


# 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.

# Contents

<b>Chapter 1: Working inside your computer</b> .....	<b>5</b>
Before working inside your computer.....	5
Safety instructions.....	5
Electrostatic discharge—ESD protection.....	6
ESD Field Service kit .....	6
After working inside your computer.....	7
<b>Chapter 2: Removing and installing components</b> .....	<b>8</b>
Recommended tools.....	8
Screw list.....	8
Major components of your system.....	9
Base cover.....	11
Removing the base cover.....	11
Installing the base cover.....	14
Battery.....	15
Removing the battery.....	15
Installing the battery.....	16
Memory module.....	17
Removing the memory.....	17
Installing the memory.....	18
Solid-state drive.....	19
Removing the solid-state drive1.....	19
Installing the solid-state drive1.....	20
Removing the solid-state drive2.....	21
Installing the solid-state drive2.....	22
Installing the M.2 2230 solid-state drive.....	23
Fans.....	24
Removing the left fan.....	24
Installing the left fan.....	25
Removing the right fan.....	26
Installing the right fan.....	27
Heat sink.....	28
Removing the heat sink.....	28
Installing the heat sink.....	29
Speakers.....	30
Removing the speakers.....	30
Installing the speakers.....	31
I/O board.....	32
Removing the I/O board.....	32
Installing the I/O board.....	33
Display assembly.....	34
Removing the display assembly.....	34
Installing the display assembly.....	36
System board.....	39

Removing the system board.....	39
Installing the system board.....	42
LED cable.....	45
Removing the LED cable.....	45
Installing the LED cable.....	46
Palm-rest and keyboard assembly.....	47
Removing the palm-rest and keyboard assembly.....	47
Installing the palm-rest and keyboard assembly.....	48
<b>Chapter 3: Drivers and downloads.....</b>	<b>50</b>
<b>Chapter 4: BIOS Setup.....</b>	<b>51</b>
BIOS overview.....	51
Entering BIOS Setup.....	51
Navigation keys.....	51
F12 One Time Boot menu.....	52
System setup options.....	52
Updating the BIOS.....	62
Updating the BIOS in Windows.....	62
Updating the BIOS in Linux and Ubuntu.....	62
Updating the BIOS using the USB drive in Windows.....	62
Updating the BIOS from the One-Time boot menu.....	63
System and setup password.....	63
Assigning a System Setup password.....	63
Deleting or changing an existing system password or setup password.....	64
Clearing system and setup passwords.....	64
<b>Chapter 5: Troubleshooting.....</b>	<b>65</b>
Handling swollen rechargeable Li-ion batteries.....	65
SupportAssist diagnostics.....	66
Built-in self-test (BIST).....	66
Motherboard Built-In Self-Test (M-BIST).....	66
Logic Built-in Self-test (L-BIST).....	66
LCD Built-in Self-Test (LCD-BIST).....	67
System diagnostic lights.....	67
Recovering the operating system.....	68
Backup media and recovery options.....	69
Network power cycle.....	69
Drain flea power (perform hard reset).....	69
<b>Chapter 6: Getting help and contacting Dell.....</b>	<b>71</b>
<b>Chapter 7: Revision history.....</b>	<b>72</b>


# Working inside your computer

## Topics:




- [Before working inside your computer](#)
- [Safety instructions](#)
- [Electrostatic discharge—ESD protection](#)
- [ESD Field Service kit](#)
- [After 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 in this document assumes that you have read the safety information that shipped with your computer.

 **WARNING:** Before working inside your computer, read the safety information that is shipped with your computer. For more safety best practices, see [Dell Regulatory Compliance Home Page](#).

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

 **WARNING:** For laptops, discharge the battery completely before removing it. Disconnect the AC power adapter from the computer and operate the computer solely on battery power—the battery is fully discharged when the computer no longer turns on when the power button is pressed.

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

 **CAUTION:** You should only perform troubleshooting and repairs as authorized or directed by the Dell technical support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty.

- △ **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:** To avoid damaging the components and cards, handle them by their edges, and avoid touching the pins and the contacts.
- △ **CAUTION:** When you disconnect a cable, pull it by its connector or its pull tab, not the cable itself. Some cables have connectors with locking tabs or thumbscrews that you must disengage before disconnecting the cable. When disconnecting cables, keep them evenly aligned to avoid bending the connector pins. When connecting cables, ensure that the connector on the cable is correctly oriented and aligned with the port.
- △ **CAUTION:** Press and eject any installed card from the media-card reader.

## Electrostatic discharge—ESD protection

ESD is a major concern when you handle electronic components, especially sensitive components such as expansion cards, processors, memory modules, and system boards. A slight charge 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.

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 module that has received a static shock and immediately generates a "No POST/No Video" symptom with a beep code that is 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 memory module receives a static shock, but the tracing is merely weakened and does not immediately produce outward symptoms that are 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, and so on.

Intermittent failures that are also called latent or "walking wounded" are difficult to detect and troubleshoot.

Perform the following steps to prevent ESD damage:

- Use a wired ESD wrist strap that is properly grounded. Wireless anti-static straps 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, use the anti-static wrist strap to discharge the static electricity from your body.

**NOTE:** You can protect against ESD and discharge static electricity from your body by touching a metal-grounded object before you interact with anything electronic, for example, an unpainted metal surface on your computer's I/O panel. When connecting a peripheral (including handheld digital assistants) to your computer, you should always ground both yourself and the peripheral before connecting it to the computer. In addition, as you work inside the computer, periodically touch a metal-grounded object to remove any static charge that your body may have accumulated.

For more information about the wrist strap and ESD wrist strap tester, see [Components of an ESD Field Service Kit](#).

- 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.

- △ **CAUTION:** It is critical to keep ESD-sensitive devices away from internal parts that are insulated and often highly charged, such as plastic heat sink casings.

## Working environment

. For example, deploying the kit for a server environment is different than for a desktop or laptop environment. Servers are typically installed in a rack within a data center; desktops or laptops 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 computer 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 component 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 anti-static mat, in the computer, or inside an ESD bag.

## 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 anti-static mat and to any bare metal on the computer being worked on. Once deployed properly, service parts can be removed from the ESD bag and placed directly on the anti-static mat. ESD-sensitive items are safe in your hand, on the anti-static mat, in the computer, or inside an ESD bag.
- **Wrist Strap and Bonding Wire** – If an anti-static mat is not being used, the wrist strap and bonding wire should be connected directly between your wrist and an exposed metal part of the hardware. If you are using an anti-static mat, connect the wrist strap and bonding wire to the anti-static mat to ensure protection for any hardware placed on the mat. The physical connection of the wrist strap and bonding wire between your skin, the anti-static mat, and the hardware is known as bonding. Use only Field Service kits with a wrist strap, anti-static mat, and bonding wire. Never use wireless wrist straps. Always be cautious 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 an ESD strap are prone to damage over time. When using an unmonitored ESD kit, it is recommended to test the wrist strap regularly—ideally before each service session, and at a minimum, once per week. The most reliable method for testing is with a wrist strap tester. To perform the test, connect the bonding wire of the wrist strap to the tester while wearing the strap. Press the test button to initiate the check. A green LED indicates a successful test, while a red LED and audible alarm signal a failure.

**NOTE:** It is recommended to always use the traditional wired ESD grounding wrist strap and protective anti-static mat when servicing Dell products. In addition, it is critical to keep sensitive parts separate from all insulator parts while servicing the computer.

## 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

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

## Topics:

- Recommended tools
- Screw list
- Major components of your system
- Base cover
- Battery
- Memory module
- Solid-state drive
- Fans
- Heat sink
- Speakers
- I/O board
- Display assembly
- System board
- LED cable
- Palm-rest and keyboard assembly

## 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 and 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 surfaces when replacing a component.

**NOTE:** Screw color may vary depending on the configuration ordered.

**Table 1. Screw list**

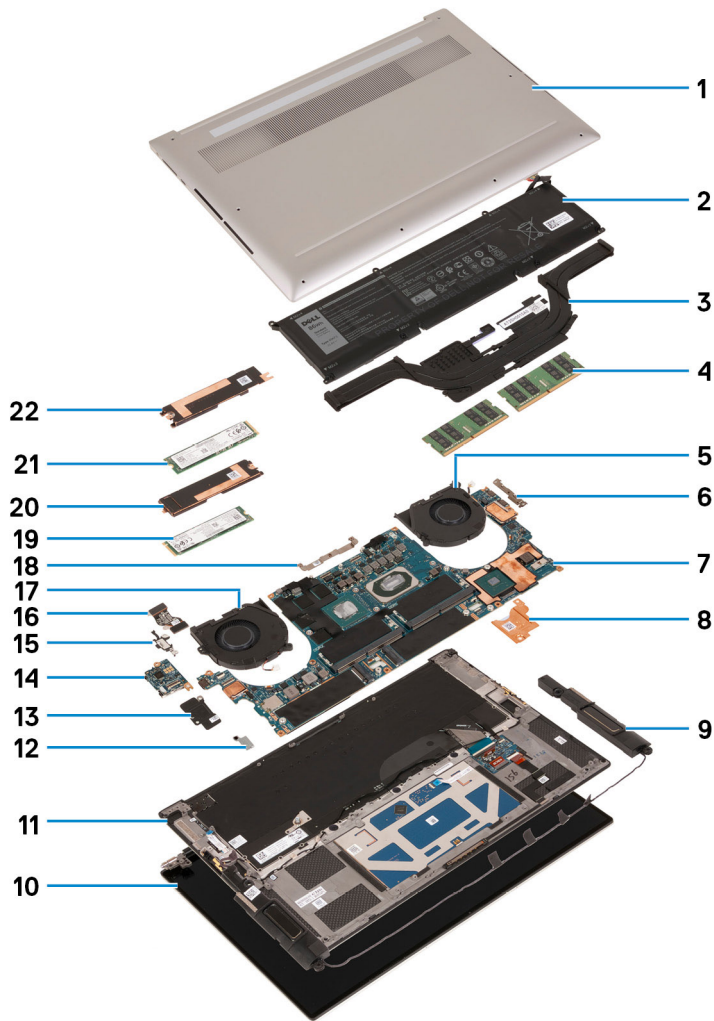
Component	Secured to	Screw type	Quantity	Screw image
Base cover	Palm-rest and keyboard assembly	M2x3	8	
Battery	Palm-rest and keyboard assembly	M2x3	4	

**Table 1. Screw list (continued)**

Component	Secured to	Screw type	Quantity	Screw image
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	
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](#).

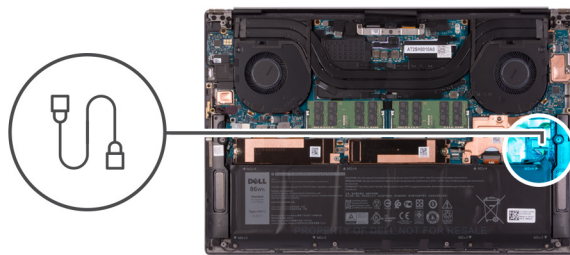
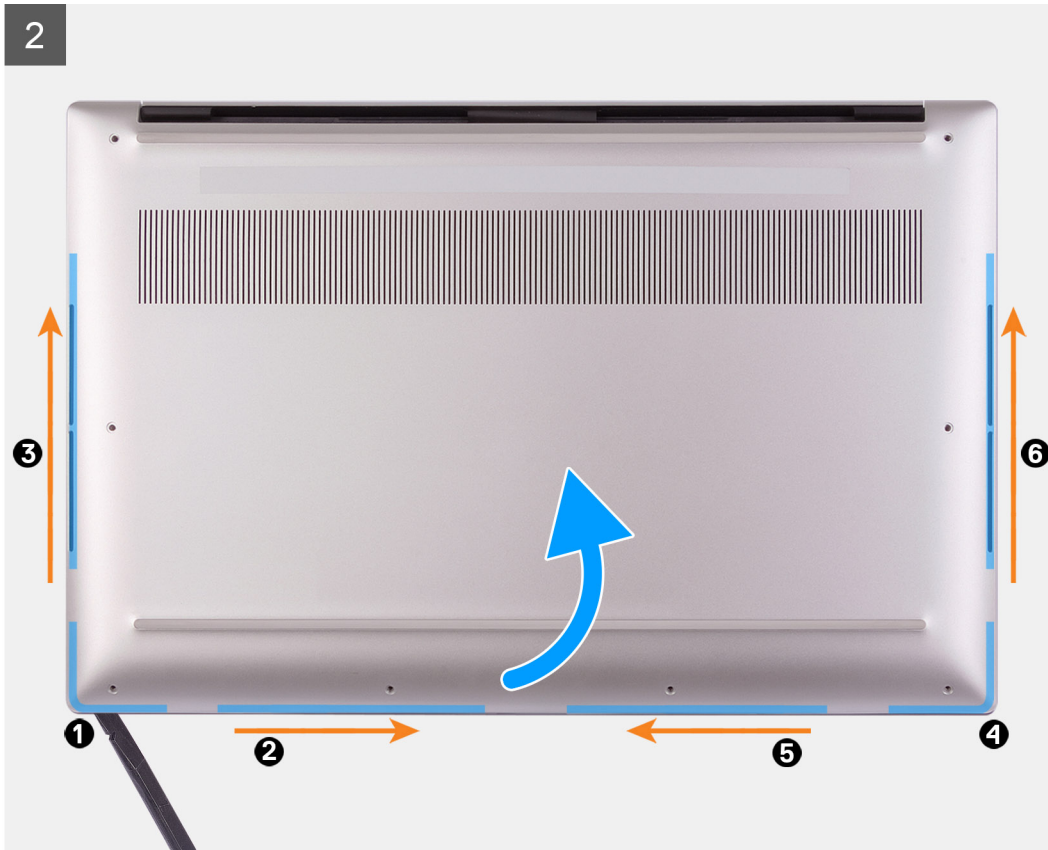
#### About this task

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



**8x**  
M2x3





4

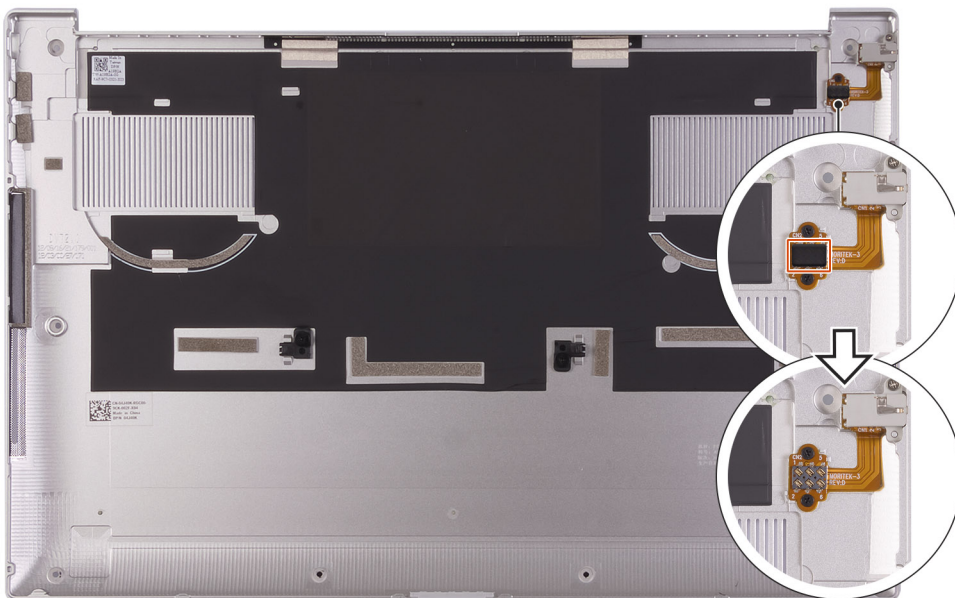


### Steps

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.



