

Dell Precision 5550

Service Manual

Notes, cautions, and warnings

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

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

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


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Working inside your computer

Before working inside your computer

About this task









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

Steps

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.
 **CAUTION:** To disconnect a network cable, first unplug the cable from your computer and then unplug the cable from the network device.
5. Remove any media card and optical disc from your computer, if applicable.

Safety instructions

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

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

 **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.

After working inside your computer

About this task

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

Steps

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

Removing and installing components

Recommended tools

The procedures in this document may require the following tools:

- Phillips screwdriver #0
- Phillips screwdriver #1
- Torx #5 (T5) screwdriver
- Plastic scribe—Recommended for field technicians.

Screw list

- 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.
- NOTE:** Some computers have magnetic surfaces. Ensure that the screws are not left attached to such surface when replacing a component.
- NOTE:** Screw color may vary with the configuration ordered.

Table 1. Screw list




















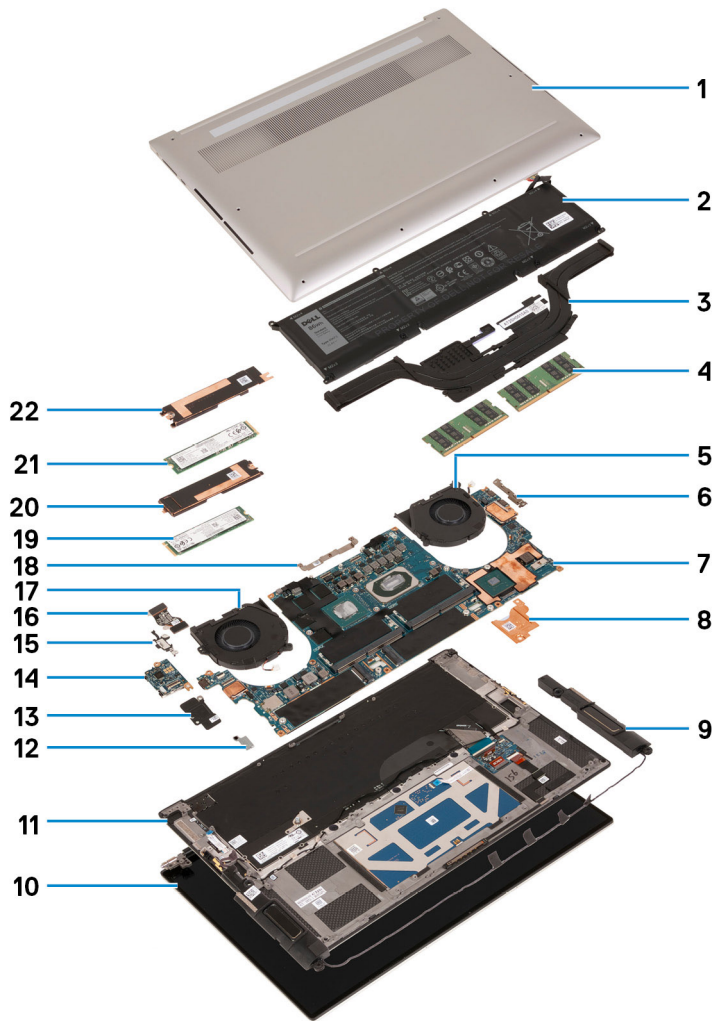
| Component | Secured to | Screw type | Quantity | Screw image |
|--------------------|--|------------|----------|---|
| Base cover | Palm-rest and keyboard assembly | M2x3 | 8 |  |
| Battery | Palm-rest and keyboard assembly | M2x3 | 4 |  |
| Battery | Palm-rest and keyboard assembly | M2x4 | 4 |  |
| Right fan | System board and palm-rest and keyboard assembly | M2x4 | 2 |  |
| I/O board shield | I/O board | M2x4 | 2 |  |
| Left fan | System board and palm-rest and keyboard assembly | M2x4 | 1 |  |
| Solid-state drive1 | System board | M2x2 | 1 |  |
| solid-state drive2 | System board | M2x2 | 1 |  |
| Speakers | Palm-rest and keyboard assembly | M2x2 | 4 |  |

Table 1. Screw list(continued)

| Component | Secured to | Screw type | Quantity | Screw image |
|--|--|------------|----------|---|
| Graphics card-processor thermal shield cover | System board | M2x2 | 2 |  |
| Type-C bracket | Palm-rest and keyboard assembly | M2x4 | 2 |  |
| Display-assembly cable bracket | System board | M2x2 | 3 |  |
| Display-assembly cable holder | Palm-rest and keyboard assembly | M1.6x3 | 2 |  |
| Left hinge | System board and palm-rest and keyboard assembly | M2.5x5.5 | 4 |  |
| Right hinge | System board and palm-rest and keyboard assembly | M2.5x5.5 | 4 |  |
| Wireless-card bracket | System board | M1.6x3 | 1 |  |
| System board | Palm-rest and keyboard assembly | M2x4 | 2 |  |
| Touchpad | Palm-rest and keyboard assembly | M1.6x2.5 | 4 |  |
| Touchpad | Palm-rest and keyboard assembly | M2x2 | 4 |  |

Major components of your system

The following image shows the major components of your system.



1. Base cover
2. Battery
3. Heat sink
4. Memory module
5. Right fan
6. USB Type-C bracket
7. System board
8. Graphics card-processor thermal bracket
9. Speaker
10. Display assembly
11. Palm-rest and keyboard assembly
12. Wireless-card bracket
13. I/O-board shield
14. I/O board
15. USB Type-C port bracket
16. I/O-board cable
17. Left fan
18. Display-assembly cable bracket
19. Solid-state drive 2
20. Solid-state drive 2 thermal bracket
21. Solid-state drive 1
22. Solid-state drive 1 thermal bracket

NOTE: Dell provides a list of components and their part numbers for the original system configuration purchased. These parts are available according to warranty coverages purchased by the customer. Contact your Dell sales representative for purchase options.

Base cover

Removing the base cover

Prerequisites

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

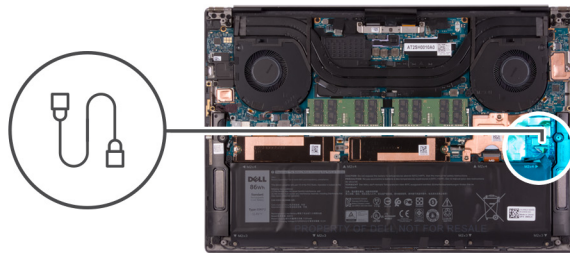
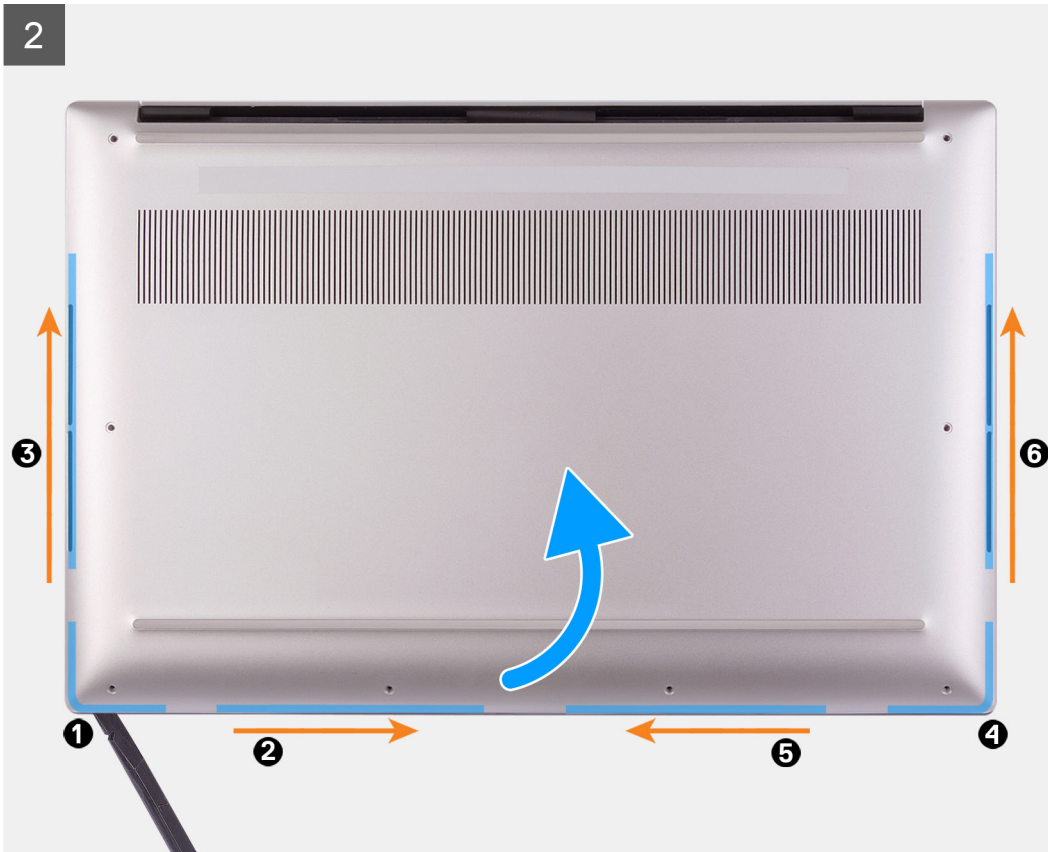
About this task

The following images indicate the location of the base cover and provide a visual representation of the removal procedure.



8x
M2x3





4

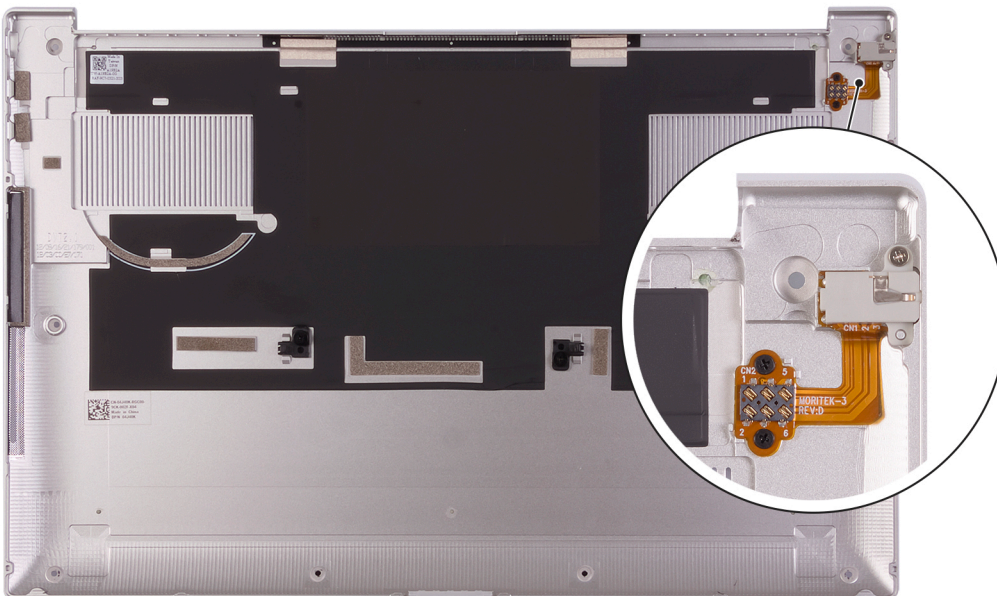


Steps

1. Remove the eight screws (M2x3) that secure the base cover to the palm-rest and keyboard assembly.

CAUTION: Do not pull on or pry the base cover at the side where the hinges are located; doing so may damage the base cover.

CAUTION: The base cover is preassembled with the audio-daughter board. The pins at the bottom of the base cover are fragile. They ground the antennas and audio-daughter board. Place the base cover on a clean surface to avoid damage to the pins.



2. Starting from the bottom-left corner, use a plastic scribe to pry the base cover in the direction of the arrows to release the base cover from the palm-rest and keyboard assembly.
3. Grasp the left side and the right side of the base cover and remove the base cover from the palm-rest and keyboard assembly.

NOTE: The following steps are applicable only if you want to further remove any other component from your computer.

NOTE: Disconnecting the battery cable, removing the battery, or draining the flea power clears the CMOS and resets the BIOS settings on your computer.

NOTE: After your computer is reassembled and powered on, it prompts for the Real Time Clock (RTC) reset. When the RTC reset cycle occurs, the computer restarts several times and then an error message is displayed– "Time of day not set". Enter the BIOS when this error appears and set the date and time on your computer to resume normal functionality.

4. Disconnect the battery cable from the system board.
5. Turn your computer over and press the power button for 15 seconds to drain the flea power.

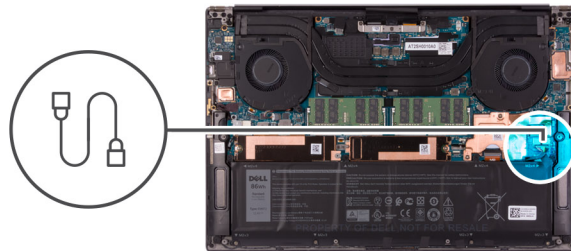
Installing the base cover

Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

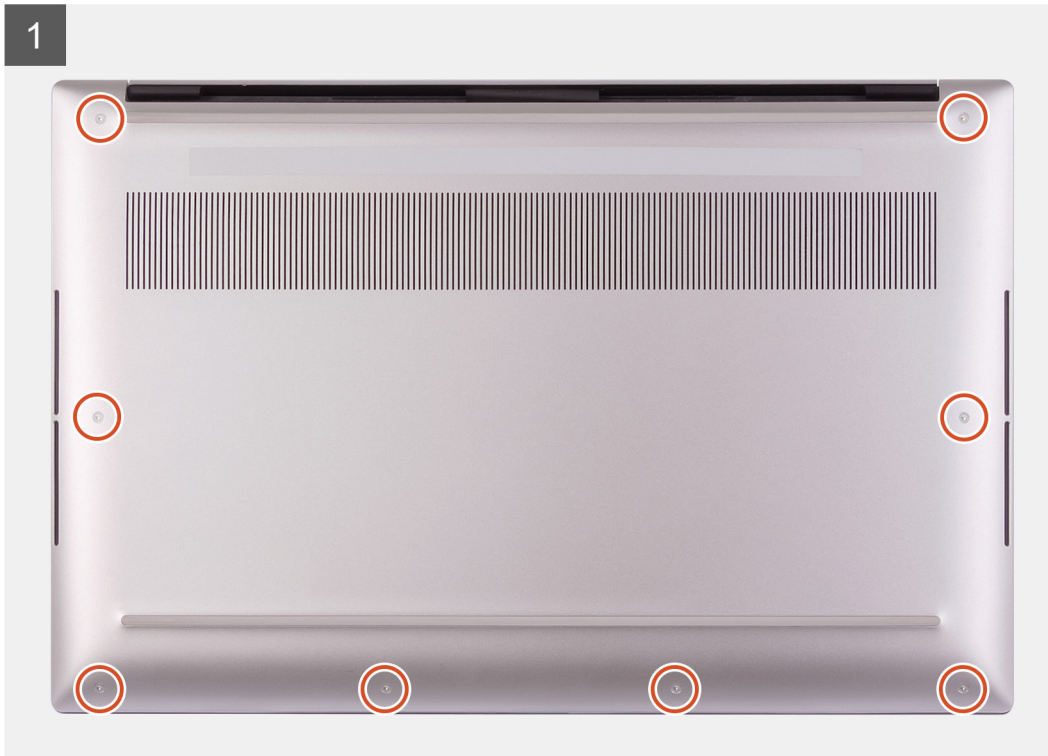
About this task

The following images indicate the location of the base cover and provide a visual representation of the installation procedure.





