power states:

Solid white: Power adapter is connected and the battery has more than 5% charge.

Amber: Computer is running on battery and the battery has less than 5% charge.

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

The power and battery-status light may blink amber or white according to pre-defined "beep codes" indicating various 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.

ⓘ **NOTE:** The following diagnostic light codes and recommended solutions are intended for Dell service technicians to troubleshoot problems. 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.

Table 21. Diagnostic-light LED codes

Diagnostic light codes (Amber,White)	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 - SBIOS message
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

Recovering the operating system

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

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

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

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

Backup media and recovery options

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

Drain residual flea power (perform hard reset)

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

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

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

To drain residual flea power (perform a hard reset)

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

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

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.