**NOTE:** Ensure to remove the protective rubber cover from audio jack pin before replacing the base cover.

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.

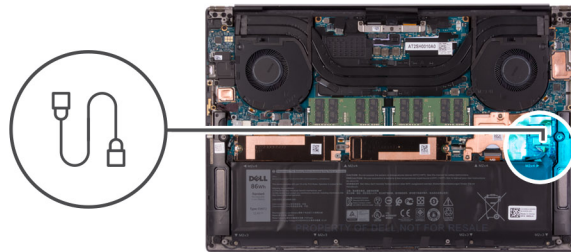
## Installing the base cover

### Prerequisites

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

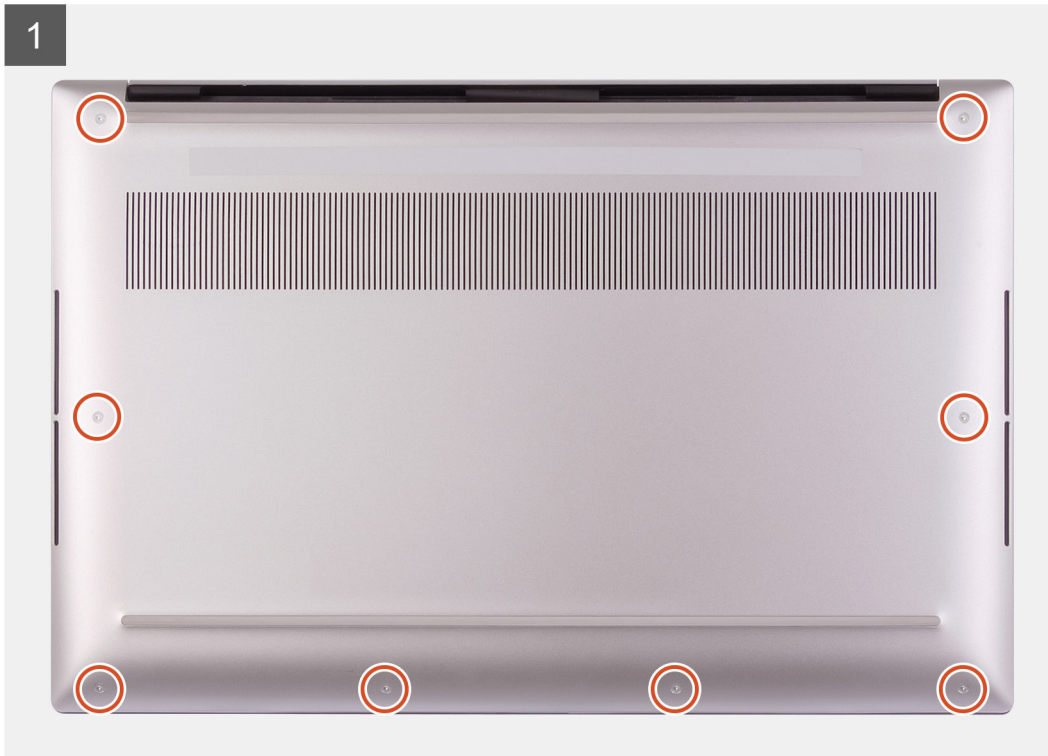
### About this task

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

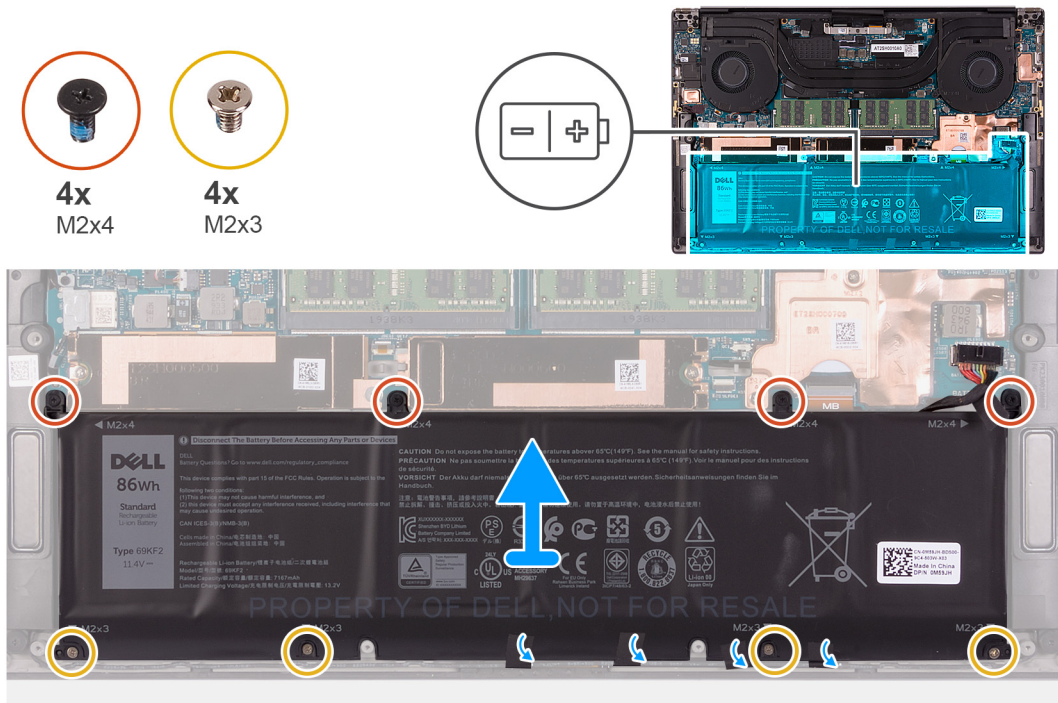
#### Prerequisites

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 (M2x4) and four (M2x3) screws that secure the battery to the palm-rest and keyboard assembly.
3. Peel the tapes that secure the speaker cable to the battery.
4. Lift the battery off the palm-rest and keyboard assembly.

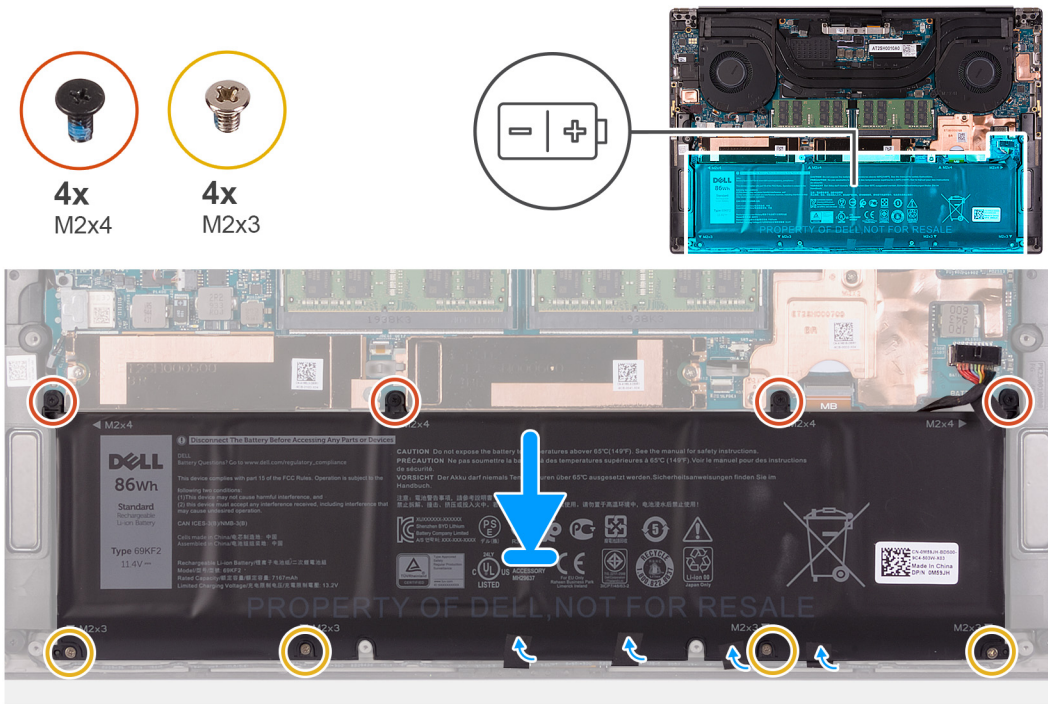
**Installing the battery**

**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 (M2x4) and four (M2x3) screws that secure the battery to the palm-rest and keyboard assembly.
4. 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 module

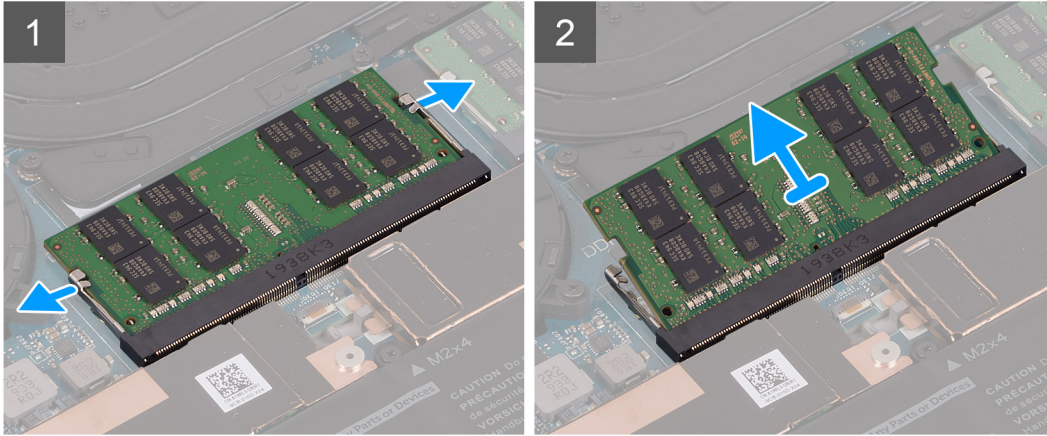
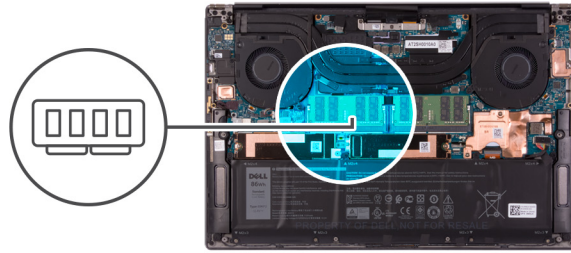
### Removing the memory

#### 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. Pry 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.

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

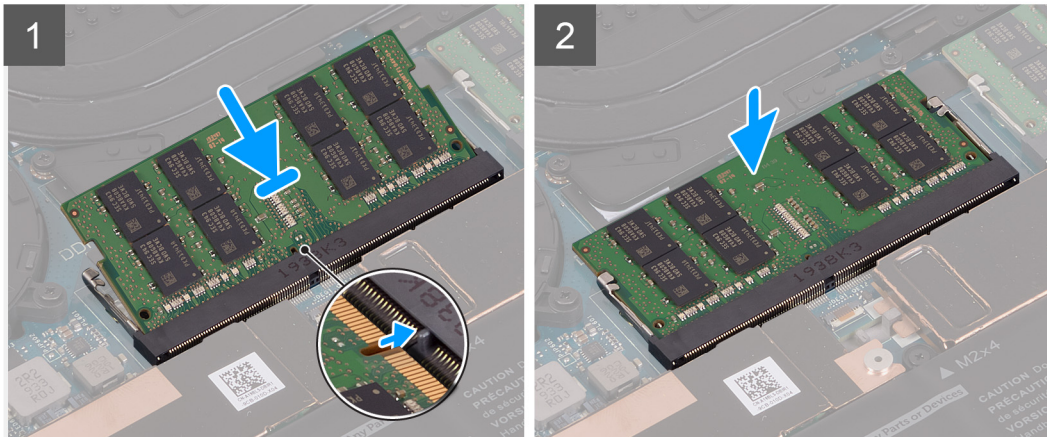
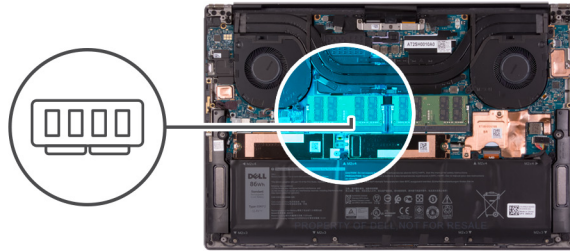
## Installing the memory

### 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.

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

**i** **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 drive<sup>1</sup>

#### Prerequisites

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

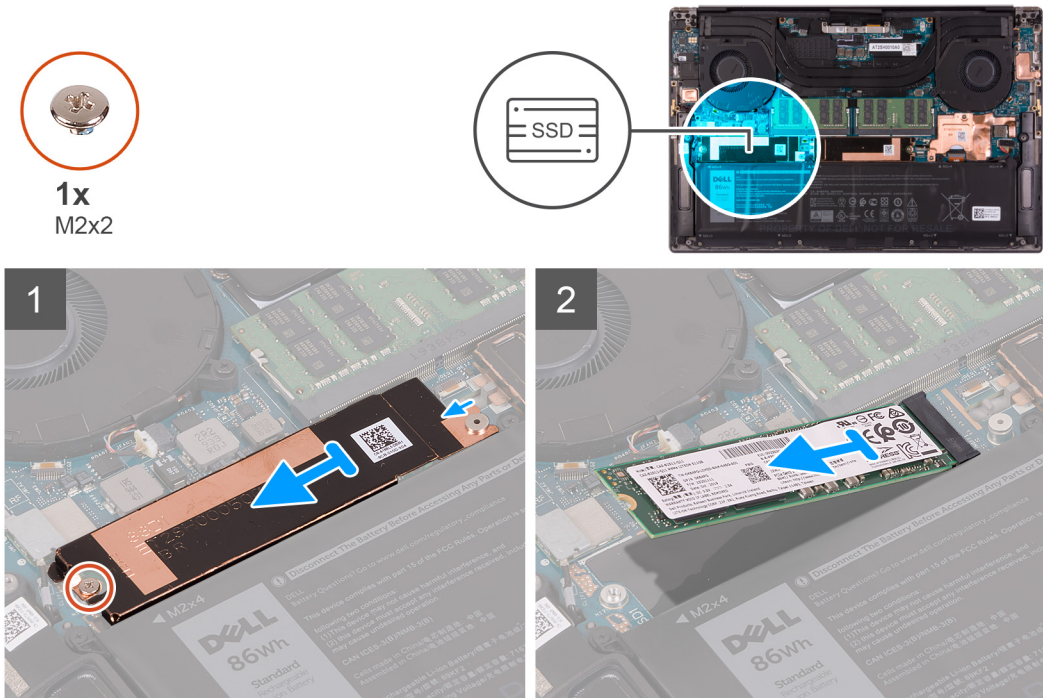
**⚠ CAUTION:** Solid-state drives are fragile. Exercise care when handling the solid-state drive.

**⚠ 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 drive<sup>1</sup> and provides a visual representation of the removal procedure.

**Steps**

1. Remove the screw (M2x2) that secures the solid-state drive thermal bracket and the solid-state drive<sup>1</sup> 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 drive<sup>1</sup> from the solid-state drive slot.