8x
M2x3



Steps

1. Connect the battery cable to the system board.
2. Align the screw holes on the base cover with the screw holes on the palm-rest and keyboard assembly.
3. Starting from the bottom-right corner snap the base cover. Work your way around to the middle of the base cover and then to the bottom-left corner and snap the base cover into place.
4. Replace the eight screws (M2x3) that secure the base cover to the palm-rest and keyboard assembly.

Next steps

i **NOTE:** After your computer is reassembled and powered on, it prompts for the Real Time Clock (RTC) reset. When the RTC reset cycle occurs, the computer restarts several times and then an error message is displayed- "Time of day not set". Enter the BIOS when this error appears and set the date and time on your computer to resume normal functionality.

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

Battery

Removing the battery

Prerequisites

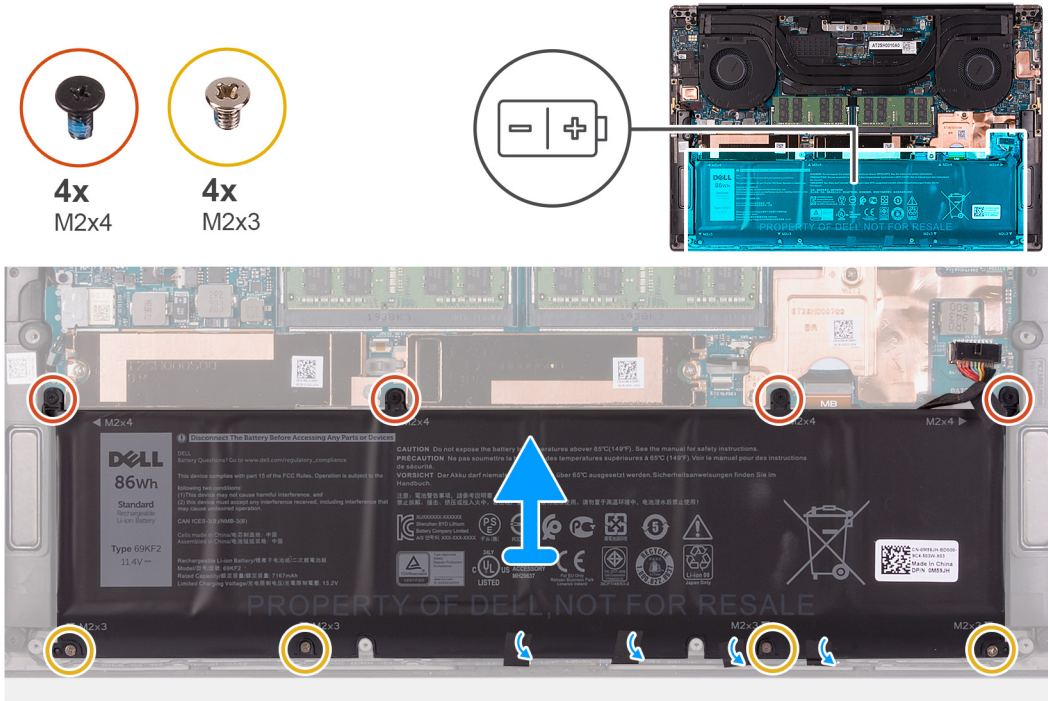
1. Follow the procedure in [Before working inside your computer](#).

2. Remove the base cover.

NOTE: Disconnecting the battery cable, removing the battery, or draining the flea power clears the CMOS and resets the BIOS settings on your computer.

About this task

The following image indicates the location of the battery and provides a visual representation of the removal procedure.



Steps

1. Disconnect the battery cable from the system board, if it was not disconnected earlier.
2. Remove the four screws (M2x4) that secure the battery to the palm-rest and keyboard assembly.
3. Remove the four screws (M2x3) that secure the battery to the palm-rest and keyboard assembly.
4. Peel the tapes that secure the speaker cable to the battery.
5. Lift the battery off the palm-rest and keyboard assembly.

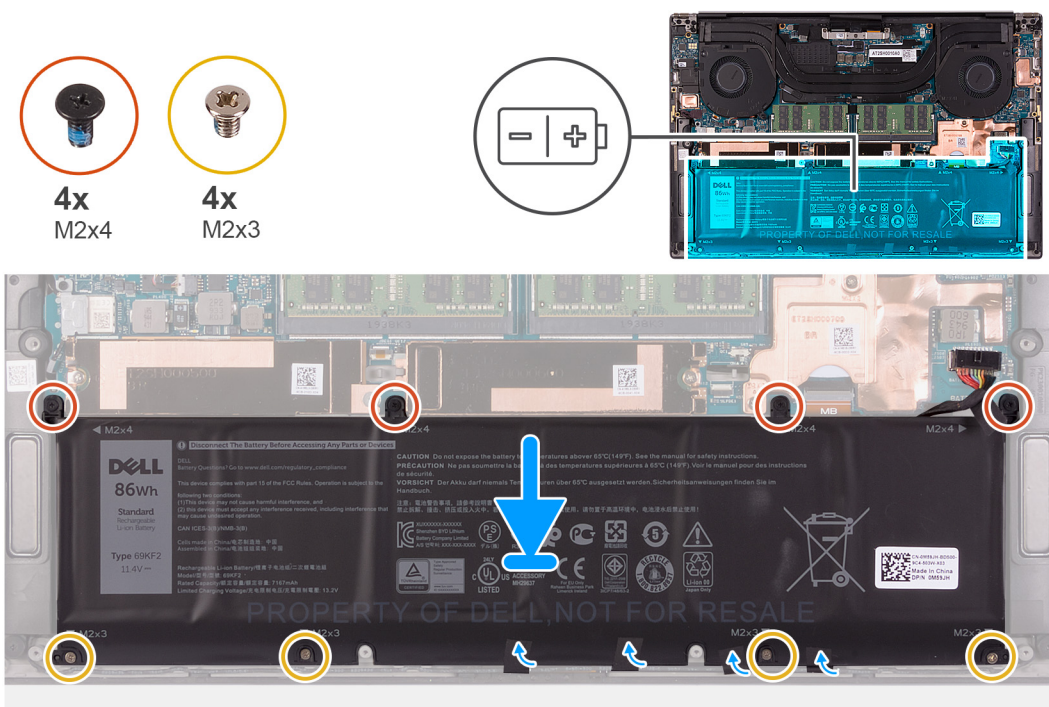
Installing the battery

Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The following image indicates the location of the battery and provides a visual representation of the installation procedure.



Steps

1. Align the screw holes on the battery with the screw holes on the palm-rest and keyboard assembly.
2. Adhere the tapes that secure the speaker cable to the battery.
3. Replace the four screws (M2x3) that secure the battery to the palm-rest and keyboard assembly.
4. Replace the four screws (M2x4) that secure the battery to the palm-rest and keyboard assembly.
5. Connect the battery cable to the system board.

Next steps

1. Install the [base cover](#).
2. Follow the procedure in [After working inside your computer](#).

Memory modules

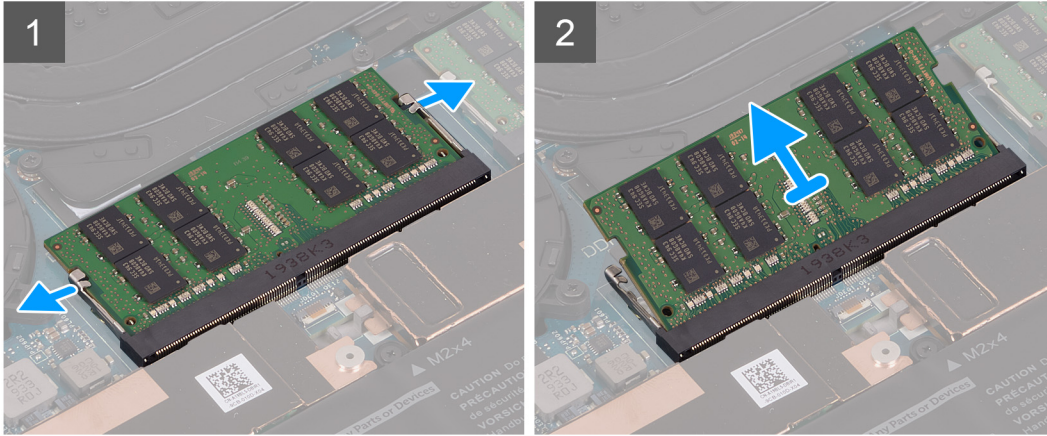
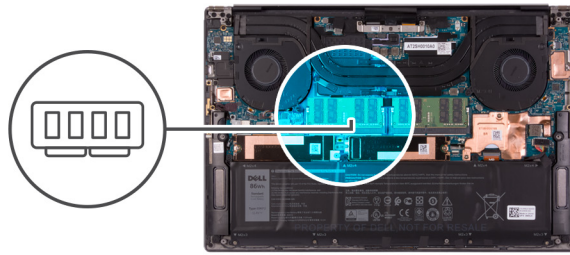
Removing the memory

Prerequisites

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

About this task

The following image indicates the location of the memory modules and provides a visual representation of the removal procedure.



Steps

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

i **NOTE:** Repeat step 1 and step 2 to remove the other memory module if available on your computer.

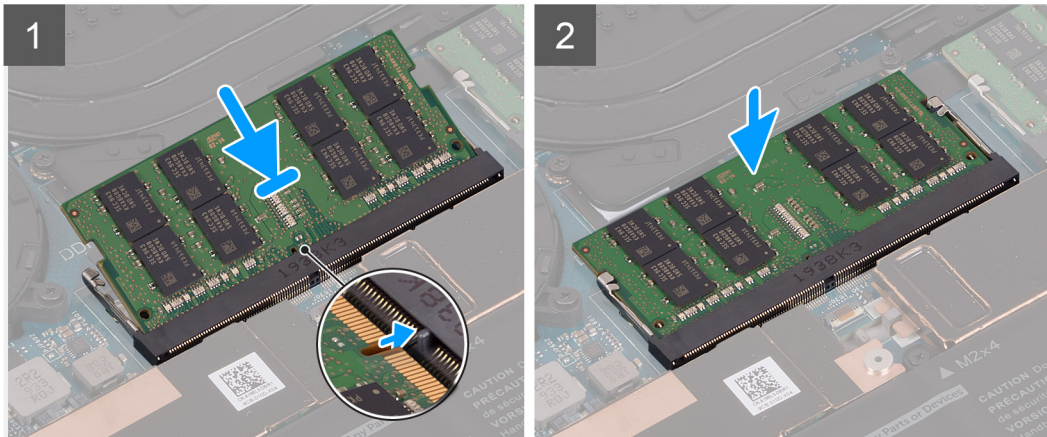
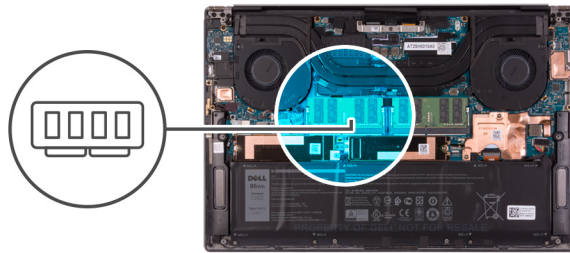
Installing the memory

Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The following image indicates the location of the memory modules and provides a visual representation of the installation procedure.



Steps

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

NOTE: If you do not hear the click, remove the memory module and reinstall it.

NOTE: Repeat step 1 to step 3 to install the other memory module if available on your computer.

Next steps

1. Install the [base cover](#).
2. Follow the procedure in [After working inside your computer](#).

Solid-state drive

Removing the solid-state drive¹

Prerequisites

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

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 turned on or is in sleep state.

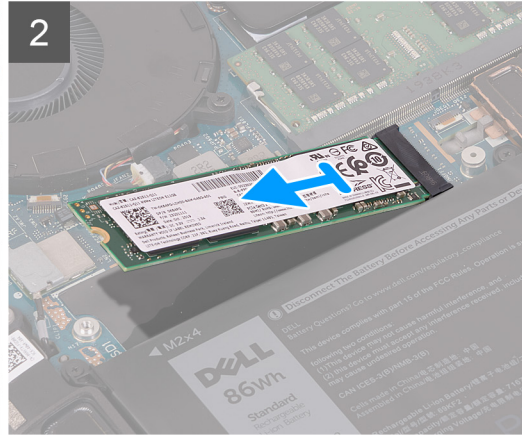
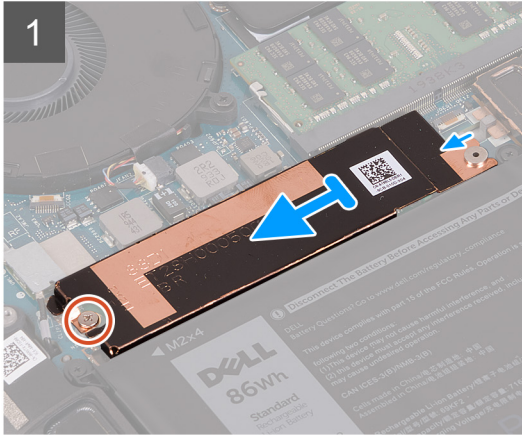
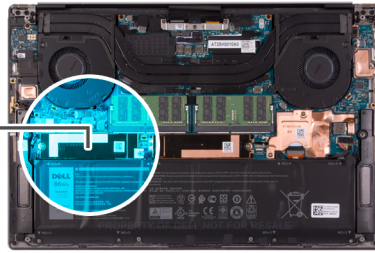
2. Remove the [base cover](#).

About this task

The following image indicates the location of the solid-state drive¹ and provides a visual representation of the removal procedure.



1x
M2x2



Steps

1. Remove the screw (M2x2) that secures the solid-state drive thermal bracket and the solid-state drive1 to the system board.
2. Slide the solid-state drive thermal bracket from the alignment post and lift it from the system board.
3. Slide and remove the solid-state drive1 from the solid-state drive slot.