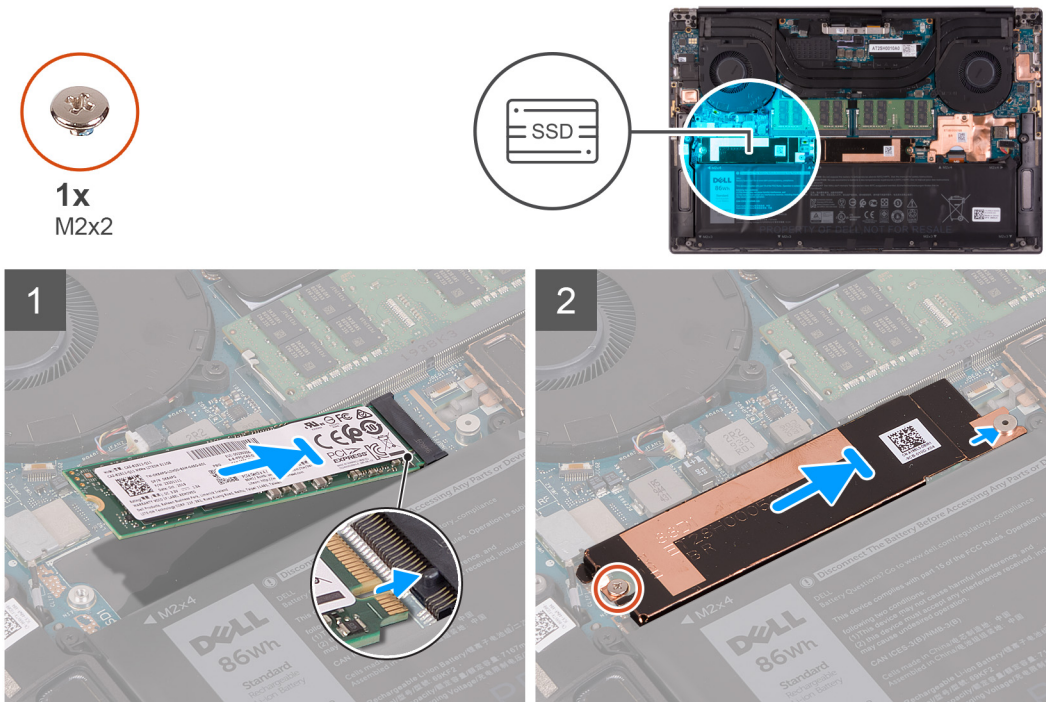
**Installing the solid-state drive<sup>1</sup>****Prerequisites**

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 drive<sup>1</sup> and provides a visual representation of the installation procedure.



### Steps

1. Align the notch on the solid-state drive<sup>1</sup> with the tab on the solid-state drive slot.
2. Gently slide the solid-state drive<sup>1</sup> 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 drive<sup>1</sup> 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 drive<sup>2</sup>

### Prerequisites

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

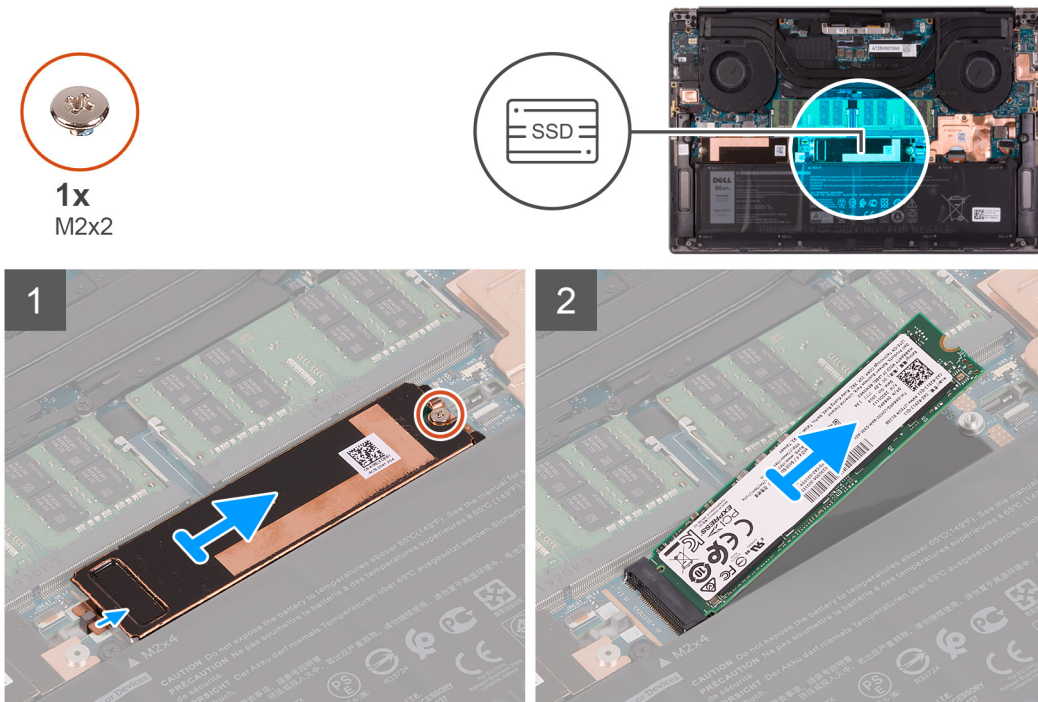
**CAUTION:** Solid-state drives are fragile. Exercise care when handling the solid-state drive.

**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.



### 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

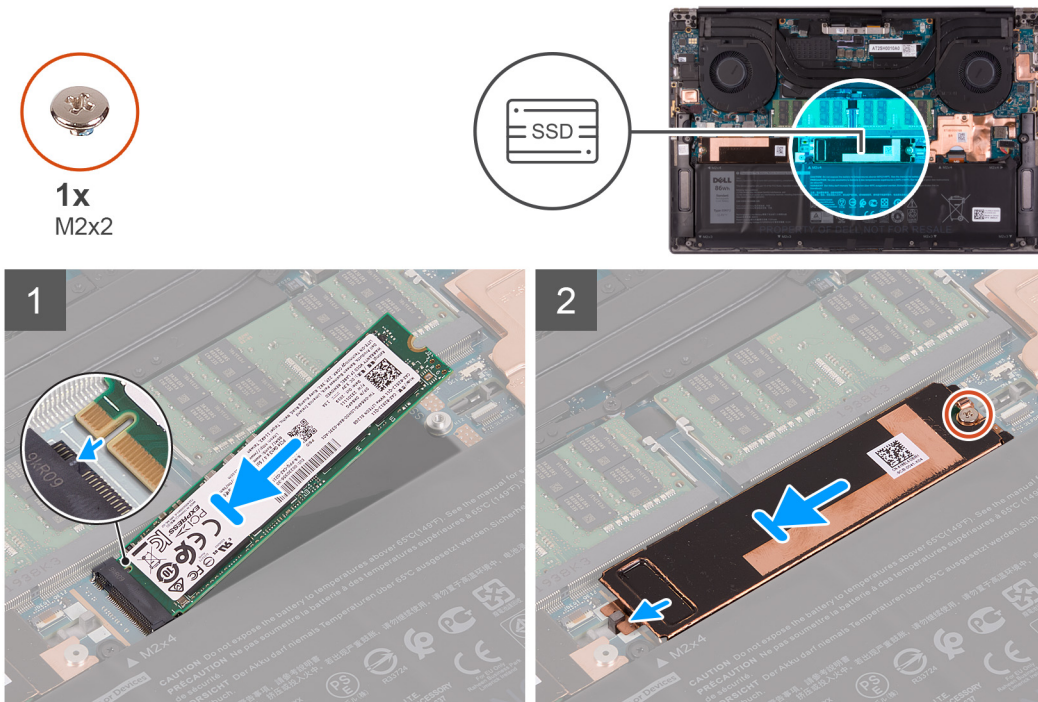
If you are replacing a component, remove the existing component before performing the installation procedure.

**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.



### Steps

1. Align the notch on the solid-state drive with the tab on the solid-state drive slot.
2. Gently slide the solid-state drive 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 drive 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.

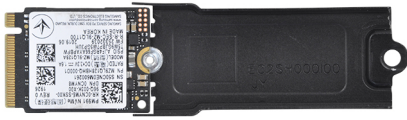
### About this task

This computer supports two solid-state drive form factors.

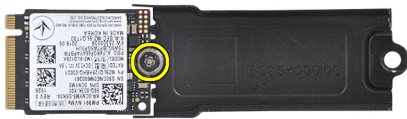
- M.2 2230
- M.2 2280

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

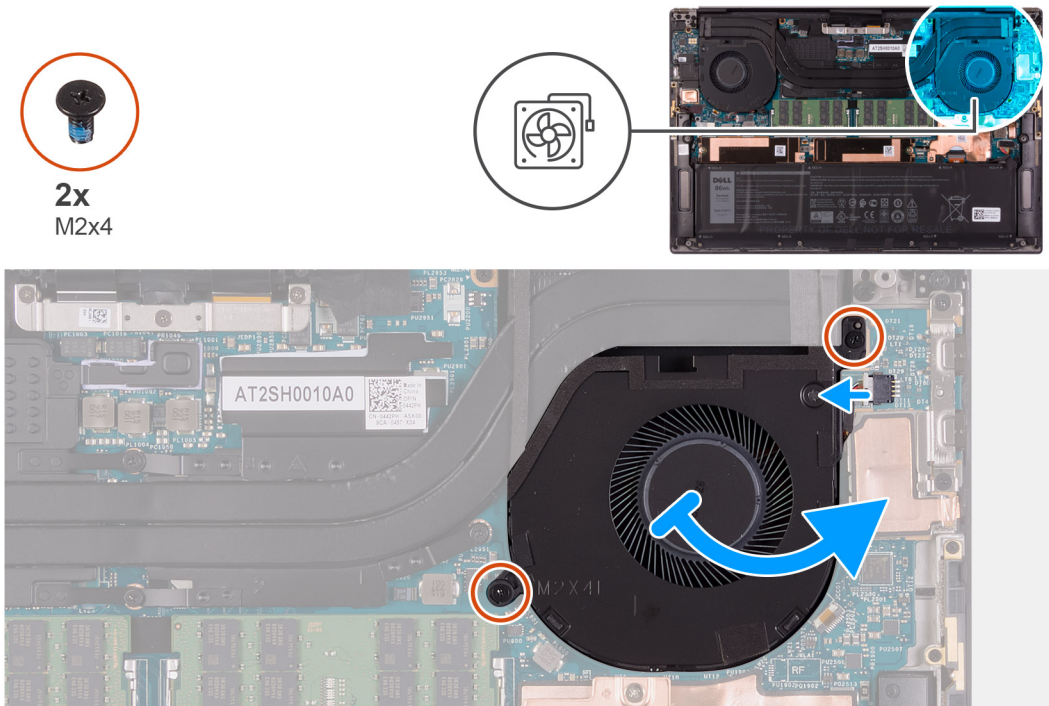
### Removing the left fan

#### 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.



### 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.

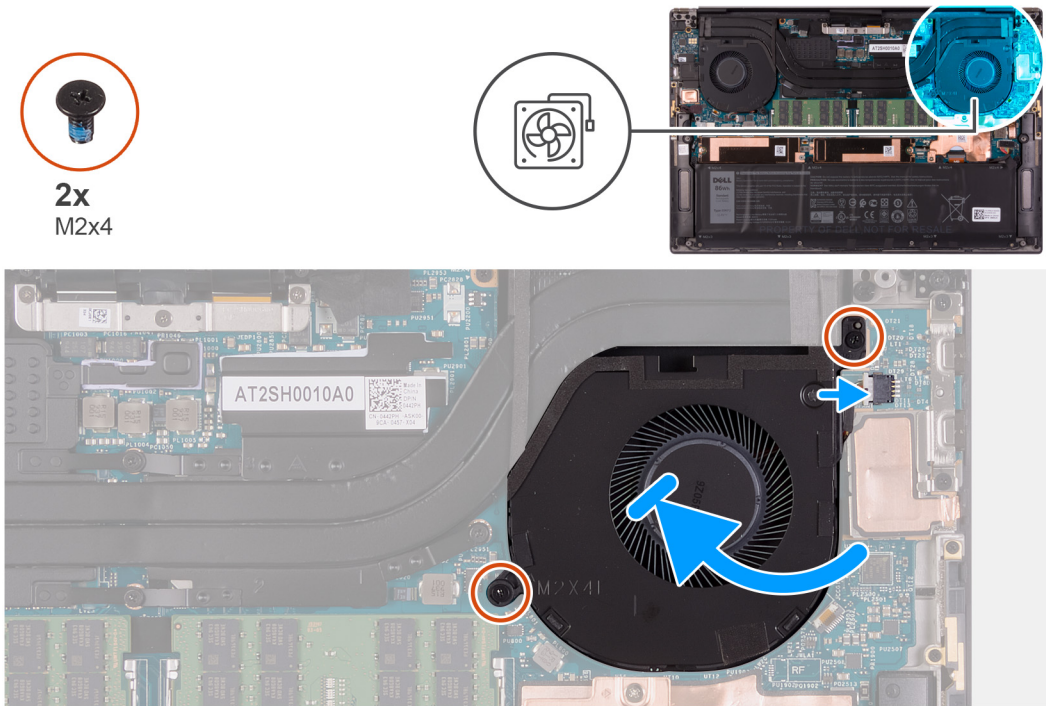
## Installing the left fan

### 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 left fan and provide a visual representation of the installation procedure.



### Steps

1. Connect the fan cable to the system board.
2. Slide the fan below the heat sink and align the screw holes on the 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](#).

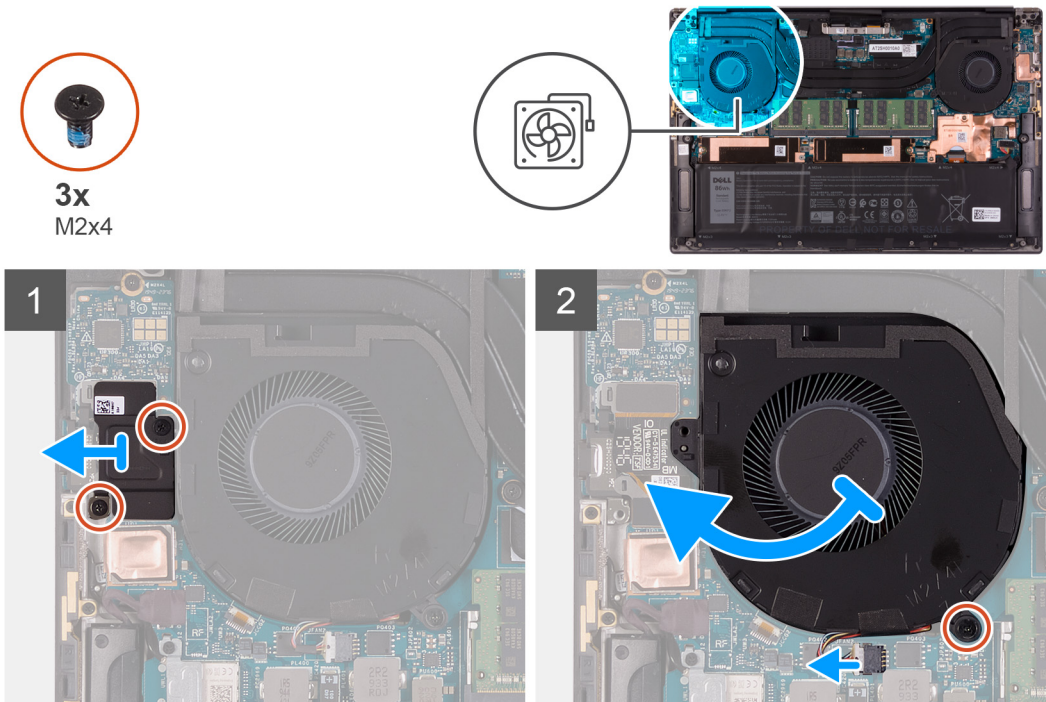
## Removing the right fan

### 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.



### 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.

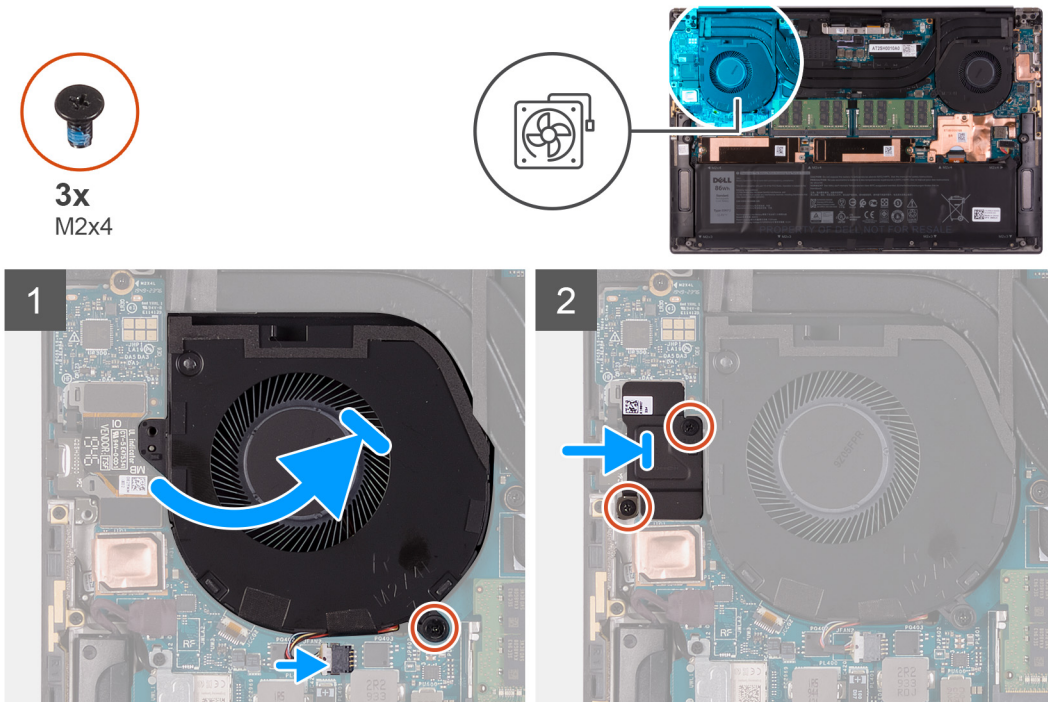
## Installing the right fan

### 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 right fan and provide a visual representation of the installation procedure.