Installing the solid-state drive1

Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

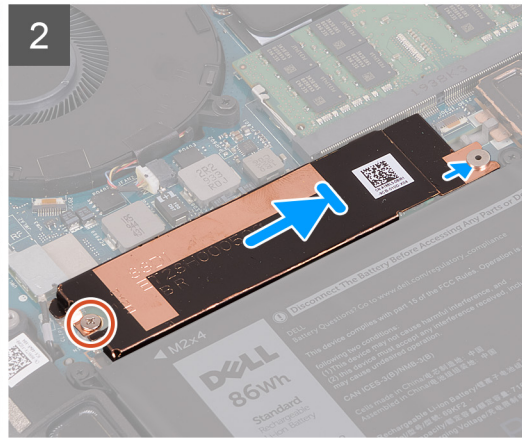
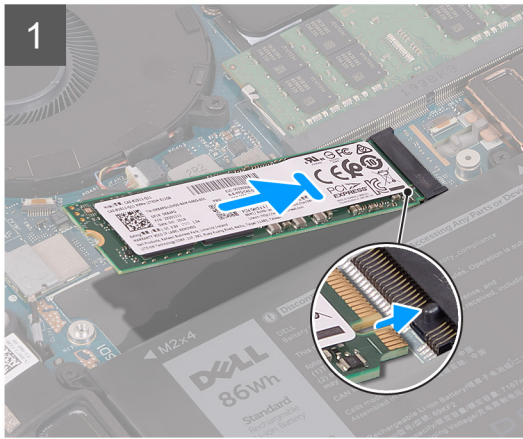
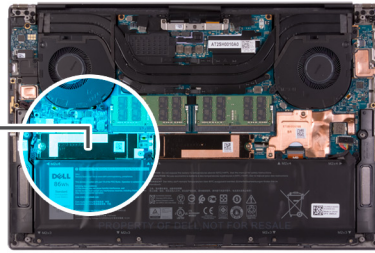
⚠ CAUTION: Solid-state drives are fragile. Exercise care when handling the solid-state drive.

About this task

The following image indicates the location of the solid-state drive1 and provides a visual representation of the installation procedure.



1x
M2x2



Steps

1. Align the notch on the solid-state drive1 with the tab on the solid-state drive slot.
2. Gently slide the solid-state drive1 into the solid-state drive slot.
3. Slide the solid-state drive thermal bracket into the alignment post on the system board.
4. Align the screw hole on the solid-state drive thermal bracket with the screw hole on the system board.
5. Replace the screw (M2x2) that secures the solid-state drive thermal bracket and the solid-state drive1 to the system board.

Next steps

1. Install the [base cover](#).
2. Follow the procedure in [After working inside your computer](#).

Removing the solid-state drive2

Prerequisites

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

 **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.**

2. Remove the [base cover](#).

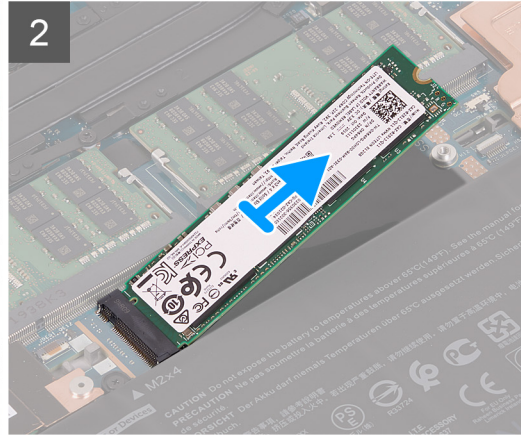
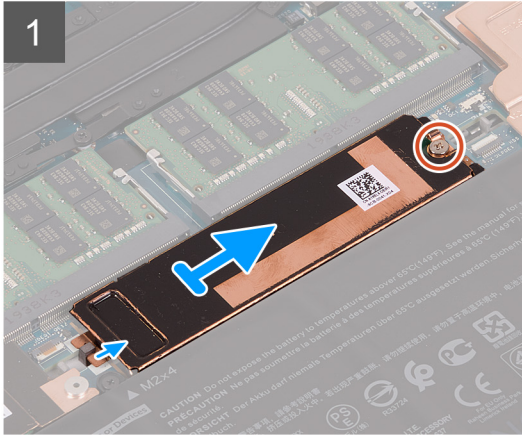
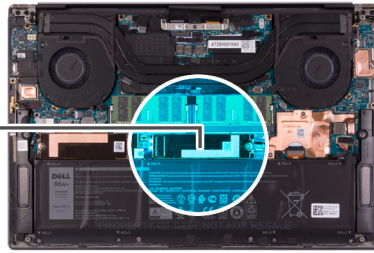
About this task

The following image indicates the location of the solid-state drive and provides a visual representation of the removal procedure.

PROCEDURE.



1x
M2x2



Steps

1. Remove the screw (M2x2) that secures the solid-state drive thermal bracket and the solid-state drive2 to the system board.
2. Slide the solid-state drive thermal bracket from the alignment post and lift it from the system board.
3. Slide and remove the solid-state drive2 from the solid-state drive slot.

Installing the solid-state drive2

Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

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

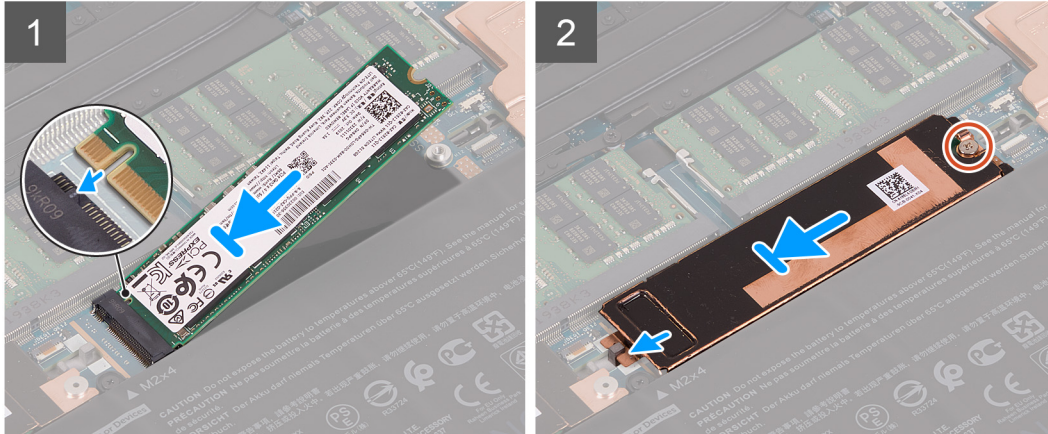
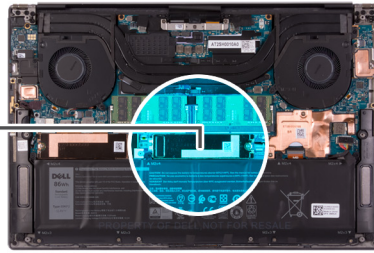
NOTE: Your computer supports 2 solid-state drive slots. Solid-state drive1 is the primary slot and solid-state drive2 is the secondary slot. If you are installing only one solid-state drive, install the drive to the primary slot. Install the second solid-state drive, if available, to the solid-state drive2 slot.

About this task

The following image indicates the location of the solid-state drive2 and provides a visual representation of the installation procedure.



1x
M2x2



Steps

1. Align the notch on the solid-state drive2 with the tab on the solid-state drive slot.
2. Gently slide the solid-state drive2 into the solid-state drive slot.
3. Slide the solid-state drive thermal bracket into the alignment post on the system board, and align the screw hole on the solid-state drive thermal bracket with the screw hole on the system board.
4. Replace the screw (M2x2) that secures the solid-state drive thermal bracket and the solid-state drive2 to the system board.

Next steps

1. Install the [base cover](#).
2. Follow the procedure in [After working inside your computer](#).

Installing the M.2 2230 solid-state drive

Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

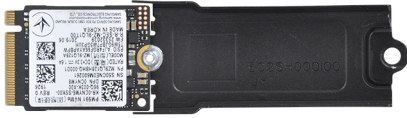
About this task

This computer supports two solid-state drive form factors.

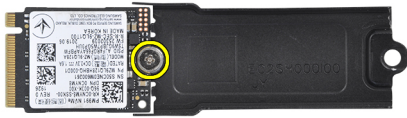
- M.2 2230
- M.2 2280

If you are replacing the M.2 2280 solid-state drive with an M.2 2230 solid-state drive, the following images indicate how to install the solid-state drive bracket to the M.2 2230 solid-state drive card before installing the 2230 solid-state drive to the computer.

1. With the printed side of the solid-state drive facing up, align the screw hole on the M.2 2230 solid-state drive with the screw hole on the M.2 solid-state drive bracket.



2. Secure the M.2 2230 solid-state drive to the bracket with a M2x2 screw.



3. To install the M.2 2230 solid-state drive card to the solid-state drive card slot1, see [installing the solid state drive1](#). To install the M.2 2230 solid-state drive card to the solid-state drive card slot2, see [installing the solid state drive2](#).

Fans

Removing the right fan

Prerequisites

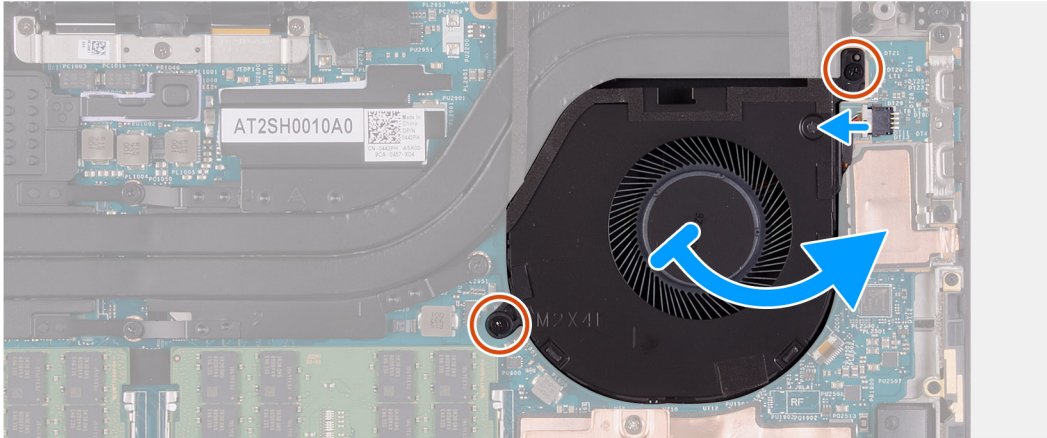
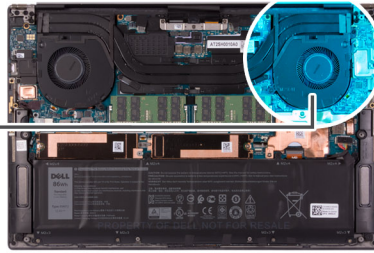
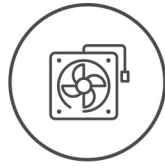
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

About this task

The following images indicate the location of the right fan and provide a visual representation of the removal procedure.



2x
M2x4



Steps

1. Disconnect the fan cable from the system board.
2. Remove the two screws (M2x4) that secure the fan to the system board and palm-rest and keyboard assembly.
3. Slide the fan out of the heat sink and then lift it from the palm-rest and keyboard assembly.

Installing the right fan

Prerequisites

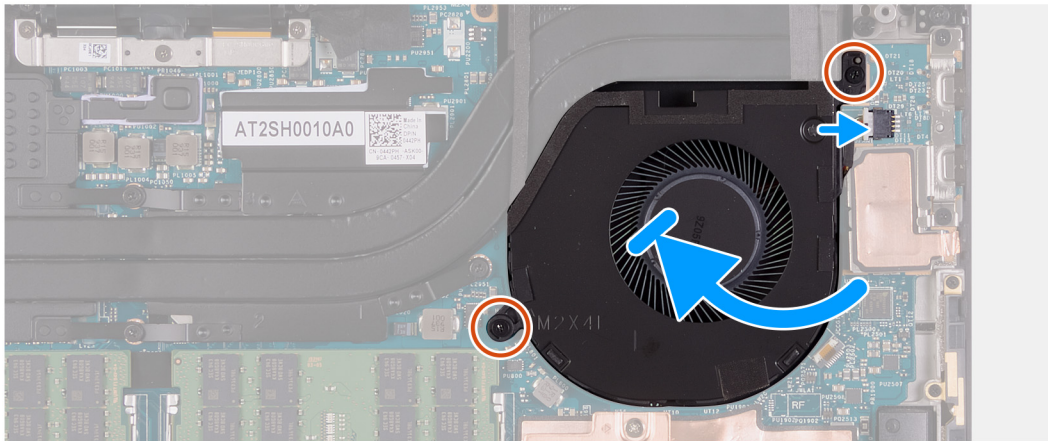
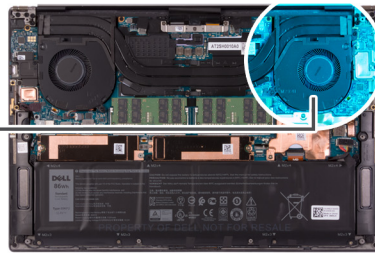
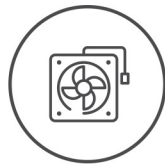
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The following images indicate the location of the left fan and provide a visual representation of the installation procedure.



2x
M2x4



Steps

1. Connect the fan cable to the system board.
2. Slide fan below the heat sink and align the screw holes on fan with the screw holes on the system board and palm-rest and keyboard assembly.
3. Replace the two screws (M2x4) that secure the fan to the system board and palm-rest and keyboard assembly.

Next steps

1. Install the [base cover](#).
2. Follow the procedure in [After working inside your computer](#).

Removing the left fan

Prerequisites

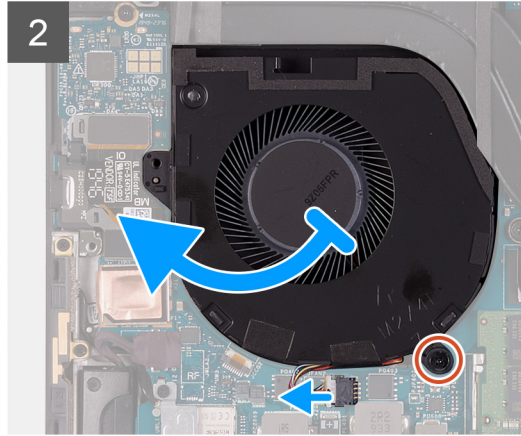
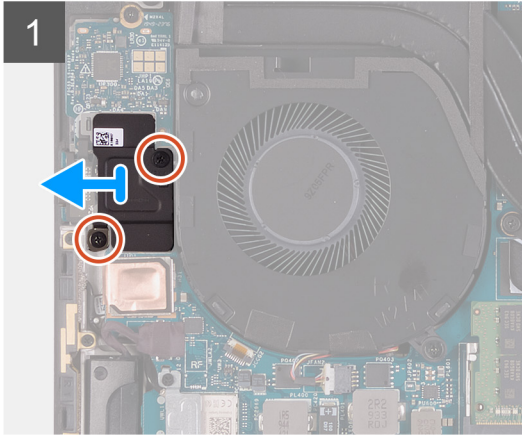
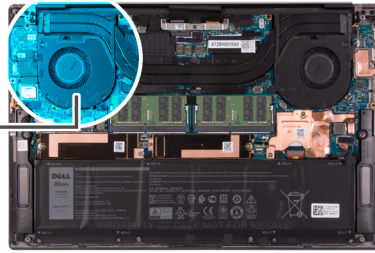
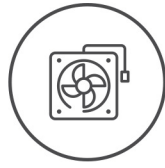
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

About this task

The following images indicate the location of the left fan and provide a visual representation of the removal procedure.