### Steps

1. Slide the fan below the heat sink and align the screw hole on the 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](#).

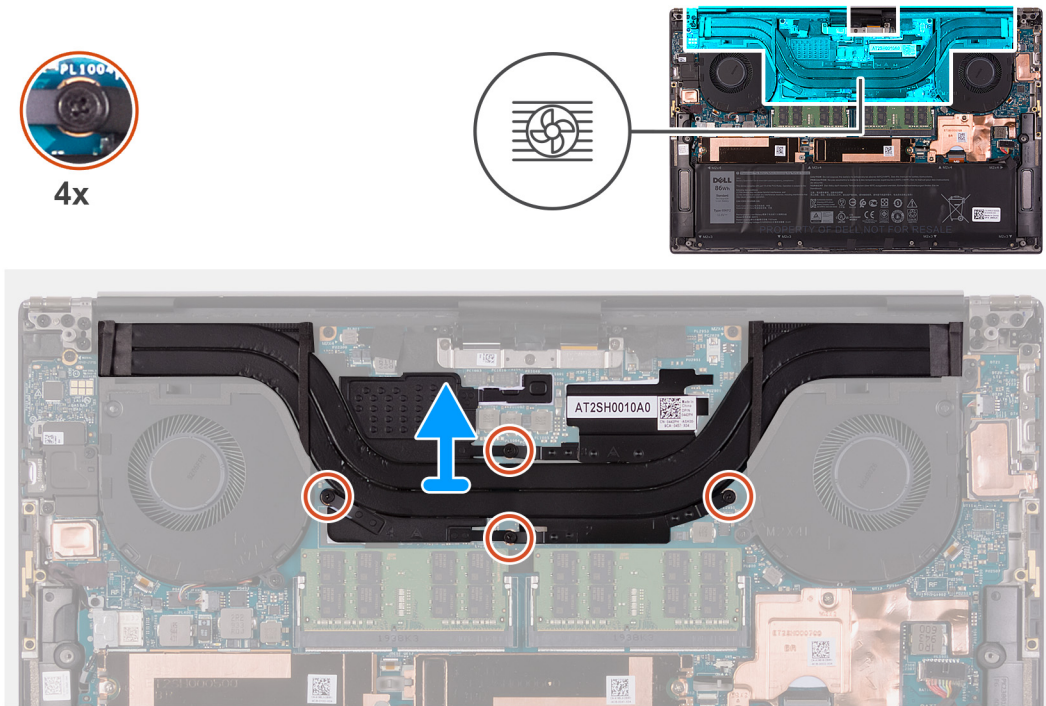
**CAUTION:** For maximum cooling of the processor, do not touch the heat transfer areas on the heat sink. The oils in your skin can reduce the heat transfer capability of the thermal grease.

**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

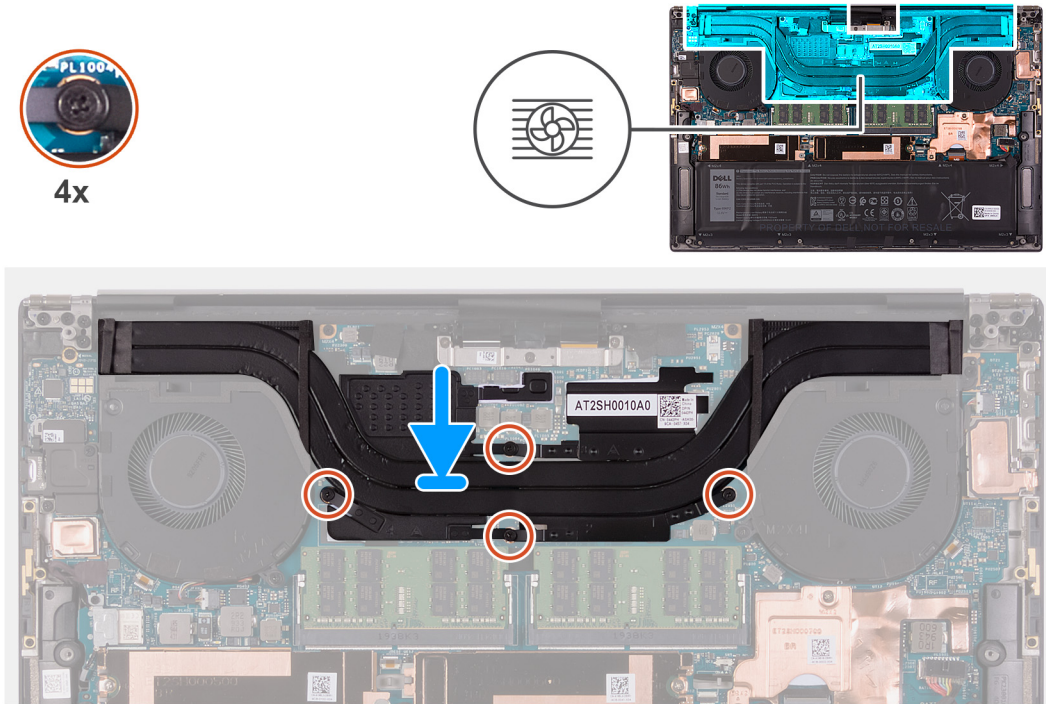
If you are replacing a component, remove the existing component before performing the installation procedure.

**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

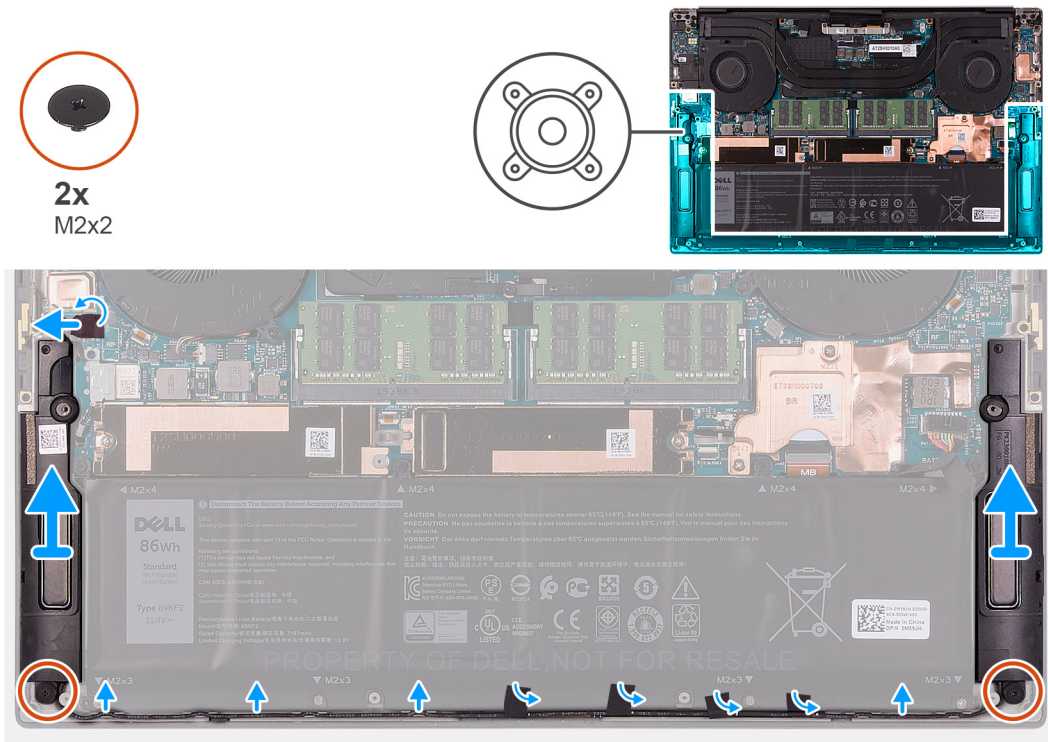
### Removing the speakers

#### 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.



### 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.

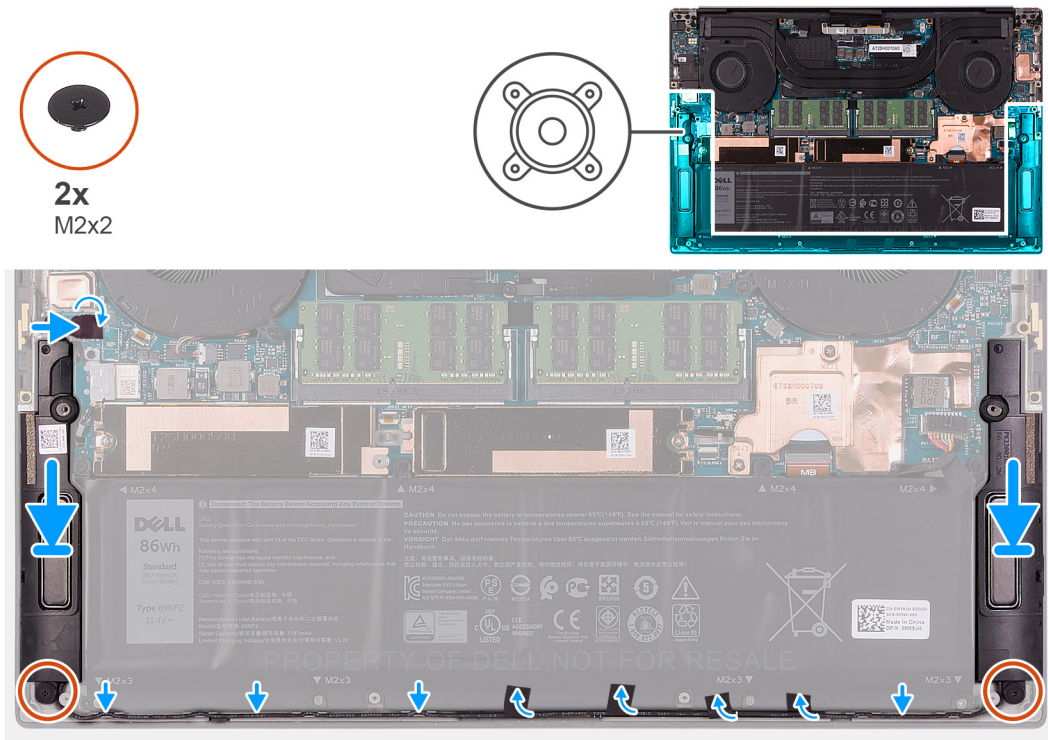
## Installing the speakers

### 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.



### 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

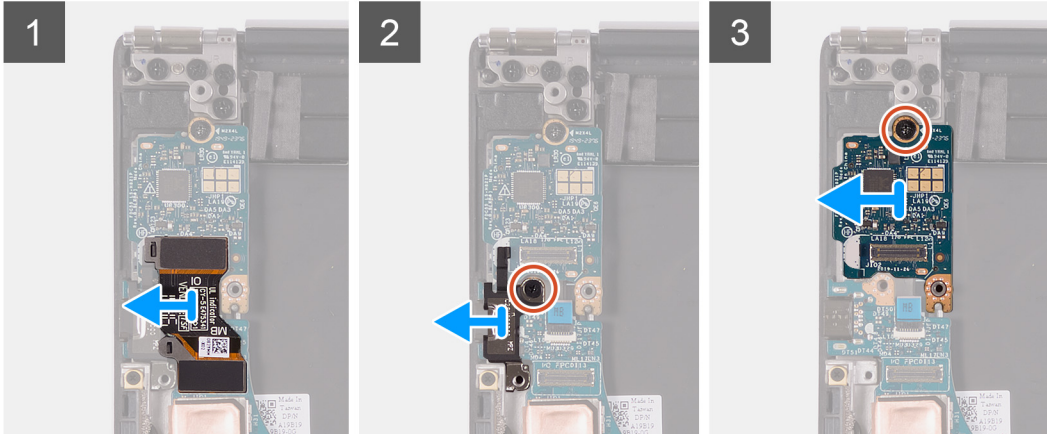
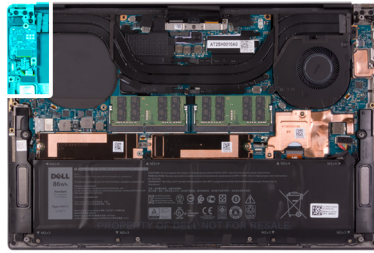
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [right fan](#).

#### About this task

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



2x  
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 two (M2x4) screws that secure 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

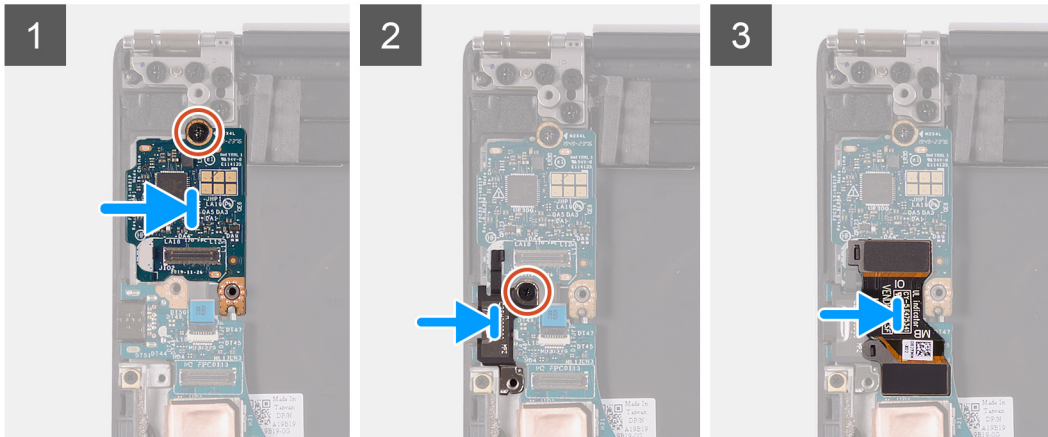
If you are replacing a component, remove the existing component before performing the installation procedure.