3x
M2x4



Steps

1. Remove the two screws (M2x4) that secure the I/O-board shield to the fan and palm-rest and keyboard assembly.
2. Lift the I/O-board shield off the system board.
3. Remove the screw (M2x4) that secures the fan to the system board.
4. Disconnect the fan cable from the system board.
5. Slide the fan out of the heat sink and lift the fan off the palm-rest and keyboard assembly.

Installing the left fan

Prerequisites

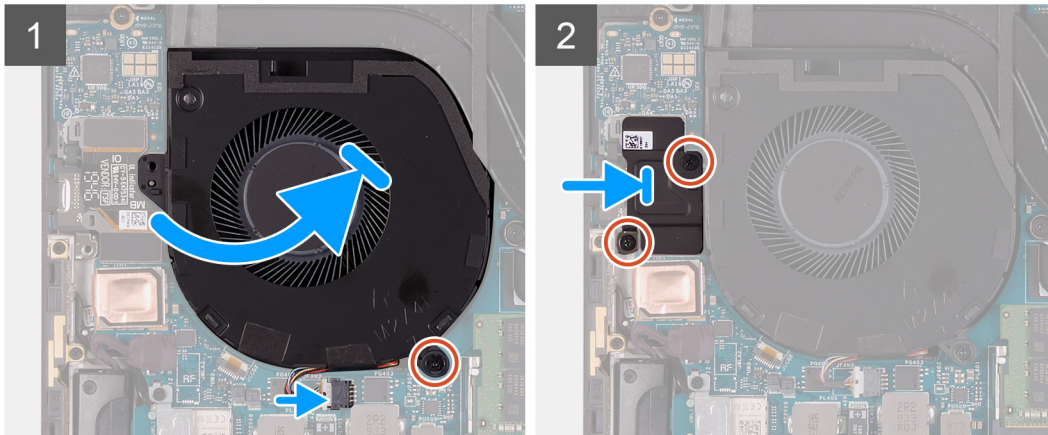
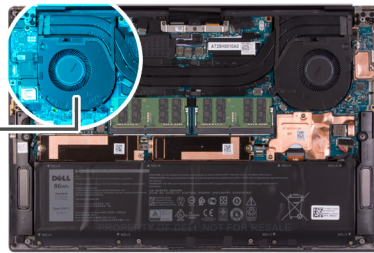
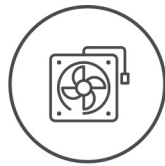
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The following images indicate the location of the right fan and provide a visual representation of the installation procedure.



3x
M2x4



Steps

1. Slide fan below the heat sink and align the screw hole on fan with the screw hole on the palm-rest and keyboard assembly.
2. Replace the screw (M2x4) that secures the fan to the system board.
3. Connect the fan cable to the system board.
4. Align the screw holes on the I/O-board shield with the screw holes on the fan and system board.
5. Replace the two screws (M2x4) that secure the I/O-board shield to the fan and palm-rest and keyboard assembly.

Next steps

1. Install the [base cover](#).
2. Follow the procedure in [After working inside your computer](#).

Heat sink

Removing the heat sink

Prerequisites

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

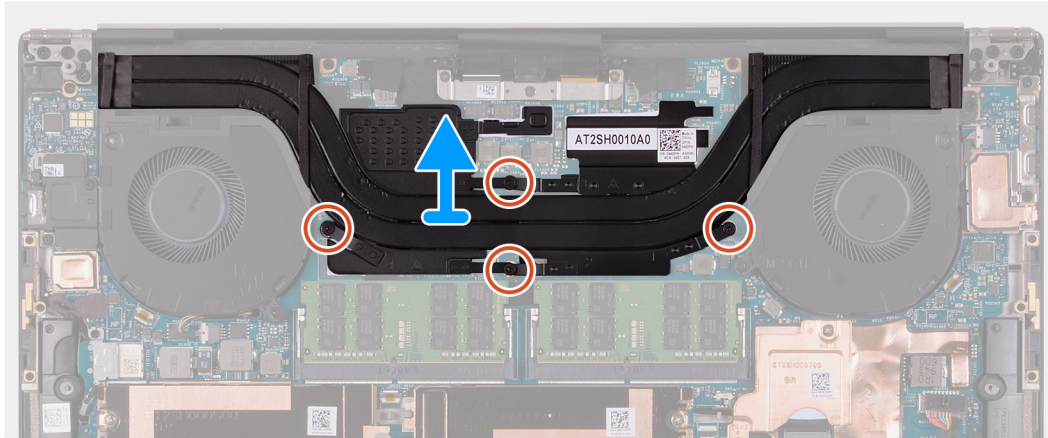
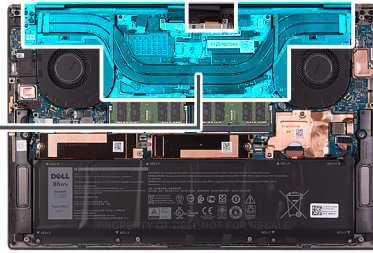
CAUTION: For maximum cooling of the processor, do not touch the heat transfer areas on the heat sink. The oils in your skin can reduce the heat transfer capability of the thermal grease.

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

2. Remove the [base cover](#).

About this task

The following image indicates the location of the heat sink and provides a visual representation of the removal procedure.



Steps

1. In reverse sequential 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.

Installing the heat sink

Prerequisites

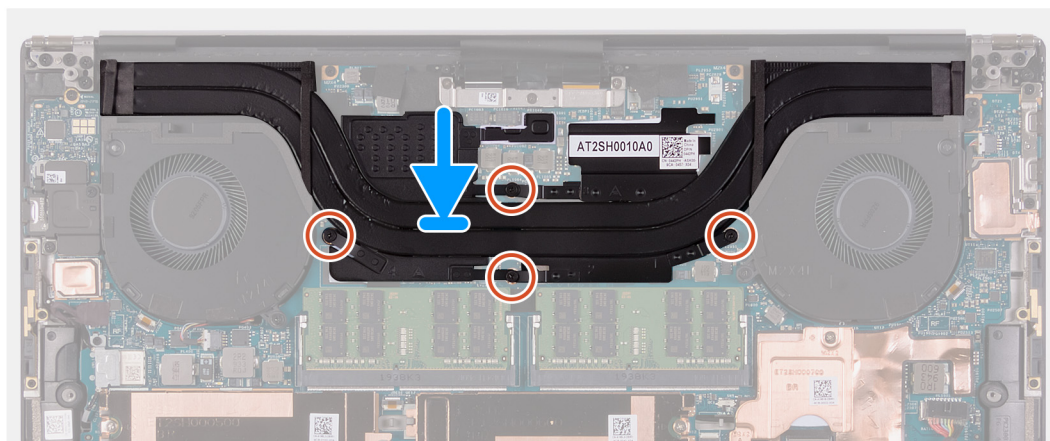
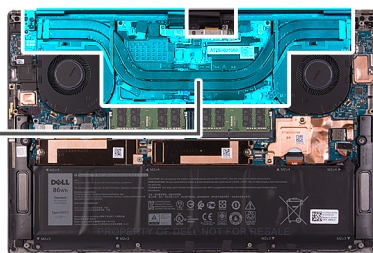
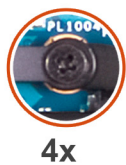
If you are replacing a component, remove the existing component before performing the installation procedure.

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 or thermal paste provided in the kit to ensure that thermal conductivity is achieved.

About this task

The following image indicates the location of the heat sink and provides a visual representation of the installation procedure.



Steps

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.

Next steps

1. Install the [base cover](#).
2. Follow the procedure in [After working inside your computer](#).

Speakers

Removing the speakers

Prerequisites

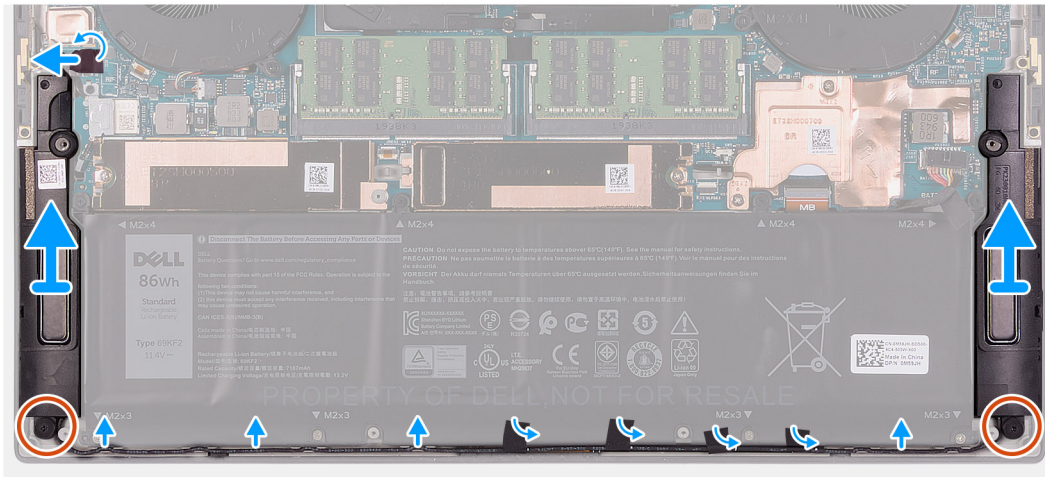
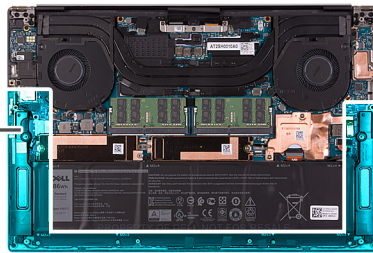
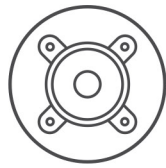
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).

About this task

The following image indicates the location of the speakers and provides a visual representation of the removal procedure.



2x
M2x2



Steps

1. Peel the tape, and disconnect the speaker cable from the system board.
2. Peel the tapes that secure the speaker cable to the battery.
3. Remove the two screws (M2x2) that secure the speakers to the palm-rest and keyboard assembly.
4. Note the speaker cable routing, and remove the speaker cable from the routing guides on the palm-rest and keyboard assembly.
5. Lift the speakers, along with the cables, off the palm-rest and keyboard assembly.

Installing the speakers

Prerequisites

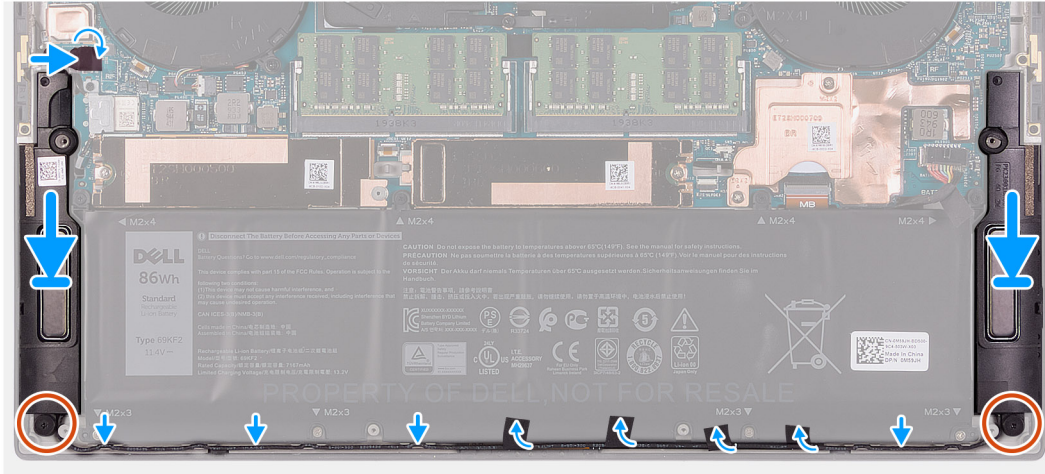
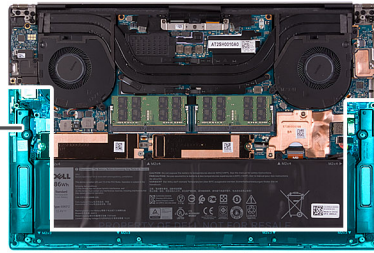
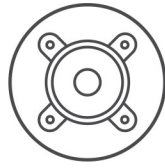
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The following image indicates the location of the speakers and provides a visual representation of the installation procedure.



2x
M2x2



Steps

1. Using the alignment posts and rubber grommets, place the speakers on the slots of the palm-rest and keyboard assembly.
2. Route the speaker cable through the routing guides on the palm-rest and keyboard assembly.
3. Adhere the tapes that secure the speaker cable to the battery.
4. Replace the two screws (M2x2) that secures the speakers to the palm-rest and keyboard assembly.
5. Connect the speaker cable to the system board and adhere the tape that secures the speaker cable to the system board.

Next steps

1. Install the [base cover](#).
2. Follow the procedure in [After working inside your computer](#).

I/O board

Removing the I/O board

Prerequisites

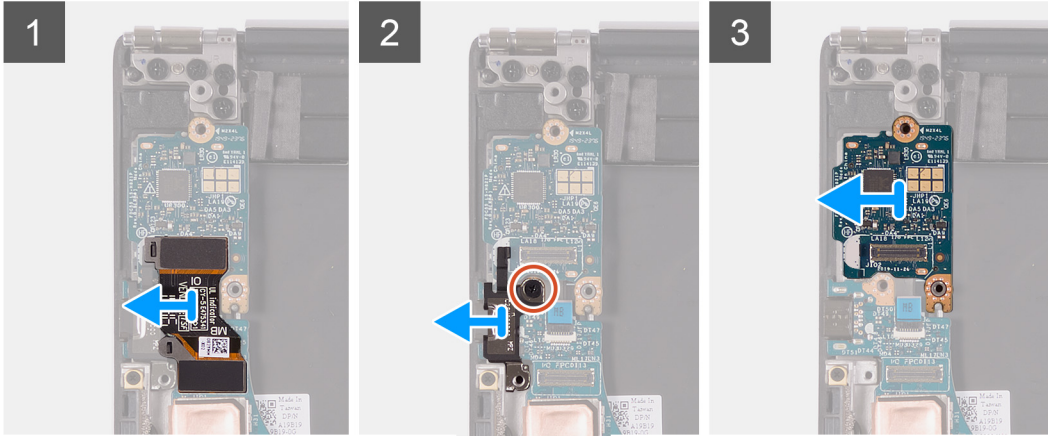
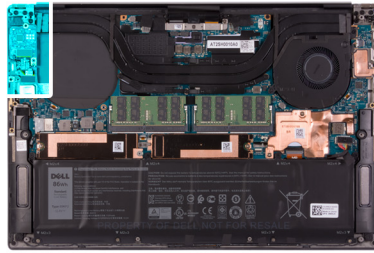
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [right fan](#).