### About this task

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



2x  
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 two (M2x4) screws that secure the USB Type-C port bracket to the system board.

**i 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.



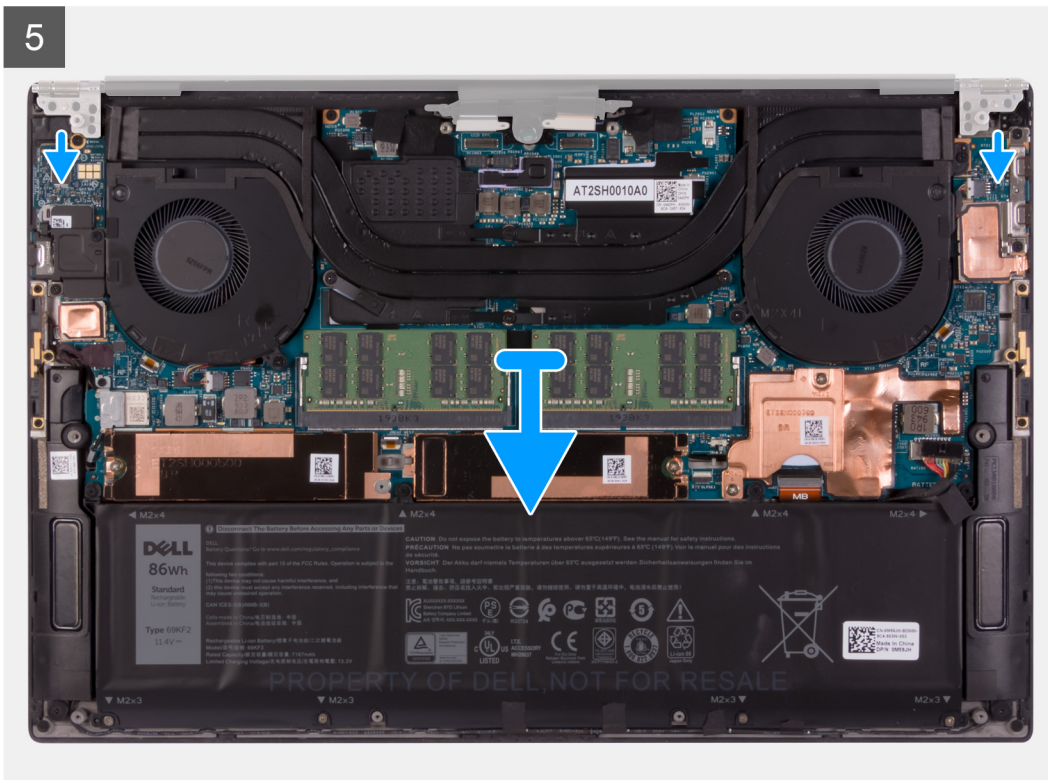
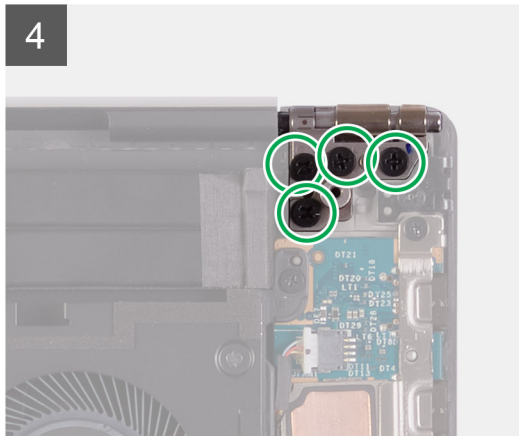
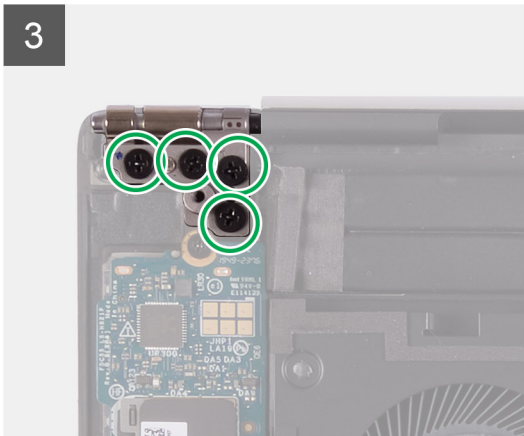
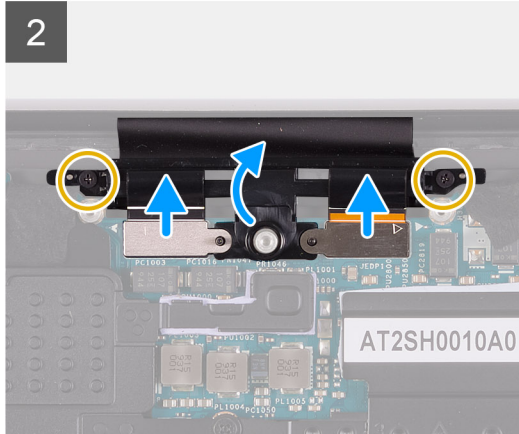
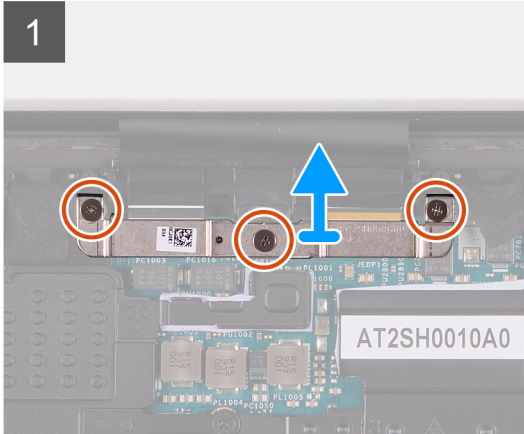
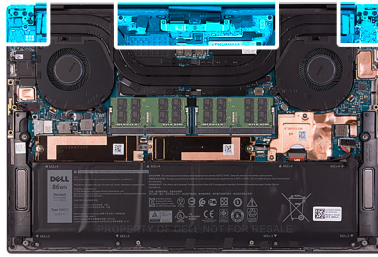
3x



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 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.



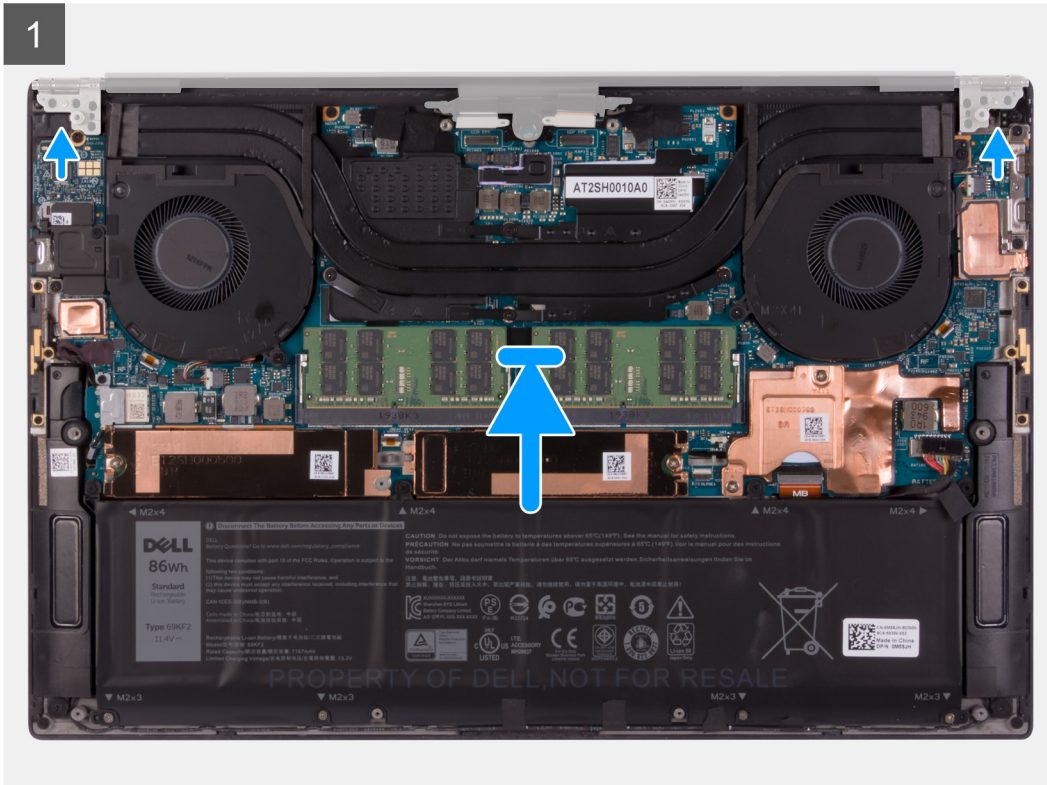
## Installing the display assembly

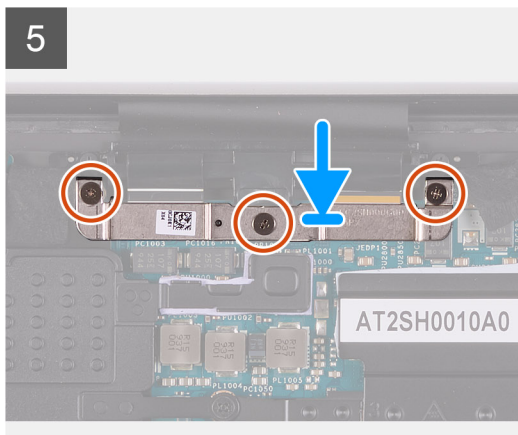
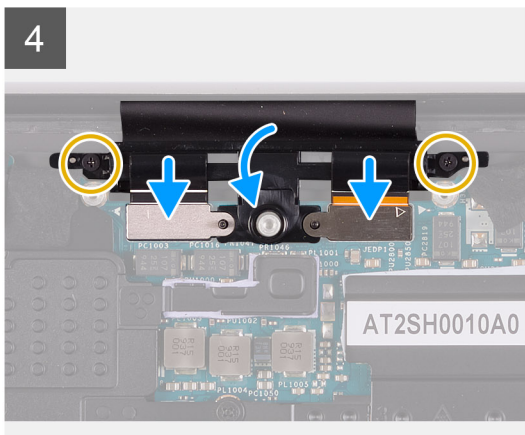
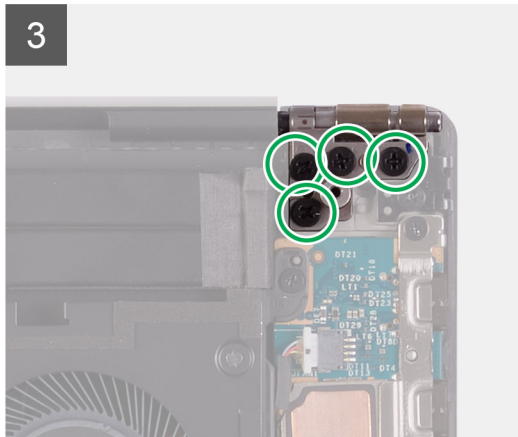
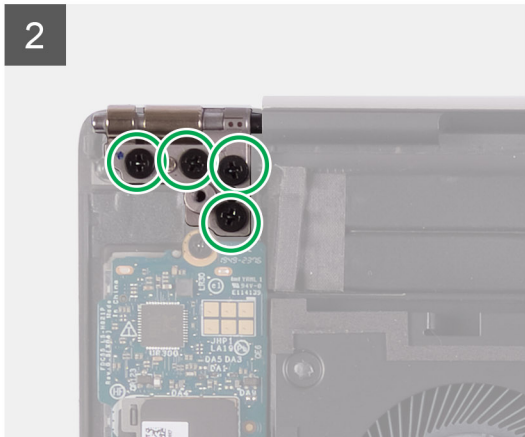
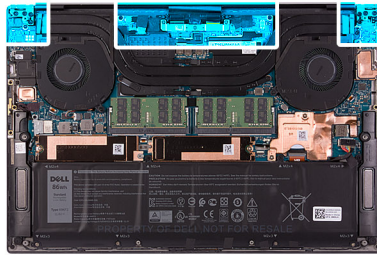
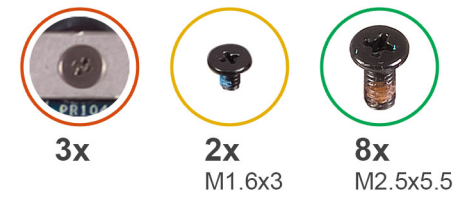
**Prerequisites**

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.





### 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) and (M2.5x5.5) that secure the left hinge to the system board and the palm-rest and keyboard assembly.
4. Align the screw holes on the display-assembly cable holder with the screw holes on the palm-rest and keyboard assembly.
5. Connect the touchscreen cable and camera cable to the display-assembly cable .
6. 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.

7. Align the screw holes on the display-assembly cable bracket with the screw holes on the system board.
8. 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.

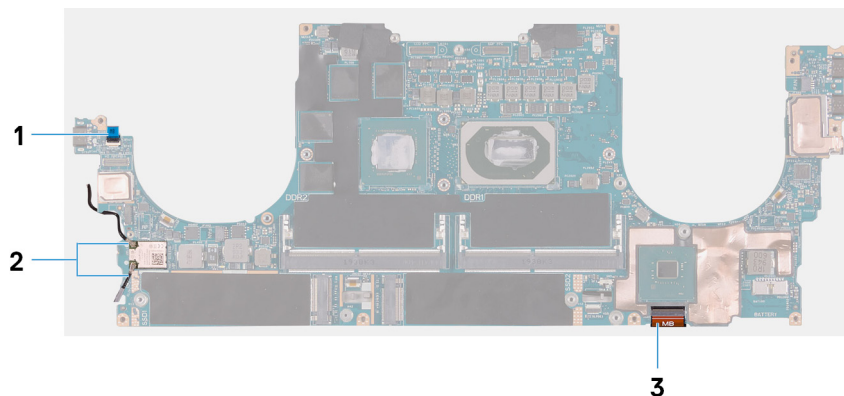
2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [speakers](#).
5. Remove the [memory](#).
6. Remove the [solid state drive1](#).
7. Remove the [solid state drive2](#).
8. Remove the [heat sink](#).

**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.

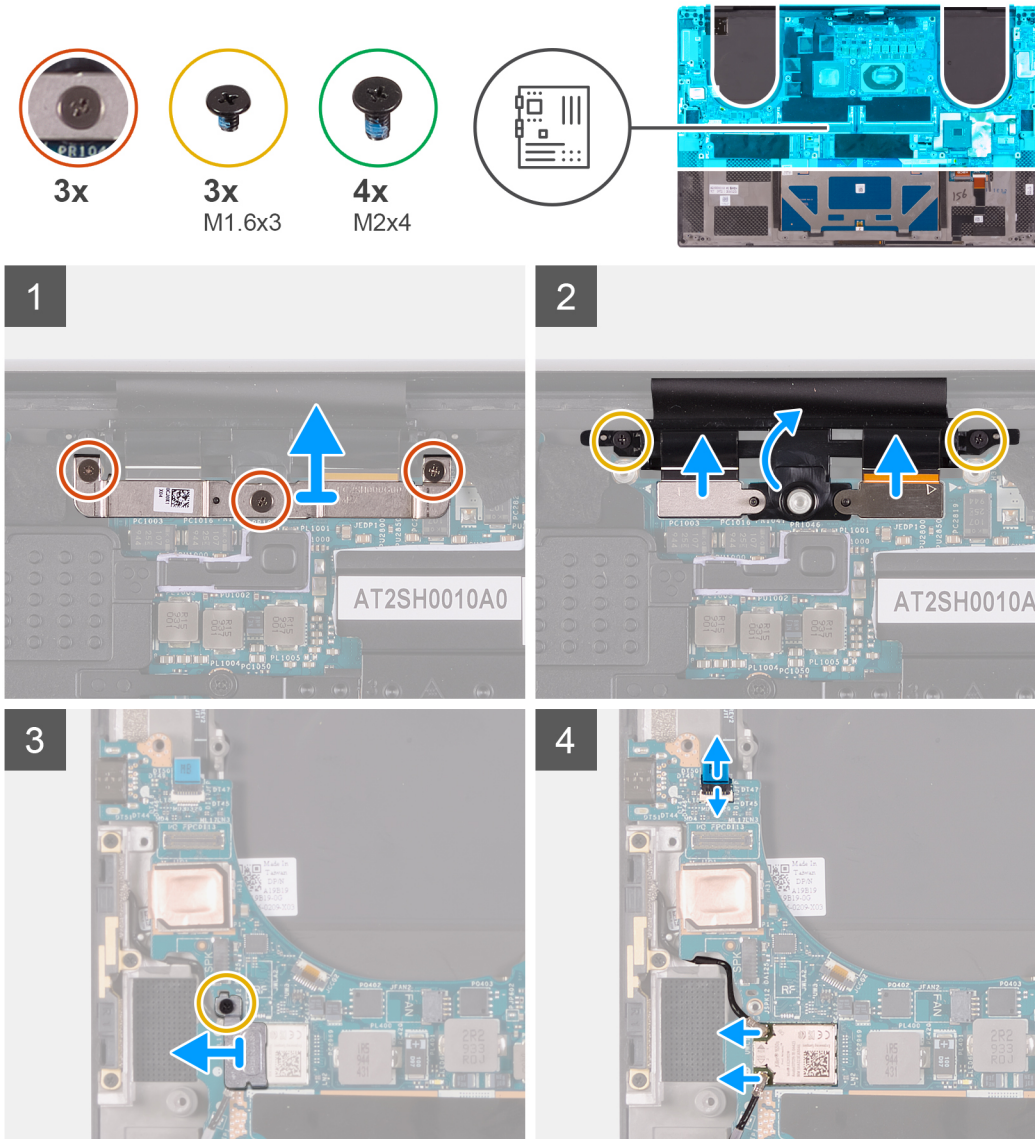


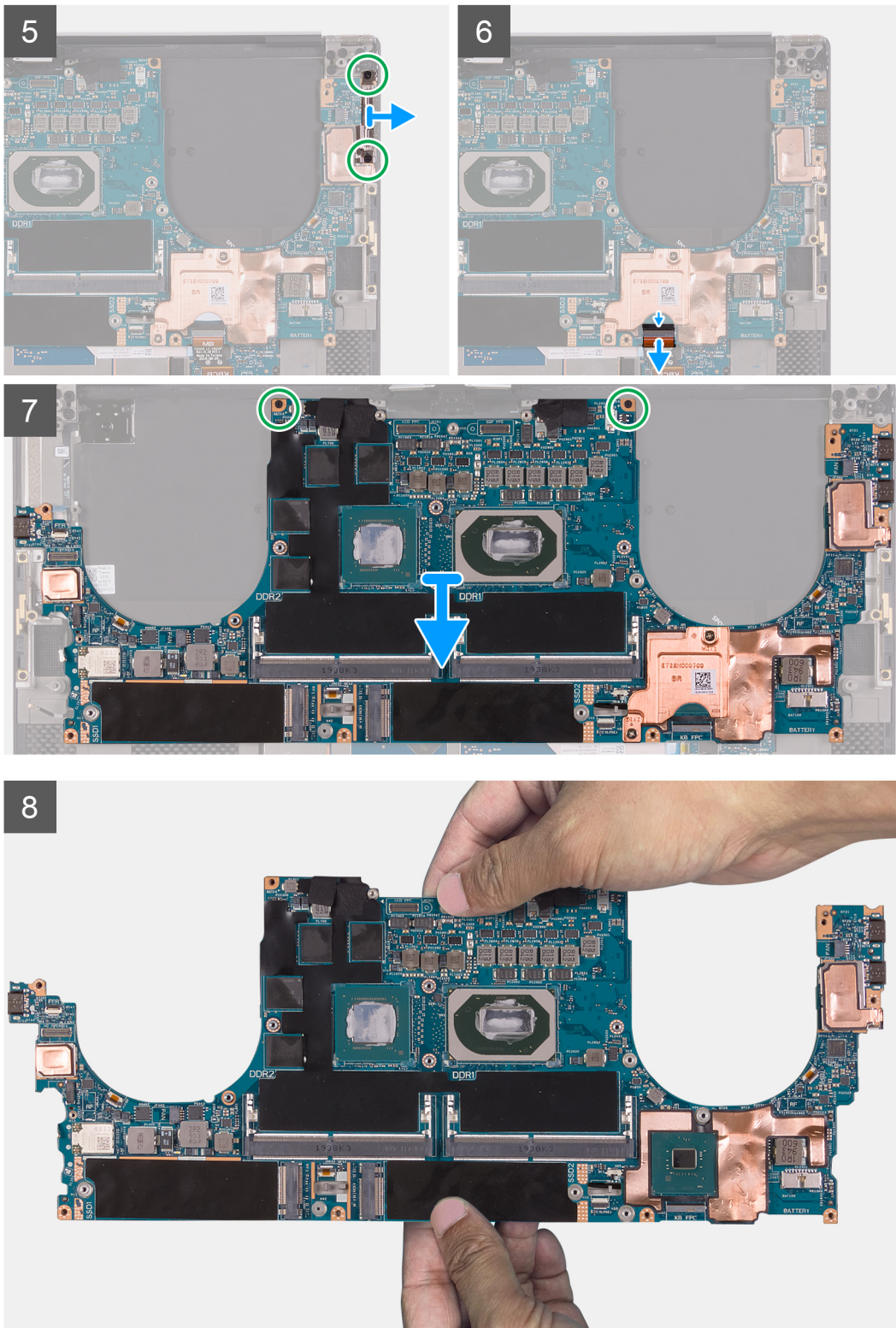
**Figure 1. System-board connectors**

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.





### 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.

**NOTE:** When handling the system board, hold the system board firmly at the top and bottom. DO NOT hold the system board at the thin areas on the sides at the left and right.

## Installing the system board

### Prerequisites

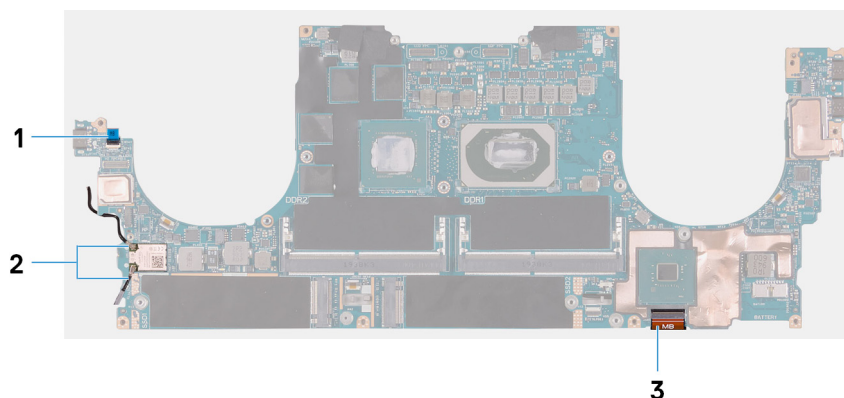
If you are replacing a component, remove the existing component before performing the installation procedure.

**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.

**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.



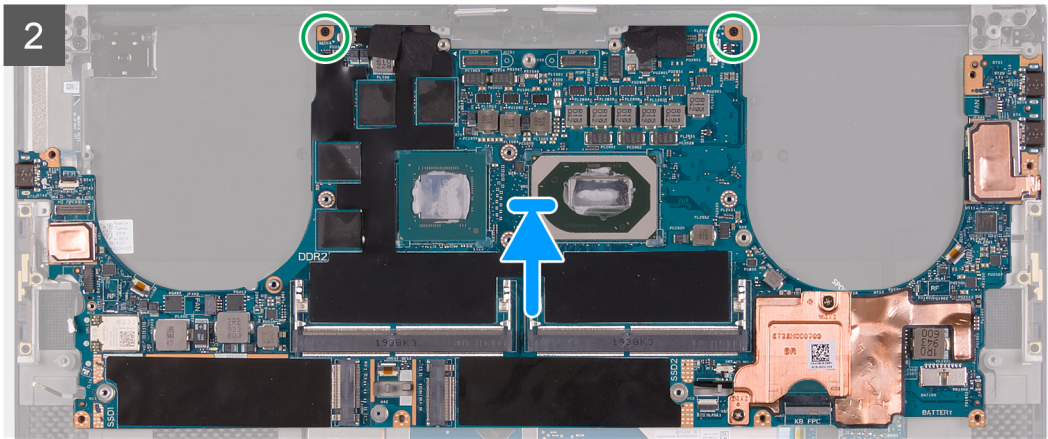
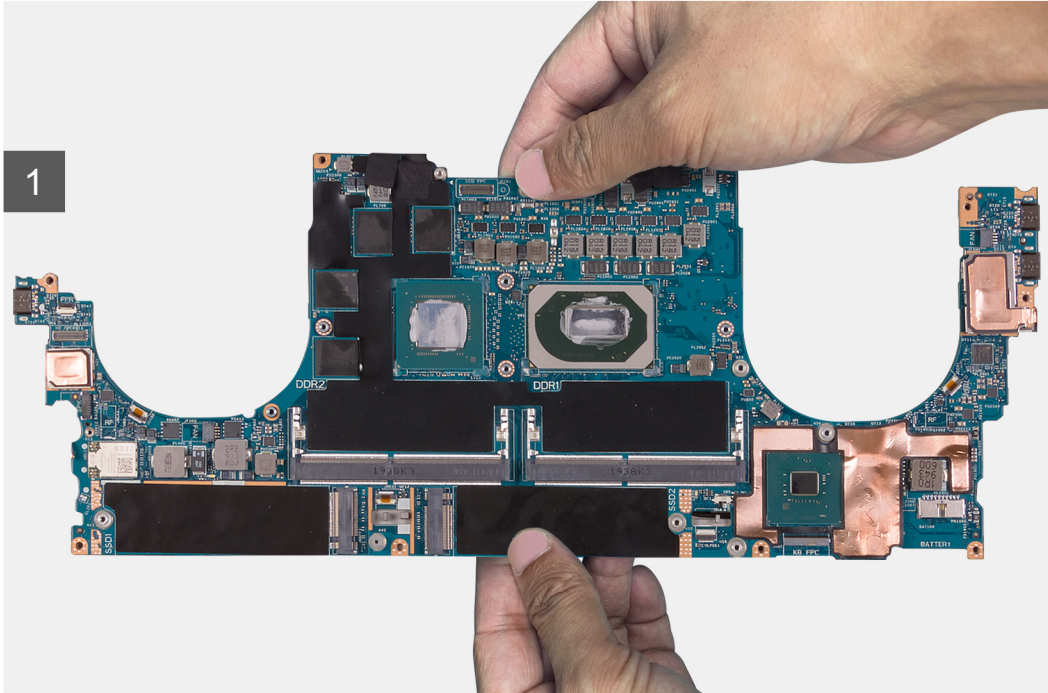
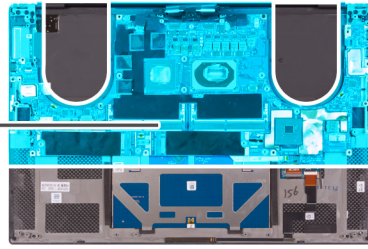
3x

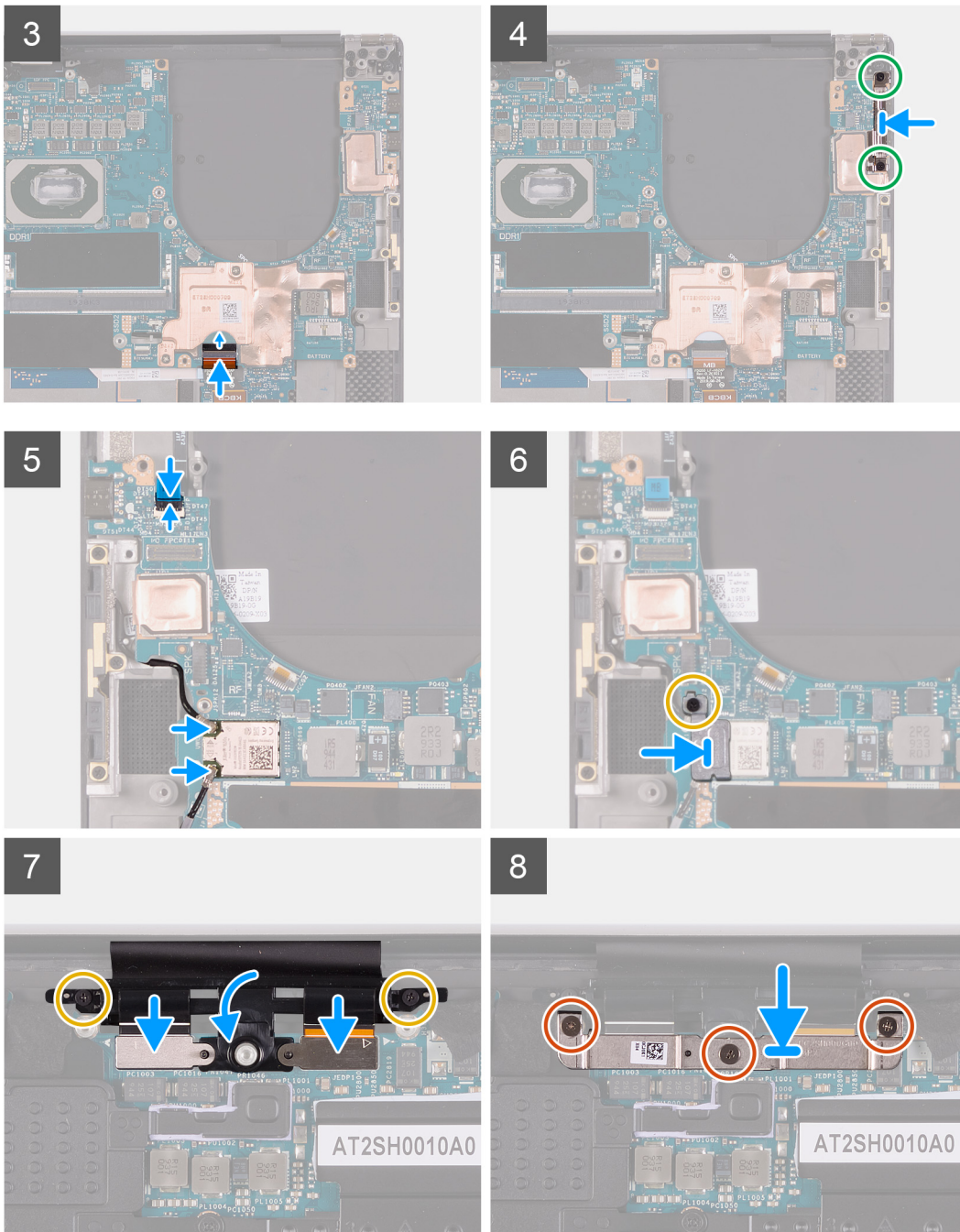


3x  
M1.6x3



4x  
M2x4





### Steps

1. Hold the system board firmly at the top and bottom portions of the system board.

**CAUTION:** DO NOT hold the system board at the sides on the left and right as it will damage the system board.

2. Place the system board on the palm-rest and keyboard assembly.
3. Align the screw holes on the system board with the screw holes on the palm-rest and keyboard assembly.
4. Replace the two screws (M2x4) that secure the system board to the palm-rest and keyboard assembly.
5. Connect the keyboard-control board cable to the system board and close the latch to secure the cable.
6. Align the screw holes on the Type-C bracket with the screw holes on the palm-rest and keyboard assembly.
7. Replace the two screws (M2x4) that secure the Type-C bracket to the palm-rest and keyboard assembly.
8. Connect the fingerprint reader-board cable to the system board and close the latch to secure the cable.
9. Connect the right speaker cable to the system board.