About this task

The following image indicates the location of the I/O board and provides a visual representation of the removal procedure.



1x
M2x4



Steps

1. Disconnect the I/O-board cable from the system board and I/O board.
2. Lift the I/O-board cable from the system board.
3. Disconnect the screw (M2x4) that secures the USB Type-C port bracket to the system board and lift the bracket off the I/O board.
4. Lift the I/O board off the palm-rest and keyboard assembly.

Installing the I/O board

Prerequisites

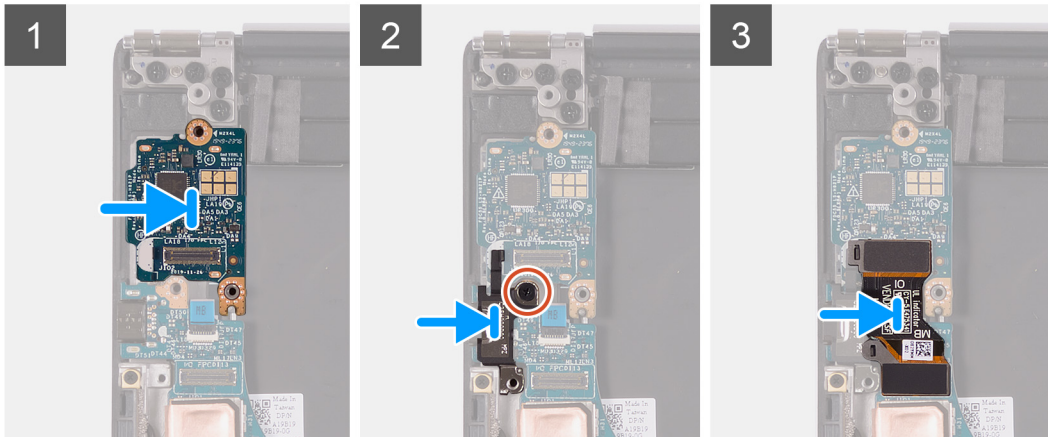
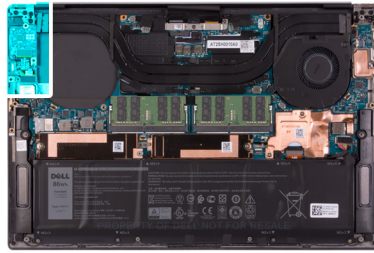
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The following image indicates the location of the I/O board and provides a visual representation of the installation procedure.



1x
M2x4



Steps

1. Place the I/O board on the palm-rest and keyboard assembly.
2. Align the screw hole on the USB Type-C port bracket with the screw hole on the system board.
3. Connect the screw (M2x4) that secures the USB Type-C port bracket to the system board.

NOTE: Ensure to connect IO marked side of the I/O-board cable to the I/O daughter board and the side marked MB to the system board.

4. Connect the I/O-board cable to the connector on the system board and I/O board.

Next steps

1. Install the [right fan](#).
2. Install the [base cover](#).
3. Follow the procedure in [After working inside your computer](#).

Display assembly

Removing the display assembly

Prerequisites

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

About this task

The following images indicate the location of the display assembly cable and display-assembly hinges and provide a visual representation of the removal procedure.



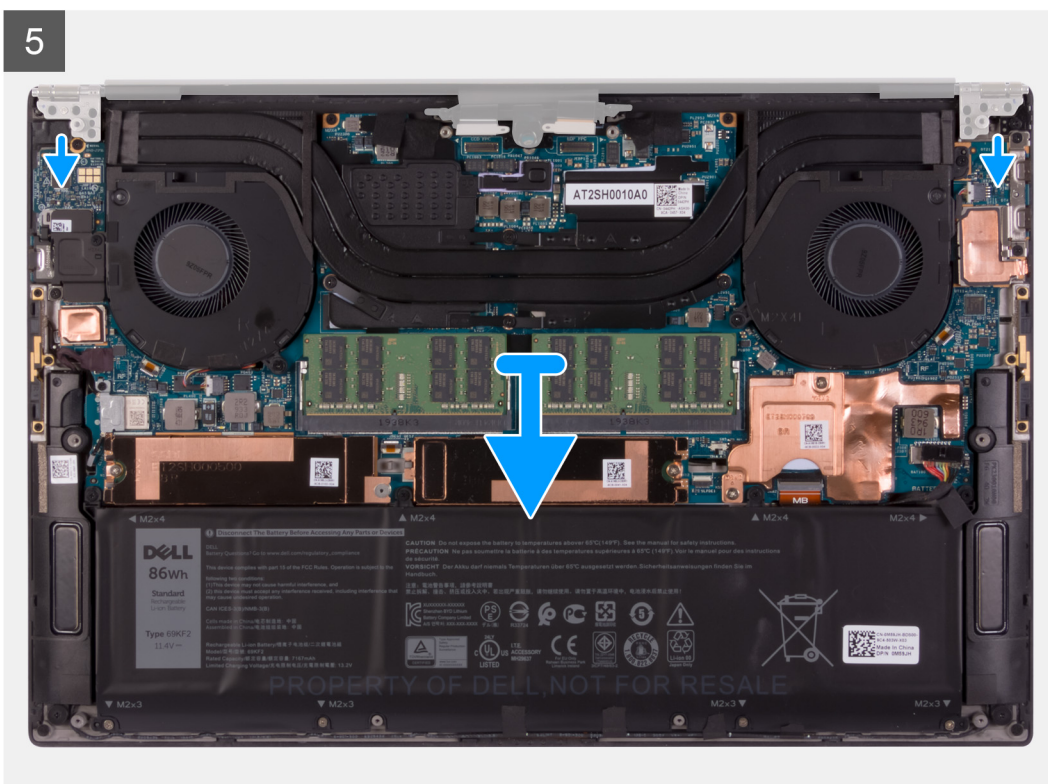
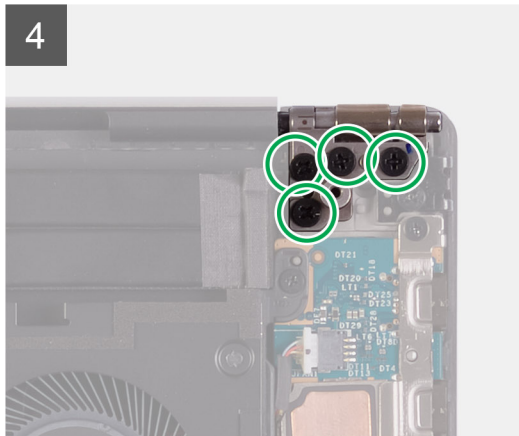
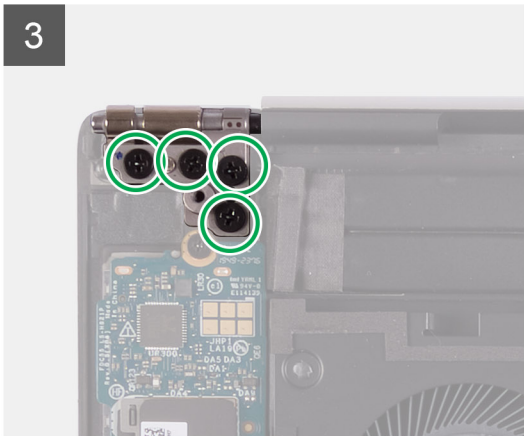
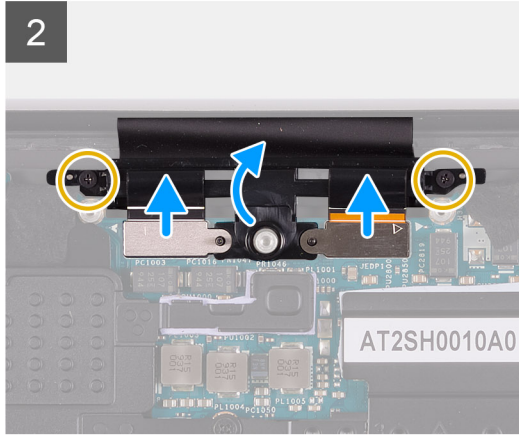
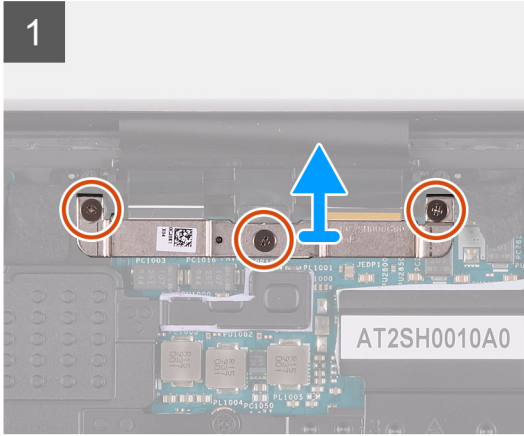
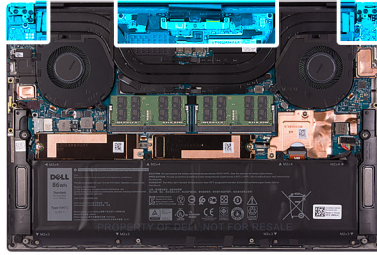
3x



2x
M1.6x3



8x
M2.5x5.5



Steps

1. Loosen the three captive screws that secure the display-assembly cable bracket to the system board.
2. Lift the display-assembly cable bracket off the system board.
3. Remove the two screws (M1.6x3) that secure the display-assembly cable holder to the palm-rest and keyboard assembly.
4. Disconnect the touchscreen cable and camera cable.
5. Remove the eight screws (M2.5x5.5) that secure the left and right display-assembly hinges to the system board and the palm-rest and keyboard assembly.
6. Slide the palm-rest and keyboard assembly from the display assembly.
7. After performing all the above steps, you are left with display assembly.



Installing the display assembly

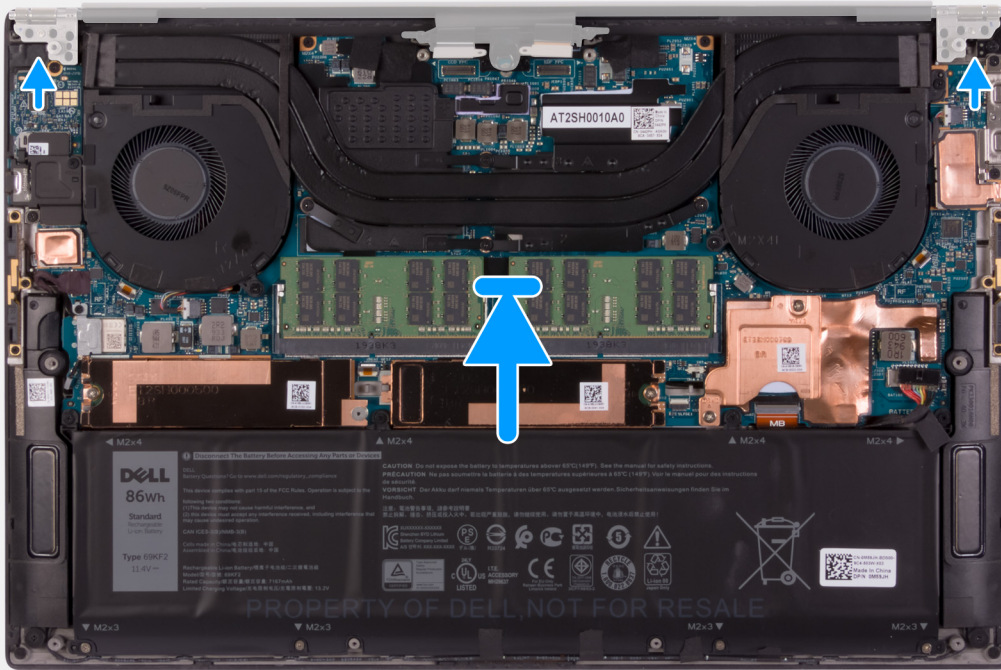
Prerequisites

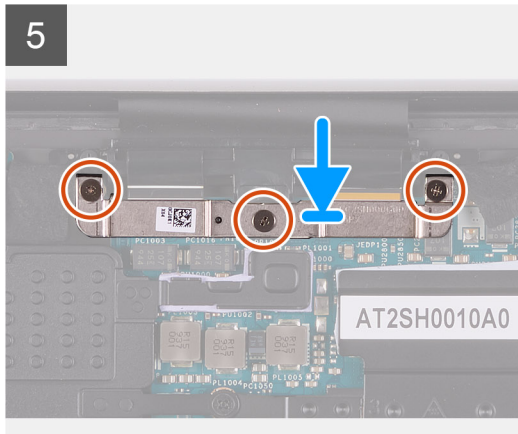
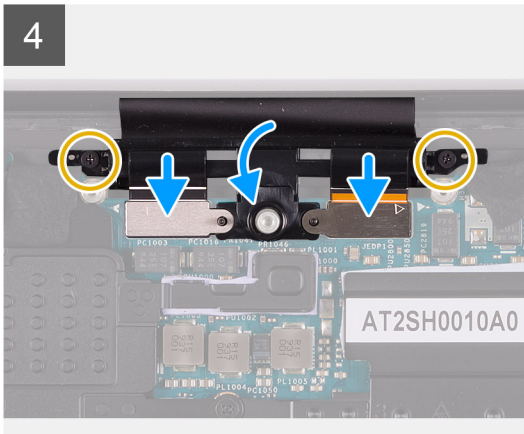
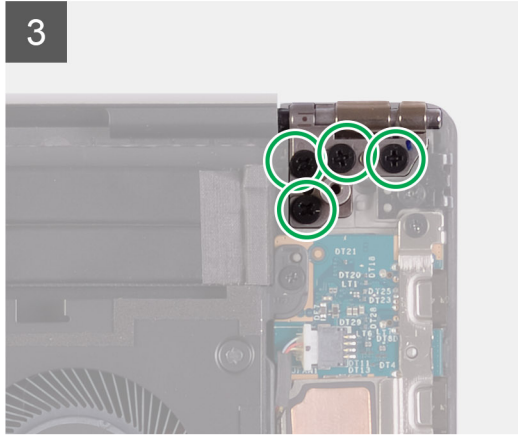
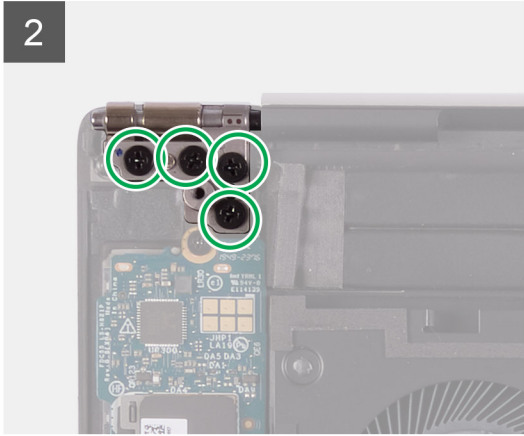
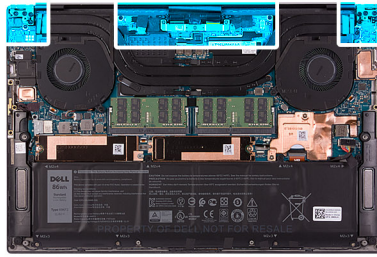
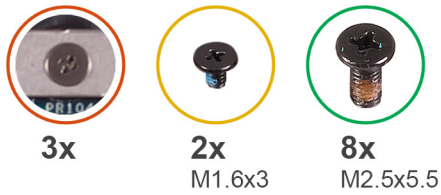
If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The following images indicate the location of the display-assembly cable and display-assembly hinges and provide a visual representation of the installation procedure.

1





Steps

1. Slide the palm-rest and keyboard assembly under the display-assembly hinges.
2. Align the screw holes on the palm-rest assembly with the screw holes on the right and left display-assembly hinges.
3. Replace the four screws (M2.5x5.5) that secure the left hinge to the system board and the palm-rest and keyboard assembly.
4. Replace the four screws (M2.5x5.5) that secure the right hinge to the system board and the palm-rest and keyboard assembly.
5. Align the screw holes on the display-assembly cable holder with the screw holes on the palm-rest and keyboard assembly.
6. Connect the touchscreen cable and camera cable to the display-assembly cable .
7. Replace the two screws (M1.6x3) that secure the display-assembly cable holder to the palm-rest and keyboard assembly.

i NOTE: Apply gentle torque when tightening the two screws (M1.6x3) to avoid damaging the screw threads.

8. Align the screw holes on the display-assembly cable bracket with the screw holes on the system board.
9. Tighten the three captive screws that secure the display-assembly cable bracket to the system board.

Next steps

1. Install the [base cover](#).
2. Follow the procedure in [After working inside your computer](#).

System board

Removing the system board

Prerequisites

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

i **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.

i **NOTE:** The Service Tag of your computer is stored in the system board. Enter the Service Tag in the BIOS setup program after you replace the system board.

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

i **NOTE:** After your computer is reassembled and powered on, it prompts for the Real Time Clock (RTC) reset. When the RTC reset cycle occurs, the computer restarts several times and then an error message is displayed- "Time of day not set". Enter the BIOS when this error appears and set the date and time on your computer to resume normal functionality.

2. Remove the [base cover](#).

3. Remove the [battery](#).

4. Remove the [speakers](#).

5. Remove the [memory](#).

6. Remove the [solid state drive1](#).

7. Remove the [solid state drive2](#).

8. Remove the [heat sink](#).

i **NOTE:** The system board can be removed or installed together with the heat sink attached. This simplifies the procedure and avoids breaking the thermal bond between the system board and the heat sink.

9. Remove the [left fan](#).

10. Remove the [right fan](#).

11. Remove the [I/O board](#).

About this task

The following image indicates the connectors on your system board.

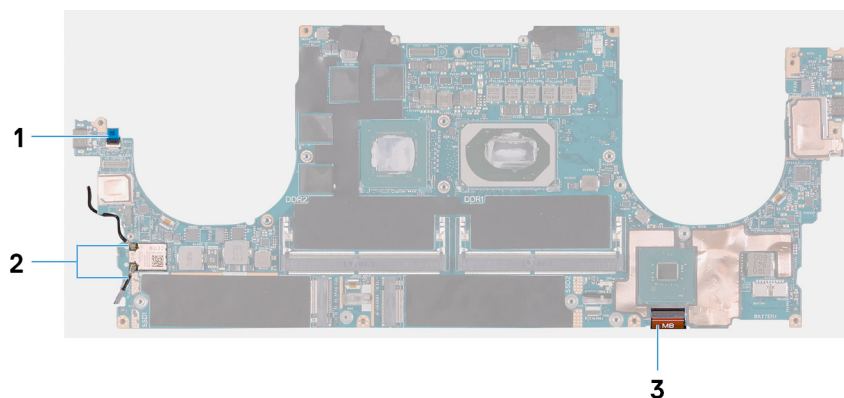


Figure 1. System-board connectors

1. Fingerprint reader-board cable
2. Antenna cables
3. Keyboard control-board cable

The following images indicate the location of the system board and provide a visual representation of the removal procedure.



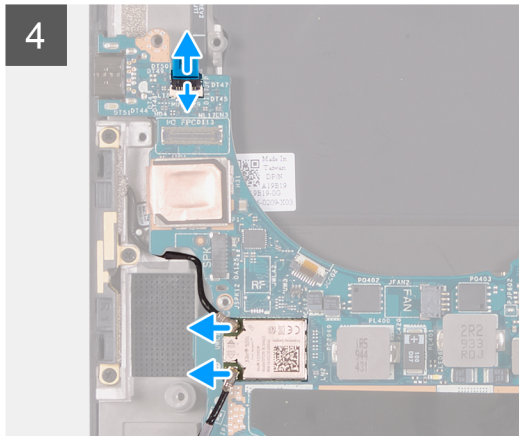
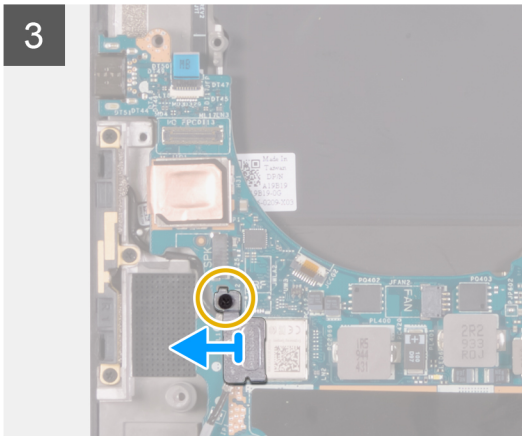
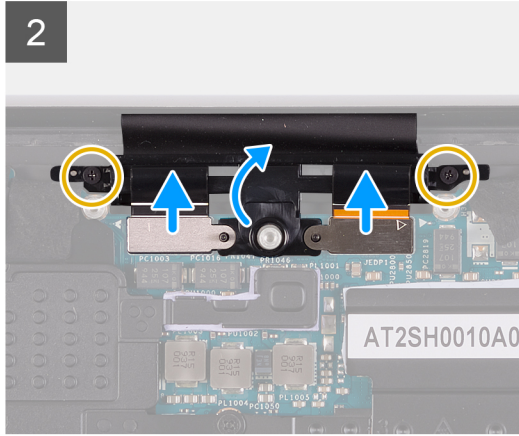
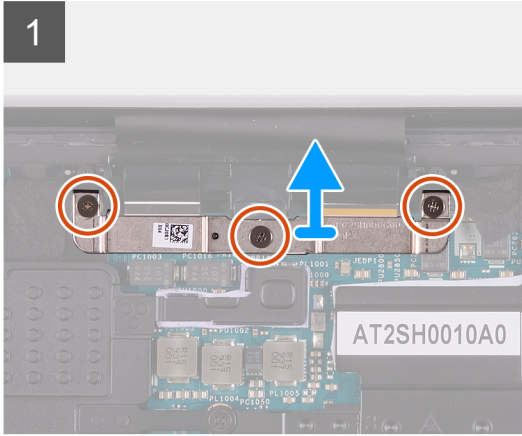
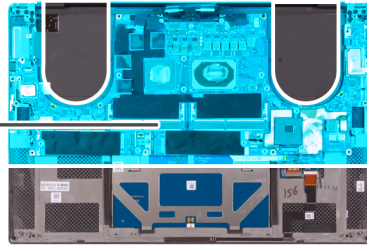
3x

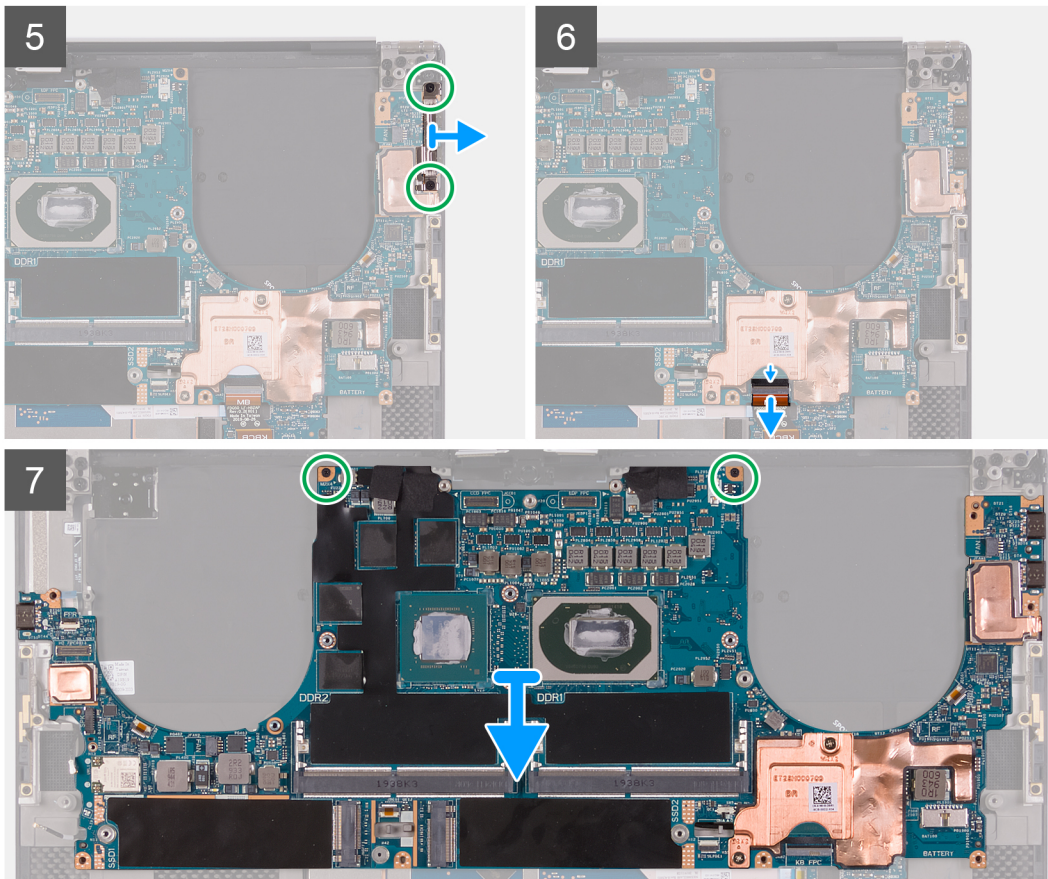


3x
M1.6x3



4x
M2x4





Steps

1. Loosen the three captive screws that secure the display-assembly cable bracket to the system board.
2. Lift the display-assembly cable bracket off the system board.
3. Remove the two screws (M1.6x3) that secure the display-assembly cable holder to the palm-rest and keyboard assembly.
4. Disconnect the touch screen cable and camera cable.
5. Remove the screw (M1.6x3) that secures the wireless-card bracket to the system board.
6. Using a plastic scribe, disconnect the antenna cables from the wireless card.
7. Open the latch, and disconnect the fingerprint reader-board cable from the system board.
8. Remove the two screws (M2x4) that secure the USB Type-C bracket to the palm-rest and keyboard assembly.
9. Lift the USB Type-C bracket from the palm-rest and keyboard assembly.
10. Open the latch, and disconnect the keyboard-control board cable the system board.
11. Remove the two screws (M2x4) that secure the system board to the palm-rest and keyboard assembly.
12. Lift the system board off the palm-rest and keyboard assembly.

Installing the system board

Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

- i** **NOTE:** The Service Tag of your computer is stored in the system board. Enter the Service Tag in the BIOS setup program after you replace the system board.
- i** **NOTE:** Replacing the system board removes any changes that you have made to the BIOS using the BIOS setup program. Make the appropriate changes again after you replace the system board. After your computer is reassembled and powered on, it prompts for the Real Time Clock (RTC) reset. When the RTC reset cycle occurs, the computer restarts several times and then an error message is displayed- "Time of day not set". Enter the BIOS when this error appears and set the date and time on your computer to resume normal functionality.

About this task

The following image indicates the connectors on your system board.