10. Connect the keyboard cable to the system board and close the latch to secure the cable.
11. Connect the antenna cables to the wireless card.
12. Align the screw hole on the wireless-card bracket with the screw hole on the system board.
13. Replace the screw (M1.6x3) that secures the wireless-card bracket to the system board.
14. Connect the touch screen cable and camera cable to the display-assembly cable .
15. Replace the two screws (M1.6x3) that secure the display-assembly cable holder to the palm-rest and keyboard assembly.
16. Connect the touch screen cable and camera cable to the display-assembly cable.
17. Align the screw holes on the display-assembly cable bracket with the screw holes on the system board.
18. 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](#).

## LED cable

### Removing the LED cable

#### Prerequisites

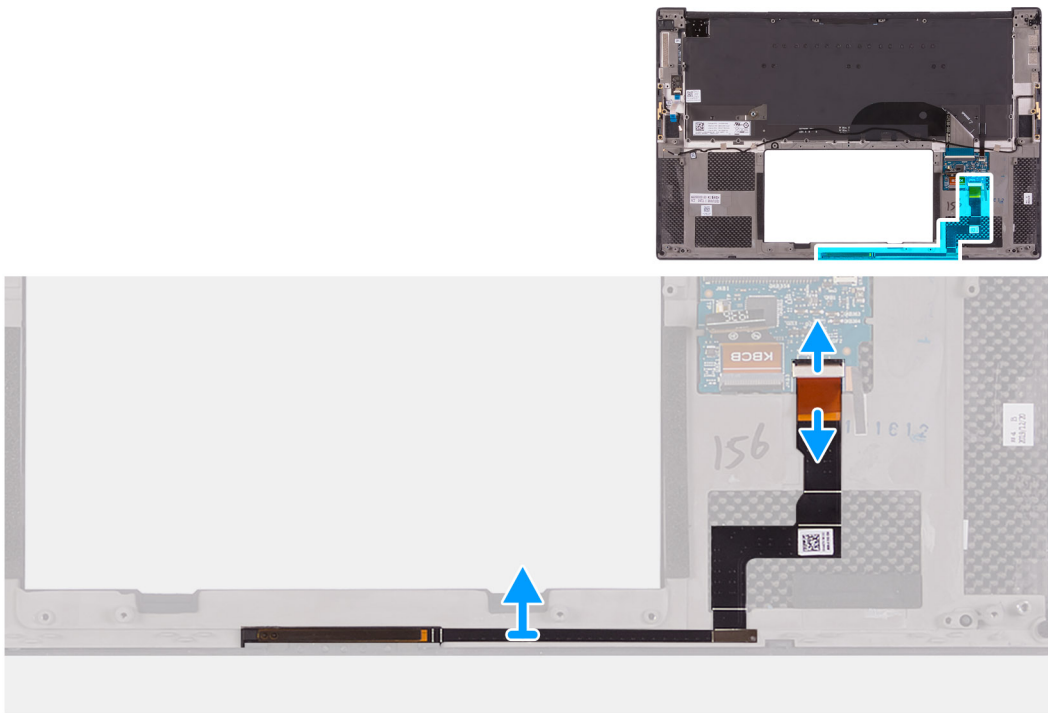
1. Follow the procedure in [Before working inside your computer](#).
2. Remove the [base cover](#).
3. Remove the [battery](#).
4. Remove the [speakers](#).
5. Remove the [memory](#).
6. Remove the [solid state drive1](#).
7. Remove the [solid state drive2](#).
8. Remove the [heat sink](#).

**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 LED cable and provides a visual representation of the removal procedure.



Peel the LED cable off the palm-rest and keyboard assembly.

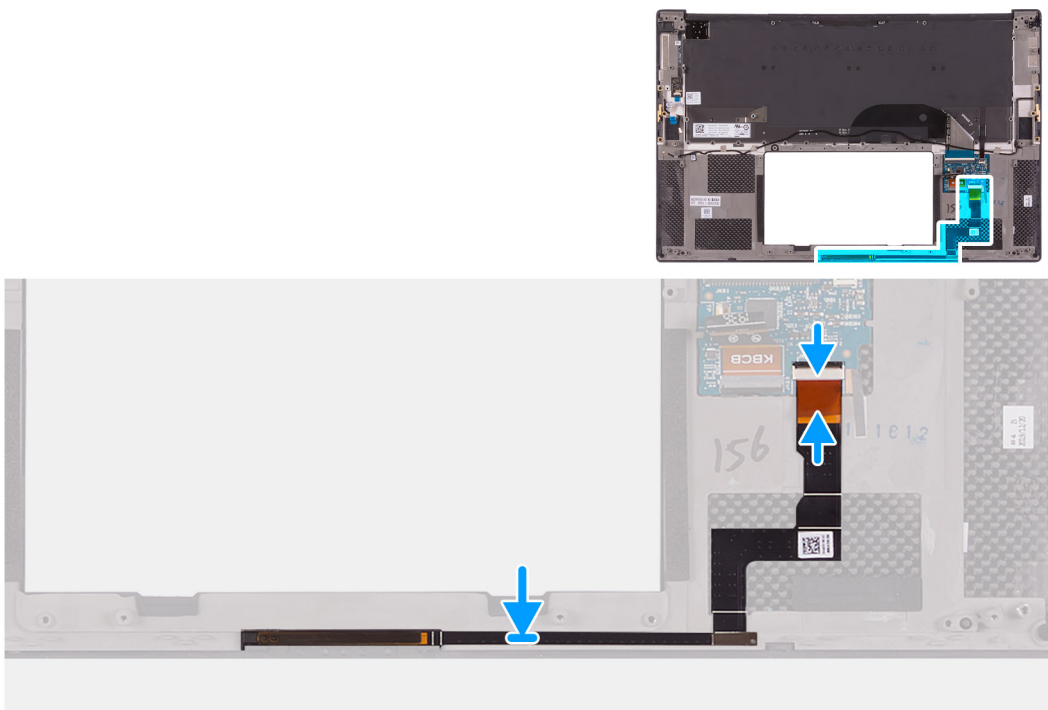
## Installing the LED cable

### Prerequisites

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

### About this task

The following image indicates the LED cable and provides a visual representation of the installation procedure.



Attach the LED cable to the palm-rest and keyboard assembly.

**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](#).

## 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.



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 Base article Drivers and Downloads FAQs [000123347](#).

# BIOS Setup

**CAUTION:** Certain changes can make your computer work incorrectly. Before you change the settings in BIOS Setup, it is recommended that you note down the original settings for future reference.

**NOTE:** Depending on the computer and the installed devices, the options that are listed in this section may differ.

Use BIOS Setup for the following purposes:

- Get information about the hardware installed in your computer, such as the amount of RAM and the capacity of the storage device.
- Change the system configuration information.
- Set or change user-selectable options such as the user password, enabling or disabling base devices, and configuring hard drive settings.

## Topics:

- [BIOS overview](#)
- [Entering BIOS Setup](#)
- [Navigation keys](#)
- [F12 One Time Boot menu](#)
- [System setup options](#)
- [Updating the BIOS](#)
- [System and setup password](#)
- [Clearing system and setup passwords](#)

## BIOS overview

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

## Entering BIOS Setup

### Steps

1. Turn on your computer.
2. Press F2 immediately to enter the BIOS Setup.

**NOTE:** If you wait too long and the operating system logo appears, continue to wait until you see the desktop. Then, turn off your computer and try again.

## Navigation keys

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

**Table 2. Navigation keys**


Keys	Navigation
Up arrow	Moves to the previous field.
Down arrow	Moves to the next field.

**Table 2. Navigation keys (continued)**

Keys	Navigation
Enter	Selects a value in the selected field (if applicable) or follows the link in the field.
Spacebar	Expands or collapses a drop-down list, if applicable.
Tab	Moves to the next focus area.
Esc	Moves to the previous page until you view the main screen. Pressing Esc in the main screen displays a message that prompts you to save any unsaved changes and restart the computer.


## F12 One Time Boot menu

To enter the One Time Boot menu, turn on or restart your computer, and then press F12 immediately.

 **NOTE:** If you are unable to enter the One Time Boot menu, repeat the above action.

The One Time Boot menu displays the devices that you can boot from and also display the options to start diagnostics. The boot menu options are:


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

 **NOTE:** XXX denotes the SATA drive number.

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

The One Time Boot menu screen also displays the option to access BIOS Setup.

## System setup options

 **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
<b>Battery</b>	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)**

<b>Overview</b>	
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.
<b>PROCESSOR</b>	
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.
<b>MEMORY</b>	
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
<b>DEVICES</b>	
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**

<b>Boot options</b>	
<b>Boot Mode</b>	
Boot Mode: UEFI only	Displays the boot mode of this computer.
Enable Boot Devices	Enables or disables Windows Boot Manager and UEFI Hard Drive.

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

<b>Boot options</b>	
	By default, Windows Boot Manager is selected
	By default, UEFI Hard Drive is selected
Boot Sequence	Displays the boot sequence.
<b>Advanced Boot Options</b>	
Enable UEFI Network Stack	Enables or disables UEFI Network Stack. Default: ON
<b>UEFI Boot Path Security</b>	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**

<b>System Configuration</b>	
<b>Date/Time</b>	
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.
<b>Storage Interface</b>	
Port Enablement	Enables the selected onboard drives. Default: ON
<b>SATA Operation</b>	
	Configures operating mode of the integrated SATA hard drive controller. Default: RAID On. SATA is configured to support RAID (Intel Rapid Restore Technology).
<b>Drive Information</b>	
<b>Enable SMART Reporting</b>	Enables or disables Self-Monitoring, Analysis, and Reporting Technology (SMART). Default: OFF
<b>Enable Audio</b>	
	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.
<b>USB Configuration</b>	
	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.
<b>Thunderbolt Adapter Configuration</b>	
Enable Thunderbolt Technology Support	Enables or disables Thunderbolt Technology Support. Default: ON

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

<b>System Configuration</b>	
Enable Thunderbolt Boot Support	Enables or disables Thunderbolt Boot Support. Default: OFF
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
<b>Miscellaneous Devices</b>	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.
<b>Enable MediaCard</b>	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.
<b>Keyboard Illumination</b>	Configures the operating mode of the keyboard illumination feature. Default: Bright. Enable the keyboard illumination feature at 100% brightness level.
<b>Keyboard Backlight Timeout on AC</b>	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
<b>Keyboard Backlight Timeout on Battery</b>	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**

<b>Video</b>	
<b>LCD Brightness</b>	
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**

<b>Security</b>	
<b>Enable Admin Setup Lockout</b>	Enables or disables the user from entering BIOS Setup when an Admin Password is set. Default: OFF
<b>Password Bypass</b>	Bypass the System (Boot) Password and the internal hard drive password prompts during a system restart.

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

Security	
	Default: Disabled
<b>Enable Non-Admin Password Changes</b>	Enables or disables the user to change the system and hard drive password without the need for admin password. Default: ON
<b>Non-Admin Setup Changes</b>	
Enable UEFI Capsule Firmware Updates	Enables or disables BIOS updates through UEFI capsule update packages. Default: ON
<b>Absolute</b>	Enables, disables or permanently disable the BIOS module interface of the optional Absolute Persistence Module service from Absolute Software. Default: Enabled
<b>TPM 2.0 Security On</b>	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
<b>SMM Security Mitigation</b>	Enables or disables additional UEFI SMM Security Mitigation protections. Default: OFF
	 <b>NOTE:</b> This feature may cause compatibility issues or loss of functionality with some legacy tools and applications.

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

<b>Security</b>	
<b>Intel SGX</b>	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**

<b>Passwords</b>	
<b>Enable Strong Passwords</b>	Enables or disables strong passwords.  Default: OFF
<b>Password Configuration</b>	
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
<b>Admin Password</b>	Sets, Changes, or deletes the administrator (admin) password (sometimes called the "setup" password).
<b>System Password</b>	Sets, Changes, or deletes the system password.
<b>Enable Master Password Lockout</b>	Enables or disables the master password support.  Default: OFF

**Table 9. System setup options—Secure Boot menu**

<b>Secure Boot</b>	
Enable Secure Boot	Enables or disables the computer to boots using only validated boot software.  Default: ON  <b>i</b> <b>NOTE:</b> 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  <b>i</b> <b>NOTE:</b> Deployed Mode should be selected for normal operation of Secure Boot.

**Table 10. System setup options—Expert Key Management menu**

<b>Expert Key Management</b>	
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.

**Table 10. System setup options—Expert Key Management menu (continued)**

<b>Expert Key Management</b>
Default: PK

**Table 11. System setup options—Performance menu****Performance****Multi-Core Support**

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.

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

<b>Power Management</b>	
	Default: Adaptive. Battery settings are adaptively optimized based on your typical battery usage pattern.
<b>Enable Advanced Battery Charge Configuration</b>	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
<b>Peak Shift</b>	Enables the computer to run on battery during peak power usage hours. Default: OFF
<b>Wireless Radio Control</b>	
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
<b>Wake on LAN</b>	Enables or disables the computer to turn on by a special LAN signal. Default: Disabled
<b>Intel Speed Shift Technology</b>	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
<b>Lid Switch</b>	
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**

<b>Wireless</b>	
<b>Wireless Device Enable</b>	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**

<b>POST Behavior</b>	
<b>Numlock Enable</b>	
Enable Numlock	Enables or disables Numlock when the computer boots. Default: ON
<b>Fn Lock</b>	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.
<b>Warnings and Errors</b>	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.

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

<b>POST Behavior</b>	
	 <b>NOTE:</b> Errors deemed critical to the operation of the computer hardware will always halt the computer.
<b>Enable Adapter Warnings</b>	Enables or disables the computer to display adapter warning messages when adapters with too little power capacity are detected. Default: ON
<b>Enable Dock Warning Messages</b>	Enables or disables dock warning messages. Default: ON
<b>Fastboot</b>	Configures the speed of the UEFI boot process. Default: Thorough. Performs complete hardware and configuration initialization during boot.
<b>Extend BIOS POST Time</b>	Configures the BIOS POST (Power-On Self-Test) load time. Default: 0 seconds
<b>Full Screen Logo</b>	Enabled or disabled the computer to display full screen logo if the image match screen resolution. Default: OFF
<b>Mouse/Touchpad</b>	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.
<b>Sign of Life</b>	
Early Logo Display	Display Logo Sign of Life. Default: ON
Early Keyboard Backlight	Keyboard Backlight Sign of Life. Default: ON
<b>MAC Address Pass-Through</b>	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**

<b>Virtualization</b>	
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**

<b>Maintenance</b>	
<b>Asset Tag</b>	
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.