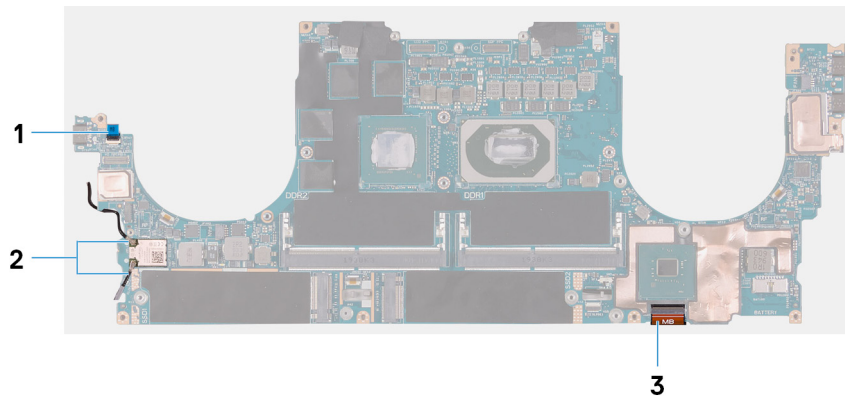
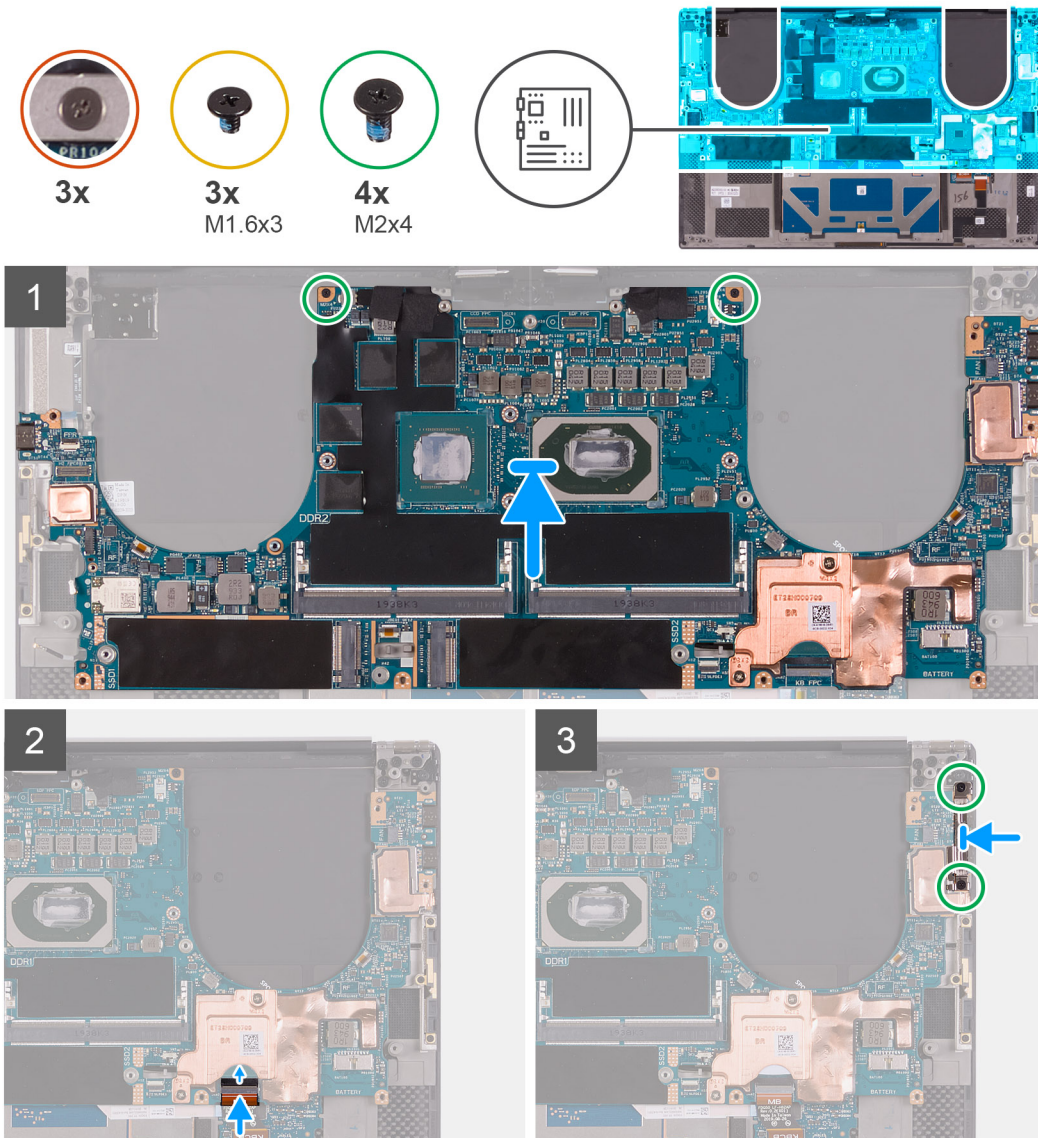
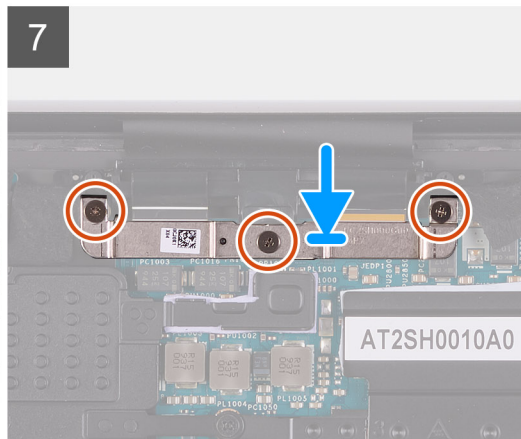
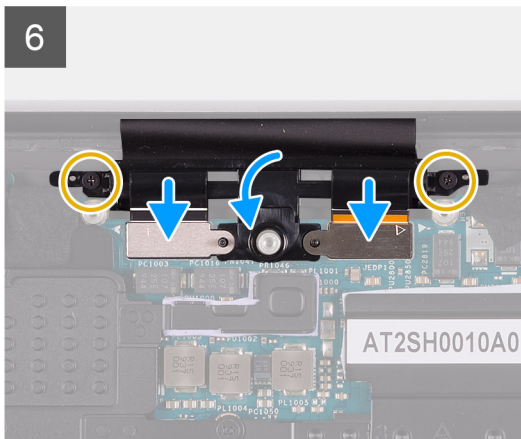
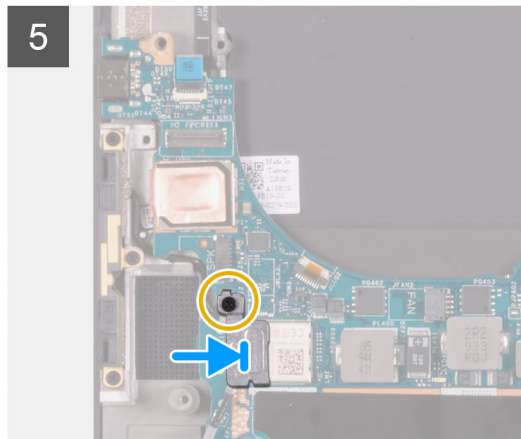
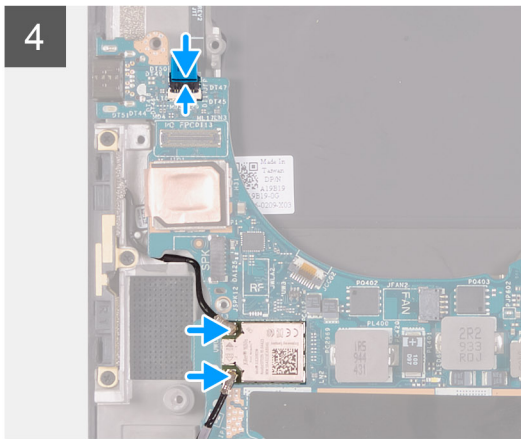


Figure 2. System-board connectors

1. Fingerprint reader-board cable
2. Antenna cables
3. Keyboard control-board cable

The following images indicate the location of the system board and provide a visual representation of the installation procedure.





Steps

1. Align the screw holes on the system board with the screw holes on the palm-rest and keyboard assembly.
2. Replace the two screws (M2x4) that secure the system board to the palm-rest and keyboard assembly.
3. Connect the keyboard-control board cable to the system board and close the latch to secure the cable.
4. Align the screw holes on the Type-C bracket with the screw holes on the palm-rest and keyboard assembly.
5. Replace the two screws (M2x4) that secure the Type-C bracket to the palm-rest and keyboard assembly.
6. Connect the fingerprint reader-board cable to the system board and close the latch to secure the cable.
7. Connect the right speaker cable to the system board.
8. Connect the keyboard cable to the system board and close the latch to secure the cable.
9. Connect the antenna cables to the wireless card.
10. Align the screw hole on the wireless-card bracket with the screw hole on the system board.
11. Replace the screw (M1.6x3) that secures the wireless-card bracket to the system board.
12. Connect the touch screen cable and camera cable to the display-assembly cable .
13. Replace the two screws (M1.6x3) that secure the display-assembly cable holder to the palm-rest and keyboard assembly.
14. Connect the touch screen cable and camera cable to the display-assembly cable.
15. Align the screw holes on the display-assembly cable bracket with the screw holes on the system board.
16. Tighten the three captive screws that secure the display-assembly cable bracket to the system board.

Next steps

1. Install the [I/O board](#).
2. Install the [right fan](#).
3. Install the [left fan](#).
4. Install the [heat sink](#).
5. Install the [solid state drive2](#).
6. Install the [solid state drive1](#).
7. Install the [memory](#).
8. Install the [battery](#).
9. Install the [speakers](#).

10. Install the [base cover](#).
11. Follow the procedure in [After working inside your computer](#).

Palm-rest and keyboard assembly

Removing the palm-rest and keyboard assembly

Prerequisites

1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [speakers](#).
5. Remove the [memory](#).
6. Remove the [solid state drive1](#).
7. Remove the [solid state drive2](#).
8. Remove the [heat sink](#).

NOTE: The system board can be removed or installed together with the heat sink attached. This simplifies the procedure and avoids breaking the thermal bond between the system board and the heat sink.

9. Remove the [left fan](#).
10. Remove the [right fan](#).
11. Remove the [I/O board](#).
12. Remove the [display assembly](#).
13. Remove the [system board](#).

About this task

The following image indicates the palm-rest and keyboard assembly and provides a visual representation of the removal procedure.



After performing the steps in the pre-requisites, you are left with the palm-rest and keyboard assembly.

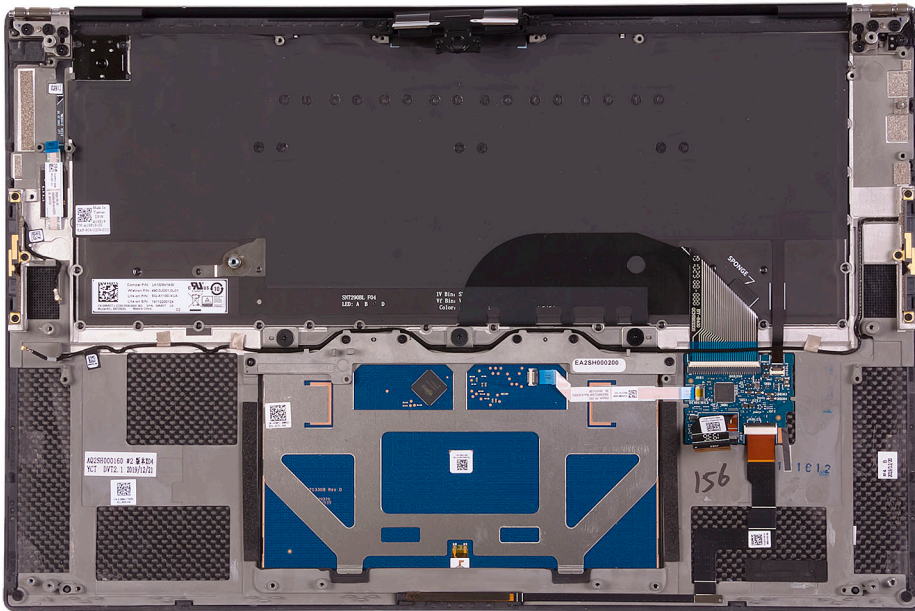
Installing the palm-rest and keyboard assembly

Prerequisites

If you are replacing a component, remove the existing component before performing the installation procedure.

About this task

The following image indicates the palm-rest and keyboard assembly and provides a visual representation of the installation procedure.



Steps

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

Next steps

1. Install the [system board](#).
2. Install the [display assembly](#).
3. Install the [I/O board](#).
4. Install the [left fan](#).
5. Install the [right fan](#).
6. Install the [heat sink](#).
7. Install the [solid state drive2](#).
8. Install the [solid state drive1](#).
9. Install the [memory](#).
10. Install the [battery](#).
11. Install the [speakers](#).
12. Install the [base cover](#).
13. Follow the procedure in [After working inside your computer](#).

Drivers and downloads

When troubleshooting, downloading or installing drivers it is recommended that you read the Dell Knowledge Based article, Drivers and Downloads FAQ [SLN128938](#).

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

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

Use the BIOS Setup program for the following purposes:

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

Topics:

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

Entering BIOS setup program

About this task

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.

Table 2. Navigation keys

| Keys | Navigation |
|------------|---|
| Up arrow | Moves to the previous field. |
| Down arrow | Moves to the next field. |
| Enter | Selects a value in the selected field (if applicable) or follow the link in the field. |
| Spacebar | Expands or collapses a drop-down list, if applicable. |
| Tab | Moves to the next focus area. NOTE: For the standard graphics browser only. |
| Esc | Moves to the previous page until you view the main screen. Pressing Esc in the main screen displays a message that prompts you to save any unsaved changes and restarts the system. |

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.

One time boot menu

To enter **one time boot menu**, turn on your computer, and then press F2 immediately.

i **NOTE: It is recommended to shutdown the computer if it is on.**

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

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

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. |
| 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. Default: Enabled |
| Battery | Displays the battery health information. |
| Primary | Displays the primary battery. |
| Battery Level | Displays the battery level. |

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

| Overview | |
|-------------------------------|---|
| Battery State | Displays the battery state. |
| Health | Displays the battery health. |
| AC Adapter | Displays whether an AC adapter is connected. If connected, the AC adapter type. |
| PROCESSOR | |
| Processor Type | Displays the processor type. |
| Maximum Clock Speed | Displays the maximum processor clock speed. |
| Minimum Clock Speed | Displays the minimum processor clock speed. |
| Current Clock Speed | Displays the current processor clock speed. |
| Core Count | Displays the number of cores on the processor. |
| Processor ID | Displays the processor identification code. |
| Processor L2 Cache | Displays the processor L2 Cache size. |
| Processor L3 Cache | Displays the processor L3 Cache size. |
| 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 | |
| Memory Installed | Displays the total computer memory installed. |
| Memory Available | Displays the total computer memory available. |
| Memory Speed | Displays the memory speed. |
| Memory Channel Mode | Displays single or dual channel mode. |
| Memory Technology | Displays the technology that is used for the memory. |
| DIMM SLOT 1 | Displays the memory card installed in slot 1 |
| DIMM SLOT 2 | Displays the memory card installed in slot 2 |
| DEVICES | |
| Panel Type | Displays the Panel Type of the computer. |
| Video Controller | Displays the integrate graphics information of the computer. |
| Video Memory | Displays the video memory information of the computer. |
| Wi-Fi Device | Displays the Wi-Fi device installed in the computer. |
| Native Resolution | Displays the native resolution of the computer. |
| Video BIOS Version | Displays the video BIOS version of the computer. |
| Audio Controller | Displays the audio controller information of the computer. |
| Bluetooth Device | Displays whether a Bluetooth device is installed in the computer. |
| Pass Through MAC Address | Displays the MAC address of the video pass-through. |

Table 4. System setup options—Boot options menu

| Boot options | |
|----------------------|---|
| Boot Mode | |
| Boot Mode: UEFI only | Displays the boot mode of this computer. |
| Enable Boot Devices | Enables or disables Windows Boot Manager and UEFI Hard Drive. By default, Windows Boot Manager is selected |

Table 4. System setup options—Boot options menu(continued)

| Boot options | |
|--------------------------------|--|
| | By default, UEFI Hard Drive is selected |
| Boot Sequence | Displays the boot sequence. |
| Advanced Boot Options | |
| Enable UEFI Network Stack | Enables or disables UEFI Network Stack. 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. |
| Storage Interface | |
| Port Enablement | Enables the selected onboard drives. Default: ON |
| SATA Operation | |
| | Configures operating mode of the integrated SATA hard drive controller. Default: RAID On. SATA is configured to support RAID (Intel Rapid Restore Technology). |
| Drive Information | |
| Enable SMART Reporting | Displays the information of various onboard drives. Enables or disables Self-Monitoring, Analysis, and Reporting Technology (SMART). Default: OFF |
| Enable Audio | |
| | Enables or disables all integrated audio controller. Default: ON |
| Enable Microphone | Enables or disables microphone. By default, Enable Microphone is selected. |
| Enable Internal Speaker | Enables or disables internal speaker. By default, Enable Internal Speaker is selected. |
| USB Configuration | |
| | Enables or disables booting from USB mass storage devices such as external hard drive, optical drive, and USB drive. By default, Enable USB Boot Support is selected. By default, Enable External USB Ports is selected. |
| Thunderbolt Adapter Configuration | |
| Enable Thunderbolt Technology Support | Enables or disables Thunderbolt Technology Support. Default: ON |
| Enable Thunderbolt Boot Support | Enables or disables Thunderbolt Boot Support. Default: OFF |