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



Maintenance	
<b>BIOS Recovery from Hard Drive</b>	<p>Enables the computer to recover from a bad BIOS image, as long as the Boot Block portion is intact and functioning.</p> <p>Default: ON</p> <p> <b>NOTE:</b> 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.</p>
BIOS Auto-Recovery	<p>Enables the computer to automatically recover the BIOS without user actions. This feature requires BIOS Recovery from Hard Drive to be set to Enabled.</p> <p>Default: OFF</p>
<b>Start Data Wipe</b>	<p> <b>CAUTION:</b> 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>
<b>Allow BIOS Downgrade</b>	<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	
<b>Power Event Log</b>	
Clear POWER Event Log	<p>Select keep or clear Power events.</p> <p>Default: Keep</p>
<b>BIOS Event Log</b>	
Clear Bios Event Log	<p>Select keep or clear BIOS events.</p> <p>Default: Keep</p>
<b>Thermal Event Log</b>	
Clear Thermal Event Log	<p>Select keep or clear Thermal events.</p> <p>Default: Keep</p>

Table 18. System setup options—SupportAssist menu

SupportAssist	
<b>Dell Auto OS Recovery Threshold</b>	<p>Controls the automatic boot flow for SupportAssist System Resolution Console and for Dell operating system Recovery tool.</p> <p>Default: 2.</p>
<b>SupportAssist OS Recovery</b>	<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>
<b>BIOSConnect</b>	<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>

# Updating the BIOS

## Updating the BIOS in Windows

### About this task

**CAUTION:** If BitLocker is not suspended before updating the BIOS, the BitLocker key is not recognized the next time you reboot the computer. You will then be prompted to enter the recovery key to proceed, and the computer displays a prompt for the recovery key on each reboot. Failure to provide the recovery key can result in data loss or an operating system reinstall. For more information, refer [Updating the BIOS on Dell systems with BitLocker enabled](#).

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

### Steps

1. Go to [Dell Support Site](#).
2. Go to **Identify your product or ask support**. In the box, enter the product identifier, model, service request or describe what you are looking for, and then click **Search**.
  - NOTE:** If you do not have the Service Tag, click **Detect This PC**. The site automatically detects your device, and you can then click **Explore Product Support** to go to the support page for your device. You can also use the product ID or manually browse for your computer model.
3. Click **Drivers & Downloads**.
4. Select the operating system installed on your computer.
5. In the **Category** drop-down list, select **BIOS**.
6. Select the latest version of BIOS, and click **Download** to download the BIOS file for your computer.
7. After the download is complete, navigate to the folder where the BIOS update file has been saved.
8. Double-click the BIOS update file and follow the on-screen instructions.
 

For more information, search [Dell Support Site](#).

## Updating the BIOS in Linux and Ubuntu

To update the system BIOS on a computer that is installed with Linux or Ubuntu, see [How to Update the Dell BIOS in the Ubuntu or Linux Environment](#) at [Dell Support Site](#).

## Updating the BIOS using the USB drive in Windows

### About this task

**CAUTION:** If BitLocker is not suspended before updating the BIOS, the BitLocker key is not recognized the next time you reboot the computer. You will then be prompted to enter the recovery key to proceed, and the computer displays a prompt for the recovery key on each reboot. Failure to provide the recovery key can result in data loss or an operating system reinstall. For more information, refer [Updating the BIOS on Dell systems with BitLocker enabled](#).

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

### Steps

1. Go to [Dell Support Site](#).
2. Go to **Identify your product or ask support**. In the box, enter the product identifier, model, service request or describe what you are looking for, and then click **Search**.

**NOTE:** If you do not have the Service Tag, click **Detect This PC**. The site automatically detects your device, and you can then click **Explore Product Support** to go to the support page for your device. You can also use the product ID or manually browse for your computer model.

3. Click **Drivers & Downloads**.
4. Select the operating system installed on your computer.
5. In the **Category** drop-down list, select **BIOS**.
6. Select the latest version of BIOS, and click **Download** to download the BIOS file for your computer.
7. Create a bootable USB drive. For more information, search [Dell Support Site](#).
8. Copy the BIOS setup program file to the bootable USB drive.
9. Connect the bootable USB drive to the computer that needs the BIOS update.
10. Restart the computer and press **F12**.
11. Select the USB drive from the **One Time Boot Menu**.
12. Type the BIOS setup program filename and press **Enter**.  
The **BIOS Update Utility** appears.
13. Follow the on-screen instructions to complete the BIOS update.

## Updating the BIOS from the One-Time boot menu

To update the BIOS from the One-Time boot menu, see [Updating the BIOS from the One Time Boot Menu](#) at [Dell Support Site](#).

## System and setup password

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

**CAUTION:** Ensure that your computer is locked when it is not in use. Anyone can access the data that is stored on your computer, when left unattended.

**Table 19. System and setup password**

Password type	Description
System password	Password that you must enter to boot to your operating system.
Setup password	Password that you must enter to access and change the BIOS settings of your computer.

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

**NOTE:** The System and setup password feature is disabled by default.

## Assigning a System Setup password

### Prerequisites

You can assign a new System or Admin Password only when the status is set to **Not Set**. To enter BIOS System Setup, press F2 immediately after a power-on or reboot.

### Steps

1. To enter the **System Setup**, press **F2** immediately after a power-on or reboot.
2. In the **System BIOS** or **System Setup** screen, select **Security** and press Enter.  
The **Security** screen is displayed.
3. Select **System/Admin Password** and create a password in the **Enter the new password** field.  
Use the following guidelines to create the system password:


- Password can be up to 32 characters.
  - Password must contain at least one special character: "( ! " # \$ % & ' \* + , - . / : ; < = > ? @ [ \ ] ^ \_ ` { | } )" )"
  - The password can contain numbers from 0 to 9.
  - The password can contain alphabets A to Z and a to z.
4. Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.
  5. Press Y to save the changes.  
The computer restarts.

## Deleting or changing an existing system password or setup password

### Prerequisites

Ensure that the **Password Status** is Unlocked in the System Setup before attempting to delete or change the existing system password and/or setup password. You cannot delete or change an existing system password or setup password if the **Password Status** is Locked. To enter the System Setup, press F2 immediately after a power-on or reboot.


### Steps

1. To enter the **System Setup**, press **F2** immediately after a power-on or reboot.
2. In the **System BIOS** or **System Setup** screen, select **System Security** and press Enter.  
The **System Security** screen is displayed.
3. In the **System Security** screen, verify that the **Password Status** is Unlocked.
4. Select **System Password**. Update or delete the existing system password, and press Enter or Tab.
5. Select **Setup Password**. Update or delete the existing setup password, and press Enter or Tab.  
 **NOTE:** If you change the system password and/or setup password, reenter the new password when prompted. If you delete the system password and/or setup password, confirm the deletion when prompted.
6. Press Esc. A message prompts you to save the changes.
7. Press Y to save the changes and exit from **System Setup**.  
The computer restarts.

## Clearing system and setup passwords

### About this task

To clear the system or setup passwords, contact Dell technical support as described at [Contact Support](#).

- 
- NOTE:**
- For information about how to reset Windows or application passwords, see the documentation accompanying Windows or your application.

# Troubleshooting

## Topics:

- [Handling swollen rechargeable Li-ion batteries](#)
- [SupportAssist diagnostics](#)
- [Built-in self-test \(BIST\)](#)
- [System diagnostic lights](#)
- [Recovering the operating system](#)
- [Backup media and recovery options](#)
- [Network power cycle](#)
- [Drain flea power \(perform hard reset\)](#)

## Handling swollen rechargeable Li-ion batteries

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

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

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

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

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

Rechargeable Li-ion batteries can swell for various reasons such as age, number of charge cycles, or exposure to high heat. For more information about how to improve the performance and lifespan of the laptop battery and to minimize the possibility of occurrence of the issue, search Dell laptop battery at [Dell Support Site](#).

# 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

**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](#).

## Built-in self-test (BIST)

### Motherboard Built-In Self-Test (M-BIST)

M-BIST is the system board onboard self-test diagnostics tool that improves the diagnostics accuracy of system board Embedded Controller (EC) failures.

**NOTE:** M-BIST can be manually initiated before Power On Self-Test (POST).

### How to run M-BIST

**NOTE:** Before initiating M-BIST, ensure that the computer is in a power-off state.

1. Press and hold both the **M** key and the power button to initiate M-BIST.
2. The battery-status light may exhibit two states:
  - Off: No fault was detected.
  - Amber and White: Indicates a problem with the system board.
3. If there is a failure with the system board, the battery-status light flashes one of the following error codes for 30 seconds:

**Table 20. LED error codes**

Blinking Pattern		Possible Problem
Amber	White	
2	1	CPU Failure
2	8	LCD Power Rail Failure
1	1	TPM Detection Failure
2	4	Memory/RAM failure

4. If there is no failure with the system board, the LCD cycles through the solid color screens (that are described in the LCD-BIST) for 30 seconds and then turn off.

### Logic Built-in Self-test (L-BIST)

L-BIST is an enhancement to the single LED error code diagnostics and is automatically initiated during POST. L-BIST will check the LCD power rail. If there is no power being supplied to the LCD (that is if the L-BIST circuit fails), the battery status LED flashes either an error code [2,8] or an error code [2,7].

**NOTE:** If L-BIST fails, LCD-BIST cannot function as no power will be supplied to the LCD.

## How to invoke the L-BIST

1. Turn on your computer.
2. If the computer does not start up normally, look at the battery status LED:
  - If the battery status LED flashes an error code [2,7], the display cable may not be connected properly.
  - If the battery status LED flashes an error code [2,8], there is a failure on the LCD power rail of the system board, hence there is no power that is supplied to the LCD.
3. For cases, when a [2,7] error code is shown, check to see if the display cable is properly connected.
4. For cases when a [2,8] error code is shown, replace the system board.

## LCD Built-in Self-Test (LCD-BIST)

Dell laptops have a built-in diagnostic tool that helps you determine if the screen abnormality you are experiencing is an inherent problem with the LCD (screen) of the Dell laptop or with the video card (GPU) and computer settings.

When you notice screen abnormalities like flickering, distortion, clarity issues, fuzzy or blurry image, horizontal or vertical lines, color fade, it is always a good practice to isolate the LCD (screen) by running the LCD-BIST.

## How to invoke the LCD-BIST

1. Turn off your computer.
2. Disconnect any peripherals that are connected to the computer. Connect only the AC adapter (charger) to the computer.
3. Ensure that the LCD (screen) is clean (no dust particles on the surface of the screen).
4. Press and hold the **D** key and press the power button to enter LCD-BIST mode. Continue to hold the **D** key until the computer boots up.
5. The screen displays solid colors and changes colors on the entire screen to white, black, red, green, and blue twice.
6. Then it displays the colors white, black, and red.
7. Carefully inspect the screen for abnormalities (any lines, fuzzy color, or distortion on the screen).
8. At the end of the last solid color (red), the computer shuts down.

**NOTE:** Dell SupportAssist Preboot diagnostics upon launch initiates an LCD-BIST first, expecting a user intervention to confirm functionality of the LCD.

## 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 21. Power and battery-charge status light**

Power and battery-charge status light	Status of computer
<b>Solid white</b>	<ul style="list-style-type: none"> <li>• The power adapter is connected and the battery is fully charged.</li> <li>• The power adapter is connected and the battery has more than five percent charge.</li> </ul>

**Table 21. Power and battery-charge status light (continued)**

Power and battery-charge status light	Status of computer
<b>Amber</b>	The computer is running on battery and the battery has less than five percent charge.
<b>Off</b>	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 22. LED codes**

Diagnostic light codes	Problem description
<b>2,1</b>	Processor failure
<b>2,2</b>	System board: BIOS or ROM (Read-Only Memory) failure
<b>2,3</b>	No memory or RAM (Random-Access Memory) detected
<b>2,4</b>	Memory or RAM (Random-Access Memory) failure
<b>2,5</b>	Invalid memory installed
<b>2,6</b>	System-board or chipset error
<b>2,7</b>	Display failure
<b>2,8</b>	LCD power rail failure.
<b>3,1</b>	CMOS battery failure
<b>3,2</b>	PCI, video card/chip failure
<b>3,3</b>	Recovery image not found
<b>3,4</b>	Recovery image found but invalid
<b>3,5</b>	Power-rail failure
<b>3,6</b>	System BIOS Flash incomplete
<b>3,7</b>	Management Engine (ME) error


## Recovering the operating system

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

Dell SupportAssist OS Recovery is a stand-alone tool that is preinstalled on Dell computers running the Windows operating system. It consists of tools to diagnose and troubleshoot issues that may occur before your computer boots to the operating system. It enables you to diagnose hardware issues, repair your computer, back up your files, and 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 the 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 [Serviceability Tools at the Dell Support Site](#). Click **SupportAssist** and then click **SupportAssist OS Recovery**.

 **NOTE:** Windows 11 IoT Enterprise LTSC 2024 and Dell ThinOS 10 do not support Dell SupportAssist. For more information about recovering ThinOS 10, see [Recovery mode using R-Key](#).

## Backup media and recovery options

It is recommended to create a recovery drive to troubleshoot and fix problems that may occur with Windows. Dell provides multiple options for recovering the Windows operating system on your Dell computer. For more information, see [Dell Windows Backup Media and Recovery Options](#).

## Network power cycle

### About this task

If your computer is unable to access the Internet due to network connectivity issues, reset your network devices by performing the following steps:

### Steps

1. Turn off the 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 the computer.

 **NOTE:** Some Internet service providers (ISPs) provide a modem and router combo device.

## Drain flea power (perform hard reset)

### About this task

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


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

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


Perform the following steps to drain the flea power:

### Steps

1. Turn off the computer.
2. Disconnect the power adapter from the computer.
3. Remove the base cover.
4. Remove the battery.

 **CAUTION: The battery is a Field Replaceable Unit (FRU) and the removal and installation procedures are intended for authorized service technicians only.**

5. Press and hold the power button for 20 seconds to drain the flea power.
6. Install the battery.
7. Install the base cover.
8. Connect the power adapter to the computer.
9. Turn on the computer.

 **NOTE:** For more information about performing a hard reset, go to [Dell Support Site](#). On the menu bar at the top of the Support page, select Support > Support Library. In the Search field on the Support Library page, type the keyword, topic, or model number, and then click or tap the search icon to view the related articles.

# 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 23. Self-help resources**

Self-help resources	Resource location
Information about Dell products and services	<a href="#">Dell Site</a>
Contact Support	In Windows search, type <code>Contact Support</code> , and press Enter.
Online help for operating system	<a href="#">Windows Support Site</a> <a href="#">Linux Support Site</a>
Access top solutions, diagnostics, drivers and downloads, and learn more about your computer through videos, manuals, and documents.	Your Dell computer is uniquely identified using a Service Tag or Express Service Code. To view relevant support resources for your Dell computer, enter the Service Tag or Express Service Code at <a href="#">Dell Support Site</a> .  For more information about how to find the Service Tag for your computer, see <a href="#">Locate the Service Tag on your computer</a> .
Dell knowledge base articles	<ol style="list-style-type: none"> <li>1. Go to <a href="#">Dell Support Site</a>.</li> <li>2. On the menu bar at the top of the Support page, select <b>Support &gt; Support Library</b>.</li> <li>3. In the Search field on the Support Library page, type the keyword, topic, or model number, and then click or tap the search icon to view the related articles.</li> </ol>

## Contacting Dell

To contact Dell for sales, technical support, or customer service issues, see [Contact Support at Dell Support Site](#).

 **NOTE:** Availability of the services may vary depending on the country or region, and product.

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

## Revision history

Tracks all updates that are made to the document. It typically includes the date of change, version number, and a brief description of the modification. This log helps maintain transparency, accountability, and a clear timeline of progress.

**Table 24. Revision history**

Revision	Date	Description
A00	05-21-2020	Original publish date
A04	09-08-2025	<ul style="list-style-type: none"><li>• Added LED cable topic.</li><li>• Updated Palm-rest and keyboard assembly topic.</li></ul>
A05	09-12-2025	Updated LED cable topic.