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

| System Configuration | |
|--|--|
| EnableThunderbolt (and PCIe behind TBT) pre-boot modules | Enables or disables to allow or disallow PCIe devices to be connected through a Thunderbolt adapter during pre-boot. Default: OFF |
| Miscellaneous Devices | Enables or disables various onboard devices. |
| Enable Camera | Enables or disables the camera. By default, Enable Camera is selected. |
| Touchscreen | Enables or disables the touchscreen. By default, Touchscreen is selected. |
| Enable Fingerprint Reader Device | Enables or disables the Fingerprint Reader Device. By default, Enable Fingerprint Reader Device is selected. |
| Enable MediaCard | Enables to switch all media cards On/Off or set the media card to read-only state. By default, Enable Secure Digital (SD) Card is selected. |
| Keyboard Illumination | Configures the operating mode of the keyboard illumination feature. Default: Bright. Enable the keyboard illumination feature at 100% brightness level. |
| 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 |

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. Default: 50 |
| Brightness on AC power | Sets the screen brightness when the computer is running on AC power. Default: 100 |

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 |

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

| Security | |
|--------------------------------------|---|
| Non-Admin Setup Changes | |
| Enable UEFI Capsule Firmware Updates | Enables or disables BIOS updates through UEFI capsule update packages. Default: ON |
| Absolute | Enables, disables or permanently disable the BIOS module interface of the optional Absolute Persistence Module service from Absolute Software. Default: Enabled |
| TPM 2.0 Security On | Select whether or not the Trusted Platform Model (TPM) is visible to the OS. Default: ON |
| PPI Bypass for Enable Commands | Enables or disables the OS to skip BIOS Physical Presence Interface (PPI) user prompts when issuing TPM PPI enabled and activate commands. Default: OFF |
| PPI Bypass for Disable Commands | Enables or disables The OS to skip BIOS PPI user prompts when issuing TPM PPI Disable and Deactivate commands. Default: OFF |
| 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 |
| Attestation Enable | Enables to control whether the TPM Endorsement Hierarchy is available to the OS. Disabling this setting restricts the ability to use the TPM for signature operations. Default: ON |
| Key Storage Enable | Enables to control whether the TPM Endorsement Hierarchy is available to the OS. Disabling this setting restricts the ability to use the TPM for storing owner data. Default: ON |
| SHA-256 | Enables or disables the BIOS and the TPM to use the SHA-256 hash algorithm to extend measurements into the TPM PCRs during BIOS boot. Default: ON |
| Clear | Enables or disables the computer to clear the PTT owner information, and returns the PTT to the default state. Default: OFF |
| TPM State | Enables or disables the TPM. This is the normal operating state for the TPM when you want to use its complete array of capabilities. Default: Enabled |
| SMM Security Mitigation | Enables or disables additional UEFI SMM Security Mitigation protections. Default: OFF |
| | NOTE: This feature may cause compatibility issues or loss of functionality with some legacy tools and applications. |
| 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 |

Table 8. System setup options—Passwords menu

| Passwords | |
|---------------------------------------|---|
| Enable Strong Passwords | Enables or disables strong passwords. Default: OFF |
| Password Configuration | |
| Admin Password Min | Specify the minimum number of characters allowed for Admin password. Default: 4 |
| Admin Password Max | Specify the maximum number of characters allowed for Admin password. Default: 32 |
| System Password Min | Specify the minimum number of characters allowed for System password. Default: 4 |
| System Password Max | Specify the maximum number of characters allowed for System password. Default: 32 |
| Admin Password | Sets, Changes, or deletes the administrator (admin) password (sometimes called the "setup" password). |
| System Password | Sets, Changes, or deletes the system password. |
| Enable Master Password Lockout | Enables or disables the master password support. Default: OFF |

Table 9. System setup options—Secure Boot menu

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

Table 10. System setup options—Expert Key Management menu

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

Table 11. System setup options—Performance menu

| Performance | |
|---------------------------|--|
| Multi-Core Support | |

Table 11. System setup options—Performance menu(continued)

| Performance | |
|---|---|
| Active Cores | 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 |
| Intel SpeedStep | |
| Enable Intel SpeedStep Technology | Enables or disables the Intel SpeedStep Technology to dynamically adjust processor voltage and core frequency, decreasing average power consumption and heat production. Default: ON |
| Enable C-State Control | Enables or disables the CPU's ability to enter and exit low-power states. Default: ON |
| Intel Turbo Boost Technology | |
| Enable Intel Turbo Boost 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 |
| Intel Hyper-Threading Technology | |
| Enable Intel Hyper-Threading Technology | Enabled or disabled the Intel Hyper-Threading mode of the processor. If enabled, the Intel Hyper-Threading increases the efficiency of the processor resources when multiple threads run on each core. Default: ON |

Table 12. System setup options—Power Management menu

| Power Management | |
|---|--|
| Wake on AC | Enables the computer to turn on and go to boot when AC power is supplied to the computer. Default: OFF |
| Wake on Dell USB-C Dock | Enables connecting a Dell USB-C Dock to wake the computer from Standby. Default: ON |
| Auto On Time | Enables the computer to automatically power on for defined days and times. Default: Disabled. The system will not automatically power up. |
| 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. |
| 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 |
| Peak Shift | Enables the computer to run on battery during peak power usage hours. |

Table 12. System setup options—Power Management menu(continued)

| Power Management | |
|-------------------------------------|--|
| | Default: OFF |
| Wireless Radio Control | |
| Control WLAN radio | Enables to sense the connection of the computer to a wired network and subsequently disable the selected wireless radios (WLAN and/or WWAN). Upon disconnection from the wired network, the selected wireless radios are re-enabled. Default: OFF |
| Wake on LAN | Enables or disables the computer to turn on by a special LAN signal. Default: Disabled |
| Intel Speed Shift Technology | Enables or disables the Intel Speed Shift Technology support. Setting this option to enable allows the operating system to select the appropriate processor performance automatically. Default: ON |
| Lid Switch | |
| Power On Lid Open | Enables the computer to power up from the off state whenever the lid is opened. Default: ON |

Table 13. System setup options—Wireless menu

| Wireless | |
|-------------------------------|---|
| Wireless Device Enable | Enable or disable internal WLAN/Bluetooth devices. By default, WLAN is selected. By default, Bluetooth is selected. |

Table 14. System setup options—POST Behavior menu

| POST Behavior | |
|-------------------------------------|--|
| Numlock Enable | |
| Enable Numlock | Enables or disables Numlock when the computer boots. Default: ON |
| Fn Lock | 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. |
| 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. |
| | NOTE: Errors deemed critical to the operation of the computer hardware will always halt the computer. |
| Enable Adapter Warnings | Enables or disables the computer to display adapter warning messages when adapters with too little power capacity are detected. Default: ON |
| Enable Dock Warning Messages | Enables or disables dock warning messages. Default: ON |
| Fastboot | Configures the speed of the UEFI boot process. |

Table 14. System setup options—POST Behavior menu(continued)

| POST Behavior | |
|---------------------------------|---|
| Extend BIOS POST Time | Default: Thorough. Performs complete hardware and configuration initialization during boot. Configures the BIOS POST (Power-On Self-Test) load time. Default: 0 seconds |
| Full Screen Logo | Enabled or disabled the computer to display full screen logo if the image match screen resolution. Default: OFF |
| Mouse/Touchpad | Defines how the computer handles mouse and touchpad input. Default: Touchpad and PS/2 Mouse. Leave the integrated touchpad enabled when an external PS/2 mouse is present. |
| Sign of Life | |
| Early Logo Display | Display Logo Sign of Life. Default: ON |
| Early Keyboard Backlight | Keyboard Backlight Sign of Life. Default: ON |
| MAC Address Pass-Through | Replaces the external NIC MAC address (in a supported dock or dongle) with the selected MAC address from the computer. Default: System Unique MAC Address. |

Table 15. System setup options—Virtualization menu

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

Table 16. System setup options—Maintenance menu

| Maintenance | |
|--------------------------------------|--|
| Asset Tag | |
| Asset Tag | Creates a system Asset Tag that can be used by an IT administrator to uniquely identify a particular system. Once set in BIOS, the Asset Tag cannot be changed. |
| Service Tag | Displays the Service Tag of the computer. |
| BIOS Recovery from Hard Drive | Enables the computer to recover from a bad BIOS image, as long as the Boot Block portion is intact and functioning. Default: ON |
| | 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. |

Table 16. System setup options—Maintenance menu(continued)


| Maintenance | |
|-----------------------------|---|
| | Default: OFF |
| Start Data Wipe | <p> CAUTION: This Secure Wipe Operation deletes information in a way that it cannot be reconstructed.</p> <p>If enabled, the BIOS will queue up a data wipe cycle for storage devices that are connected to the motherboard on the next reboot.</p> <p>Default: OFF</p> |
| Allow BIOS Downgrade | <p>Controls flashing of the system firmware to previous revisions.</p> <p>Default: ON</p> |

Table 17. System setup options—System Logs menu

| System Logs | |
|--------------------------|--|
| Power Event Log | |
| Clear POWER Event Log | <p>Select keep or clear Power events.</p> <p>Default: Keep</p> |
| BIOS Event Log | |
| Clear Bios Event Log | <p>Select keep or clear BIOS events.</p> <p>Default: Keep</p> |
| Thermal Event Log | |
| Clear Thermal Event Log | <p>Select keep or clear Thermal events.</p> <p>Default: Keep</p> |

Table 18. System setup options—SupportAssist menu

| SupportAssist | |
|--|--|
| Dell Auto OS Recovery Threshold | <p>Controls the automatic boot flow for SupportAssist System Resolution Console and for Dell operating system Recovery tool.</p> <p>Default: 2.</p> |
| SupportAssist OS Recovery | <p>Enables or disables the boot flow for SupportAssist operating system Recovery tool in the even of certain system errors.</p> <p>Default: ON</p> |
| BIOSConnect | <p>Enables or disables cloud Service OS recover if the main operating system fails to boot with the number of failures equal to or greater than the value specified by the Auto OS Recovery Threshold setup option.</p> <p>Default: ON</p> |

Clearing CMOS settings

About this task

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

Steps

1. Turn off your computer.

2. Remove the [base cover](#).

i **NOTE:** The battery must be disconnected from the system board. See step 3 in [removing base cover](#).

3. Press and hold the power button for 15 seconds to drain the flea power.
4. Before you turn on your computer, follow the steps in [installing the base cover](#).
5. Turn on your computer.

Clearing BIOS (System Setup) and System passwords

About this task

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

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

Troubleshooting

System diagnostic lights

When static, the power and battery-charge status light indicates the power mode that your computer is in. When blinking in different patterns, the power and battery-charge status light indicates the respective issues that your computer is encountering.

Static power and battery-charge status light

The following table lists the status of your computer based on the power and battery-charge status light.

Table 19. Power and battery-charge status light

| Power and battery-charge status light | Status of computer |
|---------------------------------------|---|
| Solid white | <ul style="list-style-type: none"> The power adapter is connected and the battery is fully charged. The power adapter is connected and the battery has more than five percent charge. |
| Amber | The computer is running on battery and the battery has less than five percent charge. |
| Off | The computer is in sleep state, hibernation, or turned off. |

Blinking power and battery-charge status light

The power and battery-status light blinks alternately between amber and off to indicate issues that your computer is encountering.

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 the different power and battery-status light patterns and the associated issues.

Table 20. LED codes

| Diagnostic light codes | Problem description |
|------------------------|--|
| 2,1 | Processor failure |
| 2,2 | System board: BIOS or ROM (Read-Only Memory) failure |
| 2,3 | No memory or RAM (Random-Access Memory) detected |
| 2,4 | Memory or RAM (Random-Access Memory) failure |
| 2,5 | Invalid memory installed |
| 2,6 | System-board or chipset error |
| 2,7 | Display failure |
| 2,8 | LCD power rail failure. |
| 3,1 | CMOS battery failure |
| 3,2 | PCI, video card/chip failure |

Table 20. LED codes(continued)

| Diagnostic light codes | Problem description |
|------------------------|----------------------------------|
| 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 |

SupportAssist diagnostics

About this task

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

i **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](#).

Recovering the operating system

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

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

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

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

Flashing the BIOS

About this task

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

Follow these steps to flash the BIOS:

Steps

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

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

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

Flea power release

About this task

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

Steps

1. Turn off your computer.
2. Remove the [base cover](#).

 **NOTE:** The battery must be disconnected from the system board (see [Step 3 in removing base cover](#))

3. Press and hold the power button for 15 seconds to drain the flea power.
4. Install the [base cover](#).
5. Turn on your computer.

WiFi power cycle

About this task

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

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

Steps

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.

Flashing BIOS (USB key)

Steps

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

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](#).

Getting help and contacting Dell

Self-help resources


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


Table 21. Self-help resources

| Self-help resources | Resource location |
|--|---|
| Information about Dell products and services | www.dell.com |
| My Dell |  |
| Tips |  |
| Contact Support | In Windows search, type <code>Contact Support</code> , and press Enter. |
| Online help for operating system | www.dell.com/support/windows www.dell.com/support/linux |
| Troubleshooting information, user manuals, set up instructions, product specifications, technical help blogs, drivers, software updates, and so on. | www.dell.com/support |
| Dell knowledge base articles for a variety of computer concerns | <ol style="list-style-type: none"> 1. Go to www.dell.com/support. 2. On the menu bar at the top of the Support page, select Support > Knowledge Base. 3. In the Search field on the Knowledge Base page, type the keyword, topic, or model number, and then click or tap the search icon to view the related articles. |
| Learn and know the following information about your product: <ul style="list-style-type: none"> • Product specifications • Operating system • Setting up and using your product • Data backup • Troubleshooting and diagnostics • Factory and system restore • BIOS information | See <i>Me and My Dell</i> at www.dell.com/support/manuals . To locate the <i>Me and My Dell</i> relevant to your product, identify your product through one of the following: <ul style="list-style-type: none"> • Select Detect Product. • Locate your product through the drop-down menu under View Products. • Enter the Service Tag number or Product ID in the search bar. |

Contacting Dell

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

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

 **NOTE:** If you do not have an active Internet connection, you can find contact information about your purchase invoice, packing slip, bill, or Dell product catalog.